LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

ADMINISTRATIVE RECORD

Volume 3 of 13

2009

Bate Stamp Numbers
00072702 - 00073693

Prepared for

Department of the Army
Longhorn Army Ammunition Plant

1976 – 2009

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS
ADMINISTRATIVE RECORD – CHRONOLOGICAL INDEX

VOLUME 3 of 13

2009

A. Title: Report (continued) – Final Engineering Evaluation and Cost Analysis, LHAAP-04 Former Pilot Wastewater Treatment Plant, Group 4, LHAAP, Karnack, TX
Author(s): Shaw Environmental, Inc., Houston, Texas
Recipient: All Stakeholders
Date: March 5, 2009
Bate Stamp: 00072702 - 00073211

B. Title: Media Release – Public Notice Open House on March 24, 2009 for Public Comment
Author(s): Shaw Environmental, Inc., Houston, Texas
Recipient: All Local Media
Date: March 8, 2009
Bate Stamp: 00073212 - 00073224

C. Title: Minutes – Monthly Managers Meeting
Author(s): Shaw Environmental, Inc., Houston, Texas
Recipient: All Stakeholders
Date: March 24, 2009
Bate Stamp: 00073225 - 00073235

D. Title: Minutes – Quarterly Restoration Advisory Board Meeting
Author(s): Shaw Environmental, Inc., Houston, Texas
Recipient: All Stakeholders
Date: March 24, 2009
Bate Stamp: 00073236 - 00073258

E. Title: Minutes – Monthly Managers Meeting
Author(s): Shaw Environmental, Inc., Houston, Texas
Recipient: All Stakeholders
Date: April 14, 2009
Bate Stamp: 00073259 - 00073267

F. Title: Report – Final Addendum to the Final Data Evaluation Report Chemical Concentrations in Soil Samples Associated with LHAAP-35/36 Sumps, LHAAP, Karnack, TX
Author(s): Shaw Environmental, Inc., Houston, Texas
Recipient: All Stakeholders
Date: April 22, 2009
Bate Stamp: 00073268 – 00073623

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS
ADMINISTRATIVE RECORD – CHRONOLOGICAL INDEX

VOLUME 3 of 13

2009

NOTE: Volume 3, YEAR 2009, Letter G is listed OUT OF DATE IN SEQUENCE and should have been inserted in the YEAR 1995 UPDATE to the ADMINISTRATIVE RECORD

G.	Title:	Report – Interim Remedial Action Burning Ground No. 3 and Unlined Evaporation Pond
	Author(s):	Dow Environmental, Inc.
	Recipient:	All Stakeholders
	Date:	March 15, 1995
	Bate Stamp:	00073624 – 00073693

00072702

156 Starlite Drive, Marietta, OH 45750 * TEL 740-373-4071 * FAX 740-373-4835 * http://www.kemron.com

Laboratory Report Number: L0609457

Please find enclosed the analytical results for the samples you submitted to KEMRON Environmental Services.

Review and compilation of your report was completed by KEMRON's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact our team member noted in the Reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Debra Elliott - Team Leader
delliott@kemron-lab.com

Cheryl Koelsch - Team Chemist/Data Specialist
ckoelsch@kemron-lab.com

Stephanie Mossburg - Team Chemist/Data Specialist
smossburg@kemron-lab.com

Kathy Albertson - Team Chemist/Data Specialist
kalbertson@kemron-lab.com

Amanda Fickiesen - Client Services Specialist
afickiesen@kemron-lab.com

Annie Bock - Client Services Specialist
abock@kemron-lab.com

This report was reviewed on 09-OCT-06.

Stephanie Mossburg

STEPHANIE MOSSBURG

I certify that all test results meet all of the requirments of the NELAP standards and other applicable contract terms and conditions. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on an 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of KEMRON Environmental Services.

This report was certified on 09-OCT-06.

David E. Vandenberg

DAVID VANDENBERG

FL DOH NELAP ID: E8755

This report contains a total of 244 pages.

Protecting Our Environmental Future

Laboratory Data Package Cover Page

00072703

This data Package consists of:

This signature page, the laboratory review checklists, and the following reportable data:

R1 Field chain-of-custody documentation;

R2 sample identification cross-reference;

R3 Test reports (analytical data sheets) for each enviornmental sample that includes:

a) Items consistant with NELAC 5.13 or ISO/IEC 17025 Section 5.10
b) dilution factors,
c) preparation methods,
d) Cleanup methods, and
e) If required for the project, tentatively identified compounds (TICs)

R4 Surrogate recovery data including:

a) Calculated recovery (%R) for each analyte, and
b) The laboratory's surrogate QC limits.

R5 Test reports/summary forms for blank samples;

R6 Test reports/summary forms FOR laboratory control samples (LCSs) including:

a) LCS spiking amount,
b) Calculated %R for each analyte, and
c) The laboratory"s LCS QC limits.

R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:

a) Samples associated with the MS/MSD clearly identified,
b) MS/MSD spiking amounts,
c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
d) Calculated %R and relative percent differences (RPDs), and
e) The laboratory's MS/MSD QC limits

R8 Laboratory analytical duplicate (if applicable) revocery and precision:

a) the amount of analyte measured in the duplicate,
b) the calculated RPD, and
c) the laboratory's QC limits for anlytical duplicates.

R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix;

R10 Other problems or anomalies.

The exception Report for every "No" or "Not Reviewed (NR)" item in laboratory review checklist.

Release statement: I am responsible for the release of this laboratory data package. This data package has been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exceptions reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratoy in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, If applicable: [] This laboratory is an in-house laboratory controlled by the person repsonding to rule. The official signing the cover page of the rule-required report (for example, the APAR) in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is trus.

MAREN M. BEERY	Maren Beery		September 26, 2006
Name (Printed)	Signature	Official Title (printed)	DATE

RG-366/TRRP-13 December 2002 A1

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0609457
Project Name:	798-LONGHORN
Method:	7471
Prep Batch Number(s):	WG223121
Reviewer Name:	MAREN M. BEERY
LRC Date:	September 26, 2006

Description	Yes	No	NA(1)	NR(2)	ER(3)
Chain-Of-Custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	✓				
Were all departures from standard conditions described in an exception report?	✓				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	✓				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	✓				
Test reports					
Were all samples prepared and analyzed within holding times?	✓				
Other than those results <MQL, were all other raw values bracketed by calibration standards?	✓				
Were calculations checked by a peer or supervisor?	✓				
Were all analyte identifications checked by a peer or supervisor?	✓				
Were sample quantitation limits reported for all analytes not detected?	✓				
Were all results for soil and sediment samples reported on a dry weight basis?	✓				
Were % moisture (or solids) reported for all soil and sediment samples?	✓				
If required for the project, TICs reported?			✓		
Surrogate recovery data					
Were surrogates added prior to extraction?			✓		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			✓		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	✓				
Were blanks analyzed at the appropriate frequency?	✓				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	✓				
Were blank concentrations <MQL?	✓				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	✓				
Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	✓				
Were LCSs analyzed at the required frequency?	✓				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	✓				
Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	✓				
Was the LCSD RPD within QC limits?			✓		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			✓		
Were MS/MSD analyzed at the appropriate frequency?			✓		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			✓		

Description	Yes	No	NA(1)	NR(2)	ER(3)
Were MS/MSD RPDs within laboratory QC limits?			✓		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			✓		
Were analytical duplicates analyzed at the appropriate frequency?			✓		
Were RPDs or relative standard deviations within the laboratory QC limits?			✓		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	✓				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	✓				
Are unadjusted MQLs included in the laboratory data package?	✓				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	✓				
Were all necessary corrective actions performed for the reported data?	✓				
Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	✓				
ICAL					
Were response factors and/or relative response factors for each analyte within QC limits?			✓		
Were percent RSDs or correlation coefficient criteria met?	✓				
Was the number of standards recommended in the method used for all analytes?	✓				
Were all points generated between the lowest and highest standard used to calculate the curve?	✓				
Are ICAL data available for all instruments used?	✓				
Has the initial calibration curve been verified using an appropriate second source standard?	✓				
Initial and continuing calibration verification (ICV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	✓				
Were percent differences for each analyte within the method-required QC limits?	✓				
Was the ICAL curve verified for each analyte?	✓				
Was the absolute value of the analyte concentration in the inorganic CCB <RL?	✓				
Mass spectral tuning:					
Was the appropriate compound for the method used for tuning?			✓		
Were ion abundance data within the method-required QC limits?			✓		
Internal standards (IS):					
Were IS area counts and retention times within the method-required QC limits?			✓		
Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section 4.12.2)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	✓				
Were data associated with manual integrations flagged on the raw data?			✓		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			✓		
Tentatively identified compounds (TICs):					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			✓		
Interference Check Sample (ICS) results:					
Were percent recoveries within method QC limits?			✓		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	✓				
Method detection limit (MDL) studies					
Was a MDL study performed for each reported analyte?	✓				
Is the MDL either adjusted or supported by the analysis of DCSs?	✓				
Proficiency test reports:					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	✓				

00072705

Description	Yes	No	NA(1)	NR(2)	ER(3)
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	✓				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	✓				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	✓				
Is documentation of the analyst's competency up-to-date and on file?	✓				
Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	✓				
Laboratory standard operating procedures (SOPs):					
Are laboratory SOPs current and on file for each method performed?	✓				

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0609457
Project Name:	798-LONGHORN
Method:	7471
Prep Batch Number(s):	WG223121
Reviewer Name:	MAREN M. BEERY
LRC Date:	September 26, 2006

EXCEPTIONS REPORT
ER# - Description
Footnotes:
(1) NA = Not applicable to method or project
(2) NR = Not reviewed
(3) ER# = Exception report number

Laboratory Data Package Cover Page

00072708

This data Package consists of:

This signature page, the laboratory review checklists, and the following reportable data:

R1 Field chain-of-custody documentation;

R2 sample identification cross-reference;

R3 Test reports (analytical data sheets) for each enviornmental sample that includes:

a) Items consistant with NELAC 5.13 or ISO/IEC 17025 Section 5.10

b) dilution factors,

c) preparation methods,

d) Cleanup methods, and

e) If required for the project, tentatively identified compounds (TICs)

R4 Surrogate recovery data including:

a) Calculated recovery (%R) for each analyte, and

b) The laboratory's surrogate QC limits.

R5 Test reports/summary forms for blank samples;

R6 Test reports/summary forms FOR laboratory control samples (LCSs) including:

a) LCS spiking amount,

b) Calculated %R for each analyte, and

c) The laboratory"s LCS QC limits.

R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:

a) Samples associated with the MS/MSD clearly identified,

b) MS/MSD spiking amounts,

c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,

d) Calculated %R and relative percent differences (RPDs), and

e) The laboratory's MS/MSD QC limits

R8 Laboratory analytical duplicate (if applicable) revocery and precision:

a) the amount of analyte measured in the duplicate,

b) the calculated RPD, and

c) the laboratory's QC limits for anlytical duplicates.

R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix;

R10 Other problems or anomalies.

The exception Report for every "No" or "Not Reviewed (NR)" item in laboratory review checklist.

Release statement: I am responsible for the release of this laboratory data package. This data package has been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exceptions reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratoy in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, If applicable: [] This laboratory is an in-house laboratory controlled by the person repsonding to rule. The official signing the cover page of the rule-required report (for example, the APAR) in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is trus.

LESLIE S. BUCINA	Leslie Bucina	Metals Supervisor	September 28, 2006
Name (Printed)	Signature	Official Title (printed)	DATE

RG-366/TRRP-13 December 2002 A1

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0609457
Project Name:	798-LONGHORN
Method:	6010
Prep Batch Number(s):	WG223242
Reviewer Name:	LESLIE S. BUCINA
LRC Date:	September 28, 2006

Description	Yes	No	NA(1)	NR(2)	ER(3)
Chain-Of-Custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	✓				
Were all departures from standard conditions described in an exception report?	✓				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	✓				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	✓				
Test reports					
Were all samples prepared and analyzed within holding times?	✓				
Other than those results <MQL, were all other raw values bracketed by calibration standards?			✓		
Were calculations checked by a peer or supervisor?	✓				
Were all analyte identifications checked by a peer or supervisor?	✓				
Were sample quantitation limits reported for all analytes not detected?	✓				
Were all results for soil and sediment samples reported on a dry weight basis?	✓				
Were % moisture (or solids) reported for all soil and sediment samples?	✓				
If required for the project, TICs reported?			✓		
Surrogate recovery data					
Were surrogates added prior to extraction?			✓		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			✓		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	✓				
Were blanks analyzed at the appropriate frequency?	✓				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	✓				
Were blank concentrations <MQL?	✓				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	✓				
Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	✓				
Were LCSs analyzed at the required frequency?	✓				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	✓				
Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	✓				
Was the LCSD RPD within QC limits?			✓		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			✓		
Were MS/MSD analyzed at the appropriate frequency?			✓		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			✓		

Description	Yes	No	NA(1)	NR(2)	ER(3)
Were MS/MSD RPDs within laboratory QC limits?			✓		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			✓		
Were analytical duplicates analyzed at the appropriate frequency?			✓		
Were RPDs or relative standard deviations within the laboratory QC limits?			✓		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	✓				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	✓				
Are unadjusted MQLs included in the laboratory data package?	✓				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	✓				
Were all necessary corrective actions performed for the reported data?	✓				
Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	✓				
ICAL					
Were response factors and/or relative response factors for each analyte within QC limits?			✓		
Were percent RSDs or correlation coefficient criteria met?	✓				
Was the number of standards recommended in the method used for all analytes?	✓				
Were all points generated between the lowest and highest standard used to calculate the curve?	✓				
Are ICAL data available for all instruments used?	✓				
Has the initial calibration curve been verified using an appropriate second source standard?	✓				
Initial and continuing calibration verification (ICV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	✓				
Were percent differences for each analyte within the method-required QC limits?	✓				
Was the ICAL curve verified for each analyte?	✓				
Was the absolute value of the analyte concentration in the inorganic CCB <RL?	✓				
Mass spectral tuning:					
Was the appropriate compound for the method used for tuning?			✓		
Were ion abundance data within the method-required QC limits?			✓		
Internal standards (IS):					
Were IS area counts and retention times within the method-required QC limits?			✓		
Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section 4.12.2)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	✓				
Were data associated with manual integrations flagged on the raw data?			✓		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			✓		
Tentatively identified compounds (TICs):					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			✓		
Interference Check Sample (ICS) results:					
Were percent recoveries within method QC limits?	✓				
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	✓				
Method detection limit (MDL) studies					
Was a MDL study performed for each reported analyte?	✓				
Is the MDL either adjusted or supported by the analysis of DCSs?	✓				
Proficiency test reports:					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	✓				

Description	Yes	No	NA(1)	NR(2)	ER(3)
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	✓				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	✓				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	✓				
Is documentation of the analyst's competency up-to-date and on file?	✓				
Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	✓				
Laboratory standard operating procedures (SOPs):					
Are laboratory SOPs current and on file for each method performed?	✓				

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0609457
Project Name:	798-LONGHORN
Method:	6010
Prep Batch Number(s):	WG223242
Reviewer Name:	LESLIE S. BUCINA
LRC Date:	September 28, 2006

EXCEPTIONS REPORT
ER# - Description
Footnotes:
(1) NA = Not applicable to method or project
(2) NR = Not reviewed
(3) ER# = Exception report number

Laboratory Data Package Cover Page

00072713

This data Package consists of:

This signature page, the laboratory review checklists, and the following reportable data:

R1 Field chain-of-custody documentation;

R2 sample identification cross-reference;

R3 Test reports (analytical data sheets) for each enviornmental sample that includes:

a) Items consistant with NELAC 5.13 or ISO/IEC 17025 Section 5.10
b) dilution factors,
c) preparation methods,
d) Cleanup methods, and
e) If required for the project, tentatively identified compounds (TICs)

R4 Surrogate recovery data including:

a) Calculated recovery (%R) for each analyte, and
b) The laboratory's surrogate QC limits.

R5 Test reports/summary forms for blank samples;

R6 Test reports/summary forms FOR laboratory control samples (LCSs) including:

a) LCS spiking amount,
b) Calculated %R for each analyte, and
c) The laboratory"s LCS QC limits.

R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:

a) Samples associated with the MS/MSD clearly identified,
b) MS/MSD spiking amounts,
c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
d) Calculated %R and relative percent differences (RPDs), and
e) The laboratory's MS/MSD QC limits

R8 Laboratory analytical duplicate (if applicable) revocery and precision:

a) the amount of analyte measured in the duplicate,
b) the calculated RPD, and
c) the laboratory's QC limits for anlytical duplicates.

R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix;

R10 Other problems or anomalies.

The exception Report for every "No" or "Not Reviewed (NR)" item in laboratory review checklist.

Release statement: I am responsible for the release of this laboratory data package. This data package has been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exceptions reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratoy in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, If applicable: [] This laboratory is an in-house laboratory controlled by the person repsonding to rule. The official signing the cover page of the rule-required report (for example, the APAR) in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is trus.

MAREN M. BEERY	Maren Beery		September 28, 2006
Name (Printed)	Signature	Official Title (printed)	DATE

RG-366/TRRP-13 December 2002 A1

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0609457
Project Name:	798-LONGHORN
Method:	6020
Prep Batch Number(s):	WG222955
Reviewer Name:	MAREN M. BEERY
LRC Date:	September 28, 2006

Description	Yes	No	NA(1)	NR(2)	ER(3)
Chain-Of-Custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	✓				
Were all departures from standard conditions described in an exception report?	✓				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	✓				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	✓				
Test reports					
Were all samples prepared and analyzed within holding times?	✓				
Other than those results <MQL, were all other raw values bracketed by calibration standards?	✓				
Were calculations checked by a peer or supervisor?	✓				
Were all analyte identifications checked by a peer or supervisor?	✓				
Were sample quantitation limits reported for all analytes not detected?	✓				
Were all results for soil and sediment samples reported on a dry weight basis?	✓				
Were % moisture (or solids) reported for all soil and sediment samples?	✓				
If required for the project, TICs reported?			✓		
Surrogate recovery data					
Were surrogates added prior to extraction?			✓		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			✓		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	✓				
Were blanks analyzed at the appropriate frequency?	✓				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	✓				
Were blank concentrations <MQL?	✓				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	✓				
Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	✓				
Were LCSs analyzed at the required frequency?	✓				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	✓				
Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	✓				
Was the LCSD RPD within QC limits?			✓		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			✓		
Were MS/MSD analyzed at the appropriate frequency?			✓		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			✓		

Description	Yes	No	NA(1)	NR(2)	ER(3)
Were MS/MSD RPDs within laboratory QC limits?			✓		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			✓		
Were analytical duplicates analyzed at the appropriate frequency?			✓		
Were RPDs or relative standard deviations within the laboratory QC limits?			✓		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	✓				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	✓				
Are unadjusted MQLs included in the laboratory data package?	✓				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	✓				
Were all necessary corrective actions performed for the reported data?	✓				
Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	✓				
ICAL					
Were response factors and/or relative response factors for each analyte within QC limits?			✓		
Were percent RSDs or correlation coefficient criteria met?	✓				
Was the number of standards recommended in the method used for all analytes?	✓				
Were all points generated between the lowest and highest standard used to calculate the curve?	✓				
Are ICAL data available for all instruments used?	✓				
Has the initial calibration curve been verified using an appropriate second source standard?	✓				
Initial and continuing calibration verification (ICV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	✓				
Were percent differences for each analyte within the method-required QC limits?	✓				
Was the ICAL curve verified for each analyte?	✓				
Was the absolute value of the analyte concentration in the inorganic CCB <RL?	✓				
Mass spectral tuning:					
Was the appropriate compound for the method used for tuning?			✓		
Were ion abundance data within the method-required QC limits?			✓		
Internal standards (IS):					
Were IS area counts and retention times within the method-required QC limits?			✓		
Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section 4.12.2)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	✓				
Were data associated with manual integrations flagged on the raw data?			✓		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			✓		
Tentatively identified compounds (TICs):					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			✓		
Interference Check Sample (ICS) results:					
Were percent recoveries within method QC limits?	✓				
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	✓				
Method detection limit (MDL) studies					
Was a MDL study performed for each reported analyte?	✓				
Is the MDL either adjusted or supported by the analysis of DCSs?	✓				
Proficiency test reports:					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	✓				

00072715

Description	Yes	No	NA(1)	NR(2)	ER(3)
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	✓				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	✓				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	✓				
Is documentation of the analyst's competency up-to-date and on file?	✓				
Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	✓				
Laboratory standard operating procedures (SOPs):					
Are laboratory SOPs current and on file for each method performed?	✓				

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0609457
Project Name:	798-LONGHORN
Method:	6020
Prep Batch Number(s):	WG222955
Reviewer Name:	MAREN M. BEERY
LRC Date:	September 28, 2006

EXCEPTIONS REPORT
ER# - Description
Footnotes:
(1) NA = Not applicable to method or project
(2) NR = Not reviewed
(3) ER# = Exception report number

Laboratory Data Package Cover Page

00072718

This data Package consists of:

This signature page, the laboratory review checklists, and the following reportable data:

✓R1 Field chain-of-custody documentation;

✓R2 sample identification cross-reference;

R3 Test reports (analytical data sheets) for each enviornmental sample that includes:

a) Items consistant with NELAC 5.13 or ISO/IEC 17025 Section 5.10
b) dilution factors,
c) preparation methods,
d) Cleanup methods, and
e) If required for the project, tentatively identified compounds (TICs)

✓R4 Surrogate recovery data including:

a) Calculated recovery (%R) for each analyte, and
b) The laboratory's surrogate QC limits.

✓R5 Test reports/summary forms for blank samples;

✓R6 Test reports/summary forms for laboratory control samples (LCSs) including:

a) LCS spiking amount,
b) Calculated %R for each analyte, and
c) The laboratory"s LCS QC limits.

✓R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:

a) Samples associated with the MS/MSD clearly identified,
b) MS/MSD spiking amounts,
c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
d) Calculated %R and relative percent differences (RPDs), and
e) The laboratory's MS/MSD QC limits

✓R8 Laboratory analytical duplicate (if applicable) revocery and precision:

a) the amount of analyte measured in the duplicate,
b) the calculated RPD, and
c) the laboratory's QC limits for anlytical duplicates.

✓R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix;

✓R10 Other problems or anomalies.

✓The exception Report for every "No" or "Not Reviewed (NR)" item IN laboratory review checklist.

Release statement: I am responsible for the release of this laboratory data package. This data package has been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exceptions reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratoy in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: [✓] This laboratory is an in-house laboratory controlled by the person repsonding to rule. The official signing the cover page of the rule-required report (for example, the APAR) in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

MIKE D. ALBERTSON		Volatiles Lab Supervisor	September 29, 2006
Name (Printed)	Signature	Official Title (printed)	DATE

RG-366/TRRP-13 December 2002 A1

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0609457
Project Name:	798-LONGHORN
Method:	8260B
Prep Batch Number(s):	223178, 223214
Reviewer Name:	MIKE D. ALBERTSON
LRC Date:	September 29, 2006

Description	Yes	No	NA(1)	NR(2)	ER(3)
Chain-Of-Custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	✓				
Were all departures from standard conditions described in an exception report?	✓				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	✓				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	✓				
Test reports					
Were all samples prepared and analyzed within holding times?	✓				
Other than those results <MQL, were all other raw values bracketed by calibration standards?	✓				
Were calculations checked by a peer or supervisor?	✓				
Were all analyte identifications checked by a peer or supervisor?	✓				
Were sample quantitation limits reported for all analytes not detected?	✓				
Were all results for soil and sediment samples reported on a dry weight basis?	✓				
Were % moisture (or solids) reported for all soil and sediment samples?	✓				
If required for the project, TICs reported?			✓		
Surrogate recovery data					
Were surrogates added prior to extraction?	✓				
Were surrogate percent recoveries in all samples within the laboratory QC limits?	✓				
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	✓				
Were blanks analyzed at the appropriate frequency?	✓				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	✓				
Were blank concentrations <MQL?	✓				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	✓				
Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	✓				
Were LCSs analyzed at the required frequency?	✓				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	✓				
Does the detectability data document the laboratorys capability to detect the COCs at the MDL used to calculate the SQLs?	✓				
Was the LCSD RPD within QC limits?	✓				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			✓		
Were MS/MSD analyzed at the appropriate frequency?			✓		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			✓		

Description	Yes	No	NA(1)	NR(2)	ER(3)
Were MS/MSD RPDs within laboratory QC limits?			✓		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			✓		
Were analytical duplicates analyzed at the appropriate frequency?			✓		
Were RPDs or relative standard deviations within the laboratory QC limits?			✓		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	✓				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	✓				
Are unadjusted MQLs included in the laboratory data package?	✓				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	✓				
Were all necessary corrective actions performed for the reported data?	✓				
Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	✓				
ICAL					
Were response factors and/or relative response factors for each analyte within QC limits?	✓				
Were percent RSDs or correlation coefficient criteria met?	✓				
Was the number of standards recommended in the method used for all analytes?	✓				
Were all points generated between the lowest and highest standard used to calculate the curve?	✓				
Are ICAL data available for all instruments used?	✓				
Has the initial calibration curve been verified using an appropriate second source standard?	✓				
Initial and continuing calibration verification (ICV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	✓				
Were percent differences for each analyte within the method-required QC limits?	✓				
Was the ICAL curve verified for each analyte?	✓				
Was the absolute value of the analyte concentration in the inorganic CCB <MDL?			✓		
Mass spectral tuning:					
Was the appropriate compound for the method used for tuning?	✓				
Were ion abundance data within the method-required QC limits?	✓				
Internal standards (IS):					
Were IS area counts and retention times within the method-required QC limits?	✓				
Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section 4.12.2)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	✓				
Were data associated with manual integrations flagged on the raw data?	✓				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			✓		
Tentatively identified compounds (TICs):					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			✓		
Interference Check Sample (ICS) results:					
Were percent recoveries within method QC limits?			✓		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			✓		
Method detection limit (MDL) studies					
Was a MDL study performed for each reported analyte?	✓				
Is the MDL either adjusted or supported by the analysis of DCSs?	✓				
Proficiency test reports:					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	✓				

00072720

Description	Yes	No	NA(1)	NR(2)	ER(3)
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	✓				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	✓				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	✓				
Is documentation of the analyst's competency up-to-date and on file?	✓				
Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	✓				
Laboratory standard operating procedures (SOPs):					
Are laboratory SOPs current and on file for each method performed?	✓				

EXCEPTIONS REPORT
ER# - Description
There were no exceptions.

Footnotes:
(1) NA = Not applicable to method or project
(2) NR = Not reviewed
(3) ER# = Exception report number

Laboratory Data Package Cover Page

00072722

This data Package consists of:

This signature page, the laboratory review checklists, and the following reportable data:

R1 Field chain-of-custody documentation;

R2 sample identification cross-reference;

R3 Test reports (analytical data sheets) for each enviornmental sample that includes:

a) Items consistant with NELAC 5.13 or ISO/IEC 17025 Section 5.10
b) dilution factors,
c) preparation methods,
d) Cleanup methods, and
e) If required for the project, tentatively identified compounds (TICs)

R4 Surrogate recovery data including:

a) Calculated recovery (%R) for each analyte, and
b) The laboratory's surrogate QC limits.

R5 Test reports/summary forms for blank samples;

R6 Test reports/summary forms FOR laboratory control samples (LCSs) including:

a) LCS spiking amount,
b) Calculated %R for each analyte, and
c) The laboratory"s LCS QC limits.

R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:

a) Samples associated with the MS/MSD clearly identified,
b) MS/MSD spiking amounts,
c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
d) Calculated %R and relative percent differences (RPDs), and
e) The laboratory's MS/MSD QC limits

R8 Laboratory analytical duplicate (if applicable) revocery and precision:

a) the amount of analyte measured in the duplicate,
b) the calculated RPD, and
c) the laboratory's QC limits for anlytical duplicates.

R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix;

R10 Other problems or anomalies.

The exception Report for every "No" or "Not Reviewed (NR)" item in laboratory review checklist.

Release statement: I am responsible for the release of this laboratory data package. This data package has been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exceptions reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratoy in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, If applicable: [] This laboratory is an in-house laboratory controlled by the person repsonding to rule. The official signing the cover page of the rule-required report (for example, the APAR) in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is trus.

DEANNA I. HESSON	Deanna Hesson	Conventional Lab Supervisor	October 3, 2006
Name (Printed)	Signature	Official Title (printed)	DATE

RG-366/TRRP-13 December 2002 A1

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0609457
Project Name:	798-LONGHORN
Method:	PCTSOLIDS
Prep Batch Number(s):	WG223387, WG223419, WG223552
Reviewer Name:	DEANNA I. HESSON
LRC Date:	October 03, 2006

Description	Yes	No	NA(1)	NR(2)	ER(3)
Chain-Of-Custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	✓				
Were all departures from standard conditions described in an exception report?	✓				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	✓				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	✓				
Test reports					
Were all samples prepared and analyzed within holding times?	✓				
Other than those results <MQL, were all other raw values bracketed by calibration standards?			✓		
Were calculations checked by a peer or supervisor?	✓				
Were all analyte identifications checked by a peer or supervisor?			✓		
Were sample quantitation limits reported for all analytes not detected?			✓		
Were all results for soil and sediment samples reported on a dry weight basis?	✓				
Were % moisture (or solids) reported for all soil and sediment samples?	✓				
If required for the project, TICs reported?			✓		
Surrogate recovery data					
Were surrogates added prior to extraction?			✓		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			✓		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?			✓		
Were blanks analyzed at the appropriate frequency?			✓		
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?			✓		
Were blank concentrations <MQL?			✓		
Laboratory control samples (LCS):					
Were all COCs included in the LCS?			✓		
Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?			✓		
Were LCSs analyzed at the required frequency?			✓		
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?			✓		
Does the detectability data document the laboratorys capability to detect the COCs at the MDL used to calculate the SQLs?			✓		
Was the LCSD RPD within QC limits?			✓		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			✓		
Were MS/MSD analyzed at the appropriate frequency?			✓		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			✓		

Description	Yes	No	NA(1)	NR(2)	ER(3)
Were MS/MSD RPDs within laboratory QC limits?			✓		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?	✓				
Were analytical duplicates analyzed at the appropriate frequency?	✓				
Were RPDs or relative standard deviations within the laboratory QC limits?	✓				
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?			✓		
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?			✓		
Are unadjusted MQLs included in the laboratory data package?			✓		
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	✓				
Were all necessary corrective actions performed for the reported data?	✓				
Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?			✓		
Were response factors and/or relative response factors for each analyte within QC limits?			✓		
Were percent RSDs or correlation coefficient criteria met?			✓		
Was the number of standards recommended in the method used for all analytes?			✓		
Were all points generated between the lowest and highest standard used to calculate the curve?			✓		
Are ICAL data available for all instruments used?			✓		
Has the initial calibration curve been verified using an appropriate second source standard?			✓		
Initial and continuing calibration verification (ICV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?			✓		
Were percent differences for each analyte within the method-required QC limits?			✓		
Was the ICAL curve verified for each analyte?			✓		
Was the absolute value of the analyte concentration in the inorganic CCB <MDL?			✓		
Mass spectral tuning:					
Was the appropriate compound for the method used for tuning?			✓		
Were ion abundance data within the method-required QC limits?			✓		
Internal standards (IS):					
Were IS area counts and retention times within the method-required QC limits?			✓		
Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section 4.12.2)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	✓				
Were data associated with manual integrations flagged on the raw data?			✓		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			✓		
Tentatively identified compounds (TICs):					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			✓		
Interference Check Sample (ICS) results:					
Were percent recoveries within method QC limits?			✓		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			✓		
Method detection limit (MDL) studies					
Was a MDL study performed for each reported analyte?			✓		
Is the MDL either adjusted or supported by the analysis of DCSs?			✓		
Proficiency test reports:					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?			✓		

00072724

Description	Yes	No	NA(1)	NR(2)	ER(3)
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?			✓		
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?			✓		
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	✓				
Is documentation of the analyst's competency up-to-date and on file?	✓				
Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	✓				
Laboratory standard operating procedures (SOPs):					
Are laboratory SOPs current and on file for each method performed?	✓				

00072725

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0609457
Project Name:	798-LONGHORN
Method:	PCTSOLIDS
Prep Batch Number(s):	WG223387, WG223419, WG223552
Reviewer Name:	DEANNA I. HESSON
LRC Date:	October 03, 2006

EXCEPTIONS REPORT
ER# - Description
Footnotes:
(1) NA = Not applicable to method or project
(2) NR = Not reviewed
(3) ER# = Exception report number

Laboratory Data Package Cover Page

00072727

This data Package consists of:

This signature page, the laboratory review checklists, and the following reportable data:

R1 Field chain-of-custody documentation;

R2 sample identification cross-reference;

R3 Test reports (analytical data sheets) for each enviornmental sample that includes:

a) Items consistant with NELAC 5.13 or ISO/IEC 17025 Section 5.10
b) dilution factors,
c) preparation methods,
d) Cleanup methods, and
e) If required for the project, tentatively identified compounds (TICs)

R4 Surrogate recovery data including:

a) Calculated recovery (%R) for each analyte, and
b) The laboratory's surrogate QC limits.

R5 Test reports/summary forms for blank samples;

R6 Test reports/summary forms FOR laboratory control samples (LCSs) including:

a) LCS spiking amount,
b) Calculated %R for each analyte, and
c) The laboratory"s LCS QC limits.

R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:

a) Samples associated with the MS/MSD clearly identified,
b) MS/MSD spiking amounts,
c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
d) Calculated %R and relative percent differences (RPDs), and
e) The laboratory's MS/MSD QC limits

R8 Laboratory analytical duplicate (if applicable) revocery and precision:

a) the amount of analyte measured in the duplicate,
b) the calculated RPD, and
c) the laboratory's QC limits for anlytical duplicates.

R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix;

R10 Other problems or anomalies.

The exception Report for every "No" or "Not Reviewed (NR)" item in laboratory review checklist.

Release statement: I am responsible for the release of this laboratory data package. This data package has been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exceptions reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratoy in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, If applicable: [] This laboratory is an in-house laboratory controlled by the person repsonding to rule. The official signing the cover page of the rule-required report (for example, the APAR) in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is trus.

MICHAEL D. COCHRAN	Michael Cochran	Semivolatiles Lab Supervisor	October 4, 2006
Name (Printed)	Signature	Official Title (printed)	DATE

RG-366/TRRP-13 December 2002 A1

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0609457
Project Name:	798-LONGHORN
Method:	T1005
Prep Batch Number(s):	WG223381
Reviewer Name:	MICHAEL D. COCHRAN
LRC Date:	October 04, 2006

Description	Yes	No	NA(1)	NR(2)	ER(3)
Chain-Of-Custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	✓				
Were all departures from standard conditions described in an exception report?	✓				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	✓				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	✓				
Test reports					
Were all samples prepared and analyzed within holding times?	✓				
Other than those results <MQL, were all other raw values bracketed by calibration standards?	✓				
Were calculations checked by a peer or supervisor?	✓				
Were all analyte identifications checked by a peer or supervisor?	✓				
Were sample quantitation limits reported for all analytes not detected?	✓				
Were all results for soil and sediment samples reported on a dry weight basis?	✓				
Were % moisture (or solids) reported for all soil and sediment samples?	✓				
If required for the project, TICs reported?			✓		
Surrogate recovery data					
Were surrogates added prior to extraction?	✓				
Were surrogate percent recoveries in all samples within the laboratory QC limits?	✓				
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	✓				
Were blanks analyzed at the appropriate frequency?	✓				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	✓				
Were blank concentrations <MQL?	✓				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	✓				
Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	✓				
Were LCSs analyzed at the required frequency?	✓				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	✓				
Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	✓				
Was the LCSD RPD within QC limits?	✓				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			✓		
Were MS/MSD analyzed at the appropriate frequency?			✓		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			✓		

Description	Yes	No	NA(1)	NR(2)	ER(3)
Were MS/MSD RPDs within laboratory QC limits?			✓		

00072729

Checklist ID: **10774**

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0609457
Project Name:	798-LONGHORN
Method:	T1005
Prep Batch Number(s):	WG223381
Reviewer Name:	MICHAEL D. COCHRAN
LRC Date:	October 04, 2006

Description	Yes	No	NA(1)	NR(2)	ER(3)
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			✓		
Were analytical duplicates analyzed at the appropriate frequency?			✓		
Were RPDs or relative standard deviations within the laboratory QC limits?			✓		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	✓				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	✓				
Are unadjusted MQLs included in the laboratory data package?	✓				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	✓				
Were all necessary corrective actions performed for the reported data?			✓		
Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	✓				
ICAL					
Were response factors and/or relative response factors for each analyte within QC limits?	✓				
Were percent RSDs or correlation coefficient criteria met?	✓				
Was the number of standards recommended in the method used for all analytes?	✓				
Were all points generated between the lowest and highest standard used to calculate the curve?	✓				
Are ICAL data available for all instruments used?	✓				
Has the initial calibration curve been verified using an appropriate second source standard?	✓				
Initial and continuing calibration verification (ICV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	✓				
Were percent differences for each analyte within the method-required QC limits?	✓				
Was the ICAL curve verified for each analyte?	✓				
Was the absolute value of the analyte concentration in the inorganic CCB <MDL?			✓		
Mass spectral tuning:					
Was the appropriate compound for the method used for tuning?			✓		
Were ion abundance data within the method-required QC limits?			✓		
Internal standards (IS):					
Were IS area counts and retention times within the method-required QC limits?			✓		
Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section 4.12.2)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	✓				
Were data associated with manual integrations flagged on the raw data?			✓		

Checklist ID: **10774**

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0609457
Project Name:	798-LONGHORN
Method:	T1005
Prep Batch Number(s):	WG223381
Reviewer Name:	MICHAEL D. COCHRAN
LRC Date:	October 04, 2006

Description	Yes	No	NA(1)	NR(2)	ER(3)
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			✓		
Tentatively identified compounds (TICs):					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			✓		
Interference Check Sample (ICS) results:					
Were percent recoveries within method QC limits?			✓		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			✓		
Method detection limit (MDL) studies					
Was a MDL study performed for each reported analyte?	✓				
Is the MDL either adjusted or supported by the analysis of DCSs?	✓				
Proficiency test reports:					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	✓				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	✓				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	✓				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	✓				
Is documentation of the analyst's competency up-to-date and on file?	✓				
Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	✓				
Laboratory standard operating procedures (SOPs):					
Are laboratory SOPs current and on file for each method performed?	✓				

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0609457
Project Name:	798-LONGHORN
Method:	T1005
Prep Batch Number(s):	WG223381
Reviewer Name:	MICHAEL D. COCHRAN
LRC Date:	October 04, 2006

EXCEPTIONS REPORT
ER# - Description
Footnotes:
(1) NA = Not applicable to method or project
(2) NR = Not reviewed
(3) ER# = Exception report number

Laboratory Data Package Cover Page

00072733

This data Package consists of:

This signature page, the laboratory review checklists, and the following reportable data:

R1 Field chain-of-custody documentation;

R2 sample identification cross-reference;

R3 Test reports (analytical data sheets) for each enviornmental sample that includes:

a) Items consistant with NELAC 5.13 or ISO/IEC 17025 Section 5.10
b) dilution factors,
c) preparation methods,
d) Cleanup methods, and
e) If required for the project, tentatively identified compounds (TICs)

R4 Surrogate recovery data including:

a) Calculated recovery (%R) for each analyte, and
b) The laboratory's surrogate QC limits.

✓R5 Test reports/summary forms for blank samples;

✓R6 Test reports/summary forms for laboratory control samples (LCSs) including:

a) LCS spiking amount,
b) Calculated %R for each analyte, and
c) The laboratory"s LCS QC limits.

✓R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:

a) Samples associated with the MS/MSD clearly identified,
b) MS/MSD spiking amounts,
c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
d) Calculated %R and relative percent differences (RPDs), and
e) The laboratory's MS/MSD QC limits

✓R8 Laboratory analytical duplicate (if applicable) revocery and precision:

a) the amount of analyte measured in the duplicate,
b) the calculated RPD, and
c) the laboratory's QC limits for anlytical duplicates.

R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix;

R10 Other problems or anomalies.

The exception Report for every "No" or "Not Reviewed (NR)" item in laboratory review checklist.

Release statement: I am responsible for the release of this laboratory data package. This data package has been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exceptions reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratoy in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, If applicable: [] This laboratory is an in-house laboratory controlled by the person repsonding to rule. The official signing the cover page of the rule-required report (for example, the APAR) in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is trus.

DEANNA I. HESSON	Deanna Hesson	Conventional Lab Supervisor	October 6, 2006
Name (Printed)	Signature	Official Title (printed)	DATE

RG-366/TRRP-13 December 2002 A1

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0609457
Project Name:	798-LONGHORN
Method:	314
Prep Batch Number(s):	WG223307, WG224306
Reviewer Name:	DEANNA I. HESSON
LRC Date:	October 06, 2006

Description	Yes	No	NA(1)	NR(2)	ER(3)
Chain-Of-Custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	✓				
Were all departures from standard conditions described in an exception report?	✓				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	✓				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	✓				
Test reports					
Were all samples prepared and analyzed within holding times?	✓				
Other than those results <MQL, were all other raw values bracketed by calibration standards?	✓				
Were calculations checked by a peer or supervisor?	✓				
Were all analyte identifications checked by a peer or supervisor?	✓				
Were sample quantitation limits reported for all analytes not detected?	✓				
Were all results for soil and sediment samples reported on a dry weight basis?	✓				
Were % moisture (or solids) reported for all soil and sediment samples?	✓				
If required for the project, TICs reported?	✓				
Surrogate recovery data					
Were surrogates added prior to extraction?			✓		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			✓		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	✓				
Were blanks analyzed at the appropriate frequency?	✓				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	✓				
Were blank concentrations <MQL?	✓				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	✓				
Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	✓				
Were LCSs analyzed at the required frequency?	✓				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	✓				
Does the detectability data document the laboratorys capability to detect the COCs at the MDL used to calculate the SQLs?	✓				
Was the LCSD RPD within QC limits?	✓				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	✓				
Were MS/MSD analyzed at the appropriate frequency?	✓				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	✓				

Description	Yes	No	NA(1)	NR(2)	ER(3)
Were MS/MSD RPDs within laboratory QC limits?	✓				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?	✓				
Were analytical duplicates analyzed at the appropriate frequency?	✓				
Were RPDs or relative standard deviations within the laboratory QC limits?	✓				
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	✓				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	✓				
Are unadjusted MQLs included in the laboratory data package?	✓				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	✓				
Were all necessary corrective actions performed for the reported data?	✓				
Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	✓				
Were response factors and/or relative response factors for each analyte within QC limits?	✓				
Were percent RSDs or correlation coefficient criteria met?	✓				
Was the number of standards recommended in the method used for all analytes?	✓				
Were all points generated between the lowest and highest standard used to calculate the curve?	✓				
Are ICAL data available for all instruments used?	✓				
Has the initial calibration curve been verified using an appropriate second source standard?	✓				
Initial and continuing calibration verification (ICV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	✓				
Were percent differences for each analyte within the method-required QC limits?	✓				
Was the ICAL curve verified for each analyte?	✓				
Was the absolute value of the analyte concentration in the inorganic CCB <MDL?	✓				
Mass spectral tuning:					
Was the appropriate compound for the method used for tuning?			✓		
Were ion abundance data within the method-required QC limits?			✓		
Internal standards (IS):					
Were IS area counts and retention times within the method-required QC limits?			✓		
Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section 4.12.2)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	✓				
Were data associated with manual integrations flagged on the raw data?	✓				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			✓		
Tentatively identified compounds (TICs):					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			✓		
Interference Check Sample (ICS) results:			✓		
Were percent recoveries within method QC limits?			✓		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			✓		
Method detection limit (MDL) studies					
Was a MDL study performed for each reported analyte?	✓				
Is the MDL either adjusted or supported by the analysis of DCSs?	✓				
Proficiency test reports:					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	✓				

00072735

Description	Yes	No	NA(1)	NR(2)	ER(3)
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	✓				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	✓				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	✓				
Is documentation of the analyst's competency up-to-date and on file?	✓				
Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	✓				
Laboratory standard operating procedures (SOPs):					
Are laboratory SOPs current and on file for each method performed?	✓				

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0609457
Project Name:	798-LONGHORN
Method:	314
Prep Batch Number(s):	WG223307, WG224306
Reviewer Name:	DEANNA I. HESSON
LRC Date:	October 06, 2006

EXCEPTIONS REPORT
ER# - Description
The samples were diluted to remove turbidity interference. The reporting limits are elevated accordingly.
Footnotes:
(1) NA = Not applicable to method or project
(2) NR = Not reviewed
(3) ER# = Exception report number

LABORATORY REPORT

L0609457

00072738

10/06/06 11:56

Submitted By

KEMRON Environmental Services
156 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: Shaw E & I, Inc.
ABB Lummus Biulding
3010 Briarpark
Houston, TX 77042
Attention: Diane Meyer

Account Number: 2773
Work ID: LHAAP

P.O. Number: 200328

Sample Summary

Client ID	Lab ID	Date Collected	Date Received
35-SMP92-SB01-02	L0609457-01	19-SEP-06	20-SEP-06
35-SMP117-SB01-01	L0609457-02	19-SEP-06	20-SEP-06
35-SMP117-SB01-02	L0609457-03	19-SEP-06	20-SEP-06
35-SMP117-SB02-02	L0609457-04	19-SEP-06	20-SEP-06
35-SMP47-SB01-01	L0609457-05	15-SEP-06	20-SEP-06
35-SMP47-SB01-02	L0609457-06	15-SEP-06	20-SEP-06
35-SMP47-SB02-01	L0609457-07	15-SEP-06	20-SEP-06
35-SMP47-SB02-02	L0609457-08	15-SEP-06	20-SEP-06
SITE4-SB07-01	L0609457-09	15-SEP-06	20-SEP-06
SITE4-SB08-01	L0609457-10	15-SEP-06	20-SEP-06
SITE4-SB08-02	L0609457-11	15-SEP-06	20-SEP-06
SITE4-SB08-03	L0609457-12	15-SEP-06	20-SEP-06
SITE4-SB13-01	L0609457-13	15-SEP-06	20-SEP-06

Sample Number: L0609457-01
Client ID: 35-SMP92-SB01-02
Matrix: Soil
Workgroup Number: WG223242
Collect Date: 09/19/2006 09:21
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3050B
Analytical Method: 6010B
Analyst: SLP
Dilution: 1
Units: mg/kg

Instrument: IRIS-ICP
Prep Date: 09/22/2006 06:20
Cal Date: 09/27/2006 10:00
Run Date: 09/27/2006 13:16
File ID: IR.092706.131600
Percent Solid: 84.9

Analyte	CAS. Number	Result	Qual	PQL	SQL
Aluminum, Total	7429-90-5	8320		17.3	8.66
Silver, Total	7440-22-4		U	1.73	0.216
Barium, Total	7440-39-3	116		0.433	0.0866
Beryllium, Total	7440-41-7	0.527		0.433	0.0104
Calcium, Total	7440-70-2	479		8.66	4.33
Cadmium, Total	7440-43-9	0.101	J	0.433	0.0433
Cobalt, Total	7440-48-4	7.87		0.866	0.104
Chromium, Total	7440-47-3	7.03		0.866	0.104
Copper, Total	7440-50-8	3.05		0.866	0.433
Iron, Total	7439-89-6	7500		1.73	0.866
Potassium, Total	7440-09-7	281		43.3	21.6
Magnesium, Total	7439-95-4	1050		21.6	10.4
Manganese, Total	7439-96-5	28.9		0.433	0.0866
Sodium, Total	7440-23-5	230		21.6	4.33
Nickel, Total	7440-02-0	8.37		1.73	0.433
Vanadium, Total	7440-62-2	8.65		0.433	0.216
Zinc, Total	7440-66-6	18.9		0.866	0.433

J The analyte was positively identified, but the quantitation was below the RL
U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-01
Client ID: 35-SMP92-SB01-02
Matrix: Soil
Workgroup Number: WG223001
Collect Date: 09/19/2006 09:21
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3051
Analytical Method: 6020
Analyst: JYH
Dilution: 1
Units: mg/kg

Instrument: ELAN-ICP
Prep Date: 09/21/2006 07:30
Cal Date: 09/21/2006 09:22
Run Date: 09/21/2006 15:02
File ID: EL.092106.150233
Percent Solid: 84.9

Analyte	CAS. Number	Result	Qual	PQL	SQL
Arsenic, Total	7440-38-2	0.202	J	0.353	0.0883
Lead, Total	7439-92-1	3.33		0.235	0.118
Antimony, Total	7440-36-0	0.0839	J	0.118	0.0589
Selenium, Total	7782-49-2		U	0.235	0.118
Thallium, Total	7440-28-0	0.0492		0.0235	0.0118

J The analyte was positively identified, but the quantitation was below the RL
U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-01
Client ID: 35-SMP92-SB01-02
Matrix: Soil
Workgroup Number: WG223291
Collect Date: 09/19/2006 09:21
Sample Tag: 01

PrePrep Method: NONE
Prep Method: METHOD
Analytical Method: 7471A
Analyst: MMB
Dilution: 1
Units: mg/kg

Instrument: HYDRA
Prep Date: 09/22/2006 14:10
Cal Date: 09/25/2006 18:52
Run Date: 09/25/2006 19:39
File ID: HY.092506.193934
Percent Solid: 84.9

Analyte	CAS. Number	Result	Qual	PQL	SQL
Mercury, Total	7439-97-6		U	0.283	0.0113

U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-01
Client ID: 35-SMP92-SB01-02
Matrix: Soil
Workgroup Number: WG223178
Collect Date: 09/19/2006 09:21
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 5030B
Analytical Method: 8260B
Analyst: MES
Dilution: 1
Units: ug/kg

Instrument: HPMS9
Prep Date: 09/24/2006 21:44
Cal Date: 09/13/2006 15:11
Run Date: 09/24/2006 21:44
File ID: 9M48886
Percent Solid: 84.9

Analyte	CAS. Number	Result	Qual	PQL	SQL
Acetone	67-64-1	6.34	J	9.56	4.78
Benzene	71-43-2		U	4.78	0.478
Bromobenzene	108-86-1		U	4.78	0.478
Bromochloromethane	74-97-5		U	4.78	0.478
Bromodichloromethane	75-27-4		U	4.78	0.478
Bromoform	75-25-2		U	4.78	0.478
Bromomethane	74-83-9		U	9.56	0.956
2-Butanone	78-93-3		U	9.56	2.39
n-Butylbenzene	104-51-8		U	4.78	0.478
sec-Butylbenzene	135-98-8		U	4.78	0.478
tert-Butylbenzene	98-06-6		U	4.78	0.478
Carbon disulfide	75-15-0		U	4.78	0.478
Carbon tetrachloride	56-23-5		U	4.78	0.478
Chlorobenzene	108-90-7		U	4.78	0.478
Chlorodibromomethane	124-48-1		U	4.78	0.478
Chloroethane	75-00-3		U	9.56	0.956
2-Chloroethyl vinyl ether	110-75-8		U	9.56	1.91
Chloroform	67-66-3		U	4.78	0.478
Chloromethane	74-87-3		U	9.56	1.91
2-Chlorotoluene	95-49-8		U	4.78	0.478
4-Chlorotoluene	106-43-4		U	4.78	0.478
1,2-Dibromo-3-chloropropane	96-12-8		U	4.78	1.91
1,2-Dibromoethane	106-93-4		U	4.78	0.478
Dibromomethane	74-95-3		U	4.78	0.478
1,2-Dichlorobenzene	95-50-1		U	4.78	0.478
1,3-Dichlorobenzene	541-73-1		U	4.78	0.478
1,4-Dichlorobenzene	106-46-7		U	4.78	0.478
Dichlorodifluoromethane	75-71-8		U	9.56	0.956
1,1-Dichloroethane	75-34-3		U	4.78	0.956
1,2-Dichloroethane	107-06-2		U	4.78	0.478
1,1-Dichloroethene	75-35-4		U	4.78	0.478
cis-1,2-Dichloroethene	156-59-2		U	4.78	0.478
trans-1,2-Dichloroethene	156-60-5		U	4.78	0.478
1,2-Dichloropropane	78-87-5		U	4.78	0.478

Report Number: **L0609457**
Report Date : **October 6, 2006**

00072741

Sample Number: **L0609457-01**
Client ID: **35-SMP92-SB01-02**
Matrix: **Soil**
Workgroup Number: **WG223178**
Collect Date: **09/19/2006 09:21**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **MES**
Dilution: **1**
Units: **ug/kg**

Instrument: **HPMS9**
Prep Date: **09/24/2006 21:44**
Cal Date: **09/13/2006 15:11**
Run Date: **09/24/2006 21:44**
File ID: **9M48886**
Percent Solid: **84.9**

Analyte	CAS. Number	Result	Qual	PQL	SQL
1,3-Dichloropropane	142-28-9		U	4.78	0.478
2,2-Dichloropropane	594-20-7		U	4.78	0.478
cis-1,3-Dichloropropene	10061-01-5		U	4.78	0.478
trans-1,3-Dichloropropene	10061-02-6		U	4.78	0.478
1,1-Dichloropropene	563-58-6		U	4.78	0.478
Ethylbenzene	100-41-4		U	4.78	0.478
2-Hexanone	591-78-6		U	9.56	2.39
Hexachlorobutadiene	87-68-3		U	4.78	0.478
Isopropylbenzene	98-82-8		U	4.78	0.478
p-Isopropyltoluene	99-87-6		U	4.78	0.478
4-Methyl-2-pentanone	108-10-1		U	9.56	2.39
Methylene chloride	75-09-2		U	4.78	0.956
Naphthalene	91-20-3		U	9.56	0.478
n-Propylbenzene	103-65-1		U	4.78	0.478
Styrene	100-42-5		U	4.78	0.478
1,1,1,2-Tetrachloroethane	630-20-6		U	4.78	0.478
1,1,2,2-Tetrachloroethane	79-34-5		U	4.78	0.478
Tetrachloroethene	127-18-4		U	4.78	0.478
Toluene	108-88-3		U	4.78	0.478
1,2,3-Trichlorobenzene	87-61-6		U	4.78	0.478
1,2,4-Trichlorobenzene	120-82-1		U	4.78	0.478
1,1,1-Trichloroethane	71-55-6		U	4.78	0.478
1,1,2-Trichloroethane	79-00-5		U	4.78	0.478
Trichloroethene	79-01-6		U	4.78	0.478
Trichlorofluoromethane	75-69-4		U	9.56	0.956
1,2,3-Trichloropropane	96-18-4		U	4.78	0.956
1,2,4-Trimethylbenzene	95-63-6		U	4.78	0.478
1,3,5-Trimethylbenzene	108-67-8		U	4.78	0.478
Vinyl acetate	108-05-4		U	9.56	0.956
Vinyl chloride	75-01-4		U	9.56	0.956
o-Xylene	95-47-6		U	4.78	0.478
m-,p-Xylene	136777-61-2		U	4.78	0.478

Surrogate	% Recovery	Lower	Upper	Qual
Dibromofluoromethane	91.3	80	120	
1,2-Dichloroethane-d4	101	80	120	
Toluene-d8	92.7	81	117	
4-Bromofluorobenzene	88.7	74	121	

J The analyte was positively identified, but the quantitation was below the RL
U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-01
Client ID: 35-SMP92-SB01-02
Matrix: Soil
Workgroup Number: WG223387
Collect Date: 09/19/2006 09:21

PrePrep Method: NONE
Prep Method: D2216-90
Analytical Method: D2216-90
Analyst: TMB
Dilution: 1
Units: weight %

Instrument: OVEN
Prep Date: 09/26/2006 13:05
Cal Date:
Run Date: 09/26/2006 13:05
File ID: OV.0609261305-07

Analyte	CAS. Number	Result	Qual	PQL	SQL
Percent Solids	10-02-6	84.9		1.00	1.00

Sample Number: L0609457-02
Client ID: 35-SMP117-SB01-01
Matrix: Soil
Workgroup Number: WG223242
Collect Date: 09/19/2006 11:26
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3050B
Analytical Method: 6010B
Analyst: SLP
Dilution: 1
Units: mg/kg

Instrument: IRIS-ICP
Prep Date: 09/22/2006 06:20
Cal Date: 09/27/2006 10:00
Run Date: 09/27/2006 13:34
File ID: IR.092706.133400
Percent Solid: 81.1

Analyte	CAS. Number	Result	Qual	PQL	SQL
Aluminum, Total	7429-90-5	12200		17.7	8.87
Silver, Total	7440-22-4		U	1.77	0.222
Barium, Total	7440-39-3	79.3		0.443	0.0887
Beryllium, Total	7440-41-7	0.510		0.443	0.0106
Calcium, Total	7440-70-2	1570		8.87	4.43
Cadmium, Total	7440-43-9	0.185	J	0.443	0.0443
Cobalt, Total	7440-48-4	5.67		0.887	0.106
Chromium, Total	7440-47-3	15.3		0.887	0.106
Copper, Total	7440-50-8	14.8		0.887	0.443
Iron, Total	7439-89-6	19200		1.77	0.887
Potassium, Total	7440-09-7	550		44.3	22.2
Magnesium, Total	7439-95-4	1150		22.2	10.6
Manganese, Total	7439-96-5	160		0.443	0.0887
Sodium, Total	7440-23-5	30.1		22.2	4.43
Nickel, Total	7440-02-0	9.44		1.77	0.443
Vanadium, Total	7440-62-2	29.6		0.443	0.222
Zinc, Total	7440-66-6	62.7		0.887	0.443

J The analyte was positively identified, but the quantitation was below the RL
U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-02
Client ID: 35-SMP117-SB01-01
Matrix: Soil
Workgroup Number: WG223001
Collect Date: 09/19/2006 11:26
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3051
Analytical Method: 6020
Analyst: JYH
Dilution: 1
Units: mg/kg

Instrument: ELAN-ICP
Prep Date: 09/21/2006 07:30
Cal Date: 09/21/2006 09:22
Run Date: 09/21/2006 16:12
File ID: EL.092106.161215
Percent Solid: 81.1

Analyte	CAS. Number	Result	Qual	PQL	SQL
Arsenic, Total	7440-38-2	4.79		0.363	0.0908
Lead, Total	7439-92-1	13.1		0.242	0.121
Antimony, Total	7440-36-0	0.266		0.121	0.0606
Selenium, Total	7782-49-2	0.295		0.242	0.121
Thallium, Total	7440-28-0	0.0658		0.0242	0.0121

Sample Number: L0609457-02
Client ID: 35-SMP117-SB01-01
Matrix: Soil
Workgroup Number: WG223291
Collect Date: 09/19/2006 11:26
Sample Tag: 01

PrePrep Method: NONE
Prep Method: METHOD
Analytical Method: 7471A
Analyst: MMB
Dilution: 1
Units: mg/kg

Instrument: HYDRA
Prep Date: 09/22/2006 14:10
Cal Date: 09/25/2006 18:52
Run Date: 09/25/2006 19:46
File ID: HY.092506.194638
Percent Solid: 81.1

Analyte	CAS. Number	Result	Qual	PQL	SQL
Mercury, Total	7439-97-6	0.152	J	0.291	0.0116

J The analyte was positively identified, but the quantitation was below the RL

Sample Number: L0609457-02
Client ID: 35-SMP117-SB01-01
Matrix: Soil
Workgroup Number: WG223552
Collect Date: 09/19/2006 11:26

PrePrep Method: NONE
Prep Method: D2216-90
Analytical Method: D2216-90
Analyst: TMM
Dilution: 1
Units: weight %

Instrument: OVEN
Prep Date: 09/27/2006 16:30
Cal Date:
Run Date: 09/27/2006 16:30
File ID: OV.0609271630-07

Analyte	CAS. Number	Result	Qual	PQL	SQL
Percent Solids	10-02-6	81.1		1.00	1.00

Sample Number: L0609457-02
Client ID: 35-SMP117-SB01-01
Matrix: Soil
Workgroup Number: WG223382
Collect Date: 09/19/2006 11:26
Sample Tag: 01

PrePrep Method: NONE
Prep Method: METHOD
Analytical Method: T1005
Analyst: HAV
Dilution: 1
Units: mg/kg

Instrument: HP14
Prep Date: 09/26/2006 09:00
Cal Date: 09/11/2006 20:33
Run Date: 09/26/2006 15:21
File ID: 14G9321
Percent Solid: 81.1

Analyte	CAS. Number	Result	Qual	PQL	SQL
Carbon Range C6-C12			U	61.6	30.8
Carbon Range C12-C28			U	61.6	30.8
Carbon Range C28-C35			U	61.6	30.8

Surrogate	% Recovery	Lower	Upper	Qual
Chlorobenzene	106	31	130	
o-Terphenyl	106	70	130	

U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-03
Client ID: 35-SMP117-SB01-02
Matrix: Soil
Workgroup Number: WG223242
Collect Date: 09/19/2006 11:48
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3050B
Analytical Method: 6010B
Analyst: SLP
Dilution: 1
Units: mg/kg

Instrument: IRIS-ICP
Prep Date: 09/22/2006 06:20
Cal Date: 09/27/2006 10:00
Run Date: 09/27/2006 13:40
File ID: IR.092706.134000
Percent Solid: 79.1

Analyte	CAS. Number	Result	Qual	PQL	SQL
Aluminum, Total	7429-90-5	15700		19.1	9.57
Silver, Total	7440-22-4		U	1.91	0.239
Barium, Total	7440-39-3	315		0.479	0.0957
Beryllium, Total	7440-41-7	0.784		0.479	0.0115
Calcium, Total	7440-70-2	3390		9.57	4.79

Sample Number: L0609457-03
Client ID: 35-SMP117-SB01-02
Matrix: Soil
Workgroup Number: WG223242
Collect Date: 09/19/2006 11:48
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3050B
Analytical Method: 6010B
Analyst: SLP
Dilution: 1
Units: mg/kg

Instrument: IRIS-ICP
Prep Date: 09/22/2006 06:20
Cal Date: 09/27/2006 10:00
Run Date: 09/27/2006 13:40
File ID: IR.092706.134000
Percent Solid: 79.1

Analyte	CAS. Number	Result	Qual	PQL	SQL
Cadmium, Total	7440-43-9	0.657		0.479	0.0479
Cobalt, Total	7440-48-4	22.1		0.957	0.115
Chromium, Total	7440-47-3	23.0		0.957	0.115
Copper, Total	7440-50-8	27.5		0.957	0.479
Iron, Total	7439-89-6	23900		1.91	0.957
Potassium, Total	7440-09-7	1120		47.9	23.9
Magnesium, Total	7439-95-4	6810		23.9	11.5
Sodium, Total	7440-23-5	1370		23.9	4.79
Nickel, Total	7440-02-0	62.6		1.91	0.479
Vanadium, Total	7440-62-2	28.4		0.479	0.239
Zinc, Total	7440-66-6	107		0.957	0.479

U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-03
Client ID: 35-SMP117-SB01-02
Matrix: Soil
Workgroup Number: WG223242
Collect Date: 09/19/2006 11:48
Sample Tag: DL01

PrePrep Method: NONE
Prep Method: 3050B
Analytical Method: 6010B
Analyst: SLP
Dilution: 10
Units: mg/kg

Instrument: IRIS-ICP
Prep Date: 09/22/2006 06:20
Cal Date: 09/27/2006 10:00
Run Date: 09/27/2006 14:57
File ID: IR.092706.145700
Percent Solid: 79.1

Analyte	CAS. Number	Result	Qual	PQL	SQL
Manganese, Total	7439-96-5	2640		4.79	0.957

Sample Number: L0609457-03
Client ID: 35-SMP117-SB01-02
Matrix: Soil
Workgroup Number: WG223001
Collect Date: 09/19/2006 11:48
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3051
Analytical Method: 6020
Analyst: JYH
Dilution: 1
Units: mg/kg

Instrument: ELAN-ICP
Prep Date: 09/21/2006 07:30
Cal Date: 09/21/2006 09:22
Run Date: 09/21/2006 16:18
File ID: EL.092106.161819
Percent Solid: 79.1

Analyte	CAS. Number	Result	Qual	PQL	SQL
Arsenic, Total	7440-38-2	0.450		0.377	0.0942
Lead, Total	7439-92-1	16.5		0.251	0.126
Antimony, Total	7440-36-0		U	0.126	0.0628
Selenium, Total	7782-49-2	0.273		0.251	0.126
Thallium, Total	7440-28-0	0.167		0.0251	0.0126

U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-03
Client ID: 35-SMP117-SB01-02
Matrix: Soil
Workgroup Number: WG223291
Collect Date: 09/19/2006 11:48
Sample Tag: 01

PrePrep Method: NONE
Prep Method: METHOD
Analytical Method: 7471A
Analyst: MMB
Dilution: 1
Units: mg/kg

Instrument: HYDRA
Prep Date: 09/22/2006 14:10
Cal Date: 09/25/2006 18:52
Run Date: 09/25/2006 19:53
File ID: HY.092506.195332
Percent Solid: 79.1

Analyte	CAS. Number	Result	Qual	PQL	SQL
Mercury, Total	7439-97-6	0.0242	J	0.297	0.0119

J The analyte was positively identified, but the quantitation was below the RL

Sample Number: L0609457-03
Client ID: 35-SMP117-SB01-02
Matrix: Soil
Workgroup Number: WG223178
Collect Date: 09/19/2006 11:48
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 5030B
Analytical Method: 8260B
Analyst: MES
Dilution: 1
Units: ug/kg

Instrument: HPMS9
Prep Date: 09/24/2006 22:16
Cal Date: 09/13/2006 15:11
Run Date: 09/24/2006 22:16
File ID: 9M48887
Percent Solid: 79.1

Analyte	CAS. Number	Result	Qual	PQL	SQL
Acetone	67-64-1	6.48	J	11.0	5.49
Benzene	71-43-2		U	5.49	0.549
Bromobenzene	108-86-1		U	5.49	0.549
Bromochloromethane	74-97-5		U	5.49	0.549
Bromodichloromethane	75-27-4		U	5.49	0.549
Bromoform	75-25-2		U	5.49	0.549
Bromomethane	74-83-9		U	11.0	1.10
2-Butanone	78-93-3		U	11.0	2.75
n-Butylbenzene	104-51-8		U	5.49	0.549
sec-Butylbenzene	135-98-8		U	5.49	0.549
tert-Butylbenzene	98-06-6		U	5.49	0.549
Carbon disulfide	75-15-0		U	5.49	0.549
Carbon tetrachloride	56-23-5		U	5.49	0.549
Chlorobenzene	108-90-7		U	5.49	0.549
Chlorodibromomethane	124-48-1		U	5.49	0.549
Chloroethane	75-00-3		U	11.0	1.10
2-Chloroethyl vinyl ether	110-75-8		U	11.0	2.20
Chloroform	67-66-3		U	5.49	0.549
Chloromethane	74-87-3		U	11.0	2.20
2-Chlorotoluene	95-49-8		U	5.49	0.549
4-Chlorotoluene	106-43-4		U	5.49	0.549
1,2-Dibromo-3-chloropropane	96-12-8		U	5.49	2.20
1,2-Dibromoethane	106-93-4		U	5.49	0.549
Dibromomethane	74-95-3		U	5.49	0.549
1,2-Dichlorobenzene	95-50-1		U	5.49	0.549
1,3-Dichlorobenzene	541-73-1		U	5.49	0.549
1,4-Dichlorobenzene	106-46-7		U	5.49	0.549
Dichlorodifluoromethane	75-71-8		U	11.0	1.10
1,1-Dichloroethane	75-34-3	4.53	J	5.49	1.10
1,2-Dichloroethane	107-06-2		U	5.49	0.549
1,1-Dichloroethene	75-35-4		U	5.49	0.549
cis-1,2-Dichloroethene	156-59-2		U	5.49	0.549
trans-1,2-Dichloroethene	156-60-5		U	5.49	0.549
1,2-Dichloropropane	78-87-5		U	5.49	0.549

Report Number: **L0609457**
Report Date : **October 6, 2006**

00072746

Sample Number: **L0609457-03**
Client ID: **35-SMP117-SB01-02**
Matrix: **Soil**
Workgroup Number: **WG223178**
Collect Date: **09/19/2006 11:48**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **MES**
Dilution: **1**
Units: **ug/kg**

Instrument: **HPMS9**
Prep Date: **09/24/2006 22:16**
Cal Date: **09/13/2006 15:11**
Run Date: **09/24/2006 22:16**
File ID: **9M48887**
Percent Solid: **79.1**

Analyte	CAS. Number	Result	Qual	PQL	SQL
1,3-Dichloropropane	142-28-9		U	5.49	0.549
2,2-Dichloropropane	594-20-7		U	5.49	0.549
cis-1,3-Dichloropropene	10061-01-5		U	5.49	0.549
trans-1,3-Dichloropropene	10061-02-6		U	5.49	0.549
1,1-Dichloropropene	563-58-6		U	5.49	0.549
Ethylbenzene	100-41-4		U	5.49	0.549
2-Hexanone	591-78-6		U	11.0	2.75
Hexachlorobutadiene	87-68-3		U	5.49	0.549
Isopropylbenzene	98-82-8		U	5.49	0.549
p-Isopropyltoluene	99-87-6		U	5.49	0.549
4-Methyl-2-pentanone	108-10-1		U	11.0	2.75
Methylene chloride	75-09-2		U	5.49	1.10
Naphthalene	91-20-3		U	11.0	0.549
n-Propylbenzene	103-65-1		U	5.49	0.549
Styrene	100-42-5		U	5.49	0.549
1,1,1,2-Tetrachloroethane	630-20-6		U	5.49	0.549
1,1,2,2-Tetrachloroethane	79-34-5		U	5.49	0.549
Tetrachloroethene	127-18-4		U	5.49	0.549
Toluene	108-88-3		U	5.49	0.549
1,2,3-Trichlorobenzene	87-61-6		U	5.49	0.549
1,2,4-Trichlorobenzene	120-82-1		U	5.49	0.549
1,1,1-Trichloroethane	71-55-6		U	5.49	0.549
1,1,2-Trichloroethane	79-00-5		U	5.49	0.549
Trichloroethene	79-01-6		U	5.49	0.549
Trichlorofluoromethane	75-69-4		U	11.0	1.10
1,2,3-Trichloropropane	96-18-4		U	5.49	1.10
1,2,4-Trimethylbenzene	95-63-6		U	5.49	0.549
1,3,5-Trimethylbenzene	108-67-8		U	5.49	0.549
Vinyl acetate	108-05-4		U	11.0	1.10
Vinyl chloride	75-01-4		U	11.0	1.10
o-Xylene	95-47-6		U	5.49	0.549
m-,p-Xylene	136777-61-2		U	5.49	0.549

Surrogate	% Recovery	Lower	Upper	Qual
Dibromofluoromethane	92.8	80	120	
1,2-Dichloroethane-d4	106	80	120	
Toluene-d8	91.9	81	117	
4-Bromofluorobenzene	89.2	74	121	

J The analyte was positively identified, but the quantitation was below the RL
U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-03
Client ID: 35-SMP117-SB01-02
Matrix: Soil
Workgroup Number: WG223552
Collect Date: 09/19/2006 11:48

PrePrep Method: NONE
Prep Method: D2216-90
Analytical Method: D2216-90
Analyst: TMM
Dilution: 1
Units: weight %

Instrument: OVEN
Prep Date: 09/27/2006 16:30
Cal Date:
Run Date: 09/27/2006 16:30
File ID: OV.0609271630-08

Analyte	CAS. Number	Result	Qual	PQL	SQL
Percent Solids	10-02-6	79.1		1.00	1.00

Sample Number: L0609457-03
Client ID: 35-SMP117-SB01-02
Matrix: Soil
Workgroup Number: WG223382
Collect Date: 09/19/2006 11:48
Sample Tag: 01

PrePrep Method: NONE
Prep Method: METHOD
Analytical Method: T1005
Analyst: HAV
Dilution: 1
Units: mg/kg

Instrument: HP14
Prep Date: 09/26/2006 09:00
Cal Date: 09/11/2006 20:33
Run Date: 09/26/2006 16:00
File ID: 14G9322
Percent Solid: 79.1

Analyte	CAS. Number	Result	Qual	PQL	SQL
Carbon Range C6-C12			U	62.4	31.2
Carbon Range C12-C28			U	62.4	31.2
Carbon Range C28-C35			U	62.4	31.2

Surrogate	% Recovery	Lower	Upper	Qual
Chlorobenzene	111	31	130	
o-Terphenyl	108	70	130	

U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-04
Client ID: 35-SMP117-SB02-02
Matrix: Soil
Workgroup Number: WG223242
Collect Date: 09/19/2006 12:15
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3050B
Analytical Method: 6010B
Analyst: SLP
Dilution: 1
Units: mg/kg

Instrument: IRIS-ICP
Prep Date: 09/22/2006 06:20
Cal Date: 09/27/2006 10:00
Run Date: 09/27/2006 13:46
File ID: IR.092706.134600
Percent Solid: 78.3

Analyte	CAS. Number	Result	Qual	PQL	SQL
Aluminum, Total	7429-90-5	15900		18.2	9.12
Silver, Total	7440-22-4		U	1.82	0.228
Barium, Total	7440-39-3	149		0.456	0.0912
Beryllium, Total	7440-41-7	0.654		0.456	0.0109
Calcium, Total	7440-70-2	3770		9.12	4.56
Cadmium, Total	7440-43-9	0.342	J	0.456	0.0456
Cobalt, Total	7440-48-4	13.1		0.912	0.109
Chromium, Total	7440-47-3	22.4		0.912	0.109
Copper, Total	7440-50-8	26.1		0.912	0.456
Iron, Total	7439-89-6	21600		1.82	0.912
Potassium, Total	7440-09-7	1150		45.6	22.8
Magnesium, Total	7439-95-4	6780		22.8	10.9
Manganese, Total	7439-96-5	714		0.456	0.0912
Sodium, Total	7440-23-5	1420		22.8	4.56
Nickel, Total	7440-02-0	33.9		1.82	0.456
Vanadium, Total	7440-62-2	24.9		0.456	0.228
Zinc, Total	7440-66-6	102		0.912	0.456

J The analyte was positively identified, but the quantitation was below the RL

Sample Number: L0609457-04
Client ID: 35-SMP117-SB02-02
Matrix: Soil
Workgroup Number: WG223242
Collect Date: 09/19/2006 12:15
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3050B
Analytical Method: 6010B
Analyst: SLP
Dilution: 1
Units: mg/kg

Instrument: IRIS-ICP
Prep Date: 09/22/2006 06:20
Cal Date: 09/27/2006 10:00
Run Date: 09/27/2006 13:46
File ID: IR.092706.134600
Percent Solid: 78.3

Analyte	CAS. Number	Result	Qual	PQL	SQL

U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-04
Client ID: 35-SMP117-SB02-02
Matrix: Soil
Workgroup Number: WG223001
Collect Date: 09/19/2006 12:15
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3051
Analytical Method: 6020
Analyst: JYH
Dilution: 1
Units: mg/kg

Instrument: ELAN-ICP
Prep Date: 09/21/2006 07:30
Cal Date: 09/21/2006 09:22
Run Date: 09/21/2006 16:24
File ID: EL.092106.162423
Percent Solid: 78.3

Analyte	CAS. Number	Result	Qual	PQL	SQL
Arsenic, Total	7440-38-2	0.523		0.377	0.0943
Lead, Total	7439-92-1	10.2		0.251	0.126
Antimony, Total	7440-36-0		U	0.126	0.0628
Selenium, Total	7782-49-2		U	0.251	0.126
Thallium, Total	7440-28-0	0.0942		0.0251	0.0126

U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-04
Client ID: 35-SMP117-SB02-02
Matrix: Soil
Workgroup Number: WG223291
Collect Date: 09/19/2006 12:15
Sample Tag: 01

PrePrep Method: NONE
Prep Method: METHOD
Analytical Method: 7471A
Analyst: MMB
Dilution: 1
Units: mg/kg

Instrument: HYDRA
Prep Date: 09/22/2006 14:10
Cal Date: 09/25/2006 18:52
Run Date: 09/25/2006 19:55
File ID: HY.092506.195510
Percent Solid: 78.3

Analyte	CAS. Number	Result	Qual	PQL	SQL
Mercury, Total	7439-97-6	0.0383	J	0.299	0.0120

J The analyte was positively identified, but the quantitation was below the RL

Sample Number: L0609457-04
Client ID: 35-SMP117-SB02-02
Matrix: Soil
Workgroup Number: WG223214
Collect Date: 09/19/2006 12:15
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 5030B
Analytical Method: 8260B
Analyst: MES
Dilution: 1
Units: ug/kg

Instrument: HPMS9
Prep Date: 09/25/2006 10:52
Cal Date: 09/13/2006 15:11
Run Date: 09/25/2006 10:52
File ID: 9M48901
Percent Solid: 78.3

Analyte	CAS. Number	Result	Qual	PQL	SQL
Acetone	67-64-1		U	11.0	5.49
Benzene	71-43-2		U	5.49	0.549
Bromobenzene	108-86-1		U	5.49	0.549
Bromochloromethane	74-97-5		U	5.49	0.549
Bromodichloromethane	75-27-4		U	5.49	0.549

Report Number: **L0609457**
Report Date : **October 6, 2006**

00072749

Sample Number: **L0609457-04**
Client ID: **35-SMP117-SB02-02**
Matrix: **Soil**
Workgroup Number: **WG223214**
Collect Date: **09/19/2006 12:15**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **MES**
Dilution: **1**
Units: **ug/kg**

Instrument: **HPMS9**
Prep Date: **09/25/2006 10:52**
Cal Date: **09/13/2006 15:11**
Run Date: **09/25/2006 10:52**
File ID: **9M48901**
Percent Solid: **78.3**

Analyte	CAS. Number	Result	Qual	PQL	SQL
Bromoform	75-25-2		U	5.49	0.549
Bromomethane	74-83-9		U	11.0	1.10
2-Butanone	78-93-3		U	11.0	2.74
n-Butylbenzene	104-51-8		U	5.49	0.549
sec-Butylbenzene	135-98-8		U	5.49	0.549
tert-Butylbenzene	98-06-6		U	5.49	0.549
Carbon disulfide	75-15-0		U	5.49	0.549
Carbon tetrachloride	56-23-5		U	5.49	0.549
Chlorobenzene	108-90-7		U	5.49	0.549
Chlorodibromomethane	124-48-1		U	5.49	0.549
Chloroethane	75-00-3		U	11.0	1.10
2-Chloroethyl vinyl ether	110-75-8		U	11.0	2.19
Chloroform	67-66-3		U	5.49	0.549
Chloromethane	74-87-3		U	11.0	2.19
2-Chlorotoluene	95-49-8		U	5.49	0.549
4-Chlorotoluene	106-43-4		U	5.49	0.549
1,2-Dibromo-3-chloropropane	96-12-8		U	5.49	2.19
1,2-Dibromoethane	106-93-4		U	5.49	0.549
Dibromomethane	74-95-3		U	5.49	0.549
1,2-Dichlorobenzene	95-50-1		U	5.49	0.549
1,3-Dichlorobenzene	541-73-1		U	5.49	0.549
1,4-Dichlorobenzene	106-46-7		U	5.49	0.549
Dichlorodifluoromethane	75-71-8		U	11.0	1.10
1,1-Dichloroethane	75-34-3	32.9		5.49	1.10
1,2-Dichloroethane	107-06-2		U	5.49	0.549
1,1-Dichloroethene	75-35-4	3.23	J	5.49	0.549
cis-1,2-Dichloroethene	156-59-2	1.24	J	5.49	0.549
trans-1,2-Dichloroethene	156-60-5		U	5.49	0.549
1,2-Dichloropropane	78-87-5		U	5.49	0.549
1,3-Dichloropropane	142-28-9		U	5.49	0.549
2,2-Dichloropropane	594-20-7		U	5.49	0.549
cis-1,3-Dichloropropene	10061-01-5		U	5.49	0.549
trans-1,3-Dichloropropene	10061-02-6		U	5.49	0.549
1,1-Dichloropropene	563-58-6		U	5.49	0.549
Ethylbenzene	100-41-4		U	5.49	0.549
2-Hexanone	591-78-6		U	11.0	2.74
Hexachlorobutadiene	87-68-3		U	5.49	0.549
Isopropylbenzene	98-82-8		U	5.49	0.549
p-Isopropyltoluene	99-87-6		U	5.49	0.549
4-Methyl-2-pentanone	108-10-1		U	11.0	2.74
Methylene chloride	75-09-2		U	5.49	1.10
Naphthalene	91-20-3		U	11.0	0.549
n-Propylbenzene	103-65-1		U	5.49	0.549
Styrene	100-42-5		U	5.49	0.549
1,1,1,2-Tetrachloroethane	630-20-6		U	5.49	0.549
1,1,2,2-Tetrachloroethane	79-34-5		U	5.49	0.549
Tetrachloroethene	127-18-4		U	5.49	0.549
Toluene	108-88-3		U	5.49	0.549

Sample Number: L0609457-04
Client ID: 35-SMP117-SB02-02
Matrix: Soil
Workgroup Number: WG223214
Collect Date: 09/19/2006 12:15
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 5030B
Analytical Method: 8260B
Analyst: MES
Dilution: 1
Units: ug/kg

Instrument: HPMS9
Prep Date: 09/25/2006 10:52
Cal Date: 09/13/2006 15:11
Run Date: 09/25/2006 10:52
File ID: 9M48901
Percent Solid: 78.3

Analyte	CAS. Number	Result	Qual	PQL	SQL
1,2,3-Trichlorobenzene	87-61-6		U	5.49	0.549
1,2,4-Trichlorobenzene	120-82-1		U	5.49	0.549
1,1,1-Trichloroethane	71-55-6		U	5.49	0.549
1,1,2-Trichloroethane	79-00-5		U	5.49	0.549
Trichloroethene	79-01-6	0.875	J	5.49	0.549
Trichlorofluoromethane	75-69-4		U	11.0	1.10
1,2,3-Trichloropropane	96-18-4		U	5.49	1.10
1,2,4-Trimethylbenzene	95-63-6		U	5.49	0.549
1,3,5-Trimethylbenzene	108-67-8		U	5.49	0.549
Vinyl acetate	108-05-4		U	11.0	1.10
Vinyl chloride	75-01-4		U	11.0	1.10
o-Xylene	95-47-6		U	5.49	0.549
m-,p-Xylene	136777-61-2		U	5.49	0.549

Surrogate	% Recovery	Lower	Upper	Qual
Dibromofluoromethane	90.7	80	120	
1,2-Dichloroethane-d4	94.9	80	120	
Toluene-d8	92.2	81	117	
4-Bromofluorobenzene	89.7	74	121	

J The analyte was positively identified, but the quantitation was below the RL
U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-04
Client ID: 35-SMP117-SB02-02
Matrix: Soil
Workgroup Number: WG223552
Collect Date: 09/19/2006 12:15

PrePrep Method: NONE
Prep Method: D2216-90
Analytical Method: D2216-90
Analyst: TMM
Dilution: 1
Units: weight %

Instrument: OVEN
Prep Date: 09/27/2006 16:30
Cal Date:
Run Date: 09/27/2006 16:30
File ID: OV.0609271630-09

Analyte	CAS. Number	Result	Qual	PQL	SQL
Percent Solids	10-02-6	78.3		1.00	1.00

Sample Number: L0609457-04
Client ID: 35-SMP117-SB02-02
Matrix: Soil
Workgroup Number: WG223382
Collect Date: 09/19/2006 12:15
Sample Tag: 01

PrePrep Method: NONE
Prep Method: METHOD
Analytical Method: T1005
Analyst: HAV
Dilution: 1
Units: mg/kg

Instrument: HP14
Prep Date: 09/26/2006 09:00
Cal Date: 09/11/2006 20:33
Run Date: 09/26/2006 16:41
File ID: 14G9323
Percent Solid: 78.3

Analyte	CAS. Number	Result	Qual	PQL	SQL
Carbon Range C6-C12			U	63.7	31.9
Carbon Range C12-C28			U	63.7	31.9
Carbon Range C28-C35			U	63.7	31.9

Sample Number: L0609457-04
Client ID: 35-SMP117-SB02-02
Matrix: Soil
Workgroup Number: WG223382
Collect Date: 09/19/2006 12:15
Sample Tag: 01

PrePrep Method: NONE
Prep Method: METHOD
Analytical Method: T1005
Analyst: HAV
Dilution: 1
Units: mg/kg

Instrument: HP14
Prep Date: 09/26/2006 09:00
Cal Date: 09/11/2006 20:33
Run Date: 09/26/2006 16:41
File ID: 14G9323
Percent Solid: 78.3

Surrogate	% Recovery	Lower	Upper	Qual
Chlorobenzene	109	31	130	
o-Terphenyl	108	70	130	

U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-05
Client ID: 35-SMP47-SB01-01
Matrix: Soil
Workgroup Number: WG223307
Collect Date: 09/15/2006 11:40
Sample Tag: DL01

PrePrep Method: NONE
Prep Method: 314.0
Analytical Method: 314.0
Analyst: JWR
Dilution: 4
Units: ug/kg

Instrument: IC1
Prep Date: 10/02/2006 21:43
Cal Date:
Run Date: 10/02/2006 21:43
File ID: I1100206.16

Analyte	CAS. Number	Result	Qual	PQL	SQL
Perchlorate	14797-73-0		U	40.2	20.1

U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-05
Client ID: 35-SMP47-SB01-01
Matrix: Soil
Workgroup Number: WG223242
Collect Date: 09/15/2006 11:40
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3050B
Analytical Method: 6010B
Analyst: SLP
Dilution: 1
Units: mg/kg

Instrument: IRIS-ICP
Prep Date: 09/22/2006 06:20
Cal Date: 09/27/2006 10:00
Run Date: 09/27/2006 13:52
File ID: IR.092706.135200
Percent Solid: 90.2

Analyte	CAS. Number	Result	Qual	PQL	SQL
Aluminum, Total	7429-90-5	10100		16.2	8.09
Silver, Total	7440-22-4		U	1.62	0.202
Barium, Total	7440-39-3	128		0.405	0.0809
Beryllium, Total	7440-41-7	0.622		0.405	0.00971
Calcium, Total	7440-70-2	989		8.09	4.05
Cadmium, Total	7440-43-9	0.132	J	0.405	0.0405
Cobalt, Total	7440-48-4	7.37		0.809	0.0971
Chromium, Total	7440-47-3	12.7		0.809	0.0971
Copper, Total	7440-50-8	4.61		0.809	0.405
Iron, Total	7439-89-6	13300		1.62	0.809
Potassium, Total	7440-09-7	681		40.5	20.2
Magnesium, Total	7439-95-4	853		20.2	9.71
Manganese, Total	7439-96-5	235		0.405	0.0809
Sodium, Total	7440-23-5	31.4		20.2	4.05
Nickel, Total	7440-02-0	7.89		1.62	0.405
Vanadium, Total	7440-62-2	24.1		0.405	0.202
Zinc, Total	7440-66-6	63.5		0.809	0.405

J The analyte was positively identified, but the quantitation was below the RL
U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-05
Client ID: 35-SMP47-SB01-01
Matrix: Soil
Workgroup Number: WG223001
Collect Date: 09/15/2006 11:40
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3051
Analytical Method: 6020
Analyst: JYH
Dilution: 1
Units: mg/kg

Instrument: ELAN-ICP
Prep Date: 09/21/2006 07:30
Cal Date: 09/21/2006 09:22
Run Date: 09/21/2006 16:30
File ID: EL.092106.163028
Percent Solid: 90.2

Analyte	CAS. Number	Result	Qual	PQL	SQL
Arsenic, Total	7440-38-2	14.6		0.333	0.0832
Lead, Total	7439-92-1	27.8		0.222	0.111
Antimony, Total	7440-36-0	0.246		0.111	0.0554
Selenium, Total	7782-49-2	0.325		0.222	0.111
Thallium, Total	7440-28-0	0.0610		0.0222	0.0111

Sample Number: L0609457-05
Client ID: 35-SMP47-SB01-01
Matrix: Soil
Workgroup Number: WG223291
Collect Date: 09/15/2006 11:40
Sample Tag: 01

PrePrep Method: NONE
Prep Method: METHOD
Analytical Method: 7471A
Analyst: MMB
Dilution: 1
Units: mg/kg

Instrument: HYDRA
Prep Date: 09/22/2006 14:10
Cal Date: 09/25/2006 18:52
Run Date: 09/25/2006 19:56
File ID: HY.092506.195659
Percent Solid: 90.2

Analyte	CAS. Number	Result	Qual	PQL	SQL
Mercury, Total	7439-97-6	0.0290	J	0.259	0.0104

J The analyte was positively identified, but the quantitation was below the RL

Sample Number: L0609457-05
Client ID: 35-SMP47-SB01-01
Matrix: Soil
Workgroup Number: WG223387
Collect Date: 09/15/2006 11:40

PrePrep Method: NONE
Prep Method: D2216-90
Analytical Method: D2216-90
Analyst: TMB
Dilution: 1
Units: weight %

Instrument: OVEN
Prep Date: 09/26/2006 13:05
Cal Date:
Run Date: 09/26/2006 13:05
File ID: OV.0609261305-08

Analyte	CAS. Number	Result	Qual	PQL	SQL
Percent Solids	10-02-6	90.2		1.00	1.00

Sample Number: L0609457-06
Client ID: 35-SMP47-SB01-02
Matrix: Soil
Workgroup Number: WG223307
Collect Date: 09/15/2006 11:45
Sample Tag: DL01

PrePrep Method: NONE
Prep Method: 314.0
Analytical Method: 314.0
Analyst: JWR
Dilution: 5
Units: ug/kg

Instrument: IC1
Prep Date: 10/02/2006 22:04
Cal Date:
Run Date: 10/02/2006 22:04
File ID: I1100206.17

Analyte	CAS. Number	Result	Qual	PQL	SQL
Perchlorate	14797-73-0		U	49.8	24.9

U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-06
Client ID: 35-SMP47-SB01-02
Matrix: Soil
Workgroup Number: WG223242
Collect Date: 09/15/2006 11:45
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3050B
Analytical Method: 6010B
Analyst: SLP
Dilution: 1
Units: mg/kg

Instrument: IRIS-ICP
Prep Date: 09/22/2006 06:20
Cal Date: 09/27/2006 10:00
Run Date: 09/27/2006 13:58
File ID: IR.092706.135800
Percent Solid: 91.6

Analyte	CAS. Number	Result	Qual	PQL	SQL
Aluminum, Total	7429-90-5	8920		15.3	7.63
Silver, Total	7440-22-4		U	1.53	0.191
Barium, Total	7440-39-3	69.1		0.382	0.0763
Beryllium, Total	7440-41-7	0.608		0.382	0.00916
Calcium, Total	7440-70-2	1100		7.63	3.82
Cadmium, Total	7440-43-9	0.0744	J	0.382	0.0382
Cobalt, Total	7440-48-4	9.97		0.763	0.0916
Chromium, Total	7440-47-3	21.1		0.763	0.0916
Copper, Total	7440-50-8	3.58		0.763	0.382
Iron, Total	7439-89-6	15100		1.53	0.763
Potassium, Total	7440-09-7	326		38.2	19.1
Magnesium, Total	7439-95-4	445		19.1	9.16
Manganese, Total	7439-96-5	357		0.382	0.0763
Sodium, Total	7440-23-5	72.6		19.1	3.82
Nickel, Total	7440-02-0	6.17		1.53	0.382
Vanadium, Total	7440-62-2	27.5		0.382	0.191
Zinc, Total	7440-66-6	16.3		0.763	0.382

J The analyte was positively identified, but the quantitation was below the RL
U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-06
Client ID: 35-SMP47-SB01-02
Matrix: Soil
Workgroup Number: WG223001
Collect Date: 09/15/2006 11:45
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3051
Analytical Method: 6020
Analyst: JYH
Dilution: 1
Units: mg/kg

Instrument: ELAN-ICP
Prep Date: 09/21/2006 07:30
Cal Date: 09/21/2006 09:22
Run Date: 09/21/2006 16:36
File ID: EL.092106.163634
Percent Solid: 91.6

Analyte	CAS. Number	Result	Qual	PQL	SQL
Arsenic, Total	7440-38-2	1.33		0.327	0.0819
Lead, Total	7439-92-1	6.02		0.218	0.109
Antimony, Total	7440-36-0	0.116		0.109	0.0546
Selenium, Total	7782-49-2	0.186	J	0.218	0.109
Thallium, Total	7440-28-0	0.0533		0.0218	0.0109

J The analyte was positively identified, but the quantitation was below the RL

Sample Number: L0609457-06
Client ID: 35-SMP47-SB01-02
Matrix: Soil
Workgroup Number: WG223291
Collect Date: 09/15/2006 11:45
Sample Tag: 01

PrePrep Method: NONE
Prep Method: METHOD
Analytical Method: 7471A
Analyst: MMB
Dilution: 1
Units: mg/kg

Instrument: HYDRA
Prep Date: 09/22/2006 14:10
Cal Date: 09/25/2006 18:52
Run Date: 09/25/2006 19:58
File ID: HY.092506.195858
Percent Solid: 91.6

Analyte	CAS. Number	Result	Qual	PQL	SQL
Mercury, Total	7439-97-6	0.0256	J	0.259	0.0104

J The analyte was positively identified, but the quantitation was below the RL

Sample Number: L0609457-06
Client ID: 35-SMP47-SB01-02
Matrix: Soil
Workgroup Number: WG223387
Collect Date: 09/15/2006 11:45

PrePrep Method: NONE
Prep Method: D2216-90
Analytical Method: D2216-90
Analyst: TMB
Dilution: 1
Units: weight %

Instrument: OVEN
Prep Date: 09/26/2006 13:05
Cal Date:
Run Date: 09/26/2006 13:05
File ID: OV.0609261305-09

Analyte	CAS. Number	Result	Qual	PQL	SQL
Percent Solids	10-02-6	91.6		1.00	1.00

Sample Number: L0609457-07
Client ID: 35-SMP47-SB02-01
Matrix: Soil
Workgroup Number: WG223307
Collect Date: 09/15/2006 11:31
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 314.0
Analytical Method: 314.0
Analyst: JWR
Dilution: 1
Units: ug/kg

Instrument: IC1
Prep Date: 10/02/2006 22:24
Cal Date:
Run Date: 10/02/2006 22:24
File ID: I1100206.18

Analyte	CAS. Number	Result	Qual	PQL	SQL
Perchlorate	14797-73-0	181		10.0	5.01

Sample Number: L0609457-07
Client ID: 35-SMP47-SB02-01
Matrix: Soil
Workgroup Number: WG223242
Collect Date: 09/15/2006 11:31
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3050B
Analytical Method: 6010B
Analyst: SLP
Dilution: 1
Units: mg/kg

Instrument: IRIS-ICP
Prep Date: 09/22/2006 06:20
Cal Date: 09/27/2006 10:00
Run Date: 09/27/2006 14:04
File ID: IR.092706.140400
Percent Solid: 91.3

Analyte	CAS. Number	Result	Qual	PQL	SQL
Aluminum, Total	7429-90-5	9680		16.8	8.42
Silver, Total	7440-22-4		U	1.68	0.211
Barium, Total	7440-39-3	54.0		0.421	0.0842
Beryllium, Total	7440-41-7	0.452		0.421	0.0101
Calcium, Total	7440-70-2	880		8.42	4.21
Cadmium, Total	7440-43-9		U	0.421	0.0421
Cobalt, Total	7440-48-4	4.58		0.842	0.101
Chromium, Total	7440-47-3	10.4		0.842	0.101
Copper, Total	7440-50-8	3.22		0.842	0.421
Iron, Total	7439-89-6	12900		1.68	0.842
Potassium, Total	7440-09-7	383		42.1	21.1
Magnesium, Total	7439-95-4	647		21.1	10.1
Manganese, Total	7439-96-5	145		0.421	0.0842
Sodium, Total	7440-23-5	30.5		21.1	4.21
Nickel, Total	7440-02-0	5.55		1.68	0.421
Vanadium, Total	7440-62-2	20.1		0.421	0.211
Zinc, Total	7440-66-6	16.9		0.842	0.421

U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-07
Client ID: 35-SMP47-SB02-01
Matrix: Soil
Workgroup Number: WG223001
Collect Date: 09/15/2006 11:31
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3051
Analytical Method: 6020
Analyst: JYH
Dilution: 1
Units: mg/kg

Instrument: ELAN-ICP
Prep Date: 09/21/2006 07:30
Cal Date: 09/21/2006 09:22
Run Date: 09/21/2006 16:42
File ID: EL.092106.164239
Percent Solid: 91.3

Analyte	CAS. Number	Result	Qual	PQL	SQL
Arsenic, Total	7440-38-2	4.11		0.327	0.0818
Lead, Total	7439-92-1	7.24		0.218	0.109
Antimony, Total	7440-36-0	0.230		0.109	0.0545
Selenium, Total	7782-49-2	0.151	J	0.218	0.109
Thallium, Total	7440-28-0	0.0690		0.0218	0.0109

J The analyte was positively identified, but the quantitation was below the RL

Sample Number: L0609457-07
Client ID: 35-SMP47-SB02-01
Matrix: Soil
Workgroup Number: WG223291
Collect Date: 09/15/2006 11:31
Sample Tag: 01

PrePrep Method: NONE
Prep Method: METHOD
Analytical Method: 7471A
Analyst: MMB
Dilution: 1
Units: mg/kg

Instrument: HYDRA
Prep Date: 09/22/2006 14:10
Cal Date: 09/25/2006 18:52
Run Date: 09/25/2006 20:00
File ID: HY.092506.200041
Percent Solid: 91.3

Analyte	CAS. Number	Result	Qual	PQL	SQL
Mercury, Total	7439-97-6	0.0242	J	0.274	0.0110

J The analyte was positively identified, but the quantitation was below the RL

Sample Number: L0609457-07
Client ID: 35-SMP47-SB02-01
Matrix: Soil
Workgroup Number: WG223387
Collect Date: 09/15/2006 11:31

PrePrep Method: NONE
Prep Method: D2216-90
Analytical Method: D2216-90
Analyst: TMB
Dilution: 1
Units: weight %

Instrument: OVEN
Prep Date: 09/26/2006 13:05
Cal Date:
Run Date: 09/26/2006 13:05
File ID: OV.0609261305-10

Analyte	CAS. Number	Result	Qual	PQL	SQL
Percent Solids	10-02-6	91.3		1.00	1.00

Sample Number: L0609457-08
Client ID: 35-SMP47-SB02-02
Matrix: Soil
Workgroup Number: WG223307
Collect Date: 09/15/2006 11:38
Sample Tag: DL01

PrePrep Method: NONE
Prep Method: 314.0
Analytical Method: 314.0
Analyst: JWR
Dilution: 2
Units: ug/kg

Instrument: IC1
Prep Date: 10/02/2006 22:45
Cal Date:
Run Date: 10/02/2006 22:45
File ID: I1100206.19

Analyte	CAS. Number	Result	Qual	PQL	SQL
Perchlorate	14797-73-0	1400		20.0	10.0

Sample Number: L0609457-08
Client ID: 35-SMP47-SB02-02
Matrix: Soil
Workgroup Number: WG223242
Collect Date: 09/15/2006 11:38
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3050B
Analytical Method: 6010B
Analyst: SLP
Dilution: 1
Units: mg/kg

Instrument: IRIS-ICP
Prep Date: 09/22/2006 06:20
Cal Date: 09/27/2006 10:00
Run Date: 09/27/2006 14:10
File ID: IR.092706.141000
Percent Solid: 90.1

Analyte	CAS. Number	Result	Qual	PQL	SQL
Aluminum, Total	7429-90-5	9560		16.9	8.47
Silver, Total	7440-22-4	0.222	J	1.69	0.212
Barium, Total	7440-39-3	36.7		0.424	0.0847
Beryllium, Total	7440-41-7	0.283	J	0.424	0.0102
Calcium, Total	7440-70-2	1080		8.47	4.24
Cadmium, Total	7440-43-9		U	0.424	0.0424
Cobalt, Total	7440-48-4	5.31		0.847	0.102
Chromium, Total	7440-47-3	7.60		0.847	0.102
Copper, Total	7440-50-8	2.35		0.847	0.424
Iron, Total	7439-89-6	11000		1.69	0.847
Potassium, Total	7440-09-7	358		42.4	21.2
Magnesium, Total	7439-95-4	441		21.2	10.2
Manganese, Total	7439-96-5	156		0.424	0.0847
Sodium, Total	7440-23-5	33.0		21.2	4.24
Nickel, Total	7440-02-0	4.19		1.69	0.424
Vanadium, Total	7440-62-2	20.6		0.424	0.212
Zinc, Total	7440-66-6	10.9		0.847	0.424

J The analyte was positively identified, but the quantitation was below the RL
U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-08
Client ID: 35-SMP47-SB02-02
Matrix: Soil
Workgroup Number: WG223001
Collect Date: 09/15/2006 11:38
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3051
Analytical Method: 6020
Analyst: JYH
Dilution: 1
Units: mg/kg

Instrument: ELAN-ICP
Prep Date: 09/21/2006 07:30
Cal Date: 09/21/2006 09:22
Run Date: 09/21/2006 16:48
File ID: EL.092106.164845
Percent Solid: 90.1

Analyte	CAS. Number	Result	Qual	PQL	SQL
Arsenic, Total	7440-38-2	4.14		0.333	0.0833
Lead, Total	7439-92-1	5.74		0.222	0.111
Antimony, Total	7440-36-0	0.275		0.111	0.0555
Selenium, Total	7782-49-2		U	0.222	0.111
Thallium, Total	7440-28-0	0.0586		0.0222	0.0111

U Not detected at or above adjusted sample detection limit

Sample Number: L0609457-08
Client ID: 35-SMP47-SB02-02
Matrix: Soil
Workgroup Number: WG223291
Collect Date: 09/15/2006 11:38
Sample Tag: 01

PrePrep Method: NONE
Prep Method: METHOD
Analytical Method: 7471A
Analyst: MMB
Dilution: 1
Units: mg/kg

Instrument: HYDRA
Prep Date: 09/22/2006 14:10
Cal Date: 09/25/2006 18:52
Run Date: 09/25/2006 20:02
File ID: HY.092506.200235
Percent Solid: 90.1

Analyte	CAS. Number	Result	Qual	PQL	SQL
Mercury, Total	7439-97-6	0.0351	J	0.269	0.0107

J The analyte was positively identified, but the quantitation was below the RL

Sample Number: **L0609457-08**
Client ID: **35-SMP47-SB02-02**
Matrix: **Soil**
Workgroup Number: **WG223387**
Collect Date: **09/15/2006 11:38**

PrePrep Method: **NONE**
Prep Method: **D2216-90**
Analytical Method: **D2216-90**
Analyst: **TMB**
Dilution: **1**
Units: **weight %**

Instrument: **OVEN**
Prep Date: **09/26/2006 13:05**
Cal Date:
Run Date: **09/26/2006 13:05**
File ID: **OV.0609261305-11**

Analyte	CAS. Number	Result	Qual	PQL	SQL
Percent Solids	**10-02-6**	**90.1**		**1.00**	**1.00**

Sample Number: **L0609457-09**
Client ID: **SITE4-SB07-01**
Matrix: **Soil**
Workgroup Number: **WG223307**
Collect Date: **09/15/2006 11:27**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **314.0**
Analytical Method: **314.0**
Analyst: **JWR**
Dilution: **1**
Units: **ug/kg**

Instrument: **IC1**
Prep Date: **10/02/2006 23:05**
Cal Date:
Run Date: **10/02/2006 23:05**
File ID: **I1100206.20**

Analyte	CAS. Number	Result	Qual	PQL	SQL
Perchlorate	**14797-73-0**	**134**		**10.2**	**5.12**

Sample Number: **L0609457-09**
Client ID: **SITE4-SB07-01**
Matrix: **Soil**
Workgroup Number: **WG223419**
Collect Date: **09/15/2006 11:27**

PrePrep Method: **NONE**
Prep Method: **D2216-90**
Analytical Method: **D2216-90**
Analyst: **TMB**
Dilution: **1**
Units: **weight %**

Instrument: **OVEN**
Prep Date: **09/26/2006 16:30**
Cal Date:
Run Date: **09/26/2006 16:30**
File ID: **OV.0609261630-06**

Analyte	CAS. Number	Result	Qual	PQL	SQL
Percent Solids	**10-02-6**	**77.0**		**1.00**	**1.00**

Sample Number: **L0609457-10**
Client ID: **SITE4-SB08-01**
Matrix: **Soil**
Workgroup Number: **WG223307**
Collect Date: **09/15/2006 08:30**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **314.0**
Analytical Method: **314.0**
Analyst: **JWR**
Dilution: **20**
Units: **ug/kg**

Instrument: **IC1**
Prep Date: **10/02/2006 23:25**
Cal Date:
Run Date: **10/02/2006 23:25**
File ID: **I1100206.21**

Analyte	CAS. Number	Result	Qual	PQL	SQL
Perchlorate	**14797-73-0**	**34000**	**I**	**199**	**99.5**

I Semiquantitative result (out of instrument calibration range)

Sample Number: L0609457-10
Client ID: SITE4-SB08-01
Matrix: Soil
Workgroup Number: WG224306
Collect Date: 09/15/2006 08:30
Sample Tag: DL02

PrePrep Method: NONE
Prep Method: 314.0
Analytical Method: 314.0
Analyst: JWR
Dilution: 100
Units: ug/kg

Instrument: IC1
Prep Date: 10/04/2006 19:26
Cal Date:
Run Date: 10/04/2006 19:26
File ID: I1100406.16

Analyte	CAS. Number	Result	Qual	PQL	SQL
Perchlorate	14797-73-0	27100		995	498

Sample Number: L0609457-10
Client ID: SITE4-SB08-01
Matrix: Soil
Workgroup Number: WG223419
Collect Date: 09/15/2006 08:30

PrePrep Method: NONE
Prep Method: D2216-90
Analytical Method: D2216-90
Analyst: TMB
Dilution: 1
Units: weight %

Instrument: OVEN
Prep Date: 09/26/2006 16:30
Cal Date:
Run Date: 09/26/2006 16:30
File ID: OV.0609261630-07

Analyte	CAS. Number	Result	Qual	PQL	SQL
Percent Solids	10-02-6	90.2		1.00	1.00

Sample Number: L0609457-11
Client ID: SITE4-SB08-02
Matrix: Soil
Workgroup Number: WG223307
Collect Date: 09/15/2006 08:37
Sample Tag: DL01

PrePrep Method: NONE
Prep Method: 314.0
Analytical Method: 314.0
Analyst: JWR
Dilution: 4
Units: ug/kg

Instrument: IC1
Prep Date: 10/03/2006 00:06
Cal Date:
Run Date: 10/03/2006 00:06
File ID: I1100206.23

Analyte	CAS. Number	Result	Qual	PQL	SQL
Perchlorate	14797-73-0	170000	I	39.2	19.6

I Semiquantitative result (out of instrument calibration range)

Sample Number: L0609457-11
Client ID: SITE4-SB08-02
Matrix: Soil
Workgroup Number: WG224306
Collect Date: 09/15/2006 08:37
Sample Tag: DL02

PrePrep Method: NONE
Prep Method: 314.0
Analytical Method: 314.0
Analyst: JWR
Dilution: 400
Units: ug/kg

Instrument: IC1
Prep Date: 10/04/2006 20:06
Cal Date:
Run Date: 10/04/2006 20:06
File ID: I1100406.18

Analyte	CAS. Number	Result	Qual	PQL	SQL
Perchlorate	14797-73-0	95500		3920	1960

Sample Number: L0609457-11
Client ID: SITE4-SB08-02
Matrix: Soil
Workgroup Number: WG224306
Collect Date: 09/15/2006 08:37
Sample Tag: DL03

PrePrep Method: NONE
Prep Method: 314.0
Analytical Method: 314.0
Analyst: JWR
Dilution: 1000
Units: ug/kg

Instrument: IC1
Prep Date: 10/04/2006 20:27
Cal Date:
Run Date: 10/04/2006 20:27
File ID: I1100406.19

Analyte	CAS. Number	Result	Qual	PQL	SQL
Perchlorate	14797-73-0	93700		9800	4900

Sample Number: L0609457-11
Client ID: SITE4-SB08-02
Matrix: Soil
Workgroup Number: WG223419
Collect Date: 09/15/2006 08:37

PrePrep Method: NONE
Prep Method: D2216-90
Analytical Method: D2216-90
Analyst: TMB
Dilution: 1
Units: weight %

Instrument: OVEN
Prep Date: 09/26/2006 16:30
Cal Date:
Run Date: 09/26/2006 16:30
File ID: OV.0609261630-08

Analyte	CAS. Number	Result	Qual	PQL	SQL
Percent Solids	10-02-6	84.8		1.00	1.00

Sample Number: L0609457-12
Client ID: SITE4-SB08-03
Matrix: Soil
Workgroup Number: WG223307
Collect Date: 09/15/2006 09:20
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 314.0
Analytical Method: 314.0
Analyst: JWR
Dilution: 1
Units: ug/kg

Instrument: IC1
Prep Date: 10/03/2006 00:27
Cal Date:
Run Date: 10/03/2006 00:27
File ID: I1100206.24

Analyte	CAS. Number	Result	Qual	PQL	SQL
Perchlorate	14797-73-0	355		9.71	4.86

Sample Number: L0609457-12
Client ID: SITE4-SB08-03
Matrix: Soil
Workgroup Number: WG223419
Collect Date: 09/15/2006 09:20

PrePrep Method: NONE
Prep Method: D2216-90
Analytical Method: D2216-90
Analyst: TMB
Dilution: 1
Units: weight %

Instrument: OVEN
Prep Date: 09/26/2006 16:30
Cal Date:
Run Date: 09/26/2006 16:30
File ID: OV.0609261630-09

Analyte	CAS. Number	Result	Qual	PQL	SQL
Percent Solids	10-02-6	74.9		1.00	1.00

Sample Number: L0609457-13
Client ID: SITE4-SB13-01
Matrix: Soil
Workgroup Number: WG223307
Collect Date: 09/15/2006 13:30
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 314.0
Analytical Method: 314.0
Analyst: JWR
Dilution: 1
Units: ug/kg

Instrument: IC1
Prep Date: 10/03/2006 01:07
Cal Date:
Run Date: 10/03/2006 01:07
File ID: I1100206.26

Analyte	CAS. Number	Result	Qual	PQL	SQL
Perchlorate	14797-73-0	3490	I	10.1	5.04

I Semiquantitative result (out of instrument calibration range)

Sample Number: L0609457-13
Client ID: SITE4-SB13-01
Matrix: Soil
Workgroup Number: WG224306
Collect Date: 09/15/2006 13:30
Sample Tag: DL01

PrePrep Method: NONE
Prep Method: 314.0
Analytical Method: 314.0
Analyst: JWR
Dilution: 10
Units: ug/kg

Instrument: IC1
Prep Date: 10/04/2006 20:47
Cal Date:
Run Date: 10/04/2006 20:47
File ID: I1100406.20

Analyte	CAS. Number	Result	Qual	PQL	SQL
Perchlorate	14797-73-0	2870		101	50.4

Sample Number: L0609457-13
Client ID: SITE4-SB13-01
Matrix: Soil
Workgroup Number: WG223419
Collect Date: 09/15/2006 13:30

PrePrep Method: NONE
Prep Method: D2216-90
Analytical Method: D2216-90
Analyst: TMB
Dilution: 1
Units: weight %

Instrument: OVEN
Prep Date: 09/26/2006 16:30
Cal Date:
Run Date: 09/26/2006 16:30
File ID: OV.0609261630-10

Analyte	CAS. Number	Result	Qual	PQL	SQL
Percent Solids	10-02-6	75.2		1.00	1.00

WORKGROUP SUMMARY BY METHOD

Analysis:Metals Analysis
Extraction Method:3051
Workgroup:WG222955

Lab ID	Client ID	Tclp Date	Prep Date	Analysis Date	Tag	Inst Id	Analyst
L0609457-01	35-SMP92-SB01-02		09/21/06 07:30			MICROWAVE	VC
L0609457-02	35-SMP117-SB01-01		09/21/06 07:30			MICROWAVE	VC
L0609457-03	35-SMP117-SB01-02		09/21/06 07:30			MICROWAVE	VC
L0609457-04	35-SMP117-SB02-02		09/21/06 07:30			MICROWAVE	VC
L0609457-05	35-SMP47-SB01-01		09/21/06 07:30			MICROWAVE	VC
L0609457-06	35-SMP47-SB01-02		09/21/06 07:30			MICROWAVE	VC
L0609457-07	35-SMP47-SB02-01		09/21/06 07:30			MICROWAVE	VC
L0609457-08	35-SMP47-SB02-02		09/21/06 07:30			MICROWAVE	VC

Analysis:Metals Analysis
Analytical Method:6020
Workgroup:WG223001

Lab ID	Client ID	Tclp Date	Prep Date	Analysis Date	Tag	Inst Id	Analyst
L0609457-01	35-SMP92-SB01-02		09/21/06 07:30	09/21/06 15:02	01	ELAN-ICP	JYH
L0609457-02	35-SMP117-SB01-01		09/21/06 07:30	09/21/06 16:12	01	ELAN-ICP	JYH
L0609457-03	35-SMP117-SB01-02		09/21/06 07:30	09/21/06 16:18	01	ELAN-ICP	JYH
L0609457-04	35-SMP117-SB02-02		09/21/06 07:30	09/21/06 16:24	01	ELAN-ICP	JYH
L0609457-05	35-SMP47-SB01-01		09/21/06 07:30	09/21/06 16:30	01	ELAN-ICP	JYH
L0609457-06	35-SMP47-SB01-02		09/21/06 07:30	09/21/06 16:36	01	ELAN-ICP	JYH
L0609457-07	35-SMP47-SB02-01		09/21/06 07:30	09/21/06 16:42	01	ELAN-ICP	JYH
L0609457-08	35-SMP47-SB02-02		09/21/06 07:30	09/21/06 16:48	01	ELAN-ICP	JYH

Analysis:Metals Analysis
Extraction Method:3050B
Workgroup:WG223084

Lab ID	Client ID	Tclp Date	Prep Date	Analysis Date	Tag	Inst Id	Analyst
L0609457-01	35-SMP92-SB01-02		09/22/06 06:20			HOT BLOCK	REK
L0609457-02	35-SMP117-SB01-01		09/22/06 06:20			HOT BLOCK	REK
L0609457-03	35-SMP117-SB01-02		09/22/06 06:20			HOT BLOCK	REK
L0609457-04	35-SMP117-SB02-02		09/22/06 06:20			HOT BLOCK	REK
L0609457-05	35-SMP47-SB01-01		09/22/06 06:20			HOT BLOCK	REK
L0609457-06	35-SMP47-SB01-02		09/22/06 06:20			HOT BLOCK	REK
L0609457-07	35-SMP47-SB02-01		09/22/06 06:20			HOT BLOCK	REK
L0609457-08	35-SMP47-SB02-02		09/22/06 06:20			HOT BLOCK	REK

Analysis:Mercury, Total
Extraction Method:METHOD
Workgroup:WG223121

Lab ID	Client ID	Tclp Date	Prep Date	Analysis Date	Tag	Inst Id	Analyst
L0609457-01	35-SMP92-SB01-02		09/22/06 14:10			HOT BLOCK	REK
L0609457-02	35-SMP117-SB01-01		09/22/06 14:10			HOT BLOCK	REK
L0609457-03	35-SMP117-SB01-02		09/22/06 14:10			HOT BLOCK	REK
L0609457-04	35-SMP117-SB02-02		09/22/06 14:10			HOT BLOCK	REK
L0609457-05	35-SMP47-SB01-01		09/22/06 14:10			HOT BLOCK	REK
L0609457-06	35-SMP47-SB01-02		09/22/06 14:10			HOT BLOCK	REK
L0609457-07	35-SMP47-SB02-01		09/22/06 14:10			HOT BLOCK	REK
L0609457-08	35-SMP47-SB02-02		09/22/06 14:10			HOT BLOCK	REK

Analysis:Volatile Organics
Analytical Method:8260B
Workgroup:WG223178

Lab ID	Client ID	Tclp Date	Prep Date	Analysis Date	Tag	Inst Id	Analyst
L0609457-01	35-SMP92-SB01-02			09/24/06 21:44	01	HPMS9	MES
L0609457-03	35-SMP117-SB01-02			09/24/06 22:16	01	HPMS9	MES

Analysis:Volatile Organics
Extraction Method:5030B
Workgroup:WG223178

Lab ID	Client ID	Tclp Date	Prep Date	Analysis Date	Tag	Inst Id	Analyst
L0609457-01	35-SMP92-SB01-02				223178	HPMS9	MES
L0609457-03	35-SMP117-SB01-02				223178	HPMS9	MES

Analysis:Volatile Organics
Analytical Method:8260B
Workgroup:WG223214

Lab ID	Client ID	Tclp Date	Prep Date	Analysis Date	Tag	Inst Id	Analyst
L0609457-04	35-SMP117-SB02-02			09/25/06 10:52	01	HPMS9	MES

Analysis:Volatile Organics
Extraction Method:5030B
Workgroup:WG223214

Lab ID	Client ID	Tclp Date	Prep Date	Analysis Date	Tag	Inst Id	Analyst
L0609457-04	35-SMP117-SB02-02				223214	HPMS9	MES

Analysis:Metals Analysis
Analytical Method:6010B
Workgroup:WG223242

Lab ID	Client ID	Tclp Date	Prep Date	Analysis Date	Tag	Inst Id	Analyst
L0609457-01	35-SMP92-SB01-02		09/22/06 06:20	09/27/06 13:16	01	IRIS-ICP	SLP
L0609457-02	35-SMP117-SB01-01		09/22/06 06:20	09/27/06 13:34	01	IRIS-ICP	SLP
L0609457-03	35-SMP117-SB01-02		09/22/06 06:20	09/27/06 13:40	01	IRIS-ICP	SLP
L0609457-03	35-SMP117-SB01-02		09/22/06 06:20	09/27/06 14:57	DL01	IRIS-ICP	SLP
L0609457-04	35-SMP117-SB02-02		09/22/06 06:20	09/27/06 13:46	01	IRIS-ICP	SLP
L0609457-05	35-SMP47-SB01-01		09/22/06 06:20	09/27/06 13:52	01	IRIS-ICP	SLP
L0609457-06	35-SMP47-SB01-02		09/22/06 06:20	09/27/06 13:58	01	IRIS-ICP	SLP
L0609457-07	35-SMP47-SB02-01		09/22/06 06:20	09/27/06 14:04	01	IRIS-ICP	SLP
L0609457-08	35-SMP47-SB02-02		09/22/06 06:20	09/27/06 14:10	01	IRIS-ICP	SLP

Analysis:Mercury, Total
Analytical Method:7471A
Workgroup:WG223291

Lab ID	Client ID	Tclp Date	Prep Date	Analysis Date	Tag	Inst Id	Analyst
L0609457-01	35-SMP92-SB01-02		09/22/06 14:10	09/25/06 19:39	01	HYDRA	MMB
L0609457-02	35-SMP117-SB01-01		09/22/06 14:10	09/25/06 19:46	01	HYDRA	MMB
L0609457-03	35-SMP117-SB01-02		09/22/06 14:10	09/25/06 19:53	01	HYDRA	MMB
L0609457-04	35-SMP117-SB02-02		09/22/06 14:10	09/25/06 19:55	01	HYDRA	MMB
L0609457-05	35-SMP47-SB01-01		09/22/06 14:10	09/25/06 19:56	01	HYDRA	MMB
L0609457-06	35-SMP47-SB01-02		09/22/06 14:10	09/25/06 19:58	01	HYDRA	MMB
L0609457-07	35-SMP47-SB02-01		09/22/06 14:10	09/25/06 20:00	01	HYDRA	MMB
L0609457-08	35-SMP47-SB02-02		09/22/06 14:10	09/25/06 20:02	01	HYDRA	MMB

Analysis:Perchlorate
Analytical Method:314.0
Workgroup:WG223307

Lab ID	Client ID	Tclp Date	Prep Date	Analysis Date	Tag	Inst Id	Analyst
L0609457-05	35-SMP47-SB01-01			10/02/06 21:43	DL01	IC1	JWR
L0609457-06	35-SMP47-SB01-02			10/02/06 22:04	DL01	IC1	JWR
L0609457-07	35-SMP47-SB02-01			10/02/06 22:24	01	IC1	JWR
L0609457-08	35-SMP47-SB02-02			10/02/06 22:45	DL01	IC1	JWR
L0609457-09	SITE4-SB07-01			10/02/06 23:05	01	IC1	JWR
L0609457-10	SITE4-SB08-01			10/02/06 23:25	DL01	IC1	JWR
L0609457-11	SITE4-SB08-02			10/03/06 00:06	DL01	IC1	JWR
L0609457-12	SITE4-SB08-03			10/03/06 00:27	01	IC1	JWR
L0609457-13	SITE4-SB13-01			10/03/06 01:07	01	IC1	JWR

Analysis:Perchlorate
Extraction Method:314.0
Workgroup:WG223307

Lab ID	Client ID	Tclp Date	Prep Date	Analysis Date	Tag	Inst Id	Analyst
L0609457-05	35-SMP47-SB01-01		10/02/06 20:22			FILTER	JWR
L0609457-06	35-SMP47-SB01-02		10/02/06 20:22			FILTER	JWR
L0609457-07	35-SMP47-SB02-01		10/02/06 20:22			FILTER	JWR
L0609457-08	35-SMP47-SB02-02		10/02/06 20:22			FILTER	JWR
L0609457-09	SITE4-SB07-01		10/02/06 20:22			FILTER	JWR
L0609457-10	SITE4-SB08-01		10/02/06 20:22			FILTER	JWR
L0609457-11	SITE4-SB08-02		10/02/06 20:22			FILTER	JWR
L0609457-12	SITE4-SB08-03		10/02/06 20:22			FILTER	JWR
L0609457-13	SITE4-SB13-01		10/02/06 20:22			FILTER	JWR

Analysis:TPH - Texas Method 1005
Extraction Method:METHOD
Workgroup:WG223381

Lab ID	Client ID	Tclp Date	Prep Date	Analysis Date	Tag	Inst Id	Analyst
L0609457-02	35-SMP117-SB01-01		09/26/06 09:00			HP14	HAV
L0609457-03	35-SMP117-SB01-02		09/26/06 09:00			HP14	HAV
L0609457-04	35-SMP117-SB02-02		09/26/06 09:00			HP14	HAV

Analysis:TPH - Texas Method 1005
Analytical Method:T1005
Workgroup:WG223382

Lab ID	Client ID	Tclp Date	Prep Date	Analysis Date	Tag	Inst Id	Analyst
L0609457-02	35-SMP117-SB01-01		09/26/06 09:00	09/26/06 15:21	01	HP14	HAV
L0609457-03	35-SMP117-SB01-02		09/26/06 09:00	09/26/06 16:00	01	HP14	HAV
L0609457-04	35-SMP117-SB02-02		09/26/06 09:00	09/26/06 16:41	01	HP14	HAV

Analysis:Percent Solids
Analytical Method:D2216-90
Workgroup:WG223387

Lab ID	Client ID	Tclp Date	Prep Date	Analysis Date	Tag	Inst Id	Analyst
L0609457-01	35-SMP92-SB01-02			09/26/06 13:05		OVEN	TMB
L0609457-05	35-SMP47-SB01-01			09/26/06 13:05		OVEN	TMB
L0609457-06	35-SMP47-SB01-02			09/26/06 13:05		OVEN	TMB
L0609457-07	35-SMP47-SB02-01			09/26/06 13:05		OVEN	TMB
L0609457-08	35-SMP47-SB02-02			09/26/06 13:05		OVEN	TMB

Analysis:Percent Solids
Analytical Method:D2216-90
Workgroup:WG223419

Lab ID	Client ID	Tclp Date	Prep Date	Analysis Date	Tag	Inst Id	Analyst
L0609457-09	SITE4-SB07-01			09/26/06 16:30		OVEN	TMB
L0609457-10	SITE4-SB08-01			09/26/06 16:30		OVEN	TMB
L0609457-11	SITE4-SB08-02			09/26/06 16:30		OVEN	TMB
L0609457-12	SITE4-SB08-03			09/26/06 16:30		OVEN	TMB
L0609457-13	SITE4-SB13-01			09/26/06 16:30		OVEN	TMB

Analysis:Percent Solids
Analytical Method:D2216-90
Workgroup:WG223552

Lab ID	Client ID	Tclp Date	Prep Date	Analysis Date	Tag	Inst Id	Analyst
L0609457-02	35-SMP117-SB01-01			09/27/06 16:30		OVEN	TMM
L0609457-03	35-SMP117-SB01-02			09/27/06 16:30		OVEN	TMM
L0609457-04	35-SMP117-SB02-02			09/27/06 16:30		OVEN	TMM

WORKGROUP SUMMARY BY METHOD

Analysis: Perchlorate
Analytical Method: 314.0
Workgroup: WG224306

Lab ID	Client ID	Tclp Date	Prep Date	Analysis Date	Tag	Inst Id	Analyst
L0609457-10	SITE4-SB08-01			10/04/06 19:26	DL02	IC1	JWR
L0609457-11	SITE4-SB08-02			10/04/06 20:06	DL02	IC1	JWR
L0609457-11	SITE4-SB08-02			10/04/06 20:27	DL03	IC1	JWR
L0609457-13	SITE4-SB13-01			10/04/06 20:47	DL01	IC1	JWR

Analysis: Perchlorate
Extraction Method: 314.0
Workgroup: WG224306

Lab ID	Client ID	Tclp Date	Prep Date	Analysis Date	Tag	Inst Id	Analyst
L0609457-10	SITE4-SB08-01		10/04/06 18:04		DL01	FILTER	JWR
L0609457-11	SITE4-SB08-02		10/04/06 18:04		DL01	FILTER	JWR
L0609457-13	SITE4-SB13-01		10/04/06 18:04		DL01	FILTER	JWR

Kemron Environmental Services
Analyst Listing
October 6, 2006

AJF - AMANDA J. FICKIESEN
ALB - ANNIE L. BOCK
ALT - ANN L. THAYER
ARA - ADRIAN R. ACHTERMANN
BRG - BRENDA R. GREGORY
CAA - CASSIE A. AUGENSTEIN
CAF - CHERYL A. FLOWERS
CAK - CHERYL A. KOELSCH
CEB - CHAD E. BARNES
CFB - CHAD F. BOOK
CLC - CHRYS L. CRAWFORD
CLS - CARA L. STRICKLER
CLW - CHARISSA L. WINTERS
CM - CHARLIE MARTIN
CMS - CRYSTAL M. STEPHENS
CPD - CHAD P. DAVIS
CSA - LUCINDA S. ARNOLD
CSH - CHRIS S. HILL
DAS - DALLAS A. SULLIVAN
DD - DIANE M. DENNIS
DDE - DEBRA D. ELLIOTT
DEL - DON E. LIGHTFRITZ
DEV - DAVID E. VANDENBERG
DGB - DOUGLAS G. BUTCHER
DIH - DEANNA I. HESSON
DJ - DONGPING JIANG
DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE
DLR - DIANNA L. RAUCH
DR - DEANNA ROBERTS
DRP - DAVE R. PITZER
DSM - DAVID S. MOSSOR
DST - DENNIS S. TEPE
ECL - ERIC C. LAWSON
ED - EMILY E. DECKER
FJB - FRANCES J. BOLDEN
HAV - HEMA VILASAGAR
JAL - JOHN A. LENT
JKT - JANE K. THOMPSON
JLS - JANICE L. SCHIMMEL
JNB - JOSHUA N. BOOTH
JS - JENNIFER L. SOUTHALL
JWR - JOHN W. RICHARDS
JWS - JACK W. SHEAVES
JYH - JI Y. HU
KCZ - KEVIN C. ZUMBRO
KEB - KATHRYN E. BARNES
KHR - KIM H. RHODES
KRA - KATHY R. ALBERTSON
LKN - LINDA K. NEDEFF
LSB - LESLIE S. BUCINA
MDA - MIKE D. ALBERTSON
MDC - MICHAEL D. COCHRAN
MES - MARY E. SCHILLING
MKZ - MARILYN K. ZUMBRO
MLR - MARY L. ROCHOTTE
MLS - MICHAEL L. SCHIMMEL
MMB - MAREN M. BEERY
MSW - MATT S. WILSON
NJB - NATALIE J. BOOTH
PAS - PATRICK A. STREET
PJM - PAUL J. MILLER
RB - ROBERT BUCHANAN
RDC - REBECCA D. CUTLIP
REK - ROBERT E. KYER
RNP - RICK N. PETTY
RWC - RODNEY W. CAMPBELL
SCM - SUSAN C. MOELLENDICK
SLM - STEPHANIE L. MOSSBURG
SLP - SHERI L. PFALZGRAF
SMH - SHAUNA M. HYDE
SRM - SAMUEL R. MCFEE
TMB - TIFFANY M. BAILEY
TMM - TAMMY M. MORRIS
VC - VICKI COLLIER
WFM - WALTER F. MARTIN

KEMRON Environmental Services

List of Valid Qualifiers

October 06, 2006

00072769

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
FL	Free Liquid
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	ESTIMATE & COLUMNS DON'T AGREE TO WITHIN 40%
L	Sample reporting limits elevated due to matrix interference
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound an are matrix dependent.

Organic QA/QC

00072771

KEMRON Environmental Services
Data Checklist

Date: 13-SEP-2006
Analyst: MES
Analyst: NA
Method: 8260
Instrument: HPMS9
Curve Workgroup: NA
Runlog ID: 12261
Analytical Workgroups: WG222144,WG222227

System Performance Check	NA
BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	X
Project/Client Specific Requirements	X
Special Standards	NA
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	X
Samples	X
TCL Hits	X
Spectra of TCL Hits	X
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	NA
Reruns	X
Manual Integrations	X
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	MES
Secondary Reviewer	MDA
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Check the reasonableness of the results	X

Primary Reviewer: 14-SEP-2006

Secondary Reviewer: 14-SEP-2006

Generated: SEP-14-2006 23:02:57

00072772

KEMRON Environmental Services
Data Checklist

Date: 24-SEP-2006
Analyst: MES
Analyst: NA
Method: 8260
Instrument: HPMS9
Curve Workgroup: NA
Runlog ID: 12496
Analytical Workgroups: WG223178

System Performance Check	NA
BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	X
Project/Client Specific Requirements	X
Special Standards	X
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	X
Samples	X
TCL Hits	X
Spectra of TCL Hits	X
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	NA
Reruns	X
Manual Integrations	NA
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	MES
Secondary Reviewer	MDA
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Check the reasonableness of the results	X

Primary Reviewer:
27-SEP-2006

Secondary Reviewer:
28-SEP-2006

Generated: SEP-28-2006 17:22:03

00072773

KEMRON Environmental Services
Data Checklist

Date: 25-SEP-2006
Analyst: MES
Analyst: NA
Method: 8260
Instrument: HPMS9
Curve Workgroup: NA
Runlog ID: 12505
Analytical Workgroups: WG223214

System Performance Check	NA
BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	X
Project/Client Specific Requirements	X
Special Standards	NA
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	NA
Samples	X
TCL Hits	X
Spectra of TCL Hits	X
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	NA
Reruns	X
Manual Integrations	X
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	MES
Secondary Reviewer	MDA
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Check the reasonableness of the results	X

Primary Reviewer: 27-SEP-2006

Secondary Reviewer: 28-SEP-2006

Generated: SEP-28-2006 23:14:31

00072774

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS9 Dataset: 091306
Analyst1: MES Analyst2: NA
Method: 8260B SOP: MSV01 Rev: 10
Method: 5030/5035 SOP: PAT01 Rev: 10

Maintenance Log ID: 15644

Internal Standard: STD14996 Surrogate Standard: STD15001
CCV: STD14999 LCS: STD14925 MS/MSD: STD14925

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG222144,WG222227

Comments:

Seq.	File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
1	9M48520	WG222144-01 50NG BFB STD 8260	NA	7	1	STD14811	09/13/06 08:35
2	9M48521	SYSTEM BLANK	NA	7	1		09/13/06 08:57
3	9M48522	WG222144-02 0.5ug/Kg SOIL STD 8260	NA	7	1	STD14999	09/13/06 09:28
4	9M48523	WG222144-03 1ug/Kg SOIL STD 8260	NA	7	1	STD14999	09/13/06 10:00
5	9M48524	WG222144-04 2ug/Kg SOIL STD 8260	NA	7	1	STD14999	09/13/06 10:32
6	9M48525	WG222144-05 5ug/Kg SOIL STD 8260	NA	7	1	STD14999	09/13/06 11:03
7	9M48526	WG222144-06 10ug/Kg SOIL STD 8260	NA	7	1	STD14999	09/13/06 11:34
8	9M48527	WG222144-07 20ug/Kg SOIL STD 8260	NA	7	1	STD14999	09/13/06 12:05
9	9M48528	WG222144-08 50ug/Kg SOIL STD 8260	NA	7	1	STD14999	09/13/06 12:36
10	9M48529	WG222144-09 100ug/Kg SOIL STD 8260	NA	7	1	STD14999	09/13/06 13:08
11	9M48530	WG222144-10 200 ug/Kg SOIL STD 8260	NA	7	1	STD14999	09/13/06 13:38
12	9M48531	SYSTEM BLANK	NA	7	1		09/13/06 14:09
13	9M48532	SYSTEM BLANK	NA	7	1		09/13/06 14:40
14	9M48533	WG222144-05 5ug/Kg SOIL STD 8260	NA	7	1	STD14999	09/13/06 15:11
15	9M48534	WG222144-11 20ug/Kg ALT SOURCE	NA	7	1	STD14925	09/13/06 16:03
16	9M48535	WG222144-11 20ug/Kg ALT SOURCE	NA	7	1	STD14925	09/13/06 16:45
17	9M48536	WG222226-01 50NG BFB STD 8260	NA	7	1	STD14811	09/13/06 17:16
18	9M48537	WG222226-02 50ug/Kg SOIL STD 8260	NA	7	1	STD14999	09/13/06 17:39
19	9M48538	SYSTEM BLANK	NA	7	1		09/13/06 18:10
20	9M48539	WG222144-11 20ug/Kg ALT SOURCE	NA	7	1	STD14925	09/13/06 18:41
21	9M48540	WG222227-01 VBLK0913 BLANK 8260	NA	7	1		09/13/06 19:13
22	9M48541	WG222227-02 20ug/Kg LCS 8260	NA	7	1	STD14925	09/13/06 19:44
23	9M48542	L0609168-10 B 0.9X 826-SPE	NA	7	1		09/13/06 20:15
24	9M48543	L0609124-06 8260A	NA	7	1		09/13/06 20:45
25	9M48544	L0609124-07 A1 8260A	NA	7	1		09/13/06 21:16
26	9M48545	L0609124-08 8260A	NA	7	1		09/13/06 21:48
27	9M48546	L0609212-11 A 0.8X 8260	NA	7	1		09/13/06 22:19
28	9M48547	L0609212-12 MS A 0.8X 8260	NA	7	1		09/13/06 22:50
29	9M48548	L0609212-13 MSD A 0.9X 8260	NA	7	1		09/13/06 23:21
30	9M48549	L0609212-14 A 0.8X 8260	NA	7	1		09/13/06 23:52
31	9M48550	L0609212-16 A 0.9X 8260	NA	7	1		09/14/06 00:24
32	9M48551	L0609262-01 A 0.7X 8260	NA	7	1		09/14/06 00:56

Approved: September 14, 2006

00072775

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS9 Dataset: 091306
Analyst1: MES Analyst2: NA
Method: 8260B SOP: MSV01 Rev: 10
Method: 5030/5035 SOP: PAT01 Rev: 10

Maintenance Log ID: 15644

Internal Standard: STD14996 Surrogate Standard: STD15001
CCV: STD14999 LCS: STD14925 MS/MSD: STD14925

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG222144,WG222227

Seq.	File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
33	9M48552	L0609262-02 A 0.7X 8260	NA	7	1		09/14/06 01:27
34	9M48553	L0609262-03 A 0.7X 8260	NA	7	1		09/14/06 01:58
35	9M48554	L0609262-04 A 0.7X 8260	NA	7	1		09/14/06 02:29
36	9M48555	L0609262-05 A 0.7X 8260	NA	7	1		09/14/06 03:01
37	9M48556	L0609262-06 A 0.7X 8260	NA	7	1		09/14/06 03:32
38	9M48557	L0609262-07 A 0.7X 8260	NA	7	1		09/14/06 04:04
39	9M48558	L0609262-08 A 0.7X 8260	NA	7	1		09/14/06 04:35
40	9M48559	SYSTEM BLANK	NA	7	1		09/14/06 05:07
41	9M48560	SYSTEM BLANK	NA	7	1		09/14/06 05:39

Comments

Seq.	Rerun	Dil.	Reason	Analytes
6				
File ID: 9M48525				
	Do not report.			
15				
File ID: 9M48534				
	RR-acetone is high.			
16				
File ID: 9M48535				
	RR-spiked wrong-no acrolein or acrylonitrile.			
23				
File ID: 9M48542				
	Do not report-confirms high baseline.			
24	X	5	Surrogate standard failure	
File ID: 9M48543				
26				
File ID: 9M48545				
	Do not report.			
30	X	1	Surrogate standard failure	
File ID: 9M48549				
31	X	1	Surrogate standard failure	

Approved: September 14, 2006

00072776

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS9 Dataset: 091306
Analyst1: MES Analyst2: NA
Method: 8260B SOP: MSV01 Rev: 10
Method: 5030/5035 SOP: PAT01 Rev: 10

Maintenance Log ID: 15644

Internal Standard: STD14996 Surrogate Standard: STD15001
CCV: STD14999 LCS: STD14925 MS/MSD: STD14925

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG222144,WG222227

Comments

Seq.	Rerun	Dil.	Reason	Analytes
File ID: 9M48550				
32	X	1	Surrogate standard failure	
File ID: 9M48551				
33	X	1	Surrogate standard failure	
File ID: 9M48552				
36	X	1	Surrogate standard failure	
File ID: 9M48555				
37	X	1	Surrogate standard failure	
File ID: 9M48556				

Approved: September 14, 2006

00072777

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS9 Dataset: 092406
Analyst1: MES Analyst2: NA
Method: 8260B SOP: MSV01 Rev: 10
Method: 5030/5035 SOP: PAT01 Rev: 10

Maintenance Log ID: 15869

Internal Standard: STD15290 Surrogate Standard: STD15001
CCV: STD15104 LCS: STD15161/STD15165 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG223178

Comments:

Seq.	File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
1	9M48865	WG223177-01 50NG BFB STD 8260	NA	7	1	STD14811	09/24/06 10:35
2	9M48866	WG223177-02 50ug/Kg SOIL STD 8260	NA	7	1	STD15104;STD15164	09/24/06 11:06
3	9M48867	WG223177-03 100ug/Kg FOO/APPIX STD	NA	7	1	STD15164	09/24/06 11:37
4	9M48868	WG223178-01 VBLK0924 BLANK 8260	NA	7	1		09/24/06 12:08
5	9M48869	WG223178-02 20ug/Kg LCS 8260	NA	7	1	STD15161	09/24/06 12:39
6	9M48870	WG223178-03 FOO/APPIX LCS	NA	7	1	STD15165	09/24/06 13:11
7	9M48871	L0609473-01 B 1.1X 826-SPE1	NA	7	1		09/24/06 13:43
8	9M48872	L0609499-15 A 0.9X 8260	NA	7	1		09/24/06 14:14
9	9M48873	L0609499-16 MS A 1X 8260	NA	7	1		09/24/06 14:45
10	9M48874	L0609499-17 MSD A 0.9X 8260	NA	7	1		09/24/06 15:16
11	9M48875	L0609409-33 A 1.1X 826-SPE1	NA	7	1		09/24/06 15:47
12	9M48876	L0609409-37 A 0.9X 826-SPE1	NA	7	1		09/24/06 16:19
13	9M48877	L0609409-38 A 0.9X 826-SPE1	NA	7	1		09/24/06 16:51
14	9M48878	L0609409-39 A 0.9X 826-SPE1	NA	7	1		09/24/06 17:22
15	9M48879	L0609409-40 A 0.9X 826-SPE1	NA	7	1		09/24/06 17:54
16	9M48880	L0609409-41 A 0.9X 826-SPE1	NA	7	1		09/24/06 18:25
17	9M48881	L0609409-45 A 1.2X 826-SPE1	NA	7	1		09/24/06 18:55
18	9M48882	L0609409-46 A 1X 826-SPE1	NA	7	1		09/24/06 19:37
19	9M48883	L0609409-47 A 0.9X 826-SPE1	NA	7	1		09/24/06 20:08
20	9M48884	L0609409-48 A 0.9X 826-SPE1	NA	7	1		09/24/06 20:40
21	9M48885	L0609409-49 B 0.9X 826-SPE1	NA	7	1		09/24/06 21:12
22	9M48886	L0609457-01 A 0.8X 8260	NA	7	1		09/24/06 21:44
23	9M48887	L0609457-03 A 0.9X 8260	NA	7	1		09/24/06 22:16
24	9M48888	L0609430-01 5X 8260	NA	10	1		09/24/06 22:47
25	9M48889	SYSTEM BLANK	NA	7	1		09/24/06 23:19
26	9M48890	5035 BLANK A 9/18/06	NA	7	1		09/24/06 23:51
27	9M48891	5035 BLANK A 9/20/06	NA	7	1		09/25/06 00:23
28	9M48892	SYSTEM CHECK	NA	7	1		09/25/06 00:55
29	9M48893	SYSTEM CHECK	NA	7	1		09/25/06 01:27
30	9M48894	SYSTEM BLANK	NA	7	1		09/25/06 01:59

Comments

Approved: September 28, 2006

00072778

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS9 Dataset: 092406
Analyst1: MES Analyst2: NA
Method: 8260B SOP: MSV01 Rev: 10
Method: 5030/5035 SOP: PAT01 Rev: 10

Maintenance Log ID: 15869

Internal Standard: STD15290 Surrogate Standard: STD15001
CCV: STD15104 LCS: STD15161/STD15165 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG223178

Comments

Seq.	Rerun	Dil.	Reason	Analytes
13	X	100	Over Calibration Range	acetone
File ID: 9M48877				
24	X	1	Missed Tune	
File ID: 9M48888				

Approved: September 28, 2006

Page: 2 of 2

00072779

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS9 Dataset: 092506
Analyst1: MES Analyst2: NA
Method: 8260B SOP: MSV01 Rev: 10
Method: 5030/5035 SOP: PAT01 Rev: 10

Maintenance Log ID: 15875

Internal Standard: STD15290 Surrogate Standard: STD15001
CCV: STD15104 LCS: STD15161 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG223214

Comments:

Seq.	File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
1	9M48896	WG223213-01 50NG BFB STD 8260	NA	7	1	STD14811	09/25/06 08:38
2	9M48897	WG223213-01 50NG BFB STD 8260	NA	7	1	STD14811	09/25/06 08:54
3	9M48898	WG223213-02 50ug/Kg SOIL STD 8260	NA	7	1	STD15104	09/25/06 09:16
4	9M48899	WG223214-01 VBLK0925 BLANK 8260	NA	7	1		09/25/06 09:48
5	9M48900	WG223214-02 20ug/Kg LCS 8260	NA	7	1	STD15161	09/25/06 10:20
6	9M48901	L0609457-04 A 0.9X 8260	NA	7	1		09/25/06 10:52
7	9M48902	L0609499-02 A 0.8X 8260	NA	7	1		09/25/06 11:23
8	9M48903	L0609499-04 A 1.2X 8260	NA	7	1		09/25/06 11:55
9	9M48904	L0609499-06 A 0.8X 8260	NA	7	1		09/25/06 12:26
10	9M48905	L0609499-08 A 1.1X 8260	NA	7	1		09/25/06 12:57
11	9M48906	L0609430-01 8260	NA	10	1		09/25/06 13:28
12	9M48907	L0609459-07 8260	NA	7	1		09/25/06 14:00
13	9M48908	SYSTEM BLANK	NA	7	1		09/25/06 14:31
14	9M48909	SYSTEM BLANK	NA	7	1		09/25/06 15:53
15	9M48910	SYSTEM BLANK	NA	7	1		09/25/06 16:24
16	9M48911	L0609430-01 8260	NA	10	1		09/25/06 16:56
17	9M48912	L0609430-01 D1 5X 8260	NA	10	1		09/25/06 17:27
18	9M48913	SYSTEM BLANK	NA	7	1		09/25/06 17:58
19	9M48914	WG223214-03 20ug/L LCSDUP	NA	7	1	STD15161	09/25/06 18:29
20	9M48915	SYSTEM BLANK	NA	7	1		09/25/06 19:01
21	9M48916	SYSTEM BLANK	NA	7	1		09/25/06 19:33
22	9M48917	L0609459-07 8260	NA	7	1		09/25/06 20:04
23	9M48918	L0609499-11 A 0.9X 8260	NA	7	1		09/25/06 20:35
24	9M48919	SYSTEM BLANK	NA	7	1		09/25/06 21:07
25	9M48920	5035 BLANK A 9/21/06	NA	7	1		09/25/06 21:39
26	9M48921	SYSTEM CHECK	NA	7	1		09/25/06 22:11
27	9M48922	SYSTEM CHECK	NA	7	1		09/25/06 22:43
28	9M48923	SYSTEM BLANK	NA	7	1		09/25/06 23:14

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Approved: September 28, 2006

00072780

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS9 Dataset: 092506
Analyst1: MES Analyst2: NA
Method: 8260B SOP: MSV01 Rev: 10
Method: 5030/5035 SOP: PAT01 Rev: 10

Maintenance Log ID: 15875

Internal Standard: STD15290 Surrogate Standard: STD15001
CCV: STD15104 LCS: STD15161 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG223214

Comments

Seq.	Rerun	Dil.	Reason	Analytes
8	X	100	Over Calibration Range	methylene chloride, cis-1,2,1,1,1-TCA,TCE
File ID: 9M48903				
9	X	1000	Over Calibration Range	vc,cis-1,2,TCE,1,1-DCE,1,1,1-TCA,ethyl,styrene
File ID: 9M48904				
10	X	1	Carry-over contamination	
File ID: 9M48905				
	Do not report.			
11	X	1	Carry-over contamination	
File ID: 9M48906				
	Do not report.			
12	X	1	Carry-over contamination	
File ID: 9M48907				
	Do not report.			
16	X	5	Over Calibration Range	IS,acetone,2-butanone
File ID: 9M48911				

Approved: September 28, 2006

KEMRON ENVIRONMENTAL SERVICES

VOA Preservation and Extraction Log

Analyst: SMH Date Preserved: 9-20-06 Method: 8015 / 8260

Client	Sample #	Fraction ID	Date Collected	Time Collected	Time Preserved	Tare Wt. (g)	Total Wt. (g)	Sample Wt. (g)	Water Vol. (mL)	Methanol Vol. (mL)	Comments	Team Notified
BRKAFB-016	L0609211-09	N/A	9-7-06	N/A	N/A	N/A	N/A	5.01	5	N/A	8015	
SHAW-ALLIANCE-798	L0609457-01	A	9-19-06	0921	1100	N/A	N/A	6.16	5	–	8260, 5	
↓	↓	B	↓	↓	↓	↓	↓	6.04	5	–	↓	
↓	↓	C	↓	↓	↓	↓	↓	6.09	–	10	↓	
↓	-03	A	↓	1148	1105	↓	↓	5.75	5	–	↓	
↓	↓	B	↓	↓	↓	↓	↓	5.54	5	–	↓	
↓	↓	C	↓	↓	↓	↓	↓	5.61	–	10	↓	
↓	-04	A	↓	1215	1108	↓	↓	5.82	5	–	↓	
↓	↓	B	↓	↓	↓	↓	↓	6.06	5	–	↓	
↓	↓	C	↓	↓	↓	↓	↓	5.57	–	10	↓	
N/A	BLANK	A	N/A	N/A	N/A	↓	↓	5.00	5	–	↓	
↓	↓	B	↓	↓	↓	↓	↓	↓	5	–	↓	
↓	↓	C	↓	↓	↓	↓	↓	↓	–	10	↓	
SHAW-ALLIANCE-798	L0609459-07	A	9-19-06	1058	1130	↓	↓	5.65	5	–	8260, 5	
↓	↓	B	↓	↓	↓	↓	↓	5.44	5	–	↓	
↓	↓	C	↓	↓	↓	↓	↓	5.54	–	10	↓	
KEMRON-838	L0609 389-01	N/A	9-15-06	N/A	N/A	↓	↓	4.60	5	N/A	8015	
↓	↓ -02	↓	↓	↓	↓	↓	↓	4.64	↓	↓	↓	
↓	↓ -03	↓	↓	↓	↓	↓	↓	4.93	↓	↓	↓	
↓	↓ -04	↓	↓	↓	↓	↓	↓	4.52	↓	↓	↓	
ENSR-509	L0609470-01	A	9-19-06	1720	1335	N/A	N/A	5.82	5	–	8260, 5	
↓	↓	B	↓	↓	↓	↓	↓	5.83	5	–	↓	
↓	↓	C	↓	↓	↓	↓	↓	5.36	–	10	↓	

SMH 9-20-06

Comments:
1 = improperly sealed cap
2 = preserved out of hold (past 48 hours from time of collection)
3 = effervesced
4 = preserved with NaHSO4 (sodium bisulfate)
5 = preserved by freezing

Methanol (Manufacturer, Lot #) B&J CP805

NaHSO4 (Manufacturer, Lot #) N/A

Reviewed by: _____

KEMRON Environmental Services
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

00072782

Analytical Method: 8260B

AAB#: WG223178

Login Number: L0609457

Client ID	Date Collected	Date Received	Date Extracted	Max Hold Time Ext.	Time Held Ext.	Date Analyzed	Max Hold Time Anal	Time Held Anal.	Q
35-SMP92-SB01-02	09/19/06	09/20/06	09/24/06	14	5.52	09/24/06	14	5.52	
35-SMP117-SB01-02	09/19/06	09/20/06	09/24/06	14	5.44	09/24/06	14	5.44	

* EXT = SEE PROJECT QAPP REQUIREMENTS
*ANAL = SEE PROJECT QAPP REQUIREMENTS

KEMRON FORMS - Modified 02/14/2006
Version 1.5 PDF File ID: 580450
Report generated 09/29/2006 09:47

KEMRON Environmental Services
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

00072783

Analytical Method: 8260B

AAB#: WG223214

Login Number: L0609457

Client ID	Date Collected	Date Received	Date Extracted	Max Hold Time Ext.	Time Held Ext.	Date Analyzed	Max Hold Time Anal	Time Held Anal.	Q
35-SMP117-SB02-02	09/19/06	09/20/06	09/25/06	14	5.94	09/25/06	14	5.94	

* EXT = SEE PROJECT QAPP REQUIREMENTS
*ANAL = SEE PROJECT QAPP REQUIREMENTS

KEMRON FORMS - Modified 02/14/2006
Version 1.5 PDF File ID: 580450
Report generated 09/29/2006 09:47

SURROGATE STANDARDS

00072784

Login Number: L0609457
Instrument Id: HPMS9
Workgroup (AAB#): WG223178

Method: 8260
CAL ID: HPMS9-13-SEP-06
Matrix: Soil

Sample Number	Dilution	Tag	1	2	3	4
L0609457-01	1.00	01	101	91.3	88.7	92.7
L0609457-03	1.00	01	106	92.8	89.2	91.9
WG223178-01	1.00	01	96.1	92.1	90.4	93.7
WG223178-02	1.00	01	97.6	91.8	92.0	93.6

Surrogates	Surrogate Limits		
1 - 1,2-Dichloroethane-d4	80	-	120
2 - Dibromofluoromethane	80	-	120
3 - 4-Bromofluorobenzene	74	-	121
4 - Toluene-d8	81	-	117

Underline = Result out of surrogate limits

DL = surrogate diluted out
ND = surrogate not detected

KEMRON FORMS - Modified 09/27/2006
Version 1.5 PDF File ID: 580460
Report generated 09/29/2006 09:53

SURROGATE STANDARDS

00072785

Login Number: L0609457
Instrument Id: HPMS9
Workgroup (AAB#): WG223214

Method: 8260
CAL ID: HPMS9-13-SEP-06
Matrix: Soil

Sample Number	Dilution	Tag	1	2	3	4
L0609457-04	1.00	01	94.9	90.7	89.7	92.2
WG223214-01	1.00	01	96.0	91.9	88.9	93.9
WG223214-02	1.00	01	97.1	91.6	90.7	94.0
WG223214-03	1.00	01	93.2	90.4	89.7	93.9

Surrogates	Surrogate Limits		
1 - 1,2-Dichloroethane-d4	80	-	120
2 - Dibromofluoromethane	80	-	120
3 - 4-Bromofluorobenzene	74	-	121
4 - Toluene-d8	81	-	117

Underline = Result out of surrogate limits

DL = surrogate diluted out
ND = surrogate not detected

KEMRON FORMS - Modified 09/27/2006
Version 1.5 PDF File ID: 580460
Report generated 09/29/2006 09:53

00072786

METHOD BLANK SUMMARY

Login Number: L0609457
Blank File ID: 9M48868
Date Analyzed: 09/24/06
Time Analyzed: 12:08
Analyst: MES

Work Group: WG223178
Blank Sample ID: WG223178-01
Instrument ID: HPMS9
Method: 8260B

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG223178-02	9M48869	09/24/06 12:39	01
35-SMP92-SB01-02	L0609457-01	9M48886	09/24/06 21:44	01
35-SMP117-SB01-02	L0609457-03	9M48887	09/24/06 22:16	01

00072787

METHOD BLANK SUMMARY

Login Number: L0609457
Blank File ID: 9M48899
Date Analyzed: 09/25/06
Time Analyzed: 09:48
Analyst: MES

Work Group: WG223214
Blank Sample ID: WG223214-01
Instrument ID: HPMS9
Method: 8260B

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG223214-02	9M48900	09/25/06 10:20	01
35-SMP117-SB02-02	L0609457-04	9M48901	09/25/06 10:52	01
LCS2	WG223214-03	9M48914	09/25/06 18:29	01

KEMRON Environmental Services

METHOD BLANK REPORT

00072788

Login Number: L0609457 Run Date: 09/24/2006 Sample ID: WG223178-01
Instrument ID: HPMS9 Run Time: 12:08 Prep Method: 5030B
File ID: 9M48868 Analyst: MES Method: 8260B
Workgroup (AAB#): WG223178 Matrix: Soil Units: ug/kg
Contract #: DACA56-94-D-0020 Cal ID: HPMS9-13-SEP-06

Analytes	SQL	PQL	Concentration	Dilution	Qualifier
Acetone	5.00	10.0	5.00	1	U
Benzene	0.500	5.00	0.500	1	U
Bromobenzene	0.500	5.00	0.500	1	U
Bromochloromethane	0.500	5.00	0.500	1	U
Bromodichloromethane	0.500	5.00	0.500	1	U
Bromoform	0.500	5.00	0.500	1	U
Bromomethane	1.00	10.0	1.00	1	U
2-Butanone	2.50	10.0	2.50	1	U
n-Butylbenzene	0.500	5.00	0.500	1	U
sec-Butylbenzene	0.500	5.00	0.500	1	U
tert-Butylbenzene	0.500	5.00	0.500	1	U
Carbon disulfide	0.500	5.00	0.500	1	U
Carbon tetrachloride	0.500	5.00	0.500	1	U
Chlorobenzene	0.500	5.00	0.500	1	U
Chlorodibromomethane	0.500	5.00	0.500	1	U
Chloroethane	1.00	10.0	1.00	1	U
2-Chloroethyl vinyl ether	2.00	10.0	2.00	1	U
Chloroform	0.500	5.00	0.500	1	U
Chloromethane	2.00	10.0	2.00	1	U
2-Chlorotoluene	0.500	5.00	0.500	1	U
4-Chlorotoluene	0.500	5.00	0.500	1	U
1,2-Dibromo-3-chloropropane	2.00	5.00	2.00	1	U
1,2-Dibromoethane	0.500	5.00	0.500	1	U
Dibromomethane	0.500	5.00	0.500	1	U
1,2-Dichlorobenzene	0.500	5.00	0.500	1	U
1,3-Dichlorobenzene	0.500	5.00	0.500	1	U
1,4-Dichlorobenzene	0.500	5.00	0.500	1	U
Dichlorodifluoromethane	1.00	10.0	1.00	1	U
1,1-Dichloroethane	1.00	5.00	1.00	1	U
1,2-Dichloroethane	0.500	5.00	0.500	1	U
1,1-Dichloroethene	0.500	5.00	0.500	1	U
cis-1,2-Dichloroethene	0.500	5.00	0.500	1	U
trans-1,2-Dichloroethene	0.500	5.00	0.500	1	U
1,2-Dichloropropane	0.500	5.00	0.500	1	U
1,3-Dichloropropane	0.500	5.00	0.500	1	U
2,2-Dichloropropane	0.500	5.00	0.500	1	U
cis-1,3-Dichloropropene	0.500	5.00	0.500	1	U
trans-1,3-Dichloropropene	0.500	5.00	0.500	1	U
1,1-Dichloropropene	0.500	5.00	0.500	1	U
Ethylbenzene	0.500	5.00	0.500	1	U
2-Hexanone	2.50	10.0	2.50	1	U
Hexachlorobutadiene	0.500	5.00	0.500	1	U

KEMRON FORMS - Modified 09/27/2006
Version 1.5 PDF File ID: 580452
Report generated 09/29/2006 09:47

KEMRON Environmental Services

METHOD BLANK REPORT

00072789

Login Number: L0609457 Run Date: 09/24/2006 Sample ID: WG223178-01
Instrument ID: HPMS9 Run Time: 12:08 Prep Method: 5030B
File ID: 9M48868 Analyst: MES Method: 8260B
Workgroup (AAB#): WG223178 Matrix: Soil Units: ug/kg
Contract #: DACA56-94-D-0020 Cal ID: HPMS9-13-SEP-06

Analytes	SQL	PQL	Concentration	Dilution	Qualifier
Isopropylbenzene	0.500	5.00	0.500	1	U
p-Isopropyltoluene	0.500	5.00	0.500	1	U
4-Methyl-2-pentanone	2.50	10.0	2.50	1	U
Methylene chloride	1.00	5.00	1.00	1	U
Naphthalene	0.500	10.0	0.500	1	U
n-Propylbenzene	0.500	5.00	0.500	1	U
Styrene	0.500	5.00	0.500	1	U
1,1,1,2-Tetrachloroethane	0.500	5.00	0.500	1	U
1,1,2,2-Tetrachloroethane	0.500	5.00	0.500	1	U
Tetrachloroethene	0.500	5.00	0.500	1	U
Toluene	0.500	5.00	0.500	1	U
1,2,3-Trichlorobenzene	0.500	5.00	0.500	1	U
1,2,4-Trichlorobenzene	0.500	5.00	0.500	1	U
1,1,1-Trichloroethane	0.500	5.00	0.500	1	U
1,1,2-Trichloroethane	0.500	5.00	0.500	1	U
Trichloroethene	0.500	5.00	0.500	1	U
Trichlorofluoromethane	1.00	10.0	1.00	1	U
1,2,3-Trichloropropane	1.00	5.00	1.00	1	U
1,2,4-Trimethylbenzene	0.500	5.00	0.500	1	U
1,3,5-Trimethylbenzene	0.500	5.00	0.500	1	U
Vinyl acetate	1.00	10.0	1.00	1	U
Vinyl chloride	1.00	10.0	1.00	1	U
o-Xylene	0.500	5.00	0.500	1	U
m-,p-Xylene	0.500	5.00	0.500	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
Dibromofluoromethane	92.1	80 - 120	PASS
1,2-Dichloroethane-d4	96.1	80 - 120	PASS
Toluene-d8	93.7	81 - 117	PASS
4-Bromofluorobenzene	90.4	74 - 121	PASS

MDL Method Detection Limit
RL Reporting/quantitation Limit

* Analyte concentration > RL

KEMRON FORMS - Modified 09/27/2006
Version 1.5 PDF File ID: 580452
Report generated 09/29/2006 09:47

KEMRON Environmental Services

METHOD BLANK REPORT

00072790

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223214-01
Instrument ID: HPMS9 Run Time: 09:48 Prep Method: 5030B
File ID: 9M48899 Analyst: MES Method: 8260B
Workgroup (AAB#): WG223214 Matrix: Soil Units: ug/kg
Contract #: DACA56-94-D-0020 Cal ID: HPMS9-13-SEP-06

Analytes	SQL	PQL	Concentration	Dilution	Qualifier
Acetone	5.00	10.0	5.00	1	U
Benzene	0.500	5.00	0.500	1	U
Bromobenzene	0.500	5.00	0.500	1	U
Bromochloromethane	0.500	5.00	0.500	1	U
Bromodichloromethane	0.500	5.00	0.500	1	U
Bromoform	0.500	5.00	0.500	1	U
Bromomethane	1.00	10.0	1.00	1	U
2-Butanone	2.50	10.0	2.50	1	U
n-Butylbenzene	0.500	5.00	0.500	1	U
sec-Butylbenzene	0.500	5.00	0.500	1	U
tert-Butylbenzene	0.500	5.00	0.500	1	U
Carbon disulfide	0.500	5.00	0.500	1	U
Carbon tetrachloride	0.500	5.00	0.500	1	U
Chlorobenzene	0.500	5.00	0.500	1	U
Chlorodibromomethane	0.500	5.00	0.500	1	U
Chloroethane	1.00	10.0	1.00	1	U
2-Chloroethyl vinyl ether	2.00	10.0	2.00	1	U
Chloroform	0.500	5.00	0.500	1	U
Chloromethane	2.00	10.0	2.00	1	U
2-Chlorotoluene	0.500	5.00	0.500	1	U
4-Chlorotoluene	0.500	5.00	0.500	1	U
1,2-Dibromo-3-chloropropane	2.00	5.00	2.00	1	U
1,2-Dibromoethane	0.500	5.00	0.500	1	U
Dibromomethane	0.500	5.00	0.500	1	U
1,2-Dichlorobenzene	0.500	5.00	0.500	1	U
1,3-Dichlorobenzene	0.500	5.00	0.500	1	U
1,4-Dichlorobenzene	0.500	5.00	0.500	1	U
Dichlorodifluoromethane	1.00	10.0	1.00	1	U
1,1-Dichloroethane	1.00	5.00	1.00	1	U
1,2-Dichloroethane	0.500	5.00	0.500	1	U
1,1-Dichloroethene	0.500	5.00	0.500	1	U
cis-1,2-Dichloroethene	0.500	5.00	0.500	1	U
trans-1,2-Dichloroethene	0.500	5.00	0.500	1	U
1,2-Dichloropropane	0.500	5.00	0.500	1	U
1,3-Dichloropropane	0.500	5.00	0.500	1	U
2,2-Dichloropropane	0.500	5.00	0.500	1	U
cis-1,3-Dichloropropene	0.500	5.00	0.500	1	U
trans-1,3-Dichloropropene	0.500	5.00	0.500	1	U
1,1-Dichloropropene	0.500	5.00	0.500	1	U
Ethylbenzene	0.500	5.00	0.500	1	U
2-Hexanone	2.50	10.0	2.50	1	U
Hexachlorobutadiene	0.500	5.00	0.500	1	U

KEMRON FORMS - Modified 09/27/2006
Version 1.5 PDF File ID: 580452
Report generated 09/29/2006 09:47

KEMRON Environmental Services

METHOD BLANK REPORT

00072791

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223214-01
Instrument ID: HPMS9 Run Time: 09:48 Prep Method: 5030B
File ID: 9M48899 Analyst: MES Method: 8260B
Workgroup (AAB#): WG223214 Matrix: Soil Units: ug/kg
Contract #: DACA56-94-D-0020 Cal ID: HPMS9-13-SEP-06

Analytes	SQL	PQL	Concentration	Dilution	Qualifier
Isopropylbenzene	0.500	5.00	0.500	1	U
p-Isopropyltoluene	0.500	5.00	0.500	1	U
4-Methyl-2-pentanone	2.50	10.0	2.50	1	U
Methylene chloride	1.00	5.00	1.00	1	U
Naphthalene	0.500	10.0	0.500	1	U
n-Propylbenzene	0.500	5.00	0.500	1	U
Styrene	0.500	5.00	0.500	1	U
1,1,1,2-Tetrachloroethane	0.500	5.00	0.500	1	U
1,1,2,2-Tetrachloroethane	0.500	5.00	0.500	1	U
Tetrachloroethene	0.500	5.00	0.500	1	U
Toluene	0.500	5.00	0.500	1	U
1,2,3-Trichlorobenzene	0.500	5.00	0.500	1	U
1,2,4-Trichlorobenzene	0.500	5.00	0.500	1	U
1,1,1-Trichloroethane	0.500	5.00	0.500	1	U
1,1,2-Trichloroethane	0.500	5.00	0.500	1	U
Trichloroethene	0.500	5.00	0.500	1	U
Trichlorofluoromethane	1.00	10.0	1.00	1	U
1,2,3-Trichloropropane	1.00	5.00	1.00	1	U
1,2,4-Trimethylbenzene	0.500	5.00	0.500	1	U
1,3,5-Trimethylbenzene	0.500	5.00	0.500	1	U
Vinyl acetate	1.00	10.0	1.00	1	U
Vinyl chloride	1.00	10.0	1.00	1	U
o-Xylene	0.500	5.00	0.500	1	U
m-,p-Xylene	0.500	5.00	0.500	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
Dibromofluoromethane	91.9	80 - 120	PASS
1,2-Dichloroethane-d4	96.0	80 - 120	PASS
Toluene-d8	93.9	81 - 117	PASS
4-Bromofluorobenzene	88.9	74 - 121	PASS

MDL Method Detection Limit
RL Reporting/quantitation Limit

* Analyte concentration > RL

KEMRON FORMS - Modified 09/27/2006
Version 1.5 PDF File ID: 580452
Report generated 09/29/2006 09:47

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00072792

Login Number: L0609457 Run Date: 09/24/2006 Sample ID: WG223178-02
Instrument ID: HPMS9 Run Time: 12:39 Prep Method: 5030B
File ID: 9M48869 Analyst: MES Method: 8260B
Workgroup (AAB#): WG223178 Matrix: Solid Units: ug/kg
Contract #: DACA56-94-D-0020 Cal ID: HPMS9-13-SEP-06

Analytes	Expected	Found	% Rec	LCS Limits	Q
Acetone	20.0	24.2	121	20 - 160	
Benzene	20.0	20.9	104	70 - 139	
Bromobenzene	20.0	20.6	103	72 - 131	
Bromochloromethane	20.0	19.9	99.4	70 - 130	
Bromodichloromethane	20.0	21.8	109	72 - 137	
Bromoform	20.0	19.4	96.8	49 - 136	
Bromomethane	20.0	19.2	96.0	37 - 143	
2-Butanone	20.0	28.0	140	37 - 172	
n-Butylbenzene	20.0	21.7	108	70 - 136	
sec-Butylbenzene	20.0	21.3	106	71 - 132	
tert-Butylbenzene	20.0	20.4	102	72 - 130	
Carbon disulfide	20.0	19.1	95.7	39 - 139	
Carbon tetrachloride	20.0	19.7	98.3	59 - 136	
Chlorobenzene	20.0	19.8	98.9	70 - 130	
Chlorodibromomethane	20.0	20.2	101	59 - 136	
Chloroethane	20.0	19.6	97.8	52 - 135	
2-Chloroethyl vinyl ether	20.0	18.8	94.1	35 - 154	
Chloroform	20.0	20.6	103	74 - 129	
Chloromethane	20.0	24.0	120	30 - 131	
2-Chlorotoluene	20.0	21.6	108	63 - 147	
4-Chlorotoluene	20.0	21.2	106	70 - 138	
1,2-Dibromo-3-chloropropane	20.0	20.2	101	40 - 135	
1,2-Dibromoethane	20.0	20.5	103	69 - 130	
Dibromomethane	20.0	20.2	101	59 - 137	
1,2-Dichlorobenzene	20.0	20.4	102	70 - 130	
1,3-Dichlorobenzene	20.0	20.0	100	70 - 130	
1,4-Dichlorobenzene	20.0	19.4	96.9	70 - 130	
Dichlorodifluoromethane	20.0	16.6	83.0	25 - 130	
1,1-Dichloroethane	20.0	21.3	106	75 - 125	
1,2-Dichloroethane	20.0	21.7	108	63 - 133	
1,1-Dichloroethene	20.0	20.2	101	65 - 135	
cis-1,2-Dichloroethene	20.0	20.7	104	65 - 135	
trans-1,2-Dichloroethene	20.0	20.5	102	65 - 139	
1,2-Dichloropropane	20.0	22.2	111	70 - 130	
1,3-Dichloropropane	20.0	21.8	109	65 - 128	
2,2-Dichloropropane	20.0	19.4	97.0	66 - 135	
cis-1,3-Dichloropropene	20.0	20.9	105	70 - 142	
trans-1,3-Dichloropropene	20.0	19.1	95.3	56 - 135	
1,1-Dichloropropene	20.0	21.2	106	57 - 138	
Ethylbenzene	20.0	20.5	102	70 - 130	
2-Hexanone	20.0	21.8	109	45 - 145	

KEMRON FORMS - Modified 07/06/2006
Version 1.5 PDF File ID: 580539
Report generated 09/29/2006 10:06

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00072793

Login Number: L0609457 Run Date: 09/24/2006 Sample ID: WG223178-02
Instrument ID: HPMS9 Run Time: 12:39 Prep Method: 5030B
File ID: 9M48869 Analyst: MES Method: 8260B
Workgroup (AAB#): WG223178 Matrix: Solid Units: ug/kg
Contract #: DACA56-94-D-0020 Cal ID: HPMS9-13-SEP-06

Analytes	Expected	Found	% Rec	LCS Limits	Q
Hexachlorobutadiene	20.0	21.0	105	65 - 135	
Isopropylbenzene	20.0	19.1	95.3	68 - 129	
p-Isopropyltoluene	20.0	20.5	103	72 - 128	
4-Methyl-2-pentanone	20.0	21.0	105	47 - 146	
Methylene chloride	20.0	20.1	101	74 - 128	
Naphthalene	20.0	20.7	104	50 - 146	
n-Propylbenzene	20.0	21.2	106	72 - 136	
Styrene	20.0	21.4	107	74 - 130	
1,1,1,2-Tetrachloroethane	20.0	20.9	105	71 - 137	
1,1,2,2-Tetrachloroethane	20.0	22.3	112	55 - 130	
Tetrachloroethene	20.0	20.2	101	72 - 130	
Toluene	20.0	20.4	102	77 - 126	
1,2,3-Trichlorobenzene	20.0	20.3	102	60 - 135	
1,2,4-Trichlorobenzene	20.0	19.8	99.0	65 - 130	
1,1,1-Trichloroethane	20.0	21.2	106	70 - 135	
1,1,2-Trichloroethane	20.0	21.5	107	60 - 125	
Trichloroethene	20.0	20.2	101	72 - 126	
Trichlorofluoromethane	20.0	17.6	87.8	48 - 154	
1,2,3-Trichloropropane	20.0	22.2	111	65 - 130	
1,2,4-Trimethylbenzene	20.0	20.6	103	75 - 132	
1,3,5-Trimethylbenzene	20.0	21.6	108	74 - 133	
Vinyl acetate	20.0	13.5	67.5	10 - 150	
Vinyl chloride	20.0	21.6	108	25 - 130	
o-Xylene	20.0	21.2	106	70 - 130	
m-,p-Xylene	40.0	39.4	98.4	70 - 130	

Surrogates	% Recovery	Surrogate Limits	Qualifier
Dibromofluoromethane	91.8	80 - 120	PASS
1,2-Dichloroethane-d4	97.6	80 - 120	PASS
Toluene-d8	93.6	81 - 117	PASS
4-Bromofluorobenzene	92.0	74 - 121	PASS

* FAILS %REC LIMIT

KEMRON FORMS - Modified 07/06/2006
Version 1.5 PDF File ID: 580539
Report generated 09/29/2006 10:06

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00072794

Login Number: L0609457 Analyst: MES Prep Method: 5030B
Instrument ID: HPMS9 Matrix: Soil Method: 8260B
Workgroup (AAB#): WG223214 Units: ug/kg
Sample ID: WG223214-02 LCS File ID: 9M48900 Run Date: 09/25/2006 10:20
Sample ID: WG223214-03 LCS2 File ID: 9M48914 Run Date: 09/25/2006 18:29

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Acetone	20.0	27.7	138	20.0	28.0	140	1.35	20 - 160	30	
Benzene	20.0	21.8	109	20.0	21.2	106	2.61	70 - 139	30	
Bromobenzene	20.0	20.7	104	20.0	20.6	103	0.436	72 - 131	30	
Bromochloromethane	20.0	20.1	100	20.0	20.0	99.9	0.536	70 - 130	30	
Bromodichloromethane	20.0	22.6	113	20.0	21.6	108	4.56	72 - 137	30	
Bromoform	20.0	20.0	99.8	20.0	18.5	92.6	7.50	49 - 136	30	
Bromomethane	20.0	19.2	95.9	20.0	18.1	90.5	5.77	37 - 143	30	
2-Butanone	20.0	30.7	154	20.0	26.1	131	16.1	37 - 172	30	
n-Butylbenzene	20.0	22.3	112	20.0	22.3	111	0.223	70 - 136	30	
sec-Butylbenzene	20.0	21.8	109	20.0	21.7	108	0.490	71 - 132	30	
tert-Butylbenzene	20.0	20.5	103	20.0	20.8	104	1.63	72 - 130	30	
Carbon disulfide	20.0	21.0	105	20.0	20.7	104	1.36	39 - 139	30	
Carbon tetrachloride	20.0	20.8	104	20.0	19.2	95.8	8.29	59 - 136	30	
Chlorobenzene	20.0	20.5	102	20.0	20.3	102	0.622	70 - 130	30	
Chlorodibromomethane	20.0	21.5	107	20.0	20.3	102	5.63	59 - 136	30	
Chloroethane	20.0	20.3	102	20.0	20.3	101	0.241	52 - 135	30	
2-Chloroethyl vinyl ether	20.0	19.0	95.0	20.0	16.9	84.3	11.9	35 - 154	30	
Chloroform	20.0	21.4	107	20.0	20.7	103	3.26	74 - 129	30	
Chloromethane	20.0	24.6	123	20.0	23.8	119	3.00	30 - 131	30	
2-Chlorotoluene	20.0	22.6	113	20.0	21.4	107	5.41	63 - 147	30	
4-Chlorotoluene	20.0	21.0	105	20.0	21.6	108	2.68	70 - 138	30	
1,2-Dibromo-3-chloropropane	20.0	21.6	108	20.0	20.5	102	5.28	40 - 135	30	
1,2-Dibromoethane	20.0	21.4	107	20.0	21.2	106	0.951	69 - 130	30	
Dibromomethane	20.0	20.6	103	20.0	20.2	101	2.17	59 - 137	30	
1,2-Dichlorobenzene	20.0	20.4	102	20.0	20.4	102	0.0228	70 - 130	30	
1,3-Dichlorobenzene	20.0	20.3	102	20.0	20.3	102	0.127	70 - 130	30	
1,4-Dichlorobenzene	20.0	19.7	98.6	20.0	19.8	99.0	0.371	70 - 130	30	
Dichlorodifluoromethane	20.0	17.3	86.6	20.0	16.8	84.0	3.07	25 - 130	30	
1,1-Dichloroethane	20.0	22.2	111	20.0	21.2	106	4.93	75 - 125	30	
1,2-Dichloroethane	20.0	22.4	112	20.0	21.3	106	4.99	63 - 133	30	
1,1-Dichloroethene	20.0	20.7	104	20.0	20.0	99.8	3.82	65 - 135	30	
cis-1,2-Dichloroethene	20.0	21.3	106	20.0	21.1	106	0.717	65 - 135	30	
trans-1,2-Dichloroethene	20.0	21.1	106	20.0	20.6	103	2.31	65 - 139	30	
1,2-Dichloropropane	20.0	23.1	115	20.0	22.9	115	0.647	70 - 130	30	
1,3-Dichloropropane	20.0	22.2	111	20.0	22.2	111	0.109	65 - 128	30	
2,2-Dichloropropane	20.0	20.1	100	20.0	18.9	94.4	6.07	66 - 135	30	
cis-1,3-Dichloropropene	20.0	21.3	106	20.0	20.7	104	2.72	70 - 142	30	
trans-1,3-Dichloropropene	20.0	19.7	98.5	20.0	19.2	96.2	2.39	56 - 135	30	
1,1-Dichloropropene	20.0	22.5	113	20.0	21.6	108	4.14	57 - 138	30	
Ethylbenzene	20.0	21.1	105	20.0	21.0	105	0.525	70 - 130	30	
2-Hexanone	20.0	24.6	123	20.0	24.4	122	0.645	45 - 145	30	
Hexachlorobutadiene	20.0	21.3	106	20.0	21.8	109	2.12	65 - 135	30	

KEMRON FORMS - Modified 07/13/2006
Version 1.5 PDF File ID: 580453
Report generated 09/29/2006 09:49

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00072795

Login Number: L0609457 Analyst: MES Prep Method: 5030B
Instrument ID: HPMS9 Matrix: Soil Method: 8260B
Workgroup (AAB#): WG223214 Units: ug/kg
Sample ID: WG223214-02 LCS File ID: 9M48900 Run Date: 09/25/2006 10:20
Sample ID: WG223214-03 LCS2 File ID: 9M48914 Run Date: 09/25/2006 18:29

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Isopropylbenzene	20.0	19.7	98.7	20.0	19.6	97.9	0.828	68 - 129	30	
p-Isopropyltoluene	20.0	20.7	103	20.0	20.7	104	0.211	72 - 128	30	
4-Methyl-2-pentanone	20.0	23.1	115	20.0	22.8	114	1.31	47 - 146	30	
Methylene chloride	20.0	19.0	94.8	20.0	17.8	88.8	6.52	74 - 128	30	
Naphthalene	20.0	21.1	105	20.0	21.9	109	3.76	50 - 146	30	
n-Propylbenzene	20.0	21.8	109	20.0	21.5	108	1.42	72 - 136	30	
Styrene	20.0	21.8	109	20.0	22.0	110	0.726	74 - 130	30	
1,1,1,2-Tetrachloroethane	20.0	21.2	106	20.0	20.5	102	3.33	71 - 137	30	
1,1,2,2-Tetrachloroethane	20.0	22.7	113	20.0	22.0	110	3.04	55 - 130	30	
Tetrachloroethene	20.0	21.3	107	20.0	20.9	104	2.13	72 - 130	30	
Toluene	20.0	21.4	107	20.0	20.9	104	2.34	77 - 126	30	
1,2,3-Trichlorobenzene	20.0	20.4	102	20.0	21.1	106	3.34	60 - 135	30	
1,2,4-Trichlorobenzene	20.0	19.6	98.2	20.0	20.2	101	2.90	65 - 130	30	
1,1,1-Trichloroethane	20.0	22.0	110	20.0	20.9	104	5.19	70 - 135	30	
1,1,2-Trichloroethane	20.0	22.2	111	20.0	22.3	112	0.274	60 - 125	30	
Trichloroethene	20.0	21.0	105	20.0	21.4	107	2.07	72 - 126	30	
Trichlorofluoromethane	20.0	18.5	92.3	20.0	17.7	88.4	4.33	48 - 154	30	
1,2,3-Trichloropropane	20.0	22.6	113	20.0	22.6	113	0.0579	65 - 130	30	
1,2,4-Trimethylbenzene	20.0	20.9	105	20.0	21.0	105	0.357	75 - 132	30	
1,3,5-Trimethylbenzene	20.0	21.9	110	20.0	21.8	109	0.744	74 - 133	30	
Vinyl acetate	20.0	12.0	60.1	20.0	9.12	45.6	27.3	10 - 150	30	
Vinyl chloride	20.0	22.2	111	20.0	21.7	108	2.46	25 - 130	30	
o-Xylene	20.0	22.0	110	20.0	21.8	109	0.820	70 - 130	30	
m-,p-Xylene	40.0	41.2	103	40.0	41.2	103	0.124	70 - 130	30	

Surogates	LCS	LCS2	Surrogate Limits	Qualifier
	% Recovery	% Recovery		
Dibromofluoromethane	91.6	90.4	80 - 120	PASS
1,2-Dichloroethane-d4	97.1	93.2	80 - 120	PASS
Toluene-d8	94.0	93.9	81 - 117	PASS
4-Bromofluorobenzene	90.7	89.7	74 - 121	PASS

* FAILS %REC LIMIT

\# FAILS RPD LIMIT

KEMRON FORMS - Modified 07/13/2006
Version 1.5 PDF File ID: 580453
Report generated 09/29/2006 09:49

KEMRON ENVIRONMENTAL SERVICES
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L0609457
Instrument: HPMS9
Analyst: MES
Workgroup: WG222144

Tune ID: WG222144-01
Run Date: 09/13/2006
Run Time: 08:35
File ID: 9M48520
Cal ID: HPMS9-13-SEP-06

Target	Rel. to	Lower	Upper	Rel.	Raw	Result
50.0	95.0	15.0	40.0	18.2	3612	PASS
75.0	95.0	30.0	60.0	45.6	9046	PASS
95.0	95.0	100	100	100	19842	PASS
96.0	95.0	5.00	9.00	6.82	1354	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	83.0	16459	PASS
175	174	5.00	9.00	7.28	1198	PASS
176	174	95.0	101	96.5	15887	PASS
177	176	5.00	9.00	6.70	1065	PASS

This check relates to the following samples, MS, MSD:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG222144-05	STD-S	01	09/13/2006 15:11	
WG222144-10	STD-S	01	09/13/2006 13:38	
WG222144-09	STD-S	01	09/13/2006 13:08	
WG222144-07	STD-S	01	09/13/2006 12:05	
WG222144-04	STD-S	01	09/13/2006 10:32	
WG222144-02	STD-S	01	09/13/2006 09:28	
WG222144-03	STD-S	01	09/13/2006 10:00	
WG222144-06	STD-S	01	09/13/2006 11:34	
WG222144-08	STD-CCV-S	01	09/13/2006 12:36	

* Sample past 12 hour tune limit

KEMRON FORMS - Modified 07/26/2006
Version 1.3 PDF File ID: 580456
Report generated 09/29/2006 09:50

KEMRON ENVIRONMENTAL SERVICES
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L0609457
Instrument: HPMS9
Analyst: MES
Workgroup: WG222226

Tune ID: WG222226-01
Run Date: 09/13/2006
Run Time: 17:16
File ID: 9M48536
Cal ID: HPMS9-13-SEP-06

Target	Rel. to	Lower	Upper	Rel.	Raw	Result
50.0	95.0	15.0	40.0	18.3	1602	PASS
75.0	95.0	30.0	60.0	47.1	4122	PASS
95.0	95.0	100	100	100	8747	PASS
96.0	95.0	5.00	9.00	7.11	622	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	73.6	6434	PASS
175	174	5.00	9.00	7.17	461	PASS
176	174	95.0	101	96.9	6237	PASS
177	176	5.00	9.00	7.52	469	PASS

This check relates to the following samples, MS, MSD:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG222144-11	SSCV-S	01	09/13/2006 18:41	

* Sample past 12 hour tune limit

KEMRON FORMS - Modified 07/26/2006
Version 1.3 PDF File ID: 580456
Report generated 09/29/2006 09:50

KEMRON ENVIRONMENTAL SERVICES
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L0609457
Instrument: HPMS9
Analyst: MES
Workgroup: WG223177

Tune ID: WG223177-01
Run Date: 09/24/2006
Run Time: 10:35
File ID: 9M48865
Cal ID: HPMS9 -13-SEP-06

Target	Rel. to	Lower	Upper	Rel.	Raw	Result
50.0	95.0	15.0	40.0	20.3	3140	PASS
75.0	95.0	30.0	60.0	46.4	7169	PASS
95.0	95.0	100	100	100	15459	PASS
96.0	95.0	5.00	9.00	5.99	926	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	77.1	11926	PASS
175	174	5.00	9.00	7.40	883	PASS
176	174	95.0	101	95.1	11344	PASS
177	176	5.00	9.00	7.30	828	PASS

This check relates to the following CCV:

Lab ID	Client ID	Date Analyzed	
WG223177-02	CCV	09/24/2006 11:06	

This check relates to the following samples & batch QC:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG223178-01	BLANK	01	09/24/2006 12:08	
WG223178-02	LCS	01	09/24/2006 12:39	
L0609457-01	35-SMP92-SB01-02	01	09/24/2006 21:44	
L0609457-03	35-SMP117-SB01-02	01	09/24/2006 22:16	

* Sample past 12 hour tune limit

KEMRON FORMS - Modified 07/27/2006
Version 1.3 PDF File ID: 580457
Report generated 09/29/2006 09:50

KEMRON ENVIRONMENTAL SERVICES
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L0609457
Instrument: HPMS9
Analyst: MES
Workgroup: WG223213

Tune ID: WG223213-01
Run Date: 09/25/2006
Run Time: 08:54
File ID: 9M48897
Cal ID: HPMS9 -13-SEP-06

Target	Rel. to	Lower	Upper	Rel.	Raw	Result
50.0	95.0	15.0	40.0	20.5	3089	PASS
75.0	95.0	30.0	60.0	46.7	7054	PASS
95.0	95.0	100	100	100	15095	PASS
96.0	95.0	5.00	9.00	6.62	1000	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	74.1	11185	PASS
175	174	5.00	9.00	7.54	843	PASS
176	174	95.0	101	97.4	10897	PASS
177	176	5.00	9.00	6.75	736	PASS

This check relates to the following CCV:

Lab ID	Client ID	Date Analyzed	
WG223213-02	CCV	09/25/2006 09:16	

This check relates to the following samples & batch QC:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG223214-01	BLANK	01	09/25/2006 09:48	
WG223214-02	LCS	01	09/25/2006 10:20	
L0609457-04	35-SMP117-SB02-02	01	09/25/2006 10:52	
WG223214-03	LCS2	01	09/25/2006 18:29	

* Sample past 12 hour tune limit

KEMRON FORMS - Modified 07/27/2006
Version 1.3 PDF File ID: 580457
Report generated 09/29/2006 09:50

KEMRON Environmental Services

INITIAL CALIBRATION SUMMARY

00072800

Login Number: L0609457
Analytical Method: 8260B
ICAL Workgroup: WG222144

Instrument ID: HPMS9
Initial Calibration Date: 13-SEP-06 15:11
Column ID: F

Analyte		AVG RF	% RSD	LINEAR	QUAD
1,1-Dichloroethene	CCC	0.1853	10.3		
1,2-Dichloropropane	CCC	0.1645	11.1		
Chloroform	CCC	0.3432	7.46		
Ethylbenzene	CCC	0.3957	5.80		
Toluene	CCC	1.011	5.13		
Vinyl Chloride	CCC	0.1344	12.2		
1,1,2,2-Tetrachloroethane	SPCC	0.4801	8.53		
1,1-Dichloroethane	SPCC	0.3411	6.84		
Bromoform	SPCC	0.1350	14.4		
Chlorobenzene	SPCC	0.7388	3.39		
Chloromethane	SPCC	0.1626	3.57		
1,1,1,2-Tetrachloroethane		0.2364	13.0		
1,1,1-Trichloroethane		0.3095	12.2		
1,1,2-Trichloroethane		0.1884	8.99		
1,1-Dichloropropene		0.2687	7.77		
1,2,3-Trichlorobenzene		0.5631	11.3		
1,2,3-Trichloropropane		0.1670	8.09		
1,2,4-Trichlorobenzene		0.6360	10.8		
1,2,4-Trimethylbenzene		2.097	4.93		
1,2-Dibromo-3-Chloropropane		0.1001	24.1	1.00	
1,2-Dibromoethane		0.2136	8.78		
1,2-Dichlorobenzene		1.051	4.46		
1,2-Dichloroethane		0.2654	3.56		
1,3,5-Trimethylbenzene		1.969	11.7		
1,3-Dichlorobenzene		1.139	3.60		
1,3-Dichloropropane		0.3275	6.49		
1,4-Dichlorobenzene		1.186	4.06		
2,2-Dichloropropane		0.2831	11.9		
2-Butanone		0.06208	5.44		
2-Chloroethyl Vinyl Ether		0.09552	10.7		
2-Chlorotoluene		1.840	6.32		
2-Hexanone		0.1183	10.8		
4-Chlorotoluene		1.633	7.66		
4-Methyl-2-Pentanone		0.05668	17.2	0.999	
Acetone		0.05180	17.1	1.00	
Benzene		0.7218	4.91		
Bromobenzene		0.5774	5.07		
Bromochloromethane		0.1038	7.68		
Bromodichloromethane		0.2246	10.5		
Bromomethane		0.1059	3.38		
Carbon Disulfide		0.5884	5.63		
Carbon Tetrachloride		0.2956	11.4		
Chloroethane		0.1448	4.02		
Dibromochloromethane		0.2319	12.8		
Dibromomethane		0.1124	4.46		

KEMRON FORMS - Modified 08/31/2006
Version 1.5 PDF File ID: 580454
Report generated 09/29/2006 09:50

KEMRON Environmental Services

INITIAL CALIBRATION SUMMARY

00072801

Login Number: L0609457
Analytical Method: 8260B
ICAL Workgroup: WG222144

Instrument ID: HPMS9
Initial Calibration Date: 13-SEP-06 15:11
Column ID: F

Analyte		AVG RF	% RSD	LINEAR	QUAD
Dichlorodifluoromethane		0.2608	5.33		
Hexachlorobutadiene		0.2855	11.7		
Isopropylbenzene		1.174	11.0		
Methylene Chloride		0.2331	26.4	1.00	
Naphthalene		1.619	10.3		
Styrene		0.7501	12.7		
Tetrachloroethene		0.2031	8.27		
Trichloroethene		0.2206	8.07		
Trichlorofluoromethane		0.4332	7.49		
Vinyl Acetate		0.2297	10.4		
cis-1,2-Dichloroethene		0.2022	11.3		
cis-1,3-Dichloropropene		0.2661	13.1		
m-,p-Xylene		0.5031	3.51		
n-Butylbenzene		1.910	11.4		
n-Propylbenzene		2.714	9.85		
o-Xylene		0.4422	14.1		
p-Isopropyltoluene		2.192	12.2		
sec-Butylbenzene		2.615	11.0		
tert-Butylbenzene		0.4357	8.86		
trans-1,2-Dichloroethene		0.1961	13.2		
trans-1,3-Dichloropropene		0.3202	13.3		

KEMRON FORMS - Modified 08/31/2006
Version 1.5 PDF File ID: 580454
Report generated 09/29/2006 09:50

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00072802

Login Number: L0609457

Analytical Method: 8260B

Instrument ID: HPMS9

Initial Calibration Date: 13-SEP-06 15:11

Column ID: F

Analyte	WG222144-02			WG222144-03			WG222144-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,1-Dichloroethene	NA	NA	NA	NA	NA	NA	2.00	2898.00000	0.1542
1,2-Dichloropropane	NA	NA	NA	1.00	1257.00000	0.1323	2.00	2719.00000	0.1447
Chloroform	NA	NA	NA	1.00	2758.00000	0.2904	2.00	6402.00000	0.3406
Ethylbenzene	0.500	1500.00000	0.3862	1.00	2637.00000	0.3615	2.00	5334.00000	0.3695
Toluene	0.500	3824.00000	0.9847	1.00	6745.00000	0.9247	2.00	13955.0000	0.9668
Vinyl Chloride	NA	NA	NA	NA	NA	NA	2.00	2525.00000	0.1344
1,1,2,2-Tetrachloroethane	NA	NA	NA	1.00	1509.00000	0.3961	2.00	3797.00000	0.5046
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	2.00	5881.00000	0.3129
Bromoform	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	1.00	5027.00000	0.6892	2.00	10504.0000	0.7277
Chloromethane	NA	NA	NA	NA	NA	NA	2.00	3010.00000	0.1602
1,1,1,2-Tetrachloroethane	NA	NA	NA	1.00	1392.00000	0.1908	2.00	3001.00000	0.2079
1,1,1-Trichloroethane	NA	NA	NA	1.00	2309.00000	0.2431	2.00	5366.00000	0.2855
1,1,2-Trichloroethane	NA	NA	NA	1.00	1097.00000	0.1504	2.00	2647.00000	0.1834
1,1-Dichloropropene	NA	NA	NA	NA	NA	NA	2.00	4446.00000	0.2366
1,2,3-Trichlorobenzene	NA	NA	NA	1.00	1715.00000	0.4501	2.00	4292.00000	0.5704
1,2,3-Trichloropropane	NA	NA	NA	NA	NA	NA	2.00	1059.00000	0.1407
1,2,4-Trichlorobenzene	NA	NA	NA	1.00	2017.00000	0.5294	2.00	5042.00000	0.6701
1,2,4-Trimethylbenzene	NA	NA	NA	1.00	7484.00000	1.964	2.00	15555.0000	2.067
1,2-Dibromo-3-Chloropropane	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	NA	NA	NA	1.00	1280.00000	0.1755	2.00	2990.00000	0.2071
1,2-Dichlorobenzene	NA	NA	NA	1.00	3740.00000	0.9817	2.00	8307.00000	1.104
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	2.00	5042.00000	0.2683
1,3,5-Trimethylbenzene	NA	NA	NA	1.00	5961.00000	1.565	2.00	13217.0000	1.757
1,3-Dichlorobenzene	NA	NA	NA	1.00	4117.00000	1.081	2.00	8589.00000	1.142
1,3-Dichloropropane	NA	NA	NA	1.00	2057.00000	0.2820	2.00	4633.00000	0.3210
1,4-Dichlorobenzene	NA	NA	NA	1.00	4621.00000	1.213	2.00	9715.00000	1.291
2,2-Dichloropropane	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloroethyl Vinyl Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorotoluene	NA	NA	NA	1.00	6204.00000	1.628	2.00	13573.0000	1.804
2-Hexanone	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorotoluene	NA	NA	NA	1.00	5237.00000	1.375	2.00	12213.0000	1.623
4-Methyl-2-Pentanone	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	0.500	3423.00000	0.6916	1.00	6330.00000	0.6664	2.00	13163.0000	0.7004
Bromobenzene	NA	NA	NA	1.00	2000.00000	0.5249	2.00	4255.00000	0.5655
Bromochloromethane	NA	NA	NA	NA	NA	NA	2.00	1717.00000	0.09140
Bromodichloromethane	NA	NA	NA	1.00	1770.00000	0.1863	2.00	3873.00000	0.2061
Bromomethane	NA	NA	NA	NA	NA	NA	2.00	2023.00000	0.1076
Carbon Disulfide	NA	NA	NA	NA	NA	NA	2.00	10083.0000	0.5365
Carbon Tetrachloride	NA	NA	NA	NA	NA	NA	2.00	4712.00000	0.2507

KEMRON FORMS - Modified 09/06/2006
Version 1.6 PDF File ID: 580454
Report generated 09/29/2006 09:50

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00072803

Login Number: L0609457

Analytical Method: 8260B

Instrument ID: HPMS9

Initial Calibration Date: 13-SEP-06 15:11

Column ID: F

Analyte	WG222144-05			WG222144-06			WG222144-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,1-Dichloroethene	5.00	7773.00000	0.1671	10.0	16562.0000	0.1795	20.0	35360.0000	0.1917
1,2-Dichloropropane	5.00	7255.00000	0.1560	10.0	15671.0000	0.1698	20.0	31799.0000	0.1724
Chloroform	5.00	15020.0000	0.3230	10.0	32047.0000	0.3473	20.0	65539.0000	0.3553
Ethylbenzene	5.00	13270.0000	0.3768	10.0	28390.0000	0.4020	20.0	58533.0000	0.4160
Toluene	5.00	34171.0000	0.9704	10.0	72689.0000	1.029	20.0	150696.000	1.071
Vinyl Chloride	5.00	6624.00000	0.1424	10.0	13358.0000	0.1448	20.0	27864.0000	0.1511
1,1,2,2-Tetrachloroethane	5.00	7958.00000	0.4492	10.0	17354.0000	0.4760	20.0	35241.0000	0.4858
1,1-Dichloroethane	5.00	14372.0000	0.3090	10.0	30652.0000	0.3322	20.0	64736.0000	0.3510
Bromoform	5.00	3637.00000	0.1033	10.0	8642.00000	0.1224	20.0	18848.0000	0.1340
Chlorobenzene	5.00	25462.0000	0.7231	10.0	52723.0000	0.7465	20.0	105791.000	0.7519
Chloromethane	5.00	7596.00000	0.1633	10.0	15072.0000	0.1633	20.0	31621.0000	0.1714
1,1,1,2-Tetrachloroethane	5.00	7269.00000	0.2064	10.0	16772.0000	0.2375	20.0	35618.0000	0.2532
1,1,1-Trichloroethane	5.00	12917.0000	0.2777	10.0	28516.0000	0.3090	20.0	61302.0000	0.3323
1,1,2-Trichloroethane	5.00	6440.00000	0.1829	10.0	13780.0000	0.1951	20.0	27647.0000	0.1965
1,1-Dichloropropene	5.00	11377.0000	0.2446	10.0	24326.0000	0.2636	20.0	51766.0000	0.2806
1,2,3-Trichlorobenzene	5.00	8867.00000	0.5006	10.0	20058.0000	0.5502	20.0	40710.0000	0.5612
1,2,3-Trichloropropane	5.00	2980.00000	0.1682	10.0	5817.00000	0.1596	20.0	12434.0000	0.1714
1,2,4-Trichlorobenzene	5.00	9708.00000	0.5480	10.0	22514.0000	0.6176	20.0	45798.0000	0.6313
1,2,4-Trimethylbenzene	5.00	34534.0000	1.950	10.0	75869.0000	2.081	20.0	154360.000	2.128
1,2-Dibromo-3-Chloropropane	5.00	1099.00000	0.06200	10.0	3115.00000	0.08540	20.0	6917.00000	0.09540
1,2-Dibromoethane	5.00	7117.00000	0.2021	10.0	15289.0000	0.2165	20.0	30794.0000	0.2189
1,2-Dichlorobenzene	5.00	17534.0000	0.9898	10.0	37666.0000	1.033	20.0	76034.0000	1.048
1,2-Dichloroethane	5.00	11396.0000	0.2450	10.0	24753.0000	0.2683	20.0	49212.0000	0.2668
1,3,5-Trimethylbenzene	5.00	32623.0000	1.842	10.0	72911.0000	2.000	20.0	149689.000	2.064
1,3-Dichlorobenzene	5.00	19224.0000	1.085	10.0	40907.0000	1.122	20.0	84605.0000	1.166
1,3-Dichloropropane	5.00	11169.0000	0.3172	10.0	23574.0000	0.3338	20.0	47574.0000	0.3381
1,4-Dichlorobenzene	5.00	20180.0000	1.139	10.0	42808.0000	1.174	20.0	84850.0000	1.170
2,2-Dichloropropane	5.00	10480.0000	0.2253	10.0	24423.0000	0.2647	20.0	52582.0000	0.2851
2-Butanone	NA	NA	NA	10.0	5357.00000	0.05810	20.0	10954.0000	0.05940
2-Chloroethyl Vinyl Ether	5.00	3739.00000	0.08040	10.0	8239.00000	0.08930	20.0	16761.0000	0.09090
2-Chlorotoluene	5.00	30707.0000	1.733	10.0	69280.0000	1.900	20.0	135878.000	1.873
2-Hexanone	5.00	3425.00000	0.09730	10.0	7814.00000	0.1106	20.0	16500.0000	0.1173
4-Chlorotoluene	5.00	27986.0000	1.580	10.0	57925.0000	1.589	20.0	125332.000	1.728
4-Methyl-2-Pentanone	5.00	1857.00000	0.03990	10.0	4820.00000	0.05220	20.0	10359.0000	0.05620
Acetone	5.00	3148.00000	0.06770	10.0	5189.00000	0.05620	20.0	9222.00000	0.05000
Benzene	5.00	32081.0000	0.6898	10.0	67955.0000	0.7364	20.0	138853.000	0.7528
Bromobenzene	5.00	9834.00000	0.5551	10.0	21568.0000	0.5916	20.0	42368.0000	0.5841
Bromochloromethane	5.00	4372.00000	0.09400	10.0	9643.00000	0.1045	20.0	19716.0000	0.1069
Bromodichloromethane	5.00	9495.00000	0.2042	10.0	20786.0000	0.2253	20.0	42565.0000	0.2308
Bromomethane	5.00	4766.00000	0.1025	10.0	9598.00000	0.1040	20.0	20544.0000	0.1114
Carbon Disulfide	5.00	25824.0000	0.5553	10.0	53482.0000	0.5796	20.0	109364.000	0.5929
Carbon Tetrachloride	5.00	11654.0000	0.2506	10.0	26515.0000	0.2873	20.0	56913.0000	0.3085

KEMRON FORMS - Modified 09/06/2006
Version 1.6 PDF File ID: 580454
Report generated 09/29/2006 09:50

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00072804

Login Number: L0609457

Analytical Method: 8260B

Instrument ID: HPMS9

Initial Calibration Date: 13-SEP-06 15:11

Column ID: F

Analyte	WG222144-08			WG222144-09			WG222144-10		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,1-Dichloroethene	50.0	93190.0000	0.2003	100	195960.000	0.2044	200	395770.000	0.1999
1,2-Dichloropropane	50.0	82716.0000	0.1778	100	175055.000	0.1826	200	357030.000	0.1803
Chloroform	50.0	167275.000	0.3595	100	352473.000	0.3676	200	717001.000	0.3622
Ethylbenzene	50.0	151715.000	0.4230	100	312230.000	0.4205	200	626994.000	0.4060
Toluene	50.0	381430.000	1.063	100	791119.000	1.065	200	1579280.00	1.023
Vinyl Chloride	50.0	64432.0000	0.1385	100	122914.000	0.1282	200	200484.000	0.1013
1,1,2,2-Tetrachloroethane	50.0	91801.0000	0.4957	100	190690.000	0.5255	200	382208.000	0.5077
1,1-Dichloroethane	50.0	165488.000	0.3556	100	353597.000	0.3688	200	709002.000	0.3581
Bromoform	50.0	52298.0000	0.1458	100	114504.000	0.1542	200	232059.000	0.1503
Chlorobenzene	50.0	272783.000	0.7605	100	569928.000	0.7675	200	1148315.00	0.7436
Chloromethane	50.0	78141.0000	0.1679	100	149098.000	0.1555	200	309688.000	0.1564
1,1,1,2-Tetrachloroethane	50.0	94770.0000	0.2642	100	201203.000	0.2709	200	401805.000	0.2602
1,1,1-Trichloroethane	50.0	157479.000	0.3384	100	334271.000	0.3486	200	676050.000	0.3415
1,1,2-Trichloroethane	50.0	71253.0000	0.1986	100	151070.000	0.2034	200	303450.000	0.1965
1,1-Dichloropropene	50.0	132121.000	0.2839	100	276908.000	0.2888	200	559791.000	0.2828
1,2,3-Trichlorobenzene	50.0	113439.000	0.6125	100	226061.000	0.6230	200	479214.000	0.6366
1,2,3-Trichloropropane	50.0	31963.0000	0.1726	100	66376.0000	0.1829	200	130806.000	0.1738
1,2,4-Trichlorobenzene	50.0	125491.000	0.6776	100	251488.000	0.6930	200	542707.000	0.7210
1,2,4-Trimethylbenzene	50.0	408266.000	2.204	100	812097.000	2.238	200	1613141.00	2.143
1,2-Dibromo-3-Chloropropane	50.0	20394.0000	0.1101	100	44232.0000	0.1219	200	94499.0000	0.1255
1,2-Dibromoethane	50.0	81747.0000	0.2279	100	174012.000	0.2343	200	349730.000	0.2265
1,2-Dichlorobenzene	50.0	198533.000	1.072	100	399432.000	1.101	200	812426.000	1.079
1,2-Dichloroethane	50.0	126128.000	0.2711	100	262575.000	0.2738	200	523878.000	0.2646
1,3,5-Trimethylbenzene	50.0	398994.000	2.154	100	812618.000	2.239	200	1606378.00	2.134
1,3-Dichlorobenzene	50.0	214866.000	1.160	100	435592.000	1.200	200	867696.000	1.153
1,3-Dichloropropane	50.0	123647.000	0.3447	100	258772.000	0.3485	200	516804.000	0.3347
1,4-Dichlorobenzene	50.0	214205.000	1.157	100	431856.000	1.190	200	869364.000	1.155
2,2-Dichloropropane	50.0	138301.000	0.2972	100	299757.000	0.3126	200	620763.000	0.3136
2-Butanone	50.0	29036.0000	0.06240	100	63500.0000	0.06620	200	127232.000	0.06430
2-Chloroethyl Vinyl Ether	50.0	47106.0000	0.1012	100	100779.000	0.1051	200	210180.000	0.1062
2-Chlorotoluene	50.0	350260.000	1.891	100	728708.000	2.008	200	1414128.00	1.879
2-Hexanone	50.0	44917.0000	0.1252	100	98192.0000	0.1322	200	196371.000	0.1272
4-Chlorotoluene	50.0	323493.000	1.747	100	636353.000	1.754	200	1257258.00	1.670
4-Methyl-2-Pentanone	50.0	28405.0000	0.06100	100	63722.0000	0.06650	200	127342.000	0.06430
Acetone	50.0	21458.0000	0.04610	100	43609.0000	0.04550	200	89638.0000	0.04530
Benzene	50.0	353003.000	0.7586	100	733663.000	0.7652	200	1456003.00	0.7354
Bromobenzene	50.0	109838.000	0.5930	100	226138.000	0.6232	200	437713.000	0.5815
Bromochloromethane	50.0	50350.0000	0.1082	100	107866.000	0.1125	200	215352.000	0.1088
Bromodichloromethane	50.0	112974.000	0.2428	100	240928.000	0.2513	200	494065.000	0.2496
Bromomethane	50.0	50381.0000	0.1083	100	102009.000	0.1064	200	200213.000	0.1011
Carbon Disulfide	50.0	286326.000	0.6153	100	597650.000	0.6233	200	1219483.00	0.6160
Carbon Tetrachloride	50.0	148432.000	0.3190	100	314931.000	0.3285	200	643157.000	0.3249

KEMRON FORMS - Modified 09/06/2006
Version 1.6 PDF File ID: 580454
Report generated 09/29/2006 09:50

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00072805

Login Number: L0609457

Analytical Method: 8260B

Instrument ID: HPMS9

Initial Calibration Date: 13-SEP-06 15:11

Column ID: F

Analyte	WG222144-02			WG222144-03			WG222144-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Chloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	NA	NA	NA	NA	NA	NA	2.00	2797.00000	0.1938
Dibromomethane	NA	NA	NA	NA	NA	NA	2.00	1937.00000	0.1031
Dichlorodifluoromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	1.00	907.000000	0.2381	2.00	2190.00000	0.2911
Isopropylbenzene	NA	NA	NA	1.00	6882.00000	0.9435	2.00	15691.0000	1.087
Methylene Chloride	NA	NA	NA	NA	NA	NA	2.00	6969.00000	0.3708
Naphthalene	NA	NA	NA	1.00	5459.00000	1.433	2.00	12143.0000	1.614
Styrene	NA	NA	NA	1.00	4270.00000	0.5854	2.00	9557.00000	0.6621
Tetrachloroethene	NA	NA	NA	1.00	1286.00000	0.1763	2.00	2635.00000	0.1826
Trichloroethene	NA	NA	NA	1.00	1731.00000	0.1822	2.00	4002.00000	0.2129
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	2.00	7007.00000	0.3728
Vinyl Acetate	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	NA	NA	NA	1.00	1506.00000	0.1585	2.00	3436.00000	0.1828
cis-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	2.00	4040.00000	0.2150
m-,p-Xylene	1.00	3979.00000	0.5123	2.00	7042.00000	0.4827	4.00	14157.0000	0.4904
n-Butylbenzene	NA	NA	NA	1.00	5905.00000	1.550	2.00	13130.0000	1.745
n-Propylbenzene	NA	NA	NA	1.00	8654.00000	2.272	2.00	18768.0000	2.494
o-Xylene	0.500	1217.00000	0.3134	1.00	2844.00000	0.3899	2.00	5976.00000	0.4140
p-Isopropyltoluene	NA	NA	NA	1.00	6772.00000	1.778	2.00	14492.0000	1.926
sec-Butylbenzene	NA	NA	NA	1.00	8160.00000	2.142	2.00	17818.0000	2.368
tert-Butylbenzene	NA	NA	NA	NA	NA	NA	2.00	2795.00000	0.3715
trans-1,2-Dichloroethene	NA	NA	NA	1.00	1356.00000	0.1428	2.00	3526.00000	0.1876
trans-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	2.00	3773.00000	0.2614

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00072806

Login Number: L0609457

Analytical Method: 8260B

Instrument ID: HPMS9

Initial Calibration Date: 13-SEP-06 15:11

Column ID: F

Analyte	WG222144-05			WG222144-06			WG222144-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Chloroethane	5.00	6278.00000	0.1350	10.0	12942.0000	0.1403	20.0	27272.0000	0.1478
Dibromochloromethane	5.00	6811.00000	0.1934	10.0	15747.0000	0.2230	20.0	33396.0000	0.2374
Dibromomethane	5.00	5073.00000	0.1091	10.0	10353.0000	0.1122	20.0	21195.0000	0.1149
Dichlorodifluoromethane	5.00	11289.0000	0.2427	10.0	23935.0000	0.2594	20.0	51797.0000	0.2808
Hexachlorobutadiene	5.00	4151.00000	0.2343	10.0	10443.0000	0.2865	20.0	20652.0000	0.2847
Isopropylbenzene	5.00	37691.0000	1.070	10.0	83632.0000	1.184	20.0	175267.000	1.246
Methylene Chloride	5.00	10597.0000	0.2279	10.0	19933.0000	0.2160	20.0	37834.0000	0.2051
Naphthalene	5.00	24812.0000	1.401	10.0	55129.0000	1.512	20.0	115685.000	1.595
Styrene	5.00	24212.0000	0.6876	10.0	53617.0000	0.7591	20.0	113278.000	0.8052
Tetrachloroethene	5.00	6782.00000	0.1926	10.0	15078.0000	0.2135	20.0	30628.0000	0.2177
Trichloroethene	5.00	9981.00000	0.2146	10.0	20607.0000	0.2233	20.0	42185.0000	0.2287
Trichlorofluoromethane	5.00	18968.0000	0.4079	10.0	39877.0000	0.4322	20.0	84287.0000	0.4569
Vinyl Acetate	5.00	9128.00000	0.1963	10.0	19290.0000	0.2090	20.0	41036.0000	0.2225
cis-1,2-Dichloroethene	5.00	8946.00000	0.1924	10.0	19334.0000	0.2095	20.0	38782.0000	0.2102
cis-1,3-Dichloropropene	5.00	10541.0000	0.2267	10.0	23751.0000	0.2574	20.0	50356.0000	0.2730
m-,p-Xylene	10.0	33455.0000	0.4750	20.0	71704.0000	0.5076	40.0	146912.000	0.5221
n-Butylbenzene	5.00	30624.0000	1.729	10.0	69106.0000	1.896	20.0	146038.000	2.013
n-Propylbenzene	5.00	44398.0000	2.506	10.0	98432.0000	2.700	20.0	207122.000	2.855
o-Xylene	5.00	15104.0000	0.4289	10.0	32742.0000	0.4636	20.0	68185.0000	0.4846
p-Isopropyltoluene	5.00	34920.0000	1.971	10.0	80934.0000	2.220	20.0	168532.000	2.323
sec-Butylbenzene	5.00	42360.0000	2.391	10.0	95717.0000	2.626	20.0	199864.000	2.755
tert-Butylbenzene	5.00	7135.00000	0.4028	10.0	15315.0000	0.4201	20.0	33090.0000	0.4562
trans-1,2-Dichloroethene	5.00	8261.00000	0.1776	10.0	18748.0000	0.2032	20.0	38955.0000	0.2112
trans-1,3-Dichloropropene	5.00	9361.00000	0.2658	10.0	21986.0000	0.3113	20.0	46440.0000	0.3301

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00072807

Login Number: L0609457

Analytical Method: 8260B

Instrument ID: HPMS9

Initial Calibration Date: 13-SEP-06 15:11

Column ID: F

Analyte	WG222144-08			WG222144-09			WG222144-10		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Chloroethane	50.0	68915.0000	0.1481	100	143340.000	0.1495	200	293007.000	0.1480
Dibromochloromethane	50.0	90110.0000	0.2512	100	196263.000	0.2643	200	401541.000	0.2600
Dibromomethane	50.0	53643.0000	0.1153	100	113541.000	0.1184	200	225292.000	0.1138
Dichlorodifluoromethane	50.0	126309.000	0.2714	100	250040.000	0.2608	200	494111.000	0.2496
Hexachlorobutadiene	50.0	57152.0000	0.3086	100	115331.000	0.3178	200	243019.000	0.3228
Isopropylbenzene	50.0	465581.000	1.298	100	966727.000	1.302	200	1948811.00	1.262
Methylene Chloride	50.0	95580.0000	0.2054	100	199078.000	0.2076	200	393190.000	0.1986
Naphthalene	50.0	326651.000	1.764	100	653832.000	1.802	200	1378735.00	1.832
Styrene	50.0	300930.000	0.8390	100	630267.000	0.8487	200	1255981.00	0.8133
Tetrachloroethene	50.0	77822.0000	0.2170	100	160682.000	0.2164	200	322703.000	0.2090
Trichloroethene	50.0	108266.000	0.2327	100	227472.000	0.2372	200	461748.000	0.2332
Trichlorofluoromethane	50.0	214939.000	0.4619	100	436759.000	0.4555	200	880773.000	0.4449
Vinyl Acetate	50.0	114817.000	0.2468	100	238582.000	0.2488	200	503760.000	0.2545
cis-1,2-Dichloroethene	50.0	101473.000	0.2181	100	216235.000	0.2255	200	436736.000	0.2206
cis-1,3-Dichloropropene	50.0	133498.000	0.2869	100	291258.000	0.3038	200	593631.000	0.2998
m-,p-Xylene	100	373652.000	0.5208	200	772877.000	0.5204	400	1533522.00	0.4965
n-Butylbenzene	50.0	386494.000	2.087	100	781022.000	2.152	200	1586444.00	2.108
n-Propylbenzene	50.0	541436.000	2.923	100	1104237.00	3.043	200	2194467.00	2.915
o-Xylene	50.0	178781.000	0.4984	100	371882.000	0.5008	200	751098.000	0.4864
p-Isopropyltoluene	50.0	445716.000	2.407	100	905666.000	2.496	200	1820723.00	2.419
sec-Butylbenzene	50.0	522739.000	2.822	100	1073188.00	2.957	200	2152054.00	2.859
tert-Butylbenzene	50.0	85428.0000	0.4612	100	173541.000	0.4782	200	346394.000	0.4602
trans-1,2-Dichloroethene	50.0	99219.0000	0.2132	100	210627.000	0.2197	200	422968.000	0.2136
trans-1,3-Dichloropropene	50.0	125602.000	0.3502	100	272894.000	0.3675	200	548342.000	0.3551

KEMRON FORMS - Modified 09/06/2006
Version 1.6 PDF File ID: 580454
Report generated 09/29/2006 09:50

KEMRON Environmental Services

ALTERNATE SOURCE CALIBRATION REPORT

00072808

Login Number: L0609457 Run Date: 09/13/2006 Sample ID: WG222144-11
Instrument ID: HPMS9 Run Time: 18:41 Method: 8260B
File ID: 9M48539 Analyst: MES
ICal Workgroup: WG222144 Cal ID: HPMS9 - 13-SEP-06

Analyte		Expected	Found	RF	%D	UNITS	Q
Chloroform	CCC	20	21.5	0.370	7.7	ug/kg	
1,1-Dichloroethene	CCC	20	22.2	0.206	11.1	ug/kg	
1,2-Dichloropropane	CCC	20	22.2	0.183	11	ug/kg	
Ethylbenzene	CCC	20	22.4	0.442	11.8	ug/kg	
Toluene	CCC	20	22.0	1.11	10	ug/kg	
Vinyl Chloride	CCC	20	21.2	0.142	5.9	ug/kg	
Bromoform	SPCC	20	20.0	0.135	0	ug/kg	
Chlorobenzene	SPCC	20	21.5	0.793	7.4	ug/kg	
Chloromethane	SPCC	20	22.7	0.184	13.4	ug/kg	
1,1-Dichloroethane	SPCC	20	21.3	0.364	6.6	ug/kg	
1,1,2,2-Tetrachloroethane	SPCC	20	20.6	0.495	3.1	ug/kg	
Acetone		20	23.9	0.0584	19.5	ug/kg	
Benzene		20	22.0	0.792	9.8	ug/kg	
Bromobenzene		20	21.3	0.615	6.5	ug/kg	
Bromochloromethane		20	22.1	0.114	10.3	ug/kg	
Bromodichloromethane		20	22.5	0.252	12.4	ug/kg	
Bromomethane		20	21.7	0.115	8.7	ug/kg	
2-Butanone		20	22.8	0.0707	13.8	ug/kg	
n-Butylbenzene		20	22.7	2.17	13.7	ug/kg	
sec-Butylbenzene		20	22.2	2.90	10.9	ug/kg	
tert-Butylbenzene		20	21.3	0.463	6.4	ug/kg	
Carbon Disulfide		20	20.0	0.588	.1	ug/kg	
Carbon Tetrachloride		20	21.6	0.320	8.2	ug/kg	
Dibromochloromethane		20	21.4	0.249	7.2	ug/kg	
Chloroethane		20	21.5	0.156	7.5	ug/kg	
2-Chloroethyl Vinyl Ether		20	19.1	0.0910	4.7	ug/kg	
2-Chlorotoluene		20	22.2	2.04	11	ug/kg	
4-Chlorotoluene		20	21.2	1.73	5.9	ug/kg	
1,2-Dibromo-3-Chloropropane		20	19.8	0.0989	.8	ug/kg	
1,2-Dibromoethane		20	21.2	0.227	6.1	ug/kg	
Dibromomethane		20	21.8	0.123	9.1	ug/kg	
1,2-Dichlorobenzene		20	20.7	1.09	3.7	ug/kg	
1,3-Dichlorobenzene		20	21.2	1.21	6.2	ug/kg	
1,4-Dichlorobenzene		20	20.5	1.22	2.7	ug/kg	
Dichlorodifluoromethane		20	20.7	0.270	3.6	ug/kg	
1,2-Dichloroethane		20	21.1	0.280	5.6	ug/kg	
cis-1,2-Dichloroethene		20	22.0	0.222	10	ug/kg	
trans-1,2-Dichloroethene		20	22.0	0.216	10.1	ug/kg	
1,3-Dichloropropane		20	22.0	0.361	10.1	ug/kg	
2,2-Dichloropropane		20	20.9	0.296	4.4	ug/kg	
cis-1,3-Dichloropropene		20	21.4	0.284	6.9	ug/kg	
trans-1,3-Dichloropropene		20	19.4	0.310	3.1	ug/kg	

KEMRON FORMS - Modified 07/26/2006
Version 1.5 PDF File ID: 580455
Report generated 09/29/2006 09:50

KEMRON Environmental Services

ALTERNATE SOURCE CALIBRATION REPORT

00072809

Login Number: L0609457 Run Date: 09/13/2006 Sample ID: WG222144-11
Instrument ID: HPMS9 Run Time: 18:41 Method: 8260B
File ID: 9M48539 Analyst: MES
ICal Workgroup: WG222144 Cal ID: HPMS9 - 13-SEP-06

Analyte		Expected	Found	RF	%D	UNITS	Q
1,1-Dichloropropene		20	22.3	0.299	11.3	ug/kg	
2-Hexanone		20	19.7	0.116	1.7	ug/kg	
Hexachlorobutadiene		20	23.2	0.331	15.9	ug/kg	
Isopropylbenzene		20	20.5	1.20	2.6	ug/kg	
p-Isopropyltoluene		20	21.5	2.36	7.7	ug/kg	
4-Methyl-2-Pentanone		20	19.9	0.0587	.3	ug/kg	
Methylene Chloride		20	19.4	0.207	3	ug/kg	
Naphthalene		20	21.4	1.73	7	ug/kg	
n-Propylbenzene		20	21.7	2.94	8.3	ug/kg	
Styrene		20	22.4	0.841	12.2	ug/kg	
1,1,1,2-Tetrachloroethane		20	21.8	0.257	8.9	ug/kg	
Tetrachloroethene		20	22.7	0.231	13.5	ug/kg	
1,2,3-Trichlorobenzene		20	22.0	0.620	10.1	ug/kg	
1,2,4-Trichlorobenzene		20	21.2	0.673	5.8	ug/kg	
1,1,1-Trichloroethane		20	22.4	0.347	12	ug/kg	
1,1,2-Trichloroethane		20	22.4	0.211	12.2	ug/kg	
Trichloroethene		20	22.3	0.246	11.3	ug/kg	
Trichlorofluoromethane		20	19.5	0.423	2.4	ug/kg	
1,2,3-Trichloropropane		20	20.5	0.172	2.7	ug/kg	
1,2,4-Trimethylbenzene		20	21.5	2.26	7.6	ug/kg	
1,3,5-Trimethylbenzene		20	22.0	2.17	10.1	ug/kg	
Vinyl Acetate		20	13.7	0.158	31.4	ug/kg	*
o-Xylene		20	22.6	0.499	12.9	ug/kg	
m-,p-Xylene		40	43.8	0.552	9.6	ug/kg	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

KEMRON FORMS - Modified 07/26/2006
Version 1.5 PDF File ID: 580455
Report generated 09/29/2006 09:50

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072810

Login Number: L0609457 Run Date: 09/24/2006 Sample ID: WG223177-02
Instrument ID: HPMS9 Run Time: 11:06 Method: 8260B
File ID: 9M48866 Analyst: MES
Workgroup (AAB#): WG223178 Cal ID: HPMS9 - 13-SEP-06

Analyte		Expected	Found	RF	%D	UNITS	Q
Chloroform	CCC	50.0	50.0	0.343	0	ug/kg	
1,1-Dichloroethene	CCC	50.0	50.9	0.189	1.70	ug/kg	
1,2-Dichloropropane	CCC	50.0	52.4	0.172	4.80	ug/kg	
Ethylbenzene	CCC	50.0	49.1	0.389	1.70	ug/kg	
Toluene	CCC	50.0	49.6	1.00	0.700	ug/kg	
Vinyl Chloride	CCC	50.0	48.2	0.130	3.60	ug/kg	
Bromoform	SPCC	50.0	51.1	0.138	2.20	ug/kg	
Chlorobenzene	SPCC	50.0	47.9	0.707	4.20	ug/kg	
Chloromethane	SPCC	50.0	49.9	0.162	0.100	ug/kg	
1,1-Dichloroethane	SPCC	50.0	51.8	0.354	3.60	ug/kg	
1,1,2,2-Tetrachloroethane	SPCC	50.0	50.2	0.483	0.500	ug/kg	
Acetone		50.0	57.5	0.0534	15.0	ug/kg	
Benzene		50.0	50.0	0.722	0.100	ug/kg	
Bromobenzene		50.0	47.9	0.553	4.20	ug/kg	
Bromochloromethane		50.0	48.2	0.100	3.50	ug/kg	
Bromodichloromethane		50.0	50.6	0.227	1.20	ug/kg	
Bromomethane		50.0	45.4	0.0962	9.10	ug/kg	
2-Butanone		50.0	59.8	0.0742	19.5	ug/kg	
n-Butylbenzene		50.0	52.6	2.01	5.20	ug/kg	
sec-Butylbenzene		50.0	50.9	2.66	1.90	ug/kg	
tert-Butylbenzene		50.0	49.2	0.428	1.70	ug/kg	
Carbon Disulfide		50.0	50.5	0.595	1.00	ug/kg	
Carbon Tetrachloride		50.0	49.6	0.293	0.800	ug/kg	
Dibromochloromethane		50.0	50.5	0.234	1.00	ug/kg	
Chloroethane		50.0	48.5	0.141	2.90	ug/kg	
2-Chloroethyl Vinyl Ether		50.0	48.3	0.0922	3.50	ug/kg	
2-Chlorotoluene		50.0	50.8	1.87	1.60	ug/kg	
4-Chlorotoluene		50.0	49.6	1.62	0.900	ug/kg	
1,2-Dibromo-3-Chloropropane		50.0	46.2	0.107	7.60	ug/kg	
1,2-Dibromoethane		50.0	49.9	0.213	0.200	ug/kg	
Dibromomethane		50.0	47.4	0.106	5.30	ug/kg	
1,2-Dichlorobenzene		50.0	47.2	0.991	5.70	ug/kg	
1,3-Dichlorobenzene		50.0	47.3	1.08	5.40	ug/kg	
1,4-Dichlorobenzene		50.0	45.1	1.07	9.70	ug/kg	
Dichlorodifluoromethane		50.0	35.5	0.185	29.1	ug/kg	
1,2-Dichloroethane		50.0	50.5	0.268	1.10	ug/kg	
cis-1,2-Dichloroethene		50.0	50.3	0.204	0.700	ug/kg	
trans-1,2-Dichloroethene		50.0	50.4	0.198	0.900	ug/kg	
1,3-Dichloropropane		50.0	50.2	0.329	0.500	ug/kg	
2,2-Dichloropropane		50.0	50.7	0.287	1.40	ug/kg	
cis-1,3-Dichloropropene		50.0	51.5	0.274	3.00	ug/kg	
trans-1,3-Dichloropropene		50.0	52.7	0.338	5.40	ug/kg	

KEMRON FORMS - Modified 09/06/2006
Version 1.3 PDF File ID: 580458
Report generated 09/29/2006 09:50

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072811

Login Number: L0609457 Run Date: 09/24/2006 Sample ID: WG223177-02
Instrument ID: HPMS9 Run Time: 11:06 Method: 8260B
File ID: 9M48866 Analyst: MES
Workgroup (AAB#): WG223178 Cal ID: HPMS9 - 13-SEP-06

Analyte		Expected	Found	RF	%D	UNITS	Q
1,1-Dichloropropene		50.0	50.8	0.273	1.50	ug/kg	
2-Hexanone		50.0	62.4	0.148	24.8	ug/kg	
Hexachlorobutadiene		50.0	52.1	0.298	4.30	ug/kg	
Isopropylbenzene		50.0	51.0	1.20	2.10	ug/kg	
p-Isopropyltoluene		50.0	51.4	2.25	2.70	ug/kg	
4-Methyl-2-Pentanone		50.0	52.5	0.0661	5.10	ug/kg	
Methylene Chloride		50.0	47.2	0.193	5.60	ug/kg	
Naphthalene		50.0	52.3	1.69	4.60	ug/kg	
n-Propylbenzene		50.0	51.4	2.79	2.80	ug/kg	
Styrene		50.0	51.6	0.774	3.20	ug/kg	
1,1,1,2-Tetrachloroethane		50.0	51.5	0.244	3.00	ug/kg	
Tetrachloroethene		50.0	49.1	0.199	1.90	ug/kg	
1,2,3-Trichlorobenzene		50.0	51.8	0.583	3.60	ug/kg	
1,2,4-Trichlorobenzene		50.0	51.2	0.651	2.40	ug/kg	
1,1,1-Trichloroethane		50.0	51.6	0.319	3.10	ug/kg	
1,1,2-Trichloroethane		50.0	50.0	0.189	0.100	ug/kg	
Trichloroethene		50.0	48.2	0.213	3.70	ug/kg	
Trichlorofluoromethane		50.0	49.8	0.432	0.300	ug/kg	
1,2,3-Trichloropropane		50.0	50.4	0.168	0.800	ug/kg	
1,2,4-Trimethylbenzene		50.0	48.9	2.05	2.30	ug/kg	
1,3,5-Trimethylbenzene		50.0	51.4	2.02	2.70	ug/kg	
Vinyl Acetate		50.0	35.6	0.164	28.7	ug/kg	
o-Xylene		50.0	51.6	0.456	3.20	ug/kg	
m-,p-Xylene		100	96.3	0.485	3.70	ug/kg	
Xylenes		150	148	0.470	1.40	ug/kg	
1,2-Dichloroethene		100	101	0.201	0.800	ug/kg	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

KEMRON FORMS - Modified 09/06/2006
Version 1.3 PDF File ID: 580458
Report generated 09/29/2006 09:50

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072812

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223213-02
Instrument ID: HPMS9 Run Time: 09:16 Method: 8260B
File ID: 9M48898 Analyst: MES
Workgroup (AAB#): WG223214 Cal ID: HPMS9 - 13-SEP-06

Analyte		Expected	Found	RF	%D	UNITS	Q
Chloroform	CCC	50.0	51.3	0.352	2.60	ug/kg	
1,1-Dichloroethene	CCC	50.0	51.4	0.191	2.80	ug/kg	
1,2-Dichloropropane	CCC	50.0	55.2	0.182	10.3	ug/kg	
Ethylbenzene	CCC	50.0	51.4	0.407	2.80	ug/kg	
Toluene	CCC	50.0	51.2	1.04	2.40	ug/kg	
Vinyl Chloride	CCC	50.0	48.9	0.132	2.20	ug/kg	
Bromoform	SPCC	50.0	58.5	0.158	16.9	ug/kg	
Chlorobenzene	SPCC	50.0	49.7	0.735	0.500	ug/kg	
Chloromethane	SPCC	50.0	51.7	0.168	3.50	ug/kg	
1,1-Dichloroethane	SPCC	50.0	53.3	0.364	6.60	ug/kg	
1,1,2,2-Tetrachloroethane	SPCC	50.0	61.5	0.590	22.9	ug/kg	
Acetone		50.0	63.8	0.0591	27.6	ug/kg	
Benzene		50.0	51.8	0.748	3.60	ug/kg	
Bromobenzene		50.0	51.3	0.592	2.50	ug/kg	
Bromochloromethane		50.0	50.1	0.104	0.300	ug/kg	
Bromodichloromethane		50.0	54.0	0.243	8.00	ug/kg	
Bromomethane		50.0	46.5	0.0986	6.90	ug/kg	
2-Butanone		50.0	75.9	0.0942	51.8	ug/kg	*
n-Butylbenzene		50.0	54.9	2.10	9.90	ug/kg	
sec-Butylbenzene		50.0	54.0	2.83	8.00	ug/kg	
tert-Butylbenzene		50.0	52.1	0.454	4.10	ug/kg	
Carbon Disulfide		50.0	51.6	0.607	3.20	ug/kg	
Carbon Tetrachloride		50.0	50.3	0.297	0.500	ug/kg	
Dibromochloromethane		50.0	54.8	0.254	9.50	ug/kg	
Chloroethane		50.0	50.9	0.147	1.70	ug/kg	
2-Chloroethyl Vinyl Ether		50.0	54.3	0.104	8.60	ug/kg	
2-Chlorotoluene		50.0	53.6	1.97	7.30	ug/kg	
4-Chlorotoluene		50.0	53.4	1.74	6.80	ug/kg	
1,2-Dibromo-3-Chloropropane		50.0	55.4	0.131	10.8	ug/kg	
1,2-Dibromoethane		50.0	53.9	0.230	7.80	ug/kg	
Dibromomethane		50.0	50.4	0.113	0.800	ug/kg	
1,2-Dichlorobenzene		50.0	51.5	1.08	3.00	ug/kg	
1,3-Dichlorobenzene		50.0	50.5	1.15	1.00	ug/kg	
1,4-Dichlorobenzene		50.0	48.6	1.15	2.80	ug/kg	
Dichlorodifluoromethane		50.0	34.5	0.180	30.9	ug/kg	
1,2-Dichloroethane		50.0	53.3	0.283	6.70	ug/kg	
cis-1,2-Dichloroethene		50.0	52.3	0.212	4.60	ug/kg	
trans-1,2-Dichloroethene		50.0	52.1	0.205	4.30	ug/kg	
1,3-Dichloropropane		50.0	54.1	0.354	8.20	ug/kg	
2,2-Dichloropropane		50.0	50.9	0.288	1.70	ug/kg	
cis-1,3-Dichloropropene		50.0	53.8	0.286	7.70	ug/kg	
trans-1,3-Dichloropropene		50.0	56.1	0.360	12.3	ug/kg	

KEMRON FORMS - Modified 09/06/2006
Version 1.3 PDF File ID: 580458
Report generated 09/29/2006 09:50

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072813

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223213-02
Instrument ID: HPMS9 Run Time: 09:16 Method: 8260B
File ID: 9M48898 Analyst: MES
Workgroup (AAB#): WG223214 Cal ID: HPMS9 - 13-SEP-06

Analyte		Expected	Found	RF	%D	UNITS	Q
1,1-Dichloropropene		50.0	52.1	0.280	4.30	ug/kg	
2-Hexanone		50.0	81.1	0.192	62.2	ug/kg	*
Hexachlorobutadiene		50.0	52.2	0.298	4.40	ug/kg	
Isopropylbenzene		50.0	53.6	1.26	7.20	ug/kg	
p-Isopropyltoluene		50.0	53.4	2.34	6.90	ug/kg	
4-Methyl-2-Pentanone		50.0	66.3	0.0842	32.7	ug/kg	
Methylene Chloride		50.0	48.3	0.198	3.40	ug/kg	
Naphthalene		50.0	59.3	1.92	18.6	ug/kg	
n-Propylbenzene		50.0	54.7	2.97	9.40	ug/kg	
Styrene		50.0	54.6	0.819	9.20	ug/kg	
1,1,1,2-Tetrachloroethane		50.0	54.3	0.257	8.50	ug/kg	
Tetrachloroethene		50.0	49.6	0.202	0.800	ug/kg	
1,2,3-Trichlorobenzene		50.0	55.3	0.623	10.6	ug/kg	
1,2,4-Trichlorobenzene		50.0	52.4	0.667	4.80	ug/kg	
1,1,1-Trichloroethane		50.0	52.2	0.323	4.40	ug/kg	
1,1,2-Trichloroethane		50.0	54.7	0.206	9.40	ug/kg	
Trichloroethene		50.0	49.3	0.218	1.40	ug/kg	
Trichlorofluoromethane		50.0	50.0	0.433	0.100	ug/kg	
1,2,3-Trichloropropane		50.0	60.2	0.201	20.5	ug/kg	
1,2,4-Trimethylbenzene		50.0	51.7	2.17	3.40	ug/kg	
1,3,5-Trimethylbenzene		50.0	54.2	2.13	8.40	ug/kg	
Vinyl Acetate		50.0	37.9	0.174	24.2	ug/kg	
o-Xylene		50.0	54.1	0.478	8.20	ug/kg	
m-,p-Xylene		100	98.7	0.497	1.30	ug/kg	
Xylenes		150	153	0.488	1.90	ug/kg	
1,2-Dichloroethene		100	104	0.208	4.40	ug/kg	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

KEMRON FORMS - Modified 09/06/2006
Version 1.3 PDF File ID: 580458
Report generated 09/29/2006 09:50

KEMRON ENVIRONMENTAL SERVICES
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO CCV)

Login Number: L0609457
Instrument ID: HPMS9
Workgroup (AAB#): WG223178

CCV Number: WG223177-02
CAL ID: HPMS9-13-SEP-06
Matrix: SOLID

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG223177-02	NA	NA	204774	403922	529246
Upper Limit	NA	NA	409548	807844	1058492
Lower Limit	NA	NA	102387	201961	264623
L0609457-01	1.00	01	182792	360845	478823
L0609457-03	1.00	01	180475	352677	466636
WG223178-01	1.00	01	184908	375855	501935
WG223178-02	1.00	01	186105	376919	498283

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

KEMRON FORMS - Modified 04/18/2006
Version 1.3 PDF File ID: 580459
Report generated 09/29/2006 09:51

KEMRON ENVIRONMENTAL SERVICES
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO CCV)

00072815

Login Number: L0609457
Instrument ID: HPMS9
Workgroup (AAB#): WG223214

CCV Number: WG223213-02
CAL ID: HPMS9-13-SEP-06
Matrix: SOLID

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG223213-02	NA	NA	188524	378458	495938
Upper Limit	NA	NA	377048	756916	991876
Lower Limit	NA	NA	94262	189229	247969
L0609457-04	1.00	01	178546	361605	481545
WG223214-01	1.00	01	190006	376734	504667
WG223214-02	1.00	01	179309	359748	477711
WG223214-03	1.00	01	191613	381958	504430

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

KEMRON FORMS - Modified 04/18/2006
Version 1.3 PDF File ID: 580459
Report generated 09/29/2006 09:51

KEMRON ENVIRONMENTAL SERVICES
INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO CCV)

Login Number: L0609457
Instrument ID: HPMS9
Workgroup (AAB#): WG223178

CCV Number: WG223177-02
CAL ID: HPMS9-13-SEP-06
Matrix: SOLID

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG223177-02	NA	NA	15.34	12.36	8.51
Upper Limit	NA	NA	15.84	12.86	9.01
Lower Limit	NA	NA	14.84	11.86	8.01
L0609457-01	1.00	01	15.34	12.36	8.51
L0609457-03	1.00	01	15.34	12.36	8.52
WG223178-01	1.00	01	15.33	12.36	8.51
WG223178-02	1.00	01	15.34	12.36	8.51

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

KEMRON FORMS - Modified 04/18/2006
Version 1.3 PDF File ID: 580461
Report generated 09/29/2006 09:53

KEMRON ENVIRONMENTAL SERVICES
INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO CCV)

Login Number: L0609457
Instrument ID: HPMS9
Workgroup (AAB#): WG223214

CCV Number: WG223213-02
CAL ID: HPMS9-13-SEP-06
Matrix: SOLID

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG223213-02	NA	NA	15.34	12.36	8.51
Upper Limit	NA	NA	15.84	12.86	9.01
Lower Limit	NA	NA	14.84	11.86	8.01
L0609457-04	1.00	01	15.34	12.36	8.52
WG223214-01	1.00	01	15.34	12.36	8.52
WG223214-02	1.00	01	15.33	12.36	8.52
WG223214-03	1.00	01	15.33	12.36	8.52

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

KEMRON FORMS - Modified 04/18/2006
Version 1.3 PDF File ID: 580461
Report generated 09/29/2006 09:53

00072818

KEMRON Environmental Services
Data Checklist

Date: 11-SEP-2006
Analyst: HAV
Analyst: NA
Method: TX-T1005
Instrument: HP14
Curve Workgroup: WG222034
Runlog ID: 12206
Analytical Workgroups: L0608643, L0608645

Runlog ID number:	12206
System Performance Check	NA
DFTPP	NA
Endrin/DDT Breakdown	NA
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	
Second Source standard % Difference	X
Continuing Calibration /Check Standards	X
Project/Client Specific Requirements	X
Special Standards	
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	X
Samples	X
TCL Hits	X
Spectra of TCL Hits	NA
Surrogates	X
Internal Standards Criteria	NA
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	
Reruns	
Manual Integrations	NA
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	HAV
Secondary Reviewer	MDC
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	NA
Check the resonableness of the results	X

Primary Reviewer:
12-SEP-2006

Secondary Reviewer:
12-SEP-2006

Generated: SEP-12-2006 14:58:26

00072819

KEMRON Environmental Services
Data Checklist

Date: 26-SEP-2006
Analyst: HAV
Analyst: NA
Method: TX-T1005
Instrument: HP14
Curve Workgroup: NA
Runlog ID: 12542
Analytical Workgroups: L0609457, -459, -540 (PART)

System Performance Check	NA
DFTPP	NA
Endrin/DDT Breakdown	NA
Initial Calibration	
Average RF	
Linear Reg or Higher Order Curve	
Second Source standard % Difference	
Continuing Calibration /Check Standards	X
Project/Client Specific Requirements	X
Special Standards	
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	X
Samples	X
TCL Hits	X
Spectra of TCL Hits	NA
Surrogates	X
Internal Standards Criteria	NA
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	
Reruns	
Manual Integrations	X
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	HAV
Secondary Reviewer	MDC
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	NA
Check the resonableness of the results	X

Primary Reviewer:
29-SEP-2006
Hema Vikasagar

Secondary Reviewer:
29-SEP-2006
Michel Cadieux

Generated: SEP-29-2006 16:24:17

00072820

KEMRON Environmental Services

Instrument Run Log

Instrument: HP14 Dataset: 091106

Analyst1: HAV Analyst2: NA

Method: TX-T1005 SOP: GCSOP5 Rev: 4

Maintenance Log ID:

Column 1 ID: RTX-5 Column 2 ID: NA

Workgroups:

Internal STD: NA Surrogate STD: NA Calibration STD

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	14G9183	pentane	1	1		09/11/06 13:55
2	14G9184	WIN DEF STD	1	1	SOS78-19	09/11/06 11:46
3	14G9185	TPH CCV @1000ppm	1	1		09/11/06 16:13
4	14G9186	WG222034-01 TPH @10000ppm	1	1	STD14961	09/11/06 17:12
5	14G9187	WG222034-02 TPH @5000ppm	1	1	STD14961	09/11/06 17:53
6	14G9188	WG222034-03 TPH @2500ppm	1	1	STD14961	09/11/06 18:33
7	14G9189	WG222034-04 TPH @1000ppm	1	1	STD14961	09/11/06 19:13
8	14G9190	WG222034-05 TPH @500ppm	1	1	STD14961	09/11/06 19:53
9	14G9191	WG222034-06 TPH @50ppm	1	1	STD14961	09/11/06 20:33
10	14G9192	WG222034-07 ALT TPH @1000ppm	1	1	STD13641/	09/11/06 21:13
11	14G9193	WG221521-01 BLANK V14-P24	7	1		09/11/06 21:53
12	14G9194	WG221521-02 LCS V14-P24	7	1		09/11/06 22:33
13	14G9195	WG221521-03 REF L0608643-01	7	1		09/11/06 23:13
14	14G9196	L0608643-02	7	1		09/11/06 23:54
15	14G9197	L0608643-03	7	1		09/12/06 00:34
16	14G9198	L0608643-04	7	1		09/12/06 01:15
17	14G9199	L0608643-05	7	1		09/12/06 01:55
18	14G9200	L0608643-06	7	1		09/12/06 02:36
19	14G9201	L0608643-07 DUP	7	1		09/12/06 03:16
20	14G9202	WG221521-04 MS L0608643-09	7	1		09/12/06 03:57
21	14G9203	WG222035-01 TPH CCV @1000ppm	1	1	STD14961	09/12/06 04:37
22	14G9204	L0608645-02	7	1		09/12/06 05:18
23	14G9205	L0608645-03	7	1		09/12/06 05:58
24	14G9206	L0608645-04	7	1		09/12/06 06:39
25	14G9207	L0608645-05	7	1		09/12/06 07:19
26	14G9208	L0608645-06	7	1		09/12/06 08:00
27	14G9209	L0608645-07 DUP	7	1		09/12/06 08:40
28	14G9210	WG221521-05 MSD L0608643-10	7	1		09/12/06 09:21
29	14G9211	WG221521-06 REF L0608645-01	7	1		09/12/06 10:01
30	14G9212	WG221521-07 MS L0608645-09	7	1		09/12/06 10:41
31	14G9213	WG221521-08 MSD L0608645-10	7	1		09/12/06 11:21
32	14G9214	WG222035-02 TPH CCV @1000ppm	1	1	STD14961	09/12/06 12:02

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 1 of 1

Approved: 12-SEP-06

00072821

KEMRON Environmental Services

Instrument Run Log

Instrument: HP14 Dataset: 092606

Analyst1: HAV Analyst2: NA

Method: TX-T1005 SOP: GCSOP5 Rev: 4

Maintenance Log ID:

Column 1 ID: RTX-5 Column 2 ID: NA

Workgroups:

Internal STD: NA Surrogate STD: NA Calibration STD

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	14G9312	pentane	1	1		09/26/06 09:11
2	14G9313	WIN DEF STD	1	1	STD15024	09/26/06 09:50
3	14G9314	WG223548-01 TPH CCV @1000ppm	1	1	STD14961	09/26/06 10:31
4	14G9315	WG223381-01 BLANK V14-P33	7	1		09/26/06 11:24
5	14G9316	WG223381-02 LCS V14-P33	7	1		09/26/06 12:04
6	14G9317	L0609540-04	7	1		09/26/06 12:43
7	14G9318	WG223381-03 REF L0609540-13	7	1		09/26/06 13:23
8	14G9319	WG223381-04 MS L0609540-14	7	1		09/26/06 14:02
9	14G9320	WG223381-05 MSD L0609540-15	7	1		09/26/06 14:41
10	14G9321	L0609457-02	7	1		09/26/06 15:21
11	14G9322	L0609457-03	7	1		09/26/06 16:00
12	14G9323	L0609457-04	7	1		09/26/06 16:41
13	14G9324	L0609459-06	7	1		09/26/06 17:21
14	14G9325	L0609459-07	7	1		09/26/06 18:01
15	14G9326	pentane	7	1		09/26/06 18:41
16	14G9327	WG223548-02 TPH CCV @1000ppm	1	1	STD14961	09/26/06 19:21
17	14G9328	L0609540-05	7	1		09/26/06 20:01
18	14G9329	L0609540-08	7	1		09/26/06 20:41
19	14G9330	L0609540-09	7	1		09/26/06 21:21
20	14G9331	L0609540-10	7	1		09/26/06 22:01
21	14G9332	L0609540-11	7	1		09/26/06 22:41
22	14G9333	L0609540-12	7	1		09/26/06 23:21
23	14G9334	L0609540-16	7	1		09/27/06 00:01
24	14G9335	L0609540-17	7	1		09/27/06 00:41
25	14G9336	L0609540-18	7	1		09/27/06 01:21
26	14G9337	L0609540-19	7	1		09/27/06 02:01
27	14G9338	WG223548-03 TPH CCV @1000ppm	1	1	STD14961	09/27/06 09:17

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 1 of 1

Approved: 29-SEP-06

KEMRON ENVIRONMENTAL SERVICES

Semivolatile Sample Extract Log Sheet

Parameter: TP005 Matrix: soil
SOP# GCSOP5 Rev. # A
Analyst: HV Date/Time Extracted: 9-26-06 @ 09:00
Spike/Surrogate analyst: HV Witness: GS
Surrogate #: STD 15093
Spike # A: STD 15092 Spike # B: —
Ext Solvent: Pentane Lot#: L70225
Ext Solvent: Lot#:
Ext Disk: Lot#:

Extraction Work Group: WG 223381
Analytical Work Group: WG 223382
Run I.D.: R117527

Reagent: Lot #
Reagent: Lot #
Other: D.I. H2O Lot#: In-house
Methanol HPLC grade

Color Code
T = Transparent
C = Colored
O = Opaque

	Sample ID	Test Code	pH	Initial Wt / Vol	Amount Surrogate	Amount Spike	Final Volume	Extract Color	Comments
1	Blank	TP005	NA	10.0g.	200 ul		10.0	T	D.I. Water 2 ml. ca. to all.
2	LCS					1000 ul.			Methanol
3	466457-02			10.01					
4	— 03			10.13					
5	— 04			10.02					
6	459-06			10.14					
7	— 07			10.14					
8	540-04			10.00					
9	— 05			10.02					
10	— 08			10.13					
11	— 09			10.01					
12	— 10			10.16					
13	— 11			10.02					
14	— 12			10.01					
15	— 13	Ref.		10.18					
16	— 14	MS		10.17		1000			
17	— 15	MSD		10.15					
18	— 16			10.07					
19	— 17			10.13					
20	— 18			10.08					
21	— 19			10.09					
22	— 20			10.10					
23									HV 9/26/06
24									

Reviewed by: [illegible] 9/27/06

KEMRON Environmental Services
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

00072823

Analytical Method: T1005 AAB#: WG223382
Login Number: L0609457

Client ID	Date Collected	Date Received	Date Extracted	Max Hold Time Ext.	Time Held Ext.	Date Analyzed	Max Hold Time Anal	Time Held Anal.	Q
35-SMP117-SB01-01	09/19/06	09/20/06	09/26/06	14	6.90	09/26/06	14	0.265	
35-SMP117-SB01-02	09/19/06	09/20/06	09/26/06	14	6.88	09/26/06	14	0.292	
35-SMP117-SB02-02	09/19/06	09/20/06	09/26/06	14	6.86	09/26/06	14	0.321	

* EXT = SEE PROJECT QAPP REQUIREMENTS
*ANAL = SEE PROJECT QAPP REQUIREMENTS

KEMRON FORMS - Modified 02/14/2006
Version 1.5 PDF File ID: 580584
Report generated 10/02/2006 13:52

SURROGATE STANDARDS

00072824

Login Number: L0609457
Instrument Id: HP14
Workgroup (AAB#): WG223382

Method: T1005
CAL ID: HP14-11-SEP-06
Matrix: Soil

Sample Number	Dilution	Tag	1	2
L0609457-02	1.00	01	106	106
L0609457-03	1.00	01	111	108
L0609457-04	1.00	01	109	108
WG223381-01	1.00	01	97.5	99.1
WG223381-02	1.00	01	107	105

Surrogates	Surrogate Limits		
1 - Chlorobenzene	31	-	130
2 - o-Terphenyl	70	-	130

Underline = Result out of surrogate limits

DL = surrogate diluted out
ND = surrogate not detected

KEMRON FORMS - Modified 09/27/2006
Version 1.5 PDF File ID: 580588
Report generated 10/02/2006 13:52

METHOD BLANK SUMMARY

00072825

Login Number: L0609457
Blank File ID: 14G9315
Date Analyzed: 09/26/06
Time Analyzed: 11:24
Analyst: HAV

Work Group: WG223382
Blank Sample ID: WG223381-01
Instrument ID: HP14
Method: T1005

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG223381-02	14G9316	09/26/06 12:04	01
35-SMP117-SB01-01	L0609457-02	14G9321	09/26/06 15:21	01
35-SMP117-SB01-02	L0609457-03	14G9322	09/26/06 16:00	01
35-SMP117-SB02-02	L0609457-04	14G9323	09/26/06 16:41	01

KEMRON Environmental Services

METHOD BLANK REPORT

00072826

Login Number: L0609457 Run Date: 09/26/2006 Sample ID: WG223381-01
Instrument ID: HP14 Run Time: 11:24 Prep Method: METHOD
File ID: 14G9315 Analyst: HAV Method: T1005
Workgroup (AAB#): WG223382 Matrix: Soil Units: mg/kg
Contract #: DACA56-94-D-0020 Cal ID: HP14-11-SEP-06

Analytes	SQL	PQL	Concentration	Dilution	Qualifier
Carbon Range C6-C12	25.0	50.0	25.0	1	U
Carbon Range C12-C28	25.0	50.0	25.0	1	U
Carbon Range C28-C35	25.0	50.0	31.3	1	J

Surrogates	% Recovery	Surrogate Limits	Qualifier
Chlorobenzene	97.5	31 - 130	PASS
o-Terphenyl	99.1	70 - 130	PASS

MDL Method Detection Limit
RL Reporting/quantitation Limit

* Analyte concentration > RL

KEMRON FORMS - Modified 09/27/2006
Version 1.5 PDF File ID: 580586
Report generated 10/02/2006 13:53

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00072827

Login Number: L0609457 Run Date: 09/26/2006 Sample ID: WG223381-02
Instrument ID: HP14 Run Time: 12:04 Prep Method: METHOD
File ID: 14G9316 Analyst: HAV Method: T1005
Workgroup (AAB#): WG223382 Matrix: Solid Units: mg/kg
Contract #: DACA56-94-D-0020 Cal ID: HP14-11-SEP-06

Analytes	Expected	Found	% Rec	LCS Limits	Q
Carbon Range C6-C35	1000	973	97.3	75 - 125	

Surrogates	% Recovery	Surrogate Limits	Qualifier
Chlorobenzene	107	31 - 130	PASS
o-Terphenyl	105	70 - 130	PASS

* FAILS %REC LIMIT

KEMRON FORMS - Modified 07/06/2006
Version 1.5 PDF File ID: 580587
Report generated 10/02/2006 13:52

KEMRON Environmental Services

INITIAL CALIBRATION SUMMARY

00072828

Login Number: L0609457
Analytical Method: T1005
ICAL Workgroup: WG222034

Instrument ID: HP14
Initial Calibration Date: 11-SEP-06 20:33
Column ID: F

Analyte		AVG RF	% RSD	LINEAR	QUAD
Carbon Range C12-C28		13560	11.6		
Carbon Range C28-C35		2549	188	0.383	
Carbon Range C6-C12		8428	6.60		
Carbon Range C6-C35		19130	4.78		

KEMRON FORMS - Modified 08/31/2006
Version 1.5 PDF File ID: 582467
Report generated 10/02/2006 13:52

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00072829

Login Number: L0609457

Analytical Method: T1005

Instrument ID: HP14

Initial Calibration Date: 11-SEP-06 20:33

Column ID: F

Analyte	WG222034-01			WG222034-02			WG222034-03		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Carbon Range C12-C28	10000	129011148	12900	5000	62958689.0	12590	2500	33266830.0	13310
Carbon Range C28-C35	10000	249579.000	24.96	5000	682361.000	136.5	2500	1050613.00	420.2
Carbon Range C6-C12	10000	89387551.0	8939	5000	41828850.0	8366	2500	22036804.0	8815
Carbon Range C6-C35	10000	183298303	18330	5000	89124728.0	17820	2500	48092896.0	19240

KEMRON FORMS - Modified 09/06/2006
Version 1.6 PDF File ID: 582467
Report generated 10/02/2006 13:52

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00072830

Login Number: L0609457

Analytical Method: T1005

Instrument ID: HP14

Initial Calibration Date: 11-SEP-06 20:33

Column ID: F

Analyte	WG222034-04			WG222034-05			WG222034-06		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Carbon Range C12-C28	1000	13075058.0	13080	500	6371461.00	12740	50.0	836311.000	16730
Carbon Range C28-C35	1000	1181494.00	1181	500	633495.000	1267	50.0	613270.000	12270
Carbon Range C6-C12	1000	8770558.00	8771	500	4120065.00	8240	50.0	371905.000	7438
Carbon Range C6-C35	1000	19760668.0	19760	500	9649295.00	19300	50.0	1015803.00	20320

KEMRON FORMS - Modified 09/06/2006
Version 1.6 PDF File ID: 582467
Report generated 10/02/2006 13:52

KEMRON Environmental Services

ALTERNATE SOURCE CALIBRATION REPORT

00072831

Login Number: L0609457 Run Date: 09/11/2006 Sample ID: WG222034-07
Instrument ID: HP14 Run Time: 21:13 Method: T1005
File ID: 14G9192 Analyst: HAV
ICal Workgroup: WG222034 Cal ID: HP14 - 11-SEP-06

Analyte		Expected	Found	RF	%D	UNITS	Q
Carbon Range C6-C12		1000	516	9880	48.4	mg/L	*
Carbon Range C12-C28		1000	664	12700	33.6	mg/L	*
Carbon Range C28-C35		1000	55.1	1050	94.5	mg/L	*
Carbon Range C6-C35		1000	1100	21000	10	mg/L	

* Exceeds %D Limit

KEMRON FORMS - Modified 07/26/2006
Version 1.5 PDF File ID: 582469
Report generated 10/02/2006 13:52

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072832

Login Number: L0609457 Run Date: 09/26/2006 Sample ID: WG223548-01
Instrument ID: HP14 Run Time: 10:31 Method: T1005
File ID: 14G9314 Analyst: HAV
Workgroup (AAB#): WG223382 Cal ID: HP14 - 11-SEP-06

Analyte		Expected	Found	RF	%D	UNITS	Q
Carbon Range C6-C35		1000	941	18000	5.90	mg/L	

* Exceeds %D Criteria

KEMRON FORMS - Modified 09/06/2006
Version 1.3 PDF File ID: 582470
Report generated 10/02/2006 13:52

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072833

Login Number: L0609457 Run Date: 09/26/2006 Sample ID: WG223548-02
Instrument ID: HP14 Run Time: 19:21 Method: T1005
File ID: 14G9327 Analyst: HAV
Workgroup (AAB#): WG223382 Cal ID: HP14 - 11-SEP-06

Analyte		Expected	Found	RF	%D	UNITS	Q
Carbon Range C6-C35		1000	974	18600	2.60	mg/L	

* Exceeds %D Criteria

KEMRON FORMS - Modified 09/06/2006
Version 1.3 PDF File ID: 582470
Report generated 10/02/2006 13:52

Inorganic QA/QC

00072835

KEMRON Environmental Services
Data Checklist

Date: 27-SEP-2006
Analyst: SLP
Analyst: MMB
Method: 6010B
Instrument: IRIS-ICP
Curve Workgroup: 223529
Runlog ID: 12500
Analytical Workgroups: 223242, 222761, 223516, 223243, 223517

Calibration/Linearity	X
ICV/CCV	X
ICB/CCB	X
ICSA/ICSAB	X
CRI	
Blank/LCS	X
MS/MSD	X
Post Spike/Serial Dilution	X
Upload Results	X
Data Qualifiers	
Generate PDF Instrument Data	X
Sign/Annotate PDF Data	X
Upload Curve Data	X
Workgroup Forms	X
Case Narrative	333, 440, 457, 652, 459, 481, 499, 509, 642, 64
Client Forms	X
Level X	
Level 3	440, 457, 459, 499
Level 4	333, 481, 509
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Primary Reviewer	SLP
Secondary Reviewer	LSB
Comments	

Primary Reviewer:
27-SEP-2006

Secondary Reviewer:
28-SEP-2006

Generated: SEP-28-2006 10:08:04

00072836

KEMRON Environmental Services

Instrument Run Log

Instrument: IRIS-ICP Dataset: 20060927.1
Analyst1: SLP Analyst2: MMB
Method: 6010B SOP: ME600F Rev: 6
Maintenance Log ID: 15871

Calibration Std: STD15289 ICV/CCV Std: STD15241 Post Spike: STD14577
ICSA: STD15048 ICSAB: STD15049

Workgroups: 223242, 222761, 223516, 223243, 223517

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	IR.092706.093000	WG223529-01	Calibration Point		1		09/27/06 09:30
2	IR.092706.093600	WG223529-02	Calibration Point		1		09/27/06 09:36
3	IR.092706.094200	WG223529-03	Calibration Point		1		09/27/06 09:42
4	IR.092706.094800	WG223529-04	Calibration Point		1		09/27/06 09:48
5	IR.092706.095400	WG223529-05	Calibration Point		1		09/27/06 09:54
6	IR.092706.100000	WG223529-06	Calibration Point		1		09/27/06 10:00
7	IR.092706.100700	WG223529-07	Initial Calibration Verification		1		09/27/06 10:07
8	IR.092706.101300	WG223529-08	Initial Calib Blank		1		09/27/06 10:13
9	IR.092706.101900	WG223529-09	Interference Check		1		09/27/06 10:19
10	IR.092706.102500	WG223529-10	Interference Check		1		09/27/06 10:25
11	IR.092706.103100	WG223529-11	CCV		1		09/27/06 10:31
12	IR.092706.103700	WG223529-12	CCB		1		09/27/06 10:37
13	IR.092706.110600	WG223084-02	Method/Prep Blank	1/50	1		09/27/06 11:06
14	IR.092706.111200	WG223084-03	Laboratory Control S	1/50	1		09/27/06 11:12
15	IR.092706.111800	WG223084-01	Reference Sample		1	L0609440-01	09/27/06 11:18
16	IR.092706.112400	WG223084-04	Matrix Spike	1.35/50	1		09/27/06 11:24
17	IR.092706.113000	WG223084-05	Matrix Spike Duplica	1.35/50	1		09/27/06 11:30
18	IR.092706.113600	L0609440-02	SUMP089-SB-01-02	1.31/50	1		09/27/06 11:36
19	IR.092706.114600	WG223242-02	Serial Dilution		5	L0609440-02	09/27/06 11:46
20	IR.092706.115200	WG223242-02	Serial Dilution		25	L0609440-02	09/27/06 11:52
21	IR.092706.115800	WG223242-01	Post Digestion Spike		1	L0609440-02	09/27/06 11:58
22	IR.092706.120400	L0609440-03	SUMP089-SB-02-01	1.38/50	1		09/27/06 12:04
23	IR.092706.121000	WG223529-13	CCV		1		09/27/06 12:10
24	IR.092706.121600	WG223529-14	CCB		1		09/27/06 12:16
25	IR.092706.122200	L0609440-04	SUMP089-SB-02-02	1.3/50	1		09/27/06 12:22
26	IR.092706.122800	L0609440-05	SUMP081-SB-01-01	1.38/50	1		09/27/06 12:28
27	IR.092706.123400	L0609440-06	SUMP081-SB-01-02	1.32/50	1		09/27/06 12:34
28	IR.092706.124000	L0609440-07	SUMP082-SB-01-01	1.33/50	1		09/27/06 12:40
29	IR.092706.124600	L0609440-08	SUMP082-SB-01-02	1.43/50	1		09/27/06 12:46
30	IR.092706.125200	L0609440-09	SUMP083-SB-01-01	1.3/50	1		09/27/06 12:52
31	IR.092706.125800	L0609440-10	SUMP083-SB-01-02	1.45/50	1		09/27/06 12:58
32	IR.092706.130400	L0609440-11	SUMP090-SB-01-01	1.37/50	1		09/27/06 13:04
33	IR.092706.131000	L0609440-12	SUMP090-SB-01-02	1.3/50	1		09/27/06 13:10
34	IR.092706.131600	L0609457-01	35-SMP92-SB01-02	1.36/50	1		09/27/06 13:16
35	IR.092706.132200	WG223529-15	CCV		1		09/27/06 13:22
36	IR.092706.132800	WG223529-16	CCB		1		09/27/06 13:28
37	IR.092706.133400	L0609457-02	35-SMP117-SB01-01	1.39/50	1		09/27/06 13:34

Approved: September 28, 2006

00072837

KEMRON Environmental Services

Instrument Run Log

Instrument: IRIS-ICP Dataset: 20060927.1
Analyst1: SLP Analyst2: MMB
Method: 6010B SOP: ME600F Rev: 6
Maintenance Log ID: 15871

Calibration Std: STD15289 ICV/CCV Std: STD15241 Post Spike: STD14577
ICSA: STD15048 ICSAB: STD15049

Workgroups: 223242, 222761, 223516, 223243, 223517

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
38	IR.092706.134000	L0609457-03	35-SMP117-SB01-02	1.32/50	1		09/27/06 13:40
39	IR.092706.134600	L0609457-04	35-SMP117-SB02-02	1.4/50	1		09/27/06 13:46
40	IR.092706.135200	L0609457-05	35-SMP47-SB01-01	1.37/50	1		09/27/06 13:52
41	IR.092706.135800	L0609457-06	35-SMP47-SB01-02	1.43/50	1		09/27/06 13:58
42	IR.092706.140400	L0609457-07	35-SMP47-SB02-01	1.3/50	1		09/27/06 14:04
43	IR.092706.141000	L0609457-08	35-SMP47-SB02-02	1.31/50	1		09/27/06 14:10
44	IR.092706.141600	L0609333-05	MW009-SO01-091306	1.41/50	10		09/27/06 14:16
45	IR.092706.142200	WG223529-17	CCV		1		09/27/06 14:22
46	IR.092706.142800	WG223529-18	CCB		1		09/27/06 14:28
47	IR.092706.143900	L0609440-05	SUMP081-SB-01-01	1.38/50	10		09/27/06 14:39
48	IR.092706.144500	L0609440-09	SUMP083-SB-01-01	1.3/50	10		09/27/06 14:45
49	IR.092706.145100	L0609440-11	SUMP090-SB-01-01	1.37/50	10		09/27/06 14:51
50	IR.092706.145700	L0609457-03	35-SMP117-SB01-02	1.32/50	10		09/27/06 14:57
51	IR.092706.150300	WG223529-19	CCV		1		09/27/06 15:03
52	IR.092706.150900	WG223529-20	CCB		1		09/27/06 15:09
53	IR.092706.151500	WG223503-02	Method/Prep Blank	1/50	1		09/27/06 15:15
54	IR.092706.152100	WG223503-03	Laboratory Control S	1/50	1		09/27/06 15:21
55	IR.092706.152700	L0609652-01	1181-144	1.35/50	1		09/27/06 15:27
56	IR.092706.153300	WG223516-02	Serial Dilution		5	L0609652-01	09/27/06 15:33
57	IR.092706.153900	WG223516-01	Post Digestion Spike		1	L0609652-01	09/27/06 15:39
58	IR.092706.154500	L0609652-02	1181-145	1.36/50	1		09/27/06 15:45
59	IR.092706.155100	WG223503-01	Reference Sample		1	L0609652-03	09/27/06 15:51
60	IR.092706.155700	WG223503-04	Matrix Spike	1.35/50	1		09/27/06 15:57
61	IR.092706.160400	WG223503-05	Matrix Spike Duplica	1.35/50	1		09/27/06 16:04
62	IR.092706.161200	WG223529-21	CCV		1		09/27/06 16:12
63	IR.092706.161800	WG223529-22	CCB		1		09/27/06 16:18
64	IR.092706.163300	WG223155-02	Method/Prep Blank	1/50	1		09/27/06 16:33
65	IR.092706.163900	WG223155-03	Laboratory Control S	1/50	1		09/27/06 16:39
66	IR.092706.164500	L0609459-03	35-SMP54-SB01-02	1.39/50	1		09/27/06 16:45
67	IR.092706.165100	L0609459-04	35-SMP54-SB02-02	1.46/50	1		09/27/06 16:51
68	IR.092706.165700	L0609481-01	MW007-SO01-091906	1.34/50	1		09/27/06 16:57
69	IR.092706.170300	L0609481-03	MW010-SO01-091906	1.37/50	1		09/27/06 17:03
70	IR.092706.170900	L0609499-03	35-SMP116-SB01-01	1.36/50	1		09/27/06 17:09
71	IR.092706.171500	WG223243-02	Serial Dilution		5	L0609499-03	09/27/06 17:15
72	IR.092706.172100	WG223243-02	Serial Dilution		25	L0609499-03	09/27/06 17:21
73	IR.092706.172700	WG223243-01	Post Digestion Spike		1	L0609499-03	09/27/06 17:27
74	IR.092706.173300	WG223529-23	CCV		1		09/27/06 17:33

Approved: September 28, 2006

00072838

KEMRON Environmental Services

Instrument Run Log

Instrument: IRIS-ICP Dataset: 20060927.1
Analyst1: SLP Analyst2: MMB
Method: 6010B SOP: ME600F Rev: 6
Maintenance Log ID: 15871

Calibration Std: STD15289 ICV/CCV Std: STD15241 Post Spike: STD14577
ICSA: STD15048 ICSAB: STD15049

Workgroups: 223242, 222761, 223516, 223243, 223517

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
75	IR.092706.173900	WG223529-24	CCB		1		09/27/06 17:39
76	IR.092706.174500	L0609499-04	35-SMP116-SB01-02	1.33/50	1		09/27/06 17:45
77	IR.092706.175100	L0609499-05	35-SMP116-SB02-01	1.38/50	1		09/27/06 17:51
78	IR.092706.175700	L0609499-06	35-SMP116-SB02-02	1.38/50	1		09/27/06 17:57
79	IR.092706.180300	L0609499-11	35-SMP049-SB01-02	1.45/50	1		09/27/06 18:03
80	IR.092706.180900	L0609499-12	35-SMP088-SB01-01	1.35/50	1		09/27/06 18:09
81	IR.092706.181500	L0609499-13	35-SMP088-SB02-02	1.3/50	1		09/27/06 18:15
82	IR.092706.182100	L0609499-14	35-SMP088-SB02-01	1.3/50	1		09/27/06 18:21
83	IR.092706.182700	WG223155-01	Reference Sample		1	L0609499-15	09/27/06 18:27
84	IR.092706.183300	WG223155-04	Matrix Spike	1.3/50	1	L0609499-16	09/27/06 18:33
85	IR.092706.183800	WG223155-05	Matrix Spike Duplica	1.3/50	1	L0609499-17	09/27/06 18:38
86	IR.092706.184400	WG223529-25	CCV		1		09/27/06 18:44
87	IR.092706.185000	WG223529-26	CCB		1		09/27/06 18:50
88	IR.092706.185600	L0609499-18	35-SMP088-SB01-02-QC	1.33/50	1		09/27/06 18:56
89	IR.092706.190200	L0609499-22	35-SMP085-SB01-02	1.35/50	1		09/27/06 19:02
90	IR.092706.190800	L0609509-01	1002-SO01-092006	1.3/50	1		09/27/06 19:08
91	IR.092706.191400	L0609509-02	1011-SO01-092006	1.34/50	1		09/27/06 19:14
92	IR.092706.192000	L0609509-03	1011-SO02-092006	1.37/50	1		09/27/06 19:20
93	IR.092706.192600	WG223529-27	CCV		1		09/27/06 19:26
94	IR.092706.193200	WG223529-28	CCB		1		09/27/06 19:32
95	IR.092706.202000	WG223493-02	Method/Prep Blank	1/50	1		09/27/06 20:20
96	IR.092706.202600	WG223493-03	Laboratory Control S	1/50	1		09/27/06 20:26
97	IR.092706.203200	L0609642-01	L5-09	1.37/50	1		09/27/06 20:32
98	IR.092706.203800	L0609645-01	L31SP-01	1.3/50	1		09/27/06 20:38
99	IR.092706.204400	WG223517-02	Serial Dilution		5	L0609645-01	09/27/06 20:44
100	IR.092706.205000	WG223517-02	Serial Dilution		25	L0609645-01	09/27/06 20:50
101	IR.092706.210400	WG223517-02	Serial Dilution		125	L0609645-01	09/27/06 21:04
102	IR.092706.211000	WG223517-01	Post Digestion Spike		1	L0609645-01	09/27/06 21:10
103	IR.092706.211600	WG223493-01	Reference Sample		1	L0609645-08	09/27/06 21:16
104	IR.092706.212200	WG223493-04	Matrix Spike	1.3/50	1	L0609645-09	09/27/06 21:22
105	IR.092706.212800	WG223529-29	CCV		1		09/27/06 21:28
106	IR.092706.213400	WG223529-30	CCB		1		09/27/06 21:34
107	IR.092706.214100	WG223493-05	Matrix Spike Duplica	1.3/50	1	L0609645-10	09/27/06 21:41
108	IR.092706.214700	L0609645-02	L31SP-02	1.3/50	1		09/27/06 21:47
109	IR.092706.215300	L0609645-03	L31SP-03	1.3/50	1		09/27/06 21:53
110	IR.092706.215900	WG223529-31	CCV		1		09/27/06 21:59
111	IR.092706.220500	WG223529-32	CCB		1		09/27/06 22:05

Approved: September 28, 2006

00072839

KEMRON Environmental Services

Instrument Run Log

Instrument: IRIS-ICP Dataset: 20060927.1
Analyst1: SLP Analyst2: MMB
Method: 6010B SOP: ME600F Rev: 6
Maintenance Log ID: 15871

Calibration Std: STD15289 ICV/CCV Std: STD15241 Post Spike: STD14577
ICSA: STD15048 ICSAB: STD15049

Workgroups: 223242, 222761, 223516, 223243, 223517

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time

Comments

Seq.	Rerun	Dil.	Reason	Analytes
26			Fe OLR; reanalyzed @ dil. for Fe.	
30			Fe OLR; reanalyzed @ dil. for Fe.	
32			Ca OLR; reanalyzed @ dil. for Ca.	
38			Mn OLR; reanalyzed @ dil. for Mn.	
91			Ba OLR; needs reanalyzed @ dil. for Ba.	
97			Ca OLR; needs reanalyzed @ dil. for Ca.	
98			Ca OLR; reanalyzed @ dil. for Ca.	
103			Ca OLR; needs reanalyzed @ dil. for Ca.	
104			Ca OLR; needs reanalyzed @ dil. for Ca.	
107			Ca OLR; needs reanalyzed @ dil. for Ca.	
108			Ca OLR; needs reanalyzed @ dil. for Ca.	
109			Ca OLR; needs reanalyzed @ dil. for Ca.	

Approved: September 28, 2006

Metals Digestion Log

Analyst(s): RM
Date: 9/22/16
LCS: 5 ml STD 15240
MS/MSD: 5 ml STD 15240
Witness: AP
HNO_3 Lot #: RGT 10672
1:1HNO_3: RGT 10670
HCl Lot #: RGT 10625
H_2O_2 Lot #: RGT 10595
Earliest Sample Due Date: 9/29/16
Hotblock #: 1
Hotblock Temp - Start: 95.1 @ 0620
Hotblock Temp - End: 95.0 @ 1145

Box: A1
Digestion Work Group: WG 223084

General Digestion
ME401 Revision # _____ - Method 3005A-Water
ME403 Revision # 12 - Method 3050B-Soil

Furnace Digestion
ME402 Revision # _____ - Method 3020A-Water
ME403 Revision # _____ - Method 3050B-Soil

AS/SE Digestion
ME410 Revision # _____ - Method 7060/7740-Water

Relinquished By: VC
Digest Received By: AS Date: 9/22/16

	KEMRON #	Initial WT/Vol	Final Volume	Comments	Due Date
1	ABS	1.008	50 ml	-02	
2	LCS	↓	↓	-03	
3	09-440-01	1.35		-01	9/29
4	-01 MS	↓		-04	
5	-01 MSD	↓		-05	
6	-02	1.31			
7	-03	1.38			
8	-04	1.30			
9	-05	1.38			
10	-06	1.32			
11	-07	1.33			
12	-08	1.43			
13	-09	1.30			
14	-10	1.45			
15	-11	1.37			
16	-12	1.30			
17	09-457-01	1.36			9/29
18	-02	1.39			
19	-03	1.32			
20	-04	1.40			
21	-05	1.37			
22	-06	1.43			
23	-07	1.30			
24	-08	1.31			
25					
26					
27					
28					

9/22/16

Comments:

Primary Review: 9/22/16

Secondary Review: Vicki Collins 9/22/16

Metals Digestion Log

Analyst(s): RDK
Date: 9/22/06
LCS: 5 ml STD 15240
MS/MSD: 5 ml STD 15240
Witness: NA
HNO_3 Lot #: RGT 10672
1:1HNO_3: RGT 10670
HCl Lot #: RGT 10625
H_2O_2 Lot #: RGT 10595
Earliest Sample Due Date: 9/27
Hotblock #: 1
Hotblock Temp - Start: 95.1 °C 0615
Hotblock Temp - End: 95.0 °C 1145

Box: 57
Digestion Work Group: WG 223080

General Digestion
ME401 Revision # _____ - Method 3005A-Water
ME403 Revision # 12 - Method 3050B-Soil

Furnace Digestion
ME402 Revision # _____ - Method 3020A-Water
ME403 Revision # _____ - Method 3050B-Soil

AS/SE Digestion
ME410 Revision # _____ - Method 7060/7740-Water

Relinquished By: VC
Digest Received By: RAS Date: 9/22/06

	KEMRON #	Initial WT/Vol	Final Volume	Comments	Due Date
1	PBS	1.00 g	50 ml	-02	
2	LCS	1		-03	
3	09-424-01	1.35		ROCKS	9/29
4	-02	1.38			
5	-03	1.32			
6	-04	1.38		ROCKS	
7	-05	1.44			
8	09-429-01	1.40		*	9/29
9	09-470-01	1.32		-01	9/27
10	-01 MS	1		-04	
11	-01 MSD	1		-05	
12	-02	1.31			
13	-03	1.34			
14	-04	1.38			
15	-05	1.48			
16	-06	1.36			
17	-07	1.44			
18	-08	1.30			
19	-09	1.45			
20	-10	1.44			
21	-11	1.38			
22					
23					
24					
25		9/22/06			
26					
27					
28					

Comments: * 09-429-01 POSS. A BASE REACTED W/ HNO_3

Primary Review: 9/22/06 Secondary Review: Vicki Collins 9/22/06

KEMRON Environmental Services
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

00072842

Analytical Method: 6010B

AAB#: WG223242

Login Number: L0609457

Client ID	Date Collected	Date Received	Date Extracted	Max Hold Time Ext.	Time Held Ext.	Date Analyzed	Max Hold Time Anal	Time Held Anal.	Q
35-SMP92-SB01-02	09/19/06	09/20/06	09/22/06	180	2.87	09/27/06	180	5.29	
35-SMP117-SB01-01	09/19/06	09/20/06	09/22/06	180	2.79	09/27/06	180	5.30	
35-SMP117-SB01-02	09/19/06	09/20/06	09/22/06	180	2.77	09/27/06	180	5.31	
35-SMP117-SB01-02	09/19/06	09/20/06	09/22/06	180	2.77	09/27/06	180	5.36	
35-SMP117-SB02-02	09/19/06	09/20/06	09/22/06	180	2.75	09/27/06	180	5.31	
35-SMP47-SB01-01	09/15/06	09/20/06	09/22/06	180	6.78	09/27/06	180	5.31	
35-SMP47-SB01-02	09/15/06	09/20/06	09/22/06	180	6.77	09/27/06	180	5.32	
35-SMP47-SB02-01	09/15/06	09/20/06	09/22/06	180	6.78	09/27/06	180	5.32	
35-SMP47-SB02-02	09/15/06	09/20/06	09/22/06	180	6.78	09/27/06	180	5.33	

* EXT = SEE PROJECT QAPP REQUIREMENTS
*ANAL = SEE PROJECT QAPP REQUIREMENTS

KEMRON FORMS - Modified 02/14/2006
Version 1.5 PDF File ID: 578416
Report generated 09/27/2006 15:33

METHOD BLANK SUMMARY

Login Number: L0609457
Blank File ID: IR.092706.110600
Date Analyzed: 09/27/06
Time Analyzed: 11:06
Analyst: SLP

Work Group: WG223242
Blank Sample ID: WG223084-02
Instrument ID: IRIS-ICP
Method: 6010B

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG223084-03	IR.092706.111200	09/27/06 11:12	01
35-SMP92-SB01-02	L0609457-01	IR.092706.131600	09/27/06 13:16	01
35-SMP117-SB01-01	L0609457-02	IR.092706.133400	09/27/06 13:34	01
35-SMP117-SB01-02	L0609457-03	IR.092706.134000	09/27/06 13:40	01
35-SMP117-SB02-02	L0609457-04	IR.092706.134600	09/27/06 13:46	01
35-SMP47-SB01-01	L0609457-05	IR.092706.135200	09/27/06 13:52	01
35-SMP47-SB01-02	L0609457-06	IR.092706.135800	09/27/06 13:58	01
35-SMP47-SB02-01	L0609457-07	IR.092706.140400	09/27/06 14:04	01
35-SMP47-SB02-02	L0609457-08	IR.092706.141000	09/27/06 14:10	01
35-SMP117-SB01-02	L0609457-03	IR.092706.145700	09/27/06 14:57	DL01

KEMRON Environmental Services

METHOD BLANK REPORT

00072844

Login Number: L0609457 Run Date: 09/27/2006 Sample ID: WG223084-02
Instrument ID: IRIS-ICP Run Time: 11:06 Prep Method: 3050B
File ID: IR.092706.110600 Analyst: SLP Method: 6010B
Workgroup (AAB#): WG223242 Matrix: Soil Units: mg/kg
Contract #: DACA56-94-D-0020 Cal ID: IRIS-I-27-SEP-06

Analytes	SQL	PQL	Concentration	Dilution	Qualifier
Aluminum, Total	10.0	20.0	10.0	1	U
Silver, Total	0.250	2.00	0.250	1	U
Barium, Total	0.100	0.500	0.100	1	U
Beryllium, Total	0.0120	0.500	0.0120	1	U
Calcium, Total	5.00	10.0	5.00	1	U
Cadmium, Total	0.0500	0.500	0.0500	1	U
Cobalt, Total	0.120	1.00	0.120	1	U
Chromium, Total	0.120	1.00	0.120	1	U
Copper, Total	0.500	1.00	0.500	1	U
Iron, Total	1.00	2.00	1.00	1	U
Potassium, Total	25.0	50.0	25.0	1	U
Magnesium, Total	12.0	25.0	12.0	1	U
Manganese, Total	0.100	0.500	0.100	1	U
Sodium, Total	5.00	25.0	5.00	1	U
Nickel, Total	0.500	2.00	0.500	1	U
Vanadium, Total	0.250	0.500	0.250	1	U
Zinc, Total	0.500	1.00	0.500	1	U

MDL Method Detection Limit
RL Reporting/quantitation Limit

* Analyte concentration > RL

KEMRON FORMS - Modified 09/27/2006
Version 1.5 PDF File ID: 578418
Report generated 09/27/2006 15:33

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00072845

Login Number: L0609457 Run Date: 09/27/2006 Sample ID: WG223084-03
Instrument ID: IRIS-ICP Run Time: 11:12 Prep Method: 3050B
File ID: IR.092706.111200 Analyst: SLP Method: 6010B
Workgroup (AAB#): WG223242 Matrix: Solid Units: mg/kg
Contract #: DACA56-94-D-0020 Cal ID: IRIS-I-27-SEP-06

Analytes	Expected	Found	% Rec	LCS Limits	Q
Aluminum, Total	250	233	93.3	80 - 120	
Silver, Total	10.0	9.51	95.1	80 - 120	
Barium, Total	25.0	23.7	95.0	80 - 120	
Beryllium, Total	1.25	1.21	96.5	80 - 120	
Calcium, Total	250	240	95.8	80 - 120	
Cadmium, Total	1.25	1.13	90.8	80 - 120	
Cobalt, Total	5.00	4.84	96.9	80 - 120	
Chromium, Total	12.5	11.7	93.5	80 - 120	
Copper, Total	12.5	11.8	94.8	80 - 120	
Iron, Total	100	93.5	93.5	80 - 120	
Potassium, Total	1250	1240	99.1	80 - 120	
Magnesium, Total	250	231	92.2	80 - 120	
Manganese, Total	12.5	11.8	94.2	80 - 120	
Sodium, Total	1250	1260	101	80 - 120	
Nickel, Total	12.5	11.6	93.1	80 - 120	
Vanadium, Total	25.0	24.2	96.8	80 - 120	
Zinc, Total	25.0	22.9	91.5	80 - 120	

KEMRON FORMS - Modified 07/06/2006
Version 1.5 PDF File ID: 578419
Report generated 09/27/2006 15:33

KEMRON Environmental Services

MATRIX SPIKE AND MATRIX SPIKE DUP (MS/MSD)

00072846

Loginnum: L0609457 Cal ID: IRIS-ICP- Worknum: WG223242
Instrument ID: IRIS-ICP Contract #: DACA56-94-D-0020 Method: 6010B
Parent ID: WG223084-01 File ID: IR.092706.111800 Dil: 1 Matrix: SOLID
Sample ID: WG223084-04 MS File ID: IR.092706.112400 Dil: 1 Units: mg/kg
Sample ID: WG223084-05 MSD File ID: IR.092706.113000 Dil: 1 Percent Solid: 100

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Aluminum, Total	10100	185	19300	4940	185	17400	3930	10.1	75 - 125	20	*
Barium, Total	94.4	18.5	114	103	18.5	93.5	-4.84	19.3	75 - 125	20	*
Beryllium, Total	0.547	0.926	1.59	113	0.926	1.50	103	6.02	75 - 125	20	
Cadmium, Total	0.0933	0.926	1.01	99.3	0.926	0.999	97.8	1.40	75 - 125	20	
Calcium, Total	1610	185	1650	20.2	185	1570	-18.2	4.41	75 - 125	20	*
Chromium, Total	15.3	9.26	27.5	132	9.26	25.9	115	6.16	75 - 125	20	*
Cobalt, Total	7.98	3.70	9.11	30.7	3.70	10.2	61.2	11.7	75 - 125	20	*
Copper, Total	4.53	9.26	14.0	103	9.26	13.7	99.2	2.30	75 - 125	20	
Iron, Total	12600	74.1	16800	5730	74.1	13000	622	25.3	75 - 125	20	*
Magnesium, Total	831	185	1350	279	185	1270	239	5.66	75 - 125	20	*
Manganese, Total	130	9.26	83.4	-503	9.26	111	-206	28.2	75 - 125	20	*
Nickel, Total	10.9	9.26	20.8	107	9.26	20.4	103	1.78	75 - 125	20	
Potassium, Total	411	926	1690	138	926	1650	134	2.43	75 - 125	20	*
Silver, Total	ND	7.41	7.24	97.7	7.41	7.30	98.5	0.805	75 - 125	20	
Sodium, Total	46.1	926	956	98.2	926	957	98.3	0.0968	75 - 125	20	
Vanadium, Total	21.3	18.5	51.5	163	18.5	45.2	129	12.9	75 - 125	20	*
Zinc, Total	21.9	18.5	46.6	134	18.5	45.1	125	3.36	75 - 125	20	*

* FAILS %REC LIMIT

FAILS RPD LIMIT

NOTE: This is an internal quality control sample.

KEMRON FORMS - Modified 03/16/2006
Version 1.5 PDF File ID: 578420
Report generated 09/27/2006 15:33

KEMRON ENVIRONMENTAL SERVICES
SERIAL DILUTION REPORT

00072847

Sample Login ID: L0609457 Worknum: WG223242
Instrument ID: IRIS-ICP Method: 6010B
Sample ID: L0609440-02 File ID: IR.092706.113600 Dil: 1 Units: mg/kg
Serial Dilution ID: WG223242-02 File ID: IR.092706.114600 Dil: 5

Analyte	Sample	C	Serial Dilution	C	% Difference	Q
Aluminum	248		260		4.84	
Barium	3.03		3.20		5.61	
Beryllium	0.0249		0.0262	F	5.22	
Cadmium	0.00263	F	0	U	100	
Calcium	9.98		10.7	X	7.21	
Chromium	0.321		0.352	X	9.66	
Cobalt	0.327		0.368	X	12.5	E
Copper	0.140	X	0.143	X	2.14	
Iron	397		444		11.8	E
Magnesium	40.8		42.5	X	4.17	
Manganese	1.36		1.56		14.7	E
Nickel	0.481	X	0.521	X	8.32	
Potassium	11.5	X	12.0	X	4.35	
Silver	ND	U	0	U		
Sodium	8.81		9.26	X	5.11	
Vanadium	0.484		0.490	X	1.24	
Zinc	1.26		1.32	X	4.76	

U = Result is below MDL
F = Result is between MDL and RL
X = Result is greater than RL and less than 50 times the MDL
E = %D exceeds control limit of 10% and initial
sample result is greater than or equal to 50 times the MDL

KEMRON FORMS - Modified 02/14/2006
Version 1.3 PDF File ID: 578414
Report generated 09/27/2006 15:33

KEMRON ENVIRONMENTAL SERVICES
SERIAL DILUTION REPORT

00072848

Sample Login ID: L0609457 Worknum: WG223242
Instrument ID: IRIS-ICP Method: 6010B
Sample ID: L0609440-02 File ID: IR.092706.114600 Dil: 5 Units: mg/kg
Serial Dilution ID: WG223242-02 File ID: IR.092706.115200 Dil: 25

Analyte	Sample	C	Serial Dilution	C	% Difference	Q
Aluminum	260		257		1.15	
Barium	3.20		3.17		0.938	
Beryllium	0.0262	F	0.0255	F	2.67	
Cadmium	0	U	0	U		
Calcium	10.7	X	11.1	X	3.74	
Chromium	0.352	X	0.348	F	1.14	
Cobalt	0.368	X	0.435	F	18.2	
Copper	0.143	X	0	U	100	
Iron	444		440		0.901	
Magnesium	42.5	X	43.1	X	1.41	
Manganese	1.56		1.59	X	1.92	
Nickel	0.521	X	0.527	F	1.15	
Potassium	12.0	X	0	U	100	
Silver	0	U	0	U		
Sodium	9.26	X	9.34	F	0.864	
Vanadium	0.490	X	0.498	X	1.63	
Zinc	1.32	X	1.32	X	0.00	

U = Result is below MDL
F = Result is between MDL and RL
X = Result is greater than RL and less than 50 times the MDL
E = %D exceeds control limit of 10% and initial
sample result is greater than or equal to 50 times the MDL

KEMRON FORMS - Modified 02/14/2006
Version 1.3 PDF File ID: 578414
Report generated 09/27/2006 15:33

KEMRON ENVIRONMENTAL SERVICES
POST SPIKE REPORT

Sample Login ID: L0609457
Instrument ID: IRIS-ICP
Post Spike ID: WG223242-01 File ID: IR.092706.115800 Dil: 1
Sample ID: L0609440-02 File ID: IR.092706.113600 Dil: 1

Worknum: WG223242
Method: 6010B
Units: mg/kg
Matrix: Soil

Analyte	Control Limit %R	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Q
ALUMINUM	75 - 125	236		248		5.00	256	N
BARIUM	75 - 125	3.30		3.03		0.500	115	
BERYLLIUM	75 - 125	0.0481		0.0249		0.0250	103	
CADMIUM	75 - 125	0.0267		0.00263	F	0.0250	97.3	
CALCIUM	75 - 125	14.4		9.98		5.00	108	
CHROMIUM	75 - 125	0.523		0.321		0.250	93.6	
COBALT	75 - 125	0.386		0.327		0.100	91.7	
COPPER	75 - 125	0.375		0.140		0.250	99.6	
IRON	75 - 125	358		397		2.00	35.0	N
MAGNESIUM	75 - 125	42.6		40.8		5.00	118	
MANGANESE	75 - 125	1.45		1.36		0.250	90.4	
NICKEL	75 - 125	0.665		0.481		0.250	92.8	
POTASSIUM	75 - 125	34.1		11.5		25.0	95.0	
SILVER	75 - 125	0.190		ND	U	0.200	95.0	
SODIUM	75 - 125	32.4		8.81		25.0	97.9	
VANADIUM	75 - 125	0.933		0.484		0.500	99.5	
ZINC	75 - 125	1.61		1.26		0.500	95.2	

N = % Recoverv exceeds control limits of 75% - 125%
F = Result is between MDL and RL
U = Sample result is below MDL. A value of zero is used in the calculation.

KEMRON FORMS - Modified 02/14/2006
Version 2.0 PDF File ID: 578415
Report generated 09/27/2006 15:33

KEMRON Environmental Services

INITIAL CALIBRATION SUMMARY

00072850

Login Number: L0609457 Workgroup (AAB#): WG223242

Analytical Method: 6010B Instrument ID: IRIS-ICP

ICAL Worknum: WG223529 Initial Calibration Date: 27-SEP-2006 10:00

Analyte	WG223529-01		WG223529-02		WG223529-03		WG223529-04		WG223529-05		WG223529-06	
	STD	INT	STD	INT	STD	INT	STD	INT	STD	INT	STD	INT
Aluminum	0	.03603	.1	.16906	.2	.30202	5	6.7261	10	14.017	20	28.099
Barium	0	.8037	.01	6.3005	.02	11.944	.5	276.67	1	574.42	2	1142
Beryllium	0	.23649	.0005	.93307	.001	1.7198	.025	36.976	.05	75.218	.1	150.59
Cadmium	0	.45427	**NA**	**NA**	.001	.51737	.025	2.2476	.05	4.3054	.1	8.0702
Calcium	0	.33625	.1	1.3192	.2	2.2148	5	46.715	10	95.562	20	192.44
Chromium	0	.71977	.005	1.3847	.01	2.0281	.25	33.963	.5	70.015	1	139.14
Cobalt	0	.31597	**NA**	**NA**	.004	.60603	.1	7.4561	.2	14.949	.4	29.319
Copper	0	.21062	NA	NA	.01	.51722	.25	9.0272	.5	18.652	1	37.01
Iron	0	.10482	.04	.41576	.08	.77212	2	15.198	4	32.259	8	64.414
Magnesium	0	.00554	**NA**	**NA**	.2	.12376	5	3.2207	10	6.8747	20	13.754
Manganese	0	.08395	.005	5.7348	.01	11.2	.25	274.56	.5	574.5	1	1142.5
Nickel	0	.38933	**NA**	**NA**	.01	.97753	.25	14.687	.5	30.204	1	60.234
Potassium	0	-.81157	.5	5.1774	1	11.132	25	311.71	50	616.79	100	1178.9
Silver	0	-.0425	**NA**	**NA**	.008	.29556	.2	5.6781	.4	11.717	.8	23.479
Sodium	0	.34277	.5	36.212	1	73.16	25	1822.5	50	3610.7	100	6788.7
Vanadium	0	.91641	.01	1.3008	.02	1.6921	.5	19.298	1	39.554	2	76.927
Zinc	0	.27391	.01	1.3995	.02	2.5873	.5	57.982	1	122.2	2	247.27

INT = Instrument intensity
R = Coefficient of correlation
Q = Data Qualifier
*** = Out of Compliance; R < 0.995**

KEMRON FORMS - Modified 03/03/2006
Version 1.5 PDF File ID: 578423
Report generated 09/27/2006 15:33

INITIAL CALIBRATION SUMMARY

00072851

Analyte	R	Q
Aluminum	0.999864	
Barium	0.999921	
Beryllium	0.999964	
Cadmium	0.999673	
Calcium	0.999930	
Chromium	0.999894	
Cobalt	0.999972	
Copper	0.999336	
Iron	0.999762	
Magnesium	0.999694	
Manganese	0.999893	
Nickel	0.999883	
Potassium	0.999687	
Silver	0.999409	
Sodium	0.999475	
Vanadium	0.999884	
Zinc	0.999736	

INT = Instrument intensity
R = Coefficient of correlation
Q = Data Qualifier
*** = Out of Compliance; R < 0.995**

KEMRON FORMS - Modified 03/03/2006
Version 1.5 PDF File ID: 578423
Report generated 09/27/2006 15:33

KEMRON Environmental Services

INITIAL CALIBRATION BLANK (ICB)

00072852

Login Number: L0609457 Run Date: 09/27/2006 Sample ID: WG223529-08
Instrument ID: IRIS-ICP Run Time: 10:13 Method: 6010B
File ID: IR.092706.101300 Analyst: SLP Units: mg/L
Workgroup (AAB#): WG223242 Cal ID: IRIS-I - 27-SEP-06

Analytes	MDL	RDL	Concentration	Dilution	Qualifier
Aluminum	0.200	0.400	-.0179	1	U
Silver	0.00500	0.0400	.00146	1	U
Barium	0.00200	0.0100	.00007	1	U
Beryllium	0.000240	0.0100	0	1	U
Calcium	0.100	0.200	.00677	1	U
Cadmium	0.00100	0.0100	.00025	1	U
Cobalt	0.00240	0.0200	.00018	1	U
Chromium	0.00240	0.0200	-.00005	1	U
Copper	0.0100	0.0200	-.00281	1	U
Iron	0.0200	0.0400	.00261	1	U
Potassium	0.500	1.00	-.0138	1	U
Magnesium	0.240	0.500	.058	1	U
Manganese	0.00200	0.0100	.00017	1	U
Sodium	0.100	0.500	.00375	1	U
Nickel	0.0100	0.0400	-.00025	1	U
Vanadium	0.00500	0.0100	.00198	1	U
Zinc	0.0100	0.0200	.00012	1	U

U = Result is less than MDL
F = Result is between MDL and RL

KEMRON FORMS - Modified 03/06/2006
Version 1.5 PDF File ID: 578425
Report generated 09/27/2006 15:33

KEMRON Environmental Services

CONTINUING CALIBRATION BLANK (CCB)

00072853

Login Number: L0609457 Run Date: 09/27/2006 Sample ID: WG223529-12
Instrument ID: IRIS-ICP Run Time: 10:37 Method: 6010B
File ID: IR.092706.103700 Analyst: SLP Units: mg/L
Workgroup (AAB#): WG223242 Cal ID: IRIS-I - 27-SEP-06

Analytes	MDL	RDL	Concentration	Dilution	Qualifier
Aluminum	0.200	0.400	-0.0199	1	U
Silver	0.00500	0.0400	0.00123	1	U
Barium	0.00200	0.0100	0.0000400	1	U
Beryllium	0.000240	0.0100	0.0000100	1	U
Calcium	0.100	0.200	0.00525	1	U
Cadmium	0.00100	0.0100	0.000150	1	U
Cobalt	0.00240	0.0200	0.000240	1	U
Chromium	0.00240	0.0200	0.000250	1	U
Copper	0.0100	0.0200	-0.00186	1	U
Iron	0.0200	0.0400	0.00112	1	U
Potassium	0.500	1.00	0.00201	1	U
Magnesium	0.240	0.500	-0.0171	1	U
Manganese	0.00200	0.0100	0.000100	1	U
Sodium	0.100	0.500	0.0121	1	U
Nickel	0.0100	0.0400	0.0000400	1	U
Vanadium	0.00500	0.0100	0.00272	1	U
Zinc	0.0100	0.0200	0.000200	1	U

U = Result is less than MDL
F = Result is between MDL and RL

KEMRON FORMS - Modified 09/27/2006
Version 2.0 PDF File ID: 578428
Report generated 09/27/2006 15:33

KEMRON Environmental Services

CONTINUING CALIBRATION BLANK (CCB)

00072854

Login Number: L0609457 Run Date: 09/27/2006 Sample ID: WG223529-14
Instrument ID: IRIS-ICP Run Time: 12:16 Method: 6010B
File ID: IR.092706.121600 Analyst: SLP Units: mg/L
Workgroup (AAB#): WG223242 Cal ID: IRIS-I - 27-SEP-06

Analytes	MDL	RDL	Concentration	Dilution	Qualifier
Aluminum	0.200	0.400	-0.00589	1	U
Silver	0.00500	0.0400	0.00179	1	U
Barium	0.00200	0.0100	0.000270	1	U
Beryllium	0.000240	0.0100	0.0000500	1	U
Calcium	0.100	0.200	0.0147	1	U
Cadmium	0.00100	0.0100	0.000140	1	U
Cobalt	0.00240	0.0200	0.000210	1	U
Chromium	0.00240	0.0200	0.000150	1	U
Copper	0.0100	0.0200	-0.00282	1	U
Iron	0.0200	0.0400	0.00135	1	U
Potassium	0.500	1.00	-0.00873	1	U
Magnesium	0.240	0.500	0.00975	1	U
Manganese	0.00200	0.0100	0.000170	1	U
Sodium	0.100	0.500	0.00671	1	U
Nickel	0.0100	0.0400	-0.000110	1	U
Vanadium	0.00500	0.0100	-0.00103	1	U
Zinc	0.0100	0.0200	0.000600	1	U

U = Result is less than MDL
F = Result is between MDL and RL

KEMRON FORMS - Modified 09/27/2006
Version 2.0 PDF File ID: 578428
Report generated 09/27/2006 15:33

KEMRON Environmental Services

CONTINUING CALIBRATION BLANK (CCB)

00072855

Login Number: L0609457 Run Date: 09/27/2006 Sample ID: WG223529-16
Instrument ID: IRIS-ICP Run Time: 13:28 Method: 6010B
File ID: IR.092706.132800 Analyst: SLP Units: mg/L
Workgroup (AAB#): WG223242 Cal ID: IRIS-I - 27-SEP-06

Analytes	MDL	RDL	Concentration	Dilution	Qualifier
Aluminum	0.200	0.400	0.00545	1	U
Silver	0.00500	0.0400	0.00184	1	U
Barium	0.00200	0.0100	0.0000700	1	U
Beryllium	0.000240	0.0100	0.0000300	1	U
Calcium	0.100	0.200	0.00716	1	U
Cadmium	0.00100	0.0100	-0.0000800	1	U
Cobalt	0.00240	0.0200	0.000230	1	U
Chromium	0.00240	0.0200	-0.0000500	1	U
Copper	0.0100	0.0200	-0.00268	1	U
Iron	0.0200	0.0400	0.00306	1	U
Potassium	0.500	1.00	0.00852	1	U
Magnesium	0.240	0.500	0.0217	1	U
Manganese	0.00200	0.0100	0.000120	1	U
Sodium	0.100	0.500	0.000380	1	U
Nickel	0.0100	0.0400	-0.000210	1	U
Vanadium	0.00500	0.0100	-0.00157	1	U
Zinc	0.0100	0.0200	0.000180	1	U

U = Result is less than MDL
F = Result is between MDL and RL

KEMRON FORMS - Modified 09/27/2006
Version 2.0 PDF File ID: 578428
Report generated 09/27/2006 15:33

KEMRON Environmental Services

CONTINUING CALIBRATION BLANK (CCB)

00072856

Login Number: L0609457 Run Date: 09/27/2006 Sample ID: WG223529-18
Instrument ID: IRIS-ICP Run Time: 14:28 Method: 6010B
File ID: IR.092706.142800 Analyst: SLP Units: mg/L
Workgroup (AAB#): WG223242 Cal ID: IRIS-I - 27-SEP-06

Analytes	MDL	RDL	Concentration	Dilution	Qualifier
Aluminum	0.200	0.400	-0.0212	1	U
Silver	0.00500	0.0400	0.00306	1	U
Barium	0.00200	0.0100	0.0000600	1	U
Beryllium	0.000240	0.0100	0.0000100	1	U
Calcium	0.100	0.200	0.00717	1	U
Cadmium	0.00100	0.0100	0.000190	1	U
Cobalt	0.00240	0.0200	0.000310	1	U
Chromium	0.00240	0.0200	0.0000700	1	U
Copper	0.0100	0.0200	-0.00187	1	U
Iron	0.0200	0.0400	0.00514	1	U
Potassium	0.500	1.00	-0.00687	1	U
Magnesium	0.240	0.500	0.0781	1	U
Manganese	0.00200	0.0100	0.000130	1	U
Sodium	0.100	0.500	0.00283	1	U
Nickel	0.0100	0.0400	-0.000300	1	U
Vanadium	0.00500	0.0100	-0.00155	1	U
Zinc	0.0100	0.0200	0.000150	1	U

U = Result is less than MDL
F = Result is between MDL and RL

KEMRON FORMS - Modified 09/27/2006
Version 2.0 PDF File ID: 578428
Report generated 09/27/2006 15:33

KEMRON Environmental Services

CONTINUING CALIBRATION BLANK (CCB)

00072857

Login Number: L0609457 Run Date: 09/27/2006 Sample ID: WG223529-20
Instrument ID: IRIS-ICP Run Time: 15:09 Method: 6010B
File ID: IR.092706.150900 Analyst: SLP Units: mg/L
Workgroup (AAB#): WG223242 Cal ID: IRIS-I - 27-SEP-06

Analytes	MDL	RDL	Concentration	Dilution	Qualifier
Aluminum	0.200	0.400	0.0108	1	U
Silver	0.00500	0.0400	0.00276	1	U
Barium	0.00200	0.0100	0.000260	1	U
Beryllium	0.000240	0.0100	0.0000300	1	U
Calcium	0.100	0.200	0.0118	1	U
Cadmium	0.00100	0.0100	-0.000510	1	U
Cobalt	0.00240	0.0200	0	1	U
Chromium	0.00240	0.0200	0.000200	1	U
Copper	0.0100	0.0200	-0.000370	1	U
Iron	0.0200	0.0400	0.00264	1	U
Potassium	0.500	1.00	-0.0107	1	U
Magnesium	0.240	0.500	0.00701	1	U
Manganese	0.00200	0.0100	0.000190	1	U
Sodium	0.100	0.500	0.00984	1	U
Nickel	0.0100	0.0400	-0.000180	1	U
Vanadium	0.00500	0.0100	-0.00136	1	U
Zinc	0.0100	0.0200	-0.000150	1	U

U = Result is less than MDL
F = Result is between MDL and RL

KEMRON FORMS - Modified 09/27/2006
Version 2.0 PDF File ID: 578428
Report generated 09/27/2006 15:33

KEMRON Environmental Services

INITIAL CALIBRATION VERIFICATION (ICV)

00072858

Login Number: L0609457 Run Date: 09/27/2006 Sample ID: WG223529-07
Instrument ID: IRIS-ICP Run Time: 10:07 Method: 6010B
File ID: IR.092706.100700 Analyst: SLP Units: mg/L
Workgroup (AAB#): WG223242 Cal ID: IRIS-I - 27-SEP-06

Analyte		Expected	Found	%REC	LIMITS	Q
Aluminum		10	9.97	99.7	90 - 110	
Silver		.4	0.400	100	90 - 110	
Barium		1	0.982	98.2	90 - 110	
Beryllium		.05	0.0504	101	90 - 110	
Calcium		10	9.90	99.0	90 - 110	
Cadmium		.05	0.0509	102	90 - 110	
Cobalt		.2	0.203	101	90 - 110	
Chromium		.5	0.499	99.8	90 - 110	
Copper		.5	0.500	100	90 - 110	
Iron		4	4.01	100	90 - 110	
Potassium		50	50.4	101	90 - 110	
Magnesium		10	10.0	100	90 - 110	
Manganese		.5	0.505	101	90 - 110	
Sodium		50	51.3	103	90 - 110	
Nickel		.5	0.495	99.0	90 - 110	
Vanadium		1	1.01	101	90 - 110	
Zinc		1	1.00	100	90 - 110	

* Exceeds LIMITS Limit

KEMRON FORMS - Modified 03/03/2006
Version 1.3 PDF File ID: 578424
Report generated 09/27/2006 15:33

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072859

Login Number: L0609457 Run Date: 09/27/2006 Sample ID: WG223529-11
Instrument ID: IRIS-ICP Run Time: 10:31 Method: 6010B
File ID: IR.092706.103100 Analyst: SLP
Workgroup (AAB#): WG223242 Cal ID: IRIS-I - 27-SEP-06

Analyte		Expected	Found	%REC	LIMITS	UNITS	Q
Aluminum		10.0	9.98	99.8	90 - 110	mg/L	
Silver		0.400	0.405	101	90 - 110	mg/L	
Barium		1.00	0.987	98.7	90 - 110	mg/L	
Beryllium		0.0500	0.0508	102	90 - 110	mg/L	
Calcium		10.0	9.92	99.2	90 - 110	mg/L	
Cadmium		0.0500	0.0509	102	90 - 110	mg/L	
Cobalt		0.200	0.202	101	90 - 110	mg/L	
Chromium		0.500	0.499	99.9	90 - 110	mg/L	
Copper		0.500	0.501	100	90 - 110	mg/L	
Iron		4.00	3.99	99.8	90 - 110	mg/L	
Potassium		50.0	50.7	101	90 - 110	mg/L	
Magnesium		10.0	10.0	100	90 - 110	mg/L	
Manganese		0.500	0.505	101	90 - 110	mg/L	
Sodium		50.0	51.6	103	90 - 110	mg/L	
Nickel		0.500	0.496	99.2	90 - 110	mg/L	
Vanadium		1.00	1.01	101	90 - 110	mg/L	
Zinc		1.00	1.01	101	90 - 110	mg/L	

* Exceeds LIMITS Criteria

KEMRON FORMS - Modified 08/16/2006
Version 1.3 PDF File ID: 578427
Report generated 09/27/2006 15:33

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072860

Login Number: L0609457 Run Date: 09/27/2006 Sample ID: WG223529-13
Instrument ID: IRIS-ICP Run Time: 12:10 Method: 6010B
File ID: IR.092706.121000 Analyst: SLP
Workgroup (AAB#): WG223242 Cal ID: IRIS-I - 27-SEP-06

Analyte		Expected	Found	%REC	LIMITS	UNITS	Q
Aluminum		10.0	9.97	99.7	90 - 110	mg/L	
Silver		0.400	0.399	99.8	90 - 110	mg/L	
Barium		1.00	0.976	97.6	90 - 110	mg/L	
Beryllium		0.0500	0.0504	101	90 - 110	mg/L	
Calcium		10.0	9.86	98.6	90 - 110	mg/L	
Cadmium		0.0500	0.0505	101	90 - 110	mg/L	
Cobalt		0.200	0.202	101	90 - 110	mg/L	
Chromium		0.500	0.495	99.1	90 - 110	mg/L	
Copper		0.500	0.498	99.6	90 - 110	mg/L	
Iron		4.00	4.01	100	90 - 110	mg/L	
Potassium		50.0	50.7	101	90 - 110	mg/L	
Magnesium		10.0	10.1	101	90 - 110	mg/L	
Manganese		0.500	0.502	100	90 - 110	mg/L	
Sodium		50.0	51.8	104	90 - 110	mg/L	
Nickel		0.500	0.496	99.2	90 - 110	mg/L	
Vanadium		1.00	1.01	101	90 - 110	mg/L	
Zinc		1.00	1.00	100	90 - 110	mg/L	

* Exceeds LIMITS Criteria

KEMRON FORMS - Modified 08/16/2006
Version 1.3 PDF File ID: 578427
Report generated 09/27/2006 15:33

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072861

Login Number: L0609457 Run Date: 09/27/2006 Sample ID: WG223529-15
Instrument ID: IRIS-ICP Run Time: 13:22 Method: 6010B
File ID: IR.092706.132200 Analyst: SLP
Workgroup (AAB#): WG223242 Cal ID: IRIS-I - 27-SEP-06

Analyte		Expected	Found	%REC	LIMITS	UNITS	Q
Aluminum		10.0	9.76	97.6	90 - 110	mg/L	
Silver		0.400	0.398	99.4	90 - 110	mg/L	
Barium		1.00	0.971	97.1	90 - 110	mg/L	
Beryllium		0.0500	0.0496	99.1	90 - 110	mg/L	
Calcium		10.0	9.74	97.4	90 - 110	mg/L	
Cadmium		0.0500	0.0509	102	90 - 110	mg/L	
Cobalt		0.200	0.200	99.8	90 - 110	mg/L	
Chromium		0.500	0.490	98.1	90 - 110	mg/L	
Copper		0.500	0.490	98.0	90 - 110	mg/L	
Iron		4.00	3.93	98.2	90 - 110	mg/L	
Potassium		50.0	49.8	99.7	90 - 110	mg/L	
Magnesium		10.0	9.80	98.0	90 - 110	mg/L	
Manganese		0.500	0.497	99.4	90 - 110	mg/L	
Sodium		50.0	50.5	101	90 - 110	mg/L	
Nickel		0.500	0.485	97.1	90 - 110	mg/L	
Vanadium		1.00	0.990	99.0	90 - 110	mg/L	
Zinc		1.00	0.984	98.4	90 - 110	mg/L	

* Exceeds LIMITS Criteria

KEMRON FORMS - Modified 08/16/2006
Version 1.3 PDF File ID: 578427
Report generated 09/27/2006 15:33

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072862

Login Number: L0609457 Run Date: 09/27/2006 Sample ID: WG223529-17
Instrument ID: IRIS-ICP Run Time: 14:22 Method: 6010B
File ID: IR.092706.142200 Analyst: SLP
Workgroup (AAB#): WG223242 Cal ID: IRIS-I - 27-SEP-06

Analyte		Expected	Found	%REC	LIMITS	UNITS	Q
Aluminum		10.0	9.80	98.0	90 - 110	mg/L	
Silver		0.400	0.394	98.5	90 - 110	mg/L	
Barium		1.00	0.965	96.5	90 - 110	mg/L	
Beryllium		0.0500	0.0494	98.7	90 - 110	mg/L	
Calcium		10.0	9.70	97.0	90 - 110	mg/L	
Cadmium		0.0500	0.0497	99.4	90 - 110	mg/L	
Cobalt		0.200	0.198	99.1	90 - 110	mg/L	
Chromium		0.500	0.486	97.2	90 - 110	mg/L	
Copper		0.500	0.490	98.0	90 - 110	mg/L	
Iron		4.00	3.92	98.1	90 - 110	mg/L	
Potassium		50.0	49.4	98.9	90 - 110	mg/L	
Magnesium		10.0	9.73	97.3	90 - 110	mg/L	
Manganese		0.500	0.493	98.5	90 - 110	mg/L	
Sodium		50.0	50.5	101	90 - 110	mg/L	
Nickel		0.500	0.484	96.8	90 - 110	mg/L	
Vanadium		1.00	0.991	99.1	90 - 110	mg/L	
Zinc		1.00	0.979	97.9	90 - 110	mg/L	

* Exceeds LIMITS Criteria

KEMRON FORMS - Modified 08/16/2006
Version 1.3 PDF File ID: 578427
Report generated 09/27/2006 15:33

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072863

Login Number: L0609457 Run Date: 09/27/2006 Sample ID: WG223529-19
Instrument ID: IRIS-ICP Run Time: 15:03 Method: 6010B
File ID: IR.092706.150300 Analyst: SLP
Workgroup (AAB#): WG223242 Cal ID: IRIS-I - 27-SEP-06

Analyte		Expected	Found	%REC	LIMITS	UNITS	Q
Aluminum		10.0	9.76	97.6	90 - 110	mg/L	
Silver		0.400	0.394	98.4	90 - 110	mg/L	
Barium		1.00	0.963	96.3	90 - 110	mg/L	
Beryllium		0.0500	0.0492	98.3	90 - 110	mg/L	
Calcium		10.0	9.65	96.5	90 - 110	mg/L	
Cadmium		0.0500	0.0497	99.5	90 - 110	mg/L	
Cobalt		0.200	0.197	98.6	90 - 110	mg/L	
Chromium		0.500	0.485	96.9	90 - 110	mg/L	
Copper		0.500	0.488	97.7	90 - 110	mg/L	
Iron		4.00	3.91	97.8	90 - 110	mg/L	
Potassium		50.0	49.9	99.8	90 - 110	mg/L	
Magnesium		10.0	9.77	97.7	90 - 110	mg/L	
Manganese		0.500	0.491	98.2	90 - 110	mg/L	
Sodium		50.0	51.0	102	90 - 110	mg/L	
Nickel		0.500	0.482	96.3	90 - 110	mg/L	
Vanadium		1.00	0.988	98.8	90 - 110	mg/L	
Zinc		1.00	0.974	97.4	90 - 110	mg/L	

* Exceeds LIMITS Criteria

KEMRON FORMS - Modified 08/16/2006
Version 1.3 PDF File ID: 578427
Report generated 09/27/2006 15:33

KEMRON ENVIRONMENTAL SERVICES
INTERFERENCE CHECK SAMPLES

00072864

Login number: L0609457
Instrument ID: IRIS-ICP
Sol. A : WG223529-09 **File ID:** IR.092706.101900
Sol. AB : WG223529-10 **File ID:** IR.092706.102500

Workgroup (AAB#): WG223242
Method: 6010B
Units: mg/L

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Aluminum	250	235	94.0	250	237	94.8	
Barium	NS	0.000110	NS	0.250	0.228	91.2	
Beryllium	NS	-0.000110	NS	0.250	0.234	93.6	
Cadmium	NS	0.00135	NS	0.500	0.483	96.6	
Calcium	250	228	91.2	250	229	91.6	
Chromium	NS	0.00144	NS	0.250	0.229	91.6	
Cobalt	NS	0.00239	NS	0.250	0.227	90.8	
Copper	NS	-0.000200	NS	0.250	0.233	93.2	
Iron	100	91.2	91.2	100	95.2	95.2	
Magnesium	250	227	90.8	250	228	91.2	
Manganese	NS	0.00114	NS	0.250	0.220	88.0	
Nickel	NS	0.00724	NS	0.500	0.456	91.2	
Potassium	NS	0.0102	NS	5.00	4.74	94.8	
Silver	NS	0.00330	NS	0.500	0.448	89.6	
Sodium	NS	0.0393	NS	5.00	4.85	97.0	
Vanadium	NS	0.0000700	NS	0.250	0.225	90.0	
Zinc	NS	0.00128	NS	0.500	0.480	96.0	

NS = Not spiked
*** = Recovery of spiked element is outside acceptance limit of 80% - 120% of true value.**
 # = Result for unspiked element is outside the acceptance limits of (+/-) the project reporting limit (RL).

KEMRON FORMS - Modified 07/07/2006
Version 1.3 PDF File ID: 578426
Report generated 09/27/2006 15:33

INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L0609457 **Date:** 06/08/2006
Insturment ID: IRIS-ICP **Method:** 6010B

Analyte	Wave Length	AL	AS	B	BA	BE
ALUMINUM	308.20	0	0	0	0	0
ANTIMONY	206.80	-0.00000400	-0.00000300	0	0	0
ARSENIC	189.00	0.0000100	0	0	0	0
BARIUM	455.40	0	0	0	0	0
BERYLLIUM	313.00	0	0	0	0	0
BORON	249.70	0	0	0	0	0
CADMIUM	228.80	0.00000100	0.0160	0	-0.00181	0
CALCIUM	373.70	0	0	0	0	0
CHROMIUM	267.70	0	0	0	0	0
COBALT	228.60	0	0	0	0	0
COPPER	324.70	0	0	0	0	0
IRON	271.40	0	0	0	0	0
LEAD	220.30	0.000500	0	0	0	0
LITHIUM	670.80	0	0	0	0	0
MAGNESIUM	277.90	0	-0.0432	0	0	0
MANGANESE	257.60	0	0	0	0	0
MOLYBDENUM	202.03	0	0	0	0	0
NICKEL	231.60	0	0	0	0	0.00830
POTASSIUM	766.40	0	0	0	-0.0660	0
SELENIUM	196.00	0.000156	0	0	0	0
SILICON	251.60	0	0	-0.0157	0	0
SILVER	328.00	0.00000100	0	0	0	0
SODIUM	589.50	0	0	0	0	0
STRONTIUM	215.20	0	0	0	0	0
THALLIUM	190.80	-0.0000300	0	0	0	0
TIN	189.90	0	0	0	0	0
TITANIUM	334.90	0	0	0	0	0
VANADIUM	310.20	-0.0000260	0	0	0	0.00900
ZINC	213.80	0	0	0	0	0

KEMRON FORMS - Modified 02/14/2006
Version 1.5 PDF File ID: 578422
Report generated 09/27/2006 15:33

KEMRON Environmental Services

INTERELEMENT CORRECTION FACTORS (ANNUALLY)

00072866

Login Number: L0609457 **Date:** 06/08/2006

Insturment ID: IRIS-ICP **Method:** 6010B

Analyte	Wave Length	CA	CO	CR	CU	FE
ALUMINUM	308.20	0	-0.00524	0	0	0
ANTIMONY	206.80	0	0	0.0230	0	0.00000500
ARSENIC	189.00	0	0	0.000280	0	-0.000110
BARIUM	455.40	0	0	0	0	0
BERYLLIUM	313.00	0	0	0	0	0
BORON	249.70	0	0.00160	0	0	0
CADMIUM	228.80	0.00000200	0	0	0	0.00000300
CALCIUM	373.70	0	0	0	0	0.00400
CHROMIUM	267.70	0	0	0	0	-0.0000100
COBALT	228.60	0	0	0.0000450	0	0.0000150
COPPER	324.70	0	0	-0.000150	0	0.0000390
IRON	271.40	0.00160	0.0969	0	0	0
LEAD	220.30	0	-0.000300	-0.000220	0	0.0000170
LITHIUM	670.80	-0.0000500	0	0	0	0
MAGNESIUM	277.90	0	0	-0.00436	0	0
MANGANESE	257.60	0	0	0	0	-0.0000180
MOLYBDENUM	202.03	0	0	0	0	0
NICKEL	231.60	0	0.000400	0	0	0.00000700
POTASSIUM	766.40	0	0	0	0	0
SELENIUM	196.00	0	0.00419	0	0	-0.00100
SILICON	251.60	0	0	0	0	0
SILVER	328.00	0	0	-0.0000420	0	0.00000100
SODIUM	589.50	0	0	0	0	0
STRONTIUM	215.20	0	0.0000600	0	0	-0.000392
THALLIUM	190.80	0	0.00649	0.000190	0	-0.0000800
TIN	189.90	0	0	0	0	0
TITANIUM	334.90	-0.0000300	0	0.000300	0	0
VANADIUM	310.20	0	0	-0.000646	0	-0.0000100
ZINC	213.80	0	0	0	0.000250	0.0000600

KEMRON FORMS - Modified 02/14/2006
Version 1.5 PDF File ID: 578422
Report generated 09/27/2006 15:33

KEMRON Environmental Services

INTERELEMENT CORRECTION FACTORS (ANNUALLY)

00072867

Login Number: L0609457 **Date:** 06/08/2006

Insturment ID: IRIS-ICP **Method:** 6010B

Analyte	Wave Length	LI	MG	MN	MO	NI
ALUMINUM	308.20	0	0	0.00180	0.0300	0
ANTIMONY	206.80	0	0	0	-0.00800	-0.000100
ARSENIC	189.00	0	0	0	0.00108	0
BARIUM	455.40	0	0	0	0	0
BERYLLIUM	313.00	0	0	0	-0.0000500	0
BORON	249.70	0	0	0	0	0
CADMIUM	228.80	0	0	0	0	-0.0000250
CALCIUM	373.70	0	0	0.00160	0	0.00195
CHROMIUM	267.70	0	0	0.000510	0	0
COBALT	228.60	0	0	0	0	0
COPPER	324.70	0	0	0	0	0
IRON	271.40	0	0	-0.000500	-0.00740	0
LEAD	220.30	0	0	0	-0.00300	0.000489
LITHIUM	670.80	0	0	0	0	0
MAGNESIUM	277.90	0	0	0.00132	-0.120	0
MANGANESE	257.60	0	0	0	0	0
MOLYBDENUM	202.03	0	0	0	0	0
NICKEL	231.60	0	0	0	0	0
POTASSIUM	766.40	0	0	0	0	0
SELENIUM	196.00	0	0	0.000260	-0.000660	0
SILICON	251.60	0	0	0	0.00800	0
SILVER	328.00	0	0	0.0000800	-0.000290	0
SODIUM	589.50	0	0	0	0	0
STRONTIUM	215.20	0	0	0	-0.0000800	0
THALLIUM	190.80	0	0	0.00130	-0.00710	0
TIN	189.90	0	0	0	0	0
TITANIUM	334.90	-0.00250	0	0	0	0
VANADIUM	310.20	0	-0.00000400	0	0	0
ZINC	213.80	0	0.0000180	0.000279	0	0.00635

KEMRON FORMS - Modified 02/14/2006
Version 1.5 PDF File ID: 578422
Report generated 09/27/2006 15:33

INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Login Number: L0609457 **Date:** 06/08/2006
Insturment ID: IRIS-ICP **Method:** 6010B

Analyte	Wave Length	SB	SN	TI	V	ZN
ALUMINUM	308.20	0	0	-0.00200	0.00930	0
ANTIMONY	206.80	0	0	0.000620	0.0000700	0
ARSENIC	189.00	-0.000420	0	0	0	0
BARIUM	455.40	0	0	0	0	0
BERYLLIUM	313.00	0	0	0	0.00120	0
BORON	249.70	0	0	0	0	0
CADMIUM	228.80	0	0	0	0.0000360	0
CALCIUM	373.70	0	0	0	0	0
CHROMIUM	267.70	0	0	0	0.000100	0
COBALT	228.60	0	-0.00339	0.00180	0	-0.00100
COPPER	324.70	0	0	-0.000950	-0.00383	0
IRON	271.40	0	0	0	-0.0430	0
LEAD	220.30	0	0	0	0	0
LITHIUM	670.80	0	0	0	0	0
MAGNESIUM	277.90	0	0	0	0.00570	0
MANGANESE	257.60	0	0	0	-0.0000750	0
MOLYBDENUM	202.03	0	0	0	-0.000247	0.00200
NICKEL	231.60	0	0	0	0	0
POTASSIUM	766.40	0	0	0	0	0
SELENIUM	196.00	0	0	0	0	0.0140
SILICON	251.60	0	0	0.00665	0	0
SILVER	328.00	0	0	0.00268	-0.0143	0
SODIUM	589.50	0	0	0	0	0
STRONTIUM	215.20	0	0	0	0	0.000768
THALLIUM	190.80	-0.000146	0	0.00180	0.00321	0
TIN	189.90	0	0	0	0	0
TITANIUM	334.90	0	0		0	0
VANADIUM	310.20	0	0	0	0	0
ZINC	213.80	0	0	0	0	0

KEMRON FORMS - Modified 02/14/2006
Version 1.5 PDF File ID: 578422
Report generated 09/27/2006 15:33

LINEAR RANGE (QUARTERLY)

Login Number: L0609457 **Date:** 09/12/2006
Insturment ID: IRIS-ICP **Method:** 6010B

Analyte	Integration Time (Sec.)	Concentration (mg/L)
Aluminum	10.00	800.0
Antimony	55.00	50.0
Arsenic	55.00	100.0
Barium	10.00	20.0
Beryllium	10.00	4.0
Boron	55.00	100.0
Cadmium	55.00	30.0
Calcium	10.00	500.0
Chromium	55.00	20.0
Cobalt	55.00	100.0
Copper	10.00	50.0
Iron	55.00	900.0
Lead	55.00	200.0
Lithium	10.00	10.0
Magnesium	55.00	1000.0
Manganese	55.00	20.0
Molybdenum	55.00	30.0
Nickel	55.00	100.0
Potassium	10.00	200.0
Selenium	55.00	20.0
Silicon	55.00	50.0
Silver	10.00	10.0
Sodium	10.00	150.0
Strontium	55.00	30.0
Thallium	55.00	20.0
Tin	55.00	30.0
Titanium	10.00	25.0
Vanadium	10.00	100.0
Zinc	55.00	20.0

Comments:

00072870

KEMRON Environmental Services
Data Checklist

Date: 21-SEP-2006
Analyst: JYH
Analyst: NA
Method: 6020
Instrument: ELAN-ICP
Curve Workgroup: 223009
Runlog ID: 12390
Analytical Workgroups: 222915,222413,222794,223001

Calibration/Linearity	X
ICV/CCV	X
ICB/CCB	X
ICSA/ICSAB	X
CRI	X
Blank/LCS	X
MS/MSD	X
Post Spike/Serial Dilution	X
Upload Results	X
Data Qualifiers	
Generate PDF Instrument Data	X
Sign/Annotate PDF Data	X
Upload Curve Data	X
Workgroup Forms	X
Case Narrative	436,440,446,220,330,457,459,475,481
Client Forms	X
Level X	
Level 3	440,220,457,459,475
Level 4	436,446,330,481
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Primary Reviewer	JYH
Secondary Reviewer	LSB
Comments	

Primary Reviewer: Secondary Reviewer:
22-SEP-2006

Generated: SEP-22-2006 10:16:21

00072871

KEMRON Environmental Services

Instrument Run Log

Instrument: ELAN-ICP Dataset: 092106A.REP
Analyst1: JYH Analyst2: N/A
Method: 6020 SOP: ME700 Rev: 3
Maintenance Log ID: 14546

Calibration Std: STD14828 ICV/CCV Std: STD14827 Post Spike: STD15023
ICSA: STD15021 ICSAB: STD14829

Workgroups: 222915,222413,222794,223001

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	EL.092106.085749	Blank	Blank		1		09/21/06 08:57
2	EL.092106.090352	WG223009-01	Calibration Point		1		09/21/06 09:03
3	EL.092106.090955	WG223009-02	Calibration Point		1		09/21/06 09:09
4	EL.092106.091559	WG223009-03	Calibration Point		1		09/21/06 09:15
5	EL.092106.092203	WG223009-04	Calibration Point		1		09/21/06 09:22
6	EL.092106.092808	WG223009-05	Initial Calibration Verification		1		09/21/06 09:28
7	EL.092106.093432	WG223009-06	Initial Calib Blank		1		09/21/06 09:34
8	EL.092106.094057	WG223009-07	CRQL Check Solid		1		09/21/06 09:40
9	EL.092106.094726	WG223009-08	CRQL Check Water		1		09/21/06 09:47
10	EL.092106.095354	WG223009-09	Interference Check		1		09/21/06 09:53
11	EL.092106.100020	WG223009-10	Interference Check		1		09/21/06 10:00
12	EL.092106.100827	WG223009-11	CCV		1		09/21/06 10:08
13	EL.092106.101451	WG223009-12	CCB		1		09/21/06 10:14
14	EL.092106.102113	WG222827-02	Method/Prep Blank	.5/200	1		09/21/06 10:21
15	EL.092106.102716	WG222827-03	Laboratory Control S	.5/200	1		09/21/06 10:27
16	EL.092106.103319	WG222827-01	Reference Sample		1	L0609440-01	09/21/06 10:33
17	EL.092106.103922	WG222827-04	Matrix Spike	.5/200	1		09/21/06 10:39
18	EL.092106.104525	WG222827-05	Matrix Spike Duplica	.5/200	1		09/21/06 10:45
19	EL.092106.105129	L0609436-01	BIP-SL-P1E-A-12-G	.5/200	5		09/21/06 10:51
20	EL.092106.105733	L0609440-02	SUMP089-SB-01-02	.522/200	1		09/21/06 10:57
21	EL.092106.110337	WG222915-01	Post Digestion Spike		1	L0609440-02	09/21/06 11:03
22	EL.092106.110942	WG222915-02	Serial Dilution		5	L0609440-02	09/21/06 11:09
23	EL.092106.111548	WG223009-13	CCV		1		09/21/06 11:15
24	EL.092106.112212	WG223009-14	CCB		1		09/21/06 11:22
25	EL.092106.112850	L0609436-01	BIP-SL-P1E-A-12-G	.5/200	50		09/21/06 11:28
26	EL.092106.113455	L0609440-03	SUMP089-SB-02-01	.504/200	1		09/21/06 11:34
27	EL.092106.114102	L0609440-04	SUMP089-SB-02-02	.509/200	1		09/21/06 11:41
28	EL.092106.114708	L0609440-05	SUMP081-SB-01-01	.5/200	1		09/21/06 11:47
29	EL.092106.115313	L0609440-06	SUMP081-SB-01-02	.504/200	1		09/21/06 11:53
30	EL.092106.115916	L0609440-07	SUMP082-SB-01-01	.5/200	1		09/21/06 11:59
31	EL.092106.120520	L0609440-08	SUMP082-SB-01-02	.52/200	1		09/21/06 12:05
32	EL.092106.121124	L0609440-09	SUMP083-SB-01-01	.502/200	1		09/21/06 12:11
33	EL.092106.121728	L0609440-10	SUMP083-SB-01-02	.506/200	1		09/21/06 12:17
34	EL.092106.122333	L0609440-11	SUMP090-SB-01-01	.523/200	1		09/21/06 12:23
35	EL.092106.122938	WG223009-15	CCV		1		09/21/06 12:29
36	EL.092106.123602	WG223009-16	CCB		1		09/21/06 12:36
37	EL.092106.124226	L0609440-12	SUMP090-SB-01-02	.513/200	1		09/21/06 12:42

Approved: September 22, 2006

00072872

KEMRON Environmental Services

Instrument Run Log

Instrument: ELAN-ICP Dataset: 092106A.REP
Analyst1: JYH Analyst2: N/A
Method: 6020 SOP: ME700 Rev: 3
Maintenance Log ID: 14546

Calibration Std: STD14828 ICV/CCV Std: STD14827 Post Spike: STD15023
ICSA: STD15021 ICSAB: STD14829

Workgroups: 222915,222413,222794,223001

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
38	EL.092106.124831	L0609446-01	1001-SO01-091806	.511/200	1		09/21/06 12:48
39	EL.092106.125437	L0609446-02	1001-SO02-091806	.5/200	1		09/21/06 12:54
40	EL.092106.130043	L0609446-05	1000-SO01-091806	.507/200	1		09/21/06 13:00
41	EL.092106.130649	L0609446-06	1000-SO02-091806	.51/200	1		09/21/06 13:06
42	EL.092106.131256	WG222165-02	Reference Sample		1	L0609220-13	09/21/06 13:12
43	EL.092106.131901	WG222165-07	Matrix Spike	.5/200	1	L0609220-14	09/21/06 13:19
44	EL.092106.132506	WG222165-08	Matrix Spike Duplica	.5/200	1	L0609220-15	09/21/06 13:25
45	EL.092106.133110	WG223009-17	CCV		1		09/21/06 13:31
46	EL.092106.133735	WG223009-18	CCB		1		09/21/06 13:37
47	EL.092106.134358	WG222616-02	Method/Prep Blank	40/100	1		09/21/06 13:43
48	EL.092106.135004	WG222616-03	Laboratory Control S	40/100	1		09/21/06 13:50
49	EL.092106.135610	WG222616-01	Reference Sample		1	L0609330-11	09/21/06 13:56
50	EL.092106.140216	WG222616-04	Matrix Spike	40/100	1		09/21/06 14:02
51	EL.092106.140823	WG222616-05	Matrix Spike Duplica	40/100	1		09/21/06 14:08
52	EL.092106.141430	L0609330-12	FT02DP61-W	40/100	1		09/21/06 14:14
53	EL.092106.142035	WG222794-01	Post Digestion Spike		1	L0609330-12	09/21/06 14:20
54	EL.092106.142638	WG222794-02	Serial Dilution		5	L0609330-12	09/21/06 14:26
55	EL.092106.143243	WG223009-19	CCV		1		09/21/06 14:32
56	EL.092106.143907	WG223009-20	CCB		1		09/21/06 14:39
57	EL.092106.145024	WG222955-02	Method/Prep Blank	.5/200	1		09/21/06 14:50
58	EL.092106.145628	WG222955-03	Laboratory Control S	.5/200	1		09/21/06 14:56
59	EL.092106.150233	WG222955-01	Reference Sample		1	L0609457-01	09/21/06 15:02
60	EL.092106.150837	WG222955-04	Matrix Spike	.5/200	1		09/21/06 15:08
61	EL.092106.151443	WG222955-05	Matrix Spike Duplica	.5/200	1		09/21/06 15:14
62	EL.092106.152048	L0609475-01	BB-SS-18-0906	.502/200	1		09/21/06 15:20
63	EL.092106.152654	L0609475-03	BB-SS-20-0906	.507/200	1		09/21/06 15:26
64	EL.092106.153300	L0609475-02	BB-SS-19-0906	.519/200	1		09/21/06 15:33
65	EL.092106.154111	WG223001-01	Post Digestion Spike		1	L0609475-02	09/21/06 15:41
66	EL.092106.154718	WG223001-02	Serial Dilution		5	L0609475-02	09/21/06 15:47
67	EL.092106.155324	WG223009-21	CCV		1		09/21/06 15:53
68	EL.092106.155948	WG223009-22	CCB		1		09/21/06 15:59
69	EL.092106.160611	L0609475-03	BB-SS-20-0906		100		09/21/06 16:06
70	EL.092106.161215	L0609457-02	35-SMP117-SB01-01	.509/200	1		09/21/06 16:12
71	EL.092106.161819	L0609457-03	35-SMP117-SB01-02	.503/200	1		09/21/06 16:18
72	EL.092106.162423	L0609457-04	35-SMP117-SB02-02	.508/200	1		09/21/06 16:24
73	EL.092106.163028	L0609457-05	35-SMP47-SB01-01	.5/200	1		09/21/06 16:30
74	EL.092106.163634	L0609457-06	35-SMP47-SB01-02	.5/200	1		09/21/06 16:36

Approved: September 22, 2006

00072873

KEMRON Environmental Services

Instrument Run Log

Instrument: ELAN-ICP Dataset: 092106A.REP

Analyst1: JYH Analyst2: N/A

Method: 6020 SOP: ME700 Rev: 3

Maintenance Log ID: 14546

Calibration Std: STD14828 ICV/CCV Std: STD14827 Post Spike: STD15023

ICSA: STD15021 ICSAB: STD14829

Workgroups: 222915,222413,222794,223001

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
75	EL.092106.164239	L0609457-07	35-SMP47-SB02-01	.502/200	1		09/21/06 16:42
76	EL.092106.164845	L0609457-08	35-SMP47-SB02-02	.5/200	1		09/21/06 16:48
77	EL.092106.165452	L0609459-03	35-SMP54-SB01-02	.504/200	1		09/21/06 16:54
78	EL.092106.170058	L0609459-04	35-SMP54-SB02-02	.518/200	1		09/21/06 17:00
79	EL.092106.170704	WG223009-23	CCV		1		09/21/06 17:07
80	EL.092106.171328	WG223009-24	CCB		1		09/21/06 17:13
81	EL.092106.171953	L0609481-01	MW007-SO01-091906	.5/200	1		09/21/06 17:19
82	EL.092106.172600	L0609481-03	MW010-SO01-091906	.5/200	1		09/21/06 17:26
83	EL.092106.173206	L0609475-01	BB-SS-18-0906		10		09/21/06 17:32
84	EL.092106.173811	WG223009-25	CCV		1		09/21/06 17:38
85	EL.092106.174435	WG223009-26	CCB		1		09/21/06 17:44

Approved: September 22, 2006

KEMRON ENVIRONMENTAL SERVICES

Microwave Digestion Log

Analyst(s): VC
Date: 9/21/06 7:30
LCS: 0.5 mL STD 14864
MS/MSD: 0.5 mL STD 14864
Witness: ///
HNO_3 Lot #: RCT 10417
HCl Lot #: —
Earliest Sample Due Date: 9/25
Microwave # MW2

Box: 74 R1114434
Digestion Work Group: WG 222955
ME407 Revision # ____ Method 3015-Water
ME406 Revision # 8 Method 3051-Soil-Oil

Relinquished By: VC
Digest Received By: [illegible] Date: 9/21/06

	KEMRON #	Initial Wt/Vol	Final Volume	Initial Weight	Final Weight	Comments	Due Date
1	PBS	0.500g	200mL	175.00 g	174.99 g	02	
2	LCS	0.500		176.85	176.83	03	
3	09-457.01	0.500		176.20	176.18	01	~~9/25~~ 9/29 VC 9/26
4	01MS	0.500		176.86	176.85	04	
5	01MD	0.500		174.47	174.46	05	
6	02	0.509		176.87	176.86		
7	03	0.503		174.47	174.46		
8	04	0.508		174.44	174.43		
9	05	0.500		176.51	176.49		
10	06	0.500		174.41	174.39		
11	07	0.502		174.20	174.19		
12	08	0.500		175.06	175.05		
13	459-03	0.504		175.85	175.84		9/29
14	04	0.518		175.84	175.83		
15	475.01	0.502		174.12	174.11	9/25	~~9/25~~ ~~9/26~~ VC 9/26
16	02	0.519		174.58	174.57		
17	03	0.507		174.58	174.57		
18	481.01 ☆	0.500		175.87	175.86		10/4
19	03	0.500		176.46	176.45		
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

VC 9/21/06

Comments: ☆ lead

Primary Review: [illegible] 9/21/06 Secondary Review: [illegible] 9/21/06

KEMRON Environmental Services
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

00072875

Analytical Method: 6020 AAB#: WG223001
Login Number: L0609457

Client ID	Date Collected	Date Received	Date Extracted	Max Hold Time Ext.	Time Held Ext.	Date Analyzed	Max Hold Time Anal	Time Held Anal.	Q
35-SMP92-SB01-02	09/19/06	09/20/06	09/21/06	180	1.92	09/21/06	180	0.314	
35-SMP117-SB01-01	09/19/06	09/20/06	09/21/06	180	1.84	09/21/06	180	0.363	
35-SMP117-SB01-02	09/19/06	09/20/06	09/21/06	180	1.82	09/21/06	180	0.367	
35-SMP117-SB02-02	09/19/06	09/20/06	09/21/06	180	1.80	09/21/06	180	0.371	
35-SMP47-SB01-01	09/15/06	09/20/06	09/21/06	180	5.83	09/21/06	180	0.375	
35-SMP47-SB01-02	09/15/06	09/20/06	09/21/06	180	5.82	09/21/06	180	0.380	
35-SMP47-SB02-01	09/15/06	09/20/06	09/21/06	180	5.83	09/21/06	180	0.384	
35-SMP47-SB02-02	09/15/06	09/20/06	09/21/06	180	5.83	09/21/06	180	0.388	

* EXT = SEE PROJECT QAPP REQUIREMENTS
*ANAL = SEE PROJECT QAPP REQUIREMENTS

KEMRON FORMS - Modified 02/14/2006
Version 1.5 PDF File ID: 573686
Report generated 09/22/2006 08:43

METHOD BLANK SUMMARY

Login Number: L0609457
Blank File ID: EL.092106.145024
Date Analyzed: 09/21/06
Time Analyzed: 14:50
Analyst: JYH

Work Group: WG223001
Blank Sample ID: WG222955-02
Instrument ID: ELAN-ICP
Method: 6020

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG222955-03	EL.092106.145628	09/21/06 14:56	01
35-SMP92-SB01-02	L0609457-01	EL.092106.150233	09/21/06 15:02	01
35-SMP117-SB01-01	L0609457-02	EL.092106.161215	09/21/06 16:12	01
35-SMP117-SB01-02	L0609457-03	EL.092106.161819	09/21/06 16:18	01
35-SMP117-SB02-02	L0609457-04	EL.092106.162423	09/21/06 16:24	01
35-SMP47-SB01-01	L0609457-05	EL.092106.163028	09/21/06 16:30	01
35-SMP47-SB01-02	L0609457-06	EL.092106.163634	09/21/06 16:36	01
35-SMP47-SB02-01	L0609457-07	EL.092106.164239	09/21/06 16:42	01
35-SMP47-SB02-02	L0609457-08	EL.092106.164845	09/21/06 16:48	01

KEMRON Environmental Services

METHOD BLANK REPORT

00072877

Login Number: L0609457 Run Date: 09/21/2006 Sample ID: WG222955-02
Instrument ID: ELAN-ICP Run Time: 14:50 Prep Method: 3051
File ID: EL.092106.145024 Analyst: JYH Method: 6020
Workgroup (AAB#): WG223001 Matrix: Solid Units: mg/kg
Contract #: DACA56-94-D-0020 Cal ID: ELAN-I-21-SEP-06

Analytes	SQL	PQL	Concentration	Dilution	Qualifier
Arsenic, Total	0.0750	0.300	0.0750	1	U
Lead, Total	0.100	0.200	0.100	1	U
Antimony, Total	0.0500	0.100	0.0500	1	U
Selenium, Total	0.100	0.200	0.100	1	U
Thallium, Total	0.0100	0.0200	0.0100	1	U

MDL Method Detection Limit
RL Reporting/quantitation Limit

* Analyte concentration > RL

KEMRON FORMS - Modified 07/21/2006
Version 1.5 PDF File ID: 573688
Report generated 09/22/2006 08:44

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00072878

Login Number: L0609457 Run Date: 09/21/2006 Sample ID: WG222955-03
Instrument ID: ELAN-ICP Run Time: 14:56 Prep Method: 3051
File ID: EL.092106.145628 Analyst: JYH Method: 6020
Workgroup (AAB#): WG223001 Matrix: Solid Units: mg/kg
Contract #: DACA56-94-D-0020 Cal ID: ELAN-I-21-SEP-06

Analytes	Expected	Found	% Rec	LCS Limits	Q
Arsenic, Total	10.0	10.3	103	80 - 120	
Lead, Total	10.0	10.1	101	80 - 120	
Antimony, Total	10.0	10.3	103	80 - 120	
Selenium, Total	10.0	10.4	104	80 - 120	
Thallium, Total	10.0	10.3	103	80 - 120	

KEMRON FORMS - Modified 07/06/2006
Version 1.5 PDF File ID: 573689
Report generated 09/22/2006 08:44

KEMRON Environmental Services

MATRIX SPIKE AND MATRIX SPIKE DUP (MS/MSD)

00072879

Loginnum:L0609457 Cal ID: ELAN-ICP- Worknum:WG223001
Instrument ID:ELAN-ICP Contract #:DACA56-94-D-0020 Method:6020
Parent ID:WG222955-01 File ID:EL.092106.150233 Dil:1 Matrix:SOLID
Sample ID:WG222955-04 MS File ID:EL.092106.150837 Dil:1 Units:mg/kg
Sample ID:WG222955-05 MSD File ID:EL.092106.151443 Dil:1 Percent Solid:100

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Antimony, Total	0.0712	10.0	4.79	47.2	10.0	3.92	38.5	20.0	75 - 125	20	*
Arsenic, Total	0.171	10.0	8.42	82.5	10.0	7.84	76.7	7.13	75 - 125	20	
Lead, Total	2.83	10.0	13.4	105	10.0	13.8	110	3.19	75 - 125	20	
Selenium, Total	ND	10.0	6.56	65.6	10.0	6.13	61.3	6.64	75 - 125	20	*
Thallium, Total	0.0418	10.0	10.1	100	10.0	9.75	97.1	3.28	75 - 125	20	

* FAILS %REC LIMIT

FAILS RPD LIMIT

NOTE: This is an internal quality control sample.

KEMRON FORMS - Modified 03/16/2006
Version 1.5 PDF File ID: 573690
Report generated 09/22/2006 08:44

KEMRON ENVIRONMENTAL SERVICES
SERIAL DILUTION REPORT

00072880

Sample Login ID: L0609457
Instrument ID: ELAN-ICP
Sample ID: L0609475-02 File ID: EL.092106.153300 Dil: 1
Serial Dilution ID: WG223001-02 File ID: EL.092106.154718 Dil: 5

Worknum: WG223001
Method: 6020
Units: ug/kg

Analyte	Sample	C	Serial Dilution	C	% Difference	Q
Antimony	0.610	X	1.19	F	95.1	
Arsenic	282		287		1.77	
Lead	25.5		24.7	X	3.14	
Selenium	0	U	0	U		
Thallium	0.263	X	0.274	X	4.18	

U = Result is below MDL
F = Result is between MDL and RL
X = Result is greater than RL and less than 100 times the MDL
E = %D exceeds control limit of 10% and initial
sample result is greater than or equal to 100 times the MDL

KEMRON FORMS - Modified 02/14/2006
Version 1.3 PDF File ID: 573684
Report generated 09/22/2006 08:43

KEMRON ENVIRONMENTAL SERVICES
POST SPIKE REPORT

Sample Login ID: L0609457
Instrument ID: ELAN-ICP
Post Spike ID: WG223001-01 File ID: EL.092106.154111 Dil: 1
Sample ID: L0609475-02 File ID: EL.092106.153300 Dil: 1

Worknum: WG223001
Method: 6020
Units: ug/kg
Matrix: Soil

Analyte	Control Limit %R	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Q
ANTIMONY	75 - 125	58.0		0.610		50.0	115	
ARSENIC	75 - 125	324		282		50.0	84.0	
LEAD	75 - 125	80.8		25.5		50.0	111	
SELENIUM	75 - 125	49.2		0	U	50.0	98.4	
THALLIUM	75 - 125	58.0		0.263		50.0	115	

N = % Recoverv exceeds control limits of 75% - 125%
F = Result is between MDL and RL
U = Sample result is below MDL. A value of zero is used in the calculation.

KEMRON FORMS - Modified 02/14/2006
Version 2.0 PDF File ID: 573685
Report generated 09/22/2006 08:43

KEMRON Environmental Services

INITIAL CALIBRATION SUMMARY

00072882

Login Number: L0609457
Analytical Method: 6020
ICAL Worknum: WG223009

Workgroup (AAB#): WG223001
Instrument ID: ELAN-ICP
Initial Calibration Date: 21-SEP-2006 09:22

Analyte	WG223009-01		WG223009-02		WG223009-03		WG223009-04			
	STD	INT	STD	INT	STD	INT	STD	INT	R	Q
Antimony	0	1996.269	.4	1777.784	50	229480.167	100	466247.724	0.999674	
Arsenic	0	-78.21	.4	599.608	50	89116.461	100	177992.851	0.999933	
Lead	0	536.676	.4	12161.149	50	1452817.227	100	2954123.632	0.999965	
Selenium	0	8.415	.4	69.665	50	7868.638	100	15580.264	0.999971	
Thallium	0	23	.4	3586.153	50	450914.463	100	893499.11	0.999989	

INT = Instrument intensity
R = Coefficient of correlation
Q = Data Qualifier
* = Out of Compliance; R < 0.995

KEMRON FORMS - Modified 03/03/2006
Version 1.5 PDF File ID: 573693
Report generated 09/22/2006 08:43

KEMRON Environmental Services

INITIAL CALIBRATION BLANK (ICB)

00072883

Login Number: L0609457 Run Date: 09/21/2006 Sample ID: WG223009-06
Instrument ID: ELAN-ICP Run Time: 09:34 Method: 6020
File ID: EL.092106.093432 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG223001 Cal ID: ELAN-I - 21-SEP-06

Analytes	MDL	RDL	Concentration	Dilution	Qualifier
Arsenic	0.188	0.750	.0088	1	U
Lead	0.250	0.500	.005	1	U
Antimony	0.125	0.250	.192	1	F
Selenium	0.250	0.500	-.0353	1	U
Thallium	0.0250	0.0500	.0057	1	U

U = Result is less than MDL
F = Result is between MDL and RL

KEMRON FORMS - Modified 03/06/2006
Version 1.5 PDF File ID: 573695
Report generated 09/22/2006 08:43

KEMRON Environmental Services

CONTINUING CALIBRATION BLANK (CCB)

00072884

Login Number: L0609457 Run Date: 09/21/2006 Sample ID: WG223009-12
Instrument ID: ELAN-ICP Run Time: 10:14 Method: 6020
File ID: EL.092106.101451 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG223001 Cal ID: ELAN-I - 21-SEP-06

Analytes	MDL	RDL	Concentration	Dilution	Qualifier
Arsenic	0.188	0.750	0.0227	1	U
Lead	0.250	0.500	0.00550	1	U
Antimony	0.125	0.250	0.180	1	F
Selenium	0.250	0.500	0.0462	1	U
Thallium	0.0250	0.0500	0.00590	1	U

U = Result is less than MDL
F = Result is between MDL and RL

KEMRON FORMS - Modified 09/18/2006
Version 2.0 PDF File ID: 573698
Report generated 09/22/2006 08:43

KEMRON Environmental Services

CONTINUING CALIBRATION BLANK (CCB)

00072885

Login Number: L0609457 Run Date: 09/21/2006 Sample ID: WG223009-20
Instrument ID: ELAN-ICP Run Time: 14:39 Method: 6020
File ID: EL.092106.143907 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG223001 Cal ID: ELAN-I - 21-SEP-06

Analytes	MDL	RDL	Concentration	Dilution	Qualifier
Arsenic	0.188	0.750	0.0180	1	U
Lead	0.250	0.500	0.00760	1	U
Antimony	0.125	0.250	0.153	1	F
Selenium	0.250	0.500	0.00940	1	U
Thallium	0.0250	0.0500	0.00710	1	U

U = Result is less than MDL
F = Result is between MDL and RL

KEMRON FORMS - Modified 09/18/2006
Version 2.0 PDF File ID: 573698
Report generated 09/22/2006 08:43

KEMRON Environmental Services

CONTINUING CALIBRATION BLANK (CCB)

00072886

Login Number: L0609457 Run Date: 09/21/2006 Sample ID: WG223009-22
Instrument ID: ELAN-ICP Run Time: 15:59 Method: 6020
File ID: EL.092106.155948 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG223001 Cal ID: ELAN-I - 21-SEP-06

Analytes	MDL	RDL	Concentration	Dilution	Qualifier
Arsenic	0.188	0.750	0.00900	1	U
Lead	0.250	0.500	0.00870	1	U
Antimony	0.125	0.250	0.159	1	F
Selenium	0.250	0.500	0.00620	1	U
Thallium	0.0250	0.0500	0.00740	1	U

U = Result is less than MDL
F = Result is between MDL and RL

KEMRON FORMS - Modified 09/18/2006
Version 2.0 PDF File ID: 573698
Report generated 09/22/2006 08:43

KEMRON Environmental Services

CONTINUING CALIBRATION BLANK (CCB)

00072887

Login Number: L0609457 Run Date: 09/21/2006 Sample ID: WG223009-24
Instrument ID: ELAN-ICP Run Time: 17:13 Method: 6020
File ID: EL.092106.171328 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG223001 Cal ID: ELAN-I - 21-SEP-06

Analytes	MDL	RDL	Concentration	Dilution	Qualifier
Arsenic	0.188	0.750	-0.00660	1	U
Lead	0.250	0.500	0.00830	1	U
Antimony	0.125	0.250	0.164	1	F
Selenium	0.250	0.500	-0.0737	1	U
Thallium	0.0250	0.0500	0.00710	1	U

U = Result is less than MDL
F = Result is between MDL and RL

KEMRON FORMS - Modified 09/18/2006
Version 2.0 PDF File ID: 573698
Report generated 09/22/2006 08:43

KEMRON Environmental Services

INITIAL CALIBRATION VERIFICATION (ICV)

00072888

Login Number: L0609457 Run Date: 09/21/2006 Sample ID: WG223009-05
Instrument ID: ELAN-ICP Run Time: 09:28 Method: 6020
File ID: EL.092106.092808 Analyst: JYH Units: ug/L
Workgroup (AAB#): WG223001 Cal ID: ELAN-I - 21-SEP-06

Analyte		Expected	Found	%REC	LIMITS	Q
Arsenic		50	47.9	95.8	90 - 110	
Lead		50	49.2	98.5	90 - 110	
Antimony		50	48.8	97.6	90 - 110	
Selenium		50	48.4	96.9	90 - 110	
Thallium		50	48.8	97.6	90 - 110	

* Exceeds LIMITS Limit

KEMRON FORMS - Modified 03/03/2006
Version 1.3 PDF File ID: 573694
Report generated 09/22/2006 08:43

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072889

Login Number: L0609457 Run Date: 09/21/2006 Sample ID: WG223009-11
Instrument ID: ELAN-ICP Run Time: 10:08 Method: 6020
File ID: EL.092106.100827 Analyst: JYH
Workgroup (AAB#): WG223001 Cal ID: ELAN-I - 21-SEP-06

Analyte		Expected	Found	%REC	LIMITS	UNITS	Q
Arsenic		50.0	48.6	97.1	90 - 110	ug/L	
Lead		50.0	49.2	98.3	90 - 110	ug/L	
Antimony		50.0	49.9	99.8	90 - 110	ug/L	
Selenium		50.0	50.4	101	90 - 110	ug/L	
Thallium		50.0	48.4	96.7	90 - 110	ug/L	

* Exceeds LIMITS Criteria

KEMRON FORMS - Modified 08/16/2006
Version 1.3 PDF File ID: 573697
Report generated 09/22/2006 08:43

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072890

Login Number: L0609457 Run Date: 09/21/2006 Sample ID: WG223009-19
Instrument ID: ELAN-ICP Run Time: 14:32 Method: 6020
File ID: EL.092106.143243 Analyst: JYH
Workgroup (AAB#): WG223001 Cal ID: ELAN-I - 21-SEP-06

Analyte		Expected	Found	%REC	LIMITS	UNITS	Q
Arsenic		50.0	50.4	101	90 - 110	ug/L	
Lead		50.0	48.7	97.5	90 - 110	ug/L	
Antimony		50.0	50.2	100	90 - 110	ug/L	
Selenium		50.0	52.2	104	90 - 110	ug/L	
Thallium		50.0	48.3	96.5	90 - 110	ug/L	

* Exceeds LIMITS Criteria

KEMRON FORMS - Modified 08/16/2006
Version 1.3 PDF File ID: 573697
Report generated 09/22/2006 08:43

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072891

Login Number: L0609457 Run Date: 09/21/2006 Sample ID: WG223009-21
Instrument ID: ELAN-ICP Run Time: 15:53 Method: 6020
File ID: EL.092106.155324 Analyst: JYH
Workgroup (AAB#): WG223001 Cal ID: ELAN-I - 21-SEP-06

Analyte		Expected	Found	%REC	LIMITS	UNITS	Q
Arsenic		50.0	51.7	103	90 - 110	ug/L	
Lead		50.0	50.3	101	90 - 110	ug/L	
Antimony		50.0	52.8	106	90 - 110	ug/L	
Selenium		50.0	52.9	106	90 - 110	ug/L	
Thallium		50.0	50.4	101	90 - 110	ug/L	

* Exceeds LIMITS Criteria

KEMRON FORMS - Modified 08/16/2006
Version 1.3 PDF File ID: 573697
Report generated 09/22/2006 08:43

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072892

Login Number: L0609457 Run Date: 09/21/2006 Sample ID: WG223009-23
Instrument ID: ELAN-ICP Run Time: 17:07 Method: 6020
File ID: EL.092106.170704 Analyst: JYH
Workgroup (AAB#): WG223001 Cal ID: ELAN-I - 21-SEP-06

Analyte		Expected	Found	%REC	LIMITS	UNITS	Q
Arsenic		50.0	48.3	96.7	90 - 110	ug/L	
Lead		50.0	49.5	98.9	90 - 110	ug/L	
Antimony		50.0	49.3	98.7	90 - 110	ug/L	
Selenium		50.0	49.1	98.3	90 - 110	ug/L	
Thallium		50.0	49.2	98.5	90 - 110	ug/L	

* Exceeds LIMITS Criteria

KEMRON FORMS - Modified 08/16/2006
Version 1.3 PDF File ID: 573697
Report generated 09/22/2006 08:43

KEMRON ENVIRONMENTAL SERVICES
INTERFERENCE CHECK SAMPLES

00072893

Login number: L0609457
Instrument ID: ELAN-ICP
Sol. A : WG223009-09 **File ID:** EL.092106.095354
Sol. AB : WG223009-10 **File ID:** EL.092106.100020

Workgroup (AAB#): WG223001
Method: 6020
Units: ug/L

	Sol. A			Sol. AB			
ANALYTE	True	Found	%Recovery	True	Found	%Recovery	Q
Antimony	NS	0.0426	NS	100	108	108	
Arsenic	NS	-0.0181	NS	100	104	104	
Lead	NS	0.135	NS	100	98.3	98.3	
Selenium	NS	-0.109	NS	100	104	104	
Thallium	NS	0.00650	NS	100	99.2	99.2	

NS = Not spiked
*** = Recovery of spiked element is outside acceptance limit of 80% - 120% of true value.**
 # = Result for unspiked element is outside the acceptance limits of (+/-) the project reporting limit (RL).

KEMRON FORMS - Modified 07/07/2006
Version 1.3 PDF File ID: 573696
Report generated 09/22/2006 08:43

KEMRON Environmental Services

CRI SAMPLE

00072894

Login Number: L0609457 Run Date: 09/21/2006 Sample ID: WG223009-07
Instrument ID: ELAN-ICP Run Time: 09:40 Prep Method: 3051
File ID: EL.092106.094057 Analyst: JYH Method: 6020
Workgroup (AAB#): WG223009 Matrix: Soil Units: ug/L
Contract #: DACA56-94-D-0020 Cal ID: ELAN-ICP-21-SEP-2006 09:22

Analytes	Expected	Found	% Rec	Limits	Q
Antimony, Total	0.250	0.259	104	50 - 150	
Thallium, Total	0.0500	0.0516	103	50 - 150	

KEMRON FORMS - Modified 02/14/2006
Version 1.5 PDF File ID: 573692
Report generated 09/22/2006 08:44

LINEAR RANGE (QUARTERLY)

00072895

Login Number: L0609457 **Date:** 09/07/2006
Insturment ID: ELAN-ICP **Method:** 6020

Analyte	Integration Time (Sec.)	Concentration (ug/L)
Antimony	1.00	100.0
Arsenic	1.00	100.0
Barium	1.00	100.0
Cadmium	1.00	100.0
Chromium	1.00	100.0
Cobalt	1.00	100.0
Copper	1.00	100.0
Lead	1.00	100.0
Manganese	1.00	100.0
Nickel	1.00	100.0
Selenium	1.00	100.0
Silver	1.00	100.0
Thallium	1.00	100.0
Vanadium	1.00	100.0
Zinc	1.00	100.0

Comments:

00072896

KEMRON Environmental Services
Data Checklist

Date: 25-SEP-2006
Analyst: MMB
Analyst: NA
Method: 7471A
Instrument: HYDRA
Curve Workgroup: WG223336
Runlog ID: 12454
Analytical Workgroups: WG223290, WG223291

Calibration/Linearity	X
ICV/CCV	X
ICB/CCB	X
ICSA/ICSAB	
CRI	
Blank/LCS	X
MS/MSD	X
Post Spike/Serial Dilution	X
Upload Results	X
Data Qualifiers	
Generate PDF Instrument Data	X
Sign/Annotate PDF Data	X
Upload Curve Data	
Workgroup Forms	
Case Narrative	09-396, 430, 166, 457, 446, 481, 509
Client Forms	X
Level X	
Level 3	09-457
Level 4	09-166, 446, 481, 509
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Primary Reviewer	MMB
Secondary Reviewer	LSB
Comments	

Primary Reviewer: 26-SEP-2006 Maren Berry

Secondary Reviewer: 26-SEP-2006 Leslie Bucisa

Generated: SEP-26-2006 09:31:40

00072897

KEMRON Environmental Services

Instrument Run Log

Instrument: HYDRA Dataset: 092506F2.PRN
Analyst1: MMB Analyst2: N/A
Method: 7471A SOP: 405 Rev: 7
Maintenance Log ID: 15809

Calibration Std: STD15286 ICV/CCV Std: STD15287 Post Spike: STD15286
ICSA: N/A ICSAB: N/A

Workgroups: WG223290, WG223291

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
1	HY.092506.184219	WG223336-01	Calibration Point		1		09/25/06 18:42
2	HY.092506.184406	WG223336-02	Calibration Point		1		09/25/06 18:44
3	HY.092506.184544	WG223336-03	Calibration Point		1		09/25/06 18:45
4	HY.092506.184827	WG223336-04	Calibration Point		1		09/25/06 18:48
5	HY.092506.185040	WG223336-05	Calibration Point		1		09/25/06 18:50
6	HY.092506.185218	WG223336-06	Calibration Point		1		09/25/06 18:52
7	HY.092506.185421	WG223336-07	Initial Calibration Verification		1		09/25/06 18:54
8	HY.092506.185708	WG223336-08	Initial Calib Blank		1		09/25/06 18:57
9	HY.092506.185848	WG223336-09	CCV		1		09/25/06 18:58
10	HY.092506.190027	WG223336-10	CCB		1		09/25/06 19:00
11	HY.092506.190240	WG223123-01	Method/Prep Blank	1/40	1		09/25/06 19:02
12	HY.092506.190438	WG223123-02	Laboratory Control Sample	1/40	1		09/25/06 19:04
13	HY.092506.190643	WG223123-03	Laboratory Control Sample (2	1/40	1		09/25/06 19:06
14	HY.092506.190822	L0609396-09	GM061251	1.07/40	1		09/25/06 19:08
15	HY.092506.191011	WG223290-01	Post Digestion Spike		1		09/25/06 19:10
16	HY.092506.191149	L0609430-02	GT060284	1.02/40	1		09/25/06 19:11
17	HY.092506.191329	WG223290-02	Post Digestion Spike		1		09/25/06 19:13
18	HY.092506.191507	L0609430-04	GT060286	1/40	1		09/25/06 19:15
19	HY.092506.191648	WG223336-11	CCV		1		09/25/06 19:16
20	HY.092506.191829	WG223336-12	CCB		1		09/25/06 19:18
21	HY.092506.193028	WG223121-02	Method/Prep Blank	.6/40	1		09/25/06 19:30
22	HY.092506.193240	WG223121-03	Laboratory Control Sample	.6/40	1		09/25/06 19:32
23	HY.092506.193420	L0609166-01	AV-FAS-W42-SS-G-0-0.2	.637/40	1		09/25/06 19:34
24	HY.092506.193558	WG223291-01	Post Digestion Spike		1		09/25/06 19:35
25	HY.092506.193747	L0609166-02	AV-FAS-W42-SS-G-0-0.2	.652/40	1		09/25/06 19:37
26	HY.092506.193934	WG223121-01	Reference Sample		1		09/25/06 19:39
27	HY.092506.194254	WG223121-04	Matrix Spike	.623/40	1		09/25/06 19:42
28	HY.092506.194436	WG223121-05	Matrix Spike Duplicate	.623/40	1		09/25/06 19:44
29	HY.092506.194638	L0609457-02	35-SMP117-SB01-01	.635/40	1		09/25/06 19:46
30	HY.092506.194815	WG223291-02	Post Digestion Spike		1		09/25/06 19:48
31	HY.092506.194958	WG223336-13	CCV		1		09/25/06 19:49
32	HY.092506.195155	WG223336-14	CCB		1		09/25/06 19:51
33	HY.092506.195332	L0609457-03	35-SMP117-SB01-02	.638/40	1		09/25/06 19:53
34	HY.092506.195510	L0609457-04	35-SMP117-SB02-02	.64/40	1		09/25/06 19:55
35	HY.092506.195659	L0609457-05	35-SMP47-SB01-01	.642/40	1		09/25/06 19:56
36	HY.092506.195858	L0609457-06	35-SMP47-SB01-02	.632/40	1		09/25/06 19:58
37	HY.092506.200041	L0609457-07	35-SMP47-SB02-01	.6/40	1		09/25/06 20:00

Approved: September 26, 2006

00072898

KEMRON Environmental Services

Instrument Run Log

Instrument: HYDRA Dataset: 092506F2.PRN
Analyst1: MMB Analyst2: N/A
Method: 7471A SOP: 405 Rev: 7
Maintenance Log ID: 15809

Calibration Std: STD15286 ICV/CCV Std: STD15287 Post Spike: STD15286
ICSA: N/A ICSAB: N/A

Workgroups: WG223290, WG223291

Comments:

Seq.	File ID	Sample	ID	Prep	Dil	Reference	Date/Time
38	HY.092506.200235	L0609457-08	35-SMP47-SB02-02	.62/40	1		09/25/06 20:02
39	HY.092506.200413	L0609446-01	1001-SO01-091806	.668/40	1		09/25/06 20:04
40	HY.092506.200554	WG223291-03	Post Digestion Spike		1		09/25/06 20:05
41	HY.092506.200753	L0609446-02	1001-SO02-091806	.621/40	1		09/25/06 20:07
42	HY.092506.200954	L0609446-05	1000-SO01-091806	.608/40	1		09/25/06 20:09
43	HY.092506.201143	WG223336-15	CCV		1		09/25/06 20:11
44	HY.092506.201342	WG223336-16	CCB		1		09/25/06 20:13
45	HY.092506.201525	L0609446-06	1000-SO02-091806	.61/40	1		09/25/06 20:15
46	HY.092506.201702	L0609481-01	MW007-SO01-091906	.649/40	1		09/25/06 20:17
47	HY.092506.201839	WG223291-04	Post Digestion Spike		1		09/25/06 20:18
48	HY.092506.202027	L0609481-03	MW010-SO01-091906	.604/40	1		09/25/06 20:20
49	HY.092506.202249	L0609509-01	1002-SO01-092006	.642/40	1		09/25/06 20:22
50	HY.092506.202440	WG223291-05	Post Digestion Spike		1		09/25/06 20:24
51	HY.092506.202620	L0609509-02	1011-SO01-092006		1		09/25/06 20:26
52	HY.092506.202829	L0609509-03	1011-SO02-092006	.625/40	1		09/25/06 20:28
53	HY.092506.203038	WG223336-17	CCV		1		09/25/06 20:30
54	HY.092506.203310	WG223336-18	CCB		1		09/25/06 20:33
55	HY.092506.203558	L0609509-02	1011-SO01-092006	.61/40	10		09/25/06 20:35
56	HY.092506.203750	WG223291-06	Serial Dilution		50		09/25/06 20:37
57	HY.092506.204007	L0609509-03	1011-SO02-092006		1		09/25/06 20:40
58	HY.092506.204205	WG223336-19	CCV		1		09/25/06 20:42
59	HY.092506.204403	WG223336-20	CCB		1		09/25/06 20:44

Approved: September 26, 2006

Mercury Digestion Log

Analyst(s): [illegible]
Date: 9/22/06
LCS: 4ml STD 15279
MS/MSD: 4ml STD 15279
Witness: VC
H_2SO_4 Lot #: N/A
$K_2S_2O_8$ Lot #: N/A
$KMNO_4$ Lot #: PGT 10685
HNO_3 Lot #: N/A
Aqua Regia: PGT 10691
Earliest Sample Due Date: 9/27/06
ICV / CCV: STD 15287
Stds: 0, 0.2, 1, 2, 5, 10: STD 15281 to 15286

Box: 06

Digestion Work Group: WG 223121

ME404 Revision # ____ - Method 7470A-Water
ME405 Revision # 7 - Method 7471A-Soil

Hot Block Temperature at start: 93.3°C 1410
Hot Block Temperature at end: 96.7°C 1440

Relinquished By: [illegible]
Digest Received By: PAS Date: 9/22/06

	KEMRON #	Initial Wt/Vol	Final Volume	Comments	Due Date
1	MBS	0.005	40ml	-02	
2	LCS	3		-03	
3	09-166-01	0.637			9/27
4	-02	0.652			
5	09-457-01	0.623		-01	9/29
6	-01 MS 9/22	~~0.646~~		-04	
7	-01 MSD	0		-05	
8	-02	0.635			
9	-03	0.638			
10	-04	0.640			
11	-05	0.642			
12	-06	0.632			
13	-07	0.600			
14	-08	0.626			
15	09-446-01	0.668		Level 4	10/3
16	-02	0.621			
17	-03	0.608			
18	-06	0.610			
19	09-481-01	0.649			10/4
20	-03	0.604			
21	09-509-01	0.642			10/5
22	-02	0.610			
23	-03	0.625			
24			[illegible] 9/22/06		
25					

Comments: ____

Primary Review: [illegible] 9/22/06 Secondary Review: [illegible] 9/22/06

KEMRON Environmental Services
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

00072900

Analytical Method: 7471A

AAB#: WG223291

Login Number: L0609457

Client ID	Date Collected	Date Received	Date Extracted	Max Hold Time Ext.	Time Held Ext.	Date Analyzed	Max Hold Time Anal	Time Held Anal.	Q
35-SMP92-SB01-02	09/19/06	09/20/06	09/22/06	28	3.20	09/25/06	28	3.23	
35-SMP117-SB01-01	09/19/06	09/20/06	09/22/06	28	3.11	09/25/06	28	3.23	
35-SMP117-SB01-02	09/19/06	09/20/06	09/22/06	28	3.10	09/25/06	28	3.24	
35-SMP117-SB02-02	09/19/06	09/20/06	09/22/06	28	3.08	09/25/06	28	3.24	
35-SMP47-SB01-01	09/15/06	09/20/06	09/22/06	28	7.10	09/25/06	28	3.24	
35-SMP47-SB01-02	09/15/06	09/20/06	09/22/06	28	7.10	09/25/06	28	3.24	
35-SMP47-SB02-01	09/15/06	09/20/06	09/22/06	28	7.11	09/25/06	28	3.24	
35-SMP47-SB02-02	09/15/06	09/20/06	09/22/06	28	7.11	09/25/06	28	3.24	

* EXT = SEE PROJECT QAPP REQUIREMENTS
*ANAL = SEE PROJECT QAPP REQUIREMENTS

KEMRON FORMS - Modified 02/14/2006
Version 1.5 PDF File ID: 576601
Report generated 09/26/2006 08:38

METHOD BLANK SUMMARY

Login Number: L0609457
Blank File ID: HY.092506.193028
Date Analyzed: 09/25/06
Time Analyzed: 19:30
Analyst: MMB

Work Group: WG223291
Blank Sample ID: WG223121-02
Instrument ID: HYDRA
Method: 7471A

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG223121-03	HY.092506.193240	09/25/06 19:32	01
35-SMP92-SB01-02	L0609457-01	HY.092506.193934	09/25/06 19:39	01
35-SMP117-SB01-01	L0609457-02	HY.092506.194638	09/25/06 19:46	01
35-SMP117-SB01-02	L0609457-03	HY.092506.195332	09/25/06 19:53	01
35-SMP117-SB02-02	L0609457-04	HY.092506.195510	09/25/06 19:55	01
35-SMP47-SB01-01	L0609457-05	HY.092506.195659	09/25/06 19:56	01
35-SMP47-SB01-02	L0609457-06	HY.092506.195858	09/25/06 19:58	01
35-SMP47-SB02-01	L0609457-07	HY.092506.200041	09/25/06 20:00	01
35-SMP47-SB02-02	L0609457-08	HY.092506.200235	09/25/06 20:02	01

KEMRON Environmental Services

METHOD BLANK REPORT

00072902

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223121-02
Instrument ID: HYDRA Run Time: 19:30 Prep Method: METHOD
File ID: HY.092506.193028 Analyst: MMB Method: 7471A
Workgroup (AAB#): WG223291 Matrix: Solid Units: mg/kg
Contract #: DACA56-94-D-0020 Cal ID: HYDRA-25-SEP-06

Analytes	SQL	PQL	Concentration	Dilution	Qualifier
Mercury, Total	0.0100	0.250	0.0100	1	U

MDL Method Detection Limit
RL Reporting/quantitation Limit

* Analyte concentration > RL

KEMRON FORMS - Modified 07/21/2006
Version 1.5 PDF File ID: 576603
Report generated 09/26/2006 08:38

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00072903

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223121-03
Instrument ID: HYDRA Run Time: 19:32 Prep Method: METHOD
File ID: HY.092506.193240 Analyst: MMB Method: 7471A
Workgroup (AAB#): WG223291 Matrix: Solid Units: mg/kg
Contract #: DACA56-94-D-0020 Cal ID: HYDRA-25-SEP-06

Analytes	Expected	Found	% Rec	LCS Limits	Q
Mercury, Total	0.267	0.255	95.8	80 - 120	

KEMRON FORMS - Modified 07/06/2006
Version 1.5 PDF File ID: 576613
Report generated 09/26/2006 08:38

LABORATORY CONTROL SAMPLE (LCS)

00072904

KEMRON Environmental Services

MATRIX SPIKE AND MATRIX SPIKE DUP (MS/MSD)

00072905

Loginnum: L0609457 Cal ID: HYDRA- Worknum: WG223291
Instrument ID: HYDRA Contract #: DACA56-94-D-0020 Method: 7471A
Parent ID: WG223121-01 File ID: HY.092506.193934 Dil: 1 Matrix: SOLID
Sample ID: WG223121-04 MS File ID: HY.092506.194254 Dil: 1 Units: mg/kg
Sample ID: WG223121-05 MSD File ID: HY.092506.194436 Dil: 1 Percent Solid: 100

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Mercury, Total	ND	0.257	0.259	101	0.257	0.254	98.8	2.25	75 - 125	25	

* FAILS %REC LIMIT

FAILS RPD LIMIT

NOTE: This is an internal quality control sample.

KEMRON FORMS - Modified 03/16/2006
Version 1.5 PDF File ID: 576605
Report generated 09/26/2006 08:38

KEMRON ENVIRONMENTAL SERVICES
POST SPIKE REPORT

Sample Login ID: L0609457
Instrument ID: HYDRA
Post Spike ID: WG223291-02 File ID: HY.092506.194815 Dil: 1
Sample ID: L0609457-02 File ID: HY.092506.194638 Dil: 1

Worknum: WG223291
Method: 7471A
Units: ug/kg
Matrix: Soil

Analyte	Control Limit %R	Post Spike Result	C	Sample Result	C	Spike Added(SA)	% R	Q
MERCURY	85 - 115	2.84	F	1.96	F	1.00	108	

N = % Recoverv exceeds control limits of 85% - 115%
F = Result is between MDL and RL
U = Sample result is below MDL. A value of zero is used in the calculation.

KEMRON FORMS - Modified 02/14/2006
Version 2.0 PDF File ID: 576600
Report generated 09/26/2006 08:38

KEMRON Environmental Services

INITIAL CALIBRATION SUMMARY

00072907

Login Number: L0609457

Analytical Method: 7471A

Instrument ID: HYDRA

Initial Calibration Date: 09/25/2006 18:52

Initial Calibration Time: 18:52

Analyte	WG223336-01		WG223336-02		WG223336-03		WG223336-04		WG223336-05		WG223336-06	
	STD	INT	STD	INT	STD	INT	STD	INT	STD	INT	STD	INT
Mercury	0	-469	0.200	13412	1.00	61111	2.00	119526	5.00	302825	10.0	597321

INT = Instrument intensity
R = Coefficient of correlation
Q = Data Qualifier
* = Out of Compliance; R < 0.995

KEMRON FORMS - Modified 03/03/2006
Version 1.5 PDF File ID: 576606
Report generated 09/26/2006 08:38

INITIAL CALIBRATION SUMMARY

Analyte	R	Q
Mercury	1.000	

INT = Instrument intensity
R = Coefficient of correlation
Q = Data Qualifier
* = Out of Compliance; R < 0.995

KEMRON FORMS - Modified 03/03/2006
Version 1.5 PDF File ID: 576606
Report generated 09/26/2006 08:38

KEMRON Environmental Services

INITIAL CALIBRATION BLANK (ICB)

00072909

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223336-08
Instrument ID: HYDRA Run Time: 18:57 Method: 7471A
File ID: HY.092506.185708 Analyst: MMB Units: ug/L
Workgroup (AAB#): WG223291 Cal ID: HYDRA - 25-SEP-06

Analytes	MDL	RDL	Concentration	Dilution	Qualifier
Mercury	0.150	3.75	-.048	1	U

U = Result is less than MDL
F = Result is between MDL and RL

KEMRON FORMS - Modified 03/06/2006
Version 1.5 PDF File ID: 576608
Report generated 09/26/2006 08:38

KEMRON Environmental Services

CONTINUING CALIBRATION BLANK (CCB)

00072910

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223336-10
Instrument ID: HYDRA Run Time: 19:00 Method: 7471A
File ID: HY.092506.190027 Analyst: MMB Units: ug/L
Workgroup (AAB#): WG223291 Cal ID: HYDRA - 25-SEP-06

Analytes	MDL	RDL	Concentration	Dilution	Qualifier
Mercury	0.150	3.75	0.0140	1	U

U = Result is less than MDL
F = Result is between MDL and RL

KEMRON FORMS - Modified 09/18/2006
Version 2.0 PDF File ID: 576610
Report generated 09/26/2006 08:38

KEMRON Environmental Services

CONTINUING CALIBRATION BLANK (CCB)

00072911

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223336-12
Instrument ID: HYDRA Run Time: 19:18 Method: 7471A
File ID: HY.092506.191829 Analyst: MMB Units: ug/L
Workgroup (AAB#): WG223291 Cal ID: HYDRA - 25-SEP-06

Analytes	MDL	RDL	Concentration	Dilution	Qualifier
Mercury	0.150	3.75	0.00700	1	U

U = Result is less than MDL
F = Result is between MDL and RL

KEMRON FORMS - Modified 09/18/2006
Version 2.0 PDF File ID: 576610
Report generated 09/26/2006 08:38

KEMRON Environmental Services

CONTINUING CALIBRATION BLANK (CCB)

00072912

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223336-14
Instrument ID: HYDRA Run Time: 19:51 Method: 7471A
File ID: HY.092506.195155 Analyst: MMB Units: ug/L
Workgroup (AAB#): WG223291 Cal ID: HYDRA - 25-SEP-06

Analytes	MDL	RDL	Concentration	Dilution	Qualifier
Mercury	0.150	3.75	0.00600	1	U

U = Result is less than MDL
F = Result is between MDL and RL

KEMRON FORMS - Modified 09/18/2006
Version 2.0 PDF File ID: 576610
Report generated 09/26/2006 08:38

KEMRON Environmental Services

CONTINUING CALIBRATION BLANK (CCB)

00072913

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223336-16
Instrument ID: HYDRA Run Time: 20:13 Method: 7471A
File ID: HY.092506.201342 Analyst: MMB Units: ug/L
Workgroup (AAB#): WG223291 Cal ID: HYDRA - 25-SEP-06

Analytes	MDL	RDL	Concentration	Dilution	Qualifier
Mercury	0.150	3.75	0.0150	1	U

U = Result is less than MDL
F = Result is between MDL and RL

KEMRON FORMS - Modified 09/18/2006
Version 2.0 PDF File ID: 576610
Report generated 09/26/2006 08:38

KEMRON Environmental Services

CONTINUING CALIBRATION BLANK (CCB)

00072914

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223336-18
Instrument ID: HYDRA Run Time: 20:33 Method: 7471A
File ID: HY.092506.203310 Analyst: MMB Units: ug/L
Workgroup (AAB#): WG223291 Cal ID: HYDRA - 25-SEP-06

Analytes	MDL	RDL	Concentration	Dilution	Qualifier
Mercury	0.150	3.75	-0.0220	1	U

U = Result is less than MDL
F = Result is between MDL and RL

KEMRON FORMS - Modified 09/18/2006
Version 2.0 PDF File ID: 576610
Report generated 09/26/2006 08:38

KEMRON Environmental Services

CONTINUING CALIBRATION BLANK (CCB)

00072915

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223336-20
Instrument ID: HYDRA Run Time: 20:44 Method: 7471A
File ID: HY.092506.204403 Analyst: MMB Units: ug/L
Workgroup (AAB#): WG223291 Cal ID: HYDRA - 25-SEP-06

Analytes	MDL	RDL	Concentration	Dilution	Qualifier
Mercury	0.150	3.75	-0.0620	1	U

U = Result is less than MDL
F = Result is between MDL and RL

KEMRON FORMS - Modified 09/18/2006
Version 2.0 PDF File ID: 576610
Report generated 09/26/2006 08:38

KEMRON Environmental Services

INITIAL CALIBRATION VERIFICATION (ICV)

00072916

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223336-07
Instrument ID: HYDRA Run Time: 18:54 Method: 7471A
File ID: HY.092506.185421 Analyst: MMB Units: ug/L
Workgroup (AAB#): WG223291 Cal ID: HYDRA - 25-SEP-06

Analyte		Expected	Found	%REC	LIMITS	Q
Mercury		2	1.93	96.5	90 - 110	

* Exceeds LIMITS Limit

KEMRON FORMS - Modified 03/03/2006
Version 1.3 PDF File ID: 576607
Report generated 09/26/2006 08:38

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072917

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223336-09
Instrument ID: HYDRA Run Time: 18:58 Method: 7471A
File ID: HY.092506.185848 Analyst: MMB
Workgroup (AAB#): WG223291 Cal ID: HYDRA - 25-SEP-06

Analyte		Expected	Found	%REC	LIMITS	UNITS	Q
Mercury, Total		0.00200	0.00194	97.0	80 - 120	mg/L	

* Exceeds LIMITS Criteria

KEMRON FORMS - Modified 08/16/2006
Version 1.3 PDF File ID: 576609
Report generated 09/26/2006 08:38

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072918

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223336-11
Instrument ID: HYDRA Run Time: 19:16 Method: 7471A
File ID: HY.092506.191648 Analyst: MMB
Workgroup (AAB#): WG223291 Cal ID: HYDRA - 25-SEP-06

Analyte		Expected	Found	%REC	LIMITS	UNITS	Q
Mercury, Total		0.00200	0.00190	95.0	80 - 120	mg/L	

* Exceeds LIMITS Criteria

KEMRON FORMS - Modified 08/16/2006
Version 1.3 PDF File ID: 576609
Report generated 09/26/2006 08:38

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072919

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223336-13
Instrument ID: HYDRA Run Time: 19:49 Method: 7471A
File ID: HY.092506.194958 Analyst: MMB
Workgroup (AAB#): WG223291 Cal ID: HYDRA - 25-SEP-06

Analyte		Expected	Found	%REC	LIMITS	UNITS	Q
Mercury, Total		0.00200	0.00202	101	80 - 120	mg/L	

* Exceeds LIMITS Criteria

KEMRON FORMS - Modified 08/16/2006
Version 1.3 PDF File ID: 576609
Report generated 09/26/2006 08:38

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072920

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223336-15
Instrument ID: HYDRA Run Time: 20:11 Method: 7471A
File ID: HY.092506.201143 Analyst: MMB
Workgroup (AAB#): WG223291 Cal ID: HYDRA - 25-SEP-06

Analyte		Expected	Found	%REC	LIMITS	UNITS	Q
Mercury, Total		0.00200	0.00195	97.5	80 - 120	mg/L	

* Exceeds LIMITS Criteria

KEMRON FORMS - Modified 08/16/2006
Version 1.3 PDF File ID: 576609
Report generated 09/26/2006 08:38

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072921

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223336-17
Instrument ID: HYDRA Run Time: 20:30 Method: 7471A
File ID: HY.092506.203038 Analyst: MMB
Workgroup (AAB#): WG223291 Cal ID: HYDRA - 25-SEP-06

Analyte		Expected	Found	%REC	LIMITS	UNITS	Q
Mercury, Total		0.00200	0.00194	97.0	80 - 120	mg/L	

* Exceeds LIMITS Criteria

KEMRON FORMS - Modified 08/16/2006
Version 1.3 PDF File ID: 576609
Report generated 09/26/2006 08:38

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00072922

Login Number: L0609457 Run Date: 09/25/2006 Sample ID: WG223336-19
Instrument ID: HYDRA Run Time: 20:42 Method: 7471A
File ID: HY.092506.204205 Analyst: MMB
Workgroup (AAB#): WG223291 Cal ID: HYDRA - 25-SEP-06

Analyte		Expected	Found	%REC	LIMITS	UNITS	Q
Mercury, Total		0.00200	0.00190	95.0	80 - 120	mg/L	

* Exceeds LIMITS Criteria

KEMRON FORMS - Modified 08/16/2006
Version 1.3 PDF File ID: 576609
Report generated 09/26/2006 08:38

00072923

KEMRON Environmental Services
Data Checklist

Date: 02-OCT-2006
Analyst: JWR
Analyst: NA
Method: CLO4
Instrument: IC1
Curve Workgroup: NA
Runlog ID: 12620
Analytical Workgroups: WG223307

System Performance Check	
Eluent check	X
Initial Calibration	
Average RF	
Linear Reg or Higher Order Curve	10/02/06
Alt Source Check	10/02/06
Continuing Calibration	
Continuing Calibration	X
Client Specific Requirements	X
Blanks	
Quant Report / Chromatogram	X
Spike Compounds	X
MS/MSD	X
Excel Spreadsheet	X
Samples	
TCL Hits	X
Manual Integrations	X
Data Package	
Level 2	
Level 3	L0609457, 459, 499
Level 4	
Primary Reviewer	JWR
Secondary Reviewer	MDC
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Check the resonableness of the results	X
Comments: L0609457, 459	LAB DUE 09/29/06
L0609499	LAB DUE 10/02/06
Soil extracts that remained turbid after 0.45 um filtration were diluted in order to	
maintain column pressure below 3000 psi. Reporting Limits for the diluted samples	
were raised proportionately to the dilutions required. Samples L0609457-10, 11, 13	
will need to be reanalyzed at further dilutions due to their CLO4 content.	
Column clean-up procedures were performed on the analytical column on 09/29/06	
and 10/02/06 (per manufacturer's recommendations) prior to the analysis of this	
analytical batch. A new guard column was installed prior to the analysis of this	
analytical batch as well.	

Primary Reviewer: 05-OCT-2006 — John Richards

Secondary Reviewer: 05-OCT-2006 — Michael Cohen

Generated: OCT-05-2006 15:25:42

00072924

KEMRON Environmental Services
Data Checklist

Date: 04-OCT-2006
Analyst: JWR
Analyst: NA
Method: CLO4
Instrument: IC1
Curve Workgroup: NA
Runlog ID: 12652
Analytical Workgroups: WG224306

System Performance Check	
Eluent check	X
Initial Calibration	
Average RF	
Linear Reg or Higher Order Curve	10/04/06
Alt Source Check	10/04/06
Continuing Calibration	
Continuing Calibration	X
Client Specific Requirements	X
Blanks	
Quant Report / Chromatogram	X
Spike Compounds	X
MS/MSD	X
Excel Spreadsheet	X
Samples	
TCL Hits	X
Manual Integrations	X
Data Package	
Level 2	
Level 3	L0609457 (RERUNS)
Level 4	
Primary Reviewer	JWR
Secondary Reviewer	MDC
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Check the resonableness of the results	X
Comments: L0609457	LAB DUE 09/29/06

Samples L0609457-10, 11, 13 were reanalyzed in this batch at a dilution due to their CLO4 content. These samples were initially analyzed on 10/02/06.

Primary Reviewer: 05-OCT-2006 John Richards

Secondary Reviewer: 06-OCT-2006 Michael Cadwell

Generated: OCT-06-2006 09:56:46

KEMRON Environmental Services
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

00072925

Analytical Method: 314.0 AAB#: WG223307
Login Number: L0609457

Client ID	Date Collected	Date Received	Date Extracted	Max Hold Time Ext.	Time Held Ext.	Date Analyzed	Max Hold Time Anal	Time Held Anal.	Q
35-SMP47-SB01-01	09/15/06	09/20/06	10/02/06	28	17.4	10/02/06	28	17.4	
35-SMP47-SB01-02	09/15/06	09/20/06	10/02/06	28	17.4	10/02/06	28	17.4	
35-SMP47-SB02-01	09/15/06	09/20/06	10/02/06	28	17.5	10/02/06	28	17.5	
35-SMP47-SB02-02	09/15/06	09/20/06	10/02/06	28	17.5	10/02/06	28	17.5	
SITE4-SB07-01	09/15/06	09/20/06	10/02/06	28	17.5	10/02/06	28	17.5	
SITE4-SB08-01	09/15/06	09/20/06	10/02/06	28	17.6	10/02/06	28	17.6	
SITE4-SB08-02	09/15/06	09/20/06	10/03/06	28	17.6	10/03/06	28	17.6	
SITE4-SB08-03	09/15/06	09/20/06	10/03/06	28	17.6	10/03/06	28	17.6	
SITE4-SB13-01	09/15/06	09/20/06	10/03/06	28	17.5	10/03/06	28	17.5	

* EXT = SEE PROJECT QAPP REQUIREMENTS
*ANAL = SEE PROJECT QAPP REQUIREMENTS

KEMRON FORMS - Modified 02/14/2006
Version 1.5 PDF File ID: 586313
Report generated 10/05/2006 19:35

KEMRON Environmental Services
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

00072926

Analytical Method: 314.0 AAB#: WG224306
Login Number: L0609457

Client ID	Date Collected	Date Received	Date Extracted	Max Hold Time Ext.	Time Held Ext.	Date Analyzed	Max Hold Time Anal	Time Held Anal.	Q
SITE4-SB08-01	09/15/06	09/20/06	10/04/06	28	19.5	10/04/06	28	19.5	
SITE4-SB08-02	09/15/06	09/20/06	10/04/06	28	19.5	10/04/06	28	19.5	
SITE4-SB08-02	09/15/06	09/20/06	10/04/06	28	19.5	10/04/06	28	19.5	
SITE4-SB13-01	09/15/06	09/20/06	10/04/06	28	19.3	10/04/06	28	19.3	

* EXT = SEE PROJECT QAPP REQUIREMENTS
*ANAL = SEE PROJECT QAPP REQUIREMENTS

KEMRON FORMS - Modified 02/14/2006
Version 1.5 PDF File ID: 586313
Report generated 10/05/2006 19:35

00072927

METHOD BLANK SUMMARY

Login Number: L0609457
Blank File ID: I1100206.12
Date Analyzed: 10/02/06
Time Analyzed: 20:22
Analyst: JWR

Work Group: WG223307
Blank Sample ID: WG223307-01
Instrument ID: IC1
Method: 314.0

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG223307-02	I1100206.15	10/02/06 21:23	01
35-SMP47-SB01-01	L0609457-05	I1100206.16	10/02/06 21:43	DL01
35-SMP47-SB01-02	L0609457-06	I1100206.17	10/02/06 22:04	DL01
35-SMP47-SB02-01	L0609457-07	I1100206.18	10/02/06 22:24	01
35-SMP47-SB02-02	L0609457-08	I1100206.19	10/02/06 22:45	DL01
SITE4-SB07-01	L0609457-09	I1100206.20	10/02/06 23:05	01
SITE4-SB08-01	L0609457-10	I1100206.21	10/02/06 23:25	DL01
DUP	WG223307-04	I1100206.22	10/02/06 23:46	DL01
SITE4-SB08-02	L0609457-11	I1100206.23	10/03/06 00:06	DL01
SITE4-SB08-03	L0609457-12	I1100206.24	10/03/06 00:27	01
SITE4-SB13-01	L0609457-13	I1100206.26	10/03/06 01:07	01
DUP	WG223307-06	I1100206.32	10/03/06 03:10	DL01

METHOD BLANK SUMMARY

Login Number: L0609457
Blank File ID: I1100406.12
Date Analyzed: 10/04/06
Time Analyzed: 18:04
Analyst: JWR

Work Group: WG224306
Blank Sample ID: WG224306-01
Instrument ID: IC1
Method: 314.0

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG224306-02	I1100406.15	10/04/06 19:05	01
SITE4-SB08-01	L0609457-10	I1100406.16	10/04/06 19:26	DL02
DUP	WG224306-04	I1100406.17	10/04/06 19:46	DL01
SITE4-SB08-02	L0609457-11	I1100406.18	10/04/06 20:06	DL02
SITE4-SB08-02	L0609457-11	I1100406.19	10/04/06 20:27	DL03
SITE4-SB13-01	L0609457-13	I1100406.20	10/04/06 20:47	DL01

KEMRON Environmental Services

METHOD BLANK REPORT

00072929

Login Number: L0609457 Run Date: 10/02/2006 Sample ID: WG223307-01
Instrument ID: IC1 Run Time: 20:22 Prep Method: 314.0
File ID: I1100206.12 Analyst: JWR Method: 314.0
Workgroup (AAB#): WG223307 Matrix: Soil Units: ug/kg
Contract #: DACA56-94-D-0020 Cal ID: IC1 -

Analytes	SQL	PQL	Concentration	Dilution	Qualifier
Perchlorate	5.00	10.0	5.00	1	U

MDL Method Detection Limit
RL Reporting/quantitation Limit

* Analyte concentration > RL

KEMRON FORMS - Modified 09/27/2006
Version 1.5 PDF File ID: 586315
Report generated 10/05/2006 19:35

KEMRON Environmental Services

METHOD BLANK REPORT

00072930

Login Number: L0609457 Run Date: 10/04/2006 Sample ID: WG224306-01
Instrument ID: IC1 Run Time: 18:04 Prep Method: 314.0
File ID: I1100406.12 Analyst: JWR Method: 314.0
Workgroup (AAB#): WG224306 Matrix: Soil Units: ug/kg
Contract #: DACA56-94-D-0020 Cal ID: IC1 -

Analytes	SQL	PQL	Concentration	Dilution	Qualifier
Perchlorate	5.00	10.0	5.00	1	U

MDL Method Detection Limit
RL Reporting/quantitation Limit

* Analyte concentration > RL

KEMRON FORMS - Modified 09/27/2006
Version 1.5 PDF File ID: 586315
Report generated 10/05/2006 19:35

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00072931

Login Number: L0609457 Run Date: 10/02/2006 Sample ID: WG223307-02
Instrument ID: IC1 Run Time: 21:23 Prep Method: 314.0
File ID: I1100206.15 Analyst: JWR Method: 314.0
Workgroup (AAB#): WG223307 Matrix: Solid Units: ug/kg
Contract #: DACA56-94-D-0020 Cal ID: IC1 -

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	250	267	107	85 - 115	

KEMRON FORMS - Modified 07/06/2006
Version 1.5 PDF File ID: 586316
Report generated 10/05/2006 19:35

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00072932

Login Number: L0609457 Run Date: 10/04/2006 Sample ID: WG224306-02
Instrument ID: IC1 Run Time: 19:05 Prep Method: 314.0
File ID: I1100406.15 Analyst: JWR Method: 314.0
Workgroup (AAB#): WG224306 Matrix: Solid Units: ug/kg
Contract #: DACA56-94-D-0020 Cal ID: IC1 -

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	250	251	101	85 - 115	

KEMRON FORMS - Modified 07/06/2006
Version 1.5 PDF File ID: 586316
Report generated 10/05/2006 19:35

KEMRON Environmental Services

DUPLICATE (DUP)

00072933

Sample Ref: L0609457-10 Cal ID: IC1 - Worknum: WG223307
Instrument ID: IC1 Method: 314
Sample ID: WG223307-03 File ID: I1100206.21 Dil: 20 Matrix: SOLID
Duplicate ID: WG223307-04 File ID: I1100206.22 Dil: 20 Units: ug/kg

Analyte	Sample	Duplicate	RPD	RPD Limit	Q
Perchlorate	34000	33800	0.578	25	

FAILS RPD LIMIT

NOTE: This is an internal quality control sample.

KEMRON FORMS - Modified 03/06/2006
Version 1.5 PDF File ID: 586317
Report generated 10/05/2006 19:35

KEMRON Environmental Services

DUPLICATE (DUP)

00072934

Sample Ref: L0609499-15 Cal ID: IC1 - Worknum: WG223307
Instrument ID: IC1 Method: 314
Sample ID: WG223307-05 File ID: I1100206.31 Dil: 10 Matrix: SOLID
Duplicate ID: WG223307-06 File ID: I1100206.32 Dil: 10 Units: ug/kg

Analyte	Sample	Duplicate	RPD	RPD Limit	Q
Perchlorate	ND	ND	0	25	

FAILS RPD LIMIT

NOTE: This is an internal quality control sample.

KEMRON FORMS - Modified 03/06/2006
Version 1.5 PDF File ID: 586317
Report generated 10/05/2006 19:35

KEMRON Environmental Services

DUPLICATE (DUP)

00072935

Sample Ref: L0609457-10 Cal ID: IC1 - Worknum: WG224306
Instrument ID: IC1 Method: 314
Sample ID: WG224306-03 File ID: I1100406.16 Dil: 100 Matrix: SOLID
Duplicate ID: WG224306-04 File ID: I1100406.17 Dil: 100 Units: ug/kg

Analyte	Sample	Duplicate	RPD	RPD Limit	Q
Perchlorate	27100	27600	1.73	25	

FAILS RPD LIMIT

NOTE: This is an internal quality control sample.

KEMRON FORMS - Modified 03/06/2006
Version 1.5 PDF File ID: 586317
Report generated 10/05/2006 19:35

Shaw® Shaw Environmental, Inc.
3010 Briarpark Drive, Suite 4N
Houston, TX 77042 (713) 996-4400

CHAIN-OF-CUSTODY

No. 10455

Laboratory Name: Kenvon Address: Marietta, OH Contact: S. Mossberg

Project Name: LHAAP Project Location: Karnack, Tx

Project No.: 117591 Project Contact: L. Duty Project Telephone No.: 832-364-0173

Point of contact: Project Manager/Supervisor:

Telephone No.:

Analysis and Method Desired (Indicate separate containers)

Item No.	Sample Number	Date	Time	Comp	Grab	Matrix	Sample Description, Location	Number of Containers	VOC	SVOC	Explosives	Tx 1005	Metals	Perchlorate		Remarks
1	35-Sump 92-SB01-02	9/19	921		X	S	7.5 ft	4	X				X			
2	35-Sump 117-SB01-01	9/19	1126		X	S	0.5 ft	1				X	X			
3	35-Sump 117-SB01-02	9/19	1148		X	S	10.0 ft	4	X			X	X			
4	35-Sump 117-SB02-01						No Sample									
5	35-Sump 117-SB02-02	9/19	1215		X	S	10.0 ft	4	X			X	X			
6	35-Sump 47-SB01-01	9/15	1140		X	S	0.5 ft	1					X	X		
7	35-Sump 47-SB01-02	9/15	1145		X	S	2.5 ft	1					X	X		
8	35-Sump 47-SB02-01	9/15	1131		X	S	0.5 ft	1					X	X		
9	35-Sump 47-SB02-02	9/15	1138		X	S	2.5 ft	1					X	X		
10																

Transfers Relinquished By (Signature)	Date/Time	Transfers Accepted By (Signature)	Date/Time
[signature]		[signature]	
[signature]	9/19/06 1700	UPS	
		Laboratory Brenda Gregory	9/20/06 0840

Special Instructions: Ice Sealed SXS intact Cooler Temp 1 Bag

FedEx Airbill No.: 1240166322 1005 5705

Sampler's Signature: [signature]

TAT: ____ Standard ____ Rush Due: ____ Seals Intact? ____ Y ____ N Received Good Condition ____ Y ____ N ____ Cold

White - Lab Copy Canary - Field Copy Pink - File Copy

00072937

Shaw® Shaw Environmental, Inc.

3010 Briarpark Drive, Suite 4N
Houston, TX 77042 (713) 996-4400

CHAIN-OF-CUSTODY

Site 4

No. 10454

Laboratory Name: Kemron Address: Marietta, OH Contact: S Mossberg

Project Name: LHAAP Project Location: Karnack, Tx

Project No.: 117591 Project Contact: L. Duty Project Telephone No.: 832-364-0173

Point of contact: Project Manager/Supervisor:

Telephone No.:

Item No.	Sample Number	Date	Time	Comp	Grab	Matrix	Sample Description, Location	Number of Containers	Perchlorate							Remarks
1	Site4-SB07-01	9/15	1127		X	S	21.5 ft	1	X							
2	Site4-SB08-01	9/15	830		X	S	0.5 ft	1	X							
3	Site4-SB08-02	9/15	837		X	S	4.0 ft	1	X							
4	Site4-SB08-03	9/15	920		X	S	21.5 ft	1	X							
5	Site4-SB13-01	9/15	1330		X	S	21.5 ft	1	X							
6																
7																
8																
9																
10																

Transfers Relinquished By (Signature)	Date/Time	Transfers Accepted By (Signature)	Date/Time
9/19/06	1700	UPS	
		Laboratory Blenda Gregory	9/20/06 0940

Special Instructions

FedEx Airbill No.: 1 2401 6632 2 1005 5705

Sampler's Signature

TAT: ____ Standard ____ Rush Due: ___ Seals Intact? ____ Y ____ N Received Good Condition ____ Y ____ N ____ Cold

White - Lab Copy Canary - Field Copy Pink - File Copy

00072938

SAMPLE RECEIPT FORM

156 STARLITE DRIVE
MARIETTA, OH
45750
(740) 373-4071

Date: 9-20-06 Client: SHAW-LH 940

Shipped By: ( ) Fed-Ex (✓) UPS ( )DHL ( ) KEMRON ( ) Client ( ) Other

Opened By: blg

Logged By: blg Login # L06 09457

IR Temp Gun: (✓) D ( )G

COOLER INFORMATION

Number	Cooler ID	Temp °C	Airbill#	COC#	Other
1	1278	1	1740166322100	55705	
2					
3					
4					
5					
6					

Were all coolers sealed?	Y	N	N/A
Were custody seals used on all coolers?	Y	N	N/A
Were custody seals intact?	Y	N	N/A
Was visible ice present?	Y	N	N/A
Were all coolers in the temperature range of 2-6C? (>6C*)	Y	N	N/A
Were the samples frozen?*	Y	N	N/A
Were COC papers provided?	Y	N	N/A
Were all sample containers intact?*	Y	N	N/A
Were all sample labels intact?	Y	N	N/A
Were all sample labels legible?*	Y	N	N/A
Did all sample labels match the COC?*	Y	N	N/A
Was the label information complete?*	Y	N	N/A
Were the correct containers used?*	Y	N	N/A
Were the correct preservatives added to water samples?*	Y	N	N/A
Was the pH tested on preserved water samples?	Y	N	N/A
Were pH ranges acceptable?*	Y	N	N/A
Was sufficient amount of sample provided?*	Y	N	N/A
Were bubbles present in VOA samples?*	Y	N	N/A
Were COC's signed and dated?	Y	N	N/A
Did samples arrive before hold time expired?*	Y	N	N/A
Are discrepancy forms attached?	Y	N	N/A

blg 9-20-06

**Requires a discrepancy form*

CRF #1
Revised 8/22/03

Comments:

CRF#4

Sample Discrepancy Form

Client: Shaw Project: LH

Date Received: 9-20-06

_____ Cooler temperature > than 6 degrees Celsius

Reason _____

_____ Samples received not on chain of custody

_____ Samples on chain of custody not received

✓ Information on sample containers different from chain of custody

C/C Site 4-SB13-01 @1330 = NO Id on jar only date/time

C/C Site 4-SB07-01 @ 1127 = ID on label "04SB07 9/15"

_____ Sample containers received broken, leaking or not sealed (List sample ID)

_____ pH out (List sample ID, which container, pH prior to adjusting, amount of acid, preservative)

_____ Insufficient sample volume

_____ Air bubbles present in VOA vials (List sample ID)

_____ Hold time expired (List sample ID)

Service Representative:

Was client notified regarding information: YES NO

Name of Person contacted: _____ Company: _____

Service Representative: _____ Date: _____

Last Revised 08/22/03

KEMRON Environmental Services
Internal Chain of Custody Report

00072940

Login: L0609457
Account: 2773
Project: 2773.025
Samples: 13
Due Date: 29-SEP-2006

Samplenum	Container ID	Products
L0609457-01	275706	HG PCT-S FE MG MN BA BE CD CA CR CO CU NI K A(

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	PREP	W1	DIG	20-SEP-2006 14:41	REK	BRG
3	STORE	DIG	W1	22-SEP-2006 15:21	BRG	VC
4	ANALYZ	W1	WET	26-SEP-2006 10:58	TMB	JKT
5	STORE	WET	A1	28-SEP-2006 10:38	BRG	TMM

Samplenum	Container ID	Products
L0609457-01	275707	8260 G-40-T2

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	L1	VOAZ	20-SEP-2006 10:52	SMH	JKT

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	L1	VOAZ	20-SEP-2006 10:52	SMH	JKT

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	L1	VOAZ	20-SEP-2006 10:52	SMH	JKT

Samplenum	Container ID	Products
L0609457-01	275708	ENCORE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	L1	VOAZ	20-SEP-2006 10:52	SMH	JKT

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	L1	VOAZ	20-SEP-2006 10:52	SMH	JKT

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	L1	VOAZ	20-SEP-2006 10:52	SMH	JKT

KEMRON Environmental Services
Internal Chain of Custody Report

00072941

Login: L0609457
Account: 2773
Project: 2773.025
Samples: 13
Due Date: 29-SEP-2006

Samplenum	Container ID	Products
L0609457-02	275709	HG PCT-S FE MG MN BA BE CD CA CR CO CU NI K AG

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	PREP	W1	DIG	20-SEP-2006 14:40	REK	BRG
3	STORE	DIG	W1	22-SEP-2006 15:21	BRG	VC
4	PREP	W1	SEM	25-SEP-2006 09:14	HV	BRG
5	STORE	SEM	A1	25-SEP-2006 16:21	BRG	HV
6	ANALYZ	W1	WET	27-SEP-2006 16:11	TMM	BRG
7	STORE	WET	A1	28-SEP-2006 10:42	BRG	TMM

Samplenum	Container ID	Products
L0609457-03	275710	HG PCT-S FE MG MN BA BE CD CA CR CO CU NI K AG

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	PREP	W1	DIG	20-SEP-2006 14:41	REK	BRG
3	STORE	DIG	W1	22-SEP-2006 15:21	BRG	VC
4	PREP	W1	SEM	25-SEP-2006 09:14	HV	BRG
5	STORE	SEM	A1	25-SEP-2006 16:21	BRG	HV
6	STORE	WET	A1	28-SEP-2006 10:43	BRG	TMM

Samplenum	Container ID	Products
L0609457-03	275711	8260 G-40-T2

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	L1	VOAZ	20-SEP-2006 10:52	SMH	JKT

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	L1	VOAZ	20-SEP-2006 10:52	SMH	JKT

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	L1	VOAZ	20-SEP-2006 10:52	SMH	JKT

KEMRON Environmental Services
Internal Chain of Custody Report

00072942

Login: L0609457
Account: 2773
Project: 2773.025
Samples: 13
Due Date: 29-SEP-2006

Samplenum	Container ID	Products
L0609457-03	275712	ENCORE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	L1	VOAZ	20-SEP-2006 10:52	SMH	JKT

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	L1	VOAZ	20-SEP-2006 10:52	SMH	JKT

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	L1	VOAZ	20-SEP-2006 10:52	SMH	JKT

Samplenum	Container ID	Products
L0609457-04	275713	BE CD CA CR CO CU NI K AG NA ZN V AL T1005 AS-

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	PREP	W1	DIG	20-SEP-2006 14:41	REK	BRG
3	STORE	DIG	W1	22-SEP-2006 15:21	BRG	VC
4	PREP	W1	SEM	25-SEP-2006 09:13	HV	BRG
5	STORE	SEM	A1	25-SEP-2006 16:21	BRG	HV
6	ANALYZ	W1	WET	27-SEP-2006 16:11	TMM	BRG
7	STORE	WET	A1	28-SEP-2006 10:43	BRG	TMM

Samplenum	Container ID	Products
L0609457-04	275714	G-40-T2 8260

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	L1	VOAZ	20-SEP-2006 10:53	SMH	JKT

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	L1	VOAZ	20-SEP-2006 10:53	SMH	JKT

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	L1	VOAZ	20-SEP-2006 10:53	SMH	JKT

KEMRON Environmental Services
Internal Chain of Custody Report

00072943

Login: L0609457
Account: 2773
Project: 2773.025
Samples: 13
Due Date: 29-SEP-2006

Samplenum	Container ID	Products
L0609457-04	275715	ENCORE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	L1	VOAZ	20-SEP-2006 10:53	SMH	JKT

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	L1	VOAZ	20-SEP-2006 10:53	SMH	JKT

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	L1	VOAZ	20-SEP-2006 10:52	SMH	JKT

Samplenum	Container ID	Products
L0609457-05	275716	HG PCT-S FE MG MN BA BE CD CA CR CO CU NI K AG

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	PREP	W1	DIG	20-SEP-2006 14:41	REK	BRG
3	STORE	DIG	W1	22-SEP-2006 15:21	BRG	VC
4	ANALYZ	W1	WET	26-SEP-2006 10:58	TMB	JKT
5	STORE	WET	A1	28-SEP-2006 10:38	BRG	TMM

Samplenum	Container ID	Products
L0609457-06	275717	HG PCT-S FE MG MN BA BE CD CA CR CO CU NI K AG

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	PREP	W1	DIG	20-SEP-2006 14:41	REK	BRG
3	STORE	DIG	W1	22-SEP-2006 15:21	BRG	VC
4	ANALYZ	W1	WET	26-SEP-2006 10:58	TMB	JKT
5	STORE	WET	A1	28-SEP-2006 10:38	BRG	TMM

KEMRON Environmental Services
Internal Chain of Custody Report

00072944

Login: L0609457
Account: 2773
Project: 2773.025
Samples: 13
Due Date: 29-SEP-2006

Samplenum	Container ID	Products
L0609457-07	275718	HG PCT-S FE MG MN BA BE CD CA CR CO CU NI K AG

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	PREP	W1	DIG	20-SEP-2006 14:41	REK	BRG
3	STORE	DIG	W1	22-SEP-2006 15:21	BRG	VC
4	ANALYZ	W1	WET	26-SEP-2006 10:58	TMB	JKT
5	STORE	WET	A1	28-SEP-2006 10:38	BRG	TMM

Samplenum	Container ID	Products
L0609457-08	275719	HG PCT-S FE MG MN BA BE CD CA CR CO CU NI K AG

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	PREP	W1	DIG	20-SEP-2006 14:40	REK	BRG
3	STORE	DIG	W1	22-SEP-2006 15:21	BRG	VC
4	ANALYZ	W1	WET	26-SEP-2006 10:58	TMB	JKT
5	STORE	WET	A1	28-SEP-2006 10:38	BRG	TMM

Samplenum	Container ID	Products
L0609457-09	275720	PCT-S CLO4

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	W1	WET	26-SEP-2006 15:10	TMB	JKT
3	STORE	WET	A1	28-SEP-2006 10:38	BRG	TMM

Samplenum	Container ID	Products
L0609457-10	275721	PCT-S CLO4

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	W1	WET	26-SEP-2006 15:10	TMB	JKT
3	STORE	WET	A1	28-SEP-2006 10:37	BRG	TMM

KEMRON Environmental Services
Internal Chain of Custody Report

00072945

Login: L0609457
Account: 2773
Project: 2773.025
Samples: 13
Due Date: 29-SEP-2006

Samplenum	Container ID	Products
L0609457-11	275722	PCT-S CLO4

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	W1	WET	26-SEP-2006 15:10	TMB	JKT
3	STORE	WET	A1	28-SEP-2006 10:37	BRG	TMM

Samplenum	Container ID	Products
L0609457-12	275723	PCT-S CLO4

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	W1	WET	26-SEP-2006 15:09	TMB	JKT
3	STORE	WET	A1	28-SEP-2006 10:37	BRG	TMM

Samplenum	Container ID	Products
L0609457-13	275724	PCT-S CLO4

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN			20-SEP-2006 10:18	BRG	
2	ANALYZ	W1	WET	26-SEP-2006 15:09	TMB	JKT
3	STORE	WET	A1	28-SEP-2006 10:37	BRG	TMM

156 Starlite Drive, Marietta, OH 45750 • TEL 740-373-4071 • FAX 740-373-4835 • http://www.kemron.com

Laboratory Report Number: L0710597

Please find enclosed the analytical results for the samples you submitted to KEMRON Environmental Services.

Review and compilation of your report was completed by KEMRON's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box bleow at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Debra Elliott - Team Leader
delliott@kemron-lab.com

Kathy Albertson - Team Chemist/Data Specialist
kalbertson@kemron-lab.com

Stephanie Mossburg - Team Chemist/Data Specialist
smossburg@kemron-lab.com

Brenda Gregory - Client Services Specialist
bgregory@kemron-lab.com

Amanda Fickiesen - Client Services Specialist
afickiesen@kemron-lab.com

Annie Brown - Client Services Specialist
abrown@kemron-lab.com

Katie Barnes - Team Assistant
kbarnes@kemron-lab.com

Jacqueline Parsons - Team Assistant
jparsons@kemron-lab.com

This report was reviewed on November 02, 2007.

Stephanie Mossburg

STEPHANIE MOSSBURG - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the NELAP standards and other applicable contract terms and conditions. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of KEMRON Environmental Services.

This report was certified on November 02, 2007.

David E. Vandenberg

David Vandenberg - Vice President

FL DOH NELAP ID: E8755
This report contains a total of 266 pages.

Protecting Our Environmental Future

KEMRON REPORT L0710597
PREPARED FOR Shaw E I, Inc.
WORK ID: LONGHORN AAP KARNACK TX

1.0 Introduction 3
2.1 Volatiles Data 19
2.1.1 Volatiles GCMS Data (8260) 20
2.1.1.1 Summary Data 21
2.1.1.2 QC Summary Data 51
2.2 General Chemistry Data 224
2.2.1 Percent Solids Data 225
2.2.1.1 Raw Data 226
2.2.2 Perchlorate Data 230
2.2.2.1 Summary Data 231
2.2.2.2 QC Summary Data 237
3.0 Attachments 256

1.0 Introduction

KEMRON ENVIRONMENTAL SERVICES
REPORT NARRATIVE

KEMRON Login No.: L0710597

CHAIN OF CUSTODY: The chain of custody numbers were 10301 and 10304.

SHIPMENT CONDITIONS: The chain of custody forms were received sealed in a cooler. The cooler temperature was 4 degrees C.

SAMPLE MANAGEMENT: All samples received were intact.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and KEMRON Environmental Services, both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 25-OCT-07
Stephanie Mossburg

Laboratory Data Package Cover Page

00072950

This data Package consists of:

This signature page, the laboratory review checklists, and the following reportable data:

R1 Field chain-of-custody documentation;

R2 sample identification cross-reference;

R3 Test reports (analytical data sheets) for each enviornmental sample that includes:

a) Items consistant with NELAC 5.13 or ISO/IEC 17025 Section 5.10
b) dilution factors,
c) preparation methods,
d) Cleanup methods, and
e) If required for the project, tentatively identified compounds (TICs)

R4 Surrogate recovery data including:

a) Calculated recovery (%R) for each analyte, and
b) The laboratory's surrogate QC limits.

✓R5 Test reports/summary forms for blank samples;

✓R6 Test reports/summary forms for laboratory control samples (LCSs) including:

a) LCS spiking amount,
b) Calculated %R for each analyte, and
c) The laboratory"s LCS QC limits.

R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:

a) Samples associated with the MS/MSD clearly identified,
b) MS/MSD spiking amounts,
c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
d) Calculated %R and relative percent differences (RPDs), and
e) The laboratory's MS/MSD QC limits

✓R8 Laboratory analytical duplicate (if applicable) revocery and precision:

a) the amount of analyte measured in the duplicate,
b) the calculated RPD, and
c) the laboratory's QC limits for anlytical duplicates.

R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix;

R10 Other problems or anomalies.

✓The exception Report for every "No" or "Not Reviewed (NR)" item IN laboratory review checklist.

Release statement: I am responsible for the release of this laboratory data package. This data package has been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exceptions reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratoy in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, If applicable: [] This laboratory is an in-house laboratory controlled by the person repsonding to rule. The official signing the cover page of the rule-required report (for example, the APAR) in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is trus.

MICHAEL D. COCHRAN	Michael Cochran	Semivolatiles Lab Supervisor	November 1, 2007
Name (Printed)	Signature	Official Title (printed)	DATE

RG-366/TRRP-13 December 2002 A1

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0710597
Project Name:	798-LONGHORN
Method:	314
Prep Batch Number(s):	WG254202, WG254325
Reviewer Name:	MICHAEL D. COCHRAN
LRC Date:	October 31, 2007

Description	Yes	No	NA(1)	NR(2)	ER(3)
Chain-Of-Custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	✓				
Were all departures from standard conditions described in an exception report?	✓				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	✓				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	✓				
Test reports					
Were all samples prepared and analyzed within holding times?	✓				
Other than those results <MQL, were all other raw values bracketed by calibration standards?	✓				
Were calculations checked by a peer or supervisor?	✓				
Were all analyte identifications checked by a peer or supervisor?	✓				
Were sample quantitation limits reported for all analytes not detected?	✓				
Were all results for soil and sediment samples reported on a dry weight basis?			✓		
Were % moisture (or solids) reported for all soil and sediment samples?			✓		
If required for the project, TICs reported?	✓				
Surrogate recovery data					
Were surrogates added prior to extraction?			✓		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			✓		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	✓				
Were blanks analyzed at the appropriate frequency?	✓				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	✓				
Were blank concentrations <MQL?	✓				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	✓				
Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	✓				
Were LCSs analyzed at the required frequency?	✓				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	✓				
Does the detectability data document the laboratorys capability to detect the COCs at the MDL used to calculate the SQLs?	✓				
Was the LCSD RPD within QC limits?	✓				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			✓		1
Were MS/MSD analyzed at the appropriate frequency?			✓		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			✓		

Description	Yes	No	NA(1)	NR(2)	ER(3)
Were MS/MSD RPDs within laboratory QC limits?			✓		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?	✓				
Were analytical duplicates analyzed at the appropriate frequency?	✓				
Were RPDs or relative standard deviations within the laboratory QC limits?	✓				
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	✓				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	✓				
Are unadjusted MQLs included in the laboratory data package?	✓				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	✓				
Were all necessary corrective actions performed for the reported data?	✓				
Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	✓				
Were response factors and/or relative response factors for each analyte within QC limits?	✓				
Were percent RSDs or correlation coefficient criteria met?	✓				
Was the number of standards recommended in the method used for all analytes?	✓				
Were all points generated between the lowest and highest standard used to calculate the curve?	✓				
Are ICAL data available for all instruments used?	✓				
Has the initial calibration curve been verified using an appropriate second source standard?	✓				
Initial and continuing calibration verification (ICV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	✓				
Were percent differences for each analyte within the method-required QC limits?	✓				
Was the ICAL curve verified for each analyte?	✓				
Was the absolute value of the analyte concentration in the inorganic CCB <MDL?	✓				
Mass spectral tuning:					
Was the appropriate compound for the method used for tuning?			✓		
Were ion abundance data within the method-required QC limits?			✓		
Internal standards (IS):					
Were IS area counts and retention times within the method-required QC limits?			✓		
Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section 4.12.2)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	✓				
Were data associated with manual integrations flagged on the raw data?	✓				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			✓		
Tentatively identified compounds (TICs):					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			✓		
Interference Check Sample (ICS) results:					
Were percent recoveries within method QC limits?			✓		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			✓		
Method detection limit (MDL) studies					
Was a MDL study performed for each reported analyte?	✓				
Is the MDL either adjusted or supported by the analysis of DCSs?	✓				
Proficiency test reports:					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	✓				

00072952

Description	Yes	No	NA(1)	NR(2)	ER(3)
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	✓				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	✓				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	✓				
Is documentation of the analyst's competency up-to-date and on file?	✓				
Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	✓				
Laboratory standard operating procedures (SOPs):					
Are laboratory SOPs current and on file for each method performed?	✓				

00072953

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0710597
Project Name:	798-LONGHORN
Method:	314
Prep Batch Number(s):	WG254202, WG254325
Reviewer Name:	MICHAEL D. COCHRAN
LRC Date:	October 31, 2007

EXCEPTIONS REPORT
ER# - Description
1. Samples -02, -03 and -04 extractions were not suitable to acquire enough volume for the MS/MSD analysis. The turbidity was too great to acquire volume beyond the sample and one duplicate.

(1) NA = Not applicable to method or project
(2) NR = Not reviewed
(3) ER# = Exception report number

Laboratory Data Package Cover Page

00072955

This data Package consists of:

This signature page, the laboratory review checklists, and the following reportable data:

R1 Field chain-of-custody documentation;

R2 sample identification cross-reference;

R3 Test reports (analytical data sheets) for each enviornmental sample that includes:

a) Items consistant with NELAC 5.13 or ISO/IEC 17025 Section 5.10
b) dilution factors,
c) preparation methods,
d) Cleanup methods, and
e) If required for the project, tentatively identified compounds (TICs)

R4 Surrogate recovery data including:

a) Calculated recovery (%R) for each analyte, and
b) The laboratory's surrogate QC limits.

R5 Test reports/summary forms for blank samples;

R6 Test reports/summary forms FOR laboratory control samples (LCSs) including:

a) LCS spiking amount,
b) Calculated %R for each analyte, and
c) The laboratory"s LCS QC limits.

R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:

a) Samples associated with the MS/MSD clearly identified,
b) MS/MSD spiking amounts,
c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
d) Calculated %R and relative percent differences (RPDs), and
e) The laboratory's MS/MSD QC limits

R8 Laboratory analytical duplicate (if applicable) revocery and precision:

a) the amount of analyte measured in the duplicate,
b) the calculated RPD, and
c) the laboratory's QC limits for anlytical duplicates.

R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix;

R10 Other problems or anomalies.

The exception Report for every "No" or "Not Reviewed (NR)" item in laboratory review checklist.

Release statement: I am responsible for the release of this laboratory data package. This data package has been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exceptions reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratoy in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, If applicable: [] This laboratory is an in-house laboratory controlled by the person repsonding to rule. The official signing the cover page of the rule-required report (for example, the APAR) in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is trus.

DEANNA I. HESSON	Deanna Hesson	Conventional Lab Supervisor	October 30, 2007
Name (Printed)	Signature	Official Title (printed)	DATE

RG-366/TRRP-13 December 2002 A1

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0710597
Project Name:	798-LONGHORN
Method:	PCTSOLIDS
Prep Batch Number(s):	WG253661
Reviewer Name:	DEANNA I. HESSON
LRC Date:	October 30, 2007

Description	Yes	No	NA(1)	NR(2)	ER(3)
Chain-Of-Custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	✓				
Were all departures from standard conditions described in an exception report?	✓				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	✓				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	✓				
Test reports					
Were all samples prepared and analyzed within holding times?	✓				
Other than those results <MQL, were all other raw values bracketed by calibration standards?			✓		
Were calculations checked by a peer or supervisor?	✓				
Were all analyte identifications checked by a peer or supervisor?			✓		
Were sample quantitation limits reported for all analytes not detected?			✓		
Were all results for soil and sediment samples reported on a dry weight basis?	✓				
Were % moisture (or solids) reported for all soil and sediment samples?	✓				
If required for the project, TICs reported?			✓		
Surrogate recovery data					
Were surrogates added prior to extraction?			✓		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			✓		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?			✓		
Were blanks analyzed at the appropriate frequency?			✓		
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?			✓		
Were blank concentrations <MQL?			✓		
Laboratory control samples (LCS):					
Were all COCs included in the LCS?			✓		
Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?			✓		
Were LCSs analyzed at the required frequency?			✓		
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?			✓		
Does the detectability data document the laboratorys capability to detect the COCs at the MDL used to calculate the SQLs?			✓		
Was the LCSD RPD within QC limits?			✓		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			✓		
Were MS/MSD analyzed at the appropriate frequency?			✓		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			✓		

Description	Yes	No	NA(1)	NR(2)	ER(3)
Were MS/MSD RPDs within laboratory QC limits?			✓		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?	✓				
Were analytical duplicates analyzed at the appropriate frequency?	✓				
Were RPDs or relative standard deviations within the laboratory QC limits?	✓				
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?			✓		
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?			✓		
Are unadjusted MQLs included in the laboratory data package?			✓		
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	✓				
Were all necessary corrective actions performed for the reported data?	✓				
Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?			✓		
Were response factors and/or relative response factors for each analyte within QC limits?			✓		
Were percent RSDs or correlation coefficient criteria met?			✓		
Was the number of standards recommended in the method used for all analytes?			✓		
Were all points generated between the lowest and highest standard used to calculate the curve?			✓		
Are ICAL data available for all instruments used?			✓		
Has the initial calibration curve been verified using an appropriate second source standard?			✓		
Initial and continuing calibration verification (ICV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?			✓		
Were percent differences for each analyte within the method-required QC limits?			✓		
Was the ICAL curve verified for each analyte?			✓		
Was the absolute value of the analyte concentration in the inorganic CCB <MDL?			✓		
Mass spectral tuning:					
Was the appropriate compound for the method used for tuning?			✓		
Were ion abundance data within the method-required QC limits?			✓		
Internal standards (IS):					
Were IS area counts and retention times within the method-required QC limits?			✓		
Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section 4.12.2)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	✓				
Were data associated with manual integrations flagged on the raw data?			✓		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			✓		
Tentatively identified compounds (TICs):					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			✓		
Interference Check Sample (ICS) results:					
Were percent recoveries within method QC limits?			✓		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			✓		
Method detection limit (MDL) studies					
Was a MDL study performed for each reported analyte?			✓		
Is the MDL either adjusted or supported by the analysis of DCSs?			✓		
Proficiency test reports:					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?			✓		

00072957

Description	Yes	No	NA(1)	NR(2)	ER(3)
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?			✓		
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?			✓		
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	✓				
Is documentation of the analyst's competency up-to-date and on file?	✓				
Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	✓				
Laboratory standard operating procedures (SOPs):					
Are laboratory SOPs current and on file for each method performed?	✓				

00072958

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0710597
Project Name:	798-LONGHORN
Method:	PCTSOLIDS
Prep Batch Number(s):	WG253661
Reviewer Name:	DEANNA I. HESSON
LRC Date:	October 30, 2007

EXCEPTIONS REPORT
ER# - Description
Footnotes:
(1) NA = Not applicable to method or project
(2) NR = Not reviewed
(3) ER# = Exception report number

Laboratory Data Package Cover Page

00072960

This data Package consists of:

This signature page, the laboratory review checklists, and the following reportable data:

✓R1 Field chain-of-custody documentation;

✓R2 sample identification cross-reference;

R3 Test reports (analytical data sheets) for each enviornmental sample that includes:

a) Items consistant with NELAC 5.13 or ISO/IEC 17025 Section 5.10
b) dilution factors,
c) preparation methods,
d) Cleanup methods, and
e) If required for the project, tentatively identified compounds (TICs)

✓R4 Surrogate recovery data including:

a) Calculated recovery (%R) for each analyte, and
b) The laboratory's surrogate QC limits.

✓R5 Test reports/summary forms for blank samples;

✓R6 Test reports/summary forms for laboratory control samples (LCSs) including:

a) LCS spiking amount,
b) Calculated %R for each analyte, and
c) The laboratory"s LCS QC limits.

✓R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:

a) Samples associated with the MS/MSD clearly identified,
b) MS/MSD spiking amounts,
c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
d) Calculated %R and relative percent differences (RPDs), and
e) The laboratory's MS/MSD QC limits

✓R8 Laboratory analytical duplicate (if applicable) revocery and precision:

a) the amount of analyte measured in the duplicate,
b) the calculated RPD, and
c) the laboratory's QC limits for anlytical duplicates.

✓R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix;

✓R10 Other problems or anomalies.

✓The exception Report for every "No" or "Not Reviewed (NR)" item IN laboratory review checklist.

Release statement: I am responsible for the release of this laboratory data package. This data package has been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exceptions reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratoy in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: [✓] This laboratory is an in-house laboratory controlled by the person repsonding to rule. The official signing the cover page of the rule-required report (for example, the APAR) in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

MIKE D. ALBERTSON		Volatiles Lab Supervisor	November 2, 2007
Name (Printed)	Signature	Official Title (printed)	DATE

RG-366/TRRP-13 December 2002 A1

KEMRON Environmental Services
Laboratory Review Checklist

Laboratory Name:	KEMRON
Laboratory Log Number:	L0710597
Project Name:	798-LONGHORN
Method:	8260B
Prep Batch Number(s):	253794, 253910, 254006, 253678, 253819, 253919, 254048
Reviewer Name:	MIKE D. ALBERTSON
LRC Date:	November 02, 2007

Description	Yes	No	NA(1)	NR(2)	ER(3)
Chain-Of-Custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	✓				
Were all departures from standard conditions described in an exception report?	✓				
Sample and quality control (QC) identification					
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	✓				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	✓				
Test reports					
Were all samples prepared and analyzed within holding times?	✓				
Other than those results <MQL, were all other raw values bracketed by calibration standards?	✓				
Were calculations checked by a peer or supervisor?	✓				
Were all analyte identifications checked by a peer or supervisor?	✓				
Were sample quantitation limits reported for all analytes not detected?	✓				
Were all results for soil and sediment samples reported on a dry weight basis?	✓				
Were % moisture (or solids) reported for all soil and sediment samples?	✓				
If required for the project, TICs reported?			✓		
Surrogate recovery data					
Were surrogates added prior to extraction?	✓				
Were surrogate percent recoveries in all samples within the laboratory QC limits?		✓			1,2
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	✓				
Were blanks analyzed at the appropriate frequency?	✓				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	✓				
Were blank concentrations <MQL?	✓				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	✓				
Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	✓				
Were LCSs analyzed at the required frequency?	✓				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?		✓			2
Does the detectability data document the laboratorys capability to detect the COCs at the MDL used to calculate the SQLs?	✓				
Was the LCSD RPD within QC limits?		✓			2
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			✓		
Were MS/MSD analyzed at the appropriate frequency?			✓		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			✓		

Description	Yes	No	NA(1)	NR(2)	ER(3)
Were MS/MSD RPDs within laboratory QC limits?			✓		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			✓		
Were analytical duplicates analyzed at the appropriate frequency?			✓		
Were RPDs or relative standard deviations within the laboratory QC limits?			✓		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	✓				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	✓				
Are unadjusted MQLs included in the laboratory data package?	✓				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	✓				4
Were all necessary corrective actions performed for the reported data?	✓				
Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	✓				
ICAL					
Were response factors and/or relative response factors for each analyte within QC limits?	✓				
Were percent RSDs or correlation coefficient criteria met?	✓				
Was the number of standards recommended in the method used for all analytes?	✓				
Were all points generated between the lowest and highest standard used to calculate the curve?	✓				
Are ICAL data available for all instruments used?	✓				
Has the initial calibration curve been verified using an appropriate second source standard?	✓				
Initial and continuing calibration verification (ICV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	✓				
Were percent differences for each analyte within the method-required QC limits?	✓				
Was the ICAL curve verified for each analyte?		✓			3
Was the absolute value of the analyte concentration in the inorganic CCB <MDL?			✓		
Mass spectral tuning:					
Was the appropriate compound for the method used for tuning?	✓				
Were ion abundance data within the method-required QC limits?	✓				
Internal standards (IS):					
Were IS area counts and retention times within the method-required QC limits?	✓				
Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section 4.12.2)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	✓				
Were data associated with manual integrations flagged on the raw data?	✓				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			✓		
Tentatively identified compounds (TICs):					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			✓		
Interference Check Sample (ICS) results:					
Were percent recoveries within method QC limits?			✓		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			✓		
Method detection limit (MDL) studies					
Was a MDL study performed for each reported analyte?	✓				
Is the MDL either adjusted or supported by the analysis of DCSs?	✓				
Proficiency test reports:					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	✓				

00072962

Description	Yes	No	NA(1)	NR(2)	ER(3)
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	✓				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	✓				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	✓				
Is documentation of the analyst's competency up-to-date and on file?	✓				
Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	✓				
Laboratory standard operating procedures (SOPs):					
Are laboratory SOPs current and on file for each method performed?	✓				

00072963

EXCEPTIONS REPORT

ER# - Description

#1: 1,2-Dichloroethane-d4 was below the lower control limit in the analysis of sample 11 and exceeded the upper control limit in the dilution analysis of sample 09. Toluene-d8 was below the lower control limit in the analysis of sample 09. Toluene-d8 was below the lower control limit in the method blank analyzed 10/24/07 on HPMS-11. 1,2-Dichloroethane-d4 was below the lower control limit in the LCS/LCSD analzyed 10/25/07 on HPMS-6.

#2: MTBE exceeded the upper advisory limit in the LCS/LCSDs analyzed 10/25/07 on HPMS-10 and 10/26/07 on HPMS-6. Methyl acetate and MTBE exceeded the upper advisory limits in the LCS/LCSD analyzed 10/24/07 on HPMS-11. The % recoveries for methyl acetate and MTBE and the RPD for 1,2-dibromo-3-chloropropane exceeded the upper advisory limits in the LCS/LCSD analyzed 10/26/07 on HPMS-10. Methyl acetate and MTBE exceeded the upper advisory limits in the LCS analyzed 10/29/07 on HPMS-8.

#3: Methyl acetate exceeded the upper control limit in the alternate source analyzed 10/01/07 on HPMS-11.

#4: The result for trichloroethene in the un-diluted analysis of sample 09 may be bias high due to possible carry-over contamination from a previous analysis. Un-diluted reanalysis of sample 09 was not performed due to the amount of 1,1,2-trichloro-1,2,2-trifluoroethane present.

Footnotes:

(1) NA = Not applicable to method or project

(2) NR = Not reviewed

(3) ER# = Exception report number

2.1 Volatiles Data

2.1.1 Volatiles GCMS Data (8260)

2.1.1.1 Summary Data

LABORATORY REPORT

00072967

L0710597

11/02/07 15:18

Submitted By

KEMRON Environmental Services
156 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: Shaw E & I, Inc.
ABB Lummus Biulding
3010 Briarpark Drive Suite 4N
Houston, TX 77042
Attention: Larry Duty

Account Number: 2773
Work ID: LHAAP

P.O. Number: 322255 OP

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
47WW18-101807	L0710597-05	8260B	1	23-OCT-07
47WW18-101807-DUP	L0710597-06	8260B	1	23-OCT-07
47WW32-101807	L0710597-07	8260B	1	23-OCT-07
47WW30-101807	L0710597-08	8260B	1	23-OCT-07
47WW30-101807	L0710597-08	8260B	25	23-OCT-07
47WW36-101907	L0710597-09	8260B	1	23-OCT-07
47WW36-101907	L0710597-09	8260B	5	23-OCT-07
47WW31-101807	L0710597-10	8260B	1	23-OCT-07
47WW25-101607	L0710597-11	8260B	1	23-OCT-07
47WW25-101607	L0710597-11	8260B	100	23-OCT-07
47WW25-101607	L0710597-11	8260B	500	23-OCT-07
LHSMW34-101807	L0710597-12	8260B	2	23-OCT-07
EQUIPMENT RINSE #1	L0710597-13	8260B	1	23-OCT-07
TRIP BLANK	L0710597-14	8260B	1	23-OCT-07

Report Number: **L0710597**
Report Date : **November 2, 2007**

00072968

Sample Number: **L0710597-05**
Client ID: **47WW18-101807**
Matrix: **Water**
Workgroup Number: **WG253794**
Collect Date: **10/18/2007 08:45**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **MES**
Dilution: **1**
Units: **ug/L**

Instrument: **HPMS10**
Prep Date: **10/25/2007 18:23**
Cal Date: **10/18/2007 16:51**
Run Date: **10/25/2007 18:23**
File ID: **10M59870**

Analyte	CAS. Number	Result	Qual	PQL	SDL
1,1,1-Trichloroethane	71-55-6		U	1.00	0.250
1,1,2,2-Tetrachloroethane	79-34-5		U	1.00	0.125
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1		U	5.00	0.250
1,1,2-Trichloroethane	79-00-5		U	1.00	0.250
1,1-Dichloroethane	75-34-3		U	1.00	0.125
1,1-Dichloroethene	75-35-4	0.756	J	1.00	0.500
1,2,4-Trichlorobenzene	120-82-1		U	1.00	0.200
1,2-Dibromo-3-chloropropane	96-12-8		U	5.00	1.00
1,2-Dibromoethane	106-93-4		U	1.00	0.250
1,2-Dichlorobenzene	95-50-1		U	1.00	0.125
1,2-Dichloroethane	107-06-2		U	1.00	0.250
cis-1,2-Dichloroethene	156-59-2	5.61		1.00	0.250
trans-1,2-Dichloroethene	156-60-5		U	1.00	0.250
1,2-Dichloropropane	78-87-5		U	1.00	0.200
1,3-Dichlorobenzene	541-73-1		U	1.00	0.250
1,4-Dichlorobenzene	106-46-7		U	1.00	0.125
2-Butanone	78-93-3		U	10.0	2.50
2-Hexanone	591-78-6		U	10.0	2.50
4-Methyl-2-pentanone	108-10-1		U	10.0	2.50
Acetone	67-64-1		U	10.0	2.50
Benzene	71-43-2		U	1.00	0.125
Bromodichloromethane	75-27-4		U	1.00	0.250
Bromoform	75-25-2		U	1.00	0.500
Bromomethane	74-83-9		U	1.00	0.500
Carbon disulfide	75-15-0		U	1.00	0.500
Carbon tetrachloride	56-23-5		U	1.00	0.250
Chlorobenzene	108-90-7		U	1.00	0.125
Chloroethane	75-00-3		U	1.00	0.500
Chloroform	67-66-3		U	1.00	0.125
Chloromethane	74-87-3		U	1.00	0.250
cis-1,3-Dichloropropene	10061-01-5		U	1.00	0.250
Cyclohexane	110-82-7		U	5.00	0.250
Dibromochloromethane	124-48-1		U	1.00	0.250
Dichlorodifluoromethane	75-71-8		U	1.00	0.250
Ethyl benzene	100-41-4		U	1.00	0.250
Isopropylbenzene	98-82-8		U	1.00	0.250
Methyl acetate	79-20-9		U	10.0	0.250
Methyl tert-butyl ether	1634-04-4		U	5.00	0.500
Methylcyclohexane	108-87-2		U	10.0	0.250
Methylene chloride	75-09-2		U	2.00	0.250
Styrene	100-42-5		U	1.00	0.125
Tetrachloroethene	127-18-4		U	1.00	0.250
Toluene	108-88-3		U	1.00	0.250
trans-1,3-Dichloropropene	10061-02-6		U	1.00	0.500
Trichloroethene	79-01-6	147		1.00	0.250
Trichlorofluoromethane	75-69-4		U	1.00	0.250
Vinyl chloride	75-01-4	0.575	J	1.00	0.250
Xylenes, Total	1330-20-7		U	1.00	0.500

Sample Number: L0710597-05
Client ID: 47WW18-101807
Matrix: Water
Workgroup Number: WG253794
Collect Date: 10/18/2007 08:45
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 5030B
Analytical Method: 8260B
Analyst: MES
Dilution: 1
Units: ug/L

Instrument: HPMS10
Prep Date: 10/25/2007 18:23
Cal Date: 10/18/2007 16:51
Run Date: 10/25/2007 18:23
File ID: 10M59870

Surrogate	% Recovery	Lower	Upper	Qual
1,2-Dichloroethane-d4	112	80	120	
Dibromofluoromethane	110	86	118	
p-Bromofluorobenzene	103	86	115	
Toluene-d8	98.1	88	110	

U Not detected at or above adjusted sample detection limit
J The analyte was positively identified, but the quantitation was below the RL

Report Number: **L0710597**
Report Date : **November 2, 2007**

00072970

Sample Number: **L0710597-06**
Client ID: **47WW18-101807-DUP**
Matrix: **Water**
Workgroup Number: **WG253794**
Collect Date: **10/18/2007 08:45**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **MES**
Dilution: **1**
Units: **ug/L**

Instrument: **HPMS10**
Prep Date: **10/25/2007 18:54**
Cal Date: **10/18/2007 16:51**
Run Date: **10/25/2007 18:54**
File ID: **10M59871**

Analyte	CAS. Number	Result	Qual	PQL	SDL
1,1,1-Trichloroethane	71-55-6		U	1.00	0.250
1,1,2,2-Tetrachloroethane	79-34-5		U	1.00	0.125
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1		U	5.00	0.250
1,1,2-Trichloroethane	79-00-5		U	1.00	0.250
1,1-Dichloroethane	75-34-3		U	1.00	0.125
1,1-Dichloroethene	75-35-4	0.680	J	1.00	0.500
1,2,4-Trichlorobenzene	120-82-1		U	1.00	0.200
1,2-Dibromo-3-chloropropane	96-12-8		U	5.00	1.00
1,2-Dibromoethane	106-93-4		U	1.00	0.250
1,2-Dichlorobenzene	95-50-1		U	1.00	0.125
1,2-Dichloroethane	107-06-2		U	1.00	0.250
cis-1,2-Dichloroethene	156-59-2	5.40		1.00	0.250
trans-1,2-Dichloroethene	156-60-5		U	1.00	0.250
1,2-Dichloropropane	78-87-5		U	1.00	0.200
1,3-Dichlorobenzene	541-73-1		U	1.00	0.250
1,4-Dichlorobenzene	106-46-7		U	1.00	0.125
2-Butanone	78-93-3		U	10.0	2.50
2-Hexanone	591-78-6		U	10.0	2.50
4-Methyl-2-pentanone	108-10-1		U	10.0	2.50
Acetone	67-64-1		U	10.0	2.50
Benzene	71-43-2		U	1.00	0.125
Bromodichloromethane	75-27-4		U	1.00	0.250
Bromoform	75-25-2		U	1.00	0.500
Bromomethane	74-83-9		U	1.00	0.500
Carbon disulfide	75-15-0		U	1.00	0.500
Carbon tetrachloride	56-23-5		U	1.00	0.250
Chlorobenzene	108-90-7		U	1.00	0.125
Chloroethane	75-00-3		U	1.00	0.500
Chloroform	67-66-3		U	1.00	0.125
Chloromethane	74-87-3		U	1.00	0.250
cis-1,3-Dichloropropene	10061-01-5		U	1.00	0.250
Cyclohexane	110-82-7		U	5.00	0.250
Dibromochloromethane	124-48-1		U	1.00	0.250
Dichlorodifluoromethane	75-71-8		U	1.00	0.250
Ethyl benzene	100-41-4		U	1.00	0.250
Isopropylbenzene	98-82-8		U	1.00	0.250
Methyl acetate	79-20-9		U	10.0	0.250
Methyl tert-butyl ether	1634-04-4		U	5.00	0.500
Methylcyclohexane	108-87-2		U	10.0	0.250
Methylene chloride	75-09-2		U	2.00	0.250
Styrene	100-42-5		U	1.00	0.125
Tetrachloroethene	127-18-4		U	1.00	0.250
Toluene	108-88-3		U	1.00	0.250
trans-1,3-Dichloropropene	10061-02-6		U	1.00	0.500
Trichloroethene	79-01-6	134		1.00	0.250
Trichlorofluoromethane	75-69-4		U	1.00	0.250
Vinyl chloride	75-01-4	0.520	J	1.00	0.250
Xylenes, Total	1330-20-7		U	1.00	0.500

Sample Number: L0710597-06
Client ID: 47WW18-101807-DUP
Matrix: Water
Workgroup Number: WG253794
Collect Date: 10/18/2007 08:45
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 5030B
Analytical Method: 8260B
Analyst: MES
Dilution: 1
Units: ug/L

Instrument: HPMS10
Prep Date: 10/25/2007 18:54
Cal Date: 10/18/2007 16:51
Run Date: 10/25/2007 18:54
File ID: 10M59871

Surrogate	% Recovery	Lower	Upper	Qual
1,2-Dichloroethane-d4	115	80	120	
Dibromofluoromethane	110	86	118	
p-Bromofluorobenzene	97.5	86	115	
Toluene-d8	97.3	88	110	

U Not detected at or above adjusted sample detection limit
J The analyte was positively identified, but the quantitation was below the RL

Report Number: **L0710597**
Report Date : **November 2, 2007**

00072972

Sample Number: **L0710597-07**
Client ID: **47WW32-101807**
Matrix: **Water**
Workgroup Number: **WG254006**
Collect Date: **10/18/2007 14:45**
Sample Tag: **02**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **MES**
Dilution: **1**
Units: **ug/L**

Instrument: **HPMS10**
Prep Date: **10/27/2007 14:37**
Cal Date: **10/18/2007 16:51**
Run Date: **10/27/2007 14:37**
File ID: **10M59920**

Analyte	CAS. Number	Result	Qual	PQL	SDL
1,1,1-Trichloroethane	71-55-6		U	1.00	0.250
1,1,2,2-Tetrachloroethane	79-34-5		U	1.00	0.125
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1		U	5.00	0.250
1,1,2-Trichloroethane	79-00-5		U	1.00	0.250
1,1-Dichloroethane	75-34-3		U	1.00	0.125
1,1-Dichloroethene	75-35-4	0.632	J	1.00	0.500
1,2,4-Trichlorobenzene	120-82-1		U	1.00	0.200
1,2-Dibromo-3-chloropropane	96-12-8		U	5.00	1.00
1,2-Dibromoethane	106-93-4		U	1.00	0.250
1,2-Dichlorobenzene	95-50-1		U	1.00	0.125
1,2-Dichloroethane	107-06-2		U	1.00	0.250
cis-1,2-Dichloroethene	156-59-2	0.698	J	1.00	0.250
trans-1,2-Dichloroethene	156-60-5		U	1.00	0.250
1,2-Dichloropropane	78-87-5		U	1.00	0.200
1,3-Dichlorobenzene	541-73-1		U	1.00	0.250
1,4-Dichlorobenzene	106-46-7		U	1.00	0.125
2-Butanone	78-93-3		U	10.0	2.50
2-Hexanone	591-78-6		U	10.0	2.50
4-Methyl-2-pentanone	108-10-1		U	10.0	2.50
Acetone	67-64-1		U	10.0	2.50
Benzene	71-43-2		U	1.00	0.125
Bromodichloromethane	75-27-4		U	1.00	0.250
Bromoform	75-25-2		U	1.00	0.500
Bromomethane	74-83-9		U	1.00	0.500
Carbon disulfide	75-15-0		U	1.00	0.500
Carbon tetrachloride	56-23-5		U	1.00	0.250
Chlorobenzene	108-90-7		U	1.00	0.125
Chloroethane	75-00-3		U	1.00	0.500
Chloroform	67-66-3		U	1.00	0.125
Chloromethane	74-87-3		U	1.00	0.250
cis-1,3-Dichloropropene	10061-01-5		U	1.00	0.250
Cyclohexane	110-82-7		U	5.00	0.250
Dibromochloromethane	124-48-1		U	1.00	0.250
Dichlorodifluoromethane	75-71-8		U	1.00	0.250
Ethyl benzene	100-41-4		U	1.00	0.250
Isopropylbenzene	98-82-8		U	1.00	0.250
Methyl acetate	79-20-9		U	10.0	0.250
Methyl tert-butyl ether	1634-04-4		U	5.00	0.500
Methylcyclohexane	108-87-2		U	10.0	0.250
Methylene chloride	75-09-2		U	2.00	0.250
Styrene	100-42-5		U	1.00	0.125
Tetrachloroethene	127-18-4		U	1.00	0.250
Toluene	108-88-3		U	1.00	0.250
trans-1,3-Dichloropropene	10061-02-6		U	1.00	0.500
Trichloroethene	79-01-6	34.0		1.00	0.250
Trichlorofluoromethane	75-69-4		U	1.00	0.250
Vinyl chloride	75-01-4	0.302	J	1.00	0.250
Xylenes, Total	1330-20-7		U	1.00	0.500

Sample Number: L0710597-07
Client ID: 47WW32-101807
Matrix: Water
Workgroup Number: WG254006
Collect Date: 10/18/2007 14:45
Sample Tag: 02

PrePrep Method: NONE
Prep Method: 5030B
Analytical Method: 8260B
Analyst: MES
Dilution: 1
Units: ug/L

Instrument: HPMS10
Prep Date: 10/27/2007 14:37
Cal Date: 10/18/2007 16:51
Run Date: 10/27/2007 14:37
File ID: 10M59920

Surrogate	% Recovery	Lower	Upper	Qual
1,2-Dichloroethane-d4	115	80	120	
Dibromofluoromethane	108	86	118	
p-Bromofluorobenzene	101	86	115	
Toluene-d8	99.8	88	110	

U Not detected at or above adjusted sample detection limit
J The analyte was positively identified, but the quantitation was below the RL

Report Number: **L0710597**
Report Date : **November 2, 2007**

00072974

Sample Number: **L0710597-08**
Client ID: **47WW30-101807**
Matrix: **Water**
Workgroup Number: **WG253794**
Collect Date: **10/18/2007 10:32**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **MES**
Dilution: **1**
Units: **ug/L**

Instrument: **HPMS10**
Prep Date: **10/25/2007 19:26**
Cal Date: **10/18/2007 16:51**
Run Date: **10/25/2007 19:26**
File ID: **10M59872**

Analyte	CAS. Number	Result	Qual	PQL	SDL
1,1,1-Trichloroethane	71-55-6		U	1.00	0.250
1,1,2,2-Tetrachloroethane	79-34-5		U	1.00	0.125
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1		U	5.00	0.250
1,1,2-Trichloroethane	79-00-5		U	1.00	0.250
1,1-Dichloroethane	75-34-3		U	1.00	0.125
1,1-Dichloroethene	75-35-4	1.94		1.00	0.500
1,2,4-Trichlorobenzene	120-82-1		U	1.00	0.200
1,2-Dibromo-3-chloropropane	96-12-8		U	5.00	1.00
1,2-Dibromoethane	106-93-4		U	1.00	0.250
1,2-Dichlorobenzene	95-50-1		U	1.00	0.125
1,2-Dichloroethane	107-06-2		U	1.00	0.250
cis-1,2-Dichloroethene	156-59-2	10.4		1.00	0.250
trans-1,2-Dichloroethene	156-60-5	0.336	J	1.00	0.250
1,2-Dichloropropane	78-87-5		U	1.00	0.200
1,3-Dichlorobenzene	541-73-1		U	1.00	0.250
1,4-Dichlorobenzene	106-46-7		U	1.00	0.125
2-Butanone	78-93-3		U	10.0	2.50
2-Hexanone	591-78-6		U	10.0	2.50
4-Methyl-2-pentanone	108-10-1		U	10.0	2.50
Acetone	67-64-1		U	10.0	2.50
Benzene	71-43-2		U	1.00	0.125
Bromodichloromethane	75-27-4		U	1.00	0.250
Bromoform	75-25-2		U	1.00	0.500
Bromomethane	74-83-9		U	1.00	0.500
Carbon disulfide	75-15-0		U	1.00	0.500
Carbon tetrachloride	56-23-5		U	1.00	0.250
Chlorobenzene	108-90-7		U	1.00	0.125
Chloroethane	75-00-3		U	1.00	0.500
Chloroform	67-66-3		U	1.00	0.125
Chloromethane	74-87-3		U	1.00	0.250
cis-1,3-Dichloropropene	10061-01-5		U	1.00	0.250
Cyclohexane	110-82-7		U	5.00	0.250
Dibromochloromethane	124-48-1		U	1.00	0.250
Dichlorodifluoromethane	75-71-8		U	1.00	0.250
Ethyl benzene	100-41-4		U	1.00	0.250
Isopropylbenzene	98-82-8		U	1.00	0.250
Methyl acetate	79-20-9		U	10.0	0.250
Methyl tert-butyl ether	1634-04-4		U	5.00	0.500
Methylcyclohexane	108-87-2		U	10.0	0.250
Methylene chloride	75-09-2		U	2.00	0.250
Styrene	100-42-5		U	1.00	0.125
Tetrachloroethene	127-18-4		U	1.00	0.250
Toluene	108-88-3		U	1.00	0.250
trans-1,3-Dichloropropene	10061-02-6		U	1.00	0.500
Trichloroethene	79-01-6	1620	I	1.00	0.250
Trichlorofluoromethane	75-69-4		U	1.00	0.250
Vinyl chloride	75-01-4	0.747	J	1.00	0.250
Xylenes, Total	1330-20-7		U	1.00	0.500

Sample Number: L0710597-08
Client ID: 47WW30-101807
Matrix: Water
Workgroup Number: WG253794
Collect Date: 10/18/2007 10:32
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 5030B
Analytical Method: 8260B
Analyst: MES
Dilution: 1
Units: ug/L

Instrument: HPMS10
Prep Date: 10/25/2007 19:26
Cal Date: 10/18/2007 16:51
Run Date: 10/25/2007 19:26
File ID: 10M59872

Surrogate	% Recovery	Lower	Upper	Qual
1,2-Dichloroethane-d4	114	80	120	
Dibromofluoromethane	109	86	118	
p-Bromofluorobenzene	97.1	86	115	
Toluene-d8	95.0	88	110	

U Not detected at or above adjusted sample detection limit
J The analyte was positively identified, but the quantitation was below the RL
I Semiquantitative result (out of instrument calibration range)

Report Number: **L0710597**
Report Date : **November 2, 2007**

00072976

Sample Number: **L0710597-08**
Client ID: **47WW30-101807**
Matrix: **Water**
Workgroup Number: **WG253910**
Collect Date: **10/18/2007 10:32**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **MES**
Dilution: **25**
Units: **ug/L**

Instrument: **HPMS10**
Prep Date: **10/26/2007 14:04**
Cal Date: **10/18/2007 16:51**
Run Date: **10/26/2007 14:04**
File ID: **10M59889**

Analyte	CAS. Number	Result	Qual	PQL	SDL
1,1,1-Trichloroethane	71-55-6		U	25.0	6.25
1,1,2,2-Tetrachloroethane	79-34-5		U	25.0	3.13
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1		U	125	6.25
1,1,2-Trichloroethane	79-00-5		U	25.0	6.25
1,1-Dichloroethane	75-34-3		U	25.0	3.13
1,1-Dichloroethene	75-35-4		U	25.0	12.5
1,2,4-Trichlorobenzene	120-82-1		U	25.0	5.00
1,2-Dibromo-3-chloropropane	96-12-8		U	125	25.0
1,2-Dibromoethane	106-93-4		U	25.0	6.25
1,2-Dichlorobenzene	95-50-1		U	25.0	3.13
1,2-Dichloroethane	107-06-2		U	25.0	6.25
cis-1,2-Dichloroethene	156-59-2	9.88	J	25.0	6.25
trans-1,2-Dichloroethene	156-60-5		U	25.0	6.25
1,2-Dichloropropane	78-87-5		U	25.0	5.00
1,3-Dichlorobenzene	541-73-1		U	25.0	6.25
1,4-Dichlorobenzene	106-46-7		U	25.0	3.13
2-Butanone	78-93-3		U	250	62.5
2-Hexanone	591-78-6		U	250	62.5
4-Methyl-2-pentanone	108-10-1		U	250	62.5
Acetone	67-64-1		U	250	62.5
Benzene	71-43-2		U	25.0	3.13
Bromodichloromethane	75-27-4		U	25.0	6.25
Bromoform	75-25-2		U	25.0	12.5
Bromomethane	74-83-9		U	25.0	12.5
Carbon disulfide	75-15-0		U	25.0	12.5
Carbon tetrachloride	56-23-5		U	25.0	6.25
Chlorobenzene	108-90-7		U	25.0	3.13
Chloroethane	75-00-3		U	25.0	12.5
Chloroform	67-66-3		U	25.0	3.13
Chloromethane	74-87-3		U	25.0	6.25
cis-1,3-Dichloropropene	10061-01-5		U	25.0	6.25
Cyclohexane	110-82-7		U	125	6.25
Dibromochloromethane	124-48-1		U	25.0	6.25
Dichlorodifluoromethane	75-71-8		U	25.0	6.25
Ethyl benzene	100-41-4		U	25.0	6.25
Isopropylbenzene	98-82-8		U	25.0	6.25
Methyl acetate	79-20-9		U	250	6.25
Methyl tert-butyl ether	1634-04-4		U	125	12.5
Methylcyclohexane	108-87-2		U	250	6.25
Methylene chloride	75-09-2		U	50.0	6.25
Styrene	100-42-5		U	25.0	3.13
Tetrachloroethene	127-18-4		U	25.0	6.25
Toluene	108-88-3		U	25.0	6.25
trans-1,3-Dichloropropene	10061-02-6		U	25.0	12.5
Trichloroethene	79-01-6	1370		25.0	6.25
Trichlorofluoromethane	75-69-4		U	25.0	6.25
Vinyl chloride	75-01-4		U	25.0	6.25
Xylenes, Total	1330-20-7		U	25.0	12.5

Sample Number: L0710597-08
Client ID: 47WW30-101807
Matrix: Water
Workgroup Number: WG253910
Collect Date: 10/18/2007 10:32
Sample Tag: DL01

PrePrep Method: NONE
Prep Method: 5030B
Analytical Method: 8260B
Analyst: MES
Dilution: 25
Units: ug/L

Instrument: HPMS10
Prep Date: 10/26/2007 14:04
Cal Date: 10/18/2007 16:51
Run Date: 10/26/2007 14:04
File ID: 10M59889

Surrogate	% Recovery	Lower	Upper	Qual
1,2-Dichloroethane-d4	92.7	80	120	
Dibromofluoromethane	96.4	86	118	
p-Bromofluorobenzene	101	86	115	
Toluene-d8	98.0	88	110	

U Not detected at or above adjusted sample detection limit
J The analyte was positively identified, but the quantitation was below the RL

Report Number: **L0710597**
Report Date : **November 2, 2007**

00072978

Sample Number: **L0710597-09**
Client ID: **47WW36-101907**
Matrix: **Water**
Workgroup Number: **WG253678**
Collect Date: **10/19/2007 09:55**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **MES**
Dilution: **1**
Units: **ug/L**

Instrument: **HPMS11**
Prep Date: **10/24/2007 17:54**
Cal Date: **10/01/2007 15:48**
Run Date: **10/24/2007 17:54**
File ID: **11M46867**

Analyte	CAS. Number	Result	Qual	PQL	SDL
1,1,1-Trichloroethane	71-55-6		U	1.00	0.250
1,1,2,2-Tetrachloroethane	79-34-5		U	1.00	0.125
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	603	I	5.00	0.250
1,1,2-Trichloroethane	79-00-5		U	1.00	0.250
1,1-Dichloroethane	75-34-3		U	1.00	0.125
1,1-Dichloroethene	75-35-4		U	1.00	0.500
1,2,4-Trichlorobenzene	120-82-1		U	1.00	0.200
1,2-Dibromo-3-chloropropane	96-12-8		U	5.00	1.00
1,2-Dibromoethane	106-93-4		U	1.00	0.250
1,2-Dichlorobenzene	95-50-1		U	1.00	0.125
1,2-Dichloroethane	107-06-2		U	1.00	0.250
cis-1,2-Dichloroethene	156-59-2		U	1.00	0.250
trans-1,2-Dichloroethene	156-60-5		U	1.00	0.250
1,2-Dichloropropane	78-87-5		U	1.00	0.200
1,3-Dichlorobenzene	541-73-1		U	1.00	0.250
1,4-Dichlorobenzene	106-46-7		U	1.00	0.125
2-Butanone	78-93-3		U	10.0	2.50
2-Hexanone	591-78-6		U	10.0	2.50
4-Methyl-2-pentanone	108-10-1		U	10.0	2.50
Acetone	67-64-1		U	10.0	2.50
Benzene	71-43-2		U	1.00	0.125
Bromodichloromethane	75-27-4		U	1.00	0.250
Bromoform	75-25-2		U	1.00	0.500
Bromomethane	74-83-9		U	1.00	0.500
Carbon disulfide	75-15-0		U	1.00	0.500
Carbon tetrachloride	56-23-5		U	1.00	0.250
Chlorobenzene	108-90-7		U	1.00	0.125
Chloroethane	75-00-3		U	1.00	0.500
Chloroform	67-66-3		U	1.00	0.125
Chloromethane	74-87-3		U	1.00	0.250
cis-1,3-Dichloropropene	10061-01-5		U	1.00	0.250
Cyclohexane	110-82-7		U	5.00	0.250
Dibromochloromethane	124-48-1		U	1.00	0.250
Dichlorodifluoromethane	75-71-8		U	1.00	0.250
Ethyl benzene	100-41-4		U	1.00	0.250
Isopropylbenzene	98-82-8		U	1.00	0.250
Methyl acetate	79-20-9		U	10.0	0.250
Methyl tert-butyl ether	1634-04-4		U	5.00	0.500
Methylcyclohexane	108-87-2		U	10.0	0.250
Methylene chloride	75-09-2		U	2.00	0.250
Styrene	100-42-5		U	1.00	0.125
Tetrachloroethene	127-18-4		U	1.00	0.250
Toluene	108-88-3		U	1.00	0.250
trans-1,3-Dichloropropene	10061-02-6		U	1.00	0.500
Trichloroethene	79-01-6	0.799	J	1.00	0.250
Trichlorofluoromethane	75-69-4		U	1.00	0.250
Vinyl chloride	75-01-4		U	1.00	0.250
Xylenes, Total	1330-20-7		U	1.00	0.500

Sample Number: L0710597-09
Client ID: 47WW36-101907
Matrix: Water
Workgroup Number: WG253678
Collect Date: 10/19/2007 09:55
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 5030B
Analytical Method: 8260B
Analyst: MES
Dilution: 1
Units: ug/L

Instrument: HPMS11
Prep Date: 10/24/2007 17:54
Cal Date: 10/01/2007 15:48
Run Date: 10/24/2007 17:54
File ID: 11M46867

Surrogate	% Recovery	Lower	Upper	Qual
1,2-Dichloroethane-d4	93.9	80	120	
Dibromofluoromethane	92.0	86	118	
p-Bromofluorobenzene	90.4	86	115	
Toluene-d8	87.1	88	110	*

U Not detected at or above adjusted sample detection limit
J The analyte was positively identified, but the quantitation was below the RL
* Surrogate or spike compound out of range
I Semiquantitative result (out of instrument calibration range)

Report Number: **L0710597**
Report Date : **November 2, 2007**

00072980

Sample Number: **L0710597-09**
Client ID: **47WW36-101907**
Matrix: **Water**
Workgroup Number: **WG254006**
Collect Date: **10/19/2007 09:55**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **MES**
Dilution: **5**
Units: **ug/L**

Instrument: **HPMS10**
Prep Date: **10/27/2007 17:19**
Cal Date: **10/18/2007 16:51**
Run Date: **10/27/2007 17:19**
File ID: **10M59925**

Analyte	CAS. Number	Result	Qual	PQL	SDL
1,1,1-Trichloroethane	71-55-6		U	5.00	1.25
1,1,2,2-Tetrachloroethane	79-34-5		U	5.00	0.625
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	606		25.0	1.25
1,1,2-Trichloroethane	79-00-5		U	5.00	1.25
1,1-Dichloroethane	75-34-3		U	5.00	0.625
1,1-Dichloroethene	75-35-4		U	5.00	2.50
1,2,4-Trichlorobenzene	120-82-1		U	5.00	1.00
1,2-Dibromo-3-chloropropane	96-12-8		U	25.0	5.00
1,2-Dibromoethane	106-93-4		U	5.00	1.25
1,2-Dichlorobenzene	95-50-1		U	5.00	0.625
1,2-Dichloroethane	107-06-2		U	5.00	1.25
cis-1,2-Dichloroethene	156-59-2		U	5.00	1.25
trans-1,2-Dichloroethene	156-60-5		U	5.00	1.25
1,2-Dichloropropane	78-87-5		U	5.00	1.00
1,3-Dichlorobenzene	541-73-1		U	5.00	1.25
1,4-Dichlorobenzene	106-46-7		U	5.00	0.625
2-Butanone	78-93-3		U	50.0	12.5
2-Hexanone	591-78-6		U	50.0	12.5
4-Methyl-2-pentanone	108-10-1		U	50.0	12.5
Acetone	67-64-1		U	50.0	12.5
Benzene	71-43-2		U	5.00	0.625
Bromodichloromethane	75-27-4		U	5.00	1.25
Bromoform	75-25-2		U	5.00	2.50
Bromomethane	74-83-9		U	5.00	2.50
Carbon disulfide	75-15-0		U	5.00	2.50
Carbon tetrachloride	56-23-5		U	5.00	1.25
Chlorobenzene	108-90-7		U	5.00	0.625
Chloroethane	75-00-3		U	5.00	2.50
Chloroform	67-66-3		U	5.00	0.625
Chloromethane	74-87-3		U	5.00	1.25
cis-1,3-Dichloropropene	10061-01-5		U	5.00	1.25
Cyclohexane	110-82-7		U	25.0	1.25
Dibromochloromethane	124-48-1		U	5.00	1.25
Dichlorodifluoromethane	75-71-8		U	5.00	1.25
Ethyl benzene	100-41-4		U	5.00	1.25
Isopropylbenzene	98-82-8		U	5.00	1.25
Methyl acetate	79-20-9		U	50.0	1.25
Methyl tert-butyl ether	1634-04-4		U	25.0	2.50
Methylcyclohexane	108-87-2		U	50.0	1.25
Methylene chloride	75-09-2		U	10.0	1.25
Styrene	100-42-5		U	5.00	0.625
Tetrachloroethene	127-18-4		U	5.00	1.25
Toluene	108-88-3		U	5.00	1.25
trans-1,3-Dichloropropene	10061-02-6		U	5.00	2.50
Trichloroethene	79-01-6		U	5.00	1.25
Trichlorofluoromethane	75-69-4		U	5.00	1.25
Vinyl chloride	75-01-4		U	5.00	1.25
Xylenes, Total	1330-20-7		U	5.00	2.50

Sample Number: L0710597-09
Client ID: 47WW36-101907
Matrix: Water
Workgroup Number: WG254006
Collect Date: 10/19/2007 09:55
Sample Tag: DL01

PrePrep Method: NONE
Prep Method: 5030B
Analytical Method: 8260B
Analyst: MES
Dilution: 5
Units: ug/L

Instrument: HPMS10
Prep Date: 10/27/2007 17:19
Cal Date: 10/18/2007 16:51
Run Date: 10/27/2007 17:19
File ID: 10M59925

Surrogate	% Recovery	Lower	Upper	Qual
1,2-Dichloroethane-d4	127	80	120	*
Dibromofluoromethane	116	86	118	
p-Bromofluorobenzene	101	86	115	
Toluene-d8	101	88	110	

U Not detected at or above adjusted sample detection limit
* Surrogate or spike compound out of range

Report Number: **L0710597**
Report Date : **November 2, 2007**

00072982

Sample Number: **L0710597-10**
Client ID: **47WW31-101807**
Matrix: **Water**
Workgroup Number: **WG253910**
Collect Date: **10/18/2007 11:50**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **MES**
Dilution: **1**
Units: **ug/L**

Instrument: **HPMS10**
Prep Date: **10/26/2007 19:55**
Cal Date: **10/18/2007 16:51**
Run Date: **10/26/2007 19:55**
File ID: **10M59900**

Analyte	CAS. Number	Result	Qual	PQL	SDL
1,1,1-Trichloroethane	71-55-6		U	1.00	0.250
1,1,2,2-Tetrachloroethane	79-34-5		U	1.00	0.125
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1		U	5.00	0.250
1,1,2-Trichloroethane	79-00-5		U	1.00	0.250
1,1-Dichloroethane	75-34-3		U	1.00	0.125
1,1-Dichloroethene	75-35-4		U	1.00	0.500
1,2,4-Trichlorobenzene	120-82-1		U	1.00	0.200
1,2-Dibromo-3-chloropropane	96-12-8		U	5.00	1.00
1,2-Dibromoethane	106-93-4		U	1.00	0.250
1,2-Dichlorobenzene	95-50-1		U	1.00	0.125
1,2-Dichloroethane	107-06-2		U	1.00	0.250
cis-1,2-Dichloroethene	156-59-2		U	1.00	0.250
trans-1,2-Dichloroethene	156-60-5		U	1.00	0.250
1,2-Dichloropropane	78-87-5		U	1.00	0.200
1,3-Dichlorobenzene	541-73-1		U	1.00	0.250
1,4-Dichlorobenzene	106-46-7		U	1.00	0.125
2-Butanone	78-93-3		U	10.0	2.50
2-Hexanone	591-78-6		U	10.0	2.50
4-Methyl-2-pentanone	108-10-1		U	10.0	2.50
Acetone	67-64-1		U	10.0	2.50
Benzene	71-43-2		U	1.00	0.125
Bromodichloromethane	75-27-4		U	1.00	0.250
Bromoform	75-25-2		U	1.00	0.500
Bromomethane	74-83-9		U	1.00	0.500
Carbon disulfide	75-15-0		U	1.00	0.500
Carbon tetrachloride	56-23-5		U	1.00	0.250
Chlorobenzene	108-90-7		U	1.00	0.125
Chloroethane	75-00-3		U	1.00	0.500
Chloroform	67-66-3		U	1.00	0.125
Chloromethane	74-87-3		U	1.00	0.250
cis-1,3-Dichloropropene	10061-01-5		U	1.00	0.250
Cyclohexane	110-82-7		U	5.00	0.250
Dibromochloromethane	124-48-1		U	1.00	0.250
Dichlorodifluoromethane	75-71-8		U	1.00	0.250
Ethyl benzene	100-41-4		U	1.00	0.250
Isopropylbenzene	98-82-8		U	1.00	0.250
Methyl acetate	79-20-9		U	10.0	0.250
Methyl tert-butyl ether	1634-04-4		U	5.00	0.500
Methylcyclohexane	108-87-2		U	10.0	0.250
Methylene chloride	75-09-2		U	2.00	0.250
Styrene	100-42-5		U	1.00	0.125
Tetrachloroethene	127-18-4		U	1.00	0.250
Toluene	108-88-3		U	1.00	0.250
trans-1,3-Dichloropropene	10061-02-6		U	1.00	0.500
Trichloroethene	79-01-6	0.329	J	1.00	0.250
Trichlorofluoromethane	75-69-4		U	1.00	0.250
Vinyl chloride	75-01-4		U	1.00	0.250
Xylenes, Total	1330-20-7		U	1.00	0.500

Sample Number: L0710597-10
Client ID: 47WW31-101807
Matrix: Water
Workgroup Number: WG253910
Collect Date: 10/18/2007 11:50
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 5030B
Analytical Method: 8260B
Analyst: MES
Dilution: 1
Units: ug/L

Instrument: HPMS10
Prep Date: 10/26/2007 19:55
Cal Date: 10/18/2007 16:51
Run Date: 10/26/2007 19:55
File ID: 10M59900

Surrogate	% Recovery	Lower	Upper	Qual
1,2-Dichloroethane-d4	120	80	120	
Dibromofluoromethane	110	86	118	
p-Bromofluorobenzene	103	86	115	
Toluene-d8	96.8	88	110	

U Not detected at or above adjusted sample detection limit
J The analyte was positively identified, but the quantitation was below the RL

Report Number: **L0710597**
Report Date : **November 2, 2007**

00072984

Sample Number: **L0710597-11**
Client ID: **47WW25-101607**
Matrix: **Water**
Workgroup Number: **WG253819**
Collect Date: **10/18/2007 09:00**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **MES**
Dilution: **1**
Units: **ug/L**

Instrument: **HPMS6**
Prep Date: **10/25/2007 14:54**
Cal Date: **10/24/2007 17:33**
Run Date: **10/25/2007 14:54**
File ID: **6M70263**

Analyte	CAS. Number	Result	Qual	PQL	SDL
1,1,1-Trichloroethane	71-55-6		U	1.00	0.250
1,1,2,2-Tetrachloroethane	79-34-5		U	1.00	0.125
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1		U	5.00	0.250
1,1,2-Trichloroethane	79-00-5		U	1.00	0.250
1,1-Dichloroethane	75-34-3	1.81		1.00	0.125
1,1-Dichloroethene	75-35-4	19.3		1.00	0.500
1,2,4-Trichlorobenzene	120-82-1		U	1.00	0.200
1,2-Dibromo-3-chloropropane	96-12-8		U	5.00	1.00
1,2-Dibromoethane	106-93-4		U	1.00	0.250
1,2-Dichlorobenzene	95-50-1		U	1.00	0.125
1,2-Dichloroethane	107-06-2		U	1.00	0.250
cis-1,2-Dichloroethene	156-59-2	1690	I	1.00	0.250
trans-1,2-Dichloroethene	156-60-5	3.60		1.00	0.250
1,2-Dichloropropane	78-87-5		U	1.00	0.200
1,3-Dichlorobenzene	541-73-1		U	1.00	0.250
1,4-Dichlorobenzene	106-46-7		U	1.00	0.125
2-Butanone	78-93-3		U	10.0	2.50
2-Hexanone	591-78-6		U	10.0	2.50
4-Methyl-2-pentanone	108-10-1		U	10.0	2.50
Acetone	67-64-1		U	10.0	2.50
Benzene	71-43-2	0.738	J	1.00	0.125
Bromodichloromethane	75-27-4		U	1.00	0.250
Bromoform	75-25-2		U	1.00	0.500
Bromomethane	74-83-9		U	1.00	0.500
Carbon disulfide	75-15-0		U	1.00	0.500
Carbon tetrachloride	56-23-5		U	1.00	0.250
Chlorobenzene	108-90-7		U	1.00	0.125
Chloroethane	75-00-3		U	1.00	0.500
Chloroform	67-66-3	0.288	J	1.00	0.125
Chloromethane	74-87-3		U	1.00	0.250
cis-1,3-Dichloropropene	10061-01-5		U	1.00	0.250
Cyclohexane	110-82-7		U	5.00	0.250
Dibromochloromethane	124-48-1		U	1.00	0.250
Dichlorodifluoromethane	75-71-8		U	1.00	0.250
Ethyl benzene	100-41-4		U	1.00	0.250
Isopropylbenzene	98-82-8		U	1.00	0.250
Methyl acetate	79-20-9		U	10.0	0.250
Methyl tert-butyl ether	1634-04-4		U	5.00	0.500
Methylcyclohexane	108-87-2		U	10.0	0.250
Methylene chloride	75-09-2		U	2.00	0.250
Styrene	100-42-5		U	1.00	0.125
Tetrachloroethene	127-18-4	0.343	J	1.00	0.250
Toluene	108-88-3	0.660	J	1.00	0.250
trans-1,3-Dichloropropene	10061-02-6		U	1.00	0.500
Trichloroethene	79-01-6	3850	I	1.00	0.250
Trichlorofluoromethane	75-69-4		U	1.00	0.250
Vinyl chloride	75-01-4	34.9		1.00	0.250
Xylenes, Total	1330-20-7		U	1.00	0.500

Sample Number: L0710597-11
Client ID: 47WW25-101607
Matrix: Water
Workgroup Number: WG253819
Collect Date: 10/18/2007 09:00
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 5030B
Analytical Method: 8260B
Analyst: MES
Dilution: 1
Units: ug/L

Instrument: HPMS6
Prep Date: 10/25/2007 14:54
Cal Date: 10/24/2007 17:33
Run Date: 10/25/2007 14:54
File ID: 6M70263

Surrogate	% Recovery	Lower	Upper	Qual
1,2-Dichloroethane-d4	77.1	80	120	*
Dibromofluoromethane	88.6	86	118	
p-Bromofluorobenzene	98.9	86	115	
Toluene-d8	95.5	88	110	

U Not detected at or above adjusted sample detection limit
J The analyte was positively identified, but the quantitation was below the RL
* Surrogate or spike compound out of range
I Semiquantitative result (out of instrument calibration range)

Report Number: **L0710597**
Report Date : **November 2, 2007**

00072986

Sample Number: **L0710597-11**
Client ID: **47WW25-101607**
Matrix: **Water**
Workgroup Number: **WG253919**
Collect Date: **10/18/2007 09:00**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **MES**
Dilution: **100**
Units: **ug/L**

Instrument: **HPMS6**
Prep Date: **10/26/2007 13:22**
Cal Date: **10/24/2007 17:33**
Run Date: **10/26/2007 13:22**
File ID: **6M70292**

Analyte	CAS. Number	Result	Qual	PQL	SDL
1,1,1-Trichloroethane	71-55-6		U	100	25.0
1,1,2,2-Tetrachloroethane	79-34-5		U	100	12.5
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1		U	500	25.0
1,1,2-Trichloroethane	79-00-5		U	100	25.0
1,1-Dichloroethane	75-34-3		U	100	12.5
1,1-Dichloroethene	75-35-4		U	100	50.0
1,2,4-Trichlorobenzene	120-82-1		U	100	20.0
1,2-Dibromo-3-chloropropane	96-12-8		U	500	100
1,2-Dibromoethane	106-93-4		U	100	25.0
1,2-Dichlorobenzene	95-50-1		U	100	12.5
1,2-Dichloroethane	107-06-2		U	100	25.0
cis-1,2-Dichloroethene	156-59-2	1420		100	25.0
trans-1,2-Dichloroethene	156-60-5		U	100	25.0
1,2-Dichloropropane	78-87-5		U	100	20.0
1,3-Dichlorobenzene	541-73-1		U	100	25.0
1,4-Dichlorobenzene	106-46-7		U	100	12.5
2-Butanone	78-93-3		U	1000	250
2-Hexanone	591-78-6		U	1000	250
4-Methyl-2-pentanone	108-10-1		U	1000	250
Acetone	67-64-1		U	1000	250
Benzene	71-43-2		U	100	12.5
Bromodichloromethane	75-27-4		U	100	25.0
Bromoform	75-25-2		U	100	50.0
Bromomethane	74-83-9		U	100	50.0
Carbon disulfide	75-15-0		U	100	50.0
Carbon tetrachloride	56-23-5		U	100	25.0
Chlorobenzene	108-90-7		U	100	12.5
Chloroethane	75-00-3		U	100	50.0
Chloroform	67-66-3		U	100	12.5
Chloromethane	74-87-3		U	100	25.0
cis-1,3-Dichloropropene	10061-01-5		U	100	25.0
Cyclohexane	110-82-7		U	500	25.0
Dibromochloromethane	124-48-1		U	100	25.0
Dichlorodifluoromethane	75-71-8		U	100	25.0
Ethyl benzene	100-41-4		U	100	25.0
Isopropylbenzene	98-82-8		U	100	25.0
Methyl acetate	79-20-9		U	1000	25.0
Methyl tert-butyl ether	1634-04-4		U	500	50.0
Methylcyclohexane	108-87-2		U	1000	25.0
Methylene chloride	75-09-2		U	200	25.0
Styrene	100-42-5		U	100	12.5
Tetrachloroethene	127-18-4		U	100	25.0
Toluene	108-88-3		U	100	25.0
trans-1,3-Dichloropropene	10061-02-6		U	100	50.0
Trichloroethene	79-01-6	21600	I	100	25.0
Trichlorofluoromethane	75-69-4		U	100	25.0
Vinyl chloride	75-01-4		U	100	25.0
Xylenes, Total	1330-20-7		U	100	50.0

Sample Number: **L0710597-11**
Client ID: **47WW25-101607**
Matrix: **Water**
Workgroup Number: **WG253919**
Collect Date: **10/18/2007 09:00**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **MES**
Dilution: **100**
Units: **ug/L**

Instrument: **HPMS6**
Prep Date: **10/26/2007 13:22**
Cal Date: **10/24/2007 17:33**
Run Date: **10/26/2007 13:22**
File ID: **6M70292**

Surrogate	% Recovery	Lower	Upper	Qual
1,2-Dichloroethane-d4	81.1	80	120	
Dibromofluoromethane	89.3	86	118	
p-Bromofluorobenzene	98.8	86	115	
Toluene-d8	97.5	88	110	

U Not detected at or above adjusted sample detection limit
I Semiquantitative result (out of instrument calibration range)

Report Number: **L0710597**
Report Date : **November 2, 2007**

00072988

Sample Number: **L0710597-11**
Client ID: **47WW25-101607**
Matrix: **Water**
Workgroup Number: **WG254048**
Collect Date: **10/18/2007 09:00**
Sample Tag: **DL02**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **CMS**
Dilution: **500**
Units: **ug/L**

Instrument: **HPMS8**
Prep Date: **10/29/2007 14:04**
Cal Date: **10/22/2007 15:58**
Run Date: **10/29/2007 14:04**
File ID: **8M341032**

Analyte	CAS. Number	Result	Qual	PQL	SDL
1,1,1-Trichloroethane	71-55-6		U	500	125
1,1,2,2-Tetrachloroethane	79-34-5		U	500	62.5
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1		U	2500	125
1,1,2-Trichloroethane	79-00-5		U	500	125
1,1-Dichloroethane	75-34-3		U	500	62.5
1,1-Dichloroethene	75-35-4		U	500	250
1,2,4-Trichlorobenzene	120-82-1		U	500	100
1,2-Dibromo-3-chloropropane	96-12-8		U	2500	500
1,2-Dibromoethane	106-93-4		U	500	125
1,2-Dichlorobenzene	95-50-1		U	500	62.5
1,2-Dichloroethane	107-06-2		U	500	125
cis-1,2-Dichloroethene	156-59-2	1800		500	125
trans-1,2-Dichloroethene	156-60-5		U	500	125
1,2-Dichloropropane	78-87-5		U	500	100
1,3-Dichlorobenzene	541-73-1		U	500	125
1,4-Dichlorobenzene	106-46-7		U	500	62.5
2-Butanone	78-93-3		U	5000	1250
2-Hexanone	591-78-6		U	5000	1250
4-Methyl-2-pentanone	108-10-1		U	5000	1250
Acetone	67-64-1		U	5000	1250
Benzene	71-43-2		U	500	62.5
Bromodichloromethane	75-27-4		U	500	125
Bromoform	75-25-2		U	500	250
Bromomethane	74-83-9		U	500	250
Carbon disulfide	75-15-0		U	500	250
Carbon tetrachloride	56-23-5		U	500	125
Chlorobenzene	108-90-7		U	500	62.5
Chloroethane	75-00-3		U	500	250
Chloroform	67-66-3		U	500	62.5
Chloromethane	74-87-3		U	500	125
cis-1,3-Dichloropropene	10061-01-5		U	500	125
Cyclohexane	110-82-7		U	2500	125
Dibromochloromethane	124-48-1		U	500	125
Dichlorodifluoromethane	75-71-8		U	500	125
Ethyl benzene	100-41-4		U	500	125
Isopropylbenzene	98-82-8		U	500	125
Methyl acetate	79-20-9		U	5000	125
Methyl tert-butyl ether	1634-04-4		U	2500	250
Methylcyclohexane	108-87-2		U	5000	125
Methylene chloride	75-09-2		U	1000	125
Styrene	100-42-5		U	500	62.5
Tetrachloroethene	127-18-4		U	500	125
Toluene	108-88-3		U	500	125
trans-1,3-Dichloropropene	10061-02-6		U	500	250
Trichloroethene	79-01-6	26700		500	125
Trichlorofluoromethane	75-69-4		U	500	125
Vinyl chloride	75-01-4		U	500	125
Xylenes, Total	1330-20-7		U	500	250

Report Number: **L0710597**
Report Date : **November 2, 2007**

00072989

Sample Number: **L0710597-11**
Client ID: **47WW25-101607**
Matrix: **Water**
Workgroup Number: **WG254048**
Collect Date: **10/18/2007 09:00**
Sample Tag: **DL02**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **CMS**
Dilution: **500**
Units: **ug/L**

Instrument: **HPMS8**
Prep Date: **10/29/2007 14:04**
Cal Date: **10/22/2007 15:58**
Run Date: **10/29/2007 14:04**
File ID: **8M341032**

Surrogate	% Recovery	Lower	Upper	Qual
1,2-Dichloroethane-d4	99.4	80	120	
Dibromofluoromethane	100	86	118	
p-Bromofluorobenzene	100	86	115	
Toluene-d8	101	88	110	

U Not detected at or above adjusted sample detection limit

Report Number: **L0710597**
Report Date : **November 2, 2007**

00072990

Sample Number: **L0710597-12**
Client ID: **LHSMW34-101807**
Matrix: **Water**
Workgroup Number: **WG253910**
Collect Date: **10/18/2007 16:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **MES**
Dilution: **2**
Units: **ug/L**

Instrument: **HPMS10**
Prep Date: **10/26/2007 20:27**
Cal Date: **10/18/2007 16:51**
Run Date: **10/26/2007 20:27**
File ID: **10M59901**

Analyte	CAS. Number	Result	Qual	PQL	SDL
1,1,1-Trichloroethane	71-55-6		U	2.00	0.500
1,1,2,2-Tetrachloroethane	79-34-5		U	2.00	0.250
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	270		10.0	0.500
1,1,2-Trichloroethane	79-00-5		U	2.00	0.500
1,1-Dichloroethane	75-34-3	0.960	J	2.00	0.250
1,1-Dichloroethene	75-35-4		U	2.00	1.00
1,2,4-Trichlorobenzene	120-82-1		U	2.00	0.400
1,2-Dibromo-3-chloropropane	96-12-8		U	10.0	2.00
1,2-Dibromoethane	106-93-4		U	2.00	0.500
1,2-Dichlorobenzene	95-50-1		U	2.00	0.250
1,2-Dichloroethane	107-06-2		U	2.00	0.500
cis-1,2-Dichloroethene	156-59-2	0.523	J	2.00	0.500
trans-1,2-Dichloroethene	156-60-5		U	2.00	0.500
1,2-Dichloropropane	78-87-5		U	2.00	0.400
1,3-Dichlorobenzene	541-73-1		U	2.00	0.500
1,4-Dichlorobenzene	106-46-7		U	2.00	0.250
2-Butanone	78-93-3		U	20.0	5.00
2-Hexanone	591-78-6		U	20.0	5.00
4-Methyl-2-pentanone	108-10-1		U	20.0	5.00
Acetone	67-64-1		U	20.0	5.00
Benzene	71-43-2		U	2.00	0.250
Bromodichloromethane	75-27-4		U	2.00	0.500
Bromoform	75-25-2		U	2.00	1.00
Bromomethane	74-83-9		U	2.00	1.00
Carbon disulfide	75-15-0		U	2.00	1.00
Carbon tetrachloride	56-23-5		U	2.00	0.500
Chlorobenzene	108-90-7		U	2.00	0.250
Chloroethane	75-00-3		U	2.00	1.00
Chloroform	67-66-3		U	2.00	0.250
Chloromethane	74-87-3		U	2.00	0.500
cis-1,3-Dichloropropene	10061-01-5		U	2.00	0.500
Cyclohexane	110-82-7		U	10.0	0.500
Dibromochloromethane	124-48-1		U	2.00	0.500
Dichlorodifluoromethane	75-71-8		U	2.00	0.500
Ethyl benzene	100-41-4		U	2.00	0.500
Isopropylbenzene	98-82-8		U	2.00	0.500
Methyl acetate	79-20-9		U	20.0	0.500
Methyl tert-butyl ether	1634-04-4		U	10.0	1.00
Methylcyclohexane	108-87-2		U	20.0	0.500
Methylene chloride	75-09-2		U	4.00	0.500
Styrene	100-42-5		U	2.00	0.250
Tetrachloroethene	127-18-4		U	2.00	0.500
Toluene	108-88-3		U	2.00	0.500
trans-1,3-Dichloropropene	10061-02-6		U	2.00	1.00
Trichloroethene	79-01-6		U	2.00	0.500
Trichlorofluoromethane	75-69-4		U	2.00	0.500
Vinyl chloride	75-01-4		U	2.00	0.500
Xylenes, Total	1330-20-7		U	2.00	1.00

Sample Number: L0710597-12
Client ID: LHSMW34-101807
Matrix: Water
Workgroup Number: WG253910
Collect Date: 10/18/2007 16:45
Sample Tag: DL01

PrePrep Method: NONE
Prep Method: 5030B
Analytical Method: 8260B
Analyst: MES
Dilution: 2
Units: ug/L

Instrument: HPMS10
Prep Date: 10/26/2007 20:27
Cal Date: 10/18/2007 16:51
Run Date: 10/26/2007 20:27
File ID: 10M59901

Surrogate	% Recovery	Lower	Upper	Qual
1,2-Dichloroethane-d4	118	80	120	
Dibromofluoromethane	111	86	118	
p-Bromofluorobenzene	101	86	115	
Toluene-d8	98.9	88	110	

U Not detected at or above adjusted sample detection limit
J The analyte was positively identified, but the quantitation was below the RL

Report Number: **L0710597**
Report Date : **November 2, 2007**

00072992

Sample Number: **L0710597-13**
Client ID: **EQUIPMENT RINSE #1**
Matrix: **Water**
Workgroup Number: **WG253910**
Collect Date: **10/18/2007 17:00**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **MES**
Dilution: **1**
Units: **ug/L**

Instrument: **HPMS10**
Prep Date: **10/26/2007 20:59**
Cal Date: **10/18/2007 16:51**
Run Date: **10/26/2007 20:59**
File ID: **10M59902**

Analyte	CAS. Number	Result	Qual	PQL	SDL
1,1,1-Trichloroethane	71-55-6		U	1.00	0.250
1,1,2,2-Tetrachloroethane	79-34-5		U	1.00	0.125
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1		U	5.00	0.250
1,1,2-Trichloroethane	79-00-5		U	1.00	0.250
1,1-Dichloroethane	75-34-3		U	1.00	0.125
1,1-Dichloroethene	75-35-4		U	1.00	0.500
1,2,4-Trichlorobenzene	120-82-1		U	1.00	0.200
1,2-Dibromo-3-chloropropane	96-12-8		U	5.00	1.00
1,2-Dibromoethane	106-93-4		U	1.00	0.250
1,2-Dichlorobenzene	95-50-1		U	1.00	0.125
1,2-Dichloroethane	107-06-2		U	1.00	0.250
cis-1,2-Dichloroethene	156-59-2		U	1.00	0.250
trans-1,2-Dichloroethene	156-60-5		U	1.00	0.250
1,2-Dichloropropane	78-87-5		U	1.00	0.200
1,3-Dichlorobenzene	541-73-1		U	1.00	0.250
1,4-Dichlorobenzene	106-46-7		U	1.00	0.125
2-Butanone	78-93-3		U	10.0	2.50
2-Hexanone	591-78-6		U	10.0	2.50
4-Methyl-2-pentanone	108-10-1		U	10.0	2.50
Acetone	67-64-1		U	10.0	2.50
Benzene	71-43-2		U	1.00	0.125
Bromodichloromethane	75-27-4		U	1.00	0.250
Bromoform	75-25-2		U	1.00	0.500
Bromomethane	74-83-9		U	1.00	0.500
Carbon disulfide	75-15-0		U	1.00	0.500
Carbon tetrachloride	56-23-5		U	1.00	0.250
Chlorobenzene	108-90-7		U	1.00	0.125
Chloroethane	75-00-3		U	1.00	0.500
Chloroform	67-66-3		U	1.00	0.125
Chloromethane	74-87-3		U	1.00	0.250
cis-1,3-Dichloropropene	10061-01-5		U	1.00	0.250
Cyclohexane	110-82-7		U	5.00	0.250
Dibromochloromethane	124-48-1		U	1.00	0.250
Dichlorodifluoromethane	75-71-8		U	1.00	0.250
Ethyl benzene	100-41-4		U	1.00	0.250
Isopropylbenzene	98-82-8		U	1.00	0.250
Methyl acetate	79-20-9		U	10.0	0.250
Methyl tert-butyl ether	1634-04-4		U	5.00	0.500
Methylcyclohexane	108-87-2		U	10.0	0.250
Methylene chloride	75-09-2		U	2.00	0.250
Styrene	100-42-5		U	1.00	0.125
Tetrachloroethene	127-18-4		U	1.00	0.250
Toluene	108-88-3		U	1.00	0.250
trans-1,3-Dichloropropene	10061-02-6		U	1.00	0.500
Trichloroethene	79-01-6		U	1.00	0.250
Trichlorofluoromethane	75-69-4		U	1.00	0.250
Vinyl chloride	75-01-4		U	1.00	0.250
Xylenes, Total	1330-20-7		U	1.00	0.500

Report Number: **L0710597**
Report Date : **November 2, 2007**

00072993

Sample Number: **L0710597-13**
Client ID: **EQUIPMENT RINSE #1**
Matrix: **Water**
Workgroup Number: **WG253910**
Collect Date: **10/18/2007 17:00**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **MES**
Dilution: **1**
Units: **ug/L**

Instrument: **HPMS10**
Prep Date: **10/26/2007 20:59**
Cal Date: **10/18/2007 16:51**
Run Date: **10/26/2007 20:59**
File ID: **10M59902**

Surrogate	% Recovery	Lower	Upper	Qual
1,2-Dichloroethane-d4	118	80	120	
Dibromofluoromethane	112	86	118	
p-Bromofluorobenzene	101	86	115	
Toluene-d8	98.7	88	110	

U Not detected at or above adjusted sample detection limit

Report Number: **L0710597**
Report Date : **November 2, 2007**

00072994

Sample Number: **L0710597-14**
Client ID: **TRIP BLANK**
Matrix: **Water**
Workgroup Number: **WG253678**
Collect Date: **10/19/2007 00:01**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **MES**
Dilution: **1**
Units: **ug/L**

Instrument: **HPMS11**
Prep Date: **10/24/2007 13:52**
Cal Date: **10/01/2007 15:48**
Run Date: **10/24/2007 13:52**
File ID: **11M46859**

Analyte	CAS. Number	Result	Qual	PQL	SDL
1,1,1-Trichloroethane	71-55-6		U	1.00	0.250
1,1,2,2-Tetrachloroethane	79-34-5		U	1.00	0.125
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1		U	5.00	0.250
1,1,2-Trichloroethane	79-00-5		U	1.00	0.250
1,1-Dichloroethane	75-34-3		U	1.00	0.125
1,1-Dichloroethene	75-35-4		U	1.00	0.500
1,2,4-Trichlorobenzene	120-82-1		U	1.00	0.200
1,2-Dibromo-3-chloropropane	96-12-8		U	5.00	1.00
1,2-Dibromoethane	106-93-4		U	1.00	0.250
1,2-Dichlorobenzene	95-50-1		U	1.00	0.125
1,2-Dichloroethane	107-06-2		U	1.00	0.250
cis-1,2-Dichloroethene	156-59-2		U	1.00	0.250
trans-1,2-Dichloroethene	156-60-5		U	1.00	0.250
1,2-Dichloropropane	78-87-5		U	1.00	0.200
1,3-Dichlorobenzene	541-73-1		U	1.00	0.250
1,4-Dichlorobenzene	106-46-7		U	1.00	0.125
2-Butanone	78-93-3		U	10.0	2.50
2-Hexanone	591-78-6		U	10.0	2.50
4-Methyl-2-pentanone	108-10-1		U	10.0	2.50
Acetone	67-64-1		U	10.0	2.50
Benzene	71-43-2		U	1.00	0.125
Bromodichloromethane	75-27-4		U	1.00	0.250
Bromoform	75-25-2		U	1.00	0.500
Bromomethane	74-83-9		U	1.00	0.500
Carbon disulfide	75-15-0		U	1.00	0.500
Carbon tetrachloride	56-23-5		U	1.00	0.250
Chlorobenzene	108-90-7		U	1.00	0.125
Chloroethane	75-00-3		U	1.00	0.500
Chloroform	67-66-3		U	1.00	0.125
Chloromethane	74-87-3		U	1.00	0.250
cis-1,3-Dichloropropene	10061-01-5		U	1.00	0.250
Cyclohexane	110-82-7		U	5.00	0.250
Dibromochloromethane	124-48-1		U	1.00	0.250
Dichlorodifluoromethane	75-71-8		U	1.00	0.250
Ethyl benzene	100-41-4		U	1.00	0.250
Isopropylbenzene	98-82-8		U	1.00	0.250
Methyl acetate	79-20-9		U	10.0	0.250
Methyl tert-butyl ether	1634-04-4		U	5.00	0.500
Methylcyclohexane	108-87-2		U	10.0	0.250
Methylene chloride	75-09-2		U	2.00	0.250
Styrene	100-42-5		U	1.00	0.125
Tetrachloroethene	127-18-4		U	1.00	0.250
Toluene	108-88-3		U	1.00	0.250
trans-1,3-Dichloropropene	10061-02-6		U	1.00	0.500
Trichloroethene	79-01-6		U	1.00	0.250
Trichlorofluoromethane	75-69-4		U	1.00	0.250
Vinyl chloride	75-01-4		U	1.00	0.250
Xylenes, Total	1330-20-7		U	1.00	0.500

Sample Number: **L0710597-14**
Client ID: **TRIP BLANK**
Matrix: **Water**
Workgroup Number: **WG253678**
Collect Date: **10/19/2007 00:01**
Sample Tag: **01**

PrePrep Method: **NONE**
Prep Method: **5030B**
Analytical Method: **8260B**
Analyst: **MES**
Dilution: **1**
Units: **ug/L**

Instrument: **HPMS11**
Prep Date: **10/24/2007 13:52**
Cal Date: **10/01/2007 15:48**
Run Date: **10/24/2007 13:52**
File ID: **11M46859**

Surrogate	% Recovery	Lower	Upper	Qual
1,2-Dichloroethane-d4	88.3	80	120	
Dibromofluoromethane	91.3	86	118	
p-Bromofluorobenzene	90.5	86	115	
Toluene-d8	89.0	88	110	

U Not detected at or above adjusted sample detection limit

2.1.1.2 QC Summary Data

Example 8260 Calculations

1.0 Calculating the Response Factor (RF) from the initial calibration (ICAL) data:

RF = [(Ax) (Cis)] / [(Ais) (Cx)]

where:	Example
Ax = Area of the characteristic ion for the compound being measured:	3399156
Cis = Concentration of the specific internal standard (ug/mL)	25
Ais = Area of the characteristic ion of the specific internal standard	846471
Cx = Concentration of the compound in the standard being measured (ug/mL)	100
RF = Calculated Response Factor	**1.0039**

2.0 Calculating the concentration (C) of a compound in water using the average RF: *

Cx = [(Ax) (Cis) (Vn)(D)] / [(Ais) (RF) (Vs)]

where:	**Example**
Ax = Area of the characteristic ion for the compound being measured	**3122498**
Cis = Concentration of the specific internal standard (ug/L)	**25**
D = Dilution factor for sample as a multiplier (10x = 10)	**1**
Ais = Area of the characteristic ion of the specific internal standard	**611048**
RF = Average RF from the ICAL	**1.004**
Vs = Purge volume of sample (mL)	**10**
Vn = Nominal purge volume of sample (mL) (10.0 mL)	**10**
Cx = Concentration of the compound in the sample being measured (ug/L)	**127.2428**

3.0 Calculating the concentration (C) of a compound in soil using the average RF: *

Cx = [(Ax) (Cis) (Wn)(D)] / [(Ais) (RF) (Ws)]

where:	**Example**
Ax = Area of the characteristic ion for the compound being measured	**3122498**
Cis = Concentration of the specific internal standard (ug/L)	**25**
D = Dilution factor for sample as a multiplier (10x = 10)	**1**
Ais = Area of the characteristic ion of the specific internal standard	**611048**
RF = Average RF from the ICAL	**1.004**
Ws = Weight of sample purged (g)	**5**
Wn = Nominal purge weight (g) (5.0 g)	**5**
Cx = Concentration of the compound in the sample being measured (ug/L)	**127.2428**

Dry weight correction:

Percent solids (PCT_S)	**50**
Cd = (Cx) (100)/PCT_S	**254.4856**

* Concentrations appearing on the instrument quantitation reports are on-column results and do not take into account initial volume, final volume, and the dilution factor.

4.0 Concentration from Linear Regression

Step 1: Retrieve Curve Data From Plot, y = mx + b

y = response ratio = response of analyte / response of IS = Ax/Ais

x = amount ratio = concentration analyte/concentration internal standard = Cx / Cis

m = slope from curve = 0.213

b = intercept from curve = - 0.00642

Step 2: Calculate y from Quantitation Report

y = 86550/593147 = 0.1459

Step 3: Solve for x

x = (y - b)/m = [(0.1459 -(- 0.00642)]/ 0.213 = 0.7152

Step 4: Solve for analyte concentration Cx

Cx = Cis (x) = (25.0)(0.7152) = 17.88

Example Spreadsheet Calculation:

Slope from curve, m:	**0.213**
Intercept from curve, b:	**-0.00642**
Area of analyte, Ax:	**86550**
Area of Internal Standard , Ais:	**593147**
Concentration of IS, Cis	**25.00**
Response Ratio:	**0.145917**
Amount Ratio:	**0.715195**
Concentration:	**17.87988**
Units of Internal Standard:	**ug/L**

5.0 Concentration from Quadratic Regression

Step 1 - Retrieve Curve Data from Plot, y = Ax^2 + Bx + C
Where:
Ax^2 + Bx + (C - y) = 0
A, B, C = constants from the ICAL quadratic regression
y = Response ratio = Area of analyte/Area of internal standard (IS)
x = Amount ratio = Concentration of analyte/concentration of IS

Step 2: Calculate y from Quantitation Report

y = Ax/Ais

Step 3: Solve for x using the quadratic formula
Ax^2 + Bx + C - y = 0

$$x = \frac{b \pm \sqrt{\left(b^2 - 4a(c - y)\right)}}{2a}$$ (Two possible solutions)

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(Amount ratio)

Example Spreadsheet Calculation:

Value of A from plot:	**-0.00629**	
Value of B from plot:	**0.511**	
Value of C from plot:	**-0.0276**	
Area of unknown from quantitation report:	**293821**	
Area of IS from quantiation report:	**784848**	
Response ratio, y:	**0.374367**	
C - y:	**-0.40197**	
Root 1 - Computed amount ratio , X1:	**80.44567**	
Root 2 - Computed amount ratio , X2:	**0.794396**	use this solution
Concentration of IS, Cis:	**25.00**	
Concentration of analyte, Cx:	**19.86**	ug/L

00072999

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS11 Dataset: 100107
Analyst1: MES Analyst2: NA
Method: 8260B SOP: MSV01 Rev: 10
Method: 5030/5035 SOP: PAT01 Rev: 10

Maintenance Log ID: 21097

Internal Standard: STD21833 Surrogate Standard: STD22023
CCV: STD22186 LCS: STD22188 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG251532,WG251619

Comments:

Seq.	File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
1	11M46046	SYSTEM BLANK	NA	1	1		10/01/07 08:53
2	11M46047	SYSTEM BLANK	NA	1	1		10/01/07 09:23
3	11M46048	SYSTEM BLANK	NA	1	1		10/01/07 10:00
4	11M46049	SYSTEM BLANK	NA	1	1		10/01/07 10:40
5	11M46050	WG251532-01 50NG BFB STD 8260	NA	1	1	STD21685	10/01/07 11:15
6	11M46051	WG251532-02 0.3ug/L WATER STD 8260	NA	1	1	STD22186	10/01/07 11:40
7	11M46052	WG251532-03 0.4 ug/L WATER STD 8260	NA	1	1	STD22186	10/01/07 12:11
8	11M46053	WG251532-04 1 ug/L WATER STD 8260	NA	1	1	STD22186	10/01/07 12:42
9	11M46054	WG251532-05 2 ug/L WATER STD 8260	NA	1	1	STD22186	10/01/07 13:12
10	11M46055	WG251532-06 5 ug/L WATER STD 8260	NA	1	1	STD22186	10/01/07 13:42
11	11M46056	WG251532-07 20 ug/L WATER STD 8260	NA	1	1	STD22186	10/01/07 14:18
12	11M46057	WG251532-08 50 ug/L WATER STD 8260	NA	1	1	STD22186	10/01/07 14:48
13	11M46058	WG251532-09 100 ug/L WATER STD 8260	NA	1	1	STD22186	10/01/07 15:18
14	11M46059	WG251532-10 200 ug/L WATER STD 8260	NA	1	1	STD22186	10/01/07 15:48
15	11M46060	SYSTEM BLANK	NA	1	1		10/01/07 16:19
16	11M46061	SYSTEM BLANK	NA	1	1		10/01/07 16:49
17	11M46062	SYSTEM BLANK	NA	1	1		10/01/07 17:23
18	11M46063	WG251532-11 20ug/L ALT SOURCE 8260	NA	1	1	STD22188	10/01/07 18:05
19	11M46064	WG251618-01 50NG BFB STD 8260	NA	1	1	STD21685	10/01/07 18:38
42	11M46065	WG251618-02 50ug/L WATER STD 8260	NA	1	1	STD22186	10/01/07 19:02
20	11M46066	SYSTEM BLANK	NA	1	1		10/01/07 19:32
21	11M46067	WG251532-11 20ug/L ALT SOURCE	NA	1	1	STD22188	10/01/07 20:02
22	11M46068	WG251619-01 VBLK1001 BLANK 8260	NA	1	1		10/01/07 20:32
23	11M46069	WG251619-01 VBLK1001 BLANK 8260	NA	1	1		10/01/07 21:02
24	11M46070	WG251619-02 20ug/L LCS 8260	NA	1	1	STD22188	10/01/07 21:32
25	11M46071	WG251619-03 20ug/L LCSDUP 8260	NA	1	1	STD22188	10/01/07 22:02
26	11M46072	L0709662-09 B D1 5X 826-SPE	<2	1	5		10/01/07 22:33
27	11M46073	L0709662-10 B D1 10X 826-SPE	<2	1	10		10/01/07 23:03
28	11M46074	L0709662-11 B D1 10X 826-SPE	5	1	10		10/01/07 23:33
29	11M46075	L0709499-11 B D1 10X 826-SPE	<2	1	10		10/02/07 00:03
30	11M46076	L0709540-08 A 826-SPE	<2	1	1		10/02/07 00:33
31	11M46077	L0709542-09 A 826-SPE	<2	1	1		10/02/07 01:03
32	11M46078	L0709540-01 A 826-SPE	<2	1	1		10/02/07 01:34
33	11M46079	L0709540-02 A 826-SPE	<2	1	1		10/02/07 02:04

Approved: October 03, 2007

Page: 1

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS11 Dataset: 100107

Analyst1: MES Analyst2: NA

Method: 8260B SOP: MSV01 Rev: 10

Method: 5030/5035 SOP: PAT01 Rev: 10

Maintenance Log ID: 21097

Internal Standard: STD21833 Surrogate Standard: STD22023

CCV: STD22186 LCS: STD22188 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA

Workgroups: WG251532,WG251619

Seq.	File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
34	11M46080	L0709540-04 A 826-SPE	<2	1	1		10/02/07 02:34
35	11M46081	L0709540-05 A 826-SPE	<2	1	1		10/02/07 03:04
36	11M46082	L0709540-06 A 826-SPE	<2	1	1		10/02/07 03:34
37	11M46083	L0709540-07 A 826-SPE	<2	1	1		10/02/07 04:05
38	11M46084	L0709538-05 A 826-SPE	<2	1	1		10/02/07 04:35
39	11M46085	L0709538-07 A 826-SPE	<2	1	1		10/02/07 05:05
40	11M46086	L0709600-19 A 826-SPE	<2	1	1		10/02/07 05:35
41	11M46087	L0709600-21 A 826-SPE	<2	1	1		10/02/07 06:05

Comments

Seq.	Rerun	Dil.	Reason	Analytes
18				
File ID: 11M46063				
Do not report.				

Approved: October 03, 2007

Page: 2

00073001

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS10 Dataset: 101807
Analyst1: MES Analyst2: NA
Method: 8260B SOP: MSV01 Rev: 10
Method: 5030/5035 SOP: PAT01 Rev: 10

Maintenance Log ID: 21384

Internal Standard: STD22019 Surrogate Standard: STD22132
CCV: STD22565 LCS: STD22574 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG253187

Comments:

Seq.	File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
1	10M59716	WG253187-01 50NG BFB STD 8260	NA	1	1	STD22252	10/18/07 08:52
2	10M59717	SYSTEM BLANK	NA	1	1		10/18/07 09:18
3	10M59718	WG253187-02 0.3 ug/L WATER STD 8260	NA	1	1	STD22560	10/18/07 09:57
4	10M59719	WG253187-03 0.4 ug/L WATER STD 8260	NA	1	1	STD22565	10/18/07 10:29
5	10M59720	WG253187-04 1 ug/L WATER STD 8260	NA	1	1	STD22565	10/18/07 11:00
6	10M59721	WG253187-05 2 ug/L WATER STD 8260	NA	1	1	STD22565	10/18/07 11:31
7	10M59722	WG253187-06 5 ug/L WATER STD 8260	NA	1	1	STD22565	10/18/07 12:03
8	10M59723	WG253187-07 20 ug/L WATER STD 8260	NA	1	1	STD22565	10/18/07 12:35
9	10M59724	WG253187-08 50 ug/L WATER STD 8260	NA	1	1	STD22565	10/18/07 13:07
10	10M59725	WG253187-09 100 ug/L WATER STD 8260	NA	1	1	STD22565	10/18/07 13:45
11	10M59726	WG253187-10 200 ug/L WATER STD 8260	NA	1	1	STD22565	10/18/07 14:16
12	10M59727	WG253187-11 300 ug/L WATER STD 8260	NA	1	1	STD22565	10/18/07 14:47
13	10M59728	SYSTEM BLANK	NA	1	1		10/18/07 15:18
14	10M59729	SYSTEM BLANK	NA	1	1		10/18/07 15:49
15	10M59730	SYSTEM BLANK	NA	1	1		10/18/07 16:20
16	10M59731	WG253187-03 0.4 ug/L WATER STD 8260	NA	1	1	STD22565	10/18/07 16:51
17	10M59732	WG253187-12 20ug/L ALT SOURCE	NA	1	1	STD22409	10/18/07 18:23
18	10M59733	WG253187-12 100ug/L MA OXY ALT SOUR	NA	1	1	STD22474	10/18/07 18:55
19	10M59734	WG253187-13 100ug/L MA OXY ALT SOUR	NA	1	1	STD22474	10/18/07 19:37
20	10M59735	SYSTEM BLANK	NA	1	1		10/18/07 20:08

Comments

Seq.	Rerun	Dil.	Reason	Analytes
4 File ID: 10M59719				
Do not report.				
18 File ID: 10M59733				
Do not report.				

Approved: October 23, 2007

Page: 1

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS8 Dataset: 102207
Analyst1: CMS Analyst2: NA
Method: 8260B SOP: MSV01 Rev: 10
Method: 624 SOP: MSV10 Rev: 9
Method: 5030B SOP: PAT01 Rev: 10
Maintenance Log ID: 21419

Internal Standard: STD22561 Surrogate Standard: STD22637
CCV: STD22616 LCS: STD22622 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG253480

Comments:

Seq.	File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
1	8M340855	SYSTEM BLANK	NA	1	1		10/22/07 08:24
2	8M340856	50ug/L STD CHK	NA	1	1	STD22560	10/22/07 09:04
3	8M340857	SYSTEM BLANK	NA	1	1		10/22/07 09:36
4	8M340858	WG253480-01 BFB 50ng STD 8260	NA	1	1	STD22252	10/22/07 10:02
5	8M340859	WG253480-01 BFB 50ng STD 8260	NA	1	1	STD22252	10/22/07 10:16
6	8M340860	WG253480-01 BFB 50ng STD 8260	NA	1	1	STD22252	10/22/07 11:00
7	8M340861	WG253480-02 0.30ug/L STD 8260	NA	1	1	STD22616	10/22/07 11:30
8	8M340862	WG253480-03 0.40ug/L STD 8260	NA	1	1	STD22616	10/22/07 12:00
9	8M340863	WG253480-04 1ug/L STD 8260	NA	1	1	STD22616	10/22/07 12:29
10	8M340864	WG253480-05 2ug/L STD 8260	NA	1	1	STD22616	10/22/07 12:59
11	8M340865	WG253480-06 5ug/L STD 8260	NA	1	1	STD22616	10/22/07 13:30
12	8M340866	WG253480-07 20ug/L STD 8260	NA	1	1	STD22616	10/22/07 14:00
13	8M340867	WG253480-08 50ug/L STD 8260	NA	1	1	STD22616	10/22/07 14:29
14	8M340868	WG253480-09 100ug/L STD 8260	NA	1	1	STD22616	10/22/07 14:59
15	8M340869	WG253480-10 200ug/L STD 8260	NA	1	1	STD22616	10/22/07 15:28
16	8M340870	WG253480-11 300ug/L STD 8260	NA	1	1	STD22616	10/22/07 15:58
17	8M340871	SYSTEM BLANK	NA	1	1		10/22/07 16:27
18	8M340872	SYSTEM BLANK	NA	1	1		10/22/07 16:57
19	8M340873	WG253480-12 20ug/L ALT SOURCE STD 8	NA	1	1	STD22622	10/22/07 17:26
20	8M340874	SYSTEM BLANK	NA	1	1		10/22/07 17:56
21	8M340875	SYSTEM BLANK	NA	1	1		10/22/07 18:25

Comments

Seq.	Rerun	Dil.	Reason	Analytes
4	X			
File ID: 8M340858				
	Tune failed/DNR			
5	X			
File ID: 8M340859				
	Tune failed/DNR-Baked system out and replaced septa			
19	X		Surrogate standard failure	
File ID: 8M340873				
	DNR			

Approved: October 24, 2007

Page: 1

00073003

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS8 Dataset: 102307
Analyst1: CMS Analyst2: NA
Method: 8260B SOP: MSV01 Rev: 10
Method: 5030B SOP: PAT01 Rev: 10

Maintenance Log ID: 21424

Internal Standard: STD22561 Surrogate Standard: STD22637
CCV: STD22616;STD22513 LCS: STD22622;STD22514 MS/MSD: STD22622

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG253480;WG253579

Comments:

Seq.	File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
1	8M340877	WG253578-01 BFB 50ng STD 8260	NA	1	1	STD22252	10/23/07 08:29
2	8M340878	WG253578-02 50ug/L STD 8260	NA	1	1	STD22616	10/23/07 08:57
3	8M340879	WG253578-02 50ug/L STD 8260	NA	1	1	STD22616	10/23/07 09:34
4	8M340880	WG253580-01 100ug/L A9FOO STD 8260	NA	1	1	STD22513	10/23/07 10:07
5	8M340881	WG253579-01 VBLK1023 BLANK 8260	NA	1	1		10/23/07 10:37
6	8M340882	WG253480-12 20ug/L ALT SOURCE STD 8	NA	1	1	STD22622	10/23/07 11:07
7	8M340883	WG253579-02 20ug/L LCS STD 8260	NA	1	1	STD22622	10/23/07 11:36
8	8M340884	WG253579-03 100ug/L A9FOOLCS STD 82	NA	1	1	STD22514	10/23/07 12:06
9	8M340885	L0710575-01 B 826-SPE2	=7	1	1		10/23/07 12:36
10	8M340886	L0710574-03 B 20X 826-SPE2 D1	=7	1	20		10/23/07 13:05
11	8M340887	L0710577-01 A 826-SPE1	<2	1	1		10/23/07 13:35
12	8M340888	L0710577-02 A 826-SPE1	<2	1	1		10/23/07 14:05
13	8M340889	L0710526-05 A 826-SPE	<2	1	1		10/23/07 14:34
14	8M340890	L0710526-01 A 826-SPE	<2	1	1		10/23/07 15:04
15	8M340891	L0710526-02 A 826-SPE	<2	1	1		10/23/07 15:34
16	8M340892	L0710526-03 A 826-SPE	<2	1	1		10/23/07 16:03
17	8M340893	L0710526-04 A 826-SPE	<2	1	1		10/23/07 16:33
18	8M340894	WG253579-04 L0710527-03 A 826-SPE1	<2	1	1		10/23/07 17:03
19	8M340895	WG253579-05 L0710527-04 MS A 826-SP	<2	1	1	STD22622	10/23/07 17:33
20	8M340896	WG253579-06 L0710527-05 MSD A 826-S	<2	1	1	STD22622	10/23/07 18:03
21	8M340897	L0710556-01 A 10X 826-TC	NA	17	10		10/23/07 18:33
22	8M340898	L0710556-03 A 10X 826-TC	NA	17	10		10/23/07 19:03
23	8M340899	L0710556-05 A 10X 826-TC	NA	17	10		10/23/07 19:33
24	8M340900	L0710556-07 A 10X 826-TC	NA	17	10		10/23/07 20:03
25	8M340901	SYSTEM BLANK	NA	1	1		10/23/07 20:33

Comments

Seq.	Rerun	Dil.	Reason	Analytes
2	X		Check Standard Failure	
File ID: 8M340878				
	DNR			
17	X	10	Over Calibration Range	TCE
File ID: 8M340893				

Approved: October 24, 2007

Page: 1

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS8 Dataset: 102307

Analyst1: CMS Analyst2: NA

Method: 8260B SOP: MSV01 Rev: 10

Method: 5030B SOP: PAT01 Rev: 10

Maintenance Log ID: 21424

Internal Standard: STD22561 Surrogate Standard: STD22637

CCV: STD22616;STD22513 LCS: STD22622;STD22514 MS/MSD: STD22622

Column 1 ID: RTX502.2 Column 2 ID: NA

Workgroups: WG253480;WG253579

Comments

Seq.	Rerun	Dil.	Reason	Analytes
18	X		Carry-over contamination	
File ID: 8M340894				
	QC ONLY			
19	X			
File ID: 8M340895				
	QC ONLY			
20	X			
File ID: 8M340896				
	QC ONLY			

Approved: October 24, 2007

Page: 2

00073005

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS11 Dataset: 102407
Analyst1: MES Analyst2: TMB
Method: 8260B SOP: MSV01 Rev: 10
Method: 624 SOP: MSV10 Rev: 9
Method: 5030/5035 SOP: PAT01 Rev: 10
Maintenance Log ID: 21449

Internal Standard: STD22304 Surrogate Standard: STD22615
CCV: STD22565 LCS: STD22574 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG253678

Comments:

Seq.	File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
1	11M46848	SYSTEM BLANK	NA	1	1		10/24/07 08:23
2	11M46849	SYSTEM BLANK	NA	1	1		10/24/07 08:54
3	11M46850	WG253676-01 50ng BFB STD 8260	NA	1	1	STD22252	10/24/07 09:19
4	11M46851	WG253676-02 50ug/L CCV STD 8260	NA	1	1	STD22565	10/24/07 09:42
5	11M46852	WG253678-01 VBLK1024 BLANK 8260	NA	1	1		10/24/07 10:21
6	11M46853	WG253678-01 VBLK1024 BLANK 8260	NA	1	1		10/24/07 10:51
7	11M46854	WG253678-02 20ug/L LCS STD 8260	NA	1	1	STD22574	10/24/07 11:21
8	11M46855	WG253678-03 20ug/L LCSDUP STD 8260	NA	1	1	STD22574	10/24/07 11:52
9	11M46856	L0710605-01 A 826-BETX	<2	1	1		10/24/07 12:22
10	11M46857	L0710610-05 A 826-SPE	<2	1	1		10/24/07 12:52
11	11M46858	L0710596-15 A 826-SPE	<2	1	1		10/24/07 13:22
12	11M46859	L0710597-14 A 826-SPE	<2	1	1		10/24/07 13:52
13	11M46860	L0710610-01 A 826-SPE	<2	1	1		10/24/07 14:23
14	11M46861	L0710610-02 A 826-SPE	<2	1	1		10/24/07 14:53
15	11M46862	L0710610-03 A 826-SPE	<2	1	1		10/24/07 15:23
16	11M46863	L0710610-04 A 10X 826-SPE	<2	1	10		10/24/07 15:54
17	11M46864	L0710596-01 A 826-SPE	<2	1	1		10/24/07 16:23
18	11M46865	L0710596-02 A 826-SPE	5	1	1		10/24/07 16:53
19	11M46866	L0710596-05 A 826-SPE	<2	1	1		10/24/07 17:23
20	11M46867	L0710597-09 A 826-SPE	<2	1	1		10/24/07 17:54
21	11M46868	L0710596-07 A 826-SPE	<2	1	1		10/24/07 18:24
22	11M46869	L0710596-08 A 826-SPE	<2	1	1		10/24/07 18:55
23	11M46870	L0710596-09 A 826-SPE	<2	1	1		10/24/07 19:25
24	11M46871	L0710596-10 A 826-SPE	<2	1	1		10/24/07 19:56
25	11M46872	L0710596-11 A 826-SPE	<2	1	1		10/24/07 20:26
26	11M46873	L0710597-07 A 826-SPE	<2	1	1		10/24/07 20:56
27	11M46874	SYSTEM BLANK	NA	1	1		10/24/07 21:27
28	11M46875	WG253678-04 624 BLANK	NA	1	1		10/24/07 21:57
29	11M46876	L0710674-01 A 624-SPE	3	2	1		10/24/07 22:28
30	11M46877	L0710680-01 A 624-SPE	7	2	1		10/24/07 22:59

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Approved: October 26, 2007

Page: 1

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS11 Dataset: 102407
Analyst1: MES Analyst2: TMB
Method: 8260B SOP: MSV01 Rev: 10
Method: 624 SOP: MSV10 Rev: 9
Method: 5030/5035 SOP: PAT01 Rev: 10
Maintenance Log ID: 21449

Internal Standard: STD22304 Surrogate Standard: STD22615
CCV: STD22565 LCS: STD22574 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG253678

Comments

Seq.	Rerun	Dil.	Reason	Analytes
16	X	1	Analyzed too dilute	
File ID: 11M46863				
	Do not report.			
17	X	100	Over Calibration Range	cis-1,2-DCE and TCE
File ID: 11M46864				
18	X	10	Over Calibration Range	TCE
File ID: 11M46865				
19	X	1	Carry-over contamination	
File ID: 11M46866				
	Do not report.			
20	X	5	Over Calibration Range	FREON-113
File ID: 11M46867				
21	X	1	Carry-over contamination	
File ID: 11M46868				
	Do not report.			
23	X	20	Over Calibration Range	FREON-113
File ID: 11M46870				
24	X	1	Carry-over contamination	
File ID: 11M46871				
	Do not report.			

Approved: October 26, 2007

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS6 Dataset: 102407
Analyst1: CMS Analyst2: NA
Method: 8260B SOP: MSV01 Rev: 10
Method: 5030/5035 SOP: PAT01 Rev: 10

Maintenance Log ID: 21450

Internal Standard: NA Surrogate Standard: NA
CCV: STD22673 LCS: STD22622 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG253721

Comments:

Seq.	File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
1	6M70223	WG253668-01 BFB 50ng STD 8260	NA	1	1	STD22252	10/24/07 07:18
2	6M70224	WG253668-02 50ug/L STD 8260	NA	1	1	STD22640	10/24/07 07:41
3	6M70225	WG253669-01 VBLK1024 BLANK 8260	NA	1	1		10/24/07 08:14
4	6M70226	WG253669-01 VBLK1024 BLANK 8260	NA	1	1		10/24/07 08:46
5	6M70228	SYSTEM BLANK FILAMENT 2	NA	1	1		10/24/07 09:50
6	6M70229	SYSTEM BLANK FILAMENT 2	NA	1	1		10/24/07 10:23
7	6M70230	SYSTEM BLANK FILAMENT 2	NA	1	1		10/24/07 11:07
8	6M70231	BFB STD CHK	NA	1	1	STD22252	10/24/07 11:37
9	6M70232	WG253721-01 BFB 50ng STD 8260	NA	1	1	STD22252	10/24/07 11:50
10	6M70233	WG253721-01 BFB 50ng STD 8260	NA	1	1	STD22252	10/24/07 12:10
11	6M70234	WG253721-03 0.40ug/L STD 8260	NA	1	1	STD22673	10/24/07 12:45
12	6M70235	WG253721-02 0.30ug/L STD 8260	NA	1	1	STD22673	10/24/07 13:17
13	6M70236	WG253721-04 1ug/L STD 8260	NA	1	1	STD22673	10/24/07 13:49
14	6M70237	WG253721-05 2ug/L STD 8260	NA	1	1	STD22673	10/24/07 14:21
15	6M70238	WG253721-06 5ug/L STD 8260	NA	1	1	STD22673	10/24/07 14:53
16	6M70239	WG253721-07 20ug/L STD 8260	NA	1	1	STD22673	10/24/07 15:25
17	6M70240	WG253721-08 50ug/L STD 8260	NA	1	1	STD22673	10/24/07 15:57
18	6M70241	WG253721-09 100ug/L STD 8260	NA	1	1	STD22673	10/24/07 16:29
19	6M70242	WG253721-10 200ug/L STD 8260	NA	1	1	STD22673	10/24/07 17:01
20	6M70243	WG253721-11 300ug/L STD 8260	NA	1	1	STD22673	10/24/07 17:33
21	6M70244	SYSTEM BLANK	NA	1	1		10/24/07 18:05
22	6M70245	SYSTEM BLANK	NA	1	1		10/24/07 18:36
23	6M70246	WG253721-12 20ug/L ALT SOURCE STD 8	NA	1	1	STD22622	10/24/07 19:08
24	6M70247	SYSTEM BLANK	NA	1	1		10/24/07 19:40
25	6M70248	SYSTEM BLANK	NA	1	1		10/24/07 20:12
26	6M70249	SYSTEM BLANK	NA	1	1		10/24/07 20:44
27	6M70250	SYSTEM BLANK	NA	1	1		10/24/07 21:17

Comments

Seq.	Rerun	Dil.	Reason	Analytes
4				
File ID: 6M70226				
Blew filament 1, switched to filament 2.				

Approved: October 26, 2007

Page: 1

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS6 Dataset: 102407

Analyst1: CMS Analyst2: NA

Method: 8260B SOP: MSV01 Rev: 10

Method: 5030/5035 SOP: PAT01 Rev: 10

Maintenance Log ID: 21450

Internal Standard: NA Surrogate Standard: NA

CCV: STD22673 LCS: STD22622 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA

Workgroups: WG253721

Comments

Seq.	Rerun	Dil.	Reason	Analytes
9 File ID: 6M70232				
	Do not report-running to make sure that BFB is passing.			
23 File ID: 6M70246				
	Do not report-RR for Trichlorofluoromethane.			

Approved: October 26, 2007

Page: 2

00073009

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS10 Dataset: 102507
Analyst1: MES Analyst2: NA
Method: 8260B SOP: MSV01 Rev: 10
Method: 5030/5035 SOP: PAT01 Rev: 10

Maintenance Log ID: 21463

Internal Standard: STD22019 Surrogate Standard: STD22132
CCV: STD22565 LCS: STD22574 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG253794

Comments:

Seq.	File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
1	10M59849	WG253793-01 50NG BFB STD 8260	NA	1	1	STD22252	10/25/07 07:51
2	10M59850	WG253793-01 50NG BFB STD 8260	NA	1	1	STD22252	10/25/07 08:04
3	10M59851	WG253793-02 50ug/L WATER STD 8260	NA	1	1	STD22565	10/25/07 08:27
4	10M59852	WG253794-01 VBLK1025 BLANK 8260	NA	1	1		10/25/07 09:00
5	10M59853	WG253794-01 VBLK1025 BLANK 8260	NA	1	1		10/25/07 09:31
6	10M59854	WG253794-02 20ug/L LCS 8260	NA	1	1	STD22574	10/25/07 10:03
7	10M59855	WG253794-03 20ug/L LCSDUP 8260	NA	1	1	STD22574	10/25/07 10:35
8	10M59856	L0710582-10 B D1 10X 826-LOW	<2	1	10		10/25/07 11:06
9	10M59857	L0710616-01 A 826-SPE	<2	1	1		10/25/07 11:37
10	10M59858	L0710557-03 B 826-SPE	<2	1	1		10/25/07 12:08
11	10M59859	L0710596-05 B 826-SPE	<2	1	1		10/25/07 12:40
12	10M59860	L0710596-07 B 826-SPE	<2	1	1		10/25/07 13:11
13	10M59861	L0710596-10 B 826-SPE	<2	1	1		10/25/07 13:42
14	10M59862	L0710582-11 B D1 10X 826-LOW	<2	1	10		10/25/07 14:13
15	10M59863	L0710582-15 B D1 10X 826-LOW	<2	1	10		10/25/07 14:44
16	10M59864	L0710582-05 B D1 10X 826-LOW	<2	1	10		10/25/07 15:15
17	10M59865	L0710616-02 A 826-SPE	<2	1	1		10/25/07 15:46
18	10M59866	L0710616-03 A 826-SPE	<2	1	1		10/25/07 16:17
19	10M59867	L0710616-04 A 826-SPE	<2	1	1		10/25/07 16:48
20	10M59868	L0710616-05 A 826-SPE	<2	1	1		10/25/07 17:19
21	10M59869	L0710616-06 A 826-SPE	<2	1	1		10/25/07 17:51
22	10M59870	L0710597-05 A 826-SPE	<2	1	1		10/25/07 18:23
23	10M59871	L0710597-06 A 826-SPE	<2	1	1		10/25/07 18:54
24	10M59872	L0710597-08 A 826-SPE	<2	1	1		10/25/07 19:26
25	10M59873	L0710597-10 A 826-SPE	<2	1	1		10/25/07 19:57
26	10M59874	SYSTEM BLANK	NA	1	1		10/25/07 20:28
27	10M59875	SYSTEM BLANK	NA	1	1		10/25/07 21:00
28	10M59877	SYSTEM CHECK	NA	1	1		10/25/07 21:32

Comments

Seq.	Rerun	Dil.	Reason	Analytes
1				
File ID: 10M59849				

Approved: October 29, 2007

Page: 1

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS10 Dataset: 102507

Analyst1: MES Analyst2: NA

Method: 8260B SOP: MSV01 Rev: 10

Method: 5030/5035 SOP: PAT01 Rev: 10

Maintenance Log ID: 21463

Internal Standard: STD22019 Surrogate Standard: STD22132

CCV: STD22565 LCS: STD22574 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA

Workgroups: WG253794

Comments

Seq.	Rerun	Dil.	Reason	Analytes
			RR, BFB failed.	
24	X	25	Over Calibration Range	TCE
File ID: 10M59872				
25	X	1	Carry-over contamination	
File ID: 10M59873				
			Do not report.	

Approved: October 29, 2007

Page: 2

00073011

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS6 Dataset: 102507
Analyst1: CMS Analyst2: NA
Method: 8260B SOP: MSV01 Rev: 10
Method: 624 SOP: MSV10 Rev: 9
Method: 5030B SOP: PAT01 Rev: 10
Maintenance Log ID: 21477

Internal Standard: STD22318 Surrogate Standard: STD22613
CCV: STD22673 LCS: STD22622 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG253819

Comments:

Seq.	File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
1	6M70252	WG253818-01 BFB 50ng STD 8260	NA	1	1	STD22252	10/25/07 09:30
2	6M70253	WG253818-01 BFB 50ng STD 8260	NA	1	1	STD22252	10/25/07 09:44
3	6M70254	WG253818-02 50ug/L WATER STD 8260	NA	1	1	STD22673	10/25/07 10:08
4	6M70255	SYSTEM BLANK	NA	1	1		10/25/07 10:40
5	6M70256	WG253721-12 20ug/L ALT SOURCE 8260	NA	1	1	STD22622	10/25/07 11:12
6	6M70257	WG253819-01 VBLK1025 BLANK 8260	NA	1	1		10/25/07 11:44
7	6M70258	WG253819-02 20ug/L LCS 8260	NA	1	1	STD226222	10/25/07 12:15
8	6M70259	WG253819-03 20ug/L LCSDUP 8260	NA	1	1	STD226222	10/25/07 12:47
9	6M70260	L0710578-05 A 826-SPE1	<2	1	1		10/25/07 13:19
10	6M70261	L0710578-06 A 826-SPE1	<2	1	1		10/25/07 13:50
11	6M70262	L0710547-06 B 200X 826-LOW	<2	1	200		10/25/07 14:22
12	6M70263	L0710597-11 A 826-SPE	<2	1	1		10/25/07 14:54
13	6M70264	L0710597-12 A 826-SPE	<2	1	1		10/25/07 15:26
14	6M70265	L0710597-13 A 826-SPE	<2	1	1		10/25/07 15:58
15	6M70266	L0710578-02 A 826-SPE1	<2	1	1		10/25/07 16:30
16	6M70267	L0710536-16 A 8260	<2	1	1		10/25/07 17:02
17	6M70268	L0710536-11 A 8260	<2	1	1		10/25/07 17:35
18	6M70269	L0710536-14 A 8260	<2	1	1		10/25/07 18:07
19	6M70270	L0710536-01 A 200X 8260	<2	1	200		10/25/07 18:39
20	6M70271	L0710536-03 A 100X 8260	<2	1	100		10/25/07 19:11
21	6M70272	L0710536-05 A 100X 8260	<2	1	100		10/25/07 19:43
22	6M70273	L0710536-07 A 100X 8260	<2	1	100		10/25/07 20:15
23	6M70274	L0710536-09 A 50X 8260	=7	1	50		10/25/07 20:47
24	6M70275	L0710536-12 A 500X 8260	=6	1	500		10/25/07 21:20
25	6M70276	SYSTEM BLANK	NA	1	1		10/25/07 21:52
26	6M70277	WG253819-04 624 BLANK	NA	2	1		10/25/07 22:24
27	6M70278	L0710681-01 A 624-SPE	=7	2	1		10/25/07 22:56
28	6M70279	L0710681-02 A 624-SPE	=7	2	1		10/25/07 23:28
29	6M70280	L0710153-01 B 826-REF-BLK	<2	1	1		10/26/07 00:00

Comments

Seq.	Rerun	Dil.	Reason	Analytes
1	X			

Approved: October 30, 2007

Page: 1

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS6 Dataset: 102507
Analyst1: CMS Analyst2: NA
Method: 8260B SOP: MSV01 Rev: 10
Method: 624 SOP: MSV10 Rev: 9
Method: 5030B SOP: PAT01 Rev: 10
Maintenance Log ID: 21477

Internal Standard: STD22318 Surrogate Standard: STD22613
CCV: STD22673 LCS: STD22622 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG253819

Comments

Seq.	Rerun	Dil.	Reason	Analytes
File ID: 6M70252				
	Tune failed/DNR			
9	X		Surrogate standard failure	
File ID: 6M70260				
	DNR			
12	X	100	Over Calibration Range	cis-1,2-DCE, TCE
File ID: 6M70263				
13	X	2	Carry-over contamination	
File ID: 6M70264				
	DNR			
14	X		Carry-over contamination	
File ID: 6M70265				
	DNR			
15	X	25	Over Calibration Range	cis-1,2-DCE, TCE
File ID: 6M70266				
16	X		Carry-over contamination	
File ID: 6M70267				
	DNR			
17	X		Carry-over contamination	
File ID: 6M70268				
	DNR			
18	X		Carry-over contamination	
File ID: 6M70269				
	DNR			
21	X	1000	Over Calibration Range	Tol., CB, Styrene
File ID: 6M70272				
22	X	1000	Over Calibration Range	Tol., CB, Styrene
File ID: 6M70273				
23	X	100	Over Calibration Range	Tol.
File ID: 6M70274				
24	X	1000	Over Calibration Range	CB

Approved: October 30, 2007

Page: 2

00073013

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS6 Dataset: 102507

Analyst1: CMS Analyst2: NA

Method: 8260B SOP: MSV01 Rev: 10

Method: 624 SOP: MSV10 Rev: 9

Method: 5030B SOP: PAT01 Rev: 10

Maintenance Log ID: 21477

Internal Standard: STD22318 Surrogate Standard: STD22613

CCV: STD22673 LCS: STD22622 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA

Workgroups: WG253819

Comments

Seq.	Rerun	Dil.	Reason	Analytes
File ID: 6M70275				

Approved: October 30, 2007

Page: 3

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS6 Dataset: 102607
Analyst1: MES Analyst2: CMS
Method: 8260B SOP: MSV01 Rev: 10
Method: 624 SOP: MSV10 Rev: 9
Method: 5030B SOP: PAT01 Rev: 10
Maintenance Log ID: 21480

Internal Standard: STD22318 Surrogate Standard: SD22613
CCV: STD22673 LCS: STD22622 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG253919

Comments:

Seq.	File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
1	6M70282	SYSTEM BLANK	NA	1	1		10/26/07 07:40
2	6M70283	WG253918-01 50NG BFB STD 8260	NA	1	1	STD22252	10/26/07 08:32
3	6M70284	WG253918-01 50NG BFB STD 8260	NA	1	1	STD22252	10/26/07 08:45
4	6M70285	WG253918-01 50NG BFB STD 8260	NA	1	1	STD22252	10/26/07 09:28
5	6M70286	WG253918-02 50ug/L WATER STD 8260	NA	1	1	STD22673	10/26/07 09:51
6	6M70287	WG253918-02 50ug/L WATER STD 8260	NA	1	1	STD22673	10/26/07 10:25
7	6M70288	WG253919-01 VBLK1026 BLANK 8260	NA	1	1		10/26/07 11:10
8	6M70289	WG253919-01 VBLK1026 BLANK 8260	NA	1	1		10/26/07 11:43
9	6M70290	WG253919-02 20ug/L LCS 8260	NA	1	1	STD22622	10/26/07 12:16
10	6M70291	WG253919-03 20ug/L LCSDUP 8260	NA	1	1	STD22622	10/26/07 12:48
11	6M70292	L0710597-11 B 100X 826-SPE D1	<2	1	100		10/26/07 13:22
12	6M70293	L0710583-02 A 10X 826-SPLP	NA	18	10		10/26/07 13:55
13	6M70294	L0710578-02 B 25X 826-SPE1 D1	<2	1	25		10/26/07 14:27
14	6M70295	L0710536-05 B 1000X 8260 D1	<2	1	1000		10/26/07 14:59
15	6M70296	L0710536-07 B 1000X 8260 D1	<2	1	1000		10/26/07 15:31
16	6M70297	L0710536-09 B 100X 8260 D1	=7	1	100		10/26/07 16:03
17	6M70298	L0710536-12 B 1000X 8260 D1	=7	1	1000		10/26/07 16:35
18	6M70299	WG253919-04 624 BLANK	NA	1	1		10/26/07 17:07
19	6M70300	L0710718-02 A 624	=7	2	1		10/26/07 17:39
20	6M70301	L0710718-01 A 2X 624	=7	2	2		10/26/07 18:11
21	6M70302	L0710718-03 A 5X 624	=7	2	5		10/26/07 18:44
22	6M70303	L0710513-07 A 826-LOW	<2	1	1		10/26/07 19:16
23	6M70304	L0710447-05 B 826-SPE	<2	1	1		10/26/07 19:49
24	6M70305	L0710447-06 B 826-SPE	<2	1	1		10/26/07 20:21
25	6M70306	L0710513-04 A 826-LOW	<2	1	1		10/26/07 20:54
26	6M70307	L0710513-05 A 826-LOW	<2	1	1		10/26/07 21:26
27	6M70308	SYSTEM BLANK	NA	1	1		10/26/07 21:58
28	6M70309	SYSTEM BLANK	NA	1	1		10/26/07 22:31
29	6M70310	L0710737-03 A 624-SPE	=7	2	1		10/26/07 23:03
30	6M70311	VIAL 10/24/07	NA	2	1		10/26/07 23:35
31	6M70312	VIAL 10/24/07 HCL	NA	2	1		10/27/07 00:08

Comments

Approved: October 30, 2007

Page: 1

00073015

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS6 Dataset: 102607
Analyst1: MES Analyst2: CMS
Method: 8260B SOP: MSV01 Rev: 10
Method: 624 SOP: MSV10 Rev: 9
Method: 5030B SOP: PAT01 Rev: 10
Maintenance Log ID: 21480

Internal Standard: STD22318 Surrogate Standard: SD22613
CCV: STD22673 LCS: STD22622 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG253919

Comments

Seq.	Rerun	Dil.	Reason	Analytes
2	X			
File ID: 6M70283				
	Tune failed/DNR			
3	X			
File ID: 6M70284				
	Tune failed/DNR			
5	X		Check Standard Failure	
File ID: 6M70286				
	DNR			
7	X		Carry-over contamination	
File ID: 6M70288				
	DNR			
11	X	500	Over Calibration Range	TCE
File ID: 6M70292				
12	X	500	Over Calibration Range	PCE, 1,2-DCB
File ID: 6M70293				
20	X	1	Analyzed too dilute	
File ID: 6M70301				
	DNR			

Approved: October 30, 2007

00073016

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS10 Dataset: 102607
Analyst1: MES Analyst2: NA
Method: 8260B SOP: MSV01 Rev: 10
Method: 5030/5035 SOP: PAT01 Rev: 10

Maintenance Log ID: 21478

Internal Standard: STD22714 Surrogate Standard: STD22715
CCV: STD22565 LCS: STD22574 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA
Workgroups: WG253910

Comments:

Seq.	File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
28	10M59879	WG253909-01 50NG BFB STD 8260	NA	1	1	STD22252	10/26/07 08:31
29	10M59880	WG253909-01 50NG BFB STD 8260	NA	1	1	STD22252	10/26/07 08:45
30	10M59881	WG253909-01 50NG BFB STD 8260	NA	1	1	STD22252	10/26/07 09:27
1	10M59882	WG253909-01 50NG BFB STD 8260	NA	1	1	STD22252	10/26/07 09:43
2	10M59883	WG253909-02 50ug/L WATER STD 8260	NA	1	1	STD22565	10/26/07 10:07
3	10M59884	WG253909-02 50ug/L WATER STD 8260	NA	1	1	STD22565	10/26/07 11:25
4	10M59885	WG253910-01 VBLK1026 BLANK 8260	NA	1	1		10/26/07 11:57
5	10M59886	WG253910-01 VBLK1026 BLANK 8260	NA	1	1		10/26/07 12:28
6	10M59887	WG253910-02 20ug/L LCS 8260	NA	1	1	STD22574	10/26/07 13:00
7	10M59888	WG253910-03 20ug/L LCSDUP 8260	NA	1	1	STD22574	10/26/07 13:32
8	10M59889	L0710597-08 B D1 25X 826-SPE	<2	1	25		10/26/07 14:04
9	10M59890	L0710730-24 A 826-SPE	<2	1	1		10/26/07 14:35
10	10M59891	L0710582-03 A 826-LOW	<2	1	1		10/26/07 15:07
11	10M59892	L0710675-01 A 826-SPE	<2	1	1		10/26/07 15:39
12	10M59893	L0710675-08 A 826-SPE	<2	1	1		10/26/07 16:10
13	10M59894	L0710675-02 A 826-SPE	<2	1	1		10/26/07 16:42
14	10M59895	L0710675-03 A 826-SPE	<2	1	1		10/26/07 17:14
15	10M59896	L0710675-04 A 826-SPE	<2	1	1		10/26/07 17:47
16	10M59897	L0710675-05 A 826-SPE	<2	1	1		10/26/07 18:19
17	10M59898	L0710675-06 A 826-SPE	<2	1	1		10/26/07 18:51
18	10M59899	L0710675-07 A 826-SPE	<2	1	1		10/26/07 19:23
19	10M59900	L0710597-10 B 286-SPE	<2	1	1		10/26/07 19:55
20	10M59901	L0710597-12 B 2X 286-SPE	<2	1	2		10/26/07 20:27
21	10M59902	L0710597-13 B 286-SPE	<2	1	1		10/26/07 20:59
22	10M59903	L0710582-06 B 826-LOW	<2	1	1		10/26/07 21:31
23	10M59904	L0710582-16 B 826-LOW	<2	1	1		10/26/07 22:03
24	10M59905	L0710582-17 A 826-LOW	<2	1	1		10/26/07 22:35
25	10M59906	SYSTEM BLANK	NA	1	1		10/26/07 23:07
26	10M59907	SYSTEM BLANK	NA	1	1		10/26/07 23:39
27	10M59908	SYSTEM CHECK	NA	1	1		10/27/07 00:11

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Approved: October 30, 2007

Page: 1

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS10 Dataset: 102607

Analyst1: MES Analyst2: NA

Method: 8260B SOP: MSV01 Rev: 10

Method: 5030/5035 SOP: PAT01 Rev: 10

Maintenance Log ID: 21478

Internal Standard: STD22714 Surrogate Standard: STD22715

CCV: STD22565 LCS: STD22574 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA

Workgroups: WG253910

Comments

Seq.	Rerun	Dil.	Reason	Analytes
28				
File ID: 10M59879				
	RR, BFB failed.			
29				
File ID: 10M59880				
	RR, BFB failed. Baking out for 30 minutes.			
30	X			
File ID: 10M59881				
	RR, BFB failed. Replaced septum.			
4	X	1		
File ID: 10M59885				
	CMPTR ERROR			
23	X	1	Missed Tune	
File ID: 10M59904				
	DO NOT REPORT			
24	X	1	Missed Tune	
File ID: 10M59905				
	DO NOT REPORT			

Approved: October 30, 2007

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS10 Dataset: 102707

Analyst1: MES Analyst2: NA

Method: 8260B SOP: MSV01 Rev: 10

Method: 5030/5035 SOP: PAT01 Rev: 10

Maintenance Log ID: 21484

Internal Standard: STD22714 Surrogate Standard: STD22715

CCV: STD22565 LCS: STD22574 MS/MSD: NA

Column 1 ID: RTX502.2 Column 2 ID: NA

Workgroups: WG254006

Comments:

Seq.	File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
1	10M59910	WG254005-01 50NG BFB STD 8260	NA	1	1	STD22252	10/27/07 09:21
2	10M59911	WG254005-02 50ug/L WATER STD 8260	NA	1	1	STD22565	10/27/07 09:47
3	10M59912	WG254006-01 VBLK1027 BLANK 8260	NA	1	1		10/27/07 10:19
4	10M59913	WG254006-01 VBLK1027 BLANK 8260	NA	1	1		10/27/07 10:52
5	10M59914	WG254006-02 20ug/L LCS 8260	NA	1	1	STD22574	10/27/07 11:24
6	10M59915	WG254006-03 20ug/L LCSDUP 8260	NA	1	1	STD22574	10/27/07 11:56
7	10M59916	L0710596-01 B D1 100X 826-SPE	<2	1	100		10/27/07 12:28
8	10M59917	L0710596-02 B D1 10X 826-SPE	5	1	10		10/27/07 13:00
9	10M59918	L0710596-09 B D1 20X 826-SPE	<2	1	20		10/27/07 13:32
10	10M59919	L0710596-11 B 826-SPE	<2	1	1		10/27/07 14:05
11	10M59920	L0710597-07 B 826-SPE	<2	1	1		10/27/07 14:37
12	10M59921	L0710582-07 B 826-LOW	<2	1	1		10/27/07 15:10
13	10M59922	L0710582-09 B 826-LOW	<2	1	1		10/27/07 15:42
14	10M59923	L0710582-16 B 826-LOW	<2	1	1		10/27/07 16:15
15	10M59924	L0710582-17 B 826-LOW	<2	1	1		10/27/07 16:46
16	10M59925	L0710597-09 B D1 5X 826-SPE	<2	1	5		10/27/07 17:19
17	10M59926	L0710447-03 B D1 10X 826-SPE	<2	1	10		10/27/07 17:51
18	10M59927	L0710447-04 B D1 5X 826-SPE	<2	1	5		10/27/07 18:24
19	10M59928	L0710447-07 B D1 5X 826-SPE	<2	1	5		10/27/07 18:56
20	10M59929	L0710494-03 B D1 20X 826-SPE	<2	1	20		10/27/07 19:29
21	10M59930	L0710494-04 B D1 20X 826-SPE	<2	1	20		10/27/07 20:03
22	10M59931	L0710494-05 B D1 50X 826-SPE	<2	1	50		10/27/07 20:35
23	10M59932	L0710494-07 B D1 5X 826-SPE	<2	1	5		10/27/07 21:08
24	10M59933	L0710582-04 A 826-LOW	<2	1	1		10/27/07 21:41
25	10M59934	SYSTEM BLANK	NA	1	1		10/27/07 22:13
26	10M59935	SYSTEM CHECK	NA	1	1		10/27/07 22:44

Comments

Seq.	Rerun	Dil.	Reason	Analytes
24	X	2.5	Missed Tune	
File ID: 10M59933				

Approved: October 30, 2007

Page: 1

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS8 Dataset: 102907

Analyst1: CMS Analyst2: NA

Method: 8260B SOP: MSV01 Rev: 10

Method: 5030B SOP: PAT01 Rev: 10

Maintenance Log ID: 21490

Internal Standard: STD22561 Surrogate Standard: STD22637

CCV: STD22616;STD22513 LCS: STD22622;STD22514 MS/MSD: STD22622

Column 1 ID: RTX502.2 Column 2 ID: NA

Workgroups: WG254048

Comments:

Seq.	File ID	Sample Information	pH	Mat	Dil	Reference	Date/Time
1	8M341020	WG254047-01 BFB 50ng STD 8260	NA	1	1	STD22252	10/29/07 08:05
2	8M341021	WG254047-02 50ug/L STD 8260	NA	1	1	STD22616	10/29/07 08:31
3	8M341022	WG254049-01 100ug/L A9FOO STD 8260	NA	1	1	STD22513	10/29/07 09:04
4	8M341023	WG254048-01 VBLK1029 BLANK 8260	NA	1	1		10/29/07 09:34
5	8M341024	WG254048-02 20ug/L LCS STD 8260	NA	1	1	STD22622	10/29/07 10:04
6	8M341025	WG254048-03 100ug/L A9FOOLCS STD 82	NA	1	1	STD22514	10/29/07 10:34
7	8M341026	L0710001-01 826-SPE 4th QTR MDL	NA	1	1	STD22720	10/29/07 11:04
8	8M341027	L0710002-01 826-SPE 4th QTR MDL	NA	1	1	STD22720	10/29/07 11:34
9	8M341028	L0710769-01 B 826-SPE2	=7	1	1		10/29/07 12:04
10	8M341029	L0710771-01 B 826-SPE2	=7	1	1		10/29/07 12:34
11	8M341030	L0710766-01 B 10X 826-SPE2 D1	=7	1	10		10/29/07 13:04
12	8M341031	L0710583-02 B 500X 826-SPLP D1	NA	18	500		10/29/07 13:34
13	8M341032	L0710597-11 C 500X 826-SPE D1	<2	1	500		10/29/07 14:04
14	8M341033	L0710620-05 B 826-SPE1	<2	1	1		10/29/07 14:34
15	8M341034	L0710494-08 B 826-SPE	<2	1	1		10/29/07 15:03
16	8M341035	L0710548-01 B 826-SPE	<2	1	1		10/29/07 15:33
17	8M341036	L0710548-02 B 826-SPE	<2	1	1		10/29/07 16:03
18	8M341037	L0710548-03 B 826-SPE	<2	1	1		10/29/07 16:33
19	8M341038	L0710620-18 A 826-SPE	<2	1	1		10/29/07 17:03
20	8M341039	L0710620-19 MS A 826-SPE	<2	1	1	STD22622	10/29/07 17:32
21	8M341040	L0710620-20 MSD A 826-SPE	<2	1	1	STD22622	10/29/07 18:02
22	8M341041	L0710620-04 B 10X 826-SPE1 D1	<2	1	10		10/29/07 18:32
23	8M341042	L0710582-04 B 2.5X 826-LOW	<2	1	2.5		10/29/07 19:02
24	8M341043	L0710582-08 A 826-LOW	<2	1	1		10/29/07 19:32
25	8M341044	SYSTEM BLANK	NA	1	1		10/29/07 20:02
26	8M341045	WG254048-07 624 BLANK	NA	1	1		10/29/07 20:32
27	8M341046	L0710668-02 D 624UL	=7	2	1		10/29/07 21:02
28	8M341047	L0710668-01 D 624UL	=7	2	1		10/29/07 21:32
29	8M341048	L0710670-01 D 624UL	=7	2	1		10/29/07 22:02
30	8M341049	SYSTEM BLANK	NA	2	1		10/29/07 22:33

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Approved: October 31, 2007

Page: 1

00073020

KEMRON Environmental Services

Instrument Run Log

Instrument: HPMS8 Dataset: 102907

Analyst1: CMS Analyst2: NA

Method: 8260B SOP: MSV01 Rev: 10

Method: 5030B SOP: PAT01 Rev: 10

Maintenance Log ID: 21490

Internal Standard: STD22561 Surrogate Standard: STD22637

CCV: STD22616;STD22513 LCS: STD22622;STD22514 MS/MSD: STD22622

Column 1 ID: RTX502.2 Column 2 ID: NA

Workgroups: WG254048

Comments

Seq.	Rerun	Dil.	Reason	Analytes
27	X			
File ID: 8M341046				
	RR as an ulta low			
28	X			
File ID: 8M341047				
	RR as an ulta low			
29	X			
File ID: 8M341048				
	RR as an ulta low			

Approved: October 31, 2007

Page: 2

00073021

KEMRON Environmental Services
Data Checklist

Date: 01-OCT-2007
Analyst: MES
Analyst: NA
Method: 8260
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 18538
Analytical Workgroups: WG251532,WG251619

BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	X
Project/Client Specific Requirements	X
Special Standards	NA
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	NA
Samples	X
TCL Hits	X
Spectra of TCL Hits	X
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	X
Reruns	NA
Manual Integrations	NA
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	MES
Secondary Reviewer	MDA
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Check the reasonableness of the results	X

Primary Reviewer:
02-OCT-2007

Secondary Reviewer:
03-OCT-2007

Generated: OCT-03-2007 10:10:17

00073022

KEMRON Environmental Services
Data Checklist

Date: 18-OCT-2007
Analyst: MES
Analyst: NA
Method: 8260
Instrument: HPMS10
Curve Workgroup: NA
Runlog ID: 18888
Analytical Workgroups: WG253187

BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	NA
Project/Client Specific Requirements	NA
Special Standards	NA
Blanks	NA
TCL's	NA
Surrogates	NA
LCS (Laboratory Control Sample)	NA
Recoveries	NA
Surrogates	NA
MS/MSD/Duplicates	NA
Samples	NA
TCL Hits	NA
Spectra of TCL Hits	NA
Surrogates	NA
Internal Standards Criteria	NA
Library Searches	NA
Calculations & Correct Factors	NA
Dilutions Run	NA
Reruns	NA
Manual Integrations	NA
Case Narrative	NA
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	MES
Secondary Reviewer	MDA
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Check the reasonableness of the results	X

Primary Reviewer:
22-OCT-2007

Secondary Reviewer:
23-OCT-2007

Generated: OCT-23-2007 11:16:45

00073023

KEMRON Environmental Services
Data Checklist

Date: 22-OCT-2007
Analyst: CMS
Analyst: NA
Method: 8260B/624
Instrument: HPMS8
Curve Workgroup: NA
Runlog ID: 18926
Analytical Workgroups: WG253480

System Performance Check	X
BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	NA
Project/Client Specific Requirements	NA
Special Standards	NA
Blanks	NA
TCL's	NA
Surrogates	NA
LCS (Laboratory Control Sample)	NA
Recoveries	NA
Surrogates	NA
MS/MSD/Duplicates	NA
Samples	NA
TCL Hits	NA
Spectra of TCL Hits	NA
Surrogates	NA
Internal Standards Criteria	NA
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	NA
Reruns	X
Manual Integrations	NA
Case Narrative	NA
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	CMS
Secondary Reviewer	MDA
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Check the reasonableness of the results	X

Primary Reviewer:
23-OCT-2007

Secondary Reviewer:
24-OCT-2007

Generated: OCT-24-2007 12:18:27

00073024

KEMRON Environmental Services
Data Checklist

Date: 23-OCT-2007
Analyst: CMS
Analyst: NA
Method: 8260B
Instrument: HPMS8
Curve Workgroup: NA
Runlog ID: 18933
Analytical Workgroups: WG253480;WG253579

System Performance Check	X
BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	X
Project/Client Specific Requirements	X
Special Standards	X
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	X
Samples	X
TCL Hits	X
Spectra of TCL Hits	X
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	X
Reruns	X
Manual Integrations	NA
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	CMS
Secondary Reviewer	MDA
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Check the reasonableness of the results	X

Primary Reviewer:
24-OCT-2007

Secondary Reviewer:
24-OCT-2007

Generated: OCT-24-2007 11:20:01

00073025

KEMRON Environmental Services
Data Checklist

Date: 24-OCT-2007
Analyst: MES
Analyst: TMB
Method: 8260/624
Instrument: HPMS11
Curve Workgroup: NA
Runlog ID: 18964
Analytical Workgroups: WG253678

BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	X
Project/Client Specific Requirements	X
Special Standards	NA
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	NA
Samples	X
TCL Hits	X
Spectra of TCL Hits	X
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	NA
Reruns	X
Manual Integrations	NA
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	MES
Secondary Reviewer	MDA
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Check the reasonableness of the results	X

Primary Reviewer:
25-OCT-2007

Secondary Reviewer:
26-OCT-2007

Generated: OCT-26-2007 13:30:22

00073026

KEMRON Environmental Services
Data Checklist

Date: 24-OCT-2007
Analyst: CMS
Analyst: NA
Method: 8260
Instrument: HPMS6
Curve Workgroup: NA
Runlog ID: 18967
Analytical Workgroups: WG253721

BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	NA
Project/Client Specific Requirements	NA
Special Standards	NA
Blanks	NA
TCL's	NA
Surrogates	NA
LCS (Laboratory Control Sample)	NA
Recoveries	NA
Surrogates	NA
MS/MSD/Duplicates	NA
Samples	NA
TCL Hits	NA
Spectra of TCL Hits	NA
Surrogates	NA
Internal Standards Criteria	NA
Library Searches	NA
Calculations & Correct Factors	NA
Dilutions Run	NA
Reruns	NA
Manual Integrations	NA
Case Narrative	NA
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	MES
Secondary Reviewer	MDA
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Check the reasonableness of the results	X

Primary Reviewer:
25-OCT-2007

Secondary Reviewer:
26-OCT-2007

Generated: OCT-26-2007 10:28:33

00073027

KEMRON Environmental Services
Data Checklist

Date: 25-OCT-2007
Analyst: MES
Analyst: NA
Method: 8260
Instrument: HPMS10
Curve Workgroup: NA
Runlog ID: 18983
Analytical Workgroups: WG253794

BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	X
Project/Client Specific Requirements	X
Special Standards	NA
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	NA
Samples	X
TCL Hits	X
Spectra of TCL Hits	X
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	X
Reruns	X
Manual Integrations	NA
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	MES
Secondary Reviewer	MDA
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Check the reasonableness of the results	X

Primary Reviewer:
26-OCT-2007

Secondary Reviewer:
29-OCT-2007

Generated: OCT-29-2007 09:10:40

00073028

KEMRON Environmental Services
Data Checklist

Date: 25-OCT-2007
Analyst: MES
Analyst: CMS
Method: 8260B/624
Instrument: HPMS6
Curve Workgroup: NA
Runlog ID: 18999
Analytical Workgroups: WG253819

System Performance Check	X
BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	X
Project/Client Specific Requirements	X
Special Standards	NA
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	NA
Samples	X
TCL Hits	X
Spectra of TCL Hits	X
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	X
Reruns	X
Manual Integrations	NA
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	CMS
Secondary Reviewer	MDA
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Check the reasonableness of the results	X

Primary Reviewer:
29-OCT-2007

Secondary Reviewer:
30-OCT-2007

Generated: OCT-30-2007 12:23:09

00073029

KEMRON Environmental Services
Data Checklist

Date: 26-OCT-2007
Analyst: MES
Analyst: CMS
Method: 8260B/624
Instrument: HPMS6
Curve Workgroup: NA
Runlog ID: 19002
Analytical Workgroups: WG253919

System Performance Check	X
BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	X
Project/Client Specific Requirements	X
Special Standards	NA
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	NA
Samples	X
TCL Hits	X
Spectra of TCL Hits	X
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	X
Reruns	X
Manual Integrations	NA
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	CMS
Secondary Reviewer	MDA
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Check the reasonableness of the results	X

Primary Reviewer:
29-OCT-2007

Secondary Reviewer:
30-OCT-2007

Generated: OCT-30-2007 12:33:43

00073030

KEMRON Environmental Services
Data Checklist

Date: 26-OCT-2007
Analyst: MES
Analyst: NA
Method: 8260
Instrument: HPMS10
Curve Workgroup: NA
Runlog ID: 19000
Analytical Workgroups: WG253910

System Performance Check	NA
BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	X
Project/Client Specific Requirements	X
Special Standards	NA
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	NA
Samples	X
TCL Hits	X
Spectra of TCL Hits	X
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	X
Reruns	X
Manual Integrations	NA
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	TMB
Secondary Reviewer	MDA
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Check the reasonableness of the results	X

Primary Reviewer:
29-OCT-2007
Tiffany Bailey

Secondary Reviewer:
30-OCT-2007

Generated: OCT-30-2007 12:12:12

00073031

KEMRON Environmental Services
Data Checklist

Date: 27-OCT-2007
Analyst: MES
Analyst: NA
Method: 8260
Instrument: HPMS10
Curve Workgroup: NA
Runlog ID: 19007
Analytical Workgroups: WG254006

BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	X
Project/Client Specific Requirements	X
Special Standards	NA
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	NA
Samples	X
TCL Hits	X
Spectra of TCL Hits	X
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	X
Reruns	NA
Manual Integrations	NA
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	MES
Secondary Reviewer	MDA
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Check the reasonableness of the results	X

Primary Reviewer:
29-OCT-2007

Secondary Reviewer:
30-OCT-2007

Generated: OCT-30-2007 08:43:08

00073032

KEMRON Environmental Services
Data Checklist

Date: 29-OCT-2007
Analyst: CMS
Analyst: NA
Method: 8260B
Instrument: HPMS6
Curve Workgroup: NA
Runlog ID: 19014
Analytical Workgroups: WG254048

System Performance Check	X
BFB	X
Initial Calibration	X
Average RF	X
Linear Reg or Higher Order Curve	X
Second Source standard % Difference	X
Continuing Calibration /Check Standards	X
Project/Client Specific Requirements	X
Special Standards	X
Blanks	X
TCL's	X
Surrogates	X
LCS (Laboratory Control Sample)	X
Recoveries	X
Surrogates	X
MS/MSD/Duplicates	X
Samples	X
TCL Hits	X
Spectra of TCL Hits	X
Surrogates	X
Internal Standards Criteria	X
Library Searches	NA
Calculations & Correct Factors	X
Dilutions Run	X
Reruns	NA
Manual Integrations	X
Case Narrative	X
Results Reporting/Data Qualifiers	X
KOBRA Workgroup Data	X
Check for Completeness	X
Primary Reviewer	CMS
Secondary Reviewer	LSB
Check for compliance with method and project specific requirements	X
Check the completeness of reported information	X
Check the information for the report narrative	X
Check the reasonableness of the results	X

Primary Reviewer:
30-OCT-2007

Secondary Reviewer:
31-OCT-2007

Generated: OCT-31-2007 17:39:19

KEMRON Environmental Services
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

00073033

Analytical Method: 8260B

AAB#: WG253919

Login Number: L0710597

Client ID	Date Collected	Date Received	Date Extracted	Max Hold Time Ext.	Time Held Ext.	Date Analyzed	Max Hold Time Anal	Time Held Anal.	Q
47WW25-101607	10/18/07	10/23/07	10/26/07	14	8.18	10/26/07	14	8.18	

* EXT = SEE PROJECT QAPP REQUIREMENTS
*ANAL = SEE PROJECT QAPP REQUIREMENTS

KEMRON FORMS - Modified 11/20/2006
Version 1.5 PDF File ID: 919901
Report generated 11/01/2007 15:45

KEMRON Environmental Services
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

00073034

Analytical Method: 8260B

AAB#: WG254006

Login Number: L0710597

Client ID	Date Collected	Date Received	Date Extracted	Max Hold Time Ext.	Time Held Ext.	Date Analyzed	Max Hold Time Anal	Time Held Anal.	Q
47WW32-101807	10/18/07	10/23/07	10/27/07	14	8.99	10/27/07	14	8.99	
47WW36-101907	10/19/07	10/23/07	10/27/07	14	8.31	10/27/07	14	8.31	

* EXT = SEE PROJECT QAPP REQUIREMENTS
*ANAL = SEE PROJECT QAPP REQUIREMENTS

KEMRON FORMS - Modified 11/20/2006
Version 1.5 PDF File ID: 919901
Report generated 11/01/2007 15:45

KEMRON Environmental Services
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

00073035

Analytical Method: 8260B

AAB#: WG254048

Login Number: L0710597

Client ID	Date Collected	Date Received	Date Extracted	Max Hold Time Ext.	Time Held Ext.	Date Analyzed	Max Hold Time Anal	Time Held Anal.	Q
47WW25-101607	10/18/07	10/23/07	10/29/07	14	11.2	10/29/07	14	11.2	

* EXT = SEE PROJECT QAPP REQUIREMENTS
*ANAL = SEE PROJECT QAPP REQUIREMENTS

KEMRON FORMS - Modified 11/20/2006
Version 1.5 PDF File ID: 919901
Report generated 11/01/2007 15:45

KEMRON Environmental Services
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

00073036

Analytical Method: 8260B

AAB#: WG253678

Login Number: L0710597

Client ID	Date Collected	Date Received	Date Extracted	Max Hold Time Ext.	Time Held Ext.	Date Analyzed	Max Hold Time Anal	Time Held Anal.	Q
TRIP BLANK	10/19/07	10/23/07	10/24/07	14	5.58	10/24/07	14	5.58	
47WW36-101907	10/19/07	10/23/07	10/24/07	14	5.33	10/24/07	14	5.33	

* EXT = SEE PROJECT QAPP REQUIREMENTS
*ANAL = SEE PROJECT QAPP REQUIREMENTS

KEMRON FORMS - Modified 11/20/2006
Version 1.5 PDF File ID: 919901
Report generated 11/01/2007 15:45

KEMRON Environmental Services
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

00073037

Analytical Method: 8260B

AAB#: WG253794

Login Number: L0710597

Client ID	Date Collected	Date Received	Date Extracted	Max Hold Time Ext.	Time Held Ext.	Date Analyzed	Max Hold Time Anal	Time Held Anal.	Q
47WW18-101807	10/18/07	10/23/07	10/25/07	14	7.40	10/25/07	14	7.40	
47WW18-101807-DUP	10/18/07	10/23/07	10/25/07	14	7.42	10/25/07	14	7.42	
47WW30-101807	10/18/07	10/23/07	10/25/07	14	7.37	10/25/07	14	7.37	

* EXT = SEE PROJECT QAPP REQUIREMENTS
*ANAL = SEE PROJECT QAPP REQUIREMENTS

KEMRON FORMS - Modified 11/20/2006
Version 1.5 PDF File ID: 919901
Report generated 11/01/2007 15:45

KEMRON Environmental Services
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

00073038

Analytical Method: 8260B

AAB#: WG253910

Login Number: L0710597

Client ID	Date Collected	Date Received	Date Extracted	Max Hold Time Ext.	Time Held Ext.	Date Analyzed	Max Hold Time Anal	Time Held Anal.	Q
EQUIPMENT RINSE #1	10/18/07	10/23/07	10/26/07	14	8.17	10/26/07	14	8.17	
LHSMW34-101807	10/18/07	10/23/07	10/26/07	14	8.15	10/26/07	14	8.15	
47WW30-101807	10/18/07	10/23/07	10/26/07	14	8.15	10/26/07	14	8.15	
47WW31-101807	10/18/07	10/23/07	10/26/07	14	8.34	10/26/07	14	8.34	

* EXT = SEE PROJECT QAPP REQUIREMENTS
*ANAL = SEE PROJECT QAPP REQUIREMENTS

KEMRON FORMS - Modified 11/20/2006
Version 1.5 PDF File ID: 919901
Report generated 11/01/2007 15:45

KEMRON Environmental Services
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

00073039

Analytical Method: 8260B

AAB#: WG253819

Login Number: L0710597

Client ID	Date Collected	Date Received	Date Extracted	Max Hold Time Ext.	Time Held Ext.	Date Analyzed	Max Hold Time Anal	Time Held Anal.	Q
47WW25-101607	10/18/07	10/23/07	10/25/07	14	7.25	10/25/07	14	7.25	

* EXT = SEE PROJECT QAPP REQUIREMENTS
*ANAL = SEE PROJECT QAPP REQUIREMENTS

KEMRON FORMS - Modified 11/20/2006
Version 1.5 PDF File ID: 919901
Report generated 11/01/2007 15:45

KEMRON Environmental Services

SURROGATE STANDARDS

00073040

Login Number: L0710597
Instrument Id: HPMS10
Workgroup (AAB#): WG254006

Method: 8260
CAL ID: HPMS10-18-OCT-07
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L0710597-07	1.00	02	115	108	101	99.8
L0710597-09	5.00	DL01	127	116	101	101
WG254006-01	1.00	01	98.2	96.5	97.5	94.7
WG254006-02	1.00	01	102	102	97.1	97.3
WG254006-03	1.00	01	98.3	101	101	99.4

Surrogates	Surrogate Limits		
1 - 1,2-Dichloroethane-d4	80	-	120
2 - Dibromofluoromethane	86	-	118
3 - p-Bromofluorobenzene	86	-	115
4 - Toluene-d8	88	-	110

Underline = Result out of surrogate limits

DL = surrogate diluted out
ND = surrogate not detected

KEMRON FORMS - Modified 09/27/2006
Version 1.5 PDF File ID: 919909
Report generated 11/01/2007 15:46

KEMRON Environmental Services

SURROGATE STANDARDS

00073041

Login Number: L0710597
Instrument Id: HPMS11
Workgroup (AAB#): WG253678

Method: 8260
CAL ID: HPMS11-01-OCT-07
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L0710597-09	1.00	01	93.9	92.0	90.4	87.1
L0710597-14	1.00	01	88.3	91.3	90.5	89.0
WG253678-01	1.00	01	90.9	90.6	88.4	87.6
WG253678-02	1.00	01	89.4	93.1	87.1	88.0
WG253678-03	1.00	01	90.1	93.3	87.5	89.5
WG253678-04	1.00	01	94.9	93.8	89.2	87.4

Surrogates	Surrogate Limits		
1 - 1,2-Dichloroethane-d4	80	-	120
2 - Dibromofluoromethane	86	-	118
3 - p-Bromofluorobenzene	86	-	115
4 - Toluene-d8	88	-	110

Underline = Result out of surrogate limits

DL = surrogate diluted out
ND = surrogate not detected

KEMRON FORMS - Modified 09/27/2006
Version 1.5 PDF File ID: 919909
Report generated 11/01/2007 15:46

KEMRON Environmental Services

SURROGATE STANDARDS

00073042

Login Number: L0710597
Instrument Id: HPMS10
Workgroup (AAB#): WG253794

Method: 8260
CAL ID: HPMS10-18-OCT-07
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L0710597-05	1.00	01	112	110	103	98.1
L0710597-06	1.00	01	115	110	97.5	97.3
L0710597-08	1.00	01	114	109	97.1	95.0
WG253794-01	1.00	01	99.7	101	105	105
WG253794-02	1.00	01	99.3	102	96.6	98.5
WG253794-03	1.00	01	93.7	96.4	95.9	96.5

Surrogates	Surrogate Limits		
1 - 1,2-Dichloroethane-d4	80	-	120
2 - Dibromofluoromethane	86	-	118
3 - p-Bromofluorobenzene	86	-	115
4 - Toluene-d8	88	-	110

Underline = Result out of surrogate limits

DL = surrogate diluted out
ND = surrogate not detected

KEMRON FORMS - Modified 09/27/2006
Version 1.5 PDF File ID: 919909
Report generated 11/01/2007 15:46

SURROGATE STANDARDS

00073043

Login Number: L0710597
Instrument Id: HPMS8
Workgroup (AAB#): WG254048

Method: 8260
CAL ID: HPMS8-22-OCT-07
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L0710597-11	500	DL02	99.4	100	100	101
WG254048-01	1.00	01	100	99.6	99.8	101
WG254048-02	1.00	01	101	102	99.8	100
WG254048-03	1.00	01	98.7	99.7	101	101

Surrogates	Surrogate Limits		
1 - 1,2-Dichloroethane-d4	80	-	120
2 - Dibromofluoromethane	86	-	118
3 - p-Bromofluorobenzene	86	-	115
4 - Toluene-d8	88	-	110

Underline = Result out of surrogate limits

DL = surrogate diluted out
ND = surrogate not detected

KEMRON FORMS - Modified 09/27/2006
Version 1.5 PDF File ID: 919909
Report generated 11/01/2007 15:46

SURROGATE STANDARDS

00073044

Login Number: L0710597
Instrument Id: HPMS10
Workgroup (AAB#): WG253910

Method: 8260
CAL ID: HPMS10-18-OCT-07
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L0710597-08	25.0	DL01	92.7	96.4	101	98.0
L0710597-10	1.00	01	120	110	103	96.8
L0710597-12	2.00	DL01	118	111	101	98.9
L0710597-13	1.00	01	118	112	101	98.7
WG253910-01	1.00	01	93.4	97.8	99.8	99.5
WG253910-02	1.00	01	95.6	101	98.2	98.6
WG253910-03	1.00	01	99.4	101	99.1	98.8

Surrogates	Surrogate Limits		
1 - 1,2-Dichloroethane-d4	80	-	120
2 - Dibromofluoromethane	86	-	118
3 - p-Bromofluorobenzene	86	-	115
4 - Toluene-d8	88	-	110

Underline = Result out of surrogate limits

DL = surrogate diluted out
ND = surrogate not detected

KEMRON FORMS - Modified 09/27/2006
Version 1.5 PDF File ID: 919909
Report generated 11/01/2007 15:46

KEMRON Environmental Services

SURROGATE STANDARDS

00073045

Login Number: L0710597
Instrument Id: HPMS6
Workgroup (AAB#): WG253919

Method: 8260
CAL ID: HPMS6-24-OCT-07
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L0710597-11	100	DL01	81.1	89.3	98.8	97.5
WG253919-01	1.00	01	82.2	88.9	97.7	96.7
WG253919-02	1.00	01	84.4	90.3	93.7	96.0
WG253919-03	1.00	01	82.0	90.4	92.2	96.3
WG253919-04	1.00	01	84.0	91.5	98.7	97.3

Surrogates	Surrogate Limits		
1 - 1,2-Dichloroethane-d4	80	-	120
2 - Dibromofluoromethane	86	-	118
3 - p-Bromofluorobenzene	86	-	115
4 - Toluene-d8	88	-	110

Underline = Result out of surrogate limits

DL = surrogate diluted out
ND = surrogate not detected

KEMRON FORMS - Modified 09/27/2006
Version 1.5 PDF File ID: 919909
Report generated 11/01/2007 15:46

KEMRON Environmental Services

SURROGATE STANDARDS

00073046

Login Number: L0710597
Instrument Id: HPMS6
Workgroup (AAB#): WG253819

Method: 8260
CAL ID: HPMS6-24-OCT-07
Matrix: Water

Sample Number	Dilution	Tag	1	2	3	4
L0710597-11	1.00	01	77.1	88.6	98.9	95.5
WG253819-01	1.00	01	75.9	86.1	98.0	97.6
WG253819-02	1.00	01	80.2	88.6	95.4	98.9
WG253819-03	1.00	01	77.9	87.8	95.7	97.7

Surrogates	Surrogate Limits		
1 - 1,2-Dichloroethane-d4	80	-	120
2 - Dibromofluoromethane	86	-	118
3 - p-Bromofluorobenzene	86	-	115
4 - Toluene-d8	88	-	110

Underline = Result out of surrogate limits

DL = surrogate diluted out
ND = surrogate not detected

KEMRON FORMS - Modified 09/27/2006
Version 1.5 PDF File ID: 919909
Report generated 11/01/2007 15:46

00073047

METHOD BLANK SUMMARY

Login Number: L0710597
Blank File ID: 10M59853
Prep Date: 10/25/07 09:31
Analyzed Date: 10/25/07 09:31
Analyst: MES

Work Group: WG253794
Blank Sample ID: WG253794-01
Instrument ID: HPMS10
Method: 8260B

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG253794-02	10M59854	10/25/07 10:03	01
LCS2	WG253794-03	10M59855	10/25/07 10:35	01
47WW18-101807	L0710597-05	10M59870	10/25/07 18:23	01
47WW18-101807-DUP	L0710597-06	10M59871	10/25/07 18:54	01
47WW30-101807	L0710597-08	10M59872	10/25/07 19:26	01

METHOD BLANK SUMMARY

Login Number: L0710597
Blank File ID: 10M59886
Prep Date: 10/26/07 12:28
Analyzed Date: 10/26/07 12:28
Analyst: MES

Work Group: WG253910
Blank Sample ID: WG253910-01
Instrument ID: HPMS10
Method: 8260B

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG253910-02	10M59887	10/26/07 13:00	01
LCS2	WG253910-03	10M59888	10/26/07 13:32	01
47WW30-101807	L0710597-08	10M59889	10/26/07 14:04	DL01
47WW31-101807	L0710597-10	10M59900	10/26/07 19:55	01
LHSMW34-101807	L0710597-12	10M59901	10/26/07 20:27	DL01
EQUIPMENT RINSE #1	L0710597-13	10M59902	10/26/07 20:59	01

METHOD BLANK SUMMARY

Login Number: L0710597
Blank File ID: 10M59913
Prep Date: 10/27/07 10:52
Analyzed Date: 10/27/07 10:52
Analyst: MES

Work Group: WG254006
Blank Sample ID: WG254006-01
Instrument ID: HPMS10
Method: 8260B

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG254006-02	10M59914	10/27/07 11:24	01
LCS2	WG254006-03	10M59915	10/27/07 11:56	01
47WW32-101807	L0710597-07	10M59920	10/27/07 14:37	02
47WW36-101907	L0710597-09	10M59925	10/27/07 17:19	DL01

00073050

METHOD BLANK SUMMARY

Login Number: L0710597
Blank File ID: 11M46853
Prep Date: 10/24/07 10:51
Analyzed Date: 10/24/07 10:51
Analyst: MES

Work Group: WG253678
Blank Sample ID: WG253678-01
Instrument ID: HPMS11
Method: 8260B

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG253678-02	11M46854	10/24/07 11:21	01
LCS2	WG253678-03	11M46855	10/24/07 11:52	01
TRIP BLANK	L0710597-14	11M46859	10/24/07 13:52	01
47WW36-101907	L0710597-09	11M46867	10/24/07 17:54	01

METHOD BLANK SUMMARY

00073051

Login Number: L0710597
Blank File ID: 6M70257
Prep Date: 10/25/07 11:44
Analyzed Date: 10/25/07 11:44
Analyst: MES

Work Group: WG253819
Blank Sample ID: WG253819-01
Instrument ID: HPMS6
Method: 8260B

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG253819-02	6M70258	10/25/07 12:15	01
LCS2	WG253819-03	6M70259	10/25/07 12:47	01
47WW25-101607	L0710597-11	6M70263	10/25/07 14:54	01

METHOD BLANK SUMMARY

Login Number: L0710597
Blank File ID: 6M70289
Prep Date: 10/26/07 11:43
Analyzed Date: 10/26/07 11:43
Analyst: MES

Work Group: WG253919
Blank Sample ID: WG253919-01
Instrument ID: HPMS6
Method: 8260B

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG253919-02	6M70290	10/26/07 12:16	01
LCS2	WG253919-03	6M70291	10/26/07 12:48	01
47WW25-101607	L0710597-11	6M70292	10/26/07 13:22	DL01

METHOD BLANK SUMMARY

00073053

Login Number: L0710597
Blank File ID: 8M341023
Prep Date: 10/29/07 09:34
Analyzed Date: 10/29/07 09:34
Analyst: CMS

Work Group: WG254048
Blank Sample ID: WG254048-01
Instrument ID: HPMS8
Method: 8260B

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG254048-02	8M341024	10/29/07 10:04	01
LCS	WG254048-03	8M341025	10/29/07 10:34	01
47WW25-101607	L0710597-11	8M341032	10/29/07 14:04	DL02

KEMRON Environmental Services

METHOD BLANK REPORT

00073054

Login Number: L0710597 Prep Date: 10/25/07 09:31 Sample ID: WG253794-01
Instrument ID: HPMS10 Run Date: 10/25/07 09:31 Prep Method: 5030B
File ID: 10M59853 Analyst: MES Method: 8260B
Workgroup (AAB#): WG253794 Matrix: Water Units: ug/L
Contract #: DACA56-94-D-0020 Cal ID: HPMS10-18-OCT-07

Analytes	SDL	PQL	Concentration	Dilution	Qualifier
1,1,1-Trichloroethane	0.250	1.00	0.250	1	U
1,1,2,2-Tetrachloroethane	0.125	1.00	0.125	1	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.250	5.00	0.250	1	U
1,1,2-Trichloroethane	0.250	1.00	0.250	1	U
1,1-Dichloroethane	0.125	1.00	0.125	1	U
1,1-Dichloroethene	0.500	1.00	0.500	1	U
1,2,4-Trichlorobenzene	0.200	1.00	0.200	1	U
1,2-Dibromo-3-chloropropane	1.00	5.00	1.00	1	U
1,2-Dibromoethane	0.250	1.00	0.250	1	U
1,2-Dichlorobenzene	0.125	1.00	0.125	1	U
1,2-Dichloroethane	0.250	1.00	0.250	1	U
cis-1,2-Dichloroethene	0.250	1.00	0.250	1	U
trans-1,2-Dichloroethene	0.250	1.00	0.250	1	U
1,2-Dichloropropane	0.200	1.00	0.200	1	U
1,3-Dichlorobenzene	0.250	1.00	0.250	1	U
1,4-Dichlorobenzene	0.125	1.00	0.125	1	U
2-Butanone	2.50	10.0	2.50	1	U
2-Hexanone	2.50	10.0	2.50	1	U
4-Methyl-2-pentanone	2.50	10.0	2.50	1	U
Acetone	2.50	10.0	2.50	1	U
Benzene	0.125	1.00	0.125	1	U
Bromodichloromethane	0.250	1.00	0.250	1	U
Bromoform	0.500	1.00	0.500	1	U
Bromomethane	0.500	1.00	0.500	1	U
Carbon disulfide	0.500	1.00	0.500	1	U
Carbon tetrachloride	0.250	1.00	0.250	1	U
Chlorobenzene	0.125	1.00	0.125	1	U
Chloroethane	0.500	1.00	0.500	1	U
Chloroform	0.125	1.00	0.125	1	U
Chloromethane	0.250	1.00	0.250	1	U
cis-1,3-Dichloropropene	0.250	1.00	0.250	1	U
Cyclohexane	0.250	5.00	0.250	1	U
Dibromochloromethane	0.250	1.00	0.250	1	U
Dichlorodifluoromethane	0.250	1.00	0.250	1	U
Ethyl benzene	0.250	1.00	0.250	1	U
Isopropylbenzene	0.250	1.00	0.250	1	U
Methyl acetate	0.250	10.0	0.250	1	U
Methyl tert-butyl ether	0.500	5.00	0.500	1	U
Methylcyclohexane	0.250	10.0	0.250	1	U
Methylene chloride	0.250	2.00	0.250	1	U
Styrene	0.125	1.00	0.125	1	U
Tetrachloroethene	0.250	1.00	0.250	1	U

KEMRON FORMS - Modified 12/07/2006
Version 1.5 PDF File ID: 919903
Report generated 11/01/2007 15:46

KEMRON Environmental Services

METHOD BLANK REPORT

00073055

Login Number: L0710597 Prep Date: 10/25/07 09:31 Sample ID: WG253794-01
Instrument ID: HPMS10 Run Date: 10/25/07 09:31 Prep Method: 5030B
File ID: 10M59853 Analyst: MES Method: 8260B
Workgroup (AAB#): WG253794 Matrix: Water Units: ug/L
Contract #: DACA56-94-D-0020 Cal ID: HPMS10-18-OCT-07

Analytes	SDL	PQL	Concentration	Dilution	Qualifier
Toluene	0.250	1.00	0.250	1	U
trans-1,3-Dichloropropene	0.500	1.00	0.500	1	U
Trichloroethene	0.250	1.00	0.250	1	U
Trichlorofluoromethane	0.250	1.00	0.250	1	U
Vinyl chloride	0.250	1.00	0.250	1	U
Xylenes, Total	0.500	1.00	0.500	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	99.7	80 - 120	PASS
Dibromofluoromethane	101	86 - 118	PASS
p-Bromofluorobenzene	105	86 - 115	PASS
Toluene-d8	105	88 - 110	PASS

SDL Method Detection Limit
PQL Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* Analyte concentration > RL

KEMRON FORMS - Modified 12/07/2006
Version 1.5 PDF File ID: 919903
Report generated 11/01/2007 15:46

KEMRON Environmental Services

METHOD BLANK REPORT

00073056

Login Number: L0710597 Prep Date: 10/26/07 12:28 Sample ID: WG253910-01
Instrument ID: HPMS10 Run Date: 10/26/07 12:28 Prep Method: 5030B
File ID: 10M59886 Analyst: MES Method: 8260B
Workgroup (AAB#): WG253910 Matrix: Water Units: ug/L
Contract #: DACA56-94-D-0020 Cal ID: HPMS10-18-OCT-07

Analytes	SDL	PQL	Concentration	Dilution	Qualifier
1,1,1-Trichloroethane	0.250	1.00	0.250	1	U
1,1,2,2-Tetrachloroethane	0.125	1.00	0.125	1	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.250	5.00	0.250	1	U
1,1,2-Trichloroethane	0.250	1.00	0.250	1	U
1,1-Dichloroethane	0.125	1.00	0.125	1	U
1,1-Dichloroethene	0.500	1.00	0.500	1	U
1,2,4-Trichlorobenzene	0.200	1.00	0.200	1	U
1,2-Dibromo-3-chloropropane	1.00	5.00	1.00	1	U
1,2-Dibromoethane	0.250	1.00	0.250	1	U
1,2-Dichlorobenzene	0.125	1.00	0.125	1	U
1,2-Dichloroethane	0.250	1.00	0.250	1	U
cis-1,2-Dichloroethene	0.250	1.00	0.250	1	U
trans-1,2-Dichloroethene	0.250	1.00	0.250	1	U
1,2-Dichloropropane	0.200	1.00	0.200	1	U
1,3-Dichlorobenzene	0.250	1.00	0.250	1	U
1,4-Dichlorobenzene	0.125	1.00	0.125	1	U
2-Butanone	2.50	10.0	2.50	1	U
2-Hexanone	2.50	10.0	2.50	1	U
4-Methyl-2-pentanone	2.50	10.0	2.50	1	U
Acetone	2.50	10.0	2.50	1	U
Benzene	0.125	1.00	0.125	1	U
Bromodichloromethane	0.250	1.00	0.250	1	U
Bromoform	0.500	1.00	0.500	1	U
Bromomethane	0.500	1.00	0.500	1	U
Carbon disulfide	0.500	1.00	0.500	1	U
Carbon tetrachloride	0.250	1.00	0.250	1	U
Chlorobenzene	0.125	1.00	0.125	1	U
Chloroethane	0.500	1.00	0.500	1	U
Chloroform	0.125	1.00	0.125	1	U
Chloromethane	0.250	1.00	0.250	1	U
cis-1,3-Dichloropropene	0.250	1.00	0.250	1	U
Cyclohexane	0.250	5.00	0.250	1	U
Dibromochloromethane	0.250	1.00	0.250	1	U
Dichlorodifluoromethane	0.250	1.00	0.250	1	U
Ethyl benzene	0.250	1.00	0.250	1	U
Isopropylbenzene	0.250	1.00	0.250	1	U
Methyl acetate	0.250	10.0	0.250	1	U
Methyl tert-butyl ether	0.500	5.00	0.500	1	U
Methylcyclohexane	0.250	10.0	0.250	1	U
Methylene chloride	0.250	2.00	0.250	1	U
Styrene	0.125	1.00	0.125	1	U
Tetrachloroethene	0.250	1.00	0.250	1	U

KEMRON FORMS - Modified 12/07/2006
Version 1.5 PDF File ID: 919903
Report generated 11/01/2007 15:46

KEMRON Environmental Services

METHOD BLANK REPORT

00073057

Login Number: L0710597 Prep Date: 10/26/07 12:28 Sample ID: WG253910-01
Instrument ID: HPMS10 Run Date: 10/26/07 12:28 Prep Method: 5030B
File ID: 10M59886 Analyst: MES Method: 8260B
Workgroup (AAB#): WG253910 Matrix: Water Units: ug/L
Contract #: DACA56-94-D-0020 Cal ID: HPMS10-18-OCT-07

Analytes	SDL	PQL	Concentration	Dilution	Qualifier
Toluene	0.250	1.00	0.250	1	U
trans-1,3-Dichloropropene	0.500	1.00	0.500	1	U
Trichloroethene	0.250	1.00	0.250	1	U
Trichlorofluoromethane	0.250	1.00	0.250	1	U
Vinyl chloride	0.250	1.00	0.250	1	U
Xylenes, Total	0.500	1.00	0.500	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	93.4	80 - 120	PASS
Dibromofluoromethane	97.8	86 - 118	PASS
p-Bromofluorobenzene	99.8	86 - 115	PASS
Toluene-d8	99.5	88 - 110	PASS

SDL Method Detection Limit
PQL Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* Analyte concentration > RL

KEMRON FORMS - Modified 12/07/2006
Version 1.5 PDF File ID: 919903
Report generated 11/01/2007 15:46

KEMRON Environmental Services

METHOD BLANK REPORT

00073058

Login Number: L0710597 Prep Date: 10/27/07 10:52 Sample ID: WG254006-01
Instrument ID: HPMS10 Run Date: 10/27/07 10:52 Prep Method: 5030B
File ID: 10M59913 Analyst: MES Method: 8260B
Workgroup (AAB#): WG254006 Matrix: Water Units: ug/L
Contract #: DACA56-94-D-0020 Cal ID: HPMS10-18-OCT-07

Analytes	SDL	PQL	Concentration	Dilution	Qualifier
1,1,1-Trichloroethane	0.250	1.00	0.250	1	U
1,1,2,2-Tetrachloroethane	0.125	1.00	0.125	1	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.250	5.00	0.250	1	U
1,1,2-Trichloroethane	0.250	1.00	0.250	1	U
1,1-Dichloroethane	0.125	1.00	0.125	1	U
1,1-Dichloroethene	0.500	1.00	0.500	1	U
1,2,4-Trichlorobenzene	0.200	1.00	0.200	1	U
1,2-Dibromo-3-chloropropane	1.00	5.00	1.00	1	U
1,2-Dibromoethane	0.250	1.00	0.250	1	U
1,2-Dichlorobenzene	0.125	1.00	0.125	1	U
1,2-Dichloroethane	0.250	1.00	0.250	1	U
cis-1,2-Dichloroethene	0.250	1.00	0.250	1	U
trans-1,2-Dichloroethene	0.250	1.00	0.250	1	U
1,2-Dichloropropane	0.200	1.00	0.200	1	U
1,3-Dichlorobenzene	0.250	1.00	0.250	1	U
1,4-Dichlorobenzene	0.125	1.00	0.125	1	U
2-Butanone	2.50	10.0	2.50	1	U
2-Hexanone	2.50	10.0	2.50	1	U
4-Methyl-2-pentanone	2.50	10.0	2.50	1	U
Acetone	2.50	10.0	2.50	1	U
Benzene	0.125	1.00	0.125	1	U
Bromodichloromethane	0.250	1.00	0.250	1	U
Bromoform	0.500	1.00	0.500	1	U
Bromomethane	0.500	1.00	0.500	1	U
Carbon disulfide	0.500	1.00	0.500	1	U
Carbon tetrachloride	0.250	1.00	0.250	1	U
Chlorobenzene	0.125	1.00	0.125	1	U
Chloroethane	0.500	1.00	0.500	1	U
Chloroform	0.125	1.00	0.125	1	U
Chloromethane	0.250	1.00	0.250	1	U
cis-1,3-Dichloropropene	0.250	1.00	0.250	1	U
Cyclohexane	0.250	5.00	0.250	1	U
Dibromochloromethane	0.250	1.00	0.250	1	U
Dichlorodifluoromethane	0.250	1.00	0.250	1	U
Ethyl benzene	0.250	1.00	0.250	1	U
Isopropylbenzene	0.250	1.00	0.250	1	U
Methyl acetate	0.250	10.0	0.250	1	U
Methyl tert-butyl ether	0.500	5.00	0.500	1	U
Methylcyclohexane	0.250	10.0	0.250	1	U
Methylene chloride	0.250	2.00	0.250	1	U
Styrene	0.125	1.00	0.125	1	U
Tetrachloroethene	0.250	1.00	0.250	1	U

KEMRON FORMS - Modified 12/07/2006
Version 1.5 PDF File ID: 919903
Report generated 11/01/2007 15:46

KEMRON Environmental Services

METHOD BLANK REPORT

00073059

Login Number: L0710597 Prep Date: 10/27/07 10:52 Sample ID: WG254006-01
Instrument ID: HPMS10 Run Date: 10/27/07 10:52 Prep Method: 5030B
File ID: 10M59913 Analyst: MES Method: 8260B
Workgroup (AAB#): WG254006 Matrix: Water Units: ug/L
Contract #: DACA56-94-D-0020 Cal ID: HPMS10-18-OCT-07

Analytes	SDL	PQL	Concentration	Dilution	Qualifier
Toluene	0.250	1.00	0.250	1	U
trans-1,3-Dichloropropene	0.500	1.00	0.500	1	U
Trichloroethene	0.250	1.00	0.250	1	U
Trichlorofluoromethane	0.250	1.00	0.250	1	U
Vinyl chloride	0.250	1.00	0.250	1	U
Xylenes, Total	0.500	1.00	0.500	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	98.2	80 - 120	PASS
Dibromofluoromethane	96.5	86 - 118	PASS
p-Bromofluorobenzene	97.5	86 - 115	PASS
Toluene-d8	94.7	88 - 110	PASS

SDL Method Detection Limit
PQL Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* Analyte concentration > RL

KEMRON FORMS - Modified 12/07/2006
Version 1.5 PDF File ID: 919903
Report generated 11/01/2007 15:46

KEMRON Environmental Services

METHOD BLANK REPORT

00073060

Login Number: L0710597 Prep Date: 10/24/07 10:51 Sample ID: WG253678-01
Instrument ID: HPMS11 Run Date: 10/24/07 10:51 Prep Method: 5030B
File ID: 11M46853 Analyst: MES Method: 8260B
Workgroup (AAB#): WG253678 Matrix: Water Units: ug/L
Contract #: DACA56-94-D-0020 Cal ID: HPMS11-01-OCT-07

Analytes	SDL	PQL	Concentration	Dilution	Qualifier
1,1,1-Trichloroethane	0.250	1.00	0.250	1	U
1,1,2,2-Tetrachloroethane	0.125	1.00	0.125	1	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.250	5.00	0.250	1	U
1,1,2-Trichloroethane	0.250	1.00	0.250	1	U
1,1-Dichloroethane	0.125	1.00	0.125	1	U
1,1-Dichloroethene	0.500	1.00	0.500	1	U
1,2,4-Trichlorobenzene	0.200	1.00	0.200	1	U
1,2-Dibromo-3-chloropropane	1.00	5.00	1.00	1	U
1,2-Dibromoethane	0.250	1.00	0.250	1	U
1,2-Dichlorobenzene	0.125	1.00	0.125	1	U
1,2-Dichloroethane	0.250	1.00	0.250	1	U
cis-1,2-Dichloroethene	0.250	1.00	0.250	1	U
trans-1,2-Dichloroethene	0.250	1.00	0.250	1	U
1,2-Dichloropropane	0.200	1.00	0.200	1	U
1,3-Dichlorobenzene	0.250	1.00	0.250	1	U
1,4-Dichlorobenzene	0.125	1.00	0.125	1	U
2-Butanone	2.50	10.0	2.50	1	U
2-Hexanone	2.50	10.0	2.50	1	U
4-Methyl-2-pentanone	2.50	10.0	2.50	1	U
Acetone	2.50	10.0	2.50	1	U
Benzene	0.125	1.00	0.125	1	U
Bromodichloromethane	0.250	1.00	0.250	1	U
Bromoform	0.500	1.00	0.500	1	U
Bromomethane	0.500	1.00	0.500	1	U
Carbon disulfide	0.500	1.00	0.500	1	U
Carbon tetrachloride	0.250	1.00	0.250	1	U
Chlorobenzene	0.125	1.00	0.125	1	U
Chloroethane	0.500	1.00	0.500	1	U
Chloroform	0.125	1.00	0.125	1	U
Chloromethane	0.250	1.00	0.250	1	U
cis-1,3-Dichloropropene	0.250	1.00	0.250	1	U
Cyclohexane	0.250	5.00	0.250	1	U
Dibromochloromethane	0.250	1.00	0.250	1	U
Dichlorodifluoromethane	0.250	1.00	0.250	1	U
Ethyl benzene	0.250	1.00	0.250	1	U
Isopropylbenzene	0.250	1.00	0.250	1	U
Methyl acetate	0.250	10.0	0.250	1	U
Methyl tert-butyl ether	0.500	5.00	0.500	1	U
Methylcyclohexane	0.250	10.0	0.250	1	U
Methylene chloride	0.250	2.00	0.250	1	U
Styrene	0.125	1.00	0.125	1	U
Tetrachloroethene	0.250	1.00	0.250	1	U

KEMRON FORMS - Modified 12/07/2006
Version 1.5 PDF File ID: 919903
Report generated 11/01/2007 15:46

KEMRON Environmental Services

METHOD BLANK REPORT

00073061

Login Number: L0710597 Prep Date: 10/24/07 10:51 Sample ID: WG253678-01
Instrument ID: HPMS11 Run Date: 10/24/07 10:51 Prep Method: 5030B
File ID: 11M46853 Analyst: MES Method: 8260B
Workgroup (AAB#): WG253678 Matrix: Water Units: ug/L
Contract #: DACA56-94-D-0020 Cal ID: HPMS11-01-OCT-07

Analytes	SDL	PQL	Concentration	Dilution	Qualifier
Toluene	0.250	1.00	0.250	1	U
trans-1,3-Dichloropropene	0.500	1.00	0.500	1	U
Trichloroethene	0.250	1.00	0.250	1	U
Trichlorofluoromethane	0.250	1.00	0.250	1	U
Vinyl chloride	0.250	1.00	0.250	1	U
Xylenes, Total	0.500	1.00	0.500	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	90.9	80 - 120	PASS
Dibromofluoromethane	90.6	86 - 118	PASS
p-Bromofluorobenzene	88.4	86 - 115	PASS
Toluene-d8	87.6	88 - 110	FAIL

SDL Method Detection Limit
PQL Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* Analyte concentration > RL

KEMRON FORMS - Modified 12/07/2006
Version 1.5 PDF File ID: 919903
Report generated 11/01/2007 15:46

KEMRON Environmental Services

METHOD BLANK REPORT

00073062

Login Number: L0710597 Prep Date: 10/25/07 11:44 Sample ID: WG253819-01
Instrument ID: HPMS6 Run Date: 10/25/07 11:44 Prep Method: 5030B
File ID: 6M70257 Analyst: MES Method: 8260B
Workgroup (AAB#): WG253819 Matrix: Water Units: ug/L
Contract #: DACA56-94-D-0020 Cal ID: HPMS6-24-OCT-07

Analytes	SDL	PQL	Concentration	Dilution	Qualifier
1,1,1-Trichloroethane	0.250	1.00	0.250	1	U
1,1,2,2-Tetrachloroethane	0.125	1.00	0.125	1	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.250	5.00	0.250	1	U
1,1,2-Trichloroethane	0.250	1.00	0.250	1	U
1,1-Dichloroethane	0.125	1.00	0.125	1	U
1,1-Dichloroethene	0.500	1.00	0.500	1	U
1,2,4-Trichlorobenzene	0.200	1.00	0.200	1	U
1,2-Dibromo-3-chloropropane	1.00	5.00	1.00	1	U
1,2-Dibromoethane	0.250	1.00	0.250	1	U
1,2-Dichlorobenzene	0.125	1.00	0.125	1	U
1,2-Dichloroethane	0.250	1.00	0.250	1	U
cis-1,2-Dichloroethene	0.250	1.00	0.250	1	U
trans-1,2-Dichloroethene	0.250	1.00	0.250	1	U
1,2-Dichloropropane	0.200	1.00	0.200	1	U
1,3-Dichlorobenzene	0.250	1.00	0.250	1	U
1,4-Dichlorobenzene	0.125	1.00	0.125	1	U
2-Butanone	2.50	10.0	2.50	1	U
2-Hexanone	2.50	10.0	2.50	1	U
4-Methyl-2-pentanone	2.50	10.0	2.50	1	U
Acetone	2.50	10.0	2.50	1	U
Benzene	0.125	1.00	0.125	1	U
Bromodichloromethane	0.250	1.00	0.250	1	U
Bromoform	0.500	1.00	0.500	1	U
Bromomethane	0.500	1.00	0.500	1	U
Carbon disulfide	0.500	1.00	0.500	1	U
Carbon tetrachloride	0.250	1.00	0.250	1	U
Chlorobenzene	0.125	1.00	0.125	1	U
Chloroethane	0.500	1.00	0.500	1	U
Chloroform	0.125	1.00	0.125	1	U
Chloromethane	0.250	1.00	0.250	1	U
cis-1,3-Dichloropropene	0.250	1.00	0.250	1	U
Cyclohexane	0.250	5.00	0.250	1	U
Dibromochloromethane	0.250	1.00	0.250	1	U
Dichlorodifluoromethane	0.250	1.00	0.250	1	U
Ethyl benzene	0.250	1.00	0.250	1	U
Isopropylbenzene	0.250	1.00	0.250	1	U
Methyl acetate	0.250	10.0	0.250	1	U
Methyl tert-butyl ether	0.500	5.00	0.500	1	U
Methylcyclohexane	0.250	10.0	0.250	1	U
Methylene chloride	0.250	2.00	0.250	1	U
Styrene	0.125	1.00	0.125	1	U
Tetrachloroethene	0.250	1.00	0.250	1	U

KEMRON FORMS - Modified 12/07/2006
Version 1.5 PDF File ID: 919903
Report generated 11/01/2007 15:46

KEMRON Environmental Services

METHOD BLANK REPORT

00073063

Login Number: L0710597 Prep Date: 10/25/07 11:44 Sample ID: WG253819-01
Instrument ID: HPMS6 Run Date: 10/25/07 11:44 Prep Method: 5030B
File ID: 6M70257 Analyst: MES Method: 8260B
Workgroup (AAB#): WG253819 Matrix: Water Units: ug/L
Contract #: DACA56-94-D-0020 Cal ID: HPMS6-24-OCT-07

Analytes	SDL	PQL	Concentration	Dilution	Qualifier
Toluene	0.250	1.00	0.250	1	U
trans-1,3-Dichloropropene	0.500	1.00	0.500	1	U
Trichloroethene	0.250	1.00	0.250	1	U
Trichlorofluoromethane	0.250	1.00	0.250	1	U
Vinyl chloride	0.250	1.00	0.250	1	U
Xylenes, Total	0.500	1.00	0.500	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	75.9	80 - 120	FAIL
Dibromofluoromethane	86.1	86 - 118	PASS
p-Bromofluorobenzene	98.0	86 - 115	PASS
Toluene-d8	97.6	88 - 110	PASS

SDL Method Detection Limit
PQL Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* Analyte concentration > RL

KEMRON FORMS - Modified 12/07/2006
Version 1.5 PDF File ID: 919903
Report generated 11/01/2007 15:46

KEMRON Environmental Services

METHOD BLANK REPORT

00073064

Login Number: L0710597 Prep Date: 10/26/07 11:43 Sample ID: WG253919-01
Instrument ID: HPMS6 Run Date: 10/26/07 11:43 Prep Method: 5030B
File ID: 6M70289 Analyst: MES Method: 8260B
Workgroup (AAB#): WG253919 Matrix: Water Units: ug/L
Contract #: DACA56-94-D-0020 Cal ID: HPMS6-24-OCT-07

Analytes	SDL	PQL	Concentration	Dilution	Qualifier
1,1,1-Trichloroethane	0.250	1.00	0.250	1	U
1,1,2,2-Tetrachloroethane	0.125	1.00	0.125	1	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.250	5.00	0.250	1	U
1,1,2-Trichloroethane	0.250	1.00	0.250	1	U
1,1-Dichloroethane	0.125	1.00	0.125	1	U
1,1-Dichloroethene	0.500	1.00	0.500	1	U
1,2,4-Trichlorobenzene	0.200	1.00	0.200	1	U
1,2-Dibromo-3-chloropropane	1.00	5.00	1.00	1	U
1,2-Dibromoethane	0.250	1.00	0.250	1	U
1,2-Dichlorobenzene	0.125	1.00	0.125	1	U
1,2-Dichloroethane	0.250	1.00	0.250	1	U
cis-1,2-Dichloroethene	0.250	1.00	0.250	1	U
trans-1,2-Dichloroethene	0.250	1.00	0.250	1	U
1,2-Dichloropropane	0.200	1.00	0.200	1	U
1,3-Dichlorobenzene	0.250	1.00	0.250	1	U
1,4-Dichlorobenzene	0.125	1.00	0.125	1	U
2-Butanone	2.50	10.0	2.50	1	U
2-Hexanone	2.50	10.0	2.50	1	U
4-Methyl-2-pentanone	2.50	10.0	2.50	1	U
Acetone	2.50	10.0	2.50	1	U
Benzene	0.125	1.00	0.125	1	U
Bromodichloromethane	0.250	1.00	0.250	1	U
Bromoform	0.500	1.00	0.500	1	U
Bromomethane	0.500	1.00	0.500	1	U
Carbon disulfide	0.500	1.00	0.500	1	U
Carbon tetrachloride	0.250	1.00	0.250	1	U
Chlorobenzene	0.125	1.00	0.125	1	U
Chloroethane	0.500	1.00	0.500	1	U
Chloroform	0.125	1.00	0.125	1	U
Chloromethane	0.250	1.00	0.250	1	U
cis-1,3-Dichloropropene	0.250	1.00	0.250	1	U
Cyclohexane	0.250	5.00	0.250	1	U
Dibromochloromethane	0.250	1.00	0.250	1	U
Dichlorodifluoromethane	0.250	1.00	0.250	1	U
Ethyl benzene	0.250	1.00	0.250	1	U
Isopropylbenzene	0.250	1.00	0.250	1	U
Methyl acetate	0.250	10.0	0.250	1	U
Methyl tert-butyl ether	0.500	5.00	0.500	1	U
Methylcyclohexane	0.250	10.0	0.250	1	U
Methylene chloride	0.250	2.00	0.250	1	U
Styrene	0.125	1.00	0.125	1	U
Tetrachloroethene	0.250	1.00	0.250	1	U

KEMRON FORMS - Modified 12/07/2006
Version 1.5 PDF File ID: 919903
Report generated 11/01/2007 15:46

KEMRON Environmental Services

METHOD BLANK REPORT

00073065

Login Number: L0710597 Prep Date: 10/26/07 11:43 Sample ID: WG253919-01
Instrument ID: HPMS6 Run Date: 10/26/07 11:43 Prep Method: 5030B
File ID: 6M70289 Analyst: MES Method: 8260B
Workgroup (AAB#): WG253919 Matrix: Water Units: ug/L
Contract #: DACA56-94-D-0020 Cal ID: HPMS6-24-OCT-07

Analytes	SDL	PQL	Concentration	Dilution	Qualifier
Toluene	0.250	1.00	0.250	1	U
trans-1,3-Dichloropropene	0.500	1.00	0.500	1	U
Trichloroethene	0.250	1.00	0.250	1	U
Trichlorofluoromethane	0.250	1.00	0.250	1	U
Vinyl chloride	0.250	1.00	0.250	1	U
Xylenes, Total	0.500	1.00	0.500	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	82.2	80 - 120	PASS
Dibromofluoromethane	88.9	86 - 118	PASS
p-Bromofluorobenzene	97.7	86 - 115	PASS
Toluene-d8	96.7	88 - 110	PASS

SDL Method Detection Limit
PQL Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* Analyte concentration > RL

KEMRON FORMS - Modified 12/07/2006
Version 1.5 PDF File ID: 919903
Report generated 11/01/2007 15:46

KEMRON Environmental Services

METHOD BLANK REPORT

00073066

Login Number: L0710597 Prep Date: 10/29/07 09:34 Sample ID: WG254048-01
Instrument ID: HPMS8 Run Date: 10/29/07 09:34 Prep Method: 5030B
File ID: 8M341023 Analyst: CMS Method: 8260B
Workgroup (AAB#): WG254048 Matrix: Water Units: ug/L
Contract #: DACA56-94-D-0020 Cal ID: HPMS8-22-OCT-07

Analytes	SDL	PQL	Concentration	Dilution	Qualifier
1,1,1-Trichloroethane	0.250	1.00	0.250	1	U
1,1,2,2-Tetrachloroethane	0.125	1.00	0.125	1	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.250	5.00	0.250	1	U
1,1,2-Trichloroethane	0.250	1.00	0.250	1	U
1,1-Dichloroethane	0.125	1.00	0.125	1	U
1,1-Dichloroethene	0.500	1.00	0.500	1	U
1,2,4-Trichlorobenzene	0.200	1.00	0.200	1	U
1,2-Dibromo-3-chloropropane	1.00	5.00	1.00	1	U
1,2-Dibromoethane	0.250	1.00	0.250	1	U
1,2-Dichlorobenzene	0.125	1.00	0.125	1	U
1,2-Dichloroethane	0.250	1.00	0.250	1	U
cis-1,2-Dichloroethene	0.250	1.00	0.250	1	U
trans-1,2-Dichloroethene	0.250	1.00	0.250	1	U
1,2-Dichloropropane	0.200	1.00	0.200	1	U
1,3-Dichlorobenzene	0.250	1.00	0.250	1	U
1,4-Dichlorobenzene	0.125	1.00	0.125	1	U
2-Butanone	2.50	10.0	2.50	1	U
2-Hexanone	2.50	10.0	2.50	1	U
4-Methyl-2-pentanone	2.50	10.0	2.50	1	U
Acetone	2.50	10.0	2.50	1	U
Benzene	0.125	1.00	0.125	1	U
Bromodichloromethane	0.250	1.00	0.250	1	U
Bromoform	0.500	1.00	0.500	1	U
Bromomethane	0.500	1.00	0.500	1	U
Carbon disulfide	0.500	1.00	0.500	1	U
Carbon tetrachloride	0.250	1.00	0.250	1	U
Chlorobenzene	0.125	1.00	0.125	1	U
Chloroethane	0.500	1.00	0.500	1	U
Chloroform	0.125	1.00	0.125	1	U
Chloromethane	0.250	1.00	0.250	1	U
cis-1,3-Dichloropropene	0.250	1.00	0.250	1	U
Cyclohexane	0.250	5.00	0.250	1	U
Dibromochloromethane	0.250	1.00	0.250	1	U
Dichlorodifluoromethane	0.250	1.00	0.250	1	U
Ethyl benzene	0.250	1.00	0.250	1	U
Isopropylbenzene	0.250	1.00	0.250	1	U
Methyl acetate	0.250	10.0	0.250	1	U
Methyl tert-butyl ether	0.500	5.00	0.500	1	U
Methylcyclohexane	0.250	10.0	0.250	1	U
Methylene chloride	0.250	2.00	0.250	1	U
Styrene	0.125	1.00	0.125	1	U
Tetrachloroethene	0.250	1.00	0.250	1	U

KEMRON FORMS - Modified 12/07/2006
Version 1.5 PDF File ID: 919903
Report generated 11/01/2007 15:46

KEMRON Environmental Services

METHOD BLANK REPORT

00073067

Login Number: L0710597 Prep Date: 10/29/07 09:34 Sample ID: WG254048-01
Instrument ID: HPMS8 Run Date: 10/29/07 09:34 Prep Method: 5030B
File ID: 8M341023 Analyst: CMS Method: 8260B
Workgroup (AAB#): WG254048 Matrix: Water Units: ug/L
Contract #: DACA56-94-D-0020 Cal ID: HPMS8-22-OCT-07

Analytes	SDL	PQL	Concentration	Dilution	Qualifier
Toluene	0.250	1.00	0.250	1	U
trans-1,3-Dichloropropene	0.500	1.00	0.500	1	U
Trichloroethene	0.250	1.00	0.250	1	U
Trichlorofluoromethane	0.250	1.00	0.250	1	U
Vinyl chloride	0.250	1.00	0.250	1	U
Xylenes, Total	0.500	1.00	0.500	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	100	80 - 120	PASS
Dibromofluoromethane	99.6	86 - 118	PASS
p-Bromofluorobenzene	99.8	86 - 115	PASS
Toluene-d8	101	88 - 110	PASS

SDL Method Detection Limit
PQL Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* Analyte concentration > RL

KEMRON FORMS - Modified 12/07/2006
Version 1.5 PDF File ID: 919903
Report generated 11/01/2007 15:46

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00073068

Login Number: L0710597 Run Date: 10/29/2007 Sample ID: WG254048-02
Instrument ID: HPMS8 Run Time: 10:04 Prep Method: 5030B
File ID: 8M341024 Analyst: CMS Method: 8260B
Workgroup (AAB#): WG254048 Matrix: Water Units: ug/L
QC Key: STD Lot#: STD22622 Cal ID: HPMS8-22-OCT-07

Analytes	Expected	Found	% Rec	LCS Limits	Q
1,1,1-Trichloroethane	20.0	22.2	111	80 - 134	
1,1,2,2-Tetrachloroethane	20.0	21.4	107	79 - 125	
1,1,2-Trichloro-1,2,2-Trifluoroethane	20.0	20.6	103	80 - 130	
1,1,2-Trichloroethane	20.0	21.7	108	80 - 125	
1,1-Dichloroethane	20.0	20.9	104	80 - 125	
1,1-Dichloroethene	20.0	22.2	111	80 - 132	
1,2,4-Trichlorobenzene	20.0	20.4	102	65 - 135	
1,2-Dibromo-3-chloropropane	20.0	22.4	112	50 - 130	
1,2-Dibromoethane	20.0	21.7	108	80 - 125	
1,2-Dichlorobenzene	20.0	19.3	96.4	80 - 125	
1,2-Dichloroethane	20.0	21.9	109	80 - 129	
cis-1,2-Dichloroethene	20.0	22.2	111	70 - 125	
trans-1,2-Dichloroethene	20.0	21.1	105	80 - 127	
1,2-Dichloropropane	20.0	21.2	106	80 - 120	
1,3-Dichlorobenzene	20.0	19.6	97.9	80 - 120	
1,4-Dichlorobenzene	20.0	18.8	94.2	80 - 120	
2-Butanone	20.0	23.4	117	30 - 150	
2-Hexanone	20.0	19.6	97.8	55 - 130	
4-Methyl-2-pentanone	20.0	20.8	104	64 - 140	
Acetone	20.0	23.8	119	40 - 142	
Benzene	20.0	19.0	94.8	80 - 121	
Bromodichloromethane	20.0	22.9	114	80 - 131	
Bromoform	20.0	22.0	110	70 - 130	
Bromomethane	20.0	19.3	96.6	30 - 145	
Carbon disulfide	20.0	18.7	93.6	58 - 138	
Carbon tetrachloride	20.0	22.2	111	65 - 140	
Chlorobenzene	20.0	19.8	99.0	80 - 120	
Chloroethane	20.0	22.0	110	60 - 135	
Chloroform	20.0	20.5	103	80 - 125	
Chloromethane	20.0	19.2	96.2	40 - 125	
cis-1,3-Dichloropropene	20.0	21.8	109	70 - 130	
Cyclohexane	20.0	20.8	104	80 - 130	
Dibromochloromethane	20.0	21.7	108	60 - 135	
Dichlorodifluoromethane	20.0	22.5	112	50 - 133	
Ethyl benzene	20.0	20.8	104	80 - 122	
Isopropylbenzene	20.0	19.6	98.2	80 - 122	
Methyl acetate	20.0	28.8	144	80 - 130	*
Methyl tert-butyl ether	20.0	26.9	134	65 - 125	*
Methylcyclohexane	20.0	21.2	106	80 - 130	
Methylene chloride	20.0	20.6	103	80 - 123	
Styrene	20.0	22.3	112	80 - 123	

KEMRON FORMS - Modified 09/06/2007
Version 1.5 PDF File ID: 920444
Report generated 10/30/2007 09:57

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00073069

Login Number: L0710597 Run Date: 10/29/2007 Sample ID: WG254048-02
Instrument ID: HPMS8 Run Time: 10:04 Prep Method: 5030B
File ID: 8M341024 Analyst: CMS Method: 8260B
Workgroup (AAB#): WG254048 Matrix: Water Units: ug/L
QC Key: STD Lot#: STD22622 Cal ID: HPMS8-22-OCT-07

Analytes	Expected	Found	% Rec	LCS Limits	Q
Tetrachloroethene	20.0	21.0	105	80 - 124	
Toluene	20.0	20.8	104	80 - 124	
trans-1,3-Dichloropropene	20.0	20.2	101	80 - 130	
Trichloroethene	20.0	21.8	109	80 - 122	
Trichlorofluoromethane	20.0	17.8	88.9	62 - 151	
Vinyl chloride	20.0	23.6	118	65 - 140	
Xylenes, Total	60.0	62.7	104	80 - 121	

Surrogates	% Recovery	Surrogate Limits	Qualifier
1,2-Dichloroethane-d4	101	80 - 120	PASS
Dibromofluoromethane	102	86 - 118	PASS
p-Bromofluorobenzene	99.8	86 - 115	PASS
Toluene-d8	100	88 - 110	PASS

* FAILS %REC LIMIT

KEMRON FORMS - Modified 09/06/2007
Version 1.5 PDF File ID: 920444
Report generated 10/30/2007 09:57

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00073070

Login Number: L0710597 Analyst: MES Prep Method: 5030B
Instrument ID: HPMS10 Matrix: Water Method: 8260B
Workgroup (AAB#): WG253794 Units: ug/L
QC Key: STD Lot #: STD22574

Sample ID: WG253794-02 LCS File ID: 10M59854 Run Date: 10/25/2007 10:03
Sample ID: WG253794-03 LCS2 File ID: 10M59855 Run Date: 10/25/2007 10:35

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
1,1,1-Trichloroethane	20.0	21.5	107	20.0	19.5	97.3	9.80	80 - 134	20	
1,1,2,2-Tetrachloroethane	20.0	20.3	102	20.0	20.1	101	0.954	79 - 125	20	
1,1,2-Trichloro-1,2,2-Trifluoroethane	20.0	19.7	98.7	20.0	17.8	89.1	10.2	80 - 130	20	
1,1,2-Trichloroethane	20.0	21.1	105	20.0	20.3	101	3.93	80 - 125	20	
1,1-Dichloroethane	20.0	20.8	104	20.0	19.2	95.9	8.14	80 - 125	20	
1,1-Dichloroethene	20.0	19.9	99.5	20.0	18.5	92.3	7.51	80 - 132	20	
1,2,4-Trichlorobenzene	20.0	19.7	98.3	20.0	19.3	96.5	1.86	65 - 135	20	
1,2-Dibromo-3-chloropropane	20.0	17.4	87.2	20.0	17.8	89.0	2.05	50 - 130	20	
1,2-Dibromoethane	20.0	22.0	110	20.0	20.9	104	5.45	80 - 125	20	
1,2-Dichlorobenzene	20.0	19.7	98.4	20.0	19.4	97.2	1.24	80 - 125	20	
1,2-Dichloroethane	20.0	21.1	106	20.0	19.5	97.3	8.14	80 - 129	20	
cis-1,2-Dichloroethene	20.0	22.4	112	20.0	20.7	104	7.83	70 - 125	20	
trans-1,2-Dichloroethene	20.0	21.4	107	20.0	20.1	101	6.37	80 - 127	20	
1,2-Dichloropropane	20.0	21.9	110	20.0	20.1	101	8.65	80 - 120	20	
1,3-Dichlorobenzene	20.0	19.1	95.5	20.0	18.6	93.1	2.53	80 - 120	20	
1,4-Dichlorobenzene	20.0	18.5	92.4	20.0	17.7	88.4	4.40	80 - 120	20	
2-Butanone	20.0	19.6	98.2	20.0	19.2	96.0	2.31	30 - 150	20	
2-Hexanone	20.0	17.7	88.7	20.0	17.9	89.3	0.714	55 - 130	20	
4-Methyl-2-pentanone	20.0	19.3	96.5	20.0	18.3	91.4	5.40	64 - 140	20	
Acetone	20.0	18.2	90.8	20.0	17.6	87.9	3.23	40 - 142	20	
Benzene	20.0	20.0	100	20.0	18.8	94.0	6.21	80 - 121	20	
Bromodichloromethane	20.0	22.0	110	20.0	20.4	102	7.57	80 - 131	20	
Bromoform	20.0	20.6	103	20.0	19.8	98.9	4.17	70 - 130	20	
Bromomethane	20.0	24.6	123	20.0	22.5	112	8.78	30 - 145	20	
Carbon disulfide	20.0	17.9	89.6	20.0	16.3	81.7	9.15	58 - 138	20	
Carbon tetrachloride	20.0	21.9	109	20.0	19.7	98.3	10.8	65 - 140	20	
Chlorobenzene	20.0	19.8	98.9	20.0	18.5	92.5	6.69	80 - 120	20	
Chloroethane	20.0	21.6	108	20.0	19.8	99.0	8.47	60 - 135	20	
Chloroform	20.0	21.2	106	20.0	19.7	98.4	7.44	80 - 125	20	
Chloromethane	20.0	18.7	93.3	20.0	17.5	87.7	6.16	40 - 125	20	
cis-1,3-Dichloropropene	20.0	22.9	115	20.0	21.7	108	5.61	70 - 130	20	
Cyclohexane	20.0	20.9	105	20.0	19.2	96.1	8.60	80 - 130	20	
Dibromochloromethane	20.0	21.6	108	20.0	20.5	102	5.24	60 - 135	20	
Dichlorodifluoromethane	20.0	23.4	117	20.0	21.1	105	10.2	50 - 133	20	
Ethyl benzene	20.0	21.3	106	20.0	19.9	99.7	6.39	80 - 122	20	
Isopropylbenzene	20.0	17.5	87.7	20.0	16.3	81.6	7.22	80 - 122	20	
Methyl acetate	20.0	24.9	125	20.0	24.1	121	3.21	80 - 130	20	
Methyl tert-butyl ether	20.0	25.6	128	20.0	24.1	121	6.03	65 - 125	20	*
Methylcyclohexane	20.0	20.7	104	20.0	18.9	94.3	9.55	80 - 130	20	
Methylene chloride	20.0	20.5	102	20.0	19.4	97.0	5.44	80 - 123	20	

KEMRON FORMS - Modified 02/08/2007
Version 1.5 PDF File ID: 918579
Report generated 11/01/2007 15:46

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00073071

Login Number: L0710597 Analyst: MES Prep Method: 5030B
Instrument ID: HPMS10 Matrix: Water Method: 8260B
Workgroup (AAB#): WG253794 Units: ug/L
QC Key: STD Lot #: STD22574

Sample ID: WG253794-02 LCS File ID: 10M59854 Run Date: 10/25/2007 10:03
Sample ID: WG253794-03 LCS2 File ID: 10M59855 Run Date: 10/25/2007 10:35

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Styrene	20.0	19.3	96.7	20.0	18.1	90.7	6.37	80 - 123	20	
Tetrachloroethene	20.0	20.4	102	20.0	18.5	92.7	9.62	80 - 124	20	
Toluene	20.0	21.5	108	20.0	19.9	99.5	7.75	80 - 124	20	
trans-1,3-Dichloropropene	20.0	20.5	102	20.0	19.2	96.1	6.23	80 - 130	20	
Trichloroethene	20.0	21.8	109	20.0	20.3	102	6.91	80 - 122	20	
Trichlorofluoromethane	20.0	16.9	84.3	20.0	15.2	76.0	10.4	62 - 151	20	
Vinyl chloride	20.0	20.9	105	20.0	17.8	88.8	16.5	65 - 140	20	
Xylenes, Total	60.0	63.7	106	60.0	59.4	99.0	7.02	80 - 121	20	

Surogates	LCS	LCS2	Surrogate Limits	Qualifier
	% Recovery	% Recovery		
Dibromofluoromethane	102	96.4	86 - 118	PASS
1,2-Dichloroethane-d4	99.3	93.7	80 - 120	PASS
Toluene-d8	98.5	96.5	88 - 110	PASS
p-Bromofluorobenzene	96.6	95.9	86 - 115	PASS

* FAILS %REC LIMIT

\# FAILS RPD LIMIT

KEMRON FORMS - Modified 02/08/2007
Version 1.5 PDF File ID: 918579
Report generated 11/01/2007 15:46

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00073072

Login Number: L0710597 Analyst: MES Prep Method: 5030B
Instrument ID: HPMS10 Matrix: Water Method: 8260B
Workgroup (AAB#): WG254006 Units: ug/L
QC Key: STD Lot #: STD22574

Sample ID: WG254006-02 LCS File ID: 10M59914 Run Date: 10/27/2007 11:24
Sample ID: WG254006-03 LCS2 File ID: 10M59915 Run Date: 10/27/2007 11:56

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
1,1,1-Trichloroethane	20.0	22.5	112	20.0	21.6	108	4.00	80 - 134	20	
1,1,2,2-Tetrachloroethane	20.0	20.6	103	20.0	20.2	101	2.12	79 - 125	20	
1,1,2-Trichloro-1,2,2-Trifluoroethane	20.0	20.4	102	20.0	19.0	94.9	7.11	80 - 130	20	
1,1,2-Trichloroethane	20.0	21.5	108	20.0	20.7	104	4.00	80 - 125	20	
1,1-Dichloroethane	20.0	21.2	106	20.0	20.3	102	4.33	80 - 125	20	
1,1-Dichloroethene	20.0	19.8	99.2	20.0	19.1	95.3	4.04	80 - 132	20	
1,2,4-Trichlorobenzene	20.0	18.9	94.4	20.0	19.3	96.7	2.43	65 - 135	20	
1,2-Dibromo-3-chloropropane	20.0	18.1	90.4	20.0	16.2	81.1	10.8	50 - 130	20	
1,2-Dibromoethane	20.0	22.2	111	20.0	21.5	107	3.44	80 - 125	20	
1,2-Dichlorobenzene	20.0	19.8	99.1	20.0	19.7	98.6	0.557	80 - 125	20	
1,2-Dichloroethane	20.0	22.4	112	20.0	21.3	106	5.26	80 - 129	20	
cis-1,2-Dichloroethene	20.0	22.1	111	20.0	21.5	107	2.97	70 - 125	20	
trans-1,2-Dichloroethene	20.0	21.9	109	20.0	20.9	105	4.47	80 - 127	20	
1,2-Dichloropropane	20.0	21.8	109	20.0	21.6	108	0.854	80 - 120	20	
1,3-Dichlorobenzene	20.0	18.8	94.2	20.0	19.0	94.9	0.788	80 - 120	20	
1,4-Dichlorobenzene	20.0	18.2	91.1	20.0	18.4	92.0	0.915	80 - 120	20	
2-Butanone	20.0	15.0	74.9	20.0	13.1	65.3	13.6	30 - 150	20	
2-Hexanone	20.0	17.8	88.8	20.0	15.7	78.6	12.2	55 - 130	20	
4-Methyl-2-pentanone	20.0	20.0	99.8	20.0	18.7	93.6	6.36	64 - 140	20	
Acetone	20.0	15.1	75.5	20.0	14.2	70.8	6.45	40 - 142	20	
Benzene	20.0	20.0	99.8	20.0	19.6	98.0	1.86	80 - 121	20	
Bromodichloromethane	20.0	23.2	116	20.0	22.2	111	4.51	80 - 131	20	
Bromoform	20.0	22.1	110	20.0	21.0	105	4.93	70 - 130	20	
Bromomethane	20.0	23.9	120	20.0	23.5	117	1.88	30 - 145	20	
Carbon disulfide	20.0	17.9	89.7	20.0	17.2	86.1	4.12	58 - 138	20	
Carbon tetrachloride	20.0	23.1	116	20.0	21.7	109	6.29	65 - 140	20	
Chlorobenzene	20.0	19.6	97.9	20.0	19.3	96.7	1.17	80 - 120	20	
Chloroethane	20.0	21.7	109	20.0	21.1	105	3.14	60 - 135	20	
Chloroform	20.0	22.0	110	20.0	21.1	106	4.23	80 - 125	20	
Chloromethane	20.0	19.8	98.8	20.0	18.9	94.7	4.26	40 - 125	20	
cis-1,3-Dichloropropene	20.0	23.3	117	20.0	22.4	112	3.83	70 - 130	20	
Cyclohexane	20.0	21.0	105	20.0	20.0	100	4.86	80 - 130	20	
Dibromochloromethane	20.0	22.1	110	20.0	21.6	108	2.01	60 - 135	20	
Dichlorodifluoromethane	20.0	24.1	121	20.0	22.2	111	8.18	50 - 133	20	
Ethyl benzene	20.0	20.8	104	20.0	20.4	102	1.99	80 - 122	20	
Isopropylbenzene	20.0	17.5	87.5	20.0	17.2	86.0	1.76	80 - 122	20	
Methyl acetate	20.0	25.9	130	20.0	22.7	113	13.4	80 - 130	20	
Methyl tert-butyl ether	20.0	23.9	119	20.0	22.5	113	5.70	65 - 125	20	
Methylcyclohexane	20.0	20.8	104	20.0	20.0	100	3.75	80 - 130	20	
Methylene chloride	20.0	21.0	105	20.0	20.0	100	4.81	80 - 123	20	

KEMRON FORMS - Modified 02/08/2007
Version 1.5 PDF File ID: 918579
Report generated 11/01/2007 15:46

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00073073

Login Number: L0710597 Analyst: MES Prep Method: 5030B
Instrument ID: HPMS10 Matrix: Water Method: 8260B
Workgroup (AAB#): WG254006 Units: ug/L
QC Key: STD Lot #: STD22574

Sample ID: WG254006-02 LCS File ID: 10M59914 Run Date: 10/27/2007 11:24
Sample ID: WG254006-03 LCS2 File ID: 10M59915 Run Date: 10/27/2007 11:56

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Styrene	20.0	19.3	96.6	20.0	19.0	95.0	1.66	80 - 123	20	
Tetrachloroethene	20.0	21.1	105	20.0	20.1	100	4.93	80 - 124	20	
Toluene	20.0	21.1	105	20.0	20.6	103	2.05	80 - 124	20	
trans-1,3-Dichloropropene	20.0	21.3	107	20.0	20.4	102	4.49	80 - 130	20	
Trichloroethene	20.0	22.2	111	20.0	21.0	105	5.56	80 - 122	20	
Trichlorofluoromethane	20.0	17.9	89.4	20.0	16.8	83.9	6.34	62 - 151	20	
Vinyl chloride	20.0	23.2	116	20.0	20.4	102	12.5	65 - 140	20	
Xylenes, Total	60.0	63.5	106	60.0	62.3	104	1.87	80 - 121	20	

Surogates	LCS	LCS2	Surrogate Limits	Qualifier
	% Recovery	% Recovery		
Dibromofluoromethane	102	101	86 - 118	PASS
1,2-Dichloroethane-d4	102	98.3	80 - 120	PASS
Toluene-d8	97.3	99.4	88 - 110	PASS
p-Bromofluorobenzene	97.1	101	86 - 115	PASS

* FAILS %REC LIMIT

\# FAILS RPD LIMIT

KEMRON FORMS - Modified 02/08/2007
Version 1.5 PDF File ID: 918579
Report generated 11/01/2007 15:46

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00073074

Login Number: L0710597 Analyst: MES Prep Method: 5030B
Instrument ID: HPMS11 Matrix: Water Method: 8260B
Workgroup (AAB#): WG253678 Units: ug/L
QC Key: STD Lot #: STD22574

Sample ID: WG253678-02 LCS File ID: 11M46854 Run Date: 10/24/2007 11:21
Sample ID: WG253678-03 LCS2 File ID: 11M46855 Run Date: 10/24/2007 11:52

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
1,1,1-Trichloroethane	20.0	21.5	108	20.0	21.0	105	2.46	80 - 134	20	
1,1,2,2-Tetrachloroethane	20.0	22.3	111	20.0	22.4	112	0.512	79 - 125	20	
1,1,2-Trichloro-1,2,2-Trifluoroethane	20.0	20.3	102	20.0	19.8	99.0	2.56	80 - 130	20	
1,1,2-Trichloroethane	20.0	22.6	113	20.0	22.6	113	0.118	80 - 125	20	
1,1-Dichloroethane	20.0	21.6	108	20.0	21.1	106	2.12	80 - 125	20	
1,1-Dichloroethene	20.0	20.4	102	20.0	20.1	101	1.35	80 - 132	20	
1,2,4-Trichlorobenzene	20.0	22.1	111	20.0	22.0	110	0.611	65 - 135	20	
1,2-Dibromo-3-chloropropane	20.0	21.7	109	20.0	21.2	106	2.15	50 - 130	20	
1,2-Dibromoethane	20.0	22.2	111	20.0	22.0	110	0.915	80 - 125	20	
1,2-Dichlorobenzene	20.0	21.2	106	20.0	21.0	105	0.693	80 - 125	20	
1,2-Dichloroethane	20.0	21.3	107	20.0	20.9	105	1.89	80 - 129	20	
cis-1,2-Dichloroethene	20.0	22.3	111	20.0	22.1	111	0.760	70 - 125	20	
trans-1,2-Dichloroethene	20.0	21.1	106	20.0	21.0	105	0.447	80 - 127	20	
1,2-Dichloropropane	20.0	21.2	106	20.0	21.6	108	1.94	80 - 120	20	
1,3-Dichlorobenzene	20.0	20.7	103	20.0	20.8	104	0.299	80 - 120	20	
1,4-Dichlorobenzene	20.0	20.7	103	20.0	20.5	103	0.823	80 - 120	20	
2-Butanone	20.0	20.1	101	20.0	19.9	99.7	0.901	30 - 150	20	
2-Hexanone	20.0	21.0	105	20.0	20.5	102	2.70	55 - 130	20	
4-Methyl-2-pentanone	20.0	21.4	107	20.0	20.6	103	4.02	64 - 140	20	
Acetone	20.0	21.2	106	20.0	22.0	110	3.80	40 - 142	20	
Benzene	20.0	21.1	105	20.0	21.3	106	0.861	80 - 121	20	
Bromodichloromethane	20.0	22.6	113	20.0	22.7	113	0.615	80 - 131	20	
Bromoform	20.0	21.8	109	20.0	21.4	107	1.63	70 - 130	20	
Bromomethane	20.0	25.6	128	20.0	26.1	131	1.99	30 - 145	20	
Carbon disulfide	20.0	18.6	92.8	20.0	17.7	88.6	4.63	58 - 138	20	
Carbon tetrachloride	20.0	19.5	97.4	20.0	19.0	95.1	2.38	65 - 140	20	
Chlorobenzene	20.0	20.1	100	20.0	20.1	100	0.177	80 - 120	20	
Chloroethane	20.0	22.4	112	20.0	22.7	113	1.09	60 - 135	20	
Chloroform	20.0	21.8	109	20.0	21.5	108	1.30	80 - 125	20	
Chloromethane	20.0	21.7	109	20.0	22.0	110	1.23	40 - 125	20	
cis-1,3-Dichloropropene	20.0	21.5	108	20.0	21.7	108	0.573	70 - 130	20	
Cyclohexane	20.0	20.0	99.8	20.0	19.5	97.7	2.07	80 - 130	20	
Dibromochloromethane	20.0	22.4	112	20.0	22.2	111	0.862	60 - 135	20	
Dichlorodifluoromethane	20.0	21.8	109	20.0	21.4	107	1.68	50 - 133	20	
Ethyl benzene	20.0	21.3	106	20.0	21.1	106	0.513	80 - 122	20	
Isopropylbenzene	20.0	17.5	87.6	20.0	17.5	87.5	0.139	80 - 122	20	
Methyl acetate	20.0	29.2	146	20.0	28.8	144	1.33	80 - 130	20	*
Methyl tert-butyl ether	20.0	25.4	127	20.0	24.8	124	2.36	65 - 125	20	*
Methylcyclohexane	20.0	19.7	98.6	20.0	19.5	97.7	0.909	80 - 130	20	
Methylene chloride	20.0	21.0	105	20.0	21.1	105	0.497	80 - 123	20	

KEMRON FORMS - Modified 02/08/2007
Version 1.5 PDF File ID: 918579
Report generated 11/01/2007 15:46

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00073075

Login Number: L0710597 Analyst: MES Prep Method: 5030B
Instrument ID: HPMS11 Matrix: Water Method: 8260B
Workgroup (AAB#): WG253678 Units: ug/L
QC Key: STD Lot #: STD22574

Sample ID: WG253678-02 LCS File ID: 11M46854 Run Date: 10/24/2007 11:21
Sample ID: WG253678-03 LCS2 File ID: 11M46855 Run Date: 10/24/2007 11:52

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Styrene	20.0	19.6	97.9	20.0	19.7	98.3	0.428	80 - 123	20	
Tetrachloroethene	20.0	19.0	95.1	20.0	18.7	93.5	1.61	80 - 124	20	
Toluene	20.0	20.8	104	20.0	20.8	104	0.0245	80 - 124	20	
trans-1,3-Dichloropropene	20.0	20.4	102	20.0	20.0	99.9	2.04	80 - 130	20	
Trichloroethene	20.0	21.8	109	20.0	21.3	106	2.30	80 - 122	20	
Trichlorofluoromethane	20.0	17.0	84.9	20.0	16.5	82.3	3.10	62 - 151	20	
Vinyl chloride	20.0	21.6	108	20.0	20.7	103	4.60	65 - 140	20	
Xylenes, Total	60.0	62.1	103	60.0	62.6	104	0.762	80 - 121	20	

Surogates	LCS	LCS2	Surrogate Limits	Qualifier
	% Recovery	% Recovery		
Dibromofluoromethane	93.1	93.3	86 - 118	PASS
1,2-Dichloroethane-d4	89.4	90.1	80 - 120	PASS
Toluene-d8	88.0	89.5	88 - 110	PASS
p-Bromofluorobenzene	87.1	87.5	86 - 115	PASS

* FAILS %REC LIMIT

\# FAILS RPD LIMIT

KEMRON FORMS - Modified 02/08/2007
Version 1.5 PDF File ID: 918579
Report generated 11/01/2007 15:46

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00073076

Login Number: L0710597 Analyst: MES Prep Method: 5030B
Instrument ID: HPMS6 Matrix: Water Method: 8260B
Workgroup (AAB#): WG253919 Units: ug/L
QC Key: STD Lot #: STD22622

Sample ID: WG253919-02 LCS File ID: 6M70290 Run Date: 10/26/2007 12:16
Sample ID: WG253919-03 LCS2 File ID: 6M70291 Run Date: 10/26/2007 12:48

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
1,1,1-Trichloroethane	20.0	21.1	105	20.0	20.0	100	5.08	80 - 134	20	
1,1,2,2-Tetrachloroethane	20.0	20.4	102	20.0	20.0	100	1.89	79 - 125	20	
1,1,2-Trichloro-1,2,2-Trifluoroethane	20.0	19.1	95.7	20.0	17.9	89.4	6.78	80 - 130	20	
1,1,2-Trichloroethane	20.0	20.8	104	20.0	20.9	105	0.555	80 - 125	20	
1,1-Dichloroethane	20.0	21.1	105	20.0	20.3	101	3.79	80 - 125	20	
1,1-Dichloroethene	20.0	21.8	109	20.0	20.5	103	5.82	80 - 132	20	
1,2,4-Trichlorobenzene	20.0	20.9	105	20.0	20.7	104	0.754	65 - 135	20	
1,2-Dibromo-3-chloropropane	20.0	20.4	102	20.0	20.9	105	2.82	50 - 130	20	
1,2-Dibromoethane	20.0	21.8	109	20.0	21.6	108	0.869	80 - 125	20	
1,2-Dichlorobenzene	20.0	19.6	97.8	20.0	19.2	95.8	2.04	80 - 125	20	
1,2-Dichloroethane	20.0	19.8	98.8	20.0	19.0	95.2	3.71	80 - 129	20	
cis-1,2-Dichloroethene	20.0	22.3	112	20.0	21.7	108	3.08	70 - 125	20	
trans-1,2-Dichloroethene	20.0	21.9	110	20.0	21.2	106	3.52	80 - 127	20	
1,2-Dichloropropane	20.0	21.5	107	20.0	21.1	105	1.93	80 - 120	20	
1,3-Dichlorobenzene	20.0	19.6	97.8	20.0	19.3	96.4	1.41	80 - 120	20	
1,4-Dichlorobenzene	20.0	18.5	92.6	20.0	18.2	90.8	1.99	80 - 120	20	
2-Butanone	20.0	18.7	93.7	20.0	18.9	94.3	0.717	30 - 150	20	
2-Hexanone	20.0	19.5	97.6	20.0	20.2	101	3.38	55 - 130	20	
4-Methyl-2-pentanone	20.0	19.9	99.7	20.0	20.6	103	3.13	64 - 140	20	
Acetone	20.0	22.9	114	20.0	23.3	116	1.63	40 - 142	20	
Benzene	20.0	20.4	102	20.0	20.0	99.9	2.14	80 - 121	20	
Bromodichloromethane	20.0	21.3	107	20.0	20.6	103	3.80	80 - 131	20	
Bromoform	20.0	19.5	97.6	20.0	19.0	94.8	2.94	70 - 130	20	
Bromomethane	20.0	23.6	118	20.0	23.4	117	1.04	30 - 145	20	
Carbon disulfide	20.0	16.9	84.7	20.0	16.5	82.5	2.70	58 - 138	20	
Carbon tetrachloride	20.0	21.4	107	20.0	19.9	99.3	7.33	65 - 140	20	
Chlorobenzene	20.0	19.5	97.6	20.0	19.2	95.9	1.74	80 - 120	20	
Chloroethane	20.0	21.7	109	20.0	21.3	106	2.17	60 - 135	20	
Chloroform	20.0	20.4	102	20.0	19.7	98.6	3.22	80 - 125	20	
Chloromethane	20.0	20.5	102	20.0	19.2	95.9	6.46	40 - 125	20	
cis-1,3-Dichloropropene	20.0	22.6	113	20.0	21.9	110	2.94	70 - 130	20	
Cyclohexane	20.0	19.5	97.4	20.0	18.9	94.6	2.93	80 - 130	20	
Dibromochloromethane	20.0	20.8	104	20.0	20.4	102	2.01	60 - 135	20	
Dichlorodifluoromethane	20.0	21.0	105	20.0	20.0	99.8	5.15	50 - 133	20	
Ethyl benzene	20.0	20.8	104	20.0	20.3	101	2.46	80 - 122	20	
Isopropylbenzene	20.0	20.4	102	20.0	19.7	98.3	3.67	80 - 122	20	
Methyl acetate	20.0	23.2	116	20.0	23.9	120	3.02	80 - 130	20	
Methyl tert-butyl ether	20.0	25.6	128	20.0	25.6	128	0.322	65 - 125	20	*
Methylcyclohexane	20.0	20.1	100	20.0	19.5	97.4	3.11	80 - 130	20	
Methylene chloride	20.0	21.1	106	20.0	20.7	104	1.82	80 - 123	20	

KEMRON FORMS - Modified 02/08/2007
Version 1.5 PDF File ID: 918579
Report generated 11/01/2007 15:46

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00073077

Login Number: L0710597 Analyst: MES Prep Method: 5030B
Instrument ID: HPMS6 Matrix: Water Method: 8260B
Workgroup (AAB#): WG253919 Units: ug/L
QC Key: STD Lot #: STD22622

Sample ID: WG253919-02 LCS File ID: 6M70290 Run Date: 10/26/2007 12:16
Sample ID: WG253919-03 LCS2 File ID: 6M70291 Run Date: 10/26/2007 12:48

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Styrene	20.0	21.8	109	20.0	21.5	107	1.55	80 - 123	20	
Tetrachloroethene	20.0	21.0	105	20.0	20.3	102	3.35	80 - 124	20	
Toluene	20.0	21.8	109	20.0	21.6	108	0.961	80 - 124	20	
trans-1,3-Dichloropropene	20.0	20.3	102	20.0	20.2	101	0.518	80 - 130	20	
Trichloroethene	20.0	21.4	107	20.0	20.7	103	3.34	80 - 122	20	
Trichlorofluoromethane	20.0	16.0	80.2	20.0	15.1	75.3	6.30	62 - 151	20	
Vinyl chloride	20.0	19.9	99.3	20.0	18.4	91.8	7.88	65 - 140	20	
Xylenes, Total	60.0	63.0	105	60.0	61.7	103	2.07	80 - 121	20	

Surogates	LCS	LCS2	Surrogate Limits	Qualifier
	% Recovery	% Recovery		
Dibromofluoromethane	90.3	90.4	86 - 118	PASS
1,2-Dichloroethane-d4	84.4	82.0	80 - 120	PASS
Toluene-d8	96.0	96.3	88 - 110	PASS
p-Bromofluorobenzene	93.7	92.2	86 - 115	PASS

* FAILS %REC LIMIT

\# FAILS RPD LIMIT

KEMRON FORMS - Modified 02/08/2007
Version 1.5 PDF File ID: 918579
Report generated 11/01/2007 15:46

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00073078

Login Number: L0710597 Analyst: MES Prep Method: 5030B
Instrument ID: HPMS10 Matrix: Water Method: 8260B
Workgroup (AAB#): WG253910 Units: ug/L
QC Key: STD Lot #: STD22574

Sample ID: WG253910-02 LCS File ID: 10M59887 Run Date: 10/26/2007 13:00
Sample ID: WG253910-03 LCS2 File ID: 10M59888 Run Date: 10/26/2007 13:32

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
1,1,1-Trichloroethane	20.0	22.5	113	20.0	21.3	107	5.57	80 - 134	20	
1,1,2,2-Tetrachloroethane	20.0	20.0	100	20.0	22.1	110	9.69	79 - 125	20	
1,1,2-Trichloro-1,2,2-Trifluoroethane	20.0	20.3	101	20.0	19.5	97.4	3.95	80 - 130	20	
1,1,2-Trichloroethane	20.0	20.6	103	20.0	21.7	109	5.39	80 - 125	20	
1,1-Dichloroethane	20.0	21.4	107	20.0	21.0	105	2.06	80 - 125	20	
1,1-Dichloroethene	20.0	20.4	102	20.0	19.9	99.7	2.14	80 - 132	20	
1,2,4-Trichlorobenzene	20.0	19.7	98.3	20.0	20.5	102	3.98	65 - 135	20	
1,2-Dibromo-3-chloropropane	20.0	16.5	82.4	20.0	20.6	103	22.1	50 - 130	20	#
1,2-Dibromoethane	20.0	21.4	107	20.0	22.8	114	6.35	80 - 125	20	
1,2-Dichlorobenzene	20.0	20.5	103	20.0	20.5	103	0.0621	80 - 125	20	
1,2-Dichloroethane	20.0	21.3	107	20.0	21.9	109	2.37	80 - 129	20	
cis-1,2-Dichloroethene	20.0	23.0	115	20.0	22.9	115	0.239	70 - 125	20	
trans-1,2-Dichloroethene	20.0	22.4	112	20.0	21.5	107	4.17	80 - 127	20	
1,2-Dichloropropane	20.0	22.2	111	20.0	22.0	110	0.752	80 - 120	20	
1,3-Dichlorobenzene	20.0	20.0	100	20.0	19.4	97.2	2.97	80 - 120	20	
1,4-Dichlorobenzene	20.0	19.3	96.7	20.0	19.1	95.7	1.10	80 - 120	20	
2-Butanone	20.0	18.0	90.0	20.0	21.5	108	18.0	30 - 150	20	
2-Hexanone	20.0	16.0	80.0	20.0	19.5	97.7	20.0	55 - 130	20	
4-Methyl-2-pentanone	20.0	18.9	94.7	20.0	21.3	107	12.0	64 - 140	20	
Acetone	20.0	17.9	89.4	20.0	20.4	102	13.4	40 - 142	20	
Benzene	20.0	20.9	104	20.0	20.5	102	1.86	80 - 121	20	
Bromodichloromethane	20.0	22.6	113	20.0	22.9	114	0.950	80 - 131	20	
Bromoform	20.0	19.9	99.5	20.0	21.9	109	9.42	70 - 130	20	
Bromomethane	20.0	25.0	125	20.0	23.1	116	7.88	30 - 145	20	
Carbon disulfide	20.0	19.0	94.9	20.0	18.2	91.1	4.07	58 - 138	20	
Carbon tetrachloride	20.0	22.9	115	20.0	21.8	109	5.24	65 - 140	20	
Chlorobenzene	20.0	20.0	99.8	20.0	19.5	97.5	2.26	80 - 120	20	
Chloroethane	20.0	22.3	111	20.0	21.4	107	3.77	60 - 135	20	
Chloroform	20.0	21.8	109	20.0	21.2	106	2.68	80 - 125	20	
Chloromethane	20.0	19.8	99.0	20.0	17.7	88.7	10.9	40 - 125	20	
cis-1,3-Dichloropropene	20.0	23.2	116	20.0	23.7	119	2.28	70 - 130	20	
Cyclohexane	20.0	21.8	109	20.0	21.3	107	2.00	80 - 130	20	
Dibromochloromethane	20.0	21.3	107	20.0	22.3	111	4.42	60 - 135	20	
Dichlorodifluoromethane	20.0	23.5	118	20.0	22.3	112	5.25	50 - 133	20	
Ethyl benzene	20.0	21.6	108	20.0	20.6	103	4.62	80 - 122	20	
Isopropylbenzene	20.0	18.2	91.1	20.0	17.4	86.9	4.71	80 - 122	20	
Methyl acetate	20.0	24.2	121	20.0	27.4	137	12.2	80 - 130	20	*
Methyl tert-butyl ether	20.0	24.8	124	20.0	27.5	137	10.3	65 - 125	20	*
Methylcyclohexane	20.0	21.4	107	20.0	20.8	104	3.22	80 - 130	20	
Methylene chloride	20.0	21.2	106	20.0	21.3	107	0.633	80 - 123	20	

KEMRON FORMS - Modified 02/08/2007
Version 1.5 PDF File ID: 918579
Report generated 11/01/2007 15:46

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00073079

Login Number: L0710597 Analyst: MES Prep Method: 5030B
Instrument ID: HPMS10 Matrix: Water Method: 8260B
Workgroup (AAB#): WG253910 Units: ug/L
QC Key: STD Lot #: STD22574

Sample ID: WG253910-02 LCS File ID: 10M59887 Run Date: 10/26/2007 13:00
Sample ID: WG253910-03 LCS2 File ID: 10M59888 Run Date: 10/26/2007 13:32

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Styrene	20.0	19.8	99.0	20.0	19.4	97.0	2.00	80 - 123	20	
Tetrachloroethene	20.0	21.3	107	20.0	20.2	101	5.40	80 - 124	20	
Toluene	20.0	22.0	110	20.0	21.2	106	3.53	80 - 124	20	
trans-1,3-Dichloropropene	20.0	20.2	101	20.0	21.4	107	5.79	80 - 130	20	
Trichloroethene	20.0	22.7	113	20.0	21.9	110	3.27	80 - 122	20	
Trichlorofluoromethane	20.0	17.6	88.0	20.0	16.5	82.7	6.19	62 - 151	20	
Vinyl chloride	20.0	21.2	106	20.0	19.0	95.2	10.6	65 - 140	20	
Xylenes, Total	60.0	65.3	109	60.0	63.9	106	2.24	80 - 121	20	

Surogates	LCS	LCS2	Surrogate Limits	Qualifier
	% Recovery	% Recovery		
Dibromofluoromethane	101	101	86 - 118	PASS
1,2-Dichloroethane-d4	95.6	99.4	80 - 120	PASS
Toluene-d8	98.6	98.8	88 - 110	PASS
p-Bromofluorobenzene	98.2	99.1	86 - 115	PASS

* FAILS %REC LIMIT

\# FAILS RPD LIMIT

KEMRON FORMS - Modified 02/08/2007
Version 1.5 PDF File ID: 918579
Report generated 11/01/2007 15:46

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00073080

Login Number: L0710597 Analyst: MES Prep Method: 5030B
Instrument ID: HPMS6 Matrix: Water Method: 8260B
Workgroup (AAB#): WG253819 Units: ug/L
QC Key: STD Lot #: STD22622

Sample ID: WG253819-02 LCS File ID: 6M70258 Run Date: 10/25/2007 12:15
Sample ID: WG253819-03 LCS2 File ID: 6M70259 Run Date: 10/25/2007 12:47

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
1,1,1-Trichloroethane	20.0	20.7	103	20.0	19.0	94.8	8.74	80 - 134	20	
1,1,2,2-Tetrachloroethane	20.0	19.3	96.3	20.0	19.1	95.3	1.05	79 - 125	20	
1,1,2-Trichloro-1,2,2-Trifluoroethane	20.0	18.9	94.7	20.0	17.4	87.2	8.18	80 - 130	20	
1,1,2-Trichloroethane	20.0	20.3	101	20.0	20.0	100	1.30	80 - 125	20	
1,1-Dichloroethane	20.0	20.8	104	20.0	19.8	99.1	4.99	80 - 125	20	
1,1-Dichloroethene	20.0	21.7	109	20.0	19.9	99.4	8.93	80 - 132	20	
1,2,4-Trichlorobenzene	20.0	21.0	105	20.0	20.4	102	2.89	65 - 135	20	
1,2-Dibromo-3-chloropropane	20.0	18.7	93.4	20.0	18.7	93.4	0.0069	50 - 130	20	
1,2-Dibromoethane	20.0	20.6	103	20.0	20.0	99.9	3.25	80 - 125	20	
1,2-Dichlorobenzene	20.0	19.8	99.0	20.0	18.9	94.5	4.64	80 - 125	20	
1,2-Dichloroethane	20.0	18.3	91.6	20.0	17.5	87.3	4.88	80 - 129	20	
cis-1,2-Dichloroethene	20.0	22.2	111	20.0	20.9	104	6.03	70 - 125	20	
trans-1,2-Dichloroethene	20.0	21.6	108	20.0	20.3	101	6.55	80 - 127	20	
1,2-Dichloropropane	20.0	21.4	107	20.0	20.8	104	3.26	80 - 120	20	
1,3-Dichlorobenzene	20.0	20.0	100	20.0	19.0	95.1	5.26	80 - 120	20	
1,4-Dichlorobenzene	20.0	18.6	93.2	20.0	18.0	89.9	3.63	80 - 120	20	
2-Butanone	20.0	19.7	98.7	20.0	19.7	98.4	0.267	30 - 150	20	
2-Hexanone	20.0	17.8	89.0	20.0	17.6	87.9	1.19	55 - 130	20	
4-Methyl-2-pentanone	20.0	18.2	91.1	20.0	17.9	89.6	1.74	64 - 140	20	
Acetone	20.0	20.2	101	20.0	20.2	101	0.239	40 - 142	20	
Benzene	20.0	20.6	103	20.0	19.6	98.2	4.88	80 - 121	20	
Bromodichloromethane	20.0	20.2	101	20.0	19.0	95.0	5.94	80 - 131	20	
Bromoform	20.0	17.9	89.5	20.0	17.0	85.2	4.90	70 - 130	20	
Bromomethane	20.0	24.1	120	20.0	22.9	115	4.84	30 - 145	20	
Carbon disulfide	20.0	17.3	86.5	20.0	16.3	81.6	5.80	58 - 138	20	
Carbon tetrachloride	20.0	20.4	102	20.0	18.5	92.6	9.58	65 - 140	20	
Chlorobenzene	20.0	19.8	98.9	20.0	19.0	94.8	4.19	80 - 120	20	
Chloroethane	20.0	22.0	110	20.0	20.6	103	6.62	60 - 135	20	
Chloroform	20.0	19.7	98.5	20.0	18.5	92.6	6.13	80 - 125	20	
Chloromethane	20.0	19.2	96.2	20.0	17.7	88.4	8.53	40 - 125	20	
cis-1,3-Dichloropropene	20.0	21.6	108	20.0	20.6	103	4.80	70 - 130	20	
Cyclohexane	20.0	20.4	102	20.0	18.9	94.4	7.78	80 - 130	20	
Dibromochloromethane	20.0	20.0	100	20.0	19.1	95.7	4.48	60 - 135	20	
Dichlorodifluoromethane	20.0	21.0	105	20.0	19.3	96.5	8.35	50 - 133	20	
Ethyl benzene	20.0	21.5	107	20.0	20.0	100	6.94	80 - 122	20	
Isopropylbenzene	20.0	20.8	104	20.0	19.4	96.9	6.88	80 - 122	20	
Methyl acetate	20.0	22.9	115	20.0	22.0	110	4.26	80 - 130	20	
Methyl tert-butyl ether	20.0	23.7	119	20.0	23.0	115	3.34	65 - 125	20	
Methylcyclohexane	20.0	20.6	103	20.0	19.2	96.0	7.25	80 - 130	20	
Methylene chloride	20.0	21.0	105	20.0	20.2	101	4.11	80 - 123	20	

KEMRON FORMS - Modified 02/08/2007
Version 1.5 PDF File ID: 918579
Report generated 11/01/2007 15:46

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00073081

Login Number: L0710597 Analyst: MES Prep Method: 5030B
Instrument ID: HPMS6 Matrix: Water Method: 8260B
Workgroup (AAB#): WG253819 Units: ug/L
QC Key: STD Lot #: STD22622

Sample ID: WG253819-02 LCS File ID: 6M70258 Run Date: 10/25/2007 12:15
Sample ID: WG253819-03 LCS2 File ID: 6M70259 Run Date: 10/25/2007 12:47

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Styrene	20.0	22.0	110	20.0	21.0	105	4.72	80 - 123	20	
Tetrachloroethene	20.0	21.5	107	20.0	19.9	99.3	7.87	80 - 124	20	
Toluene	20.0	22.6	113	20.0	21.3	106	5.88	80 - 124	20	
trans-1,3-Dichloropropene	20.0	20.2	101	20.0	19.1	95.6	5.25	80 - 130	20	
Trichloroethene	20.0	21.0	105	20.0	19.8	99.0	6.06	80 - 122	20	
Trichlorofluoromethane	20.0	15.6	78.0	20.0	14.1	70.5	10.1	62 - 151	20	
Vinyl chloride	20.0	18.5	92.6	20.0	16.8	84.0	9.70	65 - 140	20	
Xylenes, Total	60.0	64.3	107	60.0	60.8	101	5.46	80 - 121	20	

Surogates	LCS	LCS2	Surrogate Limits	Qualifier
	% Recovery	% Recovery		
Dibromofluoromethane	88.6	87.8	86 - 118	PASS
1,2-Dichloroethane-d4	80.2	77.9	80 - 120	FAIL
Toluene-d8	98.9	97.7	88 - 110	PASS
p-Bromofluorobenzene	95.4	95.7	86 - 115	PASS

* FAILS %REC LIMIT

\# FAILS RPD LIMIT

KEMRON FORMS - Modified 02/08/2007
Version 1.5 PDF File ID: 918579
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L0710597
Instrument: HPMS10
Analyst: MES
Workgroup: WG253187

Tune ID: WG253187-01
Run Date: 10/18/2007
Run Time: 08:52
File ID: 10M59716
Cal ID: HPMS10-18-OCT-07

Target	Rel. to	Lower	Upper	Rel.	Raw	Result
50.0	95.0	15.0	40.0	22.0	7983	PASS
75.0	95.0	30.0	60.0	48.9	17728	PASS
95.0	95.0	100	100	100	36237	PASS
96.0	95.0	5.00	9.00	6.76	2448	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	80.4	29150	PASS
175	174	5.00	9.00	6.19	1804	PASS
176	174	95.0	101	98.5	28710	PASS
177	176	5.00	9.00	5.73	1644	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG253187-02	STD	01	10/18/2007 09:57	
WG253187-04	STD	01	10/18/2007 11:00	
WG253187-05	STD	01	10/18/2007 11:31	
WG253187-06	STD	01	10/18/2007 12:03	
WG253187-07	STD	01	10/18/2007 12:35	
WG253187-08	STD-CCV	01	10/18/2007 13:07	
WG253187-09	STD	01	10/18/2007 13:45	
WG253187-10	STD	01	10/18/2007 14:16	
WG253187-11	STD	01	10/18/2007 14:47	
WG253187-03	STD	01	10/18/2007 16:51	
WG253187-12	SSCV	02	10/18/2007 18:23	
WG253187-12	SSCV	01	10/18/2007 18:55	
WG253187-13	SSCV	01	10/18/2007 19:37	

* Sample past 12 hour tune limit

KEMRON FORMS - Modified 03/12/2007
Version 1.3 PDF File ID: 919906
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L0710597
Instrument: HPMS10
Analyst: MES
Workgroup: WG253793

Tune ID: WG253793-01
Run Date: 10/25/2007
Run Time: 08:04
File ID: 10M59850
Cal ID: HPMS10-18-OCT-07

Target	Rel. to	Lower	Upper	Rel.	Raw	Result
50.0	95.0	15.0	40.0	21.8	8388	PASS
75.0	95.0	30.0	60.0	50.3	19337	PASS
95.0	95.0	100	100	100	38432	PASS
96.0	95.0	5.00	9.00	7.10	2727	PASS
173	174	0	2.00	0.648	205	PASS
174	95.0	50.0	100	82.3	31629	PASS
175	174	5.00	9.00	7.63	2414	PASS
176	174	95.0	101	97.0	30678	PASS
177	176	5.00	9.00	6.81	2088	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG253793-02	CCV	01	10/25/2007 08:27	
WG253794-01	BLANK	01	10/25/2007 09:31	
WG253794-02	LCS	01	10/25/2007 10:03	
WG253794-03	LCS2	01	10/25/2007 10:35	
L0710597-05	47WW18-101807	01	10/25/2007 18:23	
L0710597-06	47WW18-101807-DUP	01	10/25/2007 18:54	
L0710597-08	47WW30-101807	01	10/25/2007 19:26	

* Sample past 12 hour tune limit

KEMRON FORMS - Modified 03/12/2007
Version 1.3 PDF File ID: 919906
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L0710597
Instrument: HPMS10
Analyst: MES
Workgroup: WG253909

Tune ID: WG253909-01
Run Date: 10/26/2007
Run Time: 09:43
File ID: 10M59882
Cal ID: HPMS10-18-OCT-07

Target	Rel. to	Lower	Upper	Rel.	Raw	Result
50.0	95.0	15.0	40.0	19.4	6624	PASS
75.0	95.0	30.0	60.0	50.9	17387	PASS
95.0	95.0	100	100	100	34133	PASS
96.0	95.0	5.00	9.00	6.91	2360	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	82.1	28029	PASS
175	174	5.00	9.00	8.29	2324	PASS
176	174	95.0	101	95.1	26669	PASS
177	176	5.00	9.00	6.38	1701	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG253909-02	CCV	01	10/26/2007 11:25	
WG253910-01	BLANK	01	10/26/2007 12:28	
WG253910-02	LCS	01	10/26/2007 13:00	
WG253910-03	LCS2	01	10/26/2007 13:32	
L0710597-08	47WW30-101807	DL01	10/26/2007 14:04	
L0710597-10	47WW31-101807	01	10/26/2007 19:55	
L0710597-12	LHSMW34-101807	DL01	10/26/2007 20:27	
L0710597-13	EQUIPMENT RINSE #1	01	10/26/2007 20:59	

* Sample past 12 hour tune limit

KEMRON FORMS - Modified 03/12/2007
Version 1.3 PDF File ID: 919906
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L0710597
Instrument: HPMS10
Analyst: MES
Workgroup: WG254005

Tune ID: WG254005-01
Run Date: 10/27/2007
Run Time: 09:21
File ID: 10M59910
Cal ID: HPMS10-18-OCT-07

Target	Rel. to	Lower	Upper	Rel.	Raw	Result
50.0	95.0	15.0	40.0	23.6	8981	PASS
75.0	95.0	30.0	60.0	51.6	19625	PASS
95.0	95.0	100	100	100	38013	PASS
96.0	95.0	5.00	9.00	7.25	2756	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	79.5	30227	PASS
175	174	5.00	9.00	6.41	1937	PASS
176	174	95.0	101	96.7	29243	PASS
177	176	5.00	9.00	6.31	1844	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG254005-02	CCV	01	10/27/2007 09:47	
WG254006-01	BLANK	01	10/27/2007 10:52	
WG254006-02	LCS	01	10/27/2007 11:24	
WG254006-03	LCS2	01	10/27/2007 11:56	
L0710597-07	47WW32-101807	02	10/27/2007 14:37	
L0710597-09	47WW36-101907	DL01	10/27/2007 17:19	

* Sample past 12 hour tune limit

KEMRON FORMS - Modified 03/12/2007
Version 1.3 PDF File ID: 919906
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L0710597
Instrument: HPMS11
Analyst: MES
Workgroup: WG251532

Tune ID: WG251532-01
Run Date: 10/01/2007
Run Time: 11:15
File ID: 11M46050
Cal ID: HPMS11-01-OCT-07

Target	Rel. to	Lower	Upper	Rel.	Raw	Result
50.0	95.0	15.0	40.0	28.5	12940	PASS
75.0	95.0	30.0	60.0	55.6	25260	PASS
95.0	95.0	100	100	100	45413	PASS
96.0	95.0	5.00	9.00	7.38	3351	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	55.4	25144	PASS
175	174	5.00	9.00	7.53	1894	PASS
176	174	95.0	101	98.4	24744	PASS
177	176	5.00	9.00	7.33	1814	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG251532-02	STD	01	10/01/2007 11:40	
WG251532-03	STD	01	10/01/2007 12:11	
WG251532-04	STD	01	10/01/2007 12:42	
WG251532-05	STD	01	10/01/2007 13:12	
WG251532-06	STD	01	10/01/2007 13:42	
WG251532-07	STD	01	10/01/2007 14:18	
WG251532-08	STD-CCV	01	10/01/2007 14:48	
WG251532-09	STD	01	10/01/2007 15:18	
WG251532-10	STD	01	10/01/2007 15:48	

* Sample past 12 hour tune limit

KEMRON FORMS - Modified 03/12/2007
Version 1.3 PDF File ID: 919906
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L0710597
Instrument: HPMS11
Analyst: MES
Workgroup: WG251618

Tune ID: WG251618-01
Run Date: 10/01/2007
Run Time: 18:38
File ID: 11M46064
Cal ID: HPMS11-01-OCT-07

Target	Rel. to	Lower	Upper	Rel.	Raw	Result
50.0	95.0	15.0	40.0	28.1	15873	PASS
75.0	95.0	30.0	60.0	54.1	30544	PASS
95.0	95.0	100	100	100	56448	PASS
96.0	95.0	5.00	9.00	6.83	3854	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	59.4	33531	PASS
175	174	5.00	9.00	7.80	2616	PASS
176	174	95.0	101	98.1	32907	PASS
177	176	5.00	9.00	7.16	2357	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG251532-11	SSCV	01	10/01/2007 20:02	

* Sample past 12 hour tune limit

KEMRON FORMS - Modified 03/12/2007
Version 1.3 PDF File ID: 919906
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L0710597
Instrument: HPMS11
Analyst: MES
Workgroup: WG253676

Tune ID: WG253676-01
Run Date: 10/24/2007
Run Time: 09:19
File ID: 11M46850
Cal ID: HPMS11-01-OCT-07

Target	Rel. to	Lower	Upper	Rel.	Raw	Result
50.0	95.0	15.0	40.0	26.8	21342	PASS
75.0	95.0	30.0	60.0	54.4	43360	PASS
95.0	95.0	100	100	100	79645	PASS
96.0	95.0	5.00	9.00	6.91	5507	PASS
173	174	0	2.00	0	0	PASS
174	95.0	50.0	100	66.8	53218	PASS
175	174	5.00	9.00	7.97	4242	PASS
176	174	95.0	101	98.9	52613	PASS
177	176	5.00	9.00	5.91	3107	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG253676-02	CCV	01	10/24/2007 09:42	
WG253678-01	BLANK	01	10/24/2007 10:51	
WG253678-02	LCS	01	10/24/2007 11:21	
WG253678-03	LCS2	01	10/24/2007 11:52	
L0710597-14	TRIP BLANK	01	10/24/2007 13:52	
L0710597-09	47WW36-101907	01	10/24/2007 17:54	
WG253678-04	BLANK2	01	10/24/2007 21:57	*

* Sample past 12 hour tune limit

KEMRON FORMS - Modified 03/12/2007
Version 1.3 PDF File ID: 919906
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L0710597
Instrument: HPMS6
Analyst: CMS
Workgroup: WG253721

Tune ID: WG253721-01
Run Date: 10/24/2007
Run Time: 12:10
File ID: 6M70233
Cal ID: HPMS6-24-OCT-07

Target	Rel. to	Lower	Upper	Rel.	Raw	Result
50.0	95.0	15.0	40.0	23.3	8548	PASS
75.0	95.0	30.0	60.0	58.5	21434	PASS
95.0	95.0	100	100	100	36650	PASS
96.0	95.0	5.00	9.00	6.61	2421	PASS
173	174	0	2.00	0.590	164	PASS
174	95.0	50.0	100	75.9	27800	PASS
175	174	5.00	9.00	7.92	2202	PASS
176	174	95.0	101	99.8	27744	PASS
177	176	5.00	9.00	6.65	1845	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG253721-03	STD	01	10/24/2007 12:45	
WG253721-02	STD	01	10/24/2007 13:17	
WG253721-04	STD	01	10/24/2007 13:49	
WG253721-05	STD	01	10/24/2007 14:21	
WG253721-06	STD	01	10/24/2007 14:53	
WG253721-07	STD	01	10/24/2007 15:25	
WG253721-08	STD-CCV	01	10/24/2007 15:57	
WG253721-09	STD	01	10/24/2007 16:29	
WG253721-10	STD	01	10/24/2007 17:01	
WG253721-11	STD	01	10/24/2007 17:33	

* Sample past 12 hour tune limit

KEMRON FORMS - Modified 03/12/2007
Version 1.3 PDF File ID: 919906
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L0710597
Instrument: HPMS6
Analyst: MES
Workgroup: WG253818

Tune ID: WG253818-01
Run Date: 10/25/2007
Run Time: 09:44
File ID: 6M70253
Cal ID: HPMS6-24-OCT-07

Target	Rel. to	Lower	Upper	Rel.	Raw	Result
50.0	95.0	15.0	40.0	22.7	17592	PASS
75.0	95.0	30.0	60.0	56.2	43629	PASS
95.0	95.0	100	100	100	77656	PASS
96.0	95.0	5.00	9.00	6.57	5103	PASS
173	174	0	2.00	0.955	571	PASS
174	95.0	50.0	100	77.0	59786	PASS
175	174	5.00	9.00	7.23	4322	PASS
176	174	95.0	101	95.9	57341	PASS
177	176	5.00	9.00	6.58	3771	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG253818-02	CCV	01	10/25/2007 10:08	
WG253721-12	SSCV	01	10/25/2007 11:12	
WG253819-01	BLANK	01	10/25/2007 11:44	
WG253819-02	LCS	01	10/25/2007 12:15	
WG253819-03	LCS2	01	10/25/2007 12:47	
L0710597-11	47WW25-101607	01	10/25/2007 14:54	

* Sample past 12 hour tune limit

KEMRON FORMS - Modified 03/12/2007
Version 1.3 PDF File ID: 919906
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L0710597
Instrument: HPMS6
Analyst: MES
Workgroup: WG253918

Tune ID: WG253918-01
Run Date: 10/26/2007
Run Time: 09:28
File ID: 6M70285
Cal ID: HPMS6-24-OCT-07

Target	Rel. to	Lower	Upper	Rel.	Raw	Result
50.0	95.0	15.0	40.0	22.8	12760	PASS
75.0	95.0	30.0	60.0	59.5	33208	PASS
95.0	95.0	100	100	100	55858	PASS
96.0	95.0	5.00	9.00	6.75	3769	PASS
173	174	0	2.00	0.342	151	PASS
174	95.0	50.0	100	79.0	44120	PASS
175	174	5.00	9.00	6.99	3084	PASS
176	174	95.0	101	98.2	43309	PASS
177	176	5.00	9.00	6.35	2751	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG253918-02	CCV	01	10/26/2007 10:25	
WG253919-01	BLANK	01	10/26/2007 11:43	
WG253919-02	LCS	01	10/26/2007 12:16	
WG253919-03	LCS2	01	10/26/2007 12:48	
L0710597-11	47WW25-101607	DL01	10/26/2007 13:22	
WG253919-04	BLANK2	01	10/26/2007 17:07	

* Sample past 12 hour tune limit

KEMRON FORMS - Modified 03/12/2007
Version 1.3 PDF File ID: 919906
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L0710597
Instrument: HPMS8
Analyst: CMS
Workgroup: WG253480

Tune ID: WG253480-01
Run Date: 10/22/2007
Run Time: 11:00
File ID: 8M340860
Cal ID: HPMS8-22-OCT-07

Target	Rel. to	Lower	Upper	Rel.	Raw	Result
50.0	95.0	15.0	40.0	19.9	16568	PASS
75.0	95.0	30.0	60.0	42.6	35464	PASS
95.0	95.0	100	100	100	83184	PASS
96.0	95.0	5.00	9.00	6.80	5656	PASS
173	174	0	2.00	0.233	168	PASS
174	95.0	50.0	100	86.8	72224	PASS
175	174	5.00	9.00	7.43	5364	PASS
176	174	95.0	101	96.0	69306	PASS
177	176	5.00	9.00	6.87	4761	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG253480-02	STD	01	10/22/2007 11:30	
WG253480-03	STD	01	10/22/2007 12:00	
WG253480-04	STD	01	10/22/2007 12:29	
WG253480-05	STD	01	10/22/2007 12:59	
WG253480-06	STD	01	10/22/2007 13:30	
WG253480-07	STD	01	10/22/2007 14:00	
WG253480-08	STD-CCV	01	10/22/2007 14:29	
WG253480-09	STD	01	10/22/2007 14:59	
WG253480-10	STD	01	10/22/2007 15:28	
WG253480-11	STD	01	10/22/2007 15:58	

* Sample past 12 hour tune limit

KEMRON FORMS - Modified 03/12/2007
Version 1.3 PDF File ID: 919906
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L0710597
Instrument: HPMS8
Analyst: CMS
Workgroup: WG253578

Tune ID: WG253578-01
Run Date: 10/23/2007
Run Time: 08:29
File ID: 8M340877
Cal ID: HPMS8-22-OCT-07

Target	Rel. to	Lower	Upper	Rel.	Raw	Result
50.0	95.0	15.0	40.0	20.4	8950	PASS
75.0	95.0	30.0	60.0	41.7	18280	PASS
95.0	95.0	100	100	100	43874	PASS
96.0	95.0	5.00	9.00	7.12	3124	PASS
173	174	0	2.00	0.305	110	PASS
174	95.0	50.0	100	82.1	36021	PASS
175	174	5.00	9.00	6.79	2445	PASS
176	174	95.0	101	96.4	34733	PASS
177	176	5.00	9.00	6.51	2261	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG253480-12	SSCV	01	10/23/2007 11:07	

* Sample past 12 hour tune limit

KEMRON FORMS - Modified 03/12/2007
Version 1.3 PDF File ID: 919906
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
ORGANIC INSTRUMENT CHECK

BFB

Login Number: L0710597
Instrument: HPMS8
Analyst: CMS
Workgroup: WG254047

Tune ID: WG254047-01
Run Date: 10/29/2007
Run Time: 08:05
File ID: 8M341020
Cal ID: HPMS8 - 22-OCT-07

Target	Rel. to	Lower	Upper	Rel.	Raw	Result
50.0	95.0	15.0	40.0	19.6	20311	PASS
75.0	95.0	30.0	60.0	39.4	40746	PASS
95.0	95.0	100	100	100	103493	PASS
96.0	95.0	5.00	9.00	6.65	6878	PASS
173	174	0	2.00	0.417	370	PASS
174	95.0	50.0	100	85.7	88741	PASS
175	174	5.00	9.00	7.03	6237	PASS
176	174	95.0	101	98.1	87029	PASS
177	176	5.00	9.00	6.16	5358	PASS

This check relates to the following samples:

Lab ID	Client ID	Tag	Date Analyzed	Q
WG254047-02	CCV	01	10/29/2007 08:31	
WG254048-01	BLANK	01	10/29/2007 09:34	
WG254048-02	LCS	01	10/29/2007 10:04	
WG254048-03	LCS	01	10/29/2007 10:34	
L0710597-11	47WW25-101607	DL02	10/29/2007 14:04	
WG254048-04	REF	01	10/29/2007 17:03	
WG254048-05	MS	01	10/29/2007 17:32	
WG254048-06	MSD	01	10/29/2007 18:02	

* Sample past 12 hour tune limit

KEMRON FORMS - Modified 03/12/2007
Version 1.3 PDF File ID: 919906
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION SUMMARY

00073095

Login Number: L0710597
Analytical Method: 8260B
ICAL Workgroup: WG253187

Instrument ID: HPMS10
Initial Calibration Date: 18-OCT-07 16:51
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD(R^2)
1,1-Dichloroethene	CCC	0.2800	17.8		1.00
1,2-Dichloropropane	CCC	0.2830	6.65		
Chloroform	CCC	0.6766	4.91		
Ethylbenzene	CCC	0.5538	7.95		
Toluene	CCC	1.496	9.86		
Vinyl Chloride	CCC	0.2666	14.5		
1,1,2,2-Tetrachloroethane	SPCC	0.4069	11.9		
1,1-Dichloroethane	SPCC	0.6342	4.48		
Bromoform	SPCC	0.2059	9.21		
Chlorobenzene	SPCC	1.084	6.35		
Chloromethane	SPCC	0.3466	14.3		
1,1,1-Trichloroethane		0.6678	9.32		
1,1,2-Trichloro-1,2,2-Trifluoroethane		0.3924	3.52		
1,1,2-Trichloroethane		0.2498	6.24		
1,2,4-Trichlorobenzene		0.8839	9.53		
1,2-Dibromo-3-Chloropropane		0.07583	11.1		
1,2-Dibromoethane		0.2388	9.88		
1,2-Dichlorobenzene		1.366	7.24		
1,2-Dichloroethane		0.5033	6.76		
1,3-Dichlorobenzene		1.624	5.76		
1,4-Dichlorobenzene		1.710	4.91		
2-Butanone		0.06795	4.65		
2-Hexanone		0.1080	4.50		
4-Methyl-2-Pentanone		0.04997	8.69		
Acetone		0.05652	11.3		
Benzene		1.263	7.31		
Bromodichloromethane		0.4657	7.07		
Bromomethane		0.2330	6.15		
Carbon Disulfide		0.9550	8.03		
Carbon Tetrachloride		0.6168	13.0		
Chloroethane		0.2335	2.95		
Cyclohexane		0.5127	14.1		
Dibromochloromethane		0.3471	9.68		
Dichlorodifluoromethane		0.5643	7.39		
Isopropylbenzene		1.550	20.1		1.00
Methyl Tert Butyl Ether		0.6201	8.48		
Methyl acetate		0.1325	6.24		
Methylcyclohexane		0.4898	11.1		
Methylene Chloride		0.5198	63.2		1.00
Styrene		0.9348	24.3		1.00
Tetrachloroethene		0.3687	7.07		
Trichloroethene		0.3392	9.82		
Trichlorofluoromethane		0.7826	19.2		1.00
cis-1,2-Dichloroethene		0.3348	9.30		
cis-1,3-Dichloropropene		0.4349	14.4		

KEMRON FORMS - Modified 01/18/2007
Version 1.5 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION SUMMARY

00073096

Login Number: L0710597
Analytical Method: 8260B
ICAL Workgroup: WG253187

Instrument ID: HPMS10
Initial Calibration Date: 18-OCT-07 16:51
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD(R^2)
m-,p-Xylene		0.6626	10.9		
o-Xylene		0.6097	13.2		
trans-1,2-Dichloroethene		0.3243	10.7		
trans-1,3-Dichloropropene		0.5039	9.73		

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

KEMRON FORMS - Modified 01/18/2007
Version 1.5 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION SUMMARY

00073097

Login Number: L0710597
Analytical Method: 8260B
ICAL Workgroup: WG251532

Instrument ID: HPMS11
Initial Calibration Date: 01-OCT-07 15:48
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD(R^2)
1,1-Dichloroethene	CCC	0.5856	17.3		1.00
1,2-Dichloropropane	CCC	0.2949	9.42		
Chloroform	CCC	0.5438	9.08		
Ethylbenzene	CCC	0.5272	14.3		
Toluene	CCC	1.521	10.7		
Vinyl Chloride	CCC	0.3573	16.5		1.00
1,1,2,2-Tetrachloroethane	SPCC	0.4632	5.71		
1,1-Dichloroethane	SPCC	0.6413	9.75		
Bromoform	SPCC	0.1592	10.4		
Chlorobenzene	SPCC	0.9874	7.61		
Chloromethane	SPCC	0.4467	6.42		
1,1,1-Trichloroethane		0.5202	15.0		
1,1,2-Trichloro-1,2,2-Trifluoroethane		0.2517	5.80		
1,1,2-Trichloroethane		0.2287	9.70		
1,2,4-Trichlorobenzene		0.8233	9.27		
1,2-Dibromo-3-Chloropropane		0.09771	8.36		
1,2-Dibromoethane		0.2272	8.17		
1,2-Dichlorobenzene		1.212	7.65		
1,2-Dichloroethane		0.5005	6.73		
1,3-Dichlorobenzene		1.377	12.8		
1,4-Dichlorobenzene		1.396	10.3		
2-Butanone		0.06584	5.59		
2-Hexanone		0.1555	4.45		
4-Methyl-2-Pentanone		0.06512	4.74		
Acetone		0.05000	11.0		
Benzene		1.001	6.65		
Bromodichloromethane		0.3822	10.1		
Bromomethane		0.1750	13.3		
Carbon Disulfide		0.7795	3.36		
Carbon Tetrachloride		0.4032	19.5		1.00
Chloroethane		0.2473	2.57		
Cyclohexane		0.5961	4.69		
Dibromochloromethane		0.3012	13.2		
Dichlorodifluoromethane		0.4914	7.24		
Isopropylbenzene		1.639	17.5		1.00
Methyl Tert Butyl Ether		0.6091	3.55		
Methyl acetate		0.1281	4.38		
Methylcyclohexane		0.3806	6.86		
Methylene Chloride		0.3950	54.7		1.00
Styrene		1.018	15.9	1.00	
Tetrachloroethene		0.2559	16.3		1.00
Trichloroethene		0.2327	13.2		
Trichlorofluoromethane		0.5591	24.6		1.00
cis-1,2-Dichloroethene		0.2615	12.4		
cis-1,3-Dichloropropene		0.3993	11.2		

KEMRON FORMS - Modified 01/18/2007
Version 1.5 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION SUMMARY

00073098

Login Number: L0710597
Analytical Method: 8260B
ICAL Workgroup: WG251532

Instrument ID: HPMS11
Initial Calibration Date: 01-OCT-07 15:48
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD(R^2)
m-,p-Xylene		0.6669	10.4		
o-Xylene		0.6374	11.6		
trans-1,2-Dichloroethene		0.2601	10.0		
trans-1,3-Dichloropropene		0.5556	11.1		

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

KEMRON FORMS - Modified 01/18/2007
Version 1.5 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION SUMMARY

00073099

Login Number: L0710597
Analytical Method: 8260B
ICAL Workgroup: WG253721

Instrument ID: HPMS6
Initial Calibration Date: 24-OCT-07 17:33
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD(R^2)
1,1-Dichloroethene	CCC	0.4414	4.69		
1,2-Dichloropropane	CCC	0.2081	7.27		
Chloroform	CCC	0.6148	4.69		
Ethylbenzene	CCC	0.5202	7.11		
Toluene	CCC	1.278	5.63		
Vinyl Chloride	CCC	0.4097	15.5		1.00
1,1,2,2-Tetrachloroethane	SPCC	0.3554	12.1		
1,1-Dichloroethane	SPCC	0.4770	3.59		
Bromoform	SPCC	0.2214	7.78		
Chlorobenzene	SPCC	0.9904	5.83		
Chloromethane	SPCC	0.3771	15.9		1.00
1,1,1-Trichloroethane		0.6125	4.31		
1,1,2-Trichloro-1,2,2-Trifluoroethane		0.3205	8.90		
1,1,2-Trichloroethane		0.2168	7.99		
1,2,4-Trichlorobenzene		0.9584	7.95		
1,2-Dibromo-3-Chloropropane		0.07902	4.23		
1,2-Dibromoethane		0.2213	6.80		
1,2-Dichlorobenzene		1.359	8.52		
1,2-Dichloroethane		0.4711	8.07		
1,3-Dichlorobenzene		1.522	7.21		
1,4-Dichlorobenzene		1.634	12.2		
2-Butanone		0.05205	5.47		
2-Hexanone		0.09497	9.65		
4-Methyl-2-Pentanone		0.04188	12.1		
Acetone		0.04300	10.3		
Benzene		0.9974	3.80		
Bromodichloromethane		0.4400	3.85		
Bromomethane		0.1782	10.0		
Carbon Disulfide		0.6930	16.0		1.00
Carbon Tetrachloride		0.5732	6.53		
Chloroethane		0.1694	4.86		
Cyclohexane		0.3908	8.73		
Dibromochloromethane		0.3485	6.23		
Dichlorodifluoromethane		0.5079	12.9		
Isopropylbenzene		1.587	11.3		
Methyl Tert Butyl Ether		0.5327	11.9		
Methyl acetate		0.1011	5.65		
Methylcyclohexane		0.4126	8.32		
Methylene Chloride		0.4165	68.1	1.00	
Styrene		0.9952	12.8		
Tetrachloroethene		0.4104	3.25		
Trichloroethene		0.2969	4.34		
Trichlorofluoromethane		0.7740	9.47		
cis-1,2-Dichloroethene		0.2714	9.15		
cis-1,3-Dichloropropene		0.3813	13.7		

KEMRON FORMS - Modified 01/18/2007
Version 1.5 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION SUMMARY

00073100

Login Number: L0710597
Analytical Method: 8260B
ICAL Workgroup: WG253721

Instrument ID: HPMS6
Initial Calibration Date: 24-OCT-07 17:33
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD(R^2)
m-,p-Xylene		0.6512	4.97		
o-Xylene		0.5862	12.7		
trans-1,2-Dichloroethene		0.2574	4.90		
trans-1,3-Dichloropropene		0.4494	11.4		

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

KEMRON FORMS - Modified 01/18/2007
Version 1.5 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION SUMMARY

00073101

Login Number: L0710597
Analytical Method: 8260B
ICAL Workgroup: WG253480

Instrument ID: HPMS8
Initial Calibration Date: 22-OCT-07 15:58
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD(R^2)
1,1-Dichloroethene	CCC	0.3365	10.1		
1,2-Dichloropropane	CCC	0.1995	7.19		
Chloroform	CCC	0.3965	7.33		
Ethylbenzene	CCC	0.3970	11.6		
Toluene	CCC	1.088	8.47		
Vinyl Chloride	CCC	0.1241	8.75		
1,1,2,2-Tetrachloroethane	SPCC	0.3049	5.16		
1,1-Dichloroethane	SPCC	0.4057	4.41		
Bromoform	SPCC	0.1306	14.2		
Chlorobenzene	SPCC	0.7965	14.4		
Chloromethane	SPCC	0.2233	12.0		
1,1,1-Trichloroethane		0.3525	7.90		
1,1,2-Trichloro-1,2,2-Trifluoroethane		0.2244	7.06		
1,1,2-Trichloroethane		0.1688	5.88		
1,2,4-Trichlorobenzene		0.7808	11.7		
1,2-Dibromo-3-Chloropropane		0.05440	14.0		
1,2-Dibromoethane		0.1732	6.09		
1,2-Dichlorobenzene		1.134	12.3		
1,2-Dichloroethane		0.2735	5.44		
1,3-Dichlorobenzene		1.244	11.2		
1,4-Dichlorobenzene		1.285	13.5		
2-Butanone		0.05067	5.18		
2-Hexanone		0.04843	6.72		
4-Methyl-2-Pentanone		0.04135	6.11		
Acetone		0.03688	7.91		
Benzene		0.8675	9.69		
Bromodichloromethane		0.2600	6.64		
Bromomethane		0.1561	11.0		
Carbon Disulfide		0.6216	6.39		
Carbon Tetrachloride		0.3216	8.50		
Chloroethane		0.1618	5.82		
Cyclohexane		0.3705	8.59		
Dibromochloromethane		0.2367	6.13		
Dichlorodifluoromethane		0.2818	7.46		
Isopropylbenzene		1.180	9.36		
Methyl Tert Butyl Ether		0.3786	4.66		
Methyl acetate		0.1003	0.770		
Methylcyclohexane		0.3092	9.01		
Methylene Chloride		0.3171	56.0		1.00
Styrene		0.7425	10.3		
Tetrachloroethene		0.2394	8.01		
Trichloroethene		0.2328	8.28		
Trichlorofluoromethane		0.4141	3.18		
cis-1,2-Dichloroethene		0.2255	7.17		
cis-1,3-Dichloropropene		0.2973	7.43		

KEMRON FORMS - Modified 01/18/2007
Version 1.5 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION SUMMARY

00073102

Login Number: L0710597
Analytical Method: 8260B
ICAL Workgroup: WG253480

Instrument ID: HPMS8
Initial Calibration Date: 22-OCT-07 15:58
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD(R^2)
m-,p-Xylene		0.4830	12.6		
o-Xylene		0.4739	9.58		
trans-1,2-Dichloroethene		0.3325	6.08		
trans-1,3-Dichloropropene		0.3277	6.52		

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

KEMRON FORMS - Modified 01/18/2007
Version 1.5 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073103

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS10

Initial Calibration Date: 18-OCT-07 16:51

Column ID: F

Analyte	WG253187-02			WG253187-03			WG253187-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,1-Dichloroethene	NA	NA	NA	0.400	1885.00000	0.1667	1.00	7305.00000	0.2607
1,2-Dichloropropane	NA	NA	NA	0.400	2756.00000	0.2438	1.00	8147.00000	0.2907
Chloroform	0.300	6277.00000	0.6701	0.400	7102.00000	0.6282	1.00	18487.0000	0.6597
Ethylbenzene	NA	NA	NA	0.400	4131.00000	0.4594	1.00	12304.0000	0.5551
Toluene	NA	NA	NA	0.400	10642.0000	1.183	1.00	31152.0000	1.405
Vinyl Chloride	NA	NA	NA	0.400	2511.00000	0.2221	1.00	8865.00000	0.3163
1,1,2,2-Tetrachloroethane	NA	NA	NA	0.400	1555.00000	0.3143	1.00	4829.00000	0.3879
1,1-Dichloroethane	NA	NA	NA	0.400	6860.00000	0.6068	1.00	16737.0000	0.5972
Bromoform	NA	NA	NA	NA	NA	NA	1.00	3644.00000	0.1644
Chlorobenzene	NA	NA	NA	0.400	10238.0000	1.139	1.00	24273.0000	1.095
Chloromethane	NA	NA	NA	NA	NA	NA	1.00	11127.0000	0.3971
1,1,1-Trichloroethane	NA	NA	NA	0.400	6190.00000	0.5475	1.00	18148.0000	0.6476
1,1,2-Trichloro-1,2,2-Trifluoroethane	NA	NA	NA	NA	NA	NA	1.00	11449.0000	0.4086
1,1,2-Trichloroethane	NA	NA	NA	0.400	2302.00000	0.2560	1.00	5477.00000	0.2471
1,2,4-Trichlorobenzene	NA	NA	NA	0.400	4890.00000	0.9882	1.00	9046.00000	0.7267
1,2-Dibromo-3-Chloropropane	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	NA	NA	NA	0.400	1667.00000	0.1854	1.00	5085.00000	0.2294
1,2-Dichlorobenzene	0.300	4812.00000	1.230	0.400	6405.00000	1.294	1.00	15369.0000	1.235
1,2-Dichloroethane	NA	NA	NA	0.400	5429.00000	0.4802	1.00	13527.0000	0.4827
1,3-Dichlorobenzene	NA	NA	NA	0.400	7661.00000	1.548	1.00	18239.0000	1.465
1,4-Dichlorobenzene	0.300	6633.00000	1.695	0.400	8734.00000	1.765	1.00	21411.0000	1.720
2-Butanone	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	0.400	12905.0000	1.142	1.00	31706.0000	1.131
Bromodichloromethane	NA	NA	NA	0.400	4864.00000	0.4302	1.00	11718.0000	0.4181
Bromomethane	NA	NA	NA	NA	NA	NA	1.00	5818.00000	0.2076
Carbon Disulfide	NA	NA	NA	0.400	8792.00000	0.7777	1.00	27106.0000	0.9673
Carbon Tetrachloride	NA	NA	NA	0.400	5024.00000	0.4444	1.00	16646.0000	0.5940
Chloroethane	NA	NA	NA	NA	NA	NA	1.00	6624.00000	0.2364
Cyclohexane	NA	NA	NA	NA	NA	NA	1.00	10681.0000	0.3811
Dibromochloromethane	NA	NA	NA	0.400	2474.00000	0.2751	1.00	7187.00000	0.3242
Dichlorodifluoromethane	NA	NA	NA	NA	NA	NA	1.00	15250.0000	0.5442
Isopropylbenzene	NA	NA	NA	0.400	8559.00000	0.9518	1.00	27917.0000	1.260
Methyl Tert Butyl Ether	NA	NA	NA	NA	NA	NA	1.00	15287.0000	0.5455
Methyl acetate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane	NA	NA	NA	NA	NA	NA	1.00	11442.0000	0.4083
Methylene Chloride	NA	NA	NA	0.400	14063.0000	1.244	1.00	20344.0000	0.7260
Styrene	NA	NA	NA	0.400	5375.00000	0.5977	1.00	13384.0000	0.6038
Tetrachloroethene	NA	NA	NA	0.400	2821.00000	0.3137	1.00	8350.00000	0.3767
Trichloroethene	NA	NA	NA	0.400	2997.00000	0.2651	1.00	9091.00000	0.3244

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073104

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS10

Initial Calibration Date: 18-OCT-07 16:51

Column ID: F

Analyte	WG253187-05			WG253187-06			WG253187-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,1-Dichloroethene	2.00	15287.0000	0.2715	5.00	42558.0000	0.3022	20.0	180665.000	0.3069
1,2-Dichloropropane	2.00	15196.0000	0.2699	5.00	41344.0000	0.2936	20.0	174588.000	0.2966
Chloroform	2.00	37694.0000	0.6694	5.00	102622.000	0.7287	20.0	419725.000	0.7130
Ethylbenzene	2.00	24162.0000	0.5439	5.00	65558.0000	0.5717	20.0	284174.000	0.5971
Toluene	2.00	65823.0000	1.482	5.00	182916.000	1.595	20.0	776711.000	1.632
Vinyl Chloride	2.00	17139.0000	0.3044	5.00	41513.0000	0.2948	20.0	152646.000	0.2593
1,1,2,2-Tetrachloroethane	2.00	12038.0000	0.4829	5.00	28928.0000	0.4454	20.0	112932.000	0.4174
1,1-Dichloroethane	2.00	35723.0000	0.6344	5.00	94651.0000	0.6721	20.0	388959.000	0.6607
Bromoform	2.00	9401.00000	0.2116	5.00	24005.0000	0.2093	20.0	104250.000	0.2190
Chlorobenzene	2.00	50576.0000	1.139	5.00	131659.000	1.148	20.0	528062.000	1.110
Chloromethane	2.00	23206.0000	0.4121	5.00	51889.0000	0.3684	20.0	202508.000	0.3440
1,1,1-Trichloroethane	2.00	37393.0000	0.6640	5.00	103358.000	0.7339	20.0	427717.000	0.7266
1,1,2-Trichloro-1,2,2-Trifluoroethane	2.00	22033.0000	0.3913	5.00	55893.0000	0.3969	20.0	236212.000	0.4012
1,1,2-Trichloroethane	2.00	12183.0000	0.2743	5.00	30420.0000	0.2653	20.0	119382.000	0.2508
1,2,4-Trichlorobenzene	2.00	20290.0000	0.8140	5.00	55085.0000	0.8481	20.0	242118.000	0.8949
1,2-Dibromo-3-Chloropropane	2.00	1595.00000	0.06400	5.00	4769.00000	0.07340	20.0	19160.0000	0.07080
1,2-Dibromoethane	2.00	11008.0000	0.2478	5.00	28597.0000	0.2494	20.0	124466.000	0.2615
1,2-Dichlorobenzene	2.00	37062.0000	1.487	5.00	95260.0000	1.467	20.0	392539.000	1.451
1,2-Dichloroethane	2.00	29116.0000	0.5170	5.00	78320.0000	0.5561	20.0	315717.000	0.5363
1,3-Dichlorobenzene	2.00	43128.0000	1.730	5.00	110836.000	1.707	20.0	456925.000	1.689
1,4-Dichlorobenzene	2.00	45641.0000	1.831	5.00	116311.000	1.791	20.0	465766.000	1.722
2-Butanone	NA	NA	NA	5.00	10391.0000	0.07380	20.0	38950.0000	0.06620
2-Hexanone	NA	NA	NA	5.00	11580.0000	0.1010	20.0	50374.0000	0.1058
4-Methyl-2-Pentanone	NA	NA	NA	5.00	5894.00000	0.04190	20.0	28737.0000	0.04880
Acetone	NA	NA	NA	5.00	9425.00000	0.06690	20.0	34128.0000	0.05800
Benzene	2.00	72788.0000	1.293	5.00	195190.000	1.386	20.0	791095.000	1.344
Bromodichloromethane	2.00	25970.0000	0.4612	5.00	70082.0000	0.4976	20.0	295680.000	0.5023
Bromomethane	2.00	12425.0000	0.2206	5.00	33063.0000	0.2348	20.0	138556.000	0.2354
Carbon Disulfide	2.00	53362.0000	0.9476	5.00	143650.000	1.020	20.0	589489.000	1.001
Carbon Tetrachloride	2.00	36557.0000	0.6492	5.00	95481.0000	0.6780	20.0	404158.000	0.6865
Chloroethane	2.00	12862.0000	0.2284	5.00	34147.0000	0.2425	20.0	140133.000	0.2380
Cyclohexane	2.00	25145.0000	0.4465	5.00	73667.0000	0.5231	20.0	333963.000	0.5673
Dibromochloromethane	2.00	16000.0000	0.3602	5.00	42545.0000	0.3710	20.0	176475.000	0.3708
Dichlorodifluoromethane	2.00	33123.0000	0.5882	5.00	85934.0000	0.6102	20.0	350987.000	0.5962
Isopropylbenzene	2.00	64554.0000	1.453	5.00	186995.000	1.631	20.0	868228.000	1.824
Methyl Tert Butyl Ether	2.00	31379.0000	0.5572	5.00	85244.0000	0.6053	20.0	370990.000	0.6302
Methyl acetate	2.00	8322.00000	0.1478	5.00	19185.0000	0.1362	20.0	75160.0000	0.1277
Methylcyclohexane	2.00	23891.0000	0.4243	5.00	67543.0000	0.4796	20.0	308513.000	0.5241
Methylene Chloride	2.00	30324.0000	0.5385	5.00	57224.0000	0.4063	20.0	195986.000	0.3329
Styrene	2.00	37636.0000	0.8472	5.00	111666.000	0.9737	20.0	532640.000	1.119
Tetrachloroethene	2.00	17301.0000	0.3895	5.00	44134.0000	0.3848	20.0	185017.000	0.3887
Trichloroethene	2.00	19229.0000	0.3415	5.00	49536.0000	0.3517	20.0	213441.000	0.3626

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073105

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS10

Initial Calibration Date: 18-OCT-07 16:51

Column ID: F

Analyte	WG253187-08			WG253187-09			WG253187-10		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,1-Dichloroethene	50.0	475779.000	0.3158	100	1003530.00	0.3152	200	1935564.00	0.3013
1,2-Dichloropropane	50.0	453632.000	0.3011	100	925271.000	0.2906	200	1784915.00	0.2779
Chloroform	50.0	1059062.00	0.7029	100	2158957.00	0.6780	200	4108683.00	0.6396
Ethylbenzene	50.0	749151.000	0.5951	100	1522153.00	0.5722	200	2832832.00	0.5357
Toluene	50.0	2026967.00	1.610	100	4162783.00	1.565	200	7913474.00	1.496
Vinyl Chloride	50.0	370547.000	0.2459	100	711287.000	0.2234	NA	NA	NA
1,1,2,2-Tetrachloroethane	50.0	291547.000	0.4102	100	594295.000	0.4006	200	1178290.00	0.3965
1,1-Dichloroethane	50.0	989348.000	0.6566	100	2039676.00	0.6405	200	3886735.00	0.6051
Bromoform	50.0	277168.000	0.2202	100	557539.000	0.2096	200	1095949.00	0.2072
Chlorobenzene	50.0	1347846.00	1.071	100	2704431.00	1.017	200	5030440.00	0.9512
Chloromethane	50.0	488540.000	0.3242	100	975213.000	0.3063	200	1761549.00	0.2742
1,1,1-Trichloroethane	50.0	1084473.00	0.7197	100	2151763.00	0.6757	200	4029238.00	0.6273
1,1,2-Trichloro-1,2,2-Trifluoroethane	50.0	597836.000	0.3968	100	1229619.00	0.3862	200	2347796.00	0.3655
1,1,2-Trichloroethane	50.0	308262.000	0.2449	100	619384.000	0.2328	200	1202179.00	0.2273
1,2,4-Trichlorobenzene	50.0	665354.000	0.9361	100	1404460.00	0.9467	200	2723271.00	0.9165
1,2-Dibromo-3-Chloropropane	50.0	54813.0000	0.07710	100	121349.000	0.08180	200	261127.000	0.08790
1,2-Dibromoethane	50.0	317907.000	0.2526	100	654907.000	0.2462	200	1257275.00	0.2377
1,2-Dichlorobenzene	50.0	1009013.00	1.420	100	2058619.00	1.388	200	3929616.00	1.323
1,2-Dichloroethane	50.0	778177.000	0.5164	100	1543687.00	0.4848	200	2907627.00	0.4527
1,3-Dichlorobenzene	50.0	1189583.00	1.674	100	2421127.00	1.632	200	4604178.00	1.550
1,4-Dichlorobenzene	50.0	1190942.00	1.676	100	2433385.00	1.640	200	4604639.00	1.550
2-Butanone	50.0	100214.000	0.06650	100	206535.000	0.06490	200	433307.000	0.06750
2-Hexanone	50.0	137209.000	0.1090	100	281710.000	0.1059	200	588886.000	0.1114
4-Methyl-2-Pentanone	50.0	78046.0000	0.05180	100	162869.000	0.05110	200	333244.000	0.05190
Acetone	50.0	86089.0000	0.05710	100	178522.000	0.05610	200	344201.000	0.05360
Benzene	50.0	1986629.00	1.318	100	4052802.00	1.273	200	7833302.00	1.220
Bromodichloromethane	50.0	752284.000	0.4993	100	1507757.00	0.4735	200	2847056.00	0.4432
Bromomethane	50.0	358758.000	0.2381	100	784455.000	0.2464	200	1592103.00	0.2479
Carbon Disulfide	50.0	1514838.00	1.005	100	3111933.00	0.9773	200	6059794.00	0.9434
Carbon Tetrachloride	50.0	1015653.00	0.6740	100	2017377.00	0.6335	200	3693004.00	0.5749
Chloroethane	50.0	355448.000	0.2359	100	738239.000	0.2318	200	1423490.00	0.2216
Cyclohexane	50.0	861588.000	0.5718	100	1796218.00	0.5641	200	3437904.00	0.5352
Dibromochloromethane	50.0	471939.000	0.3749	100	950867.000	0.3574	200	1816062.00	0.3434
Dichlorodifluoromethane	50.0	868912.000	0.5767	100	1742871.00	0.5473	200	3132081.00	0.4876
Isopropylbenzene	50.0	2306871.00	1.833	100	4702832.00	1.768	200	8880968.00	1.679
Methyl Tert Butyl Ether	50.0	1000841.00	0.6642	100	2125328.00	0.6674	200	4309140.00	0.6708
Methyl acetate	50.0	190839.000	0.1267	100	406224.000	0.1276	200	828426.000	0.1290
Methylcyclohexane	50.0	819734.000	0.5440	100	1708235.00	0.5365	200	3288453.00	0.5119
Methylene Chloride	50.0	477284.000	0.3168	100	967262.000	0.3038	200	1864238.00	0.2902
Styrene	50.0	1428212.00	1.135	100	2974118.00	1.118	200	5735911.00	1.085
Tetrachloroethene	50.0	479876.000	0.3812	100	974917.000	0.3665	200	1843044.00	0.3485
Trichloroethene	50.0	559436.000	0.3713	100	1137581.00	0.3572	200	2183560.00	0.3399

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073106

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS10

Initial Calibration Date: 18-OCT-07 16:51

Column ID: F

Analyte	WG253187-11		
	CONC	RESP	RF
1,1-Dichloroethene	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA
Chloroform	NA	NA	NA
Ethylbenzene	NA	NA	NA
Toluene	NA	NA	NA
Vinyl Chloride	NA	NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA
Bromoform	NA	NA	NA
Chlorobenzene	NA	NA	NA
Chloromethane	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	NA
1,1,2-Trichloro-1,2,2-Trifluoroethane	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA
1,2-Dibromo-3-Chloropropane	NA	NA	NA
1,2-Dibromoethane	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA
2-Butanone	300	663381.000	0.06880
2-Hexanone	300	886864.000	0.1149
4-Methyl-2-Pentanone	300	523327.000	0.05430
Acetone	300	457084.000	0.04740
Benzene	NA	NA	NA
Bromodichloromethane	NA	NA	NA
Bromomethane	NA	NA	NA
Carbon Disulfide	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA
Chloroethane	NA	NA	NA
Cyclohexane	NA	NA	NA
Dibromochloromethane	NA	NA	NA
Dichlorodifluoromethane	NA	NA	NA
Isopropylbenzene	NA	NA	NA
Methyl Tert Butyl Ether	NA	NA	NA
Methyl acetate	NA	NA	NA
Methylcyclohexane	NA	NA	NA
Methylene Chloride	NA	NA	NA
Styrene	NA	NA	NA
Tetrachloroethene	NA	NA	NA
Trichloroethene	NA	NA	NA

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073107

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS10

Initial Calibration Date: 18-OCT-07 16:51

Column ID: F

Analyte	WG253187-02			WG253187-03			WG253187-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Trichlorofluoromethane	NA	NA	NA	0.400	4902.00000	0.4336	1.00	22532.0000	0.8040
cis-1,2-Dichloroethene	NA	NA	NA	0.400	3261.00000	0.2884	1.00	8145.00000	0.2906
cis-1,3-Dichloropropene	NA	NA	NA	0.400	3962.00000	0.3504	1.00	9845.00000	0.3513
m-,p-Xylene	NA	NA	NA	0.800	9552.00000	0.5311	2.00	25634.0000	0.5782
o-Xylene	NA	NA	NA	NA	NA	NA	1.00	10610.0000	0.4787
trans-1,2-Dichloroethene	NA	NA	NA	0.400	2815.00000	0.2490	1.00	8887.00000	0.3171
trans-1,3-Dichloropropene	NA	NA	NA	0.400	3805.00000	0.4231	1.00	9940.00000	0.4484

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073108

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS10

Initial Calibration Date: 18-OCT-07 16:51

Column ID: F

Analyte	WG253187-05			WG253187-06			WG253187-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Trichlorofluoromethane	2.00	49072.0000	0.8714	5.00	125093.000	0.8882	20.0	518777.000	0.8812
cis-1,2-Dichloroethene	2.00	18147.0000	0.3223	5.00	48051.0000	0.3412	20.0	212252.000	0.3605
cis-1,3-Dichloropropene	2.00	21974.0000	0.3902	5.00	62793.0000	0.4459	20.0	287579.000	0.4885
m-,p-Xylene	4.00	59006.0000	0.6641	10.0	162481.000	0.7084	40.0	699373.000	0.7347
o-Xylene	2.00	23047.0000	0.5188	5.00	69801.0000	0.6087	20.0	320013.000	0.6724
trans-1,2-Dichloroethene	2.00	17095.0000	0.3036	5.00	47628.0000	0.3382	20.0	204636.000	0.3476
trans-1,3-Dichloropropene	2.00	21539.0000	0.4849	5.00	61213.0000	0.5338	20.0	266332.000	0.5596

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073109

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS10

Initial Calibration Date: 18-OCT-07 16:51

Column ID: F

Analyte	WG253187-08			WG253187-09			WG253187-10		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Trichlorofluoromethane	50.0	1276651.00	0.8473	100	2556058.00	0.8027	200	4705785.00	0.7326
cis-1,2-Dichloroethene	50.0	551863.000	0.3662	100	1146237.00	0.3600	200	2243726.00	0.3493
cis-1,3-Dichloropropene	50.0	759522.000	0.5041	100	1553167.00	0.4878	200	2959906.00	0.4608
m-,p-Xylene	100	1811635.00	0.7196	200	3722563.00	0.6997	400	7035503.00	0.6652
o-Xylene	50.0	858507.000	0.6820	100	1764641.00	0.6633	200	3404334.00	0.6437
trans-1,2-Dichloroethene	50.0	529464.000	0.3514	100	1113115.00	0.3496	200	2168851.00	0.3376
trans-1,3-Dichloropropene	50.0	695994.000	0.5529	100	1398472.00	0.5257	200	2658193.00	0.5026

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073110

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS10

Initial Calibration Date: 18-OCT-07 16:51

Column ID: F

Analyte	WG253187-11		
	CONC	RESP	RF
Trichlorofluoromethane	NA	NA	NA
cis-1,2-Dichloroethene	NA	NA	NA
cis-1,3-Dichloropropene	NA	NA	NA
m-,p-Xylene	NA	NA	NA
o-Xylene	NA	NA	NA
trans-1,2-Dichloroethene	NA	NA	NA
trans-1,3-Dichloropropene	NA	NA	NA

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073111

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS11

Initial Calibration Date: 01-OCT-07 15:48

Column ID: F

Analyte	WG251532-02			WG251532-03			WG251532-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,1-Dichloroethene	NA	NA	NA	0.400	5459.00000	0.3406	1.00	22956.0000	0.5767
1,2-Dichloropropane	NA	NA	NA	0.400	3683.00000	0.2298	1.00	11307.0000	0.2841
Chloroform	0.300	6893.00000	0.5373	0.400	6707.00000	0.4185	1.00	22279.0000	0.5597
Ethylbenzene	NA	NA	NA	0.400	3644.00000	0.3495	1.00	13022.0000	0.5067
Toluene	NA	NA	NA	0.400	11758.0000	1.128	1.00	39735.0000	1.546
Vinyl Chloride	NA	NA	NA	0.400	4333.00000	0.2703	1.00	17176.0000	0.4315
1,1,2,2-Tetrachloroethane	NA	NA	NA	0.400	2458.00000	0.4556	1.00	5562.00000	0.4178
1,1-Dichloroethane	NA	NA	NA	0.400	7965.00000	0.4969	1.00	24401.0000	0.6131
Bromoform	NA	NA	NA	NA	NA	NA	1.00	3393.00000	0.1320
Chlorobenzene	NA	NA	NA	0.400	8476.00000	0.8130	1.00	25625.0000	0.9972
Chloromethane	NA	NA	NA	0.400	7022.00000	0.4381	1.00	17646.0000	0.4433
1,1,1-Trichloroethane	NA	NA	NA	0.400	5415.00000	0.3378	1.00	20488.0000	0.5147
1,1,2-Trichloro-1,2,2-Trifluoroethane	NA	NA	NA	NA	NA	NA	1.00	9564.00000	0.2403
1,1,2-Trichloroethane	NA	NA	NA	0.400	1851.00000	0.1775	1.00	5710.00000	0.2222
1,2,4-Trichlorobenzene	NA	NA	NA	0.400	3539.00000	0.6560	1.00	10704.0000	0.8041
1,2-Dibromo-3-Chloropropane	NA	NA	NA	NA	NA	NA	1.00	1140.00000	0.08560
1,2-Dibromoethane	NA	NA	NA	0.400	2030.00000	0.1947	1.00	5190.00000	0.2020
1,2-Dichlorobenzene	0.300	4763.00000	1.183	0.400	5312.00000	0.9846	1.00	16208.0000	1.218
1,2-Dichloroethane	NA	NA	NA	0.400	7081.00000	0.4418	1.00	20110.0000	0.5052
1,3-Dichlorobenzene	NA	NA	NA	0.400	5186.00000	0.9613	1.00	17647.0000	1.326
1,4-Dichlorobenzene	0.300	5161.00000	1.282	0.400	5753.00000	1.066	1.00	18398.0000	1.382
2-Butanone	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	0.400	13570.0000	0.8466	1.00	38743.0000	0.9734
Bromodichloromethane	NA	NA	NA	0.400	4690.00000	0.2926	1.00	14758.0000	0.3708
Bromomethane	NA	NA	NA	NA	NA	NA	1.00	5941.00000	0.1493
Carbon Disulfide	NA	NA	NA	NA	NA	NA	1.00	29560.0000	0.7427
Carbon Tetrachloride	NA	NA	NA	0.400	3443.00000	0.2148	1.00	15952.0000	0.4008
Chloroethane	NA	NA	NA	NA	NA	NA	1.00	9542.00000	0.2397
Cyclohexane	NA	NA	NA	NA	NA	NA	1.00	22543.0000	0.5664
Dibromochloromethane	NA	NA	NA	0.400	2533.00000	0.2430	1.00	6241.00000	0.2429
Dichlorodifluoromethane	NA	NA	NA	NA	NA	NA	1.00	18761.0000	0.4714
Isopropylbenzene	NA	NA	NA	0.400	9883.00000	0.9479	1.00	40841.0000	1.589
Methyl Tert Butyl Ether	NA	NA	NA	NA	NA	NA	1.00	23664.0000	0.5945
Methyl acetate	NA	NA	NA	NA	NA	NA	1.00	4790.00000	0.1203
Methylcyclohexane	NA	NA	NA	NA	NA	NA	1.00	13313.0000	0.3345
Methylene Chloride	NA	NA	NA	0.400	13939.0000	0.8697	1.00	21650.0000	0.5439
Styrene	NA	NA	NA	0.400	7224.00000	0.6929	1.00	22881.0000	0.8904
Tetrachloroethene	NA	NA	NA	0.400	1692.00000	0.1623	1.00	5980.00000	0.2327
Trichloroethene	NA	NA	NA	0.400	2552.00000	0.1592	1.00	9457.00000	0.2376

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073112

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS11

Initial Calibration Date: 01-OCT-07 15:48

Column ID: F

Analyte	WG251532-05			WG251532-06			WG251532-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,1-Dichloroethene	2.00	48476.0000	0.6182	5.00	125622.000	0.6336	20.0	535695.000	0.6421
1,2-Dichloropropane	2.00	24026.0000	0.3064	5.00	60721.0000	0.3063	20.0	255504.000	0.3063
Chloroform	2.00	44355.0000	0.5657	5.00	112252.000	0.5662	20.0	484435.000	0.5807
Ethylbenzene	2.00	27498.0000	0.5335	5.00	73404.0000	0.5622	20.0	307082.000	0.5615
Toluene	2.00	79868.0000	1.550	5.00	198698.000	1.522	20.0	872465.000	1.595
Vinyl Chloride	2.00	33432.0000	0.4264	5.00	75335.0000	0.3800	20.0	315490.000	0.3782
1,1,2,2-Tetrachloroethane	2.00	12732.0000	0.4763	5.00	33959.0000	0.5071	20.0	126680.000	0.4520
1,1-Dichloroethane	2.00	52354.0000	0.6677	5.00	132096.000	0.6663	20.0	573339.000	0.6872
Bromoform	2.00	7526.00000	0.1460	5.00	19891.0000	0.1523	20.0	89511.0000	0.1637
Chlorobenzene	2.00	55132.0000	1.070	5.00	128985.000	0.9879	20.0	549650.000	1.005
Chloromethane	2.00	39610.0000	0.5052	5.00	89663.0000	0.4523	20.0	388504.000	0.4657
1,1,1-Trichloroethane	2.00	44026.0000	0.5615	5.00	111298.000	0.5614	20.0	479025.000	0.5742
1,1,2-Trichloro-1,2,2-Trifluoroethane	2.00	19426.0000	0.2478	5.00	55122.0000	0.2780	20.0	218986.000	0.2625
1,1,2-Trichloroethane	2.00	11873.0000	0.2303	5.00	31952.0000	0.2447	20.0	128006.000	0.2341
1,2,4-Trichlorobenzene	2.00	23534.0000	0.8804	5.00	58779.0000	0.8777	20.0	242679.000	0.8658
1,2-Dibromo-3-Chloropropane	2.00	2948.00000	0.1103	5.00	6744.00000	0.1007	20.0	26187.0000	0.09340
1,2-Dibromoethane	2.00	12526.0000	0.2430	5.00	30764.0000	0.2356	20.0	129058.000	0.2360
1,2-Dichlorobenzene	2.00	34537.0000	1.292	5.00	84559.0000	1.263	20.0	346990.000	1.238
1,2-Dichloroethane	2.00	41756.0000	0.5325	5.00	104639.000	0.5278	20.0	437462.000	0.5244
1,3-Dichlorobenzene	2.00	39948.0000	1.495	5.00	97419.0000	1.455	20.0	407476.000	1.454
1,4-Dichlorobenzene	2.00	40610.0000	1.519	5.00	99812.0000	1.490	20.0	415174.000	1.481
2-Butanone	NA	NA	NA	5.00	14161.0000	0.07140	20.0	53500.0000	0.06410
2-Hexanone	NA	NA	NA	5.00	21234.0000	0.1626	20.0	82590.0000	0.1510
4-Methyl-2-Pentanone	NA	NA	NA	5.00	13461.0000	0.06790	20.0	50386.0000	0.06040
Acetone	NA	NA	NA	5.00	11470.0000	0.05790	20.0	42030.0000	0.05040
Benzene	2.00	80625.0000	1.028	5.00	202501.000	1.021	20.0	855276.000	1.025
Bromodichloromethane	2.00	30555.0000	0.3897	5.00	78106.0000	0.3940	20.0	336034.000	0.4028
Bromomethane	2.00	12430.0000	0.1585	5.00	29313.0000	0.1479	20.0	147898.000	0.1773
Carbon Disulfide	2.00	58739.0000	0.7491	5.00	152424.000	0.7688	20.0	661644.000	0.7931
Carbon Tetrachloride	2.00	32747.0000	0.4176	5.00	89399.0000	0.4509	20.0	372854.000	0.4469
Chloroethane	2.00	19584.0000	0.2498	5.00	48803.0000	0.2462	20.0	213904.000	0.2564
Cyclohexane	2.00	44380.0000	0.5660	5.00	126424.000	0.6377	20.0	513595.000	0.6156
Dibromochloromethane	2.00	14878.0000	0.2886	5.00	40156.0000	0.3075	20.0	178082.000	0.3256
Dichlorodifluoromethane	2.00	38939.0000	0.4966	5.00	107316.000	0.5413	20.0	440739.000	0.5283
Isopropylbenzene	2.00	88988.0000	1.726	5.00	225803.000	1.729	20.0	965695.000	1.766
Methyl Tert Butyl Ether	2.00	48149.0000	0.6141	5.00	123625.000	0.6236	20.0	518361.000	0.6213
Methyl acetate	2.00	10311.0000	0.1315	5.00	25413.0000	0.1282	20.0	110460.000	0.1324
Methylcyclohexane	2.00	28563.0000	0.3643	5.00	83180.0000	0.4196	20.0	320406.000	0.3841
Methylene Chloride	2.00	30890.0000	0.3940	5.00	60073.0000	0.3030	20.0	228546.000	0.2740
Styrene	2.00	50686.0000	0.9833	5.00	133672.000	1.024	20.0	599855.000	1.097
Tetrachloroethene	2.00	13373.0000	0.2594	5.00	36376.0000	0.2786	20.0	154520.000	0.2825
Trichloroethene	2.00	20157.0000	0.2571	5.00	45951.0000	0.2318	20.0	205345.000	0.2461

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073113

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS11

Initial Calibration Date: 01-OCT-07 15:48

Column ID: F

Analyte	WG251532-08			WG251532-09			WG251532-10		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,1-Dichloroethene	50.0	1358330.00	0.6364	100	2768992.00	0.6282	200	5351788.00	0.6087
1,2-Dichloropropane	50.0	666385.000	0.3122	100	1378462.00	0.3127	200	2646333.00	0.3010
Chloroform	50.0	1219971.00	0.5715	100	2470299.00	0.5604	200	4693723.00	0.5339
Ethylbenzene	50.0	811958.000	0.5700	100	1688680.00	0.5795	200	3271888.00	0.5543
Toluene	50.0	2287163.00	1.606	100	4789895.00	1.644	200	9297898.00	1.575
Vinyl Chloride	50.0	746728.000	0.3498	100	1474420.00	0.3345	200	2526768.00	0.2874
1,1,2,2-Tetrachloroethane	50.0	342935.000	0.4708	100	732844.000	0.4789	200	1407385.00	0.4472
1,1-Dichloroethane	50.0	1439098.00	0.6742	100	2975247.00	0.6750	200	5716785.00	0.6502
Bromoform	50.0	245089.000	0.1721	100	520920.000	0.1788	200	1001987.00	0.1698
Chlorobenzene	50.0	1424429.00	1.000	100	2995035.00	1.028	200	5893335.00	0.9984
Chloromethane	50.0	922415.000	0.4321	100	1824763.00	0.4140	200	3716884.00	0.4227
1,1,1-Trichloroethane	50.0	1204813.00	0.5644	100	2398980.00	0.5442	200	4428050.00	0.5036
1,1,2-Trichloro-1,2,2-Trifluoroethane	50.0	535729.000	0.2510	100	1092963.00	0.2480	200	2058927.00	0.2342
1,1,2-Trichloroethane	50.0	345205.000	0.2423	100	716499.000	0.2459	200	1374339.00	0.2328
1,2,4-Trichlorobenzene	50.0	633338.000	0.8695	100	1299497.00	0.8492	200	2466328.00	0.7837
1,2-Dibromo-3-Chloropropane	50.0	73182.0000	0.1005	100	156360.000	0.1022	200	287283.000	0.09130
1,2-Dibromoethane	50.0	338403.000	0.2376	100	704616.000	0.2418	200	1336701.00	0.2265
1,2-Dichlorobenzene	50.0	922841.000	1.267	100	1943041.00	1.270	200	3765189.00	1.196
1,2-Dichloroethane	50.0	1097447.00	0.5141	100	2211026.00	0.5016	200	4013581.00	0.4565
1,3-Dichlorobenzene	50.0	1071140.00	1.471	100	2217552.00	1.449	200	4425935.00	1.406
1,4-Dichlorobenzene	50.0	1077757.00	1.480	100	2240937.00	1.465	200	4410249.00	1.401
2-Butanone	50.0	139442.000	0.06530	100	294843.000	0.06690	200	540964.000	0.06150
2-Hexanone	50.0	219714.000	0.1542	100	473751.000	0.1626	200	868705.000	0.1472
4-Methyl-2-Pentanone	50.0	139434.000	0.06530	100	298847.000	0.06780	200	564567.000	0.06420
Acetone	50.0	103145.000	0.04830	100	224035.000	0.05080	200	374421.000	0.04260
Benzene	50.0	2236743.00	1.048	100	4623566.00	1.049	200	8913761.00	1.014
Bromodichloromethane	50.0	880197.000	0.4124	100	1801325.00	0.4087	200	3398229.00	0.3865
Bromomethane	50.0	405016.000	0.1897	100	887551.000	0.2014	200	1763726.00	0.2006
Carbon Disulfide	50.0	1700768.00	0.7968	100	3574373.00	0.8109	200	6992893.00	0.7954
Carbon Tetrachloride	50.0	956758.000	0.4482	100	1933183.00	0.4386	200	3582234.00	0.4074
Chloroethane	50.0	537813.000	0.2520	100	1094406.00	0.2483	200	2100042.00	0.2389
Cyclohexane	50.0	1295094.00	0.6067	100	2679162.00	0.6078	200	5035624.00	0.5727
Dibromochloromethane	50.0	476639.000	0.3346	100	1001787.00	0.3438	200	1911288.00	0.3238
Dichlorodifluoromethane	50.0	1048920.00	0.4914	100	2093046.00	0.4748	200	3836174.00	0.4363
Isopropylbenzene	50.0	2539791.00	1.783	100	5283210.00	1.813	200	10385710.0	1.760
Methyl Tert Butyl Ether	50.0	1333866.00	0.6249	100	2730573.00	0.6195	200	4976901.00	0.5661
Methyl acetate	50.0	282808.000	0.1325	100	581867.000	0.1320	200	1055829.00	0.1201
Methylcyclohexane	50.0	817556.000	0.3830	100	1727764.00	0.3920	200	3399088.00	0.3866
Methylene Chloride	50.0	561775.000	0.2632	100	1150287.00	0.2610	200	2208724.00	0.2512
Styrene	50.0	1609485.00	1.130	100	3420981.00	1.174	200	6804235.00	1.153
Tetrachloroethene	50.0	404909.000	0.2843	100	821236.000	0.2818	200	1568099.00	0.2657
Trichloroethene	50.0	527492.000	0.2471	100	1085515.00	0.2463	200	2074840.00	0.2360

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073114

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS11

Initial Calibration Date: 01-OCT-07 15:48

Column ID: F

Analyte	WG251532-02			WG251532-03			WG251532-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Trichlorofluoromethane	NA	NA	NA	0.400	3610.00000	0.2252	1.00	23603.0000	0.5930
cis-1,2-Dichloroethene	NA	NA	NA	0.400	3018.00000	0.1883	1.00	9585.00000	0.2408
cis-1,3-Dichloropropene	NA	NA	NA	0.400	5024.00000	0.3134	1.00	14105.0000	0.3544
m-,p-Xylene	NA	NA	NA	0.800	10564.0000	0.5066	2.00	32904.0000	0.6402
o-Xylene	NA	NA	NA	0.400	4810.00000	0.4614	1.00	15978.0000	0.6218
trans-1,2-Dichloroethene	NA	NA	NA	0.400	3162.00000	0.1973	1.00	10260.0000	0.2578
trans-1,3-Dichloropropene	NA	NA	NA	0.400	4463.00000	0.4281	1.00	12893.0000	0.5017

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073115

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS11

Initial Calibration Date: 01-OCT-07 15:48

Column ID: F

Analyte	WG251532-05			WG251532-06			WG251532-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Trichlorofluoromethane	2.00	47095.0000	0.6006	5.00	130638.000	0.6589	20.0	525028.000	0.6293
cis-1,2-Dichloroethene	2.00	21372.0000	0.2726	5.00	54650.0000	0.2757	20.0	233209.000	0.2795
cis-1,3-Dichloropropene	2.00	30331.0000	0.3868	5.00	82462.0000	0.4159	20.0	355044.000	0.4256
m-,p-Xylene	4.00	70508.0000	0.6839	10.0	177033.000	0.6779	40.0	766250.000	0.7005
o-Xylene	2.00	34116.0000	0.6619	5.00	85256.0000	0.6529	20.0	363364.000	0.6644
trans-1,2-Dichloroethene	2.00	20908.0000	0.2667	5.00	53357.0000	0.2691	20.0	230105.000	0.2758
trans-1,3-Dichloropropene	2.00	28922.0000	0.5611	5.00	76148.0000	0.5832	20.0	322114.000	0.5890

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073116

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS11

Initial Calibration Date: 01-OCT-07 15:48

Column ID: F

Analyte	WG251532-08			WG251532-09			WG251532-10		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Trichlorofluoromethane	50.0	1288293.00	0.6036	100	2623720.00	0.5952	200	4987810.00	0.5673
cis-1,2-Dichloroethene	50.0	598151.000	0.2802	100	1235747.00	0.2803	200	2413546.00	0.2745
cis-1,3-Dichloropropene	50.0	929595.000	0.4355	100	1935212.00	0.4390	200	3726097.00	0.4238
m-,p-Xylene	100	2029456.00	0.7124	200	4227699.00	0.7254	400	8126794.00	0.6884
o-Xylene	50.0	962946.000	0.6760	100	2001020.00	0.6867	200	3979858.00	0.6742
trans-1,2-Dichloroethene	50.0	585527.000	0.2743	100	1203115.00	0.2729	200	2348922.00	0.2672
trans-1,3-Dichloropropene	50.0	861380.000	0.6047	100	1775450.00	0.6093	200	3349096.00	0.5674

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073117

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS6

Initial Calibration Date: 24-OCT-07 17:33

Column ID: F

Analyte	WG253721-02			WG253721-03			WG253721-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,1-Dichloroethene	NA	NA	NA	0.400	6357.00000	0.4465	1.00	14901.0000	0.4450
1,2-Dichloropropane	NA	NA	NA	0.400	2873.00000	0.2018	1.00	6680.00000	0.1995
Chloroform	0.300	6765.00000	0.6649	0.400	8727.00000	0.6130	1.00	21357.0000	0.6378
Ethylbenzene	NA	NA	NA	0.400	5698.00000	0.5017	1.00	13385.0000	0.4933
Toluene	NA	NA	NA	0.400	13626.0000	1.200	1.00	33122.0000	1.221
Vinyl Chloride	NA	NA	NA	0.400	6997.00000	0.4915	1.00	15874.0000	0.4740
1,1,2,2-Tetrachloroethane	NA	NA	NA	0.400	2227.00000	0.3271	1.00	7866.00000	0.4560
1,1-Dichloroethane	NA	NA	NA	0.400	6399.00000	0.4495	1.00	16030.0000	0.4787
Bromoform	NA	NA	NA	NA	NA	NA	1.00	6650.00000	0.2451
Chlorobenzene	NA	NA	NA	0.400	12376.0000	1.090	1.00	29058.0000	1.071
Chloromethane	NA	NA	NA	NA	NA	NA	1.00	15821.0000	0.4725
1,1,1-Trichloroethane	NA	NA	NA	0.400	8594.00000	0.6036	1.00	19910.0000	0.5946
1,1,2-Trichloro-1,2,2-Trifluoroethane	NA	NA	NA	NA	NA	NA	1.00	11559.0000	0.3452
1,1,2-Trichloroethane	NA	NA	NA	0.400	2181.00000	0.1920	1.00	6868.00000	0.2531
1,2,4-Trichlorobenzene	NA	NA	NA	0.400	6669.00000	0.9794	1.00	18772.0000	1.088
1,2-Dibromo-3-Chloropropane	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	NA	NA	NA	0.400	2240.00000	0.1972	1.00	5999.00000	0.2211
1,2-Dichlorobenzene	0.300	7116.00000	1.412	0.400	9692.00000	1.423	1.00	28035.0000	1.625
1,2-Dichloroethane	NA	NA	NA	0.400	6768.00000	0.4754	1.00	17430.0000	0.5205
1,3-Dichlorobenzene	NA	NA	NA	0.400	11102.0000	1.630	1.00	29957.0000	1.737
1,4-Dichlorobenzene	0.300	8729.00000	1.732	0.400	12655.0000	1.859	1.00	35174.0000	2.039
2-Butanone	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	0.400	13173.0000	0.9253	1.00	33356.0000	0.9961
Bromodichloromethane	NA	NA	NA	0.400	6357.00000	0.4465	1.00	14466.0000	0.4320
Bromomethane	NA	NA	NA	NA	NA	NA	1.00	5033.00000	0.1503
Carbon Disulfide	NA	NA	NA	NA	NA	NA	1.00	20080.0000	0.5996
Carbon Tetrachloride	NA	NA	NA	0.400	7598.00000	0.5337	1.00	19702.0000	0.5884
Chloroethane	NA	NA	NA	0.400	2378.00000	0.1670	1.00	5653.00000	0.1688
Cyclohexane	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	NA	NA	NA	0.400	3750.00000	0.3302	1.00	9997.00000	0.3685
Dichlorodifluoromethane	NA	NA	NA	0.400	8653.00000	0.6078	1.00	18364.0000	0.5484
Isopropylbenzene	NA	NA	NA	0.400	15235.0000	1.341	1.00	40131.0000	1.479
Methyl Tert Butyl Ether	NA	NA	NA	NA	NA	NA	1.00	14458.0000	0.4318
Methyl acetate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	0.400	15189.0000	1.067	1.00	18544.0000	0.5538
Styrene	NA	NA	NA	0.400	8592.00000	0.7565	1.00	25369.0000	0.9350
Tetrachloroethene	NA	NA	NA	0.400	4720.00000	0.4156	1.00	11039.0000	0.4069
Trichloroethene	NA	NA	NA	0.400	4235.00000	0.2975	1.00	9588.00000	0.2863

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073118

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS6

Initial Calibration Date: 24-OCT-07 17:33

Column ID: F

Analyte	WG253721-05			WG253721-06			WG253721-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,1-Dichloroethene	2.00	29353.0000	0.4165	5.00	76116.0000	0.4255	20.0	355176.000	0.4560
1,2-Dichloropropane	2.00	13152.0000	0.1866	5.00	35343.0000	0.1976	20.0	160052.000	0.2055
Chloroform	2.00	41255.0000	0.5854	5.00	111412.000	0.6228	20.0	486395.000	0.6245
Ethylbenzene	2.00	26700.0000	0.4678	5.00	73028.0000	0.4950	20.0	338950.000	0.5198
Toluene	2.00	68900.0000	1.207	5.00	186917.000	1.267	20.0	868348.000	1.332
Vinyl Chloride	2.00	29989.0000	0.4255	5.00	75648.0000	0.4229	20.0	300374.000	0.3857
1,1,2,2-Tetrachloroethane	2.00	13326.0000	0.3655	5.00	31913.0000	0.3322	20.0	140830.000	0.3243
1,1-Dichloroethane	2.00	33542.0000	0.4759	5.00	85163.0000	0.4760	20.0	380809.000	0.4890
Bromoform	2.00	10864.0000	0.1903	5.00	31038.0000	0.2104	20.0	144047.000	0.2209
Chlorobenzene	2.00	53466.0000	0.9367	5.00	140296.000	0.9510	20.0	619886.000	0.9506
Chloromethane	2.00	28501.0000	0.4044	5.00	70166.0000	0.3922	20.0	278451.000	0.3575
1,1,1-Trichloroethane	2.00	42060.0000	0.5968	5.00	111826.000	0.6251	20.0	502390.000	0.6451
1,1,2-Trichloro-1,2,2-Trifluoroethane	2.00	23236.0000	0.3297	5.00	61922.0000	0.3461	20.0	255500.000	0.3281
1,1,2-Trichloroethane	2.00	11719.0000	0.2053	5.00	31276.0000	0.2120	20.0	142036.000	0.2178
1,2,4-Trichlorobenzene	2.00	31524.0000	0.8646	5.00	82439.0000	0.8582	20.0	410367.000	0.9449
1,2-Dibromo-3-Chloropropane	2.00	2831.00000	0.07760	5.00	7258.00000	0.07560	20.0	33718.0000	0.07760
1,2-Dibromoethane	2.00	11490.0000	0.2013	5.00	32248.0000	0.2186	20.0	151223.000	0.2319
1,2-Dichlorobenzene	2.00	46623.0000	1.279	5.00	123029.000	1.281	20.0	554980.000	1.278
1,2-Dichloroethane	2.00	34014.0000	0.4826	5.00	89290.0000	0.4991	20.0	380645.000	0.4887
1,3-Dichlorobenzene	2.00	51437.0000	1.411	5.00	137353.000	1.430	20.0	639356.000	1.472
1,4-Dichlorobenzene	2.00	55372.0000	1.519	5.00	146791.000	1.528	20.0	642346.000	1.479
2-Butanone	NA	NA	NA	5.00	8711.00000	0.04870	20.0	40241.0000	0.05170
2-Hexanone	NA	NA	NA	5.00	11532.0000	0.07820	20.0	60088.0000	0.09210
4-Methyl-2-Pentanone	NA	NA	NA	5.00	5957.00000	0.03330	20.0	31770.0000	0.04080
Acetone	NA	NA	NA	5.00	8128.00000	0.04540	20.0	35901.0000	0.04610
Benzene	2.00	67774.0000	0.9616	5.00	183021.000	1.023	20.0	786803.000	1.010
Bromodichloromethane	2.00	28535.0000	0.4049	5.00	78348.0000	0.4379	20.0	353729.000	0.4542
Bromomethane	2.00	11410.0000	0.1619	5.00	31671.0000	0.1770	20.0	135473.000	0.1739
Carbon Disulfide	2.00	34977.0000	0.4963	5.00	121368.000	0.6784	20.0	572076.000	0.7345
Carbon Tetrachloride	2.00	39324.0000	0.5580	5.00	107807.000	0.6026	20.0	479193.000	0.6153
Chloroethane	2.00	10928.0000	0.1551	5.00	29048.0000	0.1624	20.0	131445.000	0.1688
Cyclohexane	NA	NA	NA	5.00	60177.0000	0.3364	20.0	297259.000	0.3817
Dibromochloromethane	2.00	17834.0000	0.3124	5.00	48476.0000	0.3286	20.0	233280.000	0.3577
Dichlorodifluoromethane	2.00	37626.0000	0.5339	5.00	95400.0000	0.5333	20.0	399239.000	0.5126
Isopropylbenzene	2.00	77762.0000	1.362	5.00	236471.000	1.603	20.0	1135739.00	1.742
Methyl Tert Butyl Ether	2.00	33815.0000	0.4798	5.00	94459.0000	0.5280	20.0	452737.000	0.5813
Methyl acetate	2.00	6722.00000	0.09540	5.00	16793.0000	0.09390	20.0	79502.0000	0.1021
Methylcyclohexane	NA	NA	NA	5.00	63702.0000	0.3561	20.0	320047.000	0.4109
Methylene Chloride	2.00	28165.0000	0.3996	5.00	53752.0000	0.3005	20.0	198304.000	0.2546
Styrene	2.00	51390.0000	0.9003	5.00	145435.000	0.9858	20.0	687536.000	1.054
Tetrachloroethene	2.00	22353.0000	0.3916	5.00	59227.0000	0.4015	20.0	266905.000	0.4093
Trichloroethene	2.00	19746.0000	0.2802	5.00	50839.0000	0.2842	20.0	230156.000	0.2955

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073119

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS6

Initial Calibration Date: 24-OCT-07 17:33

Column ID: F

Analyte	WG253721-08			WG253721-09			WG253721-10		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,1-Dichloroethene	50.0	1015045.00	0.4731	100	2164591.00	0.4536	200	4305133.00	0.4146
1,2-Dichloropropane	50.0	470815.000	0.2194	100	1057424.00	0.2216	200	2414834.00	0.2325
Chloroform	50.0	1336434.00	0.6229	100	2822301.00	0.5915	200	5922776.00	0.5703
Ethylbenzene	50.0	988352.000	0.5555	100	2213567.00	0.5623	200	5180871.00	0.5663
Toluene	50.0	2465771.00	1.386	100	5353194.00	1.360	200	11486870.0	1.256
Vinyl Chloride	50.0	760619.000	0.3545	100	1497321.00	0.3138	NA	NA	NA
1,1,2,2-Tetrachloroethane	50.0	406150.000	0.3436	100	925975.000	0.3531	200	2007284.00	0.3410
1,1-Dichloroethane	50.0	1078356.00	0.5026	100	2324429.00	0.4871	200	4748900.00	0.4573
Bromoform	50.0	408861.000	0.2298	100	898185.000	0.2281	200	2060250.00	0.2252
Chlorobenzene	50.0	1754686.00	0.9861	100	3826785.00	0.9720	200	8837034.00	0.9660
Chloromethane	50.0	717987.000	0.3346	100	1437255.00	0.3012	NA	NA	NA
1,1,1-Trichloroethane	50.0	1397185.00	0.6512	100	2910764.00	0.6100	200	5956250.00	0.5736
1,1,2-Trichloro-1,2,2-Trifluoroethane	50.0	691312.000	0.3222	100	1478080.00	0.3098	200	2726319.00	0.2625
1,1,2-Trichloroethane	50.0	391111.000	0.2198	100	853977.000	0.2169	200	1988701.00	0.2174
1,2,4-Trichlorobenzene	50.0	1183853.00	1.002	100	2620069.00	0.9992	200	5479162.00	0.9307
1,2-Dibromo-3-Chloropropane	50.0	97943.0000	0.08290	100	219127.000	0.08360	200	452340.000	0.07680
1,2-Dibromoethane	50.0	421967.000	0.2371	100	922971.000	0.2344	200	2095761.00	0.2291
1,2-Dichlorobenzene	50.0	1587380.00	1.343	100	3484251.00	1.329	200	7432995.00	1.263
1,2-Dichloroethane	50.0	1007199.00	0.4694	100	2061090.00	0.4320	200	4165855.00	0.4012
1,3-Dichlorobenzene	50.0	1799312.00	1.522	100	3952492.00	1.507	200	8640399.00	1.468
1,4-Dichlorobenzene	50.0	1830512.00	1.549	100	4016983.00	1.532	200	8642482.00	1.468
2-Butanone	50.0	115407.000	0.05380	100	257530.000	0.05400	200	575469.000	0.05540
2-Hexanone	50.0	177045.000	0.09950	100	412124.000	0.1047	200	898150.000	0.09820
4-Methyl-2-Pentanone	50.0	92056.0000	0.04290	100	214723.000	0.04500	200	502004.000	0.04830
Acetone	50.0	99115.0000	0.04620	100	213617.000	0.04480	200	419440.000	0.04040
Benzene	50.0	2227038.00	1.038	100	4917731.00	1.031	200	10326068.0	0.9944
Bromodichloromethane	50.0	987824.000	0.4604	100	2088477.00	0.4377	200	4635014.00	0.4463
Bromomethane	50.0	409671.000	0.1909	100	943363.000	0.1977	200	2031632.00	0.1956
Carbon Disulfide	50.0	1716717.00	0.8002	100	3783255.00	0.7929	200	7781090.00	0.7493
Carbon Tetrachloride	50.0	1312962.00	0.6120	100	2677288.00	0.5611	200	5338411.00	0.5141
Chloroethane	50.0	376823.000	0.1756	100	846833.000	0.1775	200	1867402.00	0.1798
Cyclohexane	50.0	905620.000	0.4221	100	1977365.00	0.4144	200	4149263.00	0.3996
Dibromochloromethane	50.0	660197.000	0.3710	100	1426039.00	0.3622	200	3272405.00	0.3577
Dichlorodifluoromethane	50.0	1046858.00	0.4879	100	2121832.00	0.4447	200	4100442.00	0.3949
Isopropylbenzene	50.0	3240288.00	1.821	100	6873412.00	1.746	200	14681353.0	1.605
Methyl Tert Butyl Ether	50.0	1293387.00	0.6028	100	2825027.00	0.5921	200	5331037.00	0.5134
Methyl acetate	50.0	229771.000	0.1071	100	513026.000	0.1075	200	1046991.00	0.1008
Methylcyclohexane	50.0	949371.000	0.4425	100	2086031.00	0.4372	200	4325267.00	0.4165
Methylene Chloride	50.0	550446.000	0.2566	100	1206771.00	0.2529	200	2562873.00	0.2468
Styrene	50.0	1982557.00	1.114	100	4401234.00	1.118	200	10038658.0	1.097
Tetrachloroethene	50.0	769363.000	0.4324	100	1671663.00	0.4246	200	3668562.00	0.4010
Trichloroethene	50.0	663581.000	0.3093	100	1462352.00	0.3065	200	3280563.00	0.3159

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073120

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS6

Initial Calibration Date: 24-OCT-07 17:33

Column ID: F

Analyte	WG253721-11		
	CONC	RESP	RF
1,1-Dichloroethene	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA
Chloroform	NA	NA	NA
Ethylbenzene	NA	NA	NA
Toluene	NA	NA	NA
Vinyl Chloride	NA	NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA
Bromoform	NA	NA	NA
Chlorobenzene	NA	NA	NA
Chloromethane	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	NA
1,1,2-Trichloro-1,2,2-Trifluoroethane	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA
1,2-Dibromo-3-Chloropropane	NA	NA	NA
1,2-Dibromoethane	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA
2-Butanone	300	815737.000	0.04870
2-Hexanone	300	1264088.00	0.09710
4-Methyl-2-Pentanone	300	685955.000	0.04100
Acetone	300	587815.000	0.03510
Benzene	NA	NA	NA
Bromodichloromethane	NA	NA	NA
Bromomethane	NA	NA	NA
Carbon Disulfide	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA
Chloroethane	NA	NA	NA
Cyclohexane	NA	NA	NA
Dibromochloromethane	NA	NA	NA
Dichlorodifluoromethane	NA	NA	NA
Isopropylbenzene	NA	NA	NA
Methyl Tert Butyl Ether	NA	NA	NA
Methyl acetate	NA	NA	NA
Methylcyclohexane	NA	NA	NA
Methylene Chloride	NA	NA	NA
Styrene	NA	NA	NA
Tetrachloroethene	NA	NA	NA
Trichloroethene	NA	NA	NA

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073121

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS6

Initial Calibration Date: 24-OCT-07 17:33

Column ID: F

Analyte	WG253721-02			WG253721-03			WG253721-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Trichlorofluoromethane	NA	NA	NA	0.400	12590.0000	0.8843	1.00	27801.0000	0.8302
cis-1,2-Dichloroethene	NA	NA	NA	0.400	3242.00000	0.2277	1.00	9095.00000	0.2716
cis-1,3-Dichloropropene	NA	NA	NA	0.400	4449.00000	0.3125	1.00	11126.0000	0.3323
m-,p-Xylene	NA	NA	NA	0.800	14304.0000	0.6297	2.00	34860.0000	0.6424
o-Xylene	NA	NA	NA	0.400	5728.00000	0.5043	1.00	14039.0000	0.5174
trans-1,2-Dichloroethene	NA	NA	NA	0.400	3489.00000	0.2451	1.00	8643.00000	0.2581
trans-1,3-Dichloropropene	NA	NA	NA	0.400	4003.00000	0.3524	1.00	11794.0000	0.4347

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073122

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS6

Initial Calibration Date: 24-OCT-07 17:33

Column ID: F

Analyte	WG253721-05			WG253721-06			WG253721-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Trichlorofluoromethane	2.00	55247.0000	0.7839	5.00	144113.000	0.8056	20.0	615028.000	0.7897
cis-1,2-Dichloroethene	2.00	17165.0000	0.2436	5.00	47499.0000	0.2655	20.0	220235.000	0.2828
cis-1,3-Dichloropropene	2.00	22939.0000	0.3255	5.00	66762.0000	0.3732	20.0	318850.000	0.4094
m-,p-Xylene	4.00	68950.0000	0.6040	10.0	186074.000	0.6306	40.0	855653.000	0.6560
o-Xylene	2.00	28487.0000	0.4991	5.00	82502.0000	0.5592	20.0	403329.000	0.6185
trans-1,2-Dichloroethene	2.00	16911.0000	0.2400	5.00	44749.0000	0.2501	20.0	204103.000	0.2621
trans-1,3-Dichloropropene	2.00	23020.0000	0.4033	5.00	66641.0000	0.4517	20.0	316566.000	0.4854

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073123

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS6

Initial Calibration Date: 24-OCT-07 17:33

Column ID: F

Analyte	WG253721-08			WG253721-09			WG253721-10		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Trichlorofluoromethane	50.0	1602011.00	0.7467	100	3320489.00	0.6959	200	6806626.00	0.6555
cis-1,2-Dichloroethene	50.0	634700.000	0.2958	100	1398585.00	0.2931	200	3026121.00	0.2914
cis-1,3-Dichloropropene	50.0	919695.000	0.4287	100	2032285.00	0.4259	200	4598491.00	0.4428
m-,p-Xylene	100	2491391.00	0.7001	200	5453768.00	0.6926	400	11973884.0	0.6544
o-Xylene	50.0	1179818.00	0.6631	100	2605974.00	0.6619	200	6096912.00	0.6664
trans-1,2-Dichloroethene	50.0	589973.000	0.2750	100	1305874.00	0.2737	200	2644766.00	0.2547
trans-1,3-Dichloropropene	50.0	895631.000	0.5034	100	1938571.00	0.4924	200	4319384.00	0.4721

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073124

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS6

Initial Calibration Date: 24-OCT-07 17:33

Column ID: F

Analyte	WG253721-11		
	CONC	RESP	RF
Trichlorofluoromethane	NA	NA	NA
cis-1,2-Dichloroethene	NA	NA	NA
cis-1,3-Dichloropropene	NA	NA	NA
m-,p-Xylene	NA	NA	NA
o-Xylene	NA	NA	NA
trans-1,2-Dichloroethene	NA	NA	NA
trans-1,3-Dichloropropene	NA	NA	NA

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073125

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS8

Initial Calibration Date: 22-OCT-07 15:58

Column ID: F

Analyte	WG253480-02			WG253480-03			WG253480-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,1-Dichloroethene	NA	NA	NA	0.400	2767.00000	0.3003	1.00	6427.00000	0.2774
1,2-Dichloropropane	NA	NA	NA	0.400	1558.00000	0.1691	1.00	4492.00000	0.1939
Chloroform	0.300	3175.00000	0.4372	0.400	4012.00000	0.4354	1.00	8840.00000	0.3815
Ethylbenzene	NA	NA	NA	0.400	3035.00000	0.4178	1.00	7172.00000	0.3929
Toluene	NA	NA	NA	0.400	8306.00000	1.144	1.00	19181.0000	1.051
Vinyl Chloride	NA	NA	NA	NA	NA	NA	1.00	3085.00000	0.1331
1,1,2,2-Tetrachloroethane	NA	NA	NA	0.400	1110.00000	0.2740	1.00	3069.00000	0.2998
1,1-Dichloroethane	NA	NA	NA	0.400	3685.00000	0.3999	1.00	8953.00000	0.3864
Bromoform	NA	NA	NA	NA	NA	NA	1.00	1765.00000	0.09670
Chlorobenzene	NA	NA	NA	0.400	7162.00000	0.9860	1.00	15277.0000	0.8370
Chloromethane	NA	NA	NA	NA	NA	NA	1.00	6447.00000	0.2782
1,1,1-Trichloroethane	NA	NA	NA	0.400	3118.00000	0.3384	1.00	7179.00000	0.3098
1,1,2-Trichloro-1,2,2-Trifluoroethane	NA	NA	NA	NA	NA	NA	1.00	4665.00000	0.2013
1,1,2-Trichloroethane	NA	NA	NA	0.400	1139.00000	0.1568	1.00	2900.00000	0.1589
1,2,4-Trichlorobenzene	NA	NA	NA	0.400	3393.00000	0.8377	1.00	8612.00000	0.8414
1,2-Dibromo-3-Chloropropane	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	NA	NA	NA	0.400	1154.00000	0.1589	1.00	2863.00000	0.1569
1,2-Dichlorobenzene	0.300	3738.00000	1.208	0.400	5659.00000	1.397	1.00	12001.0000	1.173
1,2-Dichloroethane	NA	NA	NA	0.400	2371.00000	0.2573	1.00	6532.00000	0.2819
1,3-Dichlorobenzene	NA	NA	NA	0.400	5940.00000	1.467	1.00	12876.0000	1.258
1,4-Dichlorobenzene	0.300	4679.00000	1.512	0.400	6182.00000	1.526	1.00	13020.0000	1.272
2-Butanone	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	0.400	8281.00000	0.8987	1.00	20960.0000	0.9046
Bromodichloromethane	NA	NA	NA	0.400	2191.00000	0.2378	1.00	5437.00000	0.2346
Bromomethane	NA	NA	NA	NA	NA	NA	1.00	2915.00000	0.1258
Carbon Disulfide	NA	NA	NA	NA	NA	NA	1.00	13504.0000	0.5828
Carbon Tetrachloride	NA	NA	NA	0.400	2990.00000	0.3245	1.00	6617.00000	0.2856
Chloroethane	NA	NA	NA	NA	NA	NA	1.00	3405.00000	0.1470
Cyclohexane	NA	NA	NA	NA	NA	NA	1.00	7156.00000	0.3088
Dibromochloromethane	NA	NA	NA	0.400	1670.00000	0.2299	1.00	3953.00000	0.2166
Dichlorodifluoromethane	NA	NA	NA	NA	NA	NA	1.00	6010.00000	0.2594
Isopropylbenzene	NA	NA	NA	0.400	9143.00000	1.259	1.00	19117.0000	1.047
Methyl Tert Butyl Ether	NA	NA	NA	NA	NA	NA	1.00	8053.00000	0.3475
Methyl acetate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane	NA	NA	NA	NA	NA	NA	1.00	5947.00000	0.2567
Methylene Chloride	NA	NA	NA	0.400	6548.00000	0.7106	1.00	9682.00000	0.4179
Styrene	NA	NA	NA	0.400	4877.00000	0.6714	1.00	12039.0000	0.6596
Tetrachloroethene	NA	NA	NA	0.400	1821.00000	0.2507	1.00	3963.00000	0.2171
Trichloroethene	NA	NA	NA	0.400	2158.00000	0.2342	1.00	4609.00000	0.1989

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073126

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS8

Initial Calibration Date: 22-OCT-07 15:58

Column ID: F

Analyte	WG253480-05			WG253480-06			WG253480-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,1-Dichloroethene	2.00	15199.0000	0.3187	5.00	44874.0000	0.3655	20.0	178454.000	0.3663
1,2-Dichloropropane	2.00	9753.00000	0.2045	5.00	26098.0000	0.2126	20.0	102753.000	0.2109
Chloroform	2.00	18853.0000	0.3953	5.00	49767.0000	0.4054	20.0	196312.000	0.4029
Ethylbenzene	2.00	16151.0000	0.4254	5.00	42940.0000	0.4431	20.0	164781.000	0.4311
Toluene	2.00	41654.0000	1.097	5.00	116765.000	1.205	20.0	445250.000	1.165
Vinyl Chloride	2.00	6297.00000	0.1320	5.00	15745.0000	0.1283	20.0	64342.0000	0.1321
1,1,2,2-Tetrachloroethane	2.00	6250.00000	0.2923	5.00	16873.0000	0.3156	20.0	68113.0000	0.3187
1,1-Dichloroethane	2.00	19326.0000	0.4053	5.00	52282.0000	0.4259	20.0	208256.000	0.4274
Bromoform	2.00	4352.00000	0.1146	5.00	12844.0000	0.1325	20.0	53713.0000	0.1405
Chlorobenzene	2.00	31583.0000	0.8319	5.00	81557.0000	0.8417	20.0	312804.000	0.8183
Chloromethane	2.00	10953.0000	0.2297	5.00	24963.0000	0.2033	20.0	104448.000	0.2144
1,1,1-Trichloroethane	2.00	16415.0000	0.3442	5.00	46833.0000	0.3815	20.0	185555.000	0.3808
1,1,2-Trichloro-1,2,2-Trifluoroethane	2.00	10713.0000	0.2246	5.00	27969.0000	0.2278	20.0	119789.000	0.2458
1,1,2-Trichloroethane	2.00	6390.00000	0.1683	5.00	17840.0000	0.1841	20.0	68828.0000	0.1801
1,2,4-Trichlorobenzene	2.00	17817.0000	0.8333	5.00	46461.0000	0.8691	20.0	172321.000	0.8064
1,2-Dibromo-3-Chloropropane	2.00	935.000000	0.04370	5.00	2464.00000	0.04610	20.0	11960.0000	0.05600
1,2-Dibromoethane	2.00	6563.00000	0.1729	5.00	17675.0000	0.1824	20.0	70374.0000	0.1841
1,2-Dichlorobenzene	2.00	24617.0000	1.151	5.00	62907.0000	1.177	20.0	238774.000	1.117
1,2-Dichloroethane	2.00	13457.0000	0.2822	5.00	35476.0000	0.2890	20.0	137367.000	0.2819
1,3-Dichlorobenzene	2.00	27035.0000	1.264	5.00	71011.0000	1.328	20.0	273026.000	1.278
1,4-Dichlorobenzene	2.00	28260.0000	1.322	5.00	71911.0000	1.345	20.0	271448.000	1.270
2-Butanone	NA	NA	NA	5.00	5639.00000	0.04590	20.0	24264.0000	0.04980
2-Hexanone	NA	NA	NA	5.00	4278.00000	0.04410	20.0	17200.0000	0.04500
4-Methyl-2-Pentanone	NA	NA	NA	5.00	4516.00000	0.03680	20.0	19568.0000	0.04020
Acetone	NA	NA	NA	5.00	5147.00000	0.04190	20.0	17988.0000	0.03690
Benzene	2.00	44667.0000	0.9366	5.00	118103.000	0.9621	20.0	434400.000	0.8915
Bromodichloromethane	2.00	12404.0000	0.2601	5.00	32514.0000	0.2649	20.0	135372.000	0.2778
Bromomethane	2.00	6802.00000	0.1426	5.00	18584.0000	0.1514	20.0	83168.0000	0.1707
Carbon Disulfide	2.00	31869.0000	0.6683	5.00	76436.0000	0.6226	20.0	320240.000	0.6572
Carbon Tetrachloride	2.00	14780.0000	0.3099	5.00	42905.0000	0.3495	20.0	170961.000	0.3509
Chloroethane	2.00	7379.00000	0.1547	5.00	20419.0000	0.1663	20.0	85007.0000	0.1745
Cyclohexane	2.00	18286.0000	0.3834	5.00	44911.0000	0.3658	20.0	194487.000	0.3992
Dibromochloromethane	2.00	8267.00000	0.2178	5.00	23177.0000	0.2392	20.0	95485.0000	0.2498
Dichlorodifluoromethane	2.00	14420.0000	0.3024	5.00	34810.0000	0.2836	20.0	149149.000	0.3061
Isopropylbenzene	2.00	43758.0000	1.153	5.00	124709.000	1.287	20.0	491862.000	1.287
Methyl Tert Butyl Ether	2.00	17802.0000	0.3733	5.00	45928.0000	0.3741	20.0	190428.000	0.3908
Methyl acetate	NA	NA	NA	5.00	12360.0000	0.1007	20.0	48887.0000	0.1003
Methylcyclohexane	2.00	14950.0000	0.3135	5.00	37086.0000	0.3021	20.0	163967.000	0.3365
Methylene Chloride	2.00	15583.0000	0.3268	5.00	32893.0000	0.2679	20.0	109984.000	0.2257
Styrene	2.00	27368.0000	0.7209	5.00	79229.0000	0.8176	20.0	321795.000	0.8418
Tetrachloroethene	2.00	8975.00000	0.2364	5.00	25119.0000	0.2592	20.0	99655.0000	0.2607
Trichloroethene	2.00	11407.0000	0.2392	5.00	31202.0000	0.2542	20.0	122016.000	0.2504

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073127

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS8

Initial Calibration Date: 22-OCT-07 15:58

Column ID: F

Analyte	WG253480-08			WG253480-09			WG253480-10		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
1,1-Dichloroethene	50.0	436729.000	0.3660	100	853773.000	0.3552	200	1674980.00	0.3424
1,2-Dichloropropane	50.0	250262.000	0.2097	100	486196.000	0.2023	200	943768.000	0.1929
Chloroform	50.0	469044.000	0.3931	100	898125.000	0.3736	200	1685157.00	0.3445
Ethylbenzene	50.0	381802.000	0.4008	100	688187.000	0.3642	200	1165925.00	0.3007
Toluene	50.0	1048650.00	1.101	100	1956235.00	1.035	200	3519709.00	0.9079
Vinyl Chloride	50.0	149433.000	0.1252	100	270409.000	0.1125	200	516016.000	0.1055
1,1,2,2-Tetrachloroethane	50.0	171929.000	0.3197	100	339548.000	0.3135	200	667645.000	0.3057
1,1-Dichloroethane	50.0	499619.000	0.4187	100	971119.000	0.4040	200	1847730.00	0.3777
Bromoform	50.0	140503.000	0.1475	100	275098.000	0.1456	200	531265.000	0.1370
Chlorobenzene	50.0	723684.000	0.7598	100	1325220.00	0.7012	200	2311553.00	0.5962
Chloromethane	50.0	238679.000	0.2000	100	500938.000	0.2084	200	1119864.00	0.2289
1,1,1-Trichloroethane	50.0	454822.000	0.3812	100	864997.000	0.3598	200	1584617.00	0.3239
1,1,2-Trichloro-1,2,2-Trifluoroethane	50.0	283351.000	0.2375	100	545994.000	0.2271	200	1009673.00	0.2064
1,1,2-Trichloroethane	50.0	164296.000	0.1725	100	320047.000	0.1694	200	621274.000	0.1603
1,2,4-Trichlorobenzene	50.0	409029.000	0.7605	100	757365.000	0.6993	200	1307932.00	0.5990
1,2-Dibromo-3-Chloropropane	50.0	31678.0000	0.05890	100	65416.0000	0.06040	200	133756.000	0.06130
1,2-Dibromoethane	50.0	172233.000	0.1808	100	338662.000	0.1792	200	659603.000	0.1701
1,2-Dichlorobenzene	50.0	583980.000	1.086	100	1093129.00	1.009	200	1945225.00	0.8908
1,2-Dichloroethane	50.0	335148.000	0.2809	100	644984.000	0.2683	200	1204165.00	0.2462
1,3-Dichlorobenzene	50.0	661983.000	1.231	100	1226057.00	1.132	200	2164702.00	0.9913
1,4-Dichlorobenzene	50.0	652428.000	1.213	100	1221440.00	1.128	200	2133750.00	0.9771
2-Butanone	50.0	61189.0000	0.05130	100	126631.000	0.05270	200	260510.000	0.05330
2-Hexanone	50.0	45759.0000	0.04800	100	97265.0000	0.05150	200	199037.000	0.05130
4-Methyl-2-Pentanone	50.0	50722.0000	0.04250	100	103689.000	0.04310	200	212990.000	0.04350
Acetone	50.0	44512.0000	0.03730	100	88752.0000	0.03690	200	171815.000	0.03510
Benzene	50.0	1012299.00	0.8483	100	1915161.00	0.7967	200	3433282.00	0.7018
Bromodichloromethane	50.0	334930.000	0.2807	100	652740.000	0.2715	200	1237301.00	0.2529
Bromomethane	50.0	204348.000	0.1713	100	405603.000	0.1687	200	794211.000	0.1624
Carbon Disulfide	50.0	763523.000	0.6399	100	1498177.00	0.6233	200	2724389.00	0.5569
Carbon Tetrachloride	50.0	415004.000	0.3478	100	771823.000	0.3211	200	1385697.00	0.2833
Chloroethane	50.0	201380.000	0.1688	100	395622.000	0.1646	200	767049.000	0.1568
Cyclohexane	50.0	470592.000	0.3944	100	936857.000	0.3897	200	1724529.00	0.3525
Dibromochloromethane	50.0	241897.000	0.2540	100	473314.000	0.2505	200	914909.000	0.2360
Dichlorodifluoromethane	50.0	350499.000	0.2937	100	664174.000	0.2763	200	1227000.00	0.2508
Isopropylbenzene	50.0	1187956.00	1.247	100	2202107.00	1.165	200	3866804.00	0.9974
Methyl Tert Butyl Ether	50.0	473957.000	0.3972	100	952444.000	0.3962	200	1816401.00	0.3713
Methyl acetate	50.0	120528.000	0.1010	100	242083.000	0.1007	200	484486.000	0.09900
Methylcyclohexane	50.0	400516.000	0.3356	100	777884.000	0.3236	200	1448570.00	0.2961
Methylene Chloride	50.0	250158.000	0.2096	100	474558.000	0.1974	200	883623.000	0.1806
Styrene	50.0	776327.000	0.8150	100	1436108.00	0.7599	200	2535619.00	0.6540
Tetrachloroethene	50.0	236806.000	0.2486	100	443529.000	0.2347	200	806249.000	0.2080
Trichloroethene	50.0	292312.000	0.2450	100	552863.000	0.2300	200	1030736.00	0.2107

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073128

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS8

Initial Calibration Date: 22-OCT-07 15:58

Column ID: F

Analyte	WG253480-11		
	CONC	RESP	RF
1,1-Dichloroethene	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA
Chloroform	NA	NA	NA
Ethylbenzene	NA	NA	NA
Toluene	NA	NA	NA
Vinyl Chloride	NA	NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA
Bromoform	NA	NA	NA
Chlorobenzene	NA	NA	NA
Chloromethane	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	NA
1,1,2-Trichloro-1,2,2-Trifluoroethane	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA
1,2-Dibromo-3-Chloropropane	NA	NA	NA
1,2-Dibromoethane	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA
2-Butanone	300	376659.000	0.05100
2-Hexanone	300	294556.000	0.05070
4-Methyl-2-Pentanone	300	309872.000	0.04200
Acetone	300	244884.000	0.03320
Benzene	NA	NA	NA
Bromodichloromethane	NA	NA	NA
Bromomethane	NA	NA	NA
Carbon Disulfide	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA
Chloroethane	NA	NA	NA
Cyclohexane	NA	NA	NA
Dibromochloromethane	NA	NA	NA
Dichlorodifluoromethane	NA	NA	NA
Isopropylbenzene	NA	NA	NA
Methyl Tert Butyl Ether	NA	NA	NA
Methyl acetate	NA	NA	NA
Methylcyclohexane	NA	NA	NA
Methylene Chloride	NA	NA	NA
Styrene	NA	NA	NA
Tetrachloroethene	NA	NA	NA
Trichloroethene	NA	NA	NA

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073129

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS8

Initial Calibration Date: 22-OCT-07 15:58

Column ID: F

Analyte	WG253480-02			WG253480-03			WG253480-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Trichlorofluoromethane	NA	NA	NA	0.400	3727.00000	0.4045	1.00	9439.00000	0.4074
cis-1,2-Dichloroethene	NA	NA	NA	0.400	1822.00000	0.1977	1.00	5174.00000	0.2233
cis-1,3-Dichloropropene	NA	NA	NA	0.400	2437.00000	0.2645	1.00	6299.00000	0.2719
m-,p-Xylene	NA	NA	NA	0.800	7701.00000	0.5301	2.00	17408.0000	0.4769
o-Xylene	NA	NA	NA	0.400	3512.00000	0.4835	1.00	7512.00000	0.4116
trans-1,2-Dichloroethene	NA	NA	NA	0.400	3134.00000	0.3401	1.00	7021.00000	0.3030
trans-1,3-Dichloropropene	NA	NA	NA	0.400	2202.00000	0.3031	1.00	5458.00000	0.2990

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073130

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS8

Initial Calibration Date: 22-OCT-07 15:58

Column ID: F

Analyte	WG253480-05			WG253480-06			WG253480-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Trichlorofluoromethane	2.00	20030.0000	0.4200	5.00	50562.0000	0.4119	20.0	213587.000	0.4384
cis-1,2-Dichloroethene	2.00	10789.0000	0.2262	5.00	29274.0000	0.2385	20.0	120493.000	0.2473
cis-1,3-Dichloropropene	2.00	13698.0000	0.2872	5.00	38603.0000	0.3145	20.0	155275.000	0.3187
m-,p-Xylene	4.00	39165.0000	0.5158	10.0	105077.000	0.5422	40.0	395913.000	0.5179
o-Xylene	2.00	18384.0000	0.4842	5.00	50501.0000	0.5212	20.0	200008.000	0.5232
trans-1,2-Dichloroethene	2.00	15269.0000	0.3202	5.00	43529.0000	0.3546	20.0	172166.000	0.3533
trans-1,3-Dichloropropene	2.00	11873.0000	0.3127	5.00	33316.0000	0.3438	20.0	134173.000	0.3510

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073131

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS8

Initial Calibration Date: 22-OCT-07 15:58

Column ID: F

Analyte	WG253480-08			WG253480-09			WG253480-10		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Trichlorofluoromethane	50.0	504892.000	0.4231	100	991144.000	0.4123	200	1932059.00	0.3950
cis-1,2-Dichloroethene	50.0	282932.000	0.2371	100	541649.000	0.2253	200	1022003.00	0.2089
cis-1,3-Dichloropropene	50.0	384343.000	0.3221	100	745106.000	0.3100	200	1415220.00	0.2893
m-,p-Xylene	100	924531.000	0.4853	200	1655723.00	0.4381	400	2772456.00	0.3576
o-Xylene	50.0	473948.000	0.4976	100	883339.000	0.4674	200	1560958.00	0.4026
trans-1,2-Dichloroethene	50.0	414623.000	0.3475	100	802775.000	0.3340	200	1503248.00	0.3073
trans-1,3-Dichloropropene	50.0	332032.000	0.3486	100	649006.000	0.3434	200	1239578.00	0.3197

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

INITIAL CALIBRATION DATA

00073132

Login Number: L0710597

Analytical Method: 8260B

Instrument ID: HPMS8

Initial Calibration Date: 22-OCT-07 15:58

Column ID: F

Analyte	WG253480-11		
	CONC	RESP	RF
Trichlorofluoromethane	NA	NA	NA
cis-1,2-Dichloroethene	NA	NA	NA
cis-1,3-Dichloropropene	NA	NA	NA
m-,p-Xylene	NA	NA	NA
o-Xylene	NA	NA	NA
trans-1,2-Dichloroethene	NA	NA	NA
trans-1,3-Dichloropropene	NA	NA	NA

KEMRON FORMS - Modified 10/13/2006
Version 1.6 PDF File ID: 919904
Report generated 11/01/2007 15:46

KEMRON Environmental Services

ALTERNATE SOURCE CALIBRATION REPORT

00073133

Login Number: L0710597 Run Date: 10/18/2007 Sample ID: WG253187-12
Instrument ID: HPMS10 Run Time: 18:23 Method: 8260B
File ID: 10M59732 Analyst: MES QC Key: STD
ICal Workgroup: WG253187 Cal ID: HPMS10 - 18-OCT-07

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	20.0	20.4	ug/L	0.324	1.90	30	
1,2-Dichloropropane	CCC	20.0	21.3	ug/L	0.301	6.30	30	
Chloroform	CCC	20.0	21.0	ug/L	0.711	5.10	30	
Ethylbenzene	CCC	20.0	21.7	ug/L	0.601	8.60	30	
Toluene	CCC	20.0	22.3	ug/L	1.67	11.6	30	
Vinyl Chloride	CCC	20.0	21.2	ug/L	0.282	5.80	30	
1,1,2,2-Tetrachloroethane	SPCC	20.0	19.9	ug/L	0.404	0.600	30	
1,1-Dichloroethane	SPCC	20.0	20.6	ug/L	0.654	3.10	30	
Bromoform	SPCC	20.0	19.4	ug/L	0.199	3.10	30	
Chlorobenzene	SPCC	20.0	20.2	ug/L	1.10	1.20	30	
Chloromethane	SPCC	20.0	21.3	ug/L	0.369	6.30	30	
1,1,1-Trichloroethane		20.0	21.6	ug/L	0.720	7.90	30	
1,1,2-Trichloro-1,2,2-Trifluoroethane		20.0	20.4	ug/L	0.401	2.10	30	
1,1,2-Trichloroethane		20.0	20.0	ug/L	0.250	0.100	30	
1,2,4-Trichlorobenzene		20.0	20.9	ug/L	0.925	4.60	30	
1,2-Dibromo-3-Chloropropane		20.0	18.4	ug/L	0.0698	8.00	30	
1,2-Dibromoethane		20.0	20.6	ug/L	0.246	3.00	30	
1,2-Dichlorobenzene		20.0	21.0	ug/L	1.43	4.80	30	
1,2-Dichloroethane		20.0	19.9	ug/L	0.502	0.300	30	
cis-1,2-Dichloroethene		20.0	22.2	ug/L	0.371	10.9	30	
trans-1,2-Dichloroethene		20.0	22.0	ug/L	0.356	9.80	30	
1,3-Dichlorobenzene		20.0	20.9	ug/L	1.70	4.50	30	
1,4-Dichlorobenzene		20.0	19.7	ug/L	1.68	1.70	30	
2-Butanone		20.0	16.7	ug/L	0.0566	16.7	30	
2-Hexanone		20.0	17.1	ug/L	0.0926	14.3	30	
4-Methyl-2-Pentanone		20.0	17.8	ug/L	0.0445	10.8	30	
Acetone		20.0	19.4	ug/L	0.0547	3.20	30	
Benzene		20.0	20.2	ug/L	1.28	1.10	30	
Bromodichloromethane		20.0	20.9	ug/L	0.486	4.40	30	
Bromomethane		20.0	24.8	ug/L	0.289	23.9	30	
Carbon Disulfide		20.0	19.2	ug/L	0.918	3.90	30	
Carbon Tetrachloride		20.0	21.5	ug/L	0.662	7.30	30	
Chloroethane		20.0	22.2	ug/L	0.260	11.2	30	
cis-1,3-Dichloropropene		20.0	22.3	ug/L	0.484	11.3	30	
Cyclohexane		20.0	21.3	ug/L	0.547	6.60	30	
Dibromochloromethane		20.0	20.9	ug/L	0.362	4.40	30	
Dichlorodifluoromethane		20.0	25.0	ug/L	0.706	25.2	30	
Isopropylbenzene		20.0	18.4	ug/L	1.68	7.90	30	
Methyl acetate		20.0	19.2	ug/L	0.127	4.10	30	
Methyl Tert Butyl Ether		20.0	23.6	ug/L	0.732	18.0	30	
Methylcyclohexane		20.0	21.1	ug/L	0.517	5.60	30	
Methylene Chloride		20.0	20.6	ug/L	0.341	3.00	30	

KEMRON FORMS - Modified 09/06/2007 - (ALT)
Version 1.5 PDF File ID: 919905
Report generated 11/01/2007 15:46

KEMRON Environmental Services

ALTERNATE SOURCE CALIBRATION REPORT

00073134

Login Number: L0710597 Run Date: 10/18/2007 Sample ID: WG253187-12
Instrument ID: HPMS10 Run Time: 18:23 Method: 8260B
File ID: 10M59732 Analyst: MES QC Key: STD
ICal Workgroup: WG253187 Cal ID: HPMS10 - 18-OCT-07

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Styrene		20.0	19.9	ug/L	1.12	0.300	30	
Tetrachloroethene		20.0	21.2	ug/L	0.390	5.90	30	
trans-1,3-Dichloropropene		20.0	20.2	ug/L	0.508	0.900	30	
Trichloroethene		20.0	22.1	ug/L	0.375	10.4	30	
Trichlorofluoromethane		20.0	17.1	ug/L	0.742	14.5	30	
Xylenes		60.0	66.7	ug/L	0.709	11.2	30	
m-,p-Xylene		40.0	44.2	ug/L	0.733	10.6	30	
o-Xylene		20.0	22.4	ug/L	0.684	12.2	30	
1,2-Dichloroethene		40.0	44.1	ug/L	0.364	10.3	30	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

KEMRON FORMS - Modified 09/06/2007 - (ALT)
Version 1.5 PDF File ID: 919905
Report generated 11/01/2007 15:46

KEMRON Environmental Services

ALTERNATE SOURCE CALIBRATION REPORT

00073135

Login Number: L0710597 Run Date: 10/01/2007 Sample ID: WG251532-11
Instrument ID: HPMS11 Run Time: 20:02 Method: 8260B
File ID: 11M46067 Analyst: MES QC Key: STD
ICal Workgroup: WG251532 Cal ID: HPMS11 - 01-OCT-07

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	20.0	19.5	ug/L	0.624	2.60	30	
1,2-Dichloropropane	CCC	20.0	21.3	ug/L	0.314	6.60	30	
Chloroform	CCC	20.0	20.9	ug/L	0.567	4.30	30	
Ethylbenzene	CCC	20.0	22.1	ug/L	0.582	10.4	30	
Toluene	CCC	20.0	21.7	ug/L	1.65	8.50	30	
Vinyl Chloride	CCC	20.0	19.9	ug/L	0.369	0.500	30	
1,1,2,2-Tetrachloroethane	SPCC	20.0	20.8	ug/L	0.481	3.90	30	
1,1-Dichloroethane	SPCC	20.0	20.9	ug/L	0.672	4.70	30	
Bromoform	SPCC	20.0	19.5	ug/L	0.155	2.60	30	
Chlorobenzene	SPCC	20.0	20.9	ug/L	1.03	4.30	30	
Chloromethane	SPCC	20.0	20.1	ug/L	0.450	0.700	30	
1,1,1-Trichloroethane		20.0	20.7	ug/L	0.539	3.50	30	
1,1,2-Trichloro-1,2,2-Trifluoroethane		20.0	19.8	ug/L	0.249	1.00	30	
1,1,2-Trichloroethane		20.0	22.1	ug/L	0.253	10.6	30	
1,2,4-Trichlorobenzene		20.0	21.1	ug/L	0.869	5.60	30	
1,2-Dibromo-3-Chloropropane		20.0	19.0	ug/L	0.0928	5.00	30	
1,2-Dibromoethane		20.0	20.7	ug/L	0.235	3.70	30	
1,2-Dichlorobenzene		20.0	20.8	ug/L	1.26	4.00	30	
1,2-Dichloroethane		20.0	19.7	ug/L	0.492	1.60	30	
cis-1,2-Dichloroethene		20.0	21.9	ug/L	0.286	9.50	30	
trans-1,2-Dichloroethene		20.0	20.7	ug/L	0.269	3.50	30	
1,3-Dichlorobenzene		20.0	21.5	ug/L	1.48	7.70	30	
1,4-Dichlorobenzene		20.0	21.1	ug/L	1.48	5.70	30	
2-Butanone		20.0	19.4	ug/L	0.0639	3.00	30	
2-Hexanone		20.0	18.8	ug/L	0.146	6.20	30	
4-Methyl-2-Pentanone		20.0	19.4	ug/L	0.0631	3.00	30	
Acetone		20.0	20.2	ug/L	0.0504	0.800	30	
Benzene		20.0	21.2	ug/L	1.06	6.20	30	
Bromodichloromethane		20.0	21.2	ug/L	0.405	5.90	30	
Bromomethane		20.0	24.7	ug/L	0.216	23.4	30	
Carbon Disulfide		20.0	19.2	ug/L	0.748	4.00	30	
Carbon Tetrachloride		20.0	18.5	ug/L	0.422	7.50	30	
Chloroethane		20.0	22.3	ug/L	0.275	11.3	30	
cis-1,3-Dichloropropene		20.0	21.4	ug/L	0.428	7.20	30	
Cyclohexane		20.0	19.8	ug/L	0.590	1.10	30	
Dibromochloromethane		20.0	21.3	ug/L	0.321	6.70	30	
Dichlorodifluoromethane		20.0	21.5	ug/L	0.527	7.30	30	
Isopropylbenzene		20.0	18.2	ug/L	1.64	8.90	30	
Methyl acetate		20.0	26.2	ug/L	0.168	31.2	30	*
Methyl Tert Butyl Ether		20.0	21.2	ug/L	0.647	6.20	30	
Methylcyclohexane		20.0	20.0	ug/L	0.381	0	30	
Methylene Chloride		20.0	20.3	ug/L	0.279	1.50	30	

KEMRON FORMS - Modified 09/06/2007 - (ALT)
Version 1.5 PDF File ID: 919905
Report generated 11/01/2007 15:46

KEMRON Environmental Services

ALTERNATE SOURCE CALIBRATION REPORT

00073136

Login Number: L0710597 Run Date: 10/01/2007 Sample ID: WG251532-11
Instrument ID: HPMS11 Run Time: 20:02 Method: 8260B
File ID: 11M46067 Analyst: MES QC Key: STD
ICal Workgroup: WG251532 Cal ID: HPMS11 - 01-OCT-07

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Styrene		20.0	20.3	ug/L	1.15	1.50	30	
Tetrachloroethene		20.0	19.9	ug/L	0.288	0.300	30	
trans-1,3-Dichloropropene		20.0	19.8	ug/L	0.551	0.900	30	
Trichloroethene		20.0	21.5	ug/L	0.250	7.60	30	
Trichlorofluoromethane		20.0	15.8	ug/L	0.488	21.1	30	
Xylenes		60.0	64.5	ug/L	0.699	7.40	30	
o-Xylene		20.0	21.2	ug/L	0.677	6.20	30	
m-,p-Xylene		40.0	43.2	ug/L	0.720	8.00	30	
1,2-Dichloroethene		40.0	42.6	ug/L	0.278	6.50	30	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

KEMRON FORMS - Modified 09/06/2007 - (ALT)
Version 1.5 PDF File ID: 919905
Report generated 11/01/2007 15:46

KEMRON Environmental Services

ALTERNATE SOURCE CALIBRATION REPORT

00073137

Login Number: L0710597 Run Date: 10/25/2007 Sample ID: WG253721-12
Instrument ID: HPMS6 Run Time: 11:12 Method: 8260B
File ID: 6M70256 Analyst: MES QC Key: STD
ICal Workgroup: WG253721 Cal ID: HPMS6 - 24-OCT-07

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	20.0	22.0	ug/L	0.484	9.80	30	
1,2-Dichloropropane	CCC	20.0	21.5	ug/L	0.224	7.50	30	
Chloroform	CCC	20.0	19.9	ug/L	0.612	0.400	30	
Ethylbenzene	CCC	20.0	21.5	ug/L	0.559	7.40	30	
Toluene	CCC	20.0	22.7	ug/L	1.45	13.6	30	
Vinyl Chloride	CCC	20.0	19.0	ug/L	0.365	4.90	30	
1,1,2,2-Tetrachloroethane	SPCC	20.0	19.1	ug/L	0.340	4.40	30	
1,1-Dichloroethane	SPCC	20.0	21.2	ug/L	0.505	5.80	30	
Bromoform	SPCC	20.0	17.5	ug/L	0.194	12.3	30	
Chlorobenzene	SPCC	20.0	20.1	ug/L	0.994	0.300	30	
Chloromethane	SPCC	20.0	20.1	ug/L	0.359	0.300	30	
1,1,1-Trichloroethane		20.0	20.9	ug/L	0.639	4.40	30	
1,1,2-Trichloro-1,2,2-Trifluoroethane		20.0	19.2	ug/L	0.307	4.20	30	
1,1,2-Trichloroethane		20.0	20.0	ug/L	0.217	0.100	30	
1,2,4-Trichlorobenzene		20.0	20.7	ug/L	0.992	3.50	30	
1,2-Dibromo-3-Chloropropane		20.0	19.0	ug/L	0.0753	4.80	30	
1,2-Dibromoethane		20.0	20.6	ug/L	0.228	3.10	30	
1,2-Dichlorobenzene		20.0	19.6	ug/L	1.33	1.90	30	
1,2-Dichloroethane		20.0	18.6	ug/L	0.439	6.80	30	
cis-1,2-Dichloroethene		20.0	22.4	ug/L	0.304	12.0	30	
trans-1,2-Dichloroethene		20.0	21.8	ug/L	0.281	9.20	30	
1,3-Dichlorobenzene		20.0	20.2	ug/L	1.54	1.10	30	
1,4-Dichlorobenzene		20.0	18.8	ug/L	1.53	6.20	30	
2-Butanone		20.0	19.4	ug/L	0.0506	2.80	30	
2-Hexanone		20.0	17.8	ug/L	0.0845	11.1	30	
4-Methyl-2-Pentanone		20.0	17.5	ug/L	0.0365	12.7	30	
Acetone		20.0	20.8	ug/L	0.0448	4.20	30	
Benzene		20.0	21.1	ug/L	1.05	5.30	30	
Bromodichloromethane		20.0	20.3	ug/L	0.448	1.70	30	
Bromomethane		20.0	24.6	ug/L	0.219	22.9	30	
Carbon Disulfide		20.0	17.6	ug/L	0.689	12.2	30	
Carbon Tetrachloride		20.0	20.8	ug/L	0.595	3.80	30	
Chloroethane		20.0	22.3	ug/L	0.189	11.4	30	
cis-1,3-Dichloropropene		20.0	21.9	ug/L	0.418	9.50	30	
Cyclohexane		20.0	20.7	ug/L	0.405	3.60	30	
Dibromochloromethane		20.0	19.6	ug/L	0.342	1.80	30	
Dichlorodifluoromethane		20.0	23.3	ug/L	0.592	16.6	30	
Isopropylbenzene		20.0	21.0	ug/L	1.67	5.20	30	
Methyl acetate		20.0	22.3	ug/L	0.113	11.7	30	
Methyl Tert Butyl Ether		20.0	23.7	ug/L	0.632	18.6	30	
Methylcyclohexane		20.0	21.0	ug/L	0.434	5.10	30	
Methylene Chloride		20.0	21.0	ug/L	0.276	5.20	30	

KEMRON FORMS - Modified 09/06/2007 - (ALT)
Version 1.5 PDF File ID: 919905
Report generated 11/01/2007 15:46

KEMRON Environmental Services

ALTERNATE SOURCE CALIBRATION REPORT

00073138

Login Number: L0710597 Run Date: 10/25/2007 Sample ID: WG253721-12
Instrument ID: HPMS6 Run Time: 11:12 Method: 8260B
File ID: 6M70256 Analyst: MES QC Key: STD
ICal Workgroup: WG253721 Cal ID: HPMS6 - 24-OCT-07

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Styrene		20.0	22.2	ug/L	1.11	11.2	30	
Tetrachloroethene		20.0	21.7	ug/L	0.445	8.40	30	
trans-1,3-Dichloropropene		20.0	20.0	ug/L	0.449	0.100	30	
Trichloroethene		20.0	21.5	ug/L	0.319	7.30	30	
Trichlorofluoromethane		20.0	15.8	ug/L	0.612	21.0	30	
Xylenes		60.0	64.8	ug/L	0.673	8.10	30	
m-,p-Xylene		40.0	42.6	ug/L	0.694	6.60	30	
1,2-Dichloroethene		40.0	44.3	ug/L	0.293	10.6	30	
o-Xylene		20.0	22.2	ug/L	0.651	11.1	30	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

KEMRON FORMS - Modified 09/06/2007 - (ALT)
Version 1.5 PDF File ID: 919905
Report generated 11/01/2007 15:46

KEMRON Environmental Services

ALTERNATE SOURCE CALIBRATION REPORT

00073139

Login Number: L0710597 Run Date: 10/23/2007 Sample ID: WG253480-12
Instrument ID: HPMS8 Run Time: 11:07 Method: 8260B
File ID: 8M340882 Analyst: CMS QC Key: STD
ICal Workgroup: WG253480 Cal ID: HPMS8 - 22-OCT-07

Analyte		Expected	Found	Units	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	20.0	21.6	ug/L	0.363	7.90	30	
1,2-Dichloropropane	CCC	20.0	21.7	ug/L	0.217	8.70	30	
Chloroform	CCC	20.0	20.5	ug/L	0.407	2.70	30	
Ethylbenzene	CCC	20.0	22.1	ug/L	0.439	10.6	30	
Toluene	CCC	20.0	21.5	ug/L	1.17	7.60	30	
Vinyl Chloride	CCC	20.0	22.2	ug/L	0.138	11.1	30	
1,1,2,2-Tetrachloroethane	SPCC	20.0	21.4	ug/L	0.326	6.90	30	
1,1-Dichloroethane	SPCC	20.0	21.0	ug/L	0.425	4.90	30	
Bromoform	SPCC	20.0	21.9	ug/L	0.143	9.30	30	
Chlorobenzene	SPCC	20.0	20.7	ug/L	0.823	3.30	30	
Chloromethane	SPCC	20.0	20.8	ug/L	0.232	3.80	30	
1,1,1-Trichloroethane		20.0	21.8	ug/L	0.385	9.20	30	
1,1,2-Trichloro-1,2,2-Trifluoroethane		20.0	19.8	ug/L	0.222	1.00	30	
1,1,2-Trichloroethane		20.0	22.1	ug/L	0.187	10.6	30	
1,2,4-Trichlorobenzene		20.0	20.9	ug/L	0.817	4.60	30	
1,2-Dibromo-3-Chloropropane		20.0	21.9	ug/L	0.0594	9.30	30	
1,2-Dibromoethane		20.0	21.7	ug/L	0.188	8.70	30	
1,2-Dichlorobenzene		20.0	20.2	ug/L	1.15	1.00	30	
1,2-Dichloroethane		20.0	21.3	ug/L	0.292	6.60	30	
cis-1,2-Dichloroethene		20.0	21.8	ug/L	0.246	8.90	30	
trans-1,2-Dichloroethene		20.0	21.0	ug/L	0.349	4.90	30	
1,3-Dichlorobenzene		20.0	20.5	ug/L	1.27	2.50	30	
1,4-Dichlorobenzene		20.0	19.9	ug/L	1.28	0.300	30	
2-Butanone		20.0	21.3	ug/L	0.0538	6.30	30	
2-Hexanone		20.0	19.7	ug/L	0.0477	1.50	30	
4-Methyl-2-Pentanone		20.0	20.0	ug/L	0.0413	0.100	30	
Acetone		20.0	22.3	ug/L	0.0412	11.5	30	
Benzene		20.0	19.4	ug/L	0.840	3.20	30	
Bromodichloromethane		20.0	22.6	ug/L	0.294	13.0	30	
Bromomethane		20.0	23.1	ug/L	0.180	15.6	30	
Carbon Disulfide		20.0	18.7	ug/L	0.580	6.70	30	
Carbon Tetrachloride		20.0	21.6	ug/L	0.348	8.20	30	
Chloroethane		20.0	22.3	ug/L	0.181	11.7	30	
cis-1,3-Dichloropropene		20.0	22.2	ug/L	0.330	11.0	30	
Cyclohexane		20.0	21.0	ug/L	0.388	4.80	30	
Dibromochloromethane		20.0	21.5	ug/L	0.255	7.60	30	
Dichlorodifluoromethane		20.0	24.5	ug/L	0.346	22.6	30	
Isopropylbenzene		20.0	20.7	ug/L	1.22	3.70	30	
Methyl acetate		20.0	23.4	ug/L	0.118	17.2	30	
Methyl Tert Butyl Ether		20.0	25.3	ug/L	0.478	26.3	30	
Methylcyclohexane		20.0	21.7	ug/L	0.336	8.50	30	
Methylene Chloride		20.0	20.8	ug/L	0.229	4.00	30	

KEMRON FORMS - Modified 09/06/2007 - (ALT)
Version 1.5 PDF File ID: 919905
Report generated 11/01/2007 15:46

KEMRON Environmental Services

ALTERNATE SOURCE CALIBRATION REPORT

00073140

Login Number: L0710597 Run Date: 10/23/2007 Sample ID: WG253480-12
Instrument ID: HPMS8 Run Time: 11:07 Method: 8260B
File ID: 8M340882 Analyst: CMS QC Key: STD
ICal Workgroup: WG253480 Cal ID: HPMS8 - 22-OCT-07

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Styrene		20.0	23.5	ug/L	0.872	17.4	30	
Tetrachloroethene		20.0	21.3	ug/L	0.255	6.50	30	
trans-1,3-Dichloropropene		20.0	20.7	ug/L	0.339	3.30	30	
Trichloroethene		20.0	21.9	ug/L	0.255	9.40	30	
Trichlorofluoromethane		20.0	17.3	ug/L	0.359	13.3	30	
Xylenes		60.0	66.3	ug/L	0.531	10.6	30	
m-,p-Xylene		40.0	43.9	ug/L	0.530	9.60	30	
1,2-Dichloroethene		40.0	42.8	ug/L	0.297	6.90	30	
o-Xylene		20.0	22.5	ug/L	0.533	12.5	30	

* Exceeds %D Limit

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

KEMRON FORMS - Modified 09/06/2007 - (ALT)
Version 1.5 PDF File ID: 919905
Report generated 11/01/2007 15:46

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00073141

Login Number: L0710597 Run Date: 10/25/2007 Sample ID: WG253793-02
Instrument ID: HPMS10 Run Time: 08:27 Method: 8260B
File ID: 10M59851 Analyst: MES QC Key: STD
Workgroup (AAB#): WG253794 Cal ID: HPMS10 - 18-OCT-07

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	50.0	52.1	ug/L	0.332	4.24	20	
1,2-Dichloropropane	CCC	50.0	53.0	ug/L	0.300	5.92	20	
Chloroform	CCC	50.0	52.4	ug/L	0.709	4.84	20	
Ethylbenzene	CCC	50.0	51.6	ug/L	0.572	3.26	20	
Toluene	CCC	50.0	53.3	ug/L	1.60	6.62	20	
Vinyl Chloride	CCC	50.0	47.1	ug/L	0.251	5.76	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	48.8	ug/L	0.397	2.48	40	
1,1-Dichloroethane	SPCC	50.0	51.9	ug/L	0.658	3.79	40	
Bromoform	SPCC	50.0	51.3	ug/L	0.211	2.54	40	
Chlorobenzene	SPCC	50.0	48.4	ug/L	1.05	3.11	40	
Chloromethane	SPCC	50.0	45.2	ug/L	0.314	9.54	40	
1,1,1-Trichloroethane		50.0	52.9	ug/L	0.707	5.87	40	
1,1,2-Trichloro-1,2,2-Trifluoroethane		50.0	51.9	ug/L	0.407	3.78	40	
1,1,2-Trichloroethane		50.0	49.1	ug/L	0.245	1.88	40	
1,2,4-Trichlorobenzene		50.0	50.5	ug/L	0.892	0.955	40	
1,2-Dibromo-3-Chloropropane		50.0	46.8	ug/L	0.0709	6.45	40	
1,2-Dibromoethane		50.0	52.6	ug/L	0.251	5.11	40	
1,2-Dichlorobenzene		50.0	50.1	ug/L	1.37	0.176	40	
1,2-Dichloroethane		50.0	49.7	ug/L	0.501	0.543	40	
cis-1,2-Dichloroethene		50.0	55.8	ug/L	0.374	11.6	40	
trans-1,2-Dichloroethene		50.0	55.9	ug/L	0.363	11.8	40	
1,3-Dichlorobenzene		50.0	49.5	ug/L	1.61	0.962	40	
1,4-Dichlorobenzene		50.0	47.5	ug/L	1.62	4.99	40	
2-Butanone		50.0	45.1	ug/L	0.0612	9.87	40	
2-Hexanone		50.0	47.1	ug/L	0.102	5.82	40	
4-Methyl-2-Pentanone		50.0	49.9	ug/L	0.0499	0.121	40	
Acetone		50.0	44.5	ug/L	0.0503	10.9	40	
Benzene		50.0	53.1	ug/L	1.34	6.12	40	
Bromodichloromethane		50.0	52.4	ug/L	0.488	4.77	40	
Bromomethane		50.0	54.8	ug/L	0.256	9.68	40	
Carbon Disulfide		50.0	52.4	ug/L	1.00	4.81	40	
Carbon Tetrachloride		50.0	53.2	ug/L	0.656	6.30	40	
Chloroethane		50.0	52.9	ug/L	0.247	5.90	40	
cis-1,3-Dichloropropene		50.0	57.6	ug/L	0.501	15.2	40	
Cyclohexane		50.0	55.9	ug/L	0.574	11.9	40	
Dibromochloromethane		50.0	52.8	ug/L	0.366	5.51	40	
Dichlorodifluoromethane		50.0	50.3	ug/L	0.568	0.629	40	
Isopropylbenzene		50.0	48.8	ug/L	1.77	2.37	40	
Methyl acetate		50.0	58.5	ug/L	0.155	17.0	40	
Methyl Tert Butyl Ether		50.0	55.7	ug/L	0.690	11.3	40	
Methylcyclohexane		50.0	54.9	ug/L	0.538	9.88	40	
Methylene Chloride		50.0	51.4	ug/L	0.323	2.73	40	

KEMRON FORMS - Modified 09/06/2007 - (CCV)
Version 1.5 PDF File ID: 919907
Report generated 11/01/2007 15:46

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00073142

Login Number: L0710597 Run Date: 10/25/2007 Sample ID: WG253793-02
Instrument ID: HPMS10 Run Time: 08:27 Method: 8260B
File ID: 10M59851 Analyst: MES QC Key: STD
Workgroup (AAB#): WG253794 Cal ID: HPMS10 - 18-OCT-07

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Styrene		50.0	49.1	ug/L	1.11	1.72	40	
Tetrachloroethene		50.0	51.3	ug/L	0.378	2.61	40	
trans-1,3-Dichloropropene		50.0	53.8	ug/L	0.542	7.53	40	
Trichloroethene		50.0	55.5	ug/L	0.377	11.0	40	
Trichlorofluoromethane		50.0	50.4	ug/L	0.848	0.734	40	
Xylenes		150	163	ug/L	0.695	8.80	40	
1,2-Dichloroethene		100	112	ug/L	0.368	11.7	40	
m-,p-Xylene		100	108	ug/L	0.713	7.64	40	
o-Xylene		50.0	55.6	ug/L	0.678	11.1	40	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

KEMRON FORMS - Modified 09/06/2007 - (CCV)
Version 1.5 PDF File ID: 919907
Report generated 11/01/2007 15:46

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00073143

Login Number: L0710597 Run Date: 10/26/2007 Sample ID: WG253909-02
Instrument ID: HPMS10 Run Time: 11:25 Method: 8260B
File ID: 10M59884 Analyst: MES QC Key: STD
Workgroup (AAB#): WG253910 Cal ID: HPMS10 - 18-OCT-07

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	50.0	50.8	ug/L	0.324	1.70	20	
1,2-Dichloropropane	CCC	50.0	52.3	ug/L	0.296	4.57	20	
Chloroform	CCC	50.0	52.0	ug/L	0.704	4.07	20	
Ethylbenzene	CCC	50.0	51.1	ug/L	0.566	2.18	20	
Toluene	CCC	50.0	51.6	ug/L	1.54	3.25	20	
Vinyl Chloride	CCC	50.0	44.7	ug/L	0.239	10.5	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	48.6	ug/L	0.395	2.88	40	
1,1-Dichloroethane	SPCC	50.0	51.7	ug/L	0.656	3.43	40	
Bromoform	SPCC	50.0	50.6	ug/L	0.208	1.22	40	
Chlorobenzene	SPCC	50.0	47.7	ug/L	1.03	4.70	40	
Chloromethane	SPCC	50.0	45.9	ug/L	0.318	8.21	40	
1,1,1-Trichloroethane		50.0	52.9	ug/L	0.707	5.79	40	
1,1,2-Trichloro-1,2,2-Trifluoroethane		50.0	52.1	ug/L	0.409	4.26	40	
1,1,2-Trichloroethane		50.0	47.2	ug/L	0.236	5.53	40	
1,2,4-Trichlorobenzene		50.0	52.0	ug/L	0.919	3.97	40	
1,2-Dibromo-3-Chloropropane		50.0	47.6	ug/L	0.0721	4.88	40	
1,2-Dibromoethane		50.0	50.9	ug/L	0.243	1.84	40	
1,2-Dichlorobenzene		50.0	49.7	ug/L	1.36	0.680	40	
1,2-Dichloroethane		50.0	49.2	ug/L	0.496	1.51	40	
cis-1,2-Dichloroethene		50.0	56.0	ug/L	0.375	12.0	40	
trans-1,2-Dichloroethene		50.0	55.7	ug/L	0.361	11.4	40	
1,3-Dichlorobenzene		50.0	49.5	ug/L	1.61	0.935	40	
1,4-Dichlorobenzene		50.0	47.1	ug/L	1.61	5.73	40	
2-Butanone		50.0	49.4	ug/L	0.0671	1.17	40	
2-Hexanone		50.0	47.9	ug/L	0.103	4.24	40	
4-Methyl-2-Pentanone		50.0	54.6	ug/L	0.0546	9.23	40	
Acetone		50.0	47.8	ug/L	0.0540	4.47	40	
Benzene		50.0	50.0	ug/L	1.26	0.0406	40	
Bromodichloromethane		50.0	52.4	ug/L	0.488	4.71	40	
Bromomethane		50.0	53.1	ug/L	0.247	6.11	40	
Carbon Disulfide		50.0	50.3	ug/L	0.961	0.582	40	
Carbon Tetrachloride		50.0	53.1	ug/L	0.655	6.23	40	
Chloroethane		50.0	52.9	ug/L	0.247	5.85	40	
cis-1,3-Dichloropropene		50.0	57.6	ug/L	0.501	15.2	40	
Cyclohexane		50.0	54.8	ug/L	0.562	9.56	40	
Dibromochloromethane		50.0	51.2	ug/L	0.356	2.47	40	
Dichlorodifluoromethane		50.0	50.0	ug/L	0.565	0.0346	40	
Isopropylbenzene		50.0	48.0	ug/L	1.74	4.01	40	
Methyl acetate		50.0	54.7	ug/L	0.145	9.37	40	
Methyl Tert Butyl Ether		50.0	54.5	ug/L	0.676	9.05	40	
Methylcyclohexane		50.0	54.7	ug/L	0.536	9.32	40	
Methylene Chloride		50.0	50.7	ug/L	0.319	1.39	40	

KEMRON FORMS - Modified 09/06/2007 - (CCV)
Version 1.5 PDF File ID: 919907
Report generated 11/01/2007 15:46

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00073144

Login Number: L0710597 Run Date: 10/26/2007 Sample ID: WG253909-02
Instrument ID: HPMS10 Run Time: 11:25 Method: 8260B
File ID: 10M59884 Analyst: MES QC Key: STD
Workgroup (AAB#): WG253910 Cal ID: HPMS10 - 18-OCT-07

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Styrene		50.0	47.7	ug/L	1.08	4.55	40	
Tetrachloroethene		50.0	50.2	ug/L	0.370	0.466	40	
trans-1,3-Dichloropropene		50.0	52.0	ug/L	0.524	3.91	40	
Trichloroethene		50.0	55.1	ug/L	0.374	10.2	40	
Trichlorofluoromethane		50.0	50.7	ug/L	0.854	1.43	40	
Xylenes		150	158	ug/L	0.674	5.58	40	
1,2-Dichloroethene		100	112	ug/L	0.368	11.7	40	
m-,p-Xylene		100	105	ug/L	0.693	4.58	40	
o-Xylene		50.0	53.8	ug/L	0.656	7.57	40	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

KEMRON FORMS - Modified 09/06/2007 - (CCV)
Version 1.5 PDF File ID: 919907
Report generated 11/01/2007 15:46

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00073145

Login Number: L0710597 Run Date: 10/27/2007 Sample ID: WG254005-02
Instrument ID: HPMS10 Run Time: 09:47 Method: 8260B
File ID: 10M59911 Analyst: MES QC Key: STD
Workgroup (AAB#): WG254006 Cal ID: HPMS10 - 18-OCT-07

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	50.0	49.1	ug/L	0.312	1.87	20	
1,2-Dichloropropane	CCC	50.0	52.0	ug/L	0.294	3.91	20	
Chloroform	CCC	50.0	51.6	ug/L	0.698	3.17	20	
Ethylbenzene	CCC	50.0	49.0	ug/L	0.543	1.91	20	
Toluene	CCC	50.0	50.7	ug/L	1.52	1.32	20	
Vinyl Chloride	CCC	50.0	49.8	ug/L	0.266	0.411	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	48.7	ug/L	0.397	2.50	40	
1,1-Dichloroethane	SPCC	50.0	50.7	ug/L	0.643	1.35	40	
Bromoform	SPCC	50.0	53.6	ug/L	0.221	7.12	40	
Chlorobenzene	SPCC	50.0	46.2	ug/L	1.00	7.63	40	
Chloromethane	SPCC	50.0	46.4	ug/L	0.321	7.29	40	
1,1,1-Trichloroethane		50.0	51.9	ug/L	0.693	3.74	40	
1,1,2-Trichloro-1,2,2-Trifluoroethane		50.0	50.8	ug/L	0.399	1.67	40	
1,1,2-Trichloroethane		50.0	48.9	ug/L	0.244	2.16	40	
1,2,4-Trichlorobenzene		50.0	49.3	ug/L	0.872	1.31	40	
1,2-Dibromo-3-Chloropropane		50.0	44.6	ug/L	0.0677	10.8	40	
1,2-Dibromoethane		50.0	52.6	ug/L	0.251	5.21	40	
1,2-Dichlorobenzene		50.0	48.3	ug/L	1.32	3.32	40	
1,2-Dichloroethane		50.0	52.0	ug/L	0.523	3.90	40	
cis-1,2-Dichloroethene		50.0	54.6	ug/L	0.366	9.21	40	
trans-1,2-Dichloroethene		50.0	53.5	ug/L	0.347	6.95	40	
1,3-Dichlorobenzene		50.0	46.7	ug/L	1.52	6.62	40	
1,4-Dichlorobenzene		50.0	45.3	ug/L	1.55	9.34	40	
2-Butanone		50.0	43.0	ug/L	0.0585	13.9	40	
2-Hexanone		50.0	46.9	ug/L	0.101	6.20	40	
4-Methyl-2-Pentanone		50.0	50.6	ug/L	0.0506	1.21	40	
Acetone		50.0	41.2	ug/L	0.0466	17.6	40	
Benzene		50.0	50.6	ug/L	1.28	1.10	40	
Bromodichloromethane		50.0	53.2	ug/L	0.495	6.33	40	
Bromomethane		50.0	53.4	ug/L	0.249	6.88	40	
Carbon Disulfide		50.0	48.2	ug/L	0.920	3.67	40	
Carbon Tetrachloride		50.0	51.8	ug/L	0.639	3.63	40	
Chloroethane		50.0	52.6	ug/L	0.246	5.25	40	
cis-1,3-Dichloropropene		50.0	57.7	ug/L	0.502	15.4	40	
Cyclohexane		50.0	52.1	ug/L	0.535	4.28	40	
Dibromochloromethane		50.0	53.3	ug/L	0.370	6.66	40	
Dichlorodifluoromethane		50.0	52.1	ug/L	0.588	4.13	40	
Isopropylbenzene		50.0	46.5	ug/L	1.69	6.99	40	
Methyl acetate		50.0	61.1	ug/L	0.162	22.2	40	
Methyl Tert Butyl Ether		50.0	58.0	ug/L	0.719	16.0	40	
Methylcyclohexane		50.0	51.3	ug/L	0.502	2.54	40	
Methylene Chloride		50.0	51.5	ug/L	0.324	2.98	40	

KEMRON FORMS - Modified 09/06/2007 - (CCV)
Version 1.5 PDF File ID: 919907
Report generated 11/01/2007 15:46

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00073146

Login Number: L0710597 Run Date: 10/27/2007 Sample ID: WG254005-02
Instrument ID: HPMS10 Run Time: 09:47 Method: 8260B
File ID: 10M59911 Analyst: MES QC Key: STD
Workgroup (AAB#): WG254006 Cal ID: HPMS10 - 18-OCT-07

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Styrene		50.0	47.8	ug/L	1.08	4.42	40	
Tetrachloroethene		50.0	48.2	ug/L	0.356	3.58	40	
trans-1,3-Dichloropropene		50.0	53.9	ug/L	0.543	7.85	40	
Trichloroethene		50.0	52.1	ug/L	0.354	4.25	40	
Trichlorofluoromethane		50.0	50.8	ug/L	0.856	1.69	40	
Xylenes		150	155	ug/L	0.663	3.26	40	
1,2-Dichloroethene		100	108	ug/L	0.356	8.08	40	
m-,p-Xylene		100	101	ug/L	0.670	1.15	40	
o-Xylene		50.0	53.7	ug/L	0.655	7.47	40	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

KEMRON FORMS - Modified 09/06/2007 - (CCV)
Version 1.5 PDF File ID: 919907
Report generated 11/01/2007 15:46

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00073147

Login Number: L0710597 Run Date: 10/24/2007 Sample ID: WG253676-02
Instrument ID: HPMS11 Run Time: 09:42 Method: 8260B
File ID: 11M46851 Analyst: MES QC Key: STD
Workgroup (AAB#): WG253678 Cal ID: HPMS11 - 01-OCT-07

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	50.0	51.0	ug/L	0.650	2.01	20	
1,2-Dichloropropane	CCC	50.0	50.7	ug/L	0.299	1.43	20	
Chloroform	CCC	50.0	52.5	ug/L	0.571	5.02	20	
Ethylbenzene	CCC	50.0	50.5	ug/L	0.532	0.980	20	
Toluene	CCC	50.0	50.1	ug/L	1.52	0.222	20	
Vinyl Chloride	CCC	50.0	54.2	ug/L	0.384	8.46	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	47.2	ug/L	0.437	5.63	40	
1,1-Dichloroethane	SPCC	50.0	52.8	ug/L	0.677	5.55	40	
Bromoform	SPCC	50.0	50.2	ug/L	0.160	0.456	40	
Chlorobenzene	SPCC	50.0	47.4	ug/L	0.937	5.11	40	
Chloromethane	SPCC	50.0	52.5	ug/L	0.469	5.04	40	
1,1,1-Trichloroethane		50.0	53.4	ug/L	0.556	6.87	40	
1,1,2-Trichloro-1,2,2-Trifluoroethane		50.0	58.4	ug/L	0.294	16.9	40	
1,1,2-Trichloroethane		50.0	49.8	ug/L	0.228	0.323	40	
1,2,4-Trichlorobenzene		50.0	50.7	ug/L	0.834	1.33	40	
1,2-Dibromo-3-Chloropropane		50.0	47.5	ug/L	0.0928	5.00	40	
1,2-Dibromoethane		50.0	49.3	ug/L	0.224	1.32	40	
1,2-Dichlorobenzene		50.0	48.8	ug/L	1.18	2.38	40	
1,2-Dichloroethane		50.0	49.3	ug/L	0.494	1.32	40	
cis-1,2-Dichloroethene		50.0	52.8	ug/L	0.276	5.65	40	
trans-1,2-Dichloroethene		50.0	52.9	ug/L	0.275	5.85	40	
1,3-Dichlorobenzene		50.0	49.8	ug/L	1.37	0.352	40	
1,4-Dichlorobenzene		50.0	49.3	ug/L	1.38	1.48	40	
2-Butanone		50.0	47.6	ug/L	0.0627	4.73	40	
2-Hexanone		50.0	47.3	ug/L	0.147	5.33	40	
4-Methyl-2-Pentanone		50.0	47.1	ug/L	0.0614	5.73	40	
Acetone		50.0	48.3	ug/L	0.0483	3.36	40	
Benzene		50.0	51.0	ug/L	1.02	1.98	40	
Bromodichloromethane		50.0	52.0	ug/L	0.397	3.99	40	
Bromomethane		50.0	59.1	ug/L	0.207	18.1	40	
Carbon Disulfide		50.0	53.5	ug/L	0.834	7.02	40	
Carbon Tetrachloride		50.0	49.4	ug/L	0.446	1.13	40	
Chloroethane		50.0	56.4	ug/L	0.279	12.9	40	
cis-1,3-Dichloropropene		50.0	51.3	ug/L	0.410	2.70	40	
Cyclohexane		50.0	54.3	ug/L	0.647	8.57	40	
Dibromochloromethane		50.0	51.9	ug/L	0.313	3.76	40	
Dichlorodifluoromethane		50.0	51.0	ug/L	0.501	1.98	40	
Isopropylbenzene		50.0	46.5	ug/L	1.69	6.99	40	
Methyl acetate		50.0	59.4	ug/L	0.152	18.8	40	
Methyl Tert Butyl Ether		50.0	50.6	ug/L	0.617	1.24	40	
Methylcyclohexane		50.0	54.1	ug/L	0.412	8.28	40	
Methylene Chloride		50.0	49.1	ug/L	0.261	1.86	40	

KEMRON FORMS - Modified 09/06/2007 - (CCV)
Version 1.5 PDF File ID: 919907
Report generated 11/01/2007 15:46

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00073148

Login Number: L0710597 Run Date: 10/24/2007 Sample ID: WG253676-02
Instrument ID: HPMS11 Run Time: 09:42 Method: 8260B
File ID: 11M46851 Analyst: MES QC Key: STD
Workgroup (AAB#): WG253678 Cal ID: HPMS11 - 01-OCT-07

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Styrene		50.0	46.3	ug/L	1.06	7.38	40	
Tetrachloroethene		50.0	46.8	ug/L	0.269	6.45	40	
trans-1,3-Dichloropropene		50.0	50.7	ug/L	0.563	1.31	40	
Trichloroethene		50.0	51.7	ug/L	0.241	3.38	40	
Trichlorofluoromethane		50.0	54.5	ug/L	0.661	8.91	40	
Xylenes		150	150	ug/L	0.651	0.0155	40	
1,2-Dichloroethene		100	106	ug/L	0.276	5.75	40	
m-,p-Xylene		100	100	ug/L	0.669	0.265	40	
o-Xylene		50.0	49.7	ug/L	0.634	0.577	40	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

KEMRON FORMS - Modified 09/06/2007 - (CCV)
Version 1.5 PDF File ID: 919907
Report generated 11/01/2007 15:46

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00073149

Login Number: L0710597 Run Date: 10/25/2007 Sample ID: WG253818-02
Instrument ID: HPMS6 Run Time: 10:08 Method: 8260B
File ID: 6M70254 Analyst: MES QC Key: STD
Workgroup (AAB#): WG253819 Cal ID: HPMS6 - 24-OCT-07

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	50.0	51.6	ug/L	0.456	3.23	20	
1,2-Dichloropropane	CCC	50.0	50.8	ug/L	0.212	1.66	20	
Chloroform	CCC	50.0	46.9	ug/L	0.576	6.26	20	
Ethylbenzene	CCC	50.0	53.5	ug/L	0.556	6.92	20	
Toluene	CCC	50.0	54.6	ug/L	1.40	9.13	20	
Vinyl Chloride	CCC	50.0	45.2	ug/L	0.316	9.63	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	44.1	ug/L	0.314	11.8	40	
1,1-Dichloroethane	SPCC	50.0	50.5	ug/L	0.482	0.933	40	
Bromoform	SPCC	50.0	44.3	ug/L	0.196	11.5	40	
Chlorobenzene	SPCC	50.0	48.6	ug/L	0.963	2.76	40	
Chloromethane	SPCC	50.0	50.0	ug/L	0.311	0.0362	40	
1,1,1-Trichloroethane		50.0	50.1	ug/L	0.614	0.196	40	
1,1,2-Trichloro-1,2,2-Trifluoroethane		50.0	49.0	ug/L	0.314	2.01	40	
1,1,2-Trichloroethane		50.0	45.5	ug/L	0.197	9.04	40	
1,2,4-Trichlorobenzene		50.0	50.5	ug/L	0.967	0.905	40	
1,2-Dibromo-3-Chloropropane		50.0	45.9	ug/L	0.0726	8.12	40	
1,2-Dibromoethane		50.0	47.6	ug/L	0.211	4.79	40	
1,2-Dichlorobenzene		50.0	47.5	ug/L	1.29	5.08	40	
1,2-Dichloroethane		50.0	42.7	ug/L	0.403	14.5	40	
cis-1,2-Dichloroethene		50.0	52.5	ug/L	0.285	5.04	40	
trans-1,2-Dichloroethene		50.0	53.4	ug/L	0.275	6.84	40	
1,3-Dichlorobenzene		50.0	49.8	ug/L	1.52	0.377	40	
1,4-Dichlorobenzene		50.0	46.3	ug/L	1.51	7.35	40	
2-Butanone		50.0	42.6	ug/L	0.0443	14.8	40	
2-Hexanone		50.0	44.2	ug/L	0.0840	11.5	40	
4-Methyl-2-Pentanone		50.0	43.7	ug/L	0.0366	12.5	40	
Acetone		50.0	46.7	ug/L	0.0402	6.54	40	
Benzene		50.0	51.4	ug/L	1.03	2.88	40	
Bromodichloromethane		50.0	46.6	ug/L	0.410	6.78	40	
Bromomethane		50.0	51.6	ug/L	0.184	3.28	40	
Carbon Disulfide		50.0	53.6	ug/L	0.819	7.23	40	
Carbon Tetrachloride		50.0	49.5	ug/L	0.567	1.01	40	
Chloroethane		50.0	51.8	ug/L	0.176	3.67	40	
cis-1,3-Dichloropropene		50.0	52.1	ug/L	0.398	4.30	40	
Cyclohexane		50.0	54.8	ug/L	0.429	9.63	40	
Dibromochloromethane		50.0	47.4	ug/L	0.331	5.11	40	
Dichlorodifluoromethane		50.0	46.5	ug/L	0.473	6.97	40	
Isopropylbenzene		50.0	56.1	ug/L	1.78	12.2	40	
Methyl acetate		50.0	46.3	ug/L	0.0937	7.38	40	
Methyl Tert Butyl Ether		50.0	48.8	ug/L	0.520	2.32	40	
Methylcyclohexane		50.0	54.6	ug/L	0.450	9.13	40	
Methylene Chloride		50.0	48.5	ug/L	0.246	2.94	40	

KEMRON FORMS - Modified 09/06/2007 - (CCV)
Version 1.5 PDF File ID: 919907
Report generated 11/01/2007 15:46

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00073150

Login Number: L0710597 Run Date: 10/25/2007 Sample ID: WG253818-02
Instrument ID: HPMS6 Run Time: 10:08 Method: 8260B
File ID: 6M70254 Analyst: MES QC Key: STD
Workgroup (AAB#): WG253819 Cal ID: HPMS6 - 24-OCT-07

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Styrene		50.0	54.0	ug/L	1.08	8.10	40	
Tetrachloroethene		50.0	53.4	ug/L	0.438	6.77	40	
trans-1,3-Dichloropropene		50.0	51.1	ug/L	0.459	2.19	40	
Trichloroethene		50.0	51.5	ug/L	0.306	2.94	40	
Trichlorofluoromethane		50.0	44.5	ug/L	0.689	11.0	40	
Xylenes		150	162	ug/L	0.671	7.90	40	
1,2-Dichloroethene		100	106	ug/L	0.280	5.94	40	
m-,p-Xylene		100	107	ug/L	0.695	6.73	40	
o-Xylene		50.0	55.1	ug/L	0.646	10.2	40	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

KEMRON FORMS - Modified 09/06/2007 - (CCV)
Version 1.5 PDF File ID: 919907
Report generated 11/01/2007 15:46

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00073151

Login Number: L0710597 Run Date: 10/26/2007 Sample ID: WG253918-02
Instrument ID: HPMS6 Run Time: 10:25 Method: 8260B
File ID: 6M70287 Analyst: MES QC Key: STD
Workgroup (AAB#): WG253919 Cal ID: HPMS6 - 24-OCT-07

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	50.0	50.4	ug/L	0.445	0.761	20	
1,2-Dichloropropane	CCC	50.0	51.4	ug/L	0.214	2.82	20	
Chloroform	CCC	50.0	47.6	ug/L	0.586	4.76	20	
Ethylbenzene	CCC	50.0	51.0	ug/L	0.531	2.01	20	
Toluene	CCC	50.0	52.5	ug/L	1.34	5.06	20	
Vinyl Chloride	CCC	50.0	44.9	ug/L	0.323	10.1	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	47.3	ug/L	0.336	5.33	40	
1,1-Dichloroethane	SPCC	50.0	50.4	ug/L	0.481	0.851	40	
Bromoform	SPCC	50.0	49.2	ug/L	0.218	1.67	40	
Chlorobenzene	SPCC	50.0	47.6	ug/L	0.943	4.78	40	
Chloromethane	SPCC	50.0	44.8	ug/L	0.303	10.3	40	
1,1,1-Trichloroethane		50.0	49.9	ug/L	0.611	0.174	40	
1,1,2-Trichloro-1,2,2-Trifluoroethane		50.0	48.4	ug/L	0.310	3.24	40	
1,1,2-Trichloroethane		50.0	48.5	ug/L	0.210	2.96	40	
1,2,4-Trichlorobenzene		50.0	51.4	ug/L	0.986	2.87	40	
1,2-Dibromo-3-Chloropropane		50.0	52.1	ug/L	0.0823	4.13	40	
1,2-Dibromoethane		50.0	51.1	ug/L	0.226	2.21	40	
1,2-Dichlorobenzene		50.0	47.4	ug/L	1.29	5.11	40	
1,2-Dichloroethane		50.0	46.2	ug/L	0.435	7.57	40	
cis-1,2-Dichloroethene		50.0	53.0	ug/L	0.288	6.10	40	
trans-1,2-Dichloroethene		50.0	52.5	ug/L	0.270	4.96	40	
1,3-Dichlorobenzene		50.0	48.1	ug/L	1.46	3.78	40	
1,4-Dichlorobenzene		50.0	45.3	ug/L	1.48	9.35	40	
2-Butanone		50.0	51.0	ug/L	0.0531	2.01	40	
2-Hexanone		50.0	51.8	ug/L	0.0984	3.64	40	
4-Methyl-2-Pentanone		50.0	52.5	ug/L	0.0440	5.02	40	
Acetone		50.0	53.5	ug/L	0.0460	7.06	40	
Benzene		50.0	51.1	ug/L	1.02	2.15	40	
Bromodichloromethane		50.0	49.0	ug/L	0.431	1.97	40	
Bromomethane		50.0	52.8	ug/L	0.188	5.52	40	
Carbon Disulfide		50.0	50.4	ug/L	0.807	0.717	40	
Carbon Tetrachloride		50.0	49.8	ug/L	0.571	0.341	40	
Chloroethane		50.0	49.8	ug/L	0.169	0.435	40	
cis-1,3-Dichloropropene		50.0	54.8	ug/L	0.418	9.66	40	
Cyclohexane		50.0	54.1	ug/L	0.423	8.12	40	
Dibromochloromethane		50.0	50.5	ug/L	0.352	0.934	40	
Dichlorodifluoromethane		50.0	42.8	ug/L	0.435	14.3	40	
Isopropylbenzene		50.0	54.0	ug/L	1.71	7.96	40	
Methyl acetate		50.0	54.5	ug/L	0.110	8.92	40	
Methyl Tert Butyl Ether		50.0	57.0	ug/L	0.607	13.9	40	
Methylcyclohexane		50.0	55.2	ug/L	0.456	10.5	40	
Methylene Chloride		50.0	49.5	ug/L	0.250	1.10	40	

KEMRON FORMS - Modified 09/06/2007 - (CCV)
Version 1.5 PDF File ID: 919907
Report generated 11/01/2007 15:46

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00073152

Login Number: L0710597 Run Date: 10/26/2007 Sample ID: WG253918-02
Instrument ID: HPMS6 Run Time: 10:25 Method: 8260B
File ID: 6M70287 Analyst: MES QC Key: STD
Workgroup (AAB#): WG253919 Cal ID: HPMS6 - 24-OCT-07

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Styrene		50.0	53.4	ug/L	1.06	6.78	40	
Tetrachloroethene		50.0	51.0	ug/L	0.418	1.91	40	
trans-1,3-Dichloropropene		50.0	53.3	ug/L	0.479	6.55	40	
Trichloroethene		50.0	51.5	ug/L	0.306	2.92	40	
Trichlorofluoromethane		50.0	44.4	ug/L	0.687	11.2	40	
Xylenes		150	156	ug/L	0.650	4.24	40	
1,2-Dichloroethene		100	106	ug/L	0.279	5.53	40	
m-,p-Xylene		100	102	ug/L	0.667	2.40	40	
o-Xylene		50.0	54.0	ug/L	0.633	7.93	40	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

KEMRON FORMS - Modified 09/06/2007 - (CCV)
Version 1.5 PDF File ID: 919907
Report generated 11/01/2007 15:46

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00073153

Login Number: L0710597 Run Date: 10/29/2007 Sample ID: WG254047-02
Instrument ID: HPMS8 Run Time: 08:31 Method: 8260B
File ID: 8M341021 Analyst: CMS QC Key: STD
Workgroup (AAB#): WG254048 Cal ID: HPMS8 - 22-OCT-07

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
1,1-Dichloroethene	CCC	50.0	56.9	ug/L	0.383	13.8	20	
1,2-Dichloropropane	CCC	50.0	51.9	ug/L	0.207	3.86	20	
Chloroform	CCC	50.0	50.2	ug/L	0.398	0.330	20	
Ethylbenzene	CCC	50.0	50.5	ug/L	0.401	0.934	20	
Toluene	CCC	50.0	51.9	ug/L	1.13	3.85	20	
Vinyl Chloride	CCC	50.0	54.9	ug/L	0.136	9.75	20	
1,1,2,2-Tetrachloroethane	SPCC	50.0	49.8	ug/L	0.304	0.335	40	
1,1-Dichloroethane	SPCC	50.0	53.5	ug/L	0.434	6.93	40	
Bromoform	SPCC	50.0	54.5	ug/L	0.142	8.90	40	
Chlorobenzene	SPCC	50.0	47.9	ug/L	0.762	4.28	40	
Chloromethane	SPCC	50.0	48.0	ug/L	0.214	4.07	40	
1,1,1-Trichloroethane		50.0	54.7	ug/L	0.386	9.37	40	
1,1,2-Trichloro-1,2,2-Trifluoroethane		50.0	52.0	ug/L	0.233	3.95	40	
1,1,2-Trichloroethane		50.0	50.2	ug/L	0.169	0.360	40	
1,2,4-Trichlorobenzene		50.0	47.5	ug/L	0.742	4.99	40	
1,2-Dibromo-3-Chloropropane		50.0	47.9	ug/L	0.0521	4.14	40	
1,2-Dibromoethane		50.0	50.6	ug/L	0.175	1.26	40	
1,2-Dichlorobenzene		50.0	47.5	ug/L	1.08	5.08	40	
1,2-Dichloroethane		50.0	49.6	ug/L	0.272	0.718	40	
cis-1,2-Dichloroethene		50.0	55.4	ug/L	0.250	10.8	40	
trans-1,2-Dichloroethene		50.0	54.5	ug/L	0.362	8.96	40	
1,3-Dichlorobenzene		50.0	49.8	ug/L	1.24	0.366	40	
1,4-Dichlorobenzene		50.0	47.8	ug/L	1.23	4.46	40	
2-Butanone		50.0	48.2	ug/L	0.0489	3.51	40	
2-Hexanone		50.0	44.4	ug/L	0.0430	11.3	40	
4-Methyl-2-Pentanone		50.0	45.7	ug/L	0.0378	8.66	40	
Acetone		50.0	52.9	ug/L	0.0390	5.73	40	
Benzene		50.0	48.9	ug/L	0.849	2.15	40	
Bromodichloromethane		50.0	52.4	ug/L	0.273	4.85	40	
Bromomethane		50.0	47.3	ug/L	0.148	5.33	40	
Carbon Disulfide		50.0	55.3	ug/L	0.688	10.7	40	
Carbon Tetrachloride		50.0	55.0	ug/L	0.354	9.93	40	
Chloroethane		50.0	52.2	ug/L	0.169	4.50	40	
cis-1,3-Dichloropropene		50.0	52.6	ug/L	0.313	5.23	40	
Cyclohexane		50.0	54.3	ug/L	0.402	8.55	40	
Dibromochloromethane		50.0	52.5	ug/L	0.249	5.09	40	
Dichlorodifluoromethane		50.0	53.5	ug/L	0.302	7.01	40	
Isopropylbenzene		50.0	52.7	ug/L	1.24	5.35	40	
Methyl acetate		50.0	54.4	ug/L	0.109	8.76	40	
Methyl Tert Butyl Ether		50.0	51.2	ug/L	0.387	2.32	40	
Methylcyclohexane		50.0	54.1	ug/L	0.335	8.20	40	
Methylene Chloride		50.0	52.3	ug/L	0.218	4.64	40	

KEMRON FORMS - Modified 09/06/2007 - (CCV)
Version 1.5 PDF File ID: 919907
Report generated 11/01/2007 15:46

KEMRON Environmental Services

CONTINUING CALIBRATION VERIFICATION (CCV)

00073154

Login Number: L0710597 Run Date: 10/29/2007 Sample ID: WG254047-02
Instrument ID: HPMS8 Run Time: 08:31 Method: 8260B
File ID: 8M341021 Analyst: CMS QC Key: STD
Workgroup (AAB#): WG254048 Cal ID: HPMS8 - 22-OCT-07

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Styrene		50.0	54.7	ug/L	0.812	9.41	40	
Tetrachloroethene		50.0	53.2	ug/L	0.255	6.33	40	
trans-1,3-Dichloropropene		50.0	52.0	ug/L	0.341	3.96	40	
Trichloroethene		50.0	54.6	ug/L	0.254	9.13	40	
Trichlorofluoromethane		50.0	48.9	ug/L	0.405	2.13	40	
Xylenes		150	152	ug/L	0.490	1.62	40	
1,2-Dichloroethene		100	110	ug/L	0.306	9.87	40	
m-,p-Xylene		100	99.8	ug/L	0.482	0.167	40	
o-Xylene		50.0	52.6	ug/L	0.499	5.19	40	

* Exceeds %D Criteria

CCC Calibration Check Compounds
SPCC System Performance Check Compounds

KEMRON FORMS - Modified 09/06/2007 - (CCV)
Version 1.5 PDF File ID: 919907
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO CCV)

Login Number: L0710597
Instrument ID: HPMS11
Workgroup (AAB#): WG253678

CCV Number: WG253676-02
CAL ID: HPMS11-01-OCT-07
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG253676-02	NA	NA	367509	701985	1053473
Upper Limit	NA	NA	735018	1403970	2106946
Lower Limit	NA	NA	183755	350993	526737
L0710597-09	1.00	01	295377	578896	868996
L0710597-14	1.00	01	319109	629460	941752
WG253678-01	1.00	01	341476	665863	982937
WG253678-02	1.00	01	357133	677099	998823
WG253678-03	1.00	01	355489	672208	996951
WG253678-04	1.00	01	271454	532147	787697

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

KEMRON FORMS - Modified 02/20/2007
Version 1.3 PDF File ID: 919908
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO CCV)

Login Number: L0710597
Instrument ID: HPMS10
Workgroup (AAB#): WG253794

CCV Number: WG253793-02
CAL ID: HPMS10-18-OCT-07
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG253793-02	NA	NA	413338	728620	873658
Upper Limit	NA	NA	826676	1457240	1747316
Lower Limit	NA	NA	206669	364310	436829
L0710597-05	1.00	01	233388	434887	520337
L0710597-06	1.00	01	240872	441354	516462
L0710597-08	1.00	01	244389	455475	528912
WG253794-01	1.00	01	327196	585923	726288
WG253794-02	1.00	01	385292	646316	769398
WG253794-03	1.00	01	393152	679167	813970

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

KEMRON FORMS - Modified 02/20/2007
Version 1.3 PDF File ID: 919908
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO CCV)

Login Number: L0710597
Instrument ID: HPMS6
Workgroup (AAB#): WG253819

CCV Number: WG253818-02
CAL ID: HPMS6-24-OCT-07
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG253818-02	NA	NA	636419	1002505	1263315
Upper Limit	NA	NA	1272838	2005010	2526630
Lower Limit	NA	NA	318210	501253	631658
L0710597-11	1.00	01	555335	973862	1134457
WG253819-01	1.00	01	567585	969230	1221346
WG253819-02	1.00	01	612883	980932	1212336
WG253819-03	1.00	01	632208	1016891	1256022

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

KEMRON FORMS - Modified 02/20/2007
Version 1.3 PDF File ID: 919908
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO CCV)

00073158

Login Number: L0710597
Instrument ID: HPMS10
Workgroup (AAB#): WG253910

CCV Number: WG253909-02
CAL ID: HPMS10-18-OCT-07
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG253909-02	NA	NA	397038	709486	830125
Upper Limit	NA	NA	794076	1418972	1660250
Lower Limit	NA	NA	198519	354743	415063
L0710597-08	25.0	DL01	347104	636357	763652
L0710597-10	1.00	01	243348	442775	525803
L0710597-12	2.00	DL01	242435	437604	523063
L0710597-13	1.00	01	238476	428573	512510
WG253910-01	1.00	01	343656	613467	751048
WG253910-02	1.00	01	375224	652059	768829
WG253910-03	1.00	01	387862	662120	774582

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

KEMRON FORMS - Modified 02/20/2007
Version 1.3 PDF File ID: 919908
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO CCV)

Login Number: L0710597
Instrument ID: HPMS6
Workgroup (AAB#): WG253919

CCV Number: WG253918-02
CAL ID: HPMS6-24-OCT-07
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG253918-02	NA	NA	608482	933029	1116006
Upper Limit	NA	NA	1216964	1866058	2232012
Lower Limit	NA	NA	304241	466515	558003
L0710597-11	100	DL01	528747	892814	1098922
WG253919-01	1.00	01	508438	854790	1056611
WG253919-02	1.00	01	572925	889589	1047848
WG253919-03	1.00	01	593272	925214	1108449
WG253919-04	1.00	01	434493	728121	885031

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

KEMRON FORMS - Modified 02/20/2007
Version 1.3 PDF File ID: 919908
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO CCV)

Login Number: L0710597
Instrument ID: HPMS10
Workgroup (AAB#): WG254006

CCV Number: WG254005-02
CAL ID: HPMS10-18-OCT-07
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG254005-02	NA	NA	413238	705438	829307
Upper Limit	NA	NA	826476	1410876	1658614
Lower Limit	NA	NA	206619	352719	414654
L0710597-07	1.00	02	276469	500289	594367
L0710597-09	5.00	DL01	238751	429308	508320
WG254006-01	1.00	01	342368	607071	730405
WG254006-02	1.00	01	377408	623479	725085
WG254006-03	1.00	01	367276	622980	739807

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

KEMRON FORMS - Modified 02/20/2007
Version 1.3 PDF File ID: 919908
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO CCV)

Login Number: L0710597
Instrument ID: HPMS8
Workgroup (AAB#): WG254048

CCV Number: WG254047-02
CAL ID: HPMS8-22-OCT-07
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG254047-02	NA	NA	283286	522699	670084
Upper Limit	NA	NA	566572	1045398	1340168
Lower Limit	NA	NA	141643	261350	335042
L0710597-11	500	DL02	251513	449418	574269
WG254048-01	1.00	01	263637	462695	584133
WG254048-02	1.00	01	270957	474037	583178
WG254048-03	1.00	01	266851	471037	590197
WG254048-04	1.00	01	235423	422502	538607
WG254048-05	1.00	01	247668	439871	551853
WG254048-06	1.00	01	255687	451961	562616

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

KEMRON FORMS - Modified 02/20/2007
Version 1.3 PDF File ID: 919908
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO CCV)

Login Number: L0710597
Instrument ID: HPMS11
Workgroup (AAB#): WG253678

CCV Number: WG253676-02
CAL ID: HPMS11-01-OCT-07
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG253676-02	NA	NA	16.81	14.01	10.38
Upper Limit	NA	NA	17.31	14.51	10.88
Lower Limit	NA	NA	16.31	13.51	9.88
L0710597-09	1.00	01	16.812	14.01	10.381
L0710597-14	1.00	01	16.812	14.01	10.381
WG253678-01	1.00	01	16.812	14.01	10.381
WG253678-02	1.00	01	16.812	14.01	10.381
WG253678-03	1.00	01	16.812	14.01	10.381
WG253678-04	1.00	01	16.812	14.01	10.381

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

KEMRON FORMS - Modified 02/20/2007
Version 1.3 PDF File ID: 919910
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO CCV)

Login Number: L0710597
Instrument ID: HPMS10
Workgroup (AAB#): WG253794

CCV Number: WG253793-02
CAL ID: HPMS10-18-OCT-07
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG253793-02	NA	NA	17.74	14.73	10.85
Upper Limit	NA	NA	18.24	15.23	11.35
Lower Limit	NA	NA	17.24	14.23	10.35
L0710597-05	1.00	01	17.74	14.73	10.85
L0710597-06	1.00	01	17.74	14.73	10.85
L0710597-08	1.00	01	17.74	14.73	10.85
WG253794-01	1.00	01	17.74	14.73	10.85
WG253794-02	1.00	01	17.74	14.73	10.85
WG253794-03	1.00	01	17.74	14.73	10.85

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

KEMRON FORMS - Modified 02/20/2007
Version 1.3 PDF File ID: 919910
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO CCV)

Login Number: L0710597
Instrument ID: HPMS6
Workgroup (AAB#): WG253819

CCV Number: WG253818-02
CAL ID: HPMS6-24-OCT-07
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG253818-02	NA	NA	19.06	15.5	11.01
Upper Limit	NA	NA	19.56	16	11.51
Lower Limit	NA	NA	18.56	15	10.51
L0710597-11	1.00	01	19.05	15.5	11.01
WG253819-01	1.00	01	19.05	15.5	11.02
WG253819-02	1.00	01	19.05	15.49	11.01
WG253819-03	1.00	01	19.05	15.49	11.02

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

KEMRON FORMS - Modified 02/20/2007
Version 1.3 PDF File ID: 919910
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO CCV)

Login Number: L0710597
Instrument ID: HPMS10
Workgroup (AAB#): WG253910

CCV Number: WG253909-02
CAL ID: HPMS10-18-OCT-07
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG253909-02	NA	NA	17.74	14.73	10.85
Upper Limit	NA	NA	18.24	15.23	11.35
Lower Limit	NA	NA	17.24	14.23	10.35
L0710597-08	25.0	DL01	17.73	14.73	10.85
L0710597-10	1.00	01	17.74	14.72	10.86
L0710597-12	2.00	DL01	17.75	14.73	10.85
L0710597-13	1.00	01	17.75	14.73	10.85
WG253910-01	1.00	01	17.74	14.73	10.85
WG253910-02	1.00	01	17.74	14.73	10.85
WG253910-03	1.00	01	17.74	14.72	10.86

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

KEMRON FORMS - Modified 02/20/2007
Version 1.3 PDF File ID: 919910
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO CCV)

Login Number: L0710597
Instrument ID: HPMS6
Workgroup (AAB#): WG253919

CCV Number: WG253918-02
CAL ID: HPMS6-24-OCT-07
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG253918-02	NA	NA	19.05	15.5	11.02
Upper Limit	NA	NA	19.55	16	11.52
Lower Limit	NA	NA	18.55	15	10.52
L0710597-11	100	DL01	19.05	15.5	11.02
WG253919-01	1.00	01	19.05	15.49	11.02
WG253919-02	1.00	01	19.05	15.5	11.01
WG253919-03	1.00	01	19.05	15.5	11.01
WG253919-04	1.00	01	19.05	15.5	11.01

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

KEMRON FORMS - Modified 02/20/2007
Version 1.3 PDF File ID: 919910
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO CCV)

Login Number: L0710597
Instrument ID: HPMS10
Workgroup (AAB#): WG254006

CCV Number: WG254005-02
CAL ID: HPMS10-18-OCT-07
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG254005-02	NA	NA	17.74	14.73	10.85
Upper Limit	NA	NA	18.24	15.23	11.35
Lower Limit	NA	NA	17.24	14.23	10.35
L0710597-07	1.00	02	17.74	14.73	10.85
L0710597-09	5.00	DL01	17.74	14.73	10.85
WG254006-01	1.00	01	17.73	14.73	10.85
WG254006-02	1.00	01	17.74	14.73	10.85
WG254006-03	1.00	01	17.73	14.73	10.85

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

KEMRON FORMS - Modified 02/20/2007
Version 1.3 PDF File ID: 919910
Report generated 11/01/2007 15:46

KEMRON ENVIRONMENTAL SERVICES
INTERNAL STANDARD RETENTION TIME SUMMARY
(COMPARED TO CCV)

Login Number: L0710597
Instrument ID: HPMS8
Workgroup (AAB#): WG254048

CCV Number: WG254047-02
CAL ID: HPMS8-22-OCT-07
Matrix: WATER

Sample Number	Dilution	Tag	IS-1	IS-2	IS-3
WG254047-02	NA	NA	17.6	14.59	10.71
Upper Limit	NA	NA	18.1	15.09	11.21
Lower Limit	NA	NA	17.1	14.09	10.21
L0710597-11	500	DL02	17.6	14.58	10.71
WG254048-01	1.00	01	17.6	14.58	10.71
WG254048-02	1.00	01	17.6	14.58	10.71
WG254048-03	1.00	01	17.6	14.58	10.71
WG254048-04	1.00	01	17.6	14.58	10.71
WG254048-05	1.00	01	17.6	14.59	10.71
WG254048-06	1.00	01	17.6	14.59	10.71

IS-1 - 1,4-Dichlorobenzene-d4
IS-2 - Chlorobenzene-d5
IS-3 - Fluorobenzene

Underline = Response outside limits

KEMRON FORMS - Modified 02/20/2007
Version 1.3 PDF File ID: 919910
Report generated 11/01/2007 15:46

2.2 General Chemistry Data

2.2.1 Percent Solids Data

2.2.1.1 Raw Data

Example Percent Solids Calculations

1.0 Calculating the percent solids of a sample.

$$\%Solids = \frac{WT3 - WT1}{WT2 - WT1} \times F$$

Where:

WT1 = Weight, in grams, of the empty container	1.30 g
WT2 = Weight, in grams, of the container and wet sample	21.274 g
WT3 = Weight, in grams, of the container and dried sample	5.21 g
F = Factor to get units as percent weight	100
%Solids = Percent solids present in sample.	19.58%

2.0 Calculating the percent moisture of a sample.

% Moisture = 100 - % Solids from 1.0 calculation

PERCENT SOLIDS

SOP K0003 Rev: 9

Balance: OHAUS EP2102/Other

Sample	Empty Pan WT 1	WET WT2	DRY WT 3A	WET WT 3B	DRY WT 3C
10-423-03	1.27	21.90	20.985		
04	1.27	20.83	19.99		
10-597-02	1.28	23.77	21.12		
03	1.25	26.31	23.42		
04	1.26	33.38	28.68		
10-487-01	1.23	17.77	~~16~~ 16.02		
02	1.25	21.47	19.03		
03	1.25	21.13	18.12		
04	1.26	23.16	19.71		
07	1.28	24.96	20.74		
08	1.27	15.50	13.59		
09	1.24	21.01	17.20		
10	1.23	18.13	15.39		
11	1.22	26.08	24.11		
12	1.24	19.90	18.16		
13	1.22	21.38	19.11		
14	1.26	24.13	19.48		
15	1.25	16.06	14.52		
16	1.25	15.46	14.16		
17	1.28	24.30	20.98		
Duplicate: 10-423-03	1.28	21.86	20.98		

Analyst: Justin Hesson

ADT (on): 10/23/07 @1720

ADT (off): dm 10/24/0958

ADT (off): _____

DCN#71531

Donna Hesson

Approved: October 26, 2007

KEMRON ENVIRONMENTAL SERVICES
PERCENT SOLID REPORT

Workgroup (AAB#): WG253661 Run Date: 10/23/2007
Method: D2216-90 Run Time: 17:20
Analyst: DIH

SAMPLE NUMBER	Pan WT.	Int WT.	Fnl WT.	% Solid	% Moist	UNITS
L0710423-03	1.270	21.90	20.95	95.40		%
L0710423-04	1.270	20.83	19.99	95.71		%
L0710487-01	1.230	17.77	16.02	89.42		%
L0710487-02	1.250	21.47	19.03	87.93		%
L0710487-03	1.250	21.13	18.12	84.86		%
L0710487-04	1.260	23.16	19.71	84.25		%
L0710487-07	1.280	24.96	20.74	82.18		%
L0710487-08	1.270	15.50	13.59	86.58		%
L0710487-09	1.240	21.01	17.20	80.73		%
L0710487-10	1.230	18.13	15.39	83.79		%
L0710487-11	1.220	26.08	24.11	92.08		%
L0710487-12	1.240	19.90	18.16	90.68		%
L0710487-13	1.220	21.38	19.11	88.74		%
L0710487-14	1.260	24.13	19.48	79.67		%
L0710487-15	1.250	16.06	14.52	89.60		%
L0710487-16	1.250	15.46	14.16	90.85		%
L0710487-17	1.280	24.30	20.98	85.58		%
L0710597-02	1.280	23.77	21.12	88.22		%
L0710597-03	1.250	26.31	23.42	88.47		%
L0710597-04	1.260	33.38	28.68	85.37		%
WG253661-01	1.270	21.90	20.95	95.40	4.605	%
WG253661-02	1.280	21.86	20.98	95.72	4.276	%

KEMRON FORMS - Modified 02/25/2007
Version 1.2
Report generated 10/24/2007 10:42

Donna Hesson
Approved: October 26, 2007

2.2.2 Perchlorate Data

2.2.2.1 Summary Data

LABORATORY REPORT

L0710597

00073177

11/02/07 15:18

Submitted By

KEMRON Environmental Services
156 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: Shaw E & I, Inc.
ABB Lummus Biulding
3010 Briarpark Drive Suite 4N
Houston, TX 77042
Attention: Larry Duty

Account Number: 2773
Work ID: LHAAP

P.O. Number: 322255 OP

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
LHSMW01-102207	L0710597-01	314.0	1	23-OCT-07
04SB08 (0-0.5)	L0710597-02	314.0	2	23-OCT-07
04SB08 (4-5)	L0710597-03	314.0	10	23-OCT-07
04SB08 (9-10)	L0710597-04	314.0	50	23-OCT-07

Report Number: **L0710597**
Report Date : **November 2, 2007**

00073178

Sample Number: **L0710597-01**
Client ID: **LHSMW01-102207**
Matrix: **Water**
Workgroup Number: **WG254202**
Collect Date: **10/22/2007 10:20**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **314.0**
Analytical Method: **314.0**
Analyst: **DSF**
Dilution: **1**
Units: **ug/L**

Instrument: **IC1**
Prep Date: **10/29/2007 13:18**
Cal Date: **10/23/2007 12:32**
Run Date: **10/29/2007 13:18**
File ID: **I11029071318.14**

Analyte	CAS. Number	Result	Qual	PQL	SDL
Perchlorate	**14797-73-0**		**U**	**1.00**	**0.500**

U Not detected at or above adjusted sample detection limit

Report Number: **L0710597**
Report Date : **November 2, 2007**

00073179

Sample Number: **L0710597-02**
Client ID: **04SB08 (0-0.5)**
Matrix: **Soil**
Workgroup Number: **WG254325**
Collect Date: **10/22/2007 11:00**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **314.0**
Analytical Method: **314.0**
Analyst: **DSF**
Dilution: **2**
Units: **ug/kg**

Instrument: **IC1**
Prep Date: **10/30/2007 08:00**
Cal Date: **10/31/2007 10:03**
Run Date: **10/31/2007 13:07**
File ID: **I11031071307.15**

Analyte	CAS. Number	Result	Qual	PQL	SDL
Perchlorate	**14797-73-0**	**1680**		**20.0**	**10.0**

Report Number: **L0710597**
Report Date : **November 2, 2007**

00073180

Sample Number: **L0710597-03**
Client ID: **04SB08 (4-5)**
Matrix: **Soil**
Workgroup Number: **WG254325**
Collect Date: **10/22/2007 11:25**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **314.0**
Analytical Method: **314.0**
Analyst: **DSF**
Dilution: **10**
Units: **ug/kg**

Instrument: **IC1**
Prep Date: **10/30/2007 08:00**
Cal Date: **10/31/2007 10:03**
Run Date: **10/31/2007 13:27**
File ID: **I11031071327.16**

Analyte	CAS. Number	Result	Qual	PQL	SDL
Perchlorate	**14797-73-0**	**4750**		**100**	**50.0**

Report Number: **L0710597**
Report Date : **November 2, 2007**

00073181

Sample Number: **L0710597-04**
Client ID: **04SB08 (9-10)**
Matrix: **Soil**
Workgroup Number: **WG254325**
Collect Date: **10/22/2007 12:45**
Sample Tag: **DL01**

PrePrep Method: **NONE**
Prep Method: **314.0**
Analytical Method: **314.0**
Analyst: **DSF**
Dilution: **50**
Units: **ug/kg**

Instrument: **IC1**
Prep Date: **10/30/2007 08:00**
Cal Date: **10/31/2007 10:03**
Run Date: **10/31/2007 14:55**
File ID: **I11031071455.19**

Analyte	CAS. Number	Result	Qual	PQL	SDL
Perchlorate	**14797-73-0**	**25600**		**500**	**250**

2.2.2.2 QC Summary Data

The concentrations (ppm) of the calibration standards and the resulting area counts are used to determine the equation of a linear or quadratic plot.
The slope and y-intercept of that line are used to calculate the quantity of the analyzed unkown samples.
Amount(ppm) = [(slope)(area count of unknown) + y-intercept](dilution)
(The slope is the amt/area also identified as the CF or calibration factor)

KEMRON ENVIRONMENTAL SERVICES

Semivolatile Sample Extract Log Sheet

Parameter: 314 Matrix: 7
SOP# IC02 Rev. # 4
Analyst: DSF Date/Time Extracted: 10/30/07 08:00
Spike/Surrogate analyst: DSF Witness: JWR
Surrogate #:
Spike # A: STD 20008 Spike # B:
Ext Solvent: Lot#:
Ext Solvent: Lot#:
Ext Disk: Lot#:

Extraction Work Group: WG254325
Analytical Work Group: WG254325
Run I.D.: 1302715

Reagent: Lot #
Reagent: Lot #
Other: Lot#:

Color Code
T = Transparent
C = Colored
O = Opaque

	Sample ID	Test Code	pH	Initial Wt / Vol	Amount Surrogate	Amount Spike	Final Volume	Extract Color	Comments
1	L0710597-02			20.01			200ml		
2	-03			20.00					
3	-04			20.01					
4	Blank			20.00					
5	LCS			20.00					
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

DSF 10/30/07

Reviewed by: [illegible] 11/1/07

00073185

KEMRON Environmental Services

Instrument Run Log

Instrument: IC1 Dataset: 102907 CLO4 IC1.SEQ

Analyst1: DSF Analyst2: NA

Method: CLO4 SOP: IC2 Rev: 4

Maintenance Log ID: 21488

Column 1 ID: AS16-4MM Column 2 ID: NA

Workgroups: WG254202

Internal STD: NA Surrogate STD: NA Calibration STD STD20008

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	I11029070853.01	CLO4 @ 100 ppb	1	1		10/29/07 08:53
2	I11029070913.02	CLO4 @ 50 ppb	1	1		10/29/07 09:13
3	I11029070934.03	CLO4 @ 25 ppb	1	1		10/29/07 09:34
4	I11029070954.04	CLO4 @ 10 ppb	1	1		10/29/07 09:54
5	I11029071015.05	CLO4 @ 4 ppb	1	1		10/29/07 10:15
6	I11029071035.06	CLO4 @ 1 ppb	1	1		10/29/07 10:35
7	I11029071055.07	CLO4 ALT @ 25 ppb	1	1		10/29/07 10:55
8	I11029071116.08	ELUENT	1	1		10/29/07 11:16
9	I11029071136.09	MCT \#4 (@25 ppb)	1	1		10/29/07 11:36
10	I11029071157.10	MCT \#5 (@25 ppb)	1	1		10/29/07 11:57
11	I11029071217.11	CCV (1 ppb) CLO4	1	1		10/29/07 12:17
12	I11029071237.12	WG254202-01 BLANK	1	1		10/29/07 12:37
13	I11029071258.13	WG254202-02 LCS (25 ppb)	1	1		10/29/07 12:58
14	I11029071318.14	L0710597-01 1/10	1	10		10/29/07 13:18
15	I11029071339.15	L0710596-03 1/2 RS	1	2		10/29/07 13:39
16	I11029071359.16	L0710596-04 1/2 DS	1	2		10/29/07 13:59
17	I11029071419.17	L0710596-06	1	1		10/29/07 14:19
18	I11029071440.18	L0710596-13	1	1		10/29/07 14:40
19	I11029071500.19	L0710643-01 1/3	1	3		10/29/07 15:00
20	I11029071521.20	L0710643-02 1/3 REF	1	3		10/29/07 15:21
21	I11029071541.21	WG254202-04 DUP 643-02 1/3	1	3		10/29/07 15:41
22	I11029071602.22	CCV (25 ppb) CLO4	1	1		10/29/07 16:02
23	I11029071622.23	WG254202-05 MS 1/3 643-02	1	3		10/29/07 16:22
24	I11029071642.24	WG254202-06 MSD 1/3 643-02	1	3		10/29/07 16:42
25	I11029071703.25	L0710596-06 RR 1/15	1	15		10/29/07 17:03
26	I11029071723.26	CCV (100 ppb) CLO4	1	1		10/29/07 17:23

Comments

Seq.	Rerun	Dil.	Reason	Analytes
14		10		
	Sample analyzed at a dilution only due to high conductivity reading.			
15		2		
	Sample analyzed at a dilution only due to high conductivity reading.			
16		2		
	Sample analyzed at a dilution only due to high conductivity reading.			

Page: 1 Approved: 30-OCT-07

00073186

KEMRON Environmental Services

Instrument Run Log

Instrument: IC1 Dataset: 102907 CLO4 IC1.SEQ

Analyst1: DSF Analyst2: NA

Method: CLO4 SOP: IC2 Rev: 4

Maintenance Log ID: 21488

Column 1 ID: AS16-4MM Column 2 ID: NA

Workgroups: WG254202

Internal STD: NA Surrogate STD: NA STD20008

Comments

Seq.	Rerun	Dil.	Reason	Analytes
17	X	15	Over Calibration Range	Perchlorate
19		3		
	Sample analyzed at a dilution only due to high conductivity reading.			
20		3		
	Sample analyzed at a dilution only due to high conductivity reading.			

Page: 2 Approved: 30-OCT-07

00073187

KEMRON Environmental Services

Instrument Run Log

Instrument: IC1 Dataset: 103107 CLO4 IC1.SEQ
Analyst1: DSF Analyst2: NA
Method: CLO4 SOP: IC2 Rev: 4

Maintenance Log ID: 21510

Column 1 ID: AS16-4MM Column 2 ID: NA

Workgroups: WG254325

Internal STD: NA Surrogate STD: NA Calibration STD STD20008

Comments: L0710597 samples were soil extractions.
LCS/LCS DUP was used instead of MS/MSD due to difficulty in filtering enough volume for the MS/MSD.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	I11031070821.01	CLO4 @ 100 ppb	1	1		10/31/07 08:21
2	I11031070841.02	CLO4 @ 50 ppb	1	1		10/31/07 08:41
3	I11031070902.03	CLO4 @ 25 ppb	1	1		10/31/07 09:02
4	I11031070922.04	CLO4 @ 10 ppb	1	1		10/31/07 09:22
5	I11031070942.05	CLO4 @ 4 ppb	1	1		10/31/07 09:42
6	I11031071003.06	CLO4 @ 1 ppb	1	1		10/31/07 10:03
7	I11031071023.07	CLO4 ALT @ 25 ppb	1	1		10/31/07 10:23
8	I11031071044.08	ELUENT	1	1		10/31/07 10:44
9	I11031071104.09	MCT \#1 (@25 ppb)	1	1		10/31/07 11:04
10	I11031071125.10	MCT \#2 (@25 ppb)	1	1		10/31/07 11:25
11	I11031071145.11	CCV (1 ppb) CLO4	1	1		10/31/07 11:45
12	I11031071205.12	WG254325-01 BLANK	7	1		10/31/07 12:05
13	I11031071226.13	WG254325-02 LCS (25 ppb)	7	1		10/31/07 12:26
14	I11031071246.14	WG254325-03 LCS DUP	7	1		10/31/07 12:46
15	I11031071307.15	L0710597-02 1/2	7	2		10/31/07 13:07
16	I11031071327.16	L0710597-03 1/10 REF	7	10		10/31/07 13:27
17	I11031071347.17	WG254325-05 DUP 597-03 1/10	7	10		10/31/07 13:47
18	I11031071408.18	L0710597-04 1/25 (NR)	7	25		10/31/07 14:08
19	I11031071455.19	L0710597-04 1/50	7	50		10/31/07 14:55
20	I11031071515.20	CCV (25 ppb) CLO4	1	1		10/31/07 15:15

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 1 Approved: 01-NOV-07

00073188

KEMRON Environmental Services
Data Checklist

Date: 29-OCT-2007
Analyst: DSF
Analyst: NA
Method: CLO4
Instrument: IC1
Curve Workgroup: NA
Runlog ID: 19015
Analytical Workgroups: L0710597-01, L0710596, L0710643

ANALYTICAL	
System Performance Check	X
DFTPP (MS)	NA
Endrin/DDT breakdown (8081/MS)	NA
Pentachlorophenol/benzidine tailing (MS)	NA
Eluent check (IC)/system pressure (HPLC)	X
Window standard (FID)	NA
Initial Calibration	X
Average RF	NA
Linear regression or higher order curve	X
Alternate source standard (ICV) % Difference	X
Continuing Calibration (CCV)	X
% D/% Drift	X
Minimum response factors (MS)	NA
Continuing calibration blank (CCB) (IC)	NA
Special standards	NA
Blanks	X
TCL hits	X
Surrogate recoveries	NA
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	NA
MS/MSD/Sample duplicates	X
Recoveries	X
%RPD	X
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	NA
Library searches (MS)	NA
Calculations & correct factors	X
Compounds above calibration range	X
Reruns	X
Manual integrations	X
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	X
Check for completeness	X
Primary Reviewer	DSF
SUPERVISORY/SECONDARY REVIEW	
Check for compliance with method and project specific requirements	X
Check the completeness/accuracy of reported information	X
Data qualifiers	X
Secondary Reviewer	MDC

Primary Reviewer: 30-OCT-2007 — Debra S. Frederick

Secondary Reviewer: 30-OCT-2007 — Michael Cochran

Generated: OCT-30-2007 12:31:54

00073189

KEMRON Environmental Services
Data Checklist

Date: 31-OCT-2007
Analyst: DSF
Analyst: NA
Method: CLO4
Instrument: IC1
Curve Workgroup: NA
Runlog ID: 19045
Analytical Workgroups: L0710597

ANALYTICAL	
System Performance Check	X
DFTPP (MS)	NA
Endrin/DDT breakdown (8081/MS)	NA
Pentachlorophenol/benzidine tailing (MS)	NA
Eluent check (IC)/system pressure (HPLC)	X
Window standard (FID)	NA
Initial Calibration	X
Average RF	NA
Linear regression or higher order curve	X
Alternate source standard (ICV) % Difference	X
Continuing Calibration (CCV)	X
% D/% Drift	X
Minimum response factors (MS)	NA
Continuing calibration blank (CCB) (IC)	NA
Special standards	NA
Blanks	X
TCL hits	X
Surrogate recoveries	NA
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	NA
MS/MSD/Sample duplicates	X
Recoveries	NA
%RPD	NA
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	NA
Library searches (MS)	NA
Calculations & correct factors	X
Compounds above calibration range	X
Reruns	X
Manual integrations	X
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	X
Check for completeness	X
Primary Reviewer	DSF
SUPERVISORY/SECONDARY REVIEW	
Check for compliance with method and project specific requirements	X
Check the completeness/accuracy of reported information	X
Data qualifiers	X
Secondary Reviewer	MDC

Primary Reviewer: 31-OCT-2007 — Debra S. Frederick

Secondary Reviewer: 01-NOV-2007 — Michael Cochran

Generated: NOV-01-2007 09:08:29

KEMRON Environmental Services
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

00073190

Analytical Method: 314.0 AAB#: WG254325
Login Number: L0710597

Client ID	Date Collected	Date Received	Date Extracted	Max Hold Time Ext.	Time Held Ext.	Date Analyzed	Max Hold Time Anal	Time Held Anal.	Q
04SB08 (9-10)	10/22/07	10/23/07	10/31/07	28	9.09	10/31/07	28	9.09	
04SB08 (4-5)	10/22/07	10/23/07	10/31/07	28	9.08	10/31/07	28	9.08	
04SB08 (0-0.5)	10/22/07	10/23/07	10/31/07	28	9.09	10/31/07	28	9.09	

* EXT = SEE PROJECT QAPP REQUIREMENTS
*ANAL = SEE PROJECT QAPP REQUIREMENTS

KEMRON FORMS - Modified 11/20/2006
Version 1.5 PDF File ID: 920899
Report generated 11/01/2007 09:22

KEMRON Environmental Services
HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

00073191

Analytical Method: 314.0 AAB#: WG254202
Login Number: L0710597

Client ID	Date Collected	Date Received	Date Extracted	Max Hold Time Ext.	Time Held Ext.	Date Analyzed	Max Hold Time Anal	Time Held Anal.	Q
LHSMW01-102207	10/22/07	10/23/07	10/29/07	28	7.12	10/29/07	28	7.12	

* EXT = SEE PROJECT QAPP REQUIREMENTS
*ANAL = SEE PROJECT QAPP REQUIREMENTS

KEMRON FORMS - Modified 11/20/2006
Version 1.5 PDF File ID: 920899
Report generated 11/01/2007 09:22

METHOD BLANK SUMMARY

Login Number: L0710597
Blank File ID: I11029071237.12
Prep Date: 10/29/07 12:37
Analyzed Date: 10/29/07 12:37
Analyst: DSF

Work Group: WG254202
Blank Sample ID: WG254202-01
Instrument ID: IC1
Method: 314.0

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG254202-02	I11029071258.13	10/29/07 12:58	01
LHSMW01-102207	L0710597-01	I11029071318.14	10/29/07 13:18	DL01
DUP	WG254202-04	I11029071541.21	10/29/07 15:41	DL01

METHOD BLANK SUMMARY

Login Number: L0710597
Blank File ID: I11031071205.12
Prep Date: 10/31/07 12:05
Analyzed Date: 10/31/07 12:05
Analyst: DSF

Work Group: WG254325
Blank Sample ID: WG254325-01
Instrument ID: IC1
Method: 314.0

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG254325-02	I11031071226.13	10/31/07 12:26	01
LCS2	WG254325-03	I11031071246.14	10/31/07 12:46	01
04SB08 (0-0.5)	L0710597-02	I11031071307.15	10/31/07 13:07	DL01
04SB08 (4-5)	L0710597-03	I11031071327.16	10/31/07 13:27	DL01
DUP	WG254325-05	I11031071347.17	10/31/07 13:47	DL01
04SB08 (9-10)	L0710597-04	I11031071455.19	10/31/07 14:55	DL01

KEMRON Environmental Services

METHOD BLANK REPORT

00073194

Login Number: L0710597 Prep Date: 10/29/07 12:37 Sample ID: WG254202-01
Instrument ID: IC1 Run Date: 10/29/07 12:37 Prep Method: 314.0
File ID: I11029071237.12 Analyst: DSF Method: 314.0
Workgroup (AAB#): WG254202 Matrix: Water Units: ug/L
Contract #: DACA56-94-D-0020 Cal ID: IC1-23-OCT-07

Analytes	SDL	PQL	Concentration	Dilution	Qualifier
Perchlorate	0.500	1.00	0.500	1	U

SDL Method Detection Limit
PQL Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* Analyte concentration > RL

KEMRON FORMS - Modified 12/07/2006
Version 1.5 PDF File ID: 920901
Report generated 11/01/2007 09:22

KEMRON Environmental Services

METHOD BLANK REPORT

00073195

Login Number: L0710597 Prep Date: 10/31/07 12:05 Sample ID: WG254325-01
Instrument ID: IC1 Run Date: 10/31/07 12:05 Prep Method: 314.0
File ID: I11031071205.12 Analyst: DSF Method: 314.0
Workgroup (AAB#): WG254325 Matrix: Soil Units: ug/kg
Contract #: DACA56-94-D-0020 Cal ID: IC1 -

Analytes	SDL	PQL	Concentration	Dilution	Qualifier
Perchlorate	5.00	10.0	5.00	1	U

SDL Method Detection Limit
PQL Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* Analyte concentration > RL

KEMRON FORMS - Modified 12/07/2006
Version 1.5 PDF File ID: 920901
Report generated 11/01/2007 09:22

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00073196

Login Number: L0710597 Run Date: 10/29/2007 Sample ID: WG254202-02
Instrument ID: IC1 Run Time: 12:58 Prep Method: 314.0
File ID: I11029071258.13 Analyst: DSF Method: 314.0
Workgroup (AAB#): WG254202 Matrix: Water Units: ug/L
QC Key: STD Lot#: STD20008 Cal ID: IC1-23-OCT-07

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	25.0	23.9	95.6	85 - 115	

KEMRON FORMS - Modified 09/06/2007
Version 1.5 PDF File ID: 920902
Report generated 11/01/2007 09:23

KEMRON Environmental Services

LABORATORY CONTROL SAMPLE (LCS)

00073197

Login Number: L0710597 Analyst: DSF Prep Method: 314.0
Instrument ID: IC1 Matrix: Soil Method: 314.0
Workgroup (AAB#): WG254325 Units: ug/kg
QC Key: STD Lot #: STD20008

Sample ID: WG254325-02 LCS File ID: I11031071226.13 Run Date: 10/31/2007 12:26
Sample ID: WG254325-03 LCS2 File ID: I11031071246.14 Run Date: 10/31/2007 12:46

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Perchlorate	250	251	101	250	257	103	2.33	85 - 115	25	

KEMRON FORMS - Modified 02/08/2007
Version 1.5 PDF File ID: 922171
Report generated 11/01/2007 09:23

KEMRON Environmental Services

DUPLICATE (DUP)

00073198

Sample Ref: L0710597-03 Cal ID: IC1 - Worknum: WG254325
Instrument ID: IC1 Method: 314
Sample ID: WG254325-04 File ID: I11031071327.16 Dil: 10 Matrix: SOLID
Duplicate ID: WG254325-05 File ID: I11031071347.17 Dil: 10 Units: ug/kg

Analyte	Sample	Duplicate	RPD	RPD Limit	Q
Perchlorate	4750	4690	1.22	25	

FAILS RPD LIMIT

NOTE: This is an internal quality control sample.

KEMRON FORMS - Modified 03/06/2006
Version 1.5 PDF File ID: 922172
Report generated 11/01/2007 09:22

KEMRON
ENVIRONMENTAL SERVICES

Conductivity Probe
Calibration Check:
1412/1410 µs/cm

Perchlorate Conductivity Check

Working MCT Level:
967 µs/cm

Sample	Conductivity (µs/cm)	Pretreatment or Dilution Needed
L0710598-01	6070, 728	1/10 Dil. for Conductivity
L0710596-03	1261, 662	1/2 " "
" -04	1265, 662	1/2 " "
" -06	336	
" -13	6.0	
L0710643-01	2190, 766	1/3 Dil. for Conductivity
" -02	2160, 765	1/3 " "

ASF
Analyst

10/29/07 1030
Date/Time

DCN#71622

KEMRON
ENVIRONMENTAL SERVICES

Conductivity Probe
Calibration Check:
1412/1410 µs/cm

Perchlorate Conductivity Check

Working MCT Level:
147.4 µs/cm

Sample	Conductivity (µs/cm)	Pretreatment or Dilution Needed
L0710597-02	12.5	
-03	45.8	
-04	15.0	

DSF
Analyst

10/30/07 08:30
Date/Time

DCN#71641

3.0 Attachments

Kemron Environmental Services
Analyst Listing
November 2, 2007

AJF - AMANDA J. FICKIESEN	ALB - ANNIE L. BROWN	AML - ANTHONY M. LONG
ARA - ADRIAN R. ACHTERMANN	ASP - AARON S. PETRIE	BRG - BRENDA R. GREGORY
CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS	CEB - CHAD E. BARNES
CLC - CHRYS L. CRAWFORD	CLW - CHARISSA L. WINTERS	CM - CHARLIE MARTIN
CMS - CRYSTAL M. STEPHENS	CPD - CHAD P. DAVIS	CSH - CHRIS S. HILL
DD - DIANE M. DENNIS	DDE - DEBRA D. ELLIOTT	DEL - DON E. LIGHTFRITZ
DEV - DAVID E. VANDENBERG	DGB - DOUGLAS G. BUTCHER	DIH - DEANNA I. HESSON
DLB - DAVID L. BUMGARNER	DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH
DR - DEANNA ROBERTS	DRP - DAVE R. PITZER	DSF - DEBRA S. FREDERICK
DST - DENNIS S. TEPE	ECL - ERIC C. LAWSON	ED - EMILY E. DECKER
ERE - ERIN R. ELDER	FJB - FRANCES J. BOLDEN	HAV - HEMA VILASAGAR
HJR - HOLLY J. REED	JAB - JUANITA A. BECKER	JAL - JOHN A. LENT
JBK - JEREMY B. KINNEY	JCO - JOE C. OWENS	JDH - JUSTIN D. HESSON
JKP - JACQUELINE K. PARSONS	JKT - JANE K. THOMPSON	JWR - JOHN W. RICHARDS
JWS - JACK W. SHEAVES	JYH - JI Y. HU	KCZ - KEVIN C. ZUMBRO
KEB - KATHRYN E. BARNES	KHR - KIM H. RHODES	KJW - KATIE J. WIEFERICH
KRA - KATHY R. ALBERTSON	KRV - KATHRINE R. VICKERS	LKN - LINDA K. NEDEFF
LSB - LESLIE S. BUCINA	MDA - MIKE D. ALBERTSON	MDC - MICHAEL D. COCHRAN
MES - MARY E. SCHILLING	MKZ - MARILYN K. ZUMBRO	MLR - MARY L. ROCHOTTE
MMB - MAREN M. BEERY	MRT - MICHELLE R. TAYLOR	MSW - MATT S. WILSON
NJB - NATALIE J. BOOTH	PJM - PAUL J. MILLER	RAH - ROY A. HALSTEAD
RB - ROBERT BUCHANAN	REK - ROBERT E. KYER	RLF - RACHEL L. FRYE
RLK - ROBIN L. KLINGER	RNP - RICK N. PETTY	RWC - RODNEY W. CAMPBELL
SLM - STEPHANIE L. MOSSBURG	SLP - SHERI L. PFALZGRAF	SMH - SHAUNA M. HYDE
TDH - TRICIA D. HUCK	TMB - TIFFANY M. BAILEY	TMM - TAMMY M. MORRIS
VC - VICKI COLLIER	WFM - WALTER F. MARTIN	

KEMRON Environmental Services

List of Valid Qualifiers

November 02, 2007

Qualkey: STD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte present in method blank
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
FL	Free Liquid
I	Semiquantitative result (out of instrument calibration range)
J	The analyte was positively identified, but the quantitation was below the RL
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
L	Sample reporting limits elevated due to matrix interference
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit
ND,L	Not detected; sample reporting limit (RL) elevated due to interference
ND,S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria fail. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Undetected; the concentration is below the reported MDL.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

*****Special Notes for Organic Analytes**

1. Acrolein and acrylonitrile by method 624 are semi-quantitative screens only.
2. 1,2-Diphenylhydrazine is unstable and is reported as azobenzene.
3. N-nitrosodiphenylamine cannot be separated from diphenylamine.
4. 3-Methylphenol and 4-Methylphenol are unresolvable compounds.
5. m-Xylene and p-Xylene are unresolvable compounds.
6. The reporting limits for Appendix II/IX compounds by method 8270 are based on EPA estimated PQLs referenced in 40 CFR Part 264, Appendix IX. They are not always achievable for every compound an are matrix dependent.

Chain of Custody

NO. 10304

Shaw® Shaw Environmental & Infrastructure, Inc.
3010 Briarpark Drive, Suite 400
Houston, TX 77042
(713) 996-4400

Laboratory Name: Kemron
Address: 154 Starlite Drive Marrietta, Ohio
Contact: Stephanie Massburg

Project Name: LHAAP
Project Location: Karnack, Texas

Project No.: 117591.0009A130
Project Contact: Allen Willmore
Project Telephone No.: (713) 247-9292

Point of Contact: Larry Duty
Telephone No. 713 996-4547
Project Manager/Supervisor: Praveen Srivastava

Analysis and Method Desired (Indicate separate containers): VOCs 8260

Item No.	Sample Number	Date	Time	Comp	Grab	Matrix	Sample Description, Location	Number of Containers	VOCs 8260						Remarks
1	47WW18-101807	10/18/07	08:45		✓	W	47WW18	3	X						
2	47WW18-101807	10/18/07	08:45		✓	W	4WW18-Field Dup	3	X						Field Dup.
3	47WW32-101807	10/18/07	11:45		✓	W	47WW32	3	X						
4	47WW30-101807	10/18/07	10:32		✓	W	47WW30	3	X						
5	47WW36-101907	10/19/07	09:55		✓	W	LHSMW36	3	X						
6	47WW31-101807	10/18/07	11:50		✓	W	47WW31	3	X						
7	47WW25-101607	10/18/07	09:00		✓	W	47WW25	3	X						
8	LHSMW34-101807	10/18/07	16:45		✓	W	LHSMW34	3	X						
9	EQUIPMENT RINSE#1	10/18/07	17:00		✓	W	ER #1	3	X						From Probe
10															

Transfers Relinquished By (signature)	Date/Time	Transfers Accepted By (signature)	Date/Time
Chris Mabe	10/19/07 13:00	[signature]	10/19/07 13:00
[signature]	10/22/07 17:30		
		Laboratory [signature]	10/23/07 0950

Special Instructions: 7-day TAT

FedEx Airbill No.:

Sampler's Signature: Chris Mabe

TAT: _____ Standard _____ Rush Date _____ Seals Intact? ✓ Y _____ N Received Good Condition ✓ Y _____ N _____ Cold

White - Lab Copy Canary - Field Copy Pink - File Copy

Form Number: 433_1
Rev. 03-19-07

00073205

Chain of Custody

NO. 10301

Shaw® Shaw Environmental & Infrastructure, Inc.
3010 Briarpark Drive, Suite 400
Houston, TX 77042
(713) 996-4400

Laboratory Name: Kemron
Address: 154 Starlite Drive Marietta, Ohio
Contact: Stephanie Mossburg

Project Name: LHAAP
Project Location: Karnack, Texas
Project No.: 117591.0009A100
Project Contact: Allen Willmore
Project Telephone No.: (713) 247-9292
Point of Contact: Larry Doty
Telephone No.: (713) 996-4547
Project Manager/Supervisor: Praveen Srivastav

Analysis and Method Desired (Indicate separate containers): Perchlorate

Item No.	~~Telephone~~ SAMPLE Number	Date	Time	Comp	Grab	Matrix	Sample Description, Location	Number of Containers	Perchlorate	Remarks
1	LHSMW01-102207	10/22/07	10:20		✓	W	LHSMW01	1	X	
2	045B08 (0-0.5)	10/22/07	11:00		✓	S	045B08 (0-0.5)	1	X	
3	045B08 (~~3-4~~ 4-5)	10/22/07	11:25		✓	S	045B08 (3-4)	1	X	SAMPLE COLLECTED 4 to 5' Please have label Perfect.
4	045B08 (9-10)	10/22/07	12:45		✓	S	045B08 (9-10)	1	X	
5										
6										
7										
8										
9										
10										

Transfers Relinquished By (signature)	Date/Time	Transfers Accepted By (signature)	Date/Time
[signature]	10/22/07 17:30		
		Laboratory [signature]	10/23/07 0950

Special Instructions: * 7-day TAT

FedEx Airbill No.:

Sampler's Signature: [signature]

TAT: ____ Standard ____ Rush Date ____ Seals Intact? ✓ Y ____ N Received Good Condition ✓ Y ____ N ____ Cold

White - Lab Copy Canary - Field Copy Pink - File Copy

Form Number: 433_1
Rev. 03-19-07

00073206

KEMRON Environmental Services

SAMPLE RECEIPT FORM

156 Starlite Drive
Marietta, OH 45750
(740) 373-4071

Client:	Shaw - LHAAP
Workorder Number: B	—
Date Received:	10-23-07
Delivered by:	( ) Fedx (✓) UPS ( ) Client ( ) Courier **Time:** 0950
Opened by:	RLK
IR Temp Gun:	(✓) D ( ) G
Logged by:	T.L. L 10-597

Cooler Information

Cooler ID	Temp C	Airbill#	COC#	Other
1822	4	1Z401 663 22 1005 5867	10305, 10301	Soil, water
			10304	

Inspection Checklist	Y	N	NA	Discrepancy ID
Were shipping coolers sealed?	✓			
Were custody seals intact?	✓			
Were cooler temperatures in range of 0 - 6?	✓			
Was ice present?	✓			
Were COC's received/ information complete/signed and dated? (RK)	✓	✓		(1)
Were sample containers and labels intact and match COC?		✓		
Were the correct containers and volumes received?	✓			
Were correct preservatives used? (water only)	✓			
Were pH ranges acceptable? (voa's excluded)			✓	
Were VOA samples free of headspace?	✓	✓		(2)
Were samples received within EPA hold times?	✓			

Discrepancy/Comments/Other Problems

(1) On chain 10304: (A) Did not Rec. 3 bottles Labeled 47 WW18 - 101807 (Field Dup)
(B) Did Rec. 3 bottles Labeled "Dup 3" but no time on bottle
(C) Did not Rec. 3 bottles Labeled 47 WW36 - 101907
(D) Did Rec. 3 bottles Labeled LHS MW36 - 101907 / same time
(E) Rec. 3 bottles Labeled Labeled "Equipment Blank"; Chain says "Equipment Rinse #1"
(2) (RK) (*) Both trip Blanks have Bubbles the size of a pea.
(F) Equipment Rinse #2 - Rec'd Metals Bottle, Shaun says TSS/TDS

Distribution

Name of KEMRON representative	
Client/Company:	
Person Contacted:	
Date contacted:	

Resolution/other comments:

KEMRON Environmental Services
Internal Chain of Custody Report

00073207

Login: L0710597
Account: 2773
Project: 2773.025
Samples: 14
Due Date: 30-OCT-2007

Samplenum	Container ID	Products
L0710597-01	387535	CLO4

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	23-OCT-2007 12:10	AML	
2	ANALYZ	W1	SEM	29-OCT-2007 07:30	DSF	ERE
3	STORE	SEM	A1	01-NOV-2007 12:25	JKT	DSF

Samplenum	Container ID	Products
L0710597-07	387541	826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:10	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:10	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:10	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Samplenum	Container ID	Products
L0710597-09	387543	826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:11	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:11	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:11	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

KEMRON Environmental Services
Internal Chain of Custody Report

00073208

Login: L0710597
Account: 2773
Project: 2773.025
Samples: 14
Due Date: 30-OCT-2007

Samplenum	Container ID	Products
L0710597-12	387546	826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:11	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER		23-OCT-2007 12:11	AML	

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:11	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Samplenum	Container ID	Products
L0710597-10	387544	826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:11	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:11	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:11	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Samplenum	Container ID	Products
L0710597-03	387537	CLO4

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	23-OCT-2007 12:10	AML	
2	ANALYZ	W1	WET	23-OCT-2007 14:00	DIH	ERE
3	STORE	WET	W1	24-OCT-2007 07:31	ERE	DIH
4	ANALYZ	W1	SEM	29-OCT-2007 12:46	DSF	ERE
5	STORE	SEM	A1	01-NOV-2007 12:25	JKT	DSF

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

KEMRON Environmental Services
Internal Chain of Custody Report

00073209

Login: L0710597
Account: 2773
Project: 2773.025
Samples: 14
Due Date: 30-OCT-2007

Samplenum	Container ID	Products
L0710597-06	387540	826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:10	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:10	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:10	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Samplenum	Container ID	Products
L0710597-02	387536	CLO4

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	23-OCT-2007 12:10	AML	
2	ANALYZ	W1	WET	23-OCT-2007 14:00	DIH	ERE
3	STORE	WET	W1	24-OCT-2007 07:31	ERE	DIH
4	ANALYZ	W1	SEM	29-OCT-2007 12:46	DSF	ERE
5	STORE	SEM	A1	01-NOV-2007 12:25	JKT	DSF

Samplenum	Container ID	Products
L0710597-04	387538	CLO4

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	23-OCT-2007 12:10	AML	
2	ANALYZ	W1	WET	23-OCT-2007 14:00	DIH	ERE
3	STORE	WET	W1	24-OCT-2007 07:31	ERE	DIH
4	ANALYZ	W1	SEM	29-OCT-2007 12:46	DSF	ERE
5	STORE	SEM	A1	01-NOV-2007 12:25	JKT	DSF

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

KEMRON Environmental Services
Internal Chain of Custody Report

00073210

Login: L0710597
Account: 2773
Project: 2773.025
Samples: 14
Due Date: 30-OCT-2007

Samplenum	Container ID	Products
L0710597-11	387545	826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:11	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:11	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:11	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Samplenum	Container ID	Products
L0710597-05	387539	826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:10	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:10	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:10	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Samplenum	Container ID	Products
L0710597-14	387548	826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:11	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

KEMRON Environmental Services
Internal Chain of Custody Report

00073211

Login: L0710597
Account: 2773
Project: 2773.025
Samples: 14
Due Date: 30-OCT-2007

Samplenum	Container ID	Products
L0710597-08	387542	826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER		23-OCT-2007 12:10	AML	

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:10	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:10	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Samplenum	Container ID	Products
L0710597-13	387547	826-SPE

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:11	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Bottle: 2

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:11	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

Bottle: 3

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	V1	23-OCT-2007 12:11	AML	
2	ANALYZ	V1	ORG4	23-OCT-2007 13:58	MRT	RLK

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

00073212

The Times

PROOF OF PUBLICATION

STATE OF LOUISIANA

PARISH OF CADDO

Before me, the undersigned authority, personally came and appeared

Altheas Critton personally known to me,

Who being duly sworn, deposes and says that she is the Assistant to the Classified Advertising Manager of The Times, and that the attached Advertisement entitled:

PUBLIC NOTICE OPEN HOUSE ON MARCH 24, 2009 THE UNITED STATES ARMY INVITES PUBLIC COMMENT ON THE EE/CAs FOR THE FORMER PISTOL RANGE AND LHAAP-04 LONGHORN ARMY AMMUNITION PLANT, TEXAS

As per copy of advertisement hereto annexed, was published in The Times on the following dates to wit:

March 15, 2009

(Signed) Altheas Critton

Sworn to and subscribed before me this 16th day of March, 2009

Diana W. Barber

(Notary)

DIANA W. BARBER, NOTARY PUBLIC # 60491
CADDO PARISH, LOUISIANA
MY COMMISSION IS FOR LIFE

GANNETT

00073213

Public Notices

33. Polished Concrete Flooring
34. Painting
35. Plaque and Interior Signage
36. Lockers
37. Flagpoles
38. Canopies
39. Theater / Stage Equipment
40. Audio Visual Equipment
41. Foodservice Equipment
42. Athletic Equipment.
43. Window Treatment
44. Auditorium and Gym Seating
45. Laboratory Casework
46. Elevators and Lifts
47. Fire Suppression Sprinkler System
48. Gas / Plumbing.
49. HVAC.
50. Combination Gas / Plumbing and HVAC.
51. Electrical.

The following Material - Purchase order packages:
A. Structural Steel & Miscellaneous Metals
a. Structural steel
b. Metal deck
c. Anchor bolts
d. Lintels
e. Support steel at operable partition
f. Handrails & railings
g. Bollards
h. Design connections not detailed on the drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Arkansas.
B. Expansion Joint Covers.
C. Roof Trusses including connectors.
D. I-Joists and Rim boards including connectors.
E. Glue-laminated construction.
F. Gluelam beams and trusses including connectors, plates and rods. Includes connections to other building elements.
G. Lumber Materials Package
H. Hollow Metal Doors & Frames.
I. Wood Doors.
J. Finish Hardware.
K. Combination Hollow Metal Doors & Frames / Wood Doors / Finish Hardware.
L. Visual Display Boards.
M. Plastic Toilet Compartments.
N. Privacy Curtains and Cubicle Tracks.
O. Manufactured Trophy Cases
P. Toilet Accessories.
Q. Fire Protection Specialties.
R. Laboratory Appliances.
S. Residential Appliances.
T. Projection Screens.

Bidders are instructed to review SECTION 01015 BID PACKAGE SCHEDULE in the project manual for a complete description of these packages.

Obtaining contract documents through any source other than the Construction Manager or their representative(s) is not advisable due to the risks of receiving incomplete or inaccurate information. Contract documents obtained through the Construction Manager or their representative(s) are considered the official versions and take precedence should any discrepancies occur. The official version of the complete set of the contract documents should be examined and are obtainable from Baldwin & Shell Construction Company, 523 Ringo Street., Little Rock, AR 72201 (Phone: 501-374-8677; Fax: 501-375-7649).

All Bid Proposals must be submitted on a copy of the Bid Forms provided in the project manual. Bidders may photocopy these forms. The entire manual does not need to be submitted with the bids. Faxed Bid Proposals, Phone Quotes and Email Quotes will not be accepted.

A 5% Bid Bond or Cashier's Check is required on bids that exceed $20,000. Trade Contract Bids must include the cost of your Performance Bond and Labor and Material Bond. Successful Trade Contact bidders will be required to furnish the Performance Bond and Labor and Material Bond on Arkansas statutory bond forms.

Bidders shall conform to the requirements of the Arkansas licensing laws and regulations for contractors, and shall be licensed before a bid is submitted.

Both the Owner and Construction Manager reserve the right to reject any and all bids, and to waive any formalities.

BALDWIN & SHELL CONSTRUCTION CO.
CONSTRUCTION MANAGER
523 RINGO STREET
LITTLE ROCK,
ARKANSAS 72201

The Times:
March 8 & 15, 2009

PUBLIC NOTICE
OPEN HOUSE ON MARCH 24, 2009
THE UNITED STATES ARMY INVITES PUBLIC COMMENT ON THE EE/CAs FOR THE FORMER PISTOL RANGE AND LHAAP-04 LONGHORN ARMY AMMUNITION PLANT, TEXAS

The U.S. Army, as lead agency for environmental response actions at Longhorn Army Ammunition Plant (LHAAP), in partnership with Texas Commission on Environmental Quality (TCEQ) and the U.S. Environmental Protection Agency Region 6, has developed Engineering Evaluations/Cost Analyses (EE/CAs) for (1) the former Pistol Range and (2) LHAAP-04, the Former Wastewater Treatment Plant. An open house forum for the public to view information and ask questions will be held on Tuesday, March 24, 2009 from 6:00 to 8:00 p.m. at the Karnack Community Center, Highway 134 and Spur 449, Karnack, Texas. The meeting will be an open house format with no set or formal presentations.

The purpose of the EE/CAs is to identify the objectives of a removal action at each site and to analyze various alternatives that may be used to satisfy those objectives. The alternatives are evaluated for effectiveness, implementability, and cost. The U.S. Army is soliciting public review and comment on the proposed removal actions at both the former Pistol Range and LHAAP-04.

(1) Former Pistol Range Summary
The former Pistol Range is located in the southeastern portion of LHAAP at the end of Robert Avenue, approximately 280 feet south of Avenue Q. The site is approximately 110 feet north to south by 150 feet east to west and covers 0.4 acres. The target area was a wooded slope at the eastern end of the site. The former Pistol Range was established before 1954 and was used intermittently until 2004 by LHAAP security personnel for small arms target practice and qualifying tests. The site will be part of a wildlife refuge in the future. Based on the concentrations of lead in the surface and near-surface soil, the soil is a threat to public health via the potential for ingestion, inhalation, or direct contact. The proposed removal action is excavation and disposal of the contaminated soil, which will remove the threat by preventing future human contact with the soil.

(2) LHAAP-04 Summary
LHAAP-04, the Former Pilot Wastewater Treatment Plant, is approximately 0.5 acres and is located in the central portion of LHAAP at the northwest corner of 6th and 60th Streets adjacent to the former fire station. Wastewater treatment operations began at LHAAP-04 in 1984. The site was closed in 1998 with conditional TCEQ approval based on soil contamination being addressed under the Comprehensive Environmental Response Compensation and Liability Act. The contaminant of concern in the soil is perchlorate, which does not pose an ecological or human health hazard or risk, but has the potential to leach into the groundwater based on TCEQ medium-specific concentrations. The EE/CA addresses the soil contamination; the proposed action is to excavate and dispose the soil and thus mitigate the potential for perchlorate to leach into and contaminate the groundwater.

The U.S. Army encourages the public to participate in the decision-making process by offering comments on the two sites (Former Pistol Range and LHAAP-04, Former Pilot Wastewater Treatment Plant). Public comment period begins March 15, 2009, and concludes April 15, 2009. Interested parties are invited to attend the public forum. Copies of the EE/CAs and supporting documentation are available for public review at the Marshall Public Library, 300 S. Alamo, Marshall, Texas, 75670. For further information, contact: Dr. Rose M. Zeiler, Longhorn Army Ammunition Plant, P.O. Box 220, Ratcliff, Arkansas, 72951; phone number 479-635-0110 or e-mail rose.zeiler@us.army.mil.

The Times:
March 15, 2009

Succession Of

Jeney McCoy

Number: 511,120-C

First Judicial
District Court
Caddo Parish,
Louisiana

NOTICE:

Please take notice that the above named individual has been named as defendant in the above-styled cause of action.

Mary Louise Thomas McCoy, or heirs, or anyone knowing the whereabouts of the same, must contact the LAW OFFICE OF GINGER WEST JOHNSON & ASSOCIATES at 846 Margaret Place, Shreveport, LA 71001; or at the telephone number 318-221-4500.
The Times:
March 15, 2009

TOWN OF GREENWOOD
PARISH OF CADDO
STATE OF LOUISIANA

ORDINANCE NO. 2 OF 2009

TITLE: AN ORDINANCE DECLARING CERTAIN TOWN-OWNED PROPERTY NOT NEEDED FOR PUBLIC PURCHASE; AUTHORIZING THE LEASE OF SAID PROPERTY; SETTING THE MINIMUM RENT AND LEASE TERMS FOR SUCH PROPERTY; AND OTHERWISE PROVIDING WITH RESPECT THERETO.

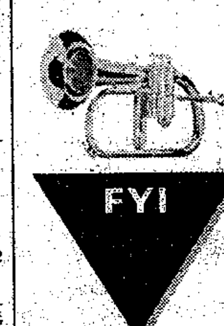
BE IT THEREFORE ORDAINED by the Board of Alderman of the Town of Greenwood, State of Louisiana, that certain property having legal description of Lot 1 of Block 7, Greenwood and Adjacent ½ Abandoned Alley, Caddo Parish, Louisiana (geo. # 171623010002200) and bearing municipal address of 9351 Greenwood Road, Greenwood, Louisiana 71033 is not needed for public purposes;

BE IT FURTHER ORDAINED that the Mayor is hereby authorized to enter into a lease substantially similar to that lease attached to proposed Ordinance 2 of 2009 with any party the Mayor deems appropriate subject to the following requirements: a) the minimum monthly rent shall be $450.00 with a minimum security deposit of $450.00; b) tenant shall be solely responsible for all utilities, taxes, and maintenance of the Real Property; and c) tenant shall provide insurance which, in the Mayor's sole discretion, protects the Town from liability.

Scheduled for hearing and potential passage April 13, 2009 at 7:00 pm at Town of Greenwood Town Hall, 9381 Greenwood Road, Greenwood, Louisiana 71033.

The Times:
March 15, 22, 29, 2009

The Times Classifieds make just about anything an easy sell. Call 459-3333 to place your ad.
The Times
shreveporttimes.com



Found

Found Female Black Lab Mix, young at the Albertsons, Southfield & E. Kings 318-868-1317

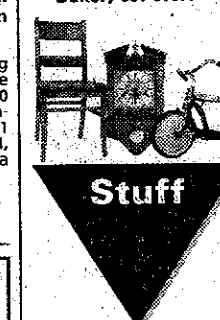
Found Dachshund, 1 blue eye in Broadmoor area. 347-3361

Found Yellow Lab Mix, 20lbs, very sweet in N S'port 318-453-6189

Lost

LOST: Male Cur, brindle, long tailed, golden eyes, white on chest/paws, family pet, near Springlake area. Call 584-4500 or 603-0045

LOST: Small Silver Money Clip - Drug Emporium Area with name engraved on it. Keep money, but please call me. **Baker, 861-6069.**



Antiques

River City Antique Mall & Collectors Market
Great deals happen every day! Our discount prices are a way for us to thank you for past business & allow you tremendous savings on antiques, collectibles, vintage furniture, books, old paper, unique treasures & gifts galore.
Jump start your spring cleaning!
Call Robbie 453-8382 to learn a great way to supplement your income & have extra money! It's easy & fun with little overhead & short terms! We offer competitive options for buying & selling 7 days a week! We strive to bring you the best selection with new inventory daily! Join our family today! Come by and say hi to zoey the rare one! Security at your best!

6363 Hearne Ave.
318-621-1009
M-Sat 10-5; Sun 1-5

GIVE BACK, GET GREEN.
DONATE PLASMA.
New Donors Earn up to $60 This Week
For more information, call or visit:
1020 Shreveort Barksdale Highway, Suite 160
Shreveport, LA 71105
318-861-1466
plasmasaveslives.com
Bring photo ID, proof of address and Social Security or immigration card.
Good People. Making Good Things Happen.
Talecris PLASMA RESOURCES
TPR280-1108
00011289984

Antiques

2 AUCTIONS
March 14 @ 10 AM
Loop 256/ Hwy 19
Palestine, Texas
Furniture, Tools, Guns, Antiques, Glassware, Generators New Items, Misc.
March 21 @ 10 AM
Hwy. 69/ Bonner
Rusk, Texas
Real Estate, Super Antiques, Porc. Signs, Great Primitives, Furniture, Glassware, RR items
www.sasauction.com
Photos & Listing
Steve Smith 11118
(903) 876-3981 10%
BP. C.C. Accepted

Appliances

Maytag gas dryer, $120 Temperped. boxspring $160. 617-9831

Maytag Washer-Dryer, Front loading, 3 yrs old, ext. warranty $600. 318-465-6706

BUY IT. SELL IT. FIND IT.
No matter what it is, you can always buy it, sell it or find it with The Times Classifieds. To place your ad, call **459-3333.**
The Times
shreveporttimes.com

Appliances

Moving! Kenmore Washer and Dryer, Super Capacity, 2 Years Old $400 Both (318)364-8456

Auctions

Antiques Auction !
Sat. Mar. 21st@ 2:00pm
Previewing starts at 10:00 a.m. Fine English & French Antiques furniture & collectibles
1597 Hudson Lane
Monroe, LA. Delivery available. Call
European Antique Auction Gallery
601-722-4218 or visit
EAAG.NET
for details.
Auctioneer Jennings Gilmore Lic#1697-08

Beauty-Barber Equipment

COMPLETE Beauty Shop Equipment Enough for 2 operators, $800. Retiring, selling out. Roll top desk $175 318-746-1880 or 318-426-6391

Cemetery Lots-Monuments

2 CEMETERY LOTS Forest Park - St Vincent. $6000 per lot with use of tombstone. Call 1-225-654-8095 anytime

FOREST PARK EAST
1 lot- sect. X lot #42
originally $2760
will sell for $2000.
Mr. Porter 512-255-2770

FOREST PARK East
3 plots most desirable location, value $5520 ea. will sell for $3995 ea.
225-405-1183

Cattle Auction
Lawdow Hays Memorial Angus Sale
Saturday, March 21, 2009
12:30 p.m. Arcadia, LA.
Featuring: Herd Sires, Cow/Calf pairs, Bred and open heifers, Commercial Brangus, Type Heifers, Many will be paired, the balance safe in calf to the good HBAR Bulls
For More Information
Contact:
Dusty Taylor#836 318-245-8800
Clark Hays 318-548-1400
view sale catalogue at
www.taylormadeauctions.com

OKLAHOMA'S LARGEST TRACTOR & FARM MACHINERY
AUCTION
IDABEL, OKLAHOMA
WED. MAR. 18 - 2009
SALVAGE TRACTORS
THURS., MAR. 19 - 2009
400 - 500 TRACTORS
STARTING AT 9:00 A.M. EACH DAY
FRIDAY, MAR. 20 - 2009
FARM & RANCH MACHINERY OF ALL KINDS
CHAD DAWSON ESTATE SELLOUT
1 - JD 7220 C/A 4x4 Tractor
3 - JD 6420 C/A 4x4 Tractors
1 - Kubota 9540 C/A 4x4 Tractor w/ Ldr.
1 - Kubota 8540 4x4 Tractor w/Ldr.
1 - Kubota 7040 C/A 4x4 Tractor w/ Ldr.
CHAD DAWSON ESTATE SALE
1 - Cat 320 Excavator
1 - Cat 322 B Excavator
2 - Westernstar Dump Trucks
1 - Pete Dump Truck
1 - Ford 9000 Dump Truck
1 - '04 Dodge Ram 4 Door, 6 Speed
YARD FULL OF FARM MACHINERY
2 - JD 348 Square Balers; 1 - JD 467 Round Baler, Netwrap; 1 - JD 567 Round Baler, Netwrap; 1 - JD 435 Round Baler; Offset Disc; Batwing Cutters; Pull type Cutters; 4-5-6 ft. 3 pt. Cutters; Disc Mowers; Hay Rakes; JD 9 ft. Sickle Mower; New 8 & 10 ft. Offset Disc; 1 - Bushhog 6 ft. Offset Disc; 1 - Hesston 5530 Small Rd. Baler; 1 - NH 630 Small Rd. Baler; Lots & Lots of Other Farm & Ranch Items.
THIS IS ONLY A PARTIAL LISTING:
FOR A FULL LISTING & PICTURES
brinkleyauctions.com
BRINKLEY AUCTIONS, INC.
580-286-6539
Fax: 580-286-9460
brinkley@brinkley auctions.com
0001135626

Firewood

FIREWOOD
Stacked & Delivered
$190 a cord
$90 a 1/2-cord
(318) 687-1116

Furniture-Accessories

Armoire -Pine, 2 doors, 2 drawers, $730 new asking $299. 686-1060

Cherry Frame Futon
Washer & Dryer
318-524-1037

Hardrock maple bookcase bed, nice, $135. 318-560-0579

Moving! Dark Oak 6 Piece King Bedroom Suite With New Mattress Set $625, Broyhill Coffeetable & One Endtable $135, Light Oak Dining Table W/6 Chairs $250, Complete Double Bed With Mattress Set $250, Kenmore Washer & Dryer 2 Years Old $400, Ethan Allen Cherrywood King Sleigh Bed W/Mattress Set $475, Breakfast Table W/4 Chairs $185 (318)364-8456

Moving Sale:
~ New couch-chair&1/2-ottoman $750, washer & dryer $50, push mower $100, chest freezer $40, king bed & mattress $50, comp desk $40 (318)470-9930

Garage Sale-Zone 4

Broadmoor Garage Sale, Plus size mens clothes, Womens clothing, Lots of electronics including video games and sound equipment, Cool odds and ends, 6am till 2pm, Sat. Mar. 13th 209 Pennsylvania Ave. Rain or Shine!!!

Jewelry & Watches

National Jewelry & Loan
Will loan money or purchase any gold, diamond, or platinum jewelry. We also purchase old pocket watches.
Call Now!
318-636-9033

It pays to read the
REAL Classifieds

Jewelry & Watches

Discount Jewelry & Loan
(318) 688-8310
Paying Top Dollar on Gold, Silver, Diamonds, Platinum & Broken Jewelry

WE PAY 22% MORE For DIAMONDS
Also Buying Gold, Rolex Pocket Watches & Sterling Silver
EVERETT JEWELRY
(318) 795-0860

Miscellaneous

4 AIR FARE TICKETS with Allegient Air for Orlando, FL. Good through March 2010. Paid $780, with tax, 3 bag checks, insurance, will sell for $500. Call 318-746-4204 or 318-453-3153.

65" MITS. HD TV, $5000 new, sell $780. 100 gal aquarium & stand, $150; Blue & gold couch exc. cond, $200. 318-572-1948

Baby bed $75 Basinette $50; 51" tv $100, Stove $100. 670-7398

COMPOST,
RICH BLACK COMPOSTED COTTON GIN WASTE.
$10 yard. / We load.
318-422-2742

Moulding Chopper w/extra blades, $300. 318-868-3021

New Carpet Padding, still on roll $225. 670-7398

RERUNS ARE Fun! Kids Consignment Sale; Pierre Bossier Mall (Service Merch. Bldg.) Kids clothes, shoes, toys, furn., equip, & MORE! 3/17 - (12-6p), 3/18-21 - (9-6p) & 3/22 (1/2 price sale) 1-6p rerunsarefun.com
HOMERUNS Home Furniture & More. **OPENS!!** 3/20 thru 3/22 located in Reruns

Look for the latest real estate listings online at
shreveporttimes.com

00073214

Proof of Publication

from

MARSHALL NEWS MESSENGER

P.O. BOX 730 MARSHALL, TX 75670 (903) 935-7914

#1888541 $277.84

PUBLIC NOTICE
OPEN HOUSE ON MARCH 24, 2009
E UNITED STATES ARMY INVITES PUBLIC COMMENT
EE/CAs FOR THE FORMER PISTOL RANGE AND LHAAP-04
LONGHORN ARMY AMMUNITION PLANT, TEXAS

Army, as lead agency for environmental response actions at Long- Ammunition Plant (LHAAP), in partnership with Texas Commission mental Quality (TCEQ) and the U.S. Environmental Protection Agency has developed Engineering Evaluations/Cost Analyses (EE/CAs) for rmer Pistol Range and (2) LHAAP-04, the Former Wastewater Treat- it. An open house forum for the public to view information and ask will be held on Tuesday, March 24, 2009 from 6:00 to 8:00 p.m. at ck Community Center, Highway 134 and Spur 449, Karnack, Texas. ing will be an open house format with no set or formal presentations.

ose of the EE/CAs is to identify the objectives of a removal action at and to analyze various alternatives that may be used to satisfy jectives. The alternatives are evaluated for effectiveness, imple- ty, and cost. The U.S. Army is soliciting public review and comment roposed removal actions at both the former Pistol Range and

r Pistol Range Summary
er Pistol Range is located in the southeastern portion of LHAAP at the bert Avenue, approximately 280 feet south of Avenue Q. The site is ately 110 feet north to south by 150 feet east to west and covers s. The target area was a wooded slope at the eastern end of the former Pistol Range was established before 1954 and was used ently until 2004 by LHAAP security personnel for small arms target and qualifying tests. The site will be part of a wildlife refuge in the based on the concentrations of lead in the surface and near-surface soil is a threat to public health via the potential for ingestion, inhala- irect contact. The proposed removal action is excavation and dis- the contaminated soil, which will remove the threat by preventing man contact with the soil.

P-04 Summary
, the Former Pilot Wastewater Treatment Plant, is approximately 0.5 1 is located in the central portion of LHAAP at the northwest corner of 50th Streets adjacent to the former fire station. Wastewater treat- erations began at LHAAP-04 in 1984. The site was closed in 1998 litional TCEQ approval based on soil contamination being addressed Comprehensive Environmental Response Compensation and Liabil- the contaminant of concern in the soil is perchlorate, which does not ecological or human health hazard or risk, but has the potential to the groundwater based on TCEQ medium-specific concentrations. As addresses the soil contamination, the proposed action is to exca- dispose the soil and thus mitigate the potential for perchlorate to and contaminate the groundwater.

Army encourages the public to participate in the decision making by offering comments on the two sites (Former Pistol Range and 4, Former Pilot Wastewater Treatment Plant). Public comment period arch 15, 2009, and concludes April 15, 2009. Interested parties are attend the public forum. Copies of the EE/CAs and supporting doc- on are available for public review at the Marshall Public Library, 300 Marshall, Texas, 75670. For further information, contact: Dr. Rose Longhorn Army Ammunition Plant, P.O. Box 220, Ratcliff, Arkansas, hone number 479-635-0110 or e-mail rose.zeller@us.army.mil.

STATE OF TEXAS
COUNTY OF HARRISON

On this 11th day of March, 20 09 personally appeared before me the undersigned, a Notary Public in and for said county and state.

Dianne Gray

of the MARSHALL NEWS MESSENGER, a daily newspaper published at MARSHALL, County of HARRISON, State of TEXAS, who, being by me duly sworn, states that the attached advertisement, a true copy of which is hereto annexed, was published in said newspaper in its issues thereof on the following dates:

8th day of March 20 09
____ day of ____ 20 ____
____ day of ____ 20 ____
____ day of ____ 20 ____
____ day of ____ 20 ____
____ day of ____ 20 ____

Dianne Gray
SIGNATURE

Subscribed and sworn to before me this 11th day of March 20 09.

Jacqueline English
Notary Public, Harrison County, Texas

My Commision expires 11-8-2012

JACQUELINE ENGLISH
Notary Public State of Texas
COMM. EXP. 11-08-2012

00073215

Welcome to "Marshall's Marketplace"

CLASSIFIEDS

Office Hours: Monday-Friday • 8 AM - 5 PM
P.O. Box 730, 309 E. Austin, Marshall, Texas 75671

Pick it Up! Click it Up!
www.marshallnewsmessenger.com

935-SELL (7355)

Fax: 903-935-6242
Local from Longview: 903-758-7355

AILY DEALS

4 lines 14 days $17
00 each
itional line. Some
trictions apply. Non-commercial rates.
udes marshallnewsmessenger.com—

GARAGE SALES

2 days - only $19
-pay and receive Free Garage Sale signs.
rger sizes and additional days available!

DEADLINES

Line ads deadline prior business day at 3:00 p.m. Exceptions include Saturday line ads (Friday 10:00 a.m.)

Display ads deadline two business days prior to publication. Exception includes Saturday display (Thursday Noon).

Legal Notices deadline two business days prior to publication. Exception includes Saturday and Sunday (Thursday Noon).

3000 EMPLOYMENT

The best source for employment and career opportunities in our eleven-county circulation area. Call us today and post and view ads tomorrow. Pick it Up! Click it Up!

Ask one of our sales professionals about combination rates to add The Longview News-Journal readership.

ORTATION

PARTS ERVICE

CTURED! 6 diesel eng. elivered. 8-5811.

2000 Dodge 4X4, 8" lift, arts, call 18 or 071

ATS/ PLIES

hinum Boat ude, $2000. nore info. 10

CYCLES/ VS

★★★

l C50, wind- ddlebags, 000 orig mi. 903-836-2006

★★★

4-Wheelers w/helmets 9. 125 CC - 36-2006

TIONAL CLES

r Trailer 5th ulo, Skyline, ndition, new opy, sleeps 9001 Call 5

TORS/ RM MENT

35HP trac- iginal paint, tires, solid lt! $3950. 8 aft 5pm

RCIAL/ VY MENT

dozer LGP 0 hrs, very tion, 75% , $69,000. 3 or

an Forklift, e, runs & at, $2500.

P

ic, 1948 the family years, no abused, ll main- ptions, rare 800, or

1110 TRUCKS

★★★★★

2002 Dodge 3/4 ton ext cab, diesel, leather int, bedliner, 115 K orig mi, $7950 obo.903-836-2006

★★★★★

2005 Dodge 1-ton dually crew cab, 4x4, diesel, 62K orig mi, $16,950 obo 903-836-2006

★★★★★

2007 Dodge Ram 2500 HD, diesel, 4-dr crew cab, 17K orig mi, $17,950obo 903-836-2006

2007 Hummer H2, loaded, excellent condition, only 19,000 miles. Blue with black leather interior. $37,995. Call 903-235-4832

2008 Chev. Silverado LS crew cab, well-maintained, $18,500. 903-660-3071 or 903-736-3555

1120 VANS

2003 Dodge Entervan Handicap Conversion, 35,300 miles. Very clean! Dropped floor with ramp & Kneeling Suspension. 903-725-5705 or 903-918-3479

2006 Honda Odyssey, 50K mi, great condition, $16,500 obo. Call 903-935-4137

1130 ANTIQUES AND CLASSICS

★★★★★

LEWIS AUTO SWAP, on 1st Monday grounds, Canton.Mar 6, 7, 8, Antique, classic autos & parts. 903-567-6762

1170 CHEVROLET

1977 CAPRICE CLASSIC, 4 dr, clean , 54K actual miles, trans rebuilt, warranty $4500. 903-407-6059

2002 Corvette in showroom condition, garage kept, only 14K miles, heads-up display, both tops, silver w/black, $24,500. 903-563-6400

1180 CHRYSLER

★★★★★

2006 PT Cruiser, 4 dr, auto, cold air, 27K orig miles. $6950 obo. 903-836-2006

ANNOUNCEMENTS 2000

2005 ADOPTIONS

Adopt
A happy secure home, hugs & kisses, fulltime mom, beaches, loving extended family awaits your precious baby. Expenses paid.
Laura & John
1-800-563-7964

Employment Opportunities
At Your Fingertips
marshallnewsmessenger.com

2030 LEGAL NOTICES

THE STATE OF TEXAS
COUNTY OF HARRISON COUNTY

NOTICE OF SALE OF REAL PROPERTY

By virtue of an Order of Sale issued out of the District Court of 71st Judicial District Court for Harrison County, Texas on a Judgment rendered in said court in the Sam Lavender vs. Michelle Lavender and being numbered 08-0453, I did on the 19th day of February 2009, at 10:56 o'clock a.m., levy upon the following real property and improvements described as follows:

Lot 63 B, Abstract 393 of M. Lindsey Survey, Harrison County, Texas (Also known as 335 Whispering Pines, Hallsville, Texas) and more fully described at vol. 1627 page 199 of the Official Records of Harrison County, Texas.

And on April 7, 2009, being the first Tuesday of said month, between the hours of 10:00 a.m. and 4:00 p.m., on said day at the Courthouse door of said County I will offer for sale and sell at public auction for cash, all of the right, title and interest of said parties in said property. (Said property is subject to two prior liens, and the subject of a foreclosure of an equitable vendor's lien in favor of Sam Lavender.).

Dated: February 25, 2009
W.T. McCool, Sheriff of Harrison County
By: Deputy Robert J. Webb

2030 LEGAL NOTICES

PUBLIC NOTICE
OPEN HOUSE ON MARCH 24, 2009
THE UNITED STATES ARMY INVITES PUBLIC COMMENT ON THE EE/CAs FOR THE FORMER PISTOL RANGE AND LHAAP-04
LONGHORN ARMY AMMUNITION PLANT, TEXAS

The U.S. Army, as lead agency for environmental response actions at Longhorn Army Ammunition Plant (LHAAP), in partnership with Texas Commission on Environmental Quality (TCEQ) and the U.S. Environmental Protection Agency Region 6, has developed Engineering Evaluations/Cost Analyses (EE/CAs) for (1) the former Pistol Range and (2) LHAAP-04, the Former Wastewater Treatment Plant. An open house forum for the public to view information and ask questions will be held on Tuesday, March 24, 2009 from 6:00 to 8:00 p.m. at the Karnack Community Center, Highway 134 and Spur 449, Karnack, Texas. The meeting will be an open house format with no set or formal presentations.

The purpose of the EE/CAs is to identify the objectives of a removal action at each site and to analyze various alternatives that may be used to satisfy those objectives. The alternatives are evaluated for effectiveness, implementability, and cost. The U.S. Army is soliciting public review and comment on the proposed removal actions at both the former Pistol Range and LHAAP-04.

(1)Former Pistol Range Summary
The former Pistol Range is located in the southeastern portion of LHAAP at the end of Robert Avenue, approximately 280 feet south of Avenue Q. The site is approximately 110 feet north to south by 150 feet east to west and covers 0.4 acres. The target area was a wooded slope at the eastern end of the site. The former Pistol Range was established before 1954 and was used intermittently until 2004 by LHAAP security personnel for small arms target practice and qualifying tests. The site will be part of a wildlife refuge in the future. Based on the concentrations of lead in the surface and near-surface soil, the soil is a threat to public health via the potential for ingestion, inhalation, or direct contact. The proposed removal action is excavation and disposal of the contaminated soil, which will remove the threat by preventing future human contact with the soil.

(2) LHAAP-04 Summary
LHAAP-04, the Former Pilot Wastewater Treatment Plant, is approximately 0.5 acres and is located in the central portion of LHAAP at the northwest corner of 6th and 60th Streets adjacent to the former fire station. Wastewater treatment operations began at LHAAP-04 in 1984. The site was closed in 1998 with conditional TCEQ approval based on soil contamination being addressed under the Comprehensive Environmental Response Compensation and Liability Act. The contaminant of concern in the soil is perchlorate, which does not pose an ecological or human health hazard or risk, but has the potential to leach into the groundwater based on TCEQ medium-specific concentrations. The EE/CA addresses the soil contamination; the proposed action is to excavate and dispose the soil and thus mitigate the potential for perchlorate to leach into and contaminate the groundwater.

The U.S. Army encourages the public to participate in the decision-making process by offering comments on the two sites (Former Pistol Range and LHAAP-04, Former Pilot Wastewater Treatment Plant). Public comment period begins March 15, 2009, and concludes April 15, 2009. Interested parties are invited to attend the public forum. Copies of the EE/CAs and supporting documentation are available for public review at the Marshall Public Library, 300 S. Alamo, Marshall, Texas, 75670. For further information, contact: Dr. Rose M. Zeller, Longhorn Army Ammunition Plant, P.O. Box 220, Ratcliff, Arkansas, 72951; phone number 479-635-0110 or e-mail rose.zeller@us.army.mil.

2040 LOST

LOST Feb. 26, possibly on N. Grove or 1st Baptist parking lot, an East Texas Bank & Trust, money envelope containing $710.68. Please call 903-926 -9040

LOST: Female cat, tan & white, 12 yrs old, long haired, Jeff Davis area. 935-5347 or 926-5453

LOST: Female Terrier Mix on Feb. 22, 30lbs brown, tan & white, wearing orange collar & ear tattoo, Gill Community area, Hwy 59 S. REWARD! 903-754-0381

LOST on Hwy 80 behind Abraham Grocery Store, goes by "Prissy", 903-926-4768

White female Schnauzer lost near Hwy 2208 & Hwy 154 near Harleton. Reward! 903-452-2136, 903-736-2693

EMPLOYMENT 3000

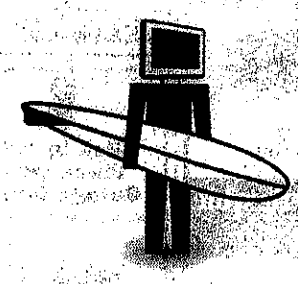
3002 ACCOUNTING/ FINANCE

Accounts Payable Clerk. Sales tax exemptions, accounts payable, customer service, proficient in Excel. Email resume: resumes@hgpcorp.net

Pick up or click up the latest **SPORTS STATS** everyday in The Marshall News Messenger
marshallnewsmessenger.com

3002 ACCOUNTING/ FINANCE

HOTFACTS by YAHOO! hotjobs



22% of people spend 8 hours a week web surfing instead of working.

Source: Yahoo! HotJobs site poll, May 2008

Browse more stimulating jobs at MarshallNewsMessenger.com

3012 ADMINISTRATIVE/ CLERICAL

ADMINISTRATIVE ASSISTANT
Harris Potteries is seeking a detail-oriented person to assist with a variety of administrative duties. Applicants must have a strong knowledge of Word and Excel. This position will consist of answering multi-line phones, data entry, filing, and assisting with Accounts Payable, Payroll, and HR functions. Salary will be commensurate with experience. Fax resume to 903-938-9040

The news doesn't stop. Neither do we.
marshallnewsmessenger.com

3014 CONSTRUCTION/ FACILITIES

✓✓✓✓✓

HORIZONTAL DIRECTIONAL DRILL, locator with class a CDL and clean driving record needed!!! Laborers with Class C license also needed! Call for phone interview 469-384-9752 Please only call if you have experience!!

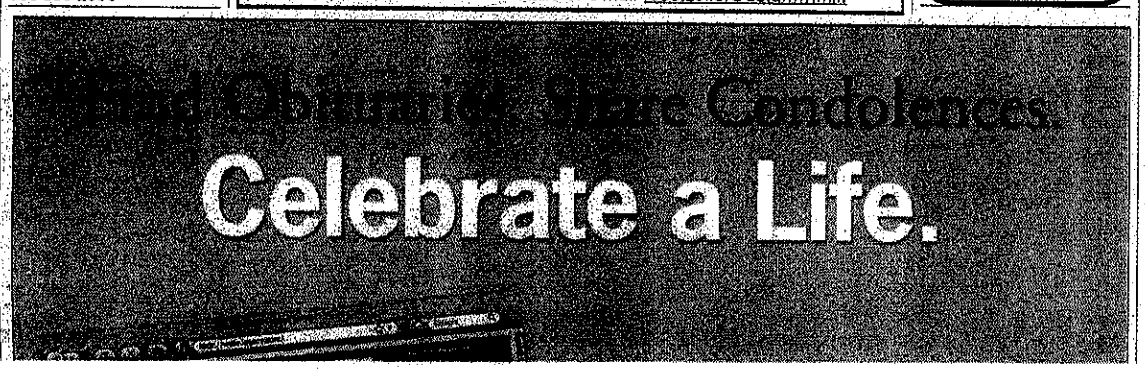
FIND GREAT DEALS ON WHEELS IN CLASSIFIEDS!

3016 CUSTOMER SERVICE

17,640 readers every sunday.
The Marshall News Messenger

EMPLOY OUR

The Marshall News Messenger
903-935-7355
marshallnewsmessenger.com



Customer Service

THINK ABOUT THE BIGGER PICTURE

00073216

Louisiana Press Association

Your online source for public notice in Louisiana

Public Notice

Print This Notice

NEW since Aug. 2008
Search in this notice, CTRL+F or APPLE+F
NOTE: Some notices are extracted from PDF files and may be difficult to read.

County: Caddo
Printed In: The Times
Printed On: 2009/03/15

Public Notice:

PUBLIC NOTICE OPEN HOUSE ON MARCH 24, 2009 THE UNITED STATES ARMY INVITES PUBLIC COMMENT ON THE EE/CAs FOR THE FORMER PISTOL RANGE AND LHAAP-04 LONGHORN ARMY AMMUNITION PLANT, TEXAS The U.S. Army, as lead agency for environmental response actions at Longhorn Army Ammunition Plant (LHAAP), in partnership with Texas Commission on Environmental Quality (TCEQ) and the U.S. Environmental Protection Agency Region 6, has developed Engineering Evaluations/Cost Analyses (EE/CAs) for (1) the former Pistol Range and (2) LHAAP-04, the Former Wastewater Treatment Plant. An open house forum for the public to view information and ask questions will be held on Tuesday, March 24, 2009 from 6:00 to 8:00 p.m. at the Karnack Community Center, Highway 134 and Spur 449, Karnack, Texas. The meeting will be an open house format with no set or formal presentations. The purpose of the EE/CAs is to identify the objectives of a removal action at each site and to analyze various alternatives that may be used to satisfy those objectives. The alternatives are evaluated for effectiveness, implementability, and cost. The U.S. Army is soliciting public review and comment on the proposed removal actions at both the former Pistol Range and LHAAP-04. (1) Former Pistol Range Summary The former Pistol Range is located in the southeastern portion of LHAAP at the end of Robert Avenue, approximately 280 feet south of Avenue Q. The site is approximately 110 feet north to south by 150 feet east to west and covers 0.4 acres. The target area was a wooded slope at the eastern end of the site. The former Pistol Range was established before 1954 and was used intermittently until 2004 by LHAAP security personnel for small arms target practice and qualifying tests. The site will be part of a wildlife refuge in the future. Based on the concentrations of lead in the surface and near-surface soil, the soil is a threat to public health via the potential for ingestion, inhalation, or direct contact. The proposed removal action is excavation and disposal of the contaminated soil, which will remove the threat by preventing future human contact with the soil. (2) LHAAP-04 Summary LHAAP-04, the Former Pilot Wastewater Treatment Plant, is approximately 0.5 acres and is located in the central portion of LHAAP at the northwest corner of 6th and 60th Streets adjacent to the former fire station. Wastewater treatment operations began at LHAAP-04 in 1984. The site was closed in 1998 with conditional TCEQ approval based on soil contamination being addressed under the Comprehensive Environmental Response Compensation and Liability Act. The contaminant of concern in the soil is perchlorate, which does not pose an ecological or human health hazard or risk, but has the potential to leach into the groundwater based on TCEQ medium-specific concentrations. The EE/CA addresses the soil contamination; the proposed action is to excavate and dispose the soil and thus

00073217

mitigate the potential for perchlorate to leach into and contaminate the groundwater. The U.S. Army encourages the public to participate in the decision-making process by offering comments on the two sites (Former Pistol Range and LHAAP-04, Former Pilot Wastewater Treatment Plant). Public comment period begins March 15, 2009, and concludes April 15, 2009. Interested parties are invited to attend the public forum. Copies of the EE/CAs and supporting documentation are available for public review at the Marshall Public Library, 300 S. Alamo, Marshall, Texas, 75670. For further information, contact: Dr. Rose M. Zeiler, Longhorn Army Ammunition Plant, P.O. Box 220, Ratcliff, Arkansas, 72951; phone number 479-635-0110 or e-mail rose.zeiler@us.army.mil. The Times: March 15, 2009

Public Notice ID: 9261595.HTM

Print This Notice

Return to Found List | New Search | Return To Current Search Criteria

A public service by the members of
Louisiana Press Association
Copyright © 1999 - 2000 Arizona Newspapers Association
If you have any questions please send an email to the administrator.
Powered by Inetium. All Rights Reserved.

MEDIA RELEASE

The United States Army has prepared Engineering Evaluations/Cost Analyses (EE/CAs) for two contaminated sites at the Longhorn Army Ammunition Plant: the former Pistol Range and site LHAAP-04 (the former Pilot Wastewater Treatment Plant). The EE/CAs are documents that describe the two sites and the proposed remedies. The EE/CAs were developed to facilitate public involvement in the remedy selection process.

Copies of the EE/CAs and supporting documentation will be available for public review at the Marshall Public Library, 300 S. Alamo, Marshall, Texas, 75670 on March 14, 2009 through April 15, 2009.

The public information forum will be held on March 24, 2009, from 6:00 to 8:00 p.m. at the Karnack Community Center, Highway 134 and Spur 449, Karnack, Texas 75661.

All public comments on the documents must be submitted by April 15, 2009. Written comments may be provided to Dr. Rose M. Zeiler, Longhorn Army Ammunition Plant, P.O. Box 220, Ratcliff, Arkansas, 72951 or e-mailed to rose.zeiler@us.army.mil.

00073219

****
*** FAX TX REPORT ***
****

TRANSMISSION OK

JOB NO.	1273
DESTINATION ADDRESS	913182194680
PSWD/SUBADDRESS	
DESTINATION ID	
ST. TIME	03/10 13:35
USAGE T	00'17
PGS.	1
RESULT	OK

MEDIA RELEASE

The United States Army has prepared Engineering Evaluations/Cost Analyses (EE/CAs) for two contaminated sites at the Longhorn Army Ammunition Plant: the former Pistol Range and site LHAAP-04 (the former Pilot Wastewater Treatment Plant). The EE/CAs are documents that describe the two sites and the proposed remedies. The EE/CAs were developed to facilitate public involvement in the remedy selection process.

Copies of the EE/CAs and supporting documentation will be available for public review at the Marshall Public Library, 300 S. Alamo, Marshall, Texas, 75670 on March 14, 2009 through April 15, 2009.

The public information forum will be held on March 24, 2009, from 6:00 to 8:00 p.m. at the Karnack Community Center, Highway 134 and Spur 449, Karnack, Texas 75661.

All public comments on the documents must be submitted by April 15, 2009. Written comments may be provided to Dr. Rose M. Zeiler, Longhorn Army Ammunition Plant, P.O. Box 220, Ratcliff, Arkansas, 72951 or e-mailed to rose.zeiler@us.army.mil.

****
*** FAX TX REPORT ***
****

TRANSMISSION OK

JOB NO.	1274
DESTINATION ADDRESS	919033340288
PSWD/SUBADDRESS	
DESTINATION ID	
ST. TIME	03/10 13:36
USAGE T	00'19
PGS.	1
RESULT	OK

MEDIA RELEASE

The United States Army has prepared Engineering Evaluations/Cost Analyses (EE/CAs) for two contaminated sites at the Longhorn Army Ammunition Plant: the former Pistol Range and site LHAAP-04 (the former Pilot Wastewater Treatment Plant). The EE/CAs are documents that describe the two sites and the proposed remedies. The EE/CAs were developed to facilitate public involvement in the remedy selection process.

Copies of the EE/CAs and supporting documentation will be available for public review at the Marshall Public Library, 300 S. Alamo, Marshall, Texas, 75670 on March 14, 2009 through April 15, 2009.

The public information forum will be held on March 24, 2009, from 6:00 to 8:00 p.m. at the Karnack Community Center, Highway 134 and Spur 449, Karnack, Texas 75661.

All public comments on the documents must be submitted by April 15, 2009. Written comments may be provided to Dr. Rose M. Zeiler, Longhorn Army Ammunition Plant, P.O. Box 220, Ratcliff, Arkansas, 72951 or e-mailed to rose.zeiler@us.army.mil.

00073221

****
*** FAX TX REPORT ***
****

TRANSMISSION OK

JOB NO.	1275
DESTINATION ADDRESS	913186314194
PSWD/SUBADDRESS	
DESTINATION ID	
ST. TIME	03/10 13:37
USAGE T	00'17
PGS.	1
RESULT	OK

MEDIA RELEASE

The United States Army has prepared Engineering Evaluations/Cost Analyses (EE/CAs) for two contaminated sites at the Longhorn Army Ammunition Plant: the former Pistol Range and site LHAAP-04 (the former Pilot Wastewater Treatment Plant). The EE/CAs are documents that describe the two sites and the proposed remedies. The EE/CAs were developed to facilitate public involvement in the remedy selection process.

Copies of the EE/CAs and supporting documentation will be available for public review at the Marshall Public Library, 300 S. Alamo, Marshall, Texas, 75670 on March 14, 2009 through April 15, 2009.

The public information forum will be held on March 24, 2009, from 6:00 to 8:00 p.m. at the Karnack Community Center, Highway 134 and Spur 449, Karnack, Texas 75661.

All public comments on the documents must be submitted by April 15, 2009. Written comments may be provided to Dr. Rose M. Zeiler, Longhorn Army Ammunition Plant, P.O. Box 220, Ratcliff, Arkansas, 72951 or e-mailed to rose.zeiler@us.army.mil.

00073222

****
*** FAX TX REPORT ***
****

TRANSMISSION OK

JOB NO.	1276
DESTINATION ADDRESS	913186776705
PSWD/SUBADDRESS	
DESTINATION ID	
ST. TIME	03/10 13:38
USAGE T	00'23
PGS.	1
RESULT	OK

MEDIA RELEASE

The United States Army has prepared Engineering Evaluations/Cost Analyses (EE/CAs) for two contaminated sites at the Longhorn Army Ammunition Plant: the former Pistol Range and site LHAAP-04 (the former Pilot Wastewater Treatment Plant). The EE/CAs are documents that describe the two sites and the proposed remedies. The EE/CAs were developed to facilitate public involvement in the remedy selection process.

Copies of the EE/CAs and supporting documentation will be available for public review at the Marshall Public Library, 300 S. Alamo, Marshall, Texas, 75670 on March 14, 2009 through April 15, 2009.

The public information forum will be held on March 24, 2009, from 6:00 to 8:00 p.m. at the Karnack Community Center, Highway 134 and Spur 449, Karnack, Texas 75661.

All public comments on the documents must be submitted by April 15, 2009. Written comments may be provided to Dr. Rose M. Zeiler, Longhorn Army Ammunition Plant, P.O. Box 220, Ratcliff, Arkansas, 72951 or e-mailed to rose.zeiler@us.army.mil.

00073223

****
*** FAX TX REPORT ***
****

TRANSMISSION OK

JOB NO.	1277
DESTINATION ADDRESS	919035612459
PSWD/SUBADDRESS	
DESTINATION ID	
ST. TIME	03/10 13:39
USAGE T	00'29
PGS.	1
RESULT	OK

MEDIA RELEASE

The United States Army has prepared Engineering Evaluations/Cost Analyses (EE/CAs) for two contaminated sites at the Longhorn Army Ammunition Plant: the former Pistol Range and site LHAAP-04 (the former Pilot Wastewater Treatment Plant). The EE/CAs are documents that describe the two sites and the proposed remedies. The EE/CAs were developed to facilitate public involvement in the remedy selection process.

Copies of the EE/CAs and supporting documentation will be available for public review at the Marshall Public Library, 300 S. Alamo, Marshall, Texas, 75670 on March 14, 2009 through April 15, 2009.

The public information forum will be held on March 24, 2009, from 6:00 to 8:00 p.m. at the Karnack Community Center, Highway 134 and Spur 449, Karnack, Texas 75661.

All public comments on the documents must be submitted by April 15, 2009. Written comments may be provided to Dr. Rose M. Zeiler, Longhorn Army Ammunition Plant, P.O. Box 220, Ratcliff, Arkansas, 72951 or e-mailed to rose.zeiler@us.army.mil.

THIS PAGE INTENTIONALLY LEFT BLANK

LONGHORN ARMY AMMUNITION PLANT,

Karnack, Texas

MONTHLY MANAGERS' MEETING

AGENDA

DATE:	Tuesday, 24 March, 2009
TIME:	12:30 p.m.
PLACE:	USFWS Office, Longhorn AAP, TX Dial in number: 866-797-9304, code - 4155734

Welcome **RMZ**

Site Schedule Review with Carlos Sanchez, EPA Region 6 **RMZ**

Action Items:

Army

- Update site status spreadsheet/schedule and provide to EPA before next meeting.
- Provide schedule on progress of Powerhouse Demolition and Site 19 Landfill Closure,
- Provide a hardcopy of the Draft Final ROD for LHAAP-37/67 to EPA.
- Provide the 5-year Review Follow-up Status Table.
- Send Shaw a copy of the hunting map.

EPA

- Provide comments to Army on the site schedule.
- Confirm if formal publication and public comment period are needed for NFA ROD

Shaw

- Notify stakeholders of RAB meeting date change. Completed.

USFWS

- Settlement of card access issues during hunting programs.

Defense Environmental Restoration Program (DERP) PBC Update **PS**

- Document Status/Environmental Sites (Table)
- Groundwater Treatment Plant Update
- Presentation for LHAAP-04 and Pistol Range EE/CA public Meeting

DERP Total Environmental Restoration Contract Update **RMZ**

- Status of Draft Final ROD for Sites 37/67

BRAC-Funded Environmental Restoration

- LHAAP-19 – Demolition Landfill Progress **DB**

MMRP **JRL/DB**

- Update
- Notification Requirement vs. Proposed Plan for MMRP Sites (Steve Tzhone)

Transfer Update

- Electrical ROW Lease to USFWS

- Transfer of LHAAP-12 Parcel
- ECOP VI

Other Issues

- 2009 IAP Schedule
- Status of Army's Perchlorate page for Longhorn

Adjourn

Shaw Environmental, Inc.

Subject:	**Draft Final Minutes, Monthly Managers Meeting, Longhorn Army Ammunition Plant (LHAAP)**
Location of Meeting:	**Teleconference**
Date of Meeting:	**March 24, 2009; 12:30 PM – 4:00 PM**

Meeting Participants:

BRAC:	Rose M. Zeiler
USACE-Tulsa:	Aaron Williams, John Lambert, Scottie Fiehler
USAEC:	Jeff Armstrong (phone)
Shaw:	Praveen Srivastav, Greg Jones, Kay Everett, Susan Watson
USEPA Region 6:	Steve Tzhone, Carlos Sanchez
TCEQ:	Fay Duke (phone), Dale Vodak (phone)
USFWS:	Paul Bruckwicki

Carlos Sanchez, Chief, Arkansas/Texas Section, EPA Region 6 Superfund Division, was introduced to all and welcomed to the meeting. Mr. Sanchez attended the meeting to discuss schedule slippage of several RODs into FY10 and to facilitate bringing the RODs back into FY09.

Previous Action Items

Army

- Update site status spreadsheet/schedule and provide to EPA before next meeting.
- Provide schedule on progress of Demolition of Powerhouse and Construction Landfill Closure. *Completed.*
- Provide a hardcopy of the Draft Final ROD for LHAAP-37/67 to EPA. *Completed.*
- Provide the 5-year Review Follow-up Status Table. *Completed.*
- Send Shaw a copy of the hunting map. *Completed.*
- Update NPL vs. Non-NPL. *In Progress.*

EPA

- Provide comments to Army on site status spreadsheet. *Completed.*
- Confirm if Proposed Plan presentation and public comment period are needed for NFA ROD. *Completed. (Yes)*

Shaw

- Notify stakeholders of RAB meeting date change. *Completed.*

USFWS

- Settlement of card access issues during hunting programs. I*ssue will be dropped from future discussion.*

Site Schedule Review with Carlos Sanchez, EPA Region 6

Carlos Sanchez discussed the importance of meeting commitments on schedules and was concerned that important commitments have slipped a couple months. He said that the schedule had previously shown that 11 to 13 RODs would be signed by the end of this fiscal year, but now there may be only 6 to 7 RODs that are completed this year. He would like to see these RODs come back into this fiscal year (i.e., to be finished by September 2009). Steve Tzhone suggested that we look at the schedule, see which RODs are on schedule now, and verify whether they will remain on schedule or are in any danger of slipping. The group then discussed individual sites and the identification of sites that may have issues that could ultimately delay the ROD stage.

The schedule for LHAAP-04 may slip because of groundwater issues. Rose Zeiler indicated it was the NFA remedy that may be in jeopardy and not the ROD. Rose stated that the next RAB meeting in June would also be the appropriate time for a public meeting for the various sites that are expected to have RODs completed by the end of this fiscal year and that our schedule for resolving issues impeding progress would have to be resolved very soon to meet that date.

Carlos commented that additional sampling data collection that has been conducted and provided during the FS stage should have been performed earlier during the RI stage. Praveen said that the previous contractor conducted the RI with concurrence from the stakeholders; however, data gaps were identified as work progressed, and perchlorate, an emerging contaminant, became an added concern at several sites.

Other sites on the schedule that may be delayed include LHAAP-16 and -17. Rose suggested the stakeholders meet to discuss all major issues and resolve comments during an on-board review process. Several sites could be addressed at such a meeting in order to push those sites forward toward RODs and prevent any additional delays.

Carlos suggested that triggers could be written in RODs, when needed, to identify contingent activities. Such a ROD would indicate that, if certain remedial conditions or goals are not achieved by the actions specified in the ROD, the trigger would compel the initiation of additional evaluation or action. He said that these triggers do not have to be tied to the first 5-year review; they may come earlier or later.

Late April was suggested as the timing of the on-board review. It was suggested that LHAAP-17, -29, -50, and -46 could be on the agenda for this on-board review. The group needs to aim for

proposed plan meetings in June in order to complete the associated RODs this fiscal year. Fay indicated that if there is an MNA remedy, she wants the MNA study ahead of time because she will need to have others at TCEQ involved in the review. Carlos said that MNA should be acceptable if it meets the EPA checklist and can meet remedial goals on a timely basis. Steve indicated that previously accepted time frames at LHAAP have been a couple hundred years.

Discussion Regarding Previous Action Items

The asbestos removal at the Power House is making good progress and near completion. Heavy truck traffic should be expected at LHAAP for about 6 weeks, from about April 13 to the end of May, as debris is transported off site. The work plan on the closure of the landfill is expected to go to the regulators in April for their review.

Steve suggested another column be added in the 5-year review recommendations table for the completion date. Praveen Srivastav will provide an updated table by the May meeting to allow for review and revision time before the June RAB.

Paul Bruckwicki indicated that the hunting program previously discussed was not signed off and did not get published in the Federal Register. The dates provided at the last meeting are no longer valid. They are working with the State to get something in place for a scheduled hunt in the interim.

Steve confirmed that a public meeting and public comment period are still needed for a No Further Action ROD.

Aaron reported that sites LHAAP-02 and -03 are non-NPL, and site LHAAP-58 has been determined to be NPL. Army noted that there are sumps associated with LHAAP-56 and LHAAP-65. Aaron confirmed that the sump at LHAAP-56 is indeed sump 113 which is addressed in the Shaw sump report for LHAAP-35/36. However, mention of LHAAP-65 shows that it is Building 209, with two sumps. No evidence of sampling has been found. Aaron indicated that based on the 1996 DERPMIS/RMIS Resolution document, these two sumps were intended to be addressed under LHAAP-35/36. Praveen said that Shaw would consider this, but still needed to look at the site definitions and other available information. The inclusion of the sumps at LHAAP-65 within LHAAP-35/36 is pending.

Dale Vodak provided information regarding USTs from the TCEQ database. The USTs were removed from the site except for two that were filled in place. The USTs were removed under the RCRA and UST programs.

Defense Environmental Restoration Program (DERP) PBC Update **Praveen Srivastav**

Document Status/Environmental Sites (Table)
Praveen briefly went over the document status/environmental sites table. The Decision Document for LHAAP-02 and the RTCs for the Draft Final SI Report for LHAAP-03 are in progress. The Draft Action Memorandum for LHAAP-04 and the Pistol Range has been submitted to the Army

for review. The Draft Feasibility Studies (FSs) for LHAAP-17 and LHAAP-18/24 are currently with the Army for review. The Draft Final FS for LHAAP-16 is in progress. The Draft Final FSs for LHAAP-29 and LHAAP-46 are in regulatory review. Army comments for the Draft FS for LHAAP-47 are in progress and additional samples have been collected. The Draft Final Site Evaluation for LHAAP-49 is in progress by addressing regulatory comments and incorporating new data. Steve said that EPA would be comfortable with the site if one more sample for arsenic is collected and has acceptable results. More discussion regarding the nitrates/nitrites hit ensued. Greg Jones indicated that the well with results exceeding the MCL (49WW02) was subsequently dry and could not be sampled. A DPT temporary well was installed and sampled with the result showing nitrate/nitrite above the MCL. However, a permanent monitoring well (49WW04) was installed at the location, and the two results thus far from 49WW04 have sample indicated nitrate/nitrite levels below the MCL. Fay asked Steve to discuss further after the meeting. The Draft Final FSs for LHAAP-50 and -58 are in progress. The Final Addendum for LHAAP-35/36 is being prepared, pending resolution of other sump issues.

A discussion about water levels was brought up in regards to the Central Texas drought. Paul Bruckwicki indicated that the FWS had burn bans in effect before the rain event occurring last week. It was reported that Caddo Lake has a USGS water level gauge.

Praveen reported that Shaw would arrange to have the sites LHAAP-06, -07, -51, -55, -64, -66, -68, and LHAAP-60 surveyed. No special arrangements will be initiated for the septic tank systems (LHAAP-55). They will be surveyed individually according to their footprint.

Groundwater Treatment Plant Update
Normal operations continued. The three control panels for the ICTs have an intermittent communication problem; however, treatment has not been disrupted because operators have used manual overrides as needed to maintain pumping.

Presentation for LHAAP-04 and Pistol Range EE/CA Public Meeting
Praveen will provide a presentation for LHAAP-04 and the Pistol Range at 6:00 PM during the public meeting prior to the commencement of the RAB meeting at 6:30 PM. The poster, extra copies of the EE/CAs, and a copy of the presentation will be available for the public to review before and after the RAB meeting.

DERP Total Environmental Restoration Contract (TERC) Update **Rose Zeiler**

Status of Draft Final ROD for Sites 37/67
Rose indicated that the Army is reviewing regulator comments on the ROD for these two sites.

BRAC-Funded Environmental Protection **John Lambert**

LHAAP-19—Demolition Landfill Progress
John said the schedule on the demolition landfill was recently provided and the work plan should be in regulatory review by mid-April.

MMRP **John Lambert**

Update
John Lambert indicated that two documents are in progress. They are the MEC (Munitions and Explosives of Concern) Removal Action Completion Report, which should be submitted to Fay and Steve sometime in March. The other document is the Munitions Constituent Summary Report, which is expected to be submitted sometime in March. John said that the contractor is Shaw, but this work is handled under a separate contract from the PBC.

Transfer Update **Rose Zeiler**

Electrical ROW Lease to USFWS
Rose asked the status of the transfer/lease for the electric easement. Paul said that it was mailed out to the regional office in Fort Worth and that the signed copies were sent out. It is not known if Army has received or signed as yet.

Transfer of LHAAP-12 Parcel
Rose indicated that a final letter has been issued. She has not heard anything from USFWS on the LHAAP-12 transfer and asked for a status from USFWS. Paul has not heard anything regarding that transfer.

ECOPs
ECOP VI should be finished by the end of the fiscal year and would include the transfer of LHAAP-08, -32, -48, and -53. The upcoming ECOP VII consists of the MMRP sites.

Schedule of Powerhouse Building/Debris Removal
The schedule of the Powerhouse demolition was discussed briefly at the beginning of the meeting. The demolition is currently in progress.

Other Issues **Rose Zeiler**

2009 IAP Schedule
Rose reminded everyone that there will be no Installation Action Plan (IAP) meeting this year. She indicated that if anyone feels a meeting for the IAP is needed, it could be arranged outside of the next Managers' meeting.

Status of Army's Perchlorate Page for Longhorn
This issue was resolved.

The next monthly manager's meeting will be a conference call scheduled for April 14, 2009 at 2:00 PM. The next several monthly managers' meetings are suggested for May 12, 2009 (as a teleconference) and June 16, 2009, at the installation. The RAB meeting date is June 16 at 6:30 PM. The monthly managers meeting will be held at 12:30 PM with the RAB following at 6:30 PM.

Meeting Adjourned

Action Items:

Army

- Update site status spreadsheet/schedule and provide to EPA before the May meeting.
- Tulsa upload MMRP DF Removal Report to ftp. DONE
- Put Site Status supporting information into Memo format and submit to regulators.

EPA

- Provide comments to Army on the site schedule before the June meeting.

TCEQ

- Check with TCEQ management regarding how to identify small sites (i.e., the industrial sumps under LHAAP-35/36 and the sanitary septic systems under LHAAP-55) that are closed to industrial levels within larger areas that have been closed to residential levels.

Shaw

- Provide additional column for completion date on the 5-year review recommendations table and submit to Army by May.
- Provide site status spreadsheet to the Army before May meeting for review and revision before the June RAB.

Shaw Environmental, Inc.

Status of Sites and Technical Documents
Longhorn Army Ammunition Plant – PBC Contract
24 March 2009

No.	Document in Progress	Submittal Date	Army	Regulator	Next Submittal	Expected Date	Army	Regulator	Comment Resolution	Status	Remarks
1	Final SI Report, LHAAP-02	1/30/09	x	x						Final report submitted.	Decision Document to be submitted
2	Draft Final SI Report for LHAAP-03, Rev 01	12/30/07		x	RTC	3/31/09	x		In progress	Preparing RTCs	Final SI report to be submitted after RTCs are resolved.
3	Final EE/CA, LHAAP-04	3/05/09	x	x					Submitted	Final EE/CA submitted on 3/5/09	
4	Draft Action Memorandum, LHAAP-04/Pistol Range	3/13/09	x							Draft Action Memo submitted to Army on 3/13/09	No regulatory review or signatures required
5	Final Decision Document, LHAAP-06, 07, 51, 55, 64, 66, 68	12/18/08	x		NA				NA	Final copies were distributed on 12/18/08.	Scheduling survey, followed by County notification.
6	Draft Final Feasibility Study Addendum, Rev 01, LHAAP-16	7/3/08		x	RTC	03/31/09	x		In progress	EPA and TCEQ comments rec'd. RTCs reviewed by Army. RTC revision in progress	FS delayed because of additional field work
7	Draft Feasibility Study, LHAAP-17	2/27/09	x							Submitted to Army	Collected a new round of groundwater samples in March 2009 to support FS
8	Draft Feasibility Study, LHAAP-18/24	3/3/09	x							Submitted to Army	

Shaw Environmental, Inc.

Status of Sites and Technical Documents
Longhorn Army Ammunition Plant – PBC Contract
24 March 2009

No.	Document in Progress	Submittal Date	Army	Regulator	Next Submittal	Expected Date	Army	Regulator	Comment Resolution	Status	Remarks
9	Draft Final Feasibility Study, LHAAP-29	03/11/09	x	x						Document in regulatory review	
10	Draft Final Focused Feasibility Study, LHAAP-46	1/30/09	x	x						Document in regulatory review	
11	Draft Focused Feasibility Study, LHAAP-47	12/23/08	x						In progress	Army comments received. Conducted a new round of groundwater sampling. RTC in prep.	
12	Draft Final Site Evaluation Report for LHAAP-49	3/3/08	x	x	RTC		x		In progress	Collected a new round of samples from wells. Nitrate/nitrite, arsenic, and chromium below MCLs	Need to resolve comments and finalize report
13	Draft Final Feasibility Study, LHAAP-50	11/20/08	x	x	RTC	2/20/09	x		In progress	Regulatory comments received. RTC in preparation	
14	Draft Final Feasibility Study, LHAAP-58	9/20/07	x	x					In progress	RTCs submitted to regulators on 1/30/09. Additional TCEQ comments rec'd on 3/06/09. EPA comments pending	
15	Final Decision Document, LHAAP-60	12/18/08	x						NA	Final copies were distributed on 12/18/08.	Scheduling survey, followed by County notification.
16	Final EE/CA, Pistol Range	2/25/09	x	x						Final EE/CA submitted on 2/25/09	
17	Draft Final Addendum, LHAAP-35/36	1/14/09	x							Document approved with few editorial comments. Preparation of final document in progress.	

LONGHORN ARMY AMMUNITION PLANT
MONTHLY MANAGERS' MEETING

Location	Longhorn Army Ammunition Plant, Karnack, Texas		
Date	Mar. 24, 2009	**Time**	12:30 PM

ATTENDEES

Name (printed)	Signature	Organization	Phone	E-mail
Longhorn Team Members				
Rose M. Zeiler	Rose M. Zeiler	BRAC	(479) 635-0110	rose.zeiler@us.army.mil
Jeff Armstrong	phone	USAEC	(410) 436-1510	jeffrey.armstrong@us.army.mil
Aaron Williams	Aaron Williams	USACE, Tulsa	(918) 669-4915	aaron.k.williams@usace.army.mil
John Lambert	John Lambert	USACE, Tulsa	(918) 669-4992	john.r.lambert@SWT03.usace.army.mil
Stephen Tzhone		USEPA, Dallas	(214) 665-8409	tzhone.stephen@epa.gov
Raji Josiam		USEPA, Dallas	(214) 665-8529	josiam.raji@epa.gov
Fay Duke	phone	TCEQ, Austin	(512) 239-2443	fduke@tceq.state.tx.us
Dale Vodak	phone	TCEQ, Tyler	(903) 535-5142	dvodak@tceq.state.tx.us
Barry Forsythe		USFSW, Dallas	(214) 665-8467	forsythe.barry@epa.gov
Paul Bruckwicki	PB	USFSW, Karnack	(903) 679-4536	paul_bruckwicki@fws.gov
Mark Williams		USFSW, Karnack	(903) 679-9144	mark_williams@fws.gov
Praveen Srivastav		SHAW, Houston	(713) 996-4588	praveen.srivastav@shawgrp.com
Kay Everett		SHAW, Houston	(713) 996-4421	kay.everett@shawgrp.com
Greg Jones		SHAW, Houston	(713) 996-4472	greg.n.jones@shawgrp.com
Susan Watson		SHAW, Houston	(713) 996-4407	susan.watson@shawgrp.com
Carlos A. Sanchez	Carlos A. Sanchez	USEPA	214/665-8507	sanchez.carlos@epa.gov
Scottie Fiehler	Scottie Fiehler	USACE Tulsa	918 669 7232	scottie.fiehler@us.army.mil

00073236

LONGHORN ARMY AMMUNITION PLANT
RESTORATION ADVISORY BOARD
Karnack, Texas
(479) 635-0110

March 9, 2009

Distribution (one copy each)

Paul Fortune
Post Office Box 16
Karnack, Texas 75661

Robert Speight, Jr.
2757 Blairs Landing Road
Karnack, Texas 75661

Tony Novak
271 R.R. 2422
Karnack, Texas 75661

Judith Johnson
1635 Dorough Road
Karnack, Texas 75661

Larry McCathran
3024 Marshall-Leigh Road
Marshall, Texas 75672

Tom Walker
500 Private Rd 7222
Jefferson, Texas 75657

Ken Shaw
1517 Dorough Road
Karnack, Texas 75661

Nigel R. Shivers
Post Office Box 558
Karnack, Texas 75661

Dear LHAAP RAB Member,

The next Restoration Advisory Board (RAB) meeting will be held on Tuesday, March 24, 2009, from 6:30 to 7:30 p.m. at the Karnack Community Center, Highway 134 and Spur 449, Karnack, Texas 75661. We hope that you can attend this meeting. If you have any questions, please do not hesitate to contact me.

Shaw Environmental, Inc. (Shaw) is the contractor supporting the U.S. Army environmental restoration activities at the Longhorn Army Ammunition Plant (LHAAP), and will be coordinating the RAB meeting. A tentative agenda is attached.

Regards,

Dr. Rose Zeiler
Department of the Army
Longhorn Army Ammunition Plant
Box 220
Ratcliff, Arkansas 72951

LONGHORN ARMY AMMUNITION PLANT
RESTORATION ADVISORY BOARD
Karnack, Texas
(479) 635-0110

AGENDA

DATE:	Tuesday, March 24, 2009
TIME:	6:30 – 7:30 PM
PLACE:	Karnack Community Center, Karnack, Texas

06:30 Welcome {RMZ & PF}

06:35 Open items {RMZ}

06:40 Programmatic Issues
- Site Status Summary
- Other

06:50 Defense Environmental Restoration Program (DERP) Performance Based Contract (PBC) Update {Shaw}
- Groundwater Treatment Plant (GWTP) Update
- Field Work Update
- Documents Status/ Environmental Sites
- EE/CA for the Former Pistol Range
- EE/CA for LHAAP-04, Former Pilot Wastewater Treatment Plant

07:05 DERP Total Environmental Restoration Contract Update {Shaw}
- ROD for LHAAP-37 and-67

07:15 Military Munitions Response Program (MMRP) Update {USACE}

07:25 Other Environmental Restoration Issues/Concerns {RMZ)
- Construction Debris Landfill
- IAP Schedule

07:30 Adjourn {RMZ}

Shaw Environmental, Inc.

Subject: **Draft Final Minutes, Quarterly Restoration Advisory Board (RAB) Meeting, Longhorn Army Ammunition Plant (LHAAP)**

Location of Meeting: Karnack Community Center, Karnack, Texas

Date of Meeting: **March 24, 2009, 6:30 – 07:30 PM**

Meeting Participants:

LHAAP/BRAC	Rose M. Zeiler
USACE-Tulsa:	John Lambert, Aaron Williams, Scottie Fiehler
USFWS:	Paul Bruckwicki
Shaw Environmental:	Praveen Srivastav, Greg Jones, Kay Everett, Susan Watson
USEPA Region 6:	Steve Tzhone
RAB:	Paul Fortune, Nigel Shivers, Tony Novak, Tom Walker
Community:	Shirley Shivers

Prior to the RAB meeting, a formal public meeting was held for Engineering Evaluations/Cost Analyses (EE/CAs) for the Pistol Range and site LHAAP-04.

An agenda for the RAB meeting was distributed prior to the meeting.

Welcome – Rose Zeiler and Paul Fortune
Rose Zeiler and Paul Fortune called the meeting to order.

The draft final minutes from the fourth quarter 2008 meeting were distributed prior to the meeting. The RAB had no comments or revisions on the minutes.

Open Items – Rose Zeiler
There were no open items were discussed.

Programmatic Issues
Site Status Summary
Rose indicated that the site status summary was not ready to distribute. Some of the sites have only minor environmental issues, and there has been an effort to separate the NPL sites from

the non-NPL sites. This will help tighten the schedule and makes it easier to review the status of each site. The draft table was passed around to give meeting participants an idea of what it shows, including the CERCLA phases for each site.

Other
Many areas at LHAAP have been fenced and locked to prevent unauthorized entry. Some of these areas were part of the pit and hazard mitigation program and involved physical safety hazards; others are environmental sites requiring remediation.

Some sites have groundwater issues and some sites will require soil removal, which will be executed in the future. Approximately 7,000 acres have already been transferred to FWS. There are approximately 1,400 acres remaining. All of Longhorn is intended to be transferred to the FWS pending their agreement.

Rose indicated that LHAAP-12 was addressed in Environmental Condition of Property (ECOP) V and has been offered to USFWS for transfer. ECOP VI is being written and includes Sites 8, 32, 48 and 53. She mentioned that ECOP VI was scoped originally to include the MMRP sites, but they have been removed because they are not ready. They will be addressed in the next ECOP. Paul Fortune asked about any unresolved issues between the Army and the FWS. Rose indicated that there is an issue with LHAAP-12 concerning land use controls and their implementation. She said that the issue has been taken to a higher level and is currently being resolved.

Defense Environmental Restoration Program (DERP) Performance Based Contract (PBC) Update–Shaw

Document Status/Environmental Sites
Praveen Srivastav distributed copies of the document status table. Praveen indicated that the Decision Document (DD) for LHAAP-02 is in Army's review. He said that responses to comments (RTC) are in preparation for the Site Investigation (SI) Report for LHAAP-03. A draft Action Memorandum for LHAAP-04 and the Pistol Range is in review with the Army. The final Engineering Evaluation/Cost Analysis (EE/CA) report for LHAAP-04 was submitted in early March. The RTC for the DF Feasibility Study (FS) for LHAAP-16 is in progress and additional field data is being collected. The draft FS for LHAAP-18/24 is in review with the Army. DF FSs for LHAAP-29 and -46 are in regulatory review. The draft FS for LHAAP-47 is in progress as additional groundwater sampling is being conducted and the RTC is in preparation. The DF Site Evaluation Report for LHAAP-49 is in progress. Additional field data is being collected. The RTC for the DF FS LHAAP-50 is in preparation. The DF FS for LHAAP-58 is awaiting regulatory comments. Survey service and county notification are the next activities planned for LHAAP-60. The Final EE/CA for the Pistol Range was submitted in February. A public meeting for the Pistol Range and LHAAP-04 EE/CAs was held earlier before the meeting. The final Addendum to the Final Data Evaluation Report for LHAAP-35/36 is in preparation.

Groundwater Treatment Plant (GWTP) Update
The plant is functioning normally and some repairs are being scheduled.

Field Work Update
Shaw was in the field, sampling at LHAAP-16, LHAAP-17, LHAAP-18/24, and LHAAP-49. Data have been collected from LHAAP-03, -18 /24, -46, -47, -49, -50, and -58. Field work was completed in the first week of December 2008, and the new wells are currently being surveyed.

DERP Total Environmental Restoration Contract (TERC) Update –USACE

ROD for LHAAP-37 and -67
The Record of Decision (ROD) is at the Base Realignment and Closure division (BRAC) to be finalized. Rose indicated that this document should be finalized this fiscal year.

Military Munitions Response Program (MMRP) Update – USACE

The South Test Area and the Signal Test Area were 100% surface cleared. In LHAAP-27, the OB/OD clearance was made to 4 feet below ground surface. The draft report is in review with the Army and should be submitted to the regulators this week. John Lambert indicated that another contract to summarize chemical data at the two sites is with Shaw. Shaw will be submitting the MC summary report next week.

Other Environmental Restoration Issues/Concerns

Construction Debris Landfill
This work will begin upon regulator review and approval of the Landfill Closure Work Plan. A delay in receipt of the draft Landfill Closure Work Plan will likely cause delays in schedule. An investigation was conducted around the landfill, and the cover needed to be repaired.
Powerhouse Demolition Progress

The powerhouse demolition is in progress. Paul Fortune asked about the Army demolishing the building behind the Administrative Building, also known as the old data processing building. Rose indicated that it is not Army property anymore.

The next RAB meeting is June 16, 2009 at 6:30 PM.

Adjourn

March Meeting Attachments and Handouts:
- *December 2008 RAB Meeting Minutes*
- *December 2008 Attendees Signup Sheet*
- *Status of Technical Documents MARC PBC*
- *Shaw Presentation of EE/CAs for LHAAP-04 and Pistol Range*

00073241

Shaw Environmental, Inc.

Longhorn Army Ammunition Plant
Restoration Advisory Board Meeting

Location	Karnack Community Center, Karnack, Texas
Date	24-Mar-2009 6:30 PM **page 1 of 1**

Please sign in the space provided or add your name and address on next page if your name does not appear below.

ATTENDEES

Name (printed)	Signature	Organization	Phone	E-mail
RAB Members				
Paul Fortune	Paul Fortune			plfortune@hotmail.com
Robert Speight				r.speightjr@att.net
Larry McCathran				MMCattle@yahoo.com
Nigel R. Shivers	Nigel R Shivers	RAB		nigelshivers@yahoo.com
Tom Walker	Tom Walker		903-665-8279	twalkercaddolake@gmail.com
Tony Novak				paldog_1@windstring.net
Judith Johnson				judithjohnson@webtv.net
Ken Shaw				kens@shreve.net
Longhorn Team Members and Community				
Rose M. Zeiler	Rose Zeiler	Longhorn AAP	(479) 635-0110	rose.zeiler@us.army.mil
Cliff Murray		USACE, Tulsa	(918) 669-7573	cliff.murray@SWT03.usace.army.mil
John Lambert		USACE, Tulsa	(918) 669-4992	john.r.lambert@SWT03.usace.army.mil
Steve Tzhone		USEPA, Dallas	(214) 665-8409	tzhone.stephen@epa.gov
Raji Josiam		USEPA, Dallas	(214) 665-8529	josiam.raji@epa.gov
Fay Duke		TCEQ, Austin	(512) 239-2443	fduke@tceq.state.tx.us
Dale Vodak		TCEQ	(903) 535-5142	dvodak@tceq.state.tx.us
Paul Bruckwicki	P Bruckwicki	USFSW	(903) 679-4536	paul_bruckwicki@fws.gov
Barry Forsythe		USFSW	(214) 665-8467	forsythe.barry@epa.gov
Mark Williams		USFSW	(903) 679-9144	mark_williams@fws.gov
Praveen Srivastav		SHAW	(713) 996-4588	praveen.srivastav@shawgrp.com
Greg Jones	Gregory N. Jones	SHAW	(713) 996-4472	gregary.n.jones@shawgrp.com
John Elliott		SHAW	(713) 996-4517	john.elliott@shawgrp.com
Kay Everett		SHAW	(713) 996-4421	kay.everett@shawgrp.com
Susan Watson		SHAW	(713)996.4407	susan.watson@shawgrp.com
Scottie Fiebler	Scottie Fiebler	USACE, Tulsa	918 669 7232	Scottie.Fiebler@us.army.mil

Shaw Environmental, Inc.

Status of Sites and Technical Documents
Longhorn Army Ammunition Plant – PBC Contract
14 April 2009

No.	Document in Progress	Submittal Date	Army	Regulator	Next Submittal	Expected Date	Army	Regulator	Comment Resolution	Status	Remarks
1	Draft Decision Document, LHAAP-02	4/06/09	x		Draft Final DD	4/30/09	x	x			
2	Draft Final SI Report for LHAAP-03, Rev 01	12/30/07		x	RTC	4/30/09	x	x	Resolved	RTCs submitted for Army's review on 4/2/09	Final SI report to be submitted after RTCs are resolved.
3	Final EE/CA, LHAAP-04	3/05/09	x	x					Submitted	Final EE/CA submitted on 3/5/09. Public comment period 3/15/09 – 4/15/09	
4	Draft Action Memorandum, LHAAP-04/Pistol Range	3/13/09	x		Revised Draft Action Memo	4/16/09	x			Draft Action Memo submitted to Army on 3/13/09. Comments received. Revision in progress.	No regulatory review or signatures required
5	Final Decision Document, LHAAP-06, 07, 51, 55, 64, 66, 68	12/18/08	x		NA				NA	Final copies were distributed on 12/18/08.	Scheduling survey, followed by County notification.
6	Draft Final Feasibility Study Addendum, Rev 01, LHAAP-16	7/3/08		x	RTC	04/17/09	x		In progress	EPA and TCEQ comments rec'd. RTCs reviewed by Army. RTC revision in progress	FS delayed because of additional field work
7	Draft Feasibility Study, LHAAP-17	2/27/09	x		Draft Final	4/15/09	x	x		Army comments resolved.	Collected a new round of groundwater samples in March 2009 to support FS
8	Draft Feasibility Study, LHAAP-18/24	3/3/09	x		Draft Final	5/15/09	x	x		Submitted to Army	

Shaw Environmental, Inc.

Status of Sites and Technical Documents
Longhorn Army Ammunition Plant – PBC Contract
14 April 2009

No.	Document in Progress	Submittal Date	Army	Regulator	Next Submittal	Expected Date	Army	Regulator	Comment Resolution	Status	Remarks
9	Draft Final Feasibility Study, LHAAP-29	03/11/09	x	x						Document in regulatory review	
10	Draft Final Focused Feasibility Study, LHAAP-46	1/30/09	x	x						Document in regulatory review	
11	Draft Focused Feasibility Study, LHAAP-47	12/23/08	x		Draft Final	5/15/09	x	x	In progress	Army comments received. Conducted a new round of groundwater sampling. RTC in prep.	
12	Draft Final Site Evaluation Report for LHAAP-49	3/3/08	x	x	RTC		x		In progress	Collected a new round of samples from wells. Nitrate/nitrite, arsenic, and chromium below MCLs	Need to resolve comments and finalize report
13	Draft Final Feasibility Study, LHAAP-50	11/20/08	x	x	Final FS	5/15/09			In progress	Regulatory comments received. RTC submitted 4/06/09	
14	Draft Final Feasibility Study, LHAAP-58	9/20/07	x	x					In progress	RTCs submitted to regulators on 1/30/09. Additional TCEQ comments rec'd on 3/06/09. EPA comments pending	
15	Final Decision Document, LHAAP-60	12/18/08	x						NA	Final copies were distributed on 12/18/08.	Scheduling survey, followed by County notification.
16	Final EE/CA, Pistol Range	2/25/09	x	x						Final EE/CA submitted on 2/25/09	
17	Draft Final Addendum, LHAAP-35/36	1/14/09	x							Document approved with few editorial comments. Preparation of final document in progress.	

00073244

02M062007D

The Shaw Group Inc.®

Longhorn Army Ammunition Plant
Karnack, Texas

LHAAP-04, Former Pilot Wastewater Treatment Plant

and

FORMER PISTOL RANGE

March 24, 2009

02M062007D

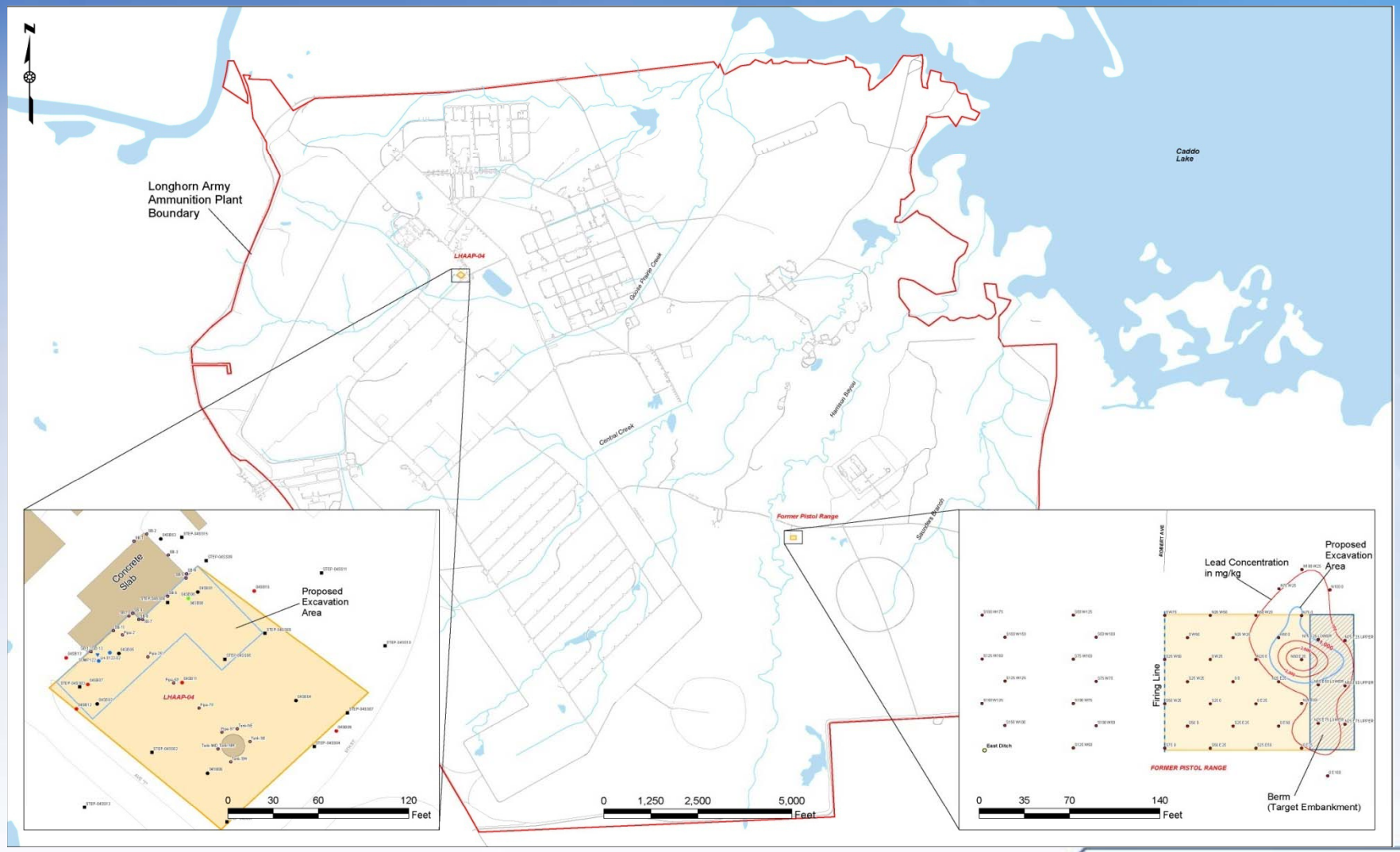
Shaw® a world of Solutions™

Engineering Evaluation/Cost Analysis (EE/CA)

- Evaluates removal action alternatives for contaminated sites
- Presents cost analysis comparison for implementation of each alternative
- EE/CAs were developed to facilitate public involvement in the remedy selection process

02M062007D

LHAAP-04, Former Pilot Wastewater Treatment Plant
Former Pistol Range



02M062007D

Shaw® a world of Solutions™

LHAAP-04, Former Pilot Wastewater Treatment Plant

Site History

- Began operations in 1984.
- Occupied approximately ½ an acre at the northwest corner of 6th and 60th Streets.
- Wastewater from sumps throughout Longhorn Army Ammunition Plant (LHAAP) was trucked to the plant for treatment.
- Solids were shipped off site for disposal.
- The plant was closed in 1997.

02M062007D

LHAAP-04, Former Pilot Wastewater Treatment Plant

Chemicals of Concern

- ***Mercury***
- ***Perchlorate***

Cleanup Levels

- 150 micrograms per kilograms (µg/kg) for mercury (SAI-Ind)
  - o *Mercury cleanup level is protective of the adsorption, ingestion, and inhalation pathways for the industrial user .*
- 7,200 µg/kg for perchlorate (GWP-Ind).
  - o *Perchlorate cleanup level reflects the soil MSC for industrial use based on groundwater protection.*

LHAAP-04
Removal Action Alternatives

Alternatives were evaluated based on effectiveness, implementability, and cost.

Alternative 1 – No Action

- Leaves contaminated soil in place
- Involves no action to be performed under current or future land-use scenarios
- Provides a comparative baseline.

02M062007D

LHAAP-04
Removal Action Alternatives con't

Alternative 2 – Excavation and Off-Site Disposal

- Removes contaminated soil above cleanup levels.
- Disposes excavated soil off site at a permitted disposal facility.
- Proposed extent of the excavation is approximately 4,200 square feet.
- Five-Year reviews to ensure industrial use.

LHAAP-04
Removal Action Alternatives con't

Recommended Alternative:

- ***Alternative 2*** *is the recommended alternative for LHAAP-04*
- *Most appropriately addresses the soil contamination at LHAAP-04 in a manner that is effective and consistent with the future use of LHAAP.*

02M062007D

Former Pistol Range

Site History

- The former Pistol Range was established before 1954
- Known to have been used by LHAAP security personnel for small arms target practice and qualifying tests
- Used through 2003 and into 2004
- Officially closed by the Army in 2005

Former Pistol Range

Chemical of Concern

- Lead

Cleanup Levels

- 1,000 milligrams per kilogram (SAI-Ind)
- *Cleanup level is protective of adsorption, ingestion, and inhalation pathways for the industrial user*
- Lead concentrations remaining after soil removal will not impact groundwater

Former Pistol Range Removal Action Alternatives

The alternatives were evaluated based on effectiveness, implementability, and cost.

Alternative 1 – No Action

- Leaves contaminated soil in place with no measures to prevent exposure.
- Serves as a baseline for comparison of other alternatives.

Alternative 2 – Land Use Controls

- Implements land use controls to prevent human exposure to contaminated soil.
- For future maintenance worker, exposure limited to levels below SAI-Ind.

Former Pistol Range Removal Action Alternatives con't

Alternative 3 – Excavation and Off-Site Disposal with Land Use Controls

- Removes contaminated soil exceeding the SAI-Ind value of 1,000 mg/kg
- Transport excavated soils to permitted off-site facility for disposal.
- Proposed excavation area follows the concentration contour of 1,000 mg/kg, the cleanup level for lead.
- Actual excavation limits will be conducted based on confirmation sampling.
- Five-Year reviews to ensure industrial use.

Public Notification of the EE/CAs for LHAAP-04 and Former Pistol Range

- Public notices were published in the Marshall News Messenger (March 8, 2009) and the Shreveport Times (March 15, 2009).
- Electronic version can be found at www.publicnoticeads.com for the Shreveport Times.
- Media release copy was provided to KTBS 3 (ABC), KTAL-TV (NBC), KMISS (FOX), KSLA TV (CBS), and KETK (NBC)
- Copies of the EE/CAs were delivered to the Marshall Public Library, the repository for the LHAAP Administrative Record, by March 13, 2009.
- Copies of the EE/CAs and other supporting documentation were made available to the public before the beginning of the 30-day public comment period of March 15 through April 15, 2009.
- Public comments must be submitted by April 15, 2009, to Dr. Rose M. Zeiler, Longhorn Army Ammunition Plant, P.O. Box 220, Ratcliff, AR 72951 or emailed to rose.zeiler@us.army.mil.

QUESTIONS?

Shaw® a world of Solutions™

The Shaw Group Inc.®

LONGHORN ARMY AMMUNITION PLANT,

Karnack, Texas

MONTHLY MANAGERS' MEETING

AGENDA

DATE:	Tuesday, 14 April 2009
TIME:	2:00 p.m.
PLACE:	Teleconference
	Dial in number: 866-797-9304, code - 4155734

Welcome **RMZ**

Action Items:

Army

- Update site status spreadsheet/schedule and provide to EPA before May meeting.
- Tulsa upload MMRP DF Removal Report to ftp. DONE
- Put Site Status supporting information into Memo format and submit to regulators.

EPA

- Provide comments to Army on the site schedule before the June meeting.

TCEQ

- Check with TCEQ management regarding how to identify small sites (i.e., the industrial sumps under LHAAP-35/36 and the sanitary septic systems under LHAAP-55) that are closed to industrial levels within larger areas that have been closed to residential levels.

Shaw

- Provide additional column for completion date on the 5-year review recommendations table and submit to Army by May.
- Provide site status spreadsheet to the Army before Managers' meeting in May for review and revision before the June RAB.

Defense Environmental Restoration Program (DERP) PBC Update **PS**

- Document Status/Environmental Sites (Table)
- Groundwater Treatment Plant Update
- Path forward for LHAAP-49
- Path forward for LHAAP-04 and Pistol Range
- Feasibility Study meeting in Austin on April 27-28

DERP Total Environmental Restoration Contract Update **RMZ**

- Status of Draft Final ROD for Sites 37/67

BRAC-Funded Environmental Restoration

- LHAAP-19 – Demolition Landfill Progress **DB**

MMRP **JRL/DB**

- Status of regulatory review

DF MEC Removal Action Report
DF MC Data Summary Report

Transfer Update

- Electrical ROW Lease to USFWS
- Transfer of LHAAP-12 Parcel
- ECOP VI

Other Issues

- 2009 IAP SchedulePowerhouse Demolition Status
- LHAAP-19 Closure Work Plan Status

Adjourn

Shaw Environmental, Inc.

Subject: **Draft Final Minutes, Monthly Managers Meeting, Longhorn Army Ammunition Plant (LHAAP)**

Location of Meeting: **Teleconference**

Date of Meeting: **April 14, 2009; 2:00 PM – 3:50 PM**

Meeting Participants:

BRAC:	Rose M. Zeiler
USACE-Tulsa:	Aaron Williams, John Lambert, Scottie Fiehler
USAEC:	Jeff Armstrong
Shaw:	Praveen Srivastav, Greg Jones, Kay Everett, Susan Watson
USEPA Region 6:	Steve Tzhone, Carlos Sanchez
TCEQ:	Fay Duke, Dale Vodak
USFWS:	Paul Bruckwicki

Previous Action Items

Army

- Update site status spreadsheet/schedule and provide to EPA before May meeting.
- Tulsa upload MMRP Draft Final Removal Report to ftp. *Completed.*
- Put Site Status supporting information into memo format and submit to regulators.

EPA

- Provide comments to Army on the site schedule before the June meeting.

TCEQ

- Check with TCEQ management regarding how to identify small sites (i.e., the industrial sumps under LHAAP-35/36 and the sanitary septic systems under LHAAP-55) that are closed under industrial cleanup levels within larger areas that have been closed under residential cleanup levels.

Shaw

- Provide additional column for completion date on the 5-year review recommendations table and submit to Army by May.
- Provide site status spreadsheet to the Army before Managers' meeting in May for review and revision before the June RAB.

Discussion Regarding Previous Action Items

The site status spreadsheet will be updated and provided to EPA before the May meeting. Tulsa completed the upload of the MMRP DF Removal Report. Aaron Williams is currently completing the site status supporting information and is awaiting a resolution regarding the Site 69 issue. EPA will review the spreadsheet so that the status spreadsheet will be available by the June meeting. Steve Tzhone held a regional call regarding items on the site schedule. An issue was mentioned about controlled/uncontrolled pathways for human health risk. A discussion followed regarding the EPA website: how data are input, definitions of the input data, what is being presented in the website, and the elements involved in selection of the data shown on the website in cases where the data may appear misleading. Steve also mentioned that last week the interim director was considering sites for follow-up regarding 5-year reviews, and Longhorn was selected. Steve provided HQ the concurrence letter and the 5-yr review status table that Aaron had sent to EPA. Rose Zeiler asked what follow up to expect. Steve indicated that the Army will need to provide the status of follow-up to 5-year review recommendations. EPA wants to work closely with the Army on that.

There was also discussion regarding how to identify small sites under LHAAP-35/36 and LHAAP-55 associated with sites that have been closed to residential levels. This is pending.

Defense Environmental Restoration Program (DERP) PBC Update **Praveen Srivastav**

Document Status/Environmental Sites (Table)
Praveen Srivastav briefly went over the document status/environmental sites table. The Decision Document for LHAAP-02 is in progress. RTCs for the Draft Final SI Report for LHAAP-03 have been submitted to the Army, and the Final document will be submitted after the RTCs are resolved. A public meeting was held for the Final LHAAP-04 and Pistol Range EE/CAs last month, and the Action Memo has been submitted to the Army. The Draft Final Feasibility Study (FS) Addendum for LHAAP-16 is in progress because of additional field work in response to RTCs (collecting samples for metals and sampling shallow/deep to confirm the deep is not contaminated). The Draft Final FS for LHAAP-17 is in preparation (delayed due to request for more data - data was from 1998). The DF FS for LHAAP-18/24 is currently in comment resolution with the Army. The Draft Final FSs for LHAAP-29 and LHAAP-46 are in regulatory review. Responses to Army comments for the Draft FS for LHAAP-47 are in progress, while additional sampling data are being incorporated. The Draft Final Site Evaluation for LHAAP-49 is in progress; Shaw is addressing regulatory comments and incorporating new groundwater results from early April. RTCs to the Draft Final FS for LHAAP-50 were submitted to the EPA and TCEQ. DF FS LHAAP-58 is in progress; EPA comments are pending. The Final Addendum for the LHAAP-35/36 Site Evaluation Report is being prepared.

Groundwater Treatment Plant Update
Normal operations continued. Shaw is currently isolating the communication problem regarding the three control panels for the ICTs previously reported; however, treatment has not been disrupted because operators have used manual overrides as needed to maintain pumping. Water levels in the wells at LHAAP-18/24 have been rising recently, due in part to rain.

Vegetation around the groundwater treatment plant is being removed, and semi-annual inspections for Landfills 12 and 16 were conducted, including an inspection of all wells at the two sites. The monitoring wells appeared to be in good shape overall. Eradication of tree seedlings on top of the landfill caps appears to be partially effective; it was observed only about half of the seedlings had been destroyed. Another herbicide application is planned.

Path Forward for LHAAP-49
Praveen indicated that new data collected would be sent and wanted to discuss the path forward. He stated that these chemicals should not be carried forward as contaminants of concern. There was agreement to discuss the issue further.

Path Forward for LHAAP-04 and Pistol Range
Removal of the soil at these two sites is currently being planned for July. The duration is expected to be about two to three weeks. Rose indicated a two week notice to the stakeholders should be given. Fay Duke asked about the removal action work plan and Praveen said he would provide that when it was available. It is currently being prepared.

Feasibility Study Meeting in Austin on April 27-28
Fay said that she booked a room for the meeting in Austin. The meeting will start at 1 pm on April 27, 2009. The sites to be discussed at the meeting are: LHAAP-17, -29, -46, -50, and -58. Fay asked for the MNA evaluation for LHAAP-58, and Praveen said that Shaw will try to provide it before the meeting. He indicated that scoring has been conducted on some of these evaluations and that this and other supplemental data will be provided. Fay also requested the electronic Excel tables for LHAAP-29 for her review of the FS; Shaw will provide these.

DERP Total Environmental Restoration Contract (TERC) Update **Rose Zeiler**

Status of Draft Final ROD for Sites 37/67
Rose indicated that the Army is reviewing regulator comments on the ROD for these two sites and expects that these two RODs will be signed this fiscal year.

BRAC-Funded Site OPerations **John Lambert**

LHAAP-19—Demolition Landfill Progress
John Lambert indicated that during the Powerhouse demolition, asbestos was found next to the boiler and needed to be removed. The demolition work is in progress.

MMRP **John Lambert**

John will be getting the report out and asked Fay if an electronic version would suffice. She said she preferred the hardcopy.

Status of Regulatory Review

John said he will have the electronic version out this week and will submit the hardcopy next week.

DF MEC Removal Action Report and DF MC Data Summary Report

John indicated that both reports had been submitted. The electronic versions went out at the end of last week. Rose mentioned that these two sites may be ready to transfer before the end of this year. Fay said that she no longer has the MEC contractors to assist on review of these sites.

John mentioned the next step is a proposed plan and to issue a NFA ROD.

Transfer Update **Rose Zeiler**

Electrical ROW Lease to USFWS

Rose indicated that the electrical lease still needs to be signed. Paul Bruckwicki said that he contacted Jack Andres. Lines along the LHAAP-49 right of way have to be refurbished.

Transfer of LHAAP-12 Parcel

Rose said she has not heard anything from USFWS on the LHAAP-12 transfer and asked for a status from USFWS. Paul said that Mark Williams took it to the meeting in Albuquerque. He said they may send someone to the RAB meeting in June when Tom Lederle (Army) is expected to be in attendance.

ECOP VI

ECOP VI should be finished by the end of the fiscal year and would include the transfer of LHAAP-08, -32, -48, and -53 and possibly -12 if issues are resolved, and the INF pond, since it is not being used. The upcoming ECOP VII consists of the MMRP sites.

Schedule of Powerhouse Building/Debris Removal

The schedule of the Powerhouse demolition was discussed briefly at the beginning of the meeting. The demolition is currently in progress. Heavy truck traffic is expected beginning the end of May beginning of June in conjunction with removing the demolition debris at the Powerhouse.

Other Issues **Rose Zeiler**

2009 IAP Schedule

There will be no meeting this year. They are sending out the comments and expect it to be signed by the end of April. John indicated that there was not a lot of time and a draft would be out this week. Rose said that there were few changes and that any remedy changes would be reflected in next year's IAP. While regulator review would be good, it is not required.

LHAAP-19 Closure Work Plan Status
This was discussed earlier in the meeting.

The next monthly manager's meeting will be a conference call scheduled for May 12, 2009, at 2:00 PM. The RAB meeting date is June 16 at 6:30 PM. The next monthly managers meeting will be June 16, 2009, at 12:30 PM with the RAB meeting following at 6:30 PM.

Meeting Adjourned

Action Items:

Army
- Update site status spreadsheet/schedule and provide to EPA before the May meeting.
- Put Site Status supporting information into Memo format and submit to regulators.

EPA
- Provide comments to Army on the site schedule before the June meeting.

TCEQ
- Check with TCEQ management regarding how to identify small sites (i.e., the industrial sumps under LHAAP-35/36 and the sanitary septic systems under LHAAP-55) that are closed to industrial levels within larger areas that have been closed to residential levels.

Shaw
- Provide site status spreadsheet to the Army before May meeting for review and revision before the June RAB.
- Provide TCEQ with electronic tables from the FS for LHAAP-29.
- Provide the MNA evaluation for LHAAP-58.
- Provide the Army with 5-Year Review recommendations table with additional column for completion date.

Shaw Environmental, Inc.

Status of Sites and Technical Documents
Longhorn Army Ammunition Plant – PBC Contract
14 April 2009

No.	Document in Progress	Submittal Date	Army	Regulator	Next Submittal	Expected Date	Army	Regulator	Comment Resolution	Status	Remarks
1	Draft Decision Document, LHAAP-02	4/06/09	x		Draft Final DD	4/30/09	x	x			
2	Draft Final SI Report for LHAAP-03, Rev 01	12/30/07		x	RTC	4/30/09	x	x	Resolved	RTCs submitted for Army's review on 4/2/09	Final SI report to be submitted after RTCs are resolved.
3	Final EE/CA, LHAAP-04	3/05/09	x	x					Submitted	Final EE/CA submitted on 3/5/09. Public comment period 3/15/09 – 4/15/09	
4	Draft Action Memorandum, LHAAP-04/Pistol Range	3/13/09	x		Revised Draft Action Memo	4/16/09	x			Draft Action Memo submitted to Army on 3/13/09. Comments received. Revision in progress.	No regulatory review or signatures required
5	Final Decision Document, LHAAP-06, 07, 51, 55, 64, 66, 68	12/18/08	x		NA				NA	Final copies were distributed on 12/18/08.	Scheduling survey, followed by County notification.
6	Draft Final Feasibility Study Addendum, Rev 01, LHAAP-16	7/3/08		x	RTC	04/17/09	x		In progress	EPA and TCEQ comments rec'd. RTCs reviewed by Army. RTC revision in progress	FS delayed because of additional field work
7	Draft Feasibility Study, LHAAP-17	2/27/09	x		Draft Final	4/15/09	x	x		Army comments resolved.	Collected a new round of groundwater samples in March 2009 to support FS
8	Draft Feasibility Study, LHAAP-18/24	3/3/09	x		Draft Final	5/15/09	x	x		Submitted to Army	

Shaw Environmental, Inc.

Status of Sites and Technical Documents
Longhorn Army Ammunition Plant – PBC Contract
14 April 2009

No.	Document in Progress	Submittal Date	Army	Regulator	Next Submittal	Expected Date	Army	Regulator	Comment Resolution	Status	Remarks
9	Draft Final Feasibility Study, LHAAP-29	03/11/09	x	x						Document in regulatory review	
10	Draft Final Focused Feasibility Study, LHAAP-46	1/30/09	x	x						Document in regulatory review	
11	Draft Focused Feasibility Study, LHAAP-47	12/23/08	x		Draft Final	5/15/09	x	x	In progress	Army comments received. Conducted a new round of groundwater sampling. RTC in prep.	
12	Draft Final Site Evaluation Report for LHAAP-49	3/3/08	x	x	RTC		x		In progress	Collected a new round of samples from wells. Nitrate/nitrite, arsenic, and chromium below MCLs	Need to resolve comments and finalize report
13	Draft Final Feasibility Study, LHAAP-50	11/20/08	x	x	Final FS	5/15/09			In progress	Regulatory comments received. RTC submitted 4/06/09	
14	Draft Final Feasibility Study, LHAAP-58	9/20/07	x	x					In progress	RTCs submitted to regulators on 1/30/09. Additional TCEQ comments rec'd on 3/06/09. EPA comments pending	
15	Final Decision Document, LHAAP-60	12/18/08	x						NA	Final copies were distributed on 12/18/08.	Scheduling survey, followed by County notification.
16	Final EE/CA, Pistol Range	2/25/09	x	x						Final EE/CA submitted on 2/25/09	
17	Draft Final Addendum, LHAAP-35/36	1/14/09	x							Document approved with few editorial comments. Preparation of final document in progress.	

Shaw® Shaw Environmental, Inc.

Date: ***April 22, 2009***

Project No.:117591

TRANSMITTAL LETTER:

To: Mr. Aaron Williams

Address: US Army Corps of Engineers - Tulsa
CESWT-PP-M
1645 South 101st East Ave
Tulsa, Oklahoma 74128

Re: Final Addendum to the Final Data Evaluation Report Chemical Concentrations in Soil Samples Associated with LHAAP-35/36 Sumps

Contract No. W912QR-04-D-0027/DS02

For: Review_____ As Requested _____ Approval_____ Corrections_____ Submittal _____ Other X_____

Item No:	***No. of Copies***	***Date:***	***Document Title***
1	2	April 2009	Final Addendum to the Final Data Evaluation Report Chemical Concentrations in Soil Samples Associated with LHAAP-35/36 Sumps, Longhorn Army Ammunition Plant, Karnack, Texas

Aaron – Enclosed please find two copies of Shaw's final version of the above-named document.

Copies have been distributed as indicated below.

Please call with any questions or comments.

Sincerely:

Praveen Srivastav
Project Manager

CC: **Distribution List:**
J. Lambert/S. Fiehler – USACE, Tulsa (sent to A. Williams for distribution)
J. Armstrong – AEC
Rose Zeiler – BRAC-LHAAP
S. Tzhone – EPA Region 6 (2)
F. Duke– TCEQ, Austin (2)
D. Vodak– TCEQ, Tyler
P. Bruckwicki– U.S. Fish and Wildlife Service

3010 Briarpark Drive, Suite 400, Houston, Texas 77042 ***Phone: (713) 996-4588/Fax: (713) 996-4436***

00073269

DEPARTMENT OF THE ARMY
LONGHORN ARMY AMMUNITION PLANT
POST OFFICE BOX 220
RATCLIFF, AR 72951

April 22, 2009

DAIM-ODB-LO

Mr. Stephen Tzhone
US Environmental Protection Agency
Superfund Division (6SF-AT)
1445 Ross Avenue
Dallas, TX 75202-2733

Re: Final Addendum to the Final Data Evaluation Report Chemical Concentrations in Soil Samples Associated With LHAAP-35/36 Sumps,
Longhorn Army Ammunition Plant, Karnack, Texas, April 2009

Dear Mr. Tzhone,

The above-referenced document is being transmitted to you for your records. The document has been prepared by Shaw Environmental, Inc. (Shaw) on behalf of the Army as part of Shaw's performance based contract for the facility.

The point of contact for this action is the undersigned. I ask that Praveen Srivastav, Shaw's Project Manager, be copied on any communications related to the project. I may be contacted at 479-635-0110, or by email at rose.zeiler@us.army.mil.

Sincerely,

Rose M. Zeiler

Rose M. Zeiler, Ph.D.
Longhorn AAP Site Manager

Copies furnished:
F. Duke, TCEQ, Austin, TX
D. Vodak, TCEQ, Tyler, TX
A. Williams, USACE, Tulsa District, OK
J. Armstrong, USAEC, MD
J. Lambert/S. Fiehler, USACE, Tulsa District, OK
P. Bruckwicki, Caddo Lake NWR, TX
P. Srivastav, Shaw – Houston, TX (for project files)

00073270

DEPARTMENT OF THE ARMY
LONGHORN ARMY AMMUNITION PLANT
POST OFFICE BOX 220
RATCLIFF, AR 72951

April 22, 2009

DAIM-ODB-LO

Ms. Fay Duke
Texas Commission on Environmental Quality
TCEQ Environmental Cleanup Section I, Team 2, MC-136
12100 Park 35 Circle, Bldg D
Austin, TX 78753

Re: Final Addendum to the Final Data Evaluation Report Chemical Concentrations in Soil Samples Associated With LHAAP-35/36 Sumps,
Longhorn Army Ammunition Plant, Karnack, Texas, April 2009
SUP 126

Dear Ms. Duke,

The above-referenced document is being transmitted to you for your records. The document has been prepared by Shaw Environmental, Inc. (Shaw) on behalf of the Army as part of Shaw's performance based contract for the facility.

The point of contact for this action is the undersigned. I ask that Praveen Srivastav, Shaw's Project Manager be copied on any communications related to the project. I may be contacted at 479-635-0110, or by email at rose.zeiler@us.army.mil.

Sincerely,

Rose M. Zeiler, Ph.D.
Longhorn AAP Site Manager

Copies furnished:
S. Tzhone, USEPA Region 6, Dallas, TX
D. Vodak, TCEQ, Tyler, TX
P. Bruckwicki, Caddo Lake NWR, TX
J. Lambert/S. Fiehler, USACE, Tulsa District, OK
A. Williams, USACE, Tulsa District, OK
J. Armstrong, USAEC, MD
P. Srivastav, Shaw – Houston, TX (for project files)

Response to Comments on
Draft Final Addendum to the Final Data Evaluation Report Chemical Concentrations in Soil Samples Associated with LHAAP-35/36 Sumps (January 2009)
Longhorn Army Ammunition Plant, Karnack, Texas

April 2009

Reviewer: Fay Duke, TCEQ, via email dated March 4, 2009
Respondents: Shaw Environmental, Inc.

1. Respondent Concurs (C), Does Not Concur (D), Takes Exception (E), or Delete (X).
2. Commenter Agrees (A) with response, or Does not Agree (D) with response.

Comment #	Section/ Pages	Paragraph /line	Comment	C,D, or E	Response	A or D[2]
General			We have completed our review of the evaluation of the leaching potential of chemical in soil near the sumps located within or near sites LHAAP-48, 35C(43), 46,66,29,59, and 45. The evaluation concluded that although some samples contain concentrations of metal, VOCs and an herbicide exceeding the TCEQ Standard 3 soil-to-groundwater cross-media protection concentrations, groundwater results from nearby wells indicate that groundwater is currently not impacted above the TCEQ regulatory levels. Although absent in this report, we also considered whether the chemical in soil would impact the groundwater in the future. Based on the duration since the cease of operations of these sumps (the time in which release occurred) and the concentrations of the soil and water samples, we concluded that it is unlikely that the chemical in soil would continue to impact or worsen the impact to the groundwater in the future. Therefore we concur with the no further action for soil near the sumps at these sites. Please note we have the following editorial comment:		The report has been finalized with editorial revisions as noted below.	
1			Section 3, Page 3-3: Please clarify the conclusion summarizing the pesticide evaluation. We believe the last sentence may be missing the word "no".	C	The change was made.	
2			We recommend adding in Section 13, Summary, a brief discussion regarding the additional weight of evidence that the chemical in soil would not continue to impact groundwater.	C	Section 13.0 title was changed to Summary and Conclusions and a new subsection 13.3 was added with the following paragraph: Results of SAM modeling have shown that most chemicals associated with soil at former sump locations are not expected to affect groundwater by leaching from soil. Only a limited set of chemicals have the potential to affect groundwater based on this model. None of those chemicals have been detected at significant levels in groundwater samples from potentially affected	

Response to Comments on
Draft Final Addendum to the Final Data Evaluation Report Chemical Concentrations in Soil Samples Associated with LHAAP-35/36 Sumps (January 2009)
Longhorn Army Ammunition Plant, Karnack, Texas

April 2009

Reviewer: Fay Duke, TCEQ, via email dated March 4, 2009
Respondents: Shaw Environmental, Inc.

1. Respondent Concurs (C), Does Not Concur (D), Takes Exception (E), or Delete (X).
2. Commenter Agrees (A) with response, or Does not Agree (D) with response.

Comment #	Section/ Pages	Paragraph /line	Comment	C,D, or E	Response	A or D[2]
					wells. Operations at the LHAAP facilities ceased in the mid-1990s (Shaw, 2006, 2007, 2008) and subsequent analyses of groundwater have shown that concentrations of the chemicals are below regulatory levels. It is unlikely that these chemicals will impact the groundwater in the future; therefore, the contaminants associated with soil at the sump locations are judged to be of no further concern.	

FINAL

ADDENDUM TO THE FINAL DATA EVALUATION REPORT CHEMICAL CONCENTRATIONS IN SOIL SAMPLES ASSOCIATED WITH LHAAP-35/36 SUMPS LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

Prepared for

U.S. Army Corps of Engineers
Tulsa District
1645 South 101st East Avenue
Tulsa, Oklahoma

Prepared by

Shaw Environmental, Inc.
3010 Briarpark, Suite 400
Houston, Texas 77042

Contract No. W912QR-04-D-0027, Task Order No. DS02
Shaw Project No. 117591

April 2009

Table of Contents

List of Tables ii
List of Attachments iii
Acronyms and Abbreviations iv

1.0 Introduction 1-1
2.0 Calculation of Risk Reduction Standard 3 MSC Values Using the SAM Model 2-1
2.1 Comparisons to Applicable Standard 3 Commercial/Industrial MSC Values 2-1
2.2 Definitions 2-1
3.0 Sump 094, Sump 123, and WRSump 003 3-1
4.0 Sump 095, Sump 096, and WRSump 001 4-1
5.0 Sump 097, Sump 098, Sump 099, and WRSump 002 5-1
6.0 Sump 100 and Sump 101 6-1
7.0 Sump 102, Sump 103, Sump 104, and Sump 105 7-1
8.0 Sump 106 8-1
9.0 Sump 110 9-1
10.0 Sump 118 10-1
11.0 Sump 119 and Sump 120 11-1
12.0 WRSump 013 12-1
13.0 Summary and Conclusions 13-1
13.1 Leaching Potential 13-1
13.2 No Leaching Potential 13-2
13.3 Conclusions 13-2
14.0 References 14-1

List of Tables

Table 1	Sumps and Waste Rack Sumps Selected for Comparison of Nearby Soil Concentrations to Groundwater Protective Medium Specific Concentrations
Table 2	Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 094, Sump 123, and Waste Rack Sump WRS003
Table 3	Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 095, Sump 096, and Waste Rack Sump WRS001
Table 4	Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 097, Sump 098, Sump 099, and Waste Rack Sump WRS003
Table 5	Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 100 and Sump 101
Table 6	Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 102, Sump 103, Sump 104, and Sump 105
Table 7	Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 106
Table 8a	Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 110 Older Samples
Table 8b	Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 110 Recent Samples
Table 9a	Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 118 Older Samples
Table 9b	Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 118 Recent Samples
Table 10a	Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 119 and Sump 120 Older Samples
Table 10b	Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 119 and Sump 120 Recent Samples
Table 11	Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – WRSump 013

List of Attachments

Attachment 1 Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 094, Sump 123, and WRSump 003

Attachment 2 Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 095, Sump 096, and WRSump 001

Attachment 3 Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 097, Sump 098, Sump 099, and WRSump 002

Attachment 4 Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 100 and Sump 101

Attachment 5 Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 102, Sump 103, Sump 104, and Sump 105

Attachment 6 Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 110

Attachment 7 Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 118

Attachment 8 Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 119 and Sump 120

Attachment 9 Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Waste Rack Sump WRSump 013

Acronyms and Abbreviations

AST	aboveground storage tank
bgs	below ground surface
BHC	hexachlorocyclohexane
DCS	detectability check sample
GWP-Ind	soil MSC for industrial use based on groundwater protection
LHAAP	Longhorn Army Ammunition Plant
MARC	Multiple Award Remediation Contract
MCPP	2-(2-Methyl-4-Chlorophenoxy) Propanoic Acid (2-((4-Chloro-O-Tolyloxy) Propionic Acid
MDL	method detection limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MQL	method quantitation limit
MSC	medium specific concentration
PCB	polychlorinated biphenyl
PQL	practical quantitation limit
RP	rocket propelled
SAM	Soil Attenuation Model
SDL	sample detection limit
Shaw	Shaw Environmental, Inc.
SQL	sample quantitation limit
SVOC	semivolatile organic compound
TAC	Texas Administrative Code
TCDD	tetrachlorodibenzodioxin
TCEQ	Texas Commission on Environmental Quality
TEQ	toxicity equivalent
TNT	trinitrotoluene
TPH	total petroleum hydrocarbons
UPL	upper prediction limit
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

1.0 Introduction

This addendum supplements the report, Final Data Evaluation Report Chemical Concentrations in Soil Samples Associated With LHAAP-35/36 Sumps, Longhorn Army Ammunition Plant, Karnack, Texas, January, 2008 (Shaw Environmental, Inc. [Shaw], 2008), cited hereafter as the LHAAP-35/36 Sumps Report. The LHAAP-35/36 Sumps Report evaluated chemical concentrations in soil samples associated with wastewater sumps near process facilities at the former Longhorn Army Ammunition Plant (LHAAP) near Karnack, Texas, and was prepared for the U.S. Army Corps of Engineers (USACE), Tulsa District, under Task Order DS02 of the Louisville District's Multiple Award Remediation Contract (MARC) No. W912QR-04-D-0027.

Based on the LHAAP-35/36 Sumps Report, it was recommended that no action is required for soils near the sumps (Shaw, 2008). All of the sump locations were within, or closely associated with, sites LHAAP-04, 18, 29, 35C(53), 35A(58), 36, 39, 46, 47, 48, 59, and 66. As stated in the LHAAP-35/36 Sumps Report, the groundwater at these sites is being investigated under each individual site, and any impacts to the groundwater from the soil near the sumps will be addressed on a site-specific basis. However, comments by the Texas Commission on Environmental Quality (TCEQ) noted that certain sumps were not included in the LHAAP-35/36 Sumps Report because they are not located within or near one of the above sites. The TCEQ requested separate evaluations of soil samples from locations near these sumps to address potential impacts to groundwater. Therefore, groundwater-protective Risk Reduction Standard 3 medium specific concentration (MSC) values were calculated to evaluate potential migration of chemicals from soil to groundwater as provided in TCEQ guidance [30 Texas Administrative Code (TAC) §335.563(i)(2)]. The Standard 3 MSC values were calculated using the Soil Attenuation Model (SAM Model). The sumps in question are 18 wastewater sumps and 4 waste rack sumps located within or near sites LHAAP-48, 35C(53), 46, 66, 29, 59, and 45 (**Table 1**).

The remainder of this addendum is organized in the following manner:

Section 2.0 – Contains a brief discussion of the SAM Model and definitions of terms. **Section 3.0** through **Section 12.0** – Contain discussions of the soil at specific groups of sumps. **Section 13.0** – Contains a summary of the conclusions in **Sections 3.0** through **12.0**.

2.0 Calculation of Risk Reduction Standard 3 MSC Values Using the SAM Model

The SAM model was selected to predict impacts of soil contamination on groundwater quality. The SAM model is an extension of the Soil Screening Level calculations described in USEPA (1996) guidance and is based on calculating total mass (liquid phase, solid phase, and gas phase) in the soil column. The SAM model assumes a zone of contaminated soils overlying a zone of clean soil and predicts leachate concentration at the bottom of the soil column.

The SAM model calculates the soil saturation concentration (C_{sat}), which corresponds to the contaminant concentration at which the chemical is assumed to be in free phase. The Standard 3 MSC is equated to the C_{sat} concentration for chemicals having a calculated MSC greater than the soil saturation concentration. Details of calculation of Applicable Standard 3 Commercial/ Industrial Standard 3 MSC values for soil using the SAM model are provided in **Attachments 1** through **9**.

2.1 Comparisons to Applicable Standard 3 Commercial/Industrial MSC Values

Concentrations of chemicals in soil near the sump locations were compared to Applicable Standard 3 MSC Values developed for commercial/industrial land use as described in 30 TAC §335.563(i)(2) and TCEQ (1998) guidance. Essential human nutrients (calcium, chloride, iron, magnesium, potassium, and sodium) were eliminated from comparison to MSCs (TCEQ, 1998, 2001, 2003). When available, the comparison included background concentrations as represented by the 95% upper prediction limit (UPL) of soil background concentrations reported previously (Shaw, 2004).

2.2 Definitions

Terms used in this report to describe concentrations at or near the detection limit are defined as follows:

Practical quantitation limit (PQL). For samples analyzed from 1993 through 1998, the PQL is defined as described in 30 TAC 335.552(7), which is "The lowest concentration of an analyte which can be reliably quantified within specified limits of precision and accuracy during routine laboratory operating conditions." For samples analyzed in 2006, the PQL is the concentration of the lowest non-zero standard in the laboratory's calibration curve adjusted for laboratory reagent matrix type and sample size.

The PQL is analogous to the method quantitation limit (MQL) reported by the laboratory and described in Section 7 of SW846-Method 8000B (USEPA, 1997). The PQL is used under the 30

TAC 335 rule to evaluate the capability of the analytical method used by the laboratory to quantitate the chemicals at concentrations below a regulatory level. When the PQL of the most sensitive standard available method is greater than the regulatory level, the PQL from that method is used as the regulatory limit in lieu of the regulatory level as allowed in 30 TAC 335.

Sample quantitation limit (SQL). The SQL is the PQL adjusted for sample-specific factors affecting the quantitation of the chemical measured in an environmental sample, such as dilution or moisture content, and flagged with a "U" qualifier to indicate the chemical was not detected in the sample.

Method detection limit (MDL). The MDL is the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from the analysis of a sample in a given matrix type containing the analyte (TCEQ, 1998, Appendix B.1.1.2).

In this document, the MDL only applies to the samples analyzed in 2006 for which the analytical laboratory establishes the MDL for the chemical and verifies the value on at least a quarterly basis using a detectability check sample (DCS) to demonstrate that the laboratory can detect the chemical at that MDL. The DCS is a laboratory reagent grade matrix sample spiked with the chemical at or within two times the laboratory's MDL and carried through the entire sample preparation and analysis procedures. This evaluation used the MDL provided by the analytical laboratory for these samples.

Sample detection limit (SDL). In this document, the SDL only applies to the samples analyzed in 2006. The SDL is the laboratory's MDL for the chemical adjusted for sample-specific factors affecting the detection of the chemical measured in an environmental sample, such as dilution or percent moisture, and flagged or qualified with a "U" or "<" to indicate the chemical was not detected in the sample. As described in correspondence with the TCEQ, the SDL is used in this document to report nondetected results for chemicals only when the PQL is being used as the regulatory limit in lieu of the MSC for the chemical. The correspondence with the TCEQ is available in the Project Administrative Record.

Method Quantitation Limit. The MQL is the concentration of the lowest non-zero standard in the laboratory's calibration curve. MQL values that were provided by the analytical laboratory for its quality assurance program were used in the screening step for all samples analyzed in 2006. Samples analyzed from 1993 through 1998 were evaluated according to the PQL, as described above.

Background. For metals and a few organic chemicals, a screening comparison to LHAAP background concentrations was used in the SAM Model to determine whether detected

concentrations might be related to LHAAP operations or naturally occurring background levels. The LHAAP-specific background concentrations for soil were developed using data that represent background concentrations for surface soil (0-0.5 feet below ground surface [bgs]) and subsurface soil (1.5-2.5 feet bgs) (Shaw, 2004). Because the samples collected at LHAAP sumps were taken at several depth intervals, the depth interval of surface and subsurface samples for sumps and background soil data do not correspond exactly. Therefore, the concentrations were compared to the lower of surface and subsurface background concentrations.

Based on TCEQ recommendations, 95% UPLs of the background data sets (Shaw, 2004) were calculated and used in this evaluation. The 95% UPL value represents the concentration that will be above the next single measurement with 95 percent confidence, and was calculated as described in the LHAAP-35/36 Sumps Report.

For chemicals analyzed from 1993 through 1998, and with a PQL concentration higher than the groundwater protective commercial/industrial soil MSC (the GWP-Ind) value, the PQL concentration was chosen as the applicable MSC for the chemical, as described in §335.555(d)(1) for Risk Reduction Standard 3. Similarly, for chemicals analyzed in 2006 with an adjusted MQL higher than the GWP-Ind MSC value, the adjusted MQL was chosen as the applicable MSC for screening the chemical. This process was applied to dioxins, explosives, metals, pesticides, polychlorinated biphenyls (PCBs), semivolatile organic compounds (SVOCs), and volatile organic compounds (VOCs).

The soil screening step involves comparison of the detected concentration to the applicable MSC. Screening of data for chemical concentrations in soil are shown in **Table 2** through **Table 11** attached to this memo. A master footnote and abbreviation legend that applies to all data evaluation tables is provided with the tables.

Data qualifiers assigned to the soil concentrations in the analytical data evaluation step are as follows:

- U Not detected. The analyte was analyzed for, but not detected above the value shown. For samples analyzed prior to the development of TCEQ (1998) guidance, the value shown is the PQL. For samples analyzed in 2006, the value shown is the MQL or the MDL modified according to TCEQ guidance as described below.
- J The analyte was positively identified; the reported value is the estimated concentration of the constituent detected with concentration measured between the MDL and the PQL (for 1993 through 1998 samples) or the adjusted MQL value shown for 2006 samples.
- UJ The analyte was analyzed for, but not detected above the MDL. However, review and evaluation of supporting quality control data indicated that the detection limit

may be imprecise or estimated. UJ-qualified values are counted as non-detects. The laboratory detection limit for this measurement should be considered as estimated.

- B The concentration reported was detected in the associated method blank, trip blank, or equipment blank within five times (5X) the blank concentration. If the chemical is a common laboratory contaminant, the concentrations is within 10X the blank concentration.
- E The concentration reported exceeded the upper calibration limit, therefore, the concentration is estimated.
- L Result may be biased low.
- H Result may be biased high.
- R The reported results are rejected due to 1) severe deficiencies in the supporting quality control data; 2) anomalies noted in the sampling or analysis process; 3) the presence or absence of the constituent cannot be verified based on the data provided; or 4) a reanalysis of the sample.
- P The percent difference between the results from both columns is outside the established limits.

3.0 Sump 094, Sump 123, and WRSump 003

Sump 094, Sump 123 and Waste Rack Sump WRSump 003 were associated with Buildings 16-Y and 18-Y at LHAAP-48 (Figure A1-1**, Attachment 1**). The signal, smoke and marine illuminators MK 120 MOD O (Green) and MK 121 MOD O (Yellow) were assembled and packed out in Building 16-Y. Metals used in these illuminators were copper powder, magnesium, and barium (Plexus, 2005).

Table 2 lists the analytical results for 13 samples and compares them to the Applicable Risk Reduction Standard 3 Groundwater Protective Soil MSC calculated in **Attachment 1**. Detected values higher than the MSC are shown in bold with an outline. Undetected values where the SQL was higher than the MSC are shown in shading. A total of 214 chemicals were tested in these 13 samples (but not all analytes in all samples), 14 chemicals were eliminated from comparison, and MSC values were calculated for the remaining 200. Five chemicals were identified in **Table 2** as having concentrations exceeding the MSC: barium, cadmium, manganese, silver, and strontium. These concentrations were found in samples analyzed in 1993 and 1995 from the 48SB01, LH-S123-01, LHS94-01, LHS-Y-06, and LH-WRS3-01 locations.

Chemical specific SAM Model evaluation was performed for the 5 chemicals identified by comparison to the Applicable MSC values. **Attachment 1** describes the initial SAM Model evaluation for the chemicals and the chemical-specific SAM Model evaluation for 5 chemicals (barium, cadmium, manganese, silver and strontium) at Sump 094, Sump 123, and WRSump 003. A discussion of the results for each chemical or group of chemicals is presented below (**Attachment 1**).

Dioxins

The maximum 2,3,7,8-tetrachlorodibenzodioxin (2,3,7,8-TCDD) toxicity equivalent (TEQ) concentration of dioxins was 9.587 ng/kg. The SAM Model calculated an Applicable Commercial/Industrial Soil MSC of 9.1e-03 milligrams per kilogram (mg/kg), or 9.1e+03 ng/kg, much higher than the maximum 2,3,7,8-TCDD TEQ concentration.

Explosives

No explosives were detected among 13 samples analyzed. Those compounds with SQL values above the Applicable Commercial/Industrial Soil MSC values developed for the explosive compounds were included in the evaluation of SVOCs below.

Metals

Among the 13 samples analyzed for metals, concentrations above the MSC were reported for barium, cadmium, manganese, silver, and strontium (**Table 2**). These 5 metals were carried on to further chemical specific SAM Model evaluation.

Barium was reported above the initial Standard 3 MSC, (8.5E+01 mg/kg) in 10 samples at concentrations ranging from 86 to 2,510 mg/kg. The chemical-specific Standard 3 Commercial/Industrial Soil MSC of 8.5E+01 mg/kg developed in **Attachment 1**, equals the background value and is unchanged from the initial MSC calculation. As described in **Attachment 1**, barium concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Cadmium was reported above the initial Standard 3 MSC (4.0E-01 mg/kg) in 6 samples at concentrations ranging from 3.42 to 5.55 mg/kg. The chemical-specific Standard 3 Commercial/Industrial Soil MSC of 4.0E-01 mg/kg equals the background value and is unchanged from the initial calculation (**Attachment 1**). As described in **Attachment 1**, cadmium concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Manganese was reported above the initial Standard 3 MSC (7.7E+02 mg/kg) in 1 sample at a concentration of 1,310 mg/kg. The chemical-specific Standard 3 Commercial/Industrial Soil MSC of 1.8E+03 mg/kg is greater than the maximum concentration of manganese in soil. As described in **Attachment 1**, manganese concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Silver was reported above the initial Standard 3 MSC (7.6E-01 mg/kg) in 2 samples at concentrations of 1.06 and 1.2 mg/kg. The chemical-specific Standard 3 Commercial/Industrial Soil MSC of 4.8E+00 mg/kg is greater than the maximum concentration of silver in soil. As described in **Attachment 1**, silver concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Strontium was reported above the initial Standard 3 MSC (1.4E+02 mg/kg) in 2 samples at concentrations of 405 and 514 mg/kg. The chemical-specific Standard 3 Commercial/Industrial Soil MSC of 9.1E+02 mg/kg is greater than the maximum concentration of strontium in soil. Strontium concentrations were either not detected, or were detected at concentrations below

TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

The chemical-specific SAM Model calculations indicate that barium and cadmium have the potential to leach into groundwater. However, groundwater concentrations indicate that barium, cadmium, manganese, silver, and strontium have not affected groundwater zones at LHAAP-48 or at the nearby LHAAP-35C(53) (Shaw, 2007). As such, barium, cadmium and all other metals analyzed are judged to be of no further concern for soil associated with Sump 094, Sump 123, or WRSump 003.

PCBs

Among the four samples analyzed for PCB compounds, only 1 Aroclor 1254 concentration of 0.066 mg/kg was detected. The Standard 3 Commercial/Industrial Soil MSC of 5.7 mg/kg, is much higher than the maximum Aroclor 1254 concentration. Aroclor 1254 and other PCBs are judged to be of no further concern at Sump 094, Sump 123, or WRSump 003.

Pesticides

No pesticide concentrations were detected in the 4 samples analyzed. The highest SQL value for one pesticide (0.002 mg/kg alpha-hexachlorocyclohexane [BHC]) was greater than the Applicable Standard 3 Commercial/Industrial Soil MSC of 1.8E-03, which is represented by the MQL (**Table 2**). Because the maximum detected concentrations were all less than the Applicable Standard 3 Commercial/Industrial Soil MSC values, and the single SQL value is approximately equal to the MQL, leaching of pesticides in soil to groundwater is judged to be of no further concern at Sump 094, Sump 123, or WRSump 003.

SVOCs

Among the 13 samples analyzed for SVOCs, no SVOCs were detected at concentrations exceeding the initial Standard 3 Commercial/Industrial Soil MSC values calculated by the SAM Model (**Attachment 1**). For some SVOCs that were never detected, the highest SQL values were greater than the MSCs. These SQL values are low and approximately equal to the MSC and the MQL. Their variability reflects the routine sample-specific correction factors described in the **Definitions** section above. Because the maximum detected concentrations were all less than the Applicable Standard 3 Commercial/Industrial Soil MSC values, and the SQL values that slightly exceed the MSCs reflect normal analytical corrections, leaching of SVOCs in soil to groundwater is judged to be of no further concern at Sump 094, Sump 123, or WRSump 003.

VOCs

Among the 13 samples analyzed for VOCs, no VOCs were detected at concentrations exceeding the Applicable Commercial/Industrial Soil MSC values calculated by the SAM Model

(**Attachment 1**). For some VOCs that were never detected, the highest SQL values were greater than the MSCs. These SQL values are low and approximately equal to the MSC and the MQL; their variability reflects the routine sample-specific correction factors described in the **Definitions** section above. Analysis of groundwater taken from LHAAP-48 and LHAAP-35C(53) in 2005 indicated that those VOCs shown with higher SQLs in **Table 2**, were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007, **Tables 2-1** and **3-1**). Because the maximum detected concentrations were all less than the Applicable Commercial/Industrial Soil MSC values, and VOC concentrations in groundwater are within TCEQ limits, VOCs are judged to be of no further concern at Sump 094, Sump 123, or WRSump 003.

Barium and cadmium were the only chemicals found at concentrations greater than the Applicable Standard 3 Commercial/Industrial Soil MSC. As discussed in **Attachment 1**, barium and cadmium concentrations in groundwater from nearby wells were undetectable or less than TCEQ regulatory values. No further evaluation or action for any chemicals is needed at Sump 094, Sump 123, or WRSump 003.

4.0 Sump 095, Sump 096, and WRSump 001

Sump 095, Sump 096, and waste rack sump WRSump 001 were associated with Building 34-Y at LHAAP-48. Building 34-Y was used for mixing pyrotechnic materials for hand-signals and illuminators (Plexus, 2005). The fuse for the signal, smoke, and marine illuminators MK 120 MOD O (Green) and MK 121 MOD O (Yellow) was assembled in Building 34-Y. Fuse assembly included the handling of barium, and lead, trinitrotoluene (TNT), and organic resins. Metals used in these materials included: barium, cobalt, lead, strontium, and zirconium.

Table 3 lists the analytical results for 19 samples and compares them to the Applicable Risk Reduction Standard 3 Groundwater Protective Soil MSC calculated in **Attachment 2**. Detected values higher than the MSC are shown in bold with an outline. These concentrations were found in samples analyzed in 1993 and 1995 from the LH-DL95-01, LH-DL95-02, LH-S96-01, LHS-Y-01, LHS-Y-02, LHS-Y-04, and LH-WRS1-01 locations. Undetected values where the SQL was higher than the MSC are shown in shading. Eight chemicals were identified in **Table 3** as exceeding the MSCs: antimony, arsenic, barium, cadmium, copper, lead, strontium, and trichloroethene.

Chemical specific SAM Model evaluation was performed for the 8 chemicals identified by comparison to the Applicable MSC values. **Attachment 2** describes the initial SAM Model evaluation for the chemicals and chemical specific SAM Model evaluation for 8 chemicals (antimony, arsenic, barium, cadmium, copper, lead, strontium, and trichloroethene) at Sump 095, Sump 096, and WRSump 001. A discussion of the results for each chemical or group of chemicals is presented below (**Attachment 2**).

Explosives

No explosives were detected among 19 samples analyzed. For some explosives that were never detected, the highest SQL values were greater than the Applicable Commercial/Industrial Soil MSC values calculated by the SAM Model (**Attachment 2**). These SQL values are low and approximately equal to the MSC and the MQL, and their variability reflects the routine sample-specific correction factors described in the **Definitions** section above. Because the maximum detected concentrations were all less than the Applicable Commercial/Industrial Soil MSC values, and the SQL values that slightly exceed the MSCs reflect normal analytical corrections, leaching of explosives in soil to groundwater is judged to be of no further concern at Sump 095, Sump 096 and WRSump 001.

Metals

Among the 19 samples analyzed for metals, concentrations above the MSC were reported for antimony, arsenic, barium, cadmium, copper, lead, and strontium (**Table 3**). These 7 metals

were carried on to further chemical-specific SAM Model evaluation as described in **Attachment 2**.

Antimony was reported above the initial Standard 3 MSC (9.4E-01 mg/kg) in 1 sample at a concentration of 11 mg/kg. The chemical-specific Standard 3 Commercial/ Industrial Soil MSC of 1.1E+00 mg/kg developed in **Attachment 2** is less than the maximum detected concentration. As described in **Attachment 2**, antimony concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Arsenic was reported above the initial Standard 3 MSC (4.8E+01 mg/kg) in 1 sample at a concentration of 5.05 mg/kg. The chemical-specific Standard 3 Commercial/ Industrial Soil MSC of 4.8E+01 mg/kg developed in **Attachment 2** equals the background value and is unchanged from the initial MSC calculation. As described in **Attachment 2**, arsenic concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Barium was reported above the initial Standard 3 MSC, (9.3E+01 mg/kg) in 14 samples at concentrations ranging from 108 to 1,600 mg/kg. The chemical-specific Standard 3 Commercial/Industrial Soil MSC of 9.3E+01 mg/kg developed in **Attachment 2** is unchanged from the initial MSC calculation. As described in **Attachment 2**, barium concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Cadmium was reported above the initial Applicable MSC (4.0E-01 mg/kg) in 12 samples at concentrations ranging from 1.46 to 5.96 mg/kg. The chemical-specific Applicable Commercial /Industrial Soil MSC of 4.0E-01 mg/kg developed in **Attachment 2** equals the background value and is unchanged from the initial MSC calculation. As described in **Attachment 2**, cadmium concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Copper was reported above the initial Applicable MSC (8.1E+01 mg/kg) in 1 sample at a concentration of 102 mg/kg. The chemical-specific Applicable Commercial /Industrial Soil MSC of 1.1E+03 mg/kg developed in **Attachment 2** is greater than the maximum detected concentration. Copper concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Lead was reported above the initial Applicable MSC (4.2E+01 mg/kg) in 1 sample at a concentration of 47.4 mg/kg. The chemical-specific Applicable Commercial /Industrial Soil MSC of 2.8E+02 mg/kg developed in **Attachment 2** is greater than the maximum detected concentration. Lead concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Strontium was reported above the initial Applicable MSC (2.0E+02 mg/kg) in 2 samples at concentrations of 291 and 458 mg/kg. The chemical-specific Applicable Commercial /Industrial Soil MSC of 6.6E+02 mg/kg is greater than the maximum detected strontium concentration. Strontium concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

SVOCs

Among the 19 samples analyzed, no SVOCs were detected at concentrations exceeding the initial Applicable Commercial/Industrial Soil MSC values calculated by the SAM Model (**Attachment 2**). For some SVOCs that were never detected, the highest SQL values were greater than the MSCs. These SQL values are low and approximately equal to the MSC and the MQL. Their variability reflects the routine sample-specific correction factors described in the **Definitions** section above.

VOCs

Among the 19 samples analyzed, only one VOC (trichloroethene) was detected at a concentration exceeding the initial Applicable Commercial /Industrial Soil MSC value calculated by the SAM Model. Trichloroethene was reported above the initial Applicable MSC (1.6E-02 mg/kg) at a concentration of 0.020 mg/kg. The chemical-specific Applicable Commercial /Industrial Soil MSC of 8.5E-02 mg/kg developed in **Attachment 2** is greater than the maximum detected concentration. Trichloroethene concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

For some other VOCs that were never detected, the highest SQL values were greater than the MSCs. As for SVOCs, these SQL values are low and approximately equal to the MSC and the MQL. Their variability reflects the routine sample-specific correction factors described in the **Definitions** section above.

Antimony, arsenic, barium and cadmium were the only chemicals detected at concentrations greater than the chemical-specific Applicable Commercial/Industrial Soil MSC values. As discussed in **Attachment 2**, These metals were either not detected or had concentrations in

groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 that were below TCEQ regulatory values (Shaw, 2007). No further evaluation or action for any chemicals is needed at Sump 095, Sump 096, or WRSump 001.

5.0 Sump 097, Sump 098, Sump 099, and WRSump 002

Sump 097, Sump 098, Sump 099, and waste rack sump WRSump 002 were associated with Building 38-Y at LHAAP-48. Building 38-Y was constructed as an Igniter Blending Building. The LHAAP drawing index includes references to a vacuum sweeping system, 81mm illuminant consolidation (pressing) and black powder handling in this building (Plexus, 2005). Metals used in these materials are expected to include: barium, chromium, cobalt, and strontium.

Table 4 lists the analytical results for 11 samples and compares them to the Applicable Risk Reduction Standard 3 Groundwater Protective Soil MSC calculated in **Attachment 3**. Detected values higher than the MSC are shown in bold with an outline. These concentrations were found in samples analyzed in 1993 from the LH-S97-01, LH-S98-01, LH-S99-01, and LH-WRS972-01 locations. Undetected values where the SQL was higher than the MSC are shown in shading. Nine chemicals were identified in **Table 4** as exceeding the MSCs: antimony, arsenic, barium, cadmium, lead, mercury, tetrachloroethene, trichloroethene, and vinyl chloride.

Chemical specific SAM Model evaluation was performed for the 9 chemicals identified by comparison to the Applicable MSC values. **Attachment 3** describes the initial SAM Model evaluation and chemical-specific SAM Model evaluation for 9 chemicals (antimony, arsenic, barium, cadmium, lead, mercury, tetrachloroethene, trichloroethene, and vinyl chloride) at Sump 097, Sump 098, Sump 099, and WRSump 002. A discussion of the results for each chemical or group of chemicals is presented below (**Attachment 3**).

Explosives

2,4- and 2,6-Dinitrotoluene were the explosives analyzed in the 11 samples and these compounds were not detected. At some locations, SQL values were greater than the Applicable Commercial/Industrial Soil MSC values calculated by the SAM Model (**Attachment 3**). These SQL values are low and approximately equal to the MSC and the MQL, and their variability reflects the routine sample-specific correction factors described in the **Definitions** section above. Because the maximum detected concentrations were all less than the Applicable Commercial/Industrial Soil MSC values, and the SQL values that slightly exceed the MSCs reflect normal analytical corrections, leaching of explosives in soil to groundwater is judged to be of no further concern at Sump 097, Sump 098, Sump 099, and WRSump 002.

Metals

Among the 11 samples analyzed for metals, concentrations above the chemical-specific Applicable Commercial/Industrial Soil MSC values were reported for antimony, arsenic, cadmium, and lead. These 4 metals were carried on to further chemical-specific SAM Model evaluation as described in **Attachment 3**.

Antimony was reported above the initial Standard 3 MSC, (9.4E-01 mg/kg) in 1 sample at a concentration of 7.96 mg/kg. The chemical-specific Standard 3 Commercial/ Industrial Soil MSC of 3.5E+00 mg/kg developed in **Attachment 3** and the PQL value shown in **Table 4** are less than the maximum detected concentration. As described in **Attachment 3**, antimony concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Arsenic was reported above the initial Standard 3 MSC (4.8E+00 mg/kg) in 3 samples at concentrations ranging from 6.87 to 10.7 mg/kg and also exceeds the chemical-specific Standard 3 Commercial /Industrial Soil MSC of 4.8E+00 mg/kg developed in **Attachment 3**. As described in **Attachment 3**, arsenic concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Barium was reported above the initial Standard 3 MSC (9.0E+01 mg/kg) in 2 samples at the same location (LH-S99-01), with a maximum detected value of 131 mg/kg, which also exceeds the chemical-specific Standard 3 Commercial/ Industrial Soil MSC of 9.5E+01 mg/kg developed in **Attachment 3.** As described in **Attachment 3**, barium concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Cadmium was reported above the initial Standard 3 MSC (4.0E-01mg/kg) in 8 samples at concentrations ranging from 2.12 to 11.4 mg/kg and also exceeds the chemical-specific Standard 3 Commercial /Industrial Soil MSC of 4.0E-01 mg/kg developed in **Attachment 3** and it exceeds the Applicable Standard 3 Commercial/Industrial MSC value, which is represented by the PQL (**Table 4**). As described in **Attachment 3**, cadmium concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Lead was reported above the initial Standard 3 MSC (4.1E+01 mg/kg) in 1 sample at a concentration of 151 mg/kg. The chemical-specific Standard 3 Commercial /Industrial Soil MSC of 2.8E+02 mg/kg is greater than the maximum (**Attachment 3**). As described in **Attachment 3**, lead concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Mercury was reported above the initial Standard 3 MSC (8.2E-02 mg/kg) in 1 sample at a concentration of 0.312 mg/kg. The chemical-specific Standard 3 Commercial /Industrial Soil MSC of 8.2E-02 mg/kg is less than the maximum concentration (**Attachment 3**). As described

in **Attachment 3**, mercury concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

SVOCs

Among the 11 samples analyzed, no SVOCs were detected at concentrations exceeding the initial Standard 3 Commercial/Industrial Soil MSC values calculated by the SAM Model (**Attachment 3**). For some SVOCs that were never detected, the highest SQL values were greater than the MSCs. These SQL values are low and approximately equal to the MSC and the MQL. Their variability reflects the routine sample-specific correction factors described in the **Definitions** section above.

VOCs

Among the 11 samples analyzed, 3 VOCs (tetrachloroethene, trichloroethene, and vinyl chloride) were detected at concentrations exceeding the initial Standard 3 Commercial /Industrial Soil MSC values. These 3 VOCs were further compared to chemical-specific Standard 3 Commercial /Industrial Soil MSC values calculated by the SAM Model.

Tetrachloroethene was reported above the initial Standard 3 MSC (2.5E-02 mg/kg) in 2 samples at concentrations of 0.048 and 0.204 mg/kg. The chemical-specific Standard 3 Commercial /Industrial Soil MSC of 8.6E-02 mg/kg developed in **Attachment 3** is still less than the maximum concentration. As described in **Attachment 3**, tetrachloroethene concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Trichloroethene was reported above the initial Standard 3MSC (1.5E-02 mg/kg) in 2 samples at concentrations of 0.024 and 0.087 mg/kg. The chemical-specific Standard 3 Commercial /Industrial Soil MSC of 5.2E-02 mg/kg developed in **Attachment 3** is still less than the maximum concentration. As described in **Attachment 3**, trichloroethene concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Vinyl chloride was reported above the initial Standard 3 MSC (3.0E-03 mg/kg) in 1 sample at a concentration of 0.497 mg/kg. The chemical-specific Standard 3Commercial /Industrial Soil MSC of 3.7E-02 mg/kg developed in **Attachment 3** is still less than the maximum concentration. As described in **Attachment 3**, vinyl chloride concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

For other VOCs that were never detected, the highest SQL values were greater than the MSCs. As for SVOCs, these SQL values are low and approximately equal to the MSC and the MQL. Their variability reflects the routine sample-specific correction factors described in the **Definitions** section above.

Antimony, arsenic, cadmium, tetrachloroethene, trichloroethene, and vinyl chloride were the only chemicals found at concentrations greater than their Applicable Commercial/Industrial Soil MSC values calculated by the SAM Model. As discussed in **Attachment 3**, these chemicals were either not detected or had concentrations in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 that were below TCEQ regulatory values (Shaw, 2007). Therefore, no further action for any chemicals is needed at Sump 097, Sump 098, Sump 099, or WRSump 002.

6.0 Sump 100 and Sump 101

Sump 100 and Sump 101 were associated with Building 45-Y at LHAAP-48. Building 45-Y was constructed in 1955 as a Metal Powder Preparation Building. The LHAAP drawing index includes references to igniter operations (XM47E1 and LTX-3), igniter rehabilitation, delay consolidation, black powder handling, and hand-signal propellant finishing in this building (Plexus, 2005). Metals used in these materials are expected to include: aluminum, barium, chromium, strontium, and zirconium.

Table 5 lists the analytical results for 5 samples and compares them to the Applicable Risk Reduction Standard 3 Groundwater Protective Soil MSC calculated in **Attachment 4**. Detected values higher than the MSC are shown in bold with an outline. These concentrations were found in samples analyzed in 1993 from the LH-S100-01, and LH-S101-01 locations. Undetected values where the SQL was higher than the MSC are shown in shading. Three chemicals were identified in **Table 5** as exceeding the MSCs: antimony, arsenic, and cadmium.

Chemical specific SAM Model evaluation was performed for the 3 chemicals identified by comparison to the initial Standard 3 Commercial/Industrial MSC values. **Attachment 4** describes the initial SAM Model evaluation and calculation of chemical-specific Standard 3 MSCs for 3 chemicals (antimony, arsenic and cadmium) at Sump 100 and Sump 101. A discussion of the results for each chemical or group of chemicals is presented below (**Attachment 4**).

Explosives

2,4- and 2,6-Dinitrotoluene were the explosives analyzed in the 5 samples and these compounds were not detected. At some locations, SQL values were greater than the Applicable Commercial/Industrial Soil MSC values calculated by the SAM Model (**Attachment 4**). These SQL values are low and approximately equal to the MSC and the MQL, and their variability reflects the routine sample-specific correction factors described in the **Definitions** section above. Because the maximum detected concentrations were all less than the Applicable Commercial/Industrial Soil MSC values, and the SQL values that slightly exceed the MSCs reflect normal analytical corrections, leaching of explosives in soil to groundwater is judged to be of no further concern at Sump 100 and Sump 101.

Metals

Among the 5 samples analyzed for metals, concentrations above the chemical-specific Applicable Commercial/Industrial Soil MSC values were reported for antimony, arsenic and cadmium (**Table 5**). These 3 metals were carried on to further chemical specific SAM Model evaluation as described in **Attachment 4**.

Antimony was reported above the initial Standard 3 MSC (9.4E-01 mg/kg) in 1 sample at a concentration of 5.12 mg/kg. The maximum concentration exceeds the chemical-specific Standard 3 Commercial /Industrial Soil MSC of 2.4E+00 mg/kg (**Attachment 4**). As described in **Attachment 4**, antimony concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Arsenic was reported above the initial Standard 3 MSC (4.8E+00 mg/kg) in 1 sample at a concentration of 6.28 mg/kg. The maximum concentration exceeds the chemical-specific Standard 3 Commercial /Industrial Soil MSC of 5.5E+00 mg/kg (**Attachment 4**), which equals the background concentration. As described in **Attachment 4**, arsenic concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Cadmium was reported above the initial Applicable MSC (5.0E-01 mg/kg) in all 5 samples at concentrations ranging from 1.67 to 5.55 mg/kg. These concentrations also exceed the chemical-specific Applicable Commercial/Industrial Soil MSC of 5.0E-01 mg/kg. Cadmium concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-48 (Shaw, 2007).

Organic Compounds

Among the 5 samples analyzed, no SVOCs or VOCs were detected at concentrations exceeding the initial Standard 3 Commercial/Industrial Soil MSC values calculated by the SAM Model (**Attachment 4**). For some compounds that were never detected, the highest SQL values were greater than the MSCs. These SQL values are low and approximately equal to the MSC and the MQL. Their variability reflects the routine sample-specific correction factors described in the **Definitions** section above. Because the SQL values that slightly exceed Applicable Commercial/Industrial Soil MSC values reflect normal analytical corrections, leaching of organic chemicals in soil to groundwater is judged to be of no further concern at Sump 100 or Sump 101.

Antimony, arsenic and cadmium were the only chemicals found at concentrations greater than the Applicable Commercial/Industrial Soil MSC values calculated by the SAM model. As discussed in **Attachment 4**, antimony, arsenic, and cadmium concentrations in groundwater samples collected in 2005 were undetectable or less than TCEQ regulatory values, no further evaluation or action for any chemicals is needed at Sump 100 or Sump 101.

7.0 Sump 102, Sump 103, Sump 104, and Sump 105

Sump 102, Sump 103, Sump 104, and Sump 105 were associated with Building 16-T at LHAAP-35C(53). Building 16-T was an Ammunition Quality Facility constructed in 1955. Building 16-T was used for the soakout of rocket motors. The LHAAP drawing index identifies a solvent storage and transfer system (including a methylene chloride aboveground storage tank (AST)), a methylene chloride spray unit, and soakout tanks for small motors (Plexus, 2005). There were three solvent tanks in the middle of the building, three solvent vats on the west end of the building, and one oil dip vat on the east side of the building. A sump was sampled at this building in 1982 that contained methylene chloride, arsenic, barium, cadmium, and lead (Plexus, 2005). The contents of these sumps were removed and the sumps were closed in 1997 (OHM Remediation Services Corp., 1997).

Table 6 lists the analytical results for 27 samples and compares them to the Applicable Risk Reduction Standard 3 Groundwater Protective Soil MSC calculated in **Attachment 5**. Detected values higher than the MSC are shown in bold with an outline. These concentrations were found in samples analyzed in 1993 and 1995 from the LH-DL102-01, LH-DL103-01, LH-S102-01, LH-S102-02, LH-S103-01, LH-S103-02, LHS-T-01, LH-DL104-01, LH-DL105-01, LH-S104-01, LH-S104-02, LH-S105-01, LH-S105-02, and LHS-T-01 locations. Undetected values where the SQL was higher than the MSC are shown in shading.

Chemical specific SAM Model evaluation was performed for the 4 chemicals identified by comparison to the Applicable MSC values. **Attachment 5** describes the initial SAM Model evaluation and chemical specific SAM Model evaluation for 4 chemicals (arsenic, barium, cadmium, and silver) at Sump 102, Sump 103, Sump 104 and Sump 105. A discussion of the results for each chemical or group of chemicals is presented below (**Attachment 5**).

Explosives

No explosives were detected among 4 samples analyzed. For some explosives that were never detected, the highest SQL values were greater than the Applicable Commercial/Industrial Soil MSC values calculated by the SAM Model (**Attachment 5**). These SQL values are low and approximately equal to the MSC and the MQL, and their variability reflects the routine sample-specific correction factors described in the **Definitions** section above. Because the maximum detected concentrations were all less than the Applicable Commercial/Industrial Soil MSC values, and the SQL values that slightly exceed the MSCs reflect normal analytical corrections, leaching of explosives in soil to groundwater is judged to be of no further concern at Sump 102, Sump 103, Sump 104 and Sump 105.

Metals

Among the 27 samples analyzed for metals, concentrations above the chemical-specific Applicable Commercial/Industrial Soil MSC values were reported for arsenic, barium, cadmium and silver (**Table 6**). These 4 metals were carried on to further chemical-specific SAM Model evaluation as described in **Attachment 5**.

Arsenic was reported above the initial Standard 3 MSC (4.8E+00 mg/kg) in 6 of the 27 samples at concentrations ranging from 5.10 to 10.1 mg/kg. The chemical-specific Applicable Commercial /Industrial Soil MSC of 4.8E+00 mg/kg developed in **Attachment 5** equals the background concentration. As described in **Attachment 3**, arsenic concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from constructed monitoring wells (Shaw, 2007, Table 3-1). Arsenic was detected above MCL levels in groundwater from wells PZ002 and PZ004, however, these concentrations were attributed to turbidity in groundwater samples from those temporary piezometer wells.

Barium was reported above the initial Standard 3 MSC (8.5E+01 mg/kg) in 16 of the 27 samples at concentrations ranging from 87.8 of 179 mg/kg. The chemical-specific Standard 3 Commercial /Industrial Soil MSC of 8.5E+01 mg/kg developed in **Attachment 5** is less than the maximum detected concentration of 179 mg/kg. As described in **Attachment 5**, barium concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-35C(53) (Shaw, 2007).

Cadmium was reported above the initial Standard 3 MSC (4.0E-01 mg/kg) in 2 samples at concentrations of 1.60 and 1.60 mg/kg. The chemical-specific Standard 3 Commercial /Industrial Soil MSC of 2.5E+00 mg/kg developed in **Attachment 5** is greater than the maximum concentration. As described in **Attachment 5**, cadmium concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-35C(53) (Shaw, 2007).

Silver was reported above the initial Standard 3 MSC (3.1E-01 mg/kg) in 2 samples at concentrations of 3.90 and 6.40 mg/kg. The chemical-specific Standard 3 Commercial /Industrial Soil MSC of 3.8E+00 mg/kg developed in **Attachment 5** is still less than the detected silver concentrations. As described in **Attachment 5**, silver concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected in 2005 from the shallow or intermediate zones beneath LHAAP-35C(53) (Shaw, 2007).

Organic Chemicals

Among the 27 samples analyzed, no SVOCs and VOCs were detected at concentrations exceeding the initial Applicable Commercial/Industrial Soil MSC values calculated by the SAM Model (**Attachment 5**). For some compounds that were never detected, the highest SQL values were greater than the MSCs. These SQL values are low and approximately equal to the MSC and the MQL. Their variability reflects the routine sample-specific correction factors described in the **Definitions** section above. Because the SQL values that slightly exceed Applicable Commercial/Industrial Soil MSC values reflect normal analytical corrections, leaching of organic chemicals in soil to groundwater is judged to be of no further concern at Sump 102, Sump 103, Sump 104 and Sump 105.

Arsenic, barium, cadmium, and silver were the only chemicals found at concentrations greater than the chemical-specific Applicable Commercial/Industrial Soil MSC values. As discussed in **Attachment 5**, barium, cadmium, and silver concentrations in groundwater samples collected in 2005 were not either not detected or were measured at low concentrations below TCEQ regulatory values. Arsenic was detected above MCL levels in turbid groundwater from temporary piezometer wells, but were not detected above the MCL in groundwater samples from constructed monitoring wells. Therefore, no further evaluation or action for any chemicals is needed at Sump 102, Sump 103, Sump 104 and Sump 105.

8.0 Sump 106

Sump 106 was associated with Building 401 at LHAAP-66. Building 401 is a Gas-Fired Heating Plant where steam was generated at LHAAP by gas-fired boilers until it was to burn fuel oil (Plexus, 2005). One diesel oil spill was recorded on February 1, 1995 at an AST location adjacent to Building 401. It was determined that an underground line running from a loading station where tank trucks unloaded fuel into a 10,000-gallon tank was leaking. After the spill was detected a leak was found in the 3-inch line between the tank and Building 401 that resulted in a 400 gallon release. The leak was repaired the ditch pumped out, and contaminated soil removed (Plexus, 2005).

Table 7 lists the analytical results for 2 samples taken in 2006 and analyzed for total petroleum hydrocarbons (TPH) according to TCEQ Method TX1005. Standard 3 Commercial/industrial MSC values were calculated using the SAM model as described in **Attachments 1** through **9**, which is illustrated in **Table 7**.

Input parameters to the SAM Model that are either specific to Sump 106 locations at LHAAP-66 and physical and chemical properties of TPH components are shown in **Table 7**. Other input values are default TCEQ values shown in **Attachments 1** through **9**. For SAM model calculations of Standard 3 MSCs for TPH results reported as "Carbon Range C12-C28 and Carbon Range C28-C35" concentrations, the GW-Ind values used are the lowest of the values for >12-16 C, >16-21 C, and >21-35 C (aromatic) boiling fraction of TPH, given in TCEQ (2006) guidance (3.1E+00 milligrams per liter [mg/L]). For TPH results reported as "Carbon Range C6-C12" concentrations, the TCEQ (2006) GW-Ind value for the >8-10 C (aromatic) TPH boiling fraction is used (4.1E+00 mg/L).

Comparison of TPH concentrations in soil located near the Sump 106 location to groundwater protective MSCs are shown in **Table 7**. Because no concentrations of TPH components were detected above the Applicable Standard 3 MSC values for TPH constituents, no further evaluation or action for any chemicals is needed at Sump 106.

9.0 Sump 110

Sump 110 was associated with Building 207 near LHAAP-46. Building 207 was Maintenance Calibration Facility constructed in 1953. During the early 1960s, a research and development laboratory operated in this building and by 1980 the building was being used for development of a rocket propelled (RP) smoke test device. Waste from the laboratory was disposed at the burning ground (Plexus, 2005).

Table 8a lists analytical results for 2 samples analyzed in 1993 that were compared to PQL values reported by the analytical laboratory in 1993. **Table 8b** lists analytical results for 2 samples analyzed in 2006 that were compared to MQL values provided by the analytical laboratory used in 2006. Comparisons of soil concentrations to the Applicable Risk Reduction Standard 3 MSC values developed in **Attachment 6** are shown in **Tables 8a** and **8b**. Detected values higher than the MSC are shown in bold with an outline. Undetected values where the SQL was higher than the MSC are shown in shading. No chemicals were identified in **Tables 8a** and **8b** as having detectable concentrations exceeding the Applicable Standard 3 Commercial/Industrial MSCs.

Explosives

No explosives were detected among 2 samples analyzed in 2006 (**Table 8b**). Because no explosives were detected in these samples, and all SQL values are below the Applicable Standard 3 Commercial/Industrial Soil MSC values calculated by the SAM model (**Attachment 6**), explosives are judged to be of no further concern at Sump 110.

Metals

Among the 4 samples analyzed for metals, no detectable concentrations above the MSC were reported (**Tables 8a** and **8b**). Antimony was reported as undetected in two samples (LH-S110-01.1 and LH-S110-01.2) with SQL values greater than undetected concentrations the Applicable Standard 3 Commercial/Industrial Soil MSC value developed in **Attachment 6**. Because antimony was confirmed to be undetected in additional samples analyzed in 2006, and with SQL values below the groundwater-protective MSC, antimony, and all other metals analyzed are judged to be of no further concern at Sump 110.

Organic Compounds

Among the 2 samples analyzed for SVOCs and VOCs (**Table 8a**), no concentrations were detected above the Applicable Standard 3 Commercial/Industrial Soil MSC values developed in **Attachment 6** and all SQL values were below MSCs. Because the SQL values were all less than

the Applicable Commercial/Industrial Soil MSC values, SVOCs and VOCs are judged to be of no further concern at Sump 110.

No chemicals were detected at concentrations greater than the SAM Model calculated Applicable Commercial/Industrial Soil MSC. No further evaluation or action for any chemical is needed at Sump 110.

10.0 Sump 118

Sump 118 was associated with Building 813 near LHAAP-29. Building B-16 was used for production of the M21 simulator until November 1982. This building was used for processing of the 4.2-inch illuminating cartridge expelling charge and may have been used for other operations also. The LHAAP drawing index refers to propellant consolidation, black powder blending, heat-sealing expelling charges, 40mm delay consolidation, 155mm delay line, M74A1 delay consolidation, M74 fuse powder trimmer, hand signals delay assembly, M74A1 fuse manufacture, M752E1 ignition cartridge line, M21 assembly, and fuse powder at this building (Plexus, 2005). Barium, chromium and lead (5,700 ppm) were detected in sump sediment in 1982.

Tables 9a and **9b** list the analytical results for 6 samples; four were analyzed in 1993 and two were analyzed in 2006. **Table 9a** lists analytical results for 2 samples analyzed in 1993 that were compared to PQL values reported by the analytical laboratory in 1993. **Table 9b** lists analytical results for 2 samples analyzed in 2006 that were compared to MQL values provided by the analytical laboratory used in 2006.

Comparisons of soil concentrations to Applicable Risk Reduction Standard 3 values developed in **Attachment 7** are shown in **Tables 9a** and **9b**. Detected values higher than the MSC are shown in bold with an outline. Undetected values where the SQL was higher than the MSC are shown in shading. No chemicals were identified in **Tables 9a** and **9b** as having detectable concentrations exceeding the MSCs.

Explosives

No explosives were detected among 6 samples analyzed. Because no explosives were detected in these samples, and all SQL values are below the Applicable Standard 3 Commercial/Industrial Soil MSC values, explosives are judged to be of no further concern at Sump 118.

Metals

Among the 4 samples analyzed for metals, no detectable concentrations or SQLs above the MSC were reported (**Table 9a**). Therefore, metals are judged to be of no further concern at Sump 118.

SVOCs

Among the 4 samples analyzed for SVOCs, no SVOCs were detected at concentrations exceeding the SAM Model calculated Applicable Standard 3 Commercial/Industrial Soil MSC values developed in **Attachment 7**. For some SVOCs that were never detected, the highest SQL values were greater than the Standard 3 MSCs. These SQL values are low and approximately equal to the MSC and the MQL. Their variability reflects the routine sample-specific correction

factors described in the **Definitions** section above. Because the maximum SQL values that slightly exceed Applicable Commercial/Industrial Soil MSC values reflect normal analytical corrections, leaching of SVOCs in soil to groundwater is judged to be of no further concern at Sump 118.

TPH

No TPH was detected among 2 samples analyzed. Because no explosives were detected in these samples, and all SQL values are below the Applicable Standard 3 Commercial/Industrial Soil MSC values calculated by the SAM model (**Attachment 7**), TPH compounds are judged to be of no further concern at Sump 118.

VOCs

Among the 5 samples analyzed for VOCs, no VOCs were detected at concentrations exceeding the SAM Model calculated Applicable Commercial/Industrial Soil MSC values developed in **Attachment 7**, and all SQL values were below the MSCs and all SQL values were less than the MSCs. Because the maximum detected concentrations and SQLs were all less than the Applicable Commercial/Industrial Soil MSC values, VOCs are judged to be of no further concern at Sump 118.

No chemicals were detected at concentrations greater than the SAM Model calculated Applicable Commercial/Industrial Soil MSC. No further evaluation or action for any chemical is needed at Sump 118.

11.0 Sump 119 and Sump 120

Sump 119 and Sump 120 were associated with Building 725 at LHAAP-59, which is in the vicinity of the larger LHAAP-58 site. Building 725 was an insecticide storage building, which has been demolished.

Tables 10a and **10b** list the analytical results for 32 samples; 22 were analyzed in 2006, one was analyzed in 1995, and nine were analyzed in 1993. Comparisons of soil concentrations to the Applicable Risk Reduction Standard 3 MSC values developed in **Attachment 8** are shown in **Tables 10a** and **10b**. Detected values higher than the MSC are shown in bold with an outline. Undetected values where the SQL was higher than the MSC are shown in shading.

Three chemicals were identified in **Tables 10a** and **10b** as exceeding the MSCs. Detected concentrations of the metal arsenic, the pesticide heptachlor epoxide, the herbicide MCPP exceeded their initial Standard 3 MSCs developed in **Attachment 8**.

Chemical specific SAM Model evaluation was performed for the 3 chemicals identified by comparison to the Applicable MSC values. **Attachment 8** describes the initial SAM Model evaluation and chemical-specific SAM Model evaluation for the 3 chemicals (heptachlor epoxide, MCPP, and arsenic) at Sump 119 and Sump 120.

A discussion of the results for each chemical or group of chemicals is presented below (**Attachment 8**).

Explosives

No explosives were detected in the one sample analyzed for explosives. For some compounds that were never detected, the SQL values were greater than the MSCs. These SQL values are low and approximately equal to the MSC and the MQL. Their variability reflects the routine sample-specific correction factors described in the **Definitions** section above. Because the SQL values that slightly exceed Applicable Commercial/Industrial Soil MSC values reflect normal analytical corrections, leaching of explosives residues in soil to groundwater is judged to be of no further concern at Sump 119 and Sump 120.

Herbicides

Among the 18 samples analyzed for herbicides, MCPP was reported above the initial Applicable MSC (4.3E-02 mg/kg) in 1 of the 18 samples at a concentration of 6.127 mg/kg. This concentration exceeds the chemical-specific Applicable Commercial /Industrial Soil MSC of 5.1E-01 mg/kg developed in **Attachment 8**. Herbicides were not tested in groundwater samples from nearby wells LHSMW03 and LHSMW04. Because herbicides have not been detected in

groundwater elsewhere at the LHAAP-35A(58) site (Shaw, 2006), and MCPP is not expected to leach to groundwater to the exclusion of other herbicides, MCPP is judged to be of no further concern at the Sump 119 and Sump 120 locations.

Metals

Arsenic was reported above the initial Applicable MSC (4.8E+00 mg/kg) in 2 of 10 samples at concentrations of 5.20 and 8.20 mg/kg. The chemical-specific Applicable Commercial/Industrial Soil MSC of 4.8E+00 mg/kg developed in **Attachment 8**, still less than the maximum concentration. Arsenic concentrations were either not detected, or were detected at concentrations below TCEQ regulatory values in groundwater collected from nearby monitoring wells LHSMW03 and LHSMW04, with the exception of one 1998 concentration of 11 µg/L at LHSMW03 in 1998, which is slightly above the MCL of 10 µg/L (TCEQ, 1998).

Pesticides

Among the 22 samples analyzed for pesticides, heptachlor epoxide was reported above the initial Applicable MSC (1.4E-01 mg/kg) in 1 of the 22 samples at a concentration of 0.1735 mg/kg. The chemical-specific Applicable Commercial /Industrial Soil MSC of 1.7E+00 mg/kg developed in **Attachment 8** is greater than the maximum concentration and all SQL values are below the MSC. Therefore, heptachlor epoxide and other pesticides are judged to be of no further concern at Sump 119 and Sump 120.

Organic Chemicals

Among the samples analyzed for SVOCs and VOCs, no organic chemicals were detected at concentrations exceeding the Applicable Commercial/Industrial Soil MSC values developed in **Attachment 8**. For some chemicals that were never detected, the highest SQL values were greater than the MSCs. These SQL values are low and approximately equal to the MSC and the MQL. Their variability reflects the routine sample-specific correction factors described in the **Definitions** section above. Because the maximum SQL values that slightly exceed Applicable Commercial/Industrial Soil MSC values reflect normal analytical corrections, leaching of organic chemicals to groundwater is judged to be of no further concern at Sump 119 and Sump 120.

Arsenic and MCPP were the only chemicals found at concentrations greater than the Applicable Standard 3 Commercial/Industrial Soil MSC calculated by the SAM model. Herbicides were not tested for in groundwater at the closest wells LHSMW03 and LHSMW04 or in other wells at the LHAAP-35A(58) site. However, other herbicides have not been detected in groundwater elsewhere at the LHAAP-35A(58) site (Shaw, 2006). Therefore, MCPP is not expected to leach to groundwater to the exclusion of other herbicides, and is judged to be of no further concern at the Sump 119 and Sump 120 locations. Arsenic concentrations were either not detected, or were

detected at concentrations below TCEQ regulatory values in groundwater collected from nearby monitoring wells. No further evaluation or action for any chemicals is needed at Sump 102, Sump 103, Sump 119 and Sump 120.

12.0 WRSump 013

WRSump 013 was associated with the Magazine Area, at LHAAP-45. The site was a munitions storage area with a total area of more than 800 acres consisting of 58 bunkers used to store munitions products from 1942 through 1995. WRSump 013 was located in the vicinity of the loading dock near bunker 811-50 outside the southwest site boundary of the site (Plexus, 2005).

Table 11 lists the analytical results for two samples analyzed in 2006. Comparisons of soil concentrations to the Applicable Risk Reduction Standard 3 MSC values developed in **Attachment 9** are shown in **Table 11**. No chemicals were identified in **Table 11** as having detectable concentrations or SQL values exceeding the MSCs. Therefore, there is no further concern for the potential leaching of chemicals from soil near WRSump 013 to groundwater.

13.0 Summary and Conclusions

In summary, for these 18 sumps and 4 waste rack sumps, several metals (antimony, arsenic, barium, cadmium and silver) indicated potential to leach into groundwater at LHAAP-48 and LHAAP-35C(53), but groundwater results from nearby wells showed those same metals to be undetected or present at concentrations below MCLs or TCEQ regulatory levels. Several VOCs were also noted as having leaching potential at one area at LHAAP-48, and an herbicide was noted as having leaching potential at one area at LHAAP-59, but groundwater results from nearby wells showed those chemicals to be undetected or present at concentrations below MCLs or TCEQ regulatory levels.

13.1 Leaching Potential

Several chemicals were predicted to leach to groundwater based on comparison to groundwater protective Standard 3 soil MSCs calculated using the SAM model:

Antimony showed leaching potential at sumps Sump 095 through Sump 101 and waste rack sumps WRSump 001 and WRS002 located at LHAAP-48.

Arsenic showed leaching potential at sumps Sump 097 through Sump 105 and waste rack sump WRS002. These sumps located at LHAAP-48 and LHAAP-35C(53).

Barium showed leaching potential at sumps Sump 094 through Sump 096 and Sump 123, and waste rack sumps WRSump 001 and WRSump 003 located at LHAAP-48.

Cadmium showed leaching potential at sumps Sump 094 through Sump 105 and Sump 123, and waste rack sumps WRSump 001 through WRSump 003 located at LHAAP-48 and LHAAP-35C(53).

Silver showed leaching potential at sumps Sump 102 through Sump 105. These sumps are at LHAAP-35C(53).

The VOCs tetrachloroethene, trichloroethene and vinyl chloride showed leaching potential at sump Sump 099 located at LHAAP-48.

However, these chemicals were not detected above TCEQ limits in groundwater from wells near these former sump locations. Therefore, the concentrations of these chemicals in soil near these sump locations are judged to be of no further concern for their potential to leach to groundwater.

The herbicide MCPP showed leaching potential at one surface soil sample 59SB08 near Sump 119 and Sump 120 located at LHAAP-59. Although herbicides were not analyzed in

groundwater from wells at LHAAP-59, comparison of this measurement with available measurements from LHAAP-35A(58) located nearby indicates that other herbicides have not been detected in groundwater elsewhere at the LHAAP-35A(58) site (Shaw, 2006). Therefore, MCPP is not expected to leach to groundwater to the exclusion of other herbicides, and is judged to be of no further concern at the Sump 119 and Sump 120 locations.

13.2 No Leaching Potential

At four sumps (Sump 106, Sump 110, Sump 118 and WRSump 013) leaching of chemicals from soil to groundwater is not expected to occur based on comparison to Applicable Standard 3 MSC values.

13.3 Conclusions

Results of SAM modeling have shown that most chemicals associated with soil at former sump locations are not expected to affect groundwater by leaching from soil. Only a limited set of chemicals have the potential to affect groundwater based on this model. None of those chemicals have been detected at significant levels in groundwater samples from potentially affected wells. Operations at the LHAAP facilities ceased in the mid-1990s (Shaw, 2006, 2007, 2008) and subsequent analyses of groundwater have shown that concentrations of the chemicals are below regulatory levels. It is unlikely that these chemicals will impact the groundwater in the future; therefore, the contaminants associated with soil at the sump locations are judged to be of no further concern.

14.0 References

OHM Remediation Services Corp., 1997, *Removal and Closure of Wastewater Sumps, Longhorn Army Ammunition Plant, Karnack, Texas*, Volume V, Appendix H, TAB 37 – Appendix P, April.

Plexus Scientific, Inc., (Plexus), 2005, *Environmental Site Assessment Phase I and II Report, Production Areas, Longhorn Army Ammunition Plant, Karnack, Texas*, Houston, Texas, February.

Shaw Environmental, Inc. (Shaw), 2004, *Final Background Soil Study Report, Longhorn Army Ammunition Plant, Karnack Texas*, July.

Shaw, 2006, *Draft Feasibility Study, LHAAP-35A(58), Shop Area, Group 4, Longhorn Army Ammunition Plant, Karnack, Texas*, March.

Shaw, 2007, *Final Site Evaluation Report, LHAAP-48 (Former Igniter Production Area) and LHAAP-35C(53) (Former Static Test Area), Longhorn Army Ammunition Plant, Karnack Texas*, April.

Shaw, 2008, *Final Data Evaluation Report Chemical Concentrations in Soil Samples Associated With LHAAP-35/36 Sumps, Longhorn Army Ammunition Plant, Karnack, Texas*, January.

Texas Commission on Environmental Quality (TCEQ), 1998, Interoffice Memorandum from Ronald R. Pedde to Remediation Division Staff regarding implementation of the existing risk reduction rules (a.k.a. TNRCC Consistency Memorandum), July as updated through March 2006.

TCEQ, 2001, Interoffice Memorandum from Joseph T. Haney, Jr., (TCEQ) to Camarie Perry, Office or Permitting, Remediation & Registration, *Evaluation of the Potential Health Impacts of Exposure to Iron, Calcium, Magnesium, Potassium, sodium, and Phosphorus through Soil Ingestion*, October.

TCEQ, 2003, Interoffice Memorandum, *Compounds for which Calculation of a Human Health MSC is not Required*, October, available online <http://www.tnrcc.state.tx.us/permitting/rrr.htm.>

TCEQ, 2006, Texas Risk Reduction Rules (30TAC§335) as updated through March 2006, <http://www.tceq.state.tx.us/remediation/rrr.html>

U.S. Environmental Protection Agency (USEPA), 1996, Soil Screening Guidance: Technical Background Document, USEPA/540/R-95/128018, U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, July.

USEPA, 1997, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)*, 3rd Edition, Update IIIA (June 1999) or most recent update, Office of Solid Waste and Emergency Response, Washington, D.C., <http://www.epa.gov/epaoswer/hazwaste/test/ main.htm>.

Tables

Table 1
Sumps and Waste Rack Sumps Selected for Comparison of Nearby Soil Concentrations to Groundwater Protective Medium Specific Concentrations

Table 2
Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 094, Sump 123, and Waste Rack Sump WRS003

Table 3
Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 095, Sump 096, and Waste Rack Sump WRS001

Table 4
Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 097, Sump 098, Sump 099, and Waste Rack Sump WRS003

Table 5
Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 100 and Sump 101

Table 6
Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 102, Sump 103, Sump 104, and Sump 105

Table 7
Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 106

Table 8a
Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 110 Older Samples

Table 8b
Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 110 Recent Samples

Table 9a
Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 118 Older Samples

Table 9b
Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 118 Recent Samples

Table 10a
Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 119 and Sump 120 Older Samples

Table 10b
Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – Sump 119 and Sump 120 Recent Samples

Table 11
Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations – WRSump 013

Table 1
Sumps and Waste Rack Sumps Selected for
Comparison of Nearby Soil Concentrations to
Groundwater Protective Medium Specific Concentrations
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION CODE	Nearest Site	Building	Easting	Northing	Sump Depth (feet)	Attachments and Tables
LHAAP-35 Sumps						
SUMP094	LHAAP-48	16-Y	3314201.0	6959077.1	2.0	Attachment 1, Table 2
SUMP095	LHAAP-48	34-Y	3314773.0	6959043.2	5.5	Attachment 2, Table 3
SUMP096	LHAAP-48	34-Y	3314695.0	6959072.0	1.5	Attachment 2, Table 3
SUMP097	LHAAP-48	38-Y	3314745.0	6959194.6	4.0	Attachment 3, Table 4
SUMP098	LHAAP-48	38-Y	3314675.0	6959214.7	2.0	Attachment 3, Table 4
SUMP099	LHAAP-48	38-Y	3314687.0	6959291.8	2.0	Attachment 3, Table 4
SUMP100	LHAAP-48	45-Y	3314684.0	6959424.4	1.5	Attachment 4, Table 5
SUMP101	LHAAP-48	45-Y	3314769.0	6959424.6	4.0	Attachment 4, Table 5
SUMP102	LHAAP-35C(53)	16-T	3315331.0	6957302.8	4.0	Attachment 5, Table 6
SUMP103	LHAAP-35C(53)	16-T	3315376.0	6957244.9	4.0	Attachment 5, Table 6
SUMP104	LHAAP-35C(53)	16-T	3315261.0	6957234.4	7.5	Attachment 5, Table 6
SUMP105	LHAAP-35C(53)	16-T	3315334.0	6957178.6	4.0	Attachment 5, Table 6
SUMP106	LHAAP-66	401	NA	NA	Unknown	Table 7
SUMP110	LHAAP-46	207	3305605.0	6960922.4	4.2	Attachment 6, Table 8
SUMP118	LHAAP-29	813	3304549.0	6953715.7	3.0	Attachment 7, Table 9
SUMP119	LHAAP-59	725	3305443.0	6959996.6	5.0	Attachment 8, Table 10
SUMP120	LHAAP-59	725	3305384.0	6959963.3	4.0	Attachment 8, Table 10
SUMP123	LHAAP-48	18-Y	3314190.0	6959128.2	Unknown	Attachment 1, Table 2
LHAAP-36 Waste Rack Sumps						
WRSUMP001	LHAAP-48	34-Y	3314758.0	6959018.5	4.0	Attachment 2, Table 3
WRSUMP002	LHAAP-48	38-Y	3314644.0	6959229.7	4.0	Attachment 3, Table 4
WRSUMP003	LHAAP-48	16-Y	3314290.0	6959161.5	4.0	Attachment 1, Table 2
WRSUMP013	LHAAP-45	824	3308486.0	6947986.5	4.0	Attachment 9, Table 11

Note:
NA - not available.

Table 2
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump 094, Sump 123, and Waste Rack Sump WRS003
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	48SB01				48SB01				48SB01				48SB01				LH-S123-01				LH-S123-01				LH-S94-01			
SAMPLE_NO			Calculated		**Standard 3**	48SB01(0-0.5)				48SB01(1-3)				48SB01(1-3)-FD				48SB01(3-5)				LH-S123-01.1				LH-S123-01.2				LH-S94-01.1			
SAMPLE_DATE			Commercial		**Groundwater**	28-Jul-98				28-Jul-98				28-Jul-98				28-Jul-98				26-Jun-93				26-Jun-93				20-Aug-93			
DEPTH			/ Industrial	Practical	**Protective**	0-0.5 Ft				1-3 Ft				1-3 Ft				3-5 Ft				0.5-1.5 Ft				11-12.5 Ft				0.5-1.5 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				FD				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
DIOXINS_FURANS	2,3,7,8-TCDD Toxic Equivalent Concentration	ng/kg	9.1E+03	1	**9.1E+03**	9.587	1		nv	1.133	1		nv	1.274	1		nv	0.322	1		nv												
EXPLOSIVES	1,3,5-Trinitrobenzene	mg/kg	1.2E+00	0.15	**1.2E+00**	0.150	1	U	U	0.150	1	U	U	0.150	1	U	U	0.150	1	U	U												
EXPLOSIVES	1,3-Dinitrobenzene	mg/kg	7.5E-03	0.05	**5.0E-02**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U												
EXPLOSIVES	2,4,6-Trinitrotoluene	mg/kg	3.4E-01	0.1	**3.4E-01**	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U												
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	5.0E-04	0.1	**1.0E-01**	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	4.1E-04	0.1	**1.0E-01**	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	mg/kg	2.1E-01	0.05	**2.1E-01**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U												
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	mg/kg	1.3E-01	0.05	**1.3E-01**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U												
EXPLOSIVES	HMX	mg/kg	4.8E-01	0.1	**4.8E-01**	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U												
EXPLOSIVES	m-Nitrotoluene	mg/kg	3.2E+00	0.1	**3.2E+00**	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U												
EXPLOSIVES	Nitrobenzene	mg/kg	1.5E-01	0.1	**1.5E-01**	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U												
EXPLOSIVES	o-Nitrotoluene	mg/kg	3.2E+00	0.1	**3.2E+00**	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U												
EXPLOSIVES	p-Nitrotoluene	mg/kg	3.2E+00	0.1	**3.2E+00**	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U												
EXPLOSIVES	RDX	mg/kg	3.8E-02	0.1	**1.0E-01**	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U												
EXPLOSIVES	Tetryl	mg/kg	5.2E+00	0.69	**5.2E+00**	R	1	U	R	R	1	U	R	R	1	U	R	R	1	U	R												
METALS	Aluminum	mg/kg	3.9E+06	20	**3.9E+06**	8700.000	1			11000.000	1			11000.000	1			6900.000	1			6700.000	1			6320.000	1			10100.000	1		
METALS	Antimony	mg/kg	9.4E-01	4.8	**4.8E+00**	R	1	U	R	R	1	U	R	R	1	U	R	R	1	U	R	6.840	1	U	U	5.660	1	U	U	5.080	1	U	U
METALS	Arsenic	mg/kg	4.8E+00	0.3	**4.8E+00**	3.500	1			3.890	1			3.860	1			2.460	1			1.370	1			1.500	1			0.660	1		
METALS	Barium	mg/kg	8.5E+01	0.3	**8.5E+01**	**86.000**	1			**120.000**	1			**130.000**	1			**100.000**	1			**1620.000**	1			32.200	1			**100.000**	1		
METALS	Beryllium	mg/kg	6.5E-01	0.535	**6.5E-01**	0.535	1	U	U	0.643	1			0.643	1			0.559	1	U	U												
METALS	Cadmium	mg/kg	4.0E-01	0.535	**5.4E-01**	0.535	1	U	U	0.536	1	U	U	0.536	1	U	U	0.559	1	U	U	**4.410**	1			**5.550**	1			**3.910**	1		
METALS	Calcium	mg/kg	NA	NA	**none**	1500.000	1			1200.000	1			1100.000	1			560.000	1			332.000	1			1530.000	1			1720.000	1		
METALS	Chromium	mg/kg	2.1E+04	0.4	**2.1E+04**	15.000	1			18.000	1			17.000	1			11.000	1			12.900	1			8.380	1			29.400	1		
METALS	Cobalt	mg/kg	3.0E+02	0.5	**3.0E+02**	6.900	1			11.000	1			11.000	1			6.700	1			8.340	1			5.010	1			3.250	1		
METALS	Copper	mg/kg	5.6E+01	2.79	**5.6E+01**	6.030	1			10.600	1			4.440	1			2.790	1	U	U	8.760	1			9.820	1			8.000	1		
METALS	Iron	mg/kg	NA	NA	**none**	14000.000	1			15000.000	1			14000.000	1			7300.000	1			8080.000	1			14700.000	1			7080.000	1		
METALS	Lead	mg/kg	2.9E+01	7.2	**2.9E+01**	13.600	1			12.800	1			12.500	1			9.450	1			12.900	1		E	12.100	1		E	17.500	1		
METALS	Magnesium	mg/kg	NA	NA	**none**	620.000	1			810.000	1			750.000	1			570.000	1			338.000	1			1230.000	1			644.000	1		
METALS	Manganese	mg/kg	1.8E+03	0.2	**1.8E+03**	287.000	1			519.000	1			412.000	1			727.000	1			384.000	1			118.000	1			119.000	1		
METALS	Mercury	mg/kg	8.2E-02	0.027	**8.2E-02**	0.110	1	U	U	0.110	1	U	U	0.110	1	U	U	0.110	1	U	U	0.053	1		E	0.055	1		E	0.060	1		E
METALS	Nickel	mg/kg	8.3E+01	0.8	**8.3E+01**	7.700	1			12.000	1			10.000	1			5.400	1														
METALS	Potassium	mg/kg	NA	NA	**none**	800.000	1			1100.000	1			1100.000	1			770.000	1			369.000	1			408.000	1			590.000	1		
METALS	Selenium	mg/kg	3.5E+00	0.27	**3.5E+00**	1.070	1	U	U	1.650	1			1.870	1			1.340	1			0.445	1	U	U	0.368	1	U	U	0.330	1	U	U
METALS	Silver	mg/kg	4.8E+00	0.024	**4.8E+00**	1.100	1	U	U	1.100	1	U	U	1.100	1	U	U	1.100	1	U	U	1.060	1			0.269	1			1.200	1		
METALS	Sodium	mg/kg	NA	540	**none**	540.000	1	U	U	540.000	1	U	U	540.000	1	U	U	560.000	1	U	U												
METALS	Strontium	mg/kg	9.1E+02	15.6	**9.1E+02**	8.400	1			7.700	1			7.300	1			6.900	1			514.000	1			27.200	1			20.300	1		
METALS	Thallium	mg/kg	4.7E-01	0.535	**5.4E-01**	0.535	1	U	U	0.536	1	U	U	0.536	1	U	U	0.559	1	U	U												
METALS	Vanadium	mg/kg	7.7E+02	0.5	**7.7E+02**	26.000	1			28.000	1			28.000	1			17.000	1														
METALS	Zinc	mg/kg	1.2E+03	2.5	**1.2E+03**	49.000	1			24.000	1			22.000	1			13.000	1			19.300	1			56.500	1			28.800	1		
PCBS	Aroclor 1016	mg/kg	5.7E+00	0.036	**5.7E+00**	0.036	1	U	U	0.036	1	U	U	0.036	1	U	U	0.037	1	U	U												
PCBS	Aroclor 1221	mg/kg	5.7E+00	0.071	**5.7E+00**	0.071	1	U	U	0.071	1	U	U	0.071	1	U	U	0.074	1	U	U												
PCBS	Aroclor 1232	mg/kg	5.7E+00	0.036	**5.7E+00**	0.036	1	U	U	0.036	1	U	U	0.036	1	U	U	0.037	1	U	U												
PCBS	Aroclor 1242	mg/kg	5.7E+00	0.036	**5.7E+00**	0.036	1	U	U	0.036	1	U	U	0.036	1	U	U	0.037	1	U	U												
PCBS	Aroclor 1248	mg/kg	5.7E+00	0.036	**5.7E+00**	0.036	1	U	U	0.036	1	U	U	0.036	1	U	U	0.037	1	U	U												
PCBS	Aroclor 1254	mg/kg	5.7E+00	0.036	**5.7E+00**	0.066	1			0.036	1	U	U	0.036	1	U	U	0.037	1	U	U												
PCBS	Aroclor 1260	mg/kg	5.7E+00	0.036	**5.7E+00**	0.036	1	U	U	0.036	1	U	U	0.036	1	U	U	0.037	1	U	U												
PESTICIDES	4,4'-DDD	mg/kg	2.2E+00	0.0036	**2.2E+00**	0.004	1	U	U	0.004	1	U	U	0.004	1	U	U	0.004	1	U	U												
PESTICIDES	4,4'-DDE	mg/kg	2.0E+00	0.0036	**2.0E+00**	0.004	1	U	U	0.004	1	U	U	0.004	1	U	U	0.004	1	U	U												
PESTICIDES	4,4'-DDT	mg/kg	2.5E+00	0.0036	**2.5E+00**	0.004	1	U	U	0.004	1	U	U	0.004	1	U	U	0.004	1	U	U												
PESTICIDES	Aldrin	mg/kg	1.7E-02	0.0018	**1.7E-02**	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U												
PESTICIDES	alpha-BHC	mg/kg	1.3E-03	0.0018	**1.8E-03**	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U												
PESTICIDES	beta-BHC	mg/kg	4.7E-02	0.0018	**4.7E-02**	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U												
PESTICIDES	Chlordane	mg/kg	5.1E+00	0.036	**5.1E+00**	0.036	1	U	U	0.036	1	U	U	0.036	1	U	U	0.037	1	U	U												
PESTICIDES	delta-BHC	mg/kg	2.9E-02	0.0018	**2.9E-02**	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U												
PESTICIDES	Dieldrin	mg/kg	8.2E-03	0.0036	**8.2E-03**	0.004	1	U	U	0.004	1	U	U	0.004	1	U	U	0.004	1	U	U												
PESTICIDES	Endosulfan I	mg/kg	6.9E+01	0.0018	**6.9E+01**	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U												
PESTICIDES	Endosulfan II	mg/kg	2.1E+02	0.0036	**2.1E+02**	0.004	1	U	U	0.004	1	U	U	0.004	1	U	U	0.004	1	U	U												
PESTICIDES	Endosulfan Sulfate	mg/kg	1.6E+03	0.0036	**1.6E+03**	0.004	1	U	U	0.004	1	U	U	0.004	1	U	U	0.004	1	U	U												
PESTICIDES	Endrin	mg/kg	4.0E-01	0.0036	**4.0E-01**	0.004	1	U	U	0.004	1	U	U	0.004	1	U	U	0.004	1	U	U												
PESTICIDES	Endrin aldehyde	mg/kg	7.2E+02	0.0036	**7.2E+02**	0.004	1	U	U	0.004	1	U	U	0.004	1	U	U	0.004	1	U	U												
PESTICIDES	Endrin ketone	mg/kg	1.1E+02	0.0036	**1.1E+02**	0.004	1	U	U	0.004	1	U	U	0.004	1	U	U	0.004	1	U	U												
PESTICIDES	gamma-BHC (Lindane)	mg/kg	4.7E-03	0.0018	**4.7E-03**	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U												
PESTICIDES	Heptachlor	mg/kg	1.0E-01	0.0018	**1.0E-01**	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U												
PESTICIDES	Heptachlor epoxide	mg/kg	3.1E-02	0.0018	**3.1E-02**	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U												

Table 2
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump 094, Sump 123, and Waste Rack Sump WRS003
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	48SB01				48SB01				48SB01				48SB01				LH-S123-01				LH-S123-01				LH-S94-01			
SAMPLE_NO			Calculated		**Standard 3**	48SB01(0-0.5)				48SB01(1-3)				48SB01(1-3)-FD				48SB01(3-5)				LH-S123-01.1				LH-S123-01.2				LH-S94-01.1			
SAMPLE_DATE			Commercial		**Groundwater**	28-Jul-98				28-Jul-98				28-Jul-98				28-Jul-98				26-Jun-93				26-Jun-93				20-Aug-93			
DEPTH			/ Industrial	Practical	**Protective**	0-0.5 Ft				1-3 Ft				1-3 Ft				3-5 Ft				0.5-1.5 Ft				11-12.5 Ft				0.5-1.5 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				FD				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
PESTICIDES	METHOXYCHLOR	mg/kg	6.6E+01	0.018	**6.6E+01**	0.018	1	U	U	0.018	1	U	U	0.018	1	U	U	0.019	1	U	U												
PESTICIDES	Toxaphene	mg/kg	6.2E+00	0.036	**6.2E+00**	0.036	1	U	U	0.036	1	U	U	0.036	1	U	U	0.037	1	U	U												
SEMIVOLATILES	1,2,4-Trichlorobenzene	mg/kg	2.5E+00	0.36	**2.5E+00**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
SEMIVOLATILES	1,2-Dichlorobenzene	mg/kg	9.0E+00	0.36	**9.0E+00**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
SEMIVOLATILES	1,3-Dichlorobenzene	mg/kg	1.2E+01	0.36	**1.2E+01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
SEMIVOLATILES	1,4-Dichlorobenzene	mg/kg	1.0E+00	0.36	**1.0E+00**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
SEMIVOLATILES	2,4,5-Trichlorophenol	mg/kg	4.8E+02	0.89	**4.8E+02**	0.890	1	U	U	0.890	1	U	U	0.890	1	U	U	0.930	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
SEMIVOLATILES	2,4,6-Trichlorophenol	mg/kg	4.5E-01	0.36	**4.5E-01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
SEMIVOLATILES	2,4-Dichlorophenol	mg/kg	1.1E+00	0.36	**1.1E+00**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
SEMIVOLATILES	2,4-Dimethylphenol	mg/kg	5.3E+00	0.36	**5.3E+00**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	2,4-Dinitrophenol	mg/kg	1.9E-02	0.89	**8.9E-01**	0.890	1	U	U	0.890	1	U	U	0.890	1	U	U	0.930	1	U	U	11.561	1	U	U	12.407	1	U	U	12.285	1	U	U
SEMIVOLATILES	2,4-Dinitrotoluene	mg/kg	5.0E-04	0.36	**3.6E-01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U												
SEMIVOLATILES	2,6-Dinitrotoluene	mg/kg	4.1E-04	0.36	**3.6E-01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U												
SEMIVOLATILES	2-Chloronaphthalene	mg/kg	1.1E+03	0.328	**1.1E+03**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.347	1	U	U	0.372	1	U	U	0.369	1	U	U
SEMIVOLATILES	2-Chlorophenol	mg/kg	4.4E+00	0.36	**4.4E+00**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	2-Methylnaphthalene	mg/kg	3.8E+01	0.328	**3.8E+01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.347	1	U	U	0.372	1	U	U	0.369	1	U	U
SEMIVOLATILES	2-Methylphenol	mg/kg	1.1E+01	0.36	**1.1E+01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	2-Nitroaniline	mg/kg	2.1E-02	0.89	**8.9E-01**	0.890	1	U	U	0.890	1	U	U	0.890	1	U	U	0.930	1	U	U	3.468	1	U	U	3.722	1	U	U	3.686	1	U	U
SEMIVOLATILES	2-Nitrophenol	mg/kg	8.4E-01	0.36	**8.4E-01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
SEMIVOLATILES	3,3'-Dichlorobenzidine	mg/kg	9.9E-03	0.36	**3.6E-01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	3-Nitroaniline	mg/kg	2.9E-02	0.89	**8.9E-01**	0.890	1	U	U	0.890	1	U	U	0.890	1	U	U	0.930	1	U	U	3.468	1	U	U	3.722	1	U	U	3.686	1	U	U
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	mg/kg	1.9E-02	0.89	**8.9E-01**	0.890	1	U	U	0.890	1	U	U	0.890	1	U	U	0.930	1	U	U	5.780	1	U	U	6.203	1	U	U	6.143	1	U	U
SEMIVOLATILES	4-Bromophenyl phenyl ether	mg/kg	5.9E-01	0.36	**5.9E-01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
SEMIVOLATILES	4-Chloro-3-methylphenol	mg/kg	9.7E+00	0.36	**9.7E+00**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	4-Chloroaniline	mg/kg	6.2E-01	0.36	**6.2E-01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	3.468	1	U	U	3.722	1	U	U	3.686	1	U	U
SEMIVOLATILES	4-Chlorophenyl phenyl ether	mg/kg	5.4E-02	0.36	**3.6E-01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
SEMIVOLATILES	4-Methylphenol	mg/kg	9.4E-01	0.36	**9.4E-01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	4-Nitroaniline	mg/kg	2.5E-02	0.89	**8.9E-01**	0.890	1	U	U	0.890	1	U	U	0.890	1	U	U	0.930	1	U	U	5.780	1	U	U	6.203	1	U	U	6.143	1	U	U
SEMIVOLATILES	4-Nitrophenol	mg/kg	2.1E-01	0.643	**6.4E-01**	0.890	1	U	U	0.890	1	U	U	0.890	1	U	U	0.930	1	U	U	5.780	1	U	U	6.203	1	U	U	0.643	1	U	U
SEMIVOLATILES	Acenaphthene	mg/kg	3.4E+02	0.328	**3.4E+02**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.347	1	U	U	0.372	1	U	U	0.369	1	U	U
SEMIVOLATILES	Acenaphthylene	mg/kg	5.4E+02	0.36	**5.4E+02**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	Anthracene	mg/kg	2.0E+01	0.36	**2.0E+01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	Benzo(a)anthracene	mg/kg	3.0E+00	0.328	**3.0E+00**	0.250	1			0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.347	1	U	U	0.372	1	U	U	0.369	1	U	U
SEMIVOLATILES	Benzo(a)pyrene	mg/kg	4.1E+00	0.18	**4.1E+00**	0.180	1	U	U	0.180	1	U	U	0.180	1	U	U	0.190	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	Benzo(b)fluoranthene	mg/kg	1.0E+01	0.36	**1.0E+01**	0.290	1			0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
SEMIVOLATILES	Benzo(ghi)perylene	mg/kg	8.2E+00	0.36	**8.2E+00**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	2.312	1	U	U	2.481	1	U	U	2.457	1	U	U
SEMIVOLATILES	Benzo(k)fluoranthene	mg/kg	1.4E+01	0.36	**1.4E+01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
SEMIVOLATILES	Benzoic Acid	mg/kg	4.6E+01	0.89	**4.6E+01**	0.890	1	U	U	0.890	1	U	U	0.890	1	U	U	0.930	1	U	U												
SEMIVOLATILES	Benzyl Alcohol	mg/kg	1.1E+01	0.41	**1.1E+01**	0.890	1	U	U	0.890	1	U	U	0.890	1	U	U	0.930	1	U	U												
SEMIVOLATILES	bis(2-Chloroethoxy)methane	mg/kg	1.7E-03	0.36	**3.6E-01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	bis(2-Chloroethyl)ether	mg/kg	1.1E-04	0.36	**3.6E-01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	mg/kg	2.8E-01	0.36	**3.6E-01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	mg/kg	8.7E+01	0.1346	**8.7E+01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.382	1	U	U	0.261	1	U	U	0.209	1	U	U
SEMIVOLATILES	Butyl benzyl phthalate	mg/kg	8.0E+02	0.36	**8.0E+02**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.162	1		B	0.223	1		J	0.614	1	U	U
SEMIVOLATILES	Carbazole	mg/kg	7.5E-01	0.36	**7.5E-01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
SEMIVOLATILES	Chrysene	mg/kg	1.2E+01	0.36	**1.2E+01**	0.270	1			0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	5.780	1	U	U	6.203	1	U	U	6.142	1	U	U
SEMIVOLATILES	Dibenzo(a,h)anthracene	mg/kg	8.2E+00	0.36	**8.2E+00**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	2.312	1	U	U	2.481	1	U	U	2.457	1	U	U
SEMIVOLATILES	Dibenzofuran	mg/kg	7.4E+01	0.36	**7.4E+01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
SEMIVOLATILES	Diethyl phthalate	mg/kg	2.7E+02	0.161	**2.7E+02**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.197	1	U	U	0.161	1	U	U	0.221	1	U	U
SEMIVOLATILES	Dimethyl phthalate	mg/kg	6.3E+01	0.36	**6.3E+01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	di-n-Butyl phthalate	mg/kg	7.4E+03	0.347	**7.4E+03**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.347	1	U	U	0.372	1	U	U	0.369	1	U	U
SEMIVOLATILES	di-n-Octyl phthalate	mg/kg	3.3E+04	0.36	**3.3E+04**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	Fluoranthene	mg/kg	2.5E+02	0.36	**2.5E+02**	0.600	1			0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	Fluorene	mg/kg	3.0E+02	0.36	**3.0E+02**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	Hexachlorobenzene	mg/kg	6.0E-01	0.18	**6.0E-01**	0.180	1	U	U	0.180	1	U	U	0.180	1	U	U	0.190	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
SEMIVOLATILES	Hexachlorobutadiene	mg/kg	3.0E+00	0.36	**3.0E+00**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	3.468	1	U	U	3.722	1	U	U	3.686	1	U	U
SEMIVOLATILES	Hexachlorocyclopentadiene	mg/kg	1.0E+01	0.36	**1.0E+01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	3.468	1	U	U	3.722	1	U	U	3.686	1	U	U
SEMIVOLATILES	Hexachloroethane	mg/kg	4.0E+00	0.36	**4.0E+00**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	mg/kg	2.9E+01	0.36	**2.9E+01**	0.200	1			0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U
SEMIVOLATILES	Isophorone	mg/kg	2.2E+00	0.36	**2.2E+00**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	Naphthalene	mg/kg	6.8E+01	0.328	**6.8E+01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.347	1	U	U	0.372	1	U	U	0.369	1	U	U
SEMIVOLATILES	Nitrobenzene	mg/kg	1.5E-01	0.36	**3.6E-01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	n-Nitrosodimethylamine	mg/kg	9.5E-07	0.36	**3.6E-01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U												
SEMIVOLATILES	n-Nitroso-di-n-propylamine	mg/kg	2.1E-05	0.36	**3.6E-01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	1.156	1	U	U	1.241	1	U	U	1.229	1	U	U

Table 2
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump 094, Sump 123, and Waste Rack Sump WRS003
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	48SB01				48SB01				48SB01				48SB01				LH-S123-01				LH-S123-01				LH-S94-01			
SAMPLE_NO			Calculated		**Standard 3**	48SB01(0-0.5)				48SB01(1-3)				48SB01(1-3)-FD				48SB01(3-5)				LH-S123-01.1				LH-S123-01.2				LH-S94-01.1			
SAMPLE_DATE			Commercial		**Groundwater**	28-Jul-98				28-Jul-98				28-Jul-98				28-Jul-98				26-Jun-93				26-Jun-93				20-Aug-93			
DEPTH			/ Industrial	Practical	**Protective**	0-0.5 Ft				1-3 Ft				1-3 Ft				3-5 Ft				0.5-1.5 Ft				11-12.5 Ft				0.5-1.5 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				FD				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
SEMIVOLATILES	n-Nitrosodiphenylamine	mg/kg	4.2E-01	0.36	**4.2E-01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	Pentachlorophenol	mg/kg	3.4E-02	0.18	**1.8E-01**	0.180	1	U	U	0.180	1	U	U	0.180	1	U	U	0.190	1	U	U	5.780	1	U	U	6.203	1	U	U	6.143	1	U	U
SEMIVOLATILES	Phenanthrene	mg/kg	2.8E+02	0.36	**2.8E+02**	0.430	1			0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	Phenol	mg/kg	1.4E+01	0.36	**1.4E+01**	0.360	1	U	U	0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
SEMIVOLATILES	Pyrene	mg/kg	1.0E+02	0.36	**1.0E+02**	0.390	1			0.360	1	U	U	0.360	1	U	U	0.370	1	U	U	0.578	1	U	U	0.620	1	U	U	0.614	1	U	U
VOLATILES	1,1,1,2-Tetrachloroethane	mg/kg	2.3E+00	0.0053	**2.3E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	1,1,1-Trichloroethane	mg/kg	5.2E-01	0.005	**5.2E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	2.5E-02	0.005	**2.5E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,1,2-Trichloroethane	mg/kg	5.9E-03	0.005	**5.9E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,1-Dichloroethane	mg/kg	8.4E+00	0.005	**8.4E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,1-Dichloroethene	mg/kg	1.2E-02	0.005	**1.2E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,1-Dichloropropene	mg/kg	1.4E-02	0.0053	**1.4E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	1,2,3-Trichlorobenzene	mg/kg	5.9E+01	0.0053	**5.9E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	1,2,3-Trichloropropane	mg/kg	3.4E-04	0.012	**1.2E-02**	0.016	1	U	U	0.016	1	U	U	0.016	1	U	U	0.017	1	U	U												
VOLATILES	1,2,4-Trichlorobenzene	mg/kg	2.5E+00	0.0053	**2.5E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	1,2,4-Trimethylbenzene	mg/kg	1.0E+02	0.0053	**1.0E+02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	1,2-Dibromo-3-chloropropane	mg/kg	7.5E-04	0.011	**1.1E-02**	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U												
VOLATILES	1,2-Dibromoethane	mg/kg	6.2E-05	0.0053	**5.3E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	1,2-Dichlorobenzene	mg/kg	9.0E+00	0.0053	**9.0E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	1,2-Dichloroethane	mg/kg	2.4E-03	0.005	**5.0E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,2-Dichloroethene	mg/kg	5.3E-02	0.005	**5.3E-02**																	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,2-Dichloropropane	mg/kg	6.9E-03	0.005	**6.9E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,3,5-Trimethylbenzene	mg/kg	1.1E+02	0.0053	**1.1E+02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	1,3-Dichlorobenzene	mg/kg	1.2E+01	0.0053	**1.2E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	1,3-Dichloropropane	mg/kg	8.0E-02	0.0053	**8.0E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	1,4-Dichloro-2-butene (SAI-Ind)	mg/kg	1.5E-01	0.0053	**1.5E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	1,4-Dichlorobenzene	mg/kg	1.0E+00	0.0053	**1.0E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	1,4-Dioxane	mg/kg	2.7E-03	1.1	**1.1E+00**	1.100	1	U	U	1.100	1	U	U	1.100	1	U	U	1.100	1	U	U												
VOLATILES	2,2-Dichloropropane	mg/kg	1.5E-01	0.016	**1.5E-01**	0.016	1	U	U	0.016	1	U	U	0.016	1	U	U	0.017	1	U	U												
VOLATILES	2-Butanone	mg/kg	8.2E+00	0.012	**8.2E+00**	0.021	1	U	U	0.021	1	U	U	0.021	1	U	U	0.022	1	U	U	0.058	1	U	U	0.062	1	U	U	0.062	1	U	U
VOLATILES	2-Chloroethyl vinyl ether	mg/kg	2.3E-03	0.012	**1.2E-02**																												
VOLATILES	2-Chlorotoluene	mg/kg	1.8E+01	0.0053	**1.8E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	2-Hexanone	mg/kg	2.9E+00	0.012	**2.9E+00**	0.021	1	U	U	0.021	1	U	U	0.021	1	U	U	0.022	1	U	U	0.058	1	U	U	0.062	1	U	U	0.062	1	U	U
VOLATILES	2-Propenal	mg/kg	5.3E-03	0.11	**1.1E-01**	0.110	1	U	U	0.110	1	U	U	0.110	1	U	U	0.110	1	U	U												
VOLATILES	4-Chlorotoluene	mg/kg	2.2E+01	0.0053	**2.2E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	Acetone	mg/kg	9.7E+00	0.012	**9.7E+00**	0.005	1		J	0.021	1	U	U	0.021	1	U	U	0.022	1	U	U	0.040	1	U	U	0.022	1	U	U	0.059	1	U	U
VOLATILES	Acetonitrile	mg/kg	3.4E-01	0.12	**3.4E-01**																												
VOLATILES	Acrylonitrile	mg/kg	6.2E-05	0.11	**1.1E-01**	0.110	1	U	U	0.110	1	U	U	0.110	1	U	U	0.110	1	U	U												
VOLATILES	Allyl chloride	mg/kg	7.8E-01	0.012	**7.8E-01**																												
VOLATILES	Benzene	mg/kg	7.8E-03	0.005	**7.8E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Bromobenzene	mg/kg	1.1E+01	0.0053	**1.1E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	Bromochloromethane	mg/kg	2.8E+00	0.0053	**2.8E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	Bromodichloromethane	mg/kg	6.0E-03	0.005	**6.0E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Bromoform	mg/kg	7.1E-02	0.005	**7.1E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Bromomethane	mg/kg	6.3E-02	0.011	**6.3E-02**	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U	0.029	1	U	U	0.031	1	U	U	0.031	1	U	U
VOLATILES	Carbon disulfide	mg/kg	1.4E+01	0.005	**1.4E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Carbon tetrachloride	mg/kg	2.2E-02	0.005	**2.2E-02**	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Chlorobenzene	mg/kg	4.7E-01	0.005	**4.7E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Chloroethane	mg/kg	2.1E+01	0.011	**2.1E+01**	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U	0.029	1	U	U	0.031	1	U	U	0.031	1	U	U
VOLATILES	Chloroform	mg/kg	1.2E+00	0.005	**1.2E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Chloromethane	mg/kg	1.2E-01	0.011	**1.2E-01**	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U	0.029	1	U	U	0.031	1	U	U	0.031	1	U	U
VOLATILES	Chloroprene	mg/kg	3.6E-01	0.12	**3.6E-01**																												
VOLATILES	cis-1,2-Dichloroethene	mg/kg	5.3E-02	0.0053	**5.3E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	cis-1,3-Dichloropropene	mg/kg	5.7E-03	0.005	**5.7E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Dibromochloromethane	mg/kg	4.9E-02	0.005	**4.9E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Dibromomethane	mg/kg	1.5E+00	0.011	**1.5E+00**	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U												
VOLATILES	Dichlorodifluoromethane	mg/kg	1.3E+02	0.016	**1.3E+02**	0.016	1	U	U	0.016	1	U	U	0.016	1	U	U	0.017	1	U	U												
VOLATILES	Ethyl methacrylate	mg/kg	8.2E+00	0.0053	**8.2E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	Ethylbenzene	mg/kg	3.2E+00	0.005	**3.2E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Hexachlorobutadiene	mg/kg	3.0E+00	0.0053	**3.0E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	IODOMETHANE	mg/kg	8.2E-02	0.0053	**8.2E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	ISOBUTYL ALCOHOL	mg/kg	6.5E+00	1.1	**6.5E+00**	1.100	1	U	U	1.100	1	U	U	1.100	1	U	U	1.100	1	U	U												
VOLATILES	Isopropylbenzene	mg/kg	7.6E+02	0.0053	**7.6E+02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	Methacrylonitrile	mg/kg	1.7E-03	0.024	**2.4E-02**	0.110	1	U	U	0.110	1	U	U	0.110	1	U	U	0.110	1	U	U												

Table 2
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump 094, Sump 123, and Waste Rack Sump WRS003
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	48SB01				48SB01				48SB01				48SB01				LH-S123-01				LH-S123-01				LH-S94-01			
SAMPLE_NO			Calculated		**Standard 3**	48SB01(0-0.5)				48SB01(1-3)				48SB01(1-3)-FD				48SB01(3-5)				LH-S123-01.1				LH-S123-01.2				LH-S94-01.1			
SAMPLE_DATE			Commercial		**Groundwater**	28-Jul-98				28-Jul-98				28-Jul-98				28-Jul-98				26-Jun-93				26-Jun-93				20-Aug-93			
DEPTH			/ Industrial	Practical	**Protective**	0-0.5 Ft				1-3 Ft				1-3 Ft				3-5 Ft				0.5-1.5 Ft				11-12.5 Ft				0.5-1.5 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				FD				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
VOLATILES	Methyl isobutyl ketone	mg/kg	3.4E+00	0.012	**3.4E+00**	0.021	1	U	U	0.021	1	U	U	0.021	1	U	U	0.022	1	U	U	0.058	1	U	U	0.062	1	U	U	0.062	1	U	U
VOLATILES	METHYL METHACRYLATE	mg/kg	8.4E+01	0.024	**8.4E+01**	0.054	1	U	U	0.054	1	U	U	0.054	1	U	U	0.056	1	U	U												
VOLATILES	Methylene chloride	mg/kg	1.8E-03	0.004	**4.0E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.004	1	U	U	0.005	1	U	U	0.004	1	U	U
VOLATILES	Naphthalene	mg/kg	6.8E+01	0.0053	**6.8E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	n-BUTYLBENZENE	mg/kg	2.7E+02	0.0053	**2.7E+02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	n-PROPYLBENZENE	mg/kg	9.5E+01	0.0053	**9.5E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	Pentachloroethane	mg/kg	4.6E-01	0.011	**4.6E-01**	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U												
VOLATILES	p-ISOPROPYLTOLUENE	mg/kg	5.0E+02	0.0053	**5.0E+02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	Propionitrile	mg/kg	5.2E-03	0.061	**6.1E-02**	0.110	1	U	U	0.110	1	U	U	0.110	1	U	U	0.110	1	U	U												
VOLATILES	sec-BUTYLBENZENE	mg/kg	1.8E+02	0.0053	**1.8E+02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	Styrene	mg/kg	1.6E+00	0.005	**1.6E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	tert-BUTYLBENZENE	mg/kg	2.2E+02	0.0053	**2.2E+02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	Tetrachloroethene	mg/kg	1.8E-02	0.005	**1.8E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Toluene	mg/kg	3.2E+00	0.005	**3.2E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	trans-1,2-Dichloroethene	mg/kg	1.2E-01	0.0053	**1.2E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U												
VOLATILES	trans-1,3-Dichloropropene	mg/kg	3.1E-02	0.005	**3.1E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	trans-1,4-Dichloro-2-butene (SAI-Ind)	mg/kg	1.8E-03	0.024	**2.4E-02**																												
VOLATILES	Trichloroethene	mg/kg	1.1E-02	0.005	**1.1E-02**	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U	0.001	1		J	0.006	1	U	U	0.006	1	U	U
VOLATILES	Trichlorofluoromethane	mg/kg	1.2E+02	0.011	**1.2E+02**	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U												
VOLATILES	Vinyl acetate	mg/kg	2.1E+01	0.012	**2.1E+01**	0.021	1	U	U	0.021	1	U	U	0.021	1	U	U	0.022	1	U	U												
VOLATILES	Vinyl chloride	mg/kg	2.2E-03	0.011	**1.1E-02**	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U	0.011	1	U	U	0.029	1	U	U	0.031	1	U	U	0.031	1	U	U
VOLATILES	Xylenes, Total	mg/kg	5.3E+01	0.005	**5.3E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U

Notes:

Boxed and Bold = Detected Concentration exceeds Applicable Standard 3 Soil MSC.

Shaded = Undetected (SQL) value exceeds Applicable Standard 3 Soil MSC.

B - The concentration reported was detected in the associated method blank, trip blank, or equipment blank within 5X the blank concentration.

E - The concentration reported exceeded the upper calibration limit, therefore, the concentration is estimated.

J - The analyte was positively identified; the reported value is the estimated concentration of the constituent detected with concentration measured between the MDL and the PQL for 1993 through 1998 samples.

nv - not validated

R - The reported results are rejected as unusable.

U - Not detected

DIL - dilution factor

FD - field duplicate

Ft - feet

LQ - laboratory qualifier

mg/kg - milligrams per kilogram

MSC - medium specific concentration

NA - not applicable

ng/kg - nanograms per kilogram

PQL - practical quantitation limit

REG - regular sample

SQL - Sample Quantitation Limit

VQ - validation qualifier

[a] Value developed in Attachment 1 using the SAM model. Shading indicates a chemical specific value.

[b] PQL values are the minimum undetected result shown in the table, or a laboratory value.

[c] Shading indicates MSC value equal to the PQL.

Table 2
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump 094, Sump 123, and Waste Rack Sump WRS003
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S94-01				LHS-Y-05				LHS-Y-06				LH-WRS3-01				LH-WRS3-01				LH-WRS3-01			
SAMPLE_NO			Calculated		**Standard 3**	LH-S94-01.2				LHS-Y-05				LHS-Y-06				LH-WRS3-01.1				LH-WRS3-01.2				LH-WRS3-01.3			
SAMPLE_DATE			Commercial		**Groundwater**	20-Aug-93				11-Jan-95				11-Jan-95				26-Jun-93				26-Jun-93				26-Jun-93			
DEPTH			/ Industrial	Practical	**Protective**	2.9-3.5 Ft				0-0.5 Ft				0-0.5 Ft				0.5-1.5 Ft				3.5-4.3 Ft				10.5-10.9 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
DIOXINS_FURANS	2,3,7,8-TCDD Toxic Equivalent Concentration	ng/kg	9.1E+03	1	**9.1E+03**																								
EXPLOSIVES	1,3,5-Trinitrobenzene	mg/kg	1.2E+00	0.15	**1.2E+00**					0.220	1	U	U	0.240	1	U	U												
EXPLOSIVES	1,3-Dinitrobenzene	mg/kg	7.5E-03	0.05	**5.0E-02**					0.220	1	U	U	0.240	1	U	U												
EXPLOSIVES	2,4,6-Trinitrotoluene	mg/kg	3.4E-01	0.1	**3.4E-01**					0.220	1	U	U	0.240	1	U	U												
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	5.0E-04	0.1	**1.0E-01**	1.252	1	U	U	0.220	1	U	U	0.240	1	U	U	1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	4.1E-04	0.1	**1.0E-01**	1.252	1	U	U	0.240	1	U	U	0.250	1	U	U	1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	mg/kg	2.1E-01	0.05	**2.1E-01**																								
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	mg/kg	1.3E-01	0.05	**1.3E-01**					0.460	1	U	U	0.490	1	U	U												
EXPLOSIVES	HMX	mg/kg	4.8E-01	0.1	**4.8E-01**					2.000	1	U	U	2.200	1	U	U												
EXPLOSIVES	m-Nitrotoluene	mg/kg	3.2E+00	0.1	**3.2E+00**					0.930	1	U	U	0.980	1	U	U												
EXPLOSIVES	Nitrobenzene	mg/kg	1.5E-01	0.1	**1.5E-01**					0.240	1	U	U	0.250	1	U	U												
EXPLOSIVES	o-Nitrotoluene	mg/kg	3.2E+00	0.1	**3.2E+00**					0.930	1	U	U	0.980	1	U	U												
EXPLOSIVES	p-Nitrotoluene	mg/kg	3.2E+00	0.1	**3.2E+00**					2.800	1	U	U	2.900	1	U	U												
EXPLOSIVES	RDX	mg/kg	3.8E-02	0.1	**1.0E-01**					1.000	1	U	U	1.100	1	U	U												
EXPLOSIVES	Tetryl	mg/kg	5.2E+00	0.69	**5.2E+00**					0.690	1	U	U	0.730	1	U	U												
METALS	Aluminum	mg/kg	3.9E+06	20	**3.9E+06**	13000.000	1			10300.000	1			9570.000	1			3550.000	1			12200.000	1			5030.000	1		
METALS	Antimony	mg/kg	9.4E-01	4.8	**4.8E+00**	5.180	1	U	U	15.600	1	U	UJ	9.800	1	U	UJ	4.800	1	U	U	5.180	1	U	U	10.600	1	U	U
METALS	Arsenic	mg/kg	4.8E+00	0.3	**4.8E+00**	1.010	1			0.570	1		J	3.000	1			1.440	1			0.337	1		E	2.390	1		
METALS	Barium	mg/kg	8.5E+01	0.3	**8.5E+01**	**224.000**	1			83.100	1			**2510.000**	1			18.500	1			**152.000**	1			**195.000**	1		
METALS	Beryllium	mg/kg	6.5E-01	0.535	**6.5E-01**																								
METALS	Cadmium	mg/kg	4.0E-01	0.535	**5.4E-01**	**4.250**	1			1.600	1	U	U	0.980	1	U	U	**3.550**	1			**3.420**	1			2.660	1	U	U
METALS	Calcium	mg/kg	NA	NA	**none**	1870.000	1			964.000	1			2330.000	1			719.000	1			1530.000	1			1680.000	1		
METALS	Chromium	mg/kg	2.1E+04	0.4	**2.1E+04**	14.900	1			13.400	1		J	20.600	1			6.740	1			11.300	1			6.010	1		E
METALS	Cobalt	mg/kg	3.0E+02	0.5	**3.0E+02**	2.460	1			3.300	1			6.600	1			0.290	1		E	3.060	1			84.600	1		
METALS	Copper	mg/kg	5.6E+01	2.79	**5.6E+01**	8.830	1			23.900	1			8.800	1			3.910	1			5.100	1			10.300	1		
METALS	Iron	mg/kg	NA	NA	**none**	8500.000	1			7190.000	1			17400.000	1			6700.000	1			6350.000	1			8120.000	1		
METALS	Lead	mg/kg	2.9E+01	7.2	**2.9E+01**	17.700	1			15.100	1			21.800	1			7.200	1	U	U	19.100	1			16.000	1	U	U
METALS	Magnesium	mg/kg	NA	NA	**none**	819.000	1			494.000	1			1030.000	1			104.000	1			947.000	1			1010.000	1		
METALS	Manganese	mg/kg	1.8E+03	0.2	**1.8E+03**	150.000	1			60.800	1			257.000	1			13.000	1			111.000	1			1310.000	1		
METALS	Mercury	mg/kg	8.2E-02	0.027	**8.2E-02**	0.057	1		E	0.120	1	U	U	0.091	1	U	U	0.051	1			0.057	1		E	0.027	1	U	U
METALS	Nickel	mg/kg	8.3E+01	0.8	**8.3E+01**																								
METALS	Potassium	mg/kg	NA	NA	**none**	816.000	1			497.000	1			433.000	1			203.000	1			401.000	1			463.000	1		
METALS	Selenium	mg/kg	3.5E+00	0.27	**3.5E+00**	0.337	1	U	U	0.270	1	U	UJ	0.300	1		J	0.312	1	U	U	0.337	1	U	U	1.060	1	U	U
METALS	Silver	mg/kg	4.8E+00	0.024	**4.8E+00**	0.031	1		E	1.600	1	U	U	0.980	1	U	U	0.024	1	U	U	0.026	1	U	U	0.053	1	U	U
METALS	Sodium	mg/kg	NA	540	**none**																								
METALS	Strontium	mg/kg	9.1E+02	15.6	**9.1E+02**	32.400	1			15.600	1	U	U	405.000	1			7.420	1			31.400	1			25.100	1		
METALS	Thallium	mg/kg	4.7E-01	0.535	**5.4E-01**					78.200	1	U	U	49.000	1	U	U												
METALS	Vanadium	mg/kg	7.7E+02	0.5	**7.7E+02**																								
METALS	Zinc	mg/kg	1.2E+03	2.5	**1.2E+03**	207.000	1			62.400	1			38.200	1		J	10.400	1			17.700	1			36.500	1		
PCBS	Aroclor 1016	mg/kg	5.7E+00	0.036	**5.7E+00**																								
PCBS	Aroclor 1221	mg/kg	5.7E+00	0.071	**5.7E+00**																								
PCBS	Aroclor 1232	mg/kg	5.7E+00	0.036	**5.7E+00**																								
PCBS	Aroclor 1242	mg/kg	5.7E+00	0.036	**5.7E+00**																								
PCBS	Aroclor 1248	mg/kg	5.7E+00	0.036	**5.7E+00**																								
PCBS	Aroclor 1254	mg/kg	5.7E+00	0.036	**5.7E+00**																								
PCBS	Aroclor 1260	mg/kg	5.7E+00	0.036	**5.7E+00**																								
PESTICIDES	4,4'-DDD	mg/kg	2.2E+00	0.0036	**2.2E+00**																								
PESTICIDES	4,4'-DDE	mg/kg	2.0E+00	0.0036	**2.0E+00**																								
PESTICIDES	4,4'-DDT	mg/kg	2.5E+00	0.0036	**2.5E+00**																								
PESTICIDES	Aldrin	mg/kg	1.7E-02	0.0018	**1.7E-02**																								
PESTICIDES	alpha-BHC	mg/kg	1.3E-03	0.0018	**1.8E-03**																								
PESTICIDES	beta-BHC	mg/kg	4.7E-02	0.0018	**4.7E-02**																								
PESTICIDES	Chlordane	mg/kg	5.1E+00	0.036	**5.1E+00**																								
PESTICIDES	delta-BHC	mg/kg	2.9E-02	0.0018	**2.9E-02**																								
PESTICIDES	Dieldrin	mg/kg	8.2E-03	0.0036	**8.2E-03**																								
PESTICIDES	Endosulfan I	mg/kg	6.9E+01	0.0018	**6.9E+01**																								
PESTICIDES	Endosulfan II	mg/kg	2.1E+02	0.0036	**2.1E+02**																								
PESTICIDES	Endosulfan Sulfate	mg/kg	1.6E+03	0.0036	**1.6E+03**																								
PESTICIDES	Endrin	mg/kg	4.0E-01	0.0036	**4.0E-01**																								
PESTICIDES	Endrin aldehyde	mg/kg	7.2E+02	0.0036	**7.2E+02**																								
PESTICIDES	Endrin ketone	mg/kg	1.1E+02	0.0036	**1.1E+02**																								
PESTICIDES	gamma-BHC (Lindane)	mg/kg	4.7E-03	0.0018	**4.7E-03**																								
PESTICIDES	Heptachlor	mg/kg	1.0E-01	0.0018	**1.0E-01**																								
PESTICIDES	Heptachlor epoxide	mg/kg	3.1E-02	0.0018	**3.1E-02**																								

Table 2
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump 094, Sump 123, and Waste Rack Sump WRS003
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S94-01				LHS-Y-05				LHS-Y-06				LH-WRS3-01				LH-WRS3-01				LH-WRS3-01			
SAMPLE_NO			Calculated		**Standard 3**	LH-S94-01.2				LHS-Y-05				LHS-Y-06				LH-WRS3-01.1				LH-WRS3-01.2				LH-WRS3-01.3			
SAMPLE_DATE			Commercial		**Groundwater**	20-Aug-93				11-Jan-95				11-Jan-95				26-Jun-93				26-Jun-93				26-Jun-93			
DEPTH			/ Industrial	Practical	**Protective**	2.9-3.5 Ft				0-0.5 Ft				0-0.5 Ft				0.5-1.5 Ft				3.5-4.3 Ft				10.5-10.9 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
PESTICIDES	METHOXYCHLOR	mg/kg	6.6E+01	0.018	**6.6E+01**																								
PESTICIDES	Toxaphene	mg/kg	6.2E+00	0.036	**6.2E+00**																								
SEMIVOLATILES	1,2,4-Trichlorobenzene	mg/kg	2.5E+00	0.36	**2.5E+00**	1.252	1	U	U	0.550	1	U	U	0.410	1	U	U	1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
SEMIVOLATILES	1,2-Dichlorobenzene	mg/kg	9.0E+00	0.36	**9.0E+00**	1.252	1	U	U	0.550	1	U	U	0.410	1	U	U	1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
SEMIVOLATILES	1,3-Dichlorobenzene	mg/kg	1.2E+01	0.36	**1.2E+01**	1.252	1	U	U	0.550	1	U	U	0.410	1	U	U	1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
SEMIVOLATILES	1,4-Dichlorobenzene	mg/kg	1.0E+00	0.36	**1.0E+00**	1.252	1	U	U	0.550	1	U	U	0.410	1	U	U	1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
SEMIVOLATILES	2,4,5-Trichlorophenol	mg/kg	4.8E+02	0.89	**4.8E+02**	1.252	1	U	U	2.700	1	U	U	2.000	1	U	U	1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
SEMIVOLATILES	2,4,6-Trichlorophenol	mg/kg	4.5E-01	0.36	**4.5E-01**	1.252	1	U	U	0.550	1	U	U	0.410	1	U	U	1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
SEMIVOLATILES	2,4-Dichlorophenol	mg/kg	1.1E+00	0.36	**1.1E+00**	1.252	1	U	U	0.550	1	U	U	0.410	1	U	U	1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
SEMIVOLATILES	2,4-Dimethylphenol	mg/kg	5.3E+00	0.36	**5.3E+00**	0.626	1	U	U	0.550	1	U	U	0.410	1	U	U	0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	2,4-Dinitrophenol	mg/kg	1.9E-02	0.89	**8.9E-01**	12.516	1	U	U	2.700	1	U	U	2.000	1	U	U	10.917	1	U	U	12.788	1	U	U	1.224	1	U	U
SEMIVOLATILES	2,4-Dinitrotoluene	mg/kg	5.0E-04	0.36	**3.6E-01**					0.550	1	U	U	0.410	1	U	U												
SEMIVOLATILES	2,6-Dinitrotoluene	mg/kg	4.1E-04	0.36	**3.6E-01**					0.550	1	U	U	0.410	1	U	U												
SEMIVOLATILES	2-Chloronaphthalene	mg/kg	1.1E+03	0.328	**1.1E+03**	0.375	1	U	U	0.550	1	U	U	0.410	1	U	U	0.328	1	U	U	0.384	1	U	U	0.367	1	U	U
SEMIVOLATILES	2-Chlorophenol	mg/kg	4.4E+00	0.36	**4.4E+00**	0.626	1	U	U	0.550	1	U	U	0.410	1	U	U	0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	2-Methylnaphthalene	mg/kg	3.8E+01	0.328	**3.8E+01**	0.375	1	U	U	0.550	1	U	U	0.410	1	U	U	0.328	1	U	U	0.384	1	U	U	0.367	1	U	U
SEMIVOLATILES	2-Methylphenol	mg/kg	1.1E+01	0.36	**1.1E+01**	0.626	1	U	U	0.550	1	U	U	0.410	1	U	U	0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	2-Nitroaniline	mg/kg	2.1E-02	0.89	**8.9E-01**	3.755	1	U	U	2.700	1	U	U	2.000	1	U	U	3.275	1	U	U	3.836	1	U	U	3.672	1	U	U
SEMIVOLATILES	2-Nitrophenol	mg/kg	8.4E-01	0.36	**8.4E-01**	1.252	1	U	U	0.550	1	U	U	0.410	1	U	U	1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
SEMIVOLATILES	3,3'-Dichlorobenzidine	mg/kg	9.9E-03	0.36	**3.6E-01**	0.626	1	U	U	1.100	1	U	U	0.810	1	U	U	0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	3-Nitroaniline	mg/kg	2.9E-02	0.89	**8.9E-01**	3.755	1	U	U	2.700	1	U	U	2.000	1	U	U	3.275	1	U	U	3.836	1	U	U	3.672	1	U	U
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	mg/kg	1.9E-02	0.89	**8.9E-01**	6.258	1	U	U	2.700	1	U	U	2.000	1	U	U	5.459	1	U	U	6.394	1	U	U	6.120	1	U	U
SEMIVOLATILES	4-Bromophenyl phenyl ether	mg/kg	5.9E-01	0.36	**5.9E-01**	1.252	1	U	U	0.550	1	U	U	0.410	1	U	U	1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
SEMIVOLATILES	4-Chloro-3-methylphenol	mg/kg	9.7E+00	0.36	**9.7E+00**	0.626	1	U	U	0.550	1	U	U	0.410	1	U	U	0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	4-Chloroaniline	mg/kg	6.2E-01	0.36	**6.2E-01**	3.755	1	U	U	0.550	1	U	U	0.410	1	U	U	3.275	1	U	U	3.836	1	U	U	3.672	1	U	U
SEMIVOLATILES	4-Chlorophenyl phenyl ether	mg/kg	5.4E-02	0.36	**3.6E-01**	1.252	1	U	U	0.550	1	U	U	0.410	1	U	U	1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
SEMIVOLATILES	4-Methylphenol	mg/kg	9.4E-01	0.36	**9.4E-01**	0.626	1	U	U	0.550	1	U	U	0.410	1	U	U	0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	4-Nitroaniline	mg/kg	2.5E-02	0.89	**8.9E-01**	6.258	1	U	U	2.700	1	U	U	2.000	1	U	U	5.459	1	U	U	6.394	1	U	U	6.120	1	U	U
SEMIVOLATILES	4-Nitrophenol	mg/kg	2.1E-01	0.643	**6.4E-01**	6.258	1	U	U	2.700	1	U	U	2.000	1	U	U	5.459	1	U	U	6.394	1	U	U	6.120	1	U	U
SEMIVOLATILES	Acenaphthene	mg/kg	3.4E+02	0.328	**3.4E+02**	0.375	1	U	U	0.550	1	U	U	0.300	1		J	0.328	1	U	U	0.384	1	U	U	0.367	1	U	U
SEMIVOLATILES	Acenaphthylene	mg/kg	5.4E+02	0.36	**5.4E+02**	0.626	1	U	U	0.550	1	U	U	0.410	1	U	U	0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	Anthracene	mg/kg	2.0E+01	0.36	**2.0E+01**	0.626	1	U	U	0.550	1	U	U	0.590	1			0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	Benzo(a)anthracene	mg/kg	3.0E+00	0.328	**3.0E+00**	0.375	1	U	U	0.075	1		J	1.900	1			0.328	1	U	U	0.384	1	U	U	0.367	1	U	U
SEMIVOLATILES	Benzo(a)pyrene	mg/kg	4.1E+00	0.18	**4.1E+00**	0.626	1	U	U	0.087	1		J	1.600	1			0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	Benzo(b)fluoranthene	mg/kg	1.0E+01	0.36	**1.0E+01**	1.252	1	U	U	0.320	1		J	2.900	1			1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
SEMIVOLATILES	Benzo(ghi)perylene	mg/kg	8.2E+00	0.36	**8.2E+00**	2.503	1	U	U	0.550	1	U	U	0.670	1			2.183	1	U	U	2.558	1	U	U	2.448	1	U	U
SEMIVOLATILES	Benzo(k)fluoranthene	mg/kg	1.4E+01	0.36	**1.4E+01**	1.252	1	U	U	0.098	1		J	1.100	1			1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
SEMIVOLATILES	Benzoic Acid	mg/kg	4.6E+01	0.89	**4.6E+01**					2.700	1	U	U	0.340	1		J												
SEMIVOLATILES	Benzyl Alcohol	mg/kg	1.1E+01	0.41	**1.1E+01**					0.550	1	U	U	0.410	1	U	U												
SEMIVOLATILES	bis(2-Chloroethoxy)methane	mg/kg	1.7E-03	0.36	**3.6E-01**	0.626	1	U	U	0.550	1	U	U	0.410	1	U	U	0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	bis(2-Chloroethyl)ether	mg/kg	1.1E-04	0.36	**3.6E-01**	0.626	1	U	U	0.550	1	U	U	0.410	1	U	U	0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	mg/kg	2.8E-01	0.36	**3.6E-01**	1.252	1	U	U	0.550	1	U	U	0.410	1	U	U	1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	mg/kg	8.7E+01	0.1346	**8.7E+01**	0.275	1	U	U	0.130	1		J	0.170	1		J	0.546	1	U	U	0.639	1	U	U	0.135	1	U	U
SEMIVOLATILES	Butyl benzyl phthalate	mg/kg	8.0E+02	0.36	**8.0E+02**	0.626	1	U	U	0.550	1	U	U	0.290	1		J	0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	Carbazole	mg/kg	7.5E-01	0.36	**7.5E-01**	1.252	1	U	U									1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
SEMIVOLATILES	Chrysene	mg/kg	1.2E+01	0.36	**1.2E+01**	6.258	1	U	U	0.180	1		J	2.200	1			5.459	1	U	U	6.394	1	U	U	6.120	1	U	U
SEMIVOLATILES	Dibenzo(a,h)anthracene	mg/kg	8.2E+00	0.36	**8.2E+00**	2.503	1	U	U	0.550	1	U	U	0.230	1		J	2.183	1	U	U	2.558	1	U	U	2.448	1	U	U
SEMIVOLATILES	Dibenzofuran	mg/kg	7.4E+01	0.36	**7.4E+01**	1.252	1	U	U	0.550	1	U	U	0.170	1		J	1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
SEMIVOLATILES	Diethyl phthalate	mg/kg	2.7E+02	0.161	**2.7E+02**	0.225	1	U	U	0.550	1	U	U	0.410	1	U	U	0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	Dimethyl phthalate	mg/kg	6.3E+01	0.36	**6.3E+01**	0.626	1	U	U	0.550	1	U	U	0.970	1			0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	di-n-Butyl phthalate	mg/kg	7.4E+03	0.347	**7.4E+03**	0.375	1	U	U	0.550	1	U	U	0.410	1	U	U	4.727	1	U	U	1.918	1	U	U	2.436	1	U	U
SEMIVOLATILES	di-n-Octyl phthalate	mg/kg	3.3E+04	0.36	**3.3E+04**	0.626	1	U	U	0.550	1	U	U	0.410	1	U	U	0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	Fluoranthene	mg/kg	2.5E+02	0.36	**2.5E+02**	0.626	1	U	U	0.210	1		J	3.600	1			0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	Fluorene	mg/kg	3.0E+02	0.36	**3.0E+02**	0.626	1	U	U	0.550	1	U	U	0.250	1		J	0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	Hexachlorobenzene	mg/kg	6.0E-01	0.18	**6.0E-01**	1.252	1	U	U	0.550	1	U	U	0.410	1	U	U	1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
SEMIVOLATILES	Hexachlorobutadiene	mg/kg	3.0E+00	0.36	**3.0E+00**	3.755	1	U	U	0.550	1	U	U	0.410	1	U	U	3.275	1	U	U	3.836	1	U	U	3.672	1	U	U
SEMIVOLATILES	Hexachlorocyclopentadiene	mg/kg	1.0E+01	0.36	**1.0E+01**	3.755	1	U	U	0.550	1	U	U	0.410	1	U	U	3.275	1	U	U	3.836	1	U	U	3.672	1	U	U
SEMIVOLATILES	Hexachloroethane	mg/kg	4.0E+00	0.36	**4.0E+00**	1.252	1	U	U	0.550	1	U	U	0.410	1	U	U	1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	mg/kg	2.9E+01	0.36	**2.9E+01**	1.252	1	U	U	0.550	1	U	U	0.750	1			1.092	1	U	U	1.279	1	U	U	1.224	1	U	U
SEMIVOLATILES	Isophorone	mg/kg	2.2E+00	0.36	**2.2E+00**	0.626	1	U	U	0.550	1	U	U	0.410	1	U	U	0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	Naphthalene	mg/kg	6.8E+01	0.328	**6.8E+01**	0.375	1	U	U	0.550	1	U	U	0.110	1		J	0.328	1	U	U	0.384	1	U	U	0.367	1	U	U
SEMIVOLATILES	Nitrobenzene	mg/kg	1.5E-01	0.36	**3.6E-01**	0.626	1	U	U	0.550	1	U	U	0.410	1	U	U	0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	n-Nitrosodimethylamine	mg/kg	9.5E-07	0.36	**3.6E-01**																								
SEMIVOLATILES	n-Nitroso-di-n-propylamine	mg/kg	2.1E-05	0.36	**3.6E-01**	1.252	1	U	U	0.550	1	U	U	0.410	1	U	U	1.092	1	U	U	1.279	1	U	U	1.224	1	U	U

Table 2
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump 094, Sump 123, and Waste Rack Sump WRS003
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S94-01				LHS-Y-05				LHS-Y-06				LH-WRS3-01				LH-WRS3-01				LH-WRS3-01			
SAMPLE_NO			Calculated		**Standard 3**	LH-S94-01.2				LHS-Y-05				LHS-Y-06				LH-WRS3-01.1				LH-WRS3-01.2				LH-WRS3-01.3			
SAMPLE_DATE			Commercial		**Groundwater**	20-Aug-93				11-Jan-95				11-Jan-95				26-Jun-93				26-Jun-93				26-Jun-93			
DEPTH			/ Industrial	Practical	**Protective**	2.9-3.5 Ft				0-0.5 Ft				0-0.5 Ft				0.5-1.5 Ft				3.5-4.3 Ft				10.5-10.9 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
SEMIVOLATILES	n-Nitrosodiphenylamine	mg/kg	4.2E-01	0.36	**4.2E-01**	0.626	1	U	U	0.550	1	U	U	0.410	1	U	U	0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	Pentachlorophenol	mg/kg	3.4E-02	0.18	**1.8E-01**	6.258	1	U	U	2.700	1	U	U	2.000	1	U	U	5.459	1	U	U	6.394	1	U	U	6.120	1	U	U
SEMIVOLATILES	Phenanthrene	mg/kg	2.8E+02	0.36	**2.8E+02**	0.626	1	U	U	0.097	1		J	2.900	1			0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	Phenol	mg/kg	1.4E+01	0.36	**1.4E+01**	0.626	1	U	U	0.550	1	U	U	0.410	1	U	U	0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
SEMIVOLATILES	Pyrene	mg/kg	1.0E+02	0.36	**1.0E+02**	0.626	1	U	U	0.260	1		J	2.400	1			0.546	1	U	U	0.639	1	U	U	0.612	1	U	U
VOLATILES	1,1,1,2-Tetrachloroethane	mg/kg	2.3E+00	0.0053	**2.3E+00**					0.017	1	U	U	0.012	1	U	U												
VOLATILES	1,1,1-Trichloroethane	mg/kg	5.2E-01	0.005	**5.2E-01**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	2.5E-02	0.005	**2.5E-02**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,1,2-Trichloroethane	mg/kg	5.9E-03	0.005	**5.9E-03**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,1-Dichloroethane	mg/kg	8.4E+00	0.005	**8.4E+00**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,1-Dichloroethene	mg/kg	1.2E-02	0.005	**1.2E-02**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,1-Dichloropropene	mg/kg	1.4E-02	0.0053	**1.4E-02**																								
VOLATILES	1,2,3-Trichlorobenzene	mg/kg	5.9E+01	0.0053	**5.9E+01**																								
VOLATILES	1,2,3-Trichloropropane	mg/kg	3.4E-04	0.012	**1.2E-02**					0.017	1	U	U	0.012	1	U	U												
VOLATILES	1,2,4-Trichlorobenzene	mg/kg	2.5E+00	0.0053	**2.5E+00**																								
VOLATILES	1,2,4-Trimethylbenzene	mg/kg	1.0E+02	0.0053	**1.0E+02**																								
VOLATILES	1,2-Dibromo-3-chloropropane	mg/kg	7.5E-04	0.011	**1.1E-02**					0.033	1	U	U	0.024	1	U	U												
VOLATILES	1,2-Dibromoethane	mg/kg	6.2E-05	0.0053	**5.3E-03**					0.033	1	U	U	0.024	1	U	U												
VOLATILES	1,2-Dichlorobenzene	mg/kg	9.0E+00	0.0053	**9.0E+00**																								
VOLATILES	1,2-Dichloroethane	mg/kg	2.4E-03	0.005	**5.0E-03**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,2-Dichloroethene	mg/kg	5.3E-02	0.005	**5.3E-02**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,2-Dichloropropane	mg/kg	6.9E-03	0.005	**6.9E-03**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,3,5-Trimethylbenzene	mg/kg	1.1E+02	0.0053	**1.1E+02**																								
VOLATILES	1,3-Dichlorobenzene	mg/kg	1.2E+01	0.0053	**1.2E+01**																								
VOLATILES	1,3-Dichloropropane	mg/kg	8.0E-02	0.0053	**8.0E-02**																								
VOLATILES	1,4-Dichloro-2-butene (SAI-Ind)	mg/kg	1.5E-01	0.0053	**1.5E-01**																								
VOLATILES	1,4-Dichlorobenzene	mg/kg	1.0E+00	0.0053	**1.0E+00**																								
VOLATILES	1,4-Dioxane	mg/kg	2.7E-03	1.1	**1.1E+00**																								
VOLATILES	2,2-Dichloropropane	mg/kg	1.5E-01	0.016	**1.5E-01**																								
VOLATILES	2-Butanone	mg/kg	8.2E+00	0.012	**8.2E+00**	0.063	1	U	U	0.017	1	U	U	0.012	1	U	U	0.055	1	U	U	0.064	1	U	U	0.061	1	U	U
VOLATILES	2-Chloroethyl vinyl ether	mg/kg	2.3E-03	0.012	**1.2E-02**					0.017	1	U	U	0.012	1	U	U												
VOLATILES	2-Chlorotoluene	mg/kg	1.8E+01	0.0053	**1.8E+01**																								
VOLATILES	2-Hexanone	mg/kg	2.9E+00	0.012	**2.9E+00**	0.063	1	U	U	0.017	1	U	U	0.012	1	U	U	0.055	1	U	U	0.064	1	U	U	0.061	1	U	U
VOLATILES	2-Propenal	mg/kg	5.3E-03	0.11	**1.1E-01**					0.830	1	U	U	0.610	1	U	U												
VOLATILES	4-Chlorotoluene	mg/kg	2.2E+01	0.0053	**2.2E+01**																								
VOLATILES	Acetone	mg/kg	9.7E+00	0.012	**9.7E+00**	0.017	1	U	U	0.017	1	U	U	0.012	1	U	U	0.034	1	U	U	0.070	1	U	U	0.027	1	U	U
VOLATILES	Acetonitrile	mg/kg	3.4E-01	0.12	**3.4E-01**					0.170	1	U	U	0.120	1	U	U												
VOLATILES	Acrylonitrile	mg/kg	6.2E-05	0.11	**1.1E-01**					0.170	1	U	U	0.120	1	U	U												
VOLATILES	Allyl chloride	mg/kg	7.8E-01	0.012	**7.8E-01**					0.017	1	U	U	0.012	1	U	U												
VOLATILES	Benzene	mg/kg	7.8E-03	0.005	**7.8E-03**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Bromobenzene	mg/kg	1.1E+01	0.0053	**1.1E+01**																								
VOLATILES	Bromochloromethane	mg/kg	2.8E+00	0.0053	**2.8E+00**																								
VOLATILES	Bromodichloromethane	mg/kg	6.0E-03	0.005	**6.0E-03**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Bromoform	mg/kg	7.1E-02	0.005	**7.1E-02**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Bromomethane	mg/kg	6.3E-02	0.011	**6.3E-02**	0.031	1	U	U	0.017	1	U	U	0.012	1	U	U	0.027	1	U	U	0.032	1	U	U	0.030	1	U	U
VOLATILES	Carbon disulfide	mg/kg	1.4E+01	0.005	**1.4E+01**	0.042	1			0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Carbon tetrachloride	mg/kg	2.2E-02	0.005	**2.2E-02**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Chlorobenzene	mg/kg	4.7E-01	0.005	**4.7E-01**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Chloroethane	mg/kg	2.1E+01	0.011	**2.1E+01**	0.031	1	U	U	0.017	1	U	U	0.012	1	U	U	0.027	1	U	U	0.032	1	U	U	0.030	1	U	U
VOLATILES	Chloroform	mg/kg	1.2E+00	0.005	**1.2E+00**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Chloromethane	mg/kg	1.2E-01	0.011	**1.2E-01**	0.031	1	U	U	0.017	1	U	U	0.012	1	U	U	0.027	1	U	U	0.032	1	U	U	0.030	1	U	U
VOLATILES	Chloroprene	mg/kg	3.6E-01	0.12	**3.6E-01**					0.170	1	U	U	0.120	1	U	U												
VOLATILES	cis-1,2-Dichloroethene	mg/kg	5.3E-02	0.0053	**5.3E-02**																								
VOLATILES	cis-1,3-Dichloropropene	mg/kg	5.7E-03	0.005	**5.7E-03**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Dibromochloromethane	mg/kg	4.9E-02	0.005	**4.9E-02**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Dibromomethane	mg/kg	1.5E+00	0.011	**1.5E+00**					0.033	1	U	U	0.024	1	U	U												
VOLATILES	Dichlorodifluoromethane	mg/kg	1.3E+02	0.016	**1.3E+02**					0.033	1	U	U	0.024	1	U	U												
VOLATILES	Ethyl methacrylate	mg/kg	8.2E+00	0.0053	**8.2E+00**					0.033	1	U	U	0.024	1	U	U												
VOLATILES	Ethylbenzene	mg/kg	3.2E+00	0.005	**3.2E+00**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Hexachlorobutadiene	mg/kg	3.0E+00	0.0053	**3.0E+00**																								
VOLATILES	IODOMETHANE	mg/kg	8.2E-02	0.0053	**8.2E-02**					0.017	1	U	U	0.012	1	U	U												
VOLATILES	ISOBUTYL ALCOHOL	mg/kg	6.5E+00	1.1	**6.5E+00**					3.300	1	U	U	2.400	1	U	U												
VOLATILES	Isopropylbenzene	mg/kg	7.6E+02	0.0053	**7.6E+02**																								
VOLATILES	Methacrylonitrile	mg/kg	1.7E-03	0.024	**2.4E-02**					0.033	1	U	U	0.024	1	U	U												

Table 2
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump 094, Sump 123, and Waste Rack Sump WRS003
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S94-01				LHS-Y-05				LHS-Y-06				LH-WRS3-01				LH-WRS3-01				LH-WRS3-01			
SAMPLE_NO			Calculated		**Standard 3**	LH-S94-01.2				LHS-Y-05				LHS-Y-06				LH-WRS3-01.1				LH-WRS3-01.2				LH-WRS3-01.3			
SAMPLE_DATE			Commercial		**Groundwater**	20-Aug-93				11-Jan-95				11-Jan-95				26-Jun-93				26-Jun-93				26-Jun-93			
DEPTH			/ Industrial	Practical	**Protective**	2.9-3.5 Ft				0-0.5 Ft				0-0.5 Ft				0.5-1.5 Ft				3.5-4.3 Ft				10.5-10.9 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
VOLATILES	Methyl isobutyl ketone	mg/kg	3.4E+00	0.012	**3.4E+00**	0.063	1	U	U	0.017	1	U	U	0.012	1	U	U	0.055	1	U	U	0.064	1	U	U	0.061	1	U	U
VOLATILES	METHYL METHACRYLATE	mg/kg	8.4E+01	0.024	**8.4E+01**					0.033	1	U	U	0.024	1	U	U												
VOLATILES	Methylene chloride	mg/kg	1.8E-03	0.004	**4.0E-03**	0.014	1	U	U	0.008	1	U	U	0.006	1	U	U	0.004	1	U	U	0.005	1	U	U	0.007	1	U	U
VOLATILES	Naphthalene	mg/kg	6.8E+01	0.0053	**6.8E+01**																								
VOLATILES	n-BUTYLBENZENE	mg/kg	2.7E+02	0.0053	**2.7E+02**																								
VOLATILES	n-PROPYLBENZENE	mg/kg	9.5E+01	0.0053	**9.5E+01**																								
VOLATILES	Pentachloroethane	mg/kg	4.6E-01	0.011	**4.6E-01**					0.033	1	U	U	0.024	1	U	U												
VOLATILES	p-ISOPROPYLTOLUENE	mg/kg	5.0E+02	0.0053	**5.0E+02**																								
VOLATILES	Propionitrile	mg/kg	5.2E-03	0.061	**6.1E-02**					0.083	1	U	U	0.061	1	U	U												
VOLATILES	sec-BUTYLBENZENE	mg/kg	1.8E+02	0.0053	**1.8E+02**																								
VOLATILES	Styrene	mg/kg	1.6E+00	0.005	**1.6E+00**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	tert-BUTYLBENZENE	mg/kg	2.2E+02	0.0053	**2.2E+02**																								
VOLATILES	Tetrachloroethene	mg/kg	1.8E-02	0.005	**1.8E-02**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Toluene	mg/kg	3.2E+00	0.005	**3.2E+00**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	trans-1,2-Dichloroethene	mg/kg	1.2E-01	0.0053	**1.2E-01**																								
VOLATILES	trans-1,3-Dichloropropene	mg/kg	3.1E-02	0.005	**3.1E-02**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	trans-1,4-Dichloro-2-butene (SAI-Ind)	mg/kg	1.8E-03	0.024	**2.4E-02**					0.033	1	U	U	0.024	1	U	U												
VOLATILES	Trichloroethene	mg/kg	1.1E-02	0.005	**1.1E-02**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Trichlorofluoromethane	mg/kg	1.2E+02	0.011	**1.2E+02**					0.017	1	U	U	0.012	1	U	U												
VOLATILES	Vinyl acetate	mg/kg	2.1E+01	0.012	**2.1E+01**					0.017	1	U	U	0.012	1	U	U												
VOLATILES	Vinyl chloride	mg/kg	2.2E-03	0.011	**1.1E-02**	0.031	1	U	U	0.017	1	U	U	0.012	1	U	U	0.027	1	U	U	0.032	1	U	U	0.030	1	U	U
VOLATILES	Xylenes, Total	mg/kg	5.3E+01	0.005	**5.3E+01**	0.006	1	U	U	0.008	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U

Notes:

Boxed and Bold = Detected Concentration exceeds Applicable Standard 3 Soil MSC.

Shaded = Undetected (SQL) value exceeds Applicable Standard 3 Soil MSC.

B - The concentration reported was detected in the associated method blank, trip blank, or equipment blank within 5X the blank concentration.

E - The concentration reported exceeded the upper calibration limit, therefore, the concentration is estimated.

J - The analyte was positively identified; the reported value is the estimated concentration of the constituent detected with concentration measured between the MDL and the PQL for 1993 through 1998 samples.

nv - not validated

R - The reported results are rejected as unusable.

U - Not detected

DIL - dilution factor

FD - field duplicate

Ft - feet

LQ - laboratory qualifier

mg/kg - milligrams per kilogram

MSC - medium specific concentration

NA - not applicable

ng/kg - nanograms per kilogram

PQL - practical quantitation limit

REG - regular sample

SQL - Sample Quantitation Limit

VQ - validation qualifier

[a] Value developed in Attachment 1 using the SAM model. Shading indicates a chemical specific value.

[b] PQL values are the minimum undetected result shown in the table, or a laboratory value.

[c] Shading indicates MSC value equal to the PQL.

Table 3
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump 095, Sump 096, and Waste Rack Sump WRS001
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION CODE					**Applicable**	LH-DL95-01				LH-S95-01				LH-S95-01				LH-S95-01				LH-S95-01				LH-S95-02				LH-S95-02				LH-S95-02				LH-S96-01				LH-S96-01			
SAMPLE NO			Calculated		**Standard 3**	LH-DL95-01				LH-S95-01.1				LH-S95-01.2				LH-S95-01.3				LH-S95-01-FD				LH-S95-02.1				LH-S95-02.2				LH-S95-02.3				LH-S96-01.1				LH-S96-01.2			
SAMPLE DATE			Commercial		**Groundwater**	26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93			
DEPTH			/ Industrial	Practical	**Protective**	2-2.5 Ft				0.5-1.5 Ft				5.5-6.2 Ft				11.3-12 Ft				0.5-1.5 Ft				0.5-1.5 Ft				4-4.5 Ft				5.5-6 Ft				0.5-1.5 Ft				2-2.8 Ft			
SAMPLE PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				FD				REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
EXPLOSIVES	1,3,5-Trinitrobenzene	mg/kg	1.8E+00	0.210	**1.8E+00**																																								
EXPLOSIVES	1,3-Dinitrobenzene	mg/kg	1.1E-02	0.210	**2.1E-01**																																								
EXPLOSIVES	2,4,6-Trinitrotoluene	mg/kg	4.8E-01	0.210	**4.8E-01**																																								
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	7.2E-04	0.210	**2.1E-01**	1.269	1	U	U	1.316	1	U	U	1.000	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	1.282	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	6.0E-04	0.230	**2.3E-01**	1.269	1	U	U	1.316	1	U	U	1.111	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	1.282	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	mg/kg	1.9E-01	0.440	**4.4E-01**																																								
EXPLOSIVES	HMX	mg/kg	6.9E-01	1.900	**1.9E+00**																																								
EXPLOSIVES	m-Nitrotoluene	mg/kg	4.6E+00	0.880	**4.6E+00**																																								
EXPLOSIVES	Nitrobenzene	mg/kg	2.2E-01	0.230	**2.3E-01**																																								
EXPLOSIVES	o-Nitrotoluene	mg/kg	4.6E+00	0.880	**4.6E+00**																																								
EXPLOSIVES	p-Nitrotoluene	mg/kg	4.6E+00	2.700	**4.6E+00**																																								
EXPLOSIVES	RDX	mg/kg	5.4E-02	0.960	**9.6E-01**																																								
EXPLOSIVES	Tetryl	mg/kg	7.5E+00	0.650	**7.5E+00**																																								
METALS	Aluminum	mg/kg	5.6E+06	20.00	**5.6E+06**	13300.000	1			15600.000	1			10600.000	1			5400.000	1			11200.000	1			12500.000	1			13200.000	1			10300.000	1			7590.000	1			7910.000	1		
METALS	Antimony	mg/kg	1.1E+00	5.28	**5.3E+00**	8.980	1	U	U	13.000	1	U	U	10.700	1	U	U	**11.000**	1		E	5.800	1	U	U	6.120	1	U	U	12.000	1	U	U	8.820	1	U	U	5.280	1	U	U	6.520	1	U	U
METALS	Arsenic	mg/kg	4.8E+00	0.30	**4.8E+00**	1.750	1			3.760	1			2.740	1			2.190	1			**5.050**	1			1.990	1			3.000	1			1.940	1			2.300	1			1.790	1		
METALS	Barium	mg/kg	9.3E+01	0.30	**9.3E+01**	**251.000**	1			**943.000**	1			**179.000**	1			90.300	1			**1600.000**	1			**327.000**	1			**121.000**	1			**190.000**	1			66.800	1			76.400	1		
METALS	Cadmium	mg/kg	4.0E-01	0.89	**8.9E-01**	**3.460**	1		E	**5.960**	1		E	**4.350**	1		E	2.540	1	U	U	**3.510**	1			**3.400**	1			**4.440**	1		E	**2.690**	1		E	**2.220**	1		E	**1.760**	1		E
METALS	Calcium	mg/kg	NA	NA	**none**	1770.000	1			1390.000	1			1130.000	1			992.000	1			513.000	1			774.000	1			1370.000	1			870.000	1			1120.000	1			1220.000	1		
METALS	Chromium	mg/kg	3.1E+04	5.65	**3.1E+04**	13.000	1			22.500	1			10.400	1			5.650	1	U	U	13.200	1			12.400	1			16.000	1			10.300	1			11.100	1			12.500	1		
METALS	Cobalt	mg/kg	4.3E+02	0.50	**4.3E+02**	3.640	1			8.620	1			8.810	1			8.300	1			8.530	1			3.180	1			14.600	1			7.190	1			3.120	1			3.360	1		
METALS	Copper	mg/kg	1.1E+03	0.60	**1.1E+03**	9.740	1			9.910	1			10.600	1			8.960	1			7.890	1			5.630	1			12.600	1			9.530	1			6.440	1			8.800	1		
METALS	Iron	mg/kg	NA	NA	**none**	13500.000	1			19100.000	1			13900.000	1			8860.000	1			10800.000	1			11900.000	1			12800.000	1			11900.000	1			8280.000	1			7340.000	1		
METALS	Lead	mg/kg	2.8E+02	13.20	**2.8E+02**	20.200	1		E	37.900	1		E	22.000	1		E	15.300	1	U	U	47.400	1			17.500	1		E	25.100	1		E	13.200	1	U	U	28.200	1			20.300	1		
METALS	Magnesium	mg/kg	NA	NA	**none**	1580.000	1			1730.000	1			1440.000	1			849.000	1			1380.000	1			985.000	1			968.000	1			1240.000	1			368.000	1			431.000	1		
METALS	Manganese	mg/kg	1.1E+03	0.20	**1.1E+03**	11.500	1			316.000	1			130.000	1			95.700	1			293.000	1			43.100	1			418.000	1			82.200	1			89.900	1			153.000	1		
METALS	Mercury	mg/kg	8.2E-02	0.02	**8.2E-02**	0.027	1	U	U	0.029	1	U	U	0.028	1	U	U	0.028	1	U	U	0.026	1	U	U	0.028	1	U	U	0.060	1	U	U	0.030	1	U	U	0.024	1	U	U	0.029	1	U	U
METALS	Potassium	mg/kg	NA	NA	**none**	493.000	1			712.000	1			589.000	1			334.000	1			640.000	1			554.000	1			658.000	1			546.000	1			431.000	1			405.000	1		
METALS	Selenium	mg/kg	3.5E+00	0.53	**3.5E+00**	0.898	1	U	U	1.300	1	U	U	1.070	1	U	U	1.020	1	U	U	0.580	1	U	U	0.612	1	U	U	1.200	1	U	U	0.882	1	U	U	0.528	1	U	U	0.652	1	U	U
METALS	Silver	mg/kg	1.1E+00	0.03	**1.1E+00**	0.045	1	U	U	0.065	1	U	U	0.054	1	U	U	0.051	1	U	U	0.029	1	U	U	0.031	1	U	U	0.072	1		E	0.044	1	U	U	0.050	1		E	0.085	1		
METALS	Strontium	mg/kg	6.6E+02	15.20	**6.6E+02**	291.000	1			458.000	1			41.700	1			27.500	1			140.000	1			149.000	1			19.000	1			24.200	1			16.400	1			16.200	1		
METALS	Thallium	mg/kg	4.7E-01	44.60	**4.5E+01**																																								
METALS	Zinc	mg/kg	1.7E+03	2.50	**1.7E+03**	49.800	1			60.100	1			45.500	1			29.400	1			47.200	1			24.100	1			35.000	1			37.000	1			20.600	1			16.900	1		
SEMIVOLATILES	1,2,4-Trichlorobenzene	mg/kg	3.6E+00	0.460	**3.6E+00**	1.269	1	U	U	1.316	1	U	U	1.111	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	1.282	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
SEMIVOLATILES	1,2-Dichlorobenzene	mg/kg	1.3E+01	0.460	**1.3E+01**	1.269	1	U	U	1.316	1	U	U	1.111	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	1.282	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
SEMIVOLATILES	1,3-Dichlorobenzene	mg/kg	1.7E+01	0.460	**1.7E+01**	1.269	1	U	U	1.316	1	U	U	1.111	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	1.282	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
SEMIVOLATILES	1,4-Dichlorobenzene	mg/kg	1.5E+00	0.460	**1.5E+00**	1.269	1	U	U	1.316	1	U	U	1.111	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	1.282	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
SEMIVOLATILES	2,4,5-Trichlorophenol	mg/kg	7.0E+02	1.111	**7.0E+02**	1.269	1	U	U	1.316	1	U	U	1.111	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	1.282	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
SEMIVOLATILES	2,4,6-Trichlorophenol	mg/kg	6.4E-01	0.460	**6.4E-01**	1.269	1	U	U	1.316	1	U	U	1.111	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	1.282	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
SEMIVOLATILES	2,4-Dichlorophenol	mg/kg	1.5E+00	0.460	**1.5E+00**	1.269	1	U	U	1.316	1	U	U	1.111	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	1.282	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
SEMIVOLATILES	2,4-Dimethylphenol	mg/kg	7.7E+00	0.460	**7.7E+00**	0.635	1	U	U	0.658	1	U	U	0.556	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	0.641	1	U	U	0.617	1	U	U	0.564	1	U	U	0.594	1	U	U
SEMIVOLATILES	2,4-Dinitrophenol	mg/kg	2.7E-02	0.641	**6.4E-01**	12.690	1	U	U	13.158	1	U	U	10.000	1	U	U	12.346	1	U	U	12.195	1	U	U	12.048	1	U	U	0.641	1	U	U	12.330	1	U	U	11.274	1	U	U	11.877	1	U	U
SEMIVOLATILES	2,4-Dinitrotoluene	mg/kg	7.2E-04	0.460	**4.6E-01**																																								
SEMIVOLATILES	2,6-Dinitrotoluene	mg/kg	6.0E-04	0.460	**4.6E-01**																																								
SEMIVOLATILES	2-Chloronaphthalene	mg/kg	1.1E+03	0.333	**1.1E+03**	0.381	1	U	U	0.395	1	U	U	0.333	1	U	U	0.370	1	U	U	0.366	1	U	U	0.361	1	U	U	0.385	1	U	U	0.370	1	U	U	0.338	1	U	U	0.356	1	U	U
SEMIVOLATILES	2-Chlorophenol	mg/kg	6.3E+00	0.460	**6.3E+00**	0.635	1	U	U	0.658	1	U	U	0.556	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	0.641	1	U	U	0.617	1	U	U	0.564	1	U	U	0.594	1	U	U
SEMIVOLATILES	2-Methylnaphthalene	mg/kg	5.5E+01	0.333	**5.5E+01**	0.381	1	U	U	0.395	1	U	U	0.333	1	U	U	0.370	1	U	U	0.366	1	U	U	0.361	1	U	U	0.385	1	U	U	0.370	1	U	U	1.635	1			0.356	1	U	U
SEMIVOLATILES	2-Methylphenol	mg/kg	1.6E+01	0.460	**1.6E+01**	0.635	1	U	U	0.658	1	U	U	0.556	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	0.641	1	U	U	0.617	1	U	U	0.564	1	U	U	0.594	1	U	U
SEMIVOLATILES	2-Nitroaniline	mg/kg	3.0E-02	2.300	**2.3E+00**	3.807	1	U	U	3.947	1	U	U	3.333	1	U	U	3.704	1	U	U	3.659	1	U	U	3.614	1	U	U	3.846	1	U	U	3.699	1	U	U	3.382	1	U	U	3.563	1	U	U
SEMIVOLATILES	2-Nitrophenol	mg/kg	1.2E+00	0.460	**1.2E+00**	1.269	1	U	U	1.316	1	U	U	1.111	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	1.282	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
SEMIVOLATILES	3,3'-Dichlorobenzidine	mg/kg	1.4E-02	0.500	**5.0E-01**	0.635	1	U	U	0.658	1	U	U	0.500	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	3.846	1	U	U	0.617	1	U	U	0.564	1	U	U	0.594	1	U	U
SEMIVOLATILES	3-Nitroaniline	mg/kg	4.1E-02	2.300	**2.3E+00**	3.807	1	U	U	3.947	1	U	U	3.333	1	U	U	3.704	1	U	U	3.659	1	U	U	3.614	1	U	U	3.846	1	U	U	3.699	1	U	U	3.382	1	U	U	3.563	1	U	U
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	mg/kg	2.8E-02	0.641	**6.4E-01**	6.345	1	U	U	6.579	1	U	U	5.000	1	U	U	6.173	1	U	U	6.098	1	U	U	6.024	1	U	U	0.641	1	U	U	6.165	1	U	U	5.637	1	U	U	5.938	1	U	U
SEMIVOLATILES	4-Bromophenyl phenyl ether	mg/kg	8.6E-01	0.460	**8.6E-01**	1.269	1	U	U	1.316	1	U	U	1.000	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	1.282	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
SEMIVOLATILES	4-Chloro-3-methylphenol	mg/kg	1.4E+01	0.460	**1.4E+01**	0.635	1	U	U	0.658	1	U	U	0.556	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	0.641	1	U	U	0.617	1	U	U	0.564	1	U	U	0.594	1	U	U
SEMIVOLATILES	4-Chloroaniline	mg/kg	8.9E-01	0.460	**8.9E-01**	3.807	1	U	U	3.947	1	U	U	3.333	1	U	U	3.704	1	U	U	3.659	1	U	U	3.614	1	U	U	3.846	1	U	U	3.699	1	U	U	3.382	1	U	U	3.563	1	U	U
SEMIVOLATILES	4-Chlorophenyl phenyl ether	mg/kg	7.7E-02	0.460	**4.6E-01**	1.269	1	U	U	1.316	1	U	U	1.000	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	1.282	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
SEMIVOLATILES	4-Methylphenol	mg/kg	1.4E+00	0.460	**1.4E+00**	0.635	1	U	U	0.658	1	U	U	0.556	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	0.641	1	U	U	0.617	1	U	U	0.564	1	U	U	0.594	1	U	U
SEMIVOLATILES	4-Nitroaniline	mg/kg	3.6E-02	1.282	**1.3E+00**	6.345	1	U	U	6.579	1	U	U	5.000	1	U	U	6.173	1	U	U	6.098	1	U	U	6.024	1	U	U	1.282	1	U	U	6.165	1	U	U	5.637	1	U	U	5.938	1	U	U
SEMIVOLATILES	4-Nitrophenol	mg/kg	3.0E-01	0.641	**6.4E-01**	6.345	1	U	U	6.579	1	U	U	5.000	1	U	U	6.173	1	U	U	6.098	1	U	U	6.024	1	U	U	0.641	1	U	U	6.165	1	U	U	5.637	1	U	U	5.938	1	U	U
SEMIVOLATILES	Acenaphthene	mg/kg	3.4E+02	0.333	**3.4E+02**	0.381	1	U	U	0.395	1	U	U	0.333	1	U	U	0.370	1	U	U	0.366	1	U	U	0.361	1	U	U	0.385	1	U	U	0.370	1	U	U	0.338	1	U	U	0.356	1	U	U
SEMIVOLATILES	Acenaphthylene	mg/kg	5.4E+02	0.460	**5.4E+02**	0.635	1	U	U	0.658	1	U	U	0.556	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	0.641	1	U	U	0.617	1	U	U	0.564	1	U	U	0.594	1	U	U

Table 3
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump 095, Sump 096, and Waste Rack Sump WRS001
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION CODE					**Applicable**	LH-DL95-01				LH-S95-01				LH-S95-01				LH-S95-01				LH-S95-01				LH-S95-02				LH-S95-02				LH-S95-02				LH-S96-01				LH-S96-01			
SAMPLE NO			Calculated		**Standard 3**	LH-DL95-01				LH-S95-01.1				LH-S95-01.2				LH-S95-01.3				LH-S95-01-FD				LH-S95-02.1				LH-S95-02.2				LH-S95-02.3				LH-S96-01.1				LH-S96-01.2			
SAMPLE DATE			Commercial		**Groundwater**	26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93			
DEPTH			/ Industrial	Practical	**Protective**	2-2.5 Ft				0.5-1.5 Ft				5.5-6.2 Ft				11.3-12 Ft				0.5-1.5 Ft				0.5-1.5 Ft				4-4.5 Ft				5.5-6 Ft				0.5-1.5 Ft				2-2.8 Ft			
SAMPLE PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				FD				REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
SEMIVOLATILES	Anthracene	mg/kg	2.0E+01	0.460	**2.0E+01**	0.635	1	U	U	0.658	1	U	U	0.500	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	0.641	1	U	U	0.617	1	U	U	0.564	1	U	U	0.594	1	U	U
SEMIVOLATILES	Benzo(a)anthracene	mg/kg	4.3E+00	0.300	**4.3E+00**	0.381	1	U	U	0.395	1	U	U	0.300	1	U	U	0.370	1	U	U	0.366	1	U	U	0.361	1	U	U	0.641	1	U	U	0.370	1	U	U	0.338	1	U	U	0.356	1	U	U
SEMIVOLATILES	Benzo(a)pyrene	mg/kg	5.9E+00	0.460	**5.9E+00**	0.635	1	U	U	0.658	1	U	U	0.500	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	3.846	1	U	U	0.617	1	U	U	0.564	1	U	U	0.594	1	U	U
SEMIVOLATILES	Benzo(b)fluoranthene	mg/kg	1.5E+01	0.460	**1.5E+01**	1.269	1	U	U	1.316	1	U	U	1.000	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	1.282	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
SEMIVOLATILES	Benzo(ghi)perylene	mg/kg	8.2E+00	0.460	**8.2E+00**	2.538	1	U	U	2.632	1	U	U	2.000	1	U	U	2.469	1	U	U	2.439	1	U	U	2.410	1	U	U	1.282	1	U	U	2.466	1	U	U	2.255	1	U	U	2.375	1	U	U
SEMIVOLATILES	Benzo(k)fluoranthene	mg/kg	1.4E+01	0.385	**1.4E+01**	1.269	1	U	U	1.316	1	U	U	1.000	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	0.385	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
SEMIVOLATILES	Benzoic Acid	mg/kg	6.7E+01	2.300	**6.7E+01**																																								
SEMIVOLATILES	Benzyl Alcohol	mg/kg	1.6E+01	0.460	**1.6E+01**																																								
SEMIVOLATILES	bis(2-Chloroethoxy)methane	mg/kg	2.5E-03	0.460	**4.6E-01**	0.635	1	U	U	0.658	1	U	U	0.556	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	0.641	1	U	U	0.617	1	U	U	0.564	1	U	U	0.594	1	U	U
SEMIVOLATILES	bis(2-Chloroethyl)ether	mg/kg	1.6E-04	0.460	**4.6E-01**	0.635	1	U	U	0.658	1	U	U	0.556	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	0.641	1	U	U	0.617	1	U	U	0.564	1	U	U	0.594	1	U	U
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	mg/kg	4.1E-01	0.460	**4.6E-01**	1.269	1	U	U	1.316	1	U	U	1.111	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	1.282	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	mg/kg	1.3E+02	0.118	**1.3E+02**	0.228	1	U	U	0.171	1	U	U	0.130	1	U	U	0.123	1	U	U	0.610	1	U	U	0.193	1	U	U	0.128	1	U	U	0.617	1	U	U	0.135	1	U	U	0.119	1	U	U
SEMIVOLATILES	Butyl benzyl phthalate	mg/kg	8.0E+02	0.460	**8.0E+02**	0.635	1	U	U	0.658	1	U	U	0.500	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	3.846	1	U	U	0.617	1	U	U	0.564	1	U	U	0.594	1	U	U
SEMIVOLATILES	Carbazole	mg/kg	1.1E+00	0.641	**1.1E+00**	1.269	1	U	U	1.316	1	U	U	1.000	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	0.641	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
SEMIVOLATILES	Chrysene	mg/kg	1.2E+01	0.385	**1.2E+01**	6.345	1	U	U	6.579	1	U	U	5.000	1	U	U	6.173	1	U	U	6.098	1	U	U	6.024	1	U	U	0.385	1	U	U	6.165	1	U	U	5.637	1	U	U	5.938	1	U	U
SEMIVOLATILES	Dibenzo(a,h)anthracene	mg/kg	1.2E+01	0.460	**1.2E+01**	2.538	1	U	U	2.632	1	U	U	2.000	1	U	U	2.469	1	U	U	2.439	1	U	U	2.410	1	U	U	0.641	1	U	U	2.466	1	U	U	2.255	1	U	U	2.375	1	U	U
SEMIVOLATILES	Dibenzofuran	mg/kg	1.1E+02	0.460	**1.1E+02**	1.269	1	U	U	1.316	1	U	U	1.000	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	0.641	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
SEMIVOLATILES	Diethyl phthalate	mg/kg	3.9E+02	0.460	**3.9E+02**	0.635	1	U	U	0.658	1	U	U	0.100	1		J	0.123	1		J	0.610	1	U	U	0.121	1		J	1.282	1	U	U	0.160	1		J	0.564	1	U	U	0.594	1	U	U
SEMIVOLATILES	Dimethyl phthalate	mg/kg	9.1E+01	0.460	**9.1E+01**	0.635	1	U	U	0.658	1	U	U	0.556	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	0.641	1	U	U	0.617	1	U	U	0.868	1			0.594	1	U	U
SEMIVOLATILES	di-n-Butyl phthalate	mg/kg	7.6E+03	0.361	**7.6E+03**	2.995	1	U	U	3.724	1	U	U	3.350	1	U	U	3.420	1	U	U	2.427	1	U	U	2.482	1	U	U	3.244	1	U	U	6.227	1	U	U	2.999	1	U	U	1.615	1	U	U
SEMIVOLATILES	di-n-Octyl phthalate	mg/kg	3.3E+04	0.460	**3.3E+04**	0.635	1	U	U	0.658	1	U	U	0.500	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	1.282	1	U	U	0.617	1	U	U	0.564	1	U	U	0.594	1	U	U
SEMIVOLATILES	Fluoranthene	mg/kg	2.5E+02	0.460	**2.5E+02**	0.635	1	U	U	0.658	1	U	U	0.500	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	1.282	1	U	U	0.617	1	U	U	0.180	1		J	0.594	1	U	U
SEMIVOLATILES	Fluorene	mg/kg	3.0E+02	0.460	**3.0E+02**	0.635	1	U	U	0.658	1	U	U	0.500	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	0.641	1	U	U	0.617	1	U	U	0.564	1	U	U	0.594	1	U	U
SEMIVOLATILES	Hexachlorobenzene	mg/kg	8.7E-01	0.460	**8.7E-01**	1.269	1	U	U	1.316	1	U	U	1.000	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	0.641	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
SEMIVOLATILES	Hexachlorobutadiene	mg/kg	4.4E+00	0.460	**4.4E+00**	3.807	1	U	U	3.947	1	U	U	3.333	1	U	U	3.704	1	U	U	3.659	1	U	U	3.614	1	U	U	3.846	1	U	U	3.699	1	U	U	3.382	1	U	U	3.563	1	U	U
SEMIVOLATILES	Hexachlorocyclopentadiene	mg/kg	1.5E+01	0.460	**1.5E+01**	3.807	1	U	U	3.947	1	U	U	3.333	1	U	U	3.704	1	U	U	3.659	1	U	U	3.614	1	U	U	3.846	1	U	U	3.699	1	U	U	3.382	1	U	U	3.563	1	U	U
SEMIVOLATILES	Hexachloroethane	mg/kg	5.8E+00	0.460	**5.8E+00**	1.269	1	U	U	1.316	1	U	U	1.111	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	1.282	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	mg/kg	4.2E+01	0.460	**4.2E+01**	1.269	1	U	U	1.316	1	U	U	1.000	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	0.641	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
SEMIVOLATILES	Isophorone	mg/kg	3.2E+00	0.460	**3.2E+00**	0.635	1	U	U	0.658	1	U	U	0.556	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	0.641	1	U	U	0.617	1	U	U	0.564	1	U	U	0.594	1	U	U
SEMIVOLATILES	Naphthalene	mg/kg	9.8E+01	0.333	**9.8E+01**	0.381	1	U	U	0.395	1	U	U	0.333	1	U	U	0.370	1	U	U	0.366	1	U	U	0.361	1	U	U	0.385	1	U	U	0.370	1	U	U	3.912	1			0.356	1	U	U
SEMIVOLATILES	Nitrobenzene	mg/kg	2.2E-01	0.460	**4.6E-01**	0.635	1	U	U	0.658	1	U	U	0.556	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	0.641	1	U	U	0.617	1	U	U	0.564	1	U	U	0.594	1	U	U
SEMIVOLATILES	n-Nitroso-di-n-propylamine	mg/kg	3.0E-05	0.460	**4.6E-01**	1.269	1	U	U	1.316	1	U	U	1.111	1	U	U	1.235	1	U	U	1.220	1	U	U	1.205	1	U	U	1.282	1	U	U	1.233	1	U	U	1.127	1	U	U	1.188	1	U	U
SEMIVOLATILES	n-Nitrosodiphenylamine	mg/kg	6.1E-01	0.460	**6.1E-01**	0.635	1	U	U	0.658	1	U	U	0.500	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	1.282	1	U	U	0.617	1	U	U	0.564	1	U	U	0.594	1	U	U
SEMIVOLATILES	Pentachlorophenol	mg/kg	4.8E-02	0.641	**6.4E-01**	6.345	1	U	U	6.579	1	U	U	5.000	1	U	U	6.173	1	U	U	6.098	1	U	U	6.024	1	U	U	0.641	1	U	U	6.165	1	U	U	5.637	1	U	U	5.938	1	U	U
SEMIVOLATILES	Phenanthrene	mg/kg	2.8E+02	0.460	**2.8E+02**	0.635	1	U	U	0.658	1	U	U	0.500	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	1.282	1	U	U	0.617	1	U	U	0.564	1	U	U	0.594	1	U	U
SEMIVOLATILES	Phenol	mg/kg	2.1E+01	0.460	**2.1E+01**	0.635	1	U	U	0.658	1	U	U	0.556	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	0.641	1	U	U	0.617	1	U	U	0.564	1	U	U	0.594	1	U	U
SEMIVOLATILES	Pyrene	mg/kg	1.0E+02	0.385	**1.0E+02**	0.635	1	U	U	0.658	1	U	U	0.500	1	U	U	0.617	1	U	U	0.610	1	U	U	0.602	1	U	U	0.385	1	U	U	0.617	1	U	U	0.180	1		J	0.594	1	U	U
VOLATILES	1,1,1,2-Tetrachloroethane	mg/kg	3.3E+00	0.014	**3.3E+00**																																								
VOLATILES	1,1,1-Trichloroethane	mg/kg	7.5E-01	0.005	**7.5E-01**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	3.6E-02	0.005	**3.6E-02**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,1,2-Trichloroethane	mg/kg	8.5E-03	0.005	**8.5E-03**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,1-Dichloroethane	mg/kg	1.2E+01	0.005	**1.2E+01**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,1-Dichloroethene	mg/kg	1.7E-02	0.005	**1.7E-02**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,2,3-Trichloropropane	mg/kg	5.0E-04	0.014	**1.4E-02**																																								
VOLATILES	1,2-Dibromo-3-chloropropane	mg/kg	1.1E-03	0.028	**2.8E-02**																																								
VOLATILES	1,2-Dibromoethane	mg/kg	9.0E-05	0.028	**2.8E-02**																																								
VOLATILES	1,2-Dichloroethane	mg/kg	3.4E-03	0.005	**5.0E-03**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,2-Dichloroethene	mg/kg	7.6E-02	0.005	**7.6E-02**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,2-Dichloropropane	mg/kg	1.0E-02	0.005	**1.0E-02**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	2-Butanone	mg/kg	1.2E+01	0.014	**1.2E+01**	0.063	1	U	U	0.066	1	U	U	0.060	1	U	U	0.062	1	U	U	0.060	1	U	U	0.060	1	U	U	0.009	1			0.062	1	U	U	0.056	1	U	U	0.060	1	U	U
VOLATILES	2-Chloroethyl vinyl ether	mg/kg	3.4E-03	0.014	**1.4E-02**																																								
VOLATILES	2-Hexanone	mg/kg	4.2E+00	0.014	**4.2E+00**	0.063	1	U	U	0.066	1	U	U	0.060	1	U	U	0.062	1	U	U	0.060	1	U	U	0.060	1	U	U	0.050	1	U	U	0.062	1	U	U	0.056	1	U	U	0.060	1	U	U
VOLATILES	2-Propenal	mg/kg	7.7E-03	0.690	**6.9E-01**																																								
VOLATILES	Acetone	mg/kg	1.4E+01	0.014	**1.4E+01**	0.032	1	U	U	0.268	1	U	U	0.118	1	U	U	0.111	1	U	U	0.552	1	U	U	0.135	1	U	U	0.233	1	U	U	0.076	1	U	U	0.031	1	U	U	0.030	1	U	U
VOLATILES	Acetonitrile	mg/kg	4.9E-01	0.140	**4.9E-01**																																								
VOLATILES	Acrylonitrile	mg/kg	9.0E-05	0.140	**1.4E-01**																																								
VOLATILES	Allyl chloride	mg/kg	1.1E+00	0.014	**1.1E+00**																																								
VOLATILES	Benzene	mg/kg	1.1E-02	0.005	**1.1E-02**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Bromodichloromethane	mg/kg	8.7E-03	0.005	**8.7E-03**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Bromoform	mg/kg	1.0E-01	0.005	**1.0E-01**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Bromomethane	mg/kg	9.2E-02	0.014	**9.2E-02**	0.032	1	U	U	0.033	1	U	U	0.030	1	U	U	0.031	1	U	U	0.030	1	U	U	0.030	1	U	U	0.025	1	U	U	0.031	1	U	U	0.028	1	U	U	0.030	1	U	U
VOLATILES	Carbon disulfide	mg/kg	2.0E+01	0.006	**2.0E+01**	0.006	1	U	U	0.007	1	U	U	0.001	1			0.004	1			0.006	1	U	U	0.014	1			0.145	1			0.006	1	U	U	0.006	1	U	U	0.006	1	U	U

Table 3
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump 095, Sump 096, and Waste Rack Sump WRS001
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION CODE					**Applicable**	LH-DL95-01				LH-S95-01				LH-S95-01				LH-S95-01				LH-S95-01				LH-S95-02				LH-S95-02				LH-S95-02				LH-S96-01				LH-S96-01			
SAMPLE NO			Calculated		**Standard 3**	LH-DL95-01				LH-S95-01.1				LH-S95-01.2				LH-S95-01.3				LH-S95-01-FD				LH-S95-02.1				LH-S95-02.2				LH-S95-02.3				LH-S96-01.1				LH-S96-01.2			
SAMPLE DATE			Commercial		**Groundwater**	26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93			
DEPTH			/ Industrial	Practical	**Protective**	2-2.5 Ft				0.5-1.5 Ft				5.5-6.2 Ft				11.3-12 Ft				0.5-1.5 Ft				0.5-1.5 Ft				4-4.5 Ft				5.5-6 Ft				0.5-1.5 Ft				2-2.8 Ft			
SAMPLE PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				FD				REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
VOLATILES	Carbon tetrachloride	mg/kg	3.1E-02	0.005	**3.1E-02**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Chlorobenzene	mg/kg	6.8E-01	0.005	**6.8E-01**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Chloroethane	mg/kg	3.1E+01	0.014	**3.1E+01**	0.032	1	U	U	0.033	1	U	U	0.030	1	U	U	0.031	1	U	U	0.030	1	U	U	0.030	1	U	U	0.025	1	U	U	0.031	1	U	U	0.028	1	U	U	0.030	1	U	U
VOLATILES	Chloroform	mg/kg	1.7E+00	0.005	**1.7E+00**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Chloromethane	mg/kg	1.7E-01	0.014	**1.7E-01**	0.032	1	U	U	0.033	1	U	U	0.030	1	U	U	0.031	1	U	U	0.030	1	U	U	0.030	1	U	U	0.025	1	U	U	0.031	1	U	U	0.028	1	U	U	0.030	1	U	U
VOLATILES	Chloroprene	mg/kg	5.2E-01	0.140	**5.2E-01**																																								
VOLATILES	cis-1,3-Dichloropropene	mg/kg	8.2E-03	0.005	**8.2E-03**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Dibromochloromethane	mg/kg	7.1E-02	0.005	**7.1E-02**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Dibromomethane	mg/kg	2.2E+00	0.028	**2.2E+00**																																								
VOLATILES	Dichlorodifluoromethane	mg/kg	1.9E+02	0.028	**1.9E+02**																																								
VOLATILES	Ethyl methacrylate	mg/kg	1.2E+01	0.028	**1.2E+01**																																								
VOLATILES	Ethylbenzene	mg/kg	4.6E+00	0.005	**4.6E+00**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	IODOMETHANE	mg/kg	1.2E-01	0.014	**1.2E-01**																																								
VOLATILES	ISOBUTYL ALCOHOL	mg/kg	9.4E+00	2.800	**9.4E+00**																																								
VOLATILES	Methacrylonitrile	mg/kg	2.5E-03	0.028	**2.8E-02**																																								
VOLATILES	Methyl isobutyl ketone	mg/kg	4.9E+00	0.014	**4.9E+00**	0.063	1	U	U	0.066	1	U	U	0.060	1	U	U	0.062	1	U	U	0.060	1	U	U	0.060	1	U	U	0.050	1	U	U	0.062	1	U	U	0.056	1	U	U	0.060	1	U	U
VOLATILES	METHYL METHACRYLATE	mg/kg	1.2E+02	0.028	**1.2E+02**																																								
VOLATILES	Methylene chloride	mg/kg	2.6E-03	0.002	**2.6E-03**	0.006	1	U	U	0.128	1	U	U	0.005	1	U	U	0.005	1	U	U	0.018	1	U	U	0.006	1	U	U	0.035	1	U	U	0.003	1	U	U	0.003	1	U	U	0.002	1	U	U
VOLATILES	Pentachloroethane	mg/kg	6.6E-01	0.028	**6.6E-01**																																								
VOLATILES	Propionitrile	mg/kg	7.6E-03	0.069	**6.9E-02**																																								
VOLATILES	Styrene	mg/kg	2.4E+00	0.005	**2.4E+00**	0.003	1			0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Tetrachloroethene	mg/kg	2.6E-02	0.005	**2.6E-02**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Toluene	mg/kg	4.5E+00	0.005	**4.5E+00**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	trans-1,3-Dichloropropene	mg/kg	4.4E-02	0.005	**4.4E-02**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	trans-1,4-Dichloro-2-butene	mg/kg	2.5E-03	0.028	**2.8E-02**																																								
VOLATILES	Trichloroethene	mg/kg	8.5E-02	0.006	**8.5E-02**	0.006	1	U	U	0.007	1	U	U	0.005	1			0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.020	1			0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Trichlorofluoromethane	mg/kg	1.7E+02	0.014	**1.7E+02**																																								
VOLATILES	Vinyl acetate	mg/kg	3.1E+01	0.014	**3.1E+01**																																								
VOLATILES	Vinyl chloride	mg/kg	3.1E-03	0.014	**1.4E-02**	0.032	1	U	U	0.033	1	U	U	0.030	1	U	U	0.031	1	U	U	0.030	1	U	U	0.030	1	U	U	0.025	1	U	U	0.031	1	U	U	0.028	1	U	U	0.030	1	U	U
VOLATILES	Xylenes, Total	mg/kg	7.6E+01	0.005	**7.6E+01**	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U

Notes:

Boxed and Bold = Detected Concentration exceeds Applicable Standard 3 Soil MSC.
Shaded = Undetected (SQL) value exceeds Applicable Standard 3 Soil MSC.

E - The concentration reported exceeded the upper calibration limit, therefore, the concentration is estimated.
J - The analyte was positively identified; the reported value is the estimated concentration of the constituent detected with concentration measured between the MDL and the PQL for 1993 through 1998 samples.
U - Not detected

DIL - dilution factor
FD - field duplicate
Ft - feet
LQ - laboratory qualifier
mg/kg - milligrams per kilogram
MSC - medium specific concentration
NA - not applicable
PQL - practical quantitation limit
REG - regular sample
SQL - Sample Quantitation Limit
VQ - validation qualifier

[a] Value developed in Attachment 2 using the SAM model. Shading indicates a chemical specific value.
[b] PQL values are the minimum undetected result shown in the table, or a laboratory value.
[c] Shading indicates MSC value equal to the PQL.

Table 3
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump 095, Sump 096, and Waste Rack Sump WRS001
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION CODE					Applicable	LH-S96-01				LHS-Y-01				LHS-Y-01				LHS-Y-02				LHS-Y-04				LH-WRS1-01				LH-WRS1-01				LH-WRS1-01				LH-WRS1-01			
SAMPLE NO			Calculated		Standard 3	LH-S96-01.3				LHS-Y-01				LHS-Y-01-FD				LHS-Y-02				LHS-Y-04				LH-WRS1-01.1				LH-WRS1-01.2				LH-WRS1-01.3				LH-WRS1-01-FD			
SAMPLE DATE			Commercial		Groundwater	26-Jun-93				11-Jan-95				11-Jan-95				11-Jan-95				11-Jan-95				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93			
DEPTH			/ Industrial	Practical	Protective	11-12.5 Ft				0-0.5 Ft				0-0.5 Ft				0-0.5 Ft				0-0.5 Ft				0.5-1.5 Ft				3.5-5 Ft				11-12.5 Ft				0.5-1.5 Ft			
SAMPLE PURPOSE			Soil MSC	Quantitation	Soil MSC	REG				REG				FD				REG				REG				REG				REG				REG				FD			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	Value [c]	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
EXPLOSIVES	1,3,5-Trinitrobenzene	mg/kg	1.8E+00	0.210	1.8E+00					0.230	1	U	U	0.210	1	U	U	0.220	1	U	U	0.220	1	U	U																
EXPLOSIVES	1,3-Dinitrobenzene	mg/kg	1.1E-02	0.210	2.1E-01					0.230	1	U	U	0.210	1	U	U	0.220	1	U	U	0.220	1	U	U																
EXPLOSIVES	2,4,6-Trinitrotoluene	mg/kg	4.8E-01	0.210	4.8E-01					0.230	1	U	U	0.210	1	U	U	0.220	1	U	U	0.220	1	U	U																
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	7.2E-04	0.210	2.1E-01	1.266	1	U	U	0.230	1	U	U	0.210	1	U	U	0.220	1	U	U	0.220	1	U	U	1.176	1	U	U	1.205	1	U	U	2.778	1	U	U	1.163	1	U	U
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	6.0E-04	0.230	2.3E-01	1.266	1	U	U	0.250	1	U	U	0.230	1	U	U	0.240	1	U	U	0.240	1	U	U	1.176	1	U	U	1.205	1	U	U	1.232	1	U	U	1.163	1	U	U
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	mg/kg	1.9E-01	0.440	4.4E-01					0.470	1	U	U	0.440	1	U	U	0.460	1	U	U	0.460	1	U	U																
EXPLOSIVES	HMX	mg/kg	6.9E-01	1.900	1.9E+00					2.100	1	U	U	1.900	1	U	U	2.000	1	U	U	2.000	1	U	U																
EXPLOSIVES	m-Nitrotoluene	mg/kg	4.6E+00	0.880	4.6E+00					0.940	1	U	U	0.880	1	U	U	0.920	1	U	U	0.910	1	U	U																
EXPLOSIVES	Nitrobenzene	mg/kg	2.2E-01	0.230	2.3E-01					0.250	1	U	U	0.230	1	U	U	0.240	1	U	U	0.240	1	U	U																
EXPLOSIVES	o-Nitrotoluene	mg/kg	4.6E+00	0.880	4.6E+00					0.940	1	U	U	0.880	1	U	U	0.920	1	U	U	0.910	1	U	U																
EXPLOSIVES	p-Nitrotoluene	mg/kg	4.6E+00	2.700	4.6E+00					2.800	1	U	U	2.700	1	U	U	2.800	1	U	U	2.700	1	U	U																
EXPLOSIVES	RDX	mg/kg	5.4E-02	0.960	9.6E-01					1.000	1	U	U	0.960	1	U	U	1.000	1	U	U	0.990	1	U	U																
EXPLOSIVES	Tetryl	mg/kg	7.5E+00	0.650	7.5E+00					0.700	1	U	U	0.650	1	U	U	0.680	1	U	U	0.680	1	U	U																
METALS	Aluminum	mg/kg	5.6E+06	20.00	5.6E+06	5400.000	1			13400.000	1			14000.000	1			19300.000	1			7810.000	1			6140.000	1			12600.000	1			5730.000	1			6220.000	1		
METALS	Antimony	mg/kg	1.1E+00	5.28	5.3E+00	5.740	1	U	U	10.700	1	U	UJ	8.900	1	U	UJ	13.700	1	U	UJ	15.200	1	U	UJ	5.900	1	U	U	10.300	1	U	U	12.600	1	U	U	9.020	1	U	U
METALS	Arsenic	mg/kg	4.8E+00	0.30	4.8E+00	1.380	1			2.700	1		J	4.500	1		J	4.700	1		J	2.700	1		J	2.270	1			2.320	1			2.020	1			1.850	1		
METALS	Barium	mg/kg	9.3E+01	0.30	9.3E+01	65.500	1			422.000	1			384.000	1			143.000	1			126.000	1			121.000	1			77.900	1			108.000	1			119.000	1		
METALS	Cadmium	mg/kg	4.0E-01	0.89	8.9E-01	1.460	1		E	1.100	1	U	U	0.890	1	U	U	1.400	1	U	U	1.500	1	U	U	1.980	1		E	2.730	1		E	3.160	1	U	U	2.260	1	U	U
METALS	Calcium	mg/kg	NA	NA	none	1310.000	1			701.000	1			654.000	1			1590.000	1			1080.000	1			1130.000	1			2300.000	1			963.000	1			1220.000	1		
METALS	Chromium	mg/kg	3.1E+04	5.65	3.1E+04	7.690	1			21.000	1		J	18.700	1		J	22.000	1		J	12.100	1		J	8.730	1			12.300	1			8.340	1			8.250	1		
METALS	Cobalt	mg/kg	4.3E+02	0.50	4.3E+02	2.270	1			12.100	1			10.600	1			9.400	1			10.100	1			14.300	1			11.400	1			11.400	1			8.030	1		
METALS	Copper	mg/kg	1.1E+03	0.60	1.1E+03	6.690	1			102.000	1			61.800	1			8.500	1			7.700	1			7.700	1			9.370	1			13.300	1			10.100	1		
METALS	Iron	mg/kg	NA	NA	none	7710.000	1			18500.000	1			14800.000	1			22700.000	1			10100.000	1			6540.000	1			12200.000	1			8080.000	1			8080.000	1		
METALS	Lead	mg/kg	2.8E+02	13.20	2.8E+02	10.900	1		E	41.000	1			29.600	1			15.300	1			19.200	1			24.400	1			26.000	1		E	19.000	1	U	U	25.800	1		E
METALS	Magnesium	mg/kg	NA	NA	none	1100.000	1			1100.000	1			1080.000	1			1830.000	1			516.000	1			368.000	1			705.000	1			1210.000	1			351.000	1		
METALS	Manganese	mg/kg	1.1E+03	0.20	1.1E+03	24.700	1			209.000	1			175.000	1			69.500	1			504.000	1			828.000	1			214.000	1			42.700	1			487.000	1		
METALS	Mercury	mg/kg	8.2E-02	0.02	8.2E-02	0.027	1	U	U	0.130	1	U	U	0.130	1	U	U	0.130	1	U	U	0.130	1	U	U	0.042	1		E	0.026	1	U	U	0.028	1	U	U	0.043	1		E
METALS	Potassium	mg/kg	NA	NA	none	346.000	1			708.000	1			753.000	1			1070.000	1			490.000	1			386.000	1			650.000	1			519.000	1			512.000	1		
METALS	Selenium	mg/kg	3.5E+00	0.53	3.5E+00	0.574	1	U	U	0.450	1		J	0.510	1		J	0.560	1		J	0.550	1		J	0.590	1	U	U	1.030	1	U	U	1.260	1	U	U	0.902	1	U	U
METALS	Silver	mg/kg	1.1E+00	0.03	1.1E+00	0.029	1	U	U	1.100	1	U	U	0.890	1	U	U	1.400	1	U	U	1.500	1	U	U	0.047	1		E	0.052	1	U	U	0.063	1	U	U	0.045	1	U	U
METALS	Strontium	mg/kg	6.6E+02	15.20	6.6E+02	25.700	1			118.000	1			113.000	1			41.700	1			15.200	1	U	U	25.900	1			14.200	1			21.200	1			30.500	1		
METALS	Thallium	mg/kg	4.7E-01	44.60	4.5E+01					53.600	1	U	U	44.600	1	U	U	68.300	1	U	U	75.900	1	U	U																
METALS	Zinc	mg/kg	1.7E+03	2.50	1.7E+03	28.000	1			76.300	1			70.200	1			62.600	1			53.400	1			49.100	1			30.500	1			42.700	1			66.900	1		
SEMIVOLATILES	1,2,4-Trichlorobenzene	mg/kg	3.6E+00	0.460	3.6E+00	1.266	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	1.176	1	U	U	1.205	1	U	U	1.232	1	U	U	1.163	1	U	U
SEMIVOLATILES	1,2-Dichlorobenzene	mg/kg	1.3E+01	0.460	1.3E+01	1.266	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	1.176	1	U	U	1.205	1	U	U	1.232	1	U	U	1.163	1	U	U
SEMIVOLATILES	1,3-Dichlorobenzene	mg/kg	1.7E+01	0.460	1.7E+01	1.266	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	1.176	1	U	U	1.205	1	U	U	1.232	1	U	U	1.163	1	U	U
SEMIVOLATILES	1,4-Dichlorobenzene	mg/kg	1.5E+00	0.460	1.5E+00	1.266	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	1.176	1	U	U	1.205	1	U	U	1.232	1	U	U	1.163	1	U	U
SEMIVOLATILES	2,4,5-Trichlorophenol	mg/kg	7.0E+02	1.111	7.0E+02	1.266	1	U	U	2.300	1	U	U	2.500	1	U	U	2.300	1	U	U	2.800	1	U	U	1.176	1	U	U	1.205	1	U	U	1.232	1	U	U	1.163	1	U	U
SEMIVOLATILES	2,4,6-Trichlorophenol	mg/kg	6.4E-01	0.460	6.4E-01	1.266	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	1.176	1	U	U	1.205	1	U	U	1.232	1	U	U	1.163	1	U	U
SEMIVOLATILES	2,4-Dichlorophenol	mg/kg	1.5E+00	0.460	1.5E+00	1.266	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	1.176	1	U	U	1.205	1	U	U	1.232	1	U	U	1.163	1	U	U
SEMIVOLATILES	2,4-Dimethylphenol	mg/kg	7.7E+00	0.460	7.7E+00	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	0.616	1	U	U	0.581	1	U	U
SEMIVOLATILES	2,4-Dinitrophenol	mg/kg	2.7E-02	0.641	6.4E-01	12.658	1	U	U	2.300	1	U	U	2.500	1	U	U	2.300	1	U	U	2.800	1	U	U	11.765	1	U	U	12.048	1	U	U	27.778	1	U	U	11.628	1	U	U
SEMIVOLATILES	2,4-Dinitrotoluene	mg/kg	7.2E-04	0.460	4.6E-01					0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U																
SEMIVOLATILES	2,6-Dinitrotoluene	mg/kg	6.0E-04	0.460	4.6E-01					0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U																
SEMIVOLATILES	2-Chloronaphthalene	mg/kg	1.1E+03	0.333	1.1E+03	0.380	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.353	1	U	U	0.361	1	U	U	0.369	1	U	U	0.349	1	U	U
SEMIVOLATILES	2-Chlorophenol	mg/kg	6.3E+00	0.460	6.3E+00	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	0.616	1	U	U	0.581	1	U	U
SEMIVOLATILES	2-Methylnaphthalene	mg/kg	5.5E+01	0.333	5.5E+01	1.835	1			0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.353	1	U	U	0.361	1	U	U	1.786	1			0.349	1	U	U
SEMIVOLATILES	2-Methylphenol	mg/kg	1.6E+01	0.460	1.6E+01	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	0.616	1	U	U	0.581	1	U	U
SEMIVOLATILES	2-Nitroaniline	mg/kg	3.0E-02	2.300	2.3E+00	3.797	1	U	U	2.300	1	U	U	2.500	1	U	U	2.300	1	U	U	2.800	1	U	U	3.529	1	U	U	3.614	1	U	U	3.695	1	U	U	3.488	1	U	U
SEMIVOLATILES	2-Nitrophenol	mg/kg	1.2E+00	0.460	1.2E+00	1.266	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	1.176	1	U	U	1.205	1	U	U	1.232	1	U	U	1.163	1	U	U
SEMIVOLATILES	3,3'-Dichlorobenzidine	mg/kg	1.4E-02	0.500	5.0E-01	0.633	1	U	U	0.930	1	U	U	0.990	1	U	U	0.910	1	U	U	1.100	1	U	U	0.588	1	U	U	0.602	1	U	U	1.389	1	U	U	0.581	1	U	U
SEMIVOLATILES	3-Nitroaniline	mg/kg	4.1E-02	2.300	2.3E+00	3.797	1	U	U	2.300	1	U	U	2.500	1	U	U	2.300	1	U	U	2.800	1	U	U	3.529	1	U	U	3.614	1	U	U	3.695	1	U	U	3.488	1	U	U
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	mg/kg	2.8E-02	0.641	6.4E-01	6.329	1	U	U	2.300	1	U	U	2.500	1	U	U	2.300	1	U	U	2.800	1	U	U	5.882	1	U	U	6.024	1	U	U	13.889	1	U	U	5.814	1	U	U
SEMIVOLATILES	4-Bromophenyl phenyl ether	mg/kg	8.6E-01	0.460	8.6E-01	1.266	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	1.176	1	U	U	1.205	1	U	U	2.778	1	U	U	1.163	1	U	U
SEMIVOLATILES	4-Chloro-3-methylphenol	mg/kg	1.4E+01	0.460	1.4E+01	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	0.616	1	U	U	0.581	1	U	U
SEMIVOLATILES	4-Chloroaniline	mg/kg	8.9E-01	0.460	8.9E-01	3.797	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	3.529	1	U	U	3.614	1	U	U	3.695	1	U	U	3.488	1	U	U
SEMIVOLATILES	4-Chlorophenyl phenyl ether	mg/kg	7.7E-02	0.460	4.6E-01	1.266	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	1.176	1	U	U	1.205	1	U	U	2.778	1	U	U	1.163	1	U	U
SEMIVOLATILES	4-Methylphenol	mg/kg	1.4E+00	0.460	1.4E+00	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	0.616	1	U	U	0.581	1	U	U
SEMIVOLATILES	4-Nitroaniline	mg/kg	3.6E-02	1.282	1.3E+00	6.329	1	U	U	2.300	1	U	U	2.500	1	U	U	2.300	1	U	U	2.800	1	U	U	5.882	1	U	U	6.024	1	U	U	13.889	1	U	U	5.814	1	U	U
SEMIVOLATILES	4-Nitrophenol	mg/kg	3.0E-01	0.641	6.4E-01	6.329	1	U	U	2.300	1	U	U	2.500	1	U	U	2.300	1	U	U	2.800	1	U	U	5.882	1	U	U	6.024	1	U	U	13.889	1	U	U	5.814	1	U	U
SEMIVOLATILES	Acenaphthene	mg/kg	3.4E+02	0.333	3.4E+02	0.380	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.353	1	U	U	0.361	1	U	U	0.369	1	U	U	0.349	1	U	U
SEMIVOLATILES	Acenaphthylene	mg/kg	5.4E+02	0.460	5.4E+02	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	0.616	1	U	U	0.581	1	U	U

Table 3
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump 095, Sump 096, and Waste Rack Sump WRS001
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION CODE					**Applicable**	LH-S96-01				LHS-Y-01				LHS-Y-01				LHS-Y-02				LHS-Y-04				LH-WRS1-01				LH-WRS1-01				LH-WRS1-01				LH-WRS1-01			
SAMPLE NO			Calculated		**Standard 3**	LH-S96-01.3				LHS-Y-01				LHS-Y-01-FD				LHS-Y-02				LHS-Y-04				LH-WRS1-01.1				LH-WRS1-01.2				LH-WRS1-01.3				LH-WRS1-01-FD			
SAMPLE DATE			Commercial		**Groundwater**	26-Jun-93				11-Jan-95				11-Jan-95				11-Jan-95				11-Jan-95				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93			
DEPTH			/ Industrial	Practical	**Protective**	11-12.5 Ft				0-0.5 Ft				0-0.5 Ft				0-0.5 Ft				0-0.5 Ft				0.5-1.5 Ft				3.5-5 Ft				11-12.5 Ft				0.5-1.5 Ft			
SAMPLE PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				FD				REG				REG				REG				REG				REG				FD			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
SEMIVOLATILES	Anthracene	mg/kg	2.0E+01	0.460	**2.0E+01**	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	1.389	1	U	U	0.581	1	U	U
SEMIVOLATILES	Benzo(a)anthracene	mg/kg	4.3E+00	0.300	**4.3E+00**	0.380	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.353	1	U	U	0.361	1	U	U	0.833	1	U	U	0.349	1	U	U
SEMIVOLATILES	Benzo(a)pyrene	mg/kg	5.9E+00	0.460	**5.9E+00**	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	1.389	1	U	U	0.581	1	U	U
SEMIVOLATILES	Benzo(b)fluoranthene	mg/kg	1.5E+01	0.460	**1.5E+01**	1.266	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	1.176	1	U	U	1.205	1	U	U	2.778	1	U	U	1.163	1	U	U
SEMIVOLATILES	Benzo(ghi)perylene	mg/kg	8.2E+00	0.460	**8.2E+00**	2.532	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	2.353	1	U	U	2.410	1	U	U	5.556	1	U	U	2.326	1	U	U
SEMIVOLATILES	Benzo(k)fluoranthene	mg/kg	1.4E+01	0.385	**1.4E+01**	1.266	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	1.176	1	U	U	1.205	1	U	U	2.778	1	U	U	1.163	1	U	U
SEMIVOLATILES	Benzoic Acid	mg/kg	6.7E+01	2.300	**6.7E+01**					2.300	1	U	U	2.500	1	U	U	2.300	1	U	U	2.800	1	U	U																
SEMIVOLATILES	Benzyl Alcohol	mg/kg	1.6E+01	0.460	**1.6E+01**					0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U																
SEMIVOLATILES	bis(2-Chloroethoxy)methane	mg/kg	2.5E-03	0.460	**4.6E-01**	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	0.616	1	U	U	0.581	1	U	U
SEMIVOLATILES	bis(2-Chloroethyl)ether	mg/kg	1.6E-04	0.460	**4.6E-01**	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	0.616	1	U	U	0.581	1	U	U
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	mg/kg	4.1E-01	0.460	**4.6E-01**	1.266	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	1.176	1	U	U	1.205	1	U	U	1.232	1	U	U	1.163	1	U	U
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	mg/kg	1.3E+02	0.118	**1.3E+02**	0.266	1	U	U	0.061	1		J	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.118	1	U	U	0.181	1	U	U	7.556	1	U	U	0.128	1	U	U
SEMIVOLATILES	Butyl benzyl phthalate	mg/kg	8.0E+02	0.460	**8.0E+02**	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	1.389	1	U	U	0.581	1	U	U
SEMIVOLATILES	Carbazole	mg/kg	1.1E+00	0.641	**1.1E+00**	1.266	1	U	U																	1.176	1	U	U	1.205	1	U	U	2.778	1	U	U	1.163	1	U	U
SEMIVOLATILES	Chrysene	mg/kg	1.2E+01	0.385	**1.2E+01**	6.329	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	5.882	1	U	U	6.024	1	U	U	13.889	1	U	U	5.814	1	U	U
SEMIVOLATILES	Dibenzo(a,h)anthracene	mg/kg	1.2E+01	0.460	**1.2E+01**	2.532	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	2.353	1	U	U	2.410	1	U	U	5.556	1	U	U	2.326	1	U	U
SEMIVOLATILES	Dibenzofuran	mg/kg	1.1E+02	0.460	**1.1E+02**	1.266	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	1.176	1	U	U	1.205	1	U	U	2.778	1	U	U	1.163	1	U	U
SEMIVOLATILES	Diethyl phthalate	mg/kg	3.9E+02	0.460	**3.9E+02**	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.145	1		J	1.833	1			0.581	1	U	U
SEMIVOLATILES	Dimethyl phthalate	mg/kg	9.1E+01	0.460	**9.1E+01**	0.975	1			0.460	1			0.200	1		J	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	0.948	1			0.581	1	U	U
SEMIVOLATILES	di-n-Butyl phthalate	mg/kg	7.6E+03	0.361	**7.6E+03**	4.785	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	2.518	1	U	U	0.361	1	U	U	5.917	1	U	U	3.465	1	U	U
SEMIVOLATILES	di-n-Octyl phthalate	mg/kg	3.3E+04	0.460	**3.3E+04**	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	1.389	1	U	U	0.581	1	U	U
SEMIVOLATILES	Fluoranthene	mg/kg	2.5E+02	0.460	**2.5E+02**	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	1.389	1	U	U	0.581	1	U	U
SEMIVOLATILES	Fluorene	mg/kg	3.0E+02	0.460	**3.0E+02**	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	1.389	1	U	U	0.581	1	U	U
SEMIVOLATILES	Hexachlorobenzene	mg/kg	8.7E-01	0.460	**8.7E-01**	1.266	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	1.176	1	U	U	1.205	1	U	U	2.778	1	U	U	1.163	1	U	U
SEMIVOLATILES	Hexachlorobutadiene	mg/kg	4.4E+00	0.460	**4.4E+00**	3.797	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	3.529	1	U	U	3.614	1	U	U	3.695	1	U	U	3.488	1	U	U
SEMIVOLATILES	Hexachlorocyclopentadiene	mg/kg	1.5E+01	0.460	**1.5E+01**	3.797	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	3.529	1	U	U	3.614	1	U	U	3.695	1	U	U	3.488	1	U	U
SEMIVOLATILES	Hexachloroethane	mg/kg	5.8E+00	0.460	**5.8E+00**	1.266	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	1.176	1	U	U	1.205	1	U	U	1.232	1	U	U	1.163	1	U	U
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	mg/kg	4.2E+01	0.460	**4.2E+01**	1.266	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	1.176	1	U	U	1.205	1	U	U	2.778	1	U	U	1.163	1	U	U
SEMIVOLATILES	Isophorone	mg/kg	3.2E+00	0.460	**3.2E+00**	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	0.616	1	U	U	0.581	1	U	U
SEMIVOLATILES	Naphthalene	mg/kg	9.8E+01	0.333	**9.8E+01**	4.392	1			0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.353	1	U	U	0.361	1	U	U	4.273	1			0.349	1	U	U
SEMIVOLATILES	Nitrobenzene	mg/kg	2.2E-01	0.460	**4.6E-01**	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	0.616	1	U	U	0.581	1	U	U
SEMIVOLATILES	n-Nitroso-di-n-propylamine	mg/kg	3.0E-05	0.460	**4.6E-01**	1.266	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	1.176	1	U	U	1.205	1	U	U	1.232	1	U	U	1.163	1	U	U
SEMIVOLATILES	n-Nitrosodiphenylamine	mg/kg	6.1E-01	0.460	**6.1E-01**	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	1.389	1	U	U	0.581	1	U	U
SEMIVOLATILES	Pentachlorophenol	mg/kg	4.8E-02	0.641	**6.4E-01**	6.329	1	U	U	2.300	1	U	U	2.500	1	U	U	2.300	1	U	U	2.800	1	U	U	5.882	1	U	U	6.024	1	U	U	13.889	1	U	U	5.814	1	U	U
SEMIVOLATILES	Phenanthrene	mg/kg	2.8E+02	0.460	**2.8E+02**	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	1.944	1			0.581	1	U	U
SEMIVOLATILES	Phenol	mg/kg	2.1E+01	0.460	**2.1E+01**	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	0.616	1	U	U	0.581	1	U	U
SEMIVOLATILES	Pyrene	mg/kg	1.0E+02	0.385	**1.0E+02**	0.633	1	U	U	0.460	1	U	U	0.500	1	U	U	0.460	1	U	U	0.570	1	U	U	0.588	1	U	U	0.602	1	U	U	1.389	1	U	U	0.581	1	U	U
VOLATILES	1,1,1,2-Tetrachloroethane	mg/kg	3.3E+00	0.014	**3.3E+00**					0.014	1	U	U	0.015	1	U	U	0.014	1	U	U	0.018	1	U	U																
VOLATILES	1,1,1-Trichloroethane	mg/kg	7.5E-01	0.005	**7.5E-01**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	3.6E-02	0.005	**3.6E-02**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,1,2-Trichloroethane	mg/kg	8.5E-03	0.005	**8.5E-03**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,1-Dichloroethane	mg/kg	1.2E+01	0.005	**1.2E+01**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,1-Dichloroethene	mg/kg	1.7E-02	0.005	**1.7E-02**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,2,3-Trichloropropane	mg/kg	5.0E-04	0.014	**1.4E-02**					0.014	1	U	U	0.015	1	U	U	0.014	1	U	U	0.018	1	U	U																
VOLATILES	1,2-Dibromo-3-chloropropane	mg/kg	1.1E-03	0.028	**2.8E-02**					0.028	1	U	U	0.030	1	U	U	0.028	1	U	U	0.035	1	U	U																
VOLATILES	1,2-Dibromoethane	mg/kg	9.0E-05	0.028	**2.8E-02**					0.028	1	U	U	0.030	1	U	U	0.028	1	U	U	0.035	1	U	U																
VOLATILES	1,2-Dichloroethane	mg/kg	3.4E-03	0.005	**5.0E-03**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,2-Dichloroethene	mg/kg	7.6E-02	0.005	**7.6E-02**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	1,2-Dichloropropane	mg/kg	1.0E-02	0.005	**1.0E-02**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	2-Butanone	mg/kg	1.2E+01	0.014	**1.2E+01**	0.063	1	U	U	0.014	1	U	U	0.015	1	U	U	0.014	1	U	U	0.018	1	U	U	0.060	1	U	U	0.060	1	U	U	0.062	1	U	U	0.025	1		
VOLATILES	2-Chloroethyl vinyl ether	mg/kg	3.4E-03	0.014	**1.4E-02**					0.014	1	U	U	0.015	1	U	U	0.014	1	U	U	0.018	1	U	U																
VOLATILES	2-Hexanone	mg/kg	4.2E+00	0.014	**4.2E+00**	0.063	1	U	U	0.014	1	U	U	0.015	1	U	U	0.014	1	U	U	0.018	1	U	U	0.060	1	U	U	0.060	1	U	U	0.062	1	U	U	0.059	1	U	U
VOLATILES	2-Propenal	mg/kg	7.7E-03	0.690	**6.9E-01**					0.700	1	U	U	0.740	1	U	U	0.690	1	U	U	0.880	1	U	U																
VOLATILES	Acetone	mg/kg	1.4E+01	0.014	**1.4E+01**	0.020	1	U	U	0.014	1	U	U	0.015	1	U	U	0.014	1	U	U	0.018	1	U	U	0.039	1	U	U	0.117	1	U	U	0.024	1	U	U	0.029	1	U	U
VOLATILES	Acetonitrile	mg/kg	4.9E-01	0.140	**4.9E-01**					0.140	1	U	U	0.150	1	U	U	0.140	1	U	U	0.180	1	U	U																
VOLATILES	Acrylonitrile	mg/kg	9.0E-05	0.140	**1.4E-01**					0.140	1	U	U	0.150	1	U	U	0.140	1	U	U	0.180	1	U	U																
VOLATILES	Allyl chloride	mg/kg	1.1E+00	0.014	**1.1E+00**					0.014	1	U	U	0.015	1	U	U	0.014	1	U	U	0.018	1	U	U																
VOLATILES	Benzene	mg/kg	1.1E-02	0.005	**1.1E-02**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Bromodichloromethane	mg/kg	8.7E-03	0.005	**8.7E-03**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Bromoform	mg/kg	1.0E-01	0.005	**1.0E-01**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Bromomethane	mg/kg	9.2E-02	0.014	**9.2E-02**	0.032	1	U	U	0.014	1	U	U	0.015	1	U	U	0.014	1	U	U	0.018	1	U	U	0.030	1	U	U	0.030	1	U	U	0.031	1	U	U	0.029	1	U	U
VOLATILES	Carbon disulfide	mg/kg	2.0E+01	0.006	**2.0E+01**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U

Table 3
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump 095, Sump 096, and Waste Rack Sump WRS001
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION CODE					**Applicable**	LH-S96-01				LHS-Y-01				LHS-Y-01				LHS-Y-02				LHS-Y-04				LH-WRS1-01				LH-WRS1-01				LH-WRS1-01				LH-WRS1-01			
SAMPLE NO			Calculated		**Standard 3**	LH-S96-01.3				LHS-Y-01				LHS-Y-01-FD				LHS-Y-02				LHS-Y-04				LH-WRS1-01.1				LH-WRS1-01.2				LH-WRS1-01.3				LH-WRS1-01-FD			
SAMPLE DATE			Commercial		**Groundwater**	26-Jun-93				11-Jan-95				11-Jan-95				11-Jan-95				11-Jan-95				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93			
DEPTH			/ Industrial	Practical	**Protective**	11-12.5 Ft				0-0.5 Ft				0-0.5 Ft				0-0.5 Ft				0-0.5 Ft				0.5-1.5 Ft				3.5-5 Ft				11-12.5 Ft				0.5-1.5 Ft			
SAMPLE PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				FD				REG				REG				REG				REG				REG				FD			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
VOLATILES	Carbon tetrachloride	mg/kg	3.1E-02	0.005	**3.1E-02**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Chlorobenzene	mg/kg	6.8E-01	0.005	**6.8E-01**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Chloroethane	mg/kg	3.1E+01	0.014	**3.1E+01**	0.032	1	U	U	0.014	1	U	U	0.015	1	U	U	0.014	1	U	U	0.018	1	U	U	0.030	1	U	U	0.030	1	U	U	0.031	1	U	U	0.029	1	U	U
VOLATILES	Chloroform	mg/kg	1.7E+00	0.005	**1.7E+00**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Chloromethane	mg/kg	1.7E-01	0.014	**1.7E-01**	0.032	1	U	U	0.014	1	U	U	0.015	1	U	U	0.014	1	U	U	0.018	1	U	U	0.030	1	U	U	0.030	1	U	U	0.031	1	U	U	0.029	1	U	U
VOLATILES	Chloroprene	mg/kg	5.2E-01	0.140	**5.2E-01**					0.140	1	U	U	0.150	1	U	U	0.140	1	U	U	0.180	1	U	U																
VOLATILES	cis-1,3-Dichloropropene	mg/kg	8.2E-03	0.005	**8.2E-03**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Dibromochloromethane	mg/kg	7.1E-02	0.005	**7.1E-02**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Dibromomethane	mg/kg	2.2E+00	0.028	**2.2E+00**					0.028	1	U	U	0.030	1	U	U	0.028	1	U	U	0.035	1	U	U																
VOLATILES	Dichlorodifluoromethane	mg/kg	1.9E+02	0.028	**1.9E+02**					0.028	1	U	U	0.030	1	U	U	0.028	1	U	U	0.035	1	U	U																
VOLATILES	Ethyl methacrylate	mg/kg	1.2E+01	0.028	**1.2E+01**					0.028	1	U	U	0.030	1	U	U	0.028	1	U	U	0.035	1	U	U																
VOLATILES	Ethylbenzene	mg/kg	4.6E+00	0.005	**4.6E+00**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	IODOMETHANE	mg/kg	1.2E-01	0.014	**1.2E-01**					0.014	1	U	U	0.015	1	U	U	0.014	1	U	U	0.018	1	U	U																
VOLATILES	ISOBUTYL ALCOHOL	mg/kg	9.4E+00	2.800	**9.4E+00**					2.800	1	U	U	3.000	1	U	U	2.800	1	U	U	3.500	1	U	U																
VOLATILES	Methacrylonitrile	mg/kg	2.5E-03	0.028	**2.8E-02**					0.028	1	U	U	0.030	1	U	U	0.028	1	U	U	0.035	1	U	U																
VOLATILES	Methyl isobutyl ketone	mg/kg	4.9E+00	0.014	**4.9E+00**	0.063	1	U	U	0.014	1	U	U	0.015	1	U	U	0.014	1	U	U	0.018	1	U	U	0.060	1	U	U	0.060	1	U	U	0.062	1	U	U	0.059	1	U	U
VOLATILES	METHYL METHACRYLATE	mg/kg	1.2E+02	0.028	**1.2E+02**					0.028	1	U	U	0.030	1	U	U	0.028	1	U	U	0.035	1	U	U																
VOLATILES	Methylene chloride	mg/kg	2.6E-03	0.002	**2.6E-03**	0.005	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.007	1	U	U	0.021	1	U	U	0.006	1	U	U
VOLATILES	Pentachloroethane	mg/kg	6.6E-01	0.028	**6.6E-01**					0.028	1	U	U	0.030	1	U	U	0.028	1	U	U	0.035	1	U	U																
VOLATILES	Propionitrile	mg/kg	7.6E-03	0.069	**6.9E-02**					0.070	1	U	U	0.074	1	U	U	0.069	1	U	U	0.088	1	U	U																
VOLATILES	Styrene	mg/kg	2.4E+00	0.005	**2.4E+00**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Tetrachloroethene	mg/kg	2.6E-02	0.005	**2.6E-02**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Toluene	mg/kg	4.5E+00	0.005	**4.5E+00**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	trans-1,3-Dichloropropene	mg/kg	4.4E-02	0.005	**4.4E-02**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	trans-1,4-Dichloro-2-butene	mg/kg	2.5E-03	0.028	**2.8E-02**					0.028	1	U	U	0.030	1	U	U	0.028	1	U	U	0.035	1	U	U																
VOLATILES	Trichloroethene	mg/kg	8.5E-02	0.006	**8.5E-02**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U
VOLATILES	Trichlorofluoromethane	mg/kg	1.7E+02	0.014	**1.7E+02**					0.014	1	U	U	0.015	1	U	U	0.014	1	U	U	0.018	1	U	U																
VOLATILES	Vinyl acetate	mg/kg	3.1E+01	0.014	**3.1E+01**					0.014	1	U	U	0.015	1	U	U	0.014	1	U	U	0.018	1	U	U																
VOLATILES	Vinyl chloride	mg/kg	3.1E-03	0.014	**1.4E-02**	0.032	1	U	U	0.014	1	U	U	0.015	1	U	U	0.014	1	U	U	0.018	1	U	U	0.030	1	U	U	0.030	1	U	U	0.031	1	U	U	0.029	1	U	U
VOLATILES	Xylenes, Total	mg/kg	7.6E+01	0.005	**7.6E+01**	0.006	1	U	U	0.007	1	U	U	0.007	1	U	U	0.007	1	U	U	0.009	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U

Notes:

Boxed and Bold = Detected Concentration exceeds Applicable Standard 3 Soil MSC.

Shaded = Undetected (SQL) value exceeds Applicable Standard 3 Soil MSC.

E - The concentration reported exceeded the upper calibration limit, therefore, the concentration is estimated.
J - The analyte was positively identified; the reported value is the estimated concentration of the constituent detected with concentration measured between the MDL and the PQL for 1993 through 1998 samples.
U - Not detected

DIL - dilution factor
FD - field duplicate
Ft - feet
LQ - laboratory qualifier
mg/kg - milligrams per kilogram
MSC - medium specific concentration
NA - not applicable
PQL - practical quantitation limit
REG - regular sample
SQL - Sample Quantitation Limit
VQ - validation qualifier

[a] Value developed in Attachment 2 using the SAM model. Shading indicates a chemical specific value.
[b] PQL values are the minimum undetected result shown in the table, or a laboratory value.
[c] Shading indicates MSC value equal to the PQL.

Table 4
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump097, Sump098, Sump099, and WRSump002
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					Applicable	LH-S97-01				LH-S97-01				LH-S97-01				LH-S98-01				LH-S98-01				LH-S99-01				LH-S99-01				LH-S99-01				LH-S99-01				LH-WRS2-01				LH-WRS2-01			
SAMPLE_NO			Calculated		Standard 3	LH-S97-01.1				LH-S97-01.2				LH-S97-01.3				LH-S98-01.1				LH-S98-01.2				LH-S99-01.1				LH-S99-01.2				LH-S99-01.3				LH-S99-01-FD				LH-WRS2-01.1				LH-WRS2-01.2			
SAMPLE_DATE			Commercial		Groundwater	26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93			
DEPTH			/ Industrial	Practical	Protective	0.5-1.5 Ft				3.9-4.7 Ft				11-11.7 Ft				0.5-1.5 Ft				1.5-3 Ft				0.5-1.5 Ft				2-2.8 Ft				12-12.8 Ft				0.5-1.5 Ft				0.5-1.5 Ft				3-3.7 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	Soil MSC	REG				REG				REG				REG				REG				REG				REG				REG				FD				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	Value [c]	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	7.0E-04	1.1455	1.1E+00	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.146	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	5.8E-04	1.145	1.1E+00	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.145	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
METALS	Aluminum	mg/kg	5.4E+06	20	5.4E+06	6720.000	1			11600.000	1			7340.000	1			6140.000	1			4680.000	1			########	1			15300.000	1			6520.000	1			3890.000	1			6830.000	1			1420.000	1		
METALS	Antimony	mg/kg	3.5E+00	5.38	5.4E+00	5.500	1	U	U	11.300	1	U	U	6.960	1	U	U	7.960	1		E	10.100	1	U	U	5.380	1	U	U	6.940	1	U	U	7.680	1	U	U	9.640	1	U	U	12.100	1	U	U	9.620	1	U	U
METALS	Arsenic	mg/kg	4.8E+00	0.625	4.8E+00	1.680	1			1.640	1			1.530	1			9.920	1			10.700	1			1.240	1			0.798	1		E	2.150	1			1.780	1			6.870	1			0.625	1	U	U
METALS	Barium	mg/kg	9.5E+01	0.3	9.5E+01	68.400	1			41.700	1			64.700	1			43.100	1			83.800	1			74.900	1			85.400	1			131.000	1			98.800	1			58.500	1			6.590	1		
METALS	Cadmium	mg/kg	4.0E-01	2.4	2.4E+00	2.120	1		E	3.230	1		E	2.820	1		E	11.400	1			2.520	1	U	U	2.560	1			2.220	1		E	4.920	1			2.410	1	U	U	5.170	1		E	2.400	1	U	U
METALS	Calcium	mg/kg	NA	NA	none	640.000	1			1160.000	1			1070.000	1			804.000	1			751.000	1			2360.000	1			1270.000	1			2040.000	1			1070.000	1			2340.000	1			776.000	1		
METALS	Chromium	mg/kg	3.0E+03	0.4	3.0E+03	10.200	1			9.530	1			9.710	1			22.000	1			8.620	1			11.800	1			12.500	1			8.950	1			4.290	1		E	41.500	1			3.900	1		E
METALS	Cobalt	mg/kg	4.1E+02	0.818	4.1E+02	12.100	1			6.630	1			8.040	1			3.850	1			6.550	1			5.510	1			3.370	1			5.720	1			4.920	1			3.650	1			0.818	1	U	U
METALS	Copper	mg/kg	7.8E+01	1.28	7.8E+01	4.950	1			7.990	1			6.860	1			1.280	1	U	U	3.530	1		E	5.680	1			8.320	1			8.680	1			3.570	1		E	13.000	1			4.380	1		
METALS	Iron	mg/kg	NA	NA	none	7800.000	1			13100.000	1			11200.000	1			########	1			9480.000	1			########	1			8830.000	1			19900.000	1			6190.000	1			17000.000	1			4280.000	1		
METALS	Lead	mg/kg	2.8E+02	14.5	2.8E+02	15.000	1		E	23.300	1		E	13.300	1		E	21.900	1			15.100	1	U	U	22.700	1			20.500	1		E	13.600	1		E	14.500	1	U	U	151.000	1			14.400	1		
METALS	Magnesium	mg/kg	NA	NA	none	300.000	1			1070.000	1			1310.000	1			277.000	1			206.000	1			462.000	1			779.000	1			1490.000	1			197.000	1			402.000	1			65.300	1		
METALS	Manganese	mg/kg	1.1E+03	0.2	1.1E+03	214.000	1			32.700	1			183.000	1			155.000	1			743.000	1			164.000	1			74.900	1			272.000	1			894.000	1			97.500	1			8.560	1		
METALS	Mercury	mg/kg	8.2E-02	0.024	8.2E-02	0.025	1	U	U	0.025	1	U	U	0.028	1	U	U	0.025	1	U	U	0.026	1	U	U	0.024	1	U	U	0.030	1	U	U	0.027	1	U	U	0.025	1	U	U	0.312	1			0.028	1	U	U
METALS	Potassium	mg/kg	NA	NA	none	557.000	1			569.000	1			459.000	1			225.000	1			556.000	1			456.000	1			495.000	1			469.000	1			265.000	1			430.000	1			92.200	1		
METALS	Selenium	mg/kg	3.5E+00	0.538	3.5E+00	0.550	1	U	U	1.130	1	U	U	0.696	1			0.551	1	U	U	1.010	1	U	U	0.538	1	U	U	0.694	1			0.768	1	U	U	0.964	1	U	U	1.220	1	U	U	0.962	1	U	U
METALS	Silver	mg/kg	1.1E+00	0.026	1.1E+00	0.028	1	U	U	0.057	1	U	U	0.035	1			0.026	1	U	U	0.050	1	U	U	0.043	1		E	0.066	1		E	0.038	1	U	U	0.067	1		E	0.085	1		E	0.048	1	U	U
METALS	Strontium	mg/kg	1.9E+02	0.5	1.9E+02	7.150	1			20.200	1			22.000	1			5.740	1			18.700	1			30.000	1			22.500	1			30.200	1			9.060	1			15.900	1			5.730	1		
METALS	Zinc	mg/kg	1.7E+03	2.5	1.7E+03	14.800	1			29.400	1			36.400	1			35.900	1			6.400	1			15.800	1			20.100	1			55.700	1			10.400	1			190.000	1			8.420	1		
SEMIVOLATILES	1,2,4-Trichlorobenzene	mg/kg	3.5E+00	1.145	3.5E+00	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.145	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
SEMIVOLATILES	1,2-Dichlorobenzene	mg/kg	1.2E+01	1.145	1.2E+01	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.145	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
SEMIVOLATILES	1,3-Dichlorobenzene	mg/kg	1.6E+01	1.145	1.6E+01	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.145	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
SEMIVOLATILES	1,4-Dichlorobenzene	mg/kg	1.5E+00	1.145	1.5E+00	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.145	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
SEMIVOLATILES	2,4,5-Trichlorophenol	mg/kg	6.8E+02	1.145	6.8E+02	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.145	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
SEMIVOLATILES	2,4,6-Trichlorophenol	mg/kg	6.2E-01	1.145	1.1E+00	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.145	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
SEMIVOLATILES	2,4-Dichlorophenol	mg/kg	1.5E+00	1.145	1.5E+00	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.145	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
SEMIVOLATILES	2,4-Dimethylphenol	mg/kg	7.4E+00	0.573	7.4E+00	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.573	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	2,4-Dinitrophenol	mg/kg	2.7E-02	11.4548	1.1E+01	11.547	1	U	U	12.092	1	U	U	12.610	1	U	U	11.455	1	U	U	11.919	1	U	U	11.494	1	U	U	12.953	1	U	U	13.158	1	U	U	11.919	1	U	U	12.658	1	U	U	13.333	1	U	U
SEMIVOLATILES	2-Chloronaphthalene	mg/kg	1.1E+03	0.344	1.1E+03	0.346	1	U	U	0.363	1	U	U	0.378	1	U	U	0.344	1	U	U	0.358	1	U	U	0.345	1	U	U	0.389	1	U	U	0.395	1	U	U	0.358	1	U	U	0.380	1	U	U	0.400	1	U	U
SEMIVOLATILES	2-Chlorophenol	mg/kg	6.1E+00	0.573	6.1E+00	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.573	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	2-Methylnaphthalene	mg/kg	5.3E+01	0.344	5.3E+01	0.346	1	U	U	0.363	1	U	U	0.378	1	U	U	0.344	1	U	U	0.358	1	U	U	0.345	1	U	U	0.389	1	U	U	0.395	1	U	U	0.358	1	U	U	0.380	1	U	U	0.400	1	U	U
SEMIVOLATILES	2-Methylphenol	mg/kg	1.6E+01	0.573	1.6E+01	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.573	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	2-Nitroaniline	mg/kg	2.9E-02	3.436	3.4E+00	3.464	1	U	U	3.628	1	U	U	3.783	1	U	U	3.436	1	U	U	3.576	1	U	U	3.448	1	U	U	3.886	1	U	U	3.947	1	U	U	3.576	1	U	U	3.797	1	U	U	4.000	1	U	U
SEMIVOLATILES	2-Nitrophenol	mg/kg	1.2E+00	1.145	1.2E+00	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.145	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
SEMIVOLATILES	3,3'-Dichlorobenzidine	mg/kg	1.4E-02	0.5727	5.7E-01	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.573	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	3-Nitroaniline	mg/kg	4.0E-02	3.436	3.4E+00	3.464	1	U	U	3.628	1	U	U	3.783	1	U	U	3.436	1	U	U	3.576	1	U	U	3.448	1	U	U	3.886	1	U	U	3.947	1	U	U	3.576	1	U	U	3.797	1	U	U	4.000	1	U	U
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	mg/kg	2.7E-02	5.7274	5.7E+00	5.774	1	U	U	6.046	1	U	U	6.305	1	U	U	5.727	1	U	U	5.959	1	U	U	5.747	1	U	U	6.477	1	U	U	6.579	1	U	U	5.959	1	U	U	6.329	1	U	U	6.667	1	U	U
SEMIVOLATILES	4-Bromophenyl phenyl ether	mg/kg	8.3E-01	1.1455	1.1E+00	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.146	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
SEMIVOLATILES	4-Chloro-3-methylphenol	mg/kg	1.3E+01	0.573	1.3E+01	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.573	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	4-Chloroaniline	mg/kg	8.6E-01	3.436	3.4E+00	3.464	1	U	U	3.628	1	U	U	3.783	1	U	U	3.436	1	U	U	3.576	1	U	U	3.448	1	U	U	3.886	1	U	U	3.947	1	U	U	3.576	1	U	U	3.797	1	U	U	4.000	1	U	U
SEMIVOLATILES	4-Chlorophenyl phenyl ether	mg/kg	7.5E-02	1.1455	1.1E+00	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.146	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
SEMIVOLATILES	4-Methylphenol	mg/kg	1.3E+00	0.573	1.3E+00	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.573	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	4-Nitroaniline	mg/kg	3.5E-02	5.7274	5.7E+00	5.774	1	U	U	6.046	1	U	U	6.305	1	U	U	5.727	1	U	U	5.959	1	U	U	5.747	1	U	U	6.477	1	U	U	6.579	1	U	U	5.959	1	U	U	6.329	1	U	U	6.667	1	U	U
SEMIVOLATILES	4-Nitrophenol	mg/kg	2.9E-01	5.7274	5.7E+00	5.774	1	U	U	6.046	1	U	U	6.305	1	U	U	5.727	1	U	U	5.959	1	U	U	5.747	1	U	U	6.477	1	U	U	6.579	1	U	U	5.959	1	U	U	6.329	1	U	U	6.667	1	U	U
SEMIVOLATILES	Acenaphthene	mg/kg	3.4E+02	0.344	3.4E+02	0.346	1	U	U	0.363	1	U	U	0.378	1	U	U	0.344	1	U	U	0.358	1	U	U	0.345	1	U	U	0.389	1	U	U	0.395	1	U	U	0.358	1	U	U	0.380	1	U	U	0.400	1	U	U
SEMIVOLATILES	Acenaphthylene	mg/kg	5.4E+02	0.573	5.4E+02	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.573	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	Anthracene	mg/kg	2.0E+01	0.5727	2.0E+01	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.573	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	Benzo(a)anthracene	mg/kg	4.2E+00	0.3436	4.2E+00	0.346	1	U	U	0.363	1	U	U	0.378	1	U	U	0.344	1	U	U	0.358	1	U	U	0.345	1	U	U	0.389	1	U	U	0.395	1	U	U	0.358	1	U	U	0.380	1	U	U	0.400	1	U	U
SEMIVOLATILES	Benzo(a)pyrene	mg/kg	5.7E+00	0.5727	5.7E+00	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.573	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	Benzo(b)fluoranthene	mg/kg	1.4E+01	1.1455	1.4E+01	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.146	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
SEMIVOLATILES	Benzo(ghi)perylene	mg/kg	8.2E+00	2.2909	8.2E+00	2.309	1	U	U	2.418	1	U	U	2.522	1	U	U	2.291	1	U	U	2.384	1	U	U	2.299	1	U	U	2.591	1	U	U	2.632	1	U	U	2.384	1	U	U	2.532	1	U	U	2.667	1	U	U
SEMIVOLATILES	Benzo(k)fluoranthene	mg/kg	1.4E+01	1.1455	1.4E+01	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.146	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
SEMIVOLATILES	bis(2-Chloroethoxy)methane	mg/kg	2.4E-03	0.573	5.7E-01	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.573	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	bis(2-Chloroethyl)ether	mg/kg	1.5E-04	0.573	5.7E-01	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.573	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	mg/kg	3.9E-01	1.145	1.1E+00	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.145	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	mg/kg	1.2E+02	0.115	1.2E+02	0.115	1	U	U	0.605	1	U	U	0.189	1	U	U	0.206	1	U	U	0.226	1	U	U	0.287	1	U	U	0.181	1	U	U	0.132	1	U	U	0.262	1	U	U	0.127	1	U	U	0.413	1	U	U
SEMIVOLATILES	Butyl benzyl phthalate	mg/kg	8.0E+02	0.5727	8.0E+02	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.573	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	Carbazole	mg/kg	1.1E+00	1.1455	1.1E+00	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.146	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
SEMIVOLATILES	Chrysene	mg/kg	1.2E+01	5.7274	1.2E+01	5.774	1	U	U	6.046	1	U	U	6.305	1	U	U	5.727	1	U	U	5.959	1	U	U	5.747	1	U	U	6.477	1	U	U	6.579	1	U	U	5.959	1	U	U	6.329	1	U	U	6.667	1	U	U
SEMIVOLATILES	Dibenzo(a,h)anthracene	mg/kg	1.1E+01	2.2909	1.1E+01	2.309	1	U	U	2.418	1	U	U	2.522	1	U	U	2.291	1	U	U	2.384	1	U	U	2.299	1	U	U	2.591	1	U	U	2.632	1	U	U	2.384	1	U	U	2.532	1	U	U	2.667	1	U	U
SEMIVOLATILES	Dibenzofuran	mg/kg	1.0E+02	1.1455	1.0E+02	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.146	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
SEMIVOLATILES	Diethyl phthalate	mg/kg	3.8E+02	0.5727	3.8E+02	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.573	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	Dimethyl phthalate	mg/kg	8.8E+01	0.573	8.8E+01	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.573	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	di-n-Butyl phthalate	mg/kg	7.6E+03	0.329	7.6E+03	2.275	1	U	U	3.531	1	U	U	1.690	1	U	U	1.535	1	U	U	4.410	1	U	U	2.161	1	U	U	2.759	1	U	U	0.329	1	U	U	3.290	1	U	U	3.418	1	U	U	1.693	1	U	U
SEMIVOLATILES	di-n-Octyl phthalate	mg/kg	3.3E+04	0.2757	3.3E+04	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.276	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	Fluoranthene	mg/kg	2.5E+02	0.575	2.5E+02	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.183	1		J	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	Fluorene	mg/kg	3.0E+02	0.5727	3.0E+02	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.573	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	Hexachlorobenzene	mg/kg	8.4E-01	1.1455	1.1E+00	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.146	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
SEMIVOLATILES	Hexachlorobutadiene	mg/kg	4.2E+00	3.436	4.2E+00	3.464	1	U	U	3.628	1	U	U	3.783	1	U	U	3.436	1	U	U	3.576	1	U	U	3.448	1	U	U	3.886	1	U	U	3.947	1	U	U	3.576	1	U	U	3.797	1	U	U	4.000	1	U	U
SEMIVOLATILES	Hexachlorocyclopentadiene	mg/kg	1.4E+01	3.436	1.4E+01	3.464	1	U	U	3.628	1	U	U	3.783	1	U	U	3.436	1	U	U	3.576	1	U	U	3.448	1	U	U	3.886	1	U	U	3.947	1	U	U	3.576	1	U	U	3.797	1	U	U	4.000	1	U	U
SEMIVOLATILES	Hexachloroethane	mg/kg	5.6E+00	1.145	5.6E+00	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.145	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	mg/kg	4.1E+01	1.1455	4.1E+01	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.146	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U
SEMIVOLATILES	Isophorone	mg/kg	3.1E+00	0.573	3.1E+00	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.573	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	Naphthalene	mg/kg	9.5E+01	0.344	9.5E+01	0.346	1	U	U	0.363	1	U	U	0.378	1	U	U	0.344	1	U	U	0.358	1	U	U	0.345	1	U	U	0.389	1	U	U	0.395	1	U	U	0.358	1	U	U	0.380	1	U	U	0.400	1	U	U
SEMIVOLATILES	Nitrobenzene	mg/kg	2.1E-01	0.573	5.7E-01	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.573	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	n-Nitroso-di-n-propylamine	mg/kg	2.9E-05	1.145	1.1E+00	1.155	1	U	U	1.209	1	U	U	1.261	1	U	U	1.145	1	U	U	1.192	1	U	U	1.149	1	U	U	1.295	1	U	U	1.316	1	U	U	1.192	1	U	U	1.266	1	U	U	1.333	1	U	U

Table 4
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump097, Sump098, Sump099, and WRSump002
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S97-01				LH-S97-01				LH-S97-01				LH-S98-01				LH-S98-01				LH-S99-01				LH-S99-01				LH-S99-01				LH-S99-01				LH-S99-01				LH-WRS2-01				LH-WRS2-01			
SAMPLE_NO			Calculated		**Standard 3**	LH-S97-01.1				LH-S97-01.2				LH-S97-01.3				LH-S98-01.1				LH-S98-01.2				LH-S99-01.1				LH-S99-01.2				LH-S99-01.3				LH-S99-01-FD				LH-WRS2-01.1				LH-WRS2-01.2			
SAMPLE_DATE			Commercial		**Groundwater**	26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93			
DEPTH			/ Industrial	Practical	**Protective**	0.5-1.5 Ft				3.9-4.7 Ft				11-11.7 Ft				0.5-1.5 Ft				1.5-3 Ft				0.5-1.5 Ft				2-2.8 Ft				12-12.8 Ft				0.5-1.5 Ft				0.5-1.5 Ft				3-3.7 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				REG				REG				REG				REG				FD				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
SEMIVOLATILES	n-Nitrosodiphenylamine	mg/kg	5.9E-01	0.5727	**5.9E-01**	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.573	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	Pentachlorophenol	mg/kg	4.7E-02	5.7274	**5.7E+00**	5.774	1	U	U	6.046	1	U	U	6.305	1	U	U	5.727	1	U	U	5.959	1	U	U	5.747	1	U	U	6.477	1	U	U	6.579	1	U	U	5.959	1	U	U	6.329	1	U	U	6.667	1	U	U
SEMIVOLATILES	Phenanthrene	mg/kg	2.8E+02	0.575	**2.8E+02**	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.126	1		J	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	Phenol	mg/kg	2.0E+01	0.573	**2.0E+01**	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.573	1	U	U	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
SEMIVOLATILES	Pyrene	mg/kg	1.0E+02	0.575	**1.0E+02**	0.577	1	U	U	0.605	1	U	U	0.631	1	U	U	0.126	1		J	0.596	1	U	U	0.575	1	U	U	0.648	1	U	U	0.658	1	U	U	0.596	1	U	U	0.633	1	U	U	0.667	1	U	U
VOLATILES	1,1,1-Trichloroethane	mg/kg	7.2E-01	0.006	**7.2E-01**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	3.5E-02	0.006	**3.5E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	1,1,2-Trichloroethane	mg/kg	8.2E-03	0.006	**8.2E-03**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	1,1-Dichloroethane	mg/kg	1.2E+01	0.006	**1.2E+01**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	1,1-Dichloroethene	mg/kg	1.7E-02	0.006	**1.7E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.002	1			0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	1,2-Dichloroethane	mg/kg	3.3E-03	0.006	**6.0E-03**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	1,2-Dichloroethene	mg/kg	7.4E-02	0.006	**7.4E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	1,2-Dichloropropane	mg/kg	9.6E-03	0.006	**9.6E-03**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	2-Butanone	mg/kg	1.1E+01	0.057	**1.1E+01**	0.058	1	U	U	0.060	1	U	U	0.063	1	U	U	0.057	1	U	U	0.060	1	U	U	0.060	1	U	U	0.065	1	U	U	0.066	1	U	U	0.060	1	U	U	0.036	1			0.025	1		
VOLATILES	2-Hexanone	mg/kg	4.1E+00	0.057	**4.1E+00**	0.058	1	U	U	0.060	1	U	U	0.063	1	U	U	0.057	1	U	U	0.060	1	U	U	0.060	1	U	U	0.065	1	U	U	0.066	1	U	U	0.060	1	U	U	0.063	1	U	U	0.067	1	U	U
VOLATILES	Acetone	mg/kg	1.4E+01	0.006	**1.4E+01**	0.030	1	U	U	0.044	1	U	U	0.039	1	U	U	0.006	1	U	U	0.058	1	U	U	0.015	1	U	U	0.254	1	U	U	0.031	1	U	U	0.027	1	U	U	0.018	1	U	U	0.110	1	U	U
VOLATILES	Benzene	mg/kg	1.1E-02	0.006	**1.1E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	Bromodichloromethane	mg/kg	8.4E-03	0.006	**8.4E-03**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	Bromoform	mg/kg	9.9E-02	0.006	**9.9E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	Bromomethane	mg/kg	8.9E-02	0.029	**8.9E-02**	0.029	1	U	U	0.030	1	U	U	0.032	1	U	U	0.029	1	U	U	0.030	1	U	U	0.030	1	U	U	0.032	1	U	U	0.033	1	U	U	0.030	1	U	U	0.032	1	U	U	0.033	1	U	U
VOLATILES	Carbon disulfide	mg/kg	1.9E+01	0.006	**1.9E+01**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.003	1			0.011	1		
VOLATILES	Carbon tetrachloride	mg/kg	3.0E-02	0.006	**3.0E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	Chlorobenzene	mg/kg	6.6E-01	0.006	**6.6E-01**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	Chloroethane	mg/kg	3.0E+01	0.029	**3.0E+01**	0.029	1	U	U	0.030	1	U	U	0.032	1	U	U	0.029	1	U	U	0.030	1	U	U	0.030	1	U	U	0.032	1	U	U	0.033	1	U	U	0.030	1	U	U	0.032	1	U	U	0.033	1	U	U
VOLATILES	Chloroform	mg/kg	1.6E+00	0.006	**1.6E+00**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	Chloromethane	mg/kg	1.6E-01	0.029	**1.6E-01**	0.029	1	U	U	0.030	1	U	U	0.032	1	U	U	0.029	1	U	U	0.030	1	U	U	0.030	1	U	U	0.032	1	U	U	0.033	1	U	U	0.030	1	U	U	0.032	1	U	U	0.033	1	U	U
VOLATILES	cis-1,3-Dichloropropene	mg/kg	7.9E-03	0.006	**7.9E-03**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	Dibromochloromethane	mg/kg	6.9E-02	0.006	**6.9E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	Ethylbenzene	mg/kg	4.4E+00	0.006	**4.4E+00**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.002	1			0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	Methyl isobutyl ketone	mg/kg	4.7E+00	0.057	**4.7E+00**	0.058	1	U	U	0.060	1	U	U	0.063	1	U	U	0.057	1	U	U	0.060	1	U	U	0.060	1	U	U	0.065	1	U	U	0.066	1	U	U	0.060	1	U	U	0.063	1	U	U	0.067	1	U	U
VOLATILES	Methylene chloride	mg/kg	2.5E-03	0.002	**2.5E-03**	0.005	1	U	U	0.002	1	U	U	0.005	1	U	U	0.017	1	U	U	0.010	1	U	U	0.003	1	U	U	0.019	1	U	U	0.016	1	U	U	0.010	1	U	U	0.006	1	U	U	0.009	1	U	U
VOLATILES	Styrene	mg/kg	2.3E+00	0.006	**2.3E+00**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	Tetrachloroethene	mg/kg	8.6E-02	0.006	**8.6E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.014	1			**0.204**	1			0.009	1			0.048	1			0.006	1	U	U	0.007	1	U	U
VOLATILES	Toluene	mg/kg	4.4E+00	0.006	**4.4E+00**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.002	1			0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	trans-1,3-Dichloropropene	mg/kg	4.3E-02	0.006	**4.3E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.003	1			0.010	1			0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U
VOLATILES	Trichloroethene	mg/kg	5.2E-02	0.006	**5.2E-02**	0.002	1			0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	**0.087**	1			0.024	1			0.007	1	U	U	0.004	1			0.006	1	U	U	0.007	1	U	U
VOLATILES	Vinyl chloride	mg/kg	3.7E-02	0.029	**3.7E-02**	0.029	1	U	U	0.030	1	U	U	0.032	1	U	U	0.029	1	U	U	0.030	1	U	U	0.030	1	U	U	**0.497**	1			0.033	1	U	U	0.030	1	U	U	0.032	1	U	U	0.033	1	U	U
VOLATILES	Xylenes, Total	mg/kg	7.4E+01	0.006	**7.4E+01**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.018	1			0.007	1	U	U	0.006	1	U	U	0.006	1	U	U	0.007	1	U	U

Notes:

Boxed and Bold = Detected Concentration exceeds Applicable Standard 3 Soil MSC.

Shaded = Undetected (SQL) value exceeds Applicable Standard 3 Soil MSC.

E - The concentration reported exceeded the upper calibration limit, therefore, the concentration is estimated.

J - The analyte was positively identified; the reported value is the estimated concentration of the constituent detected with concentration measured between the MDL and the PQL for 1993 through 1998 samples.

U - Not detected

DIL - dilution factor

FD - field duplicate

Ft - feet

LQ - laboratory qualifier

mg/kg - milligrams per kilogram

MSC - medium specific concentration

NA - not applicable

PQL - practical quantitation limit

REG - regular sample

SQL - Sample Quantitation Limit

VQ - validation qualifier

[a] Value developed in Attachment 3 using the SAM model. Shading indicates a chemical specific value.

[b] PQL values are the minimum undetected result shown in the table, or a laboratory value.

[c] Shading indicates MSC value equal to the PQL.

Table 5
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump100 and Sump101
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S100-01				LH-S100-01				LH-S100-01				LH-S101-01				LH-S101-01			
SAMPLE_NO			Calculated		**Standard 3**	LH-S100-01.1				LH-S100-01.2				LH-S100-01-FD				LH-S101-01.1				LH-S101-01.2			
SAMPLE_DATE			Commercial		**Groundwater**	26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93			
DEPTH			/ Industrial	Practical	**Protective**	0.5-1.5 Ft				1.5-3 Ft				0.5-1.5 Ft				0.5-1.5 Ft				3.8-4.2 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				FD				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	1.3E-03	1.149	**1.1E+00**	1.160	1	U	U	1.235	1	U	U	1.149	1	U	U	1.220	1	U	U	1.250	1	U	U
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	1.0E-03	1.149	**1.1E+00**	1.160	1	U	U	1.235	1	U	U	1.149	1	U	U	1.220	1	U	U	1.250	1	U	U
METALS	Aluminum	mg/kg	9.7E+06	20	**9.7E+06**	13400.000	1			12500.000	1			3200.000	1			7200.000	1			12800.000	1		
METALS	Antimony	mg/kg	2.4E+00	5.54	**5.5E+00**	6.900	1	U	U	5.540	1	U	U	5.860	1	U	U	5.120	1		E	7.780	1	U	U
METALS	Arsenic	mg/kg	4.8E+00	0.3	**4.8E+00**	2.070	1			1.250	1			4.780	1			**6.280**	1			2.960	1		
METALS	Barium	mg/kg	1.6E+02	0.3	**1.6E+02**	119.000	1			71.200	1			46.000	1			36.800	1			54.800	1		
METALS	Cadmium	mg/kg	5.0E-01	0.1	**5.0E-01**	**3.590**	1			**2.130**	1		E	**1.670**	1		E	**5.550**	1			**4.550**	1		
METALS	Calcium	mg/kg	NA	NA	**none**	1750.000	1			1010.000	1			473.000	1			655.000	1			1330.000	1		
METALS	Chromium	mg/kg	5.4E+04	0.4	**5.4E+04**	14.400	1			10.800	1			6.680	1			19.800	1			13.100	1		
METALS	Cobalt	mg/kg	7.5E+02	0.5	**7.5E+02**	4.830	1			4.160	1			2.430	1			2.600	1			3.540	1		
METALS	Copper	mg/kg	1.4E+02	0.6	**1.4E+02**	8.140	1			6.090	1			3.900	1			3.200	1			10.600	1		
METALS	Iron	mg/kg	NA	NA	**none**	12500.000	1			7590.000	1			6540.000	1			25000.000	1			11000.000	1		
METALS	Lead	mg/kg	7.4E+01	5	**7.4E+01**	24.300	1			19.000	1			16.900	1		E	14.200	1		E	20.100	1		E
METALS	Magnesium	mg/kg	NA	NA	**none**	523.000	1			490.000	1			129.000	1			316.000	1			534.000	1		
METALS	Manganese	mg/kg	1.9E+03	0.2	**1.9E+03**	89.300	1			91.700	1			78.800	1			71.200	1			40.600	1		
METALS	Mercury	mg/kg	8.2E-02	0.026	**8.2E-02**	0.034	1		E	0.026	1	U	U	0.026	1	U	U	0.028	1	U	U	0.039	1	U	U
METALS	Potassium	mg/kg	NA	NA	**none**	775.000	1			784.000	1			202.000	1			299.000	1			783.000	1		
METALS	Selenium	mg/kg	3.5E+00	0.5	**3.5E+00**	0.690	1	U	U	0.554	1	U	U	0.586	1	U	U	0.500	1	U	U	0.778	1	U	U
METALS	Silver	mg/kg	1.9E+00	0.025	**1.9E+00**	0.034	1	U	U	0.036	1		E	0.038	1		E	0.025	1	U	U	0.039	1	U	U
METALS	Strontium	mg/kg	3.5E+02	0.5	**3.5E+02**	14.900	1			45.500	1			4.450	1			7.100	1			13.200	1		
METALS	Zinc	mg/kg	3.0E+03	2.5	**3.0E+03**	27.600	1			10.700	1			24.200	1			109.000	1			30.900	1		
SEMIVOLATILES	1,2,4-Trichlorobenzene	mg/kg	6.3E+00	1.149	**6.3E+00**	1.160	1	U	U	1.235	1	U	U	1.149	1	U	U	1.220	1	U	U	1.250	1	U	U
SEMIVOLATILES	1,2-Dichlorobenzene	mg/kg	2.3E+01	1.149	**2.3E+01**	1.160	1	U	U	1.235	1	U	U	1.149	1	U	U	1.220	1	U	U	1.250	1	U	U
SEMIVOLATILES	1,3-Dichlorobenzene	mg/kg	2.9E+01	1.149	**2.9E+01**	1.160	1	U	U	1.235	1	U	U	1.149	1	U	U	1.220	1	U	U	1.250	1	U	U
SEMIVOLATILES	1,4-Dichlorobenzene	mg/kg	2.6E+00	1.149	**2.6E+00**	1.160	1	U	U	1.235	1	U	U	1.149	1	U	U	1.220	1	U	U	1.250	1	U	U
SEMIVOLATILES	2,4,5-Trichlorophenol	mg/kg	1.2E+03	1.149	**1.2E+03**	1.160	1	U	U	1.235	1	U	U	1.149	1	U	U	1.220	1	U	U	1.250	1	U	U
SEMIVOLATILES	2,4,6-Trichlorophenol	mg/kg	1.1E+00	1.149	**1.1E+00**	1.160	1	U	U	1.235	1	U	U	1.149	1	U	U	1.220	1	U	U	1.250	1	U	U
SEMIVOLATILES	2,4-Dichlorophenol	mg/kg	2.7E+00	1.149	**2.7E+00**	1.160	1	U	U	1.235	1	U	U	1.149	1	U	U	1.220	1	U	U	1.250	1	U	U
SEMIVOLATILES	2,4-Dimethylphenol	mg/kg	1.3E+01	0.575	**1.3E+01**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	2,4-Dinitrophenol	mg/kg	4.8E-02	11.494	**1.1E+01**	11.601	1	U	U	12.346	1	U	U	11.494	1	U	U	12.195	1	U	U	12.500	1	U	U
SEMIVOLATILES	2-Chloronaphthalene	mg/kg	1.1E+03	0.345	**1.1E+03**	0.348	1	U	U	0.370	1	U	U	0.345	1	U	U	0.366	1	U	U	0.375	1	U	U
SEMIVOLATILES	2-Chlorophenol	mg/kg	1.1E+01	0.575	**1.1E+01**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	2-Methylnaphthalene	mg/kg	9.5E+01	0.345	**9.5E+01**	0.348	1	U	U	0.370	1	U	U	0.345	1	U	U	0.366	1	U	U	0.375	1	U	U
SEMIVOLATILES	2-Methylphenol	mg/kg	2.8E+01	0.575	**2.8E+01**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	2-Nitroaniline	mg/kg	5.2E-02	3.448	**3.4E+00**	3.480	1	U	U	3.704	1	U	U	3.448	1	U	U	3.659	1	U	U	3.750	1	U	U
SEMIVOLATILES	2-Nitrophenol	mg/kg	2.1E+00	1.149	**2.1E+00**	1.160	1	U	U	1.235	1	U	U	1.149	1	U	U	1.220	1	U	U	1.250	1	U	U
SEMIVOLATILES	3,3'-Dichlorobenzidine	mg/kg	2.5E-02	0.575	**5.8E-01**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	3-Nitroaniline	mg/kg	7.2E-02	3.448	**3.4E+00**	3.480	1	U	U	3.704	1	U	U	3.448	1	U	U	3.659	1	U	U	3.750	1	U	U
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	mg/kg	4.8E-02	5.747	**5.7E+00**	5.800	1	U	U	6.173	1	U	U	5.747	1	U	U	6.098	1	U	U	6.250	1	U	U
SEMIVOLATILES	4-Bromophenyl phenyl ether	mg/kg	1.5E+00	1.149	**1.5E+00**	1.160	1	U	U	1.235	1	U	U	1.149	1	U	U	1.220	1	U	U	1.250	1	U	U
SEMIVOLATILES	4-Chloro-3-methylphenol	mg/kg	2.4E+01	0.575	**2.4E+01**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	4-Chloroaniline	mg/kg	1.6E+00	3.448	**3.4E+00**	3.480	1	U	U	3.704	1	U	U	3.448	1	U	U	3.659	1	U	U	3.750	1	U	U
SEMIVOLATILES	4-Chlorophenyl phenyl ether	mg/kg	1.3E-01	1.149	**1.1E+00**	1.160	1	U	U	1.235	1	U	U	1.149	1	U	U	1.220	1	U	U	1.250	1	U	U
SEMIVOLATILES	4-Methylphenol	mg/kg	2.4E+00	0.575	**2.4E+00**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	4-Nitroaniline	mg/kg	6.3E-02	5.747	**5.7E+00**	5.800	1	U	U	6.173	1	U	U	5.747	1	U	U	6.098	1	U	U	6.250	1	U	U
SEMIVOLATILES	4-Nitrophenol	mg/kg	5.3E-01	5.747	**5.7E+00**	5.800	1	U	U	6.173	1	U	U	5.747	1	U	U	6.098	1	U	U	6.250	1	U	U
SEMIVOLATILES	Acenaphthene	mg/kg	3.4E+02	0.345	**3.4E+02**	0.348	1	U	U	0.370	1	U	U	0.345	1	U	U	0.366	1	U	U	0.375	1	U	U
SEMIVOLATILES	Acenaphthylene	mg/kg	5.4E+02	0.575	**5.4E+02**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	Anthracene	mg/kg	2.0E+01	0.575	**2.0E+01**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	Benzo(a)anthracene	mg/kg	7.5E+00	0.345	**7.5E+00**	0.348	1	U	U	0.370	1	U	U	0.345	1	U	U	0.366	1	U	U	0.375	1	U	U
SEMIVOLATILES	Benzo(a)pyrene	mg/kg	1.0E+01	0.575	**1.0E+01**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	Benzo(b)fluoranthene	mg/kg	2.5E+01	1.149	**2.5E+01**	1.160	1	U	U	1.235	1	U	U	1.149	1	U	U	1.220	1	U	U	1.250	1	U	U
SEMIVOLATILES	Benzo(ghi)perylene	mg/kg	8.2E+00	2.32	**8.2E+00**	2.320	1	U	U	2.469	1	U	U	0.172	1			2.439	1	U	U	2.500	1	U	U
SEMIVOLATILES	Benzo(k)fluoranthene	mg/kg	1.4E+01	1.149	**1.4E+01**	1.160	1	U	U	1.235	1	U	U	1.149	1	U	U	1.220	1	U	U	1.250	1	U	U
SEMIVOLATILES	bis(2-Chloroethoxy)methane	mg/kg	4.4E-03	0.575	**5.8E-01**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	bis(2-Chloroethyl)ether	mg/kg	2.8E-04	0.575	**5.8E-01**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	mg/kg	7.1E-01	1.149	**1.1E+00**	1.160	1	U	U	1.235	1	U	U	1.149	1	U	U	1.220	1	U	U	1.250	1	U	U
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	mg/kg	2.2E+02	0.185	**2.2E+02**	0.197	1	U	U	0.185	1	U	U	0.207	1	U	U	0.610	1	U	U	0.625	1	U	U

Table 5
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump100 and Sump101
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S100-01				LH-S100-01				LH-S100-01				LH-S101-01				LH-S101-01			
SAMPLE_NO			Calculated		**Standard 3**	LH-S100-01.1				LH-S100-01.2				LH-S100-01-FD				LH-S101-01.1				LH-S101-01.2			
SAMPLE_DATE			Commercial		**Groundwater**	26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93			
DEPTH			/ Industrial	Practical	**Protective**	0.5-1.5 Ft				1.5-3 Ft				0.5-1.5 Ft				0.5-1.5 Ft				3.8-4.2 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				FD				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
SEMIVOLATILES	Butyl benzyl phthalate	mg/kg	8.0E+02	0.575	**8.0E+02**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	Carbazole	mg/kg	1.9E+00	0.575	**1.9E+00**	1.160	1	U	U	1.235	1	U	U	0.575	1	U	U	1.220	1	U	U	1.250	1	U	U
SEMIVOLATILES	Chrysene	mg/kg	1.2E+01	5.747	**1.2E+01**	5.800	1	U	U	6.173	1	U	U	5.747	1	U	U	6.098	1	U	U	6.250	1	U	U
SEMIVOLATILES	Dibenzo(a,h)anthracene	mg/kg	1.9E+01	2.32	**1.9E+01**	2.320	1	U	U	2.469	1	U	U	0.149	1			2.439	1	U	U	2.500	1	U	U
SEMIVOLATILES	Dibenzofuran	mg/kg	1.9E+02	1.149	**1.9E+02**	1.160	1	U	U	1.235	1	U	U	1.149	1	U	U	1.220	1	U	U	1.250	1	U	U
SEMIVOLATILES	Diethyl phthalate	mg/kg	6.9E+02	0.617	**6.9E+02**	0.139	1		J	0.617	1	U	U	0.138	1			0.244	1			0.125	1		J
SEMIVOLATILES	Dimethyl phthalate	mg/kg	1.6E+02	0.575	**1.6E+02**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	di-n-Butyl phthalate	mg/kg	7.6E+03	2.782	**7.6E+03**	3.770	1	U	U	3.679	1	U	U	2.782	1	U	U	4.098	1	U	U	3.150	1	U	U
SEMIVOLATILES	di-n-Octyl phthalate	mg/kg	3.3E+04	0.575	**3.3E+04**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	Fluoranthene	mg/kg	2.5E+02	0.575	**2.5E+02**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	Fluorene	mg/kg	3.0E+02	0.575	**3.0E+02**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	Hexachlorobenzene	mg/kg	1.5E+00	1.149	**1.5E+00**	1.160	1	U	U	1.235	1	U	U	1.149	1	U	U	1.220	1	U	U	1.250	1	U	U
SEMIVOLATILES	Hexachlorobutadiene	mg/kg	7.6E+00	3.448	**7.6E+00**	3.480	1	U	U	3.704	1	U	U	3.448	1	U	U	3.659	1	U	U	3.750	1	U	U
SEMIVOLATILES	Hexachlorocyclopentadiene	mg/kg	2.6E+01	3.448	**2.6E+01**	3.480	1	U	U	3.704	1	U	U	3.448	1	U	U	3.659	1	U	U	3.750	1	U	U
SEMIVOLATILES	Hexachloroethane	mg/kg	1.0E+01	1.149	**1.0E+01**	1.160	1	U	U	1.235	1	U	U	1.149	1	U	U	1.220	1	U	U	1.250	1	U	U
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	mg/kg	7.3E+01	1.16	**7.3E+01**	1.160	1	U	U	1.235	1	U	U	0.172	1			1.220	1	U	U	1.250	1	U	U
SEMIVOLATILES	Isophorone	mg/kg	5.6E+00	0.575	**5.6E+00**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	Naphthalene	mg/kg	1.7E+02	0.345	**1.7E+02**	0.348	1	U	U	0.370	1	U	U	0.345	1	U	U	0.366	1	U	U	0.375	1	U	U
SEMIVOLATILES	Nitrobenzene	mg/kg	3.8E-01	0.575	**5.8E-01**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	n-Nitroso-di-n-propylamine	mg/kg	5.3E-05	1.149	**1.1E+00**	1.160	1	U	U	1.235	1	U	U	1.149	1	U	U	1.220	1	U	U	1.250	1	U	U
SEMIVOLATILES	n-Nitrosodiphenylamine	mg/kg	1.1E+00	0.575	**1.1E+00**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	Pentachlorophenol	mg/kg	8.4E-02	5.747	**5.7E+00**	5.800	1	U	U	6.173	1	U	U	5.747	1	U	U	6.098	1	U	U	6.250	1	U	U
SEMIVOLATILES	Phenanthrene	mg/kg	2.8E+02	0.575	**2.8E+02**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	Phenol	mg/kg	3.6E+01	0.575	**3.6E+01**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
SEMIVOLATILES	Pyrene	mg/kg	1.0E+02	0.575	**1.0E+02**	0.580	1	U	U	0.617	1	U	U	0.575	1	U	U	0.610	1	U	U	0.625	1	U	U
VOLATILES	1,1,1-Trichloroethane	mg/kg	1.3E+00	0.005	**1.3E+00**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	6.3E-02	0.005	**6.3E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	1,1,2-Trichloroethane	mg/kg	1.5E-02	0.005	**1.5E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	1,1-Dichloroethane	mg/kg	2.1E+01	0.005	**2.1E+01**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	1,1-Dichloroethene	mg/kg	3.0E-02	0.005	**3.0E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	1,2-Dichloroethane	mg/kg	6.0E-03	0.005	**6.0E-03**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	1,2-Dichloroethene	mg/kg	1.3E-01	0.005	**1.3E-01**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	1,2-Dichloropropane	mg/kg	1.7E-02	0.005	**1.7E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	2-Butanone	mg/kg	2.1E+01	0.05	**2.1E+01**	0.058	1	U	U	0.062	1	U	U	0.057	1	U	U	0.061	1	U	U	0.050	1	U	U
VOLATILES	2-Hexanone	mg/kg	7.4E+00	0.05	**7.4E+00**	0.058	1	U	U	0.062	1	U	U	0.057	1	U	U	0.061	1	U	U	0.050	1	U	U
VOLATILES	Acetone	mg/kg	2.4E+01	0.029	**2.4E+01**	0.043	1	U	U	0.029	1	U	U	0.036	1	U	U	0.048	1	U	U	0.060	1	U	U
VOLATILES	Benzene	mg/kg	2.0E-02	0.005	**2.0E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	Bromodichloromethane	mg/kg	1.5E-02	0.005	**1.5E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	Bromoform	mg/kg	1.8E-01	0.005	**1.8E-01**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	Bromomethane	mg/kg	1.6E-01	0.025	**1.6E-01**	0.029	1	U	U	0.031	1	U	U	0.029	1	U	U	0.030	1	U	U	0.025	1	U	U
VOLATILES	Carbon disulfide	mg/kg	3.5E+01	0.006	**3.5E+01**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.017	1		
VOLATILES	Carbon tetrachloride	mg/kg	5.5E-02	0.005	**5.5E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	Chlorobenzene	mg/kg	1.2E+00	0.005	**1.2E+00**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	Chloroethane	mg/kg	5.3E+01	0.025	**5.3E+01**	0.029	1	U	U	0.031	1	U	U	0.029	1	U	U	0.030	1	U	U	0.025	1	U	U
VOLATILES	Chloroform	mg/kg	2.9E+00	0.005	**2.9E+00**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	Chloromethane	mg/kg	2.9E-01	0.025	**2.9E-01**	0.029	1	U	U	0.031	1	U	U	0.029	1	U	U	0.030	1	U	U	0.025	1	U	U
VOLATILES	cis-1,3-Dichloropropene	mg/kg	1.4E-02	0.005	**1.4E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	Dibromochloromethane	mg/kg	1.2E-01	0.005	**1.2E-01**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	Ethylbenzene	mg/kg	8.0E+00	0.005	**8.0E+00**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	Methyl isobutyl ketone	mg/kg	8.6E+00	0.05	**8.6E+00**	0.058	1	U	U	0.062	1	U	U	0.057	1	U	U	0.061	1	U	U	0.050	1	U	U
VOLATILES	Methylene chloride	mg/kg	4.6E-03	0.002	**4.6E-03**	0.002	1	U	U	0.013	1	U	U	0.027	1	U	U	0.009	1	U	U	0.020	1	U	U
VOLATILES	Styrene	mg/kg	4.1E+00	0.005	**4.1E+00**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	Tetrachloroethene	mg/kg	4.5E-02	0.005	**4.5E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	Toluene	mg/kg	7.9E+00	0.005	**7.9E+00**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	trans-1,3-Dichloropropene	mg/kg	7.7E-02	0.005	**7.7E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	Trichloroethene	mg/kg	2.7E-02	0.005	**2.7E-02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U
VOLATILES	Vinyl chloride	mg/kg	5.4E-03	0.025	**2.5E-02**	0.029	1	U	U	0.031	1	U	U	0.029	1	U	U	0.030	1	U	U	0.025	1	U	U
VOLATILES	Xylenes, Total	mg/kg	1.3E+02	0.005	**1.3E+02**	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.006	1	U	U	0.005	1	U	U

Table 5
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump100 and Sump101
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S100-01				LH-S100-01				LH-S100-01				LH-S101-01				LH-S101-01			
SAMPLE_NO			Calculated		**Standard 3**	LH-S100-01.1				LH-S100-01.2				LH-S100-01-FD				LH-S101-01.1				LH-S101-01.2			
SAMPLE_DATE			Commercial		**Groundwater**	26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93				26-Jun-93			
DEPTH			/ Industrial	Practical	**Protective**	0.5-1.5 Ft				1.5-3 Ft				0.5-1.5 Ft				0.5-1.5 Ft				3.8-4.2 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				FD				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
Notes:																									
Boxed and Bold = Detected Concentration exceeds Applicable Standard 3 Soil MSC.																									
Shaded = Undetected (SQL) value exceeds Applicable Standard 3 Soil MSC.																									
E - The concentration reported exceeded the upper calibration limit, therefore, the concentration is estimated.																									
J - The analyte was positively identified; the reported value is the estimated concentration of the constituent detected with concentration measured between the MDL and the PQL for 1993 through 1998 samples.																									
U - Not detected																									
DIL - dilution factor																									
FD - field duplicate																									
Ft - feet																									
LQ - laboratory qualifier																									
mg/kg - milligrams per kilogram																									
MSC - medium specific concentration																									
NA - not applicable																									
PQL - practical quantitation limit																									
REG - regular sample																									
SQL - Sample Quantitation Limit																									
VQ - validation qualifier																									
[a] Value developed in Attachment 4 using the SAM model. Shading indicates a chemical specific value.																									
[b] PQL values are the minimum undetected result shown in the table, or a laboratory value.																									
[c] Shading indicates MSC value equal to the PQL.																									

Table 6
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump102, Sump103, Sump104 and Sump105
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-DL102-01				LH-DL103-01				LH-S102-01				LH-S102-01				LH-S102-01				LH-S102-02				LH-S102-02				LH-S103-01				LH-S103-01			
SAMPLE_NO			Calculated		**Standard 3**	LH-DL102-01				LH-DL103-01				LH-S102-01.1				LH-S102-01.2				LH-S102-01-FD				LH-S102-02.1				LH-S102-02.2				LH-S103-01.1				LH-S103-01.2			
SAMPLE_DATE			Commercial		**Groundwater**	3-Aug-93				25-Jul-93				3-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93				24-Jul-93				24-Jul-93			
DEPTH			/ Industrial	Practical	**Protective**	2-4 Ft				2-4 Ft				0.5-2 Ft				4-6 Ft				0.5-2 Ft				0.5-2 Ft				4-6 Ft				0.5-2 Ft				4-6 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				FD				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
EXPLOSIVES	1,3,5-Trinitrobenzene	mg/kg	1.5E+00	0.22	**1.5E+00**																																				
EXPLOSIVES	1,3-Dinitrobenzene	mg/kg	9.2E-03	0.22	**2.2E-01**																																				
EXPLOSIVES	2,4,6-Trinitrotoluene	mg/kg	4.1E-01	0.22	**4.1E-01**																																				
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	6.2E-04	0.22	**2.2E-01**					0.330	1	U	U																												
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	5.1E-04	0.23	**2.3E-01**					0.330	1	U	U																												
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	mg/kg	1.6E-01	0.45	**4.5E-01**																																				
EXPLOSIVES	HMX	mg/kg	5.9E-01	2	**2.0E+00**																																				
EXPLOSIVES	m-Nitrotoluene	mg/kg	3.9E+00	0.9	**3.9E+00**																																				
EXPLOSIVES	Nitrobenzene	mg/kg	1.8E-01	0.23	**2.3E-01**																																				
EXPLOSIVES	o-Nitrotoluene	mg/kg	3.9E+00	0.9	**3.9E+00**																																				
EXPLOSIVES	p-Nitrotoluene	mg/kg	3.9E+00	2.7	**3.9E+00**																																				
EXPLOSIVES	RDX	mg/kg	4.6E-02	0.97	**9.7E-01**																																				
EXPLOSIVES	Tetryl	mg/kg	6.4E+00	0.67	**6.4E+00**																																				
METALS	Aluminum	mg/kg	4.7E+06	5240	**4.7E+06**	15000.000	1			12700.000	1	U	U	22300.000	1			20100.000	1			12300.000	1			15300.000	1			23800.000	1			7990.000	1	U	U	15500.000	1	U	U
METALS	Antimony	mg/kg	9.4E-01	3	**3.0E+00**	3.000	1	U	U	3.000	1	U	U	3.000	1	U	U	3.000	1	U	U	3.000	1	U	U	3.000	1	U	U	3.300	1	U	U	3.000	1	U	U	3.000	1	U	U
METALS	Arsenic	mg/kg	4.8E+00	0.3	**4.8E+00**	3.000	1			3.900	1			2.000	1			3.300	1			3.000	1			3.400	1			3.400	1			3.400	1			3.700	1		
METALS	Barium	mg/kg	8.5E+01	0.3	**8.5E+01**	**135.000**	1			**92.500**	1			**101.000**	1			**122.000**	1			**179.000**	1			**107.000**	1			**103.000**	1			**87.800**	1			**90.600**	1		
METALS	Cadmium	mg/kg	2.5E+00	1	**2.5E+00**	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U
METALS	Calcium	mg/kg	NA	NA	**none**	799.000	1			1610.000	1			2460.000	1			1260.000	1			1900.000	1			1800.000	1			1220.000	1			2290.000	1			1520.000	1		
METALS	Chromium	mg/kg	1.1E+03	0.4	**1.1E+03**	20.200	1			21.500	1			25.700	1			23.800	1			17.700	1			21.800	1			27.500	1			12.600	1			20.600	1		
METALS	Cobalt	mg/kg	3.6E+02	0.5	**3.6E+02**	11.100	1			23.800	1			6.900	1			7.000	1			6.600	1			9.300	1			5.300	1			7.400	1			12.300	1		
METALS	Copper	mg/kg	6.9E+01	0.6	**6.9E+01**	7.600	1			6.700	1			7.200	1			6.900	1			6.000	1			6.900	1			6.800	1			6.500	1			7.300	1		
METALS	Iron	mg/kg	NA	7620	**none**	18000.000	1			19700.000	1	U	U	20900.000	1			17800.000	1			18100.000	1			21000.000	1			22500.000	1			15300.000	1	U	U	19900.000	1	U	U
METALS	Lead	mg/kg	3.6E+01	5	**3.6E+01**	9.100	1			13.600	1			21.200	1			7.000	1			8.400	1			10.000	1			7.200	1			11.400	1			13.700	1		
METALS	Magnesium	mg/kg	NA	NA	**none**	2370.000	1			1300.000	1			2170.000	1			1660.000	1			1800.000	1			1740.000	1			1770.000	1			969.000	1			1320.000	1		
METALS	Manganese	mg/kg	9.4E+02	0.2	**9.4E+02**	49.200	1			513.000	1			61.500	1			109.000	1			50.900	1			64.400	1			191.000	1			93.300	1			183.000	1		
METALS	Mercury	mg/kg	8.2E-02	0.1	**1.0E-01**	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U
METALS	Potassium	mg/kg	NA	NA	**none**	1200.000	1			1350.000	1			1710.000	1			1590.000	1			933.000	1			1130.000	1			1600.000	1			673.000	1			1430.000	1		
METALS	Selenium	mg/kg	3.5E+00	1	**3.5E+00**	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U
METALS	Silver	mg/kg	3.8E+00	1	**3.8E+00**	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U
METALS	Strontium	mg/kg	1.7E+02	11.8	**1.7E+02**	22.200	1			17.900	1			24.000	1			16.800	1			23.300	1			19.600	1			16.200	1			14.600	1			16.500	1		
METALS	Thallium	mg/kg	4.7E-01	59	**5.9E+01**																																				
METALS	Zinc	mg/kg	9.3E+02	2.5	**9.3E+02**	67.200	1			45.500	1			59.900	1			45.400	1			52.800	1			59.000	1			44.000	1			54.500	1			56.800	1		
SEMIVOLATILES	1,2,4-Trichlorobenzene	mg/kg	3.1E+00	0.33	**3.1E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	1,2-Dichlorobenzene	mg/kg	1.1E+01	0.33	**1.1E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	1,3-Dichlorobenzene	mg/kg	1.4E+01	0.33	**1.4E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	1,4-Dichlorobenzene	mg/kg	1.3E+00	0.33	**1.3E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4,5-Trichlorophenol	mg/kg	6.3E+02	1.65	**6.3E+02**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	2,4,6-Trichlorophenol	mg/kg	6.9E-01	0.33	**6.9E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4-Dichlorophenol	mg/kg	1.3E+00	0.33	**1.3E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4-Dimethylphenol	mg/kg	6.6E+00	0.33	**6.6E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4-Dinitrophenol	mg/kg	2.3E-02	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	2,4-Dinitrotoluene	mg/kg	6.2E-04	0.33	**3.3E-01**	0.330	1	U	U					0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,6-Dinitrotoluene	mg/kg	5.1E-04	0.33	**3.3E-01**	0.330	1	U	U					0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Chloronaphthalene	mg/kg	1.1E+03	0.33	**1.1E+03**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Chlorophenol	mg/kg	5.4E+00	0.33	**5.4E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Methylnaphthalene	mg/kg	4.6E+01	0.33	**4.6E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Methylphenol	mg/kg	1.4E+01	0.33	**1.4E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Nitroaniline	mg/kg	2.5E-02	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	2-Nitrophenol	mg/kg	1.1E+00	0.33	**1.1E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	3,3'-Dichlorobenzidine	mg/kg	1.2E-02	0.65	**6.5E-01**	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	3-Nitroaniline	mg/kg	3.5E-02	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	mg/kg	2.3E-02	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	4-Bromophenyl phenyl ether	mg/kg	7.3E-01	0.33	**7.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	4-Chloro-3-methylphenol	mg/kg	1.2E+01	0.5	**1.2E+01**	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	4-Chloroaniline	mg/kg	7.6E-01	0.5	**7.6E-01**	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	4-Chlorophenyl phenyl ether	mg/kg	6.6E-02	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	4-Methylphenol	mg/kg	1.2E+00	0.33	**1.2E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	4-Nitroaniline	mg/kg	3.1E-02	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	4-Nitrophenol	mg/kg	2.8E-01	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	Acenaphthene	mg/kg	3.4E+02	0.33	**3.4E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Acenaphthylene	mg/kg	5.4E+02	0.33	**5.4E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Anthracene	mg/kg	2.0E+01	0.33	**2.0E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(a)anthracene	mg/kg	3.7E+00	0.33	**3.7E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(a)pyrene	mg/kg	5.0E+00	0.33	**5.0E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(b)fluoranthene	mg/kg	1.2E+01	0.33	**1.2E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(ghi)perylene	mg/kg	8.2E+00	0.33	**8.2E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(k)fluoranthene	mg/kg	1.4E+01	0.33	**1.4E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzoic Acid	mg/kg	7.6E+01	1.65	**7.6E+01**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U

Table 6
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump102, Sump103, Sump104 and Sump105
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-DL102-01				LH-DL103-01				LH-S102-01				LH-S102-01				LH-S102-01				LH-S102-02				LH-S102-02				LH-S103-01				LH-S103-01			
SAMPLE_NO			Calculated		**Standard 3**	LH-DL102-01				LH-DL103-01				LH-S102-01.1				LH-S102-01.2				LH-S102-01-FD				LH-S102-02.1				LH-S102-02.2				LH-S103-01.1				LH-S103-01.2			
SAMPLE_DATE			Commercial		**Groundwater**	3-Aug-93				25-Jul-93				3-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93				24-Jul-93				24-Jul-93			
DEPTH			/ Industrial	Practical	**Protective**	2-4 Ft				2-4 Ft				0.5-2 Ft				4-6 Ft				0.5-2 Ft				0.5-2 Ft				4-6 Ft				0.5-2 Ft				4-6 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				FD				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
SEMIVOLATILES	Benzyl Alcohol	mg/kg	1.3E+01	0.5	**1.3E+01**	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	bis(2-Chloroethoxy)methane	mg/kg	2.1E-03	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	bis(2-Chloroethyl)ether	mg/kg	1.4E-04	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	mg/kg	3.4E-01	0.33	**3.4E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	mg/kg	1.1E+02	0.33	**1.1E+02**	0.580	1			0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Butyl benzyl phthalate	mg/kg	8.0E+02	0.33	**8.0E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Chrysene	mg/kg	1.2E+01	0.33	**1.2E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Dibenzo(a,h)anthracene	mg/kg	1.0E+01	0.33	**1.0E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Dibenzofuran	mg/kg	9.1E+01	0.33	**9.1E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Diethyl phthalate	mg/kg	3.3E+02	0.33	**3.3E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Dimethyl phthalate	mg/kg	7.7E+01	0.33	**7.7E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	di-n-Butyl phthalate	mg/kg	7.6E+03	0.33	**7.6E+03**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	di-n-Octyl phthalate	mg/kg	3.3E+04	0.33	**3.3E+04**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Fluoranthene	mg/kg	2.5E+02	0.33	**2.5E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Fluorene	mg/kg	3.0E+02	0.33	**3.0E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachlorobenzene	mg/kg	7.4E-01	0.33	**7.4E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachlorobutadiene	mg/kg	3.7E+00	0.33	**3.7E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachlorocyclopentadiene	mg/kg	1.3E+01	0.33	**1.3E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachloroethane	mg/kg	4.9E+00	0.33	**4.9E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	mg/kg	3.6E+01	0.33	**3.6E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Isophorone	mg/kg	2.7E+00	0.33	**2.7E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Naphthalene	mg/kg	8.4E+01	0.33	**8.4E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Nitrobenzene	mg/kg	1.8E-01	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	n-Nitroso-di-n-propylamine	mg/kg	2.6E-05	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	n-Nitrosodiphenylamine	mg/kg	5.2E-01	0.33	**5.2E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Pentachlorophenol	mg/kg	1.3E-01	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	Phenanthrene	mg/kg	2.8E+02	0.33	**2.8E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Phenol	mg/kg	1.8E+01	0.33	**1.8E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Pyrene	mg/kg	1.0E+02	0.33	**1.0E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
VOLATILES	1,1,1,2-Tetrachloroethane	mg/kg	2.8E+00	0.015	**2.8E+00**																																				
VOLATILES	1,1,1-Trichloroethane	mg/kg	6.4E-01	0.005	**6.4E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	3.1E-02	0.005	**3.1E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,1,2-Trichloroethane	mg/kg	7.2E-03	0.005	**7.2E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,1-Dichloroethane	mg/kg	1.0E+01	0.005	**1.0E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,1-Dichloroethene	mg/kg	1.5E-02	0.005	**1.5E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,2,3-Trichloropropane	mg/kg	4.2E-04	0.015	**1.5E-02**																																				
VOLATILES	1,2-Dibromo-3-chloropropane	mg/kg	9.2E-04	0.031	**3.1E-02**																																				
VOLATILES	1,2-Dibromoethane	mg/kg	7.7E-05	0.031	**3.1E-02**																																				
VOLATILES	1,2-Dichloroethane	mg/kg	2.9E-03	0.005	**5.0E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,2-Dichloroethene	mg/kg	6.5E-02	0.005	**6.5E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,2-Dichloropropane	mg/kg	8.5E-03	0.005	**8.5E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	2-Butanone	mg/kg	1.0E+01	0.015	**1.0E+01**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U
VOLATILES	2-Chloroethyl vinyl ether	mg/kg	2.9E-03	0.01	**1.0E-02**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	2-Hexanone	mg/kg	3.6E+00	0.015	**3.6E+00**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U
VOLATILES	2-Propenal	mg/kg	6.5E-03	0.76	**7.6E-01**																																				
VOLATILES	Acetone	mg/kg	1.2E+01	0.015	**1.2E+01**	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U
VOLATILES	Acetonitrile	mg/kg	4.1E-01	0.15	**4.1E-01**																																				
VOLATILES	Acrylonitrile	mg/kg	7.6E-05	0.15	**1.5E-01**																																				
VOLATILES	Allyl chloride	mg/kg	9.6E-01	0.015	**9.6E-01**																																				
VOLATILES	Benzene	mg/kg	9.6E-03	0.005	**9.6E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Bromodichloromethane	mg/kg	7.4E-03	0.005	**7.4E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Bromoform	mg/kg	8.7E-02	0.005	**8.7E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Bromomethane	mg/kg	7.8E-02	0.01	**7.8E-02**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	Carbon disulfide	mg/kg	1.7E+01	0.005	**1.7E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Carbon tetrachloride	mg/kg	2.7E-02	0.005	**2.7E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Chlorobenzene	mg/kg	5.8E-01	0.005	**5.8E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Chloroethane	mg/kg	2.6E+01	0.01	**2.6E+01**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	Chloroform	mg/kg	1.4E+00	0.005	**1.4E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Chloromethane	mg/kg	1.4E-01	0.01	**1.4E-01**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	Chloroprene	mg/kg	4.4E-01	0.15	**4.4E-01**																																				
VOLATILES	cis-1,3-Dichloropropene	mg/kg	7.0E-03	0.005	**7.0E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Dibromochloromethane	mg/kg	6.1E-02	0.005	**6.1E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Dibromomethane	mg/kg	1.9E+00	0.031	**1.9E+00**																																				
VOLATILES	Dichlorodifluoromethane	mg/kg	1.6E+02	0.031	**1.6E+02**																																				
VOLATILES	Ethyl methacrylate	mg/kg	1.0E+01	0.031	**1.0E+01**																																				
VOLATILES	Ethylbenzene	mg/kg	3.9E+00	0.005	**3.9E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	IODOMETHANE	mg/kg	1.0E-01	0.015	**1.0E-01**																																				
VOLATILES	ISOBUTYL ALCOHOL	mg/kg	8.0E+00	3.1	**8.0E+00**																																				
VOLATILES	Methacrylonitrile	mg/kg	2.1E-03	0.031	**3.1E-02**																																				

Table 6
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump102, Sump103, Sump104 and Sump105
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-DL102-01				LH-DL103-01				LH-S102-01				LH-S102-01				LH-S102-01				LH-S102-02				LH-S102-02				LH-S103-01				LH-S103-01			
SAMPLE_NO			Calculated		**Standard 3**	LH-DL102-01				LH-DL103-01				LH-S102-01.1				LH-S102-01.2				LH-S102-01-FD				LH-S102-02.1				LH-S102-02.2				LH-S103-01.1				LH-S103-01.2			
SAMPLE_DATE			Commercial		**Groundwater**	3-Aug-93				25-Jul-93				3-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93				24-Jul-93				24-Jul-93			
DEPTH			/ Industrial	Practical	**Protective**	2-4 Ft				2-4 Ft				0.5-2 Ft				4-6 Ft				0.5-2 Ft				0.5-2 Ft				4-6 Ft				0.5-2 Ft				4-6 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				FD				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
VOLATILES	Methyl isobutyl ketone	mg/kg	4.2E+00	0.015	**4.2E+00**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U
VOLATILES	METHYL METHACRYLATE	mg/kg	1.0E+02	0.031	**1.0E+02**																																				
VOLATILES	Methylene chloride	mg/kg	2.2E-03	0.005	**5.0E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Pentachloroethane	mg/kg	5.6E-01	0.031	**5.6E-01**																																				
VOLATILES	Propionitrile	mg/kg	6.4E-03	0.076	**7.6E-02**																																				
VOLATILES	Styrene	mg/kg	2.0E+00	0.005	**2.0E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Tetrachloroethene	mg/kg	2.2E-02	0.005	**2.2E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Toluene	mg/kg	3.9E+00	0.005	**3.9E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	trans-1,3-Dichloropropene	mg/kg	3.8E-02	0.005	**3.8E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	trans-1,4-Dichloro-2-butene	mg/kg	2.2E-03	0.031	**3.1E-02**																																				
VOLATILES	Trichloroethene	mg/kg	1.3E-02	0.005	**1.3E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Trichlorofluoromethane	mg/kg	1.4E+02	0.015	**1.4E+02**																																				
VOLATILES	Vinyl acetate	mg/kg	2.6E+01	0.015	**2.6E+01**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U
VOLATILES	Vinyl chloride	mg/kg	2.6E-03	0.01	**1.0E-02**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	Xylenes, Total	mg/kg	6.5E+01	0.005	**6.5E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U

Notes:

Boxed and Bold = Detected Concentration exceeds Applicable Standard 3 Soil MSC.

Shaded = Undetected (SQL) value exceeds Applicable Standard 3 Soil MSC.

J - The analyte was positively identified; the reported value is the estimated concentration of the constituent detected with concentration measured between the MDL and the PQL for 1993 through 1998 samples.

U - Not detected

DIL - dilution factor
FD - field duplicate
Ft - feet
LQ - laboratory qualifier
mg/kg - milligrams per kilogram
MSC - medium specific concentration
NA - not applicable
PQL - practical quantitation limit
REG - regular sample
SQL - Sample Quantitation Limit
VQ - validation qualifier

[a] Value developed in Attachment 5 using the SAM model. Shading indicates a chemical specific value.

[b] PQL values are the minimum undetected result shown in the table, or a laboratory value.

[c] Shading indicates MSC value equal to the PQL.

Table 6
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump102, Sump103, Sump104 and Sump105
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					Applicable	LH-S103-01				LH-S103-02				LH-S103-02				LH-S103-02				LHS-T-01				LH-DL104-01				LH-DL105-01				LH-S104-01				LH-S104-01			
SAMPLE_NO			Calculated		Standard 3	LH-S103-01.3				LH-S103-02.1				LH-S103-02.2				LH-S103-02.3				LHS-T-01				LH-DL104-01				LH-DL105-01				LH-S104-01.1				LH-S104-01.2			
SAMPLE_DATE			Commercial		Groundwater	24-Jul-93				25-Jul-93				25-Jul-93				25-Jul-93				11-Jan-95				4-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93			
DEPTH			/ Industrial	Practical	Protective	9-11 Ft				0.5-2 Ft				4-6 Ft				9-11 Ft				0-0.5 Ft				2-4 Ft				2-4 Ft				1.5-2.5 Ft				9-11 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	Soil MSC	REG				REG				REG				REG				REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	Value [c]	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
EXPLOSIVES	1,3,5-Trinitrobenzene	mg/kg	1.5E+00	0.22	1.5E+00																	0.220	1	U	U																
EXPLOSIVES	1,3-Dinitrobenzene	mg/kg	9.2E-03	0.22	2.2E-01																	0.220	1	U	U																
EXPLOSIVES	2,4,6-Trinitrotoluene	mg/kg	4.1E-01	0.22	4.1E-01																	0.220	1	U	U																
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	6.2E-04	0.22	2.2E-01																	0.220	1	U	U																
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	5.1E-04	0.23	2.3E-01																	0.230	1	U	U																
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	mg/kg	1.6E-01	0.45	4.5E-01																	0.450	1	U	U																
EXPLOSIVES	HMX	mg/kg	5.9E-01	2	2.0E+00																	2.000	1	U	U																
EXPLOSIVES	m-Nitrotoluene	mg/kg	3.9E+00	0.9	3.9E+00																	0.900	1	U	U																
EXPLOSIVES	Nitrobenzene	mg/kg	1.8E-01	0.23	2.3E-01																	0.230	1	U	U																
EXPLOSIVES	o-Nitrotoluene	mg/kg	3.9E+00	0.9	3.9E+00																	0.900	1	U	U																
EXPLOSIVES	p-Nitrotoluene	mg/kg	3.9E+00	2.7	3.9E+00																	2.700	1	U	U																
EXPLOSIVES	RDX	mg/kg	4.6E-02	0.97	9.7E-01																	0.970	1	U	U																
EXPLOSIVES	Tetryl	mg/kg	6.4E+00	0.67	6.4E+00																	0.670	1	U	U																
METALS	Aluminum	mg/kg	4.7E+06	5240	4.7E+06	7760.000	1	U	U	11600.000	1	U	U	18000.000	1	U	U	5240.000	1	U	U	5890.000	1			15700.000	1			23200.000	1			15400.000	1			16700.000	1		
METALS	Antimony	mg/kg	9.4E-01	3	3.0E+00	3.000	1	U	U	3.000	1	U	U	3.000	1	U	U	3.000	1	U	U	11.800	1	U	UJ	3.000	1	U	U	3.000	1	U	U	3.000	1	U	U	3.000	1	U	U
METALS	Arsenic	mg/kg	4.8E+00	0.3	4.8E+00	1.600	1			2.400	1			4.100	1			1.400	1			10.100	1			3.100	1			5.700	1			3.800	1			2.200	1		
METALS	Barium	mg/kg	8.5E+01	0.3	8.5E+01	45.800	1			88.000	1			88.800	1			57.600	1			66.300	1			111.000	1			124.000	1			83.000	1			45.000	1		
METALS	Cadmium	mg/kg	2.5E+00	1	2.5E+00	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.200	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U
METALS	Calcium	mg/kg	NA	NA	none	328.000	1			2500.000	1			1360.000	1			257.000	1			1070.000	1			971.000	1			2100.000	1			648.000	1			779.000	1		
METALS	Chromium	mg/kg	1.1E+03	0.4	1.1E+03	10.300	1			17.200	1			21.600	1			7.300	1			20.600	1			18.000	1			22.700	1			18.000	1			18.000	1		
METALS	Cobalt	mg/kg	3.6E+02	0.5	3.6E+02	5.300	1			8.000	1			29.800	1			3.800	1			6.500	1			10.000	1			6.600	1			10.000	1			6.000	1		
METALS	Copper	mg/kg	6.9E+01	0.6	6.9E+01	3.900	1			6.800	1			7.900	1			3.800	1			9.600	1			7.000	1			7.100	1			7.000	1			5.000	1		
METALS	Iron	mg/kg	NA	7620	none	10100.000	1	U	U	22300.000	1	U	U	20500.000	1	U	U	7620.000	1	U	U	17200.000	1			19200.000	1			21100.000	1			20700.000	1			14000.000	1		
METALS	Lead	mg/kg	3.6E+01	5	3.6E+01	5.500	1			7.100	1			16.900	1			5.000	1			28.500	1			3.800	1			9.600	1			3.900	1			3.100	1		
METALS	Magnesium	mg/kg	NA	NA	none	1270.000	1			1540.000	1			1720.000	1			874.000	1			441.000	1			2210.000	1			2380.000	1			1990.000	1			1640.000	1		
METALS	Manganese	mg/kg	9.4E+02	0.2	9.4E+02	69.700	1			70.300	1			354.000	1			46.700	1			170.000	1			45.000	1			58.900	1			79.000	1			69.000	1		
METALS	Mercury	mg/kg	8.2E-02	0.1	1.0E-01	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.120	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U
METALS	Potassium	mg/kg	NA	NA	none	674.000	1			890.000	1			1860.000	1			422.000	1			363.000	1			934.000	1			1390.000	1			921.000	1			904.000	1		
METALS	Selenium	mg/kg	3.5E+00	1	3.5E+00	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	0.430	1		J	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U
METALS	Silver	mg/kg	3.8E+00	1	3.8E+00	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.200	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U
METALS	Strontium	mg/kg	1.7E+02	11.8	1.7E+02	9.300	1			19.500	1			18.000	1			7.000	1			11.800	1	U	U	25.000	1			49.500	1			20.000	1			13.000	1		
METALS	Thallium	mg/kg	4.7E-01	59	5.9E+01																	59.000	1	U	U																
METALS	Zinc	mg/kg	9.3E+02	2.5	9.3E+02	25.900	1			56.100	1			53.600	1			22.700	1			50.200	1		J	60.000	1			56.900	1			61.000	1			55.000	1		
SEMIVOLATILES	1,2,4-Trichlorobenzene	mg/kg	3.1E+00	0.33	3.1E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	1,2-Dichlorobenzene	mg/kg	1.1E+01	0.33	1.1E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	1,3-Dichlorobenzene	mg/kg	1.4E+01	0.33	1.4E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	1,4-Dichlorobenzene	mg/kg	1.3E+00	0.33	1.3E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4,5-Trichlorophenol	mg/kg	6.3E+02	1.65	6.3E+02	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.500	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	2,4,6-Trichlorophenol	mg/kg	6.9E-01	0.33	6.9E-01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4-Dichlorophenol	mg/kg	1.3E+00	0.33	1.3E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4-Dimethylphenol	mg/kg	6.6E+00	0.33	6.6E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4-Dinitrophenol	mg/kg	2.3E-02	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.500	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	2,4-Dinitrotoluene	mg/kg	6.2E-04	0.33	3.3E-01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,6-Dinitrotoluene	mg/kg	5.1E-04	0.33	3.3E-01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Chloronaphthalene	mg/kg	1.1E+03	0.33	1.1E+03	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Chlorophenol	mg/kg	5.4E+00	0.33	5.4E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Methylnaphthalene	mg/kg	4.6E+01	0.33	4.6E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Methylphenol	mg/kg	1.4E+01	0.33	1.4E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Nitroaniline	mg/kg	2.5E-02	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.500	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	2-Nitrophenol	mg/kg	1.1E+00	0.33	1.1E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	3,3'-Dichlorobenzidine	mg/kg	1.2E-02	0.65	6.5E-01	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	1.000	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	3-Nitroaniline	mg/kg	3.5E-02	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.500	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	mg/kg	2.3E-02	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.500	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	4-Bromophenyl phenyl ether	mg/kg	7.3E-01	0.33	7.3E-01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	4-Chloro-3-methylphenol	mg/kg	1.2E+01	0.5	1.2E+01	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.500	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	4-Chloroaniline	mg/kg	7.6E-01	0.5	7.6E-01	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.500	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	4-Chlorophenyl phenyl ether	mg/kg	6.6E-02	0.33	3.3E-01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	4-Methylphenol	mg/kg	1.2E+00	0.33	1.2E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	4-Nitroaniline	mg/kg	3.1E-02	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.500	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	4-Nitrophenol	mg/kg	2.8E-01	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.500	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	Acenaphthene	mg/kg	3.4E+02	0.33	3.4E+02	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Acenaphthylene	mg/kg	5.4E+02	0.33	5.4E+02	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Anthracene	mg/kg	2.0E+01	0.33	2.0E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(a)anthracene	mg/kg	3.7E+00	0.33	3.7E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.140	1		J	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(a)pyrene	mg/kg	5.0E+00	0.33	5.0E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.110	1		J	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(b)fluoranthene	mg/kg	1.2E+01	0.33	1.2E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.280	1		J	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(ghi)perylene	mg/kg	8.2E+00	0.33	8.2E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(k)fluoranthene	mg/kg	1.4E+01	0.33	1.4E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.110	1		J	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzoic Acid	mg/kg	7.6E+01	1.65	7.6E+01	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.500	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U

Table 6
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump102, Sump103, Sump104 and Sump105
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S103-01				LH-S103-02				LH-S103-02				LH-S103-02				LHS-T-01				LH-DL104-01				LH-DL105-01				LH-S104-01				LH-S104-01			
SAMPLE_NO			Calculated		**Standard 3**	LH-S103-01.3				LH-S103-02.1				LH-S103-02.2				LH-S103-02.3				LHS-T-01				LH-DL104-01				LH-DL105-01				LH-S104-01.1				LH-S104-01.2			
SAMPLE_DATE			Commercial		**Groundwater**	24-Jul-93				25-Jul-93				25-Jul-93				25-Jul-93				11-Jan-95				4-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93			
DEPTH			/ Industrial	Practical	**Protective**	9-11 Ft				0.5-2 Ft				4-6 Ft				9-11 Ft				0-0.5 Ft				2-4 Ft				2-4 Ft				1.5-2.5 Ft				9-11 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
SEMIVOLATILES	Benzyl Alcohol	mg/kg	1.3E+01	0.5	**1.3E+01**	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.500	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	bis(2-Chloroethoxy)methane	mg/kg	2.1E-03	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	bis(2-Chloroethyl)ether	mg/kg	1.4E-04	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	mg/kg	3.4E-01	0.33	**3.4E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	mg/kg	1.1E+02	0.33	**1.1E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.081	1		J	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Butyl benzyl phthalate	mg/kg	8.0E+02	0.33	**8.0E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.220	1		J	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Chrysene	mg/kg	1.2E+01	0.33	**1.2E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.290	1		J	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Dibenzo(a,h)anthracene	mg/kg	1.0E+01	0.33	**1.0E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Dibenzofuran	mg/kg	9.1E+01	0.33	**9.1E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Diethyl phthalate	mg/kg	3.3E+02	0.33	**3.3E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Dimethyl phthalate	mg/kg	7.7E+01	0.33	**7.7E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	di-n-Butyl phthalate	mg/kg	7.6E+03	0.33	**7.6E+03**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	di-n-Octyl phthalate	mg/kg	3.3E+04	0.33	**3.3E+04**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Fluoranthene	mg/kg	2.5E+02	0.33	**2.5E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.420	1		J	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Fluorene	mg/kg	3.0E+02	0.33	**3.0E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachlorobenzene	mg/kg	7.4E-01	0.33	**7.4E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachlorobutadiene	mg/kg	3.7E+00	0.33	**3.7E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachlorocyclopentadiene	mg/kg	1.3E+01	0.33	**1.3E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachloroethane	mg/kg	4.9E+00	0.33	**4.9E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	mg/kg	3.6E+01	0.33	**3.6E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Isophorone	mg/kg	2.7E+00	0.33	**2.7E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Naphthalene	mg/kg	8.4E+01	0.33	**8.4E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Nitrobenzene	mg/kg	1.8E-01	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	n-Nitroso-di-n-propylamine	mg/kg	2.6E-05	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	n-Nitrosodiphenylamine	mg/kg	5.2E-01	0.33	**5.2E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Pentachlorophenol	mg/kg	1.3E-01	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.500	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	Phenanthrene	mg/kg	2.8E+02	0.33	**2.8E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Phenol	mg/kg	1.8E+01	0.33	**1.8E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.500	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Pyrene	mg/kg	1.0E+02	0.33	**1.0E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.320	1		J	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
VOLATILES	1,1,1,2-Tetrachloroethane	mg/kg	2.8E+00	0.015	**2.8E+00**																	0.015	1	U	U																
VOLATILES	1,1,1-Trichloroethane	mg/kg	6.4E-01	0.005	**6.4E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	3.1E-02	0.005	**3.1E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,1,2-Trichloroethane	mg/kg	7.2E-03	0.005	**7.2E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,1-Dichloroethane	mg/kg	1.0E+01	0.005	**1.0E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,1-Dichloroethene	mg/kg	1.5E-02	0.005	**1.5E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,2,3-Trichloropropane	mg/kg	4.2E-04	0.015	**1.5E-02**																	0.015	1	U	U																
VOLATILES	1,2-Dibromo-3-chloropropane	mg/kg	9.2E-04	0.031	**3.1E-02**																	0.031	1	U	U																
VOLATILES	1,2-Dibromoethane	mg/kg	7.7E-05	0.031	**3.1E-02**																	0.031	1	U	U																
VOLATILES	1,2-Dichloroethane	mg/kg	2.9E-03	0.005	**5.0E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,2-Dichloroethene	mg/kg	6.5E-02	0.005	**6.5E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,2-Dichloropropane	mg/kg	8.5E-03	0.005	**8.5E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	2-Butanone	mg/kg	1.0E+01	0.015	**1.0E+01**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.015	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U
VOLATILES	2-Chloroethyl vinyl ether	mg/kg	2.9E-03	0.01	**1.0E-02**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.015	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	2-Hexanone	mg/kg	3.6E+00	0.015	**3.6E+00**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.015	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U
VOLATILES	2-Propenal	mg/kg	6.5E-03	0.76	**7.6E-01**																	0.760	1	U	U																
VOLATILES	Acetone	mg/kg	1.2E+01	0.015	**1.2E+01**	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.015	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U
VOLATILES	Acetonitrile	mg/kg	4.1E-01	0.15	**4.1E-01**																	0.150	1	U	U																
VOLATILES	Acrylonitrile	mg/kg	7.6E-05	0.15	**1.5E-01**																	0.150	1	U	U																
VOLATILES	Allyl chloride	mg/kg	9.6E-01	0.015	**9.6E-01**																	0.015	1	U	U																
VOLATILES	Benzene	mg/kg	9.6E-03	0.005	**9.6E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Bromodichloromethane	mg/kg	7.4E-03	0.005	**7.4E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Bromoform	mg/kg	8.7E-02	0.005	**8.7E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Bromomethane	mg/kg	7.8E-02	0.01	**7.8E-02**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.015	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	Carbon disulfide	mg/kg	1.7E+01	0.005	**1.7E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Carbon tetrachloride	mg/kg	2.7E-02	0.005	**2.7E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Chlorobenzene	mg/kg	5.8E-01	0.005	**5.8E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Chloroethane	mg/kg	2.6E+01	0.01	**2.6E+01**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.015	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	Chloroform	mg/kg	1.4E+00	0.005	**1.4E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Chloromethane	mg/kg	1.4E-01	0.01	**1.4E-01**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.015	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	Chloroprene	mg/kg	4.4E-01	0.15	**4.4E-01**																	0.150	1	U	U																
VOLATILES	cis-1,3-Dichloropropene	mg/kg	7.0E-03	0.005	**7.0E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Dibromochloromethane	mg/kg	6.1E-02	0.005	**6.1E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Dibromomethane	mg/kg	1.9E+00	0.031	**1.9E+00**																	0.031	1	U	U																
VOLATILES	Dichlorodifluoromethane	mg/kg	1.6E+02	0.031	**1.6E+02**																	0.031	1	U	U																
VOLATILES	Ethyl methacrylate	mg/kg	1.0E+01	0.031	**1.0E+01**																	0.031	1	U	U																
VOLATILES	Ethylbenzene	mg/kg	3.9E+00	0.005	**3.9E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	IODOMETHANE	mg/kg	1.0E-01	0.015	**1.0E-01**																	0.015	1	U	U																
VOLATILES	ISOBUTYL ALCOHOL	mg/kg	8.0E+00	3.1	**8.0E+00**																	3.100	1	U	U																
VOLATILES	Methacrylonitrile	mg/kg	2.1E-03	0.031	**3.1E-02**																	0.031	1	U	U																

Table 6
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump102, Sump103, Sump104 and Sump105
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					Applicable	LH-S103-01				LH-S103-02				LH-S103-02				LH-S103-02				LHS-T-01				LH-DL104-01				LH-DL105-01				LH-S104-01				LH-S104-01			
SAMPLE_NO			Calculated		Standard 3	LH-S103-01.3				LH-S103-02.1				LH-S103-02.2				LH-S103-02.3				LHS-T-01				LH-DL104-01				LH-DL105-01				LH-S104-01.1				LH-S104-01.2			
SAMPLE_DATE			Commercial		Groundwater	24-Jul-93				25-Jul-93				25-Jul-93				25-Jul-93				11-Jan-95				4-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93			
DEPTH			/ Industrial	Practical	Protective	9-11 Ft				0.5-2 Ft				4-6 Ft				9-11 Ft				0-0.5 Ft				2-4 Ft				2-4 Ft				1.5-2.5 Ft				9-11 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	Soil MSC	REG				REG				REG				REG				REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	Value [c]	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
VOLATILES	Methyl isobutyl ketone	mg/kg	4.2E+00	0.015	**4.2E+00**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.015	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U
VOLATILES	METHYL METHACRYLATE	mg/kg	1.0E+02	0.031	**1.0E+02**																	0.031	1	U	U																
VOLATILES	Methylene chloride	mg/kg	2.2E-03	0.005	**5.0E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Pentachloroethane	mg/kg	5.6E-01	0.031	**5.6E-01**																	0.031	1	U	U																
VOLATILES	Propionitrile	mg/kg	6.4E-03	0.076	**7.6E-02**																	0.076	1	U	U																
VOLATILES	Styrene	mg/kg	2.0E+00	0.005	**2.0E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Tetrachloroethene	mg/kg	2.2E-02	0.005	**2.2E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Toluene	mg/kg	3.9E+00	0.005	**3.9E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	trans-1,3-Dichloropropene	mg/kg	3.8E-02	0.005	**3.8E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	trans-1,4-Dichloro-2-butene	mg/kg	2.2E-03	0.031	**3.1E-02**																	0.031	1	U	U																
VOLATILES	Trichloroethene	mg/kg	1.3E-02	0.005	**1.3E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Trichlorofluoromethane	mg/kg	1.4E+02	0.015	**1.4E+02**																	0.015	1	U	U																
VOLATILES	Vinyl acetate	mg/kg	2.6E+01	0.015	**2.6E+01**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.015	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U
VOLATILES	Vinyl chloride	mg/kg	2.6E-03	0.01	**1.0E-02**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.015	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	Xylenes, Total	mg/kg	6.5E+01	0.005	**6.5E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U

Notes:

Boxed and Bold = Detected Concentration exceeds Applicable Standard 3 Soil MSC.

Shaded = Undetected (SQL) value exceeds Applicable Standard 3 Soil MSC.

J - The analyte was positively identified; the reported value is the estimated concentration of the constituent detected with concentration measured between the MDL and the PQL for 1993 through 1998 samples.

U - Not detected

DIL - dilution factor
FD - field duplicate
Ft - feet
LQ - laboratory qualifier
mg/kg - milligrams per kilogram
MSC - medium specific concentration
NA - not applicable
PQL - practical quantitation limit
REG - regular sample
SQL - Sample Quantitation Limit
VQ - validation qualifier

[a] Value developed in Attachment 5 using the SAM model. Shading indicates a chemical specific value.
[b] PQL values are the minimum undetected result shown in the table, or a laboratory value.
[c] Shading indicates MSC value equal to the PQL.

Table 6
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump102, Sump103, Sump104 and Sump105
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					Applicable	LH-S104-02				LH-S104-02				LH-S104-02				LH-S105-01				LH-S105-01				LH-S105-02				LH-S105-02				LHS-T-02				LHS-T-02			
SAMPLE_NO			Calculated		Standard 3	LH-S104-02.1				LH-S104-02.2				LH-S104-02-FD				LH-S105-01.1				LH-S105-01.2				LH-S105-02.1				LH-S105-02.2				LHS-T-02				LHS-T-02-FD			
SAMPLE_DATE			Commercial		Groundwater	3-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93				11-Jan-95				11-Jan-95			
DEPTH			/ Industrial	Practical	Protective	0.5-2 Ft				7-9 Ft				0.5-2 Ft				0.5-2 Ft				4-6 Ft				0.5-2 Ft				4-6 Ft				0-0.5 Ft				0-0.5 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	Soil MSC	REG				REG				FD				REG				REG				REG				REG				REG				FD			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	Value [c]	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
EXPLOSIVES	1,3,5-Trinitrobenzene	mg/kg	1.5E+00	0.22	1.5E+00																													0.230	1	U	U	0.240	1	U	U
EXPLOSIVES	1,3-Dinitrobenzene	mg/kg	9.2E-03	0.22	2.2E-01																													0.230	1	U	U	0.240	1	U	U
EXPLOSIVES	2,4,6-Trinitrotoluene	mg/kg	4.1E-01	0.22	4.1E-01																													0.230	1	U	U	0.240	1	U	U
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	6.2E-04	0.22	2.2E-01																													0.230	1	U	U	0.240	1	U	U
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	5.1E-04	0.23	2.3E-01																													0.250	1	U	U	0.250	1	U	U
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	mg/kg	1.6E-01	0.45	4.5E-01																													0.480	1	U	U	0.490	1	U	U
EXPLOSIVES	HMX	mg/kg	5.9E-01	2	2.0E+00																													2.100	1	U	U	2.200	1	U	U
EXPLOSIVES	m-Nitrotoluene	mg/kg	3.9E+00	0.9	3.9E+00																													0.950	1	U	U	0.980	1	U	U
EXPLOSIVES	Nitrobenzene	mg/kg	1.8E-01	0.23	2.3E-01																													0.250	1	U	U	0.250	1	U	U
EXPLOSIVES	o-Nitrotoluene	mg/kg	3.9E+00	0.9	3.9E+00																													0.950	1	U	U	0.980	1	U	U
EXPLOSIVES	p-Nitrotoluene	mg/kg	3.9E+00	2.7	3.9E+00																													2.900	1	U	U	2.900	1	U	U
EXPLOSIVES	RDX	mg/kg	4.6E-02	0.97	9.7E-01																													1.000	1	U	U	1.100	1	U	U
EXPLOSIVES	Tetryl	mg/kg	6.4E+00	0.67	6.4E+00																													0.700	1	U	U	0.730	1	U	U
METALS	Aluminum	mg/kg	4.7E+06	5240	4.7E+06	9420.000	1			7980.000	1			16600.000	1			16100.000	1			13700.000	1			23300.000	1			17200.000	1			4950.000	1			4750.000	1		
METALS	Antimony	mg/kg	9.4E-01	3	3.0E+00	3.000	1	U	U	3.000	1	U	U	3.300	1	U	U	3.000	1	U	U	3.000	1	U	U	3.000	1	U	U	3.000	1	U	U	12.100	1	U	UJ	14.000	1	U	UJ
METALS	Arsenic	mg/kg	4.8E+00	0.3	4.8E+00	6.000	1			2.300	1			4.700	1			6.300	1			3.500	1			5.600	1			5.100	1			2.400	1			2.300	1		
METALS	Barium	mg/kg	8.5E+01	0.3	8.5E+01	71.500	1			79.300	1			116.000	1			85.000	1			124.000	1			103.000	1			75.700	1			48.800	1			52.500	1		
METALS	Cadmium	mg/kg	2.5E+00	1	2.5E+00	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.600	1			1.600	1		
METALS	Calcium	mg/kg	NA	NA	none	2170.000	1			1040.000	1			2110.000	1			2290.000	1			1960.000	1			3350.000	1			1140.000	1			53200.000	1			3910.000	1		
METALS	Chromium	mg/kg	1.1E+03	0.4	1.1E+03	20.700	1			49.700	1			20.300	1			23.500	1			17.400	1			23.600	1			18.700	1			10.100	1			12.900	1		
METALS	Cobalt	mg/kg	3.6E+02	0.5	3.6E+02	8.600	1			1.600	1			6.300	1			14.100	1			12.400	1			8.900	1			11.200	1			3.800	1			5.000	1		
METALS	Copper	mg/kg	6.9E+01	0.6	6.9E+01	4.100	1			3.000	1			7.200	1			8.400	1			5.800	1			7.900	1			6.700	1			13.500	1			16.200	1		
METALS	Iron	mg/kg	NA	7620	none	18100.000	1			12700.000	1			20900.000	1			27800.000	1			12200.000	1			22600.000	1			19000.000	1			7410.000	1			13500.000	1		
METALS	Lead	mg/kg	3.6E+01	5	3.6E+01	9.500	1			6.700	1			8.600	1			13.500	1			7.100	1			18.500	1			10.700	1			29.000	1			23.400	1		
METALS	Magnesium	mg/kg	NA	NA	none	773.000	1			472.000	1			2100.000	1			1930.000	1			1420.000	1			1750.000	1			1860.000	1			617.000	1			446.000	1		
METALS	Manganese	mg/kg	9.4E+02	0.2	9.4E+02	316.000	1			46.300	1			51.000	1			244.000	1			58.100	1			163.000	1			166.000	1			175.000	1			209.000	1		
METALS	Mercury	mg/kg	8.2E-02	0.1	1.0E-01	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.140	1	U	U	0.120	1	U	U
METALS	Potassium	mg/kg	NA	NA	none	662.000	1			781.000	1			1190.000	1			1420.000	1			935.000	1			1470.000	1			1160.000	1			400.000	1			387.000	1		
METALS	Selenium	mg/kg	3.5E+00	1	3.5E+00	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	0.400	1		J	0.440	1		J
METALS	Silver	mg/kg	3.8E+00	1	3.8E+00	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	3.900	1			6.400	1		
METALS	Strontium	mg/kg	1.7E+02	11.8	1.7E+02	12.100	1			8.900	1			22.700	1			21.100	1			22.300	1			23.600	1			21.000	1			82.500	1			15.900	1		
METALS	Thallium	mg/kg	4.7E-01	59	5.9E+01																													60.300	1	U	U	69.800	1	U	U
METALS	Zinc	mg/kg	9.3E+02	2.5	9.3E+02	36.800	1			29.700	1			55.000	1			55.900	1			58.600	1			55.500	1			47.400	1			201.000	1		J	252.000	1		J
SEMIVOLATILES	1,2,4-Trichlorobenzene	mg/kg	3.1E+00	0.33	3.1E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	1,2-Dichlorobenzene	mg/kg	1.1E+01	0.33	1.1E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	1,3-Dichlorobenzene	mg/kg	1.4E+01	0.33	1.4E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	1,4-Dichlorobenzene	mg/kg	1.3E+00	0.33	1.3E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	2,4,5-Trichlorophenol	mg/kg	6.3E+02	1.65	6.3E+02	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.600	1	U	U	2.600	1	U	U
SEMIVOLATILES	2,4,6-Trichlorophenol	mg/kg	6.9E-01	0.33	6.9E-01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	2,4-Dichlorophenol	mg/kg	1.3E+00	0.33	1.3E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	2,4-Dimethylphenol	mg/kg	6.6E+00	0.33	6.6E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	2,4-Dinitrophenol	mg/kg	2.3E-02	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.600	1	U	U	2.600	1	U	U
SEMIVOLATILES	2,4-Dinitrotoluene	mg/kg	6.2E-04	0.33	3.3E-01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	2,6-Dinitrotoluene	mg/kg	5.1E-04	0.33	3.3E-01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	2-Chloronaphthalene	mg/kg	1.1E+03	0.33	1.1E+03	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	2-Chlorophenol	mg/kg	5.4E+00	0.33	5.4E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	2-Methylnaphthalene	mg/kg	4.6E+01	0.33	4.6E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	2-Methylphenol	mg/kg	1.4E+01	0.33	1.4E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	2-Nitroaniline	mg/kg	2.5E-02	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.600	1	U	U	2.600	1	U	U
SEMIVOLATILES	2-Nitrophenol	mg/kg	1.1E+00	0.33	1.1E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	3,3'-Dichlorobenzidine	mg/kg	1.2E-02	0.65	6.5E-01	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	1.000	1	U	U	1.000	1	U	U
SEMIVOLATILES	3-Nitroaniline	mg/kg	3.5E-02	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.600	1	U	U	2.600	1	U	U
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	mg/kg	2.3E-02	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.600	1	U	U	2.600	1	U	U
SEMIVOLATILES	4-Bromophenyl phenyl ether	mg/kg	7.3E-01	0.33	7.3E-01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	4-Chloro-3-methylphenol	mg/kg	1.2E+01	0.5	1.2E+01	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	4-Chloroaniline	mg/kg	7.6E-01	0.5	7.6E-01	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	4-Chlorophenyl phenyl ether	mg/kg	6.6E-02	0.33	3.3E-01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	4-Methylphenol	mg/kg	1.2E+00	0.33	1.2E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	4-Nitroaniline	mg/kg	3.1E-02	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.600	1	U	U	2.600	1	U	U
SEMIVOLATILES	4-Nitrophenol	mg/kg	2.8E-01	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.600	1	U	U	2.600	1	U	U
SEMIVOLATILES	Acenaphthene	mg/kg	3.4E+02	0.33	3.4E+02	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Acenaphthylene	mg/kg	5.4E+02	0.33	5.4E+02	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Anthracene	mg/kg	2.0E+01	0.33	2.0E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Benzo(a)anthracene	mg/kg	3.7E+00	0.33	3.7E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Benzo(a)pyrene	mg/kg	5.0E+00	0.33	5.0E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Benzo(b)fluoranthene	mg/kg	1.2E+01	0.33	1.2E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Benzo(ghi)perylene	mg/kg	8.2E+00	0.33	8.2E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Benzo(k)fluoranthene	mg/kg	1.4E+01	0.33	1.4E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Benzoic Acid	mg/kg	7.6E+01	1.65	7.6E+01	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.600	1	U	U	2.600	1	U	U

Table 6
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump102, Sump103, Sump104 and Sump105
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					Applicable	LH-S104-02				LH-S104-02				LH-S104-02				LH-S105-01				LH-S105-01				LH-S105-02				LH-S105-02				LHS-T-02				LHS-T-02			
SAMPLE_NO			Calculated		Standard 3	LH-S104-02.1				LH-S104-02.2				LH-S104-02-FD				LH-S105-01.1				LH-S105-01.2				LH-S105-02.1				LH-S105-02.2				LHS-T-02				LHS-T-02-FD			
SAMPLE_DATE			Commercial		Groundwater	3-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93				11-Jan-95				11-Jan-95			
DEPTH			/ Industrial	Practical	Protective	0.5-2 Ft				7-9 Ft				0.5-2 Ft				0.5-2 Ft				4-6 Ft				0.5-2 Ft				4-6 Ft				0-0.5 Ft				0-0.5 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	Soil MSC	REG				REG				FD				REG				REG				REG				REG				REG				FD			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	Value [c]	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
SEMIVOLATILES	Benzyl Alcohol	mg/kg	1.3E+01	0.5	1.3E+01	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	bis(2-Chloroethoxy)methane	mg/kg	2.1E-03	0.33	3.3E-01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	bis(2-Chloroethyl)ether	mg/kg	1.4E-04	0.33	3.3E-01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	mg/kg	3.4E-01	0.33	3.4E-01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	mg/kg	1.1E+02	0.33	1.1E+02	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Butyl benzyl phthalate	mg/kg	8.0E+02	0.33	8.0E+02	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Chrysene	mg/kg	1.2E+01	0.33	1.2E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Dibenzo(a,h)anthracene	mg/kg	1.0E+01	0.33	1.0E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Dibenzofuran	mg/kg	9.1E+01	0.33	9.1E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Diethyl phthalate	mg/kg	3.3E+02	0.33	3.3E+02	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Dimethyl phthalate	mg/kg	7.7E+01	0.33	7.7E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	di-n-Butyl phthalate	mg/kg	7.6E+03	0.33	7.6E+03	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	di-n-Octyl phthalate	mg/kg	3.3E+04	0.33	3.3E+04	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Fluoranthene	mg/kg	2.5E+02	0.33	2.5E+02	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Fluorene	mg/kg	3.0E+02	0.33	3.0E+02	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Hexachlorobenzene	mg/kg	7.4E-01	0.33	7.4E-01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Hexachlorobutadiene	mg/kg	3.7E+00	0.33	3.7E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Hexachlorocyclopentadiene	mg/kg	1.3E+01	0.33	1.3E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Hexachloroethane	mg/kg	4.9E+00	0.33	4.9E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	mg/kg	3.6E+01	0.33	3.6E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Isophorone	mg/kg	2.7E+00	0.33	2.7E+00	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Naphthalene	mg/kg	8.4E+01	0.33	8.4E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Nitrobenzene	mg/kg	1.8E-01	0.33	3.3E-01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	n-Nitroso-di-n-propylamine	mg/kg	2.6E-05	0.33	3.3E-01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	n-Nitrosodiphenylamine	mg/kg	5.2E-01	0.33	5.2E-01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Pentachlorophenol	mg/kg	1.3E-01	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.600	1	U	U	2.600	1	U	U
SEMIVOLATILES	Phenanthrene	mg/kg	2.8E+02	0.33	2.8E+02	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Phenol	mg/kg	1.8E+01	0.33	1.8E+01	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
SEMIVOLATILES	Pyrene	mg/kg	1.0E+02	0.33	1.0E+02	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.520	1	U	U	0.520	1	U	U
VOLATILES	1,1,1,2-Tetrachloroethane	mg/kg	2.8E+00	0.015	2.8E+00																													0.016	1	U	U	0.016	1	U	U
VOLATILES	1,1,1-Trichloroethane	mg/kg	6.4E-01	0.005	6.4E-01	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	3.1E-02	0.005	3.1E-02	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	1,1,2-Trichloroethane	mg/kg	7.2E-03	0.005	7.2E-03	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	1,1-Dichloroethane	mg/kg	1.0E+01	0.005	1.0E+01	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	1,1-Dichloroethene	mg/kg	1.5E-02	0.005	1.5E-02	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	1,2,3-Trichloropropane	mg/kg	4.2E-04	0.015	1.5E-02																													0.016	1	U	U	0.016	1	U	U
VOLATILES	1,2-Dibromo-3-chloropropane	mg/kg	9.2E-04	0.031	3.1E-02																													0.031	1	U	U	0.031	1	U	U
VOLATILES	1,2-Dibromoethane	mg/kg	7.7E-05	0.031	3.1E-02																													0.031	1	U	U	0.031	1	U	U
VOLATILES	1,2-Dichloroethane	mg/kg	2.9E-03	0.005	5.0E-03	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	1,2-Dichloroethene	mg/kg	6.5E-02	0.005	6.5E-02	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	1,2-Dichloropropane	mg/kg	8.5E-03	0.005	8.5E-03	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	2-Butanone	mg/kg	1.0E+01	0.015	1.0E+01	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.016	1	U	U	0.016	1	U	U
VOLATILES	2-Chloroethyl vinyl ether	mg/kg	2.9E-03	0.01	1.0E-02	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.016	1	U	U	0.016	1	U	U
VOLATILES	2-Hexanone	mg/kg	3.6E+00	0.015	3.6E+00	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.016	1	U	U	0.016	1	U	U
VOLATILES	2-Propenal	mg/kg	6.5E-03	0.76	7.6E-01																													0.780	1	U	U	0.780	1	U	U
VOLATILES	Acetone	mg/kg	1.2E+01	0.015	1.2E+01	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.016	1	U	U	0.016	1	U	U
VOLATILES	Acetonitrile	mg/kg	4.1E-01	0.15	4.1E-01																													0.160	1	U	U	0.160	1	U	U
VOLATILES	Acrylonitrile	mg/kg	7.6E-05	0.15	1.5E-01																													0.160	1	U	U	0.160	1	U	U
VOLATILES	Allyl chloride	mg/kg	9.6E-01	0.015	9.6E-01																													0.016	1	U	U	0.016	1	U	U
VOLATILES	Benzene	mg/kg	9.6E-03	0.005	9.6E-03	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	Bromodichloromethane	mg/kg	7.4E-03	0.005	7.4E-03	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	Bromoform	mg/kg	8.7E-02	0.005	8.7E-02	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	Bromomethane	mg/kg	7.8E-02	0.01	7.8E-02	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.016	1	U	U	0.016	1	U	U
VOLATILES	Carbon disulfide	mg/kg	1.7E+01	0.005	1.7E+01	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	Carbon tetrachloride	mg/kg	2.7E-02	0.005	2.7E-02	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	Chlorobenzene	mg/kg	5.8E-01	0.005	5.8E-01	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	Chloroethane	mg/kg	2.6E+01	0.01	2.6E+01	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.016	1	U	U	0.016	1	U	U
VOLATILES	Chloroform	mg/kg	1.4E+00	0.005	1.4E+00	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	Chloromethane	mg/kg	1.4E-01	0.01	1.4E-01	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.016	1	U	U	0.016	1	U	U
VOLATILES	Chloroprene	mg/kg	4.4E-01	0.15	4.4E-01																													0.160	1	U	U	0.160	1	U	U
VOLATILES	cis-1,3-Dichloropropene	mg/kg	7.0E-03	0.005	7.0E-03	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	Dibromochloromethane	mg/kg	6.1E-02	0.005	6.1E-02	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	Dibromomethane	mg/kg	1.9E+00	0.031	1.9E+00																													0.031	1	U	U	0.031	1	U	U
VOLATILES	Dichlorodifluoromethane	mg/kg	1.6E+02	0.031	1.6E+02																													0.031	1	U	U	0.031	1	U	U
VOLATILES	Ethyl methacrylate	mg/kg	1.0E+01	0.031	1.0E+01																													0.031	1	U	U	0.031	1	U	U
VOLATILES	Ethylbenzene	mg/kg	3.9E+00	0.005	3.9E+00	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	IODOMETHANE	mg/kg	1.0E-01	0.015	1.0E-01																													0.016	1	U	U	0.016	1	U	U
VOLATILES	ISOBUTYL ALCOHOL	mg/kg	8.0E+00	3.1	8.0E+00																													3.100	1	U	U	3.100	1	U	U
VOLATILES	Methacrylonitrile	mg/kg	2.1E-03	0.031	3.1E-02																													0.031	1	U	U	0.031	1	U	U

Table 6
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump102, Sump103, Sump104 and Sump105
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S104-02				LH-S104-02				LH-S104-02				LH-S105-01				LH-S105-01				LH-S105-02				LH-S105-02				LHS-T-02				LHS-T-02			
SAMPLE_NO			Calculated		**Standard 3**	LH-S104-02.1				LH-S104-02.2				LH-S104-02-FD				LH-S105-01.1				LH-S105-01.2				LH-S105-02.1				LH-S105-02.2				LHS-T-02				LHS-T-02-FD			
SAMPLE_DATE			Commercial		**Groundwater**	3-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93				3-Aug-93				11-Jan-95				11-Jan-95			
DEPTH			/ Industrial	Practical	**Protective**	0.5-2 Ft				7-9 Ft				0.5-2 Ft				0.5-2 Ft				4-6 Ft				0.5-2 Ft				4-6 Ft				0-0.5 Ft				0-0.5 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				FD				REG				REG				REG				REG				REG				FD			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
VOLATILES	Methyl isobutyl ketone	mg/kg	4.2E+00	0.015	**4.2E+00**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.016	1	U	U	0.016	1	U	U
VOLATILES	METHYL METHACRYLATE	mg/kg	1.0E+02	0.031	**1.0E+02**																													0.031	1	U	U	0.031	1	U	U
VOLATILES	Methylene chloride	mg/kg	2.2E-03	0.005	**5.0E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	Pentachloroethane	mg/kg	5.6E-01	0.031	**5.6E-01**																													0.031	1	U	U	0.031	1	U	U
VOLATILES	Propionitrile	mg/kg	6.4E-03	0.076	**7.6E-02**																													0.078	1	U	U	0.078	1	U	U
VOLATILES	Styrene	mg/kg	2.0E+00	0.005	**2.0E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	Tetrachloroethene	mg/kg	2.2E-02	0.005	**2.2E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	Toluene	mg/kg	3.9E+00	0.005	**3.9E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	trans-1,3-Dichloropropene	mg/kg	3.8E-02	0.005	**3.8E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	trans-1,4-Dichloro-2-butene	mg/kg	2.2E-03	0.031	**3.1E-02**																													0.031	1	U	U	0.031	1	U	U
VOLATILES	Trichloroethene	mg/kg	1.3E-02	0.005	**1.3E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U
VOLATILES	Trichlorofluoromethane	mg/kg	1.4E+02	0.015	**1.4E+02**																													0.016	1	U	U	0.016	1	U	U
VOLATILES	Vinyl acetate	mg/kg	2.6E+01	0.015	**2.6E+01**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.016	1	U	U	0.016	1	U	U
VOLATILES	Vinyl chloride	mg/kg	2.6E-03	0.01	**1.0E-02**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.016	1	U	U	0.016	1	U	U
VOLATILES	Xylenes, Total	mg/kg	6.5E+01	0.005	**6.5E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.008	1	U	U	0.008	1	U	U

Notes:

Boxed and Bold = Detected Concentration exceeds Applicable Standard 3 Soil MSC.

Shaded = Undetected (SQL) value exceeds Applicable Standard 3 Soil MSC.

J - The analyte was positively identified; the reported value is the estimated concentration of the constituent detected with concentration measured between the MDL and the PQL for 1993 through 1998 samples.

U - Not detected

DIL - dilution factor
FD - field duplicate
Ft - feet
LQ - laboratory qualifier
mg/kg - milligrams per kilogram
MSC - medium specific concentration
NA - not applicable
PQL - practical quantitation limit
REG - regular sample
SQL - Sample Quantitation Limit
VQ - validation qualifier

[a] Value developed in Attachment 5 using the SAM model. Shading indicates a chemical specific value.

[b] PQL values are the minimum undetected result shown in the table, or a laboratory value.

[c] Shading indicates MSC value equal to the PQL.

Table 7
Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations
Sump106
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION CODE					**Applicable**	35SUMP106-SB01				35SUMP106-SB01			
SAMPLE NO			Calculated		**Standard 3**	35-SMP106-SB01-01				35-SMP106-SB01-02			
SAMPLE DATE			Commercial		**Groundwater**	20-Sep-06				20-Sep-06			
DEPTH			/ Industrial	Method	**Protective**	.5-.5 Ft				4-4 Ft			
SAMPLE PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
TPH	Carbon Range C12-C28	mg/kg	2.1E+02	25	**2.1E+02**	33.140	1	U	U	60.456	1	J	B
TPH	CARBON RANGE C28-C35	mg/kg	2.1E+02	25	**2.1E+02**	33.140	1	U	U	81.749	1		
TPH	Carbon Range C6-C12	mg/kg	1.2E+03	25	**1.2E+03**	33.140	1	U	U	40.051	1	U	U
Calculating the Standard 3 Commercial / Industrial Soil MSC Values													
Soil Dry Bulk Density		ρ_b	1.5	g/cm^3	EPA, 1996, pg. 38.								
Particle Density		$\rho_{particle}$	2.65	g/cm^3	TCEQ default value, 30 TAC §350.75 (c) and (d)								
Total Porosity		n	0.43	unitless	$n = 1-(\rho_b/\rho_{particle}) = 1 - (1.5 / 2.65)$, EPA, 1996, pg. 38.								
Volumetric Water Content of Soil		θ_w	0.13	unitless	Assumed 30%, EPA, 1996, pg. 38.								
Soil Fraction Organic Carbon		f_{oc}	0.02	unitless	TCEQ default value, 30 TAC §335.567. Appendix I. (p. 26)								
Net Infiltration Rate through soil		I	30.4	cm/yr	I = 0.0018 x P x P, P = precipitation for Marshall Texas 130 cm/year, TCEQ, 2000								
Thickness of affected soil		L_1	122	cm	Samples taken at various depths from 0 down to 4 ft. Assumed 4 ft. (122 cm), Shaw, 2008, Table 7								
Top of affected soils to top of water bearing unit.		L_2	457	cm	top of sand layer in shallow monitor wells ranged from 15.5 to 16 ft below ground. Assumed 15 ft. (457 cm), Jacobs, 2002, Appendix A, Boring Logs								
Groundwater Darcy Velocity		V_{gw}	136	cm/yr	Calculated = K*i*31500000 sec/yr, EPA, 1996, pg. 42.								
Hydraulic conductivity in groundwater bearing unit		K	0.000636	cm/sec	Value listed as modeling input, Shaw, 2007, Apx A, pg. 2-4								
Hydraulic gradient in groundwater bearing unit		i	0.00679	unitless	Value listed as modeling input, Shaw, 2007, Apx A, pg. 2-4								
Width of soil source area parallel to groundwater flow		W	1000	cm	Single Location for samples, Assumed W = 10 meters (1000 cm) , Final Sump Report, Shaw 2008, Figure 2-3								
Groundwater mixing zone		d	305	cm	The wells in Shallow Zone contained 10-ft screen sections. 10 x 12 x 2.54, Jacobs 2002, pg. 10-3								
Soil Air Filled Porosity (θ_a)		θ_a	0.3	unitless	n - θw, EPA, 1996, pg. 38.								
Groundwater pH		pH	6.5	Std Units	Average for 04WW01, 04WW02, 04WW03 (2004) and LHSMW01 (2007)								
Dilution Factor for SAM Model		LDF	2.365	unitless	LDF = 1 + (Vgw * δgw) / (I * W)								

Test Group	Parameter	H'	Koc	S	Kd	GW-Ind	Ksw	Csat	Calculated MSC	**Applicable MSC**
TPH	Carbon Range C12-C28	1.30E-02	1.58E+04	6.50E-01	3.17E+02	3.1E+00	3.15E-03	2.06E+02	8.6E+03	**2.1E+02**
TPH	CARBON RANGE C28-C35	1.30E-02	1.58E+04	6.50E-01	3.17E+02	3.1E+00	3.15E-03	2.06E+02	8.6E+03	**2.1E+02**
TPH	Carbon Range C6-C12	4.80E-01	1.58E+03	6.50E+01	3.17E+01	4.1E+00	3.14E-02	2.07E+03	1.2E+03	**1.2E+03**

Kd = Koc * foc
Ksw = ρb / (θw+Kd*ρb+H'*θa)
Csat = S / Ksw
Calculated MSC = GW-Ind x LDF x (L2/L1) / Ksw
Applicable MSC = smaller of Csat and Calculated MSC

Table 7
Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations
Sump106
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION CODE					**Applicable**	35SUMP106-SB01				35SUMP106-SB01				
SAMPLE NO			Calculated		**Standard 3**	35-SMP106-SB01-01				35-SMP106-SB01-02				
SAMPLE DATE			Commercial		**Groundwater**	20-Sep-06				20-Sep-06				
DEPTH			/ Industrial	Method	**Protective**	.5-.5 Ft				4-4 Ft				
SAMPLE PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	

Notes:

Results were adjusted for moisture content.

B - The concentration reported was detected in the associated method blank, trip blank, or equipment blank within 5X the blank concentration.

J - The analyte was positively identified; the reported value is the estimated concentration of the constituent detected with concentration measured between the MDL and the PQL for 1993 through 1998 samples.

U - Not detected

cm - centimeter

cm/sec - centimeters per second

cm/y - centimeters per year

DIL - dilution factor

Ft - feet

g/cm³ - grams per cubic centimeter

LQ - laboratory qualifier

mg/kg - milligrams per kilogram

MQL - method quantitation limit

MSC - medium specific concentration

NA - not applicable

PQL - practical quantitation limit

REG - regular sample

SQL - Sample Quantitation Limit

VQ - validation qualifier

[a] Value developed using the SAM model as noted above.

[b] MQL values provided by laboratory for recent samples (2000 or later)

Table 8a
Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations
Sump110 Older Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION CODE					Applicable	LH-S110-01				LH-S110-01			
SAMPLE NO			Calculated		Standard 3	LH-S110-01.1				LH-S110-01.2			
SAMPLE DATE			Commercial		Groundwater	4-Aug-93				4-Aug-93			
DEPTH			/ Industrial	Practical	Protective	0.5-2 Ft				3-5 Ft			
SAMPLE PURPOSE			Soil MSC	Quantitation	Soil MSC	REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	Value [c]	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
EXPLOSIVES	1,3,5-Trinitrobenzene	mg/kg	8.0E+00	0.25	8.0E+00								
EXPLOSIVES	1,3-Dinitrobenzene	mg/kg	4.9E-02	0.25	2.5E-01								
EXPLOSIVES	2,4,6-Trinitrotoluene	mg/kg	2.2E+00	0.25	2.2E+00								
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	3.3E-03	0.165	1.7E-01								
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	2.7E-03	0.165	1.7E-01								
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	mg/kg	1.4E+00	0.26	1.4E+00								
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	mg/kg	8.8E-01	0.26	8.8E-01								
EXPLOSIVES	HMX	mg/kg	3.2E+00	2.2	3.2E+00								
EXPLOSIVES	m-Nitrotoluene	mg/kg	2.1E+01	0.25	2.1E+01								
EXPLOSIVES	Nitrobenzene	mg/kg	9.8E-01	0.165	9.8E-01								
EXPLOSIVES	o-Nitrotoluene	mg/kg	2.1E+01	1	2.1E+01								
EXPLOSIVES	p-Nitrotoluene	mg/kg	2.1E+01	0.65	2.1E+01								
EXPLOSIVES	RDX	mg/kg	2.5E-01	0.26	2.6E-01								
EXPLOSIVES	Tetryl	mg/kg	3.4E+01	0.25	3.4E+01								
METALS	Aluminum	mg/kg	2.5E+07	20	2.5E+07	11200.000	1			9060.000	1		
METALS	Antimony	mg/kg	2.4E+00	3	3.0E+00	3.000	1	U	U	3.000	1	U	U
METALS	Arsenic	mg/kg	4.8E+00	0.3	4.8E+00	3.700	1			2.900	1		
METALS	Barium	mg/kg	4.2E+02	0.3	4.2E+02	44.000	1			29.000	1		
METALS	Beryllium	mg/kg	2.3E+00	0.5	2.3E+00								
METALS	Cadmium	mg/kg	1.3E+00	1	1.3E+00	1.000	1	U	U	1.000	1	U	U
METALS	Calcium	mg/kg	NA	NA	none	484.000	1			667.000	1		
METALS	Chromium	mg/kg	1.4E+05	0.4	1.4E+05	16.000	1			10.000	1		
METALS	Cobalt	mg/kg	1.9E+03	1	1.9E+03	2.000	1			1.000	1	U	U
METALS	Copper	mg/kg	3.7E+02	0.6	3.7E+02	2.000	1			3.000	1		
METALS	Iron	mg/kg	NA	NA	none	13500.000	1			9200.000	1		
METALS	Lead	mg/kg	1.9E+02	5	1.9E+02	3.100	1			49.900	1		
METALS	Magnesium	mg/kg	NA	NA	none	435.000	1			304.000	1		
METALS	Manganese	mg/kg	5.1E+03	0.2	5.1E+03	27.000	1			15.000	1		
METALS	Mercury	mg/kg	8.2E-02	0.1	1.0E-01	0.100	1	U	U	0.100	1	U	U
METALS	Nickel	mg/kg	5.5E+02	0.8	5.5E+02								
METALS	Potassium	mg/kg	NA	NA	none	483.000	1			456.000	1		
METALS	Selenium	mg/kg	3.5E+00	1	3.5E+00	1.000	1	U	U	1.000	1	U	U
METALS	Silver	mg/kg	5.0E+00	1	5.0E+00	1.000	1	U	U	1.000	1	U	U
METALS	Sodium	mg/kg	NA	NA	none								
METALS	Strontium	mg/kg	9.0E+02	0.5	9.0E+02	8.000	1			10.000	1		
METALS	Thallium	mg/kg	8.2E-01	0.02	8.2E-01								
METALS	Vanadium	mg/kg	5.0E+03	0.5	5.0E+03								
METALS	Zinc	mg/kg	7.8E+03	2.5	7.8E+03	13.000	1			9.000	1		
SEMIVOLATILES	1,2,4-Trichlorobenzene	mg/kg	1.6E+01	0.33	1.6E+01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	1,2-Dichlorobenzene	mg/kg	5.9E+01	0.33	5.9E+01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	1,3-Dichlorobenzene	mg/kg	7.6E+01	0.33	7.6E+01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	1,4-Dichlorobenzene	mg/kg	6.9E+00	0.33	6.9E+00	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4,5-Trichlorophenol	mg/kg	3.2E+03	1.65	3.2E+03	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	2,4,6-Trichlorophenol	mg/kg	2.9E+00	0.33	2.9E+00	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4-Dichlorophenol	mg/kg	7.0E+00	0.33	7.0E+00	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4-Dimethylphenol	mg/kg	3.5E+01	0.33	3.5E+01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4-Dinitrophenol	mg/kg	1.3E-01	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	2,4-Dinitrotoluene	mg/kg	3.3E-03	0.33	3.3E-01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,6-Dinitrotoluene	mg/kg	2.7E-03	0.33	3.3E-01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Chloronaphthalene	mg/kg	1.1E+03	0.33	1.1E+03	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Chlorophenol	mg/kg	2.9E+01	0.33	2.9E+01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Methylnaphthalene	mg/kg	2.5E+02	0.33	2.5E+02	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Methylphenol	mg/kg	7.4E+01	0.33	7.4E+01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Nitroaniline	mg/kg	1.4E-01	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	2-Nitrophenol	mg/kg	5.5E+00	0.33	5.5E+00	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	3,3'-Dichlorobenzidine	mg/kg	6.5E-02	0.65	6.5E-01	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	3-Nitroaniline	mg/kg	1.9E-01	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	mg/kg	1.3E-01	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	4-Bromophenyl phenyl ether	mg/kg	3.9E+00	0.33	3.9E+00	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	4-Chloro-3-methylphenol	mg/kg	6.4E+01	0.65	6.4E+01	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	4-Chloroaniline	mg/kg	4.1E+00	0.65	4.1E+00	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	4-Chlorophenyl phenyl ether	mg/kg	3.5E-01	0.33	3.5E-01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	4-Methylphenol	mg/kg	6.2E+00	0.33	6.2E+00	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	4-Nitroaniline	mg/kg	1.7E-01	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	4-Nitrophenol	mg/kg	1.4E+00	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	Acenaphthene	mg/kg	3.4E+02	0.33	3.4E+02	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Acenaphthylene	mg/kg	5.4E+02	0.33	5.4E+02	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Anthracene	mg/kg	2.0E+01	0.33	2.0E+01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(a)anthracene	mg/kg	2.0E+01	0.33	2.0E+01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(a)pyrene	mg/kg	2.7E+01	0.33	2.7E+01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(b)fluoranthene	mg/kg	3.6E+01	0.33	3.6E+01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(ghi)perylene	mg/kg	8.2E+00	0.33	8.2E+00	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(k)fluoranthene	mg/kg	1.4E+01	0.33	1.4E+01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzoic Acid	mg/kg	3.1E+02	1.65	3.1E+02	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	Benzyl Alcohol	mg/kg	7.1E+01	0.65	7.1E+01	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	bis(2-Chloroethoxy)methane	mg/kg	1.1E-02	0.33	3.3E-01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	bis(2-Chloroethyl)ether	mg/kg	7.3E-04	0.33	3.3E-01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	mg/kg	1.8E+00	0.33	1.8E+00	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	mg/kg	5.7E+02	0.33	5.7E+02	0.519	1			0.330	1	U	U
SEMIVOLATILES	Butyl benzyl phthalate	mg/kg	8.0E+02	0.33	8.0E+02	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Chrysene	mg/kg	1.2E+01	0.33	1.2E+01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Dibenzo(a,h)anthracene	mg/kg	1.9E+01	0.33	1.9E+01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Dibenzofuran	mg/kg	4.9E+02	0.33	4.9E+02	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Diethyl phthalate	mg/kg	1.8E+03	0.33	1.8E+03	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Dimethyl phthalate	mg/kg	4.1E+02	0.33	4.1E+02	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	di-n-Butyl phthalate	mg/kg	7.6E+03	0.33	7.6E+03	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	di-n-Octyl phthalate	mg/kg	3.3E+04	0.33	3.3E+04	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Fluoranthene	mg/kg	2.5E+02	0.33	2.5E+02	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Fluorene	mg/kg	3.0E+02	0.33	3.0E+02	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachlorobenzene	mg/kg	3.4E+00	0.33	3.4E+00	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachlorobutadiene	mg/kg	2.0E+01	0.33	2.0E+01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachlorocyclopentadiene	mg/kg	6.7E+01	0.33	6.7E+01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachloroethane	mg/kg	2.6E+01	0.33	2.6E+01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	mg/kg	1.9E+02	0.33	1.9E+02	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Isophorone	mg/kg	1.5E+01	0.33	1.5E+01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Naphthalene	mg/kg	4.5E+02	0.33	4.5E+02	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Nitrobenzene	mg/kg	9.8E-01	0.33	9.8E-01	0.330	1	U	U	0.330	1	U	U

Table 8a
Comparison of Chemical Concentrations in Soil to Groundwater Protective Medium Specific Concentrations
Sump110 Older Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION CODE					Applicable	LH-S110-01				LH-S110-01			
SAMPLE NO			Calculated		Standard 3	LH-S110-01.1				LH-S110-01.2			
SAMPLE DATE			Commercial		Groundwater	4-Aug-93				4-Aug-93			
DEPTH			/ Industrial	Practical	Protective	0.5-2 Ft				3-5 Ft			
SAMPLE PURPOSE			Soil MSC	Quantitation	Soil MSC	REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	Value [c]	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
SEMIVOLATILES	n-Nitroso-di-n-propylamine	mg/kg	1.4E-04	0.33	3.3E-01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	n-Nitrosodiphenylamine	mg/kg	2.8E+00	0.33	2.8E+00	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Pentachlorophenol	mg/kg	2.2E-01	1.65	1.7E+00	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	Phenanthrene	mg/kg	2.8E+02	0.33	2.8E+02	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Phenol	mg/kg	9.4E+01	0.33	9.4E+01	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Pyrene	mg/kg	1.0E+02	0.33	1.0E+02	0.330	1	U	U	0.330	1	U	U
VOLATILES	1,1,1,2-Tetrachloroethane	mg/kg	1.5E+01	0.005	1.5E+01								
VOLATILES	1,1,1-Trichloroethane	mg/kg	3.4E+00	0.005	3.4E+00	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	1.7E-01	0.005	1.7E-01	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	1,1,2-Trichloroethane	mg/kg	3.9E-02	0.005	3.9E-02	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	1,1-Dichloroethane	mg/kg	5.5E+01	0.005	5.5E+01	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	1,1-Dichloroethene	mg/kg	7.8E-02	0.005	7.8E-02	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	1,1-Dichloropropene	mg/kg	9.2E-02	0.005	9.2E-02								
VOLATILES	1,2,3-Trichlorobenzene	mg/kg	3.9E+02	0.005	3.9E+02								
VOLATILES	1,2,3-Trichloropropane	mg/kg	2.3E-03	0.005	5.0E-03								
VOLATILES	1,2,4-Trichlorobenzene	mg/kg	1.6E+01	0.005	1.6E+01								
VOLATILES	1,2,4-Trimethylbenzene	mg/kg	6.8E+02	0.005	6.8E+02								
VOLATILES	1,2-Dibromo-3-chloropropane	mg/kg	4.9E-03	0.005	5.0E-03								
VOLATILES	1,2-Dibromoethane	mg/kg	4.1E-04	0.005	5.0E-03								
VOLATILES	1,2-Dichlorobenzene	mg/kg	5.9E+01	0.005	5.9E+01								
VOLATILES	1,2-Dichloroethane	mg/kg	1.6E-02	0.005	1.6E-02	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	1,2-Dichloroethene	mg/kg	3.5E-01	0.005	3.5E-01	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	1,2-Dichloropropane	mg/kg	4.5E-02	0.005	4.5E-02	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	1,2-Dimethylbenzene (o-Xylene)	mg/kg	1.9E+02	0.005	1.9E+02								
VOLATILES	1,3,5-Trimethylbenzene	mg/kg	7.4E+02	0.005	7.4E+02								
VOLATILES	1,3-Dichlorobenzene	mg/kg	7.6E+01	0.005	7.6E+01								
VOLATILES	1,3-Dichloropropane	mg/kg	5.2E-01	0.005	5.2E-01								
VOLATILES	1,4-Dichlorobenzene	mg/kg	6.9E+00	0.005	6.9E+00								
VOLATILES	2,2-Dichloropropane	mg/kg	9.7E-01	0.005	9.7E-01								
VOLATILES	2-Butanone	mg/kg	5.4E+01	0.05	5.4E+01	0.0500	1	U	U	0.0500	1	U	U
VOLATILES	2-Chloroethyl vinyl ether	mg/kg	1.5E-02	0.01	1.5E-02	0.0100	1	U	U	0.0100	1	U	U
VOLATILES	2-Chlorotoluene	mg/kg	1.2E+02	0.005	1.2E+02								
VOLATILES	2-Hexanone	mg/kg	1.9E+01	0.05	1.9E+01	0.0500	1	U	U	0.0500	1	U	U
VOLATILES	4-Chlorotoluene	mg/kg	1.4E+02	0.005	1.4E+02								
VOLATILES	Acetone	mg/kg	6.4E+01	0.1	6.4E+01	0.1000	1	U	U	0.1000	1	U	U
VOLATILES	Benzene	mg/kg	5.1E-02	0.005	5.1E-02	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	Bromobenzene	mg/kg	7.1E+01	0.005	7.1E+01								
VOLATILES	Bromochloromethane	mg/kg	1.9E+01	0.005	1.9E+01								
VOLATILES	Bromodichloromethane	mg/kg	3.9E-02	0.005	3.9E-02	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	Bromoform	mg/kg	4.7E-01	0.005	4.7E-01	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	Bromomethane	mg/kg	4.2E-01	0.01	4.2E-01	0.0100	1	U	U	0.0100	1	U	U
VOLATILES	Carbon disulfide	mg/kg	9.1E+01	0.005	9.1E+01	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	Carbon tetrachloride	mg/kg	1.4E-01	0.005	1.4E-01	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	Chlorobenzene	mg/kg	3.1E+00	0.005	3.1E+00	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	Chloroethane	mg/kg	1.4E+02	0.01	1.4E+02	0.0100	1	U	U	0.0100	1	U	U
VOLATILES	Chloroform	mg/kg	7.6E+00	0.005	7.6E+00	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	Chloromethane	mg/kg	7.7E-01	0.01	7.7E-01	0.0100	1	U	U	0.0100	1	U	U
VOLATILES	cis-1,2-Dichloroethene	mg/kg	3.5E-01	0.005	3.5E-01								
VOLATILES	cis-1,3-Dichloropropene	mg/kg	3.7E-02	0.005	3.7E-02	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	Dibromochloromethane	mg/kg	3.3E-01	0.005	3.3E-01	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	Dibromomethane	mg/kg	1.0E+01	0.005	1.0E+01								
VOLATILES	Dichlorodifluoromethane	mg/kg	8.6E+02	0.01	8.6E+02								
VOLATILES	Ethylbenzene	mg/kg	2.1E+01	0.005	2.1E+01	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	Hexachlorobutadiene	mg/kg	2.0E+01	0.005	2.0E+01								
VOLATILES	Isopropylbenzene	mg/kg	3.5E+03	0.005	3.5E+03								
VOLATILES	m,p-Xylenes	mg/kg	4.5E+02	0.005	4.5E+02								
VOLATILES	Methyl isobutyl ketone	mg/kg	2.2E+01	0.05	2.2E+01	0.0500	1	U	U	0.0500	1	U	U
VOLATILES	Methylene chloride	mg/kg	1.2E-02	0.005	1.2E-02	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	Naphthalene	mg/kg	4.5E+02	0.01	4.5E+02								
VOLATILES	n-BUTYLBENZENE	mg/kg	6.5E+02	0.005	6.5E+02								
VOLATILES	n-PROPYLBENZENE	mg/kg	6.2E+02	0.005	6.2E+02								
VOLATILES	p-ISOPROPYLTOLUENE	mg/kg	7.9E+02	0.005	7.9E+02								
VOLATILES	sec-BUTYLBENZENE	mg/kg	7.6E+02	0.005	7.6E+02								
VOLATILES	Styrene	mg/kg	1.1E+01	0.005	1.1E+01	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	tert-BUTYLBENZENE	mg/kg	7.4E+02	0.005	7.4E+02								
VOLATILES	Tetrachloroethene	mg/kg	1.2E-01	0.005	1.2E-01	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	Toluene	mg/kg	2.1E+01	0.005	2.1E+01	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	trans-1,2-Dichloroethene	mg/kg	8.2E-01	0.005	8.2E-01								
VOLATILES	trans-1,3-Dichloropropene	mg/kg	2.0E-01	0.005	2.0E-01	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	Trichloroethene	mg/kg	7.2E-02	0.005	7.2E-02	0.0050	1	U	U	0.0050	1	U	U
VOLATILES	Trichlorofluoromethane	mg/kg	7.8E+02	0.01	7.8E+02								
VOLATILES	Vinyl acetate	mg/kg	1.4E+02	0.05	1.4E+02	0.0500	1	U	U	0.0500	1	U	U
VOLATILES	Vinyl chloride	mg/kg	1.4E-02	0.01	1.4E-02	0.0100	1	U	U	0.0100	1	U	U
VOLATILES	Xylenes, Total	mg/kg	3.5E+02	0.005	3.5E+02	0.0050	1	U	U	0.0050	1	U	U

Notes:

J - The analyte was positively identified; the reported value is the estimated concentration of the constituent detected with concentration measured between the MDL and the PQL for 1993 through 1998 samples.

U - Not detected

DIL - dilution factor

Ft - feet

LQ - laboratory qualifier

mg/kg - milligrams per kilogram

MSC - medium specific concentration

NA - not applicable

PQL - practical quantitation limit

REG - regular sample

VQ - validation qualifier

[a] Value developed in Attachment 6 using the SAM Model.

[b] PQL values are the minimum undetected result shown in the table, or a laboratory value.

[c] Shading indicates MSC value equal to the PQL.

Table 8b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump110 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	35SUMP110-SB01				35SUMP110-SB02			
SAMPLE_NO			Calculated		**Standard 3**	35-SMP110-SB01-02				35-SMP110-SB02-02			
SAMPLE_DATE			Commercial		**Groundwater**	14-Sep-06				14-Sep-06			
DEPTH			/ Industrial	Method	**Protective**	5.5-5.5 Ft				5.5-5.5 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
EXPLOSIVES	1,3,5-Trinitrobenzene	mg/kg	8.0E+00	0.25	**8.0E+00**	0.114	1	U	U	0.115	1	U	U
EXPLOSIVES	1,3-Dinitrobenzene	mg/kg	4.9E-02	0.25	**2.5E-01**	0.114	1	U	U	0.114	1	U	U
EXPLOSIVES	2,4,6-Trinitrotoluene	mg/kg	2.2E+00	0.25	**2.2E+00**	0.114	1	U	U	0.115	1	U	U
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	3.3E-03	0.165	**1.7E-01**	0.114	1	U	U	0.114	1	U	U
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	2.7E-03	0.165	**1.7E-01**	0.114	1	U	U	0.114	1	U	U
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	mg/kg	1.4E+00	0.26	**1.4E+00**	0.114	1	U	U	0.115	1	U	U
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	mg/kg	8.8E-01	0.26	**8.8E-01**	0.114	1	U	U	0.115	1	U	U
EXPLOSIVES	HMX	mg/kg	3.2E+00	2.2	**3.2E+00**	0.114	1	U	U	0.115	1	U	U
EXPLOSIVES	m-Nitrotoluene	mg/kg	2.1E+01	0.25	**2.1E+01**	0.114	1	U	U	0.115	1	U	U
EXPLOSIVES	Nitrobenzene	mg/kg	9.8E-01	0.165	**9.8E-01**	0.148	1	U	U	0.150	1	U	U
EXPLOSIVES	o-Nitrotoluene	mg/kg	2.1E+01	1	**2.1E+01**	0.114	1	U	U	0.115	1	U	U
EXPLOSIVES	p-Nitrotoluene	mg/kg	2.1E+01	0.65	**2.1E+01**	0.114	1	U	U	1.572	1		
EXPLOSIVES	RDX	mg/kg	2.5E-01	0.26	**2.6E-01**	0.114	1	U	U	0.114	1	U	U
EXPLOSIVES	Tetryl	mg/kg	3.4E+01	0.25	**3.4E+01**	0.228	1	U	U	0.231	1	U	U
METALS	Aluminum	mg/kg	2.5E+07	20	**2.5E+07**	10467.290	1			16414.435	1		
METALS	Antimony	mg/kg	2.4E+00	0.1	**2.4E+00**	0.067	1	U	U	0.068	1	U	U
METALS	Arsenic	mg/kg	4.8E+00	0.3	**4.8E+00**	0.150	1	J	J	0.139	1	J	J
METALS	Barium	mg/kg	4.2E+02	0.3	**4.2E+02**	88.902	1			167.637	1		
METALS	Beryllium	mg/kg	2.3E+00	0.5	**2.3E+00**	0.563	1			0.990	1		
METALS	Cadmium	mg/kg	1.3E+00	0.1	**1.3E+00**	0.089	1	J	J	0.139	1	J	J
METALS	Calcium	mg/kg	NA	NA	**none**	400.701	1			596.042	1		
METALS	Chromium	mg/kg	1.4E+05	0.4	**1.4E+05**	11.320	1			13.155	1		
METALS	Cobalt	mg/kg	1.9E+03	0.5	**1.9E+03**	7.290	1			10.978	1		
METALS	Copper	mg/kg	3.7E+02	0.6	**3.7E+02**	3.808	1			6.414	1		
METALS	Iron	mg/kg	NA	NA	**none**	14719.626	1			18859.139	1		
METALS	Lead	mg/kg	1.9E+02	5	**1.9E+02**	7.418	1			5.425	1		
METALS	Magnesium	mg/kg	NA	NA	**none**	990.654	1			1490.105	1		
METALS	Manganese	mg/kg	5.1E+03	0.2	**5.1E+03**	11.402	1			19.558	1		
METALS	Mercury	mg/kg	8.2E-02	0.25	**2.5E-01**	0.018	1	J	J	0.013	1	U	U
METALS	Nickel	mg/kg	5.5E+02	0.8	**5.5E+02**	9.673	1			12.573	1		
METALS	Potassium	mg/kg	NA	NA	**none**	316.589	1			369.034	1		
METALS	Selenium	mg/kg	3.5E+00	0.2	**3.5E+00**	0.322	1			0.215	1	J	J
METALS	Silver	mg/kg	5.0E+00	0.2	**5.0E+00**	0.229	1	U	U	0.247	1	U	U
METALS	Sodium	mg/kg	NA	NA	**none**	515.187	1			550.640	1		
METALS	Strontium	mg/kg	9.0E+02	0.5	**9.0E+02**								
METALS	Thallium	mg/kg	8.2E-01	0.02	**8.2E-01**	0.069	1			0.059	1		
METALS	Vanadium	mg/kg	5.0E+03	0.5	**5.0E+03**	22.897	1			18.277	1		
METALS	Zinc	mg/kg	7.8E+03	2.5	**7.8E+03**	17.056	1			23.516	1		
SEMIVOLATILES	1,2,4-Trichlorobenzene	mg/kg	1.6E+01	0.005	**1.6E+01**								
SEMIVOLATILES	1,2-Dichlorobenzene	mg/kg	5.9E+01	0.005	**5.9E+01**								
SEMIVOLATILES	1,3-Dichlorobenzene	mg/kg	7.6E+01	0.005	**7.6E+01**								
SEMIVOLATILES	1,4-Dichlorobenzene	mg/kg	6.9E+00	0.005	**6.9E+00**								
SEMIVOLATILES	2,4,5-Trichlorophenol	mg/kg	3.2E+03	0.165	**3.2E+03**								
SEMIVOLATILES	2,4,6-Trichlorophenol	mg/kg	2.9E+00	0.165	**2.9E+00**								
SEMIVOLATILES	2,4-Dichlorophenol	mg/kg	7.0E+00	0.165	**7.0E+00**								
SEMIVOLATILES	2,4-Dimethylphenol	mg/kg	3.5E+01	0.165	**3.5E+01**								
SEMIVOLATILES	2,4-Dinitrophenol	mg/kg	1.3E-01	0.825	**8.3E-01**								
SEMIVOLATILES	2,4-Dinitrotoluene	mg/kg	3.3E-03	0.165	**1.7E-01**								
SEMIVOLATILES	2,6-Dinitrotoluene	mg/kg	2.7E-03	0.165	**1.7E-01**								
SEMIVOLATILES	2-Chloronaphthalene	mg/kg	1.1E+03	0.165	**1.1E+03**								
SEMIVOLATILES	2-Chlorophenol	mg/kg	2.9E+01	0.165	**2.9E+01**								
SEMIVOLATILES	2-Methylnaphthalene	mg/kg	2.5E+02	0.165	**2.5E+02**								
SEMIVOLATILES	2-Methylphenol	mg/kg	7.4E+01	0.165	**7.4E+01**								
SEMIVOLATILES	2-Nitroaniline	mg/kg	1.4E-01	0.825	**8.3E-01**								
SEMIVOLATILES	2-Nitrophenol	mg/kg	5.5E+00	0.165	**5.5E+00**								
SEMIVOLATILES	3,3'-Dichlorobenzidine	mg/kg	6.5E-02	0.33	**3.3E-01**								
SEMIVOLATILES	3-Nitroaniline	mg/kg	1.9E-01	0.825	**8.3E-01**								
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	mg/kg	1.3E-01	0.825	**8.3E-01**								
SEMIVOLATILES	4-Bromophenyl phenyl ether	mg/kg	3.9E+00	0.165	**3.9E+00**								
SEMIVOLATILES	4-Chloro-3-methylphenol	mg/kg	6.4E+01	0.165	**6.4E+01**								
SEMIVOLATILES	4-Chloroaniline	mg/kg	4.1E+00	0.165	**4.1E+00**								
SEMIVOLATILES	4-Chlorophenyl phenyl ether	mg/kg	3.5E-01	0.165	**3.5E-01**								
SEMIVOLATILES	4-Methylphenol	mg/kg	6.2E+00	0.165	**6.2E+00**								
SEMIVOLATILES	4-Nitroaniline	mg/kg	1.7E-01	0.825	**8.3E-01**								
SEMIVOLATILES	4-Nitrophenol	mg/kg	1.4E+00	0.825	**1.4E+00**								
SEMIVOLATILES	Acenaphthene	mg/kg	3.4E+02	0.165	**3.4E+02**								
SEMIVOLATILES	Acenaphthylene	mg/kg	5.4E+02	0.165	**5.4E+02**								
SEMIVOLATILES	Anthracene	mg/kg	2.0E+01	0.165	**2.0E+01**								
SEMIVOLATILES	Benzo(a)anthracene	mg/kg	2.0E+01	0.165	**2.0E+01**								
SEMIVOLATILES	Benzo(a)pyrene	mg/kg	2.7E+01	0.165	**2.7E+01**								
SEMIVOLATILES	Benzo(b)fluoranthene	mg/kg	3.6E+01	0.165	**3.6E+01**								
SEMIVOLATILES	Benzo(ghi)perylene	mg/kg	8.2E+00	0.165	**8.2E+00**								
SEMIVOLATILES	Benzo(k)fluoranthene	mg/kg	1.4E+01	0.165	**1.4E+01**								
SEMIVOLATILES	Benzoic Acid	mg/kg	3.1E+02	0.825	**3.1E+02**								
SEMIVOLATILES	Benzyl Alcohol	mg/kg	7.1E+01	0.165	**7.1E+01**								
SEMIVOLATILES	bis(2-Chloroethoxy)methane	mg/kg	1.1E-02	0.165	**1.7E-01**								
SEMIVOLATILES	bis(2-Chloroethyl)ether	mg/kg	7.3E-04	0.165	**1.7E-01**								
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	mg/kg	1.8E+00	0.165	**1.8E+00**								
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	mg/kg	5.7E+02	0.165	**5.7E+02**								
SEMIVOLATILES	Butyl benzyl phthalate	mg/kg	8.0E+02	0.165	**8.0E+02**								
SEMIVOLATILES	Chrysene	mg/kg	1.2E+01	0.165	**1.2E+01**								
SEMIVOLATILES	Dibenzo(a,h)anthracene	mg/kg	1.9E+01	0.165	**1.9E+01**								
SEMIVOLATILES	Dibenzofuran	mg/kg	4.9E+02	0.165	**4.9E+02**								
SEMIVOLATILES	Diethyl phthalate	mg/kg	1.8E+03	0.165	**1.8E+03**								
SEMIVOLATILES	Dimethyl phthalate	mg/kg	4.1E+02	0.165	**4.1E+02**								
SEMIVOLATILES	di-n-Butyl phthalate	mg/kg	7.6E+03	0.165	**7.6E+03**								
SEMIVOLATILES	di-n-Octyl phthalate	mg/kg	3.3E+04	0.165	**3.3E+04**								
SEMIVOLATILES	Fluoranthene	mg/kg	2.5E+02	0.165	**2.5E+02**								
SEMIVOLATILES	Fluorene	mg/kg	3.0E+02	0.165	**3.0E+02**								
SEMIVOLATILES	Hexachlorobenzene	mg/kg	3.4E+00	0.165	**3.4E+00**								
SEMIVOLATILES	Hexachlorobutadiene	mg/kg	2.0E+01	0.005	**2.0E+01**								
SEMIVOLATILES	Hexachlorocyclopentadiene	mg/kg	6.7E+01	0.165	**6.7E+01**								
SEMIVOLATILES	Hexachloroethane	mg/kg	2.6E+01	0.165	**2.6E+01**								
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	mg/kg	1.9E+02	0.165	**1.9E+02**								
SEMIVOLATILES	Isophorone	mg/kg	1.5E+01	0.165	**1.5E+01**								
SEMIVOLATILES	Naphthalene	mg/kg	4.5E+02	0.01	**4.5E+02**								
SEMIVOLATILES	Nitrobenzene	mg/kg	9.8E-01	0.165	**9.8E-01**								
SEMIVOLATILES	n-Nitroso-di-n-propylamine	mg/kg	1.4E-04	0.165	**1.7E-01**								
SEMIVOLATILES	n-Nitrosodiphenylamine	mg/kg	2.8E+00	0.165	**2.8E+00**								
SEMIVOLATILES	Pentachlorophenol	mg/kg	2.2E-01	0.825	**8.3E-01**								
SEMIVOLATILES	Phenanthrene	mg/kg	2.8E+02	0.165	**2.8E+02**								

Table 8b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump110 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	35SUMP110-SB01				35SUMP110-SB02			
SAMPLE_NO			Calculated		**Standard 3**	35-SMP110-SB01-02				35-SMP110-SB02-02			
SAMPLE_DATE			Commercial		**Groundwater**	14-Sep-06				14-Sep-06			
DEPTH			/ Industrial	Method	**Protective**	5.5-5.5 Ft				5.5-5.5 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
SEMIVOLATILES	Phenol	mg/kg	9.4E+01	0.165	**9.4E+01**								
SEMIVOLATILES	Pyrene	mg/kg	1.0E+02	0.165	**1.0E+02**								
VOLATILES	1,1,1,2-Tetrachloroethane	mg/kg	1.5E+01	0.005	**1.5E+01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	1,1,1-Trichloroethane	mg/kg	3.4E+00	0.005	**3.4E+00**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	1.7E-01	0.005	**1.7E-01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	1,1,2-Trichloroethane	mg/kg	3.9E-02	0.005	**3.9E-02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	1,1-Dichloroethane	mg/kg	5.5E+01	0.005	**5.5E+01**	0.0012	1	U	U	0.0012	1	U	U
VOLATILES	1,1-Dichloroethene	mg/kg	7.8E-02	0.005	**7.8E-02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	1,1-Dichloropropene	mg/kg	9.2E-02	0.005	**9.2E-02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	1,2,3-Trichlorobenzene	mg/kg	3.9E+02	0.005	**3.9E+02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	1,2,3-Trichloropropane	mg/kg	2.3E-03	0.005	**5.0E-03**	0.0012	1	U	U	0.0012	1	U	U
VOLATILES	1,2,4-Trichlorobenzene	mg/kg	1.6E+01	0.005	**1.6E+01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	1,2,4-Trimethylbenzene	mg/kg	6.8E+02	0.005	**6.8E+02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	1,2-Dibromo-3-chloropropane	mg/kg	4.9E-03	0.005	**5.0E-03**	0.0023	1	U	U	0.0023	1	U	U
VOLATILES	1,2-Dibromoethane	mg/kg	4.1E-04	0.005	**5.0E-03**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	1,2-Dichlorobenzene	mg/kg	5.9E+01	0.005	**5.9E+01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	1,2-Dichloroethane	mg/kg	1.6E-02	0.005	**1.6E-02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	1,2-Dichloroethene	mg/kg	3.5E-01	0.005	**3.5E-01**								
VOLATILES	1,2-Dichloropropane	mg/kg	4.5E-02	0.005	**4.5E-02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	1,2-Dimethylbenzene (o-Xylene)	mg/kg	1.9E+02	0.005	**1.9E+02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	1,3,5-Trimethylbenzene	mg/kg	7.4E+02	0.005	**7.4E+02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	1,3-Dichlorobenzene	mg/kg	7.6E+01	0.005	**7.6E+01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	1,3-Dichloropropane	mg/kg	5.2E-01	0.005	**5.2E-01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	1,4-Dichlorobenzene	mg/kg	6.9E+00	0.005	**6.9E+00**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	2,2-Dichloropropane	mg/kg	9.7E-01	0.005	**9.7E-01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	2-Butanone	mg/kg	5.4E+01	0.01	**5.4E+01**	0.0030	1	U	U	0.0029	1	U	U
VOLATILES	2-Chloroethyl vinyl ether	mg/kg	1.5E-02	0.01	**1.5E-02**	0.0024	1	U	U	0.0023	1	U	U
VOLATILES	2-Chlorotoluene	mg/kg	1.2E+02	0.005	**1.2E+02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	2-Hexanone	mg/kg	1.9E+01	0.01	**1.9E+01**	0.0030	1	U	U	0.0029	1	U	U
VOLATILES	4-Chlorotoluene	mg/kg	1.4E+02	0.005	**1.4E+02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Acetone	mg/kg	6.4E+01	0.01	**6.4E+01**	0.0061	1	U	U	0.0058	1	U	U
VOLATILES	Benzene	mg/kg	5.1E-02	0.005	**5.1E-02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Bromobenzene	mg/kg	7.1E+01	0.005	**7.1E+01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Bromochloromethane	mg/kg	1.9E+01	0.005	**1.9E+01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Bromodichloromethane	mg/kg	3.9E-02	0.005	**3.9E-02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Bromoform	mg/kg	4.7E-01	0.005	**4.7E-01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Bromomethane	mg/kg	4.2E-01	0.01	**4.2E-01**	0.0012	1	U	U	0.0012	1	U	U
VOLATILES	Carbon disulfide	mg/kg	9.1E+01	0.005	**9.1E+01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Carbon tetrachloride	mg/kg	1.4E-01	0.005	**1.4E-01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Chlorobenzene	mg/kg	3.1E+00	0.005	**3.1E+00**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Chloroethane	mg/kg	1.4E+02	0.01	**1.4E+02**	0.0012	1	U	U	0.0012	1	U	U
VOLATILES	Chloroform	mg/kg	7.6E+00	0.005	**7.6E+00**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Chloromethane	mg/kg	7.7E-01	0.01	**7.7E-01**	0.0024	1	U	U	0.0023	1	U	U
VOLATILES	cis-1,2-Dichloroethene	mg/kg	3.5E-01	0.005	**3.5E-01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	cis-1,3-Dichloropropene	mg/kg	3.7E-02	0.005	**3.7E-02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Dibromochloromethane	mg/kg	3.3E-01	0.005	**3.3E-01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Dibromomethane	mg/kg	1.0E+01	0.005	**1.0E+01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Dichlorodifluoromethane	mg/kg	8.6E+02	0.01	**8.6E+02**	0.0012	1	U	U	0.0012	1	U	U
VOLATILES	Ethylbenzene	mg/kg	2.1E+01	0.005	**2.1E+01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Hexachlorobutadiene	mg/kg	2.0E+01	0.005	**2.0E+01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Isopropylbenzene	mg/kg	3.5E+03	0.005	**3.5E+03**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	m,p-Xylenes	mg/kg	4.5E+02	0.005	**4.5E+02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Methyl isobutyl ketone	mg/kg	2.2E+01	0.01	**2.2E+01**	0.0030	1	U	U	0.0029	1	U	U
VOLATILES	Methylene chloride	mg/kg	1.2E-02	0.005	**1.2E-02**	0.0012	1	U	U	0.0012	1	U	U
VOLATILES	Naphthalene	mg/kg	4.5E+02	0.01	**4.5E+02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	n-BUTYLBENZENE	mg/kg	6.5E+02	0.005	**6.5E+02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	n-PROPYLBENZENE	mg/kg	6.2E+02	0.005	**6.2E+02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	p-ISOPROPYLTOLUENE	mg/kg	7.9E+02	0.005	**7.9E+02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	sec-BUTYLBENZENE	mg/kg	7.6E+02	0.005	**7.6E+02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Styrene	mg/kg	1.1E+01	0.005	**1.1E+01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	tert-BUTYLBENZENE	mg/kg	7.4E+02	0.005	**7.4E+02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Tetrachloroethene	mg/kg	1.2E-01	0.005	**1.2E-01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Toluene	mg/kg	2.1E+01	0.005	**2.1E+01**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	trans-1,2-Dichloroethene	mg/kg	8.2E-01	0.005	**8.2E-01**	0.0006	1	U	UJ	0.0006	1	U	U
VOLATILES	trans-1,3-Dichloropropene	mg/kg	2.0E-01	0.005	**2.0E-01**	0.0006	1	U	U	0.0006	1	U	UJ
VOLATILES	Trichloroethene	mg/kg	7.2E-02	0.005	**7.2E-02**	0.0006	1	U	U	0.0006	1	U	U
VOLATILES	Trichlorofluoromethane	mg/kg	7.8E+02	0.01	**7.8E+02**	0.0012	1	U	U	0.0012	1	U	U
VOLATILES	Vinyl acetate	mg/kg	1.4E+02	0.01	**1.4E+02**	0.0012	1	U	U	0.0012	1	U	U
VOLATILES	Vinyl chloride	mg/kg	1.4E-02	0.01	**1.4E-02**	0.0012	1	U	U	0.0012	1	U	U
VOLATILES	Xylenes, Total	mg/kg	3.5E+02	0.005	**3.5E+02**								

Notes:

J - The analyte was positively identified; the reported value is the estimated concentration of the constituent detected with concentration measured between the MDL and the MQL for samples 2000 or later.

U - Not detected

DIL - dilution factor

Ft - feet

LQ - laboratory qualifier

mg/kg - milligrams per kilogram

MQL - Method quantitation limit

MSC - medium specific concentration

NA - not applicable

REG - regular sample

VQ - validation qualifier

[a] Value developed in Attachment 6 using the SAM model.

[b] MQL values provided by laboratory for recent samples (2000 or later)

[c] Shading indicates MSC value equal to the MQL.

[d] Results for recent samples were adjusted for moisture content and for dilution factor if MQL = Applicable MSC.

Table 9a
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump118 Older Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S118-01				LH-S118-01				LH-S118-02				LH-S118-02			
SAMPLE_NO			Calculated		**Standard 3**	LH-S118-01.1				LH-S118-01.2				LH-S118-02.1				LH-S118-02.2			
SAMPLE_DATE			Commercial		**Groundwater**	8-Jul-93				8-Jul-93				8-Jul-93				8-Jul-93			
DEPTH			/ Industrial	Practical	**Protective**	0-2 Ft				2-4 Ft				0-2 Ft				2-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
EXPLOSIVES	1,3,5-Trinitrobenzene	mg/kg	2.1E+01	0.25	**2.1E+01**																
EXPLOSIVES	1,3-Dinitrobenzene	mg/kg	1.3E-01	0.25	**2.5E-01**																
EXPLOSIVES	2,4,6-Trinitrotoluene	mg/kg	5.7E+00	0.25	**5.7E+00**																
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	8.5E-03	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	7.0E-03	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	mg/kg	3.5E+00	0.26	**3.5E+00**																
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	mg/kg	2.3E+00	0.26	**2.3E+00**																
EXPLOSIVES	HMX	mg/kg	8.1E+00	2.2	**8.1E+00**																
EXPLOSIVES	m-Nitrotoluene	mg/kg	5.4E+01	0.25	**5.4E+01**																
EXPLOSIVES	Nitrobenzene	mg/kg	2.5E+00	0.165	**2.5E+00**																
EXPLOSIVES	o-Nitrotoluene	mg/kg	5.4E+01	1	**5.4E+01**																
EXPLOSIVES	p-Nitrotoluene	mg/kg	5.4E+01	0.65	**5.4E+01**																
EXPLOSIVES	RDX	mg/kg	6.4E-01	0.26	**6.4E-01**																
EXPLOSIVES	Tetryl	mg/kg	8.8E+01	0.25	**8.8E+01**																
METALS	Aluminum	mg/kg	6.5E+07	20	**6.5E+07**	9560.000	1			19500.000	1			6570.000	1			21700.000	1		
METALS	Antimony	mg/kg	4.9E+00	3	**4.9E+00**	3.000	1	U	U	3.000	1	U	U	4.300	1			3.000	1	U	U
METALS	Arsenic	mg/kg	5.1E+00	0.3	**5.1E+00**	2.400	1			3.200	1			3.400	1			1.400	1		
METALS	Barium	mg/kg	1.3E+03	0.3	**1.3E+03**	109.000	1			85.200	1			70.700	1			106.000	1		
METALS	Cadmium	mg/kg	4.7E+00	1	**4.7E+00**	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U
METALS	Calcium	mg/kg	NA	NA	**none**	1810.000	1			397.000	1			896.000	1			763.000	1		
METALS	Chromium	mg/kg	1.8E+06	0.4	**1.8E+06**	10.300	1			16.400	1			9.100	1			21.000	1		
METALS	Cobalt	mg/kg	5.0E+03	0.5	**5.0E+03**	4.200	1			7.700	1			3.800	1			3.200	1		
METALS	Copper	mg/kg	9.4E+02	0.6	**9.4E+02**	8.100	1			8.000	1			4.700	1			8.400	1		
METALS	Iron	mg/kg	NA	NA	**none**	17300.000	1			17600.000	1			10100.000	1			20600.000	1		
METALS	Lead	mg/kg	5.0E+02	5	**5.0E+02**	11.700	1			14.000	1			10.300	1			14.900	1		
METALS	Magnesium	mg/kg	NA	NA	**none**	883.000	1			883.000	1			402.000	1			1200.000	1		
METALS	Manganese	mg/kg	1.3E+04	0.2	**1.3E+04**	358.000	1			135.000	1			336.000	1			29.400	1		
METALS	Mercury	mg/kg	6.7E-01	0.1	**6.7E-01**	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U
METALS	Potassium	mg/kg	NA	NA	**none**	393.000	1			627.000	1			237.000	1			669.000	1		
METALS	Selenium	mg/kg	5.6E+00	1	**5.6E+00**	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U
METALS	Silver	mg/kg	4.0E+01	1	**4.0E+01**	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U
METALS	Strontium	mg/kg	2.3E+03	0.5	**2.3E+03**	18.300	1			11.600	1			10.600	1			17.000	1		
METALS	Zinc	mg/kg	2.8E+04	2.5	**2.8E+04**	21.900	1			24.200	1			11.800	1			25.500	1		
SEMIVOLATILES	1,2,4-Trichlorobenzene	mg/kg	4.2E+01	0.33	**4.2E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	1,2-Dichlorobenzene	mg/kg	1.5E+02	0.33	**1.5E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	1,3-Dichlorobenzene	mg/kg	2.0E+02	0.33	**2.0E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	1,4-Dichlorobenzene	mg/kg	1.8E+01	0.33	**1.8E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4,5-Trichlorophenol	mg/kg	7.1E+03	1.65	**7.1E+03**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	2,4,6-Trichlorophenol	mg/kg	5.1E+00	0.33	**5.1E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4-Dichlorophenol	mg/kg	1.7E+01	0.33	**1.7E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4-Dimethylphenol	mg/kg	9.0E+01	0.33	**9.0E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4-Dinitrophenol	mg/kg	3.2E-01	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	2-Chloronaphthalene	mg/kg	1.1E+03	0.33	**1.1E+03**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Chlorophenol	mg/kg	7.4E+01	0.33	**7.4E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Methylnaphthalene	mg/kg	6.4E+02	0.33	**6.4E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Methylphenol	mg/kg	1.9E+02	0.33	**1.9E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Nitroaniline	mg/kg	3.5E-01	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	2-Nitrophenol	mg/kg	1.2E+01	0.33	**1.2E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	3,3'-Dichlorobenzidine	mg/kg	1.7E-01	0.65	**6.5E-01**	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	3-Nitroaniline	mg/kg	4.9E-01	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	mg/kg	3.2E-01	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	4-Bromophenyl phenyl ether	mg/kg	1.0E+01	0.33	**1.0E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	4-Chloro-3-methylphenol	mg/kg	1.6E+02	0.65	**1.6E+02**	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	4-Chloroaniline	mg/kg	1.0E+01	0.65	**1.0E+01**	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	4-Chlorophenyl phenyl ether	mg/kg	9.1E-01	0.33	**9.1E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U

Table 9a
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump118 Older Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S118-01				LH-S118-01				LH-S118-02				LH-S118-02			
SAMPLE_NO			Calculated		**Standard 3**	LH-S118-01.1				LH-S118-01.2				LH-S118-02.1				LH-S118-02.2			
SAMPLE_DATE			Commercial		**Groundwater**	8-Jul-93				8-Jul-93				8-Jul-93				8-Jul-93			
DEPTH			/ Industrial	Practical	**Protective**	0-2 Ft				2-4 Ft				0-2 Ft				2-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
SEMIVOLATILES	4-Methylphenol	mg/kg	1.6E+01	0.33	**1.6E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	4-Nitroaniline	mg/kg	4.3E-01	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	4-Nitrophenol	mg/kg	2.8E+00	1.65	**2.8E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	Acenaphthene	mg/kg	3.4E+02	0.33	**3.4E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Acenaphthylene	mg/kg	5.4E+02	0.33	**5.4E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Anthracene	mg/kg	2.0E+01	0.33	**2.0E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(a)anthracene	mg/kg	5.0E+01	0.33	**5.0E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(a)pyrene	mg/kg	3.1E+01	0.33	**3.1E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(b)fluoranthene	mg/kg	3.6E+01	0.33	**3.6E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(ghi)perylene	mg/kg	8.2E+00	0.33	**8.2E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(k)fluoranthene	mg/kg	1.4E+01	0.33	**1.4E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzoic Acid	mg/kg	3.5E+02	1.65	**3.5E+02**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	Benzyl Alcohol	mg/kg	1.8E+02	0.65	**1.8E+02**	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	bis(2-Chloroethoxy)methane	mg/kg	2.9E-02	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	bis(2-Chloroethyl)ether	mg/kg	1.9E-03	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	mg/kg	4.8E+00	0.33	**4.8E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	mg/kg	1.5E+03	0.33	**1.5E+03**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Butyl benzyl phthalate	mg/kg	8.0E+02	0.33	**8.0E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Chrysene	mg/kg	1.2E+01	0.33	**1.2E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Dibenzo(a,h)anthracene	mg/kg	1.9E+01	0.33	**1.9E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Dibenzofuran	mg/kg	4.9E+02	0.33	**4.9E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Diethyl phthalate	mg/kg	3.4E+03	0.33	**3.4E+03**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Dimethyl phthalate	mg/kg	1.1E+03	0.33	**1.1E+03**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	di-n-Butyl phthalate	mg/kg	7.6E+03	0.33	**7.6E+03**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	di-n-Octyl phthalate	mg/kg	3.3E+04	0.33	**3.3E+04**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Fluoranthene	mg/kg	2.5E+02	0.33	**2.5E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Fluorene	mg/kg	3.0E+02	0.33	**3.0E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachlorobenzene	mg/kg	3.4E+00	0.33	**3.4E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachlorobutadiene	mg/kg	5.1E+01	0.33	**5.1E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachlorocyclopentadiene	mg/kg	1.7E+02	0.33	**1.7E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachloroethane	mg/kg	6.8E+01	0.33	**6.8E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	mg/kg	2.6E+02	0.33	**2.6E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Isophorone	mg/kg	3.8E+01	0.33	**3.8E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Naphthalene	mg/kg	9.8E+02	0.33	**9.8E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Nitrobenzene	mg/kg	2.5E+00	0.33	**2.5E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	n-Nitroso-di-n-propylamine	mg/kg	3.6E-04	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	n-Nitrosodiphenylamine	mg/kg	7.1E+00	0.33	**7.1E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Pentachlorophenol	mg/kg	2.8E-01	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	Phenanthrene	mg/kg	2.8E+02	0.33	**2.8E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Phenol	mg/kg	2.4E+02	0.33	**2.4E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Pyrene	mg/kg	1.0E+02	0.33	**1.0E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
TPH	Carbon Range C12-C28	mg/kg	2.1E+02	25	**2.1E+02**																
TPH	CARBON RANGE C28-C35	mg/kg	2.1E+02	25	**2.1E+02**																
TPH	Carbon Range C6-C12	mg/kg	2.1E+03	25	**2.1E+03**																
VOLATILES	1,1,1,2-Tetrachloroethane	mg/kg	3.8E+01	0.005	**3.8E+01**																
VOLATILES	1,1,1-Trichloroethane	mg/kg	8.8E+00	0.005	**8.8E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	4.3E-01	0.005	**4.3E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,1,2-Trichloroethane	mg/kg	9.9E-02	0.005	**9.9E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,1-Dichloroethane	mg/kg	1.4E+02	0.005	**1.4E+02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,1-Dichloroethene	mg/kg	2.0E-01	0.005	**2.0E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,1-Dichloropropene	mg/kg	2.4E-01	0.005	**2.4E-01**																
VOLATILES	1,2,3-Trichlorobenzene	mg/kg	9.9E+02	0.005	**9.9E+02**																
VOLATILES	1,2,3-Trichloropropane	mg/kg	5.8E-03	0.005	**5.8E-03**																
VOLATILES	1,2,4-Trichlorobenzene	mg/kg	4.2E+01	0.005	**4.2E+01**																
VOLATILES	1,2,4-Trimethylbenzene	mg/kg	1.1E+03	0.005	**1.1E+03**																

Table 9a
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump118 Older Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S118-01				LH-S118-01				LH-S118-02				LH-S118-02			
SAMPLE_NO			Calculated		**Standard 3**	LH-S118-01.1				LH-S118-01.2				LH-S118-02.1				LH-S118-02.2			
SAMPLE_DATE			Commercial		**Groundwater**	8-Jul-93				8-Jul-93				8-Jul-93				8-Jul-93			
DEPTH			/ Industrial	Practical	**Protective**	0-2 Ft				2-4 Ft				0-2 Ft				2-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
VOLATILES	1,2-Dibromo-3-chloropropane	mg/kg	1.3E-02	0.005	**1.3E-02**																
VOLATILES	1,2-Dibromoethane	mg/kg	1.1E-03	0.005	**5.0E-03**																
VOLATILES	1,2-Dichlorobenzene	mg/kg	1.5E+02	0.005	**1.5E+02**																
VOLATILES	1,2-Dichloroethane	mg/kg	4.0E-02	0.005	**4.0E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,2-Dichloroethene	mg/kg	8.9E-01	0.005	**8.9E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,2-Dichloropropane	mg/kg	1.2E-01	0.005	**1.2E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,2-Dimethylbenzene (o-Xylene)	mg/kg	4.7E+02	0.005	**4.7E+02**																
VOLATILES	1,3,5-Trimethylbenzene	mg/kg	1.1E+03	0.005	**1.1E+03**																
VOLATILES	1,3-Dichlorobenzene	mg/kg	2.0E+02	0.005	**2.0E+02**																
VOLATILES	1,3-Dichloropropane	mg/kg	1.3E+00	0.005	**1.3E+00**																
VOLATILES	1,4-Dichlorobenzene	mg/kg	1.8E+01	0.005	**1.8E+01**																
VOLATILES	2,2-Dichloropropane	mg/kg	2.5E+00	0.005	**2.5E+00**																
VOLATILES	2-Butanone	mg/kg	1.4E+02	0.05	**1.4E+02**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U
VOLATILES	2-Chloroethyl vinyl ether	mg/kg	3.9E-02	0.01	**3.9E-02**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	2-Chlorotoluene	mg/kg	3.1E+02	0.005	**3.1E+02**																
VOLATILES	2-Hexanone	mg/kg	5.0E+01	0.05	**5.0E+01**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U
VOLATILES	4-Chlorotoluene	mg/kg	3.7E+02	0.005	**3.7E+02**																
VOLATILES	Acetone	mg/kg	1.6E+02	0.1	**1.6E+02**	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U
VOLATILES	Benzene	mg/kg	1.3E-01	0.005	**1.3E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Bromobenzene	mg/kg	1.8E+02	0.005	**1.8E+02**																
VOLATILES	Bromochloromethane	mg/kg	4.8E+01	0.005	**4.8E+01**																
VOLATILES	Bromodichloromethane	mg/kg	1.0E-01	0.005	**1.0E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Bromoform	mg/kg	1.2E+00	0.005	**1.2E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Bromomethane	mg/kg	1.1E+00	0.01	**1.1E+00**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	Carbon disulfide	mg/kg	2.3E+02	0.005	**2.3E+02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Carbon tetrachloride	mg/kg	3.7E-01	0.005	**3.7E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Chlorobenzene	mg/kg	8.0E+00	0.005	**8.0E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Chloroethane	mg/kg	3.6E+02	0.01	**3.6E+02**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	Chloroform	mg/kg	2.0E+01	0.005	**2.0E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Chloromethane	mg/kg	2.0E+00	0.01	**2.0E+00**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	cis-1,2-Dichloroethene	mg/kg	8.9E-01	0.005	**8.9E-01**																
VOLATILES	cis-1,3-Dichloropropene	mg/kg	9.6E-02	0.005	**9.6E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Dibromochloromethane	mg/kg	8.4E-01	0.005	**8.4E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Dibromomethane	mg/kg	2.6E+01	0.005	**2.6E+01**																
VOLATILES	Dichlorodifluoromethane	mg/kg	1.7E+03	0.01	**1.7E+03**																
VOLATILES	Ethylbenzene	mg/kg	5.4E+01	0.005	**5.4E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Hexachlorobutadiene	mg/kg	5.1E+01	0.005	**5.1E+01**																
VOLATILES	Isopropylbenzene	mg/kg	3.5E+03	0.005	**3.5E+03**																
VOLATILES	m,p-Xylenes	mg/kg	1.1E+03	0.005	**1.1E+03**																
VOLATILES	Methyl isobutyl ketone	mg/kg	5.7E+01	0.05	**5.7E+01**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U
VOLATILES	Methylene chloride	mg/kg	3.1E-02	0.005	**3.1E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Naphthalene	mg/kg	9.8E+02	0.01	**9.8E+02**																
VOLATILES	n-BUTYLBENZENE	mg/kg	6.5E+02	0.005	**6.5E+02**																
VOLATILES	n-PROPYLBENZENE	mg/kg	9.1E+02	0.005	**9.1E+02**																
VOLATILES	p-ISOPROPYLTOLUENE	mg/kg	7.9E+02	0.005	**7.9E+02**																
VOLATILES	sec-BUTYLBENZENE	mg/kg	7.6E+02	0.005	**7.6E+02**																
VOLATILES	Styrene	mg/kg	2.8E+01	0.005	**2.8E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	tert-BUTYLBENZENE	mg/kg	7.4E+02	0.005	**7.4E+02**																
VOLATILES	Tetrachloroethene	mg/kg	3.0E-01	0.005	**3.0E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Toluene	mg/kg	5.3E+01	0.005	**5.3E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	trans-1,2-Dichloroethene	mg/kg	2.1E+00	0.005	**2.1E+00**																
VOLATILES	trans-1,3-Dichloropropene	mg/kg	5.2E-01	0.005	**5.2E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Trichloroethene	mg/kg	1.8E-01	0.005	**1.8E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Trichlorofluoromethane	mg/kg	2.0E+03	0.01	**2.0E+03**																
VOLATILES	Vinyl acetate	mg/kg	3.6E+02	0.05	**3.6E+02**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U
VOLATILES	Vinyl chloride	mg/kg	3.6E-02	0.01	**3.6E-02**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	Xylenes, Total	mg/kg	9.0E+02	0.005	**9.0E+02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U

Table 9a
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump118 Older Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S118-01				LH-S118-01				LH-S118-02				LH-S118-02			
SAMPLE_NO			Calculated		**Standard 3**	LH-S118-01.1				LH-S118-01.2				LH-S118-02.1				LH-S118-02.2			
SAMPLE_DATE			Commercial		**Groundwater**	8-Jul-93				8-Jul-93				8-Jul-93				8-Jul-93			
DEPTH			/ Industrial	Practical	**Protective**	0-2 Ft				2-4 Ft				0-2 Ft				2-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
Notes:																					
U - Not detected																					
DIL - dilution factor																					
Ft - feet																					
LQ - laboratory qualifier																					
mg/kg - milligrams per kilogram																					
MSC - medium specific concentration																					
NA - not applicable																					
PQL - practical quantitation limit																					
REG - regular sample																					
VQ - validation qualifier																					
[a] Value developed in Attachment 7 using the SAM model.																					
[b] PQL values are the minimum undetected result shown in the table, or a laboratory value.																					
[c] Shading indicates MSC value equal to the PQL.																					

Table 9b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump118 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	35SUMP118-SB01				35SUMP118-SB01			
SAMPLE_NO			Calculated		**Standard 3**	35-SMP118-SB01-01				35-SMP118-SB01-02			
SAMPLE_DATE			Commercial		**Groundwater**	19-Sep-06				19-Sep-06			
DEPTH			/ Industrial	Method	**Protective**	.5-.5 Ft				4-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) b	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
EXPLOSIVES	1,3,5-Trinitrobenzene	mg/kg	2.1E+01	0.25	**2.1E+01**	0.114	1	U	U	0.129	1	U	U
EXPLOSIVES	1,3-Dinitrobenzene	mg/kg	1.3E-01	0.25	**2.5E-01**	0.113	1	U	U	0.129	1	U	U
EXPLOSIVES	2,4,6-Trinitrotoluene	mg/kg	5.7E+00	0.25	**5.7E+00**	0.114	1	U	U	0.129	1	U	U
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	8.5E-03	0.165	**1.7E-01**	0.113	1	U	U	0.129	1	U	U
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	7.0E-03	0.165	**1.7E-01**	0.113	1	U	U	0.129	1	U	U
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	mg/kg	3.5E+00	0.26	**3.5E+00**	0.114	1	U	U	0.129	1	U	U
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	mg/kg	2.3E+00	0.26	**2.3E+00**	0.114	1	U	U	0.129	1	U	U
EXPLOSIVES	HMX	mg/kg	8.1E+00	2.2	**8.1E+00**	0.114	1	U	U	0.129	1	U	U
EXPLOSIVES	m-Nitrotoluene	mg/kg	5.4E+01	0.25	**5.4E+01**	0.114	1	U	U	0.129	1	U	U
EXPLOSIVES	Nitrobenzene	mg/kg	2.5E+00	0.165	**2.5E+00**	0.148	1	U	U	0.168	1	U	U
EXPLOSIVES	o-Nitrotoluene	mg/kg	5.4E+01	1	**5.4E+01**	0.114	1	U	U	0.129	1	U	U
EXPLOSIVES	p-Nitrotoluene	mg/kg	5.4E+01	0.65	**5.4E+01**	0.114	1	U	U	0.129	1	U	U
EXPLOSIVES	RDX	mg/kg	6.4E-01	0.26	**6.4E-01**	0.114	1	U	U	0.129	1	U	U
EXPLOSIVES	Tetryl	mg/kg	8.8E+01	0.25	**8.8E+01**	0.227	1	U	U	0.258	1	U	U
METALS	Aluminum	mg/kg	6.5E+07	20	**6.5E+07**								
METALS	Antimony	mg/kg	4.9E+00	0.1	**4.9E+00**								
METALS	Arsenic	mg/kg	5.1E+00	0.3	**5.1E+00**								
METALS	Barium	mg/kg	1.3E+03	0.3	**1.3E+03**								
METALS	Cadmium	mg/kg	4.7E+00	0.1	**4.7E+00**								
METALS	Calcium	mg/kg	NA	NA	**none**								
METALS	Chromium	mg/kg	1.8E+06	0.4	**1.8E+06**								
METALS	Cobalt	mg/kg	5.0E+03	0.5	**5.0E+03**								
METALS	Copper	mg/kg	9.4E+02	0.6	**9.4E+02**								
METALS	Iron	mg/kg	NA	NA	**none**								
METALS	Lead	mg/kg	5.0E+02	5	**5.0E+02**								
METALS	Magnesium	mg/kg	NA	NA	**none**								
METALS	Manganese	mg/kg	1.3E+04	0.2	**1.3E+04**								
METALS	Mercury	mg/kg	6.7E-01	0.25	**6.7E-01**								
METALS	Potassium	mg/kg	NA	NA	**none**								
METALS	Selenium	mg/kg	5.6E+00	0.2	**5.6E+00**								
METALS	Silver	mg/kg	4.0E+01	0.2	**4.0E+01**								
METALS	Strontium	mg/kg	2.3E+03	0.5	**2.3E+03**								
METALS	Zinc	mg/kg	2.8E+04	2.5	**2.8E+04**								
SEMIVOLATILES	1,2,4-Trichlorobenzene	mg/kg	4.2E+01	0.005	**4.2E+01**								
SEMIVOLATILES	1,2-Dichlorobenzene	mg/kg	1.5E+02	0.005	**1.5E+02**								
SEMIVOLATILES	1,3-Dichlorobenzene	mg/kg	2.0E+02	0.005	**2.0E+02**								
SEMIVOLATILES	1,4-Dichlorobenzene	mg/kg	1.8E+01	0.005	**1.8E+01**								
SEMIVOLATILES	2,4,5-Trichlorophenol	mg/kg	7.1E+03	0.165	**7.1E+03**								
SEMIVOLATILES	2,4,6-Trichlorophenol	mg/kg	5.1E+00	0.165	**5.1E+00**								
SEMIVOLATILES	2,4-Dichlorophenol	mg/kg	1.7E+01	0.165	**1.7E+01**								
SEMIVOLATILES	2,4-Dimethylphenol	mg/kg	9.0E+01	0.165	**9.0E+01**								
SEMIVOLATILES	2,4-Dinitrophenol	mg/kg	3.2E-01	0.825	**8.3E-01**								
SEMIVOLATILES	2-Chloronaphthalene	mg/kg	1.1E+03	0.165	**1.1E+03**								
SEMIVOLATILES	2-Chlorophenol	mg/kg	7.4E+01	0.165	**7.4E+01**								
SEMIVOLATILES	2-Methylnaphthalene	mg/kg	6.4E+02	0.165	**6.4E+02**								
SEMIVOLATILES	2-Methylphenol	mg/kg	1.9E+02	0.165	**1.9E+02**								
SEMIVOLATILES	2-Nitroaniline	mg/kg	3.5E-01	0.825	**8.3E-01**								
SEMIVOLATILES	2-Nitrophenol	mg/kg	1.2E+01	0.165	**1.2E+01**								
SEMIVOLATILES	3,3'-Dichlorobenzidine	mg/kg	1.7E-01	0.33	**3.3E-01**								
SEMIVOLATILES	3-Nitroaniline	mg/kg	4.9E-01	0.825	**8.3E-01**								
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	mg/kg	3.2E-01	0.825	**8.3E-01**								
SEMIVOLATILES	4-Bromophenyl phenyl ether	mg/kg	1.0E+01	0.165	**1.0E+01**								
SEMIVOLATILES	4-Chloro-3-methylphenol	mg/kg	1.6E+02	0.165	**1.6E+02**								
SEMIVOLATILES	4-Chloroaniline	mg/kg	1.0E+01	0.165	**1.0E+01**								
SEMIVOLATILES	4-Chlorophenyl phenyl ether	mg/kg	9.1E-01	0.165	**9.1E-01**								
SEMIVOLATILES	4-Methylphenol	mg/kg	1.6E+01	0.165	**1.6E+01**								
SEMIVOLATILES	4-Nitroaniline	mg/kg	4.3E-01	0.825	**8.3E-01**								
SEMIVOLATILES	4-Nitrophenol	mg/kg	2.8E+00	0.825	**2.8E+00**								
SEMIVOLATILES	Acenaphthene	mg/kg	3.4E+02	0.165	**3.4E+02**								
SEMIVOLATILES	Acenaphthylene	mg/kg	5.4E+02	0.165	**5.4E+02**								
SEMIVOLATILES	Anthracene	mg/kg	2.0E+01	0.165	**2.0E+01**								
SEMIVOLATILES	Benzo(a)anthracene	mg/kg	5.0E+01	0.165	**5.0E+01**								
SEMIVOLATILES	Benzo(a)pyrene	mg/kg	3.1E+01	0.165	**3.1E+01**								
SEMIVOLATILES	Benzo(b)fluoranthene	mg/kg	3.6E+01	0.165	**3.6E+01**								
SEMIVOLATILES	Benzo(ghi)perylene	mg/kg	8.2E+00	0.165	**8.2E+00**								
SEMIVOLATILES	Benzo(k)fluoranthene	mg/kg	1.4E+01	0.165	**1.4E+01**								
SEMIVOLATILES	Benzoic Acid	mg/kg	3.5E+02	0.825	**3.5E+02**								
SEMIVOLATILES	Benzyl Alcohol	mg/kg	1.8E+02	0.165	**1.8E+02**								
SEMIVOLATILES	bis(2-Chloroethoxy)methane	mg/kg	2.9E-02	0.165	**1.7E-01**								
SEMIVOLATILES	bis(2-Chloroethyl)ether	mg/kg	1.9E-03	0.165	**1.7E-01**								
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	mg/kg	4.8E+00	0.165	**4.8E+00**								
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	mg/kg	1.5E+03	0.165	**1.5E+03**								
SEMIVOLATILES	Butyl benzyl phthalate	mg/kg	8.0E+02	0.165	**8.0E+02**								
SEMIVOLATILES	Chrysene	mg/kg	1.2E+01	0.165	**1.2E+01**								
SEMIVOLATILES	Dibenzo(a,h)anthracene	mg/kg	1.9E+01	0.165	**1.9E+01**								
SEMIVOLATILES	Dibenzofuran	mg/kg	4.9E+02	0.165	**4.9E+02**								
SEMIVOLATILES	Diethyl phthalate	mg/kg	3.4E+03	0.165	**3.4E+03**								
SEMIVOLATILES	Dimethyl phthalate	mg/kg	1.1E+03	0.165	**1.1E+03**								
SEMIVOLATILES	di-n-Butyl phthalate	mg/kg	7.6E+03	0.165	**7.6E+03**								
SEMIVOLATILES	di-n-Octyl phthalate	mg/kg	3.3E+04	0.165	**3.3E+04**								
SEMIVOLATILES	Fluoranthene	mg/kg	2.5E+02	0.165	**2.5E+02**								
SEMIVOLATILES	Fluorene	mg/kg	3.0E+02	0.165	**3.0E+02**								
SEMIVOLATILES	Hexachlorobenzene	mg/kg	3.4E+00	0.165	**3.4E+00**								
SEMIVOLATILES	Hexachlorobutadiene	mg/kg	5.1E+01	0.005	**5.1E+01**								
SEMIVOLATILES	Hexachlorocyclopentadiene	mg/kg	1.7E+02	0.165	**1.7E+02**								
SEMIVOLATILES	Hexachloroethane	mg/kg	6.8E+01	0.165	**6.8E+01**								
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	mg/kg	2.6E+02	0.165	**2.6E+02**								
SEMIVOLATILES	Isophorone	mg/kg	3.8E+01	0.165	**3.8E+01**								
SEMIVOLATILES	Naphthalene	mg/kg	9.8E+02	0.01	**9.8E+02**								
SEMIVOLATILES	Nitrobenzene	mg/kg	2.5E+00	0.165	**2.5E+00**								
SEMIVOLATILES	n-Nitroso-di-n-propylamine	mg/kg	3.6E-04	0.165	**1.7E-01**								
SEMIVOLATILES	n-Nitrosodiphenylamine	mg/kg	7.1E+00	0.165	**7.1E+00**								
SEMIVOLATILES	Pentachlorophenol	mg/kg	2.8E-01	0.825	**8.3E-01**								
SEMIVOLATILES	Phenanthrene	mg/kg	2.8E+02	0.165	**2.8E+02**								
SEMIVOLATILES	Phenol	mg/kg	2.4E+02	0.165	**2.4E+02**								
SEMIVOLATILES	Pyrene	mg/kg	1.0E+02	0.165	**1.0E+02**								
TPH	Carbon Range C12-C28	mg/kg	2.1E+02	25	**2.1E+02**	33.841	1	U	U	44.489	1	U	U
TPH	CARBON RANGE C28-C35	mg/kg	2.1E+02	25	**2.1E+02**	33.841	1	U	U	44.489	1	U	U
TPH	Carbon Range C6-C12	mg/kg	2.1E+03	25	**2.1E+03**	33.841	1	U	U	44.489	1	U	U

Table 9b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump118 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	35SUMP118-SB01				35SUMP118-SB01			
SAMPLE_NO			Calculated		**Standard 3**	35-SMP118-SB01-01				35-SMP118-SB01-02			
SAMPLE_DATE			Commercial		**Groundwater**	19-Sep-06				19-Sep-06			
DEPTH			/ Industrial	Method	**Protective**	.5-.5 Ft				4-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) b	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
VOLATILES	1,1,1,2-Tetrachloroethane	mg/kg	3.8E+01	0.005	**3.8E+01**					0.0008	1	U	U
VOLATILES	1,1,1-Trichloroethane	mg/kg	8.8E+00	0.005	**8.8E+00**					0.0008	1	U	U
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	4.3E-01	0.005	**4.3E-01**					0.0008	1	U	U
VOLATILES	1,1,2-Trichloroethane	mg/kg	9.9E-02	0.005	**9.9E-02**					0.0008	1	U	U
VOLATILES	1,1-Dichloroethane	mg/kg	1.4E+02	0.005	**1.4E+02**					0.0017	1	U	U
VOLATILES	1,1-Dichloroethene	mg/kg	2.0E-01	0.005	**2.0E-01**					0.0008	1	U	U
VOLATILES	1,1-Dichloropropene	mg/kg	2.4E-01	0.005	**2.4E-01**					0.0008	1	U	U
VOLATILES	1,2,3-Trichlorobenzene	mg/kg	9.9E+02	0.005	**9.9E+02**					0.0008	1	U	U
VOLATILES	1,2,3-Trichloropropane	mg/kg	5.8E-03	0.005	**5.8E-03**					0.0017	1	U	U
VOLATILES	1,2,4-Trichlorobenzene	mg/kg	4.2E+01	0.005	**4.2E+01**					0.0008	1	U	U
VOLATILES	1,2,4-Trimethylbenzene	mg/kg	1.1E+03	0.005	**1.1E+03**					0.0008	1	U	U
VOLATILES	1,2-Dibromo-3-chloropropane	mg/kg	1.3E-02	0.005	**1.3E-02**					0.0034	1	U	U
VOLATILES	1,2-Dibromoethane	mg/kg	1.1E-03	0.005	**5.0E-03**					0.0008	1	U	U
VOLATILES	1,2-Dichlorobenzene	mg/kg	1.5E+02	0.005	**1.5E+02**					0.0008	1	U	U
VOLATILES	1,2-Dichloroethane	mg/kg	4.0E-02	0.005	**4.0E-02**					0.0008	1	U	U
VOLATILES	1,2-Dichloroethene	mg/kg	8.9E-01	0.005	**8.9E-01**								
VOLATILES	1,2-Dichloropropane	mg/kg	1.2E-01	0.005	**1.2E-01**					0.0008	1	U	U
VOLATILES	1,2-Dimethylbenzene (o-Xylene)	mg/kg	4.7E+02	0.005	**4.7E+02**					0.0008	1	U	U
VOLATILES	1,3,5-Trimethylbenzene	mg/kg	1.1E+03	0.005	**1.1E+03**					0.0008	1	U	U
VOLATILES	1,3-Dichlorobenzene	mg/kg	2.0E+02	0.005	**2.0E+02**					0.0008	1	U	U
VOLATILES	1,3-Dichloropropane	mg/kg	1.3E+00	0.005	**1.3E+00**					0.0008	1	U	U
VOLATILES	1,4-Dichlorobenzene	mg/kg	1.8E+01	0.005	**1.8E+01**					0.0008	1	U	U
VOLATILES	2,2-Dichloropropane	mg/kg	2.5E+00	0.005	**2.5E+00**					0.0008	1	U	U
VOLATILES	2-Butanone	mg/kg	1.4E+02	0.01	**1.4E+02**					0.0042	1	U	U
VOLATILES	2-Chloroethyl vinyl ether	mg/kg	3.9E-02	0.01	**3.9E-02**					0.0034	1	U	U
VOLATILES	2-Chlorotoluene	mg/kg	3.1E+02	0.005	**3.1E+02**					0.0008	1	U	U
VOLATILES	2-Hexanone	mg/kg	5.0E+01	0.01	**5.0E+01**					0.0042	1	U	U
VOLATILES	4-Chlorotoluene	mg/kg	3.7E+02	0.005	**3.7E+02**					0.0008	1	U	U
VOLATILES	Acetone	mg/kg	1.6E+02	0.01	**1.6E+02**					0.0084	1	U	U
VOLATILES	Benzene	mg/kg	1.3E-01	0.005	**1.3E-01**					0.0008	1	U	U
VOLATILES	Bromobenzene	mg/kg	1.8E+02	0.005	**1.8E+02**					0.0008	1	U	U
VOLATILES	Bromochloromethane	mg/kg	4.8E+01	0.005	**4.8E+01**					0.0008	1	U	U
VOLATILES	Bromodichloromethane	mg/kg	1.0E-01	0.005	**1.0E-01**					0.0008	1	U	U
VOLATILES	Bromoform	mg/kg	1.2E+00	0.005	**1.2E+00**					0.0008	1	U	U
VOLATILES	Bromomethane	mg/kg	1.1E+00	0.01	**1.1E+00**					0.0017	1	U	U
VOLATILES	Carbon disulfide	mg/kg	2.3E+02	0.005	**2.3E+02**					0.0008	1	U	U
VOLATILES	Carbon tetrachloride	mg/kg	3.7E-01	0.005	**3.7E-01**					0.0008	1	U	U
VOLATILES	Chlorobenzene	mg/kg	8.0E+00	0.005	**8.0E+00**					0.0008	1	U	U
VOLATILES	Chloroethane	mg/kg	3.6E+02	0.01	**3.6E+02**					0.0017	1	U	U
VOLATILES	Chloroform	mg/kg	2.0E+01	0.005	**2.0E+01**					0.0008	1	U	U
VOLATILES	Chloromethane	mg/kg	2.0E+00	0.01	**2.0E+00**					0.0034	1	U	U
VOLATILES	cis-1,2-Dichloroethene	mg/kg	8.9E-01	0.005	**8.9E-01**					0.0008	1	U	U
VOLATILES	cis-1,3-Dichloropropene	mg/kg	9.6E-02	0.005	**9.6E-02**					0.0008	1	U	U
VOLATILES	Dibromochloromethane	mg/kg	8.4E-01	0.005	**8.4E-01**					0.0008	1	U	U
VOLATILES	Dibromomethane	mg/kg	2.6E+01	0.005	**2.6E+01**					0.0008	1	U	U
VOLATILES	Dichlorodifluoromethane	mg/kg	1.7E+03	0.01	**1.7E+03**					0.0017	1	U	U
VOLATILES	Ethylbenzene	mg/kg	5.4E+01	0.005	**5.4E+01**					0.0008	1	U	U
VOLATILES	Hexachlorobutadiene	mg/kg	5.1E+01	0.005	**5.1E+01**					0.0008	1	U	U
VOLATILES	Isopropylbenzene	mg/kg	3.5E+03	0.005	**3.5E+03**					0.0008	1	U	U
VOLATILES	m,p-Xylenes	mg/kg	1.1E+03	0.005	**1.1E+03**					0.0008	1	U	U
VOLATILES	Methyl isobutyl ketone	mg/kg	5.7E+01	0.01	**5.7E+01**					0.0042	1	U	U
VOLATILES	Methylene chloride	mg/kg	3.1E-02	0.005	**3.1E-02**					0.0017	1	U	U
VOLATILES	Naphthalene	mg/kg	9.8E+02	0.01	**9.8E+02**					0.0008	1	U	U
VOLATILES	n-BUTYLBENZENE	mg/kg	6.5E+02	0.005	**6.5E+02**					0.0008	1	U	U
VOLATILES	n-PROPYLBENZENE	mg/kg	9.1E+02	0.005	**9.1E+02**					0.0008	1	U	U
VOLATILES	p-ISOPROPYLTOLUENE	mg/kg	7.9E+02	0.005	**7.9E+02**					0.0008	1	U	U
VOLATILES	sec-BUTYLBENZENE	mg/kg	7.6E+02	0.005	**7.6E+02**					0.0008	1	U	U
VOLATILES	Styrene	mg/kg	2.8E+01	0.005	**2.8E+01**					0.0008	1	U	U
VOLATILES	tert-BUTYLBENZENE	mg/kg	7.4E+02	0.005	**7.4E+02**					0.0008	1	U	U
VOLATILES	Tetrachloroethene	mg/kg	3.0E-01	0.005	**3.0E-01**					0.0008	1	U	U
VOLATILES	Toluene	mg/kg	5.3E+01	0.005	**5.3E+01**					0.0008	1	U	U
VOLATILES	trans-1,2-Dichloroethene	mg/kg	2.1E+00	0.005	**2.1E+00**					0.0008	1	U	U
VOLATILES	trans-1,3-Dichloropropene	mg/kg	5.2E-01	0.005	**5.2E-01**					0.0008	1	U	U
VOLATILES	Trichloroethene	mg/kg	1.8E-01	0.005	**1.8E-01**					0.0008	1	U	U
VOLATILES	Trichlorofluoromethane	mg/kg	2.0E+03	0.01	**2.0E+03**					0.0017	1	U	U
VOLATILES	Vinyl acetate	mg/kg	3.6E+02	0.01	**3.6E+02**					0.0017	1	U	U
VOLATILES	Vinyl chloride	mg/kg	3.6E-02	0.01	**3.6E-02**					0.0017	1	U	U
VOLATILES	Xylenes, Total	mg/kg	9.0E+02	0.005	**9.0E+02**								

Notes:

U - Not detected

DIL - dilution factor
Ft - feet
LQ - laboratory qualifier
mg/kg - milligrams per kilogram
MQL - method quantitation limit
MSC - medium specific concentration
NA - not applicable
REG - regular sample
VQ - validation qualifier

[a] Value developed in Attachment 7 using the SAM model.
[b] MQL values provided by laboratory for recent samples (2000 or later)
[c] Shading indicates MSC value equal to the MQL.
[d] Results for recent samples were adjusted for moisture content and for dilution factor if MQL = Applicable MSC.

Table 10a
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Older Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S119-01				LH-S119-01				LH-S119-01				LH-S119-02				LH-S119-02			
SAMPLE_NO			Calculated		**Standard 3**	LH-S119-01.1				LH-S119-01.2				LH-S119-01-FD				LH-S119-02.1				LH-S119-02.2			
SAMPLE_DATE			Commercial		**Groundwater**	4-Aug-93				4-Aug-93				4-Aug-93				4-Aug-93				4-Aug-93			
DEPTH			/ Industrial	Practical	**Protective**	0.5-2 Ft				5-7 Ft				0.5-2 Ft				0.5-2 Ft				5-7 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				FD				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
EXPLOSIVES	1,3,5-Trinitrobenzene	mg/kg	5.5E+00	0.21	**5.5E+00**																				
EXPLOSIVES	1,3-Dinitrobenzene	mg/kg	3.4E-02	0.21	**2.1E-01**																				
EXPLOSIVES	2,4,6-Trinitrotoluene	mg/kg	1.5E+00	0.21	**1.5E+00**																				
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	2.3E-03	0.21	**2.1E-01**																				
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	1.9E-03	0.23	**2.3E-01**																				
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	mg/kg	6.0E-01	0.44	**6.0E-01**																				
EXPLOSIVES	HMX	mg/kg	2.2E+00	2	**2.2E+00**																				
EXPLOSIVES	m-Nitrotoluene	mg/kg	1.4E+01	0.89	**1.4E+01**																				
EXPLOSIVES	Nitrobenzene	mg/kg	6.7E-01	0.23	**6.7E-01**																				
EXPLOSIVES	o-Nitrotoluene	mg/kg	1.4E+01	0.89	**1.4E+01**																				
EXPLOSIVES	p-Nitrotoluene	mg/kg	1.4E+01	2.7	**1.4E+01**																				
EXPLOSIVES	RDX	mg/kg	1.7E-01	0.96	**9.6E-01**																				
EXPLOSIVES	Tetryl	mg/kg	2.4E+01	0.66	**2.4E+01**																				
HERBICIDES	2,2-Dichloropropanoic Acid	mg/kg	5.7E-01	0.1	**5.7E-01**																				
HERBICIDES	2,4,5-T	mg/kg	5.6E+00	0.004	**5.6E+00**																				
HERBICIDES	2,4,5-TP (Silvex)	mg/kg	1.3E+01	0.003	**1.3E+01**																				
HERBICIDES	2,4-D	mg/kg	6.0E+00	0.04	**6.0E+00**																				
HERBICIDES	2,4-DB	mg/kg	4.9E-01	0.04	**4.9E-01**																				
HERBICIDES	Dicamba	mg/kg	1.9E+00	0.004	**1.9E+00**																				
HERBICIDES	Dichloroprop	mg/kg	4.3E-01	0.04	**4.3E-01**																				
HERBICIDES	Dinoseb	mg/kg	8.1E-01	0.02	**8.1E-01**																				
HERBICIDES	MCPA	mg/kg	2.2E-02	4	**4.0E+00**																				
HERBICIDES	MCPP	mg/kg	5.1E-01	4	**4.0E+00**																				
METALS	Aluminum	mg/kg	1.7E+07	20	**1.7E+07**	9030.000	1			14400.000	1			12500.000	1			7210.000	1			13000.000	1		
METALS	Antimony	mg/kg	1.7E+00	3	**3.0E+00**	3.000	1	U	U	3.000	1	U	U	3.000	1	U	U	3.000	1	U	U	3.000	1	U	U
METALS	Arsenic	mg/kg	4.8E+00	0.3	**4.8E+00**	2.000	1			4.400	1			**8.200**	1			1.600	1			2.100	1		
METALS	Barium	mg/kg	2.7E+02	0.3	**2.7E+02**	96.000	1			128.000	1			57.000	1			67.000	1			79.000	1		
METALS	Cadmium	mg/kg	8.5E-01	1	**1.0E+00**	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U
METALS	Calcium	mg/kg	NA	NA	**none**	2520.000	1			2070.000	1			1320.000	1			1910.000	1			886.000	1		
METALS	Chromium	mg/kg	6.3E+04	0.4	**6.3E+04**	15.000	1			21.000	1			19.000	1			11.000	1			25.000	1		
METALS	Cobalt	mg/kg	1.3E+03	0.5	**1.3E+03**	8.000	1			19.000	1			3.000	1			5.000	1			11.000	1		
METALS	Copper	mg/kg	2.5E+02	0.6	**2.5E+02**	3.000	1			3.000	1			3.000	1			3.000	1			3.000	1		
METALS	Iron	mg/kg	NA	NA	**none**	13800.000	1			19100.000	1			15700.000	1			8220.000	1			13500.000	1		
METALS	Lead	mg/kg	1.3E+02	5	**1.3E+02**	6.800	1			21.300	1			6.900	1			5.900	1			4.100	1		
METALS	Magnesium	mg/kg	NA	NA	**none**	1080.000	1			1050.000	1			1020.000	1			1040.000	1			491.000	1		
METALS	Manganese	mg/kg	3.5E+03	0.2	**3.5E+03**	529.000	1			593.000	1			175.000	1			229.000	1			759.000	1		
METALS	Mercury	mg/kg	8.2E-02	0.089	**8.9E-02**	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U
METALS	Potassium	mg/kg	NA	NA	**none**	582.000	1			758.000	1			796.000	1			511.000	1			673.000	1		
METALS	Selenium	mg/kg	3.5E+00	1	**3.5E+00**	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U
METALS	Silver	mg/kg	2.9E+00	1	**2.9E+00**	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U
METALS	Strontium	mg/kg	6.2E+02	10	**6.2E+02**	8.000	1			11.000	1			7.000	1			6.000	1			9.000	1		
METALS	Thallium	mg/kg	5.4E-01	49.8	**5.0E+01**																				
METALS	Zinc	mg/kg	5.0E+03	2.5	**5.0E+03**	14.000	1			30.000	1			24.000	1			17.000	1			26.000	1		
PESTICIDES	4,4'-DDD	mg/kg	9.8E+00	0.00165	**9.8E+00**																				
PESTICIDES	4,4'-DDE	mg/kg	8.9E+00	0.00165	**8.9E+00**																				
PESTICIDES	4,4'-DDT	mg/kg	8.5E+00	0.00165	**8.5E+00**																				
PESTICIDES	Aldrin	mg/kg	7.8E-02	0.00165	**7.8E-02**																				
PESTICIDES	alpha-BHC	mg/kg	5.8E-03	0.00165	**5.8E-03**																				
PESTICIDES	alpha-Chlordane	mg/kg	5.6E+02	0.00165	**5.6E+02**																				
PESTICIDES	beta-BHC	mg/kg	2.1E-01	0.00165	**2.1E-01**																				
PESTICIDES	delta-BHC	mg/kg	1.3E-01	0.00165	**1.3E-01**																				
PESTICIDES	Dieldrin	mg/kg	3.7E-02	0.00165	**3.7E-02**																				
PESTICIDES	Endosulfan I	mg/kg	3.1E+02	0.00165	**3.1E+02**																				
PESTICIDES	Endosulfan II	mg/kg	3.6E+02	0.00165	**3.6E+02**																				
PESTICIDES	Endosulfan Sulfate	mg/kg	1.6E+03	0.00165	**1.6E+03**																				
PESTICIDES	Endrin	mg/kg	1.8E+00	0.00165	**1.8E+00**																				
PESTICIDES	Endrin aldehyde	mg/kg	7.2E+02	0.00165	**7.2E+02**																				
PESTICIDES	Endrin ketone	mg/kg	5.1E+02	0.00165	**5.1E+02**																				
PESTICIDES	gamma-BHC (Lindane)	mg/kg	2.1E-02	0.00165	**2.1E-02**																				
PESTICIDES	Heptachlor	mg/kg	4.5E-01	0.00165	**4.5E-01**																				
PESTICIDES	Heptachlor epoxide	mg/kg	1.7E+00	0.00165	**1.7E+00**																				
PESTICIDES	METHOXYCHLOR	mg/kg	7.0E+01	0.00165	**7.0E+01**																				

Table 10a
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Older Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S119-01				LH-S119-01				LH-S119-01				LH-S119-02				LH-S119-02			
SAMPLE_NO			Calculated		**Standard 3**	LH-S119-01.1				LH-S119-01.2				LH-S119-01-FD				LH-S119-02.1				LH-S119-02.2			
SAMPLE_DATE			Commercial		**Groundwater**	4-Aug-93				4-Aug-93				4-Aug-93				4-Aug-93				4-Aug-93			
DEPTH			/ Industrial	Practical	**Protective**	0.5-2 Ft				5-7 Ft				0.5-2 Ft				0.5-2 Ft				5-7 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				FD				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
PESTICIDES	Toxaphene	mg/kg	2.8E+01	0.033	**2.8E+01**																				
PESTICIDES	gamma-CHLORDANE	mg/kg	3.1E+01	0.00165	**3.1E+01**																				
SEMIVOLATILES	1,2,4-Trichlorobenzene	mg/kg	1.1E+01	0.33	**1.1E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	1,2-Dichlorobenzene	mg/kg	4.0E+01	0.33	**4.0E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	1,3-Dichlorobenzene	mg/kg	5.2E+01	0.33	**5.2E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	1,4-Dichlorobenzene	mg/kg	4.7E+00	0.33	**4.7E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4,5-Trichlorophenol	mg/kg	2.2E+03	1.65	**2.2E+03**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	2,4,6-Trichlorophenol	mg/kg	2.1E+00	0.33	**2.1E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4-Dichlorophenol	mg/kg	4.8E+00	0.33	**4.8E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4-Dimethylphenol	mg/kg	2.4E+01	0.33	**2.4E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,4-Dinitrophenol	mg/kg	8.6E-02	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	2,4-Dinitrotoluene	mg/kg	2.3E-03	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2,6-Dinitrotoluene	mg/kg	1.9E-03	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Chloronaphthalene	mg/kg	1.1E+03	0.33	**1.1E+03**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Chlorophenol	mg/kg	2.0E+01	0.33	**2.0E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Methylnaphthalene	mg/kg	1.7E+02	0.33	**1.7E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Methylphenol	mg/kg	5.0E+01	0.33	**5.0E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	2-Nitroaniline	mg/kg	9.2E-02	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	2-Nitrophenol	mg/kg	3.8E+00	0.33	**3.8E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	3,3'-Dichlorobenzidine	mg/kg	4.5E-02	0.65	**6.5E-01**	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	3-Nitroaniline	mg/kg	1.3E-01	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	mg/kg	8.6E-02	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	4-Bromophenyl phenyl ether	mg/kg	2.7E+00	0.33	**2.7E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	4-Chloro-3-methylphenol	mg/kg	4.3E+01	0.4	**4.3E+01**	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	4-Chloroaniline	mg/kg	2.8E+00	0.4	**2.8E+00**	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	4-Chlorophenyl phenyl ether	mg/kg	2.4E-01	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	4-Methylphenol	mg/kg	4.2E+00	0.33	**4.2E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	4-Nitroaniline	mg/kg	1.1E-01	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	4-Nitrophenol	mg/kg	9.7E-01	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	Acenaphthene	mg/kg	3.4E+02	0.33	**3.4E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Acenaphthylene	mg/kg	5.4E+02	0.33	**5.4E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Anthracene	mg/kg	2.0E+01	0.33	**2.0E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(a)anthracene	mg/kg	1.3E+01	0.33	**1.3E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(a)pyrene	mg/kg	1.8E+01	0.33	**1.8E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(b)fluoranthene	mg/kg	3.6E+01	0.33	**3.6E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(ghi)perylene	mg/kg	8.2E+00	0.33	**8.2E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzo(k)fluoranthene	mg/kg	1.4E+01	0.33	**1.4E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Benzoic Acid	mg/kg	2.1E+02	1.65	**2.1E+02**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U
SEMIVOLATILES	Benzyl Alcohol	mg/kg	4.8E+01	0.4	**4.8E+01**	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U
SEMIVOLATILES	bis(2-Chloroethoxy)methane	mg/kg	7.8E-03	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	bis(2-Chloroethyl)ether	mg/kg	5.0E-04	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	mg/kg	1.3E+00	0.33	**1.3E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	mg/kg	3.9E+02	0.33	**3.9E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Butyl benzyl phthalate	mg/kg	8.0E+02	0.33	**8.0E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Chrysene	mg/kg	1.2E+01	0.33	**1.2E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Dibenzo(a,h)anthracene	mg/kg	1.9E+01	0.33	**1.9E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Dibenzofuran	mg/kg	3.3E+02	0.33	**3.3E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Diethyl phthalate	mg/kg	1.2E+03	0.33	**1.2E+03**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Dimethyl phthalate	mg/kg	2.8E+02	0.33	**2.8E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	di-n-Butyl phthalate	mg/kg	7.6E+03	0.33	**7.6E+03**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	di-n-Octyl phthalate	mg/kg	3.3E+04	0.33	**3.3E+04**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Fluoranthene	mg/kg	2.5E+02	0.33	**2.5E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Fluorene	mg/kg	3.0E+02	0.33	**3.0E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachlorobenzene	mg/kg	2.7E+00	0.33	**2.7E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachlorobutadiene	mg/kg	1.4E+01	0.33	**1.4E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachlorocyclopentadiene	mg/kg	4.6E+01	0.33	**4.6E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Hexachloroethane	mg/kg	1.8E+01	0.33	**1.8E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	mg/kg	1.3E+02	0.33	**1.3E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Isophorone	mg/kg	1.0E+01	0.33	**1.0E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Naphthalene	mg/kg	3.1E+02	0.33	**3.1E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Nitrobenzene	mg/kg	6.7E-01	0.33	**6.7E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	n-Nitroso-di-n-propylamine	mg/kg	9.5E-05	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	n-Nitrosodiphenylamine	mg/kg	1.9E+00	0.33	**1.9E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U

Table 10a
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Older Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S119-01				LH-S119-01				LH-S119-01				LH-S119-02				LH-S119-02			
SAMPLE_NO			Calculated		**Standard 3**	LH-S119-01.1				LH-S119-01.2				LH-S119-01-FD				LH-S119-02.1				LH-S119-02.2			
SAMPLE_DATE			Commercial		**Groundwater**	4-Aug-93				4-Aug-93				4-Aug-93				4-Aug-93				4-Aug-93			
DEPTH			/ Industrial	Practical	**Protective**	0.5-2 Ft				5-7 Ft				0.5-2 Ft				0.5-2 Ft				5-7 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				FD				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
SEMIVOLATILES	Pentachlorophenol	mg/kg	1.8E-01	1.65	**1.7E+00**	1.6500	1	U	U	1.6500	1	U	U	1.6500	1	U	U	1.6500	1	U	U	1.6500	1	U	U
SEMIVOLATILES	Phenanthrene	mg/kg	2.8E+02	0.33	**2.8E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Phenol	mg/kg	6.4E+01	0.33	**6.4E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
SEMIVOLATILES	Pyrene	mg/kg	1.0E+02	0.33	**1.0E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U
VOLATILES	1,1,1,2-Tetrachloroethane	mg/kg	1.0E+01	0.012	**1.0E+01**																				
VOLATILES	1,1,1-Trichloroethane	mg/kg	2.3E+00	0.005	**2.3E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	1.1E-01	0.005	**1.1E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,1,2-Trichloroethane	mg/kg	2.6E-02	0.005	**2.6E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,1-Dichloroethane	mg/kg	3.8E+01	0.005	**3.8E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,1-Dichloroethene	mg/kg	5.4E-02	0.005	**5.4E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,2,3-Trichloropropane	mg/kg	1.6E-03	0.012	**1.2E-02**																				
VOLATILES	1,2-Dibromo-3-chloropropane	mg/kg	3.4E-03	0.024	**2.4E-02**																				
VOLATILES	1,2-Dibromoethane	mg/kg	2.8E-04	0.024	**2.4E-02**																				
VOLATILES	1,2-Dichloroethane	mg/kg	1.1E-02	0.005	**1.1E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,2-Dichloroethene	mg/kg	2.4E-01	0.005	**2.4E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	1,2-Dichloropropane	mg/kg	3.1E-02	0.005	**3.1E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	2-Butanone	mg/kg	3.7E+01	0.012	**3.7E+01**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U
VOLATILES	2-Chloroethyl vinyl ether	mg/kg	1.0E-02	0.01	**1.0E-02**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	2-Hexanone	mg/kg	1.3E+01	0.012	**1.3E+01**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U
VOLATILES	2-Propenal	mg/kg	2.4E-02	0.6	**6.0E-01**																				
VOLATILES	Acetone	mg/kg	4.4E+01	0.012	**4.4E+01**	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U
VOLATILES	Acetonitrile	mg/kg	1.5E+00	0.12	**1.5E+00**																				
VOLATILES	Acrylonitrile	mg/kg	2.8E-04	0.12	**1.2E-01**																				
VOLATILES	Allyl chloride	mg/kg	3.5E+00	0.012	**3.5E+00**																				
VOLATILES	Benzene	mg/kg	3.5E-02	0.005	**3.5E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Bromodichloromethane	mg/kg	2.7E-02	0.005	**2.7E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Bromoform	mg/kg	3.2E-01	0.005	**3.2E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Bromomethane	mg/kg	2.9E-01	0.01	**2.9E-01**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	Carbon disulfide	mg/kg	6.2E+01	0.005	**6.2E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Carbon tetrachloride	mg/kg	9.8E-02	0.005	**9.8E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Chlorobenzene	mg/kg	2.1E+00	0.005	**2.1E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Chloroethane	mg/kg	9.6E+01	0.01	**9.6E+01**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	Chloroform	mg/kg	5.2E+00	0.005	**5.2E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Chloromethane	mg/kg	5.2E-01	0.01	**5.2E-01**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	Chloroprene	mg/kg	1.6E+00	0.12	**1.6E+00**																				
VOLATILES	cis-1,3-Dichloropropene	mg/kg	2.6E-02	0.005	**2.6E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Dibromochloromethane	mg/kg	2.2E-01	0.005	**2.2E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Dibromomethane	mg/kg	6.9E+00	0.024	**6.9E+00**																				
VOLATILES	Dichlorodifluoromethane	mg/kg	5.9E+02	0.024	**5.9E+02**																				
VOLATILES	Ethyl methacrylate	mg/kg	3.7E+01	0.024	**3.7E+01**																				
VOLATILES	Ethylbenzene	mg/kg	1.4E+01	0.005	**1.4E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	IODOMETHANE	mg/kg	3.7E-01	0.012	**3.7E-01**																				
VOLATILES	ISOBUTYL ALCOHOL	mg/kg	2.9E+01	2.4	**2.9E+01**																				
VOLATILES	Methacrylonitrile	mg/kg	7.6E-03	0.024	**2.4E-02**																				
VOLATILES	Methyl isobutyl ketone	mg/kg	1.5E+01	0.012	**1.5E+01**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U
VOLATILES	METHYL METHACRYLATE	mg/kg	3.8E+02	0.024	**3.8E+02**																				
VOLATILES	Methylene chloride	mg/kg	8.2E-03	0.005	**8.2E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Pentachloroethane	mg/kg	2.1E+00	0.024	**2.1E+00**																				
VOLATILES	Propionitrile	mg/kg	2.4E-02	0.06	**6.0E-02**																				
VOLATILES	Styrene	mg/kg	7.4E+00	0.005	**7.4E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Tetrachloroethene	mg/kg	8.0E-02	0.005	**8.0E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Toluene	mg/kg	1.4E+01	0.005	**1.4E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	trans-1,3-Dichloropropene	mg/kg	1.4E-01	0.005	**1.4E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	trans-1,4-Dichloro-2-butene	mg/kg	7.9E-03	0.024	**2.4E-02**																				
VOLATILES	Trichloroethene	mg/kg	4.9E-02	0.005	**4.9E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U
VOLATILES	Trichlorofluoromethane	mg/kg	5.3E+02	0.012	**5.3E+02**																				
VOLATILES	Vinyl acetate	mg/kg	9.7E+01	0.012	**9.7E+01**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U
VOLATILES	Vinyl chloride	mg/kg	9.7E-03	0.01	**1.0E-02**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U
VOLATILES	Xylenes, Total	mg/kg	2.4E+02	0.005	**2.4E+02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U

Table 10a
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Older Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S119-01				LH-S119-01				LH-S119-01				LH-S119-02				LH-S119-02			
SAMPLE_NO			Calculated		**Standard 3**	LH-S119-01.1				LH-S119-01.2				LH-S119-01-FD				LH-S119-02.1				LH-S119-02.2			
SAMPLE_DATE			Commercial		**Groundwater**	4-Aug-93				4-Aug-93				4-Aug-93				4-Aug-93				4-Aug-93			
DEPTH			/ Industrial	Practical	**Protective**	0.5-2 Ft				5-7 Ft				0.5-2 Ft				0.5-2 Ft				5-7 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				FD				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
Notes:																									
Boxed and Bold = Detected Concentration exceeds Applicable Standard 3 Soil MSC.																									
Shaded = Undetected (SQL) value exceeds Applicable Standard 3 Soil MSC.																									
U - Not detected																									
DIL - dilution factor																									
FD - field duplicate																									
Ft - feet																									
LQ - laboratory qualifier																									
mg/kg - milligrams per kilogram																									
MSC - medium specific concentration																									
NA - not applicable																									
PQL - practical quantitation limit																									
REG - regular sample																									
SQL - Sample Quantitation Limit																									
VQ - validation qualifier																									
[a] Value developed in Attachment 8 using the SAM Model. Shading indicates a chemical specific value.																									
[b] PQL values are the minimum undetected result shown in the table, or a laboratory value.																									
[c] Shading indicates MSC value equal to the PQL.																									

Table 10a
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Older Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S120-01				LH-S120-01				LH-S120-02				LH-S120-02				LHS-SH-02			
SAMPLE_NO			Calculated		**Standard 3**	LH-S120-01.1				LH-S120-01.2				LH-S120-02 .1				LH-S120-02.2				LHS-SH-02			
SAMPLE_DATE			Commercial		**Groundwater**	4-Aug-93				4-Aug-93				4-Aug-93				4-Aug-93				12-Jan-95			
DEPTH			/ Industrial	Practical	**Protective**	0.5-2 Ft				4-6 Ft				0.5-2 Ft				4-5 Ft				0-0.5 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
EXPLOSIVES	1,3,5-Trinitrobenzene	mg/kg	5.5E+00	0.21	**5.5E+00**																	0.210	1	U	U
EXPLOSIVES	1,3-Dinitrobenzene	mg/kg	3.4E-02	0.21	**2.1E-01**																	0.210	1	U	U
EXPLOSIVES	2,4,6-Trinitrotoluene	mg/kg	1.5E+00	0.21	**1.5E+00**																	0.210	1	U	U
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	2.3E-03	0.21	**2.1E-01**																	0.210	1	U	U
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	1.9E-03	0.23	**2.3E-01**																	0.230	1	U	U
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	mg/kg	6.0E-01	0.44	**6.0E-01**																	0.440	1	U	U
EXPLOSIVES	HMX	mg/kg	2.2E+00	2	**2.2E+00**																	2.000	1	U	U
EXPLOSIVES	m-Nitrotoluene	mg/kg	1.4E+01	0.89	**1.4E+01**																	0.890	1	U	U
EXPLOSIVES	Nitrobenzene	mg/kg	6.7E-01	0.23	**6.7E-01**																	0.230	1	U	U
EXPLOSIVES	o-Nitrotoluene	mg/kg	1.4E+01	0.89	**1.4E+01**																	0.890	1	U	U
EXPLOSIVES	p-Nitrotoluene	mg/kg	1.4E+01	2.7	**1.4E+01**																	2.700	1	U	U
EXPLOSIVES	RDX	mg/kg	1.7E-01	0.96	**9.6E-01**																	0.960	1	U	U
EXPLOSIVES	Tetryl	mg/kg	2.4E+01	0.66	**2.4E+01**																	0.660	1	U	U
HERBICIDES	2,2-Dichloropropanoic Acid	mg/kg	5.7E-01	0.1	**5.7E-01**																				
HERBICIDES	2,4,5-T	mg/kg	5.6E+00	0.004	**5.6E+00**																				
HERBICIDES	2,4,5-TP (Silvex)	mg/kg	1.3E+01	0.003	**1.3E+01**																				
HERBICIDES	2,4-D	mg/kg	6.0E+00	0.04	**6.0E+00**																				
HERBICIDES	2,4-DB	mg/kg	4.9E-01	0.04	**4.9E-01**																				
HERBICIDES	Dicamba	mg/kg	1.9E+00	0.004	**1.9E+00**																				
HERBICIDES	Dichloroprop	mg/kg	4.3E-01	0.04	**4.3E-01**																				
HERBICIDES	Dinoseb	mg/kg	8.1E-01	0.02	**8.1E-01**																				
HERBICIDES	MCPA	mg/kg	2.2E-02	4	**4.0E+00**																				
HERBICIDES	MCPP	mg/kg	5.1E-01	4	**4.0E+00**																				
METALS	Aluminum	mg/kg	1.7E+07	20	**1.7E+07**	6870.000	1			12400.000	1			6720.000	1			22200.000	1			4500.000	1		
METALS	Antimony	mg/kg	1.7E+00	3	**3.0E+00**	3.000	1	U	U	3.000	1	U	U	3.000	1	U	U	3.000	1	U	U	10.000	1	U	UJ
METALS	Arsenic	mg/kg	4.8E+00	0.3	**4.8E+00**	2.200	1			4.600	1			2.700	1			**5.200**	1			1.800	1		J
METALS	Barium	mg/kg	2.7E+02	0.3	**2.7E+02**	39.000	1			71.000	1			148.000	1			69.000	1			53.400	1		
METALS	Cadmium	mg/kg	8.5E-01	1	**1.0E+00**	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U
METALS	Calcium	mg/kg	NA	NA	**none**	2400.000	1			909.000	1			805.000	1			1190.000	1			422.000	1		
METALS	Chromium	mg/kg	6.3E+04	0.4	**6.3E+04**	9.000	1			15.000	1			10.000	1			23.000	1			7.300	1		
METALS	Cobalt	mg/kg	1.3E+03	0.5	**1.3E+03**	3.000	1			19.000	1			9.000	1			4.000	1			6.100	1		
METALS	Copper	mg/kg	2.5E+02	0.6	**2.5E+02**	3.000	1			3.000	1			2.960	1			4.000	1			4.100	1		
METALS	Iron	mg/kg	NA	NA	**none**	7810.000	1			15300.000	1			9330.000	1			19700.000	1			4680.000	1		
METALS	Lead	mg/kg	1.3E+02	5	**1.3E+02**	7.100	1			10.300	1			8.600	1			8.100	1			7.200	1		
METALS	Magnesium	mg/kg	NA	NA	**none**	3330.000	1			528.000	1			334.000	1			978.000	1			221.000	1		
METALS	Manganese	mg/kg	3.5E+03	0.2	**3.5E+03**	194.000	1			582.000	1			1030.000	1			94.000	1			662.000	1		
METALS	Mercury	mg/kg	8.2E-02	0.089	**8.9E-02**	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.089	1	U	U
METALS	Potassium	mg/kg	NA	NA	**none**	930.000	1			478.000	1			331.000	1			875.000	1			264.000	1		
METALS	Selenium	mg/kg	3.5E+00	1	**3.5E+00**	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	0.340	1		
METALS	Silver	mg/kg	2.9E+00	1	**2.9E+00**	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U	1.000	1	U	U
METALS	Strontium	mg/kg	6.2E+02	10	**6.2E+02**	6.000	1			11.000	1			8.000	1			15.000	1			10.000	1	U	U
METALS	Thallium	mg/kg	5.4E-01	49.8	**5.0E+01**																	49.800	1	U	U
METALS	Zinc	mg/kg	5.0E+03	2.5	**5.0E+03**	16.000	1			17.000	1			12.000	1			23.000	1			12.400	1		
PESTICIDES	4,4'-DDD	mg/kg	9.8E+00	0.00165	**9.8E+00**																				
PESTICIDES	4,4'-DDE	mg/kg	8.9E+00	0.00165	**8.9E+00**																				
PESTICIDES	4,4'-DDT	mg/kg	8.5E+00	0.00165	**8.5E+00**																				
PESTICIDES	Aldrin	mg/kg	7.8E-02	0.00165	**7.8E-02**																				
PESTICIDES	alpha-BHC	mg/kg	5.8E-03	0.00165	**5.8E-03**																				
PESTICIDES	alpha-Chlordane	mg/kg	5.6E+02	0.00165	**5.6E+02**																				
PESTICIDES	beta-BHC	mg/kg	2.1E-01	0.00165	**2.1E-01**																				
PESTICIDES	delta-BHC	mg/kg	1.3E-01	0.00165	**1.3E-01**																				
PESTICIDES	Dieldrin	mg/kg	3.7E-02	0.00165	**3.7E-02**																				
PESTICIDES	Endosulfan I	mg/kg	3.1E+02	0.00165	**3.1E+02**																				
PESTICIDES	Endosulfan II	mg/kg	3.6E+02	0.00165	**3.6E+02**																				
PESTICIDES	Endosulfan Sulfate	mg/kg	1.6E+03	0.00165	**1.6E+03**																				
PESTICIDES	Endrin	mg/kg	1.8E+00	0.00165	**1.8E+00**																				
PESTICIDES	Endrin aldehyde	mg/kg	7.2E+02	0.00165	**7.2E+02**																				
PESTICIDES	Endrin ketone	mg/kg	5.1E+02	0.00165	**5.1E+02**																				
PESTICIDES	gamma-BHC (Lindane)	mg/kg	2.1E-02	0.00165	**2.1E-02**																				
PESTICIDES	Heptachlor	mg/kg	4.5E-01	0.00165	**4.5E-01**																				
PESTICIDES	Heptachlor epoxide	mg/kg	1.7E+00	0.00165	**1.7E+00**																				
PESTICIDES	METHOXYCHLOR	mg/kg	7.0E+01	0.00165	**7.0E+01**																				

Table 10a
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Older Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S120-01				LH-S120-01				LH-S120-02				LH-S120-02				LHS-SH-02			
SAMPLE_NO			Calculated		**Standard 3**	LH-S120-01.1				LH-S120-01.2				LH-S120-02 .1				LH-S120-02.2				LHS-SH-02			
SAMPLE_DATE			Commercial		**Groundwater**	4-Aug-93				4-Aug-93				4-Aug-93				4-Aug-93				12-Jan-95			
DEPTH			/ Industrial	Practical	**Protective**	0.5-2 Ft				4-6 Ft				0.5-2 Ft				4-5 Ft				0-0.5 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
PESTICIDES	Toxaphene	mg/kg	2.8E+01	0.033	**2.8E+01**																				
PESTICIDES	gamma-CHLORDANE	mg/kg	3.1E+01	0.00165	**3.1E+01**																				
SEMIVOLATILES	1,2,4-Trichlorobenzene	mg/kg	1.1E+01	0.33	**1.1E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	1,2-Dichlorobenzene	mg/kg	4.0E+01	0.33	**4.0E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	1,3-Dichlorobenzene	mg/kg	5.2E+01	0.33	**5.2E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	1,4-Dichlorobenzene	mg/kg	4.7E+00	0.33	**4.7E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	2,4,5-Trichlorophenol	mg/kg	2.2E+03	1.65	**2.2E+03**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.000	1	U	U
SEMIVOLATILES	2,4,6-Trichlorophenol	mg/kg	2.1E+00	0.33	**2.1E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	2,4-Dichlorophenol	mg/kg	4.8E+00	0.33	**4.8E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	2,4-Dimethylphenol	mg/kg	2.4E+01	0.33	**2.4E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	2,4-Dinitrophenol	mg/kg	8.6E-02	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.000	1	U	U
SEMIVOLATILES	2,4-Dinitrotoluene	mg/kg	2.3E-03	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	2,6-Dinitrotoluene	mg/kg	1.9E-03	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	2-Chloronaphthalene	mg/kg	1.1E+03	0.33	**1.1E+03**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	2-Chlorophenol	mg/kg	2.0E+01	0.33	**2.0E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	2-Methylnaphthalene	mg/kg	1.7E+02	0.33	**1.7E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	2-Methylphenol	mg/kg	5.0E+01	0.33	**5.0E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	2-Nitroaniline	mg/kg	9.2E-02	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.000	1	U	U
SEMIVOLATILES	2-Nitrophenol	mg/kg	3.8E+00	0.33	**3.8E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	3,3'-Dichlorobenzidine	mg/kg	4.5E-02	0.65	**6.5E-01**	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.800	1	U	U
SEMIVOLATILES	3-Nitroaniline	mg/kg	1.3E-01	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.000	1	U	U
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	mg/kg	8.6E-02	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.000	1	U	U
SEMIVOLATILES	4-Bromophenyl phenyl ether	mg/kg	2.7E+00	0.33	**2.7E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	4-Chloro-3-methylphenol	mg/kg	4.3E+01	0.4	**4.3E+01**	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.400	1	U	U
SEMIVOLATILES	4-Chloroaniline	mg/kg	2.8E+00	0.4	**2.8E+00**	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.400	1	U	U
SEMIVOLATILES	4-Chlorophenyl phenyl ether	mg/kg	2.4E-01	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	4-Methylphenol	mg/kg	4.2E+00	0.33	**4.2E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	4-Nitroaniline	mg/kg	1.1E-01	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.000	1	U	U
SEMIVOLATILES	4-Nitrophenol	mg/kg	9.7E-01	1.65	**1.7E+00**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.000	1	U	U
SEMIVOLATILES	Acenaphthene	mg/kg	3.4E+02	0.33	**3.4E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Acenaphthylene	mg/kg	5.4E+02	0.33	**5.4E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Anthracene	mg/kg	2.0E+01	0.33	**2.0E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Benzo(a)anthracene	mg/kg	1.3E+01	0.33	**1.3E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Benzo(a)pyrene	mg/kg	1.8E+01	0.33	**1.8E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Benzo(b)fluoranthene	mg/kg	3.6E+01	0.33	**3.6E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Benzo(ghi)perylene	mg/kg	8.2E+00	0.33	**8.2E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Benzo(k)fluoranthene	mg/kg	1.4E+01	0.33	**1.4E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Benzoic Acid	mg/kg	2.1E+02	1.65	**2.1E+02**	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	1.650	1	U	U	2.000	1	U	U
SEMIVOLATILES	Benzyl Alcohol	mg/kg	4.8E+01	0.4	**4.8E+01**	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.650	1	U	U	0.400	1	U	U
SEMIVOLATILES	bis(2-Chloroethoxy)methane	mg/kg	7.8E-03	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	bis(2-Chloroethyl)ether	mg/kg	5.0E-04	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	mg/kg	1.3E+00	0.33	**1.3E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	mg/kg	3.9E+02	0.33	**3.9E+02**	0.330	1	U	U	0.330	1	U	U	0.380	1			0.373	1			0.400	1	U	U
SEMIVOLATILES	Butyl benzyl phthalate	mg/kg	8.0E+02	0.33	**8.0E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Chrysene	mg/kg	1.2E+01	0.33	**1.2E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Dibenzo(a,h)anthracene	mg/kg	1.9E+01	0.33	**1.9E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Dibenzofuran	mg/kg	3.3E+02	0.33	**3.3E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Diethyl phthalate	mg/kg	1.2E+03	0.33	**1.2E+03**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Dimethyl phthalate	mg/kg	2.8E+02	0.33	**2.8E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	di-n-Butyl phthalate	mg/kg	7.6E+03	0.33	**7.6E+03**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	di-n-Octyl phthalate	mg/kg	3.3E+04	0.33	**3.3E+04**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Fluoranthene	mg/kg	2.5E+02	0.33	**2.5E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Fluorene	mg/kg	3.0E+02	0.33	**3.0E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Hexachlorobenzene	mg/kg	2.7E+00	0.33	**2.7E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Hexachlorobutadiene	mg/kg	1.4E+01	0.33	**1.4E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Hexachlorocyclopentadiene	mg/kg	4.6E+01	0.33	**4.6E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Hexachloroethane	mg/kg	1.8E+01	0.33	**1.8E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	mg/kg	1.3E+02	0.33	**1.3E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Isophorone	mg/kg	1.0E+01	0.33	**1.0E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Naphthalene	mg/kg	3.1E+02	0.33	**3.1E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Nitrobenzene	mg/kg	6.7E-01	0.33	**6.7E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	n-Nitroso-di-n-propylamine	mg/kg	9.5E-05	0.33	**3.3E-01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	n-Nitrosodiphenylamine	mg/kg	1.9E+00	0.33	**1.9E+00**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U

Table 10a
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Older Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S120-01				LH-S120-01				LH-S120-02				LH-S120-02				LHS-SH-02			
SAMPLE_NO			Calculated		**Standard 3**	LH-S120-01.1				LH-S120-01.2				LH-S120-02 .1				LH-S120-02.2				LHS-SH-02			
SAMPLE_DATE			Commercial		**Groundwater**	4-Aug-93				4-Aug-93				4-Aug-93				4-Aug-93				12-Jan-95			
DEPTH			/ Industrial	Practical	**Protective**	0.5-2 Ft				4-6 Ft				0.5-2 Ft				4-5 Ft				0-0.5 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
SEMIVOLATILES	Pentachlorophenol	mg/kg	1.8E-01	1.65	**1.7E+00**	1.6500	1	U	U	1.6500	1	U	U	1.6500	1	U	U	1.6500	1	U	U	2.0000	1	U	U
SEMIVOLATILES	Phenanthrene	mg/kg	2.8E+02	0.33	**2.8E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Phenol	mg/kg	6.4E+01	0.33	**6.4E+01**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
SEMIVOLATILES	Pyrene	mg/kg	1.0E+02	0.33	**1.0E+02**	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.330	1	U	U	0.400	1	U	U
VOLATILES	1,1,1,2-Tetrachloroethane	mg/kg	1.0E+01	0.012	**1.0E+01**																	0.012	1	U	U
VOLATILES	1,1,1-Trichloroethane	mg/kg	2.3E+00	0.005	**2.3E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	1.1E-01	0.005	**1.1E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	1,1,2-Trichloroethane	mg/kg	2.6E-02	0.005	**2.6E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	1,1-Dichloroethane	mg/kg	3.8E+01	0.005	**3.8E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	1,1-Dichloroethene	mg/kg	5.4E-02	0.005	**5.4E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	1,2,3-Trichloropropane	mg/kg	1.6E-03	0.012	**1.2E-02**																	0.012	1	U	U
VOLATILES	1,2-Dibromo-3-chloropropane	mg/kg	3.4E-03	0.024	**2.4E-02**																	0.024	1	U	U
VOLATILES	1,2-Dibromoethane	mg/kg	2.8E-04	0.024	**2.4E-02**																	0.024	1	U	U
VOLATILES	1,2-Dichloroethane	mg/kg	1.1E-02	0.005	**1.1E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	1,2-Dichloroethene	mg/kg	2.4E-01	0.005	**2.4E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	1,2-Dichloropropane	mg/kg	3.1E-02	0.005	**3.1E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	2-Butanone	mg/kg	3.7E+01	0.012	**3.7E+01**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.012	1	U	U
VOLATILES	2-Chloroethyl vinyl ether	mg/kg	1.0E-02	0.01	**1.0E-02**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.012	1	U	U
VOLATILES	2-Hexanone	mg/kg	1.3E+01	0.012	**1.3E+01**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.012	1	U	U
VOLATILES	2-Propenal	mg/kg	2.4E-02	0.6	**6.0E-01**																	0.600	1	U	U
VOLATILES	Acetone	mg/kg	4.4E+01	0.012	**4.4E+01**	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.100	1	U	U	0.012	1	U	U
VOLATILES	Acetonitrile	mg/kg	1.5E+00	0.12	**1.5E+00**																	0.120	1	U	U
VOLATILES	Acrylonitrile	mg/kg	2.8E-04	0.12	**1.2E-01**																	0.120	1	U	U
VOLATILES	Allyl chloride	mg/kg	3.5E+00	0.012	**3.5E+00**																	0.012	1	U	U
VOLATILES	Benzene	mg/kg	3.5E-02	0.005	**3.5E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	Bromodichloromethane	mg/kg	2.7E-02	0.005	**2.7E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	Bromoform	mg/kg	3.2E-01	0.005	**3.2E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	Bromomethane	mg/kg	2.9E-01	0.01	**2.9E-01**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.012	1	U	U
VOLATILES	Carbon disulfide	mg/kg	6.2E+01	0.005	**6.2E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	Carbon tetrachloride	mg/kg	9.8E-02	0.005	**9.8E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	Chlorobenzene	mg/kg	2.1E+00	0.005	**2.1E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	Chloroethane	mg/kg	9.6E+01	0.01	**9.6E+01**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.012	1	U	U
VOLATILES	Chloroform	mg/kg	5.2E+00	0.005	**5.2E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	Chloromethane	mg/kg	5.2E-01	0.01	**5.2E-01**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.012	1	U	U
VOLATILES	Chloroprene	mg/kg	1.6E+00	0.12	**1.6E+00**																	0.120	1	U	U
VOLATILES	cis-1,3-Dichloropropene	mg/kg	2.6E-02	0.005	**2.6E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	Dibromochloromethane	mg/kg	2.2E-01	0.005	**2.2E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	Dibromomethane	mg/kg	6.9E+00	0.024	**6.9E+00**																	0.024	1	U	U
VOLATILES	Dichlorodifluoromethane	mg/kg	5.9E+02	0.024	**5.9E+02**																	0.024	1	U	U
VOLATILES	Ethyl methacrylate	mg/kg	3.7E+01	0.024	**3.7E+01**																	0.024	1	U	U
VOLATILES	Ethylbenzene	mg/kg	1.4E+01	0.005	**1.4E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	IODOMETHANE	mg/kg	3.7E-01	0.012	**3.7E-01**																	0.012	1	U	U
VOLATILES	ISOBUTYL ALCOHOL	mg/kg	2.9E+01	2.4	**2.9E+01**																	2.400	1	U	U
VOLATILES	Methacrylonitrile	mg/kg	7.6E-03	0.024	**2.4E-02**																	0.024	1	U	U
VOLATILES	Methyl isobutyl ketone	mg/kg	1.5E+01	0.012	**1.5E+01**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.012	1	U	U
VOLATILES	METHYL METHACRYLATE	mg/kg	3.8E+02	0.024	**3.8E+02**																	0.024	1	U	U
VOLATILES	Methylene chloride	mg/kg	8.2E-03	0.005	**8.2E-03**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	Pentachloroethane	mg/kg	2.1E+00	0.024	**2.1E+00**																	0.024	1	U	U
VOLATILES	Propionitrile	mg/kg	2.4E-02	0.06	**6.0E-02**																	0.060	1	U	U
VOLATILES	Styrene	mg/kg	7.4E+00	0.005	**7.4E+00**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	Tetrachloroethene	mg/kg	8.0E-02	0.005	**8.0E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	Toluene	mg/kg	1.4E+01	0.005	**1.4E+01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	trans-1,3-Dichloropropene	mg/kg	1.4E-01	0.005	**1.4E-01**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	trans-1,4-Dichloro-2-butene	mg/kg	7.9E-03	0.024	**2.4E-02**																	0.024	1	U	U
VOLATILES	Trichloroethene	mg/kg	4.9E-02	0.005	**4.9E-02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U
VOLATILES	Trichlorofluoromethane	mg/kg	5.3E+02	0.012	**5.3E+02**																	0.012	1	U	U
VOLATILES	Vinyl acetate	mg/kg	9.7E+01	0.012	**9.7E+01**	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.050	1	U	U	0.012	1	U	U
VOLATILES	Vinyl chloride	mg/kg	9.7E-03	0.01	**1.0E-02**	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.010	1	U	U	0.012	1	U	U
VOLATILES	Xylenes, Total	mg/kg	2.4E+02	0.005	**2.4E+02**	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.005	1	U	U	0.006	1	U	U

Table 10a
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Older Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	LH-S120-01				LH-S120-01				LH-S120-02				LH-S120-02				LHS-SH-02			
SAMPLE_NO			Calculated		**Standard 3**	LH-S120-01.1				LH-S120-01.2				LH-S120-02 .1				LH-S120-02.2				LHS-SH-02			
SAMPLE_DATE			Commercial		**Groundwater**	4-Aug-93				4-Aug-93				4-Aug-93				4-Aug-93				12-Jan-95			
DEPTH			/ Industrial	Practical	**Protective**	0.5-2 Ft				4-6 Ft				0.5-2 Ft				4-5 Ft				0-0.5 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (PQL) [b]	**Value [c]**	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ	Result	DIL	LQ	VQ
Notes:																									
Boxed and Bold = Detected Concentration exceeds Applicable Standard 3 Soil MSC.																									
Shaded = Undetected (SQL) value exceeds Applicable Standard 3 Soil MSC.																									
U - Not detected																									
DIL - dilution factor																									
FD - field duplicate																									
Ft - feet																									
LQ - laboratory qualifier																									
mg/kg - milligrams per kilogram																									
MSC - medium specific concentration																									
NA - not applicable																									
PQL - practical quantitation limit																									
REG - regular sample																									
SQL - Sample Quantitation Limit																									
VQ - validation qualifier																									
[a] Value developed in Attachment 8 using the SAM Model. Shading indicates a chemical specific value.																									
[b] PQL values are the minimum undetected result shown in the table, or a laboratory value.																									
[c] Shading indicates MSC value equal to the PQL.																									

Table 10b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	35SUMP119-SB01				35SUMP119-SB02				35SUMP120-SB01				35SUMP120-SB02				59SB01				59SB01			
SAMPLE_NO			Calculated		**Standard 3**	35-SMP119-SB01-02				35-SMP119-SB02-02				35-SMP120-SB01-02				35-SMP120-SB02-02				59SB01-01				59SB01-02			
SAMPLE_DATE			Commercial		**Groundwater**	26-Sep-06				26-Sep-06				26-Sep-06				26-Sep-06				2-Aug-06				2-Aug-06			
DEPTH			/ Industrial	Method	**Protective**	6-6 Ft				6-6 Ft				6-6 Ft				6-6 Ft				0-1 Ft				3-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
EXPLOSIVES	1,3,5-Trinitrobenzene	mg/kg	5.5E+00	0.25	**5.5E+00**																								
EXPLOSIVES	1,3-Dinitrobenzene	mg/kg	3.4E-02	0.25	**2.5E-01**																								
EXPLOSIVES	2,4,6-Trinitrotoluene	mg/kg	1.5E+00	0.25	**1.5E+00**																								
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	2.3E-03	0.165	**1.7E-01**																								
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	1.9E-03	0.165	**1.7E-01**																								
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	mg/kg	6.0E-01	0.26	**6.0E-01**																								
EXPLOSIVES	HMX	mg/kg	2.2E+00	2.2	**2.2E+00**																								
EXPLOSIVES	m-Nitrotoluene	mg/kg	1.4E+01	0.25	**1.4E+01**																								
EXPLOSIVES	Nitrobenzene	mg/kg	6.7E-01	0.165	**6.7E-01**																								
EXPLOSIVES	o-Nitrotoluene	mg/kg	1.4E+01	1	**1.4E+01**																								
EXPLOSIVES	p-Nitrotoluene	mg/kg	1.4E+01	0.65	**1.4E+01**																								
EXPLOSIVES	RDX	mg/kg	1.7E-01	0.26	**2.6E-01**																								
EXPLOSIVES	Tetryl	mg/kg	2.4E+01	0.25	**2.4E+01**																								
HERBICIDES	2,2-Dichloropropanoic Acid	mg/kg	5.7E-01	0.1	**5.7E-01**																	0.058	1	U	U	0.065	1	U	U
HERBICIDES	2,4,5-T	mg/kg	5.6E+00	0.004	**5.6E+00**																	0.002	1	U	U	0.003	1	U	U
HERBICIDES	2,4,5-TP (Silvex)	mg/kg	1.3E+01	0.003	**1.3E+01**																	0.002	1	U	U	0.002	1	U	U
HERBICIDES	2,4-D	mg/kg	6.0E+00	0.04	**6.0E+00**																	0.023	1	U	U	0.026	1	U	U
HERBICIDES	2,4-DB	mg/kg	4.9E-01	0.04	**4.9E-01**																	0.023	1	U	U	0.026	1	U	U
HERBICIDES	Dicamba	mg/kg	1.9E+00	0.004	**1.9E+00**																	0.002	1	U	U	0.003	1	U	U
HERBICIDES	Dichloroprop	mg/kg	4.3E-01	0.04	**4.3E-01**																	0.023	1	U	U	0.026	1	U	U
HERBICIDES	Dinoseb	mg/kg	8.1E-01	0.02	**8.1E-01**																	0.011	1	U	U	0.013	1	U	U
HERBICIDES	MCPA	mg/kg	2.2E-02	4	**4.0E+00**																	2.245	1	U	U	2.378	1	U	U
HERBICIDES	MCPP	mg/kg	5.1E-01	4	**4.0E+00**																	2.245	1	U	U	2.378	1	U	U
METALS	Aluminum	mg/kg	1.7E+07	20	**1.7E+07**																								
METALS	Antimony	mg/kg	1.7E+00	0.1	**1.7E+00**																								
METALS	Arsenic	mg/kg	4.8E+00	0.3	**4.8E+00**																								
METALS	Barium	mg/kg	2.7E+02	0.3	**2.7E+02**																								
METALS	Cadmium	mg/kg	8.5E-01	0.1	**8.5E-01**																								
METALS	Calcium	mg/kg	NA	NA	**none**																								
METALS	Chromium	mg/kg	6.3E+04	0.4	**6.3E+04**																								
METALS	Cobalt	mg/kg	1.3E+03	0.5	**1.3E+03**																								
METALS	Copper	mg/kg	2.5E+02	0.6	**2.5E+02**																								
METALS	Iron	mg/kg	NA	NA	**none**																								
METALS	Lead	mg/kg	1.3E+02	5	**1.3E+02**																								
METALS	Magnesium	mg/kg	NA	NA	**none**																								
METALS	Manganese	mg/kg	3.5E+03	0.2	**3.5E+03**																								
METALS	Mercury	mg/kg	8.2E-02	0.25	**2.5E-01**																								
METALS	Potassium	mg/kg	NA	NA	**none**																								
METALS	Selenium	mg/kg	3.5E+00	0.2	**3.5E+00**																								
METALS	Silver	mg/kg	2.9E+00	0.2	**2.9E+00**																								
METALS	Strontium	mg/kg	6.2E+02	0.5	**6.2E+02**																								
METALS	Thallium	mg/kg	5.4E-01	0.02	**5.4E-01**																								
METALS	Zinc	mg/kg	5.0E+03	2.5	**5.0E+03**																								
PESTICIDES	4,4'-DDD	mg/kg	9.8E+00	0.00165	**9.8E+00**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	4,4'-DDE	mg/kg	8.9E+00	0.00165	**8.9E+00**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	4,4'-DDT	mg/kg	8.5E+00	0.00165	**8.5E+00**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Aldrin	mg/kg	7.8E-02	0.00165	**7.8E-02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	alpha-BHC	mg/kg	5.8E-03	0.00165	**5.8E-03**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	alpha-Chlordane	mg/kg	5.6E+02	0.00165	**5.6E+02**	0.0025	1	P	J	0.0004	1	U	U	0.0397	1	P	J	0.0004	1	U	U	2.2664	500	P	J	0.0149	1	P	J
PESTICIDES	beta-BHC	mg/kg	2.1E-01	0.00165	**2.1E-01**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	delta-BHC	mg/kg	1.3E-01	0.00165	**1.3E-01**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Dieldrin	mg/kg	3.7E-02	0.00165	**3.7E-02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Endosulfan I	mg/kg	3.1E+02	0.00165	**3.1E+02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Endosulfan II	mg/kg	3.6E+02	0.00165	**3.6E+02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Endosulfan Sulfate	mg/kg	1.6E+03	0.00165	**1.6E+03**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Endrin	mg/kg	1.8E+00	0.00165	**1.8E+00**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Endrin aldehyde	mg/kg	7.2E+02	0.00165	**7.2E+02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Endrin ketone	mg/kg	5.1E+02	0.00165	**5.1E+02**	0.0004	1	U	UJ	0.0004	1	U	UJ	0.0004	1	U	UJ	0.0004	1	U	UJ	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	gamma-BHC (Lindane)	mg/kg	2.1E-02	0.00165	**2.1E-02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Heptachlor	mg/kg	4.5E-01	0.00165	**4.5E-01**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0059	1			0.0004	1	U	U
PESTICIDES	Heptachlor epoxide	mg/kg	1.7E+00	0.00165	**1.7E+00**	0.0004	1	U	U	0.0004	1	U	U	0.0099	1			0.0004	1	U	U	0.0004	1	U	U	0.0030	1	P	J
PESTICIDES	METHOXYCHLOR	mg/kg	7.0E+01	0.00165	**7.0E+01**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Toxaphene	mg/kg	2.8E+01	0.033	**2.8E+01**	0.0222	1	U	U	0.0215	1	U	U	0.0227	1	U	U	0.0220	1	U	U	0.0191	1	U	U	0.0214	1	U	U
PESTICIDES	gamma-CHLORDANE	mg/kg	3.1E+01	0.00165	**3.1E+01**	0.0012	1	J	J	0.0004	1	U	U	0.0093	1			0.0004	1	U	U	2.6101	500			0.0179	1		

Table 10b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	35SUMP119-SB01				35SUMP119-SB02				35SUMP120-SB01				35SUMP120-SB02				59SB01				59SB01			
SAMPLE_NO			Calculated		**Standard 3**	35-SMP119-SB01-02				35-SMP119-SB02-02				35-SMP120-SB01-02				35-SMP120-SB02-02				59SB01-01				59SB01-02			
SAMPLE_DATE			Commercial		**Groundwater**	26-Sep-06				26-Sep-06				26-Sep-06				26-Sep-06				2-Aug-06				2-Aug-06			
DEPTH			/ Industrial	Method	**Protective**	6-6 Ft				6-6 Ft				6-6 Ft				6-6 Ft				0-1 Ft				3-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
SEMIVOLATILES	1,2,4-Trichlorobenzene	mg/kg	1.1E+01	0.005	**1.1E+01**																								
SEMIVOLATILES	1,2-Dichlorobenzene	mg/kg	4.0E+01	0.005	**4.0E+01**																								
SEMIVOLATILES	1,3-Dichlorobenzene	mg/kg	5.2E+01	0.005	**5.2E+01**																								
SEMIVOLATILES	1,4-Dichlorobenzene	mg/kg	4.7E+00	0.005	**4.7E+00**																								
SEMIVOLATILES	2,4,5-Trichlorophenol	mg/kg	2.2E+03	0.165	**2.2E+03**																								
SEMIVOLATILES	2,4,6-Trichlorophenol	mg/kg	2.1E+00	0.165	**2.1E+00**																								
SEMIVOLATILES	2,4-Dichlorophenol	mg/kg	4.8E+00	0.165	**4.8E+00**																								
SEMIVOLATILES	2,4-Dimethylphenol	mg/kg	2.4E+01	0.165	**2.4E+01**																								
SEMIVOLATILES	2,4-Dinitrophenol	mg/kg	8.6E-02	0.825	**8.3E-01**																								
SEMIVOLATILES	2,4-Dinitrotoluene	mg/kg	2.3E-03	0.165	**1.7E-01**																								
SEMIVOLATILES	2,6-Dinitrotoluene	mg/kg	1.9E-03	0.165	**1.7E-01**																								
SEMIVOLATILES	2-Chloronaphthalene	mg/kg	1.1E+03	0.165	**1.1E+03**																								
SEMIVOLATILES	2-Chlorophenol	mg/kg	2.0E+01	0.165	**2.0E+01**																								
SEMIVOLATILES	2-Methylnaphthalene	mg/kg	1.7E+02	0.165	**1.7E+02**																								
SEMIVOLATILES	2-Methylphenol	mg/kg	5.0E+01	0.165	**5.0E+01**																								
SEMIVOLATILES	2-Nitroaniline	mg/kg	9.2E-02	0.825	**8.3E-01**																								
SEMIVOLATILES	2-Nitrophenol	mg/kg	3.8E+00	0.165	**3.8E+00**																								
SEMIVOLATILES	3,3'-Dichlorobenzidine	mg/kg	4.5E-02	0.33	**3.3E-01**																								
SEMIVOLATILES	3-Nitroaniline	mg/kg	1.3E-01	0.825	**8.3E-01**																								
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	mg/kg	8.6E-02	0.825	**8.3E-01**																								
SEMIVOLATILES	4-Bromophenyl phenyl ether	mg/kg	2.7E+00	0.165	**2.7E+00**																								
SEMIVOLATILES	4-Chloro-3-methylphenol	mg/kg	4.3E+01	0.165	**4.3E+01**																								
SEMIVOLATILES	4-Chloroaniline	mg/kg	2.8E+00	0.165	**2.8E+00**																								
SEMIVOLATILES	4-Chlorophenyl phenyl ether	mg/kg	2.4E-01	0.165	**2.4E-01**																								
SEMIVOLATILES	4-Methylphenol	mg/kg	4.2E+00	0.165	**4.2E+00**																								
SEMIVOLATILES	4-Nitroaniline	mg/kg	1.1E-01	0.825	**8.3E-01**																								
SEMIVOLATILES	4-Nitrophenol	mg/kg	9.7E-01	0.825	**9.7E-01**																								
SEMIVOLATILES	Acenaphthene	mg/kg	3.4E+02	0.165	**3.4E+02**																								
SEMIVOLATILES	Acenaphthylene	mg/kg	5.4E+02	0.165	**5.4E+02**																								
SEMIVOLATILES	Anthracene	mg/kg	2.0E+01	0.165	**2.0E+01**																								
SEMIVOLATILES	Benzo(a)anthracene	mg/kg	1.3E+01	0.165	**1.3E+01**																								
SEMIVOLATILES	Benzo(a)pyrene	mg/kg	1.8E+01	0.165	**1.8E+01**																								
SEMIVOLATILES	Benzo(b)fluoranthene	mg/kg	3.6E+01	0.165	**3.6E+01**																								
SEMIVOLATILES	Benzo(ghi)perylene	mg/kg	8.2E+00	0.165	**8.2E+00**																								
SEMIVOLATILES	Benzo(k)fluoranthene	mg/kg	1.4E+01	0.165	**1.4E+01**																								
SEMIVOLATILES	Benzoic Acid	mg/kg	2.1E+02	0.825	**2.1E+02**																								
SEMIVOLATILES	Benzyl Alcohol	mg/kg	4.8E+01	0.165	**4.8E+01**																								
SEMIVOLATILES	bis(2-Chloroethoxy)methane	mg/kg	7.8E-03	0.165	**1.7E-01**																								
SEMIVOLATILES	bis(2-Chloroethyl)ether	mg/kg	5.0E-04	0.165	**1.7E-01**																								
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	mg/kg	1.3E+00	0.165	**1.3E+00**																								
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	mg/kg	3.9E+02	0.165	**3.9E+02**																								
SEMIVOLATILES	Butyl benzyl phthalate	mg/kg	8.0E+02	0.165	**8.0E+02**																								
SEMIVOLATILES	Chrysene	mg/kg	1.2E+01	0.165	**1.2E+01**																								
SEMIVOLATILES	Dibenzo(a,h)anthracene	mg/kg	1.9E+01	0.165	**1.9E+01**																								
SEMIVOLATILES	Dibenzofuran	mg/kg	3.3E+02	0.165	**3.3E+02**																								
SEMIVOLATILES	Diethyl phthalate	mg/kg	1.2E+03	0.165	**1.2E+03**																								
SEMIVOLATILES	Dimethyl phthalate	mg/kg	2.8E+02	0.165	**2.8E+02**																								
SEMIVOLATILES	di-n-Butyl phthalate	mg/kg	7.6E+03	0.165	**7.6E+03**																								
SEMIVOLATILES	di-n-Octyl phthalate	mg/kg	3.3E+04	0.165	**3.3E+04**																								
SEMIVOLATILES	Fluoranthene	mg/kg	2.5E+02	0.165	**2.5E+02**																								
SEMIVOLATILES	Fluorene	mg/kg	3.0E+02	0.165	**3.0E+02**																								
SEMIVOLATILES	Hexachlorobenzene	mg/kg	2.7E+00	0.165	**2.7E+00**																								
SEMIVOLATILES	Hexachlorobutadiene	mg/kg	1.4E+01	0.005	**1.4E+01**																								
SEMIVOLATILES	Hexachlorocyclopentadiene	mg/kg	4.6E+01	0.165	**4.6E+01**																								
SEMIVOLATILES	Hexachloroethane	mg/kg	1.8E+01	0.165	**1.8E+01**																								
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	mg/kg	1.3E+02	0.165	**1.3E+02**																								
SEMIVOLATILES	Isophorone	mg/kg	1.0E+01	0.165	**1.0E+01**																								
SEMIVOLATILES	Naphthalene	mg/kg	3.1E+02	0.01	**3.1E+02**																								
SEMIVOLATILES	Nitrobenzene	mg/kg	6.7E-01	0.165	**6.7E-01**																								
SEMIVOLATILES	n-Nitroso-di-n-propylamine	mg/kg	9.5E-05	0.165	**1.7E-01**																								
SEMIVOLATILES	n-Nitrosodiphenylamine	mg/kg	1.9E+00	0.165	**1.9E+00**																								
SEMIVOLATILES	Pentachlorophenol	mg/kg	1.8E-01	0.825	**8.3E-01**																	0.002	1	U	U	0.002	1	U	U
SEMIVOLATILES	Phenanthrene	mg/kg	2.8E+02	0.165	**2.8E+02**																								
SEMIVOLATILES	Phenol	mg/kg	6.4E+01	0.165	**6.4E+01**																								
SEMIVOLATILES	Pyrene	mg/kg	1.0E+02	0.165	**1.0E+02**																								

Table 10b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	35SUMP119-SB01				35SUMP119-SB02				35SUMP120-SB01				35SUMP120-SB02				59SB01				59SB01			
SAMPLE_NO			Calculated		**Standard 3**	35-SMP119-SB01-02				35-SMP119-SB02-02				35-SMP120-SB01-02				35-SMP120-SB02-02				59SB01-01				59SB01-02			
SAMPLE_DATE			Commercial		**Groundwater**	26-Sep-06				26-Sep-06				26-Sep-06				26-Sep-06				2-Aug-06				2-Aug-06			
DEPTH			/ Industrial	Method	**Protective**	6-6 Ft				6-6 Ft				6-6 Ft				6-6 Ft				0-1 Ft				3-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
VOLATILES	1,1,1,2-Tetrachloroethane	mg/kg	1.0E+01	0.005	**1.0E+01**																								
VOLATILES	1,1,1-Trichloroethane	mg/kg	2.3E+00	0.005	**2.3E+00**																								
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	1.1E-01	0.005	**1.1E-01**																								
VOLATILES	1,1,2-Trichloroethane	mg/kg	2.6E-02	0.005	**2.6E-02**																								
VOLATILES	1,1-Dichloroethane	mg/kg	3.8E+01	0.005	**3.8E+01**																								
VOLATILES	1,1-Dichloroethene	mg/kg	5.4E-02	0.005	**5.4E-02**																								
VOLATILES	1,2,3-Trichloropropane	mg/kg	1.6E-03	0.005	**5.0E-03**																								
VOLATILES	1,2-Dibromo-3-chloropropane	mg/kg	3.4E-03	0.005	**5.0E-03**																								
VOLATILES	1,2-Dibromoethane	mg/kg	2.8E-04	0.005	**5.0E-03**																								
VOLATILES	1,2-Dichloroethane	mg/kg	1.1E-02	0.005	**1.1E-02**																								
VOLATILES	1,2-Dichloroethene	mg/kg	2.4E-01	0.005	**2.4E-01**																								
VOLATILES	1,2-Dichloropropane	mg/kg	3.1E-02	0.005	**3.1E-02**																								
VOLATILES	2-Butanone	mg/kg	3.7E+01	0.01	**3.7E+01**																								
VOLATILES	2-Chloroethyl vinyl ether	mg/kg	1.0E-02	0.01	**1.0E-02**																								
VOLATILES	2-Hexanone	mg/kg	1.3E+01	0.01	**1.3E+01**																								
VOLATILES	2-Propenal	mg/kg	2.4E-02	0.005	**2.4E-02**																								
VOLATILES	Acetone	mg/kg	4.4E+01	0.01	**4.4E+01**																								
VOLATILES	Acetonitrile	mg/kg	1.5E+00	0.005	**1.5E+00**																								
VOLATILES	Acrylonitrile	mg/kg	2.8E-04	0.005	**5.0E-03**																								
VOLATILES	Allyl chloride	mg/kg	3.5E+00	0.005	**3.5E+00**																								
VOLATILES	Benzene	mg/kg	3.5E-02	0.005	**3.5E-02**																								
VOLATILES	Bromodichloromethane	mg/kg	2.7E-02	0.005	**2.7E-02**																								
VOLATILES	Bromoform	mg/kg	3.2E-01	0.005	**3.2E-01**																								
VOLATILES	Bromomethane	mg/kg	2.9E-01	0.01	**2.9E-01**																								
VOLATILES	Carbon disulfide	mg/kg	6.2E+01	0.005	**6.2E+01**																								
VOLATILES	Carbon tetrachloride	mg/kg	9.8E-02	0.005	**9.8E-02**																								
VOLATILES	Chlorobenzene	mg/kg	2.1E+00	0.005	**2.1E+00**																								
VOLATILES	Chloroethane	mg/kg	9.6E+01	0.01	**9.6E+01**																								
VOLATILES	Chloroform	mg/kg	5.2E+00	0.005	**5.2E+00**																								
VOLATILES	Chloromethane	mg/kg	5.2E-01	0.01	**5.2E-01**																								
VOLATILES	Chloroprene	mg/kg	1.6E+00	0.005	**1.6E+00**																								
VOLATILES	cis-1,3-Dichloropropene	mg/kg	2.6E-02	0.005	**2.6E-02**																								
VOLATILES	Dibromochloromethane	mg/kg	2.2E-01	0.005	**2.2E-01**																								
VOLATILES	Dibromomethane	mg/kg	6.9E+00	0.005	**6.9E+00**																								
VOLATILES	Dichlorodifluoromethane	mg/kg	5.9E+02	0.01	**5.9E+02**																								
VOLATILES	Ethyl methacrylate	mg/kg	3.7E+01	0.005	**3.7E+01**																								
VOLATILES	Ethylbenzene	mg/kg	1.4E+01	0.005	**1.4E+01**																								
VOLATILES	IODOMETHANE	mg/kg	3.7E-01	0.005	**3.7E-01**																								
VOLATILES	ISOBUTYL ALCOHOL	mg/kg	2.9E+01	0.005	**2.9E+01**																								
VOLATILES	Methacrylonitrile	mg/kg	7.6E-03	0.005	**7.6E-03**																								
VOLATILES	Methyl isobutyl ketone	mg/kg	1.5E+01	0.01	**1.5E+01**																								
VOLATILES	METHYL METHACRYLATE	mg/kg	3.8E+02	0.005	**3.8E+02**																								
VOLATILES	Methylene chloride	mg/kg	8.2E-03	0.005	**8.2E-03**																								
VOLATILES	Pentachloroethane	mg/kg	2.1E+00	0.005	**2.1E+00**																								
VOLATILES	Propionitrile	mg/kg	2.4E-02	0.005	**2.4E-02**																								
VOLATILES	Styrene	mg/kg	7.4E+00	0.005	**7.4E+00**																								
VOLATILES	Tetrachloroethene	mg/kg	8.0E-02	0.005	**8.0E-02**																								
VOLATILES	Toluene	mg/kg	1.4E+01	0.005	**1.4E+01**																								
VOLATILES	trans-1,3-Dichloropropene	mg/kg	1.4E-01	0.005	**1.4E-01**																								
VOLATILES	trans-1,4-Dichloro-2-butene	mg/kg	7.9E-03	0.005	**7.9E-03**																								
VOLATILES	Trichloroethene	mg/kg	4.9E-02	0.005	**4.9E-02**																								
VOLATILES	Trichlorofluoromethane	mg/kg	5.3E+02	0.01	**5.3E+02**																								
VOLATILES	Vinyl acetate	mg/kg	9.7E+01	0.01	**9.7E+01**																								
VOLATILES	Vinyl chloride	mg/kg	9.7E-03	0.01	**1.0E-02**																								
VOLATILES	Xylenes, Total	mg/kg	2.4E+02	0.005	**2.4E+02**																								

Table 10b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	35SUMP119-SB01				35SUMP119-SB02				35SUMP120-SB01				35SUMP120-SB02				59SB01				59SB01			
SAMPLE_NO			Calculated		**Standard 3**	35-SMP119-SB01-02				35-SMP119-SB02-02				35-SMP120-SB01-02				35-SMP120-SB02-02				59SB01-01				59SB01-02			
SAMPLE_DATE			Commercial		**Groundwater**	26-Sep-06				26-Sep-06				26-Sep-06				26-Sep-06				2-Aug-06				2-Aug-06			
DEPTH			/ Industrial	Method	**Protective**	6-6 Ft				6-6 Ft				6-6 Ft				6-6 Ft				0-1 Ft				3-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ

Notes:

Boxed and Bold = Detected Concentration exceeds Applicable Standard 3 Soil MSC.

Shaded = Undetected (SQL) value exceeds Applicable Standard 3 Soil MSC.

J - The analyte was positively identified; the reported value is the estimated concentration of the constituent detected with concentration measured between the MDL and the MQL for samples 2000 or later.

P - Difference between gas chromatograph column readings is greater than 25 percent.

U - Not detected

DIL - dilution factor
FD - field duplicate
Ft - feet
LQ - laboratory qualifier
MDL - method detection limit
mg/kg - milligrams per kilogram
MQL - method quantitation limit
MSC - medium specific concentration
NA - not applicable
REG - regular sample
SQL - Sample Quantitation Limit
VQ - validation qualifier

[a] Value developed in Attachment 8 using the SAM Model. Shading indicates a chemical specific value.

[b] MQL values provided by laboratory for recent samples (2000 or later).

[c] Shading indicates MSC value equal to the MQL.

[d] Results for recent samples were adjusted for moisture content and for dilution factor if MQL = Applicable MSC.

Table 10b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	59SB02				59SB02				59SB03				59SB03				59SB04				59SB04			
SAMPLE_NO			Calculated		**Standard 3**	59SB02-01				59SB02-02				59SB03-01				59SB03-02				59SB04-01				59SB04-02			
SAMPLE_DATE			Commercial		**Groundwater**	2-Aug-06				2-Aug-06				2-Aug-06				2-Aug-06				2-Aug-06				2-Aug-06			
DEPTH			/ Industrial	Method	**Protective**	0-1 Ft				3-4 Ft				0-1 Ft				3-4 Ft				0-1 Ft				3-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
EXPLOSIVES	1,3,5-Trinitrobenzene	mg/kg	5.5E+00	0.25	**5.5E+00**																								
EXPLOSIVES	1,3-Dinitrobenzene	mg/kg	3.4E-02	0.25	**2.5E-01**																								
EXPLOSIVES	2,4,6-Trinitrotoluene	mg/kg	1.5E+00	0.25	**1.5E+00**																								
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	2.3E-03	0.165	**1.7E-01**																								
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	1.9E-03	0.165	**1.7E-01**																								
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	mg/kg	6.0E-01	0.26	**6.0E-01**																								
EXPLOSIVES	HMX	mg/kg	2.2E+00	2.2	**2.2E+00**																								
EXPLOSIVES	m-Nitrotoluene	mg/kg	1.4E+01	0.25	**1.4E+01**																								
EXPLOSIVES	Nitrobenzene	mg/kg	6.7E-01	0.165	**6.7E-01**																								
EXPLOSIVES	o-Nitrotoluene	mg/kg	1.4E+01	1	**1.4E+01**																								
EXPLOSIVES	p-Nitrotoluene	mg/kg	1.4E+01	0.65	**1.4E+01**																								
EXPLOSIVES	RDX	mg/kg	1.7E-01	0.26	**2.6E-01**																								
EXPLOSIVES	Tetryl	mg/kg	2.4E+01	0.25	**2.4E+01**																								
HERBICIDES	2,2-Dichloropropanoic Acid	mg/kg	5.7E-01	0.1	**5.7E-01**	0.552	10	U	U	0.062	1	U	U	0.314	5	U	U	0.063	1	U	U	0.282	5	U	U	0.061	1	U	U
HERBICIDES	2,4,5-T	mg/kg	5.6E+00	0.004	**5.6E+00**	0.022	10	U	U	0.002	1	U	U	0.013	5	U	U	0.003	1	U	U	0.011	5	U	U	0.002	1	U	U
HERBICIDES	2,4,5-TP (Silvex)	mg/kg	1.3E+01	0.003	**1.3E+01**	0.017	10	U	U	0.002	1	U	U	0.009	5	U	U	0.002	1	U	U	0.008	5	U	U	0.002	1	U	U
HERBICIDES	2,4-D	mg/kg	6.0E+00	0.04	**6.0E+00**	0.221	10	U	U	0.025	1	U	U	0.126	5	U	U	0.025	1	U	U	0.113	5	U	U	0.024	1	U	U
HERBICIDES	2,4-DB	mg/kg	4.9E-01	0.04	**4.9E-01**	0.221	10	U	U	0.025	1	U	U	0.126	5	U	U	0.025	1	U	U	0.113	5	U	U	0.024	1	U	U
HERBICIDES	Dicamba	mg/kg	1.9E+00	0.004	**1.9E+00**	0.022	10	U	U	0.002	1	U	U	0.013	5	U	U	0.003	1	U	U	0.011	5	U	U	0.002	1	U	U
HERBICIDES	Dichloroprop	mg/kg	4.3E-01	0.04	**4.3E-01**	0.221	10	U	U	0.025	1	U	U	0.126	5	U	U	0.025	1	U	U	0.113	5	U	U	0.024	1	U	U
HERBICIDES	Dinoseb	mg/kg	8.1E-01	0.02	**8.1E-01**	0.110	10	U	U	0.012	1	U	U	0.063	5	U	U	0.013	1	U	U	0.056	5	U	U	0.012	1	U	U
HERBICIDES	MCPA	mg/kg	2.2E-02	4	**4.0E+00**	21.977	10	U	U	2.325	1	U	U	11.728	5	U	U	2.356	1	U	U	11.105	5	U	U	2.320	1	U	U
HERBICIDES	MCPP	mg/kg	5.1E-01	4	**4.0E+00**	21.977	10	U	U	2.325	1	U	U	11.728	5	U	U	2.356	1	U	U	11.105	5	U	U	2.320	1	U	U
METALS	Aluminum	mg/kg	1.7E+07	20	**1.7E+07**																								
METALS	Antimony	mg/kg	1.7E+00	0.1	**1.7E+00**																								
METALS	Arsenic	mg/kg	4.8E+00	0.3	**4.8E+00**																								
METALS	Barium	mg/kg	2.7E+02	0.3	**2.7E+02**																								
METALS	Cadmium	mg/kg	8.5E-01	0.1	**8.5E-01**																								
METALS	Calcium	mg/kg	NA	NA	**none**																								
METALS	Chromium	mg/kg	6.3E+04	0.4	**6.3E+04**																								
METALS	Cobalt	mg/kg	1.3E+03	0.5	**1.3E+03**																								
METALS	Copper	mg/kg	2.5E+02	0.6	**2.5E+02**																								
METALS	Iron	mg/kg	NA	NA	**none**																								
METALS	Lead	mg/kg	1.3E+02	5	**1.3E+02**																								
METALS	Magnesium	mg/kg	NA	NA	**none**																								
METALS	Manganese	mg/kg	3.5E+03	0.2	**3.5E+03**																								
METALS	Mercury	mg/kg	8.2E-02	0.25	**2.5E-01**																								
METALS	Potassium	mg/kg	NA	NA	**none**																								
METALS	Selenium	mg/kg	3.5E+00	0.2	**3.5E+00**																								
METALS	Silver	mg/kg	2.9E+00	0.2	**2.9E+00**																								
METALS	Strontium	mg/kg	6.2E+02	0.5	**6.2E+02**																								
METALS	Thallium	mg/kg	5.4E-01	0.02	**5.4E-01**																								
METALS	Zinc	mg/kg	5.0E+03	2.5	**5.0E+03**																								
PESTICIDES	4,4'-DDD	mg/kg	9.8E+00	0.00165	**9.8E+00**	0.0036	10	U	U	0.0004	1	U	U	0.0020	5	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	4,4'-DDE	mg/kg	8.9E+00	0.00165	**8.9E+00**	0.0036	10	U	U	0.0004	1	U	U	0.0020	5	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	4,4'-DDT	mg/kg	8.5E+00	0.00165	**8.5E+00**	0.0036	10	U	U	0.0004	1	U	U	0.0020	5	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Aldrin	mg/kg	7.8E-02	0.00165	**7.8E-02**	0.0036	10	U	U	0.0004	1	U	U	0.0020	5	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	alpha-BHC	mg/kg	5.8E-03	0.00165	**5.8E-03**	0.0036	10	U	U	0.0004	1	U	U	0.0020	5	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	alpha-Chlordane	mg/kg	5.6E+02	0.00165	**5.6E+02**	0.6951	10	P	J	0.0184	1	P	J	0.0068	5	J	J	0.0004	1	U	U	0.0623	1	P	J	0.0070	1	P	J
PESTICIDES	beta-BHC	mg/kg	2.1E-01	0.00165	**2.1E-01**	0.0036	10	U	U	0.0004	1	U	U	0.0020	5	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	delta-BHC	mg/kg	1.3E-01	0.00165	**1.3E-01**	0.0036	10	U	U	0.0004	1	U	U	0.0020	5	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Dieldrin	mg/kg	3.7E-02	0.00165	**3.7E-02**	0.0036	10	U	U	0.0004	1	U	U	0.0020	5	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Endosulfan I	mg/kg	3.1E+02	0.00165	**3.1E+02**	0.0036	10	U	U	0.0004	1	U	U	0.0020	5	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Endosulfan II	mg/kg	3.6E+02	0.00165	**3.6E+02**	0.0036	10	U	U	0.0004	1	U	U	0.0020	5	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Endosulfan Sulfate	mg/kg	1.6E+03	0.00165	**1.6E+03**	0.0036	10	U	U	0.0004	1	U	U	0.0020	5	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Endrin	mg/kg	1.8E+00	0.00165	**1.8E+00**	0.0036	10	U	U	0.0004	1	U	U	0.0020	5	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Endrin aldehyde	mg/kg	7.2E+02	0.00165	**7.2E+02**	0.0036	10	U	U	0.0004	1	U	U	0.0020	5	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Endrin ketone	mg/kg	5.1E+02	0.00165	**5.1E+02**	0.0036	10	U	U	0.0004	1	U	U	0.0020	5	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	gamma-BHC (Lindane)	mg/kg	2.1E-02	0.00165	**2.1E-02**	0.0036	10	U	U	0.0004	1	U	U	0.0020	5	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Heptachlor	mg/kg	4.5E-01	0.00165	**4.5E-01**	0.0113	10	J	J	0.0004	1	U	U	0.0020	5	U	U	0.0004	1	U	U	0.0015	1	J		0.0004	1	U	U
PESTICIDES	Heptachlor epoxide	mg/kg	1.7E+00	0.00165	**1.7E+00**	0.1735	10	P	J	0.0038	1	P	J	0.0020	5	U	U	0.0004	1	U	U	0.0164	1	P	J	0.0017	1	J	J
PESTICIDES	METHOXYCHLOR	mg/kg	7.0E+01	0.00165	**7.0E+01**	0.0036	10	U	U	0.0004	1	U	U	0.0020	5	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Toxaphene	mg/kg	2.8E+01	0.033	**2.8E+01**	0.1840	10	U	U	0.0204	1	U	U	0.1022	5	U	U	0.0210	1	U	U	0.0184	1	U	U	0.0204	1	U	U
PESTICIDES	gamma-CHLORDANE	mg/kg	3.1E+01	0.00165	**3.1E+01**	0.7119	10	P	J	0.0226	1			0.0078	5	J	J	0.0004	1	U	U	0.0730	1			0.0082	1		

Table 10b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	59SB02				59SB02				59SB03				59SB03				59SB04				59SB04			
SAMPLE_NO			Calculated		**Standard 3**	59SB02-01				59SB02-02				59SB03-01				59SB03-02				59SB04-01				59SB04-02			
SAMPLE_DATE			Commercial		**Groundwater**	2-Aug-06				2-Aug-06				2-Aug-06				2-Aug-06				2-Aug-06				2-Aug-06			
DEPTH			/ Industrial	Method	**Protective**	0-1 Ft				3-4 Ft				0-1 Ft				3-4 Ft				0-1 Ft				3-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
SEMIVOLATILES	1,2,4-Trichlorobenzene	mg/kg	1.1E+01	0.005	**1.1E+01**																								
SEMIVOLATILES	1,2-Dichlorobenzene	mg/kg	4.0E+01	0.005	**4.0E+01**																								
SEMIVOLATILES	1,3-Dichlorobenzene	mg/kg	5.2E+01	0.005	**5.2E+01**																								
SEMIVOLATILES	1,4-Dichlorobenzene	mg/kg	4.7E+00	0.005	**4.7E+00**																								
SEMIVOLATILES	2,4,5-Trichlorophenol	mg/kg	2.2E+03	0.165	**2.2E+03**																								
SEMIVOLATILES	2,4,6-Trichlorophenol	mg/kg	2.1E+00	0.165	**2.1E+00**																								
SEMIVOLATILES	2,4-Dichlorophenol	mg/kg	4.8E+00	0.165	**4.8E+00**																								
SEMIVOLATILES	2,4-Dimethylphenol	mg/kg	2.4E+01	0.165	**2.4E+01**																								
SEMIVOLATILES	2,4-Dinitrophenol	mg/kg	8.6E-02	0.825	**8.3E-01**																								
SEMIVOLATILES	2,4-Dinitrotoluene	mg/kg	2.3E-03	0.165	**1.7E-01**																								
SEMIVOLATILES	2,6-Dinitrotoluene	mg/kg	1.9E-03	0.165	**1.7E-01**																								
SEMIVOLATILES	2-Chloronaphthalene	mg/kg	1.1E+03	0.165	**1.1E+03**																								
SEMIVOLATILES	2-Chlorophenol	mg/kg	2.0E+01	0.165	**2.0E+01**																								
SEMIVOLATILES	2-Methylnaphthalene	mg/kg	1.7E+02	0.165	**1.7E+02**																								
SEMIVOLATILES	2-Methylphenol	mg/kg	5.0E+01	0.165	**5.0E+01**																								
SEMIVOLATILES	2-Nitroaniline	mg/kg	9.2E-02	0.825	**8.3E-01**																								
SEMIVOLATILES	2-Nitrophenol	mg/kg	3.8E+00	0.165	**3.8E+00**																								
SEMIVOLATILES	3,3'-Dichlorobenzidine	mg/kg	4.5E-02	0.33	**3.3E-01**																								
SEMIVOLATILES	3-Nitroaniline	mg/kg	1.3E-01	0.825	**8.3E-01**																								
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	mg/kg	8.6E-02	0.825	**8.3E-01**																								
SEMIVOLATILES	4-Bromophenyl phenyl ether	mg/kg	2.7E+00	0.165	**2.7E+00**																								
SEMIVOLATILES	4-Chloro-3-methylphenol	mg/kg	4.3E+01	0.165	**4.3E+01**																								
SEMIVOLATILES	4-Chloroaniline	mg/kg	2.8E+00	0.165	**2.8E+00**																								
SEMIVOLATILES	4-Chlorophenyl phenyl ether	mg/kg	2.4E-01	0.165	**2.4E-01**																								
SEMIVOLATILES	4-Methylphenol	mg/kg	4.2E+00	0.165	**4.2E+00**																								
SEMIVOLATILES	4-Nitroaniline	mg/kg	1.1E-01	0.825	**8.3E-01**																								
SEMIVOLATILES	4-Nitrophenol	mg/kg	9.7E-01	0.825	**9.7E-01**																								
SEMIVOLATILES	Acenaphthene	mg/kg	3.4E+02	0.165	**3.4E+02**																								
SEMIVOLATILES	Acenaphthylene	mg/kg	5.4E+02	0.165	**5.4E+02**																								
SEMIVOLATILES	Anthracene	mg/kg	2.0E+01	0.165	**2.0E+01**																								
SEMIVOLATILES	Benzo(a)anthracene	mg/kg	1.3E+01	0.165	**1.3E+01**																								
SEMIVOLATILES	Benzo(a)pyrene	mg/kg	1.8E+01	0.165	**1.8E+01**																								
SEMIVOLATILES	Benzo(b)fluoranthene	mg/kg	3.6E+01	0.165	**3.6E+01**																								
SEMIVOLATILES	Benzo(ghi)perylene	mg/kg	8.2E+00	0.165	**8.2E+00**																								
SEMIVOLATILES	Benzo(k)fluoranthene	mg/kg	1.4E+01	0.165	**1.4E+01**																								
SEMIVOLATILES	Benzoic Acid	mg/kg	2.1E+02	0.825	**2.1E+02**																								
SEMIVOLATILES	Benzyl Alcohol	mg/kg	4.8E+01	0.165	**4.8E+01**																								
SEMIVOLATILES	bis(2-Chloroethoxy)methane	mg/kg	7.8E-03	0.165	**1.7E-01**																								
SEMIVOLATILES	bis(2-Chloroethyl)ether	mg/kg	5.0E-04	0.165	**1.7E-01**																								
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	mg/kg	1.3E+00	0.165	**1.3E+00**																								
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	mg/kg	3.9E+02	0.165	**3.9E+02**																								
SEMIVOLATILES	Butyl benzyl phthalate	mg/kg	8.0E+02	0.165	**8.0E+02**																								
SEMIVOLATILES	Chrysene	mg/kg	1.2E+01	0.165	**1.2E+01**																								
SEMIVOLATILES	Dibenzo(a,h)anthracene	mg/kg	1.9E+01	0.165	**1.9E+01**																								
SEMIVOLATILES	Dibenzofuran	mg/kg	3.3E+02	0.165	**3.3E+02**																								
SEMIVOLATILES	Diethyl phthalate	mg/kg	1.2E+03	0.165	**1.2E+03**																								
SEMIVOLATILES	Dimethyl phthalate	mg/kg	2.8E+02	0.165	**2.8E+02**																								
SEMIVOLATILES	di-n-Butyl phthalate	mg/kg	7.6E+03	0.165	**7.6E+03**																								
SEMIVOLATILES	di-n-Octyl phthalate	mg/kg	3.3E+04	0.165	**3.3E+04**																								
SEMIVOLATILES	Fluoranthene	mg/kg	2.5E+02	0.165	**2.5E+02**																								
SEMIVOLATILES	Fluorene	mg/kg	3.0E+02	0.165	**3.0E+02**																								
SEMIVOLATILES	Hexachlorobenzene	mg/kg	2.7E+00	0.165	**2.7E+00**																								
SEMIVOLATILES	Hexachlorobutadiene	mg/kg	1.4E+01	0.005	**1.4E+01**																								
SEMIVOLATILES	Hexachlorocyclopentadiene	mg/kg	4.6E+01	0.165	**4.6E+01**																								
SEMIVOLATILES	Hexachloroethane	mg/kg	1.8E+01	0.165	**1.8E+01**																								
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	mg/kg	1.3E+02	0.165	**1.3E+02**																								
SEMIVOLATILES	Isophorone	mg/kg	1.0E+01	0.165	**1.0E+01**																								
SEMIVOLATILES	Naphthalene	mg/kg	3.1E+02	0.01	**3.1E+02**																								
SEMIVOLATILES	Nitrobenzene	mg/kg	6.7E-01	0.165	**6.7E-01**																								
SEMIVOLATILES	n-Nitroso-di-n-propylamine	mg/kg	9.5E-05	0.165	**1.7E-01**																								
SEMIVOLATILES	n-Nitrosodiphenylamine	mg/kg	1.9E+00	0.165	**1.9E+00**																								
SEMIVOLATILES	Pentachlorophenol	mg/kg	1.8E-01	0.825	**8.3E-01**	0.022	10	U	U	0.002	1	U	U	0.012	5	U	U	0.002	1	U	U	0.011	5	U	U	0.002	1	U	U
SEMIVOLATILES	Phenanthrene	mg/kg	2.8E+02	0.165	**2.8E+02**																								
SEMIVOLATILES	Phenol	mg/kg	6.4E+01	0.165	**6.4E+01**																								
SEMIVOLATILES	Pyrene	mg/kg	1.0E+02	0.165	**1.0E+02**																								

Table 10b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	59SB02				59SB02				59SB03				59SB03				59SB04				59SB04			
SAMPLE_NO			Calculated		**Standard 3**	59SB02-01				59SB02-02				59SB03-01				59SB03-02				59SB04-01				59SB04-02			
SAMPLE_DATE			Commercial		**Groundwater**	2-Aug-06				2-Aug-06				2-Aug-06				2-Aug-06				2-Aug-06				2-Aug-06			
DEPTH			/ Industrial	Method	**Protective**	0-1 Ft				3-4 Ft				0-1 Ft				3-4 Ft				0-1 Ft				3-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
VOLATILES	1,1,1,2-Tetrachloroethane	mg/kg	1.0E+01	0.005	**1.0E+01**																								
VOLATILES	1,1,1-Trichloroethane	mg/kg	2.3E+00	0.005	**2.3E+00**																								
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	1.1E-01	0.005	**1.1E-01**																								
VOLATILES	1,1,2-Trichloroethane	mg/kg	2.6E-02	0.005	**2.6E-02**																								
VOLATILES	1,1-Dichloroethane	mg/kg	3.8E+01	0.005	**3.8E+01**																								
VOLATILES	1,1-Dichloroethene	mg/kg	5.4E-02	0.005	**5.4E-02**																								
VOLATILES	1,2,3-Trichloropropane	mg/kg	1.6E-03	0.005	**5.0E-03**																								
VOLATILES	1,2-Dibromo-3-chloropropane	mg/kg	3.4E-03	0.005	**5.0E-03**																								
VOLATILES	1,2-Dibromoethane	mg/kg	2.8E-04	0.005	**5.0E-03**																								
VOLATILES	1,2-Dichloroethane	mg/kg	1.1E-02	0.005	**1.1E-02**																								
VOLATILES	1,2-Dichloroethene	mg/kg	2.4E-01	0.005	**2.4E-01**																								
VOLATILES	1,2-Dichloropropane	mg/kg	3.1E-02	0.005	**3.1E-02**																								
VOLATILES	2-Butanone	mg/kg	3.7E+01	0.01	**3.7E+01**																								
VOLATILES	2-Chloroethyl vinyl ether	mg/kg	1.0E-02	0.01	**1.0E-02**																								
VOLATILES	2-Hexanone	mg/kg	1.3E+01	0.01	**1.3E+01**																								
VOLATILES	2-Propenal	mg/kg	2.4E-02	0.005	**2.4E-02**																								
VOLATILES	Acetone	mg/kg	4.4E+01	0.01	**4.4E+01**																								
VOLATILES	Acetonitrile	mg/kg	1.5E+00	0.005	**1.5E+00**																								
VOLATILES	Acrylonitrile	mg/kg	2.8E-04	0.005	**5.0E-03**																								
VOLATILES	Allyl chloride	mg/kg	3.5E+00	0.005	**3.5E+00**																								
VOLATILES	Benzene	mg/kg	3.5E-02	0.005	**3.5E-02**																								
VOLATILES	Bromodichloromethane	mg/kg	2.7E-02	0.005	**2.7E-02**																								
VOLATILES	Bromoform	mg/kg	3.2E-01	0.005	**3.2E-01**																								
VOLATILES	Bromomethane	mg/kg	2.9E-01	0.01	**2.9E-01**																								
VOLATILES	Carbon disulfide	mg/kg	6.2E+01	0.005	**6.2E+01**																								
VOLATILES	Carbon tetrachloride	mg/kg	9.8E-02	0.005	**9.8E-02**																								
VOLATILES	Chlorobenzene	mg/kg	2.1E+00	0.005	**2.1E+00**																								
VOLATILES	Chloroethane	mg/kg	9.6E+01	0.01	**9.6E+01**																								
VOLATILES	Chloroform	mg/kg	5.2E+00	0.005	**5.2E+00**																								
VOLATILES	Chloromethane	mg/kg	5.2E-01	0.01	**5.2E-01**																								
VOLATILES	Chloroprene	mg/kg	1.6E+00	0.005	**1.6E+00**																								
VOLATILES	cis-1,3-Dichloropropene	mg/kg	2.6E-02	0.005	**2.6E-02**																								
VOLATILES	Dibromochloromethane	mg/kg	2.2E-01	0.005	**2.2E-01**																								
VOLATILES	Dibromomethane	mg/kg	6.9E+00	0.005	**6.9E+00**																								
VOLATILES	Dichlorodifluoromethane	mg/kg	5.9E+02	0.01	**5.9E+02**																								
VOLATILES	Ethyl methacrylate	mg/kg	3.7E+01	0.005	**3.7E+01**																								
VOLATILES	Ethylbenzene	mg/kg	1.4E+01	0.005	**1.4E+01**																								
VOLATILES	IODOMETHANE	mg/kg	3.7E-01	0.005	**3.7E-01**																								
VOLATILES	ISOBUTYL ALCOHOL	mg/kg	2.9E+01	0.005	**2.9E+01**																								
VOLATILES	Methacrylonitrile	mg/kg	7.6E-03	0.005	**7.6E-03**																								
VOLATILES	Methyl isobutyl ketone	mg/kg	1.5E+01	0.01	**1.5E+01**																								
VOLATILES	METHYL METHACRYLATE	mg/kg	3.8E+02	0.005	**3.8E+02**																								
VOLATILES	Methylene chloride	mg/kg	8.2E-03	0.005	**8.2E-03**																								
VOLATILES	Pentachloroethane	mg/kg	2.1E+00	0.005	**2.1E+00**																								
VOLATILES	Propionitrile	mg/kg	2.4E-02	0.005	**2.4E-02**																								
VOLATILES	Styrene	mg/kg	7.4E+00	0.005	**7.4E+00**																								
VOLATILES	Tetrachloroethene	mg/kg	8.0E-02	0.005	**8.0E-02**																								
VOLATILES	Toluene	mg/kg	1.4E+01	0.005	**1.4E+01**																								
VOLATILES	trans-1,3-Dichloropropene	mg/kg	1.4E-01	0.005	**1.4E-01**																								
VOLATILES	trans-1,4-Dichloro-2-butene	mg/kg	7.9E-03	0.005	**7.9E-03**																								
VOLATILES	Trichloroethene	mg/kg	4.9E-02	0.005	**4.9E-02**																								
VOLATILES	Trichlorofluoromethane	mg/kg	5.3E+02	0.01	**5.3E+02**																								
VOLATILES	Vinyl acetate	mg/kg	9.7E+01	0.01	**9.7E+01**																								
VOLATILES	Vinyl chloride	mg/kg	9.7E-03	0.01	**1.0E-02**																								
VOLATILES	Xylenes, Total	mg/kg	2.4E+02	0.005	**2.4E+02**																								

Table 10b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	59SB02				59SB02				59SB03				59SB03				59SB04				59SB04			
SAMPLE_NO			Calculated		**Standard 3**	59SB02-01				59SB02-02				59SB03-01				59SB03-02				59SB04-01				59SB04-02			
SAMPLE_DATE			Commercial		**Groundwater**	2-Aug-06				2-Aug-06				2-Aug-06				2-Aug-06				2-Aug-06				2-Aug-06			
DEPTH			/ Industrial	Method	**Protective**	0-1 Ft				3-4 Ft				0-1 Ft				3-4 Ft				0-1 Ft				3-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ

Notes:

Boxed and Bold = Detected Concentration exceeds Applicable Standard 3 Soil MSC.

Shaded = Undetected (SQL) value exceeds Applicable Standard 3 Soil MSC.

J - The analyte was positively identified; the reported value is the estimated concentration of the constituent detected with concentration measured between the MDL and the MQL for samples 2000 or later.

P - Difference between gas chromatograph column readings is greater than 25 percent.

U - Not detected

DIL - dilution factor

FD - field duplicate

Ft - feet

LQ - laboratory qualifier

MDL - method detection limit

mg/kg - milligrams per kilogram

MQL - method quantitation limit

MSC - medium specific concentration

NA - not applicable

REG - regular sample

SQL - Sample Quantitation Limit

VQ - validation qualifier

[a] Value developed in Attachment 8 using the SAM Model. Shading indicates a chemical specific value.

[b] MQL values provided by laboratory for recent samples (2000 or later).

[c] Shading indicates MSC value equal to the MQL.

[d] Results for recent samples were adjusted for moisture content and for dilution factor if MQL = Applicable MSC.

Table 10b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	59SB04				59SB05				59SB05				59SB06				59SB06				59SB06			
SAMPLE_NO			Calculated		**Standard 3**	59SB04-02-FD				59SB05-01				59SB05-02				59SB06-01				59SB06-01-FD				59SB06-02			
SAMPLE_DATE			Commercial		**Groundwater**	2-Aug-06				3-Aug-06				3-Aug-06				3-Aug-06				3-Aug-06				3-Aug-06			
DEPTH			/ Industrial	Method	**Protective**	3-4 Ft				0-1 Ft				3-4 Ft				0-1 Ft				0-1 Ft				3-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	FD				REG				REG				REG				FD				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
EXPLOSIVES	1,3,5-Trinitrobenzene	mg/kg	5.5E+00	0.25	**5.5E+00**																								
EXPLOSIVES	1,3-Dinitrobenzene	mg/kg	3.4E-02	0.25	**2.5E-01**																								
EXPLOSIVES	2,4,6-Trinitrotoluene	mg/kg	1.5E+00	0.25	**1.5E+00**																								
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	2.3E-03	0.165	**1.7E-01**																								
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	1.9E-03	0.165	**1.7E-01**																								
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	mg/kg	6.0E-01	0.26	**6.0E-01**																								
EXPLOSIVES	HMX	mg/kg	2.2E+00	2.2	**2.2E+00**																								
EXPLOSIVES	m-Nitrotoluene	mg/kg	1.4E+01	0.25	**1.4E+01**																								
EXPLOSIVES	Nitrobenzene	mg/kg	6.7E-01	0.165	**6.7E-01**																								
EXPLOSIVES	o-Nitrotoluene	mg/kg	1.4E+01	1	**1.4E+01**																								
EXPLOSIVES	p-Nitrotoluene	mg/kg	1.4E+01	0.65	**1.4E+01**																								
EXPLOSIVES	RDX	mg/kg	1.7E-01	0.26	**2.6E-01**																								
EXPLOSIVES	Tetryl	mg/kg	2.4E+01	0.25	**2.4E+01**																								
HERBICIDES	2,2-Dichloropropanoic Acid	mg/kg	5.7E-01	0.1	**5.7E-01**	0.061	1	U	U	0.055	1	U	U	0.060	1	U	U	0.300	5	U	U	0.296	5	U	U	0.058	1	U	U
HERBICIDES	2,4,5-T	mg/kg	5.6E+00	0.004	**5.6E+00**	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U	0.012	5	U	U	0.012	5	U	U	0.002	1	U	U
HERBICIDES	2,4,5-TP (Silvex)	mg/kg	1.3E+01	0.003	**1.3E+01**	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U	0.009	5	U	U	0.009	5	U	U	0.002	1	U	U
HERBICIDES	2,4-D	mg/kg	6.0E+00	0.04	**6.0E+00**	0.025	1	U	U	0.022	1	U	U	0.024	1	U	U	0.120	5	U	U	0.119	5	U	U	0.023	1	U	U
HERBICIDES	2,4-DB	mg/kg	4.9E-01	0.04	**4.9E-01**	0.025	1	U	U	0.022	1	U	U	0.024	1	U	U	0.120	5	U	U	0.119	5	U	U	0.023	1	U	U
HERBICIDES	Dicamba	mg/kg	1.9E+00	0.004	**1.9E+00**	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U	0.012	5	U	U	0.012	5	U	U	0.002	1	U	U
HERBICIDES	Dichloroprop	mg/kg	4.3E-01	0.04	**4.3E-01**	0.025	1	U	U	0.022	1	U	U	0.024	1	U	U	0.120	5	U	U	0.119	5	U	U	0.023	1	U	U
HERBICIDES	Dinoseb	mg/kg	8.1E-01	0.02	**8.1E-01**	0.012	1	U	U	0.011	1	U	U	0.012	1	U	U	0.060	5	U	U	0.059	5	U	U	0.012	1	U	U
HERBICIDES	MCPA	mg/kg	2.2E-02	4	**4.0E+00**	2.320	1	U	U	2.209	1	U	U	2.302	1	U	U	11.471	5	U	U	11.471	5	U	U	2.267	1	U	U
HERBICIDES	MCPP	mg/kg	5.1E-01	4	**4.0E+00**	2.320	1	U	U	2.209	1	U	U	2.302	1	U	U	11.471	5	U	U	11.471	5	U	U	2.267	1	U	U
METALS	Aluminum	mg/kg	1.7E+07	20	**1.7E+07**																								
METALS	Antimony	mg/kg	1.7E+00	0.1	**1.7E+00**																								
METALS	Arsenic	mg/kg	4.8E+00	0.3	**4.8E+00**																								
METALS	Barium	mg/kg	2.7E+02	0.3	**2.7E+02**																								
METALS	Cadmium	mg/kg	8.5E-01	0.1	**8.5E-01**																								
METALS	Calcium	mg/kg	NA	NA	**none**																								
METALS	Chromium	mg/kg	6.3E+04	0.4	**6.3E+04**																								
METALS	Cobalt	mg/kg	1.3E+03	0.5	**1.3E+03**																								
METALS	Copper	mg/kg	2.5E+02	0.6	**2.5E+02**																								
METALS	Iron	mg/kg	NA	NA	**none**																								
METALS	Lead	mg/kg	1.3E+02	5	**1.3E+02**																								
METALS	Magnesium	mg/kg	NA	NA	**none**																								
METALS	Manganese	mg/kg	3.5E+03	0.2	**3.5E+03**																								
METALS	Mercury	mg/kg	8.2E-02	0.25	**2.5E-01**																								
METALS	Potassium	mg/kg	NA	NA	**none**																								
METALS	Selenium	mg/kg	3.5E+00	0.2	**3.5E+00**																								
METALS	Silver	mg/kg	2.9E+00	0.2	**2.9E+00**																								
METALS	Strontium	mg/kg	6.2E+02	0.5	**6.2E+02**																								
METALS	Thallium	mg/kg	5.4E-01	0.02	**5.4E-01**																								
METALS	Zinc	mg/kg	5.0E+03	2.5	**5.0E+03**																								
PESTICIDES	4,4'-DDD	mg/kg	9.8E+00	0.00165	**9.8E+00**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	4,4'-DDE	mg/kg	8.9E+00	0.00165	**8.9E+00**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	4,4'-DDT	mg/kg	8.5E+00	0.00165	**8.5E+00**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Aldrin	mg/kg	7.8E-02	0.00165	**7.8E-02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	alpha-BHC	mg/kg	5.8E-03	0.00165	**5.8E-03**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	alpha-Chlordane	mg/kg	5.6E+02	0.00165	**5.6E+02**	0.0065	1	P	J	0.0048	1	P	J	0.0070	1	P	J	0.0540	1	P	J	0.0526	1	P	J	0.0320	1	P	J
PESTICIDES	beta-BHC	mg/kg	2.1E-01	0.00165	**2.1E-01**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	delta-BHC	mg/kg	1.3E-01	0.00165	**1.3E-01**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Dieldrin	mg/kg	3.7E-02	0.00165	**3.7E-02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Endosulfan I	mg/kg	3.1E+02	0.00165	**3.1E+02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Endosulfan II	mg/kg	3.6E+02	0.00165	**3.6E+02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Endosulfan Sulfate	mg/kg	1.6E+03	0.00165	**1.6E+03**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Endrin	mg/kg	1.8E+00	0.00165	**1.8E+00**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Endrin aldehyde	mg/kg	7.2E+02	0.00165	**7.2E+02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Endrin ketone	mg/kg	5.1E+02	0.00165	**5.1E+02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	gamma-BHC (Lindane)	mg/kg	2.1E-02	0.00165	**2.1E-02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Heptachlor	mg/kg	4.5E-01	0.00165	**4.5E-01**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0018	1	J		0.0015	1	J		0.0019	1		
PESTICIDES	Heptachlor epoxide	mg/kg	1.7E+00	0.00165	**1.7E+00**	0.0015	1	J	J	0.0004	1	U	U	0.0017	1	J	J	0.0105	1	P	J	0.0097	1	P	J	0.0103	1	P	J
PESTICIDES	METHOXYCHLOR	mg/kg	7.0E+01	0.00165	**7.0E+01**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U
PESTICIDES	Toxaphene	mg/kg	2.8E+01	0.033	**2.8E+01**	0.0201	1	U	U	0.0184	1	U	U	0.0199	1	U	U	0.0199	1	U	U	0.0200	1	U	U	0.0192	1	U	U
PESTICIDES	gamma-CHLORDANE	mg/kg	3.1E+01	0.00165	**3.1E+01**	0.0077	1			0.0058	1			0.0093	1			0.0642	1			0.0637	1			0.0463	1		

Table 10b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	59SB04				59SB05				59SB05				59SB06				59SB06				59SB06			
SAMPLE_NO			Calculated		**Standard 3**	59SB04-02-FD				59SB05-01				59SB05-02				59SB06-01				59SB06-01-FD				59SB06-02			
SAMPLE_DATE			Commercial		**Groundwater**	2-Aug-06				3-Aug-06				3-Aug-06				3-Aug-06				3-Aug-06				3-Aug-06			
DEPTH			/ Industrial	Method	**Protective**	3-4 Ft				0-1 Ft				3-4 Ft				0-1 Ft				0-1 Ft				3-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	FD				REG				REG				REG				FD				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
SEMIVOLATILES	1,2,4-Trichlorobenzene	mg/kg	1.1E+01	0.005	**1.1E+01**																								
SEMIVOLATILES	1,2-Dichlorobenzene	mg/kg	4.0E+01	0.005	**4.0E+01**																								
SEMIVOLATILES	1,3-Dichlorobenzene	mg/kg	5.2E+01	0.005	**5.2E+01**																								
SEMIVOLATILES	1,4-Dichlorobenzene	mg/kg	4.7E+00	0.005	**4.7E+00**																								
SEMIVOLATILES	2,4,5-Trichlorophenol	mg/kg	2.2E+03	0.165	**2.2E+03**																								
SEMIVOLATILES	2,4,6-Trichlorophenol	mg/kg	2.1E+00	0.165	**2.1E+00**																								
SEMIVOLATILES	2,4-Dichlorophenol	mg/kg	4.8E+00	0.165	**4.8E+00**																								
SEMIVOLATILES	2,4-Dimethylphenol	mg/kg	2.4E+01	0.165	**2.4E+01**																								
SEMIVOLATILES	2,4-Dinitrophenol	mg/kg	8.6E-02	0.825	**8.3E-01**																								
SEMIVOLATILES	2,4-Dinitrotoluene	mg/kg	2.3E-03	0.165	**1.7E-01**																								
SEMIVOLATILES	2,6-Dinitrotoluene	mg/kg	1.9E-03	0.165	**1.7E-01**																								
SEMIVOLATILES	2-Chloronaphthalene	mg/kg	1.1E+03	0.165	**1.1E+03**																								
SEMIVOLATILES	2-Chlorophenol	mg/kg	2.0E+01	0.165	**2.0E+01**																								
SEMIVOLATILES	2-Methylnaphthalene	mg/kg	1.7E+02	0.165	**1.7E+02**																								
SEMIVOLATILES	2-Methylphenol	mg/kg	5.0E+01	0.165	**5.0E+01**																								
SEMIVOLATILES	2-Nitroaniline	mg/kg	9.2E-02	0.825	**8.3E-01**																								
SEMIVOLATILES	2-Nitrophenol	mg/kg	3.8E+00	0.165	**3.8E+00**																								
SEMIVOLATILES	3,3'-Dichlorobenzidine	mg/kg	4.5E-02	0.33	**3.3E-01**																								
SEMIVOLATILES	3-Nitroaniline	mg/kg	1.3E-01	0.825	**8.3E-01**																								
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	mg/kg	8.6E-02	0.825	**8.3E-01**																								
SEMIVOLATILES	4-Bromophenyl phenyl ether	mg/kg	2.7E+00	0.165	**2.7E+00**																								
SEMIVOLATILES	4-Chloro-3-methylphenol	mg/kg	4.3E+01	0.165	**4.3E+01**																								
SEMIVOLATILES	4-Chloroaniline	mg/kg	2.8E+00	0.165	**2.8E+00**																								
SEMIVOLATILES	4-Chlorophenyl phenyl ether	mg/kg	2.4E-01	0.165	**2.4E-01**																								
SEMIVOLATILES	4-Methylphenol	mg/kg	4.2E+00	0.165	**4.2E+00**																								
SEMIVOLATILES	4-Nitroaniline	mg/kg	1.1E-01	0.825	**8.3E-01**																								
SEMIVOLATILES	4-Nitrophenol	mg/kg	9.7E-01	0.825	**9.7E-01**																								
SEMIVOLATILES	Acenaphthene	mg/kg	3.4E+02	0.165	**3.4E+02**																								
SEMIVOLATILES	Acenaphthylene	mg/kg	5.4E+02	0.165	**5.4E+02**																								
SEMIVOLATILES	Anthracene	mg/kg	2.0E+01	0.165	**2.0E+01**																								
SEMIVOLATILES	Benzo(a)anthracene	mg/kg	1.3E+01	0.165	**1.3E+01**																								
SEMIVOLATILES	Benzo(a)pyrene	mg/kg	1.8E+01	0.165	**1.8E+01**																								
SEMIVOLATILES	Benzo(b)fluoranthene	mg/kg	3.6E+01	0.165	**3.6E+01**																								
SEMIVOLATILES	Benzo(ghi)perylene	mg/kg	8.2E+00	0.165	**8.2E+00**																								
SEMIVOLATILES	Benzo(k)fluoranthene	mg/kg	1.4E+01	0.165	**1.4E+01**																								
SEMIVOLATILES	Benzoic Acid	mg/kg	2.1E+02	0.825	**2.1E+02**																								
SEMIVOLATILES	Benzyl Alcohol	mg/kg	4.8E+01	0.165	**4.8E+01**																								
SEMIVOLATILES	bis(2-Chloroethoxy)methane	mg/kg	7.8E-03	0.165	**1.7E-01**																								
SEMIVOLATILES	bis(2-Chloroethyl)ether	mg/kg	5.0E-04	0.165	**1.7E-01**																								
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	mg/kg	1.3E+00	0.165	**1.3E+00**																								
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	mg/kg	3.9E+02	0.165	**3.9E+02**																								
SEMIVOLATILES	Butyl benzyl phthalate	mg/kg	8.0E+02	0.165	**8.0E+02**																								
SEMIVOLATILES	Chrysene	mg/kg	1.2E+01	0.165	**1.2E+01**																								
SEMIVOLATILES	Dibenzo(a,h)anthracene	mg/kg	1.9E+01	0.165	**1.9E+01**																								
SEMIVOLATILES	Dibenzofuran	mg/kg	3.3E+02	0.165	**3.3E+02**																								
SEMIVOLATILES	Diethyl phthalate	mg/kg	1.2E+03	0.165	**1.2E+03**																								
SEMIVOLATILES	Dimethyl phthalate	mg/kg	2.8E+02	0.165	**2.8E+02**																								
SEMIVOLATILES	di-n-Butyl phthalate	mg/kg	7.6E+03	0.165	**7.6E+03**																								
SEMIVOLATILES	di-n-Octyl phthalate	mg/kg	3.3E+04	0.165	**3.3E+04**																								
SEMIVOLATILES	Fluoranthene	mg/kg	2.5E+02	0.165	**2.5E+02**																								
SEMIVOLATILES	Fluorene	mg/kg	3.0E+02	0.165	**3.0E+02**																								
SEMIVOLATILES	Hexachlorobenzene	mg/kg	2.7E+00	0.165	**2.7E+00**																								
SEMIVOLATILES	Hexachlorobutadiene	mg/kg	1.4E+01	0.005	**1.4E+01**																								
SEMIVOLATILES	Hexachlorocyclopentadiene	mg/kg	4.6E+01	0.165	**4.6E+01**																								
SEMIVOLATILES	Hexachloroethane	mg/kg	1.8E+01	0.165	**1.8E+01**																								
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	mg/kg	1.3E+02	0.165	**1.3E+02**																								
SEMIVOLATILES	Isophorone	mg/kg	1.0E+01	0.165	**1.0E+01**																								
SEMIVOLATILES	Naphthalene	mg/kg	3.1E+02	0.01	**3.1E+02**																								
SEMIVOLATILES	Nitrobenzene	mg/kg	6.7E-01	0.165	**6.7E-01**																								
SEMIVOLATILES	n-Nitroso-di-n-propylamine	mg/kg	9.5E-05	0.165	**1.7E-01**																								
SEMIVOLATILES	n-Nitrosodiphenylamine	mg/kg	1.9E+00	0.165	**1.9E+00**																								
SEMIVOLATILES	Pentachlorophenol	mg/kg	1.8E-01	0.825	**8.3E-01**	0.002	1	U	U	0.003	1	J	J	0.002	1	U	U	0.012	5	U	U	0.012	5	U	U	0.002	1	U	U
SEMIVOLATILES	Phenanthrene	mg/kg	2.8E+02	0.165	**2.8E+02**																								
SEMIVOLATILES	Phenol	mg/kg	6.4E+01	0.165	**6.4E+01**																								
SEMIVOLATILES	Pyrene	mg/kg	1.0E+02	0.165	**1.0E+02**																								

Table 10b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	59SB04				59SB05				59SB05				59SB06				59SB06				59SB06			
SAMPLE_NO			Calculated		**Standard 3**	59SB04-02-FD				59SB05-01				59SB05-02				59SB06-01				59SB06-01-FD				59SB06-02			
SAMPLE_DATE			Commercial		**Groundwater**	2-Aug-06				3-Aug-06				3-Aug-06				3-Aug-06				3-Aug-06				3-Aug-06			
DEPTH			/ Industrial	Method	**Protective**	3-4 Ft				0-1 Ft				3-4 Ft				0-1 Ft				0-1 Ft				3-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	FD				REG				REG				REG				FD				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
VOLATILES	1,1,1,2-Tetrachloroethane	mg/kg	1.0E+01	0.005	**1.0E+01**																								
VOLATILES	1,1,1-Trichloroethane	mg/kg	2.3E+00	0.005	**2.3E+00**																								
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	1.1E-01	0.005	**1.1E-01**																								
VOLATILES	1,1,2-Trichloroethane	mg/kg	2.6E-02	0.005	**2.6E-02**																								
VOLATILES	1,1-Dichloroethane	mg/kg	3.8E+01	0.005	**3.8E+01**																								
VOLATILES	1,1-Dichloroethene	mg/kg	5.4E-02	0.005	**5.4E-02**																								
VOLATILES	1,2,3-Trichloropropane	mg/kg	1.6E-03	0.005	**5.0E-03**																								
VOLATILES	1,2-Dibromo-3-chloropropane	mg/kg	3.4E-03	0.005	**5.0E-03**																								
VOLATILES	1,2-Dibromoethane	mg/kg	2.8E-04	0.005	**5.0E-03**																								
VOLATILES	1,2-Dichloroethane	mg/kg	1.1E-02	0.005	**1.1E-02**																								
VOLATILES	1,2-Dichloroethene	mg/kg	2.4E-01	0.005	**2.4E-01**																								
VOLATILES	1,2-Dichloropropane	mg/kg	3.1E-02	0.005	**3.1E-02**																								
VOLATILES	2-Butanone	mg/kg	3.7E+01	0.01	**3.7E+01**																								
VOLATILES	2-Chloroethyl vinyl ether	mg/kg	1.0E-02	0.01	**1.0E-02**																								
VOLATILES	2-Hexanone	mg/kg	1.3E+01	0.01	**1.3E+01**																								
VOLATILES	2-Propenal	mg/kg	2.4E-02	0.005	**2.4E-02**																								
VOLATILES	Acetone	mg/kg	4.4E+01	0.01	**4.4E+01**																								
VOLATILES	Acetonitrile	mg/kg	1.5E+00	0.005	**1.5E+00**																								
VOLATILES	Acrylonitrile	mg/kg	2.8E-04	0.005	**5.0E-03**																								
VOLATILES	Allyl chloride	mg/kg	3.5E+00	0.005	**3.5E+00**																								
VOLATILES	Benzene	mg/kg	3.5E-02	0.005	**3.5E-02**																								
VOLATILES	Bromodichloromethane	mg/kg	2.7E-02	0.005	**2.7E-02**																								
VOLATILES	Bromoform	mg/kg	3.2E-01	0.005	**3.2E-01**																								
VOLATILES	Bromomethane	mg/kg	2.9E-01	0.01	**2.9E-01**																								
VOLATILES	Carbon disulfide	mg/kg	6.2E+01	0.005	**6.2E+01**																								
VOLATILES	Carbon tetrachloride	mg/kg	9.8E-02	0.005	**9.8E-02**																								
VOLATILES	Chlorobenzene	mg/kg	2.1E+00	0.005	**2.1E+00**																								
VOLATILES	Chloroethane	mg/kg	9.6E+01	0.01	**9.6E+01**																								
VOLATILES	Chloroform	mg/kg	5.2E+00	0.005	**5.2E+00**																								
VOLATILES	Chloromethane	mg/kg	5.2E-01	0.01	**5.2E-01**																								
VOLATILES	Chloroprene	mg/kg	1.6E+00	0.005	**1.6E+00**																								
VOLATILES	cis-1,3-Dichloropropene	mg/kg	2.6E-02	0.005	**2.6E-02**																								
VOLATILES	Dibromochloromethane	mg/kg	2.2E-01	0.005	**2.2E-01**																								
VOLATILES	Dibromomethane	mg/kg	6.9E+00	0.005	**6.9E+00**																								
VOLATILES	Dichlorodifluoromethane	mg/kg	5.9E+02	0.01	**5.9E+02**																								
VOLATILES	Ethyl methacrylate	mg/kg	3.7E+01	0.005	**3.7E+01**																								
VOLATILES	Ethylbenzene	mg/kg	1.4E+01	0.005	**1.4E+01**																								
VOLATILES	IODOMETHANE	mg/kg	3.7E-01	0.005	**3.7E-01**																								
VOLATILES	ISOBUTYL ALCOHOL	mg/kg	2.9E+01	0.005	**2.9E+01**																								
VOLATILES	Methacrylonitrile	mg/kg	7.6E-03	0.005	**7.6E-03**																								
VOLATILES	Methyl isobutyl ketone	mg/kg	1.5E+01	0.01	**1.5E+01**																								
VOLATILES	METHYL METHACRYLATE	mg/kg	3.8E+02	0.005	**3.8E+02**																								
VOLATILES	Methylene chloride	mg/kg	8.2E-03	0.005	**8.2E-03**																								
VOLATILES	Pentachloroethane	mg/kg	2.1E+00	0.005	**2.1E+00**																								
VOLATILES	Propionitrile	mg/kg	2.4E-02	0.005	**2.4E-02**																								
VOLATILES	Styrene	mg/kg	7.4E+00	0.005	**7.4E+00**																								
VOLATILES	Tetrachloroethene	mg/kg	8.0E-02	0.005	**8.0E-02**																								
VOLATILES	Toluene	mg/kg	1.4E+01	0.005	**1.4E+01**																								
VOLATILES	trans-1,3-Dichloropropene	mg/kg	1.4E-01	0.005	**1.4E-01**																								
VOLATILES	trans-1,4-Dichloro-2-butene	mg/kg	7.9E-03	0.005	**7.9E-03**																								
VOLATILES	Trichloroethene	mg/kg	4.9E-02	0.005	**4.9E-02**																								
VOLATILES	Trichlorofluoromethane	mg/kg	5.3E+02	0.01	**5.3E+02**																								
VOLATILES	Vinyl acetate	mg/kg	9.7E+01	0.01	**9.7E+01**																								
VOLATILES	Vinyl chloride	mg/kg	9.7E-03	0.01	**1.0E-02**																								
VOLATILES	Xylenes, Total	mg/kg	2.4E+02	0.005	**2.4E+02**																								

Table 10b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	59SB04				59SB05				59SB05				59SB06				59SB06				59SB06			
SAMPLE_NO			Calculated		**Standard 3**	59SB04-02-FD				59SB05-01				59SB05-02				59SB06-01				59SB06-01-FD				59SB06-02			
SAMPLE_DATE			Commercial		**Groundwater**	2-Aug-06				3-Aug-06				3-Aug-06				3-Aug-06				3-Aug-06				3-Aug-06			
DEPTH			/ Industrial	Method	**Protective**	3-4 Ft				0-1 Ft				3-4 Ft				0-1 Ft				0-1 Ft				3-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	FD				REG				REG				REG				FD				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
Notes:																													
Boxed and Bold = Detected Concentration exceeds Applicable Standard 3 Soil MSC.																													
Shaded = Undetected (SQL) value exceeds Applicable Standard 3 Soil MSC.																													
J - The analyte was positively identified; the reported value is the estimated concentration of the constituent detected with concentration measured between the MDL and the MQL for samples 2000 or later.																													
P - Difference between gas chromatograph column readings is greater than 25 percent.																													
U - Not detected																													
DIL - dilution factor																													
FD - field duplicate																													
Ft - feet																													
LQ - laboratory qualifier																													
MDL - method detection limit																													
mg/kg - milligrams per kilogram																													
MQL - method quantitation limit																													
MSC - medium specific concentration																													
NA - not applicable																													
REG - regular sample																													
SQL - Sample Quantitation Limit																													
VQ - validation qualifier																													
[a] Value developed in Attachment 8 using the SAM Model. Shading indicates a chemical specific value.																													
[b] MQL values provided by laboratory for recent samples (2000 or later).																													
[c] Shading indicates MSC value equal to the MQL.																													
[d] Results for recent samples were adjusted for moisture content and for dilution factor if MQL = Applicable MSC.																													

Table 10b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	59SB07				59SB07				59SB08				59SB08			
SAMPLE_NO			Calculated		**Standard 3**	59SB07-01				59SB07-02				59SB08-01				59SB08-02			
SAMPLE_DATE			Commercial		**Groundwater**	3-Aug-06				3-Aug-06				3-Aug-06				3-Aug-06			
DEPTH			/ Industrial	Method	**Protective**	0-1 Ft				3-4 Ft				0-1 Ft				3-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
EXPLOSIVES	1,3,5-Trinitrobenzene	mg/kg	5.5E+00	0.25	**5.5E+00**																
EXPLOSIVES	1,3-Dinitrobenzene	mg/kg	3.4E-02	0.25	**2.5E-01**																
EXPLOSIVES	2,4,6-Trinitrotoluene	mg/kg	1.5E+00	0.25	**1.5E+00**																
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	2.3E-03	0.165	**1.7E-01**																
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	1.9E-03	0.165	**1.7E-01**																
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	mg/kg	6.0E-01	0.26	**6.0E-01**																
EXPLOSIVES	HMX	mg/kg	2.2E+00	2.2	**2.2E+00**																
EXPLOSIVES	m-Nitrotoluene	mg/kg	1.4E+01	0.25	**1.4E+01**																
EXPLOSIVES	Nitrobenzene	mg/kg	6.7E-01	0.165	**6.7E-01**																
EXPLOSIVES	o-Nitrotoluene	mg/kg	1.4E+01	1	**1.4E+01**																
EXPLOSIVES	p-Nitrotoluene	mg/kg	1.4E+01	0.65	**1.4E+01**																
EXPLOSIVES	RDX	mg/kg	1.7E-01	0.26	**2.6E-01**																
EXPLOSIVES	Tetryl	mg/kg	2.4E+01	0.25	**2.4E+01**																
HERBICIDES	2,2-Dichloropropanoic Acid	mg/kg	5.7E-01	0.1	**5.7E-01**	0.307	5	U	U	0.067	1	U	U	0.066	1	U	U	0.073	1	U	U
HERBICIDES	2,4,5-T	mg/kg	5.6E+00	0.004	**5.6E+00**	0.012	5	U	U	0.003	1	U	U	0.003	1	U	U	0.003	1	U	U
HERBICIDES	2,4,5-TP (Silvex)	mg/kg	1.3E+01	0.003	**1.3E+01**	0.009	5	U	U	0.002	1	U	U	0.002	1	U	U	0.002	1	U	U
HERBICIDES	2,4-D	mg/kg	6.0E+00	0.04	**6.0E+00**	0.123	5	U	U	0.027	1	U	U	0.026	1	U	U	0.029	1	U	U
HERBICIDES	2,4-DB	mg/kg	4.9E-01	0.04	**4.9E-01**	0.123	5	U	U	0.027	1	U	U	0.026	1	U	U	0.029	1	U	U
HERBICIDES	Dicamba	mg/kg	1.9E+00	0.004	**1.9E+00**	0.012	5	U	U	0.003	1	U	U	0.003	1	U	U	0.003	1	U	U
HERBICIDES	Dichloroprop	mg/kg	4.3E-01	0.04	**4.3E-01**	0.123	5	U	U	0.027	1	U	U	0.026	1	U	U	0.029	1	U	U
HERBICIDES	Dinoseb	mg/kg	8.1E-01	0.02	**8.1E-01**	0.062	5	U	U	0.013	1	U	U	0.013	1	U	U	0.015	1	U	U
HERBICIDES	MCPA	mg/kg	2.2E-02	4	**4.0E+00**	11.676	5	U	U	2.422	1	U	U	2.416	1	U	U	2.533	1	U	U
HERBICIDES	MCPP	mg/kg	5.1E-01	4	**4.0E+00**	11.676	5	U	U	2.422	1	U	U	**6.127**	1	P	J	2.533	1	U	U
METALS	Aluminum	mg/kg	1.7E+07	20	**1.7E+07**																
METALS	Antimony	mg/kg	1.7E+00	0.1	**1.7E+00**																
METALS	Arsenic	mg/kg	4.8E+00	0.3	**4.8E+00**																
METALS	Barium	mg/kg	2.7E+02	0.3	**2.7E+02**																
METALS	Cadmium	mg/kg	8.5E-01	0.1	**8.5E-01**																
METALS	Calcium	mg/kg	NA	NA	**none**																
METALS	Chromium	mg/kg	6.3E+04	0.4	**6.3E+04**																
METALS	Cobalt	mg/kg	1.3E+03	0.5	**1.3E+03**																
METALS	Copper	mg/kg	2.5E+02	0.6	**2.5E+02**																
METALS	Iron	mg/kg	NA	NA	**none**																
METALS	Lead	mg/kg	1.3E+02	5	**1.3E+02**																
METALS	Magnesium	mg/kg	NA	NA	**none**																
METALS	Manganese	mg/kg	3.5E+03	0.2	**3.5E+03**																
METALS	Mercury	mg/kg	8.2E-02	0.25	**2.5E-01**																
METALS	Potassium	mg/kg	NA	NA	**none**																
METALS	Selenium	mg/kg	3.5E+00	0.2	**3.5E+00**																
METALS	Silver	mg/kg	2.9E+00	0.2	**2.9E+00**																
METALS	Strontium	mg/kg	6.2E+02	0.5	**6.2E+02**																
METALS	Thallium	mg/kg	5.4E-01	0.02	**5.4E-01**																
METALS	Zinc	mg/kg	5.0E+03	2.5	**5.0E+03**																
PESTICIDES	4,4'-DDD	mg/kg	9.8E+00	0.00165	**9.8E+00**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U
PESTICIDES	4,4'-DDE	mg/kg	8.9E+00	0.00165	**8.9E+00**	0.0017	1	J		0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U
PESTICIDES	4,4'-DDT	mg/kg	8.5E+00	0.00165	**8.5E+00**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U
PESTICIDES	Aldrin	mg/kg	7.8E-02	0.00165	**7.8E-02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U
PESTICIDES	alpha-BHC	mg/kg	5.8E-03	0.00165	**5.8E-03**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U
PESTICIDES	alpha-Chlordane	mg/kg	5.6E+02	0.00165	**5.6E+02**	0.0009	1	J	J	0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U
PESTICIDES	beta-BHC	mg/kg	2.1E-01	0.00165	**2.1E-01**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U
PESTICIDES	delta-BHC	mg/kg	1.3E-01	0.00165	**1.3E-01**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U
PESTICIDES	Dieldrin	mg/kg	3.7E-02	0.00165	**3.7E-02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U
PESTICIDES	Endosulfan I	mg/kg	3.1E+02	0.00165	**3.1E+02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U
PESTICIDES	Endosulfan II	mg/kg	3.6E+02	0.00165	**3.6E+02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U
PESTICIDES	Endosulfan Sulfate	mg/kg	1.6E+03	0.00165	**1.6E+03**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U
PESTICIDES	Endrin	mg/kg	1.8E+00	0.00165	**1.8E+00**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U
PESTICIDES	Endrin aldehyde	mg/kg	7.2E+02	0.00165	**7.2E+02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U
PESTICIDES	Endrin ketone	mg/kg	5.1E+02	0.00165	**5.1E+02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U
PESTICIDES	gamma-BHC (Lindane)	mg/kg	2.1E-02	0.00165	**2.1E-02**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U
PESTICIDES	Heptachlor	mg/kg	4.5E-01	0.00165	**4.5E-01**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U
PESTICIDES	Heptachlor epoxide	mg/kg	1.7E+00	0.00165	**1.7E+00**	0.0004	1	J	J	0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U
PESTICIDES	METHOXYCHLOR	mg/kg	7.0E+01	0.00165	**7.0E+01**	0.0004	1	U	U	0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U
PESTICIDES	Toxaphene	mg/kg	2.8E+01	0.033	**2.8E+01**	0.0206	1	U	U	0.0221	1	U	U	0.0217	1	U	U	0.0239	1	U	U
PESTICIDES	gamma-CHLORDANE	mg/kg	3.1E+01	0.00165	**3.1E+01**	0.0022	1			0.0004	1	U	U	0.0004	1	U	U	0.0005	1	U	U

Table 10b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	59SB07				59SB07				59SB08				59SB08			
SAMPLE_NO			Calculated		**Standard 3**	59SB07-01				59SB07-02				59SB08-01				59SB08-02			
SAMPLE_DATE			Commercial		**Groundwater**	3-Aug-06				3-Aug-06				3-Aug-06				3-Aug-06			
DEPTH			/ Industrial	Method	**Protective**	0-1 Ft				3-4 Ft				0-1 Ft				3-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
SEMIVOLATILES	1,2,4-Trichlorobenzene	mg/kg	1.1E+01	0.005	**1.1E+01**																
SEMIVOLATILES	1,2-Dichlorobenzene	mg/kg	4.0E+01	0.005	**4.0E+01**																
SEMIVOLATILES	1,3-Dichlorobenzene	mg/kg	5.2E+01	0.005	**5.2E+01**																
SEMIVOLATILES	1,4-Dichlorobenzene	mg/kg	4.7E+00	0.005	**4.7E+00**																
SEMIVOLATILES	2,4,5-Trichlorophenol	mg/kg	2.2E+03	0.165	**2.2E+03**																
SEMIVOLATILES	2,4,6-Trichlorophenol	mg/kg	2.1E+00	0.165	**2.1E+00**																
SEMIVOLATILES	2,4-Dichlorophenol	mg/kg	4.8E+00	0.165	**4.8E+00**																
SEMIVOLATILES	2,4-Dimethylphenol	mg/kg	2.4E+01	0.165	**2.4E+01**																
SEMIVOLATILES	2,4-Dinitrophenol	mg/kg	8.6E-02	0.825	**8.3E-01**																
SEMIVOLATILES	2,4-Dinitrotoluene	mg/kg	2.3E-03	0.165	**1.7E-01**																
SEMIVOLATILES	2,6-Dinitrotoluene	mg/kg	1.9E-03	0.165	**1.7E-01**																
SEMIVOLATILES	2-Chloronaphthalene	mg/kg	1.1E+03	0.165	**1.1E+03**																
SEMIVOLATILES	2-Chlorophenol	mg/kg	2.0E+01	0.165	**2.0E+01**																
SEMIVOLATILES	2-Methylnaphthalene	mg/kg	1.7E+02	0.165	**1.7E+02**																
SEMIVOLATILES	2-Methylphenol	mg/kg	5.0E+01	0.165	**5.0E+01**																
SEMIVOLATILES	2-Nitroaniline	mg/kg	9.2E-02	0.825	**8.3E-01**																
SEMIVOLATILES	2-Nitrophenol	mg/kg	3.8E+00	0.165	**3.8E+00**																
SEMIVOLATILES	3,3'-Dichlorobenzidine	mg/kg	4.5E-02	0.33	**3.3E-01**																
SEMIVOLATILES	3-Nitroaniline	mg/kg	1.3E-01	0.825	**8.3E-01**																
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	mg/kg	8.6E-02	0.825	**8.3E-01**																
SEMIVOLATILES	4-Bromophenyl phenyl ether	mg/kg	2.7E+00	0.165	**2.7E+00**																
SEMIVOLATILES	4-Chloro-3-methylphenol	mg/kg	4.3E+01	0.165	**4.3E+01**																
SEMIVOLATILES	4-Chloroaniline	mg/kg	2.8E+00	0.165	**2.8E+00**																
SEMIVOLATILES	4-Chlorophenyl phenyl ether	mg/kg	2.4E-01	0.165	**2.4E-01**																
SEMIVOLATILES	4-Methylphenol	mg/kg	4.2E+00	0.165	**4.2E+00**																
SEMIVOLATILES	4-Nitroaniline	mg/kg	1.1E-01	0.825	**8.3E-01**																
SEMIVOLATILES	4-Nitrophenol	mg/kg	9.7E-01	0.825	**9.7E-01**																
SEMIVOLATILES	Acenaphthene	mg/kg	3.4E+02	0.165	**3.4E+02**																
SEMIVOLATILES	Acenaphthylene	mg/kg	5.4E+02	0.165	**5.4E+02**																
SEMIVOLATILES	Anthracene	mg/kg	2.0E+01	0.165	**2.0E+01**																
SEMIVOLATILES	Benzo(a)anthracene	mg/kg	1.3E+01	0.165	**1.3E+01**																
SEMIVOLATILES	Benzo(a)pyrene	mg/kg	1.8E+01	0.165	**1.8E+01**																
SEMIVOLATILES	Benzo(b)fluoranthene	mg/kg	3.6E+01	0.165	**3.6E+01**																
SEMIVOLATILES	Benzo(ghi)perylene	mg/kg	8.2E+00	0.165	**8.2E+00**																
SEMIVOLATILES	Benzo(k)fluoranthene	mg/kg	1.4E+01	0.165	**1.4E+01**																
SEMIVOLATILES	Benzoic Acid	mg/kg	2.1E+02	0.825	**2.1E+02**																
SEMIVOLATILES	Benzyl Alcohol	mg/kg	4.8E+01	0.165	**4.8E+01**																
SEMIVOLATILES	bis(2-Chloroethoxy)methane	mg/kg	7.8E-03	0.165	**1.7E-01**																
SEMIVOLATILES	bis(2-Chloroethyl)ether	mg/kg	5.0E-04	0.165	**1.7E-01**																
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	mg/kg	1.3E+00	0.165	**1.3E+00**																
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	mg/kg	3.9E+02	0.165	**3.9E+02**																
SEMIVOLATILES	Butyl benzyl phthalate	mg/kg	8.0E+02	0.165	**8.0E+02**																
SEMIVOLATILES	Chrysene	mg/kg	1.2E+01	0.165	**1.2E+01**																
SEMIVOLATILES	Dibenzo(a,h)anthracene	mg/kg	1.9E+01	0.165	**1.9E+01**																
SEMIVOLATILES	Dibenzofuran	mg/kg	3.3E+02	0.165	**3.3E+02**																
SEMIVOLATILES	Diethyl phthalate	mg/kg	1.2E+03	0.165	**1.2E+03**																
SEMIVOLATILES	Dimethyl phthalate	mg/kg	2.8E+02	0.165	**2.8E+02**																
SEMIVOLATILES	di-n-Butyl phthalate	mg/kg	7.6E+03	0.165	**7.6E+03**																
SEMIVOLATILES	di-n-Octyl phthalate	mg/kg	3.3E+04	0.165	**3.3E+04**																
SEMIVOLATILES	Fluoranthene	mg/kg	2.5E+02	0.165	**2.5E+02**																
SEMIVOLATILES	Fluorene	mg/kg	3.0E+02	0.165	**3.0E+02**																
SEMIVOLATILES	Hexachlorobenzene	mg/kg	2.7E+00	0.165	**2.7E+00**																
SEMIVOLATILES	Hexachlorobutadiene	mg/kg	1.4E+01	0.005	**1.4E+01**																
SEMIVOLATILES	Hexachlorocyclopentadiene	mg/kg	4.6E+01	0.165	**4.6E+01**																
SEMIVOLATILES	Hexachloroethane	mg/kg	1.8E+01	0.165	**1.8E+01**																
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	mg/kg	1.3E+02	0.165	**1.3E+02**																
SEMIVOLATILES	Isophorone	mg/kg	1.0E+01	0.165	**1.0E+01**																
SEMIVOLATILES	Naphthalene	mg/kg	3.1E+02	0.01	**3.1E+02**																
SEMIVOLATILES	Nitrobenzene	mg/kg	6.7E-01	0.165	**6.7E-01**																
SEMIVOLATILES	n-Nitroso-di-n-propylamine	mg/kg	9.5E-05	0.165	**1.7E-01**																
SEMIVOLATILES	n-Nitrosodiphenylamine	mg/kg	1.9E+00	0.165	**1.9E+00**																
SEMIVOLATILES	Pentachlorophenol	mg/kg	1.8E-01	0.825	**8.3E-01**	0.012	5	U	U	0.002	1	U	U	0.002	1	U	U	0.003	1	U	U
SEMIVOLATILES	Phenanthrene	mg/kg	2.8E+02	0.165	**2.8E+02**																
SEMIVOLATILES	Phenol	mg/kg	6.4E+01	0.165	**6.4E+01**																
SEMIVOLATILES	Pyrene	mg/kg	1.0E+02	0.165	**1.0E+02**																

Table 10b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	59SB07				59SB07				59SB08				59SB08			
SAMPLE_NO			Calculated		**Standard 3**	59SB07-01				59SB07-02				59SB08-01				59SB08-02			
SAMPLE_DATE			Commercial		**Groundwater**	3-Aug-06				3-Aug-06				3-Aug-06				3-Aug-06			
DEPTH			/ Industrial	Method	**Protective**	0-1 Ft				3-4 Ft				0-1 Ft				3-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
VOLATILES	1,1,1,2-Tetrachloroethane	mg/kg	1.0E+01	0.005	**1.0E+01**																
VOLATILES	1,1,1-Trichloroethane	mg/kg	2.3E+00	0.005	**2.3E+00**																
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	1.1E-01	0.005	**1.1E-01**																
VOLATILES	1,1,2-Trichloroethane	mg/kg	2.6E-02	0.005	**2.6E-02**																
VOLATILES	1,1-Dichloroethane	mg/kg	3.8E+01	0.005	**3.8E+01**																
VOLATILES	1,1-Dichloroethene	mg/kg	5.4E-02	0.005	**5.4E-02**																
VOLATILES	1,2,3-Trichloropropane	mg/kg	1.6E-03	0.005	**5.0E-03**																
VOLATILES	1,2-Dibromo-3-chloropropane	mg/kg	3.4E-03	0.005	**5.0E-03**																
VOLATILES	1,2-Dibromoethane	mg/kg	2.8E-04	0.005	**5.0E-03**																
VOLATILES	1,2-Dichloroethane	mg/kg	1.1E-02	0.005	**1.1E-02**																
VOLATILES	1,2-Dichloroethene	mg/kg	2.4E-01	0.005	**2.4E-01**																
VOLATILES	1,2-Dichloropropane	mg/kg	3.1E-02	0.005	**3.1E-02**																
VOLATILES	2-Butanone	mg/kg	3.7E+01	0.01	**3.7E+01**																
VOLATILES	2-Chloroethyl vinyl ether	mg/kg	1.0E-02	0.01	**1.0E-02**																
VOLATILES	2-Hexanone	mg/kg	1.3E+01	0.01	**1.3E+01**																
VOLATILES	2-Propenal	mg/kg	2.4E-02	0.005	**2.4E-02**																
VOLATILES	Acetone	mg/kg	4.4E+01	0.01	**4.4E+01**																
VOLATILES	Acetonitrile	mg/kg	1.5E+00	0.005	**1.5E+00**																
VOLATILES	Acrylonitrile	mg/kg	2.8E-04	0.005	**5.0E-03**																
VOLATILES	Allyl chloride	mg/kg	3.5E+00	0.005	**3.5E+00**																
VOLATILES	Benzene	mg/kg	3.5E-02	0.005	**3.5E-02**																
VOLATILES	Bromodichloromethane	mg/kg	2.7E-02	0.005	**2.7E-02**																
VOLATILES	Bromoform	mg/kg	3.2E-01	0.005	**3.2E-01**																
VOLATILES	Bromomethane	mg/kg	2.9E-01	0.01	**2.9E-01**																
VOLATILES	Carbon disulfide	mg/kg	6.2E+01	0.005	**6.2E+01**																
VOLATILES	Carbon tetrachloride	mg/kg	9.8E-02	0.005	**9.8E-02**																
VOLATILES	Chlorobenzene	mg/kg	2.1E+00	0.005	**2.1E+00**																
VOLATILES	Chloroethane	mg/kg	9.6E+01	0.01	**9.6E+01**																
VOLATILES	Chloroform	mg/kg	5.2E+00	0.005	**5.2E+00**																
VOLATILES	Chloromethane	mg/kg	5.2E-01	0.01	**5.2E-01**																
VOLATILES	Chloroprene	mg/kg	1.6E+00	0.005	**1.6E+00**																
VOLATILES	cis-1,3-Dichloropropene	mg/kg	2.6E-02	0.005	**2.6E-02**																
VOLATILES	Dibromochloromethane	mg/kg	2.2E-01	0.005	**2.2E-01**																
VOLATILES	Dibromomethane	mg/kg	6.9E+00	0.005	**6.9E+00**																
VOLATILES	Dichlorodifluoromethane	mg/kg	5.9E+02	0.01	**5.9E+02**																
VOLATILES	Ethyl methacrylate	mg/kg	3.7E+01	0.005	**3.7E+01**																
VOLATILES	Ethylbenzene	mg/kg	1.4E+01	0.005	**1.4E+01**																
VOLATILES	IODOMETHANE	mg/kg	3.7E-01	0.005	**3.7E-01**																
VOLATILES	ISOBUTYL ALCOHOL	mg/kg	2.9E+01	0.005	**2.9E+01**																
VOLATILES	Methacrylonitrile	mg/kg	7.6E-03	0.005	**7.6E-03**																
VOLATILES	Methyl isobutyl ketone	mg/kg	1.5E+01	0.01	**1.5E+01**																
VOLATILES	METHYL METHACRYLATE	mg/kg	3.8E+02	0.005	**3.8E+02**																
VOLATILES	Methylene chloride	mg/kg	8.2E-03	0.005	**8.2E-03**																
VOLATILES	Pentachloroethane	mg/kg	2.1E+00	0.005	**2.1E+00**																
VOLATILES	Propionitrile	mg/kg	2.4E-02	0.005	**2.4E-02**																
VOLATILES	Styrene	mg/kg	7.4E+00	0.005	**7.4E+00**																
VOLATILES	Tetrachloroethene	mg/kg	8.0E-02	0.005	**8.0E-02**																
VOLATILES	Toluene	mg/kg	1.4E+01	0.005	**1.4E+01**																
VOLATILES	trans-1,3-Dichloropropene	mg/kg	1.4E-01	0.005	**1.4E-01**																
VOLATILES	trans-1,4-Dichloro-2-butene	mg/kg	7.9E-03	0.005	**7.9E-03**																
VOLATILES	Trichloroethene	mg/kg	4.9E-02	0.005	**4.9E-02**																
VOLATILES	Trichlorofluoromethane	mg/kg	5.3E+02	0.01	**5.3E+02**																
VOLATILES	Vinyl acetate	mg/kg	9.7E+01	0.01	**9.7E+01**																
VOLATILES	Vinyl chloride	mg/kg	9.7E-03	0.01	**1.0E-02**																
VOLATILES	Xylenes, Total	mg/kg	2.4E+02	0.005	**2.4E+02**																

Table 10b
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
Sump119 and Sump120 Recent Samples
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	59SB07				59SB07				59SB08				59SB08			
SAMPLE_NO			Calculated		**Standard 3**	59SB07-01				59SB07-02				59SB08-01				59SB08-02			
SAMPLE_DATE			Commercial		**Groundwater**	3-Aug-06				3-Aug-06				3-Aug-06				3-Aug-06			
DEPTH			/ Industrial	Method	**Protective**	0-1 Ft				3-4 Ft				0-1 Ft				3-4 Ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG				REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
Notes:																					
Boxed and Bold = Detected Concentration exceeds Applicable Standard 3 Soil MSC.																					
Shaded = Undetected (SQL) value exceeds Applicable Standard 3 Soil MSC.																					
J - The analyte was positively identified; the reported value is the estimated concentration of the constituent detected with concentration measured between the MDL and the MQL for samples 2000 or later.																					
P - Difference between gas chromatograph column readings is greater than 25 percent.																					
U - Not detected																					
DIL - dilution factor																					
FD - field duplicate																					
Ft - feet																					
LQ - laboratory qualifier																					
MDL - method detection limit																					
mg/kg - milligrams per kilogram																					
MQL - method quantitation limit																					
MSC - medium specific concentration																					
NA - not applicable																					
REG - regular sample																					
SQL - Sample Quantitation Limit																					
VQ - validation qualifier																					
[a] Value developed in Attachment 8 using the SAM Model. Shading indicates a chemical specific value.																					
[b] MQL values provided by laboratory for recent samples (2000 or later).																					
[c] Shading indicates MSC value equal to the MQL.																					
[d] Results for recent samples were adjusted for moisture content and for dilution factor if MQL = Applicable MSC.																					

Table 11
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
WRSump013
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	WRSUMP13-SB01				WRSUMP13-SB01			
SAMPLE_NO			Calculated		**Standard 3**	WRSUMP13-SB01-01				WRSUMP13-SB01-02			
SAMPLE_DATE			Commercial		**Groundwater**	15-Nov-06				15-Nov-06			
DEPTH			/ Industrial	Method	**Protective**	0-0.5				1-2 ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
EXPLOSIVES	1,3,5-Trinitrobenzene	mg/kg	2.5E+01	0.25	**2.5E+01**	0.120	1	U	U	0.120	1	U	U
EXPLOSIVES	1,3-Dinitrobenzene	mg/kg	1.6E-01	0.25	**2.5E-01**	0.120	1	U	U	0.118	1	U	U
EXPLOSIVES	2,4,6-Trinitrotoluene	mg/kg	6.9E+00	0.25	**6.9E+00**	0.120	1	U	U	0.120	1	U	U
EXPLOSIVES	2,4-Dinitrotoluene	mg/kg	1.0E-02	0.165	**1.7E-01**	0.120	1	U	U	0.118	1	U	U
EXPLOSIVES	2,6-Dinitrotoluene	mg/kg	8.6E-03	0.165	**1.7E-01**	0.120	1	U	U	0.118	1	U	U
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	mg/kg	4.3E+00	0.26	**4.3E+00**	0.120	1	U	U	0.120	1	U	U
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	mg/kg	2.8E+00	0.26	**2.8E+00**	0.120	1	U	U	0.120	1	U	U
EXPLOSIVES	HMX	mg/kg	9.9E+00	2.2	**9.9E+00**	0.120	1	U	U	0.120	1	U	U
EXPLOSIVES	m-Nitrotoluene	mg/kg	6.6E+01	0.25	**6.6E+01**	0.120	1	U	U	0.120	1	U	U
EXPLOSIVES	Nitrobenzene	mg/kg	3.1E+00	0.165	**3.1E+00**	0.156	1	U	U	0.156	1	U	U
EXPLOSIVES	o-Nitrotoluene	mg/kg	6.6E+01	1	**6.6E+01**	0.120	1	U	U	0.120	1	U	U
EXPLOSIVES	p-Nitrotoluene	mg/kg	6.6E+01	0.65	**6.6E+01**	0.120	1	U	U	0.120	1	U	U
EXPLOSIVES	RDX	mg/kg	7.8E-01	0.26	**7.8E-01**	0.120	1	U	U	0.120	1	U	U
EXPLOSIVES	Tetryl	mg/kg	1.1E+02	0.25	**1.1E+02**	0.240	1	U	U	0.240	1	U	U
METALS	Aluminum	mg/kg	8.0E+07	20	**8.0E+07**	15621.156	1			15096.618	1		
METALS	Antimony	mg/kg	8.0E+00	0.1	**8.0E+00**	0.116	1	J	J	0.073	1	U	U
METALS	Arsenic	mg/kg	6.0E+00	0.3	**6.0E+00**	4.932	1			1.059	1		
METALS	Barium	mg/kg	1.2E+03	0.3	**1.2E+03**	74.785	1			142.512	1		
METALS	Beryllium	mg/kg	6.1E+00	0.5	**6.1E+00**	0.593	1			0.524	1	J	J
METALS	Cadmium	mg/kg	3.9E+00	0.1	**3.9E+00**	0.054	1	U	U	0.055	1	U	U
METALS	Calcium	mg/kg	NA	NA	**none**	3542.435	1			962.560	1		
METALS	Chromium	mg/kg	2.9E+05	0.4	**2.9E+05**	14.268	1			13.768	1		
METALS	Cobalt	mg/kg	6.1E+03	0.5	**6.1E+03**	3.456	1			7.150	1		
METALS	Copper	mg/kg	1.2E+03	0.6	**1.2E+03**	3.481	1			3.502	1		
METALS	Iron	mg/kg	NA	NA	**none**	13530.135	1			16666.667	1		
METALS	Lead	mg/kg	6.1E+02	5	**6.1E+02**	30.258	1			8.019	1		
METALS	Magnesium	mg/kg	NA	NA	**none**	1019.680	1			1219.807	1		
METALS	Manganese	mg/kg	1.6E+04	0.2	**1.6E+04**	61.378	1			106.884	1		
METALS	Mercury	mg/kg	8.2E-02	0.25	**2.5E-01**	0.048	1	J	J	0.014	1	U	U
METALS	Nickel	mg/kg	1.6E+03	0.8	**1.6E+03**	5.424	1			6.908	1		
METALS	Potassium	mg/kg	NA	NA	**none**	603.936	1			457.729	1		
METALS	Selenium	mg/kg	1.0E+01	0.2	**1.0E+01**	0.439	1			0.146	1	U	U
METALS	Silver	mg/kg	1.3E+01	0.2	**1.3E+01**	0.271	1	U	U	0.277	1	U	U
METALS	Sodium	mg/kg	NA	NA	**none**	48.339	1			288.647	1		
METALS	Thallium	mg/kg	2.5E+00	0.02	**2.5E+00**	0.102	1			0.297	1		

Table 11
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
WRSump013
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	WRSUMP13-SB01				WRSUMP13-SB01			
SAMPLE_NO			Calculated		**Standard 3**	WRSUMP13-SB01-01				WRSUMP13-SB01-02			
SAMPLE_DATE			Commercial		**Groundwater**	15-Nov-06				15-Nov-06			
DEPTH			/ Industrial	Method	**Protective**	0-0.5				1-2 ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
METALS	Vanadium	mg/kg	1.6E+04	0.5	**1.6E+04**	30.996	1			28.865	1		
METALS	Zinc	mg/kg	2.3E+04	2.5	**2.3E+04**	31.365	1			22.343	1		
VOLATILES	1,1,1,2-Tetrachloroethane	mg/kg	4.7E+01	0.005	**4.7E+01**					0.0006	1	U	U
VOLATILES	1,1,1-Trichloroethane	mg/kg	1.1E+01	0.005	**1.1E+01**					0.0006	1	U	U
VOLATILES	1,1,2,2-Tetrachloroethane	mg/kg	5.2E-01	0.005	**5.2E-01**					0.0006	1	U	U
VOLATILES	1,1,2-Trichloroethane	mg/kg	1.2E-01	0.005	**1.2E-01**					0.0006	1	U	U
VOLATILES	1,1-Dichloroethane	mg/kg	1.7E+02	0.005	**1.7E+02**					0.0012	1	U	U
VOLATILES	1,1-Dichloroethene	mg/kg	2.5E-01	0.005	**2.5E-01**					0.0006	1	U	U
VOLATILES	1,1-Dichloropropene	mg/kg	2.9E-01	0.005	**2.9E-01**					0.0006	1	U	U
VOLATILES	1,2,3-Trichlorobenzene	mg/kg	1.2E+03	0.005	**1.2E+03**					0.0006	1	U	U
VOLATILES	1,2,3-Trichloropropane	mg/kg	7.1E-03	0.005	**7.1E-03**					0.0012	1	U	U
VOLATILES	1,2,4-Trichlorobenzene	mg/kg	5.2E+01	0.005	**5.2E+01**					0.0006	1	U	U
VOLATILES	1,2,4-Trimethylbenzene	mg/kg	1.1E+03	0.005	**1.1E+03**					0.0006	1	U	U
VOLATILES	1,2-Dibromo-3-chloropropane	mg/kg	1.5E-02	0.005	**1.5E-02**					0.0025	1	U	U
VOLATILES	1,2-Dibromoethane	mg/kg	1.3E-03	0.005	**5.0E-03**					0.0006	1	U	U
VOLATILES	1,2-Dichlorobenzene	mg/kg	1.9E+02	0.005	**1.9E+02**					0.0006	1	U	U
VOLATILES	1,2-Dichloroethane	mg/kg	4.9E-02	0.005	**4.9E-02**					0.0006	1	U	U
VOLATILES	1,2-Dichloropropane	mg/kg	1.4E-01	0.005	**1.4E-01**					0.0006	1	U	U
VOLATILES	1,2-Dimethylbenzene (o-Xylene)	mg/kg	4.7E+02	0.005	**4.7E+02**					0.0006	1	U	U
VOLATILES	1,3,5-Trimethylbenzene	mg/kg	1.1E+03	0.005	**1.1E+03**					0.0006	1	U	U
VOLATILES	1,3-Dichlorobenzene	mg/kg	2.4E+02	0.005	**2.4E+02**					0.0006	1	U	U
VOLATILES	1,3-Dichloropropane	mg/kg	1.6E+00	0.005	**1.6E+00**					0.0006	1	U	U
VOLATILES	1,4-Dichlorobenzene	mg/kg	2.2E+01	0.005	**2.2E+01**					0.0006	1	U	U
VOLATILES	2,2-Dichloropropane	mg/kg	3.0E+00	0.005	**3.0E+00**					0.0006	1	U	U
VOLATILES	2-Butanone	mg/kg	1.7E+02	0.01	**1.7E+02**					0.0031	1	U	U
VOLATILES	2-Chloroethyl vinyl ether	mg/kg	4.8E-02	0.01	**4.8E-02**					0.0025	1	U	U
VOLATILES	2-Chlorotoluene	mg/kg	3.7E+02	0.005	**3.7E+02**					0.0006	1	U	U
VOLATILES	2-Hexanone	mg/kg	6.1E+01	0.01	**6.1E+01**					0.0031	1	U	U
VOLATILES	4-Chlorotoluene	mg/kg	4.5E+02	0.005	**4.5E+02**					0.0006	1	U	U
VOLATILES	Acetone	mg/kg	2.0E+02	0.01	**2.0E+02**					0.0062	1	U	U
VOLATILES	Benzene	mg/kg	1.6E-01	0.005	**1.6E-01**					0.0006	1	U	U
VOLATILES	Bromobenzene	mg/kg	2.2E+02	0.005	**2.2E+02**					0.0006	1	U	U
VOLATILES	Bromochloromethane	mg/kg	5.8E+01	0.005	**5.8E+01**					0.0006	1	U	U
VOLATILES	Bromodichloromethane	mg/kg	1.2E-01	0.005	**1.2E-01**					0.0006	1	U	U
VOLATILES	Bromoform	mg/kg	1.5E+00	0.005	**1.5E+00**					0.0006	1	U	U

Table 11
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
WRSump013
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	WRSUMP13-SB01				WRSUMP13-SB01			
SAMPLE_NO			Calculated		**Standard 3**	WRSUMP13-SB01-01				WRSUMP13-SB01-02			
SAMPLE_DATE			Commercial		**Groundwater**	15-Nov-06				15-Nov-06			
DEPTH			/ Industrial	Method	**Protective**	0-0.5				1-2 ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
VOLATILES	Bromomethane	mg/kg	1.3E+00	0.01	**1.3E+00**					0.0012	1	U	U
VOLATILES	Carbon disulfide	mg/kg	2.9E+02	0.005	**2.9E+02**					0.0006	1	U	U
VOLATILES	Carbon tetrachloride	mg/kg	4.5E-01	0.005	**4.5E-01**					0.0006	1	U	U
VOLATILES	Chlorobenzene	mg/kg	9.8E+00	0.005	**9.8E+00**					0.0006	1	U	U
VOLATILES	Chloroethane	mg/kg	4.4E+02	0.01	**4.4E+02**					0.0012	1	U	U
VOLATILES	Chloroform	mg/kg	2.4E+01	0.005	**2.4E+01**					0.0006	1	U	U
VOLATILES	Chloromethane	mg/kg	2.4E+00	0.01	**2.4E+00**					0.0025	1	U	U
VOLATILES	cis-1,2-Dichloroethene	mg/kg	1.1E+00	0.005	**1.1E+00**					0.0006	1	U	U
VOLATILES	cis-1,3-Dichloropropene	mg/kg	1.2E-01	0.005	**1.2E-01**					0.0006	1	U	U
VOLATILES	Dibromochloromethane	mg/kg	1.0E+00	0.005	**1.0E+00**					0.0006	1	U	U
VOLATILES	Dibromomethane	mg/kg	3.2E+01	0.005	**3.2E+01**					0.0006	1	U	U
VOLATILES	Dichlorodifluoromethane	mg/kg	1.7E+03	0.01	**1.7E+03**					0.0012	1	U	U
VOLATILES	Ethylbenzene	mg/kg	6.6E+01	0.005	**6.6E+01**					0.0006	1	U	U
VOLATILES	Hexachlorobutadiene	mg/kg	6.3E+01	0.005	**6.3E+01**					0.0006	1	U	U
VOLATILES	Isopropylbenzene	mg/kg	3.5E+03	0.005	**3.5E+03**					0.0006	1	U	U
VOLATILES	m,p-Xylenes	mg/kg	1.2E+03	0.005	**1.2E+03**					0.0006	1	U	U
VOLATILES	Methyl isobutyl ketone	mg/kg	7.0E+01	0.01	**7.0E+01**					0.0031	1	U	U
VOLATILES	Methylene chloride	mg/kg	3.8E-02	0.005	**3.8E-02**					0.0012	1	U	U
VOLATILES	Naphthalene	mg/kg	9.8E+02	0.01	**9.8E+02**					0.0006	1	U	U
VOLATILES	n-BUTYLBENZENE	mg/kg	6.5E+02	0.005	**6.5E+02**					0.0006	1	U	U
VOLATILES	n-PROPYLBENZENE	mg/kg	9.1E+02	0.005	**9.1E+02**					0.0006	1	U	U
VOLATILES	p-ISOPROPYLTOLUENE	mg/kg	7.9E+02	0.005	**7.9E+02**					0.0006	1	U	U
VOLATILES	sec-BUTYLBENZENE	mg/kg	7.6E+02	0.005	**7.6E+02**					0.0006	1	U	U
VOLATILES	Styrene	mg/kg	3.4E+01	0.005	**3.4E+01**					0.0006	1	U	U
VOLATILES	tert-BUTYLBENZENE	mg/kg	7.4E+02	0.005	**7.4E+02**					0.0006	1	U	U
VOLATILES	Tetrachloroethene	mg/kg	3.7E-01	0.005	**3.7E-01**					0.0006	1	U	U
VOLATILES	Toluene	mg/kg	6.5E+01	0.005	**6.5E+01**					0.0006	1	U	U
VOLATILES	trans-1,2-Dichloroethene	mg/kg	2.6E+00	0.005	**2.6E+00**					0.0006	1	U	U
VOLATILES	trans-1,3-Dichloropropene	mg/kg	6.3E-01	0.005	**6.3E-01**					0.0006	1	U	U
VOLATILES	Trichloroethene	mg/kg	2.3E-01	0.005	**2.3E-01**					0.0006	1	U	U
VOLATILES	Trichlorofluoromethane	mg/kg	2.4E+03	0.01	**2.4E+03**					0.0012	1	U	U
VOLATILES	Vinyl acetate	mg/kg	4.4E+02	0.01	**4.4E+02**					0.0012	1	U	U
VOLATILES	Vinyl chloride	mg/kg	4.5E-02	0.01	**4.5E-02**					0.0012	1	U	U

Table 11
Comparison of Chemical Concentrations in Soil to
Groundwater Protective Medium Specific Concentrations
WRSump013
LHAAP-35/36
Longhorn Army Ammunition Plant - Karnack, Texas

LOCATION_CODE					**Applicable**	WRSUMP13-SB01				WRSUMP13-SB01			
SAMPLE_NO			Calculated		**Standard 3**	WRSUMP13-SB01-01				WRSUMP13-SB01-02			
SAMPLE_DATE			Commercial		**Groundwater**	15-Nov-06				15-Nov-06			
DEPTH			/ Industrial	Method	**Protective**	0-0.5				1-2 ft			
SAMPLE_PURPOSE			Soil MSC	Quantitation	**Soil MSC**	REG				REG			
Test Group	Parameter	Units	Value [a]	Limit (MQL) [b]	**Value [c]**	Result [d]	DIL	LQ	VQ	Result [d]	DIL	LQ	VQ
Notes:													
J - The analyte was positively identified; the reported value is the estimated concentration of the constituent detected with concentration measured between the MDL and the MQL for samples 2000 or later.													
U - Not detected													
DIL - dilution factor													
Ft - feet													
LQ - laboratory qualifier													
MDL - method detection limit													
mg/kg - milligrams per kilogram													
MQL - method quantitation limit													
MSC - medium specific concentration													
NA - not applicable													
REG - regular sample													
VQ - validation qualifier													
[a] Value developed in Attachment 9 using the SAM Model.													
[b] MQL values provided by laboratory for recent samples (2000 or later).													
[c] Shading indicates MSC value equal to the MQL.													
[d] Results for recent samples were adjusted for moisture content and for dilution factor if MQL = Applicable MSC.													

Attachment 1

Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 094, Sump 123, and WRSump 003

Attachment 1 – SAM Model Evaluation

Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 094, Sump 123, and WRSump 003 at the Longhorn Army Ammunition Plant, Karnack, Texas

Attachment 1 describes development of Medium Specific Concentrations (MSCs) for chemicals in soil that are protective of groundwater for soil associated with Sump 094, Sump 123 and WRSump 003. The MSC values were developed according to the Texas Commission on Environmental Quality [TCEQ] Texas Risk Reduction Rules, Title 30 Texas Administrative Code (TAC) Chapter 335 (30 TAC §335 and updates).

Groundwater-protective Risk Reduction Standard 3 MSCs were calculated to evaluate the potential for migration of chemicals from soil to groundwater as provided in TCEQ guidance [30 TAC §335.563(i)(2)] by using the SAM model to estimate the potential impacts of soil contamination on groundwater quality.

Sump 094, Sump 123, and WRSump 003 were located at Longhorn Army Ammunition Plant (LHAAP) LHAAP-48 (Former Igniter Production Area) as shown on **Figure A1-1,** which is from the Final Site Evaluation Report for LHAAP-48 and LHAAP-35C(53) (Shaw, 2007). Evaluation of chemicals in soil associated with these sumps was based on data from analysis of 13 soil samples collected from depths ranging from 0.0 to 12.5 feet below ground surface (bgs). The samples were analyzed for dioxins, explosives, metals, polychlorinated biphenyls (PCBs), pesticides, semivolatile organic compounds (SVOCs), and volatile organic compounds (VOCs). The analytical results were evaluated as reported in **Table 2** of the main body of this Addendum.

The initial step in the SAM model compared the tested chemicals to available background concentrations and method quantitation limits (MQL) for each chemical. Of the chemicals tested, 5 were not evaluated because they are regarded as essential nutrients (TCEQ, 2001). The evaluation of the remaining chemicals is recorded on **Table A1-1**.

The SAM model is an extension of the Soil Screening Level calculations USEPA (1996) guidance and is based on calculating total mass (liquid phase, solid phase, and gas phase) in the soil column:

$$M_T = V(\rho_b C_s + \theta_w C_w + \theta_a C_g)$$

Where

M_T = total mass of chemical
V = volume of the soil column
ρ_b = bulk density
C_s = concentration in soil (dry weight basis)
θ_w = water filled porosity

C_w = concentration in pore water
θ_a = air filled porosity
C_g = gas phase concentration

Total mass is redistributed using equilibrium conditions based on the adsorption coefficient and Henry's constant. The equilibrium equations are:

$$C_s = K_d C_w \qquad \text{Equation 1}$$

$$C_g = H' C_w \qquad \text{Equation 2}$$

Where Kd is the distribution (or adsorption) coefficient, and H' is the dimensionless Henry's Law constant.

A SAM model enhancement over USEPA's Soil Screening Level calculations is that the SAM model assumes a zone of contaminated soils overlying a zone of clean soil (zero contaminant concentration). The SAM model simulates mixing of contamination through the contaminated and clean soil zones based on equilibrium conditions and predicts leachate concentration at the bottom of the soil column. In the SAM model, the leachate concentration is calculated as follows:

$$C_w = C_s \left(\frac{\rho_b}{\theta_w + (K_d \rho_b) + H' \theta_a} \right) \left(\frac{L_1}{L_2} \right) \qquad \text{Equation 3}$$

Or, alternately, the concentration in soil that will produce a given leachate concentration can be calculated as:

$$C_s = C_w \left(\frac{\theta_w + (K_d \rho_b) + H' \theta_a}{\rho_b} \right) \left(\frac{L_2}{L_1} \right) \qquad \text{Equation 4}$$

Where L_1 is the thickness of the contaminated zone and L_2 is the thickness of the total soil column. The factor (L_2/L_1) is an enhancement in the SAM model over the Soil Screening Level model by USEPA. A further dilution factor for leachate mixing with groundwater can be incorporated by using a leachate dilution factor:

$$LDF = 1 + \frac{Kid}{IW} \qquad \text{Equation 5}$$

Where
K = aquifer hydraulic conductivity
i = hydraulic gradient in aquifer
d = groundwater mixing zone depth
I = infiltration rate

W = source length parallel to groundwater flow.

The groundwater protective Standard 3 MSC is the soil concentration (C_s) described by Equation 4 where the groundwater concentration (C_w) is limited by the TCEQ risk-based drinking water concentration (GW-Ind) modified by the leachate dilution factor (LDF) as follows:

$$\text{Standard 3 } MSC = C_w \left(\frac{\theta_w + (K_d \rho_b) + H'\theta_a}{\rho_b} \right) \left(\frac{L_2}{L_1} \right) x\ LDF \qquad \text{Equation 6}$$

The model further calculates the soil saturation concentration (C_{sat}), which corresponds to the contaminant concentration in soil at which the absorptive capacity of soil particles, the solubility limits of soil pore water and saturation of soil pore air have been reached. Concentrations above C_{sat} are assumed to be in free phase. The C_{sat} concentration is calculated in the SAM model according to Equation 7.

$$C_{sat} = S \left(\frac{\theta_w + (K_d \rho_b) + H'\theta_a}{\rho_b} \right) \qquad \text{Equation 7}$$

For the purpose of simplification, a soil to water coefficient, K_{sw}, can stand in for the complex bracketed formula in Equation 3, 4, 6, and 7.

$$K_{sw} = \left(\frac{\rho_b}{\theta_w + (K_d \rho_b) + (H'\theta_a)} \right) \qquad \text{Equation 8}$$

Input parameters to the SAM model that are either specific to Sump 094, Sump 123 and WRSump 003 at LHAAP-48 or are default TCEQ values, are shown in **Table A1-2**. Because some chemical properties are pH dependent, an average groundwater pH calculation was calculated (6.0) and documented in **Table A1-3**. **Table A1-4** lists the chemical properties (TCEQ, 2008). From these input parameters and properties, the SAM model calculates a theoretical saturated soil concentration (C_{sat}) using Equation 7.

Then the SAM model calculates a Standard 3 Commercial/Industrial Soil MSC using Equation 6 by equating C_w to the GW-Ind MSC and calculating the concentration of chemical in the soil at the site (mg/kg) that would theoretically leach into the groundwater at the GW-Ind concentration (mg/L). The

lower of the C_{sat} and the calculated Soil MSC values is used as the Standard 3 Commercial/Industrial Soil MSC.

Finally, the calculated Standard 3 Soil MSC is compared to available background soil concentrations for the chemical. The 95% upper prediction limit (UPL) of soil background concentrations given in the LHAAP-35/36 Sump Report (Shaw, 2008) were used for this comparison. The larger of the Standard 3 Commercial/Industrial Soil MSC and the background concentration is then selected as the Applicable Standard 3 Commercial/Industrial Soil MSC.

Table A1-5 presents the results of those calculations. While it is possible to select different site parameters for each chemical, general site parameters were used as if each chemical were equally and evenly distributed across the entire site for this initial calculation. When compared to actual chemical concentrations in individual samples taken near former sump locations, this assumption overestimates the extent of the chemical concentration across the site, resulting in lower concentrations calculated for the Applicable Standard 3 Commercial/Industrial Soil MSC.

Table A1-6 compares the Applicable Standard 3 Commercial/Industrial Soil MSC values to maximum soil concentrations for each chemical in the samples associated with Sump 094, Sump 123 and WRSump 003 at LHAAP-48.

Discussion

The SAM model results for Sump 094, Sump 123 and WRSump 003 at LHAAP-48 indicate that detected concentrations of 5 metals (barium, cadmium, manganese, silver, and strontium) exceed the calculated groundwater protective soil MSC values. The SAM model was recalculated for these 5 specific metals to determine whether chemical-specific input values for L1, L2 and W would result in a changed MSC value. These chemical specific calculations are shown in **Table A1-7**.

All 13 samples contained detectable barium, but only 10 samples contained barium above the initial calculated MSC value (8.5E+01 mg/kg in **Table A1-6**). These 10 samples ranged in depth from 0.0 to 10.9 feet bgs, and were from multiple locations spread around the site. Rerunning the SAM model specifically for barium, with a changed value for L1 of 10.9 feet (332 centimeters [cm]), and unchanged values for L2 of 13.2 feet (402 cm) and W of 180 feet (5500 cm) that reflect the barium results, the SAM model calculates an unchanged MSC value of 8.5E+01 mg/kg (**Table A1-7**), which is the background concentration.

Of the 13 samples, 6 contained detectable cadmium, and all were greater than the initial calculated MSC value (4.0E-01 mg/kg in **Table A1-6**). These 6 samples ranged in depth from 0.5 to 12.5 feet bgs, and were from multiple locations spread around the site. Rerunning the SAM model specifically for cadmium,

with unchanged values for L1 of 12.5 feet (381 cm), L2 of 13.2 feet (402 cm), and W of 180 feet (5500 cm) that reflect the cadmium results, the SAM model calculates an unchanged MSC value of 4.0E-01 mg/kg (**Table A1-7**), which is the background concentration.

All 13 samples contained detectable manganese, but only 1 sample contained manganese above the initial calculated MSC value (7.7E+02 mg/kg in **Table A1-6**). This sample was LH-WRS3-01.3 from a depth of 10.5 to 10.9 feet bgs. Rerunning the SAM model specifically for manganese, with a changed value for L1 of 1 foot (30 cm), L2 of 2.3 feet (70 cm) and W of 32 feet (1000 cm) that reflect the single manganese result greater than the MSC, the SAM model calculates an MSC value of 1.8E+03 mg/kg (**Table A1-7**), which is greater than the maximum detected manganese concentration of 1,310 mg/kg.

Of the 13 samples, 4 contained detectable silver, but only 2 samples contained silver above the initial calculated MSC value (7.6E-01 mg/kg in **Table A1-6**). These 2 samples were both from a depth of 0.5 to 1.5 feet bgs, and all detectable silver was found at just 2 locations (LH-S094-01 and LH-S123-01). Rerunning the SAM model specifically for silver, with changed values for L1 of 2 feet (61 cm), and W of 92 feet (2800 cm), and an unchanged value for L2 of 13.2 feet (402 cm) that reflects the location-specific silver conditions, the SAM model calculates an MSC value of 4.8E+00 mg/kg (**Table A1-7**), which is greater than the maximum detected silver concentration of 1.2 mg/kg.

Of the 13 samples, 12 contained detectable strontium, but only 2 samples contained strontium above the initial calculated MSC value (1.4E+02 mg/kg in **Table A1-6**). These 2 samples ranged in depth from 0.0 to 1.5 feet bgs, and were from 2 locations fairly close together (LHS-Y-06 and LH-S123-01). Rerunning the SAM model specifically for strontium, with changed values for L1 of 2 feet (61 cm), and W of 35 feet (1100 cm), and an unchanged value for L2 of 13.2 feet (402 cm) that reflect the strontium results, the SAM model calculates an MSC value of 9.1E+02 mg/kg (**Table A1-7**), which is greater than the maximum detected strontium concentration of 514 mg/kg.

Concentrations of two chemicals, barium and cadmium, are predicted by the SAM model to have potential to leach from soil into the groundwater. Analysis of groundwater taken from LHAAP-48 and LHAAP-35C(53) in 2005 indicated that barium was not detected in groundwater from Well LHSMW63, which is the well closest to the sumps (**Figure A1-1**), and all detected barium concentrations at other well locations were well below the maximum contaminant level (MCL) (Shaw, 2008, **Tables 2-1**). These results indicate that any leaching of barium to groundwater is within TCEQ limits. Cadmium was not detected in any groundwater sample (Shaw, 2008, **Tables 2-1**), indicating that cadmium is not leaching from the soil into groundwater. Three other chemicals, manganese, silver, and strontium were initially predicted to have potential for leaching, but more specific evaluation for those chemicals yielded a higher value for the MSC, larger than the maximum detected concentrations of those chemicals in soil.

References

Shaw Environmental & Infrastructure (Shaw), 2007, *Final Site Evaluation Report LHAAP-48 (Former Igniter Production Area) and LHAAP-35C(53) (Former Static Test Area)*, April.

Shaw, 2008, *Final Data Evaluation Report, Chemical Concentrations in Soil Samples Associated with LHAAP-35/36 Sumps*, January (LHAAP-35/36 Sump Report).

Texas Commission on Environmental Quality (TCEQ), 2001, Interoffice Memorandum from Joseph T. Haney, Jr., (TCEQ) to Camarie Perry, Office or Permitting, Remediation & Registration, *Evaluation of the Potential Health Impacts of Exposure to Iron, Calcium, Magnesium, Potassium, sodium, and Phosphorus through Soil Ingestion*, October.

TCEQ, 2008, Annual TCEQ update of chemical/physical properties table [(Figure: 30 TAC §350.73(e)], April.

U.S. Environmental Protection Agency (USEPA), 1996, *Soil Screening Guidance: User's Guide*, Second Edition.

Table A1-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	MQL	Calculate MSC ?
DIOXINS_FURANS	2,3,7,8-TCDD TEQ	9.587E-06	-	1.530E-07	NE	0.000001	YES
EXPLOSIVES	1,3,5-Trinitrobenzene	-	0.24	NE	NE	0.15	YES
EXPLOSIVES	1,3-Dinitrobenzene	-	0.24	NE	NE	0.05	YES
EXPLOSIVES	2,4,6-Trinitrotoluene	-	0.24	NE	NE	0.1	YES
EXPLOSIVES	2,4-Dinitrotoluene	-	1.279	NE	NE	0.1	No, 2
EXPLOSIVES	2,6-Dinitrotoluene	-	1.279	NE	NE	0.1	No, 2
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	-	0.05	NE	NE	0.05	YES
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	-	0.49	NE	NE	0.05	YES
EXPLOSIVES	HMX	-	2.2	NE	NE	0.1	YES
EXPLOSIVES	m-Nitrotoluene	-	0.98	NE	NE	0.1	YES
EXPLOSIVES	Nitrobenzene	-	0.25	NE	NE	0.1	No, 2
EXPLOSIVES	o-Nitrotoluene	-	0.98	NE	NE	0.1	YES
EXPLOSIVES	p-Nitrotoluene	-	2.9	NE	NE	0.1	YES
EXPLOSIVES	RDX	-	1.1	NE	NE	0.1	YES
EXPLOSIVES	Tetryl	-	0.73	NE	NE	0.69	YES
METALS	Aluminum	13000	-	1.63E+04	2.08E+04	20	YES
METALS	Antimony	-	15.6	9.40E-01	1.60E+00	4.8	YES
METALS	Arsenic	3.89	-	4.81E+00	5.54E+00	0.3	YES
METALS	Barium	2510	-	1.52E+02	8.55E+01	0.3	YES
METALS	Beryllium	0.643	0.559	6.45E-01	7.66E-01	0.535	YES
METALS	Cadmium	5.55	2.66	1.40E+00	4.00E-01	0.535	YES
METALS	Calcium	2330	560	NE	NE	NA	No, 1
METALS	Chromium	29.4	-	2.66E+01	3.01E+01	0.4	YES
METALS	Cobalt	84.6	-	7.23E+00	5.61E+00	0.5	YES
METALS	Copper	23.9	2.79	5.55E+00	9.25E+00	2.79	YES
METALS	Iron	17400	-	NE	NE	NA	No, 1
METALS	Lead	21.8	16	2.26E+01	1.14E+01	7.2	YES
METALS	Magnesium	1230	-	NE	NE	NA	No, 1
METALS	Manganese	1310	-	1.25E+03	2.01E+02	0.2	YES
METALS	Mercury	0.06	0.12	8.19E-02	3.60E-01	0.027	YES
METALS	Nickel	12	-	6.98E+00	1.16E+01	0.8	YES
METALS	Potassium	1100	-	NE	NE	NA	No, 1
METALS	Selenium	1.87	1.07	3.48E+00	5.57E+00	0.27	YES
METALS	Silver	1.2	1.6	3.10E-01	3.70E-01	0.024	YES
METALS	Sodium	-	560	NE	NE	540	No, 1
METALS	Strontium	514	15.6	1.98E+01	2.91E+01	15.6	YES
METALS	Thallium	-	78.2	4.70E-01	NE	0.535	YES
METALS	Vanadium	28	-	3.21E+01	4.46E+01	0.5	YES
METALS	Zinc	207	-	6.16E+01	2.02E+01	2.5	YES
PCBS	Aroclor 1016	-	0.037	NE	NE	0.036	YES
PCBS	Aroclor 1221	-	0.074	NE	NE	0.071	YES
PCBS	Aroclor 1232	-	0.037	NE	NE	0.036	YES
PCBS	Aroclor 1242	-	0.037	NE	NE	0.036	YES
PCBS	Aroclor 1248	-	0.037	NE	NE	0.036	YES
PCBS	Aroclor 1254	0.066	0.037	NE	NE	0.036	YES
PCBS	Aroclor 1260	-	0.037	NE	NE	0.036	YES
PESTICIDES	4,4'-DDD	-	0.0037	NE	NE	0.0036	YES
PESTICIDES	4,4'-DDE	-	0.0037	3.80E-03	NE	0.0036	YES
PESTICIDES	4,4'-DDT	-	0.0037	6.40E-03	NE	0.0036	YES
PESTICIDES	Aldrin	-	0.0019	NE	NE	0.0018	YES
PESTICIDES	alpha-BHC	-	0.0019	NE	NE	0.0018	YES
PESTICIDES	beta-BHC	-	0.0019	NE	NE	0.0018	YES
PESTICIDES	Chlordane	-	0.037	NE	NE	0.036	YES
PESTICIDES	delta-BHC	-	0.0019	NE	NE	0.0018	YES
PESTICIDES	Dieldrin	-	0.0037	NE	NE	0.0036	YES
PESTICIDES	Endosulfan I	-	0.0019	NE	NE	0.0018	YES
PESTICIDES	Endosulfan II	-	0.0037	NE	NE	0.0036	YES
PESTICIDES	Endosulfan Sulfate	-	0.0037	NE	NE	0.0036	YES
PESTICIDES	Endrin	-	0.0037	NE	NE	0.0036	YES
PESTICIDES	Endrin aldehyde	-	0.0037	NE	NE	0.0036	YES
PESTICIDES	Endrin ketone	-	0.0037	NE	NE	0.0036	YES
PESTICIDES	gamma-BHC (Lindane)	-	0.0019	NE	NE	0.0018	YES
PESTICIDES	Heptachlor	-	0.0019	NE	NE	0.0018	YES

Table A1-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	MQL	Calculate MSC ?
PESTICIDES	Heptachlor epoxide	-	0.0019	NE	NE	0.0018	YES
PESTICIDES	METHOXYCHLOR	-	0.019	NE	NE	0.018	YES
PESTICIDES	Toxaphene	-	0.037	NE	NE	0.036	YES
SEMIVOLATILES	1,2,4-Trichlorobenzene	-	1.279	NE	NE	0.36	YES
SEMIVOLATILES	1,2-Dichlorobenzene	-	1.279	NE	NE	0.36	YES
SEMIVOLATILES	1,3-Dichlorobenzene	-	1.279	NE	NE	0.36	YES
SEMIVOLATILES	1,4-Dichlorobenzene	-	1.279	NE	NE	0.36	YES
SEMIVOLATILES	2,4,5-Trichlorophenol	-	2.7	NE	NE	0.89	YES
SEMIVOLATILES	2,4,6-Trichlorophenol	-	1.279	NE	NE	0.36	YES
SEMIVOLATILES	2,4-Dichlorophenol	-	1.279	NE	NE	0.36	YES
SEMIVOLATILES	2,4-Dimethylphenol	-	0.639	NE	NE	0.36	YES
SEMIVOLATILES	2,4-Dinitrophenol	-	12.788	NE	NE	0.89	YES
SEMIVOLATILES	2,4-Dinitrotoluene	-	0.55	NE	NE	0.36	YES
SEMIVOLATILES	2,6-Dinitrotoluene	-	0.55	NE	NE	0.36	YES
SEMIVOLATILES	2-Chloronaphthalene	-	0.55	NE	NE	0.328	YES
SEMIVOLATILES	2-Chlorophenol	-	0.639	NE	NE	0.36	YES
SEMIVOLATILES	2-Methylnaphthalene	-	0.55	NE	NE	0.328	YES
SEMIVOLATILES	2-Methylphenol	-	0.639	NE	NE	0.36	YES
SEMIVOLATILES	2-Nitroaniline	-	3.836	NE	NE	0.89	YES
SEMIVOLATILES	2-Nitrophenol	-	1.279	NE	NE	0.36	YES
SEMIVOLATILES	3,3'-Dichlorobenzidine	-	1.1	NE	NE	0.36	YES
SEMIVOLATILES	3-Nitroaniline	-	3.836	NE	NE	0.89	YES
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	-	6.394	NE	NE	0.89	YES
SEMIVOLATILES	4-Bromophenyl phenyl ether	-	1.279	NE	NE	0.36	YES
SEMIVOLATILES	4-Chloro-3-methylphenol	-	0.639	NE	NE	0.36	YES
SEMIVOLATILES	4-Chloroaniline	-	3.836	NE	NE	0.36	YES
SEMIVOLATILES	4-Chlorophenyl phenyl ether	-	1.279	NE	NE	0.36	YES
SEMIVOLATILES	4-Methylphenol	-	0.639	NE	NE	0.36	YES
SEMIVOLATILES	4-Nitroaniline	-	6.394	NE	NE	0.89	YES
SEMIVOLATILES	4-Nitrophenol	-	6.394	NE	NE	0.643	YES
SEMIVOLATILES	Acenaphthene	0.3	0.55	NE	NE	0.328	YES
SEMIVOLATILES	Acenaphthylene	-	0.639	NE	NE	0.36	YES
SEMIVOLATILES	Anthracene	0.59	0.639	NE	NE	0.36	YES
SEMIVOLATILES	Benzo(a)anthracene	1.9	0.384	1.53E-02	NE	0.328	YES
SEMIVOLATILES	Benzo(a)pyrene	1.6	0.639	1.54E-02	NE	0.18	YES
SEMIVOLATILES	Benzo(b)fluoranthene	2.9	1.279	1.53E-02	NE	0.36	YES
SEMIVOLATILES	Benzo(ghi)perylene	0.67	2.558	1.23E-02	NE	0.36	YES
SEMIVOLATILES	Benzo(k)fluoranthene	1.1	1.279	1.30E-02	NE	0.36	YES
SEMIVOLATILES	Benzoic Acid	0.34	2.7	NE	NE	0.89	YES
SEMIVOLATILES	Benzyl Alcohol	-	0.93	NE	NE	0.41	YES
SEMIVOLATILES	bis(2-Chloroethoxy)methane	-	0.639	NE	NE	0.36	YES
SEMIVOLATILES	bis(2-Chloroethyl)ether	-	0.639	NE	NE	0.36	YES
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	-	1.279	NE	NE	0.36	YES
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	0.17	0.639	NE	NE	0.1346	YES
SEMIVOLATILES	Butyl benzyl phthalate	0.29	0.639	NE	NE	0.36	YES
SEMIVOLATILES	Carbazole	-	1.279	NE	NE	0.36	YES
SEMIVOLATILES	Chrysene	2.2	6.394	1.51E-02	NE	0.36	YES
SEMIVOLATILES	Dibenzo(a,h)anthracene	0.23	2.558	NE	NE	0.36	YES
SEMIVOLATILES	Dibenzofuran	0.17	1.279	NE	NE	0.36	YES
SEMIVOLATILES	Diethyl phthalate	-	0.639	NE	NE	0.161	YES
SEMIVOLATILES	Dimethyl phthalate	0.97	0.639	NE	NE	0.36	YES
SEMIVOLATILES	di-n-Butyl phthalate	-	4.727	NE	NE	0.347	YES
SEMIVOLATILES	di-n-Octyl phthalate	-	0.639	NE	NE	0.36	YES
SEMIVOLATILES	Fluoranthene	3.6	0.639	2.29E-02	NE	0.36	YES
SEMIVOLATILES	Fluorene	0.25	0.639	NE	NE	0.36	YES
SEMIVOLATILES	Hexachlorobenzene	-	1.279	NE	NE	0.18	YES
SEMIVOLATILES	Hexachlorobutadiene	-	3.836	NE	NE	0.36	YES
SEMIVOLATILES	Hexachlorocyclopentadiene	-	3.836	NE	NE	0.36	YES
SEMIVOLATILES	Hexachloroethane	-	1.279	NE	NE	0.36	YES
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	0.75	1.279	1.43E-02	NE	0.36	YES
SEMIVOLATILES	Isophorone	-	0.639	NE	NE	0.36	YES
SEMIVOLATILES	Naphthalene	0.11	0.55	NE	NE	0.328	YES
SEMIVOLATILES	Nitrobenzene	-	0.639	NE	NE	0.36	YES

Table A1-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	MQL	Calculate MSC ?
SEMIVOLATILES	n-Nitrosodimethylamine	-	0.37	NE	NE	0.36	YES
SEMIVOLATILES	n-Nitroso-di-n-propylamine	-	1.279	NE	NE	0.36	YES
SEMIVOLATILES	n-Nitrosodiphenylamine	-	0.639	NE	NE	0.36	YES
SEMIVOLATILES	Pentachlorophenol	-	6.394	NE	NE	0.18	YES
SEMIVOLATILES	Phenanthrene	2.9	0.639	NE	NE	0.36	YES
SEMIVOLATILES	Phenol	-	0.639	NE	NE	0.36	YES
SEMIVOLATILES	Pyrene	2.4	0.639	1.94E-02	NE	0.36	YES
VOLATILES	1,1,1,2-Tetrachloroethane	-	0.017	NE	NE	0.0053	YES
VOLATILES	1,1,1-Trichloroethane	-	0.008	NE	NE	0.005	YES
VOLATILES	1,1,2,2-Tetrachloroethane	-	0.008	NE	NE	0.005	YES
VOLATILES	1,1,2-Trichloroethane	-	0.008	NE	NE	0.005	YES
VOLATILES	1,1-Dichloroethane	-	0.008	NE	NE	0.005	YES
VOLATILES	1,1-Dichloroethene	-	0.008	NE	NE	0.005	YES
VOLATILES	1,1-Dichloropropene	-	0.0056	NE	NE	0.0053	YES
VOLATILES	1,2,3-Trichlorobenzene	-	0.0056	NE	NE	0.0053	YES
VOLATILES	1,2,3-Trichloropropane	-	0.017	NE	NE	0.012	YES
VOLATILES	1,2,4-Trichlorobenzene	-	0.0056	NE	NE	0.0053	No, 2
VOLATILES	1,2,4-Trimethylbenzene	-	0.0056	NE	NE	0.0053	YES
VOLATILES	1,2-Dibromo-3-chloropropane	-	0.033	NE	NE	0.011	YES
VOLATILES	1,2-Dibromoethane	-	0.033	NE	NE	0.0053	YES
VOLATILES	1,2-Dichlorobenzene	-	0.0056	NE	NE	0.0053	No, 2
VOLATILES	1,2-Dichloroethane	-	0.008	NE	NE	0.005	YES
VOLATILES	1,2-Dichloroethene	-	0.008	NE	NE	0.005	YES
VOLATILES	1,2-Dichloropropane	-	0.008	NE	NE	0.005	YES
VOLATILES	1,3,5-Trimethylbenzene	-	0.0056	NE	NE	0.0053	YES
VOLATILES	1,3-Dichlorobenzene	-	0.0056	NE	NE	0.0053	No, 2
VOLATILES	1,3-Dichloropropane	-	0.0056	NE	NE	0.0053	YES
VOLATILES	1,4-Dichloro-2-butene	-	0.0056	NE	NE	0.0053	YES
VOLATILES	1,4-Dichlorobenzene	-	0.0056	NE	NE	0.0053	No, 2
VOLATILES	1,4-Dioxane	-	1.1	NE	NE	1.1	YES
VOLATILES	2,2-Dichloropropane	-	0.017	NE	NE	0.016	YES
VOLATILES	2-Butanone	-	0.064	NE	NE	0.012	YES
VOLATILES	2-Chloroethyl vinyl ether	-	0.017	NE	NE	0.012	YES
VOLATILES	2-Chlorotoluene	-	0.0056	NE	NE	0.0053	YES
VOLATILES	2-Hexanone	-	0.064	NE	NE	0.012	YES
VOLATILES	2-Propenal	-	0.83	NE	NE	0.11	YES
VOLATILES	4-Chlorotoluene	-	0.0056	NE	NE	0.0053	YES
VOLATILES	Acetone	0.0051	0.07	NE	NE	0.012	YES
VOLATILES	Acetonitrile	-	0.17	NE	NE	0.12	YES
VOLATILES	Acrylonitrile	-	0.17	NE	NE	0.11	YES
VOLATILES	Allyl chloride	-	0.017	NE	NE	0.012	YES
VOLATILES	Benzene	-	0.008	NE	NE	0.005	YES
VOLATILES	Bromobenzene	-	0.0056	NE	NE	0.0053	YES
VOLATILES	Bromochloromethane	-	0.0056	NE	NE	0.0053	YES
VOLATILES	Bromodichloromethane	-	0.008	NE	NE	0.005	YES
VOLATILES	Bromoform	-	0.008	NE	NE	0.005	YES
VOLATILES	Bromomethane	-	0.032	NE	NE	0.011	YES
VOLATILES	Carbon disulfide	0.042	0.008	NE	NE	0.005	YES
VOLATILES	Carbon tetrachloride	-	0.011	NE	NE	0.005	YES
VOLATILES	Chlorobenzene	-	0.008	NE	NE	0.005	YES
VOLATILES	Chloroethane	-	0.032	NE	NE	0.011	YES
VOLATILES	Chloroform	-	0.008	NE	NE	0.005	YES
VOLATILES	Chloromethane	-	0.032	NE	NE	0.011	YES
VOLATILES	Chloroprene	-	0.17	NE	NE	0.12	YES
VOLATILES	cis-1,2-Dichloroethene	-	0.0056	NE	NE	0.0053	YES
VOLATILES	cis-1,3-Dichloropropene	-	0.008	NE	NE	0.005	YES
VOLATILES	Dibromochloromethane	-	0.008	NE	NE	0.005	YES
VOLATILES	Dibromomethane	-	0.033	NE	NE	0.011	YES
VOLATILES	Dichlorodifluoromethane	-	0.033	NE	NE	0.016	YES
VOLATILES	Ethyl methacrylate	-	0.033	NE	NE	0.0053	YES
VOLATILES	Ethylbenzene	-	0.008	NE	NE	0.005	YES
VOLATILES	Hexachlorobutadiene	-	0.0056	NE	NE	0.0053	No, 2
VOLATILES	IODOMETHANE	-	0.017	NE	NE	0.0053	YES

Table A1-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	MQL	Calculate MSC ?
VOLATILES	ISOBUTYL ALCOHOL	-	3.3	NE	NE	1.1	YES
VOLATILES	Isopropylbenzene	-	0.0056	NE	NE	0.0053	YES
VOLATILES	Methacrylonitrile	-	0.11	NE	NE	0.024	YES
VOLATILES	Methyl isobutyl ketone	-	0.064	NE	NE	0.012	YES
VOLATILES	METHYL METHACRYLATE	-	0.056	NE	NE	0.024	YES
VOLATILES	Methylene chloride	-	0.014	NE	NE	0.004	YES
VOLATILES	Naphthalene	-	0.0056	NE	NE	0.0053	No, 2
VOLATILES	n-BUTYLBENZENE	-	0.0056	NE	NE	0.0053	YES
VOLATILES	n-PROPYLBENZENE	-	0.0056	NE	NE	0.0053	YES
VOLATILES	Pentachloroethane	-	0.033	NE	NE	0.011	YES
VOLATILES	p-ISOPROPYLTOLUENE	-	0.0056	NE	NE	0.0053	YES
VOLATILES	Propionitrile	-	0.11	NE	NE	0.061	YES
VOLATILES	sec-BUTYLBENZENE	-	0.0056	NE	NE	0.0053	YES
VOLATILES	Styrene	-	0.008	NE	NE	0.005	YES
VOLATILES	tert-BUTYLBENZENE	-	0.0056	NE	NE	0.0053	YES
VOLATILES	Tetrachloroethene	-	0.008	NE	NE	0.005	YES
VOLATILES	Toluene	-	0.008	NE	NE	0.005	YES
VOLATILES	trans-1,2-Dichloroethene	-	0.0056	NE	NE	0.0053	YES
VOLATILES	trans-1,3-Dichloropropene	-	0.008	NE	NE	0.005	YES
VOLATILES	trans-1,4-Dichloro-2-butene	-	0.033	NE	NE	0.024	YES
VOLATILES	Trichloroethene	0.001	0.011	NE	NE	0.005	YES
VOLATILES	Trichlorofluoromethane	-	0.017	NE	NE	0.011	YES
VOLATILES	Vinyl acetate	-	0.022	NE	NE	0.012	YES
VOLATILES	Vinyl chloride	-	0.032	NE	NE	0.011	YES
VOLATILES	Xylenes, Total	-	0.008	NE	NE	0.005	YES

Notes:
all concentrations in milligrams per kilogram (mg/kg)
Max Detected and Max SQL values taken from Table 2 of the main body of the Addendum.
NE - Not evaluated, background was only evaluated for metals and select other analytes.
SQL - sample quantitation limit.
MQL - method quantitation limit.
MSC - medium specific concentration.

Rules for Analyte Selection

1. Chemicals that are essential nutrients (Fe, Ca, Mg, K, Na, P), TCEQ (2001).
2. Same chemical is analyzed as a semivolatile, only one MSC value is calculated.

Table A1-2
Input Values for Parameters used to Calculate Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Parameter		Value	Units	Comment	Reference
Soil Dry Bulk Density	ρ_b	1.5	g/cm^3	Typical Value	USEPA, 1996, pg. 38.
Particle Density	$\rho_{particle}$	2.65	g/cm^3	TCEQ default value	30 TAC §350.75 (c) and (d)
Total Porosity	n	0.43	unitless	n = 1-(ρb/ρparticle) = 1-(1.5 g/cc/2.65 g/cc)	USEPA, 1996, pg. 38.
Volumetric Water Content of Soil	θ_w	0.13	unitless	Assumed 30% of Total Porosity	USEPA, 1996, pg. 38.
Soil Fraction Organic Carbon	f_{oc}	0.02	unitless	TCEQ default value	30 TAC §335.567. Appendix I. (p. 26)
Net Infiltration Rate through soil	I	30.4	cm/yr	I = 0.0018 x P x P P - precipitation for Marshall Texas 130 cm/year	TCEQ, 2000
Thickness of affected soil	L_1	381	cm	Samples taken at various depths from 0 down to 12.5 ft. Assumed 12.5 ft. (381 cm)	Table 2, main body of Addendum
Distance from top of affected soils to top of water bearing unit.	L_2	402	cm	top of shallowest sand layer in nearest Monitor Well LHSMW63 is 13.2 ft. (402 cm	Jacobs, 2002, Appendix A, Boring Logs
Groundwater Darcy Velocity	V_{gw}	8.13	cm/yr	Calculated = K*i*31500000 sec/yr	USEPA, 1996, pg. 42.
Hydraulic conductivity in groundwater bearing unit	K	3.80E-05	cm/sec	Measured by rising head slug test in LHSMW65	Jacobs 2002, pg 10-3
Hydraulic gradient in groundwater bearing unit	i	0.00679	unitless	Value listed as modeling input	Shaw, 2007, Appendix I, pg. 2-1
Width of soil source area parallel to groundwater flow direction	W	5,500	cm	Maximum site dimension, 180 ft measured from between LH-WRS3-01 and LHS-Y-05. (~5500 cm)	See Figure A1-1
Groundwater mixing zone	d	305	cm	All LHAAP-48 wells in Shallow Zone contained 10-ft screen sections. 10 x 12 x 2.54	Jacobs 2002, pg. 5-4
Soil Air Filled Porosity (θ_a)	θ_a	0.3	unitless	n - θws	USEPA, 1996, pg. 38.
Henry's Law Constant	H'	Chemical specific property	unitless	See Table A1-4	TCEQ, 2008
Organic Carbon Partition Coefficient	K_{oc}	Chemical specific property	unitless	See Table A1-4	TCEQ, 2008
Soil Water Partition Coefficient	K_d	Chemical specific property	unitless	See Table A1-4	TCEQ, 2008

Notes:

Jacobs Engineering Group, Inc., 2002: *Final Remedial Investigation Report, Group 4 Sites, Sites 04, 08, 35A, 35B, 35C, 46, 47, 48, 50, 60,67, Goose Prairie Creek, Volumes 1 and 2: Report, Longhorn Army Ammunition Plant, Karnack, Texas* , Oak Ridge, Tennessee, February.

Shaw Environmental & Infrastructure (Shaw), 2007, *Final Modeling Report, Derivation of Soil and Groundwater Concentrations Protective of Surface Water and Sediment*, February.

Texas Commission on Environmental Quality (TCEQ), *Risk Reduction Rules* , 30 TAC §335.567. Appendix I.

TCEQ, 2000, Tier 2 PCL Equations, March, accessed at http://www.tceq.state.tx.us/assets/public/remediation/trrp/tier2.pdf

TCEQ, 2008: Texas Risk Reduction Program Physical Chemcial Properties Tables, April, accessed at http://www.tceq.state.tx.us/remediation/trrp/trrppcls.html

USEPA, 1996. Soil Screening Guidance: Technical Background Document, USEPA/540/R-95/128018, U. S. Environmental Protection Agency, Office of Emergency and Remedial Response, July.

Table A1-3
Determination of pH
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Well	Date	pH Measurement	Comment
LHSMW62	Sep-04	5.32	
LHSMW63	Sep-04		bailed dry, no measurements
LHSMW64	Sep-04	5.87	
LHSMW65	Sep-04		bailed dry, no measurements
LHSMW66	Sep-04		bailed dry, no measurements
LHSMW62	May-05	5.17	
LHSMW63	May-05	6.75	
LHSMW64	May-05	6.22	
LHSMW65	May-05		bailed dry, no measurements
LHSMW66	May-05	6.90	
Average		6.04	
pH to be used		**6.0**	

Notes:
1. pH data from the groundwater sampling logs (Shaw, 2007b).
2. Only the pH readings from shallow wells were averaged.

Table A1-4
Physical Chemical Properties of Chemicals of Concern [a]
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
DIOXINS_FURANS	2,3,7,8-TCDD TEQ	1.47E-03	1.41E+07	2.83E+05	1.93E-05	b
EXPLOSIVES	1,3,5-Trinitrobenzene	2.87E-06	1.41E+01	2.83E-01	3.53E+02	b
EXPLOSIVES	1,3-Dinitrobenzene	4.57E-06	3.00E+01	6.00E-01	5.40E+02	b
EXPLOSIVES	2,4,6-Trinitrotoluene	1.90E-05	3.02E+02	6.04E+00	1.30E+02	b
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	1.19E-07	5.62E+02	1.12E+01	1.73E+01	b
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	1.74E-07	3.63E+02	7.26E+00	3.64E+01	b
EXPLOSIVES	HMX	2.50E-14	3.98E-02	7.96E-04	2.37E+03	b
EXPLOSIVES	m-Nitrotoluene	2.24E-03	1.41E+02	2.81E+00	4.98E+02	b
EXPLOSIVES	o-Nitrotoluene	1.87E-03	1.41E+02	2.81E+00	6.00E+02	b
EXPLOSIVES	p-Nitrotoluene	2.29E-03	1.41E+02	2.81E+00	4.00E+02	b
EXPLOSIVES	RDX	4.99E-04	6.31E+01	1.26E+00	3.87E+01	b
EXPLOSIVES	Tetryl	8.31E-11	2.34E+02	4.69E+00	7.50E+01	b
METALS	Aluminum	0.00E+00	NA	3.53E+04	0.00E+00	c
METALS	Antimony	0.00E+00	NA	5.70E+01	0.00E+00	d
METALS	Arsenic	0.00E+00	NA	2.70E+01	0.00E+00	c
METALS	Barium	0.00E+00	NA	3.00E+01	0.00E+00	d
METALS	Beryllium	0.00E+00	NA	8.20E+01	0.00E+00	c
METALS	Cadmium	0.00E+00	NA	3.70E+01	0.00E+00	d
METALS	Chromium	0.00E+00	NA	2.00E+05	0.00E+00	d
METALS	Cobalt	0.00E+00	NA	4.50E+01	0.00E+00	
METALS	Copper	0.00E+00	NA	4.00E+01	0.00E+00	
METALS	Lead	0.00E+00	NA	1.83E+03	0.00E+00	c
METALS	Manganese	0.00E+00	NA	5.01E+01	0.00E+00	
METALS	Mercury	4.74E-01	NA	3.50E+00	3.00E-02	c
METALS	Nickel	0.00E+00	NA	3.80E+01	0.00E+00	d
METALS	Selenium	0.00E+00	NA	8.60E+00	0.00E+00	c
METALS	Silver	0.00E+00	NA	1.30E+00	0.00E+00	d
METALS	Strontium	0.00E+00	NA	2.00E+00	0.00E+00	
METALS	Thallium	0.00E+00	NA	5.80E+01	2.90E+03	d
METALS	Vanadium	0.00E+00	NA	1.00E+03	0.00E+00	
METALS	Zinc	0.00E+00	NA	3.60E+01	0.00E+00	d
PCBS	Aroclor 1016	1.75E-02	5.30E+05	1.06E+04	5.55E-02	b
PCBS	Aroclor 1221	1.75E-02	5.30E+05	1.06E+04	5.55E-02	b
PCBS	Aroclor 1232	1.75E-02	5.30E+05	1.06E+04	5.55E-02	b
PCBS	Aroclor 1242	1.75E-02	5.30E+05	1.06E+04	5.55E-02	b
PCBS	Aroclor 1248	1.75E-02	5.30E+05	1.06E+04	5.55E-02	b
PCBS	Aroclor 1254	1.75E-02	5.30E+05	1.06E+04	5.55E-02	b
PCBS	Aroclor 1260	1.75E-02	5.30E+05	1.06E+04	5.55E-02	b
PESTICIDES	4,4'-DDD	1.66E-04	8.51E+04	1.70E+03	9.00E-02	b
PESTICIDES	4,4'-DDE	8.73E-04	1.10E+05	2.19E+03	6.50E-02	b
PESTICIDES	4,4'-DDT	2.23E-03	1.37E+05	2.75E+03	3.10E-03	b
PESTICIDES	Aldrin	7.07E-03	4.79E+04	9.57E+02	7.84E-02	b
PESTICIDES	alpha-BHC	2.82E-04	1.32E+03	2.64E+01	2.00E+00	b
PESTICIDES	beta-BHC	1.44E-05	1.38E+03	2.76E+01	5.42E-01	b
PESTICIDES	Chlordane	2.02E-03	1.20E+05	2.40E+03	5.60E-02	b

Table A1-4
Physical Chemical Properties of Chemicals of Concern [a]
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
PESTICIDES	delta-BHC	1.77E-04	8.51E+03	1.70E+02	2.59E+00	b
PESTICIDES	Dieldrin	1.11E-04	2.14E+04	4.28E+02	1.95E-01	b
PESTICIDES	Endosulfan I	3.55E-05	1.57E+04	3.14E+02	1.73E+00	b
PESTICIDES	Endosulfan II	3.55E-05	1.57E+04	3.14E+02	1.16E+00	b
PESTICIDES	Endosulfan Sulfate	3.65E-05	7.94E+05	1.59E+04	1.02E-01	b
PESTICIDES	Endrin	4.95E-05	9.33E+03	1.87E+02	2.50E-01	b
PESTICIDES	Endrin aldehyde	1.80E-02	2.14E+06	4.28E+04	1.68E-02	b
PESTICIDES	Endrin ketone	3.66E-05	1.74E+05	3.48E+03	8.60E-01	b
PESTICIDES	gamma-BHC (Lindane)	1.41E-04	1.10E+03	2.19E+01	5.75E+00	b
PESTICIDES	Heptachlor	2.44E-02	1.17E+04	2.35E+02	1.80E-01	b
PESTICIDES	Heptachlor epoxide	3.45E-04	7.24E+03	1.45E+02	2.75E-01	b
PESTICIDES	METHOXYCHLOR	6.57E-04	7.76E+04	1.55E+03	4.50E-02	b
PESTICIDES	Toxaphene	1.40E-04	9.58E+04	1.92E+03	7.40E-01	b
SEMIVOLATILES	1,2,4-Trichlorobenzene	5.90E-02	1.66E+03	3.32E+01	4.88E+01	b
SEMIVOLATILES	1,2-Dichlorobenzene	8.73E-02	6.92E+02	1.38E+01	1.50E+02	b
SEMIVOLATILES	1,3-Dichlorobenzene	1.95E-01	1.70E+02	3.40E+00	1.10E+02	b
SEMIVOLATILES	1,4-Dichlorobenzene	1.17E-01	6.46E+02	1.29E+01	7.38E+01	b
SEMIVOLATILES	2,4,5-Trichlorophenol	1.78E-04	2.21E+03	4.42E+01	1.20E+03	b, e
SEMIVOLATILES	2,4,6-Trichlorophenol	3.19E-04	7.96E+02	1.59E+01	9.82E+02	b, e
SEMIVOLATILES	2,4-Dichlorophenol	1.31E-04	1.57E+02	3.14E+00	4.50E+03	b, e
SEMIVOLATILES	2,4-Dimethylphenol	8.31E-05	1.17E+02	2.35E+00	6.20E+03	b
SEMIVOLATILES	2,4-Dinitrophenol	2.01E-07	1.16E-02	2.32E-04	5.80E+03	b, e
SEMIVOLATILES	2,4-Dinitrotoluene	3.60E-05	5.13E+01	1.03E+00	2.85E+02	b
SEMIVOLATILES	2,6-Dinitrotoluene	3.11E-05	4.17E+01	8.34E-01	1.82E+02	b
SEMIVOLATILES	2-Chloronaphthalene	2.54E-02	8.51E+03	1.70E+02	6.74E+00	b
SEMIVOLATILES	2-Chlorophenol	7.40E-04	3.96E+02	7.92E+00	2.80E+04	b, e
SEMIVOLATILES	2-Methylnaphthalene	1.85E-02	4.32E+03	8.63E+01	2.54E+01	b
SEMIVOLATILES	2-Methylphenol	6.65E-05	9.77E+01	1.95E+00	2.04E+04	b
SEMIVOLATILES	2-Nitroaniline	2.08E-05	2.69E+01	5.38E-01	1.26E+03	b
SEMIVOLATILES	2-Nitrophenol	2.21E-05	1.88E+02	3.75E+00	1.73E+04	b, e
SEMIVOLATILES	3,3'-Dichlorobenzidine	8.65E-07	7.24E+02	1.45E+01	3.11E+00	b
SEMIVOLATILES	3-Nitroaniline	2.31E-07	3.94E+01	7.88E-01	4.56E+02	b
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	1.07E-07	3.16E-02	6.32E-04	3.00E+03	b
SEMIVOLATILES	4-Bromophenyl phenyl ether	9.66E-03	1.45E+05	2.90E+03	8.25E-01	b
SEMIVOLATILES	4-Chloro-3-methylphenol	1.40E-05	8.78E+02	1.76E+01	5.43E+03	b
SEMIVOLATILES	4-Chloroaniline	4.86E-05	6.61E+01	1.32E+00	3.90E+03	b
SEMIVOLATILES	4-Chlorophenyl phenyl ether	1.30E-02	1.31E+04	2.62E+02	1.43E+00	b
SEMIVOLATILES	4-Methylphenol	3.99E-05	8.13E+01	1.63E+00	2.30E+04	b
SEMIVOLATILES	4-Nitroaniline	3.33E-08	1.12E+01	2.25E-01	6.49E+02	b
SEMIVOLATILES	4-Nitrophenol	3.24E-08	4.36E+01	8.73E-01	4.49E+03	b, e
SEMIVOLATILES	Acenaphthene	6.44E-03	3.98E+03	7.96E+01	4.24E+00	b
SEMIVOLATILES	Acenaphthylene	4.74E-03	6.92E+03	1.38E+02	3.93E+00	b
SEMIVOLATILES	Anthracene	4.61E-03	2.34E+04	4.69E+02	4.34E-02	b
SEMIVOLATILES	Benzo(a)anthracene	1.39E-04	3.55E+05	7.10E+03	1.00E-02	b
SEMIVOLATILES	Benzo(a)pyrene	4.70E-05	9.55E+05	1.91E+04	1.62E-03	b

Table A1-4

Physical Chemical Properties of Chemicals of Concern [a]
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
SEMIVOLATILES	Benzo(b)fluoranthene	4.99E-04	1.20E+06	2.40E+04	1.50E-03	b
SEMIVOLATILES	Benzo(ghi)perylene	5.82E-06	1.58E+06	3.17E+04	2.60E-04	b
SEMIVOLATILES	Benzo(k)fluoranthene	4.45E-07	1.23E+06	2.46E+04	5.50E-04	b
SEMIVOLATILES	Benzoic Acid	1.39E-05	9.69E-01	1.94E-02	3.50E+03	b, e
SEMIVOLATILES	Benzyl Alcohol	1.62E-05	1.20E+01	2.40E-01	4.00E+04	b
SEMIVOLATILES	bis(2-Chloroethoxy)methane	1.25E-03	3.07E+02	6.13E+00	1.35E+03	b
SEMIVOLATILES	bis(2-Chloroethyl)ether	8.90E-04	1.55E+01	3.10E-01	1.02E+04	b
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	4.16E-03	3.16E+02	6.32E+00	1.70E+03	b
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	4.57E-04	6.76E+05	1.35E+04	3.00E-01	b
SEMIVOLATILES	Butyl benzyl phthalate	7.94E-05	1.37E+04	2.75E+02	2.90E+00	b
SEMIVOLATILES	Carbazole	3.38E-03	2.45E+03	4.91E+01	7.21E-01	b
SEMIVOLATILES	Chrysene	5.03E-05	3.09E+05	6.18E+03	2.00E-03	b
SEMIVOLATILES	Dibenzo(a,h)anthracene	4.66E+00	1.91E+06	3.81E+04	5.00E-04	b
SEMIVOLATILES	Dibenzofuran	5.28E-03	8.49E+03	1.70E+02	2.86E+00	b
SEMIVOLATILES	Diethyl phthalate	1.87E-05	1.51E+02	3.03E+00	1.08E+03	b
SEMIVOLATILES	Dimethyl phthalate	2.40E-05	3.16E+01	6.32E-01	4.19E+03	b
SEMIVOLATILES	di-n-Butyl phthalate	5.94E-05	3.39E+04	6.78E+02	1.12E+01	b
SEMIVOLATILES	di-n-Octyl phthalate	2.78E-03	8.32E+07	1.66E+06	2.00E-02	b
SEMIVOLATILES	Fluoranthene	3.88E-04	4.90E+04	9.80E+02	2.60E-01	b
SEMIVOLATILES	Fluorene	2.64E-03	7.59E+03	1.52E+02	1.98E+00	b
SEMIVOLATILES	Hexachlorobenzene	2.22E-02	2.82E+04	5.64E+02	6.00E-03	b
SEMIVOLATILES	Hexachlorobutadiene	9.94E-01	6.92E+03	1.38E+02	2.55E+00	b
SEMIVOLATILES	Hexachlorocyclopentadiene	7.15E-01	9.55E+03	1.91E+02	1.80E+00	b
SEMIVOLATILES	Hexachloroethane	1.62E-01	1.82E+03	3.64E+01	5.00E+01	b
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	2.85E+00	3.47E+06	6.93E+04	3.75E-03	b
SEMIVOLATILES	Isophorone	2.57E-04	3.02E+01	6.04E-01	1.20E+04	b
SEMIVOLATILES	Naphthalene	2.00E-02	1.55E+03	3.10E+01	3.14E+01	b
SEMIVOLATILES	Nitrobenzene	8.56E-04	1.32E+02	2.64E+00	1.90E+03	b
SEMIVOLATILES	n-Nitrosodimethylamine	2.16E-05	3.60E+00	7.20E-02	1.00E+06	b
SEMIVOLATILES	n-Nitroso-di-n-propylamine	9.35E-05	1.97E+01	3.94E-01	9.89E+03	b
SEMIVOLATILES	n-Nitrosodiphenylamine	2.08E-04	3.31E+02	6.62E+00	3.51E+01	b
SEMIVOLATILES	Pentachlorophenol	1.16E-05	1.56E+03	3.12E+01	1.40E+01	b, e
SEMIVOLATILES	Phenanthrene	5.40E-03	1.41E+04	2.83E+02	9.94E-01	b
SEMIVOLATILES	Phenol	2.47E-05	1.74E+01	3.48E-01	8.70E+04	b
SEMIVOLATILES	Pyrene	4.57E-04	3.80E+04	7.60E+02	1.35E-01	b
VOLATILES	1,1,1,2-Tetrachloroethane	9.98E-02	9.55E+02	1.91E+01	1.10E+03	b
VOLATILES	1,1,1-Trichloroethane	7.15E-01	1.10E+02	2.19E+00	1.33E+03	b
VOLATILES	1,1,2,2-Tetrachloroethane	1.55E-02	7.76E+01	1.55E+00	2.97E+03	b
VOLATILES	1,1,2-Trichloroethane	3.80E-02	5.01E+01	1.00E+00	4.42E+03	b
VOLATILES	1,1-Dichloroethane	2.39E-01	3.16E+01	6.32E-01	5.50E+03	b
VOLATILES	1,1-Dichloroethene	1.06E+00	6.46E+01	1.29E+00	2.40E+03	b
VOLATILES	1,1-Dichloropropene	1.82E+00	2.06E+02	4.12E+00	5.44E+02	b
VOLATILES	1,2,3-Trichlorobenzene	3.80E-02	8.91E+03	1.78E+02	1.64E+01	b
VOLATILES	1,2,3-Trichloropropane	1.58E-02	3.89E+02	7.78E+00	1.90E+03	b
VOLATILES	1,2,4-Trimethylbenzene	1.84E-01	9.33E+02	1.87E+01	5.68E+01	b

Table A1-4
Physical Chemical Properties of Chemicals of Concern [a]
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
VOLATILES	1,2-Dibromo-3-chloropropane	8.31E-03	1.70E+02	3.40E+00	1.00E+03	b
VOLATILES	1,2-Dibromoethane	2.93E-02	5.37E+01	1.07E+00	4.32E+03	b
VOLATILES	1,2-Dichloroethane	5.32E-02	1.74E+01	3.48E-01	8.70E+03	b
VOLATILES	1,2-Dichloroethene	1.87E-01	2.90E+01	5.80E-01	4.93E+03	b
VOLATILES	1,2-Dichloropropane	1.17E-01	5.89E+01	1.18E+00	2.80E+03	b
VOLATILES	1,3,5-Trimethylbenzene	2.72E-01	1.02E+03	2.05E+01	5.15E+01	b
VOLATILES	1,3-Dichloropropane	5.52E-02	1.25E+02	2.50E+00	2.16E+03	b
VOLATILES	1,4-Dichloro-2-butene	1.24E-02	1.82E+02	3.64E+00	6.91E+03	b
VOLATILES	1,4-Dioxane	2.04E-04	5.40E-01	1.08E-02	9.00E+05	b
VOLATILES	2,2-Dichloropropane	3.39E-01	1.56E+02	3.11E+00	1.68E+03	b
VOLATILES	2-Butanone	1.94E-03	1.90E+00	3.80E-02	2.40E+05	b
VOLATILES	2-Chloroethyl vinyl ether	3.02E-02	3.72E+01	7.43E-01	5.02E+03	b
VOLATILES	2-Chlorotoluene	1.35E-01	4.07E+02	8.15E+00	1.54E+02	b
VOLATILES	2-Hexanone	3.38E-03	1.79E+01	3.58E-01	1.79E+04	b
VOLATILES	2-Propenal	1.83E-04	5.25E-01	1.05E-02	2.00E+05	b
VOLATILES	4-Chlorotoluene	1.33E-01	4.96E+02	9.93E+00	1.18E+02	b
VOLATILES	Acetone	1.61E-03	5.70E-01	1.14E-02	6.00E+05	b
VOLATILES	Acetonitrile	1.21E-03	4.68E-01	9.35E-03	2.05E+05	b
VOLATILES	Acrylonitrile	4.57E-03	1.10E+00	2.19E-02	7.50E+04	b
VOLATILES	Allyl chloride	4.57E-01	2.69E+01	5.38E-01	3.40E+03	b
VOLATILES	Benzene	2.27E-01	6.61E+01	1.32E+00	1.77E+03	b
VOLATILES	Bromobenzene	8.38E-02	2.42E+02	4.84E+00	2.98E+02	b
VOLATILES	Bromochloromethane	3.69E-02	2.75E+01	5.50E-01	2.04E+04	b
VOLATILES	Bromodichloromethane	1.32E-01	5.50E+01	1.10E+00	4.50E+03	b
VOLATILES	Bromoform	2.56E-02	8.71E+01	1.74E+00	3.20E+03	b
VOLATILES	Bromomethane	5.90E-01	1.05E+01	2.09E-01	1.52E+04	b
VOLATILES	Carbon disulfide	6.13E-01	5.25E+01	1.05E+00	2.30E+03	b
VOLATILES	Carbon tetrachloride	1.20E+00	1.86E+02	3.72E+00	8.05E+02	b
VOLATILES	Chlorobenzene	1.82E-01	2.14E+02	4.28E+00	5.02E+02	b
VOLATILES	Chloroethane	2.12E-01	1.78E+01	3.56E-01	2.00E+04	b
VOLATILES	Chloroform	1.53E-01	4.68E+01	9.35E-01	7.92E+03	b
VOLATILES	Chloromethane	1.44E+00	6.00E+00	1.20E-01	7.25E+03	b
VOLATILES	Chloroprene	1.33E+00	1.00E+02	2.00E+00	6.30E+02	b
VOLATILES	cis-1,2-Dichloroethene	1.87E-01	2.88E+01	5.77E-01	4.93E+03	b
VOLATILES	cis-1,3-Dichloropropene	9.15E-02	4.47E+01	8.93E-01	2.70E+03	b
VOLATILES	Dibromochloromethane	3.25E-02	6.31E+01	1.26E+00	5.25E+03	b
VOLATILES	Dibromomethane	3.49E-02	1.82E+02	3.64E+00	1.10E+04	b
VOLATILES	Dichlorodifluoromethane	1.67E+01	1.29E+02	2.58E+00	2.80E+02	b
VOLATILES	Ethyl methacrylate	6.65E-03	3.70E+01	7.40E-01	1.90E+04	b
VOLATILES	Ethylbenzene	3.28E-01	2.04E+02	4.08E+00	1.69E+02	b
VOLATILES	IODOMETHANE	2.36E-01	2.02E+01	4.04E-01	1.24E+04	b
VOLATILES	ISOBUTYL ALCOHOL	4.99E-04	5.62E+00	1.12E-01	9.49E+04	b
VOLATILES	Isopropylbenzene	6.07E-01	3.47E+03	6.93E+01	5.00E+01	b
VOLATILES	Methacrylonitrile	3.03E-03	3.39E+00	6.78E-02	2.50E+04	b
VOLATILES	Methyl isobutyl ketone	5.82E-03	1.50E+01	3.00E-01	1.90E+04	b

Table A1-4

Physical Chemical Properties of Chemicals of Concern [a]
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
VOLATILES	METHYL METHACRYLATE	1.33E-02	2.30E+01	4.60E-01	1.60E+04	b
VOLATILES	Methylene chloride	9.10E-02	1.17E+01	2.35E-01	1.54E+04	b
VOLATILES	n-BUTYLBENZENE	5.57E-01	3.02E+03	6.04E+01	1.08E+01	b
VOLATILES	n-PROPYLBENZENE	4.24E-01	1.07E+03	2.14E+01	4.20E+01	b
VOLATILES	Pentachloroethane	2.15E-02	1.90E+02	3.80E+00	6.19E+02	b
VOLATILES	p-ISOPROPYLTOLUENE	4.66E-01	2.29E+03	4.58E+01	1.71E+01	b
VOLATILES	Propionitrile	1.02E-03	1.64E+00	3.28E-02	9.73E+04	b
VOLATILES	sec-BUTYLBENZENE	5.07E-01	2.09E+03	4.18E+01	1.81E+01	b
VOLATILES	Styrene	1.14E-01	7.59E+02	1.52E+01	3.10E+02	b
VOLATILES	tert-BUTYLBENZENE	8.56E-01	2.45E+03	4.91E+01	1.51E+01	b
VOLATILES	Tetrachloroethene	7.65E-01	1.55E+02	3.10E+00	2.00E+02	b
VOLATILES	Toluene	2.76E-01	1.40E+02	2.80E+00	5.30E+02	b
VOLATILES	trans-1,2-Dichloroethene	3.90E-01	5.01E+01	1.00E+00	6.30E+03	b
VOLATILES	trans-1,3-Dichloropropene	9.15E-02	4.47E+01	8.93E-01	2.80E+03	b
VOLATILES	trans-1,4-Dichloro-2-butene	1.35E-02	2.04E+02	4.09E+00	1.27E+03	b
VOLATILES	Trichloroethene	4.28E-01	9.33E+01	1.87E+00	1.10E+03	b
VOLATILES	Trichlorofluoromethane	4.03E+00	1.35E+02	2.70E+00	1.10E+03	b
VOLATILES	Vinyl acetate	2.29E-02	5.25E+00	1.05E-01	2.00E+04	b
VOLATILES	Vinyl chloride	3.49E+00	1.10E+01	2.19E-01	2.76E+03	b
VOLATILES	Xylenes, Total	2.93E-01	2.40E+02	4.80E+00	1.98E+02	b

Notes:

Chemicals of Concern shown in Table A1-1.

pH value of 6.0 averaged from pH Values on Table A1-3.

mg/L - milligrams per liter

a Annual TCEQ update of chemical/physical properties table [(Figure: 30 TAC §350.73(e)], April 2008.

b Kd value calculated by formula Koc * foc for non-metals.

c pH-dependent Kd value obtained from Figure 30TAC§350.73(e)(1)(A), April 2008.

d pH-dependent Kd value obtained from Figure 30TAC§350.73(e)(1)(C), April 2008.

e pH-dependent Koc value obtained from 30 TAC §350.73(e)(1)(B), April 2008

Table A1-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
DIOXINS_FURANS	2,3,7,8-TCDD TEQ	1.47E-03	2.83E+05	1.93E-05	3.54E-06	5.5E+00	3.0E-08	9.1E-03	1.53E-07	**9.1E-03**
EXPLOSIVES	1,3,5-Trinitrobenzene	2.87E-06	2.83E-01	3.53E+02	2.71E+00	1.3E+02	3.1E+00	1.2E+00	none	**1.2E+00**
EXPLOSIVES	1,3-Dinitrobenzene	4.57E-06	6.00E-01	5.40E+02	1.46E+00	3.7E+02	1.0E-02	7.5E-03	none	**7.5E-03**
EXPLOSIVES	2,4,6-Trinitrotoluene	1.90E-05	6.04E+00	1.30E+02	1.63E-01	8.0E+02	5.1E-02	3.4E-01	none	**3.4E-01**
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	1.19E-07	1.12E+01	1.73E+01	8.82E-02	2.0E+02	1.7E-02	2.1E-01	none	**2.1E-01**
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	1.74E-07	7.26E+00	3.64E+01	1.36E-01	2.7E+02	1.7E-02	1.3E-01	none	**1.3E-01**
EXPLOSIVES	HMX	2.50E-14	7.96E-04	2.37E+03	1.14E+01	2.1E+02	5.1E+00	4.8E-01	none	**4.8E-01**
EXPLOSIVES	m-Nitrotoluene	2.24E-03	2.81E+00	4.98E+02	3.45E-01	1.4E+03	1.0E+00	3.2E+00	none	**3.2E+00**
EXPLOSIVES	o-Nitrotoluene	1.87E-03	2.81E+00	6.00E+02	3.45E-01	1.7E+03	1.0E+00	3.2E+00	none	**3.2E+00**
EXPLOSIVES	p-Nitrotoluene	2.29E-03	2.81E+00	4.00E+02	3.45E-01	1.2E+03	1.0E+00	3.2E+00	none	**3.2E+00**
EXPLOSIVES	RDX	4.99E-04	1.26E+00	3.87E+01	7.41E-01	5.2E+01	2.6E-02	3.8E-02	none	**3.8E-02**
EXPLOSIVES	Tetryl	8.31E-11	4.69E+00	7.50E+01	2.09E-01	3.6E+02	1.0E+00	5.2E+00	none	**5.2E+00**
METALS	Aluminum	0.00E+00	3.53E+04	0.00E+00	2.83E-05	NA	1.0E+02	3.9E+06	1.63E+04	**3.9E+06**
METALS	Antimony	0.00E+00	5.70E+01	0.00E+00	1.75E-02	NA	6.0E-03	3.7E-01	9.40E-01	**9.4E-01**
METALS	Arsenic	0.00E+00	2.70E+01	0.00E+00	3.69E-02	NA	1.0E-02	2.9E-01	4.81E+00	**4.8E+00**
METALS	Barium	0.00E+00	3.00E+01	0.00E+00	3.32E-02	NA	2.0E+00	6.4E+01	8.55E+01	**8.5E+01**
METALS	Beryllium	0.00E+00	8.20E+01	0.00E+00	1.22E-02	NA	4.0E-03	3.5E-01	6.45E-01	**6.5E-01**
METALS	Cadmium	0.00E+00	3.70E+01	0.00E+00	2.70E-02	NA	5.0E-03	2.0E-01	4.00E-01	**4.0E-01**
METALS	Chromium	0.00E+00	2.00E+05	0.00E+00	5.00E-06	NA	1.0E-01	2.1E+04	2.66E+01	**2.1E+04**
METALS	Cobalt	0.00E+00	4.50E+01	0.00E+00	2.22E-02	NA	6.1E+00	3.0E+02	5.61E+00	**3.0E+02**
METALS	Copper	0.00E+00	4.00E+01	0.00E+00	2.49E-02	NA	1.3E+00	5.6E+01	5.55E+00	**5.6E+01**
METALS	Lead	0.00E+00	1.83E+03	0.00E+00	5.46E-04	NA	1.5E-02	2.9E+01	1.14E+01	**2.9E+01**
METALS	Manganese	0.00E+00	5.01E+01	0.00E+00	1.99E-02	NA	1.4E+01	7.7E+02	2.01E+02	**7.7E+02**
METALS	Mercury	4.74E-01	3.50E+00	3.00E-02	2.72E-01	1.1E-01	2.0E-03	7.9E-03	8.19E-02	**8.2E-02**
METALS	Nickel	0.00E+00	3.80E+01	0.00E+00	2.63E-02	NA	2.0E+00	8.3E+01	6.98E+00	**8.3E+01**
METALS	Selenium	0.00E+00	8.60E+00	0.00E+00	1.15E-01	NA	5.0E-02	4.7E-01	3.48E+00	**3.5E+00**
METALS	Silver	0.00E+00	1.30E+00	0.00E+00	7.21E-01	NA	5.1E-01	7.6E-01	3.10E-01	**7.6E-01**
METALS	Strontium	0.00E+00	2.00E+00	0.00E+00	4.79E-01	NA	6.1E+01	1.4E+02	1.98E+01	**1.4E+02**
METALS	Thallium	0.00E+00	5.80E+01	2.90E+03	1.72E-02	1.7E+05	2.0E-03	1.2E-01	4.70E-01	**4.7E-01**
METALS	Vanadium	0.00E+00	1.00E+03	0.00E+00	1.00E-03	NA	7.2E-01	7.7E+02	3.21E+01	**7.7E+02**
METALS	Zinc	0.00E+00	3.60E+01	0.00E+00	2.77E-02	NA	3.1E+01	1.2E+03	2.02E+01	**1.2E+03**
PCBS	Aroclor 1016	1.75E-02	1.06E+04	5.55E-02	9.43E-05	5.9E+02	5.0E-04	5.7E+00	none	**5.7E+00**
PCBS	Aroclor 1221	1.75E-02	1.06E+04	5.55E-02	9.43E-05	5.9E+02	5.0E-04	5.7E+00	none	**5.7E+00**
PCBS	Aroclor 1232	1.75E-02	1.06E+04	5.55E-02	9.43E-05	5.9E+02	5.0E-04	5.7E+00	none	**5.7E+00**
PCBS	Aroclor 1242	1.75E-02	1.06E+04	5.55E-02	9.43E-05	5.9E+02	5.0E-04	5.7E+00	none	**5.7E+00**
PCBS	Aroclor 1248	1.75E-02	1.06E+04	5.55E-02	9.43E-05	5.9E+02	5.0E-04	5.7E+00	none	**5.7E+00**
PCBS	Aroclor 1254	1.75E-02	1.06E+04	5.55E-02	9.43E-05	5.9E+02	5.0E-04	5.7E+00	none	**5.7E+00**
PCBS	Aroclor 1260	1.75E-02	1.06E+04	5.55E-02	9.43E-05	5.9E+02	5.0E-04	5.7E+00	none	**5.7E+00**
PESTICIDES	4,4'-DDD	1.66E-04	1.70E+03	9.00E-02	5.87E-04	1.5E+02	1.2E-03	2.2E+00	none	**2.2E+00**
PESTICIDES	4,4'-DDE	8.73E-04	2.19E+03	6.50E-02	4.56E-04	1.4E+02	8.4E-04	2.0E+00	3.80E-03	**2.0E+00**
PESTICIDES	4,4'-DDT	2.23E-03	2.75E+03	3.10E-03	3.64E-04	8.5E+00	8.4E-04	2.5E+00	6.40E-03	**2.5E+00**
PESTICIDES	Aldrin	7.07E-03	9.57E+02	7.84E-02	1.04E-03	7.5E+01	1.7E-05	1.7E-02	none	**1.7E-02**

Table A1-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
PESTICIDES	alpha-BHC	2.82E-04	2.64E+01	2.00E+00	3.78E-02	5.3E+01	4.5E-05	1.3E-03	none	**1.3E-03**
PESTICIDES	beta-BHC	1.44E-05	2.76E+01	5.42E-01	3.61E-02	1.5E+01	1.6E-03	4.7E-02	none	**4.7E-02**
PESTICIDES	Chlordane	2.02E-03	2.40E+03	5.60E-02	4.16E-04	1.3E+02	2.0E-03	5.1E+00	none	**5.1E+00**
PESTICIDES	delta-BHC	1.77E-04	1.70E+02	2.59E+00	5.87E-03	4.4E+02	1.6E-04	2.9E-02	none	**2.9E-02**
PESTICIDES	Dieldrin	1.11E-04	4.28E+02	1.95E-01	2.34E-03	8.3E+01	1.8E-05	8.2E-03	none	**8.2E-03**
PESTICIDES	Endosulfan I	3.55E-05	3.14E+02	1.73E+00	3.18E-03	5.4E+02	2.0E-01	6.9E+01	none	**6.9E+01**
PESTICIDES	Endosulfan II	3.55E-05	3.14E+02	1.16E+00	3.18E-03	3.6E+02	6.1E-01	2.1E+02	none	**2.1E+02**
PESTICIDES	Endosulfan Sulfate	3.65E-05	1.59E+04	1.02E-01	6.29E-05	1.6E+03	6.1E-01	1.0E+04	none	**1.6E+03**
PESTICIDES	Endrin	4.95E-05	1.87E+02	2.50E-01	5.36E-03	4.7E+01	2.0E-03	4.0E-01	none	**4.0E-01**
PESTICIDES	Endrin aldehyde	1.80E-02	4.28E+04	1.68E-02	2.34E-05	7.2E+02	3.1E-02	1.4E+03	none	**7.2E+02**
PESTICIDES	Endrin ketone	3.66E-05	3.48E+03	8.60E-01	2.88E-04	3.0E+03	3.1E-02	1.1E+02	none	**1.1E+02**
PESTICIDES	gamma-BHC (Lindane)	1.41E-04	2.19E+01	5.75E+00	4.54E-02	1.3E+02	2.0E-04	4.7E-03	none	**4.7E-03**
PESTICIDES	Heptachlor	2.44E-02	2.35E+02	1.80E-01	4.25E-03	4.2E+01	4.0E-04	1.0E-01	none	**1.0E-01**
PESTICIDES	Heptachlor epoxide	3.45E-04	1.45E+02	2.75E-01	6.91E-03	4.0E+01	2.0E-04	3.1E-02	none	**3.1E-02**
PESTICIDES	METHOXYCHLOR	6.57E-04	1.55E+03	4.50E-02	6.44E-04	7.0E+01	4.0E-02	6.6E+01	none	**6.6E+01**
PESTICIDES	Toxaphene	1.40E-04	1.92E+03	7.40E-01	5.22E-04	1.4E+03	3.0E-03	6.2E+00	none	**6.2E+00**
SEMIVOLATILES	1,2,4-Trichlorobenzene	5.90E-02	3.32E+01	4.88E+01	3.00E-02	1.6E+03	7.0E-02	2.5E+00	none	**2.5E+00**
SEMIVOLATILES	1,2-Dichlorobenzene	8.73E-02	1.38E+01	1.50E+02	7.17E-02	2.1E+03	6.0E-01	9.0E+00	none	**9.0E+00**
SEMIVOLATILES	1,3-Dichlorobenzene	1.95E-01	3.40E+00	1.10E+02	2.84E-01	3.9E+02	3.1E+00	1.2E+01	none	**1.2E+01**
SEMIVOLATILES	1,4-Dichlorobenzene	1.17E-01	1.29E+01	7.38E+01	7.68E-02	9.6E+02	7.5E-02	1.0E+00	none	**1.0E+00**
SEMIVOLATILES	2,4,5-Trichlorophenol	1.78E-04	4.42E+01	1.20E+03	2.26E-02	5.3E+04	1.0E+01	4.8E+02	none	**4.8E+02**
SEMIVOLATILES	2,4,6-Trichlorophenol	3.19E-04	1.59E+01	9.82E+02	6.25E-02	1.6E+04	2.6E-02	4.5E-01	none	**4.5E-01**
SEMIVOLATILES	2,4-Dichlorophenol	1.31E-04	3.14E+00	4.50E+03	3.10E-01	1.5E+04	3.1E-01	1.1E+00	none	**1.1E+00**
SEMIVOLATILES	2,4-Dimethylphenol	8.31E-05	2.35E+00	6.20E+03	4.10E-01	1.5E+04	2.0E+00	5.3E+00	none	**5.3E+00**
SEMIVOLATILES	2,4-Dinitrophenol	2.01E-07	2.32E-04	5.80E+03	1.15E+01	5.0E+02	2.0E-01	1.9E-02	none	**1.9E-02**
SEMIVOLATILES	2,4-Dinitrotoluene	3.60E-05	1.03E+00	2.85E+02	8.99E-01	3.2E+02	4.2E-04	5.0E-04	none	**5.0E-04**
SEMIVOLATILES	2,6-Dinitrotoluene	3.11E-05	8.34E-01	1.82E+02	1.09E+00	1.7E+02	4.2E-04	4.1E-04	none	**4.1E-04**
SEMIVOLATILES	2-Chloronaphthalene	2.54E-02	1.70E+02	6.74E+00	5.87E-03	1.1E+03	8.2E+00	1.5E+03	none	**1.1E+03**
SEMIVOLATILES	2-Chlorophenol	7.40E-04	7.92E+00	2.80E+04	1.25E-01	2.2E+05	5.1E-01	4.4E+00	none	**4.4E+00**
SEMIVOLATILES	2-Methylnaphthalene	1.85E-02	8.63E+01	2.54E+01	1.16E-02	2.2E+03	4.1E-01	3.8E+01	none	**3.8E+01**
SEMIVOLATILES	2-Methylphenol	6.65E-05	1.95E+00	2.04E+04	4.90E-01	4.2E+04	5.1E+00	1.1E+01	none	**1.1E+01**
SEMIVOLATILES	2-Nitroaniline	2.08E-05	5.38E-01	1.26E+03	1.60E+00	7.9E+02	3.1E-02	2.1E-02	none	**2.1E-02**
SEMIVOLATILES	2-Nitrophenol	2.21E-05	3.75E+00	1.73E+04	2.61E-01	6.6E+04	2.0E-01	8.4E-01	none	**8.4E-01**
SEMIVOLATILES	3,3'-Dichlorobenzidine	8.65E-07	1.45E+01	3.11E+00	6.86E-02	4.5E+01	6.4E-04	9.9E-03	none	**9.9E-03**
SEMIVOLATILES	3-Nitroaniline	2.31E-07	7.88E-01	4.56E+02	1.14E+00	4.0E+02	3.1E-02	2.9E-02	none	**2.9E-02**
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	1.07E-07	6.32E-04	3.00E+03	1.15E+01	2.6E+02	2.0E-01	1.9E-02	none	**1.9E-02**
SEMIVOLATILES	4-Bromophenyl phenyl ether	9.66E-03	2.90E+03	8.25E-01	3.44E-04	2.4E+03	1.9E-04	5.9E-01	none	**5.9E-01**
SEMIVOLATILES	4-Chloro-3-methylphenol	1.40E-05	1.76E+01	5.43E+03	5.66E-02	9.6E+04	5.1E-01	9.7E+00	none	**9.7E+00**
SEMIVOLATILES	4-Chloroaniline	4.86E-05	1.32E+00	3.90E+03	7.10E-01	5.5E+03	4.1E-01	6.2E-01	none	**6.2E-01**
SEMIVOLATILES	4-Chlorophenyl phenyl ether	1.30E-02	2.62E+02	1.43E+00	3.82E-03	3.8E+02	1.9E-04	5.4E-02	none	**5.4E-02**
SEMIVOLATILES	4-Methylphenol	3.99E-05	1.63E+00	2.30E+04	5.84E-01	3.9E+04	5.1E-01	9.4E-01	none	**9.4E-01**
SEMIVOLATILES	4-Nitroaniline	3.33E-08	2.25E-01	6.49E+02	3.21E+00	2.0E+02	7.5E-02	2.5E-02	none	**2.5E-02**

Table A1-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
SEMIVOLATILES	4-Nitrophenol	3.24E-08	8.73E-01	4.49E+03	1.04E+00	4.3E+03	2.0E-01	2.1E-01	none	**2.1E-01**
SEMIVOLATILES	Acenaphthene	6.44E-03	7.96E+01	4.24E+00	1.25E-02	3.4E+02	6.1E+00	5.2E+02	none	**3.4E+02**
SEMIVOLATILES	Acenaphthylene	4.74E-03	1.38E+02	3.93E+00	7.22E-03	5.4E+02	6.1E+00	9.1E+02	none	**5.4E+02**
SEMIVOLATILES	Anthracene	4.61E-03	4.69E+02	4.34E-02	2.13E-03	2.0E+01	3.1E+01	1.5E+04	none	**2.0E+01**
SEMIVOLATILES	Benzo(a)anthracene	1.39E-04	7.10E+03	1.00E-02	1.41E-04	7.1E+01	3.9E-04	3.0E+00	1.53E-02	**3.0E+00**
SEMIVOLATILES	Benzo(a)pyrene	4.70E-05	1.91E+04	1.62E-03	5.24E-05	3.1E+01	2.0E-04	4.1E+00	1.54E-02	**4.1E+00**
SEMIVOLATILES	Benzo(b)fluoranthene	4.99E-04	2.40E+04	1.50E-03	4.16E-05	3.6E+01	3.9E-04	1.0E+01	1.53E-02	**1.0E+01**
SEMIVOLATILES	Benzo(ghi)perylene	5.82E-06	3.17E+04	2.60E-04	3.15E-05	8.2E+00	3.1E+00	1.0E+05	1.23E-02	**8.2E+00**
SEMIVOLATILES	Benzo(k)fluoranthene	4.45E-07	2.46E+04	5.50E-04	4.06E-05	1.4E+01	3.9E-03	1.0E+02	1.30E-02	**1.4E+01**
SEMIVOLATILES	Benzoic Acid	1.39E-05	1.94E-02	3.50E+03	9.43E+00	3.7E+02	4.1E+02	4.6E+01	none	**4.6E+01**
SEMIVOLATILES	Benzyl Alcohol	1.62E-05	2.40E-01	4.00E+04	3.06E+00	1.3E+04	3.1E+01	1.1E+01	none	**1.1E+01**
SEMIVOLATILES	bis(2-Chloroethoxy)methane	1.25E-03	6.13E+00	1.35E+03	1.61E-01	8.4E+03	2.6E-04	1.7E-03	none	**1.7E-03**
SEMIVOLATILES	bis(2-Chloroethyl)ether	8.90E-04	3.10E-01	1.02E+04	2.52E+00	4.0E+03	2.6E-04	1.1E-04	none	**1.1E-04**
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	4.16E-03	6.32E+00	1.70E+03	1.56E-01	1.1E+04	4.1E-02	2.8E-01	none	**2.8E-01**
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	4.57E-04	1.35E+04	3.00E-01	7.40E-05	4.1E+03	6.0E-03	8.7E+01	none	**8.7E+01**
SEMIVOLATILES	Butyl benzyl phthalate	7.94E-05	2.75E+02	2.90E+00	3.64E-03	8.0E+02	2.0E+01	6.0E+03	none	**8.0E+02**
SEMIVOLATILES	Carbazole	3.38E-03	4.91E+01	7.21E-01	2.03E-02	3.5E+01	1.4E-02	7.5E-01	none	**7.5E-01**
SEMIVOLATILES	Chrysene	5.03E-05	6.18E+03	2.00E-03	1.62E-04	1.2E+01	3.9E-02	2.6E+02	1.51E-02	**1.2E+01**
SEMIVOLATILES	Dibenzo(a,h)anthracene	4.66E+00	3.81E+04	5.00E-04	2.62E-05	1.9E+01	2.0E-04	8.2E+00	none	**8.2E+00**
SEMIVOLATILES	Dibenzofuran	5.28E-03	1.70E+02	2.86E+00	5.89E-03	4.9E+02	4.1E-01	7.4E+01	none	**7.4E+01**
SEMIVOLATILES	Diethyl phthalate	1.87E-05	3.03E+00	1.08E+03	3.21E-01	3.4E+03	8.2E+01	2.7E+02	none	**2.7E+02**
SEMIVOLATILES	Dimethyl phthalate	2.40E-05	6.32E-01	4.19E+03	1.39E+00	3.0E+03	8.2E+01	6.3E+01	none	**6.3E+01**
SEMIVOLATILES	di-n-Butyl phthalate	5.94E-05	6.78E+02	1.12E+01	1.48E-03	7.6E+03	1.0E+01	7.4E+03	none	**7.4E+03**
SEMIVOLATILES	di-n-Octyl phthalate	2.78E-03	1.66E+06	2.00E-02	6.01E-07	3.3E+04	2.0E+00	3.6E+06	none	**3.3E+04**
SEMIVOLATILES	Fluoranthene	3.88E-04	9.80E+02	2.60E-01	1.02E-03	2.5E+02	4.1E+00	4.3E+03	2.29E-02	**2.5E+02**
SEMIVOLATILES	Fluorene	2.64E-03	1.52E+02	1.98E+00	6.59E-03	3.0E+02	4.1E+00	6.6E+02	none	**3.0E+02**
SEMIVOLATILES	Hexachlorobenzene	2.22E-02	5.64E+02	6.00E-03	1.77E-03	3.4E+00	1.0E-03	6.0E-01	none	**6.0E-01**
SEMIVOLATILES	Hexachlorobutadiene	9.94E-01	1.38E+02	2.55E+00	7.21E-03	3.5E+02	2.0E-02	3.0E+00	none	**3.0E+00**
SEMIVOLATILES	Hexachlorocyclopentadiene	7.15E-01	1.91E+02	1.80E+00	5.23E-03	3.4E+02	5.0E-02	1.0E+01	none	**1.0E+01**
SEMIVOLATILES	Hexachloroethane	1.62E-01	3.64E+01	5.00E+01	2.74E-02	1.8E+03	1.0E-01	4.0E+00	none	**4.0E+00**
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	2.85E+00	6.93E+04	3.75E-03	1.44E-05	2.6E+02	3.9E-04	2.9E+01	1.43E-02	**2.9E+01**
SEMIVOLATILES	Isophorone	2.57E-04	6.04E-01	1.20E+04	1.45E+00	8.3E+03	3.0E+00	2.2E+00	none	**2.2E+00**
SEMIVOLATILES	Naphthalene	2.00E-02	3.10E+01	3.14E+01	3.22E-02	9.8E+02	2.0E+00	6.8E+01	none	**6.8E+01**
SEMIVOLATILES	Nitrobenzene	8.56E-04	2.64E+00	1.90E+03	3.67E-01	5.2E+03	5.1E-02	1.5E-01	none	**1.5E-01**
SEMIVOLATILES	n-Nitrosodimethylamine	2.16E-05	7.20E-02	1.00E+06	6.30E+00	1.6E+05	5.6E-06	9.5E-07	none	**9.5E-07**
SEMIVOLATILES	n-Nitroso-di-n-propylamine	9.35E-05	3.94E-01	9.89E+03	2.08E+00	4.8E+03	4.1E-05	2.1E-05	none	**2.1E-05**
SEMIVOLATILES	n-Nitrosodiphenylamine	2.08E-04	6.62E+00	3.51E+01	1.49E-01	2.4E+02	5.8E-02	4.2E-01	none	**4.2E-01**
SEMIVOLATILES	Pentachlorophenol	1.16E-05	3.12E+01	1.40E+01	3.20E-02	4.4E+02	1.0E-03	3.4E-02	none	**3.4E-02**
SEMIVOLATILES	Phenanthrene	5.40E-03	2.83E+02	9.94E-01	3.54E-03	2.8E+02	3.1E+00	9.3E+02	none	**2.8E+02**
SEMIVOLATILES	Phenol	2.47E-05	3.48E-01	8.70E+04	2.30E+00	3.8E+04	3.1E+01	1.4E+01	none	**1.4E+01**
SEMIVOLATILES	Pyrene	4.57E-04	7.60E+02	1.35E-01	1.31E-03	1.0E+02	3.1E+00	2.5E+03	1.94E-02	**1.0E+02**
VOLATILES	1,1,1,2-Tetrachloroethane	9.98E-02	1.91E+01	1.10E+03	5.21E-02	2.1E+04	1.1E-01	2.3E+00	none	**2.3E+00**

Table A1-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
VOLATILES	1,1,1-Trichloroethane	7.15E-01	2.19E+00	1.33E+03	4.13E-01	3.2E+03	2.0E-01	5.2E-01	none	**5.2E-01**
VOLATILES	1,1,2,2-Tetrachloroethane	1.55E-02	1.55E+00	2.97E+03	6.09E-01	4.9E+03	1.4E-02	2.5E-02	none	**2.5E-02**
VOLATILES	1,1,2-Trichloroethane	3.80E-02	1.00E+00	4.42E+03	9.12E-01	4.8E+03	5.0E-03	5.9E-03	none	**5.9E-03**
VOLATILES	1,1-Dichloroethane	2.39E-01	6.32E-01	5.50E+03	1.30E+00	4.2E+03	1.0E+01	8.4E+00	none	**8.4E+00**
VOLATILES	1,1-Dichloroethene	1.06E+00	1.29E+00	2.40E+03	6.29E-01	3.8E+03	7.0E-03	1.2E-02	none	**1.2E-02**
VOLATILES	1,1-Dichloropropene	1.82E+00	4.12E+00	5.44E+02	2.19E-01	2.5E+03	2.9E-03	1.4E-02	none	**1.4E-02**
VOLATILES	1,2,3-Trichlorobenzene	3.80E-02	1.78E+02	1.64E+01	5.61E-03	2.9E+03	3.1E-01	5.9E+01	none	**5.9E+01**
VOLATILES	1,2,3-Trichloropropane	1.58E-02	7.78E+00	1.90E+03	1.27E-01	1.5E+04	4.1E-05	3.4E-04	none	**3.4E-04**
VOLATILES	1,2,4-Trimethylbenzene	1.84E-01	1.87E+01	5.68E+01	5.32E-02	1.1E+03	5.1E+00	1.0E+02	none	**1.0E+02**
VOLATILES	1,2-Dibromo-3-chloropropane	8.31E-03	3.40E+00	1.00E+03	2.87E-01	3.5E+03	2.0E-04	7.5E-04	none	**7.5E-04**
VOLATILES	1,2-Dibromoethane	2.93E-02	1.07E+00	4.32E+03	8.57E-01	5.0E+03	5.0E-05	6.2E-05	none	**6.2E-05**
VOLATILES	1,2-Dichloroethane	5.32E-02	3.48E-01	8.70E+03	2.25E+00	3.9E+03	5.0E-03	2.4E-03	none	**2.4E-03**
VOLATILES	1,2-Dichloroethene	1.87E-01	5.80E-01	4.93E+03	1.42E+00	3.5E+03	7.0E-02	5.3E-02	none	**5.3E-02**
VOLATILES	1,2-Dichloropropane	1.17E-01	1.18E+00	2.80E+03	7.77E-01	3.6E+03	5.0E-03	6.9E-03	none	**6.9E-03**
VOLATILES	1,3,5-Trimethylbenzene	2.72E-01	2.05E+01	5.15E+01	4.85E-02	1.1E+03	5.1E+00	1.1E+02	none	**1.1E+02**
VOLATILES	1,3-Dichloropropane	5.52E-02	2.50E+00	2.16E+03	3.85E-01	5.6E+03	2.9E-02	8.0E-02	none	**8.0E-02**
VOLATILES	1,4-Dichloro-2-butene	1.24E-02	3.64E+00	6.91E+03	2.68E-01	2.6E+04	3.8E-02	1.5E-01	none	**1.5E-01**
VOLATILES	1,4-Dioxane	2.04E-04	1.08E-02	9.00E+05	1.03E+01	8.8E+04	2.6E-02	2.7E-03	none	**2.7E-03**
VOLATILES	2,2-Dichloropropane	3.39E-01	3.11E+00	1.68E+03	3.06E-01	5.5E+03	4.2E-02	1.5E-01	none	**1.5E-01**
VOLATILES	2-Butanone	1.94E-03	3.80E-02	2.40E+05	8.00E+00	3.0E+04	6.1E+01	8.2E+00	none	**8.2E+00**
VOLATILES	2-Chloroethyl vinyl ether	3.02E-02	7.43E-01	5.02E+03	1.20E+00	4.2E+03	2.6E-03	2.3E-03	none	**2.3E-03**
VOLATILES	2-Chlorotoluene	1.35E-01	8.15E+00	1.54E+02	1.21E-01	1.3E+03	2.0E+00	1.8E+01	none	**1.8E+01**
VOLATILES	2-Hexanone	3.38E-03	3.58E-01	1.79E+04	2.25E+00	8.0E+03	6.1E+00	2.9E+00	none	**2.9E+00**
VOLATILES	2-Propenal	1.83E-04	1.05E-02	2.00E+05	1.03E+01	1.9E+04	5.1E-02	5.3E-03	none	**5.3E-03**
VOLATILES	4-Chlorotoluene	1.33E-01	9.93E+00	1.18E+02	9.96E-02	1.2E+03	2.0E+00	2.2E+01	none	**2.2E+01**
VOLATILES	Acetone	1.61E-03	1.14E-02	6.00E+05	1.02E+01	5.9E+04	9.2E+01	9.7E+00	none	**9.7E+00**
VOLATILES	Acetonitrile	1.21E-03	9.35E-03	2.05E+05	1.04E+01	2.0E+04	3.3E+00	3.4E-01	none	**3.4E-01**
VOLATILES	Acrylonitrile	4.57E-03	2.19E-02	7.50E+04	9.13E+00	8.2E+03	5.3E-04	6.2E-05	none	**6.2E-05**
VOLATILES	Allyl chloride	4.57E-01	5.38E-01	3.40E+03	1.40E+00	2.4E+03	1.0E+00	7.8E-01	none	**7.8E-01**
VOLATILES	Benzene	2.27E-01	1.32E+00	1.77E+03	6.88E-01	2.6E+03	5.0E-03	7.8E-03	none	**7.8E-03**
VOLATILES	Bromobenzene	8.38E-02	4.84E+00	2.98E+02	2.02E-01	1.5E+03	2.0E+00	1.1E+01	none	**1.1E+01**
VOLATILES	Bromochloromethane	3.69E-02	5.50E-01	2.04E+04	1.55E+00	1.3E+04	4.1E+00	2.8E+00	none	**2.8E+00**
VOLATILES	Bromodichloromethane	1.32E-01	1.10E+00	4.50E+03	8.25E-01	5.5E+03	4.6E-03	6.0E-03	none	**6.0E-03**
VOLATILES	Bromoform	2.56E-02	1.74E+00	3.20E+03	5.45E-01	5.9E+03	3.6E-02	7.1E-02	none	**7.1E-02**
VOLATILES	Bromomethane	5.90E-01	2.09E-01	1.52E+04	2.41E+00	6.3E+03	1.4E-01	6.3E-02	none	**6.3E-02**
VOLATILES	Carbon disulfide	6.13E-01	1.05E+00	2.30E+03	7.94E-01	2.9E+03	1.0E+01	1.4E+01	none	**1.4E+01**
VOLATILES	Carbon tetrachloride	1.20E+00	3.72E+00	8.05E+02	2.47E-01	3.3E+03	5.0E-03	2.2E-02	none	**2.2E-02**
VOLATILES	Chlorobenzene	1.82E-01	4.28E+00	5.02E+02	2.27E-01	2.2E+03	1.0E-01	4.7E-01	none	**4.7E-01**
VOLATILES	Chloroethane	2.12E-01	3.56E-01	2.00E+04	2.06E+00	9.7E+03	4.1E+01	2.1E+01	none	**2.1E+01**
VOLATILES	Chloroform	1.53E-01	9.35E-01	7.92E+03	9.50E-01	8.3E+03	1.0E+00	1.2E+00	none	**1.2E+00**
VOLATILES	Chloromethane	1.44E+00	1.20E-01	7.25E+03	2.02E+00	3.6E+03	2.2E-01	1.2E-01	none	**1.2E-01**
VOLATILES	Chloroprene	1.33E+00	2.00E+00	6.30E+02	4.25E-01	1.5E+03	1.4E-01	3.6E-01	none	**3.6E-01**

Table A1-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
VOLATILES	cis-1,2-Dichloroethene	1.87E-01	5.77E-01	4.93E+03	1.43E+00	3.5E+03	7.0E-02	5.3E-02	none	**5.3E-02**
VOLATILES	cis-1,3-Dichloropropene	9.15E-02	8.93E-01	2.70E+03	1.00E+00	2.7E+03	5.3E-03	5.7E-03	none	**5.7E-03**
VOLATILES	Dibromochloromethane	3.25E-02	1.26E+00	5.25E+03	7.38E-01	7.1E+03	3.4E-02	4.9E-02	none	**4.9E-02**
VOLATILES	Dibromomethane	3.49E-02	3.64E+00	1.10E+04	2.68E-01	4.1E+04	3.8E-01	1.5E+00	none	**1.5E+00**
VOLATILES	Dichlorodifluoromethane	1.67E+01	2.58E+00	2.80E+02	1.67E-01	1.7E+03	2.0E+01	1.3E+02	none	**1.3E+02**
VOLATILES	Ethyl methacrylate	6.65E-03	7.40E-01	1.90E+04	1.21E+00	1.6E+04	9.2E+00	8.2E+00	none	**8.2E+00**
VOLATILES	Ethylbenzene	3.28E-01	4.08E+00	1.69E+02	2.36E-01	7.2E+02	7.0E-01	3.2E+00	none	**3.2E+00**
VOLATILES	IODOMETHANE	2.36E-01	4.04E-01	1.24E+04	1.86E+00	6.7E+03	1.4E-01	8.2E-02	none	**8.2E-02**
VOLATILES	ISOBUTYL ALCOHOL	4.99E-04	1.12E-01	9.49E+04	5.02E+00	1.9E+04	3.1E+01	6.5E+00	none	**6.5E+00**
VOLATILES	Isopropylbenzene	6.07E-01	6.93E+01	5.00E+01	1.44E-02	3.5E+03	1.0E+01	7.6E+02	none	**7.6E+02**
VOLATILES	Methacrylonitrile	3.03E-03	6.78E-02	2.50E+04	6.45E+00	3.9E+03	1.0E-02	1.7E-03	none	**1.7E-03**
VOLATILES	Methyl isobutyl ketone	5.82E-03	3.00E-01	1.90E+04	2.58E+00	7.4E+03	8.2E+00	3.4E+00	none	**3.4E+00**
VOLATILES	METHYL METHACRYLATE	1.33E-02	4.60E-01	1.60E+04	1.82E+00	8.8E+03	1.4E+02	8.4E+01	none	**8.4E+01**
VOLATILES	Methylene chloride	9.10E-02	2.35E-01	1.54E+04	2.94E+00	5.2E+03	5.0E-03	1.8E-03	none	**1.8E-03**
VOLATILES	n-BUTYLBENZENE	5.57E-01	6.04E+01	1.08E+01	1.65E-02	6.5E+02	4.1E+00	2.7E+02	none	**2.7E+02**
VOLATILES	n-PROPYLBENZENE	4.24E-01	2.14E+01	4.20E+01	4.63E-02	9.1E+02	4.1E+00	9.5E+01	none	**9.5E+01**
VOLATILES	Pentachloroethane	2.15E-02	3.80E+00	6.19E+02	2.57E-01	2.4E+03	1.1E-01	4.6E-01	none	**4.6E-01**
VOLATILES	p-ISOPROPYLTOLUENE	4.66E-01	4.58E+01	1.71E+01	2.17E-02	7.9E+02	1.0E+01	5.0E+02	none	**5.0E+02**
VOLATILES	Propionitrile	1.02E-03	3.28E-02	9.73E+04	8.35E+00	1.2E+04	4.1E-02	5.2E-03	none	**5.2E-03**
VOLATILES	sec-BUTYLBENZENE	5.07E-01	4.18E+01	1.81E+01	2.38E-02	7.6E+02	4.1E+00	1.8E+02	none	**1.8E+02**
VOLATILES	Styrene	1.14E-01	1.52E+01	3.10E+02	6.54E-02	4.7E+03	1.0E-01	1.6E+00	none	**1.6E+00**
VOLATILES	tert-BUTYLBENZENE	8.56E-01	4.91E+01	1.51E+01	2.03E-02	7.4E+02	4.1E+00	2.2E+02	none	**2.2E+02**
VOLATILES	Tetrachloroethene	7.65E-01	3.10E+00	2.00E+02	3.00E-01	6.7E+02	5.0E-03	1.8E-02	none	**1.8E-02**
VOLATILES	Toluene	2.76E-01	2.80E+00	5.30E+02	3.40E-01	1.6E+03	1.0E+00	3.2E+00	none	**3.2E+00**
VOLATILES	trans-1,2-Dichloroethene	3.90E-01	1.00E+00	6.30E+03	8.57E-01	7.4E+03	1.0E-01	1.2E-01	none	**1.2E-01**
VOLATILES	trans-1,3-Dichloropropene	9.15E-02	8.93E-01	2.80E+03	1.00E+00	2.8E+03	2.9E-02	3.1E-02	none	**3.1E-02**
VOLATILES	trans-1,4-Dichloro-2-butene	1.35E-02	4.09E+00	1.27E+03	2.39E-01	5.3E+03	3.9E-04	1.8E-03	none	**1.8E-03**
VOLATILES	Trichloroethene	4.28E-01	1.87E+00	1.10E+03	4.90E-01	2.2E+03	5.0E-03	1.1E-02	none	**1.1E-02**
VOLATILES	Trichlorofluoromethane	4.03E+00	2.70E+00	1.10E+03	2.78E-01	4.0E+03	3.1E+01	1.2E+02	none	**1.2E+02**
VOLATILES	Vinyl acetate	2.29E-02	1.05E-01	2.00E+04	5.10E+00	3.9E+03	1.0E+02	2.1E+01	none	**2.1E+01**
VOLATILES	Vinyl chloride	3.49E+00	2.19E-01	2.76E+03	9.96E-01	2.8E+03	2.0E-03	2.2E-03	none	**2.2E-03**
VOLATILES	Xylenes, Total	2.93E-01	4.80E+00	1.98E+02	2.02E-01	9.8E+02	1.0E+01	5.3E+01	none	**5.3E+01**

Table A1-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)

Notes:

Constants	Values	
rb	1.5	
qw	0.13	
qa	0.30	
L1	381	
L2	402	
W	5500	
LDF	1.015	calculated

Values of constants shown in Table A1-2.
Values of H', Kd, and S shown in Table A1-4.
GW-Ind - groundwater qualified for industrial use
L/kg - liters per kilogram
mg/kg - milligrams per kilogram
mg/L - milligrams per liter
MSC - medium specific concentrations

Calculated Values:
Ksw = see Equation 8
Csat = see Equation 7
LDF = see Equation 5
Soil MSC = see Equation 6
Applicable Standard 3 Commercial / Industrial MSC equals the lower of the Calculated Soil MSC and Csat values. However, if the Background is larger than both values, the Applicable Standard 3 Commercial / Industrial MSC equals the Background concentration.

Table A1-6
Comparison to Maximum Soil Concentrations
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
DIOXINS_FURANS	2,3,7,8-TCDD TEQ	**9.1E-03**	0.000009587	-	All Results < MSC
EXPLOSIVES	1,3,5-Trinitrobenzene	**1.2E+00**	-	0.24	All Results < MSC
EXPLOSIVES	1,3-Dinitrobenzene	**7.5E-03**	-	0.24	Never detected, SQL > MSC
EXPLOSIVES	2,4,6-Trinitrotoluene	**3.4E-01**	-	0.24	All Results < MSC
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	**2.1E-01**	-	0.05	All Results < MSC
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	**1.3E-01**	-	0.49	Never detected, SQL > MSC
EXPLOSIVES	HMX	**4.8E-01**	-	2.2	Never detected, SQL > MSC
EXPLOSIVES	m-Nitrotoluene	**3.2E+00**	-	0.98	All Results < MSC
EXPLOSIVES	o-Nitrotoluene	**3.2E+00**	-	0.98	All Results < MSC
EXPLOSIVES	p-Nitrotoluene	**3.2E+00**	-	2.9	All Results < MSC
EXPLOSIVES	RDX	**3.8E-02**	-	1.1	Never detected, SQL > MSC
EXPLOSIVES	Tetryl	**5.2E+00**	-	0.73	All Results < MSC
METALS	Aluminum	**3.9E+06**	13000	-	All Results < MSC
METALS	Antimony	**9.4E-01**	-	15.6	Never detected, SQL > MSC
METALS	Arsenic	**4.8E+00**	3.89	-	All Results < MSC
METALS	Barium	**8.5E+01**	2510	-	**Detected > MSC**
METALS	Beryllium	**6.5E-01**	0.643	0.559	All Results < MSC
METALS	Cadmium	**4.0E-01**	5.55	2.66	**Detected > MSC**
METALS	Chromium	**2.1E+04**	29.4	-	All Results < MSC
METALS	Cobalt	**3.0E+02**	84.6	-	All Results < MSC
METALS	Copper	**5.6E+01**	23.9	2.79	All Results < MSC
METALS	Lead	**2.9E+01**	21.8	16	All Results < MSC
METALS	Manganese	**7.7E+02**	1310	-	**Detected > MSC**
METALS	Mercury	**8.2E-02**	0.06	0.12	Never detected, SQL > MSC
METALS	Nickel	**8.3E+01**	12	-	All Results < MSC
METALS	Selenium	**3.5E+00**	1.87	1.07	All Results < MSC
METALS	Silver	**7.6E-01**	1.2	1.6	**Detected > MSC**
METALS	Strontium	**1.4E+02**	514	15.6	**Detected > MSC**
METALS	Thallium	**4.7E-01**	-	78.2	Never detected, SQL > MSC
METALS	Vanadium	**7.7E+02**	28	-	All Results < MSC
METALS	Zinc	**1.2E+03**	207	-	All Results < MSC
PCBS	Aroclor 1016	**5.7E+00**	-	0.037	All Results < MSC
PCBS	Aroclor 1221	**5.7E+00**	-	0.074	All Results < MSC
PCBS	Aroclor 1232	**5.7E+00**	-	0.037	All Results < MSC
PCBS	Aroclor 1242	**5.7E+00**	-	0.037	All Results < MSC
PCBS	Aroclor 1248	**5.7E+00**	-	0.037	All Results < MSC
PCBS	Aroclor 1254	**5.7E+00**	0.066	0.037	All Results < MSC
PCBS	Aroclor 1260	**5.7E+00**	-	0.037	All Results < MSC
PESTICIDES	4,4'-DDD	**2.2E+00**	-	0.0037	All Results < MSC
PESTICIDES	4,4'-DDE	**2.0E+00**	-	0.0037	All Results < MSC
PESTICIDES	4,4'-DDT	**2.5E+00**	-	0.0037	All Results < MSC
PESTICIDES	Aldrin	**1.7E-02**	-	0.0019	All Results < MSC

Table A1-6
Comparison to Maximum Soil Concentrations
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
PESTICIDES	alpha-BHC	**1.3E-03**	-	0.0019	Never detected, SQL > MSC
PESTICIDES	beta-BHC	**4.7E-02**	-	0.0019	All Results < MSC
PESTICIDES	Chlordane	**5.1E+00**	-	0.037	All Results < MSC
PESTICIDES	delta-BHC	**2.9E-02**	-	0.0019	All Results < MSC
PESTICIDES	Dieldrin	**8.2E-03**	-	0.0037	All Results < MSC
PESTICIDES	Endosulfan I	**6.9E+01**	-	0.0019	All Results < MSC
PESTICIDES	Endosulfan II	**2.1E+02**	-	0.0037	All Results < MSC
PESTICIDES	Endosulfan Sulfate	**1.6E+03**	-	0.0037	All Results < MSC
PESTICIDES	Endrin	**4.0E-01**	-	0.0037	All Results < MSC
PESTICIDES	Endrin aldehyde	**7.2E+02**	-	0.0037	All Results < MSC
PESTICIDES	Endrin ketone	**1.1E+02**	-	0.0037	All Results < MSC
PESTICIDES	gamma-BHC (Lindane)	**4.7E-03**	-	0.0019	All Results < MSC
PESTICIDES	Heptachlor	**1.0E-01**	-	0.0019	All Results < MSC
PESTICIDES	Heptachlor epoxide	**3.1E-02**	-	0.0019	All Results < MSC
PESTICIDES	METHOXYCHLOR	**6.6E+01**	-	0.019	All Results < MSC
PESTICIDES	Toxaphene	**6.2E+00**	-	0.037	All Results < MSC
SEMIVOLATILES	1,2,4-Trichlorobenzene	**2.5E+00**	-	1.279	All Results < MSC
SEMIVOLATILES	1,2-Dichlorobenzene	**9.0E+00**	-	1.279	All Results < MSC
SEMIVOLATILES	1,3-Dichlorobenzene	**1.2E+01**	-	1.279	All Results < MSC
SEMIVOLATILES	1,4-Dichlorobenzene	**1.0E+00**	-	1.279	Never detected, SQL > MSC
SEMIVOLATILES	2,4,5-Trichlorophenol	**4.8E+02**	-	2.7	All Results < MSC
SEMIVOLATILES	2,4,6-Trichlorophenol	**4.5E-01**	-	1.279	Never detected, SQL > MSC
SEMIVOLATILES	2,4-Dichlorophenol	**1.1E+00**	-	1.279	Never detected, SQL > MSC
SEMIVOLATILES	2,4-Dimethylphenol	**5.3E+00**	-	0.639	All Results < MSC
SEMIVOLATILES	2,4-Dinitrophenol	**1.9E-02**	-	12.788	Never detected, SQL > MSC
SEMIVOLATILES	2,4-Dinitrotoluene	**5.0E-04**	-	1.279	Never detected, SQL > MSC
SEMIVOLATILES	2,6-Dinitrotoluene	**4.1E-04**	-	1.279	Never detected, SQL > MSC
SEMIVOLATILES	2-Chloronaphthalene	**1.1E+03**	-	0.55	All Results < MSC
SEMIVOLATILES	2-Chlorophenol	**4.4E+00**	-	0.639	All Results < MSC
SEMIVOLATILES	2-Methylnaphthalene	**3.8E+01**	-	0.55	All Results < MSC
SEMIVOLATILES	2-Methylphenol	**1.1E+01**	-	0.639	All Results < MSC
SEMIVOLATILES	2-Nitroaniline	**2.1E-02**	-	3.836	Never detected, SQL > MSC
SEMIVOLATILES	2-Nitrophenol	**8.4E-01**	-	1.279	Never detected, SQL > MSC
SEMIVOLATILES	3,3'-Dichlorobenzidine	**9.9E-03**	-	1.1	Never detected, SQL > MSC
SEMIVOLATILES	3-Nitroaniline	**2.9E-02**	-	3.836	Never detected, SQL > MSC
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	**1.9E-02**	-	6.394	Never detected, SQL > MSC
SEMIVOLATILES	4-Bromophenyl phenyl ether	**5.9E-01**	-	1.279	Never detected, SQL > MSC
SEMIVOLATILES	4-Chloro-3-methylphenol	**9.7E+00**	-	0.639	All Results < MSC
SEMIVOLATILES	4-Chloroaniline	**6.2E-01**	-	3.836	Never detected, SQL > MSC
SEMIVOLATILES	4-Chlorophenyl phenyl ether	**5.4E-02**	-	1.279	Never detected, SQL > MSC
SEMIVOLATILES	4-Methylphenol	**9.4E-01**	-	0.639	All Results < MSC
SEMIVOLATILES	4-Nitroaniline	**2.5E-02**	-	6.394	Never detected, SQL > MSC

Table A1-6
Comparison to Maximum Soil Concentrations
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
SEMIVOLATILES	4-Nitrophenol	**2.1E-01**	-	6.394	Never detected, SQL > MSC
SEMIVOLATILES	Acenaphthene	**3.4E+02**	0.3	0.55	All Results < MSC
SEMIVOLATILES	Acenaphthylene	**5.4E+02**	-	0.639	All Results < MSC
SEMIVOLATILES	Anthracene	**2.0E+01**	0.59	0.639	All Results < MSC
SEMIVOLATILES	Benzo(a)anthracene	**3.0E+00**	1.9	0.384	All Results < MSC
SEMIVOLATILES	Benzo(a)pyrene	**4.1E+00**	1.6	0.639	All Results < MSC
SEMIVOLATILES	Benzo(b)fluoranthene	**1.0E+01**	2.9	1.279	All Results < MSC
SEMIVOLATILES	Benzo(ghi)perylene	**8.2E+00**	0.67	2.558	All Results < MSC
SEMIVOLATILES	Benzo(k)fluoranthene	**1.4E+01**	1.1	1.279	All Results < MSC
SEMIVOLATILES	Benzoic Acid	**4.6E+01**	0.34	2.7	All Results < MSC
SEMIVOLATILES	Benzyl Alcohol	**1.1E+01**	-	0.93	All Results < MSC
SEMIVOLATILES	bis(2-Chloroethoxy)methane	**1.7E-03**	-	0.639	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Chloroethyl)ether	**1.1E-04**	-	0.639	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	**2.8E-01**	-	1.279	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	**8.7E+01**	0.17	0.639	All Results < MSC
SEMIVOLATILES	Butyl benzyl phthalate	**8.0E+02**	0.29	0.639	All Results < MSC
SEMIVOLATILES	Carbazole	**7.5E-01**	-	1.279	Never detected, SQL > MSC
SEMIVOLATILES	Chrysene	**1.2E+01**	2.2	6.394	All Results < MSC
SEMIVOLATILES	Dibenzo(a,h)anthracene	**8.2E+00**	0.23	2.558	All Results < MSC
SEMIVOLATILES	Dibenzofuran	**7.4E+01**	0.17	1.279	All Results < MSC
SEMIVOLATILES	Diethyl phthalate	**2.7E+02**	-	0.639	All Results < MSC
SEMIVOLATILES	Dimethyl phthalate	**6.3E+01**	0.97	0.639	All Results < MSC
SEMIVOLATILES	di-n-Butyl phthalate	**7.4E+03**	-	4.727	All Results < MSC
SEMIVOLATILES	di-n-Octyl phthalate	**3.3E+04**	-	0.639	All Results < MSC
SEMIVOLATILES	Fluoranthene	**2.5E+02**	3.6	0.639	All Results < MSC
SEMIVOLATILES	Fluorene	**3.0E+02**	0.25	0.639	All Results < MSC
SEMIVOLATILES	Hexachlorobenzene	**6.0E-01**	-	1.279	Never detected, SQL > MSC
SEMIVOLATILES	Hexachlorobutadiene	**3.0E+00**	-	3.836	Never detected, SQL > MSC
SEMIVOLATILES	Hexachlorocyclopentadiene	**1.0E+01**	-	3.836	All Results < MSC
SEMIVOLATILES	Hexachloroethane	**4.0E+00**	-	1.279	All Results < MSC
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	**2.9E+01**	0.75	1.279	All Results < MSC
SEMIVOLATILES	Isophorone	**2.2E+00**	-	0.639	All Results < MSC
SEMIVOLATILES	Naphthalene	**6.8E+01**	0.11	0.55	All Results < MSC
SEMIVOLATILES	Nitrobenzene	**1.5E-01**	-	0.639	Never detected, SQL > MSC
SEMIVOLATILES	n-Nitrosodimethylamine	**9.5E-07**	-	0.37	Never detected, SQL > MSC
SEMIVOLATILES	n-Nitroso-di-n-propylamine	**2.1E-05**	-	1.279	Never detected, SQL > MSC
SEMIVOLATILES	n-Nitrosodiphenylamine	**4.2E-01**	-	0.639	Never detected, SQL > MSC
SEMIVOLATILES	Pentachlorophenol	**3.4E-02**	-	6.394	Never detected, SQL > MSC
SEMIVOLATILES	Phenanthrene	**2.8E+02**	2.9	0.639	All Results < MSC
SEMIVOLATILES	Phenol	**1.4E+01**	-	0.639	All Results < MSC
SEMIVOLATILES	Pyrene	**1.0E+02**	2.4	0.639	All Results < MSC
VOLATILES	1,1,1,2-Tetrachloroethane	**2.3E+00**	-	0.017	All Results < MSC

Table A1-6
Comparison to Maximum Soil Concentrations
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
VOLATILES	1,1,1-Trichloroethane	**5.2E-01**	-	0.008	All Results < MSC
VOLATILES	1,1,2,2-Tetrachloroethane	**2.5E-02**	-	0.008	All Results < MSC
VOLATILES	1,1,2-Trichloroethane	**5.9E-03**	-	0.008	Never detected, SQL > MSC
VOLATILES	1,1-Dichloroethane	**8.4E+00**	-	0.008	All Results < MSC
VOLATILES	1,1-Dichloroethene	**1.2E-02**	-	0.008	All Results < MSC
VOLATILES	1,1-Dichloropropene	**1.4E-02**	-	0.0056	All Results < MSC
VOLATILES	1,2,3-Trichlorobenzene	**5.9E+01**	-	0.0056	All Results < MSC
VOLATILES	1,2,3-Trichloropropane	**3.4E-04**	-	0.017	Never detected, SQL > MSC
VOLATILES	1,2,4-Trimethylbenzene	**1.0E+02**	-	0.0056	All Results < MSC
VOLATILES	1,2-Dibromo-3-chloropropane	**7.5E-04**	-	0.033	Never detected, SQL > MSC
VOLATILES	1,2-Dibromoethane	**6.2E-05**	-	0.033	Never detected, SQL > MSC
VOLATILES	1,2-Dichloroethane	**2.4E-03**	-	0.008	Never detected, SQL > MSC
VOLATILES	1,2-Dichloroethene	**5.3E-02**	-	0.008	All Results < MSC
VOLATILES	1,2-Dichloropropane	**6.9E-03**	-	0.008	Never detected, SQL > MSC
VOLATILES	1,3,5-Trimethylbenzene	**1.1E+02**	-	0.0056	All Results < MSC
VOLATILES	1,3-Dichloropropane	**8.0E-02**	-	0.0056	All Results < MSC
VOLATILES	1,4-Dichloro-2-butene	**1.5E-01**	-	0.0056	All Results < MSC
VOLATILES	1,4-Dioxane	**2.7E-03**	-	1.1	Never detected, SQL > MSC
VOLATILES	2,2-Dichloropropane	**1.5E-01**	-	0.017	All Results < MSC
VOLATILES	2-Butanone	**8.2E+00**	-	0.064	All Results < MSC
VOLATILES	2-Chloroethyl vinyl ether	**2.3E-03**	-	0.017	Never detected, SQL > MSC
VOLATILES	2-Chlorotoluene	**1.8E+01**	-	0.0056	All Results < MSC
VOLATILES	2-Hexanone	**2.9E+00**	-	0.064	All Results < MSC
VOLATILES	2-Propenal	**5.3E-03**	-	0.83	Never detected, SQL > MSC
VOLATILES	4-Chlorotoluene	**2.2E+01**	-	0.0056	All Results < MSC
VOLATILES	Acetone	**9.7E+00**	0.0051	0.07	All Results < MSC
VOLATILES	Acetonitrile	**3.4E-01**	-	0.17	All Results < MSC
VOLATILES	Acrylonitrile	**6.2E-05**	-	0.17	Never detected, SQL > MSC
VOLATILES	Allyl chloride	**7.8E-01**	-	0.017	All Results < MSC
VOLATILES	Benzene	**7.8E-03**	-	0.008	Never detected, SQL > MSC
VOLATILES	Bromobenzene	**1.1E+01**	-	0.0056	All Results < MSC
VOLATILES	Bromochloromethane	**2.8E+00**	-	0.0056	All Results < MSC
VOLATILES	Bromodichloromethane	**6.0E-03**	-	0.008	Never detected, SQL > MSC
VOLATILES	Bromoform	**7.1E-02**	-	0.008	All Results < MSC
VOLATILES	Bromomethane	**6.3E-02**	-	0.032	All Results < MSC
VOLATILES	Carbon disulfide	**1.4E+01**	0.042	0.008	All Results < MSC
VOLATILES	Carbon tetrachloride	**2.2E-02**	-	0.011	All Results < MSC
VOLATILES	Chlorobenzene	**4.7E-01**	-	0.008	All Results < MSC
VOLATILES	Chloroethane	**2.1E+01**	-	0.032	All Results < MSC
VOLATILES	Chloroform	**1.2E+00**	-	0.008	All Results < MSC
VOLATILES	Chloromethane	**1.2E-01**	-	0.032	All Results < MSC
VOLATILES	Chloroprene	**3.6E-01**	-	0.17	All Results < MSC

Table A1-6
Comparison to Maximum Soil Concentrations
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
VOLATILES	cis-1,2-Dichloroethene	**5.3E-02**	-	0.0056	All Results < MSC
VOLATILES	cis-1,3-Dichloropropene	**5.7E-03**	-	0.008	Never detected, SQL > MSC
VOLATILES	Dibromochloromethane	**4.9E-02**	-	0.008	All Results < MSC
VOLATILES	Dibromomethane	**1.5E+00**	-	0.033	All Results < MSC
VOLATILES	Dichlorodifluoromethane	**1.3E+02**	-	0.033	All Results < MSC
VOLATILES	Ethyl methacrylate	**8.2E+00**	-	0.033	All Results < MSC
VOLATILES	Ethylbenzene	**3.2E+00**	-	0.008	All Results < MSC
VOLATILES	IODOMETHANE	**8.2E-02**	-	0.017	All Results < MSC
VOLATILES	ISOBUTYL ALCOHOL	**6.5E+00**	-	3.3	All Results < MSC
VOLATILES	Isopropylbenzene	**7.6E+02**	-	0.0056	All Results < MSC
VOLATILES	Methacrylonitrile	**1.7E-03**	-	0.11	Never detected, SQL > MSC
VOLATILES	Methyl isobutyl ketone	**3.4E+00**	-	0.064	All Results < MSC
VOLATILES	METHYL METHACRYLATE	**8.4E+01**	-	0.056	All Results < MSC
VOLATILES	Methylene chloride	**1.8E-03**	-	0.014	Never detected, SQL > MSC
VOLATILES	n-BUTYLBENZENE	**2.7E+02**	-	0.0056	All Results < MSC
VOLATILES	n-PROPYLBENZENE	**9.5E+01**	-	0.0056	All Results < MSC
VOLATILES	Pentachloroethane	**4.6E-01**	-	0.033	All Results < MSC
VOLATILES	p-ISOPROPYLTOLUENE	**5.0E+02**	-	0.0056	All Results < MSC
VOLATILES	Propionitrile	**5.2E-03**	-	0.11	Never detected, SQL > MSC
VOLATILES	sec-BUTYLBENZENE	**1.8E+02**	-	0.0056	All Results < MSC
VOLATILES	Styrene	**1.6E+00**	-	0.008	All Results < MSC
VOLATILES	tert-BUTYLBENZENE	**2.2E+02**	-	0.0056	All Results < MSC
VOLATILES	Tetrachloroethene	**1.8E-02**	-	0.008	All Results < MSC
VOLATILES	Toluene	**3.2E+00**	-	0.008	All Results < MSC
VOLATILES	trans-1,2-Dichloroethene	**1.2E-01**	-	0.0056	All Results < MSC
VOLATILES	trans-1,3-Dichloropropene	**3.1E-02**	-	0.008	All Results < MSC
VOLATILES	trans-1,4-Dichloro-2-butene	**1.8E-03**	-	0.033	Never detected, SQL > MSC
VOLATILES	Trichloroethene	**1.1E-02**	0.001	0.011	SQL > MSC
VOLATILES	Trichlorofluoromethane	**1.2E+02**	-	0.017	All Results < MSC
VOLATILES	Vinyl acetate	**2.1E+01**	-	0.022	All Results < MSC
VOLATILES	Vinyl chloride	**2.2E-03**	-	0.032	Never detected, SQL > MSC
VOLATILES	Xylenes, Total	**5.3E+01**	-	0.008	All Results < MSC

Notes:

Maximum Soil Concentrations shown in Table 2 of the Shaw (2008b) Addendum.

mg/kg - milligrams per kilogram

MSC - medium specific concentration

SQL - sample quantitation limit

Table A1-7
Chemical Specific Standard 3 Groundwater-Protective MSCs for Soil
Sump 094, Sump 123, and Waste Rack Sump WRSump 003

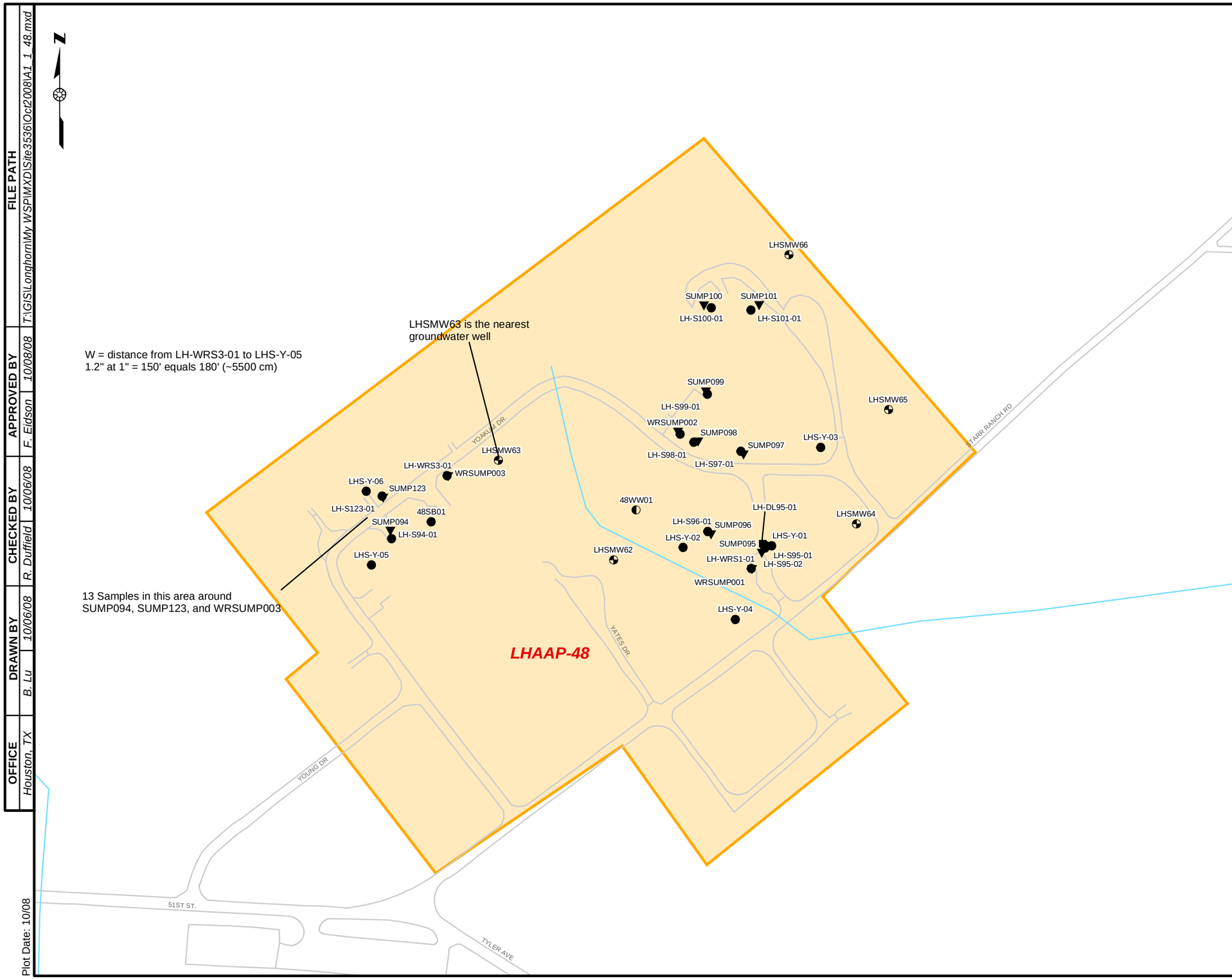
Standard 3 MSC Calculation for Specific Chemicals with Concentrations Above Initial Standard 3 MSC					
Variables	**Barium**	**Cadmium**	**Manganese**	**Silver**	**Strontium**
L1 - Thickness of affected soil	332	381	30	61	61
L2 - Distance from top of affected soils to top of water bearing unit.	402	402	70	402	402
W - Width of soil source area parallel to groundwater flow direction	5,500	5,500	1,000	2,800	1,100
H' - Dimensional form of Henry's Law Constant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Kd - Soil Water Partition Coefficient	3.00E+01	3.70E+01	5.01E+01	1.30E+00	2.00E+00
S - Solubility in mg/L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Calculations					
Ksw = see Equation 8	3.32E-02	2.70E-02	1.99E-02	7.21E-01	4.79E-01
Csat = see Equation 7 (mg/kg)	NA	NA	NA	NA	NA
GW-Ind MSC (mg/L)	2.0E+00	5.0E-03	1.4E+01	5.1E-01	6.1E+01
LDF = see Equation 5	1.015	1.015	1.082	1.029	1.074
Standard 3 Soil MSC Com/Ind (mg/kg) = see Equation 6	7.4E+01	2.0E-01	1.8E+03	4.8E+00	9.1E+02
Corrected Standard 2 Soil MSC Com/Ind (cannot be larger than Csat) (mg/kg)	7.4E+01	2.0E-01	1.8E+03	4.8E+00	9.1E+02
Background Concentration (mg/kg)	8.55E+01	4.00E-01	2.01E+02	3.10E-01	1.98E+01
Applicable Commercial/Industrial Soil MSC (mg/kg)	**8.5E+01**	**4.0E-01**	**1.8E+03**	**4.8E+00**	**9.1E+02**
Maximum Detected Concentration for Comparison (mg/kg)	**2510**	**5.55**	**1310**	**1.2**	**514**

Notes:

GW-Ind MSC	from TCEQ 2006 RBSV table
LDF	leachate dilution factor
MSC	Medium Specific Concentration
mg/kg	milligrams per kilogram

Constants:

Symbol	Value	Units	Name
r_b	1.5	g/cm³	Soil Dry Bulk Density
n	0.43	unitless	Total Porosity
q_w	0.13	unitless	Volumetric Water Content of Soil
f_{oc}	0.02	g/g	Soil Fraction Organic Carbon
I	30.4	cm/yr	Net Infiltration Rate through soil
V_{gw}	8.12763	cm/yr	Groundwater Darcy Velocity = K x i x 31500000
K	3.8E-05	cm/sec	Hydraulic conductivity in groundwater bearing unit
i	0.00679	unitless	Hydraulic gradient in groundwater bearing unit
d	305	cm	Groundwater mixing zone
q_a	0.3	unitless	Soil Air Filled Porosity (qa) = n - qw



Legend

- Shallow Monitoring Well
- Intermediate Monitoring Well
- Surface Soil
- Soil boring
- Sump
- Stream
- Road
- Existing Building
- Site

0 75 150 300 Feet

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

FIGURE A1-1

LHAAP-48 SAMPLE LOCATION MAP

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		FILE PATH
Houston, TX	B. Lu	10/06/08	R. Duffield	10/06/08	F. Eidson	10/08/08	T:\GIS\Longhorn\My WSP\MXD\Site3536\Oct2008\A1_1_48.mxd

Plot Date: 10/08

Attachment 2

Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 095, Sump 096, and WRSump 001

Attachment 2 – SAM Model Evaluation

Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 095, Sump 096, and WRSump 001 at the Longhorn Army Ammunition Plant, Karnack, Texas

Attachment 2 describes development of Medium Specific Concentrations (MSCs) for chemicals in soil that are protective of groundwater for soil associated with Sump 095, Sump 096 and WRSump 001. The MSC values were developed according to the Texas Commission on Environmental Quality [TCEQ] Texas Risk Reduction Rules, Title 30 Texas Administrative Code (TAC) Chapter 335 (30 TAC §335 and updates).

Groundwater-protective Risk Reduction Standard 3 MSCs were calculated to evaluate the potential for migration of chemicals from soil to groundwater as provided in TCEQ guidance [30 TAC §335.563(i)(2)] by using the SAM model to estimate the potential impacts of soil contamination on groundwater quality.

Sump 095, Sump 096 and WRSump 001 were located at Longhorn Army Ammunition Plant (LHAAP) LHAAP-48 (Former Igniter Production Area) as shown on **Figure A2-1,** which is from the Final Site Evaluation Report LHAAP-48 (Former Igniter Production Area) and LHAAP-35C(53) (Former Static Test Area) (Shaw, 2007). Evaluation of chemicals in soil associated with these three sumps was based on data from analysis of 19 soil samples collected from depths ranging from 0.0 to 12.5 feet below ground surface (bgs). The samples were analyzed for explosives, metals, semivolatile organic compounds (SVOCs), and volatile organic compounds (VOCs). The analytical results were evaluated as reported in **Table 3** of the main body of this Addendum.

The initial step in the SAM Model compared the tested chemicals to available background concentrations and method quantitation limits (MQL) for each chemical. Of the chemicals tested, 4 were not evaluated because they are regarded as essential nutrients (TCEQ, 2001). The evaluation of the remaining chemicals is recorded on **Table A2-1**.

The SAM Model is an extension of the Soil Screening Level calculations described in USEPA (1996) guidance and is based on calculating total mass (liquid phase, solid phase, and gas phase) in the soil column:

$$M_T = V(\rho_b C_s + \theta_w C_w + \theta_a C_g)$$

Where

M_T = total mass of chemical
V = volume of the soil column
ρ_b = bulk density

C_s = concentration in soil (dry weight basis)
θ_w = water filled porosity
C_w = concentration in pore water
θ_a = air filled porosity
C_g = gas phase concentration.

Total mass is then redistributed using equilibrium conditions based on the adsorption coefficient and Henry's constant. The equilibrium equations are:

$$C_s = K_d C_w \qquad \text{Equation 1}$$

$$C_g = H' C_w \qquad \text{Equation 2}$$

Where Kd is the distribution (or adsorption) coefficient and H' is the dimensionless Henry's Law constant.

A SAM Model enhancement over USEPA's Soil Screening Levels is that the SAM Model assumes a zone of contaminated soils overlying a zone of clean soil (zero contaminant concentration). The SAM Model simulates mixing of contamination through the contaminated and clean soil zones based on equilibrium conditions and predicts leachate concentration at the bottom of the soil column. In the SAM Model, the leachate concentration is calculated as follows:

$$C_w = C_s \left(\frac{\rho_b}{\theta_w + (K_d \rho_b) + H' \theta_a} \right) \left(\frac{L_1}{L_2} \right) \qquad \text{Equation 3}$$

Or, alternately, the concentration in soil that will produce a given leachate concentration can be calculated as:

$$C_s = C_w \left(\frac{\theta_w + (K_d \rho_b) + H' \theta_a}{\rho_b} \right) \left(\frac{L_2}{L_1} \right) \qquad \text{Equation 4}$$

Where L_1 is the thickness of the contaminated zone and L_2 is the thickness of the total soil column. The factor (L_2/L_1) is an enhancement in the SAM Model over the Soil Screening Level Model by USEPA. A further dilution factor for leachate mixing with groundwater can be incorporated by using a leachate dilution factor:

$$LDF = 1 + \frac{Kid}{IW} \qquad \text{Equation 5}$$

Where

K = aquifer hydraulic conductivity

i = hydraulic gradient in aquifer
d = groundwater mixing zone depth
I = infiltration rate
W = source length parallel to groundwater flow.

The groundwater protective Standard 3 MSC is the soil concentration (Cs) described by Equation 4 where the groundwater concentration is limited by the TCEQ risk-based drinking water concentration (GW-Ind) modified by the leachate dilution factor (LDF) as follows:

$$\text{Standard 3 } MSC = C_w \left(\frac{\theta_w + (K_d \rho_b) + H'\theta_a}{\rho_b} \right) \left(\frac{L_2}{L_1} \right) x\ LDF \qquad \text{Equation 6}$$

The model further calculates the soil saturation concentration (C_{sat}), which corresponds to the contaminant concentration in soil at which the absorptive capacity of soil particles, the solubility limits of soil pore water and saturation of soil pore air have been reached. Concentrations above C_{sat} are assumed to be in free phase. The C_{sat} concentration is calculated in the SAM Model according to Equation 7.

$$C_{sat} = S \left(\frac{\theta_w + (K_d \rho_b) + H'\theta_a}{\rho_b} \right) \qquad \text{Equation 7}$$

For the purpose of simplification, a soil to water coefficient, K_{sw}, can stand in for the complex bracketed formula in Equation 3, 4, 6, and 7.

$$K_{sw} = \left(\frac{\rho_b}{\theta_w + (K_d \rho_b) + (H'\theta_a)} \right) \qquad \text{Equation 8}$$

Input parameters to the SAM Model that are either specific to Sump 095, Sump 096 and WRSump 001 at LHAAP-48 or are default TCEQ values, are shown in **Table A2-2**. Because some chemical properties are pH dependent, an average groundwater pH calculation was calculated (6.0) in **Table A2-3**. **Table A2-4** lists the chemical properties of the 147 chemicals (TCEQ, 2008). From these input parameters and properties, the SAM Model first calculates a saturated soil concentration (C_{sat}) using Equation 7.

Then the SAM Model calculates a Standard 3 Commercial/Industrial Soil MSC using Equation 6 by equating C_w to the GW-Ind MSC and calculating the concentration of chemical in the soil at the site (mg/kg) that would theoretically leach into the groundwater at the GW-Ind concentration (mg/L). The lower of the C_{sat} and the calculated Soil MSC values is used as the Soil MSC.

Finally, the calculated Standard 3 Soil MSC is compared to available background soil concentrations for the chemical. The 95% upper prediction limit (UPL) of soil background concentrations from the LHAAP-35/36 Sump Report (Shaw, 2008) were used for this comparison. The larger of the Standard 3 Commercial/Industrial Soil MSC and the background concentration is then selected as the Applicable Standard 3 Commercial/Industrial Soil MSC.

Table A2-5 presents the results of those calculations. The Applicable Commercial/Industrial Soil MSC values are in bold along the right side of the table. While it is possible to select different site parameters for each chemical, general site parameters were used as if each chemical were equally and evenly distributed across the entire site. When compared to actual chemical concentrations in individual samples taken near former sump locations, this assumption overestimates the extent of the chemical concentration across the site, resulting in lower concentrations calculated for the Applicable Commercial Industrial Soil MSC.

Table A2-6 compares the Applicable Standard 3 Commercial/Industrial Soil MSC values to maximum soil concentrations for each chemical in the samples associated with Sump 095, Sump 096 and WRSump001 at LHAAP-48.

Discussion

The SAM Model results for Sump 095, Sump 096 and WRSump 001 at LHAAP-48 indicate that detected concentrations of 7 metals (antimony, arsenic, barium, cadmium, copper, lead and strontium) and one VOC (trichloroethene) exceed the calculated groundwater protective soil MSC values. The SAM Model was recalculated for these 8 chemicals to determine whether chemical-specific input values for L1, L2 and W would result in a changed MSC value. These chemical specific calculations are shown in **Table A2-7**.

Of the 19 samples, only 1 contained detectable antimony, but it contained antimony above the initial calculated MSC value (9.4E-01 mg/kg in **Table A2-6**). This sample LH-S95-01.3 containing 11 mg/kg of antimony was from a depth of 11.3 to 12 feet bgs. Rerunning the SAM Model specifically for antimony, with a changed value for L1 of 2 feet (61 centimeters [cm]), L2 of 6 feet (183 cm) and W of 32 feet (1000 cm) that reflect the location of the antimony concentration, the SAM Model calculates a chemical-specific MSC value of 1.1E+00 mg/kg (**Table A2-7**), which is still less than the maximum detected value of 11 mg/kg.

All 19 samples contained detectable arsenic, but only 1 sample contained arsenic above the initial calculated MSC value (4.8E+00 mg/kg). This sample LH-S95-01-FD containing 5.05 mg/kg of arsenic was from a depth of 0.5 to 1.5 feet bgs. Rerunning the SAM Model specifically for arsenic, with a changed value for L1 of 2 feet (61 cm) and W of 32 feet (1000 cm), and an unchanged value for L2 of 19 feet (579 cm) that reflect the location of the arsenic concentration, the SAM Model calculates an unchanged chemical-specific MSC value of 4.8E+00 mg/kg (**Table A2-7**), which is still less than the maximum detected value of 5.05 mg/kg.

All 19 samples contained detectable barium, but only 14 samples contained barium above the initial calculated MSC value (9.3E+01 mg/kg). These 14 samples ranged in depth from 0.0 to 6.2 feet bgs, and were from multiple locations spread around the site. Rerunning the SAM Model specifically for barium, with unchanged values for L1 of 12.5 feet (381 cm), L2 of 19 feet (579 cm) and W of 150 feet (4600 cm) that reflect locations of the barium concentrations, the SAM Model calculates an unchanged chemical-specific MSC value of 9.3E+01 mg/kg (**Table A2-7**), which is still less than the maximum detected value of 1,600 mg/kg.

Of the 19 samples, 12 contained detectable cadmium, and all were greater than the initial calculated MSC value (4.0E-01 mg/kg in **Table A2-6**). These 12 samples ranged in depth from 0.5 to 12.5 feet bgs, and were from multiple locations spread around the site. Rerunning the SAM Model specifically for cadmium, with unchanged values for L1 of 12.5 feet (381 cm), L2 of 19 feet (579 cm), and W of 150 feet (4600 cm) that reflect locations of the cadmium concentrations, the SAM Model calculates an unchanged chemical-specific MSC value of 4.0E-00 mg/kg (**Table A2-7**), which is the background concentration.

All 19 samples contained detectable copper, but only 1 sample contained copper above the initial calculated MSC value (8.1E+01 mg/kg in **Table A2-6**). This sample LHS-Y-01 was from a depth of 0 to 0.5 feet bgs. Rerunning the SAM Model specifically for copper, with changed values for L1 of 1 foot (30 cm) and W of 32 feet (1000 cm), and an unchanged value for L2 of 19 feet (579 cm) that reflect locations of the copper concentrations greater than the MSC, the SAM Model calculates a chemical specific MSC value of 1.1E+03mg/kg, which is greater than the maximum detected copper concentration of 102 mg/kg.

Of the 19 samples, 16 contained detectable lead, but only 1 sample contained lead above the initial calculated MSC value (4.2E+01 mg/kg in **Table 2-6**). This sample LH-S95-01-FD was from a depth of 0.5 to 1.5 feet bgs. Rerunning the SAM Model specifically for lead, with changed values for L1 of 2 feet (61 cm), and W of 32 feet (1000 cm), and an unchanged value for L2 of 19 feet (579 cm) that reflect the location of the single lead concentration greater than the MSC, the SAM Model calculates a chemical-specific MSC value of 2.8E+02 mg/kg (**Table A2-7**), which is greater than the maximum detected lead concentration of 47.4 mg/kg.

Of the 19 samples, 18 contained detectable strontium, but only 2 samples contained strontium above the initial calculated MSC value (2.0E+02 mg/kg in **Table A2-6**). These 2 samples ranged in depth from 0.5 to 2.5 feet bgs, and were from 2 locations fairly close together (LH-DL95-01 and LH-S95-01). Rerunning the SAM Model specifically for strontium, with changed values for L1 of 4 feet (122 cm) and W of 32 feet (1000 cm), and an unchanged value for L2 of 19 feet (579 cm) that reflect the locations of the strontium results, the SAM Model calculates a chemical-specific MSC value of 6.6E+02 mg/kg (**Table A2-7**), which is greater than the maximum detected strontium concentration of 458 mg/kg.

Of the 19 samples, 2 contained detectable trichloroethene, but only 1 sample contained trichloroethene above the initial calculated MSC value (1.6E-02 mg/kg in **Table A2-6**). This sample LH-S95-02.2 was from a depth of 4 to 4.5 feet bgs. Rerunning the SAM Model specifically for trichloroethene, with changed values for L1 of 2 feet (61 cm), L2 of 15.5 feet (472 cm), and W of 32 feet (1000 cm) that reflect the locations of trichloroethene results, the SAM Model calculates a chemical specific MSC value of 8.5E-02 mg/kg (**Table A2-7**), which is greater than the maximum detected trichloroethene concentration of 0.020 mg/kg.

Concentrations of antimony and arsenic in isolated samples, and barium and cadmium are predicted by the SAM model to have potential to leach from soil into the groundwater. Analysis of groundwater taken from LHAAP-48 and LHAAP-35C(53) in 2005 indicated that antimony was not detected in groundwater from Wells LHSMW62 and LHSMW64, which are the wells closest to the sumps (**Figure A2-1**), and all detected antimony concentrations at other well locations were well below the maximum contaminant level (MCL) (Shaw, 2008, **Table 2-1**). These results indicate that any leaching of antimony to groundwater is within TCEQ limits. Arsenic is detected in groundwater at concentrations below the maximum contaminant level (MCL) (Shaw, 2008, **Table 2-1**). Cadmium was not detected in any groundwater sample (Shaw, 2008, **Table 2-1**), indicating that cadmium is not leaching from the soil into groundwater. Barium is detected in groundwater at concentrations below the MCL (Shaw, 2008, **Table 2-1**).

Four other chemicals, copper, lead, strontium, and trichloroethene were initially predicted to have potential for leaching, but more specific evaluation for those chemicals yielded a value for the MSC that is larger than the maximum detected concentrations of those chemicals.

References

Shaw Environmental & Infrastructure (Shaw), 2007, *Final Site Evaluation Report LHAAP-48 (Former Igniter Production Area) and LHAAP-35C(53) (Former Static Test Area)*, April.

Shaw, 2008, *Final Data Evaluation Report, Chemical Concentrations in Soil Samples Associated with LHAAP-35/36 Sumps*, January (LHAAP-35/36 Sump Report).

Texas Commission on Environmental Quality (TCEQ), 2001, Interoffice Memorandum from Joseph T. Haney, Jr., (TCEQ) to Camarie Perry, Office or Permitting, Remediation & Registration, *Evaluation of the Potential Health Impacts of Exposure to Iron, Calcium, Magnesium, Potassium, sodium, and Phosphorus through Soil Ingestion*, October.

TCEQ, 2008, Annual TCEQ update of chemical/physical properties table [(Figure: 30 TAC §350.73(e)], April.

U.S. Environmental Protection Agency (USEPA), 1996, *Soil Screening Guidance: User's Guide*, Second Edition.

Table A2-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 095, Sump 096, and Waste Rack Sump WRSump 001

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	Calculate MSC ?
EXPLOSIVES	1,3,5-Trinitrobenzene	-	0.23	NE	NE	0.21	YES
EXPLOSIVES	1,3-Dinitrobenzene	-	0.23	NE	NE	0.21	YES
EXPLOSIVES	2,4,6-Trinitrotoluene	-	0.23	NE	NE	0.21	YES
EXPLOSIVES	2,4-Dinitrotoluene	-	2.778	NE	NE	0.21	YES
EXPLOSIVES	2,6-Dinitrotoluene	-	1.316	NE	NE	0.23	YES
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	-	0.47	NE	NE	0.44	YES
EXPLOSIVES	HMX	-	2.1	NE	NE	1.9	YES
EXPLOSIVES	m-Nitrotoluene	-	0.94	NE	NE	0.88	YES
EXPLOSIVES	Nitrobenzene	-	0.25	NE	NE	0.23	YES
EXPLOSIVES	o-Nitrotoluene	-	0.94	NE	NE	0.88	YES
EXPLOSIVES	p-Nitrotoluene	-	2.8	NE	NE	2.7	YES
EXPLOSIVES	RDX	-	1	NE	NE	0.96	YES
EXPLOSIVES	Tetryl	-	0.7	NE	NE	0.65	YES
METALS	Aluminum	19300	-	1.63E+04	2.08E+04	20	YES
METALS	Antimony	11	15.2	9.40E-01	1.60E+00	5.28	YES
METALS	Arsenic	5.05	-	4.81E+00	5.54E+00	0.3	YES
METALS	Barium	1600	-	1.52E+02	8.55E+01	0.3	YES
METALS	Cadmium	5.96	3.16	1.40E+00	4.00E-01	0.89	YES
METALS	Calcium	2300	-	NA	NA	NA	No, 1
METALS	Chromium	22.5	5.65	2.66E+01	3.01E+01	5.65	YES
METALS	Cobalt	14.6	-	7.23E+00	5.61E+00	0.5	YES
METALS	Copper	102	-	5.55E+00	9.25E+00	0.6	YES
METALS	Iron	22700	-	NA	NA	NA	No, 1
METALS	Lead	47.4	19	2.26E+01	1.14E+01	13.2	YES
METALS	Magnesium	1830	-	NA	NA	NA	No, 1
METALS	Manganese	828	-	1.25E+03	2.01E+02	0.2	YES
METALS	Mercury	0.043	0.13	8.19E-02	3.60E-01	0.024	YES
METALS	Potassium	1070	-	NA	NA	NA	No, 1
METALS	Selenium	0.56	1.3	3.48E+00	5.57E+00	0.528	YES
METALS	Silver	0.085	1.5	3.10E-01	3.70E-01	0.029	YES
METALS	Strontium	458	15.2	1.98E+01	2.91E+01	15.2	YES
METALS	Thallium	-	75.9	4.70E-01	NE	44.6	YES
METALS	Zinc	76.3	-	6.16E+01	2.02E+01	2.5	YES
SEMIVOLATILES	1,2,4-Trichlorobenzene	-	1.316	NE	NE	0.46	YES
SEMIVOLATILES	1,2-Dichlorobenzene	-	1.316	NE	NE	0.46	YES
SEMIVOLATILES	1,3-Dichlorobenzene	-	1.316	NE	NE	0.46	YES
SEMIVOLATILES	1,4-Dichlorobenzene	-	1.316	NE	NE	0.46	YES
SEMIVOLATILES	2,4,5-Trichlorophenol	-	2.8	NE	NE	1.111	YES
SEMIVOLATILES	2,4,6-Trichlorophenol	-	1.316	NE	NE	0.46	YES
SEMIVOLATILES	2,4-Dichlorophenol	-	1.316	NE	NE	0.46	YES
SEMIVOLATILES	2,4-Dimethylphenol	-	0.658	NE	NE	0.46	YES
SEMIVOLATILES	2,4-Dinitrophenol	-	27.778	NE	NE	0.641	YES
SEMIVOLATILES	2,4-Dinitrotoluene	-	0.57	NE	NE	0.46	No, 2
SEMIVOLATILES	2,6-Dinitrotoluene	-	0.57	NE	NE	0.46	No, 2
SEMIVOLATILES	2-Chloronaphthalene	-	0.57	NE	NE	0.333	YES
SEMIVOLATILES	2-Chlorophenol	-	0.658	NE	NE	0.46	YES
SEMIVOLATILES	2-Methylnaphthalene	1.835	0.57	NE	NE	0.333	YES
SEMIVOLATILES	2-Methylphenol	-	0.658	NE	NE	0.46	YES
SEMIVOLATILES	2-Nitroaniline	-	3.947	NE	NE	2.3	YES
SEMIVOLATILES	2-Nitrophenol	-	1.316	NE	NE	0.46	YES
SEMIVOLATILES	3,3'-Dichlorobenzidine	-	3.846	NE	NE	0.5	YES
SEMIVOLATILES	3-Nitroaniline	-	3.947	NE	NE	2.3	YES
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	-	13.889	NE	NE	0.641	YES
SEMIVOLATILES	4-Bromophenyl phenyl ether	-	2.778	NE	NE	0.46	YES
SEMIVOLATILES	4-Chloro-3-methylphenol	-	0.658	NE	NE	0.46	YES
SEMIVOLATILES	4-Chloroaniline	-	3.947	NE	NE	0.46	YES
SEMIVOLATILES	4-Chlorophenyl phenyl ether	-	2.778	NE	NE	0.46	YES
SEMIVOLATILES	4-Methylphenol	-	0.658	NE	NE	0.46	YES
SEMIVOLATILES	4-Nitroaniline	-	13.889	NE	NE	1.282	YES
SEMIVOLATILES	4-Nitrophenol	-	13.889	NE	NE	0.641	YES
SEMIVOLATILES	Acenaphthene	-	0.57	NE	NE	0.333	YES

Table A2-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 095, Sump 096, and Waste Rack Sump WRSump 001

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	Calculate MSC ?
SEMIVOLATILES	Acenaphthylene	-	0.658	NE	NE	0.46	YES
SEMIVOLATILES	Anthracene	-	1.389	NE	NE	0.46	YES
SEMIVOLATILES	Benzo(a)anthracene	-	0.833	1.53E-02	NE	0.3	YES
SEMIVOLATILES	Benzo(a)pyrene	-	3.846	1.54E-02	NE	0.46	YES
SEMIVOLATILES	Benzo(b)fluoranthene	-	2.778	1.53E-02	NE	0.46	YES
SEMIVOLATILES	Benzo(ghi)perylene	-	5.556	1.23E-02	NE	0.46	YES
SEMIVOLATILES	Benzo(k)fluoranthene	-	2.778	1.30E-02	NE	0.385	YES
SEMIVOLATILES	Benzoic Acid	-	2.8	NE	NE	2.3	YES
SEMIVOLATILES	Benzyl Alcohol	-	0.57	NE	NE	0.46	YES
SEMIVOLATILES	bis(2-Chloroethoxy)methane	-	0.658	NE	NE	0.46	YES
SEMIVOLATILES	bis(2-Chloroethyl)ether	-	0.658	NE	NE	0.46	YES
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	-	1.316	NE	NE	0.46	YES
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	0.061	7.556	NE	NE	0.118	YES
SEMIVOLATILES	Butyl benzyl phthalate	-	3.846	NE	NE	0.46	YES
SEMIVOLATILES	Carbazole	-	2.778	NE	NE	0.641	YES
SEMIVOLATILES	Chrysene	-	13.889	1.51E-02	NE	0.385	YES
SEMIVOLATILES	Dibenzo(a,h)anthracene	-	5.556	NE	NE	0.46	YES
SEMIVOLATILES	Dibenzofuran	-	2.778	NE	NE	0.46	YES
SEMIVOLATILES	Diethyl phthalate	1.833	1.282	NE	NE	0.46	YES
SEMIVOLATILES	Dimethyl phthalate	0.975	0.658	NE	NE	0.46	YES
SEMIVOLATILES	di-n-Butyl phthalate	-	6.227	NE	NE	0.361	YES
SEMIVOLATILES	di-n-Octyl phthalate	-	1.389	NE	NE	0.46	YES
SEMIVOLATILES	Fluoranthene	0.1804	1.389	2.29E-02	NE	0.46	YES
SEMIVOLATILES	Fluorene	-	1.389	NE	NE	0.46	YES
SEMIVOLATILES	Hexachlorobenzene	-	2.778	NE	NE	0.46	YES
SEMIVOLATILES	Hexachlorobutadiene	-	3.947	NE	NE	0.46	YES
SEMIVOLATILES	Hexachlorocyclopentadiene	-	3.947	NE	NE	0.46	YES
SEMIVOLATILES	Hexachloroethane	-	1.316	NE	NE	0.46	YES
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	-	2.778	1.43E-02	NE	0.46	YES
SEMIVOLATILES	Isophorone	-	0.658	NE	NE	0.46	YES
SEMIVOLATILES	Naphthalene	4.392	0.57	NE	NE	0.333	YES
SEMIVOLATILES	Nitrobenzene	-	0.658	NE	NE	0.46	No, 2
SEMIVOLATILES	n-Nitroso-di-n-propylamine	-	1.316	NE	NE	0.46	YES
SEMIVOLATILES	n-Nitrosodiphenylamine	-	1.389	NE	NE	0.46	YES
SEMIVOLATILES	Pentachlorophenol	-	13.889	NE	NE	0.641	YES
SEMIVOLATILES	Phenanthrene	1.944	1.282	NE	NE	0.46	YES
SEMIVOLATILES	Phenol	-	0.658	NE	NE	0.46	YES
SEMIVOLATILES	Pyrene	0.1804	1.389	1.94E-02	NE	0.385	YES
VOLATILES	1,1,1,2-Tetrachloroethane	-	0.018	NE	NE	0.014	YES
VOLATILES	1,1,1-Trichloroethane	-	0.009	NE	NE	0.005	YES
VOLATILES	1,1,2,2-Tetrachloroethane	-	0.009	NE	NE	0.005	YES
VOLATILES	1,1,2-Trichloroethane	-	0.009	NE	NE	0.005	YES
VOLATILES	1,1-Dichloroethane	-	0.009	NE	NE	0.005	YES
VOLATILES	1,1-Dichloroethene	-	0.009	NE	NE	0.005	YES
VOLATILES	1,2,3-Trichloropropane	-	0.018	NE	NE	0.014	YES
VOLATILES	1,2-Dibromo-3-chloropropane	-	0.035	NE	NE	0.028	YES
VOLATILES	1,2-Dibromoethane	-	0.035	NE	NE	0.028	YES
VOLATILES	1,2-Dichloroethane	-	0.009	NE	NE	0.005	YES
VOLATILES	1,2-Dichloroethene	-	0.009	NE	NE	0.005	YES
VOLATILES	1,2-Dichloropropane	-	0.009	NE	NE	0.005	YES
VOLATILES	2-Butanone	0.025	0.066	NE	NE	0.014	YES
VOLATILES	2-Chloroethyl vinyl ether	-	0.018	NE	NE	0.014	YES
VOLATILES	2-Hexanone	-	0.066	NE	NE	0.014	YES
VOLATILES	2-Propenal	-	0.88	NE	NE	0.69	YES
VOLATILES	Acetone	-	0.552	NE	NE	0.014	YES
VOLATILES	Acetonitrile	-	0.18	NE	NE	0.14	YES
VOLATILES	Acrylonitrile	-	0.18	NE	NE	0.14	YES
VOLATILES	Allyl chloride	-	0.018	NE	NE	0.014	YES
VOLATILES	Benzene	-	0.009	NE	NE	0.005	YES
VOLATILES	Bromodichloromethane	-	0.009	NE	NE	0.005	YES
VOLATILES	Bromoform	-	0.009	NE	NE	0.005	YES

Table A2-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 095, Sump 096, and Waste Rack Sump WRSump 001

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	Calculate MSC ?
VOLATILES	Bromomethane	-	0.033	NE	NE	0.014	YES
VOLATILES	Carbon disulfide	0.145	0.009	NE	NE	0.006	YES
VOLATILES	Carbon tetrachloride	-	0.009	NE	NE	0.005	YES
VOLATILES	Chlorobenzene	-	0.009	NE	NE	0.005	YES
VOLATILES	Chloroethane	-	0.033	NE	NE	0.014	YES
VOLATILES	Chloroform	-	0.009	NE	NE	0.005	YES
VOLATILES	Chloromethane	-	0.033	NE	NE	0.014	YES
VOLATILES	Chloroprene	-	0.18	NE	NE	0.14	YES
VOLATILES	cis-1,3-Dichloropropene	-	0.009	NE	NE	0.005	YES
VOLATILES	Dibromochloromethane	-	0.009	NE	NE	0.005	YES
VOLATILES	Dibromomethane	-	0.035	NE	NE	0.028	YES
VOLATILES	Dichlorodifluoromethane	-	0.035	NE	NE	0.028	YES
VOLATILES	Ethyl methacrylate	-	0.035	NE	NE	0.028	YES
VOLATILES	Ethylbenzene	-	0.009	NE	NE	0.005	YES
VOLATILES	IODOMETHANE	-	0.018	NE	NE	0.014	YES
VOLATILES	ISOBUTYL ALCOHOL	-	3.5	NE	NE	2.8	YES
VOLATILES	Methacrylonitrile	-	0.035	NE	NE	0.028	YES
VOLATILES	Methyl isobutyl ketone	-	0.066	NE	NE	0.014	YES
VOLATILES	METHYL METHACRYLATE	-	0.035	NE	NE	0.028	YES
VOLATILES	Methylene chloride	-	0.128	NE	NE	0.002	YES
VOLATILES	Pentachloroethane	-	0.035	NE	NE	0.028	YES
VOLATILES	Propionitrile	-	0.088	NE	NE	0.069	YES
VOLATILES	Styrene	0.003	0.009	NE	NE	0.005	YES
VOLATILES	Tetrachloroethene	-	0.009	NE	NE	0.005	YES
VOLATILES	Toluene	-	0.009	NE	NE	0.005	YES
VOLATILES	trans-1,3-Dichloropropene	-	0.009	NE	NE	0.005	YES
VOLATILES	trans-1,4-Dichloro-2-butene	-	0.035	NE	NE	0.028	YES
VOLATILES	Trichloroethene	0.02	0.009	NE	NE	0.006	YES
VOLATILES	Trichlorofluoromethane	-	0.018	NE	NE	0.014	YES
VOLATILES	Vinyl acetate	-	0.018	NE	NE	0.014	YES
VOLATILES	Vinyl chloride	-	0.033	NE	NE	0.014	YES
VOLATILES	Xylenes, Total	-	0.009	NE	NE	0.005	YES

Notes:

all concentrations in milligrams per kilogram (mg/kg)

Max Detected and Max SQL values taken from Table 3 of the main body of the Addendum.

NE - Not evaluated, background was only evaluated for metals and select other analytes.

SQL - sample quantitation limit.

PQL - practical quantitation limit.

MSC - medium specific concentration.

Rules for Analyte Selection

1. Chemicals that are essential nutrients (Fe, Ca, Mg, K, Na, P), TCEQ (2001).
2. Same chemical is analyzed as an explosive, only one MSC value is calculated.

Table A2-2
Input Values for Parameters used to Calculate Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 095, Sump 096, and Waste Rack Sump WRSump 001

Parameter		Value	Units	Comment	Reference
Soil Dry Bulk Density	ρ_b	1.5	g/cm^3	Typical value	USEPA, 1996, pg. 38.
Particle Density	$\rho_{particle}$	2.65	g/cm^3	TCEQ default value	30 TAC §350.75 (c) and (d)
Total Porosity	n	0.43	unitless	n = 1-(ρb/ρparticle) = 1-(1.5 g/cc/2.65 g/cc)	USEPA, 1996, pg. 38.
Volumetric Water Content of Soil	θ_w	0.13	unitless	Assumed 30%	USEPA, 1996, pg. 38.
Soil Fraction Organic Carbon	f_{oc}	0.02	unitless	TCEQ default value	30 TAC §335.567. Appendix I. (p. 26)
Net Infiltration Rate through soil	I	30.4	cm/yr	I = 0.0018 x P x P P - precipitation for Marshall Texas 130	TCEQ, 2000
Thickness of affected soil	L_1	381	cm	Samples taken at various depths from 0 down to 12.5 ft. Assumed 12.5 ft. (381 cm)	Table 3, main body of Addendum
Distance from top of affected soils to top of water bearing unit.	L_2	579	cm	top of shallowest sand layer containing free water in Monitor Well LHSMW64 is 19.2 ft. Use 19 ft. (579 cm)	Jacobs, 2002, Appendix A, Boring Logs
Groundwater Darcy Velocity	V_{gw}	8.13	cm/yr	Calculated = K*i*31500000 sec/yr	USEPA, 1996, pg. 42.
Hydraulic conductivity in groundwater bearing unit	K	3.80E-05	cm/sec	Measured by rising head slug test in LHSMW65	Jacobs 2002, pg 10-3
Hydraulic gradient in groundwater bearing unit	i	0.00679	unitless	Value listed as modeling input	Shaw, 2007, Appendix I, pg. 2-1
Width of soil source area parallel to groundwater flow direction	W	4,600	cm	Maximum site dimension, 150 ft measured from between LH-S96-01 and LHS-Y-04. (~4600 cm)	See Figure A2-1
Groundwater mixing zone	d	305	cm	All LHAAP-48 wells in Shallow Zone contained 10-ft screen sections. 10 x 12 x 2.54	Jacobs 2002, pg. 10-3
Soil Air Filled Porosity (θ_a)	θ_a	0.3	unitless	n - θw	USEPA, 1996, pg. 38.
Henry's Law Constant	H'	Chemical specific property	unitless	See Table A2-4	TCEQ, 2008
Organic Carbon Partition Coefficient	K_{oc}	Chemical specific property	unitless	See Table A2-4	TCEQ, 2008
Soil Water Partition Coefficient	K_d	Chemical specific property	unitless	See Table A2-4	TCEQ, 2008

Notes:

Jacobs Engineering Group, Inc., 2002: *Final Remedial Investigation Report, Group 4 Sites, Sites 04, 08, 35A, 35B, 35C, 46, 47, 48, 50, 60,67, Goose Prairie Creek, Volumes 1 and 2: Report, Longhorn Army Ammunition Plant, Karnack, Texas* , Oak Ridge, Tennessee, February.

Shaw Environmental & Infrastructure (Shaw), 2007, *Final Modeling Report, Derivation of Soil and Groundwater Concentrations Protective of Surface Water and Sediment* , February.

Texas Commission on Environmental Quality (TCEQ), *Risk Reduction Rules* , 30 TAC §335.567. Appendix I.

TCEQ, 2000, Tier 2 PCL Equations, March, accessed at http://www.tceq.state.tx.us/assets/public/remediation/trrp/tier2.pdf

TCEQ, 2008: Texas Risk Reduction Program Physical Chemcial Properties Tables, April, accessed at http://www.tceq.state.tx.us/remediation/trrp/trrppcls.html

USEPA, 1996. Soil Screening Guidance: Technical Background Document, USEPA/540/R-95/128018, U. S. Environmental Protection Agency, Office of Emergency and Remedial Response, July.

Table A2-3
Determination of pH
Sump 095, Sump 096, and Waste Rack Sump WRSump 001

Well	Date	pH Measurement	Comment
LHSMW62	Sep-04	5.32	
LHSMW63	Sep-04		bailed dry, no measurements
LHSMW64	Sep-04	5.87	
LHSMW65	Sep-04		bailed dry, no measurements
LHSMW66	Sep-04		bailed dry, no measurements
LHSMW62	May-05	5.17	
LHSMW63	May-05	6.75	
LHSMW64	May-05	6.22	
LHSMW65	May-05		bailed dry, no measurements
LHSMW66	May-05	6.90	
Average		6.04	
pH to be used		**6.0**	

Notes:

1. pH data from the groundwater sampling logs, Field Work images on Shaw network.
2. Only the pH readings from shallow wells were averaged.

Table A2-4
Physical Chemical Properties of Chemicals of Concern[a]
Sump 095, Sump 096, and Waste Rack Sump WRSump 001

Chemical of Concern		Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
EXPLOSIVES	1,3,5-Trinitrobenzene	2.87E-06	1.41E+01	2.83E-01	3.53E+02	b
EXPLOSIVES	1,3-Dinitrobenzene	4.57E-06	3.00E+01	6.00E-01	5.40E+02	b
EXPLOSIVES	2,4,6-Trinitrotoluene	1.90E-05	3.02E+02	6.04E+00	1.30E+02	b
EXPLOSIVES	2,4-Dinitrotoluene	3.60E-05	5.13E+01	1.03E+00	2.85E+02	b
EXPLOSIVES	2,6-Dinitrotoluene	3.11E-05	4.17E+01	8.34E-01	1.82E+02	b
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	1.74E-07	3.63E+02	7.26E+00	3.64E+01	b
EXPLOSIVES	HMX	2.50E-14	3.98E-02	7.96E-04	2.37E+03	b
EXPLOSIVES	m-Nitrotoluene	2.24E-03	1.41E+02	2.81E+00	4.98E+02	b
EXPLOSIVES	Nitrobenzene	8.56E-04	1.32E+02	2.64E+00	1.90E+03	b
EXPLOSIVES	o-Nitrotoluene	1.87E-03	1.41E+02	2.81E+00	6.00E+02	b
EXPLOSIVES	p-Nitrotoluene	2.29E-03	1.41E+02	2.81E+00	4.00E+02	b
EXPLOSIVES	RDX	4.99E-04	6.31E+01	1.26E+00	3.87E+01	b
EXPLOSIVES	Tetryl	8.31E-11	2.34E+02	4.69E+00	7.50E+01	b
METALS	Aluminum	0.00E+00	NA	3.53E+04	0.00E+00	c
METALS	Antimony	0.00E+00	NA	5.70E+01	0.00E+00	d
METALS	Arsenic	0.00E+00	NA	2.70E+01	0.00E+00	d
METALS	Barium	0.00E+00	NA	3.00E+01	0.00E+00	d
METALS	Cadmium	0.00E+00	NA	3.70E+01	0.00E+00	d
METALS	Chromium	0.00E+00	NA	2.00E+05	0.00E+00	d
METALS	Cobalt	0.00E+00	NA	4.50E+01	0.00E+00	
METALS	Copper	0.00E+00	NA	4.00E+01	0.00E+00	
METALS	Lead	0.00E+00	NA	1.83E+03	0.00E+00	c
METALS	Manganese	0.00E+00	NA	5.01E+01	0.00E+00	
METALS	Mercury	4.74E-01	NA	3.50E+00	3.00E-02	d
METALS	Selenium	0.00E+00	NA	8.60E+00	0.00E+00	d
METALS	Silver	0.00E+00	NA	1.30E+00	0.00E+00	d
METALS	Strontium	0.00E+00	NA	2.00E+00	0.00E+00	
METALS	Thallium	0.00E+00	NA	5.80E+01	2.90E+03	d
METALS	Zinc	0.00E+00	NA	3.60E+01	0.00E+00	d
SEMIVOLATILES	1,2,4-Trichlorobenzene	5.90E-02	1.66E+03	3.32E+01	4.88E+01	b
SEMIVOLATILES	1,2-Dichlorobenzene	8.73E-02	6.92E+02	1.38E+01	1.50E+02	b
SEMIVOLATILES	1,3-Dichlorobenzene	1.95E-01	1.70E+02	3.40E+00	1.10E+02	b
SEMIVOLATILES	1,4-Dichlorobenzene	1.17E-01	6.46E+02	1.29E+01	7.38E+01	b
SEMIVOLATILES	2,4,5-Trichlorophenol	1.78E-04	2.21E+03	4.42E+01	1.20E+03	b, e
SEMIVOLATILES	2,4,6-Trichlorophenol	3.19E-04	7.96E+02	1.59E+01	9.82E+02	b, e
SEMIVOLATILES	2,4-Dichlorophenol	1.31E-04	1.57E+02	3.14E+00	4.50E+03	b, e
SEMIVOLATILES	2,4-Dimethylphenol	8.31E-05	1.17E+02	2.35E+00	6.20E+03	b
SEMIVOLATILES	2,4-Dinitrophenol	2.01E-07	1.16E-02	2.32E-04	5.80E+03	b, e
SEMIVOLATILES	2-Chloronaphthalene	2.54E-02	8.51E+03	1.70E+02	6.74E+00	b
SEMIVOLATILES	2-Chlorophenol	7.40E-04	3.96E+02	7.92E+00	2.80E+04	b, e
SEMIVOLATILES	2-Methylnaphthalene	1.85E-02	4.32E+03	8.63E+01	2.54E+01	b
SEMIVOLATILES	2-Methylphenol	6.65E-05	9.77E+01	1.95E+00	2.04E+04	b
SEMIVOLATILES	2-Nitroaniline	2.08E-05	2.69E+01	5.38E-01	1.26E+03	b

Table A2-4
Physical Chemical Properties of Chemicals of Concern[a]
Sump 095, Sump 096, and Waste Rack Sump WRSump 001

Chemical of Concern		Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
EXPLOSIVES	1,3,5-Trinitrobenzene	2.87E-06	1.41E+01	2.83E-01	3.53E+02	b
SEMIVOLATILES	2-Nitrophenol	2.21E-05	1.88E+02	3.75E+00	1.73E+04	b, e
SEMIVOLATILES	3,3'-Dichlorobenzidine	8.65E-07	7.24E+02	1.45E+01	3.11E+00	b
SEMIVOLATILES	3-Nitroaniline	2.31E-07	3.94E+01	7.88E-01	4.56E+02	b
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	1.07E-07	3.16E-02	6.32E-04	3.00E+03	b
SEMIVOLATILES	4-Bromophenyl phenyl ether	9.66E-03	1.45E+05	2.90E+03	8.25E-01	b
SEMIVOLATILES	4-Chloro-3-methylphenol	1.40E-05	8.78E+02	1.76E+01	5.43E+03	b
SEMIVOLATILES	4-Chloroaniline	4.86E-05	6.61E+01	1.32E+00	3.90E+03	b
SEMIVOLATILES	4-Chlorophenyl phenyl ether	1.30E-02	1.31E+04	2.62E+02	1.43E+00	b
SEMIVOLATILES	4-Methylphenol	3.99E-05	8.13E+01	1.63E+00	2.30E+04	b
SEMIVOLATILES	4-Nitroaniline	3.33E-08	1.12E+01	2.25E-01	6.49E+02	b
SEMIVOLATILES	4-Nitrophenol	3.24E-08	4.36E+01	8.73E-01	4.49E+03	b, e
SEMIVOLATILES	Acenaphthene	6.44E-03	3.98E+03	7.96E+01	4.24E+00	b
SEMIVOLATILES	Acenaphthylene	4.74E-03	6.92E+03	1.38E+02	3.93E+00	b
SEMIVOLATILES	Anthracene	4.61E-03	2.34E+04	4.69E+02	4.34E-02	b
SEMIVOLATILES	Benzo(a)anthracene	1.39E-04	3.55E+05	7.10E+03	1.00E-02	b
SEMIVOLATILES	Benzo(a)pyrene	4.70E-05	9.55E+05	1.91E+04	1.62E-03	b
SEMIVOLATILES	Benzo(b)fluoranthene	4.99E-04	1.20E+06	2.40E+04	1.50E-03	b
SEMIVOLATILES	Benzo(ghi)perylene	5.82E-06	1.58E+06	3.17E+04	2.60E-04	b
SEMIVOLATILES	Benzo(k)fluoranthene	4.45E-07	1.23E+06	2.46E+04	5.50E-04	b
SEMIVOLATILES	Benzoic Acid	1.39E-05	9.69E-01	1.94E-02	3.50E+03	b, e
SEMIVOLATILES	Benzyl Alcohol	1.62E-05	1.20E+01	2.40E-01	4.00E+04	b
SEMIVOLATILES	bis(2-Chloroethoxy)methane	1.25E-03	3.07E+02	6.13E+00	1.35E+03	b
SEMIVOLATILES	bis(2-Chloroethyl)ether	8.90E-04	1.55E+01	3.10E-01	1.02E+04	b
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	4.16E-03	3.16E+02	6.32E+00	1.70E+03	b
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	4.57E-04	6.76E+05	1.35E+04	3.00E-01	b
SEMIVOLATILES	Butyl benzyl phthalate	7.94E-05	1.37E+04	2.75E+02	2.90E+00	b
SEMIVOLATILES	Carbazole	3.38E-03	2.45E+03	4.91E+01	7.21E-01	b
SEMIVOLATILES	Chrysene	5.03E-05	3.09E+05	6.18E+03	2.00E-03	b
SEMIVOLATILES	Dibenzo(a,h)anthracene	4.66E+00	1.91E+06	3.81E+04	5.00E-04	b
SEMIVOLATILES	Dibenzofuran	5.28E-03	8.49E+03	1.70E+02	2.86E+00	b
SEMIVOLATILES	Diethyl phthalate	1.87E-05	1.51E+02	3.03E+00	1.08E+03	b
SEMIVOLATILES	Dimethyl phthalate	2.40E-05	3.16E+01	6.32E-01	4.19E+03	b
SEMIVOLATILES	di-n-Butyl phthalate	5.94E-05	3.39E+04	6.78E+02	1.12E+01	b
SEMIVOLATILES	di-n-Octyl phthalate	2.78E-03	8.32E+07	1.66E+06	2.00E-02	b
SEMIVOLATILES	Fluoranthene	3.88E-04	4.90E+04	9.80E+02	2.60E-01	b
SEMIVOLATILES	Fluorene	2.64E-03	7.59E+03	1.52E+02	1.98E+00	b
SEMIVOLATILES	Hexachlorobenzene	2.22E-02	2.82E+04	5.64E+02	6.00E-03	b
SEMIVOLATILES	Hexachlorobutadiene	9.94E-01	6.92E+03	1.38E+02	2.55E+00	b
SEMIVOLATILES	Hexachlorocyclopentadiene	7.15E-01	9.55E+03	1.91E+02	1.80E+00	b
SEMIVOLATILES	Hexachloroethane	1.62E-01	1.82E+03	3.64E+01	5.00E+01	b
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	2.85E+00	3.47E+06	6.93E+04	3.75E-03	b
SEMIVOLATILES	Isophorone	2.57E-04	3.02E+01	6.04E-01	1.20E+04	b

Table A2-4
Physical Chemical Properties of Chemicals of Concern[a]
Sump 095, Sump 096, and Waste Rack Sump WRSump 001

Chemical of Concern		Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
EXPLOSIVES	1,3,5-Trinitrobenzene	2.87E-06	1.41E+01	2.83E-01	3.53E+02	b
SEMIVOLATILES	Naphthalene	2.00E-02	1.55E+03	3.10E+01	3.14E+01	b
SEMIVOLATILES	n-Nitroso-di-n-propylamine	9.35E-05	1.97E+01	3.94E-01	9.89E+03	b
SEMIVOLATILES	n-Nitrosodiphenylamine	2.08E-04	3.31E+02	6.62E+00	3.51E+01	b
SEMIVOLATILES	Pentachlorophenol	1.16E-05	1.56E+03	3.12E+01	1.40E+01	b, e
SEMIVOLATILES	Phenanthrene	5.40E-03	1.41E+04	2.83E+02	9.94E-01	b
SEMIVOLATILES	Phenol	2.47E-05	1.74E+01	3.48E-01	8.70E+04	b
SEMIVOLATILES	Pyrene	4.57E-04	3.80E+04	7.60E+02	1.35E-01	b
VOLATILES	1,1,1,2-Tetrachloroethane	9.98E-02	9.55E+02	1.91E+01	1.10E+03	b
VOLATILES	1,1,1-Trichloroethane	7.15E-01	1.10E+02	2.19E+00	1.33E+03	b
VOLATILES	1,1,2,2-Tetrachloroethane	1.55E-02	7.76E+01	1.55E+00	2.97E+03	b
VOLATILES	1,1,2-Trichloroethane	3.80E-02	5.01E+01	1.00E+00	4.42E+03	b
VOLATILES	1,1-Dichloroethane	2.39E-01	3.16E+01	6.32E-01	5.50E+03	b
VOLATILES	1,1-Dichloroethene	1.06E+00	6.46E+01	1.29E+00	2.40E+03	b
VOLATILES	1,2,3-Trichloropropane	1.58E-02	3.89E+02	7.78E+00	1.90E+03	b
VOLATILES	1,2-Dibromo-3-chloropropane	8.31E-03	1.70E+02	3.40E+00	1.00E+03	b
VOLATILES	1,2-Dibromoethane	2.93E-02	5.37E+01	1.07E+00	4.32E+03	b
VOLATILES	1,2-Dichloroethane	5.32E-02	1.74E+01	3.48E-01	8.70E+03	b
VOLATILES	1,2-Dichloroethene	1.87E-01	2.90E+01	5.80E-01	4.93E+03	b
VOLATILES	1,2-Dichloropropane	1.17E-01	5.89E+01	1.18E+00	2.80E+03	b
VOLATILES	2-Butanone	1.94E-03	1.90E+00	3.80E-02	2.40E+05	b
VOLATILES	2-Chloroethyl vinyl ether	3.02E-02	3.72E+01	7.43E-01	5.02E+03	b
VOLATILES	2-Hexanone	3.38E-03	1.79E+01	3.58E-01	1.79E+04	b
VOLATILES	2-Propenal	1.83E-04	5.25E-01	1.05E-02	2.00E+05	b
VOLATILES	Acetone	1.61E-03	5.70E-01	1.14E-02	6.00E+05	b
VOLATILES	Acetonitrile	1.21E-03	4.68E-01	9.35E-03	2.05E+05	b
VOLATILES	Acrylonitrile	4.57E-03	1.10E+00	2.19E-02	7.50E+04	b
VOLATILES	Allyl chloride	4.57E-01	2.69E+01	5.38E-01	3.40E+03	b
VOLATILES	Benzene	2.27E-01	6.61E+01	1.32E+00	1.77E+03	b
VOLATILES	Bromodichloromethane	1.32E-01	5.50E+01	1.10E+00	4.50E+03	b
VOLATILES	Bromoform	2.56E-02	8.71E+01	1.74E+00	3.20E+03	b
VOLATILES	Bromomethane	5.90E-01	1.05E+01	2.09E-01	1.52E+04	b
VOLATILES	Carbon disulfide	6.13E-01	5.25E+01	1.05E+00	2.30E+03	b
VOLATILES	Carbon tetrachloride	1.20E+00	1.86E+02	3.72E+00	8.05E+02	b
VOLATILES	Chlorobenzene	1.82E-01	2.14E+02	4.28E+00	5.02E+02	b
VOLATILES	Chloroethane	2.12E-01	1.78E+01	3.56E-01	2.00E+04	b
VOLATILES	Chloroform	1.53E-01	4.68E+01	9.35E-01	7.92E+03	b
VOLATILES	Chloromethane	1.44E+00	6.00E+00	1.20E-01	7.25E+03	b
VOLATILES	Chloroprene	1.33E+00	1.00E+02	2.00E+00	6.30E+02	b
VOLATILES	cis-1,3-Dichloropropene	9.15E-02	4.47E+01	8.93E-01	2.70E+03	b
VOLATILES	Dibromochloromethane	3.25E-02	6.31E+01	1.26E+00	5.25E+03	b
VOLATILES	Dibromomethane	3.49E-02	1.82E+02	3.64E+00	1.10E+04	b
VOLATILES	Dichlorodifluoromethane	1.67E+01	1.29E+02	2.58E+00	2.80E+02	b

Table A2-4
Physical Chemical Properties of Chemicals of Concern [a]
Sump 095, Sump 096, and Waste Rack Sump WRSump 001

Chemical of Concern		Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
EXPLOSIVES	1,3,5-Trinitrobenzene	2.87E-06	1.41E+01	2.83E-01	3.53E+02	b
VOLATILES	Ethyl methacrylate	6.65E-03	3.70E+01	7.40E-01	1.90E+04	b
VOLATILES	Ethylbenzene	3.28E-01	2.04E+02	4.08E+00	1.69E+02	b
VOLATILES	IODOMETHANE	2.36E-01	2.02E+01	4.04E-01	1.24E+04	b
VOLATILES	ISOBUTYL ALCOHOL	4.99E-04	5.62E+00	1.12E-01	9.49E+04	b
VOLATILES	Methacrylonitrile	3.03E-03	3.39E+00	6.78E-02	2.50E+04	b
VOLATILES	Methyl isobutyl ketone	5.82E-03	1.50E+01	3.00E-01	1.90E+04	b
VOLATILES	METHYL METHACRYLATE	1.33E-02	2.30E+01	4.60E-01	1.60E+04	b
VOLATILES	Methylene chloride	9.10E-02	1.17E+01	2.35E-01	1.54E+04	b
VOLATILES	Pentachloroethane	2.15E-02	1.90E+02	3.80E+00	6.19E+02	b
VOLATILES	Propionitrile	1.02E-03	1.64E+00	3.28E-02	9.73E+04	b
VOLATILES	Styrene	1.14E-01	7.59E+02	1.52E+01	3.10E+02	b
VOLATILES	Tetrachloroethene	7.65E-01	1.55E+02	3.10E+00	2.00E+02	b
VOLATILES	Toluene	2.76E-01	1.40E+02	2.80E+00	5.30E+02	b
VOLATILES	trans-1,3-Dichloropropene	9.15E-02	4.47E+01	8.93E-01	2.80E+03	b
VOLATILES	trans-1,4-Dichloro-2-butene	1.35E-02	2.04E+02	4.09E+00	1.27E+03	b
VOLATILES	Trichloroethene	4.28E-01	9.33E+01	1.87E+00	1.10E+03	b
VOLATILES	Trichlorofluoromethane	4.03E+00	1.35E+02	2.70E+00	1.10E+03	b
VOLATILES	Vinyl acetate	2.29E-02	5.25E+00	1.05E-01	2.00E+04	b
VOLATILES	Vinyl chloride	3.49E+00	1.10E+01	2.19E-01	2.76E+03	b
VOLATILES	Xylenes, Total	2.93E-01	2.40E+02	4.80E+00	1.98E+02	b

Notes:

Chemicals of Concern shown in Table A2-1.

pH value of 6.0 averaged from pH Values on Table A2-3.

mg/L - milligrams per liter

a Annual TCEQ update of chemical/physical properties table [(Figure: 30 TAC §350.73(e)], April 2008.

b Kd value calculated by formula Koc * foc for non-metals.

c pH-dependent Kd value obtained from Figure 30TAC§350.73(e)(1)(A), April 2008.

d pH-dependent Kd value obtained from Figure 30TAC§350.73(e)(1)(C), April 2008.

e pH-dependent Koc value obtained from 30 TAC §350.73(e)(1)(B), April 2008

Table A2-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 095, Sump 096, and Waste Rack Sump WRSump 001

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
EXPLOSIVES	1,3,5-Trinitrobenzene	2.87E-06	2.83E-01	3.53E+02	2.71E+00	1.3E+02	3.1E+00	1.8E+00	none	**1.8E+00**
EXPLOSIVES	1,3-Dinitrobenzene	4.57E-06	6.00E-01	5.40E+02	1.46E+00	3.7E+02	1.0E-02	1.1E-02	none	**1.1E-02**
EXPLOSIVES	2,4,6-Trinitrotoluene	1.90E-05	6.04E+00	1.30E+02	1.63E-01	8.0E+02	5.1E-02	4.8E-01	none	**4.8E-01**
EXPLOSIVES	2,4-Dinitrotoluene	3.60E-05	1.03E+00	2.85E+02	8.99E-01	3.2E+02	4.2E-04	7.2E-04	none	**7.2E-04**
EXPLOSIVES	2,6-Dinitrotoluene	3.11E-05	8.34E-01	1.82E+02	1.09E+00	1.7E+02	4.2E-04	6.0E-04	none	**6.0E-04**
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	1.74E-07	7.26E+00	3.64E+01	1.36E-01	2.7E+02	1.7E-02	1.9E-01	none	**1.9E-01**
EXPLOSIVES	HMX	2.50E-14	7.96E-04	2.37E+03	1.14E+01	2.1E+02	5.1E+00	6.9E-01	none	**6.9E-01**
EXPLOSIVES	m-Nitrotoluene	2.24E-03	2.81E+00	4.98E+02	3.45E-01	1.4E+03	1.0E+00	4.6E+00	none	**4.6E+00**
EXPLOSIVES	Nitrobenzene	8.56E-04	2.64E+00	1.90E+03	3.67E-01	5.2E+03	5.1E-02	2.2E-01	none	**2.2E-01**
EXPLOSIVES	o-Nitrotoluene	1.87E-03	2.81E+00	6.00E+02	3.45E-01	1.7E+03	1.0E+00	4.6E+00	none	**4.6E+00**
EXPLOSIVES	p-Nitrotoluene	2.29E-03	2.81E+00	4.00E+02	3.45E-01	1.2E+03	1.0E+00	4.6E+00	none	**4.6E+00**
EXPLOSIVES	RDX	4.99E-04	1.26E+00	3.87E+01	7.41E-01	5.2E+01	2.6E-02	5.4E-02	none	**5.4E-02**
EXPLOSIVES	Tetryl	8.31E-11	4.69E+00	7.50E+01	2.09E-01	3.6E+02	1.0E+00	7.5E+00	none	**7.5E+00**
METALS	Aluminum	0.00E+00	3.53E+04	0.00E+00	2.83E-05	NA	1.0E+02	5.6E+06	1.63E+04	**5.6E+06**
METALS	Antimony	0.00E+00	5.70E+01	0.00E+00	1.75E-02	NA	6.0E-03	5.3E-01	9.40E-01	**9.4E-01**
METALS	Arsenic	0.00E+00	2.70E+01	0.00E+00	3.69E-02	NA	1.0E-02	4.2E-01	4.81E+00	**4.8E+00**
METALS	Barium	0.00E+00	3.00E+01	0.00E+00	3.32E-02	NA	2.0E+00	9.3E+01	8.55E+01	**9.3E+01**
METALS	Cadmium	0.00E+00	3.70E+01	0.00E+00	2.70E-02	NA	5.0E-03	2.9E-01	4.00E-01	**4.0E-01**
METALS	Chromium	0.00E+00	2.00E+05	0.00E+00	5.00E-06	NA	1.0E-01	3.1E+04	2.66E+01	**3.1E+04**
METALS	Cobalt	0.00E+00	4.50E+01	0.00E+00	2.22E-02	NA	6.1E+00	4.3E+02	5.61E+00	**4.3E+02**
METALS	Copper	0.00E+00	4.00E+01	0.00E+00	2.49E-02	NA	1.3E+00	8.1E+01	5.55E+00	**8.1E+01**
METALS	Lead	0.00E+00	1.83E+03	0.00E+00	5.46E-04	NA	1.5E-02	4.2E+01	1.14E+01	**4.2E+01**
METALS	Manganese	0.00E+00	5.01E+01	0.00E+00	1.99E-02	NA	1.4E+01	1.1E+03	2.01E+02	**1.1E+03**
METALS	Mercury	4.74E-01	3.50E+00	3.00E-02	2.72E-01	1.1E-01	2.0E-03	1.1E-02	8.19E-02	**8.2E-02**
METALS	Selenium	0.00E+00	8.60E+00	0.00E+00	1.15E-01	NA	5.0E-02	6.7E-01	3.48E+00	**3.5E+00**
METALS	Silver	0.00E+00	1.30E+00	0.00E+00	7.21E-01	NA	5.1E-01	1.1E+00	3.10E-01	**1.1E+00**
METALS	Strontium	0.00E+00	2.00E+00	0.00E+00	4.79E-01	NA	6.1E+01	2.0E+02	1.98E+01	**2.0E+02**
METALS	Thallium	0.00E+00	5.80E+01	2.90E+03	1.72E-02	1.7E+05	2.0E-03	1.8E-01	4.70E-01	**4.7E-01**
METALS	Zinc	0.00E+00	3.60E+01	0.00E+00	2.77E-02	NA	3.1E+01	1.7E+03	2.02E+01	**1.7E+03**
SEMIVOLATILES	1,2,4-Trichlorobenzene	5.90E-02	3.32E+01	4.88E+01	3.00E-02	1.6E+03	7.0E-02	3.6E+00	none	**3.6E+00**
SEMIVOLATILES	1,2-Dichlorobenzene	8.73E-02	1.38E+01	1.50E+02	7.17E-02	2.1E+03	6.0E-01	1.3E+01	none	**1.3E+01**
SEMIVOLATILES	1,3-Dichlorobenzene	1.95E-01	3.40E+00	1.10E+02	2.84E-01	3.9E+02	3.1E+00	1.7E+01	none	**1.7E+01**
SEMIVOLATILES	1,4-Dichlorobenzene	1.17E-01	1.29E+01	7.38E+01	7.68E-02	9.6E+02	7.5E-02	1.5E+00	none	**1.5E+00**
SEMIVOLATILES	2,4,5-Trichlorophenol	1.78E-04	4.42E+01	1.20E+03	2.26E-02	5.3E+04	1.0E+01	7.0E+02	none	**7.0E+02**
SEMIVOLATILES	2,4,6-Trichlorophenol	3.19E-04	1.59E+01	9.82E+02	6.25E-02	1.6E+04	2.6E-02	6.4E-01	none	**6.4E-01**
SEMIVOLATILES	2,4-Dichlorophenol	1.31E-04	3.14E+00	4.50E+03	3.10E-01	1.5E+04	3.1E-01	1.5E+00	none	**1.5E+00**
SEMIVOLATILES	2,4-Dimethylphenol	8.31E-05	2.35E+00	6.20E+03	4.10E-01	1.5E+04	2.0E+00	7.7E+00	none	**7.7E+00**
SEMIVOLATILES	2,4-Dinitrophenol	2.01E-07	2.32E-04	5.80E+03	1.15E+01	5.0E+02	2.0E-01	2.7E-02	none	**2.7E-02**
SEMIVOLATILES	2-Chloronaphthalene	2.54E-02	1.70E+02	6.74E+00	5.87E-03	1.1E+03	8.2E+00	2.2E+03	none	**1.1E+03**
SEMIVOLATILES	2-Chlorophenol	7.40E-04	7.92E+00	2.80E+04	1.25E-01	2.2E+05	5.1E-01	6.3E+00	none	**6.3E+00**
SEMIVOLATILES	2-Methylnaphthalene	1.85E-02	8.63E+01	2.54E+01	1.16E-02	2.2E+03	4.1E-01	5.5E+01	none	**5.5E+01**
SEMIVOLATILES	2-Methylphenol	6.65E-05	1.95E+00	2.04E+04	4.90E-01	4.2E+04	5.1E+00	1.6E+01	none	**1.6E+01**

Table A2-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 095, Sump 096, and Waste Rack Sump WRSump 001

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
SEMIVOLATILES	2-Nitroaniline	2.08E-05	5.38E-01	1.26E+03	1.60E+00	7.9E+02	3.1E-02	3.0E-02	none	**3.0E-02**
SEMIVOLATILES	2-Nitrophenol	2.21E-05	3.75E+00	1.73E+04	2.61E-01	6.6E+04	2.0E-01	1.2E+00	none	**1.2E+00**
SEMIVOLATILES	3,3'-Dichlorobenzidine	8.65E-07	1.45E+01	3.11E+00	6.86E-02	4.5E+01	6.4E-04	1.4E-02	none	**1.4E-02**
SEMIVOLATILES	3-Nitroaniline	2.31E-07	7.88E-01	4.56E+02	1.14E+00	4.0E+02	3.1E-02	4.1E-02	none	**4.1E-02**
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	1.07E-07	6.32E-04	3.00E+03	1.15E+01	2.6E+02	2.0E-01	2.8E-02	none	**2.8E-02**
SEMIVOLATILES	4-Bromophenyl phenyl ether	9.66E-03	2.90E+03	8.25E-01	3.44E-04	2.4E+03	1.9E-04	8.6E-01	none	**8.6E-01**
SEMIVOLATILES	4-Chloro-3-methylphenol	1.40E-05	1.76E+01	5.43E+03	5.66E-02	9.6E+04	5.1E-01	1.4E+01	none	**1.4E+01**
SEMIVOLATILES	4-Chloroaniline	4.86E-05	1.32E+00	3.90E+03	7.10E-01	5.5E+03	4.1E-01	8.9E-01	none	**8.9E-01**
SEMIVOLATILES	4-Chlorophenyl phenyl ether	1.30E-02	2.62E+02	1.43E+00	3.82E-03	3.8E+02	1.9E-04	7.7E-02	none	**7.7E-02**
SEMIVOLATILES	4-Methylphenol	3.99E-05	1.63E+00	2.30E+04	5.84E-01	3.9E+04	5.1E-01	1.4E+00	none	**1.4E+00**
SEMIVOLATILES	4-Nitroaniline	3.33E-08	2.25E-01	6.49E+02	3.21E+00	2.0E+02	7.5E-02	3.6E-02	none	**3.6E-02**
SEMIVOLATILES	4-Nitrophenol	3.24E-08	8.73E-01	4.49E+03	1.04E+00	4.3E+03	2.0E-01	3.0E-01	none	**3.0E-01**
SEMIVOLATILES	Acenaphthene	6.44E-03	7.96E+01	4.24E+00	1.25E-02	3.4E+02	6.1E+00	7.6E+02	none	**3.4E+02**
SEMIVOLATILES	Acenaphthylene	4.74E-03	1.38E+02	3.93E+00	7.22E-03	5.4E+02	6.1E+00	1.3E+03	none	**5.4E+02**
SEMIVOLATILES	Anthracene	4.61E-03	4.69E+02	4.34E-02	2.13E-03	2.0E+01	3.1E+01	2.2E+04	none	**2.0E+01**
SEMIVOLATILES	Benzo(a)anthracene	1.39E-04	7.10E+03	1.00E-02	1.41E-04	7.1E+01	3.9E-04	4.3E+00	1.53E-02	**4.3E+00**
SEMIVOLATILES	Benzo(a)pyrene	4.70E-05	1.91E+04	1.62E-03	5.24E-05	3.1E+01	2.0E-04	5.9E+00	1.54E-02	**5.9E+00**
SEMIVOLATILES	Benzo(b)fluoranthene	4.99E-04	2.40E+04	1.50E-03	4.16E-05	3.6E+01	3.9E-04	1.5E+01	1.53E-02	**1.5E+01**
SEMIVOLATILES	Benzo(ghi)perylene	5.82E-06	3.17E+04	2.60E-04	3.15E-05	8.2E+00	3.1E+00	1.5E+05	1.23E-02	**8.2E+00**
SEMIVOLATILES	Benzo(k)fluoranthene	4.45E-07	2.46E+04	5.50E-04	4.06E-05	1.4E+01	3.9E-03	1.5E+02	1.30E-02	**1.4E+01**
SEMIVOLATILES	Benzoic Acid	1.39E-05	1.94E-02	3.50E+03	9.43E+00	3.7E+02	4.1E+02	6.7E+01	none	**6.7E+01**
SEMIVOLATILES	Benzyl Alcohol	1.62E-05	2.40E-01	4.00E+04	3.06E+00	1.3E+04	3.1E+01	1.6E+01	none	**1.6E+01**
SEMIVOLATILES	bis(2-Chloroethoxy)methane	1.25E-03	6.13E+00	1.35E+03	1.61E-01	8.4E+03	2.6E-04	2.5E-03	none	**2.5E-03**
SEMIVOLATILES	bis(2-Chloroethyl)ether	8.90E-04	3.10E-01	1.02E+04	2.52E+00	4.0E+03	2.6E-04	1.6E-04	none	**1.6E-04**
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	4.16E-03	6.32E+00	1.70E+03	1.56E-01	1.1E+04	4.1E-02	4.1E-01	none	**4.1E-01**
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	4.57E-04	1.35E+04	3.00E-01	7.40E-05	4.1E+03	6.0E-03	1.3E+02	none	**1.3E+02**
SEMIVOLATILES	Butyl benzyl phthalate	7.94E-05	2.75E+02	2.90E+00	3.64E-03	8.0E+02	2.0E+01	8.7E+03	none	**8.0E+02**
SEMIVOLATILES	Carbazole	3.38E-03	4.91E+01	7.21E-01	2.03E-02	3.5E+01	1.4E-02	1.1E+00	none	**1.1E+00**
SEMIVOLATILES	Chrysene	5.03E-05	6.18E+03	2.00E-03	1.62E-04	1.2E+01	3.9E-02	3.7E+02	1.51E-02	**1.2E+01**
SEMIVOLATILES	Dibenzo(a,h)anthracene	4.66E+00	3.81E+04	5.00E-04	2.62E-05	1.9E+01	2.0E-04	1.2E+01	none	**1.2E+01**
SEMIVOLATILES	Dibenzofuran	5.28E-03	1.70E+02	2.86E+00	5.89E-03	4.9E+02	4.1E-01	1.1E+02	none	**1.1E+02**
SEMIVOLATILES	Diethyl phthalate	1.87E-05	3.03E+00	1.08E+03	3.21E-01	3.4E+03	8.2E+01	3.9E+02	none	**3.9E+02**
SEMIVOLATILES	Dimethyl phthalate	2.40E-05	6.32E-01	4.19E+03	1.39E+00	3.0E+03	8.2E+01	9.1E+01	none	**9.1E+01**
SEMIVOLATILES	di-n-Butyl phthalate	5.94E-05	6.78E+02	1.12E+01	1.48E-03	7.6E+03	1.0E+01	1.1E+04	none	**7.6E+03**
SEMIVOLATILES	di-n-Octyl phthalate	2.78E-03	1.66E+06	2.00E-02	6.01E-07	3.3E+04	2.0E+00	5.3E+06	none	**3.3E+04**
SEMIVOLATILES	Fluoranthene	3.88E-04	9.80E+02	2.60E-01	1.02E-03	2.5E+02	4.1E+00	6.2E+03	2.29E-02	**2.5E+02**
SEMIVOLATILES	Fluorene	2.64E-03	1.52E+02	1.98E+00	6.59E-03	3.0E+02	4.1E+00	9.6E+02	none	**3.0E+02**
SEMIVOLATILES	Hexachlorobenzene	2.22E-02	5.64E+02	6.00E-03	1.77E-03	3.4E+00	1.0E-03	8.7E-01	none	**8.7E-01**
SEMIVOLATILES	Hexachlorobutadiene	9.94E-01	1.38E+02	2.55E+00	7.21E-03	3.5E+02	2.0E-02	4.4E+00	none	**4.4E+00**
SEMIVOLATILES	Hexachlorocyclopentadiene	7.15E-01	1.91E+02	1.80E+00	5.23E-03	3.4E+02	5.0E-02	1.5E+01	none	**1.5E+01**
SEMIVOLATILES	Hexachloroethane	1.62E-01	3.64E+01	5.00E+01	2.74E-02	1.8E+03	1.0E-01	5.8E+00	none	**5.8E+00**
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	2.85E+00	6.93E+04	3.75E-03	1.44E-05	2.6E+02	3.9E-04	4.2E+01	1.43E-02	**4.2E+01**

Table A2-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 095, Sump 096, and Waste Rack Sump WRSump 001

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
SEMIVOLATILES	Isophorone	2.57E-04	6.04E-01	1.20E+04	1.45E+00	8.3E+03	3.0E+00	3.2E+00	none	**3.2E+00**
SEMIVOLATILES	Naphthalene	2.00E-02	3.10E+01	3.14E+01	3.22E-02	9.8E+02	2.0E+00	9.8E+01	none	**9.8E+01**
SEMIVOLATILES	n-Nitroso-di-n-propylamine	9.35E-05	3.94E-01	9.89E+03	2.08E+00	4.8E+03	4.1E-05	3.0E-05	none	**3.0E-05**
SEMIVOLATILES	n-Nitrosodiphenylamine	2.08E-04	6.62E+00	3.51E+01	1.49E-01	2.4E+02	5.8E-02	6.1E-01	none	**6.1E-01**
SEMIVOLATILES	Pentachlorophenol	1.16E-05	3.12E+01	1.40E+01	3.20E-02	4.4E+02	1.0E-03	4.8E-02	none	**4.8E-02**
SEMIVOLATILES	Phenanthrene	5.40E-03	2.83E+02	9.94E-01	3.54E-03	2.8E+02	3.1E+00	1.3E+03	none	**2.8E+02**
SEMIVOLATILES	Phenol	2.47E-05	3.48E-01	8.70E+04	2.30E+00	3.8E+04	3.1E+01	2.1E+01	none	**2.1E+01**
SEMIVOLATILES	Pyrene	4.57E-04	7.60E+02	1.35E-01	1.31E-03	1.0E+02	3.1E+00	3.6E+03	1.94E-02	**1.0E+02**
VOLATILES	1,1,1,2-Tetrachloroethane	9.98E-02	1.91E+01	1.10E+03	5.21E-02	2.1E+04	1.1E-01	3.3E+00	none	**3.3E+00**
VOLATILES	1,1,1-Trichloroethane	7.15E-01	2.19E+00	1.33E+03	4.13E-01	3.2E+03	2.0E-01	7.5E-01	none	**7.5E-01**
VOLATILES	1,1,2,2-Tetrachloroethane	1.55E-02	1.55E+00	2.97E+03	6.09E-01	4.9E+03	1.4E-02	3.6E-02	none	**3.6E-02**
VOLATILES	1,1,2-Trichloroethane	3.80E-02	1.00E+00	4.42E+03	9.12E-01	4.8E+03	5.0E-03	8.5E-03	none	**8.5E-03**
VOLATILES	1,1-Dichloroethane	2.39E-01	6.32E-01	5.50E+03	1.30E+00	4.2E+03	1.0E+01	1.2E+01	none	**1.2E+01**
VOLATILES	1,1-Dichloroethene	1.06E+00	1.29E+00	2.40E+03	6.29E-01	3.8E+03	7.0E-03	1.7E-02	none	**1.7E-02**
VOLATILES	1,2,3-Trichloropropane	1.58E-02	7.78E+00	1.90E+03	1.27E-01	1.5E+04	4.1E-05	5.0E-04	none	**5.0E-04**
VOLATILES	1,2-Dibromo-3-chloropropane	8.31E-03	3.40E+00	1.00E+03	2.87E-01	3.5E+03	2.0E-04	1.1E-03	none	**1.1E-03**
VOLATILES	1,2-Dibromoethane	2.93E-02	1.07E+00	4.32E+03	8.57E-01	5.0E+03	5.0E-05	9.0E-05	none	**9.0E-05**
VOLATILES	1,2-Dichloroethane	5.32E-02	3.48E-01	8.70E+03	2.25E+00	3.9E+03	5.0E-03	3.4E-03	none	**3.4E-03**
VOLATILES	1,2-Dichloroethene	1.87E-01	5.80E-01	4.93E+03	1.42E+00	3.5E+03	7.0E-02	7.6E-02	none	**7.6E-02**
VOLATILES	1,2-Dichloropropane	1.17E-01	1.18E+00	2.80E+03	7.77E-01	3.6E+03	5.0E-03	1.0E-02	none	**1.0E-02**
VOLATILES	2-Butanone	1.94E-03	3.80E-02	2.40E+05	8.00E+00	3.0E+04	6.1E+01	1.2E+01	none	**1.2E+01**
VOLATILES	2-Chloroethyl vinyl ether	3.02E-02	7.43E-01	5.02E+03	1.20E+00	4.2E+03	2.6E-03	3.4E-03	none	**3.4E-03**
VOLATILES	2-Hexanone	3.38E-03	3.58E-01	1.79E+04	2.25E+00	8.0E+03	6.1E+00	4.2E+00	none	**4.2E+00**
VOLATILES	2-Propenal	1.83E-04	1.05E-02	2.00E+05	1.03E+01	1.9E+04	5.1E-02	7.7E-03	none	**7.7E-03**
VOLATILES	Acetone	1.61E-03	1.14E-02	6.00E+05	1.02E+01	5.9E+04	9.2E+01	1.4E+01	none	**1.4E+01**
VOLATILES	Acetonitrile	1.21E-03	9.35E-03	2.05E+05	1.04E+01	2.0E+04	3.3E+00	4.9E-01	none	**4.9E-01**
VOLATILES	Acrylonitrile	4.57E-03	2.19E-02	7.50E+04	9.13E+00	8.2E+03	5.3E-04	9.0E-05	none	**9.0E-05**
VOLATILES	Allyl chloride	4.57E-01	5.38E-01	3.40E+03	1.40E+00	2.4E+03	1.0E+00	1.1E+00	none	**1.1E+00**
VOLATILES	Benzene	2.27E-01	1.32E+00	1.77E+03	6.88E-01	2.6E+03	5.0E-03	1.1E-02	none	**1.1E-02**
VOLATILES	Bromodichloromethane	1.32E-01	1.10E+00	4.50E+03	8.25E-01	5.5E+03	4.6E-03	8.7E-03	none	**8.7E-03**
VOLATILES	Bromoform	2.56E-02	1.74E+00	3.20E+03	5.45E-01	5.9E+03	3.6E-02	1.0E-01	none	**1.0E-01**
VOLATILES	Bromomethane	5.90E-01	2.09E-01	1.52E+04	2.41E+00	6.3E+03	1.4E-01	9.2E-02	none	**9.2E-02**
VOLATILES	Carbon disulfide	6.13E-01	1.05E+00	2.30E+03	7.94E-01	2.9E+03	1.0E+01	2.0E+01	none	**2.0E+01**
VOLATILES	Carbon tetrachloride	1.20E+00	3.72E+00	8.05E+02	2.47E-01	3.3E+03	5.0E-03	3.1E-02	none	**3.1E-02**
VOLATILES	Chlorobenzene	1.82E-01	4.28E+00	5.02E+02	2.27E-01	2.2E+03	1.0E-01	6.8E-01	none	**6.8E-01**
VOLATILES	Chloroethane	2.12E-01	3.56E-01	2.00E+04	2.06E+00	9.7E+03	4.1E+01	3.1E+01	none	**3.1E+01**
VOLATILES	Chloroform	1.53E-01	9.35E-01	7.92E+03	9.50E-01	8.3E+03	1.0E+00	1.7E+00	none	**1.7E+00**
VOLATILES	Chloromethane	1.44E+00	1.20E-01	7.25E+03	2.02E+00	3.6E+03	2.2E-01	1.7E-01	none	**1.7E-01**
VOLATILES	Chloroprene	1.33E+00	2.00E+00	6.30E+02	4.25E-01	1.5E+03	1.4E-01	5.2E-01	none	**5.2E-01**
VOLATILES	cis-1,3-Dichloropropene	9.15E-02	8.93E-01	2.70E+03	1.00E+00	2.7E+03	5.3E-03	8.2E-03	none	**8.2E-03**
VOLATILES	Dibromochloromethane	3.25E-02	1.26E+00	5.25E+03	7.38E-01	7.1E+03	3.4E-02	7.1E-02	none	**7.1E-02**
VOLATILES	Dibromomethane	3.49E-02	3.64E+00	1.10E+04	2.68E-01	4.1E+04	3.8E-01	2.2E+00	none	**2.2E+00**

Table A2-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 095, Sump 096, and Waste Rack Sump WRSump 001

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
VOLATILES	Dichlorodifluoromethane	1.67E+01	2.58E+00	2.80E+02	1.67E-01	1.7E+03	2.0E+01	1.9E+02	none	**1.9E+02**
VOLATILES	Ethyl methacrylate	6.65E-03	7.40E-01	1.90E+04	1.21E+00	1.6E+04	9.2E+00	1.2E+01	none	**1.2E+01**
VOLATILES	Ethylbenzene	3.28E-01	4.08E+00	1.69E+02	2.36E-01	7.2E+02	7.0E-01	4.6E+00	none	**4.6E+00**
VOLATILES	IODOMETHANE	2.36E-01	4.04E-01	1.24E+04	1.86E+00	6.7E+03	1.4E-01	1.2E-01	none	**1.2E-01**
VOLATILES	ISOBUTYL ALCOHOL	4.99E-04	1.12E-01	9.49E+04	5.02E+00	1.9E+04	3.1E+01	9.4E+00	none	**9.4E+00**
VOLATILES	Methacrylonitrile	3.03E-03	6.78E-02	2.50E+04	6.45E+00	3.9E+03	1.0E-02	2.5E-03	none	**2.5E-03**
VOLATILES	Methyl isobutyl ketone	5.82E-03	3.00E-01	1.90E+04	2.58E+00	7.4E+03	8.2E+00	4.9E+00	none	**4.9E+00**
VOLATILES	METHYL METHACRYLATE	1.33E-02	4.60E-01	1.60E+04	1.82E+00	8.8E+03	1.4E+02	1.2E+02	none	**1.2E+02**
VOLATILES	Methylene chloride	9.10E-02	2.35E-01	1.54E+04	2.94E+00	5.2E+03	5.0E-03	2.6E-03	none	**2.6E-03**
VOLATILES	Pentachloroethane	2.15E-02	3.80E+00	6.19E+02	2.57E-01	2.4E+03	1.1E-01	6.6E-01	none	**6.6E-01**
VOLATILES	Propionitrile	1.02E-03	3.28E-02	9.73E+04	8.35E+00	1.2E+04	4.1E-02	7.6E-03	none	**7.6E-03**
VOLATILES	Styrene	1.14E-01	1.52E+01	3.10E+02	6.54E-02	4.7E+03	1.0E-01	2.4E+00	none	**2.4E+00**
VOLATILES	Tetrachloroethene	7.65E-01	3.10E+00	2.00E+02	3.00E-01	6.7E+02	5.0E-03	2.6E-02	none	**2.6E-02**
VOLATILES	Toluene	2.76E-01	2.80E+00	5.30E+02	3.40E-01	1.6E+03	1.0E+00	4.5E+00	none	**4.5E+00**
VOLATILES	trans-1,3-Dichloropropene	9.15E-02	8.93E-01	2.80E+03	1.00E+00	2.8E+03	2.9E-02	4.4E-02	none	**4.4E-02**
VOLATILES	trans-1,4-Dichloro-2-butene	1.35E-02	4.09E+00	1.27E+03	2.39E-01	5.3E+03	3.9E-04	2.5E-03	none	**2.5E-03**
VOLATILES	Trichloroethene	4.28E-01	1.87E+00	1.10E+03	4.90E-01	2.2E+03	5.0E-03	1.6E-02	none	**1.6E-02**
VOLATILES	Trichlorofluoromethane	4.03E+00	2.70E+00	1.10E+03	2.78E-01	4.0E+03	3.1E+01	1.7E+02	none	**1.7E+02**
VOLATILES	Vinyl acetate	2.29E-02	1.05E-01	2.00E+04	5.10E+00	3.9E+03	1.0E+02	3.1E+01	none	**3.1E+01**
VOLATILES	Vinyl chloride	3.49E+00	2.19E-01	2.76E+03	9.96E-01	2.8E+03	2.0E-03	3.1E-03	none	**3.1E-03**
VOLATILES	Xylenes, Total	2.93E-01	4.80E+00	1.98E+02	2.02E-01	9.8E+02	1.0E+01	7.6E+01	none	**7.6E+01**

Notes:

Values of constants shown in Table A2-2.

Values of H', Kd, and S shown in Table A2-4.

GW-Ind - groundwater qualified for industrial use

L/kg - liters per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

MSC - medium specific concentrations

Constants	Values	
rb	1.5	
qw	0.13	
qa	0.30	
L1	381	
L2	579	
W	5500	
LDF	1.018	calculated

Calculated Values:

Ksw = see Equation 8

Csat = see Equation 7

LDF = see Equation 5

Soil MSC = see Equation 6

Applicable Standard 3 Commercial / Industrial MSC equals the lower of the Calculated Soil MSC and Csat values. However, if the Background is larger than both values, the Applicable Standard 3 Commercial / Industrial MSC equals the Background concentration.

Table A2-6
Comparison to Maximum Soil Concentrations
Sump 095, Sump 096, and Waste Rack Sump WRSump 001

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
EXPLOSIVES	1,3,5-Trinitrobenzene	**1.8E+00**	-	0.23	All Results < MSC
EXPLOSIVES	1,3-Dinitrobenzene	**1.1E-02**	-	0.23	Never detected, SQL > MSC
EXPLOSIVES	2,4,6-Trinitrotoluene	**4.8E-01**	-	0.23	All Results < MSC
EXPLOSIVES	2,4-Dinitrotoluene	**7.2E-04**	-	2.778	Never detected, SQL > MSC
EXPLOSIVES	2,6-Dinitrotoluene	**6.0E-04**	-	1.316	Never detected, SQL > MSC
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	**1.9E-01**	-	0.47	Never detected, SQL > MSC
EXPLOSIVES	HMX	**6.9E-01**	-	2.1	Never detected, SQL > MSC
EXPLOSIVES	m-Nitrotoluene	**4.6E+00**	-	0.94	All Results < MSC
EXPLOSIVES	Nitrobenzene	**2.2E-01**	-	0.25	Never detected, SQL > MSC
EXPLOSIVES	o-Nitrotoluene	**4.6E+00**	-	0.94	All Results < MSC
EXPLOSIVES	p-Nitrotoluene	**4.6E+00**	-	2.8	All Results < MSC
EXPLOSIVES	RDX	**5.4E-02**	-	1	Never detected, SQL > MSC
EXPLOSIVES	Tetryl	**7.5E+00**	-	0.7	All Results < MSC
METALS	Aluminum	**5.6E+06**	19300	-	All Results < MSC
METALS	Antimony	**9.4E-01**	11	15.2	**Detected > MSC**
METALS	Arsenic	**4.8E+00**	5.05	-	**Detected > MSC**
METALS	Barium	**9.3E+01**	1600	-	**Detected > MSC**
METALS	Cadmium	**4.0E-01**	5.96	3.16	**Detected > MSC**
METALS	Chromium	**3.1E+04**	22.5	5.65	All Results < MSC
METALS	Cobalt	**4.3E+02**	14.6	-	All Results < MSC
METALS	Copper	**8.1E+01**	102	-	**Detected > MSC**
METALS	Lead	**4.2E+01**	47.4	19	**Detected > MSC**
METALS	Manganese	**1.1E+03**	828	-	All Results < MSC
METALS	Mercury	**8.2E-02**	0.043	0.13	Never detected, SQL > MSC
METALS	Selenium	**3.5E+00**	0.56	1.3	All Results < MSC
METALS	Silver	**1.1E+00**	0.085	1.5	SQL > MSC
METALS	Strontium	**2.0E+02**	458	15.2	**Detected > MSC**
METALS	Thallium	**4.7E-01**	-	75.9	Never detected, SQL > MSC
METALS	Zinc	**1.7E+03**	76.3	-	All Results < MSC
SEMIVOLATILES	1,2,4-Trichlorobenzene	**3.6E+00**	-	1.316	All Results < MSC
SEMIVOLATILES	1,2-Dichlorobenzene	**1.3E+01**	-	1.316	All Results < MSC
SEMIVOLATILES	1,3-Dichlorobenzene	**1.7E+01**	-	1.316	All Results < MSC
SEMIVOLATILES	1,4-Dichlorobenzene	**1.5E+00**	-	1.316	All Results < MSC
SEMIVOLATILES	2,4,5-Trichlorophenol	**7.0E+02**	-	2.8	All Results < MSC
SEMIVOLATILES	2,4,6-Trichlorophenol	**6.4E-01**	-	1.316	Never detected, SQL > MSC
SEMIVOLATILES	2,4-Dichlorophenol	**1.5E+00**	-	1.316	All Results < MSC
SEMIVOLATILES	2,4-Dimethylphenol	**7.7E+00**	-	0.658	All Results < MSC
SEMIVOLATILES	2,4-Dinitrophenol	**2.7E-02**	-	27.778	Never detected, SQL > MSC
SEMIVOLATILES	2-Chloronaphthalene	**1.1E+03**	-	0.57	All Results < MSC
SEMIVOLATILES	2-Chlorophenol	**6.3E+00**	-	0.658	All Results < MSC
SEMIVOLATILES	2-Methylnaphthalene	**5.5E+01**	1.835	0.57	All Results < MSC
SEMIVOLATILES	2-Methylphenol	**1.6E+01**	-	0.658	All Results < MSC

Table A2-6
Comparison to Maximum Soil Concentrations
Sump 095, Sump 096, and Waste Rack Sump WRSump 001

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
SEMIVOLATILES	2-Nitroaniline	**3.0E-02**	-	3.947	Never detected, SQL > MSC
SEMIVOLATILES	2-Nitrophenol	**1.2E+00**	-	1.316	Never detected, SQL > MSC
SEMIVOLATILES	3,3'-Dichlorobenzidine	**1.4E-02**	-	3.846	Never detected, SQL > MSC
SEMIVOLATILES	3-Nitroaniline	**4.1E-02**	-	3.947	Never detected, SQL > MSC
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	**2.8E-02**	-	13.889	Never detected, SQL > MSC
SEMIVOLATILES	4-Bromophenyl phenyl ether	**8.6E-01**	-	2.778	Never detected, SQL > MSC
SEMIVOLATILES	4-Chloro-3-methylphenol	**1.4E+01**	-	0.658	All Results < MSC
SEMIVOLATILES	4-Chloroaniline	**8.9E-01**	-	3.947	Never detected, SQL > MSC
SEMIVOLATILES	4-Chlorophenyl phenyl ether	**7.7E-02**	-	2.778	Never detected, SQL > MSC
SEMIVOLATILES	4-Methylphenol	**1.4E+00**	-	0.658	All Results < MSC
SEMIVOLATILES	4-Nitroaniline	**3.6E-02**	-	13.889	Never detected, SQL > MSC
SEMIVOLATILES	4-Nitrophenol	**3.0E-01**	-	13.889	Never detected, SQL > MSC
SEMIVOLATILES	Acenaphthene	**3.4E+02**	-	0.57	All Results < MSC
SEMIVOLATILES	Acenaphthylene	**5.4E+02**	-	0.658	All Results < MSC
SEMIVOLATILES	Anthracene	**2.0E+01**	-	1.389	All Results < MSC
SEMIVOLATILES	Benzo(a)anthracene	**4.3E+00**	-	0.833	All Results < MSC
SEMIVOLATILES	Benzo(a)pyrene	**5.9E+00**	-	3.846	All Results < MSC
SEMIVOLATILES	Benzo(b)fluoranthene	**1.5E+01**	-	2.778	All Results < MSC
SEMIVOLATILES	Benzo(ghi)perylene	**8.2E+00**	-	5.556	All Results < MSC
SEMIVOLATILES	Benzo(k)fluoranthene	**1.4E+01**	-	2.778	All Results < MSC
SEMIVOLATILES	Benzoic Acid	**6.7E+01**	-	2.8	All Results < MSC
SEMIVOLATILES	Benzyl Alcohol	**1.6E+01**	-	0.57	All Results < MSC
SEMIVOLATILES	bis(2-Chloroethoxy)methane	**2.5E-03**	-	0.658	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Chloroethyl)ether	**1.6E-04**	-	0.658	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	**4.1E-01**	-	1.316	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	**1.3E+02**	0.061	7.556	All Results < MSC
SEMIVOLATILES	Butyl benzyl phthalate	**8.0E+02**	-	3.846	All Results < MSC
SEMIVOLATILES	Carbazole	**1.1E+00**	-	2.778	Never detected, SQL > MSC
SEMIVOLATILES	Chrysene	**1.2E+01**	-	13.889	Never detected, SQL > MSC
SEMIVOLATILES	Dibenzo(a,h)anthracene	**1.2E+01**	-	5.556	All Results < MSC
SEMIVOLATILES	Dibenzofuran	**1.1E+02**	-	2.778	All Results < MSC
SEMIVOLATILES	Diethyl phthalate	**3.9E+02**	1.833	1.282	All Results < MSC
SEMIVOLATILES	Dimethyl phthalate	**9.1E+01**	0.975	0.658	All Results < MSC
SEMIVOLATILES	di-n-Butyl phthalate	**7.6E+03**	-	6.227	All Results < MSC
SEMIVOLATILES	di-n-Octyl phthalate	**3.3E+04**	-	1.389	All Results < MSC
SEMIVOLATILES	Fluoranthene	**2.5E+02**	0.1804	1.389	All Results < MSC
SEMIVOLATILES	Fluorene	**3.0E+02**	-	1.389	All Results < MSC
SEMIVOLATILES	Hexachlorobenzene	**8.7E-01**	-	2.778	Never detected, SQL > MSC
SEMIVOLATILES	Hexachlorobutadiene	**4.4E+00**	-	3.947	All Results < MSC
SEMIVOLATILES	Hexachlorocyclopentadiene	**1.5E+01**	-	3.947	All Results < MSC
SEMIVOLATILES	Hexachloroethane	**5.8E+00**	-	1.316	All Results < MSC
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	**4.2E+01**	-	2.778	All Results < MSC

Table A2-6
Comparison to Maximum Soil Concentrations
Sump 095, Sump 096, and Waste Rack Sump WRSump 001

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
SEMIVOLATILES	Isophorone	**3.2E+00**	-	0.658	All Results < MSC
SEMIVOLATILES	Naphthalene	**9.8E+01**	4.392	0.57	All Results < MSC
SEMIVOLATILES	n-Nitroso-di-n-propylamine	**3.0E-05**	-	1.316	Never detected, SQL > MSC
SEMIVOLATILES	n-Nitrosodiphenylamine	**6.1E-01**	-	1.389	Never detected, SQL > MSC
SEMIVOLATILES	Pentachlorophenol	**4.8E-02**	-	13.889	Never detected, SQL > MSC
SEMIVOLATILES	Phenanthrene	**2.8E+02**	1.944	1.282	All Results < MSC
SEMIVOLATILES	Phenol	**2.1E+01**	-	0.658	All Results < MSC
SEMIVOLATILES	Pyrene	**1.0E+02**	0.1804	1.389	All Results < MSC
VOLATILES	1,1,1,2-Tetrachloroethane	**3.3E+00**	-	0.018	All Results < MSC
VOLATILES	1,1,1-Trichloroethane	**7.5E-01**	-	0.009	All Results < MSC
VOLATILES	1,1,2,2-Tetrachloroethane	**3.6E-02**	-	0.009	All Results < MSC
VOLATILES	1,1,2-Trichloroethane	**8.5E-03**	-	0.009	Never detected, SQL > MSC
VOLATILES	1,1-Dichloroethane	**1.2E+01**	-	0.009	All Results < MSC
VOLATILES	1,1-Dichloroethene	**1.7E-02**	-	0.009	All Results < MSC
VOLATILES	1,2,3-Trichloropropane	**5.0E-04**	-	0.018	Never detected, SQL > MSC
VOLATILES	1,2-Dibromo-3-chloropropane	**1.1E-03**	-	0.035	Never detected, SQL > MSC
VOLATILES	1,2-Dibromoethane	**9.0E-05**	-	0.035	Never detected, SQL > MSC
VOLATILES	1,2-Dichloroethane	**3.4E-03**	-	0.009	Never detected, SQL > MSC
VOLATILES	1,2-Dichloroethene	**7.6E-02**	-	0.009	All Results < MSC
VOLATILES	1,2-Dichloropropane	**1.0E-02**	-	0.009	All Results < MSC
VOLATILES	2-Butanone	**1.2E+01**	0.025	0.066	All Results < MSC
VOLATILES	2-Chloroethyl vinyl ether	**3.4E-03**	-	0.018	Never detected, SQL > MSC
VOLATILES	2-Hexanone	**4.2E+00**	-	0.066	All Results < MSC
VOLATILES	2-Propenal	**7.7E-03**	-	0.88	Never detected, SQL > MSC
VOLATILES	Acetone	**1.4E+01**	-	0.552	All Results < MSC
VOLATILES	Acetonitrile	**4.9E-01**	-	0.18	All Results < MSC
VOLATILES	Acrylonitrile	**9.0E-05**	-	0.18	Never detected, SQL > MSC
VOLATILES	Allyl chloride	**1.1E+00**	-	0.018	All Results < MSC
VOLATILES	Benzene	**1.1E-02**	-	0.009	All Results < MSC
VOLATILES	Bromodichloromethane	**8.7E-03**	-	0.009	Never detected, SQL > MSC
VOLATILES	Bromoform	**1.0E-01**	-	0.009	All Results < MSC
VOLATILES	Bromomethane	**9.2E-02**	-	0.033	All Results < MSC
VOLATILES	Carbon disulfide	**2.0E+01**	0.145	0.009	All Results < MSC
VOLATILES	Carbon tetrachloride	**3.1E-02**	-	0.009	All Results < MSC
VOLATILES	Chlorobenzene	**6.8E-01**	-	0.009	All Results < MSC
VOLATILES	Chloroethane	**3.1E+01**	-	0.033	All Results < MSC
VOLATILES	Chloroform	**1.7E+00**	-	0.009	All Results < MSC
VOLATILES	Chloromethane	**1.7E-01**	-	0.033	All Results < MSC
VOLATILES	Chloroprene	**5.2E-01**	-	0.18	All Results < MSC
VOLATILES	cis-1,3-Dichloropropene	**8.2E-03**	-	0.009	Never detected, SQL > MSC
VOLATILES	Dibromochloromethane	**7.1E-02**	-	0.009	All Results < MSC
VOLATILES	Dibromomethane	**2.2E+00**	-	0.035	All Results < MSC

Table A2-6
Comparison to Maximum Soil Concentrations
Sump 095, Sump 096, and Waste Rack Sump WRSump 001

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
VOLATILES	Dichlorodifluoromethane	**1.9E+02**	-	0.035	All Results < MSC
VOLATILES	Ethyl methacrylate	**1.2E+01**	-	0.035	All Results < MSC
VOLATILES	Ethylbenzene	**4.6E+00**	-	0.009	All Results < MSC
VOLATILES	IODOMETHANE	**1.2E-01**	-	0.018	All Results < MSC
VOLATILES	ISOBUTYL ALCOHOL	**9.4E+00**	-	3.5	All Results < MSC
VOLATILES	Methacrylonitrile	**2.5E-03**	-	0.035	Never detected, SQL > MSC
VOLATILES	Methyl isobutyl ketone	**4.9E+00**	-	0.066	All Results < MSC
VOLATILES	METHYL METHACRYLATE	**1.2E+02**	-	0.035	All Results < MSC
VOLATILES	Methylene chloride	**2.6E-03**	-	0.128	Never detected, SQL > MSC
VOLATILES	Pentachloroethane	**6.6E-01**	-	0.035	All Results < MSC
VOLATILES	Propionitrile	**7.6E-03**	-	0.088	Never detected, SQL > MSC
VOLATILES	Styrene	**2.4E+00**	0.003	0.009	All Results < MSC
VOLATILES	Tetrachloroethene	**2.6E-02**	-	0.009	All Results < MSC
VOLATILES	Toluene	**4.5E+00**	-	0.009	All Results < MSC
VOLATILES	trans-1,3-Dichloropropene	**4.4E-02**	-	0.009	All Results < MSC
VOLATILES	trans-1,4-Dichloro-2-butene	**2.5E-03**	-	0.035	Never detected, SQL > MSC
VOLATILES	Trichloroethene	**1.6E-02**	0.02	0.009	**Detected > MSC**
VOLATILES	Trichlorofluoromethane	**1.7E+02**	-	0.018	All Results < MSC
VOLATILES	Vinyl acetate	**3.1E+01**	-	0.018	All Results < MSC
VOLATILES	Vinyl chloride	**3.1E-03**	-	0.033	Never detected, SQL > MSC
VOLATILES	Xylenes, Total	**7.6E+01**	-	0.009	All Results < MSC

Notes:

Maximum Soil Concentrations shown in Table 3 of the Shaw (2008b) Addendum.

mg/kg - milligrams per kilogram

MSC - medium specific concentration

SQL - sample quantitation limit

Table A2-7
Chemical Specific Standard 3 Groundwater-Protective MSCs for Soil
Sump 095, Sump 096, and Waste Rack Sump WRSump 001

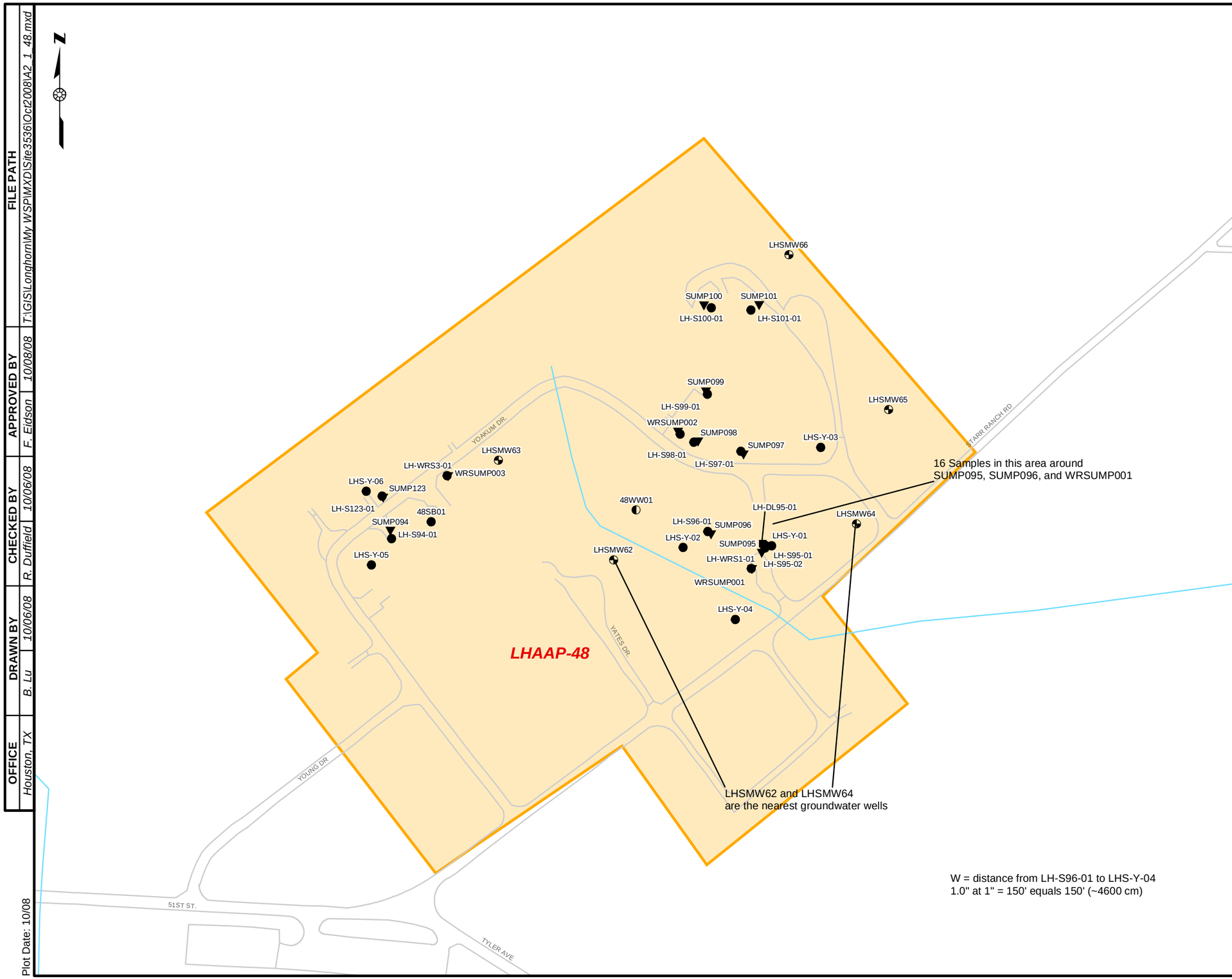
Tier 3 MSC Calculation for Specific Chemicals with Concentrations Above Initial Standard 3 MSC								
Variables	**Antimony**	**Arsenic**	**Barium**	**Cadmium**	**Copper**	**Lead**	**Strontium**	**Trichloroethene**
L1 - Thickness of affected soil	61	61	381	381	30	61	122	61
L2 - Distance from top of affected soils to top of water bearing unit.	183	579	579	579	579	579	579	472
W - Width of soil source area parallel to groundwater flow direction	1,000	1,000	4,600	4,600	1,000	1,000	1,000	1,000
H' - Dimensional form of Henry's Law Constant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.28E-01
Kd - Soil Water Partition Coefficient	5.70E+01	2.70E+01	3.00E+01	3.70E+01	4.00E+01	1.83E+03	2.00E+00	1.87E+00
S - Solubility in mg/L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.10E+03
Calculations								
Ksw = see Equation 8	1.75E-02	3.69E-02	3.32E-02	2.70E-02	2.49E-02	5.46E-04	4.79E-01	4.90E-01
Csat = see Equation 7 (mg/kg)	NA	NA	NA	NA	NA	NA	NA	2.24E+03
GW-Ind MSC (mg/L)	6.0E-03	1.0E-02	2.0E+00	5.0E-03	1.3E+00	1.5E-02	6.1E+01	5.0E-03
LDF = see Equation 5	1.082	1.082	1.018	1.018	1.082	1.082	1.082	1.082
Standard 3 Soil MSC Com/Ind (mg/kg) = see Equation 6	1.1E+00	2.8E+00	9.3E+01	2.9E-01	1.1E+03	2.8E+02	6.6E+02	8.5E-02
Corrected Standard 3 Soil MSC Com/Ind (cannot be larger than Csat) (mg/kg)	1.1E+00	2.8E+00	9.3E+01	2.9E-01	1.1E+03	2.8E+02	6.6E+02	8.5E-02
Background Concentration (mg/kg)	9.40E-01	4.81E+00	8.55E+01	4.00E-01	5.55E+00	1.14E+01	1.98E+01	none
Applicable Commercial/Industrial Soil MSC (mg/kg)	**1.1E+00**	**4.8E+00**	**9.3E+01**	**4.0E-01**	**1.1E+03**	**2.8E+02**	**6.6E+02**	**8.5E-02**
Maximum Detected Concentration for Comparison (mg/kg)	**11**	**5.05**	**1600**	**5.96**	**102**	**47.4**	**458**	**0.02**

Notes:

GW-Ind MSC	from TCEQ 2006 RBSV table
LDF	leachate dilution factor
MSC	Medium Specific Concentration
mg/kg	milligrams per kilogram

Constants:

Symbol	Value	Units	Name
ρ_b	1.5	g/cm³	Soil Dry Bulk Density
n	0.43	unitless	Total Porosity
θ_w	0.13	unitless	Volumetric Water Content of Soil
f_{oc}	0.02	g/g	Soil Fraction Organic Carbon
I	30.4	cm/yr	Net Infiltration Rate through soil
V_{gw}	8.12763	cm/yr	Groundwater Darcy Velocity = K x i x 31500000
K	3.8E-05	cm/sec	Hydraulic conductivity in groundwater bearing unit
i	0.00679	unitless	Hydraulic gradient in groundwater bearing unit
d	305	cm	Groundwater mixing zone
θ_a	0.3	unitless	Soil Air Filled Porosity (θa) = n - θw



W = distance from LH-S96-01 to LHS-Y-04
1.0" at 1" = 150' equals 150' (~4600 cm)

Legend

- Shallow Monitoring Well
- Intermediate Monitoring Well
- Surface Soil
- Soil boring
- Sump
- Stream
- Road
- Existing Building
- Site

0 75 150 300 Feet

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

FIGURE A2-1

LHAAP-48 SAMPLE LOCATION MAP

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		FILE PATH
Houston, TX	B. Lu	10/06/08	R. Duffield	10/06/08	F. Eidson	10/08/08	T:\GIS\Longhorn\My WSP\MXD\Site3536\Oct2008\A2_1_48.mxd

Plot Date: 10/08

Attachment 3

Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 097, Sump 098, Sump 099, and WRSump 002

Attachment 3 – SAM Model Evaluation

Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 097, Sump 098, Sump 099, and WRSump 002 at the Longhorn Army Ammunition Plant, Karnack, Texas

Attachment 3 describes development of Medium Specific Concentrations (MSCs) for chemicals in soil that are protective of groundwater for soil associated with Sump 097, Sump 098, Sump 099 and WRSump 002. The MSC values were developed according to the Texas Commission on Environmental Quality [TCEQ] Texas Risk Reduction Rules, Title 30 Texas Administrative Code (TAC) Chapter 335 (30 TAC §335 and updates).

Groundwater-protective Risk Reduction Standard 3 MSCs were calculated to evaluate the potential for migration of chemicals from soil to groundwater as provided in TCEQ guidance [30 TAC §335.563(i)(2)] by using the SAM model to estimate the potential impacts of soil contamination on groundwater quality.

Sump 097, Sump 098, Sump 099, and WRSump 002 were located at Longhorn Army Ammunition Plant (LHAAP) LHAAP-48 (Former Igniter Production Area) as shown on **Figure A3-1**, which is from the Final Site Evaluation Report for LHAAP-48 and LHAAP-35C(53) (Shaw, 2007). Evaluation of chemicals in soil associated with these 4 sumps was based on data from analysis of 11 soil samples collected from depths ranging from 0.5 to 12.8 feet below ground surface (bgs). The samples were analyzed for explosives, metals, semivolatile organic compounds (SVOCs), and volatile organic compounds (VOCs). The analytical results were evaluated as reported in **Table 4** of the main body of this Addendum.

The initial step in the SAM Model compared the tested chemicals to available background concentrations and method quantitation limits (MQL) for each chemical. Of the chemicals tested, 4 were not evaluated because they are regarded as essential nutrients (TCEQ, 2001). The evaluation of the remaining chemicals is recorded on **Table A3-1**.

The SAM Model is an extension of the Soil Screening Level calculations described in USEPA (1996) guidance and is based on calculating total mass (liquid phase, solid phase, and gas phase) in the soil column:

$$M_T = V(\rho_b C_s + \theta_w C_w + \theta_a C_g)$$

Where

M_T = total mass of chemical
V = volume of the soil column
ρ_b = bulk density
C_s = concentration in soil (dry weight basis)

θ_w = water filled porosity
C_w = concentration in pore water
θ_a = air filled porosity
C_g = gas phase concentration.

Total mass is then redistributed using equilibrium conditions based on the adsorption coefficient and Henry's constant. The equilibrium equations are:

$$C_s = K_d C_w \qquad \text{Equation 1}$$

$$C_g = H' C_w \qquad \text{Equation 2}$$

Where Kd is the distribution coefficient or adsorption coefficient, and H' is the dimensionless Henry's Law constant.

A SAM Model enhancement over USEPA's Soil Screening Levels is that the SAM Model assumes a zone of contaminated soils overlying a zone of clean soil (zero contaminant concentration). The SAM Model simulates mixing of contamination through the contaminated and clean soil zones based on equilibrium conditions and predicts leachate concentration at the bottom of the soil column. In the SAM Model, the leachate concentration is calculated as follows:

$$C_w = C_s \left(\frac{\rho_b}{\theta_w + (K_d \rho_b) + H' \theta_a} \right) \left(\frac{L_1}{L_2} \right) \qquad \text{Equation 3}$$

Or, alternately, the concentration in soil that will produce a given leachate concentration can be calculated as:

$$C_s = C_w \left(\frac{\theta_w + (K_d \rho_b) + H' \theta_a}{\rho_b} \right) \left(\frac{L_2}{L_1} \right) \qquad \text{Equation 4}$$

Where L_1 is the thickness of the contaminated zone and L_2 is the thickness of the total soil column. The factor (L_2/L_1) is an enhancement in the SAM Model over the Soil Screening Level Model by USEPA. A further dilution factor for leachate mixing with groundwater can be incorporated by using a leachate dilution factor:

$$LDF = 1 + \frac{Kid}{IW} \qquad \text{Equation 5}$$

Where
K = aquifer hydraulic conductivity
i = hydraulic gradient in aquifer

d = groundwater mixing zone depth
I = infiltration rate
W = source length parallel to groundwater flow.

The groundwater protective Standard 3 MSC is the soil concentration (C_s) described by Equation 4 where the groundwater concentration is limited by the TCEQ risk-based drinking water concentration (GW-Ind) modified by the leachate dilution factor (LDF) as follows:

$$\text{Standard 3 } MSC = C_w \left(\frac{\theta_w + (K_d \rho_b) + H'\theta_a}{\rho_b} \right) \left(\frac{L_2}{L_1} \right) x\ LDF \qquad \text{Equation 6}$$

The model further calculates the soil saturation concentration (C_{sat}), which corresponds to the contaminant concentration in soil at which the absorptive capacity of soil particles, the solubility limits of soil pore water and saturation of soil pore air have been reached. Concentrations above C_{sat} are assumed to be in free phase. The C_{sat} concentration is calculated in the SAM Model according to Equation 7.

$$C_{sat} = S \left(\frac{\theta_w + (K_d \rho_b) + H'\theta_a}{\rho_b} \right) \qquad \text{Equation 7}$$

For the purpose of simplification, a soil to water coefficient, K_{sw}, can stand in for the complex bracketed formula in Equation 3, 4, 6, and 7.

$$K_{sw} = \left(\frac{\rho_b}{\theta_w + (K_d \rho_b) + (H'\theta_a)} \right) \qquad \text{Equation 8}$$

Input parameters to the SAM Model that are either specific to Sump 097, Sump 098, Sump 099 and WRSump 002 at LHAAP-48 or are default TCEQ values, are shown in **Table A3-2**. Because some chemical properties are pH dependent, an average groundwater pH calculation was calculated (6.0) in **Table A3-3**. **Table A3-4** lists the chemical properties (TCEQ, 2008). From these input parameters and properties, the SAM Model first calculates a saturated soil concentration (C_{sat}) using Equation 7.

Then the SAM Model calculates a Standard 3 Commercial/Industrial Soil MSC using Equation 6 by equating C_w to the GW-Ind MSC and calculating what concentration of chemical in the soil at the site

(mg/kg) would theoretically leach into the groundwater at the GW-Ind concentration (mg/L). The lower of the C_{sat} and the calculated Soil MSC values is used as the Soil MSC.

Finally, the SAM Model compares the Soil MSC to available background soil concentrations for the chemical. The 95% upper prediction limit (UPL) of soil background concentrations from the LHAAP-35/36 Sump Report (Shaw, 2008) were used for this comparison. The larger of the Soil MSC and the background concentration is then selected as the Applicable Standard 3 Commercial/Industrial Soil MSC.

Table A3-5 presents the results of those calculations. The Applicable Commercial/Industrial Soil MSC values are in bold along the right side of the table. While it is possible to select different site parameters for each chemical, general whole site parameters were used as if each chemical were equally and evenly distributed across the entire site. When compared to actual distribution of individual chemical results in individual samples taken near former sump locations, this assumption overestimates the extent of the chemical concentration across the site, resulting in lower concentrations calculated for the Applicable Commercial Industrial Soil MSC.

Table A3-6 compares the Applicable Standard 3 Commercial/Industrial Soil MSC values to maximum soil concentrations for each chemical in the samples associated with Sump 097, Sump 098, Sump 099 and WRSump 002 at LHAAP-48.

Discussion

The SAM Model results for Sump 097, Sump 098, Sump 099 and WRSump 002 at LHAAP-48 indicate that maximum concentrations of 6 metals (antimony, arsenic, barium, cadmium, lead and mercury) and 3 VOCs (tetrachloroethene, trichloroethene, and vinyl chloride) exceed the calculated groundwater protective soil MSC concentrations in detected samples. The SAM Model was recalculated for these 9 chemicals to determine whether chemical-specific input values for L1, L2 and W would result in a changed MSC value. These chemical specific calculations are shown in **Table A3-7**.

Of the 11 samples, only 1 contained detectable antimony, but it contained antimony above the initial calculated MSC value (9.4E-01 mg/kg in **Table A3-6**). This sample LH-S98-01.1 was from a depth of 0.5 to 1.5 feet bgs. Rerunning the SAM Model specifically for antimony, with a changed value for L1 of 2 feet (61 centimeters [cm]) and W of 32 feet (1000 cm), and an unchanged value for L2 of 19 feet (579 cm) that reflect the location of the antimony concentration, the SAM Model calculates a chemical specific MSC value of 3.5E+00 mg/kg, which is still less than the maximum detected value of 7.96 mg/kg.

Of the 11 samples, 10 contained detectable arsenic, but only 3 samples contained arsenic above the initial calculated MSC value (4.8E+00 mg/kg). These 3 samples ranged in depth from 0.5 to 3 feet bgs, and were from two locations (LH-S98-01 and LH-WRS2-01) fairly close together. Rerunning the SAM

Model specifically for arsenic, with a changed value for L1 of 4 feet (122 cm), and W of 50 feet (1500 cm) and an unchanged value for L2 of 19 feet (579 cm) that reflect the reflect the location of the arsenic concentrations, the SAM Model calculates an unchanged chemical-specific MSC value of 4.8E+00 mg/kg, which is the background concentration.

All 11 samples contained detectable barium, but only 2 samples contained barium above the initial calculated MSC value (9.0E+01 mg/kg). These 2 samples ranged in depth from 0.5 to 12.8 feet bgs, and were from a single location (LH-S99-01). Rerunning the SAM Model specifically for barium, with a changed value for W of 32 feet (1000 cm) and unchanged values for L1 of 13 feet (396 cm) and L2 of 19 feet (579 cm) that reflect the reflect the location of the barium concentrations, the SAM Model calculates a chemical-specific MSC value of 9.5E+01 mg/kg, which is still less than the maximum detected value of 131 mg/kg.

Of the 11 samples, 8 contained detectable cadmium, and all were greater than the initial calculated MSC value (4.0E-01 mg/kg). These 8 samples ranged in depth from 0.5 to 12.8 feet bgs, and were from multiple locations around the site. Rerunning the SAM Model specifically for cadmium, with values for L1 (396 cm), L2 (579 cm), and W (3700 cm) that reflect the location of the cadmium concentrations, the SAM Model calculates an unchanged chemical-specific MSC value of 4.0E-01 mg/kg, which is the background concentration.

Of the 11 samples, 9 contained detectable lead, but only 1 sample contained lead above the initial calculated MSC value (4.1E+01 mg/kg). This sample LH-WRS2-01.1 was from a depth of 0.5 to 1.5 feet bgs. Rerunning the SAM Model specifically for lead, with changed values for L1 of 2 feet (61 cm), and W of 32 feet (1000 cm), and an unchanged value for L2 of 19 feet (579 cm) that reflects the location of the single lead concentration greater than the MSC, the SAM Model calculates a chemical specific MSC value of 2.8E+02 mg/kg, which is greater than the maximum detected lead concentration of 151 mg/kg.

Of the 11 samples, 1 contained detectable mercury, but the concentration was above the initial calculated MSC value (8.2E-02 mg/kg). This sample LH-WRS2-01.1 was from a depth of 0.5 to 1.5 feet bgs. Rerunning the SAM Model specifically for mercury, with changed values for L1 of 2 feet (61 cm), and W of 32 feet (1000 cm), and an unchanged value for L2 of 19 feet (579 cm) that reflects the location of the single mercury concentration greater than the MSC, the SAM Model calculates an unchanged chemical specific MSC value of 8.2E-02 mg/kg, which is the background concentration.

Of the 11 samples, 4 contained detectable tetrachloroethene, but only 2 samples contained tetrachloroethene above the initial calculated MSC value (2.5E-02 mg/kg). These samples were from depths ranging from 0.5 to 2.8 feet bgs at one location (LH-S99-01). Rerunning the SAM Model specifically for tetrachloroethene, with changed values for L1 of 4 feet (122 cm) and W of 32 feet (1000 cm), and an unchanged value for L2 of 19 feet (579 cm) that reflect the locations of the tetrachloroethene

results, the SAM Model calculates a chemical-specific MSC value of 8.6E-02 mg/kg, which is still less than the maximum detected tetrachloroethene concentration of 0.204 mg/kg.

Of the 11 samples, 4 contained detectable trichloroethene, but only 2 samples contained trichloroethene above the initial calculated MSC value (1.5E-02 mg/kg). These samples were from depths ranging from 0.5 to 2.8 feet bgs. Rerunning the SAM Model specifically for trichloroethene, with changed values for L1 of 4 feet (122 cm) and W of 32 feet (1000 cm), and an unchanged value for L2 of 19 feet (579 cm) that reflect the locations of the trichloroethene results, the SAM Model calculates a chemical-specific MSC value of 5.2E-02 mg/kg, which is still less than the maximum detected trichloroethene concentration of 0.087 mg/kg.

Of the 11 samples, 1 contained detectable vinyl chloride, but it contained vinyl chloride above the initial calculated MSC value (3.0E-03 mg/kg). This sample LH-S99-01.2 was from a depth of 2 to 2.8 feet bgs. Rerunning the SAM Model specifically for vinyl chloride, with changed values for L1 of 1 foot (30 cm), L2 of 17 feet (518) and W of 32 feet (1000 cm), that reflect the location of the vinyl chloride concentration, the SAM Model calculates a chemical-specific MSC value of 3.7E-02 mg/kg, which is still less than the maximum detected vinyl chloride concentration of 0.497 mg/kg.

Concentrations of eight chemicals, antimony, arsenic, barium, cadmium, mercury, tetrachloroethene, trichloroethene, and vinyl chloride are predicted by the SAM Model to have potential to leach from soil into the groundwater. Analysis of groundwater taken from LHAAP-48 in 2005 indicated that antimony, arsenic, and cadmium, tetrachloroethene, trichloroethene, and vinyl chloride were not detected in groundwater from Wells LHSMW64,which is the well closest to the sumps (**Figure A3-1**), or all detected concentrations of these chemicals at these or other well locations were below the maximum contaminant level (MCL) (Shaw, 2008, **Table 2-1**). These results indicate that any leaching of antimony, arsenic, barium, cadmium, mercury, tetrachloroethene, trichloroethene, and vinyl chloride to groundwater are within TCEQ limits. One other chemical, lead, was initially predicted to have potential for leaching, but more specific evaluation for lead yielded a higher value for the MSC, larger than the maximum detected concentration.

The absence of antimony, arsenic, barium, cadmium, mercury, tetrachloroethene, trichloroethene, and vinyl chloride in the groundwater indicates that the chemicals from the soil near Sump 097, Sump 098, Sump 099, and WRSump 002 are not leaching into groundwater.

References

Shaw Environmental and Infrastructure (Shaw), 2007, *Final Site Evaluation Report LHAAP-48 (Former Igniter Production Area) and LHAAP-35C(53) (Former Static Test Area)*, April.

Shaw, 2008, *Final Data Evaluation Report, Chemical Concentrations in Soil Samples Associated with LHAAP-35/36 Sumps*, January (LHAAP-35/36 Sump Report).

Texas Commission on Environmental Quality (TCEQ), 2001, Interoffice Memorandum from Joseph T. Haney, Jr., (TCEQ) to Camarie Perry, Office or Permitting, Remediation & Registration, *Evaluation of the Potential Health Impacts of Exposure to Iron, Calcium, Magnesium, Potassium, sodium, and Phosphorus through Soil Ingestion*, October.

TCEQ, 2008, Annual TCEQ update of chemical/physical properties table [(Figure: 30 TAC §350.73(e)], April.

U.S. Environmental Protection Agency (USEPA), 1996, *Soil Screening Guidance: User's Guide*, Second Edition.

Table A3-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 097, Sump 097, Sump 099, and Waste Rack Sump WRSump 002

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	Calculate MSC ?
EXPLOSIVES	2,4-Dinitrotoluene	-	1.333	NE	NE	1.1455	YES
EXPLOSIVES	2,6-Dinitrotoluene	-	1.333	NE	NE	1.145	YES
METALS	Aluminum	15300	-	1.63E+04	2.08E+04	20	YES
METALS	Antimony	7.96	12.1	9.40E-01	1.60E+00	5.38	YES
METALS	Arsenic	10.7	0.625	4.81E+00	5.54E+00	0.625	YES
METALS	Barium	131	-	1.52E+02	8.55E+01	0.3	YES
METALS	Cadmium	11.4	2.52	1.40E+00	4.00E-01	2.4	YES
METALS	Calcium	2360	-	NA	NA	NA	No, 1
METALS	Chromium	41.5	-	2.66E+01	3.01E+01	0.4	YES
METALS	Cobalt	12.1	0.818	7.23E+00	5.61E+00	0.818	YES
METALS	Copper	13	1.28	5.55E+00	9.25E+00	1.28	YES
METALS	Iron	51800	-	NA	NA	NA	No, 1
METALS	Lead	151	15.1	2.26E+01	1.14E+01	14.5	YES
METALS	Magnesium	1490	-	NA	NA	NA	No, 1
METALS	Manganese	894	-	1.25E+03	2.01E+02	0.2	YES
METALS	Mercury	0.312	0.03	8.19E-02	3.60E-01	0.024	YES
METALS	Potassium	569	-	NA	NA	NA	No, 1
METALS	Selenium	0.696	1.22	3.48E+00	5.57E+00	0.538	YES
METALS	Silver	0.085	0.057	3.10E-01	3.70E-01	0.026	YES
METALS	Strontium	30.2	-	1.98E+01	2.91E+01	0.5	YES
METALS	Zinc	190	-	6.16E+01	2.02E+01	2.5	YES
SEMIVOLATILES	1,2,4-Trichlorobenzene	-	1.333	NE	NE	1.145	YES
SEMIVOLATILES	1,2-Dichlorobenzene	-	1.333	NE	NE	1.145	YES
SEMIVOLATILES	1,3-Dichlorobenzene	-	1.333	NE	NE	1.145	YES
SEMIVOLATILES	1,4-Dichlorobenzene	-	1.333	NE	NE	1.145	YES
SEMIVOLATILES	2,4,5-Trichlorophenol	-	1.333	NE	NE	1.145	YES
SEMIVOLATILES	2,4,6-Trichlorophenol	-	1.333	NE	NE	1.145	YES
SEMIVOLATILES	2,4-Dichlorophenol	-	1.333	NE	NE	1.145	YES
SEMIVOLATILES	2,4-Dimethylphenol	-	0.667	NE	NE	0.573	YES
SEMIVOLATILES	2,4-Dinitrophenol	-	13.333	NE	NE	11.4548	YES
SEMIVOLATILES	2-Chloronaphthalene	-	0.4	NE	NE	0.344	YES
SEMIVOLATILES	2-Chlorophenol	-	0.667	NE	NE	0.573	YES
SEMIVOLATILES	2-Methylnaphthalene	-	0.4	NE	NE	0.344	YES
SEMIVOLATILES	2-Methylphenol	-	0.667	NE	NE	0.573	YES
SEMIVOLATILES	2-Nitroaniline	-	4	NE	NE	3.436	YES
SEMIVOLATILES	2-Nitrophenol	-	1.333	NE	NE	1.145	YES
SEMIVOLATILES	3,3'-Dichlorobenzidine	-	0.667	NE	NE	0.5727	YES
SEMIVOLATILES	3-Nitroaniline	-	4	NE	NE	3.436	YES
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	-	6.667	NE	NE	5.7274	YES
SEMIVOLATILES	4-Bromophenyl phenyl ether	-	1.333	NE	NE	1.1455	YES
SEMIVOLATILES	4-Chloro-3-methylphenol	-	0.667	NE	NE	0.573	YES
SEMIVOLATILES	4-Chloroaniline	-	4	NE	NE	3.436	YES
SEMIVOLATILES	4-Chlorophenyl phenyl ether	-	1.333	NE	NE	1.1455	YES
SEMIVOLATILES	4-Methylphenol	-	0.667	NE	NE	0.573	YES
SEMIVOLATILES	4-Nitroaniline	-	6.667	NE	NE	5.7274	YES
SEMIVOLATILES	4-Nitrophenol	-	6.667	NE	NE	5.7274	YES
SEMIVOLATILES	Acenaphthene	-	0.4	NE	NE	0.344	YES
SEMIVOLATILES	Acenaphthylene	-	0.667	NE	NE	0.573	YES
SEMIVOLATILES	Anthracene	-	0.667	NE	NE	0.5727	YES
SEMIVOLATILES	Benzo(a)anthracene	-	0.4	1.53E-02	NE	0.3436	YES
SEMIVOLATILES	Benzo(a)pyrene	-	0.667	1.54E-02	NE	0.5727	YES
SEMIVOLATILES	Benzo(b)fluoranthene	-	1.333	1.53E-02	NE	1.1455	YES
SEMIVOLATILES	Benzo(ghi)perylene	-	2.667	1.23E-02	NE	2.2909	YES
SEMIVOLATILES	Benzo(k)fluoranthene	-	1.333	1.30E-02	NE	1.1455	YES
SEMIVOLATILES	bis(2-Chloroethoxy)methane	-	0.667	NE	NE	0.573	YES
SEMIVOLATILES	bis(2-Chloroethyl)ether	-	0.667	NE	NE	0.573	YES
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	-	1.333	NE	NE	1.145	YES
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	-	0.605	NE	NE	0.115	YES

Table A3-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 097, Sump 097, Sump 099, and Waste Rack Sump WRSump 002

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	Calculate MSC ?
SEMIVOLATILES	Butyl benzyl phthalate	-	0.667	NE	NE	0.5727	YES
SEMIVOLATILES	Carbazole	-	1.333	NE	NE	1.1455	YES
SEMIVOLATILES	Chrysene	-	6.667	1.51E-02	NE	5.7274	YES
SEMIVOLATILES	Dibenzo(a,h)anthracene	-	2.667	NE	NE	2.2909	YES
SEMIVOLATILES	Dibenzofuran	-	1.333	NE	NE	1.1455	YES
SEMIVOLATILES	Diethyl phthalate	-	0.667	NE	NE	0.5727	YES
SEMIVOLATILES	Dimethyl phthalate	-	0.667	NE	NE	0.573	YES
SEMIVOLATILES	di-n-Butyl phthalate	-	4.41	NE	NE	0.329	YES
SEMIVOLATILES	di-n-Octyl phthalate	-	0.667	NE	NE	0.2757	YES
SEMIVOLATILES	Fluoranthene	0.1833	0.667	2.29E-02	NE	0.575	YES
SEMIVOLATILES	Fluorene	-	0.667	NE	NE	0.5727	YES
SEMIVOLATILES	Hexachlorobenzene	-	1.333	NE	NE	1.1455	YES
SEMIVOLATILES	Hexachlorobutadiene	-	4	NE	NE	3.436	YES
SEMIVOLATILES	Hexachlorocyclopentadiene	-	4	NE	NE	3.436	YES
SEMIVOLATILES	Hexachloroethane	-	1.333	NE	NE	1.145	YES
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	-	1.333	1.43E-02	NE	1.1455	YES
SEMIVOLATILES	Isophorone	-	0.667	NE	NE	0.573	YES
SEMIVOLATILES	Naphthalene	-	0.4	NE	NE	0.344	YES
SEMIVOLATILES	Nitrobenzene	-	0.667	NE	NE	0.573	YES
SEMIVOLATILES	n-Nitroso-di-n-propylamine	-	1.333	NE	NE	1.145	YES
SEMIVOLATILES	n-Nitrosodiphenylamine	-	0.667	NE	NE	0.5727	YES
SEMIVOLATILES	Pentachlorophenol	-	6.667	NE	NE	5.7274	YES
SEMIVOLATILES	Phenanthrene	0.126	0.667	NE	NE	0.575	YES
SEMIVOLATILES	Phenol	-	0.667	NE	NE	0.573	YES
SEMIVOLATILES	Pyrene	0.126	0.667	1.94E-02	NE	0.575	YES
VOLATILES	1,1,1-Trichloroethane	-	0.007	NE	NE	0.006	YES
VOLATILES	1,1,2,2-Tetrachloroethane	-	0.007	NE	NE	0.006	YES
VOLATILES	1,1,2-Trichloroethane	-	0.007	NE	NE	0.006	YES
VOLATILES	1,1-Dichloroethane	-	0.007	NE	NE	0.006	YES
VOLATILES	1,1-Dichloroethene	0.002	0.007	NE	NE	0.006	YES
VOLATILES	1,2-Dichloroethane	-	0.007	NE	NE	0.006	YES
VOLATILES	1,2-Dichloroethene	-	0.007	NE	NE	0.006	YES
VOLATILES	1,2-Dichloropropane	-	0.007	NE	NE	0.006	YES
VOLATILES	2-Butanone	0.036	0.066	NE	NE	0.057	YES
VOLATILES	2-Hexanone	-	0.067	NE	NE	0.057	YES
VOLATILES	Acetone	-	0.254	NE	NE	0.006	YES
VOLATILES	Benzene	-	0.007	NE	NE	0.006	YES
VOLATILES	Bromodichloromethane	-	0.007	NE	NE	0.006	YES
VOLATILES	Bromoform	-	0.007	NE	NE	0.006	YES
VOLATILES	Bromomethane	-	0.033	NE	NE	0.029	YES
VOLATILES	Carbon disulfide	0.011	0.007	NE	NE	0.006	YES
VOLATILES	Carbon tetrachloride	-	0.007	NE	NE	0.006	YES
VOLATILES	Chlorobenzene	-	0.007	NE	NE	0.006	YES
VOLATILES	Chloroethane	-	0.033	NE	NE	0.029	YES
VOLATILES	Chloroform	-	0.007	NE	NE	0.006	YES
VOLATILES	Chloromethane	-	0.033	NE	NE	0.029	YES
VOLATILES	cis-1,3-Dichloropropene	-	0.007	NE	NE	0.006	YES
VOLATILES	Dibromochloromethane	-	0.007	NE	NE	0.006	YES
VOLATILES	Ethylbenzene	0.002	0.007	NE	NE	0.006	YES
VOLATILES	Methyl isobutyl ketone	-	0.067	NE	NE	0.057	YES
VOLATILES	Methylene chloride	-	0.019	NE	NE	0.002	YES
VOLATILES	Styrene	-	0.007	NE	NE	0.006	YES
VOLATILES	Tetrachloroethene	0.204	0.007	NE	NE	0.006	YES
VOLATILES	Toluene	0.002	0.007	NE	NE	0.006	YES
VOLATILES	trans-1,3-Dichloropropene	0.01	0.007	NE	NE	0.006	YES
VOLATILES	Trichloroethene	0.087	0.007	NE	NE	0.006	YES
VOLATILES	Vinyl chloride	0.497	0.033	NE	NE	0.029	YES
VOLATILES	Xylenes, Total	0.018	0.007	NE	NE	0.006	YES

Table A3-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 097, Sump 097, Sump 099, and Waste Rack Sump WRSump 002

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	Calculate MSC ?

Notes:

all concentrations in milligrams per kilogram (mg/kg)

Max Detected and Max SQL values taken from Table 4 of the main body of the Addendum.

NE - Not evaluated, background was only evaluated for metals and select other analytes.

SQL - sample quantitation limit.

PQL - practical quantitation limit.

MSC - medium specific concentration.

Rules for Analyte Selection

1. Chemicals that are essential nutrients (Fe, Ca, Mg, K, Na, P), TCEQ (2001).

Table A3-2
Input Values for Parameters used to Calculate Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 097, Sump 097, Sump 099, and Waste Rack Sump WRSump 002

Parameter		Value	Units	Comment	Reference
Soil Dry Bulk Density	ρ_b	1.5	g/cm^3	Typical value	USEPA, 1996, pg. 38.
Particle Density	$\rho_{particle}$	2.65	g/cm^3	TCEQ default value	30 TAC §350.75 (c) and (d)
Total Porosity	n	0.43	unitless	n = 1-(ρb/ρparticle) = 1-(1.5 g/cc/2.65 g/cc)	USEPA, 1996, pg. 38.
Volumetric Water Content of Soil	θ_w	0.13	unitless	Assumed 30%	USEPA, 1996, pg. 38.
Soil Fraction Organic Carbon	f_{oc}	0.02	unitless	TCEQ default value	30 TAC §335.567. Appendix I. (p. 26)
Net Infiltration Rate through soil	I	30.4	cm/yr	I = 0.0018 x P x P P - precipitation for Marshall Texas 130	TCEQ, 2000
Thickness of affected soil	L_1	396	cm	Samples taken at various depths from 0 down to 12.8 ft. Assumed 13 ft. (396 cm)	Table 4, main body of Addendum
Distance from top of affected soils to top of water bearing unit.	L_2	579	cm	top of shallowest sand layer containing free water in Monitor Well LHSMW64 is 19.2 ft. Use 19 ft. (579 cm)	Jacobs, 2002, Appendix A, Boring Logs
Groundwater Darcy Velocity	V_{gw}	8.13	cm/yr	Calculated = K*i*31500000 sec/yr	USEPA, 1996, pg. 42.
Hydraulic conductivity in groundwater bearing unit	K	3.80E-05	cm/sec	Measured by rising head slug test in LHSMW65	Jacobs 2002, pg 10-3
Hydraulic gradient in groundwater bearing unit	i	0.00679	unitless	Value listed as modeling input	Shaw, 2007a, Appendix I, pg. 2-1
Width of soil source area parallel to groundwater flow direction	W	3,700	cm	Maximum site dimension, 150 ft measured from between LH-WRS2-01 to LH-S97-01. (~3700 cm)	See Figure A3-1
Groundwater mixing zone	d	305	cm	All LHAAP-48 wells in Shallow Zone contained 10-ft screen sections. 10 x 12 x 2.54	Jacobs 2002, pg. 10-3
Soil Air Filled Porosity (θ_a)	θ_a	0.3	unitless	n - θw	USEPA, 1996, pg. 38.
Henry's Law Constant	H'	Chemical specific property	unitless	See Table A3-4	TCEQ, 2008
Organic Carbon Partition Coefficient	K_{oc}	Chemical specific property	unitless	See Table A3-4	TCEQ, 2008
Soil Water Partition Coefficient	K_d	Chemical specific property	unitless	See Table A3-4	TCEQ, 2008

Notes:

Jacobs Engineering Group, Inc., 2002: *Final Remedial Investigation Report, Group 4 Sites, Sites 04, 08, 35A, 35B, 35C, 46, 47, 48, 50, 60,67, Goose Prairie Creek, Volumes 1 and 2: Report, Longhorn Army Ammunition Plant, Karnack, Texas* , Oak Ridge, Tennessee, February.

Shaw Environmental & Infrastructure (Shaw), 2007, *Final Modeling Report, Derivation of Soil and Groundwater Concentrations Protective of Surface Water and Sediment* , February.

Texas Commission on Environmental Quality (TCEQ), *Risk Reduction Rules* , 30 TAC §335.567. Appendix I.

TCEQ, 2000, Tier 2 PCL Equations, March, accessed at http://www.tceq.state.tx.us/assets/public/remediation/trrp/tier2.pdf

TCEQ, 2008: Texas Risk Reduction Program Physical Chemcial Properties Tables, April, accessed at http://www.tceq.state.tx.us/remediation/trrp/trrppcls.html

USEPA, 1996. Soil Screening Guidance: Technical Background Document, USEPA/540/R-95/128018, U. S. Environmental Protection Agency, Office of Emergency and Remedial Response, July.

Table A3-3
Determination of pH
Sump 097, Sump 097, Sump 099, and Waste Rack Sump WRSump 002

Well	Date	pH Measurement	Comment
LHSMW62	Sep-04	5.32	
LHSMW63	Sep-04		bailed dry, no measurements
LHSMW64	Sep-04	5.87	
LHSMW65	Sep-04		bailed dry, no measurements
LHSMW66	Sep-04		bailed dry, no measurements
LHSMW62	May-05	5.17	
LHSMW63	May-05	6.75	
LHSMW64	May-05	6.22	
LHSMW65	May-05		bailed dry, no measurements
LHSMW66	May-05	6.90	
Average		6.04	
pH to be used		**6.0**	

Notes:

1. pH data from the groundwater sampling logs, Field Work images on Shaw network.
2. Only the pH readings from shallow wells were averaged.

Table A3-4

Physical Chemical Properties of Chemicals of Concern[a]
Sump 097, Sump 097, Sump 099, and Waste Rack Sump WRSump 002

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
EXPLOSIVES	2,4-Dinitrotoluene	3.60E-05	5.13E+01	1.03E+00	2.85E+02	b
EXPLOSIVES	2,6-Dinitrotoluene	3.11E-05	4.17E+01	8.34E-01	1.82E+02	b
METALS	Aluminum	0.00E+00	NA	3.53E+04	0.00E+00	c
METALS	Antimony	0.00E+00	NA	5.70E+01	0.00E+00	d
METALS	Arsenic	0.00E+00	NA	2.70E+01	0.00E+00	d
METALS	Barium	0.00E+00	NA	3.00E+01	0.00E+00	d
METALS	Cadmium	0.00E+00	NA	3.70E+01	0.00E+00	d
METALS	Chromium	0.00E+00	NA	2.00E+04	0.00E+00	d
METALS	Cobalt	0.00E+00	NA	4.50E+01	0.00E+00	
METALS	Copper	0.00E+00	NA	4.00E+01	0.00E+00	
METALS	Lead	0.00E+00	NA	1.83E+03	0.00E+00	c
METALS	Manganese	0.00E+00	NA	5.01E+01	0.00E+00	
METALS	Mercury	4.74E-01	NA	3.50E+00	3.00E-02	d
METALS	Selenium	0.00E+00	NA	8.60E+00	0.00E+00	d
METALS	Silver	0.00E+00	NA	1.30E+00	0.00E+00	d
METALS	Strontium	0.00E+00	NA	2.00E+00	0.00E+00	
METALS	Zinc	0.00E+00	NA	3.60E+01	0.00E+00	d
SEMIVOLATILES	1,2,4-Trichlorobenzene	5.90E-02	1.66E+03	3.32E+01	4.88E+01	b
SEMIVOLATILES	1,2-Dichlorobenzene	8.73E-02	6.92E+02	1.38E+01	1.50E+02	b
SEMIVOLATILES	1,3-Dichlorobenzene	1.95E-01	1.70E+02	3.40E+00	1.10E+02	b
SEMIVOLATILES	1,4-Dichlorobenzene	1.17E-01	6.46E+02	1.29E+01	7.38E+01	b
SEMIVOLATILES	2,4,5-Trichlorophenol	1.78E-04	2.21E+03	4.42E+01	1.20E+03	b, e
SEMIVOLATILES	2,4,6-Trichlorophenol	3.19E-04	7.96E+02	1.59E+01	9.82E+02	b, e
SEMIVOLATILES	2,4-Dichlorophenol	1.31E-04	1.57E+02	3.14E+00	4.50E+03	b, e
SEMIVOLATILES	2,4-Dimethylphenol	8.31E-05	1.17E+02	2.35E+00	6.20E+03	b
SEMIVOLATILES	2,4-Dinitrophenol	2.01E-07	1.16E-02	2.32E-04	5.80E+03	b
SEMIVOLATILES	2-Chloronaphthalene	2.54E-02	8.51E+03	1.70E+02	6.74E+00	b
SEMIVOLATILES	2-Chlorophenol	7.40E-04	3.96E+02	7.92E+00	2.80E+04	b
SEMIVOLATILES	2-Methylnaphthalene	1.85E-02	4.32E+03	8.63E+01	2.54E+01	b
SEMIVOLATILES	2-Methylphenol	6.65E-05	9.77E+01	1.95E+00	2.04E+04	b
SEMIVOLATILES	2-Nitroaniline	2.08E-05	2.69E+01	5.38E-01	1.26E+03	b
SEMIVOLATILES	2-Nitrophenol	2.21E-05	1.88E+02	3.75E+00	1.73E+04	b
SEMIVOLATILES	3,3'-Dichlorobenzidine	8.65E-07	7.24E+02	1.45E+01	3.11E+00	b
SEMIVOLATILES	3-Nitroaniline	2.31E-07	3.94E+01	7.88E-01	4.56E+02	b
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	1.07E-07	3.16E-02	6.32E-04	3.00E+03	b
SEMIVOLATILES	4-Bromophenyl phenyl ether	9.66E-03	1.45E+05	2.90E+03	8.25E-01	b
SEMIVOLATILES	4-Chloro-3-methylphenol	1.40E-05	8.78E+02	1.76E+01	5.43E+03	b
SEMIVOLATILES	4-Chloroaniline	4.86E-05	6.61E+01	1.32E+00	3.90E+03	b
SEMIVOLATILES	4-Chlorophenyl phenyl ether	1.30E-02	1.31E+04	2.62E+02	1.43E+00	b
SEMIVOLATILES	4-Methylphenol	3.99E-05	8.13E+01	1.63E+00	2.30E+04	b
SEMIVOLATILES	4-Nitroaniline	3.33E-08	1.12E+01	2.25E-01	6.49E+02	b
SEMIVOLATILES	4-Nitrophenol	3.24E-08	4.36E+01	8.73E-01	4.49E+03	b
SEMIVOLATILES	Acenaphthene	6.44E-03	3.98E+03	7.96E+01	4.24E+00	b

Table A3-4

Physical Chemical Properties of Chemicals of Concern[a]
Sump 097, Sump 097, Sump 099, and Waste Rack Sump WRSump 002

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
SEMIVOLATILES	Acenaphthylene	4.74E-03	6.92E+03	1.38E+02	3.93E+00	b
SEMIVOLATILES	Anthracene	4.61E-03	2.34E+04	4.69E+02	4.34E-02	b
SEMIVOLATILES	Benzo(a)anthracene	1.39E-04	3.55E+05	7.10E+03	1.00E-02	b
SEMIVOLATILES	Benzo(a)pyrene	4.70E-05	9.55E+05	1.91E+04	1.62E-03	b
SEMIVOLATILES	Benzo(b)fluoranthene	4.99E-04	1.20E+06	2.40E+04	1.50E-03	b
SEMIVOLATILES	Benzo(ghi)perylene	5.82E-06	1.58E+06	3.17E+04	2.60E-04	b
SEMIVOLATILES	Benzo(k)fluoranthene	4.45E-07	1.23E+06	2.46E+04	5.50E-04	b
SEMIVOLATILES	bis(2-Chloroethoxy)methane	1.25E-03	3.07E+02	6.13E+00	1.35E+03	b
SEMIVOLATILES	bis(2-Chloroethyl)ether	8.90E-04	1.55E+01	3.10E-01	1.02E+04	b
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	4.16E-03	3.16E+02	6.32E+00	1.70E+03	b
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	4.57E-04	6.76E+05	1.35E+04	3.00E-01	b
SEMIVOLATILES	Butyl benzyl phthalate	7.94E-05	1.37E+04	2.75E+02	2.90E+00	b
SEMIVOLATILES	Carbazole	3.38E-03	2.45E+03	4.91E+01	7.21E-01	b
SEMIVOLATILES	Chrysene	5.03E-05	3.09E+05	6.18E+03	2.00E-03	b
SEMIVOLATILES	Dibenzo(a,h)anthracene	4.66E+00	1.91E+06	3.81E+04	5.00E-04	b
SEMIVOLATILES	Dibenzofuran	5.28E-03	8.49E+03	1.70E+02	2.86E+00	b
SEMIVOLATILES	Diethyl phthalate	1.87E-05	1.51E+02	3.03E+00	1.08E+03	b
SEMIVOLATILES	Dimethyl phthalate	2.40E-05	3.16E+01	6.32E-01	4.19E+03	b
SEMIVOLATILES	di-n-Butyl phthalate	5.94E-05	3.39E+04	6.78E+02	1.12E+01	b
SEMIVOLATILES	di-n-Octyl phthalate	2.78E-03	8.32E+07	1.66E+06	2.00E-02	b
SEMIVOLATILES	Fluoranthene	3.88E-04	4.90E+04	9.80E+02	2.60E-01	b
SEMIVOLATILES	Fluorene	2.64E-03	7.59E+03	1.52E+02	1.98E+00	b
SEMIVOLATILES	Hexachlorobenzene	2.22E-02	2.82E+04	5.64E+02	6.00E-03	b
SEMIVOLATILES	Hexachlorobutadiene	9.94E-01	6.92E+03	1.38E+02	2.55E+00	b
SEMIVOLATILES	Hexachlorocyclopentadiene	7.15E-01	9.55E+03	1.91E+02	1.80E+00	b
SEMIVOLATILES	Hexachloroethane	1.62E-01	1.82E+03	3.64E+01	5.00E+01	b
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	2.85E+00	3.47E+06	6.93E+04	3.75E-03	b
SEMIVOLATILES	Isophorone	2.57E-04	3.02E+01	6.04E-01	1.20E+04	b
SEMIVOLATILES	Naphthalene	2.00E-02	1.55E+03	3.10E+01	3.14E+01	b
SEMIVOLATILES	Nitrobenzene	8.56E-04	1.32E+02	2.64E+00	1.90E+03	b
SEMIVOLATILES	n-Nitroso-di-n-propylamine	9.35E-05	1.97E+01	3.94E-01	9.89E+03	b
SEMIVOLATILES	n-Nitrosodiphenylamine	2.08E-04	3.31E+02	6.62E+00	3.51E+01	b
SEMIVOLATILES	Pentachlorophenol	1.16E-05	1.56E+03	3.12E+01	1.40E+01	b
SEMIVOLATILES	Phenanthrene	5.40E-03	1.41E+04	2.83E+02	9.94E-01	b
SEMIVOLATILES	Phenol	2.47E-05	1.74E+01	3.48E-01	8.70E+04	b
SEMIVOLATILES	Pyrene	4.57E-04	3.80E+04	7.60E+02	1.35E-01	b
VOLATILES	1,1,1-Trichloroethane	7.15E-01	1.10E+02	2.19E+00	1.33E+03	b
VOLATILES	1,1,2,2-Tetrachloroethane	1.55E-02	7.76E+01	1.55E+00	2.97E+03	b
VOLATILES	1,1,2-Trichloroethane	3.80E-02	5.01E+01	1.00E+00	4.42E+03	b
VOLATILES	1,1-Dichloroethane	2.39E-01	3.16E+01	6.32E-01	5.50E+03	b
VOLATILES	1,1-Dichloroethene	1.06E+00	6.46E+01	1.29E+00	2.40E+03	b
VOLATILES	1,2-Dichloroethane	5.32E-02	1.74E+01	3.48E-01	8.70E+03	b
VOLATILES	1,2-Dichloroethene	1.87E-01	2.90E+01	5.80E-01	4.93E+03	b

Table A3-4

Physical Chemical Properties of Chemicals of Concern [a]
Sump 097, Sump 097, Sump 099, and Waste Rack Sump WRSump 002

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
VOLATILES	1,2-Dichloropropane	1.17E-01	5.89E+01	1.18E+00	2.80E+03	b
VOLATILES	2-Butanone	1.94E-03	1.90E+00	3.80E-02	2.40E+05	b
VOLATILES	2-Hexanone	3.38E-03	1.79E+01	3.58E-01	1.79E+04	b
VOLATILES	Acetone	1.61E-03	5.70E-01	1.14E-02	6.00E+05	b
VOLATILES	Benzene	2.27E-01	6.61E+01	1.32E+00	1.77E+03	b
VOLATILES	Bromodichloromethane	1.32E-01	5.50E+01	1.10E+00	4.50E+03	b
VOLATILES	Bromoform	2.56E-02	8.71E+01	1.74E+00	3.20E+03	b
VOLATILES	Bromomethane	5.90E-01	1.05E+01	2.09E-01	1.52E+04	b
VOLATILES	Carbon disulfide	6.13E-01	5.25E+01	1.05E+00	2.30E+03	b
VOLATILES	Carbon tetrachloride	1.20E+00	1.86E+02	3.72E+00	8.05E+02	b
VOLATILES	Chlorobenzene	1.82E-01	2.14E+02	4.28E+00	5.02E+02	b
VOLATILES	Chloroethane	2.12E-01	1.78E+01	3.56E-01	2.00E+04	b
VOLATILES	Chloroform	1.53E-01	4.68E+01	9.35E-01	7.92E+03	b
VOLATILES	Chloromethane	1.44E+00	6.00E+00	1.20E-01	7.25E+03	b
VOLATILES	cis-1,3-Dichloropropene	9.15E-02	4.47E+01	8.93E-01	2.70E+03	b
VOLATILES	Dibromochloromethane	3.25E-02	6.31E+01	1.26E+00	5.25E+03	b
VOLATILES	Ethylbenzene	3.28E-01	2.04E+02	4.08E+00	1.69E+02	b
VOLATILES	Methyl isobutyl ketone	5.82E-03	1.50E+01	3.00E-01	1.90E+04	b
VOLATILES	Methylene chloride	9.10E-02	1.17E+01	2.35E-01	1.54E+04	b
VOLATILES	Styrene	1.14E-01	7.59E+02	1.52E+01	3.10E+02	b
VOLATILES	Tetrachloroethene	7.65E-01	1.55E+02	3.10E+00	2.00E+02	b
VOLATILES	Toluene	2.76E-01	1.40E+02	2.80E+00	5.30E+02	b
VOLATILES	trans-1,3-Dichloropropene	9.15E-02	4.47E+01	8.93E-01	2.80E+03	b
VOLATILES	Trichloroethene	4.28E-01	9.33E+01	1.87E+00	1.10E+03	b
VOLATILES	Vinyl chloride	3.49E+00	1.10E+01	2.19E-01	2.76E+03	b
VOLATILES	Xylenes, Total	2.93E-01	2.40E+02	4.80E+00	1.98E+02	b

Notes:

Chemicals of Concern shown in Table A3-1.

pH value of 6.0 averaged from pH Values on Table A3-3.

mg/L - milligrams per liter.

a Annual TCEQ update of chemical/physical properties table [(Figure: 30 TAC §350.73(e)], April 2008.

b Kd value calculated by formula Koc * foc for non-metals.

c pH-dependent Kd value obtained from Figure 30TAC§350.73(e)(1)(A), April 2008.

d pH-dependent Kd value obtained from Figure 30TAC§350.73(e)(1)(C), April 2008.

e pH-dependent Koc value obtained from 30 TAC §350.73(e)(1)(B), April 2008

Table A3-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 097, Sump 097, Sump 099, and Waste Rack Sump WRSump 002

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
EXPLOSIVES	2,4-Dinitrotoluene	3.60E-05	1.03E+00	2.85E+02	8.99E-01	3.2E+02	4.2E-04	7.0E-04	none	**7.0E-04**
EXPLOSIVES	2,6-Dinitrotoluene	3.11E-05	8.34E-01	1.82E+02	1.09E+00	1.7E+02	4.2E-04	5.8E-04	none	**5.8E-04**
METALS	Aluminum	0.00E+00	3.53E+04	0.00E+00	2.83E-05	NA	1.0E+02	5.4E+06	1.63E+04	**5.4E+06**
METALS	Antimony	0.00E+00	5.70E+01	0.00E+00	1.75E-02	NA	6.0E-03	5.1E-01	9.40E-01	**9.4E-01**
METALS	Arsenic	0.00E+00	2.70E+01	0.00E+00	3.69E-02	NA	1.0E-02	4.0E-01	4.81E+00	**4.8E+00**
METALS	Barium	0.00E+00	3.00E+01	0.00E+00	3.32E-02	NA	2.0E+00	9.0E+01	8.55E+01	**9.0E+01**
METALS	Cadmium	0.00E+00	3.70E+01	0.00E+00	2.70E-02	NA	5.0E-03	2.8E-01	4.00E-01	**4.0E-01**
METALS	Chromium	0.00E+00	2.00E+04	0.00E+00	5.00E-05	NA	1.0E-01	3.0E+03	2.66E+01	**3.0E+03**
METALS	Cobalt	0.00E+00	4.50E+01	0.00E+00	2.22E-02	NA	6.1E+00	4.1E+02	5.61E+00	**4.1E+02**
METALS	Copper	0.00E+00	4.00E+01	0.00E+00	2.49E-02	NA	1.3E+00	7.8E+01	5.55E+00	**7.8E+01**
METALS	Lead	0.00E+00	1.83E+03	0.00E+00	5.46E-04	NA	1.5E-02	4.1E+01	1.14E+01	**4.1E+01**
METALS	Manganese	0.00E+00	5.01E+01	0.00E+00	1.99E-02	NA	1.4E+01	1.1E+03	2.01E+02	**1.1E+03**
METALS	Mercury	4.74E-01	3.50E+00	3.00E-02	2.72E-01	1.1E-01	2.0E-03	1.1E-02	8.19E-02	**8.2E-02**
METALS	Selenium	0.00E+00	8.60E+00	0.00E+00	1.15E-01	NA	5.0E-02	6.5E-01	3.48E+00	**3.5E+00**
METALS	Silver	0.00E+00	1.30E+00	0.00E+00	7.21E-01	NA	5.1E-01	1.1E+00	3.10E-01	**1.1E+00**
METALS	Strontium	0.00E+00	2.00E+00	0.00E+00	4.79E-01	NA	6.1E+01	1.9E+02	1.98E+01	**1.9E+02**
METALS	Zinc	0.00E+00	3.60E+01	0.00E+00	2.77E-02	NA	3.1E+01	1.7E+03	2.02E+01	**1.7E+03**
SEMIVOLATILES	1,2,4-Trichlorobenzene	5.90E-02	3.32E+01	4.88E+01	3.00E-02	1.6E+03	7.0E-02	3.5E+00	none	**3.5E+00**
SEMIVOLATILES	1,2-Dichlorobenzene	8.73E-02	1.38E+01	1.50E+02	7.17E-02	2.1E+03	6.0E-01	1.2E+01	none	**1.2E+01**
SEMIVOLATILES	1,3-Dichlorobenzene	1.95E-01	3.40E+00	1.10E+02	2.84E-01	3.9E+02	3.1E+00	1.6E+01	none	**1.6E+01**
SEMIVOLATILES	1,4-Dichlorobenzene	1.17E-01	1.29E+01	7.38E+01	7.68E-02	9.6E+02	7.5E-02	1.5E+00	none	**1.5E+00**
SEMIVOLATILES	2,4,5-Trichlorophenol	1.78E-04	4.42E+01	1.20E+03	2.26E-02	5.3E+04	1.0E+01	6.8E+02	none	**6.8E+02**
SEMIVOLATILES	2,4,6-Trichlorophenol	3.19E-04	1.59E+01	9.82E+02	6.25E-02	1.6E+04	2.6E-02	6.2E-01	none	**6.2E-01**
SEMIVOLATILES	2,4-Dichlorophenol	1.31E-04	3.14E+00	4.50E+03	3.10E-01	1.5E+04	3.1E-01	1.5E+00	none	**1.5E+00**
SEMIVOLATILES	2,4-Dimethylphenol	8.31E-05	2.35E+00	6.20E+03	4.10E-01	1.5E+04	2.0E+00	7.4E+00	none	**7.4E+00**
SEMIVOLATILES	2,4-Dinitrophenol	2.01E-07	2.32E-04	5.80E+03	1.15E+01	5.0E+02	2.0E-01	2.7E-02	none	**2.7E-02**
SEMIVOLATILES	2-Chloronaphthalene	2.54E-02	1.70E+02	6.74E+00	5.87E-03	1.1E+03	8.2E+00	2.1E+03	none	**1.1E+03**
SEMIVOLATILES	2-Chlorophenol	7.40E-04	7.92E+00	2.80E+04	1.25E-01	2.2E+05	5.1E-01	6.1E+00	none	**6.1E+00**
SEMIVOLATILES	2-Methylnaphthalene	1.85E-02	8.63E+01	2.54E+01	1.16E-02	2.2E+03	4.1E-01	5.3E+01	none	**5.3E+01**
SEMIVOLATILES	2-Methylphenol	6.65E-05	1.95E+00	2.04E+04	4.90E-01	4.2E+04	5.1E+00	1.6E+01	none	**1.6E+01**
SEMIVOLATILES	2-Nitroaniline	2.08E-05	5.38E-01	1.26E+03	1.60E+00	7.9E+02	3.1E-02	2.9E-02	none	**2.9E-02**
SEMIVOLATILES	2-Nitrophenol	2.21E-05	3.75E+00	1.73E+04	2.61E-01	6.6E+04	2.0E-01	1.2E+00	none	**1.2E+00**
SEMIVOLATILES	3,3'-Dichlorobenzidine	8.65E-07	1.45E+01	3.11E+00	6.86E-02	4.5E+01	6.4E-04	1.4E-02	none	**1.4E-02**
SEMIVOLATILES	3-Nitroaniline	2.31E-07	7.88E-01	4.56E+02	1.14E+00	4.0E+02	3.1E-02	4.0E-02	none	**4.0E-02**
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	1.07E-07	6.32E-04	3.00E+03	1.15E+01	2.6E+02	2.0E-01	2.7E-02	none	**2.7E-02**
SEMIVOLATILES	4-Bromophenyl phenyl ether	9.66E-03	2.90E+03	8.25E-01	3.44E-04	2.4E+03	1.9E-04	8.3E-01	none	**8.3E-01**
SEMIVOLATILES	4-Chloro-3-methylphenol	1.40E-05	1.76E+01	5.43E+03	5.66E-02	9.6E+04	5.1E-01	1.3E+01	none	**1.3E+01**
SEMIVOLATILES	4-Chloroaniline	4.86E-05	1.32E+00	3.90E+03	7.10E-01	5.5E+03	4.1E-01	8.6E-01	none	**8.6E-01**
SEMIVOLATILES	4-Chlorophenyl phenyl ether	1.30E-02	2.62E+02	1.43E+00	3.82E-03	3.8E+02	1.9E-04	7.5E-02	none	**7.5E-02**
SEMIVOLATILES	4-Methylphenol	3.99E-05	1.63E+00	2.30E+04	5.84E-01	3.9E+04	5.1E-01	1.3E+00	none	**1.3E+00**

Table A3-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 097, Sump 097, Sump 099, and Waste Rack Sump WRSump 002

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
SEMIVOLATILES	4-Nitroaniline	3.33E-08	2.25E-01	6.49E+02	3.21E+00	2.0E+02	7.5E-02	3.5E-02	none	**3.5E-02**
SEMIVOLATILES	4-Nitrophenol	3.24E-08	8.73E-01	4.49E+03	1.04E+00	4.3E+03	2.0E-01	2.9E-01	none	**2.9E-01**
SEMIVOLATILES	Acenaphthene	6.44E-03	7.96E+01	4.24E+00	1.25E-02	3.4E+02	6.1E+00	7.3E+02	none	**3.4E+02**
SEMIVOLATILES	Acenaphthylene	4.74E-03	1.38E+02	3.93E+00	7.22E-03	5.4E+02	6.1E+00	1.3E+03	none	**5.4E+02**
SEMIVOLATILES	Anthracene	4.61E-03	4.69E+02	4.34E-02	2.13E-03	2.0E+01	3.1E+01	2.1E+04	none	**2.0E+01**
SEMIVOLATILES	Benzo(a)anthracene	1.39E-04	7.10E+03	1.00E-02	1.41E-04	7.1E+01	3.9E-04	4.2E+00	1.53E-02	**4.2E+00**
SEMIVOLATILES	Benzo(a)pyrene	4.70E-05	1.91E+04	1.62E-03	5.24E-05	3.1E+01	2.0E-04	5.7E+00	1.54E-02	**5.7E+00**
SEMIVOLATILES	Benzo(b)fluoranthene	4.99E-04	2.40E+04	1.50E-03	4.16E-05	3.6E+01	3.9E-04	1.4E+01	1.53E-02	**1.4E+01**
SEMIVOLATILES	Benzo(ghi)perylene	5.82E-06	3.17E+04	2.60E-04	3.15E-05	8.2E+00	3.1E+00	1.5E+05	1.23E-02	**8.2E+00**
SEMIVOLATILES	Benzo(k)fluoranthene	4.45E-07	2.46E+04	5.50E-04	4.06E-05	1.4E+01	3.9E-03	1.4E+02	1.30E-02	**1.4E+01**
SEMIVOLATILES	bis(2-Chloroethoxy)methane	1.25E-03	6.13E+00	1.35E+03	1.61E-01	8.4E+03	2.6E-04	2.4E-03	none	**2.4E-03**
SEMIVOLATILES	bis(2-Chloroethyl)ether	8.90E-04	3.10E-01	1.02E+04	2.52E+00	4.0E+03	2.6E-04	1.5E-04	none	**1.5E-04**
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	4.16E-03	6.32E+00	1.70E+03	1.56E-01	1.1E+04	4.1E-02	3.9E-01	none	**3.9E-01**
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	4.57E-04	1.35E+04	3.00E-01	7.40E-05	4.1E+03	6.0E-03	1.2E+02	none	**1.2E+02**
SEMIVOLATILES	Butyl benzyl phthalate	7.94E-05	2.75E+02	2.90E+00	3.64E-03	8.0E+02	2.0E+01	8.4E+03	none	**8.0E+02**
SEMIVOLATILES	Carbazole	3.38E-03	4.91E+01	7.21E-01	2.03E-02	3.5E+01	1.4E-02	1.1E+00	none	**1.1E+00**
SEMIVOLATILES	Chrysene	5.03E-05	6.18E+03	2.00E-03	1.62E-04	1.2E+01	3.9E-02	3.6E+02	1.51E-02	**1.2E+01**
SEMIVOLATILES	Dibenzo(a,h)anthracene	4.66E+00	3.81E+04	5.00E-04	2.62E-05	1.9E+01	2.0E-04	1.1E+01	none	**1.1E+01**
SEMIVOLATILES	Dibenzofuran	5.28E-03	1.70E+02	2.86E+00	5.89E-03	4.9E+02	4.1E-01	1.0E+02	none	**1.0E+02**
SEMIVOLATILES	Diethyl phthalate	1.87E-05	3.03E+00	1.08E+03	3.21E-01	3.4E+03	8.2E+01	3.8E+02	none	**3.8E+02**
SEMIVOLATILES	Dimethyl phthalate	2.40E-05	6.32E-01	4.19E+03	1.39E+00	3.0E+03	8.2E+01	8.8E+01	none	**8.8E+01**
SEMIVOLATILES	di-n-Butyl phthalate	5.94E-05	6.78E+02	1.12E+01	1.48E-03	7.6E+03	1.0E+01	1.0E+04	none	**7.6E+03**
SEMIVOLATILES	di-n-Octyl phthalate	2.78E-03	1.66E+06	2.00E-02	6.01E-07	3.3E+04	2.0E+00	5.1E+06	none	**3.3E+04**
SEMIVOLATILES	Fluoranthene	3.88E-04	9.80E+02	2.60E-01	1.02E-03	2.5E+02	4.1E+00	6.0E+03	2.29E-02	**2.5E+02**
SEMIVOLATILES	Fluorene	2.64E-03	1.52E+02	1.98E+00	6.59E-03	3.0E+02	4.1E+00	9.3E+02	none	**3.0E+02**
SEMIVOLATILES	Hexachlorobenzene	2.22E-02	5.64E+02	6.00E-03	1.77E-03	3.4E+00	1.0E-03	8.4E-01	none	**8.4E-01**
SEMIVOLATILES	Hexachlorobutadiene	9.94E-01	1.38E+02	2.55E+00	7.21E-03	3.5E+02	2.0E-02	4.2E+00	none	**4.2E+00**
SEMIVOLATILES	Hexachlorocyclopentadiene	7.15E-01	1.91E+02	1.80E+00	5.23E-03	3.4E+02	5.0E-02	1.4E+01	none	**1.4E+01**
SEMIVOLATILES	Hexachloroethane	1.62E-01	3.64E+01	5.00E+01	2.74E-02	1.8E+03	1.0E-01	5.6E+00	none	**5.6E+00**
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	2.85E+00	6.93E+04	3.75E-03	1.44E-05	2.6E+02	3.9E-04	4.1E+01	1.43E-02	**4.1E+01**
SEMIVOLATILES	Isophorone	2.57E-04	6.04E-01	1.20E+04	1.45E+00	8.3E+03	3.0E+00	3.1E+00	none	**3.1E+00**
SEMIVOLATILES	Naphthalene	2.00E-02	3.10E+01	3.14E+01	3.22E-02	9.8E+02	2.0E+00	9.5E+01	none	**9.5E+01**
SEMIVOLATILES	Nitrobenzene	8.56E-04	2.64E+00	1.90E+03	3.67E-01	5.2E+03	5.1E-02	2.1E-01	none	**2.1E-01**
SEMIVOLATILES	n-Nitroso-di-n-propylamine	9.35E-05	3.94E-01	9.89E+03	2.08E+00	4.8E+03	4.1E-05	2.9E-05	none	**2.9E-05**
SEMIVOLATILES	n-Nitrosodiphenylamine	2.08E-04	6.62E+00	3.51E+01	1.49E-01	2.4E+02	5.8E-02	5.9E-01	none	**5.9E-01**
SEMIVOLATILES	Pentachlorophenol	1.16E-05	3.12E+01	1.40E+01	3.20E-02	4.4E+02	1.0E-03	4.7E-02	none	**4.7E-02**
SEMIVOLATILES	Phenanthrene	5.40E-03	2.83E+02	9.94E-01	3.54E-03	2.8E+02	3.1E+00	1.3E+03	none	**2.8E+02**
SEMIVOLATILES	Phenol	2.47E-05	3.48E-01	8.70E+04	2.30E+00	3.8E+04	3.1E+01	2.0E+01	none	**2.0E+01**
SEMIVOLATILES	Pyrene	4.57E-04	7.60E+02	1.35E-01	1.31E-03	1.0E+02	3.1E+00	3.5E+03	1.94E-02	**1.0E+02**
VOLATILES	1,1,1-Trichloroethane	7.15E-01	2.19E+00	1.33E+03	4.13E-01	3.2E+03	2.0E-01	7.2E-01	none	**7.2E-01**

Table A3-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 097, Sump 097, Sump 099, and Waste Rack Sump WRSump 002

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
VOLATILES	1,1,2,2-Tetrachloroethane	1.55E-02	1.55E+00	2.97E+03	6.09E-01	4.9E+03	1.4E-02	3.5E-02	none	**3.5E-02**
VOLATILES	1,1,2-Trichloroethane	3.80E-02	1.00E+00	4.42E+03	9.12E-01	4.8E+03	5.0E-03	8.2E-03	none	**8.2E-03**
VOLATILES	1,1-Dichloroethane	2.39E-01	6.32E-01	5.50E+03	1.30E+00	4.2E+03	1.0E+01	1.2E+01	none	**1.2E+01**
VOLATILES	1,1-Dichloroethene	1.06E+00	1.29E+00	2.40E+03	6.29E-01	3.8E+03	7.0E-03	1.7E-02	none	**1.7E-02**
VOLATILES	1,2-Dichloroethane	5.32E-02	3.48E-01	8.70E+03	2.25E+00	3.9E+03	5.0E-03	3.3E-03	none	**3.3E-03**
VOLATILES	1,2-Dichloroethene	1.87E-01	5.80E-01	4.93E+03	1.42E+00	3.5E+03	7.0E-02	7.4E-02	none	**7.4E-02**
VOLATILES	1,2-Dichloropropane	1.17E-01	1.18E+00	2.80E+03	7.77E-01	3.6E+03	5.0E-03	9.6E-03	none	**9.6E-03**
VOLATILES	2-Butanone	1.94E-03	3.80E-02	2.40E+05	8.00E+00	3.0E+04	6.1E+01	1.1E+01	none	**1.1E+01**
VOLATILES	2-Hexanone	3.38E-03	3.58E-01	1.79E+04	2.25E+00	8.0E+03	6.1E+00	4.1E+00	none	**4.1E+00**
VOLATILES	Acetone	1.61E-03	1.14E-02	6.00E+05	1.02E+01	5.9E+04	9.2E+01	1.4E+01	none	**1.4E+01**
VOLATILES	Benzene	2.27E-01	1.32E+00	1.77E+03	6.88E-01	2.6E+03	5.0E-03	1.1E-02	none	**1.1E-02**
VOLATILES	Bromodichloromethane	1.32E-01	1.10E+00	4.50E+03	8.25E-01	5.5E+03	4.6E-03	8.4E-03	none	**8.4E-03**
VOLATILES	Bromoform	2.56E-02	1.74E+00	3.20E+03	5.45E-01	5.9E+03	3.6E-02	9.9E-02	none	**9.9E-02**
VOLATILES	Bromomethane	5.90E-01	2.09E-01	1.52E+04	2.41E+00	6.3E+03	1.4E-01	8.9E-02	none	**8.9E-02**
VOLATILES	Carbon disulfide	6.13E-01	1.05E+00	2.30E+03	7.94E-01	2.9E+03	1.0E+01	1.9E+01	none	**1.9E+01**
VOLATILES	Carbon tetrachloride	1.20E+00	3.72E+00	8.05E+02	2.47E-01	3.3E+03	5.0E-03	3.0E-02	none	**3.0E-02**
VOLATILES	Chlorobenzene	1.82E-01	4.28E+00	5.02E+02	2.27E-01	2.2E+03	1.0E-01	6.6E-01	none	**6.6E-01**
VOLATILES	Chloroethane	2.12E-01	3.56E-01	2.00E+04	2.06E+00	9.7E+03	4.1E+01	3.0E+01	none	**3.0E+01**
VOLATILES	Chloroform	1.53E-01	9.35E-01	7.92E+03	9.50E-01	8.3E+03	1.0E+00	1.6E+00	none	**1.6E+00**
VOLATILES	Chloromethane	1.44E+00	1.20E-01	7.25E+03	2.02E+00	3.6E+03	2.2E-01	1.6E-01	none	**1.6E-01**
VOLATILES	cis-1,3-Dichloropropene	9.15E-02	8.93E-01	2.70E+03	1.00E+00	2.7E+03	5.3E-03	7.9E-03	none	**7.9E-03**
VOLATILES	Dibromochloromethane	3.25E-02	1.26E+00	5.25E+03	7.38E-01	7.1E+03	3.4E-02	6.9E-02	none	**6.9E-02**
VOLATILES	Ethylbenzene	3.28E-01	4.08E+00	1.69E+02	2.36E-01	7.2E+02	7.0E-01	4.4E+00	none	**4.4E+00**
VOLATILES	Methyl isobutyl ketone	5.82E-03	3.00E-01	1.90E+04	2.58E+00	7.4E+03	8.2E+00	4.7E+00	none	**4.7E+00**
VOLATILES	Methylene chloride	9.10E-02	2.35E-01	1.54E+04	2.94E+00	5.2E+03	5.0E-03	2.5E-03	none	**2.5E-03**
VOLATILES	Styrene	1.14E-01	1.52E+01	3.10E+02	6.54E-02	4.7E+03	1.0E-01	2.3E+00	none	**2.3E+00**
VOLATILES	Tetrachloroethene	7.65E-01	3.10E+00	2.00E+02	3.00E-01	6.7E+02	5.0E-03	2.5E-02	none	**2.5E-02**
VOLATILES	Toluene	2.76E-01	2.80E+00	5.30E+02	3.40E-01	1.6E+03	1.0E+00	4.4E+00	none	**4.4E+00**
VOLATILES	trans-1,3-Dichloropropene	9.15E-02	8.93E-01	2.80E+03	1.00E+00	2.8E+03	2.9E-02	4.3E-02	none	**4.3E-02**
VOLATILES	Trichloroethene	4.28E-01	1.87E+00	1.10E+03	4.90E-01	2.2E+03	5.0E-03	1.5E-02	none	**1.5E-02**
VOLATILES	Vinyl chloride	3.49E+00	2.19E-01	2.76E+03	9.96E-01	2.8E+03	2.0E-03	3.0E-03	none	**3.0E-03**
VOLATILES	Xylenes, Total	2.93E-01	4.80E+00	1.98E+02	2.02E-01	9.8E+02	1.0E+01	7.4E+01	none	**7.4E+01**

Table A3-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 097, Sump 097, Sump 099, and Waste Rack Sump WRSump 002

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)

Notes:

Values of constants shown in Table A3-2.

Values of H', Kd, and S shown in Table A3-4.

GW-Ind - groundwater qualified for industrial use

L/kg - liters per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

MSC - medium specific concentrations

Constants	Values	
rb	1.5	
qw	0.13	
qa	0.30	
L1	396	
L2	579	
W	5500	
LDF	1.022	calculated

Calculated Values:

Ksw = see Equation 8

Csat = see Equation 7

LDF = see Equation 5

Soil MSC = see Equation 6

Applicable Standard 3 Commercial / Industrial MSC equals the lower of the Calculated Soil MSC and Csat values. However if the Background is larger than both values, the Applicable Standard 3 Commercial / Industrial MSC equals the Background concentration.

Table A3-6
Comparison to Maximum Soil Concentrations
Sump 097, Sump 097, Sump 099, and Waste Rack Sump WRSump 002

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
EXPLOSIVES	2,4-Dinitrotoluene	**7.0E-04**	-	1.333	Never detected, SQL > MSC
EXPLOSIVES	2,6-Dinitrotoluene	**5.8E-04**	-	1.333	Never detected, SQL > MSC
METALS	Aluminum	**5.4E+06**	15300	-	All results < MSC
METALS	Antimony	**9.4E-01**	7.96	12.1	**Detected > MSC**
METALS	Arsenic	**4.8E+00**	10.7	0.625	**Detected > MSC**
METALS	Barium	**9.0E+01**	131	-	**Detected > MSC**
METALS	Cadmium	**4.0E-01**	11.4	2.52	**Detected > MSC**
METALS	Chromium	**3.0E+03**	41.5	-	All results < MSC
METALS	Cobalt	**4.1E+02**	12.1	0.818	All results < MSC
METALS	Copper	**7.8E+01**	13	1.28	All results < MSC
METALS	Lead	**4.1E+01**	151	15.1	**Detected > MSC**
METALS	Manganese	**1.1E+03**	894	-	All results < MSC
METALS	Mercury	**8.2E-02**	0.312	0.03	**Detected > MSC**
METALS	Selenium	**3.5E+00**	0.696	1.22	All results < MSC
METALS	Silver	**1.1E+00**	0.085	0.057	All results < MSC
METALS	Strontium	**1.9E+02**	30.2	-	All results < MSC
METALS	Zinc	**1.7E+03**	190	-	All results < MSC
SEMIVOLATILES	1,2,4-Trichlorobenzene	**3.5E+00**	-	1.333	All results < MSC
SEMIVOLATILES	1,2-Dichlorobenzene	**1.2E+01**	-	1.333	All results < MSC
SEMIVOLATILES	1,3-Dichlorobenzene	**1.6E+01**	-	1.333	All results < MSC
SEMIVOLATILES	1,4-Dichlorobenzene	**1.5E+00**	-	1.333	All results < MSC
SEMIVOLATILES	2,4,5-Trichlorophenol	**6.8E+02**	-	1.333	All results < MSC
SEMIVOLATILES	2,4,6-Trichlorophenol	**6.2E-01**	-	1.333	Never detected, SQL > MSC
SEMIVOLATILES	2,4-Dichlorophenol	**1.5E+00**	-	1.333	All results < MSC
SEMIVOLATILES	2,4-Dimethylphenol	**7.4E+00**	-	0.667	All results < MSC
SEMIVOLATILES	2,4-Dinitrophenol	**2.7E-02**	-	13.333	Never detected, SQL > MSC
SEMIVOLATILES	2-Chloronaphthalene	**1.1E+03**	-	0.4	All results < MSC
SEMIVOLATILES	2-Chlorophenol	**6.1E+00**	-	0.667	All results < MSC
SEMIVOLATILES	2-Methylnaphthalene	**5.3E+01**	-	0.4	All results < MSC
SEMIVOLATILES	2-Methylphenol	**1.6E+01**	-	0.667	All results < MSC
SEMIVOLATILES	2-Nitroaniline	**2.9E-02**	-	4	Never detected, SQL > MSC
SEMIVOLATILES	2-Nitrophenol	**1.2E+00**	-	1.333	Never detected, SQL > MSC
SEMIVOLATILES	3,3'-Dichlorobenzidine	**1.4E-02**	-	0.667	Never detected, SQL > MSC
SEMIVOLATILES	3-Nitroaniline	**4.0E-02**	-	4	Never detected, SQL > MSC
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	**2.7E-02**	-	6.667	Never detected, SQL > MSC
SEMIVOLATILES	4-Bromophenyl phenyl ether	**8.3E-01**	-	1.333	Never detected, SQL > MSC
SEMIVOLATILES	4-Chloro-3-methylphenol	**1.3E+01**	-	0.667	All results < MSC
SEMIVOLATILES	4-Chloroaniline	**8.6E-01**	-	4	Never detected, SQL > MSC
SEMIVOLATILES	4-Chlorophenyl phenyl ether	**7.5E-02**	-	1.333	Never detected, SQL > MSC
SEMIVOLATILES	4-Methylphenol	**1.3E+00**	-	0.667	All results < MSC
SEMIVOLATILES	4-Nitroaniline	**3.5E-02**	-	6.667	Never detected, SQL > MSC

Table A3-6
Comparison to Maximum Soil Concentrations
Sump 097, Sump 097, Sump 099, and Waste Rack Sump WRSump 002

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
SEMIVOLATILES	4-Nitrophenol	**2.9E-01**	-	6.667	Never detected, SQL > MSC
SEMIVOLATILES	Acenaphthene	**3.4E+02**	-	0.4	All results < MSC
SEMIVOLATILES	Acenaphthylene	**5.4E+02**	-	0.667	All results < MSC
SEMIVOLATILES	Anthracene	**2.0E+01**	-	0.667	All results < MSC
SEMIVOLATILES	Benzo(a)anthracene	**4.2E+00**	-	0.4	All results < MSC
SEMIVOLATILES	Benzo(a)pyrene	**5.7E+00**	-	0.667	All results < MSC
SEMIVOLATILES	Benzo(b)fluoranthene	**1.4E+01**	-	1.333	All results < MSC
SEMIVOLATILES	Benzo(ghi)perylene	**8.2E+00**	-	2.667	All results < MSC
SEMIVOLATILES	Benzo(k)fluoranthene	**1.4E+01**	-	1.333	All results < MSC
SEMIVOLATILES	bis(2-Chloroethoxy)methane	**2.4E-03**	-	0.667	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Chloroethyl)ether	**1.5E-04**	-	0.667	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	**3.9E-01**	-	1.333	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	**1.2E+02**	-	0.605	All results < MSC
SEMIVOLATILES	Butyl benzyl phthalate	**8.0E+02**	-	0.667	All results < MSC
SEMIVOLATILES	Carbazole	**1.1E+00**	-	1.333	Never detected, SQL > MSC
SEMIVOLATILES	Chrysene	**1.2E+01**	-	6.667	All results < MSC
SEMIVOLATILES	Dibenzo(a,h)anthracene	**1.1E+01**	-	2.667	All results < MSC
SEMIVOLATILES	Dibenzofuran	**1.0E+02**	-	1.333	All results < MSC
SEMIVOLATILES	Diethyl phthalate	**3.8E+02**	-	0.667	All results < MSC
SEMIVOLATILES	Dimethyl phthalate	**8.8E+01**	-	0.667	All results < MSC
SEMIVOLATILES	di-n-Butyl phthalate	**7.6E+03**	-	4.41	All results < MSC
SEMIVOLATILES	di-n-Octyl phthalate	**3.3E+04**	-	0.667	All results < MSC
SEMIVOLATILES	Fluoranthene	**2.5E+02**	0.1833	0.667	All results < MSC
SEMIVOLATILES	Fluorene	**3.0E+02**	-	0.667	All results < MSC
SEMIVOLATILES	Hexachlorobenzene	**8.4E-01**	-	1.333	Never detected, SQL > MSC
SEMIVOLATILES	Hexachlorobutadiene	**4.2E+00**	-	4	All results < MSC
SEMIVOLATILES	Hexachlorocyclopentadiene	**1.4E+01**	-	4	All results < MSC
SEMIVOLATILES	Hexachloroethane	**5.6E+00**	-	1.333	All results < MSC
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	**4.1E+01**	-	1.333	All results < MSC
SEMIVOLATILES	Isophorone	**3.1E+00**	-	0.667	All results < MSC
SEMIVOLATILES	Naphthalene	**9.5E+01**	-	0.4	All results < MSC
SEMIVOLATILES	Nitrobenzene	**2.1E-01**	-	0.667	Never detected, SQL > MSC
SEMIVOLATILES	n-Nitroso-di-n-propylamine	**2.9E-05**	-	1.333	Never detected, SQL > MSC
SEMIVOLATILES	n-Nitrosodiphenylamine	**5.9E-01**	-	0.667	Never detected, SQL > MSC
SEMIVOLATILES	Pentachlorophenol	**4.7E-02**	-	6.667	Never detected, SQL > MSC
SEMIVOLATILES	Phenanthrene	**2.8E+02**	0.126	0.667	All results < MSC
SEMIVOLATILES	Phenol	**2.0E+01**	-	0.667	All results < MSC

Table A3-6
Comparison to Maximum Soil Concentrations
Sump 097, Sump 097, Sump 099, and Waste Rack Sump WRSump 002

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
SEMIVOLATILES	Pyrene	**1.0E+02**	0.126	0.667	All results < MSC
VOLATILES	1,1,1-Trichloroethane	**7.2E-01**	-	0.007	All results < MSC
VOLATILES	1,1,2,2-Tetrachloroethane	**3.5E-02**	-	0.007	All results < MSC
VOLATILES	1,1,2-Trichloroethane	**8.2E-03**	-	0.007	All results < MSC
VOLATILES	1,1-Dichloroethane	**1.2E+01**	-	0.007	All results < MSC
VOLATILES	1,1-Dichloroethene	**1.7E-02**	0.002	0.007	All results < MSC
VOLATILES	1,2-Dichloroethane	**3.3E-03**	-	0.007	Never detected, SQL > MSC
VOLATILES	1,2-Dichloroethene	**7.4E-02**	-	0.007	All results < MSC
VOLATILES	1,2-Dichloropropane	**9.6E-03**	-	0.007	All results < MSC
VOLATILES	2-Butanone	**1.1E+01**	0.036	0.066	All results < MSC
VOLATILES	2-Hexanone	**4.1E+00**	-	0.067	All results < MSC
VOLATILES	Acetone	**1.4E+01**	-	0.254	All results < MSC
VOLATILES	Benzene	**1.1E-02**	-	0.007	All results < MSC
VOLATILES	Bromodichloromethane	**8.4E-03**	-	0.007	All results < MSC
VOLATILES	Bromoform	**9.9E-02**	-	0.007	All results < MSC
VOLATILES	Bromomethane	**8.9E-02**	-	0.033	All results < MSC
VOLATILES	Carbon disulfide	**1.9E+01**	0.011	0.007	All results < MSC
VOLATILES	Carbon tetrachloride	**3.0E-02**	-	0.007	All results < MSC
VOLATILES	Chlorobenzene	**6.6E-01**	-	0.007	All results < MSC
VOLATILES	Chloroethane	**3.0E+01**	-	0.033	All results < MSC
VOLATILES	Chloroform	**1.6E+00**	-	0.007	All results < MSC
VOLATILES	Chloromethane	**1.6E-01**	-	0.033	All results < MSC
VOLATILES	cis-1,3-Dichloropropene	**7.9E-03**	-	0.007	All results < MSC
VOLATILES	Dibromochloromethane	**6.9E-02**	-	0.007	All results < MSC
VOLATILES	Ethylbenzene	**4.4E+00**	0.002	0.007	All results < MSC
VOLATILES	Methyl isobutyl ketone	**4.7E+00**	-	0.067	All results < MSC
VOLATILES	Methylene chloride	**2.5E-03**	-	0.019	Never detected, SQL > MSC
VOLATILES	Styrene	**2.3E+00**	-	0.007	All results < MSC
VOLATILES	Tetrachloroethene	**2.5E-02**	0.204	0.007	**Detected > MSC**
VOLATILES	Toluene	**4.4E+00**	0.002	0.007	All results < MSC
VOLATILES	trans-1,3-Dichloropropene	**4.3E-02**	0.01	0.007	All results < MSC
VOLATILES	Trichloroethene	**1.5E-02**	0.087	0.007	**Detected > MSC**
VOLATILES	Vinyl chloride	**3.0E-03**	0.497	0.033	**Detected > MSC**
VOLATILES	Xylenes, Total	**7.4E+01**	0.018	0.007	All results < MSC

Notes:

Maximum Soil Concentrations shown in Table 4 of the Shaw (2008b) Addendum.

mg/kg - milligrams per kilogram

MSC - medium specific concentration

SQL - sample quantitation limit

Table A3-7
Chemical Specific Standard 3 Groundwater-Protective MSCs for Soil
Sump 097, Sump 097, Sump 099, and Waste Rack Sump WRSump 002

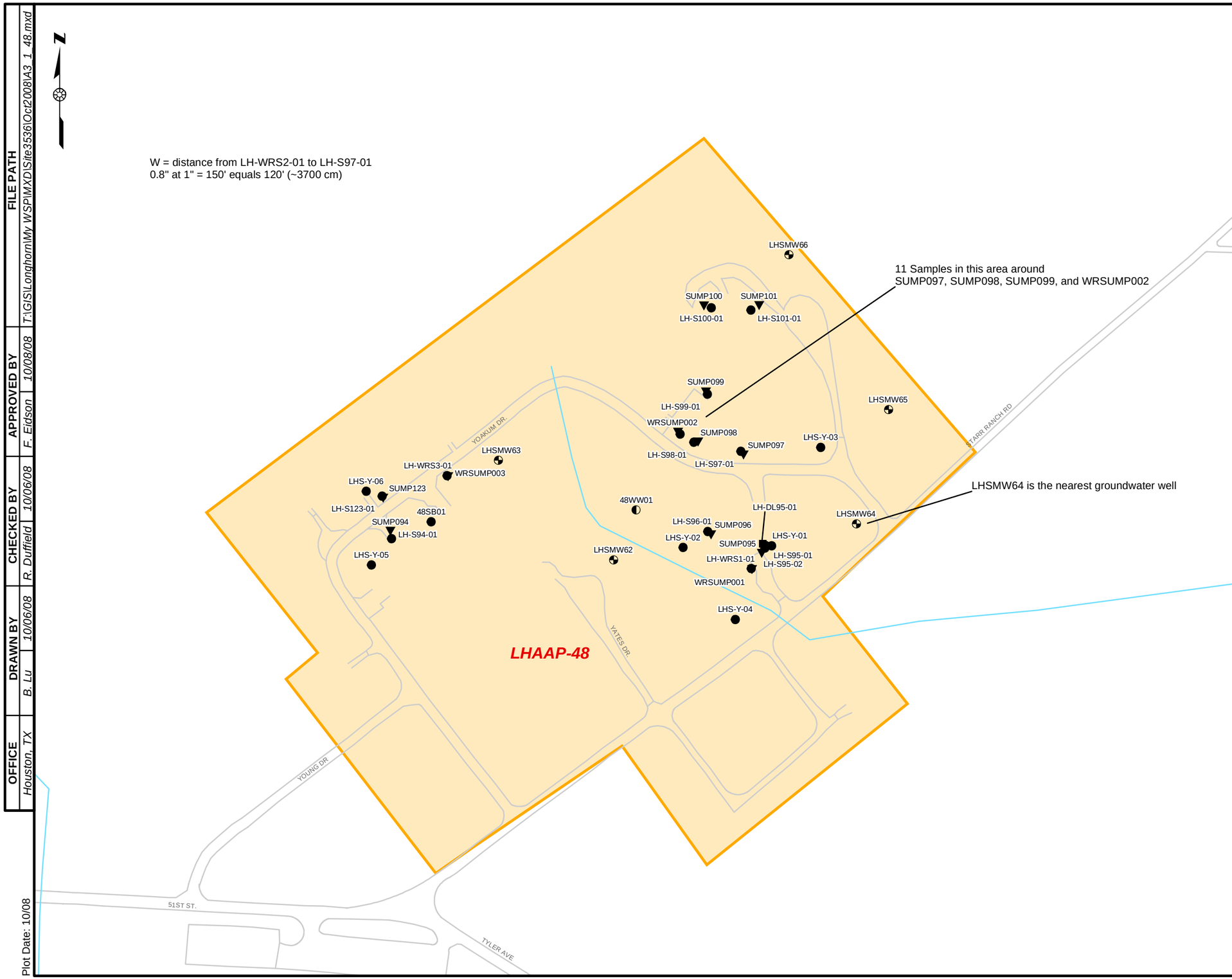
Tier 3 MSC Calculation for Specific Chemicals with Concentrations Above Initial Standard 3 MSC									
Variables	**Antimony**	**Arsenic**	**Barium**	**Cadmium**	**Lead**	**Mercury**	**Tetrachloroethene**	**Trichloroethene**	**Vinyl chloride**
L1 - Thickness of affected soil	61	122	396	396	61	61	122	122	30
L2 - Distance from top of affected soils to top of water bearing unit.	579	579	579	579	579	579	579	579	518
W - Width of soil source area parallel to groundwater flow direction	1,000	1,500	1,000	3,700	1,000	1,000	1,000	1,000	1,000
H' - Dimensional form of Henry's Law Constant	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.74E-01	7.65E-01	4.28E-01	3.49E+00
Kd - Soil Water Partition Coefficient	5.70E+01	2.70E+01	3.00E+01	3.70E+01	1.83E+03	3.50E+00	3.10E+00	1.87E+00	2.19E-01
S - Solubility in mg/L	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.00E-02	2.00E+02	1.10E+03	2.76E+03
Calculations									
Ksw = see Equation 8	1.75E-02	3.69E-02	3.32E-02	2.70E-02	5.46E-04	2.72E-01	3.00E-01	4.90E-01	9.96E-01
Csat = see Equation 7 (mg/kg)	NA	NA	NA	NA	NA	1.10E-01	6.67E+02	2.24E+03	2.77E+03
GW-Ind MSC (mg/L)	6.0E-03	1.0E-02	2.0E+00	5.0E-03	1.5E-02	2.0E-03	5.0E-03	5.0E-03	2.0E-03
LDF = see Equation 5	1.082	1.054	1.082	1.022	1.082	1.082	1.082	1.082	1.082
Standard 3 Soil MSC Com/Ind (mg/kg) = see Equation 6	3.5E+00	1.4E+00	9.5E+01	2.8E-01	2.8E+02	7.6E-02	8.6E-02	5.2E-02	3.7E-02
Corrected Standard 3 Soil MSC Com/Ind (cannot be larger than Csat) (mg/kg)	3.5E+00	1.4E+00	9.5E+01	2.8E-01	2.8E+02	7.6E-02	8.6E-02	5.2E-02	3.7E-02
Background Concentration (mg/kg)	9.40E-01	4.81E+00	8.55E+01	4.00E-01	1.14E+01	8.19E-02	none	none	none
Applicable Commercial/Industrial Soil MSC (mg/kg)	**3.5E+00**	**4.8E+00**	**9.5E+01**	**4.0E-01**	**2.8E+02**	**8.2E-02**	**8.6E-02**	**5.2E-02**	**3.7E-02**
Maximum Detected Concentration for Comparison (mg/kg)	**7.96**	**10.7**	**131**	**11.4**	**151**	**0.312**	**0.204**	**0.087**	**0.497**

Notes:

GW-Ind MSC	from TCEQ 2006 RBSV table
LDF	leachate dilution factor
MSC	Medium Specific Concentration
mg/kg	milligrams per kilogram

Constants:

Symbol	Value	Units	Name
r_b	1.5	g/cm³	Soil Dry Bulk Density
n	0.43	unitless	Total Porosity
q_w	0.13	unitless	Volumetric Water Content of Soil
f_{oc}	0.02	g/g	Soil Fraction Organic Carbon
I	30.4	cm/yr	Net Infiltration Rate through soil
V_{gw}	8.12763	cm/yr	Groundwater Darcy Velocity = K x i x 31500000
K	3.8E-05	cm/sec	Hydraulic conductivity in groundwater bearing unit
i	0.00679	unitless	Hydraulic gradient in groundwater bearing unit
d	305	cm	Groundwater mixing zone
q_a	0.3	unitless	Soil Air Filled Porosity (qa) = n - qw



Legend

- Shallow Monitoring Well
- Intermediate Monitoring Well
- Surface Soil
- Soil boring
- Sump
- Stream
- Road
- Existing Building
- Site

0 75 150 300 Feet

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

FIGURE A3-1

LHAAP-48 SAMPLE LOCATION MAP

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		FILE PATH
Houston, TX	B. Lu	10/06/08	R. Duffield	10/06/08	F. Eidson	10/08/08	T:\GIS\Longhorn\My WSP\MXD\Site3536\Oct2008\A3_1_48.mxd

Plot Date: 10/08

Attachment 4

Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 100 and Sump 101

Attachment 4 – SAM Model Evaluation

Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 100 and Sump 101 at the Longhorn Army Ammunition Plant, Karnack, Texas

Attachment 4 describes development of Medium Specific Concentrations (MSCs) for chemicals in soil that are protective of groundwater for soil associated with Sump 100 and Sump 101. The MSC values were developed according to the Texas Commission on Environmental Quality [TCEQ] Texas Risk Reduction Rules, Title 30 Texas Administrative Code (TAC) Chapter 335 (30 TAC §335 and updates). Groundwater-protective Risk Reduction Standard 3 MSCs were calculated to evaluate the potential for migration of chemicals from soil to groundwater as provided in TCEQ guidance [30 TAC §335.563(i)(2)] by using the SAM model to estimate the potential impacts of soil contamination on groundwater quality.

Sump 100 and Sump 101 are 2 sumps that were located at Longhorn Army Ammunition Plant (LHAAP-48) (Former Igniter Production Area) as shown on **Figure A4-1**, which is from the Final Site Evaluation Report for LHAAP-48 and LHAAP-35C(53) (Shaw, 2007). Evaluation of chemicals in soil associated with these 2 sumps was based on data from analysis of 5 soil samples collected from depths ranging from 0.5 to 4.15 feet below ground surface (bgs). The samples were analyzed for explosives, metals, semivolatile organic compounds (SVOCs), and volatile organic compounds (VOCs). The analytical results were evaluated as reported in **Table 5** of the main body of this Addendum.

The initial step in the SAM Model compared the tested chemicals to available background concentrations and method quantitation limits (MQL) for each chemical. Of the chemicals tested, 4 were not evaluated because they are regarded as essential nutrients (TCEQ, 2001). The evaluation of the remaining chemicals is recorded on **Table A4-1**.

The SAM Model is an extension of the Soil Screening Level calculations described in USEPA (1996) guidance and is based on calculating total mass (liquid phase, solid phase, and gas phase) in the soil column:

$$M_T = V(\rho_b C_s + \theta_w C_w + \theta_a C_g)$$

Where

M_T = total mass of chemical
V = volume of the soil column
ρ_b = bulk density
C_s = concentration in soil (dry weight basis)
θ_w = water filled porosity
C_w = concentration in pore water
θ_a = air filled porosity

C_g = gas phase concentration.

Total mass is then redistributed using equilibrium conditions based on the adsorption coefficient and Henry's constant. The equilibrium equations are:

$$C_s = K_d C_w \qquad \text{Equation 1}$$

$$C_g = H' C_w \qquad \text{Equation 2}$$

Where Kd is the distribution coefficient or adsorption coefficient, and H' is the dimensionless Henry's Law constant.

A SAM Model enhancement over USEPA's Soil Screening Levels is that the SAM Model assumes a zone of contaminated soils overlying a zone of clean soil (zero contaminant concentration). The SAM Model simulates mixing of contamination through the contaminated and clean soil zones based on equilibrium conditions and predicts leachate concentration at the bottom of the soil column. In the SAM Model, the leachate concentration is calculated as follows:

$$C_w = C_s \left(\frac{\rho_b}{\theta_w + (K_d \rho_b) + H' \theta_a} \right) \left(\frac{L_1}{L_2} \right) \qquad \text{Equation 3}$$

Or, alternately, the concentration in soil that will produce a given leachate concentration can be calculated as:

$$C_s = C_w \left(\frac{\theta_w + (K_d \rho_b) + H' \theta_a}{\rho_b} \right) \left(\frac{L_2}{L_1} \right) \qquad \text{Equation 4}$$

Where L_1 is the thickness of the contaminated zone and L_2 is the thickness of the total soil column. The factor (L_2/L_1) is an enhancement in the SAM Model over the Soil Screening Level Model by USEPA. A further dilution factor for leachate mixing with groundwater can be incorporated by using a leachate dilution factor:

$$LDF = 1 + \frac{Kid}{IW} \qquad \text{Equation 5}$$

Where

K = aquifer hydraulic conductivity
i = hydraulic gradient in aquifer
d = groundwater mixing zone depth
I = infiltration rate

W = source length parallel to groundwater flow.

The groundwater protective Standard 3 MSC is the soil concentration (C_s) described by Equation 4 where the groundwater concentration is limited by the TCEQ risk-based drinking water concentration (GW-Ind) modified by the leachate dilution factor (LDF) as follows:

$$\text{Standard 3 } MSC = GW - Ind\left(\frac{\theta_w + (K_d \rho_b) + H'\theta_a}{\rho_b}\right)\left(\frac{L_2}{L_1}\right) x\ LDF \quad \text{Equation 6}$$

The model further calculates the soil saturation concentration (C_{sat}), which corresponds to the contaminant concentration in soil at which the absorptive capacity of soil particles, the solubility limits of soil pore water and saturation of soil pore air have been reached. Concentrations above C_{sat} are assumed to be in free phase. The C_{sat} concentration is calculated in the SAM Model according to Equation 7.

$$C_{sat} = S\left(\frac{\theta_w + (K_d \rho_b) + H'\theta_a}{\rho_b}\right) \quad \text{Equation 7}$$

For the purpose of simplification, a soil to water coefficient, K_{sw}, can stand in for the complex bracketed formula in Equations 3, 4, 6, and 7.

$$K_{sw} = \left(\frac{\rho_b}{\theta_w + (K_d \rho_b) + (H'\theta_a)}\right) \quad \text{Equation 8}$$

Input parameters to the SAM Model, that are either specific to Sump 100 and Sump 101 locations at LHAAP-48 or are default TCEQ values, are shown in **Table A4-2**. Because some chemical properties are pH dependent, an average groundwater pH calculation was calculated (6.0) in **Table A4-3**. **Table A4-4** lists the chemical properties (TCEQ, 2008). From these input parameters and properties, the SAM Model first calculates a saturated soil concentration (C_{sat}) using Equation 7.

Then the SAM Model calculates a Standard 3 Commercial/Industrial Soil MSC using Equation 6 by equating C_w to the GW-Ind MSC and calculating what concentration of chemical in the soil at the site (mg/kg) would theoretically leach into the groundwater at the GW-Ind concentration (mg/L). The lower of the C_{sat} and the calculated Soil MSC values is used as the Soil MSC.

Finally, the SAM Model compares the Soil MSC to available background soil concentrations for the chemical. The 95% upper prediction limit (UPL) soil background concentrations from the LHAAP-35/36 Sump Report (Shaw, 2008) were used for this comparison. The larger of the Soil MSC and the background concentration is then selected as the Applicable Standard 3 Commercial/Industrial Soil MSC.

Table A4-5 presents the results of those calculations. The Applicable Commercial/Industrial Soil MSC values are in bold along the right side of the table. While it is possible to select different site parameters for each chemical, general whole site parameters were used as if each chemical were equally and evenly distributed across the entire site. When compared to actual distribution of individual chemical results in individual samples taken near former sump locations, this assumption, overestimates the extent of the chemical concentration across the site, resulting in lower concentrations calculated for the Applicable Commercial Industrial Soil MSC.

Table A4-6 compares the Applicable Standard 3 Commercial/Industrial Soil MSC values to maximum soil concentrations for each chemical in the samples associated with Sump 100 and Sump 101 at LHAAP-48.

Discussion

The SAM Model results for Sump 100 and Sump 101 at LHAAP-48 indicate that maximum concentrations of 3 metals (antimony, arsenic, and cadmium) exceed the calculated groundwater protective soil MSC concentrations in detected samples. The SAM Model was recalculated for these 3 chemicals to determine whether chemical-specific input values for L1, L2 and W would result in a changed MSC value. These chemical specific calculations are shown in **Table A4-7**.

Of the 5 samples, only 1 contained detectable antimony, but it contained antimony above the initial calculated MSC value (9.4E-01 mg/kg in **Table A4-6**). This sample LH-S101-01.1 was from a depth of 0.5 to 1.5 feet bgs. Rerunning the SAM Model specifically for antimony, with changed values for L1 of 2 feet (61 centimeters [cm]) and W of 32 feet (1000 cm), and an unchanged value for L2 of 13 feet (396 cm) that reflect the location of the antimony concentration, the SAM Model calculates a chemical specific MSC value of 2.4E+00 mg/kg (**Table A4-7**), which is still less than the maximum detected value of 5.12 mg/kg.

All 5 samples contained detectable arsenic, but only 1 sample contained arsenic above the initial calculated MSC value (4.8E+00 mg/kg in **Table A4-6**). This sample LH-S101-01.1 was from a depth of 0.5 to 1.5 feet bgs. Rerunning the SAM Model specifically for arsenic, with changed values for L1 of 2 feet (61 cm) and W of 32 feet (1000 cm), and an unchanged value for L2 of 13 feet (396 cm) that reflect the location of the arsenic concentration,, the SAM Model calculates an unchanged chemical-specific MSC value of 4.8E+00 mg/kg (**Table A4-7**), which is the background concentration.

All 5 samples contained detectable cadmium concentrations greater than the initial Applicable calculated MSC value (5.0E-01 mg/kg). These 5 samples ranged in depth from 0.5 to 5 feet bgs, and were from multiple locations spread around the site. Rerunning the SAM Model specifically for cadmium, with unchanged values for L1 of 5 feet (152 cm), L2 of 13 feet (396 cm), and W of 75 feet (2300 cm) that reflect the locations of the cadmium concentrations, the SAM Model calculates an unchanged chemical-specific MSC value of 5.0E-01 mg/kg (**Table A4-7**).

Concentrations of 3 chemicals, antimony, arsenic, and cadmium, are predicted by the SAM Model to have potential to leach from soil into the groundwater. Analysis of groundwater taken from LHAAP-48 in 2005 indicated that antimony, arsenic, and cadmium were not detected in groundwater from Well LHSMW66, which is the wells closest to the sumps (**Figure A4-1**), and all detected concentrations of these metals at other well locations were below the maximum contaminant level (MCL) (Shaw, 2008, **Table 2-1**). These results indicate that any leaching of antimony, arsenic, or cadmium to groundwater is within TCEQ limits.

The absence of antimony, arsenic, and cadmium in the groundwater indicates that the chemicals from the soil near Sump 100 and Sump 101 are not leaching into groundwater.

References

Shaw Environmental, Inc. (Shaw), 2007, *Final Site Evaluation Report LHAAP-48 (Former Igniter Production Area) and LHAAP-35C(53) (Former Static Test Area)*, April.

Shaw, 2008, *Final Data Evaluation Report, Chemical Concentrations in Soil Samples Associated with LHAAP-35/36 Sumps*, January (LHAAP-35/36 Sump Report).

Texas Commission on Environmental Quality (TCEQ), 2001, Interoffice Memorandum from Joseph T. Haney, Jr., (TCEQ) to Camarie Perry, Office or Permitting, Remediation & Registration, *Evaluation of the Potential Health Impacts of Exposure to Iron, Calcium, Magnesium, Potassium, sodium, and Phosphorus through Soil Ingestion*, October.

TCEQ, 2008, Annual TCEQ update of chemical/physical properties table [(Figure: 30 TAC §350.73(e)], April.

U.S. Environmental Protection Agency (USEPA), 1996, *Soil Screening Guidance: User's Guide*, Second Edition.

Table A4-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 100 and Sump 101

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	Calculate MSC ?
EXPLOSIVES	2,4-Dinitrotoluene	-	1.25	NE	NE	0.25	YES
EXPLOSIVES	2,6-Dinitrotoluene	-	1.25	NE	NE	0.26	YES
METALS	Aluminum	13400	-	1.63E+04	2.08E+04	20	YES
METALS	Antimony	5.12	7.78	9.40E-01	1.60E+00	0.1	YES
METALS	Arsenic	6.28	-	4.81E+00	5.54E+00	0.3	YES
METALS	Barium	119	-	1.52E+02	8.55E+01	0.3	YES
METALS	Cadmium	5.55	-	1.40E+00	4.00E-01	0.1	YES
METALS	Calcium	1750	-	NA	NA	NA	No, 1
METALS	Chromium	19.8	-	2.66E+01	3.01E+01	0.4	YES
METALS	Cobalt	4.83	-	7.23E+00	5.61E+00	0.5	YES
METALS	Copper	10.6	-	5.55E+00	9.25E+00	0.6	YES
METALS	Iron	25000	-	NA	NA	NA	No, 1
METALS	Lead	24.3	-	2.26E+01	1.14E+01	5	YES
METALS	Magnesium	534	-	NA	NA	NA	No, 1
METALS	Manganese	91.7	-	1.25E+03	2.01E+02	0.2	YES
METALS	Mercury	0.034	0.039	8.19E-02	3.60E-01	0.25	YES
METALS	Potassium	784	-	NA	NA	NA	No, 1
METALS	Selenium	-	0.778	3.48E+00	5.57E+00	0.2	YES
METALS	Silver	0.038	0.039	3.10E-01	3.70E-01	0.2	YES
METALS	Strontium	45.5	-	1.98E+01	2.91E+01	0.5	YES
METALS	Zinc	109	-	6.16E+01	2.02E+01	2.5	YES
SEMIVOLATILES	1,2,4-Trichlorobenzene	-	1.25	NE	NE	0.165	YES
SEMIVOLATILES	1,2-Dichlorobenzene	-	1.25	NE	NE	0.165	YES
SEMIVOLATILES	1,3-Dichlorobenzene	-	1.25	NE	NE	0.165	YES
SEMIVOLATILES	1,4-Dichlorobenzene	-	1.25	NE	NE	0.165	YES
SEMIVOLATILES	2,4,5-Trichlorophenol	-	1.25	NE	NE	0.165	YES
SEMIVOLATILES	2,4,6-Trichlorophenol	-	1.25	NE	NE	0.165	YES
SEMIVOLATILES	2,4-Dichlorophenol	-	1.25	NE	NE	0.165	YES
SEMIVOLATILES	2,4-Dimethylphenol	-	0.625	NE	NE	0.165	YES
SEMIVOLATILES	2,4-Dinitrophenol	-	12.5	NE	NE	0.825	YES
SEMIVOLATILES	2-Chloronaphthalene	-	0.375	NE	NE	0.165	YES
SEMIVOLATILES	2-Chlorophenol	-	0.625	NE	NE	0.165	YES
SEMIVOLATILES	2-Methylnaphthalene	-	0.375	NE	NE	0.165	YES
SEMIVOLATILES	2-Methylphenol	-	0.625	NE	NE	0.165	YES
SEMIVOLATILES	2-Nitroaniline	-	3.75	NE	NE	0.825	YES
SEMIVOLATILES	2-Nitrophenol	-	1.25	NE	NE	0.165	YES
SEMIVOLATILES	3,3'-Dichlorobenzidine	-	0.625	NE	NE	0.33	YES
SEMIVOLATILES	3-Nitroaniline	-	3.75	NE	NE	0.825	YES
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	-	6.25	NE	NE	0.825	YES
SEMIVOLATILES	4-Bromophenyl phenyl ether	-	1.25	NE	NE	0.165	YES
SEMIVOLATILES	4-Chloro-3-methylphenol	-	0.625	NE	NE	0.165	YES
SEMIVOLATILES	4-Chloroaniline	-	3.75	NE	NE	0.165	YES
SEMIVOLATILES	4-Chlorophenyl phenyl ether	-	1.25	NE	NE	0.165	YES
SEMIVOLATILES	4-Methylphenol	-	0.625	NE	NE	0.165	YES
SEMIVOLATILES	4-Nitroaniline	-	6.25	NE	NE	0.825	YES
SEMIVOLATILES	4-Nitrophenol	-	6.25	NE	NE	0.825	YES
SEMIVOLATILES	Acenaphthene	-	0.375	NE	NE	0.165	YES
SEMIVOLATILES	Acenaphthylene	-	0.625	NE	NE	0.165	YES
SEMIVOLATILES	Anthracene	-	0.625	NE	NE	0.165	YES
SEMIVOLATILES	Benzo(a)anthracene	-	0.375	1.53E-02	NE	0.165	YES
SEMIVOLATILES	Benzo(a)pyrene	-	0.625	1.54E-02	NE	0.165	YES
SEMIVOLATILES	Benzo(b)fluoranthene	-	1.25	1.53E-02	NE	0.165	YES
SEMIVOLATILES	Benzo(ghi)perylene	0.172	2.5	1.23E-02	NE	0.165	YES
SEMIVOLATILES	Benzo(k)fluoranthene	-	1.25	1.30E-02	NE	0.165	YES
SEMIVOLATILES	bis(2-Chloroethoxy)methane	-	0.625	NE	NE	0.165	YES
SEMIVOLATILES	bis(2-Chloroethyl)ether	-	0.625	NE	NE	0.165	YES
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	-	1.25	NE	NE	0.165	YES

Table A4-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 100 and Sump 101

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	Calculate MSC ?
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	-	0.625	NE	NE	0.165	YES
SEMIVOLATILES	Butyl benzyl phthalate	-	0.625	NE	NE	0.165	YES
SEMIVOLATILES	Carbazole	-	1.25	NE	NE	0.165	YES
SEMIVOLATILES	Chrysene	-	6.25	1.51E-02	NE	0.165	YES
SEMIVOLATILES	Dibenzo(a,h)anthracene	0.149	2.5	NE	NE	0.165	YES
SEMIVOLATILES	Dibenzofuran	-	1.25	NE	NE	0.165	YES
SEMIVOLATILES	Diethyl phthalate	0.244	0.617	NE	NE	0.165	YES
SEMIVOLATILES	Dimethyl phthalate	-	0.625	NE	NE	0.165	YES
SEMIVOLATILES	di-n-Butyl phthalate	-	4.098	NE	NE	0.165	YES
SEMIVOLATILES	di-n-Octyl phthalate	-	0.625	NE	NE	0.165	YES
SEMIVOLATILES	Fluoranthene	-	0.625	2.29E-02	NE	0.165	YES
SEMIVOLATILES	Fluorene	-	0.625	NE	NE	0.165	YES
SEMIVOLATILES	Hexachlorobenzene	-	1.25	NE	NE	0.165	YES
SEMIVOLATILES	Hexachlorobutadiene	-	3.75	NE	NE	0.165	YES
SEMIVOLATILES	Hexachlorocyclopentadiene	-	3.75	NE	NE	0.165	YES
SEMIVOLATILES	Hexachloroethane	-	1.25	NE	NE	0.165	YES
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	0.172	1.25	1.43E-02	NE	0.165	YES
SEMIVOLATILES	Isophorone	-	0.625	NE	NE	0.165	YES
SEMIVOLATILES	Naphthalene	-	0.375	NE	NE	0.165	YES
SEMIVOLATILES	Nitrobenzene	-	0.625	NE	NE	0.25	YES
SEMIVOLATILES	n-Nitroso-di-n-propylamine	-	1.25	NE	NE	0.165	YES
SEMIVOLATILES	n-Nitrosodiphenylamine	-	0.625	NE	NE	0.165	YES
SEMIVOLATILES	Pentachlorophenol	-	6.25	NE	NE	0.825	YES
SEMIVOLATILES	Phenanthrene	-	0.625	NE	NE	0.165	YES
SEMIVOLATILES	Phenol	-	0.625	NE	NE	0.165	YES
SEMIVOLATILES	Pyrene	-	0.625	1.94E-02	NE	0.165	YES
VOLATILES	1,1,1-Trichloroethane	-	0.006	NE	NE	0.005	YES
VOLATILES	1,1,2,2-Tetrachloroethane	-	0.006	NE	NE	0.005	YES
VOLATILES	1,1,2-Trichloroethane	-	0.006	NE	NE	0.005	YES
VOLATILES	1,1-Dichloroethane	-	0.006	NE	NE	0.005	YES
VOLATILES	1,1-Dichloroethene	-	0.006	NE	NE	0.005	YES
VOLATILES	1,2-Dichloroethane	-	0.006	NE	NE	0.005	YES
VOLATILES	1,2-Dichloroethene	-	0.006	NE	NE	0.005	YES
VOLATILES	1,2-Dichloropropane	-	0.006	NE	NE	0.005	YES
VOLATILES	2-Butanone	-	0.062	NE	NE	0.01	YES
VOLATILES	2-Hexanone	-	0.062	NE	NE	0.01	YES
VOLATILES	Acetone	-	0.06	NE	NE	0.01	YES
VOLATILES	Benzene	-	0.006	NE	NE	0.005	YES
VOLATILES	Bromodichloromethane	-	0.006	NE	NE	0.005	YES
VOLATILES	Bromoform	-	0.006	NE	NE	0.005	YES
VOLATILES	Bromomethane	-	0.031	NE	NE	0.01	YES
VOLATILES	Carbon disulfide	0.017	0.006	NE	NE	0.005	YES
VOLATILES	Carbon tetrachloride	-	0.006	NE	NE	0.005	YES
VOLATILES	Chlorobenzene	-	0.006	NE	NE	0.005	YES
VOLATILES	Chloroethane	-	0.031	NE	NE	0.01	YES
VOLATILES	Chloroform	-	0.006	NE	NE	0.005	YES
VOLATILES	Chloromethane	-	0.031	NE	NE	0.01	YES
VOLATILES	cis-1,3-Dichloropropene	-	0.006	NE	NE	0.005	YES
VOLATILES	Dibromochloromethane	-	0.006	NE	NE	0.005	YES
VOLATILES	Ethylbenzene	-	0.006	NE	NE	0.005	YES
VOLATILES	Methyl isobutyl ketone	-	0.062	NE	NE	0.01	YES
VOLATILES	Methylene chloride	-	0.027	NE	NE	0.005	YES
VOLATILES	Styrene	-	0.006	NE	NE	0.005	YES
VOLATILES	Tetrachloroethene	-	0.006	NE	NE	0.005	YES
VOLATILES	Toluene	-	0.006	NE	NE	0.005	YES
VOLATILES	trans-1,3-Dichloropropene	-	0.006	NE	NE	0.005	YES
VOLATILES	Trichloroethene	-	0.006	NE	NE	0.005	YES

Table A4-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 100 and Sump 101

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	Calculate MSC ?
VOLATILES	Vinyl chloride	-	0.031	NE	NE	0.01	YES
VOLATILES	Xylenes, Total	-	0.006	NE	NE	0.005	YES

Notes:

all concentrations in milligrams per kilogram (mg/kg)

Max Detected and Max SQL values taken from Table 5 of the main body of the Addendum.

NE - Not evaluated, background was only evaluated for metals and select other analytes.

SQL - sample quantitation limit.

PQL - method quantitation limit.

MSC - medium specific concentration.

Rules for Analyte Selection

1. Chemicals that are essential nutrients (Fe, Ca, Mg, K, Na, P), TCEQ (2001).

Table A4-2
Input Values for Parameters used to Calculate Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 100 and Sump 101

Parameter		Value	Units	Comment	Reference
Soil Dry Bulk Density	ρ_b	1.5	g/cm^3	Typical value	USEPA, 1996, pg. 38.
Particle Density	$\rho_{particle}$	2.65	g/cm^3	TCEQ default value	30 TAC §350.75 (c) and (d)
Total Porosity	n	0.43	unitless	n = 1-(rb/rparticle) = 1-(1.5 g/cc/2.65 g/cc)	USEPA, 1996, pg. 38.
Volumetric Water Content of Soil	θ_w	0.13	unitless	Assumed 30%	USEPA, 1996, pg. 38.
Soil Fraction Organic Carbon	f_{oc}	0.02	unitless	TCEQ default value	30 TAC §335.567. Appendix I. (p. 26)
Net Infiltration Rate through soil	I	30.4	cm/yr	I = 0.0018 x P x P P - precipitation for Marshall Texas 130	TCEQ, 2000
Thickness of affected soil	L_1	152	cm	Samples taken at various depths from 0 down to 5 ft. Assumed 5 ft. (152 cm)	Table 5, main body of Addendum
Distance from top of affected soils to top of water bearing unit.	L_2	396	cm	top of shallowest sand layer in Monitor Well LHSMW66 is 12.5 ft. Use 13 ft. (396 cm)	Jacobs, 2002, Appendix A, Boring Logs
Groundwater Darcy Velocity	V_{gw}	8.13	cm/yr	Calculated = K*i*31500000 sec/yr	USEPA, 1996, pg. 42.
Hydraulic conductivity in groundwater bearing unit	K	3.80E-05	cm/sec	Measured by rising head slug test in LHSMW65	Jacobs 2002, pg 10-3
Hydraulic gradient in groundwater bearing unit	i	0.00679	unitless	Value listed as modeling input	Shaw, 2007a, Appendix I, pg. 2-1
Width of soil source area parallel to groundwater flow direction	W	2,300	cm	Maximum site dimension, 75 ft measured from between LH-S100-01 to LH-S101-01. (~2300 cm)	See Figure A4-1
Groundwater mixing zone	d	305	cm	All LHAAP-48 wells in Shallow Zone contained 10-ft screen sections. 10 x 12 x 2.54	Jacobs 2002, pg. 10-3
Soil Air Filled Porosity (θ_{as})	θ_a	0.30	unitless	n - qws	USEPA, 1996, pg. 38.
Henry's Law Constant	H'	Chemical specific property	unitless	See Table A4-4	TCEQ, 2008
Organic Carbon Partition Coefficient	K_{oc}	Chemical specific property	unitless	See Table A4-4	TCEQ, 2008
Soil Water Partition Coefficient	K_d	Chemical specific property	unitless	See Table A4-4	TCEQ, 2008

Notes:

Jacobs Engineering Group, Inc., 2002: *Final Remedial Investigation Report, Group 4 Sites, Sites 04, 08, 35A, 35B, 35C, 46, 47, 48, 50, 60,67, Goose Prairie Creek, Volumes 1 and 2: Report, Longhorn Army Ammunition Plant, Karnack, Texas* , Oak Ridge, Tennessee, February.

Shaw Environmental & Infrastructure (Shaw), 2007, *Final Modeling Report, Derivation of Soil and Groundwater Concentrations Protective of Surface Water and Sediment* , February.

Texas Commission on Environmental Quality (TCEQ), *Risk Reduction Rules* , 30 TAC §335.567. Appendix I.

TCEQ, 2000, Tier 2 PCL Equations, March, accessed at http://www.tceq.state.tx.us/assets/public/remediation/trrp/tier2.pdf

TCEQ, 2008: Texas Risk Reduction Program Physical Chemcial Properties Tables, April, accessed at http://www.tceq.state.tx.us/remediation/trrp/trrppcls.html

USEPA, 1996. Soil Screening Guidance: Technical Background Document, USEPA/540/R-95/128018, U. S. Environmental Protection Agency, Office of Emergency and Remedial Response, July.

Table A4-3
Determination of pH
Sump 100 and Sump 101

Well	Date	pH Measurement	Comment
LHSMW62	Sep-04	5.32	
LHSMW63	Sep-04		bailed dry, no measurements
LHSMW64	Sep-04	5.87	
LHSMW65	Sep-04		bailed dry, no measurements
LHSMW66	Sep-04		bailed dry, no measurements
LHSMW62	May-05	5.17	
LHSMW63	May-05	6.75	
LHSMW64	May-05	6.22	
LHSMW65	May-05		bailed dry, no measurements
LHSMW66	May-05	6.90	
Average		6.04	
pH to be used		**6.0**	

Notes:

1. pH data from the groundwater sampling logs, Field Work images on Shaw network.
2. Only the pH readings from shallow wells were averaged.

Table A4-4
Physical Chemical Properties of Chemicals of Concern [a]
Sump 100 and Sump 101

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
EXPLOSIVES	2,4-Dinitrotoluene	3.60E-05	5.13E+01	1.03E+00	2.85E+02	b
EXPLOSIVES	2,6-Dinitrotoluene	3.11E-05	4.17E+01	8.34E-01	1.82E+02	b
METALS	Aluminum	0.00E+00	NA	3.53E+04	0.00E+00	c
METALS	Antimony	0.00E+00	NA	5.70E+01	0.00E+00	d
METALS	Arsenic	0.00E+00	NA	2.70E+01	0.00E+00	d
METALS	Barium	0.00E+00	NA	3.00E+01	0.00E+00	d
METALS	Cadmium	0.00E+00	NA	3.70E+01	0.00E+00	d
METALS	Chromium	0.00E+00	NA	2.00E+05	0.00E+00	d
METALS	Cobalt	0.00E+00	NA	4.50E+01	0.00E+00	
METALS	Copper	0.00E+00	NA	4.00E+01	0.00E+00	
METALS	Lead	0.00E+00	NA	1.83E+03	0.00E+00	c
METALS	Manganese	0.00E+00	NA	5.01E+01	0.00E+00	
METALS	Mercury	4.74E-01	NA	3.50E+00	3.00E-02	d
METALS	Selenium	0.00E+00	NA	8.60E+00	0.00E+00	d
METALS	Silver	0.00E+00	NA	1.30E+00	0.00E+00	d
METALS	Strontium	0.00E+00	NA	2.00E+00	0.00E+00	
METALS	Zinc	0.00E+00	NA	3.60E+01	0.00E+00	d
SEMIVOLATILES	1,2,4-Trichlorobenzene	5.90E-02	1.66E+03	3.32E+01	4.88E+01	b
SEMIVOLATILES	1,2-Dichlorobenzene	8.73E-02	6.92E+02	1.38E+01	1.50E+02	b
SEMIVOLATILES	1,3-Dichlorobenzene	1.95E-01	1.70E+02	3.40E+00	1.10E+02	b
SEMIVOLATILES	1,4-Dichlorobenzene	1.17E-01	6.46E+02	1.29E+01	7.38E+01	b
SEMIVOLATILES	2,4,5-Trichlorophenol	1.78E-04	2.21E+03	4.42E+01	1.20E+03	b, e
SEMIVOLATILES	2,4,6-Trichlorophenol	3.19E-04	7.96E+02	1.59E+01	9.82E+02	b, e
SEMIVOLATILES	2,4-Dichlorophenol	1.31E-04	1.57E+02	3.14E+00	4.50E+03	b, e
SEMIVOLATILES	2,4-Dimethylphenol	8.31E-05	1.17E+02	2.35E+00	6.20E+03	b
SEMIVOLATILES	2,4-Dinitrophenol	2.01E-07	1.16E-02	2.32E-04	5.80E+03	b, e
SEMIVOLATILES	2-Chloronaphthalene	2.54E-02	8.51E+03	1.70E+02	6.74E+00	b
SEMIVOLATILES	2-Chlorophenol	7.40E-04	3.96E+02	7.92E+00	2.80E+04	b, e
SEMIVOLATILES	2-Methylnaphthalene	1.85E-02	4.32E+03	8.63E+01	2.54E+01	b
SEMIVOLATILES	2-Methylphenol	6.65E-05	9.77E+01	1.95E+00	2.04E+04	b
SEMIVOLATILES	2-Nitroaniline	2.08E-05	2.69E+01	5.38E-01	1.26E+03	b
SEMIVOLATILES	2-Nitrophenol	2.21E-05	1.88E+02	3.75E+00	1.73E+04	b, e
SEMIVOLATILES	3,3'-Dichlorobenzidine	8.65E-07	7.24E+02	1.45E+01	3.11E+00	b
SEMIVOLATILES	3-Nitroaniline	2.31E-07	3.94E+01	7.88E-01	4.56E+02	b
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	1.07E-07	3.16E-02	6.32E-04	3.00E+03	b
SEMIVOLATILES	4-Bromophenyl phenyl ether	9.66E-03	1.45E+05	2.90E+03	8.25E-01	b
SEMIVOLATILES	4-Chloro-3-methylphenol	1.40E-05	8.78E+02	1.76E+01	5.43E+03	b
SEMIVOLATILES	4-Chloroaniline	4.86E-05	6.61E+01	1.32E+00	3.90E+03	b
SEMIVOLATILES	4-Chlorophenyl phenyl ether	1.30E-02	1.31E+04	2.62E+02	1.43E+00	b

Table A4-4
Physical Chemical Properties of Chemicals of Concern [a]
Sump 100 and Sump 101

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
SEMIVOLATILES	4-Methylphenol	3.99E-05	8.13E+01	1.63E+00	2.30E+04	b
SEMIVOLATILES	4-Nitroaniline	3.33E-08	1.12E+01	2.25E-01	6.49E+02	b
SEMIVOLATILES	4-Nitrophenol	3.24E-08	4.36E+01	8.73E-01	4.49E+03	b, e
SEMIVOLATILES	Acenaphthene	6.44E-03	3.98E+03	7.96E+01	4.24E+00	b
SEMIVOLATILES	Acenaphthylene	4.74E-03	6.92E+03	1.38E+02	3.93E+00	b
SEMIVOLATILES	Anthracene	4.61E-03	2.34E+04	4.69E+02	4.34E-02	b
SEMIVOLATILES	Benzo(a)anthracene	1.39E-04	3.55E+05	7.10E+03	1.00E-02	b
SEMIVOLATILES	Benzo(a)pyrene	4.70E-05	9.55E+05	1.91E+04	1.62E-03	b
SEMIVOLATILES	Benzo(b)fluoranthene	4.99E-04	1.20E+06	2.40E+04	1.50E-03	b
SEMIVOLATILES	Benzo(ghi)perylene	5.82E-06	1.58E+06	3.17E+04	2.60E-04	b
SEMIVOLATILES	Benzo(k)fluoranthene	4.45E-07	1.23E+06	2.46E+04	5.50E-04	b
SEMIVOLATILES	bis(2-Chloroethoxy)methane	1.25E-03	3.07E+02	6.13E+00	1.35E+03	b
SEMIVOLATILES	bis(2-Chloroethyl)ether	8.90E-04	1.55E+01	3.10E-01	1.02E+04	b
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	4.16E-03	3.16E+02	6.32E+00	1.70E+03	b
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	4.57E-04	6.76E+05	1.35E+04	3.00E-01	b
SEMIVOLATILES	Butyl benzyl phthalate	7.94E-05	1.37E+04	2.75E+02	2.90E+00	b
SEMIVOLATILES	Carbazole	3.38E-03	2.45E+03	4.91E+01	7.21E-01	b
SEMIVOLATILES	Chrysene	5.03E-05	3.09E+05	6.18E+03	2.00E-03	b
SEMIVOLATILES	Dibenzo(a,h)anthracene	4.66E+00	1.91E+06	3.81E+04	5.00E-04	b
SEMIVOLATILES	Dibenzofuran	5.28E-03	8.49E+03	1.70E+02	2.86E+00	b
SEMIVOLATILES	Diethyl phthalate	1.87E-05	1.51E+02	3.03E+00	1.08E+03	b
SEMIVOLATILES	Dimethyl phthalate	2.40E-05	3.16E+01	6.32E-01	4.19E+03	b
SEMIVOLATILES	di-n-Butyl phthalate	5.94E-05	3.39E+04	6.78E+02	1.12E+01	b
SEMIVOLATILES	di-n-Octyl phthalate	2.78E-03	8.32E+07	1.66E+06	2.00E-02	b
SEMIVOLATILES	Fluoranthene	3.88E-04	4.90E+04	9.80E+02	2.60E-01	b
SEMIVOLATILES	Fluorene	2.64E-03	7.59E+03	1.52E+02	1.98E+00	b
SEMIVOLATILES	Hexachlorobenzene	2.22E-02	2.82E+04	5.64E+02	6.00E-03	b
SEMIVOLATILES	Hexachlorobutadiene	9.94E-01	6.92E+03	1.38E+02	2.55E+00	b
SEMIVOLATILES	Hexachlorocyclopentadiene	7.15E-01	9.55E+03	1.91E+02	1.80E+00	b
SEMIVOLATILES	Hexachloroethane	1.62E-01	1.82E+03	3.64E+01	5.00E+01	b
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	2.85E+00	3.47E+06	6.93E+04	3.75E-03	b
SEMIVOLATILES	Isophorone	2.57E-04	3.02E+01	6.04E-01	1.20E+04	b
SEMIVOLATILES	Naphthalene	2.00E-02	1.55E+03	3.10E+01	3.14E+01	b
SEMIVOLATILES	Nitrobenzene	8.56E-04	1.32E+02	2.64E+00	1.90E+03	b
SEMIVOLATILES	n-Nitroso-di-n-propylamine	9.35E-05	1.97E+01	3.94E-01	9.89E+03	b
SEMIVOLATILES	n-Nitrosodiphenylamine	2.08E-04	3.31E+02	6.62E+00	3.51E+01	b
SEMIVOLATILES	Pentachlorophenol	1.16E-05	1.56E+03	3.12E+01	1.40E+01	b, e
SEMIVOLATILES	Phenanthrene	5.40E-03	1.41E+04	2.83E+02	9.94E-01	b
SEMIVOLATILES	Phenol	2.47E-05	1.74E+01	3.48E-01	8.70E+04	b

Table A4-4
Physical Chemical Properties of Chemicals of Concern [a]
Sump 100 and Sump 101

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
SEMIVOLATILES	Pyrene	4.57E-04	3.80E+04	7.60E+02	1.35E-01	b
VOLATILES	1,1,1-Trichloroethane	7.15E-01	1.10E+02	2.19E+00	1.33E+03	b
VOLATILES	1,1,2,2-Tetrachloroethane	1.55E-02	7.76E+01	1.55E+00	2.97E+03	b
VOLATILES	1,1,2-Trichloroethane	3.80E-02	5.01E+01	1.00E+00	4.42E+03	b
VOLATILES	1,1-Dichloroethane	2.39E-01	3.16E+01	6.32E-01	5.50E+03	b
VOLATILES	1,1-Dichloroethene	1.06E+00	6.46E+01	1.29E+00	2.40E+03	b
VOLATILES	1,2-Dichloroethane	5.32E-02	1.74E+01	3.48E-01	8.70E+03	b
VOLATILES	1,2-Dichloroethene	1.87E-01	2.90E+01	5.80E-01	4.93E+03	b
VOLATILES	1,2-Dichloropropane	1.17E-01	5.89E+01	1.18E+00	2.80E+03	b
VOLATILES	2-Butanone	1.94E-03	1.90E+00	3.80E-02	2.40E+05	b
VOLATILES	2-Hexanone	3.38E-03	1.79E+01	3.58E-01	1.79E+04	b
VOLATILES	Acetone	1.61E-03	5.70E-01	1.14E-02	6.00E+05	b
VOLATILES	Benzene	2.27E-01	6.61E+01	1.32E+00	1.77E+03	b
VOLATILES	Bromodichloromethane	1.32E-01	5.50E+01	1.10E+00	4.50E+03	b
VOLATILES	Bromoform	2.56E-02	8.71E+01	1.74E+00	3.20E+03	b
VOLATILES	Bromomethane	5.90E-01	1.05E+01	2.09E-01	1.52E+04	b
VOLATILES	Carbon disulfide	6.13E-01	5.25E+01	1.05E+00	2.30E+03	b
VOLATILES	Carbon tetrachloride	1.20E+00	1.86E+02	3.72E+00	8.05E+02	b
VOLATILES	Chlorobenzene	1.82E-01	2.14E+02	4.28E+00	5.02E+02	b
VOLATILES	Chloroethane	2.12E-01	1.78E+01	3.56E-01	2.00E+04	b
VOLATILES	Chloroform	1.53E-01	4.68E+01	9.35E-01	7.92E+03	b
VOLATILES	Chloromethane	1.44E+00	6.00E+00	1.20E-01	7.25E+03	b
VOLATILES	cis-1,3-Dichloropropene	9.15E-02	4.47E+01	8.93E-01	2.70E+03	b
VOLATILES	Dibromochloromethane	3.25E-02	6.31E+01	1.26E+00	5.25E+03	b
VOLATILES	Ethylbenzene	3.28E-01	2.04E+02	4.08E+00	1.69E+02	b
VOLATILES	Methyl isobutyl ketone	5.82E-03	1.50E+01	3.00E-01	1.90E+04	b
VOLATILES	Methylene chloride	9.10E-02	1.17E+01	2.35E-01	1.54E+04	b
VOLATILES	Styrene	1.14E-01	7.59E+02	1.52E+01	3.10E+02	b
VOLATILES	Tetrachloroethene	7.65E-01	1.55E+02	3.10E+00	2.00E+02	b
VOLATILES	Toluene	2.76E-01	1.40E+02	2.80E+00	5.30E+02	b
VOLATILES	trans-1,3-Dichloropropene	9.15E-02	4.47E+01	8.93E-01	2.80E+03	b
VOLATILES	Trichloroethene	4.28E-01	9.33E+01	1.87E+00	1.10E+03	b
VOLATILES	Vinyl chloride	3.49E+00	1.10E+01	2.19E-01	2.76E+03	b
VOLATILES	Xylenes, Total	2.93E-01	2.40E+02	4.80E+00	1.98E+02	b

Table A4-4

Physical Chemical Properties of Chemicals of Concern [a]
Sump 100 and Sump 101

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note

Notes:

Chemicals of Concern shown in Table A4-1.

pH value of 6.0 averaged from pH Values on Table A4-3.

a Annual TCEQ update of chemical/physical properties table [(Figure: 30 TAC §350.73(e)], April 2008.

b Kd value calculated by formula Koc * foc for non-metals.

c pH-dependent Kd value obtained from Figure 30TAC§350.73(e)(1)(A), April 2008.

d pH-dependent Kd value obtained from Figure 30TAC§350.73(e)(1)(C), April 2008.

e pH-dependent Koc value obtained from 30 TAC §350.73(e)(1)(B), April 2008

mg/L - milligrams per liter

Table A4-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 100 and Sump 101

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
EXPLOSIVES	2,4-Dinitrotoluene	3.60E-05	1.03E+00	2.85E+02	8.99E-01	3.2E+02	4.2E-04	1.3E-03	none	**1.3E-03**
EXPLOSIVES	2,6-Dinitrotoluene	3.11E-05	8.34E-01	1.82E+02	1.09E+00	1.7E+02	4.2E-04	1.0E-03	none	**1.0E-03**
METALS	Aluminum	0.00E+00	3.53E+04	0.00E+00	2.83E-05	NA	1.0E+02	9.7E+06	1.63E+04	**9.7E+06**
METALS	Antimony	0.00E+00	5.70E+01	0.00E+00	1.75E-02	NA	6.0E-03	9.2E-01	9.40E-01	**9.4E-01**
METALS	Arsenic	0.00E+00	2.70E+01	0.00E+00	3.69E-02	NA	1.0E-02	7.3E-01	4.81E+00	**4.8E+00**
METALS	Barium	0.00E+00	3.00E+01	0.00E+00	3.32E-02	NA	2.0E+00	1.6E+02	8.55E+01	**1.6E+02**
METALS	Cadmium	0.00E+00	3.70E+01	0.00E+00	2.70E-02	NA	5.0E-03	5.0E-01	4.00E-01	**5.0E-01**
METALS	Chromium	0.00E+00	2.00E+05	0.00E+00	5.00E-06	NA	1.0E-01	5.4E+04	2.66E+01	**5.4E+04**
METALS	Cobalt	0.00E+00	4.50E+01	0.00E+00	2.22E-02	NA	6.1E+00	7.5E+02	5.61E+00	**7.5E+02**
METALS	Copper	0.00E+00	4.00E+01	0.00E+00	2.49E-02	NA	1.3E+00	1.4E+02	5.55E+00	**1.4E+02**
METALS	Lead	0.00E+00	1.83E+03	0.00E+00	5.46E-04	NA	1.5E-02	7.4E+01	1.14E+01	**7.4E+01**
METALS	Manganese	0.00E+00	5.01E+01	0.00E+00	1.99E-02	NA	1.4E+01	1.9E+03	2.01E+02	**1.9E+03**
METALS	Mercury	4.74E-01	3.50E+00	3.00E-02	2.72E-01	1.1E-01	2.0E-03	2.0E-02	8.19E-02	**8.2E-02**
METALS	Selenium	0.00E+00	8.60E+00	0.00E+00	1.15E-01	NA	5.0E-02	1.2E+00	3.48E+00	**3.5E+00**
METALS	Silver	0.00E+00	1.30E+00	0.00E+00	7.21E-01	NA	5.1E-01	1.9E+00	3.10E-01	**1.9E+00**
METALS	Strontium	0.00E+00	2.00E+00	0.00E+00	4.79E-01	NA	6.1E+01	3.5E+02	1.98E+01	**3.5E+02**
METALS	Zinc	0.00E+00	3.60E+01	0.00E+00	2.77E-02	NA	3.1E+01	3.0E+03	2.02E+01	**3.0E+03**
SEMIVOLATILES	1,2,4-Trichlorobenzene	5.90E-02	3.32E+01	4.88E+01	3.00E-02	1.6E+03	7.0E-02	6.3E+00	none	**6.3E+00**
SEMIVOLATILES	1,2-Dichlorobenzene	8.73E-02	1.38E+01	1.50E+02	7.17E-02	2.1E+03	6.0E-01	2.3E+01	none	**2.3E+01**
SEMIVOLATILES	1,3-Dichlorobenzene	1.95E-01	3.40E+00	1.10E+02	2.84E-01	3.9E+02	3.1E+00	2.9E+01	none	**2.9E+01**
SEMIVOLATILES	1,4-Dichlorobenzene	1.17E-01	1.29E+01	7.38E+01	7.68E-02	9.6E+02	7.5E-02	2.6E+00	none	**2.6E+00**
SEMIVOLATILES	2,4,5-Trichlorophenol	1.78E-04	4.42E+01	1.20E+03	2.26E-02	5.3E+04	1.0E+01	1.2E+03	none	**1.2E+03**
SEMIVOLATILES	2,4,6-Trichlorophenol	3.19E-04	1.59E+01	9.82E+02	6.25E-02	1.6E+04	2.6E-02	1.1E+00	none	**1.1E+00**
SEMIVOLATILES	2,4-Dichlorophenol	1.31E-04	3.14E+00	4.50E+03	3.10E-01	1.5E+04	3.1E-01	2.7E+00	none	**2.7E+00**
SEMIVOLATILES	2,4-Dimethylphenol	8.31E-05	2.35E+00	6.20E+03	4.10E-01	1.5E+04	2.0E+00	1.3E+01	none	**1.3E+01**
SEMIVOLATILES	2,4-Dinitrophenol	2.01E-07	2.32E-04	5.80E+03	1.15E+01	5.0E+02	2.0E-01	4.8E-02	none	**4.8E-02**
SEMIVOLATILES	2-Chloronaphthalene	2.54E-02	1.70E+02	6.74E+00	5.87E-03	1.1E+03	8.2E+00	3.8E+03	none	**1.1E+03**
SEMIVOLATILES	2-Chlorophenol	7.40E-04	7.92E+00	2.80E+04	1.25E-01	2.2E+05	5.1E-01	1.1E+01	none	**1.1E+01**
SEMIVOLATILES	2-Methylnaphthalene	1.85E-02	8.63E+01	2.54E+01	1.16E-02	2.2E+03	4.1E-01	9.5E+01	none	**9.5E+01**
SEMIVOLATILES	2-Methylphenol	6.65E-05	1.95E+00	2.04E+04	4.90E-01	4.2E+04	5.1E+00	2.8E+01	none	**2.8E+01**
SEMIVOLATILES	2-Nitroaniline	2.08E-05	5.38E-01	1.26E+03	1.60E+00	7.9E+02	3.1E-02	5.2E-02	none	**5.2E-02**
SEMIVOLATILES	2-Nitrophenol	2.21E-05	3.75E+00	1.73E+04	2.61E-01	6.6E+04	2.0E-01	2.1E+00	none	**2.1E+00**
SEMIVOLATILES	3,3'-Dichlorobenzidine	8.65E-07	1.45E+01	3.11E+00	6.86E-02	4.5E+01	6.4E-04	2.5E-02	none	**2.5E-02**
SEMIVOLATILES	3-Nitroaniline	2.31E-07	7.88E-01	4.56E+02	1.14E+00	4.0E+02	3.1E-02	7.2E-02	none	**7.2E-02**
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	1.07E-07	6.32E-04	3.00E+03	1.15E+01	2.6E+02	2.0E-01	4.8E-02	none	**4.8E-02**
SEMIVOLATILES	4-Bromophenyl phenyl ether	9.66E-03	2.90E+03	8.25E-01	3.44E-04	2.4E+03	1.9E-04	1.5E+00	none	**1.5E+00**
SEMIVOLATILES	4-Chloro-3-methylphenol	1.40E-05	1.76E+01	5.43E+03	5.66E-02	9.6E+04	5.1E-01	2.4E+01	none	**2.4E+01**
SEMIVOLATILES	4-Chloroaniline	4.86E-05	1.32E+00	3.90E+03	7.10E-01	5.5E+03	4.1E-01	1.6E+00	none	**1.6E+00**

Table A4-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 100 and Sump 101

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
SEMIVOLATILES	4-Chlorophenyl phenyl ether	1.30E-02	2.62E+02	1.43E+00	3.82E-03	3.8E+02	1.9E-04	1.3E-01	none	**1.3E-01**
SEMIVOLATILES	4-Methylphenol	3.99E-05	1.63E+00	2.30E+04	5.84E-01	3.9E+04	5.1E-01	2.4E+00	none	**2.4E+00**
SEMIVOLATILES	4-Nitroaniline	3.33E-08	2.25E-01	6.49E+02	3.21E+00	2.0E+02	7.5E-02	6.3E-02	none	**6.3E-02**
SEMIVOLATILES	4-Nitrophenol	3.24E-08	8.73E-01	4.49E+03	1.04E+00	4.3E+03	2.0E-01	5.3E-01	none	**5.3E-01**
SEMIVOLATILES	Acenaphthene	6.44E-03	7.96E+01	4.24E+00	1.25E-02	3.4E+02	6.1E+00	1.3E+03	none	**3.4E+02**
SEMIVOLATILES	Acenaphthylene	4.74E-03	1.38E+02	3.93E+00	7.22E-03	5.4E+02	6.1E+00	2.3E+03	none	**5.4E+02**
SEMIVOLATILES	Anthracene	4.61E-03	4.69E+02	4.34E-02	2.13E-03	2.0E+01	3.1E+01	3.9E+04	none	**2.0E+01**
SEMIVOLATILES	Benzo(a)anthracene	1.39E-04	7.10E+03	1.00E-02	1.41E-04	7.1E+01	3.9E-04	7.5E+00	1.53E-02	**7.5E+00**
SEMIVOLATILES	Benzo(a)pyrene	4.70E-05	1.91E+04	1.62E-03	5.24E-05	3.1E+01	2.0E-04	1.0E+01	1.54E-02	**1.0E+01**
SEMIVOLATILES	Benzo(b)fluoranthene	4.99E-04	2.40E+04	1.50E-03	4.16E-05	3.6E+01	3.9E-04	2.5E+01	1.53E-02	**2.5E+01**
SEMIVOLATILES	Benzo(ghi)perylene	5.82E-06	3.17E+04	2.60E-04	3.15E-05	8.2E+00	3.1E+00	2.6E+05	1.23E-02	**8.2E+00**
SEMIVOLATILES	Benzo(k)fluoranthene	4.45E-07	2.46E+04	5.50E-04	4.06E-05	1.4E+01	3.9E-03	2.6E+02	1.30E-02	**1.4E+01**
SEMIVOLATILES	bis(2-Chloroethoxy)methane	1.25E-03	6.13E+00	1.35E+03	1.61E-01	8.4E+03	2.6E-04	4.4E-03	none	**4.4E-03**
SEMIVOLATILES	bis(2-Chloroethyl)ether	8.90E-04	3.10E-01	1.02E+04	2.52E+00	4.0E+03	2.6E-04	2.8E-04	none	**2.8E-04**
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	4.16E-03	6.32E+00	1.70E+03	1.56E-01	1.1E+04	4.1E-02	7.1E-01	none	**7.1E-01**
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	4.57E-04	1.35E+04	3.00E-01	7.40E-05	4.1E+03	6.0E-03	2.2E+02	none	**2.2E+02**
SEMIVOLATILES	Butyl benzyl phthalate	7.94E-05	2.75E+02	2.90E+00	3.64E-03	8.0E+02	2.0E+01	1.5E+04	none	**8.0E+02**
SEMIVOLATILES	Carbazole	3.38E-03	4.91E+01	7.21E-01	2.03E-02	3.5E+01	1.4E-02	1.9E+00	none	**1.9E+00**
SEMIVOLATILES	Chrysene	5.03E-05	6.18E+03	2.00E-03	1.62E-04	1.2E+01	3.9E-02	6.5E+02	1.51E-02	**1.2E+01**
SEMIVOLATILES	Dibenzo(a,h)anthracene	4.66E+00	3.81E+04	5.00E-04	2.62E-05	1.9E+01	2.0E-04	2.1E+01	none	**1.9E+01**
SEMIVOLATILES	Dibenzofuran	5.28E-03	1.70E+02	2.86E+00	5.89E-03	4.9E+02	4.1E-01	1.9E+02	none	**1.9E+02**
SEMIVOLATILES	Diethyl phthalate	1.87E-05	3.03E+00	1.08E+03	3.21E-01	3.4E+03	8.2E+01	6.9E+02	none	**6.9E+02**
SEMIVOLATILES	Dimethyl phthalate	2.40E-05	6.32E-01	4.19E+03	1.39E+00	3.0E+03	8.2E+01	1.6E+02	none	**1.6E+02**
SEMIVOLATILES	di-n-Butyl phthalate	5.94E-05	6.78E+02	1.12E+01	1.48E-03	7.6E+03	1.0E+01	1.9E+04	none	**7.6E+03**
SEMIVOLATILES	di-n-Octyl phthalate	2.78E-03	1.66E+06	2.00E-02	6.01E-07	3.3E+04	2.0E+00	9.2E+06	none	**3.3E+04**
SEMIVOLATILES	Fluoranthene	3.88E-04	9.80E+02	2.60E-01	1.02E-03	2.5E+02	4.1E+00	1.1E+04	2.29E-02	**2.5E+02**
SEMIVOLATILES	Fluorene	2.64E-03	1.52E+02	1.98E+00	6.59E-03	3.0E+02	4.1E+00	1.7E+03	none	**3.0E+02**
SEMIVOLATILES	Hexachlorobenzene	2.22E-02	5.64E+02	6.00E-03	1.77E-03	3.4E+00	1.0E-03	1.5E+00	none	**1.5E+00**
SEMIVOLATILES	Hexachlorobutadiene	9.94E-01	1.38E+02	2.55E+00	7.21E-03	3.5E+02	2.0E-02	7.6E+00	none	**7.6E+00**
SEMIVOLATILES	Hexachlorocyclopentadiene	7.15E-01	1.91E+02	1.80E+00	5.23E-03	3.4E+02	5.0E-02	2.6E+01	none	**2.6E+01**
SEMIVOLATILES	Hexachloroethane	1.62E-01	3.64E+01	5.00E+01	2.74E-02	1.8E+03	1.0E-01	1.0E+01	none	**1.0E+01**
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	2.85E+00	6.93E+04	3.75E-03	1.44E-05	2.6E+02	3.9E-04	7.3E+01	1.43E-02	**7.3E+01**
SEMIVOLATILES	Isophorone	2.57E-04	6.04E-01	1.20E+04	1.45E+00	8.3E+03	3.0E+00	5.6E+00	none	**5.6E+00**
SEMIVOLATILES	Naphthalene	2.00E-02	3.10E+01	3.14E+01	3.22E-02	9.8E+02	2.0E+00	1.7E+02	none	**1.7E+02**
SEMIVOLATILES	Nitrobenzene	8.56E-04	2.64E+00	1.90E+03	3.67E-01	5.2E+03	5.1E-02	3.8E-01	none	**3.8E-01**
SEMIVOLATILES	n-Nitroso-di-n-propylamine	9.35E-05	3.94E-01	9.89E+03	2.08E+00	4.8E+03	4.1E-05	5.3E-05	none	**5.3E-05**
SEMIVOLATILES	n-Nitrosodiphenylamine	2.08E-04	6.62E+00	3.51E+01	1.49E-01	2.4E+02	5.8E-02	1.1E+00	none	**1.1E+00**
SEMIVOLATILES	Pentachlorophenol	1.16E-05	3.12E+01	1.40E+01	3.20E-02	4.4E+02	1.0E-03	8.4E-02	none	**8.4E-02**

Table A4-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 100 and Sump 101

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
SEMIVOLATILES	Phenanthrene	5.40E-03	2.83E+02	9.94E-01	3.54E-03	2.8E+02	3.1E+00	2.3E+03	none	**2.8E+02**
SEMIVOLATILES	Phenol	2.47E-05	3.48E-01	8.70E+04	2.30E+00	3.8E+04	3.1E+01	3.6E+01	none	**3.6E+01**
SEMIVOLATILES	Pyrene	4.57E-04	7.60E+02	1.35E-01	1.31E-03	1.0E+02	3.1E+00	6.3E+03	1.94E-02	**1.0E+02**
VOLATILES	1,1,1-Trichloroethane	7.15E-01	2.19E+00	1.33E+03	4.13E-01	3.2E+03	2.0E-01	1.3E+00	none	**1.3E+00**
VOLATILES	1,1,2,2-Tetrachloroethane	1.55E-02	1.55E+00	2.97E+03	6.09E-01	4.9E+03	1.4E-02	6.3E-02	none	**6.3E-02**
VOLATILES	1,1,2-Trichloroethane	3.80E-02	1.00E+00	4.42E+03	9.12E-01	4.8E+03	5.0E-03	1.5E-02	none	**1.5E-02**
VOLATILES	1,1-Dichloroethane	2.39E-01	6.32E-01	5.50E+03	1.30E+00	4.2E+03	1.0E+01	2.1E+01	none	**2.1E+01**
VOLATILES	1,1-Dichloroethene	1.06E+00	1.29E+00	2.40E+03	6.29E-01	3.8E+03	7.0E-03	3.0E-02	none	**3.0E-02**
VOLATILES	1,2-Dichloroethane	5.32E-02	3.48E-01	8.70E+03	2.25E+00	3.9E+03	5.0E-03	6.0E-03	none	**6.0E-03**
VOLATILES	1,2-Dichloroethene	1.87E-01	5.80E-01	4.93E+03	1.42E+00	3.5E+03	7.0E-02	1.3E-01	none	**1.3E-01**
VOLATILES	1,2-Dichloropropane	1.17E-01	1.18E+00	2.80E+03	7.77E-01	3.6E+03	5.0E-03	1.7E-02	none	**1.7E-02**
VOLATILES	2-Butanone	1.94E-03	3.80E-02	2.40E+05	8.00E+00	3.0E+04	6.1E+01	2.1E+01	none	**2.1E+01**
VOLATILES	2-Hexanone	3.38E-03	3.58E-01	1.79E+04	2.25E+00	8.0E+03	6.1E+00	7.4E+00	none	**7.4E+00**
VOLATILES	Acetone	1.61E-03	1.14E-02	6.00E+05	1.02E+01	5.9E+04	9.2E+01	2.4E+01	none	**2.4E+01**
VOLATILES	Benzene	2.27E-01	1.32E+00	1.77E+03	6.88E-01	2.6E+03	5.0E-03	2.0E-02	none	**2.0E-02**
VOLATILES	Bromodichloromethane	1.32E-01	1.10E+00	4.50E+03	8.25E-01	5.5E+03	4.6E-03	1.5E-02	none	**1.5E-02**
VOLATILES	Bromoform	2.56E-02	1.74E+00	3.20E+03	5.45E-01	5.9E+03	3.6E-02	1.8E-01	none	**1.8E-01**
VOLATILES	Bromomethane	5.90E-01	2.09E-01	1.52E+04	2.41E+00	6.3E+03	1.4E-01	1.6E-01	none	**1.6E-01**
VOLATILES	Carbon disulfide	6.13E-01	1.05E+00	2.30E+03	7.94E-01	2.9E+03	1.0E+01	3.5E+01	none	**3.5E+01**
VOLATILES	Carbon tetrachloride	1.20E+00	3.72E+00	8.05E+02	2.47E-01	3.3E+03	5.0E-03	5.5E-02	none	**5.5E-02**
VOLATILES	Chlorobenzene	1.82E-01	4.28E+00	5.02E+02	2.27E-01	2.2E+03	1.0E-01	1.2E+00	none	**1.2E+00**
VOLATILES	Chloroethane	2.12E-01	3.56E-01	2.00E+04	2.06E+00	9.7E+03	4.1E+01	5.3E+01	none	**5.3E+01**
VOLATILES	Chloroform	1.53E-01	9.35E-01	7.92E+03	9.50E-01	8.3E+03	1.0E+00	2.9E+00	none	**2.9E+00**
VOLATILES	Chloromethane	1.44E+00	1.20E-01	7.25E+03	2.02E+00	3.6E+03	2.2E-01	2.9E-01	none	**2.9E-01**
VOLATILES	cis-1,3-Dichloropropene	9.15E-02	8.93E-01	2.70E+03	1.00E+00	2.7E+03	5.3E-03	1.4E-02	none	**1.4E-02**
VOLATILES	Dibromochloromethane	3.25E-02	1.26E+00	5.25E+03	7.38E-01	7.1E+03	3.4E-02	1.2E-01	none	**1.2E-01**
VOLATILES	Ethylbenzene	3.28E-01	4.08E+00	1.69E+02	2.36E-01	7.2E+02	7.0E-01	8.0E+00	none	**8.0E+00**
VOLATILES	Methyl isobutyl ketone	5.82E-03	3.00E-01	1.90E+04	2.58E+00	7.4E+03	8.2E+00	8.6E+00	none	**8.6E+00**
VOLATILES	Methylene chloride	9.10E-02	2.35E-01	1.54E+04	2.94E+00	5.2E+03	5.0E-03	4.6E-03	none	**4.6E-03**
VOLATILES	Styrene	1.14E-01	1.52E+01	3.10E+02	6.54E-02	4.7E+03	1.0E-01	4.1E+00	none	**4.1E+00**
VOLATILES	Tetrachloroethene	7.65E-01	3.10E+00	2.00E+02	3.00E-01	6.7E+02	5.0E-03	4.5E-02	none	**4.5E-02**
VOLATILES	Toluene	2.76E-01	2.80E+00	5.30E+02	3.40E-01	1.6E+03	1.0E+00	7.9E+00	none	**7.9E+00**
VOLATILES	trans-1,3-Dichloropropene	9.15E-02	8.93E-01	2.80E+03	1.00E+00	2.8E+03	2.9E-02	7.7E-02	none	**7.7E-02**
VOLATILES	Trichloroethene	4.28E-01	1.87E+00	1.10E+03	4.90E-01	2.2E+03	5.0E-03	2.7E-02	none	**2.7E-02**
VOLATILES	Vinyl chloride	3.49E+00	2.19E-01	2.76E+03	9.96E-01	2.8E+03	2.0E-03	5.4E-03	none	**5.4E-03**
VOLATILES	Xylenes, Total	2.93E-01	4.80E+00	1.98E+02	2.02E-01	9.8E+02	1.0E+01	1.3E+02	none	**1.3E+02**

Table A4-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 100 and Sump 101

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)

Notes:

Values of constants shown in Table A4-2.

Values of H', Kd, and S shown in Table A4-4.

GW-Ind - groundwater qualified for industrial use

L/kg - liters per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

MSC - medium specific concentrations

Constants	Values	
rb	1.5	
qw	0.13	
qa	0.30	
L1	152	
L2	396	
W	5500	
LDF	1.035	calculated

Calculated Values:

Ksw = see Equation 8

Csat = see Equation 7

LDF = see Equation 5

Soil MSC = see Equation 6

Applicable Standard 3 Commercial / Industrial MSC equals the lower of the Calculated Soil MSC and Csat values. However, if the Background is larger than both values, the Applicable Standard 3 Commercial / Industrial MSC equals the Background concentration.

Table A4-6
Comparison to Maximum Soil Concentrations
Sump 100 and Sump 101

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
EXPLOSIVES	2,4-Dinitrotoluene	**1.3E-03**	-	1.25	Never detected, SQL > MSC
EXPLOSIVES	2,6-Dinitrotoluene	**1.0E-03**	-	1.25	Never detected, SQL > MSC
METALS	Aluminum	**9.7E+06**	13400	-	All Results < MSC
METALS	Antimony	**9.4E-01**	5.12	7.78	**Detected > MSC**
METALS	Arsenic	**4.8E+00**	6.28	-	**Detected > MSC**
METALS	Barium	**1.6E+02**	119	-	All Results < MSC
METALS	Cadmium	**5.0E-01**	5.55	-	**Detected > MSC**
METALS	Chromium	**5.4E+04**	19.8	-	All Results < MSC
METALS	Cobalt	**7.5E+02**	4.83	-	All Results < MSC
METALS	Copper	**1.4E+02**	10.6	-	All Results < MSC
METALS	Lead	**7.4E+01**	24.3	-	All Results < MSC
METALS	Manganese	**1.9E+03**	91.7	-	All Results < MSC
METALS	Mercury	**8.2E-02**	0.034	0.039	All Results < MSC
METALS	Selenium	**3.5E+00**	-	0.778	All Results < MSC
METALS	Silver	**1.9E+00**	0.038	0.039	All Results < MSC
METALS	Strontium	**3.5E+02**	45.5	-	All Results < MSC
METALS	Zinc	**3.0E+03**	109	-	All Results < MSC
SEMIVOLATILES	1,2,4-Trichlorobenzene	**6.3E+00**	-	1.25	All Results < MSC
SEMIVOLATILES	1,2-Dichlorobenzene	**2.3E+01**	-	1.25	All Results < MSC
SEMIVOLATILES	1,3-Dichlorobenzene	**2.9E+01**	-	1.25	All Results < MSC
SEMIVOLATILES	1,4-Dichlorobenzene	**2.6E+00**	-	1.25	All Results < MSC
SEMIVOLATILES	2,4,5-Trichlorophenol	**1.2E+03**	-	1.25	All Results < MSC
SEMIVOLATILES	2,4,6-Trichlorophenol	**1.1E+00**	-	1.25	Never detected, SQL > MSC
SEMIVOLATILES	2,4-Dichlorophenol	**2.7E+00**	-	1.25	All Results < MSC
SEMIVOLATILES	2,4-Dimethylphenol	**1.3E+01**	-	0.625	All Results < MSC
SEMIVOLATILES	2,4-Dinitrophenol	**4.8E-02**	-	12.5	Never detected, SQL > MSC
SEMIVOLATILES	2-Chloronaphthalene	**1.1E+03**	-	0.375	All Results < MSC
SEMIVOLATILES	2-Chlorophenol	**1.1E+01**	-	0.625	All Results < MSC
SEMIVOLATILES	2-Methylnaphthalene	**9.5E+01**	-	0.375	All Results < MSC
SEMIVOLATILES	2-Methylphenol	**2.8E+01**	-	0.625	All Results < MSC
SEMIVOLATILES	2-Nitroaniline	**5.2E-02**	-	3.75	Never detected, SQL > MSC
SEMIVOLATILES	2-Nitrophenol	**2.1E+00**	-	1.25	All Results < MSC
SEMIVOLATILES	3,3'-Dichlorobenzidine	**2.5E-02**	-	0.625	Never detected, SQL > MSC
SEMIVOLATILES	3-Nitroaniline	**7.2E-02**	-	3.75	Never detected, SQL > MSC
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	**4.8E-02**	-	6.25	Never detected, SQL > MSC
SEMIVOLATILES	4-Bromophenyl phenyl ether	**1.5E+00**	-	1.25	All Results < MSC
SEMIVOLATILES	4-Chloro-3-methylphenol	**2.4E+01**	-	0.625	All Results < MSC
SEMIVOLATILES	4-Chloroaniline	**1.6E+00**	-	3.75	Never detected, SQL > MSC
SEMIVOLATILES	4-Chlorophenyl phenyl ether	**1.3E-01**	-	1.25	Never detected, SQL > MSC
SEMIVOLATILES	4-Methylphenol	**2.4E+00**	-	0.625	All Results < MSC
SEMIVOLATILES	4-Nitroaniline	**6.3E-02**	-	6.25	Never detected, SQL > MSC

Table A4-6
Comparison to Maximum Soil Concentrations
Sump 100 and Sump 101

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
SEMIVOLATILES	4-Nitrophenol	**5.3E-01**	-	6.25	Never detected, SQL > MSC
SEMIVOLATILES	Acenaphthene	**3.4E+02**	-	0.375	All Results < MSC
SEMIVOLATILES	Acenaphthylene	**5.4E+02**	-	0.625	All Results < MSC
SEMIVOLATILES	Anthracene	**2.0E+01**	-	0.625	All Results < MSC
SEMIVOLATILES	Benzo(a)anthracene	**7.5E+00**	-	0.375	All Results < MSC
SEMIVOLATILES	Benzo(a)pyrene	**1.0E+01**	-	0.625	All Results < MSC
SEMIVOLATILES	Benzo(b)fluoranthene	**2.5E+01**	-	1.25	All Results < MSC
SEMIVOLATILES	Benzo(ghi)perylene	**8.2E+00**	0.172	2.5	All Results < MSC
SEMIVOLATILES	Benzo(k)fluoranthene	**1.4E+01**	-	1.25	All Results < MSC
SEMIVOLATILES	bis(2-Chloroethoxy)methane	**4.4E-03**	-	0.625	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Chloroethyl)ether	**2.8E-04**	-	0.625	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	**7.1E-01**	-	1.25	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	**2.2E+02**	-	0.625	All Results < MSC
SEMIVOLATILES	Butyl benzyl phthalate	**8.0E+02**	-	0.625	All Results < MSC
SEMIVOLATILES	Carbazole	**1.9E+00**	-	1.25	All Results < MSC
SEMIVOLATILES	Chrysene	**1.2E+01**	-	6.25	All Results < MSC
SEMIVOLATILES	Dibenzo(a,h)anthracene	**1.9E+01**	0.149	2.5	All Results < MSC
SEMIVOLATILES	Dibenzofuran	**1.9E+02**	-	1.25	All Results < MSC
SEMIVOLATILES	Diethyl phthalate	**6.9E+02**	0.244	0.617	All Results < MSC
SEMIVOLATILES	Dimethyl phthalate	**1.6E+02**	-	0.625	All Results < MSC
SEMIVOLATILES	di-n-Butyl phthalate	**7.6E+03**	-	4.098	All Results < MSC
SEMIVOLATILES	di-n-Octyl phthalate	**3.3E+04**	-	0.625	All Results < MSC
SEMIVOLATILES	Fluoranthene	**2.5E+02**	-	0.625	All Results < MSC
SEMIVOLATILES	Fluorene	**3.0E+02**	-	0.625	All Results < MSC
SEMIVOLATILES	Hexachlorobenzene	**1.5E+00**	-	1.25	All Results < MSC
SEMIVOLATILES	Hexachlorobutadiene	**7.6E+00**	-	3.75	All Results < MSC
SEMIVOLATILES	Hexachlorocyclopentadiene	**2.6E+01**	-	3.75	All Results < MSC
SEMIVOLATILES	Hexachloroethane	**1.0E+01**	-	1.25	All Results < MSC
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	**7.3E+01**	0.172	1.25	All Results < MSC
SEMIVOLATILES	Isophorone	**5.6E+00**	-	0.625	All Results < MSC
SEMIVOLATILES	Naphthalene	**1.7E+02**	-	0.375	All Results < MSC
SEMIVOLATILES	Nitrobenzene	**3.8E-01**	-	0.625	Never detected, SQL > MSC
SEMIVOLATILES	n-Nitroso-di-n-propylamine	**5.3E-05**	-	1.25	Never detected, SQL > MSC
SEMIVOLATILES	n-Nitrosodiphenylamine	**1.1E+00**	-	0.625	All Results < MSC
SEMIVOLATILES	Pentachlorophenol	**8.4E-02**	-	6.25	Never detected, SQL > MSC
SEMIVOLATILES	Phenanthrene	**2.8E+02**	-	0.625	All Results < MSC
SEMIVOLATILES	Phenol	**3.6E+01**	-	0.625	All Results < MSC
SEMIVOLATILES	Pyrene	**1.0E+02**	-	0.625	All Results < MSC
VOLATILES	1,1,1-Trichloroethane	**1.3E+00**	-	0.006	All Results < MSC
VOLATILES	1,1,2,2-Tetrachloroethane	**6.3E-02**	-	0.006	All Results < MSC
VOLATILES	1,1,2-Trichloroethane	**1.5E-02**	-	0.006	All Results < MSC

Table A4-6
Comparison to Maximum Soil Concentrations
Sump 100 and Sump 101

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
VOLATILES	1,1-Dichloroethane	**2.1E+01**	-	0.006	All Results < MSC
VOLATILES	1,1-Dichloroethene	**3.0E-02**	-	0.006	All Results < MSC
VOLATILES	1,2-Dichloroethane	**6.0E-03**	-	0.006	All Results < MSC
VOLATILES	1,2-Dichloroethene	**1.3E-01**	-	0.006	All Results < MSC
VOLATILES	1,2-Dichloropropane	**1.7E-02**	-	0.006	All Results < MSC
VOLATILES	2-Butanone	**2.1E+01**	-	0.062	All Results < MSC
VOLATILES	2-Hexanone	**7.4E+00**	-	0.062	All Results < MSC
VOLATILES	Acetone	**2.4E+01**	-	0.06	All Results < MSC
VOLATILES	Benzene	**2.0E-02**	-	0.006	All Results < MSC
VOLATILES	Bromodichloromethane	**1.5E-02**	-	0.006	All Results < MSC
VOLATILES	Bromoform	**1.8E-01**	-	0.006	All Results < MSC
VOLATILES	Bromomethane	**1.6E-01**	-	0.031	All Results < MSC
VOLATILES	Carbon disulfide	**3.5E+01**	0.017	0.006	All Results < MSC
VOLATILES	Carbon tetrachloride	**5.5E-02**	-	0.006	All Results < MSC
VOLATILES	Chlorobenzene	**1.2E+00**	-	0.006	All Results < MSC
VOLATILES	Chloroethane	**5.3E+01**	-	0.031	All Results < MSC
VOLATILES	Chloroform	**2.9E+00**	-	0.006	All Results < MSC
VOLATILES	Chloromethane	**2.9E-01**	-	0.031	All Results < MSC
VOLATILES	cis-1,3-Dichloropropene	**1.4E-02**	-	0.006	All Results < MSC
VOLATILES	Dibromochloromethane	**1.2E-01**	-	0.006	All Results < MSC
VOLATILES	Ethylbenzene	**8.0E+00**	-	0.006	All Results < MSC
VOLATILES	Methyl isobutyl ketone	**8.6E+00**	-	0.062	All Results < MSC
VOLATILES	Methylene chloride	**4.6E-03**	-	0.027	Never detected, SQL > MSC
VOLATILES	Styrene	**4.1E+00**	-	0.006	All Results < MSC
VOLATILES	Tetrachloroethene	**4.5E-02**	-	0.006	All Results < MSC
VOLATILES	Toluene	**7.9E+00**	-	0.006	All Results < MSC
VOLATILES	trans-1,3-Dichloropropene	**7.7E-02**	-	0.006	All Results < MSC
VOLATILES	Trichloroethene	**2.7E-02**	-	0.006	All Results < MSC
VOLATILES	Vinyl chloride	**5.4E-03**	-	0.031	Never detected, SQL > MSC
VOLATILES	Xylenes, Total	**1.3E+02**	-	0.006	All Results < MSC

Notes:

Maximum Soil Concentrations shown in Table 5 of the Shaw (2008b) Addendum.

mg/kg - milligrams per kilogram

MSC - medium specific concentration

SQL - sample quantitation limit

Table A4-7
Chemical Specific Standard 3 Groundwater-Protective MSCs for Soil
Sump 100 and Sump 101

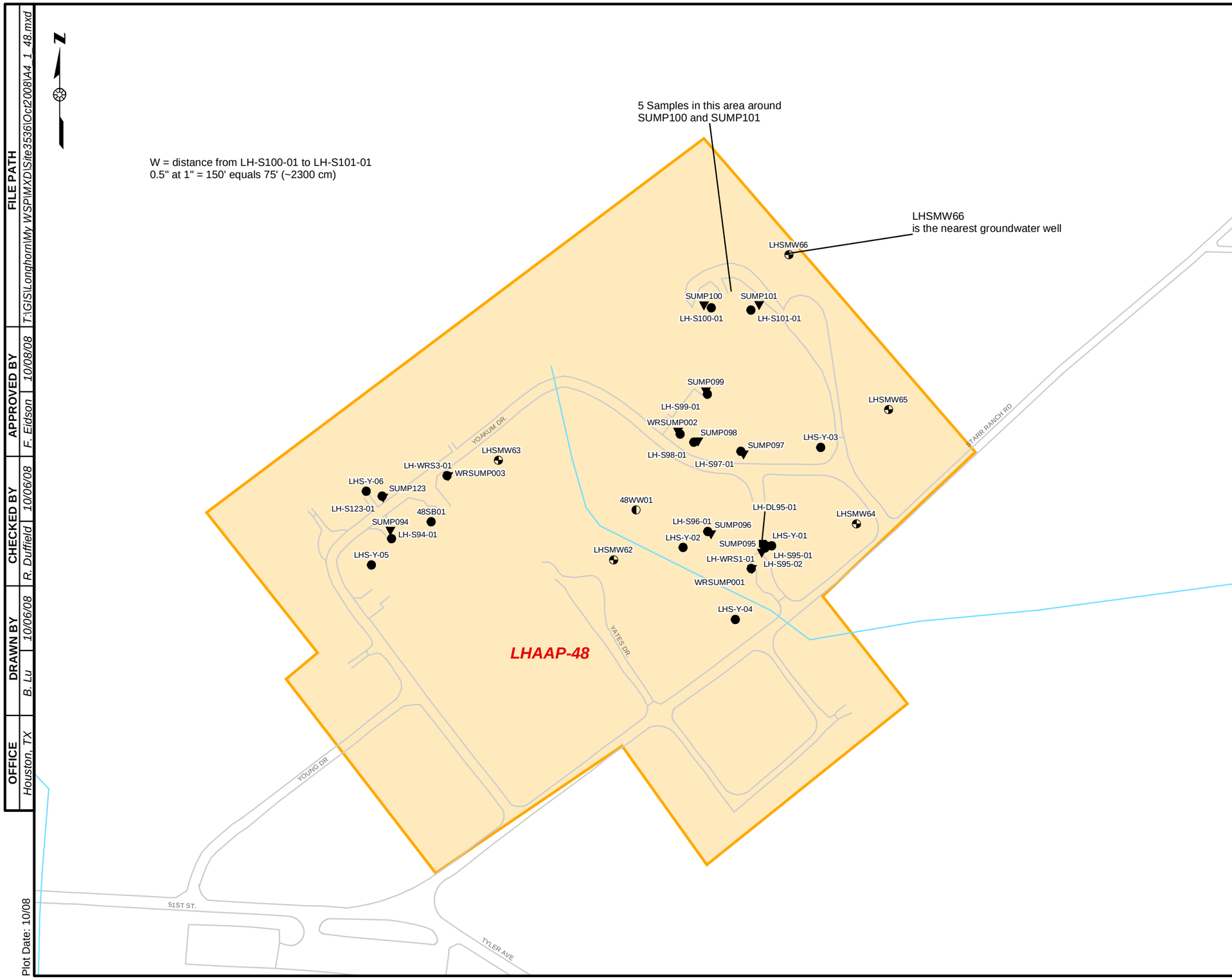
Tier 3 MSC Calculation for Specific Chemicals with Concentrations Above Initial Standard 3 MSC			
Variables	**Antimony**	**Arsenic**	**Cadmium**
L1 - Thickness of affected soil	61	61	152
L2 - Distance from top of affected soils to top of water bearing unit.	396	396	396
W - Width of soil source area parallel to groundwater flow direction	1,000	1,000	2,300
H' - Dimensional form of Henry's Law Constant	0.00E+00	0.00E+00	0.00E+00
Kd - Soil Water Partition Coefficient	5.70E+01	2.70E+01	3.70E+01
S - Solubility in mg/L	0.00E+00	0.00E+00	0.00E+00
Calculations			
Ksw = see Equation 8	1.75E-02	3.69E-02	2.70E-02
Csat = see Equation 7 (mg/kg)	NA	NA	NA
GW-Ind MSC (mg/L)	6.0E-03	1.0E-02	5.0E-03
LDF = see Equation 5	1.082	1.082	1.035
Standard 3 Soil MSC Com/Ind (mg/kg) = see Equation 6	2.4E+00	1.9E+00	5.0E-01
Corrected Standard 3 Soil MSC Com/Ind (cannot be larger than Csat) (mg/kg)	2.4E+00	1.9E+00	5.0E-01
Background Concentration (mg/kg)	9.40E-01	4.81E+00	4.00E-01
Applicable Commercial/Industrial Soil MSC (mg/kg)	**2.4E+00**	**4.8E+00**	**5.0E-01**
Maximum Detected Concentration for Comparison (mg/kg)	**5.12**	**6.28**	**5.55**

Notes:

GW-Ind MSC	from TCEQ 2006 RBSV table
LDF	leachate dilution factor
MSC	Medium Specific Concentration
mg/kg	milligrams per kilogram

Constants:

Symbol	Value	Units	Name
r_b	1.5	g/cm³	Soil Dry Bulk Density
n	0.43	unitless	Total Porosity
q_w	0.13	unitless	Volumetric Water Content of Soil
f_{oc}	0.02	g/g	Soil Fraction Organic Carbon
I	30.4	cm/yr	Net Infiltration Rate through soil
V_{gw}	8.12763	cm/yr	Groundwater Darcy Velocity = K x i x 31500000
K	3.8E-05	cm/sec	Hydraulic conductivity in groundwater bearing unit
i	0.00679	unitless	Hydraulic gradient in groundwater bearing unit
d	305	cm	Groundwater mixing zone
q_a	0.3	unitless	Soil Air Filled Porosity (qa) = n - qw



Legend

- Shallow Monitoring Well
- Intermediate Monitoring Well
- Surface Soil
- Soil boring
- Sump
- Stream
- Road
- Existing Building
- Site

0 75 150 300 Feet

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

FIGURE A4-1

LHAAP-48 SAMPLE LOCATION MAP

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		FILE PATH
Houston, TX	B. Lu	10/06/08	R. Duffield	10/06/08	F. Eidson	10/08/08	T:\GIS\Longhorn\My WSP\MXD\Site3536\Oct2008\A4_1_48.mxd

Plot Date: 10/08

Attachment 5

Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 102, Sump 103, Sump 104, and Sump 105

Attachment 5 – SAM Model Evaluation

Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 102, Sump 103, Sump 104 and Sump 105 at the Longhorn Army Ammunition Plant, Karnack, Texas

Attachment 5 describes development of Medium Specific Concentrations (MSCs) for chemicals in soil that are protective of groundwater for soil associated with Sump 102, Sump 103, Sump 104 and Sump 105. The MSC values were developed according to the Texas Commission on Environmental Quality [TCEQ] Texas Risk Reduction Rules, Title 30 Texas Administrative Code (TAC) Chapter 335 (30 TAC §335 and updates). Groundwater-protective Risk Reduction Standard 3 MSCs were calculated to evaluate the potential for migration of chemicals from soil to groundwater as provided in TCEQ guidance [30 TAC §335.563(i)(2)] by using the SAM model to estimate the potential impacts of soil contamination on groundwater quality.

Sump 102, Sump 103, Sump 104 and Sump 105 are 4 sumps that were located at Longhorn Army Ammunition Plant (LHAAP)-35C(53) (Former Static Test Area) as shown in **Figure A5-1**, which is from the Final Site Evaluation Report for LHAAP-48 and LHAAP-35C(53) (Shaw, 2007). Evaluation of chemicals in soil associated with these 4 sumps was based on data from analysis of 27 soil samples collected from depths ranging from 0 to 11 feet below ground surface (bgs). The samples were analyzed for explosives, metals, semivolatile organic compounds (SVOCs), and volatile organic compounds (VOCs). The analytical results were evaluated as reported in **Table 6** of the main body of this Addendum.

The initial step in the SAM Model compared the tested chemicals to available background concentrations and method quantitation limits (MQL) for each chemical. Of the chemicals tested, 4 were not evaluated because they are regarded as essential nutrients (TCEQ, 2001). The evaluation of the remaining chemicals is recorded on **Table A5-1**.

The SAM Model is an extension of the Soil Screening Level calculations described in USEPA (1996) guidance and is based on calculating total mass (liquid phase, solid phase, and gas phase) in the soil column:

$$M_T = V(\rho_b C_s + \theta_w C_w + \theta_a C_g)$$

Where

M_T = total mass of chemical
V = volume of the soil column
ρ_b = bulk density
C_s = concentration in soil (dry weight basis)
θ_w = water filled porosity
C_w = concentration in pore water
θ_a = air filled porosity

C_g = gas phase concentration.

Total mass is then redistributed using equilibrium conditions based on the adsorption coefficient and Henry's constant. The equilibrium equations are:

$$C_s = K_d C_w \qquad \text{Equation 1}$$

$$C_g = H' C_w \qquad \text{Equation 2}$$

Where Kd is the distribution coefficient or adsorption coefficient, and H' is the dimensionless Henry's Law constant.

A SAM Model enhancement over USEPA's Soil Screening Levels is that the SAM Model assumes a zone of contaminated soils overlying a zone of clean soil (zero contaminant concentration). The SAM Model simulates mixing of contamination through the contaminated and clean soil zones based on equilibrium conditions and predicts leachate concentration at the bottom of the soil column. In the SAM Model, the leachate concentration is calculated as follows:

$$C_w = C_s \left(\frac{\rho_b}{\theta_w + (K_d \rho_b) + H' \theta_a} \right) \left(\frac{L_1}{L_2} \right) \qquad \text{Equation 3}$$

Or, alternately, the concentration in soil that will produce a given leachate concentration can be calculated as:

$$C_s = C_w \left(\frac{\theta_w + (K_d \rho_b) + H' \theta_a}{\rho_b} \right) \left(\frac{L_2}{L_1} \right) \qquad \text{Equation 4}$$

Where L_1 is the thickness of the contaminated zone and L_2 is the thickness of the total soil column. The factor (L_2/L_1) is an enhancement in the SAM Model over the Soil Screening Level Model by USEPA. A further dilution factor for leachate mixing with groundwater can be incorporated by using a leachate dilution factor:

$$LDF = 1 + \frac{Kid}{IW} \qquad \text{Equation 5}$$

Where

K = aquifer hydraulic conductivity
i = hydraulic gradient in aquifer
d = groundwater mixing zone depth
I = infiltration rate
W = source length parallel to groundwater flow.

The groundwater protective Standard 3 MSC is the soil concentration (Cs) described by Equation 4 where the groundwater concentration is limited by the TCEQ risk-based drinking water concentration (GW-Ind) modified by the leachate dilution factor (LDF) as follows:

$$\text{Standard 3 } MSC = GW - Ind\left(\frac{\theta_w + (K_d \rho_b) + H'\theta_a}{\rho_b}\right)\left(\frac{L_2}{L_1}\right) x\ LDF \quad \text{Equation 6}$$

The model further calculates the soil saturation concentration (C_{sat}), which corresponds to the contaminant concentration in soil at which the absorptive capacity of soil particles, the solubility limits of soil pore water and saturation of soil pore air have been reached. Concentrations above C_{sat} are assumed to be in free phase. The C_{sat} concentration is calculated in the SAM Model according to Equation 7.

$$C_{sat} = S\left(\frac{\theta_w + (K_d \rho_b) + H'\theta_a}{\rho_b}\right) \quad \text{Equation 7}$$

For the purpose of simplification, a soil to water coefficient, K_{sw}, can stand in for the complex bracketed formula in Equations 3, 4, 6, and 7.

$$K_{sw} = \left(\frac{\rho_b}{\theta_w + (K_d \rho_b) + (H'\theta_a)}\right) \quad \text{Equation 8}$$

Input parameters to the SAM Model, that are either specific to Sump 102, Sump 103, Sump 104 and Sump 105 locations at LHAAP-35C(53) or are default TCEQ values, are shown in **Table A5-2**. Because some chemical properties are pH dependent, an average groundwater pH (5.3) was calculated in **Table A5-3**. **Table A5-4** lists the chemical properties (TCEQ, 2008). From these input parameters and properties, the SAM Model first calculates a saturated soil concentration (C_{sat}) using Equation 7.

Then the SAM Model calculates a Standard 3 Commercial/Industrial Soil MSC using Equation 6 by equating C_w to the GW-Ind MSC and calculating what concentration of chemical in the soil at the site (mg/kg) that would theoretically leach into the groundwater at the GW-Ind concentration (mg/L). The lower of the C_{sat} and the calculated Soil MSC values is used as the Soil MSC.

Finally, the SAM Model compares the Soil MSC to available background soil concentrations for the chemical. The 95% upper prediction limit (UPL) soil background concentrations from the LHAAP-35/36 Sump Report (Shaw, 2008) were used for this comparison. The larger of the Soil MSC and the background concentration is then selected as the Applicable Standard 3 Commercial/Industrial Soil MSC.

Table A5-5 presents the results of those calculations. The Applicable Commercial/Industrial Soil MSC values are in bold along the right side of the table. While it is possible to select different site parameters for each chemical, for this calculation, general whole site parameters were used as if each chemical were equally and evenly distributed across the entire site. When compared to actual distribution of individual chemical results in individual samples taken near former sump locations, this assumption overestimates the extent of the chemical concentration across the site, resulting in lower concentrations calculated for the Applicable Commercial Industrial Soil MSC.

Table A5-6 compares the Applicable Standard 3 Commercial/Industrial Soil MSC values to maximum soil concentrations for each chemical in the samples associated with Sump 102, Sump 103, Sump 104 and Sump 105 at LHAAP-35C(53).

Discussion

The SAM Model results for Sump 102, Sump 103, Sump 104 and Sump 105 at LHAAP-35C(53) indicate that maximum concentrations of 4 metals (arsenic, barium, cadmium and silver) exceed the calculated groundwater protective soil MSC concentrations in detected samples. The SAM Model was recalculated for these 4 chemicals to determine whether chemical-specific input values for L1, L2 and W would result in a changed MSC value. These chemical specific calculations are shown in **Table A5-7**.

All 27 samples contained detectable arsenic, but only 6 samples contained arsenic above the initial calculated MSC value (4.8E+00 mg/kg in **Table A5-6**). These samples were from depths ranging from 0 to 6 feet bgs. Rerunning the SAM Model specifically for arsenic, with a changed value for L1 of 6 feet (183 [cm]) and unchanged values for L2 of 13 feet (396 cm) and W of 180 feet (5500 cm) that reflect the location of the arsenic concentrations, the SAM Model calculates an unchanged chemical-specific MSC value of 4.8E+00 mg/kg (**Table A5-7**), which is the background concentration.

All 27 samples contained detectable barium, but only 16 samples contained barium above the initial calculated MSC value (8.5E+01 mg/kg in **Table A5-6**). These samples were scattered across the site at depths ranging from 0 to 11 feet bgs. Rerunning the SAM Model specifically for barium, with unchanged values for L1 of 11 feet (335 cm), L2 of 13 feet (396 cm), and W of 180 feet (5500 cm) that reflect the location of the barium concentration, the SAM Model calculates an unchanged chemical-specific MSC value of 8.5E+01 mg/kg (**Table A5-7**), which is the background concentration.

Only 2 of 27 samples contained detectable cadmium and both were greater than the initial calculated MSC value (4.0E-01 mg/kg). These 2 samples were both from 0 to 0.5 feet bgs, and both were from the LHS-T-02 location. Rerunning the SAM Model specifically for cadmium, with changed values for L1 of 1 foot (30 cm) and W of 32 feet (1000 cm), and an unchanged value for L2 of 13 feet (396 cm) that reflect the location of the cadmium concentration, the SAM Model calculates a chemical-specific MSC value of 2.5E+00 mg/kg (**Table A5-7**), which is greater than the maximum detected value of 1.60 mg/kg.

Only 2 of 27 samples contained detectable silver, and both were greater than the initial calculated MSC value (3.1E-01 mg/kg). These 2 samples were both from 0 to 0.5 feet bgs, and both were from the LHS-T-02 location. Rerunning the SAM Model specifically for silver, with changed values for L1 of 1 foot (30 cm) and W of 32 feet (1000 cm), and an unchanged value for L2 of 13 feet (396 cm) that reflect the location of the silver concentration, the SAM Model calculates a chemical specific MSC value of 3.8E+00 mg/kg (**Table A5-7**).

Concentrations of cadmium and silver in soil exceed background concentrations at one isolated location. Further calculation of chemical-specific MSC values for arsenic, barium, cadmium and silver indicate that arsenic, barium and silver are predicted by the SAM Model to have potential to leach from soil into the groundwater, but cadmium is not. Analysis of groundwater taken from LHAAP-35C(53) in 2005 indicated that arsenic and barium concentrations detected in groundwater were well below the barium MCL, and cadmium and silver concentrations were not detected (Shaw, 2008, **Table 3-1**). These results indicate that any leaching of arsenic, barium, cadmium, and silver from soil to groundwater is within TCEQ limits. Arsenic was detected above maximum contaminant levels (MCL) levels in wells PZ002 and PZ004, however, these concentrations were attributed to turbidity in groundwater samples from those temporary piezometer wells. All groundwater samples from constructed monitoring wells contained undetected arsenic concentrations or low estimated (J-qualified) concentrations below the arsenic MCL (Shaw, 2008, **Table 3-1**).

References

Shaw Environmental, Inc. (Shaw), 2007, Final Site Evaluation Report LHAAP-48 (Former Igniter Production Area) and LHAAP-35C(53) (Former Static Test Area), April.

Shaw, 2008, Final Data Evaluation Report, Chemical Concentrations in Soil Samples Associated with LHAAP-35/36 Sumps, January (LHAAP-35/36 Sump Report).

Texas Commission on Environmental Quality (TCEQ), 2001, Interoffice Memorandum from Joseph T. Haney, Jr., (TCEQ) to Camarie Perry, Office or Permitting, Remediation & Registration, *Evaluation of the Potential Health Impacts of Exposure to Iron, Calcium, Magnesium, Potassium, sodium, and Phosphorus through Soil Ingestion*, October.

TCEQ, 2008, Annual TCEQ update of chemical/physical properties table [(Figure: 30 TAC §350.73(e)], April.

U.S. Environmental Protection Agency (USEPA), 1996, *Soil Screening Guidance: User's Guide*, Second Edition.

Table A5-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 102, Sump 103, Sump 104 and Sump 105

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	Calculate MSC ?
EXPLOSIVES	1,3,5-Trinitrobenzene	-	0.24	NE	NE	0.22	YES
EXPLOSIVES	1,3-Dinitrobenzene	-	0.24	NE	NE	0.22	YES
EXPLOSIVES	2,4,6-Trinitrotoluene	-	0.24	NE	NE	0.22	YES
EXPLOSIVES	2,4-Dinitrotoluene	-	0.33	NE	NE	0.22	YES
EXPLOSIVES	2,6-Dinitrotoluene	-	0.33	NE	NE	0.23	YES
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	-	0.49	NE	NE	0.45	YES
EXPLOSIVES	HMX	-	2.2	NE	NE	2	YES
EXPLOSIVES	m-Nitrotoluene	-	0.98	NE	NE	0.9	YES
EXPLOSIVES	Nitrobenzene	-	0.25	NE	NE	0.23	YES
EXPLOSIVES	o-Nitrotoluene	-	0.98	NE	NE	0.9	YES
EXPLOSIVES	p-Nitrotoluene	-	2.9	NE	NE	2.7	YES
EXPLOSIVES	RDX	-	1.1	NE	NE	0.97	YES
EXPLOSIVES	Tetryl	-	0.73	NE	NE	0.67	YES
METALS	Aluminum	23800	18000	1.63E+04	2.08E+04	5240	YES
METALS	Antimony	-	14	9.40E-01	1.60E+00	3	YES
METALS	Arsenic	10.1	-	4.81E+00	5.54E+00	0.3	YES
METALS	Barium	179	-	1.52E+02	8.55E+01	0.3	YES
METALS	Cadmium	1.6	1.2	1.40E+00	4.00E-01	1	YES
METALS	Calcium	53200	-	NA	NA	NA	No, 1
METALS	Chromium	49.7	-	2.66E+01	3.01E+01	0.4	YES
METALS	Cobalt	29.8	-	7.23E+00	5.61E+00	0.5	YES
METALS	Copper	16.2	-	5.55E+00	9.25E+00	0.6	YES
METALS	Iron	27800	22300	NA	NA	7620	No, 1
METALS	Lead	29	-	2.26E+01	1.14E+01	5	YES
METALS	Magnesium	2380	-	NA	NA	NA	No, 1
METALS	Manganese	513	-	1.25E+03	2.01E+02	0.2	YES
METALS	Mercury	-	0.14	8.19E-02	3.60E-01	0.1	YES
METALS	Potassium	1860	-	NA	NA	NA	No, 1
METALS	Selenium	0.44	1	3.48E+00	5.57E+00	1	YES
METALS	Silver	6.4	1.2	3.10E-01	3.70E-01	1	YES
METALS	Strontium	82.5	11.8	1.98E+01	2.91E+01	11.8	YES
METALS	Thallium	-	69.8	4.70E-01	NE	59	YES
METALS	Zinc	252	-	6.16E+01	2.02E+01	2.5	YES
SEMIVOLATILES	1,2,4-Trichlorobenzene	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	1,2-Dichlorobenzene	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	1,3-Dichlorobenzene	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	1,4-Dichlorobenzene	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	2,4,5-Trichlorophenol	-	2.6	NE	NE	1.65	YES
SEMIVOLATILES	2,4,6-Trichlorophenol	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	2,4-Dichlorophenol	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	2,4-Dimethylphenol	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	2,4-Dinitrophenol	-	2.6	NE	NE	1.65	YES
SEMIVOLATILES	2,4-Dinitrotoluene	-	0.52	NE	NE	0.33	No, 2
SEMIVOLATILES	2,6-Dinitrotoluene	-	0.52	NE	NE	0.33	No, 2
SEMIVOLATILES	2-Chloronaphthalene	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	2-Chlorophenol	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	2-Methylnaphthalene	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	2-Methylphenol	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	2-Nitroaniline	-	2.6	NE	NE	1.65	YES
SEMIVOLATILES	2-Nitrophenol	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	3,3'-Dichlorobenzidine	-	1	NE	NE	0.65	YES
SEMIVOLATILES	3-Nitroaniline	-	2.6	NE	NE	1.65	YES
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	-	2.6	NE	NE	1.65	YES
SEMIVOLATILES	4-Bromophenyl phenyl ether	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	4-Chloro-3-methylphenol	-	0.65	NE	NE	0.5	YES
SEMIVOLATILES	4-Chloroaniline	-	0.65	NE	NE	0.5	YES
SEMIVOLATILES	4-Chlorophenyl phenyl ether	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	4-Methylphenol	-	0.52	NE	NE	0.33	YES

Table A5-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 102, Sump 103, Sump 104 and Sump 105

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	Calculate MSC ?
SEMIVOLATILES	4-Nitroaniline	-	2.6	NE	NE	1.65	YES
SEMIVOLATILES	4-Nitrophenol	-	2.6	NE	NE	1.65	YES
SEMIVOLATILES	Acenaphthene	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	Acenaphthylene	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	Anthracene	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	Benzo(a)anthracene	0.14	0.52	1.53E-02	NE	0.33	YES
SEMIVOLATILES	Benzo(a)pyrene	0.11	0.52	1.54E-02	NE	0.33	YES
SEMIVOLATILES	Benzo(b)fluoranthene	0.28	0.52	1.53E-02	NE	0.33	YES
SEMIVOLATILES	Benzo(ghi)perylene	-	0.52	1.23E-02	NE	0.33	YES
SEMIVOLATILES	Benzo(k)fluoranthene	0.11	0.52	1.30E-02	NE	0.33	YES
SEMIVOLATILES	Benzoic Acid	-	2.6	NE	NE	1.65	YES
SEMIVOLATILES	Benzyl Alcohol	-	0.65	NE	NE	0.5	YES
SEMIVOLATILES	bis(2-Chloroethoxy)methane	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	bis(2-Chloroethyl)ether	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	0.58	0.52	NE	NE	0.33	YES
SEMIVOLATILES	Butyl benzyl phthalate	0.22	0.52	NE	NE	0.33	YES
SEMIVOLATILES	Chrysene	0.29	0.52	1.51E-02	NE	0.33	YES
SEMIVOLATILES	Dibenzo(a,h)anthracene	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	Dibenzofuran	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	Diethyl phthalate	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	Dimethyl phthalate	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	di-n-Butyl phthalate	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	di-n-Octyl phthalate	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	Fluoranthene	0.42	0.52	2.29E-02	NE	0.33	YES
SEMIVOLATILES	Fluorene	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	Hexachlorobenzene	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	Hexachlorobutadiene	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	Hexachlorocyclopentadiene	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	Hexachloroethane	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	-	0.52	1.43E-02	NE	0.33	YES
SEMIVOLATILES	Isophorone	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	Naphthalene	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	Nitrobenzene	-	0.52	NE	NE	0.33	No, 2
SEMIVOLATILES	n-Nitroso-di-n-propylamine	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	n-Nitrosodiphenylamine	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	Pentachlorophenol	-	2.6	NE	NE	1.65	YES
SEMIVOLATILES	Phenanthrene	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	Phenol	-	0.52	NE	NE	0.33	YES
SEMIVOLATILES	Pyrene	0.32	0.52	1.94E-02	NE	0.33	YES
VOLATILES	1,1,1,2-Tetrachloroethane	-	0.016	NE	NE	0.015	YES
VOLATILES	1,1,1-Trichloroethane	-	0.008	NE	NE	0.005	YES
VOLATILES	1,1,2,2-Tetrachloroethane	-	0.008	NE	NE	0.005	YES
VOLATILES	1,1,2-Trichloroethane	-	0.008	NE	NE	0.005	YES
VOLATILES	1,1-Dichloroethane	-	0.008	NE	NE	0.005	YES
VOLATILES	1,1-Dichloroethene	-	0.008	NE	NE	0.005	YES
VOLATILES	1,2,3-Trichloropropane	-	0.016	NE	NE	0.015	YES
VOLATILES	1,2-Dibromo-3-chloropropane	-	0.031	NE	NE	0.031	YES
VOLATILES	1,2-Dibromoethane	-	0.031	NE	NE	0.031	YES
VOLATILES	1,2-Dichloroethane	-	0.008	NE	NE	0.005	YES
VOLATILES	1,2-Dichloroethene	-	0.008	NE	NE	0.005	YES
VOLATILES	1,2-Dichloropropane	-	0.008	NE	NE	0.005	YES
VOLATILES	2-Butanone	-	0.05	NE	NE	0.015	YES
VOLATILES	2-Chloroethyl vinyl ether	-	0.016	NE	NE	0.01	YES
VOLATILES	2-Hexanone	-	0.05	NE	NE	0.015	YES
VOLATILES	2-Propenal	-	0.78	NE	NE	0.76	YES
VOLATILES	Acetone	-	0.1	NE	NE	0.015	YES
VOLATILES	Acetonitrile	-	0.16	NE	NE	0.15	YES

Table A5-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 102, Sump 103, Sump 104 and Sump 105

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	Calculate MSC ?
VOLATILES	Acrylonitrile	-	0.16	NE	NE	0.15	YES
VOLATILES	Allyl chloride	-	0.016	NE	NE	0.015	YES
VOLATILES	Benzene	-	0.008	NE	NE	0.005	YES
VOLATILES	Bromodichloromethane	-	0.008	NE	NE	0.005	YES
VOLATILES	Bromoform	-	0.008	NE	NE	0.005	YES
VOLATILES	Bromomethane	-	0.016	NE	NE	0.01	YES
VOLATILES	Carbon disulfide	-	0.008	NE	NE	0.005	YES
VOLATILES	Carbon tetrachloride	-	0.008	NE	NE	0.005	YES
VOLATILES	Chlorobenzene	-	0.008	NE	NE	0.005	YES
VOLATILES	Chloroethane	-	0.016	NE	NE	0.01	YES
VOLATILES	Chloroform	-	0.008	NE	NE	0.005	YES
VOLATILES	Chloromethane	-	0.016	NE	NE	0.01	YES
VOLATILES	Chloroprene	-	0.16	NE	NE	0.15	YES
VOLATILES	cis-1,3-Dichloropropene	-	0.008	NE	NE	0.005	YES
VOLATILES	Dibromochloromethane	-	0.008	NE	NE	0.005	YES
VOLATILES	Dibromomethane	-	0.031	NE	NE	0.031	YES
VOLATILES	Dichlorodifluoromethane	-	0.031	NE	NE	0.031	YES
VOLATILES	Ethyl methacrylate	-	0.031	NE	NE	0.031	YES
VOLATILES	Ethylbenzene	-	0.008	NE	NE	0.005	YES
VOLATILES	IODOMETHANE	-	0.016	NE	NE	0.015	YES
VOLATILES	ISOBUTYL ALCOHOL	-	3.1	NE	NE	3.1	YES
VOLATILES	Methacrylonitrile	-	0.031	NE	NE	0.031	YES
VOLATILES	Methyl isobutyl ketone	-	0.05	NE	NE	0.015	YES
VOLATILES	METHYL METHACRYLATE	-	0.031	NE	NE	0.031	YES
VOLATILES	Methylene chloride	-	0.008	NE	NE	0.005	YES
VOLATILES	Pentachloroethane	-	0.031	NE	NE	0.031	YES
VOLATILES	Propionitrile	-	0.078	NE	NE	0.076	YES
VOLATILES	Styrene	-	0.008	NE	NE	0.005	YES
VOLATILES	Tetrachloroethene	-	0.008	NE	NE	0.005	YES
VOLATILES	Toluene	-	0.008	NE	NE	0.005	YES
VOLATILES	trans-1,3-Dichloropropene	-	0.008	NE	NE	0.005	YES
VOLATILES	trans-1,4-Dichloro-2-butene	-	0.031	NE	NE	0.031	YES
VOLATILES	Trichloroethene	-	0.008	NE	NE	0.005	YES
VOLATILES	Trichlorofluoromethane	-	0.016	NE	NE	0.015	YES
VOLATILES	Vinyl acetate	-	0.05	NE	NE	0.015	YES
VOLATILES	Vinyl chloride	-	0.016	NE	NE	0.01	YES
VOLATILES	Xylenes, Total	-	0.008	NE	NE	0.005	YES

Notes:

all concentrations in milligrams per kilogram (mg/kg)

Max Detected and Max SQL values taken from Table 6 of the main body of the Addendum.

NE - Not evaluated, background was only evaluated for metals and select other analytes.

SQL - sample quantitation limit.

PQL - practical quantitation limit.

MSC - medium specific concentration.

Rules for Analyte Selection

1. Chemicals that are essential nutrients (Fe, Ca, Mg, K, Na, P), TCEQ (2001).
2. Same chemical is analyzed as an explosive, only one MSC value is calculated.

Table A5-2
Input Values for Parameters used to Calculate Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 102, Sump 103, Sump 104 and Sump 105

Parameter		Value	Units	Comment	Reference
Soil Dry Bulk Density	ρ_b	1.5	g/cm^3	Typical value	USEPA, 1996, pg. 38.
Particle Density	$\rho_{particle}$	2.65	g/cm^3	TCEQ default value	30 TAC §350.75 (c) and (d)
Total Porosity	n	0.43	unitless	n = 1-(rb/rparticle) = 1-(1.5 g/cc/2.65 g/cc)	USEPA, 1996, pg. 38.
Volumetric Water Content of Soil	θ_w	0.13	unitless	Assumed 30%	USEPA, 1996, pg. 38.
Soil Fraction Organic Carbon	f_{oc}	0.02	unitless	TCEQ default value	30 TAC §335.567. Appendix I. (p. 26)
Net Infiltration Rate through soil	I	30.4	cm/yr	I = 0.0018 x P x P P - precipitation for Marshall Texas 130	TCEQ, 2000
Thickness of affected soil	L_1	335	cm	Samples taken at various depths from 0 down to 11 ft. Assumed 11 ft. (335 cm)	Table 6, main body of Addendum
Distance from top of affected soils to top of water bearing unit.	L_2	396	cm	top of shallowest sand layer with free water LHSMW68 at 13.7 ft, LHSMW69 at 13.2 ft. Assumed 13 ft. (396 cm)	Jacobs, 2002, Appendix A, Boring Logs
Groundwater Darcy Velocity	V_{gw}	61.74	cm/yr	Calculated = K*i*31500000 sec/yr	USEPA, 1996, pg. 42.
Hydraulic conductivity in groundwater bearing unit	K	2.80E-04	cm/sec	measured by rising head slug tests in closest monitor well, LHSMW68	Jacobs 2002, pg. 7-5
Hydraulic gradient in groundwater bearing unit	i	0.007	unitless	Value listed as modeling input	Shaw, 2007, Appendix F, page 2-1
Width of soil source area parallel to groundwater flow direction	W	5,500	cm	Maximum site dimension, 180 ft measured from between LHS-T-02 to LH-S103-01. (~5500 cm)	See Figure A5-1
Groundwater mixing zone	d	305	cm	All LHAAP-48 wells in Shallow Zone contained 10-ft screen sections. 10 x 12 x 2.54	Jacobs 2002, pg. 10-3
Soil Air Filled Porosity (θ_a)	θ_a	0.30	unitless	n - qws	USEPA, 1996, pg. 38.
Henry's Law Constant	H'	Chemical specific property	unitless	See Table A5-4	TCEQ, 2008
Organic Carbon Partition Coefficient	K_{oc}	Chemical specific property	unitless	See Table A5-4	TCEQ, 2008
Soil Water Partition Coefficient	K_d	Chemical specific property	unitless	See Table A5-4	TCEQ, 2008

Notes:

Jacobs Engineering Group, Inc., 2002: *Final Remedial Investigation Report, Group 4 Sites, Sites 04, 08, 35A, 35B, 35C, 46, 47, 48, 50, 60,67, Goose Prairie Creek, Volumes 1 and 2: Report, Longhorn Army Ammunition Plant, Karnack, Texas* , Oak Ridge, Tennessee, February.

Shaw Environmental & Infrastructure (Shaw), 2007, *Final Modeling Report, Derivation of Soil and Groundwater Concentrations Protective of Surface Water and Sediment* , February.

Texas Commission on Environmental Quality (TCEQ), *Risk Reduction Rules* , 30 TAC §335.567. Appendix I.

TCEQ, 2000, Tier 2 PCL Equations, March, accessed at http://www.tceq.state.tx.us/assets/public/remediation/trrp/tier2.pdf

TCEQ, 2008: Texas Risk Reduction Program Physical Chemical Properties Tables, April, accessed at http://www.tceq.state.tx.us/remediation/trrp/trrppcls.html

USEPA, 1996. Soil Screening Guidance: Technical Background Document, USEPA/540/R-95/128018, U. S. Environmental Protection Agency, Office of Emergency and Remedial Response, July.

Table A5-3
Determination of pH
Sump 102, Sump 103, Sump 104 and Sump 105

Well	Date	pH Measurement	Comment
106	Sep-04	4.88	
107	Sep-04	5.49	
LHSMW67	Sep-04	5.93	
LHSMW68	Sep-04		Bailed Dry, no sample
106	May-05	4.46	
107	May-05	5.63	
LHSMW67	May-05	5.88	
LHSMW68	May-05	5.16	
LHSMW69	May-05		Intermediate well, do not use
LHSMW70	May-05	4.86	
LHSMW71	May-05	5.71	
Average		5.33	
pH to be used		**5.3**	

Notes:

1. pH data from the groundwater sampling logs, Field Work images on Shaw network.
2. Only the pH readings from shallow wells were averaged.

Table A5-4
Physical Chemical Properties of Chemicals of Concern [a]
Sump 102, Sump 103, Sump 104 and Sump 105

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
EXPLOSIVES	1,3,5-Trinitrobenzene	2.87E-06	1.41E+01	2.83E-01	3.53E+02	b
EXPLOSIVES	1,3-Dinitrobenzene	4.57E-06	3.00E+01	6.00E-01	5.40E+02	b
EXPLOSIVES	2,4,6-Trinitrotoluene	1.90E-05	3.02E+02	6.04E+00	1.30E+02	b
EXPLOSIVES	2,4-Dinitrotoluene	3.60E-05	5.13E+01	1.03E+00	2.85E+02	b
EXPLOSIVES	2,6-Dinitrotoluene	3.11E-05	4.17E+01	8.34E-01	1.82E+02	b
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	1.74E-07	3.63E+02	7.26E+00	3.64E+01	b
EXPLOSIVES	HMX	2.50E-14	3.98E-02	7.96E-04	2.37E+03	b
EXPLOSIVES	m-Nitrotoluene	2.24E-03	1.41E+02	2.81E+00	4.98E+02	b
EXPLOSIVES	Nitrobenzene	8.56E-04	1.32E+02	2.64E+00	1.90E+03	b
EXPLOSIVES	o-Nitrotoluene	1.87E-03	1.41E+02	2.81E+00	6.00E+02	b
EXPLOSIVES	p-Nitrotoluene	2.29E-03	1.41E+02	2.81E+00	4.00E+02	b
EXPLOSIVES	RDX	4.99E-04	6.31E+01	1.26E+00	3.87E+01	b
EXPLOSIVES	Tetryl	8.31E-11	2.34E+02	4.69E+00	7.50E+01	b
METALS	Aluminum	0.00E+00	NA	3.53E+04	0.00E+00	c
METALS	Antimony	0.00E+00	NA	7.90E+01	0.00E+00	d
METALS	Arsenic	0.00E+00	NA	2.60E+01	0.00E+00	d
METALS	Barium	0.00E+00	NA	1.70E+01	0.00E+00	d
METALS	Cadmium	0.00E+00	NA	2.30E+01	0.00E+00	d
METALS	Chromium	0.00E+00	NA	8.10E+03	0.00E+00	d
METALS	Cobalt	0.00E+00	NA	4.50E+01	0.00E+00	
METALS	Copper	0.00E+00	NA	4.00E+01	0.00E+00	
METALS	Lead	0.00E+00	NA	1.83E+03	0.00E+00	c
METALS	Manganese	0.00E+00	NA	5.01E+01	0.00E+00	
METALS	Mercury	4.74E-01	NA	2.00E-01	3.00E-02	d
METALS	Selenium	0.00E+00	NA	1.40E+01	0.00E+00	d
METALS	Silver	0.00E+00	NA	2.60E-01	0.00E+00	d
METALS	Strontium	0.00E+00	NA	2.00E+00	0.00E+00	
METALS	Thallium	0.00E+00	NA	4.80E+01	2.90E+03	d
METALS	Zinc	0.00E+00	NA	2.30E+01	0.00E+00	d
SEMIVOLATILES	1,2,4-Trichlorobenzene	5.90E-02	1.66E+03	3.32E+01	4.88E+01	b
SEMIVOLATILES	1,2-Dichlorobenzene	8.73E-02	6.92E+02	1.38E+01	1.50E+02	b
SEMIVOLATILES	1,3-Dichlorobenzene	1.95E-01	1.70E+02	3.40E+00	1.10E+02	b
SEMIVOLATILES	1,4-Dichlorobenzene	1.17E-01	6.46E+02	1.29E+01	7.38E+01	b
SEMIVOLATILES	2,4,5-Trichlorophenol	1.78E-04	2.34E+03	4.68E+01	1.20E+03	b, e
SEMIVOLATILES	2,4,6-Trichlorophenol	3.19E-04	9.99E+02	2.00E+01	9.82E+02	b, e
SEMIVOLATILES	2,4-Dichlorophenol	1.31E-04	1.59E+02	3.18E+00	4.50E+03	b, e
SEMIVOLATILES	2,4-Dimethylphenol	8.31E-05	1.17E+02	2.35E+00	6.20E+03	b
SEMIVOLATILES	2,4-Dinitrophenol	2.01E-07	1.78E-02	3.56E-04	5.80E+03	b, e
SEMIVOLATILES	2-Chloronaphthalene	2.54E-02	8.51E+03	1.70E+02	6.74E+00	b

Table A5-4
Physical Chemical Properties of Chemicals of Concern [a]
Sump 102, Sump 103, Sump 104 and Sump 105

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
SEMIVOLATILES	2-Chlorophenol	7.40E-04	3.98E+02	7.96E+00	2.80E+04	b, e
SEMIVOLATILES	2-Methylnaphthalene	1.85E-02	4.32E+03	8.63E+01	2.54E+01	b
SEMIVOLATILES	2-Methylphenol	6.65E-05	9.77E+01	1.95E+00	2.04E+04	b
SEMIVOLATILES	2-Nitroaniline	2.08E-05	2.69E+01	5.38E-01	1.26E+03	b
SEMIVOLATILES	2-Nitrophenol	2.21E-05	2.01E+02	4.01E+00	1.73E+04	b, e
SEMIVOLATILES	3,3'-Dichlorobenzidine	8.65E-07	7.24E+02	1.45E+01	3.11E+00	b
SEMIVOLATILES	3-Nitroaniline	2.31E-07	3.94E+01	7.88E-01	4.56E+02	b
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	1.07E-07	3.16E-02	6.32E-04	3.00E+03	b
SEMIVOLATILES	4-Bromophenyl phenyl ether	9.66E-03	1.45E+05	2.90E+03	8.25E-01	b
SEMIVOLATILES	4-Chloro-3-methylphenol	1.40E-05	8.78E+02	1.76E+01	5.43E+03	b
SEMIVOLATILES	4-Chloroaniline	4.86E-05	6.61E+01	1.32E+00	3.90E+03	b
SEMIVOLATILES	4-Chlorophenyl phenyl ether	1.30E-02	1.31E+04	2.62E+02	1.43E+00	b
SEMIVOLATILES	4-Methylphenol	3.99E-05	8.13E+01	1.63E+00	2.30E+04	b
SEMIVOLATILES	4-Nitroaniline	3.33E-08	1.12E+01	2.25E-01	6.49E+02	b
SEMIVOLATILES	4-Nitrophenol	3.24E-08	4.86E+01	9.73E-01	4.49E+03	b, e
SEMIVOLATILES	Acenaphthene	6.44E-03	3.98E+03	7.96E+01	4.24E+00	b
SEMIVOLATILES	Acenaphthylene	4.74E-03	6.92E+03	1.38E+02	3.93E+00	b
SEMIVOLATILES	Anthracene	4.61E-03	2.34E+04	4.69E+02	4.34E-02	b
SEMIVOLATILES	Benzo(a)anthracene	1.39E-04	3.55E+05	7.10E+03	1.00E-02	b
SEMIVOLATILES	Benzo(a)pyrene	4.70E-05	9.55E+05	1.91E+04	1.62E-03	b
SEMIVOLATILES	Benzo(b)fluoranthene	4.99E-04	1.20E+06	2.40E+04	1.50E-03	b
SEMIVOLATILES	Benzo(ghi)perylene	5.82E-06	1.58E+06	3.17E+04	2.60E-04	b
SEMIVOLATILES	Benzo(k)fluoranthene	4.45E-07	1.23E+06	2.46E+04	5.50E-04	b
SEMIVOLATILES	Benzoic Acid	1.39E-05	2.72E+00	5.44E-02	3.50E+03	b, e
SEMIVOLATILES	Benzyl Alcohol	1.62E-05	1.20E+01	2.40E-01	4.00E+04	b
SEMIVOLATILES	bis(2-Chloroethoxy)methane	1.25E-03	3.07E+02	6.13E+00	1.35E+03	b
SEMIVOLATILES	bis(2-Chloroethyl)ether	8.90E-04	1.55E+01	3.10E-01	1.02E+04	b
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	4.16E-03	3.16E+02	6.32E+00	1.70E+03	b
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	4.57E-04	6.76E+05	1.35E+04	3.00E-01	b
SEMIVOLATILES	Butyl benzyl phthalate	7.94E-05	1.37E+04	2.75E+02	2.90E+00	b
SEMIVOLATILES	Chrysene	5.03E-05	3.09E+05	6.18E+03	2.00E-03	b
SEMIVOLATILES	Dibenzo(a,h)anthracene	4.66E+00	1.91E+06	3.81E+04	5.00E-04	b
SEMIVOLATILES	Dibenzofuran	5.28E-03	8.49E+03	1.70E+02	2.86E+00	b
SEMIVOLATILES	Diethyl phthalate	1.87E-05	1.51E+02	3.03E+00	1.08E+03	b
SEMIVOLATILES	Dimethyl phthalate	2.40E-05	3.16E+01	6.32E-01	4.19E+03	b
SEMIVOLATILES	di-n-Butyl phthalate	5.94E-05	3.39E+04	6.78E+02	1.12E+01	b
SEMIVOLATILES	di-n-Octyl phthalate	2.78E-03	8.32E+07	1.66E+06	2.00E-02	b
SEMIVOLATILES	Fluoranthene	3.88E-04	4.90E+04	9.80E+02	2.60E-01	b
SEMIVOLATILES	Fluorene	2.64E-03	7.59E+03	1.52E+02	1.98E+00	b

Table A5-4
Physical Chemical Properties of Chemicals of Concern [a]
Sump 102, Sump 103, Sump 104 and Sump 105

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
SEMIVOLATILES	Hexachlorobenzene	2.22E-02	2.82E+04	5.64E+02	6.00E-03	b
SEMIVOLATILES	Hexachlorobutadiene	9.94E-01	6.92E+03	1.38E+02	2.55E+00	b
SEMIVOLATILES	Hexachlorocyclopentadiene	7.15E-01	9.55E+03	1.91E+02	1.80E+00	b
SEMIVOLATILES	Hexachloroethane	1.62E-01	1.82E+03	3.64E+01	5.00E+01	b
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	2.85E+00	3.47E+06	6.93E+04	3.75E-03	b
SEMIVOLATILES	Isophorone	2.57E-04	3.02E+01	6.04E-01	1.20E+04	b
SEMIVOLATILES	Naphthalene	2.00E-02	1.55E+03	3.10E+01	3.14E+01	b
SEMIVOLATILES	n-Nitroso-di-n-propylamine	9.35E-05	1.97E+01	3.94E-01	9.89E+03	b
SEMIVOLATILES	n-Nitrosodiphenylamine	2.08E-04	3.31E+02	6.62E+00	3.51E+01	b
SEMIVOLATILES	Pentachlorophenol	1.16E-05	5.10E+03	1.02E+02	1.40E+01	b, e
SEMIVOLATILES	Phenanthrene	5.40E-03	1.41E+04	2.83E+02	9.94E-01	b
SEMIVOLATILES	Phenol	2.47E-05	1.74E+01	3.48E-01	8.70E+04	b
SEMIVOLATILES	Pyrene	4.57E-04	3.80E+04	7.60E+02	1.35E-01	b
VOLATILES	1,1,1,2-Tetrachloroethane	9.98E-02	9.55E+02	1.91E+01	1.10E+03	b
VOLATILES	1,1,1-Trichloroethane	7.15E-01	1.10E+02	2.19E+00	1.33E+03	b
VOLATILES	1,1,2,2-Tetrachloroethane	1.55E-02	7.76E+01	1.55E+00	2.97E+03	b
VOLATILES	1,1,2-Trichloroethane	3.80E-02	5.01E+01	1.00E+00	4.42E+03	b
VOLATILES	1,1-Dichloroethane	2.39E-01	3.16E+01	6.32E-01	5.50E+03	b
VOLATILES	1,1-Dichloroethene	1.06E+00	6.46E+01	1.29E+00	2.40E+03	b
VOLATILES	1,2,3-Trichloropropane	1.58E-02	3.89E+02	7.78E+00	1.90E+03	b
VOLATILES	1,2-Dibromo-3-chloropropane	8.31E-03	1.70E+02	3.40E+00	1.00E+03	b
VOLATILES	1,2-Dibromoethane	2.93E-02	5.37E+01	1.07E+00	4.32E+03	b
VOLATILES	1,2-Dichloroethane	5.32E-02	1.74E+01	3.48E-01	8.70E+03	b
VOLATILES	1,2-Dichloroethene	1.87E-01	2.90E+01	5.80E-01	4.93E+03	b
VOLATILES	1,2-Dichloropropane	1.17E-01	5.89E+01	1.18E+00	2.80E+03	b
VOLATILES	2-Butanone	1.94E-03	1.90E+00	3.80E-02	2.40E+05	b
VOLATILES	2-Chloroethyl vinyl ether	3.02E-02	3.72E+01	7.43E-01	5.02E+03	b
VOLATILES	2-Hexanone	3.38E-03	1.79E+01	3.58E-01	1.79E+04	b
VOLATILES	2-Propenal	1.83E-04	5.25E-01	1.05E-02	2.00E+05	b
VOLATILES	Acetone	1.61E-03	5.70E-01	1.14E-02	6.00E+05	b
VOLATILES	Acetonitrile	1.21E-03	4.68E-01	9.35E-03	2.05E+05	b
VOLATILES	Acrylonitrile	4.57E-03	1.10E+00	2.19E-02	7.50E+04	b
VOLATILES	Allyl chloride	4.57E-01	2.69E+01	5.38E-01	3.40E+03	b
VOLATILES	Benzene	2.27E-01	6.61E+01	1.32E+00	1.77E+03	b
VOLATILES	Bromodichloromethane	1.32E-01	5.50E+01	1.10E+00	4.50E+03	b
VOLATILES	Bromoform	2.56E-02	8.71E+01	1.74E+00	3.20E+03	b
VOLATILES	Bromomethane	5.90E-01	1.05E+01	2.09E-01	1.52E+04	b
VOLATILES	Carbon disulfide	6.13E-01	5.25E+01	1.05E+00	2.30E+03	b
VOLATILES	Carbon tetrachloride	1.20E+00	1.86E+02	3.72E+00	8.05E+02	b

Table A5-4
Physical Chemical Properties of Chemicals of Concern [a]
Sump 102, Sump 103, Sump 104 and Sump 105

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
VOLATILES	Chlorobenzene	1.82E-01	2.14E+02	4.28E+00	5.02E+02	b
VOLATILES	Chloroethane	2.12E-01	1.78E+01	3.56E-01	2.00E+04	b
VOLATILES	Chloroform	1.53E-01	4.68E+01	9.35E-01	7.92E+03	b
VOLATILES	Chloromethane	1.44E+00	6.00E+00	1.20E-01	7.25E+03	b
VOLATILES	Chloroprene	1.33E+00	1.00E+02	2.00E+00	6.30E+02	b
VOLATILES	cis-1,3-Dichloropropene	9.15E-02	4.47E+01	8.93E-01	2.70E+03	b
VOLATILES	Dibromochloromethane	3.25E-02	6.31E+01	1.26E+00	5.25E+03	b
VOLATILES	Dibromomethane	3.49E-02	1.82E+02	3.64E+00	1.10E+04	b
VOLATILES	Dichlorodifluoromethane	1.67E+01	1.29E+02	2.58E+00	2.80E+02	b
VOLATILES	Ethyl methacrylate	6.65E-03	3.70E+01	7.40E-01	1.90E+04	b
VOLATILES	Ethylbenzene	3.28E-01	2.04E+02	4.08E+00	1.69E+02	b
VOLATILES	IODOMETHANE	2.36E-01	2.02E+01	4.04E-01	1.24E+04	b
VOLATILES	ISOBUTYL ALCOHOL	4.99E-04	5.62E+00	1.12E-01	9.49E+04	b
VOLATILES	Methacrylonitrile	3.03E-03	3.39E+00	6.78E-02	2.50E+04	b
VOLATILES	Methyl isobutyl ketone	5.82E-03	1.50E+01	3.00E-01	1.90E+04	b
VOLATILES	METHYL METHACRYLATE	1.33E-02	2.30E+01	4.60E-01	1.60E+04	b
VOLATILES	Methylene chloride	9.10E-02	1.17E+01	2.35E-01	1.54E+04	b
VOLATILES	Pentachloroethane	2.15E-02	1.90E+02	3.80E+00	6.19E+02	b
VOLATILES	Propionitrile	1.02E-03	1.64E+00	3.28E-02	9.73E+04	b
VOLATILES	Styrene	1.14E-01	7.59E+02	1.52E+01	3.10E+02	b
VOLATILES	Tetrachloroethene	7.65E-01	1.55E+02	3.10E+00	2.00E+02	b
VOLATILES	Toluene	2.76E-01	1.40E+02	2.80E+00	5.30E+02	b
VOLATILES	trans-1,3-Dichloropropene	9.15E-02	4.47E+01	8.93E-01	2.80E+03	b
VOLATILES	trans-1,4-Dichloro-2-butene	1.35E-02	2.04E+02	4.09E+00	1.27E+03	b
VOLATILES	Trichloroethene	4.28E-01	9.33E+01	1.87E+00	1.10E+03	b
VOLATILES	Trichlorofluoromethane	4.03E+00	1.35E+02	2.70E+00	1.10E+03	b
VOLATILES	Vinyl acetate	2.29E-02	5.25E+00	1.05E-01	2.00E+04	b
VOLATILES	Vinyl chloride	3.49E+00	1.10E+01	2.19E-01	2.76E+03	b
VOLATILES	Xylenes, Total	2.93E-01	2.40E+02	4.80E+00	1.98E+02	b

Notes:

Chemicals of Concern shown in Table A5-1.

pH value of 5.3 averaged from pH Values on Table A5-3.

a Annual TCEQ update of chemical/physical properties table [(Figure: 30 TAC §350.73(e)], April 2008.

b Kd value calculated by formula Koc * foc for non-metals.

c pH-dependent Kd value obtained from Figure 30TAC§350.73(e)(1)(A), April 2008.

d pH-dependent Kd value obtained from Figure 30TAC§350.73(e)(1)(C), April 2008.

e pH-dependent Koc value obtained from 30 TAC §350.73(e)(1)(B), April 2008

mg/L - milligrams per liter

Table A5-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 102, Sump 103, Sump 104 and Sump 105

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
EXPLOSIVES	1,3,5-Trinitrobenzene	2.87E-06	2.83E-01	3.53E+02	2.71E+00	1.3E+02	3.1E+00	1.5E+00	none	**1.5E+00**
EXPLOSIVES	1,3-Dinitrobenzene	4.57E-06	6.00E-01	5.40E+02	1.46E+00	3.7E+02	1.0E-02	9.2E-03	none	**9.2E-03**
EXPLOSIVES	2,4,6-Trinitrotoluene	1.90E-05	6.04E+00	1.30E+02	1.63E-01	8.0E+02	5.1E-02	4.1E-01	none	**4.1E-01**
EXPLOSIVES	2,4-Dinitrotoluene	3.60E-05	1.03E+00	2.85E+02	8.99E-01	3.2E+02	4.2E-04	6.2E-04	none	**6.2E-04**
EXPLOSIVES	2,6-Dinitrotoluene	3.11E-05	8.34E-01	1.82E+02	1.09E+00	1.7E+02	4.2E-04	5.1E-04	none	**5.1E-04**
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	1.74E-07	7.26E+00	3.64E+01	1.36E-01	2.7E+02	1.7E-02	1.6E-01	none	**1.6E-01**
EXPLOSIVES	HMX	2.50E-14	7.96E-04	2.37E+03	1.14E+01	2.1E+02	5.1E+00	5.9E-01	none	**5.9E-01**
EXPLOSIVES	m-Nitrotoluene	2.24E-03	2.81E+00	4.98E+02	3.45E-01	1.4E+03	1.0E+00	3.9E+00	none	**3.9E+00**
EXPLOSIVES	Nitrobenzene	8.56E-04	2.64E+00	1.90E+03	3.67E-01	5.2E+03	5.1E-02	1.8E-01	none	**1.8E-01**
EXPLOSIVES	o-Nitrotoluene	1.87E-03	2.81E+00	6.00E+02	3.45E-01	1.7E+03	1.0E+00	3.9E+00	none	**3.9E+00**
EXPLOSIVES	p-Nitrotoluene	2.29E-03	2.81E+00	4.00E+02	3.45E-01	1.2E+03	1.0E+00	3.9E+00	none	**3.9E+00**
EXPLOSIVES	RDX	4.99E-04	1.26E+00	3.87E+01	7.41E-01	5.2E+01	2.6E-02	4.6E-02	none	**4.6E-02**
EXPLOSIVES	Tetryl	8.31E-11	4.69E+00	7.50E+01	2.09E-01	3.6E+02	1.0E+00	6.4E+00	none	**6.4E+00**
METALS	Aluminum	0.00E+00	3.53E+04	0.00E+00	2.83E-05	NA	1.0E+02	4.7E+06	1.63E+04	**4.7E+06**
METALS	Antimony	0.00E+00	7.90E+01	0.00E+00	1.26E-02	NA	6.0E-03	6.2E-01	9.40E-01	**9.4E-01**
METALS	Arsenic	0.00E+00	2.60E+01	0.00E+00	3.83E-02	NA	1.0E-02	3.4E-01	4.81E+00	**4.8E+00**
METALS	Barium	0.00E+00	1.70E+01	0.00E+00	5.85E-02	NA	2.0E+00	4.5E+01	8.55E+01	**8.5E+01**
METALS	Cadmium	0.00E+00	2.30E+01	0.00E+00	4.33E-02	NA	5.0E-03	1.5E-01	4.00E-01	**4.0E-01**
METALS	Chromium	0.00E+00	8.10E+03	0.00E+00	1.23E-04	NA	1.0E-01	1.1E+03	2.66E+01	**1.1E+03**
METALS	Cobalt	0.00E+00	4.50E+01	0.00E+00	2.22E-02	NA	6.1E+00	3.6E+02	5.61E+00	**3.6E+02**
METALS	Copper	0.00E+00	4.00E+01	0.00E+00	2.49E-02	NA	1.3E+00	6.9E+01	5.55E+00	**6.9E+01**
METALS	Lead	0.00E+00	1.83E+03	0.00E+00	5.46E-04	NA	1.5E-02	3.6E+01	1.14E+01	**3.6E+01**
METALS	Manganese	0.00E+00	5.01E+01	0.00E+00	1.99E-02	NA	1.4E+01	9.4E+02	2.01E+02	**9.4E+02**
METALS	Mercury	4.74E-01	2.00E-01	3.00E-02	2.62E+00	1.1E-02	2.0E-03	1.0E-03	8.19E-02	**8.2E-02**
METALS	Selenium	0.00E+00	1.40E+01	0.00E+00	7.10E-02	NA	5.0E-02	9.3E-01	3.48E+00	**3.5E+00**
METALS	Silver	0.00E+00	2.60E-01	0.00E+00	2.88E+00	NA	5.1E-01	2.3E-01	3.10E-01	**3.1E-01**
METALS	Strontium	0.00E+00	2.00E+00	0.00E+00	4.79E-01	NA	6.1E+01	1.7E+02	1.98E+01	**1.7E+02**
METALS	Thallium	0.00E+00	4.80E+01	2.90E+03	2.08E-02	1.4E+05	2.0E-03	1.3E-01	4.70E-01	**4.7E-01**
METALS	Zinc	0.00E+00	2.30E+01	0.00E+00	4.33E-02	NA	3.1E+01	9.3E+02	2.02E+01	**9.3E+02**
SEMIVOLATILES	1,2,4-Trichlorobenzene	5.90E-02	3.32E+01	4.88E+01	3.00E-02	1.6E+03	7.0E-02	3.1E+00	none	**3.1E+00**
SEMIVOLATILES	1,2-Dichlorobenzene	8.73E-02	1.38E+01	1.50E+02	7.17E-02	2.1E+03	6.0E-01	1.1E+01	none	**1.1E+01**
SEMIVOLATILES	1,3-Dichlorobenzene	1.95E-01	3.40E+00	1.10E+02	2.84E-01	3.9E+02	3.1E+00	1.4E+01	none	**1.4E+01**
SEMIVOLATILES	1,4-Dichlorobenzene	1.17E-01	1.29E+01	7.38E+01	7.68E-02	9.6E+02	7.5E-02	1.3E+00	none	**1.3E+00**
SEMIVOLATILES	2,4,5-Trichlorophenol	1.78E-04	4.68E+01	1.20E+03	2.13E-02	5.6E+04	1.0E+01	6.3E+02	none	**6.3E+02**
SEMIVOLATILES	2,4,6-Trichlorophenol	3.19E-04	2.00E+01	9.82E+02	4.98E-02	2.0E+04	2.6E-02	6.9E-01	none	**6.9E-01**
SEMIVOLATILES	2,4-Dichlorophenol	1.31E-04	3.18E+00	4.50E+03	3.06E-01	1.5E+04	3.1E-01	1.3E+00	none	**1.3E+00**
SEMIVOLATILES	2,4-Dimethylphenol	8.31E-05	2.35E+00	6.20E+03	4.10E-01	1.5E+04	2.0E+00	6.6E+00	none	**6.6E+00**
SEMIVOLATILES	2,4-Dinitrophenol	2.01E-07	3.56E-04	5.80E+03	1.15E+01	5.0E+02	2.0E-01	2.3E-02	none	**2.3E-02**
SEMIVOLATILES	2-Chloronaphthalene	2.54E-02	1.70E+02	6.74E+00	5.87E-03	1.1E+03	8.2E+00	1.8E+03	none	**1.1E+03**
SEMIVOLATILES	2-Chlorophenol	7.40E-04	7.96E+00	2.80E+04	1.24E-01	2.3E+05	5.1E-01	5.4E+00	none	**5.4E+00**
SEMIVOLATILES	2-Methylnaphthalene	1.85E-02	8.63E+01	2.54E+01	1.16E-02	2.2E+03	4.1E-01	4.6E+01	none	**4.6E+01**

Table A5-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 102, Sump 103, Sump 104 and Sump 105

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
SEMIVOLATILES	2-Methylphenol	6.65E-05	1.95E+00	2.04E+04	4.90E-01	4.2E+04	5.1E+00	1.4E+01	none	**1.4E+01**
SEMIVOLATILES	2-Nitroaniline	2.08E-05	5.38E-01	1.26E+03	1.60E+00	7.9E+02	3.1E-02	2.5E-02	none	**2.5E-02**
SEMIVOLATILES	2-Nitrophenol	2.21E-05	4.01E+00	1.73E+04	2.44E-01	7.1E+04	2.0E-01	1.1E+00	none	**1.1E+00**
SEMIVOLATILES	3,3'-Dichlorobenzidine	8.65E-07	1.45E+01	3.11E+00	6.86E-02	4.5E+01	6.4E-04	1.2E-02	none	**1.2E-02**
SEMIVOLATILES	3-Nitroaniline	2.31E-07	7.88E-01	4.56E+02	1.14E+00	4.0E+02	3.1E-02	3.5E-02	none	**3.5E-02**
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	1.07E-07	6.32E-04	3.00E+03	1.15E+01	2.6E+02	2.0E-01	2.3E-02	none	**2.3E-02**
SEMIVOLATILES	4-Bromophenyl phenyl ether	9.66E-03	2.90E+03	8.25E-01	3.44E-04	2.4E+03	1.9E-04	7.3E-01	none	**7.3E-01**
SEMIVOLATILES	4-Chloro-3-methylphenol	1.40E-05	1.76E+01	5.43E+03	5.66E-02	9.6E+04	5.1E-01	1.2E+01	none	**1.2E+01**
SEMIVOLATILES	4-Chloroaniline	4.86E-05	1.32E+00	3.90E+03	7.10E-01	5.5E+03	4.1E-01	7.6E-01	none	**7.6E-01**
SEMIVOLATILES	4-Chlorophenyl phenyl ether	1.30E-02	2.62E+02	1.43E+00	3.82E-03	3.8E+02	1.9E-04	6.6E-02	none	**6.6E-02**
SEMIVOLATILES	4-Methylphenol	3.99E-05	1.63E+00	2.30E+04	5.84E-01	3.9E+04	5.1E-01	1.2E+00	none	**1.2E+00**
SEMIVOLATILES	4-Nitroaniline	3.33E-08	2.25E-01	6.49E+02	3.21E+00	2.0E+02	7.5E-02	3.1E-02	none	**3.1E-02**
SEMIVOLATILES	4-Nitrophenol	3.24E-08	9.73E-01	4.49E+03	9.44E-01	4.8E+03	2.0E-01	2.8E-01	none	**2.8E-01**
SEMIVOLATILES	Acenaphthene	6.44E-03	7.96E+01	4.24E+00	1.25E-02	3.4E+02	6.1E+00	6.4E+02	none	**3.4E+02**
SEMIVOLATILES	Acenaphthylene	4.74E-03	1.38E+02	3.93E+00	7.22E-03	5.4E+02	6.1E+00	1.1E+03	none	**5.4E+02**
SEMIVOLATILES	Anthracene	4.61E-03	4.69E+02	4.34E-02	2.13E-03	2.0E+01	3.1E+01	1.9E+04	none	**2.0E+01**
SEMIVOLATILES	Benzo(a)anthracene	1.39E-04	7.10E+03	1.00E-02	1.41E-04	7.1E+01	3.9E-04	3.7E+00	1.53E-02	**3.7E+00**
SEMIVOLATILES	Benzo(a)pyrene	4.70E-05	1.91E+04	1.62E-03	5.24E-05	3.1E+01	2.0E-04	5.0E+00	1.54E-02	**5.0E+00**
SEMIVOLATILES	Benzo(b)fluoranthene	4.99E-04	2.40E+04	1.50E-03	4.16E-05	3.6E+01	3.9E-04	1.2E+01	1.53E-02	**1.2E+01**
SEMIVOLATILES	Benzo(ghi)perylene	5.82E-06	3.17E+04	2.60E-04	3.15E-05	8.2E+00	3.1E+00	1.3E+05	1.23E-02	**8.2E+00**
SEMIVOLATILES	Benzo(k)fluoranthene	4.45E-07	2.46E+04	5.50E-04	4.06E-05	1.4E+01	3.9E-03	1.3E+02	1.30E-02	**1.4E+01**
SEMIVOLATILES	Benzoic Acid	1.39E-05	5.44E-02	3.50E+03	7.09E+00	4.9E+02	4.1E+02	7.6E+01	none	**7.6E+01**
SEMIVOLATILES	Benzyl Alcohol	1.62E-05	2.40E-01	4.00E+04	3.06E+00	1.3E+04	3.1E+01	1.3E+01	none	**1.3E+01**
SEMIVOLATILES	bis(2-Chloroethoxy)methane	1.25E-03	6.13E+00	1.35E+03	1.61E-01	8.4E+03	2.6E-04	2.1E-03	none	**2.1E-03**
SEMIVOLATILES	bis(2-Chloroethyl)ether	8.90E-04	3.10E-01	1.02E+04	2.52E+00	4.0E+03	2.6E-04	1.4E-04	none	**1.4E-04**
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	4.16E-03	6.32E+00	1.70E+03	1.56E-01	1.1E+04	4.1E-02	3.4E-01	none	**3.4E-01**
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	4.57E-04	1.35E+04	3.00E-01	7.40E-05	4.1E+03	6.0E-03	1.1E+02	none	**1.1E+02**
SEMIVOLATILES	Butyl benzyl phthalate	7.94E-05	2.75E+02	2.90E+00	3.64E-03	8.0E+02	2.0E+01	7.4E+03	none	**8.0E+02**
SEMIVOLATILES	Chrysene	5.03E-05	6.18E+03	2.00E-03	1.62E-04	1.2E+01	3.9E-02	3.2E+02	1.51E-02	**1.2E+01**
SEMIVOLATILES	Dibenzo(a,h)anthracene	4.66E+00	3.81E+04	5.00E-04	2.62E-05	1.9E+01	2.0E-04	1.0E+01	none	**1.0E+01**
SEMIVOLATILES	Dibenzofuran	5.28E-03	1.70E+02	2.86E+00	5.89E-03	4.9E+02	4.1E-01	9.1E+01	none	**9.1E+01**
SEMIVOLATILES	Diethyl phthalate	1.87E-05	3.03E+00	1.08E+03	3.21E-01	3.4E+03	8.2E+01	3.3E+02	none	**3.3E+02**
SEMIVOLATILES	Dimethyl phthalate	2.40E-05	6.32E-01	4.19E+03	1.39E+00	3.0E+03	8.2E+01	7.7E+01	none	**7.7E+01**
SEMIVOLATILES	di-n-Butyl phthalate	5.94E-05	6.78E+02	1.12E+01	1.48E-03	7.6E+03	1.0E+01	9.1E+03	none	**7.6E+03**
SEMIVOLATILES	di-n-Octyl phthalate	2.78E-03	1.66E+06	2.00E-02	6.01E-07	3.3E+04	2.0E+00	4.5E+06	none	**3.3E+04**
SEMIVOLATILES	Fluoranthene	3.88E-04	9.80E+02	2.60E-01	1.02E-03	2.5E+02	4.1E+00	5.3E+03	2.29E-02	**2.5E+02**
SEMIVOLATILES	Fluorene	2.64E-03	1.52E+02	1.98E+00	6.59E-03	3.0E+02	4.1E+00	8.2E+02	none	**3.0E+02**
SEMIVOLATILES	Hexachlorobenzene	2.22E-02	5.64E+02	6.00E-03	1.77E-03	3.4E+00	1.0E-03	7.4E-01	none	**7.4E-01**
SEMIVOLATILES	Hexachlorobutadiene	9.94E-01	1.38E+02	2.55E+00	7.21E-03	3.5E+02	2.0E-02	3.7E+00	none	**3.7E+00**
SEMIVOLATILES	Hexachlorocyclopentadiene	7.15E-01	1.91E+02	1.80E+00	5.23E-03	3.4E+02	5.0E-02	1.3E+01	none	**1.3E+01**
SEMIVOLATILES	Hexachloroethane	1.62E-01	3.64E+01	5.00E+01	2.74E-02	1.8E+03	1.0E-01	4.9E+00	none	**4.9E+00**

Table A5-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 102, Sump 103, Sump 104 and Sump 105

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	2.85E+00	6.93E+04	3.75E-03	1.44E-05	2.6E+02	3.9E-04	3.6E+01	1.43E-02	**3.6E+01**
SEMIVOLATILES	Isophorone	2.57E-04	6.04E-01	1.20E+04	1.45E+00	8.3E+03	3.0E+00	2.7E+00	none	**2.7E+00**
SEMIVOLATILES	Naphthalene	2.00E-02	3.10E+01	3.14E+01	3.22E-02	9.8E+02	2.0E+00	8.4E+01	none	**8.4E+01**
SEMIVOLATILES	n-Nitroso-di-n-propylamine	9.35E-05	3.94E-01	9.89E+03	2.08E+00	4.8E+03	4.1E-05	2.6E-05	none	**2.6E-05**
SEMIVOLATILES	n-Nitrosodiphenylamine	2.08E-04	6.62E+00	3.51E+01	1.49E-01	2.4E+02	5.8E-02	5.2E-01	none	**5.2E-01**
SEMIVOLATILES	Pentachlorophenol	1.16E-05	1.02E+02	1.40E+01	9.80E-03	1.4E+03	1.0E-03	1.3E-01	none	**1.3E-01**
SEMIVOLATILES	Phenanthrene	5.40E-03	2.83E+02	9.94E-01	3.54E-03	2.8E+02	3.1E+00	1.1E+03	none	**2.8E+02**
SEMIVOLATILES	Phenol	2.47E-05	3.48E-01	8.70E+04	2.30E+00	3.8E+04	3.1E+01	1.8E+01	none	**1.8E+01**
SEMIVOLATILES	Pyrene	4.57E-04	7.60E+02	1.35E-01	1.31E-03	1.0E+02	3.1E+00	3.1E+03	1.94E-02	**1.0E+02**
VOLATILES	1,1,1,2-Tetrachloroethane	9.98E-02	1.91E+01	1.10E+03	5.21E-02	2.1E+04	1.1E-01	2.8E+00	none	**2.8E+00**
VOLATILES	1,1,1-Trichloroethane	7.15E-01	2.19E+00	1.33E+03	4.13E-01	3.2E+03	2.0E-01	6.4E-01	none	**6.4E-01**
VOLATILES	1,1,2,2-Tetrachloroethane	1.55E-02	1.55E+00	2.97E+03	6.09E-01	4.9E+03	1.4E-02	3.1E-02	none	**3.1E-02**
VOLATILES	1,1,2-Trichloroethane	3.80E-02	1.00E+00	4.42E+03	9.12E-01	4.8E+03	5.0E-03	7.2E-03	none	**7.2E-03**
VOLATILES	1,1-Dichloroethane	2.39E-01	6.32E-01	5.50E+03	1.30E+00	4.2E+03	1.0E+01	1.0E+01	none	**1.0E+01**
VOLATILES	1,1-Dichloroethene	1.06E+00	1.29E+00	2.40E+03	6.29E-01	3.8E+03	7.0E-03	1.5E-02	none	**1.5E-02**
VOLATILES	1,2,3-Trichloropropane	1.58E-02	7.78E+00	1.90E+03	1.27E-01	1.5E+04	4.1E-05	4.2E-04	none	**4.2E-04**
VOLATILES	1,2-Dibromo-3-chloropropane	8.31E-03	3.40E+00	1.00E+03	2.87E-01	3.5E+03	2.0E-04	9.2E-04	none	**9.2E-04**
VOLATILES	1,2-Dibromoethane	2.93E-02	1.07E+00	4.32E+03	8.57E-01	5.0E+03	5.0E-05	7.7E-05	none	**7.7E-05**
VOLATILES	1,2-Dichloroethane	5.32E-02	3.48E-01	8.70E+03	2.25E+00	3.9E+03	5.0E-03	2.9E-03	none	**2.9E-03**
VOLATILES	1,2-Dichloroethene	1.87E-01	5.80E-01	4.93E+03	1.42E+00	3.5E+03	7.0E-02	6.5E-02	none	**6.5E-02**
VOLATILES	1,2-Dichloropropane	1.17E-01	1.18E+00	2.80E+03	7.77E-01	3.6E+03	5.0E-03	8.5E-03	none	**8.5E-03**
VOLATILES	2-Butanone	1.94E-03	3.80E-02	2.40E+05	8.00E+00	3.0E+04	6.1E+01	1.0E+01	none	**1.0E+01**
VOLATILES	2-Chloroethyl vinyl ether	3.02E-02	7.43E-01	5.02E+03	1.20E+00	4.2E+03	2.6E-03	2.9E-03	none	**2.9E-03**
VOLATILES	2-Hexanone	3.38E-03	3.58E-01	1.79E+04	2.25E+00	8.0E+03	6.1E+00	3.6E+00	none	**3.6E+00**
VOLATILES	2-Propenal	1.83E-04	1.05E-02	2.00E+05	1.03E+01	1.9E+04	5.1E-02	6.5E-03	none	**6.5E-03**
VOLATILES	Acetone	1.61E-03	1.14E-02	6.00E+05	1.02E+01	5.9E+04	9.2E+01	1.2E+01	none	**1.2E+01**
VOLATILES	Acetonitrile	1.21E-03	9.35E-03	2.05E+05	1.04E+01	2.0E+04	3.3E+00	4.1E-01	none	**4.1E-01**
VOLATILES	Acrylonitrile	4.57E-03	2.19E-02	7.50E+04	9.13E+00	8.2E+03	5.3E-04	7.6E-05	none	**7.6E-05**
VOLATILES	Allyl chloride	4.57E-01	5.38E-01	3.40E+03	1.40E+00	2.4E+03	1.0E+00	9.6E-01	none	**9.6E-01**
VOLATILES	Benzene	2.27E-01	1.32E+00	1.77E+03	6.88E-01	2.6E+03	5.0E-03	9.6E-03	none	**9.6E-03**
VOLATILES	Bromodichloromethane	1.32E-01	1.10E+00	4.50E+03	8.25E-01	5.5E+03	4.6E-03	7.4E-03	none	**7.4E-03**
VOLATILES	Bromoform	2.56E-02	1.74E+00	3.20E+03	5.45E-01	5.9E+03	3.6E-02	8.7E-02	none	**8.7E-02**
VOLATILES	Bromomethane	5.90E-01	2.09E-01	1.52E+04	2.41E+00	6.3E+03	1.4E-01	7.8E-02	none	**7.8E-02**
VOLATILES	Carbon disulfide	6.13E-01	1.05E+00	2.30E+03	7.94E-01	2.9E+03	1.0E+01	1.7E+01	none	**1.7E+01**
VOLATILES	Carbon tetrachloride	1.20E+00	3.72E+00	8.05E+02	2.47E-01	3.3E+03	5.0E-03	2.7E-02	none	**2.7E-02**
VOLATILES	Chlorobenzene	1.82E-01	4.28E+00	5.02E+02	2.27E-01	2.2E+03	1.0E-01	5.8E-01	none	**5.8E-01**
VOLATILES	Chloroethane	2.12E-01	3.56E-01	2.00E+04	2.06E+00	9.7E+03	4.1E+01	2.6E+01	none	**2.6E+01**
VOLATILES	Chloroform	1.53E-01	9.35E-01	7.92E+03	9.50E-01	8.3E+03	1.0E+00	1.4E+00	none	**1.4E+00**
VOLATILES	Chloromethane	1.44E+00	1.20E-01	7.25E+03	2.02E+00	3.6E+03	2.2E-01	1.4E-01	none	**1.4E-01**
VOLATILES	Chloroprene	1.33E+00	2.00E+00	6.30E+02	4.25E-01	1.5E+03	1.4E-01	4.4E-01	none	**4.4E-01**
VOLATILES	cis-1,3-Dichloropropene	9.15E-02	8.93E-01	2.70E+03	1.00E+00	2.7E+03	5.3E-03	7.0E-03	none	**7.0E-03**

Table A5-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 102, Sump 103, Sump 104 and Sump 105

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
VOLATILES	Dibromochloromethane	3.25E-02	1.26E+00	5.25E+03	7.38E-01	7.1E+03	3.4E-02	6.1E-02	none	**6.1E-02**
VOLATILES	Dibromomethane	3.49E-02	3.64E+00	1.10E+04	2.68E-01	4.1E+04	3.8E-01	1.9E+00	none	**1.9E+00**
VOLATILES	Dichlorodifluoromethane	1.67E+01	2.58E+00	2.80E+02	1.67E-01	1.7E+03	2.0E+01	1.6E+02	none	**1.6E+02**
VOLATILES	Ethyl methacrylate	6.65E-03	7.40E-01	1.90E+04	1.21E+00	1.6E+04	9.2E+00	1.0E+01	none	**1.0E+01**
VOLATILES	Ethylbenzene	3.28E-01	4.08E+00	1.69E+02	2.36E-01	7.2E+02	7.0E-01	3.9E+00	none	**3.9E+00**
VOLATILES	IODOMETHANE	2.36E-01	4.04E-01	1.24E+04	1.86E+00	6.7E+03	1.4E-01	1.0E-01	none	**1.0E-01**
VOLATILES	ISOBUTYL ALCOHOL	4.99E-04	1.12E-01	9.49E+04	5.02E+00	1.9E+04	3.1E+01	8.0E+00	none	**8.0E+00**
VOLATILES	Methacrylonitrile	3.03E-03	6.78E-02	2.50E+04	6.45E+00	3.9E+03	1.0E-02	2.1E-03	none	**2.1E-03**
VOLATILES	Methyl isobutyl ketone	5.82E-03	3.00E-01	1.90E+04	2.58E+00	7.4E+03	8.2E+00	4.2E+00	none	**4.2E+00**
VOLATILES	METHYL METHACRYLATE	1.33E-02	4.60E-01	1.60E+04	1.82E+00	8.8E+03	1.4E+02	1.0E+02	none	**1.0E+02**
VOLATILES	Methylene chloride	9.10E-02	2.35E-01	1.54E+04	2.94E+00	5.2E+03	5.0E-03	2.2E-03	none	**2.2E-03**
VOLATILES	Pentachloroethane	2.15E-02	3.80E+00	6.19E+02	2.57E-01	2.4E+03	1.1E-01	5.6E-01	none	**5.6E-01**
VOLATILES	Propionitrile	1.02E-03	3.28E-02	9.73E+04	8.35E+00	1.2E+04	4.1E-02	6.4E-03	none	**6.4E-03**
VOLATILES	Styrene	1.14E-01	1.52E+01	3.10E+02	6.54E-02	4.7E+03	1.0E-01	2.0E+00	none	**2.0E+00**
VOLATILES	Tetrachloroethene	7.65E-01	3.10E+00	2.00E+02	3.00E-01	6.7E+02	5.0E-03	2.2E-02	none	**2.2E-02**
VOLATILES	Toluene	2.76E-01	2.80E+00	5.30E+02	3.40E-01	1.6E+03	1.0E+00	3.9E+00	none	**3.9E+00**
VOLATILES	trans-1,3-Dichloropropene	9.15E-02	8.93E-01	2.80E+03	1.00E+00	2.8E+03	2.9E-02	3.8E-02	none	**3.8E-02**
VOLATILES	trans-1,4-Dichloro-2-butene	1.35E-02	4.09E+00	1.27E+03	2.39E-01	5.3E+03	3.9E-04	2.2E-03	none	**2.2E-03**
VOLATILES	Trichloroethene	4.28E-01	1.87E+00	1.10E+03	4.90E-01	2.2E+03	5.0E-03	1.3E-02	none	**1.3E-02**
VOLATILES	Trichlorofluoromethane	4.03E+00	2.70E+00	1.10E+03	2.78E-01	4.0E+03	3.1E+01	1.4E+02	none	**1.4E+02**
VOLATILES	Vinyl acetate	2.29E-02	1.05E-01	2.00E+04	5.10E+00	3.9E+03	1.0E+02	2.6E+01	none	**2.6E+01**
VOLATILES	Vinyl chloride	3.49E+00	2.19E-01	2.76E+03	9.96E-01	2.8E+03	2.0E-03	2.6E-03	none	**2.6E-03**
VOLATILES	Xylenes, Total	2.93E-01	4.80E+00	1.98E+02	2.02E-01	9.8E+02	1.0E+01	6.5E+01	none	**6.5E+01**

Notes:

Values of constants shown in Table A5-2.
Values of H', Kd, and S shown in Table A5-4.
GW-Ind - groundwater qualified for industrial use
L/kg - liters per kilogram
mg/kg - milligrams per kilogram
mg/L - milligrams per liter
MSC - medium specific concentrations

Constants	Values
rb	1.5
qw	0.13
qa	0.30
L1	335
L2	396
W	5500
LDF	1.113 calculated

Calculated Values:

Ksw = see Equation 8
Csat = see Equation 7
LDF = see Equation 5
Soil MSC = see Equation 6
Applicable Standard 3 Commercial / Industrial MSC equals the lower of the Calculated Soil MSC and Csat values. However, if the Background is larger than both values, the Applicable Standard 3 Commercial / Industrial MSC equals the Background concentration.

Table A5-6
Comparison to Maximum Soil Concentrations
Sump 102, Sump 103, Sump 104 and Sump 105

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
EXPLOSIVES	1,3,5-Trinitrobenzene	**1.5E+00**	-	0.24	All Results < MSC
EXPLOSIVES	1,3-Dinitrobenzene	**9.2E-03**	-	0.24	Never detected, SQL > MSC
EXPLOSIVES	2,4,6-Trinitrotoluene	**4.1E-01**	-	0.24	All Results < MSC
EXPLOSIVES	2,4-Dinitrotoluene	**6.2E-04**	-	0.33	Never detected, SQL > MSC
EXPLOSIVES	2,6-Dinitrotoluene	**5.1E-04**	-	0.33	Never detected, SQL > MSC
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	**1.6E-01**	-	0.49	Never detected, SQL > MSC
EXPLOSIVES	HMX	**5.9E-01**	-	2.2	Never detected, SQL > MSC
EXPLOSIVES	m-Nitrotoluene	**3.9E+00**	-	0.98	All Results < MSC
EXPLOSIVES	Nitrobenzene	**1.8E-01**	-	0.25	Never detected, SQL > MSC
EXPLOSIVES	o-Nitrotoluene	**3.9E+00**	-	0.98	All Results < MSC
EXPLOSIVES	p-Nitrotoluene	**3.9E+00**	-	2.9	All Results < MSC
EXPLOSIVES	RDX	**4.6E-02**	-	1.1	Never detected, SQL > MSC
EXPLOSIVES	Tetryl	**6.4E+00**	-	0.73	All Results < MSC
METALS	Aluminum	**4.7E+06**	23800	18000	All Results < MSC
METALS	Antimony	**9.4E-01**	-	14	Never detected, SQL > MSC
METALS	Arsenic	**4.8E+00**	10.1	-	**Detected > MSC**
METALS	Barium	**8.5E+01**	179	-	**Detected > MSC**
METALS	Cadmium	**4.0E-01**	1.6	1.2	**Detected > MSC**
METALS	Chromium	**1.1E+03**	49.7	-	All Results < MSC
METALS	Cobalt	**3.6E+02**	29.8	-	All Results < MSC
METALS	Copper	**6.9E+01**	16.2	-	All Results < MSC
METALS	Lead	**3.6E+01**	29	-	All Results < MSC
METALS	Manganese	**9.4E+02**	513	-	All Results < MSC
METALS	Mercury	**8.2E-02**	-	0.14	Never detected, SQL > MSC
METALS	Selenium	**3.5E+00**	0.44	1	All Results < MSC
METALS	Silver	**3.1E-01**	6.4	1.2	**Detected > MSC**
METALS	Strontium	**1.7E+02**	82.5	11.8	All Results < MSC
METALS	Thallium	**4.7E-01**	-	69.8	Never detected, SQL > MSC
METALS	Zinc	**9.3E+02**	252	-	All Results < MSC
SEMIVOLATILES	1,2,4-Trichlorobenzene	**3.1E+00**	-	0.52	All Results < MSC
SEMIVOLATILES	1,2-Dichlorobenzene	**1.1E+01**	-	0.52	All Results < MSC
SEMIVOLATILES	1,3-Dichlorobenzene	**1.4E+01**	-	0.52	All Results < MSC
SEMIVOLATILES	1,4-Dichlorobenzene	**1.3E+00**	-	0.52	All Results < MSC
SEMIVOLATILES	2,4,5-Trichlorophenol	**6.3E+02**	-	2.6	All Results < MSC
SEMIVOLATILES	2,4,6-Trichlorophenol	**6.9E-01**	-	0.52	All Results < MSC
SEMIVOLATILES	2,4-Dichlorophenol	**1.3E+00**	-	0.52	All Results < MSC
SEMIVOLATILES	2,4-Dimethylphenol	**6.6E+00**	-	0.52	All Results < MSC
SEMIVOLATILES	2,4-Dinitrophenol	**2.3E-02**	-	2.6	Never detected, SQL > MSC
SEMIVOLATILES	2-Chloronaphthalene	**1.1E+03**	-	0.52	All Results < MSC

Table A5-6
Comparison to Maximum Soil Concentrations
Sump 102, Sump 103, Sump 104 and Sump 105

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
SEMIVOLATILES	2-Chlorophenol	**5.4E+00**	-	0.52	All Results < MSC
SEMIVOLATILES	2-Methylnaphthalene	**4.6E+01**	-	0.52	All Results < MSC
SEMIVOLATILES	2-Methylphenol	**1.4E+01**	-	0.52	All Results < MSC
SEMIVOLATILES	2-Nitroaniline	**2.5E-02**	-	2.6	Never detected, SQL > MSC
SEMIVOLATILES	2-Nitrophenol	**1.1E+00**	-	0.52	All Results < MSC
SEMIVOLATILES	3,3'-Dichlorobenzidine	**1.2E-02**	-	1	Never detected, SQL > MSC
SEMIVOLATILES	3-Nitroaniline	**3.5E-02**	-	2.6	Never detected, SQL > MSC
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	**2.3E-02**	-	2.6	Never detected, SQL > MSC
SEMIVOLATILES	4-Bromophenyl phenyl ether	**7.3E-01**	-	0.52	All Results < MSC
SEMIVOLATILES	4-Chloro-3-methylphenol	**1.2E+01**	-	0.65	All Results < MSC
SEMIVOLATILES	4-Chloroaniline	**7.6E-01**	-	0.65	All Results < MSC
SEMIVOLATILES	4-Chlorophenyl phenyl ether	**6.6E-02**	-	0.52	Never detected, SQL > MSC
SEMIVOLATILES	4-Methylphenol	**1.2E+00**	-	0.52	All Results < MSC
SEMIVOLATILES	4-Nitroaniline	**3.1E-02**	-	2.6	Never detected, SQL > MSC
SEMIVOLATILES	4-Nitrophenol	**2.8E-01**	-	2.6	Never detected, SQL > MSC
SEMIVOLATILES	Acenaphthene	**3.4E+02**	-	0.52	All Results < MSC
SEMIVOLATILES	Acenaphthylene	**5.4E+02**	-	0.52	All Results < MSC
SEMIVOLATILES	Anthracene	**2.0E+01**	-	0.52	All Results < MSC
SEMIVOLATILES	Benzo(a)anthracene	**3.7E+00**	0.14	0.52	All Results < MSC
SEMIVOLATILES	Benzo(a)pyrene	**5.0E+00**	0.11	0.52	All Results < MSC
SEMIVOLATILES	Benzo(b)fluoranthene	**1.2E+01**	0.28	0.52	All Results < MSC
SEMIVOLATILES	Benzo(ghi)perylene	**8.2E+00**	-	0.52	All Results < MSC
SEMIVOLATILES	Benzo(k)fluoranthene	**1.4E+01**	0.11	0.52	All Results < MSC
SEMIVOLATILES	Benzoic Acid	**7.6E+01**	-	2.6	All Results < MSC
SEMIVOLATILES	Benzyl Alcohol	**1.3E+01**	-	0.65	All Results < MSC
SEMIVOLATILES	bis(2-Chloroethoxy)methane	**2.1E-03**	-	0.52	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Chloroethyl)ether	**1.4E-04**	-	0.52	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	**3.4E-01**	-	0.52	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	**1.1E+02**	0.58	0.52	All Results < MSC
SEMIVOLATILES	Butyl benzyl phthalate	**8.0E+02**	0.22	0.52	All Results < MSC
SEMIVOLATILES	Chrysene	**1.2E+01**	0.29	0.52	All Results < MSC
SEMIVOLATILES	Dibenzo(a,h)anthracene	**1.0E+01**	-	0.52	All Results < MSC
SEMIVOLATILES	Dibenzofuran	**9.1E+01**	-	0.52	All Results < MSC
SEMIVOLATILES	Diethyl phthalate	**3.3E+02**	-	0.52	All Results < MSC
SEMIVOLATILES	Dimethyl phthalate	**7.7E+01**	-	0.52	All Results < MSC
SEMIVOLATILES	di-n-Butyl phthalate	**7.6E+03**	-	0.52	All Results < MSC
SEMIVOLATILES	di-n-Octyl phthalate	**3.3E+04**	-	0.52	All Results < MSC
SEMIVOLATILES	Fluoranthene	**2.5E+02**	0.42	0.52	All Results < MSC
SEMIVOLATILES	Fluorene	**3.0E+02**	-	0.52	All Results < MSC

Table A5-6
Comparison to Maximum Soil Concentrations
Sump 102, Sump 103, Sump 104 and Sump 105

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
SEMIVOLATILES	Hexachlorobenzene	**7.4E-01**	-	0.52	All Results < MSC
SEMIVOLATILES	Hexachlorobutadiene	**3.7E+00**	-	0.52	All Results < MSC
SEMIVOLATILES	Hexachlorocyclopentadiene	**1.3E+01**	-	0.52	All Results < MSC
SEMIVOLATILES	Hexachloroethane	**4.9E+00**	-	0.52	All Results < MSC
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	**3.6E+01**	-	0.52	All Results < MSC
SEMIVOLATILES	Isophorone	**2.7E+00**	-	0.52	All Results < MSC
SEMIVOLATILES	Naphthalene	**8.4E+01**	-	0.52	All Results < MSC
SEMIVOLATILES	n-Nitroso-di-n-propylamine	**2.6E-05**	-	0.52	Never detected, SQL > MSC
SEMIVOLATILES	n-Nitrosodiphenylamine	**5.2E-01**	-	0.52	Never detected, SQL > MSC
SEMIVOLATILES	Pentachlorophenol	**1.3E-01**	-	2.6	Never detected, SQL > MSC
SEMIVOLATILES	Phenanthrene	**2.8E+02**	-	0.52	All Results < MSC
SEMIVOLATILES	Phenol	**1.8E+01**	-	0.52	All Results < MSC
SEMIVOLATILES	Pyrene	**1.0E+02**	0.32	0.52	All Results < MSC
VOLATILES	1,1,1,2-Tetrachloroethane	**2.8E+00**	-	0.016	All Results < MSC
VOLATILES	1,1,1-Trichloroethane	**6.4E-01**	-	0.008	All Results < MSC
VOLATILES	1,1,2,2-Tetrachloroethane	**3.1E-02**	-	0.008	All Results < MSC
VOLATILES	1,1,2-Trichloroethane	**7.2E-03**	-	0.008	Never detected, SQL > MSC
VOLATILES	1,1-Dichloroethane	**1.0E+01**	-	0.008	All Results < MSC
VOLATILES	1,1-Dichloroethene	**1.5E-02**	-	0.008	All Results < MSC
VOLATILES	1,2,3-Trichloropropane	**4.2E-04**	-	0.016	Never detected, SQL > MSC
VOLATILES	1,2-Dibromo-3-chloropropane	**9.2E-04**	-	0.031	Never detected, SQL > MSC
VOLATILES	1,2-Dibromoethane	**7.7E-05**	-	0.031	Never detected, SQL > MSC
VOLATILES	1,2-Dichloroethane	**2.9E-03**	-	0.008	Never detected, SQL > MSC
VOLATILES	1,2-Dichloroethene	**6.5E-02**	-	0.008	All Results < MSC
VOLATILES	1,2-Dichloropropane	**8.5E-03**	-	0.008	All Results < MSC
VOLATILES	2-Butanone	**1.0E+01**	-	0.05	All Results < MSC
VOLATILES	2-Chloroethyl vinyl ether	**2.9E-03**	-	0.016	Never detected, SQL > MSC
VOLATILES	2-Hexanone	**3.6E+00**	-	0.05	All Results < MSC
VOLATILES	2-Propenal	**6.5E-03**	-	0.78	Never detected, SQL > MSC
VOLATILES	Acetone	**1.2E+01**	-	0.1	All Results < MSC
VOLATILES	Acetonitrile	**4.1E-01**	-	0.16	All Results < MSC
VOLATILES	Acrylonitrile	**7.6E-05**	-	0.16	Never detected, SQL > MSC
VOLATILES	Allyl chloride	**9.6E-01**	-	0.016	All Results < MSC
VOLATILES	Benzene	**9.6E-03**	-	0.008	All Results < MSC
VOLATILES	Bromodichloromethane	**7.4E-03**	-	0.008	Never detected, SQL > MSC
VOLATILES	Bromoform	**8.7E-02**	-	0.008	All Results < MSC
VOLATILES	Bromomethane	**7.8E-02**	-	0.016	All Results < MSC
VOLATILES	Carbon disulfide	**1.7E+01**	-	0.008	All Results < MSC
VOLATILES	Carbon tetrachloride	**2.7E-02**	-	0.008	All Results < MSC

Table A5-6
Comparison to Maximum Soil Concentrations
Sump 102, Sump 103, Sump 104 and Sump 105

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
VOLATILES	Chlorobenzene	**5.8E-01**	-	0.008	All Results < MSC
VOLATILES	Chloroethane	**2.6E+01**	-	0.016	All Results < MSC
VOLATILES	Chloroform	**1.4E+00**	-	0.008	All Results < MSC
VOLATILES	Chloromethane	**1.4E-01**	-	0.016	All Results < MSC
VOLATILES	Chloroprene	**4.4E-01**	-	0.16	All Results < MSC
VOLATILES	cis-1,3-Dichloropropene	**7.0E-03**	-	0.008	Never detected, SQL > MSC
VOLATILES	Dibromochloromethane	**6.1E-02**	-	0.008	All Results < MSC
VOLATILES	Dibromomethane	**1.9E+00**	-	0.031	All Results < MSC
VOLATILES	Dichlorodifluoromethane	**1.6E+02**	-	0.031	All Results < MSC
VOLATILES	Ethyl methacrylate	**1.0E+01**	-	0.031	All Results < MSC
VOLATILES	Ethylbenzene	**3.9E+00**	-	0.008	All Results < MSC
VOLATILES	IODOMETHANE	**1.0E-01**	-	0.016	All Results < MSC
VOLATILES	ISOBUTYL ALCOHOL	**8.0E+00**	-	3.1	All Results < MSC
VOLATILES	Methacrylonitrile	**2.1E-03**	-	0.031	Never detected, SQL > MSC
VOLATILES	Methyl isobutyl ketone	**4.2E+00**	-	0.05	All Results < MSC
VOLATILES	METHYL METHACRYLATE	**1.0E+02**	-	0.031	All Results < MSC
VOLATILES	Methylene chloride	**2.2E-03**	-	0.008	Never detected, SQL > MSC
VOLATILES	Pentachloroethane	**5.6E-01**	-	0.031	All Results < MSC
VOLATILES	Propionitrile	**6.4E-03**	-	0.078	Never detected, SQL > MSC
VOLATILES	Styrene	**2.0E+00**	-	0.008	All Results < MSC
VOLATILES	Tetrachloroethene	**2.2E-02**	-	0.008	All Results < MSC
VOLATILES	Toluene	**3.9E+00**	-	0.008	All Results < MSC
VOLATILES	trans-1,3-Dichloropropene	**3.8E-02**	-	0.008	All Results < MSC
VOLATILES	trans-1,4-Dichloro-2-butene	**2.2E-03**	-	0.031	Never detected, SQL > MSC
VOLATILES	Trichloroethene	**1.3E-02**	-	0.008	All Results < MSC
VOLATILES	Trichlorofluoromethane	**1.4E+02**	-	0.016	All Results < MSC
VOLATILES	Vinyl acetate	**2.6E+01**	-	0.05	All Results < MSC
VOLATILES	Vinyl chloride	**2.6E-03**	-	0.016	Never detected, SQL > MSC
VOLATILES	Xylenes, Total	**6.5E+01**	-	0.008	All Results < MSC

Notes:

Maximum Soil Concentrations shown in Table 6 of the Shaw (2008b) Addendum.

mg/kg - milligrams per kilogram

MSC - medium specific concentration

SQL - sample quantitation limit

Table A5-7
Chemical Specific Standard 3 Groundwater-Protective MSCs for Soil
Sump 102, Sump 103, Sump 104 and Sump 105

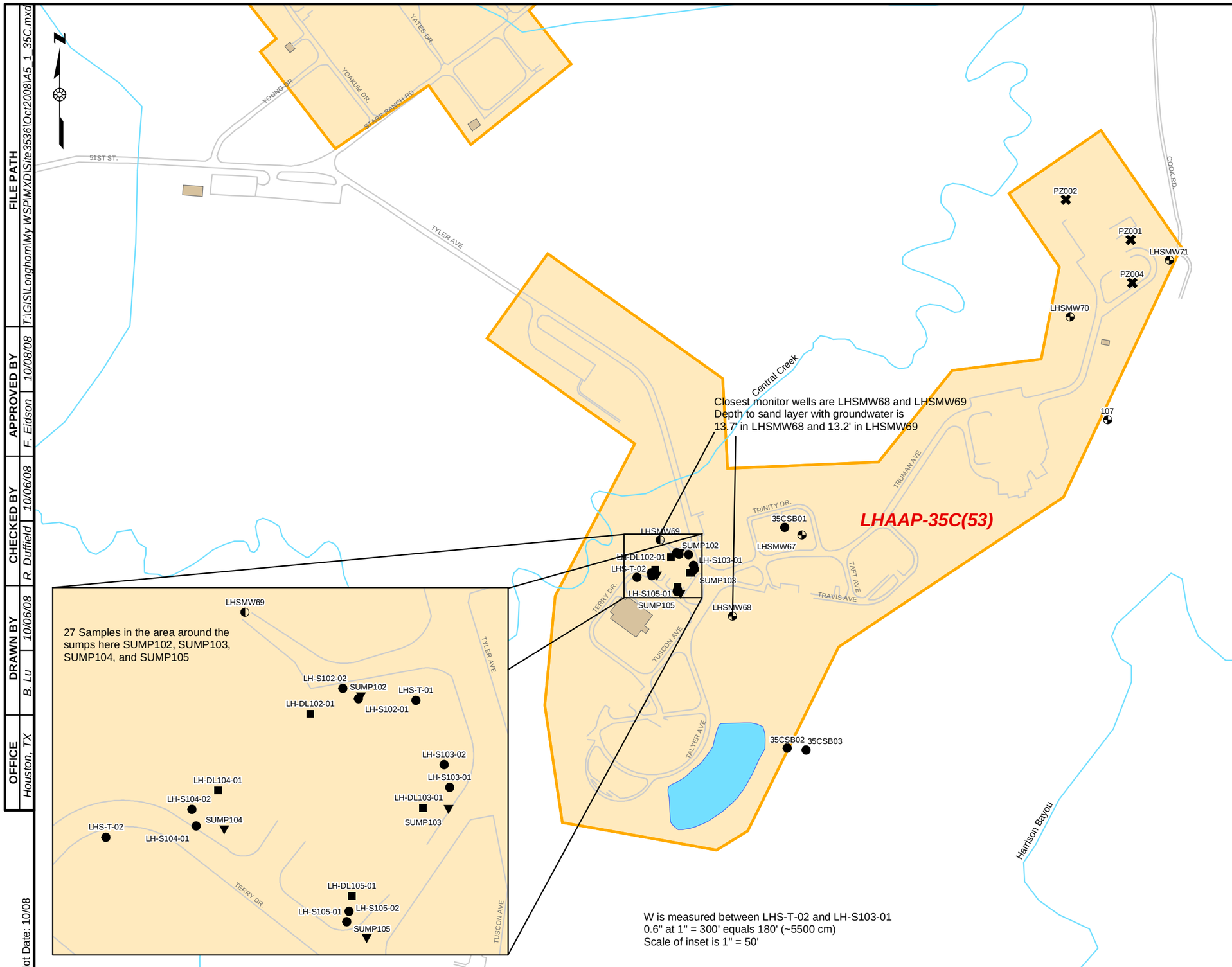
Standard 3 MSC Calculation for Specific Chemicals with Concentrations Above Initial Standard 3 MSC				
Variables	**Arsenic**	**Barium**	**Cadmium**	**Silver**
L1 - Thickness of affected soil	183	335	30	30
L2 - Distance from top of affected soils to top of water bearing unit.	396	396	396	396
W - Width of soil source area parallel to groundwater flow direction	5,500	5,500	1,000	1,000
H' - Dimensional form of Henry's Law Constant	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Kd - Soil Water Partition Coefficient	2.60E+01	1.70E+01	2.30E+01	2.60E-01
S - Solubility in mg/L	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Calculations				
Ksw = see Equation 8	3.83E-02	5.85E-02	4.33E-02	2.88E+00
Csat = see Equation 7 (mg/kg)	NA	NA	NA	NA
GW-Ind MSC (mg/L)	1.0E-02	2.0E+00	5.0E-03	5.1E-01
LDF = see Equation 5	1.113	1.113	1.619	1.619
Standard 3 Soil MSC Com/Ind (mg/kg) = see Equation 6	6.3E-01	4.5E+01	2.5E+00	3.8E+00
Corrected Standard 3 Soil MSC Com/Ind (cannot be larger than Csat) (mg/kg)	6.3E-01	4.5E+01	2.5E+00	3.8E+00
Background Concentration (mg/kg)	4.81E+00	8.55E+01	4.00E-01	3.10E-01
Applicable Commercial/Industrial Soil MSC (mg/kg)	**4.8E+00**	**8.5E+01**	**2.5E+00**	**3.8E+00**
Maximum for Comparison (mg/kg)	**10.1**	**179**	**1.6**	**6.4**

Notes:

GW-Ind MSC	from TCEQ 2006 RBSV table
LDF	leachate dilution factor
MSC	Medium Specific Concentration
mg/kg	milligrams per kilogram

Constants:

Symbol	Value	Units	Name
r_b	1.5	g/cm³	Soil Dry Bulk Density
n	0.43	unitless	Total Porosity
q_w	0.13	unitless	Volumetric Water Content of Soil
f_{oc}	0.02	g/g	Soil Fraction Organic Carbon
I	30.4	cm/yr	Net Infiltration Rate through soil
V_{gw}	61.74	cm/yr	Groundwater Darcy Velocity = K x i x 31500000
K	2.8E-04	cm/sec	Hydraulic conductivity in groundwater bearing unit
i	0.007	unitless	Hydraulic gradient in groundwater bearing unit
d	305	cm	Groundwater mixing zone
q_a	0.3	unitless	Soil Air Filled Porosity (qa) = n - qw



Legend

- Shallow Monitoring Well
- Intermediate Monitoring Well
- Surface Soil
- Soil Boring
- Sump
- Piezometer
- Stream
- Road
- Existing Building
- Water Body
- Site

0 150 300 600 Feet

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

FIGURE A5-1

SAMPLE LOCATION MAP
LHAAP-35C(53)

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	FILE PATH
Houston, TX	B. Lu 10/06/08	R. Duffield 10/06/08	F. Eidson 10/08/08	T:\GIS\Longhorn\My WSP\MXD\Site3536\Oct2008\A5_1_35C.mxd

Plot Date: 10/08

Attachment 6

Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 110

Attachment 6 – SAM Model Evaluation

Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 110 at the Longhorn Army Ammunition Plant, Karnack, Texas

Attachment 6 describes development of Medium Specific Concentrations (MSCs) for chemicals in soil that are protective of groundwater for soil associated with Sump 110. The MSC values were developed according to the Texas Commission on Environmental Quality [TCEQ] Texas Risk Reduction Rules, Title 30 Texas Administrative Code (TAC) Chapter 335 (30 TAC §335 and updates). Groundwater-protective Risk Reduction Standard 3 MSCs were calculated to evaluate the potential for migration of chemicals from soil to groundwater as provided in TCEQ guidance [30 TAC §335.563(i)(2)] by using the SAM model to estimate the potential impacts of soil contamination on groundwater quality.

Sump 110 is associated with Building 207 near Longhorn Army Ammunition Plant (LHAAP)-46 as shown in **Figure A6-1**. Building 207 was used as a maintenance calibration facility and as a research and development laboratory for a smoke test device (Plexus, 2005). Potential contaminants at Building 207 include metals, semivolatile organic compounds (SVOCs), and volatile organic compounds (VOCs) (Shaw, 2008). Evaluation of chemicals in soil associated with this sump was based on data from analysis of 4 soil samples collected from depths ranging from 0 to 5.5 feet below ground surface (bgs). The samples were analyzed for explosives, metals, SVOCs, and VOCs. The analytical results were evaluated as reported in **Table 8a** and **Table 8b** of the main body of this Addendum.

The initial step in the SAM Model compared the tested chemicals to available background concentrations and method quantitation limits (MQL) for each chemical. Of the chemicals tested, 5 were not evaluated because they are regarded as essential nutrients (TCEQ, 2001). The evaluation of the remaining chemicals is recorded on **Table A6-1**.

The SAM Model was selected to predict impacts of soil contamination on groundwater quality. The SAM Model is an extension of the Soil Screening Level calculations USEPA (1996) guidance and is based on calculating total mass (liquid phase, solid phase, and gas phase) in the soil column:

$$M_T = V(\rho_b C_s + \theta_w C_w + \theta_a C_g)$$

Where

M_T = total mass of chemical
V = volume of the soil column
ρ_b = bulk density
C_s = concentration in soil (dry weight basis)
θ_w = water filled porosity
C_w = concentration in pore water

θ_a = air filled porosity
C_g = gas phase concentration

Total mass is then redistributed using equilibrium conditions based on the adsorption coefficient and Henry's constant. The equilibrium equations are:

$$C_s = K_d C_w \qquad \text{Equation 1}$$

$$C_g = H' C_w \qquad \text{Equation 2}$$

Where Kd is the distribution coefficient or adsorption coefficient, and H' is the dimensionless Henry's Law constant.

A SAM Model enhancement over EPA's Soil Screening Levels is that the SAM Model assumes a zone of contaminated soils overlying a zone of clean soil (zero contaminant concentration). The SAM Model simulates mixing of contamination through the contaminated and clean soil zones based on equilibrium conditions and predicts leachate concentration at the bottom of the soil column. In the SAM Model, the leachate concentration is calculated as follows:

$$C_w = C_s \left(\frac{\rho_b}{\theta_w + (K_d \rho_b) + H' \theta_a} \right) \left(\frac{L_1}{L_2} \right) \qquad \text{Equation 3}$$

Or, alternately, the concentration in soil that will produce a given leachate concentration can be calculated as:

$$C_s = C_w \left(\frac{\theta_w + (K_d \rho_b) + H' \theta_a}{\rho_b} \right) \left(\frac{L_2}{L_1} \right) \qquad \text{Equation 4}$$

Where L_1 is the thickness of the contaminated zone and L_2 is the thickness of the total soil column. The factor (L_2/L_1) is an enhancement in the SAM Model over the Soil Screening Level Model by USEPA. A further dilution factor for leachate mixing with groundwater can be incorporated by using a leachate dilution factor:

$$LDF = 1 + \frac{Kid}{IW} \qquad \text{Equation 5}$$

Where
K = aquifer hydraulic conductivity
i = hydraulic gradient in aquifer
d = groundwater mixing zone depth
I = infiltration rate

W = source length parallel to groundwater flow.

The groundwater protective Standard 3 MSC is the soil concentration (Cs) described by Equation 4 where the groundwater concentration is limited by the TCEQ risk-based drinking water concentration (GW-Ind) modified by the leachate dilution factor (LDF) as follows:

$$\text{Standard 3 } MSC = GW - Ind\left(\frac{\theta_w + (K_d \rho_b) + H'\theta_a}{\rho_b}\right)\left(\frac{L_2}{L_1}\right) x\ LDF \quad \text{Equation 6}$$

The model further calculates the soil saturation concentration (C_{sat}), which corresponds to the contaminant concentration in soil at which the absorptive capacity of soil particles, the solubility limits of soil pore water and saturation of soil pore air have been reached. Concentrations above C_{sat} are assumed to be in free phase. The C_{sat} concentration is calculated in the SAM Model according to Equation 7.

$$C_{sat} = S\left(\frac{\theta_w + (K_d \rho_b) + H'\theta_a}{\rho_b}\right) \quad \text{Equation 7}$$

For the purpose of simplification, a soil to water coefficient, K_{sw}, can stand in for the complex bracketed formula in Equations 3, 4, 6, and 7.

$$K_{sw} = \left(\frac{\rho_b}{\theta_w + (K_d \rho_b) + (H'\theta_a)}\right) \quad \text{Equation 8}$$

Input parameters to the SAM Model, that are either specific to Sump 110 locations at Building 207 within LHAAP-46 or are default TCEQ values, are shown in **Table A6-2**. Because some chemical properties are pH dependent, an average groundwater pH calculation was calculated (6.0) in **Table A6-3**. **Table A6-4** lists the chemical properties (TCEQ, 2008). From these input parameters and properties, the SAM Model first calculates a saturated soil concentration (C_{sat}) using Equation 7.

Then the SAM Model calculates a Standard 3 Commercial/Industrial Soil MSC using Equation 6 by equating C_w to the GW-Ind MSC and calculating what concentration of chemical in the soil at the site

(mg/kg) would theoretically leach into the groundwater at the GW-Ind concentration (mg/L). The lower of the C_{sat} and the calculated Soil MSC values is used as the Soil MSC.

Finally, the SAM Model compares the Soil MSC to available background soil concentrations for the chemical. The 95% upper prediction limit (UPL) soil background concentrations from the LHAAP-35/36 Sump Report (Shaw, 2008) were used for this comparison. The larger of the Soil MSC and the background concentration is then selected as the Applicable Standard 3 Commercial/Industrial Soil MSC.

Table A6-5 presents the results of those calculations. The Applicable Standard 3 Commercial/Industrial Soil MSC values are in bold along the right side of the table. While it is possible to select different site parameters for each chemical, for this calculation, general whole site parameters were used as if each chemical were equally and evenly distributed across the entire site. When compared to actual distribution of individual chemical results in individual samples taken near former sump locations, this assumption overestimates the extent of the chemical concentration across the site, resulting in lower concentrations calculated for the MSC values.

Table A6-6 compares the Applicable Standard 3 Commercial/Industrial Soil MSC values to maximum soil concentrations for each chemical in the samples associated with Sump 110 at Building 207 within LHAAP-46. None of the chemicals evaluated were detected in the 4 samples at a level that exceeded the MSC. Seventeen chemicals that were never detected had at least one sample quantitation limit (SQL) greater than the Applicable Standard 3 MSC. No other chemicals had SQL values higher than the MSC.

Discussion

The SAM Model results for Sump 110 at Building 207 near LHAAP-46 indicate that no chemicals were detected in these samples at levels that exceeded the Applicable Standard 3 Commercial/Industrial Soil MSC values that were developed to be protective of groundwater.

References

Plexus Scientific, Inc., (Plexus), 2005, *Environmental Site Assessment Phase I and II Report, Production Areas, Longhorn Army Ammunition Plant, Karnack, Texas*, Houston, Texas, February.

Shaw Environmental, Inc. (Shaw), 2008, *Final Data Evaluation Report, Chemical Concentrations in Soil Samples Associated with LHAAP-35/36 Sumps*, January (LHAAP-35/36 Sump Report).

Texas Commission on Environmental Quality (TCEQ), 2001, Interoffice Memorandum from Joseph T. Haney, Jr., (TCEQ) to Camarie Perry, Office or Permitting, Remediation & Registration, *Evaluation of the Potential Health Impacts of Exposure to Iron, Calcium, Magnesium, Potassium, sodium, and Phosphorus through Soil Ingestion*, October.

TCEQ, 2008, Annual TCEQ update of chemical/physical properties table [(Figure: 30 TAC §350.73(e)], April.

U.S. Environmental Protection Agency (USEPA), 1996, *Soil Screening Guidance: User's Guide*, Second Edition.

Table A6-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 110 at Building 207

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	MQL	Calculate MSC ?
EXPLOSIVES	1,3,5-Trinitrobenzene	-	0.115	NE	NE	0.25	0.25	YES
EXPLOSIVES	1,3-Dinitrobenzene	-	0.114	NE	NE	0.25	0.25	YES
EXPLOSIVES	2,4,6-Trinitrotoluene	-	0.115	NE	NE	0.25	0.25	YES
EXPLOSIVES	2,4-Dinitrotoluene	-	0.330	NE	NE	0.165	0.165	No, 2
EXPLOSIVES	2,6-Dinitrotoluene	-	0.330	NE	NE	0.165	0.165	No, 2
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	-	0.115	NE	NE	0.26	0.26	YES
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	-	0.115	NE	NE	0.26	0.26	YES
EXPLOSIVES	HMX	-	0.115	NE	NE	2.2	2.2	YES
EXPLOSIVES	m-Nitrotoluene	-	0.115	NE	NE	0.25	0.25	YES
EXPLOSIVES	Nitrobenzene	-	0.330	NE	NE	0.165	0.165	No, 2
EXPLOSIVES	o-Nitrotoluene	-	0.115	NE	NE	1	1	YES
EXPLOSIVES	p-Nitrotoluene	1.572	0.114	NE	NE	0.65	0.65	YES
EXPLOSIVES	RDX	-	0.114	NE	NE	0.26	0.26	YES
EXPLOSIVES	Tetryl	-	0.231	NE	NE	0.25	0.25	YES
METALS	Aluminum	10467	-	1.63E+04	2.08E+04	20	20	YES
METALS	Antimony	-	3.000	9.40E-01	1.60E+00	3	0.1	YES
METALS	Arsenic	3.70	-	4.81E+00	5.54E+00	0.3	0.3	YES
METALS	Barium	88.9	-	1.52E+02	8.55E+01	0.3	0.3	YES
METALS	Beryllium	0.563	-	6.45E-01	7.66E-01	0.5	0.5	YES
METALS	Cadmium	0.089	1.000	1.40E+00	4.00E-01	1	0.1	YES
METALS	Calcium	401	-	NA	NA	NA	NA	No, 1
METALS	Chromium	11.3	-	2.66E+01	3.01E+01	0.4	0.4	YES
METALS	Cobalt	7.290	1.000	7.23E+00	5.61E+00	1	0.5	YES
METALS	Copper	3.808	-	5.55E+00	9.25E+00	0.6	0.6	YES
METALS	Iron	14720	-	NA	NA	NA	NA	No, 1
METALS	Lead	7.42	-	2.26E+01	1.14E+01	5	5	YES
METALS	Magnesium	991	-	NA	NA	NA	NA	No, 1
METALS	Manganese	11.4	-	1.25E+03	2.01E+02	0.2	0.2	YES
METALS	Mercury	0.018	0.100	8.19E-02	3.60E-01	0.1	0.25	YES
METALS	Nickel	9.67	-	6.98E+00	1.16E+01	0.8	0.8	YES
METALS	Potassium	317	-	NA	NA	NA	NA	No, 1
METALS	Selenium	0.322	1.000	3.48E+00	5.57E+00	1	0.2	YES
METALS	Silver	-	1.000	3.10E-01	3.70E-01	1	0.2	YES
METALS	Sodium	515	-	NA	NA	NA	NA	No, 1
METALS	Strontium	8.00	-	1.98E+01	2.91E+01	0.5	0.5	YES
METALS	Thallium	0.069	-	4.70E-01	NE	0.02	0.02	YES
METALS	Vanadium	22.9	-	3.21E+01	4.46E+01	0.5	0.5	YES
METALS	Zinc	17.1	-	6.16E+01	2.02E+01	2.5	2.5	YES
SEMIVOLATILES	1,2,4-Trichlorobenzene	-	0.330	NE	NE	0.33	0.005	YES
SEMIVOLATILES	1,2-Dichlorobenzene	-	0.330	NE	NE	0.33	0.005	YES
SEMIVOLATILES	1,3-Dichlorobenzene	-	0.330	NE	NE	0.33	0.005	YES
SEMIVOLATILES	1,4-Dichlorobenzene	-	0.330	NE	NE	0.33	0.005	YES
SEMIVOLATILES	2,4,5-Trichlorophenol	-	1.650	NE	NE	1.65	0.165	YES
SEMIVOLATILES	2,4,6-Trichlorophenol	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2,4-Dichlorophenol	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2,4-Dimethylphenol	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2,4-Dinitrophenol	-	1.650	NE	NE	1.65	0.825	YES
SEMIVOLATILES	2,4-Dinitrotoluene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2,6-Dinitrotoluene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2-Chloronaphthalene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2-Chlorophenol	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2-Methylnaphthalene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2-Methylphenol	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2-Nitroaniline	-	1.650	NE	NE	1.65	0.825	YES
SEMIVOLATILES	2-Nitrophenol	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	3,3'-Dichlorobenzidine	-	0.650	NE	NE	0.65	0.33	YES
SEMIVOLATILES	3-Nitroaniline	-	1.650	NE	NE	1.65	0.825	YES
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	-	1.650	NE	NE	1.65	0.825	YES
SEMIVOLATILES	4-Bromophenyl phenyl ether	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	4-Chloro-3-methylphenol	-	0.650	NE	NE	0.65	0.165	YES
SEMIVOLATILES	4-Chloroaniline	-	0.650	NE	NE	0.65	0.165	YES
SEMIVOLATILES	4-Chlorophenyl phenyl ether	-	0.330	NE	NE	0.33	0.165	YES

Table A6-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 110 at Building 207

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	MQL	Calculate MSC ?
SEMIVOLATILES	4-Methylphenol	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	4-Nitroaniline	-	1.650	NE	NE	1.65	0.825	YES
SEMIVOLATILES	4-Nitrophenol	-	1.650	NE	NE	1.65	0.825	YES
SEMIVOLATILES	Acenaphthene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Acenaphthylene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Anthracene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Benzo(a)anthracene	-	0.330	1.53E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Benzo(a)pyrene	-	0.330	1.54E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Benzo(b)fluoranthene	-	0.330	1.53E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Benzo(ghi)perylene	-	0.330	1.23E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Benzo(k)fluoranthene	-	0.330	1.30E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Benzoic Acid	-	1.650	NE	NE	1.65	0.825	YES
SEMIVOLATILES	Benzyl Alcohol	-	0.650	NE	NE	0.65	0.165	YES
SEMIVOLATILES	bis(2-Chloroethoxy)methane	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	bis(2-Chloroethyl)ether	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	0.519	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Butyl benzyl phthalate	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Chrysene	-	0.330	1.51E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Dibenzo(a,h)anthracene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Dibenzofuran	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Diethyl phthalate	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Dimethyl phthalate	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	di-n-Butyl phthalate	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	di-n-Octyl phthalate	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Fluoranthene	-	0.330	2.29E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Fluorene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Hexachlorobenzene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Hexachlorobutadiene	-	0.330	NE	NE	0.33	0.005	YES
SEMIVOLATILES	Hexachlorocyclopentadiene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Hexachloroethane	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	-	0.330	1.43E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Isophorone	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Naphthalene	-	0.330	NE	NE	0.33	0.01	YES
SEMIVOLATILES	Nitrobenzene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	n-Nitroso-di-n-propylamine	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	n-Nitrosodiphenylamine	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Pentachlorophenol	-	1.650	NE	NE	1.65	0.825	YES
SEMIVOLATILES	Phenanthrene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Phenol	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Pyrene	-	0.330	1.94E-02	NE	0.33	0.165	YES
VOLATILES	1,1,1,2-Tetrachloroethane	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	1,1,1-Trichloroethane	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	1,1,2,2-Tetrachloroethane	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	1,1,2-Trichloroethane	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	1,1-Dichloroethane	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	1,1-Dichloroethene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	1,1-Dichloropropene	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	1,2,3-Trichlorobenzene	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	1,2,3-Trichloropropane	-	0.0012	NE	NE	0.005	0.005	YES
VOLATILES	1,2,4-Trichlorobenzene	-	0.3300	NE	NE	0.005	0.005	No, 2
VOLATILES	1,2,4-Trimethylbenzene	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	1,2-Dibromo-3-chloropropane	-	0.0023	NE	NE	0.005	0.005	YES
VOLATILES	1,2-Dibromoethane	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	1,2-Dichlorobenzene	-	0.3300	NE	NE	0.005	0.005	No, 2
VOLATILES	1,2-Dichloroethane	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	1,2-Dichloroethene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	1,2-Dichloropropane	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	1,2-Dimethylbenzene (o-Xylene)	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	1,3,5-Trimethylbenzene	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	1,3-Dichlorobenzene	-	0.3300	NE	NE	0.005	0.005	No, 2
VOLATILES	1,3-Dichloropropane	-	0.0006	NE	NE	0.005	0.005	YES

Table A6-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 110 at Building 207

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	MQL	Calculate MSC ?
VOLATILES	1,4-Dichlorobenzene	-	0.3300	NE	NE	0.005	0.005	No, 2
VOLATILES	2,2-Dichloropropane	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	2-Butanone	-	0.0500	NE	NE	0.05	0.01	YES
VOLATILES	2-Chloroethyl vinyl ether	-	0.0100	NE	NE	0.01	0.01	YES
VOLATILES	2-Chlorotoluene	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	2-Hexanone	-	0.0500	NE	NE	0.05	0.01	YES
VOLATILES	4-Chlorotoluene	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	Acetone	-	0.1000	NE	NE	0.1	0.01	YES
VOLATILES	Benzene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Bromobenzene	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	Bromochloromethane	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	Bromodichloromethane	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Bromoform	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Bromomethane	-	0.0100	NE	NE	0.01	0.01	YES
VOLATILES	Carbon disulfide	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Carbon tetrachloride	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Chlorobenzene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Chloroethane	-	0.0100	NE	NE	0.01	0.01	YES
VOLATILES	Chloroform	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Chloromethane	-	0.0100	NE	NE	0.01	0.01	YES
VOLATILES	cis-1,2-Dichloroethene	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	cis-1,3-Dichloropropene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Dibromochloromethane	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Dibromomethane	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	Dichlorodifluoromethane	-	0.0012	NE	NE	0.01	0.01	YES
VOLATILES	Ethylbenzene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Hexachlorobutadiene	-	0.3300	NE	NE	0.005	0.005	No, 2
VOLATILES	Isopropylbenzene	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	m,p-Xylenes	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	Methyl isobutyl ketone	-	0.0500	NE	NE	0.05	0.01	YES
VOLATILES	Methylene chloride	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Naphthalene	-	0.3300	NE	NE	0.01	0.01	No, 2
VOLATILES	n-BUTYLBENZENE	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	n-PROPYLBENZENE	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	p-ISOPROPYLTOLUENE	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	sec-BUTYLBENZENE	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	Styrene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	tert-BUTYLBENZENE	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	Tetrachloroethene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Toluene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	trans-1,2-Dichloroethene	-	0.0006	NE	NE	0.005	0.005	YES
VOLATILES	trans-1,3-Dichloropropene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Trichloroethene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Trichlorofluoromethane	-	0.0012	NE	NE	0.01	0.01	YES
VOLATILES	Vinyl acetate	-	0.0500	NE	NE	0.05	0.01	YES
VOLATILES	Vinyl chloride	-	0.0100	NE	NE	0.01	0.01	YES
VOLATILES	Xylenes, Total	-	0.0050	NE	NE	0.005	0.005	YES

Notes:

all concentrations in milligrams per kilogram (mg/kg)

Max Detected and Max SQL values taken from Table 8a and Table 8b of the main body of the Addendum.

NE - Not evaluated, background was only evaluated for metals and select other analytes.

SQL - sample quantitation limit.

MQL - method quantitation limit (for recent samples).

MSC - medium specific concentration.

PQL - practical quantitation limit (for older samples).

Rules for Analyte Selection

1. Chemicals that are essential nutrients (Fe, Ca, Mg, K, Na, P), TCEQ (2001).
2. Same chemical is analyzed as an explosive, only one MSC value is calculated.

Table A6-2
Input Values for Parameters used to Calculate Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 110 at Building 207

Parameter		Value	Units	Comment	Reference
Soil Dry Bulk Density	ρ_b	1.5	g/cm^3	Typical value	USEPA, 1996, pg. 38.
Particle Density	$\rho_{particle}$	2.65	g/cm^3	TCEQ default value	30 TAC §350.75 (c) and (d)
Total Porosity	n	0.43	unitless	n = 1-(ρb/ρparticle) = 1-(1.5 g/cc/2.65 g/cc)	USEPA, 1996, pg. 38.
Volumetric Water Content of Soil	θ_w	0.13	unitless	Assumed 30%	USEPA, 1996, pg. 38.
Soil Fraction Organic Carbon	f_{oc}	0.02	unitless	TCEQ default value	30 TAC §335.567. Appendix I. (p. 26)
Net Infiltration Rate through soil	I	30.4	cm/yr	I = 0.0018 x P x P P - precipitation for Marshall Texas 130	TCEQ, 2000
Thickness of affected soil	L_1	183	cm	Samples taken at various depths from 0 down to 5.5 ft. Assumed 6 ft. (183 cm)	Table 8a and Table 8b, main body of Addendum
Distance from top of affected soils to top of water bearing unit.	L_2	427	cm	top of shallowest sand layer at LHSMW10 at 14 ft, (427 cm)	Jacobs, 2002, Appendix A, Boring Logs
Groundwater Darcy Velocity	V_{gw}	221.70	cm/yr	Calculated = K*i*31500000 sec/yr	USEPA, 1996, pg. 42.
Hydraulic conductivity in groundwater bearing unit	K	7.82E-04	cm/sec	Value listed as modeling input	Shaw, 2007, Appendix G, pg. 2-1
Hydraulic gradient in groundwater bearing unit	i	0.009	unitless	Value listed as modeling input	Shaw, 2007, Appendix G, pg. 2-1
Width of soil source area parallel to groundwater flow direction	W	1,100	cm	Maximum site dimension, 34 ft measured from LH-S110-01 to 35SUMP220-SB02 (~1100 cm)	See Figure A6-1
Groundwater mixing zone	d	305	cm	Nearest monitor wells in Shallow Zone LHSMW10 and LHSMW11 have 10-ft screens (305 cm)	Jacobs 2002, pg. 8-6
Soil Air Filled Porosity (θ_a)	θ_a	0.30	unitless	n - θw	USEPA, 1996, pg. 38.
Henry's Law Constant	H'	Chemical specific property	unitless	See Table A6-4	TCEQ, 2008
Organic Carbon Partition Coefficient	K_{oc}	Chemical specific property	unitless	See Table A6-4	TCEQ, 2008
Soil Water Partition Coefficient	K_d	Chemical specific property	unitless	See Table A6-4	TCEQ, 2008

Notes:

Jacobs Engineering Group, Inc., 2002: *Final Remedial Investigation Report, Group 4 Sites, Sites 04, 08, 35A, 35B, 35C, 46, 47, 48, 50, 60,67, Goose Prairie Creek, Volumes 1 and 2: Report, Longhorn Army Ammunition Plant, Karnack, Texas* , Oak Ridge, Tennessee, February.

Shaw Environmental & Infrastructure (Shaw), 2007, *Final Modeling Report, Derivation of Soil and Groundwater Concentrations Protective of Surface Water and Sediment*, February.

Texas Commission on Environmental Quality (TCEQ), *Risk Reduction Rules* , 30 TAC §335.567. Appendix I.

TCEQ, 2000, Tier 2 PCL Equations, March, accessed at http://www.tceq.state.tx.us/assets/public/remediation/trrp/tier2.pdf

TCEQ, 2008: Texas Risk Reduction Program Physical Chemical Properties Tables, April, accessed at http://www.tceq.state.tx.us/remediation/trrp/trrppcls.html

USEPA, 1996. Soil Screening Guidance: Technical Background Document, USEPA/540/R-95/128018, U. S. Environmental Protection Agency, Office of Emergency and Remedial Response, July.

Table A6-3
Determination of pH
Sump 110 at Building 207

Well	Date	pH Measurement	Comment
46WW01	Feb-07	5.27	
46WW04	Feb-07	6.20	
LHSMW22	Feb-07	5.84	
LHSMW18	Feb-07	6.02	
LHSMW19	Feb-07	6.41	
46WW04	Sep-07	6.10	
LHSMW11	Sep-07	6.31	
LHSMW14	Sep-07	5.43	
LHSMW15	Sep-07	6.29	
LHSMW19	Sep-07	6.13	
LHSMW22	Sep-07	5.73	
LHSMW24	Sep-07	6.53	
Average		6.02	
pH to be used		**6.0**	

Notes:

1. pH data from the groundwater sampling logs, Field Work images on Shaw network.
2. Only the pH readings from shallow wells were averaged.

Table A6-4
Physical Chemical Properties of Chemicals of Concern [a]
Sump 110 at Building 207

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
EXPLOSIVES	1,3,5-Trinitrobenzene	2.87E-06	1.41E+01	2.83E-01	3.53E+02	b
EXPLOSIVES	1,3-Dinitrobenzene	4.57E-06	3.00E+01	6.00E-01	5.40E+02	b
EXPLOSIVES	2,4,6-Trinitrotoluene	1.90E-05	3.02E+02	6.04E+00	1.30E+02	b
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	1.19E-07	5.62E+02	1.12E+01	1.73E+01	b
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	1.74E-07	3.63E+02	7.26E+00	3.64E+01	b
EXPLOSIVES	HMX	2.50E-14	3.98E-02	7.96E-04	2.37E+03	b
EXPLOSIVES	m-Nitrotoluene	2.24E-03	1.41E+02	2.81E+00	4.98E+02	b
EXPLOSIVES	o-Nitrotoluene	1.87E-03	1.41E+02	2.81E+00	6.00E+02	b
EXPLOSIVES	p-Nitrotoluene	2.29E-03	1.41E+02	2.81E+00	4.00E+02	b
EXPLOSIVES	RDX	4.99E-04	6.31E+01	1.26E+00	3.87E+01	b
EXPLOSIVES	Tetryl	8.31E-11	2.34E+02	4.69E+00	7.50E+01	b
METALS	Aluminum	0.00E+00	NA	3.53E+04	0.00E+00	c
METALS	Antimony	0.00E+00	NA	5.70E+01	0.00E+00	d
METALS	Arsenic	0.00E+00	NA	2.70E+01	0.00E+00	d
METALS	Barium	0.00E+00	NA	3.00E+01	0.00E+00	d
METALS	Beryllium	0.00E+00	NA	8.20E+01	0.00E+00	d
METALS	Cadmium	0.00E+00	NA	3.70E+01	0.00E+00	d
METALS	Chromium	0.00E+00	NA	2.00E+05	0.00E+00	d
METALS	Cobalt	0.00E+00	NA	4.50E+01	0.00E+00	
METALS	Copper	0.00E+00	NA	4.00E+01	0.00E+00	
METALS	Lead	0.00E+00	NA	1.83E+03	0.00E+00	c
METALS	Manganese	0.00E+00	NA	5.01E+01	0.00E+00	
METALS	Mercury	4.74E-01	NA	3.50E+00	3.00E-02	d
METALS	Nickel	0.00E+00	NA	3.80E+01	0.00E+00	d
METALS	Selenium	0.00E+00	NA	8.60E+00	0.00E+00	d
METALS	Silver	0.00E+00	NA	1.30E+00	0.00E+00	d
METALS	Strontium	0.00E+00	NA	2.00E+00	0.00E+00	
METALS	Thallium	0.00E+00	NA	5.80E+01	2.90E+03	d
METALS	Vanadium	0.00E+00	NA	1.00E+03	0.00E+00	
METALS	Zinc	0.00E+00	NA	3.60E+01	0.00E+00	d
SEMIVOLATILES	1,2,4-Trichlorobenzene	5.90E-02	1.66E+03	3.32E+01	4.88E+01	b
SEMIVOLATILES	1,2-Dichlorobenzene	8.73E-02	6.92E+02	1.38E+01	1.50E+02	b
SEMIVOLATILES	1,3-Dichlorobenzene	1.95E-01	1.70E+02	3.40E+00	1.10E+02	b
SEMIVOLATILES	1,4-Dichlorobenzene	1.17E-01	6.46E+02	1.29E+01	7.38E+01	b
SEMIVOLATILES	2,4,5-Trichlorophenol	1.78E-04	2.21E+03	4.42E+01	1.20E+03	b, e
SEMIVOLATILES	2,4,6-Trichlorophenol	3.19E-04	7.96E+02	1.59E+01	9.82E+02	b, e
SEMIVOLATILES	2,4-Dichlorophenol	1.31E-04	1.57E+02	3.14E+00	4.50E+03	b, e
SEMIVOLATILES	2,4-Dimethylphenol	8.31E-05	1.17E+02	2.35E+00	6.20E+03	b
SEMIVOLATILES	2,4-Dinitrophenol	2.01E-07	1.16E-02	2.32E-04	5.80E+03	b, e
SEMIVOLATILES	2,4-Dinitrotoluene	3.60E-05	5.13E+01	1.03E+00	2.85E+02	b

Table A6-4
Physical Chemical Properties of Chemicals of Concern [a]
Sump 110 at Building 207

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
SEMIVOLATILES	2,6-Dinitrotoluene	3.11E-05	4.17E+01	8.34E-01	1.82E+02	b
SEMIVOLATILES	2-Chloronaphthalene	2.54E-02	8.51E+03	1.70E+02	6.74E+00	b
SEMIVOLATILES	2-Chlorophenol	7.40E-04	3.96E+02	7.92E+00	2.80E+04	b, e
SEMIVOLATILES	2-Methylnaphthalene	1.85E-02	4.32E+03	8.63E+01	2.54E+01	b
SEMIVOLATILES	2-Methylphenol	6.65E-05	9.77E+01	1.95E+00	2.04E+04	b
SEMIVOLATILES	2-Nitroaniline	2.08E-05	2.69E+01	5.38E-01	1.26E+03	b
SEMIVOLATILES	2-Nitrophenol	2.21E-05	1.88E+02	3.75E+00	1.73E+04	b, e
SEMIVOLATILES	3,3'-Dichlorobenzidine	8.65E-07	7.24E+02	1.45E+01	3.11E+00	b
SEMIVOLATILES	3-Nitroaniline	2.31E-07	3.94E+01	7.88E-01	4.56E+02	b
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	1.07E-07	3.16E-02	6.32E-04	3.00E+03	b
SEMIVOLATILES	4-Bromophenyl phenyl ether	9.66E-03	1.45E+05	2.90E+03	8.25E-01	b
SEMIVOLATILES	4-Chloro-3-methylphenol	1.40E-05	8.78E+02	1.76E+01	5.43E+03	b
SEMIVOLATILES	4-Chloroaniline	4.86E-05	6.61E+01	1.32E+00	3.90E+03	b
SEMIVOLATILES	4-Chlorophenyl phenyl ether	1.30E-02	1.31E+04	2.62E+02	1.43E+00	b
SEMIVOLATILES	4-Methylphenol	3.99E-05	8.13E+01	1.63E+00	2.30E+04	b
SEMIVOLATILES	4-Nitroaniline	3.33E-08	1.12E+01	2.25E-01	6.49E+02	b
SEMIVOLATILES	4-Nitrophenol	3.24E-08	4.36E+01	8.73E-01	4.49E+03	b, e
SEMIVOLATILES	Acenaphthene	6.44E-03	3.98E+03	7.96E+01	4.24E+00	b
SEMIVOLATILES	Acenaphthylene	4.74E-03	6.92E+03	1.38E+02	3.93E+00	b
SEMIVOLATILES	Anthracene	4.61E-03	2.34E+04	4.69E+02	4.34E-02	b
SEMIVOLATILES	Benzo(a)anthracene	1.39E-04	3.55E+05	7.10E+03	1.00E-02	b
SEMIVOLATILES	Benzo(a)pyrene	4.70E-05	9.55E+05	1.91E+04	1.62E-03	b
SEMIVOLATILES	Benzo(b)fluoranthene	4.99E-04	1.20E+06	2.40E+04	1.50E-03	b
SEMIVOLATILES	Benzo(ghi)perylene	5.82E-06	1.58E+06	3.17E+04	2.60E-04	b
SEMIVOLATILES	Benzo(k)fluoranthene	4.45E-07	1.23E+06	2.46E+04	5.50E-04	b
SEMIVOLATILES	Benzoic Acid	1.39E-05	9.69E-01	1.94E-02	3.50E+03	b, e
SEMIVOLATILES	Benzyl Alcohol	1.62E-05	1.20E+01	2.40E-01	4.00E+04	b
SEMIVOLATILES	bis(2-Chloroethoxy)methane	1.25E-03	3.07E+02	6.13E+00	1.35E+03	b
SEMIVOLATILES	bis(2-Chloroethyl)ether	8.90E-04	1.55E+01	3.10E-01	1.02E+04	b
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	4.16E-03	3.16E+02	6.32E+00	1.70E+03	b
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	4.57E-04	6.76E+05	1.35E+04	3.00E-01	b
SEMIVOLATILES	Butyl benzyl phthalate	7.94E-05	1.37E+04	2.75E+02	2.90E+00	b
SEMIVOLATILES	Chrysene	5.03E-05	3.09E+05	6.18E+03	2.00E-03	b
SEMIVOLATILES	Dibenzo(a,h)anthracene	4.66E+00	1.91E+06	3.81E+04	5.00E-04	b
SEMIVOLATILES	Dibenzofuran	5.28E-03	8.49E+03	1.70E+02	2.86E+00	b
SEMIVOLATILES	Diethyl phthalate	1.87E-05	1.51E+02	3.03E+00	1.08E+03	b
SEMIVOLATILES	Dimethyl phthalate	2.40E-05	3.16E+01	6.32E-01	4.19E+03	b
SEMIVOLATILES	di-n-Butyl phthalate	5.94E-05	3.39E+04	6.78E+02	1.12E+01	b
SEMIVOLATILES	di-n-Octyl phthalate	2.78E-03	8.32E+07	1.66E+06	2.00E-02	b
SEMIVOLATILES	Fluoranthene	3.88E-04	4.90E+04	9.80E+02	2.60E-01	b

Table A6-4
Physical Chemical Properties of Chemicals of Concern [a]
Sump 110 at Building 207

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
SEMIVOLATILES	Fluorene	2.64E-03	7.59E+03	1.52E+02	1.98E+00	b
SEMIVOLATILES	Hexachlorobenzene	2.22E-02	2.82E+04	5.64E+02	6.00E-03	b
SEMIVOLATILES	Hexachlorobutadiene	9.94E-01	6.92E+03	1.38E+02	2.55E+00	b
SEMIVOLATILES	Hexachlorocyclopentadiene	7.15E-01	9.55E+03	1.91E+02	1.80E+00	b
SEMIVOLATILES	Hexachloroethane	1.62E-01	1.82E+03	3.64E+01	5.00E+01	b
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	2.85E+00	3.47E+06	6.93E+04	3.75E-03	b
SEMIVOLATILES	Isophorone	2.57E-04	3.02E+01	6.04E-01	1.20E+04	b
SEMIVOLATILES	Naphthalene	2.00E-02	1.55E+03	3.10E+01	3.14E+01	b
SEMIVOLATILES	Nitrobenzene	8.56E-04	1.32E+02	2.64E+00	1.90E+03	b
SEMIVOLATILES	n-Nitroso-di-n-propylamine	9.35E-05	1.97E+01	3.94E-01	9.89E+03	b
SEMIVOLATILES	n-Nitrosodiphenylamine	2.08E-04	3.31E+02	6.62E+00	3.51E+01	b
SEMIVOLATILES	Pentachlorophenol	1.16E-05	1.56E+03	3.12E+01	1.40E+01	b, e
SEMIVOLATILES	Phenanthrene	5.40E-03	1.41E+04	2.83E+02	9.94E-01	b
SEMIVOLATILES	Phenol	2.47E-05	1.74E+01	3.48E-01	8.70E+04	b
SEMIVOLATILES	Pyrene	4.57E-04	3.80E+04	7.60E+02	1.35E-01	b
VOLATILES	1,1,1,2-Tetrachloroethane	9.98E-02	9.55E+02	1.91E+01	1.10E+03	b
VOLATILES	1,1,1-Trichloroethane	7.15E-01	1.10E+02	2.19E+00	1.33E+03	b
VOLATILES	1,1,2,2-Tetrachloroethane	1.55E-02	7.76E+01	1.55E+00	2.97E+03	b
VOLATILES	1,1,2-Trichloroethane	3.80E-02	5.01E+01	1.00E+00	4.42E+03	b
VOLATILES	1,1-Dichloroethane	2.39E-01	3.16E+01	6.32E-01	5.50E+03	b
VOLATILES	1,1-Dichloroethene	1.06E+00	6.46E+01	1.29E+00	2.40E+03	b
VOLATILES	1,1-Dichloropropene	1.82E+00	2.06E+02	4.12E+00	5.44E+02	b
VOLATILES	1,2,3-Trichlorobenzene	3.80E-02	8.91E+03	1.78E+02	1.64E+01	b
VOLATILES	1,2,3-Trichloropropane	1.58E-02	3.89E+02	7.78E+00	1.90E+03	b
VOLATILES	1,2,4-Trimethylbenzene	1.84E-01	9.33E+02	1.87E+01	5.68E+01	b
VOLATILES	1,2-Dibromo-3-chloropropane	8.31E-03	1.70E+02	3.40E+00	1.00E+03	b
VOLATILES	1,2-Dibromoethane	2.93E-02	5.37E+01	1.07E+00	4.32E+03	b
VOLATILES	1,2-Dichloroethane	5.32E-02	1.74E+01	3.48E-01	8.70E+03	b
VOLATILES	1,2-Dichloroethene	1.87E-01	2.90E+01	5.80E-01	4.93E+03	b
VOLATILES	1,2-Dichloropropane	1.17E-01	5.89E+01	1.18E+00	2.80E+03	b
VOLATILES	1,2-Dimethylbenzene (o-Xylen	7.36E-04	1.29E+02	2.58E+00	1.78E+02	b
VOLATILES	1,3,5-Trimethylbenzene	2.72E-01	1.02E+03	2.05E+01	5.15E+01	b
VOLATILES	1,3-Dichloropropane	5.52E-02	1.25E+02	2.50E+00	2.16E+03	b
VOLATILES	2,2-Dichloropropane	3.39E-01	1.56E+02	3.11E+00	1.68E+03	b
VOLATILES	2-Butanone	1.94E-03	1.90E+00	3.80E-02	2.40E+05	b
VOLATILES	2-Chloroethyl vinyl ether	3.02E-02	3.72E+01	7.43E-01	5.02E+03	b
VOLATILES	2-Chlorotoluene	1.35E-01	4.07E+02	8.15E+00	1.54E+02	b
VOLATILES	2-Hexanone	3.38E-03	1.79E+01	3.58E-01	1.79E+04	b
VOLATILES	4-Chlorotoluene	1.33E-01	4.96E+02	9.93E+00	1.18E+02	b
VOLATILES	Acetone	1.61E-03	5.70E-01	1.14E-02	6.00E+05	b

Table A6-4
Physical Chemical Properties of Chemicals of Concern [a]
Sump 110 at Building 207

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
VOLATILES	Benzene	2.27E-01	6.61E+01	1.32E+00	1.77E+03	b
VOLATILES	Bromobenzene	8.38E-02	2.42E+02	4.84E+00	2.98E+02	b
VOLATILES	Bromochloromethane	3.69E-02	2.75E+01	5.50E-01	2.04E+04	b
VOLATILES	Bromodichloromethane	1.32E-01	5.50E+01	1.10E+00	4.50E+03	b
VOLATILES	Bromoform	2.56E-02	8.71E+01	1.74E+00	3.20E+03	b
VOLATILES	Bromomethane	5.90E-01	1.05E+01	2.09E-01	1.52E+04	b
VOLATILES	Carbon disulfide	6.13E-01	5.25E+01	1.05E+00	2.30E+03	b
VOLATILES	Carbon tetrachloride	1.20E+00	1.86E+02	3.72E+00	8.05E+02	b
VOLATILES	Chlorobenzene	1.82E-01	2.14E+02	4.28E+00	5.02E+02	b
VOLATILES	Chloroethane	2.12E-01	1.78E+01	3.56E-01	2.00E+04	b
VOLATILES	Chloroform	1.53E-01	4.68E+01	9.35E-01	7.92E+03	b
VOLATILES	Chloromethane	1.44E+00	6.00E+00	1.20E-01	7.25E+03	b
VOLATILES	cis-1,2-Dichloroethene	1.87E-01	2.88E+01	5.77E-01	4.93E+03	b
VOLATILES	cis-1,3-Dichloropropene	9.15E-02	4.47E+01	8.93E-01	2.70E+03	b
VOLATILES	Dibromochloromethane	3.25E-02	6.31E+01	1.26E+00	5.25E+03	b
VOLATILES	Dibromomethane	3.49E-02	1.82E+02	3.64E+00	1.10E+04	b
VOLATILES	Dichlorodifluoromethane	1.67E+01	1.29E+02	2.58E+00	2.80E+02	b
VOLATILES	Ethylbenzene	3.28E-01	2.04E+02	4.08E+00	1.69E+02	b
VOLATILES	Isopropylbenzene	6.07E-01	3.47E+03	6.93E+01	5.00E+01	b
VOLATILES	m,p-Xylenes	3.18E-01	3.09E+02	6.18E+00	1.85E+02	b
VOLATILES	Methyl isobutyl ketone	5.82E-03	1.50E+01	3.00E-01	1.90E+04	b
VOLATILES	Methylene chloride	9.10E-02	1.17E+01	2.35E-01	1.54E+04	b
VOLATILES	n-BUTYLBENZENE	5.57E-01	3.02E+03	6.04E+01	1.08E+01	b
VOLATILES	n-PROPYLBENZENE	4.24E-01	1.07E+03	2.14E+01	4.20E+01	b
VOLATILES	p-ISOPROPYLTOLUENE	4.66E-01	2.29E+03	4.58E+01	1.71E+01	b
VOLATILES	sec-BUTYLBENZENE	5.07E-01	2.09E+03	4.18E+01	1.81E+01	b
VOLATILES	Styrene	1.14E-01	7.59E+02	1.52E+01	3.10E+02	b
VOLATILES	tert-BUTYLBENZENE	8.56E-01	2.45E+03	4.91E+01	1.51E+01	b
VOLATILES	Tetrachloroethene	7.65E-01	1.55E+02	3.10E+00	2.00E+02	b
VOLATILES	Toluene	2.76E-01	1.40E+02	2.80E+00	5.30E+02	b
VOLATILES	trans-1,2-Dichloroethene	3.90E-01	5.01E+01	1.00E+00	6.30E+03	b
VOLATILES	trans-1,3-Dichloropropene	9.15E-02	4.47E+01	8.93E-01	2.80E+03	b
VOLATILES	Trichloroethene	4.28E-01	9.33E+01	1.87E+00	1.10E+03	b
VOLATILES	Trichlorofluoromethane	4.03E+00	1.35E+02	2.70E+00	1.10E+03	b
VOLATILES	Vinyl acetate	2.29E-02	5.25E+00	1.05E-01	2.00E+04	b
VOLATILES	Vinyl chloride	3.49E+00	1.10E+01	2.19E-01	2.76E+03	b
VOLATILES	Xylenes, Total	2.93E-01	2.40E+02	4.80E+00	1.98E+02	b

Table A6-4
Physical Chemical Properties of Chemicals of Concern [a]
Sump 110 at Building 207

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note

Notes:

Chemicals of Concern shown in Table A6-1.

pH value of 6.0 averaged from pH Values on Table A6-3.

a Annual TCEQ update of chemical/physical properties table [(Figure: 30 TAC §350.73(e)], April 2008.

b Kd value calculated by formula Koc * foc for non-metals.

c pH-dependent Kd value obtained from Figure 30TAC§350.73(e)(1)(A), April 2008.

d pH-dependent Kd value obtained from Figure 30TAC§350.73(e)(1)(C), April 2008.

e pH-dependent Koc value obtained from 30 TAC §350.73(e)(1)(B), April 2008.

mg/L - milligrams per liter

Table A6-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 110 at Building 207

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
EXPLOSIVES	1,3,5-Trinitrobenzene	2.87E-06	2.83E-01	3.53E+02	2.71E+00	1.3E+02	3.1E+00	8.0E+00	none	**8.0E+00**
EXPLOSIVES	1,3-Dinitrobenzene	4.57E-06	6.00E-01	5.40E+02	1.46E+00	3.7E+02	1.0E-02	4.9E-02	none	**4.9E-02**
EXPLOSIVES	2,4,6-Trinitrotoluene	1.90E-05	6.04E+00	1.30E+02	1.63E-01	8.0E+02	5.1E-02	2.2E+00	none	**2.2E+00**
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	1.19E-07	1.12E+01	1.73E+01	8.82E-02	2.0E+02	1.7E-02	1.4E+00	none	**1.4E+00**
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	1.74E-07	7.26E+00	3.64E+01	1.36E-01	2.7E+02	1.7E-02	8.8E-01	none	**8.8E-01**
EXPLOSIVES	HMX	2.50E-14	7.96E-04	2.37E+03	1.14E+01	2.1E+02	5.1E+00	3.2E+00	none	**3.2E+00**
EXPLOSIVES	m-Nitrotoluene	2.24E-03	2.81E+00	4.98E+02	3.45E-01	1.4E+03	1.0E+00	2.1E+01	none	**2.1E+01**
EXPLOSIVES	o-Nitrotoluene	1.87E-03	2.81E+00	6.00E+02	3.45E-01	1.7E+03	1.0E+00	2.1E+01	none	**2.1E+01**
EXPLOSIVES	p-Nitrotoluene	2.29E-03	2.81E+00	4.00E+02	3.45E-01	1.2E+03	1.0E+00	2.1E+01	none	**2.1E+01**
EXPLOSIVES	RDX	4.99E-04	1.26E+00	3.87E+01	7.41E-01	5.2E+01	2.6E-02	2.5E-01	none	**2.5E-01**
EXPLOSIVES	Tetryl	8.31E-11	4.69E+00	7.50E+01	2.09E-01	3.6E+02	1.0E+00	3.4E+01	none	**3.4E+01**
METALS	Aluminum	0.00E+00	3.53E+04	0.00E+00	2.83E-05	NA	1.0E+02	2.5E+07	1.63E+04	**2.5E+07**
METALS	Antimony	0.00E+00	5.70E+01	0.00E+00	1.75E-02	NA	6.0E-03	2.4E+00	9.40E-01	**2.4E+00**
METALS	Arsenic	0.00E+00	2.70E+01	0.00E+00	3.69E-02	NA	1.0E-02	1.9E+00	4.81E+00	**4.8E+00**
METALS	Barium	0.00E+00	3.00E+01	0.00E+00	3.32E-02	NA	2.0E+00	4.2E+02	8.55E+01	**4.2E+02**
METALS	Beryllium	0.00E+00	8.20E+01	0.00E+00	1.22E-02	NA	4.0E-03	2.3E+00	6.45E-01	**2.3E+00**
METALS	Cadmium	0.00E+00	3.70E+01	0.00E+00	2.70E-02	NA	5.0E-03	1.3E+00	4.00E-01	**1.3E+00**
METALS	Chromium	0.00E+00	2.00E+05	0.00E+00	5.00E-06	NA	1.0E-01	1.4E+05	2.66E+01	**1.4E+05**
METALS	Cobalt	0.00E+00	4.50E+01	0.00E+00	2.22E-02	NA	6.1E+00	1.9E+03	5.61E+00	**1.9E+03**
METALS	Copper	0.00E+00	4.00E+01	0.00E+00	2.49E-02	NA	1.3E+00	3.7E+02	5.55E+00	**3.7E+02**
METALS	Lead	0.00E+00	1.83E+03	0.00E+00	5.46E-04	NA	1.5E-02	1.9E+02	1.14E+01	**1.9E+02**
METALS	Manganese	0.00E+00	5.01E+01	0.00E+00	1.99E-02	NA	1.4E+01	5.1E+03	2.01E+02	**5.1E+03**
METALS	Mercury	4.74E-01	3.50E+00	3.00E-02	2.72E-01	1.1E-01	2.0E-03	5.2E-02	8.19E-02	**8.2E-02**
METALS	Nickel	0.00E+00	3.80E+01	0.00E+00	2.63E-02	NA	2.0E+00	5.5E+02	6.98E+00	**5.5E+02**
METALS	Selenium	0.00E+00	8.60E+00	0.00E+00	1.15E-01	NA	5.0E-02	3.1E+00	3.48E+00	**3.5E+00**
METALS	Silver	0.00E+00	1.30E+00	0.00E+00	7.21E-01	NA	5.1E-01	5.0E+00	3.10E-01	**5.0E+00**
METALS	Strontium	0.00E+00	2.00E+00	0.00E+00	4.79E-01	NA	6.1E+01	9.0E+02	1.98E+01	**9.0E+02**
METALS	Thallium	0.00E+00	5.80E+01	2.90E+03	1.72E-02	1.7E+05	2.0E-03	8.2E-01	4.70E-01	**8.2E-01**
METALS	Vanadium	0.00E+00	1.00E+03	0.00E+00	1.00E-03	NA	7.2E-01	5.0E+03	3.21E+01	**5.0E+03**
METALS	Zinc	0.00E+00	3.60E+01	0.00E+00	2.77E-02	NA	3.1E+01	7.8E+03	2.02E+01	**7.8E+03**
SEMIVOLATILES	1,2,4-Trichlorobenzene	5.90E-02	3.32E+01	4.88E+01	3.00E-02	1.6E+03	7.0E-02	1.6E+01	none	**1.6E+01**
SEMIVOLATILES	1,2-Dichlorobenzene	8.73E-02	1.38E+01	1.50E+02	7.17E-02	2.1E+03	6.0E-01	5.9E+01	none	**5.9E+01**
SEMIVOLATILES	1,3-Dichlorobenzene	1.95E-01	3.40E+00	1.10E+02	2.84E-01	3.9E+02	3.1E+00	7.6E+01	none	**7.6E+01**
SEMIVOLATILES	1,4-Dichlorobenzene	1.17E-01	1.29E+01	7.38E+01	7.68E-02	9.6E+02	7.5E-02	6.9E+00	none	**6.9E+00**
SEMIVOLATILES	2,4,5-Trichlorophenol	1.78E-04	4.42E+01	1.20E+03	2.26E-02	5.3E+04	1.0E+01	3.2E+03	none	**3.2E+03**
SEMIVOLATILES	2,4,6-Trichlorophenol	3.19E-04	1.59E+01	9.82E+02	6.25E-02	1.6E+04	2.6E-02	2.9E+00	none	**2.9E+00**
SEMIVOLATILES	2,4-Dichlorophenol	1.31E-04	3.14E+00	4.50E+03	3.10E-01	1.5E+04	3.1E-01	7.0E+00	none	**7.0E+00**

Table A6-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 110 at Building 207

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
SEMIVOLATILES	2,4-Dimethylphenol	8.31E-05	2.35E+00	6.20E+03	4.10E-01	1.5E+04	2.0E+00	3.5E+01	none	**3.5E+01**
SEMIVOLATILES	2,4-Dinitrophenol	2.01E-07	2.32E-04	5.80E+03	1.15E+01	5.0E+02	2.0E-01	1.3E-01	none	**1.3E-01**
SEMIVOLATILES	2,4-Dinitrotoluene	3.60E-05	1.03E+00	2.85E+02	8.99E-01	3.2E+02	4.2E-04	3.3E-03	none	**3.3E-03**
SEMIVOLATILES	2,6-Dinitrotoluene	3.11E-05	8.34E-01	1.82E+02	1.09E+00	1.7E+02	4.2E-04	2.7E-03	none	**2.7E-03**
SEMIVOLATILES	2-Chloronaphthalene	2.54E-02	1.70E+02	6.74E+00	5.87E-03	1.1E+03	8.2E+00	9.8E+03	none	**1.1E+03**
SEMIVOLATILES	2-Chlorophenol	7.40E-04	7.92E+00	2.80E+04	1.25E-01	2.2E+05	5.1E-01	2.9E+01	none	**2.9E+01**
SEMIVOLATILES	2-Methylnaphthalene	1.85E-02	8.63E+01	2.54E+01	1.16E-02	2.2E+03	4.1E-01	2.5E+02	none	**2.5E+02**
SEMIVOLATILES	2-Methylphenol	6.65E-05	1.95E+00	2.04E+04	4.90E-01	4.2E+04	5.1E+00	7.4E+01	none	**7.4E+01**
SEMIVOLATILES	2-Nitroaniline	2.08E-05	5.38E-01	1.26E+03	1.60E+00	7.9E+02	3.1E-02	1.4E-01	none	**1.4E-01**
SEMIVOLATILES	2-Nitrophenol	2.21E-05	3.75E+00	1.73E+04	2.61E-01	6.6E+04	2.0E-01	5.5E+00	none	**5.5E+00**
SEMIVOLATILES	3,3'-Dichlorobenzidine	8.65E-07	1.45E+01	3.11E+00	6.86E-02	4.5E+01	6.4E-04	6.5E-02	none	**6.5E-02**
SEMIVOLATILES	3-Nitroaniline	2.31E-07	7.88E-01	4.56E+02	1.14E+00	4.0E+02	3.1E-02	1.9E-01	none	**1.9E-01**
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	1.07E-07	6.32E-04	3.00E+03	1.15E+01	2.6E+02	2.0E-01	1.3E-01	none	**1.3E-01**
SEMIVOLATILES	4-Bromophenyl phenyl ether	9.66E-03	2.90E+03	8.25E-01	3.44E-04	2.4E+03	1.9E-04	3.9E+00	none	**3.9E+00**
SEMIVOLATILES	4-Chloro-3-methylphenol	1.40E-05	1.76E+01	5.43E+03	5.66E-02	9.6E+04	5.1E-01	6.4E+01	none	**6.4E+01**
SEMIVOLATILES	4-Chloroaniline	4.86E-05	1.32E+00	3.90E+03	7.10E-01	5.5E+03	4.1E-01	4.1E+00	none	**4.1E+00**
SEMIVOLATILES	4-Chlorophenyl phenyl ether	1.30E-02	2.62E+02	1.43E+00	3.82E-03	3.8E+02	1.9E-04	3.5E-01	none	**3.5E-01**
SEMIVOLATILES	4-Methylphenol	3.99E-05	1.63E+00	2.30E+04	5.84E-01	3.9E+04	5.1E-01	6.2E+00	none	**6.2E+00**
SEMIVOLATILES	4-Nitroaniline	3.33E-08	2.25E-01	6.49E+02	3.21E+00	2.0E+02	7.5E-02	1.7E-01	none	**1.7E-01**
SEMIVOLATILES	4-Nitrophenol	3.24E-08	8.73E-01	4.49E+03	1.04E+00	4.3E+03	2.0E-01	1.4E+00	none	**1.4E+00**
SEMIVOLATILES	Acenaphthene	6.44E-03	7.96E+01	4.24E+00	1.25E-02	3.4E+02	6.1E+00	3.4E+03	none	**3.4E+02**
SEMIVOLATILES	Acenaphthylene	4.74E-03	1.38E+02	3.93E+00	7.22E-03	5.4E+02	6.1E+00	6.0E+03	none	**5.4E+02**
SEMIVOLATILES	Anthracene	4.61E-03	4.69E+02	4.34E-02	2.13E-03	2.0E+01	3.1E+01	1.0E+05	none	**2.0E+01**
SEMIVOLATILES	Benzo(a)anthracene	1.39E-04	7.10E+03	1.00E-02	1.41E-04	7.1E+01	3.9E-04	2.0E+01	1.53E-02	**2.0E+01**
SEMIVOLATILES	Benzo(a)pyrene	4.70E-05	1.91E+04	1.62E-03	5.24E-05	3.1E+01	2.0E-04	2.7E+01	1.54E-02	**2.7E+01**
SEMIVOLATILES	Benzo(b)fluoranthene	4.99E-04	2.40E+04	1.50E-03	4.16E-05	3.6E+01	3.9E-04	6.6E+01	1.53E-02	**3.6E+01**
SEMIVOLATILES	Benzo(ghi)perylene	5.82E-06	3.17E+04	2.60E-04	3.15E-05	8.2E+00	3.1E+00	6.9E+05	1.23E-02	**8.2E+00**
SEMIVOLATILES	Benzo(k)fluoranthene	4.45E-07	2.46E+04	5.50E-04	4.06E-05	1.4E+01	3.9E-03	6.8E+02	1.30E-02	**1.4E+01**
SEMIVOLATILES	Benzoic Acid	1.39E-05	1.94E-02	3.50E+03	9.43E+00	3.7E+02	4.1E+02	3.1E+02	none	**3.1E+02**
SEMIVOLATILES	Benzyl Alcohol	1.62E-05	2.40E-01	4.00E+04	3.06E+00	1.3E+04	3.1E+01	7.1E+01	none	**7.1E+01**
SEMIVOLATILES	bis(2-Chloroethoxy)methane	1.25E-03	6.13E+00	1.35E+03	1.61E-01	8.4E+03	2.6E-04	1.1E-02	none	**1.1E-02**
SEMIVOLATILES	bis(2-Chloroethyl)ether	8.90E-04	3.10E-01	1.02E+04	2.52E+00	4.0E+03	2.6E-04	7.3E-04	none	**7.3E-04**
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	4.16E-03	6.32E+00	1.70E+03	1.56E-01	1.1E+04	4.1E-02	1.8E+00	none	**1.8E+00**
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	4.57E-04	1.35E+04	3.00E-01	7.40E-05	4.1E+03	6.0E-03	5.7E+02	none	**5.7E+02**
SEMIVOLATILES	Butyl benzyl phthalate	7.94E-05	2.75E+02	2.90E+00	3.64E-03	8.0E+02	2.0E+01	4.0E+04	none	**8.0E+02**
SEMIVOLATILES	Chrysene	5.03E-05	6.18E+03	2.00E-03	1.62E-04	1.2E+01	3.9E-02	1.7E+03	1.51E-02	**1.2E+01**
SEMIVOLATILES	Dibenzo(a,h)anthracene	4.66E+00	3.81E+04	5.00E-04	2.62E-05	1.9E+01	2.0E-04	5.4E+01	none	**1.9E+01**

Table A6-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 110 at Building 207

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
SEMIVOLATILES	Dibenzofuran	5.28E-03	1.70E+02	2.86E+00	5.89E-03	4.9E+02	4.1E-01	4.9E+02	none	**4.9E+02**
SEMIVOLATILES	Diethyl phthalate	1.87E-05	3.03E+00	1.08E+03	3.21E-01	3.4E+03	8.2E+01	1.8E+03	none	**1.8E+03**
SEMIVOLATILES	Dimethyl phthalate	2.40E-05	6.32E-01	4.19E+03	1.39E+00	3.0E+03	8.2E+01	4.1E+02	none	**4.1E+02**
SEMIVOLATILES	di-n-Butyl phthalate	5.94E-05	6.78E+02	1.12E+01	1.48E-03	7.6E+03	1.0E+01	4.9E+04	none	**7.6E+03**
SEMIVOLATILES	di-n-Octyl phthalate	2.78E-03	1.66E+06	2.00E-02	6.01E-07	3.3E+04	2.0E+00	2.4E+07	none	**3.3E+04**
SEMIVOLATILES	Fluoranthene	3.88E-04	9.80E+02	2.60E-01	1.02E-03	2.5E+02	4.1E+00	2.8E+04	2.29E-02	**2.5E+02**
SEMIVOLATILES	Fluorene	2.64E-03	1.52E+02	1.98E+00	6.59E-03	3.0E+02	4.1E+00	4.4E+03	none	**3.0E+02**
SEMIVOLATILES	Hexachlorobenzene	2.22E-02	5.64E+02	6.00E-03	1.77E-03	3.4E+00	1.0E-03	4.0E+00	none	**3.4E+00**
SEMIVOLATILES	Hexachlorobutadiene	9.94E-01	1.38E+02	2.55E+00	7.21E-03	3.5E+02	2.0E-02	2.0E+01	none	**2.0E+01**
SEMIVOLATILES	Hexachlorocyclopentadiene	7.15E-01	1.91E+02	1.80E+00	5.23E-03	3.4E+02	5.0E-02	6.7E+01	none	**6.7E+01**
SEMIVOLATILES	Hexachloroethane	1.62E-01	3.64E+01	5.00E+01	2.74E-02	1.8E+03	1.0E-01	2.6E+01	none	**2.6E+01**
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	2.85E+00	6.93E+04	3.75E-03	1.44E-05	2.6E+02	3.9E-04	1.9E+02	1.43E-02	**1.9E+02**
SEMIVOLATILES	Isophorone	2.57E-04	6.04E-01	1.20E+04	1.45E+00	8.3E+03	3.0E+00	1.5E+01	none	**1.5E+01**
SEMIVOLATILES	Naphthalene	2.00E-02	3.10E+01	3.14E+01	3.22E-02	9.8E+02	2.0E+00	4.5E+02	none	**4.5E+02**
SEMIVOLATILES	Nitrobenzene	8.56E-04	2.64E+00	1.90E+03	3.67E-01	5.2E+03	5.1E-02	9.8E-01	none	**9.8E-01**
SEMIVOLATILES	n-Nitroso-di-n-propylamine	9.35E-05	3.94E-01	9.89E+03	2.08E+00	4.8E+03	4.1E-05	1.4E-04	none	**1.4E-04**
SEMIVOLATILES	n-Nitrosodiphenylamine	2.08E-04	6.62E+00	3.51E+01	1.49E-01	2.4E+02	5.8E-02	2.8E+00	none	**2.8E+00**
SEMIVOLATILES	Pentachlorophenol	1.16E-05	3.12E+01	1.40E+01	3.20E-02	4.4E+02	1.0E-03	2.2E-01	none	**2.2E-01**
SEMIVOLATILES	Phenanthrene	5.40E-03	2.83E+02	9.94E-01	3.54E-03	2.8E+02	3.1E+00	6.1E+03	none	**2.8E+02**
SEMIVOLATILES	Phenol	2.47E-05	3.48E-01	8.70E+04	2.30E+00	3.8E+04	3.1E+01	9.4E+01	none	**9.4E+01**
SEMIVOLATILES	Pyrene	4.57E-04	7.60E+02	1.35E-01	1.31E-03	1.0E+02	3.1E+00	1.6E+04	1.94E-02	**1.0E+02**
VOLATILES	1,1,1,2-Tetrachloroethane	9.98E-02	1.91E+01	1.10E+03	5.21E-02	2.1E+04	1.1E-01	1.5E+01	none	**1.5E+01**
VOLATILES	1,1,1-Trichloroethane	7.15E-01	2.19E+00	1.33E+03	4.13E-01	3.2E+03	2.0E-01	3.4E+00	none	**3.4E+00**
VOLATILES	1,1,2,2-Tetrachloroethane	1.55E-02	1.55E+00	2.97E+03	6.09E-01	4.9E+03	1.4E-02	1.7E-01	none	**1.7E-01**
VOLATILES	1,1,2-Trichloroethane	3.80E-02	1.00E+00	4.42E+03	9.12E-01	4.8E+03	5.0E-03	3.9E-02	none	**3.9E-02**
VOLATILES	1,1-Dichloroethane	2.39E-01	6.32E-01	5.50E+03	1.30E+00	4.2E+03	1.0E+01	5.5E+01	none	**5.5E+01**
VOLATILES	1,1-Dichloroethene	1.06E+00	1.29E+00	2.40E+03	6.29E-01	3.8E+03	7.0E-03	7.8E-02	none	**7.8E-02**
VOLATILES	1,1-Dichloropropene	1.82E+00	4.12E+00	5.44E+02	2.19E-01	2.5E+03	2.9E-03	9.2E-02	none	**9.2E-02**
VOLATILES	1,2,3-Trichlorobenzene	3.80E-02	1.78E+02	1.64E+01	5.61E-03	2.9E+03	3.1E-01	3.9E+02	none	**3.9E+02**
VOLATILES	1,2,3-Trichloropropane	1.58E-02	7.78E+00	1.90E+03	1.27E-01	1.5E+04	4.1E-05	2.3E-03	none	**2.3E-03**
VOLATILES	1,2,4-Trimethylbenzene	1.84E-01	1.87E+01	5.68E+01	5.32E-02	1.1E+03	5.1E+00	6.8E+02	none	**6.8E+02**
VOLATILES	1,2-Dibromo-3-chloropropane	8.31E-03	3.40E+00	1.00E+03	2.87E-01	3.5E+03	2.0E-04	4.9E-03	none	**4.9E-03**
VOLATILES	1,2-Dibromoethane	2.93E-02	1.07E+00	4.32E+03	8.57E-01	5.0E+03	5.0E-05	4.1E-04	none	**4.1E-04**
VOLATILES	1,2-Dichloroethane	5.32E-02	3.48E-01	8.70E+03	2.25E+00	3.9E+03	5.0E-03	1.6E-02	none	**1.6E-02**
VOLATILES	1,2-Dichloroethene	1.87E-01	5.80E-01	4.93E+03	1.42E+00	3.5E+03	7.0E-02	3.5E-01	none	**3.5E-01**
VOLATILES	1,2-Dichloropropane	1.17E-01	1.18E+00	2.80E+03	7.77E-01	3.6E+03	5.0E-03	4.5E-02	none	**4.5E-02**
VOLATILES	1,2-Dimethylbenzene (o-Xylen	7.36E-04	2.58E+00	1.78E+02	3.75E-01	4.7E+02	1.0E+01	1.9E+02	none	**1.9E+02**

Table A6-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 110 at Building 207

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
VOLATILES	1,3,5-Trimethylbenzene	2.72E-01	2.05E+01	5.15E+01	4.85E-02	1.1E+03	5.1E+00	7.4E+02	none	**7.4E+02**
VOLATILES	1,3-Dichloropropane	5.52E-02	2.50E+00	2.16E+03	3.85E-01	5.6E+03	2.9E-02	5.2E-01	none	**5.2E-01**
VOLATILES	2,2-Dichloropropane	3.39E-01	3.11E+00	1.68E+03	3.06E-01	5.5E+03	4.2E-02	9.7E-01	none	**9.7E-01**
VOLATILES	2-Butanone	1.94E-03	3.80E-02	2.40E+05	8.00E+00	3.0E+04	6.1E+01	5.4E+01	none	**5.4E+01**
VOLATILES	2-Chloroethyl vinyl ether	3.02E-02	7.43E-01	5.02E+03	1.20E+00	4.2E+03	2.6E-03	1.5E-02	none	**1.5E-02**
VOLATILES	2-Chlorotoluene	1.35E-01	8.15E+00	1.54E+02	1.21E-01	1.3E+03	2.0E+00	1.2E+02	none	**1.2E+02**
VOLATILES	2-Hexanone	3.38E-03	3.58E-01	1.79E+04	2.25E+00	8.0E+03	6.1E+00	1.9E+01	none	**1.9E+01**
VOLATILES	4-Chlorotoluene	1.33E-01	9.93E+00	1.18E+02	9.96E-02	1.2E+03	2.0E+00	1.4E+02	none	**1.4E+02**
VOLATILES	Acetone	1.61E-03	1.14E-02	6.00E+05	1.02E+01	5.9E+04	9.2E+01	6.4E+01	none	**6.4E+01**
VOLATILES	Benzene	2.27E-01	1.32E+00	1.77E+03	6.88E-01	2.6E+03	5.0E-03	5.1E-02	none	**5.1E-02**
VOLATILES	Bromobenzene	8.38E-02	4.84E+00	2.98E+02	2.02E-01	1.5E+03	2.0E+00	7.1E+01	none	**7.1E+01**
VOLATILES	Bromochloromethane	3.69E-02	5.50E-01	2.04E+04	1.55E+00	1.3E+04	4.1E+00	1.9E+01	none	**1.9E+01**
VOLATILES	Bromodichloromethane	1.32E-01	1.10E+00	4.50E+03	8.25E-01	5.5E+03	4.6E-03	3.9E-02	none	**3.9E-02**
VOLATILES	Bromoform	2.56E-02	1.74E+00	3.20E+03	5.45E-01	5.9E+03	3.6E-02	4.7E-01	none	**4.7E-01**
VOLATILES	Bromomethane	5.90E-01	2.09E-01	1.52E+04	2.41E+00	6.3E+03	1.4E-01	4.2E-01	none	**4.2E-01**
VOLATILES	Carbon disulfide	6.13E-01	1.05E+00	2.30E+03	7.94E-01	2.9E+03	1.0E+01	9.1E+01	none	**9.1E+01**
VOLATILES	Carbon tetrachloride	1.20E+00	3.72E+00	8.05E+02	2.47E-01	3.3E+03	5.0E-03	1.4E-01	none	**1.4E-01**
VOLATILES	Chlorobenzene	1.82E-01	4.28E+00	5.02E+02	2.27E-01	2.2E+03	1.0E-01	3.1E+00	none	**3.1E+00**
VOLATILES	Chloroethane	2.12E-01	3.56E-01	2.00E+04	2.06E+00	9.7E+03	4.1E+01	1.4E+02	none	**1.4E+02**
VOLATILES	Chloroform	1.53E-01	9.35E-01	7.92E+03	9.50E-01	8.3E+03	1.0E+00	7.6E+00	none	**7.6E+00**
VOLATILES	Chloromethane	1.44E+00	1.20E-01	7.25E+03	2.02E+00	3.6E+03	2.2E-01	7.7E-01	none	**7.7E-01**
VOLATILES	cis-1,2-Dichloroethene	1.87E-01	5.77E-01	4.93E+03	1.43E+00	3.5E+03	7.0E-02	3.5E-01	none	**3.5E-01**
VOLATILES	cis-1,3-Dichloropropene	9.15E-02	8.93E-01	2.70E+03	1.00E+00	2.7E+03	5.3E-03	3.7E-02	none	**3.7E-02**
VOLATILES	Dibromochloromethane	3.25E-02	1.26E+00	5.25E+03	7.38E-01	7.1E+03	3.4E-02	3.3E-01	none	**3.3E-01**
VOLATILES	Dibromomethane	3.49E-02	3.64E+00	1.10E+04	2.68E-01	4.1E+04	3.8E-01	1.0E+01	none	**1.0E+01**
VOLATILES	Dichlorodifluoromethane	1.67E+01	2.58E+00	2.80E+02	1.67E-01	1.7E+03	2.0E+01	8.6E+02	none	**8.6E+02**
VOLATILES	Ethylbenzene	3.28E-01	4.08E+00	1.69E+02	2.36E-01	7.2E+02	7.0E-01	2.1E+01	none	**2.1E+01**
VOLATILES	Isopropylbenzene	6.07E-01	6.93E+01	5.00E+01	1.44E-02	3.5E+03	1.0E+01	5.0E+03	none	**3.5E+03**
VOLATILES	m,p-Xylenes	3.18E-01	6.18E+00	1.85E+02	1.58E-01	1.2E+03	1.0E+01	4.5E+02	none	**4.5E+02**
VOLATILES	Methyl isobutyl ketone	5.82E-03	3.00E-01	1.90E+04	2.58E+00	7.4E+03	8.2E+00	2.2E+01	none	**2.2E+01**
VOLATILES	Methylene chloride	9.10E-02	2.35E-01	1.54E+04	2.94E+00	5.2E+03	5.0E-03	1.2E-02	none	**1.2E-02**
VOLATILES	n-BUTYLBENZENE	5.57E-01	6.04E+01	1.08E+01	1.65E-02	6.5E+02	4.1E+00	1.7E+03	none	**6.5E+02**
VOLATILES	n-PROPYLBENZENE	4.24E-01	2.14E+01	4.20E+01	4.63E-02	9.1E+02	4.1E+00	6.2E+02	none	**6.2E+02**
VOLATILES	p-ISOPROPYLTOLUENE	4.66E-01	4.58E+01	1.71E+01	2.17E-02	7.9E+02	1.0E+01	3.3E+03	none	**7.9E+02**
VOLATILES	sec-BUTYLBENZENE	5.07E-01	4.18E+01	1.81E+01	2.38E-02	7.6E+02	4.1E+00	1.2E+03	none	**7.6E+02**
VOLATILES	Styrene	1.14E-01	1.52E+01	3.10E+02	6.54E-02	4.7E+03	1.0E-01	1.1E+01	none	**1.1E+01**
VOLATILES	tert-BUTYLBENZENE	8.56E-01	4.91E+01	1.51E+01	2.03E-02	7.4E+02	4.1E+00	1.4E+03	none	**7.4E+02**

Table A6-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 110 at Building 207

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
VOLATILES	Tetrachloroethene	7.65E-01	3.10E+00	2.00E+02	3.00E-01	6.7E+02	5.0E-03	1.2E-01	none	**1.2E-01**
VOLATILES	Toluene	2.76E-01	2.80E+00	5.30E+02	3.40E-01	1.6E+03	1.0E+00	2.1E+01	none	**2.1E+01**
VOLATILES	trans-1,2-Dichloroethene	3.90E-01	1.00E+00	6.30E+03	8.57E-01	7.4E+03	1.0E-01	8.2E-01	none	**8.2E-01**
VOLATILES	trans-1,3-Dichloropropene	9.15E-02	8.93E-01	2.80E+03	1.00E+00	2.8E+03	2.9E-02	2.0E-01	none	**2.0E-01**
VOLATILES	Trichloroethene	4.28E-01	1.87E+00	1.10E+03	4.90E-01	2.2E+03	5.0E-03	7.2E-02	none	**7.2E-02**
VOLATILES	Trichlorofluoromethane	4.03E+00	2.70E+00	1.10E+03	2.78E-01	4.0E+03	3.1E+01	7.8E+02	none	**7.8E+02**
VOLATILES	Vinyl acetate	2.29E-02	1.05E-01	2.00E+04	5.10E+00	3.9E+03	1.0E+02	1.4E+02	none	**1.4E+02**
VOLATILES	Vinyl chloride	3.49E+00	2.19E-01	2.76E+03	9.96E-01	2.8E+03	2.0E-03	1.4E-02	none	**1.4E-02**
VOLATILES	Xylenes, Total	2.93E-01	4.80E+00	1.98E+02	2.02E-01	9.8E+02	1.0E+01	3.5E+02	none	**3.5E+02**

Notes:

Values of constants shown in Table A6-2.

Values of H', Kd, and S shown in Table A6-4.

GW-Ind - groundwater qualified for industrial use

L/kg - liters per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

MSC - medium specific concentrations

Constants	Values	
rb	1.5	
qw	0.13	
qa	0.30	
L1	183	
L2	427	
W	5500	
LDF	3.022	calculated

Calculated Values:

Ksw = see Equation 8

Csat = see Equation 7

LDF = see Equation 5

Soil MSC = see Equation 6

Applicable Standard 3 Commercial / Industrial MSC equals the lower of the Calculated Soil MSC and Csat values. However, if the Background is larger than both values, the Applicable Standard 3 Commercial / Industrial MSC equals the Background concentration.

Table A6-6
Comparison to Maximum Soil Concentrations
Sump 110 at Building 207

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
EXPLOSIVES	1,3,5-Trinitrobenzene	**8.0E+00**	-	0.115	All Results < MSC
EXPLOSIVES	1,3-Dinitrobenzene	**4.9E-02**	-	0.114	Never detected, SQL > MSC
EXPLOSIVES	2,4,6-Trinitrotoluene	**2.2E+00**	-	0.115	All Results < MSC
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	**1.4E+00**	-	0.115	All Results < MSC
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	**8.8E-01**	-	0.115	All Results < MSC
EXPLOSIVES	HMX	**3.2E+00**	-	0.115	All Results < MSC
EXPLOSIVES	m-Nitrotoluene	**2.1E+01**	-	0.115	All Results < MSC
EXPLOSIVES	o-Nitrotoluene	**2.1E+01**	-	0.115	All Results < MSC
EXPLOSIVES	p-Nitrotoluene	**2.1E+01**	1.572	0.114	All Results < MSC
EXPLOSIVES	RDX	**2.5E-01**	-	0.114	All Results < MSC
EXPLOSIVES	Tetryl	**3.4E+01**	-	0.231	All Results < MSC
METALS	Aluminum	**2.5E+07**	10467	-	All Results < MSC
METALS	Antimony	**2.4E+00**	-	3	Never detected, SQL > MSC
METALS	Arsenic	**4.8E+00**	3.70	-	All Results < MSC
METALS	Barium	**4.2E+02**	88.9	-	All Results < MSC
METALS	Beryllium	**2.3E+00**	0.563	-	All Results < MSC
METALS	Cadmium	**1.3E+00**	0.0894	1	All Results < MSC
METALS	Chromium	**1.4E+05**	11.3	-	All Results < MSC
METALS	Cobalt	**1.9E+03**	7.29	1	All Results < MSC
METALS	Copper	**3.7E+02**	3.81	-	All Results < MSC
METALS	Lead	**1.9E+02**	7.42	-	All Results < MSC
METALS	Manganese	**5.1E+03**	11.4	-	All Results < MSC
METALS	Mercury	**8.2E-02**	0.0185	0.1	Never detected, SQL > MSC
METALS	Nickel	**5.5E+02**	9.67	-	All Results < MSC
METALS	Selenium	**3.5E+00**	0.322	1	All Results < MSC
METALS	Silver	**5.0E+00**	-	1	All Results < MSC
METALS	Strontium	**9.0E+02**	8	-	All Results < MSC
METALS	Thallium	**8.2E-01**	0.0694	-	All Results < MSC
METALS	Vanadium	**5.0E+03**	22.9	-	All Results < MSC
METALS	Zinc	**7.8E+03**	17.1	-	All Results < MSC
SEMIVOLATILES	1,2,4-Trichlorobenzene	**1.6E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	1,2-Dichlorobenzene	**5.9E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	1,3-Dichlorobenzene	**7.6E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	1,4-Dichlorobenzene	**6.9E+00**	-	0.330	All Results < MSC
SEMIVOLATILES	2,4,5-Trichlorophenol	**3.2E+03**	-	1.650	All Results < MSC
SEMIVOLATILES	2,4,6-Trichlorophenol	**2.9E+00**	-	0.330	All Results < MSC
SEMIVOLATILES	2,4-Dichlorophenol	**7.0E+00**	-	0.330	All Results < MSC
SEMIVOLATILES	2,4-Dimethylphenol	**3.5E+01**	-	0.330	All Results < MSC

Table A6-6
Comparison to Maximum Soil Concentrations
Sump 110 at Building 207

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
SEMIVOLATILES	2,4-Dinitrophenol	**1.3E-01**	-	1.650	Never detected, SQL > MSC
SEMIVOLATILES	2,4-Dinitrotoluene	**3.3E-03**	-	0.330	Never detected, SQL > MSC
SEMIVOLATILES	2,6-Dinitrotoluene	**2.7E-03**	-	0.330	Never detected, SQL > MSC
SEMIVOLATILES	2-Chloronaphthalene	**1.1E+03**	-	0.330	All Results < MSC
SEMIVOLATILES	2-Chlorophenol	**2.9E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	2-Methylnaphthalene	**2.5E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	2-Methylphenol	**7.4E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	2-Nitroaniline	**1.4E-01**	-	1.650	Never detected, SQL > MSC
SEMIVOLATILES	2-Nitrophenol	**5.5E+00**	-	0.330	All Results < MSC
SEMIVOLATILES	3,3'-Dichlorobenzidine	**6.5E-02**	-	0.650	Never detected, SQL > MSC
SEMIVOLATILES	3-Nitroaniline	**1.9E-01**	-	1.650	Never detected, SQL > MSC
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	**1.3E-01**	-	1.650	Never detected, SQL > MSC
SEMIVOLATILES	4-Bromophenyl phenyl ether	**3.9E+00**	-	0.330	All Results < MSC
SEMIVOLATILES	4-Chloro-3-methylphenol	**6.4E+01**	-	0.650	All Results < MSC
SEMIVOLATILES	4-Chloroaniline	**4.1E+00**	-	0.650	All Results < MSC
SEMIVOLATILES	4-Chlorophenyl phenyl ether	**3.5E-01**	-	0.330	All Results < MSC
SEMIVOLATILES	4-Methylphenol	**6.2E+00**	-	0.330	All Results < MSC
SEMIVOLATILES	4-Nitroaniline	**1.7E-01**	-	1.650	Never detected, SQL > MSC
SEMIVOLATILES	4-Nitrophenol	**1.4E+00**	-	1.650	Never detected, SQL > MSC
SEMIVOLATILES	Acenaphthene	**3.4E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Acenaphthylene	**5.4E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Anthracene	**2.0E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Benzo(a)anthracene	**2.0E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Benzo(a)pyrene	**2.7E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Benzo(b)fluoranthene	**3.6E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Benzo(ghi)perylene	**8.2E+00**	-	0.330	All Results < MSC
SEMIVOLATILES	Benzo(k)fluoranthene	**1.4E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Benzoic Acid	**3.1E+02**	-	1.650	All Results < MSC
SEMIVOLATILES	Benzyl Alcohol	**7.1E+01**	-	0.650	All Results < MSC
SEMIVOLATILES	bis(2-Chloroethoxy)methane	**1.1E-02**	-	0.330	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Chloroethyl)ether	**7.3E-04**	-	0.330	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	**1.8E+00**	-	0.330	All Results < MSC
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	**5.7E+02**	0.519	0.330	All Results < MSC
SEMIVOLATILES	Butyl benzyl phthalate	**8.0E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Chrysene	**1.2E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Dibenzo(a,h)anthracene	**1.9E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Dibenzofuran	**4.9E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Diethyl phthalate	**1.8E+03**	-	0.330	All Results < MSC
SEMIVOLATILES	Dimethyl phthalate	**4.1E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	di-n-Butyl phthalate	**7.6E+03**	-	0.330	All Results < MSC

Table A6-6
Comparison to Maximum Soil Concentrations
Sump 110 at Building 207

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
SEMIVOLATILES	di-n-Octyl phthalate	**3.3E+04**	-	0.330	All Results < MSC
SEMIVOLATILES	Fluoranthene	**2.5E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Fluorene	**3.0E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Hexachlorobenzene	**3.4E+00**	-	0.330	All Results < MSC
SEMIVOLATILES	Hexachlorobutadiene	**2.0E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Hexachlorocyclopentadiene	**6.7E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Hexachloroethane	**2.6E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	**1.9E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Isophorone	**1.5E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Naphthalene	**4.5E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Nitrobenzene	**9.8E-01**	-	0.330	All Results < MSC
SEMIVOLATILES	n-Nitroso-di-n-propylamine	**1.4E-04**	-	0.330	Never detected, SQL > MSC
SEMIVOLATILES	n-Nitrosodiphenylamine	**2.8E+00**	-	0.330	All Results < MSC
SEMIVOLATILES	Pentachlorophenol	**2.2E-01**	-	1.650	Never detected, SQL > MSC
SEMIVOLATILES	Phenanthrene	**2.8E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Phenol	**9.4E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Pyrene	**1.0E+02**	-	0.330	All Results < MSC
VOLATILES	1,1,1,2-Tetrachloroethane	**1.5E+01**	-	0.0006	All Results < MSC
VOLATILES	1,1,1-Trichloroethane	**3.4E+00**	-	0.0050	All Results < MSC
VOLATILES	1,1,2,2-Tetrachloroethane	**1.7E-01**	-	0.0050	All Results < MSC
VOLATILES	1,1,2-Trichloroethane	**3.9E-02**	-	0.0050	All Results < MSC
VOLATILES	1,1-Dichloroethane	**5.5E+01**	-	0.0050	All Results < MSC
VOLATILES	1,1-Dichloroethene	**7.8E-02**	-	0.0050	All Results < MSC
VOLATILES	1,1-Dichloropropene	**9.2E-02**	-	0.0006	All Results < MSC
VOLATILES	1,2,3-Trichlorobenzene	**3.9E+02**	-	0.0006	All Results < MSC
VOLATILES	1,2,3-Trichloropropane	**2.3E-03**	-	0.0012	All Results < MSC
VOLATILES	1,2,4-Trimethylbenzene	**6.8E+02**	-	0.0006	All Results < MSC
VOLATILES	1,2-Dibromo-3-chloropropane	**4.9E-03**	-	0.0023	All Results < MSC
VOLATILES	1,2-Dibromoethane	**4.1E-04**	-	0.0006	Never detected, SQL > MSC
VOLATILES	1,2-Dichloroethane	**1.6E-02**	-	0.0050	All Results < MSC
VOLATILES	1,2-Dichloroethene	**3.5E-01**	-	0.0050	All Results < MSC
VOLATILES	1,2-Dichloropropane	**4.5E-02**	-	0.0050	All Results < MSC
VOLATILES	1,2-Dimethylbenzene (o-Xylen	**1.9E+02**	-	0.0006	All Results < MSC
VOLATILES	1,3,5-Trimethylbenzene	**7.4E+02**	-	0.0006	All Results < MSC
VOLATILES	1,3-Dichloropropane	**5.2E-01**	-	0.0006	All Results < MSC
VOLATILES	2,2-Dichloropropane	**9.7E-01**	-	0.0006	All Results < MSC
VOLATILES	2-Butanone	**5.4E+01**	-	0.0500	All Results < MSC
VOLATILES	2-Chloroethyl vinyl ether	**1.5E-02**	-	0.0100	All Results < MSC
VOLATILES	2-Chlorotoluene	**1.2E+02**	-	0.0006	All Results < MSC
VOLATILES	2-Hexanone	**1.9E+01**	-	0.0500	All Results < MSC
VOLATILES	4-Chlorotoluene	**1.4E+02**	-	0.0006	All Results < MSC

Table A6-6
Comparison to Maximum Soil Concentrations
Sump 110 at Building 207

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
VOLATILES	Acetone	**6.4E+01**	-	0.1000	All Results < MSC
VOLATILES	Benzene	**5.1E-02**	-	0.0050	All Results < MSC
VOLATILES	Bromobenzene	**7.1E+01**	-	0.0006	All Results < MSC
VOLATILES	Bromochloromethane	**1.9E+01**	-	0.0006	All Results < MSC
VOLATILES	Bromodichloromethane	**3.9E-02**	-	0.0050	All Results < MSC
VOLATILES	Bromoform	**4.7E-01**	-	0.0050	All Results < MSC
VOLATILES	Bromomethane	**4.2E-01**	-	0.0100	All Results < MSC
VOLATILES	Carbon disulfide	**9.1E+01**	-	0.0050	All Results < MSC
VOLATILES	Carbon tetrachloride	**1.4E-01**	-	0.0050	All Results < MSC
VOLATILES	Chlorobenzene	**3.1E+00**	-	0.0050	All Results < MSC
VOLATILES	Chloroethane	**1.4E+02**	-	0.0100	All Results < MSC
VOLATILES	Chloroform	**7.6E+00**	-	0.0050	All Results < MSC
VOLATILES	Chloromethane	**7.7E-01**	-	0.0100	All Results < MSC
VOLATILES	cis-1,2-Dichloroethene	**3.5E-01**	-	0.0006	All Results < MSC
VOLATILES	cis-1,3-Dichloropropene	**3.7E-02**	-	0.0050	All Results < MSC
VOLATILES	Dibromochloromethane	**3.3E-01**	-	0.0050	All Results < MSC
VOLATILES	Dibromomethane	**1.0E+01**	-	0.0006	All Results < MSC
VOLATILES	Dichlorodifluoromethane	**8.6E+02**	-	0.0012	All Results < MSC
VOLATILES	Ethylbenzene	**2.1E+01**	-	0.0050	All Results < MSC
VOLATILES	Isopropylbenzene	**3.5E+03**	-	0.0006	All Results < MSC
VOLATILES	m,p-Xylenes	**4.5E+02**	-	0.0006	All Results < MSC
VOLATILES	Methyl isobutyl ketone	**2.2E+01**	-	0.0500	All Results < MSC
VOLATILES	Methylene chloride	**1.2E-02**	-	0.0050	All Results < MSC
VOLATILES	n-BUTYLBENZENE	**6.5E+02**	-	0.0006	All Results < MSC
VOLATILES	n-PROPYLBENZENE	**6.2E+02**	-	0.0006	All Results < MSC
VOLATILES	p-ISOPROPYLTOLUENE	**7.9E+02**	-	0.0006	All Results < MSC
VOLATILES	sec-BUTYLBENZENE	**7.6E+02**	-	0.0006	All Results < MSC
VOLATILES	Styrene	**1.1E+01**	-	0.0050	All Results < MSC
VOLATILES	tert-BUTYLBENZENE	**7.4E+02**	-	0.0006	All Results < MSC
VOLATILES	Tetrachloroethene	**1.2E-01**	-	0.0050	All Results < MSC
VOLATILES	Toluene	**2.1E+01**	-	0.0050	All Results < MSC
VOLATILES	trans-1,2-Dichloroethene	**8.2E-01**	-	0.0006	All Results < MSC
VOLATILES	trans-1,3-Dichloropropene	**2.0E-01**	-	0.0050	All Results < MSC
VOLATILES	Trichloroethene	**7.2E-02**	-	0.0050	All Results < MSC
VOLATILES	Trichlorofluoromethane	**7.8E+02**	-	0.0012	All Results < MSC
VOLATILES	Vinyl acetate	**1.4E+02**	-	0.0500	All Results < MSC
VOLATILES	Vinyl chloride	**1.4E-02**	-	0.0100	All Results < MSC

Table A6-6
Comparison to Maximum Soil Concentrations
Sump 110 at Building 207

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
VOLATILES	Xylenes, Total	**3.5E+02**	-	0.0050	All Results < MSC

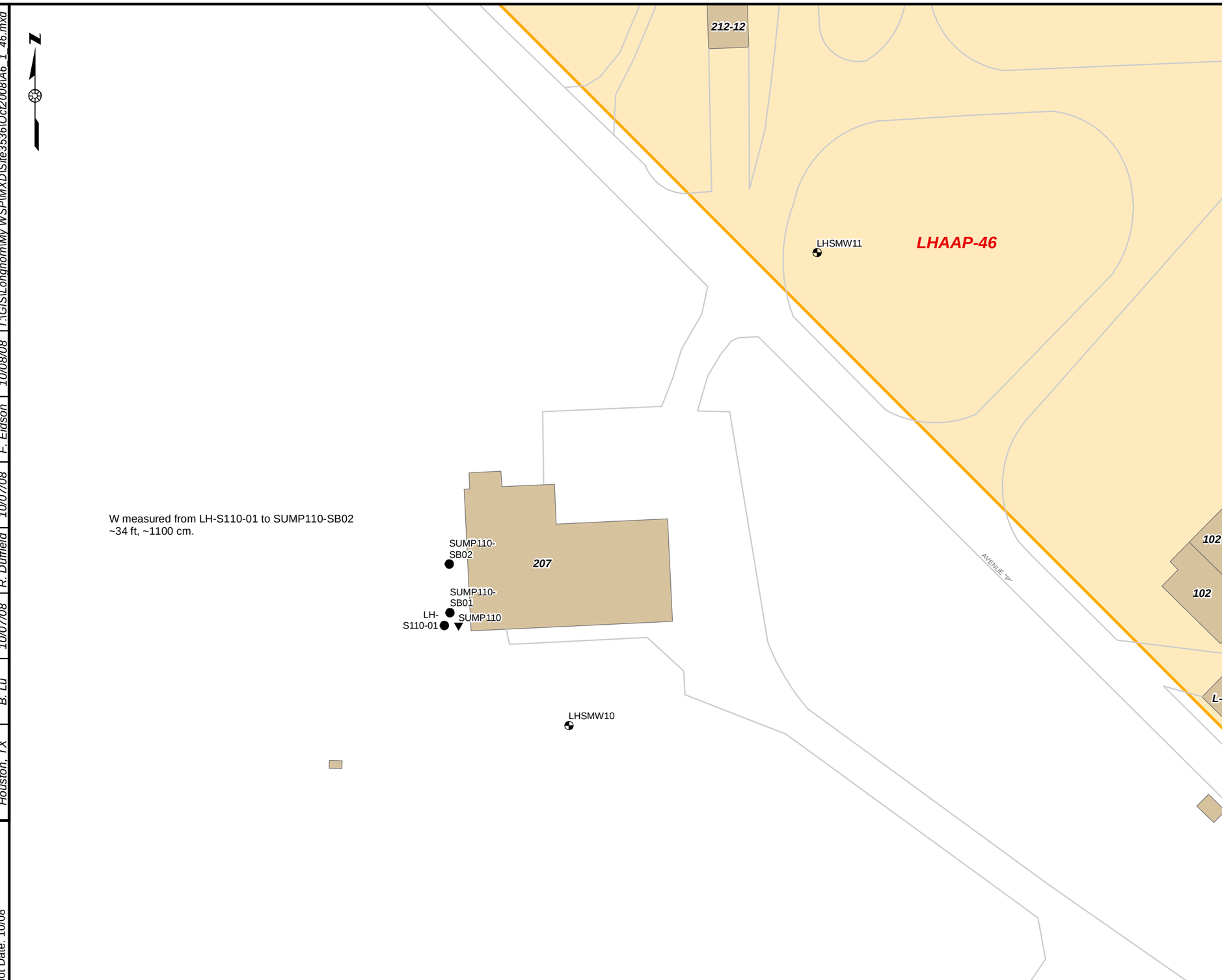
Notes:

Maximum Soil Concentrations shown in Table 8a and Table 8b of the Shaw (2008b) Addendum.

mg/kg - milligrams per kilogram

MSC - medium specific concentration

SQL - sample quantitation limit



Legend

- Monitoring Well
- Sumps
- Surface Soil
- Soil Boring
- Stream
- Road
- Existing Building
- Site

0 25 50 100 Feet

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

FIGURE A6-1

LHAAP-46 SAMPLE LOCATION MAP

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		FILE PATH
Houston, TX	B. Lu	10/07/08	R. Duffield	10/07/08	F. Eidson	10/08/08	T:\GIS\Longhorn\My WSP\MXD\Site3536\Oct2008\A6_1_46.mxd

Plot Date: 10/08

Attachment 7

Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 118

Attachment 7 – SAM Model Evaluation

Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 118 at the Longhorn Army Ammunition Plant, Karnack, Texas

Attachment 7 describes development of Medium Specific Concentrations (MSCs) for chemicals in soil that are protective of groundwater for soil associated with Sump 118. The MSC values were developed according to the Texas Commission on Environmental Quality [TCEQ] Texas Risk Reduction Rules, Title 30 Texas Administrative Code (TAC) Chapter 335 (30 TAC §335 and updates). Groundwater-protective Risk Reduction Standard 3 MSCs were calculated to evaluate the potential for migration of chemicals from soil to groundwater as provided in TCEQ guidance [30 TAC §335.563(i)(2)] by using the SAM model to estimate the potential impacts of soil contamination on groundwater quality.

This sump is located near Building 813 southwest of Longhorn Army Ammunition Plant (LHAAP)-29 as shown in **Figure A7-1**. Evaluation of chemicals in soil associated with this sump was based on data from analysis of 6 soil samples collected from depths ranging from 0 to 4 feet below ground surface (bgs). The samples were analyzed for explosives, metals, semivolatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), and volatile organic compounds (VOCs) (Shaw, 2008). The analytical results were evaluated as reported in **Table 9a** and **Table 9b** of the main body of this Addendum.

The initial step in the SAM Model compared the tested chemicals to available background concentrations and method quantitation limits (MQL) for each chemical. Of the chemicals tested, 4 were not evaluated because they are regarded as essential nutrients (TCEQ, 2001). The evaluation of the remaining chemicals is recorded on **Table A7-1**.

Groundwater-protective Risk Reduction Standard 3 Soil MSCs were calculated to evaluate potential migration of chemicals from soil to groundwater as provided in TCEQ guidance [30 TAC §335.563(i)(2)]. The SAM Model was selected to predict impacts of soil contamination on groundwater quality. The SAM Model is an extension of the Soil Screening Level calculations described in USEPA (1996) guidance and is based on calculating total mass (liquid phase, solid phase, and gas phase) in the soil column:

$$M_T = V(\rho_b C_s + \theta_w C_w + \theta_a C_g)$$

Where

M_T = total mass of chemical
V = volume of the soil column
ρ_b = bulk density
C_s = concentration in soil (dry weight basis)
θ_w = water filled porosity
C_w = concentration in pore water
θ_a = air filled porosity

C_g = gas phase concentration.

Total mass is then redistributed using equilibrium conditions based on the adsorption coefficient and Henry's constant. The equilibrium equations are:

$$C_s = K_d C_w \qquad \text{Equation 1}$$

$$C_g = H' C_w \qquad \text{Equation 2}$$

Where Kd is the distribution coefficient or adsorption coefficient, and H' is the dimensionless Henry's Law constant.

A SAM Model enhancement over USEPA's Soil Screening Levels is that the SAM Model assumes a zone of contaminated soils overlying a zone of clean soil (zero contaminant concentration). The SAM Model simulates mixing of contamination through the contaminated and clean soil zones based on equilibrium conditions and predicts leachate concentration at the bottom of the soil column. In the SAM Model, the leachate concentration is calculated as follows:

$$C_w = C_s \left(\frac{\rho_b}{\theta_w + (K_d \rho_b) + H' \theta_a} \right) \left(\frac{L_1}{L_2} \right) \qquad \text{Equation 3}$$

Or, alternately, the concentration in soil that will produce a given leachate concentration can be calculated as:

$$C_s = C_w \left(\frac{\theta_w + (K_d \rho_b) + H' \theta_a}{\rho_b} \right) \left(\frac{L_2}{L_1} \right) \qquad \text{Equation 4}$$

Where L_1 is the thickness of the contaminated zone and L_2 is the thickness of the total soil column. The factor (L_2/L_1) is an enhancement in the SAM Model over the Soil Screening Level Model by USEPA. A further dilution factor for leachate mixing with groundwater can be incorporated by using a leachate dilution factor:

$$LDF = 1 + \frac{Kid}{IW} \qquad \text{Equation 5}$$

Where

K = aquifer hydraulic conductivity
i = hydraulic gradient in aquifer
d = groundwater mixing zone depth
I = infiltration rate
W = source length parallel to groundwater flow.

The groundwater protective Standard 3 MSC is the soil concentration (Cs) described by Equation 4 where the groundwater concentration is limited by the TCEQ risk-based drinking water concentration (GW-Ind) modified by the leachate dilution factor (LDF) as follows:

$$\text{Standard 3 } MSC = GW - Ind\left(\frac{\theta_w + (K_d \rho_b) + H'\theta_a}{\rho_b}\right)\left(\frac{L_2}{L_1}\right) x\ LDF \quad \text{Equation 6}$$

The model further calculates the soil saturation concentration (C_{sat}), which corresponds to the contaminant concentration in soil at which the absorptive capacity of soil particles, the solubility limits of soil pore water and saturation of soil pore air have been reached. Concentrations above C_{sat} are assumed to be in free phase. The C_{sat} concentration is calculated in the SAM Model according to Equation 7.

$$C_{sat} = S\left(\frac{\theta_w + (K_d \rho_b) + H'\theta_a}{\rho_b}\right) \quad \text{Equation 7}$$

For the purpose of simplification, a soil to water coefficient, K_{sw}, can stand in for the complex bracketed formula in Equations 3, 4, 6, and 7.

$$K_{sw} = \left(\frac{\rho_b}{\theta_w + (K_d \rho_b) + (H'\theta_a)}\right) \quad \text{Equation 8}$$

Input parameters to the SAM Model, that are either specific to Sump 118 locations at Building 813 or are default TCEQ values, are shown in **Table A7-2**. Because some chemical properties are pH dependent, an average groundwater pH (6.5) was calculated in **Table A7-3**. **Table A7-4** lists the chemical properties (TCEQ, 2008). From these input parameters and properties, the SAM Model first calculates a saturated soil concentration (C_{sat}) using Equation 7.

Then the SAM Model calculates a Standard 3 Commercial/Industrial Soil MSC using Equation 6 by equating C_w to the GW-Ind MSC and calculating what concentration of chemical in the soil at the site (mg/kg) would theoretically leach into the groundwater at the GW-Ind concentration (mg/L). The lower of the C_{sat} and the calculated Soil MSC values is used as the Soil MSC.

The MSC values for total petroleum hydrocarbons (TPH) components analyzed according to TCEQ Method TX1005 were developed as follows:

For results reported as “Carbon Range C12-C28 and Carbon Range C28-C35” concentrations, the value used is the lowest of GW-Ind values for >12-16 C, >16-21 C, and >21-35 C (aromatic) boiling fraction of TPH, given in TCEQ (2006) guidance (3.1E+00 milligrams per liter [mg/L]). For results reported as “Carbon Range C6-C12” concentrations, the value used is the MSC for the >8-10 C (aromatic) boiling fraction of TPH, given in TCEQ (2006) guidance (4.1E+00 mg/L).

Finally, the SAM Model compares the Soil MSC to available background soil concentrations for the chemical. The 95% upper prediction limit (UPL) soil background concentrations from the LHAAP-35/36 Sump Report (Shaw, 2008) were used for this comparison. The larger of the Soil MSC and the background concentration is then selected as the Applicable Standard 3 Commercial/Industrial Soil MSC.

Table A7-5 presents the results of those calculations. The Applicable Commercial/Industrial Soil MSC values are in bold along the right side of the table. While it is possible to select different site parameters for each chemical, for this calculation, general whole site parameters were used as if each chemical were equally and evenly distributed across the entire site. When compared to actual distribution of individual chemical results in individual samples taken near former sump locations, this assumption, overestimates the extent of the chemical concentration across the site, resulting in lower concentrations calculated for the MSC values.

Table A7-6 compares the Applicable Standard 3 Commercial/Industrial Soil MSC values to maximum soil concentrations for each chemical in the samples associated with Sump 118 at Building 813. None of the chemicals evaluated were detected in the 4 samples at a level that exceeded the MSC. Thirteen chemicals that were never detected had at least one sample quantitation limit (SQL) greater than the Applicable Standard 3 MSC. No other chemicals had SQL values higher than the MSC.

Discussion

The SAM Model results for Sump 118 at Building 813 by LHAAP-29 indicate that no chemicals were detected in these samples at concentrations that exceeded the Applicable Standard 3 Commercial / Industrial Soil MSC values that were developed to be protective of groundwater.

References

Shaw Environmental, Inc. (Shaw), 2008, *Final Data Evaluation Report, Chemical Concentrations in Soil Samples Associated with LHAAP-35/36 Sumps*, January (LHAAP-35/36 Sump Report).

Texas Commission on Environmental Quality (TCEQ), 2001, Interoffice Memorandum from Joseph T. Haney, Jr., (TCEQ) to Camarie Perry, Office or Permitting, Remediation & Registration, *Evaluation of the Potential Health Impacts of Exposure to Iron, Calcium, Magnesium, Potassium, sodium, and Phosphorus through Soil Ingestion*, October.

TCEQ, 2008, Annual TCEQ update of chemical/physical properties table [(Figure: 30 TAC §350.73(e)], April.

U.S. Environmental Protection Agency (USEPA), 1996, *Soil Screening Guidance: User's Guide*, Second Edition.

Table A7-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 118 at Building 813 Southwest of LHAAP-29

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	MQL	Calculate MSC ?
EXPLOSIVES	1,3,5-Trinitrobenzene	-	0.129	NE	NE	0.25	0.25	YES
EXPLOSIVES	1,3-Dinitrobenzene	-	0.129	NE	NE	0.25	0.25	YES
EXPLOSIVES	2,4,6-Trinitrotoluene	-	0.129	NE	NE	0.25	0.25	YES
EXPLOSIVES	2,4-Dinitrotoluene	-	0.330	NE	NE	0.33	0.165	YES
EXPLOSIVES	2,6-Dinitrotoluene	-	0.330	NE	NE	0.33	0.165	YES
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	-	0.129	NE	NE	0.26	0.26	YES
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	-	0.129	NE	NE	0.26	0.26	YES
EXPLOSIVES	HMX	-	0.129	NE	NE	2.2	2.2	YES
EXPLOSIVES	m-Nitrotoluene	-	0.129	NE	NE	0.25	0.25	YES
EXPLOSIVES	Nitrobenzene	-	0.330	NE	NE	0.165	0.165	No, 2
EXPLOSIVES	o-Nitrotoluene	-	0.129	NE	NE	1	1	YES
EXPLOSIVES	p-Nitrotoluene	-	0.129	NE	NE	0.65	0.65	YES
EXPLOSIVES	RDX	-	0.129	NE	NE	0.26	0.26	YES
EXPLOSIVES	Tetryl	-	0.258	NE	NE	0.25	0.25	YES
METALS	Aluminum	21700	-	1.63E+04	2.08E+04	20	20	YES
METALS	Antimony	4.30	3	9.40E-01	1.60E+00	3	0.1	YES
METALS	Arsenic	3.40	-	4.81E+00	5.54E+00	0.3	0.3	YES
METALS	Barium	109	-	1.52E+02	8.55E+01	0.3	0.3	YES
METALS	Cadmium	-	1	1.40E+00	4.00E-01	1	0.1	YES
METALS	Calcium	1810	-	NA	NA	NA	NA	No, 1
METALS	Chromium	21.0	-	2.66E+01	3.01E+01	0.4	0.4	YES
METALS	Cobalt	7.70	-	7.23E+00	5.61E+00	0.5	0.5	YES
METALS	Copper	8.40	-	5.55E+00	9.25E+00	0.6	0.6	YES
METALS	Iron	20600	-	NA	NA	NA	NA	No, 1
METALS	Lead	14.9	-	2.26E+01	1.14E+01	5	5	YES
METALS	Magnesium	1200	-	NA	NA	NA	NA	No, 1
METALS	Manganese	358	-	1.25E+03	2.01E+02	0.2	0.2	YES
METALS	Mercury	-	0.1	8.19E-02	3.60E-01	0.1	0.25	YES
METALS	Potassium	669	-	NA	NA	NA	NA	No, 1
METALS	Selenium	-	1	3.48E+00	5.57E+00	1	0.2	YES
METALS	Silver	-	1	3.10E-01	3.70E-01	1	0.2	YES
METALS	Strontium	18.3	-	1.98E+01	2.91E+01	0.5	0.5	YES
METALS	Zinc	25.5	-	6.16E+01	2.02E+01	2.5	2.5	YES
SEMIVOLATILES	1,2,4-Trichlorobenzene	-	0.330	NE	NE	0.33	0.005	YES
SEMIVOLATILES	1,2-Dichlorobenzene	-	0.330	NE	NE	0.33	0.005	YES
SEMIVOLATILES	1,3-Dichlorobenzene	-	0.330	NE	NE	0.33	0.005	YES
SEMIVOLATILES	1,4-Dichlorobenzene	-	0.330	NE	NE	0.33	0.005	YES
SEMIVOLATILES	2,4,5-Trichlorophenol	-	1.650	NE	NE	1.65	0.165	YES
SEMIVOLATILES	2,4,6-Trichlorophenol	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2,4-Dichlorophenol	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2,4-Dimethylphenol	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2,4-Dinitrophenol	-	1.650	NE	NE	1.65	0.825	YES
SEMIVOLATILES	2-Chloronaphthalene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2-Chlorophenol	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2-Methylnaphthalene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2-Methylphenol	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2-Nitroaniline	-	1.650	NE	NE	1.65	0.825	YES
SEMIVOLATILES	2-Nitrophenol	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	3,3'-Dichlorobenzidine	-	0.650	NE	NE	0.65	0.33	YES
SEMIVOLATILES	3-Nitroaniline	-	1.650	NE	NE	1.65	0.825	YES
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	-	1.650	NE	NE	1.65	0.825	YES
SEMIVOLATILES	4-Bromophenyl phenyl ether	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	4-Chloro-3-methylphenol	-	0.650	NE	NE	0.65	0.165	YES
SEMIVOLATILES	4-Chloroaniline	-	0.650	NE	NE	0.65	0.165	YES
SEMIVOLATILES	4-Chlorophenyl phenyl ether	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	4-Methylphenol	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	4-Nitroaniline	-	1.650	NE	NE	1.65	0.825	YES
SEMIVOLATILES	4-Nitrophenol	-	1.650	NE	NE	1.65	0.825	YES
SEMIVOLATILES	Acenaphthene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Acenaphthylene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Anthracene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Benzo(a)anthracene	-	0.330	1.53E-02	NE	0.33	0.165	YES

Table A7-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 118 at Building 813 Southwest of LHAAP-29

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	MQL	Calculate MSC ?
SEMIVOLATILES	Benzo(a)pyrene	-	0.330	1.54E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Benzo(b)fluoranthene	-	0.330	1.53E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Benzo(ghi)perylene	-	0.330	1.23E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Benzo(k)fluoranthene	-	0.330	1.30E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Benzoic Acid	-	1.650	NE	NE	1.65	0.825	YES
SEMIVOLATILES	Benzyl Alcohol	-	0.650	NE	NE	0.65	0.165	YES
SEMIVOLATILES	bis(2-Chloroethoxy)methane	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	bis(2-Chloroethyl)ether	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Butyl benzyl phthalate	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Chrysene	-	0.330	1.51E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Dibenzo(a,h)anthracene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Dibenzofuran	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Diethyl phthalate	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Dimethyl phthalate	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	di-n-Butyl phthalate	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	di-n-Octyl phthalate	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Fluoranthene	-	0.330	2.29E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Fluorene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Hexachlorobenzene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Hexachlorobutadiene	-	0.330	NE	NE	0.33	0.005	YES
SEMIVOLATILES	Hexachlorocyclopentadiene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Hexachloroethane	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	-	0.330	1.43E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Isophorone	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Naphthalene	-	0.330	NE	NE	0.33	0.01	YES
SEMIVOLATILES	Nitrobenzene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	n-Nitroso-di-n-propylamine	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	n-Nitrosodiphenylamine	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Pentachlorophenol	-	1.650	NE	NE	1.65	0.825	YES
SEMIVOLATILES	Phenanthrene	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Phenol	-	0.330	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Pyrene	-	0.330	1.94E-02	NE	0.33	0.165	YES
TPH	Carbon Range C12-C28	-	44.489	NE	NE	25	25	YES
TPH	CARBON RANGE C28-C35	-	44.489	NE	NE	25	25	YES
TPH	Carbon Range C6-C12	-	44.489	NE	NE	25	25	YES
VOLATILES	1,1,1,2-Tetrachloroethane	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	1,1,1-Trichloroethane	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	1,1,2,2-Tetrachloroethane	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	1,1,2-Trichloroethane	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	1,1-Dichloroethane	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	1,1-Dichloroethene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	1,1-Dichloropropene	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	1,2,3-Trichlorobenzene	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	1,2,3-Trichloropropane	-	0.0017	NE	NE	0.005	0.005	YES
VOLATILES	1,2,4-Trichlorobenzene	-	0.3300	NE	NE	0.005	0.005	No, 2
VOLATILES	1,2,4-Trimethylbenzene	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	1,2-Dibromo-3-chloropropane	-	0.0034	NE	NE	0.005	0.005	YES
VOLATILES	1,2-Dibromoethane	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	1,2-Dichlorobenzene	-	0.3300	NE	NE	0.005	0.005	No, 2
VOLATILES	1,2-Dichloroethane	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	1,2-Dichloroethene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	1,2-Dichloropropane	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	1,2-Dimethylbenzene (o-Xylene)	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	1,3,5-Trimethylbenzene	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	1,3-Dichlorobenzene	-	0.3300	NE	NE	0.005	0.005	No, 2
VOLATILES	1,3-Dichloropropane	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	1,4-Dichlorobenzene	-	0.3300	NE	NE	0.005	0.005	No, 2
VOLATILES	2,2-Dichloropropane	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	2-Butanone	-	0.0500	NE	NE	0.05	0.01	YES
VOLATILES	2-Chloroethyl vinyl ether	-	0.0100	NE	NE	0.01	0.01	YES

Table A7-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 118 at Building 813 Southwest of LHAAP-29

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	MQL	Calculate MSC ?
VOLATILES	2-Chlorotoluene	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	2-Hexanone	-	0.0500	NE	NE	0.05	0.01	YES
VOLATILES	4-Chlorotoluene	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	Acetone	-	0.1000	NE	NE	0.1	0.01	YES
VOLATILES	Benzene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Bromobenzene	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	Bromochloromethane	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	Bromodichloromethane	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Bromoform	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Bromomethane	-	0.0100	NE	NE	0.01	0.01	YES
VOLATILES	Carbon disulfide	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Carbon tetrachloride	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Chlorobenzene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Chloroethane	-	0.0100	NE	NE	0.01	0.01	YES
VOLATILES	Chloroform	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Chloromethane	-	0.0100	NE	NE	0.01	0.01	YES
VOLATILES	cis-1,2-Dichloroethene	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	cis-1,3-Dichloropropene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Dibromochloromethane	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Dibromomethane	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	Dichlorodifluoromethane	-	0.0017	NE	NE	0.01	0.01	YES
VOLATILES	Ethylbenzene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Hexachlorobutadiene	-	0.3300	NE	NE	0.005	0.005	No, 2
VOLATILES	Isopropylbenzene	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	m,p-Xylenes	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	Methyl isobutyl ketone	-	0.0500	NE	NE	0.05	0.01	YES
VOLATILES	Methylene chloride	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Naphthalene	-	0.3300	NE	NE	0.01	0.01	No, 2
VOLATILES	n-BUTYLBENZENE	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	n-PROPYLBENZENE	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	p-ISOPROPYLTOLUENE	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	sec-BUTYLBENZENE	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	Styrene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	tert-BUTYLBENZENE	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	Tetrachloroethene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Toluene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	trans-1,2-Dichloroethene	-	0.0008	NE	NE	0.005	0.005	YES
VOLATILES	trans-1,3-Dichloropropene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Trichloroethene	-	0.0050	NE	NE	0.005	0.005	YES
VOLATILES	Trichlorofluoromethane	-	0.0017	NE	NE	0.01	0.01	YES
VOLATILES	Vinyl acetate	-	0.0500	NE	NE	0.05	0.01	YES
VOLATILES	Vinyl chloride	-	0.0100	NE	NE	0.01	0.01	YES
VOLATILES	Xylenes, Total	-	0.0050	NE	NE	0.005	0.005	YES

Notes:

all concentrations in milligrams per kilogram (mg/kg)

Max Detected and Max SQL values taken from Table 9a and Table 9b of the main body of the Addendum.

NE - Not evaluated, background was only evaluated for metals and select other analytes.

SQL - sample quantitation limit.

MQL - method quantitation limit (for recent samples).

MSC - medium specific concentration.

PQL - practical quantitation limit (for older samples).

Rules for Analyte Selection

1. Chemicals that are essential nutrients (Fe, Ca, Mg, K, Na, P), TCEQ (2001).
2. Same chemical is analyzed as an explosive, only one MSC value is calculated.

Table A7-2
Input Values for Parameters used to Calculate Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 118 at Building 813 Southwest of LHAAP-29

Parameter		Value	Units	Comment	Reference
Soil Dry Bulk Density	ρ_b	1.5	g/cm^3	Typical value	USEPA, 1996, pg. 38.
Particle Density	$\rho_{particle}$	2.65	g/cm^3	TCEQ default value	30 TAC §350.75 (c) and (d)
Total Porosity	n	0.43	unitless	n = 1-(ρb/ρparticle) = 1-(1.5 g/cc/2.65 g/cc)	USEPA, 1996, pg. 38.
Volumetric Water Content of Soil	θ_w	0.13	unitless	Assumed 30%	USEPA, 1996, pg. 38.
Soil Fraction Organic Carbon	f_{oc}	0.02	unitless	TCEQ default value	30 TAC §335.567. Appendix I. (p. 26)
Net Infiltration Rate through soil	I	30.4	cm/yr	I = 0.0018 x P x P P - precipitation for Marshall Texas 130	TCEQ, 2000
Thickness of affected soil	L_1	152	cm	Samples taken at various depths from 0 down to 4 ft. Assumed 5 ft. (152 cm)	Table 9a and Table 9b, main body of Addendum
Distance from top of affected soils to top of water bearing unit.	L_2	610	cm	top of shallowest sand layer at 29WW32 as noted on Cross-Section AA' ~20 ft (610 cm)	Jacobs, 2001, Figure 6-3
Groundwater Darcy Velocity	V_{gw}	213.89	cm/yr	Calculated = K*i*31500000 sec/yr	USEPA, 1996, pg. 42.
Hydraulic conductivity in groundwater bearing unit	K	6.79E-04	cm/sec	Value listed as modeling input	Shaw, 2007, Appendix C, pg. 2-1
Hydraulic gradient in groundwater bearing unit	i	0.0100	unitless	Value listed as modeling input	Shaw, 2007, Appendix C, pg. 2-1
Width of soil source area parallel to groundwater flow direction	W	610	cm	Maximum site dimension, 20 ft measured from LH-S118-02 to 35SUMP118-SB01 (~610 cm)	See Figure A7-1
Groundwater mixing zone	d	305	cm	Nearest monitor well in Shallow Zone 29WW32 has a 10-ft screen (305 cm)	Jacobs, 2001, page 6-8
Soil Air Filled Porosity (θ_a)	θ_a	0.30	unitless	n - θws	USEPA, 1996, pg. 38.
Henry's Law Constant	H'	Chemical specific property	unitless	See Table A7-4	TCEQ, 2008
Organic Carbon Partition Coefficient	K_{oc}	Chemical specific property	unitless	See Table A7-4	TCEQ, 2008
Soil Water Partition Coefficient	K_d	Chemical specific property	unitless	See Table A7-4	TCEQ, 2008

Notes:

Jacobs Engineering Group, Inc., 2001: *Final Remedial Investigation Report, Group 2 Sites, Sites 12, 17, 18/24, 29, and 32, Longhorn Army Ammunition Plant, Karnack, Texas* , Oak Ridge, Tennessee, April.

Shaw Environmental & Infrastructure (Shaw), 2007, *Final Modeling Report, Derivation of Soil and Groundwater Concentrations Protective of Surface Water and Sedimen*ı, February.

Texas Commission on Environmental Quality (TCEQ), *Risk Reduction Rules* , 30 TAC §335.567. Appendix I.

TCEQ, 2000, Tier 2 PCL Equations, March, accessed at http://www.tceq.state.tx.us/assets/public/remediation/trrp/tier2.pdf

TCEQ, 2008: Texas Risk Reduction Program Physical Chemcial Properties Tables, April, accessed at http://www.tceq.state.tx.us/remediation/trrp/trrppcls.html

USEPA, 1996. Soil Screening Guidance: Technical Background Document, USEPA/540/R-95/128018, U. S. Environmental Protection Agency, Office of Emergency and Remedial Response, July.

Table A7-3
Determination of pH
Sump 118 at Building 813 Southwest of LHAAP-29

Well	Date	pH Measurement	Comment
29WW02	Aug-04	6.96	
29WW03	Aug-04	6.83	
29WW05	Aug-04	6.10	
29WW07	Aug-04	6.25	
29WW11	Aug-04	6.19	
29WW12	Aug-04	6.46	
29WW15	Aug-04	6.86	
29WW20	Aug-04	6.55	
29WW22	Aug-04	6.41	
29WW36	Sep-06	6.58	
29WW36	Nov-06	6.39	
29WW06	Feb-07	6.50	
29WW36	Feb-07	6.44	
Average		6.50	
pH to be used		**6.5**	

Notes:

1. pH data from the groundwater sampling logs, Field Work images on Shaw network.
2. Only the pH readings from shallow wells were averaged.

Table A7-4

Physical Chemical Properties of Chemicals of Concern [a]
Sump 118 at Building 813 Southwest of LHAAP-29

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
EXPLOSIVES	1,3,5-Trinitrobenzene	2.87E-06	1.41E+01	2.83E-01	3.53E+02	b
EXPLOSIVES	1,3-Dinitrobenzene	4.57E-06	3.00E+01	6.00E-01	5.40E+02	b
EXPLOSIVES	2,4,6-Trinitrotoluene	1.90E-05	3.02E+02	6.04E+00	1.30E+02	b
EXPLOSIVES	2,4-Dinitrotoluene	3.60E-05	5.13E+01	1.03E+00	2.85E+02	b
EXPLOSIVES	2,6-Dinitrotoluene	3.11E-05	4.17E+01	8.34E-01	1.82E+02	b
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	1.19E-07	5.62E+02	1.12E+01	1.73E+01	b
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	1.74E-07	3.63E+02	7.26E+00	3.64E+01	b
EXPLOSIVES	HMX	2.50E-14	3.98E-02	7.96E-04	2.37E+03	b
EXPLOSIVES	m-Nitrotoluene	2.24E-03	1.41E+02	2.81E+00	4.98E+02	b
EXPLOSIVES	o-Nitrotoluene	1.87E-03	1.41E+02	2.81E+00	6.00E+02	b
EXPLOSIVES	p-Nitrotoluene	2.29E-03	1.41E+02	2.81E+00	4.00E+02	b
EXPLOSIVES	RDX	4.99E-04	6.31E+01	1.26E+00	3.87E+01	b
EXPLOSIVES	Tetryl	8.31E-11	2.34E+02	4.69E+00	7.50E+01	b
METALS	Aluminum	0.00E+00	NA	3.53E+04	0.00E+00	c
METALS	Antimony	0.00E+00	NA	4.50E+01	0.00E+00	d
METALS	Arsenic	0.00E+00	NA	2.80E+01	0.00E+00	d
METALS	Barium	0.00E+00	NA	3.70E+01	0.00E+00	d
METALS	Cadmium	0.00E+00	NA	5.20E+01	0.00E+00	d
METALS	Chromium	0.00E+00	NA	9.90E+05	0.00E+00	d
METALS	Cobalt	0.00E+00	NA	4.50E+01	0.00E+00	
METALS	Copper	0.00E+00	NA	4.00E+01	0.00E+00	
METALS	Lead	0.00E+00	NA	1.83E+03	0.00E+00	c
METALS	Manganese	0.00E+00	NA	5.01E+01	0.00E+00	
METALS	Mercury	4.74E-01	NA	2.20E+01	3.00E-02	d
METALS	Selenium	0.00E+00	NA	6.10E+00	0.00E+00	d
METALS	Silver	0.00E+00	NA	4.20E+00	0.00E+00	d
METALS	Strontium	0.00E+00	NA	2.00E+00	0.00E+00	
METALS	Zinc	0.00E+00	NA	5.10E+01	0.00E+00	d
SEMIVOLATILES	1,2,4-Trichlorobenzene	5.90E-02	1.66E+03	3.32E+01	4.88E+01	b
SEMIVOLATILES	1,2-Dichlorobenzene	8.73E-02	6.92E+02	1.38E+01	1.50E+02	b
SEMIVOLATILES	1,3-Dichlorobenzene	1.95E-01	1.70E+02	3.40E+00	1.10E+02	b
SEMIVOLATILES	1,4-Dichlorobenzene	1.17E-01	6.46E+02	1.29E+01	7.38E+01	b
SEMIVOLATILES	2,4,5-Trichlorophenol	1.78E-04	1.91E+03	3.82E+01	1.20E+03	b, e
SEMIVOLATILES	2,4,6-Trichlorophenol	3.19E-04	5.33E+02	1.07E+01	9.82E+02	b, e
SEMIVOLATILES	2,4-Dichlorophenol	1.31E-04	1.53E+02	3.06E+00	4.50E+03	b, e
SEMIVOLATILES	2,4-Dimethylphenol	8.31E-05	1.17E+02	2.35E+00	6.20E+03	b
SEMIVOLATILES	2,4-Dinitrophenol	2.01E-07	1.05E-02	2.10E-04	5.80E+03	b, e
SEMIVOLATILES	2-Chloronaphthalene	2.54E-02	8.51E+03	1.70E+02	6.74E+00	b

Table A7-4
Physical Chemical Properties of Chemicals of Concern [a]
Sump 118 at Building 813 Southwest of LHAAP-29

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
SEMIVOLATILES	2-Chlorophenol	7.40E-04	3.93E+02	7.86E+00	2.80E+04	b, e
SEMIVOLATILES	2-Methylnaphthalene	1.85E-02	4.32E+03	8.63E+01	2.54E+01	b
SEMIVOLATILES	2-Methylphenol	6.65E-05	9.77E+01	1.95E+00	2.04E+04	b
SEMIVOLATILES	2-Nitroaniline	2.08E-05	2.69E+01	5.38E-01	1.26E+03	b
SEMIVOLATILES	2-Nitrophenol	2.21E-05	1.59E+02	3.18E+00	1.73E+04	b, e
SEMIVOLATILES	3,3'-Dichlorobenzidine	8.65E-07	7.24E+02	1.45E+01	3.11E+00	b
SEMIVOLATILES	3-Nitroaniline	2.31E-07	3.94E+01	7.88E-01	4.56E+02	b
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	1.07E-07	3.16E-02	6.32E-04	3.00E+03	b
SEMIVOLATILES	4-Bromophenyl phenyl ether	9.66E-03	1.45E+05	2.90E+03	8.25E-01	b
SEMIVOLATILES	4-Chloro-3-methylphenol	1.40E-05	8.78E+02	1.76E+01	5.43E+03	b
SEMIVOLATILES	4-Chloroaniline	4.86E-05	6.61E+01	1.32E+00	3.90E+03	b
SEMIVOLATILES	4-Chlorophenyl phenyl ether	1.30E-02	1.31E+04	2.62E+02	1.43E+00	b
SEMIVOLATILES	4-Methylphenol	3.99E-05	8.13E+01	1.63E+00	2.30E+04	b
SEMIVOLATILES	4-Nitroaniline	3.33E-08	1.12E+01	2.25E-01	6.49E+02	b
SEMIVOLATILES	4-Nitrophenol	3.24E-08	3.40E+01	6.80E-01	4.49E+03	b, e
SEMIVOLATILES	Acenaphthene	6.44E-03	3.98E+03	7.96E+01	4.24E+00	b
SEMIVOLATILES	Acenaphthylene	4.74E-03	6.92E+03	1.38E+02	3.93E+00	b
SEMIVOLATILES	Anthracene	4.61E-03	2.34E+04	4.69E+02	4.34E-02	b
SEMIVOLATILES	Benzo(a)anthracene	1.39E-04	3.55E+05	7.10E+03	1.00E-02	b
SEMIVOLATILES	Benzo(a)pyrene	4.70E-05	9.55E+05	1.91E+04	1.62E-03	b
SEMIVOLATILES	Benzo(b)fluoranthene	4.99E-04	1.20E+06	2.40E+04	1.50E-03	b
SEMIVOLATILES	Benzo(ghi)perylene	5.82E-06	1.58E+06	3.17E+04	2.60E-04	b
SEMIVOLATILES	Benzo(k)fluoranthene	4.45E-07	1.23E+06	2.46E+04	5.50E-04	b
SEMIVOLATILES	Benzoic Acid	1.39E-05	6.51E-01	1.30E-02	3.50E+03	b, e
SEMIVOLATILES	Benzyl Alcohol	1.62E-05	1.20E+01	2.40E-01	4.00E+04	b
SEMIVOLATILES	bis(2-Chloroethoxy)methane	1.25E-03	3.07E+02	6.13E+00	1.35E+03	b
SEMIVOLATILES	bis(2-Chloroethyl)ether	8.90E-04	1.55E+01	3.10E-01	1.02E+04	b
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	4.16E-03	3.16E+02	6.32E+00	1.70E+03	b
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	4.57E-04	6.76E+05	1.35E+04	3.00E-01	b
SEMIVOLATILES	Butyl benzyl phthalate	7.94E-05	1.37E+04	2.75E+02	2.90E+00	b
SEMIVOLATILES	Chrysene	5.03E-05	3.09E+05	6.18E+03	2.00E-03	b
SEMIVOLATILES	Dibenzo(a,h)anthracene	4.66E+00	1.91E+06	3.81E+04	5.00E-04	b
SEMIVOLATILES	Dibenzofuran	5.28E-03	8.49E+03	1.70E+02	2.86E+00	b
SEMIVOLATILES	Diethyl phthalate	1.87E-05	1.51E+02	3.03E+00	1.08E+03	b
SEMIVOLATILES	Dimethyl phthalate	2.40E-05	3.16E+01	6.32E-01	4.19E+03	b
SEMIVOLATILES	di-n-Butyl phthalate	5.94E-05	3.39E+04	6.78E+02	1.12E+01	b
SEMIVOLATILES	di-n-Octyl phthalate	2.78E-03	8.32E+07	1.66E+06	2.00E-02	b
SEMIVOLATILES	Fluoranthene	3.88E-04	4.90E+04	9.80E+02	2.60E-01	b

Table A7-4
Physical Chemical Properties of Chemicals of Concern [a]
Sump 118 at Building 813 Southwest of LHAAP-29

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
SEMIVOLATILES	Fluorene	2.64E-03	7.59E+03	1.52E+02	1.98E+00	b
SEMIVOLATILES	Hexachlorobenzene	2.22E-02	2.82E+04	5.64E+02	6.00E-03	b
SEMIVOLATILES	Hexachlorobutadiene	9.94E-01	6.92E+03	1.38E+02	2.55E+00	b
SEMIVOLATILES	Hexachlorocyclopentadiene	7.15E-01	9.55E+03	1.91E+02	1.80E+00	b
SEMIVOLATILES	Hexachloroethane	1.62E-01	1.82E+03	3.64E+01	5.00E+01	b
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	2.85E+00	3.47E+06	6.93E+04	3.75E-03	b
SEMIVOLATILES	Isophorone	2.57E-04	3.02E+01	6.04E-01	1.20E+04	b
SEMIVOLATILES	Naphthalene	2.00E-02	1.55E+03	3.10E+01	3.14E+01	b
SEMIVOLATILES	Nitrobenzene	8.56E-04	1.32E+02	2.64E+00	1.90E+03	b
SEMIVOLATILES	n-Nitroso-di-n-propylamine	9.35E-05	1.97E+01	3.94E-01	9.89E+03	b
SEMIVOLATILES	n-Nitrosodiphenylamine	2.08E-04	3.31E+02	6.62E+00	3.51E+01	b
SEMIVOLATILES	Pentachlorophenol	1.16E-05	7.81E+02	1.56E+01	1.40E+01	b, e
SEMIVOLATILES	Phenanthrene	5.40E-03	1.41E+04	2.83E+02	9.94E-01	b
SEMIVOLATILES	Phenol	2.47E-05	1.74E+01	3.48E-01	8.70E+04	b
SEMIVOLATILES	Pyrene	4.57E-04	3.80E+04	7.60E+02	1.35E-01	b
TPH	Carbon Range C12-C28	1.30E-02	1.58E+04	3.17E+02	6.50E-01	b
TPH	CARBON RANGE C28-C35	1.30E-02	1.58E+04	3.17E+02	6.50E-01	b
TPH	Carbon Range C6-C12	4.80E-01	1.58E+03	3.17E+01	6.50E+01	b
VOLATILES	1,1,1,2-Tetrachloroethane	9.98E-02	9.55E+02	1.91E+01	1.10E+03	b
VOLATILES	1,1,1-Trichloroethane	7.15E-01	1.10E+02	2.19E+00	1.33E+03	b
VOLATILES	1,1,2,2-Tetrachloroethane	1.55E-02	7.76E+01	1.55E+00	2.97E+03	b
VOLATILES	1,1,2-Trichloroethane	3.80E-02	5.01E+01	1.00E+00	4.42E+03	b
VOLATILES	1,1-Dichloroethane	2.39E-01	3.16E+01	6.32E-01	5.50E+03	b
VOLATILES	1,1-Dichloroethene	1.06E+00	6.46E+01	1.29E+00	2.40E+03	b
VOLATILES	1,1-Dichloropropene	1.82E+00	2.06E+02	4.12E+00	5.44E+02	b
VOLATILES	1,2,3-Trichlorobenzene	3.80E-02	8.91E+03	1.78E+02	1.64E+01	b
VOLATILES	1,2,3-Trichloropropane	1.58E-02	3.89E+02	7.78E+00	1.90E+03	b
VOLATILES	1,2,4-Trimethylbenzene	1.84E-01	9.33E+02	1.87E+01	5.68E+01	b
VOLATILES	1,2-Dibromo-3-chloropropane	8.31E-03	1.70E+02	3.40E+00	1.00E+03	b
VOLATILES	1,2-Dibromoethane	2.93E-02	5.37E+01	1.07E+00	4.32E+03	b
VOLATILES	1,2-Dichloroethane	5.32E-02	1.74E+01	3.48E-01	8.70E+03	b
VOLATILES	1,2-Dichloroethene	1.87E-01	2.90E+01	5.80E-01	4.93E+03	b
VOLATILES	1,2-Dichloropropane	1.17E-01	5.89E+01	1.18E+00	2.80E+03	b
VOLATILES	1,2-Dimethylbenzene (o-Xylen	7.36E-04	1.29E+02	2.58E+00	1.78E+02	b
VOLATILES	1,3,5-Trimethylbenzene	2.72E-01	1.02E+03	2.05E+01	5.15E+01	b
VOLATILES	1,3-Dichloropropane	5.52E-02	1.25E+02	2.50E+00	2.16E+03	b
VOLATILES	2,2-Dichloropropane	3.39E-01	1.56E+02	3.11E+00	1.68E+03	b
VOLATILES	2-Butanone	1.94E-03	1.90E+00	3.80E-02	2.40E+05	b

Table A7-4
Physical Chemical Properties of Chemicals of Concern [a]
Sump 118 at Building 813 Southwest of LHAAP-29

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
VOLATILES	2-Chloroethyl vinyl ether	3.02E-02	3.72E+01	7.43E-01	5.02E+03	b
VOLATILES	2-Chlorotoluene	1.35E-01	4.07E+02	8.15E+00	1.54E+02	b
VOLATILES	2-Hexanone	3.38E-03	1.79E+01	3.58E-01	1.79E+04	b
VOLATILES	4-Chlorotoluene	1.33E-01	4.96E+02	9.93E+00	1.18E+02	b
VOLATILES	Acetone	1.61E-03	5.70E-01	1.14E-02	6.00E+05	b
VOLATILES	Benzene	2.27E-01	6.61E+01	1.32E+00	1.77E+03	b
VOLATILES	Bromobenzene	8.38E-02	2.42E+02	4.84E+00	2.98E+02	b
VOLATILES	Bromochloromethane	3.69E-02	2.75E+01	5.50E-01	2.04E+04	b
VOLATILES	Bromodichloromethane	1.32E-01	5.50E+01	1.10E+00	4.50E+03	b
VOLATILES	Bromoform	2.56E-02	8.71E+01	1.74E+00	3.20E+03	b
VOLATILES	Bromomethane	5.90E-01	1.05E+01	2.09E-01	1.52E+04	b
VOLATILES	Carbon disulfide	6.13E-01	5.25E+01	1.05E+00	2.30E+03	b
VOLATILES	Carbon tetrachloride	1.20E+00	1.86E+02	3.72E+00	8.05E+02	b
VOLATILES	Chlorobenzene	1.82E-01	2.14E+02	4.28E+00	5.02E+02	b
VOLATILES	Chloroethane	2.12E-01	1.78E+01	3.56E-01	2.00E+04	b
VOLATILES	Chloroform	1.53E-01	4.68E+01	9.35E-01	7.92E+03	b
VOLATILES	Chloromethane	1.44E+00	6.00E+00	1.20E-01	7.25E+03	b
VOLATILES	cis-1,2-Dichloroethene	1.87E-01	2.88E+01	5.77E-01	4.93E+03	b
VOLATILES	cis-1,3-Dichloropropene	9.15E-02	4.47E+01	8.93E-01	2.70E+03	b
VOLATILES	Dibromochloromethane	3.25E-02	6.31E+01	1.26E+00	5.25E+03	b
VOLATILES	Dibromomethane	3.49E-02	1.82E+02	3.64E+00	1.10E+04	b
VOLATILES	Dichlorodifluoromethane	1.67E+01	1.29E+02	2.58E+00	2.80E+02	b
VOLATILES	Ethylbenzene	3.28E-01	2.04E+02	4.08E+00	1.69E+02	b
VOLATILES	Isopropylbenzene	6.07E-01	3.47E+03	6.93E+01	5.00E+01	b
VOLATILES	m,p-Xylenes	3.18E-01	3.09E+02	6.18E+00	1.85E+02	b
VOLATILES	Methyl isobutyl ketone	5.82E-03	1.50E+01	3.00E-01	1.90E+04	b
VOLATILES	Methylene chloride	9.10E-02	1.17E+01	2.35E-01	1.54E+04	b
VOLATILES	n-BUTYLBENZENE	5.57E-01	3.02E+03	6.04E+01	1.08E+01	b
VOLATILES	n-PROPYLBENZENE	4.24E-01	1.07E+03	2.14E+01	4.20E+01	b
VOLATILES	p-ISOPROPYLTOLUENE	4.66E-01	2.29E+03	4.58E+01	1.71E+01	b
VOLATILES	sec-BUTYLBENZENE	5.07E-01	2.09E+03	4.18E+01	1.81E+01	b
VOLATILES	Styrene	1.14E-01	7.59E+02	1.52E+01	3.10E+02	b
VOLATILES	tert-BUTYLBENZENE	8.56E-01	2.45E+03	4.91E+01	1.51E+01	b
VOLATILES	Tetrachloroethene	7.65E-01	1.55E+02	3.10E+00	2.00E+02	b

Table A7-4

Physical Chemical Properties of Chemicals of Concern [a]
Sump 118 at Building 813 Southwest of LHAAP-29

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
VOLATILES	Toluene	2.76E-01	1.40E+02	2.80E+00	5.30E+02	b
VOLATILES	trans-1,2-Dichloroethene	3.90E-01	5.01E+01	1.00E+00	6.30E+03	b
VOLATILES	trans-1,3-Dichloropropene	9.15E-02	4.47E+01	8.93E-01	2.80E+03	b
VOLATILES	Trichloroethene	4.28E-01	9.33E+01	1.87E+00	1.10E+03	b
VOLATILES	Trichlorofluoromethane	4.03E+00	1.35E+02	2.70E+00	1.10E+03	b
VOLATILES	Vinyl acetate	2.29E-02	5.25E+00	1.05E-01	2.00E+04	b
VOLATILES	Vinyl chloride	3.49E+00	1.10E+01	2.19E-01	2.76E+03	b
VOLATILES	Xylenes, Total	2.93E-01	2.40E+02	4.80E+00	1.98E+02	b

Notes:

Chemicals of Concern shown in Table A7-1.

pH value of 6.5 averaged from pH Values on Table A7-3.

a Annual TCEQ update of chemical/physical properties table [(Figure: 30 TAC §350.73(e)], April 2008.

b Kd value calculated by formula Koc * foc for non-metals.

c pH-dependent Kd value obtained from Figure 30TAC§350.73(e)(1)(A), April 2008.

d pH-dependent Kd value obtained from Figure 30TAC§350.73(e)(1)(C), April 2008.

e pH-dependent Koc value obtained from 30 TAC §350.73(e)(1)(B), April 2008.

mg/L - milligrams per liter

Table A7-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 118 at Building 813 Southwest of LHAAP-29

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
EXPLOSIVES	1,3,5-Trinitrobenzene	2.87E-06	2.83E-01	3.53E+02	2.71E+00	1.3E+02	3.1E+00	2.1E+01	none	**2.1E+01**
EXPLOSIVES	1,3-Dinitrobenzene	4.57E-06	6.00E-01	5.40E+02	1.46E+00	3.7E+02	1.0E-02	1.3E-01	none	**1.3E-01**
EXPLOSIVES	2,4,6-Trinitrotoluene	1.90E-05	6.04E+00	1.30E+02	1.63E-01	8.0E+02	5.1E-02	5.7E+00	none	**5.7E+00**
EXPLOSIVES	2,4-Dinitrotoluene	3.60E-05	1.03E+00	2.85E+02	8.99E-01	3.2E+02	4.2E-04	8.5E-03	none	**8.5E-03**
EXPLOSIVES	2,6-Dinitrotoluene	3.11E-05	8.34E-01	1.82E+02	1.09E+00	1.7E+02	4.2E-04	7.0E-03	none	**7.0E-03**
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	1.19E-07	1.12E+01	1.73E+01	8.82E-02	2.0E+02	1.7E-02	3.5E+00	none	**3.5E+00**
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	1.74E-07	7.26E+00	3.64E+01	1.36E-01	2.7E+02	1.7E-02	2.3E+00	none	**2.3E+00**
EXPLOSIVES	HMX	2.50E-14	7.96E-04	2.37E+03	1.14E+01	2.1E+02	5.1E+00	8.1E+00	none	**8.1E+00**
EXPLOSIVES	m-Nitrotoluene	2.24E-03	2.81E+00	4.98E+02	3.45E-01	1.4E+03	1.0E+00	5.4E+01	none	**5.4E+01**
EXPLOSIVES	o-Nitrotoluene	1.87E-03	2.81E+00	6.00E+02	3.45E-01	1.7E+03	1.0E+00	5.4E+01	none	**5.4E+01**
EXPLOSIVES	p-Nitrotoluene	2.29E-03	2.81E+00	4.00E+02	3.45E-01	1.2E+03	1.0E+00	5.4E+01	none	**5.4E+01**
EXPLOSIVES	RDX	4.99E-04	1.26E+00	3.87E+01	7.41E-01	5.2E+01	2.6E-02	6.4E-01	none	**6.4E-01**
EXPLOSIVES	Tetryl	8.31E-11	4.69E+00	7.50E+01	2.09E-01	3.6E+02	1.0E+00	8.8E+01	none	**8.8E+01**
METALS	Aluminum	0.00E+00	3.53E+04	0.00E+00	2.83E-05	NA	1.0E+02	6.5E+07	1.63E+04	**6.5E+07**
METALS	Antimony	0.00E+00	4.50E+01	0.00E+00	2.22E-02	NA	6.0E-03	4.9E+00	9.40E-01	**4.9E+00**
METALS	Arsenic	0.00E+00	2.80E+01	0.00E+00	3.56E-02	NA	1.0E-02	5.1E+00	4.81E+00	**5.1E+00**
METALS	Barium	0.00E+00	3.70E+01	0.00E+00	2.70E-02	NA	2.0E+00	1.3E+03	8.55E+01	**1.3E+03**
METALS	Cadmium	0.00E+00	5.20E+01	0.00E+00	1.92E-02	NA	5.0E-03	4.7E+00	4.00E-01	**4.7E+00**
METALS	Chromium	0.00E+00	9.90E+05	0.00E+00	1.01E-06	NA	1.0E-01	1.8E+06	2.66E+01	**1.8E+06**
METALS	Cobalt	0.00E+00	4.50E+01	0.00E+00	2.22E-02	NA	6.1E+00	5.0E+03	5.61E+00	**5.0E+03**
METALS	Copper	0.00E+00	4.00E+01	0.00E+00	2.49E-02	NA	1.3E+00	9.4E+02	5.55E+00	**9.4E+02**
METALS	Lead	0.00E+00	1.83E+03	0.00E+00	5.46E-04	NA	1.5E-02	5.0E+02	1.14E+01	**5.0E+02**
METALS	Manganese	0.00E+00	5.01E+01	0.00E+00	1.99E-02	NA	1.4E+01	1.3E+04	2.01E+02	**1.3E+04**
METALS	Mercury	4.74E-01	2.20E+01	3.00E-02	4.51E-02	6.7E-01	2.0E-03	8.0E-01	8.19E-02	**6.7E-01**
METALS	Selenium	0.00E+00	6.10E+00	0.00E+00	1.62E-01	NA	5.0E-02	5.6E+00	3.48E+00	**5.6E+00**
METALS	Silver	0.00E+00	4.20E+00	0.00E+00	2.33E-01	NA	5.1E-01	4.0E+01	3.10E-01	**4.0E+01**
METALS	Strontium	0.00E+00	2.00E+00	0.00E+00	4.79E-01	NA	6.1E+01	2.3E+03	1.98E+01	**2.3E+03**
METALS	Zinc	0.00E+00	5.10E+01	0.00E+00	1.96E-02	NA	3.1E+01	2.8E+04	2.02E+01	**2.8E+04**
SEMIVOLATILES	1,2,4-Trichlorobenzene	5.90E-02	3.32E+01	4.88E+01	3.00E-02	1.6E+03	7.0E-02	4.2E+01	none	**4.2E+01**
SEMIVOLATILES	1,2-Dichlorobenzene	8.73E-02	1.38E+01	1.50E+02	7.17E-02	2.1E+03	6.0E-01	1.5E+02	none	**1.5E+02**
SEMIVOLATILES	1,3-Dichlorobenzene	1.95E-01	3.40E+00	1.10E+02	2.84E-01	3.9E+02	3.1E+00	2.0E+02	none	**2.0E+02**
SEMIVOLATILES	1,4-Dichlorobenzene	1.17E-01	1.29E+01	7.38E+01	7.68E-02	9.6E+02	7.5E-02	1.8E+01	none	**1.8E+01**
SEMIVOLATILES	2,4,5-Trichlorophenol	1.78E-04	3.82E+01	1.20E+03	2.61E-02	4.6E+04	1.0E+01	7.1E+03	none	**7.1E+03**
SEMIVOLATILES	2,4,6-Trichlorophenol	3.19E-04	1.07E+01	9.82E+02	9.31E-02	1.1E+04	2.6E-02	5.1E+00	none	**5.1E+00**
SEMIVOLATILES	2,4-Dichlorophenol	1.31E-04	3.06E+00	4.50E+03	3.18E-01	1.4E+04	3.1E-01	1.7E+01	none	**1.7E+01**
SEMIVOLATILES	2,4-Dimethylphenol	8.31E-05	2.35E+00	6.20E+03	4.10E-01	1.5E+04	2.0E+00	9.0E+01	none	**9.0E+01**
SEMIVOLATILES	2,4-Dinitrophenol	2.01E-07	2.10E-04	5.80E+03	1.15E+01	5.0E+02	2.0E-01	3.2E-01	none	**3.2E-01**

Table A7-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 118 at Building 813 Southwest of LHAAP-29

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
SEMIVOLATILES	2-Chloronaphthalene	2.54E-02	1.70E+02	6.74E+00	5.87E-03	1.1E+03	8.2E+00	2.5E+04	none	**1.1E+03**
SEMIVOLATILES	2-Chlorophenol	7.40E-04	7.86E+00	2.80E+04	1.26E-01	2.2E+05	5.1E-01	7.4E+01	none	**7.4E+01**
SEMIVOLATILES	2-Methylnaphthalene	1.85E-02	8.63E+01	2.54E+01	1.16E-02	2.2E+03	4.1E-01	6.4E+02	none	**6.4E+02**
SEMIVOLATILES	2-Methylphenol	6.65E-05	1.95E+00	2.04E+04	4.90E-01	4.2E+04	5.1E+00	1.9E+02	none	**1.9E+02**
SEMIVOLATILES	2-Nitroaniline	2.08E-05	5.38E-01	1.26E+03	1.60E+00	7.9E+02	3.1E-02	3.5E-01	none	**3.5E-01**
SEMIVOLATILES	2-Nitrophenol	2.21E-05	3.18E+00	1.73E+04	3.06E-01	5.7E+04	2.0E-01	1.2E+01	none	**1.2E+01**
SEMIVOLATILES	3,3'-Dichlorobenzidine	8.65E-07	1.45E+01	3.11E+00	6.86E-02	4.5E+01	6.4E-04	1.7E-01	none	**1.7E-01**
SEMIVOLATILES	3-Nitroaniline	2.31E-07	7.88E-01	4.56E+02	1.14E+00	4.0E+02	3.1E-02	4.9E-01	none	**4.9E-01**
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	1.07E-07	6.32E-04	3.00E+03	1.15E+01	2.6E+02	2.0E-01	3.2E-01	none	**3.2E-01**
SEMIVOLATILES	4-Bromophenyl phenyl ether	9.66E-03	2.90E+03	8.25E-01	3.44E-04	2.4E+03	1.9E-04	1.0E+01	none	**1.0E+01**
SEMIVOLATILES	4-Chloro-3-methylphenol	1.40E-05	1.76E+01	5.43E+03	5.66E-02	9.6E+04	5.1E-01	1.6E+02	none	**1.6E+02**
SEMIVOLATILES	4-Chloroaniline	4.86E-05	1.32E+00	3.90E+03	7.10E-01	5.5E+03	4.1E-01	1.0E+01	none	**1.0E+01**
SEMIVOLATILES	4-Chlorophenyl phenyl ether	1.30E-02	2.62E+02	1.43E+00	3.82E-03	3.8E+02	1.9E-04	9.1E-01	none	**9.1E-01**
SEMIVOLATILES	4-Methylphenol	3.99E-05	1.63E+00	2.30E+04	5.84E-01	3.9E+04	5.1E-01	1.6E+01	none	**1.6E+01**
SEMIVOLATILES	4-Nitroaniline	3.33E-08	2.25E-01	6.49E+02	3.21E+00	2.0E+02	7.5E-02	4.3E-01	none	**4.3E-01**
SEMIVOLATILES	4-Nitrophenol	3.24E-08	6.80E-01	4.49E+03	1.30E+00	3.4E+03	2.0E-01	2.8E+00	none	**2.8E+00**
SEMIVOLATILES	Acenaphthene	6.44E-03	7.96E+01	4.24E+00	1.25E-02	3.4E+02	6.1E+00	8.9E+03	none	**3.4E+02**
SEMIVOLATILES	Acenaphthylene	4.74E-03	1.38E+02	3.93E+00	7.22E-03	5.4E+02	6.1E+00	1.5E+04	none	**5.4E+02**
SEMIVOLATILES	Anthracene	4.61E-03	4.69E+02	4.34E-02	2.13E-03	2.0E+01	3.1E+01	2.6E+05	none	**2.0E+01**
SEMIVOLATILES	Benzo(a)anthracene	1.39E-04	7.10E+03	1.00E-02	1.41E-04	7.1E+01	3.9E-04	5.0E+01	1.53E-02	**5.0E+01**
SEMIVOLATILES	Benzo(a)pyrene	4.70E-05	1.91E+04	1.62E-03	5.24E-05	3.1E+01	2.0E-04	6.9E+01	1.54E-02	**3.1E+01**
SEMIVOLATILES	Benzo(b)fluoranthene	4.99E-04	2.40E+04	1.50E-03	4.16E-05	3.6E+01	3.9E-04	1.7E+02	1.53E-02	**3.6E+01**
SEMIVOLATILES	Benzo(ghi)perylene	5.82E-06	3.17E+04	2.60E-04	3.15E-05	8.2E+00	3.1E+00	1.8E+06	1.23E-02	**8.2E+00**
SEMIVOLATILES	Benzo(k)fluoranthene	4.45E-07	2.46E+04	5.50E-04	4.06E-05	1.4E+01	3.9E-03	1.7E+03	1.30E-02	**1.4E+01**
SEMIVOLATILES	Benzoic Acid	1.39E-05	1.30E-02	3.50E+03	1.00E+01	3.5E+02	4.1E+02	7.4E+02	none	**3.5E+02**
SEMIVOLATILES	Benzyl Alcohol	1.62E-05	2.40E-01	4.00E+04	3.06E+00	1.3E+04	3.1E+01	1.8E+02	none	**1.8E+02**
SEMIVOLATILES	bis(2-Chloroethoxy)methane	1.25E-03	6.13E+00	1.35E+03	1.61E-01	8.4E+03	2.6E-04	2.9E-02	none	**2.9E-02**
SEMIVOLATILES	bis(2-Chloroethyl)ether	8.90E-04	3.10E-01	1.02E+04	2.52E+00	4.0E+03	2.6E-04	1.9E-03	none	**1.9E-03**
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	4.16E-03	6.32E+00	1.70E+03	1.56E-01	1.1E+04	4.1E-02	4.8E+00	none	**4.8E+00**
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	4.57E-04	1.35E+04	3.00E-01	7.40E-05	4.1E+03	6.0E-03	1.5E+03	none	**1.5E+03**
SEMIVOLATILES	Butyl benzyl phthalate	7.94E-05	2.75E+02	2.90E+00	3.64E-03	8.0E+02	2.0E+01	1.0E+05	none	**8.0E+02**
SEMIVOLATILES	Chrysene	5.03E-05	6.18E+03	2.00E-03	1.62E-04	1.2E+01	3.9E-02	4.4E+03	1.51E-02	**1.2E+01**
SEMIVOLATILES	Dibenzo(a,h)anthracene	4.66E+00	3.81E+04	5.00E-04	2.62E-05	1.9E+01	2.0E-04	1.4E+02	none	**1.9E+01**
SEMIVOLATILES	Dibenzofuran	5.28E-03	1.70E+02	2.86E+00	5.89E-03	4.9E+02	4.1E-01	1.3E+03	none	**4.9E+02**
SEMIVOLATILES	Diethyl phthalate	1.87E-05	3.03E+00	1.08E+03	3.21E-01	3.4E+03	8.2E+01	4.6E+03	none	**3.4E+03**
SEMIVOLATILES	Dimethyl phthalate	2.40E-05	6.32E-01	4.19E+03	1.39E+00	3.0E+03	8.2E+01	1.1E+03	none	**1.1E+03**
SEMIVOLATILES	di-n-Butyl phthalate	5.94E-05	6.78E+02	1.12E+01	1.48E-03	7.6E+03	1.0E+01	1.3E+05	none	**7.6E+03**

Table A7-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 118 at Building 813 Southwest of LHAAP-29

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
SEMIVOLATILES	di-n-Octyl phthalate	2.78E-03	1.66E+06	2.00E-02	6.01E-07	3.3E+04	2.0E+00	6.2E+07	none	**3.3E+04**
SEMIVOLATILES	Fluoranthene	3.88E-04	9.80E+02	2.60E-01	1.02E-03	2.5E+02	4.1E+00	7.3E+04	2.29E-02	**2.5E+02**
SEMIVOLATILES	Fluorene	2.64E-03	1.52E+02	1.98E+00	6.59E-03	3.0E+02	4.1E+00	1.1E+04	none	**3.0E+02**
SEMIVOLATILES	Hexachlorobenzene	2.22E-02	5.64E+02	6.00E-03	1.77E-03	3.4E+00	1.0E-03	1.0E+01	none	**3.4E+00**
SEMIVOLATILES	Hexachlorobutadiene	9.94E-01	1.38E+02	2.55E+00	7.21E-03	3.5E+02	2.0E-02	5.1E+01	none	**5.1E+01**
SEMIVOLATILES	Hexachlorocyclopentadiene	7.15E-01	1.91E+02	1.80E+00	5.23E-03	3.4E+02	5.0E-02	1.7E+02	none	**1.7E+02**
SEMIVOLATILES	Hexachloroethane	1.62E-01	3.64E+01	5.00E+01	2.74E-02	1.8E+03	1.0E-01	6.8E+01	none	**6.8E+01**
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	2.85E+00	6.93E+04	3.75E-03	1.44E-05	2.6E+02	3.9E-04	4.9E+02	1.43E-02	**2.6E+02**
SEMIVOLATILES	Isophorone	2.57E-04	6.04E-01	1.20E+04	1.45E+00	8.3E+03	3.0E+00	3.8E+01	none	**3.8E+01**
SEMIVOLATILES	Naphthalene	2.00E-02	3.10E+01	3.14E+01	3.22E-02	9.8E+02	2.0E+00	1.2E+03	none	**9.8E+02**
SEMIVOLATILES	Nitrobenzene	8.56E-04	2.64E+00	1.90E+03	3.67E-01	5.2E+03	5.1E-02	2.5E+00	none	**2.5E+00**
SEMIVOLATILES	n-Nitroso-di-n-propylamine	9.35E-05	3.94E-01	9.89E+03	2.08E+00	4.8E+03	4.1E-05	3.6E-04	none	**3.6E-04**
SEMIVOLATILES	n-Nitrosodiphenylamine	2.08E-04	6.62E+00	3.51E+01	1.49E-01	2.4E+02	5.8E-02	7.1E+00	none	**7.1E+00**
SEMIVOLATILES	Pentachlorophenol	1.16E-05	1.56E+01	1.40E+01	6.37E-02	2.2E+02	1.0E-03	2.8E-01	none	**2.8E-01**
SEMIVOLATILES	Phenanthrene	5.40E-03	2.83E+02	9.94E-01	3.54E-03	2.8E+02	3.1E+00	1.6E+04	none	**2.8E+02**
SEMIVOLATILES	Phenol	2.47E-05	3.48E-01	8.70E+04	2.30E+00	3.8E+04	3.1E+01	2.4E+02	none	**2.4E+02**
SEMIVOLATILES	Pyrene	4.57E-04	7.60E+02	1.35E-01	1.31E-03	1.0E+02	3.1E+00	4.2E+04	1.94E-02	**1.0E+02**
TPH	Carbon Range C12-C28	1.30E-02	3.17E+02	6.50E-01	3.15E-03	2.1E+02	3.1E+00	1.8E+04	none	**2.1E+02**
TPH	CARBON RANGE C28-C35	1.30E-02	3.17E+02	6.50E-01	3.15E-03	2.1E+02	3.1E+00	1.8E+04	none	**2.1E+02**
TPH	Carbon Range C6-C12	4.80E-01	3.17E+01	6.50E+01	3.14E-02	2.1E+03	4.1E+00	2.4E+03	none	**2.1E+03**
VOLATILES	1,1,1,2-Tetrachloroethane	9.98E-02	1.91E+01	1.10E+03	5.21E-02	2.1E+04	1.1E-01	3.8E+01	none	**3.8E+01**
VOLATILES	1,1,1-Trichloroethane	7.15E-01	2.19E+00	1.33E+03	4.13E-01	3.2E+03	2.0E-01	8.8E+00	none	**8.8E+00**
VOLATILES	1,1,2,2-Tetrachloroethane	1.55E-02	1.55E+00	2.97E+03	6.09E-01	4.9E+03	1.4E-02	4.3E-01	none	**4.3E-01**
VOLATILES	1,1,2-Trichloroethane	3.80E-02	1.00E+00	4.42E+03	9.12E-01	4.8E+03	5.0E-03	9.9E-02	none	**9.9E-02**
VOLATILES	1,1-Dichloroethane	2.39E-01	6.32E-01	5.50E+03	1.30E+00	4.2E+03	1.0E+01	1.4E+02	none	**1.4E+02**
VOLATILES	1,1-Dichloroethene	1.06E+00	1.29E+00	2.40E+03	6.29E-01	3.8E+03	7.0E-03	2.0E-01	none	**2.0E-01**
VOLATILES	1,1-Dichloropropene	1.82E+00	4.12E+00	5.44E+02	2.19E-01	2.5E+03	2.9E-03	2.4E-01	none	**2.4E-01**
VOLATILES	1,2,3-Trichlorobenzene	3.80E-02	1.78E+02	1.64E+01	5.61E-03	2.9E+03	3.1E-01	9.9E+02	none	**9.9E+02**
VOLATILES	1,2,3-Trichloropropane	1.58E-02	7.78E+00	1.90E+03	1.27E-01	1.5E+04	4.1E-05	5.8E-03	none	**5.8E-03**
VOLATILES	1,2,4-Trimethylbenzene	1.84E-01	1.87E+01	5.68E+01	5.32E-02	1.1E+03	5.1E+00	1.7E+03	none	**1.1E+03**
VOLATILES	1,2-Dibromo-3-chloropropane	8.31E-03	3.40E+00	1.00E+03	2.87E-01	3.5E+03	2.0E-04	1.3E-02	none	**1.3E-02**
VOLATILES	1,2-Dibromoethane	2.93E-02	1.07E+00	4.32E+03	8.57E-01	5.0E+03	5.0E-05	1.1E-03	none	**1.1E-03**
VOLATILES	1,2-Dichloroethane	5.32E-02	3.48E-01	8.70E+03	2.25E+00	3.9E+03	5.0E-03	4.0E-02	none	**4.0E-02**
VOLATILES	1,2-Dichloroethene	1.87E-01	5.80E-01	4.93E+03	1.42E+00	3.5E+03	7.0E-02	8.9E-01	none	**8.9E-01**
VOLATILES	1,2-Dichloropropane	1.17E-01	1.18E+00	2.80E+03	7.77E-01	3.6E+03	5.0E-03	1.2E-01	none	**1.2E-01**
VOLATILES	1,2-Dimethylbenzene (o-Xylene)	7.36E-04	2.58E+00	1.78E+02	3.75E-01	4.7E+02	1.0E+01	4.8E+02	none	**4.7E+02**
VOLATILES	1,3,5-Trimethylbenzene	2.72E-01	2.05E+01	5.15E+01	4.85E-02	1.1E+03	5.1E+00	1.9E+03	none	**1.1E+03**

Table A7-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 118 at Building 813 Southwest of LHAAP-29

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
VOLATILES	1,3-Dichloropropane	5.52E-02	2.50E+00	2.16E+03	3.85E-01	5.6E+03	2.9E-02	1.3E+00	none	**1.3E+00**
VOLATILES	2,2-Dichloropropane	3.39E-01	3.11E+00	1.68E+03	3.06E-01	5.5E+03	4.2E-02	2.5E+00	none	**2.5E+00**
VOLATILES	2-Butanone	1.94E-03	3.80E-02	2.40E+05	8.00E+00	3.0E+04	6.1E+01	1.4E+02	none	**1.4E+02**
VOLATILES	2-Chloroethyl vinyl ether	3.02E-02	7.43E-01	5.02E+03	1.20E+00	4.2E+03	2.6E-03	3.9E-02	none	**3.9E-02**
VOLATILES	2-Chlorotoluene	1.35E-01	8.15E+00	1.54E+02	1.21E-01	1.3E+03	2.0E+00	3.1E+02	none	**3.1E+02**
VOLATILES	2-Hexanone	3.38E-03	3.58E-01	1.79E+04	2.25E+00	8.0E+03	6.1E+00	5.0E+01	none	**5.0E+01**
VOLATILES	4-Chlorotoluene	1.33E-01	9.93E+00	1.18E+02	9.96E-02	1.2E+03	2.0E+00	3.7E+02	none	**3.7E+02**
VOLATILES	Acetone	1.61E-03	1.14E-02	6.00E+05	1.02E+01	5.9E+04	9.2E+01	1.6E+02	none	**1.6E+02**
VOLATILES	Benzene	2.27E-01	1.32E+00	1.77E+03	6.88E-01	2.6E+03	5.0E-03	1.3E-01	none	**1.3E-01**
VOLATILES	Bromobenzene	8.38E-02	4.84E+00	2.98E+02	2.02E-01	1.5E+03	2.0E+00	1.8E+02	none	**1.8E+02**
VOLATILES	Bromochloromethane	3.69E-02	5.50E-01	2.04E+04	1.55E+00	1.3E+04	4.1E+00	4.8E+01	none	**4.8E+01**
VOLATILES	Bromodichloromethane	1.32E-01	1.10E+00	4.50E+03	8.25E-01	5.5E+03	4.6E-03	1.0E-01	none	**1.0E-01**
VOLATILES	Bromoform	2.56E-02	1.74E+00	3.20E+03	5.45E-01	5.9E+03	3.6E-02	1.2E+00	none	**1.2E+00**
VOLATILES	Bromomethane	5.90E-01	2.09E-01	1.52E+04	2.41E+00	6.3E+03	1.4E-01	1.1E+00	none	**1.1E+00**
VOLATILES	Carbon disulfide	6.13E-01	1.05E+00	2.30E+03	7.94E-01	2.9E+03	1.0E+01	2.3E+02	none	**2.3E+02**
VOLATILES	Carbon tetrachloride	1.20E+00	3.72E+00	8.05E+02	2.47E-01	3.3E+03	5.0E-03	3.7E-01	none	**3.7E-01**
VOLATILES	Chlorobenzene	1.82E-01	4.28E+00	5.02E+02	2.27E-01	2.2E+03	1.0E-01	8.0E+00	none	**8.0E+00**
VOLATILES	Chloroethane	2.12E-01	3.56E-01	2.00E+04	2.06E+00	9.7E+03	4.1E+01	3.6E+02	none	**3.6E+02**
VOLATILES	Chloroform	1.53E-01	9.35E-01	7.92E+03	9.50E-01	8.3E+03	1.0E+00	2.0E+01	none	**2.0E+01**
VOLATILES	Chloromethane	1.44E+00	1.20E-01	7.25E+03	2.02E+00	3.6E+03	2.2E-01	2.0E+00	none	**2.0E+00**
VOLATILES	cis-1,2-Dichloroethene	1.87E-01	5.77E-01	4.93E+03	1.43E+00	3.5E+03	7.0E-02	8.9E-01	none	**8.9E-01**
VOLATILES	cis-1,3-Dichloropropene	9.15E-02	8.93E-01	2.70E+03	1.00E+00	2.7E+03	5.3E-03	9.6E-02	none	**9.6E-02**
VOLATILES	Dibromochloromethane	3.25E-02	1.26E+00	5.25E+03	7.38E-01	7.1E+03	3.4E-02	8.4E-01	none	**8.4E-01**
VOLATILES	Dibromomethane	3.49E-02	3.64E+00	1.10E+04	2.68E-01	4.1E+04	3.8E-01	2.6E+01	none	**2.6E+01**
VOLATILES	Dichlorodifluoromethane	1.67E+01	2.58E+00	2.80E+02	1.67E-01	1.7E+03	2.0E+01	2.2E+03	none	**1.7E+03**
VOLATILES	Ethylbenzene	3.28E-01	4.08E+00	1.69E+02	2.36E-01	7.2E+02	7.0E-01	5.4E+01	none	**5.4E+01**
VOLATILES	Isopropylbenzene	6.07E-01	6.93E+01	5.00E+01	1.44E-02	3.5E+03	1.0E+01	1.3E+04	none	**3.5E+03**
VOLATILES	m,p-Xylenes	3.18E-01	6.18E+00	1.85E+02	1.58E-01	1.2E+03	1.0E+01	1.1E+03	none	**1.1E+03**
VOLATILES	Methyl isobutyl ketone	5.82E-03	3.00E-01	1.90E+04	2.58E+00	7.4E+03	8.2E+00	5.7E+01	none	**5.7E+01**
VOLATILES	Methylene chloride	9.10E-02	2.35E-01	1.54E+04	2.94E+00	5.2E+03	5.0E-03	3.1E-02	none	**3.1E-02**
VOLATILES	n-BUTYLBENZENE	5.57E-01	6.04E+01	1.08E+01	1.65E-02	6.5E+02	4.1E+00	4.5E+03	none	**6.5E+02**
VOLATILES	n-PROPYLBENZENE	4.24E-01	2.14E+01	4.20E+01	4.63E-02	9.1E+02	4.1E+00	1.6E+03	none	**9.1E+02**
VOLATILES	p-ISOPROPYLTOLUENE	4.66E-01	4.58E+01	1.71E+01	2.17E-02	7.9E+02	1.0E+01	8.5E+03	none	**7.9E+02**
VOLATILES	sec-BUTYLBENZENE	5.07E-01	4.18E+01	1.81E+01	2.38E-02	7.6E+02	4.1E+00	3.1E+03	none	**7.6E+02**
VOLATILES	Styrene	1.14E-01	1.52E+01	3.10E+02	6.54E-02	4.7E+03	1.0E-01	2.8E+01	none	**2.8E+01**
VOLATILES	tert-BUTYLBENZENE	8.56E-01	4.91E+01	1.51E+01	2.03E-02	7.4E+02	4.1E+00	3.7E+03	none	**7.4E+02**
VOLATILES	Tetrachloroethene	7.65E-01	3.10E+00	2.00E+02	3.00E-01	6.7E+02	5.0E-03	3.0E-01	none	**3.0E-01**

Table A7-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 118 at Building 813 Southwest of LHAAP-29

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
VOLATILES	Toluene	2.76E-01	2.80E+00	5.30E+02	3.40E-01	1.6E+03	1.0E+00	5.3E+01	none	**5.3E+01**
VOLATILES	trans-1,2-Dichloroethene	3.90E-01	1.00E+00	6.30E+03	8.57E-01	7.4E+03	1.0E-01	2.1E+00	none	**2.1E+00**
VOLATILES	trans-1,3-Dichloropropene	9.15E-02	8.93E-01	2.80E+03	1.00E+00	2.8E+03	2.9E-02	5.2E-01	none	**5.2E-01**
VOLATILES	Trichloroethene	4.28E-01	1.87E+00	1.10E+03	4.90E-01	2.2E+03	5.0E-03	1.8E-01	none	**1.8E-01**
VOLATILES	Trichlorofluoromethane	4.03E+00	2.70E+00	1.10E+03	2.78E-01	4.0E+03	3.1E+01	2.0E+03	none	**2.0E+03**
VOLATILES	Vinyl acetate	2.29E-02	1.05E-01	2.00E+04	5.10E+00	3.9E+03	1.0E+02	3.6E+02	none	**3.6E+02**
VOLATILES	Vinyl chloride	3.49E+00	2.19E-01	2.76E+03	9.96E-01	2.8E+03	2.0E-03	3.6E-02	none	**3.6E-02**
VOLATILES	Xylenes, Total	2.93E-01	4.80E+00	1.98E+02	2.02E-01	9.8E+02	1.0E+01	9.0E+02	none	**9.0E+02**

Notes:

Values of constants shown in Table A7-2.

Values of H', Kd, and S shown in Table A7-4.

GW-Ind - groundwater qualified for industrial use

L/kg - liters per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

MSC - medium specific concentrations

Constants	Values
rb	1.5
qw	0.13
qa	0.30
L1	152
L2	610
W	610
Vgw	213.885
I	30.4
dgw	305
LDF	4.518

Calculated Values:

Ksw = see Equation 8

Csat = see Equation 7

LDF = see Equation 5

Soil MSC = see Equation 6

Applicable Standard 3 Commercial / Industrial MSC equals the lower of the Calculated Soil MSC and Csat values. However, if the Background is larger than both values, the Applicable Standard 3 Commercial / Industrial MSC equals the Background concentration.

Table A7-6
Comparison to Maximum Soil Concentrations
Sump 118 at Building 813 Southwest of LHAAP-29

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
EXPLOSIVES	1,3,5-Trinitrobenzene	**2.1E+01**	-	0.129	All Results < MSC
EXPLOSIVES	1,3-Dinitrobenzene	**1.3E-01**	-	0.129	Never detected, SQL > MSC
EXPLOSIVES	2,4,6-Trinitrotoluene	**5.7E+00**	-	0.129	All Results < MSC
EXPLOSIVES	2,4-Dinitrotoluene	**8.5E-03**	-	0.330	Never detected, SQL > MSC
EXPLOSIVES	2,6-Dinitrotoluene	**7.0E-03**	-	0.330	Never detected, SQL > MSC
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	**3.5E+00**	-	0.129	All Results < MSC
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	**2.3E+00**	-	0.129	All Results < MSC
EXPLOSIVES	HMX	**8.1E+00**	-	0.129	All Results < MSC
EXPLOSIVES	m-Nitrotoluene	**5.4E+01**	-	0.129	All Results < MSC
EXPLOSIVES	o-Nitrotoluene	**5.4E+01**	-	0.129	All Results < MSC
EXPLOSIVES	p-Nitrotoluene	**5.4E+01**	-	0.129	All Results < MSC
EXPLOSIVES	RDX	**6.4E-01**	-	0.129	All Results < MSC
EXPLOSIVES	Tetryl	**8.8E+01**	-	0.258	All Results < MSC
METALS	Aluminum	**6.5E+07**	21700	-	All Results < MSC
METALS	Antimony	**4.9E+00**	4.30	3	All Results < MSC
METALS	Arsenic	**5.1E+00**	3.40	-	All Results < MSC
METALS	Barium	**1.3E+03**	109	-	All Results < MSC
METALS	Cadmium	**4.7E+00**	-	1	All Results < MSC
METALS	Chromium	**1.8E+06**	21.0	-	All Results < MSC
METALS	Cobalt	**5.0E+03**	7.70	-	All Results < MSC
METALS	Copper	**9.4E+02**	8.40	-	All Results < MSC
METALS	Lead	**5.0E+02**	14.9	-	All Results < MSC
METALS	Manganese	**1.3E+04**	358	-	All Results < MSC
METALS	Mercury	**6.7E-01**	-	0.1	All Results < MSC
METALS	Selenium	**5.6E+00**	-	1	All Results < MSC
METALS	Silver	**4.0E+01**	-	1	All Results < MSC
METALS	Strontium	**2.3E+03**	18.3	-	All Results < MSC
METALS	Zinc	**2.8E+04**	25.5	-	All Results < MSC
SEMIVOLATILES	1,2,4-Trichlorobenzene	**4.2E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	1,2-Dichlorobenzene	**1.5E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	1,3-Dichlorobenzene	**2.0E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	1,4-Dichlorobenzene	**1.8E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	2,4,5-Trichlorophenol	**7.1E+03**	-	1.650	All Results < MSC
SEMIVOLATILES	2,4,6-Trichlorophenol	**5.1E+00**	-	0.330	All Results < MSC
SEMIVOLATILES	2,4-Dichlorophenol	**1.7E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	2,4-Dimethylphenol	**9.0E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	2,4-Dinitrophenol	**3.2E-01**	-	1.650	Never detected, SQL > MSC

Table A7-6
Comparison to Maximum Soil Concentrations
Sump 118 at Building 813 Southwest of LHAAP-29

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
SEMIVOLATILES	2-Chloronaphthalene	**1.1E+03**	-	0.330	All Results < MSC
SEMIVOLATILES	2-Chlorophenol	**7.4E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	2-Methylnaphthalene	**6.4E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	2-Methylphenol	**1.9E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	2-Nitroaniline	**3.5E-01**	-	1.650	Never detected, SQL > MSC
SEMIVOLATILES	2-Nitrophenol	**1.2E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	3,3'-Dichlorobenzidine	**1.7E-01**	-	0.650	Never detected, SQL > MSC
SEMIVOLATILES	3-Nitroaniline	**4.9E-01**	-	1.650	Never detected, SQL > MSC
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	**3.2E-01**	-	1.650	Never detected, SQL > MSC
SEMIVOLATILES	4-Bromophenyl phenyl ether	**1.0E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	4-Chloro-3-methylphenol	**1.6E+02**	-	0.650	All Results < MSC
SEMIVOLATILES	4-Chloroaniline	**1.0E+01**	-	0.650	All Results < MSC
SEMIVOLATILES	4-Chlorophenyl phenyl ether	**9.1E-01**	-	0.330	All Results < MSC
SEMIVOLATILES	4-Methylphenol	**1.6E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	4-Nitroaniline	**4.3E-01**	-	1.650	Never detected, SQL > MSC
SEMIVOLATILES	4-Nitrophenol	**2.8E+00**	-	1.650	All Results < MSC
SEMIVOLATILES	Acenaphthene	**3.4E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Acenaphthylene	**5.4E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Anthracene	**2.0E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Benzo(a)anthracene	**5.0E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Benzo(a)pyrene	**3.1E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Benzo(b)fluoranthene	**3.6E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Benzo(ghi)perylene	**8.2E+00**	-	0.330	All Results < MSC
SEMIVOLATILES	Benzo(k)fluoranthene	**1.4E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Benzoic Acid	**3.5E+02**	-	1.650	All Results < MSC
SEMIVOLATILES	Benzyl Alcohol	**1.8E+02**	-	0.650	All Results < MSC
SEMIVOLATILES	bis(2-Chloroethoxy)methane	**2.9E-02**	-	0.330	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Chloroethyl)ether	**1.9E-03**	-	0.330	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	**4.8E+00**	-	0.330	All Results < MSC
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	**1.5E+03**	-	0.330	All Results < MSC
SEMIVOLATILES	Butyl benzyl phthalate	**8.0E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Chrysene	**1.2E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Dibenzo(a,h)anthracene	**1.9E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Dibenzofuran	**4.9E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Diethyl phthalate	**3.4E+03**	-	0.330	All Results < MSC
SEMIVOLATILES	Dimethyl phthalate	**1.1E+03**	-	0.330	All Results < MSC
SEMIVOLATILES	di-n-Butyl phthalate	**7.6E+03**	-	0.330	All Results < MSC

Table A7-6
Comparison to Maximum Soil Concentrations
Sump 118 at Building 813 Southwest of LHAAP-29

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
SEMIVOLATILES	di-n-Octyl phthalate	**3.3E+04**	-	0.330	All Results < MSC
SEMIVOLATILES	Fluoranthene	**2.5E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Fluorene	**3.0E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Hexachlorobenzene	**3.4E+00**	-	0.330	All Results < MSC
SEMIVOLATILES	Hexachlorobutadiene	**5.1E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Hexachlorocyclopentadiene	**1.7E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Hexachloroethane	**6.8E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	**2.6E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Isophorone	**3.8E+01**	-	0.330	All Results < MSC
SEMIVOLATILES	Naphthalene	**9.8E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Nitrobenzene	**2.5E+00**	-	0.330	All Results < MSC
SEMIVOLATILES	n-Nitroso-di-n-propylamine	**3.6E-04**	-	0.330	Never detected, SQL > MSC
SEMIVOLATILES	n-Nitrosodiphenylamine	**7.1E+00**	-	0.330	All Results < MSC
SEMIVOLATILES	Pentachlorophenol	**2.8E-01**	-	1.650	Never detected, SQL > MSC
SEMIVOLATILES	Phenanthrene	**2.8E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Phenol	**2.4E+02**	-	0.330	All Results < MSC
SEMIVOLATILES	Pyrene	**1.0E+02**	-	0.330	All Results < MSC
TPH	Carbon Range C12-C28	**2.1E+02**	-	44.489	All Results < MSC
TPH	CARBON RANGE C28-C35	**2.1E+02**	-	44.489	All Results < MSC
TPH	Carbon Range C6-C12	**2.1E+03**	-	44.489	All Results < MSC
VOLATILES	1,1,1,2-Tetrachloroethane	**3.8E+01**	-	0.0008	All Results < MSC
VOLATILES	1,1,1-Trichloroethane	**8.8E+00**	-	0.0050	All Results < MSC
VOLATILES	1,1,2,2-Tetrachloroethane	**4.3E-01**	-	0.0050	All Results < MSC
VOLATILES	1,1,2-Trichloroethane	**9.9E-02**	-	0.0050	All Results < MSC
VOLATILES	1,1-Dichloroethane	**1.4E+02**	-	0.0050	All Results < MSC
VOLATILES	1,1-Dichloroethene	**2.0E-01**	-	0.0050	All Results < MSC
VOLATILES	1,1-Dichloropropene	**2.4E-01**	-	0.0008	All Results < MSC
VOLATILES	1,2,3-Trichlorobenzene	**9.9E+02**	-	0.0008	All Results < MSC
VOLATILES	1,2,3-Trichloropropane	**5.8E-03**	-	0.0017	All Results < MSC
VOLATILES	1,2,4-Trimethylbenzene	**1.1E+03**	-	0.0008	All Results < MSC
VOLATILES	1,2-Dibromo-3-chloropropane	**1.3E-02**	-	0.0034	All Results < MSC
VOLATILES	1,2-Dibromoethane	**1.1E-03**	-	0.0008	All Results < MSC
VOLATILES	1,2-Dichloroethane	**4.0E-02**	-	0.0050	All Results < MSC
VOLATILES	1,2-Dichloroethene	**8.9E-01**	-	0.0050	All Results < MSC
VOLATILES	1,2-Dichloropropane	**1.2E-01**	-	0.0050	All Results < MSC
VOLATILES	1,2-Dimethylbenzene (o-Xylene	**4.7E+02**	-	0.0008	All Results < MSC
VOLATILES	1,3,5-Trimethylbenzene	**1.1E+03**	-	0.0008	All Results < MSC

Table A7-6
Comparison to Maximum Soil Concentrations
Sump 118 at Building 813 Southwest of LHAAP-29

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
VOLATILES	1,3-Dichloropropane	**1.3E+00**	-	0.0008	All Results < MSC
VOLATILES	2,2-Dichloropropane	**2.5E+00**	-	0.0008	All Results < MSC
VOLATILES	2-Butanone	**1.4E+02**	-	0.0500	All Results < MSC
VOLATILES	2-Chloroethyl vinyl ether	**3.9E-02**	-	0.0100	All Results < MSC
VOLATILES	2-Chlorotoluene	**3.1E+02**	-	0.0008	All Results < MSC
VOLATILES	2-Hexanone	**5.0E+01**	-	0.0500	All Results < MSC
VOLATILES	4-Chlorotoluene	**3.7E+02**	-	0.0008	All Results < MSC
VOLATILES	Acetone	**1.6E+02**	-	0.1000	All Results < MSC
VOLATILES	Benzene	**1.3E-01**	-	0.0050	All Results < MSC
VOLATILES	Bromobenzene	**1.8E+02**	-	0.0008	All Results < MSC
VOLATILES	Bromochloromethane	**4.8E+01**	-	0.0008	All Results < MSC
VOLATILES	Bromodichloromethane	**1.0E-01**	-	0.0050	All Results < MSC
VOLATILES	Bromoform	**1.2E+00**	-	0.0050	All Results < MSC
VOLATILES	Bromomethane	**1.1E+00**	-	0.0100	All Results < MSC
VOLATILES	Carbon disulfide	**2.3E+02**	-	0.0050	All Results < MSC
VOLATILES	Carbon tetrachloride	**3.7E-01**	-	0.0050	All Results < MSC
VOLATILES	Chlorobenzene	**8.0E+00**	-	0.0050	All Results < MSC
VOLATILES	Chloroethane	**3.6E+02**	-	0.0100	All Results < MSC
VOLATILES	Chloroform	**2.0E+01**	-	0.0050	All Results < MSC
VOLATILES	Chloromethane	**2.0E+00**	-	0.0100	All Results < MSC
VOLATILES	cis-1,2-Dichloroethene	**8.9E-01**	-	0.0008	All Results < MSC
VOLATILES	cis-1,3-Dichloropropene	**9.6E-02**	-	0.0050	All Results < MSC
VOLATILES	Dibromochloromethane	**8.4E-01**	-	0.0050	All Results < MSC
VOLATILES	Dibromomethane	**2.6E+01**	-	0.0008	All Results < MSC
VOLATILES	Dichlorodifluoromethane	**1.7E+03**	-	0.0017	All Results < MSC
VOLATILES	Ethylbenzene	**5.4E+01**	-	0.0050	All Results < MSC
VOLATILES	Isopropylbenzene	**3.5E+03**	-	0.0008	All Results < MSC
VOLATILES	m,p-Xylenes	**1.1E+03**	-	0.0008	All Results < MSC
VOLATILES	Methyl isobutyl ketone	**5.7E+01**	-	0.0500	All Results < MSC
VOLATILES	Methylene chloride	**3.1E-02**	-	0.0050	All Results < MSC
VOLATILES	n-BUTYLBENZENE	**6.5E+02**	-	0.0008	All Results < MSC
VOLATILES	n-PROPYLBENZENE	**9.1E+02**	-	0.0008	All Results < MSC
VOLATILES	p-ISOPROPYLTOLUENE	**7.9E+02**	-	0.0008	All Results < MSC
VOLATILES	sec-BUTYLBENZENE	**7.6E+02**	-	0.0008	All Results < MSC
VOLATILES	Styrene	**2.8E+01**	-	0.0050	All Results < MSC
VOLATILES	tert-BUTYLBENZENE	**7.4E+02**	-	0.0008	All Results < MSC
VOLATILES	Tetrachloroethene	**3.0E-01**	-	0.0050	All Results < MSC

Table A7-6
Comparison to Maximum Soil Concentrations
Sump 118 at Building 813 Southwest of LHAAP-29

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
VOLATILES	Toluene	**5.3E+01**	-	0.0050	All Results < MSC
VOLATILES	trans-1,2-Dichloroethene	**2.1E+00**	-	0.0008	All Results < MSC
VOLATILES	trans-1,3-Dichloropropene	**5.2E-01**	-	0.0050	All Results < MSC
VOLATILES	Trichloroethene	**1.8E-01**	-	0.0050	All Results < MSC
VOLATILES	Trichlorofluoromethane	**2.0E+03**	-	0.0017	All Results < MSC
VOLATILES	Vinyl acetate	**3.6E+02**	-	0.0500	All Results < MSC
VOLATILES	Vinyl chloride	**3.6E-02**	-	0.0100	All Results < MSC
VOLATILES	Xylenes, Total	**9.0E+02**	-	0.0050	All Results < MSC

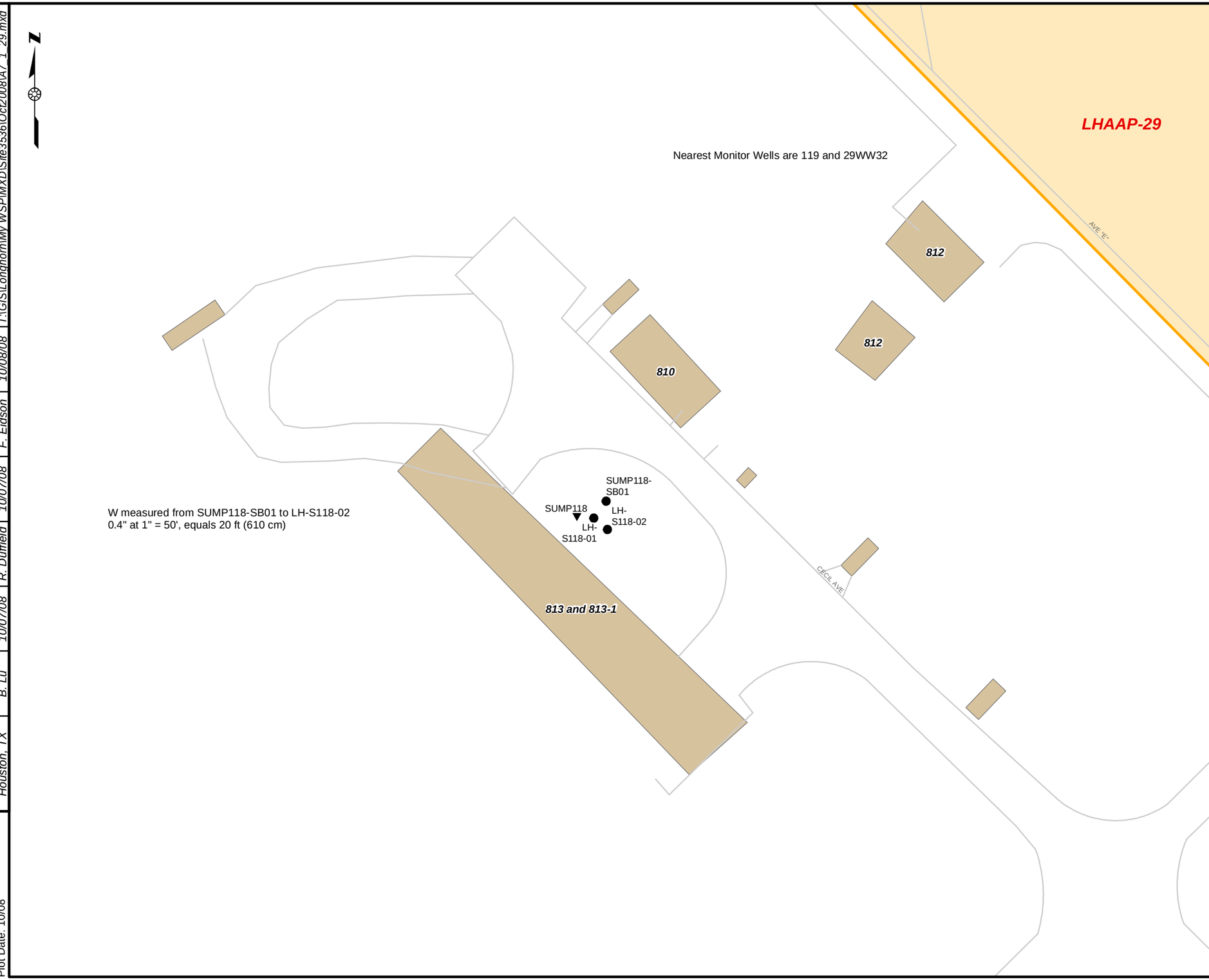
Notes:

Maximum Soil Concentrations shown in Table 9a and Table 9b of the Shaw (2008) Addendum.

mg/kg - milligrams per kilogram

MSC - medium specific concentration

SQL - sample quantitation limit



Legend

- Monitoring Well
- Sumps
- Surface Soil
- Soil Boring
- Stream
- Road
- Former Building or Concrete Slab
- Site

0 25 50 100 Feet

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

FIGURE A7-1

LHAAP-29 SAMPLE LOCATION MAP

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		FILE PATH
Houston, TX	B. Lu	10/07/08	R. Duffield	10/07/08	F. Eidson	10/08/08	T:\GIS\Longhorn\My WSP\MXD\Site3536\Oct2008\A7_1_29.mxd

Plot Date: 10/08

Attachment 8

Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 119 and Sump 120

Attachment 8 – SAM Model Evaluation

Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Sump 119 and Sump 120 at the Longhorn Army Ammunition Plant, Karnack, Texas

Attachment 8 describes development of Medium Specific Concentrations (MSCs) for chemicals in soil that are protective of groundwater for soil associated with Sump 119 and Sump 120. The MSC values were developed according to the Texas Commission on Environmental Quality [TCEQ] Texas Risk Reduction Rules, Title 30 Texas Administrative Code (TAC) Chapter 335 (30 TAC §335 and updates). Groundwater-protective Risk Reduction Standard 3 MSCs were calculated to evaluate the potential for migration of chemicals from soil to groundwater as provided in TCEQ guidance [30 TAC §335.563(i)(2)] by using the SAM model to estimate the potential impacts of soil contamination on groundwater quality.

Sump 119 and Sump 120 were associated with Building 725 at Longhorn Army Ammunition Plant (LHAAP)-59 as shown in **Figure A8-1**. Building 725 was an insecticide storage building that has been demolished. Evaluation of chemicals in soil associated with these 2 sumps was based on data from analysis of 32 soil samples collected from depths ranging from 0 to 7 feet below ground surface (bgs). The samples were analyzed for explosives, herbicides, metals, pesticides, semivolatile organic compounds (SVOCs), and volatile organic compounds (VOCs) (Shaw, 2008). The analytical results were evaluated as reported in **Table 10a** and **Table 10b** of the main body of this Addendum.

The initial step in the SAM Model compared the tested chemicals to available background concentrations and method quantitation limits (MQL) for each chemical. Of the chemicals tested, 4 were not evaluated because they are regarded as essential nutrients (TCEQ, 2001). The evaluation of the remaining chemicals is recorded on **Table A8-1**.

The SAM Model was selected to predict impacts of soil contamination on groundwater quality. The SAM Model is an extension of the Soil Screening Level calculations described in USEPA (1996) guidance and is based on calculating total mass (liquid phase, solid phase, and gas phase) in the soil column:

$$M_T = V(\rho_b C_s + \theta_w C_w + \theta_a C_g)$$

Where

M_T = total mass of chemical
V = volume of the soil column
ρ_b = bulk density
C_s = concentration in soil (dry weight basis)
θ_w = water filled porosity
C_w = concentration in pore water
θ_a = air filled porosity
C_g = gas phase concentration.

Total mass is then redistributed using equilibrium conditions based on the adsorption coefficient and Henry's constant. The equilibrium equations are:

$$C_s = K_d C_w \qquad \text{Equation 1}$$

$$C_g = H' C_w \qquad \text{Equation 2}$$

Where Kd is the distribution coefficient or adsorption coefficient, and H' is the dimensionless Henry's Law constant.

A SAM Model enhancement over USEPA's Soil Screening Levels is that the SAM Model assumes a zone of contaminated soils overlying a zone of clean soil (zero contaminant concentration). The SAM Model simulates mixing of contamination through the contaminated and clean soil zones based on equilibrium conditions and predicts leachate concentration at the bottom of the soil column. In the SAM Model, the leachate concentration is calculated as follows:

$$C_w = C_s \left(\frac{\rho_b}{\theta_w + (K_d \rho_b) + H' \theta_a} \right) \left(\frac{L_1}{L_2} \right) \qquad \text{Equation 3}$$

Or, alternately, the concentration in soil that will produce a given leachate concentration can be calculated as:

$$C_s = C_w \left(\frac{\theta_w + (K_d \rho_b) + H' \theta_a}{\rho_b} \right) \left(\frac{L_2}{L_1} \right) \qquad \text{Equation 4}$$

Where L_1 is the thickness of the contaminated zone and L_2 is the thickness of the total soil column. The factor (L_2/L_1) is an enhancement in the SAM Model over the Soil Screening Level Model by USEPA.
A further dilution factor for leachate mixing with groundwater can be incorporated by using a leachate dilution factor:

$$LDF = 1 + \frac{Kid}{IW} \qquad \text{Equation 5}$$

Where

K = aquifer hydraulic conductivity
i = hydraulic gradient in aquifer
d = groundwater mixing zone depth
I = infiltration rate
W = source length parallel to groundwater flow.

The groundwater protective Standard 3 MSC is the soil concentration (Cs) described by Equation 4 where the groundwater concentration is limited by the TCEQ risk-based drinking water concentration (GW-Ind) modified by the leachate dilution factor (LDF) as follows:

$$\text{Standard 3 } MSC = GW - Ind\left(\frac{\theta_w + (K_d \rho_b) + H'\theta_a}{\rho_b}\right)\left(\frac{L_2}{L_1}\right) x\ LDF \quad \text{Equation 6}$$

The model further calculates the soil saturation concentration (C_{sat}), which corresponds to the contaminant concentration in soil at which the absorptive capacity of soil particles, the solubility limits of soil pore water and saturation of soil pore air have been reached. Concentrations above C_{sat}t are assumed to be in free phase. The C_{sat} concentration is calculated in the SAM Model according to Equation 7.

$$C_{sat} = S\left(\frac{\theta_w + (K_d \rho_b) + H'\theta_a}{\rho_b}\right) \quad \text{Equation 7}$$

For the purpose of simplification, a soil to water coefficient, K_{sw}, can stand in for the complex bracketed formula in Equations 3, 4, 6, and 7.

$$K_{sw} = \left(\frac{\rho_b}{\theta_w + (K_d \rho_b) + (H'\theta_a)}\right) \quad \text{Equation 8}$$

Input parameters to the SAM Model, that are either specific to Sump 119 and Sump 120 at LHAAP-59 or are default TCEQ values, are shown in **Table A8-2**. Because some chemical properties are pH dependent, an average groundwater pH (5.9) was calculated in **Table A8-3**. **Table A8-4** lists the chemical properties (TCEQ, 2008). From these input parameters and properties, the SAM Model first calculates a saturated soil concentration (C_{sat}) using Equation 7.

Then the SAM Model calculates a Standard 3 Commercial/Industrial Soil MSC using Equation 6 by equating C_w to the GW-Ind MSC and calculating what concentration of chemical in the soil at the site (mg/kg) would theoretically leach into the groundwater at the GW-Ind concentration (mg/L). The lower of the C_{sat} and the calculated Soil MSC values is used as the Soil MSC.

Finally, the SAM Model compares the Soil MSC to available background soil concentrations for the chemical. The 95% upper prediction limit (UPL) soil background concentrations from the LHAAP-35/36 Sump Report (Shaw, 2008) were used for this comparison. The larger of the Soil MSC and the background concentration is then selected as the Applicable Standard 3 Commercial/Industrial Soil MSC and put into **Table 10a** and **Table 10b**.

Table A8-5 presents the results of those calculations. The Applicable Standard 3 Commercial/Industrial Soil MSC values are in bold along the right side of the table. While it is possible to select different site parameters for each chemical, for this calculation, general whole site parameters were used as if each chemical were equally and evenly distributed across the entire site. When compared to actual distribution of individual chemical results in individual samples taken near former sump locations, this assumption overestimates the extent of the chemical concentration across the site, resulting in lower concentrations calculated for the MSC values.

Table A8-6 compares the Applicable Standard 3 Commercial/Industrial Soil MSC values to maximum soil concentrations for each chemical in the samples associated with Sump 119 and Sump 120 at LHAAP-59.

Discussion

The SAM Model results for Sump 119 and Sump 120 at LHAAP-59 indicate that maximum concentrations of 3 chemicals (MCPP, arsenic, and heptachlor epoxide) exceed the calculated groundwater protective soil MSC concentrations in detected samples. The SAM Model was recalculated for these 3 chemicals to determine whether chemical-specific input values for L1, L2 and W would result in a changed MSC value. These chemical specific calculations are shown in **Table A8-7**.

Of the 32 samples, 18 were tested for MCPP, and only 1 of 18 contained detectable MCPP, which exceeded the initial Applicable MSC value (4.3E-02 mg/kg in **Table A8-6**). This sample 59SB08-01 was from a depth of 0 to 1 feet bgs. Rerunning the SAM Model specifically for MCPP, with changed values for L1 of 1 foot (30 centimeter [cm]) and W of 32 feet (1000 cm), and an unchanged value for L2 of 23 feet (700 cm) that reflect the location of the MCPP concentration, the SAM Model calculates a chemical-specific Applicable Standard 3 MSC value of 5.1E-01 mg/kg (**Table A8-7**), which is still less than the maximum detected value of 6.13 mg/kg.

Of the 32 samples, 10 were analyzed for arsenic, and all contained detectable arsenic, but only 2 samples LH-S119-01-FD and LH-S120-02.2 contained arsenic above the initial Applicable MSC value (4.8E+00 mg/kg in **Table A8-6**). These samples were from depths of 0.5 to 2 feet bgs and 4 to 5 feet bgs. Rerunning the SAM Model specifically for arsenic, with changed values for L1 of 5 feet (153 cm) and W of 50 feet (1550 cm), and an unchanged value for L2 of 23 feet (700 cm) that reflect the location of the

arsenic concentrations, the SAM Model calculates an unchanged chemical-specific Applicable Standard 3 MSC value of 4.8E+00 mg/kg (**Table A8-7**), the background concentration.

Of the 32 samples analyzed, 22 were tested for heptachlor epoxide, and 12 contained detectable heptachlor epoxide, but only 1 sample contained heptachlor epoxide above the initial Applicable MSC value (1.4E-01 mg/kg, in **Table A8-6**). This sample 59SB02-01 was from a depth of 0 to 1 feet bgs. Rerunning the SAM Model specifically for heptachlor epoxide, with changed values for L1 of 1 foot (30 cm) and W of 32 feet (1000 cm), and an unchanged value for L2 of 23 feet (700 cm) that reflect the location of the heptachlor epoxide concentration, the SAM Model calculates a chemical specific MSC value of 1.7E+00 mg/kg (**Table A8-7**), which is greater than the maximum detected value of 0.174 mg/kg.

Concentrations of the chemical MCPP and arsenic are predicted by the SAM Model to have potential to leach from soil into the groundwater. Groundwater from nearby wells LHSMW03 and LHSMW04 (**Figure A8-1**) was not analyzed for herbicides or pesticides. Arsenic was not found in those wells, or was detected at concentrations lower than the maximum contaminant level (MCL) for arsenic.

Heptachlor epoxide was initially predicted to have potential for leaching, but more specific evaluation yielded an Applicable Standard 3 MSC that is larger than the maximum detected concentrations.

References

Shaw Environmental, Inc. (Shaw), 2008, *Final Data Evaluation Report, Chemical Concentrations in Soil Samples Associated with LHAAP-35/36 Sumps*, January (LHAAP-35/36 Sump Report).

Texas Commission on Environmental Quality (TCEQ), 2001, Interoffice Memorandum from Joseph T. Haney, Jr., (TCEQ) to Camarie Perry, Office or Permitting, Remediation & Registration, *Evaluation of the Potential Health Impacts of Exposure to Iron, Calcium, Magnesium, Potassium, sodium, and Phosphorus through Soil Ingestion*, October.

TCEQ 2008, Annual TCEQ update of chemical/physical properties table [(Figure: 30 TAC §350.73(e)], April.

U.S. Environmental Protection Agency (USEPA), 1996, *Soil Screening Guidance: User's Guide*, Second Edition.

Table A8-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 119 and Sump 120 at LHAAP-59

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	MQL	Calculate MSC ?
EXPLOSIVES	1,3,5-Trinitrobenzene	-	0.210	NE	NE	0.21	0.25	YES
EXPLOSIVES	1,3-Dinitrobenzene	-	0.210	NE	NE	0.21	0.25	YES
EXPLOSIVES	2,4,6-Trinitrotoluene	-	0.210	NE	NE	0.21	0.25	YES
EXPLOSIVES	2,4-Dinitrotoluene	-	0.210	NE	NE	0.21	0.25	YES
EXPLOSIVES	2,6-Dinitrotoluene	-	0.230	NE	NE	0.23	0.26	YES
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	-	0.440	NE	NE	0.44	0.26	YES
EXPLOSIVES	HMX	-	2.000	NE	NE	2	2.2	YES
EXPLOSIVES	m-Nitrotoluene	-	0.890	NE	NE	0.89	0.25	YES
EXPLOSIVES	Nitrobenzene	-	0.230	NE	NE	0.23	0.25	YES
EXPLOSIVES	o-Nitrotoluene	-	0.890	NE	NE	0.89	0.25	YES
EXPLOSIVES	p-Nitrotoluene	-	2.700	NE	NE	2.7	0.25	YES
EXPLOSIVES	RDX	-	0.960	NE	NE	0.96	1	YES
EXPLOSIVES	Tetryl	-	0.660	NE	NE	0.66	0.65	YES
HERBICIDES	2,2-Dichloropropanoic Acid	-	0.552	NE	NE	0.1	0.1	YES
HERBICIDES	2,4,5-T	-	0.022	NE	NE	0.004	0.004	YES
HERBICIDES	2,4,5-TP (Silvex)	-	0.017	NE	NE	0.003	0.003	YES
HERBICIDES	2,4-D	-	0.221	NE	NE	0.04	0.04	YES
HERBICIDES	2,4-DB	-	0.221	NE	NE	0.04	0.04	YES
HERBICIDES	Dicamba	-	0.022	NE	NE	0.004	0.004	YES
HERBICIDES	Dichloroprop	-	0.221	NE	NE	0.04	0.04	YES
HERBICIDES	Dinoseb	-	0.110	NE	NE	0.02	0.02	YES
HERBICIDES	MCPA	-	21.977	NE	NE	4	4	YES
HERBICIDES	MCPP	6.127	21.977	NE	NE	4	4	YES
METALS	Aluminum	22200	-	1.63E+04	2.08E+04	20	20	YES
METALS	Antimony	-	10.0	9.40E-01	1.60E+00	3	0.1	YES
METALS	Arsenic	8.200	-	4.81E+00	5.54E+00	0.3	0.3	YES
METALS	Barium	148	-	1.52E+02	8.55E+01	0.3	0.3	YES
METALS	Cadmium	-	1.00	1.40E+00	4.00E-01	1	0.1	YES
METALS	Calcium	2520	-	NA	NA	NA	NA	No, 1
METALS	Chromium	25.0	-	2.66E+01	3.01E+01	0.4	0.4	YES
METALS	Cobalt	19.000	-	7.23E+00	5.61E+00	0.5	0.5	YES
METALS	Copper	4.10	-	5.55E+00	9.25E+00	0.6	0.6	YES
METALS	Iron	19700	-	NA	NA	NA	NA	No, 1
METALS	Lead	21.3	-	2.26E+01	1.14E+01	5	5	YES
METALS	Magnesium	3330	-	NA	NA	NA	NA	No, 1
METALS	Manganese	1030	-	1.25E+03	2.01E+02	0.2	0.2	YES
METALS	Mercury	-	0.100	8.19E-02	3.60E-01	0.089	0.25	YES
METALS	Potassium	930	-	NA	NA	NA	NA	No, 1
METALS	Selenium	0.340	1.00	3.48E+00	5.57E+00	1	0.2	YES
METALS	Silver	-	1.00	3.10E-01	3.70E-01	1	0.2	YES
METALS	Strontium	15.0	10.0	1.98E+01	2.91E+01	10	0.5	YES
METALS	Thallium	-	49.8	4.70E-01	NE	49.8	0.02	YES
METALS	Zinc	30.0	-	6.16E+01	2.02E+01	2.5	2.5	YES
PESTICIDES	4,4'-DDD	-	0.004	NE	NE	0.00165	0.00165	YES
PESTICIDES	4,4'-DDE	0.002	0.004	3.80E-03	NE	0.00165	0.00165	YES
PESTICIDES	4,4'-DDT	-	0.004	6.40E-03	NE	0.00165	0.00165	YES
PESTICIDES	Aldrin	-	0.004	NE	NE	0.00165	0.00165	YES
PESTICIDES	alpha-BHC	-	0.004	NE	NE	0.00165	0.00165	YES
PESTICIDES	alpha-Chlordane	2.266	0.0005	NE	NE	0.00165	0.00165	YES
PESTICIDES	beta-BHC	-	0.004	NE	NE	0.00165	0.00165	YES
PESTICIDES	delta-BHC	-	0.004	NE	NE	0.00165	0.00165	YES
PESTICIDES	Dieldrin	-	0.004	NE	NE	0.00165	0.00165	YES
PESTICIDES	Endosulfan I	-	0.004	NE	NE	0.00165	0.00165	YES
PESTICIDES	Endosulfan II	-	0.004	NE	NE	0.00165	0.00165	YES
PESTICIDES	Endosulfan Sulfate	-	0.004	NE	NE	0.00165	0.00165	YES
PESTICIDES	Endrin	-	0.004	NE	NE	0.00165	0.00165	YES
PESTICIDES	Endrin aldehyde	-	0.004	NE	NE	0.00165	0.00165	YES
PESTICIDES	Endrin ketone	-	0.004	NE	NE	0.00165	0.00165	YES
PESTICIDES	gamma-BHC (Lindane)	-	0.004	NE	NE	0.00165	0.00165	YES
PESTICIDES	gamma-CHLORDANE	2.610	0.0005	NE	NE	0.00165	0.00165	YES
PESTICIDES	Heptachlor	0.011	0.002	NE	NE	0.00165	0.00165	YES

Table A8-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 119 and Sump 120 at LHAAP-59

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	MQL	Calculate MSC ?
PESTICIDES	Heptachlor epoxide	0.174	0.002	NE	NE	0.00165	0.00165	YES
PESTICIDES	METHOXYCHLOR	-	0.004	NE	NE	0.00165	0.00165	YES
PESTICIDES	Toxaphene	-	0.184	NE	NE	0.033	0.033	YES
SEMIVOLATILES	1,2,4-Trichlorobenzene	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	1,2-Dichlorobenzene	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	1,3-Dichlorobenzene	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	1,4-Dichlorobenzene	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2,4,5-Trichlorophenol	-	2.000	NE	NE	1.65	0.165	YES
SEMIVOLATILES	2,4,6-Trichlorophenol	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2,4-Dichlorophenol	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2,4-Dimethylphenol	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2,4-Dinitrophenol	-	2.000	NE	NE	1.65	0.825	YES
SEMIVOLATILES	2,4-Dinitrotoluene	-	0.400	NE	NE	0.33	0.25	No, 2
SEMIVOLATILES	2,6-Dinitrotoluene	-	0.400	NE	NE	0.33	0.26	No, 2
SEMIVOLATILES	2-Chloronaphthalene	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2-Chlorophenol	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2-Methylnaphthalene	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2-Methylphenol	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	2-Nitroaniline	-	2.000	NE	NE	1.65	0.825	YES
SEMIVOLATILES	2-Nitrophenol	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	3,3'-Dichlorobenzidine	-	0.800	NE	NE	0.65	0.33	YES
SEMIVOLATILES	3-Nitroaniline	-	2.000	NE	NE	1.65	0.825	YES
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	-	2.000	NE	NE	1.65	0.825	YES
SEMIVOLATILES	4-Bromophenyl phenyl ether	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	4-Chloro-3-methylphenol	-	0.650	NE	NE	0.4	0.165	YES
SEMIVOLATILES	4-Chloroaniline	-	0.650	NE	NE	0.4	0.165	YES
SEMIVOLATILES	4-Chlorophenyl phenyl ether	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	4-Methylphenol	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	4-Nitroaniline	-	2.000	NE	NE	1.65	0.825	YES
SEMIVOLATILES	4-Nitrophenol	-	2.000	NE	NE	1.65	0.825	YES
SEMIVOLATILES	Acenaphthene	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Acenaphthylene	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Anthracene	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Benzo(a)anthracene	-	0.400	1.53E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Benzo(a)pyrene	-	0.400	1.54E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Benzo(b)fluoranthene	-	0.400	1.53E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Benzo(ghi)perylene	-	0.400	1.23E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Benzo(k)fluoranthene	-	0.400	1.30E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Benzoic Acid	-	2.000	NE	NE	1.65	0.825	YES
SEMIVOLATILES	Benzyl Alcohol	-	0.650	NE	NE	0.4	0.165	YES
SEMIVOLATILES	bis(2-Chloroethoxy)methane	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	bis(2-Chloroethyl)ether	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	0.380	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Butyl benzyl phthalate	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Chrysene	-	0.400	1.51E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Dibenzo(a,h)anthracene	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Dibenzofuran	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Diethyl phthalate	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Dimethyl phthalate	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	di-n-Butyl phthalate	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	di-n-Octyl phthalate	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Fluoranthene	-	0.400	2.29E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Fluorene	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Hexachlorobenzene	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Hexachlorobutadiene	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Hexachlorocyclopentadiene	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Hexachloroethane	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	-	0.400	1.43E-02	NE	0.33	0.165	YES
SEMIVOLATILES	Isophorone	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Naphthalene	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Nitrobenzene	-	0.400	NE	NE	0.33	0.25	No, 2

Table A8-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 119 and Sump 120 at LHAAP-59

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	MQL	Calculate MSC ?
SEMIVOLATILES	n-Nitroso-di-n-propylamine	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	n-Nitrosodiphenylamine	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Pentachlorophenol	0.003	2.000	NE	NE	1.65	0.825	YES
SEMIVOLATILES	Phenanthrene	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Phenol	-	0.400	NE	NE	0.33	0.165	YES
SEMIVOLATILES	Pyrene	-	0.400	1.94E-02	NE	0.33	0.165	YES
VOLATILES	1,1,1,2-Tetrachloroethane	-	0.012	NE	NE	0.012	0.005	YES
VOLATILES	1,1,1-Trichloroethane	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	1,1,2,2-Tetrachloroethane	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	1,1,2-Trichloroethane	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	1,1-Dichloroethane	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	1,1-Dichloroethene	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	1,2,3-Trichloropropane	-	0.012	NE	NE	0.012	0.005	YES
VOLATILES	1,2-Dibromo-3-chloropropane	-	0.024	NE	NE	0.024	0.005	YES
VOLATILES	1,2-Dibromoethane	-	0.024	NE	NE	0.024	0.005	YES
VOLATILES	1,2-Dichloroethane	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	1,2-Dichloroethene	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	1,2-Dichloropropane	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	2-Butanone	-	0.050	NE	NE	0.012	0.01	YES
VOLATILES	2-Chloroethyl vinyl ether	-	0.012	NE	NE	0.01	0.01	YES
VOLATILES	2-Hexanone	-	0.050	NE	NE	0.012	0.01	YES
VOLATILES	2-Propenal	-	0.600	NE	NE	0.6	0.005	YES
VOLATILES	Acetone	-	0.100	NE	NE	0.012	0.01	YES
VOLATILES	Acetonitrile	-	0.120	NE	NE	0.12	0.005	YES
VOLATILES	Acrylonitrile	-	0.120	NE	NE	0.12	0.005	YES
VOLATILES	Allyl chloride	-	0.012	NE	NE	0.012	0.005	YES
VOLATILES	Benzene	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	Bromodichloromethane	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	Bromoform	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	Bromomethane	-	0.012	NE	NE	0.01	0.01	YES
VOLATILES	Carbon disulfide	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	Carbon tetrachloride	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	Chlorobenzene	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	Chloroethane	-	0.012	NE	NE	0.01	0.01	YES
VOLATILES	Chloroform	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	Chloromethane	-	0.012	NE	NE	0.01	0.01	YES
VOLATILES	Chloroprene	-	0.120	NE	NE	0.12	0.005	YES
VOLATILES	cis-1,3-Dichloropropene	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	Dibromochloromethane	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	Dibromomethane	-	0.024	NE	NE	0.024	0.005	YES
VOLATILES	Dichlorodifluoromethane	-	0.024	NE	NE	0.024	0.01	YES
VOLATILES	Ethyl methacrylate	-	0.024	NE	NE	0.024	0.005	YES
VOLATILES	Ethylbenzene	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	IODOMETHANE	-	0.012	NE	NE	0.012	0.005	YES
VOLATILES	ISOBUTYL ALCOHOL	-	2.400	NE	NE	2.4	0.005	YES
VOLATILES	Methacrylonitrile	-	0.024	NE	NE	0.024	0.005	YES
VOLATILES	Methyl isobutyl ketone	-	0.050	NE	NE	0.012	0.01	YES
VOLATILES	METHYL METHACRYLATE	-	0.024	NE	NE	0.024	0.005	YES
VOLATILES	Methylene chloride	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	Pentachloroethane	-	0.024	NE	NE	0.024	0.005	YES
VOLATILES	Propionitrile	-	0.060	NE	NE	0.06	0.005	YES
VOLATILES	Styrene	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	Tetrachloroethene	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	Toluene	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	trans-1,3-Dichloropropene	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	trans-1,4-Dichloro-2-butene	-	0.024	NE	NE	0.024	0.005	YES
VOLATILES	Trichloroethene	-	0.006	NE	NE	0.005	0.005	YES
VOLATILES	Trichlorofluoromethane	-	0.012	NE	NE	0.012	0.01	YES
VOLATILES	Vinyl acetate	-	0.050	NE	NE	0.012	0.01	YES
VOLATILES	Vinyl chloride	-	0.012	NE	NE	0.01	0.01	YES
VOLATILES	Xylenes, Total	-	0.006	NE	NE	0.005	0.005	YES

Table A8-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Sump 119 and Sump 120 at LHAAP-59

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	PQL	MQL	Calculate MSC ?

Notes:

all concentrations in milligrams per kilogram (mg/kg)

Max Detected and Max SQL values taken from Table 10a and Table 10b of the main body of the Addendum.

NE - Not evaluated, background was only evaluated for metals and select other analytes.

SQL - sample quantitation limit.

MQL - method quantitation limit (for recent samples).

MSC - medium specific concentration.

PQL - practical quantitation limit (for older samples).

Rules for Analyte Selection

1. Chemicals that are essential nutrients (Fe, Ca, Mg, K, Na, P), TCEQ (2001).
2. Same chemical is analyzed as an explosive, only one MSC value is calculated.

Table A8-2
Input Values for Parameters used to Calculate Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 119 and Sump 120 at LHAAP-59

Parameter		Value	Units	Comment	Reference
Soil Dry Bulk Density	ρ_b	1.5	g/cm^3	Typical value	USEPA, 1996, pg. 38.
Particle Density	$\rho_{particle}$	2.65	g/cm^3	TCEQ default value	30 TAC §350.75 (c) and (d)
Total Porosity	n	0.43	unitless	n = 1-(ρb/ρparticle) = 1-(1.5 g/cc/2.65 g/cc)	USEPA, 1996, pg. 38.
Volumetric Water Content of Soil	θ_w	0.13	unitless	Assumed 30%	USEPA, 1996, pg. 38.
Soil Fraction Organic Carbon	f_{oc}	0.02	unitless	TCEQ default value	30 TAC §335.567. Appendix I. (p. 26)
Net Infiltration Rate through soil	I	30.4	cm/yr	I = 0.0018 x P x P P - precipitation for Marshall Texas 130	TCEQ, 2000
Thickness of affected soil	L_1	213	cm	Samples taken at various depths from 0 down to 7 ft. Assumed 7 ft. (213 cm)	Table 10a and Table 10b, main body of Addendum
Distance from top of affected soils to top of water bearing unit.	L_2	700	cm	top of shallowest sand layer at LHSMW04, the closest well with identifiable GW zone 23.8 ft (~700 cm)	Jacobs, 2002, Apx A
Groundwater Darcy Velocity	V_{gw}	144.24	cm/yr	Calculated = K*i*31500000 sec/yr	USEPA, 1996, pg. 42.
Hydraulic conductivity in groundwater bearing unit	K	6.36E-04	cm/sec	Value listed as modeling input	Shaw, 2007, Appendix D, pg. 2-1
Hydraulic gradient in groundwater bearing unit	i	0.0072	unitless	Value listed as modeling input	Shaw, 2007, Appendix D, pg. 2-1
Width of soil source area parallel to groundwater flow direction	W	3,100	cm	Maximum site dimension, 102 ft measured from LH-S119-02 to LHS-SH-02 (~3100 cm)	See Figure A8-1
Groundwater mixing zone	d	305	cm	Most monitor wells in Shallow Zone have 10-ft screens (305 cm)	Jacobs, 2002, Apx A
Soil Air Filled Porosity (θ_a)	θ_a	0.30	unitless	n - θw	USEPA, 1996, pg. 38.
Henry's Law Constant	H'	Chemical specific property	unitless	See Table A8-4	TCEQ, 2008
Organic Carbon Partition Coefficient	K_{oc}	Chemical specific property	unitless	See Table A8-4	TCEQ, 2008
Soil Water Partition Coefficient	K_d	Chemical specific property	unitless	See Table A8-4	TCEQ, 2008

Notes:

Jacobs Engineering Group, Inc., 2002: *Final Remedial Investigation Report, Group 4 Sites, Sites 04, 08, 35A, 35B, 35C, 46, 47, 48, 50, 60,67, Goose Prairie Creek, Volumes 1 and 2: Report, Longhorn Army Ammunition Plant, Karnack, Texas, Oak Ridge, Tennessee, April.*

Shaw Environmental & Infrastructure (Shaw), 2007, *Final Modeling Report, Derivation of Soil and Groundwater Concentrations Protective of Surface Water and Sediment*, February.

Texas Commission on Environmental Quality (TCEQ), *Risk Reduction Rules* , 30 TAC §335.567. Appendix I.

TCEQ, 2000, Tier 2 PCL Equations, March, accessed at http://www.tceq.state.tx.us/assets/public/remediation/trrp/tier2.pdf

TCEQ, 2008: Texas Risk Reduction Program Physical Chemcial Properties Tables, April, accessed at http://www.tceq.state.tx.us/remediation/trrp/trrppcls.html

USEPA, 1996. Soil Screening Guidance: Technical Background Document, USEPA/540/R-95/128018, U. S. Environmental Protection Agency, Office of Emergency and Remedial Response, July.

Table A8-3
Determination of pH
Sump 119 and Sump 120 at LHAAP-59

Well	Date	pH Measurement	Comment
LHSMW04	Sep-04	5.72	
LHSMW05	Sep-04	5.28	
LHSMW06	Sep-04	6.37	
LHSMW07	Sep-04	6.13	
LHSMW01	Sep-04		bailed dry, no sample
35AWW03	Sep-04	5.71	bailed dry
35AWW04	Sep-04	5.85	
LHSMW04	Feb-07	5.80	
LHSMW06	Feb-07	6.25	
LHSMW07	Feb-07	6.46	
LHSMW04	Jan-08	5.67	
Average		5.92	
pH to be used		**5.9**	

Notes:

1. pH data from the groundwater sampling logs, Field Work images on Shaw network.
2. Only the pH readings from shallow wells were averaged.
3. Wells from LHAAP-35A were used - LHAAP-59 has no wells.

Table A8-4

Physical Chemical Properties of Chemicals of Concern [a]
Sump 119 and Sump 120 at LHAAP-59

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
EXPLOSIVES	1,3,5-Trinitrobenzene	2.87E-06	1.41E+01	2.83E-01	3.53E+02	b
EXPLOSIVES	1,3-Dinitrobenzene	4.57E-06	3.00E+01	6.00E-01	5.40E+02	b
EXPLOSIVES	2,4,6-Trinitrotoluene	1.90E-05	3.02E+02	6.04E+00	1.30E+02	b
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	1.74E-07	3.63E+02	7.26E+00	3.64E+01	b
EXPLOSIVES	HMX	2.50E-14	3.98E-02	7.96E-04	2.37E+03	b
EXPLOSIVES	m-Nitrotoluene	2.24E-03	1.41E+02	2.81E+00	4.98E+02	b
EXPLOSIVES	o-Nitrotoluene	1.87E-03	1.41E+02	2.81E+00	6.00E+02	b
EXPLOSIVES	p-Nitrotoluene	2.29E-03	1.41E+02	2.81E+00	4.00E+02	b
EXPLOSIVES	RDX	4.99E-04	6.31E+01	1.26E+00	3.87E+01	b
EXPLOSIVES	Tetryl	8.31E-11	2.34E+02	4.69E+00	7.50E+01	b
HERBICIDES	2,2-Dichloropropanoic Acid	1.46E-05	2.51E+01	5.02E-01	6.98E+04	b
HERBICIDES	2,4,5-T	3.62E-07	5.30E+01	1.06E+00	2.78E+02	b
HERBICIDES	2,4,5-TP (Silvex)	5.45E-07	2.60E+03	5.20E+01	1.40E+02	b
HERBICIDES	2,4-D	5.82E-09	8.91E+02	1.78E+01	8.90E+02	b
HERBICIDES	2,4-DB	3.19E-08	1.88E+00	3.76E-02	7.76E+01	b
HERBICIDES	Dicamba	3.28E-07	2.20E+00	4.40E-02	5.60E+03	b
HERBICIDES	Dichloroprop	9.00E-07	2.86E-02	5.71E-04	2.30E+02	b
HERBICIDES	Dinoseb	2.08E-02	1.20E+03	2.40E+01	5.20E+01	b
HERBICIDES	MCPA	1.18E-07	3.16E-02	6.31E-04	6.50E+02	b
HERBICIDES	MCPP	1.00E-06	1.73E-02	3.47E-04	2.80E+02	b
METALS	Aluminum	0.00E+00	NA	3.53E+04	0.00E+00	c
METALS	Antimony	0.00E+00	NA	6.00E+01	0.00E+00	d
METALS	Arsenic	0.00E+00	NA	2.70E+01	0.00E+00	d
METALS	Barium	0.00E+00	NA	2.80E+01	0.00E+00	d
METALS	Cadmium	0.00E+00	NA	3.50E+01	0.00E+00	d
METALS	Chromium	0.00E+00	NA	1.30E+05	0.00E+00	d
METALS	Cobalt	0.00E+00	NA	4.50E+01	0.00E+00	
METALS	Copper	0.00E+00	NA	4.00E+01	0.00E+00	
METALS	Lead	0.00E+00	NA	1.83E+03	0.00E+00	c
METALS	Manganese	0.00E+00	NA	5.01E+01	0.00E+00	
METALS	Mercury	4.74E-01	NA	2.30E+00	3.00E-02	d
METALS	Selenium	0.00E+00	NA	9.20E+00	0.00E+00	d
METALS	Silver	0.00E+00	NA	1.10E+00	0.00E+00	d
METALS	Strontium	0.00E+00	NA	2.00E+00	0.00E+00	
METALS	Thallium	0.00E+00	NA	5.60E+01	2.90E+03	d
METALS	Zinc	0.00E+00	NA	3.40E+01	0.00E+00	d
PESTICIDES	4,4'-DDD	1.66E-04	8.51E+04	1.70E+03	9.00E-02	b
PESTICIDES	4,4'-DDE	8.73E-04	1.10E+05	2.19E+03	6.50E-02	b
PESTICIDES	4,4'-DDT	2.23E-03	1.37E+05	2.75E+03	3.10E-03	b
PESTICIDES	Aldrin	7.07E-03	4.79E+04	9.57E+02	7.84E-02	b

Table A8-4

Physical Chemical Properties of Chemicals of Concern [a]
Sump 119 and Sump 120 at LHAAP-59

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
PESTICIDES	alpha-BHC	2.82E-04	1.32E+03	2.64E+01	2.00E+00	b
PESTICIDES	alpha-Chlordane	4.11E-03	7.08E+06	1.42E+05	4.64E-02	b
PESTICIDES	beta-BHC	1.44E-05	1.38E+03	2.76E+01	5.42E-01	b
PESTICIDES	delta-BHC	1.77E-04	8.51E+03	1.70E+02	2.59E+00	b
PESTICIDES	Dieldrin	1.11E-04	2.14E+04	4.28E+02	1.95E-01	b
PESTICIDES	Endosulfan I	3.55E-05	1.57E+04	3.14E+02	1.73E+00	b
PESTICIDES	Endosulfan II	3.55E-05	1.57E+04	3.14E+02	1.16E+00	b
PESTICIDES	Endosulfan Sulfate	3.65E-05	7.94E+05	1.59E+04	1.02E-01	b
PESTICIDES	Endrin	4.95E-05	9.33E+03	1.87E+02	2.50E-01	b
PESTICIDES	Endrin aldehyde	1.80E-02	2.14E+06	4.28E+04	1.68E-02	b
PESTICIDES	Endrin ketone	3.66E-05	1.74E+05	3.48E+03	8.60E-01	b
PESTICIDES	gamma-BHC (Lindane)	1.41E-04	1.10E+03	2.19E+01	5.75E+00	b
PESTICIDES	gamma-CHLORDANE	4.11E-03	3.93E+05	7.87E+03	2.28E-02	b
PESTICIDES	Heptachlor	2.44E-02	1.17E+04	2.35E+02	1.80E-01	b
PESTICIDES	Heptachlor epoxide	3.45E-04	7.24E+03	1.45E+02	2.75E-01	b
PESTICIDES	METHOXYCHLOR	6.57E-04	7.76E+04	1.55E+03	4.50E-02	b
PESTICIDES	Toxaphene	1.40E-04	9.58E+04	1.92E+03	7.40E-01	b
SEMIVOLATILES	1,2,4-Trichlorobenzene	5.90E-02	1.66E+03	3.32E+01	4.88E+01	b
SEMIVOLATILES	1,2-Dichlorobenzene	8.73E-02	6.92E+02	1.38E+01	1.50E+02	b
SEMIVOLATILES	1,3-Dichlorobenzene	1.95E-01	1.70E+02	3.40E+00	1.10E+02	b
SEMIVOLATILES	1,4-Dichlorobenzene	1.17E-01	6.46E+02	1.29E+01	7.38E+01	b
SEMIVOLATILES	2,4,5-Trichlorophenol	1.78E-04	2.24E+03	4.48E+01	1.20E+03	b, e
SEMIVOLATILES	2,4,6-Trichlorophenol	3.19E-04	8.39E+02	1.68E+01	9.82E+02	b, e
SEMIVOLATILES	2,4-Dichlorophenol	1.31E-04	1.57E+02	3.14E+00	4.50E+03	b, e
SEMIVOLATILES	2,4-Dimethylphenol	8.31E-05	1.17E+02	2.35E+00	6.20E+03	b
SEMIVOLATILES	2,4-Dinitrophenol	2.01E-07	1.20E-02	2.40E-04	5.80E+03	b, e
SEMIVOLATILES	2,4-Dinitrotoluene	3.60E-05	5.13E+01	1.03E+00	2.85E+02	b
SEMIVOLATILES	2,6-Dinitrotoluene	3.11E-05	4.17E+01	8.34E-01	1.82E+02	b
SEMIVOLATILES	2-Chloronaphthalene	2.54E-02	8.51E+03	1.70E+02	6.74E+00	b
SEMIVOLATILES	2-Chlorophenol	7.40E-04	3.97E+02	7.94E+00	2.80E+04	b, e
SEMIVOLATILES	2-Methylnaphthalene	1.85E-02	4.32E+03	8.63E+01	2.54E+01	b
SEMIVOLATILES	2-Methylphenol	6.65E-05	9.77E+01	1.95E+00	2.04E+04	b
SEMIVOLATILES	2-Nitroaniline	2.08E-05	2.69E+01	5.38E-01	1.26E+03	b
SEMIVOLATILES	2-Nitrophenol	2.21E-05	1.90E+02	3.81E+00	1.73E+04	b, e
SEMIVOLATILES	3,3'-Dichlorobenzidine	8.65E-07	7.24E+02	1.45E+01	3.11E+00	b
SEMIVOLATILES	3-Nitroaniline	2.31E-07	3.94E+01	7.88E-01	4.56E+02	b
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	1.07E-07	3.16E-02	6.32E-04	3.00E+03	b
SEMIVOLATILES	4-Bromophenyl phenyl ether	9.66E-03	1.45E+05	2.90E+03	8.25E-01	b
SEMIVOLATILES	4-Chloro-3-methylphenol	1.40E-05	8.78E+02	1.76E+01	5.43E+03	b
SEMIVOLATILES	4-Chloroaniline	4.86E-05	6.61E+01	1.32E+00	3.90E+03	b

Table A8-4

Physical Chemical Properties of Chemicals of Concern [a]
Sump 119 and Sump 120 at LHAAP-59

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
SEMIVOLATILES	4-Chlorophenyl phenyl ether	1.30E-02	1.31E+04	2.62E+02	1.43E+00	b
SEMIVOLATILES	4-Methylphenol	3.99E-05	8.13E+01	1.63E+00	2.30E+04	b
SEMIVOLATILES	4-Nitroaniline	3.33E-08	1.12E+01	2.25E-01	6.49E+02	b
SEMIVOLATILES	4-Nitrophenol	3.24E-08	4.47E+01	8.95E-01	4.49E+03	b, e
SEMIVOLATILES	Acenaphthene	6.44E-03	3.98E+03	7.96E+01	4.24E+00	b
SEMIVOLATILES	Acenaphthylene	4.74E-03	6.92E+03	1.38E+02	3.93E+00	b
SEMIVOLATILES	Anthracene	4.61E-03	2.34E+04	4.69E+02	4.34E-02	b
SEMIVOLATILES	Benzo(a)anthracene	1.39E-04	3.55E+05	7.10E+03	1.00E-02	b
SEMIVOLATILES	Benzo(a)pyrene	4.70E-05	9.55E+05	1.91E+04	1.62E-03	b
SEMIVOLATILES	Benzo(b)fluoranthene	4.99E-04	1.20E+06	2.40E+04	1.50E-03	b
SEMIVOLATILES	Benzo(ghi)perylene	5.82E-06	1.58E+06	3.17E+04	2.60E-04	b
SEMIVOLATILES	Benzo(k)fluoranthene	4.45E-07	1.23E+06	2.46E+04	5.50E-04	b
SEMIVOLATILES	Benzoic Acid	1.39E-05	1.09E+00	2.18E-02	3.50E+03	b, e
SEMIVOLATILES	Benzyl Alcohol	1.62E-05	1.20E+01	2.40E-01	4.00E+04	b
SEMIVOLATILES	bis(2-Chloroethoxy)methane	1.25E-03	3.07E+02	6.13E+00	1.35E+03	b
SEMIVOLATILES	bis(2-Chloroethyl)ether	8.90E-04	1.55E+01	3.10E-01	1.02E+04	b
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	4.16E-03	3.16E+02	6.32E+00	1.70E+03	b
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	4.57E-04	6.76E+05	1.35E+04	3.00E-01	b
SEMIVOLATILES	Butyl benzyl phthalate	7.94E-05	1.37E+04	2.75E+02	2.90E+00	b
SEMIVOLATILES	Chrysene	5.03E-05	3.09E+05	6.18E+03	2.00E-03	b
SEMIVOLATILES	Dibenzo(a,h)anthracene	4.66E+00	1.91E+06	3.81E+04	5.00E-04	b
SEMIVOLATILES	Dibenzofuran	5.28E-03	8.49E+03	1.70E+02	2.86E+00	b
SEMIVOLATILES	Diethyl phthalate	1.87E-05	1.51E+02	3.03E+00	1.08E+03	b
SEMIVOLATILES	Dimethyl phthalate	2.40E-05	3.16E+01	6.32E-01	4.19E+03	b
SEMIVOLATILES	di-n-Butyl phthalate	5.94E-05	3.39E+04	6.78E+02	1.12E+01	b
SEMIVOLATILES	di-n-Octyl phthalate	2.78E-03	8.32E+07	1.66E+06	2.00E-02	b
SEMIVOLATILES	Fluoranthene	3.88E-04	4.90E+04	9.80E+02	2.60E-01	b
SEMIVOLATILES	Fluorene	2.64E-03	7.59E+03	1.52E+02	1.98E+00	b
SEMIVOLATILES	Hexachlorobenzene	2.22E-02	2.82E+04	5.64E+02	6.00E-03	b
SEMIVOLATILES	Hexachlorobutadiene	9.94E-01	6.92E+03	1.38E+02	2.55E+00	b
SEMIVOLATILES	Hexachlorocyclopentadiene	7.15E-01	9.55E+03	1.91E+02	1.80E+00	b
SEMIVOLATILES	Hexachloroethane	1.62E-01	1.82E+03	3.64E+01	5.00E+01	b
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	2.85E+00	3.47E+06	6.93E+04	3.75E-03	b
SEMIVOLATILES	Isophorone	2.57E-04	3.02E+01	6.04E-01	1.20E+04	b
SEMIVOLATILES	Naphthalene	2.00E-02	1.55E+03	3.10E+01	3.14E+01	b
SEMIVOLATILES	Nitrobenzene	8.56E-04	1.32E+02	2.64E+00	1.90E+03	b
SEMIVOLATILES	n-Nitroso-di-n-propylamine	9.35E-05	1.97E+01	3.94E-01	9.89E+03	b
SEMIVOLATILES	n-Nitrosodiphenylamine	2.08E-04	3.31E+02	6.62E+00	3.51E+01	b
SEMIVOLATILES	Pentachlorophenol	1.16E-05	1.84E+03	3.68E+01	1.40E+01	b, e
SEMIVOLATILES	Phenanthrene	5.40E-03	1.41E+04	2.83E+02	9.94E-01	b

Table A8-4

Physical Chemical Properties of Chemicals of Concern [a]
Sump 119 and Sump 120 at LHAAP-59

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
SEMIVOLATILES	Phenol	2.47E-05	1.74E+01	3.48E-01	8.70E+04	b
SEMIVOLATILES	Pyrene	4.57E-04	3.80E+04	7.60E+02	1.35E-01	b
VOLATILES	1,1,1,2-Tetrachloroethane	9.98E-02	9.55E+02	1.91E+01	1.10E+03	b
VOLATILES	1,1,1-Trichloroethane	7.15E-01	1.10E+02	2.19E+00	1.33E+03	b
VOLATILES	1,1,2,2-Tetrachloroethane	1.55E-02	7.76E+01	1.55E+00	2.97E+03	b
VOLATILES	1,1,2-Trichloroethane	3.80E-02	5.01E+01	1.00E+00	4.42E+03	b
VOLATILES	1,1-Dichloroethane	2.39E-01	3.16E+01	6.32E-01	5.50E+03	b
VOLATILES	1,1-Dichloroethene	1.06E+00	6.46E+01	1.29E+00	2.40E+03	b
VOLATILES	1,2,3-Trichloropropane	1.58E-02	3.89E+02	7.78E+00	1.90E+03	b
VOLATILES	1,2-Dibromo-3-chloropropane	8.31E-03	1.70E+02	3.40E+00	1.00E+03	b
VOLATILES	1,2-Dibromoethane	2.93E-02	5.37E+01	1.07E+00	4.32E+03	b
VOLATILES	1,2-Dichloroethane	5.32E-02	1.74E+01	3.48E-01	8.70E+03	b
VOLATILES	1,2-Dichloroethene	1.87E-01	2.90E+01	5.80E-01	4.93E+03	b
VOLATILES	1,2-Dichloropropane	1.17E-01	5.89E+01	1.18E+00	2.80E+03	b
VOLATILES	2-Butanone	1.94E-03	1.90E+00	3.80E-02	2.40E+05	b
VOLATILES	2-Chloroethyl vinyl ether	3.02E-02	3.72E+01	7.43E-01	5.02E+03	b
VOLATILES	2-Hexanone	3.38E-03	1.79E+01	3.58E-01	1.79E+04	b
VOLATILES	2-Propenal	1.83E-04	5.25E-01	1.05E-02	2.00E+05	b
VOLATILES	Acetone	1.61E-03	5.70E-01	1.14E-02	6.00E+05	b
VOLATILES	Acetonitrile	1.21E-03	4.68E-01	9.35E-03	2.05E+05	b
VOLATILES	Acrylonitrile	4.57E-03	1.10E+00	2.19E-02	7.50E+04	b
VOLATILES	Allyl chloride	4.57E-01	2.69E+01	5.38E-01	3.40E+03	b
VOLATILES	Benzene	2.27E-01	6.61E+01	1.32E+00	1.77E+03	b
VOLATILES	Bromodichloromethane	1.32E-01	5.50E+01	1.10E+00	4.50E+03	b
VOLATILES	Bromoform	2.56E-02	8.71E+01	1.74E+00	3.20E+03	b
VOLATILES	Bromomethane	5.90E-01	1.05E+01	2.09E-01	1.52E+04	b
VOLATILES	Carbon disulfide	6.13E-01	5.25E+01	1.05E+00	2.30E+03	b
VOLATILES	Carbon tetrachloride	1.20E+00	1.86E+02	3.72E+00	8.05E+02	b
VOLATILES	Chlorobenzene	1.82E-01	2.14E+02	4.28E+00	5.02E+02	b
VOLATILES	Chloroethane	2.12E-01	1.78E+01	3.56E-01	2.00E+04	b
VOLATILES	Chloroform	1.53E-01	4.68E+01	9.35E-01	7.92E+03	b
VOLATILES	Chloromethane	1.44E+00	6.00E+00	1.20E-01	7.25E+03	b
VOLATILES	Chloroprene	1.33E+00	1.00E+02	2.00E+00	6.30E+02	b
VOLATILES	cis-1,3-Dichloropropene	9.15E-02	4.47E+01	8.93E-01	2.70E+03	b
VOLATILES	Dibromochloromethane	3.25E-02	6.31E+01	1.26E+00	5.25E+03	b
VOLATILES	Dibromomethane	3.49E-02	1.82E+02	3.64E+00	1.10E+04	b
VOLATILES	Dichlorodifluoromethane	1.67E+01	1.29E+02	2.58E+00	2.80E+02	b
VOLATILES	Ethyl methacrylate	6.65E-03	3.70E+01	7.40E-01	1.90E+04	b
VOLATILES	Ethylbenzene	3.28E-01	2.04E+02	4.08E+00	1.69E+02	b
VOLATILES	IODOMETHANE	2.36E-01	2.02E+01	4.04E-01	1.24E+04	b

Table A8-4

Physical Chemical Properties of Chemicals of Concern [a]
Sump 119 and Sump 120 at LHAAP-59

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
VOLATILES	ISOBUTYL ALCOHOL	4.99E-04	5.62E+00	1.12E-01	9.49E+04	b
VOLATILES	Methacrylonitrile	3.03E-03	3.39E+00	6.78E-02	2.50E+04	b
VOLATILES	Methyl isobutyl ketone	5.82E-03	1.50E+01	3.00E-01	1.90E+04	b
VOLATILES	METHYL METHACRYLATE	1.33E-02	2.30E+01	4.60E-01	1.60E+04	b
VOLATILES	Methylene chloride	9.10E-02	1.17E+01	2.35E-01	1.54E+04	b
VOLATILES	Pentachloroethane	2.15E-02	1.90E+02	3.80E+00	6.19E+02	b
VOLATILES	Propionitrile	1.02E-03	1.64E+00	3.28E-02	9.73E+04	b
VOLATILES	Styrene	1.14E-01	7.59E+02	1.52E+01	3.10E+02	b
VOLATILES	Tetrachloroethene	7.65E-01	1.55E+02	3.10E+00	2.00E+02	b
VOLATILES	Toluene	2.76E-01	1.40E+02	2.80E+00	5.30E+02	b
VOLATILES	trans-1,3-Dichloropropene	9.15E-02	4.47E+01	8.93E-01	2.80E+03	b
VOLATILES	trans-1,4-Dichloro-2-butene	1.35E-02	2.04E+02	4.09E+00	1.27E+03	b
VOLATILES	Trichloroethene	4.28E-01	9.33E+01	1.87E+00	1.10E+03	b
VOLATILES	Trichlorofluoromethane	4.03E+00	1.35E+02	2.70E+00	1.10E+03	b
VOLATILES	Vinyl acetate	2.29E-02	5.25E+00	1.05E-01	2.00E+04	b
VOLATILES	Vinyl chloride	3.49E+00	1.10E+01	2.19E-01	2.76E+03	b
VOLATILES	Xylenes, Total	2.93E-01	2.40E+02	4.80E+00	1.98E+02	b

Notes:

Chemicals of Concern shown in Table A8-1.

pH value of 5.9 averaged from pH Values on Table A8-3.

a Annual TCEQ update of chemical/physical properties table [(Figure: 30 TAC §350.73(e)], April 2008.

b Kd value calculated by formula Koc * foc for non-metals.

c pH-dependent Kd value obtained from Figure 30TAC§350.73(e)(1)(A), April 2008.

d pH-dependent Kd value obtained from Figure 30TAC§350.73(e)(1)(C), April 2008.

e pH-dependent Koc value obtained from 30 TAC §350.73(e)(1)(B), April 2008

mg/L - milligrams per liter

Table A8-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 119 and Sump 120 at LHAAP-59

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
EXPLOSIVES	1,3,5-Trinitrobenzene	2.87E-06	2.83E-01	3.53E+02	2.71E+00	1.3E+02	3.1E+00	5.5E+00	none	**5.5E+00**
EXPLOSIVES	1,3-Dinitrobenzene	4.57E-06	6.00E-01	5.40E+02	1.46E+00	3.7E+02	1.0E-02	3.4E-02	none	**3.4E-02**
EXPLOSIVES	2,4,6-Trinitrotoluene	1.90E-05	6.04E+00	1.30E+02	1.63E-01	8.0E+02	5.1E-02	1.5E+00	none	**1.5E+00**
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	1.74E-07	7.26E+00	3.64E+01	1.36E-01	2.7E+02	1.7E-02	6.0E-01	none	**6.0E-01**
EXPLOSIVES	HMX	2.50E-14	7.96E-04	2.37E+03	1.14E+01	2.1E+02	5.1E+00	2.2E+00	none	**2.2E+00**
EXPLOSIVES	m-Nitrotoluene	2.24E-03	2.81E+00	4.98E+02	3.45E-01	1.4E+03	1.0E+00	1.4E+01	none	**1.4E+01**
EXPLOSIVES	o-Nitrotoluene	1.87E-03	2.81E+00	6.00E+02	3.45E-01	1.7E+03	1.0E+00	1.4E+01	none	**1.4E+01**
EXPLOSIVES	p-Nitrotoluene	2.29E-03	2.81E+00	4.00E+02	3.45E-01	1.2E+03	1.0E+00	1.4E+01	none	**1.4E+01**
EXPLOSIVES	RDX	4.99E-04	1.26E+00	3.87E+01	7.41E-01	5.2E+01	2.6E-02	1.7E-01	none	**1.7E-01**
EXPLOSIVES	Tetryl	8.31E-11	4.69E+00	7.50E+01	2.09E-01	3.6E+02	1.0E+00	2.4E+01	none	**2.4E+01**
HERBICIDES	2,2-Dichloropropanoic Acid	1.46E-05	5.02E-01	6.98E+04	1.70E+00	4.1E+04	2.0E-01	5.7E-01	none	**5.7E-01**
HERBICIDES	2,4,5-T	3.62E-07	1.06E+00	2.78E+02	8.72E-01	3.2E+02	1.0E+00	5.6E+00	none	**5.6E+00**
HERBICIDES	2,4,5-TP (Silvex)	5.45E-07	5.20E+01	1.40E+02	1.92E-02	7.3E+03	5.0E-02	1.3E+01	none	**1.3E+01**
HERBICIDES	2,4-D	5.82E-09	1.78E+01	8.90E+02	5.58E-02	1.6E+04	7.0E-02	6.0E+00	none	**6.0E+00**
HERBICIDES	2,4-DB	3.19E-08	3.76E-02	7.76E+01	8.05E+00	9.6E+00	8.2E-01	4.9E-01	none	**4.9E-01**
HERBICIDES	Dicamba	3.28E-07	4.40E-02	5.60E+03	7.65E+00	7.3E+02	3.1E+00	1.9E+00	none	**1.9E+00**
HERBICIDES	Dichloroprop	9.00E-07	5.71E-04	2.30E+02	1.15E+01	2.0E+01	1.0E+00	4.3E-01	none	**4.3E-01**
HERBICIDES	Dinoseb	2.08E-02	2.40E+01	5.20E+01	4.14E-02	1.3E+03	7.0E-03	8.1E-01	none	**8.1E-01**
HERBICIDES	MCPA	1.18E-07	6.31E-04	6.50E+02	1.15E+01	5.7E+01	5.1E-02	2.2E-02	none	**2.2E-02**
HERBICIDES	MCPP	1.00E-06	3.47E-04	2.80E+02	1.15E+01	2.4E+01	1.0E-01	4.3E-02	none	**4.3E-02**
METALS	Aluminum	0.00E+00	3.53E+04	0.00E+00	2.83E-05	NA	1.0E+02	1.7E+07	1.63E+04	**1.7E+07**
METALS	Antimony	0.00E+00	6.00E+01	0.00E+00	1.66E-02	NA	6.0E-03	1.7E+00	9.40E-01	**1.7E+00**
METALS	Arsenic	0.00E+00	2.70E+01	0.00E+00	3.69E-02	NA	1.0E-02	1.3E+00	4.81E+00	**4.8E+00**
METALS	Barium	0.00E+00	2.80E+01	0.00E+00	3.56E-02	NA	2.0E+00	2.7E+02	8.55E+01	**2.7E+02**
METALS	Cadmium	0.00E+00	3.50E+01	0.00E+00	2.85E-02	NA	5.0E-03	8.5E-01	4.00E-01	**8.5E-01**
METALS	Chromium	0.00E+00	1.30E+05	0.00E+00	7.69E-06	NA	1.0E-01	6.3E+04	2.66E+01	**6.3E+04**
METALS	Cobalt	0.00E+00	4.50E+01	0.00E+00	2.22E-02	NA	6.1E+00	1.3E+03	5.61E+00	**1.3E+03**
METALS	Copper	0.00E+00	4.00E+01	0.00E+00	2.49E-02	NA	1.3E+00	2.5E+02	5.55E+00	**2.5E+02**
METALS	Lead	0.00E+00	1.83E+03	0.00E+00	5.46E-04	NA	1.5E-02	1.3E+02	1.14E+01	**1.3E+02**
METALS	Manganese	0.00E+00	5.01E+01	0.00E+00	1.99E-02	NA	1.4E+01	3.5E+03	2.01E+02	**3.5E+03**
METALS	Mercury	4.74E-01	2.30E+00	3.00E-02	4.03E-01	7.4E-02	2.0E-03	2.4E-02	8.19E-02	**8.2E-02**
METALS	Selenium	0.00E+00	9.20E+00	0.00E+00	1.08E-01	NA	5.0E-02	2.2E+00	3.48E+00	**3.5E+00**
METALS	Silver	0.00E+00	1.10E+00	0.00E+00	8.43E-01	NA	5.1E-01	2.9E+00	3.10E-01	**2.9E+00**
METALS	Strontium	0.00E+00	2.00E+00	0.00E+00	4.79E-01	NA	6.1E+01	6.2E+02	1.98E+01	**6.2E+02**
METALS	Thallium	0.00E+00	5.60E+01	2.90E+03	1.78E-02	1.6E+05	2.0E-03	5.4E-01	4.70E-01	**5.4E-01**

Table A8-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 119 and Sump 120 at LHAAP-59

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
METALS	Zinc	0.00E+00	3.40E+01	0.00E+00	2.93E-02	NA	3.1E+01	5.0E+03	2.02E+01	**5.0E+03**
PESTICIDES	4,4'-DDD	1.66E-04	1.70E+03	9.00E-02	5.87E-04	1.5E+02	1.2E-03	9.8E+00	none	**9.8E+00**
PESTICIDES	4,4'-DDE	8.73E-04	2.19E+03	6.50E-02	4.56E-04	1.4E+02	8.4E-04	8.9E+00	3.80E-03	**8.9E+00**
PESTICIDES	4,4'-DDT	2.23E-03	2.75E+03	3.10E-03	3.64E-04	8.5E+00	8.4E-04	1.1E+01	6.40E-03	**8.5E+00**
PESTICIDES	Aldrin	7.07E-03	9.57E+02	7.84E-02	1.04E-03	7.5E+01	1.7E-05	7.8E-02	none	**7.8E-02**
PESTICIDES	alpha-BHC	2.82E-04	2.64E+01	2.00E+00	3.78E-02	5.3E+01	4.5E-05	5.8E-03	none	**5.8E-03**
PESTICIDES	alpha-Chlordane	4.11E-03	1.42E+05	4.64E-02	7.06E-06	6.6E+03	8.2E-04	5.6E+02	none	**5.6E+02**
PESTICIDES	beta-BHC	1.44E-05	2.76E+01	5.42E-01	3.61E-02	1.5E+01	1.6E-03	2.1E-01	none	**2.1E-01**
PESTICIDES	delta-BHC	1.77E-04	1.70E+02	2.59E+00	5.87E-03	4.4E+02	1.6E-04	1.3E-01	none	**1.3E-01**
PESTICIDES	Dieldrin	1.11E-04	4.28E+02	1.95E-01	2.34E-03	8.3E+01	1.8E-05	3.7E-02	none	**3.7E-02**
PESTICIDES	Endosulfan I	3.55E-05	3.14E+02	1.73E+00	3.18E-03	5.4E+02	2.0E-01	3.1E+02	none	**3.1E+02**
PESTICIDES	Endosulfan II	3.55E-05	3.14E+02	1.16E+00	3.18E-03	3.6E+02	6.1E-01	9.3E+02	none	**3.6E+02**
PESTICIDES	Endosulfan Sulfate	3.65E-05	1.59E+04	1.02E-01	6.29E-05	1.6E+03	6.1E-01	4.7E+04	none	**1.6E+03**
PESTICIDES	Endrin	4.95E-05	1.87E+02	2.50E-01	5.36E-03	4.7E+01	2.0E-03	1.8E+00	none	**1.8E+00**
PESTICIDES	Endrin aldehyde	1.80E-02	4.28E+04	1.68E-02	2.34E-05	7.2E+02	3.1E-02	6.3E+03	none	**7.2E+02**
PESTICIDES	Endrin ketone	3.66E-05	3.48E+03	8.60E-01	2.88E-04	3.0E+03	3.1E-02	5.1E+02	none	**5.1E+02**
PESTICIDES	gamma-BHC (Lindane)	1.41E-04	2.19E+01	5.75E+00	4.54E-02	1.3E+02	2.0E-04	2.1E-02	none	**2.1E-02**
PESTICIDES	gamma-CHLORDANE	4.11E-03	7.87E+03	2.28E-02	1.27E-04	1.8E+02	8.2E-04	3.1E+01	none	**3.1E+01**
PESTICIDES	Heptachlor	2.44E-02	2.35E+02	1.80E-01	4.25E-03	4.2E+01	4.0E-04	4.5E-01	none	**4.5E-01**
PESTICIDES	Heptachlor epoxide	3.45E-04	1.45E+02	2.75E-01	6.91E-03	4.0E+01	2.0E-04	1.4E-01	none	**1.4E-01**
PESTICIDES	METHOXYCHLOR	6.57E-04	1.55E+03	4.50E-02	6.44E-04	7.0E+01	4.0E-02	3.0E+02	none	**7.0E+01**
PESTICIDES	Toxaphene	1.40E-04	1.92E+03	7.40E-01	5.22E-04	1.4E+03	3.0E-03	2.8E+01	none	**2.8E+01**
SEMIVOLATILES	1,2,4-Trichlorobenzene	5.90E-02	3.32E+01	4.88E+01	3.00E-02	1.6E+03	7.0E-02	1.1E+01	none	**1.1E+01**
SEMIVOLATILES	1,2-Dichlorobenzene	8.73E-02	1.38E+01	1.50E+02	7.17E-02	2.1E+03	6.0E-01	4.0E+01	none	**4.0E+01**
SEMIVOLATILES	1,3-Dichlorobenzene	1.95E-01	3.40E+00	1.10E+02	2.84E-01	3.9E+02	3.1E+00	5.2E+01	none	**5.2E+01**
SEMIVOLATILES	1,4-Dichlorobenzene	1.17E-01	1.29E+01	7.38E+01	7.68E-02	9.6E+02	7.5E-02	4.7E+00	none	**4.7E+00**
SEMIVOLATILES	2,4,5-Trichlorophenol	1.78E-04	4.48E+01	1.20E+03	2.23E-02	5.4E+04	1.0E+01	2.2E+03	none	**2.2E+03**
SEMIVOLATILES	2,4,6-Trichlorophenol	3.19E-04	1.68E+01	9.82E+02	5.93E-02	1.7E+04	2.6E-02	2.1E+00	none	**2.1E+00**
SEMIVOLATILES	2,4-Dichlorophenol	1.31E-04	3.14E+00	4.50E+03	3.10E-01	1.5E+04	3.1E-01	4.8E+00	none	**4.8E+00**
SEMIVOLATILES	2,4-Dimethylphenol	8.31E-05	2.35E+00	6.20E+03	4.10E-01	1.5E+04	2.0E+00	2.4E+01	none	**2.4E+01**
SEMIVOLATILES	2,4-Dinitrophenol	2.01E-07	2.40E-04	5.80E+03	1.15E+01	5.0E+02	2.0E-01	8.6E-02	none	**8.6E-02**
SEMIVOLATILES	2,4-Dinitrotoluene	3.60E-05	1.03E+00	2.85E+02	8.99E-01	3.2E+02	4.2E-04	2.3E-03	none	**2.3E-03**
SEMIVOLATILES	2,6-Dinitrotoluene	3.11E-05	8.34E-01	1.82E+02	1.09E+00	1.7E+02	4.2E-04	1.9E-03	none	**1.9E-03**
SEMIVOLATILES	2-Chloronaphthalene	2.54E-02	1.70E+02	6.74E+00	5.87E-03	1.1E+03	8.2E+00	6.7E+03	none	**1.1E+03**
SEMIVOLATILES	2-Chlorophenol	7.40E-04	7.94E+00	2.80E+04	1.25E-01	2.2E+05	5.1E-01	2.0E+01	none	**2.0E+01**

Table A8-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 119 and Sump 120 at LHAAP-59

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
SEMIVOLATILES	2-Methylnaphthalene	1.85E-02	8.63E+01	2.54E+01	1.16E-02	2.2E+03	4.1E-01	1.7E+02	none	**1.7E+02**
SEMIVOLATILES	2-Methylphenol	6.65E-05	1.95E+00	2.04E+04	4.90E-01	4.2E+04	5.1E+00	5.0E+01	none	**5.0E+01**
SEMIVOLATILES	2-Nitroaniline	2.08E-05	5.38E-01	1.26E+03	1.60E+00	7.9E+02	3.1E-02	9.2E-02	none	**9.2E-02**
SEMIVOLATILES	2-Nitrophenol	2.21E-05	3.81E+00	1.73E+04	2.57E-01	6.7E+04	2.0E-01	3.8E+00	none	**3.8E+00**
SEMIVOLATILES	3,3'-Dichlorobenzidine	8.65E-07	1.45E+01	3.11E+00	6.86E-02	4.5E+01	6.4E-04	4.5E-02	none	**4.5E-02**
SEMIVOLATILES	3-Nitroaniline	2.31E-07	7.88E-01	4.56E+02	1.14E+00	4.0E+02	3.1E-02	1.3E-01	none	**1.3E-01**
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	1.07E-07	6.32E-04	3.00E+03	1.15E+01	2.6E+02	2.0E-01	8.6E-02	none	**8.6E-02**
SEMIVOLATILES	4-Bromophenyl phenyl ether	9.66E-03	2.90E+03	8.25E-01	3.44E-04	2.4E+03	1.9E-04	2.7E+00	none	**2.7E+00**
SEMIVOLATILES	4-Chloro-3-methylphenol	1.40E-05	1.76E+01	5.43E+03	5.66E-02	9.6E+04	5.1E-01	4.3E+01	none	**4.3E+01**
SEMIVOLATILES	4-Chloroaniline	4.86E-05	1.32E+00	3.90E+03	7.10E-01	5.5E+03	4.1E-01	2.8E+00	none	**2.8E+00**
SEMIVOLATILES	4-Chlorophenyl phenyl ether	1.30E-02	2.62E+02	1.43E+00	3.82E-03	3.8E+02	1.9E-04	2.4E-01	none	**2.4E-01**
SEMIVOLATILES	4-Methylphenol	3.99E-05	1.63E+00	2.30E+04	5.84E-01	3.9E+04	5.1E-01	4.2E+00	none	**4.2E+00**
SEMIVOLATILES	4-Nitroaniline	3.33E-08	2.25E-01	6.49E+02	3.21E+00	2.0E+02	7.5E-02	1.1E-01	none	**1.1E-01**
SEMIVOLATILES	4-Nitrophenol	3.24E-08	8.95E-01	4.49E+03	1.02E+00	4.4E+03	2.0E-01	9.7E-01	none	**9.7E-01**
SEMIVOLATILES	Acenaphthene	6.44E-03	7.96E+01	4.24E+00	1.25E-02	3.4E+02	6.1E+00	2.4E+03	none	**3.4E+02**
SEMIVOLATILES	Acenaphthylene	4.74E-03	1.38E+02	3.93E+00	7.22E-03	5.4E+02	6.1E+00	4.1E+03	none	**5.4E+02**
SEMIVOLATILES	Anthracene	4.61E-03	4.69E+02	4.34E-02	2.13E-03	2.0E+01	3.1E+01	6.9E+04	none	**2.0E+01**
SEMIVOLATILES	Benzo(a)anthracene	1.39E-04	7.10E+03	1.00E-02	1.41E-04	7.1E+01	3.9E-04	1.3E+01	1.53E-02	**1.3E+01**
SEMIVOLATILES	Benzo(a)pyrene	4.70E-05	1.91E+04	1.62E-03	5.24E-05	3.1E+01	2.0E-04	1.8E+01	1.54E-02	**1.8E+01**
SEMIVOLATILES	Benzo(b)fluoranthene	4.99E-04	2.40E+04	1.50E-03	4.16E-05	3.6E+01	3.9E-04	4.5E+01	1.53E-02	**3.6E+01**
SEMIVOLATILES	Benzo(ghi)perylene	5.82E-06	3.17E+04	2.60E-04	3.15E-05	8.2E+00	3.1E+00	4.7E+05	1.23E-02	**8.2E+00**
SEMIVOLATILES	Benzo(k)fluoranthene	4.45E-07	2.46E+04	5.50E-04	4.06E-05	1.4E+01	3.9E-03	4.6E+02	1.30E-02	**1.4E+01**
SEMIVOLATILES	Benzoic Acid	1.39E-05	2.18E-02	3.50E+03	9.22E+00	3.8E+02	4.1E+02	2.1E+02	none	**2.1E+02**
SEMIVOLATILES	Benzyl Alcohol	1.62E-05	2.40E-01	4.00E+04	3.06E+00	1.3E+04	3.1E+01	4.8E+01	none	**4.8E+01**
SEMIVOLATILES	bis(2-Chloroethoxy)methane	1.25E-03	6.13E+00	1.35E+03	1.61E-01	8.4E+03	2.6E-04	7.8E-03	none	**7.8E-03**
SEMIVOLATILES	bis(2-Chloroethyl)ether	8.90E-04	3.10E-01	1.02E+04	2.52E+00	4.0E+03	2.6E-04	5.0E-04	none	**5.0E-04**
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	4.16E-03	6.32E+00	1.70E+03	1.56E-01	1.1E+04	4.1E-02	1.3E+00	none	**1.3E+00**
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	4.57E-04	1.35E+04	3.00E-01	7.40E-05	4.1E+03	6.0E-03	3.9E+02	none	**3.9E+02**
SEMIVOLATILES	Butyl benzyl phthalate	7.94E-05	2.75E+02	2.90E+00	3.64E-03	8.0E+02	2.0E+01	2.7E+04	none	**8.0E+02**
SEMIVOLATILES	Chrysene	5.03E-05	6.18E+03	2.00E-03	1.62E-04	1.2E+01	3.9E-02	1.2E+03	1.51E-02	**1.2E+01**
SEMIVOLATILES	Dibenzo(a,h)anthracene	4.66E+00	3.81E+04	5.00E-04	2.62E-05	1.9E+01	2.0E-04	3.7E+01	none	**1.9E+01**
SEMIVOLATILES	Dibenzofuran	5.28E-03	1.70E+02	2.86E+00	5.89E-03	4.9E+02	4.1E-01	3.3E+02	none	**3.3E+02**
SEMIVOLATILES	Diethyl phthalate	1.87E-05	3.03E+00	1.08E+03	3.21E-01	3.4E+03	8.2E+01	1.2E+03	none	**1.2E+03**
SEMIVOLATILES	Dimethyl phthalate	2.40E-05	6.32E-01	4.19E+03	1.39E+00	3.0E+03	8.2E+01	2.8E+02	none	**2.8E+02**
SEMIVOLATILES	di-n-Butyl phthalate	5.94E-05	6.78E+02	1.12E+01	1.48E-03	7.6E+03	1.0E+01	3.3E+04	none	**7.6E+03**

Table A8-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 119 and Sump 120 at LHAAP-59

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
SEMIVOLATILES	di-n-Octyl phthalate	2.78E-03	1.66E+06	2.00E-02	6.01E-07	3.3E+04	2.0E+00	1.6E+07	none	**3.3E+04**
SEMIVOLATILES	Fluoranthene	3.88E-04	9.80E+02	2.60E-01	1.02E-03	2.5E+02	4.1E+00	1.9E+04	2.29E-02	**2.5E+02**
SEMIVOLATILES	Fluorene	2.64E-03	1.52E+02	1.98E+00	6.59E-03	3.0E+02	4.1E+00	3.0E+03	none	**3.0E+02**
SEMIVOLATILES	Hexachlorobenzene	2.22E-02	5.64E+02	6.00E-03	1.77E-03	3.4E+00	1.0E-03	2.7E+00	none	**2.7E+00**
SEMIVOLATILES	Hexachlorobutadiene	9.94E-01	1.38E+02	2.55E+00	7.21E-03	3.5E+02	2.0E-02	1.4E+01	none	**1.4E+01**
SEMIVOLATILES	Hexachlorocyclopentadiene	7.15E-01	1.91E+02	1.80E+00	5.23E-03	3.4E+02	5.0E-02	4.6E+01	none	**4.6E+01**
SEMIVOLATILES	Hexachloroethane	1.62E-01	3.64E+01	5.00E+01	2.74E-02	1.8E+03	1.0E-01	1.8E+01	none	**1.8E+01**
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	2.85E+00	6.93E+04	3.75E-03	1.44E-05	2.6E+02	3.9E-04	1.3E+02	1.43E-02	**1.3E+02**
SEMIVOLATILES	Isophorone	2.57E-04	6.04E-01	1.20E+04	1.45E+00	8.3E+03	3.0E+00	1.0E+01	none	**1.0E+01**
SEMIVOLATILES	Naphthalene	2.00E-02	3.10E+01	3.14E+01	3.22E-02	9.8E+02	2.0E+00	3.1E+02	none	**3.1E+02**
SEMIVOLATILES	Nitrobenzene	8.56E-04	2.64E+00	1.90E+03	3.67E-01	5.2E+03	5.1E-02	6.7E-01	none	**6.7E-01**
SEMIVOLATILES	n-Nitroso-di-n-propylamine	9.35E-05	3.94E-01	9.89E+03	2.08E+00	4.8E+03	4.1E-05	9.5E-05	none	**9.5E-05**
SEMIVOLATILES	n-Nitrosodiphenylamine	2.08E-04	6.62E+00	3.51E+01	1.49E-01	2.4E+02	5.8E-02	1.9E+00	none	**1.9E+00**
SEMIVOLATILES	Pentachlorophenol	1.16E-05	3.68E+01	1.40E+01	2.71E-02	5.2E+02	1.0E-03	1.8E-01	none	**1.8E-01**
SEMIVOLATILES	Phenanthrene	5.40E-03	2.83E+02	9.94E-01	3.54E-03	2.8E+02	3.1E+00	4.2E+03	none	**2.8E+02**
SEMIVOLATILES	Phenol	2.47E-05	3.48E-01	8.70E+04	2.30E+00	3.8E+04	3.1E+01	6.4E+01	none	**6.4E+01**
SEMIVOLATILES	Pyrene	4.57E-04	7.60E+02	1.35E-01	1.31E-03	1.0E+02	3.1E+00	1.1E+04	1.94E-02	**1.0E+02**
VOLATILES	1,1,1,2-Tetrachloroethane	9.98E-02	1.91E+01	1.10E+03	5.21E-02	2.1E+04	1.1E-01	1.0E+01	none	**1.0E+01**
VOLATILES	1,1,1-Trichloroethane	7.15E-01	2.19E+00	1.33E+03	4.13E-01	3.2E+03	2.0E-01	2.3E+00	none	**2.3E+00**
VOLATILES	1,1,2,2-Tetrachloroethane	1.55E-02	1.55E+00	2.97E+03	6.09E-01	4.9E+03	1.4E-02	1.1E-01	none	**1.1E-01**
VOLATILES	1,1,2-Trichloroethane	3.80E-02	1.00E+00	4.42E+03	9.12E-01	4.8E+03	5.0E-03	2.6E-02	none	**2.6E-02**
VOLATILES	1,1-Dichloroethane	2.39E-01	6.32E-01	5.50E+03	1.30E+00	4.2E+03	1.0E+01	3.8E+01	none	**3.8E+01**
VOLATILES	1,1-Dichloroethene	1.06E+00	1.29E+00	2.40E+03	6.29E-01	3.8E+03	7.0E-03	5.4E-02	none	**5.4E-02**
VOLATILES	1,2,3-Trichloropropane	1.58E-02	7.78E+00	1.90E+03	1.27E-01	1.5E+04	4.1E-05	1.6E-03	none	**1.6E-03**
VOLATILES	1,2-Dibromo-3-chloropropane	8.31E-03	3.40E+00	1.00E+03	2.87E-01	3.5E+03	2.0E-04	3.4E-03	none	**3.4E-03**
VOLATILES	1,2-Dibromoethane	2.93E-02	1.07E+00	4.32E+03	8.57E-01	5.0E+03	5.0E-05	2.8E-04	none	**2.8E-04**
VOLATILES	1,2-Dichloroethane	5.32E-02	3.48E-01	8.70E+03	2.25E+00	3.9E+03	5.0E-03	1.1E-02	none	**1.1E-02**
VOLATILES	1,2-Dichloroethene	1.87E-01	5.80E-01	4.93E+03	1.42E+00	3.5E+03	7.0E-02	2.4E-01	none	**2.4E-01**
VOLATILES	1,2-Dichloropropane	1.17E-01	1.18E+00	2.80E+03	7.77E-01	3.6E+03	5.0E-03	3.1E-02	none	**3.1E-02**
VOLATILES	2-Butanone	1.94E-03	3.80E-02	2.40E+05	8.00E+00	3.0E+04	6.1E+01	3.7E+01	none	**3.7E+01**
VOLATILES	2-Chloroethyl vinyl ether	3.02E-02	7.43E-01	5.02E+03	1.20E+00	4.2E+03	2.6E-03	1.0E-02	none	**1.0E-02**
VOLATILES	2-Hexanone	3.38E-03	3.58E-01	1.79E+04	2.25E+00	8.0E+03	6.1E+00	1.3E+01	none	**1.3E+01**
VOLATILES	2-Propenal	1.83E-04	1.05E-02	2.00E+05	1.03E+01	1.9E+04	5.1E-02	2.4E-02	none	**2.4E-02**
VOLATILES	Acetone	1.61E-03	1.14E-02	6.00E+05	1.02E+01	5.9E+04	9.2E+01	4.4E+01	none	**4.4E+01**
VOLATILES	Acetonitrile	1.21E-03	9.35E-03	2.05E+05	1.04E+01	2.0E+04	3.3E+00	1.5E+00	none	**1.5E+00**

Table A8-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 119 and Sump 120 at LHAAP-59

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
VOLATILES	Acrylonitrile	4.57E-03	2.19E-02	7.50E+04	9.13E+00	8.2E+03	5.3E-04	2.8E-04	none	**2.8E-04**
VOLATILES	Allyl chloride	4.57E-01	5.38E-01	3.40E+03	1.40E+00	2.4E+03	1.0E+00	3.5E+00	none	**3.5E+00**
VOLATILES	Benzene	2.27E-01	1.32E+00	1.77E+03	6.88E-01	2.6E+03	5.0E-03	3.5E-02	none	**3.5E-02**
VOLATILES	Bromodichloromethane	1.32E-01	1.10E+00	4.50E+03	8.25E-01	5.5E+03	4.6E-03	2.7E-02	none	**2.7E-02**
VOLATILES	Bromoform	2.56E-02	1.74E+00	3.20E+03	5.45E-01	5.9E+03	3.6E-02	3.2E-01	none	**3.2E-01**
VOLATILES	Bromomethane	5.90E-01	2.09E-01	1.52E+04	2.41E+00	6.3E+03	1.4E-01	2.9E-01	none	**2.9E-01**
VOLATILES	Carbon disulfide	6.13E-01	1.05E+00	2.30E+03	7.94E-01	2.9E+03	1.0E+01	6.2E+01	none	**6.2E+01**
VOLATILES	Carbon tetrachloride	1.20E+00	3.72E+00	8.05E+02	2.47E-01	3.3E+03	5.0E-03	9.8E-02	none	**9.8E-02**
VOLATILES	Chlorobenzene	1.82E-01	4.28E+00	5.02E+02	2.27E-01	2.2E+03	1.0E-01	2.1E+00	none	**2.1E+00**
VOLATILES	Chloroethane	2.12E-01	3.56E-01	2.00E+04	2.06E+00	9.7E+03	4.1E+01	9.6E+01	none	**9.6E+01**
VOLATILES	Chloroform	1.53E-01	9.35E-01	7.92E+03	9.50E-01	8.3E+03	1.0E+00	5.2E+00	none	**5.2E+00**
VOLATILES	Chloromethane	1.44E+00	1.20E-01	7.25E+03	2.02E+00	3.6E+03	2.2E-01	5.2E-01	none	**5.2E-01**
VOLATILES	Chloroprene	1.33E+00	2.00E+00	6.30E+02	4.25E-01	1.5E+03	1.4E-01	1.6E+00	none	**1.6E+00**
VOLATILES	cis-1,3-Dichloropropene	9.15E-02	8.93E-01	2.70E+03	1.00E+00	2.7E+03	5.3E-03	2.6E-02	none	**2.6E-02**
VOLATILES	Dibromochloromethane	3.25E-02	1.26E+00	5.25E+03	7.38E-01	7.1E+03	3.4E-02	2.2E-01	none	**2.2E-01**
VOLATILES	Dibromomethane	3.49E-02	3.64E+00	1.10E+04	2.68E-01	4.1E+04	3.8E-01	6.9E+00	none	**6.9E+00**
VOLATILES	Dichlorodifluoromethane	1.67E+01	2.58E+00	2.80E+02	1.67E-01	1.7E+03	2.0E+01	5.9E+02	none	**5.9E+02**
VOLATILES	Ethyl methacrylate	6.65E-03	7.40E-01	1.90E+04	1.21E+00	1.6E+04	9.2E+00	3.7E+01	none	**3.7E+01**
VOLATILES	Ethylbenzene	3.28E-01	4.08E+00	1.69E+02	2.36E-01	7.2E+02	7.0E-01	1.4E+01	none	**1.4E+01**
VOLATILES	IODOMETHANE	2.36E-01	4.04E-01	1.24E+04	1.86E+00	6.7E+03	1.4E-01	3.7E-01	none	**3.7E-01**
VOLATILES	ISOBUTYL ALCOHOL	4.99E-04	1.12E-01	9.49E+04	5.02E+00	1.9E+04	3.1E+01	2.9E+01	none	**2.9E+01**
VOLATILES	Methacrylonitrile	3.03E-03	6.78E-02	2.50E+04	6.45E+00	3.9E+03	1.0E-02	7.6E-03	none	**7.6E-03**
VOLATILES	Methyl isobutyl ketone	5.82E-03	3.00E-01	1.90E+04	2.58E+00	7.4E+03	8.2E+00	1.5E+01	none	**1.5E+01**
VOLATILES	METHYL METHACRYLATE	1.33E-02	4.60E-01	1.60E+04	1.82E+00	8.8E+03	1.4E+02	3.8E+02	none	**3.8E+02**
VOLATILES	Methylene chloride	9.10E-02	2.35E-01	1.54E+04	2.94E+00	5.2E+03	5.0E-03	8.2E-03	none	**8.2E-03**
VOLATILES	Pentachloroethane	2.15E-02	3.80E+00	6.19E+02	2.57E-01	2.4E+03	1.1E-01	2.1E+00	none	**2.1E+00**
VOLATILES	Propionitrile	1.02E-03	3.28E-02	9.73E+04	8.35E+00	1.2E+04	4.1E-02	2.4E-02	none	**2.4E-02**
VOLATILES	Styrene	1.14E-01	1.52E+01	3.10E+02	6.54E-02	4.7E+03	1.0E-01	7.4E+00	none	**7.4E+00**
VOLATILES	Tetrachloroethene	7.65E-01	3.10E+00	2.00E+02	3.00E-01	6.7E+02	5.0E-03	8.0E-02	none	**8.0E-02**
VOLATILES	Toluene	2.76E-01	2.80E+00	5.30E+02	3.40E-01	1.6E+03	1.0E+00	1.4E+01	none	**1.4E+01**
VOLATILES	trans-1,3-Dichloropropene	9.15E-02	8.93E-01	2.80E+03	1.00E+00	2.8E+03	2.9E-02	1.4E-01	none	**1.4E-01**
VOLATILES	trans-1,4-Dichloro-2-butene	1.35E-02	4.09E+00	1.27E+03	2.39E-01	5.3E+03	3.9E-04	7.9E-03	none	**7.9E-03**
VOLATILES	Trichloroethene	4.28E-01	1.87E+00	1.10E+03	4.90E-01	2.2E+03	5.0E-03	4.9E-02	none	**4.9E-02**
VOLATILES	Trichlorofluoromethane	4.03E+00	2.70E+00	1.10E+03	2.78E-01	4.0E+03	3.1E+01	5.3E+02	none	**5.3E+02**
VOLATILES	Vinyl acetate	2.29E-02	1.05E-01	2.00E+04	5.10E+00	3.9E+03	1.0E+02	9.7E+01	none	**9.7E+01**

Table A8-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Sump 119 and Sump 120 at LHAAP-59

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
VOLATILES	Vinyl chloride	3.49E+00	2.19E-01	2.76E+03	9.96E-01	2.8E+03	2.0E-03	9.7E-03	none	**9.7E-03**
VOLATILES	Xylenes, Total	2.93E-01	4.80E+00	1.98E+02	2.02E-01	9.8E+02	1.0E+01	2.4E+02	none	**2.4E+02**

Notes:

Values of constants shown in Table A8-2.

Values of H', Kd, and S shown in Table A8-4.

GW-Ind - groundwater qualified for industrial use

L/kg - liters per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

MSC - medium specific concentrations

Constants	Values
rb	1.5
qw	0.13
qa	0.30
L1	213
L2	700
W	3100
Vgw	144
I	30.4
dgw	305
LDF	1.467

Calculated Values:

Ksw = see Equation 8

Csat = see Equation 7

LDF = see Equation 5

Soil MSC = see Equation 6

Applicable Standard 3 Commercial / Industrial MSC equals the lower of the Calculated Soil MSC and Csat values. However, if the Background is larger than both values, the Applicable Standard 3 Commercial / Industrial MSC equals the Background concentration.

Table A8-6
Comparison to Maximum Soil Concentrations
Sump 119 and Sump 120 at LHAAP-59

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
EXPLOSIVES	1,3,5-Trinitrobenzene	**5.5E+00**	-	0.210	All Results < MSC
EXPLOSIVES	2,4,6-Trinitrotoluene	**1.5E+00**	-	0.210	All Results < MSC
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	**6.0E-01**	-	0.440	All Results < MSC
EXPLOSIVES	HMX	**2.2E+00**	-	2.000	All Results < MSC
EXPLOSIVES	m-Nitrotoluene	**1.4E+01**	-	0.890	All Results < MSC
EXPLOSIVES	o-Nitrotoluene	**1.4E+01**	-	0.890	All Results < MSC
EXPLOSIVES	p-Nitrotoluene	**1.4E+01**	-	2.700	All Results < MSC
EXPLOSIVES	Tetryl	**2.4E+01**	-	0.660	All Results < MSC
EXPLOSIVES	1,3-Dinitrobenzene	**3.4E-02**	-	0.210	Never detected, SQL > MSC
EXPLOSIVES	RDX	**1.7E-01**	-	0.960	Never detected, SQL > MSC
HERBICIDES	2,2-Dichloropropanoic Acid	**5.7E-01**	-	0.552	All Results < MSC
HERBICIDES	2,4,5-T	**5.6E+00**	-	0.022	All Results < MSC
HERBICIDES	2,4,5-TP (Silvex)	**1.3E+01**	-	0.017	All Results < MSC
HERBICIDES	2,4-D	**6.0E+00**	-	0.221	All Results < MSC
HERBICIDES	2,4-DB	**4.9E-01**	-	0.221	All Results < MSC
HERBICIDES	Dicamba	**1.9E+00**	-	0.022	All Results < MSC
HERBICIDES	Dichloroprop	**4.3E-01**	-	0.221	All Results < MSC
HERBICIDES	Dinoseb	**8.1E-01**	-	0.110	All Results < MSC
HERBICIDES	MCPA	**2.2E-02**	-	21.977	Never detected, SQL > MSC
HERBICIDES	MCPP	**4.3E-02**	6.127	21.977	**Detected > MSC**
METALS	Aluminum	**1.7E+07**	22200	-	All Results < MSC
METALS	Antimony	**1.7E+00**	-	10	Never detected, SQL > MSC
METALS	Arsenic	**4.8E+00**	8.2	-	**Detected > MSC**
METALS	Barium	**2.7E+02**	148	-	All Results < MSC
METALS	Cadmium	**8.5E-01**	-	1	Never detected, SQL > MSC
METALS	Chromium	**6.3E+04**	25	-	All Results < MSC
METALS	Cobalt	**1.3E+03**	19	-	All Results < MSC
METALS	Copper	**2.5E+02**	4.1	-	All Results < MSC
METALS	Lead	**1.3E+02**	21.3	-	All Results < MSC
METALS	Manganese	**3.5E+03**	1030	-	All Results < MSC
METALS	Mercury	**8.2E-02**	-	0.1	Never detected, SQL > MSC
METALS	Selenium	**3.5E+00**	0.34	1	All Results < MSC
METALS	Silver	**2.9E+00**	-	1	All Results < MSC
METALS	Strontium	**6.2E+02**	15	10	All Results < MSC
METALS	Thallium	**5.4E-01**	-	49.8	Never detected, SQL > MSC
METALS	Zinc	**5.0E+03**	30	-	All Results < MSC
PESTICIDES	4,4'-DDD	**9.8E+00**	-	0.0036	All Results < MSC
PESTICIDES	4,4'-DDE	**8.9E+00**	0.0017	0.0036	All Results < MSC

Table A8-6
Comparison to Maximum Soil Concentrations
Sump 119 and Sump 120 at LHAAP-59

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
PESTICIDES	4,4'-DDT	**8.5E+00**	-	0.0036	All Results < MSC
PESTICIDES	Aldrin	**7.8E-02**	-	0.0036	All Results < MSC
PESTICIDES	alpha-BHC	**5.8E-03**	-	0.0036	All Results < MSC
PESTICIDES	alpha-Chlordane	**5.6E+02**	2.266	0.0005	All Results < MSC
PESTICIDES	beta-BHC	**2.1E-01**	-	0.0036	All Results < MSC
PESTICIDES	delta-BHC	**1.3E-01**	-	0.0036	All Results < MSC
PESTICIDES	Dieldrin	**3.7E-02**	-	0.0036	All Results < MSC
PESTICIDES	Endosulfan I	**3.1E+02**	-	0.0036	All Results < MSC
PESTICIDES	Endosulfan II	**3.6E+02**	-	0.0036	All Results < MSC
PESTICIDES	Endosulfan Sulfate	**1.6E+03**	-	0.0036	All Results < MSC
PESTICIDES	Endrin	**1.8E+00**	-	0.0036	All Results < MSC
PESTICIDES	Endrin aldehyde	**7.2E+02**	-	0.0036	All Results < MSC
PESTICIDES	Endrin ketone	**5.1E+02**	-	0.0036	All Results < MSC
PESTICIDES	gamma-BHC (Lindane)	**2.1E-02**	-	0.0036	All Results < MSC
PESTICIDES	gamma-CHLORDANE	**3.1E+01**	2.610	0.0005	All Results < MSC
PESTICIDES	Heptachlor	**4.5E-01**	0.011	0.0020	All Results < MSC
PESTICIDES	Heptachlor epoxide	**1.4E-01**	0.174	0.0020	**Detected > MSC**
PESTICIDES	METHOXYCHLOR	**7.0E+01**	-	0.0036	All Results < MSC
PESTICIDES	Toxaphene	**2.8E+01**	-	0.1840	All Results < MSC
SEMIVOLATILES	1,2,4-Trichlorobenzene	**1.1E+01**	-	0.400	All Results < MSC
SEMIVOLATILES	1,2-Dichlorobenzene	**4.0E+01**	-	0.400	All Results < MSC
SEMIVOLATILES	1,3-Dichlorobenzene	**5.2E+01**	-	0.400	All Results < MSC
SEMIVOLATILES	1,4-Dichlorobenzene	**4.7E+00**	-	0.400	All Results < MSC
SEMIVOLATILES	2,4,5-Trichlorophenol	**2.2E+03**	-	2.000	All Results < MSC
SEMIVOLATILES	2,4,6-Trichlorophenol	**2.1E+00**	-	0.400	All Results < MSC
SEMIVOLATILES	2,4-Dichlorophenol	**4.8E+00**	-	0.400	All Results < MSC
SEMIVOLATILES	2,4-Dimethylphenol	**2.4E+01**	-	0.400	All Results < MSC
SEMIVOLATILES	2,4-Dinitrophenol	**8.6E-02**	-	2.000	Never detected, SQL > MSC
SEMIVOLATILES	2,4-Dinitrotoluene	**2.3E-03**	-	0.210	Never detected, SQL > MSC
SEMIVOLATILES	2,6-Dinitrotoluene	**1.9E-03**	-	0.230	Never detected, SQL > MSC
SEMIVOLATILES	2-Chloronaphthalene	**1.1E+03**	-	0.400	All Results < MSC
SEMIVOLATILES	2-Chlorophenol	**2.0E+01**	-	0.400	All Results < MSC
SEMIVOLATILES	2-Methylnaphthalene	**1.7E+02**	-	0.400	All Results < MSC
SEMIVOLATILES	2-Methylphenol	**5.0E+01**	-	0.400	All Results < MSC
SEMIVOLATILES	2-Nitroaniline	**9.2E-02**	-	2.000	Never detected, SQL > MSC
SEMIVOLATILES	2-Nitrophenol	**3.8E+00**	-	0.400	All Results < MSC
SEMIVOLATILES	3,3'-Dichlorobenzidine	**4.5E-02**	-	0.800	Never detected, SQL > MSC
SEMIVOLATILES	3-Nitroaniline	**1.3E-01**	-	2.000	Never detected, SQL > MSC

Table A8-6
Comparison to Maximum Soil Concentrations
Sump 119 and Sump 120 at LHAAP-59

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
SEMIVOLATILES	4,6-Dinitro-2-methylphenol	**8.6E-02**	-	2.000	Never detected, SQL > MSC
SEMIVOLATILES	4-Bromophenyl phenyl ether	**2.7E+00**	-	0.400	All Results < MSC
SEMIVOLATILES	4-Chloro-3-methylphenol	**4.3E+01**	-	0.650	All Results < MSC
SEMIVOLATILES	4-Chloroaniline	**2.8E+00**	-	0.650	All Results < MSC
SEMIVOLATILES	4-Chlorophenyl phenyl ether	**2.4E-01**	-	0.400	Never detected, SQL > MSC
SEMIVOLATILES	4-Methylphenol	**4.2E+00**	-	0.400	All Results < MSC
SEMIVOLATILES	4-Nitroaniline	**1.1E-01**	-	2.000	Never detected, SQL > MSC
SEMIVOLATILES	4-Nitrophenol	**9.7E-01**	-	2.000	Never detected, SQL > MSC
SEMIVOLATILES	Acenaphthene	**3.4E+02**	-	0.400	All Results < MSC
SEMIVOLATILES	Acenaphthylene	**5.4E+02**	-	0.400	All Results < MSC
SEMIVOLATILES	Anthracene	**2.0E+01**	-	0.400	All Results < MSC
SEMIVOLATILES	Benzo(a)anthracene	**1.3E+01**	-	0.400	All Results < MSC
SEMIVOLATILES	Benzo(a)pyrene	**1.8E+01**	-	0.400	All Results < MSC
SEMIVOLATILES	Benzo(b)fluoranthene	**3.6E+01**	-	0.400	All Results < MSC
SEMIVOLATILES	Benzo(ghi)perylene	**8.2E+00**	-	0.400	All Results < MSC
SEMIVOLATILES	Benzo(k)fluoranthene	**1.4E+01**	-	0.400	All Results < MSC
SEMIVOLATILES	Benzoic Acid	**2.1E+02**	-	2.000	All Results < MSC
SEMIVOLATILES	Benzyl Alcohol	**4.8E+01**	-	0.650	All Results < MSC
SEMIVOLATILES	bis(2-Chloroethoxy)methane	**7.8E-03**	-	0.400	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Chloroethyl)ether	**5.0E-04**	-	0.400	Never detected, SQL > MSC
SEMIVOLATILES	bis(2-Chloroisopropyl)ether	**1.3E+00**	-	0.400	All Results < MSC
SEMIVOLATILES	bis(2-Ethylhexyl)phthalate	**3.9E+02**	0.380	0.400	All Results < MSC
SEMIVOLATILES	Butyl benzyl phthalate	**8.0E+02**	-	0.400	All Results < MSC
SEMIVOLATILES	Chrysene	**1.2E+01**	-	0.400	All Results < MSC
SEMIVOLATILES	Dibenzo(a,h)anthracene	**1.9E+01**	-	0.400	All Results < MSC
SEMIVOLATILES	Dibenzofuran	**3.3E+02**	-	0.400	All Results < MSC
SEMIVOLATILES	Diethyl phthalate	**1.2E+03**	-	0.400	All Results < MSC
SEMIVOLATILES	Dimethyl phthalate	**2.8E+02**	-	0.400	All Results < MSC
SEMIVOLATILES	di-n-Butyl phthalate	**7.6E+03**	-	0.400	All Results < MSC
SEMIVOLATILES	di-n-Octyl phthalate	**3.3E+04**	-	0.400	All Results < MSC
SEMIVOLATILES	Fluoranthene	**2.5E+02**	-	0.400	All Results < MSC
SEMIVOLATILES	Fluorene	**3.0E+02**	-	0.400	All Results < MSC
SEMIVOLATILES	Hexachlorobenzene	**2.7E+00**	-	0.400	All Results < MSC
SEMIVOLATILES	Hexachlorobutadiene	**1.4E+01**	-	0.400	All Results < MSC
SEMIVOLATILES	Hexachlorocyclopentadiene	**4.6E+01**	-	0.400	All Results < MSC
SEMIVOLATILES	Hexachloroethane	**1.8E+01**	-	0.400	All Results < MSC
SEMIVOLATILES	Indeno(1,2,3-cd)pyrene	**1.3E+02**	-	0.400	All Results < MSC
SEMIVOLATILES	Isophorone	**1.0E+01**	-	0.400	All Results < MSC

Table A8-6
Comparison to Maximum Soil Concentrations
Sump 119 and Sump 120 at LHAAP-59

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
SEMIVOLATILES	Naphthalene	**3.1E+02**	-	0.400	All Results < MSC
SEMIVOLATILES	Nitrobenzene	**6.7E-01**	-	0.230	All Results < MSC
SEMIVOLATILES	n-Nitroso-di-n-propylamine	**9.5E-05**	-	0.400	Never detected, SQL > MSC
SEMIVOLATILES	n-Nitrosodiphenylamine	**1.9E+00**	-	0.400	All Results < MSC
SEMIVOLATILES	Pentachlorophenol	**1.8E-01**	0.003	2.000	Never detected, SQL > MSC
SEMIVOLATILES	Phenanthrene	**2.8E+02**	-	0.400	All Results < MSC
SEMIVOLATILES	Phenol	**6.4E+01**	-	0.400	All Results < MSC
SEMIVOLATILES	Pyrene	**1.0E+02**	-	0.400	All Results < MSC
VOLATILES	1,1,1,2-Tetrachloroethane	**1.0E+01**	-	0.012	All Results < MSC
VOLATILES	1,1,1-Trichloroethane	**2.3E+00**	-	0.006	All Results < MSC
VOLATILES	1,1,2,2-Tetrachloroethane	**1.1E-01**	-	0.006	All Results < MSC
VOLATILES	1,1,2-Trichloroethane	**2.6E-02**	-	0.006	All Results < MSC
VOLATILES	1,1-Dichloroethane	**3.8E+01**	-	0.006	All Results < MSC
VOLATILES	1,1-Dichloroethene	**5.4E-02**	-	0.006	All Results < MSC
VOLATILES	1,2,3-Trichloropropane	**1.6E-03**	-	0.012	Never detected, SQL > MSC
VOLATILES	1,2-Dibromo-3-chloropropane	**3.4E-03**	-	0.024	Never detected, SQL > MSC
VOLATILES	1,2-Dibromoethane	**2.8E-04**	-	0.024	Never detected, SQL > MSC
VOLATILES	1,2-Dichloroethane	**1.1E-02**	-	0.006	All Results < MSC
VOLATILES	1,2-Dichloroethene	**2.4E-01**	-	0.006	All Results < MSC
VOLATILES	1,2-Dichloropropane	**3.1E-02**	-	0.006	All Results < MSC
VOLATILES	2-Butanone	**3.7E+01**	-	0.050	All Results < MSC
VOLATILES	2-Chloroethyl vinyl ether	**1.0E-02**	-	0.012	Never detected, SQL > MSC
VOLATILES	2-Hexanone	**1.3E+01**	-	0.050	All Results < MSC
VOLATILES	2-Propenal	**2.4E-02**	-	0.600	Never detected, SQL > MSC
VOLATILES	Acetone	**4.4E+01**	-	0.100	All Results < MSC
VOLATILES	Acetonitrile	**1.5E+00**	-	0.120	All Results < MSC
VOLATILES	Acrylonitrile	**2.8E-04**	-	0.120	Never detected, SQL > MSC
VOLATILES	Allyl chloride	**3.5E+00**	-	0.012	All Results < MSC
VOLATILES	Benzene	**3.5E-02**	-	0.006	All Results < MSC
VOLATILES	Bromodichloromethane	**2.7E-02**	-	0.006	All Results < MSC
VOLATILES	Bromoform	**3.2E-01**	-	0.006	All Results < MSC
VOLATILES	Bromomethane	**2.9E-01**	-	0.012	All Results < MSC
VOLATILES	Carbon disulfide	**6.2E+01**	-	0.006	All Results < MSC
VOLATILES	Carbon tetrachloride	**9.8E-02**	-	0.006	All Results < MSC
VOLATILES	Chlorobenzene	**2.1E+00**	-	0.006	All Results < MSC
VOLATILES	Chloroethane	**9.6E+01**	-	0.012	All Results < MSC
VOLATILES	Chloroform	**5.2E+00**	-	0.006	All Results < MSC
VOLATILES	Chloromethane	**5.2E-01**	-	0.012	All Results < MSC

Table A8-6
Comparison to Maximum Soil Concentrations
Sump 119 and Sump 120 at LHAAP-59

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
VOLATILES	Chloroprene	**1.6E+00**	-	0.120	All Results < MSC
VOLATILES	cis-1,3-Dichloropropene	**2.6E-02**	-	0.006	All Results < MSC
VOLATILES	Dibromochloromethane	**2.2E-01**	-	0.006	All Results < MSC
VOLATILES	Dibromomethane	**6.9E+00**	-	0.024	All Results < MSC
VOLATILES	Dichlorodifluoromethane	**5.9E+02**	-	0.024	All Results < MSC
VOLATILES	Ethyl methacrylate	**3.7E+01**	-	0.024	All Results < MSC
VOLATILES	Ethylbenzene	**1.4E+01**	-	0.006	All Results < MSC
VOLATILES	IODOMETHANE	**3.7E-01**	-	0.012	All Results < MSC
VOLATILES	ISOBUTYL ALCOHOL	**2.9E+01**	-	2.400	All Results < MSC
VOLATILES	Methacrylonitrile	**7.6E-03**	-	0.024	Never detected, SQL > MSC
VOLATILES	Methyl isobutyl ketone	**1.5E+01**	-	0.050	All Results < MSC
VOLATILES	METHYL METHACRYLATE	**3.8E+02**	-	0.024	All Results < MSC
VOLATILES	Methylene chloride	**8.2E-03**	-	0.006	All Results < MSC
VOLATILES	Pentachloroethane	**2.1E+00**	-	0.024	All Results < MSC
VOLATILES	Propionitrile	**2.4E-02**	-	0.060	Never detected, SQL > MSC
VOLATILES	Styrene	**7.4E+00**	-	0.006	All Results < MSC
VOLATILES	Tetrachloroethene	**8.0E-02**	-	0.006	All Results < MSC
VOLATILES	Toluene	**1.4E+01**	-	0.006	All Results < MSC
VOLATILES	trans-1,3-Dichloropropene	**1.4E-01**	-	0.006	All Results < MSC
VOLATILES	trans-1,4-Dichloro-2-butene	**7.9E-03**	-	0.024	Never detected, SQL > MSC
VOLATILES	Trichloroethene	**4.9E-02**	-	0.006	All Results < MSC
VOLATILES	Trichlorofluoromethane	**5.3E+02**	-	0.012	All Results < MSC
VOLATILES	Vinyl acetate	**9.7E+01**	-	0.050	All Results < MSC
VOLATILES	Vinyl chloride	**9.7E-03**	-	0.012	Never detected, SQL > MSC
VOLATILES	Xylenes, Total	**2.4E+02**	-	0.006	All Results < MSC

Notes:

Maximum Soil Concentrations shown in Table 10a and Table 10b of the Shaw (2008) Addendum.

mg/kg - milligrams per kilogram

MSC - medium specific concentration

SQL - sample quantitation limit

Table A8-7
Chemical Specific Standard 3 Groundwater-Protective MSCs for Soil
Sump 119 and Sump 120 at LHAAP-59

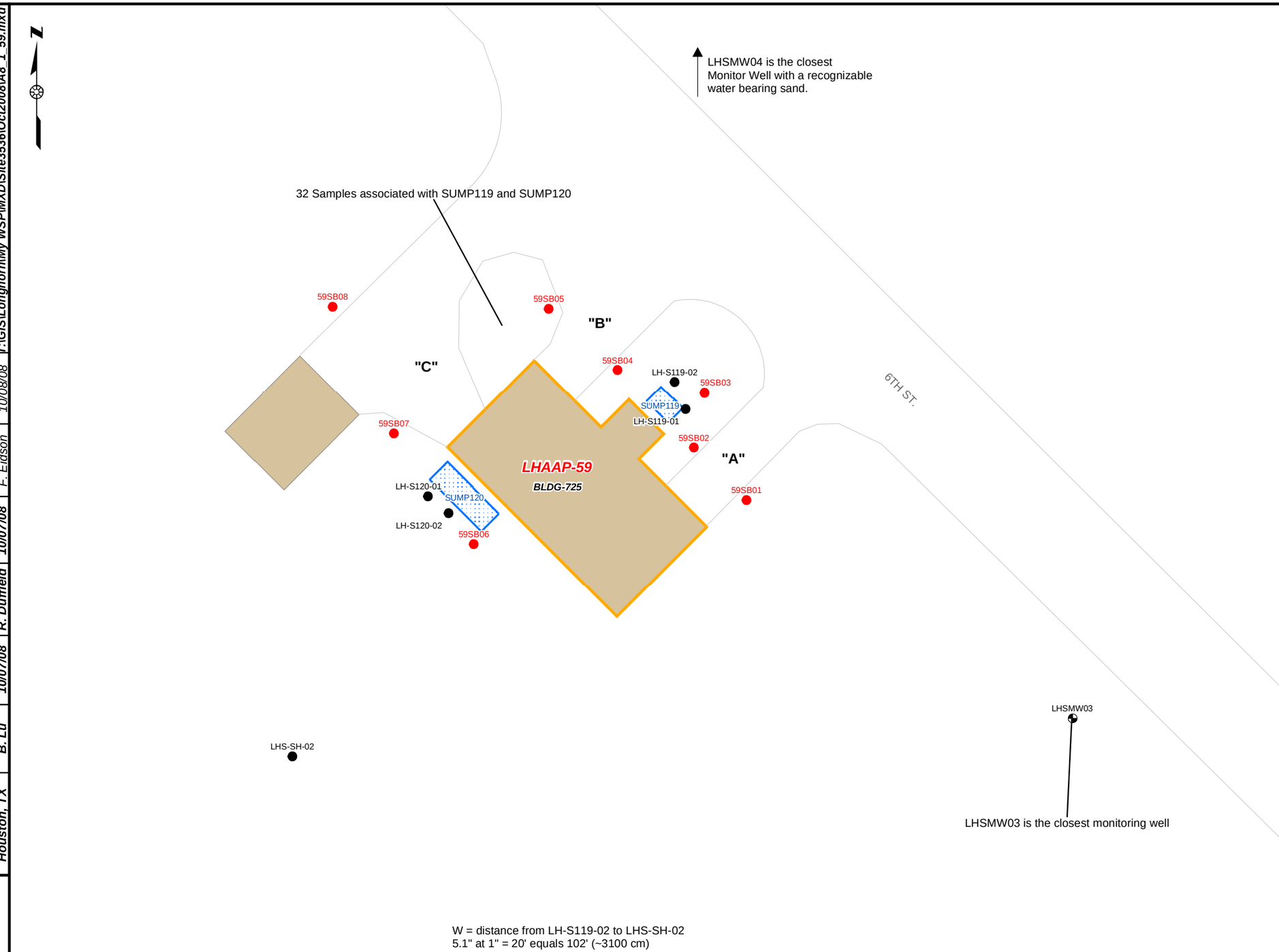
Standard 3 MSC Calculation for Specific Chemicals with Concentrations Above Initial Standard 3 MSC			
Variables	**MCPP**	**Arsenic**	**Heptachlor epoxide**
L1 - Thickness of affected soil	30	153	30
L2 - Distance from top of affected soils to top of water bearing unit.	700	700	700
W - Width of soil source area parallel to groundwater flow direction	1,000	1,550	1,000
H' - Dimensional form of Henry's Law Constant	1.00E-06	0.00E+00	3.45E-04
Kd - Soil Water Partition Coefficient	3.47E-04	2.70E+01	1.45E+02
S - Solubility in mg/L	2.80E+02	0.00E+00	2.75E-01
Calculations			
Ksw = see Equation 8	1.15E+01	3.69E-02	6.91E-03
Csat = see Equation 7 (mg/kg)	2.44E+01	NA	3.98E+01
GW-Ind MSC (mg/L)	1.0E-01	1.0E-02	2.0E-04
LDF = see Equation 5	2.447	1.934	2.447
Standard 3 Soil MSC Com/Ind (mg/kg) = see Equation 6	5.1E-01	2.4E+00	1.7E+00
Corrected Standard 3 Soil MSC Com/Ind (cannot be larger than Csat) (mg/kg)	5.1E-01	2.4E+00	1.7E+00
Background Concentration (mg/kg)	none	4.81E+00	none
Applicable Commercial/Industrial Soil MSC (mg/kg)	**5.1E-01**	**4.8E+00**	**1.7E+00**
Maximum Detected Concentration for Comparison (mg/kg)	**6.13**	**8.2**	**0.174**

Notes:

GW-Ind MSC	from TCEQ 2006 RBSV table
LDF	leachate dilution factor
MSC	Medium Specific Concentration
mg/kg	milligrams per kilogram

Constants:

Symbol	Value	Units	Name
r_b	1.5	g/cm³	Soil Dry Bulk Density
n	0.43	unitless	Total Porosity
q_w	0.13	unitless	Volumetric Water Content of Soil
f_{oc}	0.02	g/g	Soil Fraction Organic Carbon
I	30.4	cm/yr	Net Infiltration Rate through soil
V_{gw}	144	cm/yr	Groundwater Darcy Velocity = K x i x 31500000
K	6.4E-04	cm/sec	Hydraulic conductivity in groundwater bearing unit
i	0.0072	unitless	Hydraulic gradient in groundwater bearing unit
d	305	cm	Groundwater mixing zone
q_a	0.30	unitless	Soil Air Filled Porosity (qa) = n - qw



Legend

- Soil Boring (Shaw, August 2006)
- Shallow Monitoring Well
- Soil Boring (Previous Investigation, Jacobs, 2002)
- Road
- Sump
- Former Building or Concrete Slab
- Site
- "A" Drive Area Identification

0 10 20 40 Feet

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

FIGURE A8-1

SAMPLE LOCATION MAP
LHAAP-59

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		FILE PATH
Houston, TX	B. Lu	10/07/08	R. Duffield	10/07/08	F. Eidson	10/08/08	T:\GIS\Longhorn\My WSP\MXD\Site3536\Oct2008\A8_1_59.mxd

Plot Date: 10/08

Attachment 9

Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Waste Rack Sump WRSump 013

Attachment 9 – SAM Model Evaluation

Development of TCEQ Risk Reduction Rules Standard 3 Medium Specific Concentrations for Soil Associated with Waste Rack Sump WRSump 013 at the Longhorn Army Ammunition Plant, Karnack, Texas

Attachment 9 describes development of Medium Specific Concentrations (MSCs) for chemicals in soil that are protective of groundwater for soil associated with Waste Rack Sump WRSump 013. The MSC values were developed according to the Texas Commission on Environmental Quality [TCEQ] Texas Risk Reduction Rules, Title 30 Texas Administrative Code (TAC) Chapter 335 (30 TAC §335 and updates). Groundwater-protective Risk Reduction Standard 3 MSCs were calculated to evaluate the potential for migration of chemicals from soil to groundwater as provided in TCEQ guidance [30 TAC §335.563(i)(2)] by using the SAM model to estimate the potential impacts of soil contamination on groundwater quality.

Waste Rack Sump WRSump 013 was located near Building 824 near Longhorn Army Ammunition Plant (LHAAP)-45 as shown in **Figure A9-1**, which is from the LHAAP-35/36 Sump Report (Shaw, 2008). Evaluation of chemicals in soil associated with this sump was based on data from analysis of 2 soil samples collected from depths ranging from 0 to 2 feet below ground surface (bgs). The samples were analyzed for explosives, metals, and volatile organic compounds (VOCs). The analytical results were evaluated as reported in **Table 11** of the main body of this Addendum.

The initial step in the SAM Model compared the tested chemicals to available background concentrations and method quantitation limits (MQL) for each chemical. Of the chemicals tested, 5 were not evaluated because they are regarded as essential nutrients (TCEQ, 2001). The evaluation of the remaining chemicals is recorded on **Table A9-1**.

The SAM Model was selected to predict impacts of soil contamination on groundwater quality. The SAM Model is an extension of the Soil Screening Level calculations described in USEPA (1996) guidance and is based on calculating total mass (liquid phase, solid phase, and gas phase) in the soil column:

$$M_T = V(\rho_b C_s + \theta_w C_w + \theta_a C_g)$$

Where

M_T = total mass of chemical
V = volume of the soil column
ρ_b = bulk density
C_s = concentration in soil (dry weight basis)
θ_w = water filled porosity
C_w = concentration in pore water
θ_a = air filled porosity
C_g = gas phase concentration.

Total mass is then redistributed using equilibrium conditions based on the adsorption coefficient and Henry's constant. The equilibrium equations are:

$$C_s = K_d C_w \qquad \text{Equation 1}$$

$$C_g = H' C_w \qquad \text{Equation 2}$$

Where Kd is the distribution coefficient or adsorption coefficient, and H' is the dimensionless Henry's Law constant.

A SAM Model enhancement over USEPA's Soil Screening Levels is that the SAM Model assumes a zone of contaminated soils overlying a zone of clean soil (zero contaminant concentration). The SAM Model simulates mixing of contamination through the contaminated and clean soil zones based on equilibrium conditions and predicts leachate concentration at the bottom of the soil column. In the SAM Model, the leachate concentration is calculated as follows:

$$C_w = C_s \left(\frac{\rho_b}{\theta_w + (K_d \rho_b) + H' \theta_a} \right) \left(\frac{L_1}{L_2} \right) \qquad \text{Equation 3}$$

Or, alternately, the concentration in soil that will produce a given leachate concentration can be calculated as:

$$C_s = C_w \left(\frac{\theta_w + (K_d \rho_b) + H' \theta_a}{\rho_b} \right) \left(\frac{L_2}{L_1} \right) \qquad \text{Equation 4}$$

Where L_1 is the thickness of the contaminated zone and L_2 is the thickness of the total soil column. The factor (L_2/L_1) is an enhancement in the SAM Model over the Soil Screening Level Model by USEPA. A further dilution factor for leachate mixing with groundwater can be incorporated by using a leachate dilution factor:

$$LDF = 1 + \frac{Kid}{IW} \qquad \text{Equation 5}$$

Where

K = aquifer hydraulic conductivity
i = hydraulic gradient in aquifer
d = groundwater mixing zone depth
I = infiltration rate
W = source length parallel to groundwater flow.

The groundwater protective Standard 3 MSC is the soil concentration (Cs) described by Equation 4 where the groundwater concentration is limited by the TCEQ risk-based drinking water concentration (GW-Ind) modified by the leachate dilution factor (LDF) as follows:

$$\text{Standard 3 } MSC = GW - Ind\left(\frac{\theta_w + (K_d \rho_b) + H'\theta_a}{\rho_b}\right)\left(\frac{L_2}{L_1}\right) x\ LDF \quad \text{Equation 6}$$

The model further calculates the soil saturation concentration (C_{sat}), which corresponds to the contaminant concentration in soil at which the absorptive capacity of soil particles, the solubility limits of soil pore water and saturation of soil pore air have been reached. Concentrations above C_{sat} are assumed to be in free phase. The C_{sat} concentration is calculated in the SAM Model according to Equation 7.

$$C_{sat} = S\left(\frac{\theta_w + (K_d \rho_b) + H'\theta_a}{\rho_b}\right) \quad \text{Equation 7}$$

For the purpose of simplification, a soil to water coefficient, K_{sw}, can stand in for the complex bracketed formula in Equations 3, 4, 6, and 7.

$$K_{sw} = \left(\frac{\rho_b}{\theta_w + (K_d \rho_b) + (H'\theta_a)}\right) \quad \text{Equation 8}$$

Input parameters to the SAM Model, that are either specific to Waste Rack Sump WRSump 013 location at Building 824 or are default TCEQ values, are shown in **Table A9-2**. Because some chemical properties are pH dependent, an average groundwater pH (5.9) was calculated in **Table A9-3**. **Table A9-4** lists the chemical properties (TCEQ, 2008). From these input parameters and properties, the SAM Model first calculates a saturated soil concentration (Csat) using Equation 7.

Then the SAM Model calculates a Standard 3 Commercial/Industrial Soil MSC using Equation 6 by equating C_w to the GW-Ind MSC and calculating what concentration of chemical in the soil at the site (mg/kg) that would theoretically leach into the groundwater at the GW-Ind concentration (mg/L). The lower of the C_{sat} and the calculated Soil MSC values is used as the Soil MSC.

The MSC values for total petroleum hydrocarbon (TPH) components analyzed according to TCEQ Method TX1005 were developed as follows:

For results reported as "Carbon Range C12-C28 and Carbon Range C28-C35" concentrations, the value used is the lowest of GW-Ind values for >12-16 C, >16-21 C, and >21-35 C (aromatic) boiling fraction of TPH, given in TCEQ (2006) guidance (3.1E+00 milligrams per liter [mg/L]). For results reported as "Carbon Range C6-C12" concentrations, the value used is the MSC for the >8-10 C (aromatic) boiling fraction of TPH, given in TCEQ (2006) guidance (4.1E+00 mg/L).

Finally, the SAM Model compares the Soil MSC to available background soil concentrations for the chemical. The 95% upper prediction limit (UPL) soil background concentrations from the LHAAP-35/36 Sump Report (Shaw, 2008) were used for this comparison. The larger of the Soil MSC and the background concentration is then selected as the Applicable Standard 3 Commercial/Industrial Soil MSC.

Table A9-5 presents the results of those calculations. The Applicable Standard 3 Commercial/Industrial Soil MSC values are in bold along the right side of the table. While it is possible to select different site parameters for each chemical, for this calculation, general whole site parameters were used as if each chemical were equally and evenly distributed across the entire site. When compared to actual distribution of individual chemical results in individual samples taken near former sump locations, this assumption, overestimates the extent of the chemical concentration across the site, resulting in lower concentrations calculated for the MSC values.

Table A9-6 compares the Applicable Standard 3 Commercial/Industrial Soil MSC values to maximum soil concentrations for each chemical in the samples associated with Waste Rack Sump WRSump 013 at Building 824 near LHAAP-45. Two chemicals that were never detected had at least one sample quantitation limit (SQL) greater than the Applicable Standard 3 MSC. No other chemicals had SQL values higher than the MSC.

Discussion

The SAM Model results for Waste Rack Sump WRSump 013 at Building 824 near LHAAP-45 indicate that no chemicals were detected in these samples at concentrations that exceeded the Applicable Standard 3 Commercial/Industrial Soil MSC values that were developed to be protective of groundwater (**Table 11**). No further evaluation is needed for Waste Rack Sump WRSump 013 and associated soil samples.

References

Shaw Environmental, Inc. (Shaw), 2008, *Final Data Evaluation Report, Chemical Concentrations in Soil Samples Associated with LHAAP-35/36 Sumps*, January (LHAAP-35/36 Sump Report).

Texas Commission on Environmental Quality (TCEQ), 2001, Interoffice Memorandum from Joseph T. Haney, Jr., (TCEQ) to Camarie Perry, Office or Permitting, Remediation & Registration, *Evaluation of the Potential Health Impacts of Exposure to Iron, Calcium, Magnesium, Potassium, sodium, and Phosphorus through Soil Ingestion*, October.

TCEQ, 2008, Annual TCEQ update of chemical/physical properties table [(Figure: 30 TAC §350.73(e)], April.

U.S. Environmental Protection Agency (USEPA), 1996, *Soil Screening Guidance: User's Guide*, Second Edition.

Table A9-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Waste Rack Sump WRSump 013 near LHAAP-45

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	MQL	Calculate MSC ?
EXPLOSIVES	1,3,5-Trinitrobenzene	-	0.120	NE	NE	0.25	YES
EXPLOSIVES	1,3-Dinitrobenzene	-	0.120	NE	NE	0.25	YES
EXPLOSIVES	2,4,6-Trinitrotoluene	-	0.120	NE	NE	0.25	YES
EXPLOSIVES	2,4-Dinitrotoluene	-	0.120	NE	NE	0.25	YES
EXPLOSIVES	2,6-Dinitrotoluene	-	0.120	NE	NE	0.26	YES
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	-	0.120	NE	NE	0.26	YES
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	-	0.120	NE	NE	0.26	YES
EXPLOSIVES	HMX	-	0.120	NE	NE	2.2	YES
EXPLOSIVES	m-Nitrotoluene	-	0.120	NE	NE	0.25	YES
EXPLOSIVES	Nitrobenzene	-	0.156	NE	NE	0.25	YES
EXPLOSIVES	o-Nitrotoluene	-	0.120	NE	NE	0.25	YES
EXPLOSIVES	p-Nitrotoluene	-	0.120	NE	NE	0.25	YES
EXPLOSIVES	RDX	-	0.120	NE	NE	1	YES
EXPLOSIVES	Tetryl	-	0.240	NE	NE	0.65	YES
METALS	Aluminum	15621	-	1.63E+04	2.08E+04	20	YES
METALS	Antimony	0.116	0.073	9.40E-01	1.60E+00	0.1	YES
METALS	Arsenic	4.9	-	4.81E+00	5.54E+00	0.3	YES
METALS	Barium	143	-	1.52E+02	8.55E+01	0.3	YES
METALS	Beryllium	0.593	-	6.45E-01	7.66E-01	0.5	YES
METALS	Cadmium	-	0.055	1.40E+00	4.00E-01	0.1	YES
METALS	Calcium	3542	-	NA	NA	NA	No, 1
METALS	Chromium	14.3	-	2.66E+01	3.01E+01	0.4	YES
METALS	Cobalt	7.15	-	7.23E+00	5.61E+00	0.5	YES
METALS	Copper	3.50	-	5.55E+00	9.25E+00	0.6	YES
METALS	Iron	16667	-	NA	NA	NA	No, 1
METALS	Lead	30.3	-	2.26E+01	1.14E+01	5	YES
METALS	Magnesium	1220	-	NA	NA	NA	No, 1
METALS	Manganese	107	-	1.25E+03	2.01E+02	0.2	YES
METALS	Mercury	0.0485	0.014	8.19E-02	3.60E-01	0.25	YES
METALS	Nickel	6.91	-	6.98E+00	1.16E+01	0.8	YES
METALS	Potassium	604	-	NA	NA	NA	No, 1
METALS	Selenium	0.439	0.146	3.48E+00	5.57E+00	0.2	YES
METALS	Silver	-	0.277	3.10E-01	3.70E-01	0.2	YES
METALS	Sodium	289	-	NA	NA	NA	No, 1
METALS	Thallium	0.297	-	4.70E-01	NE	0.02	YES
METALS	Vanadium	31.0	-	3.21E+01	4.46E+01	0.5	YES
METALS	Zinc	31.4	-	6.16E+01	2.02E+01	2.5	YES
VOLATILES	1,1,1,2-Tetrachloroethane	-	0.0006	NE	NE	0.005	YES
VOLATILES	1,1,1-Trichloroethane	-	0.0006	NE	NE	0.005	YES
VOLATILES	1,1,2,2-Tetrachloroethane	-	0.0006	NE	NE	0.005	YES
VOLATILES	1,1,2-Trichloroethane	-	0.0006	NE	NE	0.005	YES
VOLATILES	1,1-Dichloroethane	-	0.0012	NE	NE	0.005	YES
VOLATILES	1,1-Dichloroethene	-	0.0006	NE	NE	0.005	YES
VOLATILES	1,1-Dichloropropene	-	0.0006	NE	NE	0.005	YES
VOLATILES	1,2,3-Trichlorobenzene	-	0.0006	NE	NE	0.005	YES
VOLATILES	1,2,3-Trichloropropane	-	0.0012	NE	NE	0.005	YES
VOLATILES	1,2,4-Trichlorobenzene	-	0.0006	NE	NE	0.165	YES
VOLATILES	1,2,4-Trimethylbenzene	-	0.0006	NE	NE	0.005	YES
VOLATILES	1,2-Dibromo-3-chloropropane	-	0.0025	NE	NE	0.005	YES
VOLATILES	1,2-Dibromoethane	-	0.0006	NE	NE	0.005	YES
VOLATILES	1,2-Dichlorobenzene	-	0.0006	NE	NE	0.165	YES
VOLATILES	1,2-Dichloroethane	-	0.0006	NE	NE	0.005	YES
VOLATILES	1,2-Dichloropropane	-	0.0006	NE	NE	0.005	YES
VOLATILES	1,2-Dimethylbenzene (o-Xylene)	-	0.0006	NE	NE	0.005	YES
VOLATILES	1,3,5-Trimethylbenzene	-	0.0006	NE	NE	0.005	YES
VOLATILES	1,3-Dichlorobenzene	-	0.0006	NE	NE	0.165	YES
VOLATILES	1,3-Dichloropropane	-	0.0006	NE	NE	0.005	YES

Table A9-1
Analytes Considered for Potential Risk of Leaching to Groundwater
Waste Rack Sump WRSump 013 near LHAAP-45

Group	Analyte	Max Detected	Max SQL Undetected	Surface Background	Subsurface Background	MQL	Calculate MSC ?
VOLATILES	1,4-Dichlorobenzene	-	0.0006	NE	NE	0.165	YES
VOLATILES	2,2-Dichloropropane	-	0.0006	NE	NE	0.005	YES
VOLATILES	2-Butanone	-	0.0031	NE	NE	0.01	YES
VOLATILES	2-Chloroethyl vinyl ether	-	0.0025	NE	NE	0.01	YES
VOLATILES	2-Chlorotoluene	-	0.0006	NE	NE	0.005	YES
VOLATILES	2-Hexanone	-	0.0031	NE	NE	0.01	YES
VOLATILES	4-Chlorotoluene	-	0.0006	NE	NE	0.005	YES
VOLATILES	Acetone	-	0.0062	NE	NE	0.01	YES
VOLATILES	Benzene	-	0.0006	NE	NE	0.005	YES
VOLATILES	Bromobenzene	-	0.0006	NE	NE	0.005	YES
VOLATILES	Bromochloromethane	-	0.0006	NE	NE	0.005	YES
VOLATILES	Bromodichloromethane	-	0.0006	NE	NE	0.005	YES
VOLATILES	Bromoform	-	0.0006	NE	NE	0.005	YES
VOLATILES	Bromomethane	-	0.0012	NE	NE	0.01	YES
VOLATILES	Carbon disulfide	-	0.0006	NE	NE	0.005	YES
VOLATILES	Carbon tetrachloride	-	0.0006	NE	NE	0.005	YES
VOLATILES	Chlorobenzene	-	0.0006	NE	NE	0.005	YES
VOLATILES	Chloroethane	-	0.0012	NE	NE	0.01	YES
VOLATILES	Chloroform	-	0.0006	NE	NE	0.005	YES
VOLATILES	Chloromethane	-	0.0025	NE	NE	0.01	YES
VOLATILES	cis-1,2-Dichloroethene	-	0.0006	NE	NE	0.005	YES
VOLATILES	cis-1,3-Dichloropropene	-	0.0006	NE	NE	0.005	YES
VOLATILES	Dibromochloromethane	-	0.0006	NE	NE	0.005	YES
VOLATILES	Dibromomethane	-	0.0006	NE	NE	0.005	YES
VOLATILES	Dichlorodifluoromethane	-	0.0012	NE	NE	0.01	YES
VOLATILES	Ethylbenzene	-	0.0006	NE	NE	0.005	YES
VOLATILES	Hexachlorobutadiene	-	0.0006	NE	NE	0.165	YES
VOLATILES	Isopropylbenzene	-	0.0006	NE	NE	0.005	YES
VOLATILES	m,p-Xylenes	-	0.0006	NE	NE	0.005	YES
VOLATILES	Methyl isobutyl ketone	-	0.0031	NE	NE	0.01	YES
VOLATILES	Methylene chloride	-	0.0012	NE	NE	0.005	YES
VOLATILES	Naphthalene	-	0.0006	NE	NE	0.165	YES
VOLATILES	n-BUTYLBENZENE	-	0.0006	NE	NE	0.005	YES
VOLATILES	n-PROPYLBENZENE	-	0.0006	NE	NE	0.005	YES
VOLATILES	p-ISOPROPYLTOLUENE	-	0.0006	NE	NE	0.005	YES
VOLATILES	sec-BUTYLBENZENE	-	0.0006	NE	NE	0.005	YES
VOLATILES	Styrene	-	0.0006	NE	NE	0.005	YES
VOLATILES	tert-BUTYLBENZENE	-	0.0006	NE	NE	0.005	YES
VOLATILES	Tetrachloroethene	-	0.0006	NE	NE	0.005	YES
VOLATILES	Toluene	-	0.0006	NE	NE	0.005	YES
VOLATILES	trans-1,2-Dichloroethene	-	0.0006	NE	NE	0.005	YES
VOLATILES	trans-1,3-Dichloropropene	-	0.0006	NE	NE	0.005	YES
VOLATILES	Trichloroethene	-	0.0006	NE	NE	0.005	YES
VOLATILES	Trichlorofluoromethane	-	0.0012	NE	NE	0.01	YES
VOLATILES	Vinyl acetate	-	0.0012	NE	NE	0.01	YES
VOLATILES	Vinyl chloride	-	0.0012	NE	NE	0.01	YES

Notes:

all concentrations in milligrams per kilogram (mg/kg)

Max Detected and Max SQL values taken from Table 11 of the main body of the Addendum.

NE - Not evaluated, background was only evaluated for metals and select other analytes.

SQL - sample quantitation limit.

MQL - method quantitation limit.

MSC - medium specific concentration.

Rules for Analyte Selection

1. Chemicals that are essential nutrients (Fe, Ca, Mg, K, Na, P), TCEQ (2001).

Table A9-2
Input Values for Parameters used to Calculate Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Waste Rack Sump WRSump 013 near LHAAP-45

Parameter		Value	Units	Comment	Reference
Soil Dry Bulk Density	ρ_b	1.5	g/cm^3	Typical value	USEPA, 1996, pg. 38.
Particle Density	$\rho_{particle}$	2.65	g/cm^3	TCEQ default value	30 TAC §350.75 (c) and (d)
Total Porosity	n	0.43	unitless	n = 1-(ρb/ρparticle) = 1-(1.5 g/cc/2.65 g/cc)	USEPA, 1996, pg. 38.
Volumetric Water Content of Soil	θ_w	0.13	unitless	Assumed 30%	USEPA, 1996, pg. 38.
Soil Fraction Organic Carbon	f_{oc}	0.02	unitless	TCEQ default value	30 TAC §335.567. Appendix I. (p. 26)
Net Infiltration Rate through soil	I	30.4	cm/yr	I = 0.0018 x P x P P - precipitation for Marshall Texas 130	TCEQ, 2000
Thickness of affected soil	L_1	61	cm	Samples taken at various depths from 0 down to 2 ft. Assumed 2 ft. (61 cm)	Table 11, main body of Addendum
Distance from top of affected soils to top of water bearing unit.	L_2	396	cm	smallest of values for L2 used in other attachments	Attachments 1-8
Groundwater Darcy Velocity	V_{gw}	241	cm/yr	Calculated = K*i*31500000 sec/yr	USEPA, 1996, pg. 42.
Hydraulic conductivity in groundwater bearing unit	K	9.92E-04	cm/sec	Average of values listed as modeling inputs in the appendices	Shaw, 2007, Appendices
Hydraulic gradient in groundwater bearing unit	i	0.0077	unitless	Average of values listed as modeling inputs in the appendices	Shaw, 2007, Appendices
Width of soil source area parallel to groundwater flow direction	W	1,000	cm	Only one location, W set at 1000 cm	See Figure A9-1
Groundwater mixing zone	d	305	cm	Most monitor wells in Shallow Zone have 10-ft screens (305 cm)	Jacobs, 2002, Apx A
Soil Air Filled Porosity (θ_a)	θ_a	0.30	unitless	n - θw	USEPA, 1996, pg. 38.
Henry's Law Constant	H'	Chemical specific property	unitless	See Table A9-4	TCEQ, 2008
Organic Carbon Partition Coefficient	K_{oc}	Chemical specific property	unitless	See Table A9-4	TCEQ, 2008
Soil Water Partition Coefficient	K_d	Chemical specific property	unitless	See Table A9-4	TCEQ, 2008

Notes:

Jacobs Engineering Group, Inc., 2002: *Final Remedial Investigation Report, Group 4 Sites, Sites 04, 08, 35A, 35B, 35C, 46, 47, 48, 50, 60,67, Goose Prairie Creek, Volumes 1 and 2: Report, Longhorn Army Ammunition Plant, Karnack, Texas, Oak Ridge, Tennessee, April.*

Shaw Environmental & Infrastructure (Shaw), 2007, *Final Modeling Report, Derivation of Soil and Groundwater Concentrations Protective of Surface Water and Sediment* , February.

Texas Commission on Environmental Quality (TCEQ), *Risk Reduction Rules* , 30 TAC §335.567. Appendix I.

TCEQ, 2000, Tier 2 PCL Equations, March, accessed at http://www.tceq.state.tx.us/assets/public/remediation/trrp/tier2.pdf

TCEQ, 2008: Texas Risk Reduction Program Physical Chemcial Properties Tables, April, accessed at http://www.tceq.state.tx.us/remediation/trrp/trrppcls.html

USEPA, 1996. Soil Screening Guidance: Technical Background Document, USEPA/540/R-95/128018, U. S. Environmental Protection Agency, Office of Emergency and Remedial Response, July.

Table A9-3
Determination of pH
Waste Rack Sump WRSump 013 near LHAAP-45

Source	pH Measurement	Comment
pH from Attachment 1	6.0	
pH from Attachment 2		same wells as Attachment 1, do not average
pH from Attachment 3		same wells as Attachment 1, do not average
pH from Attachment 4		same wells as Attachment 1, do not average
pH from Attachment 5	5.3	
pH from Attachment 6	6.0	
pH from Attachment 7	6.5	
pH from Attachment 8	5.9	
Average	5.94	
pH to be used	**5.9**	

Notes:

1. No pH readings for wells near WRSump013. Take average of other Attachments.

Table A9-4

Physical Chemical Properties of Chemicals of Concern[a]
Waste Rack Sump WRSump 013 near LHAAP-45

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
EXPLOSIVES	1,3,5-Trinitrobenzene	2.87E-06	1.41E+01	2.83E-01	3.53E+02	b
EXPLOSIVES	1,3-Dinitrobenzene	4.57E-06	3.00E+01	6.00E-01	5.40E+02	b
EXPLOSIVES	2,4,6-Trinitrotoluene	1.90E-05	3.02E+02	6.04E+00	1.30E+02	b
EXPLOSIVES	2,4-Dinitrotoluene	3.60E-05	5.13E+01	1.03E+00	2.85E+02	b
EXPLOSIVES	2,6-Dinitrotoluene	3.11E-05	4.17E+01	8.34E-01	1.82E+02	b
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	1.19E-07	5.62E+02	1.12E+01	1.73E+01	b
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	1.74E-07	3.63E+02	7.26E+00	3.64E+01	b
EXPLOSIVES	HMX	2.50E-14	3.98E-02	7.96E-04	2.37E+03	b
EXPLOSIVES	m-Nitrotoluene	2.24E-03	1.41E+02	2.81E+00	4.98E+02	b
EXPLOSIVES	Nitrobenzene	8.56E-04	1.32E+02	2.64E+00	1.90E+03	b
EXPLOSIVES	o-Nitrotoluene	1.87E-03	1.41E+02	2.81E+00	6.00E+02	b
EXPLOSIVES	p-Nitrotoluene	2.29E-03	1.41E+02	2.81E+00	4.00E+02	b
EXPLOSIVES	RDX	4.99E-04	6.31E+01	1.26E+00	3.87E+01	b
EXPLOSIVES	Tetryl	8.31E-11	2.34E+02	4.69E+00	7.50E+01	b
METALS	Aluminum	0.00E+00	NA	3.53E+04	0.00E+00	c
METALS	Antimony	0.00E+00	NA	6.00E+01	0.00E+00	d
METALS	Arsenic	0.00E+00	NA	2.70E+01	0.00E+00	d
METALS	Barium	0.00E+00	NA	2.80E+01	0.00E+00	d
METALS	Beryllium	0.00E+00	NA	6.90E+01	0.00E+00	d
METALS	Cadmium	0.00E+00	NA	3.50E+01	0.00E+00	d
METALS	Chromium	0.00E+00	NA	1.30E+05	0.00E+00	d
METALS	Cobalt	0.00E+00	NA	4.50E+01	0.00E+00	
METALS	Copper	0.00E+00	NA	4.00E+01	0.00E+00	
METALS	Lead	0.00E+00	NA	1.83E+03	0.00E+00	c
METALS	Manganese	0.00E+00	NA	5.01E+01	0.00E+00	
METALS	Mercury	4.74E-01	NA	2.30E+00	3.00E-02	d
METALS	Nickel	0.00E+00	NA	3.60E+01	0.00E+00	d
METALS	Selenium	0.00E+00	NA	9.20E+00	0.00E+00	d
METALS	Silver	0.00E+00	NA	1.10E+00	0.00E+00	d
METALS	Thallium	0.00E+00	NA	5.60E+01	2.90E+03	d
METALS	Vanadium	0.00E+00	NA	1.00E+03	0.00E+00	
METALS	Zinc	0.00E+00	NA	3.40E+01	0.00E+00	d
VOLATILES	1,1,1,2-Tetrachloroethane	9.98E-02	9.55E+02	1.91E+01	1.10E+03	b
VOLATILES	1,1,1-Trichloroethane	7.15E-01	1.10E+02	2.19E+00	1.33E+03	b
VOLATILES	1,1,2,2-Tetrachloroethane	1.55E-02	7.76E+01	1.55E+00	2.97E+03	b
VOLATILES	1,1,2-Trichloroethane	3.80E-02	5.01E+01	1.00E+00	4.42E+03	b
VOLATILES	1,1-Dichloroethane	2.39E-01	3.16E+01	6.32E-01	5.50E+03	b
VOLATILES	1,1-Dichloroethene	1.06E+00	6.46E+01	1.29E+00	2.40E+03	b
VOLATILES	1,1-Dichloropropene	1.82E+00	2.06E+02	4.12E+00	5.44E+02	b
VOLATILES	1,2,3-Trichlorobenzene	3.80E-02	8.91E+03	1.78E+02	1.64E+01	b
VOLATILES	1,2,3-Trichloropropane	1.58E-02	3.89E+02	7.78E+00	1.90E+03	b
VOLATILES	1,2,4-Trichlorobenzene	5.90E-02	1.66E+03	3.32E+01	4.88E+01	b
VOLATILES	1,2,4-Trimethylbenzene	1.84E-01	9.33E+02	1.87E+01	5.68E+01	b

Table A9-4
Physical Chemical Properties of Chemicals of Concern[a]
Waste Rack Sump WRSump 013 near LHAAP-45

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
VOLATILES	1,2-Dibromo-3-chloropropane	8.31E-03	1.70E+02	3.40E+00	1.00E+03	b
VOLATILES	1,2-Dibromoethane	2.93E-02	5.37E+01	1.07E+00	4.32E+03	b
VOLATILES	1,2-Dichlorobenzene	8.73E-02	6.92E+02	1.38E+01	1.50E+02	b
VOLATILES	1,2-Dichloroethane	5.32E-02	1.74E+01	3.48E-01	8.70E+03	b
VOLATILES	1,2-Dichloropropane	1.17E-01	5.89E+01	1.18E+00	2.80E+03	b
VOLATILES	1,2-Dimethylbenzene (o-Xylen	7.36E-04	1.29E+02	2.58E+00	1.78E+02	b
VOLATILES	1,3,5-Trimethylbenzene	2.72E-01	1.02E+03	2.05E+01	5.15E+01	b
VOLATILES	1,3-Dichlorobenzene	1.95E-01	1.70E+02	3.40E+00	1.10E+02	b
VOLATILES	1,3-Dichloropropane	5.52E-02	1.25E+02	2.50E+00	2.16E+03	b
VOLATILES	1,4-Dichlorobenzene	1.17E-01	6.46E+02	1.29E+01	7.38E+01	b
VOLATILES	2,2-Dichloropropane	3.39E-01	1.56E+02	3.11E+00	1.68E+03	b
VOLATILES	2-Butanone	1.94E-03	1.90E+00	3.80E-02	2.40E+05	b
VOLATILES	2-Chloroethyl vinyl ether	3.02E-02	3.72E+01	7.43E-01	5.02E+03	b
VOLATILES	2-Chlorotoluene	1.35E-01	4.07E+02	8.15E+00	1.54E+02	b
VOLATILES	2-Hexanone	3.38E-03	1.79E+01	3.58E-01	1.79E+04	b
VOLATILES	4-Chlorotoluene	1.33E-01	4.96E+02	9.93E+00	1.18E+02	b
VOLATILES	Acetone	1.61E-03	5.70E-01	1.14E-02	6.00E+05	b
VOLATILES	Benzene	2.27E-01	6.61E+01	1.32E+00	1.77E+03	b
VOLATILES	Bromobenzene	8.38E-02	2.42E+02	4.84E+00	2.98E+02	b
VOLATILES	Bromochloromethane	3.69E-02	2.75E+01	5.50E-01	2.04E+04	b
VOLATILES	Bromodichloromethane	1.32E-01	5.50E+01	1.10E+00	4.50E+03	b
VOLATILES	Bromoform	2.56E-02	8.71E+01	1.74E+00	3.20E+03	b
VOLATILES	Bromomethane	5.90E-01	1.05E+01	2.09E-01	1.52E+04	b
VOLATILES	Carbon disulfide	6.13E-01	5.25E+01	1.05E+00	2.30E+03	b
VOLATILES	Carbon tetrachloride	1.20E+00	1.86E+02	3.72E+00	8.05E+02	b
VOLATILES	Chlorobenzene	1.82E-01	2.14E+02	4.28E+00	5.02E+02	b
VOLATILES	Chloroethane	2.12E-01	1.78E+01	3.56E-01	2.00E+04	b
VOLATILES	Chloroform	1.53E-01	4.68E+01	9.35E-01	7.92E+03	b
VOLATILES	Chloromethane	1.44E+00	6.00E+00	1.20E-01	7.25E+03	b
VOLATILES	cis-1,2-Dichloroethene	1.87E-01	2.88E+01	5.77E-01	4.93E+03	b
VOLATILES	cis-1,3-Dichloropropene	9.15E-02	4.47E+01	8.93E-01	2.70E+03	b
VOLATILES	Dibromochloromethane	3.25E-02	6.31E+01	1.26E+00	5.25E+03	b
VOLATILES	Dibromomethane	3.49E-02	1.82E+02	3.64E+00	1.10E+04	b
VOLATILES	Dichlorodifluoromethane	1.67E+01	1.29E+02	2.58E+00	2.80E+02	b
VOLATILES	Ethylbenzene	3.28E-01	2.04E+02	4.08E+00	1.69E+02	b
VOLATILES	Hexachlorobutadiene	9.94E-01	6.92E+03	1.38E+02	2.55E+00	b
VOLATILES	Isopropylbenzene	6.07E-01	3.47E+03	6.93E+01	5.00E+01	b
VOLATILES	m,p-Xylenes	3.18E-01	3.09E+02	6.18E+00	1.85E+02	b
VOLATILES	Methyl isobutyl ketone	5.82E-03	1.50E+01	3.00E-01	1.90E+04	b
VOLATILES	Methylene chloride	9.10E-02	1.17E+01	2.35E-01	1.54E+04	b
VOLATILES	Naphthalene	2.00E-02	1.55E+03	3.10E+01	3.14E+01	b
VOLATILES	n-BUTYLBENZENE	5.57E-01	3.02E+03	6.04E+01	1.08E+01	b
VOLATILES	n-PROPYLBENZENE	4.24E-01	1.07E+03	2.14E+01	4.20E+01	b

Table A9-4

Physical Chemical Properties of Chemicals of Concern [a]
Waste Rack Sump WRSump 013 near LHAAP-45

Test Group	Chemical of Concern	Henry's Law Constant (H') (unitless)	Organic Carbon Partition Coefficient (Koc, unitless)	Soil Water Partition Coefficient (Kd, unitless)	Solubility in Water (S, mg/L)	Note
VOLATILES	p-ISOPROPYLTOLUENE	4.66E-01	2.29E+03	4.58E+01	1.71E+01	b
VOLATILES	sec-BUTYLBENZENE	5.07E-01	2.09E+03	4.18E+01	1.81E+01	b
VOLATILES	Styrene	1.14E-01	7.59E+02	1.52E+01	3.10E+02	b
VOLATILES	tert-BUTYLBENZENE	8.56E-01	2.45E+03	4.91E+01	1.51E+01	b
VOLATILES	Tetrachloroethene	7.65E-01	1.55E+02	3.10E+00	2.00E+02	b
VOLATILES	Toluene	2.76E-01	1.40E+02	2.80E+00	5.30E+02	b
VOLATILES	trans-1,2-Dichloroethene	3.90E-01	5.01E+01	1.00E+00	6.30E+03	b
VOLATILES	trans-1,3-Dichloropropene	9.15E-02	4.47E+01	8.93E-01	2.80E+03	b
VOLATILES	Trichloroethene	4.28E-01	9.33E+01	1.87E+00	1.10E+03	b
VOLATILES	Trichlorofluoromethane	4.03E+00	1.35E+02	2.70E+00	1.10E+03	b
VOLATILES	Vinyl acetate	2.29E-02	5.25E+00	1.05E-01	2.00E+04	b
VOLATILES	Vinyl chloride	3.49E+00	1.10E+01	2.19E-01	2.76E+03	b

Notes:

Chemicals of Concern shown in Table A9-1.

pH value of 5.9 averaged from pH Values on Table A9-3.

a Annual TCEQ update of chemical/physical properties table [(Figure: 30 TAC §350.73(e)], April 2008.

b Kd value calculated by formula Koc * foc for non-metals.

c pH-dependent Kd value obtained from Figure 30TAC§350.73(e)(1)(A), April 2008.

d pH-dependent Kd value obtained from Figure 30TAC§350.73(e)(1)(C), April 2008.

mg/L - milligrams per liter

Table A9-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Waste Rack Sump WRSump 013 near LHAAP-45

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
EXPLOSIVES	1,3,5-Trinitrobenzene	2.87E-06	2.83E-01	3.53E+02	2.71E+00	1.3E+02	3.1E+00	2.5E+01	none	**2.5E+01**
EXPLOSIVES	1,3-Dinitrobenzene	4.57E-06	6.00E-01	5.40E+02	1.46E+00	3.7E+02	1.0E-02	1.6E-01	none	**1.6E-01**
EXPLOSIVES	2,4,6-Trinitrotoluene	1.90E-05	6.04E+00	1.30E+02	1.63E-01	8.0E+02	5.1E-02	6.9E+00	none	**6.9E+00**
EXPLOSIVES	2,4-Dinitrotoluene	3.60E-05	1.03E+00	2.85E+02	8.99E-01	3.2E+02	4.2E-04	1.0E-02	none	**1.0E-02**
EXPLOSIVES	2,6-Dinitrotoluene	3.11E-05	8.34E-01	1.82E+02	1.09E+00	1.7E+02	4.2E-04	8.6E-03	none	**8.6E-03**
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	1.19E-07	1.12E+01	1.73E+01	8.82E-02	2.0E+02	1.7E-02	4.3E+00	none	**4.3E+00**
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	1.74E-07	7.26E+00	3.64E+01	1.36E-01	2.7E+02	1.7E-02	2.8E+00	none	**2.8E+00**
EXPLOSIVES	HMX	2.50E-14	7.96E-04	2.37E+03	1.14E+01	2.1E+02	5.1E+00	9.9E+00	none	**9.9E+00**
EXPLOSIVES	m-Nitrotoluene	2.24E-03	2.81E+00	4.98E+02	3.45E-01	1.4E+03	1.0E+00	6.6E+01	none	**6.6E+01**
EXPLOSIVES	Nitrobenzene	8.56E-04	2.64E+00	1.90E+03	3.67E-01	5.2E+03	5.1E-02	3.1E+00	none	**3.1E+00**
EXPLOSIVES	o-Nitrotoluene	1.87E-03	2.81E+00	6.00E+02	3.45E-01	1.7E+03	1.0E+00	6.6E+01	none	**6.6E+01**
EXPLOSIVES	p-Nitrotoluene	2.29E-03	2.81E+00	4.00E+02	3.45E-01	1.2E+03	1.0E+00	6.6E+01	none	**6.6E+01**
EXPLOSIVES	RDX	4.99E-04	1.26E+00	3.87E+01	7.41E-01	5.2E+01	2.6E-02	7.8E-01	none	**7.8E-01**
EXPLOSIVES	Tetryl	8.31E-11	4.69E+00	7.50E+01	2.09E-01	3.6E+02	1.0E+00	1.1E+02	none	**1.1E+02**
METALS	Aluminum	0.00E+00	3.53E+04	0.00E+00	2.83E-05	NA	1.0E+02	8.0E+07	1.63E+04	**8.0E+07**
METALS	Antimony	0.00E+00	6.00E+01	0.00E+00	1.66E-02	NA	6.0E-03	8.0E+00	9.40E-01	**8.0E+00**
METALS	Arsenic	0.00E+00	2.70E+01	0.00E+00	3.69E-02	NA	1.0E-02	6.0E+00	4.81E+00	**6.0E+00**
METALS	Barium	0.00E+00	2.80E+01	0.00E+00	3.56E-02	NA	2.0E+00	1.2E+03	8.55E+01	**1.2E+03**
METALS	Beryllium	0.00E+00	6.90E+01	0.00E+00	1.45E-02	NA	4.0E-03	6.1E+00	6.45E-01	**6.1E+00**
METALS	Cadmium	0.00E+00	3.50E+01	0.00E+00	2.85E-02	NA	5.0E-03	3.9E+00	4.00E-01	**3.9E+00**
METALS	Chromium	0.00E+00	1.30E+05	0.00E+00	7.69E-06	NA	1.0E-01	2.9E+05	2.66E+01	**2.9E+05**
METALS	Cobalt	0.00E+00	4.50E+01	0.00E+00	2.22E-02	NA	6.1E+00	6.1E+03	5.61E+00	**6.1E+03**
METALS	Copper	0.00E+00	4.00E+01	0.00E+00	2.49E-02	NA	1.3E+00	1.2E+03	5.55E+00	**1.2E+03**
METALS	Lead	0.00E+00	1.83E+03	0.00E+00	5.46E-04	NA	1.5E-02	6.1E+02	1.14E+01	**6.1E+02**
METALS	Manganese	0.00E+00	5.01E+01	0.00E+00	1.99E-02	NA	1.4E+01	1.6E+04	2.01E+02	**1.6E+04**
METALS	Mercury	4.74E-01	2.30E+00	3.00E-02	4.03E-01	7.4E-02	2.0E-03	1.1E-01	8.19E-02	**8.2E-02**
METALS	Nickel	0.00E+00	3.60E+01	0.00E+00	2.77E-02	NA	2.0E+00	1.6E+03	6.98E+00	**1.6E+03**
METALS	Selenium	0.00E+00	9.20E+00	0.00E+00	1.08E-01	NA	5.0E-02	1.0E+01	3.48E+00	**1.0E+01**
METALS	Silver	0.00E+00	1.10E+00	0.00E+00	8.43E-01	NA	5.1E-01	1.3E+01	3.10E-01	**1.3E+01**
METALS	Thallium	0.00E+00	5.60E+01	2.90E+03	1.78E-02	1.6E+05	2.0E-03	2.5E+00	4.70E-01	**2.5E+00**
METALS	Vanadium	0.00E+00	1.00E+03	0.00E+00	1.00E-03	NA	7.2E-01	1.6E+04	3.21E+01	**1.6E+04**
METALS	Zinc	0.00E+00	3.40E+01	0.00E+00	2.93E-02	NA	3.1E+01	2.3E+04	2.02E+01	**2.3E+04**
VOLATILES	1,1,1,2-Tetrachloroethane	9.98E-02	1.91E+01	1.10E+03	5.21E-02	2.1E+04	1.1E-01	4.7E+01	none	**4.7E+01**
VOLATILES	1,1,1-Trichloroethane	7.15E-01	2.19E+00	1.33E+03	4.13E-01	3.2E+03	2.0E-01	1.1E+01	none	**1.1E+01**
VOLATILES	1,1,2,2-Tetrachloroethane	1.55E-02	1.55E+00	2.97E+03	6.09E-01	4.9E+03	1.4E-02	5.2E-01	none	**5.2E-01**
VOLATILES	1,1,2-Trichloroethane	3.80E-02	1.00E+00	4.42E+03	9.12E-01	4.8E+03	5.0E-03	1.2E-01	none	**1.2E-01**
VOLATILES	1,1-Dichloroethane	2.39E-01	6.32E-01	5.50E+03	1.30E+00	4.2E+03	1.0E+01	1.7E+02	none	**1.7E+02**

Table A9-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Waste Rack Sump WRSump 013 near LHAAP-45

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
VOLATILES	1,1-Dichloroethene	1.06E+00	1.29E+00	2.40E+03	6.29E-01	3.8E+03	7.0E-03	2.5E-01	none	**2.5E-01**
VOLATILES	1,1-Dichloropropene	1.82E+00	4.12E+00	5.44E+02	2.19E-01	2.5E+03	2.9E-03	2.9E-01	none	**2.9E-01**
VOLATILES	1,2,3-Trichlorobenzene	3.80E-02	1.78E+02	1.64E+01	5.61E-03	2.9E+03	3.1E-01	1.2E+03	none	**1.2E+03**
VOLATILES	1,2,3-Trichloropropane	1.58E-02	7.78E+00	1.90E+03	1.27E-01	1.5E+04	4.1E-05	7.1E-03	none	**7.1E-03**
VOLATILES	1,2,4-Trichlorobenzene	5.90E-02	3.32E+01	4.88E+01	3.00E-02	1.6E+03	7.0E-02	5.2E+01	none	**5.2E+01**
VOLATILES	1,2,4-Trimethylbenzene	1.84E-01	1.87E+01	5.68E+01	5.32E-02	1.1E+03	5.1E+00	2.1E+03	none	**1.1E+03**
VOLATILES	1,2-Dibromo-3-chloropropane	8.31E-03	3.40E+00	1.00E+03	2.87E-01	3.5E+03	2.0E-04	1.5E-02	none	**1.5E-02**
VOLATILES	1,2-Dibromoethane	2.93E-02	1.07E+00	4.32E+03	8.57E-01	5.0E+03	5.0E-05	1.3E-03	none	**1.3E-03**
VOLATILES	1,2-Dichlorobenzene	8.73E-02	1.38E+01	1.50E+02	7.17E-02	2.1E+03	6.0E-01	1.9E+02	none	**1.9E+02**
VOLATILES	1,2-Dichloroethane	5.32E-02	3.48E-01	8.70E+03	2.25E+00	3.9E+03	5.0E-03	4.9E-02	none	**4.9E-02**
VOLATILES	1,2-Dichloropropane	1.17E-01	1.18E+00	2.80E+03	7.77E-01	3.6E+03	5.0E-03	1.4E-01	none	**1.4E-01**
VOLATILES	1,2-Dimethylbenzene (o-Xylene)	7.36E-04	2.58E+00	1.78E+02	3.75E-01	4.7E+02	1.0E+01	5.9E+02	none	**4.7E+02**
VOLATILES	1,3,5-Trimethylbenzene	2.72E-01	2.05E+01	5.15E+01	4.85E-02	1.1E+03	5.1E+00	2.3E+03	none	**1.1E+03**
VOLATILES	1,3-Dichlorobenzene	1.95E-01	3.40E+00	1.10E+02	2.84E-01	3.9E+02	3.1E+00	2.4E+02	none	**2.4E+02**
VOLATILES	1,3-Dichloropropane	5.52E-02	2.50E+00	2.16E+03	3.85E-01	5.6E+03	2.9E-02	1.6E+00	none	**1.6E+00**
VOLATILES	1,4-Dichlorobenzene	1.17E-01	1.29E+01	7.38E+01	7.68E-02	9.6E+02	7.5E-02	2.2E+01	none	**2.2E+01**
VOLATILES	2,2-Dichloropropane	3.39E-01	3.11E+00	1.68E+03	3.06E-01	5.5E+03	4.2E-02	3.0E+00	none	**3.0E+00**
VOLATILES	2-Butanone	1.94E-03	3.80E-02	2.40E+05	8.00E+00	3.0E+04	6.1E+01	1.7E+02	none	**1.7E+02**
VOLATILES	2-Chloroethyl vinyl ether	3.02E-02	7.43E-01	5.02E+03	1.20E+00	4.2E+03	2.6E-03	4.8E-02	none	**4.8E-02**
VOLATILES	2-Chlorotoluene	1.35E-01	8.15E+00	1.54E+02	1.21E-01	1.3E+03	2.0E+00	3.7E+02	none	**3.7E+02**
VOLATILES	2-Hexanone	3.38E-03	3.58E-01	1.79E+04	2.25E+00	8.0E+03	6.1E+00	6.1E+01	none	**6.1E+01**
VOLATILES	4-Chlorotoluene	1.33E-01	9.93E+00	1.18E+02	9.96E-02	1.2E+03	2.0E+00	4.5E+02	none	**4.5E+02**
VOLATILES	Acetone	1.61E-03	1.14E-02	6.00E+05	1.02E+01	5.9E+04	9.2E+01	2.0E+02	none	**2.0E+02**
VOLATILES	Benzene	2.27E-01	1.32E+00	1.77E+03	6.88E-01	2.6E+03	5.0E-03	1.6E-01	none	**1.6E-01**
VOLATILES	Bromobenzene	8.38E-02	4.84E+00	2.98E+02	2.02E-01	1.5E+03	2.0E+00	2.2E+02	none	**2.2E+02**
VOLATILES	Bromochloromethane	3.69E-02	5.50E-01	2.04E+04	1.55E+00	1.3E+04	4.1E+00	5.8E+01	none	**5.8E+01**
VOLATILES	Bromodichloromethane	1.32E-01	1.10E+00	4.50E+03	8.25E-01	5.5E+03	4.6E-03	1.2E-01	none	**1.2E-01**
VOLATILES	Bromoform	2.56E-02	1.74E+00	3.20E+03	5.45E-01	5.9E+03	3.6E-02	1.5E+00	none	**1.5E+00**
VOLATILES	Bromomethane	5.90E-01	2.09E-01	1.52E+04	2.41E+00	6.3E+03	1.4E-01	1.3E+00	none	**1.3E+00**
VOLATILES	Carbon disulfide	6.13E-01	1.05E+00	2.30E+03	7.94E-01	2.9E+03	1.0E+01	2.9E+02	none	**2.9E+02**
VOLATILES	Carbon tetrachloride	1.20E+00	3.72E+00	8.05E+02	2.47E-01	3.3E+03	5.0E-03	4.5E-01	none	**4.5E-01**
VOLATILES	Chlorobenzene	1.82E-01	4.28E+00	5.02E+02	2.27E-01	2.2E+03	1.0E-01	9.8E+00	none	**9.8E+00**
VOLATILES	Chloroethane	2.12E-01	3.56E-01	2.00E+04	2.06E+00	9.7E+03	4.1E+01	4.4E+02	none	**4.4E+02**
VOLATILES	Chloroform	1.53E-01	9.35E-01	7.92E+03	9.50E-01	8.3E+03	1.0E+00	2.4E+01	none	**2.4E+01**
VOLATILES	Chloromethane	1.44E+00	1.20E-01	7.25E+03	2.02E+00	3.6E+03	2.2E-01	2.4E+00	none	**2.4E+00**
VOLATILES	cis-1,2-Dichloroethene	1.87E-01	5.77E-01	4.93E+03	1.43E+00	3.5E+03	7.0E-02	1.1E+00	none	**1.1E+00**
VOLATILES	cis-1,3-Dichloropropene	9.15E-02	8.93E-01	2.70E+03	1.00E+00	2.7E+03	5.3E-03	1.2E-01	none	**1.2E-01**

Table A9-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Waste Rack Sump WRSump 013 near LHAAP-45

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)
VOLATILES	Dibromochloromethane	3.25E-02	1.26E+00	5.25E+03	7.38E-01	7.1E+03	3.4E-02	1.0E+00	none	**1.0E+00**
VOLATILES	Dibromomethane	3.49E-02	3.64E+00	1.10E+04	2.68E-01	4.1E+04	3.8E-01	3.2E+01	none	**3.2E+01**
VOLATILES	Dichlorodifluoromethane	1.67E+01	2.58E+00	2.80E+02	1.67E-01	1.7E+03	2.0E+01	2.7E+03	none	**1.7E+03**
VOLATILES	Ethylbenzene	3.28E-01	4.08E+00	1.69E+02	2.36E-01	7.2E+02	7.0E-01	6.6E+01	none	**6.6E+01**
VOLATILES	Hexachlorobutadiene	9.94E-01	1.38E+02	2.55E+00	7.21E-03	3.5E+02	2.0E-02	6.3E+01	none	**6.3E+01**
VOLATILES	Isopropylbenzene	6.07E-01	6.93E+01	5.00E+01	1.44E-02	3.5E+03	1.0E+01	1.6E+04	none	**3.5E+03**
VOLATILES	m,p-Xylenes	3.18E-01	6.18E+00	1.85E+02	1.58E-01	1.2E+03	1.0E+01	1.4E+03	none	**1.2E+03**
VOLATILES	Methyl isobutyl ketone	5.82E-03	3.00E-01	1.90E+04	2.58E+00	7.4E+03	8.2E+00	7.0E+01	none	**7.0E+01**
VOLATILES	Methylene chloride	9.10E-02	2.35E-01	1.54E+04	2.94E+00	5.2E+03	5.0E-03	3.8E-02	none	**3.8E-02**
VOLATILES	Naphthalene	2.00E-02	3.10E+01	3.14E+01	3.22E-02	9.8E+02	2.0E+00	1.4E+03	none	**9.8E+02**
VOLATILES	n-BUTYLBENZENE	5.57E-01	6.04E+01	1.08E+01	1.65E-02	6.5E+02	4.1E+00	5.5E+03	none	**6.5E+02**
VOLATILES	n-PROPYLBENZENE	4.24E-01	2.14E+01	4.20E+01	4.63E-02	9.1E+02	4.1E+00	2.0E+03	none	**9.1E+02**
VOLATILES	p-ISOPROPYLTOLUENE	4.66E-01	4.58E+01	1.71E+01	2.17E-02	7.9E+02	1.0E+01	1.0E+04	none	**7.9E+02**
VOLATILES	sec-BUTYLBENZENE	5.07E-01	4.18E+01	1.81E+01	2.38E-02	7.6E+02	4.1E+00	3.8E+03	none	**7.6E+02**
VOLATILES	Styrene	1.14E-01	1.52E+01	3.10E+02	6.54E-02	4.7E+03	1.0E-01	3.4E+01	none	**3.4E+01**
VOLATILES	tert-BUTYLBENZENE	8.56E-01	4.91E+01	1.51E+01	2.03E-02	7.4E+02	4.1E+00	4.5E+03	none	**7.4E+02**
VOLATILES	Tetrachloroethene	7.65E-01	3.10E+00	2.00E+02	3.00E-01	6.7E+02	5.0E-03	3.7E-01	none	**3.7E-01**
VOLATILES	Toluene	2.76E-01	2.80E+00	5.30E+02	3.40E-01	1.6E+03	1.0E+00	6.5E+01	none	**6.5E+01**
VOLATILES	trans-1,2-Dichloroethene	3.90E-01	1.00E+00	6.30E+03	8.57E-01	7.4E+03	1.0E-01	2.6E+00	none	**2.6E+00**
VOLATILES	trans-1,3-Dichloropropene	9.15E-02	8.93E-01	2.80E+03	1.00E+00	2.8E+03	2.9E-02	6.3E-01	none	**6.3E-01**
VOLATILES	Trichloroethene	4.28E-01	1.87E+00	1.10E+03	4.90E-01	2.2E+03	5.0E-03	2.3E-01	none	**2.3E-01**
VOLATILES	Trichlorofluoromethane	4.03E+00	2.70E+00	1.10E+03	2.78E-01	4.0E+03	3.1E+01	2.4E+03	none	**2.4E+03**
VOLATILES	Vinyl acetate	2.29E-02	1.05E-01	2.00E+04	5.10E+00	3.9E+03	1.0E+02	4.4E+02	none	**4.4E+02**
VOLATILES	Vinyl chloride	3.49E+00	2.19E-01	2.76E+03	9.96E-01	2.8E+03	2.0E-03	4.5E-02	none	**4.5E-02**

Table A9-5
Risk Reduction Standard 3 Groundwater-Protective MSCs for Soil
Waste Rack Sump WRSump 013 near LHAAP-45

Test Group	Chemical of Concern	H' (unitless)	Kd (unitless)	S (mg/L)	Ksw (L/kg)	Csat (mg/kg)	GW-Ind (mg/L)	Calculated Soil MSC (mg/kg)	Background (mg/kg)	Applicable Standard 3 Commercial / Industrial MSC (mg/kg)

Notes:	Constants	Values
Values of constants shown in Table A9-2.	rb	1.5
Values of H', Kd, and S shown in Table A9-4.	qw	0.13
GW-Ind - groundwater qualified for industrial use	qa	0.30
L/kg - liters per kilogram	L1	61
mg/kg - milligrams per kilogram	L2	396
mg/L - milligrams per liter	W	1000
MSC - medium specific concentrations	Vgw	241
	I	30.4
Calculated Values:	dgw	305
Ksw = see Equation 8	LDF	3.414
Csat = see Equation 7		
LDF = see Equation 5		
Soil MSC = see Equation 6		

Applicable Standard 3 Commercial / Industrial MSC equals the lower of the Calculated Soil MSC and Csat values. However, if the Background is larger than both values, the Applicable Standard 3 Commercial / Industrial MSC equals the Background concentration.

Table A9-6
Comparison to Maximum Soil Concentrations
Waste Rack Sump WRSump 013 near LHAAP-45

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
EXPLOSIVES	1,3,5-Trinitrobenzene	**2.5E+01**	-	0.120	All Results < MSC
EXPLOSIVES	1,3-Dinitrobenzene	**1.6E-01**	-	0.120	All Results < MSC
EXPLOSIVES	2,4,6-Trinitrotoluene	**6.9E+00**	-	0.120	All Results < MSC
EXPLOSIVES	2,4-Dinitrotoluene	**1.0E-02**	-	0.120	Never detected, SQL > MSC
EXPLOSIVES	2,6-Dinitrotoluene	**8.6E-03**	-	0.120	Never detected, SQL > MSC
EXPLOSIVES	2-Amino-4,6-dinitrotoluene	**4.3E+00**	-	0.120	All Results < MSC
EXPLOSIVES	4-Amino-2,6-dinitrotoluene	**2.8E+00**	-	0.120	All Results < MSC
EXPLOSIVES	HMX	**9.9E+00**	-	0.120	All Results < MSC
EXPLOSIVES	m-Nitrotoluene	**6.6E+01**	-	0.120	All Results < MSC
EXPLOSIVES	Nitrobenzene	**3.1E+00**	-	0.156	All Results < MSC
EXPLOSIVES	o-Nitrotoluene	**6.6E+01**	-	0.120	All Results < MSC
EXPLOSIVES	p-Nitrotoluene	**6.6E+01**	-	0.120	All Results < MSC
EXPLOSIVES	RDX	**7.8E-01**	-	0.120	All Results < MSC
EXPLOSIVES	Tetryl	**1.1E+02**	-	0.240	All Results < MSC
METALS	Aluminum	**8.0E+07**	15621	-	All Results < MSC
METALS	Antimony	**8.0E+00**	0.116	0.073	All Results < MSC
METALS	Arsenic	**6.0E+00**	4.93	-	All Results < MSC
METALS	Barium	**1.2E+03**	143	-	All Results < MSC
METALS	Beryllium	**6.1E+00**	0.593	-	All Results < MSC
METALS	Cadmium	**3.9E+00**	-	0.055	All Results < MSC
METALS	Chromium	**2.9E+05**	14.3	-	All Results < MSC
METALS	Cobalt	**6.1E+03**	7.15	-	All Results < MSC
METALS	Copper	**1.2E+03**	3.50	-	All Results < MSC
METALS	Lead	**6.1E+02**	30.3	-	All Results < MSC
METALS	Manganese	**1.6E+04**	107	-	All Results < MSC
METALS	Mercury	**8.2E-02**	0.0485	0.014	All Results < MSC
METALS	Nickel	**1.6E+03**	6.91	-	All Results < MSC
METALS	Selenium	**1.0E+01**	0.439	0.146	All Results < MSC
METALS	Silver	**1.3E+01**	-	0.277	All Results < MSC
METALS	Thallium	**2.5E+00**	0.297	-	All Results < MSC
METALS	Vanadium	**1.6E+04**	31.0	-	All Results < MSC
METALS	Zinc	**2.3E+04**	31.4	-	All Results < MSC
VOLATILES	1,1,1,2-Tetrachloroethane	**4.7E+01**	-	0.0006	All Results < MSC
VOLATILES	1,1,1-Trichloroethane	**1.1E+01**	-	0.0006	All Results < MSC
VOLATILES	1,1,2,2-Tetrachloroethane	**5.2E-01**	-	0.0006	All Results < MSC
VOLATILES	1,1,2-Trichloroethane	**1.2E-01**	-	0.0006	All Results < MSC
VOLATILES	1,1-Dichloroethane	**1.7E+02**	-	0.0012	All Results < MSC
VOLATILES	1,1-Dichloroethene	**2.5E-01**	-	0.0006	All Results < MSC
VOLATILES	1,1-Dichloropropene	**2.9E-01**	-	0.0006	All Results < MSC
VOLATILES	1,2,3-Trichlorobenzene	**1.2E+03**	-	0.0006	All Results < MSC
VOLATILES	1,2,3-Trichloropropane	**7.1E-03**	-	0.0012	All Results < MSC
VOLATILES	1,2,4-Trichlorobenzene	**5.2E+01**	-	0.0006	All Results < MSC
VOLATILES	1,2,4-Trimethylbenzene	**1.1E+03**	-	0.0006	All Results < MSC
VOLATILES	1,2-Dibromo-3-chloropropane	**1.5E-02**	-	0.0025	All Results < MSC
VOLATILES	1,2-Dibromoethane	**1.3E-03**	-	0.0006	All Results < MSC

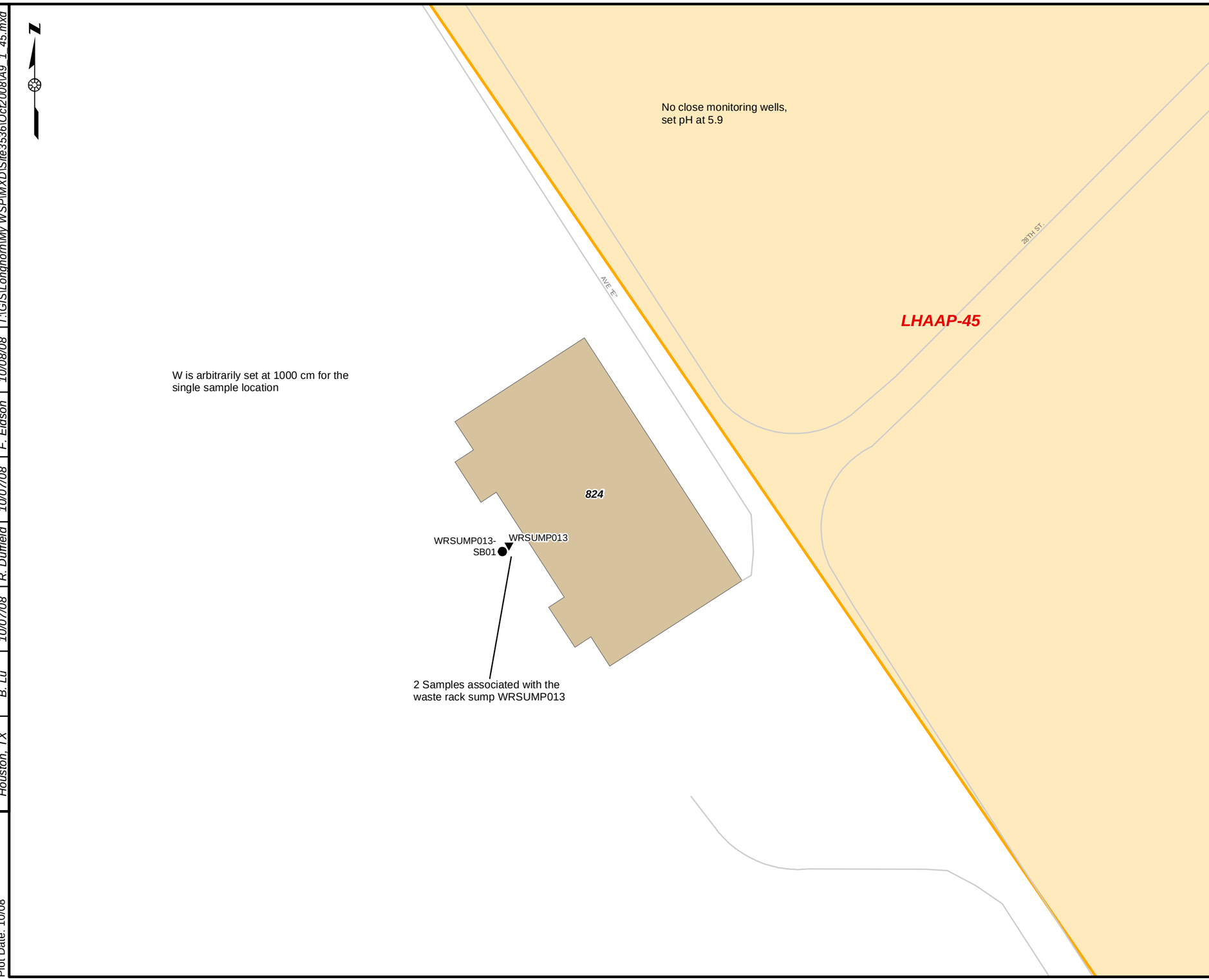
Table A9-6
Comparison to Maximum Soil Concentrations
Waste Rack Sump WRSump 013 near LHAAP-45

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
VOLATILES	1,2-Dichlorobenzene	**1.9E+02**	-	0.0006	All Results < MSC
VOLATILES	1,2-Dichloroethane	**4.9E-02**	-	0.0006	All Results < MSC
VOLATILES	1,2-Dichloropropane	**1.4E-01**	-	0.0006	All Results < MSC
VOLATILES	1,2-Dimethylbenzene (o-Xylen	**4.7E+02**	-	0.0006	All Results < MSC
VOLATILES	1,3,5-Trimethylbenzene	**1.1E+03**	-	0.0006	All Results < MSC
VOLATILES	1,3-Dichlorobenzene	**2.4E+02**	-	0.0006	All Results < MSC
VOLATILES	1,3-Dichloropropane	**1.6E+00**	-	0.0006	All Results < MSC
VOLATILES	1,4-Dichlorobenzene	**2.2E+01**	-	0.0006	All Results < MSC
VOLATILES	2,2-Dichloropropane	**3.0E+00**	-	0.0006	All Results < MSC
VOLATILES	2-Butanone	**1.7E+02**	-	0.0031	All Results < MSC
VOLATILES	2-Chloroethyl vinyl ether	**4.8E-02**	-	0.0025	All Results < MSC
VOLATILES	2-Chlorotoluene	**3.7E+02**	-	0.0006	All Results < MSC
VOLATILES	2-Hexanone	**6.1E+01**	-	0.0031	All Results < MSC
VOLATILES	4-Chlorotoluene	**4.5E+02**	-	0.0006	All Results < MSC
VOLATILES	Acetone	**2.0E+02**	-	0.0062	All Results < MSC
VOLATILES	Benzene	**1.6E-01**	-	0.0006	All Results < MSC
VOLATILES	Bromobenzene	**2.2E+02**	-	0.0006	All Results < MSC
VOLATILES	Bromochloromethane	**5.8E+01**	-	0.0006	All Results < MSC
VOLATILES	Bromodichloromethane	**1.2E-01**	-	0.0006	All Results < MSC
VOLATILES	Bromoform	**1.5E+00**	-	0.0006	All Results < MSC
VOLATILES	Bromomethane	**1.3E+00**	-	0.0012	All Results < MSC
VOLATILES	Carbon disulfide	**2.9E+02**	-	0.0006	All Results < MSC
VOLATILES	Carbon tetrachloride	**4.5E-01**	-	0.0006	All Results < MSC
VOLATILES	Chlorobenzene	**9.8E+00**	-	0.0006	All Results < MSC
VOLATILES	Chloroethane	**4.4E+02**	-	0.0012	All Results < MSC
VOLATILES	Chloroform	**2.4E+01**	-	0.0006	All Results < MSC
VOLATILES	Chloromethane	**2.4E+00**	-	0.0025	All Results < MSC
VOLATILES	cis-1,2-Dichloroethene	**1.1E+00**	-	0.0006	All Results < MSC
VOLATILES	cis-1,3-Dichloropropene	**1.2E-01**	-	0.0006	All Results < MSC
VOLATILES	Dibromochloromethane	**1.0E+00**	-	0.0006	All Results < MSC
VOLATILES	Dibromomethane	**3.2E+01**	-	0.0006	All Results < MSC
VOLATILES	Dichlorodifluoromethane	**1.7E+03**	-	0.0012	All Results < MSC
VOLATILES	Ethylbenzene	**6.6E+01**	-	0.0006	All Results < MSC
VOLATILES	Hexachlorobutadiene	**6.3E+01**	-	0.0006	All Results < MSC
VOLATILES	Isopropylbenzene	**3.5E+03**	-	0.0006	All Results < MSC
VOLATILES	m,p-Xylenes	**1.2E+03**	-	0.0006	All Results < MSC
VOLATILES	Methyl isobutyl ketone	**7.0E+01**	-	0.0031	All Results < MSC
VOLATILES	Methylene chloride	**3.8E-02**	-	0.0012	All Results < MSC
VOLATILES	Naphthalene	**9.8E+02**	-	0.0006	All Results < MSC
VOLATILES	n-BUTYLBENZENE	**6.5E+02**	-	0.0006	All Results < MSC
VOLATILES	n-PROPYLBENZENE	**9.1E+02**	-	0.0006	All Results < MSC
VOLATILES	p-ISOPROPYLTOLUENE	**7.9E+02**	-	0.0006	All Results < MSC
VOLATILES	sec-BUTYLBENZENE	**7.6E+02**	-	0.0006	All Results < MSC
VOLATILES	Styrene	**3.4E+01**	-	0.0006	All Results < MSC
VOLATILES	tert-BUTYLBENZENE	**7.4E+02**	-	0.0006	All Results < MSC

Table A9-6
Comparison to Maximum Soil Concentrations
Waste Rack Sump WRSump 013 near LHAAP-45

Test Group	Chemical of Concern	Applicable Standard 3 Commercial/Industrial Soil MSC (mg/kg)	Maximum Detected Soil Concentration (mg/kg)	Maximum Undetected SQL (mg/kg)	Comment
VOLATILES	Tetrachloroethene	**3.7E-01**	-	0.0006	All Results < MSC
VOLATILES	Toluene	**6.5E+01**	-	0.0006	All Results < MSC
VOLATILES	trans-1,2-Dichloroethene	**2.6E+00**	-	0.0006	All Results < MSC
VOLATILES	trans-1,3-Dichloropropene	**6.3E-01**	-	0.0006	All Results < MSC
VOLATILES	Trichloroethene	**2.3E-01**	-	0.0006	All Results < MSC
VOLATILES	Trichlorofluoromethane	**2.4E+03**	-	0.0012	All Results < MSC
VOLATILES	Vinyl acetate	**4.4E+02**	-	0.0012	All Results < MSC
VOLATILES	Vinyl chloride	**4.5E-02**	-	0.0012	All Results < MSC

Notes:
Maximum Soil Concentrations shown in Table 11 of the Shaw (2008) Addendum.
mg/kg - milligrams per kilogram
MSC - medium specific concentration
SQL - sample quantitation limit



Legend

- Monitoring Well
- Sumps
- Surface Soil
- Soil Boring
- Stream
- Road
- Former Building or Concrete Slab
- Site

0 25 50 100 Feet

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

FIGURE A9-1

LHAAP-45 SAMPLE LOCATION MAP

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	FILE PATH
Houston, TX	B. Lu 10/07/08	R. Duffield 10/07/08	F. Eidson 10/08/08	T:\GIS\Longhorn\My WSP\MXD\Site3536\Oct2008\A9_1_45.mxd

Plot Date: 10/08

00073624

INTERIM REMEDIAL ACTION
BURNING GROUND NO. 3 AND
UNLINED EVAPORATION POND
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

PILOT STUDY REPORT - PHASE II

PREPARED FOR

UNITED STATES ARMY CORPS OF ENGINEERS
TULSA DISTRICT

PREPARED BY

DOW ENVIRONMENTAL, INC.
(FORMERLY AWD TECHNOLOGIES, INC.)
ROCKVILLE, MARYLAND

MARCH 15, 1995
USACE CONTRACT NUMBER DACA56-93-D-0016
DELIVERY ORDER 0002
MODIFICATION 000203
DEI PROJECT NO. 2379

TABLE OF CONTENTS

SECTION	Page No.
1.0 INTRODUCTION	1-1
1.1 General	1-1
1.2 Site Description and Background	1-2
1.3 Summary of Activities	1-2
2.0 RESULTS OF PILOT STUDY	2-1
2.1 Task 1 - Groundwater Sampling Prior to Initiation of Construction	2-1
2.2 Task 2- Construction of Temporary Staging and Storage Area	2-1
2.3 Task 3- Construction of The Interceptor Collection Trench (ICT)	2-14
2.3.1 Geophysical Survey	2-14
2.3.2 Soil Borings and Temporary Groundwater Monitoring Wells Piezometers	2-15
2.3.3 Construction of the ICT	2-20
2.4 Task 4- Installation of Horizontal Extraction Well	2-23
2.4.1 Soil Borings and Temporary Groundwater Monitoring Wells Piezometers	2-23
2.4.2 Installation of the HEW	2-24
2.5 Task 5 - Groundwater Flow Testing	2-27
2.5.1 Gravity Flow Testing	2-27
2.5.1.1 Vertical Extraction Well Gravity Flow Test	2-28
2.5.1.2 Horizontal Extraction Well Gravity Flow Test	2-28
2.5.1.3 Interceptor Collection Trench Gravity Flow Test	2-36
2.5.2 Vacuum Enhanced Liquid Extraction	2-47
2.5.2.1 Vertical Extraction Well VELE Test	2-47
2.5.2.2 Horizontal Extraction Well VELE Test	2-52
2.5.2.3 Interceptor Collection Trench VELE Test	2-52
2.6 Task 6 - Groundwater Sampling, July-August, and October-November, 1994	2-57
3.0 CONCLUSIONS AND RECOMMENDATIONS	3-1

1.0 INTRODUCTION

1.1 General

This report summarizes the results of the Phase II Work for the Interim Remedial Action (IRA) at Burning Ground 3 and the Unlined Evaporation Pond (UEP), also referred to as LHAAP 18 & 24. The site is located within Longhorn Army Ammunition Plant (LHAAP) in Karnack, Texas. This report is submitted by Dow Environmental Inc. (DEI) formerly, AWD Technologies, Inc. (AWD) in partial fulfillment of the requirements of Contract No. DACA56-93-D-0016, Delivery Order No. 0002 for the U.S. Army Corps of Engineers (USACE), Tulsa District.

1.2 Site Description and Background

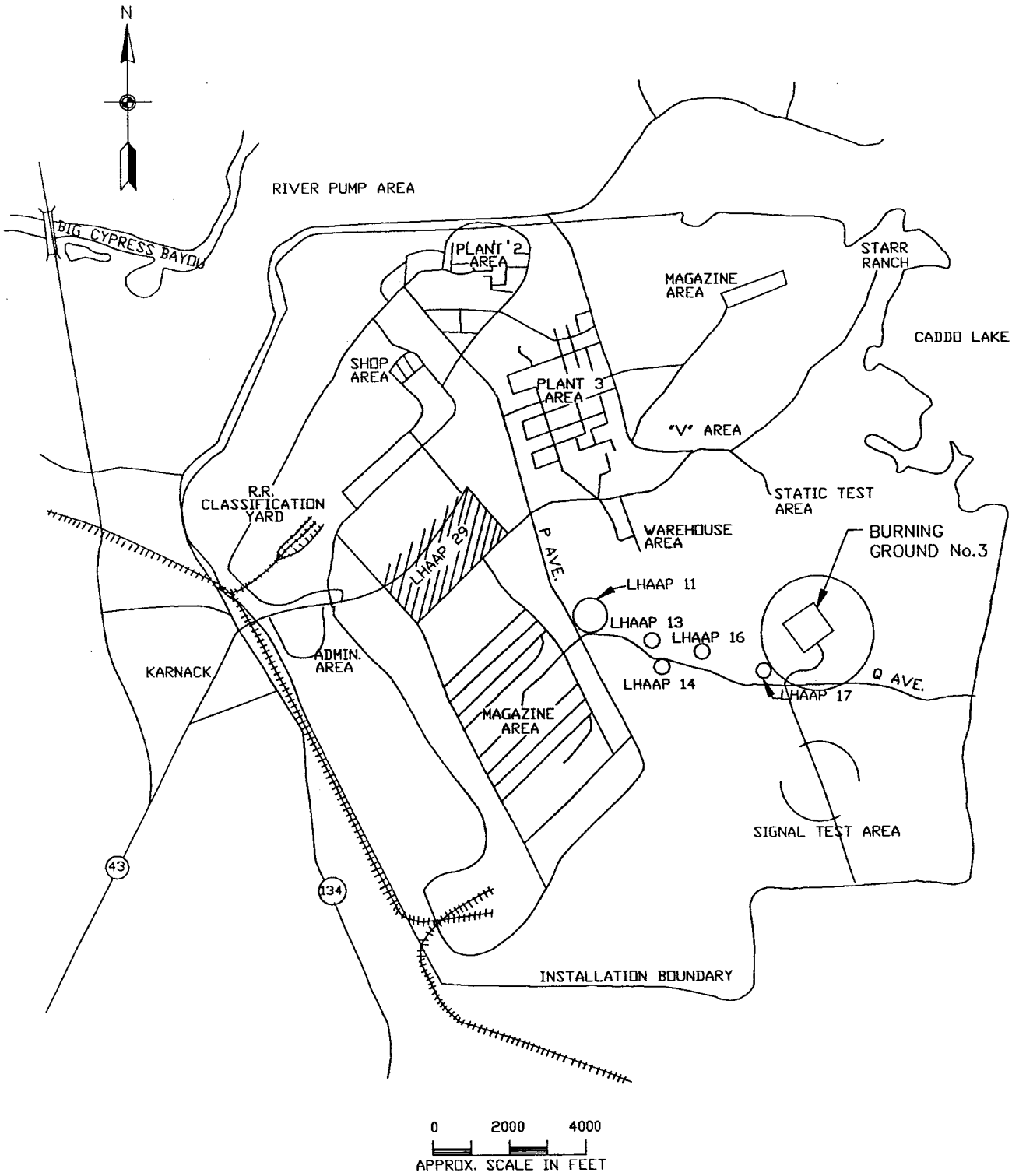
The LHAAP 18 & 24 site is an operable unit of the LHAAP Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site and also a Resource Conservation and Recovery Act (RCRA) site. The site consists of a fenced 34.5-acre secured area located in the southeast quadrant of LHAAP at the end of Avenue Q, as shown on Figure 1-1. This site has been used for the treatment, storage, and disposal of solid and liquid explosive, pyrotechnic, and combustible solvent wastes using open burning pits, the UEP, stockpiles of solvent soaked sawdust, and burial trenches.

In summary, high concentrations of solvents, primarily trichloroethylene and methylene chloride, and heavy metals, such as barium, have been detected within subsurface soils, buried waste and the uppermost water-bearing zone at the site. This contamination is attributed to waste management practices dating back to the early 1950s. Based on previous investigations performed at the site, an IRA is planned for the removal and/or control of contaminants sources within the upper groundwater and unsaturated zone.

DEI conducted Phase I of the IRA between November 8 and December 17, 1993. The Phase I work consisted of confirmation sampling required in order to complete site characterization and of treatment technologies verifications to determine suitable technologies to treat onsite contamination.

1.3 Summary of Activities

The objective of the Phase II work was to determine the effectiveness of different systems for groundwater extraction. The implementation of the Phase II work provided data and information



US Army Corps of Engineers
Tulsa District

LOCATION MAP
FOR BURNING GROUND No. 3 AND UEP
(LHAAP 18 & 24)

LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

FIGURE NUMBER

1-1

2379-382-C001

regarding construction methods (i.e. problems/solutions) of the extraction systems, groundwater flow values, and groundwater quality parameters.

The Phase II Work included the following tasks:

- Task 1 - Groundwater sampling and testing of 48 monitoring wells and the vertical extraction well (VEW) designated EW-1 which was installed during the implementation of the Phase I work.

- Task 2 - Construction of the western half of the planned temporary staging and storage area to the south of the burning ground site;

- Task 3 - Construction of two sections of a pilot Interceptor Collection Trench (ICT);

- Task 4 - Installation of a pilot horizontal extraction well (HEW);

- Task 5 - Groundwater flow testing that included two forms of groundwater withdrawal techniques, gravity flow and vacuum enhanced liquid extraction. Testing was performed on the ICT, HEW, and VEW;

- Task 6 - Groundwater sampling and testing of 48 monitoring wells and EW-1 following the completion of the flow tests in July/August and in October/November, 1994.

The field work for the Phase II activities was conducted between March 8 and August 12, 1994. The following sections describe the results of implementing the Phase II tasks.

2.0 RESULTS OF PILOT STUDY

2.1 Task 1 - Groundwater Sampling Prior to initiation of construction

Groundwater sampling was performed at EW-1 and 48 monitoring well locations. The objective of this sampling program was to obtain a "snapshot" of the existing contaminant plume condition prior to implementing the Phase II work. The well locations are shown on Figure 2-1. The analytical testing program for groundwater samples is presented in Table 2-1. Groundwater sampling and testing was performed in accordance with the protocols outlined in the Chemical Data Acquisition Plan (CDAP). The analytical testing was conducted by PDP Analytical Services (PDP) of Spring, Texas.

In general, the groundwater plume, with methylene chloride and trichloroethylene as the main contaminants, was found to have extended beyond what the Fall 1993 sampling event had shown and that concentrations of methylene chloride and/or trichloroethylene had increased in many monitoring wells especially outside the fenced area of Burning Ground 3. Field measurements taken during groundwater sampling are included in Appendix A.1. Detected contaminant concentrations are presented in Tables 2-2 through 2-5. The groundwater levels elevation contours are shown on Figure 2-2. The Methylene Chloride and trichloroethylene isoconcentration contours for this sampling round are presented in Figures 2-3 and 2-4, respectively. The analytical reports are included in Appendix A.2. and the validated analytical data are included in Appendix A.3.

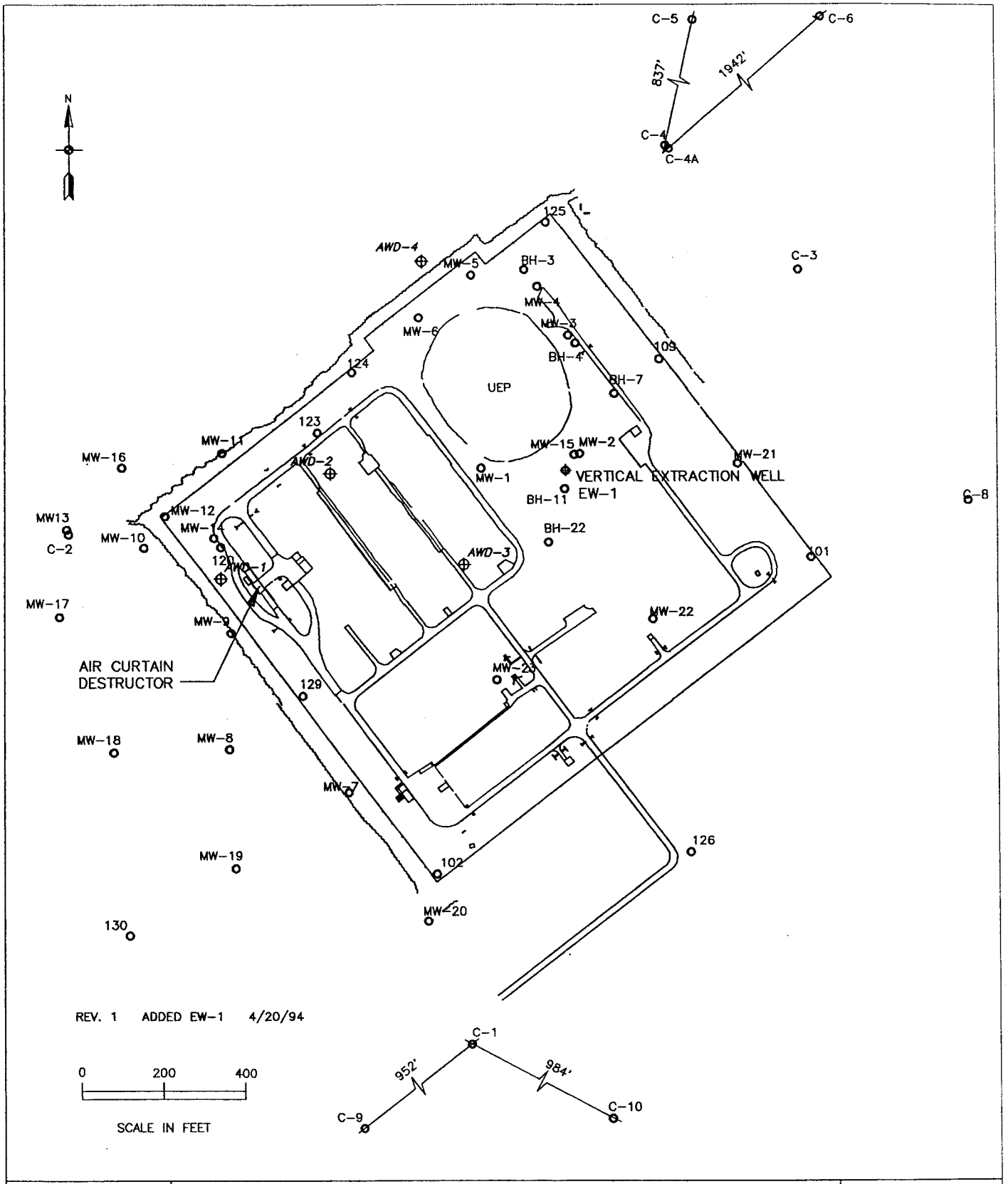
Two rounds of confirmation resampling and testing were conducted at wells C4, C4A, C5, C6, C2, MW10, MW13, and MW16 on May 20, 21, and 22, and on June 7 and 8, 1994. Data from this confirmation testing program are included in Appendix A.4. The additional testing program confirmed that the plume has extended beyond the fenced area of Burning Ground 3; however, concentrations of methylene chloride and trichloroethylene were found to be lower than detected levels for the March/April sampling round as shown in Table 2-6.

2.2 Task 2 - Construction of Temporary Staging and Storage Area

The planned Temporary Staging and Storage Area (TSSA) is to be located outside and to the south of the fenced Burning Ground 3 site as shown on Figure 2-5. Due to limited availability of funds, only about half (western half) of the TSSA, including a contractor staging area, was built during Phase II of the IRA. The construction of the western half of the TSSA included clearing, grubbing, grading, placement of clean fill material, placement of a geotextile layer, and the placement of a six inches thick gravel layer over the geotextile. The construction work was conducted by Palestine Contractors, of Marshall, Texas under subcontract to DEI.

The original ground in the area was very soft and wet during construction which created difficult conditions for maneuvering construction equipment. Several pieces of equipment were stuck in the mud when an attempt was made to remove trees and stumps prior to the grading of the site. Therefore, a decision was made by DEI and the USACE to cut the onsite trees flush with the ground surface and leave the stumps inplace. In addition, it was decided to use clean fill material to bridge over and stabilize the soft ground.

The fill placement, which ranged in thickness between three and five feet, proceeded along with the clearing and tree removal operation in order to provide a stable working platform for



US Army Corps of Engineers
Tulsa District

MONITORING WELLS
BURNING GROUND No.3 AND UEP
(LHAAP 18 & 24)

LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

FIGURE NUMBER

2-1

2379-382-EDP-C005

TABLE 2-1 SAMPLING PARAMETERS FOR LHAAP BURNING GROUND 3 AND UEP PHASE II			
Sampling Matrix	**Sampling Location**	**Chemical Parameters**	**Physical Parameters**
Groundwater	48 Monitoring Wells	pH; conductivity, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), nitrate, nitrite, sulfate, and chloride.	
Groundwater	During Flow Tests as follows: - VEW 5/7/94 to 5/10/94, - HEW 5/31, and - ICT 6/14	alkalinity, hardness, total dissolved solids, total suspended solids, silica, VOCs, SVOCs, explosives, total metals, ammonia, nitrate, nitrite, sulfate, chloride, oil and grease, and total petroleum hydrocarbons.	
Groundwater	During Flow Tests at VEW, HEW, and ICT for all dates not listed above	total suspended solids, silica, VOCs, and total metals.	
Soil	Soil borings along ICT sections and HEW. Also, 2 samples during construction of ICT	VOCs, SVOCs, explosives, antimony, arsenic, barium, cadmium, chromium, lead, mercury, nickel, selenium, silver, thallium, nitrate, sulfate, and chloride	Visual classification, moisture content, gradation, plastic limit, and liquid limit tests
Vapor	During VELE Tests	VOCs	

TABLE 2-2
LHAAP 18&24 BURNING GROUND 3 & UEP
SUMMARY OF GROUNDWATER MONITORING, MARCH-APRIL, 1994
VOCs, microgram/liter

WELL No.	VOLATILE ORGANIC COMPOUNDS																	
	MEC	TCE	1,1-DCA	1,1-DCE	1,2-DCA	VC	ACETONE	CF	PCE	1,2-DCE	EBZ	STYRENE	TOLUENE	BENZENE	XYLENES	CTC	1,1,1-TCA	1,1,2-TCA
126	13	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW22	5900	1900	ND	ND	ND	ND	6300	ND	ND	430	ND	ND	ND	ND	ND	ND	ND	ND
MW15	645	ND	ND	ND	ND	ND	7200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW2	10550000	1520000	310	4700	ND	550	3400	1500	ND	8200	ND	ND	ND	ND	ND	ND	ND	183
EW1	87000	9800	ND	ND	ND	ND	9800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW1	444000	171000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW4	80	1100	ND	ND	ND	140	ND	ND	ND	180	ND	ND	ND	ND	ND	ND	ND	ND
MW5	32	126	16	ND	ND	16	ND	ND	ND	31	ND	ND	ND	ND	ND	ND	ND	ND
MW6	22	40	ND	ND	5	8	ND	ND	ND	10	ND	ND	ND	ND	ND	ND	ND	ND
MW21	1270000	8400	ND	ND	ND	ND	160000	ND	ND	500	ND	ND	ND	ND	ND	ND	ND	ND
109	400	250	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
125	600	ND	ND	ND	ND	ND	1100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
123	40	16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AWD2	28000	11400	ND	ND	620	ND	38	10	ND	20	ND	ND	25	ND	ND	ND	ND	ND
AWD3	175	610	ND	6	4	ND	280	8	5	610	ND	ND	ND	ND	ND	10	ND	ND
MW23	820	980	ND	ND	43	ND	190	3	ND	50	ND	ND	ND	ND	ND	ND	ND	ND
C4A	2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C4	270	60	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C5	1800	130	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C6	300	90	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C7	7	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C9	26	6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C10	690	122	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C3	15	45	ND	ND	ND	ND	ND	ND	ND	20	ND	ND	ND	ND	ND	ND	ND	ND
C8	4	9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
102	3	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW7	1700	15000	ND	ND	150	ND	ND	120	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW8	390	8200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
129	26	1560	28	ND	ND	ND	7	3	ND	15	ND	ND	ND	ND	ND	ND	ND	ND
MW9	950	3600	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AWD1	19300	69000	44	1100	5	560	ND	15	30	109000	1000	170	40	10	80	ND	370	5
120	273000	42000	62	310	44	ND	35	70	ND	ND	ND	ND	42	7	ND	ND	27	8
MW14	2200	12400	34	120	23	ND	ND	4	ND	400	ND	ND	ND	ND	ND	ND	10	3
MW12	140	4000	ND	19	14	ND	ND	ND	ND	110	ND	ND	ND	ND	ND	ND	3	ND
130	ND	12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW18	9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW17	10	32	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW13	590	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C2	480	210	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW10	2100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW16	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW11	59	82	ND	ND	6	ND	ND	ND	ND	5	ND	ND	ND	ND	ND	ND	ND	ND
124	31	3	ND	ND	ND	ND	14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AWD4	58	25	ND	ND	ND	ND	ND	ND	ND	6	ND	ND	ND	ND	ND	ND	ND	ND
MW19	8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW20	6	13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C1	33	30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW3	243000	4500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTE:
MEC = Methylene Chloride 1,1-DCA = 1,1-Dichloroethane 1,2-DCA = Dichloroethane PCE = Tetrachloroethylene EBZ = Ethylbenzene 1,1,1 - TCA = 1,1,1 - Trichloroethane
TCE = Trichloroethylene 1,1-DCE = 1,1-Dichloroethene CF = Chloroform 1,2-DCE = Total-1,2-Dichloroethene CTC = Carbon tetrachloride 1,1,2 - TCA = 1,1,2 - Trichloroethane

TABLE 2-3
LHAAP 18&24, BURNING GROUND 3 & UEP
SUMMARY OF GROUNDWATER MONITORING, MARCH-APRIL, 1994
METALS, mg/l

Well No.	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead
126	0.7100	ND	ND	3.2300	ND	ND	105.0000	ND	0.0160	ND	1.0800	ND
MW22	0.2000	ND	ND	1.9600	ND	ND	99.2000	ND	ND	ND	0.2500	ND
MW15	ND	ND	ND	0.2450	ND	ND	11.2000	ND	ND	ND	2.3000	ND
MW2	ND	ND	ND	3.6800	ND	ND	96.4000	ND	0.0200	ND	0.0000	ND
EW1	ND	ND	ND	0.3290	ND	ND	8.9000	ND	ND	ND	0.1000	ND
MW1	ND	ND	ND	4.5400	ND	ND	122.0000	ND	0.0310	ND	0.0000	ND
MW4	ND	ND	ND	0.1520	ND	ND	54.8000	ND	ND	ND	0.0000	ND
MW5	ND	ND	ND	1.4300	ND	ND	35.3000	ND	ND	ND	0.0000	ND
MW6	ND	ND	ND	0.8850	ND	ND	33.6000	ND	ND	ND	6.3400	ND
MW21	0.3000	ND	ND	6.6000	ND	ND	164.0000	0.0180	0.0520	ND	0.5900	ND
109	0.2200	ND	ND	1.0300	ND	ND	53.7000	ND	ND	ND	0.5200	ND
125	2.6000	ND	ND	0.1880	ND	ND	2.5000	ND	ND	ND	3.6200	ND
123	0.5400	ND	ND	0.1650	ND	ND	16.3000	ND	ND	ND	0.4640	ND
AWD2	3.6200	ND	ND	0.1770	ND	ND	4.3000	0.0180	0.0110	ND	3.7800	ND
AWD3	0.1800	ND	ND	0.2530	ND	ND	36.2000	ND	0.0330	ND	66.5000	ND
MW23	ND	ND	ND	1.7300	ND	ND	52.9000	0.0670	0.0100	ND	2.3700	ND
C4A	ND	ND	ND	0.1010	ND	ND	14.8000	ND	ND	ND	4.1000	ND
C4	ND	ND	ND	0.2060	ND	ND	18.9000	ND	ND	ND	1.4700	ND
C5	ND	ND	ND	0.0780	ND	ND	12.2000	ND	ND	ND	2.4000	ND
C6	ND	ND	ND	1.1000	ND	ND	33.2000	ND	0.0160	ND	32.8000	ND
C7	0.2800	ND	0.0050	0.1260	ND	ND	16.4000	ND	ND	ND	0.2200	ND
C9	ND	ND	ND	0.3200	ND	ND	628.0000	ND	ND	ND	0.0000	ND
C10	ND	ND	ND	0.5920	ND	ND	75.0000	ND	ND	ND	0.3810	ND
C3	0.1300	ND	ND	1.1200	ND	ND	51.9000	ND	ND	ND	93.6000	ND
C8	1.5000	ND	ND	4.4300	ND	ND	202.0000	ND	ND	ND	1.6000	ND
102	0.7800	ND	ND	0.2500	ND	ND	3.9400	ND	ND	ND	0.7400	ND
MW7	ND	ND	ND	0.1280	ND	ND	20.6000	0.2910	ND	ND	0.9500	ND
MW8	ND	ND	ND	0.2220	ND	ND	7.6000	ND	0.0100	ND	0.0000	ND
129	0.1500	ND	ND	0.0600	ND	ND	2.9000	ND	ND	ND	0.2100	ND
MW9	0.6100	ND	ND	0.0450	ND	ND	2.6000	ND	ND	ND	0.5700	ND
AWD1	5.6900	ND	0.0130	0.9150	ND	ND	2.8000	0.0530	ND	ND	5.7000	ND
120	0.9300	ND	ND	0.2700	ND	ND	31.6000	ND	0.1840	ND	3.3400	ND
MW14	ND	ND	ND	1.6500	ND	ND	78.8000	ND	ND	ND	159.0000	ND
MW12	0.2100	ND	ND	0.2440	ND	ND	36.1000	ND	0.0360	ND	65.2000	ND
130	ND	ND	ND	0.2170	ND	ND	64.0000	ND	ND	ND	0.1600	ND
MW18	ND	ND	0.0050	0.2480	ND	ND	7.6000	ND	ND	ND	26.7000	ND
MW17	ND	ND	ND	0.3100	ND	ND	38.1000	0.0160	0.0300	ND	3.9700	ND
MW13	ND	ND	ND	0.3400	ND	ND	28.7000	ND	ND	ND	65.0000	ND
C2	ND	ND	ND	0.3970	ND	ND	19.2000	ND	ND	ND	48.2000	ND
MW10	ND	ND	ND	0.6580	ND	ND	24.7000	ND	ND	ND	54.8000	ND
MW16	ND	ND	ND	0.3360	ND	ND	15.3000	ND	ND	ND	31.3000	ND
MW11	0.1500	ND	ND	0.0860	ND	ND	4.8000	ND	ND	ND	0.2500	ND
124	2.2000	ND	0.0110	0.8150	0.0067	ND	19.8000	ND	0.0450	ND	60.8000	ND
AWD4	0.5300	ND	ND	0.3220	ND	ND	9.6000	0.0460	ND	ND	1.1200	ND
MW19	0.0000	ND	ND	0.0000	ND	ND	142.0000	ND	ND	ND	112.0000	ND
MW20	0.5300	ND	ND	0.2380	ND	ND	21.0000	ND	ND	ND	0.3800	ND
C1	0.3000	ND	ND	0.5460	ND	ND	72.5000	ND	ND	0.0450	0.5500	ND
MW3	ND	ND	ND	1.7100	ND	ND	37.6000	ND	0.0180	ND	ND	ND

TABLE 2-3 (CONTINUE)
LHAAP 18&24, BURNING GROUND 3 & UEP
SUMMARY OF GROUNDWATER MONITORING, MARCH-APRIL, 1994
METALS, mg/l

Well No.	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thalium	Vanadium	Zinc
126	84.3000	0.2350	ND	ND	ND	ND	ND	345.0000	0.0050	ND	0.0540
MW22	40.1000	0.0450	ND	ND	ND	ND	ND	364.0000	ND	ND	ND
MW15	6.7000	0.3450	ND	ND	ND	ND	ND	70.6000	ND	ND	0.0280
MW2	80.8000	0.9660	ND	ND	ND	ND	ND	297.0000	ND	ND	ND
EW1	6.6000	0.3580	ND	ND	ND	ND	ND	102.0000	ND	ND	0.0560
MW1	110.0000	2.1700	ND	ND	ND	ND	ND	384.0000	ND	ND	0.0310
MW4	55.0000	0.2470	ND	ND	ND	ND	ND	461.0000	ND	ND	ND
MW5	37.4000	0.0750	ND	ND	ND	ND	ND	128.0000	ND	ND	0.0300
MW6	25.3000	0.2340	ND	ND	ND	ND	ND	130.0000	ND	ND	0.0250
MW21	131.0000	2.9600	ND	0.0770	ND	ND	ND	458.0000	ND	ND	0.0600
109	40.0000	0.1050	ND	ND	ND	ND	ND	346.0000	ND	ND	0.0410
125	1.9000	0.0430	0.0002	ND	ND	ND	ND	24.4000	ND	0.0100	0.0480
123	9.3000	0.0120	ND	ND	ND	ND	ND	10.2000	ND	ND	0.0830
AWD2	3.6000	0.1400	ND	ND	ND	ND	ND	79.4000	ND	ND	0.0610
AWD3	22.9000	1.8900	ND	0.0660	ND	ND	ND	187.0000	ND	ND	0.2190
MW23	41.6000	0.1940	ND	0.4200	ND	ND	ND	280.0000	ND	ND	0.0290
C4A	2.8000	0.1730	ND	ND	ND	ND	ND	86.8000	ND	ND	0.0790
C4	4.1000	0.2110	ND	ND	ND	ND	ND	19.9000	ND	ND	0.0520
C5	2.9000	0.2000	ND	ND	ND	ND	ND	66.8000	ND	ND	0.0320
C6	21.4000	1.3200	ND	ND	ND	ND	ND	256.0000	ND	ND	0.0330
C7	9.3000	0.0110	ND	ND	ND	ND	ND	112.0000	ND	ND	0.0220
C9	470.0000	0.5600	ND	ND	ND	ND	ND	1590.0000	ND	ND	ND
C10	31.7000	0.2330	ND	ND	ND	ND	ND	250.0000	ND	ND	0.0600
C3	30.5000	1.9900	ND	ND	ND	ND	ND	121.0000	0.0050	ND	0.0780
C8	151.0000	0.1200	ND	ND	ND	ND	ND	819.0000	0.0050	ND	ND
102	2.8000	0.0210	ND	ND	ND	ND	ND	13.6000	ND	ND	0.0330
MW7	15.3000	0.0710	ND	0.2900	ND	ND	ND	332.0000	ND	ND	ND
MW8	6.2000	0.1070	ND	ND	ND	ND	ND	97.3000	ND	ND	ND
129	1.9000	0.0690	ND	ND	ND	ND	ND	52.4000	ND	ND	0.0470
MW9	1.3000	0.0700	ND	ND	ND	ND	ND	15.0000	ND	ND	ND
AWD1	7.5000	0.3580	ND	ND	8.7000	ND	ND	92.4000	ND	0.0110	0.0400
120	44.1000	1.6000	ND	0.0840	ND	ND	ND	1080.0000	ND	ND	0.1650
MW14	46.8000	3.5200	ND	ND	7.6000	ND	ND	407.0000	ND	ND	0.0660
MW12	23.1000	1.8700	ND	0.0740	ND	ND	ND	180.0000	ND	ND	0.2200
130	43.0000	0.5240	ND	ND	ND	ND	ND	927.0000	ND	ND	0.0530
MW18	4.2000	0.4940	ND	ND	ND	ND	ND	66.6000	ND	ND	0.0250
MW17	14.3000	0.5860	ND	0.1600	ND	ND	ND	110.0000	ND	ND	0.0440
MW13	10.5000	1.1400	ND	ND	ND	ND	ND	81.5000	ND	ND	ND
C2	11.8000	1.2100	ND	ND	ND	ND	ND	91.0000	ND	ND	ND
MW10	14.0000	1.2300	ND	ND	ND	ND	ND	106.0000	ND	ND	0.0200
MW16	88.0000	0.5730	ND	ND	ND	ND	ND	60.8000	ND	ND	ND
MW11	2.4000	0.0490	ND	ND	ND	ND	ND	21.1000	ND	ND	0.0300
124	17.2000	1.5000	ND	ND	ND	ND	ND	19.4000	ND	0.0590	0.1300
AWD4	8.3000	0.0770	ND	0.0880	ND	ND	ND	65.1000	ND	ND	0.0280
MW19	80.5000	2.4400	ND	ND	ND	ND	ND	1370.0000	ND	ND	ND
MW20	4.9000	0.0710	ND	0.0610	ND	ND	ND	37.5000	ND	ND	0.0980
C1	54.6000	0.0420	ND	ND	ND	ND	ND	329.0000	ND	ND	0.0490
MW3	35.1000	5.1400	ND	ND	ND	ND	ND	280.0000	ND	ND	ND

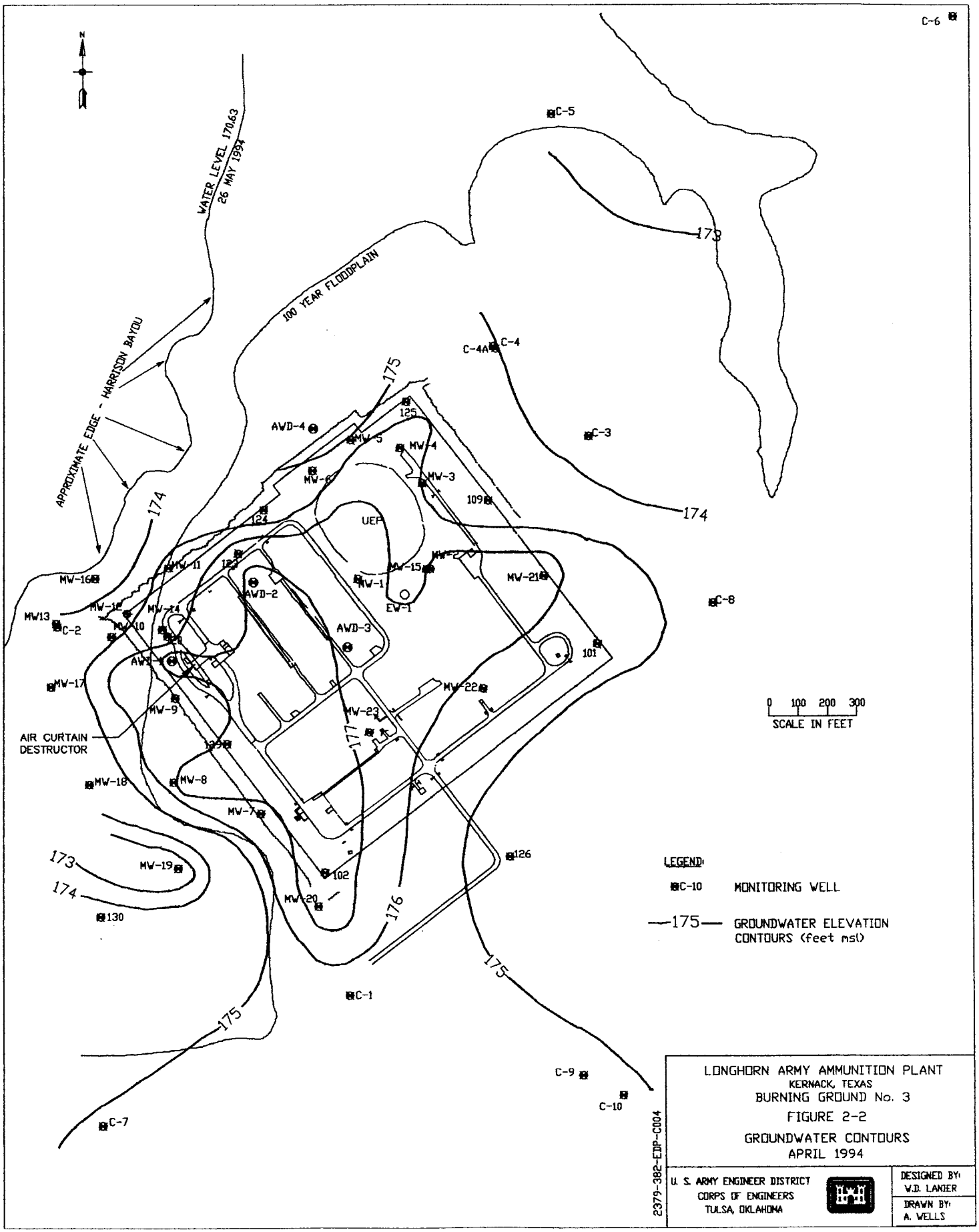
TABLE 2-4
LHAAP 18&24 BURNING GROUND 3 & UEP
SUMMARY OF GROUNDWATER MONITORING, MARCH-APRIL, 1994
EXPLOSIVES, micrograms/liter

WELL No.	EXPLOSIVES COMPOUND										
	1,3-DNB	2,4-DNT	HMX	NB	2-NT	3-NT	4-NT	RDX	Tetryl	1,3,5-TNB	2,4,6-TNT
126	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW2	ND	ND	ND	ND	ND	ND	ND	1.57J	ND	ND	ND
EW1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW21	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
101	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
109	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
125	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
123	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AWD2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AWD3	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.43J	ND
MW23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C4A	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C7	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.63J	ND
C9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C10	1.39	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
102	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
129	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AWD1	ND	ND	ND	ND	ND	ND	ND	13.0J	ND	0.49J	ND
120	ND	0.21J	ND	0.42J	ND	ND	ND	16.0J	ND	0.52J	4.70J
MW14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
130	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
124	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AWD4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW19	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW3	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.39	ND

Note: ND = Non-Detect

TABLE 2–5
LHAAP 18 & 24, Burning Ground 3 & UEP
Summary of Groundwater Monitoring , March–April, 1994
Wet Chemistry, mg/l

Well No.	Chloride	Nitrate	Sulfate
126	1090.00	ND	ND
MW22	833.00	ND	11.00
MW15	160.00	ND	8.00
MW2	790.00	16.00	ND
EW1	128.00	10.60	ND
MW1	1420.00	0.20	ND
MW4	753.00	ND	43.00
MW5	363.00	4.10	5.00
MW6	310.00	ND	10.00
MW21	1420.00	ND	6.00
109	931.00	0.50	12.00
125	35.00	1.80	19.00
123	7.00	2.77	9.00
AWD2	99.00	0.45	41.00
AWD3	18.00	0.98	77.00
MW23	594.00	1.20	11.00
C4A	78.00	ND	10.00
C4	53.00	ND	ND
C5	57.00	0.14	16.00
C6	523.00	ND	7.00
C7	80.00	0.76	33.00
C9	4010.00	0.10	176.00
C10	496.00	0.54	8.00
C3	514.00	ND	ND
C8	2280.00	0.20	ND
102	7.00	1.30	69.00
MW7	436.00	3.70	70.00
MW8	167.00	2.00	32.00
129	32.00	1.00	66.00
MW9	14.00	0.24	18.00
AWD1	74.00	1.30	21.00
120	518.00	0.60	55.00
MW14	1140.00	ND	45.00
MW12	528.00	1.70	63.00
130	1390.00	0.70	209.00
MW18	124.00	ND	10.00
MW17	239.00	ND	22.00
MW13	144.00	0.18	8.00
C2	195.00	0.15	7.00
MW10	316.00	0.10	28.00
MW16	186.00	ND	7.00
MW11	18.00	0.20	34.00
124	7.00	0.66	113.00
AWD4	106.00	0.53	19.00
MW19	2450.00	0.18	443.00
MW20	11.00	0.00	24.00
C1	762.00	0.16	20.00
MW3	505.00	0.10	12.00

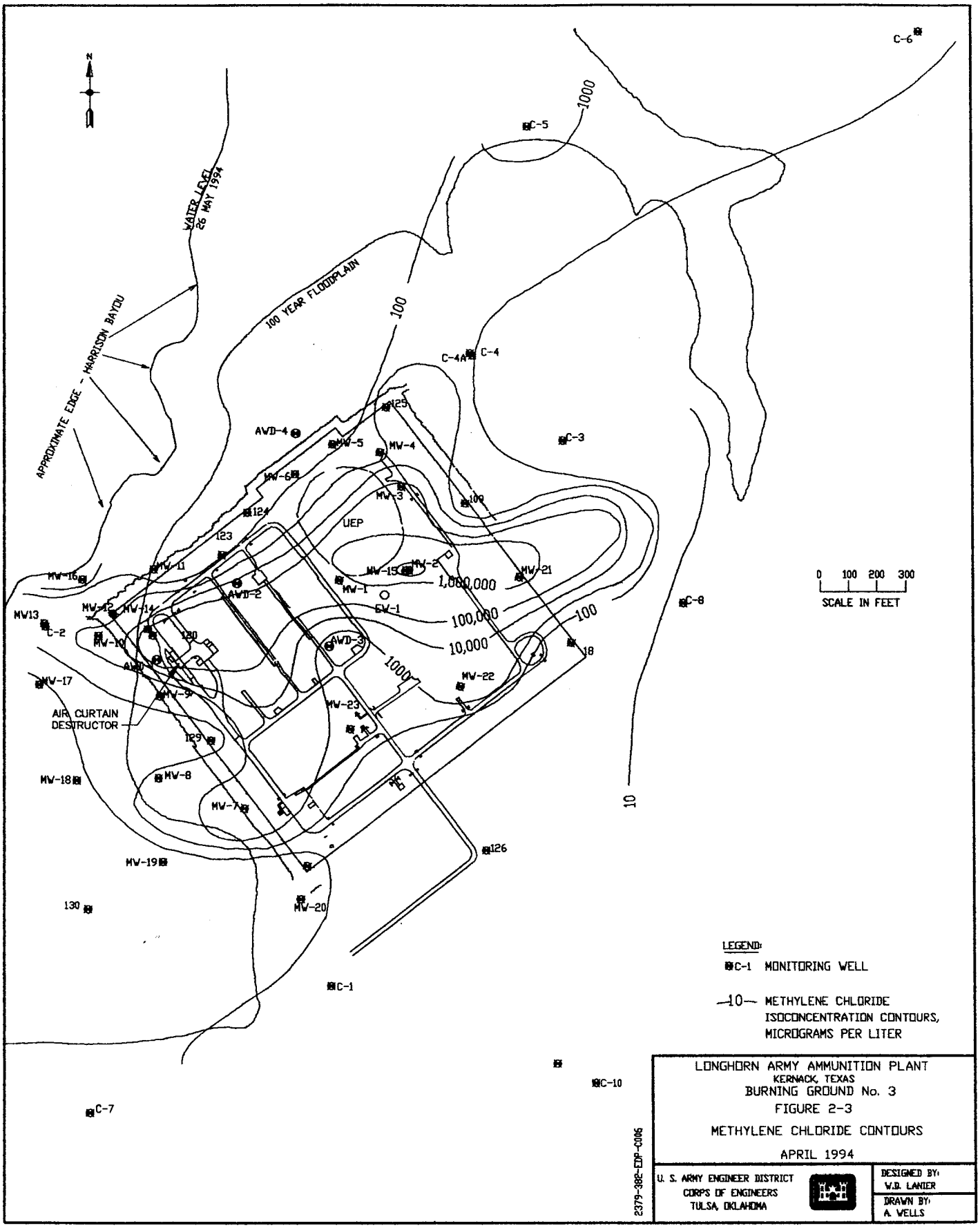


LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
BURNING GROUND No. 3
FIGURE 2-2
GROUNDWATER CONTOURS
APRIL 1994

U. S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
TULSA, OKLAHOMA

DESIGNED BY: W.D. LANIER
DRAWN BY: A. WELLS

2379-382-EDP-C004



LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
BURNING GROUND No. 3
FIGURE 2-3
METHYLENE CHLORIDE CONTOURS
APRIL 1994

U. S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
TULSA, OKLAHOMA

DESIGNED BY: W.D. LANIER
DRAWN BY: A. WELLS

2379-382-EDP-0006

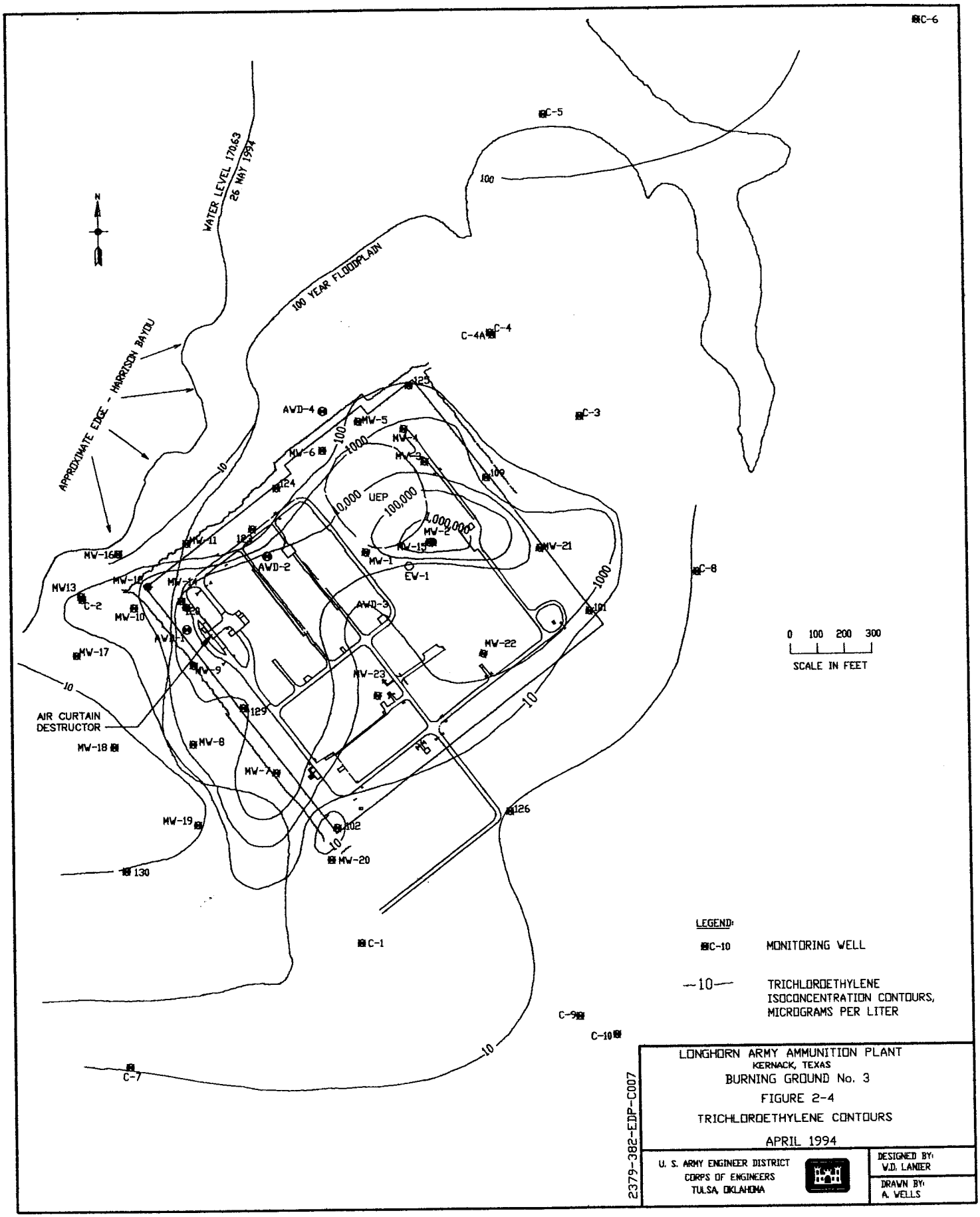
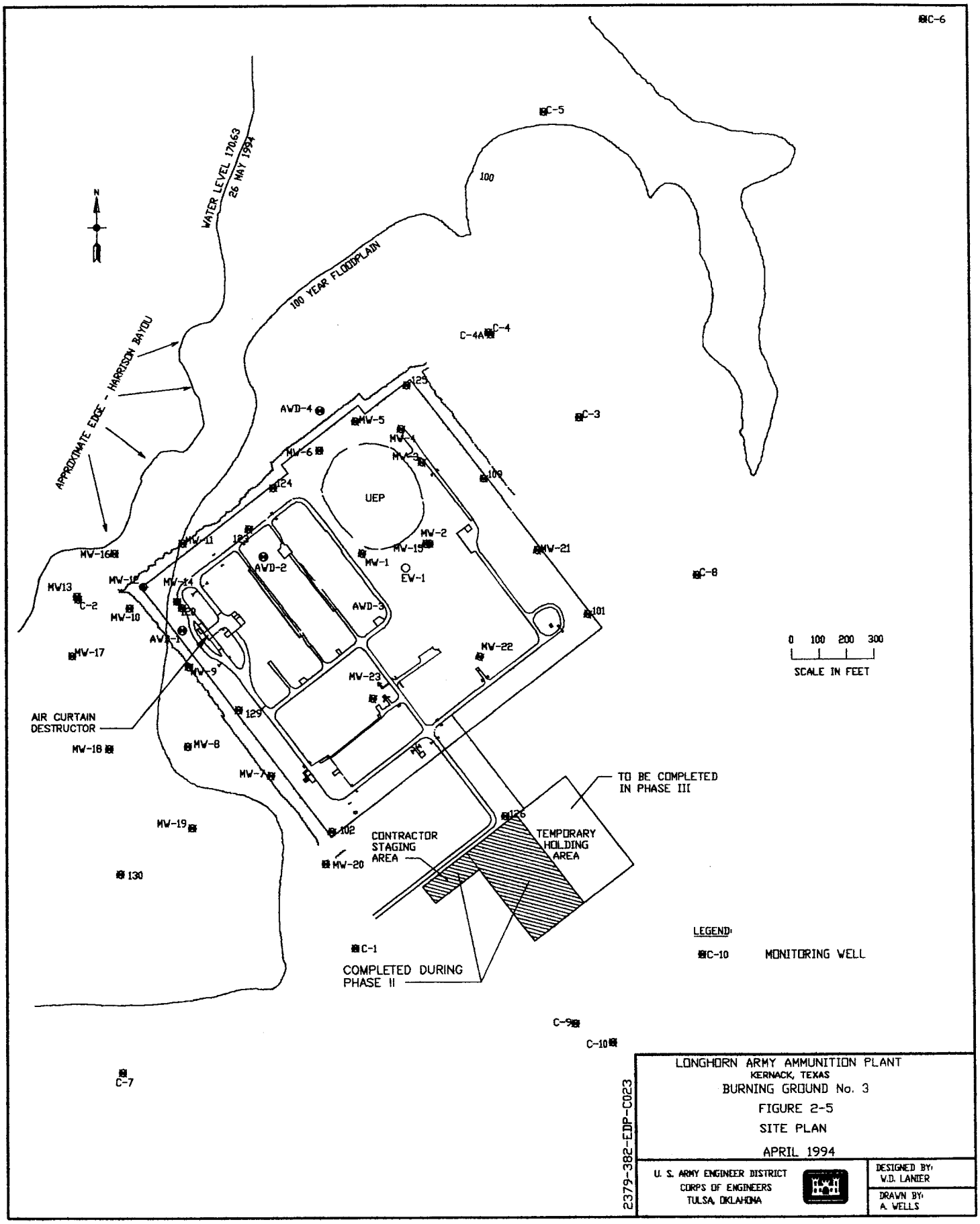

C-6
C-5
100
WATER LEVEL 170.63
26 MAY 1994
N
100 YEAR FLOODPLAIN
APPROXIMATE EDGE - HARRISON BAYOU
C-4A
C-4
C-3
AWD-4
MW-5
MW-4
MW-3
MW-6
125
109
124
1000
100
10
10,000
UEP
100,000
1,000,000
MW-2
MW-15
MW-1
EV-1
MW-21
C-8
MW-16
MW-11
123
AWD-2
MW13
C-2
MW-10
MW-14
120
AWD-1
AWD-3
101
MW-22
MW-17
MW-9
MW-23
129
AIR CURTAIN
DESTRUCTOR
MW-18
MW-8
MW-7
126
MW-19
102
MW-20
130
C-1
C-9
C-10
C-7
0 100 200 300
SCALE IN FEET
LEGEND:
C-10 MONITORING WELL
10 TRICHLOROETHYLENE ISOCONCENTRATION CONTOURS, MICROGRAMS PER LITER
LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
BURNING GROUND No. 3
FIGURE 2-4
TRICHLOROETHYLENE CONTOURS
APRIL 1994
U. S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
TULSA, OKLAHOMA
DESIGNED BY: W.D. LANIER
DRAWN BY: A. WELLS
2379-382-EDP-C007

TABLE 2-6
LHAAP 18&24 BURNING GROUND 3 & UEP
SUMMARY OF GROUNDWATER MONITORING
CONFIRMATION SAMPLING DATA COMPARISON

VOLATILE ORGANICS COMPOUNDS, microgram/liter

WELL No.	MARCH-APRIL, 1994		MAY, 1994		JUNE, 1994	
	MEC	TCE	MEC	TCE	MEC	TCE
MW2	10550000	1520000			8280000	320000
C4A	2000	ND	5	8	21	ND
C4	270	60	3	6	7	4
C5	1800	130	2	2	5	ND
C6	300	90	30	17	5	8
MW13	590	ND	ND	2	ND	ND
C2	480	210	1	5	4	ND
MW10	2100	ND	1	14	4	10
MW16	5	ND	ND	3	ND	ND

NOTE:
MEC = Methylene Chloride
TCE = Trichloroethylene
ND = None Detect



LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
BURNING GROUND No. 3
FIGURE 2-5
SITE PLAN
APRIL 1994

2379-382-EDP-C023

U. S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
TULSA, OKLAHOMA

DESIGNED BY: W.D. LANIER
DRAWN BY: A. WELLS

clearing equipment. The abandonment of tree stumps in place is not expected to cause any structural problems in this area in the future, since the construction of any structure in the area is not planned. This portion of the TSSA will only be used for storage of soil containers and for soil treatment using mobile systems. However, the stumps in the area of the second half of the TSSA will have to be removed, since this area will be occupied by a permanent groundwater treatment plant. The second half of the TSSA will be completed during Phase III of the IRA.

The clean fill was imported from a site in Karnack, Texas outside of LHAAP. Prior to importing this material, representative samples were collected and sent to the firm of Heller, Lewis, and House (HLH) in Longview, Texas for geotechnical testing. The samples were tested for moisture content, Atterbeg Limits, and shrinkage limit. The test results, which are included in Appendix B.1, indicated that the materials at the borrow pit are not expansive (swelling clays) and that they are acceptable for the project. Following this testing program, three representative samples were collected and tested for moisture-density relation by HLH. The laboratory test results which were used in the field to monitor fill placement, are presented in Appendix B.2. Field compaction test results, obtained by HLH, are included in Appendix B.3.

A layer of geotextile fabric, Exxon GTF 300, was placed over the compacted clean fill layer. A six inches gravel layer was placed over the geotextile fabric in a single lift. The material was delivered by trucks from Boorhelm-Fields in Idabell, Oklahoma. Two particle size analyses and one compaction test were performed by HLH on representative samples of the gravel. The test results are included in Appendix B.4. The gravel was spread using a bulldozer and was compacted with a self-propelled vibratory compactor. A 50-foot wide strip along the southern end of the TSSA was not covered with geotextile and gravel due to very wet and soft conditions. This portion of TSSA was topographically high and required little to no fill for grading.

A drainage ditch was cut along the western edge of the TSSA. Sections of 18-inch galvanized corrugated steel pipe were installed at the entrance of the contractor staging area, the entrance of the TSSA, and in between both of these areas in order to convey storm waters away from the site.

2.3 Task 3 - Construction of The Interceptor Collection Trench (ICT).

The ICT consists of two sections ICT-1 and ICT-2. These sections were located east and northeast of the onsite Air Curtain Destructor (ACD) as shown on Drawing II-1. The trench sections extended to the lower semi-confining, retardation layer. The purpose of the trench was to evaluate the effectiveness of such a collection system in dewatering soils of low hydraulic conductivity. The construction of the ICT included the following steps:

2.3.1 Geophysical Survey

An Electromagnetic Terrain (EM) conductivity survey was conducted in the area where the ICT was built by Subsurface Detection Investigations Incorporated (SDII) of Largo, Florida under a subcontract to DEI. The EM survey is a useful remote sensing technique that results in the delineation of the perimeters of buried waste trenches and the detection of buried metal objects (if any) through measurements of subsurface conductivity contrasts. This survey was mainly conducted for health and safety reasons since the area surrounding the proposed ICT location may have been used historically for the burial of facility wastes.

The EM method measures the electrical conductivity of subsurface materials. The conductivity is determined by inducing (from a transmitter) a time-varying magnetic field and measuring (with a receiver) the amplitude and phase shift of an induced secondary magnetic field. The secondary magnetic field is created by subsurface conductive materials behaving as an inductor as the primary magnetic field is passed through them.

SDII findings were documented in a report that is included as Appendix C.1. They indicated the potential presence of several areas with buried metallic debris. The main suspected area was located to the southeast of section ICT-2. No major anomalies were detected along the axes of the ICT. However, the ICT subcontractor and DEI personnel took extra caution during the excavation of the upper few feet of the ground in the areas were buried metals may be present based on this geophysical study. In those areas, excavation of the ICT proceeded very slowly with no personnel allowed within the vicinity of the trench. No metallic debris or buried waste was encountered during the excavation of the ICT sections.

2.3.2 Soil Borings and Temporary Groundwater Monitoring Wells/Piezometers

Soil borings, designated SBT-1 through SBT-7, were drilled along the axes of the ICT sections at about 50 to 75-foot intervals as shown on Drawing II-1, prior to the initiation of trench excavation and construction. The borings were used to define the subsurface conditions including the depth of the semi-confining layer on which the trench will rest, and to collect soil samples for chemical and physical characterization. Each borehole was drilled to the depth of the lower semi-confining layer. This depth was determined by conducting continuous soil sampling throughout the depth of the borehole.

Soil samples for chemical analyses were obtained at five-feet intervals using a three-inch split spoon. In addition, soil samples were obtained for physical testing and characterization. The analytical and geotechnical testing program for collected soil samples is listed in Table 2-1. Table 2-7 presents a summary of the detected chemical concentrations in the tested soil samples. As mentioned above, no buried waste was encountered during the excavation of the ICT sections. Soil contamination based on the collected samples appear to be minimal in the area and is confined to the interface of the semiconfining layer and the overlying shallow aquifer material and may have been caused by the contaminated groundwater in the aquifer. Appendix C.2 contains the results of the chemical analyses. The results of the geotechnical testing program are included in Appendix C.3.

Temporary groundwater monitoring wells (piezometers) were installed in each borehole. These piezometers were used to monitor the static water levels prior the construction of the ICT sections. The screen section and riser pipe of each of the temporary monitoring wells were two inches in diameter and consisted of schedule 40 PVC. Detailed boring logs are included in Appendix C.4.

Subsurface information collected from the boreholes and the temporary monitoring wells was used to develop two subsurface cross sections shown on Figures 2-6 and 2-7. These cross sections show the potential elevation of the semi-confining retardation layer on which the ICT sections rest. The final design for the ICT sections was presented to the USACE Tulsa District for approval prior to proceeding with its installation. As can be seen from these cross sections, the groundwater level was about 0.5 to 5 feet from ground surface along Section ICT-1 and 3 to 10 feet along Section ICT-2. The shallow groundwater along the western edge of ICT-1

TABLE 2-7
LHAAP 18&24 BURNING GROUND 3 & UEP
SUMMARY OF SOIL ANALYSES FOR INTERCEPTOR TRENCH
DETECTED CONCENTRATIONS, in milligram/kilogram
MARCH/APRIL 1994

Sample Number	SBT1	SBT1	SBT1	SBT1	SBT1	SBT1 QC	SBT1	SBT2	SBT2	SBT2	SBT2	SBT3	SBT3	SBT3	SBT3	SBT3	SBT4	SBT4	SBT4
Depth (ft)	5-7	9-11	13-15	19-21	25-27	25-27	29-31	5-7	9-11	15-17	17-19	5-7	9-11	15-17	19-21	23-25	5-7	10-12	15-17
VOLATILE ORGANICS																			
1,1,1-TCA	ND	0.3	0.04	ND	0.16	0.23	0.018	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,-TCA	ND	ND	ND	ND	ND	0.005	0.007	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DCA	ND	0.017	0.17	0.11	0.015	0.018	0.019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 DCE	ND	ND	0.13	0.24	0.39	0.45	0.57	ND	0.024	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.006
1,2 DCA	0.005	0.008	0.43	0.99	1.8	2	3	ND	0.1	0.04	0.003	ND	ND	0.016	0.005	0.032	ND	0.005	0.45
2-Butanone	ND	ND	ND	ND	ND	ND	0.036	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	0.007	0.006	ND	0.033	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	0.032	ND	ND	0.12	0.017	ND	0.047	0.036	0.27	0.092	0.049	0.042	0.032	0.033	0.057	0.04	0.027	0.038	0.16
Benzene	ND	ND	ND	ND	ND	ND	0.004	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	0.005	0.016	0.018	0.021	0.044	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.005
Ethylbenzene	ND	ND	ND	ND	0.005	0.006	0.004	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MEC	0.18	0.112	5.18	9.2	9.5	9.5	11.9	0.06	0.4	0.17	0.067	0.055	0.038	0.05	0.034	0.19	0.022	0.03	6.7
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCE	ND	ND	0.011	0.021	0.039	0.053	0.036	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	0.016	0.047	0.023	0.026	0.164	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.023
Total Xylenes	ND	ND	0.006	0.005	0.008	0.006	0.008	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total-1,2-DCE	0.1	ND	7.7	0.004	0.6	0.76	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.013
TCE	0.17	0.073	3.8	6.5	7.5	8.1	8.6	ND	1.4	0.04	ND	ND	ND	0.04	ND	0.01	ND	0.056	2.7
Vinylchloride	ND	0.032	0.19	0.012	0.029	0.032	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SEMI-VOLATILE ORGANICS																			
BEP	1.076	0.842	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.125	ND
DBP	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.471
TOTAL METALS																			
Aluminum	11800	1460	1350	2330	2020	1530	1260	1060	481	844	1040	2530	2570	1950	1170	1520	9210	5650	8070
Arsenic	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.73	1.4	ND	ND	ND	ND
Barium	69.5	72.5	29.4	36.3	27.6	22.5	21.1	67	38.1	33.3	12.3	60.5	45.8	113	73.7	120	63.2	54.3	84.9
Beryllium	0.87	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	170	87.5	111	235	219	219	223	394	124	399	427	790	473	965	956	994	535	373	578
Chromium	9.9	2.3	3.2	3.8	3.4	2.9	4.4	1.6	ND	2.4	4.7	3.7	1.9	2.5	ND	1.2	9.1	8.6	13.5
Cobalt	8.1	2.4	1.5	3.1	3.3	2.9	1.5	4.8	ND	2	1.2	1.4	6.2	2	1.4	4.3	3.4	5.3	6.1
Copper	6.4	ND	ND	ND	ND	ND	ND	ND	ND	2.5	ND	ND	2.9	3.7	ND	2.8	4.5	5	5.9
Iron	14300	1680	853	3660	2430	1890	1530	417	388	865	598	4820	4790	4600	1840	966	6930	12400	13300
Lead	10.7	4.5	4.4	3	3.1	2.8	2.7	3.7	3.2	4.5	2	3.7	3.8	3.2	3.6	2.5	7.4	13.1	12.2
Magnesium	918	376	231	469	484	450	319	400	206	426	384	786	836	1190	782	990	1070	968	1340
Manganese	117	9.1	8.3	5.1	11.9	10.8	9.7	5.4	6.3	4.5	1.8	6.7	69.8	22.3	16.7	55	17.2	79.6	57.9
Nickel	8.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.3	10	13.7
Potassium	367	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	268	ND	ND	686	ND	770
Sodium	1240	143	89.9	241	89.8	96.8	118	1150	ND	259	333	66	207	1530	1100	109	291	165	298
Vanadium	23.7	3.8	2.8	7.1	5.8	4.4	3.9	1.3	ND	2.8	2.8	8.8	7.1	9.4	3.9	3.3	13.9	16.1	18.1
Zinc	19.2	8.8	8.6	11.9	13.5	11.9	8.5	6.6	4.4	9.5	5.4	4.7	13.5	16.9	12.3	13.4	22.9	27.2	34.5
WET CHEMISTRY																			
Chloride	53	53	35	35	44	35	53	71	18	80	62	ND	27	35	71	89	ND	18	35
Nitrate as N	12.5	12.5	5.5	12	12.8	5.2	2.9	17.5	1.6	12.5	2	2.5	3.3	3.2	24.4	1.3	17	23	6.5
pH	5.42	5.47	4.81	4.52	4.39	4.39	4.4	4.89	5.18	5.16	6.25	6.14	4.97	5.02	7.42	5.23	4.22	5.49	4.97
Sulfate	5400	2550	1030	5990	3540	1920	80	1300	214	506	317	213	216	422	2740	111	4030	4310	5750

EXPLOSIVES: All samples indicated less than detection limits present.

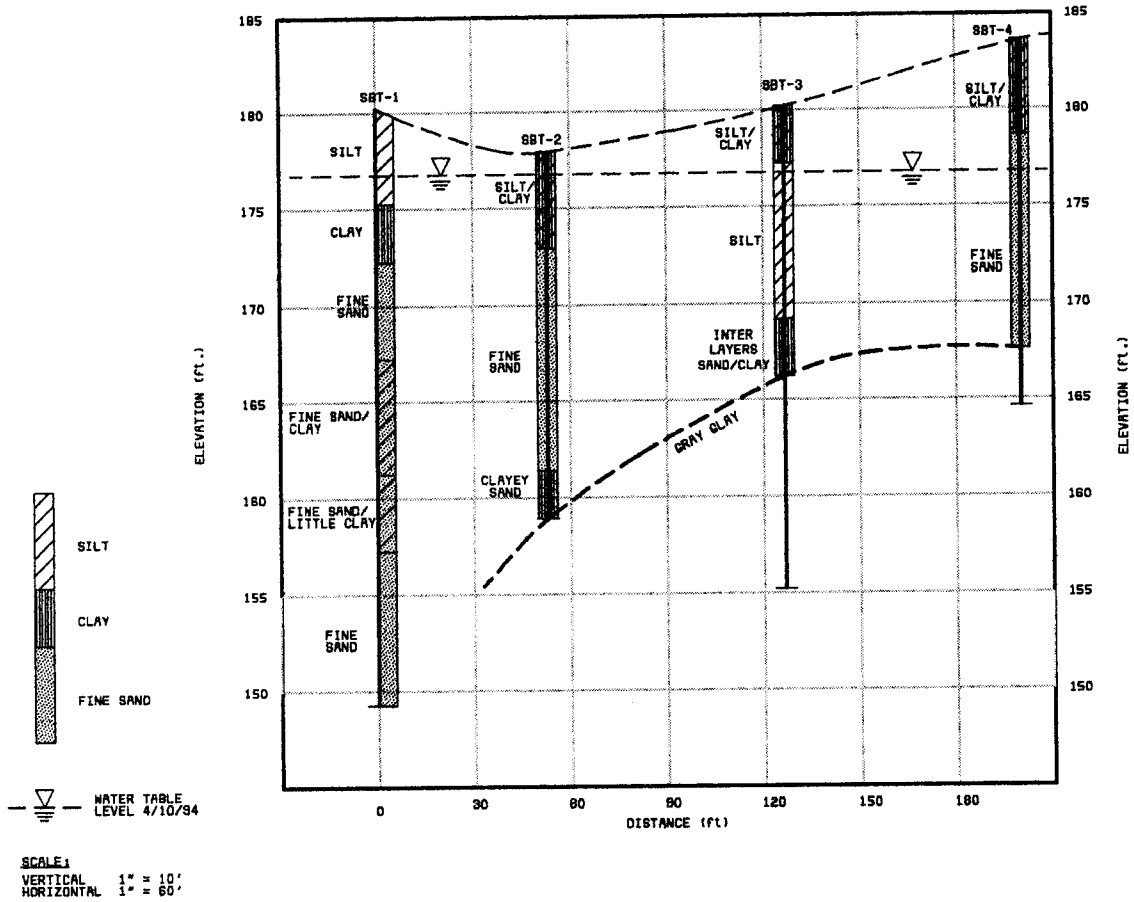
TABLE 2-7 CONTINUED
LHAAP 18&24 BURNING GROUND 3 & UEP
SUMMARY OF SOIL ANALYSES FOR INTERCEPTOR TRENCH
DETECTED CONCENTRATIONS, in milligram/kilogram
MARCH/APRIL 1994

Sample Number	SBT5	SBT5	SBT5 QC	SBT5	SBT6	SBT6	SBT6	SBT6	SBT6	SBT7	SBT7	SBT7	SBT7	SBT7 QC	SBT7	ICT1	ICT1	ICT2	ICT2
Depth (ft)	5-7	9-11	9-11	14-16	5-7	10-12	15-17	19-21	23-25	5-7	10-12	15-17	19-21	19-21	25-27	16	18	13	23
VOLATILE ORGANICS																			
1,1,1-TCA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.035
1,1,2,-TCA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DCA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 DCE	ND	ND	ND	ND	ND	ND	ND	0.008	0.007	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.23
1,2 DCA	ND	ND	ND	ND	ND	ND	ND	0.42	0.19	ND	ND	ND	0.1	0.049	ND	0.007	0.012	0.46	1.8
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	0.053	0.041	0.054	0.047	0.031	0.036	0.056	0.05	0.05	ND	0.05	0.012	ND	ND	0.025	0.12
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	0.003	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.01	0.26
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MEC	0.066	0.047	0.038	0.026	0.019	0.028	0.026	0.22	0.028	0.029	0.025	0.014	0.34	0.093	0.023	0.02	0.022	7	29.7
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.019
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.013	ND
Total Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total-1,2-DCE	ND	ND	ND	ND	ND	ND	ND	0.007	ND	ND	ND	ND	ND	ND	ND	0.006	0.006	ND	0.89
TCE	0.038	0.14	0.46	ND	ND	ND	ND	1.6	0.86	ND	0.003	ND	0.26	0.18	ND	0.16	0.086	3.9	12.7
Vinylchloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SEMI-VOLATILE ORGANICS																			
BEP	ND	1.027	1.164	ND	ND	ND	ND	ND	0.536	ND	ND	ND	ND	ND	ND	1.012	ND	ND	ND
DBP	ND	ND	0.454	ND	0.434	0.582	0.576	0.437	0.518	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL METALS																			
Aluminum	11600	4700	2990	2490	3830	7040	3990	3500	4050	17700	7100	2860	11000	17100	5720	6350	4860	7250	2890
Arsenic	1.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.4	0.92
Barium	84.2	63.3	91.7	18.9	26.1	46.3	21.9	53.8	49.7	90.3	43.8	26.7	124	194	57.1	41.3	35.2	101	37.3
Beryllium	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.64	ND	ND	0.73	0.76	ND	ND	ND	ND	ND
Calcium	331	595	346	652	129	112	713	693	808	324	127	243	1290	1820	539	125	257	703	253
Chromium	10.7	7.6	4.4	3.6	8.6	7.8	3.8	4	5.4	16.4	7.4	3.6	13.1	19	7.7	7.5	14.9	10.7	4.5
Cobalt	3.1	4.2	2.9	7.7	2.9	4.5	4.1	3	9.2	7	4.5	1.6	5.5	7.1	9.4	2.5	2.8	6.8	2.4
Copper	4.3	3.7	3.2	3.5	ND	5.3	3.4	3.4	4.6	8.4	4.4	2.7	6.7	7.7	4	2.8	5.1	4.8	ND
Iron	6190	3530	4770	2860	6490	3810	3580	6990	10600	16800	11300	2560	18700	16900	12000	3920	18500	12700	2960
Lead	11.1	12	8.2	12.3	5.5	7	5.7	6.6	7.5	11.7	8.3	6.5	13.3	5.1	11.6	2.8	5.5	6	3.8
Magnesium	975	967	632	691	309	808	861	777	921	1690	714	363	1820	2690	767	646	571	1610	358
Manganese	11.5	11	20.6	104	36.1	16.4	16.5	22.1	103	62	45.9	8.3	44.2	41.9	176	12.2	18.3	83.8	33.4
Nickel	6.3	5.1	ND	ND	ND	ND	ND	5.6	9.4	14.8	9.8	ND	11.9	16.3	8.5	ND	ND	12.9	ND
Potassium	ND	ND	ND	ND	ND	ND	ND	ND	ND	960	ND	ND	606	935	ND	ND	ND	657	ND
Sodium	204	485	147	500	ND	90	142	179	198	100	72.2	232	223	565	105	161	186	215	114
Vanadium	15.6	12.1	13.4	7.4	12.4	12.1	9.6	11.9	13.9	29	13.5	6.7	20.6	24.7	14.7	10.1	16.3	17.3	6.5
Zinc	17.9	16.2	15.6	12.5	7.9	22.1	15.9	16	23.7	35.6	24.5	8.7	31.6	43.8	19.7	16.4	21.7	40.1	13.5
WET CHEMISTRY																			
Chloride	53	18	35	35	ND	ND	18	89	89	35	ND	27	80	27	80	53	89	64	18
Nitrate as N	12	53	35	55	ND	ND	25	11	11	8	2.9	4.4	56	12	4.1	0.7	1	28	0.51
pH	4.58	6.19	5.94	5.05	4.51	4.51	4.62	4.7	5.07	4.37	4.62	4.67	4.65	4.39	4.98	5.07	4.35	7.49	5.56
Sulfate	2420	6600	7460	12400	125	167	4090	2470	1860	2080	567	731	1800	3330	665	230	299	2140	556

EXPLOSIVES: All samples analyzed indicated non detectable concentrations present.

NOTE:

MEC = Methylene Chloride
TCE = Trichloroethene
PCE = Tetrachloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
1,1,2-TCA = 1,1,2-Trichloroethane
1,1-DCA = 1,1-Dichloroethane
1,1-DCE = 1,1-Dichloroethene
1,2-DCA = 1,2-Dichloroethane
BEP = Bis(2-ethylhexyl)phthalate
DBP = Di-n-Butylphthalate
ND = None Detected



LONGHORN ARMY AMMUNITION PLANT

KERNACK, TEXAS

BURNING GROUND No.3

FIGURE 2-6

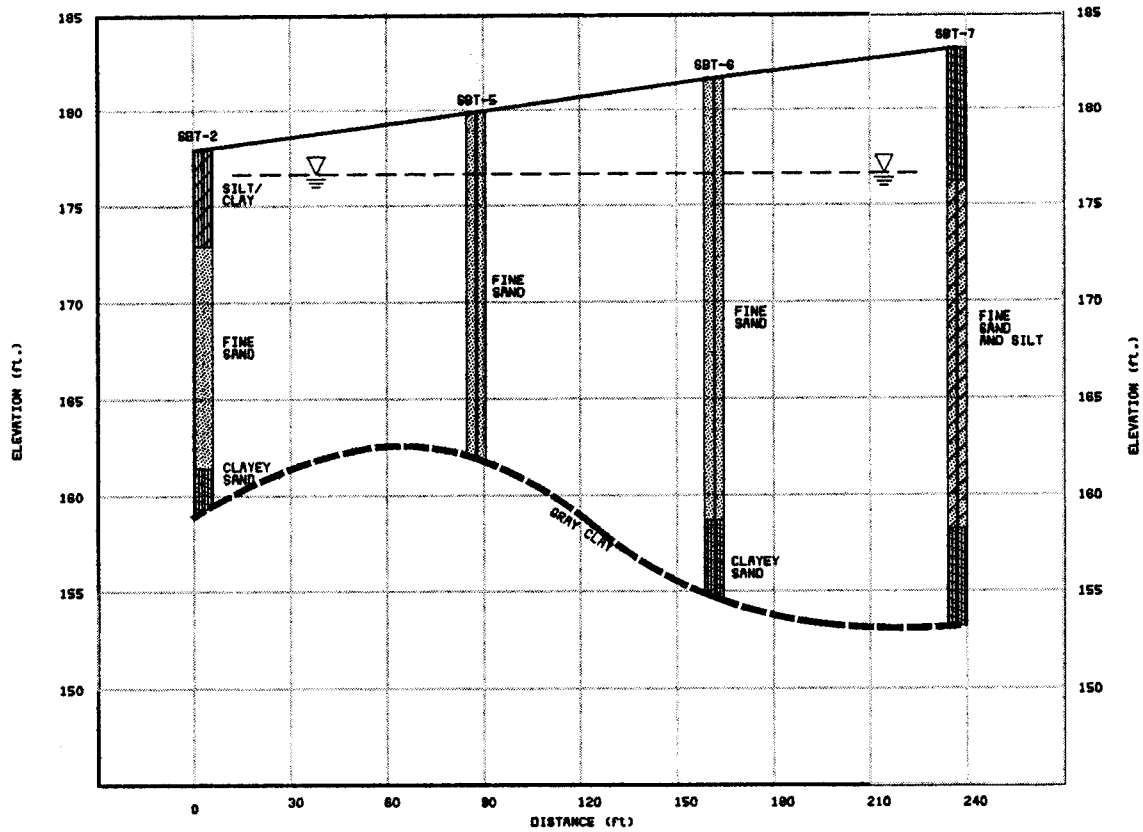
SECTION ICT - 1

FEBRUARY 1995

Dow Environmental

DESIGNED BY: A. B. ONK

DRAWN BY: E. PIEDRAMARTEL



SILT

CLAY

FINE SAND

WATER TABLE LEVEL 4/10/94

SCALE:
VERTICAL 1" = 5'
HORIZONTAL 1" = 30'

LONGHORN ARMY AMMUNITION PLANT

KERNACK, TEXAS

BURNING GROUND No.3

FIGURE 2-7

SECTION ICT - 2

FEBRUARY 1995

Dow Environmental

DESIGNED BY: A. B. ONK

DRAWN BY: E. PIEDRAMARTEL

caused ground stability problems during the excavation of this section as described below.

2.3.3 Construction of the ICT

The ICT was constructed by Inquip Associates, Inc. of Fairfax Virginia under subcontract to DEI, using the Bio-Polymer (BP) slurry trench technology. This method of drain construction uses basic slurry trench technology, however, instead of bentonite clay slurry, a guar-gum (or a similar material) based slurry is used to maintain the open trench. This type of slurry breaks down chemically and biologically following the backfilling of the trench with the desired water collection system. This method of drain construction did not require trench entry by workers since once a trench section was dug to the desired depth, the components of the water collection system (i.e. pipe laterals, filter fabric, and gravel) were placed under slurry.

All excavated soil and any liquid or solid waste generated during the construction of the ICT were collected in appropriate containers. These containers consisted of frac tanks for liquid wastes and roll-off boxes with metal covers for solid wastes. The frac tanks have been stored at the burning ground in the vicinity of EW-1 and the roll-off boxes have been stored at the TSSA. Spill control measures were also used to prevent the migration of any generated waste beyond the limits of the excavation.

Two methods were used for the construction of the ICT as follows:

- Section ICT-1 had a geocomposite drainage filter (GUNNET by Gundle) installed vertically in the middle of the trench with a coarse sand backfill on each side of the filter. A groundwater collection pipe (perforated HDPE with a six inches diameter) was wrapped around by the geocomposite filter and placed at the bottom of the trench. Appropriate sumps and clean-out pipes were also placed in the open trench prior to the placement of the sand backfill on both sides of the geocomposite filter. Steel I-beams were used on both sides of the filter material in order to keep it in the middle of the trench. Due to the construction difficulties discussed below, the length of this section was limited to 125 feet instead of 250 feet as planned.

- Section ICT-2 was backfilled with coarse sand having a permeability of $K=10^{-2}$ cm/sec. A groundwater collection pipe (six inches perforated HDPE) was placed at the bottom of the trench along with appropriate sumps and clean-out pipes prior to the placement of the sand. This section extended 250 feet as planned.

The riser pipes for the groundwater collection system consisted of six-inch diameter HDPE casings and screens. The screens extended from the bottom of the sump to about 12 inches below the top of the ICT drainage material. The riser pipes were placed beside the drain pipe and extended above the ground surface.

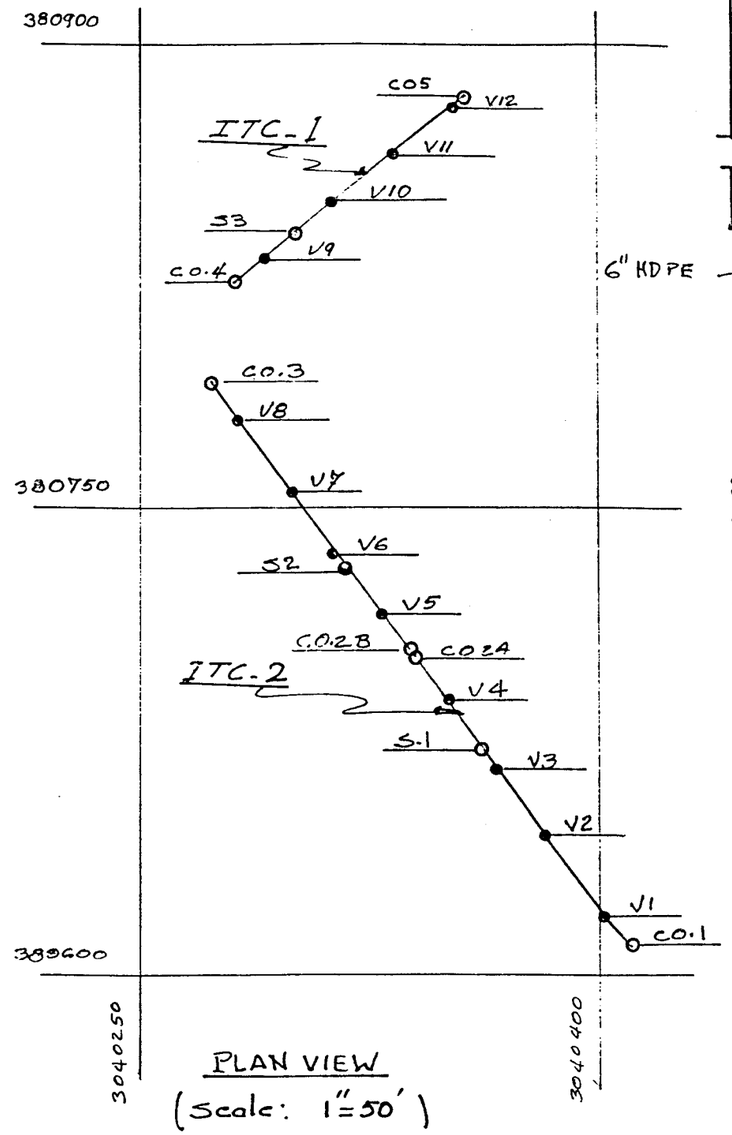
A separate three-inch diameter HDPE piping system was installed in each trench section for the distribution of additional vacuum to the trench during the vacuum enhanced groundwater tests. An as built diagram is shown on Figure 2-8.

Difficulties encountered during the construction of ICT-1 were as follows:

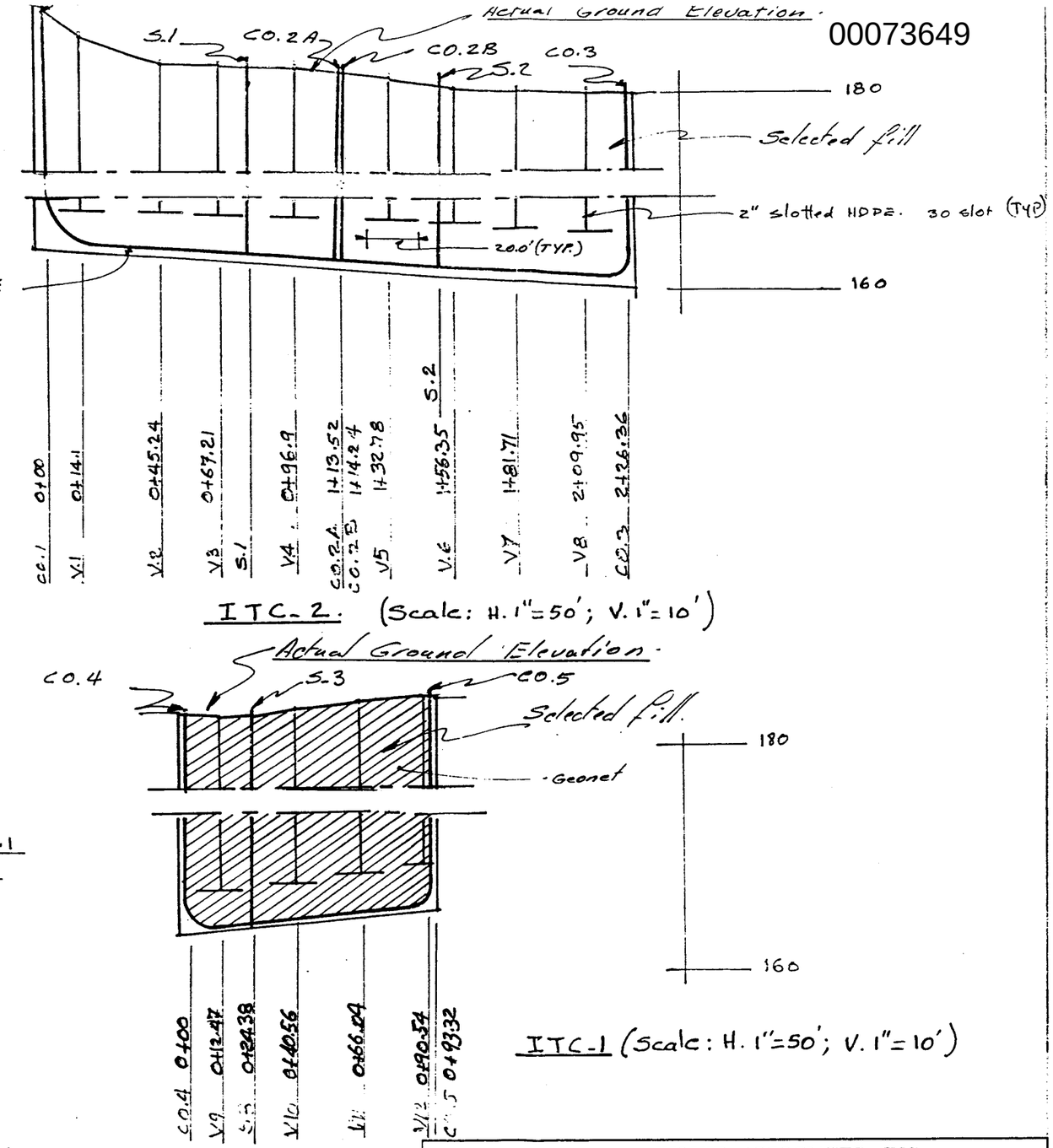
The shallow groundwater level at the western edge of Section ICT-1, which resulted less

00073649

Designation	Station	Groud Elevation	Top of riser pipe Elevation	Invert Pipe Elevation
ITC-01				
CO.04	0+00.00	182.40	184.20	163.20
V.9	0+12.47	182.39	184.39	163.36
S.3	0+24.38	182.49	184.34	163.51
V.10	0+40.56	182.87	184.82	163.72
V.11	0+66.04	183.05	185.10	164.04
V.12	0+90.54	183.45	185.10	164.35
CO.05	0+93.32	183.39	184.79	164.39
ITC-02				
CO.01	0+00.00	186.60	184.42	167.60
V.1	0+14.00	183.15	184.86	167.16
V.2	0+45.24	182.30	183.44	166.20
V.3	0+67.21	182.26	183.80	165.49
S.1	0+78.76	182.35	185.65	165.13
V.4	0+96.90	182.10	184.34	164.56
CO.02A	1+13.52	181.55	182.72	164.04
CO.02B	1+14.24	181.55	182.29	164.02
V.5	1+32.52	181.10	183.70	163.44
S.2	1+52.60	181.06	182.80	162.81
V.6	1+56.35	180.54	182.50	162.70
V.7	1+81.71	180.23	182.05	161.90
V.8	1+89.95	180.14	181.64	161.64
CO.03	2+26.36	180.04	182.29	160.50



PLAN VIEW
(Scale: 1"=50')



NOTES:

CO: Clean Out

V: Vaccum Pipe (horizontal Vaccum pipe is 5.0' above Interceptor Pipe Invert.)

S: Sump. (Sump pipe riser)

PROVIEDE BY: INQUIP ASSOCIATES, INC.

LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
BURNING GROUND No.3
FIGURE 2-8
INTERCEPTOR COLLECTION TRENCH SECTIONS
FEBRUARY 1995

Dow Environmental

DESIGNED BY: A. B. ONK

DRAWN BY: E. PIEDRAMARTEL

than the desired differential between the water level and slurry level in the trench, created stability problems during the excavation of the trench and resulted in the collapse of about 75 feet of excavation. This portion of ICT-1 was abandoned following its collapse. This action was taken after it was determined that lowering of the water table in the area several feet (6 to 8 feet) is necessary in order to achieve stability of excavation. Such dewatering may have been possible for this short section of trench, however, it would not be practical and/or cost effective to use dewatering for the construction of a site wide ICT system during Phase III of the IRA. Another option to increase stability in this area would have been the construction of a working platform by placing 6 to 8 eight feet of fill over the area were the trench was to be built. Such a platform would have resulted in a free board above the groundwater level and a stable trench due to a height differential between the groundwater elevation and the slurry level close to the top of the trench. This option was not used in the case of the collapsed portion of ICT-1 due to schedule constraints and due to the fact that such a platform would block the runoff of surface water in the area and create muddy conditions during the flow testing of the ICT sections. However, a thin platform (1 to 3 feet thick) was built along the installed section of ICT-1 in order to level the trench surface and maintain slurry in the trench. The platform was built from the same imported backfill material as the TSSA.

The installation of the geocomposite filter in the eastern portion of ICT-1 necessitated the opening of the entire trench section, 125 feet, in order to lower the drain pipe and filter material in-place. The trench remained open and stable during the installation of the drainage system. This approach may be used for short sections of trench, however, for a trench several hundred feet long, it would not be possible to open the entire trench prior to installing a similar drainage system due to the biodegradable nature of the slurry. Therefore, if the use of a geocomposite filter is required in future ICT sections, such ICT will have to be built of short overlapping trenches about 100 feet long. In addition to trench stability considerations, the installation of the geocomposite filter proceeded slowly and required a large number of I-beams to stretch it and maintain it (to the extent possible) in the middle of the trench. This problem may be avoided by constructing a steel frame per section of ICT at the ground surface, attaching the filter material and piping systems to the frame, and lowering the entire system in one piece into the open trench.

The placement of the wet sand backfill on both sides of the filter material using tremie pipes proceeded very slowly and required the withdrawal and cleanup of pipes several times prior to the completion of the ICT section. Such problems would cause delay during the construction of longer ICT sections during Phase III. A solution to this problem may be the use of pea gravel instead of sand.

Difficulties encountered during the construction of ICT-2 were as follows:

The backfilling of this section of ICT proceeded along with its excavation. However, the excavation activity ahead of the saturated sand backfilling operation applied suction pressures on the sand and caused it to run toward the area being excavated. The running of the sand backfill caused the displacement of the sumps, cleanouts, and vacuum application pipes. This problem was evident during the placement of piping systems and backfill in the southern half of ICT-2. The other half of the trench was backfilled following completion of excavation and minor-to-no problems were encountered during the backfilling of this portion of trench. The displacement of the sand and piping systems caused considerable delay in construction and resulted in a badly damaged sump (sump No. 1). These difficulties

may be avoided in the future by either using coarser material to backfill the trench or by building the trench in short, i.e. 100-foot, overlapping sections. The coarser material such as gravel may allow the hydrostatic forces caused by the saturated conditions and the suction forces of the excavation equipment to dissipate faster than the coarse sand, thus resulting in less running of backfill material and less damage to piping systems. Alternatively, the construction of an ICT using short overlapping sections would allow the backfilling of the trench without any disturbance due to excavation. In addition, rigid pipes such as stainless steel should be used instead of flexible HDPE pipes for riser sumps. As discussed below, the use of separate piping for the application of vacuum was not successful, and its use is not recommended in future ICTs at the site.

A thin platform was also built along the axis of ICT-2 (1 to 4 feet thick) mainly in the area of low original ground surface elevation along the northern third of ICT-2. This platform was necessary to maintain the excavation slurry in the trench and to provide some trench stability, especially in the vicinity of SBT-5 where the groundwater was close to ground surface. The platform was built from the same imported backfill material as the TSSA. The construction of such platform during the installation of the Phase III ICT sections will be necessary if similar conditions are encountered. This will increase the cost of the installation.

The effectiveness of the ICT sections was evaluated based on the results of the gravity flow and the vacuum enhanced liquid extraction testing as discussed in Section 2.5. These results were based on field monitoring of water levels in existing onsite monitoring wells, in some of the SBT1 through SBT7 piezometers installed prior to the construction of the ICT sections, and six new piezometers designated AWD7, AWD8, AWD9, AWD10, AWD16, and AWD17. The new piezometers, which were installed in the vicinity of the ICT following its construction as shown on Drawing II-1, consisted of two-inch, Schedule 40 PVC casings and screens. The piezometer screens extended from the top of the semi-confining layer on which the trench sections rest to about three feet from the existing ground surface. The piezometer riser pipes extended to about two feet above ground surface.

2.4 TASK 4 - Installation of Horizontal Extraction Well (HEW).

The purpose of the HEW was to evaluate the potential extraction of groundwater from a large horizontal area located under the ACD and surrounding support facilities. The construction of the HEW included the following steps:

2.4.1 Soil Borings and Temporary Groundwater Monitoring Wells/Piezometers

Soil borings, designated AWD-11 through AWD-13, were drilled along a direction parallel to the axis of the HEW at the locations shown on Drawing II-1, prior to the initiation of drilling for the horizontal well. The borings were used to define the subsurface conditions including the depth of the semi-confining retardation layer on which the screened portion of the well rests. The borings were also used to collect soil samples for chemical and physical characterization. Each borehole was drilled to the depth of the lower semi-confining layer. This depth was determined by conducting continuous soil sampling throughout the depth of the borehole. The depth of each borehole was verified by the U.S. Army Corps of Engineers, Tulsa District. Any drilled portion of the semi-confining layer was grouted using bentonite grout upon completion of the borehole. Detailed boring logs are included in Appendix D.1.

Soil samples for chemical analyses were obtained at five-feet intervals using a three-inch split spoon. In addition, soil samples were obtained for physical testing and characterization at the same intervals as for chemical analyses. The analytical and geotechnical testing program for collected soil samples is listed in Table 2-1. Appendix D.2 contains the results of the chemical analyses. The results of the geotechnical testing program are included in Appendix C.3. Soil contamination based on the collected samples appears to be minimal in the area and is confined to the interface of the semi-confining layer and the overlying shallow aquifer material and may have been caused by the contaminated groundwater in the aquifer. Table 2-8 presents a summary of the detected chemical concentrations in the tested soil samples.

Temporary groundwater piezometers were installed in each borehole. These piezometers were used to monitor the static water levels prior to proceeding with the installation of the HEW. The screen section and riser pipe of each of the piezometers were two inches in diameter and consisted of schedule 40 PVC. These piezometers were also used to measure water levels during the gravity flow and vacuum enhanced flow testing discussed below.

Subsurface information collected from the boreholes and the temporary monitoring wells was used to develop a subsurface cross section shown on Figure 2-9. This cross section shows the potential elevation of the semi-confining retardation layer on which the HEW rests. The final design for the HEW was presented to the USACE Tulsa District for approval prior to proceeding with its installation.

2.4.2 Installation of HEW

The HEW was installed by Eastman Cherington of Houston Texas under subcontract to DEI. The HEW was installed at an approximate depth of 25 feet below the ground surface. It extended about 227 feet including a 120-foot screen section. The HEW head was located to the south of the on-site ACD as shown on Drawing II-1. This location of well head was based on available space to accommodate the large number of equipment required for the installation of the HEW, and on available drilling distances for the drilling equipment to turn to a horizontal level under the ACD. Initial well head locations to the west and north of the ACD were not used due to limitation in space and drilling distance. The well was installed in a northeast direction under the ACD. It consisted of a six-inch HDPE riser pipe and a prepacked six-inch slotted HDPE screen with slot size of 0.01 inch. The screen section extended along the entire length of the horizontal section of the well. As built diagrams of the HEW are included in Appendix D.4.

All generated soil cuttings and any liquid or solid waste generated during the construction of the HEW were collected in appropriate containers. These containers consisted of frac tanks for liquid wastes and roll-off boxes with metal covers for solid wastes. The frac tanks have been stored at the burning ground in the vicinity of EW-1, and the roll-off boxes have been stored at the TSSA. Spill control measures were also used to prevent the migration of any generated waste beyond the limits of the drilling operation.

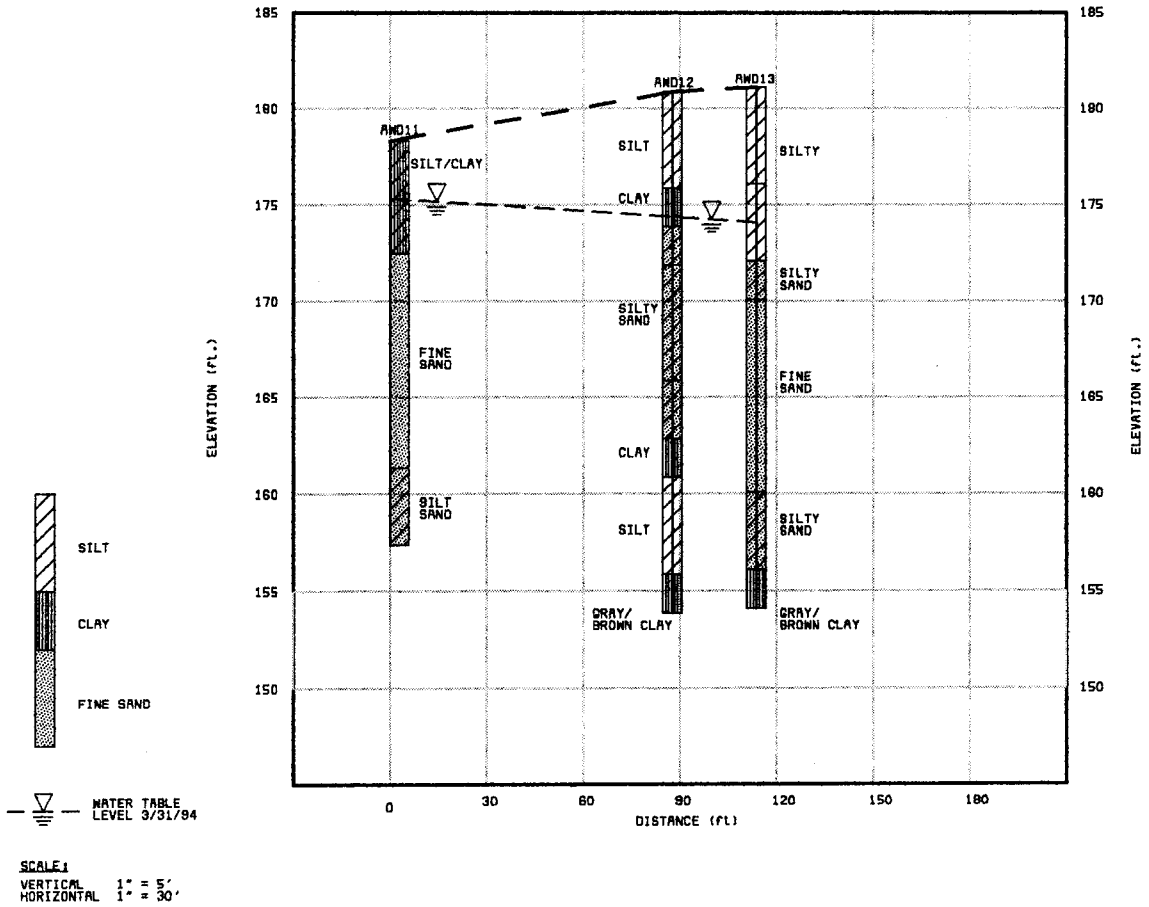
Difficulties encountered during the installation of the HEW were as follows:

- Ground fracturing occurred along most of the HEW line during drilling operations. The fine subsurface soils collected on the outside of the drilling rods and blocked the circulation of drilling fluid which was being pushed into the hole under pressure. This

TABLE 2-8
LHAAP 18&2 BURNING GROUND 3 & UEP
SUMMARY OF SOIL ANALYSIS FOR SAMPLES COLLECTED FROM HORIZONTAL EXTRACTION WELL LOCATION
DETECTED CONCENTRATIONS ALONG HEW, in milligram/kilogram
MARCH/APRIL 1994

Sample Number	AWD11	AWD11 QC	AWD11	AWD11 QC	AWD11	AWD11	AWD12	AWD12	AWD12	AWD12	AWD12	AWD13	AWD13	AWD13	AWD13	AWD13
Depth (ft)	5-7	5-7	9-11	9-11	15-17	19-21	5-7	9-11	15-17	19-21	25-27	5-7	9-11	15-17	19-21	25-27
VOLATILE ORGANIC COMPOUNDS																
1,1,1-TCA	ND	ND	0.39	0.23	0.066	ND	ND	ND	ND	ND	ND	ND	0.043	0.33	0.019	ND
1,1 DCE	ND	ND	0.14	0.17	0.035	ND	ND	ND	ND	0.034	ND	ND	ND	0.065	ND	ND
1,2 DCA	ND	ND	0.13	0.068	0.019	ND	ND	ND	ND	0.095	ND	ND	ND	ND	ND	ND
Acetone	0.075	0.099	0.13	0.13	0.66	ND	0.092	0.08	ND	0.44	ND	0.055	ND	0.21	0.16	0.255
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.04	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.038	0.14	0.09
MEC	0.11	0.106	20.1	9.06	27	0.46	0.093	0.32	0.11	30	25	0.65	0.085	0.1	0.27	3.47
Styrene	ND	ND	1.1	0.79	0.12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	0.095	0.074	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.28	ND	ND	0.03	ND	ND
Total-1,2-DCE	ND	ND	4.01	ND	ND	ND	ND	ND	ND	1.04	ND	ND	1.6	12.6	0.72	0.36
TCE	0.03	0.019	24.1	22.7	7.1	0.14	0.023	0.1	0.06	19.2	2	0.35	0.26	8.86	1.59	1.24
Vinylchloride	ND	ND	0.034	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.11	ND	ND
SEMI-VOLATILE ORGANIC COMPOUNDS																
BEP	2.914	3.573	0.601	ND	ND	2.784	1.65	0.581	ND	2.281	ND	2.636	0.624	0.756	2.315	1.814
DBP	ND	ND	0.711	ND	ND	0.616	ND	ND	ND	0.598	ND	0.41	0.427	0.442	0.549	0.266
TOTAL METALS																
Aluminum	19700	10600	2370	2420	5590	9560	11000	1820	5490	4680	8110	10500	5630	5870	5860	4760
Arseniuc	3	2.4	ND	ND	0.9	0.7	5	ND	2.9	1.6	ND	3.1	1	1.5	1	3.5
Barium	592	64.1	101	96.1	127	44.7	70	50.6	116	69.4	161	209	57.7	95	91.4	53.6
Beryllium	ND	ND	ND	ND	ND	0.62	ND	ND	ND	ND	0.82	ND	ND	ND	ND	ND
Calcium	126	57.7	66	73	356	1160	196	100	358	768	1480	461	221	172	535	594
Chromium	17.3	9.5	3.3	3.3	7	13.3	10.1	3.1	7.5	11.6	13.6	8.6	4.5	7	9	7.6
Cobalt	3.6	3	1.5	1.5	2.4	5.2	4.2	2.3	3.6	5.7	4.7	7.4	1.8	2.4	4.8	7.9
Copper	6.6	4	ND	ND	3.4	7.6	3.8	ND	4.1	7.3	14	3.6	ND	3.8	4.3	5.8
Iron	17800	10600	2570	2230	4260	15800	10100	1730	7530	9010	6900	10600	4340	4620	4860	16200
Lead	7.7	6	2.4	2.7	4.2	8.7	8.4	2.5	4.3	8.2	15	11	4.1	4.7	6.7	7
Magnesium	1080	701	279	292	732	1680	776	324	839	873	1890	697	573	608	688	707
Manganese	55.5	34.4	16.4	14.8	13.6	20.3	84.3	18.3	24.8	12.4	44.2	198	41.9	23.8	25.8	141
Nickel	8.9	6.4	ND	ND	5	12.2	5.4	ND	5.8	8.4	10.9	6.1	ND	ND	6.2	9.6
Potassium	949	ND	ND	ND	ND	663	ND	ND	ND	ND	ND	740	ND	ND	ND	ND
Sodium	2190	862	214	208	725	876	150	49.4	78.2	118	164	458	90.6	169	132	76.9
Vanadium	31.2	16.3	5.3	4.7	11.7	28.9	16.6	4.2	20.5	10.7	19	18.6	8	15.3	10.4	14.2
Zinc	27.7	18	7.9	7.9	17.4	35.2	15.4	7.6	19.6	28.3	38.5	16.5	12.3	14.9	22.2	26.6
WET CHEMISTRY																
Chloride	53	53	53	35	106	310	27	18	18	53	89	53	35	35	35	35
Nitrate as N	96	98	33	28	176	100	30	0.9	39	45	2	53	3.7	30	21	3.4
pH	5.12	5.07	4.99	4.9	4.87	5.08	5.11	5.37	5.29	6.1	6.96	7.69	7.36	6.54	5.24	5.5
Sulfate	1840	2040	1840	2020	5000	8830	5800	209	3030	9100	206	11500	405	4860	2930	428

EXPLOSIVES: All samples analyzed indicated non detectable concentrations present.



LONGHORN ARMY AMMUNITION PLANT

KERNACK, TEXAS

BURNING GROUND No.3

FIGURE 2-9

SUB-SURFACE CROSS-SECTION FROM AWD11 - AWD13

FEBRUARY 1995

Dow Environmental

DESIGNED BY: A. B. ONK

DRAWN BY: E. PIEDRAMARTEL

blockage contributed to the fracturing. The fracturing caused drilling fluids to run up to the ground surface and spill over the area of operation. This spillage was managed at all times in order to prevent contamination to the surrounding environment. About 1,000 bags of sand were used to control the problems caused by fracturing. These bags were placed in a roll-off box following the installation of the HEW and are being handled like all other solid waste generated during Phase II of IRA. It may difficult to avoid this problem in future applications at the site, especially with shallow wells where the overburden is limited and does not provide a balance to the drilling fluid pressures. However, a very slow speed of drilling and the removal and cleaning of drilling rods every few feet of drilling may reduce the amount of drilling fluids blockage and thus the amount of fracturing. This solution will cause an increase in the cost of drilling and will be time consuming.

- The well bore was lost several times during the drilling operations. This problem appears to have been caused by the high speed of drilling over the first two days of the work. It also appears to have been related to the drilling equipment which was difficult to maneuver due to the shallow nature of the well. The drilling contractor is responsible for solving this problem. However, it should be noted that such a problem causes delays and eventually impacts the cost of the project.

- The development of the well proceeded at a very slow rate. The groundwater flow during development was very slow. Eastman Cherrington redeveloped the well on May 27 and 28 and installed a submersible pump in it. The subcontractor attributed this problem to the fine nature of the soils in which the screen was installed and the shallowness of the well. It was also suggested by the subcontractor that a regular well screen be used with a conventional gravel packed instead of the prepacked screen. However, maintaining the borehole open for such an application may be difficult.

The effectiveness of the HEW was evaluated based on the results of the gravity flow and the vacuum enhanced liquid extraction testing as described below in Section 2.5. These results were based on field monitoring of water levels in existing onsite monitoring wells and piezometers, and two new piezometers that were installed in the vicinity of the HEW. The two new piezometers, AWD-14 and AWD-15, were installed at the locations shown on Drawing II-1. They consisted of 2-inch, Schedule 40 PVC casings and screens. The piezometer screens extended from the top of the semi-confining layer on which the HEW rests to about 3 feet from the existing ground surface. The piezometer riser pipes extended to about two feet above ground surface.

2.5 Task 5 - Groundwater Flow Testing

2.5.1 Gravity Flow Testing

A gravity flow test was conducted at the VEW, HEW, and the ICT. The duration of the pumping at each extraction system took into account the effects of delayed yield. The test included the measurements of flow rates, flow volumes, and water level readings in surrounding monitoring wells. The results of the flow tests are to be utilized in the design of a groundwater extraction and treatment system for the IRA.

Water levels in the pumping well and observation wells were recorded using automatic data loggers. Manual water levels were also recorded. The manual measurements were used to supplement the data from the automatic data loggers and were used as a back-up in the event of data logger failure. The manual measurements also allowed the field staff to observe the behavior of the pumping well and aquifer on a continuous basis. The water levels were also monitored after the stoppage of pumping, during aquifer recovery. The pumped groundwater was collected in frac tanks onsite for treatment during Phase III of the IRA. The frac tanks have been stored to the south of the UEP in the vicinity of the VEW. The following is a brief description for the results of flow testing:

2.5.1.1 Vertical Extraction Well Gravity Flow Test

The gravity flow test at the VEW occurred between May 7 and May 13, 1984. The test was preceded on May 6 by a sand free test and a step drawdown test. The sand free test indicated that the well had been properly developed. The step drawdown test resulted in the selection of one gallon per minute (gpm) as the flow rate for the gravity test. The manual water level readings and the data logger readings are included in Appendices D.1 and D.2, respectively. Figure 2-10 shows the sustained pumping rate during the test. The rate started at one gpm and ended at about 0.8 gpm. Figures 2-11 through 2-14 show plots of drawdown versus (vs) distance from pumping well, and drawdown vs time of the pumping well EW-1 and monitoring wells AWD-5 and MW-2, respectively. Piezometers AWD-5 and AWD-6 were installed at the locations shown on Drawing II-1, prior to the start of the flow test in order to better monitor the influence of pumping at the VEW. Figure 2-11 shows the positions of the cone of depression after pumping for 24 hours, 48 hours, 72 hours, and 96 hours. It also shows that the radius of influence due to the withdrawal of water from EW-1 is about 800 feet after 96 hours of pumping. The water level in the pump well and monitoring wells was influenced by the heavy rains that fell during the performance of the flow test as can be seen from the plotted data on Figures 2-12, 2-13, and 2-14. This rain and the fluctuation of the pumping rate influenced the interpretation of data also as shown on these figures. The aquifer transmisivity,T, of 2,030 gallon per day per foot (gpd/ft) and storativity, S, of 2.06×10^{-3} calculated from the distance drawdown graph (Figure 11) may be most representative of site conditions.

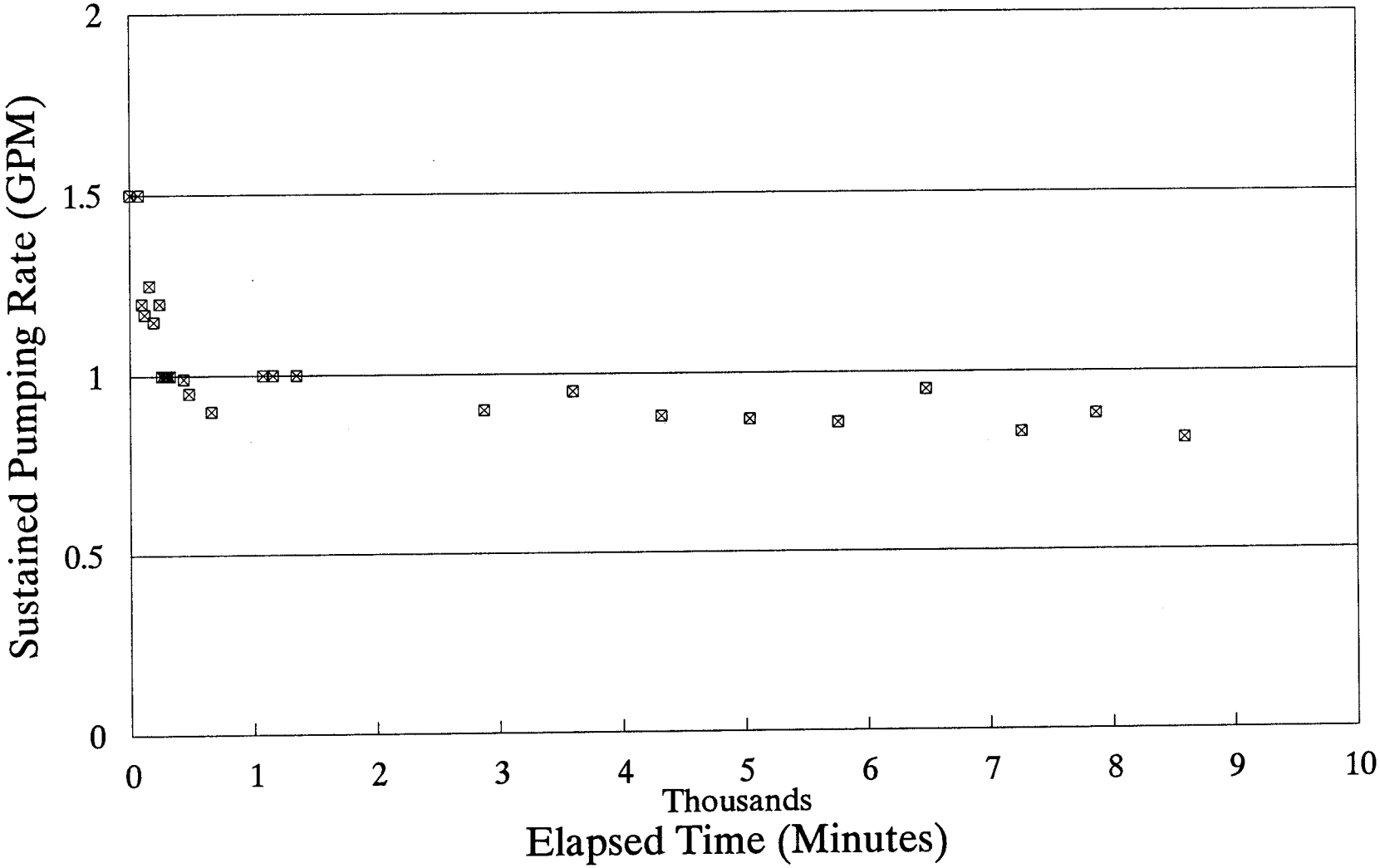
One sample of the extracted water was taken each day for laboratory analysis. The samples were analyzed for different parameters as indicated in Table 2-1. Table 2-9 presents a summary of detected parameters. The analytical results are included in Appendix D.3.

2.5.1.2 Horizontal Extraction Well Gravity Flow Test

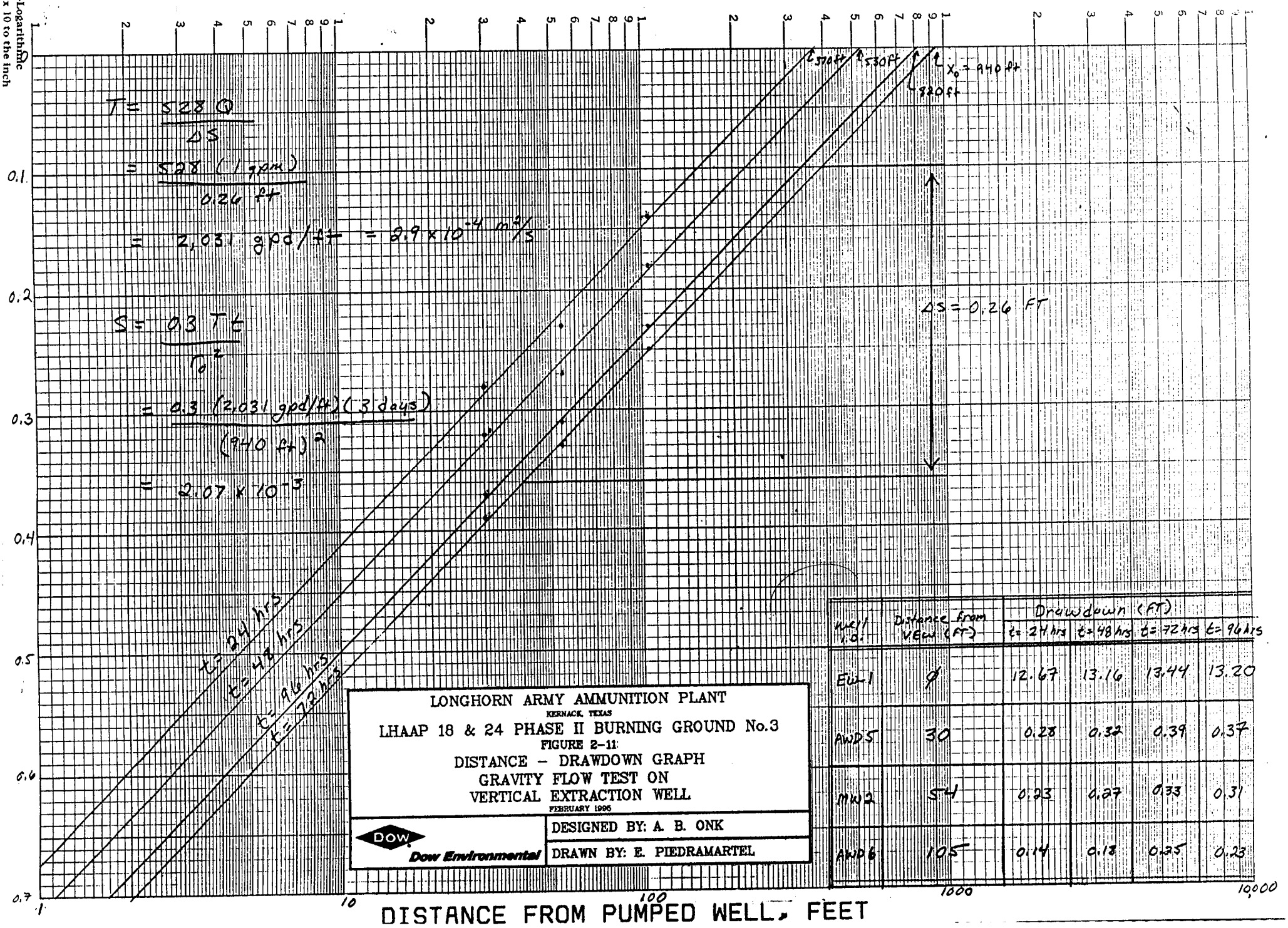
The gravity flow test at the HEW occurred between May 29 and June 3, 1994. The test was preceded on May 26 through May 28 by the redevelopment of the well by Eastman Cherrington who also conducted a sand free test and a step drawdown test following redevelopment. The sand free test indicated that the well had been properly developed. The step drawdown test resulted in the selection of a 0.7 gpm as the flow rate for the gravity test. However, as can be seen from Figure 2-15, which shows the sustained pumping rate during the test, the flow rate decreased over time and was about 0.3 gpm at the end of the test. Figure 2-16 presents a distance-drawdown plot which reflects the positions of the cone of depression after pumping for 24 hours, 72 hours, and 118 hours. Piezometers AWD-11, AWD-12 and AWD-13 which were installed prior to HEW and located near its axis had maximum drawdowns of 0.51, 0.94, and 0.69 feet, respectively. The manual water level readings and the data logger readings are

Figure 2–10, Pumping Rate vs Time, VEW, Gravity Flow Test

LHAAP 18&24 Phase II Pilot Tests



Semi-Logarithmic
4 Cycles x 10 to the inch



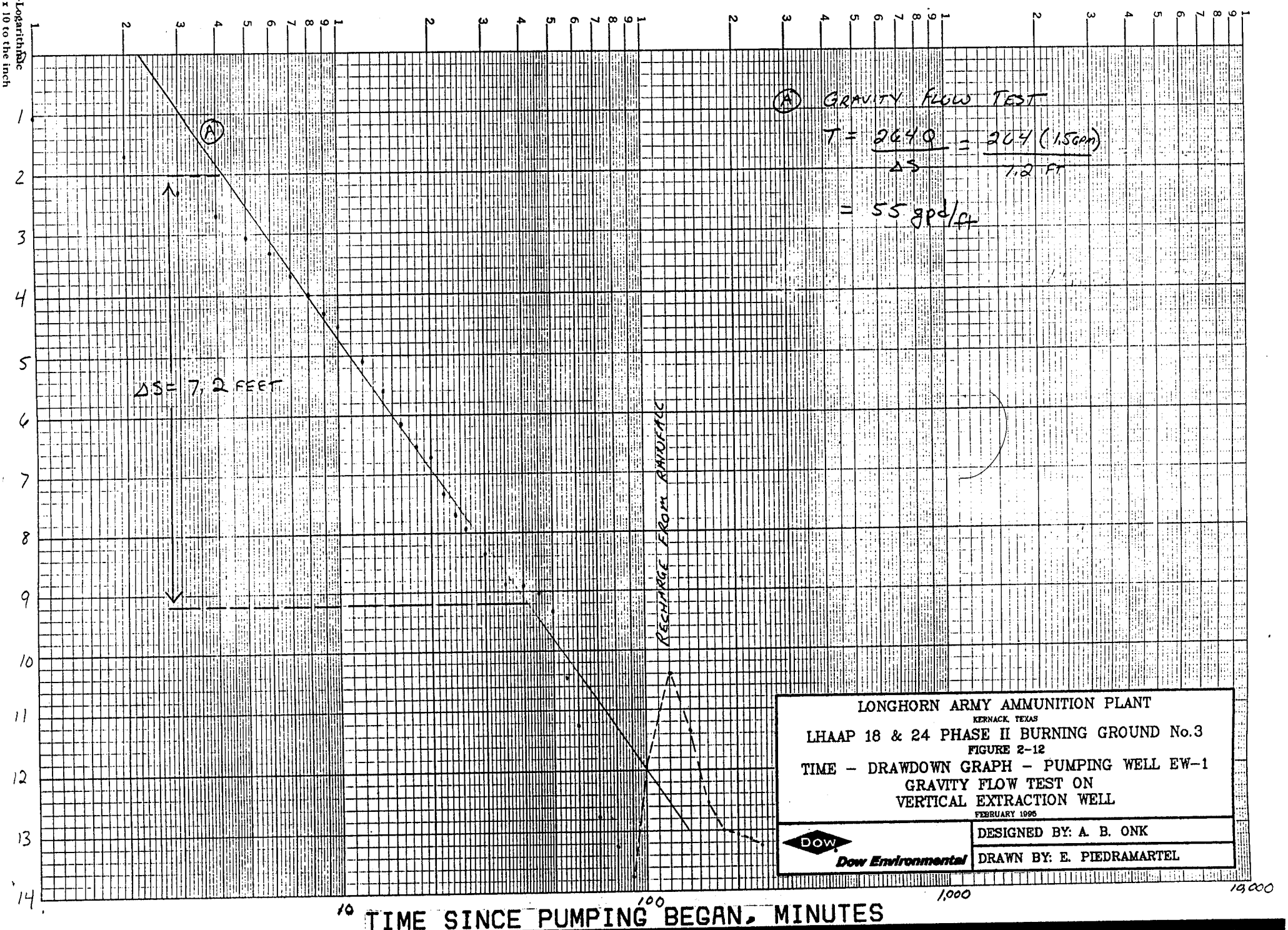
Well I.D.	Distance from Well (FT)	Drawdown (FT) t=24 hrs	t=48 hrs	t=72 hrs	t=96 hrs
EW-1	0	12.67	13.16	13.44	13.20
AWD5	30	0.28	0.32	0.39	0.37
MW2	54	0.23	0.27	0.33	0.31
AWD6	105	0.14	0.13	0.25	0.23

LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
LHAAP 18 & 24 PHASE II BURNING GROUND No.3
FIGURE 2-11
DISTANCE – DRAWDOWN GRAPH
GRAVITY FLOW TEST ON
VERTICAL EXTRACTION WELL
FEBRUARY 1995

DOW
Dow Environmental

DESIGNED BY: A. B. ONK
DRAWN BY: E. PIEDRAMARTEL

00073659



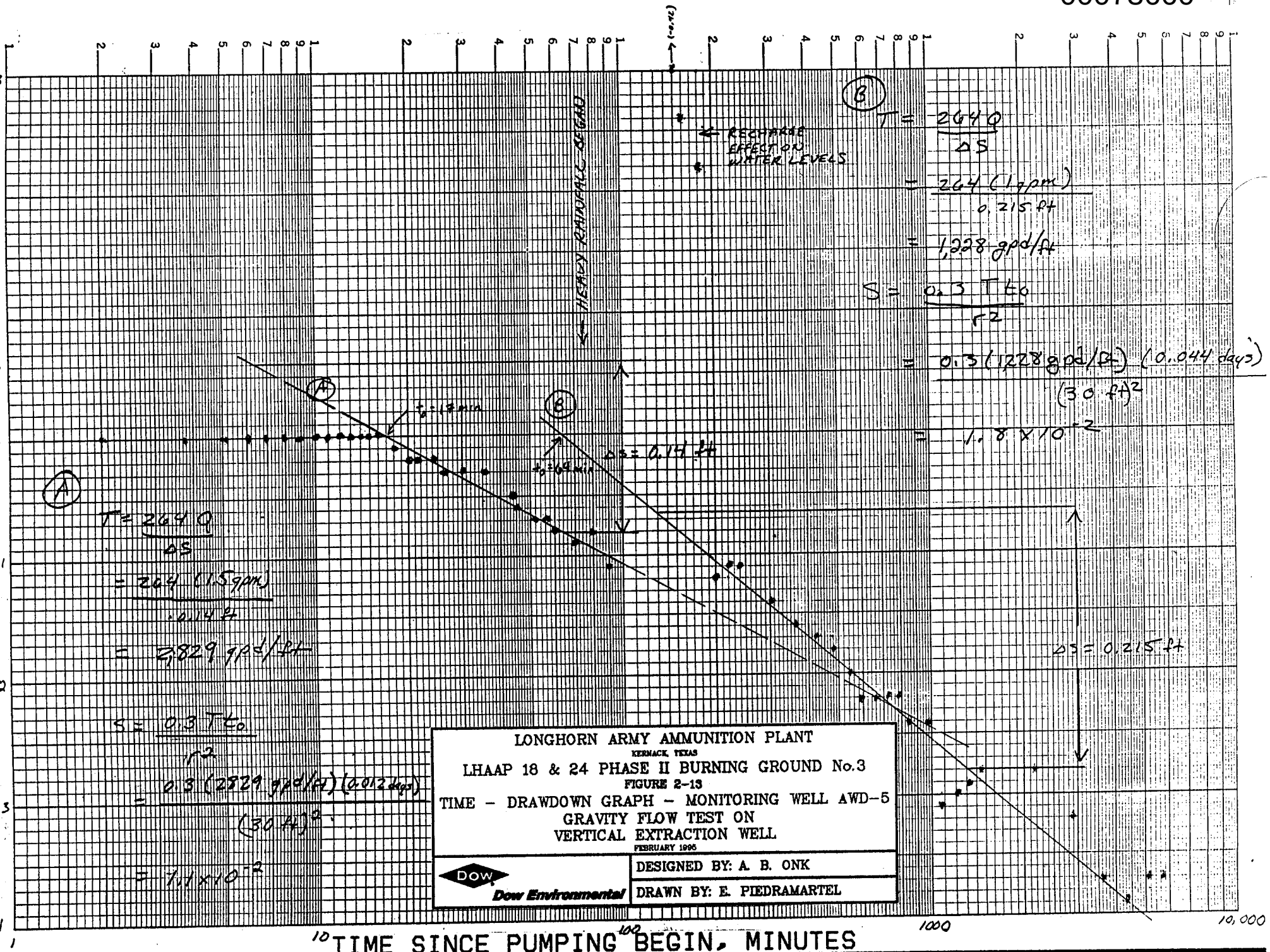
LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
LHAAP 18 & 24 PHASE II BURNING GROUND No.3
FIGURE 2-12
TIME – DRAWDOWN GRAPH – PUMPING WELL EW-1
GRAVITY FLOW TEST ON
VERTICAL EXTRACTION WELL
FEBRUARY 1995

DOW
Dow Environmental

DESIGNED BY: A. B. ONK
DRAWN BY: E. PIEDRAMARTEL

00073660

Semi-Logarithmic
4 Cycles x 10 to the inch



LONGHORN ARMY AMMUNITION PLANT
KERMACK, TEXAS
LHAAP 18 & 24 PHASE II BURNING GROUND No.3
FIGURE 2-13
TIME - DRAWDOWN GRAPH - MONITORING WELL AWD-5
GRAVITY FLOW TEST ON
VERTICAL EXTRACTION WELL
FEBRUARY 1995

Dow Environmental

DESIGNED BY: A. B. ONK
DRAWN BY: E. PIEDRAMARTEL

00073661

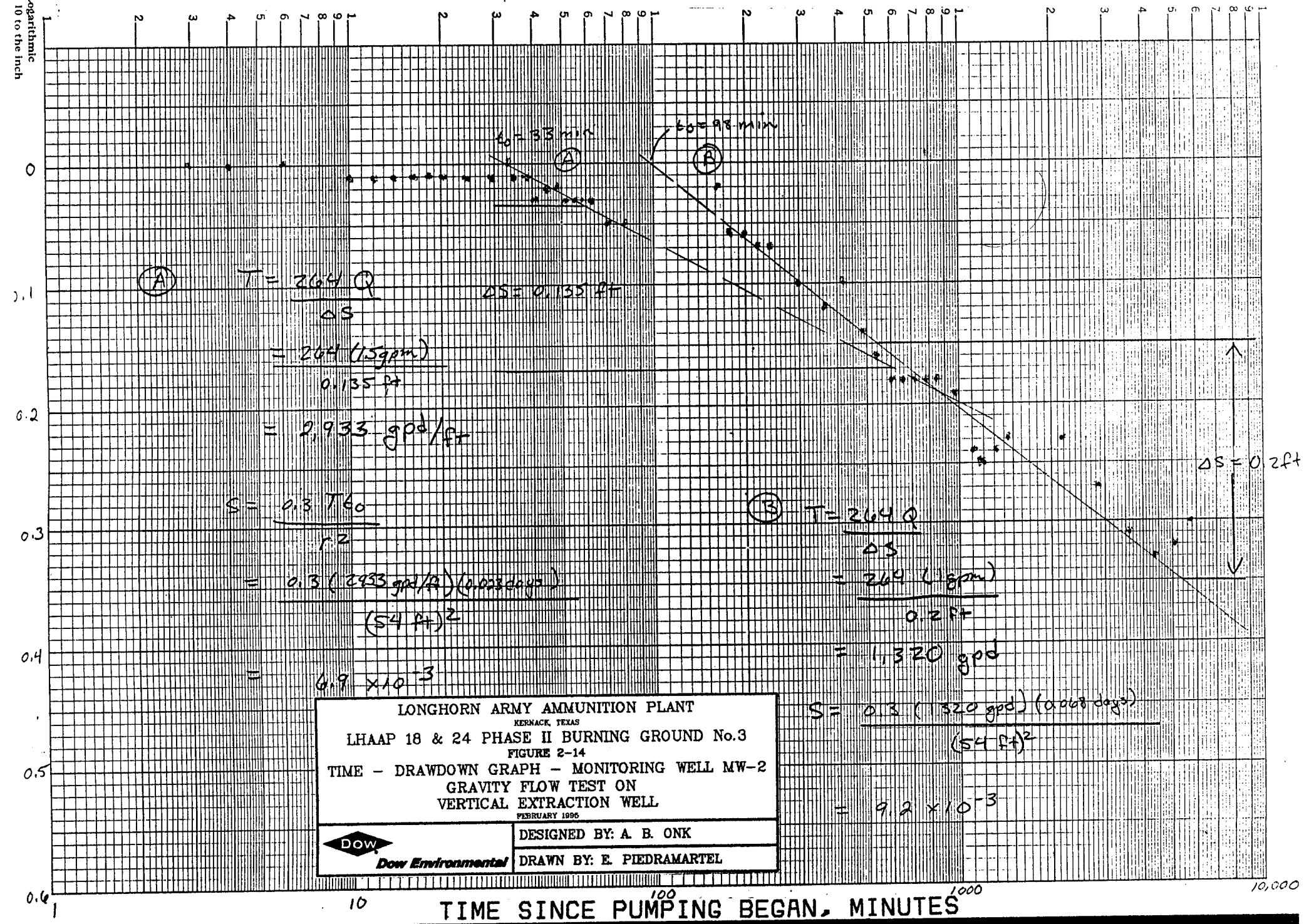

Semi-Logarithmic
Cycles x 10 to the inch
0
0.1
0.2
0.3
0.4
0.5
0.6
1
10
100
1000
10,000
TIME SINCE PUMPING BEGAN, MINUTES
t_0 = 33 min
A
t_0 = 98 min
B
A $T = \frac{264\,Q}{\Delta S}$
$\Delta S = 0.135$ ft
$= \frac{264\,(1.5\text{ gpm})}{0.135\text{ ft}}$
$= 2{,}933$ gpd/ft
$S = \frac{0.3\,T t_0}{r^2}$
$= \frac{0.3\,(2933\text{ gpd/ft})(0.023\text{ days})}{(54\text{ ft})^2}$
$= 6.9 \times 10^{-3}$
$\Delta S = 0.2$ ft
B $T = \frac{264\,Q}{\Delta S}$
$= \frac{264\,(1.5\text{ gpm})}{0.2\text{ ft}}$
$= 1{,}320$ gpd
$S = \frac{0.3\,(1320\text{ gpd})(0.068\text{ days})}{(54\text{ ft})^2}$
$= 9.2 \times 10^{-3}$
LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
LHAAP 18 & 24 PHASE II BURNING GROUND No.3
FIGURE 2-14
TIME - DRAWDOWN GRAPH - MONITORING WELL MW-2
GRAVITY FLOW TEST ON
VERTICAL EXTRACTION WELL
FEBRUARY 1995
DOW
Dow Environmental
DESIGNED BY: A. B. ONK
DRAWN BY: E. PIEDRAMARTEL

TABLE 2-9
LHAAP 18&24 BURNING GROUND 3 & UEP
SUMMARY OF GROUNDWATER ANALYSES DURING FLOW TESTING
DETECTED CONCENTRATIONS AT VEW, in microgram/liter
MAY, 1994

DATE OF SAMPLING	VOLATILE ORGANIC COMPOUND		SEMIVOLATILES					
	METHYLENE CHLORIDE	TRICHLORO-ETHELYNE	2-2-METHYL-NAPHTHALENE	2-METHYLPHENOL	BENZOIC ACID	BIS (2-ETHYLHEXYL) PHTHALATE	DIMETHYL PHTHALATE	NAPHTHALENE
05/07/94	1020000				149		15	
05/08/94	2150000			8	548		30	
05/09/94	2340000		5	6	458		20	6
05/10/94	4064250	235750			7	24	15	
05/10/94*	2895800	198800	6		392		21	7
05/11/94	3934200	127200						
05/12/94	2332600	109200						
05/13/94	2441000	105800						
05/19/94	1215400							
05/20/94	526000	53000						
05/22/94	1120000	72000						
05/23/94	977000	60000						
05/23/94	919000	42000						
05/24/94	1260000	76750						
05/24/94	1100000*							
05/24/94	1300000	65000						

*QUALITY CONTROL

DATE OF SAMPLING	WET CHEMISTRY PARAMETER									
	ALKALINITY	AMMONIA AS N	TOTAL HARDNESS	SILICA	TDS	TSS	CHLORIDE	NITRATE	NITRITE	SULFATE
05/07/94	155000	459	309000	51000	1310000	5000	510000	1100000		44000
05/08/94	118000	328	221000	53000	1060000		300000	190000		3600000
05/09/94	122000	312	250000	53000	1110000		290000	170000		210000
05/10/94	139000	750	251000	50000	1330000	238000	4800	800	30	ND
05/10/94*	153000	1100	352000	50000	1420000	8000	3700	600	ND	ND
05/11/94						ND				
05/12/94						ND				
05/13/94						ND				
05/19/94						190000				
05/20/94						4050000				
05/22/94						5000				
05/23/94						ND				
05/23/94						6000				
05/24/94*						ND				
05/24/94						ND				

NOTE: ND = NOT DETECTED

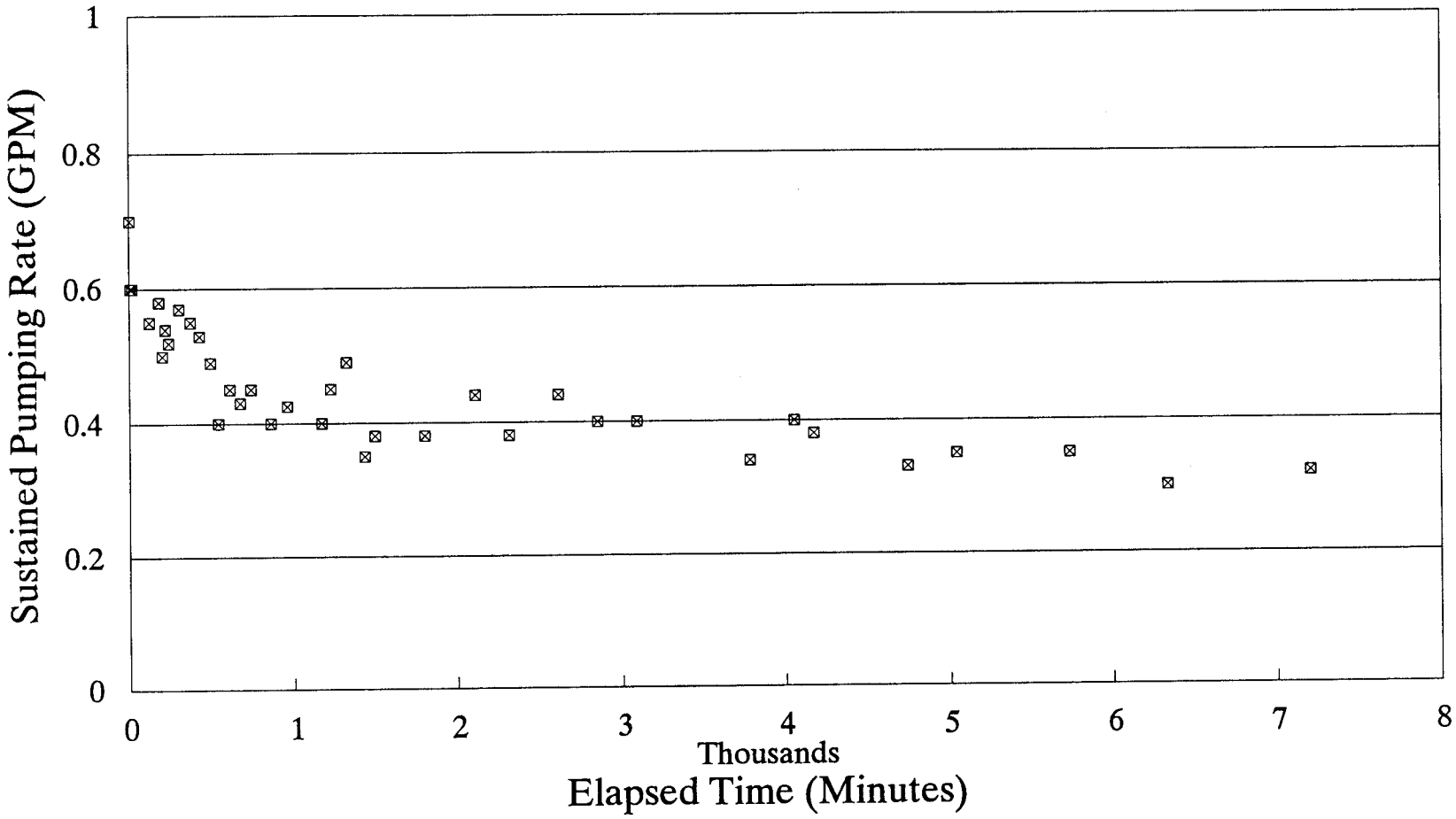
DATE OF SAMPLING	TOTAL METALS			TPH/OIL&GREASE	
	BARIUM	LEAD	MERCURY	TPH	O&G
05/07/94	688			ND	5430
05/08/94	1410			ND	ND
05/09/94	1600	6		ND	ND
05/10/94	1620	7		ND	5570
05/10/94*				ND	ND
05/11/94	1920	5			
05/12/94	1770	5			
05/13/94	1720	5			
05/19/94	1090	6			
05/20/94	1630	8	0.2		
05/22/94	1260	6			
05/23/94	1270				
05/23/94	1360				
05/24/94*	1370				
05/24/94	1350				

TPH = TOTAL PETROLEUM HYDROCARBON
O&G = OIL AND GREASE
ND = NOT DETECTED

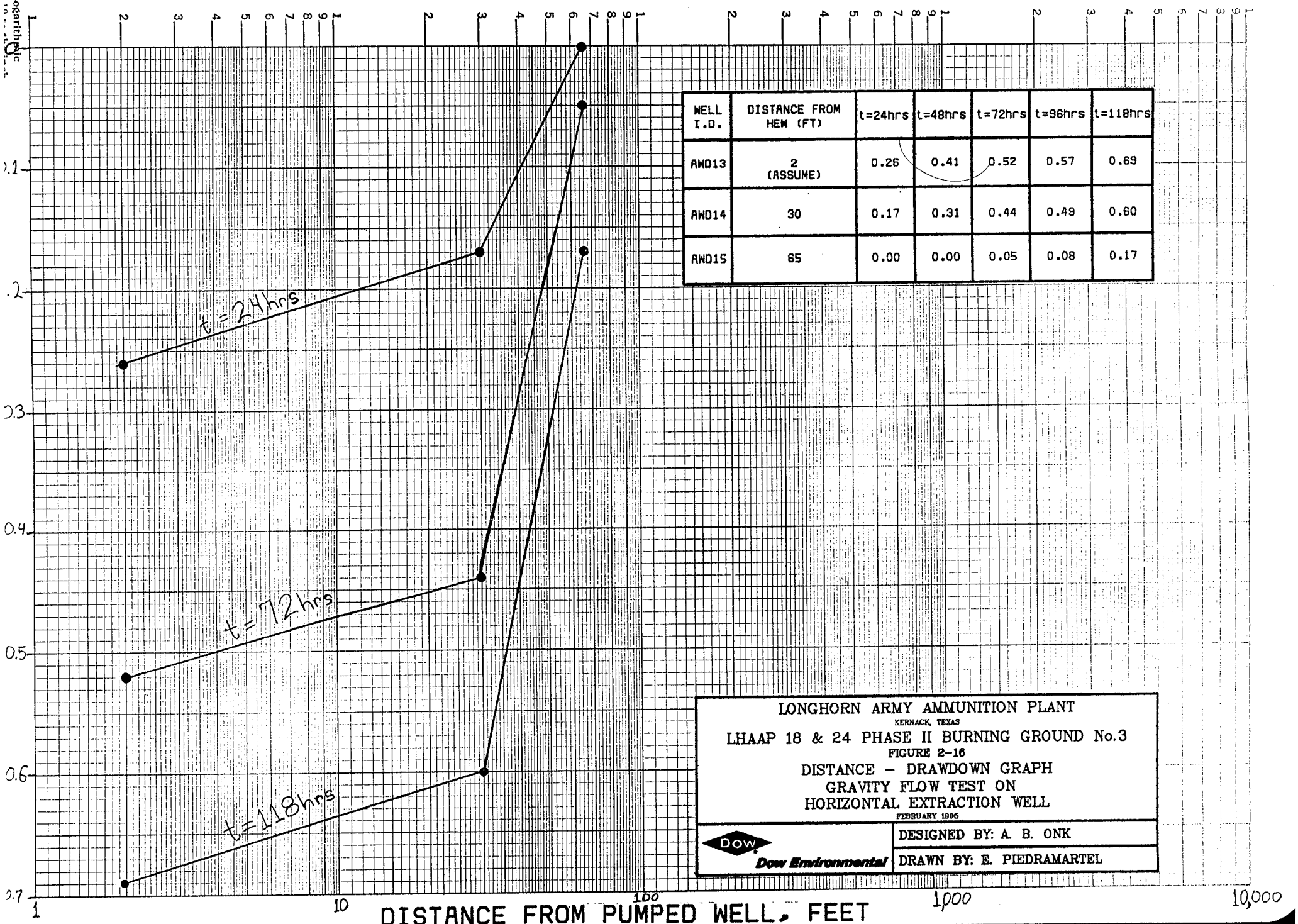
NOTE: * QUALITY CONTROL

Figure 2–15, Pumping Rate vs Time, HEW, Gravity Flow Test

LHAAP 18&24 Phase II Pilot Tests



00073664



WELL I.D.	DISTANCE FROM HEW (FT)	t=24hrs	t=48hrs	t=72hrs	t=96hrs	t=118hrs
AWD13	2 (ASSUME)	0.26	0.41	0.52	0.57	0.69
AWD14	30	0.17	0.31	0.44	0.49	0.60
AWD15	65	0.00	0.00	0.05	0.08	0.17

LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
LHAAP 18 & 24 PHASE II BURNING GROUND No.3
FIGURE 2-16
DISTANCE - DRAWDOWN GRAPH
GRAVITY FLOW TEST ON
HORIZONTAL EXTRACTION WELL
FEBRUARY 1996

DOW Dow Environmental

DESIGNED BY: A. B. ONK
DRAWN BY: E. PIEDRAMARTEL

One sample of the extracted water was taken each day for laboratory analysis. The samples were analyzed for different parameters as indicated in Table 2-1. Table 2-10 presents a summary of detected parameters. The analtytical results are included in Appendix E.3

2.5.1.3 Interceptor Collection Trench Gravity Flow Test

The gravity flow test at the ICT occurred between June 13 and June 20, 1994. The test was preceded on June 11 and 12 with the installation of pumps and site preparation. Also, a sand free test and a step drawdown test were conducted at sumps 1, 2, and 3 on June 12, 1994. The sand free tests indicated that the ICT sections had been properly developed. The step drawdown tests resulted in the selection of 1.5, 2, and 3 gpm as the starter flow rates for the gravity test at sumps 1, 2, and 3, respectively. However, as can be seen from Figure 2-17 which shows the sustained pumping rate during the test at sumps 2 and 3, higher flow rates were achieved at both of these sumps. The last measured flow rates in these sumps were 4.2 gpm and 3.75 gpm, respectively. In order to evaluate the effect of pumping from sump 3 in ICT-1 on the surrounding area including sump 2 in ICT-2 and visa versa, pumping at sump 3 started on June 13 and ended on June 18, and pumping at sump 2 started on June 15 and ended on June 19. The flow rate at sump 1 decreased rapidly and could not be sustained. The pump at sump 1 was turned off on June 16, since little to no flow was being pumped out of it. The riser pipe for sump 1 was damaged during installation due to the difficulties encountered during the installation of ICT-2 as described in Section 2.3.3 above.

Figure 2-18 presents a distance-drawdown plot which reflects the positions of the cone of depression after pumping under a constant rate of 3 gpm at sump 3 for one hour, six hours, 12 hours, and 23 hours. This figure also shows that radius of influence (distance from the sump for zero drawdown) increased with time and was about 212 feet after 23 hours of pumping. However, the increase was minimal after 12 hours. Three time-drawdown graphs, along with transmisivity and storage coefficient calculations, are presented on Figures 2-19, 2-20, and 2-21 for monitoring wells AWD-10, AWD-16, and AWD-17, respectively. These graphs represent monitoring data in these wells, which are located along the north-south axis of sump 3, during the first day of pumping from sump 3 at a rate of 3 gpm. The calculated aquifer transimisivities, with an average of 507 gpd/ft, were smaller than the potential representative transmisivitty of 2,031 gpd/ft (see Section 2.5.1.1). This difference could be attributed to the fact that the theory assumes a homogeneous aquifer, which is not the case here due to the presence of coarse material in the trench compared to the fine natural soils at the site. Figure 2-22 also presents a distance-drawdown plot which reflects the positions of the cone of depression after pumping under a constant rate of 4 gpm at sumps 2 and 3 for 24 hours, 48 hours, and 72 hours. As can be seen from this figure, the radius of influence was about 330 feet after 72 hours of pumping from both sumps. The graphs on Figure 2-23 present the measured drawdown using a data logger and transducers at several monitoring wells located near the ICT. The manual water level readings and the data logger readings are included in Appendices F.1 and F.2, respectively.

One sample of the extracted water was taken each day for laboratory analysis. The samples were analyzed for different parameters as indicated in Table 2-1. Table 2-11 presents a summary of detected parameters. The analytical results are included in Appendix F.3.

TABLE 2-10
LHAAP 18&24 BURNING GROUND 3 & UEP
SUMMARY OF GROUNDWATER ANALYSES DURING FLOW TESTING
DETECTED CONTAMINANTS AT HEW, in microgram/liter
MAY AND JUNE, 1994

DATE OF SAMPLING	VOLATILE ORGANIC COMPOUND	
	METHYLENE-CHLORIDE	TRICHLORO-ETHYLENE
05/29/94	28400	1600
05/30/94	991000	129000
05/31/94	875000	119000
06/01/94	767000	127000
06/01/94*	817000	120000
06/02/94	748000	107000
06/03/94	681000	99300
	* QUALITY CONTROL	

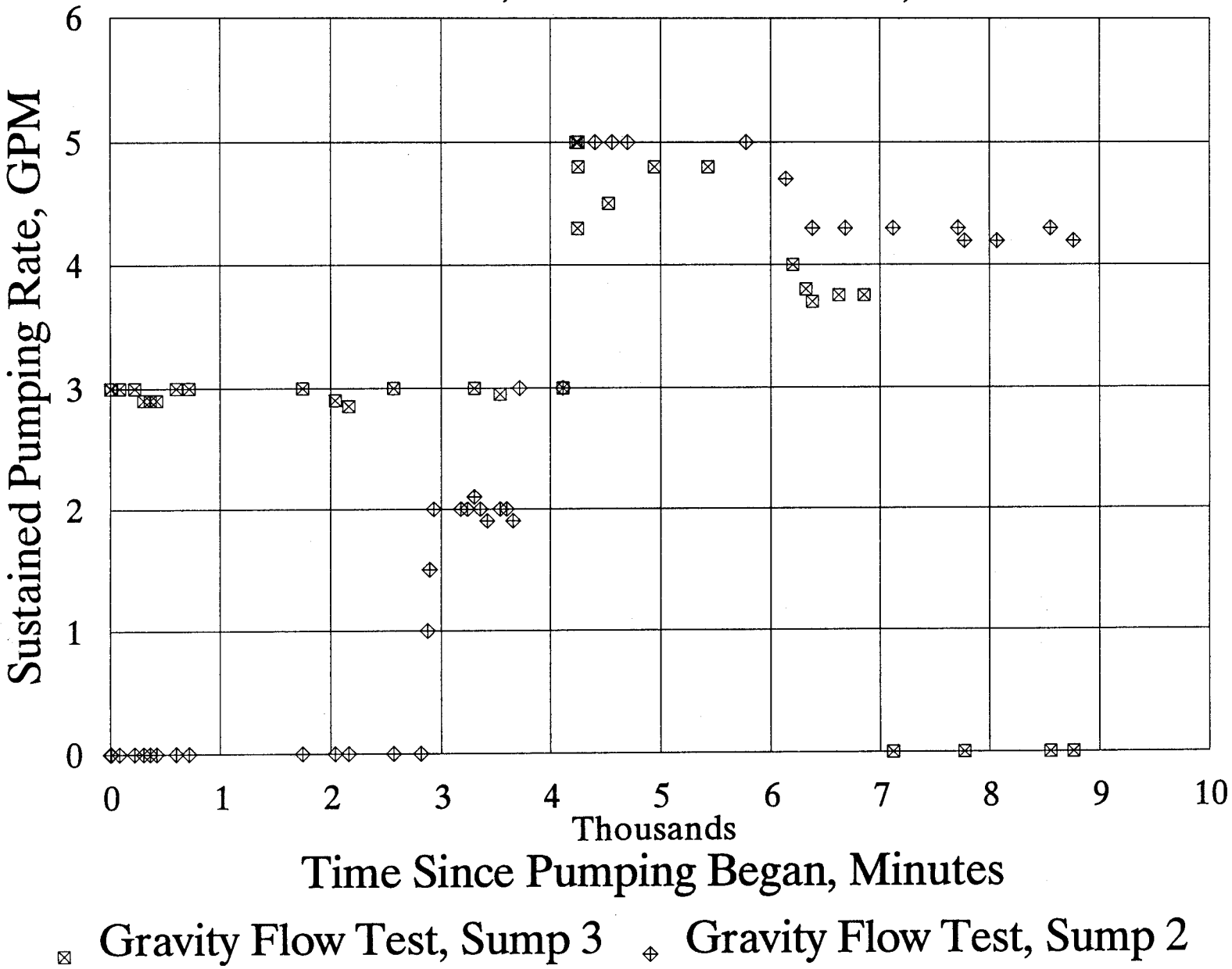
DATE OF SAMPLING	TOTAL METALS		TPH/OIL &GREASE	
	BARIUM	NICKEL	TPH	O&G
05/29/94	5250	68		
05/30/94	4780	71		
05/31/94	4500	70	ND	10900
06/01/94	4510	66		
06/01/94*	4540	74		
06/02/94	4360	63		
06/03/94	4150	56		
	* QUALITY CONTROL		ND = NON DETECT	

NOTE: SEMIVOLATILES WERE NOT DETECTED IN A SAMPLE TAKEN ON 05/31/94

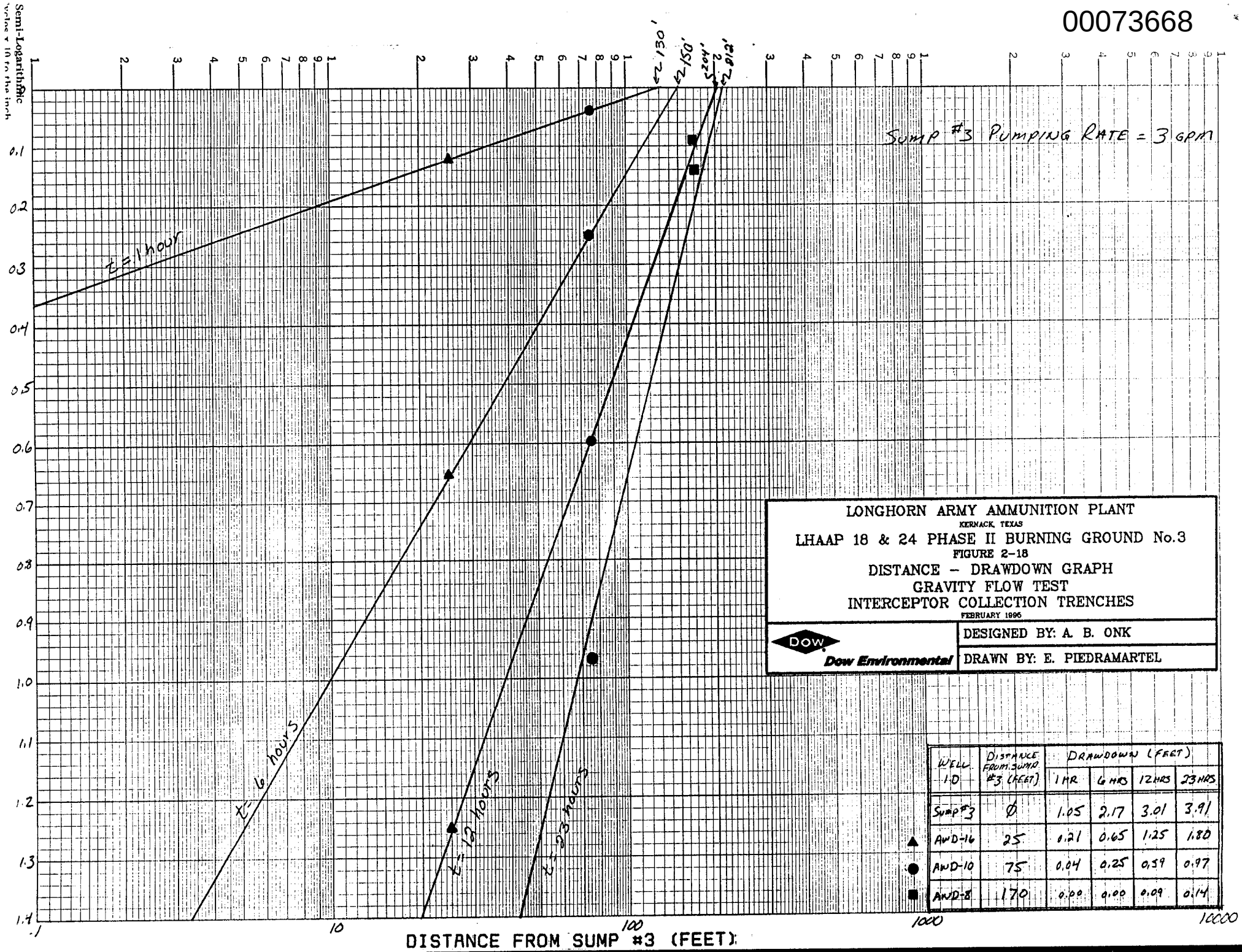
DATE OF SAMPLING	WET CHEMISTRY							
	ALKALINITY	AMMONIA AS N	HARDNESS	SILICA	TDS	TSS	CHLORIDE	SULFATE
05/29/94						6000		
05/30/94						6000		
05/31/94	180000	21800	548000	38000	1840000	22000	1600000	19000
06/01/94						14000		
06/01/94*						12000		
06/02/94						12000		
06/03/94						12000		
	* QUALITY CONTROL							

Figure 2–17, Pumping Rate vs Time, ICT, Gravity Flow Tests

LHAAP 18&24, Phase II Pilot Tests, June 1994



00073668

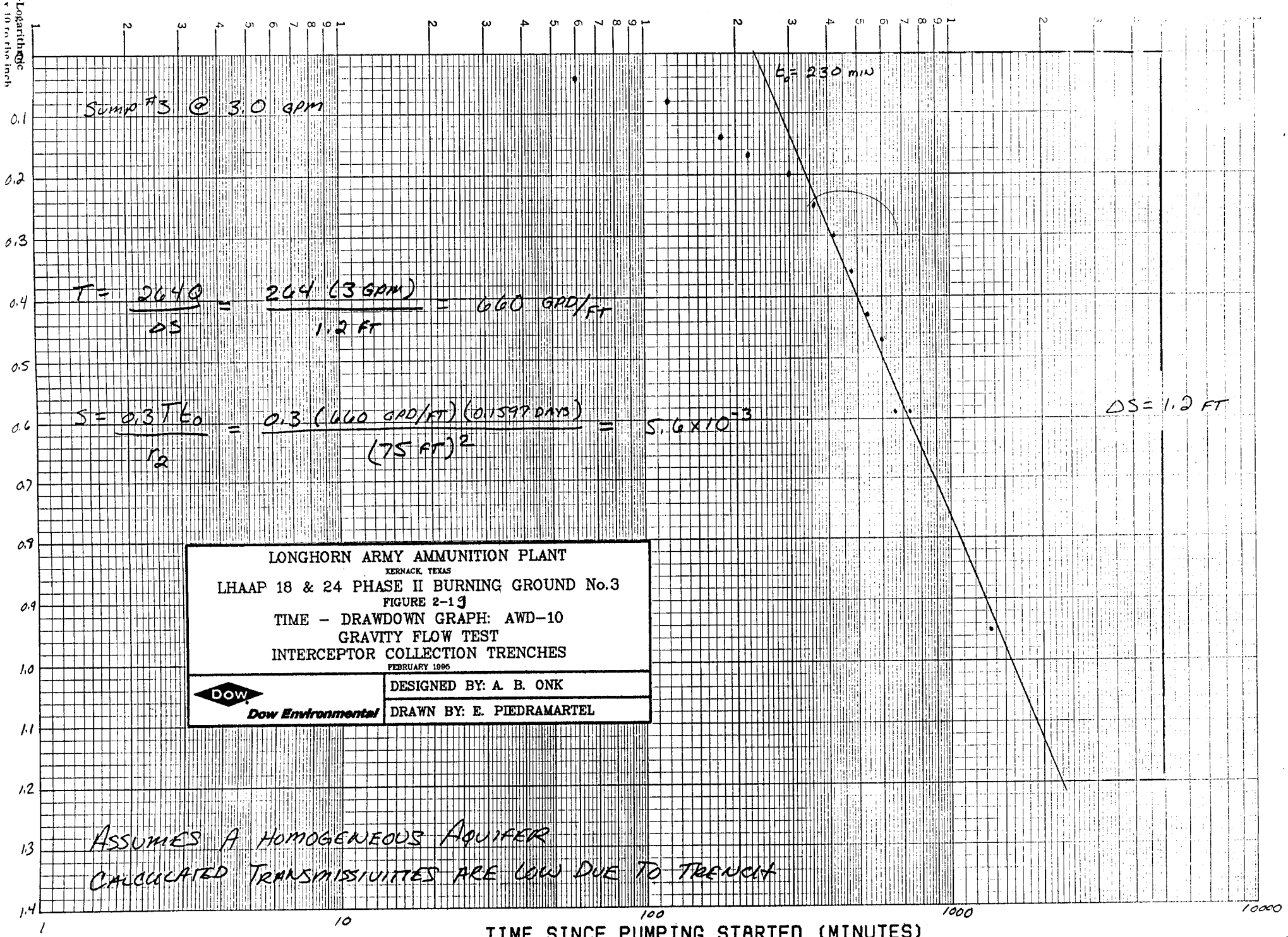


LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
LHAAP 18 & 24 PHASE II BURNING GROUND No.3
FIGURE 2-18
DISTANCE – DRAWDOWN GRAPH
GRAVITY FLOW TEST
INTERCEPTOR COLLECTION TRENCHES
FEBRUARY 1996

Dow Environmental

DESIGNED BY: A. B. ONK
DRAWN BY: E. PIEDRAMARTEL

WELL I.D.	DISTANCE FROM SUMP #3 (FEET)	DRAWDOWN (FEET)			
		1 HR	6 HRS	12 HRS	23 HRS
SUMP #3	Ø	1.05	2.17	3.01	3.91
AWD-16	25	0.21	0.65	1.25	1.80
AWD-10	75	0.04	0.25	0.59	0.97
AWD-8	170	0.00	0.00	0.09	0.14

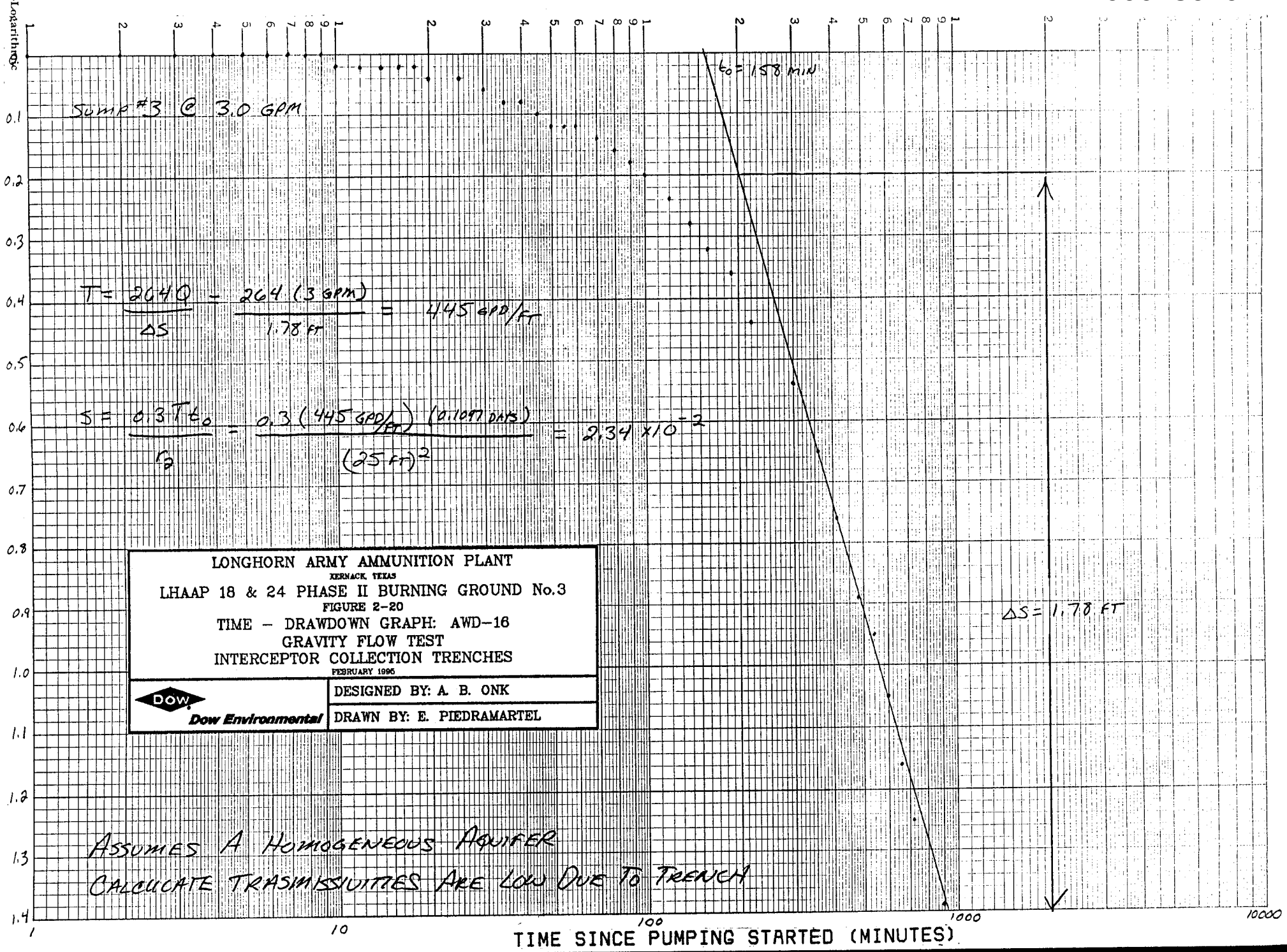


LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
LHAAP 18 & 24 PHASE II BURNING GROUND No.3
FIGURE 2-19
TIME - DRAWDOWN GRAPH: AWD-10
GRAVITY FLOW TEST
INTERCEPTOR COLLECTION TRENCHES
FEBRUARY 1995

DOW
Dow Environmental

DESIGNED BY: A. B. ONK
DRAWN BY: E. PIEDRAMARTEL

00073670

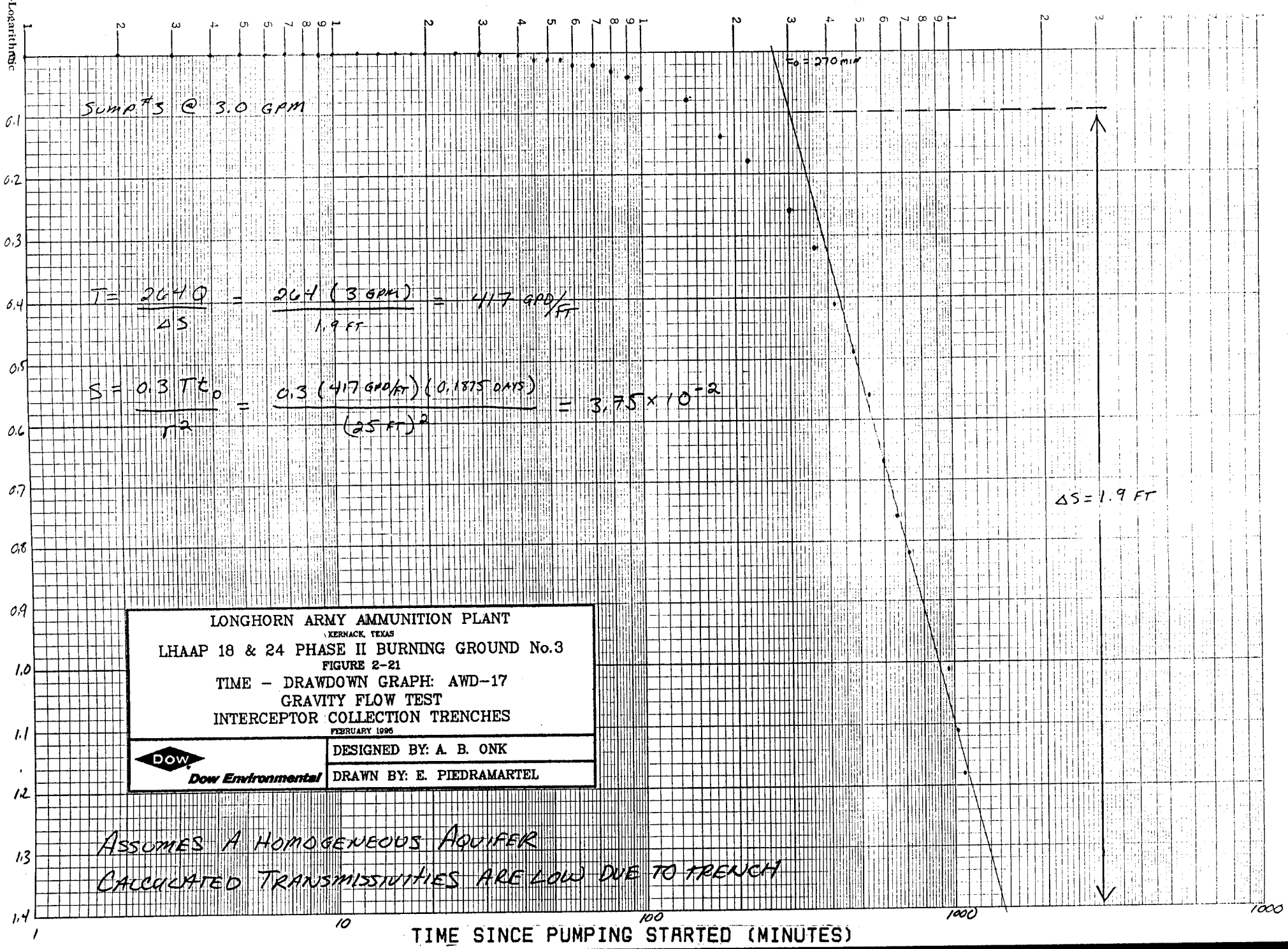


LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
LHAAP 18 & 24 PHASE II BURNING GROUND No.3
FIGURE 2-20
TIME – DRAWDOWN GRAPH: AWD-16
GRAVITY FLOW TEST
INTERCEPTOR COLLECTION TRENCHES
FEBRUARY 1995

DOW Dow Environmental

DESIGNED BY: A. B. ONK
DRAWN BY: E. PIEDRAMARTEL

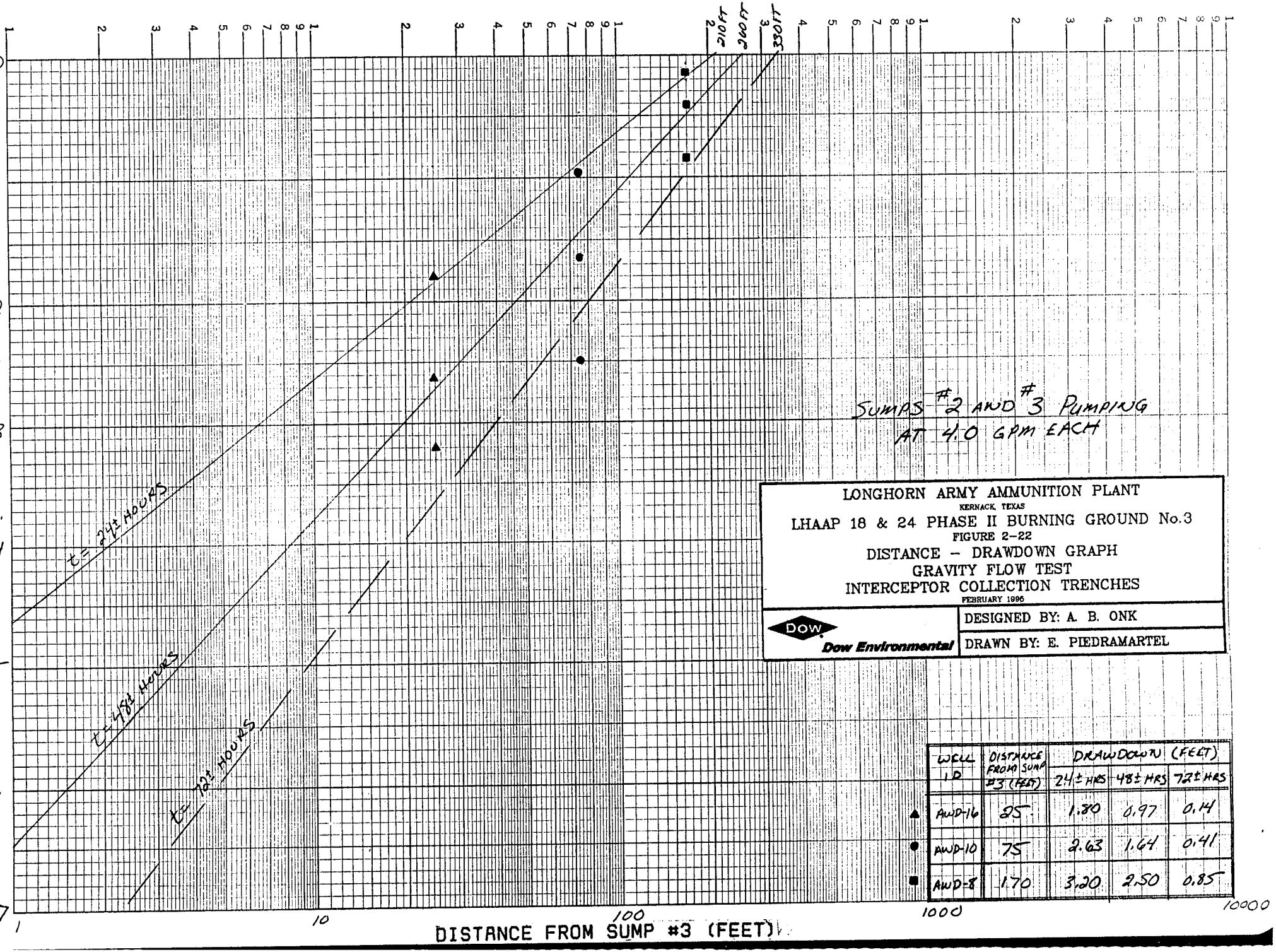
00073671



LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
LHAAP 18 & 24 PHASE II BURNING GROUND No.3
FIGURE 2-21
TIME - DRAWDOWN GRAPH: AWD-17
GRAVITY FLOW TEST
INTERCEPTOR COLLECTION TRENCHES
FEBRUARY 1995

DOW Dow Environmental	DESIGNED BY: A. B. ONK
	DRAWN BY: E. PIEDRAMARTEL

00073672



LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
LHAAP 18 & 24 PHASE II BURNING GROUND No.3
FIGURE 2-22
DISTANCE - DRAWDOWN GRAPH
GRAVITY FLOW TEST
INTERCEPTOR COLLECTION TRENCHES
FEBRUARY 1995

DOW
Dow Environmental

DESIGNED BY: A. B. ONK
DRAWN BY: E. PIEDRAMARTEL

	WELL ID	DISTANCE FROM SUMP #3 (FEET)	DRAWDOWN (FEET) 24± HRS	48± HRS	72± HRS
▲	AWD-16	25	1.80	0.97	0.14
●	AWD-10	75	2.63	1.64	0.41
■	AWD-8	170	3.20	2.50	0.85

Figure 2–23, Drawdown In Monitoring Wells During Gravity Flow Test at the ICT

LHAAP 18&24, Phase II Pilot Tests, June 1994

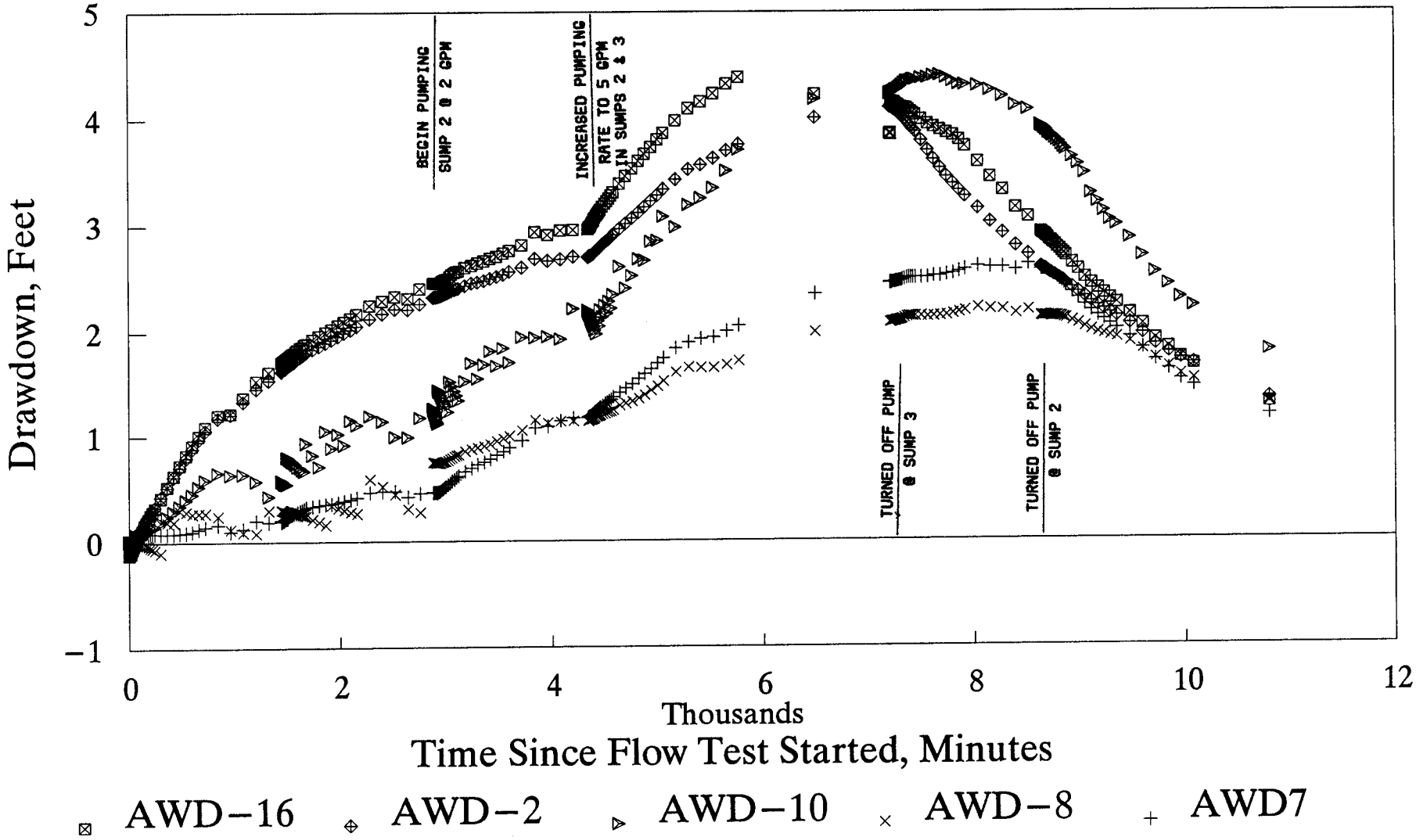


TABLE 2-11
LHAAP 18 & 25 BURNING GROUND 3 & UEP
SUMMARY OF GROUNDWATER ANALYSIS DURING FLOW TESTING
DETECTED CONCENTRATIONS IN THE ICT SUMPS, in micrograms/liter
June, 1994

DATE OF SAMPLING	SUMP NO.	VOLATILE ORGANIC COMPOUNDS						SEMI-VOLATILES		TOTAL METALS			
		MEC	TCE	1,2-DCA	2-BUTANONE	ACETONE	CF	4-Methyl-phenol	PHENOL	ARSENIC	BARIUM	LEAD	NICKEL
6/14/94	3	1700	640	ND	ND	ND	ND	640	220	ND	1130	10	84
6/15/94	1&3	1977	2379	ND	ND	1035	ND			16	869	16	73
6/16/94	2&3	3896	1753	ND	ND	ND	ND			8	1090	ND	62
6/16/94	2&3 QC									8	110	ND	63
6/17/94	2&3	8785	4485	330	277	750	ND			8	98	6	52
6/18/94	2&3	19452	9220	1416	ND	ND	ND			ND	830	ND	ND
6/19/94	2	47	639	ND	ND	589	ND			14	1220	ND	65
6/24/94	2	ND	840	42	ND	708	15			14	1180	ND	54
6/25/94	2	11162	6680	ND	ND	ND	ND			11	690	7	ND
6/26/94	2&3	13784	7583	ND	ND	ND	ND			ND	564	6	ND
6/27/94	2&3	21511	12140	ND	ND	ND	ND			10	557	ND	ND
6/28/94	2&3	22379	11979	ND	ND	ND	ND			12	623	7	ND
6/28/94	2&3 QC	20675	10844	ND	ND	ND	ND			11	626	7	467

DATE OF SAMPLING	SUMP NO.	WET CHEMISTRY PARAMETERS										
		ALKALINITY	NH4 as N	HARDNESS as CaCO3	SILICA	TDS	TSS	OIL/GREASE	CHLORIDE	NITRATE	NITRITE	SULFATE
6/14/94	3	310000	720	572000	44200	1430000	ND	87400	300000	10000	1000	500000
6/15/94	1&3						ND					
6/16/94	2&3						ND					
6/16/94	2&3 QC						ND					
6/17/94	2&3						ND					
6/18/94	2&3						ND					
6/19/94	2						ND					
6/24/94	2						28000					
6/25/94	2						36000					
6/26/94	2&3						46000					
6/27/94	2&3						32000					
6/28/94	2&3						32000					
6/28/94	2&3						32000					

NOTE:
MEC = Methylene Chloride
TCE = Trichloroethene
TDS = Total Dissolved Solids
1,2-DCA = 1,2-Dichloroethane
4-MP = 4-Methylphenol
TSS = Total Suspended Solids
CF = Chloroform
NH4 as N = Ammonia as N
ND = none detected

2.5.2 Vacuum Enhanced Liquid Extraction

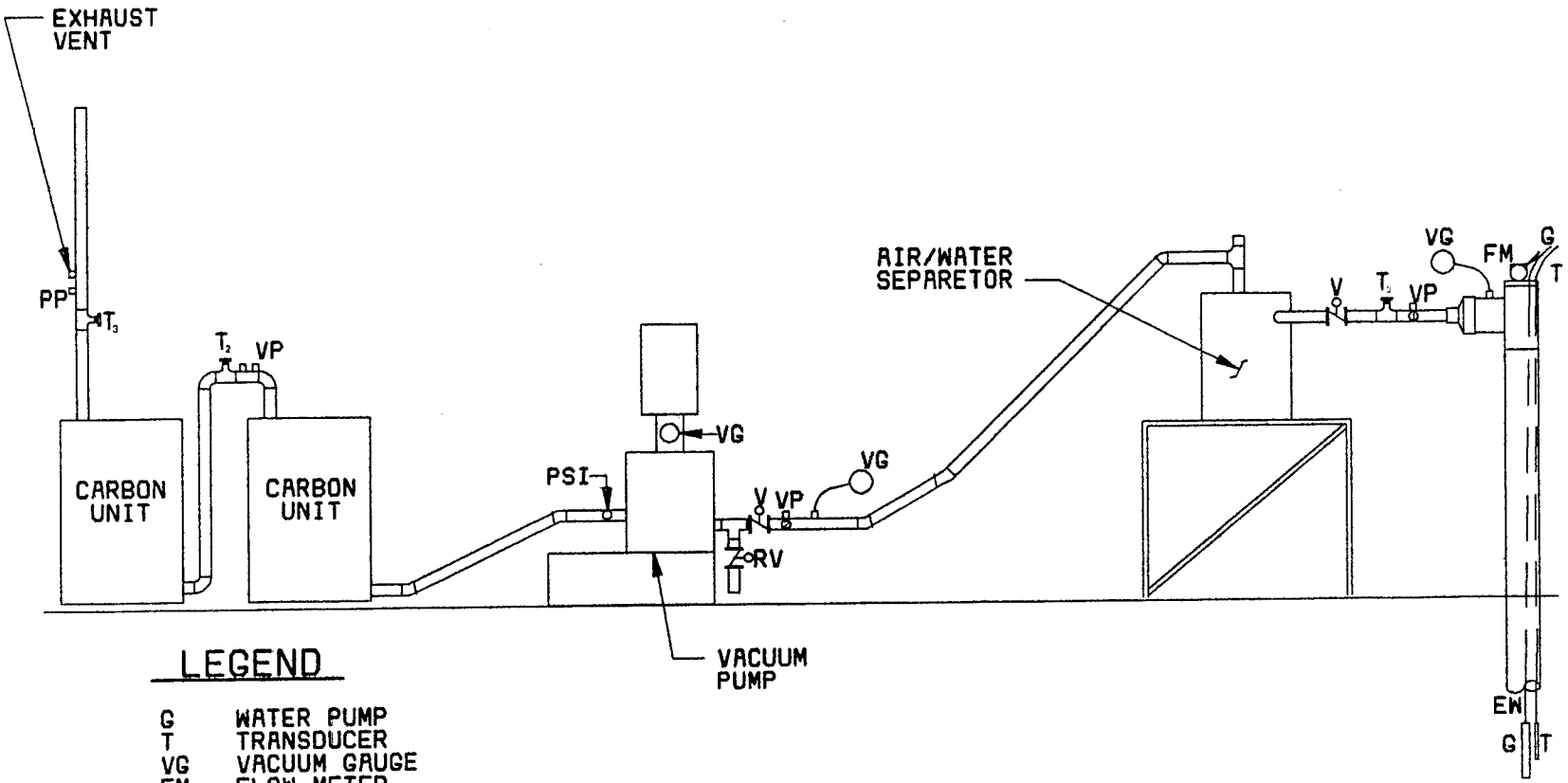
Vacuum enhanced liquid extraction (VELE) was performed on the VEW, HEW, and ICT following the completion of the gravity flow tests at each of the extraction systems and after the water levels had stabilized for two days. The VELE was conducted on each extraction system separately. The VELE test provided data on the potential of increasing the groundwater flow in the aquifer toward the extraction systems. Groundwater flow and drawdown monitoring were conducted during the VELE tests as discussed in Section 2.5.1 above. In addition Extracted vapor concentrations and obtainable vapor flow rates were collected from this test. However, the radius of influence of the vacuum pressures and soil permeability to air flow could not be calculated since no differential pressure readings were observed in the closest monitoring wells to any of the groundwater extractions systems. This lack of response to the vacuum pressures in the monitoring wells is due to the low permeability (fine) soils of the surface aquifer at the site. It also supports the decision made about not evaluating in situ vapor extraction as a potential technology for source material and soil treatment, during the planning of Phase I of the IRA.

The system for the test included the extraction well(s), observation wells, piping, an air blower, flow meter and controllers, vacuum gauges, sampling ports, an air/water separator, and a vapor treatment system consisting of two 55-gallon activated carbon canisters installed in series. Four canisters were used and then stored at the TSSA. Figure 2-24 shows a schematic of the system used for the VEW which was similar to the ones used later for the HEW and ICT.

2.5.2.1 Vertical Extraction Well VELE Test

The VELE test at the VEW was run under three different vacuum pressures applied at the well head as shown on Figure 2-24. These pressures were 70, 110, and 90 inches of water. In addition to the groundwater flow and drawdown monitoring discussed in Section 2.4.1.2 above, test monitoring included vapor flow rates, temperatures and pressure readings, and vapor sampling for every applied pressure. Figure 2-25 presents the sustainable flow rate with time for all three vacuum pressures. It also compares sustainable flow rates during the gravity with those during the VELE test. As can be seen from Figure 2-25, the flow rate during VELE was higher than during gravity flow testing. The difference was greater when the 70 and then the 110 inches of water vacuum were first applied. However, this difference decreased with time which may imply that in the long term VELE and gravity flow would yield similar flow rates. As can also be seen from Figure 2-25, higher vacuum (110 inch of water) did not result in either higher or stable flow rate after few hours from applying this rate of pressure. A lower vacuum rate, such as 90 inches of water, appeared to generate a more stable flow condition than the 110 inches of water. Figure 2-26 through 2-28 show plots of drawdown vs distance from the pumping well, and drawdown vs time at monitoring wells MW-2 and AWD-5, respectively. Figure 2-26 shows the positions of the cone of depression after pumping 6 hours, 12 hours, 18 hours, and 24 hours under 70 inches of water vacuum. This figure also shows that the radius of influence due to the withdrawal of water from EW-1 was about 205 feet which is 165 feet less than the radius of influence measured during the gravity flow test at the same well and after the same period of pumping. However, the drawdown in adjacent wells (AWD-5, MW-2, and AWD-6) was about twice what it was during the gravity flow test after 24 hours of pumping. Therefore, the data indicates that the influence from VELE was mainly in the vicinity of the well, and that by having a shorter radius of influence, additional wells may be needed to capture the plume and create a hydraulic barrier under VELE. The manual water level readings and the

00073676



LEGEND

G	WATER PUMP
T	TRANSDUCER
VG	VACUUM GAUGE
FM	FLOW METER
T_2	TEMPERATURE
V	VALVE
VP	VACUUM PORT
PP	PRESSURE PORT
RV	RELIEF VALVE

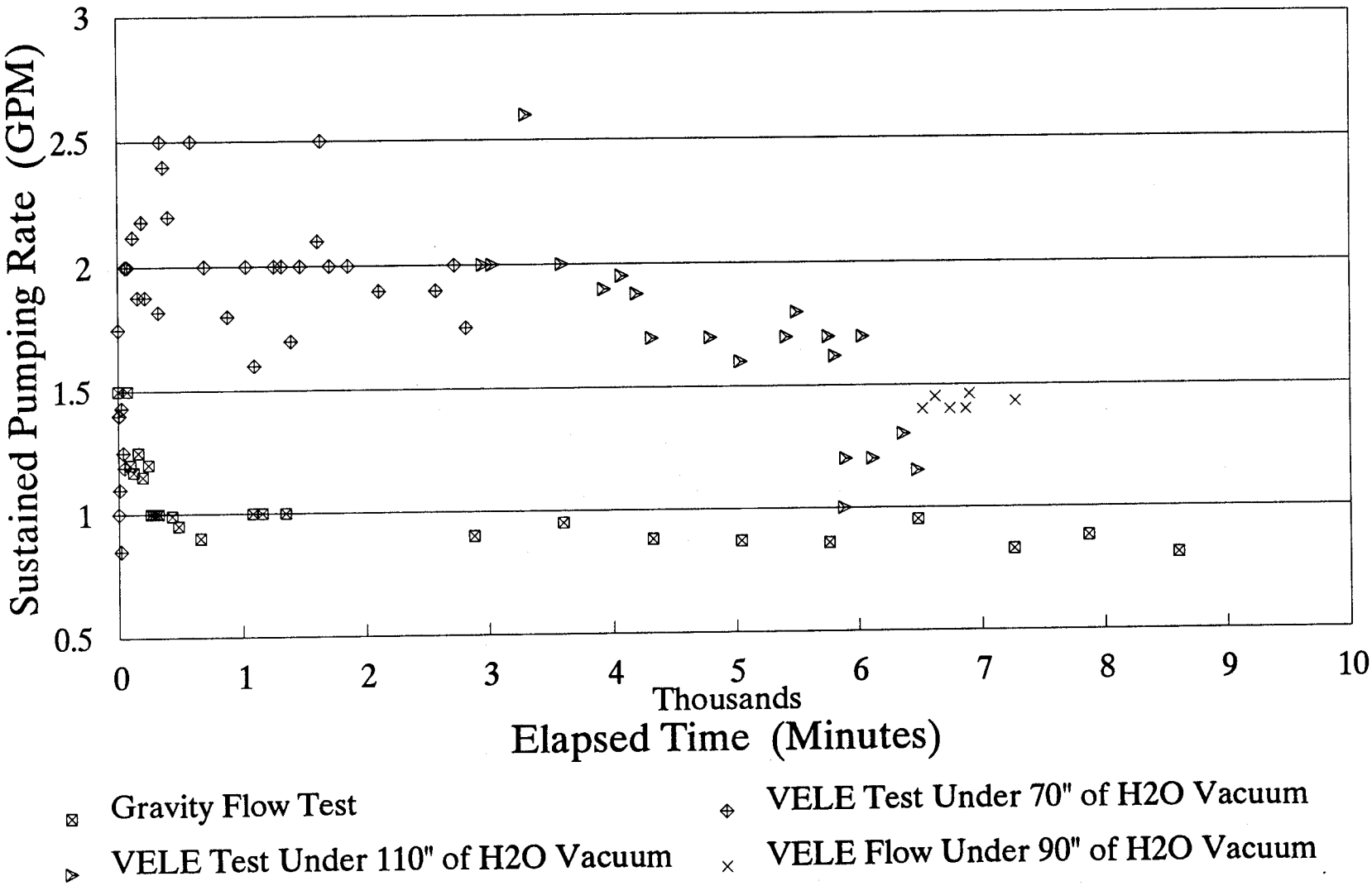
LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
BURNING GROUND No.3
FIGURE 2-24
VACUUM APPLICATION SCHEMATIC
FEBRUARY 1995

Dow Environmental

DESIGNED BY: A. B. ONK
DRAWN BY: S. HANLON

Figure 2–25, Pumping Rate vs. Time, Vertical Extraction Well, EW–1

LHAAP 18&24 Phase II Pilot Tests



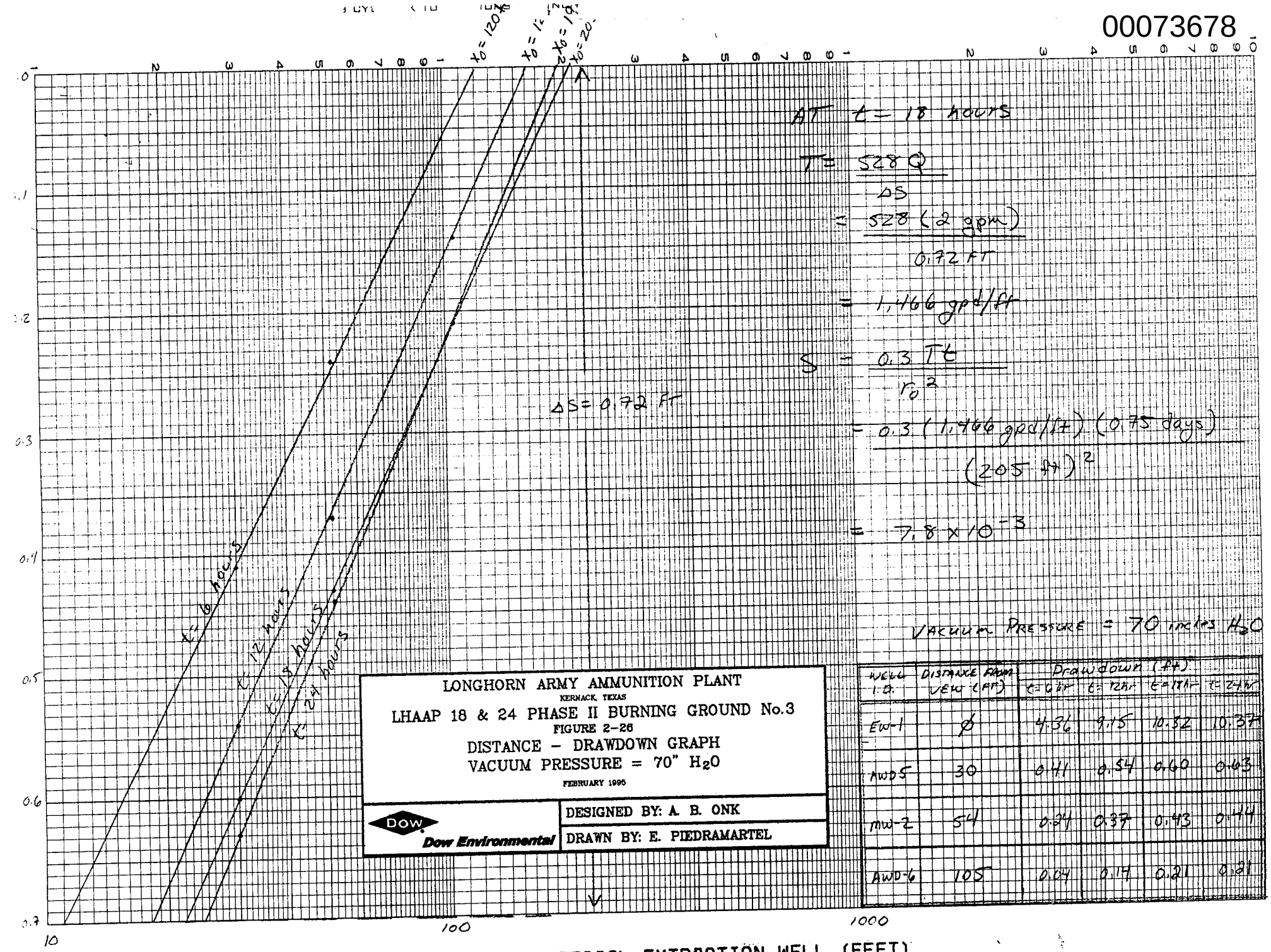
Gravity Flow Test

VELE Test Under 110" of H2O Vacuum

VELE Test Under 70" of H2O Vacuum

VELE Flow Under 90" of H2O Vacuum

00073678



AT $t = 18$ hours

$$T = \frac{528\,Q}{\Delta S} = \frac{528\,(2\text{ gpm})}{0.72\text{ FT}} = 1{,}466\text{ gpd/ft}$$

$$S = \frac{0.3\,Tt}{r_0^2} = \frac{0.3\,(1{,}466\text{ gpd/ft})\,(0.75\text{ days})}{(205\text{ ft})^2} = 7.8 \times 10^{-3}$$

VACUUM PRESSURE = 70 inches H_2O

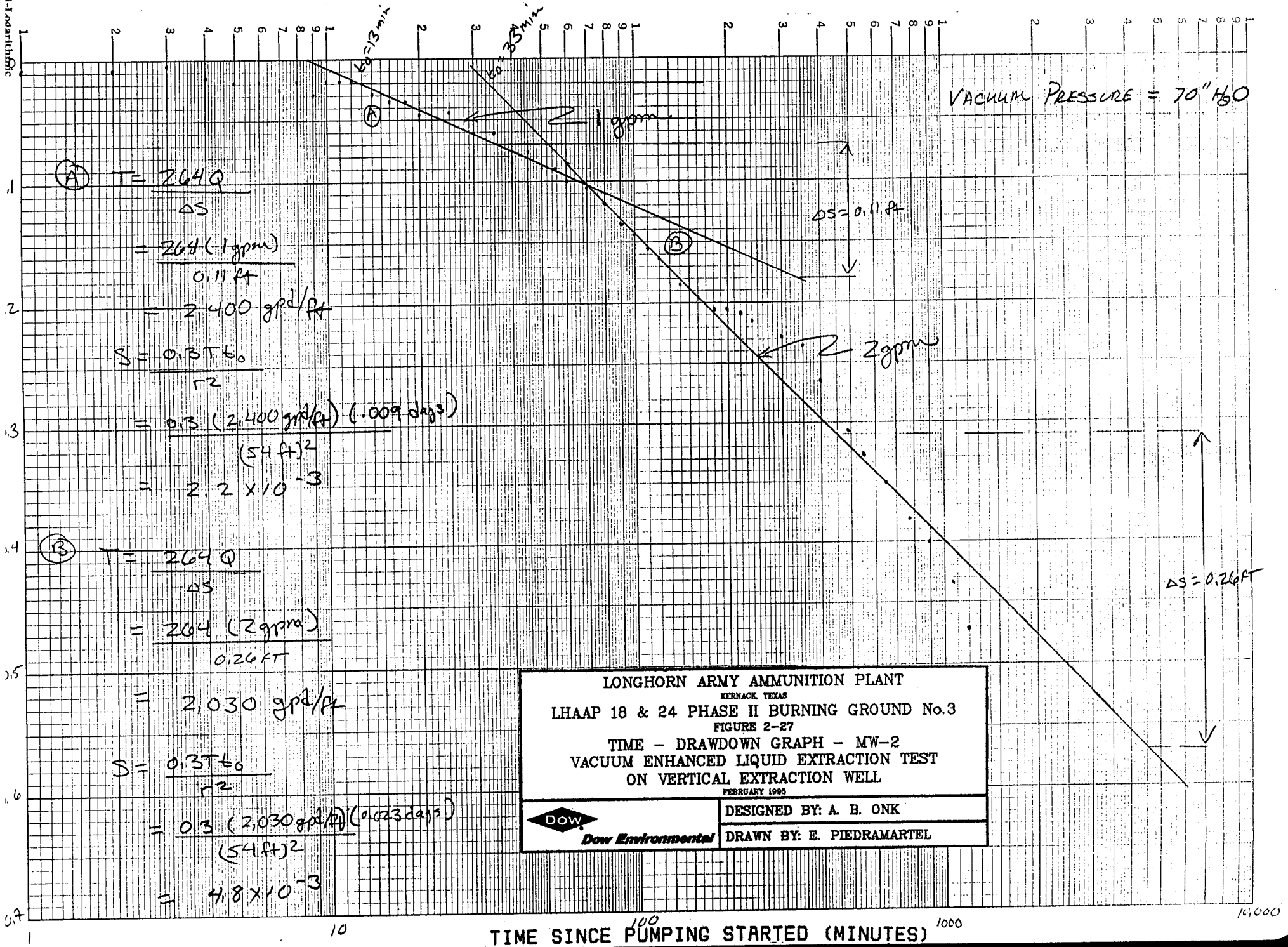
WELL I.D.	DISTANCE FROM VEW (FT)	Drawdown (ft) t = 6 hr	t = 12 hr	t = 18 hr	t = 24 hr
EW-1	Ø	4.36	9.15	10.52	10.37
AWD5	30	0.41	0.54	0.60	0.63
MW-2	54	0.24	0.37	0.43	0.44
AWD-6	105	0.04	0.14	0.21	0.21

LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
LHAAP 18 & 24 PHASE II BURNING GROUND No.3
FIGURE 2-26
DISTANCE - DRAWDOWN GRAPH
VACUUM PRESSURE = 70" H_2O
FEBRUARY 1995

DOW Dow Environmental

DESIGNED BY: A. B. ONK
DRAWN BY: E. PIEDRAMARTEL

00073679



A $T = \frac{264Q}{\Delta S}$

$= \frac{264(1\text{ gpm})}{0.11\text{ ft}}$

$= 2{,}400$ gpd/ft

$S = \frac{0.3Tt_0}{r^2}$

$= \frac{0.3(2{,}400\text{ gpd/ft})(.009\text{ days})}{(54\text{ ft})^2}$

$= 2.2 \times 10^{-3}$

B $T = \frac{264Q}{\Delta S}$

$= \frac{264(2\text{ gpm})}{0.26\text{ FT}}$

$= 2{,}030$ gpd/ft

$S = \frac{0.3Tt_0}{r^2}$

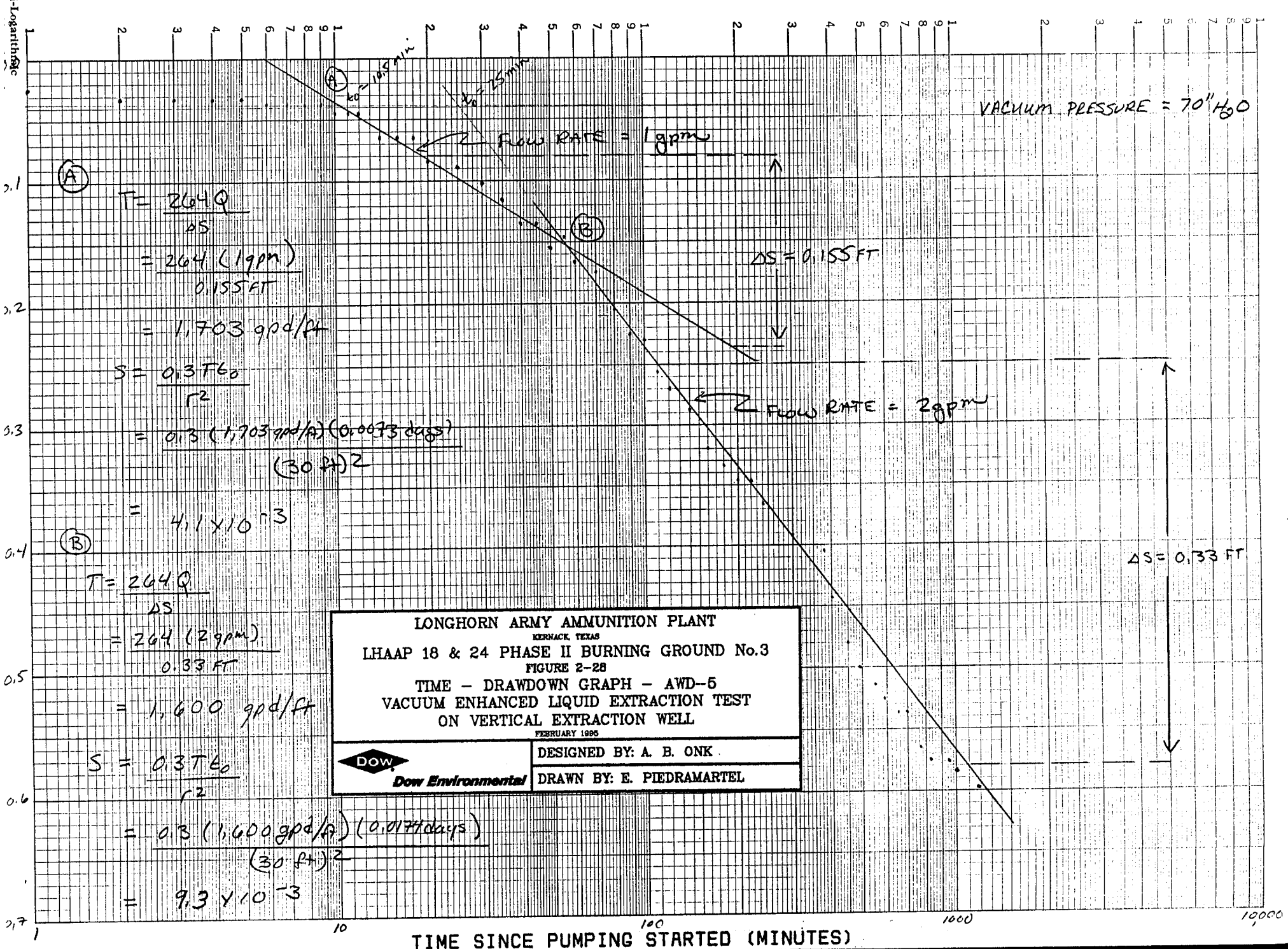
$= \frac{0.3(2{,}030\text{ gpd/ft})(0.023\text{ days})}{(54\text{ ft})^2}$

$= 4.8 \times 10^{-3}$

LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
LHAAP 18 & 24 PHASE II BURNING GROUND No.3
FIGURE 2-27
TIME - DRAWDOWN GRAPH - MW-2
VACUUM ENHANCED LIQUID EXTRACTION TEST
ON VERTICAL EXTRACTION WELL
FEBRUARY 1995

DOW Dow Environmental

DESIGNED BY: A. B. ONK
DRAWN BY: E. PIEDRAMARTEL



A

$$T = \frac{264Q}{\Delta S}$$

$$= \frac{264\,(1\,gpm)}{0.155\,FT}$$

$$= 1{,}703\ gpd/ft$$

$$S = \frac{0.3\,T t_0}{r^2}$$

$$= \frac{0.3\,(1{,}703\ gpd/ft)(0.0073\ days)}{(30\ ft)^2}$$

$$= 4.1 \times 10^{-3}$$

B

$$T = \frac{264Q}{\Delta S}$$

$$= \frac{264\,(2\,gpm)}{0.33\,FT}$$

$$= 1{,}600\ gpd/ft$$

$$S = \frac{0.3\,T t_0}{r^2}$$

$$= \frac{0.3\,(1{,}600\ gpd/ft)(0.0174\ days)}{(30\ ft)^2}$$

$$= 9.3 \times 10^{-3}$$

LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
LHAAP 18 & 24 PHASE II BURNING GROUND No.3
FIGURE 2-28
TIME - DRAWDOWN GRAPH - AWD-5
VACUUM ENHANCED LIQUID EXTRACTION TEST
ON VERTICAL EXTRACTION WELL
FEBRUARY 1995

DOW Dow Environmental	DESIGNED BY: A. B. ONK
	DRAWN BY: E. PIEDRAMARTEL

data logger readings for this test are included in Appendices G.1 and G.2, respectively.

As during the gravity flow test, one sample of the extracted water was taken each day for laboratory analysis. Detected parameters are listed in Table 2-9. The analytical results for the groundwater samples are included in Appendix G.3.

Air flow and vacuum rates were continuously monitored at the well head using a flow meter and vacuum gauges, respectively. Temperature readings were also made from sensors located at the well head and after each carbon canister. The data for this monitoring is included in Appendix G.4. A vapor/air sample was collected for laboratory analysis from three different sampling ports on a daily basis. The ports were located at the extraction well head and after each carbon unit. One background air sample was taken on May 19, 1994 at a location about 400 feet upwind from the well. The samples were analyzed as listed for VOCs in Table 2-1 by PDP. No VOCs were detected in the background sample. The only detected contaminant from the VEW samples was trichloroethylene in concentrations of 29 ppb and 79 ppb in samples collected at the well head on May 22 and May 24, respectively. The analytical reports are included in Appendix G.5.

2.5.2.2 Horizontal Extraction Well VELE Test

The VELE test at the HEW was not successful due to mechanical and electrical supply problems. Two attempts were made to run VELE at the HEW. The first attempt took place on June 9, 1994. The VELE test was started at 18:00 hours at a vacuum rate of 50 inches of water. However, at 19:00 the system shut down due to a generator problem and failure of the vacuum pump. The groundwater pumping rate during this one hour of VELE application decreased from about one gpm at the beginning of the test to about 0.5 gpm at the system shut down. The generator was fixed by an electrical contractor, and a new vacuum pump was installed on June 10, 1994. The second attempt at applying VELE started at 16:15 hours on June 10, 1994. However, this attempt was interrupted by the failure of the second vacuum pump at 20:40 hours on the same date. The groundwater flow rate at the system shut down was about 0.5 gpm. It was difficult to pin point the reason for the failures of the vacuum pumps, and a decision was made by the USACE Tulsa District onsite representative and DEI to abandon the test at the HEW for the time being and to start the gravity flow test at the ICT. The high flow rates encountered during the testing of the ICT, which showed that an ICT system would be more effective at the site than a series of HEWs under either gravity or VELE flow conditions, and schedule constraints resulted in the elimination of another attempt at applying VELE at the HEW.

The manual water level readings and the data logger readings for this limited test are included in Appendices H.1 and H.2, respectively. Due to the short periods under which this test was run, which were mainly late in the day or at night, air and groundwater samples were not collected for laboratory testing. The equipment set up for this test was similar to the one shown on Figure 2-24.

2.5.2.3 Interceptor Collection Trench VELE Test

The VELE test at sumps 2 and 3 of the ICT occurred between June 22 and July 1, 1994. Prior to applying any vacuum to either sump, gravity flow pumping at the rate of 4 gpm was used to lower the water level in the trenches and surrounding areas for about 24 hours. This lowering

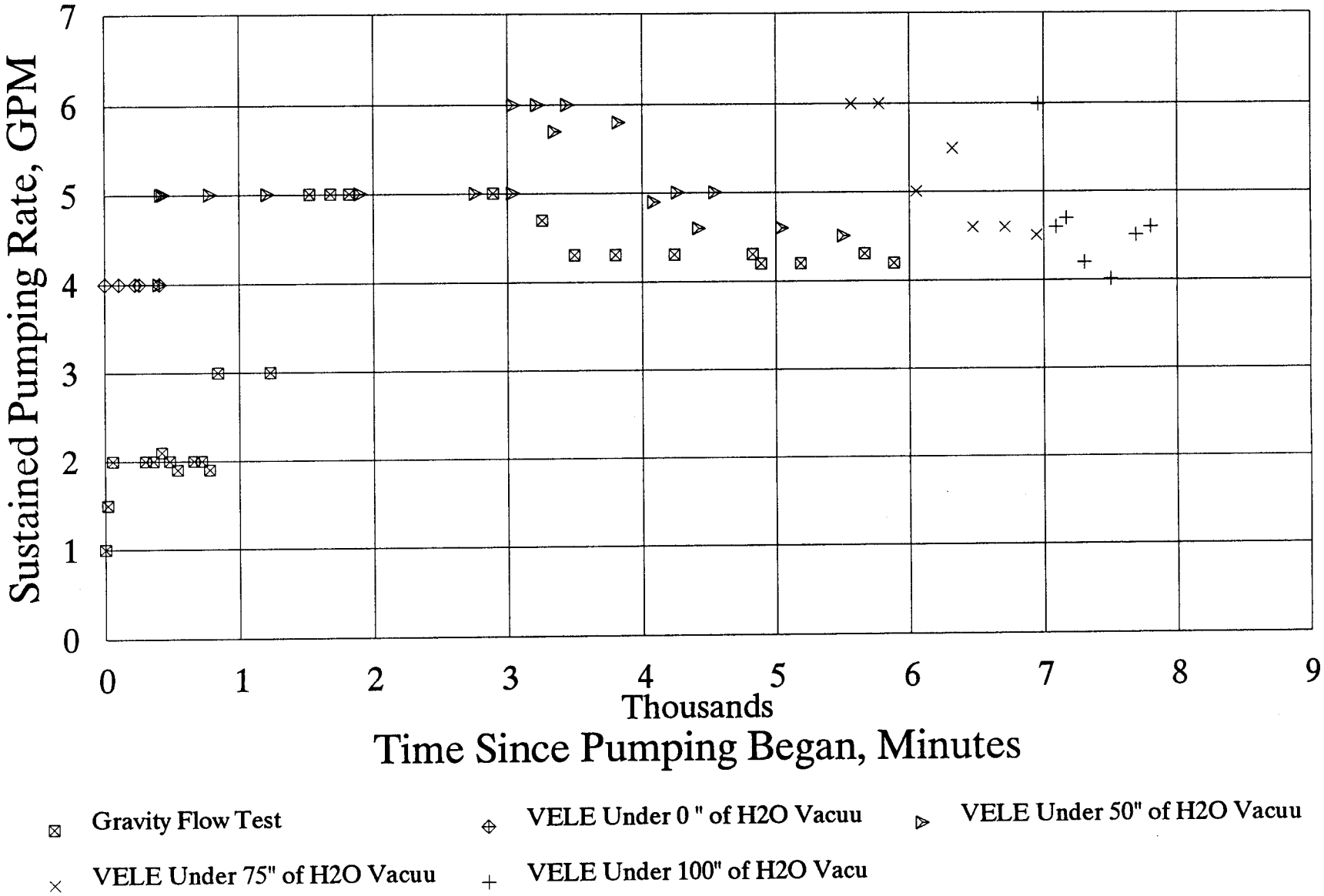
of the water level, mainly in the two sumps was deemed essential in order to prevent the water from being pulled into the VELE piping system under vacuum.

A vacuum pressure of 50 inches of water was applied at sump 3 located in section ICT-1 on June 23, 1994 at 16:30 in the afternoon. However, by 17:07 hours on the same day the groundwater pump in this sump shutoff. At that time, the vacuum was turned off, and the malfunctioning pump was replaced. Prior to replacing the pump, the sump was redeveloped to sand free conditions, since it was realized by the monitoring geologist that sand may have been pulled into the sump under the vacuum pressures. Groundwater pumping was restarted at sump 3 on June 24, 1994 at 10:49 hours, and 50 inches of vacuum was reapplied at 19:00 hours on the same date. However, the newly installed pump also shut off three hours after reapplying vacuum at sump 3. This problem at sump 3 continued throughout the duration of the VELE test. Groundwater pumping and vacuum applications were discontinued on June 28, 1994 at 12:00 hours. The problems at sump 3 during the VELE may be attributed to the geocomposite that was installed along the center line of the trench section or possibly to a crack in the sump HDPE casing. As discussed above in Section 2.4.3, the HDPE pipe used as the sumps riser in the ICT section was flexible and was difficult to maintain under the slurry pressure and the sand backfill. The presence of the geocomposite, which acted like a conduit for vacuum pressures throughout the trench and possibly contributed to vacuum pressure loss, required the application of the maximum available vacuum pressure at the vacuum pump, about 175 inches of water, in order to achieve a vacuum pressure of 50 to 60 inches of water at the sump. Vacuum was applied at the rate of 50 inches of water to vents 9 and 10, installed at ICT-1, as shown on Figure 2-8, along with sump 3 in order to investigate the possibility of increasing the groundwater flow rate toward sump 3, on June 27, 1994 at 09:25. However, up to 12:05 hours on the same date, the water level available water for pumping in sump 3 did not change which implied that the vacuum at the vents would not improve the outcome of the VELE test at sump 3. Vacuum to vents 9 and 10 was turned off at 12:05. Following this, Vent 9 was opened to the atmosphere in order to investigate the potential for also improving the flow rate toward sump 3. However, this action caused an immediate loss of vacuum in the system due to the presence of the geocomposite in ICT-1 which acted like a conduit in the entire trench section. Vent 9 was immediately closed following the loss of vacuum in the system. Therefore, it was determined that the additional vents placed for the application of vacuum or to open to atmosphere would not be beneficial for trench sections similar to ICT-1.

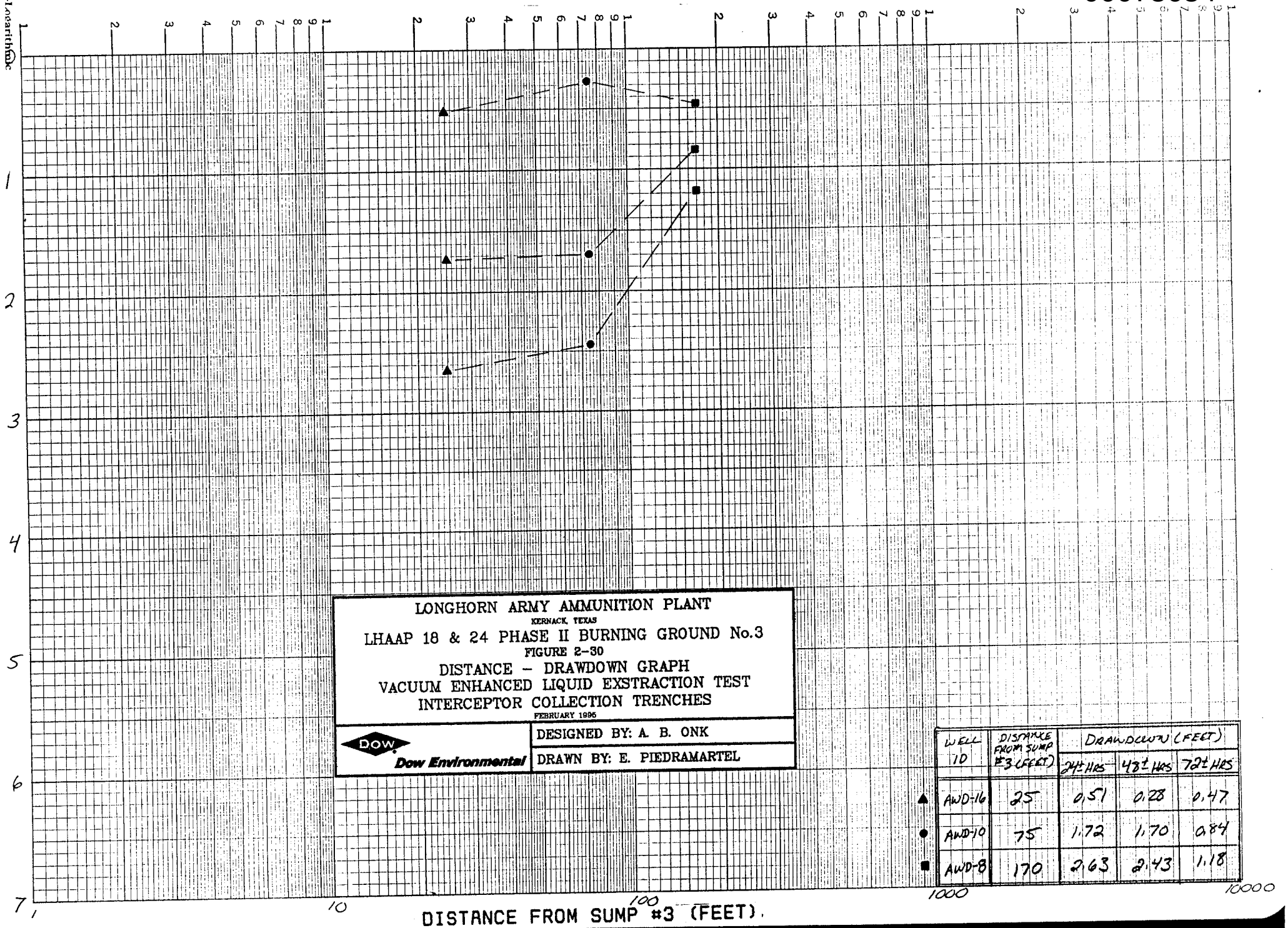
The test at Sump 2 located in section ICT-2 was run under three different vacuum pressures applied at the sum riser head from June 23 to June 29. These pressures were about 50, 75, and 95 inches of water. No mechanical and or vacuum leakage problems were encountered during the application of vacuum at sump 2. Figure 2-29 presents the sustainable flow rate with time for all three vacuum pressures at sump 2. It also compares sustainable flow rates during the gravity with those during the VELE test. As can be seen from Figure 2-29, the flow rate following the application of a particular vacuum rate was higher than during gravity flow testing. However, this difference decreased with time and became negligible which may imply that in the long term VELE and gravity flow would yield equivalent flow rates in a similar ICT. Figure 2-30 shows plots of drawdown vs distance in monitoring wells adjacent to the ICT sections. These plots, which would consist of straight lines under gravity flow testing conditions, do not reflect a clear trend which may be due to the turbulent conditions created by applying vacuum at the sumps. The manual water level readings and the data logger readings for this test are included in Appendices I.1 and I.2, respectively.

Figure 2–29, Pumping Rate vs Time, ICT, VELE Tests @ Sump 2

LHAAP 18&24, Phase II Pilot Tests, June 1994



00073684



LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
LHAAP 18 & 24 PHASE II BURNING GROUND No.3
FIGURE 2-30
DISTANCE - DRAWDOWN GRAPH
VACUUM ENHANCED LIQUID EXSTRACTION TEST
INTERCEPTOR COLLECTION TRENCHES
FEBRUARY 1995

DOW
Dow Environmental

DESIGNED BY: A. B. ONK
DRAWN BY: E. PIEDRAMARTEL

	WELL ID	DISTANCE FROM SUMP #3 (FEET)	DRAWDOWN (FEET) 24± HRS	48± HRS	72± HRS
▲	AWD-16	25	0.51	0.28	0.47
●	AWD-10	75	1.72	1.70	0.84
■	AWD-8	170	2.63	2.43	1.18

As during the gravity flow test, one sample of the extracted water was taken each day for laboratory analysis. Detected parameters are listed in Table 2-11. The analytical results for the groundwater samples are included in Appendix I.3.

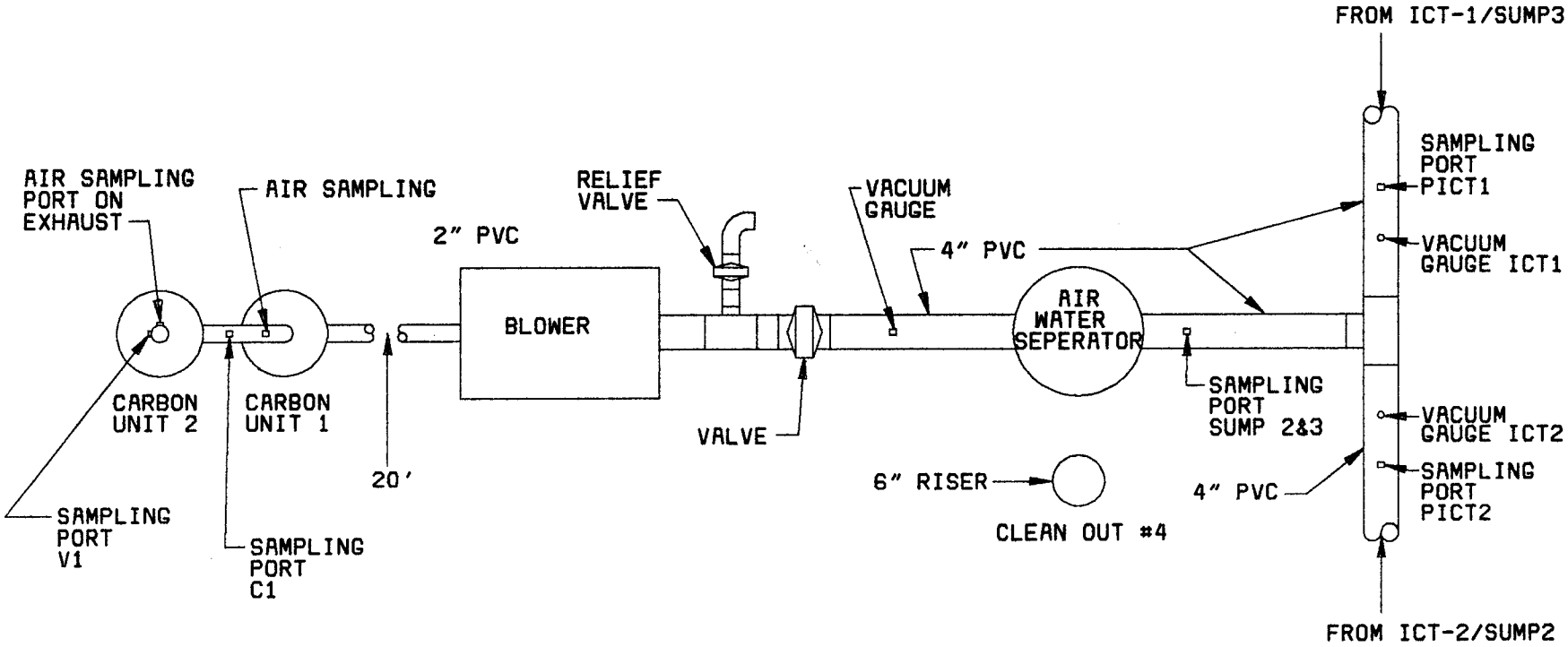
Air flow and vacuum rates were continuously monitored at the sumps head and other sampling ports using a flow meter and vacuum gauges, respectively. Temperature readings were also made from sensors located at the well head and after each carbon canister. The data for this monitoring is included in Appendix I.4. A composite vapor/air sample was collected for laboratory analysis from different sampling ports on a daily basis. The sampling ports locations are shown on Figure 2-31 which shows the equipment set-up for the VELE test at the ICT. One background air sample was taken on June 28, 1994 at a location about 500 feet upwind from the ICT. The samples were analyzed as listed for VOCs in Table 2-1 by PDP. No VOCs were detected in the background sample. Table 2-12 presents detected concentrations from the samples taken at the ICT. The analytical reports are included in Appendix I.5.

2.6 Task 6 - Groundwater Sampling, July-August and October-November 1994

Groundwater sampling was performed at EW-1 and 48 monitoring well locations, following the completion of the flow tests at the VEW, HEW, and ICT in July and August 1994. It was also performed in October-November 1994. The objective of this sampling program was to obtain a "snapshot" of the existing contaminant plume condition following the implementation of the Phase II work, and as part of quarterly sampling program. The well locations are shown on Figure 2-1. The analytical testing program for groundwater samples is presented in Table 2-1. Groundwater sampling and testing were performed in accordance with the protocols outlined in the Phase I Chemical Data Acquisition Plan (CDAP). The analytical testing was conducted by PDP Analytical Services (PDP) of Spring, Texas.

For the July-August sampling round, the groundwater plume, with methylene chloride and trichloroethylene as the main contaminants, was found to have decreased in area, especially outside the Burning Ground No. 3 fence. Field measurements taken during this round of groundwater sampling during this sampling round are included in Appendix J.1. Detected contaminant concentrations are presented in Tables 2-13 and 2-14. The analytical data is included in Appendix J.2, and the validated analytical data is included in Appendix J.3.

For the October-November sampling round, the plume condition was found to be similar to what it was during July-August. Field measurements taken during groundwater sampling are included in Appendix K.1. Detected contaminant concentrations are presented in Tables 2-15 and 2-16. The analytical data is included in Appendix K.2, and the validated analytical data is included in Appendix K.3.



LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
BURNING GROUND No.3
FIGURE 2-31
DETAIL OF BLOWER SETUP
V.E.L.E. ICT 1 & 2
NOT TO SCALE
MARCH 1995

Dow Environmental

DESIGNED BY: A. B. ONK

DRAWN BY: S. HANLON

TABLE 2-12
LHAAP 18&24 BURNING GROUND 3 & UEP
SUMMARY OF AIR/VAPOR MONITORING DURING VECE AT ICT/m
JUNE 1994
Detected VOC's in ppb

Sample ID	AIR/VAPOR from ICT			
Date Sampled	Acetone	Methylene Chloride	Trichloroethene	COMMENTS
6/24/94	ND	ND	ND	Sump 2 & 3
6/25/94	ND	ND	ND	Sump 2
6/26/94	ND	ND	54	Sump 2 & 3
6/27/94	118	54	259	Sump 2 & 3
6/28/94	ND	ND	17J	Sump 2
Sample ID	**C1 following first carbon unit**			
Date Sampled	Acetone	Methylene Chloride	Trichloroethene	COMMENTS
6/24/94	ND	ND	ND	
6/25/94	ND	ND	ND	
6/26/94	ND	ND	ND	
6/27/94	ND	ND	ND	
6/28/94	ND	ND	21J	
Sample ID	**V1 following second carbon unit**			
Date Sampled	Acetone	Methylene Chloride	Trichloroethene	COMMENTS
6/24/94	ND	ND	ND	
6/25/94	ND	ND	ND	
6/26/94	ND	ND	ND	
6/27/94	ND	ND	ND	
6/28/94	ND	ND	ND	
Sample ID	**BG Background Air**			
Date Sampled	Acetone	Methylene Chloride	Trichloroethene	COMMENTS
6/28/94	ND	ND	ND	

BG Background ND None Detected
J Compound Detected Below Method Detection Limits

TABLE 2–13
LHAAP 18&24 BURNING GROUND 3 & UEP
SUMMARY OF GROUNDWATER MONITORING, July 1994
DETECTED VOCs in microgram/liter

WELL No.	VOLATILE ORGANIC COMPOUNDS																
	MEC	TCE	1,1–DCA	1,1–DCE	1,2–DCA	VC	ACETONE	CF	PCE	1,2–DCE	EBZ	STYRENE	TOLUENE	BENZENE	XYLENES	CTC	1,1,1 TCA
126																	
MW22	1936	1490	ND	8	ND	66	ND	6	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW15	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW2	26720000	284900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EW1	26667	5467	ND	ND	ND	ND	10440	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW1	458250	49950	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW4	12	907	11	ND	ND	141	ND	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW5	6	71	ND	ND	ND	13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW6	23	45	ND	ND	ND	8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW21	739600	10500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
101	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
109	ND	333	4	ND	ND	22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
125	ND	6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
123	20	14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AWD2	19953	9693	ND	ND	726	ND	ND	14	ND	ND	ND	ND	16	ND	ND	ND	ND
AWD3	105	1356	ND	ND	ND	ND	ND	ND	ND	ND	23	5	ND	ND	ND	26	ND
MW23	71	654	ND	ND	37	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C4A	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C10	ND	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C8																	
102	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW7	ND	20046	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW8	ND	7148	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
129	ND	2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW9	ND	2543	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AWD1	54650	87600	43	865	ND	640	ND	14	46	127	1662	295	49	12	49	ND	356
120	190279	25642	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW14	1224	6575	18	58	ND	ND	ND	ND	ND	7	ND	ND	ND	ND	ND	ND	ND
MW12	299	2935	14	20	ND	ND	9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
130																	
MW18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW17	ND	31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW10	ND	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW11	ND	165	ND	ND	9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
124	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AWD4	ND	13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW19																	
MW20																	
C1	249	118	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW3	ND	788	9	7	ND	41	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTE:
MEC = Methylene Chloride
TCE = Trichloroethene
1,1–DCA = 1,1–Dichloroethane
1,1–DCE = 1,1–Dichloroethene
1,2–DCA = 1,2–Dichloroethane
VC = Vinylchloride
CF = Chloroform
PCE = Tetrachloroethene
1,2–DCE = Total –1,2–Dichloroethene
EBZ = Ethylbenzene
CTC = Carbon Tetrachloride
1,1,1 TCA = 1,1,1 Trichloroethane
ND = Non–Detect

TABLE 2-14
LHAAP 18&24, BURNING GROUND 3 & UEP
SUMMARY OF GROUNDWATER MONITORING, July 1994
METALS, mg/l

	METAL COMPOUND										
Well No.	Antimony	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Nickel	Selenium	Silver	Thallium
126											
MW22	ND	ND	1.86	ND	0.03	ND	ND	0.065	ND	ND	ND
MW15	ND	ND	0.245	ND	ND	ND	ND	ND	ND	ND	ND
MW2	ND	ND	3.84	ND	ND	ND	ND	ND	ND	ND	ND
EW1	ND	ND	0.277	ND	0.012	ND	ND	ND	ND	ND	ND
MW1	ND	ND	4.55	ND	ND	ND	ND	ND	ND	ND	ND
MW4	ND	ND	0.158	ND	ND	ND	ND	ND	ND	ND	ND
MW5	ND	ND	1.27	ND	ND	ND	ND	0.044	ND	ND	ND
MW6	ND	0.006	0.918	ND	ND	ND	ND	ND	ND	ND	ND
MW21	ND	ND	5.25	ND	0.026	ND	ND	0.08	ND	ND	ND
101	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
109	ND	ND	0.878	ND	ND	ND	ND	ND	ND	ND	ND
125	ND	ND	0.094	ND	ND	ND	ND	ND	ND	ND	ND
123	ND	ND	0.174	ND	ND	ND	ND	ND	ND	ND	ND
AWD2	ND	ND	0.169	ND	0.018	ND	ND	ND	ND	ND	ND
AWD3	ND	ND	0.15	ND	0.185	ND	ND	0.083	ND	ND	ND
MW23	ND	ND	1.96	ND	0.042	ND	ND	0.2	ND	ND	ND
C4A	ND	ND	0.135	ND	ND	ND	ND	ND	ND	ND	ND
C4	ND	ND	0.176	ND	ND	0.005	ND	ND	ND	ND	ND
C5	ND	ND	0.074	ND	ND	0.006	ND	ND	ND	0.012	ND
C6	ND	ND	1.11	ND	ND	ND	ND	ND	ND	0.016	ND
C7	ND	ND	0.177	ND	ND	ND	ND	ND	ND	ND	ND
C9	ND	ND	0.28	ND	ND	ND	ND	ND	ND	ND	ND
C10	ND	ND	0.481	ND	ND	ND	ND	ND	ND	ND	ND
C3	ND	ND	0.906	ND	ND	ND	ND	ND	ND	0.01	ND
C8											
102	ND	ND	0.066	ND	ND	ND	ND	ND	ND	ND	ND
MW7	ND	ND	0.122	ND	ND	ND	ND	0.072	ND	ND	ND
MW8	ND	ND	0.242	ND	ND	ND	ND	ND	ND	ND	ND
129	ND	ND	0.125	ND	ND	ND	ND	ND	ND	ND	ND
MW9	ND	ND	0.046	ND	0.01	ND	ND	ND	ND	ND	ND
AWD1	ND	0.016	0.977	ND	ND	ND	ND	ND	0.01	ND	ND
120	ND	ND	0.178	ND	ND	ND	ND	ND	ND	ND	ND
MW14	ND	ND	1.17	ND	ND	ND	ND	ND	ND	ND	ND
MW12	ND	ND	0.236	ND	ND	ND	ND	0.057	ND	ND	ND
130											
MW18	ND	ND	0.253	ND	ND	ND	ND	ND	ND	ND	ND
MW17	ND	ND	0.334	ND	0.08	ND	ND	0.11	ND	ND	ND
MW13	ND	ND	0.447	ND	ND	ND	ND	ND	ND	ND	ND
C2	ND	ND	0.379	ND	ND	ND	ND	ND	ND	ND	ND
MW10	ND	ND	0.629	ND	ND	ND	ND	ND	ND	ND	ND
MW16	ND	ND	0.258	ND	ND	ND	ND	ND	ND	ND	ND
MW11	ND	ND	0.076	ND	ND	ND	ND	ND	ND	ND	ND
124	ND	0.008	0.059	ND	ND	ND	ND	ND	ND	ND	ND
AWD4	ND	ND	0.692	ND	0.093	ND	ND	ND	ND	ND	ND
MW19											
MW20											
C1	ND	ND	0.544	ND	ND	ND	ND	ND	ND	ND	ND
MW3	ND	ND	1.68	ND	ND	ND	ND	ND	ND	ND	ND

Note: ND = Non-Detect

TABLE 2-15
LHAAP 18&24 BURNING GROUND 3 & UEP
SUMMARY OF GROUNDWATER MONITORING, November 1994
DETECTED VOCs in microgram/liter

WELL No.	VOLATILE ORGANIC COMPOUND																
	MEC	TCE	1,1-DCA	1,1-DCE	1,2-DCA	VC	ACETONE	CF	PCE	1,2-DCE	EBZ	STYRENE	TOLUENE	BENZENE	XYLENES	CTC	1,1,1 TCA
126	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW22	ND	1200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW15	120	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW2	6848000	368800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EW1	5497500	193300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW1	362100	21414	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW4	ND	845	ND	ND	ND	119	ND	ND	ND	134	ND	ND	ND	ND	ND	ND	ND
MW5	ND	92	ND	ND	ND	13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW6	ND	31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW21	615450	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
101	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
109	ND	380	ND	ND	ND	ND	ND	ND	ND	70	ND	ND	ND	ND	ND	ND	ND
125	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
123	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AWD2	3665	6510	ND	ND	460	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AWD3	689	264	ND	ND	ND	ND	548	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW23	ND	753	ND	ND	ND	ND	ND	ND	ND	23	ND	ND	ND	ND	ND	ND	ND
C4A	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
102	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW7	17	16250	ND	56	121	ND	ND	74	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW8	ND	7663	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
129	ND	2030	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	45	ND	84	ND
MW9	ND	4621	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AWD1	1621J	78500	58J	ND	14J	363J	ND	14J	63J	42000	1761J	276J	58J	13J	177J	ND	448J
120	171480	33060	60	241J	38J	ND	ND	73J	ND	503J	ND	ND	44J	8J	ND	ND	ND
MW14	ND	1028	5	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW12	ND	2520	9	11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
130	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW17	ND	31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW13	31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW11	ND	125	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
124	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AWD4	ND	8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW19	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW3	ND	870	ND	ND	ND	ND	ND	ND	ND	53	ND	ND	ND	ND	ND	ND	ND

NOTE:
MEC = Methylene Chloride
TCE = Trichloroethene
1,1-DCA = 1,1-Dichloroethane
1,1-DCE = 1,1-Dichloroethene
1,2-DCA = 1,2-Dichloroethane
VC = Vinylchloride
CF = Chloroform
PCE = Tetrachloroethene
1,2-DCE = Total -1,2-Dichloroethene
EBZ = Ethylbenzene
CTC = Carbon Tetrachloride
1,1,1 TCA = 1,1,1 Trichloroethane
ND = Non-Detect

TABLE 2–16
LHAAP 18&24 BURNING GROUND 3 & UEP
SUMMARY OF GROUNDWATER MONITORING, November 1994
DETECTED CONCENTRATIONS OF METALS in milligrams/liter

Well No.	Arsenic	Barium	Chromium	Lead	Nickel	Selenuim
126	ND	5.57	ND	ND	ND	ND
MW22	ND	2.07	0.048	ND	0.057	ND
MW15	0.006	0.226	ND	ND	ND	ND
MW2	ND	3.62	ND	ND	ND	ND
EW1	ND	0.248	0.006	ND	ND	ND
MW1	ND	4.04	ND	ND	ND	ND
MW4	ND	0.172	ND	ND	ND	ND
MW5	ND	1.29	ND	ND	ND	ND
MW6	0.013	0.813	ND	ND	ND	ND
MW21	ND	5.71	ND	ND	ND	ND
101	ND	0.293	ND	ND	ND	ND
109	ND	1.12	ND	ND	ND	ND
125	ND	0.17	ND	ND	ND	ND
123	ND	0.152	ND	ND	ND	ND
AWD2	ND	0.14	0.022	ND	ND	ND
AWD3	ND	0.063	0.021	ND	ND	ND
MW23	ND	2.02	0.026	ND	0.11	ND
C4A	ND	0.162	0.01	ND	ND	ND
C4	ND	0.159	ND	ND	ND	ND
C5	ND	0.084	ND	ND	ND	ND
C6	ND	1.12	ND	ND	ND	ND
C7	ND	0.111	ND	ND	ND	ND
C9	ND	0.27	ND	ND	ND	0.046
C10	ND	0.496	ND	ND	ND	ND
C3	ND	0.857	ND	ND	ND	ND
C8	ND	4.63	ND	ND	ND	ND
102	ND	0.072	ND	ND	ND	ND
MW7	ND	0.126	ND	ND	0.11	ND
MW8	ND	0.257	ND	ND	ND	ND
129	ND	0.12	ND	ND	ND	ND
MW9	ND	0.054	ND	ND	ND	ND
AWD1	0.014	0.898	0.048	ND	0.057	0.007
120	ND	0.182	0.048	ND	0.063	ND
MW14	ND	0.811	0.014	ND	0.042	ND
MW12	ND	0.233	0.048	ND	0.07	ND
130	ND	0.217	ND	ND	ND	ND
MW18	ND	0.245	ND	ND	ND	ND
MW17	ND	0.336	ND	ND	0.084	ND
MW13	ND	0.402	0.026	ND	0.043	ND
C2	ND	0.381	ND	ND	ND	ND
MW10	ND	0.586	ND	ND	ND	ND
MW16	ND	0.333	ND	ND	ND	ND
MW11	ND	0.066	ND	ND	ND	ND
124	0.003	0.063	ND	ND	ND	ND
AWD4	ND	0.6	0.054	ND	0.11	ND
MW19	ND	0.066	ND	ND	ND	0.0076J
MW20	ND	0.29	0.024	0.01	ND	ND
C1	ND	0.493	ND	ND	ND	ND
MW3	ND	1.55	ND	ND	ND	ND

Note: ND = Non–Detect

3.0 CONCLUSION AND RECOMMENDATIONS

The objective of the Phase II work was met by the implementation of the different tasks described above. This work has resulted in the following:

- Three updates to the plume condition in the shallow groundwater aquifer were developed;

- The ICT sections produced the highest groundwater pumping rates under both gravity flow and VELE, followed by the VEW and then the HEW. There was little difference as far as pumping rates between sections ICT-1 and ICT-2. However, section ICT-1 was half as long as and shallower than section ICT-2. ICT-2 was backfilled with sand, while section ICT-1 had a geocomposite drainage layer installed along its center line and throughout its depth along with a sand backfill on both sides of the geocomposite. The construction of section ICT-1 was more complicated than section ICT-2 due to the installation of the geocomposite drainage layer and the very shallow depth of the water table which caused trench stability problems. Some difficulties were also encountered during the construction of section ICT-2 due to the flowing of the sand backfill toward the section under excavation.

  The use of ICT sections during Phase III of the IRA is recommended. However, the difficulties encountered during the installation of the pilot ICT sections and the limited depth to which an ICT can be extended must be taken into account during the planning of the Phase III work. Difficulties such as the use of sand as backfill material, the geocomposite drainage layer, and the flexible piping should be considered. In addition, the requirement of building platforms in areas of near surface groundwater in order to maintain trench stability and its potential cost impact should also be evaluated.

  The option of using pea gravel to backfill the ICT sections with a geotextile fabric layer placed along the walls and bottom of the trench should be considered as an alternative to backfilling the trench sections with sand and/or sand and geocomposite. In addition, the construction of trench sections by building short (100 to 200 feet) segments in order to maintain trench stability should also be considered. This action is recommended especially if a geocomposite drainage layer is to be used similar to section ICT-1.

  The use of stainless steel screen and pipe sections to build the ICT sumps is recommended instead of the HDPE material used during this pilot work. The steel material will be easier to handle during installation and would not get damaged as the HDPE material did during the Phase II work.

- The VEW produced low flow rates under gravity flow conditions. A slightly deeper well may have produced better flow rates. The use of VEW wells during Phase III should be considered, especially in locations where it would be difficult and may be impossible to install an ICT section. However, prior to installing any VEW, it is recommended that an exploratory boring be drilled at the desired location and soil samples be taken for grain size analysis in order to size the well screen and diameter as efficiently as possible. This exploratory work should result in the installation of more efficient vertical extraction wells.

- The HEW produced a relatively low flow rate and difficulties were encountered during its installation. These conditions could be attributed to the shallow depth at which it was installed. The HEW may be pumped during the Phase III work to assist in lowering the water table in the vicinity of the ACD where source materials will be excavated and treated. The use of the HEW, as part of the network of pumping trenches and wells, may be considered based on its production rate while being used to lower the water table during excavation in its vicinity. Additional HEWs are not recommended for the IRA.

- Slightly higher flow rates were measured during the VELE test than during the gravity test at the VEW. However, these rates appeared to decrease with time and the effect of the vacuum pressures appeared to have centered in the immediate area surrounding the well. At the ICT, there was little difference between the flow rates obtained during the VELE and gravity tests. The application of VELE at the HEW was not successful due to mechanical problems. However, the flow rate during the short period at which VELE was used at the HEW appeared to have been very close to the rates obtained during the gravity flow test.

  The VELE is not recommended for application at ICT sections during Phase III of the IRA due to the little difference in the measured flow rates during the gravity and VELE tests and difficulties encountered during this pilot work, including the complications at section ICT-1 where the geocomposite acted as a big conduit that required very high rates of vacuum in order to maintain a reasonable vacuum rate at sump 3.

  The use of VELE at vertical extraction wells during Phase III may be considered. However, due to the potential spreading of the vertical extraction wells, maintenance of a VELE system will be challenging and may be cost prohibitive. In addition, its difficult to predict the amount of contaminants that will be pulled from the ground and emitted into the atmosphere, especially in highly contaminated areas. Such emissions may not be desired and may complicate the implementation of the Phase III work under the Texas Air Control Board Standard Exemptions listed in 30 Texas Administrative Code (TAC) 116.