LONGHORN ARMY AMMUNITION PLANT

KARNACK, TEXAS

ADMINISTRATIVE RECORD

VOLUME 5 of 5

1996

Bate Stamp Numbers
018245 - 019495

Prepared for:

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

1996

VOLUME 5 of 5

1996

A. 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: Ms. Diane Poteet, Superfund Investigation Section, Texas Natural Resource Conservation Commission
Date: October 16, 1996
Bate Stamp: 018245

B. 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. Chris Villarreal, Superfund Division, U. S. Environmental Protection Agency
Date: October 16, 1996
Bate Stamp: 018246

C. Title: Letter - Subject: Longhorn Army Ammunition Plant, Group 2 - Interim Remedial Action at Landfill Sites 12 & 16, Revisions to the Final Project Work Plans: Drawings and Specifications (w/enclosure)
Group(s): 2
Sites(s): 12 & 16 (Landfills)
Location: Longhorn Army Ammunition Plant
Agency: Texas Natural Resource Conservation Commission
Author(s): Ms. Diane R. Poteet, Project Manager, RI/FS II Unit, Superfund Investigation Section, Pollution Cleanup Division
Recipient: Mr. James A. McPherson, Commander's Representative
Date: October 18, 1996
Bate Stamp: 018247-018248

D. Title: Memorandum - Subject: Total Environmental Restoration Contract (TERC) Proposed Revision to the Final Project Work Plans for Longhorn Army Ammunition Plant, Karnack, TX
Group(s): All
Sites(s): All
Location: Longhorn Army Ammunition Plant
Agency: Department of The Army
Author(s): Mr. Robert J. Radkiewicz, DCS for Environmental Management

Recipient: Mr. David Tolbert/Mr. James McPherson, LHAAP
Date: October 22, 1996
Bate Stamp: 018249

E. Title: Memorandum - Subject: Total Environmental Restoration Contract (TERC) Proposed Revisions to the Final Project, Work Plans for Longhorn Army Ammunition Plant, Karnack, Texas 30 August 1996
Group(s): All
Sites(s): All
Location: Longhorn Army Ammunition Plant
Agency: Department of The Army, U.S. Army Center for health Promotion and Preventive Medicine
Author(s): Mr. Dennis E. Druck, Acting Program Manager, Environmental Health Risk Assessment and Risk Communication
Recipient: District Engineer, U.S. Army Engineering District, Tulsa, Ms. Jonna Polk
Date: October 24, 1996
Bate Stamp: 018250

F. Title: Fax - Subject: Information Paper on Army Risk Assessments (w/enclosure)
Group(s): All
Site(s): All
Location: Longhorn Army Ammunition Plant
Agency: Department of The Army, U.S. Army Center for Health Promotion and Preventive Medicine
Author(s): Mr. Matt McAtee, U.S. Army, IOC
Recipient: Commander, Industrial Operations Command (Mr. Cyril Onewokae)
Date: October 24, 1996
Bate Stamp: 017251-027255

G. Title: Letter - Subject: Longhorn Army Ammunition Plant, Group 2 - Interim Remedial Action at Landfill Sites 12 and 16, Revisions to the Final Work Plans: Drawings & Specifications
Group(s): 2
Sites(s): 12 & 16 (Landfills)
Location: Longhorn Army Ammunition Plant
Agency: United States Environmental Protection Agency
Author(s): Mr. Chris G. Villarreal, Project Manager
Recipient: Mr. James A. McPherson, Commander's Representative
Date: October 25, 1996
Bate Stamp: 018256

H. Title: Letter - Subject: Longhorn Army Ammunition Plant, Group 2 - Time Critical Removal Action (TCRA) at Landfill Site 16, Dispute Resolution Process
Sites(s): 16 (Old Landfill)
Location: Longhorn Army Ammunition Plant
Agency: Texas Natural Resource Conservation Commission

Author(s): Ms. Diane R. Poteet, Project Manager, RI/FS II Unit, Superfund Investigation Section, Pollution Cleanup Division
Recipient: Mr. James A. McPherson, Commander's Representative
Date: October 28, 1996
Bate Stamp: 018257-018258

I. Title: Memorandum - Subject: Draft Final Site Characterization Investigation Report for the Group 5 Sites (50, 52, 60, and 63), Site Investigation at the Longhorn Army Ammunition Plant, Karnack, Texas, October 1996
Group(s): 5
Sites(s): 50, 52, 60 and 63
Location: Longhorn Army Ammunition Plant
Agency: Department of The Army, U.S. Army Center for Health Promotion and Preventive Medicine
Author(s): Mr. Dennis E. Druck, Acting Program Manager, Environmental Health Risk Assessment and Risk Communication
Recipient: District Engineer, U.S. Army Engineering District, Tulsa, Ms. Jonna Polk
Date: October 29, 1996
Bate Stamp: 018259

J. Title: Letter - Subject: Longhorn Army Ammunition Plant, Group 2 - Interim Remedial Action at Burning Ground No. 3, Air Monitoring Plan Revisions (9/10/96 and 10/27/96)
Group(s): 2
Sites(s): Burning Ground No. 3 (Sites 18/24)
Location: Longhorn Army Ammunition Plant
Agency: Longhorn Army Ammunition Plant
Author(s): Ms. Diane R. Poteet, Project Manager, RI/FS II Unit, Superfund Investigation Section, Pollution Cleanup Division
Recipient: Mr. James A. McPherson, Commander's Representative
Date: November 4, 1996
Bate Stamp: 018260-018261

K. Title: Letter - Subject: Longhorn Army Ammunition Plant, Group 2 - Landfill Site 16, Informal Dispute Resolution Meeting (w/enclosures)
Group(s): 2
Sites(s): 16 (Old Landfill)
Location: Longhorn Army Ammunition Plant
Agency: Texas Natural Resource Conservation Commission
Author(s): Ms. Diane R. Poteet, Project Manager, RI/FS II Unit, Superfund Investigation Section, Pollution Cleanup Division
Recipient: Mr. Chris Villarreal, U. S. Environmental Protection Agency
Date: November 6, 1996
Bate Stamp: 018262-018267

L. Title: Letter - Subject: Longhorn Army Ammunition Plant, Group 5 - Draft Final Site Characterization Investigation Report

Group(s): 5
Sites(s): 50, 52, 60 and 63
Location: Longhorn Army Ammunition Plant
Agency: Texas Natural Resource Conservation Commission
Author(s): Ms. Diane R. Poteet, Project Manager, RI/FS II Unit, Superfund Investigation Section, Pollution Cleanup Division
Recipient: Mr. James A. McPherson, Commander's Representative
Date: November 7, 1996
Bate Stamp: 018268-018269

M. Title: Fax - Subject: Longhorn Army Ammunition Plant, Informal Dispute Resolution, Site 16 Old Landfill - Position Paper (w/enclosures)
Group(s): 2
Site(s): 16 (Old Landfill)
Location: Longhorn Army Ammunition Plant
Agency: Texas Natural Resource Conservation Commission
Author(s): Ms. Diane Poteet
Recipient: Mr. David Tolbert, Project Mgr.
Date: November 21, 1996
Bate Stamp: 018270-018272

N. Title: Letter - Subject: Longhorn Army Ammunition Plant, Group 2 - Landfill Site 16: Dispute Resolution (w/enclosure)
Group(s): 2
Sites(s): 16 (Old Landfill)
Location: Longhorn Army Ammunition Plant
Agency: Texas Natural Resource Conservation Commission
Author(s): Mr. Barry J. Williams, Deputy Director, Office of Waste Management
Recipient: Colonel James Fairall, Jr., Commander, U.S. Industrial Operations Command, Rock Island, IL 61299-6000 and Myron O. Knudsen, P.E., Director, EPA
Date: November 22, 1996
Bate Stamp: 018273-018282

O. Title: Letter - Subject: Informal Dispute Resolution
Group(s): 2
Sites(s): 16 (Old Landfill)
Location: Longhorn Army Ammunition Plant
Agency: Department of The Army, Headquarters, U.S. Army Industrial Operations Command
Author(s): James P. Fairall, Jr., Colonel, U.S. Army, Chief of Staff
Recipient: Mr. Barry J. Williams, Deputy Director, Office of Waste Management (TNRCC)
Date: December 3, 1996
Bate Stamp: 018283-018284

P. Title: Letter - Subject: Informal Dispute Resolution
Group(s): 2
Sites(s): 16 (Old Landfill)
Location: Longhorn Army Ammunition Plant

Agency: Department of The Army, Headquarters, U.S. Army Industrial Operations Command
Author(s): James P. Fairall, Jr., Colonel, U. S. Army, Chief of Staff
Recipient: Mr. Myron O. Knudson, Director, Hazardous Waste Management Division, U. S. Environmental Protection Agency, Region VI
Date: December 3, 1996
Bate Stamp: 018285-018286

Q. Title: Letter - Subject: Longhorn Army Ammunition Plant, Group 2 - Landfill Site 16: Dispute Resolution
Group(s): 2
Sites(s): 16 (Old Landfill)
Location: Longhorn Army Ammunition Plant
Agency: Texas Natural Resource Conservation Commission
Author(s): Mr. Barry J. Williams, Deputy Director, Office of Waste Management, TNRCC
Recipient: Colonel James Fairall, Jr., Commander, U. S. Industrial Operations Command & Mr. Myron O. Knudson, P. E., Director, Hazardous Waste Management Division, U. S. Environmental Protection Agency, Region 6
Date: December 6, 1996
Bate Stamp: 018287

R. Title: Minutes - TRC Meeting
Group(s): All
Site(s): All
Location: Longhorn Army Ammunition Plant
Date: December 12, 1996
Bate Stamp: 018288-018289

S. Title: Report - Subject: Final Approved Air Monitoring Plan, Interim Remedial Action, Burning Ground No. 3
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: December 16, 1996
Bate Stamp 018290-018313

T. Title: Report - Subject: Final Quality Assurance Project Plan, Interim Remedial Action, Burning Ground No. 3
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: December 18, 1996

Bate Stamp: 018314-018424

U. Title: Letter - Subject: Longhorn Army Ammunition Plant, Group 2 - Mixing of Ground Waters from Landfill Site 16 and Burning Ground No. 3
Group(s): 2
Sites(s): 16 (Old Landfill) & Burning Ground No. 3 (Sites 18/24)
Location: Longhorn Army Ammunition Plant
Agency: Texas Natural Resource Conservation Commission
Author(s): Ms. Diane R. Poteet, Project Manager, RI/FS II Unit, Superfund Investigation Section, Pollution Cleanup Division
Recipient: Mr. James A. McPherson, Commander's Representative
Date: December 17, 1996
Bate Stamp: 0182425

V. Title: Letter - Subject: Schedule for Site 16 Remedial Investigation/Feasibility Study and Treatability Study, Longhorn Army Ammunition Plant
Group(s): 2
Sites(s): 16 (Old Landfill)
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: December 19, 1996
Bate Stamp: 018426

W. Title: Letter - Subject: Schedule for Site 16 Remedial Investigation/Feasibility Study and Treatability Study, Longhorn Army Ammunition Plant
Group(s): 2
Sites(s): 16 (Old Landfill)
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, Texas Natural Resource Conservation Commission
Date: December 19, 1996
Bate Stamp: 018427

X. Title: Letter - Subject: Schedule for Site 16 Remedial Investigation/Feasibility Study and Treatability Study, Longhorn Army Ammunition Plant (w/enclosure)
Group(s): 2
Sites(s): 16 (Old Landfill)
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: December 19, 1996

	Bate Stamp:	018428-018430
Y.	Title:	Ist Ind - Subject: Total Environmental Restoration Contract (TERC) Proposed Revision to the Final Project Work Plans for Longhorn Army Ammunition Plant, Karnack, Texas
	Group(s):	2
	Sites(s):	Landfills 12 & 16
	Location:	Longhorn Army Ammunition Plant, Karnack, TX
	Agency:	US Army Corps of Engineers, CESWT-PP-ME
	Author(s):	Robert J. Radkiewicz, DCS for Environment Management
	Recipient:	James McPherson, Commander's Representative/David Tolbert/SIOLH-OR Longhorn AAP
	Date:	2 Aug 96
	Bate Stamp:	019479
Z.	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):	2
	Sites(s):	Landfills 12 & 16
	Location:	Longhorn Army Ammunition Plant, Karnack, TX
	Agency:	US Army Corps of Engineers, Tulsa District
	Author(s):	Burl D. Ragland, Lead Project Manager, Army Team
	Recipient:	Mr. Cyril Onewokae, AMSIO-EQE, Rock Island, IL
	Date:	2 August l996
	Bate Stamp:	19480

Title: Letter, Re: Proposed Revisions to the Final Project Work Plans
Group(s): 2
Sites(s): Landfills 12 & 16
Location: Longhorn Army Ammunition Plant, Karnack, TX
Agency: OHM Remediation Services Corp.
Author(s): Glen Turney, Sr. Project Manager
Recipient: Dudley C. Beene II, USACE Authorized Representative, Ft. Worth District Eastern Area Office
Date: August 30, 1996
Bate Stamp: 019481 - 019487

Title: Letter, Subject: Longhorn Army Ammunition Plant Group 2 - Final Field Summary Report, Phase II RI
Group(s): 2
Sites(s): All
Location: Longhorn Army Ammunition Plant, Karnack, TX
Agency: Texas Natural Resource Conservation Commission
Author(s): Diane R. Poteet, Project Manager, Superfund Investigation Section
Recipient: James A. McPherson, Commander's Representative, Longhorn AAP
Date: September 6, 1996
Bate Stamp: 019488 - 019491

Title: Fax Transmittal - Group 2 - Interim Remedial Action at Landfill 12 & 16 Revised Project Work Plans
Group(s): 2
Sites(s): Landfill 12 & 16
Location: Longhorn Army Ammunition Plant, Karnack, Texas
Agency: Texas Natural Resource Conservation Commission
Author(s): Diane Poteet, Project Manager, Superfund Investigation Section
Recipient: David Tolbert, Project Manager
Date: 10-21-96
Bate Stamp: 019492 - 019494

Title: Letter, Subject: Longhorn Army Ammunition Plant, Solid Waste Registration No. 30990, Agreed Order Effective December 4, 1995, Ordering Provision No. 17 Due January 25, 1997
Group(s): 2
Sites(s): All
Agency: Longhorn Army Ammunition Plant
Location Karnack, Texas
Author(s): Ira C. Nathan, Chief, Operations Review
Recipient: Ms. Lila Beckley, Enforcement Coordinator, TNRCC
Date: December 23, 1996
Bate Stamp: 019495

Note: Bate Stamp Numbers Are out of Sequence Continuing From Volume 3 of 4 1997 After the Letter A.

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

REPLY TO
ATTENTION OF

October 16, 1996

018245

SIOLH-CR

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

Dear Ms. Poteet:

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

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

REPLY TO
ATTENTION OF

October 16, 1996

018246

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

Dear Mr. Villareal:

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

James McPherson
Commander's Representative

Barry R. McBee, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
an Pearson, *Executive Director*

OCT 29 1996

018247

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

October 18, 1996

CERTIFIED MAIL
Z 746 032 759
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- Interim Remedial Action at Landfill Sites 12 & 16
Revisions to the Final Project Work Plans: Drawings and Specifications

Dear Mr. McPherson:

The Texas Natural Resource Conservation Commission (TNRCC) staff have completed its review of the above referenced document, which was received on October 7, 1996. Our comments are enclosed. 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

Enclosure

cc with 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)

P.O. Box 13087 • Austin, Texas 78711-3087 • 512/239-1000

Longhorn Army Ammunition Plant
Group 2- Interim Remedial Action at Landfill Sites 12 & 16
Revisions to the Final Project Work Plans: Drawings and Specifications
TNRCC Comments (By Richard Andersen)

No.	Section/page	Comment
1	Drawing C-11	To be more clear, the geomembrane caption on Drawing C-11 should specify that the geomembrane is either "a 20 mil geomembrane bonded to the GCL" or "a 40 mil geomembrane separate from the GCL".
2	Specifications	The minimum geomembrane thickness should be 40 mil or, if the membrane is bonded to the GCL, 20 mil.
3	Specifications/ page 02442-4	The 20 mil geomembrane which is bonded to the GCL should have specifications analogous to the specifications for the separate 40 mil membrane on 02271-11 (for example, puncture resistance). Has an engineer determined that the tensile strength, shear strength, and interface friction angles of the 20 mil geomembrane/GCL composite will be adequate for slope stability?
4	Specifications/ page 02442-8	Specific requirements for seaming the 20 mil geomembrane/GCL should be given in 3.2.4.1.

OCT 22 1996

018249

AMSIO-EQ (CESWT-PP-ME/2 Aug 96) (200-1a) 1st End
SUBJECT: Total Environmental Restoration Contract (TERC) Proposed Revision to the Final Project Work Plans for Longhorn Army Ammunition Plant, Karnack, Texas

Commander, U.S. Army Industrial Operations Command,
ATTN: AMSIO-EQ, Rock Island, IL 61299-6001 16 OCT 1996

FOR Commander's Representative, Longhorn Army Ammunition Plant,
ATTN: SIOLH-OR (Mr. David Tolbert/Mr. James McPherson),
Marshall, TX 75670-1059

1. This office has reviewed the subject revision and concurs with the change(s) in basic memorandum.

2. The POC for this action is Mr. Cyril Onewokae, AMSIO-EQE, (309) 782-1350, DSN 793-1350, E-mail conewoka@ria-emh2.army.mil.

FOR THE COMMANDER:

Robert J. Radkiewicz
ROBERT J. RADKIEWICZ
DCS for Environmental Management

Encl
nc

CF (wo/encl):
Commander, U.S. Army Corps of Engineers District, Tulsa
ATTN: CESWT-PP-E (Mrs. Jonna Polk), Post Office Box 61, Tulsa,
OK 74121-0061

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

018250

REPLY TO
ATTENTION OF

MCHB-DC-EHR (40)

24 OCT 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: Total Environmental Restoration Contract (TERC) Proposed Revisions to the Final Project, Work Plans for Longhorn Army Ammunition Plant, Karnack, Texas, 30 August 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.

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:

Dennis E. Druck

DENNIS E. DRUCK
Acting Program Manager, Environmental Health
Risk Assessment and Risk Communication

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

018251

FAX TRANSMITTAL MEMO

No. of pages including cover 5

Send out to IOC installatns ASAP.

Date:	24 Oct 96	
To:	Mr. Cyril Onewoka (309) 782-1350	U.S. Army IOC FAX (309) 782-~~1[illegible]7~~ ~~1350~~-1379
From:	Matt McAtee	(410) 612-8552 FAX 671-5237
Subject:	Requested Information Paper on Army Risk Assessments	

Cryil,

I hope that this information paper is of use to you and your team at Longhorn AAP. Request that you distribute this memo to your colleagues at IOC and AMC so that your Commands' efforts in coordinating with CHPPM can be better served.

If you've any questions, now or in the future, feel free to call me.

—Matt

Environmental Health Risk Assessment and Risk Communication Program
U.S. Army Center for Health Promotion and Preventive Medicine

DEPARTMENT OF DEFENSE UNITED STATES OF AMERICA

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

✓

018252

MCHB-DC-EHR (40)

MEMORANDUM FOR Commander, Industrial Operations Command, ATTN: AMSIO-EQE
(Mr. Cyril Onewoka), Rock Island, IL 61299-6000

SUBJECT: Risk Assessment Consultation -- The Support Role of the Environmental Health Risk Assessment and Risk Communication Program (Program 39)

1. PURPOSE. To clarify the authority and environmental program role of the U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM) Program 39 in the coordination with U.S. Army executing agencies. The specific goal is to describe the requirements and opportunities to utilize our risk assessment expertise and services in the restoration programs at Longhorn Army Ammunition Plant, Texas. Our risk communication services are available upon request, but are not summarized here.

2. OVERVIEW.

a. CHPPM Program 39 Mission. Provide expert risk assessment services in the science, evaluation, and management of environmental health to promote environmental restoration, public health, and military readiness.

b. CHPPM Program 39 Authority. Per Army Regulation 200-1, the CHPPM has the following authority, delegated to Program 39. There are plans to better define this authority in the forthcoming AR 200-1 revisions in order to facilitate coordination and provide a more comprehensive role for our expertise.

(1) Exercise approval authority, on behalf of the Office of The Surgeon General (OTSG), over all [environmental] health risk assessments. Executing organizations should refer to [DA Pamphlet 40-578] for guidance on preparing health risk assessments and obtaining OTSG support (reference AR 200-1 Chapter 1, Section II, 1-16, Responsibilities of the Surgeon General (OTSG) and AR 200-1 Chapter 9, Section 9-7 Program Concept, f(2) RI/FS).

(2) Provide guidance on the investigation, conduct, and use of risk assessments through document reviews, and in-house risk assessment and special study reports (reference DA Pamphlet 40-578).

Readiness thru Health

c. Specific Guidelines to Executing Agencies. Pay close attention to the following items because the CHPPM will focus on these during the review process. Refer to DA Pamphlet 40-578 for more detail.

(1) Use site specific data whenever possible.

(2) Use an appropriate and defensible model for the environmental situation, especially for ground-water and biological systems.

(3) Present a realistic environmental situation. Overly conservative assumptions may not always be necessary nor justified, given the safety margin built into many factors used by executing agencies.

(4) Include clear referencing for all sources of assumptions, data, factors, judgments, and opinions. CHPPM encourages attempts to move away from default exposure and toxicological assumptions if situations warrant and the technical rationale is defensible.

(5) Conduct an adequate and complete ecological [risk] assessment as part of the human health risk assessment process.

(6) Coordinate closely with CHPPM on time frames and suspenses to maintain overall program prioritization. CHPPM encourages coordination on project scoping, work plan development and risk assessment protocols.

3. CHPPM PROGRAM 39 SERVICES. The Program provides expert services in the areas of environmental health (human and ecological) risk assessment, communication, management, and science (Table 1). We provide technical input and analysis on environmental and public health issues for installations or commands. Our capabilities include soil, air, water, plant and wildlife (e.g. garden crops, fish, etc.) sampling to assess and evaluate potential health effects from chemical exposures. We can suggest how to: coordinate public meetings/availability sessions; prepare for the media; target and survey community concerns; and answer tough health risk questions. Our services and approval authority are provided on behalf of the OTSG.

Our customers include the full range of Army stakeholders: from Army contractors, regulators, and executing agencies to major commands, Departments of the Army, Navy, Air Force, and Defense, and in some instances the Executive and Congressional Branches of the federal government. The scope of our mission includes CERCLA, BRAC, RCRA, and NEPA regulations and where ever health and safety issues can benefit from a risk assessment perspective. Program 39 is structured to provide scientific and technical support for your installations' environmental programs and public health emergencies by working through the traditional executing agencies, installations, or at the MACOM and SUBMACOM levels.

Table 1. Summary of Service Roles Performed by the USACHPPM Program 39

RISK ASSESSMENT	RISK MANAGEMENT	SCIENTIFIC DEVELOPMENT
Document Review	OTSG Approval Authority	Analysis of Data
Environmental/Biological Sampling	Document Review	Scientific Literature Reviews
Data Analysis	Training	Research and Experimentation
Methodology Review & Guidance	Consultation	Guidance Development
Sample Analysis	Risk & Science Policy	Publication
Specific Consultations	Regulatory Negotiation	Expert Testimony
Rapid Response Evaluations	Guidance Development	Method Development
Human Health Risk Assessment	Public Interface	Symposia Sponsorships
Ecological Risk Assessment	Expert Testimony	Professional Society Involvement
Contaminant Biology		

4. COORDINATING DOCUMENT REVIEWS. Executing agencies should submit five copies of each of the following documents for technical review and OTSG risk management concurrence to Commander, USACHPPM, ATTN: MCHB-DC-EHR, Bldg E-1677, Aberdeen Proving Ground, MD 21010-5422. Unless otherwise requested, Program 39 reviews will provide comments, recommendations, and concurrence (if appropriate) within 30 days.

a. Statements of Work (Scopes of Work)
b. Work Plans
c. Sampling and Analysis Plans
d. Preliminary Assessments
e. Site Inspections
f. Remedial Investigations
g. Risk Assessments
h. Feasibility Studies
I. Proposed Plans
j. Records of Decision

Note that the above documents must relate or utilize risk assessments in order to remain within the purview of the Program 39 mission. Compliance issues do not typically receive Program

39 review unless risk assessments are a specific part of the compliance (e.g., facility RCRA permit) or a special risk assessment consultation is requested.

5. POINTS OF CONTACT. Our point of contact for this particular consult is Mr. Matthew McAtee who can be reached at DSN 584-8552 or commercial (410) 612-8552. Short correspondence can be sent via facsimile to (410) 671-5237. For additional assistance contact the undersigned at DSN 584-2953 or commercial (410) 671-2953.

FOR THE COMMANDER:

Dennis E. Druck
DENNIS E. DRUCK
Acting Program Manager
Environmental Health Risk Assessment and
Risk Communication

CF:
HQDA(DASG-HS-PE)
CDR, MEDCOM, ATTN: MCHO-CL-P

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

018256

OCT 29 1996

October 25, 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
Group 2 - Interim Remedial Action at Landfill Sites 12 & 16
Revisions to the Final Project Work Plans: Drawings and Specifications

Dear Mr. McPherson:

This letter is in response to your October 2, 1996 letter which outlined proposed revisions to the drawings and specifications for the interim remedial action at the Longhorn Army Ammunition Plant Landfills 12 and 16. The U.S. Environmental Protection Agency has completed its review of the proposed revisions and herein approves the revisions. 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

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

Barry R. McBee, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Dan Pearson, *Executive Director*

018257

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

October 28, 1996

CERTIFIED MAIL
Z 746 032 758
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 (TCRA) at Landfill Site 16
Dispute Resolution Process

Dear Mr. McPherson:

In accordance with the Section XV. C. of the Federal Facility Agreement, the Texas Natural Resource Conservation Commission (TNRCC) staff is initiating the informal dispute resolution process by this letter. On October 22, 1996, in the Monthly Project Manager's Meeting in Tulsa, Oklahoma, the Army stated that their upper management has decided not to continue with the above referenced removal action.

The release from Landfill 16 to Harrison Bayou, which is one and a half miles upstream from Caddo Lake, is a violation of Texas Water Code Section 26.121, and thus needs to be addressed without further delay. This release is a serious concern to us because there are still many unknowns, such as: 1) the lack of toxicity information regarding the tri-carbonyl iron compound; 2) the Army has not resolved the problems with the toxicity tests of the extracted ground water; 3) risk assessments have not been completed; 4) the Army has not collected water samples to support their opinion that the toxic constituents from the release have not reached Caddo Lake; and 5) the sampling data of Harrison Bayou appear to be incomplete.

With this in mind, TNRCC believes that the Army should continue with the removal action to try to control the discharge until a final remedy is initiated. In order to limit the overall costs of maintaining a pump and treat system under the removal action, we recommend that the Army accelerate the remedial investigation and feasibility study for Landfill 16, so that a final remedy can be initiated as early as possible. We request that the Army provide the following: 1) a schedule for an accelerated investigation of the landfill and selection of a permanent remedy;

2) sampling plan for monitoring Harrison Bayou, with action levels identified to ensure the effectiveness of the removal action; and 3) all information which the Army has obtained regarding the tri-carbonyl iron compound. We also request that the Army continue the toxicity testing on the extracted ground water to resolve the problems with the toxicity tests.

In order to discuss the matter further, an informal meeting between the project managers and their supervisors for the Army, EPA, and the TNRCC will be held at the TNRCC offices on November 19, 1996 at 9:00 am (before the Monthly Project Manager's Meeting) in Building D, Room 200-33. 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
RI/FS II Unit
Superfund Investigation Section (MC-143)
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 DEFENSE UNITED STATES OF AMERICA

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

NOV 5 1996

018259

MCHB-DC-EHR (40)

29 OCT 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 Site Characterization Investigation Report for the Group 5 Sites (50, 52, 60, and 63), Site Investigation at the Longhorn Army Ammunition Plant, Karnack, Texas, October 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.

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:

Dennis E. Druck

DENNIS E. DRUCK
Acting 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

Barry R. McBee, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Dan Pearson, *Executive Director*

NOV 12 1996

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

018260

November 4, 1996

CERTIFIED MAIL
Z 746 032 757
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 - Interim Remedial Action at Burning Ground No. 3
Air Monitoring Plan Revisions (9/10/96 and 10/27/96)

Dear Mr. McPherson:

The Texas Natural Resource Conservation Commission (TNRCC) staff has reviewed the revisions (received on 9/10/96) and the proposed revisions (received on 10/27/96) for the above referenced air monitoring plan. We concur with the revised 9/10/96 plan. With regards to the proposed revisions dated 10/27/96, we offer the following comments.

We agree that Standard Exemption No. 68 requires that air emissions from the soil and groundwater treatment plants be monitored to prove that the catalytic oxidizers are working correctly. However, the proposed elimination of other air emissions monitoring from the plan may not be in compliance with other applicable or relevant and appropriate requirements (ARARs) or the Record of Decision (ROD). During trench excavations and soil handling activities, for example, Occupational Safety and Health Administration (OSHA) and Resource Conservation and Recovery Act (RCRA) worker health and safety regulations, which were mentioned in the ROD, are ARARs and will apply. Also, in accordance with the ROD, air emissions from the treatment processes will be monitored on a regular basis to ensure that emissions are below the appropriate levels. Finally, we believe that air monitoring will be required to ensure compliance with 31 TAC §335.4. 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
RI/FS II Unit
Superfund Investigation Section (MC-143)
Pollution Cleanup Division

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

NOV 19 1996

Barry R. McBee, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
an Pearson, *Executive Director*

018262

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

November 6, 1996

CERTIFIED MAIL
Z 746 032 755
RETURN RECEIPT REQUESTED

Chris Villarreal (6SF-AT)
U. S. Environmental Protection Agency
Region 6
1445 Ross Avenue
Dallas, TX 75202-2733

Re: Longhorn Army Ammunition Plant
Group 2 - Landfill Site 16
Informal Dispute Resolution Meeting

Dear Mr.Villarreal:

Please find the enclosed agenda for the above referenced meeting, which we discussed in our letter dated October 29, 1996. Also enclosed is a list of attendees for this meeting. If you are planning to bring additional people, please provide us with a list that includes their names and the subject they will be discussing by 5:00 p.m. on November 11, 1996 (Monday). 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
RI/FS II Unit
Superfund Investigation Section (MC-143)
Pollution Cleanup Division

Enclosures

cc: James A. McPherson, LHAAP (SIOLH-CR)
Jonna Polk, COE Tulsa District (CESWT-PP-EA)
Warren Sayes, COE Eastern Area Office (CESWF-AD-E)

P.O. Box 13087 • Austin, Texas 78711-3087 • 512/239-1000
printed on recycled paper using soy-based ink

Longhorn Army Ammunition Plant
Landfill Site 16 (Group 2)

Informal Dispute Resolution Meeting

When: *9:00 a.m., November 19, 1996*
Where: *TNRCC, 12100 Park 35 Circle*
Building D, Room 200-33

Purpose: To resolve the disagreement regarding whether the Army should take immediate action to stop the seep that is providing a pathway for contaminants to flow from the ground water to Harrison Bayou, 1½ miles upstream from Caddo Lake.

AGENDA

1. Introduction/State's concerns
2. Explanation of Army's cost estimate for the proposed pump and treat system
3. Human health and environmental risk unknowns:
    a. Risk assessments have not been performed
    b. Lack of evidence that Caddo Lake has been impacted
    c. Lack of information on the tri-carbonyl iron compound
        1. Analytical information
        2. Toxicity information
    d. Additional toxicity testing of extracted ground water
4. Other immediate action alternatives
5. Accelerated schedule and costs for remedial investigation/risk assessment for Site 16
6. Sampling plan for Harrison Bayou
7. Summary and conclusions

Longhorn Army Ammunition Plant
Landfill Site 16 (Group 2)

Informal Dispute Resolution Meeting

LIST OF ATTENDEES

<u>Texas Natural Resource Conservation Commission</u>
Diane Poteet, Project Manager
Michael Moore, Federal Facilities Coordinator
Tim Dobbs, Unit II Manager
Barbara Ferguson, Community Relations Unit Manager (Mediator)

<u>U. S. Environmental Protection Agency</u>
Chris Villarreal, Project Manager
Gus Chavarria, Section Chief
Bill Honker, Branch Chief

<u>Longhorn Army Ammunition Plant</u>
James A. McPherson, Commander's Representative
David Tolbert, Project Manager

Barry R. McBee, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
n Pearson, *Executive Director*

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

018265

November 6, 1996

CERTIFIED MAIL
Z 746 032 756
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 - Landfill Site 16
Informal Dispute Resolution Meeting

Dear Mr. McPherson:

Please find the enclosed agenda for the above referenced meeting, which we discussed in our letter to dated October 29, 1996. Also enclosed is a list of attendees for this meeting. If the Army is planning to bring additional people, please provide us with a list that includes their names and the subject they will be discussing by 5:00 p.m. on November 11, 1996 (Monday). 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
RI/FS II Unit
Superfund Investigation Section (MC-143)
Pollution Cleanup Division

Enclosures

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

P.O. Box 13087 • Austin, Texas 78711-3087 • 512/239-1000

Longhorn Army Ammunition Plant
Landfill Site 16 (Group 2)

Informal Dispute Resolution Meeting

When: *9:00 a.m., November 19, 1996*
Where: *TNRCC, 12100 Park 35 Circle*
Building D, Room 200-33

Purpose: To resolve the disagreement regarding whether the Army should take immediate action to stop the seep that is providing a pathway for contaminants to flow from the ground water to Harrison Bayou, 1½ miles upstream from Caddo Lake.

AGENDA

1. Introduction/State's concerns
2. Explanation of Army's cost estimate for the proposed pump and treat system
3. Human health and environmental risk unknowns:
    a. Risk assessments have not been performed
    b. Lack of evidence that Caddo Lake has been impacted
    c. Lack of information on the tri-carbonyl iron compound
        1. Analytical information
        2. Toxicity information
    d. Additional toxicity testing of extracted ground water
4. Other immediate action alternatives
5. Accelerated schedule and costs for remedial investigation/risk assessment for Site 16
6. Sampling plan for Harrison Bayou
7. Summary and conclusions

018267

Longhorn Army Ammunition Plant
Landfill Site 16 (Group 2)

Informal Dispute Resolution Meeting

LIST OF ATTENDEES

Texas Natural Resource Conservation Commission
Diane Poteet, Project Manager
Michael Moore, Federal Facilities Coordinator
Tim Dobbs, Unit II Manager
Barbara Ferguson, Community Relations Unit Manager (Mediator)

U. S. Environmental Protection Agency
Chris Villarreal, Project Manager
Gus Chavarria, Section Chief
Bill Honker, Branch Chief

Longhorn Army Ammunition Plant
James A. McPherson, Commander's Representative
David Tolbert, Project Manager

Barry R. McBee, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Dan Pearson, *Executive Director*

NOV 19 1996

018268

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

November 7, 1996

CERTIFIED MAIL
Z 746 032 754
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 5 - Draft Final Site Characterization Investigation Report

Dear Mr. McPherson:

The Texas Natural Resource Conservation Commission (TNRCC) staff has completed its review of the above referenced document, which was received on October 7, 1996. We offer the following comments.

For each site, please state whether the objectives presented in the Work Plan and Chemical Data Acquisition Plan (CDAP) were met. In addition, since the Work Plan\CDAP did not mention comparing data to Soil Screening Level's (SSL's), please explain the rationale for using SSL's in the report. As part of your explanation, please include a discussion of whether these sites meet the assumptions for using SSL's, and give a detailed explanation of how the specific SSL's used in the study were derived (refer to the SSL guidance document). The correct reference for the SSL guidance document (see page 2-8 in the report) is: Soil Screening Guidance: Technical Background Document (9355.4-17A, EPA/540/R-95/128, PB96-963502, May 1996).

The soil background concentration levels used in all the tables are not acceptable. Maximum concentrations are not appropriate.

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
RI/FS II Unit
Superfund Investigation Section (MC-143)
Pollution Cleanup Division

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

FACSIMILE TRANSMITTAL

018270

U.S. EPA REGION 6
HAZARDOUS WASTE MANAGEMENT DIVISION
1445 ROSS AVENUE
DALLAS, TEXAS 75202-2733

TO: Diane Poteet
Texas Natural Resource Conservation Commission

MACHINE NUMBER: (512)239-2450

VERIFICATION NUMBER: ( )

FROM: Chris G. Villarreal
Project Manager

PHONE: (214) 665-6758

MAIL CODE: 6SF-AT

OFFICE: Superfund, Texas Section

DATE: November 21, 1996

PAGES, INCLUDING COVER SHEET: 3

PLEASE NUMBER ALL PAGES

INFORMATION FOR SENDING FACSIMILE MESSAGES

OUR EQUIPMENT	FACSIMILE NUMBER
PANAFAX UF-766	(214) 665-6660

COMMENTS:

Diane:

As requested during the November 19, 1996 meeting, EPA's position paper is provided. Barbara Ferguson asked that I fax you a copy if if I was unable to send it to her this morning. If you have any questions, give me a call.

Chris

Copies to: Barbara Ferguson (TNRCC)

Fax Transmittal Memo

of Pages 3

To: David Tolbert	From: Diane Poteet
Co.: LHAAP	Co.: TNRCC
Dept.: Army	Phone # 239-2502
Fax # 318-459-5112	Fax # 239-2449

DMFX14

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

18271

November 21, 1996

<u>VIA PRIORITY MAIL AND FACSIMILE</u>

Ms. Barbara Ferguson
Community Relations Coordinator
Texas Natural Resource Conservation Commission
MC-141
P.O. Box 13087
Austin, Texas 78711-3087

Re: Longhorn Army Ammunition Plant
Informal Dispute Resolution
Site 16 Old Landfill - Position Paper

Dear Ms. Ferguson:

The Environmental Protection Agency (EPA), as requested during the meeting on November 19, 1996 is herein providing a concise explanation of EPA's position in regards to the current unresolved dispute. The basis of this dispute is the Army's recanting of their previous commitment made to the local community, the State of Texas, and the EPA. The Army previously committed to take action to control and prevent the migration of contaminated groundwater from the Site 16 Old Landfill to Harrison Bayou as quickly as possible in a cost effective manner. This commitment was made nearly a year ago. Little progress has been made in regards to either controlling the plume or in accelerating the remedial investigation and feasibility study for Site 16 Old Landfill so that a final remedy can be initiated. The EPA's position is as follows:

> *The Army should follow through on their previous commitment and take immediate action to prevent the ongoing migration of contaminated groundwater from the Site 16 Old Landfill to Harrison Bayou. This action should include the installation and operation of the groundwater control measures and implementation of a plan to monitor Harrison Bayou to ensure the groundwater control measures are effective. Concurrently, the Army should accelerate the remedial investigation and feasibility study for the Site 16 Old Landfill so that a final remedy can be initiated as soon as possible.*

The EPA looks forward to resolution of this dispute and in continuing our work together with the Army and the State of Texas in achieving our common goals of protecting human health and the environment; developing timely, cost effective, and environmentally sound solutions to environmental problems, and; maintaining the Public's Trust.

Sincerely,

Gus Chavarria
Texas Section Chief
Superfund

END

Barry R. McBee, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Dan Pearson, *Executive Director*

THE STATE OF TEXAS

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

DEC 2 1996

018273

November 22, 1996

Colonel James Fairall, Jr., Commander
U. S. Industrial Operations Command
AMSIO-CS
Rock Island, IL 61299-6000
Certified Mail Receipt No. Z 746 032 752

Mr. Myron O. Knudson, P.E., Director
Hazardous Waste Management Division (6SF)
U. S. Environmental Protection Agency
Region 6
1445 Ross Avenue
Dallas, TX 75202-2733
Certified Mail Receipt No. Z 746 032 753

Re: Longhorn Army Ammunition Plant, Group 2 - Landfill Site 16: Dispute Resolution

Dear Colonel Fairall and Mr. Knudson:

In accordance with section XV.C. of the Federal Facility Agreement, an informal dispute resolution meeting was held between the Texas Natural Resource Conservation Commission (TNRCC), the United States Environmental Agency (EPA), and the United States Army (Army) on November 19, 1996 at the offices of the TNRCC. No resolution was reached at this meeting; however, the Army was given until the close of business on December 2, 1996, to resolve the issue at hand. If the Army's answer is that they will still not perform a removal action at Landfill 16 to stop the flow of contaminants from entering Harrison Bayou via a ground water seep, then

P.O. Box 13087 • Austin, Texas 78711-3087 • 512/239-1000

a meeting of the Dispute Resolution Committee (DRC) will occur during the week of December 9, 1996 at the Longhorn Army Ammunition Plant. Also, in accordance with section XV. B. of the Federal Facility Agreement, by this letter the position papers of each of the disputing parties are hereby submitted to the Dispute Resolution Committee (please see enclosures). If you have any questions or comments, please contact Diane Poteet at (512) 239-2502.

Sincerely,

Barry J. Williams

Barry J. Williams, Deputy Director
Office of Waste Management

Enclosures

cc: Mr. Dwight Shellman, Jr., Caddo Lake Institute
Ms. Ruth Culver, Uncertain Audubon Society
Mr. James McPherson, LHAAP (SILOH-OR)
Ms. Jonna Polk, COE Tulsa District (CESWT-PP-EA)
Mr. Cyril Onewokae, U.S. Army (HQ, IOC, AMSIO-EQE)
Mr. Jeff Armstrong, U.S. Army (USAEC, SFIM-AEC-IRP, APG)

018275

Texas Natural Resource Conservation Commission
Position Paper on the Contaminant Release from Landfill 16 at Longhorn Army Ammunition Plant
Dispute Resolution Process

Texas Natural Resource Conservation Commission (TNRCC) believes that the Army should continue with the removal action to try to control the contaminant release until a final remedy is initiated. The release from Landfill 16 to Harrison Bayou is a violation of Texas Water Code Section 26.121, and thus needs to be addressed without further delay.

Presently, there is a lack of information available to conclude that the risks do not justify taking immediate action. We disagree with the Army's arguments that it is not cost effective to put in the hydraulic controls (pumping wells). We support the Army's decision to accelerate the remedial investigation and feasibility study for Landfill 16 so that a final remedy can be initiated as early as possible and the overall costs of maintaining a pump and treat system under the removal action can be limited.

List of ARARs

Texas Water Code §26.121 (Unauthorized Discharges Prohibited) and §26.039 (Accidental Discharges and Spills).

30 TAC §308.1 or 40 CFR Part 125 Subpart A: Section 125.3 (e) a technology-based treatment requirements are applied prior to or at the point of discharge; and (f) technology-based treatment requirements cannot be satisfied through the use of "non-treatment" techniques such as flow augmentation and in-stream mechanical aerators.

30 TAC §307 Texas Water Quality Standards.

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

November 21, 1996

VIA PRIORITY MAIL AND FACSIMILE

Ms. Barbara Ferguson
Community Relations Coordinator
Texas Natural Resource Conservation Commission
MC-141
P.O. Box 13087
Austin, Texas 78711-3087

Re: Longhorn Army Ammunition Plant
Informal Dispute Resolution
Site 16 Old Landfill - Position Paper

Dear Ms. Ferguson:

The Environmental Protection Agency (EPA), as requested during the meeting on November 19, 1996 is herein providing a concise explanation of EPA's position in regards to the current unresolved dispute. The basis of this dispute is the Army's recanting of their previous commitment made to the local community, the State of Texas, and the EPA. The Army previously committed to take action to control and prevent the migration of contaminated groundwater from the Site 16 Old Landfill to Harrison Bayou as quickly as possible in a cost effective manner. This commitment was made nearly a year ago. Little progress has been made in regards to either controlling the plume or in accelerating the remedial investigation and feasibility study for Site 16 Old Landfill so that a final remedy can be initiated. The EPA's position is as follows:

> *The Army should follow through on their previous commitment and take immediate action to prevent the ongoing migration of contaminated groundwater from the Site 16 Old Landfill to Harrison Bayou. This action should include the installation and operation of the groundwater control measures and implementation of a plan to monitor Harrison Bayou to ensure the groundwater control measures are effective. Concurrently, the Army should accelerate the remedial investigation and feasibility study for the Site 16 Old Landfill so that a final remedy can be initiated as soon as possible.*

The EPA looks forward to resolution of this dispute and in continuing our work together with the Army and the State of Texas in achieving our common goals of protecting human health and the environment; developing timely, cost effective, and environmentally sound solutions to environmental problems, and; maintaining the Public's Trust.

Sincerely,

Gus Chavarria
Texas Section Chief
Superfund

(7)

CADDO
LAKE
INSTITUTE, INC.

Marshall, Texas Office
8703 Bridle Path
Marshall, TX 75670
Tel/Fax (903) 938-3545

Business Office
P. O. Box 2710
Aspen, Colorado 81612-2710
Delivery Address
0191 Woods Road
Woody Creek, CO 81656
Tel (970) 925-2710
Fax (970) 925-4245

November 20, 1996

018278

via FACSIMILE to 512-239-2469

Ms. Barbara Ferguson
Community Relations Coordinator
Public Meetings Unit
Pollution Cleanup Division
TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
1200 Park Thirty-Five Circle
Building D
Austin, TX 78753

Re: Longhorn Army Ammunition Plant Landfill 16 Concerns

Dear Ms. Ferguson:

In accordance with your request, I am submitting the following as the Caddo Lake Institute's concerns which I expressed at the Technical Review Committee Meeting at TNRCC's offices on November 19, 1996. While I am a newcomer to the TRC process, my impression is that the issue has arisen between the State of Texas and the Army because of the recent intervention by the U.S. Army Environmental Center. As best I can determine this intervention seems to reflect a desire, based on posing a range of hypothetical questions, to repudiate the previous representations of the Longhorn Command to take prompt interim remedial action to prevent contamination of Harrison Bayou from Landfill 16 contaminate discharge.

As an owner of a home at Caddo Lake, I participated in the Army's earlier public hearings which established a need for prompt remedial action pending development of final solutions at Landfill 16. I also observed the Longhorn Command make explicit representations that a pump and treat solution was the most effective interim measure to prevent the spread of contaminates into the ground and surface water. Like most participants in the hearing process, I have been assuming that the Army would make good on its representations. The position which the Army Environmental Center expressed on November 19th was therefore a surprise and a disappointment.

The Caddo Lake Institute has recently received a thirty year lease from the U.S. Army for substantially all of the Harrison Bayou wetland area (approx. 1400 acres) lying below the 200 foot elevation contour. This lease excludes known contaminated sites such as Landfill 16. Our environmental analysis noted recent samplings of low levels of contaminates in surface waters near Harrison Bayou but reiterated the obligation of the Command to remediate the situation.

Disclosures at the November meeting that increasing levels of contaminates were being sampled and that sampling indicated further intrusion into the Bayou was a cause of increasing concern.

The purpose of the Caddo Lake Institute's lease include the conservation and research of this unique old growth natural area, which was designated in 1996 as a Wetland of International Importance under the so-called Ramsar Wetland Convention.

As I noted at the meeting, the Ramsar Treaty is non-regulatory in nature, but does impose upon the United States and its agencies, responsibilities for the long term conservation and sustainable use of all wetlands, including those designated as internationally important. At the recent Brisbane Ramsar conference in March 1996, the introduction of toxins into wetland ecosystems was identified as a problem meriting prompt attention by signatory nations, even when levels were well below those identified as representing immediate risk to human health. The Ramsar contracting parties follow the "precautionary principle" which is widely applied in international environmental matters. This principle enjoins those responsible for wetland ecosystems to refrain from arguably destructive activities until they can show with scientific evidence that proposed activities will, in fact, be benign. In other words, it is inappropriate to continue the introduction of toxins until someone proves that they are damaging. The precautionary principle shifts the burden to the proponent of the discharge to show scientifically that it will have no negative effect upon the biological integrity or natural functions and values of the ecosystem.

The U.S. Army Environmental Center's proposal to continue the introduction of toxins into Harrison Bayou until data are gathered and other longer term solutions are developed, in my opinion, violates the precautionary principle. This is especially so where TNRCC warned that this discharge is "flatly prohibited" by the Texas Water Code and where the proposed pump and treat interim remediation has been approved by the State of Texas. Therefore, not only could the State or citizens commence litigation against the Army under the Clean Water Act and the Texas Water Code, but also any entity could report this matter to the executive department of the United States Government and to the Ramsar Bureau in Gland, Switzerland. Any of those parties could insist on immediate implementation of the pump and treat solution. It is the only currently approved immediate remedial action which is available to assure compliance with law. Internationally, failure to do so would seriously undermine the United States' ability to insist that other Ramsar nations take similar interim actions in similar circumstances. Locally, other residents have expressed a clear intent to engage in protests objecting to the U.S. Army Environmental Center's intervention and delay of the interim remediation. I am distressed that the Army Environmental Center's activities threaten to annul Under Secretary Reeder's sincere assurances of the Army's stewardship of local community values in his October 24th remarks at Caddo Lake State Park.

As a Caddo Lake homeowner, and as President of the Caddo Lake Institute, my desire is to be a good neighbor and tenant of the Army. I believe that I can do this best by supporting the authorized representations of the members of the Longhorn Command who have worked with the local community regarding implementation of interim pump and treat remedial measures.

Very truly yours,

Dwight K. Shellman, Jr.

DKSjr/vvn
Enclosure: Caddo Lake Ramsar Wetlands '96 map
cc: Bill Takakoshi, Special Assistant to the
Under Secretary of the Army (via fax w/o enc.)
James McPherson, Commander's Representative,
Longhorn Army Ammunition Plant (via fax w/o enc.)
Don Henley (via fax w/o enc.)

s:\p\caddo\ferguson.l20

(7)

019281

CADDO LAKE'S RAMSAR WETLAND OF INTERNATIONAL IMPORTANCE AS OF OCTOBER, 1996

LEGEND

▨ TPWD State Park

Original Ramsar Designation 1993:

▨ TPWD Wildlife Management Area (WMA)

Ramsar Nominations for Additions 1996:

■ TPWD Mossy Brake Wetlands

■ Starr Ranch Parcel

▨ TGLO's Jackson's Arm Parcel

▨ TGLO's Harrison County Corridor

▨ TGLO's Big Green Brake Parcel

▨ Jones Family / Henley Ramsar Stewardship Candidate Parcels

Abbreviations:

TPWD - Texas Parks and Wildlife Department
TGLO - Texas General Land Office
USGS - United States Geological Survey
BRD - Biological Resources Division
NWRC - National Wetlands Research Center

Base Layer - USGS Topographic Maps

Parcel boundaries are approximate and are subject to change upon request by owners

0.5 0 0.5 1 1.5 2 Miles

Produced by:

and
USGS-BRD-NWRC
Lafayette, LA.

1:52PM PRINT TIME NOV. 20 1:55PM

(1)

UNCERTAIN AUDUBON SOCIETY
Route 1 Box 787
Karnack, Texas 75661
(903)679-3179
(903)679-3104 Fax
rculver@pyrsm.net

018282

VIA FAX TRANSMISSION

Texas Natural Resource
Conservation Commission

ATTN: Barbara Ferguson

This letter is to confirm that the Uncertain Audubon Society favors continuation of the Time Critical Removal Action regarding Landfill No. 16.

Harrison Bayou is a Caddo Lake tributary and an important recreation site to the town of Uncertain and the State of Texas. Trichlorethylene is a volatile organic chemical used as a solvent and is a potential cause of cancer and hereditary damage in humans and other animals. Also as stated, Caddo Lake serves as a drinking water source for several Texas and Louisiana communities.

Rock Island Army representatives along with State and Federal agencies held a community meeting in Karnack, November 1996. In that meeting these agencies presented, to our community, the necessity for a TCRA due to TCE leaching from Landfill No. 16 into Harrison Bayou. The ARMY promised and committed to my community a cleanup of Landfill No. 16 by a Time Critical Removal Action. Since that time approximately $500,000 has been spent toward the cleanup of Landfill No.16. It is perplexing to the community (and apparently State and Federal agencies) that the Army is removing funding from this project and taking the stand that the issue of concern no longer requires an immediate response.

Under Secretary of the Army, Joe R. Reeder, delivered a talk to my community on October 24, 1996 asking us to keep faith in the Army. Help us do this by keeping your word to our community and continuing the TCRA on Landfill No. 16.

Sincerely,

R Culver

Ruth Culver
Conservation Chairman

(2)

END

DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY INDUSTRIAL OPERATIONS COMMAND
ROCK ISLAND, ILLINOIS 61299-6000

December 3, 1996

REPLY TO
ATTENTION OF

Deputy Chief of Staff for Environmental Management

018283

Mr. Barry J. Williams (MC122)
Deputy Director
Office of Waste Management
Texas Natural Resource Conservation Commission
12100 Park 35 Circle, Building D
Post Office Box 13087
Austin, Texas 78753

Dear Mr. Williams:

This letter is a response to fulfill the request made at the informal dispute resolution meeting held November 19, 1996, in Austin, Texas, regarding Landfill 16 (Group 2 sites at Longhorn Army Ammunition Plant), and the Army's plan of action for Landfill 16. The Army proposes to withdraw the Time Critical Removal Action decision made in November 1995. However, the Army proposes to conduct a treatability study as a part of the accelerated Remedial Investigation/Feasibility Study (RI/FS) which will include: (1) installing six additional extraction wells, and (2) Operating the extraction wells for approximately 24 months (the duration of the accelerated RI/FS), to determine the effectiveness of the pump and treat system "to stop the flow of contaminants from entering Harrison Bayou via a ground water seep" from Landfill 16. The Army will also install additional monitoring wells and piezometers to enable us to evaluate the effectiveness of extraction wells at Landfill 16.

The "treatability study" represented by these efforts will closely evaluate the effectiveness of the eight extraction wells. The results will be an important part of the final RI/FS for Landfill 16. Working in partnership with you, we expect to have the flexibility to discontinue the operation of the extraction wells if this technology is deemed unnecessary in our final remediation plan.

The Army's goal is to be consistent with the Comprehensive Environmental Response, Compensation, and Liability Act requirements which requires that remedies be protective of human health and the environment, by complying with the applicable or relevant and appropriate requirements.

If you have any further questions you may contact Mr. Cyril Onewokae, Restoration and Engineering Division, (309) 782-1350, electronic mail conewoka@ria-emh2.army.mil.

Sincerely,

018284

James P. Fairall, Jr.
Colonel, U.S. Army
Chief of Staff

Copies Furnished:

Mrs. Diane Poteet, Texas Natural Resource Conservation Commission, Superfund Investigation Section, MC-143, P.O. Box 13087, Austin, Texas 78711-3087

Mr. Chris Villarreal, U.S. Army Environmental Protection Agency, Region 6, 6SF-AT, 1445 Ross Ave, Dallas, Texas 75202-2733

Commander, U.S. Army Materiel Command, ATTN: AMCEN-A/ Mr. Khrishna Ganta, 5001 Eisenhower Avenue, Alexandria, Virginia 22333-0001

Commander's Representative, Longhorn Army Ammunition Plant, ATTN: SIOLH-CR/Mr. James McPherson, P.O. Box 658, Doyline, Louisiana 71023-0658

Commander, U.S. Army Environmental Center, ATTN: SFIM-AEC-IRP/ Mr. Jeff Armstrong, Aberdeen Proving Ground, Maryland 21010-5401

✓ Commander, U.S. Army Corps of Engineers District, Tulsa, ATTN: CESWT-PP-EA/Ms. Jonna Polk, P.O. Box 61, Tulsa, Oklahoma 74121-0061

DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY INDUSTRIAL OPERATIONS COMMAND
ROCK ISLAND, ILLINOIS 61299-6000

REPLY TO
ATTENTION OF

December 3, 1996

Deputy Chief of Staff for Environmental Management

018285

Mr. Myron O. Knudson, Director
Hazardous Waste Management Division (6SF)
U. S. Environmental Protection Agency, Region VI
1445 Ross Avenue
Dallas, Texas 75202-2733

Dear Mr. Knudson:

This letter is a response to fulfill the request made at the informal dispute resolution meeting held November 19, 1996, in Austin, Texas, regarding Landfill 16 (Group 2 sites at Longhorn Army Ammunition Plant), and the Army's plan of action for Landfill 16. The Army proposes to withdraw the Time Critical Removal Action decision made in November 1995. However, the Army proposes to conduct a treatability study as a part of the accelerated Remedial Investigation/Feasibility Study (RI/FS) which will include: (1) installing six additional extraction wells, and (2) Operating the extraction wells for approximately 24 months (the duration of the accelerated RI/FS), to determine the effectiveness of the pump and treat system "to stop the flow of contaminants from entering Harrison Bayou via a ground water seep" from Landfill 16. The Army will also install additional monitoring wells and piezometers to enable us to evaluate the effectiveness of extraction wells at Landfill 16.

The "treatability study" represented by these efforts will closely evaluate the effectiveness of the eight extraction wells. The results will be an important part of the final RI/FS for Landfill 16. Working in partnership with you, we expect to have the flexibility to discontinue the operation of the extraction wells if this technology is deemed unnecessary in our final remediation plan.

The Army's goal is to be consistent with the Comprehensive Environmental Response, Compensation, and Liability Act requirements which requires that remedies be protective of human health and the environment, by complying with the applicable or relevant and appropriate requirements.

If you have any further questions you may contact Mr. Cyril Onewokae, Restoration and Engineering Division, (309) 782-1350, electronic mail conewoka@ria-emh2.army.mil.

Sincerely,

James P. Fairall, Jr.
Colonel, U.S. Army
Chief of Staff

Copies Furnished:

Mrs. Diane Poteet, Texas Natural Resource Conservation
Commission, Superfund Investigation Section, MC-143,
P.O. Box 13087, Austin, Texas 78711-3087
Mr. Chris Villarreal, U.S. Army Environmental Protection Agency,
Region 6, 6SF-AT, 1445 Ross Ave, Dallas, Texas 75202-2733
Commander, U.S. Army Materiel Command, ATTN: AMCEN-A/
Mr. Khrishna Ganta, 5001 Eisenhower Avenue, Alexandria,
Virginia 22333-0001
Commander's Representative, Longhorn Army Ammunition Plant,
ATTN: SIOLH-CR/Mr. James McPherson, P.O. Box 658,
Doyline, Louisiana 71023-0658
Commander, U.S. Army Environmental Center, ATTN: SFIM-AEC-IRP/
Mr. Jeff Armstrong, Aberdeen Proving Ground, Maryland
21010-5401
✓ Commander, U.S. Army Corps of Engineers District, Tulsa,
ATTN: CESWT-PP-EA/Ms. Jonna Polk, P.O. Box 61,
Tulsa, Oklahoma 74121-0061

Barry R. McBee, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Dan Pearson, *Executive Director*

DEC 12 1996

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

018287

December 6, 1996

Colonel James Fairall, Jr., Commander
U. S. Industrial Operations Command
AMSIO-CS
Rock Island, IL 61299-6000

Certified Mail Receipt No. Z 746 032 750

Mr. Myron O. Knudson, P.E., Director
Hazardous Waste Management Division (6SF)
U. S. Environmental Protection Agency
Region 6
1445 Ross Avenue
Dallas, TX 75202-2733

Certified Mail Receipt No. Z 746 032 751

Re: Longhorn Army Ammunition Plant, Group 2 - Landfill Site 16: Dispute Resolution

Dear Colonel Fairall and Mr. Knudson:

On December 3, 1996, the Texas Natural Resource Conservation Commission (TNRCC) received the Army's response to our request made at the meeting held on November 19, 1996. The TNRCC concurs with the Army's proposal to install six additional extraction wells and to operate the wells throughout the duration of the accelerated RI/FS in order to stop the flow of contaminants into Harrison Bayou via a ground water seep from Landfill 16. Therefore, by this letter we are notifying you that the dispute has been resolved and further meetings regarding this dispute will no longer be necessary.

The TNRCC requests that a schedule for the installation and monitoring of the extraction wells, and the additional monitoring wells and piezometers, be submitted to us for concurrence review by December 20, 1996. If you have any questions or comments, please contact Diane Poteet at (512) 239-2502.

Sincerely,

Barry J. Williams

Barry J. Williams, Deputy Director
Office of Waste Management

cc: Mr. Dwight Shellman, Jr., Caddo Lake Institute
Ms. Ruth Culver, Uncertain Audubon Society
Mr. James McPherson, LHAAP (SILOH-OR)
Ms. Jonna Polk, COE Tulsa District (CESWT-PP-EA)
Mr. Cyril Onewokae, U.S. Army (HQ, IOC, AMSIO-EQE)
Mr. Jeff Armstrong, U.S. Army (USAEC, SFIM-AEC-IRP, APG)

P.O. Box 13087 • Austin, Texas 78711-3087 • 512/239-1000

TRC MEETING
DEC. 12, 1996

The following is a list of attendees:

- David Tolbert, LHAAP
- Bud Jones, TNRCC
- Yolane Hartsfield, Tulsa COE
- Ann Montgomery, LHAAP
- Jonna Polk, Tulsa COE
- Ruth Culver, Uncertain Audubon
- James McPherson, LHAAP
- Diane Poteet, TNRCC
- Oscar Linebaugh, COE, Ft. Worth District
- Amine Bou Onk, Radian International
- Steve Brunton, Sverdrup
- Vic Heister, Tulsa COE
- Lynn Muckelrath, LHAAP
- Mary Barrett, Audubon/Centenary
- Glen Turney, OHM Remediation
- Tom Walker, Caddo Lake Resident
- Wilma Subra, Uncertain Audubon
- Ira Nathan, LHAAP
- Cyril Onewokae, HQ, IOC, AMSIO, EQE
- Chris Villarreal, EPA
- Warren Sayes, COE, Ft. Worth District
- Frank Meleton, Ft. Worth District
- Dave Bockelmann, Sverdrup
- Cliff Murray, Tulsa COE
- Jim Bob Owens, Radian International

James McPherson called the meeting to order at 9:30 a.m. welcoming everyone. He then turned the meeting over to David Tolbert.

The agenda was presented to everyone present, along with the IRP Status Summary.

A letter issued by the Army on December 3, 1996 stated that TCRA has been renamed "Treatability Study", with Site 16 being pulled out of Group #2. The RI/FS for Site 16 is being accelerated. The Corps is committed to completing the RI/FS report within two years. The remaining 6 wells will be installed and the data will be plugged back into model which will help us in identifying the final solution for the site. The groundwater will be trucked to the BG3 treatment facilities.

Question: When will you make the decision for locating the eight wells?

Answer: Hopefully, within the next one and one-half months. We hope to be in the field in two months.

Question: Do you have enough SCAPS and well data to construct cross sections?

Answer: Probably. We have done a number of SCAP punches and installed a total of 19 wells. Data has shown two primary areas of sand distribution in the environment. The model has the capacity to adjust when additional information is obtained.

Sverdrup stated that we have a number of geologists with varying degrees of knowledge. We realize where we are and what we are up against. We will have some indication of what we are doing before we do it. James McPherson stated that we will keep Mary Barrett informed exactly where we are and what our positions are.

We are looking at potential alternate technology. EPA is also looking all known technology. Next two years there may be a better way to look at it. Our primary concern is to stop contaminant flow. We will be gathering specific data to conduct study on natural attenuation. We need a combination of technologies.

TNRCC has requested the schedule for RI/FS by December 20 which will include the schedule for workplan for monitoring. An agreement was made to submit the accelerated schedule, reducing review time for all agencies. EPA and TNRCC will review and comment.

The Air Monitoring status report was reviewed. EPA will respond to comments previously made.

A teleconference will be held at 9:00 a.m. Monday to discuss Air Monitoring Plan. All efforts will be made to finalize the Air Monitoring Report on Monday.

Radian has prepared the standard exemption forms for air monitor. Army will sign and submit those as required by the State.

Glen Turney (OHM) passed out a report on Wastewater Sump Sampling and Disposal. They are completely finished with removal of all materials from sumps. They have a recommendation to the Corps and to the facility to start demo of concrete and sumps. Field portion of project will be complete in late January. The results have come back on the concrete. The project is two months ahead of schedule. Will be ready and done with sumps so can start work on landfills.

Of the first 47 sumps, 15 came back with detectable contamination but below risk reduction 2 standards. OHM has gone through and looked at a number of sump locations based on previous investigation for contaminated groundwater and soils. Proposed to demo all of sumps. Cyril Onewokae stated that he wanted the sumps demolished and taken to the landfill.

Question: What is status of the Toxicity study.

Answer: We have a situation where the contracted lab in Houston failed the test and our lab in Louisiana passed the test. We need direction from the regulators. TNRCC will respond by Tuesday, December 17.

Question: How much material is left for open burn?

Answer: Army has material left to go through the end of March, 1997. Thiokol Corporation has requested to buy HMX equipment and the Army has consented. They should be finished here by June 1997. Contract terminates 30 June 97.

Question: What is the status of Subpart X?

Answer: In correspondence with TNRCC, the intent is to continue the present interim permit. As quickly as is finished we will withdraw application for Subpart X and close the Burning Ground. Cannot withdraw application and lose interim status.

The next Manager's Meeting is scheduled for January 14, 1997 in Dallas - 9:30 a.m.

The following Manager's Meeting will be February 11, 1997 - 9:30 a.m.

Cyril recommended that instead of having Manager's meetings, perhaps things could be resolved by phone. Will decide at the January meeting if that can be arranged or if a meeting is necessary.

The next TRC meeting will be held March 11, 1997 at 9:30 a.m.

018290

FINAL APPROVED
AIR MONITORING PLAN

INTERIM REMEDIAL ACTION
BURNING GROUND No. 3
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

PREPARED FOR:

UNITED STATES ARMY CORPS OF ENGINEERS
TULSA AND FORT WORTH DISTRICTS

PREPARED BY:

DOW ENVIRONMENTAL INC.
ROCKVILLE, MARYLAND

December 16, 1996
USACE CONTRACT DACA56-93-D-0016
DELIVERY ORDER 0002
DEI PROJECT 2379

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

A	PROCESS SIMULATOR HISYM MODELING RESULTS FOR WASTEWATER AIR STRIPPING
B	CALCULATIONS FOR EMISSIONS ASSOCIATED WITH SOIL AND SOURCE MATERIAL EXCAVATIONS
C	T-SCREEN MODELING RESULTS
D	SCREENING CRITERIA FOR METEOROLOGICAL DATA
E	U.S. EPA TO-14 COMPENDIUM OF METHODS FOR THE DETERMINATION OF TOXIC ORGANIC COMPOUNDS IN AMBIENT AIR
F	METHOD 25A - DETERMINATION OF TOTAL GASEOUS ORGANIC CONCENTRATIONS USING A FLAME IONIZATION ANALYZER
G	METHOD 2 - DETERMINATION OF STACK GAS VELOCITY AND VOLUMETRIC FLOW RATE (TYPE S PITOT TUBE)
H	FIELD SAMPLING DATA SHEET

5.0 MONITORING PROGRAM DESCRIPTION

This section describes the monitoring program that will be implemented at Burning Ground No. 3 during the IRA. The program is presented in terms of the constituents to be monitored, the monitoring phases, meteorological monitoring, air monitoring, air monitoring methods, and quality assurance/quality control (QA/QC).

5.1 Constituents to be Monitored

The contaminants of concern during the IRA are VOCs. Therefore, the monitoring program will focus on monitoring of VOCs during soil excavation and handling and during soil and ground water treatment. In addition, other pertinent operational parameters will be monitored at the GWTP and STP. To determine the potential of off-site migration of contaminants from the site, meteorological monitoring will also be performed.

5.2 Monitoring Program Details

The AMP will consist of four components. These are: Baseline Monitoring (with Screening risk assessment submitted under separate cover), Treatment System Performance Monitoring, Excavation Zone First-Alert Monitoring, and Perimeter Monitoring. The monitoring activities associated with these components are described in the following sections. Detailed monitoring procedures are discussed in Sections 5.3, 5.4, and 5.5. Table 5-1 presents a summary of the overall analytical program. A comprehensive Quality Assurance Project Plan (QAPP) will be prepared for all air measurement activities (with the exception of the Baseline Monitoring which has already been completed).

5.2.1 Baseline Monitoring Program

Baseline monitoring will be performed to augment historic site characterization and for final fine-tuning of the IRA AMP components. The emphasis of the Baseline Monitoring Program is on gaining a full understanding of the site conditions and identifying contaminants of concern prior to the onset of the planned activities. The purpose of this monitoring is to characterize conditions before the disturbance of the site so that site-specific impacts may be more accurately defined. If off-site sources of target compounds exist in the upwind direction of the site, the contribution of these sources will be evaluated. This will permit an accurate evaluation of the impact of specific IRA activities on ambient air quality throughout implementation of the IRA. Real-time data acquisition was not considered to be required at this stage because on-site baseline conditions are considered to be steady state.

TABLE 5-1

LHAAP, BURNING GROUND No. 3, IRA
SUMMARY OF ANALYTICAL AIR MONITORING PROGRAM

Activity	Parameters Required	Test Method	Frequency of Sampling
1. Baseline Monitoring	VOCs	Method TO-14 at Off-site Laboratory	Biweekly for 2 months Prior to Remedial Activities
2. Proof of Performance for GWTP.	See Table 5-2	See Table 5-2	See Table 5-2
3. Proof of Performance for STP	See Table 5-3	See Table 5-3	See Table 5-3
4. Real Time - Excavation Zone	VOCs/Target Compounds	On-site Portable IR analyzer/ per Manufacturer's Information	Real Time Daily During Remedial Activities
5. Real Time - Perimeter	VOCs/Target Compounds [a]	Charcoal tube samples with GC analysis for VOCs	Real Time Daily During Remedial Activities. Monthly Confirmation Sampling[b]
6. Stack Sampling and Monitoring For the GWTP	See Table 5-2	See Table 5-2	See Table 5-2
7. Stack Sampling and Monitoring For the STP	See Table 5-3	See Table 5-3	See Table 5-3

Notes : [a] Initially, Method TO-14 will be used for offsite testing to identify all VOCs present during the 2 month baseline monitoring period.

[b] Samples will be collected monthly throughout the IRA at one upwind and three downwind locations and sent off-site for full TO-14 scan analyses.

The baseline monitoring program will the include appropriate QA/QC procedures to ensure data quality and will consist of the following elements:

Sampling Methodology:	**Time-integrated, constant flow rate, stationary SUMMA Canisters**
Analytical Method:	**TO-14 GC/MS (full scan for VOCs)**
Sampling Duration:	**2 Months, at a frequency of once every two weeks**
Sampler Locations:	**1 Upwind, 3 Downwind from Burning Ground No. 3, inside the LHAAP Perimeter.**
Meteorology:	**1 Stationary Meteorological Station**

SUMMA canisters will be used to collect time-integrated whole air samples composited over an 8-hour period, every two weeks over a two-month period prior to the onset of IRA activities. The sampling duration and period will reflect the normal hours of activities in other areas of the facility, as well as the expected periods of IRA activities. The baseline monitoring period will include collection of samples at upwind and downwind locations from the burning ground.

A stationary meteorological monitoring station will be used to collect pertinent meteorological data, such as wind speed, direction, temperature and relative humidity. The meteorological monitoring program discussed in Section 5.3 will continue for the duration of the air monitoring program. The only exception will be if a long lag occurs during the remedial activities. In such a case, the meteorological program may be ceased until one week before resuming site activities.

5.2.2 Remedial Action Monitoring Program

Remedial Action Monitoring will consist of Excavation Zone First-Alert Monitoring, Treatment System Performance Monitoring, and Perimeter Monitoring. Real-time sampling for the target compounds will be performed during the excavation of source material. Confirmation time-integrated whole air samples will be collected using SUMMA canisters on a monthly basis and sent off-site for analysis. Detection of elevated organic contaminant levels at the first-alert stations will potentially trigger increased monitoring activities and reduced excavation activities until the first-alert levels are reduced to background levels as determined in the baseline study. If the continuous real-time analyzers at the site perimeter monitoring stations indicate that the daily trigger level for the target compounds was exceeded, a full-scan GC analysis of the charcoal tube samples will be performed. Treatment system performance monitoring will ensure that the required treatment efficiency is being achieved. Perimeter monitoring will be performed to ensure that health effects screening levels are not exceeded for potential receptors during the IRA.

5.2.2.1 Treatment System Performance Monitors

The remedial activities at the site will include the GWTP and STP. The treatment systems' performance monitoring will consist of two elements. These are the initial Proof of Performance tests and the routine, ongoing compliance sampling. A QA/QC plan for the treatment system monitoring will be provided based on the requirements outlined in 40 CFR 60, Appendix A.

Proof of performance (POP) and stack testing will be performed for the exhaust stacks at the catalytic oxidizers for the GWTP and STP according to the specifications in 40 CFR Part 60, Appendix A The exit gas velocity and flow rate measurements will be performed according to Method 2, a copy of which is in Appendix G. The analytical methods which will be employed during the tests are listed in the table in this section.

The POP tests will be performed to:

- Demonstrate that the treatment unit can meet performance levels (e.g., ARARs and site-specific clean-up goals);
- Demonstrate that the unit is operated in a manner that is protective of human health and the environment; and
- Establish operational performance criteria.

Stack sampling/monitoring will be performed in the exit stacks at the catalytic oxidizers for the GWTP and STP during both the pop tests and for ongoing compliance sampling. Monitoring will be performed on a continuous basis to ensure ongoing compliance with equipment treatment specifications and to ensure that emissions estimates made are representative of actual site conditions. The parameters to be monitored and specific test methods that will be used during stack sampling are listed in Table 5-2 for the GWTP and Table 5-3 for the STP.

5.2.2.2 Excavation Zone Monitoring

A conceptual layout of the excavation zone and perimeter monitoring is illustrated in Figure 5-1 and the system is discussed in the following sections.

Table 5-2
LHAAP, Burning Ground No. 3, IRA
Groundwater Treatment Plant Emissions Monitoring

Description of Activity	Frequency of Onsite Testing	Frequency of Offsite Testing	Parameters	Test Methods 40 CFR 60 Appendix A
A. Proof Of Performance*	Continuous Emissions Monitors (CEMs)	None	TOC's	Method 25A
	None	Daily During Testing Interval	VOCs	Method TO-14
B. Normal Operations (One Year O&M)	Continuous Emissions Monitors (CEMs)	None	TOC's	Method 25A
	Real Time - Onsite	At Least Once Every Day the GWTP is Operational	VOCs	OVA/ per Manufacturer's Information
	None	Quarterly	VOCs	Method TO-14

* Sampling and testing would start when contaminated water is introduced into the GWTP

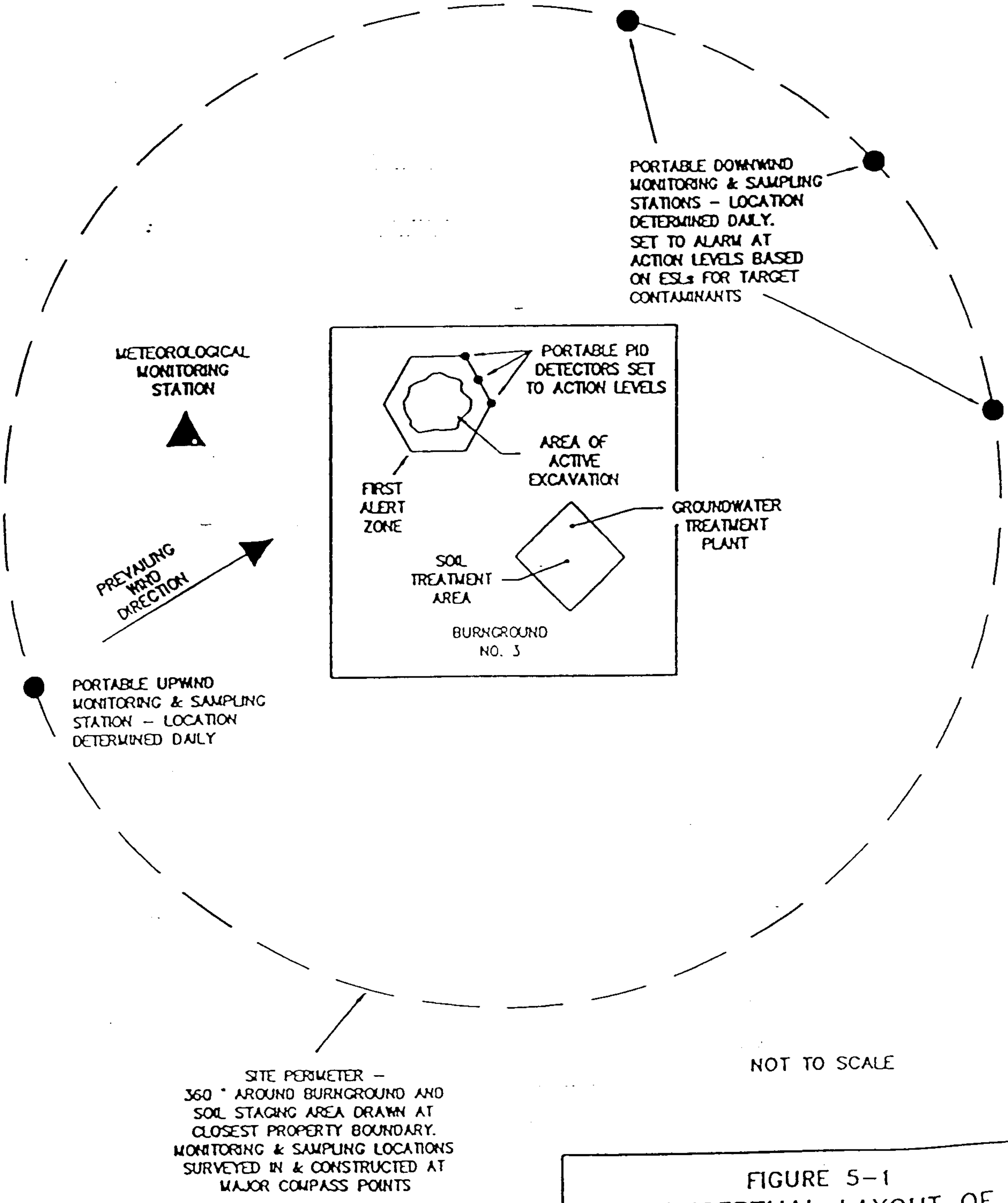
Table 5-3
LHAAP, Burning Ground No. 3, IRA
Soil Treatment Plant Stack Emissions Monitoring

018299

Description of Activity	Frequency of Onsite Testing	Frequency of Offsite Testing	Parameters	Test Methods 40 CFR 60 Appendix A
A. Proof Of Performance*	Continuous Emissions Monitors (CEMs)	None	TOC's	Method 25A
			Carbon Dioxide	Method 3
			Oxygen	Method 3
			Nitrogen Oxides	Method 7
			Carbon Monoxide	Method 10
	None	One Sample Per Run	VOCs	VOST
			Heavy Metals	Modified Method 5
			Acid Gas (HCl)	Method 26
			Total Particulates	Method 5
			Chlorine Gas	Method 26A
			Dioxins & Furans	Method 23
			Moisture Content	Method 4
			Stack Gas Velocity and Volumetric Flow Rate	Method 2
B. Normal Operations	Continuous Emissions Monitors (CEMs)	None	TOC's	Method 25A
			Carbon Dioxide	Method 3
			Oxygen	Method 3
			Carbon Monoxide	Method 10

*POP testing will include one test for each of 2 conditions (high temperature feed rate and low temperature feed rate). Each test will consist o
one hour runs from which results of each test will be averaged.

018300



NOT TO SCALE

FIGURE 5-1
CONCEPTUAL LAYOUT OF EXCAVATION ZONE AND PERIMETER MONITORING
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

DRAWN BY:	DATE:	PROJ. NO.
LMG	11-30-95	39-04

E390402

The Excavation Zone monitoring will be performed on a daily basis during excavation of contaminated soils and source materials. This monitoring will consist of the following elements:

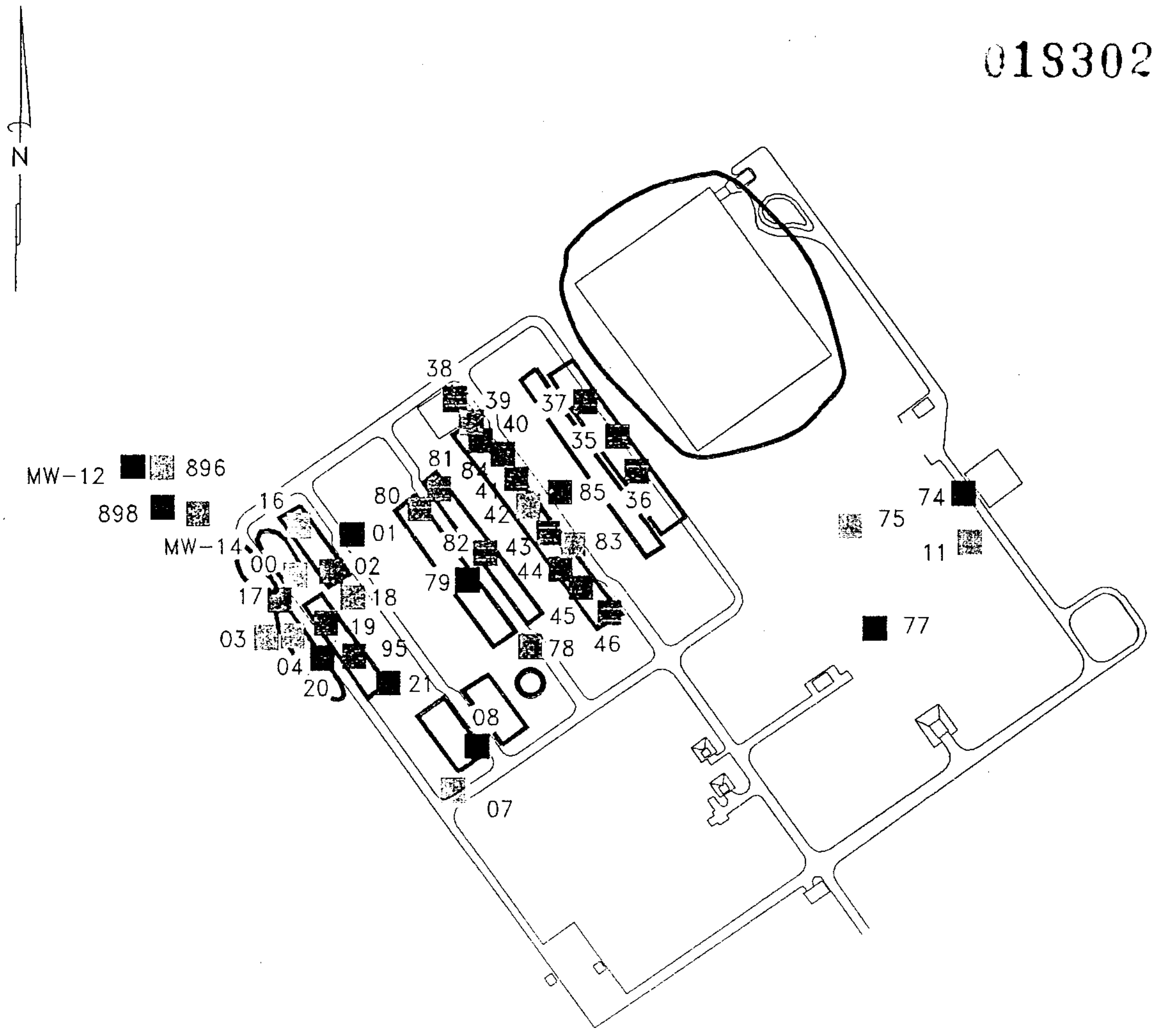
Data Analysis:	**Delineation of excavation contamination zones and determination of maximum excavation rates in each zone, based on calculated emission rate estimates and modeling.**
Modeling:	**Determination of First-Alert trigger levels (concentration-based) in the active excavation areas based on air quality health effects screening levels.**
Monitoring:	**At First-alert stations with IR detectors set to alarm at pre-determined trigger levels.**
Trigger Response:	**Modification of excavation activities.**

Available site data was reviewed and utilized to divide the excavation area into rated zones of contamination (as shown in Figure 5-2). A rating of 1 indicated the excavation zone with the lowest reported contamination and highest maximum allowable excavation rate, and a rating of 5 indicated the excavation zone with the highest contamination and the lowest maximum allowable excavation rate (see Table 5-4). The maximum allowable excavation rates were determined as follows. Total emission rates (pore space emission rates and diffusion emission rates) were calculated for each excavation zone, for each contaminant detected, using the following concentrations: Zone 1 - 0.1 mg/kg; Zone 2 - 1.0 mg/kg; Zone 3 - 10.0 mg/kg; Zone 4 - 100 mg/kg; and Zone 5 - 120 mg/kg, as a function of Q (the excavation rate). The concentrations in the zones correspond to any one VOC which could be present at or below the maximum concentration for that zone. These maximum concentrations were used to calculate the emission rates (see Appendix B for detailed calculations).

The maximum allowable emission rate for each contaminant was then determined using the SCREEN2 model and a generic emission rate of 1 gram/sec (see Appendix C for modeling results). The concentration obtained at 1200 meters was then ratioed to one-half of the actual ESL for the compound, and this value was multiplied by the generic emission rate to obtain the maximum allowable emission rate for each compound. These maximum allowable emission rates were then used to solve for Q, the maximum excavation rate. The smallest value of Q obtained for each excavation zone was used to set the maximum excavation rate in each zone.

During site activities, the immediate area of the active Excavation Zone will be monitored, real-time, utilizing two IR (Infrared) instruments (see Figure 5-1). The location of these monitors will be determined daily, based on the wind direction and the area of active excavation. These monitors will comprise the "First-Alert Stations". The trigger level will be determined by evaluating the maximum ambient concentration in

018302



EXCAVATION ZONES

▨ 0 ≥ 0.1 mg/Kg – EXCAVATION ZONE 1

■ 0.1 ≥ 1.0 mg/Kg – EXCAVATION ZONE 2

□ 1.0 ≥ 10.0 mg/Kg – EXCAVATION ZONE 3

▨ 10.0 ≥ 100 mg/Kg – EXCAVATION ZONE 4

▨ 100 mg/Kg+ – EXCAVATION ZONE 5

LEGEND

MW-7	EXISTING MONITORING WELLS
76	PREVIOUS SOIL BORING
—	SOURCE UNITS

0 150 300 600
SCALE IN FEET

NOTE:
LOCATIONS OF SITE FEATURES & SAMPLING LOCATIONS HAVE BEEN ASSEMBLED FROM REFERENCED DOCUMENTS PREPARED BY VARIOUS AGENCIES.

FIGURE 5-2
EXCAVATION ZONES
INTERIM REMEDIAL ACTION
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

DRAWN BY:	DATE:	PROJ. NO.
LMG	11-30-95	39-04

TABLE 5-4
IRA EXCAVATION ZONES & MAXIMUM EXCAVATION RATES

CONTAMINANT CONCENTRATION (mg/kg) [1]	MAXIMUM EXCAVATION RATE (CY/hr) [2]
0 ≤ 0.1	14,800
0.1 ≤ 1.0	1,480
1.0 ≤ 10.0	148
10.0 ≤ 100	14.8
> 100	12.3

[1] Corresponds to at least one contaminant present at or below the maximum concentration for the excavation zone.

[2] The maximum excavation rate which would result in an off-site concentration equal to one-half the Effects Screening Level for the limiting contaminant.

the excavation zone which would be protective of the ESLs at the perimeter of the site. Detection of concentrations above the trigger level at the first-alert stations will potentially trigger increased monitoring activities and modified excavation activities until the instrument readings return to normal background levels. The Excavation Zone will include the actual excavation area as well as the Soil Handling Pad in the Soil and Groundwater Treatment Area (Soil Staging Area).

5.2.2.3 Perimeter Monitoring Program

Perimeter monitoring will be performed to ensure that the health effects screening levels are not exceeded off-site for potential receptors.

Perimeter monitoring will consist of charcoal tube sampling with on-site GC analysis. The perimeter sample point locations will be surveyed in, equidistant from the remediation area (encompassing both the Excavation Zone and the Soil Staging Area), at the major compass points (for 360 ° around the area) (see Figure 5-1). The prevailing wind direction will be determined on a daily basis and the portable samplers will be stationed at the appropriate upwind and downwind locations. There will be at least one upwind and three downwind samples collected during each episode. More than three downwind samplers may be used if the wind direction is expected to be variable. If so, the three samplers that were within the plume for the greatest percentage of time will be selected for analysis. The data will be presented in a monthly report to the U.S. COE. The data also will be maintained in an on-site file that will be open for inspection at any time.

The SCREEN2 Air Dispersion Model was used to estimate ambient air concentrations of the target compounds at the nearest off-site receptors as detailed in Sections 4.4 and 5.2.2.2. The limiting compound for a particular excavation area will be the compound detected in historical or recent soil samples which has the lowest ESL (see Appendix B for a list of the historically detected compounds and their ESLs). These ESLs were used to determine the maximum excavation rates and will be sued to set the daily alarm limits at the excavation zone monitoring stations. Site perimeter confirmation samples will also be collected monthly (by SUMMA canister) and sent off-site for analyses for full-scan volatile analysis as a quality control check.

5.3 Meteorological Monitoring Program

Meteorological monitoring will be performed as an integral part of the IRA. To estimate the potential for off-site migration of contaminants, meteorological data would be used in conjunction with measured air concentrations at the site perimeter to determine the impact of IRA activities on ambient air quality. A dedicated meteorological system will be installed for the air monitoring program that will collect real-time data on a continuous basis. Sections 5.3.1, 5.3.2, and 5.3.3 discuss the siting criteria for such the meteorological monitoring station, the monitoring duration, and system parameters, respectively.

5.3.1 Meteorological Station Siting

The primary objective of the meteorological station will be to obtain measurements that are representative of the area. Representative data are obtained by adhering to guidelines for minimum sensor height above the surface, and distances from natural and manmade obstructions.

The meteorological station would be permanently installed on level and open terrain away from interferences. Interferences are unwanted local effects that distort the actual conditions at the site. Interferences may be buildings that disrupt the normal flow of winds or direct solar radiation that falsely elevates ambient air temperature readings. Conventions have been adopted by the U.S. EPA to aid in the collection of comparable data by avoiding interferences. These conventions would be adhered to for parameters that are dependent on height, such as wind speed, wind direction, relative humidity, temperature, and precipitation (see Table 5-5). The tower height would be 10 meters.

5.3.2 Duration of Monitoring

Meteorological data would be collected starting at least two weeks prior to the initiation of the baseline monitoring program. Data will be collected throughout the duration of the IRA. If a significant lag occurs during the remedial activity, meteorological monitoring may be ceased until one week before resuming treatment work.

5.3.3 Monitoring Parameters

The meteorological monitoring system for the site will collect information for the following parameters: wind speed, wind direction (with sigma theta), ambient temperature, precipitation, and barometric pressure. The meteorological equipment specifications would comply with the recommended accuracies, resolution, and response characteristics outlined in Tables 5-6 and 5-7. Meteorological data will be recorded continuously by a data logger and/or a strip chart recorder and will be available in hourly averages to site personnel.

The meteorological equipment installation and operation specifications would be performed according to the manufacturer's recommendations and the U.S. EPA's On-site Meteorological Program Guidance for Regulatory Modeling Applications (U.S. EPA 450/4-87-013, June 1987).

TABLE 5-5

METEOROLOGICAL SENSOR SITING CONVENTIONS[a]
LHAAP SITE

SITING CONSIDERATION	CONVENTION
Instrument Tower	Located at least 10 times the height of obstructions away from said obstructions. Avoid areas with sloping terrain, valleys, and land-water interfaces, unless features are present at project site. If located on building roof; sensors must be elevated to 1.5 x building height.
Wind Speed/Wind Direction	Ten meters above ground level. Sensors should be mounted on booms no closer than 2 x the tower width away. Booms should be oriented normal to the prevailing wind direction.
Dry-bulb Temperature and Relative Humidity	Sensors should not be influenced by direct solar radiation or radiant heat. Standard siting for sensor is 2 meters above a plot of level ground, 9 meters in diameter. Surface should be short grass or soil. Additional heights may be appropriate.
Precipitation	Gauge is mounted on level ground with no obstructions. Wind screens are installed to prevent high winds from deflecting precipitation away from gauge orifice.

(a) U.S. EPA. June 1987. On-Site Meteorological Program Guidance for Regulatory Modeling Applications. EPA-450/4-87-013. Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina 27711.

U.S. EPA. May 1987. Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD). EPA-450/4-87/007. Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina 27711.

TABLE 5-6
RECOMMENDED RESPONSE CHARACTERISTICS FOR METEOROLOGICAL SENSORS LHAAP SITE

METEOROLOGICAL VARIABLE	SENSOR SPECIFICATION(a)
Wind Speed	Starting speed ≤0.5 m/s; Distance constant ≤5 m
Wind Direction	Starting speed ≤0.5 m/s at 10° deflection; Damping Ratio 0.4 to 0.7; Delay distance ≤5 m
Temperature	Time Constant ≤1 minute
Dew Point Temperature	Time Constant ≤30 minutes; operating temperature range -30°C to +30°C

(a) U.S. EPA, June 1987. On-Site Meteorological Program Guidance for Regulatory Modeling Applications, EPA-450/4-87-013, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711, Table 5-2.

TABLE 5-7

RECOMMENDED SYSTEM ACCURACIES AND RESOLUTIONS[(a)] LHAAP SITE

METEOROLOGICAL VARIABLE	SYSTEM ACCURACY	MEASUREMENT RESOLUTION
Wind Speed	±0.2 m/s	0.1 m/s
Wind Direction	±5 degrees	1 degree
Ambient Temperature	±0.5°C	0.1°C
Dew Point Temperature	±1.5°C	0.1°C
Precipitation	±10% of observed	0.3 mm
Pressure	±3 mb (0.3 kPa)	0.5 mb
Time	±5 minutes	---

(a) U.S. EPA, June 1987. On-Site Meteorological Program Guidance for Regulatory Modeling Applications. EPA-450/4-87-013. Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina 27711.

5.4 Quality Assurance and Quality Control Program

The data acquired from the Quality Assurance and Quality Control (QA/QC) procedures implemented for this project will be used to estimate analytical data quality, to determine the need for corrective action, and to interpret results after corrective action procedures have been implemented. Method specific QC procedures have been incorporated into the individual test methods to be used during the IRA. QA also includes the management of procedures and controls to generate data of acceptable quality.

The QA/QC program for the AMP requires the specification and implementation of the following measures:

- Conformance to Standard Methods for Sampling and Analysis.
- Performance of Routine QA/QC Checks and Audits.
- Development of Documentation and Recordkeeping Procedures.
- Assignment of QA/QC Organizational Chart and Responsibilities.

The AMP will incorporate a four-component approach for routine QA/QC checks as follows:

- Use of collocated samples for precision checks.
- Blank samples for accuracy checks.
- Use of analytical standards, equipment calibrations, and laboratory spiking for equipment performance checks.
- Data review and validation for internal consistency.

Control samples, which may include blanks (trip, equipment, and laboratory), duplicates, spikes analytical standards and reference materials will be utilized throughout the AMP in different phases of the data collection process, beginning with sampling and continuing on through transportation, storage and analysis.

5.4.1 Data Quality Objectives

Precision, accuracy and completeness checks will be performed for each primary measurement parameter with reference to the project objective. The objectives of the data quality program during implementation of the IRA will be to: 1) demonstrate compliance with the treatment efficiency requirements of the GWTP and the STP; and 2) evaluate the impact of IRA activities on overall ambient air quality in the area, in particular, with reference to the potential for off-site migration of contaminants at concentrations which exceed health effect screening levels. The overall quality of the data collected for these objectives must be known. The majority of the data precision and accuracy checks are method-specific, and are incorporated here by reference to the use of specific methods. Other quality assurance aspects of the data quality program will include personnel training (demonstrated technical competence), standardization of procedures, documentation, data validation and periodic data quality evaluations. Quality control aspects will include routine instrument checks, flow rate checks, duplicate analyses, calibration checks, blank analyses and equipment drift checks.

5.4.2 Sampling Procedures

Standard methods will be used which specify the: 1) preparation, cleaning and certification of sampling equipment; 2) sample preservation, transport and storage; and 3) sample holding times before extraction and analysis. These standard methods were presented in Table 5-1 and discussed in Section 5.2.2.1, and are incorporated here by reference.

5.4.3 Sample Custody

Procedures will be documented for preparing reagents or other supplies that become an integral part of the sample. Procedures and forms will be prepared for documenting the dates, times, locations and other relevant data pertaining to sample collection and analysis.

All field notes, laboratory notes and original calculations will be retained. All samples will be uniquely identified to ensure positive identification throughout analysis procedures. Chain-of-custody forms will accompany all samples from the field to the laboratory or intermediate storage points, and the forms should be signed by all persons who handle the samples along the way. The completed chain-of custody form will include documentation of sample preservation methods and the analyses requested for the samples.

Samples will be handled in a manner suitable for ensuring that there is no contamination or other breach of sample integrity that might be caused by leakage, accidental destruction, or tampering. Samples will be packaged, labeled, preserved and documented in an area which is free of contamination and provides for secure storage. Samples will be shipped only by registered mail or other forms of registered service. Samples will be delivered and analyzed within required holding times.

5.4.4 Calibration Procedures and Frequency

Calibration will be performed at the frequency referenced in the appropriate method outlined in 40 CFR Part 60, Appendix A, or at the equipment Manufacturer's recommendation. For sampling and analysis performed onsite, the applicable QA/QC requirements for CEMs (continuous emission monitors) in 40

CFR Part 60, Appendix A, particularly in Method 2, 5A, Method 3, Method 6C (referenced in Method 3), Method 7 and Method 10 will be followed. These procedures address preparation of calibration gases, calibration and zero drift testing, response time testing, span checking, sampling system bias, and interference checks. Calibration gases are known concentrations of a gas in an appropriate diluent gas. Certified calibration gases, with the manufacturer's tolerance not to exceed 2 percent of the tag value, will be used. Zero gas and 3 ranges of calibration gases will be used.

5.4.5 Analytical Equipment and Procedures

EPA approved analytical procedures will be used where possible, or modified procedures will be validated. Appropriate environmental conditions will be maintained to ensure that all equipment in use is not adversely affected by surroundings.

Manufacturer' recommended specifications will be used to ensure that all onsite analytical equipment is operational and functioning properly.

5.4.6 Data Reduction, Validation, and Reporting

A description for each primary measurement parameter including all equations, statistics, method for treating blank, method for treating undetected compounds in statistical calculations, methods to identify and treat outliers, criteria for flagging and validating data, will be prepared for reporting data results.

For samples sent to off-site laboratories, all laboratory data reports will be reviewed and independently validated by the assigned project QA Officer before preparation of final data reports to assure that proper protocols were followed.

On a routine basis, the outside laboratory data will be evaluated for: (1) completeness of laboratory records (analyses and QC samples) ; (2) detection and quantitation limits ; (3) calibration control limits, (4) sample holding time limits (where applicable); and (5) correlation of laboratory data.

5.4.7 Internal Quality Control

Internal quality control during the AMP will be preformed to evaluate and document the performance of the sampling and analytical systems. The minimum level of quality control checks that will be performed are summarized in Table 5-8.

TABLE 5-8
Summary of Quality Control Checks

Activity	Monitoring Approach	Sampling		Analysis	
		QC Check	Frequency	QC Check	Frequency
VOC Monitoring (baseline & other)	Canisters w/offsite TO-14 analysis	* Collocated samples (baseline tests) * Duplicate samples (stack sampling)	* 1/sampling event * 10%	* Calibrations * Analytical blanks * Duplicate analysis * QC standards	Follow laboratory's standard procedures
Meteorological Monitoring	On-site weather station	N/A	N/A	* QC audit	At installation and 1/year thereafter
Emissions Monitoring	CEMs on GWTP and LTTD units	* Inspect for proper operation (look for plugged filters & water in lines)	* 2/day	* Calibration * Span/zero check	* Weekly * Daily
Stack Emissions Testing	Standard EPA stack sampling methods w/offsite analysis	Follow standard procedures in EPA methods (e.g., leak checks in every run)	As Required	*Calibrations * Analytical blanks * Duplicate analyses * QC standards	Follow laboratory's standard procedures
Excavation Zone Monitoring	Real-time portable monitors	N/A	N/A	* Calibration * Span/zero check * Drift check	* Weekly * Daily * Daily
Perimeter Monitoring	Charcoal tube samples w/GC analysis	* Collocated samples	* 10%	* Calibration * Span/zero check * Drift check	*Weekly * Daily * Daily

5.4.8 Data Precision, Accuracy and Completeness Procedures

For automated on-site analytical systems, precision data will be obtained periodically (daily or weekly), challenging the analyzer with a gas standard of known concentration and observing the analyzer's response. Precision will be expressed in terms of relative standard deviation (Standard deviation divided by the mean, expressed as a percentage) of successive precision check results. Accuracy will be expressed as the percent of the known concentration recovered through the analytical system (the observed concentration divided by the known concentration, expressed as a percentage).

For measurement methods that require integrated sampling and off-site analysis (manual methods) duplicate (collocated) sample results will be used for determining data precision. To obtain precision data, collocated samplers will be located in areas with the highest expected concentration levels of target analytes. Precision will be expressed as the relative percent difference of duplicate sample results, or as pooled standard deviation.

One set of samples will be simultaneously collocated at each downwind station for 10 percent of the sampling activities. Comparison of the results for collocated samples will be used to evaluate the integrity of the samples and the adequacy of the laboratory procedures.

Accuracy determinations for manual methods will be performed by spiking sampling media with known quantities of target analytes and measuring their recovery through the extraction and analytical systems. The accuracy of the measurement data should be expressed as the percentage of the spiked amount recovered in the analysis. The analytical laboratory will perform spike sample analyses at a frequency of one in 20.

018314

FINAL

QUALITY ASSURANCE PROJECT PLAN
for Air Measurements

INTERIM REMEDIAL ACTION
BURNING GROUND No. 3
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

PREPARED FOR:

UNITED STATES ARMY CORPS OF ENGINEERS
TULSA AND FORT WORTH DISTRICTS

PREPARED BY:

DOW ENVIRONMENTAL, INC.

December 18, 1996
USACE CONTRACT DACA56-93-D-0016
DELIVERY ORDER 0002
DEI PROJECT 2379

TABLE OF CONTENTS

SECTION Page No.

TABLE OF CONTENTS (continued)

SECTION **Page No.**

TABLE OF CONTENTS (continued)

SECTION **Page No.**

LIST OF FIGURES

LIST OF TABLES

TABLE OF CONTENTS (continued)

LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

AAM	Ambient Air Monitoring
ARARs	Applicable or Relevant and Appropriate Requirements
ASTM	American Society for Testing and Materials
ATL	Air Toxics Laboratory, Inc.
BFB	Bromofluorobenzene
BIF	Boiler and Industrial Furnace
Btu	British thermal unit
CEM	Continuous Emission Monitor(ing)
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfm	Cubic feet per minute
CFR	Code of Federal Regulations
CH_4	Methane
Cl, Cl_2	Chlorine
CO_2	Carbon dioxide
CO	Carbon monoxide
COC	Chain of Custody
Conc	Concentration
CS_2	Carbon disulfide
CV	Coefficient of variability
DAS	Data acquisition system
DE	Destruction Efficiency
deg	Degree
DNAPL	Dense nonaqueous phase liquid
dscf	Dry standard cubic feet
ECD	Electron capture detector
EPA	Environmental Protection Agency
ESL	Effects Screening Level
FFA	Federal Facility Agreement
FID	Flame ionization detector
GC	Gas Chromatograph
GC/MS	Gas chromatography/mass spectroscopy
gpm	Gallons per minute
GWTP	Groundwater Treatment Plant
HCl	Hydrogen Chloride
H_2O	Water
H_2O_2	Hydrogen peroxide
HNO_3	Nitric acid

ACRONYMS AND ABBREVIATIONS
(Continued)

H_2SO_4	Sulfuric acid
hp	Horse power
IC	Ion Chromatography
INF	Intermediate-Range Nuclear Force
ICAPES	Inductively-Coupled Argon Plasma Emission Spectroscopy
ID	Induced Draft
IPS	Inclined Plate Separator
IR	Infrared
IRA	Interim Remedial Action
LHAAP	Longhorn Army Ammunition Plant
LTTD	Low-Temperature Thermal Desorption
MeCl	Methylene Chloride
Met	Meteorological
mph	Miles per hour
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N_2	Nitrogen
NA	Not Applicable
NaOH	Sodium hydroxide
NIOSH	National Institute for Occupational Safety and Health
NPL	National Priorities List
O_2	Oxygen
Obs	Observation
ORP	Oxidation-Reduction Potential
OVA	Organic Vapor Analyzer
PCDD	Polychlorinated Dibenzodioxins
PCDF	Polychlorinated Dibenzofurans
POP	Proof of Performance
ppm	Parts-per-million
ppm-v	Parts-per-million on a volume basis
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RF	Response Factor
RPD	Relative Percent Difference
SCFM	Standard Cubic Feet per Minute

ACRONYMS AND ABBREVIATIONS
(Continued)

SHDP	Soil Handling and Dewatering Pad
SIM	Selective Ion Monitoring
SS	Stainless Steel
STP	Soil Treatment Plant
TCE	Trichloroethylene
THC	Total Hydrocarbons
TLV	Threshold Limit Value
TNRCC	Texas Natural Resources Conservation Commission
TNT	Trinitrotoluene
TOC	Total Organic Compounds
TSSA	Temporary Storage and Staging Area
UEP	Unlined Evaporation Pond
VOA	Volatile Organic Analysis
VOCs	Volatile Organic Compounds
VOST	Volatile Organic Sampling Train
WC	Water column
WD	Wind Direction
WS	Wind Speed
WWT	Wastewater Treatment

METRIC CONVERSIONS

Non-Metric Unit	Multiplied by	Yields Metric Unit
°F	0.555556 (°F-32)	°C
in.	2.54	cm
ft.	0.3048	m
mile	1609.344	m
lb.	0.453592	kg
gal.	3.78541	L
mph	0.44704	m/sec

SECTION 1
INTRODUCTION

1.1 Site Description

The Longhorn Army Ammunition Plant (LHAAP) is a government-owned, contractor-operated industrial facility under the jurisdiction of the U.S. Armament, Munitions, and Chemical Command. Its primary mission is to load, assemble, and pack pyrotechnic and illuminating/signal ammunition and solid propellant rocket motors. The LHAAP is located in east Texas in the northeast corner of Harrison County, approximately 14 miles northeast of Marshall, Texas and 40 miles west of Shreveport, Louisiana. The plant occupies about 8,500 acres of land between State Highway 43 and the western shore of Caddo Lake. Burning Ground No. 3 is a fenced 34.5-acre area in the southeastern quadrant of LHAAP, as shown in Figure 1-1. The area surrounding Burning Ground No. 3 is heavily wooded and swampy. Harrison Bayou flows within 1,000 feet of the western edge and within 500 feet of the northern edge of the site.

1.2 Background

The Longhorn Army Ammunition Plant was established in October 1942 to produce trinitrotoluene (TNT) flake and production of TNT continued until August 1945. The plant was on standby status from 1945 until February 1952. Pyrotechnic ammunition (photo flash bombs, simulators, hand signals, and tracers for 40mm) was manufactured at LHAAP from 1952 until 1956. The Plant 3 area rocket motor facility began operation in November 1955. Production of rocket motors continued to be the primary mission of LHAAP until 1965, when the production of pyrotechnic and illuminating ammunition was re-established.

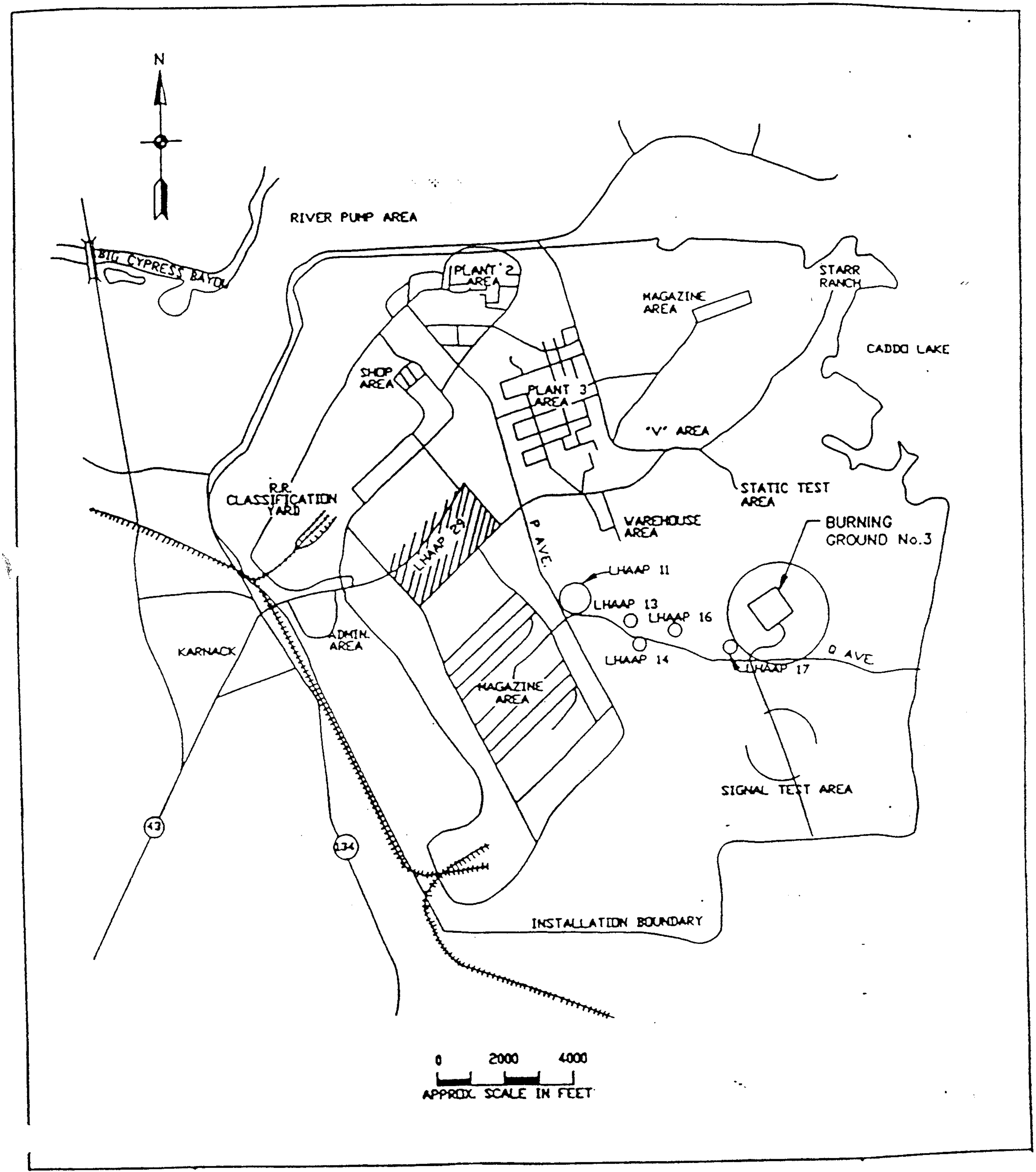


Figure 1-1. Location Map for Burning Ground No. 3

Recent operations consist of compounding pyrotechnic and propellant mixtures; loading, assembly and packing activities; accommodating receipt and shipment of containerized cargo; and the maintenance and/or layaway of standby facilities and equipment as they apply to mobilization planning. The installation also has been responsible for the static firing and elimination of Pershing I and II rocket motors in compliance with the Intermediate-Range Nuclear Force (INF) Treaty in effect between the United States and the former Soviet Union.

Burning Ground No. 3 has been in operation since 1955. The site has been used for the treatment, storage, and disposal of pyrotechnic and combustible solvent wastes by open burning, incineration, evaporation, and burial. Historical waste management units include open burning pits, an unlined evaporation pond (UEP), stockpiles of solvent soaked sawdust, and suspected waste burial pits. The UEP was constructed at the burning ground in 1963 as a holding pond to store wastes resulting from the washout of rocket motor casings. In 1973, the UEP also began receiving wash water containing solvent residues and solids collected from LHAAP operations involving pyrotechnic material preparation and mixing. These residues and solids commonly contained the metallic cations aluminum, arsenic, barium, cadmium, chromium, iron, lead, magnesium, sodium, strontium, and zinc; the nonmetallic anions nitrite, nitrate, and phosphate; and the organic solvents acetone, ethyl alcohol, methyl ethyl ketone, methylene chloride, trichloroethylene, and toluene.

Sawdust soaked with methylene chloride and other solvents was stockpiled along the southern berm of the UEP and was burned in trenches in the western portion of the burning ground. An Air Curtain Destructor was built in 1979 in the western corner of the burning ground for the purpose of disposing of explosive-contaminated wastes by burning. Use of burn pits and trenches was reportedly discontinued in 1984. Use of the UEP was discontinued in 1984 when it was discovered that the pond was contaminating ground water beneath the site. The UEP was closed as a Resource Conservation and Recovery Act (RCRA) interim status surface impoundment in 1986 by removing all waste and capping the impoundment. As part of the INF Treaty activities being conducted at LHAAP, a burn cage was added in 1989 for the open burning of Pershing II missile motors.

The LHAAP began an environmental investigation of current and previously used waste disposal sites in 1976. The LHAAP installation was added to the National Priorities List (NPL) on August 30, 1990. After being listed on the NPL, LHAAP, the U.S. Environmental Protection Agency (EPA) and the Texas Natural Resource Conservation Commission (TNRCC) entered into a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120 Agreement for remedial activities at the facility. This agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991.

The investigations at the Burning Ground No. 3 site have indicated the presence of high concentrations of chlorinated solvents and heavy metals in the shallow groundwater and buried waste. There are at least two known sources contributing to the groundwater contamination beneath the site. The primary source is the past usage of the UEP. A second source is trenches still containing solvent-contaminated wastes in the vicinity of the Air Curtain Destructor location. A third possible source for ground-water contamination is contaminated soils at various burn pit locations throughout Burning Ground No. 3. High concentrations of solvents (volatile organic compounds (VOCs)), primarily methylene chloride and trichloroethylene, and traces of heavy metals, such as barium, have been detected within subsurface soils, buried waste, and the uppermost water-bearing zone at the site. The depth to groundwater at Burning Ground No. 3 varies from one foot to 23 feet. Methylene chloride and trichloroethylene have been detected in the ground water at concentrations up to 10,550 ppm and 1,520 ppm, respectively. The free-phase of both of these compounds is referred to as a dense nonaqueous phase liquid (DNAPL).

From 1987 through 1989, 174 soil samples were analyzed for VOCs. Trichloroethylene was detected in 103 samples with a maximum concentration of 1,000 mg/kg. Methylene chloride was detected in 64 samples with a maximum concentration of 742 mg/kg. Acetone was also detected in 38 of the 174 samples with maximum concentration of 33 mg/kg. These VOCs were also detected in samples collected from potential source areas for the treatability studies program conducted in December 1993. Buried saw dust was encountered during the treatability studies sampling in the area adjacent to the southeast corner of the Air Curtain Destructor. Barium, chromium, and lead also have been detected in site soil samples.

Dow Environmental Inc. (DEI) has completed the Phase I and Phase II portions of the Interim Remedial Action (IRA). Phase I included confirmation sampling required to complete site characterization and the installation of a vertical extraction well. The Phase I work also included several laboratory treatability studies for the on-site contaminated soils and groundwater. The Phase II work was to determine the effectiveness of different systems for groundwater extraction.

Under Phase III, DEI/Radian International LLC (Radian) will remediate contaminated groundwater and soils, as well as conduct site restoration activities. The remediation processes are described in Section 3 of this document. In brief, a groundwater treatment plant is being constructed on-site and will be used to continuously treat from 50 to 300 gpm of contaminated water. The water will be pretreated and conditioned, undergo air stripping, and then be discharged to local surface waters. The off-gas will be treated using a catalytic oxidation unit and scrubber system. In addition, approximately 50,000 yd^3 of soil and source material will be excavated and treated by low-temperature thermal desorption. The VOC-laden off-gas will be treated using a catalytic oxidation unit and scrubber system.

1.3 Objectives

This quality assurance project plan (QAPP) outlines a program for measuring air emissions and characterizing ambient air quality. The overall objectives of the work are to document the 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 will consist of four components:

- Baseline Monitoring,
- Treatment System Performance Monitoring,

- Excavation Zone First-Alert Monitoring, and
- Perimeter Monitoring.

Baseline VOC monitoring was conducted to characterize conditions before the disturbance of the site so that site-specific impacts may be more accurately defined. The emphasis of the Baseline Monitoring Program was on gaining a full understanding of the site conditions and identifying contaminants of concern prior to the onset of the planned activities.

The performance of the groundwater treatment system and the soil treatment system will be measured initially during Proof of Performance (POP) tests and subsequently using continuous emission monitoring (CEM). The POP tests will be performed to:

- Demonstrate that the treatment unit can meet performance levels (e.g., ARARs and site-specific clean-up goals);
- Demonstrate that the unit is operated in a manner that is protective of human health and the environment; and
- Establish operational performance criteria.

Monitoring will be performed on a continuous basis to ensure ongoing compliance with equipment treatment specifications and to ensure that emissions estimates made are representative of actual site conditions.

Real-time monitoring for the target compounds will be performed during the excavation of source material. Detection of elevated organic contaminant levels at the first-alert stations will potentially trigger reduced excavation activities until the first-alert levels are reduced to background levels as determined in the baseline study.

Perimeter monitoring will be performed to ensure that health effects screening levels are not exceeded for potential receptors during the remediation effort. Meteorological monitoring will be performed to help estimate the potential for off-site migration of contaminants and determine the impact of remediation activities on ambient air quality. The primary objectives of the meteorological station will be to obtain measurements that are representative of the site met conditions and to assist in identifying locations for excavation zone and perimeter monitoring.

1.4 Overview of Approach

Baseline monitoring was performed during the late spring and summer of 1996 using evacuated, stainless-steel canisters to collect time-integrated air samples upwind and downwind of the site. The samples were analyzed by EPA Method TO-14 at an off-site laboratory.

The POP testing will be performed on the exhaust stacks at the catalytic oxidizers for the GWTP and STP. An intensive one-week sampling effort will be conducted. Standard stack sampling methodology will be employed. After the POP tests, CEMs will be employed to monitor the stack emissions. Sample gas will be withdrawn through heated sampling lines to a central set of gas analyzers. A data acquisition system will continuously record values for the various parameters.

During excavation of contaminated soils and source materials, the immediate area of the active Excavation Zone will be monitored, real-time, utilizing two IR (Infrared) instruments. The location of these monitors will be determined daily, based on the wind direction and the area of active excavation. These monitors will comprise the "First-Alert Stations". The trigger level will be determined by evaluating the maximum ambient concentration in the excavation zone which would be protective of the ESLs at the perimeter of the site. Detection of concentrations above the trigger level at the first-alert stations will potentially trigger modified excavation activities until the instrument readings return to normal background levels. In addition, canister samples will be collected monthly at the two IR monitoring locations and sent off-site for full scan TO-14 analysis. The detection of concentrations above the trigger level potentially will trigger increased monitoring activities.

Perimeter monitoring will consist of charcoal tube sampling with on-site GC analysis. The perimeter sample point locations will be equidistant from the remediation area at the major compass points. The prevailing wind direction will be determined on a daily basis and the portable samplers will be stationed at the appropriate upwind and downwind locations. There will be at least one upwind and three downwind samples collected during each sampling day. The samples will be analyzed for trichloroethylene and methylene chloride. In addition to the charcoal tube samples, full scan TO-14 sampling and analysis will be conducted if action (trigger) levels are exceeded.

A dedicated meteorological system has been installed for the air monitoring program to collect real-time data on a continuous basis. The monitoring system addresses the following parameters: wind speed, wind direction (with sigma theta), ambient temperature, precipitation, and barometric pressure. Meteorological data are available as hourly averages to site personnel.

SECTION 2

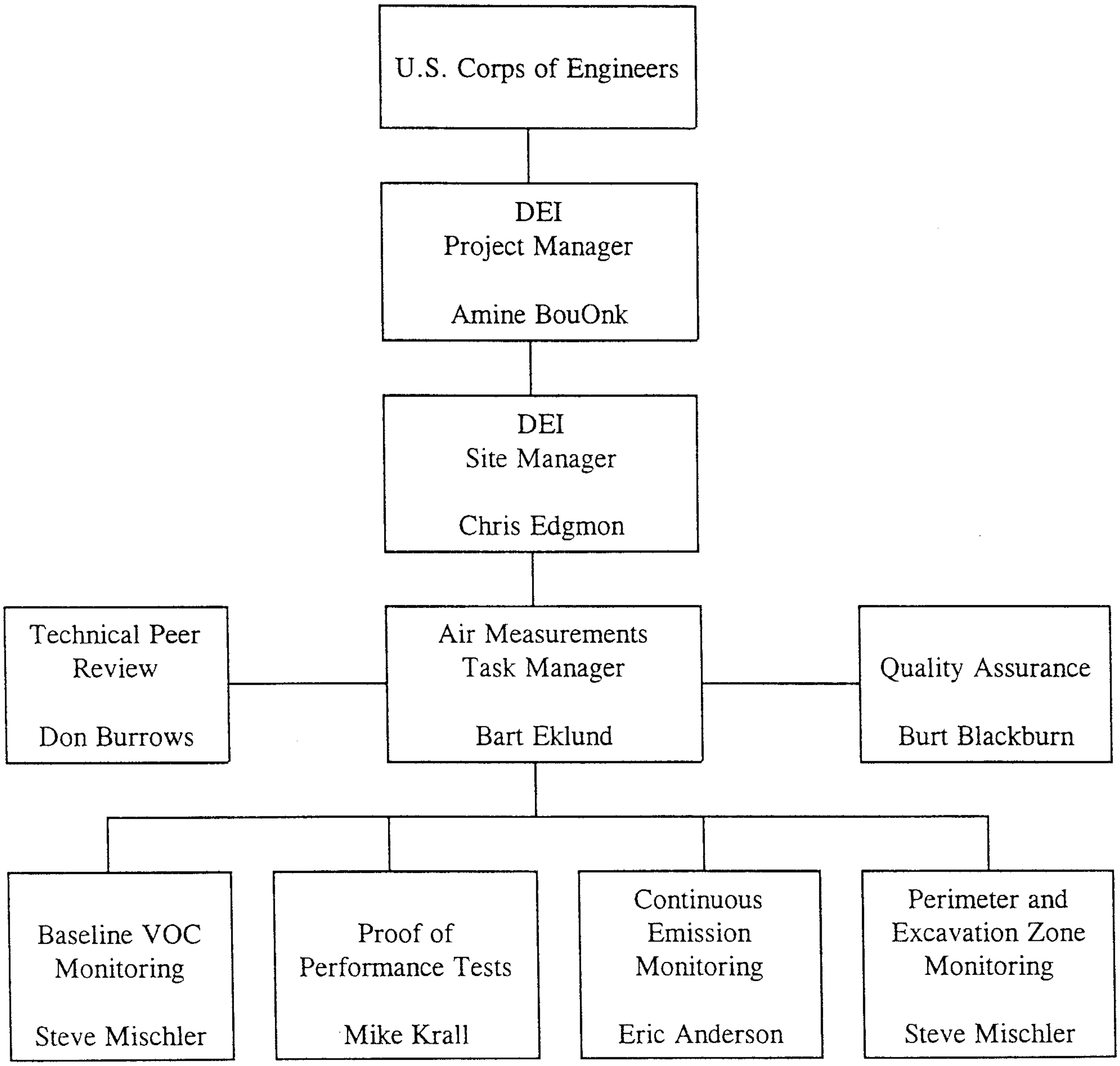
PROJECT ORGANIZATION AND RESPONSIBILITIES

The project organization and staff are shown in Figure 2-1. Mr. Amine BouOnk is the DEI/Radian Project Manager. He is ultimately responsible for the project including the technical quality of the work, the schedule, and the budget. Mr. Bart Eklund will manage the overall air measurement effort and each of the task leaders will report to Mr. Eklund. Mr. Burt Blackburn will oversee the quality assurance (QA) task. Mr. Don Burrows will serve as Radian's Technical Peer Reviewer.

It is expected that Mr. Steven Mischler will be on-site for the duration of the air measurement efforts and will have primary responsibility for day-to-day activities involving the perimeter monitoring, excavation zone monitoring, and maintenance of the CEM systems. His responsibilities will include sample collection, recording of site operational parameters, sample custody documentation, recording of samples in the sample log book, transferring of all samples to off-site laboratories, data transfer, performance of QC procedures, and on-site analysis of the perimeter samples.

01S333

Figure 2-1. Project Organization



SECTION 3

PROCESS DESCRIPTIONS

The remediation effort at the LHAAP will involve both treatment of groundwater and treatment of contaminated soil. The process units that will be used for this remediation are described below.

3.1 Groundwater Treatment Plant

Contaminated groundwater will be pumped to the groundwater treatment facility (GWTP), which is located at the northeast corner of the temporary storage and staging area (TSSA). The GWTP will be able to accommodate flow rates of 50 to 300 gallons per minute (gpm). The estimated groundwater pumping from all extraction points is about 100 to 280 gpm.

The groundwater will be treated at the GWTP to levels established by TNRCC. The treated water will be discharged to Harrison Bayou and/or Central Creek. The groundwater treatment process includes pretreatment and sludge conditioning, air stripping, and catalytic oxidation and vent scrubbing.

3.1.1 Pretreatment and Sludge Conditioning Unit

Pretreatment is necessary to remove the chemicals dissolved in the groundwater that may cause excessive scaling and fouling as well as heavy metals such as barium and lead that may be present at levels higher than the allowable discharge limits. These materials will be removed by conventional alkaline precipitation and chemical adsorption followed by flocculation and filtration. The pretreatment unit module is shown in Figure 3-1.

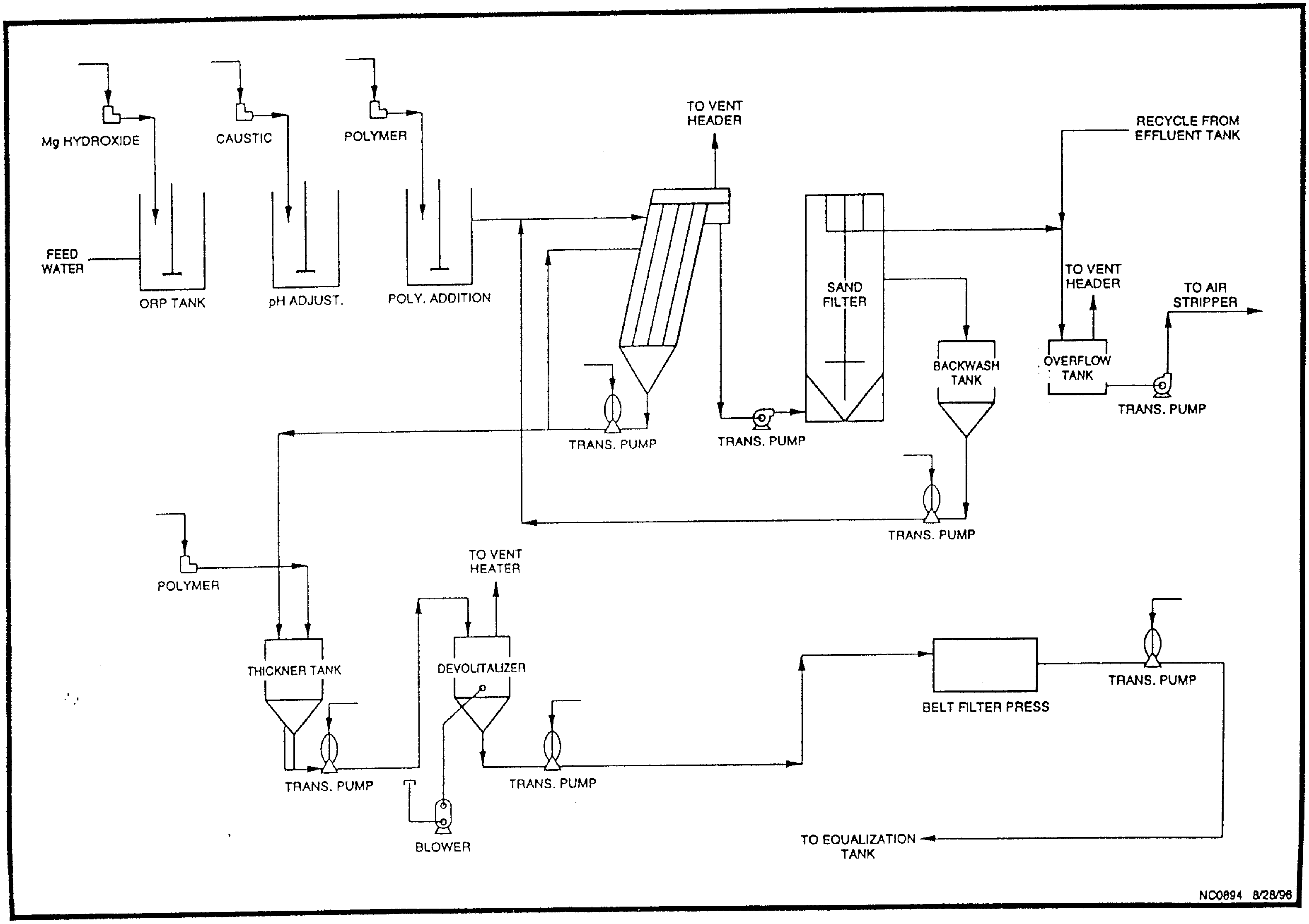


Figure 3-1. Pretreatment Unit Module of GWTP

3.1.2 Air Stripping Unit

The air stripper uses a counter-current equilibrium process to remove the volatile contaminants remaining in the water by mass transfer to the gas phase. A diagram of the unit is presented in Figure 3-2. The contaminated water enters at the top of the tower, which contains packing material to enhance the mass transfer. The water flows from top to bottom of the stripping tower by gravity and collects in the reservoir at the bottom. The reservoir is equipped to maintain the level at a constant position by opening and closing the level discharge valve. An air supply line is installed below the tower packing bed support plate. The air flow is furnished by a blower that supplies the pressure necessary to deliver the vent to the catalytic oxidizer unit.

Normal flow rate to the air stripper unit will be 150 gpm, with a maximum of 315 gpm. Water delivered to the air stripper unit will require additional treatment with hydrochloric acid to prevent scaling. An air flow rate to the air stripper unit will be maintained by the blower at 4,500 ACFM at 80° F and sufficient pressure to exit the tower at a slight positive pressure. The gas/liquid ratio of 225 under normal operating conditions ensures that excess air is present and the stripping will be at a maximum.

3.1.3 Catalytic Oxidation and Vent Scrubbing Unit

The contaminated air stream from the air stripping tower and other vent headers will be treated in a catalytic oxidizer and scrubber system prior to discharge into the atmosphere through a stack. The stack is 37 feet, 8 inches high with an outside diameter of 28 inches. The exit gas temperature from the stack will be at 140 °F. The VOCs in the air stream will be catalytically converted to carbon dioxide, water, and hydrogen chloride gases. These gases will then be scrubbed using water to produce a very diluted acid stream. This acid will be pumped to the GWTP and used to prevent scaling in the air stripper.

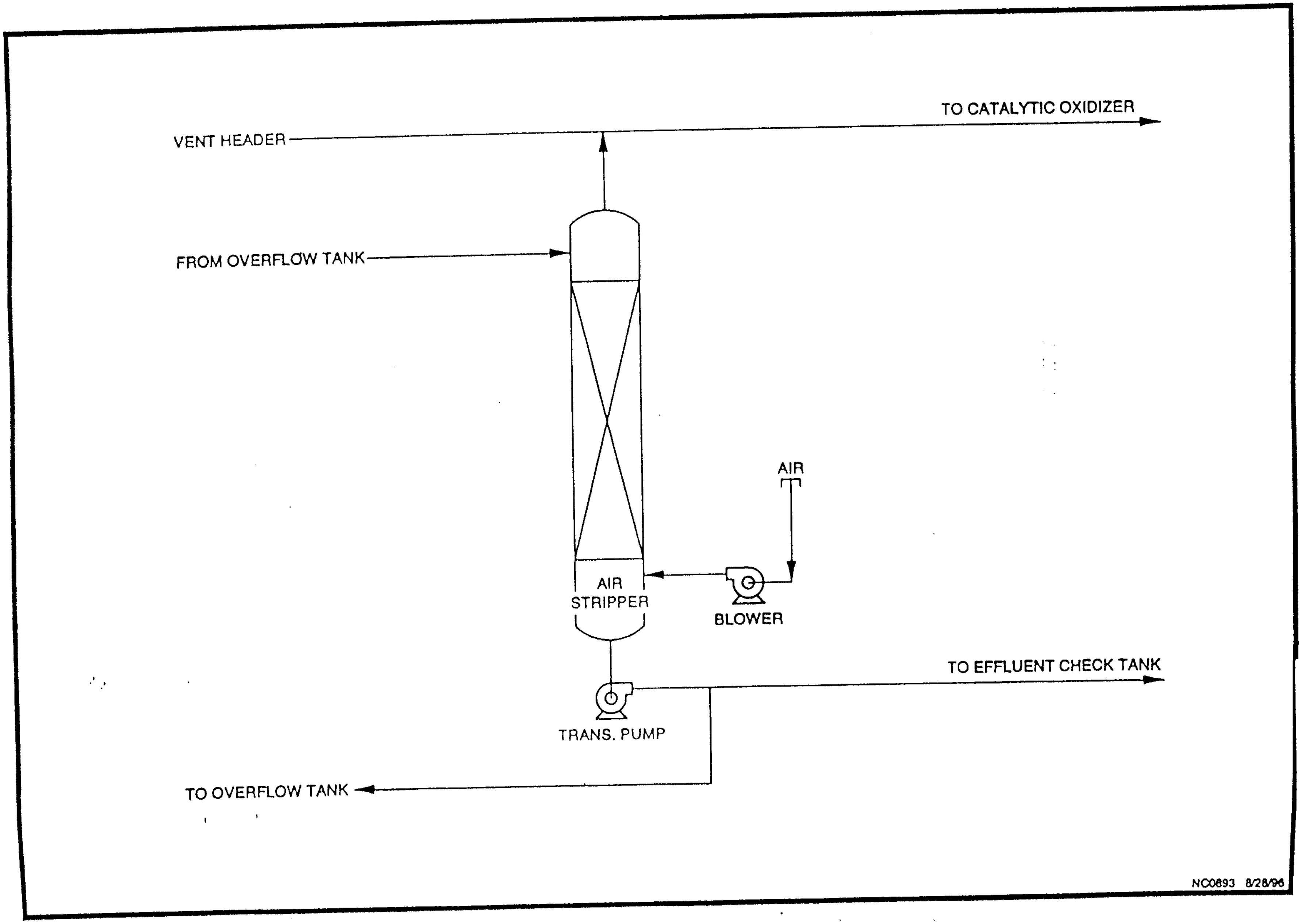


Figure 3-2. Air Stripper Unit of GWTP

3.2 Soil Treatment Plant

The soil treatment plant (STP) to be used for low temperature thermal desorption (LTTD) is a stand alone, mobile processing unit that consists of several primary trailers: one thermal desorption/particulate removal trailer and two identical catalytic oxidizer trailers. The STP will be located between the soil handling and dewatering pad (SHDP) and the treated soil staging pad (TSSP) in the southwestern corner of the TSSA. A schematic of the STP is presented in Figure 3-3. The areas to be excavated are shown in Figure 3-4.

The STP has been designed to remediate soils contaminated with chlorinated hydrocarbons such as methylene chloride, trichloroethylene, and other compounds found at Burning Ground No. 3. The STP uses a non-contact, counter-current, low-temperature, thermal desorption process that first volatilizes target organic contaminants from the soil into the air within the system and then catalytically oxidizes these airborne contaminants in a low-temperature catalytic oxidation system.

3.2.1 Primary Thermal Desorption Trailer

The thermal desorption trailer is 8.5 feet wide by 47 feet long, with an integrated control panel. It consists of a 3 yd^3 feed hopper, a contaminated soil cold feed conveyor, a weigh conveyor with a continuous sensing weigh scale, a rotary drum equipped with a gas fired low NOx burner, a propane vaporizer, a high-temperature/high-efficiency baghouse, a 4,600 SCFM induced draft (ID) system fan, and an ancillary discharge moisturizing auger. These are discussed in detail below:

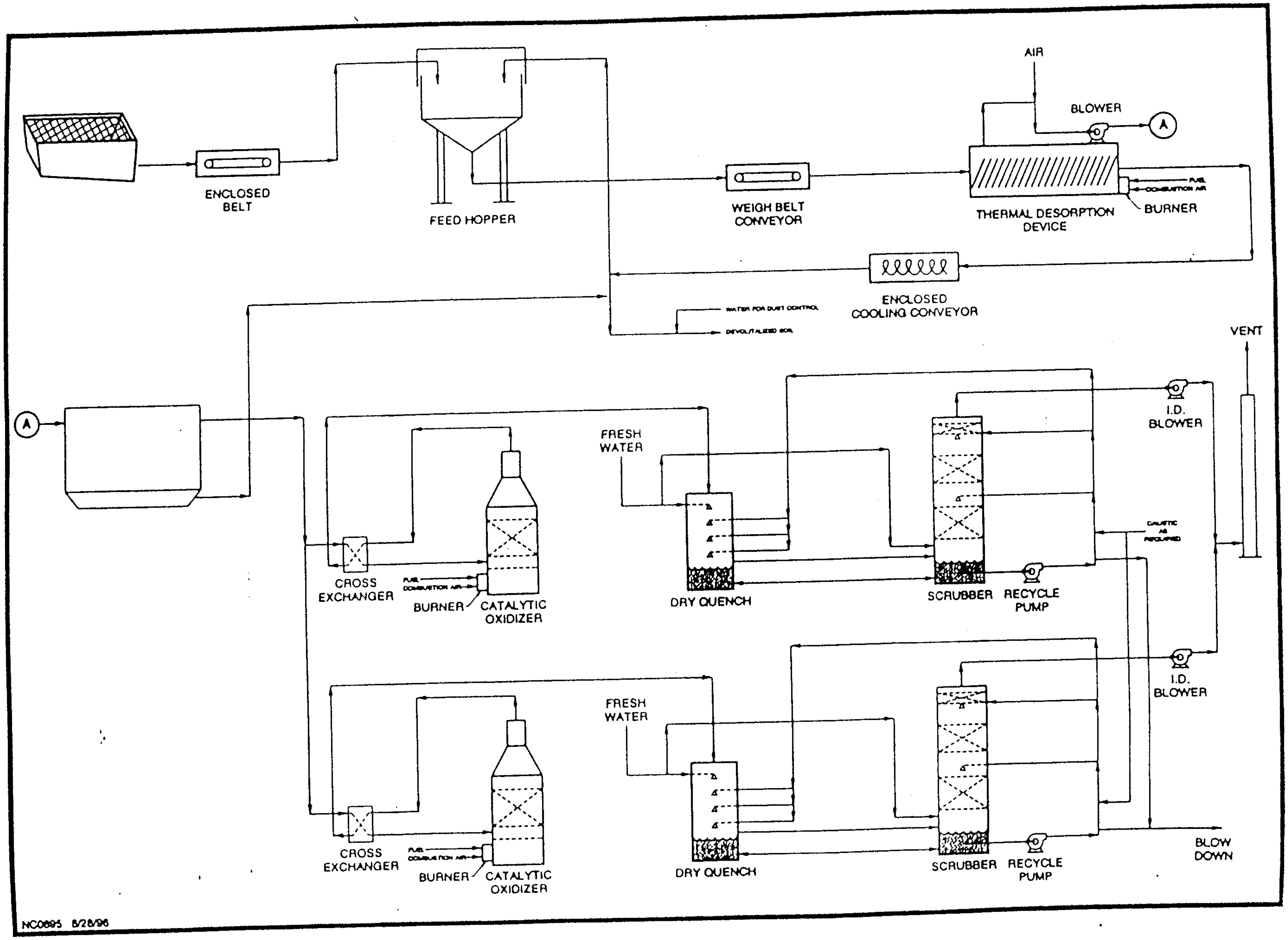


Figure 3-3. Schematic of STP

019340

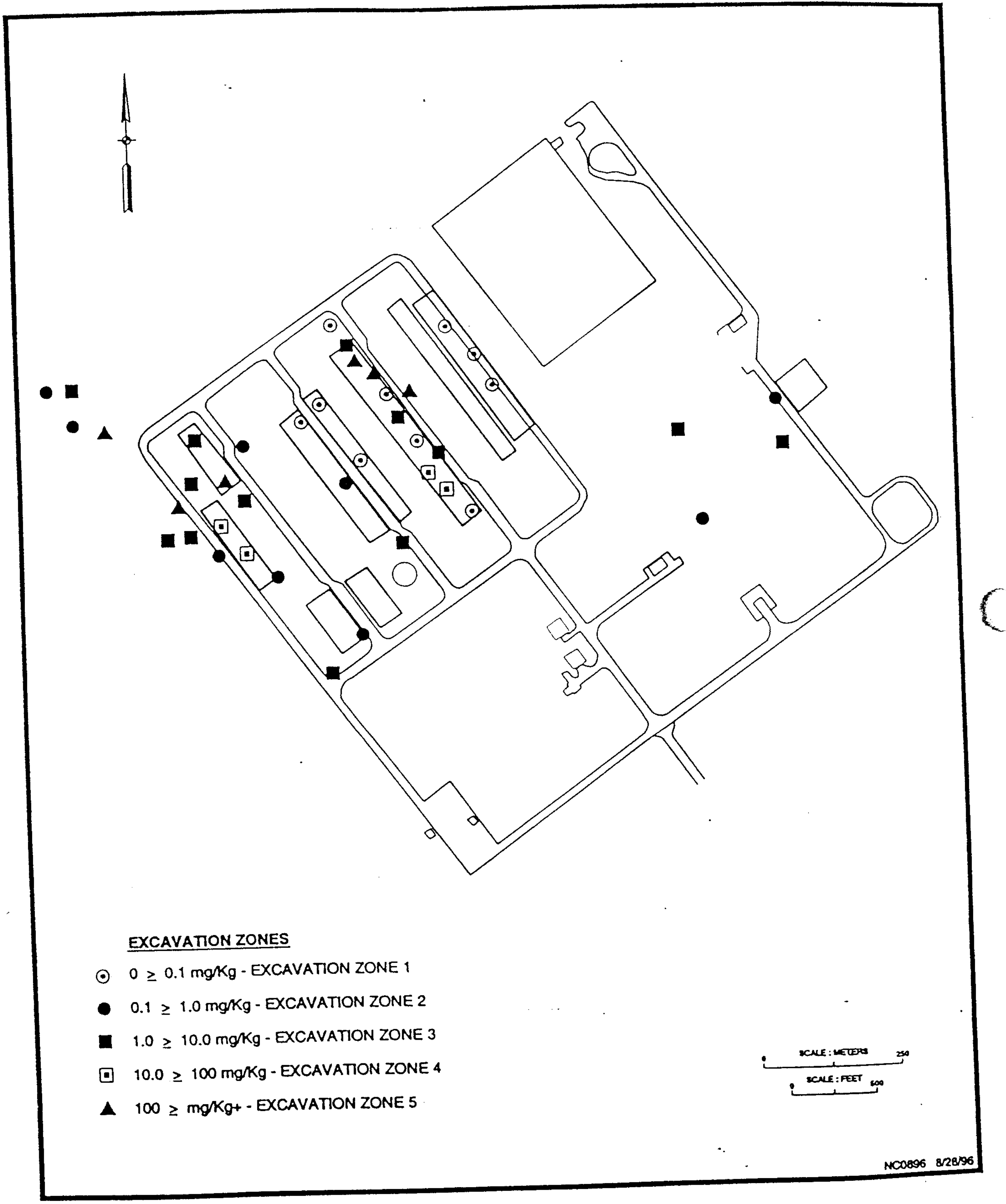


Figure 3-4. Areas to be Excavated

Hopper and Cold Feed System - The feed hopper is equipped with a vibrator to keep materials from plugging the opening to the cold feed conveyor. A temporary cover over the hopper will protect the feed material from precipitation. The cold feed conveyor has a variable speed control and drops soil onto the continuous weigh scale conveyor belt. The weigh belt weighs the contaminated soil and delivers it to the rotary drum.

Rotary Drum - Desorption of the contaminated soil is accomplished in the counter-current designed rotary drum which is equipped with a 10 million BTUs/hour low NOx emission burner. This burner is jacketed so that the flame cannot impinge directly on feed material or volatilized contaminants. This insures that only the heat of combustion, and not an open flame, is used in the desorption process.

Discharge Moisturizing Auger and Processed Soils Conveyor Belt - Desorbed soils and particulates from the baghouse are ejected into the 12 feet long discharge moisturizing auger. It is used to mix processed soils with baghouse fines, to wet processed materials for cooling, to control dust, to remoisturize soils for enhanced compaction when backfilling, and to convey processed material away from the trailer onto another conveyor belt to a temporary storage pile.

Baghouse - The baghouse is designed to remove particulates greater than 5 microns in size. It operates at temperatures up to 450° F and uses an automatic pulse-jet system to clear the bags and recover filtered particulates. The trailer is supplied with a 10 HP air compressor for the pulse-jet system. The baghouse is equipped with 78 Nomex filter cloth bags possessing a total area of 900 square feet, an air to cloth ratio of 5.0 to 1.0, and a permeability of 20 to 40 SCFM/ft2 at 0.5 inch WC pressure drop. The collected fines are transferred via a closed auger system to the discharge moisturizing auger where it is mixed and rehydrated with the processed soil.

3.2.2 Secondary Treatment Trailer (Oxidizer/Scrubber Units)

The secondary trailers are each 8.5 feet wide by 48 feet long. The process gas stream will be split in two with each trailer receiving 50% of the flow. Both trailers are identical and consist of a cross exchanger, a catalyst preheater, a five-layer catalyst bed, a flow sensor, a quench elbow, an acid gas scrubber, a system fan, and an exhaust stack.

Cross Exchanger - A shell and tube heat exchanger with 48% efficiency is supplied to preheat the incoming air stream and reduce auxiliary fuel consumption. The heat exchanger is constructed of 316 stainless steel (SS). After leaving the baghouse at less than 450° F, VOC laden air passes through a tube side of the exchanger while hot catalytically oxidized air passes through the shell side at temperatures from 780 to 850° F. There are two passes on the shell side to approach true counter flow conditions within the exchanger.

Preheater/Gas Train - The catalyst preheater gas train is fabricated to FM/IRI specifications and has a low NOx burner with a sleeve extension to provide no direct flame contact with the air stream. The gas burner has a maximum firing range of 3 million BTUs/hour and can be operated on either natural gas or propane. The burner is mounted to direct the flame in the direction of the air flow. To achieve uniform temperatures entering the catalyst, the gas train is designed to mix the hot gases downstream of the burner.

Catalytic Reactor - The reactor interior of each of the catalytic oxidizer trailers is constructed of 316 L SS. High density mineral wool is placed between the inner and outer shells to maintain external skin temperature at a safe level. The catalyst bed configuration on each trailer consists of 30 full blocks and 15 three-quarter blocks of catalyst per unit. Each of the five facial areas consist of 6 full blocks and 3 three-quarter blocks. Each catalyst was designed to treat the complete air stream from the LTTD trailer at the destruction efficiency (DE) of 99%. Air stream temperature sensors are located before and after the catalyst bed on each trailer.

Quench/Scrubber System - The oxidizer-to-scrubber connection is constructed of 316 L SS and contains sampling ports. The outlet from the catalytic oxidizer is directed into a multi-stage quench on its way to the scrubber modules. The gases exit the quench and enter the packed bed counter-current absorption column for removal of 99.9% or greater of hydrochloric acid vapors from the oxidizer exhaust. The tower is packed with polypropylene packing and contains a demister to remove entrained water droplets.

System Fan and Stack - The air stream is pulled through the scrubber and forced from the stack via a system, induced draft fan. The system fan is constructed of fiberglass reinforced plastic and is statically and dynamically balanced. The fan is powered by a 60 HP motor. The stack is mounted over the system fan and is 18 feet long, 22 inches in diameter, and constructed of fiberglass reinforced plastic.

SECTION 4
SAMPLING PROCEDURES

This section contains a description of the sampling procedures to be followed during this program. An overview of the sampling procedures to be employed is given below, followed by descriptions of the POP tests, the solid and liquid samples to be collected during the POP tests, CEMs, excavation zone monitoring, perimeter monitoring, and meteorological monitoring. The sample handling, chain-of-custody procedures, and preventive maintenance procedures also are described in this section.

4.1 Overview of Sampling Procedures

A variety of sampling procedures will be employed during the course of the remediation effort. Table 4-1 contains a summary of the sampling procedures.

The POP testing will be performed on the exhaust stacks at the catalytic oxidizers for the GWTP and STP. An intensive one-week sampling effort will be conducted using standard stack sampling methodology. The waste going into the treatment plants and the solid and liquid streams from the control devices also will be characterized. After the POP tests, CEMs will be employed to monitor the stack emissions. Sample gas will be withdrawn through heated sampling lines to a central set of gas analyzers. A data acquisition system will continuously record values for the various parameters.

During excavation of contaminated soils and source materials, the immediate area of the active Excavation Zone will be monitored using two portable IR (Infrared) instruments. These monitors will comprise the "First-Alert Stations". The trigger level will be determined by evaluating the maximum ambient concentration in the excavation zone which would be protective of the ESLs at the perimeter of the site.

Table 4-1
Summary of Sampling Procedures for Air Species

Type of Sampling	Sampling Approach	Location	Frequency	Analytes
POP Tests	Stack sampling	GWTP exhaust stack	Once, at start of program	VOCs
		STP exhaust stack	Once, at start of program	VOCs, metals, HCl, Cl_2, H_2O, PM, dioxins
Continuous Monitoring	Grab sampling	GWTP	Quarterly	VOCs
	CEMs	GWTP exhaust stack	Continuous	THC
		STP exhaust stack	Continuous	THC, CO, CO_2, O_2
Excavation Zone Monitoring	Portable, real-time IR analyzers	2 locations immediately downwind of excavation	Daily during excavation activities	TCE, $MeCl_2$
	TO-14 canisters	2 locations immediately downwind of excavation	Monthly during excavation and remediation activities	Initially to identify all VOCs present. Thereafter as a QC check.
Perimeter Monitoring	Charcoal tube samples with portable pumps	1 upwind and 3 downwind locations	Daily during excavation and remediation activities	TCE, $MeCl_2$
	TO-14 Canisters	1 upwind and 3 downwind locations	Monthly during excavation and remediation activities	Initially to identify all VOCs present. Thereafter as a QC check.

Perimeter monitoring will consist of charcoal tube sampling with on-site GC analysis. The perimeter sample point locations will be equidistant from the remediation area at the major compass points. The prevailing wind direction will be determined on a daily basis and the portable samplers will be stationed at the appropriate upwind and downwind locations. There will be at least one upwind and three downwind samples collected during each episode. The samples will be analyzed for trichloroethylene and methylene chloride. A dedicated meteorological system has been installed for the air monitoring program to collect real-time data on a continuous basis.

4.2 Proof of Performance (POP) Tests

The proof of performance tests at the groundwater treatment plant and soil treatment plant will be performed during the first week of operation of each plant. Testing will involve collecting and analyzing gas samples using standard stack sampling methods. The POP tests will be performed at 2 test conditions and 3 replicate sampling runs will be performed at each test condition. At the stack of the STP, four sample trains will be required to cover the range of analytes. This stack is configured with two sampling ports that meet the EPA Method 1 location criteria; consequently, two isokinetic trains can be run concurrently, while the other two trains will be run immediately following the completion of the first two. VOST, which does not require isokinetic sampling, is the only train that will be run at the GWTP.

The stack gas sampling protocols will be EPA Methods 1, 2, 3, 4, 5, 23, and 26A published in Title 40 CFR Part 60 - Standards of Performance for New Stationary Sources, Appendix A - Test Methods; BIF Methods for metals (M0012) and published in 40 CFR Part 266, Appendix IX, section 3.1 and SW-846 Method 0030 (VOST) for volatile organic compounds. Pretest and post-test leak checks will be performed for each sampling train as required in the respective test methods. Leak checks also will be performed at port changes. Table 4-2 summarizes the sampling procedures, frequencies, sampling durations, and sample volumes for collection of stack gas samples.

Table 4-2
Summary for Stack Sampling

Sample Trains and Analyses	Method Reference	Sampling Duration (min)	Sample Volume (dscf)
Method 26A Train HCl, Cl_2	40 CFR Part 60, Appendix A, Method 26A	120	45
VOST Volatile Organic Compounds[1]	SW-846 Method 0030	120	3 pairs of traps; 20 liters per trap
Method 23 Train Dioxins and Furans	40 CFR 60, Appendix A, Method 23	120	45
Particulate/Multi-Metals Train Metals[2]	40 CFR 60, Appendix A, Method 5 and 40 CFR Part 266, Appendix IX, Sect. 3.1	120	45

[1] Trichloroethylene, Vinyl chloride, 1,2-Dichloroethene, 1,2-Dichloroethane, 1,1-Dichloroethane, 1,1-Dichloroethene, Tetrachloroethane, Toluene, Ethylbenzene, Xylene, Chloroform, Styrene, Benzene, 1,1,1-Trichloroethane, and Trichlorofluoromethane.

[2] Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver

4.2.1 Sampling Point Determination - EPA Method 1

The number and location of the stack gas sampling points will be determined according to the procedures outlined in Title 40 CFR Part 60, Appendix A - Test Methods, EPA Method 1 - Sample and Velocity Traverses for Stationary Sources. The sampling ports at the STP stack meet the criteria specified in EPA Method 1 for distances between the sampling locations and the upstream and downstream flow disturbances. The minimum number of sampling traverse points will be 8 since the diameter of the circular stack, 0.56 m (22 in.) is between 0.30 and 0.61 m in diameter. Verification of absence of cyclonic flow will be conducted prior to testing by following the procedure described in Title 40 CFR Part 60, Appendix A, EPA Method 1, Section 2.4 - Verification of Absence of Cyclonic Flow.

4.2.2 Flue Gas Velocity and Volumetric Flow Rate - EPA Method 2

The flue gas velocity and volumetric flow rate will be determined according to the procedures outlined in EPA Method 2 - Determination of Stack Gas Velocity and Volumetric Flow (Type S pitot tube). Velocity measurements will be made using S-type Pitot tubes conforming to the geometric specifications outlined in EPA Method 2. Accordingly, each pitot tube has been assigned a coefficient of 0.84. Differential pressures will be measured with fluid manometers. Effluent gas temperatures will be measured with chromel-alumel thermocouples equipped with digital readouts.

4.2.3 Flue Gas Composition and Molecular Weight - EPA Method 3

EPA Method 3 - Gas Analysis for the Determination of Dry Molecular Weight will be used to determine carbon dioxide (CO_2) and oxygen (O_2) concentrations and dry molecular weight of the stack gas. One multi-point, integrated sample will be collected during each run concurrently with one of the sample trains. The gas sample will be analyzed for percent CO_2 and percent O_2 using an Orsat analyzer to determine dry molecular weight.

4.2.4 Flue Gas Moisture Content - EPA Method 4

The flue gas moisture content will be determined in conjunction with each isokinetic train and according to the sampling and analytical procedures outlined in EPA Method 4 - Determination of Moisture Content in Stack Gases. The impingers will be connected in series and will contain reagents as described in the following sections. The impingers will be contained in an ice bath in order to assure condensation of the moisture from the flue gas stream. Any moisture that is not condensed in the impingers is captured in the silica gel, therefore moisture can be weighed and entered into moisture content calculations.

4.2.5 Hydrogen Chloride & Chlorine - EPA Method 26A

The sampling and analytical procedures outlined in EPA Method 26A in combination with EPA Methods 1 through 4 described above will be used to determine HCl and Cl_2 stack emissions. Method 26A is published in 40 CFR Part 60, Appendix A.

The nozzle and probe liner will be constructed of borosilicate glass or quartz. The filter holder will be constructed of borosilicate glass with a Teflon™ frit filter support and a sealing gasket. A quartz-fiber or Teflon™ mat filter will be used. Nozzles, probe liners, impingers and filter holders will be rinsed thoroughly prior to testing. Samples will be collected for a minimum of two hours. The sampling runs will be performed within ± 10% of isokinetic conditions.

4.2.6 Volatile Organic Compounds - SW-846 Method 0030 (VOST)

SW-846, 3rd edition, Method 0030 Volatile Organic Sampling Train (VOST) will be used to sample stack emissions at the GWTP and STP for determination of volatile organic compounds. The VOST system draws effluent stack gas through a series of sorbent traps. The first trap will contain Tenax™ resin, and the second will contain a section of Tenax™ followed by a section of activated charcoal. The traps will be preceded by a water-cooled condenser arranged so that condensate will drain vertically through the traps.

Sampling will take place for 120 minutes per test run; 3 test runs will be performed per test condition. Sampled gas will be passed through each pair of traps for 40 minutes. One sample of condensate will be collected for each total VOST sampling run. Three pairs of VOST tubes from each run will be analyzed. For each test condition, one pair of tubes will be analyzed separately to assess analyte breakthrough from the front to the back tube.

The VOST probe will be kept at or above 130°C during sampling. The VOST will be operated at a sampling rate of approximately 0.5 liter per minute (20 liters per sample).

VOST samples will be analyzed by Air Toxics Laboratory. Air Toxics purchases GC quality Tenax™ from Chemical Research Supplies in Chicago, IL, and generally uses it without any post-purchase cleanup. This material is cleaned by the manufacturer and is tested by Air Toxics on a lot basis to ensure that it meets the QA requirements of <10 ng per tube of any target compound. The tubes are stored at 4°C over charcoal prior to conditioning. Each tube is conditioned for at least than 4 hours at 235°C with a flow of ultra high purity nitrogen (N_2) at a rate of >100 ml N_2/min. The tubes meet the "blank" criteria of the method and are consistent with the specification: "The actual conditioning period may be determined based on adequacy of the resulting blank checks."

Extra sorbent cartridges will be taken to the sampling site to serve as field and trip blanks. One pair of VOST tubes, designated as a field blank, will be exposed to the ambient air at the sampling location. The exposure time will correspond to the amount of time required to mount and dismount a pair of VOST tubes onto the sampling train. The tubes will be recovered during each day of the testing series. The field blank will be capped and stored for transport in the same manner as the sample-exposed cartridges. The field blanks will be analyzed by the same method as the actual samples. An additional pair of tubes, designated as a trip blank, will be transported to and from the field and otherwise treated as the other cartridges, except that the caps will not be removed. The trip blank will not be analyzed unless the field blanks suggest possible contamination. VOST media, reagents, and samples will be kept separate from all other samples and material to minimize potential contamination. The effect of this contamination is assessed by the blank protocols described above.

4.2.7 Polychlorinated Dibenzodioxins and Dibenzofurans - EPA Method 23

Stack gas will be sampled and analyzed for polychlorinated dibenzodioxins and dibenzofurans (PCDD/PCDF) according to EPA Method 23 (40 CFR 60, Appendix A). Method 23 calls for spiking isotopically labeled dioxins onto the XAD-2 resin before field sampling. After returning from the field, the XAD-2 resin is extracted along with the filter sample in a Soxhlet extractor. [Note: The compounds added before sampling are called "surrogates", those added after sampling and before extraction are called "internal standards." The compounds added just before analyses are called "recovery standards." The recovery of internal standards is quantified against the recovery standards. The recovery of surrogates and amount of target analytes is quantified against the internal standards.] The recovery of these labeled surrogate compounds is used to represent the overall recovery of the sample.

The sampling system, Modified Method 5, (MM5) consists of a heated probe, heated filter, sorbent module, and pumping and metering unit. A borosilicate gas nozzle of an appropriate diameter to allow isokinetic sample collection is attached to the probe. Type S pitot tube differential pressure is monitored to determine the isokinetic sampling rate. A minimum of 45 dry standard cubic feet will be collected over a minimum sampling time of 120 minutes.

From the heated filter, sample gas enters the sorbent module. The sorbent module consists of a water-cooled condenser followed by the XAD-2 resin trap. After the resin trap is a dry, modified Greenburg-Smith impinger which collects the aqueous condensate. The stem of this impinger is short to reduce carryover of collected aqueous condensate. The condensate trap is followed by an impinger containing 100 mL of deionized water and a dry impinger to collect any mist carryover from the condensate trap.

The final impinger containing silica gel completes the drying of the sample gas before metering. An extra dry impinger may be added if the gas moisture level is high. A pump and dry gas meter are used to control and monitor the sample gas flow rate.

4.2.8 Particulate/Metals - 40 CFR Part 266, Appendix IX, Sect. 3.1 and 40 CFR Part 60, Appendix A, Method 5

Stack samples for determination of arsenic, barium, cadmium, chromium, lead, selenium, and silver will be collected according to the BIF method specified in 40 CFR 266, Appendix IX, Section 3.1. Front-and back-half particulate matter will be collected in the same sample train according to EPA Method 5. The two trains will be combined as one train (sample). This method is operated in the same manner as a regular EPA Method 5 sampling train. Pretest preparations, preliminary determinations, and leak check procedures will be those outlined in EPA Method 5. Borosilicate glass or quartz probe liners and nozzles (required in 40 CFR Part 266, Appendix IX, Section 3.1.3.1.1) will be used to avoid possible contamination.

The average sampling rate for each run will be within ± 10% of isokinetic conditions. Each test run will be a minimum of 2 hours in duration and will sample at least 45 dry standard cubic feet of gas. The train is configured as a typical Method 5 train; i.e., glass nozzle, heated glass probe, filter, and impingers. In accordance with the recommendation of the method, the filter will be quartz fiber. The configuration of the impinger train will be as follows:

- First impinger - modified Greenburg-Smith containing 50 ml of deionized water;
- Second impinger - modified Greenburg-Smith containing 100 ml of 5% HNO_3 and 10% H_2O_2;
- Third impinger - Greenburg-Smith containing 100 ml of 5% HNO_3 and 10% H_2O_2;
- Fourth impinger - empty modified Greenburg-Smith; and
- Fifth impinger - modified Greenburg-Smith containing silica gel.

The front half of the sampling train will be rinsed with 0.1 N nitric acid to recover the metals. After recovery of the impinger solutions, the filter backhalf and the first 3 impingers will be recovered with 0.1 N nitric acid. Particulate loading will be measured for both front- and back-half components of the train.

4.3 Waste Feed and Residue Sample Collection Procedures

Pre- and post-treatment groundwater samples for the GWTP POP testing will be analyzed as part of the routine on-site analytical testing program and are not discussed here. For the STP POP test, waste feed and residue samples will be collected during each test run and analyzed for chemical and physical parameters, as indicated in Table 4-3. The container and volume requirements are shown in Table 4-4. Residue samples include scrubber blowdown water, treated soils, and baghouse fines. Samples of waste feed, scrubber blowdown, and treated soils will be collected periodically over the duration of each test run and composited to form a single sample of each sample type for each run. A single grab sample of baghouse fines will be collected during each run. Each composite sample will be given an individual alpha-numeric code for identification. Additional sample will be collected as required to allow for sample splits, backup, and duplicates.

Table 4-3
Sampling and Analysis Summary for Waste Feed and Process Streams

Sample Stream and Analyses Performed	Sample ID & Location	Sampling Method	Sampling Frequency	Total Number of Composite Samples Collected
Waste Feed VOCs, chloride, metals, moisture, Atterberg limit, particle size	WF	Grab (S007)	grab sample collected every 30 minutes, composite sample prepared for each test run	6
Treated Soil VOCs, metals	TS	Grab (S007)	grab sample collected every 30 minutes, composite sample prepared for each test run	6
Baghouse Fines VOCs, metals	BF	Grab (S007)	one per run	6
Scrubber Blowdown VOCs, chloride, sulfate, metals	SB	Tap (S004)	grab sample collected every 30 minutes, composite sample prepared for each test run	6

Table 4-4
Container and Volume Requirements for Waste Feed and Process Stream Samples

Sample Stream	Parameter	Container[1]	Volume (each run)
Waste Feed	VOCs	Glass, Teflon lined cap	40 mL VOA vial[2]
	Moisture, Atterberg Limit, Particle Size	Plastic	500 mL
	Metals	Plastic	500 mL
Treated Soil	VOCs	Glass, Teflon lined cap	40 mL VOA vial[2]
	Metals	Plastic	500 mL
Baghouse Fines	Metals	Plastic	500 mL
Scrubber Blowdown	VOCs	Glass, Teflon lined cap	40 mL VOA vial[2]
	Chloride, sulfate	Plastic	250 mL
	Metals	Plastic	250 mL

[1] All containers will be properly prepared according to method requirements (for example, acid rinse for metals, solvent rinse for PCDD/PCDF).

[2] A total of 8-10 VOA vials will be collected during each test run (one grab every thirty minutes). Compositing will be performed at the laboratory.

4.3.1 Scrubber Blowdown Samples

Grab samples of the scrubber blowdown water will be collected every thirty minutes during each test run in accordance with Method S004, in the EPA document "Sampling and Analysis Methods for Hazardous Waste Incineration," February, 1982. This method is supported by an ASTM standard D270, also referenced in the guidance document.

To collect the scrubber blowdown samples, the sampling tap will be opened and the line and bottle flushed with the stream to be sampled. The flush is discarded into a container and managed appropriately, then the specified sample is collected. This ensures that the actual material collected is representative of the stream.

Scrubber blowdown samples for determination of volatile organic compounds will be collected in 40-mL VOA vials with Teflon™ lined caps every thirty minutes over the duration of a test run, then composited for analysis by the syringe accumulation technique in the laboratory. For the remaining analyses, 100-mL samples will be collected every thirty minutes and composited in a separate 1-liter sample container with Teflon™ lined caps for each test run. The composited sample will be split into separate sample containers and submitted for determination of metals, chloride, and sulfate.

4.3.2 Waste Feed and Solid Residues

Amber glass bottles with Teflon cap liners will be used to collect samples of the waste feed and solid residue samples (treated soil and baghouse fines). These samples will be collected using the scoop or thief sampling procedures specified in U.S. EPA Method S-007 and S-005, "Sampling and Analysis Methods for Hazardous Waste Combustion" and analyzed for the parameters listed in Table 4-3.

Samples of the solid streams will be collected every 30 minutes during each test and composited on site. At the prescribed frequency, nominally 250 ml of each solid stream will be obtained and transferred into a 4-liter plastic container. At the conclusion of the test run, the container will be thoroughly mixed by tumbling the container. After mixing, the sample may be crushed before being split. A split sample of sufficient size for all analytical needs may be further reduced in size by crushing and/or grinding. The sample will be mechanically homogenized and then split for shipment and analysis. Homogeneity will be accomplished either by repeated cone and quartering, or by riffling.

4.4 Continuous Emission Monitoring

There will be three emission control units used at the LHAPP site that will require CEM systems to monitor their off-gas emissions; the catalytic oxidizer unit treating off-gas from the GWTP and the two catalytic oxidizer units treating off-gas from the STP.

As described earlier, the soil treatment will consist of two identical LTTD units each using a catalytic oxidation treatment unit to treat the tail gas. The exhaust gas will be monitored for total hydrocarbons (THC), oxygen (O_2), carbon dioxide (CO_2), and carbon monoxide (CO). Because these units are identical in design and construction, a single set of CEMS will be used to monitor the tail gas from both units. This will be accomplished by using separate probes and sample acquisition lines, then switching between the two sources every 5 minutes. NSPS requires that there be 5 minutes of data every 15 minutes and this switching scenario will provide sufficient data to be in regulatory compliance.

The CEM system for this site will consist of a stainless steel probe/filter assembly inserted into each stack, a heat-traced sample line for each source, and separate sample conditioning systems for each source. This will ensure that there is always a continuous stream of conditioned gas ready to feed to the analyzers. This continuous stream of conditioned gas will help prevent potential problems with system purge or response time of the analyzers and will ensure that the data acquisition system can immediately start logging the values. The instrumentation has not been purchased for this project, therefore, the manufacturer and model numbers of the instruments are not available. The gas conditioning system will remove all particulate matter from the stack and will dry the stack gas prior to measurement for CO, CO_2, and O_2, however, the total hydrocarbons will be measured wet.

The GWTP off-gas will only be monitored for total hydrocarbons. This system will be similar to the one used for the soil treatment units, except the gas conditioning system will only need to remove particulate matter from the stack, as the analytical technique measures the THC concentration on a wet basis.

4.5 Excavation Zone Monitoring

Two portable Infrared (IR) analyzers will be positioned approximately 50m downwind of the excavation activities to provide real-time information on the ambient levels of trichloroethylene (TCE) and methylene chloride ($MeCl_2$). The analyzers will be set on platforms approximately five feet above the ground surface. The location of the analyzers will be selected each day based on the location, extent, and duration of the excavation activities. The analyzers will be moved, as necessary, to ensure the emission plume from disturbed soil is sampled.

The Foxboro Miran 1B instruments will be used. This is a portable, microprocessor controlled IR spectrometer that is capable of measuring more than 100 different gaseous species. The monitors will be used to measure ambient concentrations of TCE and $MeCl_2$. The instrument has an internal pump and sampling takes less than five minutes for a given constituent.

4.6 Perimeter Monitoring

Perimeter monitoring around the excavation area will be performed to determine if the TNRCC's health effects screening levels (ESLs) potentially are exceeded for off-site receptors. The monitoring will consist of collecting 8-hour time-integrated charcoal tube samples. At least three downwind and one upwind samples will be collected each day during excavation. If the air concentrations are below the ESLs at the excavation perimeter, no adverse health effects are expected for the nearest receptors. TO-14 sampling will be performed monthly, as a QC check, at the four upwind and downwind sampling locations.

The two target compounds for the perimeter air sampling will be the same as those for the excavation zone monitoring, methylene chloride and trichloroethylene. These two compounds were chosen as the target compounds based on their ESLs and their measured concentrations in the soil. The sampling method is based on the NIOSH Method 1005 for methylene chloride; however, this method also will show good results for the other chemicals identified in the soil. A known volume of air is drawn at a low flow rate through a charcoal tube where the target compounds are absorbed. Figure 4-1 is a schematic showing the sampling apparatus which includes a charcoal tube and a pump. The commercially available charcoal tube contains 150 mg of charcoal divided into two sections of 100 mg and 50 mg for the front and back sections, respectively. The back section of the tube will collect any compound which migrates through the front section. The sampling pump can pull a flowrate of 0.005 to 1.0 liters per minute (l/min). The sample pump is set each morning at a flowrate in accordance with NIOSH Method 1005 using an independent calibrator. At the end of each run, the pump readout will display final flowrate, sampling time and total air volume sampled.

Figure 4-2 shows the locations of the 12 perimeter monitoring sites. Each morning prior to the beginning of excavation, the site operator will arrange the sampling equipment to collect three downwind samples and one upwind sample. The wind direction data from the on-site meteorological tower and from local weather forecasts will be used to decide where the samplers should be placed. Each day, the samplers will be activated at the beginning of excavation and collect a sample until the end of excavation. At the conclusion of each sampling day, the charcoal tubes will be collected, capped and refrigerated until analysis. Typically, the samples will be analyzed on the next sampling day.

If variable winds are expected, four or five downwind samplers will be used to ensure adequate plume capture. If there is a significant shift in wind direction (e.g., 180° shift), the samples will be ended, the pumps moved to the downwind location, and new samples started. The total time associated with moving the sampling equipment will be approximately 15-30 minutes. The locations shown in Figure 4-2 will not capture emissions from the STP and GWTP stacks under certain wind conditions. These emissions, however, will be regularly monitored using CEMs.

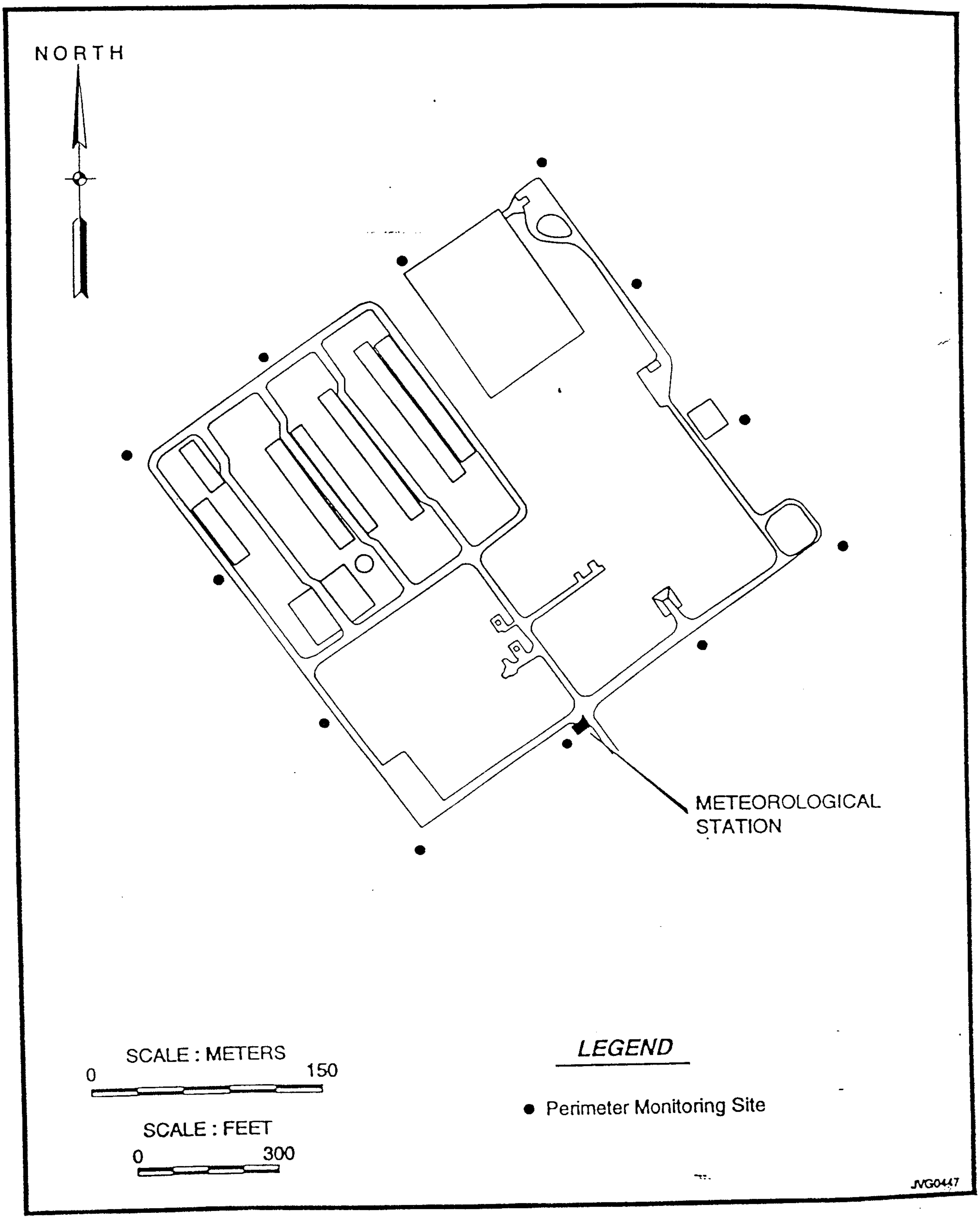


Figure 4-1. Locations of Air Monitoring Sites Around Area of Active Excavation

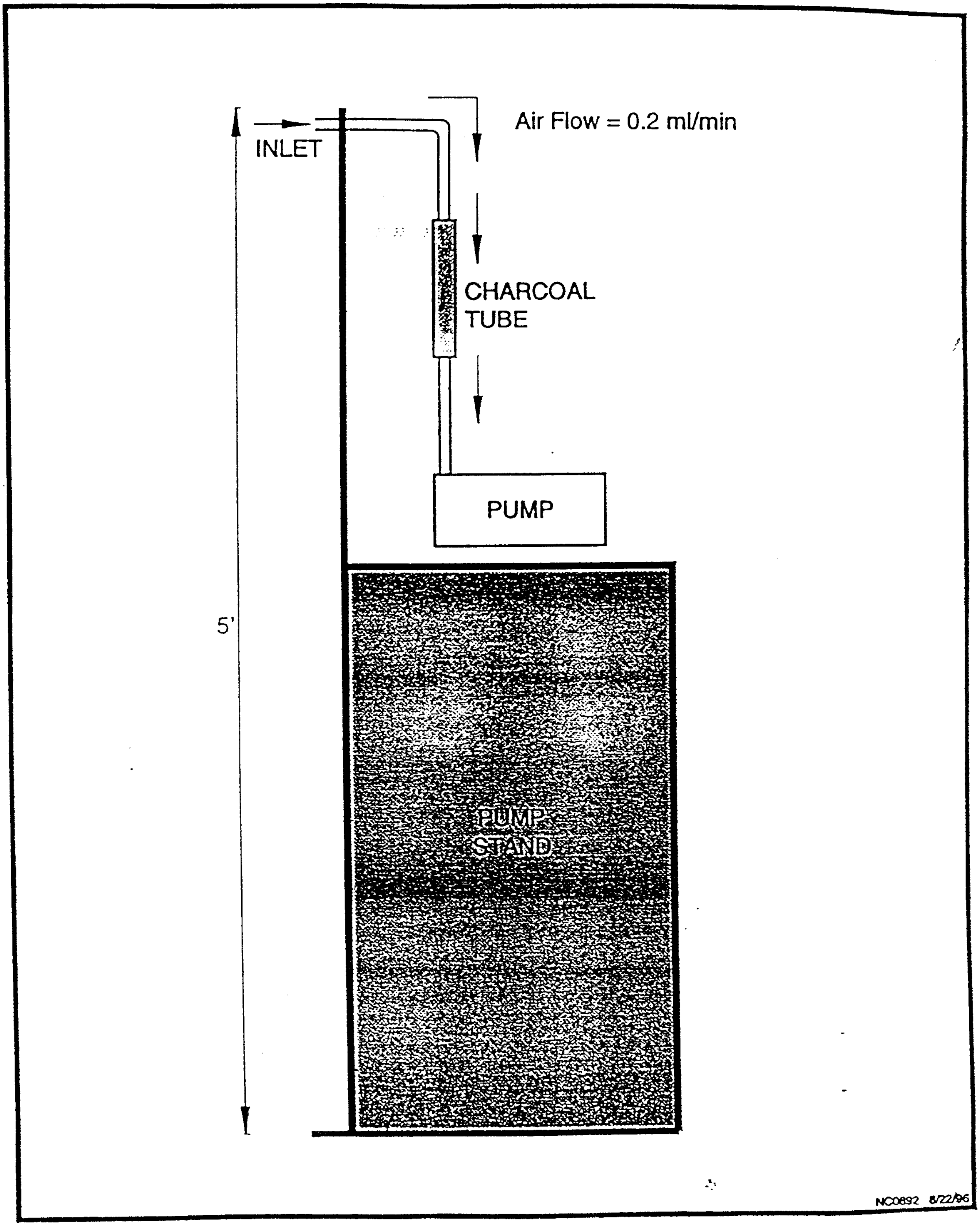


Figure 4-2. Schematic of the Perimeter Sampling Apparatus

4.7 Meteorological Monitoring

The meteorological station will be used to collect wind direction, wind speed, temperature, and relative humidity data. The wind speed and wind direction data will be obtained at 10 meters above the ground surface, while temperature and relative humidity will be collected at 2 meters height. A data acquisition system will be used to process the met data. The following sensors will be used:

- Temperature - The temperature probe will be enclosed in a naturally-aspirated radiation shield. The sensing element is a thermistor device specifically constructed to produce a linear resistance change; it is provided with a temperature translator and an analog 0-1 volt signal representing ambient temperature. Rated accuracy of the probe is ±0.5°C.
- Wind Speed - Wind speed will be measured using a 3-cup anemometer. A frequency modulated output signal, proportional to wind speed, is received by the translator and converted to a 0-1 volt output. Rated accuracy is ±0.2 mph.
- Wind Direction - Wind direction will be measured using a light-weight vane rotating on a stainless-steel shaft. The wind direction translator provides a reference voltage to a low torque potentiometer. Since the wiper arm of the potentiometer is driven by the wind vane sensor, voltage from the wiper is proportional to wind direction. Rated accuracy is ±5 degrees.

4.8 Sample Handling and Chain-of-Custody Procedures

Sample chain-of-custody (COC) procedures for this program will be based on EPA-recommended protocols. Chain-of-custody forms will accompany all samples shipped off-site for analysis. The sample preservation and hold time requirements are shown in Table 4-5.

The field crew will keep accurate written records of their daily activities in a bound station log book. All entries will be made in black ink, and contain accurate and inclusive documentation of all field activities, including field data and observations, calibrations, problems encountered, and corrective actions. All entries should be dated and signed or initialed by the site operator. Samples will be logged into a field notebook. In addition, a field notebook will be kept which documents the on-site activities. This notebook will contain a description of the day-to-day activities, the times samples were collected, and the time that samplers were inspected.

4.9 Preventative Maintenance

The objective of a preventative maintenance program is to help minimize delays due to equipment failure. Detailed maintenance schedules are needed for this project due to the long duration of the field testing and will be developed once the various instruments have been procured and the associated instrument manuals have been reviewed. At a minimum, each instrument will be checked at least once daily when in use and control charts, or data tabulations, will be used to track instrument performance over time.

In addition to the equipment required to provide the field measurements, certain extra instruments and spare parts will be available at the site. These spares include sample containers, pressure gauges, temperature measuring devices, portable gas analyzers, analytical parts, and other expendables.

Table 4-5
Sample Preservation and Holding Time Requirements

Parameter	Sample Type	Preservation	Holding Time
PCDD/PCDF	Conditioned Virgin XAD Resin	Air-tight amber glass jars with Teflon caps or in glass sorbent modules sealed with Teflon film; Cool	4 weeks Use as soon as possible.
	M23 Train	Sealed with glass or Teflon plugs or caps; resin traps wrapped with aluminum foil; Cool, 4 °C	Extract within 14 days; analyze within 40 days following extraction
Volatile Organic Sampling Train (VOST)	Aqueous Samples, VOST Condensate	Cool, 4 °C	Analyze within 14 days
	VOST	Cool, 4 °C	Analyze within 14 days
HCl and Cl_2	Stack Gas	None	28 days
Volatile Organic Compounds	Waste Feed, Treated Soil, Baghouse Fines	Cool, 4 °C	14 days
	Scrubber Blowdown Water	Cool, 4 °C	14 days
Metals	Stack Gas	None	180 days
	Waste Feed, Treated Soil, Baghouse Fines	None	180 days
	Scrubber Blowdown Water	Nitric Acid to pH <2	180 days

Table 4-5
(Continued)

Parameter	Sample Type	Preservation	Holding Time
Chloride, Atterberg Limit, Particle Size, Moisture	Waste Feed	None	28
Chloride, Sulfate[1]	Treated soil, Baghouse Fines, Scrubber Blowdown	None	28

[1] Sulfate to be determined in scrubber blowdown samples only.

SECTION 5
ANALYTICAL PROCEDURES

The analytical procedures for air samples for this program are divided into several categories: POP tests, CEMs, excavation zone monitoring, and perimeter monitoring. Details of these analytical methods are presented in the following subsections. A brief discussion of the methods for solids and water analysis also is presented.

5.1 Analytical Procedures for POP Tests

Samples collected during the POP testing will be analyzed for the parameters specified in Table 5-1 for air samples and Table 5-2 and solid/liquid samples. This section describes the analytical methods that will be employed for each parameter and/or sample matrix. Most of the methods are standard reference methods. Any modifications to the methods are appropriately explained and detailed.

5.1.1 Determination of Volatile Organic Compounds in Waste Feed and Residue Samples

The concentration of the volatile organic compounds in the waste feed, treated soil, baghouse fines, and scrubber blowdown will be determined using Method 8260A detailed in SW-846, "Test Methods for Evaluating Solid Waste" (3rd Edition). This method uses a purge and trap procedure for preparing samples for GC/MS analysis.

Before analysis, the GC/MS is tuned with bromofluorobenzene (BFB) to give an acceptable mass spectrum, as defined by EPA. An initial five-point calibration curve will be generated according to method protocol. Response factors for the volatile compounds obtained from daily calibration checks will be used for quantitation.

Response factors will be calculated by tabulating the area response of the primary characteristic ions against the concentration for each compound, including the internal

Table 5-1
Summary of Analytical Methods for POP Test Samples

Parameter	Analytical Method	Lab	Extraction Holding Time (days)	Analysis Holding Time (days)	PQL	Prep Method
Particulate	EPA M5 (w/back-half PM)	Radian	NA	NA	0.1 mg/sample	EPA Method 5
HCl, Cl_2	EPA Method 26	Radian	NA	28	0.05 mg/sample	EPA Method 26
Volatile Organic Compounds	SW-846 Method 5041/8260A	ATL	NA	14	1-10 ppb, depending on compound	SW-846 5041/8260A
Dioxin and Furan	EPA Method 23	Triangle Labs	14 (non-aqueous fractions) 7 (aqueous fraction)	40	0.1 ng/sample depending on compound	EPA Method 23
Atterberg Limit	ASTM D422	Radian	NA	28	NA	NA
Particle Size	ASTM D4318	Radian	NA	28	NA	NA
Moisture	ASTM D2216	Radian	NA	28	NA	NA

Table 5-1
(Continued)

Parameter	Analytical Method	Lab	Extraction Holding Time (days)	Analysis Holding Time (days)	PQL	Prep Method
Arsenic	SW-846 Method 7060A	Radian	NA	180	0.5 μg/sample	40 CFR Part 266 Appendix IX, sect. 3.1
Barium	SW-846 Method 6010A Trace	Radian	NA	180	0.4 μg/sample	
Cadmium	SW-846 Method 6010A Trace	Radian	NA	180	2 μg/sample	
Chromium	SW-846 Method 6010A Trace	Radian	NA	180	3 μg/sample	
Lead	SW-846 Method 6010A Trace	Radian	NA	180	5 μg/sample	
Selenium	SW-846 Method 7740	Radian	NA	180	0.5 μg/sample	
Silver	SW-846 Method 6010A Trace	Radian	NA	180	5 μg/sample	

Table 5-2
Sample Preparation and Analysis for Waste Feed and Process Samples

Parameter	Analytical Method	Lab	Extraction Holding Time (days)	Analysis Holding Time (days)	PQL	Prep. Method (SW-846)
Volatile Organic Compounds	SW-846 Method 5040/8260A	Radian	NA	14	10-50 ng/sample depending on compound	Method 5040
Arsenic	SW-846 Method 7060A	Radian	NA	180	Soil: 0.4 μg/kg Water: 0.004 μg/L	Soil: Method 3050A Water: Method 3020A
Barium	SW-846 Method 6010A	Radian	NA	180	Soil: 1.0 μg/kg Water: 0.01 μg/L	Soil: Method 3050A Water: Method 3005A
Cadmium	SW-846 Method 6010A	Radian	NA	180	Soil: 0.1 μg/kg Water: 0.001 μg/L	Soil: Method 3050A Water: Method 3005A
Chromium	SW-846 Method 6010A	Radian	NA	180	Soil: 0.1 μg/kg Water: 0.001 μg/L	Soil: Method 3050A Water: Method 3005A

Table 5-2
(Continued)

Parameter	Analytical Method	Lab	Extraction Holding Time (days)	Analysis Holding Time (days)	PQL	Prep. Method (SW-846)
Lead	SW-846 Method 6010A	Radian	NA	180	Soil: 0.3 µg/kg Water: 0.003 µg/L	Soil: Method 3050A Water: Method 3005A
Selenium	SW-846 Method 7740	Radian	NA	180	Soil: 0.4 µg/kg Water: 0.004 µg/L	Soil: Method 3050A Water: Method 3020A
Silver	SW-846 Method 6010A	Radian	NA	180	Soil: 0.2 µg/kg Water: 0.002 µg/L	Soil: Method 3050A Water: Method 3005A
Atterberg Limit	ASTM D422	Radian	NA	NA	NA	NA
Particle Size	ASTM D4318	Radian	NA	NA	NA	NA
Moisture	ASTM D2216	Radian	NA	28	NA	NA
Chloride	MCAWW Method 300.0	Radian	NA	28	Water: 0.02 mg/L	NA
Sulfate	MCAWW Method 300.0	Radian	NA	28	Water: 0.2 mg/L	NA

standards. Blank samples, matrix spike, and matrix spike duplicates also will be analyzed (MS/MSD).

5.1.2 Determination of Volatile Organic Compounds in Stack Gas Samples (VOST)

The VOST will be used to collect samples of the stack gas for quantitation of the VOCs. The Tenax and Tenax/charcoal sorbent traps will be prepared and analyzed according to Methods 5041/8260A of SW-846. This analytical method is based on the quantitative thermal desorption of volatile compounds from the sorbent traps and analysis by purge and trap GC/MS. One VOST pair per test condition will be analyzed separately to assess any breakthrough.

The target analyte list includes the following volatile organic compounds:

- Trichloroethylene,
- Vinyl chloride,
- 1,2-Dichloroethene,
- 1,2-Dichloroethane,
- 1,1-Dichloroethane,
- 1,1-Dichloroethene,
- Tetrachloroethane,
- Toluene,
- Ethylbenzene,
- Xylene,
- Chloroform,
- Styrene,
- Methylene chloride,
- Benzene,
- 1,1,1-Trichloroethane, and
- Trichlorofluoromethane.

Three pairs of VOST tubes per run will be analyzed. For one pair per condition, the front and back tubes will be analyzed separately to assess breakthrough. The front and back halves of each pair of traps are analyzed separately to measure any compound breakthrough. Breakthrough is present if the catch on the second tube exceeds 30% of the first tube and is above 75 ng. Each pair of traps and the condensates will be analyzed and reported separately and the total reported for each test run.

According to Methods 5041/8260A, the contents of the Tenax and Tenax/charcoal cartridges will be spiked with SW-846 Method 8260A internal standards, thermally desorbed for 10 minutes at 180°C with organic-free nitrogen or helium gas (at a flow rate of 40 mL/min), bubbled through 5 milliliters of organic-free water, and trapped on an analytical adsorbent trap. The analytical adsorbent trap will be rapidly heated to 180°C following the 10 minute desorption and the carrier gas flow is reversed so that the effluent flow from the analytical trap is directed through a wide-bore capillary column into the GC/MS. Volatile compounds are then separated by temperature programmed gas chromatography and detected by low-resolution mass spectrometry as outlined in Method 8260A of SW-846.

The VOST condensate from each test run (4 pairs of tubes) will be collected and analyzed for the target list of VOCs according to Method 8260A of SW-846. The condensate will be collected and preserved in accordance with Method 8260A protocol. The volume of condensate will be determined and recorded.

5.1.3 Determination of Chlorinated Dioxins (PCDD) and Chlorinated Furans (PCDF) (Method 23)

Samples of the stack gas collected for determination of PCDD/PCDF (according to Method 23) will be analyzed using high resolution capillary column GC/MS in accordance with Method 23. The method uses matrix specific extraction and analyte specific cleanup techniques for sample preparation. Results will be presented as specific isomers in some cases and as congener classes in other cases. The laboratory analysis will include quantification of all PCDD and PCDF containing 4 or more chlorine atoms. There will be congener class definition for each of the five congener groups (tetra-, penta-, hexa-, hepta-, and octa-). In addition, each individual isomer containing the 2,3,7,8 substitution pattern will be individually quantified. Finally, these results will all be converted to 2,3,7,8-tetrachlorodibenzodioxin toxicity equivalents, according to the formula presented in the BIF regulations and method manual (40 CFR 266, Appendix IX, Section 4.0).

Calibration of the GC/MS will be accomplished with internal standards and calibrating solutions. Acceptance criteria as outlined in the method will be met before any samples are analyzed.

Samples of stack gas for determination of polychlorinated dibenzodioxins and dibenzofurans (PCDD/PCDF) will be sampled and analyzed according to EPA Method 23 (40 CFR 60, Appendix A) with the following modification in the surrogate spiking scheme. The sample train returned from the field is broken into four components.

- Component 1 includes the filter with sampled particulate matter.
- Component 2 is the XAD-2 sorbent.
- Component 3 includes the solvent rinse (i.e., acetone and methylene chloride) from the probe, the front half of the filter holder, and any connecting lines between the probe and filter. The train will be rinsed with acetone and methylene chloride, as specified by Method 23. There will be no toluene rinse. Also included are the solvent rinse from the back half of the filter holder, the condenser, and any transfer lines between the filter housing and condenser, or between the sorbent module and condenser, if they are separate.

The samples are spiked with the following surrogates.

Surrogate Standards
$^{37}Cl_4$-2,3,7,8-TCDD
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD
$^{13}C_{12}$-2,3,4,7,8-PeCDF
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF

To ensure proper spiking, the isotopically labeled surrogate solution, which is normally at a concentration of 0.1ng/μl, is diluted to 0.004ng/μl with iso-octane, for a dilution factor of 25. Exactly 1.0 ml of this spiking solution is spiked uniformly onto the XAD resin using an adjustable pipette. The spiked resin is transferred to a Soxhlet extractor.

Surrogate recoveries should be between 40-130%. A minimum of 45 cubic feet of gas will be collected over a minimum sampling time of 120 minutes. This sampling volume will result in the following gas-based detection limits:

- 2,3,7,8-TCDD: 0.001 ng/m^3
- 2,3,7,8-TCDD Toxicity Equivalence: 0.01 ng/m^3
- total dioxins and furans: 0.1 ng/m^3

Concentration will be reported for each individual isomer containing the 2, 3, 7, 8-TCDD substitution pattern. Concentration will also be reported for total dioxin/furans as described in Method 23.

5.1.4 Determination of Metals in Stack Gas, Waste Feed, and Residue Samples

Stack gas samples, waste feed, treated soil, baghouse fines, and scrubber blowdown samples will be analyzed for the following metals:

- Arsenic,
- Barium,
- Cadmium,
- Chromium,
- Lead,
- Silver, and
- Selenium.

The calibration procedures for the inductively coupled argon plasma emission spectroscopy (ICAPES) system in the trace analysis configuration or graphite furnace atomic absorption (GFAA) to be used to determine metals concentrations by SW-846 Methods are described in the respective method. A response factor (RF) is calculated daily for each metal based on the detector response of a calibration standard and calibration blank. The RF is calculated and stored in a computer. Following calibration, a calibration check sample is analyzed. Agreement between the measured value and the expected value must be within 10% before analysis can proceed. Calibration is verified by analyzing a QC check standard for every ten samples, with agreement within ± 10% of the expected value required for all metals.

5.1.5 Determination of Hydrogen Chloride and Chlorine in Stack Gas Samples

An aliquot from the deionized water impinger and the dilute sulfuric acid impinger solutions from the Method 26A sampling train will be analyzed for hydrogen chloride (as chloride) during all test periods. Chlorine (as chloride) will be analyzed in the sodium hydroxide impinger solutions. The analyses will be made using an ion chromatograph following Method 9057. In this procedure, the ions in solution are separated by an ion exchange column and detected conductimetrically.

The ion chromatograph will be calibrated for each sample set analyzed. This is accomplished by introducing different standard concentrations of chloride into the instrument and measuring the response for each concentration. Calibration standards will be prepared from certified standards. A minimum of four standard concentrations for each analyte will be used to generate a calibration curve by the method of least squares (linear regression). The calibration curve is considered acceptable if the correlation coefficient is greater than 0.9950. Each sample, including blanks, will be analyzed in duplicate according to Method 9057 protocol.

5.1.6 Determination of Particulate Matter in Stack Gas Samples

Particulates will be measured in the stack gas during the Method 5/26A sampling in accordance with EPA Method 5 with back-half particulate matter. The wash from the nozzle, probe liner, and glassware prior to the filter on the sampling train will be evaporated, and the mass determined on an analytical balance. The glass fiber filter will be removed from the sampling train, desiccated, and weighed to determine the mass of particulate on the filter. The combined mass from the filter and the evaporated wash are then related to the total volume of gas sampled to determine the front-half particulate loading. The deionized water in the first impinger will be evaporated and measured for back-half particulate matter.

The analytical balance will be calibrated at the start of the program using a standard set of weights and an internal calibration weight. Measured values of the standards must agree to within 0.1 mg. Balance calibration data will be recorded in the laboratory notebook.

5.1.7 Determination of Chloride and Sulfate in Scrubber Blowdown Samples

Samples of scrubber blowdown water will be analyzed for chloride and sulfate using ion chromatography, as described above in Section 5.1.6.

5.1.8 Composition and Physical Parameters

Samples of the waste feeds will be collected for determination of total chloride, Atterberg limits, and particle size. Standard ASTM methods of analysis and QA/QC will be applied for each test parameter. Table 5-2 includes the ASTM Method reference for each parameter.

5.2 Continuous Emission Monitoring

The monitoring system for the STP will consist of two total hydrocarbon (THC) analyzers and CO, CO_2, and O_2 analyzer(s). It is anticipated that a single infrared based instrument will be used to simultaneously monitor CO, CO_2, and O_2, however, the hardware has not yet been procured. The GWTP monitoring system will consist of a THC analyzer only. The infrared analyzer will need a clean, dry gas sample in order to avoid moisture interference, while the THC anlayzer will take a hot, wet gas sample.

The THC analyzer employs a flame ionization detector (FID) to detect the hydrocarbons. The system will be operated in over a 0 to 100 ppm range. The unit operates by passing flue gas into a chamber where it is combusted by a hydrogen flame. The ions formed in the flame enter an electrode gap, decrease the gas resistance, and permit a current flow in an external circuit. The resulting current is proportional to the concentration of total hydrocarbons. All instrument components in contact with the sample gas will be made of stainless steel or Teflon and will be heated to 160°C to prevent any condensation from the wet sample gas. If the THC sample gas were dried, the sample could potentially lose hydrocarbons in the water phase.

The data will be stored using a data acquisition system (DAS). The DAS will scan each instrument output and will then log the digitized voltages. Data will be collected from each analyzer at least once every 5 seconds and averaged to yield 5 minute averages. These five minute data will be further averaged to one-hour averages. The one-hour data will be stored electronically in the DAS. The data will be stored on the DAS in electronic format until it can be downloaded and archived. Data from the DAS will be downloaded by one of two ways. Either a phone line will be connected to each DAS and remotely polled from an on-site computer, or a laptop computer will be used to download the data directly through a RS-232 port. Once data have been downloaded from the DAS, it will be archived in an on-site database developed for this program. At this time, it is anticipated that a program such as Microsoft Access will be used to archive the data.

5.3 Excavation Zone Monitoring by Infrared Spectroscopy, Aerosol Monitoring, and TO-14 Sampling

A Miran 1B analyzer will be used to monitor the levels of TCE and $MeCl_2$ immediately downwind of the excavation area. The specifications of the instrument are given in Table 5-3. The analyzer is a single-beam infrared spectrometer that is microprocessor controlled. Once a compound of interest is selected, the microprocessor automatically sets the wavelength and pathlength for analysis. The instrument has a variable pathlength gas cell that is automatically adjustable from 0.75 to 20.25 meters.

The instrument has an internal memory with a library of calibration data for over 100 compounds, including the two compounds of interest. The measured absorbance is dependent upon both the concentration and the path length. Using Beer's Law, the measured adsorbance is used to calculate the ambient concentration. The analyzer provides an audible alarm signal if a preset concentration limit is approached or exceeded. The analyzer also can be set to scan the general environment to see what compounds are present. The alarm levels to be used are shown in Table 5-4. The alarm levels were set so that an exceedance at the monitoring location would occur before an exceedance of the 30-min ESL would occur at the property boundary. The minimum amount of atmospheric dilution expected to occur across the 1200 m distance between the working area and the fenceline is 10x. Another factor of 6x was used to account for the fact that emissions would be reduced within 5 minutes of an exceedance by applying cover material to the emitting surface (ergo, the 30-minute average concentration at the fenceline would be reduced by 6x if the emissions are reduced to zero).

Particulate matter concentrations during soil excavation and handling activities will be monitored using a MIE Miniram dust and aerosol monitor. This monitor uses light scattering to determine dust levels and has a operating range between 0.01 and 100 mg/m^3. This sampling is being performed as part of the on-site health and safety monitoring. A more detailed explanation of the instrument calibration, quality control activities, and action levels is discussed in the site specific health and safety plan.

Confirmation sampling will be conducted using evacuated stainless steel canisters in accordance with Method TO-14; see Section 5.6 of this QAPP for further details of the method.

Table 5-3
Specifications for Portable Analyzers

Specification	Miran 1B	OVA 108
Readout	0.1ppm - 10%	1-10,000 ppm
Detection Limit	0.2 ppm TCE 0.4 ppm $MeCl_2$	0.5 ppm THC (as methane)
Response Time (sec)	60	2
Supply Gas	None	Hydrogen
Sample Flow Rate (L/min)	25-30	2
Power	5V NiCd Battery	12V Battery
Operational Time (hr)	4	8
Dimensions (in)	28 x 9 x 11	16 x 12 x 4 (approximate)
Weight (lbs)	30	12

Table 5-4
Alarm Level for Miran 1B Analyzer

Compound	Standard (ppm)		Alarm Level[a] (ppm)
	30-min ESL	TLV	
TCE	0.25	50	15
$MeCl_2$	0.075	50	4.5

[a] Based on dilution between monitoring area and fenceline and 5-minute response time to reduce emissions.

5.4 Total Hydrocarbon Screening by OVA 108

The OVA 108, a portable FID-based instrument, may be used periodically during the program to provide real-time data on total hydrocarbon (THC) concentrations in the exhaust stacks, identify emission hot spots in the excavation area, and check the width of the emission plume from excavation activities.

The OVA 108 is a widely used, portable FID analyzer specifically designed for field applications. The instrument has a logarithmic readout with an upper range of 10,000 ppm (1%) and a resolution of 0.5 ppm at the lower end of its scale. The OVA 108 is battery powered and contains a small sample pump. Instrument sample flow is approximately 2 liters/minute. Performance specifications for the OVA 108 are summarized in Table 5-3. The OVA 108 will be calibrated prior to use with a low-, mid-, and high-level methane gas standard as well as a zero gas standard. Instrument precision will be verified by a check at the beginning and end of each test day with the zero and mid-level calibration standards.

5.5 Perimeter Monitoring/GC Analysis of Charcoal Tube Samples

The following section describes the procedures to be used for the analysis of the charcoal tube samples collected as part of the perimeter monitoring program.

The first step of sample preparation will involve placing the front and back sections of the charcoal tube in separate vials, discarding the glass wool and foam plugs. The charcoal then is desorbed in 1.0 ml of carbon disulfide (CS_2). The vials are capped and allowed to stand for 30 minutes with occasional agitation. Desorption efficiency will be checked periodically. Sample analysis will be performed using a Hewlett Packard 6890 Series Gas Chromatograph (GC) with a flame ionization detector. This GC will be outfitted with a 60m x 0.53 mm ID, 3.0 micrometer film thickness, VOCOL fused silica capillary column. The GC set-up will be based on the manufacture's recommendations for-measuring methylene chloride. A 1μL aliquot will be injected using a solvent flush technique.

If the desired detection limits cannot be achieved using the FID, an electron capture detector (ECD) will be used. ECDs are much more sensitive to chlorinated solvents than FIDs. To get optimal results with the ECD, it may be necessary to use a different solvent to extract the sample from the charcoal. The FID/ECD combination provides the capability to detect all of the VOCs found in the soils and ground water at LHAAP and quantify their concentrations at low ppbv levels.

The peaks on the chromatograph will be integrated using a Hewlett Packard Chemstation data acquisition package. This package will allow retainage of the electronic files of the all chromatographs and all accessory data. The software will calculate the mass of the target compounds in the sample based on peak area. This data then will be used to calculate an 8-hour time weighted average concentration for each target compound:

$$\text{Concentration } (\mu g/m^3) = (\mu g \text{ in aliquot} * \text{sample volume}) / \text{total air volume sampled } (m^3) \qquad \textbf{(5-1)}$$

5.6 Perimeter Monitoring/TO-14 Sampling

This subsection describes the procedures to be used for TO-14 sampling to be conducted as part of the perimeter monitoring program. Initially, TO-14 sampling will be used for off-site testing to identify all VOCs present during the two-month baseline monitoring period. Also, TO-14 sampling will be performed monthly as a QC check at the four upwind/downwind perimeter monitoring locations and at the two IR monitoring locations.

Prior to sample collection, SUMMA® passivated stainless steel canisters will be cleaned and evacuated. Eight-hour time-integrated samples will be collected. A 7-μm filter (stainless steel) is used to exclude any particulate matter that might be present in the air. Samples will be analyzed using a Hewlett-Packard model 5890 Series II GC, a Hewlett-Packard Model 5972A MSD, and an Entech pre-concentrator. The GC column will be a DB-1 column (60m x 0. Lmm ID, 1μm film thickness) or equivalent.

SECTION 6

DATA QUALITY

This section provides information related to quality control (QC) and quality assurance (QA). The topics covered include: QA objectives, calibration procedures, internal QC, audits, and corrective action.

6.1 Quality Assurance Objectives

The objectives of the QA efforts of this program are two-fold. First, they provide the mechanism for ongoing control and evaluation of the measurement data quality throughout the course of the project. Second, QC data are used to define data quality for the various primary measurement parameters, in terms of precision and accuracy. These data quality estimates are, in turn, used to define the uncertainty associated with the estimated emission rates.

Data quality objectives for the various measured parameters are presented in Table 6-1. Also shown in the table are the data capture objectives. Precision values shown in the table present a measure of variability for replicate measurements of the same parameter, expressed in terms of either relative percent difference or percent coefficient of variation.

Particulate loading in the stack gas is not listed in Table 6-1 because accuracy and precision for particulate loading cannot be readily measured in a stack test. Adherence to the method protocol, which includes performance-related activities such as sampling equipment calibration, isokinetic sampling, balance calibration, and desiccating filters to a constant weight, is the basis for achieving acceptable method accuracy and precision. For other critical measurement parameters, the performance objectives are expressed by conditions that can be appraised experimentally.

Table 6-1
Quality Assurance Objectives for POP Test Sampling

Critical Parameter (Method)	Experimental Conditions	Precision [a]	Accuracy [b]	Completeness [c]
VOCs in Stack Gas	Surrogate Spike [d]	50% CV	50-150% recovery [d]	100%
Metals in Stack Gas, Waste Feed and Treated Soil	MS/MSD [e]	20% RPD	75-125% recovery	Stack: 100% Others: 90%
PCDDs/PCDFs in Stack Gas	Surrogate Spike	50% RPD	40-130% recovery	100%
HCl/Cl_2 in Stack Gas	MS/MSD	25% RPD	85-115% recovery	100%
VOCs in Waste Feed and Treated Soil	MS/MSD	25% RPD	50-150% recovery[d]	90%
Chloride and Sulfate in Scrubber Blowdown	MS/MSD	25% RPD	80-120% recovery	90%
Excavation Zone Monitoring	NA	NA	±50%	90%
Perimeter Monitoring	NA	±20%[f]	±20%	90%

[a] Precision is expressed according to the type of measurement. For a set of spike recoveries, precision is expressed as percent coefficient of variation (% CV) for the set. For objectives measured by matrix spike duplicates, precision is expressed as the relative percent difference (RPD) between MS/MSD recoveries.

[b] Accuracy is expressed in terms of percent error, or difference between a measured value and the theoretical value, expressed as a percentage of the theoretical. For surrogate and matrix spike recoveries, the objective is based on single measurement results.

[c] Completeness is the total number of valid measurement results, expressed as a percentage of the number planned.

[d] Recoveries vary by compound as specified by laboratory SOPs.

[e] MS/MSDs for metals in stack gas samples will be post-digestion spikes.

[f] This precision objective is for the analytical results only. No objective will be established for duplicate sample precision.

For stack VOC and all PCDDs/PCDF determinations, the accuracy and precision objectives are based on recoveries of surrogate spikes. The VOCs surrogate spikes are chemically similar to the stack test VOCs. The standard suite of SW-846 Method 8260A surrogates will be added to all samples analyzed by this method. Matrix spike and matrix spike duplicate samples will be prepared and analyzed for the soil and scrubber blowdown VOC determinations.

Precision and accuracy for metals in the stack gas samples will be assessed in terms of MS/MSD recoveries. Matrix spikes for stack gas precision and accuracy measurements will be post-digestion spikes. Precision and accuracy for the determination of metals in the other matrices will be assessed through the preparation and analysis of pre-digestion spikes.

Precision and accuracy for chloride or sulfate measurements in all samples using ion chromatography will be assessed in terms of MS/MSD recoveries. The spike will be added before sample preparation.

The QA/QC assessment (precision, accuracy, completeness) for the sorbent tube measurements will be used to assess whether the measurement data are of known and sufficient quality to meet the needs of the project. Precision will be determined by evaluating the results of duplicate samples and analyses to demonstrate the repeatability of the measurements. Spiked samples will be analyzed to provide an independent, point-in-time accuracy assessment. The completeness (data capture) will be assessed to ensure that sufficient quantity of samples were collected. The data quality objectives are presented in Table 6-1. The specific QC sample requirements for the perimeter monitoring are outlined in Table 6-4.

The precision and accuracy objectives listed in Table 6-1 are not intended to represent data validation criteria. Rather, these values represent estimates of the magnitude of uncertainty that might be associated with the measurement data due to measurement error. The QA/QC efforts focus on controlling measurement error within these limits and ultimately provide a database for estimating the actual uncertainty in the measurement data. In terms of their impact on the program objectives, the data quality objectives are not equally important for all measurement parameters, or even for the same parameter used for different purposes. If necessary, measurement results may be qualified, adjusted, or reanalyzed to mitigate excessive imprecision or bias, as determined by the project team.

6.2 Calibration Procedures

Calibration is the process of establishing the relationship between a measured output and a known input. Calibration methods vary according to equipment, but all include the following elements: the traceability of reference materials, or known inputs; established procedures; schedule of performance; and documentation of results. Calibration procedures are summarized in Table 6-2.

6.2.1 Calibration of Stack Sampling Equipment

Stack sampling equipment is calibrated according to the EPA Handbook of QA/QC Procedures for Hazardous Waste Incineration. These procedures are presented in Table 6-2. Stack sampling equipment will be calibrated before leaving for the POP tests at Longhorn, and then again on return from the field.

6.2.2 CEM Calibration and Quality Control Checks

The instrument ranges and calibration gas values are given in Table 6-3. The certificates of analysis for the calibration gases will be kept on-site during the monitoring effort. There are number of checks and calibrations that will be routinely performed. They include:

- Multipoint calibration and linearity checks;
- Line bias checks;

Table 6-2
Calibration Procedures and Criteria for Sampling Equipment

Parameter	Calibration Technique	Reference Standard	Acceptance Limits	Calibration
Probe nozzle	Measure diameter to nearest 0.001 inch	Micrometer	Mean of 3 measurements; difference between high and low ≤ 0.004 inch	Prior to test
Gas meter volume	Compare to reference dry gas meter	Reference dry gas meter	Record calibration factor, ± 5% of factor	Prior to test and post test
Gas meter temperature (thermocouple)	Compare readout sensor to mercury-in-glass thermometer	ASTM thermometer	± 5°F	Prior to test
Stack temperature (thermocouple)	Compare readout sensor to mercury-in-glass thermometer	ASTM thermometer	± 5°F	Prior to test
Final impinger/condenser exit temperature (thermocouple)	Compare readout sensor to mercury-in-glass thermometer	ASTM thermometer	± 5°F	Prior to test
Filter temperature (thermocouple)	Compare readout sensor to mercury-in-glass thermometer	NA	± 5°F	Prior to test
Stack differential pressure (inclined manometer)	None - level manometer	NA	NA	NA
Barometric pressure (obtained from local meteorological station)	NA	NA	NA	NA
S-type pitot tube	Inspection of face opening alignment, external tubing diameter, and base to opening plane distance	Design criteria	Meets RM2 criteria [a]	Prior to test

[a] Examples of these criteria are found on the "Pitot Tube Form" included in Appendix 10-3.

Table 6-3
Summary of CEM Quality Control Activities

Action	Frequency	Levels	Acceptance Criteria
Multipoint Calibration	Monthly	Three standards - 80% of full scale 50% of full scale 25% of full scale	Correlation Coefficient >0.995
Baseline Check	Daily	UHP Nitrogen	≤ 5% of full scale
Line Bias Check	Biweekly	Mid-range standard	≤2% of direct inject value
Span Check	Daily	Standard 80% of full scale	≤10% of full scale
Leak Check - O_2	Biweekly	UHP Nitrogen	≤0.5% O_2 absolute
Leak Check (THC)	Biweekly	UHP Nitrogen	THC value greater than 20% of ambient value

- Baseline (zero) checks;
- Span checks; and
- Drift checks.

Each of these instrument checks are discussed below.

Each of the instruments will be multipoint calibrated on a weekly basis using a zero gas and three upscale standards. This check will be used to establish the instrument linearity. The instrument should have a correlation coefficient of 0.995 or better. If this isn't achieved, corrective action will be taken.

On a daily basis, each instrument will have a zero point (using ultra high purity nitrogen) analyzed to determine the instrument zero or baseline drift. The baseline must be within ±5% of full scale (0.5% oxygen absolute) or the instrument will be adjusted. Span checks will also be performed on a daily basis. This calibration check will be performed at 80% of the instrument's full scale (e.g., 80 ppm for a 0-100 ppm scale). If the instrument drift is greater than 10% of full scale, corrective action will be taken and/or a new multipoint calibration will be performed.

Line bias checks will be conducted bi-weekly. These checks will be made by challenging the entire system, including sample line, sample pump, and gas conditioning system using a mid-range gas standard. The instrument response from this standard is then compared with the instrument response when the same gas standard is directly inserted into the analyzer. These two values should be within 2% of each other or corrective action will be required. At the same time as the line bias check, a system leak check will be performed using nitrogen. Nitrogen gas will be introduced at the end of the sample line and the oxygen response will be noted. If the oxygen value is greater than 0.5% absolute, corrective action will be taken. On the air stripper, which only monitors THC, nitrogen will used to leak check the system. If the analyzer response is above the zero baseline value, corrective action will be taken.

6.2.3 Meteorological Sensor Calibration

The calibration of meteorological sensors may take one of two forms: the sensor output can be compared with a standard of known quality while the pair are sampling the same ambient condition, or the sensor can be subjected to an artificial field, to which the sensor output is theoretically predictable. The wind sensors (direction and speed) will be calibrated using artificial field methods, and the temperature and solar radiation sensors will be compared to standards of known quality. All methods used will conform to EPA guidelines for calibration of meteorological systems. Meteorological calibrations will be performed at the start and end of the test program.

Wind Direction - Wind direction alignments will be calibrated by first assessing the accuracy of the sensor's alignments with a compass and transit. The magnetic declination will be established from published values for the geographical region. Secondly, the wind direction sensor vane will be rotated through 540 degrees in 90-degree increments. A compass wheel will be placed on the sensor to direct the rotation in proper 90-degree increments during the test. The results of the test will be taken from the station data system. This test will give an overall check of the complete wind direction system. Finally, an electronic calibration will be performed on the wind direction translator circuit by supplying known voltages from a precision voltage source. The voltages simulate a voltage signal from the sensor and correspond to precise wind directions. Response will be taken from the recording data system and verified with a digital voltmeter.

Wind Speed - Wind speed sensors will be calibrated using synchronous motors which will verify the accuracy of the transducer. The synchronous motor speeds correspond to known wind speeds and will actively check the wind speed system from sensor to data recordings. In addition, the wind speed translator linearity and accuracy will be calibrated using a frequency generator and counter. The frequencies input to the translator will correspond to known wind speeds. The results will be checked on the data system and verified with a digital voltmeter for accuracy.

Temperature Readouts - All temperature readouts for the POP tests will undergo a multipoint calibration prior to the start of sampling. This calibration will consist of a minimum of three points: 0°, ambient, and 50°C. An ASTM thermometer will be used for the reference. Table 6-2 lists acceptance criteria and corrective action. For the met system, the temperature sensor will be calibrated against an Assman psychrometer. The values should agree to within ±0.9°F or corrective action will be taken.

Relative Humidity - The relative humidity sensor will be calibrated using an Assman psychrometer and psychometric tables.

6.2.4 Laboratory Measurements

Calibration of all laboratory instrumentation will comply with the requirements given in the methods that are referenced in Section 5. That section also summarizes the calibration procedures that are used for each of the primary instrumental methods.

6.2.5 Perimeter Monitoring Analysis (GC calibration)

The GC calibration procedure is outlined in NIOSH method 1005. The GC will be calibrated daily with up to six working standards over the range of 0.001 to 10 mg of methylene chloride per sample. The standard will be mixed by adding known amounts of methylene chloride to the solvent in 10-ml volumetric flasks. At least three standards will be analyzed along with blanks. A calibration curve will be prepared using the peak area versus mg of methylene chloride to show the linearity of the standard responses. For each standard, a response factor will be calculated by dividing the standard concentration by the peak area. The average response factor over all standards then can be calculated. This average response factor will be used by the integrator to calculate mg of methylene chloride in each charcoal tube sample.

6.3 Internal Quality Control

An internal QC system is a set of routine internal procedures for ensuring that the data output of a measurement system meets prescribed criteria for data quality. Inherent in and implied by this control function is a parallel function of measuring and defining the quality of the data output. A well-designed internal QC program must be capable of controlling and measuring the quality of the data in terms of precision and accuracy. Precision reflects the influence of the inherent variability in any measurement system. Accuracy reflects the degree to which the measured value represents the actual or "true" value for a given parameter, and includes elements of both bias and precision. The accuracy of measurement data is related to the precision and bias of the component parts of the measurement system.

Generally, internal QC procedures may be divided into two overlapping categories. One category includes those procedures used to control data quality within prescribed limits of acceptability. These acceptability limits are usually related to data precision, accuracy, and completeness. Some internal QC procedures, by their nature, serve both control and assessment functions.

Table 6-4 presents a summary of specific QC samples planned to assess POP test measurement data quality. These include:

- Field and media blanks;
- Recovery solvent blanks;
- Analyzing a VOST pair separately during each test condition;
- Analytical duplicate samples;
- Matrix spike duplicate samples; and
- Surrogate spikes.

Table 6-4
Summary of Matrix-Specific QC Sample Requirements

	Blanks		Duplicates			
	Field	Media	Field	Analytical	MS/MSD	Surrogate Spike
VOCs						
Stack Gas	1 per run	3[a]	-	-	1	All
VOST Condensate	1 per run	1[a]	-	1	-	All
Feed Soil	-	-	-	1	1	All
Treated Soil	-	-	-	1	1	All
Scrubber Blowdown Water	-	-	-	-	1	All
Particulates						
Stack Gas	1	1[a]	-	-	-	-
PCDD/PCDF						
Stack Gas	1	1[a]	-	-	-	All
Waste Feed	-	-	-	-	-	All
HCl/Cl_2						
Stack Gas	1	1[a]	-	-	1	-
Chloride and Sulfate						
Scrubber Blowdown	-	-	-	-	1	-
Metals						
Stack Gas	1	1[a]	-	-	1	-
Feed Soil	-	-	-	-	1	-
Treated Soil	-	-	-	-	1	-
Scrubber Blowdown	-	-	-	-	1	-
Baghouse Fines	-	-	-	-	1	-
Perimeter Monitoring	1 per week	1 per week	1 per run	1 per run	1 per week	--

[a] Hold for analysis.

Field blanks for stack gas samples will be prepared by recovering assembled trains that have been treated as other trains except that no stack gas will be passed through the blank trains. Recovery solvent blanks will be collected and analyzed only if the field blanks show contamination. The solvent blanks are blanks of the recovery liquids (i.e., 0.1 N HNO_3 or D.I. water) used to recover the sample trains. A blank of approximately the same sample volume used to rinse the sample trains will be collected.

6.3.1 Gas Sampling

Before performing any sampling, all applicable sampling equipment will be thoroughly checked to ensure that each component is clean and operable. A file of the equipment calibration data forms will be compiled and reviewed for completeness and adequacy to ensure the acceptability of the equipment. All glassware used in sampling trains is cleaned before shipping following the standard operating procedures (SOPs) on the following pages. Additionally, all glassware is rinsed on site with the recovery solvent for that train, before the assembly of a particular train. On arrival on site, the equipment will be unloaded, inspected for possible damage, and then assembled for use. Any damaged or faulty equipment will be tagged and removed from service until it can be repaired. For all stack gas sampling, reagent grade solvents, including HPLC water, will be used for sample recoveries.

The following QC checks are generally applicable to source sampling techniques. If any corrective actions are taken in response to results for these QC checks or in response to supervisor review of QC procedures, the corrective action taken will be documented in the field QA/QC logbook.

The line item actions shown below follow good sampling practice and are a result of close adherence to the methods.

1. Each sampling train will be inspected visually for proper assembly before every use.

2. Assembly and recovery of the sample trains will be performed in an environment free of uncontrolled dust.

3. All cleaned glassware, hardware, and prepared sorbent traps will be kept closed with caps (Teflon or stainless steel), precleaned foil, or Teflon film until assembly of the sample train in the field. The sorbent traps will be immediately re-capped when the train is disassembled.

4. The numbers and locations of the sampling traverse points will be checked before taking measurements.

5. The incline manometer used to indicate the differential pressure (ΔP) across the S-type pitot tube will be leveled and zeroed.

6. The temperature measurement system will be checked visually for damage and operability by measuring the ambient temperature.

7. Prior to sampling, calculations will be made to determine the proper size nozzle required to attain isokinetic sampling.

8. The sampling nozzle will be inspected visually for damage before and after each run.

9. The S-type pitot tube will be inspected visually for damage before and after each run.

10. During sampling, the roll and pitch axis of the S-type pitot tube and the sampling nozzle will be properly maintained.

11. Handling of the filters will be performed in clean areas out of drafts. Teflon-coated tweezers will be used at all times to transfer the filters.

12. The field balance will be checked daily against standard weights to read within ±0.5 percent of the standard, or a calibration curve will be prepared for the balance. This will be documented in the field logbook.

STANDARD OPERATING PROCEDURE FOR METHOD 5 GLASSWARE PREPARATION

1. Wipe off any grease or Teflon tape on ground glass joints.
2. Rinse with hot tap water.
3. Wash in hot soapy (Alconox) water.
4. Rinse six times with deionized water.
5. Rinse with acetone.
6. Allow to dry in contamination-free environment.
7. Cover all openings with Teflon tape or parafilm.
8. Prior to use in the field, rinse all glassware with deionized water or impinger solution.

STANDARD OPERATING PROCEDURE FOR PCDD/PCDF GLASSWARE PREPARATION

1. Remove any Teflon tape from ground glass joints.

2. Acetone flush to remove surface residuals.

3. Hot soak in Alconox detergent and tap water of 50°C or higher.

4. Rinse with hot water three times.

5. Soak with deep penetrant and tap water of 50°C or higher. Soak for a minimum of two hours.

6. Rinse three times with hot water.

7. Rinse three times with deionized water to remove metallic deposits from the tap water.

8. Acetone rinse to flush off any final traces of organic material.

9. Dry in a contamination free environment.

10. Cap all openings with cleaned glass caps, Teflon tape, or aluminum foil rinsed with methylene chloride.

11. Prior to use in the field, rinse glassware for semivolatile determination with methylene chloride and glassware for PCDD/PCDF determination with toluene.

STANDARD OPERATING PROCEDURE FOR VOST GLASSWARE PREPARATION

1. Remove any Teflon tape or visible residue from glassware.
2. Rinse in hot tap water.
3. Clean with non-ionic detergent (Alconox) in an ultrasonic bath.
4. Rinse three times with deionized water.
5. Dry at 110°C in a contamination free environment.
6. Cap all openings with Teflon caps or tape.
7. Prior to use in the field, rinse all glassware with ultra high purity water.

13. Any unusual conditions or occurrences will be noted on the appropriate data form during each run.

14. The sampling train will be purged prior to sample collection. This will occur during the leak-checking operation and will be documented on the sampling data sheet.

15. The sampling probe will be sealed properly to prevent air in-leakage.

The following line-item activities have to do with preparation of material for sampling.

1. Prior to sampling, each particulate and metals filter will be equilibrated in a desiccator, weighed, using an analytical balance, to determine its initial mass and then packaged in a labeled Petri dish. This will be documented in a logbook showing the time and date of sequential weighings and the stabilization of the filter tare weight.

2. When weighing the filters, both before and after sampling, repeat weighings will be performed ≥6 hours after the initial weighings. Repeat weighings will be made until they agree within ±0.2 mg. These activities will be recorded in a logbook.

The following activities will be documented on the formatted data sheets.

1. All sampling data will be recorded on standard data forms which will serve as pre-test checklists.

2. Each leg of the S-type pitot tube will be leaked-checked before and after each run.

3. Dry gas meter readings, ΔP and ΔH readings, temperature readings, and pump vacuum readings will be made properly while sampling at each traverse point.

4. The entire sampling train will be leak-checked before and after each run. If the sampling train is moved from one sampling port to another during a run, the train will be leak-checked between ports.

5. Ice will be maintained in the ice bath throughout each run.

6. Filters and sorbent traps will be maintained at the proper temperature throughout the test run.

7. Impingers will be weighed to the nearest 0.1 g before and after sampling.

The following activities are specified and will be performed.

1. A cyclonic flow check of the stack gas (both stack traverse diameters) will be performed prior to sampling to verify the absence or presence of cyclonic flow.
2. A field blank will be collected by assembling and recovering one complete sampling train. The blank sample train will be leak checked at the beginning and end of a run (or for the same number of times as the actual test train). No gaseous sample will be passed through the sampling train. A sampling data sheet will be filled out for the blank sample. It will be treated as an actual sample, except that no gas will be sampled.
3. A trip blank consisting of sampling media that have been transported to the site, but not opened, will be collected and will be analyzed in the event of suspected contamination. These samples will be assigned log numbers, and will appear in the logbook and on the chain-of-custody forms.
4. Sorbent traps will be used within 4 weeks of preparation. Documentation of sorbent trap preparation will be maintained.
5. Isokinetic sampling will be achieved within ±10 percent. Calculations of isokinetics will be performed on-site, as quickly as possible after sampling is concluded. Isokinetic sampling is not required for the VOST (Method 0030).

QC procedures specific to each sampling method are discussed in the following paragraphs.

Metals Sampling

Metals concentrations in the stack gas will be determined using the BIF metals train. The probe and sample line upstream of the impinger train and the filter holder will be maintained at 248 ±25°F. The methods require that the leakage rate at the end of the run not exceed 0.02 cubic feet per minute. Final leak checks will be performed to confirm this. Also, leak checks will be performed before the test, during port change, and any time a component is changed out. A component change-out may be replacement of a filter or impinger, or just emptying an impinger. All leak checks will be recorded on the sampling data sheet.

For the metals sampling, isokinetic sampling will be maintained within ±10 percent. A field blank will be prepared by assembling and leak testing a sample train, but without drawing any gas through the system.

Method 23 Sampling

The Method 23 sampling protocols will be used to collect samples of stack gases for determination of total polychlorinated dibenzodioxins (PCDD) and total polychlorinated dibenzofurans (PCDF).

The probe liner and filter holder temperatures will be maintained at 248 ±25°F. The temperature of the gas entering the XAD-2 sorbent trap shall not exceed 68°F. The system will be leak-checked before and after each run to ensure leakage rates of less than 0.02 cfm. If leakage rates exceed this limit, sample volumes will be adjusted accordingly, as described in Method 0010. Isokinetic sampling will be maintained within ±10 percent.

A field blank will be prepared by assembling and leak testing a sampling train, but without drawing any stack gas through the system. An XAD-2 media blank will be prepared and retained for possible analysis.

VOST Sampling

The stack gas sampling for VOCs will be performed using the Volatile Organic Sampling Train (VOST). The VOST is described in Method 0030 in SW-846, Third Edition. Before sampling, all VOST glassware will be cleaned and rinsed with ultra-high purity water. The sampling train will be leak-checked before and after each run to ensure there was no leakage of ambient air into the system. When not being used in the VOST, all resin traps will be kept in cold storage.

During sampling, the resin traps will be maintained at or below 20°C. Three pairs of traps will be collected during each test run. A field blank will be prepared during each run by assembling and leak-testing a pair of tubes, but without drawing any stack gas through the system. Resin tube media blanks for each run will be analyzed. One VOST sample per test condition, including blanks, will be analyzed separately (front and back tubes) to assess breakthrough. The VOST condensate from each test run will be collected and analyzed for the VOCs.

6.3.2 Liquid Sampling

Liquid samples will be collected from the scrubber blowdown using the tap sampling procedures specified in EPA Method S-004. Liquid sampling QC procedures will include the following:

1. The sample tap will be flushed each time before sample is collected.
2. A new subsampling bottle or VOA vial will be used for each test run.
3. The composite sample in progress will be kept cold.
4. A preformatted data sheet will be used.

6.3.3 Solid Sampling

Samples of waste feed, treated soil, and baghouse fines will be collected using the scoop or thief sampling procedures specified in EPA Method S-007 or EPA Method S-005. Sampling QC procedures include the following:

1. A sample scoop or bottle will be dedicated to each sample location to prevent cross-contamination.
2. A new sample composting bottle will be used for each test run, where required. Other sampling equipment will be decontaminated between each test run.

3. The sampling equipment will be protected between sampling events by wrapping in foil or placing in an ice chest.

4. The composite sample in progress will be kept cold. (For the VOCs, discrete samples will be collected in the field and shipped to the laboratory for compositing).

6.3.4 Perimeter Monitoring

The QC sample requirements for the perimeter monitoring using charcoal tubes are presented in Table 6-4. Field blanks will be prepared by opening a charcoal tube and attaching it to the sampler. These blanks then will be capped and kept at the sampling site during sampling. They will be retrieved at the end of the day and refrigerated with the rest of the samples. Media blanks are charcoal tubes which will not opened prior to recovery. One field duplicate will be collected each day, using a second sampling apparatus adjacent to the regular sample. Both the field duplicate and the regular sample will be analyzed twice to provide nested duplicate results. Once a week, a known amounts of methylene chloride and trichloroethene will be spiked into a charcoal tube. This method spike will be analyzed twice and an average recovery will be calculated.

The QC sample requirements for the perimeter monitoring using evacuated stainless steel canisters are presented in Table 6-5. In addition to the QC checks shown, an acceptance criterion of <25 ppbv - Carbon will be used when cleaning canisters prior to sample collection.

6.4 Analytical Quality Control

A summary of analytical methods to be used for each parameter and sample stream is presented in Section 5 of this document. Analytical QC procedures will be followed as described in the referenced methods. This section presents a summary of QC checks used to control method performance within acceptable limits and provides details or modifications specifically designed to assess precision and accuracy in the actual sample matrices.

6.4.1 QC for Determination of Chloride and Sulfate by IC (Method 9057)

Concentrations of chloride and sulfate will be determined by measuring chloride ion concentrations using ion chromatographic techniques, as described in Method 9057. In addition to routine analytical method QC requirements (which include duplicate analysis of all samples), MS/MSD will be performed on splits of one sample to assess accuracy and precision in the sample matrix. Two splits of the samples will be spiked identically with chloride at appropriate levels. The volume of spiking solution added will be negligible.

A summary of routine analytical QC checks for ion chromatography is presented in Table 6-6. Accuracy and precision estimates will be calculated from matrix spike recoveries.

6.4.2 QC for Determination of VOCs by GC/MS

Concentrations of the VOCs will be determined using purge-and-trap GC/MS techniques detailed in SW-846 Method 8260A. VOST traps will be prepared according to the procedures described in Method 5041. QC procedures are discussed in Table 6-7.
as outlined in the referenced methods, with the following specifications:

Table 6-5
Summary of QC Checks for Canister Samples (Method T0-14)

Calibration and QC Analyses	Description	Frequency	Acceptance Criteria	Corrective Action
Initial Calibration	Calibration at 1.0, 2.5, 5.0, 7.5, and 10 ppbV.	Biannually or when daily calibration check fails to meet acceptance criteria	Relative Standard Deviation (RSD) for target compounds indicated (✓) in Table 2 <30%. Linear regression for analytes outside RSD criteria, $R \geq$ 0.995.	1. Reanalyze load volume not meeting criteria. 2. Troubleshoot. 3. Repeat calibration. 4. Issue QCER and notify Lab Manager.
Demonstration of Capability (DOC)	1. Annually: four replicate analyses of LCS at 2 ppbV. 2. Routine: four replicates as above, analyzed after each new calibration.	1. Annually: each instrument 2. Routine: a. At least once each year for each analyst b. Immediately following multipoint calibration	1. Accuracy: See Table 5 2. Precision: See Table 5	1. Determine source of problem and correct 2. Reanalyze DOC 3. Write QCER if necessary
Calibration Verification	Midrange calibration standard containing analytes indicated (✓) in Table 2. Applicable concentrations can be found in Table 4.	Daily prior to sample analysis	Recovery: 70-130% for all compounds, except: 1,2,4-Trichlorobenzene: 50-150% Hexachloro-1,3-butadiene: 50-150%	1. Repeat analysis. 2. Perform instrument maintenance. 3. Recalibrate. 4. Issue QCER (Level 2) and notify Lab Manager.

Table 6-5
(Continued)

Calibration and QC Analyses	Description	Frequency	Acceptance Criteria	Corrective Action
BFB Tuning Check	Evaluation of 4-Bromo-1-fluorobenzene (BFB) peak in the calibration verification.	At the beginning of each analytical sequence	Must meet: Ion abundance criteria in Table 8	If ion abundance criteria are not met: 1. Evaluate BFB in method blank. 2. Re-tune and reanalyze BFB. 3. Troubleshoot, retune if necessary and repeat BFB analysis.
LCS/LCSD	Second source standard containing analytes of interest at 2-5 ppbV.	Once daily for each analytical batch	LCS and the paired LCS must meet accuracy and precision tolerances. Accuracy: See Table 3 Precision: See Table 3	1. Accuracy: a. If any analyte is out of tolerance for the LCS and/or LCSD, analyze a third LCS of proven quality. b. If recovery for the third LCS is acceptable, then write a Level 2 QCER and precede with analyses. c. If the recovery for the third LCS is not acceptable, stop and correct the problem. d. If CSC approval is obtained to proceed, write QCER (Level 2).

Table 6-5
(Continued)

Calibration and QC Analyses	Description	Frequency	Acceptance Criteria	Corrective Action
LCS/LCSD (Continued)				2. Precision: a. Demonstrate acceptable RPD's for analytes that failed by analyzing a third LCS. b. If RPDs between the third LCS and either the LCS or LCSD meet tolerances, proceed with analysis. c. If RPD's are still out of tolerance, stop and correct problem. d. If CSC approval is obtained to proceed, write QCER - Level 2.

Table 6-5
(Continued)

Calibration and QC Analyses	Description	Frequency	Acceptance Criteria	Corrective Action
Method Blank	Canister containing humidified UHP nitrogen	Daily - prior to sample analysis	Measured concentrations for all analytes must be less than PRDL (See Table 1).	1. If contamination is >PRDL, then the concentration of the affected analytes in the associated samples must be >10 times the concentration in the method blank. 2. Repeat blank analysis. 3. If contamination is still present, determine source. a. If instrument contamination indicated, correct problem, reanalyze blank and proceed with analysis. 4. Issue QCER (Level 2) and notify Lab Manager.
Internal Standards	Two internal standards added to each sample, standard, and blank at 2 ppbV.	All samples, standards, and blanks	Extracted ion area counts must be within a factor of 2 from Calibration Verification.	1. Reanalyze sample if out of specification 2. If still out, identify and correct the problem or issue a QCER if an interference is suspected. 3. Write QCER (Level 2) if necessary and notify Lab Manager.

Table 6-5
(Continued)

Calibration and QC Analyses	Description	Frequency	Acceptance Criteria	Corrective Action
Analytical Surrogate	Five surrogate compounds are added to each sample, standard and blank at 2 ppbV.	All samples, standards, and blanks	Accuracy: see Table 3	QC Samples: 1. Reanalyze if outside tolerance. 2. If still out, correct the problem. 3. If CSC approval is obtained to proceed, write QCER (Level 2).
Analytical Duplicate Precision	Field sample analyzed in duplication.	One analytical duplicate pair for each analytical batch.	1. Surrogates RPD $\leq$ 25% 2. Four largest target analytes present RPD $\leq$ 25%	1. Repeat analysis 2. Perform system maintenance 3. Issue QCER and notify Lab Manager

Table 6-6
Summary of QC Checks for Chloride and Sulfate by IC (Method 9057)

Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action [a]
Chloride and Sulfate	Multipoint calibration	Daily	r ≥0.995	Repeat calibration.
	QC check sample	Every 10th analysis	±10% error	Repeat calibration.
	Method blank	One per batch	None detected	Determine source of contamination. Reanalyze affected samples.
	Duplicate analyses	All samples	RPD <25%	1) Obtain third value; and 2) Flag data.
	Matrix spike	Once	80-120% recovery	Flag data.

[a] All corrective action will be noted on laboratory reports, and discussed in the QA/QC section of the Trial Burn final report.

Table 6-7
Summary of QC Checks for VOC Analysis by 8260A

Parameter	Quality Control Check	Frequency	Acceptance Criteria	Correction Action
VOC	Calibration verification	Initially and as required	Response for CCCs within ±25% of multipoint	Recalibrate
	LCS/LCSD	One LCS/LCSD pair per batch	30% RPD 50-150% Recovery	1) Analyze 3rd LCS 2) Notify lab manager
	Method blank	Once per batch	<2x method reporting limit	1) Perform system blank 2) Recalibrate
	MS/MSD (Waste Feed and Process Samples)	One per sample type	25% RPD 50-150% Recovery	Flag Data
	Surrogate Spiking	All Samples	50-150% Recovery	Flag Data

- Selected isotopically-labeled compounds will be used for surrogate spiking standards;
- One pair of VOST tubes per test condition will be analyzed separately to assess breakthrough;
- VOST condensate collected over each test condition will be analyzed for the VOCs; and
- Analysis of spiked sample collection media will be performed initially to ensure the ability of the analyst to perform the method.

Other routine QC checks for Method 8260A are summarized in Table 6-6.

At a minimum, continuing calibration compounds (CCCs) will be analyzed prior to analysis of field samples. If the response for a CCC varies by more than ±25% from the working calibration curve, a new calibration standard will be prepared and analyzed for that analyte.

Selected isotopically-labeled surrogate spikes will be added at appropriate levels in all samples. In determining the spiking levels, consideration will be given to project requirements, practical quantitation limits, and indigenous levels in the samples.

One pair per test condition of front and back VOST traps will be analyzed separately to determine VOC breakthrough to the Tenax/charcoal adsorbent trap (back trap). The analysis of the Tenax/charcoal trap should indicate less than 30% of the VOCs collected on the front Tenax trap. Breakthrough of the VOC to the back tube above this level may cause loss of desorption efficiency. This criterion will not apply when less than 75 ng is detected on the back trap.

The VOST condensate collected during each test condition will be analyzed. The condensate volume will be measured, the condensate will be analyzed, and the data will be reported. Each condensate sample will be spiked with the Method 8260A surrogates and surrogate recoveries will be measured.

6.4.3 QC for Determination of PCDD/PCDF by GC/MS (Method 23)

Samples of stack gas collected on XAD-2 resin, along with the waste feed and treated soil samples will be analyzed for PCDD/PCDF using high resolution gas chromatography with high resolution mass spectroscopy (HRGC/HRMS) on purified sample extracts. A summary of method QC checks is presented in Table 6-8.

6.4.4 QC for Determination of Metals

Impinger samples as well as the other liquid and solid samples will be analyzed for metals using the analytical methods discussed earlier. A summary of method QC checks is presented in Table 6-9.

6.5 Audits

Laboratory technical systems audits (TSAs) are part of the internal quality assurance program for each analytical laboratory that will participate in this project. Project-specific laboratory TSAs are not planned for this project.

Radian will conduct a field sampling TSA during this program. This audit will be completed during the first stack sampling events by a senior Radian staff member. The U.S. EPA or its contractors, may conduct a TSA of Radian's testing program, including field or laboratory activities. Also, the Agency or State may wish to conduct a field performance evaluation audit of Radian's VOST sampling equipment. In any case, Radian will cooperate with any such reviews requested by the U.S. EPA, and provide staff to accommodate the auditor.

Table 6-8
Summary of Analytical QC Checks for PCDD/PCDF Analysis by Method 23

Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
PCDD/PCDF	Mass resolution check	Daily	10000 resolution	Adjust
	GC column performance check	At beginning of 12-hour shifts	25% Valley[a]	Recalibrate or column maintenance
	Calibration/retention time window check	At beginning of 12-hour shifts	1st and last eluters within window.	Adjust group times
	Continuing calibration	At beginning of 12-hour shifts	±25% or ±30% of initial calibration response factor[b]	Adjust and reshoot continuing calibration standard
	Lab method blank	At beginning of 12-hour shifts	<Target detection limit[c]	Flag data
	Internal standards	All samples	40-130% (tetras, pentas, & hexas) 25-130% (heptas & octas)	Flag data
	Surrogate spiking	All samples	40-130% recovery for all five surrogates	Flag data

[a] Twenty five percent valley definition is between 2378-TCDD and other TCDD isomers on DB-5 capillary column (full-screen column) or between 2378-TCDF and other TCDFs on DB-225 (confirmation column).

[b] Refer to method for specific isomers.

[c] Refer to method for target detection limits.

Table 6-9
Summary of QC Checks for Metals Analysis

Parameter	Quality Control Check	Frequency	Acceptance Criteria	Correction Action
Metals (GFAAS) arsenic, selenium	Multipoint calibration plus zero	Daily, before analysis	Correlation coefficient >0.995	Repeat calibration
	Calibration check	Following calibration; 10% during sample analysis	Recovery between 80-120% recovery	Repeat calibration
	Calibration blank	10%	<2 x method reporting limit	Repeat; evaluate system; recalibrate; notify lab manager
	MS/MSD–solid, liquid samples LC/LCSD–stack samples	5%	20% RPD; 75-125% recovery	Flag data; notify lab manager; notify QA officer
Metals (ICAPES) barium, cadmium, chromium, lead, silver	Initial mixed standard calibration	Daily, before analysis	Measured value for the initial calibration verification is within ± 5% of expected value	Recalibrate
	Calibration check sample	Following calibration; 10%	Within 10% of expected value	Evaluate system; recalibrate
	Calibration blank	10%	<2 x method reporting limit	Repeat; evaluate system; recalibrate; notify lab manager
	ICP interference check	Run at beginning and end of daily run, or 8 hours	80-120% of true value	Repeat calibration; notify lab manager
	MS/MSD–solid, liquid samples LCS/LCSD–stack samples	One MS/MSD per sample type	20% RPD; 75-125% recovery	Flag data; notify lab manager; notify QA officer

6.6 Corrective Action

During the course of the program, it will be the responsibility of the field task leader and the testing team members to see that all measurement procedures are followed as specified and that measurement data meet the prescribed acceptance criteria. Should a problem arise, it is imperative that prompt action be taken to correct the problem. Problem identification responsibilities rest with each member of the project team, although the task leaders serve as the first line of review. The field task leader will initiate corrective action if QC results exceed acceptability limits. Corrective action also may be initiated by the team members upon identification of some problem; however, the team members will inform the task leader of the problem before the corrective action is taken. Acceptability limits and prescribed corrective action related to the various internal QC checks are discussed above.

SECTION 7

DATA REDUCTION, VALIDATION, AND REPORTING

This section presents the overall data reduction, data validation, emission factor development, and reporting plans for this project.

7.1 Data Reduction

There will be several data sets to be reduced, as outlined and discussed below.

7.1.1 POP Test Data Reduction

The basic data processing steps for the individual stack sampling methods are presented in the method write-ups contained in Appendix B. Triplicate sampling runs will be performed at each test condition. The mean emission rate will be calculated as follows:

$$\frac{\sum E_i}{n} \qquad (7\text{-}1)$$

where,
E_k = mean emission rate (g/sec);
n = number of valid emission rate determinations; and
E_i = individual valid emission rate measurement.

Confidence intervals for the mean emission rate estimate will be computed by:

$$E_k \pm t_{0.10,n-1} (S/\sqrt{n}) \qquad (7\text{-}2)$$

where,
S = standard deviation of the mean emission rate estimate; and
t = tabulated statistical value (90% confidence level with n-1 degrees of freedom).

The standard deviation of the emission rate estimates, S, is:

$$S = \sqrt{\Sigma(E_i - E_k)^2 / (n-1)} \qquad (7\text{-}3)$$

7.1.2 Continuous Emission Monitoring Data Reduction

The exhaust gases from the GWTP and STP will be continuously monitored for a variety of parameters as described in Section 5. The measurement results for all samples collected at a given location will constitute a data set. For each data set, the mean, confidence interval, and standard deviation for each parameter will be calculated using Equations 7-1, 7-2, and 7-3. Data will be collected once every 5-seconds and used to develop 5-minute averages, which in turn will be used to develop 1-hour averages.

7.1.3 Exclusion Zone and Perimeter Monitoring Data Reduction

The exclusion zone monitoring will not require any data reduction. The monitors will be set to sound an alarm if preset concentration levels are met or exceeded. The perimeter monitoring results will be compared daily to published ESLs and any exceedances noted. The perimeter monitoring data will be used to develop long-term average concentrations. One sample per day that is predominantly in the emission plume will be selected to calculate this average. This also should be the sample with the highest concentration of the target analytes. Time weighted 8-hour ambient air concentrations for the target compounds will be calculated as described in Section 5. These concentrations will be used to calculate both monthly and annual averages using Equations 7-1, 7-2, and 7-3.

7.1.4 QC Data Reduction

The QC data for the various analyses performed on-site and off-site include multipoint calibrations, drift checks, blanks, duplicate sampling, and duplicate analyses, as described in Section 6. The QC data will be summarized and used to develop precision and accuracy estimates for the measurement data generated during the project.

For both the CEM and the GC analyses, multipoint calibration data will be reduced to verify the linearity of the analyzers, as well as to define an initial response factor. Daily response factors will be checked against the multipoint calibration data. The Miran and OVA calibration data will also be used to verify upscale analyzer drifts. Drifts will be verified on a percent difference relative to the multipoint response factor.

For the off-site analyses, system blanks will be run to verify minimal background effects relative to the anticipated measured values. The difference between results for analyses of duplicate samples will be used to estimate overall sampling/analytical variability. Analytical variability will be estimated from a coefficient of variance for replicate analyses.

7.2 Data Validation

All measurement data will be validated based upon representative conditions during sampling or testing, acceptable sample collection/testing procedures, consistency with expected and/or other results, adherence to prescribed QC procedures, and the specific acceptance criteria outlined in Section 6 for calibration procedures and internal QC procedures. Any suspect data will be flagged and identified with respect to the nature of the problem.

The quality of the data collected in this project will be defined in terms of four data quality indicators:

- Precision;
- Accuracy;
- Representativeness; and
- Completeness.

7.2.1 Data Precision

Precision is a measure of how closely individual measurements of the same property agree with one another. Precision will be expressed in terms of standard deviation. The relative standard deviation (RSD) of the portable analyzer responses will be used as an indicator of analytical precision. Relative standard deviation will be calculated according to the formula:

$$\% \ RSD = \frac{S}{y} * 100 \qquad (7\text{-}4)$$

where: RSD = relative standard deviation
S = standard deviation
y = mean of replicate analyses

Standard deviation, S, was defined above in Equation 7-3. Precision acceptance criteria will be ≤50%. Coefficient of variation (CV) is an equivalent term for RSD.

In some cases, duplicate results (that is, n=2) will be used to assess precision. In these instances, precision will be calculated as:

$$\% \ RPD = \frac{2|C_1 - C_2|}{C_1 + C_2} \times 100 \qquad (7\text{-}5)$$

where: RPD = relative percent difference
C_1 = the concentration of the first sample
C_2 = The concentration of the second sample

Given the unique nature of these samples, no acceptance criteria have been established for these measurements. Estimated precision values for each measurement parameter are given in Table 6-1.

7.2.2 Data Accuracy

Accuracy is the degree of agreement between a measurement and an accepted reference or true value. The accuracy of the gas-phase analyzers will be assessed weekly by certified gas standards of known concentration. Accuracy will be calculated as the percent difference of the true value according to the equation:

$$\% \text{ Accuracy} = [(X - Y)/Y] * 100 \qquad \textbf{(7-6)}$$

where: X = Analyzer response
Y = Certified gas concentration

Accuracy acceptance criteria will be ≤25% for the CEMs. As a gross check of accuracy, measured downwind concentrations will be compared to upwind (background) concentrations. Any values below background concentrations will be flagged.

Accuracy associated with the analysis of solid and liquid samples will be determined through the analyses of reference standards. In these instances, accuracy will be calculated according to the formula:

$$\%R = (c_m/c_{srm}) * 100 \qquad \textbf{(7-7)}$$

where: $\% R$ = percent recovery
c_m = measured concentration of SRM
c_{srm} = actual concentration of SRM

Given the unique nature of these samples, no acceptance criteria have been established for these measurements. Estimated accuracy values for each measurement parameter are given in Table 6-1.

7.2.3 Data Representativeness

Data representativeness, the degree to which measurement results are representative of the conditions being measured, will be ensured in four ways:

1. Sampling locations will be selected by experienced staff to identify representative sites for field testing.
2. Data will be collected over a period of several months to both detect long-term trends and to ensure that temporal fluctuations in emissions are accurately examined.
3. All measurement data will be collected according to the sampling and analytical procedures defined in Sections 4 and 5 of this document. Sampling will not be conducted during process upset conditions.
4. Historical process records will be used, as available, for comparison with field measurements of process parameters and air emissions to evaluate the representativeness of the collected data.

7.2.4 Data Completeness

Data completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under correct normal conditions. For this project, it is expected that more than 95% of the measurement data will be valid, captured, and retained. The project team will ensure that 100% of the POP test samples are collected during the field tests.

7.3 Reporting

Results of the POP tests will be presented in a report that will include:

- Introduction, background, and site description;
- Project objectives;
- Brief description of sampling and analytical procedures;
- Flow diagrams showing the sampling locations;
- Table of all raw field measurement data;

- Table of calculated emission rates for target compounds;
- Tabulated QC results;
- Summary of excluded (invalid) data;
- Table of sampling and analytical precision estimates;
- Evaluation of sampling and analytical results;
- Conclusions based upon air emissions study; and
- Detailed example calculations.

The report will be available for review within 60 days of completion of on-site sampling activities.

The results of the CEM, exclusion zone monitoring, and perimeter monitoring will be summarized in a monthly data package. The monthly report will contain tabulated validated results for the CEM, perimeter, and meteorological monitoring. The results will contain daily and monthly averages for each parameter of interest (hourly averages only for the met monitoring), as well as precision and accuracy estimates. Outliers will be flagged and reported. For the exclusion zone monitoring, a log will be prepared that notes the time and duration of any alarm event, the response action that was taken, and the subsequent change in measured ambient concentrations.

Copies of raw data, field notes, laboratory notes, strip chart recordings, and calibration data will be maintained in a central file for future inspection. Copies of laboratory instrument logs and maintenance records will also be available for review.

Raw data from the gas chromatograph (GC) chromatograms will be stored on magnetic tape. Other analytical data (i.e., records of injections, volumes, dilutions, and absorbance values) will be recorded in bound, paginated instrument logbooks. All logbook entries will be dated and initialed by the author. In addition to the analytical results, the preparation of analytical standards and QC samples will also be documented. Typical information will include dates of preparation for stock standards, manufacturer's lot numbers, preparation procedures. Chromatograms, standard curves, and other laboratory documentation is maintained in a central file for future inspection. Copies of instrument logbooks and maintenance records will also be available for review.

7.4 Quality Assurance Reporting

Effective management of a field sampling and analytical effort requires timely assessment and review of field activities. This will require effective interaction and feedback among the field team members, the field testing task leader, and the QA coordinator. The field testing task leader will keep the QA coordinator up to date regarding potential QC problems so that a quick and effective solution can be implemented. Topics that may be addressed in these conversations include summaries of activities, corrective action activities, any unresolved problems, data completeness, and any significant QA/QC problems and their solutions not included above. Problems requiring immediate resolution will be brought to the attention of the project director and task leaders via the malfunction reporting/corrective action scheme discussed in Section 6. Any final reports will include a separate QA/QC section to summarize the QC data collected during this program and to report the results of QA activities such as audits.

Barry R. McBee, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Dan Pearson, *Executive Director*

018425

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

December 17, 1996

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

CERTIFIED MAIL
Z 746 032 749
RETURN RECEIPT REQUESTED

Re: Longhorn Army Ammunition Plant
Group 2 - Mixing of Ground Waters from Landfill Site 16 and Burning Ground No. 3

Dear Mr. McPherson:

The Texas Natural Resource Conservation Commission (TNRCC) staff has completed its review of the Army's request to mix the ground water from Burning Ground No. 3 with the ground water from Landfill Site 16 (15 to 1 ratio) prior to treatment, as stated in your letter dated December 9, 1996 and diagramed in the August 1996 Monthly Manager's Meeting. As long as the earlier provisions for water treatment are followed, the staff of the TNRCC concurs with this proposal.

After the toxicity tests have been completed and accepted, we will provide comment/concurrence on the Army's proposal to treat the ground water at Landfill Site 16 if the water is found to be toxic. 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
RI/FS II Unit
Superfund Investigation Section (MC-143)
Pollution Cleanup Division

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

P.O. Box 13087 • Austin, Texas 78711-3087 • 512/239-1000

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

REPLY TO
ATTENTION OF

December 19, 1996

018426

Mr. H.L. Jones
TNRCC
2916 Teague Drive
Tyler, TX 75701

Subject: Schedule for Site 16 Remedial Investigation/ Feasibility Study and Treatability Study, Longhorn Army Ammunition Plant

Dear Mr. Jones:

Enclosed is the schedule for completion of the Remedial Investigation/Feasibility Study and Treatability Study for the Old Landfill, Site 16, Longhorn Army Ammunition Plant. The schedule includes a specific date for start-up of the eight extraction wells which are part of the treatability study. As previously agreed, the RI/FS Report will be completed within the two year timeframe from the contract award date.

If you have any questions or comments, please contact Mr. David Tolbert at 318/459-5109.

Sincerely,

James McPherson
Commander's Representative
Louisiana and Long Horn
Army Ammunition Plants

Enclosure

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

REPLY TO
ATTENTION OF

December 19, 1996

018427

Ms. Diane Poteet
TNRCC (MC-143)
Superfund Investigation
12100 Park 35 Circle, Building D
Austin, TX 78753

Subject: Schedule for Site 16 Remedial Investigation/ Feasibility Study and Treatability Study, Longhorn Army Ammunition Plant

Dear Ms. Poteet:

Enclosed is the schedule for completion of the Remedial Investigation/Feasibility Study and Treatability Study for the Old Landfill, Site 16, Longhorn Army Ammunition Plant. The schedule includes a specific date for start-up of the eight extraction wells which are part of the treatability study. As previously agreed, the RI/FS Report will be completed within the two year timeframe from the contract award date.

If you have any questions or comments, please contact Mr. David Tolbert at 318/459-5109.

Sincerely,

for
James McPherson
Commander's Representative
Louisiana and Long Horn
Army Ammunition Plants

Enclosure

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

REPLY TO
ATTENTION OF

December 19, 1996

018428

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

Subject: Schedule for Site 16 Remedial Investigation/Feasibility Study and Treatability Study, Longhorn Army Ammunition Plant

Dear Mr. Villareal:

Enclosed is the schedule for completion of the Remedial Investigation/Feasibility Study and Treatability Study for the Old Landfill, Site 16, Longhorn Army Ammunition Plant. The schedule includes a specific date for start-up of the eight extraction wells which are part of the treatability study. As previously agreed, the RI/FS Report will be completed within the two year timeframe from the contract award date.

If you have any questions or comments, please contact Mr. David Tolbert at 318/459-5109.

Sincerely,

James McPherson
Commander's Representative
Louisiana and Long Horn
Army Ammunition Plants

Enclosure

018429

LHAAP, GR2, SITE 16, accelerated; as of 12/19/96

Task#	Task Name	Duration	Predecessors	Calendar	Sched Start	Sched Fin	Compl Dat	Actual Start	Actual Fin	Base Start	Base Fin
1	CONTRACT	56d		LHAAP.C	12/16/96	02/05/97		12/16/96			
2	Workplan Prep	28d	1 FS		02/05/97	03/02/97					
3	Resistivity Survey Plan Letter	21d			01/22/97	02/10/97					
5	Mobilize/Fieldwork	7d	3 FS		02/10/97	02/16/97					
7	COE Review Workplan	7d	2 FS		03/02/97	03/08/97					
25	Comment Resolution	7d	7 FS		03/08/97	03/15/97					
8	Draft Workplan Combined Review	30d	25 FS		03/15/97	04/10/97					
9	Resolve Comments	7d	8 FS		04/10/97	04/16/97					
10	Revise Workplan	7d	9 FS		04/17/97	04/23/97					
11	Final Regulatory Review/Appvl	7d	10 FS		04/23/97	04/29/97					
12	Mobilize	7d	10 FS		04/23/97	04/29/97					
13	Fieldwork	45d	12 FS		04/29/97	06/08/97					
22	EW Start-up	7d	13 FS		06/08/97	06/14/97					
23	EW Data Collection	7d	22 FS		11/21/97	11/27/97					
14	Sampling & Analysis	45d	13 FS		06/08/97	07/18/97					
15	Data Validation	28d	14 FS		07/18/97	08/12/97					
16	Data Summary/Validation Rpt	28d	23 FS		11/27/97	12/22/97					
17	Combined Review	30d	16 FS		12/22/97	01/18/98					
18	Data Review Mtg	0d	17 FS		01/18/98	01/18/98					
24	Modeling/Risk Assessment Scoping Mtg	0d	18 FS		01/19/98	01/19/98					
19	Modeling Report	150d	18 FS		01/18/98	05/31/98					
20	COE Review	14d	19 FS		05/31/98	06/13/98					
26	Comment Resolution	7d	20 FS		06/13/98	06/19/98					
27	Combined Review	30d	26 FS		06/19/98	07/16/98					
28	Comment Resolution	14d	27 FS		07/16/98	07/28/98					
29	Draft Risk Assessment Rpt	180d	18 FS		01/18/98	06/27/98					
30	COE Review	14d	29 FS		06/27/98	07/09/98					
31	Comment Resolution	7d	30 FS		07/09/98	07/16/98					
32	Army Review	30d	31 FS		07/16/98	08/11/98					

add RA planning mtg 13 May

LHAAP, GR2, SITE 16, accelerated; as of 12/19/96

Task#	Task Name	Duration	Predecessors	Calendar	Sched Start	Sched Fin	Compl Dat	Actual Start	Actual Fin	Base Start	Base Fin
33	Comment Resolution	10d	32 FS		08/11/98	08/20/98					
34	Revise RA Rpt	7d	33 FS		08/20/98	08/26/98					
21	Regulatory Review	30d	34 FS		08/26/98	09/22/98					
35	Comment Resolution	14d	21 FS		09/22/98	10/04/98					
36	Prepare RI/FS Rpt	90d	35 FS		10/05/98	12/23/98					
37	Army Review	10d	36 FS		12/24/98	01/01/99					
38	Comment Resolution	7d	37 FS		01/01/99	01/08/99					
39	Draft RI/FS	7d	38 FS		01/08/99	01/14/99					
40	Regulatory Review	30d	39 FS		01/14/99	02/09/99					

for Jim
David

C [redacted] [redacted] [redacted]

AMSIO-EQ (CESWT-PP-ME/2 Aug 96) (200-1a) 1st End
SUBJECT: Total Environmental Restoration Contract (TERC) Proposed Revision to the Final Project Work Plans for Longhorn Army Ammunition Plant, Karnack, Texas

194[redacted]79

Commander, U.S. Army Industrial Operations Command,
ATTN: AMSIO-EQ, Rock Island, IL 61299-6001

16 OCT 1996

FOR Commander's Representative, Longhorn Army Ammunition Plant,
ATTN: SIOLH-OR (Mr. David Tolbert/Mr. James McPherson),
Marshall, TX 75670-1059

1. This office has reviewed the subject revision and concurs with the change(s) in basic memorandum.

2. The POC for this action is Mr. Cyril Onewokae, AMSIO-EQE, (309) 782-1350, DSN 793-1350, E-mail conewoka@ria-emh2.army.mil.

FOR THE COMMANDER:

Robert J. Radkiewicz
ROBERT J. RADKIEWICZ
DCS for Environmental Management

Encl
nc

CF (wo/encl):
Commander, U.S. Army Corps of Engineers District, Tulsa
ATTN: CESWT-PP-E (Mrs. Jonna Polk), Post Office Box 61, Tulsa, OK 74121-0061

DEPARTMENT OF THE ARMY
TULSA DISTRICT, CORPS OF ENGINEERS
P. O. BOX 61
TULSA, OKLAHOMA 74121-0061

REPLY TO
ATTENTION OF:

[redacted]

19480

CESWT-PP-ME (200-1c)

??? 2 August 1996 wrong date

MEMORANDUM FOR Commander, Industrial Operations Command
ATTN: AMSIO-EQE (Mr. Cyril Onewokae),
Rock Island, IL 61299-6000

SUBJECT: Total Environmental Restoration Contract (TERC) Proposed revisions to the Final Project, Work Plans for Longhorn Army Ammunition Plant, Karnack, Texas

1. 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 Ms. Jonna Polk, at 918-669-7480.

Burl D Ragland
BURL D. RAGLAND
Lead Project Manager,
Army Team

Encl

Rec
10-3-96

OHM Remediation
Services Corp.
A Subsidiary of OHM Corporation

19481

August 30, 1996

OHM-0020-12-25

Mr. Dudley C. Beene II
USACE Authorized Representative
Fort Worth District - Eastern Area Office
280 Miller Road
Bossier City, Louisiana 71112

Re: Delivery Order No. 0012
Total Environmental Restoration Contract (TERC)
Contract No. DACA56-94-D-0020
Longhorn AAP, Landfills 12 & 16 - Karnack, Texas
Proposed Revisions to the Final Project Work Plans

Dear Mr. Beene:

OHM Remediation Service Corp. (OHM) is pleased to provide the following revisions for the above referenced work plans for the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. OHM submitted the final project work plans on June 6, 1996. The work plans were approved by Ms. Diane R. Poteet of the Texas Natural Resource Conservation Commission (TNRCC) in a correspondence dated July 30, 1996.

Following a review of the final drawings, Mr. Frank Meleton of USACE and Mr. Earney Funderburg of OHM discovered a discrepancy. The cover soil depth on the drawings was listed as 12 inches while the specifications call for 18 inches. The change in depth from 12" to 18" is shown on the attached 11" x 17" Drawing Nos. 11, 18, & 20.

Additionally, OHM has clarified the drawings and specifications with regard to the proposed liner thickness. The previously mentioned approval letter from Ms. Poteet indicated TNRCC's concurrence with the 40 mil liner shown on the drawings. However, as discussed in the work plans and specifications, there are two options proposed for the liner configuration for the landfills. The first option is a 40 mil welded flexible membrane (FML) liner with a separate geocomposite layer. The second option is a 20 mil FML liner with an attached (bonded) geocomposite layer. As discussed and agreed upon by Mr. Alvie Nichols and Mr. Richard Anderson (TNRCC) at our meeting on May 22, 1996, OHM anticipates that option number 2 will most likely be the most economical alternative that meets the technical specifications. The drawings have been revised to indicated both options. Also, the first paragraph in Specification Section 02442, Page 1, has been rewritten for clarity. Finally, the 18 mil minimum liner thickness shown in Specification Section 02442, Page 4, has been changed to nominal 20 mil. This last revision was discussed with Ms. Poteet and Mr. Allan Etheridge of TNRCC during a conference call on August 21, 1996.

225 West Airtex Boulevard ■ Houston, Texas 77090-6627 ■ 713-775-7500

The full-size drawings will be red-lined in the field following the concurrence of TNRCC with these revisions. If you have any questions or require further information, please call me at (713) 775-7658.

Sincerely,

Glen R. Turney

Glen R. Turney
Sr. Project Manager

/GT

cc: O. Linebaugh - USACE (Ft. Worth)
F. Meleton - USACE (Ft. Worth)
R. Bratcher - USACE (Tulsa)
J. Polk - USACE (Tulsa)
J. Ollsen - OHM
E. Funderburg - OHM

A:WKPLN12.REV

SECTION 02442

GEOSYNTHETIC CLAY LINER (GCL)

PART 1 GENERAL

A Geosynthetic Clay Liner (GCL) may be furnished in one of two forms: 1) bentonite clay sandwiched between two layers of geotextile, or 2) a layer of bentonite clay bonded to a geomembrane. The first form, sandwiched between geotextile layers, requires a geomembrane cover layer to be installed separately. The second form combines the GCL and the geomembrane in a single layer. This Specification Section describes the requirements of the GCL for both forms. Requirements for a geomembrane, whether bonded to the GCL or installed separately, are described in Specification Section 02271 - Geomembrane.

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 638	(1989) Test Method for Tensile Properties of Plastics
ASTM D 751	(1989) Standard Methods of Testing Coated Fabrics
ASTM D 1193	(1991) Reagent Water
ASTM D 1505	(1985; R 1990) Density of Plastics by the Density-Gradient Technique
ASTM D 2216	(1992) Laboratory Determination of Water (Moisture) Content of Soil, and Rock
ASTM D 4632	(1991) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4643	(1993) Determination of Water (Moisture) Content of Soil by the Microwave Oven Method
ASTM D 5261	(1992) Test Method for Measuring Mass Per Unit Area of Geotextiles
ASTM D 5321	(1992) Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method

weight of the roll without excessive bending under normal handling conditions. The central core shall remain accessible during storage for ease of handling. Equipment used to move GCL shall have bars which extend through the central core. Rolls shall be labeled with the manufacturer's name, product identification, lot number, roll number, roll dimensions, roll weight, and date manufactured. Rolls of GCL shall be continuously supported during storage and shall be kept in their original, unopened, protective covering. GCL shall be stored indoors until transported to the construction site. Field storage shall be in flat dry areas where water cannot accumulate or the rolls shall be elevated off the ground. Storage, placement and stacking of rolls shall be performed to avoid thinning of the product at points of contact.

PART 2 PRODUCTS

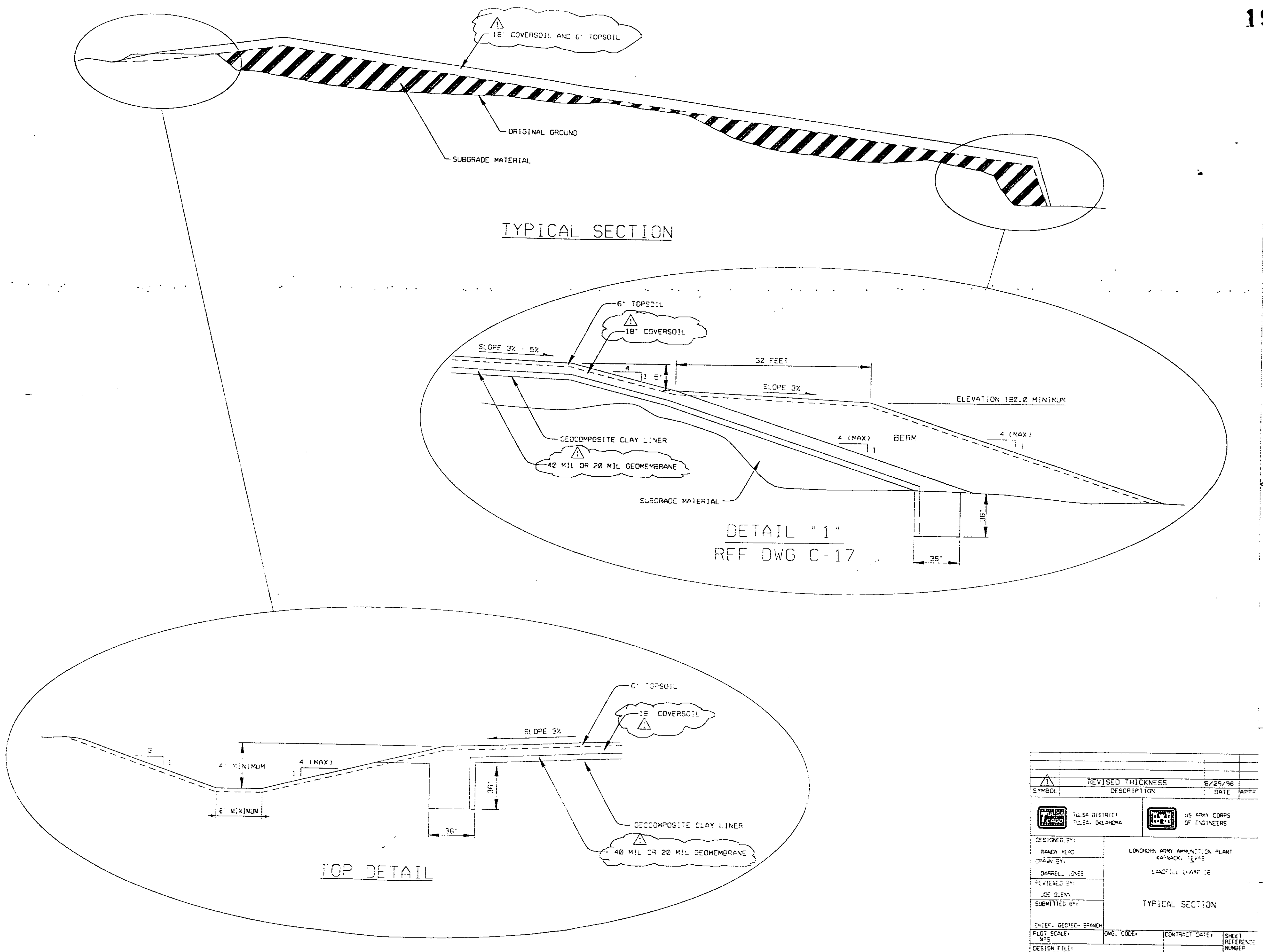
2.1 GCL PROPERTIES

GCL shall be a manufactured product consisting of a sodium montmorillonite clay (bentonite) layer evenly distributed between two geotextiles or attached to a polyethylene geomembrane. The exposed surface of the polyethylene membrane shall be textured. GCL shall conform to the property requirements listed in Table 1 and shall be free of tears, holes, or other defects which may affect its serviceability. Encapsulating geotextiles shall be either woven or nonwoven and shall be mechanically bonded using a needle punch or stitching process. If needle punching or stitch bonding is used in construction of GCL, the GCL shall be continuously inspected for broken needles using an in-line metal detector and broken needles shall be removed. The minimum manufactured GCL sheet width shall be 13.5 feet and the minimum manufactured GCL sheet length shall be 100 feet.

TABLE 1 - GCL PROPERTIES

PROPERTY	TEST METHOD	TEST VALUE
BENTONITE		
Swell Index Test, minimum	Note 1	24 mL
Filtrate Volume, maximum	API Spec 13A, Sec.4	18 mL
GEOMEMBRANE		
Thickness, nominal	ASTM D 751	20 mil
Sheet Density, minimum	ASTM D 1505	0.94 g/cc
COMPOSITE		
Bentonite Mass/Unit Area, MARV, Note 2	ASTM D 5261	0.95 psf

19485



SYMBOL	DESCRIPTION	DATE	APPR
1	REVISED THICKNESS	8/29/96	

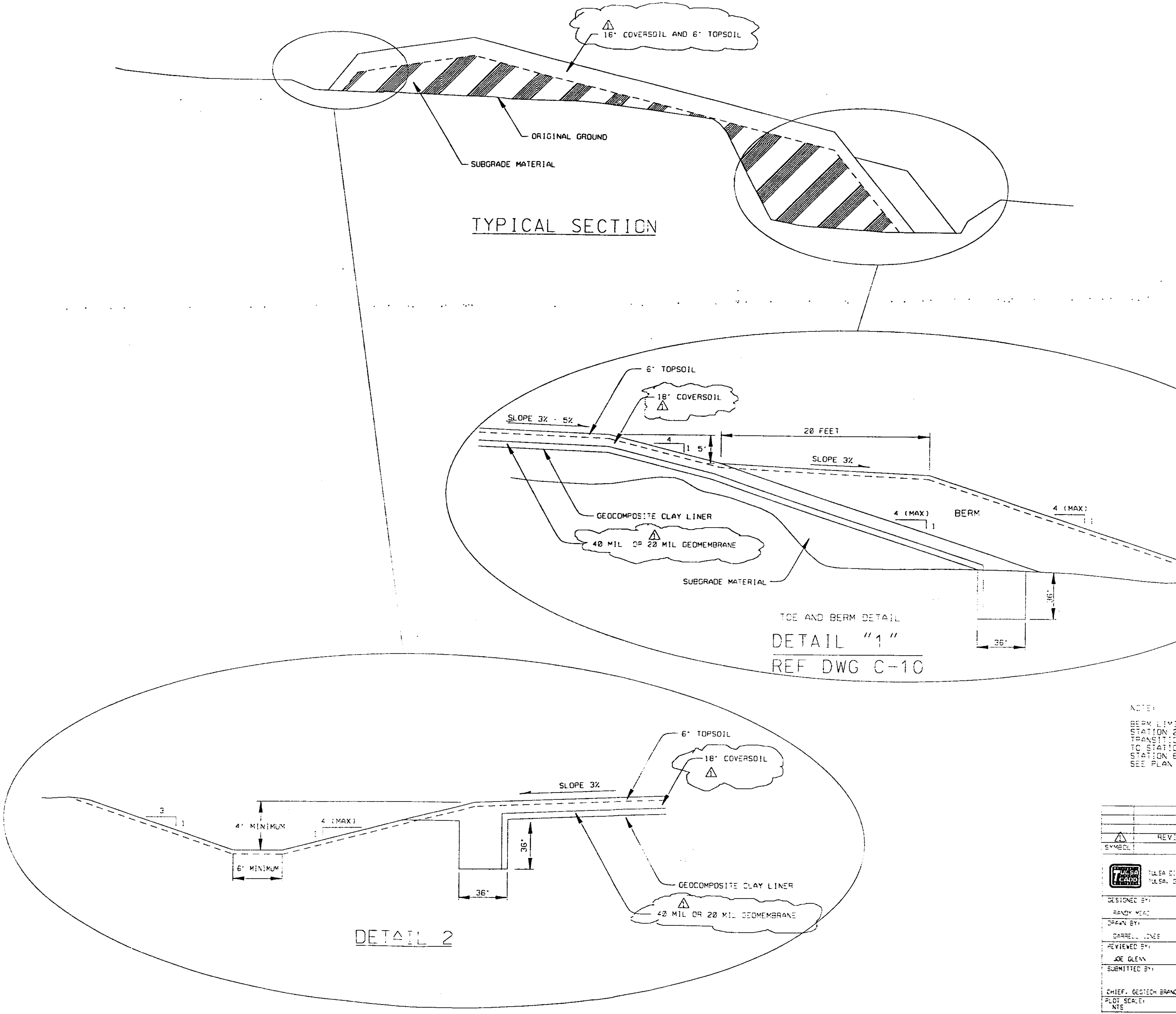
TULSA DISTRICT
TULSA, OKLAHOMA

US ARMY CORPS
OF ENGINEERS

DESIGNED BY: RANDY MEAD	LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS LANDFILL LHAAP 12
DRAWN BY: DARRELL JONES	
REVIEWED BY: JOE GLENN	TYPICAL SECTION
SUBMITTED BY: CHIEF, GEOTECH BRANCH	

PLOT SCALE: NTS	DWG. CODE:	CONTRACT DATE:	SHEET REFERENCE NUMBER
DESIGN FILE: 16TYPE.DGN			
PLOT DATE:	SHEET OF	CONTRACT NO. DACA56-94-D-0020	C-18

19486



TYPICAL SECTION

TOE AND BERM DETAIL

DETAIL "1"

REF DWG C-10

DETAIL 2

NOTE:

BERM LIMITS:
STATION 2+40 TO STATION 8+90.
TRANSITION FROM STATION 1+90
TO STATION 2+40 AND FROM
STATION 8+90 TO STATION 9+40.
SEE PLAN DRAWING C10.

SYMBOL	DESCRIPTION	DATE	APPR
⚠ 1	REVISED THICKNESS	6/29/96	

TULSA DISTRICT
TULSA, OKLAHOMA

US ARMY CORPS
OF ENGINEERS

DESIGNED BY:
RANDY MEAD
DRAWN BY:
DARRELL JONES
REVIEWED BY:
JOE GLENN
SUBMITTED BY:

CHIEF, GEOTECH BRANCH

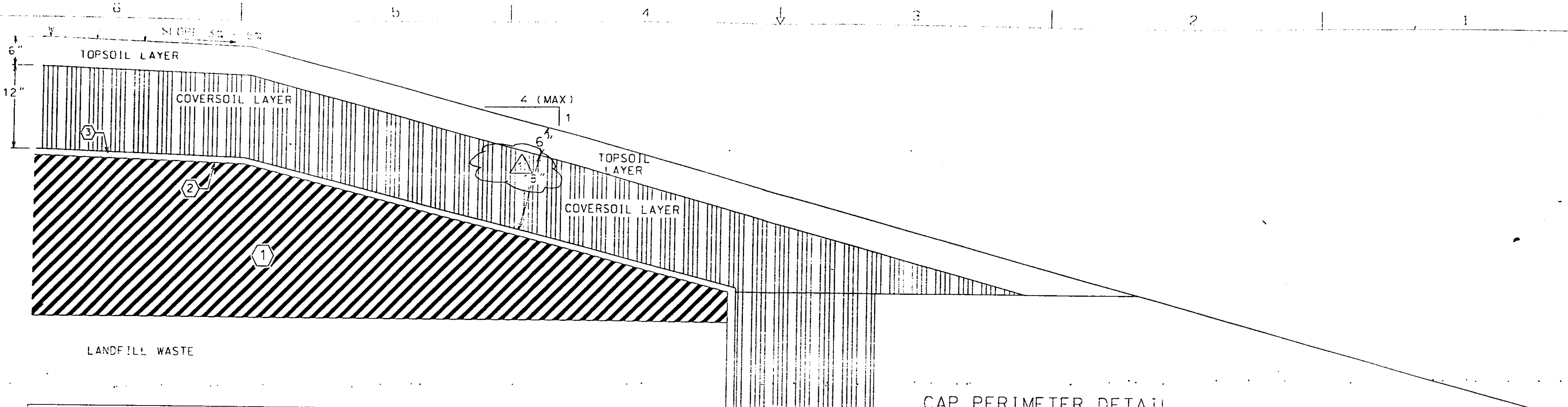
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

LANDFILL LHAAP 12

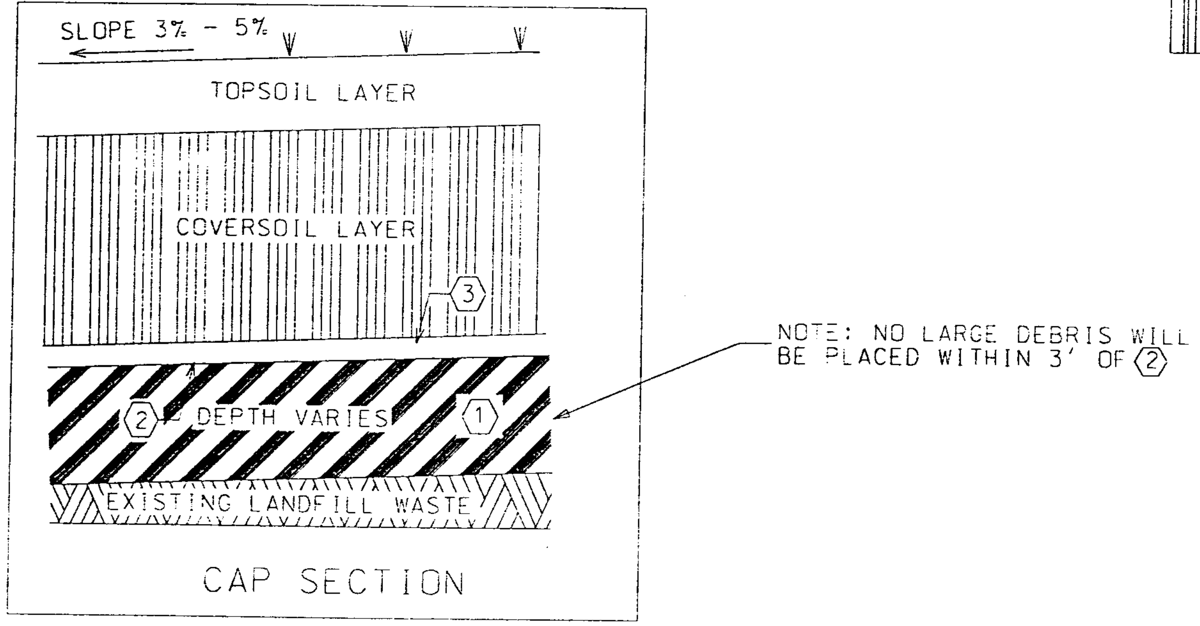
TYPICAL SECTION

PLOT SCALE: NTS	DWG. CODE:	CONTRACT DATE:	SHEET REFERENCE NUMBER
DESIGN FILE: 12TYPE.DGN			
PLOT DATE:	SHEET OF	CONTRACT NO. DACA56-94-D-0022	C-11

19487

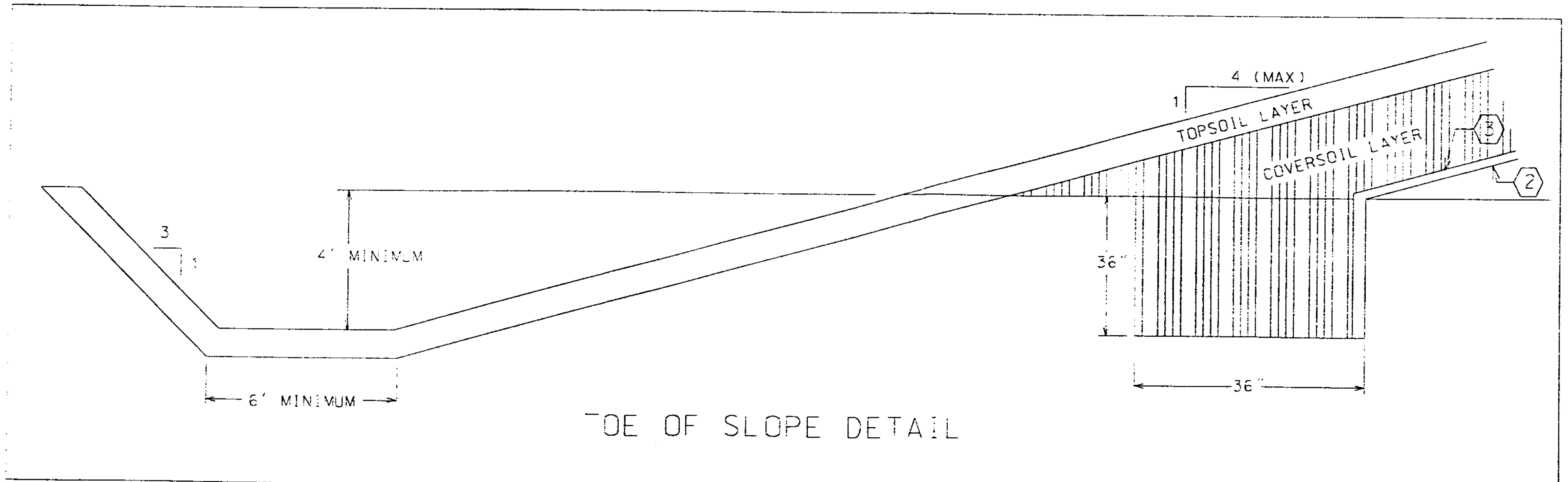


CAP PERIMETER DETAIL



NOTE: NO LARGE DEBRIS WILL BE PLACED WITHIN 3' OF ②

CAP SECTION



TOE OF SLOPE DETAIL

LEGEND

① - SUBGRADE LAYER (PLACED BY OHM)

② - GEOCOMPOSITE CLAY LINER

③ - 40 mil or 20 mil GEOMEMBRANE

SYMBOL	DESCRIPTION	DATE	APPR
1	REVISED THICKNESSES	8/29/96	

TULSA DISTRICT
TULSA, OKLAHOMA

US ARMY CORPS OF ENGINEERS

DESIGNED BY: RANDY MEAD
DRAWN BY: DARRELL JONES
REVIEWED BY: JOE GLENN
SUBMITTED BY:
CHIEF, GEOTECH BRANCH

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

LANDFILL LHAAP 12 AND 16

TYPICAL SECTION AND DETAIL

PLOT SCALE:
DWG. CODE:
CONTRACT DATE:
DESIGN FILE: 12DETAIL.DGN
PLOT DATE: DECEMBER 1995
SHEET OF
CONTRACT NO. DACA56-94-D-0020
SHEET REFERENCE NUMBER C-20

c:\wayne\12detail.dgn Aug 20 1996 12:47:25

Barry R. McBee, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Dan Pearson, *Executive Director*

19488

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

September 6, 1996

have

CERTIFIED MAIL
Z 746 032 760
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 - Draft Final Field Summary Report, Phase II RI

Dear Mr. McPherson:

The Texas Natural Resource Conservation Commission (TNRCC) has completed its review of the above referenced report. 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

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)

P.O. Box 13087 • Austin, Texas 78711-3087 • 512/239-1000

Group 2 Draft Final Field Summary Report
Phase II, RI
TNRCC Comments

A. GENERAL COMMENT

The report is written fairly well and almost follows the work plan except in one important way, which supports our previous comments regarding data quality objectives. In the data quality objective process a list, such as in Section 2.0, page 2-13, for evaluating the various media, would normally be presented in the work plan or the CDAP with further explanations stating the purpose of the evaluations and the end results of the evaluations. As in the list, the ARARs that are available for the potential contaminants and the preliminary remediation goals (like SSLs) would be presented, along with the detection limits. If no regulatory threshold or standard can be identified during this step, a realistic concentration goal to serve as an action level would then be developed. (For further information, please refer to Data Quality Objectives Process for Superfund, Interim Final Guidance (EPA540-R-93-071).)

Therefore, as detailed above, we recommend that the list in the field summary report be expanded to statements which explain the purpose of the evaluations and the end results of the evaluations. Otherwise, it is not clear to the reader as to why the comparisons are being made between ARARs or detection limits and the data results. In addition, the CDAP would likewise need to be revised for future projects.

B. SPECIFIC COMMENTS

No.	Section/page	Comment
1.	2.8/2-13 thru 2-14	To further explain what is meant by the above general comment the following specific questions are offered for further consideration:
a.	2.8/2-13 thru 2-14	Why is a comparison being made between sample data and, for example, soil background data or SSL's. What is intended to be done with this comparison? Is this how the extent of contamination will be determined or are risk based conclusions going to be determined? Are the data to be compared to the preliminary remediation goals (PRG's)? Are SSL's the PRG's? What are the PRG's?
b.	3.1.3/3-4 thru 3-8	First paragraph of section: Given that a MCL or SMCL is a point of reference, why is it being used here? To define contamination and/or to define an action level?

No.	Section/page	Comment
c.	3.1/3-8	Second and third paragraphs: Again, are the comparisons between the data and the TWQS or MCL for screening purposes?
d.	3.4.1/3-17	Second paragraph: This is the first time detection limits have been discussed. What is the point of bringing it up and then comparing the detection limit to the SSLs?
e.	3.4.1/3-17	Last paragraph: Explain the significance of "below background levels but above SSLs" or "does not exceed background levels or SSLs".
f.	3.4.2/3-18	Last paragraph: See comment #1. c. above.
g.	3.4.4/3-19 thru 3-22	See above comment about MCLs.
h.	4.4/4-21	Second paragraph in section: Same comments as #1.d. above. This comment applies to all remaining sections.
2.	2.8/2-13 thru 2-14	SSL's are to be used when the site fits the assumptions that were used to arrive at the SSL's. Please provide statements which verify that these sites fit the assumptions and that the generic SSL's are appropriate.
3.	Section 3.0/General	For this section on Landfill 12, please be consistent when describing the historical sampling events. Sometimes it is stated why something was done and sometimes it is not. If it is not known why, please say so. The following are specific questions which are offered for further consideration:
a.	3.1.3/3-3	First paragraph: Why were the four groundwater monitoring wells placed at the locations indicated?
b.	3.1.3/3-3	Third paragraph: What were the EPS groundwater samples analyzed for and why?
c.	3.1.3/3-3	Fourth paragraph: Why did Thiokol obtain three surface samples, three sediment samples, and surface water samples from Central Creek? If it was to monitor the leachate flowing from the toe of the landfill, then please state this first. What were the samples analyzed for?
d.	3.3.3/3-13	Why was one of the six borings advanced to a total depth of 164 ft bgs?

No.	Section/page	Comment
e.	3.3.3/3-13 thru 3-14	Why were the soil samples visually classified, moisture content measured, etc.? The relevance of these tests in relation to a release is not obvious.
f.	3.3.4/3-14	First paragraph: What is a Geoprobe Unit?
4.	3.1.3/3-8	Continued paragraph from previous page: It is agreed that methylene chloride is a common laboratory contaminant; however, the report does not mention whether or not the blanks contained methylene chloride. There is no "B" qualifier indicated next to methylene chloride on Table 3.1.
5.	3.1/3-8	First paragraph: Was methylene chloride detected in the sediment samples?
6.	3.3.1/3-13	The "problem" (determining if a release of potential contaminants from previous landfill operations) is stated very well. This section would be easier to understand if the first paragraph in 3.3 was moved to immediately after 3.3.1. This way the problem would be stated, then the approach to solving the problem would be discussed. Also, include what constitutes a release (*i.e.*, finding a contaminant that is above an established background concentration or action level). See general statement above. This comment applies to all sections.
7.	3.4.1/3-17	First paragraph: For the statements regarding acetone please see comment #4 above for methylene chloride.
8.	3.4.2/3-17	First paragraph: For the statements about acetone and methylene chloride see comment #4 above.
9.	4.0 thru 8.0./General	These sections are much better in terms of detail and consistency. Same comments apply for acetone, methylene chloride, and the use of MCLS, SSLs, etc.

TNRCC

Protecting Texas
by Reducing and
Preventing Pollution

FAX TRANSMITTAL

DATE: ~~10/18/96~~ 10/21/96

NUMBER OF PAGES: 3

19492

TO: David Tolbert, Project Manager
Longhorn Army Ammunition Plant
903/679-2089

FROM: TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
Diane Poteet
Pollution Cleanup Division/Superfund Investigation Section
512/239-2502
512/239-2449

NOTES:

Please see the attached comments regarding the Group 2 - Interim Remedial Action at Landfill Site 12 & 16 - Revised Project Work Plans.

SUPERFUND INVESTIGATION SECTION

Barry R. McBee, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Dan Pearson, *Executive Director*

19493

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
Protecting Texas by Reducing and Preventing Pollution

October 18, 1996

CERTIFIED MAIL
Z 746 032 759
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- Interim Remedial Action at Landfill Sites 12 & 16
Revisions to the Final Project Work Plans: Drawings and Specifications

Dear Mr. McPherson:

The Texas Natural Resource Conservation Commission (TNRCC) staff have completed its review of the above referenced document, which was received on October 7, 1996. Our comments are enclosed. 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

Enclosure

cc with 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)

P.O. Box 13087 • Austin, Texas 78711-3087 • 512/239-1000

printed on recycled paper using soy-based ink

19494

Longhorn Army Ammunition Plant
Group 2- Interim Remedial Action at Landfill Sites 12 & 16
Revisions to the Final Project Work Plans: Drawings and Specifications
TNRCC Comments (By Richard Andersen)

No.	Section/page	Comment
1	Drawing C-11	To be more clear, the geomembrane caption on Drawing C-11 should specify that the geomembrane is either "a 20 mil geomembrane bonded to the GCL" or "a 40 mil geomembrane separate from the GCL".
2	Specifications	The minimum geomembrane thickness should be 40 mil or, if the membrane is bonded to the GCL, 20 mil.
3	Specifications/ page 02442-4	The 20 mil geomembrane which is bonded to the GCL should have specifications analogous to the specifications for the separate 40 mil membrane on 02271-11 (for example, puncture resistance). Has an engineer determined that the tensile strength, shear strength, and interface friction angles of the 20 mil geomembrane/GCL composite will be adequate for slope stability?
4	Specifications/ page 02442-8	Specific requirements for seaming the 20 mil geomembrane/GCL should be given in 3.2.4.1.

END

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

DEPARTMENT OF THE ARMY
LONGHORN/LOUISIANA ARMY AMMUNITION PLANTS
P.O. BOX 658
DOYLINE, LOUISIANA 71023-0658

19495

DEC 31 1996

REPLY TO
ATTENTION OF

December 23, 1996

SIOLH-OR

SUBJECT: Longhorn Army Ammunition Plant, Solid Waste Registration No. 30990,
Agreed Order Effective December 4, 1995, Ordering Provision No. 17
Due January 25, 1997

Ms. Lila Beckley
Enforcement Coordinator
Texas Natural Resource Conservation Commission
P. O. Box 13087
Austin, Texas 78711-3087

Dear Ms. Beckley:

This letter is prepared in lieu of the Groundwater Monitoring and Remediation Report required under Ordering Provision No. 17 of the Agreed Order for Longhorn Army Ammunition Plant.

All groundwater monitoring is now being conducted under the Federal Facility Agreement according to the CERCLA process. An ongoing Remedial Investigation (RI) and Interim Remedial Action (IRA) are being conducted at Burning Ground No. 3 and the Unlined Evaporation Pond (UEP). As part of these activities, with monthly oversight and document review provided by TNRCC and EPA, groundwater monitoring was last conducted as part of the Phase II RI in 1995. However, all wells are currently being sampled (sampling began December 12, 1996) according to the Work Plans for the IRA which were approved by TNRCC and EPA in March 1996. The Work Plans specify sampling of all wells prior to Interceptor Collector Trench (ICT) installation, as part of the IRA, which will begin in January 1997. A sampling schedule is also provided in the Work Plans to provide data for evaluating the effectiveness of the groundwater extraction system.

Data from the December 1996, as well as 1997, sampling events will be submitted in the 1997 Annual Report under Ordering Provision No. 12. Therefore, in the future the submittal required under Provision No. 17 will be incorporated into the Annual Report under Ordering Provision No. 12.

If you have any questions, please contact me at (318) 459-5103.

Sincerely,

C Nathan

Ira C. Nathan
Chief, Operations Review

CF: Mr. H. L. "Bud" Jones, TNRCC
/Ms. Jonna Polk, Tulsa Corps of Engineers