USEPA

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397
PAT QUINN, GOVERNOR JOHN J. KIM, INTERIM DIRECTOR

217/524-3300

March 14, 2012

CERTIFIED MAIL
7009 3410 0002 3749 5673
7009 3410 0002 3749 5680

PDV Midwest Refining, LLC
Attn: Mr. Jim Cristman
135th Street and New Avenue
Lemont, Illinois 60439-3659

CITGO Petroleum Corporation
Attn: Mr. Claude Harmon
135th Street and New Avenue
Lemont, Illinois 60439-3659

Re: 1978030004 -- Will County
CITGO, Lemont Refinery
ILD041550567
RCRA Permit Log No: B-162R-M-1 and M-3
RCRA Permit File
Permit Approval

US EPA RECORDS CENTER REGION 5
1000463

Dear Mr. Cristman and Mr. Harmon:

This letter is in response to the requests to modify the RCRA permit for the CITGO Lemont Refinery Log No. B-162R-M-1 dated July 11, 2011 and received on July 14, 2011, and Log No. B-162R-M-3 dated September 8, 2011 and received on September 12, 2011.

The Illinois EPA reviewed the information contained in these submittals and determined that the information is acceptable. Therefore, the requests to modify the permit are hereby approved. This determination is based upon our review of the RCRA Part B Permit issued to the CITGO Lemont Refinery (CITGO), the regulations [35 Ill. Adm. Code Subtitle G], and the information contained in the submittals. Operations at the permitted facility must be conducted in accordance with the approved RCRA Permit and all subsequent modifications. A revised RCRA permit is included with this letter as Attachment 3. Please read this document carefully. Failure to meet any portion of the RCRA permit could result in civil and/or criminal penalties.

Permit modification B-162R-M-1 and M-3 request minor modifications to the permit application and provide updated wording in the application to make it consistent with existing permit conditions. Other changes to the application were in response to permit conditions that required the submittal of additional information. Several conditions were revised, some were added, and some conditions were removed from the permit in response to the information submitted in permit modifications B-162R-M-1 & M-3. A summary of the revisions made to the RCRA permit is provided in Attachment 1 to this letter.

The permit modifications requested in B-162R-M-1and M-3 were considered to be Class 1 or 1* permit modifications. Therefore, pursuant to 35 Ill. Adm. Code 703.281(a)(2), within 90 days of the modification date of this permit CITGO must notify persons on the facility mailing list of the changes to the permit identified in the permit modifications B-162R-M-1 and M-3. Within 120 days of the modification date of this permit CITGO must provide documentation to the Illinois EPA Bureau of Land Permit Section that the required notifications were made as specified above. At a minimum, this

documentation shall include a copy of the letter sent and a copy of the facility mailing list of all people who received the notification.

Attachment 2 to this letter is a copy of the Illinois EPA's current RCRA facility mailing list for the CITGO Lemont Refinery. Please use it for future mailings concerning RCRA permit activities for your facility after checking with Mara McGinnis, Illinois EPA's RCRA Public Involvement Coordinator, for any recent updates. An electronic copy of the list may be obtained by contacting Ms. McGinnis at mara.mcginnis@illinois.gov .

Work required by this letter, your submittal or the regulation may also be subject to other laws governing professional services, such as the Illinois Professional Land Surveyor Act of 1989, the Professional Engineering Practice Act of 1989, the Professional Geologist Licensing Act, and the Structural Engineering Licensing Act of 1989. This letter does not relieve anyone from compliance with these laws and the regulations adopted pursuant to these laws. All work that falls within the scope and definitions of these laws must be performed in compliance with them. The Illinois EPA may refer any discovered violation of these laws to the appropriate regulating authority.

If you have any questions concerning this permit, please contact Rob Watson, P.E. at 217/524-3265. Questions regarding the groundwater aspects of this permit should be directed to Paula Stine at 217-524-3861. Questions regarding the corrective action aspects of this permit should be directed to Takako Halteman at 217-524-3274.

Sincerely,

Stephen F. Nightingale, P.E.
Manager, Permit Section
Bureau of Land

SFN:WRW: 1978030004-RCRA-B162RM1M3-Final.docx

Attachment 1: Changes to permit
Attachment 2: Facility Mailing List
Attachment 3: RCRA Permit

cc: Gary Victorine, USEPA Region V
Claude Harmon, CITGO
Kevin Moss, CITGO
Yvonne Jeanneret, CITGO
Patricia Moore, CITGO

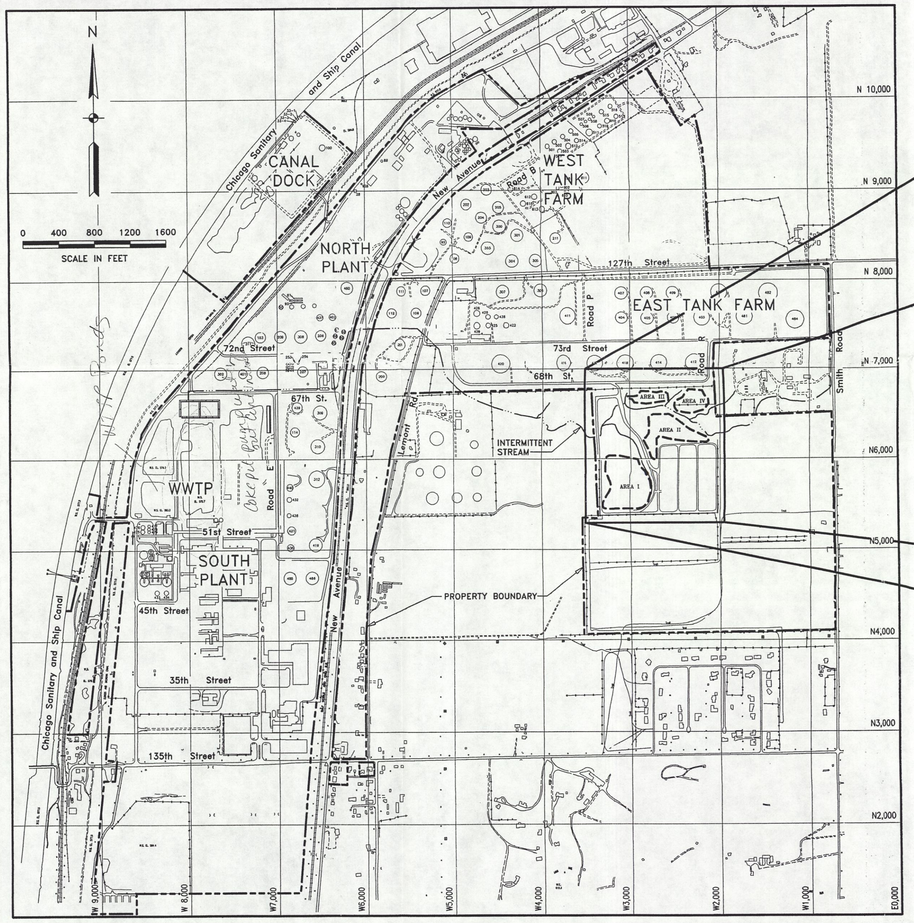
DRAWING NUMBER 131-CD-443

CORRECTIVE ACTION MANAGEMENT UNIT (CAMU) SITE WORK PLAN

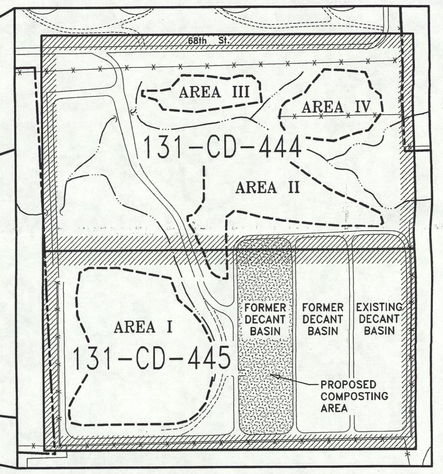
THE LEMONT REFINERY
CITGO PETROLEUM CORPORATION
LEMONT, ILLINOIS

SHEET INDEX

131-CD-443	TITLE SHEET AND OVERALL SITE PLAN
131-CD-444	LAND TREATMENT AREAS II, III, AND IV
131-CD-445	LAND TREATMENT AREA I AND COMPOSTING AREA
131-CD-446	DETAILS



SITE MAP



PROJECT LOCATION – PROPOSED CAMU

NOT TO SCALE

PRELIMINARY
NOT FOR CONSTRUCTION

RADIAN INTERNATIONAL LLC

REV	DATE	PROJ. NO.	DESCRIPTION	APPR'D
0	00/00/00	PROJNO	DESCRIPTION	APPR

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ISSUED FOR APPROVAL — BY — DATE

ISSUED FOR CONSTRUCTION — BY — DATE

UNO-VEN PROJ. # — UNO-VEN AFE # — CONTRACTOR PROJ. #

DESIGNED DBS — DRAWN MJL — REVIEWED DLJ — APPROVED AMA

THE LEMONT REFINERY
CITGO PETROLEUM CORPORATION
LEMONT, ILLINOIS

RECEIVED
AUG 01 2007
IEPA-BOL
PERMIT SECTION

TITLE SHEET AND OVERALL SITE PLAN

LAND TREATMENT FACILITY — 131

SCALE: AS SHOWN — DATE: 04/29/97 — DRAWING NUMBER: 131-CD-443 — REVISION: 0

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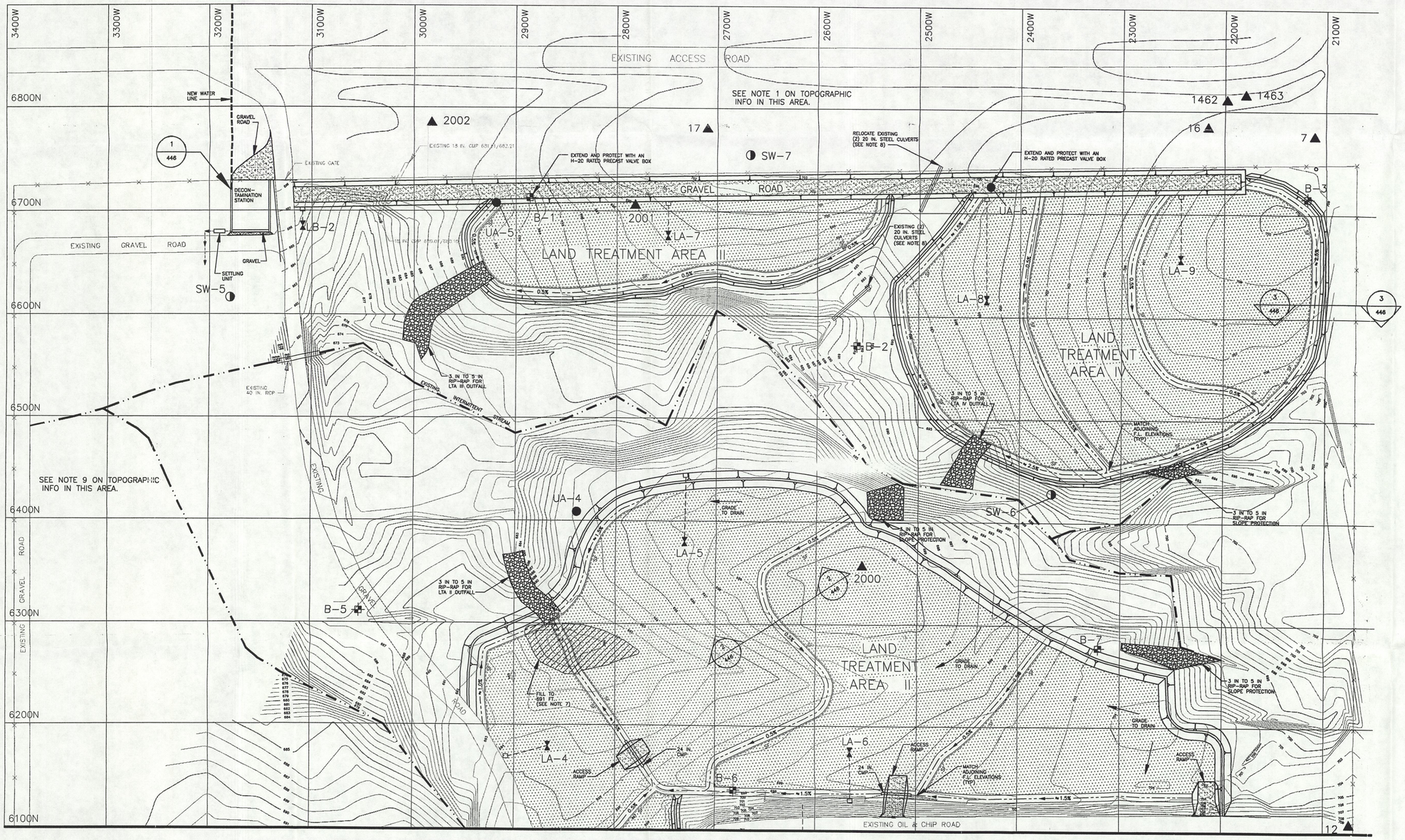
DRAWING NUMBER 131-CD-444



MATCHLINE DRAWING 131-CD-445

NOTES:

1. THIS AREA WAS NOT INCLUDED IN THE ORIGINAL SURVEY CONDUCTED IN 1993. CONTOUR ELEVATIONS AND THE LOCATIONS OF THE ACCESS ROAD ARE APPROXIMATE. THE FACILITY MAP, FIGURE B-2 (GERAGHTY & MILLER, INC., UNOVEN RCRA PART B APPLICATION, FEBRUARY 1996.) WAS THE SOURCE FOR THE REFERENCED AREA; THIS SOURCE UTILIZED A 5-FOOT CONTOUR INTERVAL AS PROVIDED ON THIS DRAWING.
2. EXISTING TOPOGRAPHIC SURVEY AND BENCHMARK LOCATIONS PROVIDED BY BELING CONSULTANTS, JOLIET, ILLINOIS, AUGUST 1993.
3. ALL SHALLOW MONITORING WELLS SHALL BE ABANDONED DURING CLOSURE IMPLEMENTATION IN ACCORDANCE WITH PROCEDURES SPECIFIED IN REGULATION 77IAC920.120.
4. CHANNEL AND BERM LOCATIONS ARE APPROXIMATE. ACTUAL LOCATIONS TO BE FIELD LOCATED PER THE DIRECTION OF OWNERS REPRESENTATIVE.
5. CONTRACTOR SHALL LOCATE AND PROTECT ALL WELLS AND PIEZOMETERS.
6. ALL CHANNELS SHALL BE GRASS LINED UNLESS OTHERWISE INDICATED.
7. BACKFILL MATERIAL SHALL BE FROM AN APPROVED CLEAN BORROW SOURCE AND GRADED TO DRAIN TO CHANNEL.
8. EXISTING CULVERTS SHALL BE RELOCATED TO PROVIDE DRAINAGE UNDER NEW GRAVEL ROAD. AREA SHALL BE REGRADED AS NECESSARY TO PROVIDE DRAINAGE.
9. THIS AREA WAS NOT INCLUDED IN THE ORIGINAL SURVEY CONDUCTED IN 1993. EXISTING TOPOGRAPHICAL INFORMATION IS NOT AVAILABLE. ROAD AND INTERMITTENT STREAM LOCATIONS ARE APPROXIMATE.

N

0 25 50 75 100
SCALE IN FEET

LEGEND:

- EXISTING CONTOUR
- EXISTING FENCE AND PROPOSED CAMU BOUNDARY
- EXISTING INTERMITTENT STREAM
- UNDERGROUND PIPING
- PROPOSED DITCH FLOW LINE
- PROPOSED SILT FENCE
- UA-1 DEEP WELL (EXISTING)
- SW-1 SHALLOW WELL (EXISTING) (SEE NOTE 3)
- B-1 PIEZOMETER (EXISTING)
- 1541 BENCHMARK (EXISTING)
- LA-1 PROPOSED LYSIMETER LOCATIONS (SEE DETAIL 5, SHEET 131-CD-446)
- LAND APPLICATION AREA

PRELIMINARY
NOT FOR CONSTRUCTION

RADIAN INTERNATIONAL LLC

REV	DATE	PROJ. NO.	DESCRIPTION	APPR'D
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ISSUED FOR APPROVAL		ISSUED FOR CONSTRUCTION	
BY	DATE	BY	DATE
UNO-VEN PROJ. #	UNO-VEN AFE #	CONTRACTOR PROJ. #	
DESIGNED DBS	DRAWN SLC	REVIEWED DLJ	APPROVED AMA

THE LEMONT REFINERY
CITGO PETROLEUM CORPORATION
LEMONT, ILLINOIS

CAMU SITE WORK PLAN
LAND TREATMENT AREAS
II, III, AND IV

LAND TREATMENT FACILITY 131

SCALE	DRAWING NUMBER	REVISION
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DATE 4/29/97		

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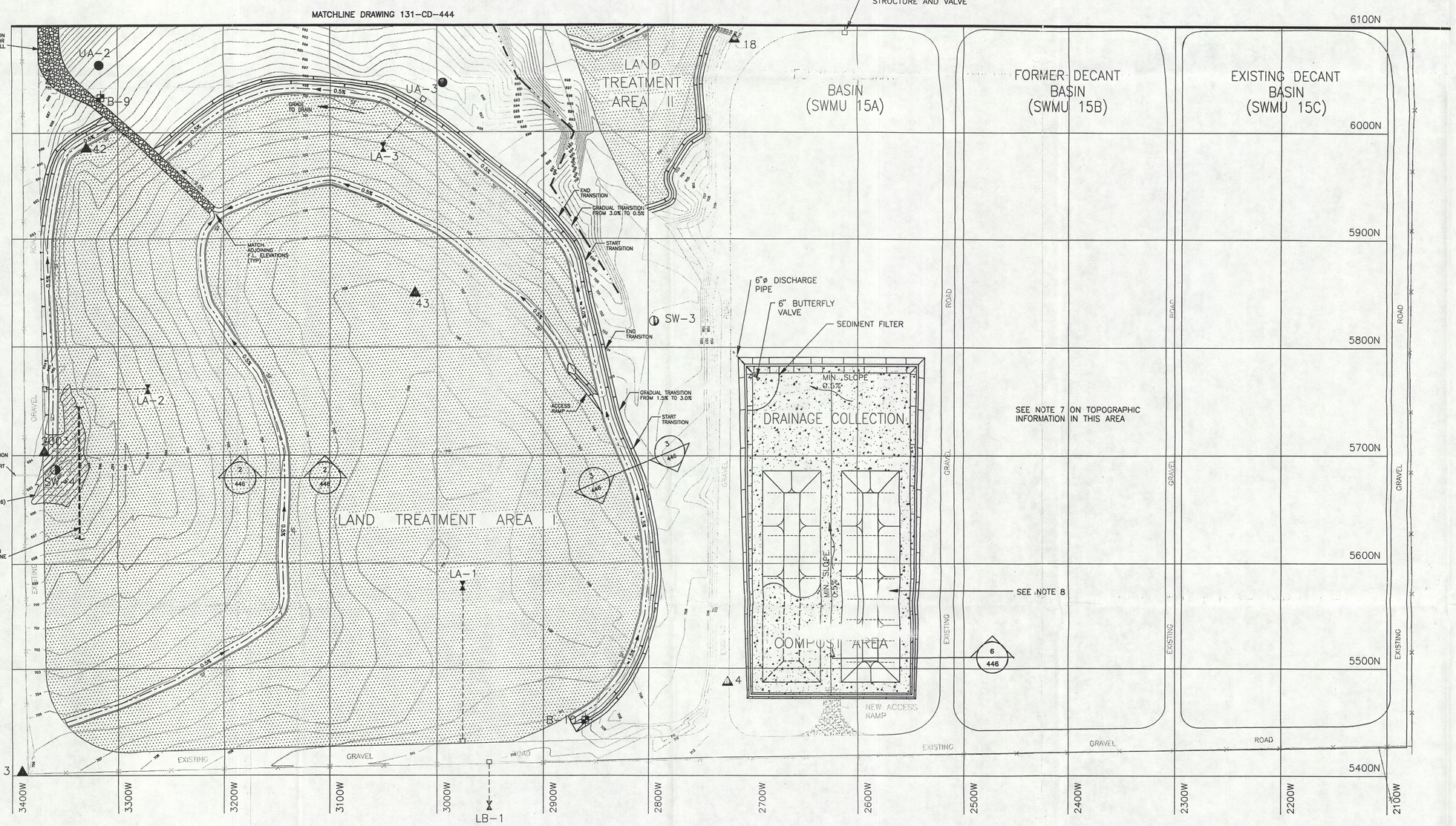
DRAWING NUMBER 131-CD-445



N

0 25 50 75 100
SCALE IN FEET

LEGEND:

- EXISTING CONTOUR
- EXISTING FENCE AND PROPOSED CAMU BOUNDARY
- EXISTING INTERMITTENT STREAM
- UNDERGROUND PIPING
- PROPOSED DITCH FLOW LINE
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5. ALL CHANNELS SHALL BE GRASS LINED UNLESS OTHERWISE INDICATED.
6. BACKFILL MATERIAL SHALL BE FROM AN APPROVED CLEAN BORROW SOURCE AND GRADED TO DRAIN TO CHANNEL.
7. THIS AREA WAS NOT INCLUDED IN THE ORIGINAL SURVEY CONDUCTED IN 1993. EXISTING TOPOGRAPHIC INFORMATION IS NOT AVAILABLE. ROAD LOCATIONS ARE APPROXIMATE.
8. REMEDIATION SOILS SHALL BE BLENDED WITH WOOD CHIPS TO CONSTRUCT PILES AT A RATE OF 20% WOOD CHIPS BY VOLUME.

RADIAN INTERNATIONAL LLC

REV	DATE	PROJ. NO.	DESCRIPTION	APPR'D
0	00/00/00	PROJNO	DESCRIPTION	APPR

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UNO-VEN PROJ. # — UNO-VEN AFE # — CONTRACTOR PROJ. #

DESIGNED	DRAWN	REVIEWED	APPROVED
DBS	SLC	DLJ	AMA

THE LEMONT REFINERY
CITGO PETROLEUM CORPORATION
LEMONT, ILLINOIS

CAMU SITE WORK PLAN
LAND TREATMENT AREA I
AND COMPOSTING AREA

LAND TREATMENT FACILITY 131

SCALE	DRAWING NUMBER	REVISION
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DATE 4/29/97		

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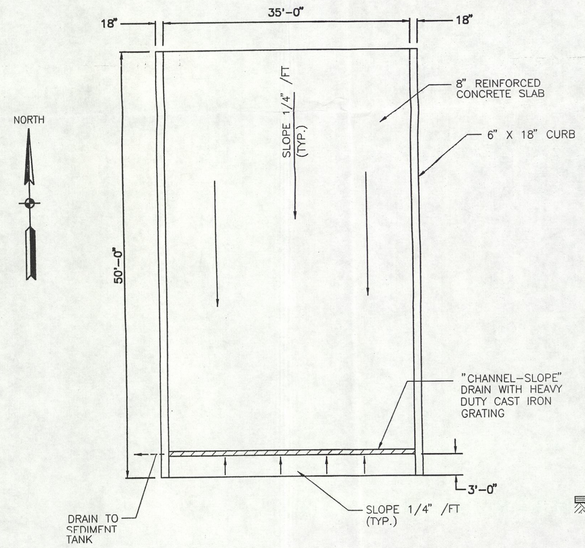

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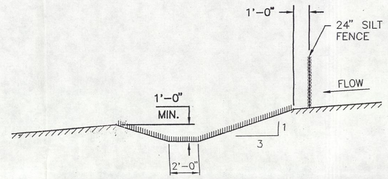
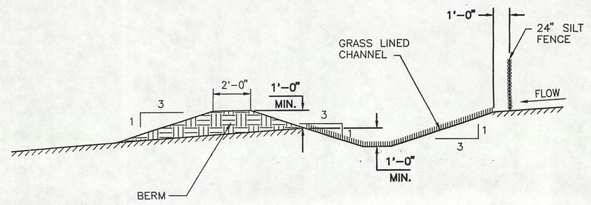
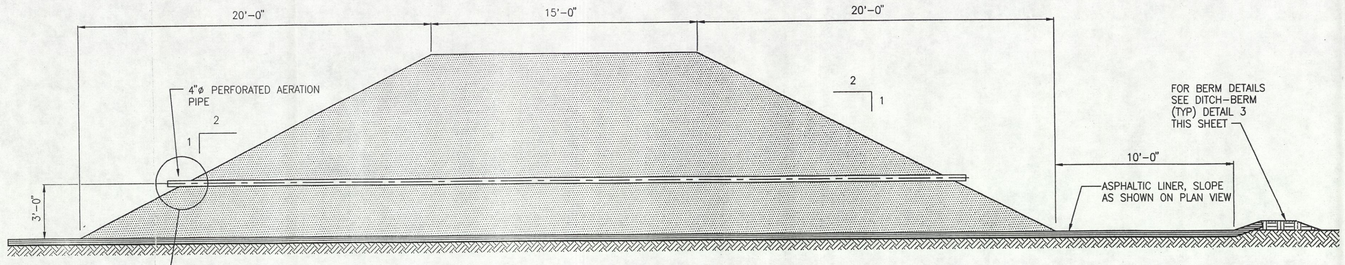
N.T.S.



DITCH (TYP.) (2 / 444 445)
N.T.S.



DITCH-BERM (TYP.) (3 / 444 445)
N.T.S.



COMPOST STORAGE UNIT (TYP.) (6 / 445)
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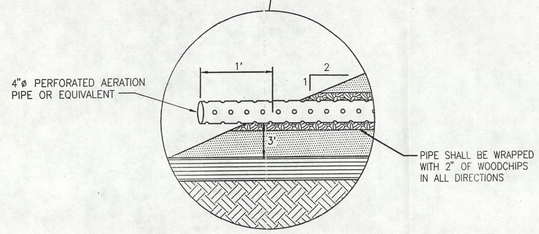
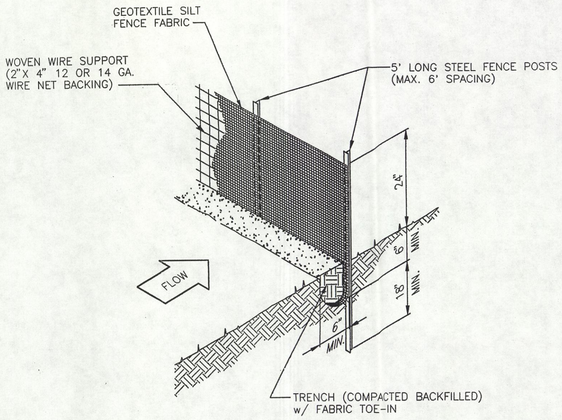
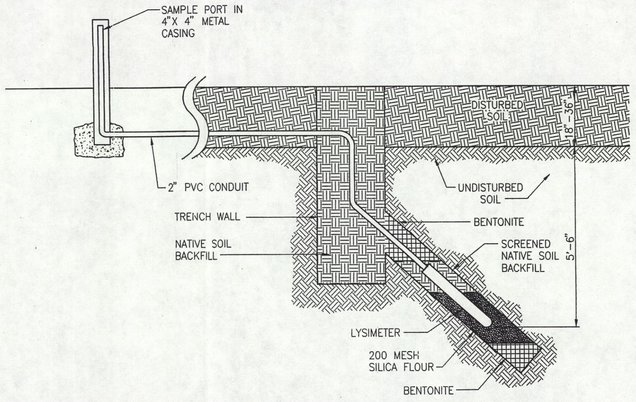




SILT FENCE (4 / 444 445)
N.T.S.

SILT FENCE NOTES:

1. STEEL POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE IMBEDDED A MINIMUM OF 2.0 FEET.
2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OF MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF THE FLOW. WHERE FENCE CANNOT BE TRENCHED IN (E.G. PAVEMENT) WEIGHT FABRIC FLAP WITH WASHED GRAVEL ON UPHILLSIDE TO PREVENT FLOW UNDER FENCE.
3. THE TRENCH MUST BE A MINIMUM OF 6 INCHES DEEP AND 6 INCHES WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.
4. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH STEEL SUPPORT POSTS OR TO WOVEN WIRE, WHICH IS IN TURN ATTACHED TO THE STEEL FENCE POSTS.



LYSIMETER INSTALLATION DETAIL (5 / 444 445)
N.T.S.

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RADIAN INTERNATIONAL LLC

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0	00/0/00	PROJNO	DESCRIPTION	APPR

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ISSUED FOR APPRVAL		ISSUED FOR CONSTRUCTION	
BY	DATE	BY	DATE
UNO-VEN PROJ.	UNO-VEN AFE #	CONTRACTOR PROJ. #	
DESIGNED DBS	DRAWN KC	REVIEWED DLJ	APPROVED AMA

THE LEMONT REFINERY
CITGO PETROLEUM CORPORATION
LEMONT, ILLINOIS

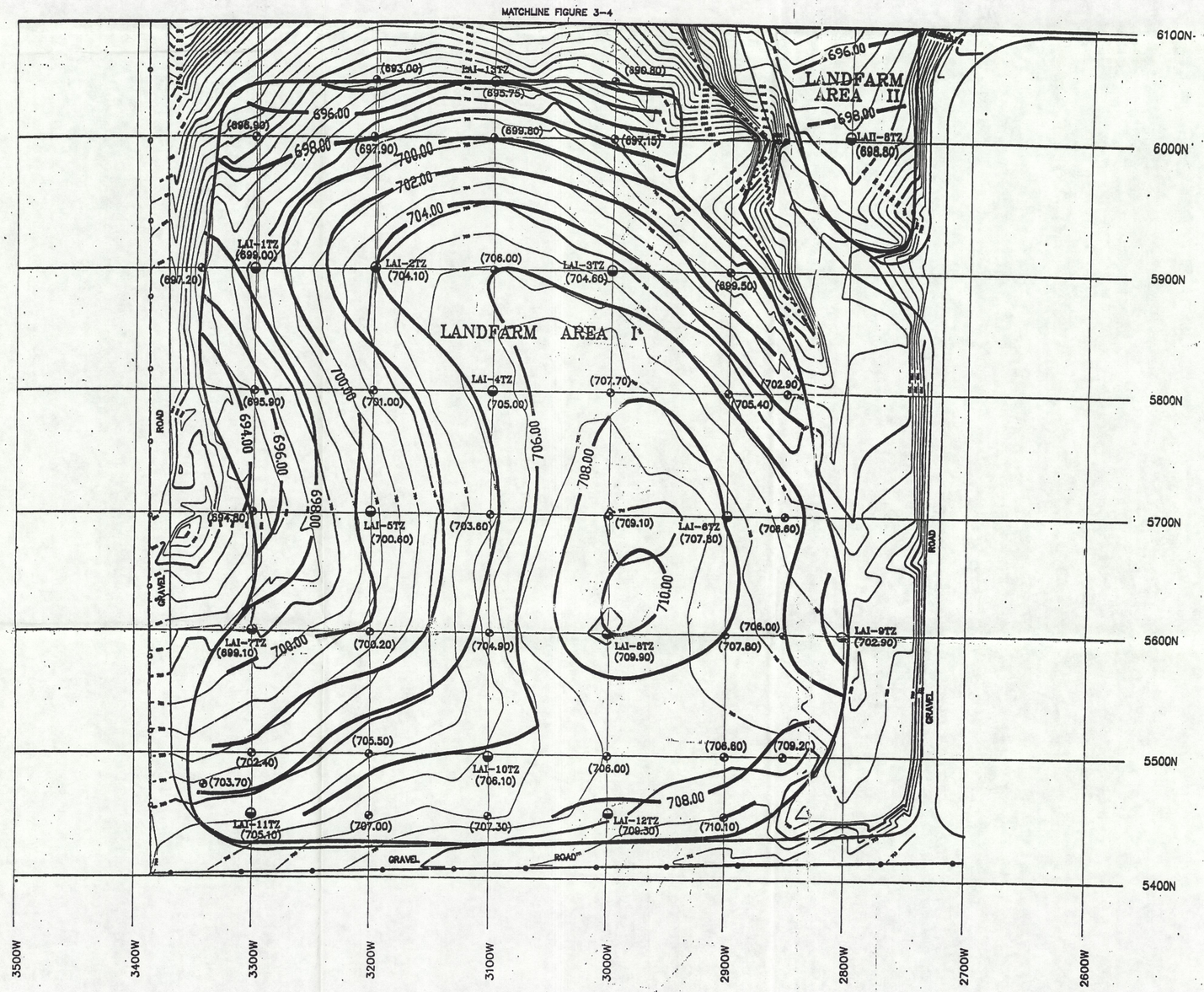
CAMU SITE WORK PLAN
DETAILS

LAND TREATMENT FACILITY 131

SCALE	DRAWING NUMBER	REVISION
NONE	131-CD-446	0
DATE 4/29/97		

CADD DWG. No. D2360C

ORIGINAL DWG. No. : NONE



N

0 100 FEET

SOURCE: ERM JUNE 1989 REPORT, "PHASE I CLOSURE REPORT FOR LAND USE TREATMENT AREA", ENVIRONMENTAL RESOURCES MANAGEMENT – NORTH CENTRAL, INC.

LEGEND:

- APPROXIMATE LIMITS OF EXISTING LANDFARM AREA
- GERAGHTY & MILLER SOIL BORING AT PREVIOUS ERM SOIL BORING LOCATION
- ERM SOIL BORING
- (703.00) ELEVATION OF UNDISTURBED ZONE (FEET MSL) ESTIMATED FROM CONTOURS OF LAND SURFACE TOPOGRAPHY PER BELING CONSULTANTS, AUGUST 1993 AND ERM (1989) TREATMENT ZONE THICKNESS DATA.
- 702.00 TOP OF UNDISTURBED ZONE ELEVATION CONTOUR (FEET MSL)

NOTES:

1. DRAWING FOR PERMIT PURPOSES ONLY; NOT TO BE USED FOR CONSTRUCTION.
2. TOPOGRAPHIC SURVEY PROVIDED BY BELING CONSULTANTS, JOLIET, ILLINOIS, AUGUST 1993.

GERAGHTY & MILLER, INC.
Environmental Services

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SCALE VERIFICATION
THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING:
USE TO VERIFY FIGURE REPRODUCTION SCALE

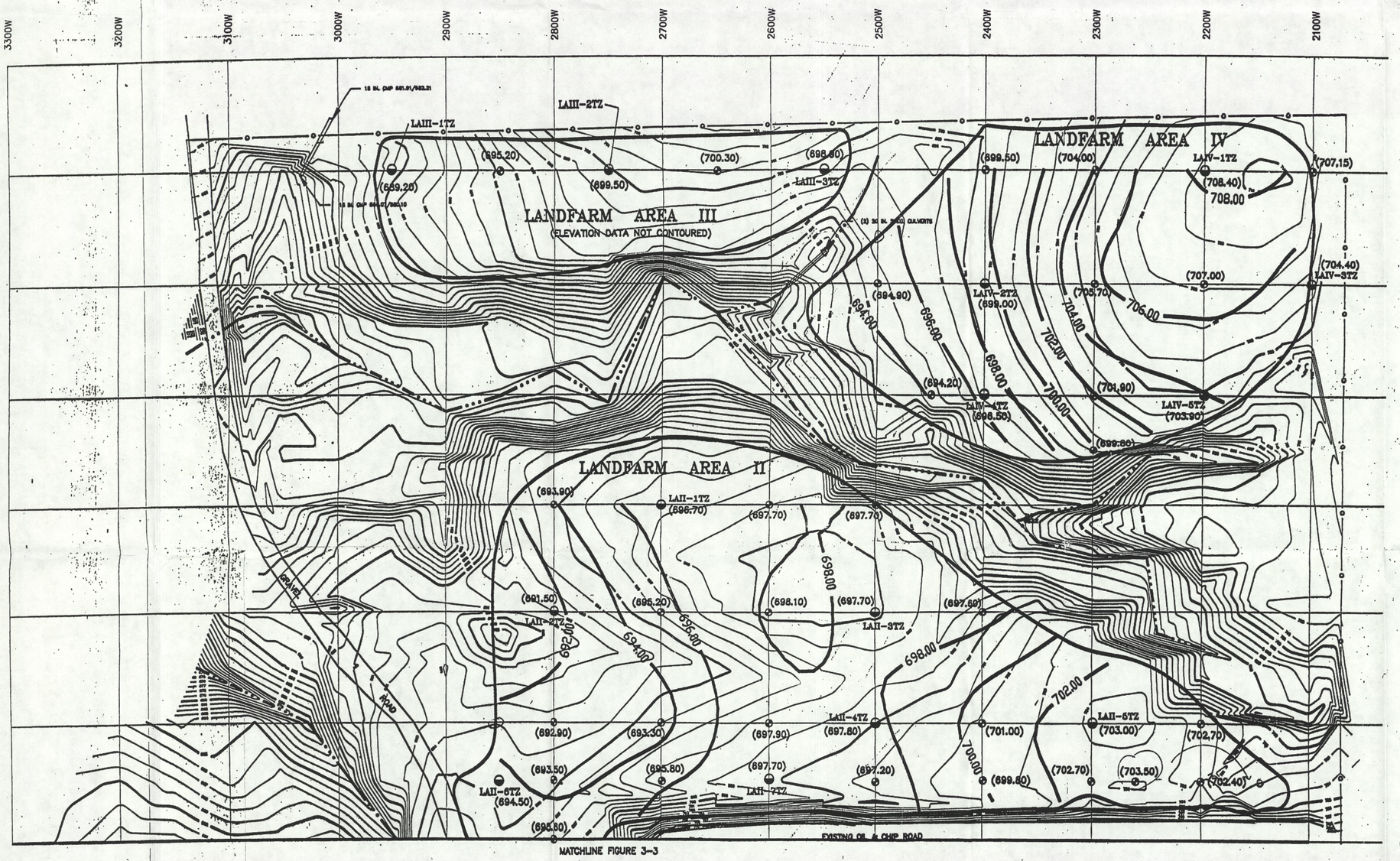
PROJECT NO.: C10395.001	FILE NO: UNOUND2.DWG
DRAWING NO.: C10395-DFIG	PLOT SCALE:1=30
DRAFTED BY: S GOZNER	DATE: MARCH 6, 1999
CHECKED BY:	DATE:
APPROVED BY:	DATE:
LAST REVISION BY: S GOZNER	DATE: MARCH 15, 1999

RADIAN INTERNATIONAL LLC
AUSTIN, TEXAS

ORIGINAL SOIL SURFACE CONTOURS FOR AREA I

CITGO - CHICAGO REFINERY, LAND TREATMENT FACILITY
LEMONT, ILLINOIS

FIGURE IV-N-5



N

0 100 FEET

SOURCE: ERM JUNE 1989 REPORT, "PHASE I CLOSURE REPORT FOR LAND USE TREATMENT AREA", ENVIRONMENTAL RESOURCES MANAGEMENT – NORTH CENTRAL, INC.

LEGEID:

- APPROXIMATE LIMITS OF EXISTING LANDFARM AREA
- GERAGHTY & MILLER SOIL BORING AT PREVIOUS ERM SOIL BORING LOCATION
- INTERMITTENT STREAM
- ERM SOIL BORING
- (703.0) ELEVATION OF UNDISTURBED ZONE (FEET MSL) ESTIMATED FROM CONTOURS OF LAND SURFACE TOPOGRAPHY PER BELING CONSULTANTS, AUGUST 1993 AND ERM (1989) TREATMENT ZONE THICKNESS DATA
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DRAWING NO.: CI0395001-DFIG_	PLOT SCALE:1=50
DRAFTED BY: S GOZNER	DATE: MARCH 6, 1989
CHECKED BY:	DATE:
APPROVED BY:	DATE:
LAST REVISION BY: S GOZNER	DATE: MARCH 30, 1989

RADIAN INTERNATIONAL LLC
AUSTIN, TEXAS

ORIGINAL SOIL SURFACE CONTOURS FOR AREAS II, III, AND IV
CITGO - CHICAGO REFINERY, LAND TREATMENT FACILITY
LEMONT, ILLINOIS

FIGURE IV-N-6

Renewal RCRA Hazardous Waste Post-Closure Permit

CITGO Lemont Refinery

USEPA ID No: ILD041550567
STATE ID No: 1978030004
Log No: B-162R-M-1 & M-3

ATTACHMENT 1

CHANGES TO RCRA PERMIT

CHANGES TO RCRA PERMIT

CITGO Lemont Refinery

STATE ID No: 1978030004
USEPA ID No: ILD041550567
Log No: B-162R-M-1 & M-3

B-162R-M-1

The following changes have been made to CITGO's RCRA permit in response to permit modification request B-162R-M-1:

Condition I.D

This condition was revised to reference the dates the initial and renewed permits were issued.

Condition III.F.1

The permittee provided a revised closure cost estimate in 2010 dollars as required by this condition. Therefore, Condition III.F.1 was revised to reflect the updated closure cost estimate:

> "The permittee shall maintain financial assurance for closure of the LTF of at least ~~$316,567 (in 2006 dollars)~~ $970,471 (in 2010 dollars)."

Conditions IV.G.1 & 2

Two new conditions in a new Subsection IV.G were added to the permit. These conditions require CITGO to maintain financial assurance for post-closure care in accordance with 35 IAC 724.245. Condition IV.G.1 specifies the amount of financial assurance that is required and the method used to calculate this amount.

IV.G. FINANCIAL ASSURANCE

1. The permittee shall maintain financial assurance for post-closure care of the land treatment facility (LTF) of at least $4,899,480 (in 2010 dollars). This amount was calculated by multiplying the Total Annual Post-Closure Cost of $163,316 (in 2010 dollars) by 30 years. The financial assurance maintained by the facility shall be sufficient to meet the requirements at 35 Ill. Adm. Code 724 Subpart H.

2. Financial assurance must be maintained for post-closure of the LTF until the Illinois EPA approves the post-closure certification for the units in accordance with 35 IAC 724.243.

Condition VIII.2

The permittee provided the 39i certification forms required by this condition. Therefore, this condition was modified to read as follows:

> The permittee shall submit the necessary 39i certification form(s) and supporting documentation ~~within 30 days of the effective date of this permit and thereafter~~ within 30 days of any of the following events:

Condition VIII.3

The permittee provided information regarding the facility's property line south of the land treatment facility as required by this condition. Therefore, this condition was deleted. Other conditions were renumbered as necessary.

Condition VIII.7

The permittee provided an updated closure cost estimate as required by this condition. Therefore, this condition was deleted. Other conditions were renumbered as necessary.

Condition VIII.8

The permittee provided some of the information required by this condition. However, the requirement specifying how post-closure costs must be calculated was not met. Therefore, Special Condition VIII.8 was deleted, and the remaining issue of how post-closure costs must be calculated was incorporated into the new Special Condition VIII.6.

Condition VIII.6

35 IAC 724.245 requires facilities subject to post-closure to have and maintain financial assurance for post-closure care and 35 IAC 724. 244(a)(2) specifies how the amount of financial assurance has to be calculated. The renewal permit did not include a condition requiring CITGO to have financial assurance for post-closure care. Therefore, this new condition was added to insure that the requirements at 35 IAC 724. 244 and 724.245 are met.

> Within 60 days of the modification date of this permit, the permittee shall provide financial assurance for post-closure care of at least $4,899,480 (in 2010 dollars). This is equal to the annual post-closure cost of $163,316 (in 2010 dollars) times 30 years (post-closure period) as required by 35 IAC 724.244(a)(2). This revision will be considered a Class 1* permit modification.

B-162R-M-3

The following changes have been made to Section VI.E of CITGO's RCRA permit in response to permit modification request B-162R-M-3:

1. The approved cost estimate for completing corrective action at this facility is $6,892,654.00 (in 2011 dollar), which includes a 5% adjustment for contingencies. This approved value is based upon estimates of the cost of the various required/known efforts required to be carried out as part of the corrective action program at this facility. As required by Condition VI.E.2 below, these estimates must be updated annually to reflect the recent results of the program and the impacts these results have on determining what is needed to complete corrective action at the facility. For example, cost estimate for a given SWMU would initially be based upon the cost for investigating any contamination which may be present at the unit; however, this estimate will eventually need to be revised to reflect any required corrective measures for the unit.

2~~1.~~ CITGO shall prepare un updated ~~a~~ cost estimate each year for the completion of any corrective measure(s) required under this Permit, in order to provide financial assurance for completion of corrective action, as required under 35 IAC 724.201(b). Such a cost estimate will be based upon the cost of contamination investigations and assessments for the SWMU(s), and design, construction, operation, inspection, monitoring, and maintenance of the corrective measure(s) to meet the requirements of this Permit. This cost estimate must be submitted to the Illinois EPA's BOL as a Class 1* Permit modification request by December 31 of each year. ~~and revised according to the following schedule:~~

~~Facility Submission~~	~~Due Date~~
~~Updated Corrective Action Cost Estimate~~	~~Within 120 days after the effective date of this Permit (as a Class I* modification request)~~
~~Revised Cost Estimate (with the initial submittal of each RFI Report and/or CMP report)~~	~~Upon written Illinois EPA request~~

~~2. As indicated in Condition VI.E.1 above, an estimate of the cost of completing corrective action at this facility must be submitted to Illinois EPA within 120 days of the date of the effective date of this permit. This submittal must be developed on a SWMU by SWMU basis and include all unit costs and resource needs used to develop the estimates.~~

3. CITGO shall demonstrate continuous compliance with 35 IAC 724.201 by providing documentation of financial assurance using a mechanism specified in 35 IAC 724.243, in at least the amount of the cost estimate required under Condition VI.E.1 the words

"completion of corrective action" shall be substituted for "closure and/or post-closure," as appropriate in the financial instrument specified in 35 IAC 724.251. The documentation shall be submitted to the Illinois EPA's BOL within 60 days after the approval ~~submittal~~ of the initial or revised cost estimates required under Condition VI.E.1 or E.2. The Illinois EPA's BOL may accept financial assurance for completion of corrective action in combination with another financial mechanism acceptable under 35 IAC 724.246 at its discretion.

Renewal RCRA Hazardous Waste Post-Closure Permit

CITGO Lemont Refinery

USEPA ID No: ILD041550567
STATE ID No: 1978030004
Log No: B-162R-M-1 & M-3

ATTACHMENT 2

FACILITY MAILING LIST

CITGO Lemont Refinery, Lemont

2010 Mailing List

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Kluczynski Federal Bldg.
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Operations Manager.
Envirite Corporation
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Will County Executive Officer
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Joliet, IL 60432

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Lemont, IL 60439

Charlene M. Smollen, Lemont Village Clerk
Lemont Village Hall
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Lemont, IL 60439

Thomas Ballard, Director
Lemont Emergency Management Agency
14600 127th Street
Lemont, IL 60439

«name» «last_name»
«community»
«address»
«City», «State» «Zip»

«name» «last_name»
«community»
«address»
«City», «State» «Zip»

The Honorable Roger C. Claar, Mayor
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Carol Penning, Village Clerk
Village of Bolingbrook
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Bolingbrook, IL 60440-0951

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Romeoville, IL 60446

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Village of Romeoville
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Gale Skrobuton, Village Clerk
Village of Homer Glen
14933 S. Founders Crossing
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Village Clerk
Village of Lockport
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Will Co. Land Use Dept.
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Joliet, IL 60432

Will County Emergency Management Agency
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Des Plaines, Il 60016

The Honorable Christine Radogno
Illinois State Senator, 41st District
410 Main Street
Lemont, IL 60439

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Lemont Environmental Advisory Commission
c/o Village Hall
418 Main Street
Lemont, IL 60439

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Illinois State Representative, 82nd District
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Countryside, IL 60525

The Honorable Judy Biggert
United States Representative, 13th District
6262 South Route 83, Suite 305
Willowbrook, IL 60527

The Honorable Emily McAsey
Illinois State Representative, 85th District
16151 Weber Rd., Suite 204
Crest Hill, IL 60403

The Honorable Arthur J. Wilhelmi
Illinois State Senator, 43rd District
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Tinley Park, IL 60477

News Desk
Homer Sun
13543 Route 30
Plainfield, IL 60544

News Desk
DuPage Suburban Life / Darien Suburban Life
1101 W. 31st. St.
Downers Grove, IL. 60515-5581

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Lemont Environmental Advisory
Commission/Lemont Odor Alert Network
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Lemont, IL 60439

Ben Wehmeier
Village Administrator
418 Main Street
Lemont, IL 60439

Renewal RCRA Hazardous Waste Post-Closure Permit

CITGO Lemont Refinery

USEPA ID No: ILD041550567
STATE ID No: 1978030004
Log No: B-162R-M-1 & M-3

ATTACHMENT 3

REVISED RCRA PERMIT

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397
PAT QUINN, GOVERNOR JOHN J. KIM, INTERIM DIRECTOR

HAZARDOUS WASTE MANAGEMENT RCRA PERMIT

1978030004 – Will County
USEPA ILD041550567
CITGO, Lemont Refinery
Log No: B-162R-M-1 & M-3
RCRA Permit File

Issue Date: April 8, 2011
Effective Date: May 13, 2011
Expiration Date: May 13, 2021
Modification Date: March 14, 2012

PERMITTEE
CITGO Petroleum Corporation
135th Street and New Avenue
Lemont, Illinois 60439-3659

A modified RCRA Post-Closure permit is hereby granted to PDV Midwest Refining, LLC as Owner, and CITGO Petroleum Corp. as Operator and Permittee pursuant Section 39(d) of the Illinois Environmental Protection Act and Title 35 Illinois Administrative Code Subtitle G (35 Ill. Adm. Code).

This permit requires CITGO to close and provide post-closure care for the four areas in the hazardous waste land treatment facility (LTF) at the CITGO Lemont Refinery in accordance with the approved permit application and the conditions in this permit. The CITGO Lemont Refinery is located at 135th Street and New Avenue in Lemont, Illinois.

This permit consists of the conditions contained herein and those in the sections and attachments in this permit. The Permittee must comply with all terms and conditions of this permit and the applicable regulations contained in 35 Ill. Adm. Code Parts 702, 703, 705 and 720 through 729 in effect on the effective date of this permit.

This permit is issued based on the information submitted in the approved permit application identified in Section II of this permit and any subsequent amendments. Any inaccuracies found in the information provided in the permit application may be grounds for the termination or modification of this permit (see 35 Ill. Adm. Code 702.187 and 702.186) and potential enforcement action (415 ILCS 5/44(h)).

Sincerely,

Stephen F. Nightingale, P.E.
Manager, Permit Section
Bureau of Land

SFN:WRW:1978030004-RCRA-B162RM1M3-Final.docx

4302 N. Main St., Rockford, IL 61103 (815)987-7760
595 S. State, Elgin, IL 60123 (847)608-3131
2125 S. First St., Champaign, IL 61820 (217)278-5800
2009 Mall St., Collinsville, IL 62234 (618)346-5120

9511 Harrison St., Des Plaines, IL 60016 (847)294-4000
5407 N. University St., Arbor 113, Peoria, IL 61614 (309)693-5462
2309 W. Main St., Suite 116, Marion, IL 62959 (618)993-7200
100 W. Randolph, Suite 11-300, Chicago, IL 60601 (312)814-6026

PLEASE PRINT ON RECYCLED PAPER

RCRA POST-CLOSURE PERMIT

CITGO Lemont Refinery

USEPA ID No: ILD041550567
STATE ID No: 1978030004
Log No: B-162R-M-1 & M-3

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SECTION I – GENERAL FACILITY DESCRIPTION

I.A. OWNER

The facility owner is PDV Midwest Refining, LLC, herein referred to as the "owner". [35 IAC 702.123 & 703.181]

PDV Midwest Refining, LLC
750 Lexington Ave., 10th Floor
New York, New York 10020

I.B. OPERATOR

The facility operator is the CITGO Petroleum Corporation, herein referred to as the "Permittee." [35 IAC 702.121, 702.123 & 703.181]

The Lemont Refinery, CITGO Petroleum Corporation
135th Street & New Avenue
Lemont, IL 60439-3659

I.C. LOCATION

I.C.1. Location of Facility

The CITGO Lemont Refinery is located in Will County in Illinois. CITGO owns approximately 900 acres at this location with approximately 13.5 acres devoted to the management of hazardous waste in four areas in the hazardous waste land treatment facility (LTF). The CITGO Lemont Refinery is located at:

The Lemont Refinery, CITGO Petroleum Corporation
135th Street & New Avenue
Lemont, IL 60439-3659

The general phone number for the facility is 630-257-4000.

I.C.2 Facility Layout Maps

The general location of the CITGO Lemont Refinery is shown in Figure 1. The four hazardous waste land treatment areas at the LTF are shown below on Figure 2.

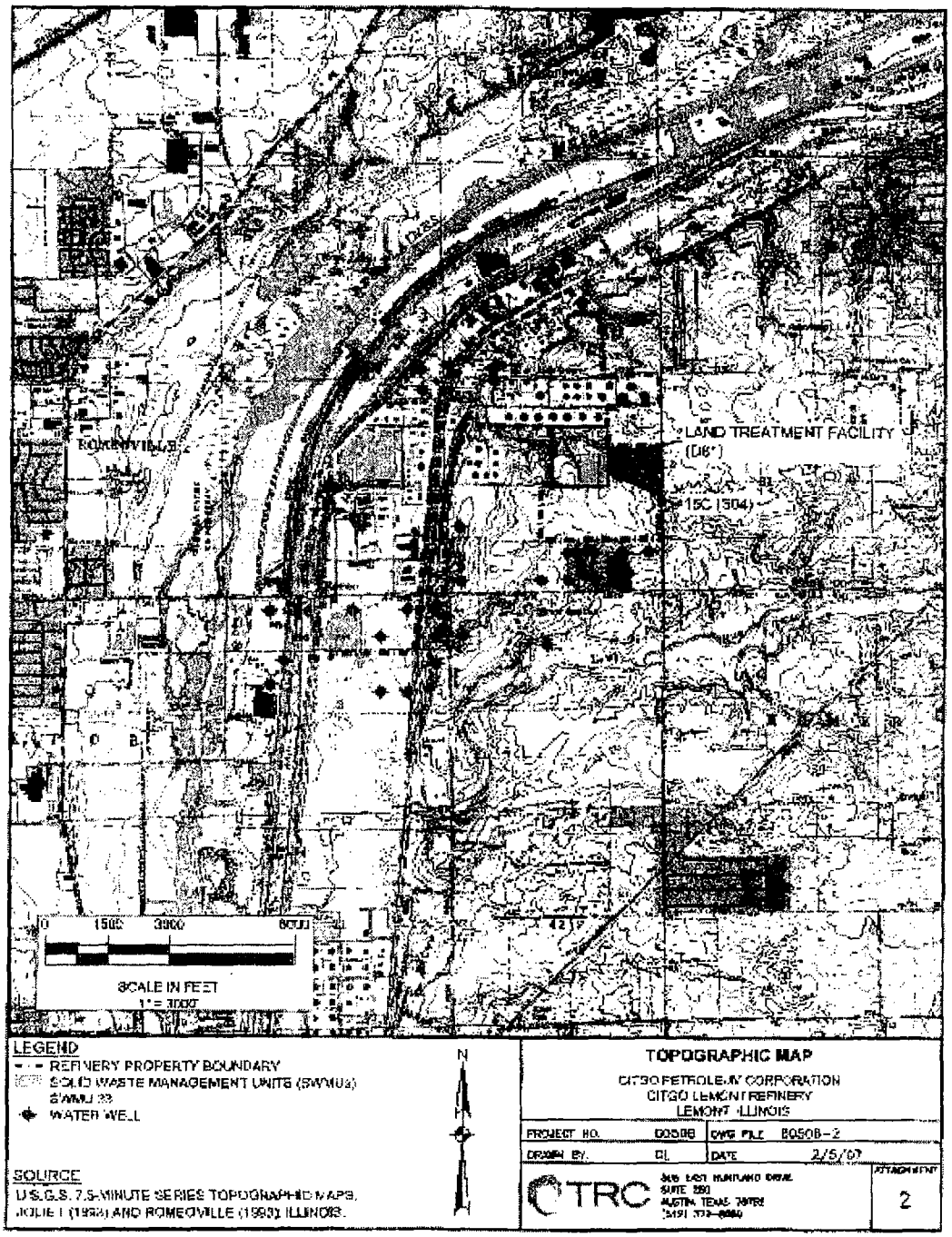


Figure 1: CITGO Lemont Refinery

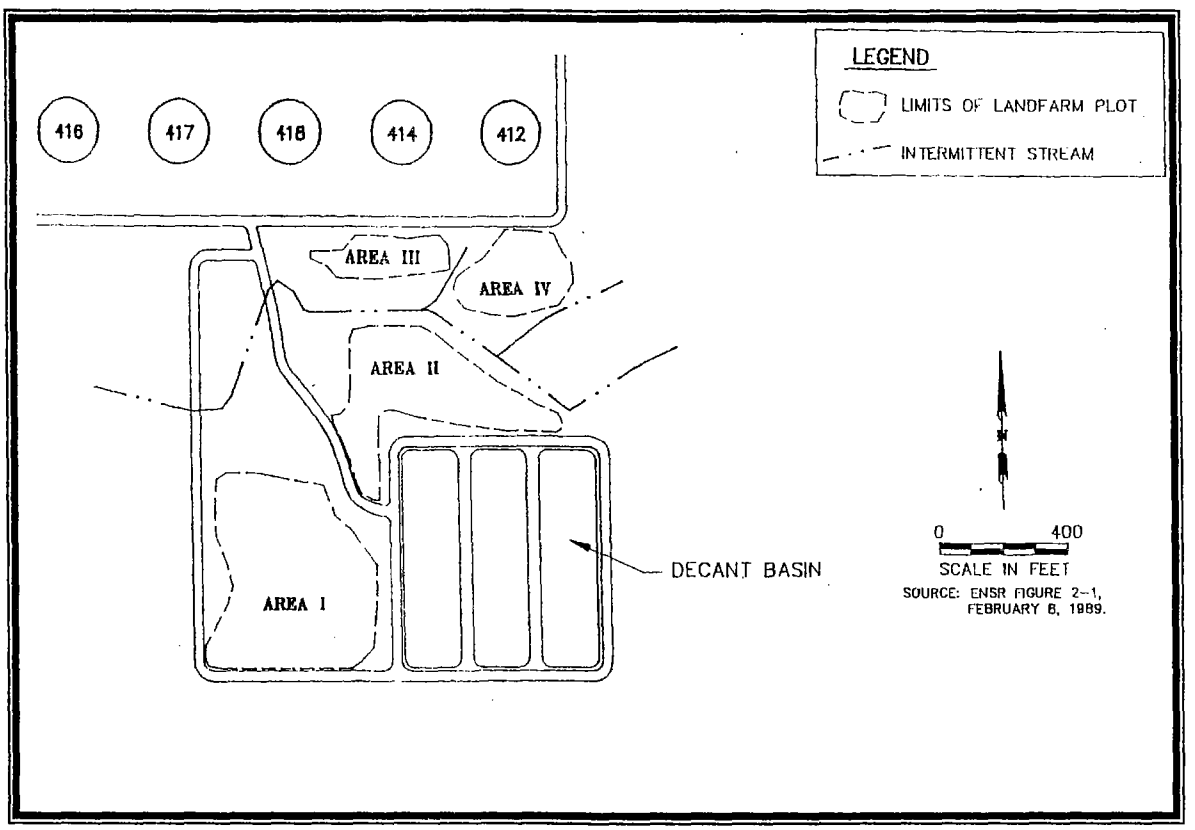


Figure 2: Land Treatment Areas, Intermittent Stream, & Decant Basin

I.D. DESCRIPTION OF HAZARDOUS WASTE MANAGEMENT ACTIVITIES

Operations began at the LTF when Area I was opened in 1973. The remaining three areas were opened in 1980. Wastes were either directly applied to the soil or were dewatered in adjacent decant basins. After dewatering, the solids were then placed on the land treatment areas. After waste was applied, it was incorporated into the soil.

API separator sludge (a listed hazardous waste: K051), was treated at the LTF until September, 1981. After that time, only nonhazardous wastes were applied to the land treatment areas. These nonhazardous wastes included clear well sludge, cooling tower sludge, heavy oil sludge, stormwater basin dredgings and water/wastewater treatment sludges. The majority of the wastes were stormwater basin dredgings and water/wastewater treatment sludges. The last time wastes were applied to the LTF for treatment was in November 1989. In 1995 the Permittee was allowed to place several piles of sludge generated during the closure of the storm water basin on Area I. These piles will be incorporated into the closure of the LTF.

The initial RCRA post-closure permit was issued to CITGO on September 18, 1997. The RCRA permit was renewed on April 8, 2011. The following hazardous waste units are permitted at the facility:

Hazardous Waste Unit Name	Capacity	Hazardous Waste in Units
Area I	5.5 acres	API Separator Sludge (K051)
Area II	4.2 acres	API Separator Sludge (K051)
Area III	1.2 acres	API Separator Sludge (K051)
Area IV	2.6 acres	API Separator Sludge (K051)
Total Acres =	13.5 acres	

SECTION II – APPROVED PERMIT APPLICATION

II.A. APPROVED PERMIT APPLICATION

This permit is based on the information in the approved permit application. The approved permit application consists of the following documents:

Document	Date	Date Received
RCRA Permit Application B-162R	April 23, 2007	April 23, 2007
Additional Information for B-162R	July 31, 2007	August 2, 2007
Additional Information for B-162R	August 10, 2007	August 10, 2007
Additional Information for B-162R CITGO intends to close the LTF	June 4, 2010	June 8, 2010
Additional Information for B-162R	June 9, 2010	June 14, 2010
B-162R-M-1: Class 1 & 1* Permit Modifications providing information required by the permit.	July 11, 2011	July 14, 2011
Corrected PA23 Form provided for B-162R-M-1	September 6, 2011	September 8, 2011
B-162R-M-3: Class 1* Permit Modification to update corrective action cost estimate.	September 8, 2011	September 12, 2011
Additional Information for B-162R-M-3	January 23, 2012	January 23, 2012

SECTION III - RCRA CLOSURE

A. INTRODUCTION

The RCRA Post-Closure Permit application addresses the four areas in the land treatment Facility (LTF) at the CITGO Refinery in Lemont, Illinois. As of the date of this permit, these hazardous waste land treatment units (D81) have not been certified closed. Therefore, this Post-Closure permit includes provisions to close these units prior to initiating the post-closure care period.

B. UNIT IDENTIFICATION

1. The Permittee shall perform closure of the following hazardous waste management units (HWMUs) in accordance with RCRA, the Approved Permit Application, and the conditions of this permit:

Type of Waste Unit	Unit Name	Size	Description of Hazardous Waste Contained in the Unit	
Land Treatment	Area I	5.5 acres	API Separator	Sludge (K051)
Land Treatment	Area II	4.2 acres	API Separator	Sludge (K051)
Land Treatment	Area III	1.2 acres	API Separator	Sludge (K051)
Land Treatment	Area IV	2.6 acres 13.5 acres total	API Separator	Sludge (K051)

The locations of these hazardous waste management units (HWMUs) are shown on Figure 1 of this permit.

2. The permittee is prohibited from placing additional hazardous or nonhazardous waste on the land treatment units.

C. INSPECTIONS

1. The Permittee shall inspect the components, structures, and equipment at the land treatment facility in accordance with the inspection schedules identified as Tables F-1, F-2, and F-3 in the Approved Permit Application. The inspection frequencies for the items in the Inspection Schedules shall be those specified in Tables F-1, F-2, and F-3.

2. Results of all inspections and a description of any remedial actions taken shall be documented in the inspection log for the facility.

3. The Permittee shall continue to follow the inspection procedures in this condition until the Illinois EPA approves the closure certification for the LTF.

D. MONITORING REQUIREMENTS

1. The Permittee shall maintain and monitor the LTF groundwater detection monitoring system in accordance with the Approved Permit Application and the conditions in this permit during the closure period.

2. The Permittee shall maintain and monitor the unsaturated zone (soil) monitoring system in accordance with the Approved Permit Application and the conditions in Section IV.D of this permit during the closure period.

E. CLOSURE REQUIREMENTS

1. The Permittee shall close the LTF in accordance with the plans and specifications contained in the closure plan to be submitted once the Permit has been approved, and in accordance with the conditions in this permit.

2. The permittee shall prepare a survey plat indicating the location and dimensions of each of the land treatment areas and any other hazardous waste disposal units with respect to permanently surveyed benchmarks. This plat shall be prepared and certified by a professional land surveyor. The plat shall contain a note, prominently displayed, which states the owner's and operator's obligation to restrict disturbance of the land treatment areas in accordance with the applicable Subpart G regulations and shall state the following:

   a. The waste materials contained in the land treatment areas are considered RCRA hazardous wastes. The wastes in the land treatment areas include API Separator Sludge (K051).

   b. Any material removed from the land treatment areas during future activities must be managed in accordance with 35 Ill. Adm. Code Subtitle G: Waste Disposal.

   The permittee shall file this survey plat with any local zoning authority, or authority with jurisdiction over local land use, and record with land titles, no later than the date the certification of closure of the land treatment areas is submitted to the Illinois EPA. The permittee shall submit the survey plat to the Illinois EPA Bureau of Land Permit Section with the certification of closure for the LTF.

3. As part of the closure activities, the Permittee shall:

   a. Record a notation on the deed to the facility property, or on some other instrument which is normally examined during title search that will in perpetuity notify any potential purchaser of the property that:

      1. The waste material in the LTF is considered a RCRA hazardous waste;

      2. Use of the area is restricted; and

      3. A survey plat and record of the type, location and quantity of waste material in the land treatment areas has been filed with the Illinois EPA, the County Recorder, and any local zoning authority or authority with jurisdiction over local land use.

   b. Attach the survey plat specified in this permit to the deed for the subject property, or on some other instrument which is normally examined during title search, which will in perpetuity notify any potential purchaser of the property of the requirements set forth in the notation on the survey plat.

   c. Submit the survey plat specified in this permit to the County Recorder, any local zoning authority and any other authority over local land use.

4. Within sixty (60) days after closure of the LTF is complete, the Permittee shall submit certification to the Illinois EPA by registered mail that the units have been closed in accordance with the approved closure plan. The following items must be included with the closure certification:

   a. A Class 1* permit modification requesting to modify this permit to delete those conditions that do not pertain to a post-closure permit. This submittal shall include a properly completed IEPA permit application form LPC-PA23. The PA23 Form must be signed and sealed by a qualified Professional Engineer registered in the State of Illinois and the owner/operator must check the box identifying the appropriate certification statement.

   b. The closure certification form in Attachment A to this permit. Signatures must meet the requirements of 35 Ill. Adm. Code Section 702.126. The qualified Professional Engineer registered in the State of Illinois should be present at all critical, major points (activities) during the closure. These might include soil sampling, soil removal, backfilling, final cover placement, etc. The frequency of inspections by the qualified Professional

Engineer must be sufficient to determine the adequacy of each critical activity.

c. A Closure Documentation Report which includes the following items:

i. A description of how the LTF was closed in accordance with the approved closure plan.

ii. Documentation that the requirements for the survey plat specified in Conditions E.2 and E.3 above have been met.

iii. Documentation that the owner/operator has recorded the notation on the deed (or other instrument) as specified in Condition E.3.

iv. The total volume of waste in each land treatment area. The term waste includes wastes resulting from decontamination activities.

v. Scaled drawings showing the horizontal and vertical boundaries of each land treatment area and the run-on / run-off control systems.

vi. The volume of any waste and waste residue removed, including wastes generated during decontamination procedures.

vii. A description of the method of waste handling and transport.

viii. Copies of the waste manifests.

ix. A description of the sampling and analytical methods used.

x. A chronological summary of closure activities and the cost involved.

xi. Tests performed, methods, and results.

xii. Color photographs of closure activities which document conditions before, during and after closure.

xiii. A scale drawing of all excavated or decontaminated areas and sample locations.

5. Under the provisions of 29 CFR 1910 (51 FR 15,654, December 19, 1986), cleanup operations must meet the applicable requirements of OSHA's Hazardous Waste Operations and Emergency Response standard. These requirements include hazard communication, medical surveillance, health and safety programs, air monitoring, decontamination and training. General site workers engaged in

activities that expose or potentially expose them to hazardous substances must receive a minimum of 40 hours of safety and health training off site plus a minimum of three days of actual field experience under the direct supervision of a trained experienced supervisor. Managers and supervisors at the cleanup site must have at least an additional eight hours of specialized training on managing hazardous waste operations.

F. FINANCIAL ASSURANCE

1. The permittee shall maintain financial assurance for closure of the LTF of at least $970,471 (in 2010 dollars). The financial assurance maintained by the facility shall be sufficient to meet the requirements at 35 Ill. Adm. Code 724 Subpart H.

2. Financial assurance must be maintained for closure of the LTF until the Illinois EPA approves the closure certification for the units in accordance with 35 IAC 724.243.

3. The Permittee shall demonstrate continuous compliance with the liability insurance requirements at 35 Ill. Adm. Code 724.247 and the documentation requirements of 35 Ill. Adm. Code 724.251 until the permitted units are certified closed.

    a. The permittee shall maintain liability coverage for sudden accidental occurrences of at least $1 Million per occurrence with an annual aggregate of at least $2 Million.

    b. The permittee shall maintain liability coverage for nonsudden accidental occurrences of at least $3 Million per occurrence with an annual aggregate of at least $6 Million.

SECTION IV - POST-CLOSURE CARE

A. SUMMARY

Hazardous waste management units where waste is left in place must receive post-closure care for at least 30 years after completion of closure. Pursuant to 35 IAC Part 724, activities required during post-closure care include, but are not limited to (1) maintenance of final cover, (2) monitoring of the groundwater, and (3) providing financial assurance for post-closure activities.

B. UNIT IDENTIFICATION

1. The Permittee shall provide post-closure care for the four areas in the hazardous waste land treatment facility (LTF) in accordance with the Approved Permit Application and the conditions of this permit:

Type of Waste Unit	Unit Name	Size	Description of Hazardous Waste Contained in Unit
Land Treatment	Area I	5.5 acres	(K051) API Separator Sludge
Land Treatment	Area II	4.2 acres	(K051) API Separator Sludge
Land Treatment	Area III	1.2 acres	(K051) API Separator Sludge
Land Treatment	Area IV	2.6 acres	(K051) API Separator Sludge
		13.5 acres total	

C. MONITORING, MAINTENANCE, & RECORD KEEPING

1. The Permittee shall implement the approved Post-Closure Plan contained in the Approved Permit Application. All post-closure care activities must be conducted in accordance with the conditions in this permit and the provisions of the approved Post-Closure Plan.

2. The Permittee shall begin the post-closure care period for the hazardous waste management unit(s) listed in Section B above after completion of closure of the unit(s) as specified in Section III of this permit. The permittee shall continue the post-closure care of these units for at least thirty (30) years after that date.

3. The Illinois EPA may require institutional controls restricting the future use of the site if necessary to protect public health and the environment, including permanent prohibition of the use of the site for purposes which may create an unreasonable risk of injury to human health or the environment. The permittee shall file such restrictions of record in the Office of the Recorder of the county in which the hazardous waste disposal site is located. If necessary, the Illinois EPA shall file such restrictions of record after any administrative and judicial challenges to such restrictions have been exhausted.

4. The Permittee shall not allow any use of the units designated in Section B to be used in a manner that will disturb the integrity of the final cover, the run-on or run-off control systems, or the function of the facility's monitoring systems during the post-closure care period unless such use is necessary to protect public health or the environment.

5. The Illinois EPA may require, at partial and/or final closure, continuation of any of the security requirements during part or all of the post-closure period.

6. The Permittee must request a permit modification to authorize a change in this permit or the approved Post-Closure Plan. This request must be in accordance with applicable requirements of Parts 702, 703 and 724 and must include a copy of the amended Post-Closure Plan for approval by the Illinois EPA.

7. The Permittee shall maintain and monitor the LTF groundwater detection monitoring system in accordance with the Approved Permit Application and the conditions in this Permit during the post-closure period.

8. The Permittee shall maintain and monitor the unsaturated zone monitoring system in accordance with the Approved Permit Application and the conditions in this Permit during the post-closure period.

9. The Permittee shall maintain the integrity and effectiveness of the final cover, including making repairs to the vegetative cover as necessary to correct the effects of settling, subsidence, erosion, and other events.

10. The Permittee shall prevent run-on and run-off from eroding or otherwise damaging the final cover.

11. The Permittee shall maintain a record of all inspections, monitoring, and maintenance activities in the facility's operating record. A copy of the operating record must be kept on-site.

12. The permittee shall not grow food chain crops on the land treatment facility cover system.

13. The Permittee shall comply with the requirements for the land treatment facility described in the approved permit application and the conditions in this permit as follows:

    a. Continue all operations (including pH control) necessary to enhance degradation and transformation and sustain immobilization of hazardous constituents in the treatment zone to the extent that such measures are consistent with other post-closure care activities.

    b. Maintain a vegetative cover over closed portions of the unit.

    c. Maintain the run-on control system.

    d. Maintain the run-off management system.

    e. Control wind dispersal of hazardous waste.

    f. Continue to comply with any prohibitions or conditions concerning growth of food-chain crops.

    g. Continue unsaturated zone monitoring.

D. UNSATURATED ZONE MONITORING

1. The Permittee shall monitor the soils below the treatment zone in the LTF in accordance with the Unsaturated Zone Monitoring (UZM) Plan in the Approved Permit Application and the conditions in this permit to determine if any hazardous constituents have migrated out of the treatment zone.

2. Sample Locations: The Permittee shall randomly select the locations for soil core samples in accordance with the procedure specified in Appendix I.1.6-1 of the Approved Permit Application. A minimum of eight soil samples shall be collected from the four land treatment areas as specified below:

Area	Size	No. of Samples
Area I	5.5 acres	3
Area II	4.2 acres	2
Area III	1.2 acres	1
Area IV	2.6 acres	2
TOTAL	13.5 acres	8

3. Sample Depth: The Permittee shall collect soil core samples immediately below the treatment zone in accordance with the procedures in the UZM Plan in the Approved Permit Application and the conditions in this permit.

The treatment zone at the permitted units is defined as a depth of the historically applied waste plus no more than an additional five feet below the original land surface. The elevations of the original land surface are identified in Figures 2-1 and 2-2 in the Unsaturated Zone Monitoring Plan in Appendix I.1.6-1 of the Approved permit application. The elevations of the original soil surface may be confirmed by visually inspecting the color of the soils immediately above and below the elevations identified in Figures 2-1 and 2-2.

4. Sampling and Analysis Procedures: The Permittee shall follow the sampling and analysis procedures in Appendix I.1.5 and Appendix I.1.6-1 of the Approved Permit Application and the conditions in this permit.

   a. Analytical methods used must be in accordance with the USEPA's "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) Third Edition, Final Update III, Revision 4," dated December 1996 – or most recent version. The analytical methods must utilize reporting limits that are equal to or less than the monitoring limits for the parameters specified in the permit. The practical quantitation limits (PQLs) may be used as monitoring limits in those cases where the lab is unable to reach the monitoring limits. The laboratory report must identify all instances when a PQL was used in place of a monitoring limit specified in this permit.

   b. The SW-846 test methods, sample holding times, containers, and preservatives specified in Table 4-3 in Appendix I.1.5 of the Approved Permit Application must be used when collecting and analyzing soil samples required by the Unsaturated Zone Monitoring program in the application and the conditions in this permit.

5. Sampling Frequency and Schedule: The Permittee shall collect soil samples annually in the fourth quarter of each calendar year.

6. Analytical Parameters: The soil samples collected shall be analyzed for the following parameters as specified below:

   a. The soil samples collected every fifth year shall be analyzed for the parameters listed in the following table:

Metals	Volatile Compounds	Semivolatile Acid-Extractable Compounds	Semivolatile Base/ Neutral Extractable Compounds
Antimony	*Acetone*	Benzenethiol	*Acenaphthylene*
Arsenic	Benzene	Cresols (o, m, & p)	Anthracene
Barium	*n-Butylbenzene*	2,4-Dimethylphenol	Benzo(a)anthracene
Beryllium	sec-Butylbenzene	2,4-Dinitrophenol	Benzo(b)fluoranthene
Cadmium	Carbon disulfide	4-Nitrophenol	Benzo(k)fluoranthene
Chromium	Chlorobenzene	Phenol	*Benzo(g,h,i)perylene*
Cobalt	Chloroform		Benzo(a)pyrene
Lead	1,2-Dichloroethane		Bis(2-ethylhexyl)phthalate
Mercury	1,4-Dioxane		Butyl benzyl phthalate
Nickel	Ethylbenzene		Chrysene
Selenium	Ethylene dibromide		Dibenz(a,h)acridine
Vanadium	*4-Isopropyltoluene*		Dibenz(a,h)anthracene
	Methyl ethyl ketone		Dichlorobenzenes
	n-Propylbenzene		Diethyl phthalate
	Styrene		7,12-Dimethylbenz(a)anthracene
	Toluene		Dimethyl phthalate
	1,3,5-Trimethylbenzene		Di(n)butyl phthalate
	1,2,4-Trimethylbenzene		Di(n)octyl phthalate
	Xylene (total)		Fluoranthene
			Fluorene
			Indene
			Indeno(1,2,3-cd)pyrene
			Methyl chrysene
			1-Methyl naphthalene
			2-methylnaphthalene
			Naphthalene
			Phenanthrene
			Pyrene
			Pyridine
			Quinoline

Note: Non-Skinner List constituents are shown in italics.

b. Soil samples collected during all other years shall be analyzed for the parameters listed in the following table:

Metals	Volatiles	Semivolatiles
Antimony	Acetone	Acenaphthylene
Arsenic	Benzene	Anthracene
Barium	n-Butylbenzene	Benzo(a)anthracene
Beryllium	sec-Butylbenzene	Benzo(g,h,i)perylene
Cadmium	Ethylbenzene	Butyl benzyl phthalate
Chromium	4-Isopropyltoluene	Chrysene
Cobalt	Methyl ethyl ketone	Di(n)octyl phthalate
Lead	n-Propylbenzene	Dibenz(a,h)anthracene
Mercury	Toluene	Fluorene
Nickel	1,3,5-Trimethylbenzene	Indeno(1,2,3-cd)pyrene
Selenium	1,2,4-Trimethylbenzene	Methyl chrysene
Vanadium	Xylene (total)	1-Methylnaphthalene
		2-Methylnaphthalene
		Naphthalene
		Phenanthrene
		Pyrene

c. If the sampling events required by Condition IV.D.6.a (every fifth year) identify compounds that are not included in Condition IV.D.6.b, those compounds shall be added to the list of compounds in Condition IV.D.6.b.

7. The results of each soil sampling event shall be submitted to the Illinois EPA by January 15 of each year.

8. The Permittee shall determine whether there is a statistically significant change over background values for any hazardous constituent to be monitored under Condition IV.D.6 each time the soil core monitoring is conducted. This determination shall be made using the statistical procedures contained in the Approved Permit Application and this condition. The Permittee shall make this determination within thirty (30) days after receipt of lab analysis results.

   Concentrations greater than the Monitoring Limit for each compound specified in the following table shall be considered to be a statistically significant increase (SSI).

Chemical	Monitoring Limit	Chemical	Monitoring Limit
Inorganics (mg/kg)		**Semivolatile Organic Compounds (µg/kg)**	
Antimony	6.69	Acenaphthylene	330
Arsenic	55.6	Anthracene	660
Barium	1028.00	Benzo(a)anthracene	660
Beryllium	2.53	Benzo(b)fluoranthene	660
Cadmium	9.11	Benzo(k)fluoranthene	660
Chromium	368.00	Benzo(g,h,i)perylene	330
Cobalt	60.10	Benzo(a)pyrene	660
Lead	504.00	Bis(2-ethylhexyl)phthalate	660
Mercury	0.90	Butyl benzyl phthalate	660
Nickel	138.00	Chrysene	660
Selenium	0.54	Dibenz(a,h)acridine	330
Vanadium	446.00	Dibenz(a,h)anthracene	660
Volatile Organic Compounds (µg/kg)		Dichlorobenzenes	660
Acetone	20	Diethyl phthalate	660
Benzene	5	7,12-Dimethyl-benz(a)anthracene	660
n-Butylbenzene	5	Dimethyl phthalate	660
sec-Butylbenzene	5	Di(n)butyl phthalate	660
Carbon disulfide	5	Di(n)octyl phthalate	660
Chlorobenzene	5	Fluoranthene	660
Chloroform	5	Fluorene	330
1,2-Dichloroethane	5	Indene	330
1,4-Dioxane	500	Indeno(1,2,3-cd)pyrene	330
Ethylbenzene	5	Methyl chrysene (TIC only)	330
Ethylene dibromide	10	1-Methylnaphthalene	660
4-Isopropyltoluene	5	2-methylnaphthalene	330
Methyl ethyl ketone	20	Naphthalene	660
n-Propylbenzene	5	Phenanthrene	660
Styrene	5	Pyrene	660
Toluene	5	Pyridine	660
1,3,5-Trimethylbenzene	5	Quinoline	330
1,2,4-Trimethylbenzene	5	Benzenethiol	3300
Xylene (total)	5	Cresols (o, m, & p)	660
		2,4-Dimethylphenol	660
		2,4-Dinitrophenol	3300
		4-Nitrophenol	3300
		Phenol	660

9. If the Permittee determines, pursuant to Condition IV.D.8, that there is a statistically significant increase (SSI) of hazardous constituents below the treatment zone, the Permittee shall take the following actions:

a. Notify the Illinois EPA in writing of this finding within seven days, indicating which constituents have shown statistically significant increases, and

b. Within ninety (90) days of determining there is a SSI, apply for a permit modification to modify the post-closure practices at the facility to maximize the success of degradation, transformation or immobilization processes in the treatment zone; or,

c. Demonstrate that a source other than regulated units caused the increase or that the increase resulted from an error in sampling, analysis, or evaluation. The Permittee must do the following when making this demonstration:

i. Notify the Agency in writing within seven days of determining there is an SSI that the Permittee intends to make a demonstration under 724.378(h);

ii. Within 90 Days of determining there is an SSI, submit a report to the Agency demonstrating that a source other than regulated units caused the increase or that the increase resulted from an error in sampling, analysis, or evaluation;

iii. Within ninety (90) days of determining there is a SSI, submit an application for a permit modification to make any appropriate changes to the unsaturated zone monitoring program at the facility; and

iv. Continue to monitor in accordance with the unsaturated zone monitoring program established under this permit and the regulations.

E. INSPECTIONS

1. The Permittee shall inspect the vegetative cover system, security system & benchmarks, Stormwater Control System, and Groundwater Monitoring Systems at the LTF in accordance with the approved permit application. All inspections shall be recorded using the Post-Closure Period Inspection Form in Appendix I.2.2 of the Approved Permit Application. The results of all inspections shall be maintained in the Inspection Log which shall be located in the CITGO Lemont Refinery's Environmental Department File Room.

2. The permittee shall inspect the LTF quarterly and within 24 hours of any precipitation event that yields 4 or more inches of rain in a 24 hour period.

3. The permittee shall record all repairs made to the LTF that are noted during an inspection in accordance with the Repair Log located in Appendix I.2.2.6 of the Approved Permit Application. All repairs made to the LTF shall be recorded in a log which shall be located in the CITGO Lemont Refinery's Environmental Department File Room.

F. NOTICES AND CERTIFICATION

1. After final closure has been certified, the person or office specified in the approved Post-Closure Plan must keep the Post-Closure Care Plan during the remainder of the post-closure period.

2. No later than sixty (60) days after completion of the established post-closure care period for each hazardous waste disposal unit, the Permittee shall submit to the Illinois EPA, by registered mail, a certification that the post-closure care for the hazardous waste disposal unit was performed in accordance with the specifications in the approved Post-closure Plan. The certification must be signed by the owner or operator and a qualified professional engineer registered in the State of Illinois. Documentation supporting the professional engineer's certification must be furnished to the Illinois EPA upon request until the Illinois EPA releases the Permittee from the financial assurance requirements for post-closure care.

G. FINANCIAL ASSURANCE

3. The permittee shall maintain financial assurance for post-closure care of the land treatment facility (LTF) of at least $4,899,480 (in 2010 dollars). This amount was calculated by multiplying the Total Annual Post-Closure Cost of $163,316 (in 2010 dollars) by 30 years. The financial assurance maintained by the facility shall be sufficient to meet the requirements at 35 Ill. Adm. Code 724 Subpart H.

4. Financial assurance must be maintained for post-closure of the LTF until the Illinois EPA approves the post-closure certification for the units in accordance with 35 IAC 724.243.

SECTION V:
GROUNDWATER DETECTION MONITORING PROGRAM

A. SUMMARY

Groundwater parameters monitored in the uppermost aquifer below the facility indicate that, at the present time, no groundwater impacts have occurred. Therefore, a Groundwater Detection Monitoring Program meeting the requirements of 35 Ill. Adm. Code 724.198 shall be implemented at the facility.

The CITGO Lemont Refinery has six (6) existing wells to monitor groundwater in the lower portion of the Lemont Drift aquifer that are utilized for the Groundwater Detection Monitoring Program. The average depth to groundwater in the wells is approximately 74 feet. The Groundwater Detection Monitoring Program will therefore consist of five (5) downgradient wells, one (1) upgradient well and eighteen (18) piezometers for determining groundwater surface elevation only.

B. DEFINITIONS

As used herein, the words or phrases set forth below shall have the following definitions:

1. "CITGO" shall refer to CITGO Petroleum Corporation-Lemont Refinery.

2. "Site" or "Facility" refers to the location at135th Street & New Avenue, Lemont, County of Will, State of Illinois.

3. "Permittee" refers to the Facility.

4. "Illinois EPA" refers to the Illinois Environmental Protection Agency.

5. "RCRA" shall mean the Resource Conservation and Recovery Act as defined by Section 3.425 of the Environmental Protection Act, 415 ILCS 5/1 (2006).

6. "Permit" refers to the RCRA Part B Permit.

7. "Point of Compliance" refers to the vertical surface located at the hydraulically downgradient limits of the waste management area (Land Treatment Facility (LTF)) extending down into the uppermost aquifer underlying the regulated unit.

8. "Ft-bgs" refers to the number of feet below the ground surface.

9. "Ft-MSL" refers to the number of feet below the ground surface referenced to mean sea level.

10. "Detected" shall mean a concentration equal to or above the PQL listed in the latest promulgated version of USEPA's "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) for the applicable analytical methods specified in the approved Sampling and Analysis Procedures, which are incorporated by reference in Condition V.H of the Permit.

11. "Uppermost Aquifer" refers to the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically connected with this aquifer in the vicinity of the facility. The uppermost aquifer in the vicinity of the CITGO facility has been identified as the Lemont Drift and consists of sandy silt, silty sand, sand and gravel layers occurring in the lower part of the Lemont Drift and the dolomite bedrock underlying the drift.

12. "Stick-up" refers to the height of the referenced survey datum. This point is determined within $\pm$ 0.01 foot in relation to mean sea level, which in turn is established by reference to an established National Geodetic Vertical Datum.

C. IMPLEMENTATION

1. The Permittee shall implement the Groundwater Detection Monitoring Program upon the effective date of this Permit. On that date, the groundwater monitoring requirements set forth in this Permit shall supersede those previously established.

2. The Permittee shall carry out the detection monitoring specified in this Permit on the groundwater beneath the CITGO Land Treatment Facility in Lemont, Illinois. The uppermost aquifer in the vicinity of the facility has been identified as the sandy silt, silty sand, sand and gravel layers occurring in the lower part of the Lemont Drift and the dolomite bedrock underlying the drift. For the purpose of this Permit and in accordance with the 35 Ill. Adm. Code Part 620 regulations, the uppermost aquifer has been designated Class I: Potable Resource Groundwater.

3. The Point of Compliance, defined as the vertical surface located at the hydraulically downgradient limit of the waste management area that extends down into the uppermost aquifer underlying the regulated unit, is delineated by the wells identified as the point of compliance wells in Condition V.D.1 and illustrated in Figure B-9 of the approved Permit Renewal Application.

D. WELL LOCATIONS AND CONSTRUCTION

1. The Permittee shall install and maintain groundwater monitoring wells and piezometers at the locations identified in the table below to allow for the collection of groundwater samples and elevations from the uppermost aquifer.

The location of these wells and piezometers are specified in Figure B-9 of the approved Permit Renewal Application.

IEPA Well No.	Facility Well No.	Well Depth (ft)	Boring Depth Elevation (ft MSL)	Screen Depth Interval (ft)
G01D	UA-1*	106.90	611.90	92.1 - 102.1
G02D	UA-2**	86.60	605.64	70.0 - 80.0
G03D	UA-3**	89.55	608.18	74.7 - 84.7
G04D	UA-4**	87.00	608.98	72.1 - 82.1
G05D	UA-5**	92.60	602.24	72.1 - 82.1
G06D	UA-6**	96.10	605.55	79.0 - 89.0

* Denotes Upgradient Wells
** Denotes Point of Compliance Wells

Piezometers

P01D	B-1***	111.10	584.10	101.90 - 106.90
P02D	B-2	110.20	586.86	100.90 - 105.90
P03D	B-3	125.00	587.07	116.00 - 121.00
P04D	B-4	99.25	584.09	90.30 - 95.30
P05D	B-5	103.10	585.39	94.77 - 99.77
P06D	B-6	113.10	587.36	103.92 - 108.92
P07D	B-7	117.42	587.70	107.67 - 112.67
P08D	B-8	118.25	589.20	108.51 - 113.51
P09D	B-9	108.70	584.47	99.50 - 104.50
P10D	B-10	122.20	591.26	117.01 - 122.01
P11D	B-11	131.85	589.24	122.92 - 127.92
P12D	B-12	135.10	588.19	126.20 - 131.20
P13D	B-13	128.00	590.26	119.70 - 124.70
P14D	B-14	99.50	586.58	91.00 - 96.00
P15D	B-15	136.93	584.61	127.50 - 132.50
P16D	B-16	124.15	595.48	115.90 - 120.90
P17D	B-17	127.05	599.97	122.90 - 127.90
P18R	B-18R	120.25	586.23	110.00 – 120.00

*** Denotes Upgradient Piezometer

2. Construction of any new monitoring well/piezometer must be at a minimum in accordance with the diagram contained in Attachment B to this Permit unless otherwise approved in writing by the Illinois EPA. Any new monitoring well/piezometer to be installed must be continuously sampled and logged on Illinois EPA boring logs which can be found at http://www.epa.state.il.us/land/regulatory-programs/permits-and-management/forms/index.html#groundwater-permits.

3. The Permittee shall notify the Illinois EPA within thirty (30) days in writing if any of the wells identified in Condition V.D.1 above are damaged or the structural integrity has been compromised. A proposal for the replacement of the subject well shall accompany this notification. The well shall not be plugged until the new well is on-line and monitoring data has been obtained and verified, unless the well is extremely damaged and would create a potential route for groundwater contamination. Prior to replacing the subject well, the Permittee shall obtain written approval from the Illinois EPA regarding the proposed installation procedures and construction.

4. Should any well become consistently dry or unserviceable; a replacement well shall be provided within ten (10) feet of the existing well. This well shall monitor the same zone as the existing well and be constructed in accordance with the current Illinois EPA groundwater monitoring well construction standards at the time that the well is replaced. A replacement well which is more than ten (10) feet from the existing well or does not monitor the same geologic zone must be approved by the Illinois EPA and designated as a new well.

5. The Permittee shall submit boring logs, construction diagrams and data sheets from installation and development of a new or replacement well to the Illinois EPA at the address below with thirty (30) days of the date that installation of the well is completed. In addition, the Permittee shall submit certification that plugging and abandonment of a well was carried out in accordance with the approved procedures to the Illinois EPA at the address below within thirty (30) days of the date that the well is plugged and abandoned. All information should be submitted to the appropriate State and/or local agencies.

   Illinois Environmental Protection Agency
   Bureau of Land - #33
   Permit Section
   1021 North Grand Avenue East
   Post Office Box 19276
   Springfield, Illinois 62794-9276

6. All wells/piezometers shall be equipped with protective caps and locks. Monitoring wells or piezometers located in high traffic areas must protected with bumper guards.

7. All groundwater monitoring wells and piezometers not utilized in the groundwater monitoring system, but retained by the facility, must be constructed and maintained in accordance with 77 Ill. Adm. Code 920 regulations. Monitoring wells and piezometers that are improperly constructed must be abandoned in accordance with Condition V.D.3.

E. MONITORING PARAMETERS

1. The Permittee shall determine groundwater quality at each groundwater monitoring well identified in Condition V.D.1, at both the upgradient and point of compliance locations, semi-annually during the active life of the four areas in the hazardous waste land treatment facility (D81) (including closure and post-closure care period). Samples collected during the semi-annual sampling events of each year shall be analyzed for the constituents below:

Semi-Annual Groundwater Sampling

Field Parameters	Storet	Units
pH	00400	Standard Units
Specific Conductance	00094	micromhos/cm
Temperature of Water Sample	00011	(°F)
Turbidity	45626	NTUs
Depth to Water (below land surface)	72019	Feet
Depth to Water (below measuring point)	72109	Feet
Elevation of Groundwater Surface	71993	Ft-MSL
Elevation of Bottom of Well #	72020	Ft-MSL
Elevation of Measuring Point (top of casing)##	72110	Ft-MSL

Shall be determined during the second sampling event each year.
Shall be surveyed once every five (5) years, at the request of the Illinois EPA, or whenever the elevation changes as required by Condition V.G.2.

Indicator Parameters	Storet	Units
TOX	78115	µg/L
TOC	00680	µg/L
Arsenic (dissolved)	01000	µg/L
Selenium (dissolved)	01145	µg/L

NOTE: All parameters with the "(dissolved)" label to the right shall be determined using groundwater samples which have been filtered through a 0.45 micron filter and used for statistical purposes along with TOX and TOC. Should a parameter be detected in groundwater and found to be statistically above background, the subsequent monitoring event must include total (unfiltered) analysis and a comparison to the appropriate 35 Ill. Adm. Code 620, Class I, Groundwater Quality Standard must then take place.

2. Alternate concentration limits may be established in accordance with 35 Ill. Adm. Code 724.194(b) where the Permittee can determine a constituent will not pose a substantial hazard to human health or the environment. The alternate

concentration limits proposed by the facility must be approved by the Illinois EPA.

3. The Permittee shall establish and maintain established background values in accordance with the procedures specified in Section E of the approved Permit Renewal Application as well as the following procedures:

   a. Background groundwater quality for a monitoring parameter or constituent shall be based on data from four (4) consecutive sampling events of the upgradient groundwater monitoring well for two (2) years.

   b. In developing the data base used to determine a background value for each parameter or constituent, the Permittee shall take a minimum of four replicate samples from each upgradient well during each of the four (4) semi-annual background sampling events. An equal number of replicate samples will be taken from each upgradient well to ensure equal weightings in statistics.

   c. For those monitoring parameters or constituents not detected above the practical quantitation limit (PQL) during background gathering, the PQL shall be the established background value.

F. DETECTION MONITORING PROGRAM

1. The Permittee shall determine groundwater quality at each monitoring well identified in Condition V.D.1 semi-annually during the active life of the regulated unit (including the closure and post-closure care periods). The Permittee shall express the groundwater quality at each monitoring well in a form necessary for the determination of statistically significant changes (i.e. means, variances, etc.).

2. The Permittee shall determine the groundwater flow rate and direction in the uppermost aquifer semi-annually, and report at least annually from monitoring wells identified in Condition V.D.1.

3. The Permittee shall determine whether there is a statistically significant increase, (or decrease in the case of pH) over the background values established for each parameter identified in Condition V.E.1 each time groundwater quality is determined at the point of compliance. In determining whether such a change has occurred, the Permittee must compare the groundwater quality at each monitoring well identified in Condition V.D.1 to the background value derived in accordance with the statistical procedures specified in Section E of the approved Permit Renewal Application.

G. GROUNDWATER ELEVATION

1. The Permittee shall determine the groundwater surface elevation referenced to mean sea level (MSL) at each well each time groundwater is sampled in accordance with Condition V.J.3.

2. The Permittee shall determine the surveyed elevation of "stick-up" referenced to MSL when the well is installed (with as-built diagrams) and every five (5) years, or at the request of the Illinois EPA, or whenever the elevation changes in accordance with Condition V.J.5.

3. Elevation, as referenced to MSL, of the bottom of each monitoring well (Storet 72020), is to be reported at least annually. The mandatory measurement shall be taken during the second semi-annual sampling event each year.

H. SAMPLING AND ANALYTICAL PROCEDURES

1. The Permittee shall use the techniques and procedures described in Section E of the approved Permit Renewal Application, except as modified below, when obtaining and analyzing samples from the groundwater monitoring wells described in Condition V.D.1:

   a. Samples shall be collected using the techniques described in Section E of the approved Permit Renewal Application.

   b. Samples shall be preserved and shipped (when shipped off-site for analysis) in accordance with the procedures specified in Section E of the approved Permit Renewal Application.

   c. Samples shall be analyzed in accordance with the procedures specified in Section E of the approved Permit Renewal Application.

   d. Samples shall be tracked and controlled using the chain of custody procedures specified in Section E of the approved Permit Renewal Application.

I. STATISTICAL PROCEDURES

When evaluating the monitoring results in accordance with Condition V.F, the Permittee shall use the following procedure:

1. The statistical methods to be used shall be as specified in Section E of the approved Permit Renewal Application.

2. Analytical data shall be compared to the parameter background values established in accordance with Section E of the approved Permit Renewal Application.

3. For Constituents which have not been detected in the groundwater, a value of two times the practical quantitation limit (PQL) shall be used as the background concentration.

J. REPORTING AND RECORDKEEPING

1. The Permittee shall enter all monitoring, testing, and analytical data obtained in accordance with Condition V.E, V.F, V.G, V.H and V.I in the operating record. The data must include all computations, calculated means, variances, t-statistic values and t-statistic results or results of statistical test that the Illinois EPA has determined to be equivalent.

2. Samples collected to meet the requirements of the groundwater monitoring program described in Conditions V.E, V.F, V.G, and V.I shall be collected and reported, as identified in the table below. All additional information required by the groundwater monitoring program (as specified in Conditions V.E, V.F, V.G and V.I) shall also be submitted to the Illinois EPA at the address listed in Condition V.D.5 in accordance with this schedule.

Samples to be Collected During The Months of:	Results Submitted to the Illinois EPA by the Following:	Parameters
April - June	July 15	Condition V.E.1
October - December	January 15	Condition V.E.1

3. Groundwater surface elevation data, measured pursuant to Condition V.G.1 shall be collected semi-annually and submitted to the Illinois EPA according to the schedule in Condition V.J.2.

4. The Permittee shall report the groundwater flow rate and direction in the uppermost aquifer as required by Condition V.F.2 during the second semi-annual sampling event of the year.

5. The Permittee shall report the surveyed elevation, as required by Condition V.G.2, of the top of the well casing "stick-up", referenced to MSL in accordance with the following schedule:

   a. For wells identified in Condition V.D.1, every five (5) years (during the second semi-annual sampling event), <u>or</u> at the request of the Illinois EPA, or whenever the elevation changes.

b. For any new wells, at the time of installation and reported in the as-built diagrams, subsequent measurements shall be made every five (5) years (during the second semi-annual sampling event), or at the request of the Illinois EPA, or whenever the elevation changes.

6. Elevation of the bottom of each monitoring well identified in Condition V.D.1, as referenced to MSL, is to be reported at least annually. This measurement shall be taken during the second semi-annual sampling event (Storet 72020) each year in accordance with Condition V.G.3.

7. Information required by Conditions V.J.2, V.J.3, V.J.5 and V.J.6 must be submitted in an electronic format. The information is to be submitted, as fixed-width text files formatted as found in Attachment B, in accordance with the schedule found in Condition V.J.2 above. Additional guidance regarding the submittal of the information in an electronic format can be found at http://www.epa.state.il.us/land/regulatory-programs/electronic-intro.html.

8. The Permittee shall submit a completed "RCRA Facility Groundwater, Leachate and Gas Reporting Form" (LPC-592) as a cover sheet for any notices or reports required by the Permit for identification purposes. Only one copy of the LPC-592 must accompany your submittal. However, the Permittee must submit one (1) original and (excluding the groundwater and leachate monitoring results submitted in an electronic format) a minimum of two (2) copies of each notice or report you submit to the Illinois EPA. The form is not to be used for Permit modification requests.

9. The Permittee shall report all information to the Illinois EPA in a form which can be easily reviewed. All submittals must contain tables of data drawings and text (as necessary) to accurately describe the information contained in the submittal.

10. If the Permittee determines, pursuant to Condition V.F.3 that there is a statistically significant increase for any of the parameters specified in Condition V.E.1 at any monitoring well at the point of compliance, the Permittee shall:

a. Notify the Illinois EPA in writing indicating what parameters and wells have shown statistically significant increases and provide all statistical calculations. This notification shall be submitted to the Illinois EPA within seven (7) days of the date that the increases are discovered.

b. Sample the groundwater in all wells listed in Condition V.D.1 and determine the concentration of all constituents identified in Appendix I of 35 Ill. Adm. Code 724 such that the results will accompany the permit modification required by Condition V.J.10.d below.

c. For any Appendix I compounds found in the analysis pursuant to this condition, the Permittee may resample within one month and repeat the analysis for those compounds detected. If results of the second analysis confirm the initial results, then these constituents will form the basis for compliance monitoring. If the Permittee does not resample for the compounds pursuant to this condition, the hazardous constituents found during the initial Appendix I analysis will form the basis for compliance monitoring.

d. Submit to the Illinois EPA an application for a permit modification to establish a compliance monitoring program meeting the requirements of 35 Ill. Adm. Code 724.199. The application shall be submitted to the Illinois EPA within ninety (90) days of the date that the increase is discovered. Furthermore, the application must include the following information:

i. An identification of the concentration of any 35 Ill. Adm. Code 724, Appendix I constituents found in the groundwater at each monitoring well at the point of compliance;

ii. Any proposed changes to the groundwater monitoring system at the facility necessary to meet the requirements 35 Ill. Adm. Code 724.199;

iii. Any proposed changes to the monitoring frequency, sampling and analysis procedures, or methods or statistical procedures used at the facility necessary to meet the requirements of 35 Ill. Adm. Code 724.199; and

iv. For each hazardous constituent found at the compliance point, a proposed concentration limit under 35 Ill. Adm. Code 724.194(a)(1) or 724.194(a)(2), or a notice of intent to seek an alternate concentration limit for a hazardous constituent under 35 Ill. Adm. Code 724.194(b).

e. Submit to the Illinois EPA a corrective action feasibility plan to meet the requirements of 35 Ill. Adm. Code 724.200 unless the concentrations of all hazardous constituents identified under Condition V.J.10.b above are listed in 35 Ill. Adm. Code 620.410 and their concentrations do not exceed the respective Groundwater Quality Standards or the Permittee has sought an alternate concentration limits under Condition V.J.10.d.iv above for every hazardous constituent identified under Condition V.J.10.b above. This plan must be submitted to the Illinois EPA within 180 days of the date the increase is discovered.

f. Submit to the Illinois EPA all data necessary to justify any alternate concentration limit for a hazardous constituent sought under Condition V.J.10.d.iv above. This plan must be submitted to the Illinois EPA within 180 days of the date the increases is discovered.

11. If the Permittee determines, pursuant to Condition V.F.3, that there is a statistically significant increase above the background values for the parameters specified in Condition V.E.1, the Permittee may demonstrate that a source other than a regulated unit caused the increase or that the increase resulted from error in sampling, analysis, or evaluation. The Permittee shall submit a permit modification application in accordance with Condition V.J.10.d unless the demonstration successfully shows that a source other than the regulated unit caused the increase or that the increase resulted from errors in sampling, analysis or evaluation and the Illinois EPA concurs.

To make this demonstration, the Permittee shall:

a. Notify the Illinois EPA in writing that they intend to make this demonstration. This notification must be submitted to the Illinois EPA within seven (7) days of the date that the increase is discovered.

b. Submit a report to the Illinois EPA which demonstrates that a source other than a regulated unit caused the increase, or that the increase resulted from error in sampling, analysis, or evaluation. This report must be submitted within ninety (90) days of the date that the increase is discovered.

c. Submit to the Illinois EPA an application to make any appropriate changes to the Groundwater Detection Monitoring Program. This application must be submitted within ninety (90) days of the date that the increase is discovered.

d. Continue to monitor in accordance with the detection monitoring program at the facility.

K. REQUEST FOR PERMIT MODIFICATION

1. If the Permittee determines that the Groundwater Detection Monitoring Program no longer satisfies the requirements of 35 Ill. Adm. Code 724.198, the Permittee must, within ninety (90) days, submit an application for a permit modification to the Illinois EPA to make any appropriate changes to the program which will satisfy the regulations.

2. Conditions in this section of the Permit may be modified in accordance with 35 Ill. Adm. Code 705.128 if there is cause for such modification, as defined in 35 Ill. Adm. Code 702.184. Causes for modification identified in this section include, but are not limited to, alterations to the permitted facility, additional information which would have justified the application of different permit conditions at the time of issuance, and new regulations.

SECTION VI
CORRECTIVE ACTION ACTIVITIES

A. INTRODUCTION

1. In accordance with Section 3004 of RCRA and 35 IAC 724.201, CITGO shall institute such corrective action as necessary to protect human health and the environment from all releases of hazardous wastes or hazardous constituents listed in Appendix H of 35 IAC Part 721 from any solid waste management unit (SWMU) at its Refinery in Lemont, Illinois. For the purpose of this permit, the constituents of concern being addressed under this section are the Modified Skinner List of constituents provided in the approved permit Renewal Application. Corrective action at this facility must be conducted by:

   a. conducting a RCRA Facility Investigation (RFI) to determine whether releases of hazardous wastes and hazardous constituents have occurred from any solid waste management unit (SWMU) at its facility, and if so, the nature and extent of the release(s); and

   b. based upon the results of the RFI, developing and implementing a Corrective Measures Program which describes the necessary corrective actions which will be taken. The required corrective actions shall be those actions necessary to protect human health and the environment from all releases of hazardous wastes or hazardous constituents listed in the afore mentioned Modified Skinner List of constituents for the facility, above site-specific cleanup objectives from any of the SWMUs.

2. This facility's original RCRA permit was issued by Illinois EPA on September 18, 1997 (Effective Date: October 23, 1997). Section IV of the permit contained corrective action requirements for the solid waste management units (SWMUs) listed in Section VI.B below at the facility.

3. The facility has completed a substantial amount of investigation and, as necessary, remediation at select SWMUs. This permit summarizes the corrective action activities completed to date and identifies the efforts which must still be carried out to complete corrective action for the SWMUs of concern at the facility.

4. Unless there is a desire to modify specific requirements set forth in this Section, information submitted to Illinois EPA regarding the corrective action requirements set forth in this Section is not a request to modify this permit nor subject to the requirements of 35 Ill. Adm. Code 703, Subpart G.

5. The Permittee must provide corrective action, as appropriate, for any future releases from SWMUs present at the facility.

6. The requirements of 35 Ill. Adm. Code 742 must be met, as appropriate, in determining remediation objectives for corrective action activities. In addition, the requirements of 35 Ill. Adm. Code 620 and 724 must be met during implementation of the RCRA corrective action program at this facility.

7. Illinois EPA's final actions on all corrective action-related submittals made by the Permittee are subject to the appeal provisions of Section 39 and 40 of the Illinois Environmental Protection Act.

8. The Permittee must conduct and complete Inspection and Maintenance Program for the storm water sewer system, and the process wastewater sewer system in accordance with the approved plans.

B. CONDUCTING THE RCRA FACILITY INVESTIGATION

The Permittee must conduct a RCRA Facility Investigation (RFI) to determine the nature and extent of releases of hazardous wastes and hazardous constituents from various SWMUs at the subject facility. In general, this investigation has been or is being done on a SWMU by SWMU basis. To date, CITGO has conducted a substantial amount of investigation at the SWMUs of concern at this facility.

The RFI for each SWMU is carried out in two phases. Each phase will provide for a more detailed evaluation of each SWMU identified. Phase I will define whether a release from the SWMU has occurred to the environmental media of concern. Phase II will define the nature and extent of any release from the SWMU to soil, groundwater, and surface water/sediments. A more detailed discussion of the goals of each phase of the RFI is presented in Section II of Attachment C-1. The guidance for conducting a RFI is provided as Attachment C-1 to the Permit.

1. CITGO has conducted a substantial amount of investigative and remedial effort to date. A summary of these activities, based on Illinois EPA's letters approving plans/reports associated with these efforts is contained in Attachment C-2 of this Permit.

2. Based upon the results of the RCRA Facility Assessment which was conducted by the Illinois EPA for this facility, the SWMUs identified in the following table must be evaluated in the RFI for potential releases to certain environmental media of concern also identified in the table. The SWMUs initially identified were grouped into two categories (Group I and Group II) based on their estimated potential risk to human health and the environment. The Group I SWMUs have either had known releases in the past or pose the highest potential for releases that

could impact the environment. Group II SWMUs are not known to have had a release and have a low potential for impact. In addition, all new SWMUs discovered during the course of carrying out this corrective action program are added to Group II (please note that this is not a complete listing of SWMUs at the subject facility).

In addition to identifying the SWMUs which must be evaluated in an RFI, the table below identifies the current status of corrective efforts at each SWMU (see the "CA Status" column in the table). Furthermore, the table identifies those SWMUs where groundwater must be addressed as part of the corrective action program (see "Need to Address GW" column). Note that following abbreviations are used in the table below:

CM = Corrective Measures
CMP = Corrective Measures Plan
ELUC = Environmental Land Use Control
CWPP = Construction Worker Precaution Plan
NFA = No Further Action
TBD = To Be Determined
I/C= Industrial/Commercial

Group I

SWMU	Name	CA Status	Need to Address GW?
2 A-E	Former Process Wastewater Line (Big Inch)	NFA for soil only issued on 1/31/06. A supplemental investigation report received on 11/23/09 and under IEPA review (CA-134).	Yes
3	Former North Plant API Separator and Above Ground Corrugated Plate Separator	NFA for soil only issued on 8/24/05.	Yes
4	Hot Oil Line, Seneca Petroleum Storage Tank	NFA issued on 4/12/07.	No
7	Interceptor Trench; Canal Dock	RFI Phase II Workplan approved on 4/25/08. IEPA verbally approved supplemental workplan on 7/8/10. CMP received on 10/25/10.	TBD
11A	Recycle Tank; 11A - Mobil Interface Tank 436	Phase II RFI Report received on 4/17/09 and under IEPA review (CA-123).	TBD

SWMU	Name	CA Status	Need to Address GW?
11B	Recycle Tank; 301 Tank	Phase II RFI Report received on 4/17/09 and under IEPA review (CA-124).	TBD
12	Tank 201 and Proximate Area	NFA on soil only issued on 10/4/10 (CA-126 & 128); ELUC required for I/C use.	Yes
17	Intermittent Stream/Stormwater Conveyance	NFA issued on12/17/07; area access control required.	No
19D	Former Sludge Drying Areas	Phase II RFI/CM report approved and NFA for soil only issued on 12/18/08; ELUC required for I/C use.	Yes (as part of GMZ)
21	Vertical Oil Storage Tanks at the Stormwater Basin (SWB)	Phase I Report approved and NFA issued on 4/12/07; ELUC required for I/C use.	No
24	Former API Separator	Determination of further CA work be completed as a part of the facility's GMZ made on 8/24/05.	Yes (as part of GMZ)
30	Former Primary Light Oil (PLO) Underground Soil/Groundwater	Phase II RFI Workplan approved on 4/25/08. CMP received on 8/4/09 and under IEPA review (CA-125).	TBD
31A	Former Underground Storage Tanks located at Active Solvent Loading Rack Area	NFA for Soil only issued on 12/17/07; ELUC required for I/C use, engineered barrier and CWPP. Draft ELUC was received on 5/23/08 and under IEPA review (CA-98).	Yes
31B-E	Former Underground Storage Tanks located at Former Service Station	NFA for soil only issued on 8/24/05. Draft ELUC was received on 5/28/08 and under IEPA review (CA-99).	Yes

SWMU	Name	CA Status	Need to Address GW?
32	Former Process Blending UST at the Process Blend Center	NFA for soil only issued on 7/17/06.	Yes
33	Groundwater Monitoring Zone (GMZ) around beneath the storm water basins	GMZ Re-evaluation approved on 5/17/07. Continued GMZ operation is required.	Yes (as GMZ)
34	French Drain System	NFA on Soil only issued on 6/16/09; ELUC required for I/C and CWPP. A revised CMP received to request a modification to the ELUC requirement on 4/8/10 and under IEPA review (CA-138).	Yes
36	Former USTs Located at South Plant Maintenance Area	Phase I RFI report approved and NFA issued on 7/17/06.	No
37	Former USTs Located near WWTP Outfall to Chicago Sanitary & Ship Canal	Phase I RFI report approved and NFA issued on 7/17/06.	No

Group II

SWMU	Name	CA Status	Need to Address GW?
1	Former Empty Drum Storage Area	NFA issued on 6/1/04.	No
5	Former Dump Area for Lime Sludge Seneca Tank Location	NFA issued on 11/4/10. ELUC required for I/C.	No
10	North Plant Heat Exchanger Bundle Cleaning Pad	Phase II RFI workplan has been approved.	TBD
13	Sludge Drying Area	Phase II RFI workplan has been approved.	TBD
15A-B	Wastewater Treatment Sludge Decant Basin within Land Treatment Facility	Phase II RFI workplan has been approved.	TBD

SWMU	Name	CA Status	Need to Address GW?
16	Sludge Application Area	NFA issued on 11/27/06.	No
18	Waste Staging Area	Phase II RFI workplan has been approved.	TBD
19A	Former Sludge Drying Area	Phase II RFI workplan has been approved.	TBD
19B	Former Sludge Drying Area	CM completion report received on 11/13/09 and under IEPA review (CA-130).	TBD
19C	Former Sludge Drying Area	Phase II RFI workplan has been approved.	TBD
20	Active Drum Staging Area	Phase II RFI workplan has been approved.	TBD
25A	Heat Exchanger Bundle Cleaning Pad	NFA issued on 6/16/09; closure activities upon closure of the unit. ELUC required for I/C use.	TBD upon Closure
25B	Heat Exchanger Bundle Cleaning Pad	Phase II RFI workplan has been approved.	TBD upon Closure
25C	Supplementary Heat Exchanger Bundle Cleaning Pad -- Cleaning Building	NFA issued on 11/4/10. ELUC required for I/C.	No
35	Red Dye Spill Area	NFA issued on 11/4/10. ELUC required for I/C.	No
43A	Suspected Spill Location Along the Product Pipe Line: Canal Dock Piping	Phase I RFI report received on 4/17/09 and under IEPA review (CA-122).	TBD
43B	Suspected Spill Location Along the Product Pipe Line: Primary Light Oil Pump	Phase I RFI report received on 4/17/09 and under IEPA review (CA-122).	TBD

SWMU	Name	CA Status	Need to Address GW?
43C	Suspected Spill Location Along the Product Pipe Line: Refinery Flare	Phase I RFI report received on 4/17/09 and under IEPA review (CA-122).	TBD
43D	Suspected Spill Location Along the Product Pipe Line: Barge	Phase I RFI report received on 4/17/09 (CA-122).	TBD
43E	Suspected Spill Location Along the Product Pipe Line: Above Ground Tank	Phase I RFI report received on 4/17/09 (CA-122).	TBD
43F	Suspected Spill Location Along the Product Pipe Line: Lift Station Pump	Phase I RFI report received on 4/17/09 and under IEPA review (CA-122).	TBD
43G	Suspected Spill Location Along the Product Pipe Line: Process Drain System	Phase I RFI report received on 4/17/09 and under IEPA review (CA-122).	TBD
43H	Suspected Spill Location Along the Product Pipe Line: Pipeline Primary Light Oil	Phase I RFI report received on 4/17/09 (and under IEPA review CA-122).	TBD
43I	Suspected Spill Location Along the Product Pipe Line: Condenser (Sulfur Dioxide)	Phase I RFI report received on 4/17/09 and under IEPA review (CA-122).	TBD
43J	Pipeline Release Near Tanks 92 and 108	ELUC required for I/C, engineered barrier (installed), and CCWPP.	Yes
44	Spill at the Gasoline Transfer Line	Phase II RFI workplan has been approved.	TBD
45	Contaminated Fill Area near Canal Dock	Newly discovered SWMU. SWMU Assessment Report was received on 8/31/10.	TBD

3. The Groundwater Management Zone (GMZ) Monitoring Program and Site-Wide Groundwater Monitoring Program are currently being conducted as part of the Corrective Action Program.

a. The GMZ was originally approved by the Illinois EPA on April 11, 1994 and was identified as SWMU 33 in the RCRA Permit. The current GMZ program implemented at a portion of the south plant includes: 14 monitoring wells, 15 bedrock piezometers, two staff gauges located in the Illinois and Michigan (I&M) Canal, and the Green Coke Storage Area (GCSA) sump (which controls the groundwater by inward gradient control pumping). The GMZ monitoring requirements currently include:

(1) Semi-annual groundwater and surface water elevation measurements;

(2) Semi-annual groundwater sampling and analysis for VOCs;

(3) No sampling of monitoring wells in which there is a presence or evidence of LNAPL; and

(4) Semi-annual and annual monitoring reports submitted to Illinois EPA.

Note that any changes to the above monitoring requirements are subject to Illinois EPA's approval under the Corrective Action Program.

b. The Site-Wide Groundwater Monitoring Program consists of a network of wells used to determine the quality of groundwater as it relates to multiple SWMUs. CITGO has proposed to address the groundwater exposure route at SWMUs that are required to address groundwater contamination during Phase I/II RFI at each SWMU through proposed Site-Wide Groundwater Monitoring Program.

c. CITGO's "Site-Wide Groundwater Monitoring and Investigation Workplan" submitted to Illinois EPA on January 31, 2007 was approved with conditions and modifications on May 31, 2007.

d. CITGO's Current Conditions Report and Proposed Workplan for Future Groundwater Management was submitted to Illinois EPA on September 15, 2008. This workplan was approved with conditions and modifications on April 26, 2010 (Log No. B-162-CA-102). This letter approved the site-wide groundwater management approach.

e. It is appropriate to address groundwater contamination at the identified SWMUs required to address groundwater, through the proposed site-wide groundwater management approach. However, should the facility choose to obtain an NFA for groundwater on SWMU by SWMU basis, the facility will be required to address groundwater contamination at each identified SWMU and the Illinois EPA will make the NFA determinations on a SWMU by SWMU basis.

4. CITGO has been conducting inspection and maintenance work at Process Sewers (SWMU No. 38), Storm Sewers (SWMU No. 39), and Open Flow Ditches (SWMU No. 40) in accordance with a workplan approved by Illinois EPA on February 21, 2003 as required in Section VI.D of this permit. As a result of the on-going investigation, some of the segments/structures of the investigated Process and Storm Sewers were determined to require further corrective action investigation. The table below identifies those locations which, to date, require a more formal investigation and have thus determined to be SWMUs. Note that this is not the complete list of the defects which require further investigation. The facility must update the list of Storm and Process Sewer related SWMUs in its annual sewer report required in Section VI.D below.

SWMUs Identified from RCRA Sewer Investigation

SWMU 38 – Process Sewer

38a	Process Sewer Line Segment: 31-MH8-DP-01 to 31-MH8-DP-02	NFA was issued on 7/8/10; ELUC required for I/C and GW restriction.
38b	Process Sewer Line Segment: 31-MH5-DP-03 to 31-MH5-DP-01	NFA on soil only issued on 10/4/10 (CA-126 & 128); ELUC required for I/C use.
38c	Process Sewer Structure: 31-MH5-DP-01	NFA on soil only issued on 10/4/10 (CA-126 & 128); ELUC required for I/C use. Groundwater must be investigated.
38d	Coker Road Process Sewer- (7) Line Segments: 52-LS51-DP-01 to 52-MH34-DP-01	Phase I RFI/Closure report received on 6/7/10 and under IEPA review (CA-141).

SWMU 39 – Storm Sewer

39a	Storm Sewer – Line Segment: 130-MH79-DRC-01 to 130-MH75-DRC-02	Phase II RFI Report received on 11/30/09 and under IEPA review (CA-131).
39b	Storm Sewer – Line Segment: 130-MH75-DRC-05 to 130-MH75-DRC-32; Structure: 130-MH75-DRC-05	Phase II RFI Report received on 11/30/09 and under IEPA review (CA-132).

5. CITGO will be required to establish environmental land use controls (ELUC) for most of the SWMUs listed in Condition VI.B.2 above. All ELUC required must be developed and recorded in accordance with 35 Ill. Ad, Code 742 Subpart J and the Illinois EPA approval letters regarding RCRA corrective action.

6. The RFI has been initiated at all SWMUs; status of the RFI to date for each SWMU is described in the table provided in Conditions VI.B.2 and 4 above.

   In general, following the submittal of the RFI Phase I/II report, the Illinois EPA's BOL will review the submitted data. The Illinois EPA's BOL will offer CITGO the opportunity to meet with Illinois EPA staff to discuss the results of the review prior to finalization of the review comments. The Illinois EPA's BOL will then notify CITGO in writing of the results of the review. This notification will discuss the status of each of the SWMUs evaluated as part of the Phase I/II RFI.

   a. If the Illinois EPA's BOL determines, based upon the data provided within and obtained from the Phase I/II Workplan for each SWMU investigated, that (1) there is no potential for release from that SWMU to the environmental media of concern <u>and</u> (2) there has been no release of hazardous wastes or hazardous constituents to the environmental media of concern from that SWMU, then no further action will be required for that SWMU.

   b. If the Illinois EPA's BOL determines, based on data from the Phase I/II RFI for each SWMU investigated, that (1) there has been a release to any environmental media of concern, or (2) there currently is a release to any environmental media of concern, then the nature and extent of the release must be defined. If the Group 1 Phase I/II RFI did not adequately define nature and extent to the satisfaction of the Illinois EPA, then a Phase II (or supplemental Phase II) investigation will be required as discussed in 6.c below.

   c. If the results of the Phase I/II RFI are inconclusive or incomplete, a Phase II (or Supplemental Phase II) investigation must be conducted by CITGO. This investigation shall be conducted to collect additional information so that a conclusive determination can be made regarding a current/past release from a SWMU. This investigation shall be carried out in accordance with the RFI guidance provided above.

   d. The final letter sent to the facility conveying the results of the review will:

      1. Identify those SWMUs for which no further investigation is needed;

      2. Identify those SWMUs for which no further action is required;

3. Identify those SWMUs that must be further investigated as part of a Phase II or a Supplemental Investigation to determine the rate and extent of migration of hazardous waste or hazardous constituents and the concentrations of the hazardous waste or hazardous constituents in the environmental media potentially impacted by a release from the SWMU;

4. Identify, for each SWMU requiring further investigation, the associated environmental media which must be further investigated;

5. Identify those SWMUs and associated environmental media for which corrective measures are required.

e. Illinois EPA action on the final Phase I/II RFI report and proposed Release Criteria will be subject to the appeal provisions of Sections 39(a) and 40(a) of the Illinois Environmental Protection Act.

7. If CITGO is notified in writing in accordance with Condition B.6 that any SWMUs identified during the Phase I/II or Supplemental Phase II RFI as needing further investigation, then CITGO must develop and submit a Phase II RFI Workplan. Phase II of the RFI shall focus on determining the rate and extent of migration of hazardous waste or hazardous constituents and the concentrations of the hazardous waste or hazardous constituents in any affected media (soil, groundwater, or surface water). Such a workplan must be submitted no more than 90 days after the facility is notified in writing in accordance with Condition B.6 above. The Scope of Work for Phase II or Supplemental Phase II of the RFI is contained in Attachment C-1 to the Permit.

8. The Illinois EPA's BOL will approve, approve with modifications, or disapprove the RFI Phase II or Supplemental Phase II workplan in writing and provide comments regarding the required corrections or modifications.

a. Within 60 days of the receipt of such comments, CITGO must modify the plan or submit a new plan for the Illinois EPA's BOL approval.

b. Within 60 days of, or by a due date specified by, the Illinois EPA's approval of the workplan, CITGO shall begin implementing the plan according to the terms and schedule established in the workplan.

c. Illinois EPA action on the workplan will be subject to the appeal provisions of Sections 39(a) and 40(a) of the Illinois Environmental Protection Act.

9. CITGO must submit a report documenting the efforts carried out in accordance with the approved RFI Phase II or Supplemental Phase II Workplan and the schedule established within the workplan. This report must be prepared in a manner which summarizes the overall Phase II RFI efforts and specific information required to be obtained in the Phase II RFI Workplan as described in Attachment C-1. F.

10. Following submittal of the RFI Phase II or Supplemental Phase II report, the Illinois EPA's BOL will review the data and notify CITGO in writing of the results.

    a. If the Illinois EPA determines that the nature and extent of hazardous waste or hazardous constituents from a SWMU release, above the Release Criteria, has not been adequately defined during the Phase II investigation, then CITGO must conduct a supplemental investigation.

    b. If the Illinois EPA's BOL determines that further investigation is not required, based on data obtained from the RFIs, the Illinois EPA reserves the right to require that corrective measures be conducted for the SWMUs of concern to address releases identified through the Phase I, Phase II, and supplemental investigations.

    c. If the Illinois EPA determines that (1) there has not been a release of hazardous waste or hazardous constituents from a SWMU to the groundwater (2) but there is a potential for future releases of hazardous waste or hazardous constituents from a SWMU to the groundwater, then the Illinois EPA may require a longer term groundwater monitoring program at any SWMU where substantial soil contamination exists (as determined by the Illinois EPA), or at any SWMU which would meet the definition of a land disposal unit. This need for additional monitoring is dependent on the corrective action taken in response to the waste and/or contaminated soil present at the SWMU.

    d. The Illinois EPA's response to the Phase II or Supplemental Phase II report will:

        i. Identify those SWMUs investigated as part of the Phase II RFI for which no further action is required.

        ii. Identify those SWMUs investigated as part of the Phase II RFI for which no further investigation is needed.

        iii. Identify those SWMUs investigated as part of the Phase II RFI for which supplemental investigations must be conducted.

iv. Identify, for each SWMU requiring further investigation, the associated environmental media which must be investigated further and the information to be obtained during the investigation.

v. Identify those SWMUs and associated environmental media for which corrective measures are required.

vi. Identify those SWMUs for which longer-term monitoring is required.

e. Illinois EPA action on the final RFI Phase II or Supplemental Phase II report will be subject to the appeal provisions of Sections 39(a) and 40(a) of the Illinois Environmental Protection Act.

C. CORRECTIVE MEASURES REQUIREMENTS

If it has been determined from the Phase I/II RFI that corrective measures must be taken in response to releases from any SWMU that have not been addressed by approved interim measures, then CITGO shall implement a Corrective Measures Program (CMP). The CMP is divided into five phases:

1. Phase I should consist of (1) development of final cleanup objectives, (2) discussion of those SWMUs requiring corrective measures and (3) a preliminary evaluation of the corrective action alternatives available for each SWMU requiring corrective action.

2. Phase II should consist of (1) detailed evaluation of the corrective measure alternatives for each SWMU and (2) development of a conceptual design of the corrective action chosen for each SWMU including remedial system(s) and/or institutional controls.

3. Phase III should consist of development and submission of the final design plans for the corrective action and should include the preparation of the operation and maintenance plans.

4. Phase IV is the actual construction/installation of the selected corrective measure.

5. Phase V is operation, maintenance, and monitoring of the selected corrective action to ensure it is properly protecting human health and the environment.

Attachment D provides an overview of each Phase of the CMP. The Illinois EPA's decision to approve or disapprove of any element of the CMP described in Attachment D shall be subject to the appeal provisions of Sections 39(a) and 40(a) of the Illinois Environmental Protection Act.

The Phase I CMP report must be submitted within 120 days after receipt of the notification from the Illinois EPA that corrective measures are necessary to protect human health and the environment from observed releases from SWMUs at the facility. The purpose of the CMP is to describe the procedures which will be followed in providing corrective action at each SWMU requiring corrective measures. The proposed corrective measures must be sufficient to protect human health and the environment from the observed release. Subsequent submittals associated with the corrective measures process must be submitted to the Illinois EPA in accordance with the schedule in the Phase I CMP Report.

D. SEWER INSPECTION AND MAINTENANCE PLAN

1. CITGO's workplan providing an inspection and Maintenance Plan for the following SWMUs: (1) Process Sewer System (SWMU No. 38); (2) Storm Sewer System (SWMU No. 39) ; and (3) Open Flow Ditches (SWMU No. 40). This workplan for a multi-year phased investigation of the sewer systems was approved by Illinois EPA on February 21, 2003 (Log No. B-162-CA-41).

2. The RCRA Sewer Inspection and Maintenance activities commenced in 2004 (Year 1). CITGO has developed a 10-year plan for the sewer inspection program, which included the division of the facility into seven (7) areas: Area 1, Area 2, Area 3, Area 4A, Area 4B, Area 5, and Area 6. Inspection and Maintenance of sewer segments in each Area is conducted in accordance with the approved plan. All defects discovered during the sewer inspection are rated in accordance with Illinois EPA approved workplans.

3. A report summarizing the results of the approved inspection and maintenance plan must be developed for each calendar year. The report shall be developed in accordance with the procedures set forth in the approved plan and be submitted to Illinois EPA by March 31 of each following year.

4. Any defect discovered during the RCRA sewer inspection and maintenance program must be evaluated to be rated for structural and environmental defects in accordance with the procedures approved by Illinois EPA for potential release to the surrounding environment. If a defect is determined to required additional investigation, a workplan shall be developed and submitted for further corrective action investigation and remediation as necessary. Each of these defects will be assigned a SWMU ID and any further corrective action will be conducted in accordance with the procedures set forth in Sections VI.B and VI.C of this Permit.

5. CITGO completed the inspection and maintenance activities for Open Flow Ditches (SWMU No. 40) in 2005, which consisted of approximately 26,000 linear

feet of open ditches at the facility. The 2005 RCRA Sewer Investigation Report documenting the inspection of SWMU 40 was approved on 6/8/06.

E. FINANCIAL ASSURANCE FOR CORRECTIVE ACTION

1. The approved cost estimate for completing corrective action at this facility is $6,892,654.00 (in 2011 dollar), which includes a 5% adjustment for contingencies. This approved value is based upon estimates of the cost of the various required/known efforts required to be carried out as part of the corrective action program at this facility. As required by Condition VI.E.2 below, these estimates must be updated annually to reflect the recent results of the program and the impacts these results have on determining what is needed to complete corrective action at the facility. For example, cost estimate for a given SWMU would initially be based upon the cost for investigating any contamination which may be present at the unit; however, this estimate will eventually need to be revised to reflect any required corrective measures for the unit.

2. CITGO shall prepare un updated cost estimate each year for the completion of any corrective measure(s) required under this Permit, in order to provide financial assurance for completion of corrective action, as required under 35 IAC 724.201(b). Such a cost estimate will be based upon the cost of contamination investigations and assessments for the SWMU(s), and design, construction, operation, inspection, monitoring, and maintenance of the corrective measure(s) to meet the requirements of this Permit. This cost estimate must be submitted to the Illinois EPA's BOL as a Class 1* Permit modification request by December 31 of each year.

3. CITGO shall demonstrate continuous compliance with 35 IAC 724.201 by providing documentation of financial assurance using a mechanism specified in 35 IAC 724.243, in at least the amount of the cost estimate required under Condition VI.E.1 the words "completion of corrective action" shall be substituted for "closure and/or post-closure," as appropriate in the financial instrument specified in 35 IAC 724.251. The documentation shall be submitted to the Illinois EPA's BOL within 60 days after the approval of the initial or revised cost estimates required under Conditions VI.E.1 or E.2. The Illinois EPA's BOL may accept financial assurance for completion of corrective action in combination with another financial mechanism acceptable under 35 IAC 724.246 at its discretion.

F. FUTURE RELEASES FROM SWMUS

Whenever the Permittee becomes aware that any SWMU identified in Condition B.2, that was not found to be releasing hazardous waste or constituents during the RFI, or was not addressed under the corrective action requirements of this permit, may have started to

release hazardous waste or constituents, the Permittee shall report this information to the Illinois EPA's BOL in writing within thirty (30) days of discovery. Upon the Illinois EPA's written request, the Permittee shall determine the nature and extent of the contamination by following the procedures set forth in Conditions VI.B through VI.D, beginning on the date approved by Illinois EPA.

G. NOTIFICATION REQUIREMENTS FOR AN ASSESSMENT OF NEWLY-IDENTIFIED SOLID WASTE MANAGEMENT UNIT(S)

1. The Permittee shall notify the Illinois EPA's BOL in writing of any newly-identified SWMU(s) discovered during the course of groundwater monitoring, field investigations, environmental audits, or other means, no later than sixty (60) calendar days after discovery. For the purposes of this permit, newly-identified SWMUs shall mean all SWMUs located at the subject facility for which corrective actions have not previously been required by this permit, or which have not been previously listed in the RFA for this facility. The notification shall provide the following information, if available:

    a. The location of the newly-identified SWMU in relation to other SWMUs on a scaled map or drawing;

    b. The type and past and present function of the SWMU;

    c. The general dimensions, capacities, and structural description of the unit (available drawings and specifications);

    d. The period during which the unit was operated;

    e. The specifics on all materials, including but not limited to, wastes and hazardous constituents, that have been or are being managed at the SWMU, to the extent available; and

    f. The results of any relevant available sampling and analysis which may aid in determining whether releases of hazardous wastes or hazardous constituents have occurred or are occurring from the unit.

2. If the submitted information demonstrates a potential for a release of hazardous waste or constituents from the newly identified SWMU, the Illinois EPA may request in writing, that the Permittee prepare a Solid Waste Management Unit (SWMU) Assessment Plan and a proposed schedule of implementation and completion of the Plan for any additional SWMU(s) discovered subsequent to the issuance of this Permit.

3. Within 120 calendar days after receipt of an Illinois EPA request for a SWMU Assessment Plan, the Permittee shall prepare a SWMU Assessment Plan consistent with the requirements of VI.B through VI.E above. This SWMU Assessment Plan must also propose investigations, including field investigations if necessary, to determine the release potential to specific environmental media for the newly-identified SWMU. The SWMU Assessment Plan must demonstrate that the sampling and analysis program, if applicable, is capable of yielding representative samples and must include parameters sufficient to identify migration of hazardous waste and hazardous constituents from the newly-discovered SWMU(s) to the environment.

4. After the Permittee submits the SWMU Assessment Plan, the Illinois EPA shall either approve, approve with conditions, or disapprove the Plan in writing. If the plan is approved, the Permittee shall begin to implement the Plan within sixty (60) calendar days of receiving such written notification, or by the date specified by Illinois EPA. If the Plan is disapproved, the Illinois EPA shall notify the Permittee in writing of the Plans deficiencies and specify a due date for submittal of a revised plan.

5. The Permittee shall submit a report documenting the results of the approved SWMU Assessment Plan to the Illinois EPA in accordance with the schedule in the approved SWMU Assessment Plan. The SWMU Assessment Report shall describe all results obtained from the implementation of the approved SWMU Assessment Plan. The Illinois EPA's response will be similar to that described in Conditions VI.B through VI.E above.

H. COMPLETION OF CORRECTIVE MEASURES

1. CITGO shall complete those corrective measures contained in the Corrective Measures Program approved in accordance with Condition VI.C above and/or interim measures approved in accordance with Condition VI.I below. CITGO may request the Illinois EPA's BOL to consider corrective action complete at any point. The petition for such a request should include a demonstration of the following:

   a. That there have been no releases of hazardous waste or hazardous constituents to any media from the SWMUs; or

   b. That all releases are below the Release Criteria (initial corrective action objectives); or

   c. That all releases of hazardous waste or hazardous constituents to all media targeted within the RFI for investigation have been remediated to the target cleanup objectives specified within the approved Phase I CMP

Report or an interim measures plan, and shall also describe how releases will be prevented in the future; or

d. That, through the use of an Illinois EPA approved risk assessment, the corrective action is successful in protecting human health and the environment; or

e. Some combination of the above demonstrations.

Appropriate documentation and certification must accompany such a demonstration. The actual documentation to be submitted will be described in the Phase II CMP Report.

CITGO shall be notified in writing if the Illinois EPA's BOL approves the request that the corrective actions can be considered complete. The notification from the Illinois EPA's BOL to CITGO may include a release from the financial requirements of Condition VI.E above. This action shall be subject to the appeal provisions set forth in Section 39(a) and 40(a) of the Environmental Protection Act.

2. A determination of no further action shall not preclude the Illinois EPA's BOL from requiring continued or periodic inspections of the SWMU(s) or continued or periodic monitoring of the specified environmental media when site-specific circumstances indicate that releases of hazardous wastes including hazardous constituents are likely to occur, if necessary to protect human health and the environment. Any requirement for long-term groundwater monitoring will only be required at a SWMU where substantial soil contamination exists (as determined by the Illinois EPA) or at any SWMU which would meet the definition of a land disposal unit. Any such requirement will be subject to the appeal provisions of Section 39(a) and 40(a) of the Illinois Environmental Protection Act.

3. A determination of no further action shall not preclude the Illinois EPA's BOL from requiring further investigations, studies, or remediation at a later date, if new information or subsequent analysis indicates a release or likelihood of a release from a SWMU at the facility that is likely to pose a threat to human health or the environment. In such a case, the Illinois EPA's BOL shall initiate a Permit modification to rescind the no further action determination.

I. INTERIM MEASURES

At any time during the RFI the Permittee may initiate interim measures and/or voluntary corrective actions for the purpose of preventing continuing releases and/or mitigating the results of releases and/or mitigating the migration of hazardous wastes or hazardous

constituents. It may not be necessary to conduct all phases of the RFI investigation if the Illinois EPA's BOL and the Permittee agree that a problem can be corrected, or a release cleaned up, without additional study and/or without a formal corrective measures program (CMP).

1. Prior to implementing any interim measures, the Permittee must submit detailed information regarding the proposed interim measures to the Illinois EPA's BOL for approval. This information shall include, at a minimum:

    a. Objectives of the interim measures: how the measure is mitigating a potential threat to human health and the environment and/or is consistent with and integrated into any long-term solution at the facility;

    b. Design, construction, and maintenance requirements;

    c. Schedules for design and construction; and

    d. Schedules for progress reports.

2. If the Illinois EPA's BOL determines that a release cannot be addressed without additional study and/or a formal CMP, then the Illinois EPA's BOL will notify the Permittee that these must be performed. Any proposal made under this provision or any other activity resulting from such proposal, including the invocation of dispute resolution, shall not affect the schedule for implementation of the RFI or of any other portion of the permit.

3. If the Illinois EPA determines that interim measures are necessary to protect human health or the environment, the Permittee will be notified by way of a permit modification.

SECTION VII: STANDARD CONDITIONS FOR POST-CLOSURE CARE

GENERAL REQUIREMENTS

1. EFFECT OF PERMIT. The existence of a RCRA permit shall not constitute a defense to a violation of the Environmental Protection Act or Subtitle G, except for development, modification or operation without a permit. Issuance of this permit does not convey property rights or any exclusive privilege. Issuance of this permit does not authorize any injury to persons or property or invasion of other private rights, or infringement of state or local law or regulations. (35 Ill. Adm. Code 702.181)

2. PERMIT ACTIONS. This permit may be modified, reissued or revoked for cause as specified in 35 Ill. Adm. Code 703.270 through 703.273 and Section 702.186. The filing of a request by the Permittee for a permit modification or revocation, or a notification of planned changes or anticipated noncompliance on the part of the Permittee does not stay the applicability or enforceability of any permit condition. (35 Ill. Adm. Code 702.146)

3. SEVERABILITY. The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby. (35 Ill. Adm. Code 700.107)

4. PERMIT CONDITION CONFLICT. In case of conflict between a special permit condition and a standard condition, the special condition will prevail. (35 Ill. Adm. Code 702.160)

5. DUTY TO COMPLY. The Permittee shall comply with all conditions of this permit except for the extent and for the duration such noncompliance is authorized by an emergency permit. Any permit noncompliance constitutes a violation of the Environmental Protection Act and is grounds for enforcement action; permit revocation or modification; or for denial of a permit renewal application. (35 Ill. Adm. Code 702.141 and 703.242)

6. DUTY TO REAPPLY. If the Permittee wishes to continue an activity allowed by this permit after the expiration date of this permit, the Permittee must apply for a new permit at least 180 days before this permit expires, unless permission for a later date has been granted by the Illinois EPA. (35 Ill. Adm. Code 702.142 and 703.125)

7. PERMIT EXPIRATION. This permit and all conditions herein will remain in effect beyond the permit's expiration date if the Permittee has submitted a timely, complete application (see 35 Ill. Adm. Code 703.181-703.209) and through no fault of the Permittee the Illinois EPA has not issued a new permit as set forth in 35 Ill. Adm. Code 702.125.

8. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE. It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. (35 Ill. Adm. Code 702.143)

9. DUTY TO MITIGATE. In the event of noncompliance with the permit, the permittee shall take all reasonable steps to minimize releases to the environment, and shall carry out such measures as are reasonable to prevent significant adverse impacts on human health or the environment. (35 Ill. Adm. Code 702.144)

10. PROPER OPERATION AND MAINTENANCE. The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory, and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit. (35 Ill. Adm. Code 702.145)

11. DUTY TO PROVIDE INFORMATION. The Permittee shall furnish to the Illinois EPA, within a reasonable time, any relevant information which the Illinois EPA may request to determine whether cause exists for modifying, revoking and reissuing or terminating this permit, or to determine compliance with this permit. The Permittee shall also furnish to the Illinois EPA, upon request, copies of records required to be kept by this permit. (35 Ill. Adm. Code 702.148)

12. INSPECTION AND ENTRY. The Permittee shall allow an authorized representative of the Illinois EPA, upon the presentation of credentials and other documents as may be required by law, to:

    a. Enter at reasonable times upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

    b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

    c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

    d. Sample or monitor, at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the appropriate Act, any substances or parameters at any location. (35 Ill. Adm. Code 702.149)

13. MONITORING AND RECORDS. (35 Ill. Adm. Code 702.150)

a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The method used to obtain a representative sample of the waste must be the appropriate method from Appendix A of 35 Ill. Adm. Code 721. Laboratory methods must be those specified in Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846, latest versions; Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, latest versions; or an equivalent method as specified in the approved Waste Analysis Plan.

b. The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports and records required by this permit, and records of all data used to complete the application for this permit for a period of at least 3 years from the date of the sample, measurement, report or application. These periods may be extended by request of the Illinois EPA at any time. The permittee shall maintain records from all groundwater monitoring wells and associated groundwater surface elevations, for the active life of the facility, and for disposal facilities for the post-closure care period as well.

c. Records of monitoring information shall include:

i. The date(s), exact place, and time of sampling or measurements;

ii. The individual(s) who performed the sampling or measurements;

iii. The date(s) analyses were performed;

iv. The individual(s) who performed the analyses;

v. The analytical technique(s) or method(s) used; and

vi. The result(s) of such analyses. (35 Ill. Adm. Code 702.150)

14. REPORTING PLANNED CHANGES. The permittee shall give written notice to the Illinois EPA as soon as possible of any planned physical alterations or additions to the permitted facility. In general, proposed changes to the facility will need to be submitted to the Illinois EPA as permit modification request that complies with the requirements of 35 Ill. Adm. Code 703.280. (35 Ill. Adm. Codes 702.152(a))

15. CONSTRUCTION CERTIFICATION. For a new hazardous waste management facility, the permittee shall not commence treatment, storage or disposal of hazardous waste; and for a facility being modified the permittee shall not treat, store or dispose of hazardous waste in the modified portion of the facility, until:

    a. The permittee has submitted to the Illinois EPA by certified mail or hand delivery a letter signed by the permittee and a registered professional engineer stating that the facility has been constructed or modified in compliance with the permit; and

    b. 1. The Illinois EPA has inspected the modified or newly constructed facility and finds it is in compliance with the condition of the permit; or

       2. If, within 15 days of the date of submission of the letter in paragraph (a), the permittee has not received notice from the Illinois EPA of its intent to inspect, prior inspection is waived and the permittee may commence treatment, storage or disposal of hazardous waste. (35 Ill. Adm. Code 703.247)

16. ANTICIPATED NONCOMPLIANCE. The Permittee shall give advanced written notice to the Illinois EPA of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements, regulations, or the Act. (35 Ill. Adm. Code 702.152(b))

17. TRANSFER OF PERMITS. This permit may not be transferred by the permittee to a new owner or operator unless the permit has been modified or reissued pursuant to 35 Ill. Adm. Code 703.260(b) or 703.272. Changes in the ownership or operational control of a facility must be made as a Class 1 modification with the prior written approval of the Illinois EPA. The new owner or operator shall submit a revised permit application no later than 90 days prior to the scheduled change. (35 Ill. Adm. Code 703.260)

18. MONITORING REPORTS. Monitoring results shall be reported at the intervals specified in the permit. (35 Ill. Adm. Code 702.152(d))

19. COMPLIANCE SCHEDULES. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than specified in 35 Ill. Adm. Code 702.162. (35 Ill. Adm. Code 702.152(e))

20. TWENTY-FOUR HOUR REPORTING.

    a. The Permittee shall report to the Illinois EPA any noncompliance with the permit which may endanger health or the environment. Any such information shall be reported orally within 24 hours from the time the Permittee becomes aware of the following circumstances. This report shall include the following:

i. Information concerning the release of any hazardous waste that may cause an endangerment to public drinking water supplies.

ii. Information concerning the release or discharge of any hazardous waste or of a fire or explosion at the HWM facility, which could threaten the environment or human health outside the facility.

b. The description of the occurrence and its cause shall include:

i. Name, address, and telephone number of the owner or operator;

ii. Name, address, and telephone number of the facility;

iii. Date, time, and type of incident;

iv. Name and quantity of material(s) involved;

v. The extent of injuries, if any;

vi. An assessment of actual or potential hazards to the environment and human health outside the facility, where applicable; and

vii. Estimated quantity and disposition of recovered material that resulted from the incident.

c. A written submission shall also be provided within 5 days of the time the Permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance including exact dates and times and if the noncompliance has not been corrected; the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. The Illinois EPA may waive the five day written notice requirement in favor of a written report within fifteen days. (35 Ill. Adm. Code 702.152(f) and 703.245(b))

21. OTHER NONCOMPLIANCE. The Permittee shall report all instances of noncompliance not otherwise required to be reported under Standard Conditions 14, 15, and 16, at the time monitoring reports, as required by this permit, are submitted. The reports shall contain the information listed in Standard Condition 20. (35 Ill. Adm. Code 702.152(g))

22. OTHER INFORMATION. Where the Permittee becomes aware that it failed to submit any relevant facts in the permit application, or submitted incorrect information in a permit application or in any report to the Illinois EPA, the Permittee shall promptly submit such facts or information. (35 Ill. Adm. Code 702.152(h))

23. SUBMITTAL OF REPORTS OR OTHER INFORMATION. All written reports or other written information required to be submitted by the terms of this permit shall be sent to:

    Illinois Environmental Protection Agency
    Bureau of Land
    Planning and Reporting Section - #24
    1021 North Grand Avenue East
    Post Office Box 19276
    Springfield, Illinois 62794-9276

24. SIGNATORY REQUIREMENT. All permit applications, reports or information submitted to the Illinois EPA shall be signed and certified as required by 35 Ill. Adm. Code 702.126. (35 Ill. Adm. Code 702.151)

25. CONFIDENTIAL INFORMATION. Any claim of confidentiality must be asserted in accordance with 35 Ill. Adm. Code 702.103 and 35 Ill. Adm. Code 161.

26. DOCUMENTS TO BE MAINTAINED AT FACILITY SITE. The Permittee shall maintain at the facility, until post-closure is complete, the following documents and amendments, revisions and modifications to these documents:

    a. Post-closure plan as required by 35 Ill. Adm. Code 724.218(a) and this permit.

    b. Cost estimate for post-closure care as required by 35 Ill. Adm. Code 724.244(d) and this permit.

    c. Operating record as required by 35 Ill. Adm. Code 724.173 and this permit.

    d. Inspection schedules as required by 35 Ill. Adm. Code 724.115(b) and this permit.

GENERAL FACILITY STANDARDS

27. GENERATOR REQUIREMENTS. Any hazardous waste generated at this facility shall be managed in accordance with the generator requirements at 35 Ill. Adm. Code Part 722.

28. SECURITY. The Permittee shall comply with the security provisions of 35 Ill. Adm. Code 724.114(b) and (c).

29. GENERAL INSPECTION REQUIREMENTS. The Permittee shall follow the approved inspection schedule. The Permittee shall remedy any deterioration or malfunction discovered by an inspection as required by 35 Ill. Adm. Code 724.115(c). Records of inspections shall be kept as required by 35 Ill. Adm. Code 724.115(d).

PREPAREDNESS AND PREVENTION

30. DESIGN AND OPERATION OF FACILITY. The Permittee shall maintain and operate the facility to minimize the possibility of fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment. (35 Ill. Adm. Code 724.131)

RECORD KEEPING

31. OPERATING RECORD. The Permittee shall maintain a written operating record at the facility in accordance with 35 Ill. Adm. Code 724.173.

POST-CLOSURE

32. CARE AND USE OF PROPERTY. The Permittee shall provide post-closure care for the facility as required by 35 Ill. Adm. Code 724.217 and in accordance with the approved post-closure plan.

33. AMENDMENT TO POST-CLOSURE PLAN. The Permittee must amend the post-closure plan whenever a change in the facility operation plans or facility design affects the post-closure plan or when an unexpected event has occurred which has affected the post-closure plan pursuant to 35 Ill. Adm. Code 724.218(d).

34. COST ESTIMATE FOR POST-CLOSURE. The Permittee's original post-closure cost estimate, prepared in accordance with 35 Ill. Adm. Code 724.244, must be:

    a. Adjusted for inflation either 60 days prior to each anniversary of the date on which the first closure cost estimate was prepared or if using the financial test or corporate guarantee, within 30 days after close of the firm's fiscal year.

    b. Revised whenever there is a change in the facility's post-closure plan increasing the cost of closure.

    c. Kept on record at the facility and updated. (35 Ill. Adm. Code 724.244)

35. FINANCIAL ASSURANCE FOR POST-CLOSURE CARE. The Permittee shall demonstrate compliance with 35 Ill. Adm. Code 724.245 by providing documentation of financial assurance, as required by 35 Ill. Adm. Code 724.251, in at least the amount of the cost estimates required by the previous Permit Condition. Changes in financial assurance mechanisms must be approved by the Agency pursuant to 35 Ill. Adm. Code 724.245.

    Financial assurance documents submitted to Illinois EPA should be directed to the following address:

Illinois Environmental Protection Agency
Bureau of Land #24
Financial Assurance Program
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

36. INCAPACITY OF OWNERS OR OPERATORS, GUARANTORS, OR FINANCIAL INSTITUTIONS. The Permittee shall comply with 35 Ill. Adm. Code 724.248 whenever necessary.

SECTION VIII - SPECIAL CONDITIONS

1. The permittee is required to complete and provide the following 39i Certification forms to the Illinois EPA Bureau of Land:

   a. A 39i (legal entity) certification form must be filled out for the legal entity (i.e. Company) that appears on the permit application being submitted, and

   b. A 39i (individual) form must be filled out for the individual that signs the 39i (legal entity) certification form, and

   c. A 39i (individual) form must be filled out for each individual who signs the permit application.

   Note: If the applicant wants additional staff to be able to send in future modifications, certifications, etc. those individuals should also send in an individual 39i certification form.

2. The permittee shall submit the necessary 39i certification form(s) and supporting documentation within 30 days of any of the following events:

   a. The owner or operator, or officer of the owner or operator, or any employee who has control over operating decisions regarding the facility has violated federal, State, or local laws, regulations, standards, or ordinances in the operation of waste management facilities or sites; or

   b. The owner or operator, or officer of the owner or operator, or any employee who has control over operating decisions regarding the facility has been convicted in this or another State of any crime which is a felony under the laws of this State, or conviction of a felony in a federal court; or

   c. The owner or operator, or officer of the owner or operator, or any employee who has control over operating decisions regarding the facility has committed an act of gross carelessness or incompetence in handling, storing, processing, transporting, or disposing of waste.

   d. A new person is associated with the owner or operator who can sign the permit application or who has control over operating decisions regarding the facility, such as a corporate officer or a delegated employee.

   The 39i certification must describe the violation(s), convictions, carelessness, or incompetence as outlined in (a), (b), or (c) above and must include the date that a new person as described in (d) above began employment with the applicant.

The 39i certification form and supporting documentation shall be submitted to the address specified below:

Illinois Environmental Protection Agency
Bureau of Land #33 – 39i Certification
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

[The 39i certification forms will be treated as confidential by the Agency. The applicant may also request the information on the 39i certification form be maintained confidential in accordance with 2 IAC 1828.]

3. Within 60 days of the effective date of this permit CITGO shall submit a closure plan for the LTF as a Class 1* permit modification. This submittal shall include a properly completed IEPA permit application form LPC-PA23. The PA23 Form must be signed and sealed by a qualified Professional Engineer registered in the State of Illinois and the owner/operator must check the box identifying the appropriate certification statement.

The closure plan shall describe how the permittee will address following specific requirements for the closure of land treatment units:

a. Continue all operations (including pH control) necessary to maximize degradation, transformation, or immobilization of hazardous constituents within the treatment zone, as required under Section 724.373(a), except to the extent such measures are inconsistent with 35 IAC 724.380(a)(8);

b. Continue all operations in the treatment zone to minimize run-off of hazardous constituents, as required under Section 724.373(b);

c. Maintain the run-on control system required under Section 724.373(c);

d. Maintain the run-off management system required under Section 724.373(d);

e. Control wind dispersal of hazardous waste if required under Section 724.373(f);

f. Continue to comply with any prohibitions or conditions concerning growth of food-chain crops under Section 724.376;

g. Continue unsaturated zone monitoring in compliance with Section 724.378 (except soil-pore liquid monitoring is not required);

h. Establish a vegetative cover on the portion of the facility being closed at such time that the cover will not substantially impede degradation, transformation, or

immobilization of hazardous constituents in the treatment zone. The vegetative cover must be capable of maintaining growth without extensive maintenance;

i. The horizontal extent of the land treatment areas indicated on drawings in the closure plan must include those locations where hazardous constituents were found at statistically significant concentrations over background. At a minimum this includes the following perimeter sample (PS) locations identified in the 1995 Site Characterization Report as: LAI-4PS, LAI-12PS, LAI-15PS, LAII-4PS, LAII-5PS, LAII-11PS, LAII-15PS, LAII-17PS, LAIII-1PS, LAIII-3PS, LAIV-3PS, LAI-4PSA, and LAI-12PSA.

4. The closure plan required in Condition VIII.4 shall include:

a. A schedule for closure of the land treatment areas.

b. A revised cost estimate for closure of the land treatment areas. The cost estimate must be provided in current (2010) dollars.

c. Financial assurance that meets the requirements of 35 IAC Part 724 Subpart H in the amount of the revised closure cost estimate.

5. The closure plan required in Condition VIII.4 shall include the following in support of its demonstration of how closure of the LTF will meet the requirements for run-on and run-off control systems required by of 35 IAC 724.380(a)(3) and (a)(4):

a. Detailed engineering drawings similar to Figures 131-CD-444 & 445 in Appendix I.1 of the application that show final contours of the four areas in the LTF and drainage control structures (berms, ditches, rip/rap, concrete pipe, etc.) are capable of meeting the regulations. The use of silt fences is not considered acceptable for long term management of run-on and run-off from the LTF.

b. Calculations demonstrating the drainage control structures shown in the engineering drawings are capable of handling the precipitation of a 24 hr 25 year storm event (i.e. 6 inches of rain) without being eroded or otherwise damaged. These calculations need to include the maximum velocity(s) the water will reach in the drainage ditches and a demonstration that this velocity will not erode or otherwise damage the drainage ditches.

c. Provisions for addressing the piles of sediments from the Stormwater basin that are currently located on Area I. If CITGO intends to use this material as fill in another area in the LTF, this location must be specified on scale drawings.

d. The specifications for the types of grasses that will be used to form the vegetative cover on the land treatment areas.

6. Within 60 days of the modification date of this permit, the permittee shall provide financial assurance for post-closure care of at least $4,899,480 (in 2010 dollars). This is equal to the annual post-closure cost of $163,316 (in 2010 dollars) times 30 years (the post-closure care period) as required by 35 IAC 724.244(a)(2). This revision will be considered a Class 1* permit modification.

SECTION IX: REPORTING AND NOTIFICATION REQUIREMENTS

The reporting and notification requirements of each section of the RCRA permit are summarized below. This summary is provided to highlight the various reporting and notification requirements of this permit.

Condition	Submittal	Due Date
III. RCRA CLOSURE		
III.E.2	File survey plat with County Recorder that records the type, location, and quantity of hazardous waste disposed within each area.	No later than the date the certification of closure of the LTF is submitted to the Illinois EPA
III.E.4	Closure certification report that the LTF has been closed in accordance with the approved permit application and conditions of permit.	Within 60 days after closure is complete.
III.E.4a	Class 1* permit modification requesting to delete those conditions not associated with post-closure care.	Within 60 days after closure is complete.
III.E.4c	Documentation that survey plat was filed with County recorder.	Within 60 days after closure is complete.
III.E.4c	Documentation that the permittee has recorded notation on the deed to the facility property regarding hazardous waste management at the site.	Within 60 days after closure is complete.
IV. POST-CLOSURE CARE		
IV.D.7	Submit the results of each annual soil sampling event to IEPA.	By January 15 of each year.
IV.D.9.a	Notify the Illinois EPA that there is a statistically significant increase (SSI) of hazardous constituents below the treatment zone in the LTF.	Within 7 days of finding an SSI.
IV.D.9.b	Apply for a permit modification to modify the post-closure practices.	Within 90 days of finding an SSI.

Condition	Submittal	Due Date
IV.D.9.c.i	Notify the Illinois EPA that there is a statistically significant increase (SSI) of hazardous constituents below the treatment zone in the LTF, and the permittee intends to demonstrate it is due to a source other than the regulated units.	Within 7 days of finding an SSI.
IV.D.9.c.ii	Submit a demonstration that the SSI is not due to regulated units.	Within 90 days of finding an SSI.
IV.D.9.c.iii	Submit a permit application to modify the unsaturated zone monitoring program as appropriate.	Within 90 days of finding an SSI.
IV.F.2	Certification that the post-closure care for the LTF was performed in accordance with the specifications in the approved Post-closure Plan.	Within 60 days after post-closure care is complete.
V. GROUNDWATER DETECTION MONITORING		
J.2	Groundwater monitoring data and statistical calculations required semi-annually. Samples Collected During Preceding Months of: April – June October – December	 Results due to IEPA by: July 15 January 15
J.3	Groundwater Surface Elevation	Semi-Annually
J.4	Groundwater flow rate and direction.	Annually with groundwater data due July 15
J.5	Surveyed Elevation	Every 5 years or at the request of IEPA, or whenever the elevation changes. In addition, for new wells, at the time of installation
J.6	Elevation of the bottom of each well.	Every year due July 15
J.10.a	Notify Illinois EPA in writing of statistically significant increase	Within 7 days after discovery of increase.

Condition	Submittal	Due Date
J.10.b	Sample groundwater in all wells for Appendix I constituents.	Immediately after increase is discovered.
J.10.d	Apply for permit modification establishing compliance monitoring program.	Within 90 days after discovery of increase.
J.10.e	Provide Illinois EPA with corrective action feasibility plan.	Within 180 days after discovery of increase.
J.11.a	Notify the Illinois EPA in writing of intent to make demonstration	Within 7 days the increase was discovered.
J.11.b	Submit a report to Illinois EPA which demonstrates than a source other than a regulated unit caused the increase, or resulted from error.	Within 90 days the increase was discovered.
J.11.c	Submit to the Illinois EPA application to change detection monitoring program.	Within 90 days the increase was discovered.
VI. CORRECTIVE ACTION		
B.6	Phase I/II RFI Report	To be specified in the Phase I/II workplan, subject to Illinois EPA approval.
B.7	Phase II Workplan	Within 90 days of notification that Phase II is required.
B.7	Supplemental Investigation workplan	Within 90 days of notification that supplemental investigation is required
C	Phase I CMP Report	Within 120 days of receiving notification that corrective measures are necessary
D	Annual Sewer Inspection and Maintenance Report	March 31 of each following year

Condition	Submittal	Due Date
E.2	Updated Corrective Action Cost Estimate	December 31st each year.
E.3	Demonstration of continual compliance with financial assurance requirements for corrective action.	Within 60 days of IEPA approval of corrective action cost estimate
G.1	Notification of Newly Discovered SWMU	Within 60 days after discovery.
G.3	Assessment Plan for Newly Discovered SWMU	Within 120 days of Illinois EPA's request.
G.4	Implementation of Assessment for Newly Discovered SWMU	Within 60 days of approval of plan, or by date specified by Illinois EPA.
VII. STANDARD CONDITIONS FOR POST-CLOSURE		
6	Complete application for new permit.	At least 180 days prior to permit expiration.
11	Information requested by Illinois EPA and copies of records required to be kept by this permit.	Reasonable time.
14	Notify Illinois EPA of planned physical alterations or additions.	At least 15 days prior to planned change.
15	Construction certification signed by permittee and P.E.	Prior to managing waste in a new or modified portion of the facility.
16	Notification of anticipated noncompliance.	Prior to modification or action.
17	Application for permit modification indicating permit is to be transferred.	90 days prior to the scheduled change
19	Submission of any information required in a compliance schedule.	Within 14 days after each schedule date.

Condition	Submittal	Due Date
20	Report to Illinois EPA any non-compliance which may endanger health or environment. telephone in writing	 Within 24 hours after discovery. Within 5 days after discovery.
21	Report all other instances of noncompliance.	March 1 of each year along with Annual Report.
35	Provide documentation of financial assurance as required by 35 Ill. Adm. Code 724.251	Annually, or when cost estimate changes
36	Notify Illinois EPA of commencement of voluntary or involuntary bankruptcy proceedings.	Within 10 days after commencement of proceeding.
VIII. SPECIAL CONDITIONS		
2	39i Certification Forms	Within 30 days of events specified in permit.
4	Closure plan for the land treatment facility (LTF) as a Class 1* permit modification.	Within 60 days of the effective date of this permit
6	Revised post-closure cost estimate	Within 60 days of the modification date of this permit
ATTACHMENT C-1: GUIDANCE FOR CONDUCTING A RCRA FACILITY INVESTIGATION		
V	Completion of Group 1 or 2 RFI Phase I/II investigation and submission of report	Within time frame established in the Phase I/II Workplan, subject to Illinois EPA's approval.
	Submission of RFI Phase II Workplans	Within 90 days of notification that Phase II is required.

Condition	Submittal	Due Date
	Completion of RFI Phase II investigation and submission of Phase II Report	Within time frame established in the Phase II workplan subject to Illinois EPA's approval.
	Submission of Supplemental Investigation Workplan	Within 90 days of notification that supplemental investigation is required.
	Completion of supplemental Investigation and Submission of Report and Summary	To be specified in the supplemental investigation workplan subject to approval by Illinois EPA.
	Annual RCRA Sewer Inspection and Maintenance Report	March 31 of each following
	Corrective Action Progress Report	Upon request and to be specified by Illinois EPA.
ATTACHMENT D: CORRECTIVE MEASURES PROGRAM OVERVIEW		
3.0	Conceptual Design Report	Within 90 days of approval of the Phase II CMP Report
4.0	Final Design Report	Within 120 days of approval of the Conceptual Design Report or as otherwise specified by the Illinois EPA
5.0	Construction Progress Reports	Quarterly during the construction/installation of the corrective measures
	Construction Report	To be specified in the Final Design Report
	Operation and Maintenance Plan	To be specified in the Final Design Report

Condition	Submittal	Due Date
6.0	Periodic Operations and Maintenance Progress Reports	To be specified in the Operation and Maintenance Plan.

1978030004-RCRA-B162RM1M3-Final.docx

Renewal RCRA Hazardous Waste Post-Closure Permit

CITGO Lemont Refinery

USEPA ID No: ILD041550567
STATE ID No: 1978030004
Log No: B-162R

ATTACHMENT A

CLOSURE CERTIFICATION FORM

This certification is to be completed by both the responsible officer and by the qualified Professional Engineer registered in Illinois upon completion of closure.
Submit one copy of the certification with original signatures and three additional copies.

Closure Certification

The four areas in the hazardous waste Land Treatment Facility (D81) at the CITGO Lemont Refinery in Lemont, Illinois have been closed in accordance with the Agency approved closure plan.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

USEPA ID Number	Facility Name
Signature of Owner	Printed Name and Title
Signature of Operator	Printed Name and Title
Signature of P.E.	Printed Name of P.E. and Illinois Registration Number
Date	P.E. Seal and Expiration Date of License

Renewal RCRA Hazardous Waste Post-Closure Permit

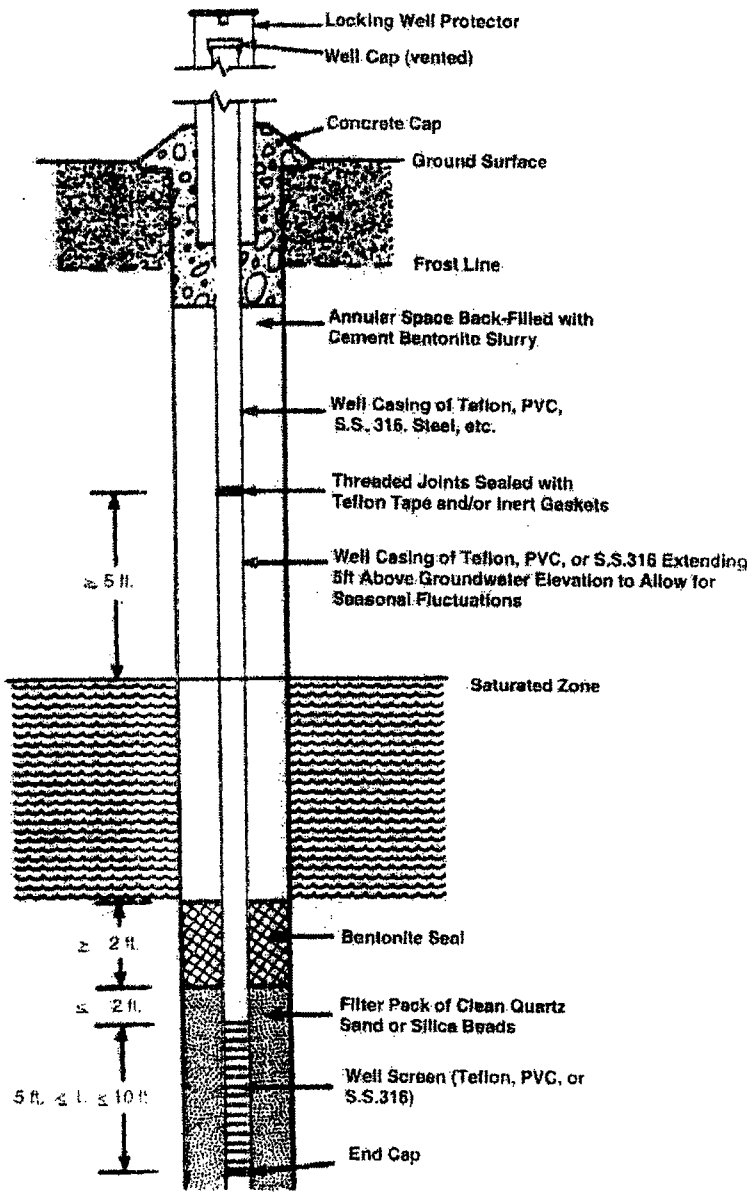
CITGO Lemont Refinery

USEPA ID No: ILD041550567
STATE ID No: 1978030004
Log No: B-162R

ATTACHMENT B

GROUNDWATER MONITORING ATTACHMENTS

Monitoring Well Diagram



Illinois Environmental Protection Agency

Field Boring Log

Page ____ of ____

Site ID No. _____ Federal ID No _____

Site Name: _____

Quadrangle: _____ Sec _____ T _____ R. _____

UTM (or State Plane) Coord. N. (X) _____ E. (Y) _____

Latitude: ____ ____ ____ Longitude: ____ ____ ____

Boring Location: _____

Drilling Equipment: _____

County: _____

Boring No. _____ Monitoring Well No. _____

Surface Elevation: _____ Completion Depth: _____

Auger Depth: _____ Rotary Depth: _____

Date: Start: _____ Finish: _____

Elev.	Description of Material	Graphic Log	Depth In Feet	SAMPLES: Sample No.	Sample Type	Sample Recovery (X)	Penetrometer	N Values (Blow Counts)	OVA or HNU Readings	Personnel: G - D - H - H - / REMARKS

Illinois Environmental Protection Agency **Well Completion Report**

Site Number: _____ County: _____

Site Name: _____ Well #: _____

State Plane Coordinate: X _____ Y _____ (or) Latitude: ___ ___ ___ Longitude: ___ ___ ___ Borehole #: _____

Surveyed by: _____ IL Registration #: _____

Drilling Contractor: _____ Driller: _____

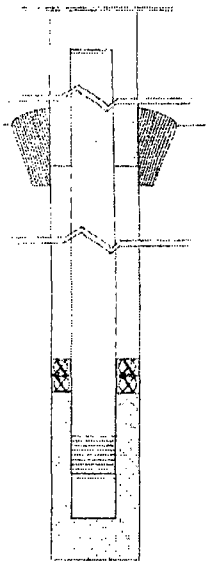
Consulting Firm: _____ Geologist: _____

Drilling Method: _____ Drilling Fluid (Type): _____

Logged By: _____ Date Started: _____ Date Finished: _____

Report Form Completed By: _____ Date: _____

ANNULAR SPACE DETAILS



Type of Surface Seal: _____

Type of Annular Sealant: _____

Installation Method: _____

Setting Time: _____

Type of Bentonite Seal - - Granular, Pellet, Slurry (Choose One)

Installation Method: _____

Setting Time: _____

Type of Sand Pack: _____

Grain Size: _____ (Sieve Size)

Installation Method: _____

Type of Backfill Material: _____ (if applicable)

Installation Method: _____

	Elevations (MSL)*	Depths (BGS)	(.01ft.)
	_____	_____	Top of Protective Casing
	_____	_____	Top of Riser Pipe
	_____	_____	Ground Surface
	_____	_____	Top of Annular Sealant
	_____	_____	Static Water Level (After Completion)
	_____	_____	Top of Seal
	_____	_____	Top of Sand Pack
	_____	_____	Top of Screen
	_____	_____	Bottom of Screen
	_____	_____	Bottom of Well
	_____	_____	Bottom of Borehole

* Referenced to a National Geodetic Datum

WELL CONSTRUCTION MATERIAL
(Choose one type of material for each area)

Protective Casing	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Above W.T.	SS304, SS316, PTFE, PVC, or Other
Riser Pipe Below W.T.	SS304, SS316, PTFE, PVC, or Other
Screen	SS304, SS316, PTFE, PVC, or Other

CASING MEASURMENTS

Diameter of Borehole (inches)	
ID of Riser Pipe (inches)	
Protective Casing Length (feet)	
Riser Pipe Length (feet)	
Bottom of Screen to End Cap (feet)	
Screen Length (1st slot to last slot) (feet)	
Total Length of Casing (feet)	
Screen Slot Size **	

**Hand-Slotted Well Screens are Unacceptable

ILLINOIS EPA MONITOR WELL PLUGGING AND ABANDONMENT PROCEDURES

	Well Construction		Plugging Procedure
I. Unconsolidated Sediment Wells	I-A	...if backfilled with cement grout above bentonite seal and/or sandpack:	1. Cut casing off at desired depth. 2. Mix neat cement slurry (5 gal. water per 94 lb. bag cement). 3. Insert tremi pipe (1" i.d. pvc) into well and extend to bottom. 4. Slowly pump slurry under low pressure through tremi pipe. 5. Slowly withdraw tremi pipe - making sure bottom of pipe remains below pure slurry. 6. Continue slow pumping until all formation water and the watery slurry mix is displaced from top of casing.
	I-B	...if backfilled with soft sediments (cuttings) above bentonite seal and/or sandpack:	1. Knock out and remove thin surface concrete plug, if present. 2. Re-auger entire length of well. 3. Remove well casing from re-augured borehole. 4. Mix neat cement slurry (5 gal. water per 94 lb. bag cement). 5. Insert tremi pipe (1" i.d. pvc) into augers and extend to bottom. 6. Slowly pump slurry under low pressure through tremi pipe. 7. Continue slow pumping until all formation water and the water slurry mix is displaced from top of casing. 8. Slowly withdraw tremi pipe - making sure bottom of pipe remains below pure slurry. 9. Pull a flight of augers (5" if in unstable materials and hole collapse is likely or 10" if in competent material and collapse is unlikely). 10. Top off cement slurry after each flight is removed.
	I-C	...if monitor well construciton is unknown:	1. Follow procedures in I-A.
II. Bedrock Wells	II-A	...All bedrock monitor wells:	1. Cut casing off at desired depth. 2. Mix neat cement slurry (5 gal. water per 94 lb. bag cement). 3. Insert tremi pipe (1" i.d. pvc) into well and extend to bottom. 4. Slowly pump slurry under low pressure through tremi pipe. 5. Slowly withdraw pipe making sure bottom of pipe remains below pure slurry. 6. Continue slow pumping until all formation water and the watery slurry mix is displaced from top of casing.

Well Plugging Procedures (revised 02/06/02)

Formatting Requirements for the 01 Record of the Electronically Submitted Groundwater and Leachate Data (the 01 Record portion of the LPC-160 is included for example purposes)

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF LAND POLLUTION CONTROL
CHEMICAL ANALYSIS FORM

Page 1 of _____

RECORD CODE | L | P | C | S | M | 0 | 1 | (1–7)

TRANS CODE | A | (8)

REPORT DUE DATE ___/___/___ (36 M D Y 41)

FEDERAL ID NUMBER _____

SITE INVENTORY NUMBER _____ (9–18)

MONITOR POINT NUMBER _____ (see Instructions) (19–22)

REGION _____ CO. _____

DATE COLLECTED ___/___/___ (23 M D Y 28)

FACILITY NAME _____

FOR IEPA USE ONLY

LAB _____ (29)

DATE RECEIVED ___/___/___ (42 M 49 Y 47)

BACKGROUND SAMPLE (X) _____ (54)

TIME COLLECTED (24 Hr. Clock) __ __:__ __ (55 H M 58)

UNABLE TO COLLECT SAMPLE (see Instructions) _____ (59)

MONITOR POINT SAMPLED BY (see Instructions) _____ (60)

OTHER (SPECIFY) _____

SAMPLE FIELD FILTERED — INORGANICS (X) _____ (61) ORGANICS (X) _____ (62)

SAMPLE APPEARANCE _____ (63–102)

COLLECTOR COMMENTS _____ (103–142)

LAB COMMENTS _____ (150–199)

IL 532 1213
LPC 160 01/90

This Agency is authorized to require this information under Illinois Revised Statutes, 1979, Chapter 111 ½, Section 1004 and 1021. Disclosure of this information is required. Failure to do so may result in a civil penalty up to $25,000 for each day the failure continues a fine up to $1,000.00 and imprisonment up to one year. This form has been approved by the Forms Management Center.

All analytical procedures must be performed in accordance with the methods contained in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," SW-846, 3rd Edition, September 1986 or equivalent methods approved by the Agency. Proper sample chain of custody control and quality assurance/quality control procedures must be maintained in accordance with the facility sampling and analysis plan.

*Only Keypunch with Data in Column 35 or Columns 38-47

KEY:

Spaces Numbered	Description	Format
Spaces 1-7	Record Code	LPCSM01
Space 8	Trans Code	A
Spaces 9-18	Site ID	0000000000
Spaces 19-22	Mon Pt ID	G000
Spaces 23-28	Date Collected	000000
Space 29	Lab	
Spaces 30-35	Filler	
Spaces 36-41	Report Due Date	000000
Spaces 42-47	Date Received	000000
Spaces 48-53	Filler 2	
Space 54	Background Sample	
Spaces 55-58	Time Collected	0000
Space 59	Unable to Collect Sample	
Space 60	Monitoring Point Sampled By	
Space 61	Field Filtered – Inorganic	
Space 62	Field Filtered – Organic	
Spaces 63-102	Sample Appearance	
Spaces 103-142	Collector Comments	
Spaces 143-149	Filler 3	
Spaces 150-199	Lab Comments	

Formatting Requirements for the 02 Record of the Electronically Submitted Groundwater and Leachate Data (the 02 Record portion of the LPC-160 is included for example purposes)

RECORD CODE | L | P | C | S | M | 0 | 2 | (1–7) TRANS CODE | A | (8) (COLUMNS 9-29 FROM ABOVE)

	FIELD MEASUREMENTS CONSTITUENT DESCRIPTION AND REQUIRED UNIT OF MEASURE	STORET NUMBER	Remarks See Inst.	Replicate	< or >	VALUE
Q	TEMP OF WATER (unfiltered °F)	0 0 0 1 1 (30–34)	(35)	(36)	(37)	(38–47)
Q	SPEC COND (unfiltered umhos)	0 0 0 9 4				
Q	pH (unfilted units)	0 0 4 0 0				
Q	ELEV OF GW SURF (ft ref MSL)	7 1 9 9 3				
Q	DEPTH OF WATER (ft below LS)	7 2 0 1 9				
A	BTM WELL ELEV (ft ref MSL)	7 2 0 2 0				
Q	DEPTH TO WATER FR MEA PT (ft)	7 2 1 0 9				

IL 532 1213
LPC 160 01/90

This Agency is authorized to require this information under Illinois Revised Statutes, 1979, Chapter 111 ½, Section 1004 and 1021. Disclosure of this information is required. Failure to do so may result in a civil penalty up to $25,000 for each day the failure continues a fine up to $1,000.00 and imprisonment up to one year. This form has been approved by the Forms Management Center.

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***Only Keypunch with Data in Column 35 or Columns 38-47**

KEY:

Spaces Numbered	Description	Format
Spaces 1-7	Record Code	LPCSM02
Space 8	Trans Code	A
Spaces 9-18	Site ID	0000000000
Spaces 19-22	Mon Pt ID	
Spaces 23-28	Date Collected	
Space 29	Lab	
Spaces 30-34	STORET Number	
Space 35	Remarks	
Space 36	Replicate	
Space 37	< or >	
Space 38-47	Value	

Renewal RCRA Hazardous Waste Post-Closure Permit

CITGO Lemont Refinery

USEPA ID No: ILD041550567
STATE ID No: 1978030004
Log No: B-162R

ATTACHMENT C-1

Guidance for Conducting a RCRA Facility Investigation

Attachment C-1
Guidance for Conducting a RCRA Facility Investigation

I. PURPOSE

The purpose of the RFI is to determine the nature and extent of releases of hazardous waste or hazardous constituents, if any, from SWMUs located at CITGO and to gather data necessary to develop and implement a Corrective Measures Program (CMP). Specifically, the information gathered during the RFI will be used to help determine the need, scope and design of any corrective or interim actions, including the corrective measures program.

II. SCOPE OF WORK

The Scope of Work for the RFI is to evaluate whether a release has occurred, and to what extent, from the two groups of SWMUs listed in Section IV of the Permit. The scope for the Group 1 and Group 2 SWMUs is divided into two phases - Phases I and II.

1. The purpose of Phase I is to provide information on the characteristics and integrity of each unit and conduct field activities, as necessary, to determine if various SWMUs at that facility have released, are currently releasing, or have the potential to release hazardous waste and/or hazardous constituents to the soil and/or surface water.

2. Phase II of the RFI will be required if the Illinois EPA's BOL determines from the data obtained in Phase I that for any SWMU (1) a release has occurred to the soil, groundwater, and/or surface water, or (2) a release is occurring to the soil, groundwater, and/or surface water. The purpose of Phase II is to define the nature and extent of releases to any affected media including soil, groundwater, and/or surface water.

3. Supplemental investigation may be required if the Illinois EPA's BOL determines from the data obtained in Phase I or Phase II that the nature and extent of hazardous wastes or hazardous constituents has not been adequately characterized in any environmental media including soil, groundwater, or surface water and sediments.

Each phase of the investigation is divided into three subparts. The first subpart deals with the development of a RFI Workplan by the Permittee. The second subpart is the implementation of the RFI. The final subpart covers the submission of reports of activities and results of the RFI.

III. RFI WORKPLANS

CITGO shall prepare detailed workplans that address each phase of the RFI which are reviewed and approved by the Illinois EPA prior to conducting that phase of the RFI. Separate plans will be prepared for the Group 1 and Group 2 SWMUs. The workplan for each phase of the RFI

must, at a minimum, contain the information identified in III.A-III.I below. The information in the workplan must be presented in a manner which is similar to the format set forth in these sections. Information provided in each Phase of the RFI may be incorporated into the workplan for the subsequent Phase by reference. Information already submitted in the Part B permit application may also be incorporated by reference into the workplans when appropriate.

The following sections describe what is required in the RFI Workplans for Phase I and Phase II investigations. These phases can be combined into one workplan provided that the requirements of each phase are met.

A. INTRODUCTION (required for all workplans)

A general discussion of the contents and goals of each workplan must be provided as an introductory portion of the workplan. This introduction should also discuss, in general, the facility and the SWMUs being investigated.

B. ADMINISTRATIVE OUTLINE

CITGO shall submit as part of the workplan for each phase of the RFI a general outline defining the RFI objectives, technical approach, and scheduling of tasks during that phase of the RFI. CITGO shall prepare a Project Management Plan (PMP) as part of each Phase Workplan which will include a discussion of the technical approach, schedules, budget, and personnel. The Project Management Plan must also include a description of the qualifications of personnel performing or directing the RFI, including contractor personnel. This plan shall also document the overall management approach to the current Phase of the RFI. The PMP from previous phases can be incorporated by reference into the current workplan provided that any changes or additions to the existing PMP are detailed in a PMP addendum contained within the workplan.

C. RFI APPROACH

Each workplan must describe the investigative approach for the phase and group of SWMUs being investigated under the workplan. The information required includes:

1. The parameters and analytical methods to be used to establish the presence or absence of contamination and define the nature and extent of known releases. These must include, but are not limited to, specific hazardous constituents of wastes known or suspected to have been managed by the SWMUs as identified and determined by the unit characterization information presented in the workplan.

2. The basis for selecting the parameters and methods in (1) above.

3. The methodology for choosing sampling locations, depths, and numbers of samples.

4. The methodology for investigating the hydrostatigraphic units at site, and the locations and depths for each monitor well, as appropriate.

5. The sample collection procedures for each parameter or constituent to be analyzed for each environmental media (soil, sediments, surface water, and groundwater). The following should be considered in developing these procedures:

   a. Sample collection methods and equipment should follow guidance in Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, Third Edition (SW-846) including Final Update 1 and any promulgated updates, where appropriate.

   b. Field sampling methods not included in SW-846 must be approved by IEPA before they are used in the RFI. This includes methods such as drilling, borings, etc. When available, standards procedures, as defined by USEPA, IEPA, or ASTM, should be followed.

   c. Soil and sediment samples collected for volatile organics analysis require specialized sampling and handling procedures, as specified in the Illinois EPA's volatile organic compound (VOC) sampling procedure. Unless extenuating circumstances dictate otherwise, soil samples collected for volatile organic analysis should not be mixed, composited, or otherwise aerated. If extenuating circumstances prevail, then procedures must be made to minimize (1) the time the sample is exposed to the air; (2) aeration of the sample; and (3) agitation of the sample.

   d. If a drill rig or other piece of equipment is necessary to collect soil samples:

      (1) The procedures specified in ASTM Method D-1586 (Split Spoon Sampling) or D-1587 (Shelby Tube Sampling) must be used in collecting the samples;

      (2) Soil samples should be collected continuously at specified locations to provide information regarding the shallow geology of the area where the investigation is being conducted.

   e. Soil and sediments encountered in an area where VOC contamination is a concern should be field-screened for VOCs. However, the actual samples collected for analysis at the laboratory should not be field-screened.

   f. The procedures which will be used to decontaminate the sampling equipment after each sample is collected should also be described. Decontamination procedures should be carried out in accordance with SW-846.

g. The actual material placed in the container for future analysis should be obtained from any visually contaminated portion of the sample, when present.

6. The sample handling procedures which will be used to store, preserve and transport the collected soil or water samples to the laboratory, including chain-of-custody procedures and preservative techniques. These procedures should be carried out in accordance with the guidance in SW-846, Third Edition, including Final Update 1 and any promulgated updates.

7. The analytical procedures which will be used to prepare the samples for analysis and to analyze them. In general, such procedures should be carried out in accordance with those set forth in SW-846, Third Edition including Final Update 1 and any promulgated updates, as appropriate. The actual portion of the sample to be analyzed should be obtained from visually contaminated material if any is present. The procedures specified must be sufficient to analyze for all the parameters identified in the workplan. The estimated quantitation limits and/or practical quantitation limits to be achieved should also be identified. Again, these limits should meet the requirements set forth in SW-846. It must be noted that it is especially important to achieve low detection limits if the goal of the sampling/analysis effort is to demonstrate that little or no contamination exists in a given area. To demonstrate a parameter is not present in a sample, the PQL achieved must be at least as low as that specified in SW-846, where practical. Low detection limits may not be as necessary when collecting samples in contaminated areas.

8. The procedures which will be used to describe and characterize the soils in and around the subject SWMUs down to the sampling depth but not below the water table, including the following:

   a. Unified Soil Classification;

   b. Soil profile; and

   c. Elevation of water table.

9. Documentation that sampling and analysis of groundwater monitoring wells will be carried out in accordance with the Quality Assurance Project Plan as required in III.G below. The plan shall provide information on the design and installation of all groundwater monitoring wells. The designs shall be in accordance with the latest version of the RCRA Groundwater Monitoring Draft Technical Guidance (EPA 53OR-93-001), where appropriate, and the latest version of the Illinois EPA's BOL design criteria. At a minimum:

   a. The groundwater monitoring wells must consist of monitoring wells installed in the uppermost aquifer and, as necessary, in each underlying aquifer (e.g., sand units) which is hydraulically interconnected, where appropriate or necessary to characterize the release;

b. At least one background monitoring well in each appropriate aquifer shall be installed hydraulically upgradient (i.e., in the direction of increasing static head) from the limit of the SWMU, except to the extent that SWMUs in close proximity can be investigated with the same background well system. The number, locations, and depths must be sufficient to yield groundwater samples that are (1) representative of background quality in the uppermost aquifer and units hydraulically interconnected beneath the facility and (2) not affected by SWMUs or other contamination sources at the subject facility; and

c. Monitoring wells in each appropriate aquifer shall be installed hydraulically downgradient (i.e., in the direction of decreasing static head) from the SWMU or SWMU group. Their number, locations and depths must ensure that they allow for detection of releases of hazardous waste or hazardous constituents from the SWMU(s).

10. The procedures and criteria for evaluating analytical results to establish the presence or absence of any plume of contamination and to define the boundaries of the plume of contamination. The release criteria shall be defined in this portion of the plan.

D. SITE-SPECIFIC SAMPLING PLANS

The Permittee shall prepare detailed site-specific sampling plans to be submitted as part of the work for each phase of the RFI which address all field activities needed to obtain site-specific data. The plans must contain: a statement of sampling objectives, specifications of equipment, analyses of interest, sample types, sample locations and schedules for sampling. The plans must describe in detail how the RFI will be implemented.

Site-Specific sampling and analysis plans should contain the following information for each SWMU or SWMU group being investigated:

1. Goals and Objectives of Effort - A discussion of the goals and objectives of the sampling/analysis effort should be included in the plan for the SWMU. This will have an impact on the overall plan, as the sampling/analysis effort required to demonstrate that an area is clean is very different than that required to determine the horizontal and vertical extent of contamination.

2. Parameters and Analytical Procedures - A list of proposed parameters and analytical methods along with a discussion justifying their selection for the SWMU should be included in the plan. The proposed parameters should include those hazardous constituents which may be present based upon knowledge of the wastes managed at the unit. This list should include degradation products. Additional parameters for analysis may be required by the Illinois EPA, depending on its review of the wastes and other materials managed at the facility.

3. Sample Locations - A scaled map should be provided in the plan showing the location where the samples are to be collected.

4. Sampling Depth - As appropriate, the plan should identify the depth from which each sample is to be collected.

5. Sample Collection Procedures - The procedures which will be used to collect the samples must be described in the workplan.

6. Any additional items regarding the sampling/analysis at a specific SWMU.

E. RFI PHASE I WORKPLAN INFORMATION

The following information must be provided as part of the RFI Phase I Workplans.

1. General Facility Information

The following information must be provided (to the extent known) in the Phase I RFI Workplan regarding the facility overall:

a. A description of the facility, including the nature of its business, both past and present. This description should identify (1) the size and location of the facility, (2) the raw materials used and products manufactured at the facility and (3) the Standard Industrial Code which describes the type of activities carried out at the facility;

b. Identification of past and present owners;

c. A discussion of the facility's past and present operations, including solid and hazardous waste generation, storage, treatment and disposal activities;

d. A brief discussion of the SWMUs addressed under the workplan;

e. A description of all significant surface features (ponds, streams, depressions, etc.) and wells within 1,500 feet of the facility;

f. A description of all land usage within 1,500 feet of the facility boundary;

g. Identification of all human populations and environmental systems susceptible to contaminant exposure from releases from the SWMUs within a distance of at least 1,500 feet of the facility;

h. Approximate dates or periods of past spills or releases, identification of material spilled, amount spilled, location, and a description of the response actions, including any inspection reports or technical reports generated as a result of the spill or release.

i. A current topographic map(s) showing a distance of at least 1,500 feet around the facility and other information described below, and at a scale of one inch equal to not more than 200 feet. Contours shall be shown on the map, with the contour interval being sufficient to clearly show the pattern of surface water flow. If such a map is not available, the workplan shall describe the method for generating the map for inclusion in the Group 1 Phase I/II report, as required to support the RFI. The map shall clearly show the following:

(1) Map scale, North arrow, date, and location of facility with respect to Township, Range and Section;

(2) Topography and surface drainage depicting all waterways, wetlands, 100-year floodplain, drainage patterns, and surface water areas as related to the SWMUs and the surrounding areas;

(3) Property lines, with the owners of all adjacent property clearly indicated;

(4) Surrounding land use;

(5) Locations and boundaries of (1) all solid waste, including hazardous waste, management units, both past and present, (2) spill areas and (3) other suspected areas of contamination;

(6) All injection and withdrawal wells, and

(7) All buildings, tanks, piles, utilities, paved areas, easements, rights-of-way, and other features including all known past and present product and waste underground tanks or piping, as available and applicable to potential releases from the SWMUs.

The map(s) shall be of sufficient detail and accuracy to locate and report all current and future RFI work performed at the site. The base map(s) shall be submitted in the Group 1 Phase I/II report and modified in subsequent reports and workplans as appropriate.

2. Unit Characterization

Phase I Workplans must contain the following information, to the extent known, for each SWMU included in the Group being investigated:

a. Location of unit/area;

b. The horizontal and vertical boundaries of each unit/area;

c. Details regarding the construction, operation and structural integrity of each unit/area;

d. A description of all materials managed and/or disposed at each SWMU including, but not limited to, solid waste, hazardous wastes, and hazardous constituents to the extent they are known or suspected over the life of the facility including

(1) Type of waste or hazardous constituents placed in the units, including source, hazardous classification, quantity and chemical composition;

(2) Physical and chemical characteristics, including physical form, physical description, general chemical class, cohesiveness of the waste;

e. The history of the utilization of each SWMU and the surrounding areas, including the period of operation and age of the unit;

f. Methods used to close the unit, if applicable;

g. A description of the existing degree and extent of contamination at each unit area.

h. Identification of additional information which must be gathered regarding 2.a through 2.g above.

3. Soil Sampling and Analysis Plan

The Sampling and Analysis Plan (SAP), dated March, 2006 developed by the Permittee was approved by Illinois EPA on August 8, 2006 (Log No. B-162-CA-9, 32, 33) with conditions and modifications. This plan was developed to be used as a reference document throughout the corrective action process at the facility. The SAP contains standard procedures for sampling and analysis for soil, groundwater and surface water during investigations. All corrective action investigation shall be conducted in accordance with the SAP and the Illinois EPA's August 8, 2006 approval letter (Log No B-162-CA-9, 32, 33) and subsequent approved plans. As indicated in the August 8, 2006 letter, an individual sampling plan shall be developed for each SWMU during the entire corrective action process; however, the foundation for the workplans shall follow the approve procedures of the SAP. Any modifications to the approved SAP must be submitted to Illinois EPA for review and approval.

4. Surface Water and Sediment Sampling and Analysis Plan

Phase I Workplans must provide for a determination of the presence or absence of releases of hazardous wastes and hazardous constituents into all surface waters or their

sediments potentially affected by the facility. The SWMUs requiring surface water and sediment investigations are identified in Condition IV.B.1. The plan should meet the requirements of III.C and III.D and must also include, but is not limited to:

a. A description and characterization of all potentially affected surface waters, as it is available, including locations, areas, depths, inflows and outflows, volumes of water, seasonal fluctuations, flooding tendencies, drainage patterns, on-site and off-site affected populations and activities.

b. Descriptions and characterization of sediments associated with all surface waters, as it is available, including deposition areas, thickness profiles, and physical and chemical parameters;

5. Hydrogeologic and Hydrologic Description

The Group 1 Phase I/II Workplan and any other workplans for investigating groundwater must provide descriptions of the hydrogeology and hydrology setting at the facility.

The information which must be provided regarding the hydrogeology and hydrology at the facility includes:

a. Information, as it is available, for the facility overall, regarding:

(1) The regional geologic and hydrogeologic characteristics in the vicinity of the facility, including stratigraphy, hydrogeologic flow and the areas of recharge and discharge.

(2) Any topographic or geomorphic features that might influence the groundwater flow system;

(3) The hydrogeologic properties of all of the hydrogeologic units found at the site down to the first bedrock aquitard, including: hydraulic conductivity and porosity, texture, uniformity and lithology; and interpretation of hydraulic interconnections between saturated zones, and zones of significant fracturing or channeling in the unconsolidated and consolidated deposits;

(4) Using the facility map as a base, isopach and structural contour maps, and at least two (2) geologic cross sections showing the extent (depth, thickness, lateral extent) of all hydrogeologic units within the facility boundary, down to the first bedrock aquitard, identifying: all units in the unconsolidated and consolidated deposits; zones of higher permeability or lower permeability that might direct or restrict the flow of contaminants; perched aquifers; and the first saturated zone that may have a potential for migration of contaminants;

(5) The water level or fluid pressure monitoring, including: water level contour maps and vertical gradient sections, well or piezometer hydrographs and interpretation of the flow system, interpretation of any changes in hydraulic gradients, and seasonal fluctuation; and

(6) Any man-made influences that may affect the hydrogeology of the site, identifying local water supply and production wells and other man-made hydraulic structures within 1500 feet of the facility boundary.

b. Additional hydrogeologic and hydrologic information may be gathered during the groundwater or SWMU investigations.

c. A detailed discussion of all previous groundwater monitoring efforts. This discussion must include: (1) scaled maps showing the location of all wells used to collect the monitoring data; (2) construction details of the wells used to collect the monitoring data; (3) a summary of the results of all previous groundwater monitoring efforts; and (4) a detailed evaluation of the collected data

6. Potential Receptors

The Group 1 Phase I workplan must contain data describing the human populations and environmental systems within a radius of 1,500 feet of the facility boundary that may be affected by releases from SWMUs must be collected and submitted. The following characteristics shall be identified.

a. Local uses and possible future uses of groundwater:

(1) Type of use (e.g., municipal or residential drinking water source, industrial, etc.); and

(2) Location of groundwater users, including wells and discharge areas.

b. Local uses and possible future uses of surface waters draining the facility:

1. Domestic and municipal;

2. Recreational;

3. Agricultural;

4. Industrial; and

5. Environmental.

c. Human use of, or access to, the facility and adjacent lands, including, but not limited to:

1. Recreation;

2. Agriculture; and

3. Residential.

7. Integrity Inspection

The Group 2 RFI Phase I Workplan must provide for an evaluation of the structural integrity of the concrete-asphalt surface of the drum staging areas (SWMUs 1 and 20) and the heat exchanger bundle cleaning pads (SWMUs 10 and 25A-C). These surfaces shall be inspected by an independent registered professional engineer for cracks/joints which penetrate through the concrete/asphalt. The workplan must define the standards and procedures that will be followed when conducting the inspections. The standards and recommendations of professional/technical entities such as the American Concrete Institute, the Portland Cement Association, the American Society of Testing and Materials, the American Society of Civil Engineers, etc., which relate to the ability of concrete/asphalt to contain liquids should be considered. The results of this inspection shall be (1) submitted in the form of a report, (2) included in the Group 2 RFI Phase I report, and (3) certified in accordance with 35 Ill. Adm. Code 702.126 by the engineer. The reports must include (1) the results of the inspection, (2) scaled drawings showing the location of all cracks and construction joints observed during the investigation, (3) conclusions reached regarding any cracks or construction joints observed in the area of concern, (4) justification for the conclusions reached (e.g., information must be provided which indicates that any construction joints in the areas of concern are indeed watertight), and (5) photographs to support the conclusions reached and recommendations for correction action to prevent releases from the SWMU, as appropriate.

If joints, cracks or other defects are found in the base of any SWMU during the inspection required above which would potentially allow hazardous waste or hazardous constituents to migrate through them, then the Phase I Workplan must provide for the collection of soil samples beneath them to determine if hazardous waste or hazardous constituents have been released to the underlying soil.

a. Samples should be collected from at least one location along each joint or crack that provides a potential for hazardous waste or hazardous constituents to migrate to underlying soil. Such locations shall be biased to stained areas or low-lying areas where spills would tend to accumulate.

b. Samples should be collected from 0" - 6" below the subgrade/natural soil interface.

c. Samples must be collected and analyzed in accordance with the procedures set forth in the sampling and Analysis Plan below.

F. RFI PHASE II WORKPLAN INFORMATION

1. Soil Investigation

A Phase II Soil Sampling and Analysis plan, if necessary, must describe procedures to determine the nature and extent of hazardous waste and/or hazardous constituents released to the soil. This plan shall address and/or include, in addition to the plans specified in III.C and III.D:

a. A description of what is known about the horizontal and vertical extent of contamination;

b. A description of relevant contaminant and environmental chemical properties within the affected source area and plume, including solubility, specification absorption, leachability, exchange capacity biodegradability, hydrolysis, photolysis, oxidation and other factors that might affect contaminant migration and transformation (if known);

c. Specific contaminant concentrations, if known;

d. The horizontal and vertical velocity and direction of contaminant movement (if known);

e. An extrapolation of future contaminant movement (if known); and

f. The methods and criteria to be used to define the boundaries of the plume(s) of contamination.

2. Sediment and Surface Water Sampling and Analysis Plan

A Phase II RFI sampling and analysis plan to characterize the contamination of surface waters and sediments shall include, at a minimum:

a. A description of the horizontal and vertical extent of any plumes and the extent of contamination in the underlying sediments (if known);

b. Specific contaminant concentrations (if known);

c. The horizontal and vertical direction and velocity of contaminant movement (if known);

d. An evaluation of the physical, biological and chemical factors influencing contaminant movement (if known);

e. An extrapolation of future contaminant movement (if known);

f. The criteria used to define the boundaries of the plume; and

g. The sampling conditions required under III.C and III.D.

3. Hydrogeologic and Geologic Investigation Plan The Phase II hydrogeologic and geologic investigation plan must provide descriptions of groundwater monitoring systems which will provide adequate data on the detection, nature, extent and rate, and concentration of any release from the SWMU to the groundwater at the facility. This information may be incorporated into the Site-Wide Groundwater Management or other program(s) approved by Illinois EPA.

The information which must be provided regarding the investigation of hydrogeology and hydrology at each SWMU includes:

a. Information for the individual SWMU or SWMU group, or other approved approach as it is available, regarding:

(1) The regional geologic and hydrogeologic characteristics in the vicinity of the facility, including stratigraphy, hydrogeologic flow and the areas of recharge and discharge.

(2) Any topographic or geomorphic features that might influence the groundwater flow system;

(3) The hydrogeologic properties of all of the hydrogeologic units found at the site down to the first bedrock aquitard, including: hydraulic conductivity and porosity, texture, uniformity and lithology; and interpretation of hydraulic interconnections between saturated zones, and zones of significant fracturing or channeling in the unconsolidated and consolidated deposits;

(4) The water level or fluid pressure monitoring, including: water level contour maps and vertical gradient sections, well or piezometer hydrographs and interpretation of the flow system, interpretation of any changes in hydraulic gradients, and seasonal fluctuation; and

(5) Any man-made influences that may affect the hydrogeology of the site, identifying local water supply and production wells and other man-made hydraulic structures near a SWMU, SWMU Group, or on a Site-Wide basis.

b. Procedures for obtaining information identified in III.F.3.a above which was not obtained during preparation of the workplan, as required to characterize the release at the SWMU.

c. A description of the extent of contamination in groundwater associated with a release from the SWMU, including:

(1) A description of the known horizontal and vertical extent of the contamination;

(2) Specific contaminant concentrations, if known;

(3) The horizontal and vertical velocity and direction of contaminant movement, if known; and

(4) An extrapolation of future contaminant movement.

d. A sampling plan which follows III.C and III.D.

G. DATA COLLECTION QUALITY ASSURANCE

Quality Assurance Project Plan (QAPP), dated March, 2006 developed by the Permittee was approved by Illinois EPA on August 8, 2006 (Log No. B-162-CA-9, 32, 33) with conditions and modifications. This plan was developed to be used as a reference document throughout the corrective action process at the facility. The QAPP contains standard procedures for the quality assurance plan during soil and groundwater sampling and analysis. All quality assurance of soil and groundwater sampling and analysis during corrective action investigation shall be conducted in accordance with the QAPP and the Illinois EPA's August 8, 2006 approval letter (Log No B-162-CA-9, 32, 33) and subsequent approved plans. Any modifications to the approved QAPP must be submitted to Illinois EPA for review and approval.

H. DATA MANAGEMENT PLAN

The Permittee shall develop and initiate a Data Management Plan to document and track investigation data and results. This Plan shall identify and set up data documentation materials and procedures, project file requirements, and project related progress reporting procedures and documents. The Plan shall also provide the format to be used to present the raw data and conclusions of the investigation(s). This plan shall be submitted with the Group 1 Phase I/II Workplan or other workplan as appropriate. The Data Management Plan can be incorporated by reference in subsequent workplans and changes shall be made as necessary through addendums to the original plan.

I. HEALTH AND SAFETY PLAN

Under the provisions of 29 CFR 1910 (54 FR 9,295, March 6, 1989), cleanup operations must meet the applicable requirements of OSHA's Hazardous Waste Operations and Emergency Response standard. These requirements include hazard communication, medical surveillance, health and safety programs, air monitoring, decontamination and training. General site workers engaged in activities that expose or potentially expose them to hazardous substances must receive a minimum of 40 hours of safety and health training off site plus a minimum of three days of actual field experience under the direct supervision of a trained experienced supervisor. Managers and supervisors at the cleanup site must have at least an additional eight hours of specialized training on managing hazardous waste operations. These requirements must be met during each phase of the RFI. A detailed Health and Safety Plan (HSP) demonstrating that his requirement is met must be contained in the workplan for each phase of the RFI. The HSP from previous phases can be incorporated by reference into the current workplan provided that any changes or additions to the existing HSP are detailed in an addendum contained within the workplan.

J. IMPLEMENTATION OF RFI

The Permittee shall conduct those investigations necessary to characterize the site, and to determine the nature, rate and extent of migration, and concentrations of hazardous waste and hazardous constituents, if any, released from the SWMUs into the surface water and sediments, groundwater, and soil. The investigations must be of adequate technical content to support the development and evaluation of a corrective measures program, if one is deemed necessary by the Illinois EPA's BOL.

The investigation activities shall follow the plans and procedures set forth in the Workplan(s) and the RFI schedule. Any actual or anticipated deviations from the Workplan(s) or the RFI schedule shall be reported no later than the time of submission of the next quarterly report required by Section V subsequent to the determination of need or actual deviation from the Workplan.

K SUBMISSION OF REPORTS OF RFI ACTIVITIES

The Permittee must prepare and submit workplans and reports which must be submitted to the Illinois EPA for review and approval in accordance with the schedule set forth in the following table. Any progress report to summarize overall corrective action program at the facility must be submitted by CITGO upon Illinois EPA's request:

Facility Action	Due Date
Completion of Group 1 or 2 RFI Phase I/II investigation and submission of report	Within time frame established in the Phase I/II Workplan, subject to Illinois EPA's approval.
Submission of RFI Phase II Workplans	Within 90 days of notification that Phase II is required.
Completion of RFI Phase II investigation and submission of Phase II Report	Within time frame established in the Phase II workplan subject to Illinois EPA's approval.
Submission of Supplemental Investigation Workplan	Within 90 days of notification that supplemental investigation is required.
Completion of supplemental Investigation and Submission of Report and Summary	To be specified in the supplemental investigation workplan subject to approval by Illinois EPA.
Annual RCRA Sewer Inspection and Maintenance Report	March 31 of each following
Corrective Action Progress Report	Upon Illinois EPA's request and to be specified by Illinois EPA.

Renewal RCRA Hazardous Waste Post-Closure Permit

CITGO Lemont Refinery

USEPA ID No: ILD041550567
STATE ID No: 1978030004
Log No: B-162R

ATTACHMENT C-2

Summary of Illinois EPA Letters Regarding Corrective Action

Attachment C-2

Summary of Illinois EPA Letters Regarding Corrective Action and CITGO's Submittals to Illinois EPA Under Review

(Updated March 2011)

I. Chronological Summary of Illinois EPA Letters Regarding Corrective Action

IEPA Letter Dates & Log No.	Description of Submittal	IEPA Action Taken
9/18/97 B-162	Application for RCRA Post-Closure Permit.	Issued a RCRA permit for closure and post-closure care of four land treatment units. Permit also required facility to conduct corrective action at 34 SWMUs. Permit broke SWMUs down to two groups, with Group 1 being those SWMUs, with a known release or highest potential risk to human health and the environment, which are to be addressed first then the Group II SWMUs. A list of SWMUs is provided in Attachment 1; a drawing showing the locations of the SWMUs and 4 land treatment units is provided in Attachment 2.
10/22/98 B-162-M-11	A request to modify the GMZ beneath and around the stormwater basin (this GMZ is also identified as SWMU 33). The requirements for the GMZ were initially contained in Conditions IV.B.1.a of the RCRA Permit.	Approved request (the GMZ is also identified as SWMU 33).
11/28/00 B-162-M-1	Closure by removal demonstration at the wastewater treatment sludge decant Basin (a surface impoundment) which had previously been closed under IEPA approved plan (Log No. C-193). This is also referred to as SWMU 15C; required by Condition I.C of the RCRA permit.	Disapproved request; required further soil investigation be conducted at this unit.

IEPA Letter Dates & Log No.	Description of Submittal	IEPA Action Taken
5/14/01 B-162-M-1	A workplan for soil investigation at SWMU 15C as part of closure by removal demonstration required by Condition I.C of the permit; follow-up to our 11/28/00 letter (see above).	Approved with conditions and modifications.
10/9/01 B-162-CA-1 B-162-CA-2 B-162-CA-3	Following documents were included in this submittal: a. Group I RFI Phase I/II Workplan b. Sewer Inspection and Maintenance Work Plan c. Streamlined Corrective Action Workplan	All three documents were disapproved.
11/14/01 B-162-M-1	A soil investigation report for SWMU 15C, submitted as part of the closure by removal demonstration required by Condition I.C of the Permit. Follow-up to our 5/14/01 letter.	Approved report with conditions; required the facility to remove the "ashy/silty" materials from the unit.
9/27/02 B-162-M-1	Final closure by removal demonstration document for SWMU 15C, as required by Condition I.C of the permit. It contained soil investigation results and soil excavation report; follow-up to our 11/14/01 letter.	Approved a closure by removal demonstration for a former surface impoundment as known as SWMU 15C.
2/21/03 B-162-CA-4 (1)	Sewer Inspection and Maintenance Work Plan (B-162-CA-2), submitted in May 1998.	Approved plan as a follow-up to IEPA's 10/9/01 letter.
4/9/03 B-162-CA-4 (2)	The submittal, received on 1/17/02, consisted of: -Workplan for Streamlined RCRA Corrective Action ; -Results of Site-Wide Groundwater Investigation; and -Workplan and Procedures: Streamline Corrective Action	IEPA's response included concerns and requirements that need to be addressed prior to establishing the revised process for carrying out corrective action program at facility.

IEPA Letter Dates & Log No.	Description of Submittal	IEPA Action Taken
1/28/04 B-162-CA-6 B-162-CA-7	Submittals included: • Site-Wide Groundwater Monitoring Report (9/03); • Workplan for Streamlined RCRA Corrective Action (10/03); • Letter dated 1/8/04- request to withdraw the 10/03 streamlined workplan.	Approved the Site-Wide Groundwater Monitoring Report with conditions to conduct additional groundwater investigation at the site. Indicated the streamlined plan was withdrawn and as discussed in 12/03 meeting, a revised Streamline CA Workplan is to be submitted to IEPA by 1/31/04.
6/1/04 B-162-CA-11	A 1/30/04 report entitled SWMU-1 Soil Investigation, Streamline Corrective Action Program and supplemental information, dated 5/6/04.	Approved a report documenting that no further action was necessary to address SWMU 1 (Former Empty Drum Storage Area).
10/4/04 B-162-CA-9 B-169-CA-10	Submittal contained following documents: • Work Plan for Site-Wide Groundwater Monitoring (rec'd on 2/2/04); • Workplan for Evaluation of GW Conditions at I&M Canal (rec'd on 3/30/04); • Sewer Inspection—Annual Report (rec'd on 3/30/04); • RCRA Streamlined Category A SWMU Work Plans (rec'd on 3/30/04) for SWMUs 2a-e, 3, 16, 17, 19b, 24, 31a, and 31b-e.	-Accepted the Sewer Inspection annual report. -Approved the Workplan for Category A SWMUs with conditions and modifications and focused mainly on soil investigation only. -Required additional groundwater corrective action activities, a report for evaluation of I&M canal, and additional information regarding groundwater monitoring wells are required in this letter.
1/6/05 B-162-CA-5	A workplan entitled SWMU 43j: Pipeline release Located Near Tanks 92 and 108, which included a soil sampling plan for SWMU 43j (rec'd on 12/14/04).	Approved workplan with conditions and modifications.
3/23/05 B-162-CA-12	A groundwater report entitled, Field Investigation Report: Evaluation of Groundwater Conditions at the I&M Canal, rec'd on 11/23/05. CITGO proposed natural attenuation to address the groundwater contaminations at the site.	Disapproved report; required CITGO to submit a plan to address groundwater in I&M Canal within 60 days (this date was eventually extended by additional 60 days as a result of a 5/19/05 meeting between IEPA and CITGO).

IEPA Letter Dates & Log No.	Description of Submittal	IEPA Action Taken
8/24/05 B-162-CA-13 &15-22	Submittals rec'd on 3/31/05 contained Category A SWMU investigation Reports for the following SWMUs: SWMUs 2a-e, 3, 16, 17, 19b, 24, 31a, 31b-e, and 43j (*workplan for this effort had been approved on 10/4/04).*	Approved the reports. Additional work is necessary at each SWMU.
10/21/05 B-162-CA-23	Site Wide Groundwater Monitoring Report, rec'd on 6/20/05, was submitted to address groundwater concern discussed during a meeting between IEPA and CITGO on 6/19/05.	Approved the report with conditions and modifications. IEPA required CITGO to submit additional information regarding its background and details on the remediation options.
11/30/05 B-162-CA-9	Work Plan for Streamlined Corrective Action, rec'd on 2/3/04 and related draft *revised* workplan, rec'd via e-mail on 3/1/05 & 5/13/05.	Disapproved. CITGO is required to submit either a revised CA workplan or a Phase I/II RFI Workplan for all Group I SWMUs in accordance with the RCRA Permit by 1/31/05.
1/31/06 B-162-CA-25	Phase II RFI Workplan for SWMUs 2A-E received on 11/28/05.	Approved. CITGO's plan to monitor this unit for 12-mo and to submit a report of the monitoring after 12-mo. No further investigation is necessary regarding soil at these units.
2/27/06 B-162-CA-1 & 8	• CITGO's 1/14/04 letter regarding Disposal of Storm Water Basin (SWB) Material, rec'd on 1/16/04. • CITGO's 7/12/05 submittal entitled, Withdrawal of January 14, 2004 Proposal Regarding Storm Water Basin (SWB) Material at the Land Treatment Facility (LTF) and Notice of Plan for Final Grading of SWB Material at the LTF, rec'd on 7/15/05. • CITGO's 12/8/05 letter to request an extension for submittal of a Phase I/II RFI Workplan for Group I SWMUs, rec'd on 11/18/05.	Approved an extension request and required CITGO to submit a Phase I/II RFI Workplan for Group I SWMUs by March 31, 2006. Also approved withdrawal of CITGO's 1/14/04 letter; however, this letter didn't not address any other content of the 7/12/05 submittal. Rob Watson (RCRA Unit) to respond to final grading plan in 7/15/05 submittal.

IEPA Letter Dates & Log No.	Description of Submittal	IEPA Action Taken
2/27/06 B-162-CA-27 thru 30	Phase II RFI Workplans for following SWMUs: SWMU 17, SWMU 19B, SWMU 31A, and SWMU 43J, rec'd on 11/28/05.	Approved Phase II Workplans for the four SWMUs with conditions and modifications. Acknowledgement that a revised SAP and QAPP will be submitted in the near future. Any future CA activities will be conducted in accordance with the facility's RCRA permit.
4/3/06 B-162-CA-26	Phase II RFI Workplan for SWMU 16 (Former Sludge Application Area).	Approved the Phase II RFI workplan for SWMU 16 with conditions and modifications. It required to address arsenic contamination and to submit a report by September 1, 2006.
5/8/06 B-162-CA-31	2006 Groundwater Monitoring and Investigation Work Plan, dated 1/30/06 (rec'd on 2/1/06). This submittal replaced Groundwater CA Workplan was received on 7/19/05 (B-162-CA-24).	Approved the groundwater investigation work plan with conditions and modifications. Additional information is required to be submitted within 30 days.
6/8/06 B-162-CA-14& 34	2004 RCRA Sewer Investigation Annual Report, dated 3/30/06 (rec'd on 4/1/05), and 2005 RCRA Sewer Investigation Report, dated 3/24/06 (rec'd on 3/27/06).	Approved with conditions and modifications. Additional information, such as maps, information regarding ratings and investigative schedule to be submitted within 75 days
7/17/06 B-162-CA-35 thru 47	Phase I/II RFI Workplans for the following 13 SWMUs, dated 3/30/06: 4, 7, 11A, 11B, 12, 19D, 21, 30, 32, 33, 34, 36, and 37.	Approved with several conditions and modifications. No further corrective action was required for the following SWMUs: SWMU 36 and SWMU 37.
8/8/2006 B-162-CA-9 (CCR), -32 (QAPP), -33 (SAP)	(1) Quality Assurance Project Plan (QAPP), dated 3/22/06; (2) Sampling and Analysis Plan (SAP), dated 3/22/06; and (3) Current Conditions Report (CCR), dated 1/30/04.	Approved with conditions and modifications. Illinois EPA required standard procedures for the sampling and analysis program unless otherwise specifically proposed in an individual workplan for each SWMU.

IEPA Letter Dates & Log No.	Description of Submittal	IEPA Action Taken
10/4/06 B-162-CA-48, 49 &50	(1) Modification to Interim 2006 Site-wide Groundwater monitoring and Investigation workplan – Free Phase Hydrocarbon Procedures, dated 6/1/06; (2) Response to Comment #1, dated 6/1/06; (3) Amended request to Groundwater Work Plan: Groundwater monitoring and Investigation workplan, dated 8/4/06; and (4) Response to Comment #7 – Sampling Schedule, dated 6/1/06.	Approved with conditions and modifications. A few modifications to proposed FPH recovery and monitoring are made by Illinois EPA.
11/27/06 B-162-CA-52	Phase II RFI Report for Former Sludge Application Area (SWMU 16), dated 8/30/06.	No further corrective action was required for SWMU 16.
1/17/07 B-162	CITGO's letter entitled Monitoring Well/Piezometer Abandonment (P-16,PB-MW-4 & FR-MW-5), dated 8/11/06.	Approved abandonment of P-16,PB-MW-4 & FR-MW-5. Additional submittal regarding the three wells is requested.
1/17/07 B-162-CA-51	Response to Comments on 2004 and 2005 RCRA Sewer Investigation Annual Reports, dated 8/18/06.	Additional information to the 2004 & 2005 Annual Sewers Reports are approved with conditions and modifications.
4/12/07 B-162-CA-55&61	Phase I RFI Report for Spill at Hot Oil Line (SWMU 4) and Vertical Oil Storage Tank (SWMU 21), both dated 1/30/07.	An ELUC must be placed for SWM 21 to restrict land use for Ind/Comm. No further action is required for SWMU 4.
5/17/07 B-162-CA-53	"Re-Evaluation of Groundwater Management Zone", received on 10/3/06.	Approved with conditions and modifications.
5/31/07 B-162-CA-54&66	"Stepped Flow Rate Pump" and "Site-wide Groundwater monitoring and Investigation Workplan", received on 11/29/06 and 2/6/07, respectively.	Approved with conditions and modifications.

IEPA Letter Dates & Log No.	Description of Submittal	IEPA Action Taken
6/13/07 B-162-CA-56 thru 60, 62, 63, 64	Phase I RFI Reports for the following SWMUs: 7, 11A, 11B, 12, 19D, 30, 34, 2 a-e (all but SWMU 2 report were submitted on 1/30/07; SWMU report was submitted on 2/28/07).	Phase II workplans and groundwater remedial plan for SWMU 2 must be submitted within 90 days.
12/6/07 B-162-CA-73 thru 84	Phase I RFI Workplans for the following SWMUs: 5, 10, 13, 15A/15B, 18&19A, 19C, 20, 25A, 25B, 25C, 35, and 44.	The twelve-workplans were approved with conditions and modifications.
12/17/07 B-162-CA-67	2006 RCRA Sewer Investigation Annual Report was submitted and was received on march 28, 2007 and October 5, 2007 (CA certification form).	The annual report was approved with conditions and modification.
12/17/07 B-162-CA-69 thru 72	Phase II RFI Report for the following SWMUs: 17, 19B, 31A, and 43J (received on May 16, 2007).	Approved Phase II Report for the 4 SWMUs with conditions and modifications.
B-162-CA-85 1/28/08	(1) Preliminary GRW-2 and GRW-2 Effectiveness Report, dated 07/06/07; and (2) Response to Comment 2C (CA-54 & 66), dated 8/1/07.	Approved with conditions. No groundwater investigation is necessary at SWMUs 36 & 37. No replacement wells are necessary at SWMU 32. Replacement wells are approved at SWMU 30, 31A-E.
2/20/08 B-162-CA-65&88	Soil Investigation of Year 2 defects (1/31/07), Re-examination of Sewer Defects/Soil Locations (9/4/07) and Soil Investigation of Year 3 and Remaining Year 2 Defects (10/17/07).	Approved with conditions and modifications.
4/25/08 B-162-CA-86	September 10, 2007 submittal (rec'd 9/13/07) regarding following SWMUs: 7, 11A&B, 12, 19D. 30, 34, and 2a-e.	Approved with conditions and modifications. This submittal included CM Plan for 19D.

IEPA Letter Dates & Log No.	Description of Submittal	IEPA Action Taken
4/25/08 B-162-CA-90	Multiple Step Pump Test (8/28/07) (rec'd 8/30/07) was submitted to further evaluate the pilot testing of hydraulic controls at GQ-MW-2A.	Approved with conditions and modifications. The facility is required to submit a report upon the completion of the pilot testing.
8/1/08 B-162-CA-91	CITGO's March 14, 2008 submittal (rec'd on 3/18/08) addressed CA activities at the following SWMs: 17, 19B, 31A, and 43J. This submittal was sent in response to IEPA's 12/17/07 letter (CA-69-72).	Approved with conditions and modifications. Workplan for SWMU 19B and an extension of submitting a workplan for SWMU 43J are approved.
12/18/08 B-162-CA-114	A corrective measure completion report for SWMU 19D Former sludge Drying Area, received on 10/31/08.	Approved NFA with condition that migration to groundwater exposure route is addressed through GMZ and that ELUC will have to be eventually placed for industrial land use in the area.
1/13/09 B-162-CA-92	2007 Annual Sewer Investigation Report	Approved with conditions and modifications.
3/12/09 B-162-CA-93 thru 97	Phase II RFI Workplan for SWMUs 38a, 38b, 38c, 39a, and 39b (RCRA sewer investigation – soil investigation)	Approved with conditions and modifications.
B-162-CA-100 and 119 No letter Issued (5/28/09 memo to BOL File)	-An extension request for the 4 required submittals included in the IEPA's 4/25/08 letter (Log No. B-162-CA-86). -Summary of Conference Call from 11/19/2008.	-Extension request was approved prior to the submittal of letter - Summary was informational purpose only.
6/5/09 B-162-CA-101	Corrective Measures Plan (CMP) for SWMU43J	Approved with conditions and modifications
6/16/09 B-162-CA-116,117, 118	Addressed: (1) Group 2 Phase I Report for: SWMU 25A, (2) Phase II & Closure Report for SWMU 34, and (3)CM Plan for SWMU 12	Approved with conditions and modifications
9/16/09 B-162-CA-115	Proposed gauging and re-sampling Sumps 2c and 2e utilizing low-flow sampling technique.	Approved with conditions and modifications

IEPA Letter Dates & Log No.	Description of Submittal	IEPA Action Taken
12/21/09 B-162-CA-121	2008 RCRA Annual Sewer Investigation Report, which addressed West Tank Farm (Areas 3 and 5) and North Plant (Areas 4b and 2).	Approved with conditions and modifications.
2/1/10 B-162-CA-135	CITGO's 12/16/09 letter, proposing to abandon five flush mounted piezometers (PZ-4, PZ-5, PZ-7, PZ-8 and PZ-9)	Approved with conditions and modifications.
2/24/10 B-162-CA-129	SWMU 43J CM Completion report.	Approved with conditions and modifications.
3/15/10 B-162-CA-127	SWMU 38A Investigation report.	Approved with conditions and modifications.
4/26/10 B-162-CA-102	Current Conditions Report and Proposed workplan for Future Groundwater Management, Lemont Refinery, Illinois	Approved with conditions and modifications.
7/8/10 B-162-CA-139	Phase II RFI and Closure report for SWMU 38a- Process Sewer Line Segment at 31-MH8-DP01 to 31-MH8-DP-02	Approved with conditions and modifications. Tier 2 evaluations for construction worker Inhalation ROs were approved.
7/14/10* B-162-CA-133 **IEPA Memo to BOL File*	Proposal for additional sampling at SWMU 7 to delineate lead contamination found in the area.	*This proposal for additional investigation was approved prior to the submittal of the letter.*
7/29/10 B-162-CA-142	Notification of a newly discovered SWMU (SWMU 45-Contaminated Fill Area)	Approved the proposal to submit a RFI workplan by 8/31/10 for this new SWMU.
10/4/10 B-162-CA-126, 128	- Revised CMP for SWMU 12 - Investigation report for SWMUs 38b, and 38c.	NFR was issued for SWMU 38b with ELUC for I/C use. NFA on soil was required for SWMUs 12 and 38c. However, groundwater must be investigated for SWMUs 12 and 38c.

IEPA Letter Dates & Log No.	Description of Submittal	IEPA Action Taken
11/04/10 B-162-CA-103 thru 113	Group 2 Phase I RFI Reports for the following SWMUs: 5,10, 13, 15A/B, 18&19A, 19C, 20 25B, 25C, 35 and 44	NFR was issued for SWMUs 5, 25C, and 35with ELUC for I/C use. Phase II RFI was required for SWMUs 10, 13, 15A/B, 18 & 19A, and 19C, 20, 25B and 44.

II. Summary of CITGO's Submittals to Illinois EPA Under Review

Log No. & Rec'd Date	Description of Submittal
B-162-CA-98 5/23/08	Draft ELUC for SWMU 31A. May 2008 submittal supersedes March 2008 submittal.
B-162-CA-99 5/28/2008	Draft ELUC for SWMUs 31 B-E. May 2008 submittal supersedes Oct 2007 submittal (B-162-CA-87)
B-162-CA-120 3/16/09	Soils Investigation Report for 2007 Sewer Defects
B-162-CA-122 4/17/09	RFI Phase I reports for SWMUs 43A thru I.
B-162-CA-123 4/17/09	RFI Phase II report for SWMU 11A
B-162-CA-124 4/17/09	RFI Phase II report for SWMU 11B
B-162-CA-125 8/4/09	CMP for SWMU 30
B-162-CA-130 11/13/09	CM completion report for SWMU 19b
B-162-CA-131 11/30/09	CM completion report for SWMU 39a
B-162-CA-132 11/30/09	CM completion report for SWMU 39b
B-162-CA-134 11/23/09	Supplemental SWMU 2a-e investigation report.
B-162-CA-136 1/6/10	Soils Investigation Report for 2008 Sewer Defects
B-162-CA-137 3/31/10	2009 RCRA Sewer Investigation Annual Report
B-162-CA-138 4/8/10	Revised Tier 2 proposal for SWMU 34 in response to IEPA's April 25, 2008 letter (Log No. B-162-CA-86).

Log No. & Rec'd Date	Description of Submittal
B-162-CA-140 6/1/10	Defect Release Determination Soil Screening Assessment Work Plan for SWMUs 38, 39, and 40.
B-162-CA-141 6/7/10	Phase I RFI and Closure Report for SWMU 38D (Process Sewer Line segment: 52-LF51-DP-01 TO 52-MH34-DP-01)
B-162-CA-144 8/31/10	SWMU Assessment Report for SWMU 45.
B-162-CA-145 9/27/10	Site-Wide Groundwater Management Program Proposed Workplan
B-162-CA-146 10/25/10	Phase II RFI and Supplemental Investigation Report for SWMU 7
B-162-CA-147 1/18/11	Request to removed manganese for GW Monitoring Parameter List
B-162-CA-148 2/7/11	Soil Investigation Report for 2009 Sewer Defects
B-162-CA-149 3/14/11	Phase II RFI Report for SWMU 10
B-162-CA-150 3/14/11	Phase II RFI Report for SWMU 20
B-162-CA-151 3/14/11	Phase II RFI Report for SWMU 25A

Renewal RCRA Hazardous Waste Post-Closure Permit

CITGO Lemont Refinery

USEPA ID No: ILD041550567
STATE ID No: 1978030004
Log No: B-162R

ATTACHMENT D

Corrective Measures Program Overview

Attachment D
Corrective Measures Program Overview

1.0 Introduction

In accordance with Section 3004 of RCRA and 35 IAC 724.201, CITGO must institute such corrective action necessary to protect human health and the environment from all releases of hazardous wastes, or hazardous constituents listed in the modified Skinner List of constituents provided in the approved Permit Renewal Application from any Solid Waste Management Unit (SWMU) at its facility. This is accomplished by:

1. Conducting a RCRA Facility Investigation (RFI) to determine whether releases of hazardous wastes and hazardous constituents have occurred from any Solid Waste Management Unit (SWMU) at the subject facility, and, if so, the nature and extent of the release; and

2. Based on the results of the RFI, developing and implementing a Corrective Measures Program which describes the necessary corrective actions which will be taken. The required corrective actions shall be those actions necessary to protect human health and the environment from all releases of hazardous wastes, or hazardous constituents, listed in the Modified Skinner List of constituents provided in the approved Permit Renewal Application from any SWMUs above site-specific cleanup objectives.

The purpose of this document is to describe the steps in developing and implementing the Corrective Measures Program (CMP). To allow for a logical and orderly progression in developing and implementing necessary corrective action at SWMUs, the Corrective Measures Program should be carried out in five phases.

1. Phase I should consist of (1) development of final cleanup objectives, (2) discussion of those SWMUs requiring corrective measures and (3) a preliminary evaluation of the corrective action alternatives available for each SWMU requiring corrective action.

2. Phase II should consist of development of a conceptual design of the corrective action chosen for each SWMU including remedial system(s) and/or institutional controls.

3. Phase III should consist of development and submission of the final design plans for the corrective action, including operation/maintenance plans and plans for the actual installation of the desired correction action.

4. Phase IV is the actual construction/installation of the selected corrective measure.

5. Phase V CMP is operation, maintenance, and monitoring of the selected corrective action to ensure it is properly protecting human health and the environment.

Workplans, reports, etc. will have to be developed as part of the efforts associated with each phase. All such documents will be subject to Illinois EPA review and approval. Details associated with each phase and the development of workplans, reports, etc. required for each phase is provided below.

2.0 Phase I of the CMP

In the initial phase of the Corrective Measures Program, the Permittee should (1) develop cleanup objectives for the SWMUs being investigated, and then (2) identify those SWMUs requiring corrective action. If it should be determined that a specific SWMU, or group of SWMUs, require corrective action, then the Permittee should identify, in general, types of remedial technologies or institutional controls which may be instituted to address and/or stabilize residual contamination, and identify the goals of the corrective measures. All of these efforts should be documented in the form of a Phase I Corrective Measures Report which includes the following:

1. Proposed Final Soil Clean-up Objectives. Final soil cleanup objectives will determine the need for and extent of soil remediation (soil corrective measures) at each SWMU investigated.

    a. The procedures utilized to develop the final soil cleanup objectives must take into consideration, as appropriate:

        i. The volume and physical and chemical characteristics of the contaminants of concern;

        ii. The effectiveness and reliability of containment, confinement and collection systems and structures in preventing contaminant migration;

        iii. The hydrologic characteristics of the unit and the surrounding area, including the topography of the land around the unit;

        iv. The patterns of precipitation in the region;

        v. The existing quality of surface soils, including other sources and their cumulative impacts on surface soils;

        vi. The potential for contaminant migration and impact to the underlying groundwater;

        vii. The land use patterns around the facility;

        viii. The potential for health risks caused by human exposure to the waste constituents; and

ix. The potential for damage to domestic animals, wildlife, food chains, crops, vegetation, and physical structures caused by exposure to waste constituents.

b. The Permittee and the Illinois EPA should have a meeting prior to the time that the Permittee begins developing these objectives. The goal of this meeting will be to provide the Permittee with guidance regarding the procedure which should be followed in developing and proposing these final cleanup levels.

c. The Illinois EPA will establish final cleanup levels if none are proposed by the Permittee.

d. All remedial objectives must be developed in accordance with 35 Ill. Adm. Code 742 (TACO). Any other methods used to develop remedial objectives for this project must be approved by the Illinois EPA.

e. Final Illinois EPA action taken on the development of and establishment of these final soil cleanup levels will be subject to the appeal provisions of Section 39(a) of the Illinois Environmental Protection Act.

f. For certain SWMUs, it may not be appropriate to establish final soil cleanup levels. This will be the case for those SWMUs where the selected corrective action is capping of the area followed by long-term monitoring of groundwater.

2. Final Groundwater Corrective Measures Objectives. Final corrective measures or cleanup groundwater objectives will determine the need for and extent of groundwater remediation (groundwater corrective measures). The procedures used in the development of these objectives must be in general accordance with the procedures described above for final soil cleanup objectives and must also meet the requirements set forth in 35 IAC 620.

a. The Permittee and the Illinois EPA should have a meeting prior to the time that the Permittee begins developing these objectives. The goal of this meeting will be to provide the Permittee with guidance regarding the procedure which should be followed in developing and proposing these final groundwater cleanup objectives;

b. The Illinois EPA will establish final cleanup levels if none are proposed by the Permittee.

c. Final Illinois EPA action taken on the development of an establishment of these final objectives will be subject to the appeal provisions of Section 39(a) of the Illinois Environmental Protection Act.

3. Evaluation of Need for Corrective Action The need for corrective action at each SWMU should be evaluated, based upon a comparison of the proposed clean-up objectives to the results of the RFI.

4. Potential Corrective Measures The report should contain a general discussion of the possible corrective measures which may be taken at SWMUs where it is determined that some type of corrective measure is necessary. More detailed information of such measures should be provided if the selected corrective measure has an impact on the development of the clean-up objectives. Also, there must be a discussion of whether the various measures will actually remove the contamination from the environmental media of concern or whether it is some type of institutional control to minimize the potential for future releases from the SWMU. Typically, some type of long-term monitoring is required for corrective measures which employ institutional control.

5. Schedule for the Corrective Measures Program The schedule for each Phase of the CMP and the submittals shall be included.

6. Ecological Assessment An ecological assessment may be required as part of the Phase I CMP if ecological receptors are identified that would be impacted by the release from the SWMU and if the proposed corrective measures do not address the exposure pathway. The objective of the analysis would be to determine if there will be any adverse impact on the ecology resulting from the proposed cleanup objectives. Ecological assessments may also be required if institutional controls (such as capping, etc.) are the selected corrective measures if the site has ecological receptors. This assessment should be developed in accordance with USEPA guidance. A review of the ecological receptors and the exposure pathways should be included in Phase I of the CMP for each SWMU or SWMU group.

3.0 Phase II of the CMP

Phase II of the CMP includes selection of the corrective measure to be taken and developing a basis for completing the final design of the measure. This effort should be documented in a Conceptual Design Report which describes the proposed corrective measure for each SWMU and provides a conceptual design for these measures. The main criteria for Illinois EPA review is whether the proposed corrective measures are able to achieve the final cleanup objectives established by the Permittee and the Illinois EPA in Phase I of the CMP and/or provide the institutional controls to prevent the migration of contaminants from the SWMU of concern necessary. Based upon a review of the Conceptual Design Report, the Illinois EPA may approve the corrective measures, require revisions to the proposed corrective measures, or require that a totally new corrective measures proposal be submitted to the Illinois EPA.

The Conceptual Design Report should contain the following sections:

1. Introduction/Purpose. The report should include an introductory section which contains: (1) general background information regarding the project; (2) the purpose and goals of the submittal; and (3) the scope of the project.

2. Existing Site Conditions. The report should contain a summary of the RFI activities conducted for each of the SWMUs of concern and the results of Phase I of the CMP for each SWMU. RFI investigation analytical results should be provided in tabular form, and maps depicting both the horizontal and vertical extent of contamination at the site should be provided.

3. Evaluation for Potential Future Migration. Based on the existing site conditions, a conceptual model of the site should be developed and presented in this report. The potential for additional future migration of contamination for each of the SWMUs of concern must then be evaluated, especially those SWMUs which have been determined to have released hazardous waste/hazardous constituents to the groundwater. It may be helpful to develop conceptual models for contaminant migration. Of special concern in this evaluation are (1) the physical properties of the contaminants (solubility, volatility, mobility, etc.) and (2) existing site conditions (types of soil present, location of contamination, hydrology, geology, etc.).

4. Corrective Measures Objectives. The report should discuss the general objectives of the proposed corrective measures to be constructed/installed for each SWMU at the subject facility, and the ability of the proposed corrective measures to achieve the established Corrective Measures cleanup objectives.

5. Identification of Options Available. The report should contain a discussion of the various options available to achieve the corrective measures objectives for each SWMU. This discussion should identify: (1) a general overview of each option available, including how the option will achieve the stated objective; (2) the advantages associated with each option; (3) the disadvantages associated with each option and (4) an estimate of the cost associated with choosing each option as the corrective measure.

6. Description of Selected Corrective Measure. The report should contain a qualitative discussion of the corrective measure chosen, along with the rationale which was used to select this measure from all those identified initially. This discussion should include documentation that the selected correction measure will be effective.

7. Identification of Design Criteria. The report should identify what information must be available to design the selected corrective measure.

8. Review of Available Information. The report should contain an evaluation of the existing information to ensure that sufficient information is available to complete the design of the selected corrective measure. If insufficient information is available, then the report should contain procedures for collecting the required information. The level of detail

required for this additional data collection should be similar to that provided in RFI workplans.

9. Procedures for Completing the Design. The report should contain a description of the procedures which will be followed to complete the design of the corrective measure. This should include as appropriate:

   a. Identification of the references and established guidance which will be used in designing the selected corrective measure. Justification for the selection of this procedure should also be provided.

   b. A description of the procedures which will be used to complete the design of the corrective measure.

   c. Identification of assumptions to be used in the design, and the impact these assumptions have on the overall corrective measure;

   d. Significant data to be used in the design effort;

   e. Identification and discussion of the major equations to be used in the design effort (including a reference to the source of the equations);

   f. Sample calculations to be used in the design effort;

   g. Conceptual process/schematic diagrams;

   h. A site plan showing a preliminary layout of the selected corrective measure;

   i. Tables giving preliminary mass balances;

   j. Site safety and security provisions.

   The information presented herein will form the continuing technical basis for the detailed design of the system and the preparation of construction plans and specifications.

10. Identification of Required Permits. The report should identify and describe any necessary permits associated with the selected corrective measure, as well as the procedures which will be used to obtain these permits.

11. Long-lead Procurement Considerations. The report should identify any elements/components of the selected corrective measure which will require a large amount of time to obtain/install. The following issues should also be discussed: (1) the reason why it will take a large amount of time to obtain/install the item; (2) the length of time necessary for procurement and (3) recognized sources of such items.

12. Project Management. The report should contain information regarding the tasks and personnel which will be involved in completing the design of the selected corrective measure. A schedule for completing the design should also be provided.

4.0 Phase III of the CMP

Once the Illinois EPA approves the Conceptual Design Report, the facility should complete the design of the approved corrective measure (Phase II of the CMP). Upon final completion of the design, the Final Design Report, consisting of final plans, specifications, construction workplan, etc. must be submitted to the Illinois EPA for review and approval. Typically, the Illinois EPA requires that these documents be submitted to the Illinois EPA within 120 days after the Conceptual Design Report has been approved. The final design report of the CMP must be submitted to the Illinois EPA in the form of a Class II permit modification in accordance with 35 Ill. Adm. Code Part 703. Should implementation of the corrective measures include construction/installation of additional structures which would meet the definition of RCRA regulated units, the Illinois EPA may notify the Permittee that the submittal will be reviewed as a Class III permit modification in accordance with 35 Ill. Adm. Code Part 703. In any event, as the submittal is either a Class II or Class III modification to the facility permit, the Illinois EPA response will be handled in accordance with the procedures for Class II and Class III modifications as outlined in 35 Ill. Adm. Code Parts 703 and 705. Several documents must be submitted to the Illinois EPA as part of Phase III of the CMP. The following text describes the expected contents of the various documents which should be developed and submitted to the Illinois EPA as part of Phase III of the CMP.

1. Final Design Report and Construction Workplan. The Final Design Report and Construction Workplan must contain the detailed plans, specifications and drawings needed to construct the corrective measure. In addition, this document must contain (1) calculations, data etc. in support of the final design; and (2) a detailed description of the overall management strategy, construction quality assurance procedures and schedule for constructing the corrective measure. It must be noted that the approved Conceptual Design Report forms the basis for this final report. The information which should be provided in this document includes:
   a. Introduction/Purpose. This portion of the document should (1) provide background information regarding the project, (2) describe the purpose and goals of the project, and (3) describe the scope of the project.

   b. Detailed Plans of the Design System, including the following:

      1. Plan views;

      2. Section and supplementary views which, together with the specifications and general layouts, facilitate construction of the designed system;

      3. Dimensions and relative elevations of structures;

4. Location and outline form of the equipment;

5. Ground elevations; and

6. Descriptive notations, as necessary, for clarity.

c. Technical Specifications. Complete technical specifications for the construction of the system. The specifications accompanying construction drawings should include, but are not limited to, the following:

1. All construction information, not shown in the drawings, which is necessary to inform the contractor in detail as to the required quality of materials, workmanship, and fabrication of the corrective measure;

2. The type, size, strength, operating characteristics and rating of the equipment;

3. The complete requirements for all mechanical and electrical equipment, including machinery, valves, piping and jointing of pipe;

4. Electrical apparatus, wiring and meters;

5. Construction materials;

6. Chemicals, when used;

7. Miscellaneous appurtenances;

8. Instruction for testing materials and equipment as necessary; and

9. Availability of site background information (such as soil boring, etc.).

d. Project Management. A description of the construction management approach, including the levels of authority and responsibility, lines of communication and qualifications of key personnel who will direct corrective measures construction/installation must be provided in the workplan.

e. Construction Quality Assurance/Quality Control. The workplan must contain a construction quality assurance/quality control plan describing the procedures which will be followed to ensure the corrective measure is constructed/installed in accordance with the approved plans and specifications.

f. Schedule. The workplan must contain a schedule for completion of all major activities associated with construction/installation of the selected corrective

measures. All major points of the construction/installation should be highlighted, with a graphical representation of the project schedule included.

g. Waste Management Practices. This portion of the document should identify the wastes anticipated to be generated during the construction/installation of the corrective measures, and provide a description of the procedures for appropriate characterization and management of these wastes.

h. Required Permits. This portion of the report should contain copies of permit applications submitted to other Bureaus of the Illinois EPA for the selected corrective measure. If it is determined that no permit is required for construction/installation and implementation of the corrective measures, rationale and justification must be provided to support this contention.

2. Operation and Maintenance Plan. An Operation and Maintenance Plan must be developed and submitted as part of Phase III of the CMP. This plan should outline the procedures for performing operations, long term maintenance, and monitoring of the corrective measure.

a. Introduction and Purpose. This portion of the document should provide a brief description of the facility operations, scope of the corrective measures project, and summary of the project objectives.

b. System Description. This portion of the document should provide a description of the corrective measure and significant equipment, including manufacturer's specifications. This portion of the plan should also include a narrative of how the selected system equipment is capable of complying with the final engineered design of the corrective measure.

c. Operation and Maintenance Procedures. This portion of the document should provide a description of the normal operation and maintenance procedures for the corrective measures system, including:

a. Description of tasks for operation;
b. Description of tasks for maintenance;
c. Description of prescribed treatment or operation conditions; and
d. Schedule showing the frequency of each operation and maintenance task.

d. Inspection Schedule. This portion of the document should provide a description of the procedures for inspection of the corrective measures system, including problems to look for during the inspection procedure, specific inspection items, and frequency of the inspections.

e. Waste Management Practices. This portion of the document should provide a description of the wastes generated by operation of the corrective measures, and

the appropriate procedures for proper characterization and management of these wastes.

f. Contingency Procedures. This portion of the document should provide a description of the procedures which will address the following items:

1. System breakdowns and operational problems including a list of redundant and emergency backup equipment and procedures;

2. Alternative procedures (i.e., stabilization) which are to be implemented in the event that the corrective measure suffers complete failure. The alternative procedures must be able to prevent release or threatened releases of hazardous wastes/hazardous constituents which may endanger human health and the environment, or exceed cleanup standards.

3. Notification of facility and regulatory personnel in the event of a breakdown in the corrective measures, including written notification identifying what occurred, what response action is being taken and any potential impacts on human health and the environment.

5.0 Phase IV of the CMP

Once the reports required by Phase III above are approved by the Illinois EPA, construction/installation of the approved corrective measure must commence. During this period, quarterly reports should be submitted which contain the following information:

1. Summary of activities completed during the reporting period;

2. An estimate of the percentage of the work completed;

3. Summaries of all actual or proposed changes to the approved plans and specifications or their implementation;

4. Summaries of all actual or potential problems encountered during the reporting period;

5. Proposal for correcting any problems; and

6. Projected work for the next reporting period.

Upon completion of construction/installation of the approved corrective measure, a Construction Report must be submitted to the Illinois EPA documenting that these efforts were carried out in accordance with the Illinois EPA approved plans and specifications. This report should contain a thorough description of the efforts that went into constructing/installing the corrective measure and demonstrate that the procedures in the Illinois EPA-approved Final Design Report were

followed during this effort. Such a report should be formatted in a logical and orderly manner and contain the following information:

1. An introduction discussing the background of the project and the purpose and scope of the corrective measure described in the report.

2. Identification of the plans, technical specifications and drawings which were used in constructing/installing the corrective measure. These specifications and drawings should have been approved by the Illinois EPA during Phase III.

3. Identification of any variations from the Illinois EPA approved plans, technical specifications and drawings used in construction/installing the corrective measure. Justification regarding the need to vary from the approved plans and specifications must also be provided.

4. A description of the procedures used to construct/install the corrective measure, including the procedures used for quality assurance and quality control.

5. As-built drawings, including identification of any variations from the approved plans, technical specifications and drawings.

6. A summary of all test results from the construction/installation effort, including quality assurance/quality control testing.

7. Actual test results, including quality assurance/quality control test results. These results should be located in an attachment/appendix and be well organized.

8. Identification of any test results which did not meet the specified value and a description of the action taken in response to this failure, including re-testing efforts.

9. Photographs documenting the various phases of construction.

10. A detailed discussion of how the construction/installation effort met the requirements of the approved Final Design Report.

11. A certification by an independent qualified, registered professional engineer and by an authorized representative of the owner/operator (the authorized representative must meet the requirements of 35 IAC 702.126). The wording for this certification must also meet the requirements of 35 IAC 702.126.

6.0 Phase V of the CMP

Once the corrective measure has been constructed/installed, it must be operated, maintained and monitored in accordance with the approved operations and maintenance plans. During this

period, quarterly reports must be submitted to the Illinois EPA documenting the results of these efforts. These reports should contain the following information:

1. Introduction. This portion of the document should provide a brief description of the facility operations, scope of the corrective measures project, and summary of the project objectives.

2. System Description. This portion of the document should provide a description of the corrective measures constructed/installed at the site, and identify significant equipment.

3. Monitoring Results. This portion of the document should provide a description of the monitoring and inspection procedures to be performed on the corrective measures. The document should include a summary of the monitoring results for the corrective measures, including copies of any laboratory analyses which document system effectiveness, and should provide a description of the monitoring procedures and inspections performed. Copies of all laboratory analytical results which document system monitoring must be provided.

4. Effectiveness Determination. This portion of the document should provide calculations and other relevant documentation that demonstrates the effectiveness of the selected corrective measure in remediating/stabilizing contamination to the extent anticipated by the corrective measures final design. Copies of relevant analytical data should be provided to substantiate this determination.

5. System Effectiveness Recommendation. Based upon the results of the effectiveness determination required under 4. above, this portion of the report should provide a recommendation on continuance of the corrective measure. If the corrective measure is not performing in accordance with the final design, a recommendation on revisions or expansion of the system should be provided. Additionally, based upon the monitoring results, a schedule for achieving the cleanup objectives should be included with each evaluation.

BLS

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 North Grand Avenue East, P.O. Box 19276, Springfield, Illinois 62794-9276 • (217) 782-2829
James R. Thompson Center, 100 West Randolph, Suite 11-300, Chicago, IL 60601 • (312) 814-6026

PAT QUINN, GOVERNOR DOUGLAS P. SCOTT, DIRECTOR

217/524-3300

7009 3410 0002 3808 4197

JAN 10 2011

Mr. Claude Harmon
Manager, Environmental
CITGO Petroleum Corp.
Lemont Refinery
135th Street and New Avenue
Lemont, Illinois 60439-3659

Re: 1978030004 -- Will County
CITGO Lemont Refinery
RCRA Permit Log No: B-162-M-2, M-3, M-4, M-5, M-6, M-10
RCRA Permit File
Permit Approval

Dear Mr. Harmon:

This letter is in response to the Class 1 and Class 1* permit modifications listed below that the CITGO Lemont Refinery submitted to the Illinois EPA.

DOCUMENT	DATED	RECEIVED
B-162-M-2: (Class 1) Addendum to Site Characterization Report	November 21, 1997	November 24, 1997
B-162-M-3: (Class 1) New Closure Period Inspection Form	November 21, 1997	November 24, 1997
B-162-M-4: (Class 1) Addendum to Groundwater Monitoring Section E, Appendix E-1.	November 21, 1997	November 24, 1997
B-162-M-5: (Class 1*) LTF Well Inspection Report	November 21, 1997	November 24, 1997
B-162-M-6: (Class 1*) Addendum to Groundwater Monitoring Plan for LTF	November 21, 1997	November 24, 1997
B-162-M-10: (Class 1) Revised Monitoring Limits for Table II.D.5 of RCRA Permit	June 5, 1998	June 11, 1998

The Illinois EPA has reviewed the information contained in your submittals and hereby approves CITGO's requests to modify the RCRA permit.

This determination was based on our review of (1) the RCRA Permit issued to CITGO Lemont Refinery; (2) the regulations [35 IAC Subtitle G]; and (3) the information contained in your submittals.

In addition, these permit modifications were included in the application to renew the RCRA permit for the CITGO Lemont Refinery dated and received on April 23, 2007. A draft RCRA renewal permit was public noticed on December 22, 2010.

Pursuant to 35 Ill. Adm. Code 703.281(a)(2), a notice of these permit modifications shall be sent to all persons on the facility mailing list, maintained by the Illinois EPA in accordance with 35 Ill. Adm. Code 705.163(a)(4), and the appropriate units of state and local government as specified in 35 Ill. Adm. Code 705.163(a)(5). For a Class I* modification the notice must be made within 90 calendar days after the Illinois EPA approves the request.

Work required by this letter, your submittal or the regulations may also be subject to other laws governing professional services, such as the Illinois Professional Engineering Practice Act of 1989, the Professional Land Surveyor Act of 1989, the Professional Geologist Licensing Act and the Structural Engineering Licensing Act of 1989. This letter does not relieve anyone from compliance with these laws and the regulations adopted pursuant to these laws. All work that falls within the scope and definitions of these laws must be performed in compliance with them. The Illinois EPA may refer any discovered violation of these laws to the appropriate regulating authority.

If you have any questions regarding the above, please contact Rob Watson, P.E. at 217/524-3265. If you have any questions regarding groundwater, please contact Paula Stine at 217/524-3861.

Sincerely,

Stephen F. Nightingale, P.E.
Manager, Permit Section
Bureau of Land
JKH WRW PS TBM
SFN:WRW:bjh\113606s.doc

Attachment: RCRA Post-Closure Permit (First Page Only)

cc: Willie Harris, USEPA Region V, w/attachment

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 North Grand Avenue East, P.O. Box 19276, Springfield, Illinois 62794-9276 • (217) 782-2829
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PAT QUINN, GOVERNOR DOUGLAS P. SCOTT, DIRECTOR

HAZARDOUS WASTE MANAGEMENT

RCRA POST-CLOSURE PERMIT

1978030004 -- Will County
USEPA ILD 041550567
CITGO, Lemont Refinery
Log No: B-162-M-2, M-3, M-4, M-5, M-6, M-10
RCRA Permit – Admin Record File
Permit Approval

Issue Date: September 18, 1997
Effective Date: October 23, 1997
Expiration Date: October 23, 2007
Modification Date: JAN 1 0 2011

CITGO Lemont Refinery
135th Street and New Avenue
Lemont, Illinois 60439-3659

A modified Post-Closure permit is hereby granted pursuant to the Resource Conservation and Recovery Act, Illinois Environmental Protection Act, and Title 35 Illinois Administrative Code (I.A.C.) parts 702, 703, 705, and 720 through 729 to CITGO (herein known as the permittee). The site is located in the City of Lemont, Will County, Illinois at 135th Street and New Avenue.

This post closure permit consists of the conditions contained herein (including those in any attachments and appendices) and applicable regulations contained in the Illinois Environmental Protection Act and Title 35 I.A.C. Parts 702, 703, 705 and 720 through 729 in effect on the effective date of this permit. The Environmental Protection Act (Ill. Rev. Stat., Chapter 111 □, Section 1039) grants the Illinois Environmental Protection Agency the authority to impose conditions on permits which are issued. This Permit contains 162 pages including Attachments A through I.

Should you have any questions related to this modified Permit, please contact Rob Watson, P.E. at 271-524-3265. If you have any questions regarding groundwater monitoring, please contact Paula Stine at 217-524-3861. If you have questions regarding corrective action please contact Takako Halteman at 217-524-3274.

Sincerely,

Stephen F. Nightingale, P.E.
Manager, Permit Section
Bureau of Land
JVR WRW PS TBM
SFN:WRW:bjh\113606s.doc

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NOTICE OF RENEWAL APPLICATION MODIFICATION

On July 12, 2011, CITGO Petroleum Corporation (CITGO), applied to the Illinois Environmental Protection Agency (Illinois EPA) for a modification of its Approved Resource Conservation and Recovery Act (RCRA) Part B Renewal Application for its petroleum refinery located in Lemont, Illinois (the Refinery). Per 35 Illinois Administrative Code (IAC) 703, Appendix A, these are Class 1 and Class 1* modifications. As specified in 35 IAC 703.281(a)(2), the facility is posting this notice of permit modification request to all persons on the facility mailing list.

The Class 1 modification request includes modifying the RCRA Part B Renewal Application to reflect current information pertaining to the Refinery's mailing list; revise the list of documents at public repositories; add copies of recently submitted 39(i) certification forms; add figures and information to correctly depict the property boundary south of the LTF; include the most recent information regarding Solid Waste Management Units (SWMUs); revise figures presenting SWMUs; add dissolved selenium as an indicator parameter for groundwater; add a requirement for inspection after a substantial precipitation event; revise the time frame for determining a statistically significant increase in groundwater during the post-closure period; and revise the unsaturated zone monitoring limit for selenium.

The Class 1* modification request includes updates to the closure and post-closure care cost estimates to reflect 2010 dollars and providing financial assurance for the updated costs and liability insurance.

Interested citizens are invited to review copies of the revised portions of the facility's Approved RCRA Part B Permit Renewal Application and modification requests at the following locations:

Lemont Public Library 50 East Wend Street Lemont, Illinois 60439	Lemont Village Hall 418 Main Street Lemont, Illinois 60439

The designated facility contact is:

Mr. Claude Harmon, Health, Safety, Security, and Environmental Manager
CITGO Petroleum Corporation
The Lemont Refinery
135th Street and New Avenue
Lemont, Illinois 60439
(630) 257-4450

Comments or questions should be sent to the following Illinois EPA contact:

Mr. Rob Watson, P.E.
Illinois Environmental Protection Agency
Bureau of Land, Permit Section
1021 North Grand Avenue East, P. O. Box 19276
Springfield, Illinois 62794-9276
(217) 524-3265

The facility's compliance history for the lifecycle of the permit being modified is available upon request from **Mr. Rob Watson** of the Illinois EPA.

RCRA Part B Permit Modification Request for CAMU Approval

Lemont Refinery

December 1997

Prepared for:
The Lemont Refinery
CITGO Petroleum Corporation
Lemont, Illinois

Prepared by:
Radian International LLC
P.O. Box 201088
Austin, Texas 78720-1088

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PERMIT SECTION

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Section I

CAMU Criteria

Section I
CAMU Criteria

Lemont Refinery

December 1997

Prepared for:
The Lemont Refinery
CITGO Petroleum Corporation
Lemont, Illinois

Prepared by:
Radian International LLC
P.O. Box 201088
Austin, Texas 78720-1088

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1.0 PURPOSE AND REGULATORY REQUIREMENTS (35 IAC 703.283)

The purpose of this submittal is to address regulatory requirements for designation of a corrective action management unit (CAMU) at the land treatment facility (LTF) located at the Lemont, Illinois refinery (Lemont Refinery) operated by the CITGO Petroleum Corporation (CITGO), [(Illinois Environmental Protection Agency (IEPA) Identification Number 197803004)]. The refinery is owned by PDV Midwest Refining LLC. The CAMU will be used for staging, treatment, and disposal of remediation waste generated during investigation and remediation activities to be conducted at the refinery. The CAMU will be designed and permitted in accordance with the requirements specified in Title 35 Illinois Administrative Code (IAC), Section 724.652. Permitting will be initiated by this Class 3 permit modification, as set forth by 35 IAC 703 Appendix A (N) (1).

On September 18, 1997 the refinery was issued its final Resource Conservation and Recovery Act (RCRA) Part B Post-Closure Permit by the IEPA. The permit, which became effective on October 23, 1997, addresses, in part, closure and post-closure care activities associated with the LTF and presents the requirements for RCRA corrective action. This permit modification requests that, in lieu of closure, the LTF be designated a CAMU in support of the corrective action program. The CAMU will be used to ensure protective and cost-effective, on-site treatment and disposal of remediation wastes generated during future corrective action activities. Closure of the unit will be delayed until the placement of remediation wastes in the CAMU is complete. The closure design includes the construction and maintenance of a vegetative cover, closing the unit as an LTF.

This CAMU permit modification request is designed to provide sufficient information to support Agency approval for designation and operation of the CAMU.

Section 1—The *CAMU Criteria* section provides information regarding the appropriate use of a CAMU at the Lemont Refinery and describes how the unit is designed to meet all seven criteria that must be considered in approving a CAMU.

Section 2—The *Remedial Approach* presents the strategy for addressing corrective action at the refinery. This includes a description of the proposed CAMU and how this concept will be used to support remediation of the solid waste management units (SWMUs) at the Lemont Refinery

Section 3—The *Engineering Report* builds on several substantial plans/reports that are developed independently, but presented as one program for engineering design and operation of the CAMU. These reports are as follows:

- The *Facility Upgrade Design and Engineering Basis* describes anticipated changes to the facility that will be necessary to support and provide the needed capacity and flexibility of the CAMU and its proper operation.

- The *Waste Characterization Report* defines the types of wastes that are anticipated as a result of remediation at the Lemont Refinery. It addresses the volumes, constituents, and concentrations that can be anticipated based on available information.

- A *Waste Management Plan* defines the expected capacity of the unit, using the *Waste Characterization Report* to predict the long-term usability of the unit. It also discusses the types of wastes that can be treated at specified loadings.

- The *Operation and Maintenance Plan* provides details on the methods which will be used to ensure that the CAMU fulfills its purpose in a safe and protective manner.

- The *Treatability Evaluation Plan* defines a study that will demonstrate the effectiveness of the unit.

Section 4—*Facility Management Plans* includes amendments to existing facility management plans (or developed management plans where none exist). Only those plans that must be modified from the existing permit application to support designation and operation of the CAMU are included.

Section 5—The *Part A Permit* provides an amended Part A permit that includes the CAMU.

1.1 Facility History (35 IAC 724.652 (d))

The Lemont Refinery is a 153,000-barrels-per-day petroleum refinery located in Lemont and Romoeville, Illinois. The Lemont Refinery was originally built in the 1920s and was purchased by Globe Oil & Refining Company in 1928. Pure Oil Company purchased the facility in 1954. Union Oil Corporation (UNOCAL) merged with Pure Oil in 1965. The new Lemont Refinery was constructed between 1967 and 1970. UNOCAL operated the refinery until 1989 at which time the UNO-VEN Company was formed through a joint venture between UNOCAL and Petroleus de Venezuela, SA. In May 1997, the refinery was acquired by PDV Midwest Refining LLC and is now operated by CITGO. The refinery produces the following major types of products: gasoline, diesel fuels, aviation turbine fuels, petroleum coke, petrochemical solvents, and liquefied petroleum gas.

The Lemont Refinery covers approximately 900 acres. It is bordered to the west and north by the Illinois and Michigan Canal. Land uses to the north are industrial, to the east are agricultural and residential, and those to the south are industrial, undeveloped, and residential. In 1973, the refinery began land treating refinery wastes in the first of four land treatment areas. In 1980, three additional areas were added; the total area of the LTF at that time became 13.5 acres. A single hazardous waste (API Separator Sludge—EPA waste code K051), and other nonhazardous wastes were land treated until September 1981. Since that time, only nonhazardous wastes have been placed on the LTF.

The Lemont Refinery operated under the RCRA Interim Status Standards until October 23, 1997. In addition to the closure requirements for the LTF, this permit identifies 34 solid waste management units (SWMUs) as candidates to undergo a RCRA Facility Investigation (RFI). In lieu of closure, this permit modification, as allowed by Section I.D of the final permit, will designate the LTF as a CAMU to support

the future corrective action program. This document provides the regulatory required information and basis for designating the LTF as a CAMU.

1.2 Meeting the CAMU Criteria 35 IAC 724.652 (c)

The CAMU, as requested, will meet the objectives of the corrective action program and the seven CAMU criteria in 35 IAC Section 724.652 (c) through on-site biological degradation and attenuation of remediation wastes at the existing LTF. Remediation wastes will be placed in the CAMU for treatment via land treatment and composting, as required. These technologies have documented histories of effective treatment of hydrocarbon-affected soils similar to those anticipated at the Lemont Refinery. Final disposal of the treatment residues will be within the CAMU, which will be closed according to this modification of the RCRA permit. The seven CAMU criteria against which the CAMU permit modification request will be evaluated and a description of how the criteria will be satisfied are presented below.

Criterion Number 1— 35 IAC 724.652 (d) (1) **SATISFIED**

The CAMU Shall Facilitate the Implementation of a Reliable, Effective, Protective, and Cost-Effective Remedy.

Reliability—Where applicable, source removal activities are proven, reliable methods that are implemented quickly, with minimal additional investigation or construction of treatment equipment necessary. Excavation is known to be a reliable source control method for removing waste constituents from each SWMU. As a source control remedy, excavation and removal for treatment provide considerable long-term effectiveness by preventing exposure, eliminating the potential for future releases, and reducing waste constituents at the SWMUs. The CAMU facilitates the excavation of affected materials by providing a local and readily accessible management location within a short-haul distance.

Biological treatment of hydrocarbon-affected soils is a proven technology and has been in use for many years. The designed use of the CAMU is biological treatment of refinery wastes through land treatment. If necessary to ensure effective CAMU management, composting also will be performed prior to the eventual application of materials. Industry-wide experience with land treatment of similar wastestreams provides sufficient data to conclude that this CAMU approach is a highly reliable alternative for treatment and disposal of remediation wastes.

Effectiveness—Excavating remediation waste assures removal of contaminated material and, therefore, is an effective method for reducing risks potentially associated with the SWMUs. Consolidation within the CAMU and land treatment of these wastes further reduces potential exposure through on-site management of remediation waste. Land treatment of refinery wastes has been conducted successfully at the LTF and at other similar facilities. As a treatment technology, land treatment has been shown to reduce the concentration of applied organic constituents and also has demonstrated effective immobilization of applied inorganic compounds.

To ensure that and waste constituents are properly transformed, immobilized, and degraded, both the groundwater and unsaturated zone monitoring (UZM) systems will be implemented, as described in the final RCRA permit and this modification.

Protectiveness—Based on three areas of consideration (consolidation and treatment, on-site handling, and closure of the CAMU), the CAMU will be protective.

Consolidation of wastes from the SWMUs will remove waste constituents from other areas of the Lemont Refinery, thereby eliminating exposure pathways. Wastes will be transferred to the CAMU; this area (former LTF) has already received and been proved to effectively treat refinery wastes. Wastes derived from remediation of the SWMUs will be applied to the CAMU in accordance with current industry-accepted procedures for application loading rates. To ensure proper treatment, the Zone of Incorporation will be monitored for performance-related parameters (TOC, pH, TPH, etc.). Adjustments and amendments will be made to procedures as necessary. As a result, operations at the CAMU will provide environmental benefit through the consolidation and effective treatment of remediation wastes.

Although other alternatives (e.g., off-site treatment) may provide protective remedies, the use of the LTF as a CAMU allows remediation waste to be treated on site, eliminating the potential for off-site exposure or impacts. In the absence of a CAMU, active management and treatment of wastes would necessitate off-site waste handling, which, for nonhazardous waste, would not include treatment. The monitoring program for both the unsaturated zone and the groundwater for the CAMU will be implemented in accordance with the final permit and this modification. This monitoring program provides a system of early detection and response to potential releases.

Finally, the CAMU is a regulated unit that will undergo closure when remediation activities cease. Closure and post-closure plans for this facility are presented in this permit modification application, as well as financial assurance mechanisms and the long-term monitoring systems. The CAMU will be closed as an LTF using a vegetative cap. Closure as an LTF will significantly decrease the potential exposure pathways and associated risks to human health or the environment through continued degradation and immobilization of waste constituents.

Cost Effectiveness—Use of the LTF as a CAMU provides a cost-effective alternative for protective management of remediation wastes. Alternatives such as off-site treatment and disposal require significantly more transportation and disposal costs per unit than that of on-site treatment in the CAMU. By using an existing, regulated unit, the cost effectiveness is even more substantial. Because this is a previously regulated unit, monitoring systems are already in place and can be easily enhanced. Minor construction costs (focused primarily toward run-on and run-off control) will be associated with the CAMU since the majority of the facility is operational as is. In addition, because the LTF will be required to undergo closure at some time in the future due to its previous regulatory status, closure and post-closure care costs will not be additional expenses incurred as a result of CAMU designation. Initial estimates have been submitted to IEPA as required by IAC 724.242 and 244, and financial assurance for these closure and post-closure care costs has been prepared.

Criterion Number 2— 35 IAC 724.652 (d) (2) **SATISFIED**

Waste Management Activities Associated With the CAMU Shall Not Create Unacceptable Risks to Humans or to the Environment, Resulting From Exposure to Hazardous Wastes or Hazardous Constituents.

Operation—The CAMU will use biological treatment and geochemical processes to degrade and immobilize waste constituents within the treatment zone. The frequency and rate of waste applications are designed to be within standard practice. Facility controls, including run-on/run-off, site restriction, and equipment cleaning, will ensure that wastes do not present an exposure risk when applied to the CAMU. The treatment technologies employed within the CAMU are proven and effective for hydrocarbon-impacted materials and will reduce the risk associated with untreated materials.

Monitoring Program—Because the LTF is a RCRA regulated unit, only slight modifications are needed to incorporate an extensive detection monitoring program involving routine groundwater, soil-pore-liquid, and soil-core sampling. This monitoring program will be implemented prior to application of remediation wastes and will be continued during the active life of the CAMU. The monitoring program will be modified as necessary for the post-closure period. This monitoring approach will identify releases of waste constituents long before any potential receptors could be affected, thereby preventing unacceptable risk to humans or the environment by allowing for appropriate corrective action.

Closure—As a result of the CAMU treatment processes, the concentrations of organic constituents will be low at the time of closure, and they will continue to decrease during the post-closure period. Metals will be immobilized through physical and chemical processes during land treatment, reducing the risk of exposure for humans and the environment. Planting a vegetative cover will allow continued organic degradation of constituents and further reduce the potential for leaching and mobilization of metals, thereby minimizing exposure potential.

Criterion Number 3— 35 IAC 724.652 (d) (3) **SATISFIED**

The CAMU Shall Include Uncontaminated Areas of the Facility Only If Including Such Areas For the Purpose of Managing Remediation Waste is More Protective Than Management of Such Waste At Contaminated Areas of the Facility.

CAMU criterion number 3 is satisfied, because no uncontaminated areas are proposed for inclusion in the CAMU.

Criterion Number 4— 35 IAC 724.652 (d) (4) **SATISFIED**

Areas Within the CAMU, Where Wastes Remain in Place After Closure of the CAMU, Shall Be Managed and Contained to Minimize Future Releases, to the Extent Practicable.

Wastes left in place will be properly managed and contained, because the CAMU will operate as a treatment unit. The CAMU will be closed as an LTF once remediation is complete. By design, the CAMU degrades organic constituents and immobilizes metals found in the wastes. Appropriate waste loading and operating practices will be conducted to immobilize metals left in place at the CAMU. While the CAMU is operated, soil, soil-pore liquids, and groundwater will be routinely monitored to ensure that potential releases are detected and appropriate corrective action taken.

Closure and post-closure requirements for the CAMU are designed to ensure that releases from wastes left in place would be detected so appropriate corrective action can be taken. At the time of closure, the results of groundwater and UZM sampling and an evaluation of the volume and types of remediation wastes placed in the CAMU will be considered to select the final closure method. Currently, vegetative cap is the most appropriate closure method considering the LTF's history and CAMU operation. As designed, the vegetative cap satisfies the closure requirements and will protect human health and the environment from potential releases of waste left in place by preventing erosion and enabling continued treatment and immobilization of constituents.

Criterion Number 5— 35 IAC 724.652 (d) (5) **SATISFIED**

The CAMU Shall Expedite the Timing of Remedial Activity Implementation When Appropriate and Applicable.

This criteria is satisfied by expediting cleanup in a number of ways. The CAMU is designed to accept a broad range of wastes typically generated during corrective action at a refinery. Use of the CAMU allows corrective action remediation wastes to be incorporated on an ongoing basis and waste characterization, staging, and disposal delays associated with off-site disposal will be minimized. The 13.5-acre effective treatment area of CAMU has sufficient space to accept and treat the volume of waste expected from remediation of the SWMUs, thereby acting as a readily available treatment and disposal option. This LTF is in place and has demonstrated successful treatment of similar wastes. It can rapidly be converted to a CAMU with minimal startup and construction time. The composting option also allows for the acceptance and treatment of wastes when weather conditions prohibit land treatment.

Criterion Number 6— 35 IAC 724.652 (d) (6) **SATISFIED**

The CAMU Shall Enable the Use, When Appropriate, of Treatment Technologies (Including Innovative Technologies) to Enhance the Long-Term Effectiveness of Remedial Actions by Reducing the Toxicity, Mobility, or Volume of Wastes That Will Remain in Place After Closure of the CAMU.

CAMU criterion number 6 will be met, because the land treatment method will reduce the toxicity of the wastes through the transformation and degradation of organic constituents, the mobility of metals will be inhibited, and the overall volume of wastes will be reduced by degradation of organic constituents. Land treatment is designed to degrade, transform, or immobilize wastes in the treatment zone by using the biodegradative capacity of native soil microbes and chemical and physical reactions in the soil. Based on the results at similar facilities in Illinois and across the country, land treatment has proved to be an effective method of treatment for wastes similar to those anticipated at the Lemont Refinery.

Criterion Number 7— 35 IAC 724.652 (d) (7) **SATISFIED**

The CAMU Shall, to the Extent Practicable, Minimize the Land Area of the Facility Upon Which Wastes Will Remain in Place After Closure of the CAMU.

Use of the LTF as a CAMU for remediation of the identified remediation waste will consolidate and reduce contaminated areas to an area that has previously treated wastes. Therefore, this approach will satisfy criterion number 7.

1.3 Summary

The CAMU that will be constructed at the Lemont Refinery will provide an effective remedial solution that is protective of human health and the environment. This remedy minimizes short-term risks that might otherwise be caused by an alternate remedy and provides long-term effectiveness by treating the wastes to reduce associated hazards. It provides permanent disposal in a unit that is carefully monitored to ensure early detection of constituent movement. Moreover, the CAMU will consolidate impacted areas

(SWMUs) without increasing the total surface area that is impacted. Because the CAMU is located in an area that already manages wastes, the overall impact to the environment will be minimal, and the overall benefit will be substantial.

Section III Remedial Approach

Section II
Remedial Approach

Lemont Refinery

December 1997

Prepared for:
The Lemont Refinery
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1.0 INTRODUCTION

The Lemont Refinery, through this permit modification, is proposing to delay closure of the land treatment facility (LTF) and operate it as a corrective action management unit (CAMU). The CAMU will manage investigation-derived and excavated remediation wastes during the Resource Conservation and Recovery Act (RCRA) corrective action program. This document explains the planned remedial approach that includes the modification of the existing LTF to operate as a CAMU. This section also overviews the objectives of the CAMU, discusses the remediation wastes projected to be treated in the unit, and offers a brief description and flow diagram showing the process for managing remediation wastes at the CAMU.

2.0 SUMMARY

The Lemont Refinery will conduct a phased RCRA facility investigation (RFI) of the solid waste management units (SWMUs) as defined in its RCRA Part B permit. The investigation will be performed in phases to address areas with greatest potential risk early in the process. The RFI approach will utilize the CAMU for the on-site treatment and disposal of investigation- and remediation-derived wastes. While the Lemont Refinery's RFI will not depend on excavation and on-site treatment as the only remedial technology, it is expected to be prominent. Additionally, investigation-derived waste and possible interim remedial action waste are planned to be managed at the CAMU. This approach to corrective action requires that the CAMU be operable while the RFI is in progress. Under this approach, hydrocarbon-containing environmental media that exceed site-specific health-based limits, as set forth in the Tiered Approach to Cleanup Objectives (TACO), will be directed to the CAMU for treatment and disposal. The primary objective for the corrective action program is to define and correct any SWMU that presents a risk (based on site-specific criteria) in the most practical, efficient, and protective way.

Treatment at the CAMU will combine degradation of organic materials (primarily oil and grease) and immobilization of inorganics. Based on historical oil and grease application to the LTF and similar industry knowledge, a maximum oil and grease content of 7.5% by weight in the incoming waste stream can be land treated effectively. If the oil and grease content of the incoming waste exceeds 7.5%, their composting will be used to facilitate organic degradation. Once the composted material meets the 7.5% oil and grease criteria, it will be transferred to the land treatment area for final placement and treatment. A maximum loading rate of 350 barrels of oil and grease/acre/year was chosen to ensure microbial viability, continued organic degradation, and protection of human health and the environment. Based on the estimated concentrations of metals in remediation wastes expected to be treated at the CAMU, accumulation of metals above the United States Environmental Protection Agency recommended thresholds is not expected. Waste placement criteria discussed later in this document will serve to further reduce the risk of metals accumulation or movement below the treatment zone.

During operation of the CAMU, the following structures will be routinely inspected: the decontamination pad, the liner in the compost area (if constructed), berms and roads, and the stormwater

management system. Repairs will be made to these structures as necessary to maintain proper operating condition.

The sections that follow provide an overview of the operational approach to the CAMU. Included is a review of the corrective action program, including a description of the existing LTF and its selection as a CAMU, the objectives of the CAMU, the remediation wastes to be treated in the unit, and a brief description and a flow diagram showing the process for managing remediation wastes at the CAMU.

3.0 REMEDY OBJECTIVE

The CAMU will meet the objectives of the corrective action program and the seven CAMU criteria in 35 IAC Section 724.652 (c) through on-site biological degradation and attenuation of remediation wastes at the existing LTF. A discussion of the CAMU criteria is provided in Section 1 of this volume.

In accordance with the corrective action portion of the RCRA permit, the corrective action program will initiate investigation and remediation at the SWMUs listed in the final permit. Designating the LTF as a CAMU early in the RFI program will ensure that wastes that require excavation can be treated via land application as they are generated. Under the proposed Subpart S rule, corrective measures must meet the following four remedy standards:

- Protection of human health and the environment;
- Attainment of media cleanup standards;
- Control of the sources of release; and
- Compliance with standards for management of wastes.

The following subsections describe how the use of the CAMU in the corrective action program will satisfy these remedy standards.

Protection of Human Health and the Environment

Excavation and removal of affected media meets this objective by eliminating exposure pathways at the SWMUs through excavation of the affected portions and placement of the resulting remediation wastes in a RCRA-regulated unit, i.e., the CAMU. This process allows for the treatment of wastes, reducing the overall risk associated with corrective action wastes from the refinery, which would not otherwise occur if the soils were disposed of off site. Because the CAMU effectively treats organic waste constituents and immobilizes inorganic constituents, risk is reduced and long-term protection is provided.

Attain Media Cleanup Standards

Remediation wastes from the SWMUs will be removed to health-based (i.e., TACO) levels, which meets the Subpart S cleanup and remediation standard. Plans for determining the volume of waste to be removed from each SWMU will be detailed in the work plans for the RFI. Corrective action wastes (investigation and excavated remediation waste) will be treated at the CAMU, reducing the exposure risk associated with SWMUs to site-specific, health-based levels.

Control the Sources of Release

Source releases will be controlled through the removal of remediation wastes that are above health-based levels. Removing constituent concentrations which are above acceptable levels will leave no residue that could cause unacceptable releases in the future. Therefore, when combined with land treatment in the CAMU, this remedy provides a complete and protective remediation program.

Compliance with Standards for Management of Wastes

Remediation wastes generated during corrective action activities will be placed in the CAMU for land treatment, and composting if necessary. These technologies have documented histories of effective treatment of hydrocarbon-affected soils similar to those anticipated at the Lemont Refinery. Final disposal of the treatment residues will be within the CAMU, which will be closed according to the conditions contained in the final RCRA permit and this modification. The CAMU is designed to comply with the seven CAMU criteria and, thus, complies with the appropriate standards for waste management.

4.0 UNIT DESCRIPTION

The CAMU site (existing LTF) is located in the southeast portion of the Lemont Refinery. It is bounded by a tank farm to the north, undeveloped land owned by the Lemont Refinery to the east and south, and undeveloped land owned by the Mobil Oil Company to the west. The LTF is a fenced area that occupies approximately 28 acres. Of the 28 acres, 13.5 acres are used by four discrete plots (known as land treatment areas ([LTAs] I through IV) which have previously treated refinery wastes. LTA I opened in 1973 and LTAs II, III, and IV opened in 1981. These areas also are SWMUs 14A-14D of the corrective action program. The remaining CAMU land includes buffer zones around each LTA, roads, drainage features, and an area that contains two former and one existing nonhazardous decant basins (designated as SWMUs 15A, 15B, and 15C under the RCRA corrective action program). As of 1980, the LTF operated under RCRA interim status standards. Rather than seeking RCRA Part B operating status, past facility operators chose to pursue a post-closure permit for the LTF. More recently, however, the Lemont Refinery is seeking to continue operating the unit as a CAMU to support the facility's corrective action program.

5.0 SITE SELECTION

The LTF was identified as a candidate location for a CAMU based on its history of successfully treating oily refinery wastes, existing monitoring systems, and location. An assessment of the typical refinery wastes that have been treated at the LTF is provided in the *Waste Characterization Report* in Appendix III-B of this volume. Groundwater and unsaturated zone monitoring (UZM) data and site investigation reports prepared by Environmental Resource Management, Inc. (ERM, 1989) and Geraghty & Miller, Inc. (Geraghty & Miller, 1995) indicate that sufficient degradation of organics and immobilization of both organic and inorganic constituents have been achieved in the past. Wastes with oil and grease concentrations greater than 7.5% and/or with high metal concentrations have been successfully treated without a significant release below the LTF.

As a former interim status facility, the LTF includes both groundwater and UZM systems and is in a location that meets facility location standards. The LTF is located at a relatively high elevation within the refinery, which maximizes the depth to groundwater.

6.0 REMEDIATION WASTE

Although the RFI at the Lemont Refinery facility has not begun, sufficient information is available to describe the contaminated media that is expected to be generated during corrective action activities. The data used to characterize the remediation waste from the various SWMUs was obtained from:

- Previous investigations of some of the areas that are now SWMUs;
- Analytical data for wastes managed at some of the SWMUs;
- Analytical data for wastes applied at the LTF in the past; and
- Industry knowledge of similar wastes.

The available data is considered to be of sufficient quality to allow a characterization of future remediation wastes which will be treated in the CAMU.

Based on the available information, calculations have been performed to predict the concentration ranges of constituents in the SWMUs. Typical remediation wastes are expected to be hydrocarbon-containing materials, such as soils, sludges, and sediment. Detailed information concerning this evaluation is provided in the *Waste Characterization Report* (Appendix III-B to this volume).

7.0 TREATMENT APPROACH

The CAMU will consist of three areas of operation. The first will be land treatment of remediation waste at the existing LTF using LTAs I through IV. If required, other areas of the CAMU may be selected for use as land treatment areas. Land treatment will be the primary method for the treatment of remediation wastes. It is expected that most (or all) of the remediation wastes will be applied directly to the CAMU. However, it may be necessary to treat certain remediation wastes, because of the quality or quantity of the waste, prior to land application. Therefore, a second area of operation (composting area) may be constructed at the north end of the former decant basin (SWMU 15a). This area will treat remediation wastes that contain elevated hydrocarbon levels or wastes that are generated when the LTAs are not able to receive wastes (e.g., when the LTAs can not be accessed) due to weather or capacity limits. If RFI data suggest that the compost area will be needed, a portion of the former decant basins will be improved (with a liner) and used for static compost piles to treat incoming wastes. Once the compost residual material has been sufficiently treated, it will be transferred directly to the land application area. Lastly, a decontamination area will be constructed to prevent off-site movement of constituents via vehicle transport. Detailed information concerning the design of the CAMU is provided in the *Facility Upgrade Design and Engineering Basis* in Appendix III-A to this volume.

Key parameters (e.g., oil and grease, pH, moisture, etc.) will be monitored to judge the success of the treatment processes. Application rate and frequency will be based on the oil and grease content of the remediation waste from each SWMU to ensure adequate treatment. Application of wastes containing arsenic, chromium, lead, and selenium will be managed based on their respective concentrations to ensure that metals do not accumulate to levels that could potentially hinder the growth of hydrocarbon-degrading microbes or otherwise adversely impact unit operation.

8.0 FACILITY UPGRADES

The LTF at the Lemont Refinery has operated as a RCRA hazardous waste management unit (HWMU) under interim status. As such, the LTF contains specific features for control and monitoring. These include, groundwater monitoring wells, lysimeters, run-on and run-off control features, and site access control. However, to satisfy the seven CAMU criterion, modifications will be made to the LTF and will include additional stormwater run-off controls, a compost pad, a decontamination pad, access improvements, and monitoring system improvements. Details are provided in the *Facility Upgrade Design and Engineering Basis* in Appendix III-A of this volume.

9.0 OPERATION

The primary method of treating remediation waste in the CAMU will be land treatment, which historically has proved effective at this unit. Because the RFI is designed to be implemented in phases, the rate of waste generation may, at times, exceed the capacity that can be land treated within a given time frame. To address the possibility, a static compost pile treatment area has been included in the CAMU design. This section addresses waste application rates and methods for the composting and land treatment operations and performance monitoring of the CAMU.

Waste Application Methods

Waste application methods are discussed separately for the two primary operating areas at the CAMU. These include the optional application of remediation waste to the compost piles and the direct application of SWMU remediation wastes directly to the LTAs. Detailed information regarding operation of the CAMU is provided in the *Operation Maintenance and Monitoring Plan,* Appendix III-D of this volume. A summary of waste management practices is provided below.

Compost Piles—The use of compost piles will serve three purposes:

- Temporary storage of remediation wastes so that the maximum oil and grease loading rate on the land treatment portion (LTAs I through IV) of the CAMU is not exceeded;
- Pretreatment of SWMU waste to degrade oil and grease, which will allow for a higher loading rate (by volume) of the composted wastes; and
- For staging and treatment when environmental conditions or land treatment area capacity prevent application to the LTF.

The remediation soils will be mixed with wood chips and fertilizer (if necessary) and formed into static compost piles on the lined area. After construction, no further handling of the wastes/compost materials should be required until the piles are disassembled and the composted materials are applied to the CAMU.

Land Treatment Facility (Areas I through IV)—The quantity and rate of waste application to the land treatment areas will be controlled using the oil and grease content (via EPA Method 413.1) of the wastes being applied. The maximum recommended loading rate to ensure effective land treatment at the CAMU is 350 barrels of oil and grease/acre/year. Waste volumes, application dates, application location, and oil and grease concentration will be recorded in the operating record with each waste application. This will ensure that SWMU remediation soils and composted wastes are applied across the LTF portion of the CAMU at a rate that does not exceed the maximum oil and grease loading rate of 350 barrels/acre/year.

Performance Monitoring

Oil and grease, pH, nutrients, and moisture will be monitored periodically to maximize the performance of the land treatment process. In addition to these parameters, temperature and oxygen content will be monitored to track the performance of the compost piles. These data provide an indication of treatment performance and a basis for operational adjustments. In addition, detection monitoring of the unsaturated zone and groundwater will be conducted to ensure that constituents are treated within the LTAs.

Unsaturated Zone Monitoring (UZM)—During operation of the CAMU, the unsaturated zone will be monitored to demonstrate that movement of waste constituents is not occurring below the treatment zone. Soil cores will be collected under the active LTF area of the CAMU. Lysimeters will be used to monitor soil-core liquids in the LTAs and will be used to indicate the effectiveness of the treatment zone. Lysimeters will be monitored semi-annually, while soil cores will be collected annually. UZM will not be computed at the composting area because this area is lined and will not be used for long-term management of wastes.

Groundwater Monitoring—Groundwater will be monitored at the CAMU on a semi-annual basis using the UA-Series monitoring wells and B-Series piezometers which are already in place. The uppermost aquifer at the refinery is comprised of two units: the basal Lemont Glacial Drift and underlying Racine Dolomite. The two units are hydraulically connected. The groundwater monitoring system for the detection monitoring program will consist of six monitoring wells (UA-1 through UA-6) completed in the basal Lemont Glacial Drift and 18 piezometers (B-1 through B-18) completed in the Racine Dolomite. Details regarding groundwater monitoring requirements are provided in Section E of the approved RCRA Part B permit application as amended by Appendix IV-D of this volume.

The groundwater quality at each of the UA-Series, wells at both the up-gradient and point-of-compliance locations, will be determined semi-annually throughout the active life of the CAMU. Samples collected during the semi-annual sampling events of each year will be analyzed for the parameters required by the permit and this modification, which includes TOC, TOX, and dissolved arsenic. In addition to the indicator parameters, field measurements of pH, specific conductance, temperature, turbidity, depth to water (below land surface and below measuring point), and elevation of groundwater surface also will be measured semi-annually. If any constituents are detected and confirmed during unsaturated zone monitoring, they will be added to the groundwater monitoring list. The elevation of measuring point (top of casing) will be surveyed once every 5 years or when an existing well is modified. The elevation of well bottoms will be determined during the second sampling event each year.

10.0 PROCESS FLOW

The CAMU will receive wastes during SWMUs investigations and remediation. Waste management criteria are established in Appendix III-D. The CAMU will consist of three areas of operation, as described in earlier sections. Figure 10-1 shows the process flow of the CAMU operation component of the corrective action program.

11.0 REFERENCES

1. Environmental Resources Management - North Central, Inc., *Phase I Closure Report for Land Treatment Area*, June 1989.

2. Geraghty & Miller, Inc., *Site Characterization Report-UNO-VEN Land Treatment Facility, Lemont, Illinois,* March 1995.

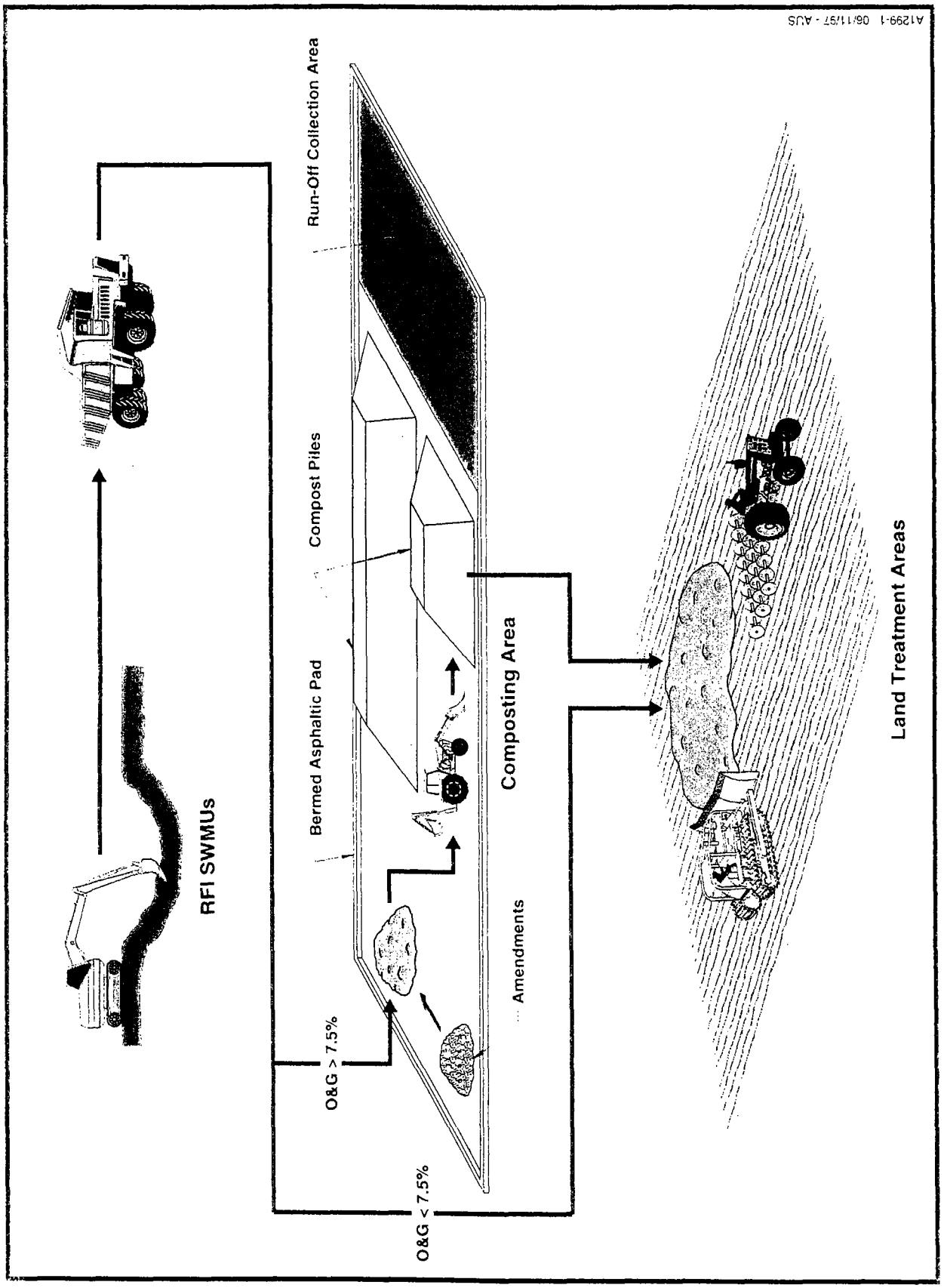

Figure 10-1. CAMU Flow Schematic

Section III Engineering Report

Section III
Engineering Report

Lemont Refinery

December 1997

Prepared for:
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1.0 INTRODUCTION

This engineering report describes the design and operation of a corrective action management unit (CAMU) at the Lemont Refinery. The CAMU consists of an existing hazardous waste land treatment facility (LTF) which will be significantly modified to improve treatment efficiency and environmental protection. The general CAMU operation will include the excavation of affected materials from the solid waste management units (SWMUs) listed in the final Resource Conservation and Recovery Act (RCRA) permit and as characterized in the *Waste Characterization* (Appendix III-B) followed by pretreatment with composting, as necessary, and ultimate land treatment of all materials. Detailed information pertaining to facility improvements, remediation wastes, and the operation, maintenance, and monitoring of the CAMU is provided in the attached appendices:

- *Facility Upgrade Design and Engineering Basis* (Appendix III-A);
- *Waste Characterization* (Appendix III-B);
- *Waste Management Plan* (Appendix III-C);
- *Operation, Maintenance, and Monitoring Plan* (Appendix III-D); and
- *Treatability Evaluation Plan* (Appendix III-E).

1.1 Operating History

The refinery began land treating refinery wastes in the first of four land treatment areas (LTAs) in 1973. Three additional LTAs were added in 1980. The combined area of the LTF is 13.5 acres. One hazardous waste stream (API Separator Sludge—EPA waste code K051), along with several nonhazardous wastes, were land treated until September 1981. After that time, only nonhazardous wastes were land treated. Land treatment activities stopped in 1989.

The LTF is located in a 28-acre fenced area in the southeast portion of the refinery (Figure 1-1). It is bounded by the refinery's east tank farm to the north, undeveloped land owned by the Lemont Refinery to the east and south, and undeveloped land owned by the Mobil Oil Company to the west. Of the 28 acres, four discrete plots known as LTAs I through IV make up 13.5 acres. The remaining land includes buffer zones around each LTA, roads, drainage features, and two former and one existing decant basins (designated as SWMUs 15a, 15b, and 15c under the RCRA Corrective Action Program).

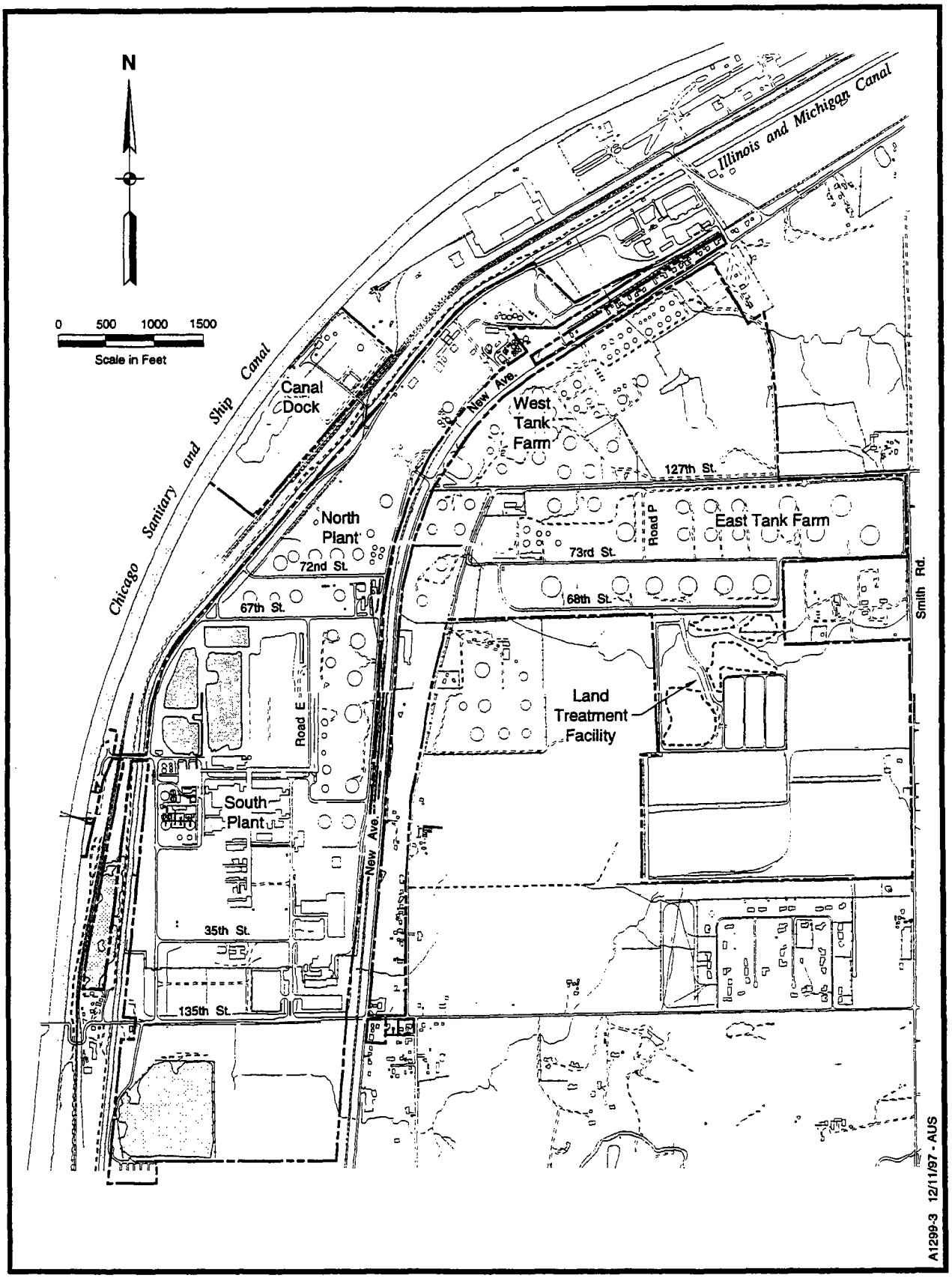

Figure 1-1. Map of Lemont Refinery Showing the Location of the Land Treatment Facility

1.2 Regulatory Status

Since November 1980, the LTF has operated as a hazardous waste management unit under interim status standards. On September 18, 1997, the Lemont Refinery received its final RCRA post-closure permit from the Illinois Environmental Protection Agency (IEPA) (permit effective date: October 23, 1997). The permit allows the refinery the option, via permit modification, to operate the LTF as a CAMU instead of proceeding to closure. The CAMU will manage remediation wastes (primarily hydrocarbon containing environmental media including soils, sludges, and sediments) which are expected to be generated during the corrective actions at the refinery. This document outlines the engineering improvements and waste management practices necessary to effectively treat and manage these remediation wastes once they are placed in the CAMU.

2.0 RATIONALE

The engineering design for the CAMU meets the remedy selection criteria outlined in the proposed RCRA Subpart S Corrective Action Rule. Section 1 (CAMU Criteria) of this volume demonstrates that the facility will comply with the CAMU criteria presented in the final CAMU/Temporary Unit rule. The Lemont Refinery has established the facility design to go beyond the administrative requirements of a CAMU, thereby enhancing the effectiveness and timeliness of the corrective action program. Additional reasons for operating the existing LTF as a CAMU include:

- Hazards associated with off-site disposal will be eliminated;
- The LTF has proved to be effective for degrading organic materials and transforming or immobilizing inorganic constituents (refer to discussion presented in Appendix C to this Section);
- Remediation wastes from multiple source areas can be managed simultaneously;
- The land area associated with waste management activities will be unchanged;
- The impact to Refinery operations will be minimal; and
- Remediation wastes (hazardous and nonhazardous) will receive treatment in the CAMU while most off-site disposal options for nonhazardous waste includes no treatment.

3.0 TECHNOLOGY DESCRIPTION

The CAMU will include two treatment processes—land treatment and composting. Land treatment will be the primary means of treatment and will be supplemented with composting as a pretreatment as required.

3.1 Land Treatment

Land treatment is a well established technology for treating wastes derived from oil refining and other petroleum-related activities. Treatment involves both biological and geochemical processes to degrade and immobilize waste constituents. The land treatment process involves spreading and incorporating contaminated media into the top layer of soil. Conventional agricultural equipment is used to incorporate the waste and soil (and any nutrients which may be required) and to control aeration and moisture content of the soil. The frequency and duration of waste applications is limited only by the soil's assimilative capacity, the rate of biodecay, and the accumulation of toxic waste residuals. The accumulation of nondegradeable inorganic constituents typically limits the ultimate useful life of an LTF. The United States Environmental Protection Agency (USEPA) has established threshold values for metals to ensure that waste residuals will not accumulate to levels which can hinder microbial processes, prevent the land from supporting a vegetated cover after unit closure, or cause concerns that toxic substances will accumulate in the food chain.

3.2 Composting

Remediation of wastes via composting allows enhanced decomposition of biodegradable material (hydrocarbon-containing environmental media) by optimizing the environmental conditions. Soil piles are constructed similarly to those used for biotreatment of municipal wastes and sewage sludge. To improve material permeability and aeration, the contaminated material is mixed with a bulking agent (such as woodchips) and with other amendments (sludge, compost, fertilizer, etc.). Properly constructed and managed compost piles generally support a greater number and diversity of microorganisms, have higher internal temperatures and microbial activity rates, and provide treatment in a shorter period of time compared to land treatment systems.

There are typically two approaches to soil composting. The most common method for composting municipal wastes is windrow composting, whereby the material is positioned in long, fairly narrow piles. To increase aeration, the pile is periodically mixed using either specialized machinery (e.g., windrow turner) or general earth moving equipment (e.g., backhoe loader).

The other composting technique involves static piles. Static piles are larger than windrows and no mixing occurs after the pile is built. Air is supplied via perforated pipes which are placed at regular intervals inside the piles. Properly designed, the aeration system will deliver sufficient amounts of oxygen

passively via convective and advective air flow. Unlike piles with active aeration systems (vacuum or forced air), control of volatile organic compound (VOC) emissions is not required for passive static piles. Static piles naturally conserve moisture and heat and have lower capital and operating requirements compared to windrowing.

The CAMU will include an area designed to manage static compost piles. These compost piles will be used to pretreat contaminated media containing high levels of hydrocarbons. The compost piles also will provide increased material storage and treatment capacity during the winter and during rainy weather when the LTAs are not accessible. Ultimately, all materials treated in compost piles will be placed on the LTF.

4.0 DESIGN CRITERIA

The following section describes facility upgrades and operating criteria for the CAMU.

4.1 Facility Upgrades

The LTF has operated under interim status as a RCRA hazardous waste management unit (HWMU). As a result, the LTF includes specific operating and monitoring features which ensure that the facility is protective to human health and the environment. These features include groundwater monitoring wells, lysimeters, run-on and run-off control features, and site access control. Prior to conversion of the LTF to a CAMU, a number of upgrades are planned to improve the effectiveness and safety of the facility. The upgrades include additional stormwater run-off controls to remove suspended solids, construction of a compost facility, construction of a decontamination pad, access improvements, and improvements to the environmental monitoring system. Details of these improvements are provided in the attached *Facility Upgrade Design and Engineering Basis* (Appendix III-A). A summary of the existing controls and proposed modifications is provided below.

4.1.1 Stormwater Controls at the Land Treatment Facility

The LTF's current stormwater management system is designed to control run-on and run-off to the intermittent stream which flows through the 28-acre facility. Because the LTAs are topographically higher than adjacent land areas, run-on to the LTAs is not a concern. Several investigations have been conducted in recent years to evaluate sediment loads in the intermittent stream and the quality of stormwater run-off from each of the LTAs. The results of these investigations indicate that contamination has not spread from the LTF. However, several drainage improvements will be constructed which will provide additional controls to prevent sediment loss from the LTAs.

Soil erosion models were used to determine the proper type, placement, and configuration of stormwater controls to provide the most efficient design. It was determined that

the most efficient plan to control solids transport involves minor grading to reduce slopes in critical areas; the installation of permanent silt fences near drainage ditches; and engineered, grass-lined ditches to control and remove suspended sediments. These improvements to the existing drainage features will enhance the CAMU's ability to control the transport of suspended materials during design storm events.

4.1.2 Composting Facility

The CAMU design includes an optional composting facility to be operated in conjunction with the LTF. At present, the total quantity and types of wastes that will be produced during corrective actions is not precisely defined. Therefore, construction of the compost facility will be delayed until it is determined that additional treatment capacity will be beneficial.

The composting facility will be constructed, as indicated on the drawings (refer to Appendix III-A), at the northern end of the former west decant basin (SWMU 15a). The facility will include a bermed, lined surface to control run-off and infiltration. Construction of the compost pad will require minor grading, soil compaction, and the placement of a base overlain with surface seal. Stormwater run-off from the compost facility will drain to a retention area in the northern edge of the pad. Accumulated water will be detained, if necessary, and ultimately released for treatment at the refinery wastewater treatment plant. Sediments will be removed periodically from the retention area and taken to the LTF.

4.1.3 Decontamination Station

A decontamination station will be constructed adjacent to the entrance/exit road on the north side of the CAMU. The station will consist of a 35 ft x 60 ft concrete pad with an integrated heavy-duty trench drain. This collection structure will convey the run-off/wash water to a settling sump. Solids will be collected in the settling sump, removed on a periodic basis, and placed in the LTAs. Water will be released for treatment at the refinery's wastewater treatment plant. All trucks and equipment leaving the CAMU facility will be required to pass through the decontamination station to prevent the spread of remediation materials. Refer to *Operations, Maintenance and Monitoring* (Appendix III-D of this Volume) for details regarding equipment decontamination procedures.

4.1.4 Site Access

Within the CAMU there are several gravel roads that provide access to all areas except LTA IV, which currently is accessed by driving through LTA III. Access to the LTF is limited by an 8-foot chain-link fence which surrounds the perimeter of the LTF.

As indicated on the drawings provided in Appendix III-A, a new gravel access road will be constructed on the north edge of the facility to improve access to LTAs III and IV. Additionally,

access ramps will be constructed at LTA I , LTA II, and, if needed, to the compost area. These improvements will allow access to each area and eliminate the need for equipment to cross drainage channels. These improvements will require some minor grading, sub-base preparation (compaction), and the placement of a gravel-surface course. The construction of the decontamination pad adjacent to the existing fence will require a portion of the existing fence to be removed and replaced with a gate that can be securely locked.

4.1.5 Monitoring Systems

Environmental monitoring systems include lysimeters, soil cores, and groundwater monitoring wells. Lysimeters sample soil-pore liquids in the unsaturated zone. These samples are used to detect any hazardous constituents which migrate below the treatment zone. Soil cores are used in a similar fashion to determine whether waste constituents have migrated and accumulated in soils below the treatment zone. Monitoring wells determine whether the groundwater beneath the CAMU has been adversely impacted. Details regarding modifications to the monitoring system are provided in Appendix III-A—*Facility Upgrade Design and Engineering Basis.*

The current interim status monitoring system at the LTF consists of six deep monitoring wells (UA series), 18 piezometers (B-series), six shallow monitoring wells (SW series) and six lysimeters. The shallow wells were completed in discontinuous, unconfined, perched water zones encountered above the uppermost bedrock unit beneath the site. The deep wells are completed in the basal Lemont Drift, and the piezometers are completed in the dolomite bedrock underlying the Lemont Drift. The lysimeters are located within the unsaturated zone.

The lysimeters are in various states of disrepair and were installed at depths too shallow to provide useful detection monitoring for the LTF. They will be abandoned and replaced by nine new lysimeters in the LTAs (LA series) and two background lysimeters (LB series). The new lysimeters will be located 5.5 feet below the original soil surface (disturbed/undisturbed soil interface) and will be distributed spatially across the LTF on an equal area basis. One background lysimeter will be located at the northern edge of the CAMU and another at the southern edge of the CAMU. Both of the background lysimeters will be located in areas isolated from the LTAs, but within the same soil series and topographic setting.

The six wells completed in discontinuous, shallow water-bearing zones beneath the LTF will be plugged and abandoned. The abandonment will be performed in accordance with the final RCRA permit and IEPA regulations (77 IAC 920) for wells that are completed in unconsolidated sediments.

4.2 Unit Performance

A summary of the historical waste application at the LTF and of potential future applications and acceptance criteria is presented in the following section. A detailed evaluation can be found in the *Waste Characterization* (Appendix III-B) and the *Waste Management Plan* (Appendix III-C).

4.2.1 Historical Application

The wastes that have been applied to the LTF include:

- Clear well sludge;
- Cooling tower sludge;
- Tank cleaning waste;
- Heavy oil sludge;
- Stormwater basin dredgings;
- Water/wastewater sludge; and
- API separator sludge (K051).

API separator sludge made up less than 1% of the total waste treated at the LTF and has not been applied since September 1981. The majority of waste applied to the LTF consisted of stormwater basin dredgings and water/wastewater treatment sludge. Since waste application ceased in 1989, the only materials applied to the LTF include 8,570 dry tons of stormwater basin sediments placed in piles at LTA I.

Historically, wastes were placed initially into the decant basins located on the east side of the LTF to allow for drainage and evaporative drying. The wastes then were removed and applied to the LTAs.

Previous investigations of the LTAs indicate that the thickness of treated wastes ranges from 0 to 6 feet (Geraghty & Miller, 1995; ERM, 1989). Annual application rates of wastes were no more than 320 dry tons per acre per year. Measured oil and grease concentrations in these applied wastes ranged from 19 to 520,000 mg/kg.

4.2.2 Future Application and Performance

The Lemont Refinery plans to treat any excavated remediation waste resulting from the RCRA cleanup process at the CAMU. Identified SWMUs are listed in the final RCRA permit and are described in the *Waste Characterization Report* (Appendix III-B of this volume). It is anticipated that some of these SWMUs will require material removal, while others will not. A preliminary estimate indicates that upwards of 40,000 yd^3 of remediation wastes may be expected. More reliable estimates will be prepared after the RCRA Facility Investigation (RFI)

has been completed. Initial loading rates and operating parameters of the CAMU will be based on interim status operating data, and USEPA guidance. The following section provides a brief description of the planned operating conditions and restrictions that will be applied to these wastestreams to ensure the treatment effectiveness of the LTF. Detailed information is provided in the *Waste Management Plan* (Appendix III-C of this volume).

Based on historical oil and grease application rates at the Lemont Refinery and industry experience, an oil and grease concentration of 7.5% by weight in the incoming wastestream can be land treated effectively. The maximum allowable loading initially will be limited to 350 barrels of oil and grease/acre/year. If the oil and grease content of the incoming waste exceeds 7.5%, then a pretreatment operation (e.g., composting or blending) will be utilized. Once the composted material has met the 7.5% oil and grease criteria, it will be transferred to the LTAs for final placement and treatment. Based on continued monitoring of the CAMU, the oil and grease loading rate may be revised (increased or decreased) as appropriate. In the event that the maximum loading is reached, excess wastes will be composted (if necessary) until direct land application is once again practical.

Because the estimated concentrations of metals in remediation wastes expected to be treated at the CAMU are low, metals are not expected to accumulate to levels that will inhibit land treatment performance or the establishment of a vegetative cover. Waste placement criteria discussed in the *Waste Management Plan* will serve to further reduce the potential for metals to accumulate above protective levels. Waste routing to the LTAs will be established for each waste source based on the waste analysis data.

5.0 OPERATION, MAINTENANCE, AND MONITORING

Operation of the CAMU will be monitored carefully to demonstrate the effectiveness and protectiveness of the unit. A brief description of the operation, maintenance, and monitoring activities for SWMU soil excavation and disposal at the CAMU, is provided in the following sections. A detailed description of these activities is provided in the *Operation, Maintenance, and Monitoring Plan* (Appendix III-D of this volume).

5.1 Operating Plan

General operations concerning treatment of remediation waste at the CAMU will involve excavation of soil from the SWMUs, transportation to the CAMU, and treatment at the LTFs or the composting facility. LTAs I through IV will be used for direct land application of incoming wastes with an oil and grease content of less than 7.5% by weight. Incoming wastes with oil and grease content greater than 7.5% by weight, if present, will be pretreated using static compost piles at

the compost facility. Once the residual compost material has been sufficiently treated, it will be transferred to the LTAs.

5.1.1 SWMU Operations

A detailed remediation plan will be prepared later in the corrective action process as RFI data are available. The following paragraphs provide a brief overview of the general steps required to remove and transport remediation wastes to the CAMU.

Excavate Soils—Soils from within the SWMUs will be excavated using standard earth-moving equipment. Debris, if encountered during excavation, will be decontaminated and disposed of appropriately.

Monitoring—Affected media will be sampled periodically for oil and grease content and any other parameters that are deemed significant in the *Treatability Evaluation Plan* (provided in Appendix III-E of this volume) and/or the *Operation, Maintenance, and Monitoring Plan* (Appendix III-D of this volume) for successful treatment at the CAMU.

Haul to Storage Pad—Excavated soils and solids will be transferred directly to trucks from the SWMUs. The trucks will haul the material to the CAMU for treatment. Trucks will be inspected for residual remediation material and decontaminated, if necessary, to prevent transport or spreading of remediation wastes.

Verification Sampling—Verification sampling will be performed as part of the corrective measures program. If concentrations of target analytes exceed the established health-based criteria, additional excavation will be performed or other measures will be employed as site constraints demand.

Backfill Excavations—Upon fulfillment of the verification sampling requirements or other health-based determinations, excavated SWMUs may be backfilled with clean soil from areas unaffected by waste management activities and seeded or otherwise restored as necessary.

5.1.2 Land Treatment Operations

The quantity and rate of waste application to the LTAs will be monitored using the oil and grease content of the wastes being applied. The maximum recommended loading to ensure effective land treatment at the CAMU is 350 barrels of oil and grease/acre/year (see *Waste Management Plan*, Appendix III-C of this volume). Incoming wastestreams with an oil and grease content of less than 7.5% by weight will be applied directly to LTAs without composting. Incoming wastestreams with an oil and grease content in excess of 7.5% by weight will be composted prior to application on the LTAs, which will reduce oil and grease concentrations and allow higher material loading rates in the LTAs. To obtain optimum land treatment effectiveness, the wastes will be applied as uniformly as practical to each treatment area in no more than a 9-inch layer. All available land treatment space will be utilized before a successive lift is placed. This practice will ensure that the maximum residence time is provided for organic degradation in any location. The minimum residence time that shall elapse between the placement of two lifts at any one location is 30 days. Waste volumes, application dates, application location, and oil and grease concentration will be recorded in the facility operating log book.

To prevent run-off of waste and waste constituents during rainstorms and to promote biodegradation of the wastes, a tractor-drawn agricultural disk, tiller, or other suitable equipment will be used to incorporate wastes into the soil immediately after placement. The tilling implement will till to an average depth of 12 inches. A spreader bar will be attached behind the tilling equipment to smooth the surface of the soil, eliminate low spots, and prevent pooling of rainfall on the unit surface. The surface will be disced at least once per week during periods of waste application. In addition, the LTAs may be periodically chisel (deep) plowed to disrupt the formation of a plow pan. The tilling schedule will be recorded in the operating log book.

Oil and grease, pH, nutrients, and moisture of soils in the Zone of Incorporation will be measured periodically to evaluate the performance of the land treatment process.

5.1.3 Compost Operations

If sufficient amounts of remediation waste containing high levels of hydrocarbons are generated during corrective actions to necessitate the construction and operation of a composting area, the following general steps will be followed:

Acquire/Store Amendments—Affected media will be blended with a bulking agent, such as wood chips (approximately 20% by volume). If necessary to activate the compost pile, easily degraded carbon sources, such as molasses, manure, or wastewater treatment plant biosludge, may be added initially to the compost mixture as co-metabolites. Nitrogen and phosphorus also may be added to the mixture if needed to provide the proper carbon:nitrogen:phosphorus ratio (100:1:0.1).

Construction of Compost Piles—As soon as sufficient remediation waste has been staged on the storage pad, the components will be blended and constructed into a pile. The operational design of the compost piles is discussed in *Operation, Maintenance, and Monitoring Plan* (Appendix III-D of this report). It is estimated that compost materials will be staged no longer than 1 month prior to incorporation with compost piles.

Compost Pile Operation—Once the compost piles are constructed, no further material handling is required until the pile is disassembled. The composting progress will be monitored at periodic intervals by measuring the temperature of the pile. It is expected that the highest temperatures will occur in the early stages of the composting period and then slowly decline as the food sources are exhausted. The compost piles also will be analyzed periodically for some or all of the following: oil and grease; pH, nutrients, moisture, temperature, and oxygen content.

5.1.4 Waste Control Operations

To ensure that remediation waste does not leave the CAMU with departing equipment, an equipment decontamination station will be constructed at the entrance/exit to the CAMU. This station will consist of a curbed concrete slab with a drainage collection and sediment removal system. All equipment will be required to pass through the station prior to leaving the CAMU. For equipment that will return immediately to the CAMU and not leave the refinery property (e.g. trucks hauling remediation waste from SWMUs), all exposed surfaces will be inspected to ensure that they are free of remediation waste. For all equipment that will not be immediately returning to the CAMU, all parts of the equipment will be inspected, including truck beds and equipment cabs. If any remediation waste is found during the inspection, then the equipment will be cleaned. A high-pressure washer will be available for this purpose.

During operations at the decontamination station, the sediment level in the sump will be checked daily. When the level of sediment in the sump begins to impact the removal efficiency of the unit, the sediment will be removed and applied to one of the LTAs.

5.2 Maintenance Activities

The decontamination pad, liner under the compost area, berms and roads, erosion controls, and the stormwater management system will be routinely inspected during operation of the CAMU. Repairs will be made as necessary to maintain these structures in proper operating condition.

5.3 Monitoring Approach

A detection monitoring program will be conducted during CAMU operation and closure. The monitoring program will include groundwater, soil-core, and lysimeter samples collected

from below treatment zone (BTZ) soils to demonstrate that movement of waste constituents is not occurring. The lysimeter system will consist of two background lysimeters and nine lysimeters strategically placed at the four LTAs. The lysimeters will be sampled semi-annually during active land treatment operations. Eight BTZ soil-core samples will be collected from the active LTA of the CAMU annually. Sampling locations will be determined using the procedures described in Appendix IV-N.

The existing monitoring well network consists of one upgradient monitoring well (UA-1) and five downgradient wells (UA-2 through UA-6) located at points of compliance. The monitoring wells will be used for monitoring groundwater quality and measuring groundwater elevations. The piezometers will be used for measuring groundwater elevations only.

Soil-core and soil-pore liquid samples will be analyzed for a select list of Modified Skinner List constituents (modified based on historical operations and past production activities) along with other non-Skinner List constituents that have been detected at the LTF during previous investigations (see Section IV, Appendix IV-N). Every fifth year soil cores and soil-pore liquid will be monitored for the full Modified Skinner List (Appendix I of the final RCRA permit). Constituents that are shown not to be present in the wastes and/or LTAs may be removed from the select list in the future. Analytical results will be evaluated statistically with respect to background concentrations for metals or practical quantitation limits for organic compounds.

Based on the USEPA guidance document titled *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities* (USEPA, 1989), semi-annual monitoring of the groundwater wells is considered protective of groundwater. Per the RCRA permit, the groundwater quality at each of the UA-series wells at both the up-gradient and point of compliance locations will be determined semi-annually throughout the active life of the CAMU. Samples collected during the semi-annual sampling events of each year will be analyzed for TOC, TOX, and dissolved arsenic. In addition, pH, specific conductance, temperature, turbidity, depth to water, and elevation of groundwater surface will be measured semiannually. A statistical evaluation will be used to compare compliance well results to background levels or practical quantitation limits to determine if a release has occurred. Additional information regarding the groundwater program is provided in Appendix IV-D of this volume.

6.0 TREATABILITY EVALUATION

Prior to full-scale operation, the Lemont Refinery will conduct a treatability evaluation to demonstrate the effectiveness of the LTF. The evaluation is designed to demonstrate that remediation-waste hydrocarbon levels can be reduced significantly and show that inorganic

waste residuals are effectively immobilized. The *Treatability Evaluation Plan* is attachment III-E to this section.

7.0 SCHEDULE

Figure 7-1 shows the proposed timeline for the tasks described in the previous sections. Active treatment operations in the CAMU are expected to last approximately 4 to 10 years.

8.0 REFERENCES

1. Environmental Resources Management-North Central, Inc. (ERM), *Phase I Closure Report For Land Treatment Area*, June 1989.

2. Geraghty & Miller, Inc., *Site Characterization Report UNO-VEN Land Treatment Facility, Lemont, Illinois*, March 1995.

3. U.S. Environmental Protection Agency, *Permit Guidance Manual on Hazardous Waste Land Treatment Demonstrations*, July 1986.

4. U.S. Environmental Protection Agency, *Statistical Analyses of Groundwater Monitoring Data of RCRA Facilities*, Interim Final Guidance, February 1989.

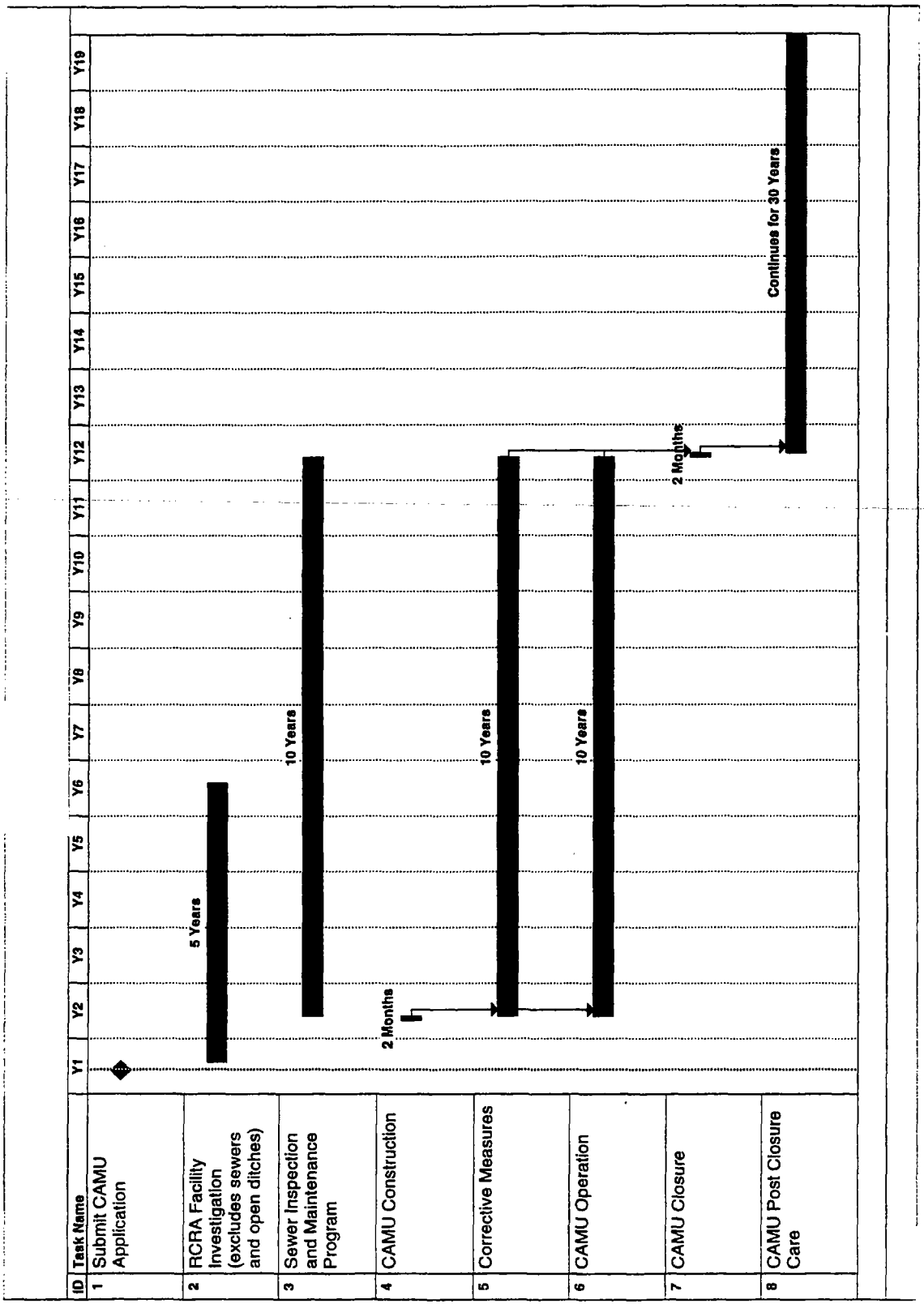

Figure 7-1. CITGO CAMU Construction and Operation Timeline

Appendix III-A Facility Upgrade Design and Engineering Basis

Appendix III-A
Facility Upgrade Design and Engineering Basis

Lemont Refinery

December 1997

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1.0 INTRODUCTION

Via this modification to the final Resource Conservation and Recovery Act (RCRA) permit, the Lemont Refinery proposes to delay closure of its land treatment facility (LTF) and redesignate it as a corrective action management unit (CAMU). The CAMU will manage remediation wastes generated during the RCRA Corrective Action Program. Based on a review of past LTF investigations, a hydrologic evaluation of surfacewater at the facility, and discussions with the Illinois Environmental Protection Agency (IEPA), several site improvements are proposed to facilitate the operation of the LTF as a CAMU. This document and the attached CAMU Site-Work Drawings explain the proposed improvements and provide the basis for their design.

2.0 BACKGROUND

The following sections provide information regarding the existing conditions at the LTF and a description of the CAMU.

2.1 Site Description

The LTF is located in the southeast portion of the Lemont Refinery. It is bounded by the refinery's tank farm to the north, undeveloped land owned by the Lemont Refinery to the east and south, and undeveloped land owned by the Mobil Oil Company to the west. The LTF is a fenced area that occupies approximately 28 acres. Of the 28 acres, four discrete plots known as land treatment areas (LTAs I through IV) make up 13.5 acres. LTA I opened in 1973 and LTAs II, III, and IV opened in 1981. The remaining land includes buffer zones around each LTA, roads, drainage features, and an area that contains two former, and one existing nonhazardous, decant basins (designated as solid waste management units [SWMUs] 15A, 15B, and 15C under the RCRA Corrective Action Program).

The wastes that have been applied to the LTF include: clear well sludge, cooling tower sludge; tank cleaning waste, heavy oil sludge, stormwater basin dredgings, water/wastewater sludge, and API separator sludge (K051). API separator sludge made up less than 1% of the total waste treated at the LTF and has not been applied since September 1981. The majority of waste applied to the LTF consisted of stormwater basin dredgings and water/wastewater treatment sludge. Historical operational practices consisted of placing wastes into the decant basins to reduce the water content and then applying the wastes directly to the land surface. On occasion, direct application of waste materials onto the plots also was performed.

The existing drainage features collect stormwater run-off from the LTAs and from areas to the east and convey it to the refinery. The stormwater collects in an intermittent stream within the LTF then flows through the adjacent property west of the LTF before returning to the refinery, where it is treated in the wastewater treatment plant (WWTP) and discharged to the Sanitary and Ship Canal under a National Pollutant Discharge Elimination System (NPDES) permitted outfall (outfall 001) (NPDES Permit No. IL0001589). The geology at the LTF consists of a glacial till underlain by dolomite bedrock. The depth to groundwater varies from approximately 60 to 100 feet below ground level, and the prevalent direction of groundwater flow is to the northwest. The surface soil series associated with the LTF has been classified by the Soil Conservation Service as being of one uniform type: Ashkum silty clay loam (Soil Report 80, 1962).

2.2 CAMU Description

The CAMU will consist of three areas of operation. The first will be land treatment at the existing LTAs. This will be the primary method for the treatment of remediation wastes. It is expected that most (or all) of the remediation wastes will be directly applied to the LTAs. However, if it is determined that it would be more effective, based on the quantity or quality of the waste, to pretreat certain remediation wastes prior to land application, then a second area of operation (composting area) will be constructed in the north end of the western-most former decant basin (SWMU 15A). This area will pretreat remediation wastes which contain elevated hydrocarbon levels or wastes that are generated when the LTAs are not able to receive wastes (e.g., during adverse weather when the LTAs cannot be accessed). Lastly, a decontamination area will be constructed to prevent off-site movement of constituents via vehicle transport.

3.0 SITE IMPROVEMENTS

The LTF was an interim status RCRA hazardous waste management unit (HWMU). As such, the LTF contains specific features for control and monitoring. These include groundwater monitoring wells, lysimeters, run-on and run-off control features, and site access control. However, as part of the CAMU, the facility design has been reviewed to ensure that placement of remediation waste will be protective of human health and the environment and that modifications will not adversely impact the effectiveness of the unit. The following sections present an evaluation of the current LTF and describe modifications to the facility management system as appropriate for establishment of a CAMU.

3.1 Stormwater Controls at the Land Treatment Areas

Stormwater provides the primary vehicle by which constituents could be transported off site. Therefore, control of stormwater and control of potential erosion is of great importance in the design and operation of land treatment systems. Stormwater management should limit the amount of water that contacts treated areas by controlling run-on and minimize the potential for an uncontrolled release of waters containing hydrocarbon- or metals-impacted sediment by controlling run-off. A properly designed stormwater and erosion control system will restrict sediment transport from the CAMU.

3.1.1 Existing Stormwater Controls at the Land Treatment Areas

The current stormwater management system is focused primarily on controlling run-on and run-off to the intermittent stream. Because the LTAs are hydraulically up-slope from adjacent land surfaces, run-on to the LTAs is not a significant issue. The LTF has undergone several investigations in recent years, including analysis of sediment in the intermittent stream and stormwater run-off from each of the LTAs.

In 1995, four sediment samples were collected from locations downstream from each of the LTAs, and prior to where the intermittent stream leaves the limits of the LTF (Geraghty & Miller, 1995). Each sample was analyzed for Skinner List constituents (analytes typically found in refinery wastes). Semivolatile organic compounds (SVOCs) were the only Skinner List constituents present at detectable concentrations but were well below Illinois Tier Approach to Corrective Action Objectives (TACO) Tier I action levels for soil. Total SVOC concentrations ranged from 13.46 mg/kg at the central portion of the LTF to 1.09 mg/kg at the western edge of the LTF where the stream leaves the LTF (Di-n-butyl phthalate was the only SVOC detected at the western location). All detections were below TACO levels.

Stormwater run-off sampling was evaluated for dissolved constituents in the spring of 1989 (ERM, 1989), which was the last year of waste application. Of the years operated, the LTAs received their highest loading of oily wastes during 1988 and 1989; however, samples collected immediately downstream of each LTA indicated no polynuclear aromatics (PNAs) or volatile organic compounds (VOCs) above the analytical limits. The LTAs all contain sufficient slope that prevents pooling of stormwater and reduces contact time between the wastes and run-off, eliminating significant dissolved phase constituent concentrations.

These results provide sufficient data to conclude that the existing controls have been sufficient to prevent movement of constituents above health-based levels. However, the most likely pathway for hazardous constituents transport during CAMU operation is by sediment

transportation resulting from significant storm events. Typically, there are two fundamental means to control sediment transportation. The first is to prevent or minimize erosion from occurring, and the second is to capture sediment after erosion has occurred. For land treatment operations in general and the CAMU in particular, the most effective method is a combination of the two: first minimizing sediment uptake and then providing a means for removing the small amount of solids that become suspended in the stormwater run-off.

3.1.2 Proposed Stormwater Control Improvements at the Land Treatment Areas

The proposed modifications to the CAMU stormwater management system include a minor amount of slope grading, positioning of controls to inhibit erosion, and construction of stormwater run-off controls in a way that will remove suspended solids. Details are provided in the attached CAMU site-work drawings. A description of these modifications is provided below.

The controls for each LTA have been designed to minimize the erosion and sediment loss that may result from a 25-year, 24-hour storm. Design storm and run-off coefficient information for the CAMU was taken from an engineering report entitled *Hydrologic Study - Run-off to Storm Pond* (Metcalf & Eddy, 1994). By calculating the volume and velocities of run-off that would result from the design storm and by applying soil erosion models, the proper type, placement, and configuration of controls were selected to provide the most protection. The most efficient design to control solids transport at the CAMU will be realized through minor grading to reduce critical slopes and the installation of a series of silt fences and engineered grass-lined ditches to prevent and/or remove suspended sediments.

Reducing the length of individual slopes over which stormwater run-off flows (by grading and installation of drainage features) will prevent erosion from occurring. By breaking up each LTA into smaller areas (cells), the length over which stormwater flows in a rain event and the associated volume and velocity of surface water is reduced. This reduction in volume and velocity corresponds directly to a reduction in the ability of stormwater to erode and carry suspended solids.

To further reduce velocities and also trap solids, silt fences will be placed along the down-slope edge of each land treatment cell. Silt fences reduce sediment from stormwater run-off by trapping sediment behind the fence and allowing the water to pass through. Additionally, silt fences slow down the rate at which water travels over the land surface which in turn reduces the ability of the stormwater to carry sediment. The filter material for the silt fence will be constructed of a durable geotextile fabric that is resistant to break down by ultraviolet light and will be toed in a minimum of 6 inches to prevent water from escaping from under the fence.

(See Detail 4, Sheet 131-CD-446 of the CAMU Site-Work Drawings.) The filter fabric will be supported by galvanized, woven wire backing mounted to metal posts to provide strength and durability. Calculations using the Universal Soil Loss Equation (USLE) indicate that slope length reduction and the use of silt fences will decrease the potential of sediment loss from each LTA by 65% to 80 percent.

As an additional control, after run-off has passed through the silt fence, it will be collected in a grass-lined ditch that will convey run-off at a reduced velocity to a central location. The combination of reduced flow velocity and grass liner provide additional reduction of sediment that may be suspended in the run-off. Where the run-off exits an LTA, which is typically down a slope, rip-rap (3 inches to 5 inches stone) will be used to remove energy from the water and protect existing slopes as indicated in the drawings. The stormwater run-off also passes through an existing vegetated buffer zone prior to entering the intermittent stream where it is conveyed to the WWTP. The combination of slope length reduction, silt fences, grass-lined ditches, plowing techniques, and reduced flow velocity significantly reduces potential sediment transport.

3.2 Monitoring Systems

Monitoring systems in the form of monitoring wells and lysimeters will serve an important function at the CAMU. Lysimeters monitor the unsaturated zone to ensure that land treatment is occurring properly and act as an early detection system for groundwater. Monitoring wells monitor the groundwater beneath the CAMU to ensure that it is not being adversely impacted.

3.2.1 Existing Monitoring System

The existing monitoring system consists of six shallow monitoring wells (SW series), six deep monitoring wells (UA series), 18 piezometers (B-series), and six lysimeters installed in the vicinity of the LTF. The shallow wells are completed in the perched water zones encountered above the saturated zone beneath the site. The deep wells are completed in the basal Lemont Drift, and the piezometers are completed in the dolomite bedrock underlying the base of the Lemont Drift. The lysimeters are located in the unsaturated zone soils within each LTA.

3.2.2 Proposed Monitoring Systems Improvements

Proposed monitoring improvements include the installation of eleven new lysimeters to measure soil-pore water in the unsaturated zone, the abandonment of the six existing lysimeters, and the abandonment of the six existing shallow monitoring wells as allowed by the final RCRA permit (see CAMU Site Work Drawings). The existing lysimeters are in various states of disrepair and were installed at a depth too shallow to provide useful information. They will be

abandoned and replaced by nine active lysimeters (LA series) and two background lysimeters (LB series). The new active lysimeters will be located 5.5 feet under the original (i.e., pre-land farm) soil interface in the unsaturated zone under each LTA and distributed horizontally on an equal area basis. One background lysimeter will be located at the northern edge of the CAMU and another at the southern edge of the CAMU. Both of the background lysimeters will be located in areas isolated from the LTAs, but within the same soil series and topographic setting.

Six wells completed in discontinuous, shallow perched aquifers beneath the LTF will be plugged and abandoned. This will be accomplished in accordance with the final RCRA permit and IEPA regulations (77 IAC 920) for wells that are completed in unconsolidated sediments and backfilled with soft sediments (e.g., native clay).

The new lysimeters, combined with the existing deep monitoring wells and piezometer network, will provide an effective means of monitoring CAMU activities. By providing a system of early detection, these systems will provide assurance of proper operation as well as protecting groundwater.

3.3 Site Access

Controlling the access to the CAMU and providing safe and efficient access for equipment and workers to the LTAs is important for successful operations at the CAMU.

3.3.1 Existing Site Access

Access to the CAMU will continue to be limited by an 8-foot chain-link fence that surrounds the perimeter of the LTF. The gate at the north entrance/exit is locked whenever the LTF is not in use or being inspected. In addition, the facility is also patrolled regularly by refinery security. Within the LTF, there are multiple compacted gravel roads in good condition that provide access to all areas of the LTF except LTA IV, which is currently accessed by driving through LTA III.

3.3.2 Proposed Site Access Improvements

As indicated on the attached site/work drawings, a new gravel access road will be constructed on the north edge of the facility to improve access to LTAs III and IV. Additionally, access ramps will be constructed at LTAs I and II and, if needed, at the compost area as indicated on the drawings. These improvements will allow access to each area and protect the silt fences and grass-lined channels from potential damage caused by heavy equipment. The improvements will require some minor grading, sub-base preparation (compaction), and the placement of a gravel surface course. Also, the construction of the decontamination pad adjacent to the existing fence will require a portion of the fence to be removed and replaced with a gate that can be securely locked.

3.4 Composting Area

If needed, a composting area will be constructed as indicated in the drawings to pretreat remediation wastes that contain elevated hydrocarbon levels or wastes that are generated when the land treatment areas are not able to receive wastes (e.g., after a rain event when the LTAs are too wet to access). The composting area will be located at the northern end of the west-most former decant basin (SWMU 15A). It will be constructed on a bermed and lined area, approximately 150 ft x 300 ft, to control run-off and infiltration. Stormwater run-off from the composting area will drain to the northern edge of the pad where sediment will be removed and the water will be detained, if necessary, and ultimately released for treatment at the refinery wastewater treatment plant. The construction of the pad will require minor grading, soil compaction, and the placement of a road base overlain with a surface seal or liner.

3.5 Decontamination Station

A decontamination station will be constructed adjacent to the north entrance/exit to the CAMU. The station will be constructed of a 35 ft x 60 ft concrete pad with an integrated heavy duty trench drain. This collection structure will convey the run-off/wash water to a settling unit. Solids will be collected in the settling unit and removed on a periodic basis and placed on the LTAs. All trucks and equipment will be required to pass through the decontamination station prior to leaving the CAMU to prevent the spread of remediation materials. All exposed surfaces will be cleaned. A high-pressure washer will be available, as necessary. The *Operations, Maintenance and Monitoring Plan* (Appendix III-D of this volume) provides more details regarding equipment decontamination procedures.

4.0 SUMMARY

The existing LTF was evaluated in context of the CAMU criteria and for the assurance of protection to human health and the environment when operated as a CAMU. Based on that evaluation, site improvements have been proposed to better control access, manage stormwater and erosion, conduct monitoring, and decontaminate CAMU equipment. The engineering drawings, attached to this document, provide details of these improvements.

5.0 REFERENCES

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2. Geraghty & Miller, Inc., *Site Characterization Report UNO-VEN Land Treatment Facility, Lemont, Illinois*, March 1995.

3. Metcalf & Eddy, *Hydrologic Study - Run-off to Storm Pond*, 1994.

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Appendix III-B Waste Characterization

Appendix III-B
Waste Characterization

Lemont Refinery

December 1997

Prepared for:
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1.0 INTRODUCTION

In accordance with the final Resource Conservation and Recovery Act (RCRA) permit for the Lemont Refinery, a RCRA Facility Investigation (RFI) will be conducted at 34 solid waste management units (SWMUs). Although the RFI will further define the need for corrective action, it is anticipated that some of the SWMUs will require remediation. By designating the land treatment facility (LTF) as a correction action management unit (CAMU) early in the process, remediation wastes, including those from investigation activities and interim measures (if necessary), can be placed in the CAMU for treatment and disposal throughout the RFI.

This report is intended to meet the following objectives:

- Identify the potential sources of remediation wastes;
- Estimate the potential quantity of remediation waste at each SWMU;
- Provide a broad characterization of the wastes that could be generated during remediation of the SWMUs;
- Establish expected, allowable ranges of waste properties that will be treated by the CAMU; and
- Compare characteristics of the anticipated remediation wastes to the as-generated wastes that were previously applied to the LTF.

The data presented in this appendix are considered to be representative of remediation wastes that will be treated in the CAMU. Information on individual SWMUs where soil excavation is expected is provided only to describe the typical waste characteristics. Decisions on whether actual corrective actions will be required at each SWMU will not be made until information from the RFI is available.

2.0 SOURCES AND CHARACTERISTICS OF REMEDIATION WASTES

The CAMU will receive remediation wastes from SWMUs that require excavation. Since the RFI at the Lemont Refinery has not begun, only limited information is available to characterize the remediation wastes which will be generated during corrective actions. While preliminary investigations have been performed for several of the SWMUs, most of the SWMUs have not been previously investigated. However, to satisfy the remedy selection, CAMU, and land treatment standards, it is necessary to have a basic understanding of quantities and characteristics of the wastes which will be treated in the CAMU. To provide this information, indirect data sources and engineering judgement were used to supplement existing information on the SWMUs. The data used to characterize potential remediation wastes from the various SWMUs was obtained from the following: 1) previous investigations of certain SWMUs; 2) characterization data for wastes managed at certain SWMUs; 3) industry knowledge of similar wastes; and

4) characterization data for similar wastes historically treated at the LTF. This information was used to predict the most probable and/or worst case waste characteristics.

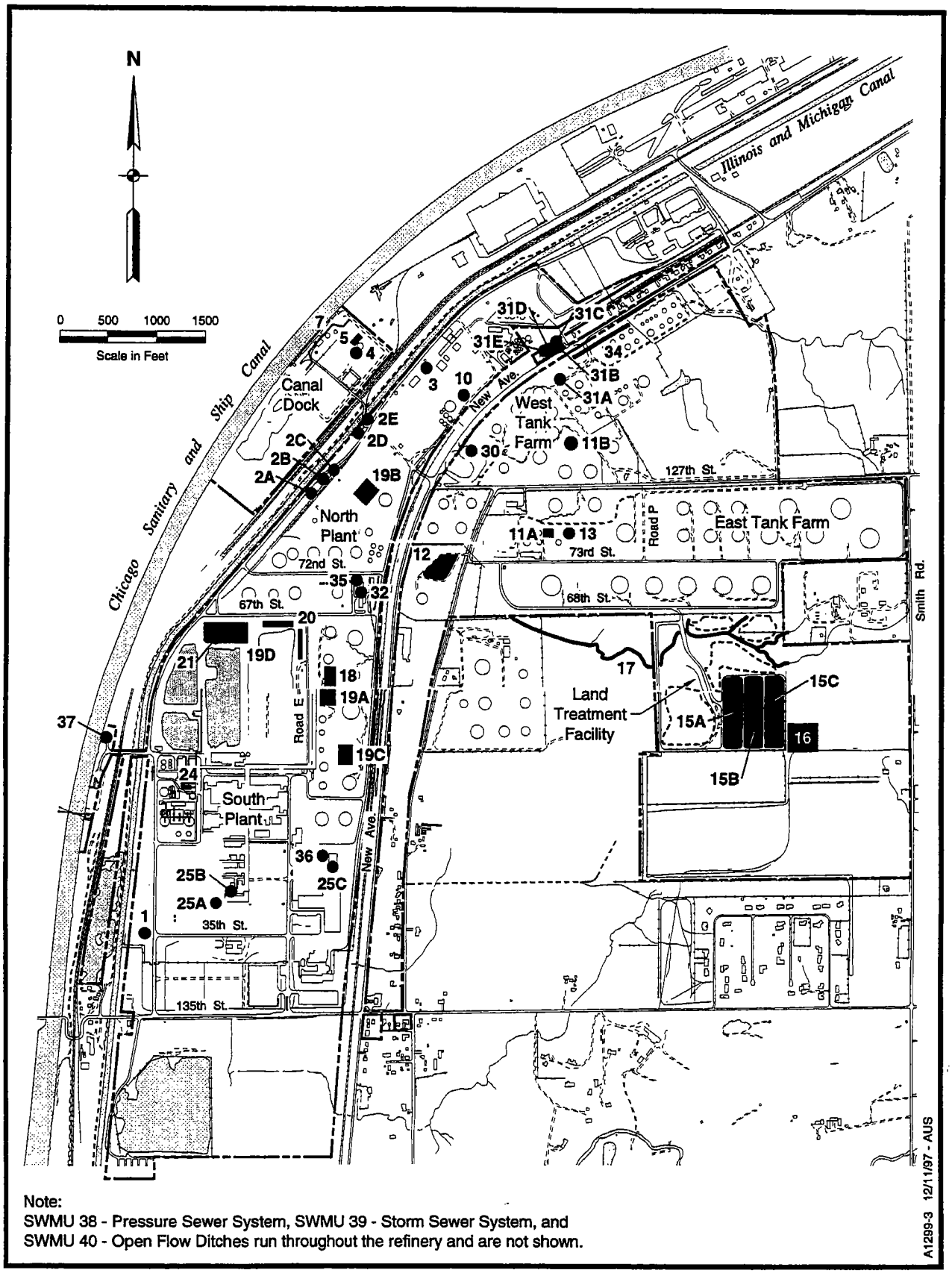
The following section provides estimates of the quantity and characteristics of remediation wastes expected to be removed from individual SWMUs and treated in the CAMU. For each set of data included, only constituents detected in the analysis of that waste stream are presented. Average concentrations were calculated when more than one set of data were available for a particular constituent. If one sample contained a detection, all sample results (including one-half the detection limit for non-detects) were used to calculate the average.

Sources of information used for this assessment include site assessment reports prepared by Maude Environmental (Maude, 1993), the RCRA Facility Assessment prepared by the Illinois Environmental Protection Agency (IEPA) (IEPA, 1996); site investigation reports prepared by Geraghty and Miller, Inc. (Geraghty and Miller, 1995), Environmental Resource Management (ERM, 1989), and ENSR Consulting & Engineering (ENSR, 1994); and other information obtained in a records search and site visit. To aid in the evaluation of the waste properties, the waste characterization data is compared to the Illinois Risk-Based Tiered Approach to Corrective Action Objectives (TACO) Class I guidelines for the migration to groundwater exposure route. This this comparison is conservative and illustrative only, a site-specific (i.e., Tier II or Tier III TACO) evaluation may be conducted during the RFI to determine remedial objectives.

The Lemont Refinery contains 34 SWMUs, 14 of which are expected to require waste excavation. Figure 2-1 shows the location of the SWMUs. Table 2-1 provides a summary of the estimated quantity of impacted media and an estimate of the types of waste constituents present at each SWMU.

2.1 SWMU 1—Former Empty Drum Storage Area

SWMU 1 consists of an asphalt pad that is approximately 50 ft by 50 ft. The area had a gravel pad before it was covered with asphalt. The unit was operated from the 1970s until 1980. Lubrication oil drums and miscellaneous drums containing solid waste, such as contaminated soil, catalysts, and corrosive materials, were managed at the unit. Historical handling practices may have resulted in minor leaks and/or spills in the area. In 1980, the gravel pad was cleaned by scraping up visually contaminated soil, however, confirmatory sampling was not conducted. The area is used to store gas cylinders and empty, clean drums. Because of past cleanup efforts and since there is no evidence of current impacts at the unit, further remediation actions are not anticipated.



Note:
SWMU 38 - Pressure Sewer System, SWMU 39 - Storm Sewer System, and
SWMU 40 - Open Flow Ditches run throughout the refinery and are not shown.

Figure 2-1. Location of the SWMUs Listed in the Lemont Refinery's Part B Permit

Table 2-1
Estimated Volume of Remediation Wastes by SWMU

SWMU No.	SWMU Description	Class of Constituents	Estimated Volume (yd^3)
1	Former Empty Drum Storage Area	None (no remediation is anticipated)	0
2A-E	Former Process Wastewater Line (Big Inch)	VOCs (5), SVOCs (1)	50
3	Former North Plant API Separator and Current Aboveground Corrugated-Plate Separator	None (no remediation is anticipated)	0
4	Hot Oil Line, Seneca Petroleum Storage Tank	None (no remediation is anticipated)	0
5	Former Dump Area for Lime Sludge; Seneca Tank Location	None (no remediation is anticipated)	0
7	Interceptor Trench; Canal Dock	None (no remediation is anticipated)	0
10	North Plant Heat Exchanger Bundle Cleaning Pad	VOCs (1), SVOCs (1), Metals (11)	20
11A&B	Recycle Tanks: 11A-Mobile Interface Tank; 11B-301 Tank	VOCs (4), SVOCs (11), Metals (9)	1,325
12	Tank 201 and Proximate Area	None (no remediation is anticipated)	0
13	Sludge Drying Area	VOCs (2), Metals (7)	850
15A&B	Wastewater Treatment Sludge Decant Basins	None (no remediation is anticipated)	0
15C	Wastewater Treatment Sludge Decant Basin	None (no remediation is anticipated)	0
16	Sludge Application Area	SVOCs (2), Metals (13)	1,000
17	Intermittent Stream/Stormwater Conveyance	None (no remediation is anticipated)	0
18	Waste Staging Areas	SVOCs (2), Metals (13)	2,200
19A-C	Former Sludge Drying Areas	SVOCs (2), Metals (13)	350
19D	Former Sludge Drying/Decant Basin	VOCs(4), SVOCs (2), Metals (13)	4,850
20	Active Drum Staging Area	None (no remediation is anticipated)	0
21	Vertical Oil Storage Tanks at the Stormwater Basin (SWB)	None (no remediation is anticipated)	0
24	Former API Separator	None (no remediation is anticipated)	0
25A&B	Heat Exchanger Bundle Cleaning Pad	VOCs (1), SVOCs (1), Metals (11)	25
25C	Supplementary Heat Exchanger Bundle Cleaning Pad	VOCs (1), SVOCs (1), Metals (11)	30
30	Former Primary Light Oil UST at Fuels Loading Rack Area	VOCs (4), Metals (1)	9,000
31A-E	Former USTs Located at Former Service Station and Active Solvent Loading Rack Area	VOCs (4), SVOCs (4), Metals (1)	5,050
32	Former Process Blending UST at the Process Blend Center	VOCs (4), Metals (1)	0
33	Groundwater Management Zone	None (Groundwater SWMU)	0

SWMU No.	SWMU Description	Class of Constituents	Estimated Volume (yd^3)
34	French Drain System	None (no remediation is anticipated)	0
35	Red Die Spill Area	VOCs (3), SVOCs (3)	115
36	Former Maintenance USTs	None (no remediation is anticipated)	0
37	Former UST Located near WWTP Outfall	None (no remediation is anticipated)	0
38	Process Sewer System	VOCs (6), SVOCs (1)	5,250
39	Storm Sewer System	None (no remediation is anticipated)	1,300
40	Open Flow Ditches	None (no remediation is anticipated)	0
43A-I	Product Pipelines (spill locations only)	None (no remediation is anticipated)	0

API = American Petroleum Institute UST = Underground storage tank WWTP = Wastewater treatment plant
SVOC = Semi-volatile organic compound VOC = Volatile organic compound

2.2 SWMUs 2A-E—Former "Big Inch" Process Wastewater Line (Sumps Only)

SWMUs 2A through 2E are five sumps located along the "Big Inch" former process wastewater line. These sumps were used to monitor and recover oil floating on the groundwater. Each sump consists of a 24-inch diameter steel pipe that is slotted at the bottom. The sumps extend vertically approximately 12-20 ft below ground surface (drilled into bedrock). The sumps were installed beginning in 1983, when oil seepage to the Illinois & Michigan (I&M) Canal was observed. Since 1991 the "Big Inch" has conveyed only non-contact stormwater.

Wastes generated during remediation of the sumps will likely consist of surface soils impacted by oily wastewater. The estimated volume of soil to be removed and applied to the CAMU for treatment is 50 cubic yards. Affected soils will likely contain various petroleum hydrocarbon constituents similar to those found at SWMUs 31B-E former underground storage tanks (USTs) located at the former service station. Table 2-2 presents the results of analyses preformed at SWMUs 31B-E, used as an indication of the affected soils likely to be encountered at SWMUs 2A-E.

Table 2-2
Estimated Remediation Waste Concentrations for SWMUs 2A-E

Analyte	Range of Constituent Concentrations[a]	Average Constituent Concentration	TACO[b]
Organic Compounds			
Benzene	ND - 7.8 mg/kg	0.70 mg/kg	0.03 mg/kg
Ethyl benzene	ND - 110 mg/kg	7.4 mg/kg	13 mg/kg

Analyte	Range of Constituent Concentrations[a]	Average Constituent Concentration	TACO[b]
Toluene	ND - 5 mg/kg	0.33 mg/kg	12 mg/kg
Xylene	ND - 200 mg/kg	12.7 mg/kg	150 mg/kg
Napthalene	ND - 0.073 mg/kg	0.026 mg/kg	84 mg/kg
Inorganic Compounds			
Lead -TCLP	ND - 0.053 mg/L	0.011 mg/L	0.0075 mg/L

[a] Maude Environmental Inc., *Site Assessment for the UNO-VEN Company, Former Service Station and Solvent Loading Rack*, July 1993
[b] TACO Tier 1 Soil Remediation Objectives—Class I for the migration to groundwater route

2.3 SWMU 3—Former North Plant API Separator and Current Above-Ground Corrugated-Plate Separator

The former American Petroleum Institute (API) separator was a below-ground concrete structure constructed in the 1920s. Sludges from the API separator were sent to the LTF prior to September 1981. The API separator was removed in 1984 when a cooling tower was installed at the Needle Coker Unit. An above-ground, corrugated-plate oil separator was installed north of the former API separator location to replace the former API separator. Several thousand cubic yards of contaminated soils were excavated and disposed off site during the removal of the API separator. Since a large volume of contaminated soils has already been excavated down to bedrock at this site, no further soil excavation is expected.

2.4 SWMU 4—Hot Oil Line, Seneca Petroleum Storage Tank

Seneca Petroleum leases property from the refinery and operates a diked above-ground storage tank (AST). In 1992, an unknown quantity of asphalt feedstock was released to the surrounding area from an above-ground line associated with the AST. The line has since been replaced. The released asphalt feedstock along with some underlying soil was excavated immediately after the release. The asphalt feedstock is a viscous liquid which does not readily migrate through soil. Due to the nature of the released materials and the fact that the released materials were removed promptly, additional remedial activities are not anticipated.

2.5 SWMU 5—Former Dump Area for Lime Sludge; Seneca Tank Location

SWMU 5 consists of an above-ground drying bed with a dike that was used to store nonhazardous lime softener sludge ($CaCO_3$) from the 1950s until 1969. The lime sludge was excavated from the unit and stockpiled. In 1985, the remaining dried sludge and underlying impacted soils were removed for off-site disposal. Since the waste has already been removed from the SWMU, no further remediation is anticipated.

2.6 SWMU 7—Interceptor Trench; Canal Dock

SWMU 7 consists of an interceptor trench that was installed in 1971 to intercept dissolved and free-phase liquid hydrocarbons in the groundwater and prevent it from seeping into the Chicago Ship and Sanitary Canal. The trench was extended to the north and south in 1992. The interceptor trench extends into the bedrock below the water level of the Chicago Ship and Sanitary Canal. All liquid entering the trench is pumped to the North Plant process sewer system. The media of concern at this site is groundwater. There are no data at this time that suggests soils will be excavated from this SWMU.

2.7 SWMU 10—North Plant Heat Exchanger Bundle Cleaning Pad

SWMU 10 consists of a curbed asphalt pad that is used to clean heater exchange bundles. The pad is approximately 60 ft by 50 ft with a 4-inch high curb and two drains. There are currently no significant cracks in the pad. The unit has been operating since the late 1980s. Wastes managed in this unit consist of heat exchanger solids (K050) which potentially contain chromium and lead. The solids are separated from the wash water and taken off site for disposal. The wash water is routed to the refinery wastewater treatment plant. The potential exists that shallow soils around the perimeter of the pad have been impacted. The estimated volume of impacted soils is 20 CY.

Table 2-3 presents the results of an analysis performed on heat exchanger solids (K050). Waste constituent concentrations expected in the impacted soils are based on a 1/10 dilution of the source concentration as a worst-case scenario.

Table 2-3
Estimated Remediation Waste Concentrations for SWMUs 10 and 25A-C

Analyte	Source Concentrations[a]	Estimated Waste Concentrations	Estimated TCLP Concentrations	TACO[b]
Volatile Organic Compounds				
Benzene—TCLP	0.80 mg/L	2 mg/kg	NA	0.03 mg/kg
Semi-Volatile Organic Compounds				
Total Cresols—TCLP	2.8 mg/L	6 mg/kg	NA	NL
Inorganic Compounds				
Lead	146 mg/kg	15 mg/kg	0.7 mg/L	0.0075 mg/L
Mercury	1.9 mg/kg	0.2 mg/kg	0.01 mg/L	0.002 mg/L
Arsenic	5 mg/kg	0.5 mg/kg	0.03 mg/L	0.05 mg/L
Barium	15 mg/kg	2 mg/kg	0.08 mg/L	2.0 mg/L
Cadmium	2 mg/kg	0.2 mg/kg	0.01 mg/L	0.005 mg/L
Chromium	350 mg/kg	35 mg/kg	NA	0.1 mg/L
Chromium—TCLP	0.36 mg/L	NA	0.04 mg/L	0.1 mg/L

Analyte	Source Concentrations[a]	Estimated Waste Concentrations	Estimated TCLP Concentrations	TACO[b]
Silver	2 mg/kg	0.2 mg/kg	0.01 mg/L	0.05 mg/L
Copper	700 mg/kg	70 mg/kg	4 mg/L	0.65 mg/L
Nickel	45 mg/kg	5 mg/kg	0.2 mg/L	0.1 mg/L
Zinc	520 mg/kg	52 mg/kg	3 mg/L	5.0 mg/L

[a] Heat exchanger solids
[b] TACO Tier 1 Soil Remediation Objectives—Class I for the migration to groundwater route
NA = Not applicable
NL =Not listed
TCLP = Toxic Characteristic Leaching Procedure
TACO = Tiered Approach to Corrective Action Objectives

The "twenty times rule" (20X Rule) was used to compare estimated inorganic waste concentrations to TACO Class I levels. The 20X Rule is a conservative rule of thumb for estimating the maximum toxic characteristic leaching procedure (TCLP) concentration of a constituent from the total concentration in the soil. The 20X Rule assumes that the TCLP is 100% efficient so that all of the constituent of interest is leached from the matrix into the extract.

2.8 SWMUs 11A&B—Recycle Tanks (11A—Mobile Interface Tank 436 and 11B—Tank 301)

SWMU 11A consists of an AST used to store a mixture of products from Mobil Oil pipeline shipments that are reused at the Lemont Refinery. The tank has been in operation since 1972 . SWMU 11B is an AST used to store combined crude oil/slop oil that is reused at the Lemont Refinery. The tank has been operating since 1940. Both tanks are surrounded by dikes to control releases. Historically, water was drained from the tank bottoms directly to the ground within the bermed area. An unknown quantity of stained soils was periodically excavated and shipped off site for disposal. A process sewer is currently in place to prevent releases associated with the draining of tank bottoms.

Because stained soils are present within the bermed area, additional soil excavation is expected. The estimated volume of waste to be excavated and applied to the CAMU for treatment from SWMUs 11A and 11B is 275 cubic yards and 1,050 cubic yards, respectively. Table 2-4 presents waste characteristics of slop oil, based on industry knowledge. The concentrations expected in the soils impacted by the discharge of water from the tank bottoms also is presented in the table. A 1/10 dilution of the source concentration was used as a worst-case scenario. The 20X Rule is used to estimate inorganic remediation waste TCLP concentrations.

2.9 SWMU 12—Tank 201 and Proximate Area

SWMU 12 consists of a bermed area approximately 500 ft by 500 ft that surrounds Tank 201. The tank has been in operation since 1930. At one time, the tank contained light cycle oil. Historically, a temporary air diaphragm pump was used to pump the material through hoses from Tank 201 into another tank.

The pump and the hoses occasionally leaked. In 1992, approximately 50,000 cubic yards of petroleum-contaminated soils were removed and transported off site for disposal. Because the site was excavated down to bedrock, no further excavation is expected.

2.10 SWMU 13—Sludge Drying Area

SWMU 13 was formerly used for dewatering primary light oil (PLO) sludge. The unit was closed between the late 1970s and the early 1980s. Approximately 200 drums of sludge were removed for disposal at the time the unit was closed. Later, the area was used to stage impacted soil from SWMU 34. These soils have been removed and disposed of off site. The dimensions of the staging area are approximately 330 ft by 140 ft. The estimated volume of waste to be excavated and applied to the CAMU for treatment is 850 cubic yards. This estimate is based on the size of the staging area and the assumptions that the average vertical extent across the area will be 0.5 feet.

Soils at this SWMU were impacted by both PLO sludge and stockpiled soils. However, constituents released from the PLO sludge are of a greater concern because of the benzene content of the waste. Therefore, estimated concentrations in the soil were based on analysis performed on the PLO sludge. Table 2-5 presents the results of an analysis performed on PLO sludge and the diluted concentrations expected in the underlying and surrounding soils. A 1/10 dilution of the source concentration was used as a worst-case scenario. The 20X Rule is used to estimate the inorganic remediation waste TCLP concentrations.

Table 2-4
Estimated Remediation Waste Concentrations for SWMUs 11A&B

Analyte	Source Concentrations[a]	Estimated Waste Concentrations	Estimated TCLP Concentrations	TACO[b]
Organic Parameters				
Oil and Grease	506,732 mg/kg	50,673 mg/kg	NA	NL
Volatile Organic Compounds				
Benzene	294 mg/kg	29 mg/kg	NA	0.03 mg/kg
Ethyl benzene	733 mg/kg	73 mg/kg	NA	13 mg/kg
Toluene	1,963 mg/kg	196 mg/kg	NA	12 mg/kg
Xylenes (total)	4,188 mg/kg	419 mg/kg	NA	150 mg/kg
Semi-Volatile Organic Compounds				
1-Methylnaphthalene	955 mg/kg	96 mg/kg	NA	NL
Anthracene	121 mg/kg	12 mg/kg	NA	12,000 mg/kg
Benzo(a)anthracene	791 mg/kg	79 mg/kg	NA	2 mg/kg
Benzo(a)pyrene	304 mg/kg	30 mg/kg	NA	8 mg/kg
Benzo(b)fluoranthene	295 mg/kg	30 mg/kg	NA	5 mg/kg
Crysene	1,310 mg/kg	131 mg/kg	NA	160 mg/kg
Fluoranthene	143 mg/kg	14 mg/kg	NA	4,300 mg/kg
Methyl chrysene	2,736 mg/kg	274 mg/kg	NA	NL
Naphthalene	656 mg/kg	66 mg/kg	NA	84 mg/kg
Phenanthrene	673 mg/kg	67 mg/kg	NA	NL
Pyrene	945 mg/kg	95 mg/kg	NA	4,200 mg/kg
Inorganic Compounds				
Arsenic	1.7 mg/kg	0.2 mg/kg	0.009 mg/L	0.05 mg/L
Lead	5.6 mg/kg	0.6 mg/kg	0.03 mg/L	0.0075 mg/L
Barium	71.5 mg/kg	7 mg/kg	0.4 mg/L	2.0 mg/L
Chromium	87.3 mg/kg	9 mg/kg	0.4 mg/L	0.1 mg/L
Cobalt	0.7 mg/kg	0.07 mg/kg	0.004 mg/L	1.0 mg/L
Nickel	2.3 mg/kg	0.2 mg/kg	0.1 mg/L	0.1 mg/L
Vanadium	1.0 mg/kg	0.1 mg/kg	.005 mg/L	0.049 mg/L
Zinc	133.3 mg/kg	13 mg/kg	0.7 mg/L	5.0 mg/L
Selenium	0.4 mg/kg	0.04 mg/kg	0.002 mg/L	0.05 mg/L

[a] Slop oil, based on industry-wide knowledge
[b] TACO Tier 1 Soil Remediation Objectives—Class I for the migration to groundwater route
NA = Not applicable
NL = Not listed
TACO = Tiered Approach to Corrective Action Objectives
TCLP = Toxic Characteristic Leaching Procedure

Table 2-5
Estimated Remediation Waste Concentrations for SWMU 13

Analyte	Source Concentrations[a]	Estimated Waste Concentrations	Estimated TCLP Concentrations	TACO[b]
Volatile Organic Compounds				
Toluene	143 mg/kg	14 mg/kg	NA	12 mg/kg
Benzene	68.9 mg/kg	6.9 mg/kg	NA	0.03 mg/kg
Inorganic Compounds				
Arsenic	1,732 mg/kg	173 mg/kg	NA	NL
Arsenic—TCLP	0.46 mg/l	NA	0.05 mg/L	0.05 mg/L
Barium	19 mg/kg	2 mg/kg	NA	NL
Barium —TCLP	0.65 mg/l	NA	0.07 mg/L	2.0 mg/L
Cadmium	14 mg/kg	1 mg/kg	NA	NL
Cadmium—TCLP	<0.1 mg/l	NA	<0.01 mg/L	0.005 mg/L
Chromium	36 mg/kg	4 mg/kg	NA	NL
Chromium—TCLP	<0.1 mg/l	NA	<0.01 mg/L	0.1 mg/L
Lead	39 mg/kg	4 mg/kg	NA	NL
Lead —TCLP	<0.1 mg/l	NA	<0.01 mg/L	0.0075 mg/L
Selenium	0.64 mg/kg	0.06 mg/kg	NA	NL
Selenium—TCLP	<0.2 mg/l	NA	<0.02 mg/L	0.05 mg/L
Mercury	7.40 mg/kg	0.7 mg/kg	NA	NL
Mercury —TCLP	<0.01 mg/l	NA	<0.001 mg/L	0.002 mg/L

[a] Primary light oil sludge
[b] TACO Tier 1 Soil Remediation Objectives—Class I for the migration to groundwater route
NA = Not applicable
NL = Not listed
TACO = Tiered Approach to Corrective Action Objectives
TCLP = Toxic Characteristic Leaching Procedure

2.11 SWMUs 15A-B—Wastewater Treatment Sludge Decant Basins

This unit consists of two decant basins located in the southeast corner of the LTF. The basins were used to reduce the water content of waste prior to application to the land treatment areas (LTAs) and to store waste during winter months. Operations began in 1974 and continued until 1984. The waste placed in the decant basins consisted of water and wastewater sludge, stormwater pond dredgings, clear well sludge, cooling tower sludge, API separator sludge, and heavy oil sludge. The total quantity of waste placed in the decant basins is unknown. Groundwater monitoring data associated with the LTF has not shown a release.

SWMUs 15A and 15B will become part of the landfarm CAMU. Refer to *Appendix III-A Facility Upgrade Design and Engineering Basis* for details regarding future use. Remediation is not anticipated, since the site is contained within the CAMU.

2.12 SWMU 15C—Wastewater Treatment Sludge Decant Basin

SWMU 15C consists of a below-grade, earthen decant basin. The basin was used to reduce the water content of waste prior to application to the LTAs and to store waste during winter months. Operations began in 1974 and continued until 1984. The waste placed in the decant basins consisted of water and wastewater sludge, stormwater pond dredgings, clear well sludge, cooling tower sludge, API separator sludge, and heavy oil sludge. The total quantity of waste placed in the decant basins is unknown. Groundwater monitoring data associated with the LTF have not shown a release. Procedures for clean closure of this unit were initiated by Unocal in 1984, and acceptance of clean closure from IEPA was received on January 13, 1987. The unit was reopened in 1986 and is currently accepting nonhazardous wastewater sludge.

SWMU 15C will become part of the landfarm CAMU. Refer to *Appendix III-A Facility Upgrade Design and Engineering Basis* for details regarding future use. Remediation is not anticipated, since the site is contained within the CAMU.

2.13 SWMU 16—Sludge Application Area

SWMU 16 was used for a one-time application of waste from July 28 to August 8, 1980. Approximately 10,500 cubic yards of stormwater basis (SWB) sediments were land applied to an area approximately 750 ft by 560 ft located southeast of the LTF. Trace amounts of waste were reported to have migrated off site via stormwater run off before the waste could be incorporated into the underlying soil. The area over which the waste was applied is covered by vegetation. It is estimated that potentially 1,000 cubic yards of soil impacted by inorganic waste residuals and hydrocarbons will be excavated and treated in the CAMU.

Table 2-6 presents the calculated average concentrations for SWB waste from analytical reports and the diluted concentrations expected in the affected soils. A 1/10 dilution of the source concentration was used as a worst-case scenario. Although none of the constituents shown in Table 2-6 are above TACO levels, it is possible that soil remediation will be required due to the high oil and grease content of the SWB dredgings.

2.14 SWMU 17— Intermittent Stream/Stormwater Conveyance

SWMU 17 consists of an intermittent stream that conveys stormwater run off from the LTAs and surrounding areas. Decanted liquids from SWMUs 15A, 15B, and 15C also were discharged to the stream. Water in the stream flows through the LTF from east to west, through an adjacent property west of

the LTF, and then returns to the refinery property. The portion of the intermittent stream located within the LTF boundaries will become part of the landfarm CAMU.

Table 2-6
Estimated Remediation Waste Concentrations for Soils Impacted by SWB Waste (SWMUs 16, 18, 19A, and 19D)

Analyte	Source Concentrations[a]	Estimated Waste Concentrations	Estimated TCLP Concentrations	TACO[b]
Organic Parameters				
Oil and Grease	90,800 mg/kg	9,080 mg/kg	NA	NL
Volatile Organic Compounds				
Benzene—TCLP	4 µg/L	0.4 µg/L	NA	NL
2-Butanone—TCLP	21 µg/L	2 µg/L	NA	NL
Carbon Disulfide—TCLP	3 µg/L	0.3 µg/L	NA	NL
1,1,1-Trichloroethane—TCLP	29 µg/L	3 µg/L	NA	NL
Toluene—TCLP	61 µg/L	6 µg/L	NA	NL
Semi-Volatile Organic Compounds				
Crysene	42.6 mg/kg	4 mg/kg	NA	160 mg/kg
Inorganic Compounds				
Aluminum	27,150 mg/kg	2,715 mg/kg	NA	NL
Arsenic	40.1 mg/kg	4 mg/kg	NA	NL
Arsenic—TCLP	0.02 mg/L	NA	0.002 mg/L	0.05 mg/L
Barium	203 mg/kg	20 mg/kg	NA	NL
Barium—TCLP	1.2 mg/L	NA	0.1 mg/L	2.0 mg/L
Cadmium	4.8 mg/kg	0.5 mg/kg	NA	NL
Cadmium—TCLP	0.02 mg/L	NA	0.002 mg/L	0.005 mg/L
Calcium	135,000 mg/kg	13,500 mg/kg	NA	NL
Chromium, Total	1,012 mg/kg	101 mg/kg	NA	NL
Chromium—Hexavalent	108 mg/kg	11 mg/kg	NA	NL
Chromium—TCLP	0.23 mg/L	NA	0.02 mg/L	0.1 mg/L
Copper	267 mg/kg	27 mg/kg	NA	NL
Copper—TCLP	0.05 mg/L	NA	0.005 mg/L	0.65 mg/L
Cobalt	31 mg/kg	3 mg/kg	NA	NL
Cyanide	6.9 mg/kg	0.7 mg/kg	NA	NL
Iron	24,233 mg/kg	2,423 mg/kg	NA	NL
Lead	267 mg/kg	27 mg/kg	NA	NL
Lead—TCLP	0.34 mg/L	NA	0.03 mg/L	0.0075 mg/L
Magnesium	13,200 mg/kg	1,320 mg/kg	NA	NL
Nickel	55 mg/kg	6 mg/kg	NA	NL
Nickel—TCLP	0.4 mg/L	NA	0.04 mg/L	0.1 mg/L
Selenium	0.97 mg/kg	0.01 mg/kg	NA	NL

[a] SWB dredgings
[b] TACO Tier 1 Soil Remediation Objectives—Class I for the migration to groundwater route
NA = Not applicable
NL = Not listed
TACO = Tiered Approach to Corrective Action Objectives
TCLP = Toxic Characteristic Leaching Procedure

Sampling data collected on two separate occasions indicates that the stormwater run-off is not adversely impacted (Geraghty & Miller, 1995). No volatile organic compounds (VOCs) or polynuclear aromatic hydrocarbons (PAHs) were detected above detection limits in any of the stormwater samples. Metals were detected at or near detection limits. Minimal impacts to the stream sediment from semi-volatile organic compounds (SVOCs) were observed in the site characterization study. SVOC concentrations at the furthest downstream sample, located at the LTF property line, were below TACO Tier 1 levels. The evidence from past investigations suggests that no removal of stream sediments will be required.

2.15 SWMU 18—Waste Staging Area

SWMU 18 was used as a sludge drying bed for SWB pond sludge until 1990. Since then, the unit has been used periodically as a staging area for oil-contaminated soil. The quantity of waste managed at the site is unknown. The sludge drying bed is surrounded by a dike to control potential releases. It is estimated that soils to the depth of 1 foot will be removed across the 200 ft by 300 ft area. An estimated 2,200 cubic yards of impacted soil may be applied to the CAMU for treatment. Soils underlying the drying areas may be impacted by both the SWB sludge and stockpiled soils. However, constituents originating in the SWB sludge are a greater concern. Table 2-6 presents the average concentrations for SWB waste.

2.16 SWMUs 19A-D—Former Sludge Drying Areas

SWMUs 19A through 19D are above-ground, diked sludge drying areas. SWMU 19A operated from the mid 1980s until 1990. Since then the unit has been used as a waste staging area. SWMUs 19B and 19C were used for 1 year (1989-1990). The wastes managed at these units were primarily sediments dredged from the SWB. The exact quantity of waste managed at these units is unknown.

It is estimated that 350 cubic yards of soil will have to be excavated from SWMU 19A and applied to the CAMU for treatment. This estimate assumes that 1 foot of soil over the entire area will be excavated. Since SWMU 19B was used for a limited time, excavation of contaminated soils is not anticipated. A new tank (Tank 487) was constructed in 1995 within the boundaries of SWMU 19C. During construction, soils were excavated for construction of the tank's foundation. No signs of contamination were reported during excavation. Because of this construction, the remediation of soils from SWMU 19C is not anticipated.

SWMU 19D was in operation from the 1970s until 1990 as a sludge drying area. SWMU 19D consisted of two basins, each approximately 240 ft by 180 ft. The basins have been used as decant basins, sludge drying beds, and a holding area for mechanical dewatering sludge. An investigation of SWMU 19D soils and groundwater in the vicinity was conducted in 1993 (ENSR, 1994). The results of this inves-

tigation indicate that soils may have been impacted by BTEX and SVOC compounds. Bedrock underlies this area and the vertical extent of the excavation is expected to be limited. It is estimated that 4,850 cubic yards of soil will have to be excavated from 19D and applied to the CAMU for treatment. This estimate assumes that 1.5 ft of soil/fill will have to be excavated over the entire area.

In summary, it is anticipated that 350 cubic yards of soil from SWMU 19A and 4,850 cubic yards of soil from SWMU 19D will be excavated and treated in the CAMU. Soils underlying the drying areas may have been impacted by both the SWB sludge and stockpiled soils. However, constituents originating in the SWB sludge are a greater concern. Table 2-6 presents the average concentrations for SWB waste.

2.17 SWMU 20—Active Drum Staging Area

SWMU 20 consists of a 250 ft by 75 ft curbed concrete drum staging area. The unit has been in operation since the late 1980s and is used for storage of empty lubricating oil drums, empty chemical drums, full drums of solid waste, roll-off boxes, and less-than-90-day storage of hazardous waste. There also is an adjacent gravel area, approximately 250 ft by 60 ft, used to store roll-off boxes and drums of nonhazardous solid waste.

Spills have occurred periodically at the unit. However, impacted soils have been excavated and disposed. Since there is no evidence of current impacts at the unit, the remediation of soils is not anticipated.

2.18 SWMU 21—Vertical Oil Storage Tanks at the SWB

SWMU 21 consists of two steel tanks used for the storage of oil removed from the SWB. The tanks belonged to a contractor and were used from the 1980s until about 1990. The tanks were used to separate oil from SWB water. The water was returned to the SWB, and the oil was sent to the refinery slop oil system. All soils surrounding the tanks are being addressed under SWMU 19D; therefore, no additional excavation is anticipated.

2.19 SWMU 24—Former API Separator

The API separator was installed in 1969 and removed in the early 1990s. The sludges that accumulated in the former unit are a listed hazardous waste (K051). Oil contamination was discovered during the installation of a new pipeline to the wastewater treatment plant and was initially traced back to the former API separator. An unknown quantity of contaminated soils were excavated and sent off site for disposal at a landfill. Sampling results revealed that the source of the soil impact was from a nearby oil collection system and not the API separator. No additional soils are expected to be excavated from this area.

2.20 SWMUs 25A-B—Heat Exchanger Bundle Cleaning Pads

SWMU 25A is a concrete pad and SWMU 25B is an asphalt pad used for cleaning heat exchanger bundles and other equipment. Heat exchanger solids (K050) and wastewater are produced at the unit during high-pressure cleaning operations. The wastewater is routed to the WWTP, and the heat exchanger solids are segregated and taken off site for incineration.

Both pads are curbed and in fairly good overall condition; however, staining of surface soils around the perimeter is evident. There also is evidence that washwater may have infiltrated below SWMU 25B through holes in the asphalt. It is estimated that 15 cubic yards of soil from the perimeter of SWMU 25A and 10 cubic yards of soil from beneath SWMU 25B will have to be excavated and applied to the CAMU for treatment. Refer to Table 2-3 for characteristics of heat exchanger solids and expected contaminant concentrations in impacted soils.

2.21 SWMU 25C—Supplementary Heat Exchanger Bundle Cleaning Pad—Cleaning Building

SWMU 25C consists of an uncurbed concrete pad with drains. Heat exchanger solids (K050) and wastewater are produced at the unit during high-pressure cleaning operations. The wastewater is routed to the WWTP, and the heat exchanger solids are segregated and sent off site for incineration. It appears that wash waters may have impacted the downslope edge of the pad.

Given the dimension of this area, and the probable depth of impact, it is estimated that 30 cubic yards of soil will have to be excavated and applied to the CAMU for treatment. Refer to Table 2-3 for characteristics of heat exchanger solids and expected contaminant concentrations in impacted soils.

2.22 SWMU 30—Former Primary Light Oil Underground Storage Tank (UST) at Fuels Loading Rack Area

SWMU 30 is at the active fuels loading rack area where fuels are loaded into bulk tanker trucks. The surface of the unit is mainly covered with concrete. Two 881-gallon PLO USTs were removed from this unit in September 1991. The former USTs were contained in an area of approximately 100 sq. ft.

Samples collected at the time of excavation and during two supplemental investigations indicate that the subsurface soils have been impacted by petroleum hydrocarbons. Table 2-7 presents the average constituent concentrations and range of constituent concentrations found in the soils during those investigations.

Table 2-7
Estimated Remediation Waste Concentrations for SWMU 30

Analyte	Range of Constituent Concentrations[a]	Average Constituent Concentration	TACO[b] (mg/kg)
Volatile Organic Compounds			
Benzene	ND- 53 mg/kg	10.8 mg/kg	0.03 mg/kg
Ethyl benzene	ND - 13 mg/kg	3.3 mg/kg	13 mg/kg
Toluene	ND - 2 mg/kg	0.8 mg/kg	12 mg/kg
Xylene	ND - 16.0 mg/kg	6.3 mg/kg	150 mg/kg
Inorganic Compounds			
Lead—TCLP	ND - 0.01 mg/L	0.005 mg/L	0.0075 mg/L

[a] Maude Environmental, Inc., *Site Assessment for the UNO-VEN Company, Fuels Loading Rack,* July 1993.
[b] TACO Tier 1 Soil Remediation Objectives—Class I for the migration to groundwater route
ND = Not detected TACO = Tiered Approach to Corrective Action Objectives
TCLP = Toxic Characteristic Leaching Procedure

Most of the fuel loading area is covered by concrete and is inaccessible due to numerous tanks and pipelines. Therefore, remediation is expected to be limited to those areas that can be accessed and where excavation does not cause structural instability. An in situ treatment method may be used to treat areas that cannot be excavated. Even with site constraints, it is estimated that 9,000 cubic yards of soil may be removed from accessible areas and applied to the CAMU for treatment.

2.23 SWMUs 31A-E—Former Underground Storage Tanks (USTs) Located at Former Service Station and Active Solvent Loading Rack Area

Eight USTs were removed from this area on October 29 and 30, 1991. These included one 1,000-gallon primary light oil UST (SWMU 31A) located at the solvent loading rack area, two 1,000-gallon gasoline USTs (SWMU 31B), one 500-gallon hydraulic oil UST (SWMU 31C), two 6,000-gallon leaded gasoline USTs (SWMU 31D), and two 3,000-gallon diesel USTs (SWMU 31E) located within the former service station area.

The former primary light oil UST (SWMU 31A) covered an area of approximately 150 sq. ft. SWMUs 31B through 31E covered a cumulative area of approximately 2000 sq. ft. The former service station area is currently a vacant parcel of property. A solvent loading rack area which has four racks where solvents are loaded into bulk tanker trucks also is present in this area.

Impacted soil was discovered upon removal of the USTs in both the solvent loading rack area and the former service station area. Samples collected in the vicinity of SWMU 31A at the time of excavation and during two supplemental investigations indicate that the subsurface soils have been impacted by petroleum hydrocarbons. Table 2-8 presents the average constituent concentrations and range of constituent

concentrations for soils found during those investigations. Samples collected in the vicinity of SWMUs 31B-E indicated that subsurface soils are also impacted by petroleum hydrocarbons and possibly lead. Table 2-9 presents the average constituent concentrations and range of constituent concentrations found in these areas. The area of highest impact is apparently associated with the former service station area. In contrast, the impact within the solvent loading rack area was reported to be limited to the area immediately surrounding the former UST. Therefore, it is estimated that 900 cubic yards of soil will be removed from the solvent loading rack area, and 4,150 cubic yards of soil will be removed from the former service station area and applied to the CAMU for treatment.

Table 2-8
Estimated Remediation Waste Concentrations for SWMU 31A

Analyte	Range of Constituent Concentrations[a]	Average Constituent Concentration	TACO[b]
Organic Compounds			
Benzene	ND- 8.2 mg/kg	0.77 mg/kg	0.03 mg/kg
Ethyl benzene	ND - 6.1 mg/kg	0.60 mg/kg	13 mg/kg
Toluene	ND - 2.9 mg/kg	0.27 mg/kg	12 mg/kg
Xylene	ND - 17 mg/kg	1.7 mg/kg	150 mg/kg
Phenanthrene	ND - 0.077 mg/kg	0.021 mg/kg	NL
Fluoranthene	ND - 0.26 mg/kg	0.065 mg/kg	4,300 mg/kg
Pyrene	ND - 0.037 mg/kg	0.01 mg/kg	4,200 mg/kg
Chrysene	ND - 0.26 mg/kg	0.026 mg/kg	160 mg/kg
Inorganic Compounds			
Lead—TCLP	ND - 0.008 mg/L	0.004 mg/L	0.0075 mg/L

[a] Maude Environmental Inc., *Site Assessment for the UNO-VEN Company, Former Service Station and Solvent Loading Rack*, July 1993.
[b] TACO Tier 1 Soil Remediation Objectives - Class I for the migration to groundwater route
NL = Not listed
ND = Not detected
TACO = Tiered Approach to Corrective Action Objectives
TCLP = Toxic Characteristic Leaching Procedure

Table 2-9
Estimated Remediation Waste Concentrations for SWMUs 31B-E

Analyte	Range of Constituent Concentrations[a]	Average Constituent Concentration	TACO[b]
Organic Compounds			
Benzene	ND- 7.8 mg/kg	10.8 mg/kg	0.03 mg/kg
Ethyl benzene	ND - 110 mg/kg	3.3 mg/kg	13 mg/kg
Toluene	ND - 5 mg/kg	0.8 mg/kg	12 mg/kg
Xylene	ND - 200 mg/kg	6.3 mg/kg	150 mg/kg
Naphthalene	ND - 0.073 mg/kg	0.026 mg/kg	84 mg/kg
Inorganic Compounds			
Lead -TCLP	ND - 0.053 mg/L	0.011 mg/L	0.0075 mg/L

[a] Maude Environmental, Inc., *Site Assessment for the UNO-VEN Company, Former Service Station and Solvent Loading Rack*, July 1993.
[b] TACO Tier 1 Soil Remediation Objectives - Class I for the migration to groundwater route
ND = Not detected
TACO = Tiered approach to Corrective Action Objectives
TCLP = Toxic Characteristic Leaching Procedure

2.24 SWMU 32—Former Process Blending UST at the Process Blend Center

A 2,000-gallon UST located at the Blend Center was removed in 1992. Impacted soil was discovered upon removal of the UST. The former UST area is approximately 150 sq. ft in surface area. A new vault and tank has been installed in the previous location of SWMU 32.

During removal activities, groundwater entered the excavation and exhibited a noticeable hydrocarbon odor and sheen. Inspection of the UST revealed holes along the sidewalls of the tank. A site investigation conducted in March 1993 indicated that the adjacent soils are impacted with low levels petroleum hydrocarbons below the TACO Tier I soil remediation objectives. Based on these findings, it is not expected that excavation of soils will be required.

2.25 SWMU 34—French Drain System

SWMU 34 consists of an underground french drain system which lies west, northwest of the 500 series tanks in the North Plant. Floating product and groundwater impacted by dissolved hydrocarbons is present in this area. The source of this groundwater impact has not been located but is suspected to be in the saturated zone. The media of concern at SWMU 34 is principally groundwater; therefore, no soil is expected to be excavated for treatment.

2.26 SWMU 35—Red Dye Spill Area

SWMU 35 is a 2 ft by 2 ft storm sewer drain that has red dye stains around it. The red dye is an additive (Oil Red B Liquid) used to identify diesel fuel that contains high concentrations of xylene. An unknown volume of red dye was spilled from a carboy and tank in March 1996. During the incident, the dye was spilled both inside and outside the curbed area. A french drain has been installed between the additive area and a storm sewer drain to prevent any future releases from reaching the stormwater sewer system.

Based on field observations, it is estimated that 115 cubic yards of soil will have to be removed and applied to the CAMU for treatment. Table 2-10 presents the composition of Oil Red B Liquid taken from a material safety data sheet (MSDS) and the diluted concentrations expected in the affected soils. A1/10 dilution of the source concentration was used as a worst-case scenario.

2.27 SWMU 36—Former Maintenance UST

One 5,000-gallon diesel tank and one 5,000-gallon gasoline tank located on the west side of the cleaning building were removed in November 1990. During removal activities, a noticeable petroleum odor and soil staining were observed. Soil samples were collected from the floor and walls of the excavation and analyzed for VOCs. Analytical results showed that the floor, north wall, south wall, and east wall met IEPA cleanup objectives. However, the west wall exhibited VOC concentrations that

Table 2-10
Estimated Remediation Waste Concentrations for SWMU 35

Analyte	Waste Concentrations[a] (%)	Estimated Soil Concentrations	TACO[b] (mg/kg)
Organic Compounds			
Benzene	<0.035	<35 mg/kg	0.03 mg/kg
Ethyl benzene	6.7	6,700 mg/kg	13 mg/kg
Xylene	35	35,000 mg/kg	150 mg/kg

[a] DuPont Material Safety Data Sheet
[b] TACO Tier 1 Soil Remediation Objectives - Class I for the migration to groundwater route
NL = Not listed

exceeded state standards. Additional soils were removed along the west wall of the excavation. A soil sample was collected after the advancement of the wall and analyzed for VOCs. Analytical results showed that the extended west wall met IEPA cleanup objectives. Since the soils surrounding the two USTs have been cleaned up to IEPA cleanup objectives, additional excavation of soils is not anticipated.

2.28 SWMU 37—Former UST Located Near WWTP Outfall

Two 1,000-gallon diesel tanks located near the wastewater treatment plant (WWTP) outfall were removed in November 1990. The tanks were located in concrete vaults on the north and south sides of the fire water pump house. The vaults and tanks were reported to be in good condition at the time of removal. No noticeable signs of contamination (i.e. no visual or olfactory evidence of contamination) were observed during removal. Since there were no signs of leakage from the two tanks, no remediation is anticipated.

2.29 SWMU 38—Process Sewer System

The process sewer system runs throughout the refinery and consists of approximately 35,000 linear feet (LF) of underground sewer line. The process sewer system conveys flows from the various process areas to the WWTP. The age and material of construction for the sewer lines varies across the plant, but consists primarily of steel, coated steel, and ductile iron pipe. A sewer inspection and maintenance plan will be submitted separately to the IEPA for review and approval. In addition to inspection and maintenance procedures, the plan will include a discussion of the operation and maintenance history and the types of waste conveyed by the sewer.

Based on the diversity of age and material, it is difficult to estimate the potential for release and associated remediation from the process sewer system. However, assumptions have been based on findings at other refineries of similar age. It is estimated that approximately 15% of the process sewer system will require maintenance and remediation of associated affected soils. It is estimated that approximately 5,250 cubic yards of impacted material will be removed and taken to the CAMU for treatment. The waste characteristics are expected to be similar to the results for impacted soils beneath leaking USTs (refer to Table 2-9).

2.30 SWMU 39—Storm Sewer System

The storm sewer system runs through out the refinery and consists of approximately 43,000 linear feet of underground gravity sewer line. The storm sewer system conveys stormwater run off from nonprocess areas within and adjacent to the refinery property to the stormwater basin. This water is processed by the WWTP prior to being discharged. The storm sewer system also will be investigated as part of the sewer inspection and maintenance plan.

Since the storm sewer system currently only carries stormwater run off from nonprocess areas, it is not expected that soil remediation will be required. However, in the area of the "Big Inch" line, which was formerly a process line, it is estimated that portions on the line may require excavation and repair. Assuming 15% and 2 cubic yards per linear feet, an estimated 1300 cubic yards may be excavated and transported to the CAMU. The waste characteristics are expected to be similar to the results for impacted soils beneath leaking USTs (refer to Table 2-9).

2.31 SWMU 40—Open-Flow Ditches

Approximately 26,000 linear feet of open-flow ditches run through the refinery. The open-flow ditches convey stormwater run off from nonprocess areas within and adjacent to the refinery property to the stormwater basin. The open-flow ditches also will be investigated as part of the sewer inspection and maintenance plan. Since the open-flow ditches only carry stormwater run off from nonprocess areas, it is not expected that soil remediation will be required.

2.32 SWMU 43—Product Pipelines (spill locations only)

There are product pipelines located throughout the plant that convey various petroleum products. The IEPA has identified the following nine product pipeline spill incidents as SWMUs 43A through 43I: 1) canal dock piping, 2) primary light oil pump, 3) refinery flare, 4) barge, 5) above ground tank, 6) lift station sump, 7) process drain system, 8) pipeline primary light oil, and 9) condenser (sulfur dioxide). These spills have been addressed under the SPCC plan and no further remediation is anticipated.

3.0 DESCRIPTION OF HISTORICAL WASTES APPLIED TO THE LTF

The LTF consists of four individual land treatment areas (referred to as LTAs I through IV) used for waste treatment. LTA I was opened in 1973, and Areas II, III, IV were opened in 1981. Operational practices consisted of placing wastes into the decant basins located on the southeast corner of the landfarm to reduce the water content and then applying the wastes directly to the land surface. On occasion, direct application of waste materials onto the plots was performed.

The wastes that have been applied to the LTF include: clear well sludge, cooling tower sludge, tank cleaning waste, heavy oil sludge, SWB dredgings, water/wastewater sludge, and API separator sludge (K051). API separator sludge made up less than 1% of the total waste treated at the LTF and has not been applied since September 1981. The majority of waste applied to the LTF consisted of SWB dredgings and water/wastewater treatment sludge. Waste application ceased in 1989 when refinery operations were turned over to UNO-VEN. Since then, 8,570 dry tons of dewatered SWB dredgings have been stockpiled on LTA I.

The thickness of the treated residuals overlying the original land surface ranges from 0 to 6 ft based on data from 29 soil borings completed by Geraghty & Miller (Geraghty & Miller, 1995) and from a previous investigation by Environmental Resource Management—North Central, Inc. (ERM, 1989). Application rates of wastes were less than 320 dry tons per acre in any one year. Table 3-1 shows the annual dry weight of waste applied at the LTF since 1981. The amount of waste applied to each individual treatment area per acre is shown in Table 3-2.

Table 3-1
Summary of Historical Waste Loading (Dry Tons) on the LTF

Waste Type	1981	1982	1983	1984	1985	1986	1987	1988	1989
Water and Wastewater Sludge	1800	1444	2060	1361	549	0	1004	350	0
Stormwater Pond Dredgings	0	2328	1650	0	2258	0	0	2882	2148
Clear Well Sludge	0	200	0	0	0	0	0	0	0
Tank Cleaning Waste	150	0	0	0	0	0	0	0	0
Cooling Tower Sludge	0	0	25	0	0	0	0	0	0
API Separator Sludge[a]	18	0	0	0	0	0	0	0	0
Heavy Oil Sludge	0	10	0	0	0	0	0	0	0
Total	1968	3982	3735	1361	2807	0	1004	3232	2148

Source: RCRA Part B permit application, Geraghty & Miller (February 1996).
[a] Estimated to be 1% of water/wastewater sludge

Table 3-2
Summary of Historical Waste Loading (Dry Tons/Acre) on Treatment Areas

Land Treatment Plot	1981	1982	1983	1984	1985	1986	1987	1988	1989
Area I	305	264	305	147	279	0	90	277	144
Area II	60	318	60	98	261	0	114	118	160
Area III + IV	317	318	317	36	270	0	0	319	180
Average	227	300	227	94	270	0	68	238	161

Source: RCRA Part B permit application, Geraghty & Miller (February 1996)

Average concentrations for organic (oil and grease) parameters and inorganic constituents were calculated using the waste analysis data from Appendix C-1 of the RCRA Part B permit application for clear well sludge, cooling tower sludge, heavy oil sludge, SWB sediments, and water/wastewater sludge (Geraghty & Miller, 1996). Concentrations for API separator sludge constituents were taken from an analysis performed for UNO-VEN in 1991. Table 3-3 presents a comparison of concentrations applied to the LTF in the past to TACO Tier I limits for the migration to groundwater route. Oil and grease concentrations ranged from 19 to 520,000 mg/kg.

Table 3-3
Comparison of Constituent Concentrations in the Historical LTF Wastes to TACO Class I Levels

Parameter	Units	Clear Well Sludge	API Separator Sludge	Cooling Tower Sludge	Heavy Oil Sludge	SWB Dredgings	Water/Wastewater Treatment Sludge	TACO
Total Solids	mg/kg	110,000	353,300	670,000	460,000	550,000	398,200	NL
Volatile Solids	mg/kg	30,000	NA	240,000	130,000	100,000	26,000	NL
pH		NA	9	NA	NA	7.85	9	NL
Oil and Grease	mg/kg	19	NA	313	520,000	78,000	3,518	NL
Arsenic	mg/kg	1.7	43.5	43	ND	196	3.3	NL
Arsenic—TCLP	mg/l	ND	NA	0.02	ND	0.03	0.06	0.05
Barium	mg/kg	80	157	200	270	229	121	NL
Barium—TCLP	mg/l	0.4	NA	0.4	0.3	0.9	0.35	2.0
Cadmium	mg/kg	0.9	2.81	ND	6	5.8	ND	NL
Cadmium—TCLP	mg/l	0.01	NA	0.02	ND	0.03	0.008	0.005
Chromium, Total	mg/kg	260	1,390	36,000	3	1,117	229	NL
Chromium, Hexavalent	mg/kg	NA	NA	NA	NA	108	200	NL
Chromium—TCLP	mg/l	0.03	0.4	0.05	ND	0.24	0.03	0.1
Copper	mg/kg	20	191	400	3	267	23.8	NL
Copper—TCLP	mg/l	0.04	NA	0.01	ND	0.05	0.04	0.65
Cobalt	mg/kg	NA	NA	NA	NA	31	3	NL
Iron	mg/kg	4,800	NA	5,500	NA	24,233	5,950	NL
Lead	mg/kg	31	398	130	21	307	17.6	NL
Lead—TCLP	mg/l	0.2	2.0	ND	ND	0.44	0.17	0.0075
Mercury	mg/kg	ND	6.24	ND	ND	ND	ND	NL
Mercury—TCLP	mg/l	ND	NA	ND	ND	ND	ND	0.002
Nickel	mg/kg	11	159	100	8	55	23.9	NL
Nickel—TCLP	mg/l	0.4	NA	0.5	ND	0.4	0.6	0.1
Selenium	mg/kg	0.1	14.7	38	ND	1.3	ND	NL
Selenium—TCLP	mg/l	ND	NA	ND	ND	ND	ND	0.05
Silver	mg/kg	2.1	1.50	8	ND	ND	ND	NL
Silver—TCLP	mg/l	ND	NA	ND	ND	ND	ND	0.05
Vanadium	mg/kg	36	NA	400	19	104	30.7	NL
Zinc	mg/kg	99	823	30,000	1	1,006	128	NL
Zinc—TCLP	mg/l	0.7	0.15	2.4	0.1	0.23	0.12	5.0

ND = Not detected NL = Not listed NA = data not available
Source: RCRA Part B permit application, Geraghty & Miller (February 1996)
API = American Petroleum Institute
SWB =
TACO = Tiered Approach to Corrective Action Objectives
TCLP = Toxic Characteristic Leaching Procedure

4.0 COMPARISON OF REMEDIATION WASTES TO HISTORICALLY APPLIED WASTES

As shown in Table 4-1, when the average constituent concentrations of potential remediation wastes from each SWMU are compared to the weighted average concentrations applied in the past, the majority of constituent concentrations are higher in the historical waste. The weighted average concentrations of waste constituents historically applied to the LTF were estimated based on past waste loading rates and waste characterization data presented in Section 3.0. Specific organic constituents data, other than oil and grease, for the historical wastes were not available. However, oil and grease was used as an indicator of organic constituent content and, based on this comparison, the organic content of the potential remediation waste is expected to be considerably less than the as-generated waste that was historically applied to the LTF.

Table 4-2 presents the average calculated mass of the inorganic constituents in potential remediation wastes compared to the calculated mass for wastes historically applied to the LTF. Mass of inorganic constituents in potential remediation wastes were calculated from the concentrations presented in Table 4-1 and the estimated volumes presented in Table 2-1. The mass of all inorganic constituents anticipated from the remediation wastes are again lower than those in the historically applied wastes.

In summary, the estimated totals for individual constituent loading from expected remediation wastes is much less (in many cases orders of magnitude) than the mass of constituents applied to the LTF during historical waste applications. Therefore, the following conclusions can be drawn:

- The remediation wastes to be applied to the CAMU will contain similar waste constituents (e.g., Skinner List analytes) but generally contain lower concentrations of those constituents than wastes applied in the past.
- The total mass of constituents applied via the remediation wastes will be much lower than that applied in the past.

Based on these conclusions, the CAMU is expected to perform as well or better than the LTF.

Table 4-1
Comparison of Constituent Concentrations in Remediation Wastes to Historical LTF Waste

Parameter/ Analyte	Units	Historical LTF Waste[a]	SWMU 2A-E	SWMUs 10 and 25A-C	SWMU 11A & 11B	SWMU 13	SWMUs 16, 18, 19A, and 19D	SWMU 30	SWMU 31A	SWMU 31B-E	SWMUs 38 and 39
Oil and Grease	mg/kg	45,548	NA	NA	50,673	NA	9,080	NA	NA	NA	NA
Arsenic	mg/kg	110	NA	0.5	0.2	173	4	NA	NA	NA	NA
Arsenic—TCLP	mg/L	0.04	NA	0.03	0.009	0.05	0.002	NA	NA	NA	NA
Barium	mg/kg	130	NA	1.5	7	2	20	NA	NA	NA	NA
Barium—TCLP	mg/L	0.7	NA	0.08	0.4	0.07	0.1	NA	NA	NA	NA
Cadmium	mg/kg	3	NA	0.2	NA	1	0.5	NA	NA	NA	NA
Cadmium—TCLP	mg/L	0.02	NA	0.01	NA	ND	0.002	NA	NA	NA	NA
Chromium, Total	mg/kg	675	NA	35	9	4	101	NA	NA	NA	NA
Chromium, Hexavalent	mg/kg	148	NA	NA	NA	NA	11	NA	NA	NA	NA
Chromium—TCLP	mg/L	0.1	NA	0.04	0.4	ND	0.02	NA	NA	NA	NA
Copper	mg/kg	150	NA	70	NA	NA	27	NA	NA	NA	NA
Copper—TCLP	mg/L	0.05	NA	4	NA	NA	0.005	NA	NA	NA	NA
Cobalt	mg/kg	19	NA	NA	0.07	NA	3	NA	NA	NA	NA
Iron	mg/kg	16,206	NA	NA	NA	NA	2,423	NA	NA	NA	NA
Lead	mg/kg	173	NA	15	0.6	4	27	NA	NA	NA	NA
Lead—TCLP	mg/L	0.3	0.01	0.7	0.03	ND	0.03	0.005	0.004	0.01	0.01
Mercury	mg/kg	2	NA	NA	NA	0.7	NA	NA	NA	NA	NA
Mercury—TCLP	mg/L	ND	NA	NA	NA	ND	NA	NA	NA	NA	NA
Nickel	mg/kg	31	NA	5	0.2	NA	6	NA	NA	NA	NA
Nickel—TCLP	mg/L	0.5	NA	0.2	0.1	NA	0.04	NA	NA	NA	NA
Selenium	mg/kg	0.8	NA	NA	0.04	0.06	0.01	NA	NA	NA	NA
Selenium—TCLP	mg/L	ND	NA	NA	0.002	ND	ND	NA	NA	NA	NA
Silver	mg/kg	0.6	NA	0.2	NA	NA	NA	NA	NA	NA	NA
Silver—TCLP	mg/L	ND	NA	0.01	NA	NA	NA	NA	NA	NA	NA
Zinc	mg/kg	603	NA	52	13	NA	NA	NA	NA	NA	NA
Zinc—TCLP	mg/L	0.1	NA	2.6	0.7	NA	NA	NA	NA	NA	NA

[a] Weighted average based on waste application rates and waste composition.
NA = Data not available
ND = Not detected
Note: SWMU 35 is not shown, because oil and grease and inorganic information is not available for direct comparison to the LTF composite wastes.
LTF = Land treatment facility
SWMU = Solid Waste Management Unit
TCLP = Toxic Characteristic Leaching Procedure

Table 4-2
Comparison of Constituent Mass in Historically Applied Wastes and Remediation Wastes

Analyte	Units	Calculated Constituent Mass in Historically Applied Wastes	Calculated Constituent Mass in Remediation Soils									
			SWMU 2A-E	SWMUs 10 and 25A-C	SWMUs 11A & 11B	SWMU 13	SWMUs 16,18,19 A, and 19D	SWMU 30	SWMU 31	SWMU 31B-E	SWMUs 38 and 39	Total from SWMUs
Arsenic	kg	2004	NA	0.01	0.3	169	39	NA	NA	NA	NA	208
Barium	kg	2369	NA	0.04	11	2	193	NA	NA	NA	NA	206
Cadmium	kg	55	NA	0.007	NA	1	5	NA	NA	NA	NA	6
Chromium, Total	kg	12,300	NA	1.15	14	4	973	NA	NA	NA	NA	992
Chromium, Hexavalent	kg	2,697	NA	NA	NA	NA	106	NA	NA	NA	NA	106
Copper	kg	2,733	NA	2.88	NA	NA	260	NA	NA	NA	NA	263
Cobalt	kg	346	NA	NA	0.1	NA	29	NA	NA	NA	NA	29
Iron	kg	295,316	NA	NA	NA	NA	23,342	NA	NA	NA	NA	23,342
Lead	kg	3,153	NA	0.43	0.9	4	260	NA	NA	NA	NA	265
Mercury	kg	36	NA	NA	NA	0.7	NA	NA	NA	NA	NA	0.7
Nickel	kg	565	NA	0.14	0.2	NA	58	NA	NA	NA	NA	88
Selenium	kg	15	NA	NA	0.06	0.06	0.10	NA	NA	NA	NA	0.22
Silver	kg	11	NA	0.007	NA	NA	NA	NA	NA	NA	NA	0.007
Zinc	kg	10,988	NA	1.44	20	NA	NA	NA	NA	NA	NA	21

NA = Data not available
Note: SWMU 35 is not shown because inorganic information on soils is not available for a direct comparison to the LTF composite wastes.
SWMU = Solid Waste Management Unit
LTF = Land treatment facility

5.0 SUMMARY

This report shows that the anticipated remediation wastes will contain constituents similar to those in the wastes applied to the LTF historically. After 9 years of operation, the wastes applied to the LTF have not interfered with successful biodegradation of organics, the soils ability to attenuate inorganics, or the soils ability to support vegetation. In addition, the total mass of constituents that will be applied to the LTF as a CAMU are substantially less than the amount applied in the past. Compost pretreatment of remediation wastes that contain high oil and grease levels will further decrease the organic concentrations and mass of organic constituents applied to the CAMU. The waste placement criteria for inorganics discussed in the *Waste Management Plan* (Appendix III-C) will serve to further reduce the hazards that metals may accumulate above unacceptable levels or migrate below the treatment zone.

The characterization of remediation wastes presented here is based on data available from site investigations or waste analyses for each of the SWMUs. More accurate predictions of the types and

quantities of remediation wastes will be possible as data from the RFI become available. However, the conclusions presented in this section are not expected to change.

6.0 REFERENCES

1. Environmental Resources Management-North Central, Inc. (ERM), *Phase I Closure Report For Land Treatment Area*, June 1989.

2. ENSR Consulting and Engineering, *Report of Former Sludge Drying Bed Area Characterization*, March 1994.

3. Geraghty & Miller, Inc., *Site Characterization Report UNO-VEN Land Treatment Facility Lemont, Illinois*, March 1995.

4. Geraghty & Miller, Inc., *The UNO-VEN Company, Lemont Refinery, Lemont Illinois, RCRA Part B Permit Application*, Volumes I, II, and III, May 1995.

5. Illinois Environmental Protection Agency, Bureau of land, Permit Section, *RCRA Facility Assessment, UNO-VEN, Lemont Refinery,* September 1996.

6. Maude Environmental, Inc., *Site Assessment for the UNO-VEN Company, Lemont Refinery, Process Blend Center*, July 1993.

7. Maude Environmental, Inc., *Site Assessment for the UNO-VEN Company, Lemont Refinery, Fuels Loading Rack* July 1993.

8. Maude Environmental, Inc., *Site Assessment for the UNO-VEN Company, Lemont Refinery, Former Service Station and Solvent Loading Rack,* July 1993.

Appendix III-C Waste Management Plan

Appendix III-C
Waste Management Plan

Lemont Refinery

December 1997

Prepared for:
The Lemont Refinery
CITGO Petroleum Corporation
Lemont, Illinois

Prepared by:
Radian International LLC
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1.0 INTRODUCTION

In accordance with the corrective action portion of the Resource Conservation and Recovery Act (RCRA) permit, a RCRA Facility Investigation (RFI) will be conducted at 34 solid waste management units (SWMUs). Based on the results of the RFI, certain SWMUs may require corrective action. By designating the existing land treatment facility (LTF) as a corrective action management unit (CAMU) early in the process, excavated soils, including those generated during RFI activities and interim measures (if necessary), can be placed in the LTF for treatment and disposal.

CAMU operations at the LTF will include waste characterization; waste classification based on oil and grease and metals content; waste segregation; uniform waste placement in the LTF; ongoing treatments to optimize aeration, moisture content, nutrients, and pH; and environmental monitoring.

The principal objectives for land treating wastes is the degradation, transformation, and immobilization of hazardous constituents within the treatment zone soil. This appendix provides an overview of the historical performance of the LTF based on the results of previous site investigations and waste loading records. It also describes proposed operating procedures to ensure that the CAMU performs effectively and safely.

2.0 BACKGROUND

The LTF consists of four land treatment areas (referred hereafter as LTAs I through IV) used for waste treatment. LTA I was opened in 1973 and LTAs II, III, and IV were opened in 1981. The LTF encompasses an area of approximately 28 acres, of which about 13.5 acres have been used for waste treatment. The LTF has operated under RCRA interim status standards since November 1980.

Wastes applied to the LTF include clear well sludge, cooling tower sludge, tank cleaning waste, heavy oil sludge, storm water basin (SWB) sediments, water/wastewater sludge, and API separator sludge (K051). API separator sludge made up less than 1% of the total waste treated at the LTF and has not been applied since September 1981. The majority of wastes applied to the LTF consisted of SWB sediments and water/wastewater treatment sludge. Waste applications stopped in 1989.

Historical operating practices consisted of placing wastes into the decant basins to lower the water content. The waste was then excavated and applied directly to the land surface. On occasion, direct application of wet waste materials was performed.

Based on a review of the site characterization report prepared (Geraghty & Miller, 1995) and other data (see Section 4.0), it appears that the LTF has not been excessively loaded with wastes. The data indicate that low levels of organic and inorganic waste residuals have accumulated within the upper treatment zone of the LTA soils. Based on these findings and a visual inspection of the facility, the LTF appears to be ideally suited for continued land treatment.

3.0 DESCRIPTION OF REMEDIATION WASTES

Since the RFI has not begun, limited information is available to describe the contaminated media that will be generated during remedial activities. However, based on available information from investigations at the SWMUs and analyses of wastes handled in SWMUs, the most probable and/or worst-case waste characteristics were predicted. The data are considered to be representative of remediation wastes that will be treated in the CAMU. Appendix III-B, *Waste Characterization*, is an assessment of the SWMUs present at the refinery along with estimates of the types and quantities of wastes expected to be generated during corrective actions. Tables 3-1 and 3-2 summarize the information presented in the *Waste Characterization*. These tables present the estimated concentration ranges of organic and inorganic constituents in the remediation wastes designated for treatment at the CAMU.

4.0 HISTORICAL PERFORMANCE OF THE LTF

This section describes the historical performance and existing conditions at the LTF. It should be noted that the data reflect treatment of as-generated refinery waste, which differs from remediation wastes because the levels of organic and inorganic constituents are higher. Residual concentrations of organic and inorganic compounds in the LTF indicate that waste constituents have been successfully degraded and immobilized within the treatment zone (TZ) . The historical performance of the LTF provides a conservative indication of how the unit will perform in the future.

Figure 4-1 illustrates the three defined zones (Zone of Incorporation [ZOI], TZ, and below the treatment zone [BTZ]) at the LTF. The ZOI is defined as the surface soil layer in which waste is incorporated. The TZ consists of 5 feet of soil below the original ground surface (before waste application) where waste residuals are attenuated. Soils immediately below the TZ make up the BTZ, is the zone where detection monitoring samples are taken.

Information on historical waste applications to the LTF are from the refinery's approved RCRA permit application (Geraghty and Miller, 1995). Sources of information which address the occurrence and distribution of organic and inorganic contaminants in the LTF include a site characterization report (prepared by Geraghty & Miller, 1995 and Environmental Resources Management-North Central, Inc.

Table 3-1
Estimated Organic Concentrations in Remediation Wastes

Analyte/Parameter	Units	Expected Concentration Range
Organic Parameter		
Oil & Grease	mg/kg	9,080 - 50,673
Volatile Organic Compounds		
Benzene	mg/kg	0.006 - 88
Ethyl benzene	mg/kg	0.6 - 16,750
Toluene	mg/kg	0.3 - 196
Xylene	mg/kg	0.7 - 162,500
Acetone	mg/kg	ND - 0.006
1,1,1-Trichloroethane	mg/kg	ND - 0.0009
Semi-Volatile Organic Compounds		
2,4-Dimethylphenol	mg/kg	ND - 0.01
Anthracene	mg/kg	ND - 12
Benzo(a)anthracene	mg/kg	ND - 79
Benzo(a)pyrene	mg/kg	ND - 30
Benzo(b)fluoranthene	mg/kg	ND - 30
Chrysene	mg/kg	ND - 131
Fluoranthene	mg/kg	ND - 14
Methyl chrysene	mg/kg	ND - 274
1-Methylnaphthalene	mg/kg	ND - 96
Naphthalene	mg/kg	ND - 66
Phenanthrene	mg/kg	ND - 67
Pyrene	mg/kg	ND - 95

ND = Not detected

Table 3-2
Estimated Inorganic Concentrations in Remediation Wastes

Analyte	Units	Expected Concentration Range
Aluminum	mg/kg	ND - 2,715
Arsenic	mg/kg	0.2 - 173
Barium	mg/kg	2 - 20
Cadmium	mg/kg	0.2 - 1
Calcium	mg/kg	ND - 13,500
Chromium, Total	mg/kg	4 - 101
Copper	mg/kg	27 - 70
Cobalt	mg/kg	0.07 - 3
Iron	mg/kg	ND - 2,423
Lead	mg/kg	0.6 - 27
Mercury	mg/kg	ND - 0.7
Nickel	mg/kg	0.2 - 6
Selenium	mg/kg	0.01 - 0.2
Silver	mg/kg	ND - 0.2
Zinc	mg/kg	13 - 52

ND = Not detected

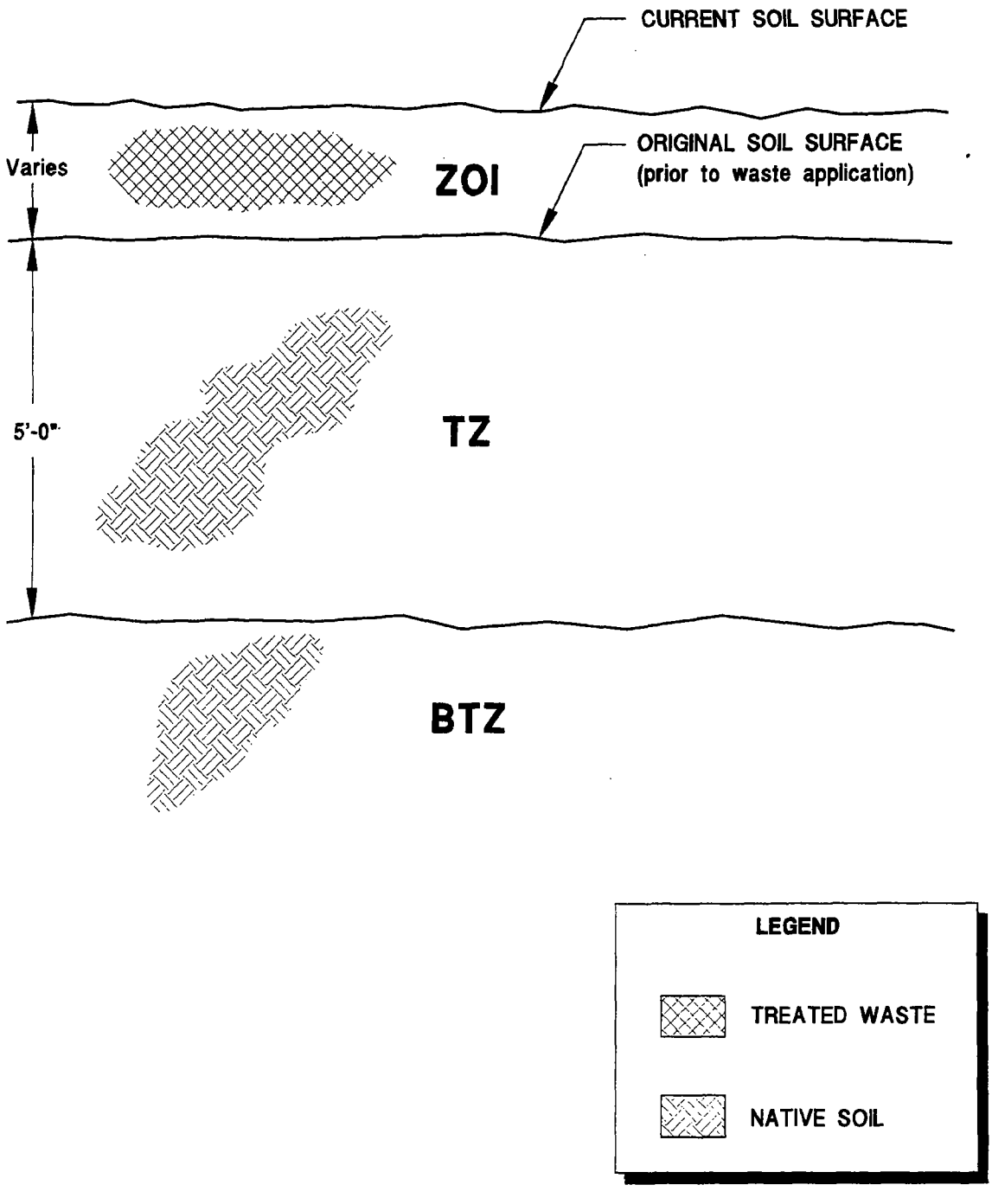


Figure 4-1. Schematic Diagram of a Soil Profile Used for Land Treatment

[ERM, 1989]) and data obtained during the most recent unsaturated zone monitoring event (December 1996).

4.1 Characterization of the LTF

The ERM Phase I closure report contains data on soil sampling activities that were conducted at the LTF in October 1988 (ERM, 1989). ERM collected 44 soil samples as part of a closure plan. Twenty-two soil samples were collected from Area I, 12 from Area II, 4 from Area III, and 6 from Area IV. Samples were analyzed for total and EP toxicity metals (arsenic, chromium, cadmium, and lead) and oil and grease.

The Geraghty & Miller site characterization report contains data on soil sampling activities that were conducted at the LTF in November 1994 and January 1995 (Geraghty & Miller, 1995). Ninety-nine soil-core samples were collected from the ZOI, TZ, BTZ, perimeter areas around the LTAs, and background locations. Figure 4-2 shows the sample locations for LTA I. Figure 4-3 shows the sample locations for LTAs II, III, and IV. Included in this investigation were the 18 soil sampling locations within the LTAs previously identified as having the highest levels of oil and grease and metals (ERM, 1989). Table 4-1 lists the number of samples that were collected from each LTA and the background areas. Samples were analyzed for total concentrations of Skinner List constituents. Samples that contained greater than 20 times the toxicity characteristic (TC) regulatory limit of an inorganic constituent also were analyzed by TCLP for that constituent.

Table 4-1
Numbers of Soil Sampling Locations Included in the Geraghty & Miller LTF Investigation

Area	Number of Sampling Locations	
	Inside LTA	Outside LTA
LTA I	13	20
LTA II	8	19
LTA III	3	7
LTA IV	5	10
Total	29	56
Background	—	14

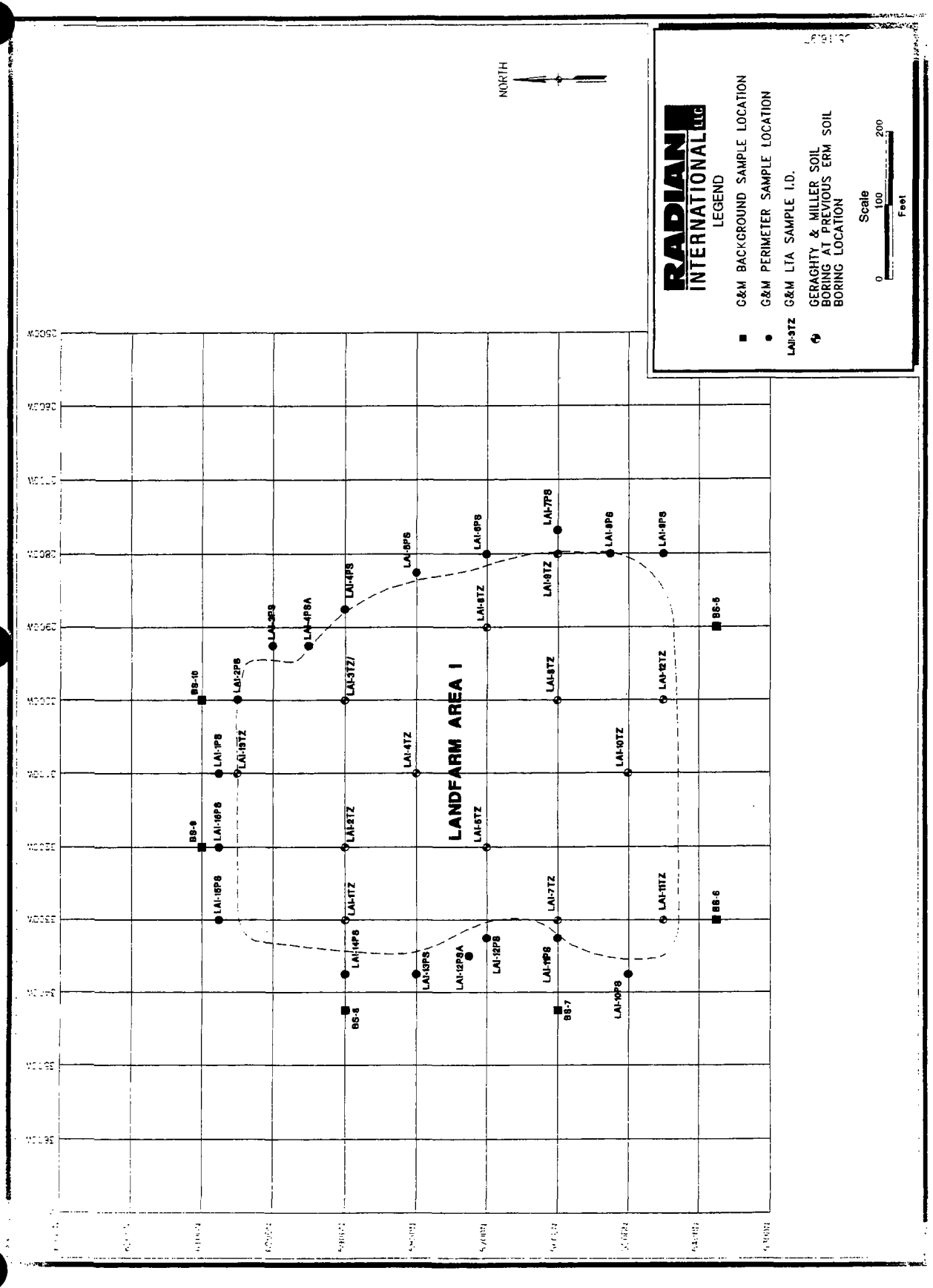


Figure 4-2. Sample Locations in LTA I

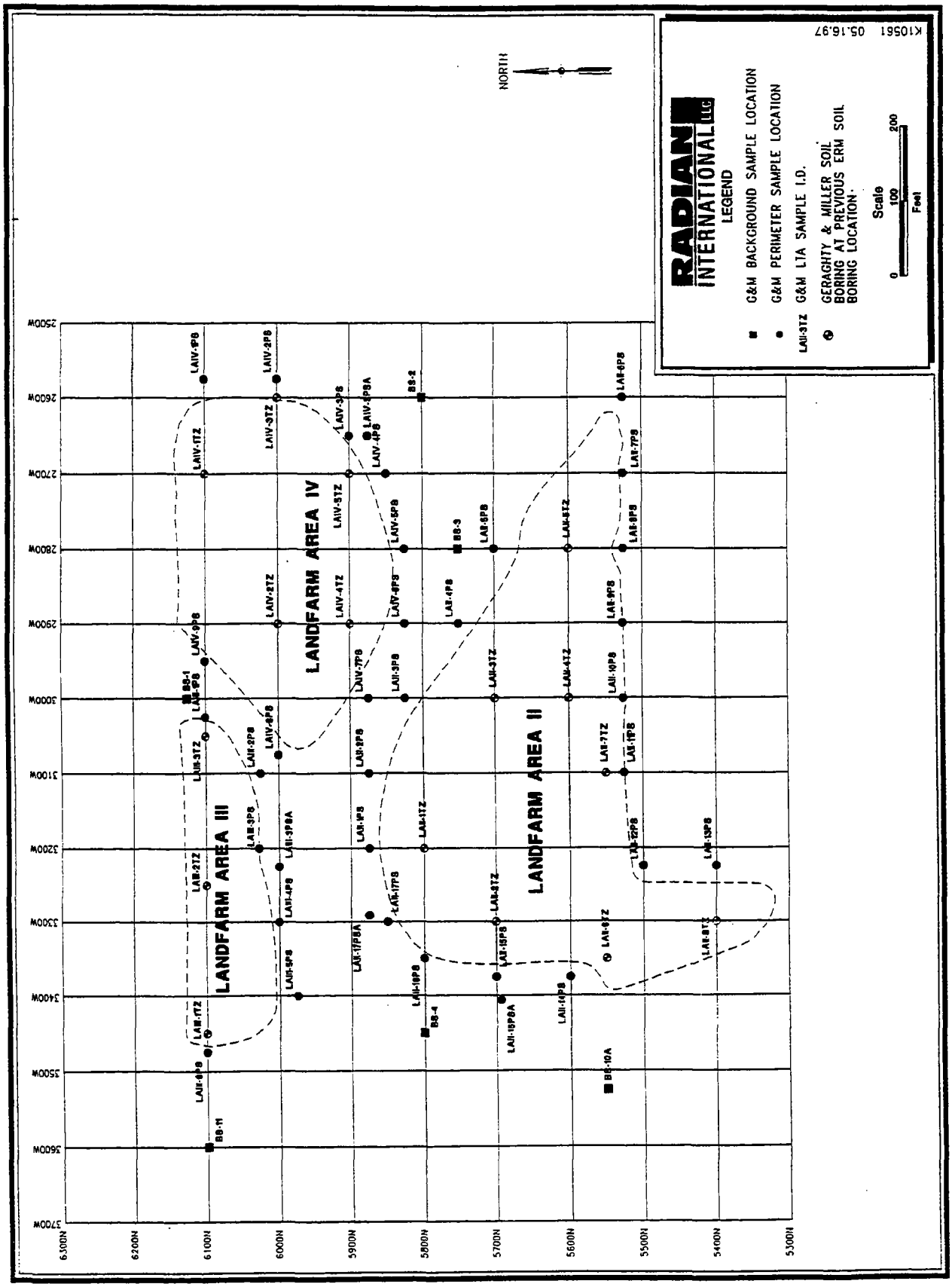


Figure 4-3. Sample Locations in LTAs II, III, and IV

4.2 Treatment of Organics

4.2.1 Organic Loading Rates

Table 4-2 shows the total mass of waste applied at the LTF since 1981. The quantity of waste applied to each individual LTA per acre is shown in Table 4-3. The waste application records combined application rates for LTAs III and IV. The maximum rate of waste application for any unit for a single year is 319 dry tons per.

Table 4-2
Summary of Historical Waste Loading (Dry Tons) on the LTF

Waste Type	1981	1982	1983	1984	1985	1986	1987	1988	1989
Water and Wastewater Sludge	1800	1444	2060	1361	549	0	1004	350	0
Storm Water Pond Dredgings	0	2328	1650	0	2258	0	0	2882	2148
Clear Well Sludge	0	200	0	0	0	0	0	0	0
Tank Cleaning Waste	150	0	0	0	0	0	0	0	0
Cooling Tower Sludge	0	0	25	0	0	0	0	0	0
API Separator Sludge[a]	18	0	0	0	0	0	0	0	0
Heavy Oil Sludge	0	10	0	0	0	0	0	0	0
Total	1968	3982	3735	1361	2807	0	1004	3232	2148

Source: *RCRA Part B permit application, Section I,* Geraghty & Miller (May 1995).
[a] Estimated to be 1% of water/wastewater sludge

Table 4-3
Summary of Historical Waste Loading (Dry Tons/Acre) on LTAs

Land Treatment Areas	1981	1982	1983	1984	1985	1986	1987	1988	1989
Area I	305	264	305	147	279	0	90	277	144
Area II	60	318	60	98	261	0	114	118	160
Area III + IV	317	318	317	36	270	0	0	319	180

Source: *RCRA Part B Permit Application, Section I,* Geraghty & Miller (May 1995).

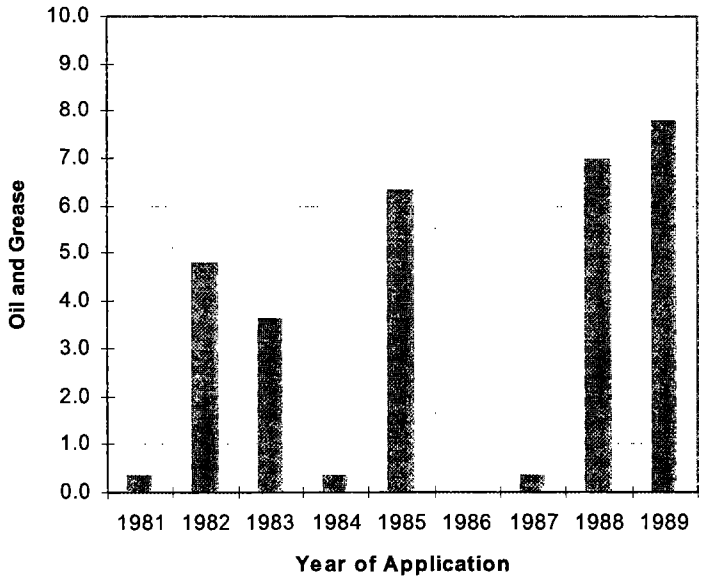
As discussed in the *Waste Characterization* (Appendix III-B), information pertaining to specific organic constituents for each wastestream is not available; however, oil and grease data are available to evaluate organic loading rates. Table 4-4 presents the average oil and grease concentration for each wastestream.

Table 4-4
Average Oil and Grease Concentrations in Historically Applied Wastestreams

Source	Oil and Gas Concentration (mg/kg)
Water/Wastewater Sludge	3,518
SWB Dredgings	78,000
Clear Well Sludge	19
Tank Cleaning Waste	NA
Cooling Tower Sludge	313
API Separator Sludge	20,200[a]
Heavy Oil Sludge	520,000

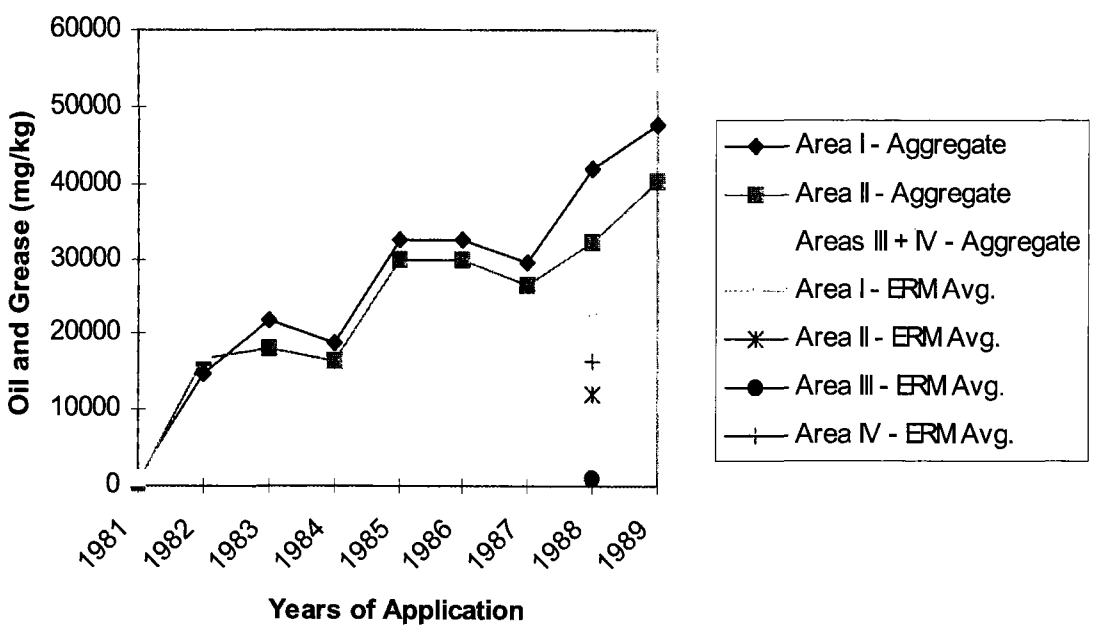
NA = Data not available
[a] Value was calculated based on general industry data

To evaluate the amount of oil and grease applied to the LTF over its operating life, a weighted average for oil and grease concentration was calculated for each year on the basis of loading rates and average source concentrations. Figure 4-4 illustrates the range of annual oil and grease concentrations applied to the LTF in the past.



4.2.2 Degradation and Immobilization of Organics

To evaluate the degradation of organics that has occurred in the past, cumulative oil and grease concentration was calculated for each year assuming a 9-inch ZOI. For the first year (1981), it was assumed that the waste was mixed with clean soil with an estimated density of 1.5 g/cm^3. The estimated thickness of the applied sludge layer was calculated based on the loading rate (dry tons/ acre) and an assumed waste density (0.9 g/cm^3). A cumulative concentration was calculated for each year for the ZOI (top 9 inches) assuming no degradation or losses. These concentrations were compared to actual oil and grease concentrations found in the ZOI during the site investigation conducted by ERM in 1988. Figure 4-5 shows that the actual oil and grease concentrations in 1988 were much less than the concentrations expected if no degradation had occurred. For example, the cumulative oil and grease concentration for LTA I, neglecting treatment, is approximately 5%. However, the average oil and grease concentration for samples collected from the ZOI of LTA I in October 1988 was 2.1%. Given the fact that wastes applied in 1988 had an average oil and grease concentration of 7%, the ZOI samples indicate that significant decay of



organics had taken place in a short period of time.

Data on specific organic constituents in LTF soils are provided in the 1995 Geraghty & Miller report. Tables 4-5 and 4-6 lists the volatile organic compounds and semi-volatile organic compounds detected in the LTA samples, respectively.

Table 4-5

Detected Volatile Organic Compounds (µg/kg) in LTF Samples

Compound	LAI-3TZ (0-1 ft) ZOI	LAI-3TZ (4-6 ft) Treatment Zone	LAI-5TZ (0-0.5 ft) ZOI	LAI-12TZ (2.5-4.5 ft) Treatment Zone	LAII-1TZ (0-1 ft) ZOI	LAIV-5TZ (0-1 ft) ZOI	TACO[a]
Acetone	ND(<150)	27.3	ND(<15)	ND(<15)	ND(<150)	363	1,000,000
Benzene	400	ND(<10)	ND(<10)	ND(<10)	754	1450	30
Toluene	61.1	ND(<5)	51.5	ND(<5)	201	219	12,000
Ethylbenzene	263	ND(<5)	ND(<5)	ND(<5)	88.4	488	13,000
m,p-Xylene	ND(<50)	ND(<5)	ND(<5)	ND(<5)	70.3	113	NL
o-Xylene	278	ND(<5)	ND(<5)	ND(<5)	85.4	350	NL
1,3,5-Trimethylbenzene	55.2	ND(<5)	ND(<5)	ND(<5)	ND(<50)	71.2	NL
sec-Butylbenzene	ND(<50)	ND(<5)	ND(<5)	5.31	ND(<50)	ND(<50)	NL
1,2,4-Trimethylbenzene	305	ND(<5)	178	ND(<5)	398	246	NL
4-Isopropyltoluene	62.5	ND(<5)	ND(<5)	ND(<5)	92	55.2	NL
n-Butylbenzene	88.6	ND(<5)	ND(<5)	ND(<5)	ND(<50)	ND(<50)	NL
n-Propylbenzene	85.8	ND(<5)	ND(<5)	ND(<5)	ND(<50)	ND(<50)	NL

NL =Not listed
ND = Not detected
(#) = Detection limit
[a] TACO Tier 1 Soil Remediation Objectives - Class I for the migration to groundwater route
TACO = Tiered Approach to Corrective Action Objectives

Table 4-6
Detected Semi-Volatile Organic Compounds (µg/kg) in LTF Samples

Compound	LAI-1TZ (0-1 ft) ZOI	LAI-2TZ (0-1 ft) ZOI	LAI-6TZ (0-1 ft) ZOI	LAI-8TZ (0-0.5 ft) ZOI	LAI-9TZ (0-1 ft) ZOI	LAIV-2TZ (5-7 ft) Treatment Zone	LAIV-4TZ (0-1 ft) ZOI	LAIV-5TZ (0-1 ft) ZOI	TACO[a]
2-Methylnaphthalene	3410	ND(<4950)	5280	576	914	ND (<3300)	ND (<3300)	66,300	NL
1-Methylnapthalene	ND(<3300)	ND(<4950)	ND(<3300)	ND (<330)	ND (<3300)	ND (<3300)	ND (<3300)	140,000	NL
Naphthalene	ND(<3300)	ND(<4950)	ND(<3300)	ND (<330)	419	ND (<3300)	ND (<3300)	13,900	84,000
Acenaphthene	ND(<3300)	ND(<4950)	ND(<3300)	ND (<330)	ND (<3300)	ND (<3300)	ND (<3300)	15,800	570,000
Fluorene	ND(<3300)	ND(<4950)	ND(<3300)	ND (<330)	ND(<3300)	ND(<3300)	ND(<3300)	ND(<4950)	560,000
Phenanthrene	ND(<3300)	7020	ND(<3300)	ND (<330)	ND (<3300)	ND (<3300)	ND (<3300)	6890	NL
Anthracene	ND(<3300)	ND(<4950)	ND(<3300)	ND (<330)	ND (<3300)	ND (<3300)	ND (<3300)	110000	12,000,000
Pyrene	ND(<3300)	5040	6510	ND (<330)	ND (<3300)	ND (<3300)	ND (<3300)	24100	4,200,000
Butylbenzyl phthalate	ND(<3300)	ND(<4950)	9910	ND (<330)	ND (<3300)	ND (<3300)	ND (<3300)	ND(<4950)	930,000
Benzo(a)anthracene	ND(<3300)	ND(<4950)	4460	ND (<330)	ND (<3300)	ND (<3300)	ND (<3300)	6890	2,000
Chrysene	ND(<3300)	ND(<4950)	5610	ND (<330)	ND (<3300)	ND (<3300)	ND (<3300)	13700	160,000
bis(2-ethylhexyl)phthalate	ND(<3300)	ND(<4950)	14180	ND (<330)	ND (<3300)	346	787	ND(<4950)	3,600,000
Metylchrysene	ND(<3300)	ND(<4950)	4860	ND (<330)	ND (<3300)	ND (<3300)	ND (<3300)	ND (<3300)	NL
di(n-octyl)phthalate	ND(<3300)	ND(<4950)	6610	ND (<330)	ND (<3300)	ND (<3300)	ND (<3300)	ND (<3300)	10,000,000
Indeno(1,2,3-cd)pyrene	ND(<3300)	ND(<4950)	5180	ND (<330)	ND (<3300)	ND (<3300)	ND (<3300)	ND (<3300)	14,000
Dibenzo(a,h)anthracene	ND(<3300)	ND(<4950)	6120	ND (<330)	ND (<3300)	ND (<3300)	ND (<3300)	ND (<3300)	2,000
Benzo(g,h,i)perylene	ND(<3300)	ND(<4950)	6350	ND (<330)	ND (<3300)	ND (<3300)	ND (<3300)	ND (<3300)	NL

NL = Not listed
ND = Not detected
(#) = Detection limit
[a] TACO Tier 1 Soil Remediation Objectives - Class I for the migration to groundwater route
TACO = Tiered Approach to Corrective Action Objectives

As a conservative comparison, the data for specific organic constituents were compared to the Illinois PA's Tiered Approach to Corrective Action Objectives (TACO) Class I standard for the migration to groundwater route to facilitate evaluation. The results indicate that benzene is the only volatile organic compound and benzo(a)anthracene and dibenzo(a)anthracene are the only semivolatile organic compounds that exceed TACO Class I cleanup objectives in the ZOI. However, none of the samples collected from within the TZ and BTZ exceeded TACO Class I cleanup objectives. This was confirmed during the latest round of unsaturated zone monitoring (December 30, 1996). These monitoring data indicated that all organic sample concentrations were below their respective TACO Class I cleanup objectives in the lower TZ and BTZ (5-7 ft bgs).

The results are consistent with the expected performance of a land treatment system. Some residual organic constituents are present in the ZOI, but have not migrated to lower soil layers.

4.3 Treatment of Inorganics

4.3.1 Accumulation

While inorganic (metal) constituents are not "degraded" biologically, the soils and organisms within an LTF serve to attenuate and immobilize these constituents when the unit is operated properly. Improperly managed, a land treatment unit can pose an environmental risk caused by the migration of metals to groundwater or the accumulation of metals to levels which can become toxic to plants or microorganisms.

The U.S. Environmental Protection Agency's (USEPA) guidance manual *Hazardous Waste Land Treatment* (USEPA, 1983) provides recommendations for maximum metals accumulation levels in land treatment soils based on microbial and plant toxicity limits, animal health considerations, and soil chemistry information. Toxicity depends on both plant type and soil type. USEPA's recommended levels provide a conservative means for evaluating the accumulation of metals within the LTF. Table 4-7 provides a listing of these values for those metals present at the LTF. According to USEPA's *Hazardous Waste Land Treatment* report, higher levels may be acceptable if metal-tolerant plants are used to establish a vegetative cover at closure or a site-specific treatability studies demonstrate that the metals will be immobile (USEPA, 1983).

In the 73 soil samples taken during the Geraghty & Miller and ERM studies, there are six occurrences of chromium (maximum 1530 mg/kg) and three occurrences of selenium (maximum 16 mg/kg) above the recommended thresholds. All of these occur in the ZOI of LTA I. To put metal accumulation levels in perspective, analytical results for each element were averaged within each LTA. Table 4-8 provides a comparison of the average arsenic, chromium, lead, and selenium concentrations for each treatment area to the USEPA-recommended limits. On average, none of the areas exceed the

Table 4-7

Suggested Maximum Metal Accumulations Where Materials Will Be Left In Place At Closure

Element	Recommended Maximum Soil Concentrations (mg/kg)
Arsenic (As)	300
Barium (Ba)	NL
Beryllium (Be)	50
Cadmium (Cd)	3
Chromium (Cr)	1000
Cobalt (Co)	200
Lead (Pb)	1000
Mercury (Hg)	NL
Nickel (Ni)	100
Selenium (Se)	5
Vanadium (V)	500

NL = not listed

Table 4-8
Comparison of Average Metals Concentrations in ZOI Soils to EPA-Recommended Accumulation Levels

	As	Cr	Pb	Se
Area I	38	681	104	3.6
Area II	31	195	43	0.1
Area III	8	132	198	0.02
Area IV	8	663	203	0.4
USEPA Limit	100	1000	1000	5

recommended metal accumulation rates for arsenic, chromium, lead, or selenium. Based on this evaluation of metals accumulation and the presence of a heavy vegetative cover, metals accumulation is not an issue at the LTF.

4.3.2 Mobility

Data from ERM's investigation of the LTF are not included in the following discussion for three reasons: 1) the soil samples were collected prior to the final placement of wastes, 2) soil samples were composited over the entire treatment zone (for the Geraghty & Miller study, separate samples were collected from the ZOI and deeper zones), and 3) the sampling locations having the highest metals levels were resampled in the Geraghty & Miller investigation.

Table 4-9 presents the data for soil samples that exceeded the established background upper tolerance limits (UTLs) in the TZ. UTLs were calculated by Geraghty & Miller (1995) and are presented in the *Site Characterization Report* contained within the RCRA Part B permit application. The data indicate that metals have been largely attenuated within the ZOI and that only arsenic occurs at more than one location above its background UTL in the TZ.

Table 4-9
Samples Exceeding Background UTLs Within the TZ

Sample I.D.	Depth (ft)	Constituent	Concentration (mg/kg)	UTL (mg/kg)
Area I				
LAI-1TZ	2.5-4.5	Arsenic	90	55.5
LAI-2TZ	3-5	Arsenic	100	55.5
LAI-3TZ	4-6	Arsenic	97	55.5
LAI-13TZ	4.5-6.5	Arsenic	150	55.5
LAI-13TZ	4.5-6.5	Beryllium	78	2.53
Area II				
LAII-6TZ	2.5-4.5	Arsenic	67	55.5
LAII-8TZ	2.5-4.5	Arsenic	86	55.5
Area III — none				
Area IV				
LAIV-1TZ	4-6	Selenium	0.7	0.56

UTL = Upper tolerance limit

Samples collected BTZ indicated that none of the analytes, including arsenic, exceeded their applicable background UTLs. This was confirmed during the latest round of unsaturated zone monitoring (December 30, 1996) where all inorganics were below their applicable UTL in the BTZ (5-7 ft bgs).

Table 4-10 lists the soil samples that exceeded the established background UTLs outside of the LTA boundaries. Apparently past operation practices, including a general lack of runoff control, allowed metals (principally chromium) to be carried out of the treatment areas. Soils from these locations will be removed and brought back into the LTAs during the construction of the CAMU.

Table 4-10
Samples Exceeding Background UTLs Outside the LTA Boundaries

Sample I.D.	Depth (ft)	Constituent	Concentration (mg/kg)	UTL (mg/kg)
LAI-4PS	0.5-1	Chromium	1200	368
LAI-12PS	0.5-1	Chromium	1100	368
LAII-4PS	0.5-1	Chromium	700	368
LAII-5PS	0.5-1	Chromium	480	368
LAII-11PS	0.5-1	Chromium	850	368
LAII-15PS	0.5-1	Chromium	470	368
LAII-17PS	0.5-1	Arsenic	73	55.5
LAII-17PS	0.5-1	Beryllium	2.7	2.53
LAIII-3PS	0.5-1	Lead	1300	504
LAIV-3PS	0.5-1	Chromium	620	368
BS-10R	0-1	Chromium	1300	368
LAI-4PSA	0-1	Chromium	920	368
LAI-12PSA	0-1	Chromium	600	368
BS-10	0.5-1	Chromium	940	368

UTL = Upper tolerance limit

5.0 WASTE PLACEMENT CRITERIA

The CAMU will be composed of three operational units: 1) an LTF which will provide biodegradation of organics, immobilization of organic and inorganic constituents, and ultimate disposal of waste residuals; 2) a composting facility for the pretreatment of organics, if necessary; and 3) a decontamination pad. The composting facility has been included to allow for the pretreatment of media containing high levels of organics should significant volumes of these remediation materials be encountered. Figure 5-1 is a process flow diagram for remediation waste management in the CAMU.

The CAMU is designed to accept only certain types of remediation waste to ensure proper performance. Restrictions will be placed on the types of waste accepted and waste loading rates. These restrictions will ensure that only wastes compatible with the land treatment process will be managed. Operating procedures will be followed to reduce the potential for upsetting or overloading the biological population, which could result in reduced organic degradation rates or metal accumulation problems.

Several parameters (O&G, TOC, pH, moisture, etc.) will be monitored throughout the CAMU operation to ensure the success of the treatment processes. Application rates and frequency will be based

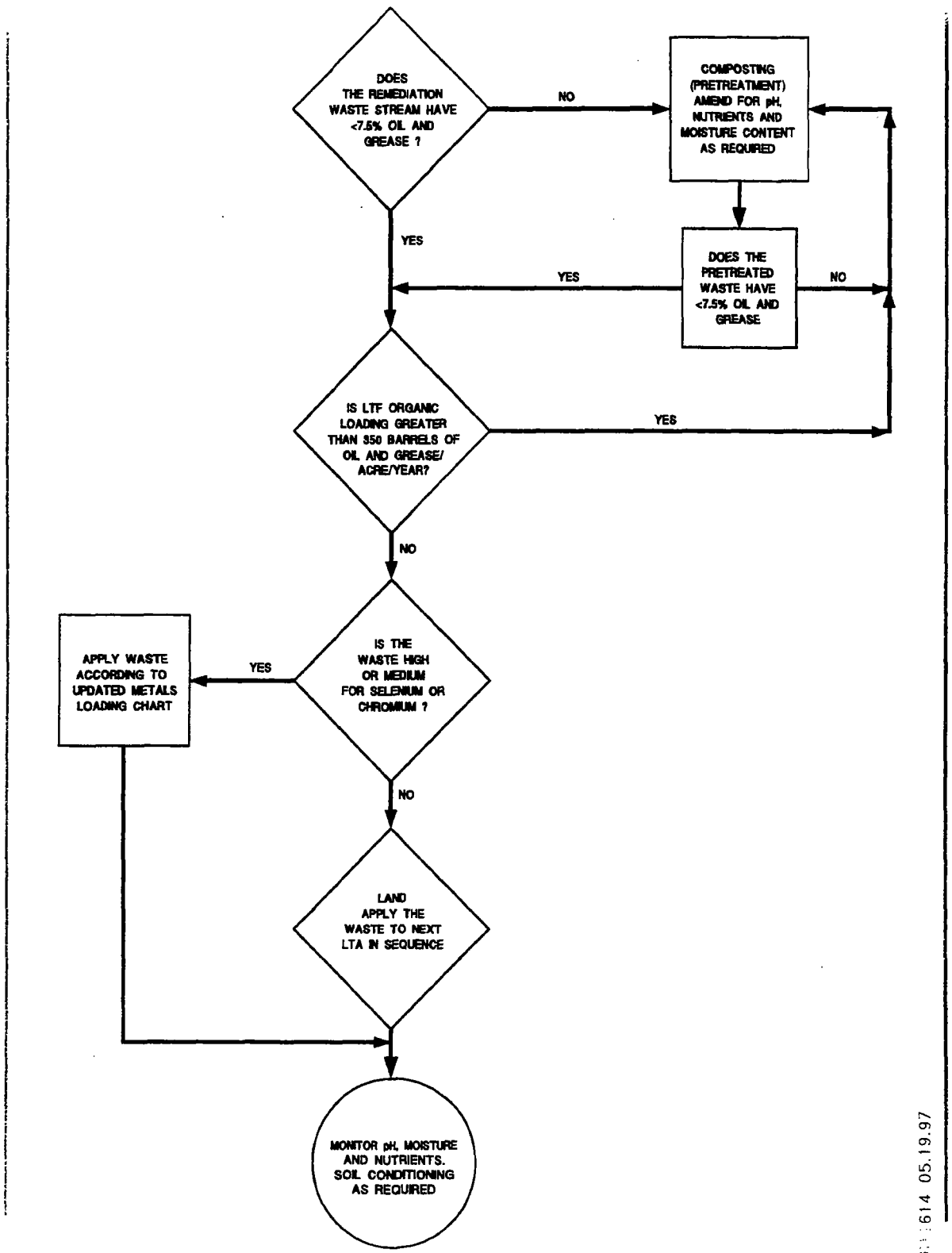


Figure 5-1. Process Flow Diagram for Remediation Waste Management in the CAMU

on the oil and grease content of the remediation waste from each SWMU. This will ensure that adequate time is provided between waste applications for the degradation of organics. The application of arse- nic-, chromium-, lead-, and selenium-containing remediation wastes will be managed based on their respective concentrations to ensure that metals do not accumulate to levels that could exceed recommended levels.

The waste placement criteria discussed in the following paragraphs may be updated as necessary. Once the RFI is started, new information will be gathered to evaluate the criteria discussed below. Based on the results of that evaluation, the waste placement criteria may be amended to provide the most effective operation of the CAMU.

5.1 Classification of Organic Wastes

Historical operational information was used to project future performance and operating conditions, to the extent possible. For a wastestream to be accepted into the CAMU, it must not have an organic content that would overwhelm the LTF's capacity to biodegrade and immobilize the waste constituents. Oil and grease, a measure of the total hydrocarbon content of a waste (as measured by Method SW9071—Oil and Grease, or equivalent), will be used to screen and segregate waste materials. Based on historical oil and grease application at the LTF, and industry experience, an oil and grease concentration up to 7.5% by weight in the incoming wastestream can be land treated effectively. If the oil and grease of the incoming waste exceeds 7.5%, the pretreatment operation (composting) will be utilized. Composting provides enhanced conditions for organic degradation by increasing oxygen availability, temperatures, and microbial activity rates. After the composted material has met the 7.5% oil and grease criteria, it will be transferred to the LTAs for treatment.

5.2 Classification of Inorganic Wastes

Data from LTF investigations indicate that there are discrete locations in the LTAs where certain metals (arsenic, chromium, and selenium) have accumulated above USEPA-recommended levels. However, the average concentration for each metal is well below the loading limit. After 9 years of operation, there is no indication that metals have interfered with successful biodegradation or the soils' ability to support vegetation. Nor are metals expected to present a concern during CAMU operation as the remediation wastes are expected to contain lower levels compared to wastes previously applied to the LTF.

USEPA guidance (1986) suggests that accumulation of metals is typically the factor that controls the ultimate capacity of a land treatment unit. However, conventional land treatment practice primarily involves the application of wet sludges. Water and organics make up a relatively large fraction (typically 70-80% and 5-10%, respectively, by weight) of process sludges. When these components are lost by evaporation, biodegradation, etc., metals accumulate in the residual solids. In contrast, the remediation wastes that will be applied to the CAMU for treatment will consist almost exclusively of contaminated soils. These contaminated soils are expected to contain 70-80% solids and have a low hydrocarbon content

on average (less than 5% by weight). Therefore, metals are not expected to accumulate significantly above their original concentrations, and they should not limit the capacity of the CAMU to accept wastes. However, to conservatively manage wastes and prevent unacceptable accumulations of metals, wastes will be classified by metals content.

To assist in the classification of remediation wastes, the following table was developed. The remediation wastes will be classified as containing either low, medium, or high levels of arsenic, chromium, lead, and selenium. The classifications in Table 5-1 are based on conservative ratios of the USEPA recommended maximum accumulation levels for each metal.

Table 5-1
Classification of Metal Levels in Remediation Wastes

	Arsenic	**Chromium**	**Lead**	**Selenium**
USEPA Limit	300	1,000	1,000	5
High	Conc>180	Conc>600	Conc>600	Conc>3
Medium	90<Conc<180	300<Conc<600	300<Conc<600	3<Conc<1.5
Low	Conc<90	Conc<300	Conc<300	Conc<1.5

EPA = Environmental Protection Agency

5.3 Loading Rate

The quantity and rate of each waste application will be based primarily on the oil and grease content of the wastes being applied. Based on historical waste application at of the LTF and industry experience, the maximum allowable loading rate will be initially limited to 350 barrels of oil and grease/acre/year. A maximum loading rate of 350 barrels of oil and grease/acre/year will ensure microbial viability and adequate rates of organic degradation and will be protective of human health and the environment. For comparison, loading rates of over 500 barrels of oil and grease/acre/year have been successfully treated at similar land treatment facilities. Remediation waste at the CAMU is expected to be similar (typical refinery wastes composed primarily of Skinner List organics) to remediation wastestreams successfully treated at these other refinery LTFs. Historical waste loading records indicate that up to 448 barrels of oil and grease/acre/year have been successfully treated at the Lemont Refinery LTF.

Based on ongoing monitoring of the CAMU, the 350 barrels of oil and grease/acre/year, the loading rate may be revised (increased or decreased) as appropriate. In the event that the maximum loading rate is reached, the wastes may be composted until direct land application is permitted.

5.4 Waste Application Methods and Application Frequency

Remediation waste will be applied in a maximum 9-inch loose lift to the LTAs. This will allow the waste to be incorporated into the underlying soil to prevent run off of waste and waste constituents and to promote biodegradation of the wastes. All available land treatment space will be used before the placement of another lift at any one location to ensure that the maximum residence time is provided for organic degradation. The minimum residence time that shall elapse between the placement of two lifts at any one location is 30 days.

Table 5-2 presents the classification of each LTA based on the current metals levels. Metal concentrations will be determined for each remediation wastestream prior to treatment at the CAMU. Wastes will be applied to appropriate LTAs according to the operating constraints presented in Table 5-2. A metals loading chart will be maintained and updated to account for dilution of "high-" level soil with "low-" level remediation waste or vice versa.

Table 5-2
Existing Metal Levels and Operating Constraints for the LTAs

LTA	Arsenic	Chromium	Lead	Selenium	Operating Constraints
I	Low	High	Low	High	Apply only low Cr and Se media
II	Low	Low	Low	Low	None
III	Low	Low	Low	Low	None
IV	Low	High	Low	Low	Apply only low Cr media

5.5 Summary

Data from historical oil and grease applications to the LTF and industry experience indicates that an oil and grease content of 7.5% by weight in the incoming wastestream can effectively be land treated. If the oil and grease content of the incoming waste exceeds 7.5%, composting will be used to provide enhanced conditions to facilitate organic degradation. Once the composted material has met the 7.5% oil and grease criteria, it will be transferred to the LTAs.

A maximum loading rate of 350 barrels of oil and grease/acre/year has been chosen to ensure microbial viability, optimum organic degradation, and protection of human health and the environment. The loading rate may be revised (increased or decreased) as appropriate based on continued monitoring and operating results of the CAMU.

Based on the estimated concentrations of metals in remediation wastes expected to be treated at the CAMU (refer to Table 3-2), accumulation of metals at levels that would inhibit future land treatment performance or establishment of a vegetative cover is not expected. Waste classification criteria will serve

to further reduce the potential that metals may accumulate above unacceptable levels or migrate below the treatment zone. Waste routing to the LTAs will be established for each waste source based on the waste analysis data. Remediation wastes that have "high" concentrations, using the classification scheme shown in Table 5-1, will only be placed in landfarm areas having "low" concentrations of these metals.

6.0 REFERENCES

1. Environmental Resources Management-North Central, Inc. (ERM), *Phase I Closure Report For Land Treatment Area*, June 1989.

2. Geraghty & Miller, Inc., *Site Characterization Report UNO-VEN Land Treatment Facility Lemont, Illinois*, March 1995.

3. Geraghty & Miller, Inc., *The UNO-VEN Company, Lemont Refinery, Lemont Illinois, RCRA Part B Permit Application*, Volumes I, II, and III, May 1995.

4. U.S. Environmental Protection Agency, *Permit Guidance Manual on Hazardous Waste Land Treatment Demonstrations*, July 1986.

5. U.S. Environmental Protection Agency, *Hazardous Waste Land Treatment*, April 1983.

Appendix III-D Operation, Maintenance, and Monitoring Plan

Appendix III-D
Operation, Maintenance, and Monitoring Plan

Lemont Refinery

December 1997

Prepared for:
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1.0 INTRODUCTION

On October 23, 1997 the Lemont Refinery's Resource Conservation and Recovery Act (RCRA) post-closure permit became effective. This permit modification request seeks to delay the closure of the land treatment facility (LTF) and authorization to operate the LTF as a corrective action management (CAMU). The CAMU will be used in support of future corrective action activities at the refinery. Closure of the CAMU will occur after the final placement of remediation waste. Information concerning the design and operation of the CAMU is provided in Appendix III—A *Facility Upgrade Design and Engineering Basis*. This section pulls from many sections of the approved Part B permit application, and other sections of this permit modification, to provide a single reference for the operating, maintenance, and monitoring procedures to be followed at the CAMU.

1.1 Background

The LTF consists of four individual treatment areas (land treatment areas [LTAs] I through IV) used for land treatment. LTA I was opened in 1973 and LTAs II, III, and IV were opened in 1981. The LTF encompasses an area of approximately 28 acres, of which about 13.5 acres were used for waste treatment. The LTF began operating under RCRA Interim Status Standards in November 1980.

The wastes that have been applied to the LTF include: clear well sludge, cooling tower sludge, tank cleaning waste, heavy oil sludge, stormwater basin (SWB) dredgings, water/wastewater sludge, and American Petroleum Institute (API) separator sludge (K051). API separator sludge made up less than 1% of the total waste treated at the LTF and has not been applied since September 1981. The majority of waste applied to the LTF consisted of SWB dredgings and water/wastewater treatment sludge. Waste application ceased in 1989.

1.2 Design and Construction of Facility

Remediation wastes may be excavated from the solid waste management units (SWMUs) listed in Table 1-1 and treated at the CAMU. In addition, waste from investigation activities, interim measures (if necessary), and new SWMUs or areas of concern (AOCs) discovered during the RFI also may be treated at the CAMU. The CAMU will include three operational portions: a land application facility for biodegradation of organics, immobilization of organic and inorganic constituents, and ultimate disposal of waste residuals; a decontamination station; and a composting area for the pretreatment of organics, if necessary. LTAs I through IV will be used for direct land application of incoming wastes with an oil and grease content of less than 7.5% by weight. A composting area may be constructed in the southeast corner of the CAMU and used for composting incoming wastes with an oil and grease content greater than 7.5% by weight and/or when LTAs are not able to receive wastes because of weather or capacity constraints.

Table 1-1
SWMUs at the Lemont Refinery

SWMU	Name
1	Former Empty Drum Storage Area
2A-E	Former Process Wastewater Line (Big Inch) (sumps only)
3	Former North Plant API Separator and Above-Ground Corrugated Plate Separator
4	Hot Oil Line, Seneca Petroleum Storage Tank
5	Former Dump Area for Lime Sludge, Seneca Tank Location
7	Interceptor Trench, Canal Dock
10	North Plant Heat Exchanger Bundle Cleaning Pad
11A	Mobil Interface Tank 436
11B	301 Tank
12	Tank 201 and Proximate Area
13	Sludge Drying Area
15A-B	Wastewater Treatment Sludge Decant Basins within LTF
15C	Wastewater Treatment Sludge Decant Basin within LTF
16	Sludge Application Area
17	Intermittent Stream/Stormwater Conveyance System
18	Waste Staging Area
19A-C	Former Sludge Drying Areas
19D	Former Sludge Drying Areas
20	Active Drum Staging Area
21	Vertical Oil Storage Tank at SWB
24	Former API Separator
25A-B	Heat Exchanger Bundle Cleaning Pad
25C	Supplementary Heat Exchanger Bundle Cleaning Pad—Cleaning Building
30	Former Primary Light Oil UST at Fuels Loading Rack Area
31A	Former USTs Located at Active Solvent Loading Rack Area
31B-E	Former USTs Located at Former Service Station Area
32	Former Process Blending UST at the Process Blend Center
34	French Drain System
35	Red Dye Spill Area
36	Former USTs Located at South Plant Administration Maintenance Area
37	Former USTs Located near WWTP Outfall to Lemont Sanitary and Ship Canal
38	Process Sewer System
39	Storm Sewer System
40	Open Flow Ditches
43A-I	Product Pipe Lines (spill locations only)

Once the composted material reaches an acceptable oil and grease concentration, it will be transferred directly to the LTF. Detailed information concerning the design of the CAMU is provided in Appendix III-A *Facility Upgrade Design and Engineering Basis.*

2.0 OPERATION AND MAINTENANCE OF THE CAMU

The primary method of treating remediation waste at the CAMU will be land treatment, using procedures similar to those used during interim status. Land treatment uses the capacity of native soil microbes to degrade organic materials as well as the chemical and physical reactions in the soil to transform and immobilize compounds. Since the rate that remediation waste may be generated (in quantity or quality) may exceed the rate at which waste can be applied to the CAMU, static compost piles may be constructed and used to pretreat the wastes (within the CAMU boundaries) prior to land treatment. This section addresses the waste application rates (Section 2.1) and methods (Section 2.2) for the composting and land treatment operations. CAMU performance monitoring methods are described in Section 2.3. CAMU routine maintenance procedures are described in Section 2.4.

2.1 Waste Application

The material applied to the CAMU will be made up of remediation waste generated during corrective action activities. Table 2-1 presents the estimated volume of remediation wastes expected to be removed from each SWMU and applied to the CAMU. Historical waste loading to the LTAs is provided for comparison. As discussed in the *Waste Characterization* (Appendix III-B), the constituent concentrations of the remediation wastes are expected to be significantly lower than the constituent concentrations of the waste previously applied to the LTF. The characterization of remediation wastes was based on data available for each SWMU and industry knowledge and will be refined during the RFI. This updated information will be submitted to IEPA on an ongoing basis.

Based on the oil and grease content, remediation wastes will either be applied directly to the LTF or will be treated in compost piles prior to land treatment. Figure 2-1 is the process flow diagram for remediation waste management at the CAMU. Waste application rates will also vary seasonally and by meatal content. A more specific description of the CAMU operation is provided in the following sections.

2.1.1 Compost Piles

SWMUs and potential remediation waste will be characterized according to sampling and analysis procedures identified in the RFI workplan. Remediation waste destined for the CAMU with an average oil and grease content greater than 7.5% by weight will be placed in compost piles. The use of

Table 2-1
Estimated Volumes of SWMU Remediation Wastes and Wastes Previously Applied to the LTF

SWMU No.	SWMU Description	Estimated Volume (yd^3)
1	Former Empty Drum Storage Area	0
2A-E	Former Process Wastewater Line (Big Inch)	50
3	Former North Plant API Separator and Current Aboveground Corrugated-Plate Separator	0
4	Hot Oil Line, Seneca Petroleum Storage Tank	0
5	Former Dump Area for Lime Sludge; Seneca Tank Location	0
7	Interceptor Trench; Canal Dock	0
10	North Plant Heat Exchanger Bundle Cleaning Pad	20
11A&B	Recycle Tanks: 11A-Mobile Interface Tank; 11B-301 Tank	1,325
12	Tank 201 and Proximate Area	0
13	Sludge Drying Area	850
15A&B	Wastewater Treatment Sludge Decant Basins	0
15C	Wastewater Treatment Sludge Decant Basin	0
16	Sludge Application Area	2,200
17	Intermittent Stream/Stormwater Conveyance	0
18	Waste Staging Areas	1,500
19A-D	Former Sludge Drying Areas	5,200
20	Active Drum Staging Area	0
21	Vertical Oil Storage Tanks at the Stormwater Basin (SWB)	0
24	Former API Separator	0
25A&B	Heat Exchanger Bundle Cleaning Pad	25
25C	Supplementary Heat Exchanger Bundle Cleaning Pad	30
30	Former Primary Light Oil UST at Fuels Loading Rack Area	9,000
31A-E	Former USTs Located at Former Service Station and Active Solvent Loading Rack Area	5,050
32	Former Process Blending UST at the Process Blend Center	0
34	French Drain System	0
35	Red Die Spill Area	115
36	Former Maintenance USTs	0
37	Former UST Located near WWTP Outfall	0
38	Process Sewer System	5,250
39	Storm Sewer System	1,300
40	Open Flow Ditches	0
43A-I	Product Pipelines (spill locations only)	0

PREVIOUSLY APPLIED WASTES	Dry Tons
Clear Well Sludge	200
Cooling Tower Sludge	25
Heavy Oil Sludge	10
Storm Water Pond Dredgings	11,226
Water/Wastewater Sludge	8,568
Tank Cleaning Waste	150
API Separator Sludge	18

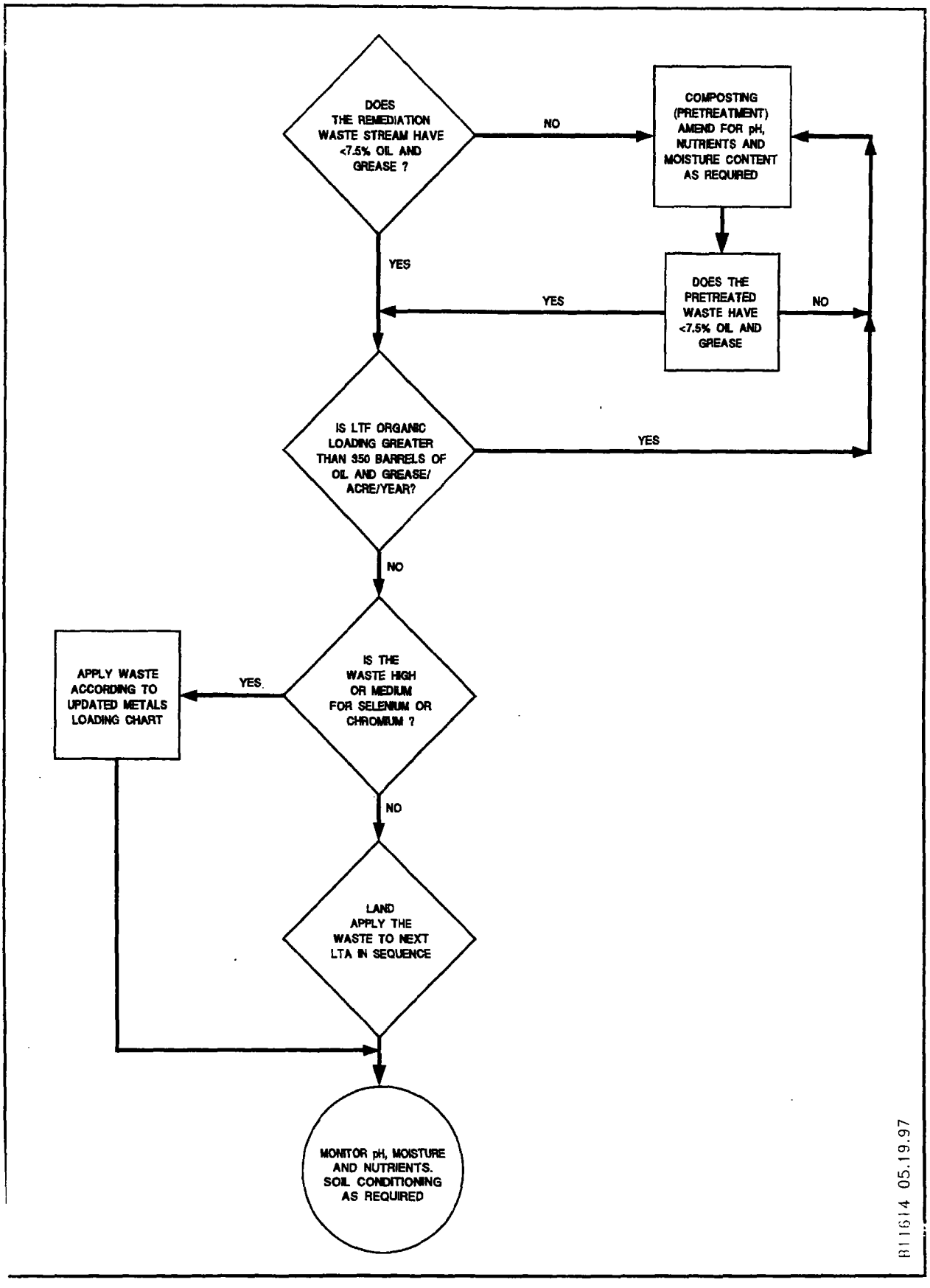


Figure 2-1. Process Flow Diagram for Remediation Waste Management in the CAMU

compost piles will serve to temporarily store remediation wastes so that the maximum oil and grease loading rate for the LTF is not exceeded.

2.1.2 LTAs I through IV

The quantity and rate of waste application at the LTAs will be monitored using the oil and grease content and metal concentrations of the wastes being applied. The maximum recommended loading rate to ensure effective land treatment at the CAMU initially will be 350 barrels of oil and grease/acre/year. Based on continued monitoring of the CAMU, the loading rate may be revised (increased or decreased) as appropriate. Incoming wastestreams with an oil and grease content of less than 7.5% by weight may be applied directly to LTAs without composting. Waste volumes, application dates, application location, and oil and grease concentrations will be recorded with each waste application. This will ensure that SWMU remediation soils and composted wastes are applied uniformly across the LTAs at a rate that does not exceed the maximum oil and grease loading rate.

Based on the estimated concentrations of metals in remediation wastes expected to be treated at the CAMU, accumulation of metals at levels that would inhibit land treatment performance or the establishment of a vegetative cover is not expected. Waste placement criteria discussed in the *Waste Management Plan* (Appendix III-C) will serve to further reduce the potential for metals to accumulate above unacceptable levels or migrate below the treatment zone. Waste routing to the LTAs will be established for each waste source based on the waste analysis data. Remediation wastes that have "high" concentrations, using the classification scheme discussed in the *Waste Management Plan*, will be placed only in LTAs having acceptable concentrations of these metals.

2.2 Waste Application Methods

Waste application methods are discussed separately for composting and land treatment. Section 2.2.1 discusses the application of remediation waste to the compost piles. Section 2.2.2 discusses the procedures for moving some SWMU remediation wastes directly to the LTAs as well as the subsequent transfer of composted materials from the compost piles to the land treatment portion of the CAMU.

2.2.1 Compost Piles

The remediation waste with an oil and grease content of greater than 7.5% by weight will be mixed with wood chips and fertilizer, if necessary, and formed into static compost piles in the southeast corner of the CAMU. Wood chips will be added at a rate of 20% (by volume) of the composted remediation waste. The need for fertilizer will be determined by analyzing the carbon, nitrogen, and phosphorus (C:N:P) ratio of the remediation waste prior to composting. After construction, no further handling of the wastes/compost materials should be required until the piles are disassembled and the composted materials are applied to the LTAs.

The methodology for mixing the compost and construction of the compost piles will include use of equipment such as front-end loaders; the specific equipment to be used will be defined by the preference of the contractor selected to perform the work. A combination of the appropriate equipment will be used both to mix and construct the compost piles. The piles will be constructed in static compost pile formations. Perforated pipes will be placed at regular intervals within the static piles to allow oxygen to infiltrate and water to drain from the piles.

2.2.2 LTAs I through IV

To obtain maximum land treatment effectiveness, given the recommended loading rate, the wastes will be applied uniformly to each treatment area in a maximum 9-inch loose lift with a minimum of 30 days between lift application. Remediation wastes will be applied with an agricultural-type spreader, dump truck, or other suitable equipment. Solid wastes that are applied via dump trucks will be spread out uniformly on the soil surface using suitable equipment.

A tractor-drawn agricultural disk, tiller, or other suitable equipment will be used to incorporate wastes into the soil immediately after application to the CAMU. This will prevent run-off of waste residuals during rainstorms and to promote biodegradation of the wastes. The equipment will till to an average depth of 12 inches, which will include newly applied wastes and the upper portion of previously applied wastes. This process serves to induce accumulated microbes from the treated residuals into the newly applied wastes. A spreader bar will be attached behind the tilling equipment to smooth the surface of the soil and, thus, minimize low-lying spots and prevent pooling of rainfall on the soil surface. Tilling will be conducted perpendicular to the slope of the LTAs to minimize erosion. The surface will be disced at least once per week during waste application periods; tilling may be more frequent during periods of heavy waste application to ensure optimum operation. In addition, the LTAs will be periodically chisel (deep) plowed to prevent the formation of a plow pan.

Tilling will not be performed when the soil is excessively wet or dry. Discing wet soil may negatively impact the soil's physical structure and does not promote aerobic microbial activity. Tilling dry soil may create dust problems and reduce the soil moisture content below acceptable levels.

2.3 Performance Monitoring

The following parameters will be periodically monitored to maximize the performance of the land treatment process: oil and grease, total organic carbon, pH, nutrients, and moisture. In addition, temperature and oxygen content will be monitored to track the performance of the compost piles. Detailed information is provided in the *Unsaturated Zone Monitoring Plan* (Appendix IV-N of this volume).

2.3.1 pH

The soil pH of the Zone of Incorporation (ZOI) will be maintained in the slightly acidic to mildly alkaline range of 6 to 8. Guidance documents indicate this to be the optimum pH range for maximizing microbial degradation of organic waste constituents and transforming and immobilizing inorganic (metal) waste constituents. If the pH of the ZOI drops to below 6 after the application of either SWMU remediation wastes or composted materials, powdered lime will be added to maintain the soil pH between 6 and 8. The amounts and dates of lime application will be recorded.

2.3.2 Nutrients

The elements that have the greatest impact on microbial degradation are nitrogen (N) and phosphorus (P). The levels of these two nutrients are monitored in the soil by their ratio to soil carbon (C). Maintaining proper carbon to nitrogen to phosphorus (C:N:P) concentration ratios will help assure continued vitality of the microorganisms. In this ratio, the carbon concentration represents total organic carbon content of the soil medium.

Based on industry experience, the recommended C:N:P ratio for land treatment will be 100:1:0.1. Nutrient concentrations at this ratio promote microbial degradation, while avoiding potential over fertilization. If the addition of fertilizer is necessary to keep nitrogen and phosphorus at these recommended levels, it will be made through several small applications to prevent over fertilization and to ensure maximum efficiency of microbial activity in the land treatment process. If needed, a fertilizer with an N:P:K ratio of 10:1:5 will be added to waste during the construction of the compost portion of the CAMU to maintain the recommended C:N:P ratio of 100:1:0.1. The amounts and dates of fertilizer applications to the land treatment and compost areas of the CAMU will be recorded in the operating log.

2.3.3 Moisture

Extreme moisture conditions inhibit microbial growth and vigor (Dragun, 1988). Extremely wet conditions deplete available oxygen in the soil matrix, resulting in anaerobic conditions and subsequent repression of target aerobic organisms. Accumulation of excess moisture will be prevented through uniform tilling and the spreader bar (to prevent low spots on the LTA surfaces) as well as by the gentle slope of the treatment areas toward the run-off collection system. This facilitates drainage of excess water so that soils in the treatment areas do not remain saturated after a precipitation event. In contrast, extremely dry soil conditions do not provide soil microorganisms with adequate amounts of water needed to support their metabolic processes, resulting in loss of biological mass and inhibition of organic degradation. In addition, inadequate soil moisture can result in wind dispersion of particulate matter. However, under extended dry conditions, irrigating the land application areas and compost piles will be performed. Short durations of extremely wet or dry weather conditions should not be of concern, because the biological community will quickly rebound after normal conditions are reestablished.

It is expected that the remediation wastes and normal precipitation will supply sufficient moisture for the composting process. However, additional moisture will be added to maintain adequate moisture for biodegradation, if necessary. Perforated piping within the piles will aid in preventing excess moisture from limiting aerobic biodegradation.

2.3.4 Oil and Grease, Temperature, and Oxygen Content

Oil and grease will be monitored in the SWMU remediation and composted wastes during application to the land treatment portion of the CAMU. The maximum oil and grease loading rate will initially be 350 bbl/acre/year to ensure optimum efficiency of the land treatment process. Oil and grease concentrations in the SWMU soils will be monitored using the concentration of oil and grease in applied wastes and the volume of waste. As the compost piles are dismantled, the composted materials will be analyzed for oil and grease.

Temperature and oxygen content will be monitored through periodic sampling of the compost area to evaluate potential limits on performance. Temperature will be monitored to track the degradation process.

2.4 Maintenance

During operation of the CAMU, the following structures will be routinely inspected: decontamination pad, liner under the compost area, berms and roads, and stormwater management and erosion control systems. Repairs will be made to these structures as necessary.

3.0 ENVIRONMENTAL MONITORING

This section discusses recommendations regarding the detection monitoring of unsaturated zone soil-pore liquids and soil cores, and groundwater. The information provided in this section is a summary of information provided in the approved Part B permit application and Section IV of this volume.

3.1 Unsaturated Zone Monitoring

Unsaturated zone (soil-pore liquids and soil cores) monitoring will be conducted at the CAMU according to the *Unsaturated Zone Monitoring Plan* provided in Appendix IV-N of this volume. Monitoring of soil-pore liquids and soil cores will be conducted for the same analyte list. These systems will be monitored to detect the movement of constituents and allow for corrective action if a detection occurs. Each system is discussed briefly below.

3.1.1 Soil-Pore Liquids

A system of lysimeters will be installed in below-treatment-zone soils at the CAMU. The location and installation will be per the *Facility Upgrade Design and Engineering Basis* (Appendix III-A of this volume). The system will consist of two background lysimeters and a total of nine lysimeters strategically placed on the four LTAs. The background lysimeters will be monitored until background levels are established. During the operation of the CAMU, soil-pore liquids will be monitored using the equipment described in Appendix IV-N to determine the presence of more soluble constituents within and below the treatment zone.

Soil-pore-liquid samples will be collected semi-annually with the timing based on when water is most likely to be present in soils. The first soil-pore sampling event of the year will be conducted soon after the first waste application, and the second will be conducted following a rain 6 months later. Appendix IV-N lists the supplies that will be used for decontaminating sampling equipment and for shipping lysimeter samples.

3.1.2 Soil Cores

During operation of the CAMU, the below-treatment-zone soils will be monitored to demonstrate that movement of waste constituents is not occurring. Soil cores will only be collected under the active LTAs of the CAMU, since the compost portion will have a liner that will prevent infiltration of wastes or waste constituents.

Soil-core sampling will be conducted annually at the CAMU. Sampling locations will be determined using the procedures specified in the *Unsaturated Zone Monitoring Plan* contained in Appendix IV-N of this volume and in accordance with the procedures suggested in the *USEPA Permit Guidance Manual on Unsaturated Zone Monitoring for Hazardous Waste Land Treatment Units* (USEPA, 1986).

Eight BTZ soil-core samples will be collected from the active LTAs of the CAMU using the equipment identified in Appendix IV-N. Each of the eight cores collected will be sampled separately for all parameters at a 60-72 inch depth from the original soil surface. Appendix IV-N provides information on the elevations of the original soil surface.

Soil-core samples results will be compared to the monitoring limits contained the *Unsaturated Zone Monitoring Report* (Appendix IV-N of this Volume). Metals results will be compared to statistically determined background upper tolerance limits and organic constituents will be compared against the practical quantitation limits in Appendix IV-N to determine if there is evidence of constituent movement.

3.1.3 Sample Handling

To ensure the security of the samples and the value of resulting data, samples will be handled according to the standard operating procedures provided in the *Unsaturated Zone Monitoring Plan*

(Appendix IV-N of this volume). All sample containers for both soil-pore-liquid and soil-core samples will have labels that identify the unique sample number, sample type, depth, client, location, preservative, sampler, data, and the analytical parameter and method. In addition, chain-of-custody procedures will be followed that will enable the tracking of each sample through each of the sampling, shipping, and analytical procedures. Upon collection of the sample, appropriate sample preservation methods will be followed. Sample containers will be stored on ice prior to same-day shipment to the designated laboratory. Following each and between all samples collected, sampling equipment will be decontaminated.

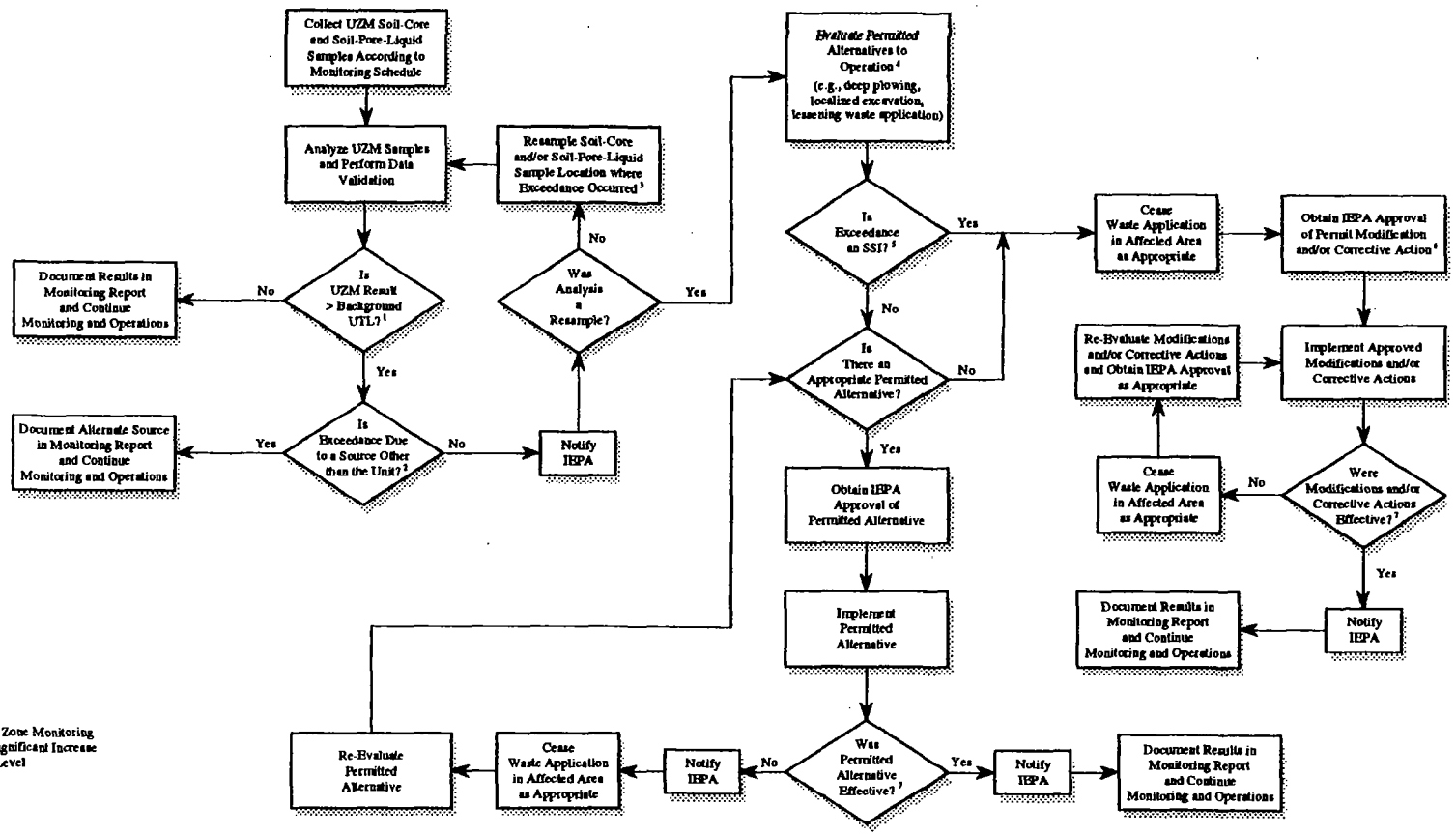
3.1.4 Responses to Detection of Constituent Movement

In the event that one or more constituents exceed their respective monitoring limits, a standard procedure will be followed to determine if a detection is statistically significant. Figure 3-1 presents this procedure in the form of a decision tree, which will be used to make the determination.

As seen in the figure, the first steps involve determining that the detection is not from some other source (e.g., lab or field cross-contamination). If not, resampling of the area/device will be performed to confirm the detection. If the detection is confirmed, the Agency will be formally notified within 7 days. The procedure then calls for alternatives to current operation to be considered and to determine if the detection constitutes a "statically significant increase" (SSI). Possible changes in operating practices to address the potential release include, but may not be limited to, the following:

- Alteration of waste quantities or characteristics;
- Alterations of methods or timing of waste application;
- Revision of unit performance monitoring;
- Alteration of properties of the treatment zone, such as soil pH or organic matter content;
- "Hot Spot" remediation/removal; and
- Alteration of sample collection procedures (e.g., methodology or schedule) or analytical methods.

If other changes than those listed above or on Figure 3-1 are necessary, or if the detection is determined to be an SSI (as defined in Figure 3-1), then a permit addendum will be submitted to address other changes in the operating procedures.



UZM = Unsaturated Zone Monitoring
SSI = Statistically Significant Increase
RBL = Risk-Based Level

Notes:

1. Background Upper Tolerance Limits (UTLs) are derived from detected pristine background data or for analytes that have never been detected in background, a value agreed upon by all parties will be used. These values could include, but not be limited to, estimated quantitation limits (EQL), laboratory-specific reporting limits (RLs), and/or project defined practical quantitation limits (PQLs).

2. Alternate sources could be, but are not limited to, laboratory contamination or the use of inappropriate statistical tests.– Identification of alternative source may result in additional sampling.

3. Corrective Action Management Unit (CAMU) resampling would occur following determination that the exceedance was due to the unit (i.e.; before the next regularly scheduled monitoring event).

4. Corrective action measures and/or modified operating procedures could consist of, but not be limited to deep plowing, localized excavation, increased monitoring, resampling, step-out sampling, lessening or ceasing waste application, enhanced nutrient application, enhanced tilling, pH adjustment, and/or addition of organic material.

5. SSI = 1) A detection that is greater than background/baseline UTLs and TACO Tier 1 levels and results in a corrective action that is not included in the permitted alternatives; or
   2) A statistically significant detection in groundwater that is determined to be from the unit; or
   3) An off-site release that is determined to come from the unit.

6. IEPA approval to be obtained for a formal permit modification request. Modification examples and modification/approval protocol to be contained in the approved permit application/permit.

7. Effectiveness of Alternative or Modifications to be measured by resampling of affected location during the next regularly scheduled monitoring event or as specified by the permit. Alternative or Modifications are deemed to be effective if concentrations of target analytes have not increased.

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Figure 3-1. Unsaturated Zone Monitoring Plan Data Assessment Decision Tree

3.2 Groundwater Monitoring

The *Groundwater Sampling and Analysis Plan* contained in the approved RCRA Part B permit application has been modified by Appendix IV-D of this volume. Groundwater will continue to be monitored at the LTF during the CAMU process on a semi-annual basis using the UA-Series monitoring wells and B-Series piezometers. This section describes the parameters that will be monitored, the rationale for their selection, and the statistical approach to evaluating groundwater quality results.

3.2.1 Groundwater Monitoring System

The monitoring well network consists of one upgradient monitoring well (UA-1) and five downgradient wells (UA-2 through UA-6) located at points of compliance. The monitoring wells will be used for groundwater quality monitoring and collection of groundwater elevation data. The piezometers will be used for collection of groundwater elevation data only.

Semi-annual monitoring is considered protective based on the USEPA guidance document titled *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities* (USEPA, 1989). Therefore, the groundwater quality at each of the UA-Series wells (at both the upgradient and point of compliance locations) will be determined semi-annually throughout the active life of the CAMU. Samples collected during the semi-annual sampling events will be analyzed for total organic carbon (TOC), total organic volatiles (TOX), and dissolved arsenic. In addition, pH, specific conductance, temperature, turbidity, depth to water (below land surface and below measuring point) and elevation of groundwater surface will be measured semi-annually in the field. If any constituents are detected during unsaturated zone monitoring below the treatment zone, then they will be subsequently added to the groundwater monitoring list. The elevation of the measuring point (top of casing) will be surveyed once every 5 years or when an existing well is modified. The elevation of well bottoms will be determined during the second sampling event each year.

3.2.2 Groundwater Sample Collection and Handling

All groundwater sampling and analysis will be carried out in accordance with the techniques and procedures described in the *Groundwater Sampling and Analysis Plan* contained in the approved RCRA Part B permit application and as modified by Appendix IV-D of this volume. Field logs and chain-of-custody forms, labels, blanks, and duplicates will be used as outlined in the *Groundwater Sampling and Analysis Plan.* The equipment necessary for collection of groundwater samples includes: distilled water; clean towels; steel tape; electronic water level meter; coolers with ice; sample bottles (contract lab); chain-of-custody forms; latex gloves; five gallon buckets; a battery-powered, combination temperature/pH/specific conductance/turbidity meter; field forms; nonphosphate detergent; plastic bags or sheeting; and bound field logbooks.

All personnel will wear fresh latex gloves during each sampling to prevent contamination or cross-contamination of wells, equipment, and samples. All sample bottles will remain capped, except when

adding groundwater. All bottles without preservatives will be rinsed with groundwater prior to filling. No sampling equipment will be allowed to touch the ground or other contaminated surfaces during sampling, and all wells will be kept capped and locked. with dedicated pumps stored inside. Non-dedicated sampling equipment will be decontaminated prior to the start of each sampling event and between each sampling location. After completion of sampling, all water removed from the groundwater wells will be poured onto the ground surface near the sampled well.

Specific procedures for sampling the groundwater monitoring system are presented in Table 3-1.

Table 3-1
Procedures for Sampling the Groundwater Monitoring System

1	Unlock well. Well and casing will be inspected for signs of deterioration/damage. Measure depth-to-water using a water level indicator with an electronic probe. Well depth will be measured with steel tape. Calculate the volume of water in the well by subtracting the depth of water from the total depth of the well and then multiplying this value by a coefficient that relates the diameter of the well to gallons per linear foot. All measurements will be entered in the field log. All instruments will be rinsed with distilled water after use.
2	Pump a minimum of three well volumes into a marked bucket from the top of the well or until the well goes dry. Amount of water purged will be recorded in the field log.
3	After purging, well may require several hours to recover sufficient water for sampling. Any well that does not recover enough water in 24 hours to obtain a representative sample will be considered dry for that sample period.
4	During sampling, the first sample aliquot will be used for volatiles (TOX and TOC samples). Sample containers will be filled from the bottom of the bailer with no headspace.
5	Samples to be analyzed for dissolved arsenic will be filtered in the field, prior to filling the sample containers, using a 0.45-micron, disposable filter.
6	A duplicate portion of each groundwater sample will be placed in a clean container to obtain field measurements of the groundwater temperature, turbidity, specific conductance, and pH.
7	When sampling and field measurements for each well are complete, the well will be capped and locked.
8	Clean all reusable sampling equipment between successive monitoring well locations.
9	At the end of each day all samples will be packed among sealed Ziplock® bags of ice in plastic coolers for shipment. Each sample bottle will be labeled and then sealed in a Ziplock bag. Bottles will be wrapped with foam or netting to prevent breakage. The sample chain-of-custody forms and analysis request sheet will be sealed in a Ziplock bag and placed in each cooler. Cooler closures will be taped and sealed with a custody seal signed by sampling personnel. All coolers will be labeled, and shipping documents will be prepared to comply with current applicable Department of Transportation regulations.

3.2.3 Responses to Detection

For dissolved arsenic, TOX, TOC, pH, and specific conductance, downgradient data will be statistically compared to upgradient data using tolerance limits. Tolerance limits have been calculated using all available interim status data. An upper tolerance limit (UTL) was calculated for each interim-status analyte, and a lower tolerance limit (LTL) also was calculated for pH. However, because dissolved arsenic was not monitored for during interim status, its UTL cannot be calculated until four monitoring events have been performed. UTLs are provided in Appendix IV-D of this volume.

For each analyte and downgradient well (UA-2 through UA-6), the most recent result will be compared to the UTL (and LTL for pH). Any downgradient well result that exceeds the UTL (or is less than the LTL for pH) may indicate a statically significant increase at that well. Table 3-2 contains the procedures that will be followed if such exceedences are determined. The specific statistical procedures that will be used to calculate UTL values for each analyte is outlined in Appendix IV-D of this volume.

Table 3-2
Responses to Groundwater Detections

1	Unless it can be determined that a source other than the CAMU caused the detection, or that the detection is an artifact caused by a sampling error. Resample potentially impacted wells and repeat the same data evaluation within 10 days of receiving laboratory data. Samples will be reanalyzed for only those constituents found to have a statistically significant increase in the initial sample.
2	If the second round of analyses indicates that a significant increase has occurred, it will be concluded that a statistically significant increase has occurred, unless it can be determined that a source other than the CAMU caused the detection, or that the detection is an artifact caused by a sampling error.
3	IEPA will be notified within 7 days of the finding.
4	Within 90 days of the original notification, an application for a permit modification to establish a compliance monitoring program meeting the requirements of 35 Illinois Administrative Code 724.199 will be submitted.
5	In addition to, or in lieu of, submitting an application for permit modification, it may be demonstrated that a source other than the CAMU caused the detection, or that the detection is an artifact caused by an error in sampling. However, this will not relieve the requirement of submitting a permit modification application within 90 days unless the demonstration successfully shows that a source other than the LTF CAMU caused the increase.

4.0 WASTE MANAGEMENT AND EMERGENCY PROCEDURES

The following paragraphs discuss the procedures that will be followed to properly manage remediation waste within the CAMU. They also discuss proper procedures to follow in the event of an emergency.

4.1 Spill Control

Precautions will be taken to ensure that remediation wastes in the CAMU are not transferred outside of the CAMU boundaries. An equipment decontamination station will be constructed at the northwest corner of the LTF to decontaminate all equipment that exits the CAMU. This station will consist of a 35 ft x 60 ft curbed concrete slab with a drainage collection and sediment removal system. All equipment will be required to pass through the station prior to leaving the CAMU. For equipment that will be immediately returning to the CAMU and will not be leaving the refinery property (e.g. trucks hauling remediation waste from SWMUs), all exposed surfaces will be inspected to be sure that they are free of remediation waste (including the tailgate, under carriage, bumpers, tires, side walls, etc.). For all other equipment that will not be immediately returning to the CAMU, all parts of the equipment will be inspected, including truck beds and equipment cabs. If remediation waste is found during the inspection, the equipment will be

decontaminated with a high-pressure washer or an otherwise appropriate means. No equipment will be allowed to leave the CAMU in a condition that could spread remediation wastes outside of the CAMU boundaries. If any remediation wastes are spilled outside of the CAMU boundaries, then the waste and any other affected materials will be contained, removed, and placed back inside the CAMU.

During operations at the decontamination station, the sediment level in the sediment removal sump will be checked daily. If the level of sediment in the sump begins to impact the removal efficiency of the unit, then the sediment will be removed and applied to one of the LTAs or compost pile.

4.2 Surface Water Control

The LTF's current surface water management system is designed to control run-on and run-off to the intermittent stream which flows through the 28-acre facility. Because the LTAs are topographically higher than adjacent land areas, run-on to the LTAs is not a concern. An investigation has been conducted in recent years to evaluate sediment loads in the intermittent stream and the quality of stormwater run-off from each of the LTAs (Geraghty & Miller, 1995). The results of this investigation indicate that contamination has not spread from the LTF. However, several drainage improvements will be constructed which will provide additional controls to prevent sediment loss from the LTAs.

Soil erosion models were used to determine the proper type, placement, and configuration of stormwater controls to provide the most efficient design. It was determined that the most efficient plan to control solids transport involves minor grading to reduce slopes in critical areas; the installation of permanent silt fences near drainage ditches; and engineered, grass-lined ditches to control and remove suspended sediments.

Surface water run-off from the compost facility will drain to a retention area in the northern edge of the pad. Accumulated water will be detained, if necessary, and ultimately released for treatment at the refinery wastewater treatment plant. Sediments will be removed periodically from the retention area and taken to the LTF. These improvements to the existing drainage features will enhance the CAMU's ability to control the transport of suspended materials during 25-year, 24-hour design storm events.

4.3 Exposure of Personnel to Wastes

Procedures to prevent hazards during operation of the CAMU are provided in Section F of the approved RCRA Part B permit application, as amended by Appendix IV-E of this volume. In the unlikely case that an emergency occurs, personnel working at the CAMU will follow emergency response procedures outlined in the site-specific contingency plan in Appendix IV-F of this volume.

5.0 REFERENCES

1. Dragun, James, *The Soil Chemistry of Hazardous Materials*, Hazardous Materials Control Resources Institute, Silver Spring, Maryland, 1988.

2. Geraghty & Miller, Inc., *Site Characterization Report UNO-VEN Land Treatment Facility Lemont, Illinois*, March 1995.

3. U.S. Environmental Protection Agency, *Permit Guidance Manual on Unsaturated Zone Monitoring for Hazardous Waste Land Treatment Units,* October 1986.

4. U.S. Environmental Protection Agency *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities*, 1989.

Appendix III-E Treatability Evaluation Plan

Appendix III-E
Treatability Evaluation Plan

Lemont Refinery

December 1997

Prepared for:
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1.0 TEST OBJECTIVES 1

1.0 TEST OBJECTIVES

The Lemont Refinery intends to remove and remediate petroleum-contaminated soils generated during the corrective action process using land treatment technology in an engineered corrective action management unit (CAMU). Land treatment uses the natural ability of indigenous microorganisms to degrade hydrocarbons. The extent of hydrocarbon biodegradation is dependent upon four factors: 1) the presence of hydrocarbon-degrading bacteria, 2) the creation and maintenance of optimum conditions to stimulate biological activity, 3) the types of petroleum hydrocarbons present. and 4) the bioavailability of the contaminants to microorganisms. A laboratory-scale land treatment study will be conducted to demonstrate that the environmental conditions can be managed properly to successfully treat remediation wastes generated from corrective actions at solid waste management units (SWMUs). The treatability study will be considered successful if a statistically significant reduction in hydrocarbon levels and immobilization of the waste residuals is demonstrated.

The laboratory study will address the following issues:

- Are indigenous hydrocarbon-degrading bacteria present in the soils of the existing land treatment areas sufficient in number to allow effective biological treatment?
- What are the hydrocarbon biodegradation rates for soils contaminated with predominantly light-end hydrocarbons versus heavy-end hydrocarbons?
- What is the treatment period required to reduce hydrocarbon concentrations significantly for soils containing predominantly light-end hydrocarbons and heavy-end hydrocarbons?
- Will the mobility (leachability) of arsenic or other metals pose a concern for future operations at the LTF?

A laboratory study has been designed to provide site-specific information needed to predict the performance of land treatment at the CAMU. The treatment media will consist of soils from the existing land treatment areas (LTAs). Petroleum-contaminated soils from SWMUs that represent the typical types of large-volume wastes expected to be generated during corrective actions at the refinery will be selected for testing. The testing program includes these elements:

(1) Collection of representative contaminated soils from SWMUs where hydrocarbon contamination has been identified. Bulk soil samples from the selected SWMUs will be collected, homogenized, and characterized in terms of contaminant levels, nutrient levels, and soil chemical and physical characteristics.

(2) Collection of bulk composite samples from the existing LTAs. Soils from the former Zone of Incorporation (0-1 ft depth) will be used as treatment media for the soil pan study. Bulk soil samples from the selected LTAs will be collected,

homogenized, and characterized in terms of contaminant levels, nutrient levels, and soil chemical and physical characteristics;

(3) A soil pan study to evaluate the effectiveness of biotreatment in degrading petroleum hydrocarbons and immobilizing waste constituents. Pollutant degradation will be monitored over a 120-day period. At the end of the treatment period, soil samples will be subjected to leaching tests to evaluate the mobility of inorganic and organic waste constituents.

Specific treatability study activities include:

- Select representative locations at the Lemont Refinery that contain soils contaminated with light-end hydrocarbons (e.g., fuels) and heavy-end hydrocarbons (e.g., fuel oil or tank bottoms).
- Collect samples from the selected SWMUs and the existing LTAs and perform initial soil characterization tests. Test parameters will include total petroleum hydrocarbons (TPH), hydrocarbon boiling point distributions, nitrogen and phosphorus levels, physical characteristics (moisture content, water retention capacity, particle-size distribution), and chemical properties (modified Skinner's List components, pH, and salinity).
- Establish two parallel soil pan studies to evaluate biotreatment effectiveness. This will include nutrient additions and pH amendments as necessary, tilling the soil, and adjusting moisture levels on a biweekly basis.
- Monitor petroleum hydrocarbons, nutrients, pH, redox potential, soil moisture, and hydrocarbon-degrading bacterial population size for samples from the soil pans on a monthly basis.
- Collect soil samples at the end of the study period and analyze these samples for constituents of concern (modified Skinner List components), TPH, and hydrocarbon boiling point distributions.
- Conduct batch leaching tests (ASTM protocol) on soil samples at the end of the study period. Aqueous extracts will be analyzed for selected metals.
- Interpret and report the results and make recommendations for performing full-scale land treatment operations in the CAMU.

Section IV

Facility Management Plans

Section IV
Facility Management Plans

Lemont Refinery

December 1997

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2-1 Facility Management Plans Summary 1

1.0 INTRODUCTION

This section contains facility management plans for the corrective action management unit (CAMU) that is described in sections I through III of this volume. The facility management plans provide permit-required information regarding the CAMU. The attached plans are addenda or whole replacements to existing management plans contained within volumes I, II, or III of the approved Resource Conservaton and Recovery Act (RCRA) Part B permit application. The plans currently describe facility management of the land treatment facility in closure and post closure. The addenda specifically modify these existing facility management plans to include operation of a CAMU.

If a discrepancy exists between the requirements in these addenda and the requirements in the approved management plans, the requirements in these addenda will take priority. Where a discrepancy does not exist, the applicable portions of the approved management plans also will apply to the CAMU.

2.0 SPECIFIC ADDENDA

The information contained in these addenda is pertinent to the operation of the land treatment facility as a CAMU. Table 2-1 presents a summary of the addenda provided in appendices A through N and identifies the specific plans that have been modified and their location in the approved RCRA Part B permit application:

Table 2-1
Addendums to Facility Management Plans

Appendix	Facility Management Plan	Approved RCRA Part B Permit Application
IV-A	General Facility Information	Section B
IV-B	Waste Characteristics	Section C
IV-C	Process Information	Section D
IV-D	Groundwater Monitoring Plan	Section E
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IEPA = Illinois Environmental Protection Agency

Appendix IV-A General Facility Information

Appendix IV-A
General Facility Information

Lemont Refinery

December 1997

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IV-A Regulatory Requirement Cross Reference—General Facility Information 1

1.0 INTRODUCTION

General facility information is required to provide a perspective for proposed permit modifications, in this case the designation of the land treatment facility (LTF) at the Lemont Refinery as a corrective action management unit (CAMU). General facility information is provided in Section B of the approved Resource Conservation and Recovery Act (RCRA) Part B permit application. It requires only minimal modification to account for the facility's continued operation during the RCRA corrective action program. The addendum that follows addresses only those portions of Section B that require either additional or modified information to account for changes at the LTF. Unmodified portions of Section B remain applicable to the unit. Table IV-A shows the regulatory requirements for additional information regarding continuing releases at permitted facilities and the source document of the information.

Table IV-A
Regulatory Requirement Cross Reference—General Facility Information

Requirement	Citation (35 IAC)	Source Document	
		Approved Permit Application	CAMU Modification
General Facility Information	703.183 (a)	Section B provides general facility information	Appendix IV-A includes facility and procedural changes to support CAMU operation

IAC = Illinois Administrative Code

2.0 ADDENDUM TO GENERAL FACILITY INFORMATION

The general facility description and the legal description of the property will be unchanged by the designation of the LTF as a CAMU. However, several details about the general facility require slight modification as a result of continued operation of the unit, facility upgrades, or changed procedures.

Surface Elevation

Minimal changes to the surface elevation will result from facility upgrades used to support operation of the CAMU. The *Facility Upgrade Design and Engineering Basis* provided in Appendix III-A of this volume provides a detailed description and several drawings illustrating changes to the LTF surface elevation. Additionally, Appendix III-A describes improvements that will facilitate material staging and composting efforts for wastes that require pretreatment prior to land application. The *Waste Characterization Report* in Appendix III-B provides revised

information regarding the solid waste management units (SWMUs) that are known to exist across the facility.

Traffic Documentation

Although access to the LTF will be enhanced to allow for the movement of remediation wastes from SWMUs to the CAMU, the new gravel road located at the north end of the LTF is designed to facilitate transportation to and from the CAMU. It will be used to improve access to land treatment areas III and IV. Facility drawings showing the improved road access are available in the *Facility Upgrade Design and Engineering Basis* provided in Appendix III-A to this volume.

Operating Record

Because the CAMU is designed to support the refinery's upcoming RCRA Facility Investigation and any remediation activities to follow, closure of the unit will be delayed. During operation, a written operating record meeting the requirements of 35 (IAC) 724.173 will be maintained at the facility. The operating record will be designed primarily to document the wastes that are received, treated, and disposed of at the CAMU and will include the 16 items detailed in 35 IAC 724.173 (b). These include, but are not limited to, records of waste analysis and characterization as applicable, inspection records, detailed accounts of any incidents that require implementation of the contingency plan, and inspection and monitoring records.

Appendix IV-B Waste Characteristics

Appendix IV-B
Waste Characteristics

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December 1997

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IV-B Regulatory Requirement Cross Reference—General Waste Analysis 1

1.0 INTRODUCTION

The waste characteristics section of the approved Resource Conservation and Recovery Act (RCRA) Part B permit application (Section C) does not include a waste analysis plan because wastes were not to be accepted at the land treatment facility (LTF). However, this modification will permit the LTF as a corrective action management unit (CAMU) which will continue to treat and dispose of remediation wastes during the Refinery's RCRA facility investigation (RFI). This addendum provides the basis of the waste analysis program, which will be used during operation of the CAMU. The details of the sampling and analysis plan for each Solid Waste Management Unit (SWMU) will be contained in the RFI work plans. Also, the *Waste Characterization* (Appendix III-B) provides all available information regarding the SWMU's which is incorporated herein by reference. Table IV-B shows the regulatory requirements for general waste analysis and the source document containing each portion of the required information.

Table IV-B
Regulatory Requirement Cross Reference—General Waste Analysis

Requirement	Citation (35 IAC)	Document Source	
		Approved Permit Application	CAMU Modification*
Analysis	724.113 (a)	Not necessary for a closing unit	Appendix IV-B
Written Plan	724.113 (b)	Not necessary for a closing unit	Appendix IV-B
Off-site Facilities	724.113 (c)	Not applicable	Not applicable as the CAMU will only receive remediation wastes from on site.

* The RFI work plan(s) will provide a detailed sampling plan for each SWMU in the RFI.

2.0 ADDENDUM TO WASTE CHARACTERISTICS

The Lemont Refinery is seeking to permit the LTF as a CAMU that will continue to treat and dispose of remediation wastes during corrective action over the next several years. The general waste analysis program for the CAMU will be designed to meet the requirements of 35 IAC 724.113. The requirements of 35 IAC 728 (land disposal restrictions) do not apply to CAMUs; therefore, waste analysis is focused on characterizing the wastes for the purpose of ensuring proper land treatment in the CAMU.

Waste Analysis

Because the remediation wastes generated during the corrective action program are expected to be typical of wastes generated at refineries, the main focus of waste analysis will be to confirm that the remediation wastes are representative of this broad category and appropriate for treatment in the CAMU. The *Waste Characterization Plan* (Appendix III-B) provides the probable concentration of ranges for hazardous constituents in the future remediation waste. Waste analysis will focus on the Modified Skinner List constituents (Attachment I of the final permit).

Waste characterization results will be compared to characteristics of the projected remediation wastes of Appendix III-B. Oil and grease levels will be reviewed to determine if waste batches can be applied directly to the unit or if they will be composted prior to land application. Oil and grease levels exceeding 7.5% will be staged for treatment according to the specifications of the *Waste Management Plan* provided as Appendix III-C of this volume. Similarly, metals concentrations will be reviewed to determine waste placement within the unit. The *Waste Management Plan* specifies waste management practices which ensure an even distribution of constituents. These procedures will be supplemented by facility monitoring to ensure that land treatment is effectively degrading organic materials and immobilizing inorganics.

Procedures for Characterization

Details regarding sampling and analysis procedures will be presented in the RFI work plan(s). In the RFI work plan(s), a sampling and analysis plan will be developed for each SWMU that details the sampling techniques, schedules, and specific analyses that will be conducted during the RFI. Because the CAMU will receive only remediation wastes associated with this effort, this sampling and analysis plan will serve as the waste analysis plan for the CAMU, meeting the requirements of 35 IAC 724.113 (b). This plan will be maintained at the facility and will include:

- Parameters that will be analyzed and rationale for their selection;
- Test methods to be used;
- Sampling methods that will be used;
- Frequency of analysis; and
- Additional methods, where applicable.

Program Modification

The CAMU is designed to accept a wide variety of refinery wastes including soils, sediments, sludges, and other media containing oil and grease, and organic and inorganic compounds (hydrocarbon-containing materials from across the refinery). The *Waste Characterization* and *Waste Management Plan* provide information on the expected range of wastes and waste constituents based on historical LTF and investigative data. If a substance outside this range of wastes is encountered, then a technical memorandum

will be prepared that evaluates and characterizes the waste such that an appropriate determination can be made with respect to its disposition. If it is determined that the waste can be accepted at the CAMU, then this technical memorandum will serve as the basis for updating the characterization of wastes associated with SWMUs at the refinery. These technical memos will be submitted as information modifications to the Part B permit application to regularly update the waste characterization.

Appendix IV-C Process Information

Appendix IV-C
Process Information

Lemont Refinery

December 1997

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IV-C Regulatory Requirement Cross-Reference—Process Information 1

1.0 INTRODUCTION

The Resource Conservation and Recovery Act (RCRA) permitting program requires that specific process information be presented for each type of operation conducted at a facility seeking a permit. Section D of the approved RCRA Part B permit application provides process information for portions of the Lemont Refinery that are impacted by RCRA. Because it is intended to continue operating its land treatment facility (LTF) as part of corrective action program, thereby delaying its closure, additional process information needs to be submitted. A summary of this information is provided in the addendum below. Only those portions of Section D from the approved RCRA Part B permit application that require either additional or modified information are addressed in the addendum; unmodified information in Section D remains applicable to this unit. Table IV-C shows the regulatory requirements for process information at a permitted LTF and the source for each portion of the required information.

Table IV-C
Regulatory Requirement Cross Reference— Process Information

Requirement	Citation (35 IAC)	Source Document	
		Approved Permit Application	CAMU Modification
Contents of Part B	703.182	Section D provides initial process information	Appendix IV-C gives additional operating information for land treatment
Containers	703.201	Not applicable to a closing unit	Appendix IV-C includes the use of containers during emergencies
Tanks	703.202	Not applicable to this unit	No modification necessary
Surface Impoundments	703.203	Provides historical information for the decent basin (SO4)	Appendix IV-C includes additional information
Waste Piles	703.204	Not applicable to this unit	No modification necessary
Incinerators	703.205	Not applicable to this unit	No modification necessary
Land Treatment	703.206	Section D provides initial process information	Appendix IV-C includes operating information for land treatment
Landfills	703.207	Not applicable to this unit	No modification necessary

CAMU = Corrective Action ManagementUnit
IAC = Illinois Administrative Code

2.0 ADDENDUM TO PROCESS INFORMATION

The RCRA permitting program requires that specific process information be presented for each type of operation conducted at a permitted facility (35 [IAC] 724.182 and 35 IAC

703.200 et seq.). Because this permit modification seeks designation of the Lemont Refinery's LTF as a corrective action management unit (CAMU), process information must be supplemented to account for the active use of the LTF.

Containers

Although the remediation program at the CAMU does not include container storage prior to treatment, it is conceivable that during an emergency or unexpected event, contaminants not compatible with the LTF could be encountered. If this unlikely event were to occur, then the material would be placed in containers prior to undergoing a thorough hazardous waste determination and eventual disposal. In this instance, hazardous wastes would not be held on site at the CAMU for more than 90 days; therefore, permit provisions to allow for such storage are not necessary.

Surface Impoundments

On November 21, 1997 a modification to the final RCRA Part B permit was submitted to provide an equivalency closure demonstration for surface impoundment S04 (decant basin) under 35 IAC 703.159. In 1986, this previous hazardous waste management unit was approved for closure under interim status. The equivalency demonstration provides documentation that the closure also meets the 35 IAC 724 standard.

Land Treatment

The refinery is seeking designation of the LTF as a CAMU to support the corrective action program. Specific information regarding the structural changes that will support continued operation is given in the *Facility Upgrade Design and Engineering Basis* provided in Appendix III-A to this volume. Information regarding the procedures for operation is detailed in the *Operation, Maintenance, and Monitoring Plan* provided in Appendix III-D of this volume.

Treatment Demonstration

A laboratory study will be conducted to demonstrate the effectiveness of land treatment at the Lemont Refinery. This study will demonstrate that organic materials are degraded and that inorganics are immobilized via the treatment processes proposed for the CAMU. If necessary, procedures for operation of the CAMU will be modified based on the results of this laboratory study.

Land Treatment Program

The CAMU will be used to treat remediation wastes from the RCRA corrective action process at the Lemont Refinery. These wastes are expected to be typical of a refinery and may include soils, sludges, and sediments that contain oil and grease, organic compounds, and inorganic constituents. Procedures for proper management and maintenance, as well as

information regarding the type and rate of waste application are discussed in the *Waste Management Plan* provided in Appendix III-C of this volume.

Unsaturated Zone Monitoring Program

Unsaturated zone monitoring (UZM) will be used to demonstrate that organics are being degraded and inorganics are being immobilized during treatment. The UZM program is discussed in Appendix IV-N of this volume and has been modified to include both soil-core and soil-pore-liquid sampling beneath the land treatment areas.

Treatment Zone Description

Treatment within the CAMU occurs in the treatment zone and is enhanced through effective CAMU operation and waste application rates. A treatment study (Refer to Appendix III-E) will be used to confirm the effectiveness of the treatment process. If modified operating procedures are needed based on this study, procedures will be updated prior to full-scale operation. The treatment zone and its effectiveness are discussed in the *Waste Management Plan* and the *Operation, Maintenance, and Monitoring Plan* (appendices III-C and III-D, respectively, to this volume).

Unit Design, Construction, Operation, and Maintenance

Although the LTF has successfully treated wastes similar to those expected to be generated during the corrective action process, certain modifications will be performed to facilitate its continued operation as a CAMU. If determined necessary, a composting area will be added for waste treatment prior to land application. The stormwater control system will be enhanced to reduce erosion, direct suspended solids in stormwater back to the treatment unit, and direct stormwater to the facility National Pollutant Discharge Elimination System permitted wastewater treatment plant via the intermittent stream. Details of the facility modifications necessary for continued operation of the LTF are given in the *Facility Upgrade Design and Engineering Basis* in Appendix III-A of this volume. Additional information regarding the proposed managment and operating procedures for the entire CAMU are presented in the *Operation, Maintenance, and Monitoring Plan* (Appendix III-D of this volume).

Appendix IV-D Groundwater Monitoring

Appendix IV-D
Groundwater Monitoring

Lemont Refinery

December 1997

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1.0 INTRODUCTION

This addendum modifies the *Groundwater Monitoring Plan* contained in the approved Resource Conservation and Recovery Act (RCRA) Part B permit application to meet the Illinois Environmental Protection Agency (IEPA) groundwater monitoring requirements for owners and operators of hazardous waste treatment, storage, and disposal facilities. The addendum identifies changes to Appendix E-2 in Section E of the approved RCRA Part B permit application. The purpose of this addendum is to provide a supplement to the detailed groundwater monitoring program that fulfills the requirements of the RCRA Hazardous Waste Management Post-Closure Permit (IEPA 197803004). Table IV-D1 shows the regulatory requirements for groundwater monitoring and the source for the required information.

Table IV-D1
Regulatory Requirement Cross Reference—Groundwater Monitoring Plan

Requirement	Citation (35 IAC)	Source Document	
		Approved Permit Application	Addendum
Subpart F: Release from Solid Waste Management Units	724.190 through 724.201	Section E, Appendix E-2 provide the basis of the groundwater monitoring program	This Addendum includes modified well locations, analytical parameters, monitoring frequency and schedule, monitoring procedures, analytical methods, sample container and preservative specifications, and sample designation. In addition, a calculation of monitoring limits based on all background values measured at Monitoring Well UA-1 over the entire interim status period is included.

IAC = Illinois Administrative Code

2.0 ADDENDUM TO GROUNDWATER MONITORING

The portions of the *Groundwater Monitoring Plan* presented in Section E and Appendix E-2 of the RCRA Part B permit application will continue to be implemented with minor changes. Specific changes to the monitoring plan are provided in the paragraphs below.

Description and Physical Setting of the CAMU

The corrective action management unit (CAMU) will be located at the existing land treatment facility (LTF) in the southeast portion of the refinery. The CAMU will consist of 28 acres, including 13.5 acres currently designated as land treatment areas (LTAs) I through IV, and approximately 10 acres that contain the present and former decant basins. The CAMU, once modified according to Appendix III-B of this volume, will have an active treatment area of 12.33 acres.

Monitoring Well Locations

The uppermost aquifer at the refinery is composed of two stratigraphic units that are hydraulically connected—the basal Lemont Glacial Drift and the underlying Racine Dolomite. To ensure that the uppermost aquifer is not being adversely impacted by the LTF, six monitoring wells (UA-1 through UA-6) have been installed in the lower portion of the Lemont Glacial Drift. The network includes one up-gradient well (UA-1) and five down-gradient wells (UA-2 through UA-6) located at the points of compliance (35 IAC 724.195). The monitoring wells will be used for groundwater quality monitoring and collection of groundwater elevation data. In addition to the UA-series monitoring wells, 18 piezometers have been completed in the Racine Dolomite. The piezometers will be used for collection of groundwater elevation data only.

Section E-2a of the approved permit application included an additional six monitoring wells completed in the perched water-bearing zones above the uppermost aquifer. These shallow monitoring wells (SW-1, SW-4, SW-5, SW-7, SW-8, and SW-9) have been removed from the RCRA permit and will not be included in the monitoring as stated in the *Groundwater Sampling and Analysis Plan* in the Part B application. These wells will be plugged and abandoned according to the procedures described in the *Facility Upgrade Design* and *Engineering Basis* located in Appendix III-B of this volume.

Analytical Parameters

As stated previously, the shallow monitoring wells (SW-series) will not be monitored under this modification. The *Groundwater Sampling and Analysis Plan,* in Appendix E-2 of the approved permit application, states that samples collected from the deep monitoring wells (UA-series) will be analyzed for the following parameters: pH (field), specific conductance (field), total organic carbon, and total organic halogen. Under this modification, the six deep monitoring wells (UA-series) will be sampled semi-annually (in the second and fourth quarters), and each well will be monitored for the expanded list of field and indicator parameters listed in Table IV-D2

Monitoring Frequency and Schedule

In accordance with the *Groundwater Sampling and Analysis Plan*, the six monitoring wells (UA-series) will be sampled semi-annually (in the second and fourth quarter) for water level and water quality and indicator parameters. The 18 piezometers (B-1 through B-18) will be used for semi-annual water level measurements only.

Table IV-D2
Analytes for UA-Series Wells

Indicator Parameters
Dissolved Arsenic (As)
Total Organic Carbon (TOC)
Total Organic Halogen (TOX)
Field Parameters
pH
Specific Conductance
Temperature of Water Sample
Turbidity
Depth to Water (bls)
Depth to Water (below measuring point)
Elevation of Groundwater Surface
Elevation of Bottom of Well [a]

[a] Shall be determined during the second sampling event each year.

Monitoring Procedures

The *Groundwater Sampling and Analysis Plan* states that dedicated bailers are stored in the monitoring wells and will be used to purge standing water from the wells and collect groundwater samples. Under this modification, dedicated bladder pumps will be used to purge standing water from the wells and collect groundwater samples. Disposable Teflon ® bailers will be used for purging and sampling if the dedicated pumps are not functioning. A minimum of three well volumes will be purged from the well prior to sample collection so that a representative groundwater sample will be collected. The dedicated Well Wizard® pump will be connected to a pump controller powered by a portable generator. The purge rate will be adjusted to provide the maximum uninterrupted flow rate. For sample collection, the purge rate will be reduced to a slow stream to minimize the disturbance of the samples. Samples will be collected by pouring groundwater directly from the dedicated pumps into the appropriate sample containers.

Analytical Methods and Sample Container and Preservative Specifications

As stated previously, the number of indicator parameters to be monitored has been expanded (refer to Table IV-D2). Table IV-D3 presents the required analytical methods, sample containers, holding times, and preservatives for the expanded list of indicator parameters and is designed to replace Table 4-1 in the *Groundwater Sampling and Analysis Plan.*

Table IV-D3
Analytical Method and Sample Container and Preservative Specifications

Parameter Analyzed	Analytical Method	Holding Times	Container	Preservative
Indicator Parameters				
Arsenic	7061a	6 months	One 1000 -mL plastic bottle with Teflon-lined cap per sampling point [a]	HNO_3, pH<2
TOX	SW9020	7 days	500 -mL glass with Teflon®-lined cap. Zero head space.	H_2SO_4, pH<2
TOC	EPA 415.1	28 days	1000- mL glass with Teflon-lined cap. Zero head space.	
Field Parameters				
pH	EPA 9040	NA	NA	NA
Temperature	Field probe	NA	NA	Measurement to be taken just after sample collection
Specific Conductance	Field probe	NA	NA	Measurement to be taken just after sample collection
Turbidity	Field probe	NA	NA	Measurement to be taken just after sample collection

NA = not applicable
[a] To be collected in quadruplicate for the first four events.
EPA = Environmental Protection Agency
TOC = Total Organic Carbon
TOX = Total Organic Halogen

Sample Designation

Each sample, including field quality assurance/quality control samples, will be designated by a unique three-part identifier. The following sample identification scheme will replace the one described in Section 5.1.3 of the *Groundwater Sampling and Analysis Plan*. The first part of the identifier will identify the location (i.e. monitoring well). The second part will identify the quarter and year the sample was collected. The last part of the identifier will identify the sample type. The following is an example sample identification:

UA1-497-N

- UA1 identifies the location (i.e., monitoring well);
- 497 identifies that the sample was collected in the fourth quarter of 1997; and
- N identifies the sample as a normal sample (E=equipment blank, D=duplicate blank, T=trip blank).

Data Analysis

Monitoring limits based on background values measured at UA-1 over the entire interim status period are displayed in Table IV-D4. Interim status monitoring was performed using four replicate samples for each parameter. The monitoring limits calculated below were determined using the average of the replicates. These monitoring limits are 95%/95% upper tolerance limits (UTLs) for the groundwater results. The interpretation of these limits is as follows:

The monitoring limit for a given parameter represents the bound below which one can be 95% confident that 95% of all background values fall for the given parameter.

Table IV-D4
Monitoring Limits Based on UA-Series Background Well Data

Parameter	Mean	Variance	Upper Monitoring Limit	Lower Monitoring Limit
pH	7.53	0.16	8.63	6.13
Specific Conductivity	926.17	21977.82	1331.35	
TOC	1.87	0.62	4.02	
TOX	-5.32*	0.87*	0.06	

* The displayed mean and variance for TOX represent the mean and variance for the log TOX results
TOC = Total organic carbon
TOX = Total organic halogen

Prior to producing the calculations, analyses of the data were performed to determine whether the background data display trends across time and to evaluate the statistical assumptions underlying the calculations. The general conclusions from these statistical analyses are summarized below.

- The within-sampling-event variability is significantly smaller than the between-sampling-event variability (at a statistical significance level of greater than 99.9% for pH, specific conductivity, total organic carbon [TOC] and total organic halogen [TOX]).

- Because the within-well variability is small relative to the between-well variability, the monitoring limits developed for monitoring averages of size 4 are reasonable for cases where fewer than four (i.e., one) monitoring samples are collected.

- No consistent significant increases in time are apparent for pH, specific conductivity, or TOX. For TOC, a significant increase over time is observed. However, the *rate* of increase is small for TOC. The plots below show the

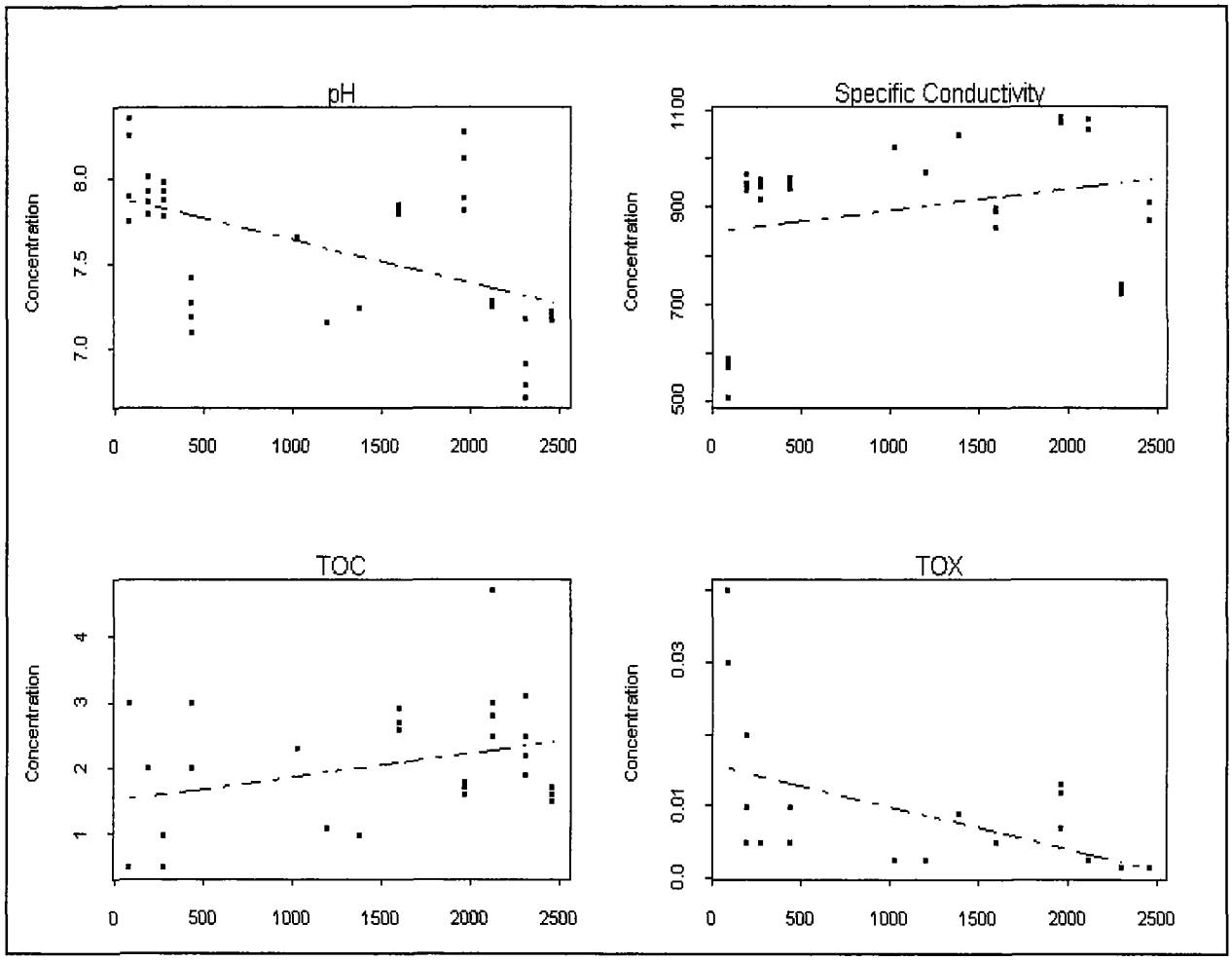
observed background data versus date (in number of days from January 1, 1989), overlayed with the estimated regression line. A positive slope is evidence of an increasing trend.

- It is reasonable to assume that the groundwater averages (of four results per event) are normally distributed for pH, specific conductivity, and TOC. It is reasonable to assume that the groundwater averages are lognormally distributed for TOX.

The equations used to calculate the limits are identical to those provided in the Appendix IV-N for the 95%/97.5% UTLs, except that for these data, the sample size (n) is 12 and for a 95%/95% UTL for this sample size, K=2.74.

These limits are appropriate to use as prediction bounds for averages of size four. That is, if the site concentrations follow the same distribution as the background concentrations, then an average of four samples is expected to fall below the limits shown above 95% of the time, with 95% confidence. If fewer than four monitoring samples are taken, then the exact probabilities change slightly. However, due to the small amount of within-well variability, these limits can be reasonably applied to a single sample. Thus, if a result falls outside the given bounds, one can be reasonably confident that the site concentrations differ from the background concentrations. The more different site concentrations are than background concentrations, the more likely that the average will fall above the given limit.

All available UA-1 data were used to calculate the limits, except for the four TOC measurements made in November 1994, which were erroneous because samples were taken from the wrong wells. The proper wells were sampled in February 1995, and these new results were used in the calculations.


pH
Concentration
7.0
7.5
8.0
0
500
1000
1500
2000
2500
Specific Conductivity
Concentration
500
700
900
1100
0
500
1000
1500
2000
2500
TOC
Concentration
1
2
3
4
0
500
1000
1500
2000
2500
TOX
Concentration
0.0
0.01
0.03
0
500
1000
1500
2000
2500

Appendix IV-E Procedures to Prevent Hazards

Appendix IV-E
Procedures to Prevent Hazards

Lemont Refinery

December 1997

Prepared for:
The Lemont Refinery
CITGO Petroleum Corporation
Lemont, Illinois

Prepared by:
Radian International LLC
P.O. Box 201088
Austin, Texas 78720-1088

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1.0 INTRODUCTION

The information provided in Section F of the approved Resource Conservation and Recovery Act (RCRA) Part B permit application is designed to fulfill the requirements of 35 IAC 724 Subpart C (724.130 through 724.137) regarding the ability of the facility to prevent the occurrence of emergency or otherwise dangerous conditions. In the unlikely event that emergency conditions arise that require immediate action, the *Contingency Plan* in Section G of the permit application as amended by Appendix IV-F of this volume would be activated.

The modification seeks to designate the land treatment facility (LTF) at the Lemont Refinery as a corrective action management unit (CAMU) to support the refinery's RCRA Facility Investigation (RFI). The CAMU will be used to treat and dispose of remediation wastes that are generated during this process.

Security procedures at the CAMU will reflect the overall approach to security and preparedness that is provided by the Lemont Refinery as a whole. In many cases, the CAMU will use (and depend on) security systems in place at the refinery. The section that follows indicates only additions or modifications to Section F of the permit application for portions that are not sufficient to address expected future activities at the CAMU. Table IV-E shows the regulatory requirements for preparedness and prevention and provides the source document for each portion of the required information.

Table IV-E
Regulatory Requirement Cross Reference—Procedure to Prevent Hazards

Requirement	Citation (35 IAC)	Source Document	
		Approved Permit Application	CAMU Modification
Design and Operation of the Facility	724.131	Provides basis of program	Appendix IV-E accounts for facility modifications supporting continued operation of the CAMU
Required Equipment	724.132	Section F	No modification is necessary
Testing and Maintenance	724.133	Provides basis of program	Appendix IV-E provides inspection procedures for facility modifications
Access to Communication or Alarm System	724.134	Section F	No modification is necessary
Required Aisle Space	724.135	Section F	
Arrangements with Local Authorities	724.137	Section G describes arrangements with local emergency response services	

CAMU = Corrective Action Management Unit
IAC = Illinois Administrative Code

2.0 ADDENDUM TO PROCEDURES TO PREVENT HAZARDS

Because the Lemont Refinery provides a strong security network that includes the LTF; the CAMU will continue to use that system during operation, closure, and post-closure activities. The refinery system includes a 24-hour surveillance system, barriers that control entry to the property, security guards, alarms, internal communication systems (two-way radios), and warning signs.

Although certain facility changes will occur in support of continued operation of the LTF (as described in the *Facility Upgrade Design and Engineering Basis* provided in Appendix III-A of this volume), any changes to facility access, such as additional roads or turn-around areas, will not compromise facility security. During operation of the CAMU, the gates to the LTF will be controlled, and entry will be allowed only once approval is received from authorized personnel, according to refinery security procedures.

Inspection of the Land Treatment Facility

The CAMU will be inspected as a matter of operation. During the RFI operation of the CAMU, site personnel working in the area will be responsible for reviewing security and the prevention of hazards. Facility inspections will involve the condition of groundwater monitoring wells and the unsaturated zone monitoring structures, the condition of the security fence, and investigation of any potential releases that could impact human health and the environment. General instructions for conducting inspections are provided as Attachment 2 to the *Post-Closure Plan* in Appendix IV-I of this volume.

Preventive Procedures, Structures, and Equipment

Site work will be conducted according to a site-specific health and safety plan. Operating procedures prepared to support the CAMU, such as those related to loading and off loading of waste, operation of the heavy equipment, and maintenance of the control systems will be followed. Operations/ procedures are outlined in the facility *Operation, Maintenance, and Monitoring Plan* (provided in Appendix III-D of this volume).

A stormwater control program is detailed in *the Facility Upgrade Design and Engineering Basis* (provided in Appendix III-A of this volume). It will manage stormwater and control erosion during rain events and divert sediment back to the treatment unit while stormwater is directed to the National Pollutant Discharge Elimination System-permitted facility wastewater treatment plant. This security program further reduces the risk of hazards associated with facility operations.

The groundwater monitoring program and the unsaturated zone monitoring program, as discussed in Appendix IV-D and IV-N, respectively, will be used to provide early detection in the unlikely case that

migration of constituents from the unit occurs. This addition to the security program will ensure that risks from operation of the CAMU are minimized.

Appendix IV-F Contingency Procedures

Appendix IV-F
Contingency Procedures

Lemont Refinery

December 1997

Prepared for:
The Lemont Refinery
CITGO Petroleum Corporation
Lemont, Illinois

Prepared by:
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INTRODUCTION

This site-specific contingency plan is submitted in accordance with the requirements for a contingency plan, as stated in 40 Code of Federal Regulations (CFR) 265 Subpart D and 35 Illinois Administrative Code (IAC) 724 Subpart D. The intent of the contingency plan is to ensure that established procedures will be followed in the event of an emergency situation at the corrective action management unit (CAMU). The plan that follows replaces in whole the contingency plan located in Section G of the approved Resource Conservation and Recovery Act (RCRA) Part B permit application. Table IV-F shows the regulatory permit requirements for contingency plans and provides the source document containing each portion of the required information.

Table IV-F
Regulatory Requirement Cross Reference—Site-Specific Contingency Procedures

Requirement	Citation (35 IAC)	Source Document	
		Approved Permit Application	CAMU Modification
Contingency Procedures	724.151 through 724.156	Section G provides the basis of the emergency management program.	Appendix IV-F provides a site-specific (stand-alone) contingency plan focused on emergency management procedures at the CAMU.

CAMU = Corrective action management unit
IAC = Illinois Administrative Code

SITE-SPECIFIC CONTINGENCY PLAN FOR THE CAMU

This site-specific contingency plan operates within the framework established by the existing general contingency plan adhered to by the Lemont Refinery entitled, *Refinery Emergency Plan* (REP). This contingency plan focuses on emergencies that could conceivably arise during operation, closure, or the post-closure period of the CAMU.

This plan includes a description of the CAMU, potential environmental hazards resulting from an unplanned release of hazardous waste or hazardous waste constituents, and the emergency procedures that would be conducted during such emergencies.

1.0 General Information

The Lemont Refinery is located approximately 40 miles southwest of Chicago, Illinois. Approximately 650 people are employed at the refinery, which covers approximately 900 acres. The refinery produces gasoline, diesel fuel, aviation turbine fuel, liquefied petroleum gas, and petrochemicals. The mailing address for the facility is as follows:

The Lemont Facility
CITGO Petroleum Corporation
135th Street and New Avenue
Lemont, Illinois 60439

The refinery contains a land treatment facility (LTF) for which the company is seeking designation as a CAMU. The CAMU will be used to support the RCRA Facility Investigation (RFI) over a several year period. The LTF originally consisted of four discrete plots (areas I through IV) covering approximately 13.5 acres. Area I opened in 1973 and areas II, III, and IV opened in 1980. The remaining land included untilled buffer zones around each landfarm plot, roadways, and a nonhazardous waste storage and decant basin.

As a CAMU, the LTF will continue to provide land treatment for remediation wastes that are generated during the RFI. To support continued operation, the unit will be modified according to the descriptions provided in the *Facility Upgrade Design and Engineering Basis* (available in Appendix III-A of this volume). During land treatment in the CAMU, soil bacteria will degrade oil and grease and immobilize inorganic constituents in remediation wastes. The CAMU will be managed using proper waste application rates and active cultivation to maintain aerobic conditions in the treatment zone. Careful monitoring and management of the land treatment plots will provide for degradation, transformation, or immobilization of the waste constituents in the treatment zone.

2.0 Emergency Response Personnel

The *Refinery Emergency Plan* (REP) has been specifically designed to serve as a guideline for dealing with emergencies at the refinery. The REP contains specific sections addressing actions and anticipated response activities. The Emergency Planning Coordinator (EPC) is responsible for the overall administration of the REP. The EPC's major responsibilities consist of maintenance of the REP, training for Emergency Management Organization (EMO) position holders; inspection and maintenance of the emergency equipment inventory, and communication with various refinery personnel to maintain readiness of emergency system components (i.e., equipment, communication systems) in the event of an emergency. The refinery's EMO is composed of a cross section of personnel in operations, maintenance, engineering, environment, management, material control, fire protection, security, and emergency planning. The majority of these personnel are available during normal office hours; however, position holders can be recalled to the refinery as needed. Attachment 1 contains a listing of the EMO position holders, including telephone numbers. Section 2.0 of the REP also discusses the chain-of-command that is followed in the event of an emergency during normal and "off" operating hours as well as other response organizations that are available for additional support in the event of an emergency. A flow chart indicating the EMO's chain-of-command/information flow from Section 2.0 of the REP is included in Attachment 2 to this contingency plan.

The Field Incident Commander (FIC) is the designated lead for the Lemont Refinery emergency response at an emergency scene. In the event that site personnel identify serious deficiencies at the CAMU, personnel would dial the refinery emergency number ("222") to initiate the refinery Incident Command System. The designated FIC would immediately notify the appropriate personnel. Depending on the situation, other response facilities may be activated. Once the extent of the emergency has been identified, the Incident Support Director (ISD) will be contacted. The ISD is responsible for relaying information to the proper on-site/off-site authorities/agencies. The ISD, in consultation with the FIC, is responsible for determining the need for further activation and notification of the EMO. The extent of the activation will vary with the severity and classification of the emergency. The refinery considers the FIC as having adequate authorization to implement the contingency plan.

3.0 Potential Environmental Hazards Associated with the CAMU

Only under unexpected or unusual conditions does the potential exist for hazardous waste or hazardous waste constituents to be released into the environment. However unlikely, the following hazards would be possible under certain conditions.

Wind Dispersal of the Waste—During operation, hazardous waste or hazardous waste constituents could be transported by the wind, resulting in potential exposure through ingestion, inhalation, or direct contact.

Infiltration of Waste Constituents Through the Subsurface Soils Below the Treatment Zone into the Groundwater—The treatment zone will attenuate contaminant movement into the subsurface soils through natural biological and chemical degradation and transformation and fixation processes. Therefore, it is unlikely that hazardous constituents will migrate into subsurface soils and groundwater. Any migration of contaminants by this pathway to a receptor would be very slow (years), and it is not anticipated that emergency procedures would be needed to prevent or control this type of release. The groundwater monitoring program will be used to detect any hazardous constituents in the subsurface soils and groundwater if leaching does occur. This system would alert facility operators of a release sufficiently in advance of exposure so as to minimize resulting risks.

Migration of Waste Constituents in Storm Water Run-off—During operation, precipitation may come in direct contact with the treatment zone or staged environmental media. Hazardous waste or hazardous waste constituents could be transported as a dissolved or suspended load in stormwater run-off. However, a stormwater control program has been designed to reduce erosion, collect suspended solids (moving them back to the treatment unit), and route stormwater to the facility wastewater treatment plant via grass-lined trenches, the intermittent stream, and the stormwater basin. The stormwater control program design is provided in Appendix III-A of this volume. The stormwater run-off ultimately enters the stormwater basin and is treated at the National Pollutant Discharge Elimination System-permitted (IL 0001589) wastewater treatment plant before being discharged to the Chicago Sanitary and Ship Canal.

4.0 Criteria for Implementing the Contingency Plan

The contingency plan will be implemented if an emergency situation occurs involving fire, explosion, or any unplanned sudden or nonsudden release of hazardous waste or hazardous waste constituents onstitutes to the air, soil, or surface water. The decision to implement the plan is made by the FIC who has the authority to implement all necessary procedures specified in the contingency plan and to coordinate with local authorities and emergency response teams. A summary of emergency communication information flow is shown on the refinery EMO flow charts (included in Attachment 2) for both normal and off-hours. All facility employees are trained in how to report emergencies and begin implementation of the contingency plan as necessary.

5.0 Activating Emergency Response Procedures

In the event that site personnel become aware of serious deficiencies at the CAMU that merit activation of the contingency plan, personnel will initiate emergency response procedures by contacting the North Gate Guard Station either by dialing "222" or via two-way radio communication. The designated FIC will immediately notify the appropriate personnel. A summary of emergency procedures is shown on the refinery EMO flow charts for both normal and off-hours, included in Appendix G-2 of the approved permit application. In the event of an emergency during normal business hours (7:30 a.m. to 4:00 p.m. Monday through Friday), the Mobile Command Center is activated and will serve as the FIC's base of operation. Once the extent of the emergency has been identified by the FIC, the ISD will be contacted. The ISD is responsible for relaying information to the proper on-site/off-site authorities. The ISD, in consultation with the FIC, is responsible for determining the need for further activation and notification of the EMO. The extent of the activation will vary with the severity and classification of the emergency.

In the event of an emergency during off-hours (afternoon and midnight shifts, weekends, and holidays), the Fire Department Shift Lieutenant will act as the FIC and will lead the initial response. The FIC will establish a temporary command post and direct response crews in incident mitigation techniques. The Fuel's Area #1 Outside Supervisor will assume the role of On-shift Emergency Manager (OEM). The FIC and OEM will determine the extent/potential of the emergency. Once emergency conditions, off-site impact, and notification requirements have been identified, the OEM will contact the ISD to make the required off-site notifications (if necessary). The OEM will be responsible for apprising the appropriate personnel of the emergency situation, as needed. Should an emergency situation require additional support from Emergency Management Organization (EMO) personnel, the OEM will implement the EMO callout via prescribed procedures. The FIC will implement callouts of emergency response organization personnel via established Fire Department Standard Operating Procedures.

6.0 Emergency Procedures

Because the CAMU will be used for the management (treatment and disposal) of remediation wastes, the potential, however slight, for an uncontrolled release exists. Once the contingency plan has been activated, the FIC will determine what emergency class exists by considering several criteria, such as the source and character of the incident, the type and quantity of any remediation waste released, and possible hazards to human health or the environment that may result directly from the problem or its control.

The Lemont Refinery has established five emergency classes. These five classes are defined below:

Internally Reported Event—An incident that does require reporting to off-site authorities, but does not require evacuation from the scene.

Unusual Event—The release has reached or surpassed the reportable quantity; however, no evacuation outside the incident scene is necessary.

Alert—The release has the potential to affect locations outside the incident scene.

Site Emergency—The entire facility, with the exception of critical employees, has been sheltered on site or evacuated.

General Emergency*—The affected community is implementing protective actions. (*This classification is made by Will County.)

If a release were to occur within the CAMU, an emergency situation could occur that would fall within one of the first three emergency classes. It is not likely that an emergency would occur inside the CAMU that would fall within either of the last two emergency classes. However, an emergency could occur within the greater refinery area that may be classified as either a site or general emergency and which would affect any personnel present at the CAMU.

If the FIC determines that the situation may impact human health or the environment outside of the facility, the FIC shall immediately notify local government agencies (the On-scene Coordinator for this geographical area) or the National Response Center using their 24-hour number (800-424-8802). Such a notification must include the following information:

- Name and telephone number of the reporter;
- Name and address of the facility;
- Time and type of incident;
- Name and quantity of materials involved to the extent known;
- Extent of injuries, if any; and
- Possible hazards to human health and the environment.

An incident endangering human health or the environment at the CAMU is extremely unlikely, because no reactive or incompatible wastes will be disposed of, liquid wastes are not managed, and wastes meeting the waste acceptance criteria in Appendix III-C are not likely to contribute to fire or explosion hazards. However, if an incident threatening human health or the

environment should occur, the FIC will direct site personnel in controlling the incident until help arrives. The following specific procedures will be implemented:

- Employees not responding to the incident will be directed to leave the area. Security personnel are responsible for directing personnel such that they avoid the area of the incident and leave emergency control procedures and response routes unobstructed. Selected personnel will be on standby for rescue, if appropriate.

- Appropriate action will be taken to temporarily cover exposed waste to minimize wind dispersion or direct contact with surface water.

- Waste released or produced through control of the incident will be collected and managed according to all appropriate waste management rules. Because the only wastes managed in this area are compatible with the CAMU treatment mechanism, all recovered waste or contaminated soil will be applied to the CAMU for land treatment. In the unlikely case that a spill involves materials not compatible with the CAMU, recovered waste or impacted materials will be collected, contained, and undergo a hazardous waste determination. Residual water resulting either from a spill or from decontamination activities will be managed through the facility wastewater treatment system.

- All emergency equipment will be cleaned, recharged, and/or otherwise returned to full operational status after the emergency.

- The United States Environmental Protection Agency (USEPA) Regional Administrator and the Illinois Emergency Services and Disaster Agency (ESDA) will be notified that cleanup procedures have been completed and that all emergency equipment is fit for its intended use before resuming operation in the affected area of the facility. The USEPA Regional Administrator and the Illinois ESDA telephone numbers are included in the emergency call list (Attachment 4).

- The operating record of the facility will include a report with the time, date, and details of the incident. A written report will be submitted to the USEPA Region V Administrator and copied to the Illinois EPA. This report will be submitted within 15 days of the incident. An outline of the emergency event report is shown as Table G-1 directly following this document.

7.0 Emergency Equipment

Each emergency management facility within the refinery will be equipped with emergency equipment and supplies commensurate with the response expected from the facility. The Fire/Safety Group will inventory this equipment on a monthly basis and maintain a record of the inventory sheets. The available mobile response equipment consists of fire fighting equipment,

containment equipment, decontamination and cleanup equipment, cleanup contractors, and portable test equipment. A listing of the emergency equipment available is included in Attachment 3. Communications, emergency, and safety equipment owned by the refinery is inspected and tested regularly to assure its proper operation in the event of an emergency.

Sources of additional emergency equipment (not owned nor operated by the refinery) are shown in Table 6.5 of the REP, which is included in Attachment 3. The FIC has the authority to utilize any of the companies or services listed in this table when responding to an emergency.

First aid supplies are maintained in the Medical Department, the Fire/Safety group, and in Vehicles 7628 and 7658 (hazardous material response vehicles). The Lemont Refinery maintains a written personal protective equipment (PPE) program for emergency response in accordance with 29 CFR 1910.120. Safety equipment and PPE are maintained in the Medical Department and the Fire Department.

8.0 Preventing Recurrence of Releases

No reactive or incompatible wastes will be disposed of within the CAMU; therefore, the potential for a fire or explosion to occur is very low. However, if a release of hazardous waste or hazardous waste constituents occurs, the failing system will be repaired and any failing procedures will be reviewed and modified as necessary. If an emergency requiring implementation of the contingency plan were to occur, site operations would cease until approval to continue work is given by the ISD or other designated authority.

9.0 Post-Emergency Equipment Maintenance

All equipment utilized during an emergency will be decontaminated immediately following the event. All washwater or decontamination residue will be directed to the stormwater control system and routed to the NPDES-permitted wastewater treatment plant (Permit #: IL0001589) prior to discharge to the Chicago Sanitary and Ship Canal. An inspection of all equipment will be conducted before operations are resumed to ensure that the equipment is fit for use.

10.0 Coordination Agreements

A copy of the *Refinery Emergency Plan* (9/97) and the contingency plan have been submitted to the following organizations:

- Will County LEPC;

- Romeoville ESDA;
- Lemont ESAD;
- Will County EMA; and
- U.S. Coast Guard.

The Lemont Refinery has entered into coordination agreements with three organizations: the Des Plaines Valley Fire Chief's Association, Northeast Illinois Area Industrial Mutual Aid Group, and the Three Rivers Response Cooperative. Copies of the agreements are in Attachment 4. A list of emergency telephone numbers also is provided in Attachment 4.

11.0 Evacuation Plan

In the event of a general emergency in which it is necessary to evacuate the main refinery facilities, an established set of procedures for ensuring that evacuation occurs properly will be followed. The need for a refinery-wide evacuation may arise in case of a tornado, terrorist attack, or other extenuating circumstance as determined by the OEM and FIC. In the event of a refinery-wide evacuation, personnel will leave the CAMU by the most direct route and report to the CITGO gas station (815-838-1818).

Because incompatible or reactive wastes will not be managed at the CAMU, the possibility of an emergency that requires evacuation from this unit is slight. Should an emergency requiring evacuation occur, site personnel will initiate emergency response procedures by contacting the North Gate Guard Station by dialing "222" or by using a two-way radio. Personnel will leave by the most direct route and report to the CITGO gas station. It is not expected that a situation at the CAMU could result in conditions requiring evacuation of the entire plant. However, if warranted, the facility-wide evacuation plan detailed in the REP would be activated. A copy of evacuation procedures, as specified in the REP, is included in Attachment 5.

12.0 Amendment to the Contingency Plan

Operations Environmental is responsible for ensuring that all local authorities and emergency response teams have copies of this contingency plan and that all copies are amended when changes occur. Operations Environmental will be responsible for maintaining a log as shown in Table F-1 following this document.

The contingency plan will be reviewed and immediately amended, if necessary, whenever the following occur:

- The facility permit is revised;
- The plan fails in an emergency;
- The potential for release increases due to a change in facility circumstances;
- The list of emergency coordinators changes; or
- The list of emergency equipment located at the CAMU changes.

13.0 Reporting Requirements

Any emergency event that requires implementation of the contingency plan will be reported in writing within 15 days to the EPA Regional Administrator. An example reporting format for emergency events involving hazardous waste is shown in Table F-2 that follows this document. Copies of these reports will be kept on file at the Lemont Refinery by Operations Environmental. The report must include the following:

- Name, address, and telephone number of the owner/operator;
- Name, address, and phone number of the facility;
- Date, time, and type of incident;
- Name and quantity of materials involved;
- Extent of injuries, if any;
- Assessment of actual or potential hazards to human health and the environment; and
- Estimated quantity of recovered material resulting from the incident.

14.0 Location of Contingency Plan Copies

Copies of this contingency plan will be maintained at the following locations at the refinery:

- Manager, Operations Environmental;
- Fire Department Command Center; and
- Each Area Shift Supervisor's Office.

Table F-1
Contingency Plan Record of Changes and Amendments,
Land Treatment Facility, Lemont Refinery, Lemont, Illinois

35 Illinois Administrative Code (IAC) 703.183(g) and 725.154 requires that the contingency plan be reviewed and immediately amended, if necessary, whenever one of the following occurs:

a) The facility permit is revised.

b) The plan fails in an emergency.

c) The facility changes—in its design, construction, operation, maintenance, or other circumstances—in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous waste constituents, or changes the response necessary in an emergency.

d) The list of emergency coordinators changes.

e) The list of emergency equipment changes.

In the event that any of the above conditions occur, Operations Environmental will review the Contingency Plan and determine if revisions are necessary.

Operations Environmental will be responsible for ensuring that revisions are incorporated into all copies of the plan, and will be responsible for maintaining this log.

DATE	SUBSECTION(S) CHANGED/AMENDED	COPIES SENT	INITIAL

Table F-2
Example Emergency Event Report Form, Land Treatment Facility, Lemont Refinery, Lemont, Illinois.

Date:_____

Author: _____

Department: _____

Facility:	Lemont Refinery, CITGO Petroleum Corporation
Facility Owner/Operator:	PDV Midwest Refining LLC/CITGO Petroleum Corporation
Facility Location:	135th Street and New Avenue Lemont, Illinois 60439
EPA ID Number:	ILD041550467

BACKGROUND INFORMATION

The land treatment facility at the Lemont Refinery is a regulated hazardous waste management unit currently in a post-closure-care period. This form is used to document incidents which require implementation of the contingency plan contained in Section G of the Resource Conservation and Recovery Act (RCRA) Part B post-closure permit application. The completed form will be part of the operating record for the facility and will be used for notification of the Illinois Environmental Protection Agency's (IEPA's) Division of Land Pollution Control, Planning and Reporting Section. The incident information presented below is in accordance with 35 Illinois Administrative Code (IAC) 703.183(g) and 725.156(l) and (j).

INCIDENT INFORMATION

1. Date, Time, and Type of Incident (e.g., fire, explosion, etc.)

2. Name and Quantity of Material(s) Involved

Table F-2
Example Emergency Event Report Form, Land Treatment Facility
Lemont Refinery, Lemont, Illinois (Continued)

3.	Extent of Injuries, if any
4.	Assessment of Actual or Potential Hazards to Human Health or the Environment
5.	Estimated Quantity and Disposition of Recovered Materials that Resulted from the Incident

ATTACHMENT 1

LIST OF POSITION HOLDERS AND PHONE NUMBERS
(FROM *REFINERY EMERGENCY PLAN*)

POSITION HOLDERS PHONE LIST

Emergency Manager	Office Number	Pager Number	Home Number
J. W. Branch	(630) 257-4300	(708) 988-1282	(630) 961-1739
S. J. Jeffords	(630) 257-4114	(708) 988-9968	(630) 243-1724
J. A. Tancredi	(630) 257-4366	(708) 988-9964	(630) 961-5391
G. C. Rabinak	(630) 257-4199	(708) 988-9763	(630) 369-6029
Public Affairs Director			
M. Wilkins	(630) 257-4031	(708) 988-9987	(630) 836-0160
J. Harper	(630) 257-4070	(708) 988-9476	(815) 588-2207
J. S. Rutter	(630) 257-4132	(708) 988-9952	(815) 838-7786
News Center Coordinator			
S. Taylor	(630) 257-4216	(708) 988-9965	(815) 741-8743
R. G. Rimbo	(630) 257-4030	(708) 988-9950	(630) 257-7965
M. Wilkins	(630) 257-4031	(708) 988-9987	(630) 836-0160
Emergency Damage Control Director			
R. L. Albaugh	(630) 257-4203	(708) 988-7673	(630) 355-6610
A. M. Klein	(630) 257-4125	(708) 988-9765	(630) 305-8810
J. A. Tancredi	(630) 257-4366	(708) 988-9964	(630) 961-5391
Operations Director			
S. J. Jeffords	(630) 257-4114	(708) 988-9968	(630) 243-1724
J. A. Cristman	(630) 257-4105	(708) 988-7620	(630) 964-7025
C. R. Plug	(630) 257-4454	(708) 988-9979	(630) 460-6823
G. C. Rabinak	(630) 257-4199	(708) 988-9763	(630) 369-6029
Operations Field Coordinator			
J. A. Cristman	(630) 257-4105	(708) 988-7620	(630) 964-7025
L. S. Ignacek	(630) 257-4242	(708) 988-7620	(630) 778-1513
L. T. Foster	(630) 257-4240	(708) 988-7627	(815) 838-8423
Incident Support Director			
A. Z. Pollak	(630) 257-4422	(708) 988-7649	(847) 934-0684
G. F. Masek	(630) 257-4686	(708) 988-9915	(630) 682-4844
D. W. Denton	(630) 257-4302	(708) 988-7686	(815) 722-1990
J. S. Noreiko	(630) 257-4330	(708) 988-7640	(815) 838-7348
Environmental Coordinator			
C. W. Harmon (QI)	(630) 257-4450	(708) 988-7680	(630) 964-4102
M. W. Klickman	(630) 257-4308	(708) 988-7418	(630) 960-4937
K. Moss	(630) 257-4452	(708) 988-1624	(630) 369-2698
L. D. Erchull	(630) 257-4324	(708) 988-7691	(630) 357-7318
Safety Coordinator			
R. J. Skewis	(630) 257-4117	(708) 988-7680	(630) 553-6945
M. R. Paluszek-Pirc(QI)	(630) 257-4288	(708) 988-7643	(630) 301-6302
R. L. Brandolino	(630) 257-4268	(708) 988-7679	(815) 725-9250
G. F. Masek	(630) 257-4686	(708) 988-9915	(630) 682-4844

Field Incident Commander			
D. T. Pirc (QI)	(630) 257-4429	(708) 988-4429	(630) 301-6302
G. J. Novotny (QI)	(630) 257-4116	(708) 988-7642	(815) 834-1560
Logistics Director			
A. L. Bochenek	(630) 257-4044	(708) 988-7678	(815) 836-8281
K. G. Daily	(630) 257-4414	(708) 988-3342	(815) 739-9011
D. L. Ellis	(630) 257-4215	(708) 988-7689	(708) 748-2749
Communications Director			
B. J. Ference	(630) 257-4076	(708) 988-4076	(630) 983-7030
D. A. Urbanek	(630) 257-4024	(708) 988-7696	(630) 469-1285
Historian			
A. L. Krock	(630) 257-4280	(708) 988-6028	(815) 372-2167
P. L. Moore	(630) 257-4029	(708) 988-7669	(815) 741-0979
S. Holman	(630) 257-4048	(708) 988-9956	(815) 722-2476
Support Staff Coordinator			
L. K. McGinn	(630) 257-4301	(708) 988-3846	(815) 886-5551
M. E. Brigham	(630) 257-4333	(708) 988-0750	(630) 739-9517
A. L. Krock	(630) 257-4280	(708) 988-6028	(815) 372-2167

NOTE: QI DENOTES "QUALIFIED INDIVIDUAL" AS DEFINED IN OPA 90

OEM

Fuels #1 Outside Supervisor	(630) 257-4249 or 4248
(Separate Outside Line OEM's)	(630) 257-6218
(Separate Outside Line N. Gate)	(630) 257-1992
	(630) 257-2446

Cellular Phone Numbers

	Office Number	Pager Number	Cellular Number
R. L. Albaugh	(630) 257-4203	(708) 988-7739	(630) 476-9044
J. W. Branch	(630) 257-4300	(708) 988-1282	(630) 476-9965
J. V. Fillar	(630) 257-4225	(708) 988-7693	(630) 476-1487
Fred Lindner	(630) 257-4157	(708) 988-9176	(630) 476-7210
J. S. Noreiko	(630) 257-4330	(708) 988-7640	(630) 476-5044
J. Martens	(630) 257-4121	(708) 988-9935	(630) 476-0742
D. T. Pirc	(630) 257-4429	(708) 988-4429	(630) 476-7305
A. Z. Pollak	(630) 257-4422	(708) 988-7649	(312) 501-4422
C. W. Harmon	(630) 257-4450	(708) 988-7680	(630) 710-4102
J. A. Tancredi	(630) 257-4366	(708) 988-9964	(630) 476-4197
G. C. Rabinak	(630) 257-4199	(708) 988-9763	(630) 476-3302
M. Wilkins	(630) 257 4031	(708) 988-9987	(847) 846-0020
J. Harper	(630) 257-4070	(708) 988-9476	(708) 476-0365
R. J. Skewis	(630) 257-4117	(708) 988-7670	(708) 772-0173
B. J. Ference	(630) 257-4076	(708) 988-4076	(708) 334-4076

Staff Car	(630) 494-0913
Shift Lieutenant (1 Ton)	(630) 476-7215
Shift Lieutenant (½ Ton)	(630) 341-0760
Command Center	(630) 476-0347
Ambulance (7615)	(815) 353-1005

Industrial Hygiene Monitoring Assistance

Hygieneering	(630) 654-2550
M. Pelletier	Pager (630) 319-3130

1.0 PURPOSE

The Emergency Plan for the Lemont Refinery has been prepared to deal with incidents which could occur at the Refinery and to meet planning requirements levied by Federal, State and Local agencies.

The plan has been specifically designed to serve as a guideline for dealing with emergencies at the Refinery. The Refinery Emergency Plan (REP) contains specific sections addressing actions and anticipated response activities.

This section also describes both the Emergency Management and Emergency Response Organizations.

1.1 RESPONSIBILITIES

It is the responsibility of the Lemont Refinery Vice President to make sure that the Plan is administered properly. The S & H Manager, along with the Fire/Safety Supervisor and Emergency Planning Coordinator (EPC) will manage all aspects of the plan and keep the Vice President abreast of all aspects and changes to the plan.

The primary position holders identified in Section 2 of the plan have specific duties relating to managing an incident. It will be their responsibility to maintain an open line of communication with the Emergency Planning Coordinator in order to ensure their readiness whenever an incident may occur.

1.2 EPC DUTIES

The Emergency Planning Coordinator is responsible for the overall administration of this plan. The responsibilities are as follows:

- Ensure that the information provided in the plan is accurate and up to date.
- Maintain open lines of communication with all position holders in order to ensure their readiness upon the occurrence of an incident.
- Provide training for all position holders as to the elements of the plan and their duties during an incident.
- Provide training for all Refinery employees on relevant plan elements and how the plan relates to employees during an incident.
- Inspect and maintain on a monthly basis emergency equipment in the EOC and the ISC.
- Communicate with the Fire Chief on a regular basis to ensure the readiness of all emergency fire and spill response equipment.
- Communicate with Refinery personnel responsible for the various components of the communications system in order to ensure that the system remains in good working order.
- Develop, conduct and evaluate various emergency response drills to test the validity of the plan.
- Manage all necessary changes to plan and ensure that all copies of the plan are updated with these changes.
- Ensure that all position holders are aware of changes and informed why changes were made.
- Acts as the liaison between the Refinery and the LEPC in matters relating to the Emergency Plan and the Chemical Safety Contingency Plan.

1.3 THE EMERGENCY MANAGEMENT ORGANIZATION AND SPILL MANAGEMENT TEAM

The Lemont Refinery's Emergency Management Organization (EMO) is composed of a cross section of personnel. The EMO is composed of personnel with specialties in operations, maintenance, engineering, environment, management, material control, fire protection, security and emergency planning. The greatest number of these personnel are available during normal office hours; however, any necessary specialists can be recalled to the Refinery as needed.

1.4 POSITION HOLDERS

The plan identifies the primary position holders and their designated alternates along with respective responsibilities which are assigned during an incident. These primary positions are described in the next section. (See Section 2.)

1.5 EMERGENCY RESPONSE ORGANIZATION

The shift organization (nights, weekends, holidays) at the Lemont Refinery consists of: four Outside Supervisors (Fuels #1, Fuels #2, Petrochem/B&T, Utilities), approximately 45 Unit personnel, three Lab personnel, four B&T personnel and two Fire/Safety Group personnel.

The Fuels #2 Outside Supervisor and the Petrochem/B&T Outside Supervisor are assigned as Main Brigade Hose Team Leaders. The Main Brigade is generally comprised of five Utilities personnel, two Lab personnel, two B&T personnel, the Utilities Supervisor and one Fire/Safety Technician under the direction of the Shift Lieutenant.

During normal office hours (7:30 a.m. – 4:00 p.m. Monday – Friday), additional Emergency Response trained personnel are present at the Refinery. These same "Support" Brigade personnel are available during off-hours by call-out procedures. During any shift, the Emergency Management Organization (EMO) will provide support to the Emergency Response Organization (ERO).

The Lemont Refinery Fire Brigade Policy and Organization Statement describes the Refinery Fire Brigade organization.(see Section 6)

1.6 INCIDENT COMMAND AT THE LEMONT REFINERY

The Incident Command System (ICS) adopted by the Lemont Refinery is designed to complement shift operations. The ICS can be implemented in a variety of emergencies, such as: fires, floods, tornadoes, oil spills, hazardous materials/wastes or other incidents. The ICS is a long-term all-hazard concept for response to emergencies that could affect the operation of the Lemont Refinery and/or have potential life threatening effects on Refinery personnel or the general population.

The following subsections describe how the ICS is implemented during an emergency at the Lemont Refinery. Generally, the ICS is implemented in phases according to the severity of the emergency.

Section 1.0, entitled, Organization, defines the responsibilities and roles of the Lemont Refinery's Emergency Management Organization.

1.6.1 Normal Hours

The normal Management staff at the Lemont Refinery is present from 7:30 a.m. - 4:00 p.m. Monday through Friday. During normal operating hours the largest percentage of the Refinery's approximately 650 employees are present.

In the event of an emergency during these hours the Mobile Command Center (MCC) will be activated. The MCC will serve as the Field Incident Commander's (FIC) base of

operations during the emergency. As warranted by the emergency condition, other emergency response facilities may be activated.

The FIC will be the designated lead Lemont Refinery Emergency Response representative at the incident scene.

Once the extent and potential of emergency conditions have been identified, the FIC will contact the Incident Support Director (ISD) and the appropriate emergency classification for reporting purposes will be reached. The ISD is responsible for having this information relayed to the proper on/off-site authorities/agencies.

The ISD, in consultation with the FIC is responsible for determining the need for further activation and notification of the Emergency Management Organization (EMO). The extent of activation will vary with the severity and classification of the emergency.

1.6.2 Off Hours

Emergencies occurring during the "off hours" (afternoons, midnights, weekends and holidays) will be addressed as follows:

The initial response will be headed by the Shift Lieutenant in the FIC role. As FIC he will establish a temporary command post and direct response crews in incident mitigation techniques. The FIC will be assisted by the Fuels #2 and Petrochem/B&T Outside Supervisors in directing the Main Brigade members.

The Outside Supervisor of Fuels Area #1 will assume the role of On-Shift Emergency Manager (OEM). The FIC, the affected Operations personnel, and OEM will determine the extent/potential of the emergency. Once emergency conditions, off-site impact and notification requirements have been identified, the OEM will contact the Incident Support Director to handle the required off-site notifications as per Chemical Safety Contingency Plan procedures. The OEM will also be responsible for notifying Operations Department Supervisors, Asset Area Managers, Operations Manager and the Emergency Manager, as needed, of the emergency situation.

Should an incident require additional support from Refinery Emergency Management Organization (EMO) personnel, the OEM will implement the Emergency Management Organization (EMO) call-out via prescribed procedures. The FIC will implement call outs of Emergency Response Organization (ERO) personnel via established Fire Brigade Standard Operating Procedures (SOP's).

1.6.3 Command Locations

Emergency Operations Center (EOC) Room 225
Offsite Agency EOC Room 244
Incident Support Center (ISC) Room 167
Mobile Command Center (MCC) 7618

1.7 HEADQUARTERS SUPPORT

Headquarters can be called upon to provide long term support in the event of an emergency. The CITGO Crisis Management Plan provides details of Headquarters support.

1.8 OFF-SITE RESPONSE ORGANIZATIONS

1.8.1 Will County Emergency Management Agency

The Will County Emergency Management Agency (EMA) consists of personnel who are full-time and part-time county employees.

The mission of the Will County Emergency Management Agency is to provide support to local jurisdictions. The Will County Emergency Services will be under the direct control of the County Emergency Services Director or his designee.

Responsibilities of the Will County Emergency Management Agency include establishing the off-site Emergency Operations Center (EOC) a safe distance from the incident (this command post is not the same as the on-site Emergency Operations Center). Representatives from all response groups should be represented at the EOC. The Will County Emergency Management Agency will activate the county-wide emergency communications system linking public and private response agencies.

The Will County Emergency Management Agency may activate the Community Alert Network (CAN) to warn citizens of an evacuation or shelter-in-place action. ***The Will County Chemical Emergency Preparedness Plan Emergency Operations Plan*** lists television and radio stations to be used as part of the public warning system.

The Will County Emergency Management Agency will also provide radio communications as required and relief personnel as needed; i.e. police for scene security.

1.9 NON-COUNTY AGENCIES

1.9.1 Illinois Emergency Management Agency (IEMA)

The Illinois Emergency Management Agency (IEMA) is responsible for coordinating the response of State agencies in major emergencies and should have a representative at the Will County Management Agency EOC.

In addition to carrying out its statutory responsibilities, IEMA personnel also have the capability to act in an advisory capacity to incident officers regarding spill or leak containment, evacuation parameters, etc. A representative of IEMA should be present at the Will County EOC at any General Emergency classification.

1.9.2 Office of the State Fire Marshal

The Office of the State Fire Marshal may respond to a hazardous materials emergency to investigate violations associated with arson or improper storage of flammable or combustible commodities or to provide technical assistance. The Office of the State Fire Marshal will report to the Will County EOC.

1.9.3 Illinois State Police

The Illinois State Police may respond to a hazardous material emergency and act in support of the jurisdictional law enforcement agency.

The Governor of the State of Illinois has charged the Illinois State Police with the responsibilities of providing communications from the scene to various state agencies, including the governor's office.

1.9.4 Illinois Department of Energy and Natural Resources

The Illinois Department of Energy and Natural Resources may respond to an incident of waterway contamination. Its responsibilities are to assist the IESDA in assuring that the clean-up activities minimize the adverse effects on the environment.

A representative of the Illinois Department of Energy and Natural Resources should report to the Will County EOC.

1.9.5 Illinois Environmental Protection Agency (IEPA)

Illinois law requires that the entity responsible for a hazardous materials spill immediately notify the Illinois Emergency Services and Disaster Agency's office. The IEPA has statutory responsibility for assuring that spilled hazardous materials are cleaned up in accordance with applicable regulations that minimize adverse effects on the environment and public health. Representatives from the Illinois Environmental Protection Agency (IEPA) may respond to the site to act in this capacity.

1.9.6 Illinois Department of Nuclear Safety (IDNS)

The IDNS has statutory responsibility for assuring incidents involving radioactive materials are cleaned up in accordance with applicable regulations minimizing adverse effects on the environment and public health. Representatives from the IDNS may respond to the site to act in this capacity.

1.10 FEDERAL AGENCIES

The Federal government's role in major pollution incidents, such as those which could result from a hazardous materials spill, is described in the National Oil and Hazardous Substances Contingency Plan.

This plan is jointly administered by the U.S. Environmental Protection Agency and the U.S. Coast Guard (a branch of the U.S. Department of Transportation).

When a hazardous materials spill occurs, the entity responsible for the spill must report it to the National Emergency Response Center (NERC) in Washington, D.C. The NERC will notify the Federal Regional Response Team and the IEMA. They will jointly decide if IEMA requires federal assistance.

In major incidents a federal On-Site Coordinator will respond to the Will County Management Agency EOC to coordinate the federal response. For incidents in Illinois coordination will generally come from the U.S. EPA Region V office or in the case of an oil spill, the U.S. Coast Guard.

If the federal On-Site Coordinator determines the incident will require a major clean up effort he may activate a Regional Response Team which responds to the site to make recommendations on spill clean-up and assure that the clean-up is conducted according to federal regulations and with minimum negative effects on the public health and the environment.

1.11 NEWS MEDIA

The news media will be given up-to-date reports, as often as possible through the Lemont Refinery Public Affairs Director or a designated alternate.

1.12 PRIVATE RESPONSE ORGANIZATIONS

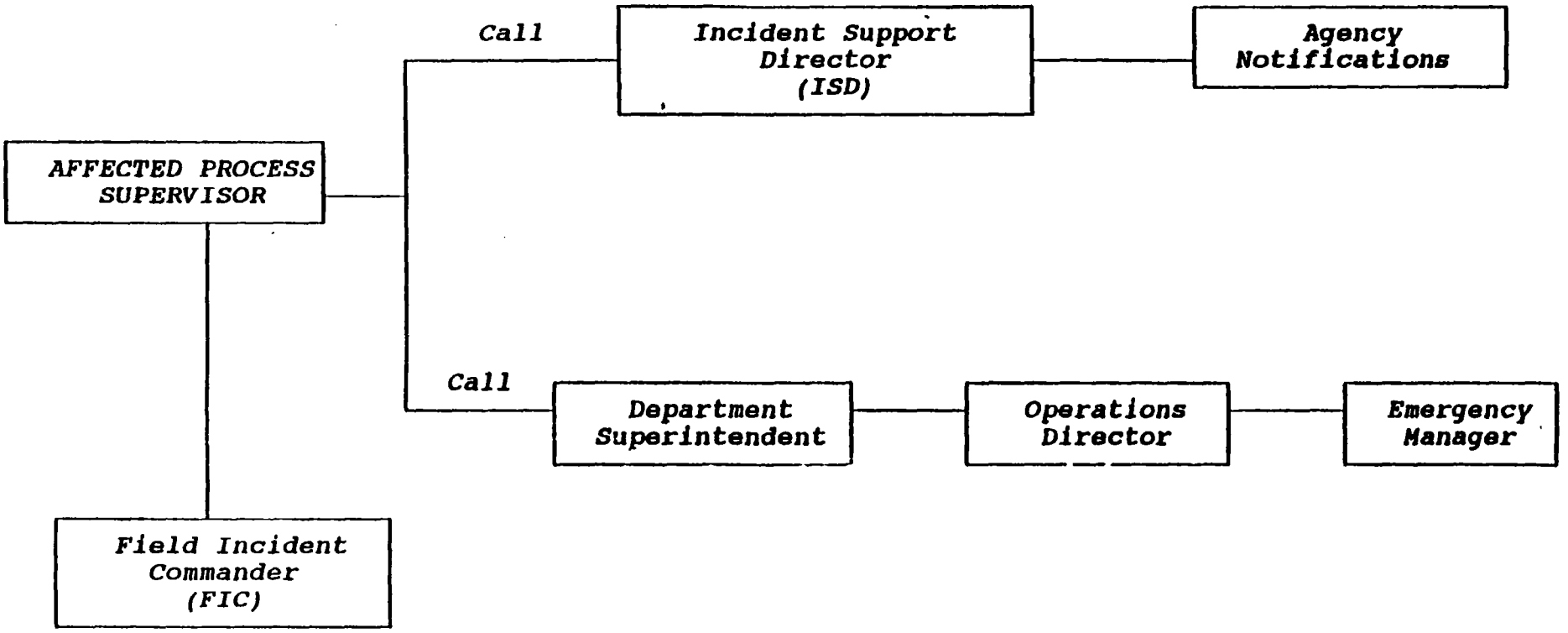
Entities requested from the private sector will report to the Incident Support Center (ISC). Private Sector resources will be assigned to assist the Field Incident Commander or a designated Lemont Refinery representative.

Private clean-up contractors will have the following responsibilities:

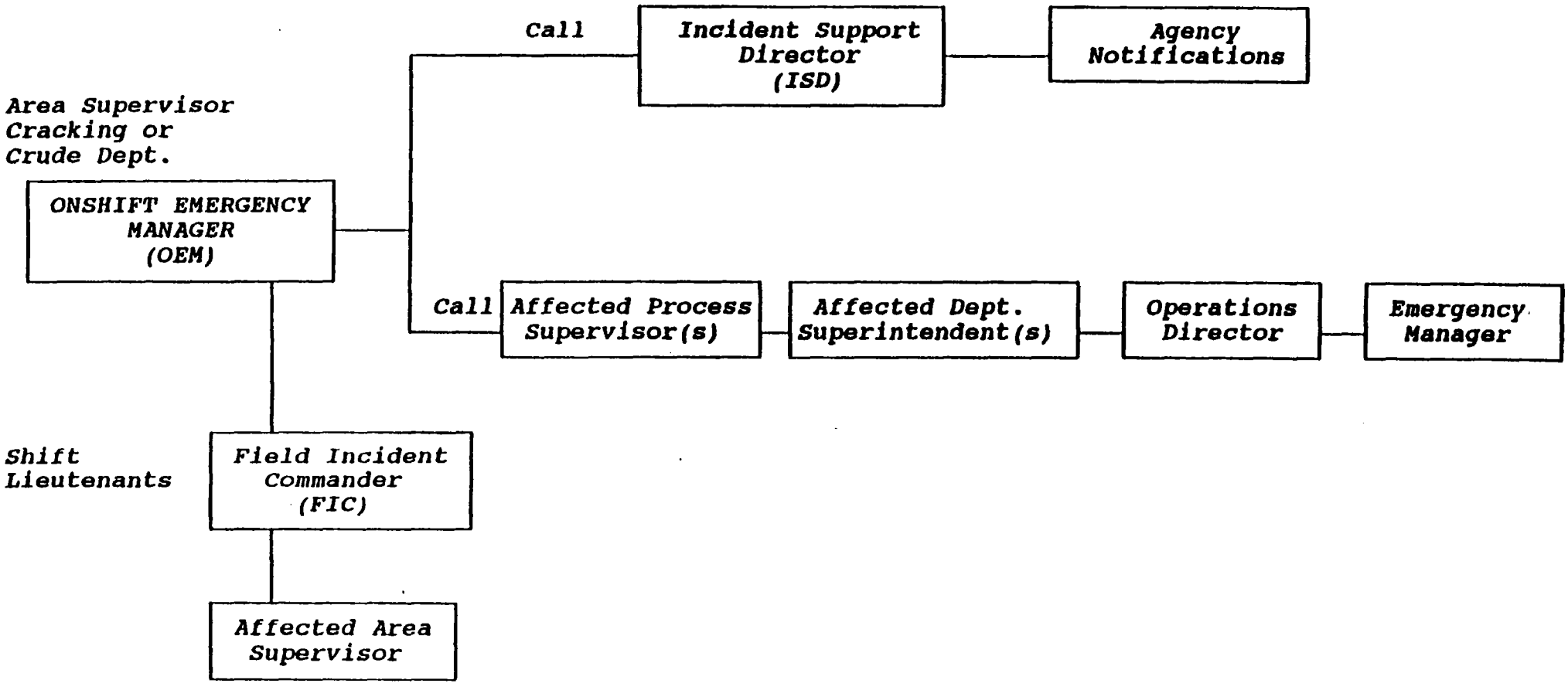
1. Provide a representative at the ISC.
2. Inform the Lemont Refinery's Logistics Director of the financial arrangements under which the private contractor is assisting in the clean-up of the release.

3. Advise the Emergency Manager and Field Incident Commander of needs and considerations regarding clean-up activities.
4. Advise Field Incident Commander and the Environmental Department when clean-up activities have been completed.

REFINERY EMERGENCY MANAGEMENT ORGANIZATION (EMO)
NORMAL BUSINESS HOURS (INFORMATION FLOW)

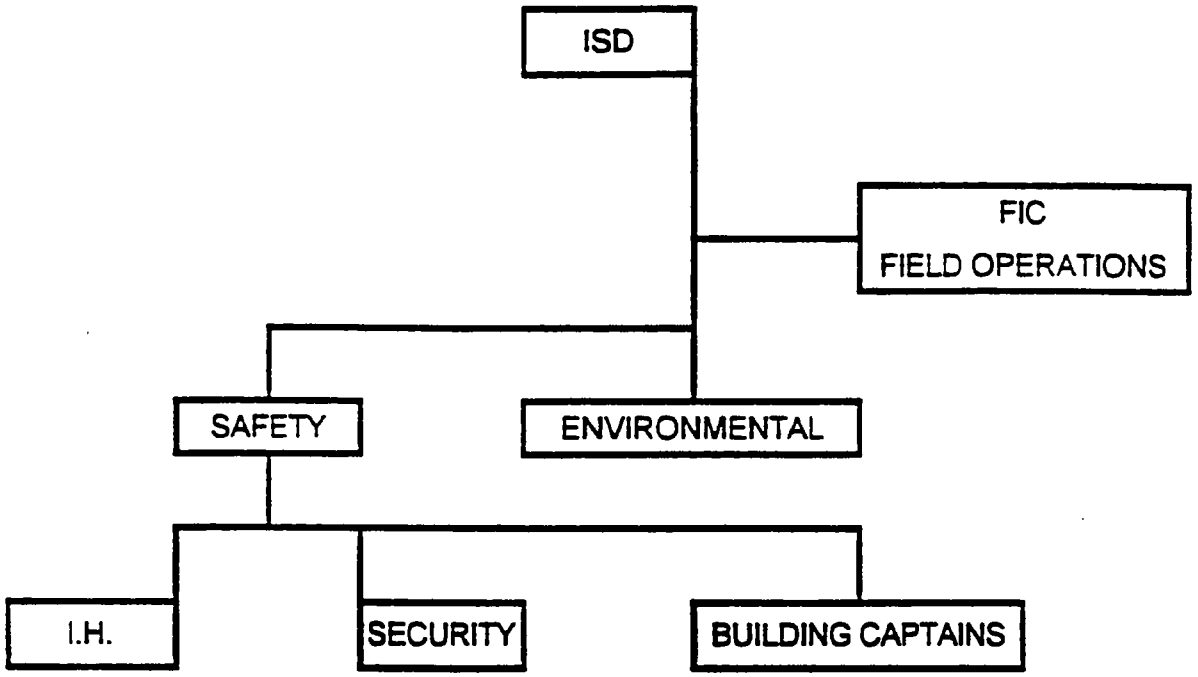


REFINERY EMERGENCY MANAGEMENT ORGANIZATION (EMO)
OFF-HOURS (INFORMATION FLOW)

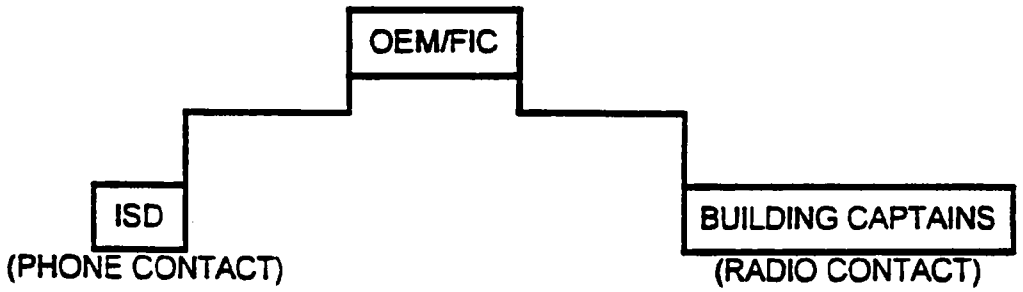


LEVEL I
INCIDENT MANAGEMENT SYSTEM

NORMAL BUSINESS HOURS



AFTER HOURS
WEEKENDS, ETC.



NOTE: A LEVEL II INCIDENT WARRANTS ACTIVIATION OF EOC (ROOM 225)

4.0 PURPOSE

4.0.1 Mobile Command Center (MCC) (7618)

A Mobile Command Center (MCC) will be activated during an emergency at the Refinery. The MCC will be 7618. The MCC will have the capability to access the emergency scene and be able to communicate with all Refinery response elements. The MCC has access to the EMO position holders, a complete set of system prints, system flow diagrams, cable/wiring diagrams and equipment specification. The MCC is equipped with a MacIntosh computer and the CAMEO Program, including ALOHA Air Modeling.

4.0.2 Incident Support Center (ISC) (Cafeteria & Room 167)

The primary Incident Support Center (ISC), is located in the cafeteria and room 167 on the first floor of the Administration Building. The Logistics Director is responsible for activation and management of the ISC. The ISC provides a general assembly and dispatch area for assigned Refinery manpower needed to support the emergency situation. Representatives from the EMO will be present in the ISC in order to log in arriving personnel, arrange teams, and deploy manpower and equipment. The ISC is included in the Refinery's emergency communications network. The ISC will remain active and manned until deactivated by the Emergency Manager.

4.0.3 Emergency Operations Center (EOC) (Room 225)

The primary Emergency Operations Center (EOC) is located in Room 225 on the second floor of the Administration Building of the Refinery. The EOC serves as a base of operations for long-term emergency management operations. All designated position holders report to the EOC when it is activated during an emergency.

The EOC is included in the Refinery emergency communications network.

Incident assessment, monitoring and evaluation, and the formulation of protective action recommendations are directed from the EOC. The EOC organization is responsible for continued evaluation and coordination of all activities related to an emergency having off-site consequences. Copies of selected building prints and general building arrangements, all emergency planning arrangements applicable to the Refinery, including area maps, etc. are available in the EOC. The EOC serves as the base of operations for material control, coordination of industry support and establishment of a long-term organization to respond to, manage and recover from an incident.

The EOC provides information needed by Federal, State and Local authorities for implementation of off-site emergency plans.

In the event that the primary EOC must be evacuated the EMO should report to the MCC (7618).

4.0.4 EOC for offsite Agency (Room 244)

Room 244 is a conference room which has been designated as the EOC for various governmental agencies to operate from if necessary. This room is located near Room 225 and has been included in the communications network.

4.0.5 News Center (Room 100)

The News Center is located in the Administration Building, Room 100, next to the Cafeteria. The News Center is the single point on-site from which information regarding an emergency condition at the Refinery will be disseminated to the public and the news media. This facility will be utilized for news conferences and special announcements. The News Center and Alternate News Center are described in section 5.0 of the plan.

4.1 EMERGENCY RESPONSE EQUIPMENT

Each emergency management facility (MCC, ISC, EOC) will be equipped with emergency equipment and supplies commensurate with the response expected from the facility. The Emergency Preparedness Coordinator will inventory this equipment on a monthly basis and maintain a record of the inventory sheets.

4.1.1 Mobile Response Equipment

A. Fire Fighting Equipment (location and description)

- The following mobile fire fighting equipment is located in the Refinery Fire Station (Laboratory Building):
- 1500 GPM foam truck (7611)
- 1500 GPM foam truck (7612)
- 1000 GPM pumper (7613)
- 75' ladder/foam truck (7619)
- Command Center van (7618)
- Haz Mat/Oil Spill Response Vehicle (7628)
- Ambulance (7614, 7615)
- Lighting unit (7616)
- Five foam tank vehicles (7617, 7627, 7637, 7647, 7657)
- Two "Hired Gun" foam cannons
- One "Six Gun" foam cannons
- Two portable diesel water pumps (2000 GPM each)
- One Haz-Mat/Oil Spill equipment trailer (7658)
- One Oil Spill containment boom trailer (7668)
- One Spill Response Vehicle (7688)
- The Refinery stocks approximately 15,000 gallons of foam concentrate.
- The following is a list of fixed fire detection/suppression systems in the Refinery:

  1. Administration Building Computer Room and Basement Detection System.
  2. Administration Building telephone switch gear room Halon detection/suppression system
  3. Cafeteria cooking hood detection/suppression systems
  4. Carbon dioxide detection/suppression systems in parts of the Laboratory and Blend Center Buildings
  5. Halon detection/Suppression systems in back-up power supply rooms in the Control Center and the Needle Coker Control Center
  6. Blend Center Pump Pit foam fire extinguishing system
  7. Manually activated deluge systems in various LPG storage facilities
  8. Fixed fire extinguishing systems on most tank storage facilities
  9. Automatic foam deluge system on Solvents Truck Loading Racks

- Refinery Fire Department members are equipped with standard turnout gear.

B. Containment Equipment (location and description)

Our oil spill containment equipment consists of:

- 500 ft. of containment boom located at the South Canal Dock (Boat House)
- An 18 foot aluminum boat equipped with outboard motors and a set of oars at the South Canal Dock. (Boat House)
- A 14' Jon Boat with 9 HP engine and association equipment (on spill response vehicle 7688 at fire station)
- Two vacuum trucks assigned by truck dispatcher.
- Additional containment boom stored in four storage boxes strategically located at the Barge Loading Dock (500 ft. each)*.
- 1000 ft. containment boom on trailer located at Fire Station.*
- 700 ft. Containment boom on spill response vehicle (7688) located at fire station.
- The following sorbent materials are stored at the south end of the Barge Loading Dock and the response trailers at the Fire Station:

Sorbent Boom
36 bales - 10 ft. lengths — for hydrocarbons
20 bales - 10 ft. lengths — for chemicals

Sorbent Sheets
Pads which are 17½"17½"to be tied onto a rope and dragged along surface of water.

Sorbent Pillows
20 bales M-60 Pillows — for hydrocarbons
10 bales 8-70 Pillows — for chemicals

Oil Skimmer
One oil skimmer driven by a peristaltic pump with all associated hoses and pick up tubes.

J&L Pom Poms
Plastic fiber snares in ½ lb. boxes to be used to absorb oil from surface of water. Use for crude or black oil.

C. Decontamination and Clean-Up Equipment (location and description)

- Two vacuum trucks assigned by truck dispatcher (Phone Ext. 4389).
- Complete portable decon set up in Haz-Mat response trailer (7668 located at Fire Station).
- An 18 foot aluminum boat equipped with outboard motors and a set of oars at the South Canal Dock.

D. Clean-Up Contractors

For approved clean-up contractor list see pages 4-9 through 4-13 of this section.

- O_2 monitors
- Hydrocarbon level detectors (reading in % LEL)
- Hydrocarbon monitors (reading in PPM)
- H_2S detectors
- Drager Tubes (detection of toxic gases).

4.3 EOC AND ISC INVENTORY LIST

EMERGENCY OPERATIONS FACILITY INVENTORY SHEET

ITEM	QUANTITY/DESCRIPTION
Tables/Chairs	(15 people maximum)
Telephones For Room 225	8 lines, 8 telephones
Telephones For Room 244	4 lines, 4 telephones
Emergency Plan	2 Controlled Copies
Refinery Maps	5 Copies
Off-site Maps	5 Copies
Marker Board	2
Plant Radio	2
Status Boards	2
TV Set	1 Monitor News Stations
Portable Cellular Telephones	10 (to be issued as needed)
Tape Recorder	3
Sign-In Board	1
Binoculars	2
In/Out Boxes	10
Activities Record Sheets	1,000
Facsimile Machine for Cellular Phone	1

INCIDENT SUPPORT CENTER INVENTORY SHEET (Room 100 Closet)

Tables/Chairs	(45 people maximum)
Telephones	6 lines, 6 telephones
Emergency Plan	2 Controlled Copies
Status Board	1
In/Out Boxes	1
Activities Record Sheets	100 sheets minimum
News Media Kits	100

4.4 EMERGENCY TELEPHONE DIRECTORY

Miscellaneous Contractors and Other Technical Support Resources

Ace Hardware Company
(815) 838-0458
(815) 726-5117

Barrett Hardware Company
(815) 726-4341
(815) 723-9041

Best Environmental
P.O. Box 576
Channahon, IL 60410
(815) 725-1554

Brown & Lambrecht Earthmovers, Inc.
Joliet, IL
(815) 727-9211
(815) 462-5352

Browning-Ferris Chemical Service Div.
Box A
Lemont, IL 60439
(708) 257-7707
Comments: Oil Spill, chemical waste hauling & tank cleaning

C.H. Heist
Joliet, IL
(815) 727-7327

Chicago Tank Cleaners
RR 2, Box 256
Lockport, IL 60441
(708) 349-0310

Clean Harbors*
21900 Central Avenue
Matteson, IL 60443
24 Hr. #(708)720-0700

Diamond Construction Company
(815) 723-9321
(815) 436-7167

Environmental Safety Group, Inc.
7545 S. Madison, Suite 15
Hinsdale, IL 60521
(630) 323-0130 - Day
(630) 953-4260 - Night

P.T. Ferro Construction Co.
(815) 726-6284
(815) 723-7665

Fitz-Simons & Conrell Dredge & Dock
3025 E. 104th Street
Chicago, IL
(312) 731-0430 - Day
(312) 458-5835 - Night

Foster Helicopters
(312) 421-5440
(312) 231-7665

Greater Chicago Harbor Assoc.
c/o Hannah Inland Waterways
Lemont, IL 60439
(708) 242-3210

Great Lake Dredge & Dock
9320 S. Ewing Avenue
Chicago, IL 60617
(312) 721-9300

Great Lakes Sub-Marine
6110 W. 26th Street
Cicero, IL 60650
(708) 863-9724 - D
(708) 775-1021 - N

Hannah Inland Water Ways
Lemont, IL
(630) 257-5456

Hulcher's Emergency Services
Box 191
Virden, IL 62690
(800) 252-3371
(800) 637-5471
Comments: Railroad car uprighting & haz-mats clean-up capabilities

Joliet Grain Company
Joliet, Illinois
(815) 725-5790
(815) 838-0520

Lemont Ship
(630) 739-5000

Lewis College
R.D. Aviation
Lockport, IL
(815) 838-7909
(708) 583-4192

Lindahl Marine Contractors, Inc.
(312) 593-5982
(219) 949-6406

Lockport Trucking Company
Lockport, IL
(815) 723-3965
(815) 725-8255

Material Service Corp.
(815) 838-3420

O. H. Materials*
1334 Enterprise Drive
Romeoville, IL 60441
(800) 537-9540
Comments: Complete oil & hazardous materials clean-up capabilities

Ohio Barge Lines
(815) 726-6300

Transport Service Company
Hinsdale, IL

Waxweiler Trucking
Lockport, IL
(815) 838-9662

William E. Phillips, Inc.
435 N. Michigan Ave.
Chicago, IL
(312) 644-9611
(312) 438-4204

Yellow Freight System, Inc.
Joliet, IL
(815) 729-4481
(815) 727-6248

SORBENT MATERIAL

If additional sorbents are needed call in order as noted below:

1. Hayden and Company (630) 654-2555/page (800) 946-4646 PIN 8778032
2. 3 M Sorbents 800-666-6477

Note: Check Three Rivers Coop members sorbant supplies if additional sorbents are needed.

4.5 CONTRACTOR EMERGENCY RESPONSE PROCEDURE

The following is the procedure that has been established for Contractor Emergency Response for the purpose leak stoppage. Furmanite, Inc., has provided and will continue to provide the following information:

- A list of personnel who are medically qualified to wear PPE and perform ER duties.
- Permeation and Breakthrough time data on all PPE that they intend to use in the Refinery.
- Copies of all encapsulated suit exposures and inspections. This includes test data on suits which will be performed every 6 months by their technicians.
- Training outlines which detail the amount and type of training their technicians have completed as well as sessions they will complete in the future.

Furmanite, Inc. has been informed that their technicians will be expected to follow all Lemont Refinery Haz-Mat protocols that may be in place at the time of each incident. This includes working within our Incident Command System, going through medical monitoring, pre-entry briefings, etc. Our Haz-Mat Officer and Haz-Mat Safety Officer will fill out all necessary forms for each person entering the hot zone. These forms will become part of the permanent incident record.

EMERGENCY RESPONSE LEAK SEALING

Lemont has contracted with Furmanite, Inc. to supply the Refinery with trained technicians for emergency leak sealing on a 24 hours a day, seven days a week basis. Included in this service is a stock of equipment and clamps that will be kept on site to reduce response time. The clamps are representative of line sizes and fittings that are most prevalent in our Refinery. To assure this equipment is available in an emergency it will not be used for routine leak stopping.

Once it is determined that we have an emergency situation, the call-out procedure will be initiated by the Maintenance Coordinator of the affected area or the Crude Processing Shift Supervisor if on "off hours". The equipment will be stored in a locked "fenced in" area in the tool room. The key will be held by the roving guards and the Fuels Area #1 Outside Supervisor.

In the event of an emergency situation the following will take place.

1) It is determined emergency leak stopping is the proper technique by parties involved.
2) Callout per Furmanite procedure made by Maintenance Coordinator or Operations Supervisor.
3) Furmanite reaches gate and is escorted to the tool room by roving guard and are opened for access and guard notifies person that initiated the call out.
4) All affected parties meet prior to actual response to determine best approach. The Inspection Department must be informed to document any and all leaks that occur in the Refinery.
5) After incident Furnamite will inventory stock and replace **ASAP**.

4.6 Clean-Up Contractors and Services — Sources of Material and Equipment

Equipment or Supplies	Description of Equipment and Company	Name of Contact	Telephone Number	
			Day	After Hours
Boats, Tows, and Barges	Hannah Inland Waterways, Lemont, IL 2 Light Oil Barges 5 Black Oil Barges 1000 H.P. Tug Boat 1800 H.P. Tug Boat Small Aluminum Boat	Dispatch	(630) 257-5457	(630) 257-5456
	Lemont Ship 2000 H.P. Tow Boat Steel Work Floats (20' x 30')	Mr. Blackburn	(630) 739-5000	(630) 739-5000
	Material Service Corp. Marine Department	Charles Chapin Ken Allen Jack Thomas Guido Schumann	(815) 838-3420	(312) 358-2679 (815) 725-7346 (815) 838-5508 (815) 838-3861
	Ohio Barge Lines 3200 H.P. Line Boat	Mr. Panzera	(815) 726-6300	(815) 726-6300
Boom	Environmental Safety Group Hinsdale, IL	Tim Debs	(630) 323-0130 24 hour number	
	Heritage Remediation, Inc.	Bill Bolte	(708) 378-1600	(630) 739-1150
	* Clean Harbors Chicago, IL	Earl Fletcher	(708) 720-0700	(312) 646-5111
	* OH Materials Romeoville, IL	Larry Johnson	(630) 759-9462	1-800-537-9590

Equipment or Supplies	Description of Equipment and Company	Name of Contact	Telephone Number	
			Day	After Hours
Chemical Cleaning	Gunderson Viking, Inc. Joliet, IL	Harold Gunderson	(815) 722-2409	(815) 722-2409
	C.H. Heist New Lenox, IL Hi-Pressure Waterwash	Mike Lake	(815) 722-2402	
	Central Industrial Cleaners Chicago, IL Hi-Pressure Waterwash		(312) 538-6337	(312) 924-3838
	National Plant Services Chicago, IL Hi-Pressure Waterwash	Bill Ackerman	(312) 731-0600	
	Service Master Industrial Cleaning General Chemical Clean-up Hi-Pressure Waterwash		(312) 656-6020	(312) 656-6020
Containing and Cleaning	* O.H. Materials, Inc. Romeoville, IL	Larry Johnson	(630) 759-9462	1-800-537-9540
	Weil Service Products Chicago, IL		(312) 528-6800	
Diving Contractor	John Peterson Diving Services Morton Grove, IL Divers	John Geschrey	(847) 774-7876	(847) 966-1915
	Lindahl Marine Contractors, Inc.		(312) 593-5982	(219) 949-6406
Hand Tools, Rakes, Shovels, Axes, Pitchforks	Ace Hardware Co. Lockport, IL	Bill Miller	(815) 838-0458	(815) 726-5117
Hand Tools, Rakes, Shovels, Axes, Pitchforks	Barrett Hardware Co. Joliet, IL	Ernie Paul	(815) 726-4341	(815) 723-9041

Equipment or Supplies	Description of Equipment and Company	Name of Contact	Telephone Number	
			Day	After Hours
Hay - Straw	Joliet Grain Co. Joliet, IL 60 Bales and Emergency Contacts	Charles Malone	(815) 725-5790	(815) 838-0520
Heavy Equipment	Brown and Lambrecht Joliet, IL Bulldozers, Rippers, Scrapers, Rollers, Hi-Lifts, Graders, Cranes, Sweeper, Drill, Compressor, Pumps, Chain Saws, Brush Clippers, Back Hoes	Jim Carnatch Jim Retenour	(815) 727-9211	(815) 462-5352
	Diamond Construction Company Bulldozers, Scrapers, Graders, Cranes, Compressor, Back Hoe	Larry Kubinski	(815) 723-9321	(815) 436-7167
	Len Cox, Jr., Excavating and Trucking Lockport, IL Loader, Back Hoe	Len Cox, Jr.	(815) 838-5741	(815) 838-5741
	P.T. Ferro Construction Company Semi's/Tractors, Dump Trucks, Pumps, Compressors, Back Hoes/End Loaders, Hi-Lifts, Trenching Machines, Cranes	Peter Ferro Tony Ferro Jack Posture Peter Ferro	(815) 726-6284	(815) 723-7665 (815) 723-5812 (815) 725-1975 (815) 423-6163
Helicopters and Airplanes	Foster Helicopters	Tom Foster	(314) 421-5440	(314) 231-5828
	Lewis College R.D. Aviation Lockport, IL Observation Planes Only	Andy Zaglaniczy	(815) 838-7909	(312) 583-4192
Helicopters and Airplanes	O.H. Materials, Inc. Romeoville, IL Cessna, Seneca, Helicopters, Jet Service	Larry Johnson	(630) 759-9462	1-800-537-9540
Lumber and Building Materials	Brown and Lambrecht Earthmovers, Inc. Joliet, IL 200 Men	Jim Ritenour	(815) 727-9211	(815) 462-5352

Equipment or Supplies	Description of Equipment and Company	Name of Contact	Telephone Number	
			Day	After Hours
Oil Spill Cleanup	* Clean Harbors Chicago, IL	Earl Fletcher	(708) 720-0700	(312) 646-5111
	* O.H. Materials, Inc. Romeoville, IL	Larry Johnson Shop	(630) 759-9462	1-800-537-9540
Skimmers	Oil Mop, Inc. Belle Chasse, LA		(504) 394-6110	(504) 394-6110
Sorbent Materials	Environmental Safety Group Hinsdale, IL (24 Hr. Response)	Tim Debbs	(630) 323-0130 24 hr. Number	(312) 438-4204
Tank Trucks	Rogers Cartage Co. 20 Tanker Trucks 7000 Gal. with Pumps	Mike Kulaga	(708) 597-8700	(708) 597-8700
	Transport Service Co. Hinsdale, IL	George Peirce	(630) 920-5808	
Trucks and Trailers	Brown and Lambrecht Earthmovers, Inc. , Joliet, IL 6 Wheel Trucks, 20 Semi-Dump, Bottom Dump Trucks, Low Boy Trailers, Water Wagon (Semi)	Jim Ritenour	(815) 737-9211	(815) 462-5352
	Diamond Construction Cresthill, IL	Larry Kubinski	(815) 723-9321	(815) 436-7167
	Len Cox, Jr., Excavating and Trucking, Lockport, IL Semi-Dump Truck, Six-Wheel Dump Truck	Len Cox, Jr.	(815) 838-5741	(815) 838-5741
	Waxweiler Trucking Lockport, IL 2 Semi-Dump Trucks 2 Six-Wheel Dump Trucks		(815) 838-9662	(815) 838-9662

Equipment or Supplies	Description of Equipment and Company	Name of Contact	Telephone Number	
			Day	After Hours
Trucks and Vans, Freight	Yellow Freight System Joliet, IL Vans and Open Top Trucks	Bob Provincal Dick Wright	(815) 729-4481	(815) 737-6248
Tank Trucks	Diamond Construction 2 - 5000 Gal. Tankers 2 - 3000 Gal. Sludge Boxes	Larry Kubinski	(815) 723-9321	(815) 436-7167
Vacuum Equipment	* Clean Harbors	Earl Fletcher	(708) 720-0700	(312) 646-5111
	* O.H. Materials Romeoville, IL	Larry Johnson	(630) 759-9462	1-800-537-9540
	Heritage Remediation Lemont, IL	Bill Bolte	(708) 378-1600	(630) 739-1150
Vacuum Equipment	General Drainage, Inc. Chicago,IL 10 Vacuum Trucks	John Kruper	(312) 375-6051	(219) 949-5794
	Kimble Septic Service Joliet, IL 2 Vacuum Trucks	C.L. Kimble	(815) 722-7569	(815) 723-0541

ATTACHMENT 4

COORDINATION AGREEMENTS AND EMERGENCY PHONE NUMBERS/INDUSTRIAL NEIGHBORS PHONE LIST (FROM *REFINERY EMERGENCY PLAN*)

SPECIAL CONCERNS (cont.)

J.J. Monge Jr. High School	(815)722-6673
Chaney Elementary School	(815)722-6673
Jamie McGee School	(630)759-4300
Jane Adams Middle School	(630)759-7200
Independence Elementary School	(630)759-7282
Oakview School	(630)759-9300
Bolingbrook High School	(630)759-6400
Northview Elementary	(630)739-5401
Ward Middle School	(630)972-9200
St. Dominic School	(630)739-1633
Woodview Elementary School	(630)739-0785
Jonas E. Sauk Elementary School	(630)739-3603
Brookview Elementary School	(630)739-7155
Hubert H. Humphrey Middle School	(630)972-9240
Children's World Preschool (1)	(630)739-4300
Children's World Preschool (2)	(630)739-0129
Kid's Productions Day Care	(630)739-5151
Kinder-Care Learning Center	(630)759-4081
Miss Nell's Child Care	(630)739-0404
N&B Child & Youth Center	(630)759-8350
Peter Pan Early Learning Center	(630)739-3765
New Beginnings Montessori Preschool	(630)759-0343
Bolingbrook Medical Center	(630)759-2300
Lemont Township High School	(630)257-5838
Bromberek School	(630)739-1950
S.S. Cyril & Methodius School	(630)257-6488
Central Jr. High School	(630)257-5476
St. Patricks School	(630)257-2380
St. Alphonsus School	(630/257-6100
Oakwood Elementary School	(630)257-2286
Mt. Assisi Academy	(630)257-7844
St. Mary's Seminary	(630)257-2494
Mother Theresa Nursing Home	(630)257-5801
Alvernia Manor Nursing Home	(630)257-7721
Short Stuff Child Care	(630)257-6497
Suburban Lithuanian Montessori School	(630)257-8891

POSITION HOLDERS PHONE LIST

Emergency Manager	Office Number	Pager Number	Home Number
J. W. Branch	(630) 257-4300	(708) 988-1282	(630) 961-1739
S. J. Jeffords	(630) 257-4114	(708) 988-9968	(630) 243-1724
J. A. Tancredi	(630) 257-4366	(708) 988-9964	(630) 961-5391
G. C. Rabinak	(630) 257-4199	(708) 988-9763	(630) 369-6029
Public Affairs Director			
M. Wilkins	(630) 257-4031	(708) 988-9987	(630) 836-0160
J. Harper	(630) 257-4070	(708) 988-9476	(815) 588-2207
J. S. Rutter	(630) 257-4132	(708) 988-9952	(815) 838-7786
News Center Coordinator			
S. Taylor	(630) 257-4216	(708) 988-9965	(815) 741-8743
R. G. Rimbo	(630) 257-4030	(708) 988-9950	(630) 257-7965
M. Wilkins	(630) 257-4031	(708) 988-9987	(630) 836-0160
Emergency Damage Control Director			
R. L. Albaugh	(630) 257-4203	(708) 988-7673	(630) 355-6610
A. M. Klein	(630) 257-4125	(708) 988-9765	(630) 305-8810
J. A. Tancredi	(630) 257-4366	(708) 988-9964	(630) 961-5391
Operations Director			
S. J. Jeffords	(630) 257-4114	(708) 988-9968	(630) 243-1724
J. A. Cristman	(630) 257-4105	(708) 988-7620	(630) 964-7025
C. R. Plug	(630) 257-4454	(708) 988-9979	(630) 460-6823
G. C. Rabinak	(630) 257-4199	(708) 988-9763	(630) 369-6029
Operations Field Coordinator			
J. A. Cristman	(630) 257-4105	(708) 988-7620	(630) 964-7025
L. S. Ignacek	(630) 257-4242	(708) 988-7620	(630) 778-1513
L. T. Foster	(630) 257-4240	(708) 988-7627	(815) 838-8423
Incident Support Director			
A. Z. Pollak	(630) 257-4422	(708) 988-7649	(847) 934-0684
G. F. Masek	(630) 257-4686	(708) 988-9915	(630) 682-4844
D. W. Denton	(630) 257-4302	(708) 988-7686	(815) 722-1990
J. S. Noreiko	(630) 257-4330	(708) 988-7640	(815) 838-7348
Environmental Coordinator			
C. W. Harmon (QI)	(630) 257-4450	(708) 988-7680	(630) 964-4102
M. W. Klickman	(630) 257-4308	(708) 988-7418	(630) 960-4937
K. Moss	(630) 257-4452	(708) 988-1624	(630) 369-2698
L. D. Erchull	(630) 257-4324	(708) 988-7691	(630) 357-7318
Safety Coordinator			
R. J. Skewis	(630) 257-4117	(708) 988-7680	(630) 553-6945
M. R. Paluszek-Pirc(QI)	(630) 257-4288	(708) 988-7643	(630) 301-6302
R. L. Brandolino	(630) 257-4268	(708) 988-7679	(815) 725-9250
G. F. Masek	(630) 257-4686	(708) 988-9915	(630) 682-4844

Field Incident Commander			
D. T. Pirc (QI)	(630) 257-4429	(708) 988-4429	(630) 301-6302
G. J. Novotny (QI)	(630) 257-4116	(708) 988-7642	(815) 834-1560
Logistics Director			
A. L. Bochenek	(630) 257-4044	(708) 988-7678	(815) 836-8281
K. G. Daily	(630) 257-4414	(708) 988-3342	(815) 739-9011
D. L. Ellis	(630) 257-4215	(708) 988-7689	(708) 748-2749
Communications Director			
B. J. Ference	(630) 257-4076	(708) 988-4076	(630) 983-7030
D. A. Urbanek	(630) 257-4024	(708) 988-7696	(630) 469-1285
Historian			
A. L. Krock	(630) 257-4280	(708) 988-6028	(815) 372-2167
P. L. Moore	(630) 257-4029	(708) 988-7669	(815) 741-0979
S. Holman	(630) 257-4048	(708) 988-9956	(815) 722-2476
Support Staff Coordinator			
L. K. McGinn	(630) 257-4301	(708) 988-3846	(815) 886-5551
M. E. Brigham	(630) 257-4333	(708) 988-0750	(630) 739-9517
A. L. Krock	(630) 257-4280	(708) 988-6028	(815) 372-2167

NOTE: QI DENOTES "QUALIFIED INDIVIDUAL" AS DEFINED IN OPA 90

OEM

Fuels #1 Outside Supervisor	(630) 257-4249 or 4248
(Separate Outside Line OEM's)	(630) 257-6218
(Separate Outside Line N. Gate)	(630) 257-1992
	(630) 257-2446

Cellular Phone Numbers

	Office Number	Pager Number	Cellular Number
R. L. Albaugh	(630) 257-4203	(708) 988-7739	(630) 476-9044
J. W. Branch	(630) 257-4300	(708) 988-1282	(630) 476-9965
J. V. Fillar	(630) 257-4225	(708) 988-7693	(630) 476-1487
Fred Lindner	(630) 257-4157	(708) 988-9176	(630) 476-7210
J. S. Noreiko	(630) 257-4330	(708) 988-7640	(630) 476-5044
J. Martens	(630) 257-4121	(708) 988-9935	(630) 476-0742
D. T. Pirc	(630) 257-4429	(708) 988-4429	(630) 476-7305
A. Z. Pollak	(630) 257-4422	(708) 988-7649	(312) 501-4422
C. W. Harmon	(630) 257-4450	(708) 988-7680	(630) 710-4102
J. A. Tancredi	(630) 257-4366	(708) 988-9964	(630) 476-4197
G. C. Rabinak	(630) 257-4199	(708) 988-9763	(630) 476-3302
M. Wilkins	(630) 257 4031	(708) 988-9987	(847) 846-0020
J. Harper	(630) 257-4070	(708) 988-9476	(708) 476-0365
R. J. Skewis	(630) 257-4117	(708) 988-7670	(708) 772-0173
B. J. Ference	(630) 257-4076	(708) 988-4076	(708) 334-4076

Staff Car	(630) 494-0913
Shift Lieutenant (1 Ton)	(630) 476-7215
Shift Lieutenant (½ Ton)	(630) 341-0760
Command Center	(630) 476-0347
Ambulance (7615)	(815) 353-1005

Industrial Hygiene Monitoring Assistance

Hygieneering	(630) 654-2550
M. Pelletier	Pager (630) 319-3130

EOC, Incident Support Center & News Center, & EOC For Agencies

Emergency Telephone Numbers

Room 225 (EOC)

	Extension	Name
J1	4340	EM
J2A	4345	ISD
J2B	4359	ISD (additional)
J3	4343	PAD
J4	4346	Logistics
J5	4348	Fax
J6	4341	E. Damage Control
J7	4344	Operations
J8	4349	Open

Room 167 (Incident Support Center)

J1	4171
J2	4172
J3	4173
J4	4174
J5	4175
J6	4176

Room 100 (News Center)

J1	4090
J2	4091
J3	4092
J4	4093
J5	4094
J6	4095

Room 244 (EOC for off site Agencies)

J1	4511
J2	4512
J3	4513(modem or fax)
J4	4514

OSHA
24 Hour Number 1-800-321-OSHA (6742)

LOCAL AGENCY EMERGENCY NUMBERS, HOSPITALS

Police Departments

Romeoville PD	(815) 886-2141
Will County Sheriff	(815) 727-6191
Lemont PD	(630) 257-2226
Lockport PD	(815) 838-2131
State Police Dist. #5	(815) 726-6991

Emergency Services and Disaster Agency

Will County EMA	(815) 740-0911
Non-Emergency	(815) 740-8351
Romeoville EMA	(815) 886-0021
Mike Littrel (pager)	(630) 962-1863
State EMA	(800) 782-7860

Fire Departments

Romeoville Fire	(815) 886-2171	Non-Emergency	(815) 886-7227
Lemont Fire	(630) 257-2221		(630) 257-2376
Lockport	(815) 838-2121		(815) 838-3287
Bolingbrook	(630) 739-1211		(630) 759-0440

Agencies

Chemtrec	(800) 424-9300
NRC/Coast Guard	(800) 424-8802

Hospitals

St Joseph Medical Center
333 North Madison
Joliet, IL 60435
(815) 725-7133

Silver Cross Hospital
1200 Maple Road (U.S. Route 6)
Joliet, IL 60432
(815) 740-1100

Foster G. McGaw Hospital/
Loyola University Medical Center
2160 S. First Avenue
Maywood, IL 60153
(630) 531-3000 (Helicopter)

Bolingbrook Medical Center
400 Medical Center Drive
Bolingbrook, IL 60440
(630) 226-8100

University of Chicago Hospital
5841 S. Maryland Avenue
Chicago, IL 60637
(773) 702-1000

Railroads

Burlington Northern & Santa Fe (Chicago)	(312) 890-550	Police Dept. Mon-Fri 7:00 A.M. - 4:00 P.M. 24 Hr. Emerg. (800) 333-2383
(Joliet)	(815) 726-3823	Police Dept.
(Joliet)	(815) 726-5255	Operating Dept. 24 Hr. except Sat. 3:00 P.M.- Sun. 3:00 P.M. - No one after 11:00 P.M. - 7:00 A.M. Sun-Mon
Schaumburg		(847) 995-4358 or (847) 995-5950
Tank Car Advisor		(773) 890-5290 or (773) 890-5296
IC Railroad		(708) 206-6755
Dispatch		(312) 819-7742 (312) 819-7755

Waterways

U.S. Coast Guard	(630) 986-2155 After Hours (414) 747-7181
Lockport Lockmaster	(815) 838-0536

THREE RIVERS RESPONSE COOPERATIVE MEMBER NUMBERS

Name and Addresses of Representatives

Amoco Chemicals Corporation
P.O. Box 941
Joliet, IL 60434
(815) 467-3200

BASF Chemical
P.O. Box 550
Joliet, IL 60434
(815) 423-5541

CITGO Petroleum Corporation
135th St. and New Avenue
Lemont, IL 60439
(630) 257-7761

Clark Oil
P.O. Box 297
Blue Island, IL 60406
(630) 385-5000

Dow Chemical
P.O. Box 368
Joliet, IL 60434
(815) 423-5921

Exxon Co.
24420 W. Durkee Rd.
Channahon, IL 60410
(815) 423-5522

Lipton
I-55 & Arsenal Rd.
Joliet, IL 60434
(815) 423-5511

Millenium Petrochemicals
8805 N. Tabler Rd.
Morris, IL 60450
(815) 942-7301

Mobil Oil Corporation
P.O. Box 874.
Joliet, IL 60434
(815) 423-5571

Petroleum Fuel and Terminal
4801 S. Harlem Ave.
Forest View, IL 60402
(708) 788-1611

Stepan Chemical Company
Elwood, IL 60421
(815) 727-4944

N.I.A.I.M.A. MEMBER NUMBERS

MEMBERSHIP MAILING LIST
FULL MEMBER COMPANIES

Amoco Chemical Company
P.O. Box 941
Joliet, IL 60434
William R. Kennedy (815) 467-3248
Fax Number (815) 467-3442

Amoco Oil Company
2815 Indianapolis Blvd.
Whiting, IN 46394
Ken Harmon (219) 473-3037
(219) 473-3120
(219) 659-7715
Fax Number (708) 473-3198

Clark Oil & Refining Corporation
131st & Kedzie Ave
P.O. Box 297
Blue Island, IL 60406
Guards (708)385-5000
Fax Number (708)385-9370

GATX Terminals Corp.
P.O. Box 409
Argo, IL 60501
Larry Zielinski (312) 581-2340
Jarry McQuire (312) 458-1330
Fax Number (708) 458-2923

Mobil Oil corp.
P.O. Box 874
Joliet, IL 60434
Chuck Snyder (815) 423-7443
Fax Number (815) 423-7511

Millenium Petrochemicals
8805 North Tabler Road
Morris, IL 60450-9988
Guards (815) 942-7301
Fax Number (815) 942-7819

CITGO Petroleum Corporation
L emont Refinery
135th & New Avenue
Lemont, IL 60439
Dale Pirc (630) 257-4429
Fax Number (630) 257-4458

EMERGENCY ASSISTANCE TELEPHONE ROSTER

Name	Phone
American Industrial Hygienists Association	(216) 762-7294
American National Standards Institute	(212) 354-3300
American Petroleum Institute	(202) 682-8000
American Society for Testing Materials	(215) 299-5400
Bureau of Explosives of Association of American Railroads	(202) 639-2222
Chemical Manufacturer's Association	(202) 887-1100
Chemnet	(800) 424-9300
Chemtrec	(800) 424-9300
Clean Harbors	(630) 720-0700
Compressed Gas Association, Inc.	(703) 979-0900
Dept. of Health and Human Services	(312) 353-3652
Division of Water Resources	(312) 793-3864
Dow Chemical	(800) 258-2436
Environmental Protection Agency Chemical Hotline	(800) 535-0202
EPA Small Business Quantity Generator of Hazardous Waste	(800) 368-5888
Federal Emergency Management Agency	(202) 646-2400
Food and Drug Administration (FDA)	(301) 443-1544
Illinois Dept. of Health, Springfield	(217) 782-4977
Illinois Dept. of Public Health	(312) 293-6840
Illinois Dept. of Transportation	(217) 782-5853
Illinois Emergency Management Agency	(800) 782-7860
Response Commission	(217) 782-2700
Illinois Environmental Protection Agency	(217) 782-7860
Illinois Environmental Protection Agency (Maywood)	(630) 338-7900
Illinois E.P.A. (Emergency Response)	(312) 345-9780
Illinois E.P.A. 24-Hour Emergency Number	(217) 782-3637
Illinois National Guard	(815) 725-8838
Illinois National Guard	(815) 725-1659
Ilinois State Police (District 5)	(815) 726-6291
National Emergency Response Center	(800) 424-8802
National Response Center (Spill Reports)	(800) 424-8802
National Oceanic & Atmospheric ADM (NOAA)	(216) 526-6317
Northern Illinois Gas Company	(800) 942-6100
Nuclear Regulatory Commission	(301) 951-0550
OSHA Region 5/Calumet City Office	(630) 891-3800
Poison Control Center	(800) 382-9097

EMERGENCY ASSISTANCE TELEPHONE ROSTER

Radiological Assistance Team (Argonne National Laboratory)	(630) 252-[illegible]
U.S. Army Corp of Engineers	(312) 886-8451
U.S. Coast Guard MSO Chicago	(630) 986-2155
After hours	(414) 747-7181
U.S. Department of Transportation (DOT) Center	(800) 424-8802
U.S. Dept. of Transportation/Federal Emergency Management Agency (DOT/FEMA) Hazardous Material Information	(800) 752-6367
U.S. Environmental Protection Agency (USEPA)	(202) 382-4700
U.S. EPA Region V Emergency Response	(312) 353-2318
U.S. EPA Superfund/RCRA Hotline	(800) 424-9346
Weather Service	(815) 726-9944Ext.2400
Will County Emergency Management Agency	(815) 740-0911
Will County Sheriff's Office	(815) 727-6191

POLICE AND FIRE NON-EMERGENCY NUMBERS

Romeoville	Fire Department	(815) 886-7227
	Police Department	(815) 886-7219
Lemont	Fire Department	(630) 257-2376
	Police Department	(630) 257-2229
Lockport	Fire Department	(815) 838-3287
	Police Department	(815) 838-2133
Bolingbrook	Fire Department	(630) 759-0440
	Police Department	(630) 759-0450
Joliet	Fire Department	(815) 740-2348
	Police Department	(815) 740-2222
Will County	Sheriff's Department	(815) 727-8575
Rev. Bergmark	Lemont Environmental Commission	(630) 257-7953

FAX NUMBERS LOCAL AGENCIES

EMA ..... (815) 723-8895
Don Gould
Kerry Sheridan
Will County Board

Joliet Community Economic Development ..... (815) 723-6972

Illinois Petroleum Council ..... (217) 523-5131

Illinois Energy Environmental Regulatory Group ..... (217) 522-5518

Romeoville-Village Hall ..... (815) 886-3546

Mayor and Police City of Joliet (same building) ..... (815) 740-1221

Lockport City Hall ..... (815) 838-9498

Lockport Police Department ..... (815) 838-9322

Bolingbrook Administration and Police Department ..... (312) 759-0545

Three Rivers Manufacturing ..... (815) 727-4609

AGREEMENT

OF

THREE RIVERS RESPONSE COOPERATIVE (TRRC)

A Cooperative for Waterway Spill Emergencies

I. PURPOSE OF COOPERATIVE (TRRC)

This Cooperative ("TRRC" or "Cooperative") is committed to developing, maintaining, and improving procedures among the member organizations as defined below ("Member Companies") for mutual assistance and cooperation in the control of oil or chemical spill emergencies occurring on the Illinois Waterway between miles 244.5 and 314; Marseilles and Summit, Illinois, respectively.

The Cooperative will make available, by one or more Member Companies, materials and equipment to Member Companies and/or provide a list of available materials and equipment to the designated government agencies for third parties, under the conditions specified below.

The Cooperative will also make available to Member Companies, a resource document that includes, but is not limited to, waterway maps and river information pertinent to the Illinois waterway.

II. MEMBERSHIP

The TRRC shall consist of those organizations operating refineries, terminals, pipelines, or other facilities for handling, storing, transporting, or manufacturing petroleum products and/or chemicals in or about the area described above or who have a related interest in the Cooperative and who have agreed in writing to participate in the Cooperative. A list of initial Member Companies is attached as Appendix "A" hereto.

A Member Company of the Cooperative may on fifteen (15) days' written notice to the Chairman with copies to all Member Companies of the TRRC, withdraw from the TRRC. Obligations incurred by a withdrawing Member Company prior to withdrawing shall survive the termination of this Agreement or withdrawal

from the TRRC. Appendix A shall be amended to reflect admission to or withdrawal from the TRRC of all organizations.

All Member Companies shall sign acceptance of the provisions of the rules and procedures set forth herein, which shall bind each signatory.

Membership dues shall be assessed and paid based on facility waterway activity. A facility will fall into one of three classifications: large, average, or small.

Large Facility:	Defined as handling over 200 barges per year. A large facility will be charged 150% of the average membership fee.
Average Facility:	Defined as handling between 50 and 200 barges per year. An average facility will be charged the average membership fee.
Small Facility:	Defined as handling between 0 and 49 barges per year. A small facility will be charged 50% of the average membership fee.

Applies to single barges that handle no more than 15 MBbl Barges that handle in excess of 15 MBbls shall, for t definition, be counted as two barges. A facility that handles zero barges will be classified as a "small facility."

Each Member shall have one vote in regards to voting matters.

Equipment suppliers and clean-up contractors will be allowed to join the Cooperative as associate members ("Associate Member"). Associate Members will be non-voting, dues paying members. Associate Members will be charged membership fees identical to a small facility. Associate Members are not limited to the geography referenced in Section I.

III. PROCEDURE

A. Equipment and Material.

For implementing the above stated purpose it will be the responsibility of the Chairman of the TRRC, with the assistance of the Member Companies, to collect and maintain the following information:

1. Equipment and Material List: Each Member Company shall furnish a list of all equipment and material (pick-up devices, skimmers, pumps, booms, boats, absorbent pads, etc.) located at the Member Company which may be released from the facility for cooperative efforts. All listed equipment and material shall be released on the authority of the designated contact persons for the respective Member Company, as identified pursuant to Paragraph 3 below.

2. Personnel: It is not anticipated that personnel will be supplied, except in the case of specialized equipment, in which case each Member Company shall indicate on its equipment list which items will require trained personnel. Personnel supplied for the operation of such specialized equipment, or for assistance to a Member Company affected by an oil or chemical emergency will be on a volunteer basis on the part of the Member Company. All response team members shall be trained to the OSHA Section 1910.120 Hazardous Materials Technician level. The Member Company whose employees are participating in a response action shall certify to the TRRC that said employees have been trained as stated above and shall maintain documentation with the TRRC to support such certification.

3. Authorized Contact Lists: Each Member Company shall supply the names and/or titles and plant telephone numbers of responsible personnel in its plant who are authorized to release material and equipment for such company. The list should be in the order to be called. The first item on the list, if possible, should be the name(s) and title(s) of personnel who are on duty at all times. Except for the normal work week (Monday through Friday, excluding holidays), these personnel should be called in the order listed to request material or equipment.

   The second name on the list should be that of the company's representative to the Cooperative who would normally be called during regular office hours. This should be followed by the alternative on the Cooperative and other officials, such as Plant Managers, General Superintendents, etc. The home telephones for named individuals should also be supplied.

4. Equipment Suppliers and Clean-up Contractors: The Cooperative shall maintain a list of names, addresses, and telephone numbers of other sources of equipment and clean-up contractors. This list will include, but will not be limited to, Associate Members.

5. Waterway Maps/Information: The Cooperative will prepare and make available to Member Companies, a resource document that includes, but is not limited to, waterway maps and river information pertinent to the Illinois waterway.

   The Cooperative shall take an active role in participating in local contingency planning efforts. Members are encouraged to take an active role in any field exercises involving waterway spill emergencies.

It shall be the responsibility of each member of the Cooperative to keep their respective equipment and material lists current. The Three Rivers Manufacturing Association will assist in reissuing the lists at least every three months.

B. Emergency Procedures.

1. Member Company Facilities:

   Any Member Company affected by an oil or chemical emergency ("Requesting Company") may, if assistance is desired, call on other Member Companies ("Assisting Companies") for materials and equipment listed. Each Member Company called on shall use reasonable efforts to assist the Requesting Company; however, no Member Company shall be obligated to provide assistance.

   The Requesting Company using equipment and/or material owned or leased by the TRRC or by any Member Company shall exercise due care and diligence in the care and protection of such equipment and material. Such equipment and material shall be returned in the same serviceable condition as when called into service, ordinary wear and tear excepted. Equipment and material consumed, lost, or damaged shall be, as soon as possible, at the option of the TRRC or Member Company owning or leasing the equipment or

material, repaired or replaced by the Requesting Company or the replacement cost thereof shall be paid by the Requesting Company into the treasury of the TRRC for the credit of all Member Companies or to the Member Company(ies) who owned or leased the equipment and material, as appropriate. If necessary, the Requesting Company shall provide and pay for temporary replacement.

The Requesting Company shall also reimburse, upon demand, the Assisting Companies for any out-of-pocket costs incurred in furnishing such assistance. Any personnel supplied by Member Companies shall be under the supervision and control of the Requesting Company.

The party experiencing the emergency shall be responsible for compliance with all applicable laws, regulations, and statutes, including without limitation, the obligation for reporting to any governmental authority concerned.

2. Spills At Other Than Member Company Facilities: The Cooperative will make available to the Coast Guard or any other federal, state, or local government agency a copy of the list of available equipment and material, and other available information, such as response manuals, upon request. However, in the absence of a signed Non-Member Indemnification Contract, the Cooperative will not provide or loan or facilitate the provision or loaning of any equipment or materials to the Coast Guard or any other federal, state, or local government agency. Members are free to provide or loan equipment on their own on any terms they want and shall not represent such to be in connection with the Cooperative.

3. Non-Member Companies borrowing equipment and/or materials from the Cooperative shall be required to sign the Non-Member Indemnification Contract, attached hereto and made a part hereof as Appendix "B".

In the event equipment and materials furnished through the Cooperative are used to contain a spill by a Non-Member, reimbursement of costs and expenses for providing such equipment and material

shall follow the procedures set forth above in Section III.B.1.

4. The cost of equipment and material furnished to Non-Members by the Cooperative, including out-of-pocket expenses incurred in making such equipment and material available, but which is not otherwise reimbursed by any other person or agency, shall be shared by the same formulas as membership by all Member Companies. Further, all Member Companies shall share by the same formula in the cost of furnishing equipment and the operating cost thereof. Any expense or cost associated with loss, destruction, or damage of such equipment or any third party liability arising out of the use or misuse of such equipment (or materials) or any deficiency thereof, shall be the responsibility of the party found to be responsible for any such damage or expenses, unless indemnity therefore is otherwise provided pursuant to this Agreement.

IV. INDEMNIFICATION

Each Member Company using equipment and/or materials (for purposes of this section, hereinafter "borrowing Member") owned or leased by the Cooperative and/or any other Member Company shall indemnify, defend, and hold harmless the Cooperative, its officers, directors, employees, and agents and all other Member Companies, their directors, officers, agents, servants, and employees ("Indemnitees"), from and against any and all fines, penalties, loss, expense, damages, demands, liability, actions, and claims for injury to or illness or death of any person, including any employee of the borrowing Member or an Indemnitee, and for loss or damage to property, including property of the borrowing Member or Indemnitees, and for harm to the environment, resulting directly or indirectly from the borrowing Member or its designee using equipment, material, or personnel provided by the Cooperative and/or Member Company, regardless of the negligence of any Indemnitee, and regardless of whether liability without fault is imposed, but the borrowing Member shall not be obligated to indemnify, defend, and hold harmless any other Member who negligently or willfully caused, in whole or in part, the spill, or who is strictly liable for the release of the oil or chemical(s) causing the spill.

The borrowing Member Company shall promptly pay to any Indemnitee all costs and attorneys' fees incurred by such Indemnitee resulting directly or indirectly from any and all

fines, penalties, loss, damage, injury, liability, actions, and claims, including any judgment or settlement, for which the borrowing Member Company is obligated to indemnify such Indemnitee. However, this indemnification shall not relieve any other Member Company or any other person or entity who negligently or willfully caused, in whole or in part, the spill or who is strictly liable for release of oil or chemicals causing the spill from any liability under the laws of the State where the spill occurred or of any jurisdiction, or any applicable laws, statutes, ordinances, rules, or regulations of any governmental agency having jurisdiction, which would otherwise apply (including liability to any affected Member Company) for causing or contributing to the spill emergency.

V. INSURANCE

Company hereto shall procure and maintain, at its sole and exclusive expense, insurance coverage, including:

- -- Comprehensive General Liability Insurance, covering Blanket Contractual Liability Coverage, Bodily Injury, and Property Damage, with a minimum combined single limit of $1,000,000 each occurrence, $2,000,000 aggregate.
- -- Comprehensive Automobile Liability or Business Auto Policy covering all owned, hired, or otherwise operated non-owned vehicles with a minimum combined single limit of $500,000 each occurrence for Bodily Injury and Property Damage.
- -- If applicable, Longshoreman and Harbor Worker's Act coverage.
- -- Worker's Compensation Insurance as required by law, covering all states of operation.

No Member Company shall have any obligation to provide or extend insurance coverage for any of the items enumerated herein to any other party hereto or its personnel. The obligations of this Section may be satisfied by a Member Company's membership in a self-insurance pool, a self-insurance plan or arrangement with an insurance provider approved by the State of Illinois. The Cooperative shall require that copies or other evidence of insurance shall be provided to the Cooperative within thirty (30) days of execution of this Agreement, and that no applicable coverage will be canceled or materially changed prior to thirty (30) days' advance written notice to the Cooperative.

VI. BY-LAWS

A. The Spill Committee of the TRRC shall be composed of one representative appointed by each Member Company. Each Member Company must also designate an alternate to serve in place of the company's representative. The present membership of the committee is set forth in Appendix A. Member Companies may change representatives and/or alternates by notice in writing to the other Member Companies and Appendix A shall be amended accordingly.

B. The TRRC shall be headed by a Chairman and Vice-Chairman who shall be the representatives of Member Companies.

Each Chairman shall serve for one (1) year and cannot succeed himself. After the initial election, by a majority vote at a meeting with a quorum, the Cooperative shall elect a new Secretary-Treasurer each year, with the present Vice-Chairman to succeed to the Chairman's post. The Secretary-Treasurer shall succeed to the Vice-Chairman's post. Mid-term vacancies shall be handled as follows:

Vacancy	Remedy
Chairman	Vice-Chairman to serve as temporary Chairman.
Vice-Chairman	Secretary/Treasurer to serve as temporary Vice-Chairman.
Secretary/Treasurer	Vice-Chairman to serve if approved by majority vote of the TRRC. Otherwise an election is required for temporary replacement.

In all cases, if the vacancy is for more than five (5) months, an election will be required to fill the vacancy on a temporary basis.

C. The TRRC shall hold at least one meeting per quarter on a day to be determined. Special meetings may be called at the discretion of the Chairman. The Chairman shall schedule and give at least five (5) days' advance notice of the meetings.

D. Decisions on day-to-day operations of the TRRC shall be by majority vote at its meetings or telephone poll of a majority of the representative of all Member Companies. Decisions involving policy or concerning the possible purchase by the Cooperative of material or equipment, shall be adopted by meetings only.

Notes: (1) Membership dues shall be $1,000 per year (average facility rate) starting the first year of the new organization (expected to be 1992). These dues shall continue each year and are for the sole use of covering administrative expense (secretarial, copying, etc.).

(2) The membership fee/set-up charge for the first year, 1992, will be indicated above, even though the first year is not a full calendar year. Membership dues, thereafter, shall be adjusted (up or down) for the purpose of not significantly exceeding the projected administrative expense budget (estimated at $10,000 per year - 1990 dollars). In no event, though, will membership dues increase by more than 10% in any one year, unless by majority vote of the general TRRC membership.

E. These rules and procedures may be amended from time to time by majority action of Member Companies.

DRAFT ADOPTED BY THREE RIVERS RESPONSE COOPERATIVE (TRRC) MEETING HELD ON JANUARY 23, 1992.

FINAL ACCEPTANCE

NAME OF COMPANY OR CORPORATION The UNO-VEN Company

APPROVAL SIGNATURE AND TITLE John K Barnett, Gen Mgr

DATE OF APPROVAL 07 FEB 92

THREERIV.AGR

APPENDIX B

Non-Member Indemnification Contract

Non-Member agrees to indemnify, defend, and hold the Three Rivers Response Cooperative ("Cooperative"), its officers, directors, employees, and agents, each of the Cooperative's members, and their officers, directors, employees, and agents ("Indemnified Parties") harmless from and against any and all claims, demands, actions, causes of action, losses, expenses, damages, or liabilities for injury to or illness or death of persons, or for damage to or loss of real or personal property, or for civil penalty (but not criminal penalty), including injury to or death of any personnel furnished by the Cooperative, a Member, or Non-Member, or of any other person, and including damage to or destruction of property of the Cooperative, a Member, Non-Member, or third parties, arising out of or in any way connected with its use of equipment, material, or personnel provided by the Cooperative or any Member. Such indemnification shall include such injury, illness, death, damage, or loss as may be caused, directly or indirectly, solely or contributorily by the active as well as passive negligence of the Cooperative and its employees, officers, agents, and directors, and/or any Member and its officers, directors, employees, and agents, and shall include, but shall not be limited to, any claim, demand, action, cause of action, loss, expense, damages, or liability arising out of the use or non-use, transporting handling of any equipment, materials, or personnel furnished by Cooperative, any Member, Non-Member, or any other persons. In the event any claim is asserted or action instituted against any of the Indemnified parties, Non-Member shall immediately upon receipt of notice of such claim or action assume and pay for the defense of the Indemnified party, and shall pay any settlement or satisfy any judgment against the Indemnified party that may be rendered. In the event of damage to or loss of property of the Cooperative or a Member, Non-Member shall forthwith restore or replace such property, or at the Cooperative or Member's option, shall pay to the Cooperative or Member the replacement value of such property.

_____
COMPANY

BY: _____

TITLE: _____

DATE: _____

MUTUAL AID AGREEMENT

DES PLAINES VALLEY FIRE CHIEF'S ASSOCIATION

MUTUAL AID AGREEMENT

This Agreement made and entered into the date set forth next to the signature of the respective parties, by and between the units of local government or industry subscribed hereto (hereafter "Unit(s)") that have approved this Agreement and adopted same in a manner as provided by law and and are hereafter listed at the end of this Agreement.

Whereas, the Constitution of the State of Illinois, 1970, Article VII, Section 10 authorizes units of local government to contract or otherwise associate among themselves in any manner not prohibited by law or ordinance; and,

Whereas, the Illinois Revised Statutes, 1987, Chapter 127, Section 741 et seq., entitled the "Intergovernmental Cooperation Act", provides that any power or powers, privileges, or authority exercised or which may be exercised by a unit of local government may be exercised and enjoyed jointly with any other unit of local government; and,

Whereas, the Illinois Revised Statutes, 1987, Chapter 127 Section 745, provides that any or more public agencies may contract with any one or more public agencies to perform any governmental service, activity, or undertaking which any of the public agencies entering into the contract is authorized by law to perform, provided that such contract shall be authorized by the governing body of each party to the contract; and,

Whereas, the parties hereto have determined that it is in their best interests to enter into this Agreement to secure to each the benefits of mutual aid in fire protection, firefighting and the protection of life and property from an emergency or disaster; and,

Whereas, the parties hereto have determined that it is in their best interests to form an association to provide for communications procedures, training, and

other necessary functions to further the provision of said protection of life and property from an emergency or disaster.

Now therefore, in consideration of the foregoing recitals, the Unit's membership in the Des Plaines Valley Fire Chief's Association and the covenants contained herein, THE PARTIES HERETO AGREE AS FOLLOWS:

SECTION ONE
Purpose

It is recognized and acknowledged that in certain situations, such as, but not limited to, emergencies, natural disasters and man-made catastrophes, the use of an individual Member Unit's personnel and equipment to perform functions outside the territorial limits of the Member Unit is desirable and necessary to preserve and protect the health, safety, and welfare of the public. It is further expressly acknowledged that in certain situations, such as the aforementioned, the use of other Member Unit's personnel and equipment to perform functions within the territorial limits of a Member Unit is desirable and necessary to preserve and protect the health, safety, and welfare of the public. Further, it is acknowledged that coordination of mutual aid through the Des Plaines Valley Fire Chief's Association is desirable for the effective and efficient provision of mutual aid.

SECTION TWO
Definitions

For the purpose of this Agreement, the following terms as used in this Agreement shall be defined as follows:

A. "MEMBER UNIT": A unit of local government including but not limited to a City, Village, Fire Protection District, or Private Industry having a fire department or fire brigade recognized by the State of Illinois, or an intergovernmental agency and the units of which the intergovernmental agency is comprised which is a party to the Des Plaines Valley

Firefighter's Association Agreement and has been appropriately authorized by the governing body to enter into such Agreement, and to comply with the rules and regulations of the Des Plaines Valley Fire Chief's Association.

B. "STRICKEN UNIT": A Member Unit which requests aid in the event of an emergency.

C. "AIDING UNIT": A Member Unit furnishing equipment, personnel, and/or services to a Stricken Unit.

D. "EMERGENCY": An occurrence or condition in a member Unit's territorial jurisdiction which results in a situation of such magnitude and/or consequence that it cannot be adequately handled by the Stricken Unit and such that a Member Unit determines the necessity and advisability of requesting aid.

E. "TRAINING": The regular scheduled practice of emergency procedures during non-emergency drills to implement the necessary joint operations of the Des Plaines Valley Firefighter's Association.

F. "DES PLAINES VALLEY FIRE CHIEF'S ASSOCIATION": The governing body of the Des Plaines Valley Fire Chief's Association comprised of the Fire Chief of each Member Unit.

SECTION THREE

Authority and Action to Effect Mutual Aid

A. The Member Units hereby authorize and direct their respective Fire Chief or his designee to take necessary and proper action to render and/or request mutual aid from other Member Units in accordance with the policies and procedures established and maintained by the Des Plaines Valley Firefighter's Association Member Units. The aid rendered shall be to the extent of available personnel and equipment not required for adequate protection of the territorial limits of the Aiding Unit. The decision shall be final as to the personnel and equipment available to render aid.

B. Whenever an emergency occurs and conditions are such that the Fire Chief, or his designee, of the Stricken Unit determines it advisable to request aid pursuant to this Agreement, he shall notify the Aiding Unit of the nature and location of the emergency and the type and amount of equipment and personnel and/or services requested from the Aiding Unit.

C. The Fire Chief, or his designee, of the Aiding Unit shall take the following action immediately upon being requested for aid:

1. Determine what equipment, personnel, and/or services is requested according to the system maintained by the Des Plaines Valley Firefighter's Association;

2. Determine if the requested equipment, personnel, and/or services can be committed in response to the request from the Stricken Unit;

3. Dispatch immediately the requested equipment, personnel, and/or services, to the extent available, to the location of the emergency reported by the Stricken Unit in accordance with the procedures of the Des Plaines Valley Fire Chief's Association;

4. Notify the Stricken Unit if any or all of the requested equipment, personnel, and/or services cannot be provided.

SECTION FOUR

Jurisdiction Over Personnel and Equipment

Personnel dispatched to aid a party pursuant to this Agreement shall remain employees of the Aiding Unit. Personnel rendering aid shall report for direction and assignment at the scene of the emergency to the Fire Chief or Incident Commander of the Stricken Unit. The party rendering aid shall at all times have the right to withdraw any and all aid upon the order of its Fire Chief or his designee; provided, however, that the party withdrawing such aid shall notify the Fire Chief or Incident Commander of the party requesting aid of the withdrawal of such aid and the extent of such withdrawal.

MUTUAL AID AGREEMENT

SECTION FIVE
Compensation for Aid

Equipment, personnel, and/or services provided pursuant to this Agreement shall be at no charge to the party requesting aid; however, any expenses recoverable from third parties shall be equitably distributed among responding parties. Nothing herein shall operate to bar any recovery of funds from any state or federal agency under any existing statutes.

SECTION SIX
Insurance

Each party hereto shall procure and maintain, at its sole and exclusive expense, insurance coverage, including: comprehensive liability, personal injury, property damage, workman's compensation, ~~and, if applicable, emergency medical service professional liability~~, with minimum limits of $3,000,000.00 auto and $3,000,000.00 combined single limit general and professional liability. No party hereto shall have any obligation to provide or extend insurance coverage for any of the items enumerated herein to any other party hereto or its personnel. The obligations of this Section may be satisfied by a party's membership in a self-insurance pool, a self-insurance plan or arrangement with an insurance provider approved the State of jurisdiction. The Des Plaines Valley Fire Chief's Association shall require that copies or other evidence of compliance with the provisions of this Section be provided to the Des Plaines Valley Fire Chief's Association. Upon request, Member Units shall provide such evidence as herein provided to the Des Plaines Valley Fire Chief's Association members.

SECTION SEVEN
Non-Liability for Failure to Render Aid

The rendering of assistance under the terms of this Agreement shall not be mandatory if local conditions of the Aiding Unit prohibit response. It is the responsibility of the Aiding Unit to immediately notify the Stricken Unit of

the Aiding Unit's inability to respond; however, failure to immediately notify the Stricken Unit of such inability to respond shall not constitute evidence of noncompliance with the terms of this Section and no liability may be assigned.

No liability of any kind or nature shall be attributed to or be assumed, whether expressly or implied, by a party hereto, its duly authorized agents and personnel, for failure or refusal to render aid. Nor shall there by any liability of a party for withdrawal of aid once provided pursuant to the terms of this Agreement.

SECTION EIGHT
Term

This Agreement shall be in effect for a term of one (1) year from the date of signature hereof and shall automatically renew for successive one (1) year terms unless terminated in accordance with this Section.

Any party hereto may terminate its participation in this Agreement at any time, provided that the party wishing to terminate its participation in this Agreement shall give written notice to the Des Plaines Valley Fire Chief's Association specifying the date of termination, such notice to be given at least ninety (90) calendar days prior to the specified date of termination of participation. The written notice provided herein shall be given by personal delivery, registered mail, or certified mail.

SECTION NINE
Effectiveness

This Agreement shall be in full force and effective upon approval by the parties hereto in the manner provided by law and upon proper execution hereof.

MUTUAL AID AGREEMENT

SECTION TEN
Binding Effect

This Agreement shall be binding upon and inure to the benefit of any successor entity which may assume the obligations of any party hereto. Provided, however, that this Agreement may not be assigned by a Member Unit without prior written consent of the parties hereto; and this Agreement shall not be assigned by the Des Plaines Valley Fire Chief's Association without prior written consent of the parties hereto.

SECTION ELEVEN
Validity

The invalidity of any provision of this Agreement shall not render invalid any other provision. If, for any reason, any provision of this Agreement is determined by a court of competent jurisdiction to be invalid or unenforceable, that provision shall be deemed severed and this Agreement may be enforced with that provision severed or modified by court order.

SECTION TWELVE
Notices

All notices hereunder shall be in writing and shall be served personally, by registered mail, or by certified mail to the parties at such addresses as may be designated from time to time on the Des Plaines Valley Fire Chief's Association mailing lists or, to other such address as shall be agreed upon.

SECTION THIRTEEN
Governing Law

This Agreement shall be governed, interpreted, and construed in accordance with the laws of the State of Illinois.

MUTUAL AID AGREEMENT

SECTION FOURTEEN

Execution in Counterparts

This Agreement may be executed in multiple counterparts or duplicate originals, each of which shall constitute and be deemed as one and the same document.

SECTION FIFTEEN

Des Plaines Valley Fire Chief's Association

The Des Plaines Valley Fire Chief's Association is hereby established to consider, adopt, and amend from time to time as needed, any rules, procedures, by-laws, and any other matters deemed necessary by the Member Units. The Des Plaines Valley Fire Chief's Association shall consist of the Chief from each Department from within the Des Plaines Valley Fire Chief's Association who shall serve as the voting representative of each Member Unit on Des Plaines Valley Fire Chief's Association matters, ~~and~~ or may appoint a designee to serve temporarily in his stead. Such appointment shall be in writing and shall be signed by the Chief of the respective Member Unit. The appointed designee shall be from within the respective Member Unit and shall have all rights and privileges attendant to a representative of that Member Unit.

Officers shall be elected from the representatives of the Member Units and shall serve without compensation. The President and such other officers as are provided for in the by-laws shall coordinate the activities of the Des Plaines Valley Fire Chief's Association

SECTION SIXTEEN

Duties of the Des Plaines Valley Fire Chief's Association

The Des Plaines Valley Fire Chief's Association shall meet regularly to conduct business and to consider and publish the rules, procedures, and by-laws of the Des Plaines Valley Fire Chief's Association.

MUTUAL AID AGREEMENT

SECTION SEVENTEEN
Rules and Procedures

Rules, procedures, and by-laws of the Des Plaines Valley Fire Chief's Association shall be established by the Member Units via the Des Plaines Valley Fire Chief's Association as deemed necessary from time to time for the purpose of administrative functions, the exchange of information and the common welfare of the Des Plaines Valley Fire Chief's Association.

SECTION EIGHTEEN
Amendments

This Agreement may only be amended by written consent of all the parties hereto. This shall not preclude the amendment of rules, procedures, and by-laws of the Des Plaines Valley Fire Chief's Association as established by the Des Plaines Valley Fire Chief's Association.

The undersigned unit of local government or industry or public agency has adopted and subscribes to, and approves this MUTUAL AID AGREEMENT to which this signature page will be attached, and agrees to be a party thereto and be bound by the terms thereof.

MUTUAL AID AGREEMENT

This Signatory certifies that this Mutual Aid Agreement has been adopted and approved by ordinance, resolution, or other manner approved by law, a copy of which document is attached hereto.

UNO-VEN COMPANY

Political Entity or Industrial Unit

John K Prassett

~~President, Mayor, or~~ Plant Manager

February 6, 1991

Date

ATTEST:

A. J. Pellal

Title

Mgr. Safety, Environmental & Health

Date February 6, 1991

FORM APPROVED

MAN

NORTHEAST ILLINOIS AREA INDUSTRIAL MUTUAL AID GROUP

1. INTRODUCTION

NIAIMA - pronounced "NAYMA" - This organization will be known as the Northeast Illinois Area Industrial Mutual Aid Group. NIAIMA was organized in 1971 by four petroleum companies located in Northeast Illinois. Participation in NIAIMA is open to Petroleum Refinery and Petrochemical Industry members and approved associated members located in Northeast Illinois and Northwest Indiana.

2. OBJECTIVES

The objectives of this organization are:

A. To join together to preplan assistance for emergency situations specific to the refining and petrochemical industries located in the Northeast Illinois and Northwest Indiana areas.

B. To uphold the good name of the industry by promoting fire prevention and by controlling emergencies immediately upon their occurrence.

C. To stimulate the interest in fire fighting, in providing and maintaining fire fighting equipment, and in training of personnel for emergencies within each full member facility.

D. To provide in an emergency situation, on a voluntary basis, supplementary fire fighting supplies and equipment of full member companies when requested.

E. To maintain up-to-date lists of supplies and equipment available for members and emergency contacts for aid.

3. BY-LAWS

A. Conditions of Memberships

1. Full membership shall be open to industries handling flammable liquids with similar potential of fire occurrence in which additional aid beyond plant and municipal facilities might be served. Voting privileges are reserved for full members.

2. Each full member agrees to maintain trained personnel and equipment sufficient to control fires or other emergencies of the type and magnitude which may occur at their facilities. A minimum of one (1) Balanced Pressure or Servo-Command proportioning type fire truck with a capacity equivalent to other full members shall be included in their equipment.

3. Associate membership shall be open to suppliers of fire and emergency equipment and services which may be needed during an emergency situation occurring in a full members facility. Associate members shall have no voting privilege.

4. The Executive Committee will review applications for all prospective members and make recommendations to the general body for approval or disapproval. General guidelines for full membership (in addition to 3.A.2) is the ability to commit any or all of the following equipment and supplies to an emergency at a full members facility.

   a) 1000 gallon minimum supply of foam concentrate to commit to transport.

   b) A foam pumper if the applicant has more than one pumper. NIFERN frequency radio should be available with the pumper.

   c) Supply 2-1/2 or 3 inch size fire hose, minimum quantity 1,000 feet, National Standard Hose Thread.

   d) Suitable foam making and applying devices.

   e) A minimum of one NIFERN frequency (154.265) radio.

5. Each full member plant shall maintain a plan in written form for handling emergencies within their own facilities and for securing municipal aid and assistance from NIAIMA. Each member shall agree to provide current lists of materials and equipment, which under most circumstances, could be made available for an emergency in another members facility.

   Each full member shall have adequate coverage for Class "A" fires through the local fire protection district, municipality, or have a written signed contract with a local municipal fire department.

6. Each full and associate member agrees to appoint a NIAIMA representative and one alternate representative. At least one representative or alternate for each member shall attend all meetings of the organization.

7. Failure to attend two successive meetings will result in a written notice to Senior-Manager of the full or associate member organization from the NIAIMA Executive Committee. Failure to attend three successive meetings will result in dismissal from the NIAIMA organization.

8. Each full member agrees to procedures outlined in the NIAIMA Manual for requesting of help, the replacement or payment for materials used and the rendering of assistance to others.

B. Probationary Status

A full or associate member organization may be placed on probationary status by action of the full membership for failure to comply with the conditions of membership. Placing a member on probationary status shall include all of the following steps:

1. A recommendation of probationary status by the executive committee.

2. A written notice of the consideration for probationary status from the NIAIMA chairman to the senior manager of the member organization outlining the reasons.

3. Including the consideration of probationary status for the member organization in the prepublished agenda for a general membership meeting.

4. After consideration of the reasons, approval by a majority of full members present at that general membership meeting.

A probationary status of one year shall be grounds for dismissal from the NIAIMA organization. Such dismissal action shall follow the same procedures outlined for probationary status. Reinstatement of member status shall be by recommendation of the Executive Committee and approved by a majority of full members present at a general membership meeting.

When under probationary status, a member retains all the normal membership privileges and responsibilities.

C. Amendments

These by-laws shall be amended by a majority vote of full members.

D. Officers and Meetings

Each member shall designate one person and an alternate to represent the company (or their respective plant) in NIAIMA. The Executive Committee shall consist of the following:

Chairman
Vice-President
Secretary

The Secretary position shall be filled on a rotating basis by each full member in January. (See Addendum No. 1)

The offices of Chairman and Vice -Chairman shall be filled by progression, i.e. after serving a year as Secretary the individual would become Vice-President for one year and the Chairman for one year. In addition to the duties customary for such offices, the officers shall also be responsible to the following areas:

Chairman	Prospective Membership and Meeting Agenda
Vice-Chairman	Program material for membership meetings
Secretary	Equipment and membership lists, Executive Committee Rotation List and meeting minutes. Minutes will reflect members in attendance and absent.

At least two membership meetings, in addition to the annual meeting, shall be held each year to review equipment, training, or other issues. Membership meetings shall be called in the Spring and Fall of each year. Special meetings may be called by agreement of a majority of the Executive Committee if necessary.

Executive Committee and Membership meetings shall be governed by Roberts Rules of Order.

E. Equipment List

Each full and associate member shall supply NIAIMA with a list of fire fighting and emergency equipment, and services that may be available upon call and the names of day/night phone numbers of persons to call for release of such equipment and supplies. Lists should be supplied to the Secretary at the Fall meeting.

F. Procedure for Requesting Aid

Upon the occurrence in any full members facility of a fire or other emergency in which additional aid beyond plant and municipal fire departments is deemed desirable, or if it is determined that standby equipment, materials, etc., is necessary, an authorized representative of said member may:

Call for specific equipment or supplies. The call should be directed to the sources a listed in the NIAIMA Manual. Upon placing such a call, the code word "NIAIMA Emergency" should be used.

If a fire apparatus is involved, the facility responding to the call for assistance shall provide an experienced operator to accompany the equipment.

G. Replacement and Compensation Procedure

Upon return of equipment and unused supplies in good condition, a list of damaged or consumed material, equipment, etc., shall be submitted with reasonable promptness to the member requesting the aid.

The loaning member may request either replacement in kind or payment of the monetary value of supplies used or equipment damaged.

Replacement, if requested, shall be as prompt as possible.

H. Technical Aid

Upon request from a member, a NIAIMA Executive Committee member, or other representative of a member company, may be called upon for technical aid or counsel on handling a given emergency. Such aid shall be given voluntarily and without liability.

On October 11, 1993, it was adapted to fill Executive Committee openings by Full Member Companies on a rotating basis. The 3 year rotation will be ascending as follows: Secretary, Vice-President, Chairperson. Leadership at the time was considered in the following list of Member Companies.

Amoco, Whiting	1994
GATX	1995
Peoples Gas	1996
Quantum	1997
Mobil	1998
Uno-Ven	1999
Amoco Chemical	2000
Clark Refg.	2001

Additions or deletions to the Full Member Companies would affect the years listed.

N.I.A.I.M.A.

MEMBERSHIP MAILING LIST

ASSOCIATE MEMBER COMPANIES

FESSCO Fire Equipment Sales and Service Company 85 Alpine Lane P. O. Box 205 Crete, IL 60417 Jack Vermilye (708) 758-8909 Fax Number (708) 758-8920	VALCOR INDUSTRIES INC./DBA P. O. Box 51 1133 West End Avenue Chicago Heights, IL 60411 John Valadez (708 754-9300 Pager (708) 512-3857 Fax Number (708) 754-9047
BASIC FIRE PROTECTION, INC. 13825 Indiana Ave. Chicago, IL 60627 Chuck Gray (312) 821-1515 (312) 849-9090 Fax Number (708) 849-4501	3M COMPANY 2468 Hillwood Drive Maplewood, MN 55119 24 Hour Emer. Number (612)733-1110 Don Leedy (800) 759-7243 Pin Number 595-5785 Fax Number (612) 738-1106
FIRE SERVICE SUPPLY 400 Bryant Street. Glen Ellyn, IL 60137 Roy Mathusiewicz (708) 858-4092 Fax Number (708) 858-4104	HAYDEN & COMPANY 950 N. York Road Hinsdale, IL 60521 Phone Number (708) 654-2555 Jerry Stachon (800) 946-4646 Pin Number 877-8032 Tom Muellor (800) 946-4646 Pin Number 877-8126 Fax Number (708) 654-0108

2.5 PROTECTIVE ACTION RECOMMENDATIONS

Protection Actions are measures taken to protect emergency workers, site personnel and the public; based upon the severity of the emergency and its potential affects with regard to health and safety. Protective action recommendations for the Refinery are dependant on the emergency situation.

Typical protective action recommendations for the Refinery are:

- Protective Clothing
- Respiratory Protection
- Sheltering-in-Place
- Partial Evacuation
- Total Evacuation

2.5.1 On-Site Evacuation Procedure

This procedure is intended to be used as a guideline for employees when an emergency incident occurs in the Refinery that may require some level of evacuation or Shelter-in-Place to take place within the Refinery.

2.5.1.1 Decision Making Progress

A. How decision is made

When an incident occurs, the following variables will determine the need and the extent of the evacuation. These variables include the following:

- Type of incident, such as fire, potential fire, hazardous materials release, bomb threat, etc.
- Type and quantity of the hazardous material(s) released.
- The location of the incident.
- Where employees are located when the incident occurs.
- Time of the incident.
- Weather conditions at the time of the incident.

B. Who makes decision

The responsibilities of calling for an evacuation rests with the following personnel:

- FIC: Field Incident Commander
- EM: Emergency Manager
- OEM: On-Shift Emergency Manager

Note: If the situation warrants, any operations personnel can order an immediate evacuation of his/her area and adjacent area.

The order to evacuate, when given, will include the following:

- The Level of Incident
- The affected area(s)
- Can temporary Sheltering-in-Place be utilized?
- Who will remain and act as critical plant employees? (This will be decided by Operations Supervisors.)

2.5.1.2 Geographical Refinery Division for Emergency Evacuation Purposes

The Refinery is separated into geographical areas. The actions employees take will be dependent upon all of the variables listed in the first section of this plan. The geographical areas are as follows:

SOUTH PLANT

Operating Areas	Non-Operating Areas
All units in South Plant and adjacent Trailer Parks	Administration Building
Braun Building and Trailers	Maintenance Building
Tank Farm (up to 13th Street)	Cleaning Building
Storm Ponds	Warehouse
Coke Pits	Laboratory Building
	Engineer Trailer East of Lab
	Trailers next to Warehouse

TANK FARM AREA

Tank Farm (East of New Avenue)
Solvent Loading Rack
Gasoline and Diesel Loading Rack
All Trailers

NORTH PLANT AREA

Needle Coker Unit	Canal Dock
Cat Reformer	LPG Loading Rack
North Plant Boiler House	All Trailers
Petrochem Office Building	Blend Center Building
Udex/Unisar Control Room	
Solvents Rail Loading Rack	

2.5.1.3 Levels of Action

The Refinery evacuation shelter-in-place procedure operates at three levels of action, depending on the location and seriousness of the incident that has occurred. Specific actions that employees are required to take will depend on the level of action required during an incident.

The following is a definition of the levels:

Level I — This level is a response to a fire, potential fire, hazardous materials release or any other incident that has occurred and most likely does not require an evacuation beyond the unit boundaries, within the geographical area where the incident occurred.

Level II — This level represents an escalation of the initial incident to include either a further evacuation of the affected area or a partial evacuation of other specific areas in the Refinery.

Level III — This level represents a major incident which requires the evacuation of all Refinery personnel.

Employees and Contractors are expected to follow the guidelines for each level of evacuation.

LEVEL I (Evacuate to Unit Boundaries)

- Personnel in the Refinery will listen to the emergency announcement.
- Personnel in the affected geographic area will discontinue working and report to unit boundaries in a safe area.
- Operations personnel will account for personnel working on the unit(s) and issue further direction when appropriate.
- When appropriate, Operations personnel on the individual affected unit will assist the Fire Department in mitigating the incident, i.e. blocking in appropriate valves.
- Personnel in the unaffected geographic areas will continue to function normally unless otherwise ordered by the FIC.
- Building Captains will monitor the Building Captain channel to receive information about the incident in order to take appropriate action as necessary.
- If the emergency conditions will last for any length of time, the FIC and Operations Supervisor can order a further relocation of personnel beyond the unit boundaries to a safe location without further escalation of the emergency.

LEVEL II (Partial Evacuation)

- Based on information received from Operations, the FIC will determine and issue specific evacuation orders for the areas that may be affected by this incident.
- Specific buildings have been outfitted with HVAC Shutdown features. The FIC will determine if and when these system should be activated and if personnel could temporarily shelter-in-place based on the condition at the time of the incident. The FIC will determine the evacuation for each particular incident based on these factors. Both Operations Personnel and non-essential personnel may be asked to be relocated to one of these buildings.

Building	Feature
Administration Building	HVAC Shutdown
Laboratory Building	HVAC Shutdown
Maintenance Building - Office Area	HVAC Shutdown
South Plant Control Center	HVAC Shutdown & Blast resistant
Blending and Transfer Building	HVAC Shutdown
Petrochem Office Building	HVAC Shutdown
Udex/Unisar Control Room	HVAC Shutdown
Needle Coker Control Room	HVAC Shutdown

The following locations can be utilized as an assembly point for personnel accountability purposes only during an evacuation.

Bulk Plant Satellite
Canal Dock Satellite
Solvents Rack Office

- Any combination of the geographic areas can be affected by the evacuation/relocation order. This will depend on current conditions.
- Building Captains will continuously monitor the emergency EMO/Building Captain frequency in order to determine when to initiate protective steps.

CRITICAL PLANT OPERATIONS

Critical operating personnel such as inside operators and their supervisors may remain in the South Plant Main Control Center, which is a designated temporary Shelter-in-Place.They will initiate emergency operating procedures per operational guidelines. Operations supervisors will specify who is required to remain, based on the nature and severity of the incident, as well as what units may be affected. All other personnel will be instructed to evacuate as per the Plan. ***Note: No other control room or any other buildings in the Refinery are currently designated as a temporary Shelter-in-Place. Operations Supervisors must take this into consideration when making decisions regarding evacuation procedures.***

LEVEL III (Total Evacuation)

In the event of a Refinery wide evacuation, all personnel will leave the Refinery by the most direct means and report to one of the following locations and wait for personnel accountability to begin.

A. The CITGO Gas Station (East)
B. Lemont Fire Station #1 on New Avenue (North)
C. Big Run Golf Course on 135th Street (East)
D. Romeoville Fire Station #3 on New Avenue (South)

In the event of a Refinery-wide evacuation, the Emergency Management Organization (EMO) will report to the Mobile Command Center #7618 to re-assume incident management. The members of the EMO should take any equipment they may need, without taking a great deal of time, but insuring their safe evacuation.

NOTE:If you are already out of the plant when the evacuation order is given, do not re-enter the plant. Stay out until further information is given to you. i.e. If you are in the Tank Farm and the alarm is in one of the other areas, do not re-enter the Refinery.

2.5.1.4 Evacuation Alarm Notification

Notification of an on-site evacuation will occur as follows.

A. LEVEL I (Evacuation to Unit Boundaries)
- The North Gate Guard will sound the Refinery fire/potential fire alarm (10 one second blasts).
- Activate strobe lights in affected geographical area only and at all guard gates.
- The North Gate Guard will announce the LEVEL I condition over the system wide radio system in the plant including the specific geographic area of the Refinery and the nature of the incident.
- When the alarm is finished sounding the North Gate Guard will then announce the LEVEL I condition over the public address system and this will include the specific geographic area and the nature.

B. LEVEL II (Partial Evacuation)
- The North Gate Guard will sound the Refinery fire/potential fire alarm (10 one-second blasts) for a second time.
- **Activate strobe lights throughout the rest of the plant.**
- The North Gate Guard will announce the Level II condition for the existing emergency ove the system wide radio system and the P.A. system, as well as announcing the nature of the incident and the location to report to.
- If an emergency warrants a Level II alarm after the first call, the guard will sound the Refinery fire/potential fire alarm (10 one-second blasts) once, and a Level II announcement will follow over all radio frequencies and the P.A. system.

C. LEVEL III (Total Evacuation)
- The in-plant fire/potential fire alarm (10 one second blasts) will be sounded <u>three</u> consecutive times. An announcement will follow over the P.A. system announcing the Level III condition.
- Radio transmissions on the system wide radio system will follow. The North Gate Guard will make these announcements as instructed by the FIC.
- If emergency apparatus is on the scene or leaving the scene, all warning devices (lights, sirens, air-horns) will be used to indicate that evacuation is necessary.

2.5.2 Routes of Evacuation

If evacuation is necessary, the following guidelines are to be followed:
- The quickest route may not be the safest.
- In the event of a toxic vapor release, always move upwind and/or at a 90° angle. If unusual odor is detected, select a different route.
- Report to the assembly area. Select the safest route and proceed to that area.

2.5.3 Personnel Accountability During Emergency Evacuation

- In the event of a Refinery wide evacuation the receptionist is to immediately start printing a personnel accountability list before evacuating the lobby.

- In the event of a partial evacuation/Shelter in Place, the roving guards will print a list of all personnel in the Refinery at that time. They will then respond to the various in plant assembly areas and begin to compare personnel in those areas with the computer lists. Discrepancies will be reported to the FIC. This will be done as conditions will allow.
- The roving guards are responsible for running printouts at any unmanned gates with personnel logged in, including the Administration Building after normal business hours.

If there is any potential risk - leave immediately without waiting for the printer. The printouts will be picked up when it is safe to do so. When the printouts have been collected, the security guards will go to each assembly area and start personnel accountability. The security guards are to keep the security supervisor informed of their progress, as it may take several hours to account for employees.

The Security Supervisor will notify the EOC of all unaccounted for personnel. All supervisors not involved in the incident may be requested by the security supervisor to assist in accounting for personnel at each assembly area.

LEMONT EVACUATION AND SHELTER-IN-PLACE PROCEDURE

Building Captains Responsibilities

LEVEL I - Unit Evacuation in Effected Geographical Area

- Turn radio to Building Captain talk group.
- Incident Support Director will advise steps to take as necessary (On-Shift Emergency Manager Fuels #1 Outside Supervisor will do this off-shift). This will be done over Building Captain talk group.
- If applicable prepare the assembly area to receive evacuees (close windows and doors, etc.).
- Continuously listen for instructions as to what further actions to take if incident escalates.

LEVEL II - Partial Refinery Evacuation

- Activate HVAC Shutdown switch.
- Insure that assembly area is ready to accept personnel.
- Listen for specific evacuation details.
- After personnel are assembled, inform Incident Support Director of status (On-Shift Emergency Manager Fuels #1 Outside Supervisor off-shift). This will be done over Building Captain talk group.
- Continue to monitor emergency.
- Assist with Personnel Accountability.

LEVEL III - Total Plant Evacuation

- Evacuate plant with all personnel in our area to one of the designated assembly areas outside the plant and wait for Personnel Accountability to begin.

Weather Related Incidents

- Tornado/Severe Weather Watch - Announcement will be made over Radio and PA System. Listen for upgrade.
- Tornado/Severe Weather Warning - Announcement will be made over Radio and PA System. Turn to Building Captain Frequency and keep personnel away from windows. They can remain in the hallways unless otherwise advised. Move everyone to main floors.

2.6 OFF-SITE EVACUATION

Off-site evacuation will be conducted in accordance with the Will County Chemical Emergency Preparedness Plan.

2.7 OFF-SITE SHELTERING

Sheltering involves members of the population-at-risk seeking shelter in homes and/or buildings.

Sheltering is suitable as a protective action alone or may be used in lieu of evacuation for:

Severe incidents in which an evacuation cannot be implemented because of inadequate lead time due to the rapid passage of the plume ("puff" release).

When an evacuation is indicated, but local constraints, such as inclement weather, road conditions, etc. dictate that directing the public to seek shelter is a more feasible and effective protective measure than evacuation.

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2.0 ADDENDUM TO PERSONNEL TRAINING 1

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IV-G Regulatory Requirements Cross Reference—Training Program 1

1.0 INTRODUCTION

35 Illinois Administrative Code 703.183(l) and 724.116 require owners and operators of treatment units to provide an outline of the hazardous waste training program used at the facility and to describe how the program is designed to meet job tasks. Section H-1 of the approved Resource Conservation and Recovery Act (RCRA) Part B permit application presents the training program that was designed for post-closure care of the land treatment facility (LTF) at the Lemont Refinery. To continue using the LTF as a corrective action management unit (CAMU) in support of the RCRA facility investigation, slight modifications in the training program are required. Table IV-G shows the regulatory requirements for training programs at permitted hazardous waste treatment and disposal facilities and the source document for each portion of the required information.

Table IV-G
Regulatory Requirement Cross Reference—Training Program

Requirement	Citation (35 IAC)	Source Document	
		Approved Permit Application	CAMU Modification
Personnel Training	724.116	Section H-1, Appendix H-1, and Appendix H-2	Appendix IV-G includes additional monitoring and contingency procedures

CAMU = corrective action management unit

2.0 ADDENDUM TO PERSONNEL TRAINING

Because the refinery intends to continue operating its LTF as a CAMU, several minor changes must be made to the personnel training program. Because the unit will be used as a CAMU that treats and disposes of remediation waste and is not intended to close for some time, training will include issues that support continued operation. Intrusive monitoring, waste application, and facility operations activities will be added to the training program. In particular, the facility training program outline presented in Table H-1 of Section H in the approved RCRA Part B permit application is expanded to include the following:

- Site-specific activities; and
- Procedures for implementing the contingency plan.

The personnel training program provided in Section H of the approved permit application is designed to be flexible and can easily accommodate the new activities associated with unit operation. Existing program topics will be expanded to account for an operating unit. For example, issues discussed in emergency hazard assessment and evaluation will reflect emergencies that could occur at an operating LTF (e.g., waste spill) as opposed to a closed unit. If additional on-site staff are assigned to support CAMU operation (other than those job descriptions provided in Appendix H-1 to Section H of the approved RCRA Part B application), additional job descriptions and appropriate training levels will be included in the training program.

Appendix IV-H
Closure Requirements

Lemont Refinery

December 1997

Prepared for:
The Lemont Refinery
CITGO Petroleum Corporation
Lemont, Illinois

Prepared by:
Radian International LLC
P.O. Box 201088
Austin, Texas 78720-1088

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IV-H Regulatory Requirement Cross Reference—Closure Requirements 1

1.0 INTRODUCTION

The facility closure requirements contained in Section I and the *Closure Plan* contained in Appendix I-1 of the approved Resource Conservation and Recovery Act (RCRA) Part B permit application were designed to support the closure of the land treatment facility (LTF) as an interim status unit. However, to designate this unit as a corrective action management unit (CAMU) that will support future RCRA Facility Investigations (RFIs), this addendum includes closure of the LTF with a vegetative cap following the operation necessary for the completion of the corrective action program. An addendum to the post-closure requirements contained in Appendix I-2 of the permit application is provided in Appendix IV-I of this volume. Table IV-H shows the regulatory requirements for closure plans and the source documents containing each portion of the required information.

Table IV-H
Regulatory Requirement Cross Reference—Closure Requirements

Requirement	Citation (35 IAC)	Source Document	
		Approved Permit Application	CAMU Modification
Requirements for Land Treatment Units	724.380 (b)	Section I , Appendix I-1	No modification necessary
Closure Performance Standard	724.211	Appendix I-1 provides basis of program	Appendix IV-H demonstrates that the CAMU will close as a land treatment facility
Closure Plan; Amendment of Plan	724.212 (a) through (e)	Provides basis of program	Appendix IV-H includes closure with a vegetative cap following operation of the CAMU
Closure; Time Allowed for Closure	724.113	Provides basis of schedule	Appendix IV-H provides for closure with a vegetative cap
Disposal or Decontamination of Equipment, Structures, or Soils	724.214	Section I-1, Appendix I-1	No modification necessary
Closure Certification	724.215	Section I, Appendix I-1	No modification necessary
Survey Plat	724.216	Section I, Appendix I-1	No modification necessary
Financial Assurance for Closure	724.243	Section I, Appendix I-1	Appendix IV-H shows vegetative cap costs

CAMU = Corrective action management unit
IAC = Illinois Administrative Code

2.0 ADDENDUM TO THE CLOSURE PLAN

The following subsections provide additional information designed to supplement or supersede the existing facility closure plan. Table IV-H shows the regulatory requirements associated with closing land treatment facilities and the section and volume in which these issues are addressed. This addendum provides additional information for the areas in which the initial permit application is not sufficient to address closure of this unit as a CAMU.

Closure Performance Standard

This closure plan is designed to comply with the requirements of 35 IAC 724 Subpart G (closure and post-closure) and 35 IAC 724.380 (closure and post-closure of LTFs). Also, the closure plan is designed to comply with applicable guidance related to closure of LTFs. Guidance documents include: the Illinois Environmental Protection Agency's (IEPA's) *RCRA Part B Permit Application Decision Guide* (IEPA, December 1990); and the U.S. Environmental Protection Agency's (USEPA's) *Guidance Manual on Hazardous Waste Land Treatment Facility Closure/Post-Closure, 40 CFR Part 265* (USEPA, 1987). This plan specifies closure of the CAMU as an LTF with a vegetative cap that performs the following functions:

- Minimizes the need for further maintenance;
- Controls, minimizes, or eliminates post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated run-off, or hazardous decomposition products to groundwater, surfacewater, or the atmosphere; and
- Complies with the closure requirements in 35 IAC 724 Subpart G and 35 IAC 724.380 (closure and post-closure requirements for land treatment units); and
- Allows continued treatment of applied wastes.

Maximum Waste Inventory

The LTF at the Lemont Refinery was designed to degrade oil and grease and to immobilize inorganic constituents. The unit was used to treat several nonhazardous wastes and one listed hazardous waste (API separator sludge—EPA hazardous waste code KO51). The unit stopped receiving hazardous waste in 1981 and has not received nonhazardous waste since 1989.

As a CAMU, the existing LTF will treat remediation wastes (typically soils, sediments, sludges, and other media containing oil and grease, organic compounds, and some inorganics) that will be generated as a result of the corrective action program defined in Section IV of the final RCRA post-closure permit. The waste types that will be applied to the CAMU during this period are expected to be very similar in content, though generally less concentrated, to those already successfully managed at the LTF. Annual application rates will be partially dependent upon the schedule of the RFI and also will be driven

by the operating capacity of the unit. Special care will be taken to schedule waste application in a manner that facilitates land treatment (refer to Appendix III-C of this volume).

Based on limited previous investigations, facility records, and the estimated application rates specified in the *Waste Characterization* (Appendix III-B), the estimated total volume of treated material at closure is 60,000 cubic yards. This treated material will be closed in place (in the CAMU) and protected by a vegetative cover. Anticipated waste descriptions, estimated annual application rates, and a lifetime capacity assessment (the maximum inventory of wastes) are discussed in more detail in the *Waste Characterization* (Appendix III-B of this volume) and the *Waste Management Plan* (Appendix III-C of this volume).

Units to Be Closed/Remain Open

The units to be closed include the historical land treatment areas (four areas making up approximately 13.5 acres); no land treatment areas will remain open. Although, the CAMU may potentially include limited auxiliary areas that represent minor expansion of the existing unit (such as to facilitate traffic to and from the unit), this closure plan specifically prescribes closure procedures for the area that is used to treat and/or receive wastes inside the CAMU. At the time of closure, the lined compost area and all other equipment that is used to support the operation will be decontaminated as necessary according to the requirements of 35 IAC 724.214.

Rationale for Selection of Closure Alternative

Several closure options were considered for the CAMU, including: 1) clean closure (removal and off-site disposal of all waste materials in the LTF), 2) hybrid closure (limited removal of waste materials), and 3) closure in-place.

Clean closure under RCRA requires that all hazardous waste be removed from the unit, followed by confirmation sampling that demonstrates compliance with appropriate risk levels. The benefits of clean closure include the reduction or elimination of maintenance and future monitoring, and the ability to use the site for other purposes. However, excavation, transportation, and disposal of the contents of the CAMU would merely transfer the waste to an off-site disposal location. Such a transfer of waste does not reduce the toxicity, mobility, or volume of wastes associated with cleanup of the refinery nor does it reduce short-term risks associated with closure due to excess waste handling. Clean closure, relative to other options, would not be more protective of human health or the environment, and its limited benefits do not outweigh its considerable cost.

Hybrid closure typically is considered when there are local areas within a site that contain significantly higher concentrations of hazardous waste or hazardous waste constituents. Based on the chemical data collected to date and the proposed application rates and operating procedures described in the *Operation and Maintenance Plan* (Appendix III-D to this volume), areas of significantly higher concen-

trations will not occur as a result of CAMU operation. The CAMU will be operated to provide treatment of organic constituents, lowering overall concentrations. It will be actively managed to ensure that no "hot spots" of metal concentrations arise. Therefore, select removal and hybrid closure will not be necessary.

Closure in-place means that treated waste residuals will be left on site. Generally, a closure system is required to control surface water infiltration and to reduce the potential for subsequent migration of constituents to groundwater. Leaving waste in place will allow further degradation and/or immobilization of potential hazardous constituents. Since an LTF relies on the aerobic treatment of waste materials, the placement of an impermeable cap (clay cap) actually diminishes the effectiveness of the unit. A cover layer that can sustain vegetation and maintain aerobic conditions will support treatment and also reduce the potential for erosion and chemical transport by wind and water. USEPA Guidance Document SW-874, *Hazardous Waste Land Treatment* (USEPA, 1987), supports the closure of land treatment areas with a vegetative cap.

The hazardous constituents will be degraded and/or immobilized through land treatment, and the leaching of constituents beyond the unit boundary is unlikely. A vegetative cover will reduce infiltration of surface water, thus further decreasing the potential for movement of constituents of concern. The vegetative cover and the associated addition of organic matter to the soil also will increase adsorption and degradation of organics, as well as inorganics.

Root advancement also will contribute to the ongoing degradation, transformation, and immobilization processes within the treatment zones. Plants reduce the mobility of metals in soils by increasing the organic matter content of soils and by promoting the growth of a diversity of microbes in the rhizosphere (root-soil interface). Plants promote degradation of many petroleum hydrocarbon compounds by enhancing microbial activity in the soil. The results are lower concentrations of mobile metals from adsorption to organic matter and the degradation of organic compounds in association with bacterial transformations.

Therefore, the chosen closure method is closure in-place protected by a vegetative cover; this method is protective and is the most appropriate for a LTF. Following the last application of wastes, the soil of the unit will be tilled regularly until sufficient treatment is achieved and a suitable surface for planting seeds is provided. Groundwater monitoring and unsaturated zone monitoring, as described in Appendix IV-D and IV-N to this volume, will be used to document that this closure method remains protective in the future.

Closure Procedures

The in-place closure method will be designed to satisfy the regulatory requirements applicable to the closure of land treatment units, minimize the need for further maintenance, reduce infiltration, and continue to promote the aerobic degradation, transformation, and immobilization processes inherent in land

treatment. The CAMU will be closed by the installation and germination of a vegetative surface. During the closure period, operations will continue as necessary to maximize degradation and immobilization of hazardous constituents within the treatment zone. Similarly, the stormwater controls identified in the *Facility Upgrade Design and Engineering Basis* (Appendix III-A of this volume) also will also continue. Although no significant wind dispersion of contaminants is expected, appropriate management controls will be used during the closure period as necessary. Soil-pore-liquid monitoring will be terminated 90 days after the last waste application, but unsaturated zone soil-core monitoring will continue on a annual basis during the post-closure period.

State and Federal Regulatory Criteria

Closure and post-closure requirements for permitted land treatment units include establishment of a vegetative cover as specified in 35 IAC 724.380 (closure and post-closure). Specifically, Section (a)(8) of this Part requires the following:

> "Establish a vegetative cover on the portion of the facility being closed at such time that the cover will not substantially impede degradation, transformation or immobilization of hazardous constituents in the treatment zone. The vegetative cover must be capable of maintaining growth without extensive maintenance."

Additionally, the closure and post-closure requirements for land treatment units found in the IEPA document entitled *RCRA Part B Permit Application Decision Guide* (IEPA, December 1990) also specifies a vegetative cover consistent with the above regulations.

In accordance with the closure selection criteria presented in the USEPA guidance document entitled *Guidance Manual on Hazardous Waste Land Treatment Facility Closure/Post-Closure, 40 CFR Part 265* (USEPA, 1987), a vegetative cover satisfies the closure requirements for the site conditions present. These selection criteria are as follow:

- "Unsatisfactory migration of constituents from the unit has not occurred.
- "Environmental site and soil conditions (e.g., moderate to low precipitation and high evapotranspiration, soils with moderate high sorptive capacity) indicate a moderate to low potential for migration from the unit.
- "Residual waste concentrations are at low to medium concentrations, exhibit moderate potential for transport in percolating water or in air, and/or are of low residual toxicity.
- "A lower potential for migration to groundwater exists such that the primary purpose of the cover would be to minimize direct contact and inhalation of residual constituents and to control erosion and run-off.
- "There may be potential for continued in-place treatment of waste residuals in the soil system during the post-closure period."

Cover System Design

The cover system will be composed of surficial vegetation and will cover all areas that have been impacted by hazardous constituents. At the close of operation, a green house study will be conducted to select the most appropriate vegetation mixture.

Closure Schedule

The schedule and sequence of closure activities is shown below. Notification to the IEPA that the refinery intends to close the CAMU will be given 90 days after the last receipt of waste. If more than 30 days will be required to construct the vegetative cover and ensure that all support equipment is sufficiently decontaminated, a request for extension will be submitted to the IEPA. The survey plat and certification of closure will be submitted to the IEPA within 60 days after completing construction of the vegetative cover. Any request for a change in this schedule will be submitted in writing to the IEPA prior to expiration of the closure period.

Closure Activity	Estimated Schedule
Notification of intent to close/last receipt of hazardous waste	90 days after receiving last shipment of waste
Completion of the vegetative cap	120 days after receiving last shipment of waste
Closure certification/amended survey plat	60 days after completing cap construction

Amendments to the Closure Plan

As specific construction designs are developed, changes in operating plans occur, or other areas of the closure plan require modification, plan modification requests will be submitted in writing to the IEPA in accordance with the applicable requirements of 35 IAC 702, 703, and 705. Plan amendment requests will be submitted at least 60 days prior to the proposed change.

Closure Cost Estimate

As indicated in Attachment 1 to this document, the estimated cost of closing the CAMU is $201,000. The estimated closure cost is presented in 1997 dollars. Unit costs for individual tasks are based on standard industry practices. The cost assumes that all work will be completed by a third-party contractor. The cost estimate will be updated annually for inflation.

Financial Assurance Mechanism

Documentation of financial assurance mechanisms was provided in May 1997 upon transfer of facility ownership. The same mechanisms that applied previously to the LTF will continue to apply to the CAMU. Financial assurance information is reviewed annually and updated to reflect inflation or other

changes as necessary. The financial assurance value is sufficient to cover the current cost estimate provided in this addendum.

3.0 REFERENCES

1. Illinois Environmental Protection Agency, *RCRA Part B Permit Application Decision Guide*, December 1990.

2. U.S. Environmental Protection Agency, *Guidance Manual on Hazardous Waste Land Treatment Facility Closure/Post-Closure, 40 CFR Part 265*, 1987.

Attachment 1
Closure Costs (Vegetative Cap)

Note: Prices are in 1997 dollars and will have to updated annually to reflect inflation 12/11/97

Item	Quantity	Unit	Unit Cost	Total Cost
COVER CONSTRUCTION				
Mob/demob	1	ls	$5,000.00	$5,000
Tilling/Ripping, Fertilizer	13.5	ac	$2,000.00	$27,000
Grade	72600	sy	$0.14	$10,164
Seed and Mulch	72600	sy	$0.39	$28,314
Water	1	ls	$5,000.00	$5,000
Equipment/personnel decon	1	ls	$1,000.00	$1,000
Plant/Nutrient Testing (Greenhouse Study)	1	ls	$5,000.00	$5,000
Total Cap Construction Costs				$81,478
RELATED COVER CONSTRUCTION COSTS				
Contingencies (20% of Construction)	1	ls	$16,295.60	$16,296
Hazardous Site Premium (15%)	1	ls	$12,221.70	$12,222
Misc. Construction Expenses (a) (18.1%)	1	ls	$14,747.52	$14,748
Health and Safety (5%)	1	ls	$4,073.90	$4,074
Construction Management (10%)	1	ls	$8,147.80	$8,148
Engineering (10%)	1	ls	$8,147.80	$8,148
Closure Report	1	ls	$15,000.00	$15,000
Permitting	1	ls	$30,000.00	$30,000
Total Cap Construction Related Costs				$108,634
ONE-TIME COSTS				
Abandoned Lysimeters	11	ea	$1,000	$11,000
Total One-Time Costs				$11,000
Total Vegetative Cap Costs (1997)				**$201,112**

(a) Includes: Bonding and Insurance (2.5%), Small Tools (2%), and Home Office Expense (13.6%)

Appendix IV-I
Post-Closure Requirements

Lemont Refinery

December 1997

Prepared for:
The Lemont Refinery
CITGO Petroleum Corporation
Lemont, Illinois

Prepared by:
Radian International LLC
P.O. Box 201088
Austin, Texas 78720-1088

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IV-I Regulatory Requirement Cross Reference—Post-Closure Requirements 1

1.0 INTRODUCTION

The post-closure requirements contained in Section I of the approved Resource Conservation and Recovery Act (RCRA) Part B permit application are designed to support the closure of the land treatment facility (LTF). However, the Lemont Refinery is pursuing the designation of the LTF as a corrective action management unit (CAMU) to support the RCRA Facility Investigation (RFI). This addendum to the existing post-closure plan in Section I of the approved RCRA Part B permit application addresses post-closure requirements for the CAMU. Table IV-I shows the regulatory requirements for post-closure plans and the source documents containing each portion of the required information.

Table IV-I
Regulatory Requirement Cross Reference—Post-Closure Requirements

Requirement	Citation (35 IAC)	Source Document	
		Approved Permit Application	CAMU Modification
Requirements for Land Treatment Units	724.380 (c)	Provides basis of program	Appendix IV-I describes additional post-closure activities
Written Plan	724.218 (a)	Appendix I-2	Appendix IV-I adds provisions for the stormwater control system and some aspects of the unsaturated zone monitoring program
Activities After Closure	724.218 (b)	Appendix I-2 describes inspection, monitoring, and maintenance activities	
Copies of the Plan	724.218 (c)	Appendix I-2 identifies a facility contact who must maintain a current plan	No modification is necessary
Amendment of the Plan	724.218 (d)	Provides basis of program	Appendix IV-I includes provisions for plan modification
Post-Closure Notices	724.219	Section I includes post-closure notification	No modification is necessary
Certification of Completion	724.220	Provides basis of program	Appendix IV-I provides information on certifying completion
Financial Assurance Mechanism	724.243	Provides the mechanism of assurance	Appendix IV-I updates the post-closure cost estimate

CAMU = Corrective action management unit
IAC = Illinois Administrative Code

2.0 ADDENDUM TO THE POST-CLOSURE PLAN

During post-closure, the CAMU will continue to degrade, transform, and immobilize hazardous constituents in the treatment zone. The unit will be covered by a vegetative layer, and run on/run-off will be managed through the stormwater control program. The unsaturated zone monitoring program will continue, though soil-pore-liquid sampling will be terminated 90 days after the last application of waste to

the treatment zone. Wind dispersal of wastes is not likely to occur due to the vegetative cover. The following subsections provide additional information designed to supplement and/or modify the existing facility post-closure plan.

Amendment of the Post-Closure Plan

Post-closure of the CAMU will include inspection and maintenance activities that are designed to ensure the continued integrity of the unit. As designed, inspection activities will involve review of security control, the vegetative cover, the stormwater control system, and the groundwater monitoring system. Monitoring activities will include both groundwater and unsaturated zone monitoring programs. However, before post-closure, these procedures may be modified if CAMU conditions require an adjusted program. If necessary, this plan will be amended according to the requirements in 35 IAC 724.218 (d).

Inspections

The inspection program will be used to ensure the integrity of the CAMU and supporting structures by identifying areas needing corrective action. Inspection procedures are provided in Appendix I-2 of the approved RCRA Part B permit application. Additional and/or modified procedures are provided below.

During the post-closure period, inspections of the CAMU will include review of the security fence, vegetative cover, stormwater control system, and groundwater and unsaturated zone monitoring systems. Inspections will be conducted monthly; however, in the event of a significant rainfall or an extended dry period, additional periodic inspections may be conducted. If repairs to the vegetative cover are necessary and corrective action is conducted, the cover will be inspected weekly until repair of the condition has been fully established.

Instructions for inspecting the CAMU are given in the facility inspection form (Attachment 1 to this appendix). This form will be completed by the inspector to record observations and to document the need for corrective action (if necessary). In the event that corrective action is necessary, the inspector also will complete a refinery work request form (Appendix A to the *Post-Closure Plan* provided in the approved RCRA Part B permit application) to ensure that the necessary procedures will be taken to correct the observed deficiency.

To determine the conditions of the vegetative cover, the inspector will walk the perimeter of the CAMU and traverse it at its widest point. Conditions that the inspector should review include, but may not be limited to, the following:

- Surface disturbances or rutting caused by vehicles traversing the CAMU;
- Surface disturbances or rutting caused by other physical actions;

- Gullies, washouts, or other cover disturbances caused by water erosion;
- Settlement/subsidence;
- Wear, such as burrows due to animals;
- Inadequate or stressed vegetation; and
- Precipitation ponding.

The inspector will request corrective action if there are any erosion gullies where greater than 10% of the area is devoid of vegetation, or if there is differential settlement in excess of 1 foot. If the inspector suspects that unauthorized vehicles have traversed the CAMU, special attention will be given to inspecting the security system.

In addition to examining the cover, the inspector will assess the integrity of the stormwater control system. The stormwater control system consists of contouring designed to reduce the speed of overland flow, silt fencing that collects suspended solids, and grass-lined trenches that direct stormwater to the facility wastewater treatment system. The inspector must walk along the terraces and trenches to examine them for conditions such as the following:

- Obstructions to flow;
- Erosion/deterioration;
- Excessive siltation; or
- Inadequate vegetation.

The inspector will request corrective action if there are any obstructions to flow, erosion gullies, silt build-up in excess of 50% of designed freeboard, or more than 10% of the area is devoid of vegetation.

The groundwater monitoring system associated with the CAMU must be examined by the site investigator during regular inspections for the following conditions:

- Overall condition of the wells;
- Any evidence of damage and/or tampering;
- Condition of locks;
- Condition of surface seal;
- Readability of well identification numbers; and
- Condition of surface pads.

In the event that the inspector finds any broken locks, obstructions that prevent monitoring, compromised seals, or unreadable well identification numbers, corrective action must be taken.

Monitoring

Groundwater monitoring and unsaturated zone monitoring are conducted to demonstrate the effectiveness of the CAMU. Monitoring procedures are provided in Appendix A-2 of the approved RCRA Part B permit application. Additional and/or modified procedures associated with the groundwater monitoring program are provided in Section E of the approved RCRA Part B permit application and Appendix IV-D of this volume. Procedures for monitoring the unsaturated zone are provided in Appendix IV-N of this volume. Although both soil cores and soil-pore liquid will be monitored during operation of the CAMU, the monitoring of soil-pore liquid (using lysimeters) will be discontinued 90 days following the last waste application. Therefore, closure and post-closure monitoring of the unsaturated zone will only include soil-core sampling.

Maintenance

Preventative and corrective action maintenance undertaken at the facility may include repair of security control devices; erosion damage repair; correction of settlement, subsidence, and displacement; repair of the stormwater control system; well replacement; and mowing, fertilization, and other vegetative cover maintenance. Maintenance activities are expected to consist primarily of occasional site regrading and revegetation of erosion channels. Maintenance procedures are provided in Appendix A-2 of the approved RCRA Part B permit application. Additional and/or modified procedures associated with maintenance of the stormwater control system are provided in the *Facility Upgrade Design and Engineering Basis* (Appendix III-A to this volume), and maintenance of the groundwater monitoring system is discussed in the *Groundwater Monitoring Program* (Section E of the approved RCRA Part B permit application as amended by Appendix IV-D of this volume).

Corrective action of the vegetative cover will be initiated if more than 10% of the cover area is devoid of vegetation or if erosion gullies or surface cracks are observed. These areas will be replaced immediately with additional soil meeting the specifications of the cover material, followed by fertilizing, seeding, and mulching, as necessary.

Depressions from settlement found in the vegetative cover in excess of 2 feet will be repaired promptly. Repairs may include regrading and the addition of appropriate cover material. This may be followed by fertilizing, seeding, and mulching, as necessary, to promote vegetative growth and to prevent erosion of the repaired area. It is expected that equipment used for such repairs may include, but may not be limited to, dump trucks and rubber-tired front-end loaders, broadcast spreaders, and hand tools.

After completing system repairs, inspection of the repaired area will be conducted monthly until repair of the condition has been fully established. If repairs are necessary at a time outside of the optimal growing season, temporary reseeding with winter plants or mulching will be conducted initially with reseeding of the preferred vegetation during the next appropriate season.

Certification of Completion of Post-Closure

No later then 60 days after completion of the established post-closure period, the Lemont Refinery will submit to the Illinois Environmental Protection Agency (IEPA) a certification that the post-closure care was performed in accordance with the specifications in this plan.

Post-Closure Cost Estimate

The cost estimate for post-closure is presented in 1997 dollars and will be updated annually to reflect inflation. The total estimated cost for post-closure of the LTF is $1,120,000. Attachment 2 to this document shows the breakdown of the post-closure costs. Cost estimates are provided for the groundwater monitoring program, soil-core sampling program, and maintenance of the LTFs. Unit costs for individual tasks are based on industry standard practices. It is assumed that all work will be completed by an independent, third-party contractor.

Financial Assurance Mechanism

Documentation of financial assurance mechanisms was provided to IEPA in May 1997 when ownership was transferred. Financial assurance information is reviewed annually and updated to reflect inflation or other changes as necessary. The financial assurance value is sufficient to cover the cost estimate in this addendum.

CLOSURE PERIOD INSPECTION FORM
LAND TREATMENT FACILITY
Lemont Refinery

GENERAL INFORMATION

Note: Read the Inspection Form Instructions and Inspections Procedures on Page 8 of This Form Before Conducting the Inspection.

1) NAME OF INSPECTOR: _____
2) COMPANY: _____
3) DATE: _____
4) TIME: _____ AM or PM
5) WEATHER:
TEMPERATURE _____ °F
SUNNY ☐ CLOUDY ☐ WINDY ☐ RAINY ☐ SNOWY ☐
6) GROUND CONDITIONS: WET ☐ DRY ☐ SNOW ☐
7) IS THIS A SCHEDULED INSPECTION? YES ☐ NO ☐
IF NO, EXPLAIN: _____
_____

8) CLOSURE PHASE:
☐ PRE-COVER CONSTRUCTION
☐ COVER CONSTRUCTION
☐ POST COVER CONSTRUCTION

MONITORING WELL INSPECTION

9) ARE THE MONITORING WELLS LOCKED? YES ☐ NO ☐
IF NO, REFERENCE SPECIFIC WELL(S) AND EXPLAIN: _____
_____
_____

10) ARE GUARD POSTS OR PROTECTIVE CASINGS DAMAGED? YES ☐ NO ☐
IF YES, REFERENCE SPECIFIC WELL(S) AND EXPLAIN: _____
_____
_____

11) ARE THE WELL LOCK OPERABLE? YES ☐ NO ☐
IF NO, REFERENCE SPECIFIC WELL(S) AND EXPLAIN: _____
_____
_____

12) ARE ID NUMBERS CLEARLY VISIBLE ON WELL CASING? YES ❒ NO ❒
IF NO, REFERENCE SPECIFIC WELL(S) AND EXPLAIN:_____

13) ARE THERE GAPS OR CRACKS IN THE SURFACE PAD? YES ❒ NO ❒
IF YES, REFERENCE SPECIFIC WELL(S) AND EXPLAIN:_____

LYSIMETER INSPECTION

14) ARE THE LYSIMETERS LOCKED AND IN OVERALL GOOD CONDITION?
YES ❒ NO ❒

IF NO, REFERENCE SPECIFIC WELL AND EXPLAIN:_____

15) DO THE GUARD POSTS OR PROTECTIVE CASINGS INDICATE ANY DAMAGE?
YES ❒ NO ❒

IF YES, EXPLAIN:_____

16) ARE THE LOCKS IN OVERALL GOOD CONDITION: YES ❒ NO ❒

IF YES, EXPLAIN:_____

LYSIMETERS WILL NOT BE INSPECTED DURING POST CLOSURE AS SOIL-PORE-LIQUID MONITORING WILL BE DISCONTINUED 90 DAYS FOLLOWING THE LAST WASTE APPLICATION.

PERIMETER FENCE INSPECTION

17) ANY SIGNS OF UNAUTHORIZED ENTRY? YES ❒ NO ❒
18) ARE ANY FENCE POSTS DAMAGED? YES ❒ NO ❒
19) DOES FENCE APPEAR IN GOOD CONDITIONS? YES ❒ NO ❒
20) ARE ANY SIGNS MISSING? YES ❒ NO ❒
21) ARE THE SIGNS READABLE? YES ❒ NO ❒
22) UPON ARRIVAL, WERE THE GATES LOCKED? YES ❒ NO ❒

COMMENTS: _____

COVER SYSTEM INSPECTION

23) IS THERE ANY SETTLING, SUBSIDENCE, OR EROSION EVIDENT?

AREA I	YES ☐	NO ☐
AREA II	YES ☐	NO ☐
AREA III	YES ☐	NO ☐
AREA IV	YES ☐	NO ☐

IF YES, NOTE AREA AND EXPLAIN: _____

24) ARE THERE ANY TREES OR SHRUBS GROWING IN THE COVER SYSTEM?

AREA I	YES ☐	NO ☐
AREA II	YES ☐	NO ☐
AREA III	YES ☐	NO ☐
AREA IV	YES ☐	NO ☐

IF YES, NOTE AREA AND EXPLAIN: _____

25) DOES THE VEGETATION GROWTH HEIGHT IMPEDE INSPECTION OF THE COVER SYSTEM SUCH THAT EVIDENCE OF SUBSIDENCE OR EROSION IS DIFFICULT TO DETECT:

AREA I	YES ☐	NO ☐
AREA II	YES ☐	NO ☐
AREA III	YES ☐	NO ☐
AREA IV	YES ☐	NO ☐

IF YES, NOTE AREA AND EXPLAIN: _____

26) ARE THERE ANY SIGNS OF STRESSED VEGETATION OR NO VEGETATION?

AREA I	YES ❒	NO ❒
AREA II	YES ❒	NO ❒
AREA III	YES ❒	NO ❒
AREA IV	YES ❒	NO ❒

IF YES, NOTE AREA AND EXPLAIN: _____

27) ARE THERE ANY SIGNS OF BURROWING ANIMALS IN THE COVER SYSTEM?

AREA I	YES ❒	NO ❒
AREA II	YES ❒	NO ❒
AREA III	YES ❒	NO ❒
AREA IV	YES ❒	NO ❒

IF YES, NOTE AREA AND EXPLAIN: _____

28) ARE THERE ANY SURFACE DISTURBANCES FROM VEHICLES OR OTHER PHYSICAL ACTIONS?

AREA I	YES ❒	NO ❒
AREA II	YES ❒	NO ❒
AREA III	YES ❒	NO ❒
AREA IV	YES ❒	NO ❒

IF YES, NOTE AREA AND EXPLAIN: _____

29) IS THERE ANY PRECIPITATION PONDING ON THE COVER SYSTEM?

AREA I	YES ❒	NO ❒
AREA II	YES ❒	NO ❒
AREA III	YES ❒	NO ❒
AREA IV	YES ❒	NO ❒

IF YES, NOTE AREA AND EXPLAIN: _____

STORMWATER MANAGEMENT SYSTEM INSPECTION

INTERMITTENT STREAM

30) ARE THERE ANY OBSTRUCTIONS TO FLOW? YES ☐ NO ☐
IF YES, EXPLAIN: _____

31) IS THERE ANY EVIDENCE OF EROSION OR DETERIORATION THAT COULD RENDER THE STRUCTURE OR CHANNEL INEFFECTIVE OR THAT COULD DAMAGE ANY OF THE LAND-FARM PLOT COVER SYSTEMS? YES ☐ NO ☐
IF YES, EXPLAIN: _____

CULVERTS

32) ARE THE INVERTS FREE OF DEBRIS? YES ☐ NO ☐
IF NO, EXPLAIN: _____

33) IS THERE ANY EVIDENCE OF EROSION OR DETERIORATION? YES ☐ NO ☐
IF YES, EXPLAIN: _____

GRASS WATERWAYS AND DIVERSION CHANNELS (Applicable to Areas III and IV only)

34) IS THERE ANY EVIDENCE OF EROSION OR DETERIORATION THAT COULD RENDER THE STRUCTURE OR CHANNEL INEFFECTIVE OR THAT COULD DAMAGE ANY OF THE LAND-FARM PLOT COVER SYSTEMS? YES ☐ NO ☐
IF YES, EXPLAIN: _____

35) IS THERE EXCESSIVE SILTATION? YES ☐ NO ☐
IF YES, EXPLAIN: _____

36) IS THE VEGETATION IN THE CHANNELS ADEQUATE? YES ☐ NO ☐
IF NO, EXPLAIN: _____

37) ARE THERE ANY OBSTRUCTIONS TO FLOW? YES ☐ NO ☐
IF YES, EXPLAIN: _____

RUN-ON AND RUN-OFF CONTROL SYSTEM

38) ARE THE RUN-ON AND RUN-OFF CONTROL MEASURES INSTALLED AND IN FUNCTIONAL CONDITION?

AREA I	YES ☐	NO ☐
AREA II	YES ☐	NO ☐
AREA III	YES ☐	NO ☐
AREA IV	YES ☐	NO ☐

IF NO, NOTE EXACT AREA AND EXPLAIN. Also, note if additional temporary measures are needed and describe location. _____

39) DO THE RUN-ON AND RUN-OFF CONTROL MEASURES (SILT FENCES) HAVE EXCESS SEDIMENT BUILD UP REQUIRING MAINTENANCE

AREA I	YES ☐	NO ☐
AREA II	YES ☐	NO ☐
AREA III	YES ☐	NO ☐
AREA IV	YES ☐	NO ☐

IF YES, NOTE EXACT AREA AND SUGGEST ACTION(S). _____

ACTION ITEMS

RE-INSPECTION NOTES

INSPECTION FORM INSTRUCTIONS AND INSPECTION PROCEDURES

1. Complete General Information section. Please note whether this inspection is occurring during the pre-cover construction phase, during the cover construction phase, or subsequent to cover construction (i.e., during the cover vegetative growth phase, but before post closure.

2. Complete 19) in Perimeter Fence Inspection section.

Refer to drawings 1 through 11 in the closure plan to complete the following:

3. Inspect each of the four cover areas successively. The inspector shall walk the perimeter of each area and across the cover from a selected point on the cover perimeter (inspector's discretion) to a perimeter point on the opposite side of the cover. Carefully inspect areas where the intermittent stream overlaps with the cover system transition. The inspector may traverse the cover system more than once if deemed necessary. Complete the Cover System Inspection section for each area.

Note: All monitoring wells, run-on and run-off control systems, and perimeter fencing encountered during the cover system inspection also may be inspected. Complete the appropriate sections of the inspection form for these structures.

4. Inspect the culverts and rip rap in the intermittent stream channel within the land treatment facility (LTF). Based on observations made pursuant to instructions 3 and 4, complete the Stormwater Management System Inspection section.

Complete the inspection of all monitoring wells, run-on and run-off control systems, and perimeter fencing that was not encountered or inspected during 3 and 4 above. This includes all of the above listed structures not located on the LTF (e.g., monitoring wells located in the adjacent agricultural land etc.).

Attachment 2
Post-Closure Costs

Note: Prices are in 1997 dollars and will have to updated annually to reflect inflation 12/11/97

Item	Quantity	Unit	Unit Cost	Total Cost per Event	Events per year	Total Cost Annually
GROUNDWATER MONITORING						
Note: There are 6 deep GW monitoring wells and 18 piezometers associated with the LTF.						
Samples will be collected semi-annually from each of the 6 wells + MSDS and DUP.						
Piezometers will be used to determine groundwater elevations in the uppermost aquifer.						
Sampling Personnel Cost	40	hr	$65.00	$2,600	2	$5,200
Sample Preservation Cost (per well)	8	ea	$30.00	$240	2	$480
Sample containers	1	ls	$60.00	$60	2	$120
Over-night shipping	1	ls	$280.00	$280	2	$560
Detection monitoring parameters	8	ea	$900.00	$7,200	2	$14,400
Groundwater contamination indicators	8	ea	$90.00	$720	2	$1,440
Annual Cost						$22,200
SOIL-CORE MONITORING						
Note: Eight soil-core locations at two depths (randomly selected) will be sampled annually.						
The soil samples will be analyzed for Skinner-list parameters.						
Engineer/Scientist (2)	30	hr	$65.00	$1,950	1	$1,950
Drilling rig and crew	10	hr	$170.00	$1,700	1	$1,700
Drill rig mob	1	ls	$300.00	$300	1	$300
Sample bottles	1	ls	$60.00	$60	1	$60
Bentonite (2 bag/hole)	16	bag	$12.65	$202	1	$202
Overnight shipping	1	ls	$140.00	$140	1	$140
Analysis Cost (Skinner list)	16	ea	$900.00	$14,400	1	$14,400
Annual Cost						$18,752
RELATED MONITORING COSTS						
Per Diem (2)	8	day	30	$240	2	$480
Truck rental	4	day	70	$280	2	$560
Data Validation	60	hr	85	$5,100	2	$10,200
Data Management	10	hr	85	$850	2	$1,700
Reporting	1	ls	$8,000.00	$8,000	1	$8,000
Annual Cost						$20,940
MAINTENANCE						
Cover Inspection	8	hr	50	$400	12	$4,800
Road Maintenance	1	ls	5000	$5,000	1	$5,000
Fence Maintenance	1	ls	5000	$5,000	1	$5,000
Cover Maintenance (mowing, seeding, fertilizer)	1	ls	15000	$15,000	1	$15,000
Well Maintenance	1	ls	5000	$5,000	1	$5,000
Annual Cost						$30,000
Total Annual Post-Closure Costs						$91,892
Cost in Present Dollars (1997): 30 years at 5% above inflation						**$1,412,570**

Appendix IV-J
Certifications

Lemont Refinery

December 1997

Prepared for:
The Lemont Refinery
CITGO Petroleum Corporation
Lemont, Illinois

Prepared by:
Radian International LLC
P.O. Box 201088
Austin, Texas 78720-1088

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IV-J Regulatory Requirement Cross-Reference—Certifications 1

1.0 INTRODUCTION

Certification of completeness and technical content are required by 35 Illinois Administrative Code 702.126. Section K of the approved Resource Conservation and Recovery Act (RCRA) Part B permit application provides facility certification (Part B certification), prior conduct certification that no improper actions have been undertaken by the operators of the facility, and engineering certification (certification of design drawings by a certified professional engineer licensed in the state of Illinois). Table IV-K shows the regulatory requirements for certifications and the source document for each portion of the required information.

Table IV-J
Regulatory Requirement Cross Reference—Certifications

Requirement	Citation (35 IAC)	Source Document	
		Approved Permit Application	CAMU Modification
Part B Certification	702.126 (d)	Section K	Appendix IV-J provides current certifications
Engineering Certification	Il Rev. Stat., par 5101, Sec. 1 and par. 5119, Sec. 13.1	Section K	Appendix IV-J provides current certifications

CAMU = Corrective action management unit
IAC = Illinois Administrative Code

2.0 ADDENDUM TO CERTIFICATIONS

The pages that follow provide the revised facility certification, as well as revised engineering certification requirements.

Facility Certification

This section is provided in compliance with 40 Code of Federal Regulations (CFR) 270.11(d) and 35 Illinois Administrative Code 702.126 (b).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

The Lemont Refinery
CITGO Petroleum Corporation

(Sign)_____

(Print)_____

(Date)_____

Engineering Certification

Design drawings of the land treatment facility will be certified by a professional engineer who is licensed in the state of Illinois in accordance with Illinois Rev. Stat. Par. 5101, Sec. 1 and par. 5119, Sec. 13.1 once design drawings become final.

Appendix IV-K
Continuing Releases

Lemont Refinery

December 1997

Prepared for:
The Lemont Refinery
CITGO Petroleum Corporation
Lemont, Illinois

Prepared by:
Radian International LLC
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2.0 ADDENDUM TO CONTINUING RELEASES 1

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IV-K Regulatory Requirement Cross-Reference—Continuing Releases 1

1.0 INTRODUCTION

The Resource Conservation and Recovery Act (RCRA) permit program requires under 35 Illinois Administrative Code (IAC) 703.187 that facilities seeking permits provide information relating to all known solid waste management units (SWMUs). Section L of the approved RCRA Part B permit application provides a review of 32 SWMUs at the Lemont Refinery based on information available at the time the permit application was prepared. Since that time, the Illinois Environmental Protection Agency (IEPA) issued the final RCRA permit which includes 34 SWMUs. These SWMUs are listed in Section IV of the final RCRA permit and a summary of each is provided in the *Waste Characterization Report* (Appendix III-B to this volume). Table IV-K shows the regulatory requirements for continuing releases at permitted facilities and the source document for each portion of the required information.

Table IV-K
Regulatory Requirement Cross Reference— Continuing Releases

Requirement	Citation (35 IAC)	Source Document	
		Approved Permit Application	CAMU Modification
Solid Waste Management Units	703.187	Section L provides the basis of the corrective action program	Appendix IV-K and Appendix III-B provide a review of the corrective action program and current SWMU summaries

CAMU = Corrective action management unit
IAC = Illinois Administrative Code
SWMU = Solid waste management unit

2.0 ADDENDUM TO CONTINUING RELEASES

The Lemont Refinery will conduct a RCRA facility investigation (RFI) over the next several years that will determine whether additional investigation or remediation is required for the solid waste management units (SWMUs) that have been identified. Information summarizing what is known about each SWMU is provided in the *Waste Characterization Report* (Appendix III-B of this volume). The work plan for the first phase of the RFI is scheduled to be submitted in January 1998 and will be designed to meet the requirements of 35 IAC 703.187.

Appendix IV-L
References

Lemont Refinery

December 1997

Prepared for:
The Lemont Refinery
CITGO Petroleum Corporation
Lemont, Illinois

Prepared by:
Radian International LLC
P.O. Box 201088-1088
Austin, Texas 78720-1088

1. Dragun, James, *The Soil Chemistry of Hazardous Materials*, Hazardous Materials Control Resources Institute, Silver Spring, Maryland, 1988.

2. ENSR Consulting and Engineering, *Report of Former Sludge Drying Bed Area Characterization*, March 1994.

3. Environmental Resources Management-North Central, Inc. (ERM), *Phase I Closure Report For Land Treatment Area*, June 1989.

4. Geraghty & Miller, Inc., *Site Characterization Report UNO-VEN Land Treatment Facility, Lemont, Illinois*, March 1995.

5. Geraghty & Miller, Inc., *The UNO-VEN Company, Chicago Refinery, Lemont Illinois, RCRA Part B Permit Application*, Volumes I, II, and III, May 1995.

6. Illinois Environmental Protection Agency, Bureau of Land, Permit Section, *RCRA Facility Assessment, UNO-VEN, Chicago Refinery,* September 1996.

7. Illinois Environmental Protection Agency, *RCRA Part B Permit Application Decision Guide,* December 1990.

8. Illinois Environmental Protection Agency, *Tiered Approach to Cleanup Objectives Guidance Document*, April 1997.

9. Maude Environmental, Inc., *Site Assessment for the UNO-VEN Company, Lemont Refinery, Former Service Station and Solvent Loading Rack,* July 1993.

10. Maude Environmental, Inc., *Site Assessment for the UNO-VEN Company, Lemont Refinery, Fuels Loading Rack* July 1993.

11. Maude Environmental, Inc., *Site Assessment for the UNO-VEN Company, Lemont Refinery, Process Blend Center*, July 1993.

12. Metcalf & Eddy, *Hydrologic Study—Run-off to Storm Pond*, 1994.

13. U.S. Environmental Protection Agency, *Guidance Manual on Hazardous Waste Land Treatment Facility Closure/Post-Closure*, 40 CFR Part 265, 1987.

14. U.S. Environmental Protection Agency, *Guidance Manual on Unsaturated Zone Monitoring for Hazardous Land Treatment Units*, October 1986.

15. U.S. Environmental Protection Agency, *Hazardous Waste Land Treatment*, April 1983.

17. U.S. Environmental Protection Agency, *Permit Guidance Manual on Hazardous Waste Land Treatment Demonstrations*, July 1986.

Appendix IV-M
IEPA Checklist

Lemont Refinery

December 1997

Prepared for:
The Lemont Refinery
CITGO Petroleum Corporation
Lemont, Illinois

Prepared by:
Radian International LLC
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Revised December, 1990

Facility Name The Lemont Refinery, CITGO Petroleum Company, Lemont, IL
State ID No. LPC # 197803004
EPA ID No. ILD 041550567
Date original Part B Received _____
Date revised Part B Received _____
Reviewer _____

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
RCRA PART B APPLICATION
COMPLETENESS/TECHNICAL EVALUATION CHECKLIST

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
A. PART A APPLICATION						Section V of Volume 4
B. FACILITY DESCRIPTION						
B-1	General description					Facility Description is provided primarily in the approved RCRA Part B permit application. Appendix IV-A of Volume 4 includes facility and procedural changes to support CAMU operation.
B-2	Topographic map					
B-2a	General requirements					
B-2b	Additional requirements for land disposal facilities					

This Agency is authorized to require this information under Illinois Revised Statues, 1979, Chapter 111 1/2, Section 1039. Disclosure of this information is required under that Section. Failure to do so may prevent this form from being processed and could result in your application being denied. This form has been approved by the Forms Management Center.

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		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
B-3a	Seismic standard					
B-3b	Floodplain standard					
B-3b(1)	Demonstration of compliance					
B-3b(1)(a)	Flood proofing and flood protection measures					
B-3b(1)(b)	Flood plan					
B-3b(2)	Waiver					
B-3b(3)	Plan for future compliance with floodplain standard					
B-3(c)	Other location requirements					
B-4	Traffic information					
B-5	Operating Record					
C. WASTE CHARACTERISTICS						
C-1	Chemical and physical analyses, including sampling/ analysis methods					Waste characteristics is provided in the approved RCRA Part B permit application. Additional information regarding anticipated remediation wastes is provided in Appendix III-B and IV-B of Volume 4.
C-1a	Containerized wastes					
C-1b	Waste in tank systems					
C-1c	Waste in piles					
C-1d	Landfilled wastes					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
C-1e	Wastes incinerated and wastes used in performance tests					
C-1f	Wastes to be land treated					Appendix III-B of Volume 4
C-2	Waste analysis plan					Appendix III-B and IV-B of Volume 4. A waste analysis plan will be prepared in coordination with site work plans supporting the RCRA Facility Investigation.
C-2a	Parameters and rationale					
C-2b	Test methods					
C-2c	Sampling methods					
C-2d	Frequency of analyses					
C-2e	Additional requirements for wastes generated off-site					
C-2f	Additional requirements for ignitable, reactive or incompatible wastes					
C-2g	Land Ban					LDRs do not apply to this unit.
C-3	Quality Assurance					

D. PROCESS INFORMATION

Revised December, 1990

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-1	Containers					NA. Process Information is provided primarily in the approved RCRA Part B permit application. Land treatment and potentially composting all the only means of treatment to be used. All other units or treatment types are not applicable.
D-1a	Containers with free liquids					
D-1a(1)	Description of containers					
D-1a(2)	Container management practices					
D-1a(3)	Secondary containment system design and operation					
D-1a(3)(a)	Requirement for the base or liner to contain liquids					
D-1a(3)(b)	Containment system drainage					
D-1a(3)(c)	Containment system capacity					
D-1a(3)(d)	Control of run-on					
D-1a(3)(e)	Removal of liquids from containment systems					
D-1b	Containers without free liquid					
D-1b(1)	Test for free liquids					
D-1b(2)	Description of containers					
D-1b(3)	Container management practices					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-1b(4)	Container storage area drainage					
D-2	Tank Systems					NA
D-2a	Existing tank systems					
D-2a(1)	Assessment of existing tank system integrity					
D-2a(2)	External corrosion practices					
D-2b	New tank systems					
D-2b(1)	Assessment of new tank system's integrity					
D-2b(2)	External corrosion protection					
D-2b(3)	Description of tank system installation and testing plans and procedures					
D-2c	Dimensions and capacity of each tank					
D-2d	Description of feed systems, safety cutoff, bypass systems and pressure control					
D-2e	Diagram of piping, instrumentation, and process flow for each tank system					
D-2f	Containment and detection of releases					

Revised December, 1990

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-2f(1)	Plans and description of the design, construction, and operation of the secondary containment system for each tank system	_____	_____	_____	_____	_____
D-2f(1)(a)	Tank age determination	_____	_____	_____	_____	_____
D-2f(1)(b)	Requirements for secondary containment and leak detection	_____	_____	_____	_____	_____
D-2f(1)(c)	Requirements for an external liner, vault, double-walled tank or equivalent device	_____	_____	_____	_____	_____
D-2f(1)(d)	Secondary containment and leak detection requirements for ancillary equipment	_____	_____	_____	_____	_____
D-2f(2)	Requirements for tank systems until secondary containment is implemented	_____	_____	_____	_____	_____
D-2f(3)	Variance from secondary containment requirements	_____	_____	_____	_____	_____
D-2f(3)(a)	Variance based on a demonstration of equivalent protection of groundwater and surface water	_____	_____	_____	_____	_____
D-2f(3)(b)	Variance based on a demonstration of no substantial present or potential hazard	_____	_____	_____	_____	_____

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-2f(3)(c)	Exemption based on no free liquids and location inside a building					
D-2g	Controls and practices to prevent spills and overflow					
D-3	Waste piles					NA
D-3a	List of wastes					
D-3b	Liner exemption					
D-3b(1)	Enclosed dry piles					
D-3b(1)(a)	Protection from precipitation					
D-3b(1)(b)	Free liquids					
D-3b(1)(c)	Run-on protection					
D-3b(1)(d)	Wind dispersal control					
D-3b(1)(e)	Leachate generation					
D-3b(2)	Liner exemption request					
D-3c	Liner engineering report					
D-3c(1)	Liner description					
D-3c(2)	Liner location relative to high water table					
D-3c(3)	Calculation of required soil liner thickness					
D-3c(4)	Liner strength requirements					

Revised December, 1990

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-3c(5)	Liner strength demonstration					
D-3c(6)	Liner/waste compatibility testing results					
D-3c(7)	Liner installation					
D-3c(7)(a)	Synthetic liner seaming					
D-3c(7)(b)	Soil liner compaction					
D-3c(7)(c)	Installation inspection/testing program					
D-3c(8)	Liner coverage					
D-3c(9)	Liner exposure prevention					
D-3c(10)	Synthetic liner bedding					
D-3d	Liner foundation report					
D-3d(1)	Liner foundation design description					
D-3d(2)	Subsurface exploration data					
D-3d(3)	Laboratory testing data					
D-3d(4)	Engineering analyses					
D-3d(4)(a)	Settlement potential					
D-3d(4)(b)	Bearing capacity and stability					
D-3d(4)(c)	Potential for bottom heave or blowout					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-3d(4)(d)	Construction and operational loading					
D-3d(5)	Foundation installation procedures					
D-3d(6)	Foundation installation inspection program					
D-3e	Leachate collection and removal system					
D-3e(1)	System design and operation					
D-3e(2)	Chemical resistance					
D-3e(3)	Strength of materials					
D-3e(4)	Prevention of clogging					
D-3e(5)	Installation					
D-3e(6)	Maintenance					
D-3f	Run-on control system					
D-3f(1)	Calculation of peak flow					
D-3f(2)	Design and performance					
D-3f(3)	Construction					
D-3f(4)	Maintenance					
D-3g	Run-off control system					
D-3g(1)	Calculation of peak flow					
D-3g(2)	Design and performance					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-3g(3)	Construction					
D-3g(4)	Maintenance					
D-3h	Management of collection and holding units					
D-3i	Control of wind dispersal					
D-3j	Groundwater monitoring exemption					
D-3j(1)	Engineered structure					
D-3j(2)	No liquid waste					
D-3j(3)	Exclusion of liquids					
D-3j(4)	Containment system					
D-3j(5)	Leak detection system					
D-3j(6)	Operation of leak detection system					
D-3j(7)	No migration					
D-3k	Treatment within the pile					
D-3k(1)	Treatment process description					
D-3k(2)	Equipment used					
D-3k(3)	Residuals description					
D-3l	Special management plan for piles containing wastes F020, F021, F022, F023, F026, and F027					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-3l(1)	Waste description					
D-3l(2)	Soil description					
D-3l(3)	Mobilizing properties					
D-3l(4)	Additional management techniques					
D-4	Surface impoundments					NA
D-4a	List of wastes					
D-4b	Liner system exemption requests					
D-4b(1)	Exemption based on existing portion					
D-4b(2)	Exemption based on alternative design and location					
D-4c	Liner system, general items					
D-4c(1)	Liner system description					
D-4c(2)	Liner system location relative to high water table					
D-4c(3)	Loads on liner system					
D-4c(4)	Liner system coverage					
D-4c(5)	Liner system exposure prevention					
D-4d	Liner system foundation					
D-4d(1)	Foundation description					

Revised December, 1990

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-4d(2)	Subsurface exploration data					
D-4d(3)	Laboratory testing data					
D-4d(4)	Engineering analyses					
D-4d(4)(a)	Settlement potential					
D-4d(4)(b)	Bearing capacity					
D-4d(4)(c)	Potential for excess hydrostatic or gas pressure					
D-4e	Liner system liners					
D-4e(1)	Synthetic liners					
D-4e(1)(a)	Synthetic liner compatibility data					
D-4e(1)(b)	Synthetic liner strength					
D-4e(1)(c)	Synthetic liner bedding					
D-4e(2)	Soil liners					
D-4e(2)(a)	Material testing data					
D-4e(2)(b)	Soil liner compatibility data					
D-4e(2)(c)	Soil liner thickness					
D-4e(2)(d)	Soil liner strength					
D-4f	Liner system leachate detection system					
D-4f(1)	System operation and design					
D-4f(2)	Equivalent capacity					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-4f(3)	Grading and drainage					
D-4f(4)	System compatibility					
D-4f(5)	System strength					
D-4f(5)(a)	Stability of drainage layers					
D-4f(5)(b)	Strength of piping					
D-4f(6)	Prevention of clogging					
D-4g	Liner system construction and maintenance					
D-4g(1)	Material specifications					
D-4g(1)(a)	Synthetic liners					
D-4g(1)(b)	Soil liners					
D-4g(1)(c)	Leachate detection system					
D-4g(2)	Construction specifications					
D-4g(2)(a)	Liner system foundation					
D-4g(2)(b)	Soil liner					
D-4g(2)(c)	Synthetic liners					
D-4g(2)(d)	Leachate detection system					
D-4g(3)	Construction quality control program					
D-4g(4)	Maintenance procedures for leachate detection system					
D-4g(5)	Liner repairs during operations					

Revised December, 1990

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-4h	Prevention of overtopping					
D-4h(1)	Design features					
D-4h(2)	Operating procedures					
D-4h(3)	Overtopping prevention					
D-4h(4)	Freeboard requirements					
D-4h(5)	Outflow destination					
D-4i	Dike stability					
D-4i(1)	Engineer's certification					
D-4i(2)	Dike design description					
D-4i(3)	Erosion and piping protection					
D-4i(4)	Subsurface soil conditions					
D-4i(5)	Stability analysis					
D-4i(6)	Strength and consolidation test results					
D-4i(7)	Dike constructio procedures					
D-4i(8)	Dike construction inspection program					
D-4j	Special waste management plan for surface impoundments containing wastes F020, F021, F022, F023, F026, and F027					
D-4j(1)	Waste description					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-4j(2)	Soil description					
D-4j(3)	Mobilizing properties					
D-4j(4)	Additional management techniques					
D-5	Incinerators					NA
D-5a	Justification for exemption					
D-5b	Trial burn					
D-5b(1)	New incinerator start-up/ shakedown conditions (reserved)					
D-5b(2)	Trial burn plan					
D-5b(2)(a)	Engineering description of incinerator					
D-5b(2)(b)	Sampling, analysis and monitoring procedures including QA/QC plan					
D-5b(2)(c)	Train burn schedule					
D-5b(2)(d)	Test protocols					
D-5b(2)(e)	Pollution control equipment operation					
D-5b(2)(f)	Shutdown procedures					
D-5b(2)(g)	New incinerator post-trial burn operation (reserved)					

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		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-5c	Data submitted in lieu of trial burn					
D-5c(1)	Engineering description of incinerator					
D-5c(2)	Expected incinerator operation					
D-5c(3)	Design and operating condition comparisons					
D-5c(4)	Previous trial burn results					
D-5c(4)(a)	Sampling and analysis techniques					
D-5c(4)(b)	Methods and results					
D-5d	Determinations					
D-6	Landfills					NA
D-6a	List of wastes					
D-6b	Liner system exemption requests					
D-6b(1)	Exemption based on existing portion					
D-6b(2)	Exemption based on alternative design and location					
D-6b(3)	Exemption for monofills					
D-6b(4)	Groundwater monitoring exemption					
D-6b(4)(a)	Engineered structure					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-6b(4)(b)	No liquid waste					
D-6b(4)(c)	Exclusion of liquids					
D-6b(4)(d)	Containment system					
D-6b(4)(e)	Leak detection system					
D-6b(4)(f)	Operation of leak detection system					
D-6b(4)(g)	No migration					
D-6c	Liner system, general items					
D-6c(1)	Liner system description					
D-6c(2)	Liner system location relative to high water table					
D-6c(3)	Loads on liner system					
D-6c(4)	Liner system coverage					
D-6c(5)	Liner system exposure prevention					
D-6d	Liner system foundation					
D-6d(1)	Foundation description					
D-6d(2)	Subsurface exploration data					
D-6d(3)	Laboratory testing data					
D-6d(4)	Engineering analyses					
D-6d(4)(a)	Settlement potential					
D-6d(4)(b)	Bearing capacity					

Revised December, 1990

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-6d(4)(c)	Stability of landfill slopes					
D-6d(4)(d)	Potential for excess hydrostatic or gas pressure					
D-6e	Liner system liners					
D-6e(1)	Synthetic liners					
D-6e(1)(a)	Synthetic liner compatibility data					
D-6e(1)(b)	Synthetic liner strength					
D-6e(1)(c)	Synthetic liner bedding					
D-6e(2)	Soil liners					
D-6e(2)(a)	Material testing data					
D-6e(2)(b)	Soil liner compatibility data					
D-6e(2)(c)	Soil liner thickness					
D-6e(2)(d)	Soil liner strength					
D-6f	Liner system, leachate collection/detection systems					
D-6f(1)	System operation and design					
D-6f(2)	Equivalent capacity					
D-6f(3)	Grading and drainage					
D-6f(4)	Maximum leachate head					
D-6f(5)	System compatibility					
D-6f(6)	System strength					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-6f(6)(a)	Stability of drainage layers					
D-6f(6)(b)	Strength of piping					
D-6f(7)	Prevention of clogging					
D-6g	Liner system, construction and maintenance					
D-6g(1)	Material specifications					
D-6g(1)(a)	Synthetic liners					
D-6g(1)(b)	Soil liners					
D-6g(1)(c)	Leachate collection/detection systems					
D-6g(2)	Construction specifications					
D-6g(2)(a)	Liner system foundation					
D-6g(2)(b)	Soil liner					
D-6g(2)(c)	Synthetic liners					
D-6g(2)(d)	Leachate collection/detection systems					
D-6g(3)	Construction quality control program					
D-6g(4)	Maintenance procedures for leachate collection/detection system					
D-6g(5)	Liner repairs during operations					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-6h	Run-on and run-off control systems					
D-6h(1)	Run-on control system					
D-6h(1)(a)	Design and performance					
D-6h(1)(b)	Calculation of peak flow					
D-6h(2)	Run-off control systems					
D-6h(2)(a)	Design and performance					
D-6h(2)(b)	Calculation of peak flow					
D-6h(3)	Management of collection and holding units					
D-6h(4)	Construction					
D-6h(5)	Maintenance					
D-6i	Control of wind dispersal					
D-6j	Liquids in landfills					
D-6j(1)	Bulk or noncontainerized free liquids					
D-6j(2)	Containers holding free liquids					
D-6j(3)	Restriction to small containers					
D-6j(4)	Nonstorage containers					
D-6j(5)	Labpacks containers					
D-6j(5)(a)	Inside containers					
D-6j(5)(b)	Overpack					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-6j(5)(c)	Absorbent material					
D-6j(5)(d)	Incompatible wastes					
D-6j(5)(e)	Reactive wastes					
D-6k	Containerized wastes					
D-6l	Special waste management plan for landfills containing wastes F020, F021, F022, F023, F026, and F027					
D-6l(1)	Waste description					
D-6l(2)	Soil description					
D-6l(3)	Mobilizing properties					
D-6l(4)	Additional management techniques					
D-7	Land treatment					The primary means of treatment is land treatment at the CAMU. A full description of the land treatment program is provided in the Engineering Report, Section III of Volume 4, and its appendices. Specifics regarding a demonstration of treatment capabilities are provided in Appendix III-E of Volume 4.
D-7a	Treatment demonstration					
D-7a(1)	Demonstration wastes					
D-7a(2)	Demonstration data sources					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-7a(2)(a)	Existing literature					
D-7a(2)(b)	Operating data					
D-7a(3)	Laboratory/field testing programs					
D-7a(3)(a)	Toxicity testing					
D-7a(3)(b)	Field plot testing					
D-7a(3)(c)	Laboratory testing					
D-7b	Land treatment program					The primary means of treatment is land treatment at the CAMU. A full description of the land treatment program is provided in the Engineering Report, Section III of Volume 4, and its appendices.
D-7b(1)	List of wastes					
D-7b(2)	Operating procedures					
D-7b(2)(a)	Waste application rates					
D-7b(2)(b)	Waste application methods					
D-7b(2)(c)	Control of soil pH					
D-7b(2)(d)	Enhancement of microbial or chemical reactions					
D-7b(2)(e)	Control of soil moisture					
D-7c	Unsaturated zone monitoring plan					
D-7c(1)	Soil-pore liquid monitoring					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-7c(1)(a)	Sampling location					
D-7c(1)(b)	Sampling frequency					
D-7c(1)(c)	Sampling equipment					
D-7c(1)(d)	Sampling equipment installation					
D-7c(1)(e)	Sampling procedures					
D-7c(1)(f)	Analytical procedures					
D-7c(1)(g)	Chain-of-custody					
D-7c(1)(h)	Background values					
D-7c(1)(i)	Statistical methods					
D-7c(1)(j)	Justification of Principle Hazardous Constituents					
D-7c(2)	Soil core monitoring					
D-7c(2)(a)	Sampling location					
D-7c(2)(b)	Sampling frequency					
D-7c(2)(c)	Sampling equipment					
D-7c(2)(d)	Sampling procedures					
D-7c(2)(e)	Analytical procedures					
D-7c(2)(f)	Chain-of-custody					
D-7c(2)(g)	Background values					
D-7c(2)(h)	Statistical methods					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-7c(2)(i)	Justification of Principle Hazardous Constituents					
D-7d	Treatment zone description					
D-7d(1)	Horizontal and vertical dimensions					
D-7d(2)	Soil survey					
D-7d(3)	Soil series descriptions					
D-7d(4)	Soil sampling data					
D-7d(5)	Seasonal high water table					
D-7e	Unit design, construction, operation and maintenance					
D-7e(1)	Surface Water Control Plans					
D-7e(2)	Collection and Control of Run-off					
D-7e(3)	Minimizing hazardous constituent run-off					
D-7e(4)	Management of accumulated run-on and run-off					
D-7e(5)	Control of wind dispersal					
D-7f	Food chain crops					
D-7f(1)	Food chain crop demonstration					
D-7f(1)(a)	Demonstration basis					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-7f(1)(b)	Test procedures					
D-7f(2)	Cadmium-bearing wastes					
D-7f(2)(a)	Crops for human consumption					
D-7f(2)(b)	Animal feed					
D-7g	Waste management plan for land treatment units containing wastes F020, F021, F022, F023, F026, and F027					
D-7g(1)	Waste description					
D-7g(2)	Soil description					
D-7g(3)	Mobilizing properties					
D-7g(4)	Additional management techniques					
D-7h	Incompatible wastes					
D-8	Miscellaneous Units					NA
D-8a	Environmental Performance Standards					
D-8b	Monitoring, Analysis, Inspection, Response, Reporting, and Corrective Action					
D-8c	Post-closure Care					

E. GROUNDWATER MONITORING

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
E-1	Exemption from groundwater protection requirements					Groundwater monitoring is discussed primarily in the approved RCRA Part B permit application. Supplemental information is provided in Appendix IV-D of Volume 4.
E-1a	Waste piles					
E-1b	Landfill					
E-1c	No migration					
E-2	Interim status groundwater monitoring data					
E-2a	Description of wells					
E-2b	Description of sampling/analysis procedures					
E-2c	Monitoring data					
E-2d	Statistical data					
E-2e	Groundwater assessment plan					
E-3	General hydrogeologic information					
E-4	Topographic map requirements					
E-5	Contaminant plume description					
E-6	General monitoring program requirements					
E-6a	Description of wells					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
E-6b	Description of sampling analysis procedures	_____	_____	_____	_____	_____
E-6c	Procedures for establishing background quality	_____	_____	_____	_____	_____
E-6d	Statistical procedures	_____	_____	_____	_____	_____
E-6d(1)	Parametric analysis of variance (ANOVA)	_____	_____	_____	_____	_____
E-6d(2)	Non-parametric ANOVA (based on ranks)	_____	_____	_____	_____	_____
E-6d(3)	Tolerance or prediction interval procedure	_____	_____	_____	_____	_____
E-6d(4)	Control chart approach	_____	_____	_____	_____	_____
E-6d(5)	Alternative approach	_____	_____	_____	_____	_____
E-7	Detection monitoring program	_____	_____	_____	_____	_____
E-7a	Indicator parameters, waste constituents, reaction products to be monitored	_____	_____	_____	_____	_____
E-7b	Groundwater monitoring system	_____	_____	_____	_____	_____
E-7c	Background groundwater concentration values for proposed parameters	_____	_____	_____	_____	_____
E-7d	Proposed sampling and analysis procedures	_____	_____	_____	_____	_____

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
E-7e	Statistically significant increase in any constituent or parameter identified at any compliance point monitoring well	_____	_____	_____	_____	_____
E-8	Compliance monitoring program	_____	_____	_____	_____	_____
E-8a	Description of the Monitoring Program	_____	_____	_____	_____	_____
E-8a(1)	Waste description	_____	_____	_____	_____	_____
E-8a(2)	Characterization of contaminated groundwater	_____	_____	_____	_____	_____
E-8a(3)	Hazardous constituents to be monitored in compliance program	_____	_____	_____	_____	_____
E-8a(4)	Concentration limits	_____	_____	_____	_____	_____
E-8a(5)	Alternate concentration limits	_____	_____	_____	_____	_____
E-8a(5)(i)	Adverse effects on groundwater quality	_____	_____	_____	_____	_____
E-8a(5)(ii)	Potential adverse effects	_____	_____	_____	_____	_____
E-8a(6)	Engineering report describing groundwater monitoring system	_____	_____	_____	_____	_____
E-8a(7)	Proposed sampling and statistical analysis procedures for groundwater data	_____	_____	_____	_____	_____

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
E-8a(8)	Groundwater protection standard exceeded at compliance point monitoring well	_____	_____	_____	_____	_____
E-9	Corrective action program	_____	_____	_____	_____	_____
E-9a	Characterization of contaminated groundwater	_____	_____	_____	_____	_____
E-9b	Concentration limits	_____	_____	_____	_____	_____
E-9c	Alternate concentration limits	_____	_____	_____	_____	_____
E-9c(1)	Adverse effects on groundwater quality	_____	_____	_____	_____	_____
E-9c(2)	Potential adverse effects	_____	_____	_____	_____	_____
E-9d	Corrective action plan	_____	_____	_____	_____	_____
E-9d(1)	Location	_____	_____	_____	_____	_____
E-9d(2)	Construction detail	_____	_____	_____	_____	_____
E-9d(3)	Plans for removing wastes	_____	_____	_____	_____	_____
E-9d(4)	Treatment technologies	_____	_____	_____	_____	_____
E-9d(5)	Effectiveness of correction program	_____	_____	_____	_____	_____
E-9d(6)	Reinjection system	_____	_____	_____	_____	_____
E-9d(7)	Additional hydrogeologic data	_____	_____	_____	_____	_____
E-9d(8)	Operation and maintenance	_____	_____	_____	_____	_____

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
E-9d(9)	Closure and post-closure plans					
E-9e	Groundwater monitoring program					
E-9e(1)	Description of monitoring system					
E-9e(2)	Description of sampling and analysis procedures					
E-9e(3)	Monitoring data and statistical analysis procedures					
E-9e(4)	Reporting requirements					
E-10	Description of Corrective Action for Solid Waste Management Units					
F. PROCEDURES TO PREVENT HAZARDS						
F-1	Security					Procedures to prevent hazards are provided primarily in Section F of the approved RCRA Part B permit application. Supplemental information to support operation of the CAMU is provided in Appendix IV-E of Volume 4.
F-1a	Security procedures and equipment					
F-1a(1)	24-hour surveillance system					
F-1a(2)	Barrier and means to control entry					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
F-1a(2)(a)	Barrier					
F-1a(2)(b)	Means to control entry					
F-1a(3)	Warning signs					
F-1b	Waiver					
F-1b(1)	Injury to intruder					
F-1b(2)	Violation caused by intruder					
F-2	Inspection schedule					
F-2a	General inspection requirements					
F-2a(1)	Types of problems					
F-2a(2)	Frequency of inspections					
F-2b	Specific process inspection requirements					
F-2b(1)	Container inspection					
F-2b(2)	Tank system inspection					
F-2b(2)(a)	Tank construction materials					
F-2b(2)(b)	Tank surrounding area					
F-2b(2)(c)	Tank overfilling control equipment					
F-2b(2)(d)	Tank monitoring data					
F-2b(2)(e)	Tank level of waste					

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		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
F-2b(2)(f)	Tank condition assessment for unretrofitted tanks					
F-2b(4)	Waste pile inspection					
F-2b(4)(a)	Leak Detection System					
F-2b(4)(b)	Run-on and run-off control system					
F-2b(4)(c)	Wind dispersal system					
F-2b(4)(d)	Leachate collection and removal system					
F-2b(5)	Surface impoundment inspection					
F-2b(5)(a)	Condition assessment					
F-2b(5)(a) (1)	Overtopping control system					
F-2b(5)(a) (2)	Impoundment contents					
F-2b(5)(a) (3)	Leak detection systsem					
F-2b(5)(a) (4)	Deterioration					
F-2b(5)(b)	Structural integrity					
F-2b(6)	Incinerator inspection					
F-2b(6)(a)	Incinerator and associated equipment					
F-2b(6)(b)	Incinerator waste feed cut-off system and associated alarms					
F-2b(7)	Landfill inspection					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
F-2b(7)(a)	Run-on and run-off control system	_____	_____	_____	_____	_____
F-2b(7)(b)	Leak detection system	_____	_____	_____	_____	_____
F-2b(7)(c)	Wind dispersal control system	_____	_____	_____	_____	_____
F-2b(7)(d)	Leachate Collection and Removal System	_____	_____	_____	_____	_____
F-2b(8)	Land treatment facility inspection	_____	_____	_____	_____	_____
F-2b(8)(a)	Run-on and run-off control system	_____	_____	_____	_____	_____
F-2b(8)(b)	Wind dispersal control system	_____	_____	_____	_____	_____
F-3	Waiver <u>or</u> documentation of preparedness and prevention requirements	_____	_____	_____	_____	_____
F-3a	Equipment requirements	_____	_____	_____	_____	_____
F-3a(1)	Internal communications	_____	_____	_____	_____	_____
F-3a(2)	External communications	_____	_____	_____	_____	_____
F-3a(3)	Emergency equipment	_____	_____	_____	_____	_____
F-3a(4)	Water for fire control	_____	_____	_____	_____	_____
F-3b	Aisle space requirement	_____	_____	_____	_____	_____
F-4	P{reventive procedures, structures and equpiment	_____	_____	_____	_____	_____
F-4a	Unloading operations	_____	_____	_____	_____	_____

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
F-4b	Run-off					
F-4c	Water supplies					
F-4d	Equipment and power failure					
F-4e	Personnel protection equipment					
F-5	Prevention of reaction of ignitable, reactive, and incompatible wastes					
F-5a	Precautions to prevent ignition or reaction of ignitable or reactive wastes					
F-5b	General precautions for handling ignitable or reactive waste and mixing of incompatible waste					
F-5c	Management of ignitable or reactive wastes in containers					
F-5d	Management of incompatible wastes in containers					
F-5e	Management of ignitable or reactive wastes in tanks					
F-5f	Management of incompatible wastes in tank systems					
F-5g	Management of ignitable or reactive wastes placed in waste piles					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
F-5h	Management of incompatible wastes placed in waste piles					
F-5i	Management of ignitable or reactive wastes placed in surface impoundments					
F-5j	Management of incompatible wastes placed in surface impoundments					
F-5k	Management of ignitable or reactive wastes placed in landfills					
F-5l	Management of incompatible wastes placed in landfills					
F-5m	Management of ignitable or reactive wastes placed in land treatment units					
F-5n	Management of incompatible wastes placed in land treatment units					
G. CONTINGENCY PLAN						
G-1	General information					Contingency procedures at the CAMU are based on the existing program already active at the Refinery. These procedures are referenced in the standalone contingency plan for the CAMU provided in Appendix IV-F of Volume 4.
G-2	Emergency coordinators					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
G-3	Implementation					
G-4	Emergency response procedures					
G-4a	Notification					
G-4b	Identification of hazardous materials					
G-4c	Assessment					
G-4d	Control procedures					
G-4e	Prevention of recurrence or spread of fires, explosions, or releases					
G-4f	Storage and treatment of released material					
G-4g	Incompatible waste					
G-4h	Post-emergency equipment maintenance					
G-4i	Container spills and leakage					
G-4j(1)	Tank spills and leakage					
G-4j(2)	Spills and leaks from tanks containing wastes F020, F021, F022, F023, F026 and F027					
G-4k	Waste pile spills and leakage					
G-4l	Surface impoundments spills and leakage					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
G-4l(1)	Emergency repairs					
G-4l(1)(a)	Stopping waste addition					
G-4l(1)(b)	Containing leaks					
G-4l(1)(c)	Stopping leaks					
G-4l(1)(d)	Preventing catastrophic failure					
G-4l(1)(e)	Emptying the impoundment					
G-4l(1)(f)	Notification					
G-4l(2)	Certification					
G-4l(3)	Repairs as a result of sudden drop					
G-4l(3)(a)	Existing portions of surface impoundment					
G-4l(3)(b)	Other portions of surface impoundment					
G-4m	Incinerator spills and leakage					
G-4n	Landfill Spills and leakage					
G-5	Emergency equipment					
G-6	Coordination agreement requirements					
G-7	Evacuation plan					
G-8	Required reports					

H. PERSONNEL TRAINING

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
H-1	Outline of the training program					Personnel training is discussed in Section H of the approved RCRA Part B permit application. This program has been modified in Appendix IV-G of Volume 4 to include provisions to support the CAMU.
H-1a	Job title/job description					
H-1b	Training content, frequency and techniques					
H-1c	Training director					
H-1d	Relevance of training to job position					
H-1e	Training for emergency response					
H-2	Implementation of training program					
I. CLOSURE AND POST-CLOSURE REQUIREMENTS						
I-1	Closure plans					Closure and post closure are addressed in Section I of the approved RCRA Part B permit application. This information has been modified to reflect closure of the CAMU with a vegetative cover. The revisions to the closure and post-closure programs are provided in Appendix IV-H and IV-I (respectively) of Volume 4.

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
I-1a	Closure performance standard					
I-1b	Partial and final closure activities					
I-1c	Maximum waste inventory					
I-1d	Inventory removal, disposal or decontamination of equipment, structures and soils					
I-1d(1)	Closure of containers					
I-1d(2)	Closure of tank systems					
I-1d(3)	Closure of waste piles					
I-1d(4)	Closure of surface impoundments					
I-1d(5)	Closure of incinerators					
I-1d(6)	Closure of land treatment facilities					
I-1d(6)(a)	Continuance of treatment					
I-1d(6)(b)	Vegetative cover					
I-1e	Closure of disposal units					
I-1e(1)	Disposal impoundments					
I-1e(1)(a)	Elimination of liquids					
I-1e(1)(b)	Waste stabilization					
I-1e(2)	Cover design					

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		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
I-1e(3)	Minimization of liquid migration					
I-1e(4)	Maintenance needs					
I-1e(5)	Drainage and erosion					
I-1e(6)	Settlement and subsidence					
I-1e(7)	Cover permeability					
I-1e(8)	Freeze/thaw effects					
I-1f	Schedule of closure					
I-1g	Extensions of closure time					
I-2	Post-closure plan					
I-2a	Inspection plan					
I-2b	Post-Closure monitoring plan					
I-2c	Post-Closure maintenance plan					
I-2d	Continued Land treatment					
I-3	Notice in deed and certification					
I-4	Closure cost estimate					
I-5	Financial assurance mechanism for closure					
I-5a	Closure trust fund					
I-5b	Surety bod					
I-5c	Closure letter of credit					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
I-5d	Closure insurance	_____	_____	_____	_____	_____
I-5e	Financial test and corporate guarantee for closure	_____	_____	_____	_____	_____
I-5f	Use of multiple financial mechanisms	_____	_____	_____	_____	_____
I-5g	Use of financial mechanism for multiple facilities	_____	_____	_____	_____	_____
I-6	Post-closure cost estimate	_____	_____	_____	_____	_____
I-7	Financial assurance mechanism for post-closure care	_____	_____	_____	_____	_____
I-7a	Post-closure trust fund	_____	_____	_____	_____	_____
I-7b	Surety bond	_____	_____	_____	_____	_____
I-7b(1)	Surety bond guaranteeing payment into a post-closure trust fund	_____	_____	_____	_____	_____
I-7b(2)	Surety bond guaranteeing performance of post-closure care	_____	_____	_____	_____	_____
I-7c	Post-closure letter of credit	_____	_____	_____	_____	_____
I-7d	Post-closure insurance	_____	_____	_____	_____	_____
I-7e	Financial test and corporate guarantee for post-closure care	_____	_____	_____	_____	_____

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
I-7f	Use of multiple financial mechanisms					
I-7g	Use of a financial mechanism for multiple facilities					
I-8	Liability requirements					
I-8a	Coverage for sudden accidental occurrences					
I-8a(1)	Endorsement or certification					
I-8a(2)	Financial test for liability coverage					
I-8a(3)	Use of multiple insurance mechanisms					
I-8b	Coverage for nonsudden accidental occurrences					
I-8b(1)	Endorsement or certification					
I-8b(2)	Financial test for liability coverage					
I-8b(3)	Use of multiple insurance mechanisms					
I-8c	Request for variance					
I-9	State mechanisms					
I-9a	Use of state-required mechanism					
I-9b	State assumption of responsibility					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
J. OTHER FEDERAL LAWS						Addressed in the approved RCRA Part B Permit Application.
K. PART B CERTIFICATION						Current certifications are provided in Appendix IV-J of Volume 4. The engineering certification will be provided following unit modification.
K-1	Facility Certification					
K-2	Engineering Certification					
K-3	Prior Conduct Certification					
L. CONTINUING RELEASES AT PERMITTED FACILITIES						
L-1						Continuing releases will be addressed through the corrective action program and the RCRA facility investigation. A description of this approach is provided in Appendix IV-K of Volume 4.
	Solid waste management units					
L-1(a)	Characterize the solid waste management unit					
L-1(b)	No solid waste management units					
L-2	Releases					
L-2(a)	Characterize releases					
L-2(b)	No releases					
M. RESEARCH, DEVELOPMENT AND DEMONSTRATION PERMITS						

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		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
M-1	Part A application					This section does not apply to the CAMU.
M-2	General description					
M-3	Handlers					
M-4	Qualification as RD&D facility					
M-4(a)	Experimental activity					
M-4(b)	No-Land based activity					
M-5	Waste characteristics					
M-5(a)	Chemical and physical analysis					
M-5(b)	Waste analysis plan					
M-5(b)(1)	Parameters and rationale					
M-5(b)(2)	Test methods					
M-5(b)(3)	Sampling methods					
M-5(b)(4)	Frequency of analyses					
M-5(b)(5)	Additional requirements for wastes generated off-site					
M-5(b)(6)	Additional requirements for ignitable, reactive or incompatible wastes					
M-6	Facility design and experimental methods					
M-6a	Engineering plans					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
M-6b	Experimental methods					
M-6c	Containment					
M-6d	Incompatible wastes					
M-6e	General inspection requirements					
M-6e(1)	Types of problems					
M-6e(2)	Frequency of inspections					
M-6e(3)	Inspection checklist					
M-6e(3)(a)	Provide inspection checklist					
M-6e(3)(b)	Describe inspection recordkeeping practices					
M-7	Contingency plan					
M-7a	General information					
M-7b	Emergency coordinators					
M-7c	Implementation					
M-7d	Notification					
M-7d(1)	Identification of hazardous materials					
M-7d(2)	Assessment					
M-7d(3)	Control procedures					

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		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
M-7d(4)	Prevention of recurrence or spread of fires, explosions or releases	_____	_____	_____	_____	_____
M-7d(5)	Storage and treatment of releases material	_____	_____	_____	_____	_____
M-7d(6)	Incompatible waste	_____	_____	_____	_____	_____
M-7d(7)	Post-emergency equipment maintenance	_____	_____	_____	_____	_____
M-7e	Emergency equipment	_____	_____	_____	_____	_____
M-7f	Coordination agreements	_____	_____	_____	_____	_____
M-7g	Evacuation plan	_____	_____	_____	_____	_____
M-7h	Required reports	_____	_____	_____	_____	_____
M-8	Emergency procedures	_____	_____	_____	_____	_____
M-8(a)	Equipment requirements	_____	_____	_____	_____	_____
M-8(b)	Internal communications	_____	_____	_____	_____	_____
M-8(c)	External communications	_____	_____	_____	_____	_____
M-8(d)	Emergency equipment	_____	_____	_____	_____	_____
M-8(e)	Water for fire control	_____	_____	_____	_____	_____
M-8(f)	Aisle space requirement	_____	_____	_____	_____	_____
M-9	Preventive procedures, structures and equipment	_____	_____	_____	_____	_____
M-9(a)	Unloading operations	_____	_____	_____	_____	_____

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
M-9(b)	Run-off					
M-9(c)	Water supplies					
M-9(d)	Equipment and power failure					
M-9(e)	Personnel protection equipment					
M-10	Personnel training					
M-10(a)	Outline of the training program					
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M-10(a)(2)	Training content, frequency and techniques					
M-10(a)(3)	Training director					
M-10(a)(4)	Relevance of training to job position					
M-10(a)(5)	Training for emergency response					
M-10(b)	Implementation of training program					
M-11	Closure					
M-11(a)	Closure plans					
M-11(a)(1)	Closure performance standard					
M-11(a)(2)	Partial and final closure activities					
M-11(a)(3)	Maximum waste inventory					

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		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
M-11(a)(4)	Inventory removal, disposal or decontamination of equipment					
M-11(a)(4)(a)	Closure of containers					
M-11(a)(4)(b)	Closure of tanks					
M-11(a)(4)(c)	Closure of incinerators					
M-11(a)(5)	Schedule for closure					
M-11(a)(6)	Extensions for closure time					
M-11(b)	Notice in deed and certification					
M-11(c)	Closure cost estimate					
M-12	Financial responsibility					
M-12(a)	Financial assurance mechanism for closure					
M-12(a)(1)	Closure trust fund					
M-12(a)(2)	Surety bond					
M-12(a)(2)(a)	Surety bond guaranteeing payment into a closure fund					
M-12(a)(2)(b)	Surety bond guaranteeing performance of closure					
M-12(a)(3)	Closure letter of credit					
M-12(a)(4)	Closure insurance					
M-12(a)(5)	Financial test and corporate guarantee for closure					

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
M-12(a)(6)	Use of multiple financial mechanism	_____	_____	_____	_____	_____
M-12(b)	Liability requirements	_____	_____	_____	_____	_____
M-12(b)(1)	Coverage for sudden accidental occurrences	_____	_____	_____	_____	_____
M-12(b)(1)(a)	Endorsement or certification	_____	_____	_____	_____	_____
M-12(b)(1)(b)	Financial test for liability coverage	_____	_____	_____	_____	_____
M-12(b)(2)	Use of multiple insurance mechanism	_____	_____	_____	_____	_____
N. PART B CERTIFICATION		_____	_____	_____	_____	_____

Appendix IV-N
Unsaturated Zone Monitoring Plan

Lemont Refinery

December 1997

Prepared for:
The Lemont Refinery
CITGO Petroleum Corporation
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1.0 INTRODUCTION

The modification to the final RCRA permit is for the designation of the land treatment facility (LTF) at Lemont Refinery as a corrective action management unit (CAMU). The CAMU will support the RCRA facility investigation (RFI). Unsaturated zone monitoring (UZM) will support operation of the unit by providing early notification in the unlikely event that the unit's integrity is compromised.

This UZM plan is a whole replacement for the UZM plan (including any modifications) contained in the approved Part B permit application. This UZM program is designed to determine whether hazardous constituents are moving out of the CAMU treatment zone and will involve collection of soil core (SC) samples and soil-pore liquid (SPL) samples. Sampling and analysis of soil core samples enables detection of slow moving constituents, and monitoring of SPLs enables detection of more mobile constituents. By detecting constituents in the unsaturated zone where they can be effectively degraded, transformed, or immobilized, the UZM plan ensures that groundwater quality will not be affected by CAMU operations. The requirements described in this plan will also apply to the closure and post-closure periods of the CAMU. Table IV-N-1 shows the regulatory requirements for unsaturated zone monitoring and the source document for each portion of the required information.

Table IV-N-1
Regulatory Requirement Cross Reference—Unsaturated Zone Monitoring

Requirement	Citation (35 IAC)	Source Document	
		Approved Permit Application	CAMU Modification Appendix IV-N
Hazardous Constituents Specification	724.378(a)	Section I, Appendix I-2	Section 1.0
Monitoring System	724.378(b)		Sections 2.0 and 3.0
Background	724.378(c)		Section 7.0
Sample Locations and Frequencies	724.378(d)		Sections 2.0 and 3.0
Sampling and Analysis Procedures	724.378(e)		Sections 2.0, 3.0, and 4.0
Statistical Analysis	724.378(f), (g), and (h)		Section 5.0

All below treatment zone (BTZ) samples (includes SCs and SPLs) will be analyzed for the constituents listed in Table IV-N-2 or Table IV-N-3. The soil samples collected of every fifth annual monitoring event will be analyzed for the full Modified Skinner List (Table IV-N-2). For all other events, samples will be analyzed for the constituents listed in Table IV-N-3. Table IV-N-3 includes both Skinner and non-Skinner constituents that have been detected at the land treatment areas previously. Non-Skinner List constituents that are later determined to be artifacts (laboratory, sampling, etc.) may be removed from the list. Analytical results for all compounds will be statistically evaluated except under the following circumstances: 1) the analyte has never been detected in any past or ongoing waste analysis;

Table IV-N-2
Modified Skinner List Constituents for Analysis

Metals	Volatiles	Semivolatile Acid-Extractable Compounds	Semivolatile Base/ Neutral Extractable Compounds
Antimony	*Acetone*	Benzenethiol	*Acenaphthylene*
Arsenic	Benzene	Cresols (o, m, & p)	Anthracene
Barium	*n-Butylbenzene*	2,4-Dimethylphenol	Benzo(a)anthracene
Beryllium	sec-Butylbenzene	2,4-Dinitrophenol	Benzo(b)fluoranthene
Cadmium	Carbon disulfide	4-Nitrophenol	Benzo(k)fluoranthene
Chromium	Chlorobenzene	Phenol	*Benzo(g,h,i)perylene*
Cobalt	Chloroform		Benzo(a)pyrene
Lead	1,2-Dichloroethane		Bis(2-ethylhexyl)phthalate
Mercury	1,4-Dioxane		Butyl benzyl phthalate
Nickel	Ethylbenzene		Chrysene
Selenium	Ethylene dibromide		Dibenz(a,h)acridine
Vanadium	*4-Isopropyltoluene*		Dibenz(a,h)anthracene
	Methyl ethyl ketone		Dichlorobenzenes
	n-Propylbenzene		Diethyl phthalate
	Styrene		7,12-Dimethylbenz(a)anthracene
	Toluene		Dimethyl phthalate
	1,3,5-Trimethylbenzene		Di(n)butyl phthalate
	1,2,4-Trimethylbenzene		Di(n)octyl phthalate
	Xylene		Fluoranthene
			Flourene
			Indene
			Indeno(1,2,3-cd)pyrene
			Methyl chrysene
			1-Methyl naphthalene
			2-methylnaphthalene
			Naphthalene
			Phenanthrene
			Pyrene
			Pyridine
			Quinoline

Note: Non-Skinner List constituents are shown in italics.

Table IV-N-3
Unsaturated Zone List Constituents for Analysis [a]

Metals	Volatiles	Semivolatiles
Antimony	Acetone	Acenaphthylene
Arsenic	Benzene	Anthracene
Barium	n-Butylbenzene	Benzo(a)anthracene
Beryllium	sec-Butylbenzene	Benzo(g,h,i)perylene
Cadmium	Ethylbenzene	Butyl benzyl phthalate
Chromium	4-Isopropyltoluene	Chrysene
Cobalt	Methyl ethyl ketone	Di(n)octyl phthalate
Lead	n-Propylbenzene	Dibenz(a,h)anthracene
Mercury	Toluene	Flourene
Nickel	1,3,5-Trimethylbenzene	Indeno(1,2,3-cd)pyrene
Selenium	1,2,4-Trimethylbenezene	Methyl chrysene
Vanadium	Xylene (total)	1-Methylnaphthalene
		2-Methylnaphthalene
		Naphthalene
		Phenanthrene
		Pyrene

[a] Initially (late 1997) and every five years afterward, samples will be analyzed for the constituents in Table 2-1. For the four intervening years the constituents listed in Table 2-2 will be analyzed for and reported.

2) the analyte is determined to have been introduced into samples via laboratory or sampling contamination; or 3) the analyte cannot be identified and quantified by standard (EPA SW-846) analytical methods.

Soil cores collected from the Zone of Incorporation (ZOI) (upper 12 inches of the land treatment areas) will be collected and analyzed for performance indicating parameters. These parameters include oil and grease, pH, moisture content, and nutrients.

The sampling plans for soil cores and SPLs are provided in two separate sections. The procedures described in the other sections apply to both soil core and SPL sampling. The plan is organized as follows:

- Soil core sampling (Section 2.0);
- SPL sampling (Section 3.0);
- Analytical procedures (Section 4.0);
- Statistical analysis (Section 5.0);
- Response to detection of constituent movement (Section 6.0); and
- Establishment of background values (Section 7.0).

2.0 SOIL CORE SAMPLES

Soil core samples will be collected below the treatment zone (BTZ) to monitor potential movement of slow moving constituents away from the treatment zone. In addition, soil samples will be collected from the zone of incorporation (ZOI) to confirm that conditions within the treatment zone are being maintained at optimum levels for degradation of constituents.

2.1 Location, Collection Frequency, and Depth

In accordance with the *Operation, Maintenance, and Monitoring Plan* for the CAMU (Appendix III-D), eight BTZ soil cores will be collected annually from the four treatment cells (one sample per two acres). Eight composite ZOI soil samples will be collected semi-annually. Table IV-N-4 presents a breakdown of sample quantities to be collected from each treatment area.

Table IV-N-4
Sample Quantities

Treatment Area ID	Former LTF Unit Area (acres)	CAMU Treatment Area (acres)	Number of Soil Cores
Area I	5.5	6.45	3
Area II	4.2	3.54	2
Area III	1.2	0.60	1
Area IV	2.6	1.74	2
Total CAMU	**13.5**	**12.33**	**8**

Soil samples will be collected from the ZOI (0 inch to 12 inches below the ground surface) semiannually and from the BTZ annually. The ZOI is defined as the active portion of the CAMU where waste is applied and treated. The treatment zone is the 5 feet of soil below the original soil surface (prior to waste application). The BTZ samples will be collected from the interval of 60-72 inches below the *original* land surface. Figures IV-N-5 and 6 (provided at the back of this document) shows the contours of the original soil surface based on exploratory trenches completed by Environmental Resources Management (ERM, 1989) and 29 soil borings completed by Geraghty & Miller, Inc. (Geraghty and Miller, 1995).

Soil core sample locations will be randomly selected as suggested in the *USEPA Permit Guidance Manual on Unsaturated Zone Monitoring for Hazardous Land Treatment Units* (USEPA, 1986). All soil-core locations will be staked and surveyed (including current elevation). The sample collection coordinate system to be used in location selection is shown in Figures IV-N-1 and IV-N-2.

2.2 Equipment and Collection Procedures

BTZ soil samples will be collected by one of the following methods: split spoon sampler driven or pushed through a hollow-stem auger, direct push technology, or hand augers. All of these sampling methods meet the data quality requirements for the sampling program. Equipment that penetrates the soil surface will be thoroughly decontaminated prior to collecting each sample.

For BTZ samples, two sample aliquots will be collected at each sampling location. The first aliquot of soil will be collected for analysis of volatile organic compounds (VOCs) and placed in two 120-mL glass jars with Teflon® lined lids and minimal head space. The other soil-core aliquot, which will be sampled for metals, and semivolatile organic compounds (SVOCs) will be thoroughly homogenized and placed in a pre-cleaned, 500-mL glass jar with a Teflon-lined lid.

ZOI samples will be collected using a shovel. Samples will be composited from random locations according to the procedures presented in the example SOP (Attachment B).

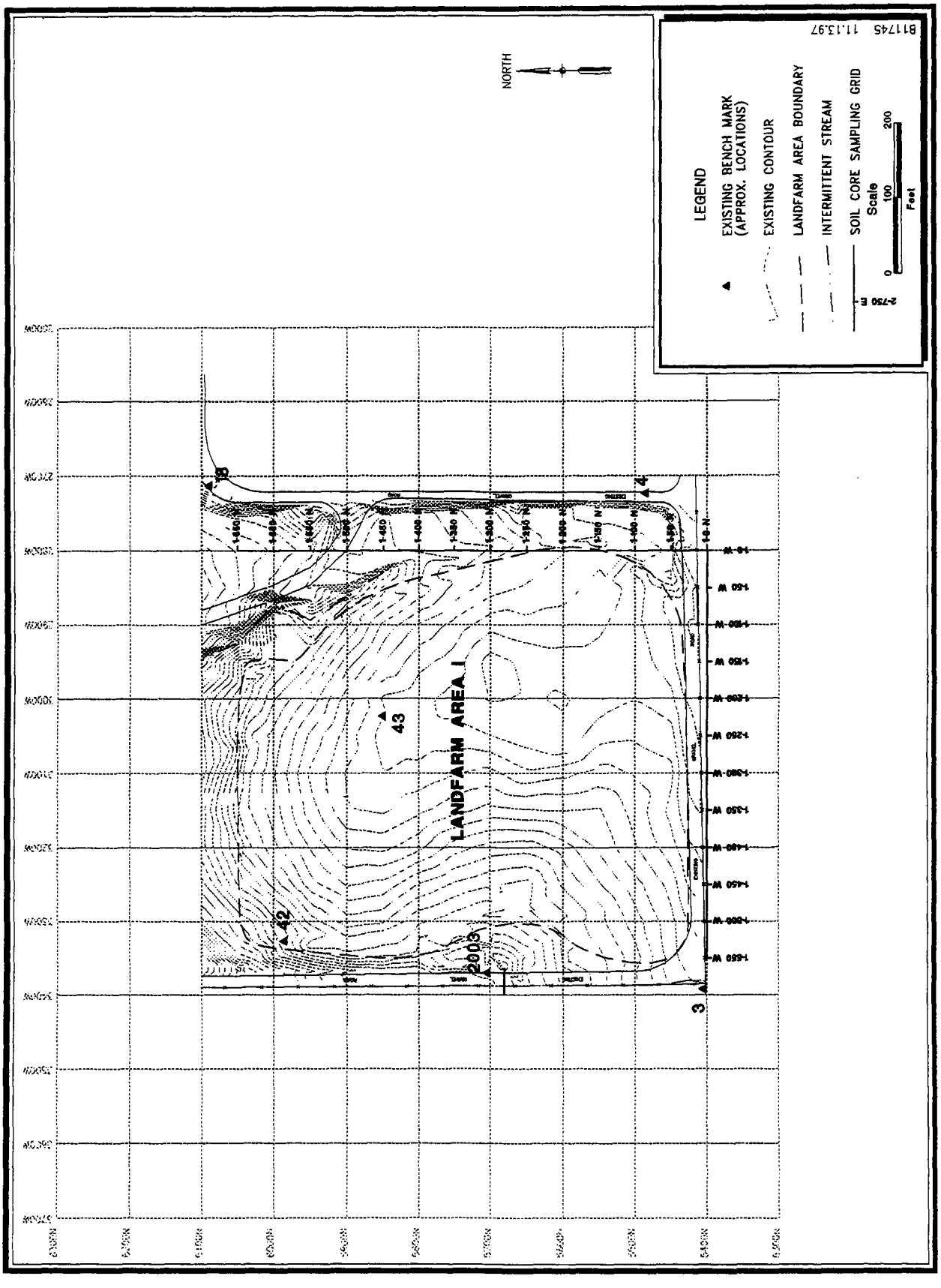


Figure IV-N-1. Soil-Core Random Sampling Grid for Area I

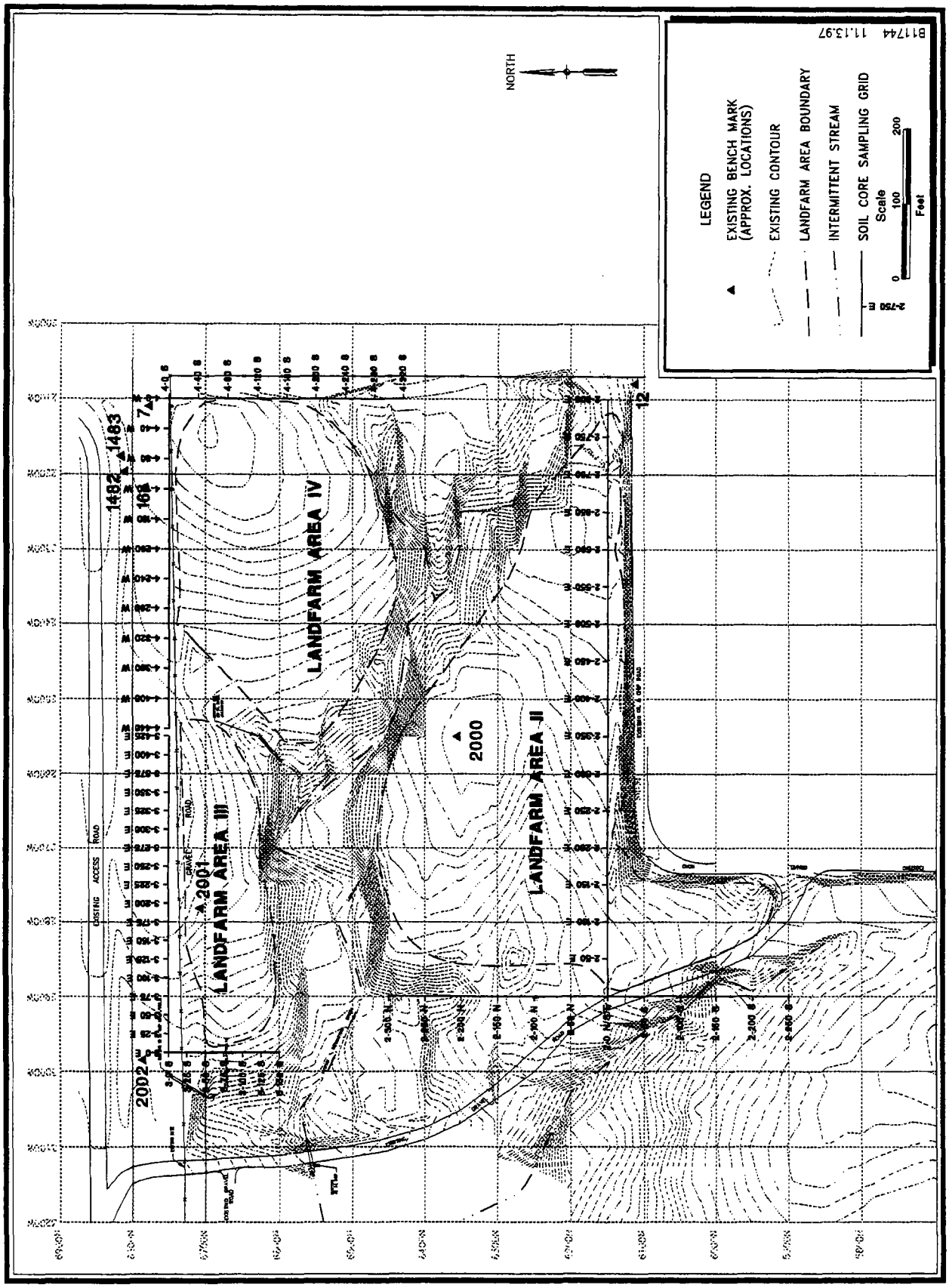


Figure IV-N-2. Soil Core Random Sampling Grid for Areas II, III, and IV

Soil sample containers will be placed on ice immediately following collection and will be shipped by overnight delivery to an analytical laboratory for extraction and analysis.

When collecting, transporting, and storing soil samples, chain of custody procedures will be followed. After taking core samples, each core hole will be backfilled with bentonite pellets, and a survey record will be kept of the location of the core hole. Supplies required for soil-core sampling, decontaminating sampling equipment, and for shipping samples are listed in Attachment A (SOP for soil core sampling).

3.0 SOIL-PORE LIQUID SAMPLES

Lysimeters will be used to collect SPL samples and detect the presence of mobile hazardous constituents should they move below the treatment zone. This section describes lysimeter locations, sampling frequency, equipment, and procedures for collecting SPL samples.

3.1 Locations and Collection Frequency

Eleven pressure-vacuum type lysimeters will be sampled semiannually. Nine of the lysimeters will be located within the treatment unit, and three of the lysimeters will monitor background conditions. The background lysimeters will only be monitored for two years until background levels are established. Figure IV-N-3 shows the locations of the lysimeters.

Exact timing of each semi-annual monitoring event will depend on when water is most likely to be moving through the treatment zone. The first SPL sampling event will occur soon after the first waste application. The second event will be conducted approximately six months later. Sampling will continue semi-annually thereafter with efforts toward collecting samples soon after heavy rains to ensure the presence of an adequate sample volume in each lysimeter.

Duplicate samples and equipment blanks will be collected at a 10% frequency. Matrix spikes, matrix spike duplicates, and trip blanks will be collected at a 5% frequency. Samples designated for matrix spike/matrix spike duplicate (MS/MSD) analysis will be identified on the sample label and the chain-of-custody form. Supplies that will be used for sampling lysimeters, decontaminating sampling equipment, and shipping samples are listed in Attachment C.

Attachment C presents an example standard operating procedure for lysimeters. Should a lysimeter need to be replaced, the defunct lysimeter will be abandoned in place and the lysimeter will be replaced according to the plans and specifications presented in Attachment C.

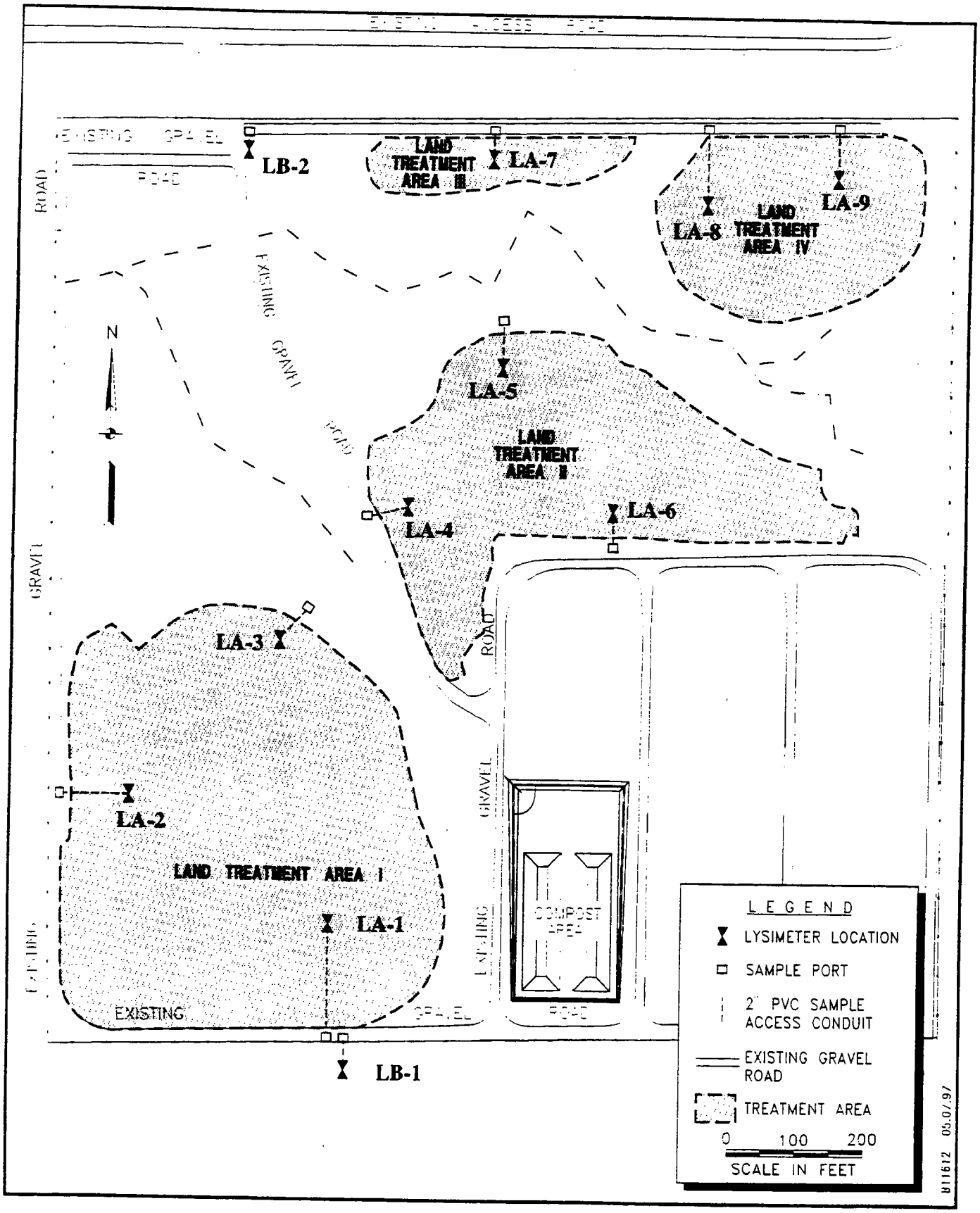


Figure IV-N-3. Locations of Lysimeters

3.2 Sample Collection Procedures

Pressure-vacuum lysimeters extract SPL from soil micropores (i.e., the liquid that is held within soil pores after gravity drainage of macropores has ceased). To ensure that samples are representative of the media at the time of sampling, the lysimeters will be purged prior to collecting a sample.

For each sample collection, a precleaned sample bottle will be fitted to the discharge tube and a pump will be applied to the pressure tube. Pressure will force SPL from the lysimeter into the sample bottle.

Lysimeters are inherently limited in their ability to extract large volumes of water from the soil at a single time. It is often difficult to collect sufficient sample volume for several different laboratory analyses during a one-day sample collection event. At best, commercially available lysimeters can extract only one liter of liquid per day from wet, unsaturated soils. Therefore, if a larger sample volume is required based on the suite of analytical procedures required in the monitoring program, the non-volatile portion of the SPL sample may be accumulated over a several-day period.

However, such a collection schedule has potentially adverse implications for sample holding times prior to laboratory analysis. For example, water samples being analyzed for VOCs (EPA Method 8240, SW-846) typically have a 7- or 14-day holding time. Water samples being analyzed for base-neutral and acid extractable compounds (EPA method 8270, SW-846) have a 14-day holding time prior to extraction and a 40-day holding time prior to analysis. Samples for metals analyses typically have much longer holding times--often 6 months. A protocol based on the required holding times for the specific analyses required in the UZM program will be used that will ensure collection of a sufficient sample volume and performance of all required analyses within required holding times.

The protocol prioritizes the order in which the individual sample containers are filled such that the analyses with the shortest holding times are filled first. Bottles for VOCs will be filled first. If any SPL sample is remaining, it will be placed in the container for SVOCs. Remaining water will go towards sample requirements for metals analyses. Samples for VOC analysis will be collected on the first day and shipped the same day to the laboratory. If the bottle for SVOC analysis is full, it will be shipped also. However, if it is only partially full, it will be sealed and stored on ice overnight while additional water collects in the lysimeter. This procedure will be repeated until all sample bottles are filled.

SPL samples will be stored in appropriate, pre-cleaned containers on ice during transportation to the laboratory. All samples will be immediately sent to an analytical laboratory for prompt processing so that sample analysis can be conducted within the required holding times.

When collecting, transporting, and storing soil pore samples, the chain of custody procedures will be followed (Attachment C).

4.0 ANALYTICAL PROCEDURES

The analytical methods specified in SW-846 or other approved methods will be used to perform the appropriate analyses. Attachments A (BTZ soil core), B (ZOI), and C (SPL) of this UZM plan present the analytical methods that will be used for all of the analytes.

5.0 ESTABLISHMENT OF BACKGROUND VALUES

LTF soil background concentrations for analytes on the modified Skinner List were determined based on the analytical results from the previous background study (Geraghty and Miller, 1995). The soil cores were collected from of the Wadsworth Till silty clay.

The background concentrations for SPLs will be established over a two-year period following the installation of the background lysimeters. Liquid samples will be collected semi-annually from the lysimeters installed north and south of the CAMU (see Figure IV-N-3). The first SPL sampling event will occur soon after the first waste application. A second SPL sampling event will be conducted 2 to 3 days following a heavy rain six months later. After all the data from sampling the background lysimeters during the first two years of CAMU operation have been collected, UTLs will be determined for each analyte via the same procedures described in Section 6.0 below.

6.0 STATISTICAL ANALYSIS AND MONITORING LIMITS

Following each monitoring event, monitoring data will be evaluated to determine whether there is a statistically significant change over background values. This determination will be made within sixty (60) days after receipt of laboratory analytical results. Detected constituents will be compared to their specific monitoring limits. If a constituent is shown to be in excess of this limit, analysis will be performed to determine if this detection is from some source other than the unit, and if not, if it represents a statistically significant increase.

Monitoring Limits for Organics Constituents

For soil and soil-pore liquid samples, organic compound concentrations will be compared to the individual constituent's practical quantitation limit (PQL). The PQLs are based on the estimated quantitation limits (EQLs) provided in USEPA's SW-846. These recommended PQLs shown in Table IV-N-5 are laboratory reporting limits. These values are the same as the published EQLs for most of the modified

Table IV-N-5
Complete Unsaturated Zone Monitoring Parameter List and Associated Monitoring Limits

Chemical	Monitoring Limit	Chemical	Monitoring Limit
Inorganics (mg/kg)		**Semivolatile organic compounds (µg/kg)**	
Antimony	6.69	*Acenaphthylene*	NA
Arsenic	55.50	Anthracene	660
Barium	1028.00	Benzo(a)anthracene	660
Beryllium	2.53	Benzo(b)fluoranthene	660
Cadmium	9.11	Benzo(k)fluoranthene	660
Chromium	368.00	*Benzo(g,h,i)perylene*	NA
Cobalt	60.10	Benzo(a)pyrene	660
Lead	504.00	Bis(2-ethylhexyl)phthalate	660
Mercury	0.90	Butyl benzyl phthalate	660
Nickel	138.00	Chrysene	660
Selenium	0.56	Dibenz(a,h)acridine	330
Vanadium	446.00	Dibenz(a,h)anthracene	660
Volatile organic compounds (µg/kg)		Dichlorobenzenes	660
Acetone	5	Diethyl phthalate	660
Benzene	5	7,12-Dimethylbenz(a)anthracene	330
n-Butylbenzene	NA	Dimethyl phthalate	660
sec-Butylbenzene	NA	Di(n)butyl phthalate	660
Carbon disulfide	5	Di(n)octyl phthalate	660
Chlorobenzene	5	Fluoranthene	660
Chloroform	5	*Flourene*	NA
1,2-Dichloroethane	5	Indene	330
1,4-Dioxane	500	*Indeno(1,2,3-cd)pyrene*	NA
Ethylbenzene	5	Methyl chrysene (TIC only)	NA
Ethylene dibromide	10	1-Methylnaphthalene	660
4-Isopropyltoluene	NA	*2-Methylnaphthalene*	NA
Methyl ethyl ketone	10	Naphthalene	660
n-Propylbenzene	NA	Phenanthrene	660
Styrene	5	Pyrene	660
Toluene	5	Pyridine	660
1,3,5-Trimethylbenzene	NA	Quinoline	330
1,2,4-Trimethylbenzene	NA	Benzenethiol	3300
Xylene	5	Cresols (o, m, & p)	660
		2,4-Dimethylphenol	660
		2,4-Dinitrophenol	3300
		4-Nitrophenol	3300
		Phenol	660

NA = Not available

Skinner List analytes. The proposed PQLs that are different than the EQLs are for analytes which laboratory testing has demonstrated to exhibit lower analytical sensitivity; and thus, are required to have higher reporting limits. SW-846 allows for this and states:

> " The EQLs determined herein are provided for guidance and may not always be achievable"

Also, some of the analytes have PQLs listed as not available. For these analytes, if they are detected, the PQL will be the laboratory reporting limit.

Monitoring Limits for Inorganic Constituents

The monitoring limits for all inorganic constituents will be the 95% upper confidence bounds for the 97.5th percentile of the background data. The background values for the LTF soils have been calculated and are provided in Table IV-N-5. These background values were determined previously and are contained in the approved Part B Permit Application (Section I). As stated in Section 5.0 above, the background data for the soil-pore liquid will be collected over the first two years of operation. This data will undergo the same statistical procedures as the soils data to determine inorganic constituent monitoring limits. Details regarding the procedures that were and/or will be used to determine the monitoring limits is provided below.

Calculation of Monitoring Limits for Inorganic Constituents

The monitoring limits for all inorganic constituents are the 95% upper confidence bounds on the 97.5th percentiles, also referred to as 95%/97.5% upper tolerance limits (UTLs). The monitoring limits for inorganic constituents can be interpreted as follows:

> *The monitoring limit for a given parameter represents the bound below which one can be 95% confident that 97.5% of all background values fall for the given constituent.*

This section explains the derivation and calculation of the 95%/97.5% UTLs.

Eleven background samples were collected during a site characterization study by Geraghty & Miller (Geraghty & Miller, 1995). These background samples were taken to be representative of the entire population of background concentrations. For selenium, the sample results indicate that it is reasonable to assume that the population of background selenium concentrations follow a normal distribution. For all other inorganic constituents, the sample results indicate that a lognormal distribution is reasonable.

For selenium (assumed to be normally distributed), the average and standard deviation of the background concentrations are estimated respectively as:

$$\bar{x} = \frac{1}{11}\sum_{i=1}^{11} x_i \quad \text{and}$$

$$s = \frac{1}{10}\sum_{i=1}^{11}(x_i - \bar{x})^2$$

where xI represents the Ith sample result.

For constituents assumed to be lognormally distributed, the average and standard deviations of the log background concentrations are estimated respectively as:

$$\bar{x}_l = \frac{1}{11}\sum_{i=1}^{11}\log(x_i) \quad \text{and}$$

$$s_l = \frac{1}{10}\sum_{i=1}^{11}(\log(x_i) - \bar{x}_l)^2$$

where xI represents the Ith sample result.

Using these estimates along with the distributional assumptions given above, the 97.5th percentile of background concentrations can be obtained for each constituent. For example, for selenium ($\bar{x} = .17$ and $s = .12$), assume that the estimated mean and standard deviation are the true parameters and assume the normality assumption is correct. Then, using known properties of the normal distribution, the 97.5th percentile of background selenium concentrations is

$$p_{97.5} = \bar{x} + 1.96 \times s$$
$$p_{97.5} = .17 + 1.96 \times .12$$
$$p_{97.5} = .40$$

Similar calculations follow for lognormally distributed constituents.

Despite the known properties of the normal distribution, the calculation above is an estimate of the 97.5th percentile because it is based on the estimated mean and standard deviation rather than the true (unknown) parameters. To account for the resulting uncertainty in the estimate of the 97.5th percentile, a tolerance factor (K) should used instead of 1.96 in the preceding equation. The tolerance factor is a function of the sample size, the percentile to be estimated and the certainty with which the percentile should be

estimated. For establishing monitoring limits, K was chosen so that one can be 95% certain that the true 97.5th percentile is less than or equal to the calculated limit. For a sample of size 11, K=3.29. The steps involved in the calculations are shown below.

For selenium (normally distributed),

$$Limit = \bar{x} + K \times s$$

where $\bar{x}_l$ and s_l are defined above and K is the appropriate tolerance factor. This leads to the following monitoring limit for selenium:

$$Limit = .17 + 3.29 \times .12$$
$$Limit = .56$$

For lognormally distributed constituents, the calculations are analogous:

$$Limit = \exp(\bar{x}_l + Ks_l)\ ,$$

where $\bar{x}_l$ and s_l are defined above and K is the appropriate tolerance factor.

To understand the implications of such a monitoring limit consider:

> *If the site concentrations follow the same distribution as the background concentrations, then one can be 95% certain that the site results will fall below the limits defined above 97.5% of the time.*

Thus, any exceedence of the monitoring limit for an inorganic constituent provides strong evidence that on-site concentrations have increased above background levels.

Individual inorganic analytical results will be compared to upper tolerance limits (UTLs) to determine whether the monitoring limit for those hazardous constituents has been needed.

7.0 RESPONSES TO DETECTION OF CONSTITUENT MOVEMENT

After samples have been collected, a reasonable time period will be required for sample shipment, chemical analysis, data reporting, and statistical analysis before a report can be prepared for the IEPA. This time period will depend upon the number and type of analytes included in the monitoring program. As a conservative estimate, a period of 60 days is suggested. This will allow 30 days for sample shipment, analysis, and data reporting, and approximately 30 days for statistical analysis and interpretation of the results.

In the event that one or more constituents exceed their respective monitoring limits, a standard procedure will be followed to determine if a detection is statistically significant. Figure IV-N-4 presents this procedure in the form of a decision tree which will be used to make the determination.

As seen in the figure, the first steps involve determining that the detection is not from some other source (e.g., lab or field cross-contamination) and, if not, resampling the area/device to confirm the detection. If the detection is confirmed, the Agency will be formally notified within 7 days. The procedure then calls for alternative to operation be considered and to determine if the detection constitutes a "statically significant increase" (SSI). Possible changes in operating practices to address the potential release include, but may not be limited to, the following:

- Alteration of waste quantities or characteristics;
- Alterations of methods or timing of waste application;
- Revision of unit performance monitoring;
- Alteration of properties of the treatment zone, such as soil pH or organic matter content;
- "Hot Spot" remediation/removal; and
- Alteration of sample collection procedures (e.g., methodology or schedule) or analytical methods.

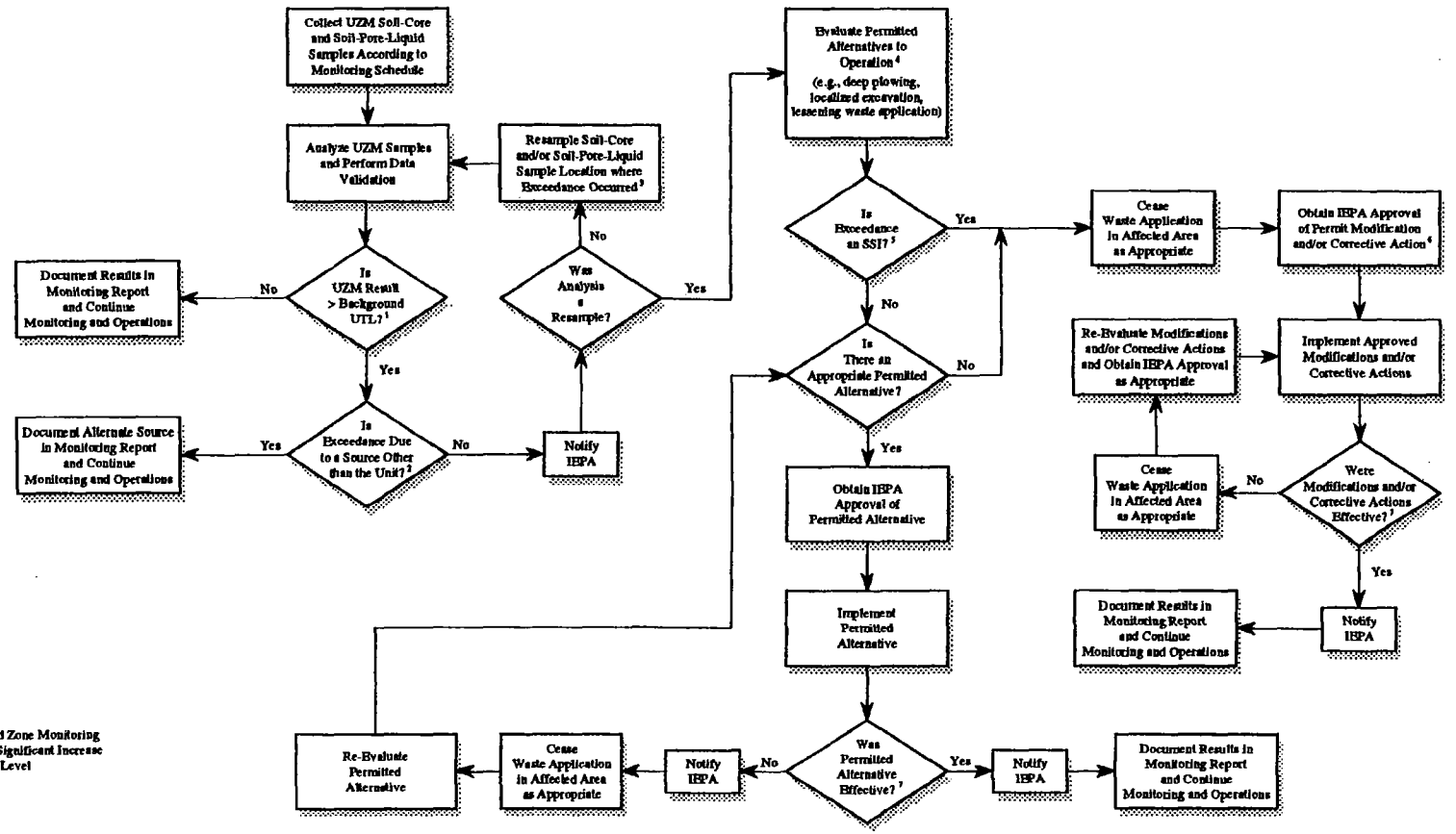
If other changes than those listed above or on Figure IV-N-4 are necessary, or the detection is determined to be an SSI (as defined in Figure IV-N-4) a permit addendum will be submitted to address other changes in the operating procedures.

8.0 REFERENCES

Environmental Resources Management-North Central, Inc. (ERM), *Phase I Closure Report For Land Treatment Area*, June 1989.

Geraghty and Miller, *Site Characterization Report UNO-EN Land Treatment Facility,* Lemont, Illinois, March 1995.

U.S. Environmental Protection Agency, *Guidance Manual on Unsaturated Zone Monitoring for Hazardous Land Treatment Units*, 1986.



UZM = Unsaturated Zone Monitoring
SSI = Statistically Significant Increase
RBL = Risk-Based Level

Notes:

1. Background Upper Tolerance Limits (UTLs) are derived from detected pristine background data or for analytes that have never been detected in background, a value agreed upon by all parties will be used. These values could include, but not be limited to, estimated quantitation limits (EQL), laboratory-specific reporting limits (RLs), and/or project defined practical quantitation limits (PQLs).

2. Alternate sources could be, but are not limited to, laboratory contamination or the use of inappropriate statistical tests.– Identification of alternative source may result in additional sampling.

3. Corrective Action Management Unit (CAMU) resampling would occur following determination that the exceedance was due to the unit (i.e.; before the next regularly scheduled monitoring event).

4. Corrective action measures and/or modified operating procedures could consist of, but not be limited to deep plowing, localized excavation, increased monitoring, resampling, step-out sampling, lessening or ceasing waste application, enhanced nutrient application, enhanced tilling, pH adjustment, and/or addition of organic material.

5. SSI = 1) A detection that is greater than background/baseline UTLs and TACO Tier 1 levels and results in a corrective action that is not included in the permitted alternatives; or
   2) A statistically significant detection in groundwater that is determined to be from the unit; or
   3) An off-site release that is determined to come from the unit.

6. IEPA approval to be obtained for a formal permit modification request. Modification examples and modification/approval protocol to be contained in the approved permit application/permit.

7. Effectiveness of Alternative or Modifications to be measured by resampling of affected location during the next regularly scheduled monitoring event or as specified by the permit. Alternative or Modifications are deemed to be effective if concentrations of target analytes have not increased.

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Figure IV-N-4. UZM Data Assessment Decision Tree

PROJECT: RCRA Monitoring	PROCEDURE NO: SC-01	PAGE: 1 of 9
TITLE: **General Sampling Procedures for Soil-Core RCRA Monitoring**	REVISION NO: 1	EFFECTIVE DATE: 12/97
	SUPERSEDES: Revision No. 1	
REFERENCES: The Lemont Refinery's Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management Permit Application (IEPA 197803004)		
SATELLITE FILES: Environmental Department, Lemont, Illinois		
REASON FOR REVISION: Minor changes		

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to detail the BTZ soil-core sampling plan that will be conducted as part of the RCRA monitoring program at the Lemont Refinery's Land Treatment Facility (LTF). The work described here will be performed to fulfill the requirements of the Lemont Refinery's RCRA Hazardous Waste Management Post Closure Permit (IEPA 197803004).

2.0 SCOPE AND APPLICABILITY

This SOP document concerns the RCRA monitoring program that involves the collection of below-treatment-zone (BTZ) soil-core samples from the LTF.

2.1 Scope

This SOW describes activities associated with sample collection including planning, sample collection, quality control (QC) samples, and packing and shipping.

2.2 Application

The procedures described in this SOP are based on the approved Part B permit application and this modification. Any deviations from this SOP must be approved by the refinery's project manager prior to implementation.

AUTHOR:	DATE:	ENVIRONMENTAL COORDINATOR:	DATE:

3.0 SAFETY

All project members who perform sampling at the Lemont Refinery will be HAZWOPER trained and must abide by the refinery's *Health and Safety Plan.* Also, all personnel must have had Three Rivers Manufacturers Association Safety Training.

4.0 FREQUENCY AND SCHEDULE

The BTZ soil-core monitoring program will be used to demonstrate that movement of waste constituents is not occurring below the treatment zone at the LTF. Figure 4-1 illustrates the treatment cells at the LTF. Eight soil-core samples are collected annually during the fourth quarter and analyzed for constituents listed in Table 4-1 or Table 4-2. The samples collected during the first episode, in November of 1997, and every fifth year thereafter will be analyzed for the full modified skinner list (Table 4-1). During other years, samples will be analyzed for the constituents listed in Table 4-2. If, when the samples are analyzed for the full Skinner List (e.g., year 1), analytes not on Table 4-2 are detected above background or PQLs then those analytes will added to Table 4-2.

Each of the eight cores collected is sampled separately for all analytes. The samples are collected from 60 inches to 72 inches below the original soil surface (which is defined as the ground elevation prior to the application of any wastes). Table 4-3 gives information on sampling containers and preservatives. The number of samples and the sample type to be collected during each sampling event, including QC samples, are presented in Table 4-4.

5.0 SAMPLING LOCATIONS AND NUMBERS

The specific soil-core sampling locations will be selected prior to each sampling event by the random number method. This method involves superimposing an "x-y" coordinate system on the land treatment unit and assigning the same scale to each axis. Numbers are then drawn in pairs from a random number table. The intersection of two randomly selected coordinates is used as the location of a soil-core sample. Each location must be unique (i.e., soil-core locations must not have been sampled previously). Procedures are provided in *USEPA Permit Guidance on Unsaturated Zone Monitoring for Hazardous Waste Land Treatment Units (USEPA, 1986).*

Numeric and logic functions found in spreadsheet software can be used to produce random sampling locations. The number of soil-core samples to be collected from each treatment area is presented in Table 5-1.

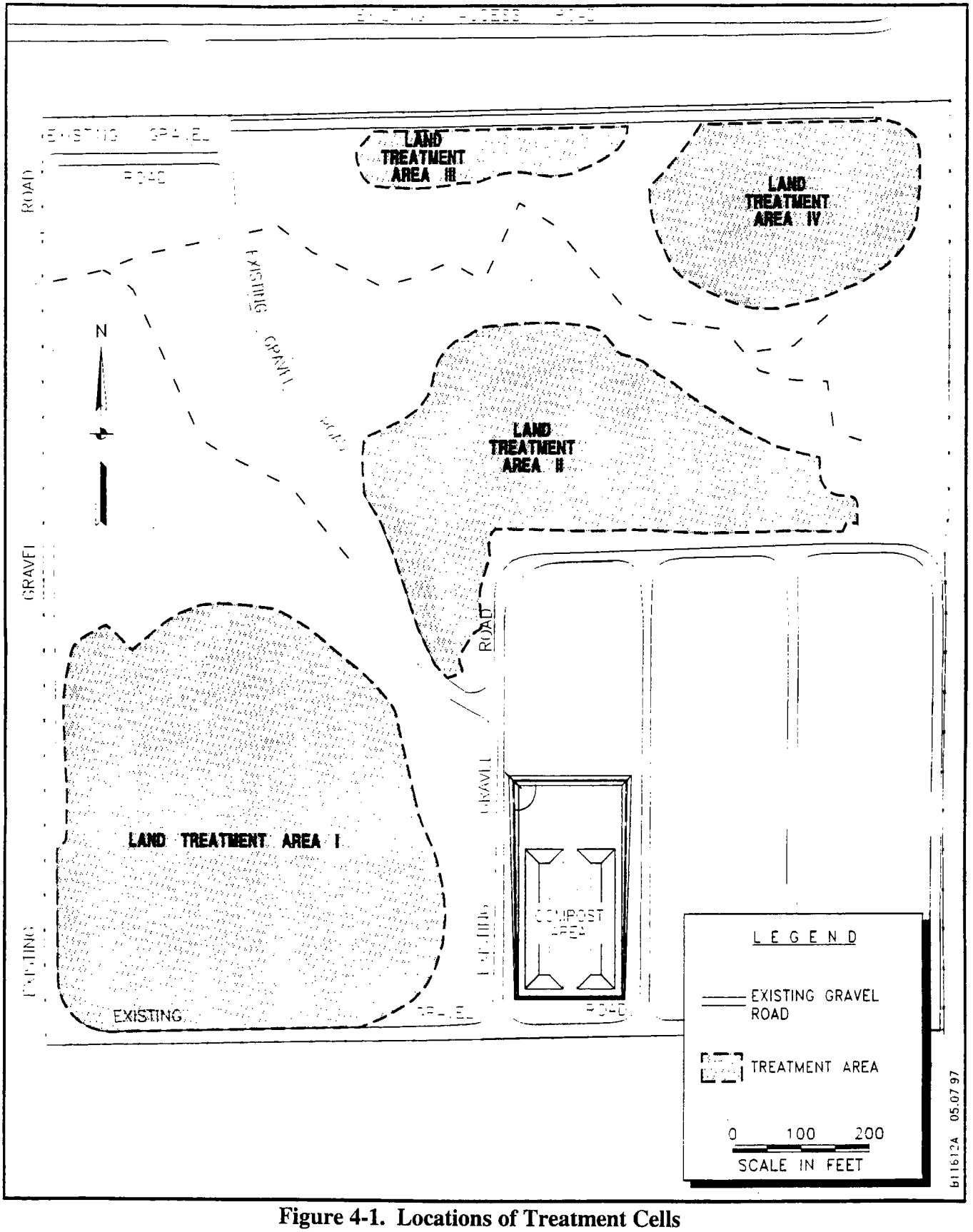


Figure 4-1. Locations of Treatment Cells

Table 4-1
Modified Skinner List Constituents for Analysis

Metals	Volatile Organics	Semi-Volatile, Acid-Extractable Organics	Semi-Volatile, Base/Neutral Organics
Antimony	*Acetone*	Benzenethiol	*Acenaphthylene*
Arsenic	Benzene	Cresols (o, m, & p)	Anthracene
Barium	*n-Butylbenzene*	2,4-Dimethylphenol	Benzo(a)anthracene
Beryllium	sec-Butylbenzene	2,4-Dinitrophenol	Benzo(b)fluoranthene
Cadmium	Carbon disulfide	4-Nitrophenol	Benzo(k)fluoranthene
Chromium	Chlorobenzene	Phenol	*Benzo(g,h,i)perylene*
Cobalt	Chloroform		Benzo(a)pyrene
Lead	1,2-Dichloroethane		Bis(2-ethylhexyl)phthalate
Mercury	1,4-Dioxane		Butyl benzyl phthalate
Nickel	Ethylbenzene		Chrysene
Selenium	Ethylene dibromide		Dibenz(a,h)acridine
Vanadium	*4-Isopropyltoluene*		Dibenz(a,h)anthracene
	Methyl ethyl ketone		Dichlorobenzenes
	n-Propylbenzene		Diethyl phthalate
	Styrene		7,12-Dimethylbenz(a)anthracene
	Toluene		Dimethyl phthalate
	1,3,5-Trimethylbenzene		Di(n)butyl phthalate
	1,2,4-Trimethylbenzene		Di(n)octyl phthalate
	Xylene		Fluoranthene
			Fluorene
			Indene
			Indeno(1,2,3-cd)pyrene
			Methyl chrysene
			1-Methylnaphthalene
			2-Methylnaphthalene
			Naphthalene
			Phenanthrene
			Pyrene
			Pyridine
			Quinoline

Note: Non-Skinner List constituents are shown in italics.

Table 4-2
Unsaturated Zone List Constituents for Analysis[a]

Metals	Volatiles	Semi-volatiles
Antimony	Acetone	Acenaphthalene
Arsenic	Benzene	Anthracene
Barium	n-Butylbenzene	Benzo(a)anthracene
Beryllium	sec-Butylbenzene	Benzo(g,h,i)perylene
Cadmium	Ethylbenzene	Butyl benzyl phthalate
Chromium	4-Isopropyltoluene	Chrysene
Cobalt	Methyl Ethyl Ketone	Di(n)octyl phthalate
Lead	n-Propylbenzene	Dibenz(a,h)anthracene
Mercury	Toluene	Fluorene
Nickel	1,3,5 Trimethylbenzene	Indeno(1,2,3-cd)pyrene
Selenium	1,2,4 Trimethylbenzene	Methylchrysene
Vanadium	Xylene (total)	1-Methylnaphthalene
		2-Methylnaphthalene
		Naphthalene
		Phenanthrene
		Pyrene

[a] Initially (late 1997) and every five years afterward, samples will be analyzed for the constituents in Table 4-1. For the four intervening years the constituents listed in Table 4-2 will be analyzed for and reported.

Table 4-3
Sample Container and Preservative Specifications

Parameter Analyzed	Analytical Method	Holding Times	Container	Preservative
Antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, nickel, selenium, vanadium	SW6010A (Trace ICPES)	6 months	One 500 mL wide-mouth glass jar with Teflon-lined cap per sampling point[a]	Cool to < 4 C
Mercury	SW7471A	28 days		
Semivolatiles	SW8270B	14 days to extraction, 40 days to analysis	One 500 mL wide-mouth glass jar with Teflon-lined cap per sampling point[a]	
Volatiles	SW8260A	14 days	Two 120 mL VOAs	

[a]A sample for all indicated analytes is collected in a single container.

Table 4-4
Soil-Core Samples to be Collected During Each RCRA Monitoring Event

Sampling Location	Volatiles [a]	Semivolatiles, Metals [b]
Ax-yyy/zzz- [c]	E [d], D [e] with MS/MSD [f], N, T [g]	N, E, D with MS/MSD
Ax-yyy/zzz-	N	N
Ax-yyy/zzz-	N	N
Ax-yyy/zzz-	N	N
Ax-yyy/zzz-	N	N
Ax-yyy/zzz-	N	N
Ax-yyy/zzz-	N	N
Ax-yyy/zzz-	N	N

E = Equipment blank (baked sand)
D = Duplicate sample
N = Normal sample
T = Trip blank
[a] Sample for volatile organic analysis is collected in two 120-mL glass jars.
[b] Sample for analysis of these two analyte groups is collected in one 500 mL jar.
[c] Soil-core identification numbers identify the LTF treatment area, followed by the coordinates of the sample location and the sample type. For example, sample ID A1-200N/350W-N identifies the treatment area as Area I with coordinates 200 north and 350 west, and is a normal sample.
[d] Equipment blank to be collected at 10 percent frequency.
[e] D = Duplicate sample to be collected at 10 percent frequency.
[f] MS/MSD = Matrix spike/matrix spike duplicate. Each is collected at 5 percent frequency (one MS/MSD per sampling event).
[g] T = Trip blank. Trip blanks will accompany every shipment that involve volatile organic analysis.

NOTE: Samples designated for MS/MSD analysis must be identified on the sample label and the chain-of-custody (COC) form.

Table 5-1
Number of Soil-Core Samples

Land Treatment Area	Land Treatment Area Size	Number of Samples
Area I	5.5 acres	3
Area II	4.2 acres	2
Area III	1.2 acres	1
Area IV	2.6 acres	2
Total	13.5 acres	8

Each soil-core location during RCRA monitoring is assigned a unique identification number. All soil-core locations will be staked in the field and surveyed (including current elevation).

6.0 PLANNING A SAMPLING EVENT

A four wheel driver vehicle will be necessary to access some of the areas. Effective collection of samples is dependent on the absence of excessive soil moisture; therefore, sampling will be scheduled for periods of relatively dry weather. Samples cannot be collected when moisture is present in quantities (either on the surface or within the soil column) that will allow liquid to flow into the borehole, thus contaminating the subsurface sample. The permit requires this sampling to occur during the fourth quarter of each year.

The contractor shall determine soil-core locations and the original elevations from Figures 6-1 and 6-2 and arrange for the locations to be surveyed and staked. Surveyed elevations shall be compared to the as-built contour lines (Figures 6-1 and 6-2) for each unit to determine the difference between the current elevation and the original soil surface. Record this difference, which is the depth to the pre-existing soil surface. The depth of the soil core shall be 60 through 72 inches below the original soil surface.

7.0 SAMPLE COLLECTION PROCEDURES

All samples will be collected using a split-spoon sampler that is advanced through a hollow-stem auger.

An ATV-rig similar to a CME-55 should be used. Prior to sampling, the rear-end of the drilling rig will be steam-cleaned by the drillers at an appropriate on-site location to prevent contamination from off-site sources. In addition, the hollow-stem auger flights will be steam-cleaned by the drillers between sampling locations using a portable water container on the drill rig. The split-spoon sampler will be thoroughly decontaminated between samples using procedures described in step 6 below. The rig itself, especially the rear portion which is directly over the borehole, will be inspected prior to use to determine that no oils or drilling fluids are present or leaking.

The following procedures will be used to collect soil core samples from the split-spoon after the driller has extracted it from the borehole:

1) Place the split spoon containing the sample on a Visqueen plastic sheet that is located away from (and upwind of) any engine exhaust sources (e.g., drill rig, idling vehicles. etc.).

2) Unscrew the collar of the split spoon and separate the two halves. Use a stainless steel knife to remove and discard the top and bottom ends of the core, and scrape away the outer-most layer of soil (which has been in contact with either split spoon half) on the core. Discard auger slough on the LTF.

3) Place the remaining sample in a stainless steel bowl, transfer an aliquot to two 120-mL VOA vials (volatile organics samples) with no head space, cap vials, and place in a cooler containing ice.

4) Homogenize the remaining sample in the stainless steel bowl using a stainless steel knife or trowel; then collect the metals/semivolatiles sample in a single 500 mL wide-mouth glass jar and place in cooler.

5) Make sure all sample containers have completed labels on them, then fill out the chain-of-custody form.

6) Decontaminate all equipment that came into contact with the sample (i.e., split-spoon sampler, stainless steel bowl and knife, etc.) by washing with a low phosphate soap (such as Alconox) water solution, rinsing with distilled water, rinsing with methanol, rinsing with distilled water again, and allowing to air dry. Rinse water may be discarded on the LTF. Spent methanol will be containerized and properly disposed of.

7) The drillers shall decontaminate the hollow-stem auger flights after pulling them from the borehole.

8) Drillers will remove the wooden survey stake, and fill in the borehole with bentonite pellets. If soil conditions are dry, pour a small amount of clean water over the bentonite after filling the borehole so it will expand to fill the hole.

All sample containers will have sample labels that identify the unique sample number, the sample type, depth, client, location, preservative, sampler, data, and the analytical parameter and method (refer to Section 4). In addition, custody procedures are followed to enable the tracking of each sample through each of the sampling, shipping, and analytical procedures. Upon collection of the soil-core sample, the sample containers will be placed in resealable plastic bags and then stored on ice prior to same-day shipment to the analytical laboratory.

7.1 Quality Control Samples

QC samples are collected as part of the RCRA monitoring program. The collection and analysis of all soil, soil-pore-liquid, and groundwater samples pertaining to all RCRA-regulated facilities at Lemont Refinery are conducted according to quality assurance procedures. Specific requirements include sample duplicates, laboratory duplicates, equipment and field blanks along with acceptable levels of precision and accuracy for all data generated at Lemont Refinery that will be used under the RCRA regulations.

For all sampling media, QC samples are collected in addition to normal samples during RCRA monitoring in accordance with the QAPP. Frequency requirements for QC sampling are as follows:

Duplicate samples for all parameters will be collected at a rate of 10% (1 in 10).

Matrix spikes and matrix spike duplicates (MS/MSDs) will be designated at a rate of one per sampling event. The sample container and the COC form will be labeled with the appropriate analytical method and the designation of MS/MSD.

Equipment blanks for all parameters will be collected at a rate of 10% (1 in 10) for all samples. Purified sand will be placed in the decontaminated split-spoon sampler, transferred to a stainless steel bowl, and then collected in the appropriate sample collection containers. Equipment blanks will be analyzed for all target analytes and all methods that were requested for the field samples.

Trip blanks, which consist of organic-free water that is placed in a pre-preserved VOA vial, will be placed in every cooler that contains samples for volatile organic analysis (Method SW-8240). Trip blanks will be obtained from the analytical laboratory.

8.0 PACKING AND SHIPPING SAMPLES

An ice chest will be used for storing and shipping samples so they can be kept at 4 C during shipping. COC forms will be filled out when samples are transferred to the shipping cooler(s). A completed COC will accompany each cooler to be shipped. Information on the COC will include sampling date and time, the exact sample ID listed on the bottle labels (**no** extra identifiers should be added, such as cell number or LTF unit), sample type ("soil" for all samples except trip blanks), number of containers sent, analytical parameters requested, and the date and time samples were relinquished (along with a signature of the person relinquishing custody).

In preparation for shipping samples, the drain plug (if there is one) on the outside of the cooler will be taped shut. Approximately 1 inch of packing material (such as brown absorbent paper) will be placed on the bottom as a liner. Sample bottles will be packed in ice chests such that bottles will not come in contact with one another. Plastic mesh and styrofoam may be used to keep bottles from touching. Ice will be double-bagged in sealable plastic bags and placed in contact with samples.

A list of analyses to be performed with the target analytes and the completed COC form will be placed in a sealable plastic bag and taped to the inside of the ice chest lid. The ice chest will be taped shut with strapping tape, and two signed custody seals will be placed on the cooler (one custody seal placed over one of the lid hinges at the back of the cooler and the other at the side or front of the cooler between the cooler lid and cooler body). The overnight shipping form will be filled out, and the shipping label is placed on the top of the cooler and covered with clear tape to protect it from moisture.

STANDARD OPERATING PROCEDURE

PROJECT: RCRA Monitoring	PROCEDURE NO: ZO-01	PAGE: 1 of 8
TITLE: **Sampling Procedures for Zone-of-Incorporation RCRA Monitoring**	REVISION NO: 1	EFFECTIVE DATE: 12/97
	SUPERSEDES: N/A	

REFERENCES:

Lemont Refinery's Approved Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management Permit Application, (IEPA 197803004)

Permit Application for CAMU Approval.
Section III, *Engineering Report for the CAMU*; and Appendix III-D, *Operation, Maintenance, and Monitoring Plan for the CAMU.*
Sectin IV, Appendix IV-N, *Unsaturated Zone Monitoring Program*

SATELLITE FILES:

Environmental Department, Lemont, Illinois

REASON FOR REVISION:

N/A

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to detail the zone-of-incorporation (ZOI) sampling plan that will be conducted as part of the RCRA monitoring program at the Lemont Refinery land treatment facility (LTF). The work described here will be performed to fulfill the requirements of the RCRA hazardous waste management permit (IEPA 197803004).

2.0 SCOPE AND APPLICABILITY

This SOP describes procedures for collection of ZOI samples at the CAMU. Similar SOPs detail the soil-pore-liquid and RCRA soil-core monitoring.

2.1 Scope

This SOP describes activities associated with sample collection including planning, sample collection, quality control (QC) samples, and packing and shipping.

AUTHOR:	DATE:	ENVIRONMENTAL COORDINATOR:	DATE:

2.2 Application

The procedures described in this SOP are currently part of the sampling effort established for the ZOI sampling task. The use of these procedures by qualified personnel will assure that sampling errors are minimized, identified problems are addressed, and corrective actions are implemented.

3.0 SAFETY

All project members who perform sampling at Lemont Refinery will be HAZWOPER and must abide by *Health and Safety Plan*. Also, all personnel must have had Three River's Manufacturers Association Safety Training.

4.0 FREQUENCY AND SCHEDULE

The ZOI, as defined for this project, is the top 12 inches of the soil/waste mixture. A composite sample will be collected from each of the LTF cells semi-annually and analyzed for total organic carbon (TOC), oil and grease, total Kjeldahl nitrogen (TKN), total phosphorus (TP), pH, and moisture content. Information derived from these analyses will be used to monitor and adjust, if necessary, pH and nutrient concentrations to maximize microbial degradation of applied wastes. Table 4-1 gives information on sampling containers and preservatives. Table 4-2 presents the number of samples and the sample types to be collected, including QC samples.

5.0 SAMPLING LOCATIONS AND NUMBERS

Ten random locations from each cell are sampled and the soil is composited, then an aliquot is sent for analysis. The ten sampling locations are selected prior to each sampling event by the random number method. Random sampling locations will be selected according to the procedures in Attachment A—*Soil Core Sampling SOP*.

6.0 PLANNING A SAMPLING EVENT

Sampling supplies must be ordered in advance. Necessary sampling and decontamination supplies are shown in Tables 6-1 and 6-2. If additional decontamination solvent is needed, it should be ordered in advance and ground-shipped by the supplier to avoid shipping problems. Collection of samples is dependent on the absence of excessive soil moisture, so the scheduling of sampling trips should be coordinated with periods of relatively dry weather. This is usually not of concern during the summer and fall, but may require additional coordination during the winter and early spring.

Table 4-1
Sample Container and Preservative Specifications

Parameter Analyzed	Analytical Method	Holding Times	Container	Preservative
Total Kjeldahl Nitrogen	351.2	28 days	One 500ml glass jar	Cool to 4°C
Total Phosphorus	365.3	28 days		
pH [a]	150	24 hours		
Moisture Content	160.3	7 days		
Oil and Grease	413.1*	28 days		

*Method will be outdated when freon is no longer available. However, no equivalent method has been issued by the EPA at this time.

Table 4-2
ZOI Samples to be Collected During Each Monitoring Event

Sample Location	Sample ID	Analysis	Sample Type
Cell I	QXX[a]-001	TKN, TP, MC, pH [b]	Normal
	QXX-002	TKN, TP, MC, pH	
	QXX-003	TKN, TP, MC, pH	
Cell II	QXX-004	TKN, TP, MC, pH	Duplicate with MS/MSD on TOC, TKN, TP[c]
	QXX-005	TKN, TP, MC, pH	
Cell III	QXX-006	TKN, TP, MC, pH	Normal
Cell IV	QXX-007	TKN, TP, MC, pH	Normal
	QXX-0058	TKN, TP, MC, pH	Equipment Blanks[c]

[a] QXX should be replaced in sample ID with the three appropriate digits that represent the quarter and year during which the sampling event occurred.
[b] Analytes and their corresponding analytical methods are detailed in Table 4-1.
[c] QC samples are moved around from cell to cell for each sampling event. (The sampling scheme shown in the table is only an example.)

Table 6-1
Supply List for ZOI Sampling

Equipment	Purpose
Sampling Equipment	
Tyvek® suits	Safety
Tyvek® booties or neoprene rubber boots	Safety
Hard Hat	Safety
Safety Glasses	Safety
Latex gloves	Inner gloves
Nitrile gloves	Outer gloves
Baked (purified) sand	Equipment blank
Blue mesh (500-mL size)	Sample protection
Visqueen® plastic sheeting	Sample protection
Sharpshooter shovel	Take sample
Stainless steel bowls	Contain sample
Stainless steel trowels	Composite sample
Cooler	Store samples
Resealable plastic bags (quart and gallon)	Ice storage and COC protection
Ice	Cool sample
Sample Containers	
18 500-mL Glass Jars	All samples and equipment blanks

Table 6-2
Supplies for Decontamination of Sampling Equipment

Sampling Equipment	
Equipment	**Purpose**
Alconox®	Soapy water
Distilled water [a]	Rinse water
Hexane	Solvent rinse
Buckets	Hold soapy and rinse water
Brushes	Scrubbers
Visqueen® plastic sheeting	Sample protection
Packing Supplies	
Chain-of-custody forms	
Sample analysis and target analyte forms	
Blank labels	
Brown absorbent paper	
Shipping labels	
Airborne Express shipping forms	
Custody seals	
"Fragile"labels	
"This-Side-Up" labels	
Packing peanuts or vermiculite	
Clear tape	
Packing tape	

Sample labels are generated prior to sampling to facilitate the field work. Each sample receives a unique sample ID. Labels should include the following information:

- Sample ID;
- Sample type;
- Client;
- Location;
- Type of analysis;
- Preservative;
- Sampler;
- Date; and
- Comments.

7.0 SAMPLE COLLECTION PROCEDURES

Each of the individual samples is taken from a depth of surface to 12 inches. Locations of individual soil samples are determined prior to each sampling event (see Sections 5.0 and 9.0 of this SOP). The methodology for sample collection is as follows for each cell:

① Thoroughly decontaminate all equipment using the procedure shown in Step 10.

② Take a stainless steel bowl, a hand trowel, and a shovel, and pace the correct distance to the individual sampling point within the cell. The distance is paced off from the same reference point each time. In pacing the distance, each step is assumed to be three feet.

③ Using the shovel, take a 12-inch vertical sample and place it in the stainless steel bowl.

④ Use the hand trowel to thoroughly composite the sample from this location.

⑤ Collect an appropriate volume of sample from this location, and place it in a clean stainless steel bowl. The goal is to collect the same volume of soil from each of the ten individual locations and composite them into one sample that reflects the characteristics of the treatment cell.

⑥ Repeat steps 2-5 until all ten locations within the cell have been sampled.

⑦ Thoroughly mix the composite sample and fill the appropriate sample container with soil, making sure the sample label is completely filled out.

⑧ Place the sample jars in re-sealable plastic bags and put in a cooler containing ice.

⑨ Enter the sample information into the sampling logbook and fill out the chain-of-custody (COC form).

⑩ Thoroughly decontaminate all equipment that came into contact with the soil by washing with soapy water, rinsing with distilled water, rinsing with methanol, rinsing again with distilled water, then allowing to air dry.

Repeat steps 2-10 until all cells have been sampled on both units.

From the composite, individual samples are collected and analyzed for those analytes listed in Table 4-1. Table 4-1 also presents the appropriate sample containers to be used.

All sample containers have sample labels that identify the unique sample number, the sample type, client, location, preservative, sampler, date, and the analytical parameter and method. In addition, COC forms are included with each shipment (see Section 8). Records and notes taken during the sampling are recorded in a logbook (that is stored in the Environmental offices) used solely for RCRA monitoring sampling.

QC samples are collected in addition to normal samples. Frequency requirements for QC sampling are as follows:

- Duplicate samples for all parameters are collected at a rate of 10% (1 in 10).
- Matrix spikes and matrix spike duplicates are designated at a rate of 5% each (1 in 20) for all samples. The sample container and the COC form are labeled with the appropriate analytical method and the designation of matrix spikes (where applicable).
- Equipment blanks for all parameters are collected at a rate of 10% (1 in 10) for all samples. Purified sand is poured over the decontaminated sampling equipment then collected in sample containers.

8.0 PACKING AND SHIPPING SAMPLES

A cooler packed with ample ice is used for shipping samples to ensure that the samples arrive at the analytical laboratory at temperature of less than 4°C.

The COC forms are filled out as samples are transferred to the shipping cooler(s). A completed COC form, which is shipped from the analytical laboratory, accompanies each cooler to be shipped. It begins the "cradle-to-grave" documentation of sample custody, and describes the samples contained in the cooler. Information should include sampling date and time, the exact sample ID listed on the bottle labels (**no** extra identifiers should be added, such as cell number or LTF unit), sample type ("soil" for all samples except trip blanks), number of containers sent, analytical parameters requested, and the date and time samples were relinquished (along with a signature of the person relinquishing custody).

In preparation for shipping samples, the drain plug on the outside of the cooler is taped shut. Packing material (such as brown absorbent paper) is placed on the bottom as a liner. Sample bottles are packed in ice chests such that bottles will not come in contact with one another. Plastic mesh and styrofoam may be used to keep bottles from touching. Ice is double-bagged in sealable plastic bags and placed in contact with samples.

A list of analyses to be performed with the target analytes and the COC form are placed in a sealable plastic bag and taped to the inside of the ice chest lid. The ice chest is taped shut with strapping tape, and two signed custody seals are placed on the cooler (one custody seal placed

over one of the lid hinges at the back of the cooler and the other at the side or front of the cooler between the cooler lid and cooler body). The overnight shipping form is filled out, and the shipping label is placed on the top of the cooler. The shipping label is covered with clear tape to protect it from moisture.

PROJECT: RCRA Monitoring	PROCEDURE NO: SP-01	PAGE: 1 of 15
TITLE: **Sampling Procedures for Soil-pore liquid (Lysimeter) RCRA Monitoring**	REVISION NO: 1	EFFECTIVE DATE: 12/97
	SUPERSEDES: N/A	

REFERENCES:

Approved Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management Permit Application, (IEPA 197803004)

Permit Modification Request for CAMU Approval:
Section III, *Engineering Report for the CAMU*; and Appendix III-D, *Operation, Maintenance, and Monitoring Plan for the CAMU.*
Section IV, Appendix IV-N, *Unsaturated Zone Monitoring Program*

SATELLITE FILES:

Environmental Department, Lemont, Illinois

REASON FOR REVISION:

N/A

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to detail the soil-pore liquid (lysimeter) sampling plan that will be conducted as part of the RCRA monitoring program at the Lemont Refinery and Land Treatment Facility (LTF). The work described here fulfills the requirements of the RCRA Hazardous Waste Management Permit (IEPA 197803004).

2.0 SCOPE AND APPLICABILITY

This SOP concerns the RCRA monitoring program that involves the collection of soil-pore liquid samples from lysimeters located at the Corrective Action Management Unit (CAMU)). Similar SOPs detail the groundwater, soil-core, and zone-of-incorporation (ZOI) RCRA monitoring.

2.1 Scope

This SOP describes activities associated with sample collection including planning, sample collection, quality control (QC) samples, and packing and shipping.

AUTHOR:	DATE:	ENVIRONMENTAL COORDINATOR:	DATE:

2.2 Application

The procedures described in this SOP are currently part of the sampling effort established for the soil-pore liquid sampling task. The use of these procedures by qualified personnel will assure that sampling errors are minimized, identified problems are addressed, and corrective actions are implemented.

3.0 SAFETY

All project members who perform sampling at Lemont Refinery will be HAZWOPER trained and must abide by the *Health and Safety Plan.* Also, all personnel must have had Three Rivers Manufacturer's Association Safety Training.

4.0 FREQUENCY AND SCHEDULE

The soil-pore liquid monitoring program will be used to determine the presence of more mobile hazardous constituents within and below the treatment zone at the CAMU. Samples of soil-pore liquid will also be collected from two lysimeters located in areas immediately north and immediately south of the unit. These samples will be analyzed to provide data on background conditions (areas not affected by waste management practices).

Soil-pore liquid samples will be collected semi-annually with the timing based on when water is most likely to be moving through soils at the LTF.

The first soil-pore liquid sampling event of the year will be conducted following the first waste application. The second sampling event will be conducted approximately six months later, following a heavy rain to ensure the presence of an adequate pore-water volume.

5.0 DESCRIPTION OF LYSIMETERS

There are a total of eleven lysimeters in the CAMU area. Nine are located within treatment cells, and three are located in inactive areas to provide background data. Figure 5-1 shows the location of each lysimeter.

Pressure-vacuum lysimeters will be installed at the CAMU. Figure 5-2 contains a schematic diagram of a pressure-vacuum lysimeter.

5.1 Pressure-Vacuum Lysimeters

Pressure-vacuum lysimeters extract soil-pore liquid from soil micropores, i.e., that liquid which is held within the soil pores after gravity drainage of macropores has ceased. Pressure-vacuum lysimeters only collect a soil-pore liquid sample when a vacuum is drawn within the body of the sampler. Hence, during periods of zero vacuum no sample will be collected. Therefore, representative samples of soil-pore liquid constituents that are moving through the soil profile are collected as "snapshots" in time. Depending on the strength of the vacuum applied, soil-pore liquid can be collected from soils with moisture potentials of 0 (saturation) to approximately 70

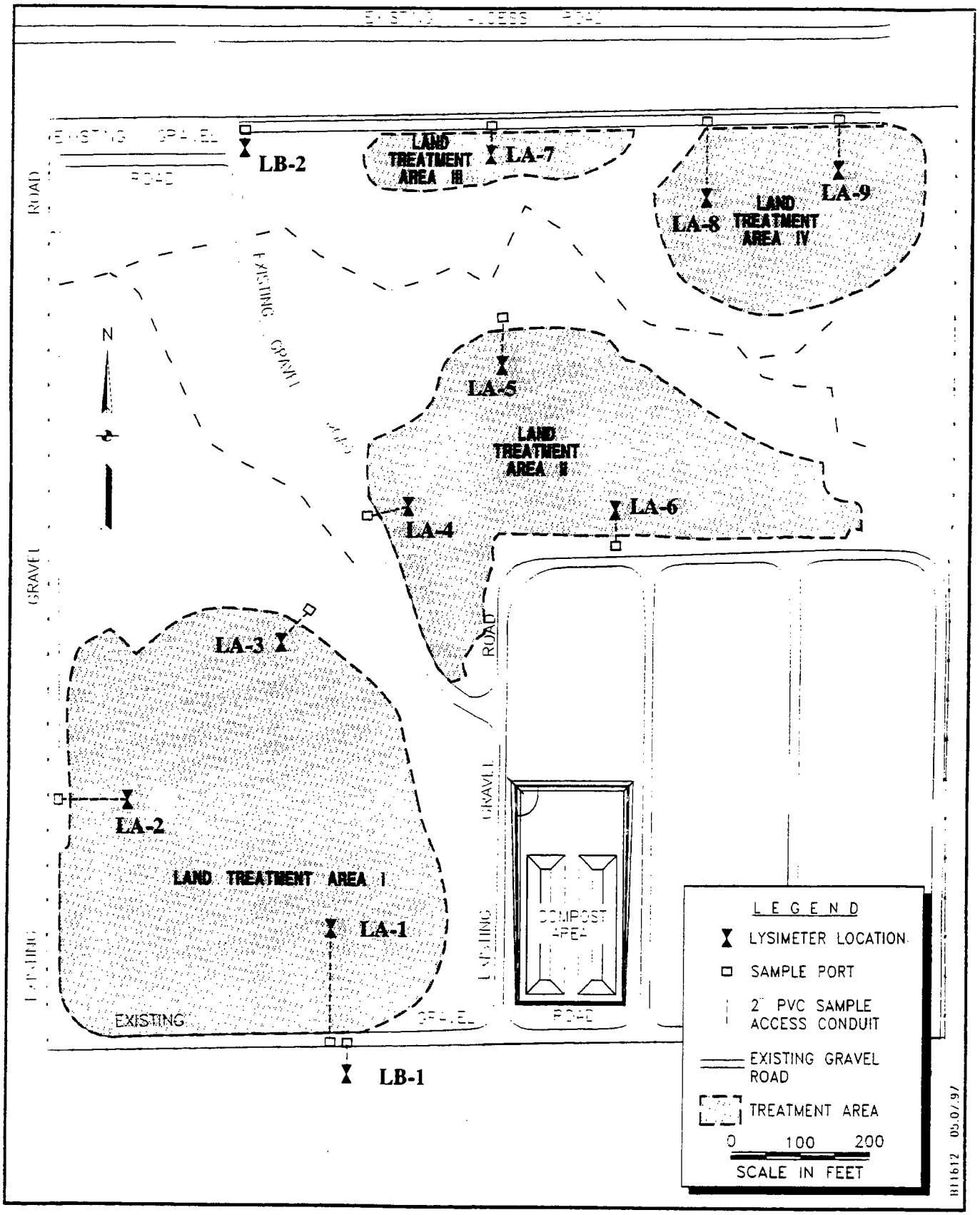


Figure 5-1. Lysimeter Locations

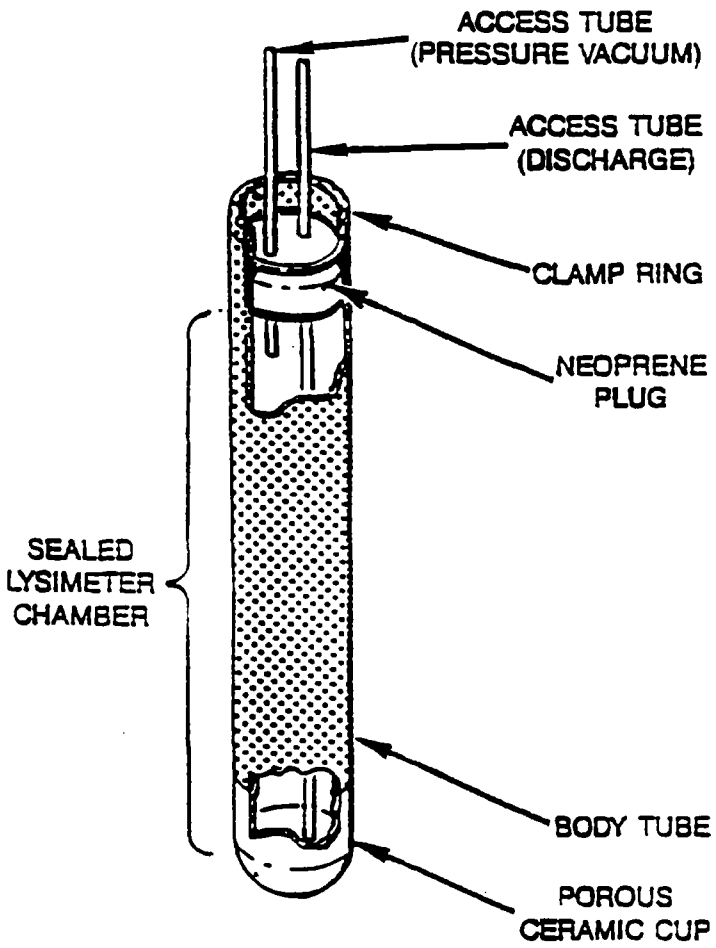


Figure 5-2. Schematic Diagram of Pressure-Vacuum Lysimeter

to 85 centibars. Thus, soil-pore liquid can be collected over a wide range of soil moisture conditions. However, if the soil moisture potential exceeds that present in the lysimeter, no sample will be collected. In very dry conditions, several days of vacuum may be required to withdraw a soil-pore liquid sample. In some instances, it will be impossible to collect a soil-pore liquid sample due to a lack of soil moisture.

Pressure-vacuum lysimeters will be installed at a depth of 66 inches below the original surface of the treatment zone of the LTF units and at approximately 66 inches below the soil surface in the background area. The lysimeter apparatus consists of a 2-inch diameter, 4-inch long porous ceramic cup mounted on one end of a 2-inch diameter, 36-inch long PVC tube. Two Teflon tubes, the discharge tube and the pressure-vacuum tube, are inserted in the other end of the body tube through a rubber stopper. The discharge tube extends through the entire length of the body tube into the ceramic cup. The pressure-vacuum tube extends only slightly into the sealed chamber. This allows a sample to be collected within 1 foot of the 5-foot treatment zone and ensures that the soil directly above the sampling point is undisturbed. Thus, liquid collected by the sampler will have infiltrated through the entire 5-foot treatment zone and will be representative of the chemical composition of soil-pore liquid beneath the treatment zone in other portions of the CAMU.

The two access tubes are conveyed underground through the PVC conduit to the soil surface at the specified sample collection site. At the sampling station the discharge tube is connected to a sample bottle and the pressure-vacuum tube is connected to a pressure-vacuum pump. By clamping off the tubes, either pressure or vacuum can be applied to the porous cup and soil-pore liquid can be collected.

The lysimeters and the associated apparatus will be installed by excavating a 2- to 3-foot deep trench from the sampling point to an easily accessible sample collection site at the edge of the treatment unit. The Teflon tubing projecting from the lysimeter apparatus is encased in PVC conduit. The conduit extends from the lysimeter to the sample collection site along the bottom of the trench. At the sample collection site the tubes are brought to the surface in 3/4-inch diameter PVC pipe. The pipe terminates in a post-mounted steel electrical box where the access tubing is kept between sampling events. In the electrical box, the discharge tube is marked with red tape and the pressure vacuum tube is marked with yellow tape. The access tubing is kept clamped shut during periods of non-use and the ends of the tubing are cleaned with distilled/de-ionized water prior to sample collection. In addition, before collecting a sample, the ends are checked to ensure they are free from foreign matter.

When drilling on the LTF, care must be taken to lysimeters and their PVC conduit. Only threaded PVC conduit and joints are used during installation, and the use of PVC primer and glue is **prohibited.**

6.0 PLANNING A SAMPLING EVENT

Since the collection of samples is dependent on the presence of soil moisture, the scheduling of sampling events should ideally be coordinated with periods of significant precipitation. This is usually not of concern during the winter and early spring, but may require additional coordination with laboratories and contractors during the summer and fall sampling episodes.

Sampling supplies must be ordered in advance. Necessary sampling and decontamination supplies are shown in Tables 6-1 and 6-2. To determine which supplies are low and need to be reordered, check the inventory list that was compiled on the last day of each monitoring event and recorded in the field book. If additional decontamination solvent is needed, it should be ordered in advance and ground-shipped by the supplier to avoid last minute shipping problems.

Prior to collecting samples, the hand pump should be inspected and over-hauled to ensure it is in working condition. Particular attention should be paid to the leather plunger, which tends to dry and shrink in between sampling periods and may need to be replaced. Under no circumstances should oils or oil-based lubricants be used to maintain these plungers since many of the target analytes are also contained in lubricating oils.

Trip blanks and sample bottles must be ordered in advance. Prepreserved bottles should be requested for volatile organics, metals, and total organic carbon (TOC) samples to save time in the field. Also, alert the laboratory as to the expected dates of sample shipments. This is especially important when collecting samples over time (i.e. semivolatiles or metals) since a portion of the hold time will have elapsed before the samples arrive at the laboratory. For semi-volatiles, a three-day collection period is usually the maximum allowable that will still allow the laboratory to meet hold times. It is imperative that this type of scenario be communicated immediately to ensure that the laboratory can meet all hold times.

Sample labels should be generated prior to sampling to facilitate field work and ensure that the labels are correct. Each sample receives a unique sample ID. All sample labels must be checked carefully for errors because the information is later input directly into a database. Labels should include the following information:

- Sample ID;
- Sample type;
- Client;
- Location;
- Type of analysis;
- Preservative;
- Sampler;
- Date; and
- Comments.

If metals samples are to be filtered in the Refinery laboratory instead of filtered in the field, arrangements should be made with the laboratory manager to ensure that a laboratory technician is available.

7.0 SAMPLE COLLECTION PROCEDURES

Soil-pore liquid samples are collected and analyzed for TOC and analytes listed in Appendix IV-N of this volume. Table 7-1 lists sample containers and preservative specifications for each type of analysis. Table 7-2 presents the number of samples and the sample type to be

Table 6-1
Supplies for Lysimeter Sampling

Equipment	Purpose
Sampling Equipment	
Glasses with side shields	Safety
Boots	Safety
Hard hat	Safety
Latex gloves (optional)	Inner gloves
Nitrile gloves	Outer gloves
Organic-free water	Equipment blanks
Filters	Collection of metals samples
Acids	Sample preservation
Blue mesh (VOA and one liter size)	Sample protection
Cooler	Store and ship samples
Hand pump	To apply pressure to purge pressure-vacuum lysimeters and to sample both types of lysimeters.
Ice (crushed ice)	Cool samples
Sample Containers	
Two 120-mL VOAs	Volatile organic samples
500 mL plastic containers	Metals samples
1000 mL amber glass bottles	Semivolatile organic samples
Trip blanks	Quality assurance samples

Table 6-2
Supplies for Decontamination of Sampling Equipment

Equipment	Purpose
Sampling Equipment	
Alconox®	Soapy water for decontaminating equipment
Distilled water	Soapy water and pre-wash water for decontaminating equipment
Hexane	Solvent rinse for decontaminating equipment
Organic-free water	Final rinse for decontaminating equipment
Buckets	Hold pre-wash and soapy water
Brushes	Scrubbers
Visqueen® plastic sheeting	Sample protection
Packing Equipment	
Chain-of-Custody forms	
Sample Analysis and Target Analyte Forms	
Labels	
Brown absorbent paper	
Airborne Express shipping forms	
Shipping labels	
Custody seals	
"Fragile" labels	
"This-Side-Up" labels	
Vermiculite or packing peanuts	
Clear tape	
Packing tape	
Ziplok® bags for ice storage and Chain-of-Custody form protection	

Table 7-1
Sample Container and Preservative Specifications for Soil-Pore Liquid Samples

Parameter Analyzed	Analytical Method	Holding Times	Container [a]	Preservative
Dissolved: Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Lead, Nickel, Selenium, Vanadium, Zinc	SW6010A	6 months	One 500 mL polyethylene bottle per lysimeter	5 mLs 50% HNO_3 (pH<2), Cool to 4°C (filter prior to preservation)
Mercury	SW7470A	28 days		
Semivolatiles [b]	SW8270B	7 days to extraction, 40 days to analysis	One 1000 mL amber glass bottle/lysimeter	Cool to 4°C
Volatiles [b]	SW8260B	14 days preserved (one day unpreserved)	Two 120 mL VOA vials per lysimeter	200 microliters 50% HCL per VOA (pH<2), Cool to 4°C

[a] Use Teflon-lined caps for all parameters specifying glass sample containers.
[b] For specific constituents analyzed, see Table 7-1.

Table 7-2
Lysimeter Samples to be Collected During Each RCRA Monitoring Event

Sampling Location	Volatiles[a]	Semivolatiles	Metals
LB-1	N	N	N
LB-2	N,D [b],MS/MSD [c]	N	N
LA-1	N, E[d]	N	N
LA-2	N	N	N, D, MS/MSD
LA-3	N	N	N
LA-4	N, D, MS/MSD	N	N
LA-5	N	N	N
LA-6	N, E, T	N, D, MS/MSD	N, E, D, MS/MSD
LA-7	N	N	N
LA-8	N	N	N
LA-9	N	N	N

D = Duplicate sample
E = Equipment blank
N = Normal sample
T = Trip blank
[a] T = Trip Blank. Trip blanks will accompany every shipment that contains volatile organic analysis.
[b] D = Duplicate sample to be collected at 10 percent frequency.
[c] MS/MSD = Matrix Spike/Matrix Spike Duplicate. Each is collected at 5 percent frequency.
[d] Equipment blank to be collected at 10 percent frequency.

collected, including QA/QC samples. Due to volume requirements for laboratory analysis and to sample holding times, samples are collected in the following order:

- Volatile Organics;
- Total Organic Carbon;
- Semivolatile Organics; and
- Metals.

Lysimeters are inherently limited in their ability to extract large volumes of water from the soil at a single time. It is often difficult or impossible to collect sufficient sample volume for several different laboratory analyses during a one-day sample collection event. Most commercially available lysimeters can extract only one liter of liquid per day from very wet unsaturated soils. Therefore, if a larger sample volume is required based on the suite of analytical procedures required in the monitoring program, the soil-pore liquid sample will have to be accumulated over several days. This approach to sample collection is justified because the chemical composition of soil-pore liquids beneath the treatment zone is unlikely to dramatically change from day to day or even over a one-week period.

Such a collection schedule has potentially adverse implications for the holding times of the sample prior to the laboratory analysis. Based on the required holding times for the specific analyses required in the unsaturated zone monitoring program, a protocol has been developed which will increase the chances that sufficient sample volume will be collected to conduct all analyses and will also ensure that the requirements for sample holding times will be met. The protocol prioritizes the order in which the individual sample containers are filled such that the aliquots for analyses with the shortest holding times are collected first. In this case, the bottles for the volatile organics are filled first. If any soil-pore liquid sample is remaining, it is placed in the container for the semivolatile organic analysis. Remaining sample volume will be used to fulfill sample requirements for metals analysis. The samples for volatile analysis are collected on the first day and shipped the same day to the laboratory. If the bottle for semivolatile analysis is full, it is shipped also. However, if it is only partially full, it is capped and stored in refrigeration at 4°C while a vacuum is again applied to the lysimeter. A sample for semivolatile analysis may be collected for up to 3 days. If not enough sample volume has been collected after 3 days, the sample is used for metals analysis (which has a longer hold time). The lysimeter is then allowed to recharge for approximately one week, and the semivolatile sample is collected. This procedure is repeated until all sample bottles are filled.

If an insufficient amount of soil-pore liquid is available in the lysimeters after at least a week from the initial sampling attempt, the lysimeter is declared dry for those analytes that could not be sampled.

Prior to sample collection, the appropriate preservatives are added (if the bottles were not received prepreserved). The samples are labeled and stored in refrigeration prior to shipment to the designated laboratory. Samples for metals analysis are filtered first and then preserved. Sample bottles are packed in ice chests so that the bottles will not come in contact with one another. Plastic mesh is used for this purpose.

Sample labels are affixed to each sample bottle and filled out in indelible ink. Information on each sample label includes: the sample number, type of analysis, date and time collected, and the

name of the collector. Chain-of-custody (COC) forms are completed for each sample and include, at a minimum, the sample number, signature of the collector, date and time of collection, sample type, signature of persons involved in the chain of possession and inclusive dates of possession. Requests for the laboratory to analyze matrix spikes are indicated on both the label and the COC form.

Records and notes taken during sampling are recorded in a logbook used solely for RCRA monitoring sampling. Record the volume purged from each lysimeter, and record what samples (sample ID, type of analysis, etc.) were collected each day and from which lysimeter. Record which day a sample was started and when it was completed, and note the volume collected each day for samples that are collected over several days. Include anything unusual (e.g., sample odor or color) in the sampling notes.

7.1 Pressure-Vacuum Lysimeters - Collection Procedures

Operation of the pressure-vacuum lysimeters is a two-step process involving purging and sampling. **The pressure-vacuum lysimeters need to be purged of all accumulated liquids at least 24 hours prior to sampling.** The pressure-vacuum tube is opened and connected to a pressure source (modified hand pump). A positive pressure, not greater than 15 pounds per square inch (psi), is then applied which forces the liquid within the lysimeter through the discharge tube. Higher pressures may rupture the ceramic cup. A positive pressure is maintained until the lysimeter is completely drained. The discharge tube (color-coded with red tape) is then closed and vacuum, typically 70-85 centibars, is applied to the lysimeter chamber by attaching a vacuum source (modified hand pump) to the pressure-vacuum tube (color coded with yellow tape). Following vacuum application, the pressure-vacuum tube is closed and the lysimeter is allowed to collect a sample over an undetermined time period. The amount of time required to collect a sample varies depending on the amount of liquid in the soil and the soil texture. As an initial estimate, a vacuum should be applied to the lysimeter and at least 24 hours should be allowed before a sample is collected. At this point, the lysimeter exists as a sealed chamber with a negative pressure. Due to pressure differences, soil-pore liquid enters the lysimeter through the porous ceramic cup. If the soil moisture outside the lysimeter is held at greater negative pressures than those applied to the interior of the porous ceramic cup, no liquid will move into the lysimeter. Conversely, if soil moisture outside the cup is held at lower negative pressures, the soil-pore liquid will move into the lysimeter until no pressure difference exists across the porous ceramic cup.

After at least 24 hours, the pressure-vacuum tube (yellow tape) is opened and connected to a pressure source. The discharge tube (red tape) is opened and connected to a precleaned, acceptable sample collection container. A maximum positive pressure of approximately 15 pounds is then applied to the lysimeter through the pressure-vacuum tube, which forces the sample through the discharge tube and into the sample collection container. The use of positive pressure in collecting the sample minimizes the loss of volatile compounds, if present, which would occur if a vacuum is used.

Samples are collected in pre-cleaned glass containers and immediately labeled and placed on ice until they are shipped to the laboratory.

7.2 Quality Control Samples

QC samples will be collected as part of the RCRA monitoring program.

QC samples are collected in addition to normal samples during RCRA monitoring. Frequency requirements for QC sampling are as follows:

- Duplicate samples for all parameters are collected at a rate of 10% (1 in 10).
- Matrix spikes and matrix spike duplicates are designated at a rate of 5% each (1 in 20) for all samples. The sample container and the COC form are labeled with the appropriate analytical method and the designation of matrix spikes (where applicable).
- Equipment blanks for all parameters are collected at a rate of 10% (1 in 10) for all samples Since the lysimeter samples are collected directly from the sampling tube, equipment blanks consist of organic-free water that is poured into sample containers at the site. Equipment blanks are tested for the same analytes as the lysimeter samples.
- Trip blanks, which consist of organic-free water that is placed in a pre-preserved VOA vial, are will be placed in every cooler that contains samples for volatile organic analysis (Method SW-8260A).

8.0 PACKING AND SHIPPING SAMPLES

An ice chest is used for shipping samples so that samples can be kept at 4°C during shipping.

The COC forms are filled out as samples are transferred to the shipping cooler(s). A completed COC form, which is shipped from the analytical laboratory, accompanies each cooler to be shipped. It begins the documentation of sample custody, and describes the samples contained in the cooler. The COC will accompany the sample during shipment, storage analysis until the sample is ultimately disposed of. Information should include sampling date and time, the exact sample ID listed on the bottle labels (**no** extra identifiers should be added, such as cell number or LTF unit), sample type ("soil" for all samples except trip blanks), number of containers sent, analytical parameters requested, and the date and time samples were relinquished (along with a signature of the person relinquishing custody).

In preparation for shipping samples, the drain plug on the outside of the cooler is taped shut. Approximately 1 inch of packing material (such as brown absorbent paper or vermiculite) is placed on the bottom as a liner. Sample bottles are packed in ice chests such that bottles will not come in contact with one another. Plastic mesh and styrofoam may be used to keep bottles from touching. Ice is double-bagged in sealable plastic bags and placed in contact with samples. A minimum of 1 inch of packing material is put on top of samples for protection.

A list of analyses to be performed with the target analytes and the COC form are placed in a sealable plastic bag and taped to the inside of the ice chest lid. The ice chest is taped shut with

strapping tape, and two signed custody seals are placed on the cooler (one custody seal placed over one of the lid hinges at the back of the cooler and the other at the side or front of the cooler between the cooler lid and cooler body). The overnight shipping form is filled out, and the shipping label is placed on the top of the cooler. The shipping label is covered with clear tape to protect it from moisture.

Checklist for Sampling Pressure-Vacuum Lysimeters

Purging:

1. Open the pressure-vacuum tube (coded with yellow tape) and connect to the modified hand pump.
2. Apply no more than 15 psi of positive pressure until the lysimeter is completely drained. The liquid in the lysimeter will be forced through the discharge tube (coded with red tape) and should be discarded.
3. Close the discharge tube.
4. Attach the hand pump to the pressure-vacuum tube (yellow) and apply around 70-85 centibars of vacuum.
5. Close the pressure-vacuum tube (yellow) and allow the lysimeter to collect sample for at least 24 hours. (The amount of time required to collect sample varies depending on the amount of liquid in the soil pores.)

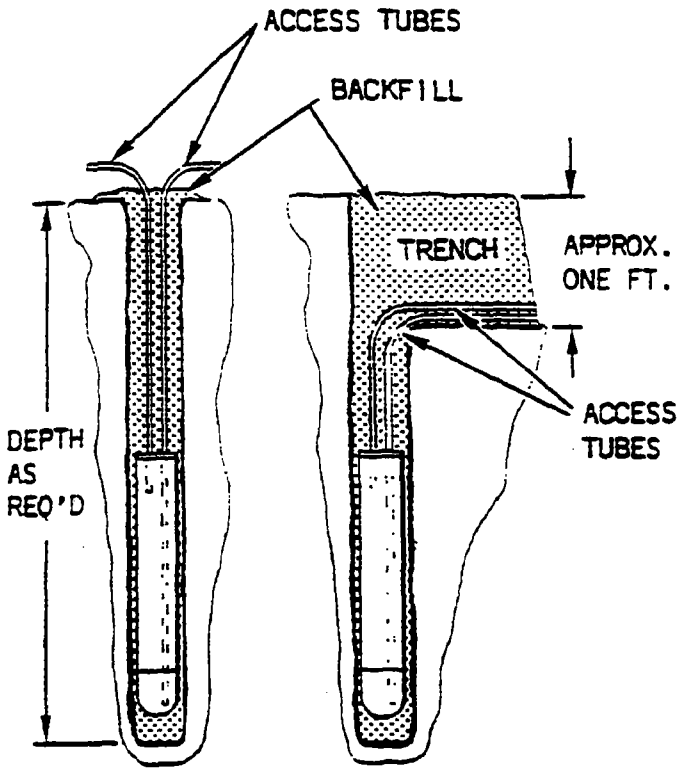
Sampling:

6. Open the pressure-vacuum tube (yellow) and connect the hand pump.
7. Open the discharge tube (red) and connect to the sample collection container.
8. Apply a maximum positive pressure of 15 psi through the pressure-vacuum tube to force sample through the discharge tube into the sample collection container.
9. Collect volatiles sample, then semivolatiles, and metals. (Metals samples must be filtered through 0.45 micron filter paper.)
10. Place completed labels on sample containers then place samples in cooler containing ice.
11. Fill out sample logbook and chain-of-custody forms.
12. Ship packed cooler(s) via overnight express so they arrive the following morning.

OPERATING INSTRUCTIONS for the

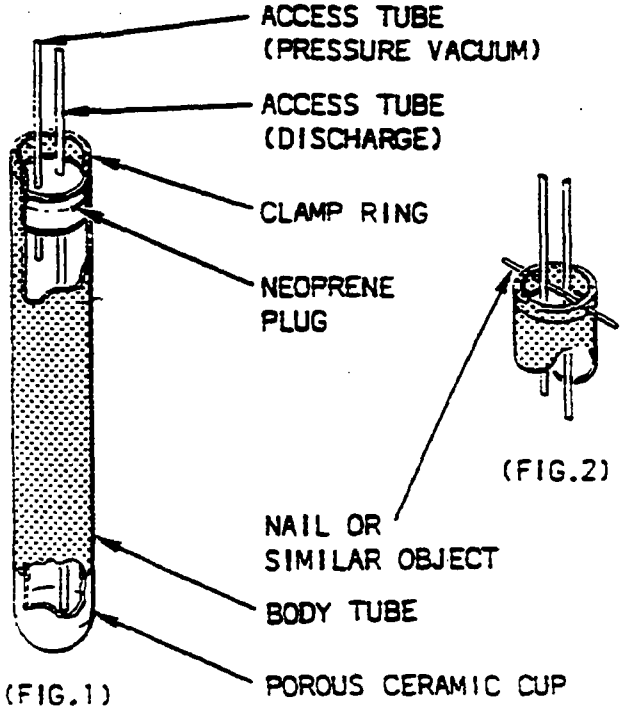
Model 1920

PRESSURE-VACUUM SOIL WATER SAMPLER



SITE LOCATION

The Model 1920 Pressure-Vacuum Soil Water Sampler can be installed in any location, at any depth up to a maximum of 50 ft. The access tubes from the sampler may be terminated directly above the sampler installation or, if conditions require, the access tubes may be laid in a trench and carried to a remote location, terminated above the soil surface. The access tubes should be located so that they will be free from damage by mechanical equipment and by livestock. The surface area directly above the sampler should not be covered in any manner that would interfere with the normal percolation of soil moisture down to the depth of the sampler. Once the depth [illegible] location for the pressure-vacuum soil [illegible] sampler has been decided, the length of the access tubes should be determined so that they can be cut and mounted into the soil water sampler.

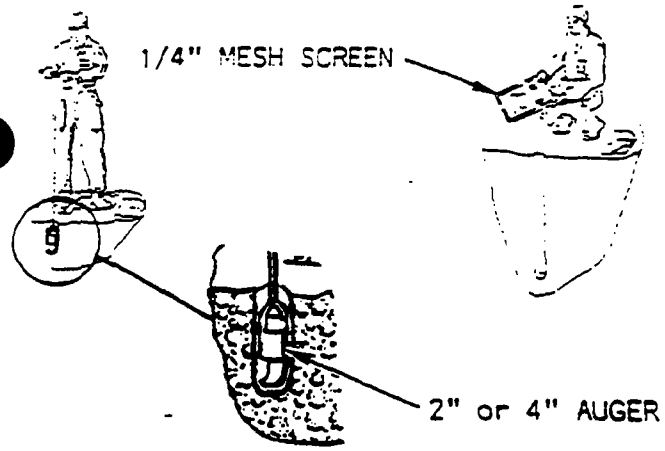


(FIG.1)

INSTALLATION OF ACCESS TUBES IN THE SAMPLER

(Fig.1) The access tubes are normally made from 1/4" diameter copper or polyethylene tubing. When installing the tubes, one tub should be pushed through the neoprene plug so that the end of the tubing reaches almos down to the bottom of the porous ceramic cup. This "discharge" access tube should b marked at the other end in some fashion as to identify it. The other "pressure-vacuum access tube should be inserted into the neoprene plug so that it extends through th plug perhaps one inch.

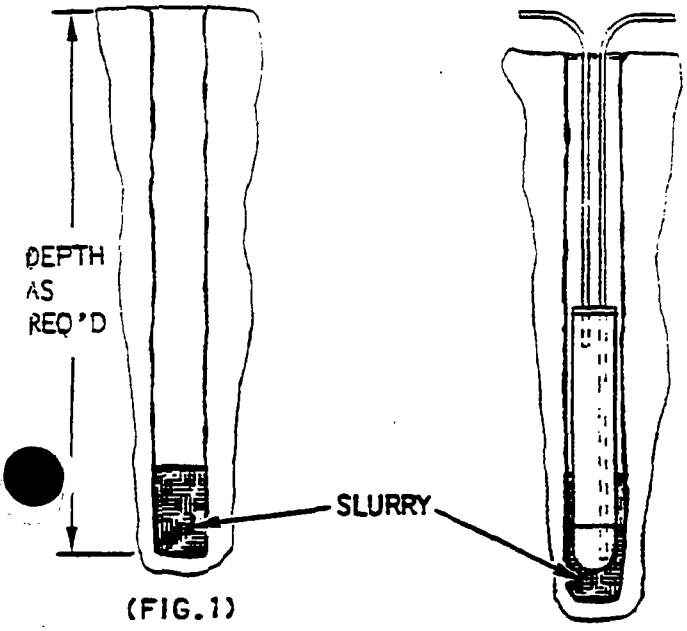
(Fig.2) After the tubes are installed, tighten the clamp ring with a nail or simil object inserted through the holes provided the clamp ring. Tighten only until it [illegible] the body tube. See note on page 5 if [illegible] is desired.



CORING THE HOLE

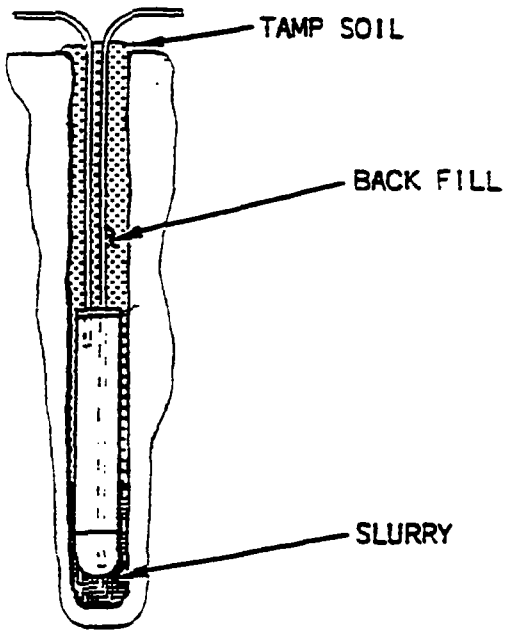
In rock-free uniform soils at shallow depths, use a 2" screw or bucket auger for coring the hole.

If the soil is rocky, a 4" auger should be used. The soil should then be sifted through a 1/4" mesh screen to free it of pebbles and rocks. This will provide a reasonably uniform backfill soil for filling in around the soil water sampler. The Model 230 Series Soil Augers can be used for this purpose.



(FIG.1)

(FIG.2)



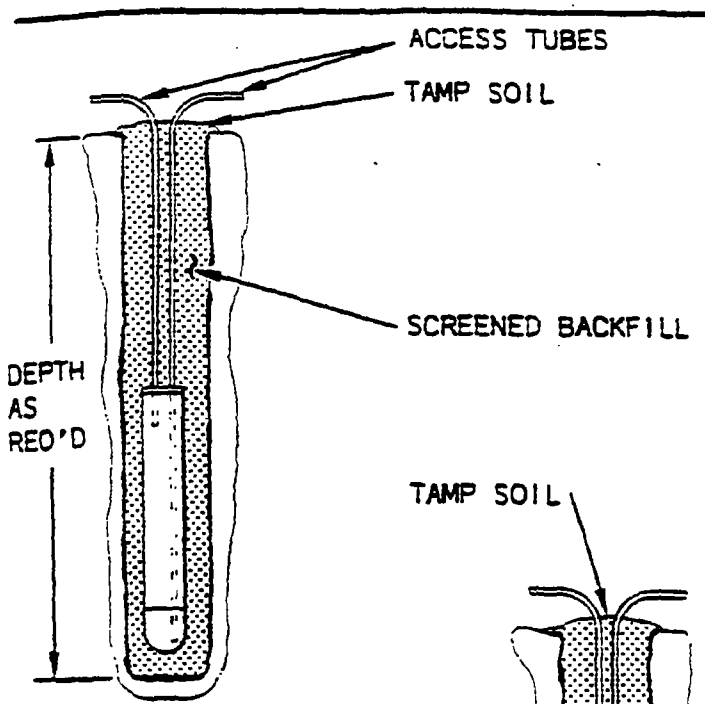
(FIG.3)

INSTALLATION OF PRESSURE-VACUUM SOIL WATER SAMPLER USING A SOIL SLURRY

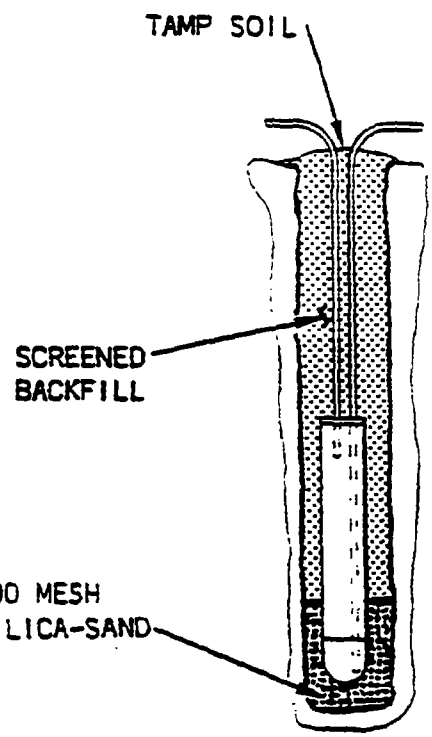
(Fig.1) After the hole has been cored, mix a substantial quantity of soil from the bottom of the hole with water to make a slurry which has a consistency of cemen mortar. This slurry is then poured down to the bottom of the cored hole to insure a good soil contact with the porous ceramic cup.

(Fig.2) Immediately after the slurry has been poured, push the soil water sampler down into the hole so that the porous ceramic cup is completely embedded in the soil slurry.

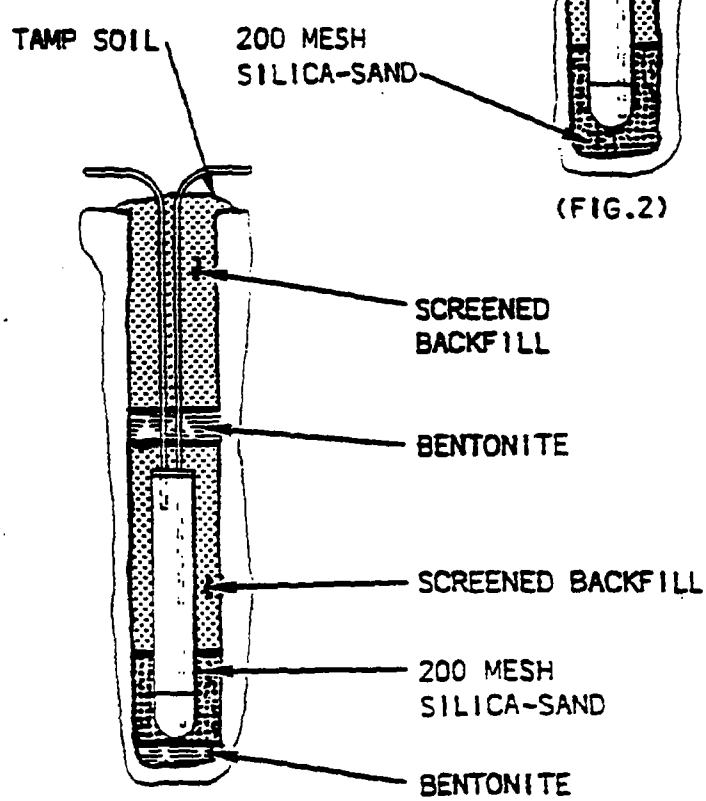
(Fig.3) Backfill the remaining area around the soil water sampler, tamping lightly with a small diameter rod. Backfill the remainder of the hole, tamping soil firmly, to prevent surface water from running down the cored hole. Backfill hole with native soil free of pebbles and rocks.



(FIG.1)



(FIG.2)



(FIG.3)

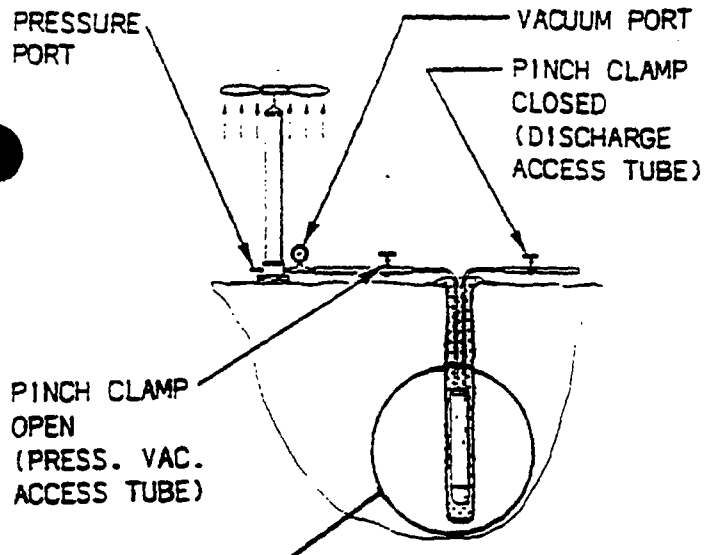
ADDITIONAL METHODS OF INSTALLING THE PRESSURE-VACUUM SAMPLER

(Fig.1) Core hole to desired depth, insert soil water sampler and backfill the hole with native soil, tamping continuously to insure good soil contact with the porous ceramic cup and complete sealing of the cored hole.

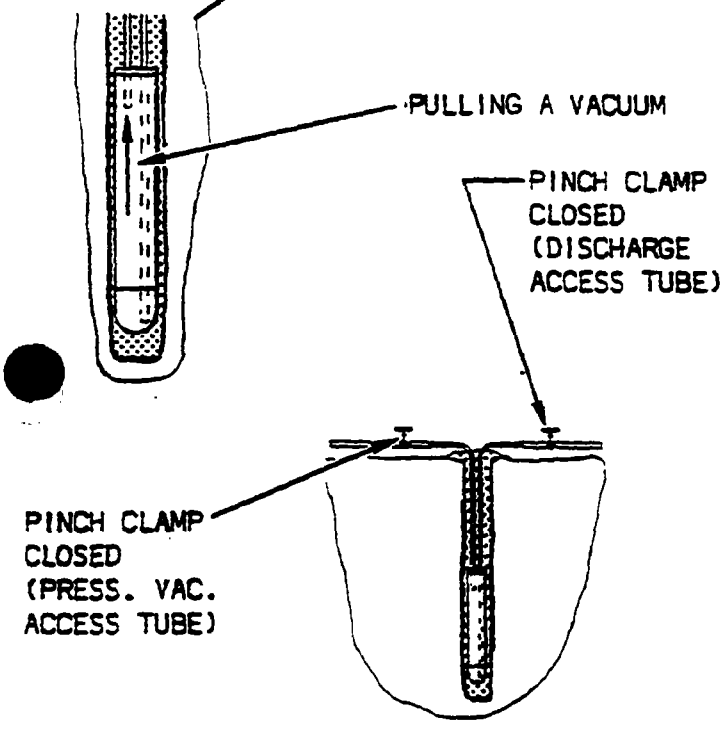
(Fig.2) Core hole to desired depth, pour in a small quantity of crushed 200 mesh pure silica-sand of almost talcum powder consistency (commercially available under trade names of Super-Sil and Silica Flour). Insert soil water sampler and pour another layer of the 200 mesh silica-sand at least six inches deep around cup of the soil water sampler. Backfill the hole with soil free of pebbles and rocks, tampir continuously with a long metal rod to insur against surface water channeling down betwe the soil and the body tube of the sampler.

(Fig.3) Core hole to desired depth, [illegible] i a small quantity of wet bentonite cla[illegible] -t will isolate the sampler from the soil [illegible] Pour in a small quantity of 200 mesh silica sand and insert soil water sampler. Pour another layer of 200 mesh silica-sand at least six inches deep around the cup of the soil water sampler. Backfill with native soil to a level just above the soil water sampler and again add a small quantity of bentonite as a plug, to further isolate the soil water sampler and guard against possib channeling of water down the hole. Backfil the remainder of the hole slowly, tamping continuously with a long metal rod. Again backfill should be of native soil free of pebbles and rocks.

There are other methods of installing the soil water samplers that may be used, large dictated by the type of soil you are concern with and the tools available. The primary concern in any method of installation is th the porous ceramic cup of the sampler be in tight, intimate contact with the soil, so that soil moisture can move readily f[illegible] th pores of the soil through the pores i[illegible] e ceramic cup and into the soil water sampler



(FIG.1)



(FIG.2)

COLLECTING SOIL WATER SAMPLE

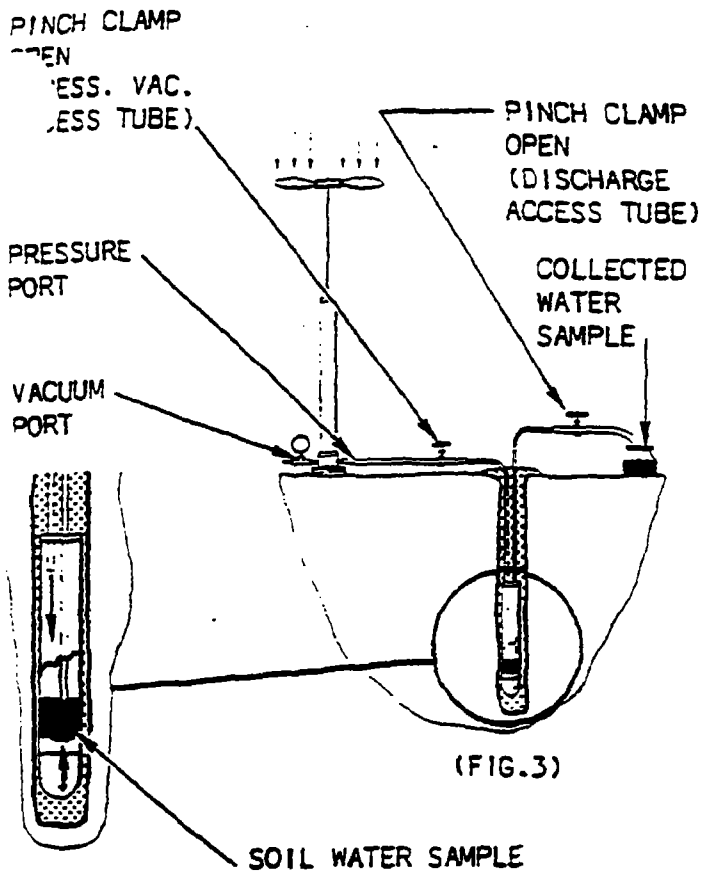
After the pressure-vacuum soil water sampler has been installed in the field, the accessory items are added as shown on page 6 .

(Fig.1) To collect a sample, the pinch clamp on the discharge access tube is closed and the vacuum port of the pressure-vacuum hand pump is connected to the pressure-vacuum access tube. The pump is then stroked until a vacuum of perhaps 60 centibars (1: of mercury) is created within the sampler, as read out on the gauge connected to the pump.

(Fig.2) The pinch clamp on the pressure-vacuum access tube is then closed securely to seal the sampler under vacuum. The hand pump can then be removed for other uses. The sampler is allowed to set for a period of time under vacuum.

The vacuum within the sampler causes the moisture to move from the soil, through the porous ceramic cup, and into the sampler. The rate at which the soil solution will collect within the sampler depends on the capillary conductivity of the soil, the soil suction value within the soil (as measured with tensiometers), and the amount of vacuum that has been created within the sampler. In moist soils of good conductivity, at field capacity (10 to 30 centibars of soil suction as read on a tensiometer) substantial soil water samples can be collected within a few hours. Under more difficult conditions it may require severa days to collect an adequate sample.

In general, vacuums of 50 to 85 centibars (15" to 25" of mercury) are normally applied to the soil water sampler. In very sandy soils it has been noted, however, that very high vacuums applied to the soil water sampler seem to result in slower rate of collection of the sample than lower applied vacuums. It is our feeling that in these coarse, sandy soils, the high vacuums within the sampler may deplete the moisture in the immediate vicinity of the porous ceramic cup and hence reduce the capillary conductivity, which creates a barrier to the flow of moisture to the cup under these circumstances. In loams and gravelly clay loams, users have reported collection of 300 to 500 ml of solution over a period of a day with applied vacuum of 15" of mercury (50 centibars) when soils are at field capacity. On waste water disposal sites, some users have obtained up to 1500 ml of sample within 24 hours after cessation of irrigation with 1" to 2" of waste water on sandy or clay loam soil.



(FIG.3)

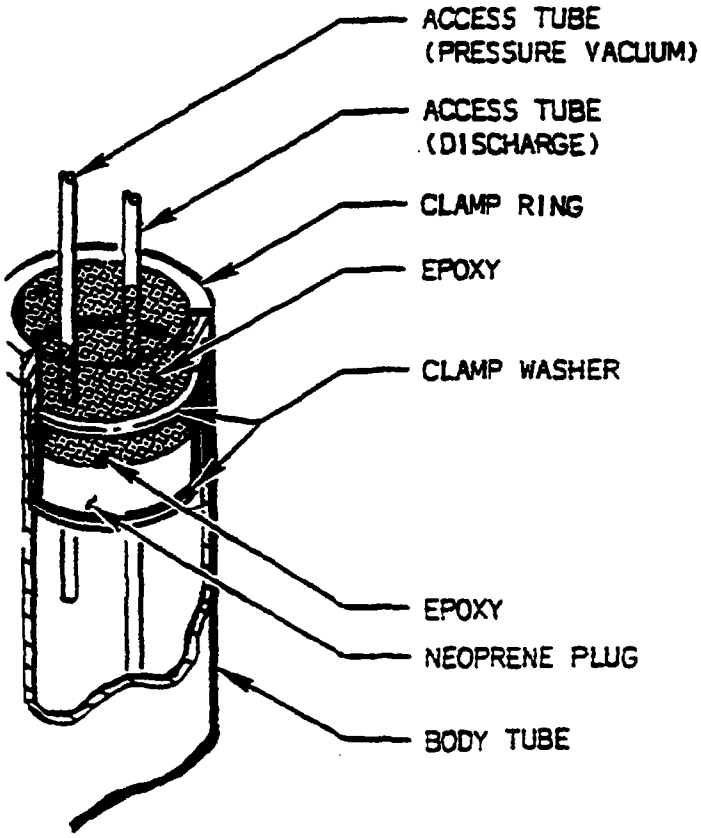
(Fig.3) To recover a soil water sample, attach the pressure-vacuum access tube to the pressure port on the pump. Place the discharge access tube in a small collecti bottle and open both pinch clamps. Apply a few strokes on the hand pump to develop enough pressure within the sampler to force the collected water out of the sampler and into the collection bottle.

Subsequent samples are collected by again creating a vacuum within the sampler and following the steps as outlined above.

MAINTENANCE

There are no maintenance requirements for the pressure-vacuum soil water samplers, other than protecting the access tubes from damage. Tube ends should be covered or plugged to prevent debris from entering the tubes and later contaminating the sample.

Freezing conditions will not damage the samplers. The samplers are normally left permanently in place throughout the year.



INSTRUCTIONS FOR POTTING

With our current design, we do not feel that potting of the neoprene plug is necessary to maintain a permanent pressure-vacuum seal; however, if you desire, the design has been arranged so that these elements can be potted with an epoxy resin.

(1) INSTALL ACCESS TUBES

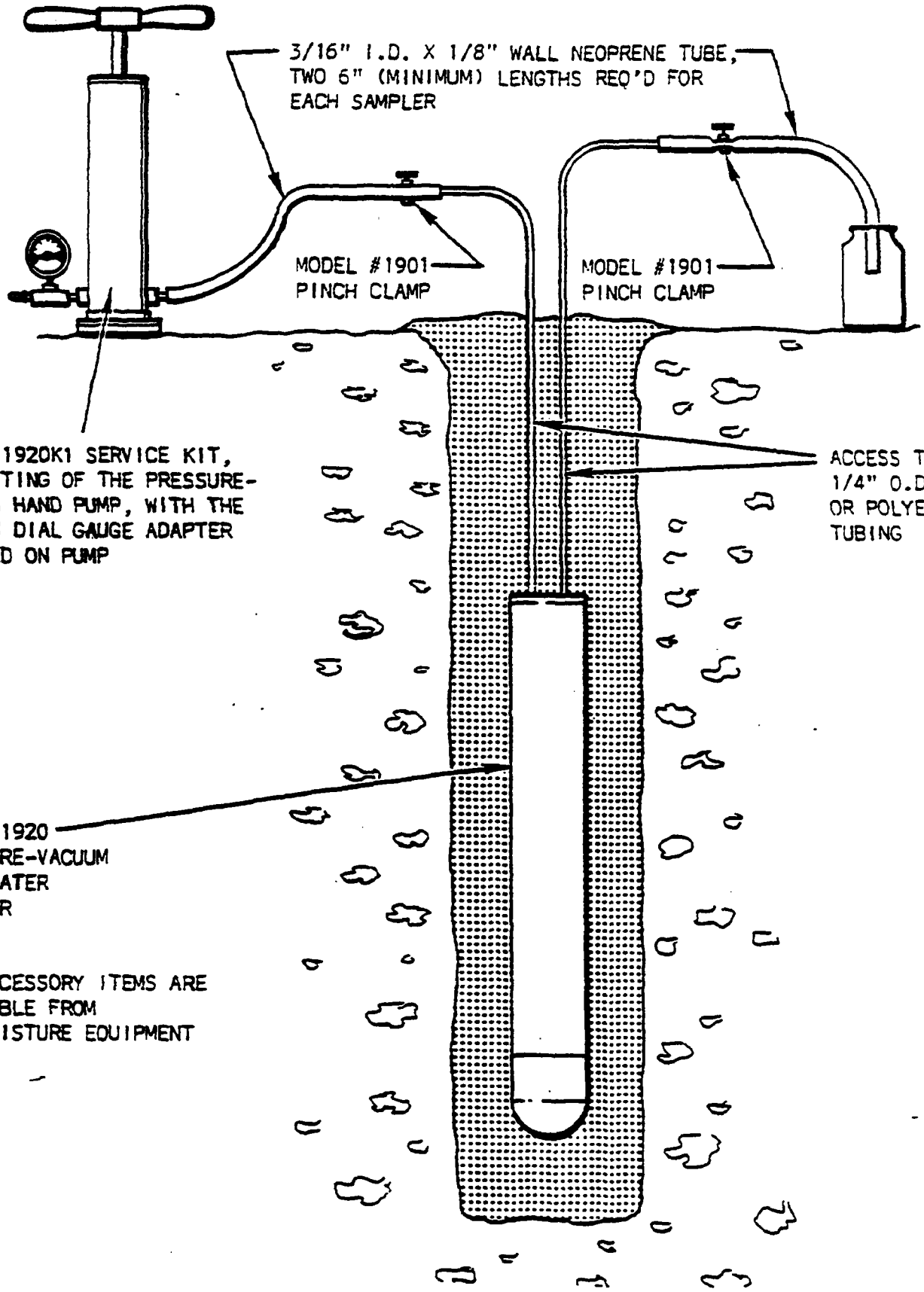
(2) INSTALL FIRST CLAMP WASHER

(3) INSTALL NEOPRENE PLUG AND ADD EPOXY TO THE OUTSIDE DIAMETER

(4) INSTALL SECOND CLAMP WASHER

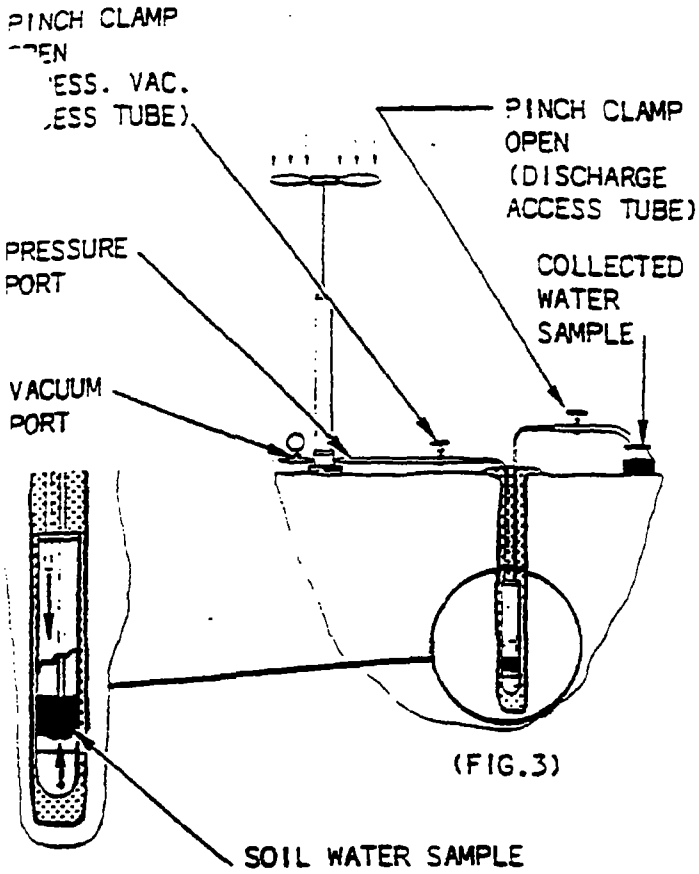
(5) SCREW CLAMP RING IN PLACE, AND POUR EPOXY INTO CAVITY TO COMPLETELY SEAL THE NEOPRENE PLUG AND ACCESS TUBES

ACCESSORY ITEMS REQUIRED FOR OPERATION OF THE PRESSURE-VACUUM SOIL WATER SAMPLER



NOTE:
ALL ACCESSORY ITEMS ARE AVAILABLE FROM SOILMOISTURE EQUIPMENT CORP.

Soilmoisture Equipment Corp. P.O. Box 30025, Santa Barbara, Calif. 93105 U.S



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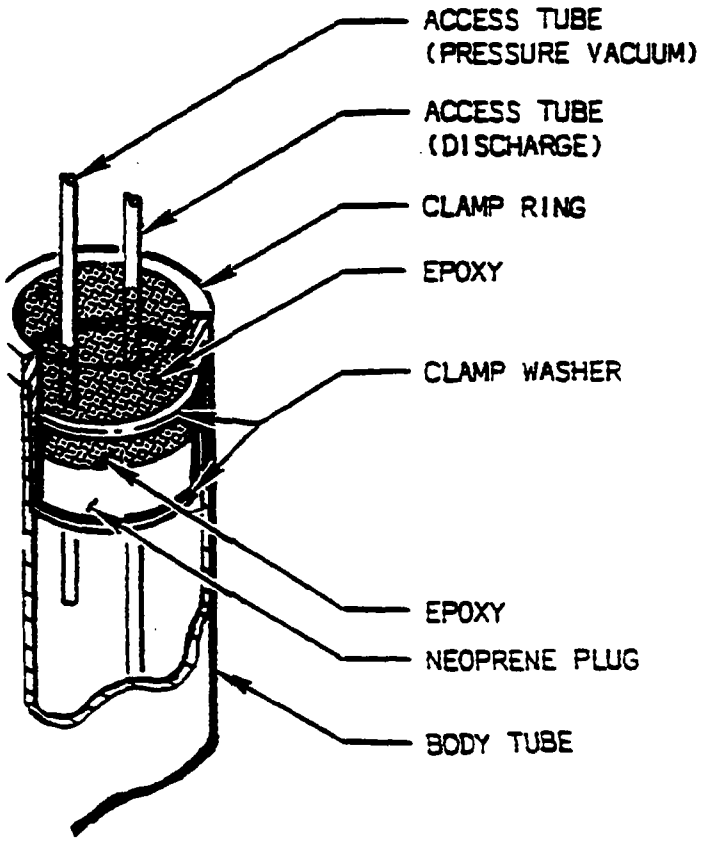

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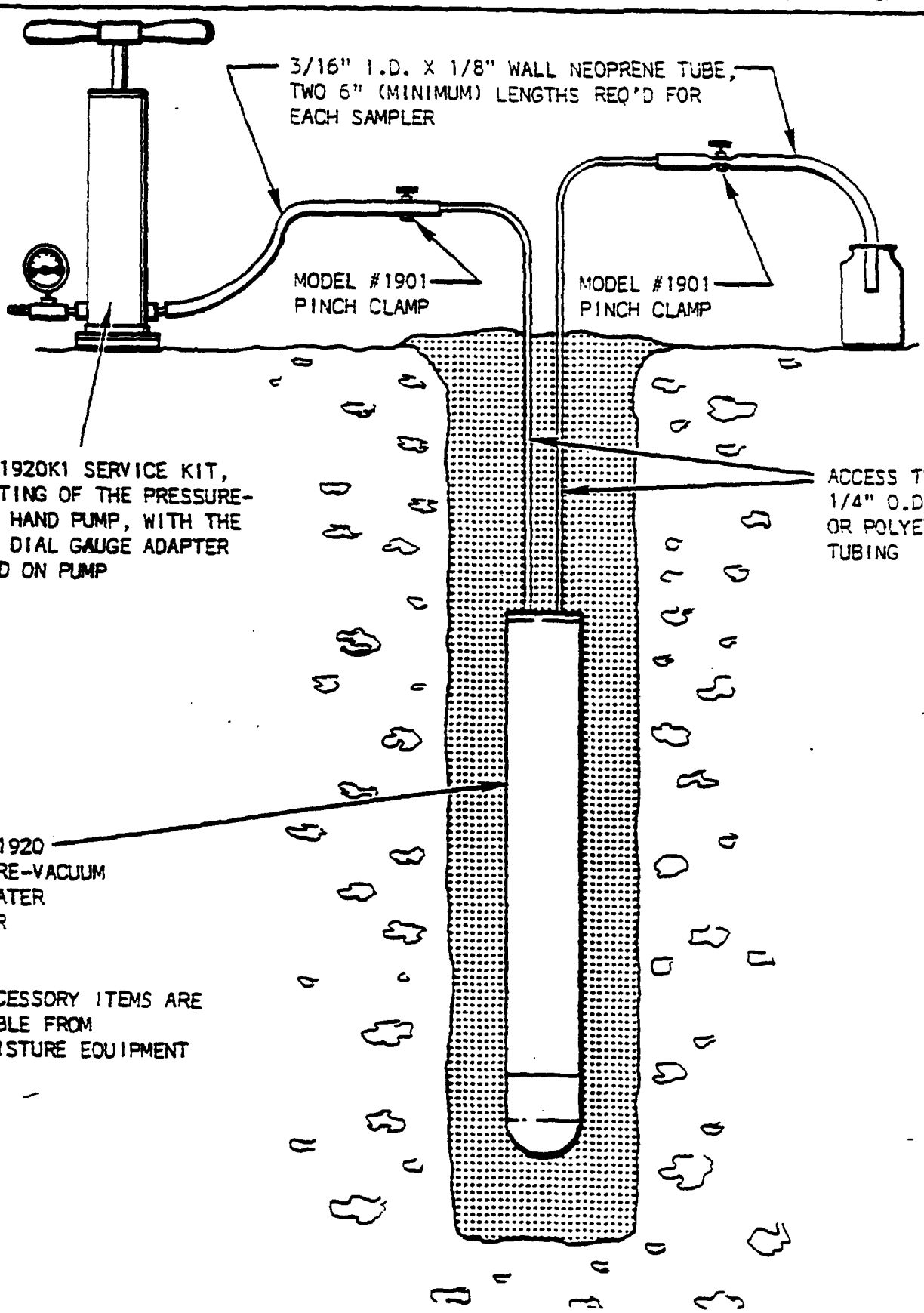
ACCESSORY ITEMS REQUIRED FOR OPERATION OF THE PRESSURE-VACUUM SOIL WATER SAMPLER



NOTE:
ALL ACCESSORY ITEMS ARE AVAILABLE FROM SOILMOISTURE EQUIPMENT CORP.

Soilmoisture Equipment Corp. P.O. Box 30025, Santa Barbara, Calif. 93105 U.S

Section V
Part A Application

Lemont Refinery

December 1997

Prepared for:
The Lemont Refinery
CITGO Petroleum Corporation
Lemont, Illinois

Prepared by:
Radian International LLC
P.O. Box 201088
Austin, Texas 78720-1088

Please print or type with ELITE type (12 characters per inch) in the unshaded areas only

Form Approved, OMB No. 2050-0034 Expires 9-30-96
GSA No. 0248-EPA-OT

For EPA Regional Use Only	
Date Received	Month / Day / Year

EPA

United States Environmental Protection Agency
Washington, DC 20460

Hazardous Waste Permit Application Part A

(Read the Instructions before starting)

I. Installation's EPA ID Number *(Mark 'X' in the appropriate box)*

☐ A. First Part A Submission ☐ B. Part A Amendment #_____

C. Installation's EPA ID Number	D. Secondary ID Number *(If applicable)*
ILD041550567	

II. Name of Facility

CITGO PETROLEUM CORPORATION

III. Facility Location *(Physical address not P.O. Box or Route Number)*

A. Street

135th STREET & NEW AVENUE

Street *(Continued)*

City or Town	State	Zip Code
LEMONT	IL	60439-3659

County Code (If known)	County Name
	WILL

B. Land Type (Enter code)	C. Geographic Location LATITUDE (Degrees, Minutes, & Seconds)	LONGITUDE (Degrees, Minutes & Seconds)	D. Facility Existence Date Month Day Year
P	41 39 00	88 03 30	11 09 1973

IV. Facility Mailing Address

Street or P.O. Box

135th STREET & NEW AVENUE

City or Town	State	Zip Code
LEMONT	IL	60439-3659

V. Facility Contact *(Person to be contacted regarding waste activities at facility)*

Name *(Last)*	*(First)*
HARMON	CLAUDE

Job Title	Phone Number *(Area Code and Number)*
MGR OPS ENV	630-257-4450

VI. Facility Contact Address *(See instructions)*

A. Contact Address Location	Mailing	Other	B. Street or P.O. Box
X			SAME

City or Town	State	Zip Code
		-

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GSA No. 0248-EPA-OT

EPA I.D. Number *(Enter from page 1)*	Secondary ID Number *(Enter from page 1)*
ILD041550567	

VII. Operator Information *(See instructions)*

Name of Operator	
CITGO PETROLEUM CORPORATION	
Street or P.O. Box	
PO BOX 37558	
City or Town	**State** / **ZIP Code**
TULSA	OK 74102-3758

Phone Number *(Area Code and Number)*	B. Operator Type	C. Change of Operator Indicator	Date Changed (Month Day Year)
918-495-4000	P	Yes X No	05 01 97

VIII. Facility Owner *(See Instructions)*

A. Name of Facility's Legal Owner	
PDV MIDWEST REFINING LLC	
Street or P.O. Box	
750 LEXINGTON AVE	10TH FLOOR
City or Town	**State** / **ZIP Code**
NEW YORK	NY 10022-

Phone Number *(Area Code and Number)*	B. Owner Type	C. Change of Owner Indicator	Date Changed (Month Day Year)
212-339-7944	P	Yes X No	05 01 97

IX. SIC Codes *(4-digit, in order of significance)*

Primary		Secondary	
2911	*(Description)* Petroleum Refining		*(Description)*
Secondary		**Secondary**	
	(Description)		*(Description)*

X. Other Environmental Permits *(See Instructions)*

A. Permit Type *(Enter code)*	B. Permit Number	C. Description
N	IL0001258 9	NPDES Permit
E	721102388	Offsite Facility Air Permit
E	721102399	Crude Unit Air Permit
E	721102400	FCCU Air Permit
E	721102411	Unsat. Gas Plant Air Permit
E	721102422	Coker Air Permit
E	721102433	Naptha Unionfiner Air Permit
E	721102444	Light Dist. Unionfiner Air Permit
E	72 2	See Attached List

EPA I.D. Number *(Enter from page 1)*

I	L	D	0	4	1	5	5	0	5	6	7

Secondary ID Number *(Enter from page 1)*

XI. Nature of Business *(Provide a brief description)*

A. Petroleum refining and related activities.

B. Process crude oil and finished petroleum products such as gasoline, diesel, and fuel oils.

XII. Process Codes and Design Capacities

A. **PROCESS CODE** - *Enter the code from the list of process codes below that best describes each process to be used at the facility. Thirteen lines are provided for entering codes. If more lines are needed, attach a separate sheet of paper with the additional information. For "other" processes (i.e., D99, S99, T04 and X99), describe the process (including its design capacity) in the space provided in item XIII.*

B. **PROCESS DESIGN CAPACITY** - *For each code entered in column A, enter the capacity of the process.*
1. **AMOUNT** - *Enter the amount. In a case where design capacity is not applicable (such as in a closure/post-closure or enforcement action) enter the total amount of waste for that process.*
2. **UNIT OF MEASURE** - *For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.*

C. **PROCESS TOTAL NUMBER OF UNITS** - *Enter the total number of units used with the corresponding process code.*

PROCESS CODE	PROCESS	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
	Disposal:	
D79	Underground Injection	Gallons; Liters; Gallons Per Day; or Liters Per Day
D80	Landfill	Acre-feet or Hectare-meter
D81	Land Treatment	Acres or Hectares
D82	Ocean Disposal	Gallons Per Day r Liters Per Day
D83	Surface Impoundment	Gallons or Liters
D99	Other Disposal	Any Unit of Measure Listed Below
	Storage:	
S01	Container (Barrel, Drum, Etc.)	Gallons or Liters
S02	Tank	Gallons or Liters
S03	Waste Pile	Cubic Yards or Cubic Meters
S04	Surface Impoundment	Gallons or Liters
S05	Drip Pad	Gallons or Liters
S06	Containment Building-Storage	Cubic Yards or Cubic Meters
S99	Other Storage	Any Unit of Measure Listed Below
	Treatment:	
T01	Tank	Gallons Per Day or Liters Per Day
T02	Surface Impoundment	Gallons Per Day or Liters Per Day
T03	Incinerator	Short Tons Per Hour; Metric Tons Per Hour; Gallons Per Hour; Liters Per Hour; or Btu's Per Hour
T04	Other Treatment	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; or Btu's Per Hour
T80	Boiler	Gallons or Liters
T81	Cement Kiln	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; or Btu's Per Hour
T82	Lime Kiln	
T83	Aggregate Kiln	
T84	Phosphate Kiln	
T85	Coke Oven	
T86	Blast Furnace	
T87	Smelting, Melting, Or Refining Furnace	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; or Btu's Per Hour
T88	Titanium Dioxide Chloride Process Oxidation Reactor	
T89	Methane Reforming Furnace	
T90	Pulping Liquor Recovery Furnace	
T91	Combustion Device Used In The Recovery Of Sulfur Values From Spent Sulfuric Acid	
T92	Halogen Acid Furnaces	
T93	Other Industrial Furnaces Listed in 40 CFR §260.10	
T94	Containment Building-Treatment	Cubic Yards or Cubic Meters
	Miscellaneous (Subpart X):	
X01	Open Burning/Open Detonation	Any Unit of Measure Listed Below
X02	Mechanical Processing	Short Tons Per Hour; Metric Tons Per Hour; Short Tons Per Day; Metric Tons Per Day; Pounds Per Hour; or Kilograms Per Hour
X03	Thermal Unit	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; or Btu's Per Hour
X04	Geologic Repository	Cubic Yards or Cubic Meters
X99	Other Subpart X	Any Unit of Measure Listed Below

UNIT OF MEASURE	UNIT OF MEASURE CODE
Gallons	G
Gallons Per Hour	E
Gallons Per Day	U
Liters	L
Liters Per Hour	H
Liters Per Day	V
Short Tons Per Hour	D
Metric Tons Per Hour	W
Short Tons Per Day	N
Metric Tons Per Day	S
Pounds Per Hour	J
Kilograms Per Hour	R
Cubic Yards	Y
Cubic Meters	C
Acres	B
Acre-feet	A
Hectares	Q
Hectare-meter	F
Btu's Per Hour	I

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Form Approved. OMB No. 2050-0034 Expires 9-30-96
GSA No. 0248-EPA-OT

EPA I.D. Number *(Enter from page 1)*: I L D 0 4 1 5 5 0 5 6 7

Secondary ID Number *(Enter from page 1)*:

XII. Process Codes and Design Capabilities *(Continued)*

EXAMPLE FOR COMPLETING ITEM XII (Shown in line number X-1 below): A facility has a storage tank, which can hold 533,788 gallons.

Line Number	A. Process Code (From list above)	B. PROCESS DESIGN CAPACITY 1. Amount (Specify)	B. 2. Unit Of Measure (Enter code)	C. Process Total Number Of Units	For Official Use Only
X 1	S 0 2	5 3 3 7 8 8	G	0 0 1	
X 1	D 8 1	13.5	B	0 0 1	
2		.			
3		.			
4		.			
5		.			
6		.			
7		.			
8		.			
9		.			
10		.			
11		.			
12		.			
13		.			

NOTE: If you need to list more than 13 process codes, attach an additional sheet(s) with the information in the same format as above. Number the lines sequentially, taking into account any lines that will be used for "other" processes (i.e., D99, S99, T04 and X99) in item XIII.

XIII. Other Processes *(Follow instructions from item XII for D99, S99, T04 and X99 process codes)*

Line Number (Enter as in seq w/XII)	A. Process Code (From list above)	B. PROCESS DESIGN CAPACITY 1. Amount (Specify)	B. 2. Unit Of Measure (Enter code)	C. Process Total Number Of Units	D. Description Of Process
X 1	T 0 4	.			In-situ Vitrification
1		.			
2		.			
3		.			
4		.			

EPA I.D. Number *(Enter from page 1)*: I L D 0 4 1 5 5 0 5 6 7

Secondary ID Number *(Enter from page 1)*:

XIV. Description of Hazardous Wastes

A. EPA HAZARDOUS WASTE NUMBER - *Enter the four-digit number from 40 CFR, Part 261 Subpart D of each listed hazardous waste you will handle. For hazardous wastes which are not listed in 40 CFR, Part 261 Subpart D, enter the four-digit number(s) from 40 CFR, Part 261 Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.*

B. ESTIMATED ANNUAL QUANTITY - *For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.*

C UNIT OF MEASURE - *For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:*

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. **PROCESS CODES:**

For listed hazardous waste: For each listed hazardous waste entered in column A select the code(s) from the list of process codes contained in Item XII A. on page 3 to indicate how the waste will be stored, treated, and/or disposed of at the facility.

For non-listed hazardous waste: For each characteristic or toxic contaminant entered in column A, select the code(s) from the list of process codes contained in Item XII A. on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed hazardous wastes that possess that characteristic or toxic contaminant.

NOTE: THREE SPACES ARE PROVIDED FOR ENTERING PROCESS CODES. IF MORE ARE NEEDED:

1. *Enter the first two as described above.*
2. *Enter "000" in the extreme right box of Item XIV-D(1).*
3. *Enter in the space provided on page 7, Item XIV-E, the line number and the additional code(s).*

2. **PROCESS DESCRIPTION:** *If a code is not listed for a process that will be used, describe the process in the space provided on the form (D.(2)).*

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER - Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. *Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B, C and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.*
2. *In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "Included with above" and make no other entries on that line.*
3. *Repeat step 2 for each EPA Hazardous Waste Number that can be used to describe the hazardous waste.*

EXAMPLE FOR COMPLETING ITEM XIV (shown in line numbers X-1, X-2, X-3, and X-4 below) - A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

Line Number	A. EPA HAZARD WASTE NO. (Enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (Enter code)	D. PROCESS (1) PROCESS CODES (Enter code)	D. PROCESS (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
X 1	K 0 5 4	900	P	T 0 3 D 8 0	
X 2	D 0 0 2	400	P	T 0 3 D 8 0	
X 3	D 0 0 1	100	P	T 0 3 D 8 0	
X 4	D 0 0 2				Included With Above

Please print or type with ELITE type (12 characters per inch) in the unshaded areas only

Form Approved, OMB No. 2050-0034 Expires 9-30-96
GSA No. 0248-EPA-OT

EPA I.D. Number *(Enter from page 1)*: I L D 0 4 1 5 5 0 5 6 7

Secondary ID Number *(Enter from page 1)*:

XIV. Description of Hazardous Wastes *(Continued)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	F037	TBD	--	D81	Primary Sludge
2	F038	TBD	--	D81	Secondary Sludge
3					
4	K050	TBD	--	D81	Heat exchanger bundle cleaning sludge
5	K051	TBD	--	D81	API Separator Sludge
6	D008	TBD	--	D81	Lead
7	D018	TBD	--	D81	Benzene
8					
9					NOTE: The waste numbers
10					identified here are
11					potentially associated
12					with remediation wastes at
13					the Refinery. They may not
14					actually be generated
15					during cleanup activities.
16					
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33					

EPA I.D. Number *(Enter from page 1)*	Secondary ID Number *(Enter from page 1)*
I L D 0 4 1 5 5 0 5 6 7	

XV. Map

Attach to this application a topographic map, or other equivalent map, of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in this map area. See instructions for precise requirements.

XVI. Facility Drawing

All existing facilities must include a scale drawing of the facility (see instructions for more detail).

XVII. Photographs

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas (see instructions for more detail).

XVIII. Certification(s)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Owner Signature	Date Signed
Name and Official Title (Type or print)	
Owner Signature	Date Signed
Name and Official Title (Type or print)	
Operator Signature	Date Signed
Name and Official Title (Type or print)	
Operator Signature	Date Signed
Name and Official Title (Type or print)	

XIX. Comments

This permit is for a corrective action management unit.

Note: Mail completed form to the appropriate EPA Regional or State Office. (Refer to instructions for more information)