LONGHORN ARMY AMMUNITION PLANT

KARNACK, TEXAS

ADMINISTRATIVE RECORD

VOLUME 4 of 5

1996

Bate Stamp Numbers
018015 - 018244

Prepared for:

Department of the Army
Longhorn Army Ammunition Plant
Marshall, Texas 75671

1996

VOLUME 4 OF 5

1996

A. Title: Letter - Subject: Notification of Address Change
Location: Longhorn Army Ammunition Plant
Agency: Department of The Army, Marshall, TX
Authors(s): Darrell W. Chinn, Captain, U. S. Army, Executive Officer
Recipient: Ms. Jonna Polk, Tulsa District Corps of Engineers
Date: August 7, 1996
Bate Stamp: 018015

B. Title: Letter - Subject: Longhorn Army Ammunition Plant, Draft Final Comprehensive Chemical Data Acquisition Plan (CDAP) and Draft Final Field Summary Report for the Phase II, Group 2 Sites Remedial Investigation
Group(s): 2
Site(s): Landfills (12, 16, 17, 18, 24, 29, 32)
Location: Longhorn Army Ammunition Plant
Agency: Texas Natural Resource Conservation Commission
Author(s): Ms. Diane R. Poteet, Project Mgr., RI/FS II Unit, Superfund Investigation Section, Pollution Cleanup Division
Recipient: Mr. James A. McPherson, Commander's Representative
Date: August 12, 1996
Bate Stamp: 018016

C. Title: Memorandum - Subject: Treatment Simulation and Toxicity Testing Results on Site 16
Site(s): 16 - (Old Landfill)
Location: Longhorn Army Ammunition Plant
Agency: SUBRA Company
Author(s): Ms. Wilma Subra
Recipient: Ms. Jonna Polk, U. S. Army Corps of Engineers
Date: August 16, 1996
Bate Stamp: 018017-018018

D. Title: Memorandum - Subject: Draft Final Comprehensive Chemical Data Acquisition Plan for the Remedial Investigation/Feasibility Study at the Longhorn Army Ammunition Plant, Karnack, Texas, June 1996
Location: Longhorn Army Ammunition Plant
Agency: Department of The Army, U.S. Army Center for Health Promotion and Preventive Medicine
Author(s): Arthur P. Lee, P.E., MAJ, MS, Program Mgr., Environmental Health Risk Assessment and Risk Communication
Recipient: District Engineer, U.S. Army Engineering District, Tulsa, ATTN; CESWT-PP-EA/Ms. Jonna Polk
Date: August 19,1996
Bate Stamp: 018019-018020

E. Title: Letter - Subject: Longhorn Army Ammunition Plant, Group 2, Letter dated July 10, 1996 regarding Interim Remedial Action at Burning Ground No. 3 Work Plan Amendments and Time Critical Removal Action at Landfill 16 Design Issues
Group(s): 2
Site(s): 16 - (Old Landfill)

Location: Longhorn Army Ammunition Plant
Agency: Texas Natural Resource Conservation Commission
Author(s): Ms. Diane R. Poteet, Project Mgr., RI/FS II Unit, Superfund Investigation Section, Pollution Cleanup Division
Recipient: Mr. James A. McPherson, Commander's Representative
Date: August 20, 1996
Bate Stamp: 018021-018022

F. Title: Letter - Subject: Final Project Construction Drawings, Interim Remedial Action, Landfill 12 & 16 Caps, Longhorn Army Ammunition Plant, Karnack, Texas
Group(s): 2
Site(s): Landfill Caps (12 & 16)
Location: Longhorn Army Ammunition Plant
Agency: Department of The Army, Marshall, Texas
Author(s): Mr. James McPherson, Commander's Representative
Recipient: Mr. H. L. Jones, Texas Natural Resource Conservation Commission
Date: August 21, 1996
Bate Stamp: 018023

G. Title: Letter - Subject: Final Project Construction Drawings, Interim Remedial Action, Landfill 12 & 16 Caps, Longhorn Army Ammunition Plant, Karnack, Texas
Group(s): 2
Site(s): Landfill Caps (12 & 16)
Location: Longhorn Army Ammunition Plant
Agency: Department of The Army, Marshall, Texas
Author(s): Mr. James McPherson, Commander's Representative
Recipient: Mr. Chris Villarreal, Superfund Division, U. S. Environmental Protection Agency
Date: August 21, 1996
Bate Stamp: 018024

H. Title: Letter - Subject: Final Project Construction Drawings, Interim Remedial Action, Landfill 12 & 16 Caps, Longhorn Army Ammunition Plant, Karnack, Texas
Group(s): 2
Site(s): Landfill Caps
Location: Longhorn Army Ammunition Plant
Agency: Department of The Army, Marshall, Texas
Author(s): Mr. James McPherson, Commander's Representative
Recipient: Ms. Diane Poteet, Superfund Investigation Section, Texas Natural Resource Conservation Commission
Date: August 21, 1996
Bate Stamp: 018025

I. Title: Letter - Subject: Longhorn Army Ammunition Plant, Draft Final Comprehensive Chemical Data Acquisition Plan (w/attachment)
Location: Longhorn Army Ammunition Plant
Agency: Texas Natural Resource Conservation Commission
Author(s): Ms. Diane R. Poteet, Project Mgr., RI/FS II Unit, Superfund Investigation Section Pollution Cleanup Division
Recipient: Mr. James A. McPherson, Commander's Representative
Date: August 25, 1996
Bate Stamp: 018026-018027

J. Title: Memorandum - Subject: Treatment Simulation and Toxicity Testing Results of Site 16 Groundwater, Longhorn Army Ammunition Plant, Karnack, Texas, July 12, 1996 (w/enclosure)
Group(s): 2
Site(s): 16 (Old Landfill)
Location: Longhorn Army Ammunition Plant
Agency: Center for Health Promotion & Preventive Medicine
Author(s): Mr. Wm. Sharland
Recipient: Ms. Jonna Polk, U.S. Army Engineering District, Tulsa, OK
Date: August 26, 1996
Bate Stamp: 018028-018029

K. Title: Letter - Subject: Longhorn Army Ammunition Plant, Draft Final Group 4 Baseline Risk Assessment Work Plan (w/enclosures)
Group(s): 4
Site(s): Sumps (Site 35)
Location: Longhorn Army Ammunition Plant
Agency: United States Environmental Protection Agency
Author(s): Mr. Chris G. Villarreal, Remedial Project Mgr., Superfund Division
Recipient: Mr. James A. McPherson, Commander's Representative
Date: August 27, 1996
Bate Stamp: 018030-018038

L. Title: Report - Group IV Pre-Phase III Groundwater Investigation Report
Group(s): 4
Site(s): Sumps (Site 35)
Location: Longhorn Army Ammunition Plant
Agency: U.S. Army Corps of Engineers, Tulsa District
Authors(s): COE
Recipient: Longhorn Army Ammunition Plant
Date: September 1996
Bate Stamp: 018039-018067

M. Title: Letter - Subject: Longhorn Army Ammunition Plant, Group 2 - Time Critical Removal Action at Landfill 16 (w/enclosure)
Group(s): 2
Site(s): 16 (Old Landfill)
Location: Longhorn Army Ammunition Plant
Agency: Texas Natural Resource Conservation Commission
Author(s): Ms. Diane R. Poteet, Project Mgr., Superfund Investigation Section, Pollution Cleanup Division
Recipient: Mr. James A. McPherson, Commander's Representative
Date: September 4, 1996
Bate Stamp: 018068-018069

N. Title: Letter - Longhorn Army Ammunition Plant - Guidance Documents (w/enclosure)
Group(s): All
Site(s): All
Location: Longhorn Army Ammunition Plant
Agency: Texas Natural Resource Conservation Commission
Author: Ms. Diane R. Poteet, Project Mgr., Superfund Investigation Section, Pollution Cleanup Division
Recipient: Mr. James A. McPherson, Commander's Representative

Date: September 4, 1996
Bate Stamp: 018070-018072

O. Title: Minutes - Subject: TRC Meeting
Group(s): All
Site(s): All
Location: Longhorn Army Ammunition Plant
Date: September 10, 1996
Bate Stamp: 018073-018074

P. Title: Memorandum - Subject: Treatment Simulation and Toxicity Testing Results of Site 16 Ground Water, Longhorn Army Ammunition Plant, Karnack, Texas 12 July 1996
Group(s): 2
Site(s): 16 (Old Landfill)
Location: Longhorn Army Ammunition Plant
Agency: Department of The Army, U.S. Army Center for Health Promotion and Preventive Medicine
Author(s): Arthur P. Lee, P.E., MAJ, MS, Program Manager, Environmental Health Risk Assessment and Risk Communication Program
Recipient: District Engineer, U.S. Army Engineering District, Tulsa, ATTN; CESWT-PP-EA/Ms. Jonna Polk
Date: September 10, 1996
Bate Stamp: 018075

Q. Title: Report - Subject: Baseline Study, Burning Ground No. 3, Interim Remedial Action
Group(s): 2
Site(s): Burning Ground No. 3 (Sites 18 & 24)
Location: Longhorn Army Ammunition Plant
Agency: Dow Environmental, Inc.
Author(s): Dow Environmental, Inc.
Recipient: U.S. Army Corps of Engineers, Tulsa & Ft. Worth Districts
Date: September 11, 1996
Bate Stamp: 018076-018223

R. Title: Memorandum - Subject: Draft Final Field Summary Report for the Phase II, Group 2 Sites Remedial Investigation at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas, July 1996
Group(s): 2
Site(s): 12, 16, 17, 18, 24, 29, 32
Location: Longhorn Army Ammunition Plant
Agency: Department of The Army, U.S. Army Center for Health Promotion and Preventive Medicine
Author(s): Arthur P. Lee, P.E. MAJ, MS, Program Manager, Environmental Health Risk Assessment and Risk Communication
Recipient: District Engineer, U.S. Army Engineering District, Tulsa, Ms. Jonna Polk
Date: September 16, 1996
Bate Stamp: 018224

S. Title: Letter - Subject: Total Environmental Restoration Contract (TERC) Proposed Revisions to the Final Project, Work Plans for Longhorn Army Ammunition Plant, Karnack, Texas
Group(s): All

Sites(s): All
Location: Longhorn Army Ammunition Plant
Agency: Department of The Army, Marshall, TX
Author(s): Mr. James McPherson, Commander's Representative
Recipient: Ms. Diane Poteet, Superfund Investigation Section, Texas Natural Resource Conservation Commission
Date: October 2, 1996
Bate Stamp: 018225

T. Title: Letter - Subject: Total Environmental Restoration Contract (TERC) Proposed Revisions to the Final Project, Work Plans for Longhorn Army Ammunition Plant, Karnack, Texas
Group(s): All
Sites(s): All
Location: Longhorn Army Ammunition Plant
Agency: Department of The Army, Marshall, TX
Author(s): Mr. James McPherson, Commander's Representative
Recipient: Mr. Chris Villarreal, Superfund Division, U. S. Environmental Protection Agency
Date: October 2, 1996
Bate Stamp: 018226

U. Title: Letter - Subject: Total Environmental Restoration Contract (TERC) Proposed Revisions to the Final Project, Work Plans for Longhorn Army Ammunition Plant, Karnack, Texas
Group(s): All
Sites(s): All
Location: Longhorn Army Ammunition Plant
Agency: Department of The Army, Marshall, TX
Author(s): Mr. James McPherson, Commander's Representative
Recipient: Mr. H. L. Jones, Texas Natural Resource Conservation Commission
Date: October 2, 1996
Bate Stamp: 018227

V. Title: Memorandum - Subject: Treatment Simulation and Toxicity Testing Results of Site 16 Groundwater, Longhorn Army Ammunition Plant, Karnack, Texas, 12 July 1996
Group(s): 2
Site(s): 16 (Old Landfill)
Location: Longhorn Army Ammunition Plant
Agency: Department of The Army, U.S. Army Center for Health Promotion and Preventive Medicine
Author(s): Arthur P. Lee, P.E., MAJ, MS, Program Mgr., Environmental Health Risk Assessment and Risk Communication
Recipient: Commander, U.S. Army Environmental Center
Date: October 7, 1996
Bate Stamp: 018228-018229

W. Title: Letter - Subject: Longhorn Army Ammunition Plant, Burning Ground No. 3, Interim Remedial Action, Revised Air Monitoring Plan and Draft Quality Assurance Plan for Air Measurements (w/enclosure)
Group(s): 2
Site(s): Burning Ground No. 3 (Sites 18/24)
Location: Longhorn Army Ammunition Plant

Agency: United States Environmental Protection Agency
Author(s): Mr. Chris G. Villarreal, Project Mgr.
Recipient: Mr. James A. McPherson, Commander's Representative
Date: October 8, 1996
Bate Stamp: 018230-018235

X. Title: Memorandum - Subject: Disposition of LHAAP TCRA at Site 16 (Old Landfill)
Group(s): 2
Site(s): 16 (Old Landfill)
Location: Longhorn Army Ammunition Plant
Agency: Department of The Army, U. S. Army Environmental Center
Author(s): Mr. Kenneth E. Wiggans, Chief, Restoration and Oversight Branch
Recipient: Mr. James McPherson, Commander's Representative, LHAAP
Date: October 15, 1996
Bate Stamp: 018236-018237

Y. Title: Letter - Subject: Longhorn Army Ammunition Plant, Burning Ground No. 3 Remedial Action, Revised Air Monitoring Plan and Draft Quality Assurance Project Plan for Air Measurements (w/enclosures)
Group(s): 2
Sites(s): Burning Ground No. 3 (Sites 18/24)
Location: Longhorn Army Ammunition Plant
Agency: United States Environmental Protection Agency
Author(s): Mr. Chris Villarreal, Project Manager
Recipient: Mr. James A. McPherson, Commander's Representative
Date: October 16, 1996
Bate Stamp: 018238-018243

Z. Title: Letter - Subject: Team Building Workshop
Group(s): All
Sites(s): All
Location: Longhorn Army Ammunition Plant
Agency: Department of The Army, Marshall, TX
Author(s): Mr. James McPherson
Recipient: Mr. H. L. Jones, Texas Natural Resource Conservation Commission
Date: October 16, 1996
Bate Stamp: 018244

DEPARTMENT OF THE ARMY
LONGHORN/LOUISIANA ARMY AMMUNITION PLANTS
MARSHALL, TEXAS 75671-1059

REPLY TO
ATTENTION OF

August 7, 1996

018015

SIOLH-CR

SUBJECT: Notification of Address Change

Ms. Jonna Polk
Tulsa District Corps of Engineers
Box 61 - CESWT-PP-E
Tulsa, OK 74121-0061

Dear Ms. Polk:

In an effort to cut operational costs and streamline logistical efforts, we are changing our post office box.

Please address all future correspondence to:

Longhorn/Louisiana Army Ammunition Plants
Attn: (office symbol/name)
P. O. Box 658
Doyline, LA 71023

Office symbols remain unchanged. They include SIOLH-CR (Commander's Representative), SIOLH-CA (Contract Administration), and SIOLH-OR (Operations Review).

Your attention to this matter is appreciated. Please direct any questions or comments to the undersigned at 318/459-5101.

Sincerely,

Darrell W. Chinn
Captain, U. S. Army
Executive Officer

018016

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

August 12, 1966

CERTIFIED MAIL
P 836 901 739
RETURN RECEIPT REQUESTED

James A. McPherson, Commander's Representative
Longhorn/Louisiana Army Ammunition Plant
Attn: SIOLH-CR
P.O. Box 658
Doyline, LA 71023

Re: Longhorn Army Ammunition Plant
Draft Final Comprehensive Chemical Data Acquisition Plan (CDAP) and
Draft Final Field Summary Report for the Phase II, Group 2 Sites Remedial Investigation

Dear Mr. McPherson:

In accordance with Section VIII. G. 2 of the Federal Facility Agreement, the TNRCC staff is notifying the Army that a twenty-day extension will be needed in order to provide a more thorough review and comment of the above referenced projects. Comments will be provided by August 25, 1996 for the CDAP and by September 8, 1996 for the Field Summary Report. If you have any further questions regarding this matter, please call me at (512) 239-2502.

Sincerely,

Diane R. Poteet
Project Manager (MC-143)
RI/FS II Unit
Superfund Investigation Section
Pollution Cleanup Division

cc: Chris Villarreal, EPA Region 6 (6SF-AT)
Jonna Polk, COE Tulsa District (CESWT-PP-EA)
Oscar Linebaugh, COE Eastern Area Office (CESWF-AD-E)

SUBRA COMPANY

3008 SOUTHWEST DRIVE • SOUTHWEST INDUSTRIAL PARK • P.O. BOX 9813 • NEW IBERIA, LA. 70562-9813 • (318) 367-2216

018017

Date: August 16, 1996

To: Jonna Polk
U. S. Army Corps Engineers
1645 S. 101st East Ave.
Tulsa, OK 74128
Fax: 918-669-7235

From: Wilma Subra

Subject: Treatment Simulation and Toxicity Testing Results on Site 16

Thank you for the report on the treatment simulation and toxicity test results of Site 16 ground water. The text portion of the treatment simulation describes three liters of ground water samples being treated in four 1 gallon jars for at total volume of treated water of approximately 12 liters. Was water added to the ground water samples to make the volume up to 12 liters? Was this meant to be a dilution to simulate a portion of the process? This issue needs clarification in the report.

The description of treatments E and F states ground water was diluted 15:1 with deionized water before treatment. The laboratory results describe the ground water samples as being diluted 1:15. Clarification of the dilution ratio and consistency should be incorporated into the report.

The description of treatment E and F are the same as A and B, respectively, except E and F are diluted (15:1) ground water samples. If the samples were diluted 1:15, you would expect the concentrations of contaminants to also be diluted. The results of the volatile organic compounds did not demonstrate the expected dilution of contaminants. In fact, the concentration of trichloroethene was higher in samples E and F

SUBRA COMPANY

018018

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when compared to A and B. An explanation should be included in the report.

The cover letter from DOW dated July 12, 1996 indicates that a very detailed evaluation was not attempted due to the potential shortage of funding for the Site 16 WAD. Please provide information on this issue and the impact it will have on the overall Site 16 and Longhorn projects.

Thank you for the opportunity to comment on this report.

DEPARTMENT OF THE ARMY
U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE
5158 BLACKHAWK ROAD
ABERDEEN PROVING GROUND, MARYLAND 21010-5422

REPLY TO
ATTENTION OF

MCHB-DC-EHR (40)

19 AUG 1996

MEMORANDUM FOR District Engineer, U.S. Army Engineering District, Tulsa, ATTN: CESWT-PP-EA/Ms. Jonna Polk, Post Office Box 61, Tulsa, OK 74121-0061

SUBJECT: Draft Final Comprehensive Chemical Data Acquisition Plan for the Remedial Investigation/Feasibility Study at the Longhorn Army Ammunition Plant, Karnack, Texas, June 1996

1. The U.S. Army Center for Health Promotion and Preventive Medicine reviewed the subject document on behalf of the Office of The Surgeon General. Our previous comment pertaining to a shallow soil sample being defined as the uppermost foot of soil was not adequately addressed. Typically a surface soil sample is considered to be limited to the uppermost six inches of soil.

2. We received only one copy of the subject document, which did not allow for a matrixed review of the document. In the future, please send seven copies of any document for review.

3. The scientist reviewing this document and our point of contact is Mr. William Sharland, Environmental Health Risk Assessment and Risk Communication Program, at DSN 584-2953 or commercial (410) 671-2953.

FOR THE COMMANDER:

Arthur P. Lee

ARTHUR P. LEE, P.E.
MAJ, MS
Program Manager, Environmental Health Risk Assessment and Risk Communication

CF:
HQDA(DASG-HS-PE)
CDR, USAMEDCOM, ATTN: MCHO-CL-W
CDR, AMCEN-A\Mr. Pete Cunanan
CDR, USAEC, ATTN: SFIM-AEC-RPO
CDR, CEMRD, ATTN: CEMRD-ET-EH
CDR, LHAAP, ATTN: SMLO-EN

Readiness thru Health

018020

Longhorn Army Ammunition Plant
Draft Final Comprehensive Chemical Data Acquisition Plan (CDAP)
TNRCC Comments

No.	Section/Page	Comment
1	1.0/General	We understand from previous discussions on this topic that this document is intended as a general guide for the overall site investigation of the plant, and that the specific quality assurance plan for each individual project will be included in each work plan. We recommend that a statement like this be put in the introduction of this document. Also, how will the Army handle revisions or additions to the CDAP? Will they be submitted as appendices to the CDAP? This should also be stated in the introduction.
2	3.0/3-1	For defining Data Quality Objectives (DQOs), the USEPA 540-R-93-071 was referenced. USEPA 540-R-93-071 does not define DQOs as they are described in Section 3.0. We recommend the use of the 7-step DQO process as described in 540-R-93-071 or the more recently approved: "Guidance for the Data Quality Objectives Process," USEPA QA/G-4, September 1994
3	3.0/3-1	We also recommend that the document "Interim Draft EPA Requirements for Quality Assurance Project Plans" USEPA QA/R-5, May 1994, be used and referenced for the preparation of the Army's QAPP.
4	4.4.1.3/4-18	Pumping tests should be as detailed as everything else is in this document. There are standard procedures which can be listed for various tests, and if the Army would like some suggestions, we could provide them.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

August 20, 1996

CERTIFIED MAIL
P 836 901 734
RETURN RECEIPT REQUESTED

James A. McPherson, Commander's Representative
Longhorn/Louisiana Army Ammunition Plant
Attn: SIOLH-CR
P.O. Box 658
Doyline, LA 71023

Re: Longhorn Army Ammunition Plant
Group 2 - Letter dated July 10, 1996 regarding the Interim Remedial Action at Burning Ground No. 3 Work Plan Amendments and Time Critical Removal Action at Landfill 16 Design Issues

Dear Mr. McPherson:

The Texas Natural Resource Conservation Commission (TNRCC) staff have completed our review of the above referenced letter, which was received on July 12, 1996. A response to each amendment or issue for which the Army is seeking TNRCC's concurrence and written approval has been specifically provided below.

Interim Remedial Action at Burning Ground No. 3 Amendments

Amendment No. 1: The TNRCC has no objection if the Army wishes to use a mechanical filter press instead of a sand bed in their treatment plant; however, the Army will need to submit revised plans and specifications to reflect this change for our review and concurrence.

Amendment No. 2: Even though there have been several verbal discussions between the TNRCC and the Army regarding the Army's plans to stockpile soil generated from the new trenching technology, design plans or specifications have never been submitted, and thus, the TNRCC cannot provide comments on the Army's plans to stockpile these soils. Please submit for our review and comment plans and specifications that demonstrate how the facility will comply with the following State ARARs: 30 TAC §335.4, §335.152 (a) (10),which refers to 40 CFR Part 264 Subpart L (except §264.251), and §335.170.

Time Critical Removal Action at Landfill 16 Design Issues

Design Issue No. 1: The Army needs to submit plans and specifications for the containment system for the 50,000 gallon extraction water holding tank for our review and concurrence. The specific State ARARs for tank systems are found at 30 TAC §335.152 (a) (8), which refers to 40 CFR Part 264 Subpart J.

Design Issue No. 2: If the Army intends to mix the water from Landfill 16 with the water at the Burning Ground No. 3 water treatment plant (15 to 1 ratio based on relative extraction rates), then the Army needs to submit a written description on how and where this will be accomplished before the TNRCC can provide comment and concurrence. It is suggested that the description include the diagrams which were presented at the August Monthly Manager's meeting.

If you have any further questions regarding this matter, please call me at (512) 239-2502.

Sincerely,

Diane R. Poteet

Diane R. Poteet
Project Manager (MC-143)
RI/FS II Unit
Superfund Investigation Section
Pollution Cleanup Division

cc: Chris Villarreal, EPA Region 6 (6SF-AT)
Jonna Polk, COE Tulsa District (CESWT-PP-EA)
Oscar Linebaugh, COE Eastern Area Office (CESWF-AD-E)

DEPARTMENT OF THE ARMY
LONGHORN/LOUISIANA ARMY AMMUNITION PLANTS
MARSHALL, TEXAS 75671-1059

REPLY TO ATTENTION OF

August 21, 1996

018023

SIOLH-CR

Mr. H.L. Jones
Texas Natural Recource Conservation
Commission
2916 Teague Drive
Tyler, TX 75701

SUBJECT: Final Project Construction Drawings, Interim Remedial Action, Landfill 12 & 16 Caps, Longhorn Army Ammunition Plant, Karnack, Texas

Dear Mr. Jones:

Enclosed is a complete set of the Final Construction Drawings for the Landfill Caps. Each drawing has been reviewed and approved by a state of Texas registered Professional Engineer. These drawings should be inserted in Appendix H in the Final Landfill Caps Workplan previously submitted on June 10, 1996.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

James McPherson
Commander's Representative

Enclosure

DEPARTMENT OF THE ARMY
LONGHORN/LOUISIANA ARMY AMMUNITION PLANTS
MARSHALL, TEXAS 75671-1059

REPLY TO ATTENTION OF

August 21, 1996

018024

SIOLH-CR

Mr. Chris Villareal
Superfund Division (6SF-AT)
U.S. Environmental Protection Agency
1445 Ross Avenue
Dallas, TX 75202-2733

SUBJECT: Final Project Construction Drawings, Interim Remedial Action, Landfill 12 & 16 Caps, Longhorn Army Ammunition Plant, Karnack, Texas

Dear Mr. Villareal:

Enclosed is a complete set of the Final Construction Drawings for the Landfill Caps. Each drawing has been reviewed and approved by a state of Texas registered Professional Engineer. These drawings should be inserted in Appendix H in the Final Landfill Caps Workplan previously submitted on June 10, 1996.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

James McPherson
Commander's Representative

Enclosure

DEPARTMENT OF THE ARMY
LONGHORN/LOUISIANA ARMY AMMUNITION PLANTS
MARSHALL, TEXAS 75671-1059

018025

REPLY TO ATTENTION OF

August 21, 1996

SIOLH-CR

Ms. Diana Poteet
Superfund Investigation Section
Texas Natural Resource Conservation Commission
Post Office Box 13087
Austin, TX 78711-3087

SUBJECT: Final Project Construction Drawings, Interim Remedial Action, Landfill 12 & 16 Caps, Longhorn Army Ammunition Plant, Karnack, Texas

Dear Ms. Poteet:

Enclosed is a complete set of the Final Construction Drawings for the Landfill Caps. Each drawing has been reviewed and approved by a state of Texas registered Professional Engineer. These drawings should be inserted in Appendix H in the Final Landfill Caps Workplan previously submitted on June 10, 1996.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

James McPherson
Commander's Representative

Enclosure

018026

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

August 25, 1996

CERTIFIED MAIL
Z 746 032 644
RETURN RECEIPT REQUESTED

James A. McPherson, Commander's Representative
Longhorn/Louisiana Army Ammunition Plant
Attn: SIOLH-CR
P.O. Box 658
Doyline, LA 71023

Re: Longhorn Army Ammunition Plant
Draft Final Comprehensive Chemical Data Acquisition Plan (CDAP)

Dear Mr. McPherson:

The Texas Natural Resource Conservation Commission (TNRCC) has completed our review of the above referenced document. Our comments are attached. If you have any questions or comments regarding this matter, please call me at (512) 239-2502.

Sincerely,

Diane R. Poteet

Diane R. Poteet
Project Manager (MC-143)
RI/FS II Unit
Superfund Investigation Section
Pollution Cleanup Division

enclosure

cc: Chris Villarreal, EPA Region 6 (6SF-AT)
Jonna Polk, COE Tulsa District (CESWT-PP-EA)
Oscar Linebaugh, COE Eastern Area Office (CESWF-AD-E)

Longhorn Army Ammunition Plant
Draft Final Comprehensive Chemical Data Acquisition Plan (CDAP)
TNRCC Comments

No.	Section/Page	Comment
1	1.0/General	We understand from previous discussions on this topic that this document is intended as a general guide for the overall site investigation of the plant, and that the specific quality assurance plan for each individual project will be included in each work plan. We recommend that a statement like this be put in the introduction of this document. Also, how will the Army handle revisions or additions to the CDAP? Will they be submitted as appendices to the CDAP? This should also be stated in the introduction.
2	3.0/3-1	For defining Data Quality Objectives (DQOs), the USEPA 540-R-93-071 was referenced. USEPA 540-R-93-071 does not define DQOs as they are described in Section 3.0. We recommend the use of the 7-step DQO process as described in 540-R-93-071 or the more recently approved: "Guidance for the Data Quality Objectives Process," USEPA QA/G-4, September 1994
3	3.0/3-1	We also recommend that the document "Interim Draft EPA Requirements for Quality Assurance Project Plans" USEPA QA/R-5, May 1994, be used and referenced for the preparation of the Army's QAPP.
4	4.4.1.3/4-18	Pumping tests should be as detailed as everything else is in this document. There are standard procedures which can be listed for various tests, and if the Army would like some suggestions, we could provide them.

018028

U.S. Army
Center for Health Promotion & Preventive Medicine

Health Risk Assessment Team

Attention: MCHB-DC-EHR
Bldg. E1677
Aberdeen Proving Ground, Maryland, 21010-5422
(Edgewood Arsenal)

Phone (410) 671-2953
FAX (410) 671-8170
DSN (410) 584-2953

FAX Transmittal Sheet

For: Ms. Jonna Polk
U.S. Army Engineering District, Tulsa

From: William S. Sharland

PHONE: (918) 669-7480
FAX: (918) 669-7235

Date: 8/26/96

Total number of pages including cover: 2

Message

Ms. Polk,

Enclosed is a draft review for the Treatment Simulation and Toxicity Testing Results of Site 16 Groundwater at Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas, July 1996. If you have any questions, please call (410) 671-2953.

018029

MCHB-DC-EHR (40)

MEMORANDUM FOR District Engineer, U.S. Army Engineering District, Tulsa, ATTN: CESWT-PP-EA/Ms. Jonna Polk, Post Office Box 61, Tulsa, OK 74121-0061

SUBJECT: Treatment Simulation and Toxicity Testing Results of Site 16 Groundwater, Longhorn Army Ammunition Plant, Karnack, Texas, July 12, 1996

1. The U.S. Army Center for Health Promotion and Preventive Medicine reviewed the subject document on behalf of the Office of The Surgeon General. The subject document was reviewed with no comment.

2. We received only one copy of the subject document, which did not allow a matrixed review of the document. In the future, please send seven copies of a document for a matrixed review.

3. The scientist reviewing this document and our point of contact is Mr. William Sharland, Environmental Health Risk Assessment and Risk Communication Program, at DSN 584-2953 or commercial (410) 671-2953.

FOR THE COMMANDER:

Encl

ARTHUR P. LEE, P.E.
MAJ, MS
Program Manager, Environmental Health Risk Assessment and Risk Communication

CF:
HQDA(DASG-HS-PE)
CDR, USAMEDCOM, ATTN: MCHO-CL-W
CDR, AMCEN-A\ Pete Cunanan
CDR, USAEC, ATTN: SFIM-AEC-RPO
CDR, CEMRD, ATTN: CEMRD-ET-EH
CDR, LHAAP, ATTN: SMLO-EN

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

018030

August 27, 1996

VIA PRIORITY MAIL

James A McPherson, Commander's Representative
Longhorn/Louisiana Army Ammunition Plants
Attn: SIOLH-CR
P.O. Box 658
Doyline, LA 71023

Re: Longhorn Army Ammunition Plant
Draft Final Group 4 Baseline Risk Assessment Work Plan

Dear Mr. McPherson:

Pursuant to the Federal Facility Agreement, the Environmental Protection Agency (EPA) is providing comments on the *Draft Final Group 4 Baseline Risk Assessment Work Plan*. Comments are being provided in the form of memoranda (copies enclosed) which I received from Ghassan Khoury (EPA Toxicologists) and Susan Roddy (EPA Ecological Risk Assessor). Sorry for the delay in providing these comments.

Susan Roddy and I are looking forward to September 11, 1996 meeting at the facility to initiate discussions on the plant-wide ecological risk assessment. It is our hope that this meeting (and site tour) will initiate a process which will result in a technically defensible, appropriately scaled, ecological risk assessment. If you have any questions about this or any other matter, please contact me at (214) 665-6758.

Sincerely,

Chris G. Villarreal

Chris G. Villarreal
Remedial Project Manager
Superfund Division

Enclosures

cc: Oscar Linebaugh, Jr., COE Eastern Area Office (CESWF-AD-E)
Jonna Polk, COE Tulsa District (CESWT-PP-EA)
Diane Poteet, TNRCC (MC-143)

August 15, 1996

MEMORANDUM

018031

FROM: Ghassan Khoury, Toxicologist
Superfund Branch (6SF-L)

TO: Chris Villareal, RPM
Superfund Branch (6SF-AT)

SUBJECT: Review of Draft Final Human Health Baseline Risk Assessment Work Plan for Group 4 Sites at the Longhorn Army Ammunition Plant.

I reviewed the draft final Human Health Baseline Risk Assessment Work Plan for Group 4 sites for Longhorn Army Ammunition Plant. The document is very well written and well organized. The document follows EPA guidances and procedures. I am providing the following comments:

General Comments

1) In developing exposure point concentrations, it is important to identify exposure areas. Seven areas Plant 2, Plant 3, the 400 Area, Power Area, Shop Area, Static Test Area, and Y Area were identified. Samples collected from these areas need to be based on a random or systemic grid sampling. The variability withing samples collected from each area would then be calculated. Based on this variability, the number of samples needed to statisically represent the exposure area is determined for each area.

2) I am concerned that by evaluating the impact of each group on surface water, it would tend to reduce the total impact from all Longhorn sites and groups on surface water. For example the modeling suggested to determine migration of contaminants from groundwater into Lake Caddo will only address impact from groundwater monitoring wells within Group 4 sites. It does not include impact of groundwater or surface water runoff from other parts of the Longhorn Plant.

Specific Comments

1) Page 2-3 Section 2.3
It was reported that "In the Phase II investigations 0-6 inch surface soil samples were collected in the vincinity of each of the 71 monitoring wells."
I have a question on whether the surface soil was scraped before collecting the surface soil sample or not?

2) Page 3-1 Principal guidance documents that will be used
Use the updated Exposure Factors Handbook (EPA,1995)

3) Page 3-6 Section 3.3.1.1 (last paragraph)
Provide better justification for future land use than the one provided. Follow OSWER Directive No. 9355.7-04 guidance on Land Use in the CERCLA Remedy Selection Process (EPA, 1995). This guidance is also relevent for Federal Facility sites.

4) Page 3-11 Section 3.3.3.1
Hunting season seems to last 3 months in a year and mostly done on weekends. Provide information that by evaluating risk to a trespasser, it will be more conservative than risk to a hunter. Provide information on type of game hunted and why ingestion of contaminants in game meat is not of concern for the site.

5) Page 3-14 (2nd paragraph) and page 3-17 Section 3.3.4.3
It was reported that the exposure concentrations in Caddo Lake will be modeled based on potential groundwater migration. Need also to model contaminants contribution from watershed and surface water draining into the lake. Results from both groundwater and surface water migration of contaminants into the lake should be used as exposure conentrations for Caddo Lake.

6) Page 3-17 (1st paragraph)
Calculate the arithmetic mean of the 3 wells and not the 95% UCL of the mean.

7) Page 3-17 Section 3.3.4.4
Use BCF for chemicals such as arsenic, nitrobenzene, beryllium, dinitrotoluene. Note that dissolved water concentration is used with BCF. For chemicals such as benzo(a)pyrene, di-n-octyl phthalate, mercury, barium or lead need to use the Bioaccumulation Factor (BAF) in the total water column. Refer to EPAs "Water Quality Guidance for the Great Lakes System and Correction; Proposed Rules. April 16, 1993. 58(72)20802-21047," Or the Food and Gill Exchange of Toxic Substances Model (FGETS) can be used to estimate bioconcentration and bioaccumulation. For chemicals that have fish biota to sediment accumulation factor (BSAF) such as PCBs and dioxin need to use the following equation :

$$Cfish = (Csb * f\ lipid * BSAF) / OCSed$$

Where:

Cfish : Fish concentration (mg/kg)
Csb : Concentration of contaminant sorbed to bed sediment (mg/kg)
f lipid : Fraction of fish lipid content (unitless)
OCSed : Fraction organic carbon in bottom sediment

(unitless)

Need to reference all values used for BCF, BSAF or BAF. Provide information or data on how the most conservative values were chosen for each chemical of concern.

8) Page 3-18 Section 3.3.4.5
It was reported that the models that will be used for the air pathway are those recommended by EPA for calculating preliminary remediation goals.
Use models provided in the Soil Screening Guidance:Users Guide and its Technical Background Document; EPA/540/R-96/018. April 1996.

9) Page 3-22 Section 3.3.5.4 (2nd paragraph)
Dont reduce inhalation rate to 10 m3/day because of the time spent hunting or trespassing. Keep the default value of 20 m3/day and reduce exposure time.

10) Page 3-23 Section 3.3.5.6
The rate of drinking water ingestion was reduced to 1 liter/day for an adult. Reduce the time of exposure but not the rate of ingestion. Or use fraction of the time spent on site.

11) Page 3-23 (1st paragraph)
Use the PEF value provided in the Soil Screening Guidance.

12) Page 3-33 Section 3.7 (3rd paragraph)
It was not clear why a range of total hazard indices are calculated (0.1,1 and 10).

MEMORANDUM

SUBJECT: Group 4 Baseline Risk Assessment Work Plan for Longhorn

FROM: Susan Roddy

TO: Chris Villarreal

DATE: June 7, 1996

I have reviewed the ecological risk assessment sections of the Group 4 Baseline Risk Assessment Work Plan for Longhorn and have the following comments:

Page 1-3: What did Group 4 produce? What were the likely contaminants for Group 4? And, how was Group 4 identified as a separate area for study?

Page 2-2: It is stated that if a chemical was not positively identified in any sample from a medium, and was either a nondetect or a blank contamination, the chemical was not addressed for that medium. Without an evaluation of the adequacy of detection limits with respect to ecotoxicity values, it is unclear whether chemicals that should have been included were excluded.

Pages 2-6 and 2-7: Detections above background for metals were mentioned. How were the background locations determined?

Page 2-7: An evaluation of the adequacy of detection limits with respect to ecotoxicity values is needed. Tables 2-1-2-31 need the ecotoxicity values on the Tables to show the adequacy of the detection limits and/or data gaps.

Page 2-8: It is stated in the third paragraph that there is minimal soil contamination in the Static Test Area and the Y-Area. Please provide the documentation for this statement.

Table 2-13: There were some chemicals that were not selected as CPECs because the frequency of detection was less than 5%. Frequency of detection should not be used to eliminate chemicals unless it can be documented that the sampling was systematic.

Page 4-1: A screening ecological risk assessment using conservative literature ecotoxicity values should be done initially prior to the problem formulation (for the desktop assessment described in this document) in order to determine the need for further evaluation and to determine if the number of contaminants can be reduced. The literature screening ecotoxicity values could then be used to determine the adequacy of the detection limits of data already or to be collected.

Page 4-4: The first bullet in Section 4.2.1.2 states that a chemical will be excluded as a CPEC for a medium if it is not detected in any sample from that medium. A chemical should not be

excluded based on a nondetect if the detection limits are inadequate. Adequacy of detection limits need to be determined and discussed with respect to conservative ecotoxicity values.

Page 4-5: Reference citation should be provided for the bullet at the top of the page.

Page 4-6: Will a vegetative cover map be provided using GIS?

Pages 4-7-4-9: Regarding the inventory of expected species, categorization by trophic function is recommended.

Page 4-10, Section 4.2.4: Identification of Exposure Pathways needs to be done separately for each contaminant or group of similar contaminants.

Page 4-12: Regarding the bulleted criteria listed for selecting assessment endpoint, sensitivity to toxicity of the contaminant should be added. Also, in relation to societal relevance, ecological relevance should be the primary consideration, and, if the public requests evaluation of an endpoint based on societal concern/relevance, that evaluation could be added on.

Table 4-3, Assessment and Measurement Endpoints: The endpoints need to developed for each contaminant specific to the contaminant's toxicity and to sensitive exposed trophic receptors. The endpoint should be stated in terms of what is to be protected rather than reductions of biota. The second assessment endpoint seems to be a subset of the first assessment endpoint. Top predator trophic levels are missing. Testable hypotheses need to be included. Measurement endpoints need to be more clearly worded and more specific.

Section 4.2.5: The text needs to have more discussion of the specific assessment and measurement endpoints presented in Table 4-3. Also, testable hypotheses need to be presented.

Section 4.2.6, Site Conceptual Model: The adequacy of the site conceptual models cannot be determined without a discussion of the mechanisms of toxicity of each contaminant (or groups of similar contaminants) for various trophic level receptors. It cannot be determined from the text whether the receptors selected were adequately sensitive endpoints for the site conceptual models. The site conceptual models need to be chemical-specific and driven by sensitivity to toxicity of chemicals as well as susceptibility to exposure. More detailed discussions are needed.

It is not recommended that a threatened and endangered species be selected as an assessment endpoint. Rather, a species representative of the threatened and endangered species' trophic level and sensitivity would be preferred.

Page 4-16: In the second bullet, it is stated that if sufficient exposure and toxicity data for a reptile do not exist for a

quantitative evaluation, then the exposure pathway would be evaluated qualitatively. Please clarify what qualitative evaluation would be done. Would site-specific field data be collected?

Page 4-17, Section 4.3.1: It is stated at the end of the first paragraph that all exposure pathways that were of little or no concern based on the analysis of site characteristics were eliminated. Pathways should only be eliminated if they are incomplete. Please clarify.

Page 4-17, Section 4.3.1: Regarding criteria for selecting species representative of assessment endpoint receptors, the bullet on threatened and endangered species can be eliminated.

Page 4-18: Please clarify how the exposure pathway selection criteria (the middle set of bullets) were specifically applied.

Section 4.3.1: The adequacy of the species selected as representatives for the trophic level receptors cannot be determined without detailed discussions on sensitivity to toxicity for each contaminant or group of similar contaminants. More detailed discussions are needed in Section 4.3.1 and its subsections and in support of Table 4-4.

Pages 4-19-24: More details are also needed on ecological relevance for each subsection.

Page 4-21, River Otter: Was the river otter observed there?

Pages 4-2 and 4-40: Are earthworms expected to be at the site and to bioaccumulate the contaminants that occur at the site?

Page 4-25: Please define "substantially" greater concentrations for hotspots.

Page 4-25: Please clarify whether, in addition to 95 UCL calculations, calculations will be done using central tendency data.

Page 4-26, Section 4.3.2.2, Surface Water/Sediment: It is stated that exposure point concentrations for surface water in Caddo Lake will be modeled. Further site-specific information is needed to determine whether contaminants from the site are impacting biota in Caddo Lake. Will sediment and surface water data be collected along the creek up to the point of entry into Caddo Lake as well as in Caddo Lake?

Pages 4-27-28: It is stated that tissue doses will be modeled. Since it is preferred that site-specific tissue data be used for food chain estimations, if tissue doses are modeled, documentation will be needed that conservative bioaccumulation and plant uptake values as well as other exposure parameter values are used.

Estimates in fish tissue will be made using bioconcentration factors. Please consider using bioaccumulation factors as well for top trophic level fish that could be prey for piscivores.

Section 4.3.3: Regarding exposure parameters such as body weight and ingestion rates, clarification is needed that conservative values will be used for these parameters for the modeled assessment.

Page 4-31: It does not seem justified to eliminate the exposure pathway for ingestion of small mammals or birds (which have bioaccumulated chemicals) by predatory bird or mammal species.

Page 4-31, Section 4.4: It is stated that information on the toxicity of the CPECs to ecological receptors will be presented in the ecological effects characterization. Toxicity information needs to be presented in the Problem Formulation as well. A ecotoxicity literature search needs to be conducted and ecotoxicological profiles need to be presented for each contaminant. The profiles should contain information on mechanisms of toxicity for terrestrial and aquatic receptors for various trophic levels which would be used to justify the logic of selecting endpoints and testable hypotheses for each contaminant. The profiles should also include summaries of literature studies and ecotoxicity values. Tables summarizing the studies, values, and conversion factors (concentration to doses) should be included.

Section 4.4.1: Regarding the list of database sources, TERRETOX and Oak Ridge databases should be considered as well.

Page 4-33: In the next to last paragraph, it is stated that in the absence of chronic and subchronic data, RTVs will be derived on available acute data, and thus protect for potential acute effects. Ecotoxicity values protective of chronic effects should be estimated.

Pages 4-33-36 and Table 4-12: The term safety factor is inappropriate. The term extrapolation factor would be more appropriate.

Page 4-34: Regarding extrapolations to estimate LOAELs and NOAELs, EPA's Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments should be used. This document recommends using a factor of 10 to estimate from an LC50 to a LOAEL and another factor of 10 to estimate from a LOAEL to a NOAEL. This comment applies to Table 4-12.

Page 4-38: It is mentioned in the second paragraph that small mammal tissue data may be collected in order to evaluate potential exposure to carnivores such as hawks or foxes, if such a pathway is of concern at the site. The small mammal to predator pathway should be included in this desktop assessment as well.

Page 4-40, Section 4.6.1: As mentioned previously, the ecorisk

screen should be done earlier in the process.

In the last paragraph on page 4-40, it is stated that the lowest value calculated for either the shrew or the woodcock will be used as the basis of the screening level. For a terrestrial soils screen involving food chain or soil ingestions, the approach should be to identify literature studies for experimental species having the most sensitive ecotoxicity values (regardless of whether the species is expected to occur at the site), and to use that experimental species to identify a representative receptor for determination of exposure parameter values. The intent of the screen is to be sufficiently conservative such that if the hazard quotients do not exceed unity, there is confidence in eliminating contaminants from further evaluation. (More site-specific species can be used in the next stage of the ecological risk assessment.) It is unclear whether the shrew or the woodcock represent most sensitive species from literature studies for each contaminant.

It is also stated on page 4-40 that for those chemicals for which earthworm bioaccumulation factors are available in the literature, screening levels will be based on the earthworm ingestion pathway, and that for all other chemicals, screening levels will be based on the soil ingestion pathway. There should be discussions on the appropriateness of evaluating exposure for top trophic level receptors from ingestion of plant tissues and small mammal/bird tissues (as well as soil and invertebrate ingestion) based on the contaminants. Also, for each sensitive receptor being screened, hazard quotients for all pathways for each contaminant should be summed (to determine the back-calculatable media, i.e., soil, screening value) rather than using only the value for the most impacted pathway. Please clarify and/or revise the discussion.

Page 4-41, Section 4.2, Surface Waters: LOAELs should not be used for screening. Either NOAELs or estimated NOAELs should be used for screening.

Page 4-41, Section 4.6.3: The NOAA database should be consulted for freshwater values.

Tables 4-5, 4-7, 4-9, and 4-10: Clarification is needed for the IIR term related to the body weight provided on Table 4-5, for the EIR term on Table 4-7, and for the FIR term on Table 4-9. And, clarification is needed for the CI term on Table 4-5 and the CFI and CF terms on Tables 4-9 and 4-10.

Tables 4-5-4-11: Are the body weight and ingestion rates conservative?

LONGHORN ARMY AMMUNITION PLANT

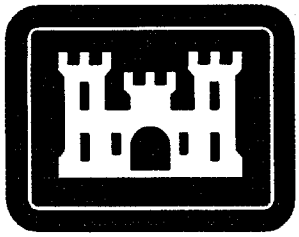
Karnack, Texas

Group IV
Pre-Phase III
Groundwater Investigation
Report

September 1996

PREPARED BY:

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT



LONGHORN ARMY AMMUNITION PLANT

KARNACK, TEXAS

GROUP IV SUMPS

PRE-PHASE III
GROUNDWATER INVESTIGATION
REPORT

Prepared by:

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT

SEPTEMBER 1996

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LONGHORN ARMY AMMUNITION PLANT
GROUP IV SUMPS
PRE-PHASE III GROUNDWATER INVESTIGATION REPORT

SECTION 1
INTRODUCTION

Phase I and Phase II of a multi-phase investigation of 125 underground sumps and 20 waste rack sumps located throughout the Longhorn Army Ammunition Plant (LHAAP) production area has been performed by the U.S. Army Corps of Engineers (USACE), Tulsa District. Phase I of the investigation consisted of drilling subsurface borings to investigate potential soil contaminants adjacent to all 145 sumps. Analytical results from the first phase of the investigation confirmed the presence of several organic contaminants in the subsurface soil. Based on these findings, a second phase of remedial investigations was recommended to determine if groundwater had been impacted. A total of 71 shallow monitoring wells were installed in the uppermost water bearing zone within the Wilcox Aquifer to define the nature and extent of groundwater contamination in the sumps area. Samples from each of the monitoring wells were collected and analyzed, and the results indicated that Volatile organic compounds (VOCs), primarily trichloroethene (TCE), 1,2-dichloroethene (1,2-DCE), and tetrachloroethene (PCE), had been released to the groundwater. However, due to the large number of sumps and potential sources of contamination in the production area, the number of monitoring wells installed was not sufficient to fully delineate the areas of contamination in the groundwater. The USACE report titled Phase II Investigations of 125 Waste Process Sumps and 20 Wast Rack Sumps (October, 1995) presents a detailed discussion of the findings of the previous sumps investigations.

The purpose of this investigation was to quickly and cost effectively delineate the lateral extent of VOC contamination in the uppermost groundwater bearing zone in the sumps project area shown on Figure 1. This was accomplished by utilizing the Site Characterization and Analysis Penetrometer System (SCAPS) to push power punch groundwater sampling devices (temporary well points) into the uppermost groundwater zone as a field screening tool to collect groundwater samples from locations upgradient and downgradient of wells known to be contaminated with VOCs. In remote locations inaccessible to the SCAPS unit, hand augers were used to advance the borings. Samples obtained were analyzed using a portable gas chromatograph in the field to provide rapid VOC results. Using this approach, a determination of the extent of VOC contamination in the shallow aquifer at the Longhorn Group IV sumps project area was made in the field.

Use of SCAPS as a field screening technology expedited the determination of the lateral extent and possible source areas of groundwater VOC contamination, and provided a process by which minimal analytical costs were incurred. The data collected during this investigation will aid in scoping the Phase III Investigation of the Group IV Sumps Project and will be used to identify the optimum locations for installation of additional monitoring wells. This report presents the findings of the Pre-Phase III groundwater investigation and includes updated plume maps and tabulated results and recommendations for use in scoping the Phase III Investigation.

SECTION 2
SAMPLING AND DATA ANALYSIS PROCEDURES

Investigation and Sampling Procedures

To develop a plan of investigation, a groundwater elevation map and a map of total VOCs based on the results of the February 1996 groundwater sampling round were produced. The maps visually depict the potential contaminant flow directions, distribution and relative quantities of all VOCs detected in each well during the February 1996 groundwater sampling round. This approach was selected because most of these compounds are can be related as daughter compounds of parent compound degradation.

Primary sampling locations were chosen based on the contaminant plumes maps and on a review of the groundwater flow directions.

Groundwater Sampling

During the pre-phase III investigation, groundwater samples were collected and analyzed from the majority of the primary sampling points which were generally located near the edges of the VOC plumes as interpreted from the February 1996 sampling round (presented in USACE, June 1996). Based on the analytical results from the primary sampling points, secondary sampling locations were chosen as needed to delineate the contamination. Numbers were assigned to the secondary points as they were pushed and sampled. Fieldwork began on 6 May, 1996 and was finished 24 May, 1996.

The general locations of the primary sampling points were selected based on the interpretation of the plume boundaries as defined by the monitoring well network. However, the specific locations of individual sampling points were selected based on a review of aerial photographs to ensure that the locations were reasonably accessible for the SCAPS rig. The objective was to maximize the number of pushes which could be made by avoiding areas with difficult access.

A power punch groundwater sampler was utilized to obtain groundwater samples. The power punch is a direct push well point system utilizing a stainless steel sacrificial point attached to 3/4" PVC slot screen and casing

sections. The screen is encased in a retractable sleeve while being pushed into the aquifer. Once the desired sampling depth is achieved, the retractable sleeve is withdrawn up the hole exposing the PVC slot screen.

During this investigation, the sleeves were generally retracted to within three feet below the ground surface and left in place so that they would act as a temporary surface seal. Once the power punch was pushed to the desired depth, the push rods, used to push the power punch down, were extracted and the PVC screen and casing were left down-hole to act as a temporary sampling well. In areas inaccessible by the SCAPS truck, hand augers were used to advance the borings and groundwater grab samples were obtained. The depths of the borings were based on the static water levels obtained in nearby monitoring wells. Because of the shallow depth of the uppermost groundwater zone, all holes pushed or drilled during this investigation were less than 21 feet in depth.

In-situ ground water samples from the power punch locations and hand auger borings were collected using a ½" stainless steel or Teflon bailers. The groundwater samples were immediately placed on ice and were taken to the field laboratory for analysis using a Sentex portable gas chromatograph. Confirmation analytical testing for 10% of the pre-phase III groundwater samples was performed by the USACE Southwestern Division Laboratory and its USACE Missouri River Division (MRD) validated contract laboratories. Table 2-1 presents the analytical parameters that were analyzed for in both the field and at the laboratory. Vinyl chloride, trichloroethane, and benzene were not analyzed in the field, as originally proposed in the workplan, due to the difficulty in obtaining standards for the field GC.

Static water level measurements were taken prior to sampling and prior to abandonment of the borings. To abandon the borings, all retrievable casing and screen was pulled and the borings were grouted to the surface using a cement/bentonite mixture.

Stratigraphic Investigation

In addition to groundwater sampling, the SCAPS unit, by use of it cone penetrometer (CPT)/resistivity system, was utilized to obtain stratigraphic information in selected areas where stratigraphic information was lacking. The system has a cone penetrometer which takes continuous measurements of cone tip penetration resistance and sleeve friction. These measurements determine, in real time, the soil strength characteristics of the material being

Table 1 Longhorn Pre-Phase III Groundwater Analytical Parameters

FIELD TESTING PARAMETERS	METHOD NUMBER	LABORATORY PARAMETERS	METHOD NUMBER
Volatile Organics: TCE PCE trans 1,2- DCE cis 1,2- DCE 1,2- DCA	Portable GC/Gas Chromatograph	Volatile Organics	8260

pushed through. The CPT system also has the capability of measuring soil electrical resistivity. Both CPT and soil resistivity measurements were utilized to collect stratigraphic information at five locations in the sumps project area to support a detailed subsurface interpretation in areas where there was limited knowledge. In order to advance the CPT/resistivety probe into the subsurface, the SCAPS system is mounted in a 20-ton truck equipped with two hydraulic rams capable of exerting 38,000 pounds of force. The system is capable of pushing 1.7 inch (44 mm) diameter rods to approximately 75 feet in geologically suitable materials. During this investigation, the deepest CPT/stratigraphic push was 63 feet. Results of the five CPT/stratigraphic borings can be found in Appendix A. The stratigraphic information acquired will be used to locate possible confining zones during phase III monitoring well installation. Grouting of the CPT borings was accomplished through the penetrometer probe tip as the probe was being withdrawn from the borings. During this procedure, microfine portland cement grout was pumped through a central tube in the push rod cable and through the probe tip as the tip was extracted.

Investigative Derived Wastes

The investigative materials that were generated during this investigation included: decontamination fluids and waste sample water. These wastes were drummed on-site and at the field laboratory, labeled, and stored at site 16. Decontamination of the sampling equipment was performed at each drilling site or at the field laboratory. The use of the SCAPs push technology does not produce drill cuttings and thereby minimized waste generation. Only three drums of waste were produced during the entire investigation.

Location Surveying

The locations of groundwater sampling points and penetrometer pushes were surveyed using a Global Positioning System (GPS). The GPS acquisition and processing was performed by USACE. Sampling locations within or on the edge of heavily forested areas were not surveyed using the GPS unit because of satellite signal interference caused by the trees. These locations were mapped based on distances from known landmarks.

SECTION 3

PRE-PHASE III GROUNDWATER INVESTIGATION SAMPLING SUMMARY

This section presents the results of the pre-phase III groundwater investigation at LHAAP. Groundwater elevations and VOC results are presented.

Water Table Elevations

Survey information on boring locations along with static water level measurements obtained during the pre-phase III investigation are presented in Table 2. Figure 2 is a map of the groundwater elevations obtained during the pre-phase III investigation. Shallow groundwater elevations were consistent with those measured in the group IV monitoring wells during quarterly sampling and generally show a easterly flow direction across the Plant towards Caddo Lake.

Analytical Results

The following results are presented after evaluation of groundwater analytical data from the pre-phase III investigation. Table 3 lists the LHAAP pre-phase III groundwater investigation results for VOCs.

Volatile Organics Results

Organic compounds detected by the field GC above the method detection limit include trans-1,2-dichloroethene (tDCE), cis-1,2-dichloroethene (cDCE), 1,2-dichloroethane (1,2-DCA), trichloroethene (TCE), and tetrachloroethene (PCE). Of the samples sent to the laboratory for confirmation testing, the VOCs detected included tDCE, cDCE, 1,2-DCA, TCE, PCE, benzene, chloroform, 1,1-dichloroethene, 1,1-dichloroethane, 1,1,2-trichloroethane, vinyl chloride, dichlorodifluoromethane, and methylene chloride.

For mapping the extent of VOC contamination, the total concentration of VOCs in each sample was utilized to visually depict the distribution and relative quantities of all VOCs detected during the pre-phase III investigations. This approach was selected because most of these compounds can be related as daughter compounds of parent compound degradation. Figure 3 shows the total VOCs results from the pre-phase III investigation. When both

Table 2 Pre-Phase III Groundwater Elevations					
Boring No.	Northing	Easting	Elevation	Depth to Water	G.W. Elevation
S-2-1	6962932.449	3306109.046	208.545	4.9	203.6
S-2-2	6962948.562	3306378.378	206.873	8.8	198.1
S-2-3	6962904.015	3306918.933	202.611	13.3	189.3
S-2-4	6962576.029	3306395.281	206.414	12.2	194.2
S-2-5	6962507.180	3306099.233	209.246	12.9	196.3
S-2-6	6962756.410	3306120.922	207.124	13.3	193.8
S-2-7	6962755.645	3305909.185	210.502	10.3	200.2
S-2-8	6962344.215	3305770.762	211.078	6.0	205.1
S-2-9	6962949.760	3305616.683	211.608	9.8	201.8
S-2-9B	6963203.372	3305626.393	210.015	9.1	200.9
S-3-1	6961582.921	3309216.398	198.085	12.3	185.8
S-3-1A	6961472.764	3309069.661	197.487	11.4	186.1
S-3-1B	6961721.717	3309287.752	196.042	10.7	185.3
S-3-2	6961732.962	3309449.803	196.363	11.4	185.0
S-3-2A	6961933.638	3309386.977	195.231	10.2	185.0
S-3-3	6961490.370	3309554.818	196.955	12.1	184.9
S-3-3A	6961567.282	3309798.815	194.876	10.7	184.2
S-3-3B	6961877.852	3309964.728	193.024	9.9	183.1
S-3-4	6960686.899	3309518.840	199.536	13.3	186.2
S-3-4A	6960896.130	3309467.852	197.610	11.7	185.9
S-3-4B	6961079.953	3309354.534	198.158	12.2	186.0
S-3-5	6960824.101	3309814.044	197.722	12.9	184.8
S-3-5A	6961019.043	3309829.921	196.106	11.6	184.5
S-3-5B	6961600.756	3310076.873	193.682	10.6	183.1
S-3-5C	6961225.155	3310227.564	194.907	11.8	183.1
S-3-6	6960606.938	3309900.939	197.639	12.7	184.9
S-3-6A	6960881.123	3310340.112	195.265	12.1	183.2
S-3-7	6960113.602	3310070.126	195.969	11.1	184.9
S-3-7B	6960334.887	3310590.490	194.089	10.1	184.0
S-3-8	6959716.495	3310097.522	197.268	11.7	185.6
S-3-9A	6959533.683	3309650.138	199.218	11.9	187.3
S-3-9C	6959287.168	3309655.656	199.592	12.1	187.5
S-3-10	6959336.676	3310401.948	198.204	12.2	186.0
S-3-10B	6959183.268	3310496.093	196.252	10.3	186.0
S-3-11	6959503.552	3310879.662	190.186	6.8	183.4
S-3-11A	6959901.445	3310732.673	194.946	11.9	183.0
S-3-12	6959152.955	3311037.139	190.848	7.8	183.0
S-3-12A	6959120.923	3311589.847	191.178	10.4	180.8

Table 2 Pre-Phase III Groundwater Elevations					
Boring No.	Northing	Easting	Elevation	Depth to Water	G.W. Elevation
S-3-13	6958649.268	3310704.066	192.232	5.6	186.6
S-3-13A	6958832.081	3310636.993	193.753	7.3	186.5
S-3-14	6958210.851	3310580.673	193.684	9.5	184.2
S-3-15	6958489.918	3310243.431	196.383	8.1	188.3
S-3-16	6958784.960	3310108.024	196.956	10.1	186.9
S-3-17	6959095.308	3309734.878	198.527	11.0	187.5
S-3-18	6959030.749	3309268.937	200.643	11.2	189.4
S-3-18B	6958790.646	3309414.584	200.003	11.0	189.0
S-3-19	6959255.677	3308956.571	202.089	10.9	191.2
S-3-19A	6959164.203	3308709.782	203.43	10.9	192.5
S-3-20	6959638.096	3308794.658	199.514	9.9	189.6
S-3-20A	6959675.577	3308524.856	202.482	12.1	190.4
S-3-20B	6959485.773	3308528.891	201.945	14.5	187.4
S-3-20C	6959767.072	3308897.261	200.915	10.8	190.1
S-3-20D	6959393.651	3308637.310	203.414	11.4	192.0
S-3-21	6959767.828	3309108.680	200.391	5.9	194.5
S-3-21A	6959349.081	3309187.620	201.257	11.6	189.7
S-3-21B	6959433.449	3309595.627	200.193	12.2	188.0
S-3-22	6960027.303	3309416.687	198.03	10.2	187.8
S-3-22B	6959906.680	3309223.958	200.287	11.3	189.0
S-3-24	6960452.444	3309187.013	199.5	12.4	187.1
S-3-24B	6960767.107	3309061.303	199.719	15.5	184.2
S-3-25	6958446.301	3308235.386	202.976	10.4	192.6
S-3-26	6958165.966	3308342.844	201.997	9.7	192.3
S-3-27	6957849.538	3308471.032	200.244	7.6	192.6
S-3-28	6957726.327	3307992.736	203.702	8.3	195.4
S-3-30	6958018.169	3307874.292	203.618	3.6	200.0
S-3-31	6958331.639	3307749.459	203.973	7.9	196.1
S-3-31A	6958608.399	3307638.311	204.304	9.1	195.2
S-3-32	6961004.615	3307879.287	201.824	12.9	188.9
S-3-33	6960782.080	3308404.647	200.512	12.8	187.7
S-3-34	6960876.833	3307777.993	201.536	12.4	189.1
S-3-35	6960927.743	3307563.379	202.002	12.0	190.0
S-3-43	6959972.265	3309673.779	196.687	9.9	186.8
S-S-1	6960399.057	3305044.933	216.66	12.0	204.7
S-S-2	6960258.639	3305244.014	215.872	14.2	201.7
S-S-4	6959971.003	3304766.386	218.313	6.2	212.1
S-S-5	6959756.533	3304550.616	219.36	15.2	204.2

Table 2 Pre-Phase III Groundwater Elevations					
Boring No.	Northing	Easting	Elevation	Depth to Water	G.W. Elevation
S-S-5A	6959626.695	3304683.885	218.847	15.6	203.2
S-S-7	6959978.214	3304257.040	219.504	11.9	207.6
S-S-8	6960186.619	3304642.443	219.699	9.4	210.3
S-S-11	6959962.869	3305670.160	213.588	11.9	201.7
S-ST-1	6957408.412	3315560.030	185.613	7.9	177.7
S-ST-2	6957519.696	3316047.125	183.772	10.4	173.4
S-ST-3	6957273.245	3316068.382	185.133	12.0	173.1
S-ST-4	6957163.725	3315773.041	185.964	12.6	173.4
S-ST-5	6957166.847	3315118.378	185.25	9.3	176.0
S-ST-6	6957444.237	3315361.522	180.553	6.0	174.6
S-Y-1	6959651.985	3314683.798	193.197	14.6	178.6
S-Y-2	6959555.779	3314800.511	192.704	14.9	177.8
S-Y-3	6959387.721	3314876.773	194.316	15.9	178.4
S-Y-4	6959275.653	3314561.318	193.418	14.2	179.2
S-Y-5	6959004.881	3314740.977	189.92	12.9	177.0
S-Y-6	6958892.519	3314541.846	190.822	14.6	176.2
S-Y-7	6958850.943	3314201.518	193.845	16.6	177.2
S-Y-8	6959062.175	3314078.210	195.261	18.0	177.3
S-Y-9	6959480.743	3314471.217	192.881	15.9	177.0

Based on survey information (measuring point is top of ground)
Not all borings surveyed due to GPS interference in remote locations

Table 3 - Longhorn Army Ammunition Plant - Field Gas Chromatography Results Table							
Sampling ID	Analysis Date (1996)	Analyte Concentrations (ug/l)					
		tDCE	cDCE	12DCA	TCE	PCE	TICs
S-2-01	5-14	ND	ND	ND	ND	ND	
S-2-01A	5-16	ND	ND	ND	ND	ND	
S-2-01B	5-16	ND	ND	ND	ND	ND	
S-2-02	5-13	ND	ND	ND	ND	ND	
S-2-03	5-17	ND	ND	ND	ND	ND	
S-2-04	5-13	ND	ND	ND	ND	ND	
S-2-05	5-16	ND	ND	ND	ND	ND	
S-2-06A	5-23	ND	ND	ND	14	ND	
S-2-07	5-15	56	1900	400	>3200	21	1 Hit
S-2-07dup	5-16	ND	390	600	5500	ND	
S-2-08	5-13	ND	ND	ND	ND	ND	
S-2-09	5-15	ND	ND	ND	ND	ND	Unknowns
S-2-09B	5-14	ND	ND	ND	2	ND	
S-3-01	5-11	ND	ND	ND	ND	ND	Broad Peak
S-3-01dup	5-13	ND	ND	ND	ND	ND	Broad Peak
S-3-01A	5-14	ND	ND	ND	ND	ND	Broad Peak
S-3-01B	5-14	ND	ND	ND	ND	ND	Broad Peak
S-3-02	5-11	ND	ND	ND	ND	ND	Broad Peak
S-3-02A	5-14	ND	ND	ND	ND	ND	Broad Peak
S-3-03	5-11	17	59	ND	16	1	Broad Peak
S-3-03dup	5-14	18	51	ND	8	suspect	Broad Peak
S-3-03A	5-14	ND	82	ND	28	suspect	
S-3-03B	5-16	ND	ND	ND	ND	ND	Broad Peak
S-3-03C	5-17	ND	ND	ND	ND	ND	
S-3-04	5-10	ND	ND	ND	>60000	ND	
S-3-04dup	5-13	ND	ND	ND	6600	ND	
S-3-04A	5-15	ND	ND	ND	ND	ND	

Table 3 - Longhorn Army Ammunition Plant - Field Gas Chromatography Results Table							
Sampling ID	Analysis Date (1996)	Analyte Concentrations (ug/l)					
		tDCE	cDCE	12DCA	TCE	PCE	TICs
S-3-04B	5-15	ND	ND	ND	ND	ND	
S-3-05	5-10	ND	ND	ND	8700	ND	
S-3-05A	5-15	ND	ND	ND	2900	ND	
S-3-05B	5-16	suspect	128	ND	50	ND	Broad Peak
S-3-05C	5-16	ND	ND	ND	34	ND	
S-3-05D	5-23	ND	ND	ND	ND	ND	
S-3-06	5-10	26	21	suspect	124	ND	
S-3-06A	5-15	ND	1	ND	12	ND	Broad Peak
S-3-07	5-11	ND	ND	ND	ND	ND	
S-3-07B	5-16	ND	ND	ND	ND	ND	
S-3-08	5-11	ND	ND	ND	ND	ND	
S-3-08dup	5-13	ND	ND	ND	ND	ND	
S-3-09	5-11	ND	2	ND	9	ND	
S-3-09A	5-15	ND	ND	ND	ND	ND	
S-3-09C	5-15	ND	ND	ND	ND	ND	
S-3-10	5-10	ND	ND	ND	suspect	ND	
S-3-10A	5-15	ND	68	7	51	ND	
S-3-10B	5-17	ND	ND	ND	144000	ND	
S-3-11	5-10	ND	ND	ND	564	ND	
S-3-11A	5-15	ND	ND	ND	ND	ND	
S-3-11B	5-23	ND	ND	ND	ND	ND	
S-3-12	5-9	ND	24	ND	480	ND	
S-3-12A	5-13	ND	6	ND	186	ND	
S-3-12C	5-23	ND	ND	ND	ND	ND	
S-3-13	5-10	ND	ND	ND	ND	ND	
S-3-13A	5-17	ND	752	ND	129	ND	
S-3-14	5-10	ND	ND	ND	ND	ND	

Table 3 - Longhorn Army Ammunition Plant - Field Gas Chromatography Results Table							
Sampling ID	Analysis Date (1996)	Analyte Concentrations (ug/l)					
		tDCE	cDCE	12DCA	TCE	PCE	TICs
S-3-15	5-10	ND	ND	ND	ND	ND	
S-3-16	5-10	ND	ND	ND	ND	ND	
S-3-17	5-10	ND	ND	ND	18	ND	
S-3-18	5-10	ND	ND	ND	ND	ND	
S-3-18B	5-15	ND	ND	ND	ND	ND	
S-3-19	5-9	ND	1	28	8	4	
S-3-19A	5-15	ND	ND	ND	ND	ND	
S-3-19dup	5-13	ND	ND	ND	4	ND	
S-3-20	5-10	66	250	ND	>30000	ND	
S-3-20dup	5-14	ND	271	ND	150000	ND	
S-3-20A	5-15	ND	ND	ND	suspect	ND	
S-3-20B	5-16	ND	ND	ND	ND	ND	
S-3-20C	5-16	ND	26	ND	13	ND	
S-3-20D	5-16	ND	ND	ND	ND	ND	
S-3-21	5-10	ND	ND	ND	1	ND	
S-3-21A	5-15	ND	ND	ND	ND	ND	
S-3-21B	5-16	ND	7	ND	77	ND	
S-3-22	5-11	ND	ND	ND	13000	ND	
S-3-22B	5-17	ND	ND	ND	ND	ND	
S-3-23	5-11	ND	ND	ND	ND	ND	
S-3-24	5-11	ND	ND	ND	ND	ND	
S-3-24B	5-17	ND	ND	ND	ND	ND	
S-3-25	5-16	ND	ND	ND	ND	ND	
S-3-26	5-12	ND	ND	ND	ND	ND	
S-3-27	5-16	ND	ND	ND	ND	ND	
S-3-28	5-12	ND	ND	ND	ND	ND	
S-3-28A	5-16	ND	ND	ND	ND	ND	

Table 3 - Longhorn Army Ammunition Plant - Field Gas Chromatography Results Table							
Sampling ID	Analysis Date (1996)	Analyte Concentrations (ug/l)					
		tDCE	cDCE	12DCA	TCE	PCE	TICs
S-ST-04	5-13	ND	ND	ND	ND	ND	
S-ST-05	5-13	ND	ND	ND	ND	ND	
S-ST-06	5-13	ND	ND	ND	ND	ND	
S-Y-01	5-13	ND	ND	ND	ND	ND	
S-Y-02	5-13	ND	ND	ND	ND	ND	
S-Y-03	5-13	ND	ND	ND	ND	ND	
S-Y-04	5-13	ND	ND	ND	ND	ND	
S-Y-05	5-13	ND	ND	ND	ND	ND	
S-Y-06	5-13	ND	ND	ND	ND	ND	
S-Y-07	5-12	ND	ND	ND	ND	ND	
S-Y-08	5-12	ND	ND	ND	ND	ND	
S-Y-09	5-12	ND	ND	ND	ND	ND	

field GC and laboratory results were available, the laboratory results were used. To supplement the pre-phase III groundwater results, February 1996 groundwater sampling results for the 71 Group IV monitoring wells were also included on the map. The area of highest VOCs contamination occurred at push location S-3-10B (144,000 ug/l total VOCs), located in the southeast portion of the Plant 3 area.

Quality Assurance Results

In accordance with USACE and EPA guidance, a minimum of 10% of the total pre-phase III groundwater samples analyzed by the field gas chromatograph (GC) were distributed to a USACE certified analytical laboratory to confirm the field technique. A total of 112 groundwater samples were analyzed by the field GC. 12 of these samples were distributed to the laboratory in order to satisfy the 10% quality assurance requirement. 8 of the pre-phase III sampling locations were resampled and analyzed by the field GC during the course of the investigation to provide additional quality control information.

SW-846 method 8260 (volatile organics) was requested to be performed on the groundwater samples shipped to the lab. Results generated by this method are somewhat comparable to the GC method employed in the field at Longhorn Army Ammunition Plant, Sumps Investigation.

To facilitate timely determination of sample results, coupled with the uncertainty about the varing levels of possible contaminant concentrations, two point calibration curves were established for the project. The upper bound concentration was 50 parts per billion (ppb), established using a standard solution. The lower bound was established by the instrument as zero ppb. Accuracy of the results, using this protocol, was estimated to range between 10 and 20% of the true value. Accuracy was dependent upon how close the field sample constituent concentration was to that of the standard. Therefore, detected concentrations at or below 50 ppb were expected to be more representative of actual field conditions. Higher concentrations were considered to be less representative and more likely estimated values. Since the critical values were those concentration values at the lower bounds of the calibration curve (defining plume boundaries), bracketed between 0 and 50 ppb, this approach was technically sound. Confirmation results and the corresponding field results have been tabulated in Table 4 below. Tentatively identified compounds were reported with the other detected compounds due in part to the concentrations found at some of the sampling sites and the potential of these compounds to conceal the presence of other analytes within the chromatogram pattern.

Table 4 - Longhorn Army Ammunition Plant - Field and Lab Comparability Table							
Sampling ID	Analysis Date	Analyte Concentrations (ug/l)					
		tDCE	cDCE	12DCA	TCE	PCE	Other Analytes
S-2-01A	5-16	ND	ND	ND	ND	ND	
S-2-01A	Lab	ND	ND	ND	ND	ND	
S-2-07	5-15	56	1900	400	>3200	21	1Hit
S-2-07	Lab	77	725	ND	3325	54	chloroform @ 8.1 1,1-dichloroethene @ 58 1,1,2-trichloroethane @ 1.4J vinyl chloride @ 190
S-3-01	5-11	ND	ND	ND	ND	ND	Broad Peak
S-3-01	Lab	ND	ND	ND	10.4	ND	1,2-dichloro 1,1,2-trifluoroethane @ 554 1,1,2-trichlorotrifluoroetane @ 336 acetone @ 1892
S-3-03	5-11	17	59	ND	16	1	Broad Peak
S-3-03	Lab	ND	54	ND	40	8.5	dichlorodifluoromethane @ 577 1,1-dichloroethane @ 4.6 1,1-dichloroethene @ 18.9 1,2-dichloro 1,1,2-trifluoroethane @ 140 1,1,2-trichlorotrifluoroetane @ 167 acetone @ 2195
S-3-04	5-10	ND	ND	ND	>60000	ND	
S-3-04	Lab	1.5	81	ND	15015	ND	chloroform @ 3.0 1,1-dichloroethene @ 24.8 1,1,2-trichloroethane @ 2.5 vinyl chloride @ 2.1 acetone @ 127
S-3-07	5-11	ND	ND	ND	ND	ND	
S-3-07	Lab	ND	ND	ND	ND	ND	
S-3-08	5-11	ND	ND	ND	ND	ND	
S-3-08	Lab	ND	ND	ND	29.5	ND	acetone @ 104
S-3-09A	5-15	ND	ND	ND	ND	ND	
S-3-09A	Lab	ND	ND	ND	ND	ND	

Table 4 - Longhorn Army Ammunition Plant - Field and Lab Comparability Table							
Sampling ID	Analysis Date	Analyte Concentrations (ug/l)					
		tDCE	cDCE	12DCA	TCE	PCE	Other Analytes
S-3-12	5-9	ND	24	ND	480	ND	
S-3-12	Lab	ND	37.4	ND	521	ND	1,1-dichloroethene @ 3.7 vinyl chloride @ 4.9 acetone @ 602
S-3-16A	5-15	ND	ND	ND	ND	ND	
S-3-16A	Lab	ND	ND	ND	ND	ND	
S-3-19	5-9	ND	1	28	8	ND	
S-3-19	Lab	ND	2.7	1.7	38.3	ND	1,1-dichloroethene @ 1.7 acetone @ 192
S-3-20	5-10	66	250	ND	>30000	ND	
S-3-20	Lab	6.1	932	ND	55200	ND	chloroform @ 21.2 dichlordifluoromethane @ 13.1 1,1-dichloroethene @ 47.9 methylene dichloride @ 25 vinyl chloride @ 30.5 acetone @ 94
S-S-05	5-12	ND	ND	342	3	ND	1 Hit
S-S-05	Lab	ND	1.7	7.4	12.7	ND	benezene @ 3.2 1,1-dichloroethane @ 29.6 1,1-dichloroethene @ 298 1,1,2-trichloroethane @ 1.5J vinyl chloride @ 2.1

tDCE = trans 1,2-dichloroethene

cDCE = cis 1,2-dichloroethene

12DCA = 1,2 Dichloroethane

TCE = trichloroethene

PCE = tetrachloroethene

ND = Not detected (i.e < 1 ug/l)

TIC = tentatively identified compound

The chemical abstracts service (CAS) registry number of these TICs have been used to identify them. Three compounds were typically identified as TICs. They are commonly known as acetone (CAS# 67-64-1), 1,1,2-trichloro-trifluoroethane or CFC-113 (CAS# 76-13-1) and 1,2-dichloro-1,1,2-trifluoroethane (CAS# 354-23-4). These compounds have only been tentatively identified by the SW-846 method 8240.

The analytical details, such as, surrogate and spike recoveries, relative percent differences, calibration data, mass spectra, performance standards, and other lab quality control information are available from the Tulsa District USACE, Chemistry and Industrial Hygiene Section, upon request.

Conclusions and Recommendations

Based on the results of the pre-phase III investigation, the limits of the shallow VOC contamination have been defined using site screening methods as seen in Figure 3. It is recommended that shallow monitoring wells be placed around the perimeter of the known shallow groundwater contamination plumes at the locations shown in Figure 4. These shallow wells would be required in order to positively identify the lateral extent of groundwater contamination and would satisfy the requirement for an assessment of risk for each site (shown generally enclosed by the dashed line in Figure 4). It is also recommended that the vertical extent of groundwater contamination be investigated by placement of intermediate and deep well clusters in areas which have total VOC contamination of 4,000 ug/l or more. In areas where pre-phase III groundwater samples indicated elevated VOC contamination above 4,000 ug/l and a monitoring well was not previously existing, it is recommended that a shallow, intermediate and deep well be placed at these locations to aid in determining the vertical extent of contamination. The intermediate and deep monitoring wells should be completed very carefully with surface casing and appropriate grouting procedures so as to prevent cross contamination of the deeper water bearing zones. Once the wells have been installed they should be initially sampled for Appendix IX parameters so that the vertical and horizontal extent of contamination can be determined.

SECTION 4

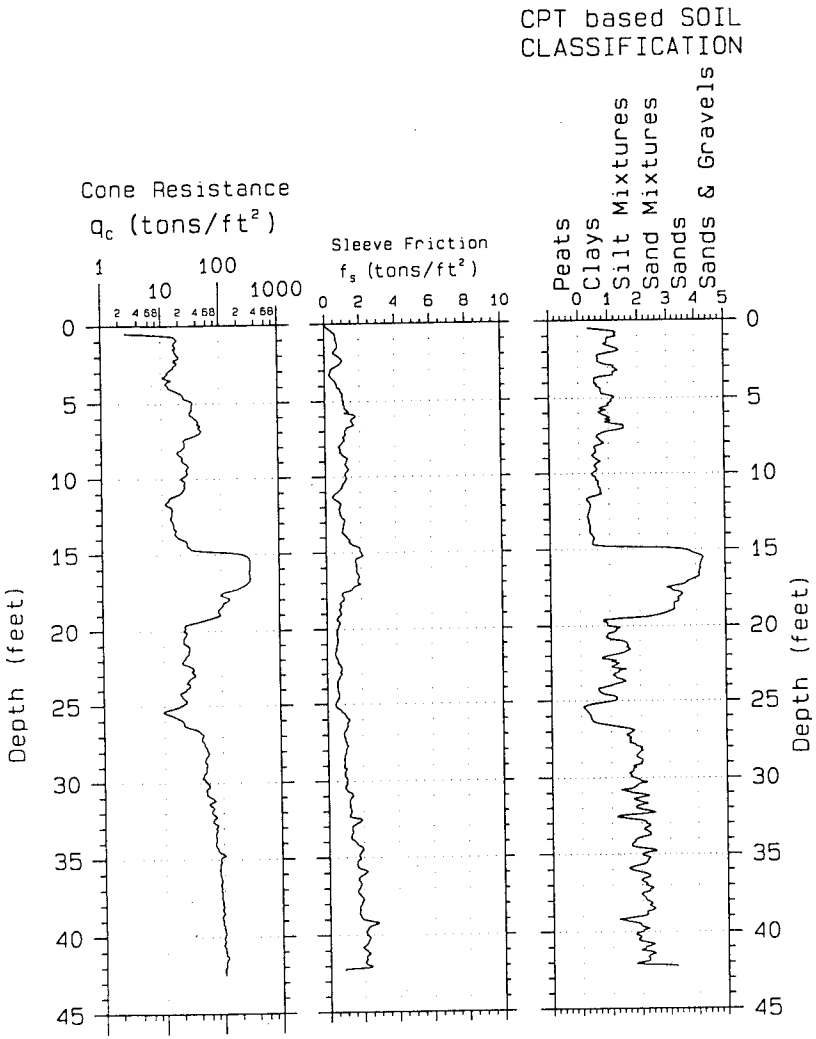
REFERENCES

U.S. Army Corps of Engineers, March 1996. "Pre-Phase III Groundwater Investigation Workplan" Prepared for the Longhorn Army Ammunition Plant.

U.S. Army Corps of Engineers, June 1996. "Groundwater Monitoring Quarterly Report -February 1996" Prepared for the Longhorn Army Ammunition Plant.

APPENDIX A

CPT BASED SOIL STRATIGRAPHY LOGS

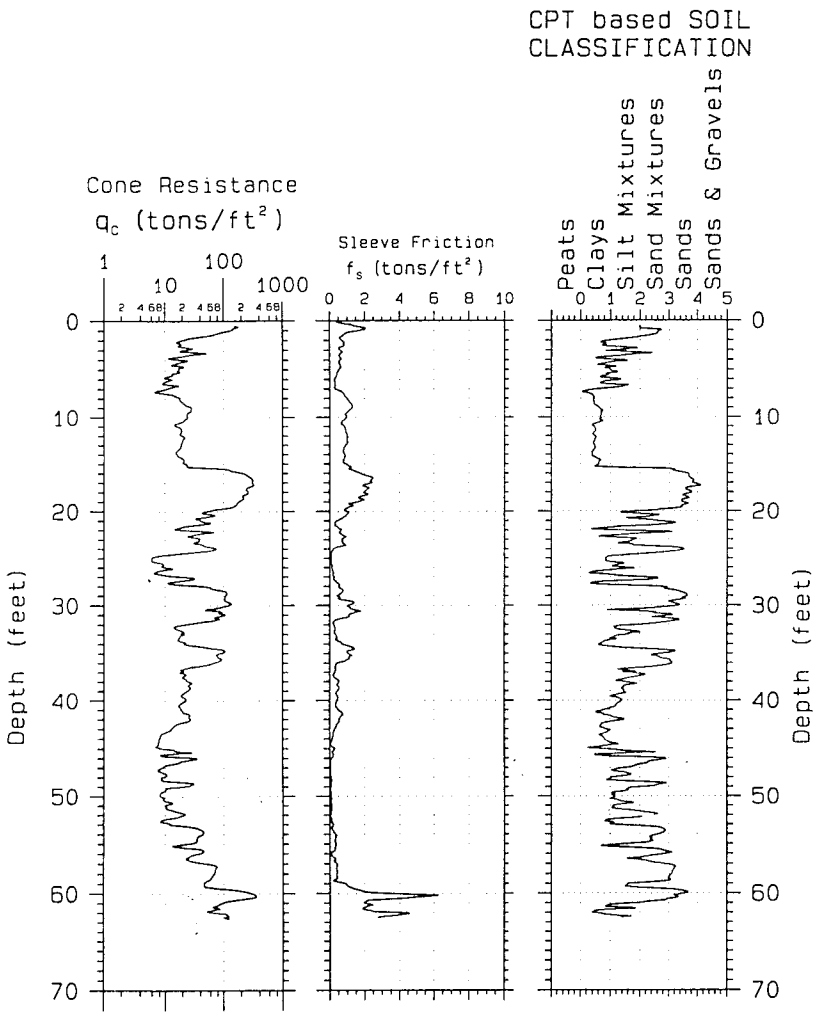


CPT: S-3-7

STATE COORDINATES:

EASTING (ft.)	NORTHING (ft.)	ELEVATION (ft.)
0	0	0

Project: LHAAP



CPT: S-3-10B

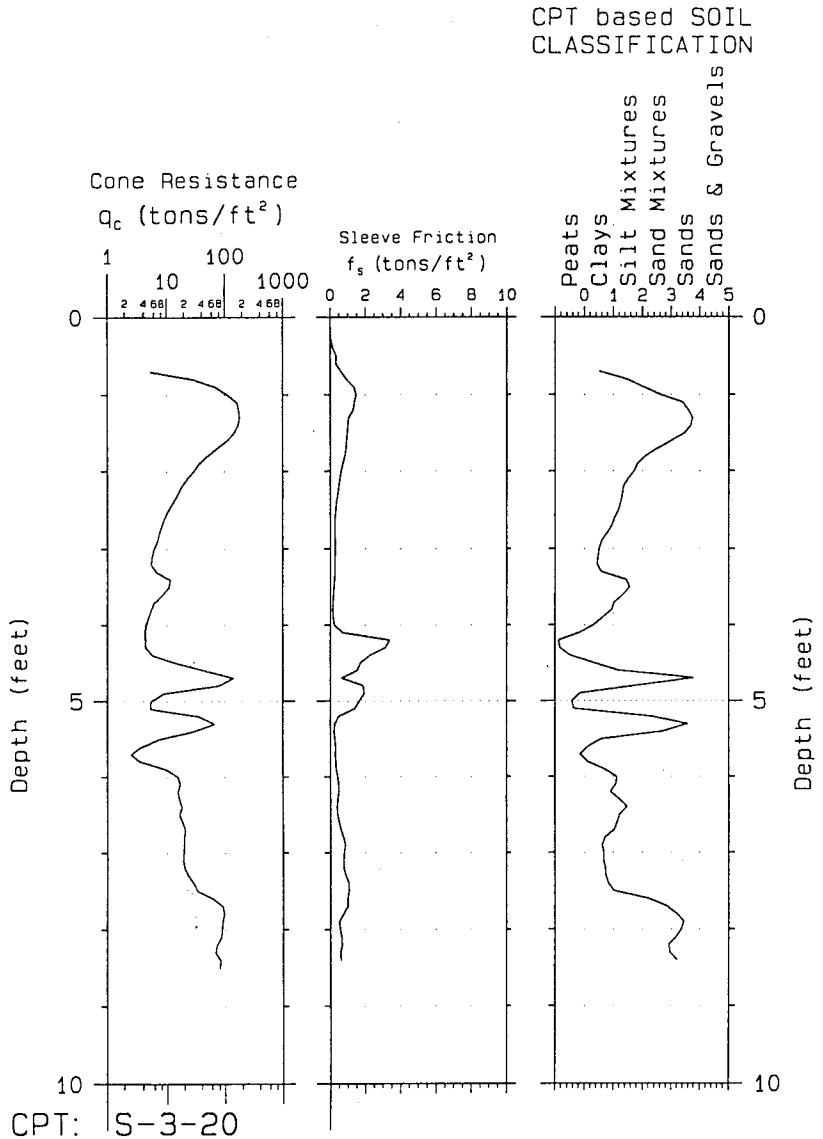
Project: LHAAP

STATE COORDINATES:

EASTING (ft.)	NORTHING (ft.)	ELEVATION (ft.)
0	0	0

018064

Project: LHAAP
CPT: S-3-12B
STATE COORDINATES:
EASTING (ft.) 0
NORTHING (ft.) 0
ELEVATION (ft.) 0
Cone Resistance
q_c (tons/ft^2)
Sleeve Friction
f_s (tons/ft^2)
Depth (feet)
CPT based SOIL
CLASSIFICATION
Peats
Clays
Silt Mixtures
Sand Mixtures
Sands
Sands & Gravels



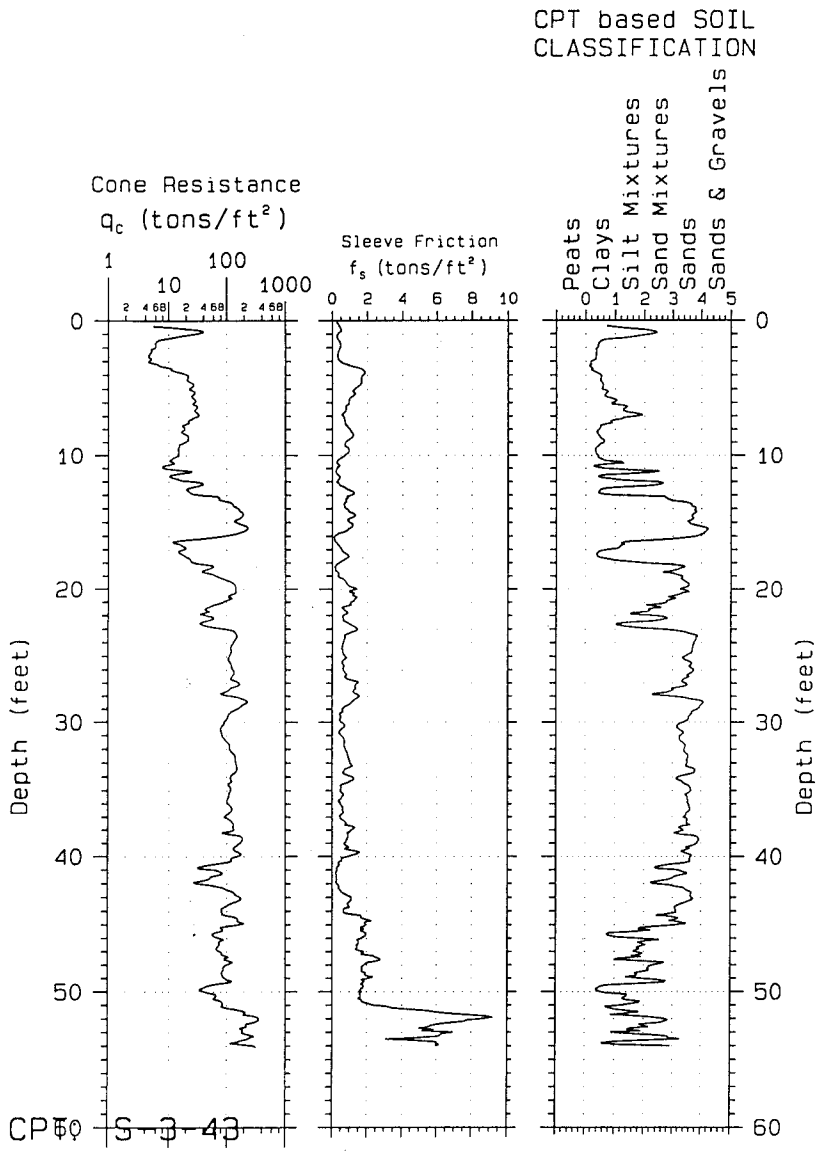
CPT: S-3-20

STATE COORDINATES:

EASTING (ft.)	NORTHING (ft.)	ELEVATION (ft.)
0	0	0

Project: LHAAP

018066



CPT S-3-43

STATE COORDINATES:

EASTING (ft.)	NORTHING (ft.)	ELEVATION (ft.)
0	0	0

Project: LHAAP <NEW>

018067

018068

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

September 4, 1996

CERTIFIED MAIL
Z 746 032 996
RETURN RECEIPT REQUESTED

James A. McPherson, Commander's Representative
Longhorn/Louisiana Army Ammunition Plant
Attn: SIOLH-CR
P.O. Box 658
Doyline, LA 71023

Re: Longhorn Army Ammunition Plant
Group 2 - Time Critical Removal Action at Landfill 16
Toxicity Sampling of Extracted Ground Water

Dear Mr. McPherson:

The Texas Natural Resource Conservation Commission (TNRCC) has completed its review of the above referenced toxicity test results. Comments and recommendations are attached. If you have any questions or comments regarding this matter, please call me at (512) 239-2502.

Sincerely,

Diane R. Poteet
Project Manager
Superfund Investigation Section (MC-143)
Pollution Cleanup Division

enclosure

cc w/enclosure: Chris Villarreal, EPA Region 6 (6SF-AT)
Jonna Polk, COE Tulsa District (CESWT-PP-EA)
Oscar Linebaugh, COE Eastern Area Office (CESWF-AD-E)

Longhorn Army Ammunition Plant
Group 2 - Time Critical Removal Action at Landfill 16
Toxicity Sampling of Extracted Ground Water
TNRCC's (Kelly Holligan's) Comments

No.	Comments/Recommendations
1	The test results do not show that salinity caused the toxicity in treatments 5 and 6 to the fathead minnow. First, the Ceriodaphnia passed in these treatments and they are more sensitive to salinity toxicity than the fathead minnow. Second, after calculating salinity from the conductivity measured in these tests, it was found to be very low. Most revealing, is that the fatheads failed while Ceriodaphnia passed. This usually does not indicate salinity, chlorides or sulfates. It usually indicates ammonia, but in these tests the ammonia seemed low. It is a puzzle.
2	Treatments 1 - 4 were not considered a problem because it was assumed that treatments 5 and 6 represented the discharge which the stream would receive. However, the salinity was high enough to cause toxicity in treatments 1 and 2. In treatment 3, once again, the Ceriodaphnia passed while the fatheads failed.
3	Passing a 7-day chronic test with 100% effluent as the critical dilution can be a difficult task, especially with the Ceriodaphnia. Longhorn's effluent (assuming treatments 5 & 6 represent it) is not toxic to Ceriodaphnia; however, the fathead toxicity is puzzling. Fatheads almost always seem to be less sensitive to all pollutants, except ammonia.
4	If the Army still intends to discharge this water, then Phase I Toxicity Identification Evaluation tests will be needed to be run in order to identify the class of toxicant which is causing these tests to fail.
5	Also, we would like to have a copy of the Southwest Research Report on the unknown compound - tricarbonyl iron.

018070

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

September 4, 1996

CERTIFIED MAIL
Z 746 032 997
RETURN RECEIPT REQUESTED

James A. McPherson, Commander's Representative
Longhorn/Louisiana Army Ammunition Plant
Attn: SIOLH-CR
P.O. Box 658
Doyline, LA 71023

Re: Longhorn Army Ammunition Plant
Guidance Documents

Dear Mr. McPherson:

In accordance with Section VIII. F. of the Federal Facility Agreement, I have enclosed for your information the list of guidance documents which are required by 31 TAC Chapter 335.352 to be used by State Superfund Project Managers to evaluate the acceptability of a RI/FS/RD or similar study. If you any questions or comments regarding this matter, please call me at (512) 239-2502.

Sincerely,

Diane R. Poteet
Project Manager
Superfund Investigation Section (MC-143)
Pollution Cleanup Division

enclosure

cc w/enclosure: Chris Villarreal, EPA Region 6 (6SF-AT)
Jonna Polk, COE Tulsa District (CESWT-PP-EA)
Oscar Linebaugh, COE Eastern Area Office (CESWF-AD-E)

Chapter 335.352
Appendix II. List of TNRCC and EPA Technical Guidance Documents
(Updated December 1, 1994)

The following guidance documents will be used by State Superfund Project Managers to evaluate the acceptability of a RI/FS/RD or similar study. The TNRCC may not be limited to the use of the following guidance documents during the evaluation process. This list will be updated periodically to reflect revisions or replacement of the existing guidance documents and/or the addition of future guidance documents.

Conducting RI/FS:

1. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, EPA/540/G-89/004.

2. Guidance on Oversite of Potentially Responsible Party Remedial Investigations and Feasibility Studies, EPA/540/G-91/010a.

3. Guidance on Oversite of Potentially Responsible Party Remedial Investigations and Feasibility Studies, Volume 2, EPA/540/G-91/010b.

Groundwater Issues:

4. RCRA Ground-Water Monitoring Technical Enforcement Guidance Document, U.S. EPA, OSWER Directive 9950.1

5. Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells, EPA/600/4-89/034.

6. Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites, EPA/540/G-88/003.

Risk Assessment/Ecological Assessment:

7. Risk Assessment Guidance for Superfund-Volume 1: Human Health Evaluation Manual (Part A), EPA/540/1-89/002.

8. Risk Assessment Guidance for Superfund-Volume 1: Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals), EPA/540/R-92/003, December 1991.

9. Superfund Exposure Assessment Manual, EPA/540/1-88/001.

10. Superfund Risk Assessment Information Directory, EPA/540/1- 86/061.

11. Risk Assessment Guidance for Superfund-Volume 2: Environmental Evaluation Manual, EPA/540/1-89/001.

12. Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference, EPA/600/3-89/013.

Data Validation:

13. USEPA Contract Laboratory Program, National Functional Guidelines for Organic Data Review, Multi-Media, Multi-Concentration and Low Concentration Water, 1991.

14. USEPA Contract Laboratory Program, National Functional Guidelines for Inorganic Data Review,EPA 540/R-94/013, February 1994.

Data Quality:

15. Data Quality Objectives Process for Superfund, Interim Final Guidance, EPA 540-R-93-071, September 1993.

16. Guidance for Data Useability in Risk Assessment (Part A), Pub. 9285.7-09A, PB 92-963356, April 1992.

Quality Assurance Plans:

17. Quality Management Plan -- Pollution Cleanup Division, October 1995 (updated annually).

18. EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations, EPA QA/R-5, Draft Final, July 1993.

Analytical Chemistry:

19. Test Methods for Evaluating Solid Waste, Volumes IA, IB, and IC: Laboratory Manual: Physical/Chemical Methods, and Volume II Field Manual Physical/Chemical Methods, SW-846.

20. U.S. EPA Methods of Chemical Analysis of Water and Wastes EPA 1983, 600/4-79/020 and (Water & Waste);

Clean Water Act methods published in 40 CFR, Part 136, Appendix A.

Field Activities:

21. Compendium of Superfund Field Operations Methods, EPA/540/P-87/001.

NOTE: These manuals may be purchased from the following:

National Technical Information Service (NTIS)
Springfield, Virginia 22161
Telephone: 703-487-4650
Fax: 703-321-8547

TRC MEETING
10 September 1996

018073

James McPherson called the meeting to order. He welcomed all of the visitors and expressed his appreciation of the interest exhibited by the number of people in attendance. Those present were:

CPT. Darrell Chinn, LHAAP
Chris Villarreal, EPA
Wilma Subra, Uncertain Audubon Soc.
Jeff Armstrong, USAEC
Cliff Murray, COE
Ira Nathan, LHAAP
Yolane Hartsfield, CESWT-EC-GC
James McPherson, LAAP/LHAAP
David DeFrieze, Ind. Op. Command, Legal
Ann Montgomery, LHAAP
Warren Sayes, COE
Frank Meleton, COE
Janet Rich, OHM
Bob Speight, Greater Caddo Lake Assn.
Oscar Linebaugh, Jr., COE
Lynn Muckelrath, Army Env.
Jonna Polk, COE
Diane Poteet, TNRCC
H. L. "Bud" Jones, TNRCC
Cyril Onewokae, HQ, IOC, AMSIO, EQE
Amine Bou Onk, Dow Env/Radian Int.
Rick Michaels, Network Env. Serv.
David Tolbert, LAAP
Dwight Shelman, Caddo Lake Institute
Donald Carter, AMC
Dudley Beene, COE
Wm. R. Corrigan, LHAAP Env./Radian Int.
Earney Funderburg, OHM
Steve Brunton, Sverdrup
Tom Walker, Caddo Lake Institute
Mary Barrett, Centenary College/Audubon
Dave Bockelman, Sverdrup

James McPherson commented that there were representatives from all the appropriate places, such as HQ, AEC, EPA, TNRCC, local staff, etc. He welcomed all and then turned the meeting over to David Tolbert.

An agenda was then presented to everyone present as well as the minutes of last month's meeting in Dallas.

Everyone was presented a copy of the IRP Status Summary by Project Name, Project Phase, Project Status, and Next Major Milestone(s). Each project was reviewed by group number, as well as Burning Ground No. 3, Landfill Caps, Landfill Site 16 and DERA Sumps.

It was agreed that we will go to quarterly sampling of Harrison Bayou and Goose Prarie Creek starting in November.

Thiokol inventories are expected to be finished this month or by October. Thiokol still has a facility use contract. This contract will be terminated 30 June 97. Army will then bring in a new contractor (disposal contractor). The Army will continue to do all environmental work necessary. Budget cuts make the money smaller each year. Everything will be liquidated.

The next TRC meeting is scheduled for Tuesday 12 December 96 at 9:30 a.m. The next Program Manager's meeting will be in Tulsa 22 October 96 at 8:00 a.m.

CPT. Chinn told everyone that this was his last meeting, that he would be leaving and said good-bye to everyone present.

The meeting adjourned at 11:30 a.m. and those wishing to go went on a tour of the Burning Ground Water Treatment Plant.

The next program manager's meeting will be in Tulsa 22 October at 8:00 a.m.

CPT. Chinn told everyone that this was his last meeting, that he would be leaving and said good-bye to everyone present.

The meeting adjourned at 11:30 a.m. and those wishing to go went on a tour of the Burning Ground Water Treatment Plant.

DEPARTMENT OF THE ARMY
U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE
5158 BLACKHAWK ROAD
ABERDEEN PROVING GROUND, MARYLAND 21010-5422

018075

REPLY TO
ATTENTION OF

MCHB-DC-EHR (40)

10 SEP 1996

MEMORANDUM FOR District Engineer, U.S. Army Engineering District, Tulsa, ATTN: CESWT-PP-EA/Ms. Jonna Polk, Post Office Box 61, Tulsa, OK 74121-0061

SUBJECT: Treatment Simulation and Toxicity Testing Results of Site 16 Ground Water, Longhorn Army Ammunition Plant, Karnack, Texas, 12 July 1996

1. The U.S. Army Center for Health Promotion and Preventive Medicine reviewed the subject document, without comment, on behalf of the Office of The Surgeon General. We received only one copy of the subject document, which did not allow a matrixed review of the document. In the future, please send seven copies of a document for a matrixed review.

3. The scientist reviewing this document and our point of contact is Mr. William Sharland, Environmental Health Risk Assessment and Risk Communication Program, at DSN 584-2953 or commercial (410) 671-2953.

FOR THE COMMANDER:

Arthur P. Lee

Encl

ARTHUR P. LEE, P.E.
MAJ, MS
Program Manager, Environmental Health Risk Assessment and Risk Communication

CF:
HQDA(DASG-HS-PE)
CDR, USAMEDCOM, ATTN: MCHO-CL-W
CDR, AMC, ATTN: AMCEN-A\Mr. Pete Cunanan
CDR, USAEC, ATTN: SFIM-AEC-RPO
CDR, CEMRD, ATTN: CEMRD-ET-EH
CDR, LHAAP, ATTN: SMLO-EN

Readiness thru Health

Baseline Study
Burning Ground No. 3
Interim Remedial Action

Longhorn Army Ammunition Plant
Karnack, Texas

Prepared for:

United States Army Corps of Engineers
Tulsa and Fort Work Districts

Prepared by:

Dow Environmental, Inc.
Karnack, Texas

September 11, 1996
USACE CONTRACT NO. DACA56-93-D-0016
DELIVERY ORDER 0002
DEI PROJECT 2379

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1.0 INTRODUCTION

Dow Environmental Inc. (DEI) is under contract to the United States Army Corps of Engineers (USACE) to remediate contaminated groundwater and soils at the Longhorn Army Ammunition Plant (LHAAP) in Karnack, Texas. During Phase III of the Interim Remedial Action (IRA), air monitoring activities will be conducted to document air emissions and local air quality resulting from the remediation effort and to provide feedback to the site engineer to ensure that the air emissions do not pose a threat to human health or the environment. The air measurement program consists of four components:

- Baseline Monitoring;
- Treatment system performance monitoring;
- Excavation zone monitoring; and
- Perimeter monitoring.

This report presents the results of the baseline monitoring program. The purpose of this program was to characterize current air quality conditions at the LHAAP and to identify contaminants of concern prior to any remedial activity. These results will be used to more accurately define site-specific impacts to the local air quality. The baseline monitoring also served to identify any off-site volatile organic compounds (VOC) sources.

Ambient air samples were collected at four sites, one upwind site and three downwind sites, during this program. The sites were chosen based upon the prevailing wind direction of the area and placed at the perimeter of the plant between the burning ground and the closest receptors. Figure 1-1 is a map showing the locations of the four monitoring sites.

SUMMA canisters were used to collect time-integrated, whole air samples over an 8-hour period. Samples were collected every two weeks between May 31 and July 27, 1996, for a total of five sampling episodes. Canisters were analyzed by Lancaster Laboratories, using EPA

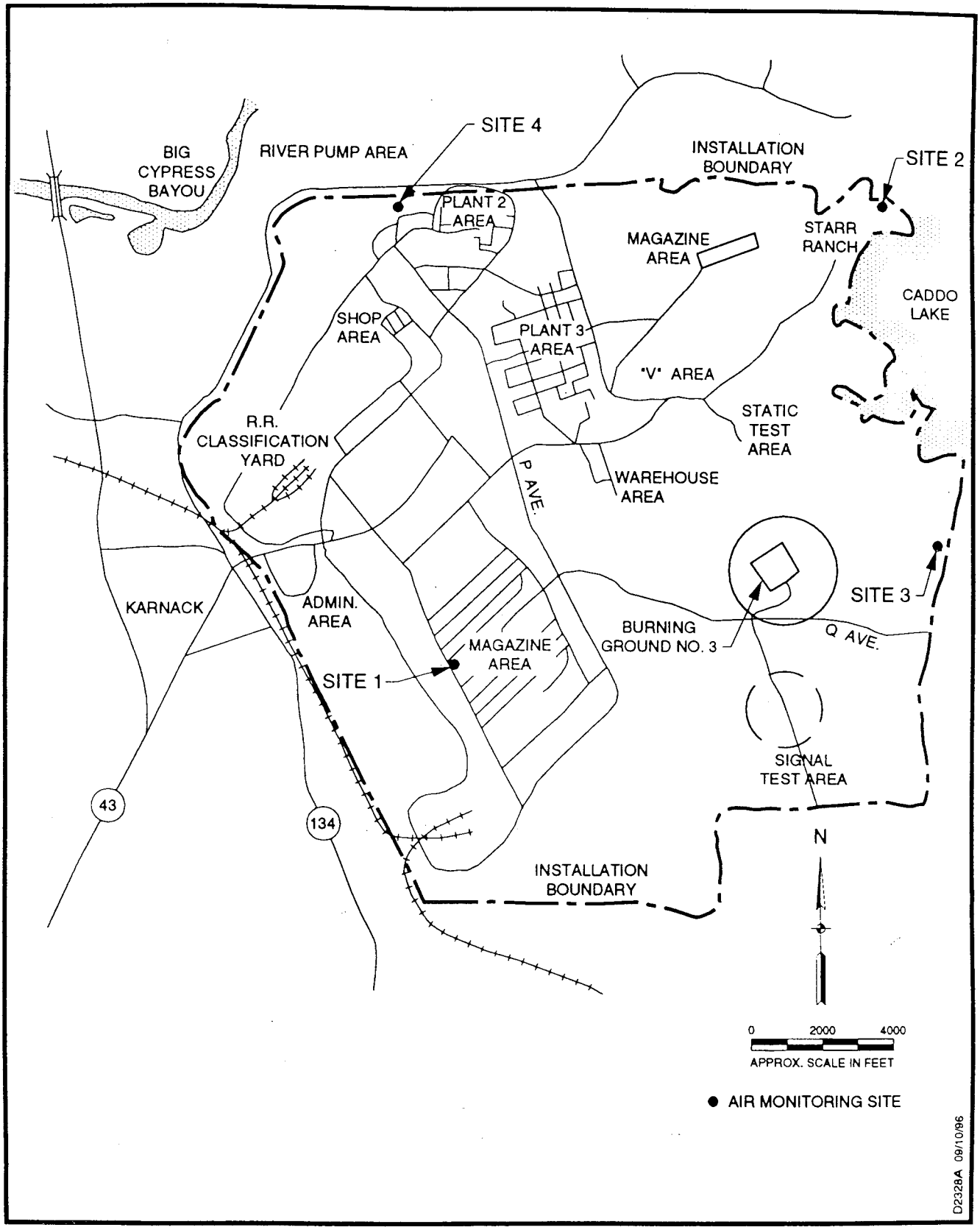

Figure 1-1. Location of Sampling Sites for Baseline Monitoring

method TO-14 for the VOCs listed in Table 1-1. The target compounds for this program were selected because of their presence in soil and groundwater samples collected at the remediation site.

A permanent meteorological monitoring station was used to collect wind speed, wind direction, temperature and relative humidity data. This meteorological station was located next to the southern entrance of burning ground No. 3.

Table 1-1

List of Target Compounds

Vinyl Chloride
Trichlorofluoromethane
Acetone
Methylene Chloride
1,1-Dichloroethane
cis-1,2-Dichloroethene
Chloroform
1,1,1-Trichloroethane
Carbon Tetrachloride
1,2-Dichloroethane
Benzene
Trichloroethene
Toluene
1,1,2-Trichloroethane
Tetrachloroethene
Chlorobenzene
Ethylbenzene
m/p-Xylene
o-Xylene
Styrene
1,1,2,2-Tetrachloroethane

2.0 SUMMARY OF RESULTS

This section contains the results from the baseline monitoring program. These results are summarized in Tables 2-1 through 2-5. Table 2-1 lists all of the target compounds, with the site means, the project mean concentration and the Texas Natural Resource Conservation Commissions (TNRCC) 24-hour Effects Screening Levels (ESLs). The site mean is the average concentration measured at a given location. The project mean is the average concentration measured across all locations. The ESLs are tools used by TNRCC to evaluate impacts of air pollution emissions. As is shown in this table, all compounds were measured at concentrations well below the established 24-hour ESL; thus, no adverse health effects are expected. The air quality at this site is comparable to that of rural, unpolluted sites across the United States.

Table 2-2 through 2-5 lists the target compounds, the 8-hour time weighted means for each sampling episode, and the site mean concentration over all 5 episodes at Sites 1 through 4, respectively. In order to calculate mean concentrations, the data listed as Not Detected (ND) were handled in the following manner. If all results were ND, then the mean was ND. If at least one reported value was above the detection limit, all ND's were assigned the value of one-half the detection limit. In the table the detection limit is given in parenthesis beside the ND. As is shown in these tables, all compounds with the exception of acetone were measured at concentrations below 5 ppbv. Acetone had a project mean concentration of 8.1 ppbv with the site mean concentrations ranging from 9.6 ppbv to 7.6 ppbv. Acetone, however, is a common laboratory contaminant and these results may not be representative of actual air quality at the site. The project mean concentrations for methylene chloride and trichloroethene were 0.4 ppbv and 0.3 ppbv, respectively.

Figures 2-1 through 2-5 are graphical presentations, showing LHAAP in relation to the 4 sites, the 8-hour wind roses, and the concentrations of methylene chloride and trichloroethane at each site are shown for each sampling episode. The wind roses display what

percentage of time the wind is blowing from each direction and at what wind speed. These presentations are useful for assessing the effect of wind direction on the concentrations of these two target compounds, with respect to the Burning Ground #3. These figures show a slight increase in methylene chloride and trichloroethene concentrations at Site 1 when winds are predominately from the east.

Table 2-1

Summary of VOC Results from Baseline Monitoring Project

Compound	Mean Concentration (pp v)					24-Hour ESL (ppbv)
	Site 1	Site 2	Site 3	Site 4	Project	
Vinyl Chloride	ND	ND	ND	ND	ND	20
Trichlorofluoromethane	0.3	0.3	0.3	0.3	0.3	2000
Acetone	6.8	8.2	7.6	9.6	8.1	1000
Methylene Chloride	0.5	0.4	0.4	0.4	0.4	30
1,1-Dichloroethane	ND	ND	ND	ND	ND	396
cis-1,2-Dichloroethene	0.1	ND	ND	ND	0.1	800
Chloroform	0.2	0.2	0.2	0.1	0.2	8
1,1,1-Trichloroethane	0.4	0.4	0.3	0.3	0.3	800
Carbon Tetrachloride	0.8	ND	ND	ND	0.2	8
1,2-Dichloroethane	0.2	ND	ND	ND	0.1	3.9
Benzene	0.7	0.6	0.6	0.6	0.6	1
Trichloroethene	0.3	0.3	0.3	0.2	0.3	100
Toluene	1.5	1.5	1.3	1.0	1.3	200
1,1,2-Trichloroethane	0.3	ND	0.1	ND	0.2	40
Tetrachloroethene	0.8	0.7	0.5	0.6	0.7	20
Chlorobenzene	0.3	ND	ND	0.1	0.1	40
Ethylbenzene	0.7	0.4	0.4	0.3	0.4	184
m/p-Xylene	1.2	1.0	1.0	0.7	1.0	340
o-Xylene	0.3	0.3	0.3	0.2	0.3	340
Styrene	0.1	0.2	0.1	ND	0.1	40
1,1,2,2-Tetrachloroethane	0.5	0.2	0.2	0.2	0.3	4

Table 2-2

VOC Results from Site 1 (Background Site)

Compound	Mean Concentration (ppbv) by Sampling Date					Site 1 Mean Concentration (ppbv)
	5/31	6/14	6/28	7/12	7/28	
Vinyl Chloride	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
Trichlorofluoromethane	ND (<0.2)	0.4	0.4	0.2	0.4	0.3
Acetone	7.0	6.0	10.0	4.0	7.0	6.8
Methylene Chloride	ND (<0.5)	1.0	0.5	0.7	ND (<0.5)	0.5
1,1-Dichloroethane	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
cis-1,2-Dichloroethene	ND (<0.2)	ND (<0.2)	0.3	ND (<0.2)	ND (<0.2)	0.1
Chloroform	ND (<0.2)	ND (<0.2)	0.3	0.5	ND (<0.2)	0.2
1,1,1-Trichloroethane	ND (<0.2)	ND (<0.2)	0.4	1.0	0.2	0.4
Carbon Tetrachloride	ND (<0.2)	ND (<0.2)	0.4	ND (<0.2)	ND (<0.2)	0.8
1,2-Dichloroethane	ND (<0.2)	ND (<0.2)	0.5	ND (<0.2)	ND (<0.2)	0.2
Benzene	0.3	0.6	1.0	0.7	0.7	0.7
Trichloroethene	ND (<0.2)	0.4	0.7	0.4	ND (<0.2)	0.3
Toluene	0.8	0.8	1.0	4.0	1.0	1.5
1,1,2-Trichloroethane	ND (<0.2)	ND (<0.2)	0.9	ND (<0.2)	ND (<0.2)	0.3
Tetrachloroethene	ND (<0.2)	ND (<0.2)	1.0	1.0	2.0	0.8
Chlorobenzene	ND (<0.2)	ND (<0.2)	1.0	ND (<0.2)	ND (<0.2)	0.3
Ethylbenzene	ND (<0.2)	0.3	2.0	0.9	0.2	0.7
m/p-Xylene	0.4	0.9	2.0	2.0	0.7	1.2
o-Xylene	ND (<0.2)	0.3	ND (<0.2)	0.8	0.2	0.3
Styrene	ND (<0.2)	ND (<0.2)	ND (<0.2)	0.3	ND (<0.2)	0.1
1,1,2,2-Tetrachloroethane	ND (<0.2)	ND (<0.2)	2.0	ND (<0.2)	ND (<0.2)	0.5

Table 2-3

VOC Results from Site 2 (Star Ranch)

Compound	Concentrations (ppbv)					Site 2 Mean Concentration (ppbv)
	5/31	6/14	6/28	7/12	7/28	
Vinyl Chloride	ND (<0.3)	ND (<0.3)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
Trichlorofluoromethane	ND (<0.3)	0.4	0.3	0.4	0.4	0.3
Acetone	10.0	11.0	6.0	8.0	6.0	8.2
Methylene Chloride	ND (<0.8)	ND (<0.8)	ND (<0.5)	0.6	ND (<0.5)	0.4
1,1-Dichloroethane	ND (<0.3)	ND (<0.3)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
cis-1,2-Dichloroethene	ND (<0.3)	ND (<0.3)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
Chloroform	ND (<0.3)	ND (<0.3)	ND (<0.2)	0.3	ND (<0.2)	0.2
1,1,1-Trichloroethane	ND (<0.3)	ND (<0.3)	ND (<0.2)	0.8	0.6	0.4
Carbon Tetrachloride	ND (<0.3)	ND (<0.3)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
1,2-Dichloroethane	ND (<0.3)	ND (<0.3)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
Benzene	0.5	0.8	0.4	0.6	0.5	0.6
Trichloroethene	ND (<0.3)	0.5	ND (<0.2)	0.4	ND (<0.2)	0.3
Toluene	1.0	0.9	0.5	4.0	1.0	1.5
1,1,2-Trichloroethane	ND (<0.3)	ND (<0.3)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
Tetrachloroethene	ND (<0.3)	ND (<0.3)	0.3	1.0	2.0	0.7
Chlorobenzene	ND (<0.3)	ND (<0.3)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
Ethylbenzene	ND (<0.3)	0.3	0.4	0.7	0.2	0.4
m/p-Xylene	0.9	0.9	0.6	2.0	0.6	1.0
o-Xylene	ND (<0.3)	0.4	ND (<0.2)	0.6	0.2	0.3
Styrene	ND (<0.3)	ND (<0.3)	ND (<0.2)	0.3	ND (<0.2)	0.2
1,1,2,2-Tetrachloroethane	ND (<0.3)	ND (<0.3)	0.5	ND (<0.2)	ND (<0.2)	0.2

Table 2-4

VOC Results from Site 3 (Production Area)

Compound	Concentrations (ppbv)					Site 3 Mean Concentration (ppbv)
	5/31	6/14	6/28	7/12	7/28	
Vinyl Chloride	ND (<0.2)	ND (<0.4)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
Trichlorofluoromethane	0.3	ND (<0.4)	0.3	0.2	0.3	0.3
Acetone	8.0	8.0	11.0	4.0	7.0	7.6
Methylene Chloride	ND (<0.5)	ND (<0.9)	ND (<0.5)	0.6	ND (<0.5)	0.4
1,1-Dichloroethane	ND (<0.2)	ND (<0.4)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
cis-1,2-Dichloroethene	ND (<0.2)	ND (<0.4)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
Chloroform	ND (<0.2)	ND (<0.4)	ND (<0.2)	0.3	ND (<0.2)	0.2
1,1,1-Trichloroethane	ND (<0.2)	ND (<0.4)	ND (<0.2)	0.8	0.2	0.3
Carbon Tetrachloride	ND (<0.2)	ND (<0.4)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
1,2-Dichloroethane	ND (<0.2)	ND (<0.4)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
Benzene	0.4	0.7	0.7	0.7	0.6	0.6
Trichloroethene	ND (<0.2)	0.5	0.2	0.4	<0.2	0.3
Toluene	0.6	1.0	0.8	3.0	1.0	1.3
1,1,2-Trichloroethane	ND (<0.2)	ND (<0.4)	0.2	ND (<0.2)	ND (<0.2)	0.1
Tetrachloroethene	ND (<0.2)	ND (<0.4)	0.3	1.0	1.0	0.5
Chlorobenzene	ND (<0.2)	ND (<0.4)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
Ethylbenzene	ND (<0.2)	ND (<0.4)	0.5	0.6	0.5	0.4
m/p-Xylene	0.4	0.9	0.7	2.0	1.0	1.0
o-Xylene	0.3	ND (<0.4)	ND (<0.2)	0.5	0.5	0.3
Styrene	ND (<0.2)	ND (<0.4)	ND (<0.2)	0.2	ND (<0.2)	0.1
1,1,2,2-Tetrachloroethane	ND (<0.2)	ND (<0.4)	0.6	ND (<0.2)	ND (<0.2)	0.2

Table 2-5

VOC Results from Site 4 (Nearest Receptors)

Compound	Concentrations (ppbv)					Site 4 Mean Concentration (ppbv)
	5/31	6/14	6/28	7/12	7/28	
Vinyl Chloride	ND (<0.2)	ND (<0.3)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
Trichlorofluoromethane	0.2	ND (<0.3)	0.2	0.4	0.3	0.3
Acetone	14.0	8.0	12.0	9.0	5.0	9.6
Methylene Chloride	ND (<0.5)	ND (<0.8)	ND (<0.5)	0.6	ND (<0.5)	0.4
1,1-Dichloroethane	ND (<0.2)	ND (<0.3)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
cis-1,2-Dichloroethene	ND (<0.2)	ND (<0.3)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
Chloroform	ND (<0.2)	ND (<0.3)	ND (<0.2)	0.2	ND (<0.2)	0.1
1,1,1-Trichloroethane	ND (<0.2)	ND (<0.3)	0.5	0.4	ND (<0.2)	0.3
Carbon Tetrachloride	ND (<0.2)	ND (<0.3)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
1,2-Dichloroethane	ND (<0.2)	ND (<0.3)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
Benzene	0.4	0.6	0.6	0.6	0.6	0.6
Trichloroethene	ND (<0.2)	0.4	0.2	0.3	ND (<0.2)	0.2
Toluene	0.8	0.7	0.7	2.0	0.9	1.0
1,1,2-Trichloroethane	ND (<0.2)	ND (<0.3)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
Tetrachloroethene	1.0	ND (<0.3)	0.2	0.6	1.0	0.6
Chlorobenzene	ND (<0.2)	ND (<0.3)	0.2	ND (<0.2)	ND (<0.2)	0.1
Ethylbenzene	ND (<0.2)	ND (<0.3)	0.5	0.4	ND (<0.2)	0.3
m/p-Xylene	0.6	0.6	0.8	1.0	0.5	0.7
o-Xylene	ND (<0.2)	ND (<0.3)	0.2	0.4	ND (<0.2)	0.2
Styrene	ND (<0.2)	ND (<0.3)	ND (<0.2)	ND (<0.2)	ND (<0.2)	ND
1,1,2,2-Tetrachloroethane	ND (<0.2)	ND (<0.3)	0.4	ND (<0.2)	ND (<0.2)	0.2

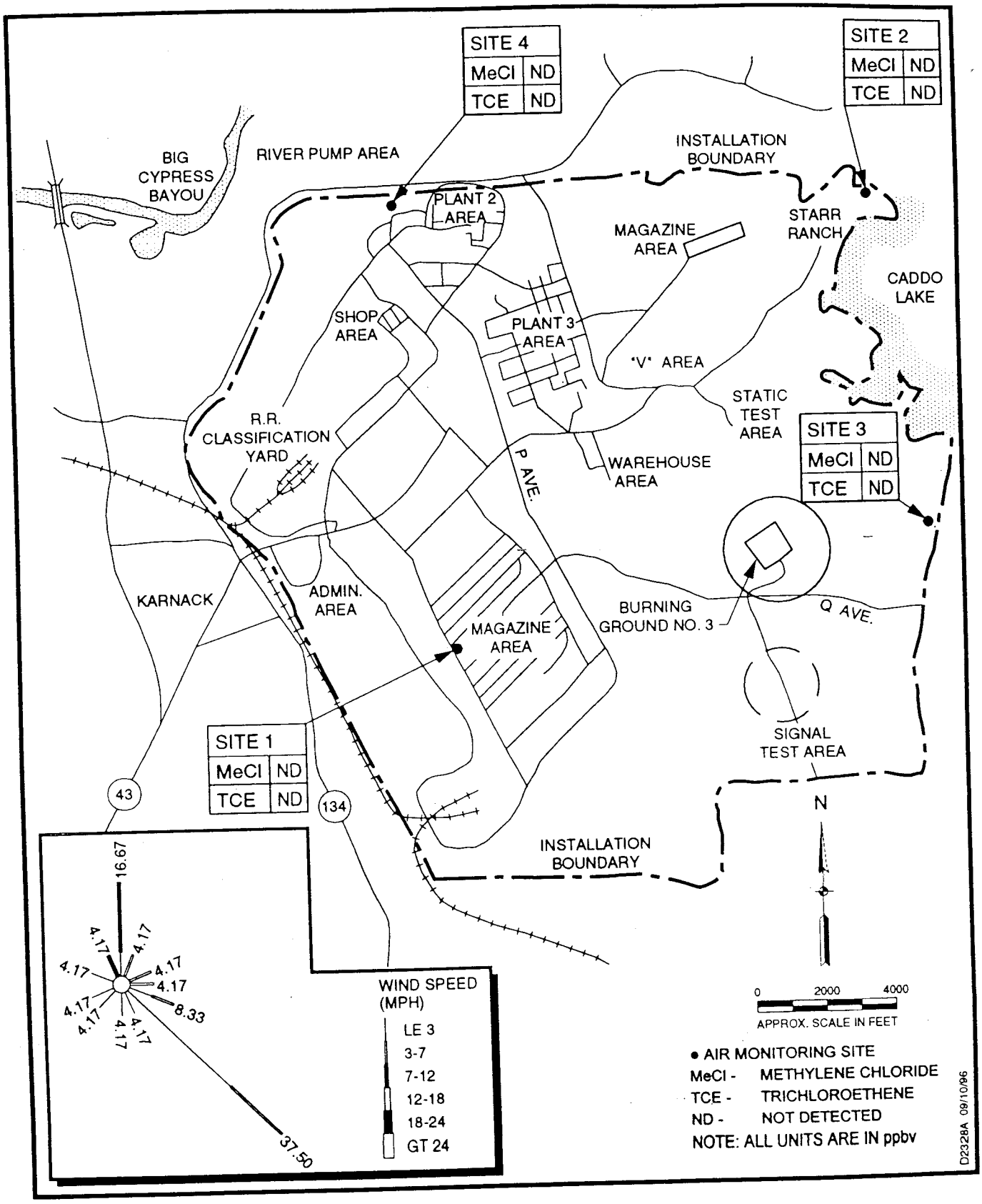

Figure 2-1. LHAAP Diagram Showing Wind Rose and VOC Concentrations for May 31, 1996

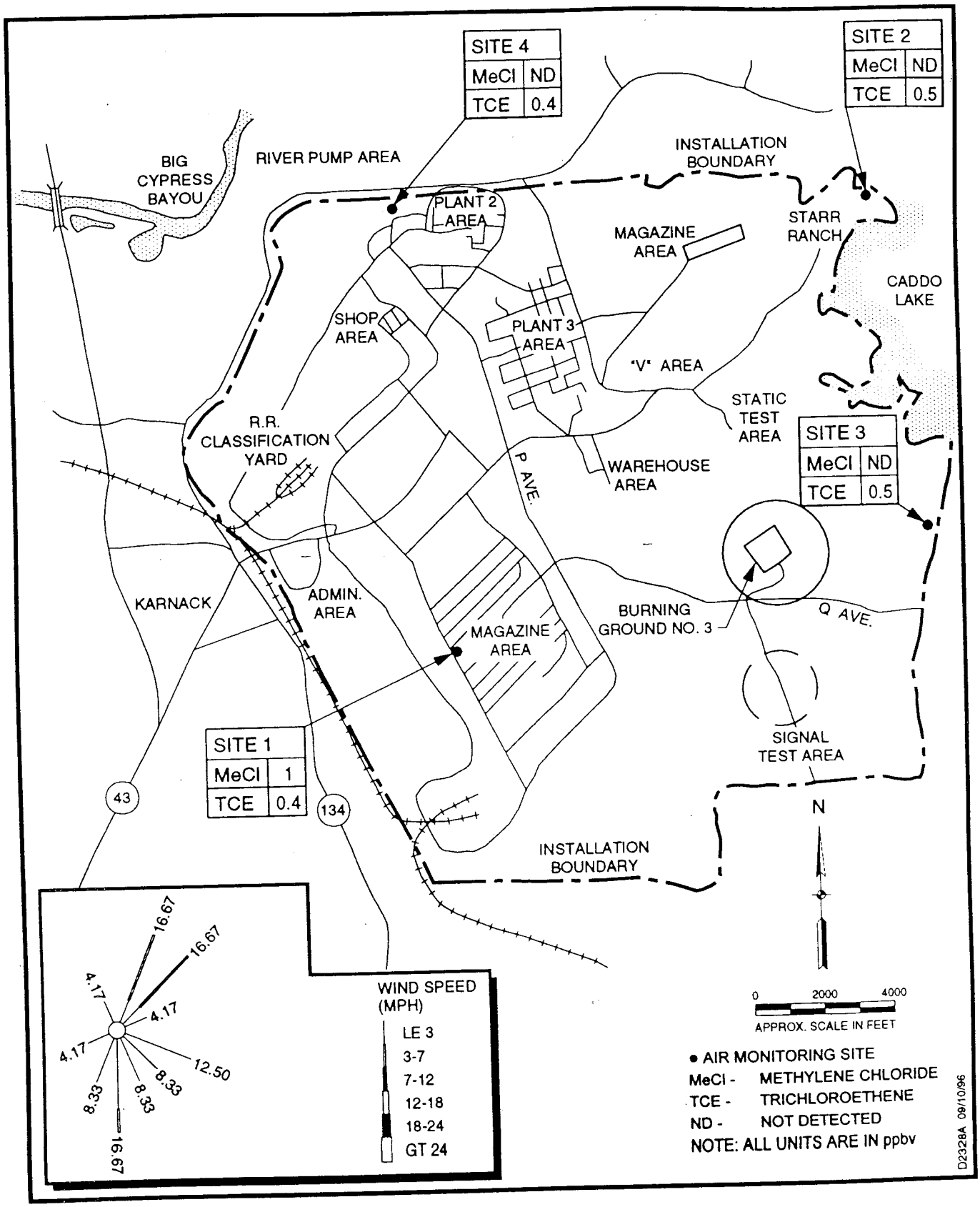

Figure 2-2. LHAAP Diagram Showing Wind Rose and VOC Concentrations for June 14, 1996

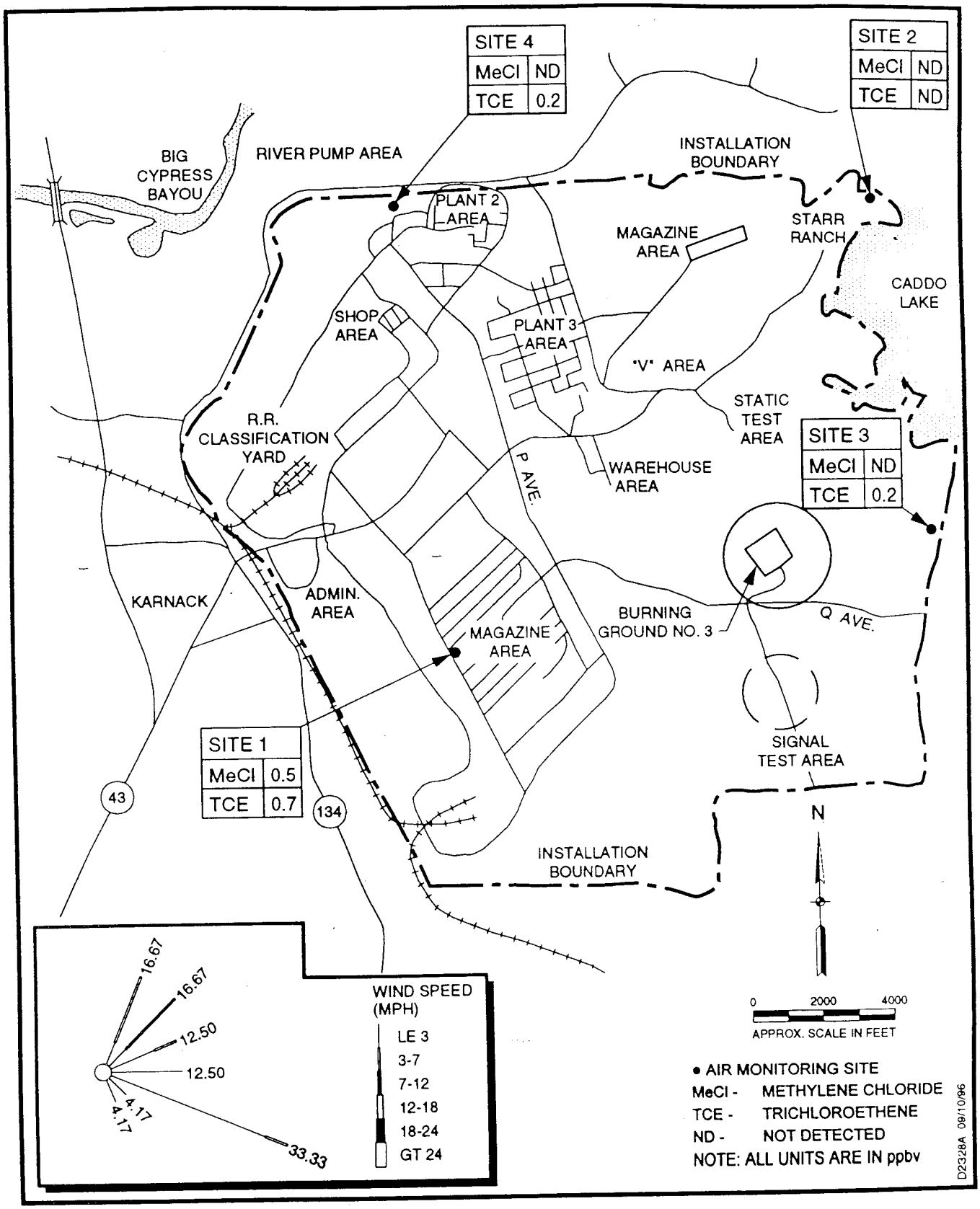

Figure 2-3. LHAAP Diagram Showing Wind Rose and VOC Concentrations for June 28, 1996

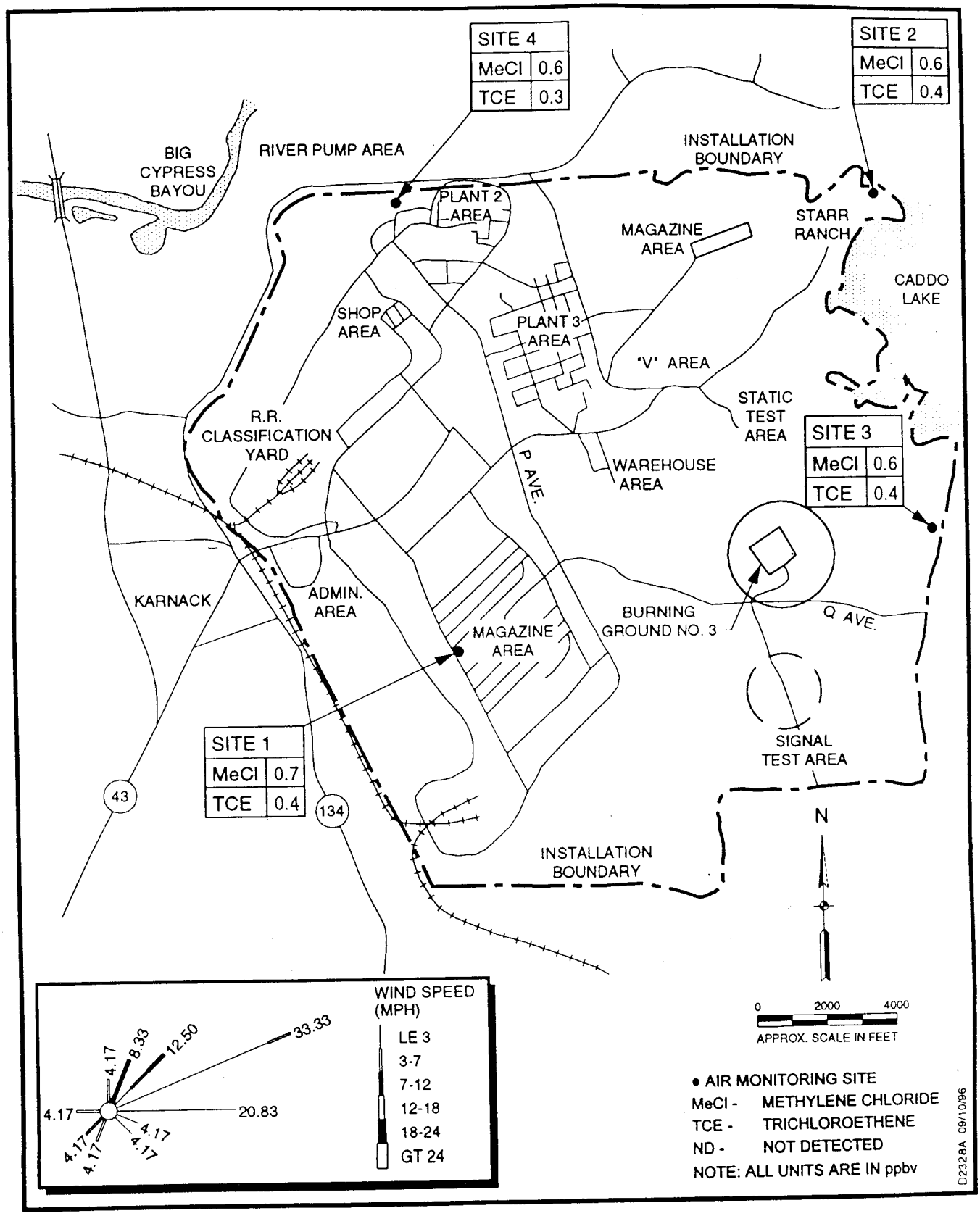

Figure 2-4. LHAAP Diagram Showing Wind Rose and VOC Concentrations for July 12, 1996

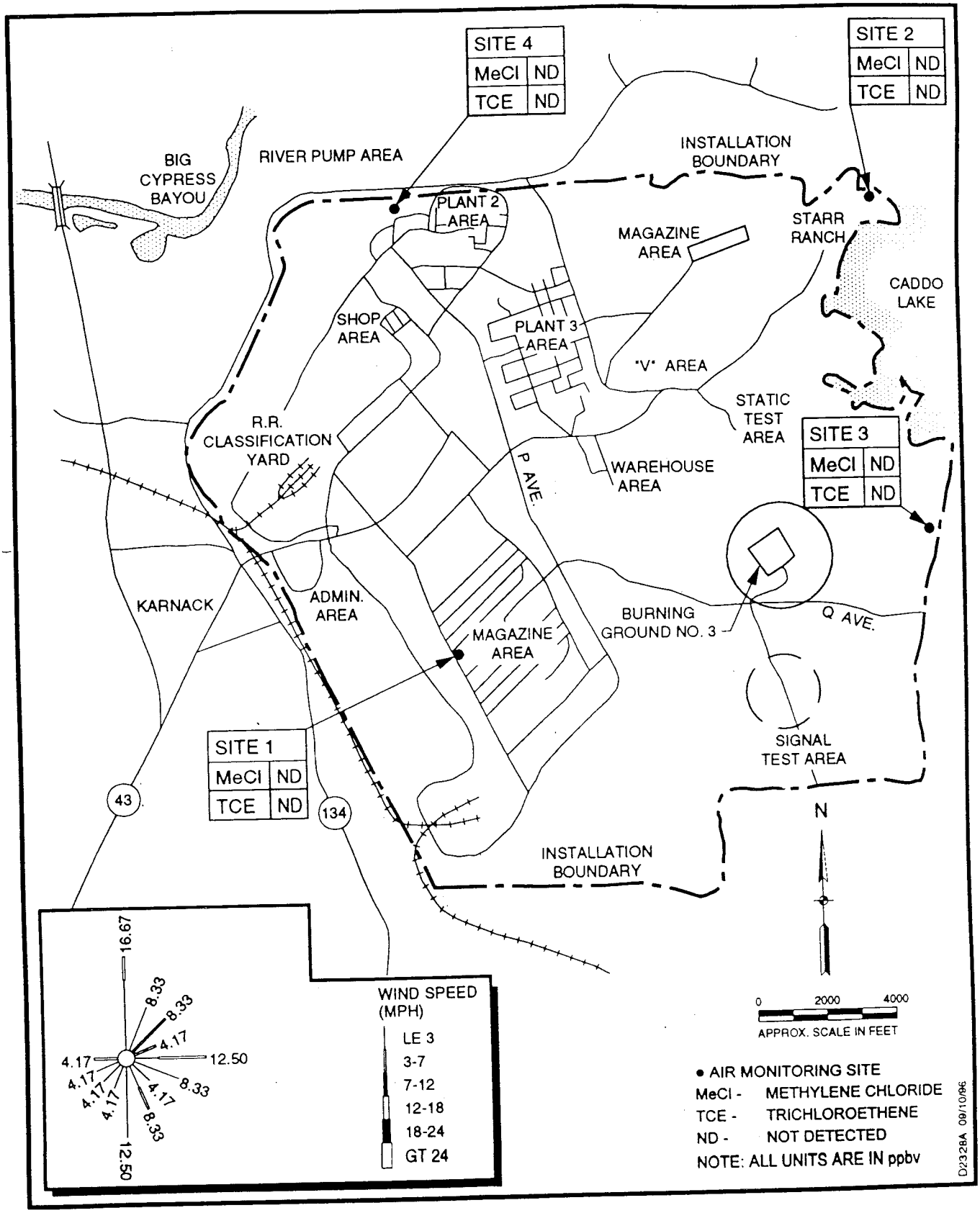

Figure 2-5. LHAAP Diagram Showing Wind Rose and VOC Concentrations for July 28, 1996

3.0 ASSESSMENT OF DATA QUALITY

The purpose of evaluating the quality control data associated with the VOC measurements is to determine whether the data collected are of known and sufficient quality to qualitatively and quantitatively meet the project objectives. The primary tools used to assess the quality of the data collected for this project are background samples, and precision and accuracy checks. Overall, the data for this program are of good quality and meet all project objectives.

3.1 Background Assessments

Background levels represent the contribution to the measurement results that may be due to the analytical process. Background contamination was evaluated in two ways: canister cleanliness checks prior to sampling and method blanks during analysis.

All canisters were cleaned in the laboratory by repeated evacuation and pressurization with zero grade humid air. Each canister was filled with zero grade humid air and analyzed before the final evacuation prior to shipping to LHAAP. All target compounds were below the limit of quantitation in the cleaning certification analysis.

Method blanks were performed on all sample analysis dates after the GC had been calibrated and prior to sample analysis. No target compounds were found in the method blanks at or above the laboratory's limit of quantitation. These limits are presented in Tables 2-2 through 2-5 in section 2.

3.2 Precision Assessments

The precision assessments for the VOC data were obtained by collecting and analyzing duplicate field samples. Table 3-1 presents the results from the five duplicate samples collected during this program. Only the target compounds that were detected in all of the

samples are included in this table. The ability to assess precision was limited by the consistently low VOC concentrations that were found. In general, the variability in VOC measurement tends to increase at low ppbv concentrations. In terms of actual concentrations, however, the variability usually is on the order of a few tenths of a ppbv. The one exception is the acetone results from the June 28th sample, which show an absolute difference of 4 ppbv. Because of its polarity, acetone is very difficult to measure at low ppbv levels, and the percent recovery of acetone from canister samples tends to be variable. Thus, a 4 ppbv difference in duplicate measurements is not surprising.

3.3 Accuracy Assessments

The accuracy of the analysis method was estimated by using Laboratory Control Samples (LCS). The LCS consists of five target compounds spiked to concentrations of approximately 50 ppbv. The target compounds, vinyl chloride, 1,1,1-trichloroethane, benzene, trichloroethylene and ethylbenzene, were acquired independently from calibration standards. The LCS served as a check of analysis and calibration standards validity. The results from the LCS analyzed during analysis for each episode are presented in Table 3-2. All LCS compounds were within the 75%-125% recovery limits, set by the laboratory.

Table 3-1

Summary of Sampling Precision for Baseline Monitoring Program

Compound	5/31			6/14			6/28			7/12			7/28		
	Regular (ppbv)	Duplicate (ppbv)	Percent Difference (%)	Regular (ppbv)	Duplicate (ppbv)	Percent Difference (%)	Regular (ppbv)	Duplicate (ppbv)	Percent Difference (%)	Regular (ppbv)	Duplicate (ppbv)	Percent Difference (%)	Regular (ppbv)	Duplicate (ppbv)	Percent Difference (%)
Dichlorodifluoromethane	0.6	0.6	0.0	0.6	0.6	0.0	0.6	0.7	-15.4	0.7	0.6	15.4	0.6	0.6	0.0
Acetone	8.0	6.0	28.6	8.0	8.0	0.0	11.0	10.0	9.5	4.0	8.0	-66.7	7.0	7.0	0.0
Benzene	0.4	0.4	0.0	0.7	0.6	15.4	0.7	0.6	15.4	0.7	0.6	15.4	0.6	0.5	18.2
Toluene	0.6	0.8	-28.6	1.0	0.8	22.2	0.8	0.6	28.6	3.0	3.0	0.0	1.0	1.0	0.0
m/p-Xylene	0.4	0.5	-22.2	0.9	0.4	76.9	0.7	0.6	15.4	2.0	2.0	0.0	1.0	0.5	66.7

Percent Difference = ((regular - duplicate)/(regular + duplicate)/2) * 100

Table 3-2

LCS Analyses Results

Compound Name	LCS Recovery (%)				
	5/31	6/14	6/28	7/12	7/28
Vinyl Chloride	110	110	109	100	106
1,1,1-Trichloroethane	89	89	106	99	109
Benzene	109	109	114	98	114
Trichloroethene	107	107	116	99	104
Ethylbenzene	119	119	115	104	125

Baseline Monitoring Results
Run 1
May 31, 1996

MIPR#	SWD LAB# 1	Chest#	Temp.

CHAIN OF CUSTODY
for
AIR SAMPLES

018102

U.S. Army Corps of Engineers
Tulsa District, Tulsa, Okla.

Location: Longhorn AAP Site:

Baseline Samples **AIR SAMPLE DATA**

Sample#: Run 1 Date: 5/31/96 Time: 1800

Source: LHAAP

Analysis Requested: **Volatile Organics**

Date Mfg: _____ Bag#: _____ C/Seal#: _____

VOC Concentration: _____ PID #: _____

Signature of Sampler: [signature]

SAMPLES CONTAINED IN THIS SHIPMENT

Sample ID Code Number	VOA	Alt#	X-Chest#	SWD Lab #
0107 - - -				1
0018 - - -				
0136 - - -				
0057 - - -				
0157 - - -				
0063 - - -				
Total Samples Shipped	6			

CUSTODY RECORD / DEI

Relinquished by: [signature]	Date 5/31/96	Time 1800
Chest#: C/Seal#:	Bill#:	
Received by:	Date	Time

LHAAP/FM2/15JAN92

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018103 Page: 1 of 4

LLI Sample No. AQ 2521439
Collected:

Submitted: 6/ 3/96 Reported: 7/ 5/96
Discard: 7/ 5/96

0107 Summa Canister
LHAAP Superfund Site

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack, TX 75661

P.O. 2379-390
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9301	TO-14 List	See Attached		

Site 1

Background

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10:37:04 D 0003 6 REP 518602
386 0.00 00016000 DIS000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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See reverse side for explanation of symbols and abbreviations

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018104

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0107 Date Collected: / / Date Received: 6/03/96
Lab Sample ID:2521439 Date Analyzed: 6/05/96 Time Analyzed:13:41
Canister ID:SUMMA0107 Pressure Rec'd: 9.8 psia Final Pressure: 19.6 psia
Injection Volume: 500.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN05\0501004.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.4	JD
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.2	U
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.2	U
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	0.5	U
67-64-1	Acetone	7	D
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.5	U
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.2	U
71-55-6	1,1,1-Trichloroethane	0.2	U
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.3	JD
79-01-6	Trichloroethene	0.2	U
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	0.8	JD
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	0.2	U
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.2	U
1330-20-7	m/p-Xylene	0.4	JD
95-47-6	o-Xylene	0.2	U
100-42-5	Styrene	0.2	U
79-34-5	1,1,2,2-Tetrachloroethane	0.2	U
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

MEMBER ACIL
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Respectfully Submitted
Michele McClarin, B.A.

Lancaster Laboratories
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019105

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0107 Date Collected: / / Date Received: 6/03/96
Lab Sample ID:2521439 Date Analyzed: 6/05/96 Time Analyzed:13:41
Canister ID:SUMMA0107 Pressure Rec'd: 9.8 psia Final Pressure: 19.6 psia
Injection Volume: 500.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN05\0501004.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

Respectfully Submitted
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Group Leader, GC/MS Volatiles

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717-656-2300 Fax 717-656-2681

&&&

Analysis Rep

Lancaster Laboratories
A Thermo Analytical Laboratory

LABORATORY CHRONIC

018106

LLI Sample No. AQ 2521439
Collected:

Submitted: 06/03/96

0107 Summa Canister
LHAAP Superfund Site

SDG#:

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack, TX 75661

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		06/05/96 1341	George M. Main, Jr.

MEMBER ACIL

Lancaster Laboratories
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax 717-656-2681

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018107 Page: 1 of 4

LLI Sample No. AQ 2521440
Collected:

Submitted: 6/ 3/96 Reported: 7/ 5/96
Discard: 7/ 5/96

0018 Summa Canister
LHAAP Superfund Site

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack, TX 75661

P.O. 2379-390
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1	See Attached		
9301	TO-14 List			

See Page 2

Site 2

Starr-Ranch

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1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

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386 0.00 00016000 DIS000

Respectfully Submitted
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c18108

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0018 Date Collected: / / Date Received: 6/03/96
Lab Sample ID:2521440 Date Analyzed: 6/05/96 Time Analyzed:14:30
Canister ID:SUMMA0018 Pressure Rec'd: 7.1 psia Final Pressure: 21.5 psia
Injection Volume: 500.0 cc Nominal Volume: 250 cc Dilution Factor: 1.5
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN05\0601005.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	1	JD
76-14-2	Freon 114	0.3	U
74-87-3	Chloromethane	1	JD
75-01-4	Vinyl Chloride	0.3	U
74-83-9	Bromomethane	0.3	U
75-00-3	Chloroethane	0.3	U
75-69-4	Trichlorofluoromethane	0.3	U
75-35-4	1,1-Dichloroethene	0.3	U
76-13-1	Freon 113	0.8	U
67-64-1	Acetone	10	D
107-05-1	3-Chloropropene	0.3	U
75-09-2	Methylene Chloride	0.8	U
75-34-3	1,1-Dichloroethane	0.3	U
156-59-2	cis-1,2-Dichloroethene	0.3	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	0.3	U
56-23-5	Carbon Tetrachloride	0.3	U
107-06-2	1,2-Dichloroethane	0.3	U
71-43-2	Benzene	0.5	JD
79-01-6	Trichloroethene	0.3	U
78-87-5	1,2-Dichloropropane	0.3	U
10061-01-5	cis-1,3-Dichloropropene	0.3	U
108-88-3	Toluene	1	JD
10061-02-6	trans-1,3-Dichloropropene	0.3	U
79-00-5	1,1,2-Trichloroethane	0.3	U
127-18-4	Tetrachloroethene	0.3	U
106-93-4	1,2-Dibromoethane	0.3	U
108-90-7	Chlorobenzene	0.3	U
100-41-4	Ethylbenzene	0.3	U
1330-20-7	m/p-Xylene	0.9	JD
95-47-6	o-Xylene	0.3	U
100-42-5	Styrene	0.3	U
79-34-5	1,1,2,2-Tetrachloroethane	0.3	U
622-96-8	4-Ethyltoluene	0.3	U
108-67-8	1,3,5-Trimethylbenzene	0.3	U
95-63-6	1,2,4-Trimethylbenzene	0.3	U
541-73-1	1,3-Dichlorobenzene	0.8	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.
Limits of quantitation raised due to low initial sa

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018109

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0018 Date Collected: / / Date Received: 6/03/96
Lab Sample ID:2521440 Date Analyzed: 6/05/96 Time Analyzed:14:30
Canister ID:SUMMA0018 Pressure Rec'd: 7.1 psia Final Pressure: 21.5 psia
Injection Volume: 500.0 cc Nominal Volume: 250 cc Dilution Factor: 1.5
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN05\0601005.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.8	U
100-44-7	Benzyl Chloride	0.3	U
95-50-1	1,2-Dichlorobenzene	0.8	U
120-82-1	1,2,4-Trichlorobenzene	2	U
87-68-3	Hexachlorobutadiene	0.8	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.
Limits of quantitation raised due to low initial sample pressure.

Respectfully Submitted
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&&&

Analysis Rep

Lancaster Laboratories
A Thermo Analytical Laboratory

LABORATORY CHRONIC

LLI Sample No. AQ 2521440
Collected:

Submitted: 06/03/96

0018 Summa Canister
LHAAP Superfund Site

SDG#:

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack, TX 75661

018110

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		06/05/96 1430	George M. Main, Jr.

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PO Box 12425
Lancaster, PA 17605-2425
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A Thermo Analytical Laboratory

018111

LLI Sample No. AQ 2521441
Collected:

Submitted: 6/ 3/96 Reported: 7/ 5/96
Discard: 7/ 5/96

0136 Summa Canister
LHAAP Superfund Site

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack, TX 75661

P.O. 2379-390
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9301	TO-14 List	See Attached		

Site 3

Production Area

Regular

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10:37:51 D 0003 6 REP 518602
386 0.00 00016000 DIS000

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Lancaster, PA 17605-2425
717-656-2300 Fax 717-656-2681

Lancaster Laboratories
A Thermo Analytical Laboratory

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

018112

Sample No.:0136 Date Collected: / / Date Received: 6/03/96
Lab Sample ID:2521441 Date Analyzed: 6/05/96 Time Analyzed:15:20
Canister ID:SUMMA0136 Pressure Rec'd: 9.6 psia Final Pressure: 19.2 psia
Injection Volume: 500.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN05\0701006.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.6	JD
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.2	U
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.3	JD
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	0.5	U
67-64-1	Acetone	8	D
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.5	U
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.2	U
71-55-6	1,1,1-Trichloroethane	0.2	U
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.4	JD
79-01-6	Trichloroethene	0.2	U
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	0.6	JD
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	0.2	U
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.2	U
1330-20-7	m/p-Xylene	0.4	JD
95-47-6	o-Xylene	0.3	JD
100-42-5	Styrene	0.2	U
79-34-5	1,1,2,2-Tetrachloroethane	0.2	U
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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Respectfully Submitted
Michele McClarin, B.A.

See reverse side for explanation of symbols and abbreviations.

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019113

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0136 Date Collected: / / Date Received: 6/03/96
Lab Sample ID:2521441 Date Analyzed: 6/05/96 Time Analyzed:15:20
Canister ID:SUMMA0136 Pressure Rec'd: 9.6 psia Final Pressure: 19.2 psia
Injection Volume: 500.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN05\0701006.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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&&&

Analysis Rep

LABORATORY CHRONIC

Lancaster Laboratories
A Thermo Analytical Laboratory

LLI Sample No. AQ 2521441
Collected:

Submitted: 06/03/96

0136 Summa Canister
LHAAP Superfund Site

SDG#:

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack, TX 75661

018114

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		06/05/96 1520	George M. Main, Jr.

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Lancaster Laboratories
A Thermo Analytical Laboratory

LLI Sample No. AQ 2521442
Collected:

Submitted: 6/ 3/96 Reported: 7/ 5/96
Discard: 7/ 5/96

0057 Summa Canister
LHAAP Superfund Site

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack, TX 75661

P.O. 2379-390
Rel.

018115

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9301	TO-14 List	See Attached		

Site 3 Duplicate

Production Area

1 COPY TO Radian International ATTN: Mr. Amine Bou Onk
1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
at (717) 656-2300

10:38:11 D 0003 6 REP 518602
386 0.00 00016000 DIS000

Respectfully Submitted
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Group Leader, GC/MS Volatiles

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Lancaster Laboratories
A Thermo Analytical Laboratory

018116

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0057 Date Collected: / / Date Received: 6/03/96
Lab Sample ID:2521442 Date Analyzed: 6/05/96 Time Analyzed:16:10
Canister ID:SUMMA0057 Pressure Rec'd: 9.8 psia Final Pressure: 19.6 psia
Injection Volume: 500.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN05\0801007.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.6	JD
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.6	JD
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.2	JD
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	0.5	U
67-64-1	Acetone	6	D
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.5	U
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.2	U
71-55-6	1,1,1-Trichloroethane	0.2	U
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.4	JD
79-01-6	Trichloroethene	0.2	U
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	0.8	JD
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	0.2	U
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.2	U
1330-20-7	m/p-Xylene	0.5	JD
95-47-6	o-Xylene	0.2	U
100-42-5	Styrene	0.2	U
79-34-5	1,1,2,2-Tetrachloroethane	0.2	U
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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Respectfully Submitted
Michele McClarin, B.A.

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A Thermo Analytical Laboratory

018117

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0057 Date Collected: / / Date Received: 6/03/96
Lab Sample ID:2521442 Date Analyzed: 6/05/96 Time Analyzed:16:10
Canister ID:SUMMA0057 Pressure Rec'd: 9.8 psia Final Pressure: 19.6 psia
Injection Volume: 500.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN05\0801007.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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&&&

Analysis Rep

Lancaster Laboratories
A Thermo Analytical Laboratory

LABORATORY CHRONICI

LLI Sample No. AQ 2521442
Collected:

Submitted: 06/03/96

0057 Summa Canister
LHAAP Superfund Site

SDG#:

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack, TX 75661

018118

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		06/05/96 1610	George M. Main, Jr.

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See reverse side for explanation of symbols and abbreviations

Lancaster Laboratories
A Thermo Analytical Laboratory

018119

LLI Sample No. AQ 2521444
Collected:

Submitted: 6/ 3/96 Reported: 7/ 5/96
Discard: 7/ 5/96

0063 Summa Canister
LHAAP Superfund Site

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack, TX 75661

P.O. 2379-390
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			
9301	TO-14 List	See Attached		

See Page 2

Site 4

East Perimeter

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1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
at (717) 656-2300

10:39:11 D 0003 6 REP 518602
386 0.00 00016000 DIS000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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018120

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0063 Date Collected: / / Date Received: 6/03/96
Lab Sample ID:2521444 Date Analyzed: 6/05/96 Time Analyzed:18:45
Canister ID:SUMMA0063 Pressure Rec'd: 9.1 psia Final Pressure: 18.2 psia
Injection Volume: 500.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN05\1101010.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.6	JD
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.8	JD
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.2	JD
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	0.5	JD
67-64-1	Acetone	14	D
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.5	U
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.2	U
71-55-6	1,1,1-Trichloroethane	0.2	U
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.4	JD
79-01-6	Trichloroethene	0.2	U
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	0.8	JD
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	1	D
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.2	U
1330-20-7	m/p-Xylene	0.6	JD
95-47-6	o-Xylene	0.2	U
100-42-5	Styrene	0.2	U
79-34-5	1,1,2,2-Tetrachloroethane	0.2	U
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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Respectfully Submitted
Michele McClarin, B.A.

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018121

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0063
Lab Sample ID:2521444
Canister ID:SUMMA0063
Injection Volume: 500.0 cc
Instrument ID:HP4508

Date Collected: / /
Date Analyzed: 6/05/96
Pressure Rec'd: 9.1 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUN05\1101010.D

Date Received: 6/03/96
Time Analyzed:18:45
Final Pressure: 18.2 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster Laboratories
A Thermo Analytical Laboratory

LLI Sample No. AQ 2521444
Collected:

Submitted: 06/03/96

0063 Summa Canister
LHAAP Superfund Site

SDG#:

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack, TX 75661

018122

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		06/05/96 1845	George M. Main, Jr.

Lancaster Laboratories
A Thermo Analytical Laboratory

019123

LLI Sample No. AQ 2521443
Collected:

Submitted: 6/ 3/96 Reported: 7/ 5/96
Discard: 7/ 5/96

0157 Summa Canister
LHAAP Superfund Site

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack, TX 75661

P.O. 2379-390
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9301	TO-14 List	See Attached		

Trip Blank

1 COPY TO Radian International ATTN: Mr. Amine Bou Onk
1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
at (717) 656-2300
10:38:42 D 0003 6 REP 518602
386 0.00 00016000 DIS000

Respectfully Submitted
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Group Leader, GC/MS Volatiles

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Lancaster Laboratories
A Thermo Analytical Laboratory

018124

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0157 Date Collected: / / Date Received: 6/03/96
Lab Sample ID:2521443 Date Analyzed: 6/05/96 Time Analyzed:16:58
Canister ID:SUMMA0157 Pressure Rec'd: 0.4 psia Final Pressure: 19.6 psia
Injection Volume: 250.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN05\0901008.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.2	U
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.2	U
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.2	U
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	0.5	U
67-64-1	Acetone	1	JD
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.5	U
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.2	U
71-55-6	1,1,1-Trichloroethane	0.2	U
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.2	U
79-01-6	Trichloroethene	0.2	U
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	0.2	U
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	0.2	U
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.2	U
1330-20-7	m/p-Xylene	0.2	U
95-47-6	o-Xylene	0.2	U
100-42-5	Styrene	0.2	U
79-34-5	1,1,2,2-Tetrachloroethane	0.2	U
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

MEMBER ACIL
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Respectfully Submitted
Michele McClarin, B.A.

See reverse side for explanation of symbols and abbreviations.

Lancaster Laboratories
A Thermo Analytical Laboratory

018125

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0157 Date Collected: / / Date Received: 6/03/96
Lab Sample ID:2521443 Date Analyzed: 6/05/96 Time Analyzed:16:58
Canister ID:SUMMA0157 Pressure Rec'd: 0.4 psia Final Pressure: 19.6 psia
Injection Volume: 250.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN05\0901008.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.
B = Compound was found in method blank. D = analysis of diluted sample.
NOTE: This sample was assumed to be a trip blank due to minimal pressure. It was filled to a positive pressure with humid air and analyzed, and reported with a dilution factor of 1.0 applied.

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster Laboratories
A Thermo Analytical Laboratory

LLI Sample No. AQ 2521443
Collected:

Submitted: 06/03/96

0157 Summa Canister
LHAAP Superfund Site

SDG#:

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack, TX 75661

018126

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		06/05/96 1658	George M. Main, Jr.

018127

RUN 2

Baseline Monitoring Results
Run 2
June 16, 1996

KADIAN CORPORATION

Baseline Samples
Run 2

Chain of Custody Record

#9206
2529883-87

Page 1 of 1

31919

PROJECT: LHAAP/DEI
SITE: Karnack, TX
COLLECTED BY (Signature):

FIELD SAMPLE I.D	SAMPLE MATRIX	DATE/TIME	NO. OF CONTAINERS	ANALYSES: TO-14	REMARKS	SAM ID NO. (for lab use only)
0133	AIR	6/14/96	1	✓		
0123	"	"	1	✓		
0155	"	"	1	✓		
0152	"	"	1	✓		
0037	"	"	1	✓		

REMARKS

RELINQUISHED BY: DATE 6/14/96 TIME 1600

RECEIVED BY:	DATE	TIME	RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME	RELINQUISHED BY:	DATE	TIME

LAB USE ONLY

RECEIVED FOR LABORATORY BY:	DATE	TIME	AIRBILL NO.	OPENED BY:	DATE	TIME	TEMP°C	SEAL #	CONDITION
L. Smith	6-17-96	0935	✓	L. Smith	6-17-96	0935	N/A	N/A	GOOD

REMARKS

862079 3311

4-88-30337

Lancaster Laboratories
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018130

LLI Sample No. AQ 2529883
Collected: 6/14/96 by JP

Submitted: 6/17/96 Reported: 7/ 5/96
Discard: 7/ 5/96

Summa Canister #0133

LHAAP Burning Ground #3

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

P.O.
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9001	TO-14 List	See Attached		

Site 1

Background

1 COPY TO Radian International ATTN: Mr. Amine Bou Onk
1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2300
10:40:21 D 0003 5 REP 126156 520758
386 0.00 00016000 DIS000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

MEMBER ACIL
Lancaster Laboratories
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425

Lancaster Laboratories
A Thermo Analytical Laboratory

019131

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:SUMMA0133 Date Collected: 6/14/96 Date Received: 6/17/96
Lab Sample ID:2529883 Date Analyzed: 6/18/96 Time Analyzed:14:55
Canister ID:SUMMA0133 Pressure Rec'd: 8.2 psia Final Pressure: 20.5 psia
Injection Volume: 500.0 cc Nominal Volume: 250 cc Dilution Factor: 1.3
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN18\0601009.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.7	JD
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.7	JD
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.4	JD
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	59	D
67-64-1	Acetone	6	D
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	1	BJD
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.2	U
71-55-6	1,1,1-Trichloroethane	0.2	U
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.6	JD
79-01-6	Trichloroethene	0.4	JD
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	0.8	JD
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	0.2	U
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.3	JD
1330-20-7	m/p-Xylene	0.9	JD
95-47-6	o-Xylene	0.3	JD
100-42-5	Styrene	0.2	U
79-34-5	1,1,2,2-Tetrachloroethane	0.2	U
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.6	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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Respectfully Submitted
Michele McClarin, B.A.

Lancaster Laboratories
A Thermo Analytical Laboratory

018132

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:SUMMA0133 Date Collected: 6/14/96 Date Received: 6/17/96
Lab Sample ID:2529883 Date Analyzed: 6/18/96 Time Analyzed:14:55
Canister ID:SUMMA0133 Pressure Rec'd: 8.2 psia Final Pressure: 20.5 psia
Injection Volume: 500.0 cc Nominal Volume: 250 cc Dilution Factor: 1.3
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN18\0601009.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.6	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.6	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.6	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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&&&

Analysis Rep

LABORATORY CHRONIC

Lancaster Laboratories
A Thermo Analytical Laboratory

LLI Sample No. AQ 2529883
Collected: 06/14/96 by JP

Submitted: 06/17/96

Summa Canister #0133

LHAAP Burning Ground #3
SDG#:

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

018133

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9001	TO-14 List	EPA Method TO14		06/18/96 1455	George M. Main, Jr.

MEMBER ACIL
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Lancaster, PA 17605-2425

Lancaster Laboratories
A Thermo Analytical Laboratory

LLI Sample No. AQ 2529884
Collected: 6/14/96 by JP

Submitted: 6/17/96 Reported: 7/ 5/96
Discard: 7/ 5/96

Summa Canister #0123

LHAAP Burning Ground #3

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

P.O. 018134
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9001	TO-14 List	See Attached		

Site 2

Starr Ranch

1 COPY TO Radian International ATTN: Mr. Amine Bou Onk
1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2300
10:40:40 D 0003 5 REP 126156 520758
386 0.00 00016000 DIS000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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013135

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:SUMMA0123 Date Collected: 6/14/96 Date Received: 6/17/96
Lab Sample ID:2529884 Date Analyzed: 6/17/96 Time Analyzed:22:24
Canister ID:SUMMA0123 Pressure Rec'd: 6.5 psia Final Pressure: 19.5 psia
Injection Volume: 500.0 cc Nominal Volume: 250 cc Dilution Factor: 1.5
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN17\1001015.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.7	JD
76-14-2	Freon 114	0.3	U
74-87-3	Chloromethane	0.3	U
75-01-4	Vinyl Chloride	0.3	U
74-83-9	Bromomethane	0.3	U
75-00-3	Chloroethane	0.3	U
75-69-4	Trichlorofluoromethane	0.4	JD
75-35-4	1,1-Dichloroethene	0.3	U
76-13-1	Freon 113	3	B D
67-64-1	Acetone	11	D
107-05-1	3-Chloropropene	0.3	U
75-09-2	Methylene Chloride	0.8	U
75-34-3	1,1-Dichloroethane	0.3	U
156-59-2	cis-1,2-Dichloroethene	0.3	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	0.3	U
56-23-5	Carbon Tetrachloride	0.3	U
107-06-2	1,2-Dichloroethane	0.3	U
71-43-2	Benzene	0.8	JD
79-01-6	Trichloroethene	0.5	JD
78-87-5	1,2-Dichloropropane	0.3	U
10061-01-5	cis-1,3-Dichloropropene	0.3	U
108-88-3	Toluene	0.9	JD
10061-02-6	trans-1,3-Dichloropropene	0.3	U
79-00-5	1,1,2-Trichloroethane	0.3	U
127-18-4	Tetrachloroethene	0.3	U
106-93-4	1,2-Dibromoethane	0.3	U
108-90-7	Chlorobenzene	0.3	U
100-41-4	Ethylbenzene	0.3	JD
1330-20-7	m/p-Xylene	0.9	JD
95-47-6	o-Xylene	0.4	JD
100-42-5	Styrene	0.3	U
79-34-5	1,1,2,2-Tetrachloroethane	0.3	U
622-96-8	4-Ethyltoluene	0.3	U
108-67-8	1,3,5-Trimethylbenzene	0.3	U
95-63-6	1,2,4-Trimethylbenzene	0.3	U
541-73-1	1,3-Dichlorobenzene	0.8	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.
Limits of quantitation were raised due to low initi

Respectfully Submitted
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Lancaster, PA 17605-2425

Lancaster Laboratories
A Thermo Analytical Laboratory

018136

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:SUMMA0123 Date Collected: 6/14/96 Date Received: 6/17/96
Lab Sample ID:2529884 Date Analyzed: 6/17/96 Time Analyzed:22:24
Canister ID:SUMMA0123 Pressure Rec'd: 6.5 psia Final Pressure: 19.5 psia
Injection Volume: 500.0 cc Nominal Volume: 250 cc Dilution Factor: 1.5
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN17\1001015.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.8	U
100-44-7	Benzyl Chloride	0.3	U
95-50-1	1,2-Dichlorobenzene	0.8	U
120-82-1	1,2,4-Trichlorobenzene	2	U
87-68-3	Hexachlorobutadiene	0.8	U

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Limits of quantitation were raised due to low initial sample pressure.

Respectfully Submitted
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&&&

Analysis Repo

LABORATORY CHRONICI

Lancaster Laboratories
A Thermo Analytical Laboratory

LLI Sample No. AQ 2529884
Collected: 06/14/96 by JP

Submitted: 06/17/96

Summa Canister #0123

LHAAP Burning Ground #3
SDG#:

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

018137

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9001	TO-14 List	EPA Method TO14		06/17/96 2224	George M. Main, Jr.

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LLI Sample No. AQ 2529885
Collected: 6/14/96 by JP

Submitted: 6/17/96 Reported: 7/ 5/96
Discard: 7/ 5/96

Summa Canister #0155

LHAAP Burning Ground #3

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

P.O. 018138
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9001	TO-14 List	See Attached		

Site 3

Production Area

Regular

1 COPY TO Radian International ATTN: Mr. Amine Bou Onk
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1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2300
10:41:00 D 0003 5 REP 126156 520758
386 0.00 00016000 DIS000

Respectfully Submitted
Michele McClarin, B.A.
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VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

018139

Sample No.:SUMMA0155 Date Collected: 6/14/96 Date Received: 6/17/96
Lab Sample ID:2529885 Date Analyzed: 6/18/96 Time Analyzed:00:54
Canister ID:SUMMA0155 Pressure Rec'd: 5.6 psia Final Pressure: 19.9 psia
Injection Volume: 500.0 cc Nominal Volume: 250 cc Dilution Factor: 1.8
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN17\1301018.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.6	JD
76-14-2	Freon 114	0.4	U
74-87-3	Chloromethane	0.4	U
75-01-4	Vinyl Chloride	0.4	U
74-83-9	Bromomethane	0.4	U
75-00-3	Chloroethane	0.4	U
75-69-4	Trichlorofluoromethane	0.4	U
75-35-4	1,1-Dichloroethene	0.4	U
76-13-1	Freon 113	5	B D
67-64-1	Acetone	8	D
107-05-1	3-Chloropropene	0.4	U
75-09-2	Methylene Chloride	0.9	U
75-34-3	1,1-Dichloroethane	0.4	U
156-59-2	cis-1,2-Dichloroethene	0.4	U
67-66-3	Chloroform	0.4	U
71-55-6	1,1,1-Trichloroethane	0.4	U
56-23-5	Carbon Tetrachloride	0.4	U
107-06-2	1,2-Dichloroethane	0.4	U
71-43-2	Benzene	0.7	JD
79-01-6	Trichloroethene	0.5	JD
78-87-5	1,2-Dichloropropane	0.4	U
10061-01-5	cis-1,3-Dichloropropene	0.4	U
108-88-3	Toluene	1	JD
10061-02-6	trans-1,3-Dichloropropene	0.4	U
79-00-5	1,1,2-Trichloroethane	0.4	U
127-18-4	Tetrachloroethene	0.4	U
106-93-4	1,2-Dibromoethane	0.4	U
108-90-7	Chlorobenzene	0.4	U
100-41-4	Ethylbenzene	0.4	U
1330-20-7	m/p-Xylene	0.9	JD
95-47-6	o-Xylene	0.4	U
100-42-5	Styrene	0.4	U
79-34-5	1,1,2,2-Tetrachloroethane	0.4	U
622-96-8	4-Ethyltoluene	0.4	U
108-67-8	1,3,5-Trimethylbenzene	0.4	U
95-63-6	1,2,4-Trimethylbenzene	0.4	U
541-73-1	1,3-Dichlorobenzene	0.9	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.
Limits of quantitation were raised due to low initi

Respectfully Submitted
Michele McClarin, B.A.
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U18140

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:SUMMA0155 Date Collected: 6/14/96 Date Received: 6/17/96
Lab Sample ID:2529885 Date Analyzed: 6/18/96 Time Analyzed:00:54
Canister ID:SUMMA0155 Pressure Rec'd: 5.6 psia Final Pressure: 19.9 psia
Injection Volume: 500.0 cc Nominal Volume: 250 cc Dilution Factor: 1.8
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN17\1301018.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.9	U
100-44-7	Benzyl Chloride	0.4	U
95-50-1	1,2-Dichlorobenzene	0.9	U
120-82-1	1,2,4-Trichlorobenzene	2	U
87-68-3	Hexachlorobutadiene	0.9	U

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B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.
Limits of quantitation were raised due to low initial sample pressure.

Respectfully Submitted
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Group Leader, GC/MS Volatiles

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PO Box 12425
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&&&

Analysis Rep

LABORATORY CHRONICl

Lancaster Laboratories
A Thermo Analytical Laboratory

LLI Sample No. AQ 2529885
Collected: 06/14/96 by JP

Submitted: 06/17/96

Summa Canister #0155

LHAAP Burning Ground #3
SDG#:

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

018141

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9001	TO-14 List	EPA Method TO14		06/18/96 0054	George M. Main, Jr.

MEMBER ACIL
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Lancaster, PA 17605-2425

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018142

LLI Sample No. AQ 2529886
Collected: 6/14/96 by JP

Submitted: 6/17/96 Reported: 7/ 5/96
Discard: 7/ 5/96

Summa Canister #0152

LHAAP Burning Ground #3

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

P.O.
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9001	TO-14 List	See Attached		

Site 3 Duplicate

Production Area

1 COPY TO Radian International ATTN: Mr. Amine Bou Onk
1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2300
10:41:25 D 0003 5 REP 126156 520758
386 0.00 00016000 DIS000

Respectfully Submitted
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018143

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:SUMMA152 Date Collected: 6/14/96 Date Received: 6/17/96
Lab Sample ID:2529886 Date Analyzed: 6/18/96 Time Analyzed:03:24
Canister ID:SUMMA0152 Pressure Rec'd: 7.1 psia Final Pressure: 21.4 psia
Injection Volume: 500.0 cc Nominal Volume: 250 cc Dilution Factor: 1.5
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN17\1601021.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.6	JD
76-14-2	Freon 114	0.3	U
74-87-3	Chloromethane	0.3	U
75-01-4	Vinyl Chloride	0.3	U
74-83-9	Bromomethane	0.3	U
75-00-3	Chloroethane	0.3	U
75-69-4	Trichlorofluoromethane	0.3	U
75-35-4	1,1-Dichloroethene	0.3	U
76-13-1	Freon 113	2	B D
67-64-1	Acetone	8	D
107-05-1	3-Chloropropene	0.3	U
75-09-2	Methylene Chloride	0.8	U
75-34-3	1,1-Dichloroethane	0.3	U
156-59-2	cis-1,2-Dichloroethene	0.3	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	0.3	U
56-23-5	Carbon Tetrachloride	0.3	U
107-06-2	1,2-Dichloroethane	0.3	U
71-43-2	Benzene	0.6	JD
79-01-6	Trichloroethene	0.4	JD
78-87-5	1,2-Dichloropropane	0.3	U
10061-01-5	cis-1,3-Dichloropropene	0.3	U
108-88-3	Toluene	0.8	JD
10061-02-6	trans-1,3-Dichloropropene	0.3	U
79-00-5	1,1,2-Trichloroethane	0.3	U
127-18-4	Tetrachloroethene	0.3	U
106-93-4	1,2-Dibromoethane	0.3	U
108-90-7	Chlorobenzene	0.3	U
100-41-4	Ethylbenzene	0.3	U
1330-20-7	m/p-Xylene	0.4	JD
95-47-6	o-Xylene	0.3	U
100-42-5	Styrene	0.3	U
79-34-5	1,1,2,2-Tetrachloroethane	0.3	U
622-96-8	4-Ethyltoluene	0.3	U
108-67-8	1,3,5-Trimethylbenzene	0.3	U
95-63-6	1,2,4-Trimethylbenzene	0.3	U
541-73-1	1,3-Dichlorobenzene	0.8	U

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B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.
Limits of quantitation were raised due to low initi

Respectfully Submitted
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Lancaster Laboratories
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018144

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:SUMMA152 Date Collected: 6/14/96 Date Received: 6/17/96
Lab Sample ID:2529886 Date Analyzed: 6/18/96 Time Analyzed:03:24
Canister ID:SUMMA0152 Pressure Rec'd: 7.1 psia Final Pressure: 21.4 psia
Injection Volume: 500.0 cc Nominal Volume: 250 cc Dilution Factor: 1.5
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN17\1601021.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.8	U
100-44-7	Benzyl Chloride	0.3	U
95-50-1	1,2-Dichlorobenzene	0.8	U
120-82-1	1,2,4-Trichlorobenzene	2	U
87-68-3	Hexachlorobutadiene	0.8	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.
Limits of quantitation were raised due to low initial sample pressure.

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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&&&

Analysis Rep

LABORATORY CHRONIC

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A Thermo Analytical Laboratory

018145

LLI Sample No. AQ 2529886
Collected: 06/14/96 by JP

Submitted: 06/17/96

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

Summa Canister #0152

LHAAP Burning Ground #3
SDG#:

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9001	TO-14 List	EPA Method TO14		06/18/96 0324	George M. Main, Jr.

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Lancaster, PA 17605-2425

Lancaster Laboratories
A Thermo Analytical Laboratory

LLI Sample No. AQ 2529887
Collected: 6/14/96 by JP

Submitted: 6/17/96 Reported: 7/ 5/96
Discard: 7/ 5/96

Summa Canister #0037

LHAAP Burning Ground #3

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

P.O.
Rel.

018146

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
				See Page 2
5695	TO-14 Form 1	See Attached		
9001	TO-14 List			

Site 4

East Perimeter

1 COPY TO Radian International ATTN: Mr. Amine Bou Onk
1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2300
10:42:09 D 0003 5 REP 126156 520758
386 0.00 00016000 DIS000

Respectfully Submitted
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Lancaster Laboratories
A Thermo Analytical Laboratory

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

018147

Sample No.:SUMMA0037 Date Collected: 6/14/96 Date Received: 6/17/96
Lab Sample ID:2529887 Date Analyzed: 6/18/96 Time Analyzed:05:54
Canister ID:SUMMA0037 Pressure Rec'd: 7.1 psia Final Pressure: 21.4 psia
Injection Volume: 500.0 cc Nominal Volume: 250 cc Dilution Factor: 1.5
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN17\1901024.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.6	JD
76-14-2	Freon 114	0.3	U
74-87-3	Chloromethane	0.3	U
75-01-4	Vinyl Chloride	0.3	U
74-83-9	Bromomethane	0.3	U
75-00-3	Chloroethane	0.3	U
75-69-4	Trichlorofluoromethane	0.3	U
75-35-4	1,1-Dichloroethene	0.3	U
76-13-1	Freon 113	2	B D
67-64-1	Acetone	8	D
107-05-1	3-Chloropropene	0.3	U
75-09-2	Methylene Chloride	0.8	U
75-34-3	1,1-Dichloroethane	0.3	U
156-59-2	cis-1,2-Dichloroethene	0.3	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	0.3	U
56-23-5	Carbon Tetrachloride	0.3	U
107-06-2	1,2-Dichloroethane	0.3	U
71-43-2	Benzene	0.6	JD
79-01-6	Trichloroethene	0.4	JD
78-87-5	1,2-Dichloropropane	0.3	U
10061-01-5	cis-1,3-Dichloropropene	0.3	U
108-88-3	Toluene	0.7	JD
10061-02-6	trans-1,3-Dichloropropene	0.3	U
79-00-5	1,1,2-Trichloroethane	0.3	U
127-18-4	Tetrachloroethene	0.3	U
106-93-4	1,2-Dibromoethane	0.3	U
108-90-7	Chlorobenzene	0.3	U
100-41-4	Ethylbenzene	0.3	U
1330-20-7	m/p-Xylene	0.6	JD
95-47-6	o-Xylene	0.3	U
100-42-5	Styrene	0.3	U
79-34-5	1,1,2,2-Tetrachloroethane	0.3	U
622-96-8	4-Ethyltoluene	0.3	U
108-67-8	1,3,5-Trimethylbenzene	0.3	U
95-63-6	1,2,4-Trimethylbenzene	0.3	U
541-73-1	1,3-Dichlorobenzene	0.8	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.
Limits of quantitation were raised due to low initi

Respectfully Submitted
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Lancaster Laboratories
A Thermo Analytical Laboratory

018148

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:SUMMA0037 Date Collected: 6/14/96 Date Received: 6/17/96
Lab Sample ID:2529887 Date Analyzed: 6/18/96 Time Analyzed:05:54
Canister ID:SUMMA0037 Pressure Rec'd: 7.1 psia Final Pressure: 21.4 psia
Injection Volume: 500.0 cc Nominal Volume: 250 cc Dilution Factor: 1.5
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUN17\1901024.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.8	U
100-44-7	Benzyl Chloride	0.3	U
95-50-1	1,2-Dichlorobenzene	0.8	U
120-82-1	1,2,4-Trichlorobenzene	2	U
87-68-3	Hexachlorobutadiene	0.8	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.
Limits of quantitation were raised due to low initial sample pressure.

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018149

LLI Sample No. AQ 2529887
Collected: 06/14/96 by JP

Submitted: 06/17/96

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

Summa Canister #0037

LHAAP Burning Ground #3
SDG#:

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9001	TO-14 List	EPA Method TO14		06/18/96 0554	George M. Main, Jr.

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See reverse side for explanation of symbols and abbreviations

018150

RUN 3

Baseline Monitoring Results
Run 3
June 28, 1996

Baseline Samples

Run 3

Chain of Custody Record

2538851-56

Page 1 of 1

PROJECT: LHAAP / DEI 018152

SITE: Karnack, TX

COLLECTED BY (Signature): [signature]

FIELD SAMPLE I.D.	SAMPLE MATRIX	DATE/TIME	NO. OF CONTAINERS	ANALYSES: TO-14+Acetone	REMARKS	SAM ID NO. (for lab use only)
0109	Air	6/28/96	1	✓	8-hr sample	
0081	Air	"	1	✓	"	
0063	Air	"	1	✓	"	
0052	Air	"	1	✓	"	
0120	Air	"	1	✓	"	
0008	Air	"	1	✓	"	

REMARKS

RELINQUISHED BY: [signature] DATE 6/28/96 TIME 1730

RECEIVED BY:	DATE	TIME	RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME	RELINQUISHED BY:	DATE	TIME

LAB USE ONLY

RECEIVED FOR LABORATORY BY:	DATE	TIME	AIRBILL NO.	OPENED BY:	DATE	TIME	TEMP°C	SEAL #	CONDITION
L. Smith	7-1-96	0915		L. Smith	7-1-96	0915	N/A	N/A	GOOD

REMARKS: 8620793300

4-88-30337

Site #1 (Background)

Lancaster Laboratories
A Thermo Analytical Laboratory

018153

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0109-
Lab Sample ID:2538851
Canister ID:SUMMA0109
Injection Volume: 625.0 cc
Instrument ID:HP4508

Date Collected: 6/28/96
Date Analyzed: 7/05/96
Pressure Rec'd: 8.1 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUL05\1201017.D

Date Received: 7/01/96
Time Analyzed:21:00
Final Pressure: 20.3 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.7	JD
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.9	JD
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	JD
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.4	JD
75-35-4	1,1-Dichloroethene	0.3	JD
76-13-1	Freon 113	0.8	JD
67-64-1	Acetone	10	D
107-05-1	3-Chloropropene	0.2	U
5-09-2	Methylene Chloride	0.5	JD
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.3	JD
67-66-3	Chloroform	0.3	JD
71-55-6	1,1,1-Trichloroethane	0.4	JD
56-23-5	Carbon Tetrachloride	0.4	JD
107-06-2	1,2-Dichloroethane	0.5	JD
71-43-2	Benzene	1	JD
79-01-6	Trichloroethene	0.7	JD
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.7	JD
108-88-3	Toluene	1	D
10061-02-6	trans-1,3-Dichloropropene	0.8	JD
79-00-5	1,1,2-Trichloroethane	0.9	JD
127-18-4	Tetrachloroethene	1	JD
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	1	D
100-41-4	Ethylbenzene	2	D
1330-20-7	m/p-Xylene	2	D
95-47-6	o-Xylene	0.2	U
100-42-5	Styrene	0.2	U
79-34-5	1,1,2,2-Tetrachloroethane	2	D
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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MEMBER ACIL

Respectfully Submitted
Michele McClarin, B.A.

Lancaster Laboratories
A Thermo Analytical Laboratory

018154

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0109-
Lab Sample ID:2538851
Canister ID:SUMMA0109
Injection Volume: 625.0 cc
Instrument ID:HP4508

Date Collected: 6/28/96
Date Analyzed: 7/05/96
Pressure Rec'd: 8.1 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUL05\1201017.D

Date Received: 7/01/96
Time Analyzed:21:00
Final Pressure: 20.3 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.9	JD
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

Respectfully Submitted
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Group Leader, GC/MS Volatiles

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Analysis Repo

LABORATORY CHRONICL

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018155

LLI Sample No. AQ 2538851
Collected: 06/28/96 by SM

Submitted: 07/01/96

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

Summa Canister #0109

LHAAP Burning Ground #3
0109- SDG#: LHA01-01

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		07/05/96 2100	George M. Main, Jr.

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Lancaster, PA 17605-2425

Site # 2 Star Ranc

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018156

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0081-
Lab Sample ID:2538852
Canister ID:SUMMA0081
Injection Volume: 625.0 cc
Instrument ID:HP4508

Date Collected: 6/28/96
Date Analyzed: 7/05/96
Pressure Rec'd: 9.3 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUL05\0601011.D

Date Received: 7/01/96
Time Analyzed:15:58
Final Pressure: 23.3 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.7	JD
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.8	JD
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.3	JD
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	0.5	U
67-64-1	Acetone	6	D
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.5	U
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.2	U
71-55-6	1,1,1-Trichloroethane	0.2	U
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.4	JD
79-01-6	Trichloroethene	0.2	U
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	0.5	JD
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	0.3	JD
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.4	JD
1330-20-7	m/p-Xylene	0.6	JD
95-47-6	o-Xylene	0.2	U
100-42-5	Styrene	0.2	U
79-34-5	1,1,2,2-Tetrachloroethane	0.5	JD
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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Respectfully Submitted
Michele McClarin, B.A.

See reverse side for explanation of codes and abbreviations

Lancaster Laboratories
A Thermo Analytical Laboratory

018157

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0081-
Lab Sample ID:2538852
Canister ID:SUMMA0081
Injection Volume: 625.0 cc
Instrument ID:HP4508

Date Collected: 6/28/96
Date Analyzed: 7/05/96
Pressure Rec'd: 9.3 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUL05\0601011.D

Date Received: 7/01/96
Time Analyzed:15:58
Final Pressure: 23.3 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

Respectfully Submitted
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Group Leader, GC/MS Volatiles

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Lancaster Laboratories
A Thermo Analytical Laboratory

LABORATORY CHRONICL

LLI Sample No. AQ 2538852
Collected: 06/28/96 by SM

Submitted: 07/01/96

Summa Canister #0081

LHAAP Burning Ground #3
0081- SDG#: LHA01-02

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

018158

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		07/05/96 1558	George M. Main, Jr.

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018159 Page: 1 of 4

LLI Sample No. AQ 2538853
Collected: 6/28/96 by SM

Submitted: 7/ 1/96 Reported: 7/10/96
Discard: 7/10/96

Summa Canister #0063

LHAAP Burning Ground #3
0063- SDG#: LHA01-03

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

P.O. 2379-390
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9301	TO-14 List	0.00000		See Attached

Site # 3 (Production Area)

Regulor

1 COPY TO Radian International ATTN: Mr. Amine Bou Onk
1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2300
07:42:41 D 0003 6 126156 522863
204 0.00 00016000 DIS000

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018160

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0063-
Lab Sample ID:2538853
Canister ID:SUMMA0063
Injection Volume: 750.0 cc
Instrument ID:HP4508

Date Collected: 6/28/96
Date Analyzed: 7/05/96
Pressure Rec'd: 7.6 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUL05\0701012.D

Date Received: 7/01/96
Time Analyzed:16:49
Final Pressure: 23.0 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.6	JD
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.9	JD
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.3	JD
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	0.7	JD
67-64-1	Acetone	11	D
107-05-1	3-Chloropropene	0.2	U
5-09-2	Methylene Chloride	0.5	U
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.2	U
71-55-6	1,1,1-Trichloroethane	0.2	U
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.7	JD
79-01-6	Trichloroethene	0.2	JD
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	0.8	JD
10061-02-6	trans-1,3-Dichloropropene	0.2	JD
79-00-5	1,1,2-Trichloroethane	0.2	JD
127-18-4	Tetrachloroethene	0.3	JD
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.5	JD
1330-20-7	m/p-Xylene	0.7	JD
95-47-6	o-Xylene	0.2	U
100-42-5	Styrene	0.2	U
79-34-5	1,1,2,2-Tetrachloroethane	0.6	JD
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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Respectfully Submitted
Michele McClarin, B.A.

See reverse side for explanation of symbols and abbreviations.

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Q18161

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0063- Date Collected: 6/28/96 Date Received: 7/01/96
Lab Sample ID:2538853 Date Analyzed: 7/05/96 Time Analyzed:16:49
Canister ID:SUMMA0063 Pressure Rec'd: 7.6 psia Final Pressure: 23.0 psia
Injection Volume: 750.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUL05\0701012.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster, PA 17605-2425
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&&&

Analysis Rep

Lancaster Laboratories
A Thermo Analytical Laboratory

LABORATORY CHRONICI

LLI Sample No. AQ 2538853
Collected: 06/28/96 by SM

Submitted: 07/01/96

Summa Canister #0063

LHAAP Burning Ground #3
0063- SDG#: LHA01-03

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

019162

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		07/05/96 1649	George M. Main, Jr.

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Lancaster Laboratories
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018163

LLI Sample No. AQ 2538854
Collected: 6/28/96 by SM

Submitted: 7/ 1/96 Reported: 7/10/96
Discard: 7/10/96

Summa Canister #0052

LHAAP Burning Ground #3
0052- SDG#: LHA01-04

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

P.O. 2379-390
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9301	TO-14 List	0.00000		See Attached

site # 3 (Production Area)

Duplicate

1 COPY TO Radian International ATTN: Mr. Amine Bou Onk
1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2300
07:42:49 D 0003 6 126156 522863
204 0.00 00016000 DIS000

Respectfully Submitted
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Group Leader, GC/MS Volatiles

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Lancaster, PA 17605-2425

Lancaster Laboratories
A Thermo Analytical Laboratory

018164

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0052-
Lab Sample ID:2538854
Canister ID:SUMMA0052
Injection Volume: 625.0 cc
Instrument ID:HP4508

Date Collected: 6/28/96
Date Analyzed: 7/05/96
Pressure Rec'd: 8.5 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUL05\0801013.D

Date Received: 7/01/96
Time Analyzed:17:38
Final Pressure: 21.3 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.7	JD
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.8	JD
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.3	JD
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	0.7	JD
67-64-1	Acetone	10	D
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.5	U
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.2	U
71-55-6	1,1,1-Trichloroethane	0.2	U
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.6	JD
79-01-6	Trichloroethene	0.2	U
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	0.6	JD
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	0.2	U
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.3	JD
1330-20-7	m/p-Xylene	0.6	JD
95-47-6	o-Xylene	0.2	U
100-42-5	Styrene	0.2	U
79-34-5	1,1,2,2-Tetrachloroethane	0.4	JD
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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Respectfully Submitted
Michele McClarin, B.A.

Lancaster Laboratories
A Thermo Analytical Laboratory

019165

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0052- Date Collected: 6/28/96 Date Received: 7/01/96
Lab Sample ID:2538854 Date Analyzed: 7/05/96 Time Analyzed:17:38
Canister ID:SUMMA0052 Pressure Rec'd: 8.5 psia Final Pressure: 21.3 psia
Injection Volume: 625.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUL05\0801013.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

Respectfully Submitted
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Lancaster Laboratories
A Thermo Analytical Laboratory

LABORATORY CHRONICL

018166

LLI Sample No. AQ 2538854
Collected: 06/28/96 by SM

Submitted: 07/01/96

Summa Canister #0052

LHAAP Burning Ground #3
0052- SDG#: LHA01-04

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		07/05/96 1738	George M. Main, Jr.

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018167 Page: 1 of 4

LLI Sample No. AQ 2538855
Collected: 6/28/96 by SM

Submitted: 7/ 1/96 Reported: 7/10/96
Discard: 7/10/96

Summa Canister #0120

LHAAP Burning Ground #3
0120- SDG#: LHA01-05

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

P.O. 2379-390
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9301	TO-14 List	0.00000		See Attached

Site # 4

East Perimeter

1 COPY TO Radian International ATTN: Mr. Amine Bou Onk
1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2300
07:42:58 D 0003 6 126156 522863
204 0.00 00016000 DIS000

Respectfully Submitted
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018168

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0120-
Lab Sample ID:2538855
Canister ID:SUMMA0120
Injection Volume: 750.0 cc
Instrument ID:HP4508

Date Collected: 6/28/96
Date Analyzed: 7/05/96
Pressure Rec'd: 7.2 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUL05\0901014.D

Date Received: 7/01/96
Time Analyzed:18:29
Final Pressure: 21.6 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.7	JD
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.9	JD
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.2	JD
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	0.8	JD
67-64-1	Acetone	12	D
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.5	U
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.2	U
71-55-6	1,1,1-Trichloroethane	0.5	JD
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.6	JD
79-01-6	Trichloroethene	0.2	JD
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	0.7	JD
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	0.2	JD
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	JD
100-41-4	Ethylbenzene	0.5	JD
1330-20-7	m/p-Xylene	0.8	JD
95-47-6	o-Xylene	0.2	JD
100-42-5	Styrene	0.2	U
79-34-5	1,1,2,2-Tetrachloroethane	0.4	JD
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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Respectfully Submitted
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Group Leader GC/MS Volatiles

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018169

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0120-
Lab Sample ID:2538855
Canister ID:SUMMA0120
Injection Volume: 750.0 cc
Instrument ID:HP4508

Date Collected: 6/28/96
Date Analyzed: 7/05/96
Pressure Rec'd: 7.2 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUL05\0901014.D

Date Received: 7/01/96
Time Analyzed:18:29
Final Pressure: 21.6 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

Respectfully Submitted
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Lancaster Laboratories
A Thermo Analytical Laboratory

LABORATORY CHRONICLE

LLI Sample No. AQ 2538855
Collected: 06/28/96 by SM

Submitted: 07/01/96

Summa Canister #0120

LHAAP Burning Ground #3
0120- SDG#: LHA01-05

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

018170

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		07/05/96 1829	George M. Main, Jr.

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018171

RUN 4

Baseline Monitoring Results
Run 4
July 12, 1996

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013174 Page: 1 of 4

LLI Sample No. AQ 2545423
Collected: 7/12/96 by SM

Submitted: 7/15/96 Reported: 7/18/96
Discard: 7/18/96

Summa Canister #0135

LHAAP Burning Ground #3
0135- SDG#: LHA02-01

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

P.O.
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9301	TO-14 List	0.00000		See Attached

Site # 1

Background

1 COPY TO Radian International ATTN: Mr. Amine Bou Onk
1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2300
05:20:54 D 0003 6 126156 524673
204 0.00 00016000 DIS000

Respectfully Submitted
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013175

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0135-
Lab Sample ID:2545423
Canister ID:SUMMA0135
Injection Volume: 500.0 cc
Instrument ID:HP4508

Date Collected: 7/12/96
Date Analyzed: 7/16/96
Pressure Rec'd: 9.6 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUL16\1401018.D

Date Received: 7/15/96
Time Analyzed:21:05
Final Pressure: 19.2 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.7	JD
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.9	JD
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.2	JD
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	3	B D
67-64-1	Acetone	4	D
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.7	JD
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.5	JD
71-55-6	1,1,1-Trichloroethane	1	D
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.7	JD
79-01-6	Trichloroethene	0.4	JD
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	4	B D
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	1	B D
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.9	BJD
1330-20-7	m/p-Xylene	2	B D
95-47-6	o-Xylene	0.8	JD
100-42-5	Styrene	0.3	JD
79-34-5	1,1,2,2-Tetrachloroethane	0.2	U
622-96-8	4-Ethyltoluene	0.2	JD
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.4	JD
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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Respectfully Submitted
Michele McClarin, B.A.

Lancaster Laboratories
A Thermo Analytical Laboratory

018176

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0135-
Lab Sample ID:2545423
Canister ID:SUMMA0135
Injection Volume: 500.0 cc
Instrument ID:HP4508

Date Collected: 7/12/96
Date Analyzed: 7/16/96
Pressure Rec'd: 9.6 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUL16\1401018.D

Date Received: 7/15/96
Time Analyzed:21:05
Final Pressure: 19.2 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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Respectfully Submitted
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Group Leader, GC/MS Volatiles

&&&

Analysis Rep

Lancaster Laboratories
A Thermo Analytical Laboratory

LABORATORY CHRONIC

LLI Sample No. AQ 2545423
Collected: 07/12/96 by SM

Submitted: 07/15/96

Summa Canister #0135

LHAAP Burning Ground #3
0135- SDG#: LHA02-01

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

018177

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		07/16/96 2105	George M. Main, Jr.

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018178 Page: 1 of 4

LLI Sample No. AQ 2545424
Collected: 7/12/96 by SM

Submitted: 7/15/96 Reported: 7/18/96
Discard: 7/18/96

Summa Canister #0049

LHAAP Burning Ground #3
0049- SDG#: LHA02-02

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

P.O.
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9301	TO-14 List	0.00000		See Attached

Site # 2

STAR Ranch

1 COPY TO Radian International ATTN: Mr. Amine Bou Onk
1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2300
05:21:01 D 0003 6 126156 524673
204 0.00 00016000 DIS000

Respectfully Submitted
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Lancaster Laboratories
A Thermo Analytical Laboratory

018179

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0049-
Lab Sample ID:2545424
Canister ID:SUMMA0049
Injection Volume: 625.0 cc
Instrument ID:HP4508

Date Collected: 7/12/96
Date Analyzed: 7/16/96
Pressure Rec'd: 9.3 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUL16\1501019.D

Date Received: 7/15/96
Time Analyzed:21:56
Final Pressure: 23.3 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.6	JD
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.8	JD
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.4	JD
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	2	B D
67-64-1	Acetone	8	D
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.6	JD
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.3	JD
71-55-6	1,1,1-Trichloroethane	0.8	JD
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.6	JD
79-01-6	Trichloroethene	0.4	JD
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	4	B D
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	1	B D
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.7	BJD
1330-20-7	m/p-Xylene	2	B D
95-47-6	o-Xylene	0.6	JD
100-42-5	Styrene	0.3	JD
79-34-5	1,1,2,2-Tetrachloroethane	0.2	U
622-96-8	4-Ethyltoluene	0.2	JD
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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Respectfully Submitted
Michele McClarin, B.A.

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019180

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0049-
Lab Sample ID:2545424
Canister ID:SUMMA0049
Injection Volume: 625.0 cc
Instrument ID:HP4508

Date Collected: 7/12/96
Date Analyzed: 7/16/96
Pressure Rec'd: 9.3 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUL16\1501019.D

Date Received: 7/15/96
Time Analyzed:21:56
Final Pressure: 23.3 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

Respectfully Submitted
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Analysis Rep

Lancaster Laboratories
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LABORATORY CHRONIC

LLI Sample No. AQ 2545424
Collected: 07/12/96 by SM

Submitted: 07/15/96

Summa Canister #0049

LHAAP Burning Ground #3
0049- SDG#: LHA02-02

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

018181

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		07/16/96 2156	George M. Main, Jr.

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Lancaster, PA 17605-2425
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See reverse side for explanation of symbols and abbreviations

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018182 Page: 1 of 4

LLI Sample No. AQ 2545425
Collected: 7/12/96 by SM

Submitted: 7/15/96 Reported: 7/18/96
Discard: 7/18/96

Summa Canister #0143

LHAAP Burning Ground #3
0143- SDG#: LHA02-03

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

P.O.
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9301	TO-14 List	0.00000		See Attached

Site # 3

Production Area

Regular

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1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2300
05:21:09 D 0003 6 126156 524673
204 0.00 00016000 DIS000

Respectfully Submitted
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Group Leader, GC/MS Volatiles

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018183

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0143-
Lab Sample ID:2545425
Canister ID:SUMMA0143
Injection Volume: 625.0 cc
Instrument ID:HP4508

Date Collected: 7/12/96
Date Analyzed: 7/16/96
Pressure Rec'd: 8.9 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUL16\1601020.D

Date Received: 7/15/96
Time Analyzed:22:46
Final Pressure: 22.5 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.7	JD
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.8	JD
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.2	JD
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	2	B D
67-64-1	Acetone	4	D
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.6	JD
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.3	JD
71-55-6	1,1,1-Trichloroethane	0.8	JD
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.7	JD
79-01-6	Trichloroethene	0.4	JD
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	3	B D
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	1	BJD
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.6	BJD
1330-20-7	m/p-Xylene	2	B D
95-47-6	o-Xylene	0.5	JD
100-42-5	Styrene	0.2	JD
79-34-5	1,1,2,2-Tetrachloroethane	0.2	U
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	JD
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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Respectfully Submitted
Michele McClarin, B.A.

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018184

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0143- Date Collected: 7/12/96 Date Received: 7/15/96
Lab Sample ID:2545425 Date Analyzed: 7/16/96 Time Analyzed:22:46
Canister ID:SUMMA0143 Pressure Rec'd: 8.9 psia Final Pressure: 22.5 psia
Injection Volume: 625.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUL16\1601020.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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Group Leader, GC/MS Volatiles

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LABORATORY CHRONIC

019185

LLI Sample No. AQ 2545425
Collected: 07/12/96 by SM

Submitted: 07/15/96

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

Summa Canister #0143

LHAAP Burning Ground #3
0143- SDG#: LHA02-03

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		07/16/96 2246	George M. Main, Jr.

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LLI Sample No. AQ 2545426
Collected: 7/12/96 by SM

Submitted: 7/15/96 Reported: 7/18/96
Discard: 7/18/96

Summa Canister #0018

LHAAP Burning Ground #3
0018- SDG#: LHA02-04

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

P.O. 018186
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9301	TO-14 List	0.00000		See Attached

Site #3
Production Area
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1 COPY TO Data Package Group

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Eileen R. Hostetler at (717) 656-2300
05:21:17 D 0003 6 126156 524673
204 0.00 00016000 DIS000

Respectfully Submitted
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Group Leader, GC/MS Volatiles

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018187

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0018-
Lab Sample ID:2545426
Canister ID:SUMMA0018
Injection Volume: 625.0 cc
Instrument ID:HP4508

Date Collected: 7/12/96
Date Analyzed: 7/16/96
Pressure Rec'd: 8.9 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUL16\1701021.D

Date Received: 7/15/96
Time Analyzed:23:36
Final Pressure: 22.3 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.6	JD
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.8	JD
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.3	JD
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	2	B D
67-64-1	Acetone	8	D
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.6	JD
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.3	JD
71-55-6	1,1,1-Trichloroethane	0.7	JD
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.6	JD
79-01-6	Trichloroethene	0.3	JD
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	3	B D
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	0.9	BJD
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.6	BJD
1330-20-7	m/p-Xylene	2	B D
95-47-6	o-Xylene	0.4	JD
100-42-5	Styrene	0.2	JD
79-34-5	1,1,2,2-Tetrachloroethane	0.2	U
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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Respectfully Submitted
Michele McClarin, B.A.

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018188

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0018-
Lab Sample ID:2545426
Canister ID:SUMMA0018
Injection Volume: 625.0 cc
Instrument ID:HP4508

Date Collected: 7/12/96
Date Analyzed: 7/16/96
Pressure Rec'd: 8.9 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUL16\1701021.D

Date Received: 7/15/96
Time Analyzed:23:36
Final Pressure: 22.3 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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Respectfully Submitted
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Group Leader, GC/MS Volatiles

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LABORATORY CHRONIC

018189

LLI Sample No. AQ 2545426
Collected: 07/12/96 by SM

Submitted: 07/15/96

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

Summa Canister #0018

LHAAP Burning Ground #3
0018- SDG#: LHA02-04

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		07/16/96 2336	George M. Main, Jr.

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018190

LLI Sample No. AQ 2545427
Collected: 7/12/96 by SM

Submitted: 7/15/96 Reported: 7/18/96
Discard: 7/18/96

Summa Canister #0021

LHAAP Burning Ground #3
0021- SDG#: LHA02-05

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

P.O.
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9301	TO-14 List	0.00000		See Attached

Site # 4

East Perimeter

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1 COPY TO Data Package Group

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Eileen R. Hostetler at (717) 656-2300
05:21:24 D 0003 6 126156 524673
204 0.00 00016000 DIS000

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019191

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0021-
Lab Sample ID:2545427
Canister ID:SUMMA0021
Injection Volume: 625.0 cc
Instrument ID:HP4508

Date Collected: 7/12/96
Date Analyzed: 7/17/96
Pressure Rec'd: 9.4 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUL16\1801022.D

Date Received: 7/15/96
Time Analyzed:00:26
Final Pressure: 23.5 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.6	JD
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.8	JD
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.4	JD
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	2	B D
67-64-1	Acetone	9	D
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.6	JD
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.2	JD
71-55-6	1,1,1-Trichloroethane	0.4	JD
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.6	JD
79-01-6	Trichloroethene	0.3	JD
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	2	B D
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	0.6	BJD
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.4	BJD
1330-20-7	m/p-Xylene	1	B D
95-47-6	o-Xylene	0.4	JD
100-42-5	Styrene	0.2	U
79-34-5	1,1,2,2-Tetrachloroethane	0.2	U
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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Respectfully Submitted
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018192

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0021-
Lab Sample ID:2545427
Canister ID:SUMMA0021
Injection Volume: 625.0 cc
Instrument ID:HP4508

Date Collected: 7/12/96
Date Analyzed: 7/17/96
Pressure Rec'd: 9.4 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUL16\1801022.D

Date Received: 7/15/96
Time Analyzed:00:26
Final Pressure: 23.5 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. - D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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Respectfully Submitted
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Group Leader, GC/MS Volatiles

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LABORATORY CHRONIC

LLI Sample No. AQ 2545427
Collected: 07/12/96 by SM

Submitted: 07/15/96

Summa Canister #0021

LHAAP Burning Ground #3
0021- SDG#: LHA02-05

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

018193

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		07/17/96 0026	George M. Main, Jr.

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Lancaster, PA 17605-2425
717-656-2300 Fax 717-656-2681

See reverse side for explanation of symbols and abbreviations

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018194 Page: 1 of 4

LLI Sample No. AQ 2545428
Collected: 7/12/96 by SM

Submitted: 7/15/96 Reported: 7/18/96
Discard: 7/18/96

Summa Canister #0088

LHAAP Burning Ground #3
0088- SDG#: LHA02-06

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

P.O.
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9301	TO-14 List	0.00000		See Attached

Trip
Field Blank

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Eileen R. Hostetler at (717) 656-2300
05:21:32 D 0003 6 126156 524673
204 0.00 00016000 DIS000

Respectfully Submitted
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Group Leader, GC/MS Volatiles

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018195

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0088-
Lab Sample ID:2545428
Canister ID:SUMMA0088
Injection Volume: 250.0 cc
Instrument ID:HP4508

Date Collected: 7/12/96
Date Analyzed: 7/17/96
Pressure Rec'd: 0.8 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUL16\1901023.D

Date Received: 7/15/96
Time Analyzed:01:13
Final Pressure: 24.7 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.2	U
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.2	U
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.2	U
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	4	B D
67-64-1	Acetone	1	JD
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.5	U
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.4	JD
71-55-6	1,1,1-Trichloroethane	2	D
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.2	U
79-01-6	Trichloroethene	0.3	JD
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	3	B D
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	1	B D
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.4	BJD
1330-20-7	m/p-Xylene	1	B D
95-47-6	o-Xylene	0.2	JD
100-42-5	Styrene	0.2	U
79-34-5	1,1,2,2-Tetrachloroethane	0.2	U
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.
NOTE: This sample was assumed to be a field blank. Respectfully Submitted
zero grad[illegible]r and analyzed. No dilution fac Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

Lancaster Laboratories
A Thermo Analytical Laboratory

018196

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0088- Date Collected: 7/12/96 Date Received: 7/15/96
Lab Sample ID:2545428 Date Analyzed: 7/17/96 Time Analyzed:01:13
Canister ID:SUMMA0088 Pressure Rec'd: 0.8 psia Final Pressure: 24.7 psia
Injection Volume: 250.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUL16\1901023.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.
NOTE: This sample was assumed to be a field blank. It was filled with zero grade humid air and analyzed. No dilution factor was applied.

MEMBER ACIL
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2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

&&&

Lancaster Laboratories
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LABORATORY CHRONICL

018197

LLI Sample No. AQ 2545428
Collected: 07/12/96 by SM

Submitted: 07/15/96

Summa Canister #0088

LHAAP Burning Ground #3
0088- SDG#: LHA02-06

Account No: 09206
Radian International
Longhorn Army Ammunitions Plan
Karnack TX 75661

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		07/17/96 0113	George M. Main, Jr.

018198

RUN 5

Baseline Monitoring Results
Run 5
July 26, 1996

Lancaster Laboratories
A Thermo Analytical Laboratory

018200

LLI Sample No. AQ 2554553
Collected: 7/26/96 by JBO

Submitted: 7/29/96 Reported: 8/ 6/96
Discard: 8/ 6/96

Site #1 Summa Canister #0004

LHAAP Burning Ground #5
0004- SDG#: LHA03-01

Account No: 09206
Radian International/Dow Env.
Longhorn Army Ammunitions Plan
PO Box 107
Karnack TX 75661

P.O. 2379-390
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9301	TO-14 List	0.00000		See Attached

Site #1

Background (Magazine)

1 COPY TO Dow Environmental ATTN: Mr. Amine Bou Onk
1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2300
11:13:15 D 0003 6 126156 526725
204 0.00 00016000 DIS000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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PO Box 12425
Lancaster PA 17605-2425

Lancaster Laboratories
A Thermo Analytical Laboratory

018201

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0004- Date Collected: 7/26/96 Date Received: 7/29/96
Lab Sample ID:2554553 Date Analyzed: 7/31/96 Time Analyzed:21:31
Canister ID:SUMMA0004 Pressure Rec'd: 8.6 psia Final Pressure: 21.6 psia
Injection Volume: 625.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUL31\0801014.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.2	U
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	1	D
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.4	JD
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	0.9	JD
67-64-1	Acetone	7	D
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.5	U
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.2	U
71-55-6	1,1,1-Trichloroethane	0.2	JD
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.7	JD
79-01-6	Trichloroethene	0.2	U
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	1	D
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	2	B D
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.2	JD
1330-20-7	m/p-Xylene	0.7	JD
95-47-6	o-Xylene	0.2	JD
100-42-5	Styrene	0.2	U
79-34-5	1,1,2,2-Tetrachloroethane	0.2	U
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	JD
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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Respectfully Submitted
Michele McClarin, B.A.

Lancaster Laboratories
A Thermo Analytical Laboratory

018202

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0004- Date Collected: 7/26/96 Date Received: 7/29/96
Lab Sample ID:2554553 Date Analyzed: 7/31/96 Time Analyzed:21:31
Canister ID:SUMMA0004 Pressure Rec'd: 8.6 psia Final Pressure: 21.6 psia
Injection Volume: 625.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUL31\0801014.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster PA 17605-2425

&&&

Analysis Repo

LABORATORY CHRONICI

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018203

LLI Sample No. AQ 2554553
Collected: 07/26/96 by JBO

Submitted: 07/29/96

Site #1 Summa Canister #0004

LHAAP Burning Ground #5
0004- SDG#: LHA03-01

Account No: 09206
Radian International/Dow Env.
Longhorn Army Ammunitions Plan
PO Box 107
Karnack TX 75661

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		07/31/96 2131	George M. Main, Jr.

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018204 Page: 1 of 4

LLI Sample No. AQ 2554554
Collected: 7/26/96 by JBO

Submitted: 7/29/96 Reported: 8/ 6/96
Discard: 8/ 6/96

Site #2 Summa Canister #0151

LHAAP Burning Ground #5
0151- SDG#: LHA03-02

Account No: 09206
Radian International/Dow Env.
Longhorn Army Ammunitions Plan
PO Box 107
Karnack TX 75661

P.O. 2379-390
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9301	TO-14 List	0.00000		See Attached

Site #2

Star Ranch

1 COPY TO Dow Environmental ATTN: Mr. Amine Bou Onk
1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2300
11:14:02 D 0003 6 126156 526725
204 0.00 00016000 DIS000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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2425 New Holland Pike
PO Box 12425

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018205

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0151-
Lab Sample ID:2554554
Canister ID:SUMMA0151
Injection Volume: 750.0 cc
Instrument ID:HP4508

Date Collected: 7/26/96
Date Analyzed: 7/31/96
Pressure Rec'd: 7.6 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\JUL31\0901015.D

Date Received: 7/29/96
Time Analyzed:22:22
Final Pressure: 23.0 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.7	JD
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	1	D
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.4	JD
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	0.7	JD
67-64-1	Acetone	6	D
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.5	U
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.2	U
71-55-6	1,1,1-Trichloroethane	0.6	JD
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.5	JD
79-01-6	Trichloroethene	0.2	U
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	1	D
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	2	B D
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.2	JD
1330-20-7	m/p-Xylene	0.6	JD
95-47-6	o-Xylene	0.2	JD
100-42-5	Styrene	0.2	U
79-34-5	1,1,2,2-Tetrachloroethane	0.2	U
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

MEMBER ACIL
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Respectfully Submitted
Michele McClarin, B.A.

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A Thermo Analytical Laboratory

018206

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0151- Date Collected: 7/26/96 Date Received: 7/29/96
Lab Sample ID:2554554 Date Analyzed: 7/31/96 Time Analyzed:22:22
Canister ID:SUMMA0151 Pressure Rec'd: 7.6 psia Final Pressure: 23.0 psia
Injection Volume: 750.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUL31\0901015.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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PO Box 12425
Lancaster PA 17605-2425

&&&

Analysis Repo

LABORATORY CHRONI

Lancaster Laboratories
A Thermo Analytical Laboratory

LLI Sample No. AQ 2554554
Collected: 07/26/96 by JBO

Submitted: 07/29/96

Site #2 Summa Canister #0151

LHAAP Burning Ground #5
0151- SDG#: LHA03-02

Account No: 09206
Radian International/Dow Env.
Longhorn Army Ammunitions Plan
PO Box 107
Karnack TX 75661

018207

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		07/31/96 2222	George M. Main, Jr.

MEMBER ACIL
Lancaster Laboratories
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PO Box 12425
Lancaster PA 17605-2425

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018208

LLI Sample No. AQ 2554555
Collected: 7/26/96 by JBO

Submitted: 7/29/96 Reported: 8/ 6/96
Discard: 8/ 6/96

Site #3 Summa Canister #0030

LHAAP Burning Ground #5
0030- SDG#: LHA03-03

Account No: 09206
Radian International/Dow Env.
Longhorn Army Ammunitions Plan
PO Box 107
Karnack TX 75661

P.O. 2379-390
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9301	TO-14 List	0.00000		See Attached

Site #3
Production Area
Regular

1 COPY TO Dow Environmental ATTN: Mr. Amine Bou Onk
1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2300
11:14:29 D 0003 6 126156 526725
204 0.00 00016000 DIS000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster, PA 17605-2425

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A Thermo Analytical Laboratory

018209

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0030-
Lab Sample ID:2554555
Canister ID:SUMMA0030
Injection Volume: 625.0 cc
Instrument ID:HP4508

Date Collected: 7/26/96
Date Analyzed: 8/02/96
Pressure Rec'd: 8.2 psia
Nominal Volume: 250 cc
Lab File ID:C:\HPCHEM\1\DATA\AUG02\0901002.D

Date Received: 7/29/96
Time Analyzed:15:02
Final Pressure: 20.6 psia
Dilution Factor: 1.0

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.6	JD
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	1	JD
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.3	JD
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	1	D
67-64-1	Acetone	7	D
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.5	U
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.2	U
71-55-6	1,1,1-Trichloroethane	0.2	JD
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.6	JD
79-01-6	Trichloroethene	0.2	U
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	1	D
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	1	B D
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.5	JD
1330-20-7	m/p-Xylene	1	D
95-47-6	o-Xylene	0.5	JD
100-42-5	Styrene	0.2	U
79-34-5	1,1,2,2-Tetrachloroethane	0.2	U
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

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Respectfully Submitted
Michele McClarin, B.A.

Lancaster Laboratories
A Thermo Analytical Laboratory

018210

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:0030- Date Collected: 7/26/96 Date Received: 7/29/96
Lab Sample ID:2554555 Date Analyzed: 8/02/96 Time Analyzed:15:02
Canister ID:SUMMA0030 Pressure Rec'd: 8.2 psia Final Pressure: 20.6 psia
Injection Volume: 625.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\AUG02\0901002.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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&&&

Analysis Repo

LABORATORY CHRONICI

Lancaster Laboratories
A Thermo Analytical Laboratory

018211

LLI Sample No. AQ 2554555
Collected: 07/26/96 by JBO

Submitted: 07/29/96

Site #3 Summa Canister #0030

LHAAP Burning Ground #5
0030- SDG#: LHA03-03

Account No: 09206
Radian International/Dow Env.
Longhorn Army Ammunitions Plan
PO Box 107
Karnack TX 75661

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		08/02/96 1502	George M. Main, Jr.

Lancaster Laboratories
A Thermo Analytical Laboratory

018212

LLI Sample No. AQ 2554556
Collected: 7/26/96 by JBO

Submitted: 7/29/96 Reported: 8/ 6/96
Discard: 8/ 6/96

Site #3D Summa Canister #0133

LHAAP Burning Ground #5
-0133 SDG#: LHA03-04

Account No: 09206
Radian International/Dow Env.
Longhorn Army Ammunitions Plan
PO Box 107
Karnack TX 75661

P.O. 2379-390
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9301	TO-14 List	0.00000		See Attached

Site #3
Production Area
Duplicate

1 COPY TO Dow Environmental ATTN: Mr. Amine Bou Onk
1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2300
11:15:13 D 0003 6 126156 526725
204 0.00 00016000 DIS000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster Laboratories
2425 New Holland Pike
PO Box 12425
Lancaster PA 17605-2425

Lancaster Laboratories
A Thermo Analytical Laboratory

018213

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:-0133 Date Collected: 7/26/96 Date Received: 7/29/96
Lab Sample ID:2554556 Date Analyzed: 8/01/96 Time Analyzed:00:02
Canister ID:SUMMA0133 Pressure Rec'd: 7.5 psia Final Pressure: 22.7 psia
Injection Volume: 750.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUL31\1101017.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.6	JD
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.8	JD
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.4	JD
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	1	D
67-64-1	Acetone	7	D
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.5	U
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.2	U
71-55-6	1,1,1-Trichloroethane	0.3	JD
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.5	JD
79-01-6	Trichloroethene	0.2	U
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	1	JD
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	1	B D
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.2	U
1330-20-7	m/p-Xylene	0.5	JD
95-47-6	o-Xylene	0.2	U
100-42-5	Styrene	0.2	U
79-34-5	1,1,2,2-Tetrachloroethane	0.2	U
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

MEMBER ACIL
Lancaster Laboratories
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PO Box 12425
Lancaster, PA 17605-2425

Respectfully Submitted
Michele McClarin, B.A.

Lancaster Laboratories
A Thermo Analytical Laboratory

018214

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:-0133 Date Collected: 7/26/96 Date Received: 7/29/96
Lab Sample ID:2554556 Date Analyzed: 8/01/96 Time Analyzed:00:02
Canister ID:SUMMA0133 Pressure Rec'd: 7.5 psia Final Pressure: 22.7 psia
Injection Volume: 750.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUL31\1101017.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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PO Box 12425
Lancaster PA 17605-2425

Analysis Rep

Lancaster Laboratories
A Thermo Analytical Laboratory

LABORATORY CHRONIC

LLI Sample No. AQ 2554556
Collected: 07/26/96 by JBO

Submitted: 07/29/96

Site #3D Summa Canister #0133

LHAAP Burning Ground #5
-0133 SDG#: LHA03-04

Account No: 09206
Radian International/Dow Env.
Longhorn Army Ammunitions Plan
PO Box 107
Karnack TX 75661

018215

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		08/01/96 0002	George M. Main, Jr.

Lancaster Laboratories
A Thermo Analytical Laboratory

018216

LLI Sample No. AQ 2554557
Collected: 7/26/96 by JBO

Submitted: 7/29/96 Reported: 8/ 6/96
Discard: 8/ 6/96

Site #4 Summa Canister #0162

LHAAP Burning Ground #5
-0162 SDG#: LHA03-05

Account No: 09206
Radian International/Dow Env.
Longhorn Army Ammunitions Plan
PO Box 107
Karnack TX 75661

P.O. 2379-390
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9301	TO-14 List	0.00000		See Attached

Site #4
East Perimeter

1 COPY TO Dow Environmental ATTN: Mr. Amine Bou Onk
1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2300
11:15:37 D 0003 6 126156 526725
204 0.00 00016000 DIS000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster, PA 17605-2425

Lancaster Laboratories
A Thermo Analytical Laboratory

018217

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:-0162 Date Collected: 7/26/96 Date Received: 7/29/96
Lab Sample ID:2554557 Date Analyzed: 8/01/96 Time Analyzed:00:51
Canister ID:SUMMA0162 Pressure Rec'd: 8.3 psia Final Pressure: 20.8 psia
Injection Volume: 625.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUL31\1201018.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.7	JD
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.9	JD
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.3	JD
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	0.6	JD
67-64-1	Acetone	5	D
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.5	U
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.2	U
71-55-6	1,1,1-Trichloroethane	0.2	U
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.6	JD
79-01-6	Trichloroethene	0.2	U
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	0.9	JD
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	1	B D
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.2	U
1330-20-7	m/p-Xylene	0.5	JD
95-47-6	o-Xylene	0.2	U
100-42-5	Styrene	0.2	U
79-34-5	1,1,2,2-Tetrachloroethane	0.2	U
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

MEMBER ACIL
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Lancaster PA 17605-2425

Respectfully Submitted
Michele McClarin, B.A.

Lancaster Laboratories
A Thermo Analytical Laboratory

018218

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:-0162 Date Collected: 7/26/96 Date Received: 7/29/96
Lab Sample ID:2554557 Date Analyzed: 8/01/96 Time Analyzed:00:51
Canister ID:SUMMA0162 Pressure Rec'd: 8.3 psia Final Pressure: 20.8 psia
Injection Volume: 625.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUL31\1201018.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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PO Box 12425
Lancaster PA 17605-2425

&&&

Analysis Repo

LABORATORY CHRONICI

Lancaster Laboratories
A Thermo Analytical Laboratory

LLI Sample No. AQ 2554557
Collected: 07/26/96 by JBO

Submitted: 07/29/96

Site #4 Summa Canister #0162

LHAAP Burning Ground #5
-0162 SDG#: LHA03-05

Account No: 09206
Radian International/Dow Env.
Longhorn Army Ammunitions Plan
PO Box 107
Karnack TX 75661

018219

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		08/01/96 0051	George M. Main, Jr.

Lancaster Laboratories
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018220 Page: 1 of 4

LLI Sample No. AQ 2554558
Collected:

Submitted: 7/29/96 Reported: 8/ 6/96
Discard: 8/ 6/96

Trip Blank Summa Canister #0156

LHAAP Burning Ground #5
-0156 SDG#: LHA03-06TB

Account No: 09206
Radian International/Dow Env.
Longhorn Army Ammunitions Plan
PO Box 107
Karnack TX 75661

P.O. 2379-390
Rel.

CAT NO.	ANALYSIS NAME	AS RECEIVED RESULTS	LIMIT OF QUANTITATION	UNITS
5695	TO-14 Form 1			See Page 2
9301	TO-14 List	0.00000		See Attached

Trip Blank

1 COPY TO Dow Environmental ATTN: Mr. Amine Bou Onk
1 COPY TO Radian International ATTN: Mr. Steve Mischler
1 COPY TO Data Package Group

Questions? Contact your Client Services Representative
Eileen R. Hostetler at (717) 656-2300
11:16:05 D 0003 6 126156 526725
204 0.00 00016000 DIS000

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

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Lancaster PA 17605-2425

Lancaster Laboratories
A Thermo Analytical Laboratory

018221

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:-0156 Date Collected: / / Date Received: 7/29/96
Lab Sample ID:2554558 Date Analyzed: 8/01/96 Time Analyzed:01:38
Canister ID:SUMMA0156 Pressure Rec'd: 0.1 psia Final Pressure: 24.7 psia
Injection Volume: 250.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUL31\1301019.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
75-71-8	Dichlorodifluoromethane	0.2	U
76-14-2	Freon 114	0.2	U
74-87-3	Chloromethane	0.2	U
75-01-4	Vinyl Chloride	0.2	U
74-83-9	Bromomethane	0.2	U
75-00-3	Chloroethane	0.2	U
75-69-4	Trichlorofluoromethane	0.2	U
75-35-4	1,1-Dichloroethene	0.2	U
76-13-1	Freon 113	0.6	JD
67-64-1	Acetone	1	U
107-05-1	3-Chloropropene	0.2	U
75-09-2	Methylene Chloride	0.5	U
75-34-3	1,1-Dichloroethane	0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	U
67-66-3	Chloroform	0.2	U
71-55-6	1,1,1-Trichloroethane	0.3	JD
56-23-5	Carbon Tetrachloride	0.2	U
107-06-2	1,2-Dichloroethane	0.2	U
71-43-2	Benzene	0.2	U
79-01-6	Trichloroethene	0.2	U
78-87-5	1,2-Dichloropropane	0.2	U
10061-01-5	cis-1,3-Dichloropropene	0.2	U
108-88-3	Toluene	0.2	U
10061-02-6	trans-1,3-Dichloropropene	0.2	U
79-00-5	1,1,2-Trichloroethane	0.2	U
127-18-4	Tetrachloroethene	0.6	BJD
106-93-4	1,2-Dibromoethane	0.2	U
108-90-7	Chlorobenzene	0.2	U
100-41-4	Ethylbenzene	0.2	U
1330-20-7	m/p-Xylene	0.2	U
95-47-6	o-Xylene	0.2	U
100-42-5	Styrene	0.2	U
79-34-5	1,1,2,2-Tetrachloroethane	0.2	U
622-96-8	4-Ethyltoluene	0.2	U
108-67-8	1,3,5-Trimethylbenzene	0.2	U
95-63-6	1,2,4-Trimethylbenzene	0.2	U
541-73-1	1,3-Dichlorobenzene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.
This sample was assumed to be a trip blank. No dil

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

MEMBER ACIL
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2425 New Holland Pike
PO Box 12425
Lancaster PA 17605-2425

Lancaster Laboratories
A Thermo Analytical Laboratory

018222

VOLATILE ORGANICS IN AIR
SUMMA CANISTER SAMPLE
ANALYSIS DATA SHEET

Sample No.:-0156 Date Collected: / / Date Received: 7/29/96
Lab Sample ID:2554558 Date Analyzed: 8/01/96 Time Analyzed:01:38
Canister ID:SUMMA0156 Pressure Rec'd: 0.1 psia Final Pressure: 24.7 psia
Injection Volume: 250.0 cc Nominal Volume: 250 cc Dilution Factor: 1.0
Instrument ID:HP4508 Lab File ID:C:\HPCHEM\1\DATA\JUL31\1301019.D

CAS RN	COMPOUND NAME	CONCENTRATION (PPBV)	Q
106-46-7	1,4-Dichlorobenzene	0.5	U
100-44-7	Benzyl Chloride	0.2	U
95-50-1	1,2-Dichlorobenzene	0.5	U
120-82-1	1,2,4-Trichlorobenzene	1	U
87-68-3	Hexachlorobutadiene	0.5	U

U = Compound was undetected at the specified limit of detection.
B = Compound was found in method blank. D = analysis of diluted sample.
J = Compound detected but below the limit of quantitation.
This sample was assumed to be a trip blank. No dilution factor was applied.

Respectfully Submitted
Michele McClarin, B.A.
Group Leader, GC/MS Volatiles

MEMBER ACIL
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2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425

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Analysis Repor

Lancaster Laboratories
A Thermo Analytical Laboratory

LABORATORY CHRONICLE

018223

LLI Sample No. AQ 2554558
Collected:

Submitted: 07/29/96

Trip Blank Summa Canister #0156

LHAAP Burning Ground #5
-0156 SDG#: LHA03-06TB

Account No: 09206
Radian International/Dow Env.
Longhorn Army Ammunitions Plan
PO Box 107
Karnack TX 75661

CAT NO	ANALYSIS NAME	METHOD	TRIAL	ANALYSIS DATE AND TIME	ANALYST
9301	TO-14 List	EPA Method TO14		08/01/96 0138	George M. Main, Jr.

DEPARTMENT OF THE ARMY
U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE
5158 BLACKHAWK ROAD
ABERDEEN PROVING GROUND, MARYLAND 21010-5422

SEP 16 1996

REPLY TO
ATTENTION OF

MCHB-DC-EHR (40)

018224

MEMORANDUM FOR District Engineer, U.S. Army Engineering District, Tulsa, ATTN: CESWT-PP-EA/Ms. Jonna Polk, Post Office Box 61, Tulsa, OK 74121-0061

SUBJECT: Draft Final Field Summary Report for the Phase II, Group 2 Sites Remedial Investigation at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas, July 1996

1. The U.S. Army Center for Health Promotion and Preventive Medicine reviewed without comment the subject document on behalf of the Office of The Surgeon General. We received only one copy of the subject document, which did not allow a matrixed review of the document. In the future, please send seven copies of a document for a matrixed review.

2. The scientist reviewing this document and our point of contact is Mr. William Sharland, Environmental Health Risk Assessment and Risk Communication Program, at DSN 584-2953 or commercial (410) 671-2953.

FOR THE COMMANDER:

Arthur P. Lee

ARTHUR P. LEE, P.E.
MAJ, MS
Program Manager, Environmental Health Risk Assessment and Risk Communication

CF:
HQDA(DASG-HS-PE)
CDR, USAMEDCOM, ATTN: MCHO-CL-W
CDR, AMCEN-A\ Pete Cunanan
CDR, USAEC, ATTN: SFIM-AEC-RPO
CDR, CEMRD, ATTN: CEMRD-ET-EH
CDR, LHAAP, ATTN: SMLO-EN

Readiness thru Health

DEPARTMENT OF THE ARMY
LONGHORN/LOUISIANA army AMMUNITION PLANTS
MARSHALL, TEXAS 75671-1059

REPLY TO ATTENTION OF

October 2, 1996

SIOLH-CR

013225

Ms. Diane Poteet
Superfund Investigation Section
Texas Natural Resource Conservation Commission
Post Office Box 13087
Austin, TX 78711-3087

SUBJECT: Total Environmental Restoration Contract (TERC) Proposed Revisions to the Final Project, Work Plans for Longhorn Army Ammunition Plant, Karnack, Texas

Dear Ms. Poteet:

This letter is to advise that plans and specifications for the Longhorn Army Ammunition Plant Landfills 12 and 16, which were approved by TNRCC and EPA, have had minimal revisions, and those specific revisions are enclosed for your review and concurrence.

Following a review of the final plans and specifications, some discrepancies were discovered. The soil cover depth and liner options have been clarified. Also, specification Section 02442, page 1, first paragraph has been rewritten for clarity and the liner thickness on page 4 has been changed from 18 mil to 20 mil.

The full sized drawings will be redlined in the field following concurrence.

Please advise the Army of your approval of these revisions within the next two weeks.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

James McPherson
Commander's Representative

Enclosures

DEPARTMENT OF THE ARMY
LONGHORN/LOUISIANA ARMY AMMUNITION PLANTS
MARSHALL TEXAS 75671-1059

REPLY TO ATTENTION OF

October 2, 1996

SIOLH-CR

018226

Mr. Chris Villareal
Superfund Division (6SF-AT)
U.S. Environmental Protection Agency
1445 Ross Avenue
Dallas, TX 75202-2733

SUBJECT: Total Environmental Restoration Contract (TERC)
Proposed Revisions to the Final Project, Work Plans for Longhorn Army Ammunition Plant, Karnack, Texas

Dear Mr. Villareal:

This letter is to advise that plans and specifications for the Longhorn Army Ammunition Plant Landfills 12 and 16, which were approved by TNRCC and EPA, have had minimal revisions, and those specific revisions are enclosed for your review and concurrence.

Following a review of the final plans and specifications, some discrepancies were discovered. The soil cover depth and liner options have been clarified. Also, specification Section 02442, page 1, first paragraph has been rewritten for clarity and the liner thickness on page 4 has been changed from 18 mil to 20 mil.

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Please advise the Army of your approval of these revisions within the next two weeks.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

James McPherson
Commander's Representative

Enclosures

DEPARTMENT OF THE ARMY
LONGHORN/LOUISIANA ARMY AMMUNITION PLANTS
MARSHALL, TEXAS 75671-1059

REPLY TO ATTENTION OF

October 2, 1996

SIOLH-CR

018227

Mr. H.L. Jones
Texas Natural Resource Conservation Commission
2916 Teague Drive
Tyler, TX 75701

SUBJECT: Total Environmental Restoration Contract (TERC) Proposed Revisions to the Final Project, Work Plans for Longhorn Army Ammunition Plant, Karnack, Texas

Dear Mr. Jones:

This letter is to advise that plans and specifications for the Longhorn Army Ammunition Plant Landfills 12 and 16, which were approved by TNRCC and EPA, have had minimal revisions, and those specific revisions are enclosed for your review and concurrence.

Following a review of the final plans and specifications, some discrepancies were discovered. The soil cover depth and liner options have been clarified. Also, specification Section 02442, page 1, first paragraph has been rewritten for clarity and the liner thickness on page 4 has been changed from 18 mil to 20 mil.

The full sized drawings will be redlined in the field following concurrence.

Please advise the Army of your approval of these revisions within the next two weeks.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

James McPherson
Commander's Representative

Enclosure

DEPARTMENT OF THE ARMY
U.S. ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE
5158 BLACKHAWK ROAD
ABERDEEN PROVING GROUND, MARYLAND 21010-5422

REPLY TO
ATTENTION OF

013228

MCHB-DC-EHR (40)

07 OCT 1996

MEMORANDUM FOR Commander, U.S. Army Environmental Center,
ATTN: SFIM-AEC-ETD, Aberdeen Proving Ground,
MD 21010-5410

SUBJECT: Treatment Simulation and Toxicity Testing Results of Site 16 Groundwater, Longhorn Army Ammunition Plant, Karnack, Texas, 12 July 1996

1. The U.S. Army Center for Health Promotion and Preventive Medicine has reviewed the subject document on behalf of the Office of The Surgeon General.

2. The subject document is not well organized, and our ability to evaluate it was hampered by this. Additionally, information critical to the interpretation of the reported data (e.g., procedures, definitions of terms, etc.) is not supplied. Because a proper scientific review could not be conducted, we cannot supply an opinion of whether or not the reported results support a decision to perform any groundwater or other remediation effort at Longhorn Army Ammunition Plant at the present time.

3. In the future, our Center would prefer to see drafts of all such toxicity testing protocols. Our early input into the development of such testing schemes would facilitate our concurrence on reports such as the subject document.

4. Our point of contact is Mr. Larry Tannenbaum, Environmental Health Risk Assessment and Risk Communication, at DSN 584-5210 or commercial (410) 671-5210.

FOR THE COMMANDER:

Arthur P. Lee

ARTHUR P. LEE, P.E.
MAJ, MS
Program Manager, Environmental Health
Risk Assessment and Risk Communication

OPTIONAL FORM 99 (7-90)
FAX TRANSMITTAL
To DONNA POLK
Dept./Agency
Fax #
From D TOLBERT
# of pages ▶
Phone #
Fax #
NSN 7540-01-317-7368 5099-101
GENERAL SERVICES ADMINISTRATION

ru Health

MCHB-DC-EHR
SUBJECT: Treatment Simulation and Toxicity Testing Results of Site 16 Groundwater, Longhorn Army Ammunition Plant, Karnack, Texas, 12 July 1996

CF:
HQDA(DASG-HS-PE)
CDR, USAMEDCOM, ATTN: MCHO-CL-W
CDR, AMC, ATTN: AMCEN-A/Mr. Pete Cunanan
CDR, USAEC, ATTN: SFIM-AEC-RPO/Mr. Jeffrey Armstrong
CDR, CEMRD, ATTN: CEMRD-ET-EH
CDR, LHAAP, ATTN: SMLO-EN

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

018230

October 8, 1996

VIA PRIORITY MAIL

James A. McPherson, Commander's Representative
Longhorn/Louisiana Army Ammunition Plants
Attn: SIOLH-CR
P.O. Box 658
Doyline, LA 71023

Re: Longhorn Army Ammunition Plant
Burning Ground No. 3 Interim Remedial Action
Revised Air Monitoring Plan and
Draft Quality Assurance Project Plan for Air Measurements

Dear Mr. McPherson:

The U.S. Environmental Protection Agency (EPA) has completed its review of the above referenced documents. Please find enclosed EPA's comments on these documents. If you have any questions or comments regarding this matter, please call me at (214) 665-6758.

Sincerely,

Chris G. Villarreal

Chris G. Villarreal
Project Manager

Enclosure

cc: Oscar Linebaugh, Jr., COE Eastern Area Office (CESWF-AD-E)
Jonna Polk, COE Tulsa District (CESWT-PP-EA)
Diane Poteet, TNRCC (MC-143)

EPA'S COMMENTS ON THE AIR MONITORING PLAN INTERIM REMEDIAL ACTION BURNING GROUND NO. 3 AUGUST 13, 1996

013231

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Shaded text indicates the removal of the "Biweekly Confirmation Sampling." Specifically removal of sample collection for full TO-14 scan analysis.

EPA Comment

The confirmation sampling using full TO-14 scan analysis needs to be put back into plan. Sampling frequency can be either on a biweekly or monthly basis.

#2 SECTION 5.2.2, REMEDIAL ACTION MONITORING PROGRAM, PAGE 18:

Shaded text indicates the removal of confirmation time-integrated whole air sampling using SUMMA canisters.

EPA Comment

The confirmation sampling using full TO-14 scan analysis needs to be put back into plan. Sampling should be conducted periodically and if perimeter monitoring stations indicate that the daily trigger level for the target compounds was exceeded.

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Note at bottom of page states:

"Stack sampling will be performed on one of the two identical stacks."

EPA Comment:

Need process data on both stacks (i.e., temperature, stack gas velocity, volumetric flow rate, etc.). Will also need process data for the soil treatment plant (i.e., waste feed rates, waste feed residence time, temperature, etc.).

#4 SECTION 5.2.2.2 EXCAVATION ZONE MONITORING, PAGE 26:

Text states:

"Detection of concentrations above the trigger level at the first-alert stations will potentially trigger increase monitoring activities and . . ."

Do not delete the text - " increased monitoring activities and "

General Comment:

Given the potential for the generation of particulates from excavation activities (especially during dry periods), why isn't any particulate monitoring being conducted? Particulate monitoring using a MiniRam aerosol monitor should be performed in areas where worker exposure to particulates may occur. During intrusive activities, documentation particulate monitoring should be performed both upwind and downwind of the exclusion zone. Particulate monitoring action levels should be established based on worker protection.

#6 SECTION 5.2.2.3, PERIMETER MONITORING PROGRAM, PAGE 26:

Text states:

"Perimeter monitoring will consists of charcoal tube sampling with on-site GC analysis."

EPA Comment:

How long before GC results are provided? 48 hours?

Text states:

There will be at least one upwind and three downwind samples collected during each episode."

EPA Comment:

Replace "episode" with "sampling day."

#7 SECTION 5.2.2.3, PERIMETER MONITORING PROGRAM, PAGE 27:

Shaded text indicates the removal of biweekly confirmation air sampling (by SUMMA canister).

EPA Comment

The confirmation sampling using full TO-14 scan analysis needs to be put back into plan. Sampling frequency can be either on a biweekly or monthly basis.

EPA'S COMMENTS ON THE DRAFT QUALITY ASSURANCE PROJECT PLAN INTERIM REMEDIAL ACTION BURNING GROUND NO. 3 SEPTEMBER 10, 1996

#1. SECTION 1.4, OVERVIEW OF APPROACH, PAGE 1-7:

Third paragraph:

This paragraph discusses excavation zone first-alert monitoring. In addition to the monitoring by the two infrared analyzers, confirmation sampling should be conducted using full TO-14 scan analysis (i.e., by SUMMA canister) periodically and if first-alert stations indicate that the daily trigger level for the target compounds was exceeded. Modify text to include the periodic conformation full scan TO-14 analysis and that the detection of concentrations above the trigger level will potentially trigger increased monitoring activities.

Given the potential for the generation of particulates from excavation activities (especially during dry periods), why isn't any particulate monitoring being conducted? Particulate monitoring using a MiniRam aerosol monitor should be performed in areas where worker exposure to particulates may occur. During intrusive activities, documentation particulate monitoring should be performed both upwind and downwind of the exclusion zone. Particulate monitoring action levels should be established based on worker protection.

Fourth Paragraph:

This paragraph discusses perimeter monitoring. In addition to the charcoal tube sampling, confirmation sampling using full TO-14 scan analysis needs to be put back in plan. Sampling frequency can either be on a biweekly or monthly basis. Additionally, text states, "There will be at least one upwind and three downwind samples collected during each episode." Replace "episode" with "sampling day."

#2 SECTION 3.1.1 PRETREATMENT AND SLUDGE CONDITIONING UNIT, PAGE 3-1, FIRST SENTENCE:

Typo: Replace "Retreatment" with "Pretreatment"

#3 SECTION 3.2.2 SECONDARY TREATMENT TRAILER (OXIDIZER/SCRUBBER UNITS) CROSS EXCHANGER, PAGE 3-9:

Text states:

"The heat exchanger is constructed if of 316 L stainless steel (SS)."

What is 316 L?

#4 SECTION 4.1 OVERVIEW OF SAMPLING PROCEDURES AND TABLE 4-1 SUMMARY OF SAMPLING PROCEDURES FOR AIR SPECIES, PAGE 4-1 - 4-3:

In regards to Excavation Zone Monitoring, add particulate monitoring (using a MiniRam aerosol monitor) and confirmation full TO-14 scan sampling and analysis as discussed in comment #1 (Third Paragraph).

In regards to Perimeter Monitoring, add confirmation full TO-14 scan analysis as discussed in Comment #1 (Fourth Paragraph).

#5 SECTION 4.5 EXCAVATION ZONE MONITORING, PAGE 4-15:

As stated in Comment #1, in addition to the monitoring by the two infrared analyzers, confirmation sampling should be conducted using full TO-14 scan analysis (i.e., by SUMMA canister) periodically and if first-alert stations indicate that the daily trigger level for the target compounds was exceeded. Modify text to include the periodic conformation full scan TO-14 analysis and that the detection of concentrations above the trigger level will potentially trigger increased monitoring activities.

Particulate monitoring using a MiniRam aerosol monitor should be performed in areas where worker exposure to particulates may occur. During intrusive activities, documentation particulate monitoring should be performed both upwind and downwind of the exclusion zone. Particulate monitoring action levels should be established based on worker protection.

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As stated in Comment #1, in addition to the charcoal tube sampling, confirmation sampling using full TO-14 scan analysis needs to be put back in plan. Sampling frequency can either be on a biweekly or monthly basis.

#7 SECTION 5.3 EXCAVATION ZONE MONITORING BY INFRARED SPECTROSCOPY, PAGE 5-12:

In addition to the discussion on infrared spectroscopy, include discussion on particulate monitoring using a MiniRam aerosol monitor and confirmation sampling using full scan TO-14 analysis.

#8 SECTION 5.5 PERIMETER MONITORING/GC ANALYSIS OF CHARCOAL TUBE SAMPLES, PAGE 5-16:

In addition to the charcoal tube samples, include discussion of confirmation sampling using full scan TO-14 analysis.

#9 SECTION 6.3.4 PERIMETER MONITORING, PAGE 6-21:

Include in this section some discussion of QC sample requirements for the TO-14 analysis (i.e., calibrations, QC standards).

OCT 22 1996

DEPARTMENT OF THE ARMY
U.S. ARMY ENVIRONMENTAL CENTER
ABERDEEN PROVING GROUND, MARYLAND 21010-5401

018236

REPLY TO ATTENTION OF

15 OCT 1996

SFIM-AEC-RPO (50-6c)

MEMORANDUM FOR Commander, Longhorn/Louisiana Army Ammunition Plants, ATTN: SIOLH-CR (Mr. James McPherson), P.O. Box 658, Doyline, LA 71023-0658

SUBJECT: Disposition of LHAAP TCRA at Site 16 (Old Landfill)

1. Reference discussion between the Army, EPA, TNRCC, and Svendrop Environmental, 10 Sep 96, regarding disposition of LHAAP TRCR at Site 16 (Old Landfill).

2. Based upon the discussion, the status of the Time Critical Removal Action (TCRA) at Site 16 (Old Landfill) has been revised to comply with provisions outlined in the Comprehensive Environmental Response Compensation and Liability Act/Superfund Amendments and Reauthorization Act. This includes, but is not limited to, the preparation of a remedial investigation/ feasibility study, including an endangerment assessment (EA), Proposed Remedial Action Plan (PRAP), and a Record of Decision (ROD).

3. In hindsight, it is apparent that the decision to pursue a TCRA was premature. In executing your program, you should focus on developing a "contaminants of concern (COC) list instead of just looking at trichloroethene (TCE). It is emphasized that the nine established evaluation criteria outlined in the National Contingency Plan, must be addressed prior to finalization of the PRAP and ROD. The Human Health and Ecological Risk Assessments incorporated in the EA should clearly support any remedial action (RA) decision. The finding of no public health hazard due to TCE in Harrison Bayou (in the Agency for Toxic Substances and Disease Registry (ATSDR) Health Consultation CERCLIS Number TX6213820529) must be included.

4. Requirements of paragraphs 2 and 3 do not preclude the possibility of a "focused feasibility study." For example, if it can be shown that an RA at Harrison Bayou using a low cost technology such as bubble diffusion, coupled with a cost effective RA technology to address the contamination source is necessary, and will lead to a timely ROD, then it should be pursued.

5. Recommended changes to improve your current program would include installation of complementary monitoring wells to evaluate the Volatile Organic Compound (VOC) plume along its axis, from the source to the bayou, and perpendicular to the axis at approximately one-third and two-thirds distance from the

source to the bayou. This will permit groundwater sampling, at regular intervals to evaluate the existing problem and the effectiveness of any future remedy. In addition, available surface water (SW) data indicates VOC MCL exceedances during the drought season, while there is no exceedance for the only sample taken outside the drought season. It is strongly recommended that SW sampling at Harrison Bayou be performed on a quarterly basis to provide a more balanced picture of VOC contamination.

6. We eagerly await the performance evaluation of the two extraction wells at Site 16. It is strongly recommended that the wells remain in a continuous operational mode until a thorough evaluation of their effectiveness can be made. This will provide valuable geohydrologic data for the remedial investigation/ feasibility study efforts.

7. It is requested that a copy of all LHAAP environmental reports and minutes of all related meetings, continue to be copy furnished to this Center.

8. The POC at this Center is Mr. Jeffrey P. Armstrong at DSN 584-1510 or commercial (410) 671-1510.

FOR THE COMMANDER:

Kenneth E. Wiggans

KENNETH E. WIGGANS
Chief
Restoration and Oversight Branch

CF:
Commander, U.S. Army Industrial Operations Command, ATTN: AMSIO-EQE (Mr. Cyril Onewokae) Rock Island, IL 61299-6000
Commander, U.S. Army Engineer District, Tulsa, ATTN: CESWT-PP-EA (Ms. Jonna Polk), P.O. Box 61, Tulsa, OK 74121-0061

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

018238

OCT 16 1996

October 8, 1996

VIA PRIORITY MAIL

James A. McPherson, Commander's Representative
Longhorn/Louisiana Army Ammunition Plants
Attn: SIOLH-CR
P.O. Box 658
Doyline, LA 71023

Re: Longhorn Army Ammunition Plant
Burning Ground No. 3 Interim Remedial Action
Revised Air Monitoring Plan and
Draft Quality Assurance Project Plan for Air Measurements

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DEPARTMENT OF THE ARMY
LONGHORN/LOUISIANA ARMY AMMUNITION PLANTS
MARSHALL, TEXAS 75671-1059

REPLY TO ATTENTION OF

October 16, 1996

SIOLH-CR

013244

Mr. H.L. Jones
Texas Natural Resource Conservation
Commission
2916 Teague Drive
Tyler, TX 75701

Dear Mr. Jones:

Arrangements have been made to have a team building workshop for all who support the Longhorn AAP environmental effort. The objective of the workshop will be to promote trust, common goals, teamwork, and cooperation in achieving quality work on Longhorn environmental projects.

The team building workshop will take place at the Holiday Inn Riverwalk, 217 North St. Mary's, San Antonio, Texas on October 29, 1996. We will meet from 8:00 to noon. A group dinner will be held at Mi Tiaras Cafe, 210-225-1262 in the Old Marketplace at 7:00 p.m. on October 28, 1996. Dress will be casual.

A block of rooms at the rate of $91 (single including tax) has been reserved for the evening of October 28, 1996 at the Holiday Inn, Riverwalk. Reservations must be confirmed by October 18, 1996. When confirming reservations please call 210-224-2500, and reference the Longhorn Army Ammunition Plant Meeting.

We hope to see you there.

Sincerely,

James McPherson
Commander's Representative