Western Refining Southwest LLC
A subsidiary of Marathon Petroleum Corporation
I-40 Exit 39
Jamestown, NM 87347

June 23, 2023

CERTFIED MAIL
RETURN RECEIPT

Mr. Dave Cobrain, Interim Chief
New Mexico Environment Department
2905 Rodeo Park Drive East, Bldg. 1
Santa Fe, NM 87505-6303

RE: Part A and Part B RCRA Permit Renewal Application
Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery
EPA ID #NMD000333211

Dear Mr. Cobrain:

Pursuant to Chapter 40 of the Code of Federal Regulations (40 CFR) part 270.13 and 40 CFR 270.14 through 270.27, Western Refining Southwest LLC (D/B/A Marathon Gallup Refinery) (Refinery) is formally submitting an original, as well as a hard copy and an electronic copy, of its Resource Conservation and Recovery Act (RCRA) Part A and Part B Renewal Application (Renewal Application) for post-care and corrective action activities.

Post-closure care of the Land Treatment Unit (LTU), site-wide groundwater monitoring, and corrective action for the Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) at the Refinery are currently implemented under the Post-Closure Permit issued by the New Mexico Environment Department (NMED) (Permit No. NM000333211), which is set to expire on December 2, 2023.

The LTU is no longer in operation and was certified closed in 2011. Hence, the Renewal Application follows the applicable requirements of 40 CFR 270.28 (Part B information for post-closure permits), as well as the New Mexico Hazardous Waste Management Regulations (HWMR) in Title 20 of the New Mexico Administrative Code (NMAC) Chapter 4 Section 1. The HWMR generally incorporate the federal regulations under Subtitle C of RCRA. This Renewal Application reflects updates to the Refinery and Refinery operations since the issuance of the last renewal permit in 2013 and includes an initial list of proposed changes to the current permit for consideration by NMED during the issuance of a renewal permit. These proposed changes include edits to the current permit as well as permit attachments, and include the following:

- Changes to the frequency of updates to the facility-wide groundwater monitoring plan: changes would allow for more real time data collection executed under an NMED approved work plan. The Refinery feels that a more flexible update schedule remains protective and meets the intent of the facility-wide program given that the Refinery is currently idled.
- Changes to various sampling and reporting protocols to reflect current practices and site conditions.

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- Statistical methods used for analysis of detection monitoring data: changes proposed to allow for the application of other statistical methods that may also be appropriate based on site-specific conditions.

In accordance with Tables 2 and 4 in 20 NMAC 4.2.205, the Refinery will submit the required RCRA Renewal Application fees upon receipt of the invoice from NMED. It is our understanding that the technical review will follow.

After the NMED deems the Renewal Application to be administratively and technically complete, public notice (at NMED's direction) of the draft renewal permit will be completed in compliance with 40 CFR Part 124 Subparts A and B, and 40 CFR Part 270.

If you have any questions or comments regarding the information contained herein, please contact Mr. John Moore at 505-879-7643 or Ms. Kateri Luka at 714-713-1218.

Sincerely,
Western Refining Southwest LLC, Gallup Refinery

Mr. Timothy Peterkoski
Director of Environment and Climate Strategy
Marathon Petroleum Company LP

Enclosure

cc: L. Andress, NMED HWB
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J. Moore, Marathon Gallup Refinery
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PART A AND PART B RCRA PERMIT RENEWAL APPLICATION

Western Refining Southwest LLC

(D/B/A Marathon Gallup Refinery)

Gallup, New Mexico

EPA ID# NMD000333211

JUNE 23, 2023

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List of Acronyms

°C	degrees Celsius
%C	completeness
%R	percent recovery
AL	Aeration Lagoon
AOC	area of concern
API	American Petroleum Institute
BTZ	below treatment zone
CEC	cation exchange capacity
CFR	Code of Federal Regulations
cfs	cubic feet per second
CMIWP	Corrective Measures Implementation Work Plan
COC	chain of custody
Consent Order	2017 Order on Consent
current permit	2013 permit, as modified in 2017 and 2022
DQO	data quality objective
DRO	diesel range organics
EP	Evaporation Pond
ERP	emergency response plan
ESSM	Environmental, Safety, and Security Manager
eV	electron volt
ft	foot or feet
GFW	Gannett Fleming West, Inc.
GRO	gasoline range organics
HSWA	Hazardous and Solid Waste Act
HWMR	Hazardous Waste Management Regulation
HWMU	hazardous waste management unit
I-40	Interstate 40
in.	inch or inches
IWP	investigation work plan

List of Acronyms (cont.)

LCS	laboratory control sample
LIF/HP	laser-induced fluorescence/hydraulic profiling
LTD	land treatment demonstration
LTU	Land Treatment Unit
MCL	maximum contaminant levels
MDL	method detection limit
mL	milliliter
Modification	Class I Permit Modification
NAPIS	New American Petroleum Institute Separator
NFA	no further action
NLCI	no longer contained-in
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
OAPIS	Old American Petroleum Institute Separator
oz	ounce or ounces
QA	quality assurance
QC	quality control
PCC	post-closure care
PCCP	post-closure care plan
PHC	principal hazardous constituents
PID	photoionization detector
PM	project manager
PPE	personal protective equipment
RCRA	Resource Conservation and Recovery Act
Refinery	Western Refining Southwest LLC D/B/A Marathon Gallup Refinery
Renewal Application	RCRA Part B Permit Renewal Application
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RPD	relative percent difference

List of Acronyms (cont.)

SOP	standard operating procedure
SPH	separate phase hydrocarbon
SSL	soil screening level
SVOC	semi-volatile organic compound
SWMU	solid waste management unit
TDS	total dissolved solids
TPH	total petroleum hydrocarbons
TZ	treatment zone
U.S.C.	United States Code
USEPA	United States Environmental Protection Agency
VCAP	Voluntary Corrective Action Plan
VOA	volatile organic analyte
VOC	volatile organic compounds
WQCC	Water Quality Control Commission
WWT	wastewater treatment
ZOI	Zone of Incorporation

A.0 - INTRODUCTION

Western Refining Southwest LLC

(D/B/A Marathon Gallup Refinery)

Gallup, New Mexico

EPA ID# NMD000333211

JUNE 23, 2023

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A.0 Introduction

This post closure permit application is being submitted to the New Mexico Environment Department (NMED) and the United States Environmental Protection Agency (USEPA) to meet the requirements of the Resource Conservation and Recovery Act (RCRA); the New Mexico Hazardous Waste Act; and Title 20 of the New Mexico Administrative Code (NMAC), Chapter 4, Part 1.900 (20 NMAC 4.1.900).

Western Refining Southwest LLC D/B/A Marathon Gallup Refinery is the owner and operator of the Gallup Refinery (Refinery), located in McKinley County, New Mexico. NMED issued the RCRA Post-Closure Permit (Permit No. NM000333211) on October 31, 2013 (with an effective date of December 2, 2013). The 2013 Permit authorizes post-closure care (PCC) for the former Land Treatment Unit (LTU) which is a Hazardous Waste Management Unit (HWMU). The 2013 Permit also requires corrective action activities for the RCRA Solid Waste Management Units (SWMUs) as well as an associated schedule of compliance. The 2013 Permit was subsequently modified in 2017 and 2022 (current permit) to add corrective action requirements for the RCRA Areas of Concern (AOCs). A PCC permit was previously issued in 2000.

The 2013 Permit expires on December 2, 2023. Per the Code of Federal Regulations (CFR) Chapter 40 Part 270.10(h)(1), the Refinery is required to submit a RCRA Part B Permit Renewal Application (Renewal Application) within 180 days of the expiration of the current 2013 Permit, however, an extension request was submitted to NMED to extend the submittal from June 4, 2023 to June 30, 2023. The information contained in this application is designed to meet the permit application requirements of 20 NMAC 4.1.900 and the closure/post closure requirements of 20 NMAC 4.1.500. This Renewal Application provides the informational elements required under 40 CFR 270.28 and is submitted pursuant to the New Mexico Hazardous Waste Management Regulations (HWMR) 20 NMAC 4.1. The HWMR generally incorporate the federal regulations under RCRA Subtitle Chapter 40 of the CFR, Parts 260 through 279.

Note that this Renewal Application includes a number of proposed changes to the current permit, which are specifically identified in Table A-1.

A.1 Renewal Application Approach

The required signature and certification by a principal corporate official regarding the method of preparation of this Renewal Application and the accuracy and completeness of its contents is provided as part of this application (Section H). There are no new documents or changes in this Renewal Application that require certification by a qualified professional engineer. In addition to fulfilling the Renewal Application requirements for the LTU, the Refinery is also including the RCRA Part A application which includes all hazardous waste codes and volumes applied to the LTU between 1988 and 1990. 20 NMAC 4.1.900 permitting regulations do not distinguish between information requirements for operating permits and post-closure permits. Therefore, this application includes facility level information (20 NMAC 4.1.900) and unit specific information (20 NMAC 4.1.500).

Since the only permitted HWMU is the closed LTU, the content of this Renewal Application is based upon 40 CFR 270.28 (Part B information for post-closure permits), and other applicable federal and state regulations in 40 CFR Parts 264 and 270, and 20 NMAC 4.1 respectively. For ease of reading in cases where the federal regulations have been incorporated by reference into the NMAC, only the federal regulatory citation is referenced within the Renewal Application. Where application content is specified in the regulations but is not applicable to the Refinery (e.g., tanks, containers, incinerators) or to a post-closure permit application, those regulations are not generally discussed in this Renewal Application unless important to context or background. A table detailing the applicable federal regulations for a post-closure Renewal Application for the LTU is provided as Table A-2.

The Renewal Application was developed to be as straightforward as possible, while still providing the required and pertinent information for post-closure care and corrective action permit applications. Within the Renewal Application, the Refinery references various documents previously submitted by the Refinery to the NMED (e.g., annual monitoring reports) as opposed to including copies as part of the application. Day-to-day details of the RCRA post-closure program and the RCRA corrective action program will be addressed via approved work plans and other reports. This convention is intended to minimize the bulk of this application and to eliminate duplication of information provided to the NMED. Streamlining this application and the subsequent Permit in this manner will minimize the need for, and complexity of, future Permit modifications, thereby lessening the Refinery's and the NMED's burden for managing the current permit and Renewal Application without sacrificing compliance and environmental benefit.

Also included in this section:

- A topographic map of the Refinery (Figure A-1)
- A detailed map of the Refinery (Figure A-2)
- A map of the evaporation ponds of the Refinery (Figure A-3)
- Photographs of the LTU (Attachment A-1)

A.2 Renewal Application Structure

The Part B Renewal Application is structured with an up-front introduction and background information section (Sections B and C), which include the required Refinery location and other general information, followed by a series of stand-alone plans (Sections D through F) relevant to PCC of the closed LTU and to corrective action activities related to site-wide groundwater monitoring, SWMUs, and AOCs at the Refinery. The following sections are included in the Renewal Application:

- Section A.0 – Introduction
- Section B.0 – General Description
- Section C.0 – Land Treatment Unit Program History
- Section D.0 – Post-Closure Care Plan
- Section E.0 – Security, Inspection, and Preparedness/Prevention Plans

- Section F.0 – Site-Wide Corrective Action: Groundwater Monitoring, Solid Waste Management Units and Areas of Concern
- Section G.0 – Other Federal Laws
- Section H.0 –Certification
- Section I.0 – References

Per 40 CFR 270.14(b)(16) (as required in 40 CFR 270.28), a copy of the most recent Post-Closure Financial Assurance Package is provided in this Renewal Application as Appendix C.

Forms

EPA ID Number | | | | | | | | | | | | |

United States Environmental Protection Agency

HAZARDOUS WASTE PERMIT PART A FORM

1. Facility Permit Contact

First Name	MI	Last Name
Title		
Email		
Phone	Ext	Fax

2. Facility Permit Contact Mailing Address

Street Address		
City, Town, or Village		
State	Country	Zip Code

3. Facility Existence Date (mm/dd/yyyy)

4. Other Environmental Permits

A. Permit Type	B. Permit Number	C. Description

5. Nature of Business

EPA ID Number | | | | | | | | | | | | |

6. Process Codes and Design Capacities

Line Number		A. Process Code			B. Process Design Capacity		C. Process Total Number of Units	D. Unit Name
					(1) Amount	(2) Unit of Measure		

7. Description of Hazardous Wastes (Enter codes for Items 7.A, 7.C and 7.D(1))

Line No.		A. EPA Hazardous Waste No.				B. Estimated Annual Qty of Waste	C. Unit of Measure	D. Processes									
								(1) Process Codes									(2) Process Description (if code is not entered in 7.D1))

8. Map

Attach to this application a topographical 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 intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all spring, rivers, and other surface water bodies in this map area. See instructions for precise requirements.

9. Facility Drawing

All existing facilities must include a scale drawing of the facility. See instructions for more detail.

10. 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.

11. Comments

United States Environmental Protection Agency

RCRA SUBTITLE C SITE IDENTIFICATION FORM

1. Reason for Submittal (Select only one.)

☐	Obtaining or updating an EPA ID number for on-going regulated activities (Items 10-17 below) that will continue for a period of time.
☐	Submitting as a component of the Hazardous Waste Report for __________ (Reporting Year)
	☐ Site was a TSD facility, a reverse distributor, and/or generator of ≥ 1,000 kg of non-acute hazardous waste, > 1 kg of acute hazardous waste, or > 100 kg of acute hazardous waste spill cleanup in **one or more months of the reporting year** (or State equivalent LQG regulations)
☐	Notifying that regulated activity is no longer occurring at this Site
☐	Obtaining or updating an EPA ID number for conducting Electronic Manifest Broker activities
☐	Submitting a new or revised Part A (permit) Form

2. Site EPA ID Number

3. Site Name

4. Site Location Address

Street Address		
City, Town, or Village		County
State	Country	Zip Code
Latitude	Longitude	☐ Use Lat/Long as Primary Address

5. Site Mailing Address ☐ Same as Location Street Address

Street Address		
City, Town, or Village		
State	Country	Zip Code

6. Site Land Type

☐ Private	☐ County	☐ District	☐ Federal	☐ Tribal	☐ Municipal	☐ State	☐ Other

7. North American Industry Classification System (NAICS) Code(s) for the Site (at least 5-digit codes)

A. (Primary)	C.
B.	D.

EPA ID Number | | | | | | | | | | | | |

8. Site Contact Information

☐ Same as Location Address

First Name	MI	Last Name
Title		
Street Address		
City, Town, or Village		
State	Country	Zip Code
Email		
Phone	Ext	Fax

9. Legal Owner and Operator of the Site

A. Name of Site's Legal Owner

☐ Same as Location Address

Full Name	Date Became Owner (mm/dd/yyyy)
Owner Type ☐ Private ☐ County ☐ District ☐ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other	
Street Address	
City, Town, or Village	

State	Country	Zip Code
Email		
Phone	Ext	Fax
Comments		

B. Name of Site's Legal Operator

☐ Same as Location Address

Full Name	Date Became Operator (mm/dd/yyyy)
Operator Type ☐ Private ☐ County ☐ District ☐ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other	
Street Address	
City, Town, or Village	

State	Country	Zip Code
Email		
Phone	Ext	Fax
Comments		

EPA ID Number | | | | | | | | | | | | |

10. Type of Regulated Waste Activity (at your site)
Mark "Yes" or "No" for all current activities (as of the date submitting the form); complete any additional boxes as instructed.

A. Hazardous Waste Activities

☐ Y ☐ N		1. Generator of Hazardous Waste—If "Yes", mark only one of the following—a, b, c
☐	a. LQG	-Generates, in any calendar month, 1,000 kg/mo (2,200 lb/mo) or more of non-acute hazardous waste (includes quantities imported by importer site); or - Generates, in any calendar month, or accumulates at any time, more than 1 kg/mo (2.2 lb/mo) of acute hazardous waste; or - Generates, in any calendar month or accumulates at any time, more than 100 kg/mo (220 lb/mo) of acute hazardous spill cleanup material.
☐	b. SQG	100 to 1,000 kg/mo (220-2,200 lb/mo) of non-acute hazardous waste and no more than 1 kg (2.2 lb) of acute hazardous waste and no more than 100 kg (220 lb) of any acute hazardous spill cleanup material.
☐	c. VSQG	Less than or equal to 100 kg/mo (220 lb/mo) of non-acute hazardous waste.
☐ Y ☐ N		2. Short-Term Generator (generates from a short-term or one-time event and not from on-going processes). If "Yes", provide an explanation in the Comments section. *Note: If "Yes", you MUST indicate that you are a Generator of Hazardous Waste in Item 10.A.1 above.*
☐ Y ☐ N		3. Treater, Storer or Disposer of Hazardous Waste—Note: Part B of a hazardous waste permit is required for these activities.
☐ Y ☐ N		4. Receives Hazardous Waste from Off-site
☐ Y ☐ N		5 Recycler of Hazardous Waste
☐		a. Recycler who stores prior to recycling
☐		b. Recycler who does not store prior to recycling
☐ Y ☐ N		6. Exempt Boiler and/or Industrial Furnace—If "Yes", mark all that apply.
☐		a. Small Quantity On-site Burner Exemption
☐		b. Smelting, Melting, and Refining Furnace Exemption

B. Waste Codes for Federally Regulated Hazardous Wastes. Please list the waste codes of the Federal hazardous wastes handled at your site. List them in the order they are presented in the regulations (e.g. D001, D003, F007, U112). Use an additional page if more spaces are needed.

C. Waste Codes for State Regulated (non-Federal) Hazardous Wastes. Please list the waste codes of the State hazardous wastes handled at your site. List them in the order they are presented in the regulations. Use an additional page if more spaces are needed.

EPA ID Number

11. Additional Regulated Waste Activities (NOTE: Refer to your State regulations to determine if a separate permit is required.)

A. Other Waste Activities

☐ Y ☐ N		1. Transporter of Hazardous Waste—If "Yes", mark all that apply.
	☐	a. Transporter
	☐	b. Transfer Facility (at your site)
☐ Y ☐ N		2. Underground Injection Control
☐ Y ☐ N		3. United States Importer of Hazardous Waste
☐ Y ☐ N		4. Recognized Trader—If "Yes", mark all that apply.
	☐	a. Importer
	☐	b. Exporter
☐ Y ☐ N		5. Importer/Exporter of Spent Lead-Acid Batteries (SLABs) under 40 CFR 266 Subpart G—If "Yes", mark all that apply.
	☐	a. Importer
	☐	b. Exporter

B. Universal Waste Activities

☐ Y ☐ N		1. Large Quantity Handler of Universal Waste (you accumulate 5,000 kg or more) - If "Yes" mark all that apply. Note: Refer to your State regulations to determine what is regulated.
	☐	a. Batteries
	☐	b. Pesticides
	☐	c. Mercury containing equipment
	☐	d. Lamps
	☐	e. Aerosol Cans
	☐	f. Other (specify) ____________________
	☐	g. Other (specify) ____________________
☐ Y ☐ N		2. Destination Facility for Universal Waste Note: A hazardous waste permit may be required for this activity.

C. Used Oil Activities

☐ Y ☐ N		1. Used Oil Transporter—If "Yes", mark all that apply.
	☐	a. Transporter
	☐	b. Transfer Facility (at your site)
☐ Y ☐ N		2. Used Oil Processor and/or Re-refiner—If "Yes", mark all that apply.
	☐	a. Processor
	☐	b. Re-refiner
☐ Y ☐ N		3. Off-Specification Used Oil Burner
☐ Y ☐ N		4. Used Oil Fuel Marketer—If "Yes", mark all that apply.
	☐	a. Marketer Who Directs Shipment of Off-Specification Used Oil to Off-Specification Used Oil Burner
	☐	b. Marketer Who First Claims the Used Oil Meets the Specifications

EPA ID Number

D. Pharmaceutical Activities

☐ Y ☐ N		1. Operating under 40 CFR Part 266, Subpart P for the management of hazardous waste pharmaceuticals—if "Yes", mark only one. Note: See the item-by-item instructions for definitions of healthcare facility and reverse distributor.
	☐	a. Healthcare Facility
	☐	b. Reverse Distributor
☐ Y ☐ N		2. Withdrawing from operating under 40 CFR Part 266, Subpart P for the management of hazardous waste pharmaceuticals. Note: You may only withdraw if you are a healthcare facility that is a VSQG for all of your hazardous waste, including hazardous waste pharmaceuticals.

12. Eligible Academic Entities with Laboratories—Notification for opting into or withdrawing from managing laboratory hazardous wastes pursuant to 40 CFR Part 262, Subpart K.

☐ Y ☐ N		A. Opting into or currently operating under 40 CFR Part 262, Subpart K for the management of hazardous wastes in laboratories— If "Yes", mark all that apply. Note: See the item-by-item instructions for definitions of types of eligible academic entities.
	☐	1. College or University
	☐	2. Teaching Hospital that is owned by or has a formal written affiliation with a college or university
	☐	3. Non-profit Institute that is owned by or has a formal written affiliation with a college or university
☐ Y ☐ N		B. Withdrawing from 40 CFR Part 262, Subpart K for the management of hazardous wastes in laboratories.

13. Episodic Generation

☐ Y ☐ N	Are you an SQG or VSQG generating hazardous waste from a planned or unplanned episodic event, lasting no more than 60 days, that moves you to a higher generator category. If "Yes", you must fill out the Addendum for Episodic Generator.

14. LQG Consolidation of VSQG Hazardous Waste

☐ Y ☐ N	Are you an LQG notifying of consolidating VSQG Hazardous Waste Under the Control of the Same Person pursuant to 40 CFR 262.17(f)? If "Yes", you must fill out the Addendum for LQG Consolidation of VSQG hazardous waste.

15. Notification of LQG Site Closure for a Central Accumulation Area (CAA) (optional) OR Entire Facility (required)

☐ Y ☐ N	LQG Site Closure of a Central Accumulation Area (CAA) or Entire Facility.
	A. ☐ Central Accumulation Area (CAA) or ☐ Entire Facility
	B. Expected closure date: ____________ mm/dd/yyyy
	C. Requesting new closure date: ____________ mm/dd/yyyy
	D. Date closed : ____________ mm/dd/yyyy ☐ 1. In compliance with the closure performance standards 40 CFR 262.17(a)(8) ☐ 2. Not in compliance with the closure performance standards 40 CFR 262.17(a)(8)

EPA ID Number | | | | | | | | | | | | |

16. **Notification of Hazardous Secondary Material (HSM) Activity**

☐ Y ☐ N	Are you notifying under 40 CFR 260.42 that you will begin managing, are managing, or will stop managing hazardous secondary material under 40 CFR 260.30, 40 CFR 261.4(a)(23), (24), (25), or (27)? If "Yes", you must fill out the Addendum to the Site Identification Form for Managing Hazardous Secondary Material.

17. **Electronic Manifest Broker**

☐ Y ☐ N	Are you notifying as a person, as defined in 40 CFR 260.10, electing to use the EPA electronic manifest system to obtain, complete, and transmit an electronic manifest under a contractual relationship with a hazardous waste generator?

18. **Comments** (include item number for each comment)

19. **Certification** 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 fines and imprisonment for knowing violations. **Note: For the RCRA Hazardous Waste Part A permit Application, all owners and operators must sign (see 40 CFR 270.10(b) and 270.11)**.

Signature of legal owner, operator or authorized representative	Date (mm/dd/yyyy)
Printed Name (First, Middle Initial Last)	Title
Email	

Signature of legal owner, operator or authorized representative	Date (mm/dd/yyyy)
Printed Name (First, Middle Initial Last)	Title
Email	

Figures

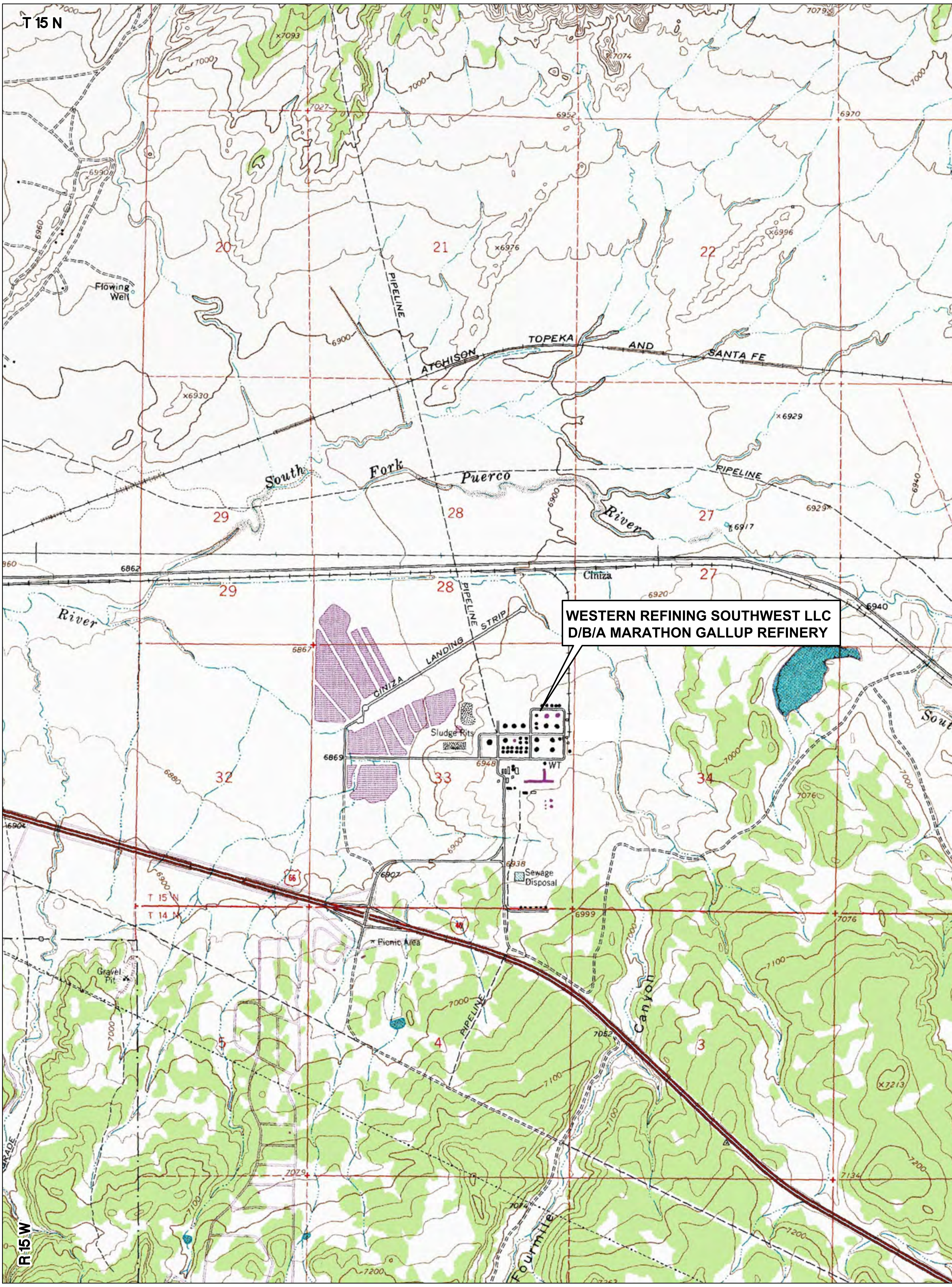
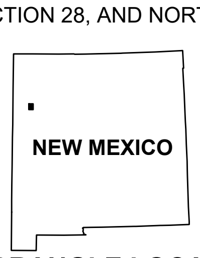


Image Cite: U.S. Geological Survey, 1:24,000–Scale 7.5 Minute Digital Raster Graphic Quadrangle, McKinley County, Publication: 2004

NOTE:
SITE LEGAL DESCRIPTION - TOWNSHIP 15 NORTH, RANGE 15 WEST, SECTION 33, LOWER QUARTER SECTION 28, AND NORTHEAST QUARTER SECTION 4.



QUADRANGLE LOCATION

N

0 2,000'

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE A-1

REFINERY LOCATION AND TOPOGRAPHIC MAP

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: KML	Checked By: CF	Scale: 1" = 2,000'	Date: 3/20/2023	File: 697-RCRA-PA-TOPOMAP

M:\TON\MARATHON\CADD\GALLUP_REPORTS\RCRAPERMITAPP\2023\03\697-RCRA-PA-TOPOMAP

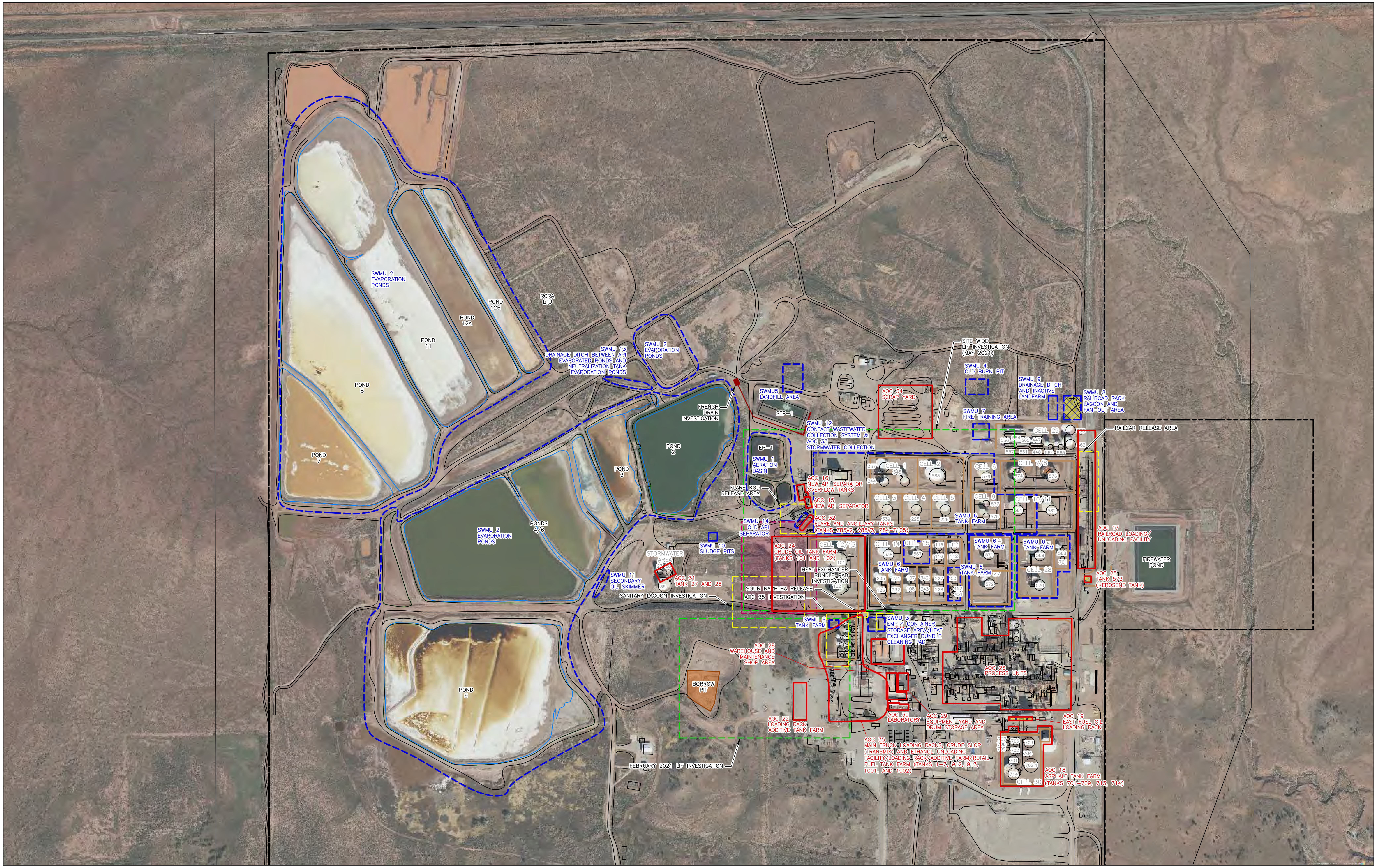


Image Cite: DigitalGlobe © CNES (2022) Distribution Airbus DS © Microsoft Corporation, BING Imagery

EXPLANATION

- PROPERTY BOUNDARY (APPROXIMATE)
- AOC LOCATION
- SWMU LOCATION
- FRENCH DRAIN
- RELEASE AREA
- LIF (LASER INDUCED FLUORESCENCE)
- BORROW PIT (APPROXIMATE)
- HYDROCARBON SEEP AREA
- CORRECTIVE ACTION COMPLETE WITHOUT CONTROLS

NOTE:

THE FOLLOWING WORK INVESTIGATIONS ARE COMPLETED SITE WIDE: GROUNDWATER MONITORING, FENCELINE MONITORING, WEEKLY ON-SITE SUPPORT.

WARNING

IF THIS BAR DOES NOT MEASURE 1" THEN THIS DRAWING IS NOT TO SCALE

N

0 400' 800'

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

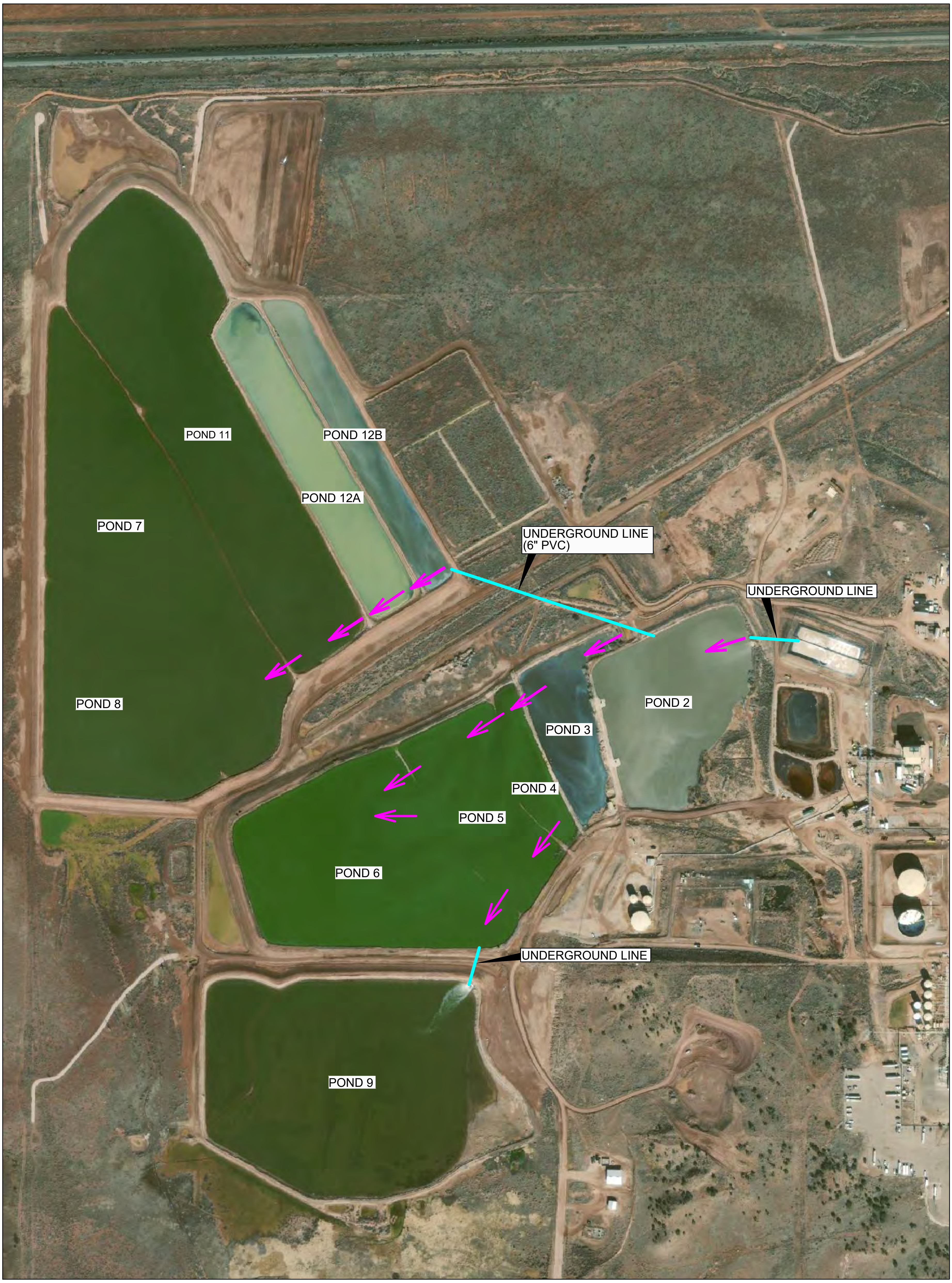
FIGURE A-2

REFINERY MAP

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: KML	Checked By: CF	Scale: 1" = 400'	Date: 3/20/2023	File: 697-RCRA-PA-REFINERYMAP

M:\TON\MARATHON\CADD\GALLUP_REPORTS\RCRAPERMITAPP\202303\697-RCRA-PA-REFINERYMAP



Modified From: DiSorbo Environmental Consulting Firm, Evaporation Ponds Flow Path of Wastewater and Sampling Locations; June 26, 2019

N

0 400'

NOTE:

ORIGINAL DISORBO DOCUMENT CONTAINED SAMPLE LOCATIONS WHICH HAVE BEEN REMOVED BY TRIHYDRO FOR PROJECT SPECIFIC MODIFICATIONS.

EXPLANATION

FLOW DIRECTION

UNDERGROUND LINE

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE A-3

EVAPORATION PONDS

WESTERN REFINING SOUTH WEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: KML	Checked By: CF	Scale: 1" = 400'	Date: 3/20/23	File: 697-GAOCD-EVAPPONDS_202303

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Tables

TABLE A-1. SUMMARY OF SUGGESTED EDITS
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Primary Section	Proposed Modification	Justification
Section I.C	A post-closure care permit was previously issued in 2013 (which was modified in 2017 and 2022).	Revision to reflect most recent permit reissuance and modifications.
IV.C.2	The Permittee shall submit for the NMED's review, by the 1st of February every 5 years beginning in 2024, an updated facility-wide groundwater monitoring plan to fully characterize the nature and extent of groundwater contamination at, and migrating from, the Facility, and to monitor the effectiveness of interim containment and remediation systems.	Although the Refinery is requesting that the work plan be submitted to NMED for review every five years, Section F of the permit renewal application proposed submittal of a revised map, analytical list, and well locations for NMED review each year no later than January 31. These edits are requested so that the Refinery can collect groundwater samples under an approved work plan.
IV.C.3	The Permittee shall submit to the NMED a Facility-Wide Groundwater Monitoring Report by March 31st of each year.	Revised to reflect the current date that the Refinery submits the annual Monitoring Report.
IV.H.5.a.iv	The Permittee shall include an anticipated schedule to complete any permit or corrective action-related field activity (*e.g.*, drilling, sampling).	Revised to reflect current activity notifications.

TABLE A-1. SUMMARY OF SUGGESTED EDITS
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Primary Section	Proposed Modification	Justification
IV.J.2.d.ii	Generally, the samples shall be collected based on the established intervals and depths in the specific investigation work plans. These intervals and depths will be approved by NMED prior to investigation.	Sampling intervals and depths are established in the individual investigation work plans submitted to the NMED. Intervals and depths are approved by the NMED prior to investigations.
IV.J.2.d.v	Draft boring logs, test pit logs, and well construction diagrams shall be submitted to the NMED within the investigation reports.	Boring logs, test pit logs, and well construction diagrams are included in investigation reports. The timeframe of submittal is provided in the investigation work plan.
IV.J.2.d.vi	A photo-ionization detector (PID) equipped with a 10.6 electron volt (eV) lamp, combustible gas indicator, or other instrument approved by the NMED shall be used for VOC field screening. The limitations, precision, and calibration procedures of the instrument to be used for VOC field screening shall be included in the site-specific investigation work plan prepared for each unit.	Higher energy lamps tend to produce both a weaker ionization current and have an increased tendency towards drift. The 10.6 eV lamp usually produces better resolution and accuracy, generally have much longer service lives, and have an energy output sufficient to detect a wide range of VOCs. Consequently, 10.6 eV lamps tend to be the most widely used.
IV.J.2.d.vi		XRF is not used at the Refinery.
IV.J.2.h	Water samples shall be analyzed in accordance with the NMED-approved groundwater monitoring work plan.	Groundwater samples are collected and analyzed in accordance with the annual Groundwater Monitoring Work Plan.
IV.J.2.h.i	In general, water samples may be obtained from the well after one or more measured parameters of the purge water have stabilized to within ten percent for three consecutive measurements.	Monitoring wells are purged, and samples are collected in accordance with the annual Groundwater Monitoring Work Plan.
IV.J.2.h.ii		Groundwater samples are analyzed in accordance with the annual Groundwater Monitoring Work Plan. This language is being removed to reflect current operations. Groundwater samples are collected for total metals every year. Dissolved metals are collected on even numbered years.
IV.J.3.a	The Permittee shall provide the names of the contract analytical laboratories to the NMED.	It is up to the Refinery to identify and contract an analytical laboratory that meets the QA/QC standards required by the RCRA Permit. The Refinery may choose other laboratories based on availability, turnaround time, and cost.

TABLE A-1. SUMMARY OF SUGGESTED EDITS
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Primary Section	Proposed Modification	Justification
IV.J.3.a.iv	The laboratory analytical data package kept on file at the Facility shall be prepared in accordance with EPA-established Level II analytical support protocol.	This change is necessary so that the data package kept on file is consistent with the data package presented to NMED. Level III or IV data packages are typically much more expensive (up to 50% more expensive) than the standard format provided by most commercial laboratories. Selection of instrument outputs for Level 3 and 4 validation checks generally will depend on many factors including, but not limited to, the type of verification and validation being performed (electronic or manual), analytical method(s), the number of laboratories reporting the data, the number and type of analytical methods reported, the number of analytes reported in each method, and the number of detected analytes.
IV.J.3.b	The Facility project manager shall contact the NMED within one business day of receipt of laboratory notification of data quality exceptions that may affect the ability to meet the objectives of the investigation or compliance activity in order to discuss the implications and determine whether the data will still be considered acceptable or if sample re-analysis or resampling is necessary. The Facility project manager will include a discussion of the data quality objectives in the investigation report summarizing the implications.	This change is it reflect current actions taken when data quality objectives are identified.
IV.L.1	The Permittee shall submit maps and figures in paper copies and pdf versions.	Maps and figures are currently submitted to the NMED in paper copies and pdf versions. This update is to reflect current actions taken.
IV.L.2.m	A description of IDW management shall be included in the investigation work plan. The results of historical investigations required in this Permit shall be submitted with the investigation work plan as a separate document.	This update is to reflect current actions. A description of IDW management is included in the work plan for each investigation rather than an appendix.

TABLE A-1. SUMMARY OF SUGGESTED EDITS
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Primary Section	Proposed Modification	Justification
IV.L.3.a	A signature block providing spaces for the names and titles of the responsible Facility representatives shall be provided on the cover letter in accordance with 40 CFR § 270.11(d)(1).	A cover letter with the signature block detailed in 40 CFR 270.11(d)(1) includes a signature block for the responsible Facility representatives. A new cover letter is prepared with each iteration of a report and is signed by the responsible Facility representative.
Permit Attachment D: Section D.7.a	As required by 20 NMAC 4.1.500 (40 CFR 264.271(c) and 264.278(f)(3)), data collected during monitoring will be evaluated using appropriate techniques per USEPA guidance, to determine whether there is a statistically significant increase in concentrations of analytical parameters measured in soil and groundwater below the treatment zone. The statistical procedure will be selected such that migration from the treatment zone will be identified with reasonable confidence, as follows: (i) Statistical procedure is appropriate for the distribution of the data used to establish background values; and (ii) Statistical procedure provides a reasonable balance between the probability of falsely identifying migration from the treatment zone and the probability of failing to identify real migration from the treatment zone.	There is considerable USEPA guidance for statistical methods applied to detection monitoring. This change is proposed to allow for the application of other statistical methods that may also be appropriate based on site-specific conditions.

TABLE A-2. APPLICABLE SECTIONS OF 40 CFR AND LOCATION IN APPLICATION
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Item Number	Section	Description	Federal Hazardous Waste Regulations at 40 CFR (*not needed for titles etc.)	Location of Information (Section)
1	I.	**GENERAL INFORMATION**	*	Section B
2	I.A.	**Applicant: Facility Operator (or Facility Owner & Operator, if same)**	270.10(a)-(b)	Part A Forms Section B
3	I.A.*1.*	Legal name of facility	*	Part A Forms Section B
4	I.A.*2.*	Provide facility's physical address, including latitude and longitude (and business address if different from physical) [Part A]	270.10(b); 270.13(b)	Part A Forms Section B
5	I.A.*3.*	Provide facility telephone number	270.13(d)	Part A Forms Section D.4
6	I.A.*4.*	Provide EPA I.D. number	264.11	Part A Forms
7	*I.A.5.*	*Up to four SIC codes which best reflect the principal products or services provided by the facility*	270.13(c)	Part A Forms
8	*I.A.6.*	*Ownership status and status as Federal, State, private, public or other entity; and whether the facility is located on Indian lands*	270.13(d); 270.13(f)	Part A Forms
9	*I.A.7.*	*A listing of all permits or construction approvals received or applied for under any of the following programs:* *- (1) Hazardous Waste Management program under RCRA.* *- (2) UIC program under the SWDA.* *- (3) NPDES program under the CWA.* *- (4) PSD program under the Clean Air Act.* *- (5) Nonattainment program under the Clean Air Act.* *- (6) NESHAPS preconstruction approval under the Clean Air Act.* *- (7) Ocean dumping permits under the Marine Protection Research and Sanctuaries Act.* *- (8) Dredge or fill permits under section 404 of the CWA.* *- (9) Other relevant environmental permits, including State permits.*	270.13(k)	Part A Forms Section G
11	I.C.	**Applicant Contact Name**	270.10; 270.13	Section A Section D.4
24	I.D.7.	Provide total acreage of the facility being permitted	270.13	Part A Forms
26	I.E.	**Facility Siting Summary**	*	Section B
27	I.E.1.	Indicate whether the facility is located within a 100-yr floodplain	270.14(b)(11)(iii); 270.28	Section B.4
35	*I.F.1.*	*General information requirements. The following information is required for all HWM facilities, except as §264.1 provides otherwise:* *(1) A general description of the facility.*	270.14(b)(1); 270.28	Section B Section C
46	II.	**FACILITY SITING CRITERIA**	*	Sections B and D
51	II.A.4.	Identification of the uppermost aquifer and aquifers hydraulically interconnected beneath the facility property. Provide the source of information; if facility overlies an aquifer, information should be provided in either Section V (see # 326) or in Section VI (see #1247). Check state-specific standards. Some states have restrictions for siting in recharge zone of a sole-source aquifer.	Guidance: "Sensitive Environments and the Siting of Hazardous Waste Management Facilities" (530K97003), 270.14(c)(2)	Section D.2 Section D.3 Section D.9
71	II.E.2.	If the unit is proposed to be located in 100-yr floodplain, determine state-specific siting requirements. - Hazardous waste management facilities should avoid building in floodplains. Existing regulations require hazardous waste management structures built is above the 100-year flood level or built to withstand the flooding event. - Check the siting criteria in your state. Some states will not issue a permit for a new HW landfill (especially if commercial) or an areal expansion of an existing landfill in a 100-yr floodplain.	264.18, 270.14(b)(11)(iii); 270.28 Guidance: "Sensitive Environments and the Siting of Hazardous Waste Management Facilities" (530K97003)	Section B.4
76	II.F.1.	Indicate whether the facility is located or proposed to be located within 100-year floodplain: - if yes, complete II.F.2-4, providing supporting documentation; Note: For an application for a proposed HWM facility, aside from the flood plain maps prepared by FEMA, additional information may be necessary for a floodplain determination; - if no, do not complete II.F.2-4.	270.14(b)(11)(iii), 264.18(b); 270.28	Section B.4

TABLE A-2. APPLICABLE SECTIONS OF 40 CFR AND LOCATION IN APPLICATION
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Item Number	Section	Description	Federal Hazardous Waste Regulations at 40 CFR (*not needed for titles etc.)	Location of Information (Section)
77	II.F.2.	Provide information defining the 100-year Flood levels	270.14(b)(11)(iii), 264.18(b); 270.28	Section B.4
99	III.	**FACILITY MANAGEMENT**	*	Section E
109	III.C.	**Security:**	*	Section E.2
110	III.C.*1.*	Provide a description of how the facility complies with security requirements:	264.14; 270.14(b)(4); 270.28	Section E.2
111	III.C.*1.a.*	- 24-hr surveillance system	264.14(b)(1)	Section E.2
112	III.C.*1.b.*	- Artificial or natural barrier	264.14(b)(2)(i)	Section E.2
113	III.C.*1.c.*	- Means to control entry	264.14(b)(2)(ii)	Section E.2
114	III.C.*1.d.*	- Warning signs	264.14(c)	Section E.2
116	III.D.	**Inspection Schedule:**	264.15; 264.33; 270.14(b)(5); 270.28	Section E.3
159	III.D.*1.k.*	- LAND TREATMENT UNIT INSPECTION: (weekly and after storms)	264.273(g); 270.20(c)(5)	Section E.3
296	V.A.	**GENERAL ENGINEERING REPORTS**	*	Sections B, D and F
297	V.A.1.	General Information:	*	Sections B, D and F
305	V.A.1.*c.*	- Submit topographic map(s) showing the facility boundary and a distance of 1,000 feet around it, having a scale of 1 inch equal to not more than 200 feet. Contours must be shown on the map as described in 270.14(b)(19) or more specific state requirements; the map must clearly show:	270.14(b)(19); 270.28	Section B.2 Figure B-4
306	V.A.1.*c.1.*	- scale and date	270.14(b)(19)(i)	All figures (as applicable)
307	V.A.1.*c.2.*	- 100-yr flood plain area	270.14(b)(19)(ii)	Figure B-3
308	V.A.1.*c.3.*	- surface waters (including intermittent streams and drainage ditches)	270.14(b)(19)(iii)	Figure B-5
309	V.A.1.*c.4.*	- surrounding land uses	270.14(b)(19)(iv)	Figure B-6
310	V.A.1.*c.5.*	- wind rose (may be submitted in a separate sheet)	270.14(b)(19)(v)	Figure B-7
311	V.A.1.*c.6.*	- orientation of the map (north arrow)	270.14(b)(19)(vi)	All figures (as applicable)
312	V.A.1.*c.7.*	- legal boundaries of the HWM facility	270.14(b)(19)(vii)	Figure B-6
313	V.A.1.*c.8.*	- access control (fences, gates) or surveillance equipment	270.14(b)(19)(viii)	Figure B-6
315	V.A.1.*c.10.*	- buildings	270.14(b)(19)(x)	Figure B-8
318	V.A.1.*c.13.*	- run-off control system	270.14(b)(19)(x)	Figure B-8
319	V.A.1.*c.14.*	- access and internal roads	270.14(b)(19)(x)	Figure B-8
323	V.A.1.*c.18.*	- barriers for drainage or flood control	270.14(b)(19)(xi)	Figure B-8
326	V.A.1.*c.20.a.*	- Identification of the uppermost aquifer and aquifers hydraulically interconnected beneath the facility property, including ground-water flow direction and rate, and the basis for such identification (i.e., the information obtained from hydrogeologic investigations of the facility area)	270.14(c)(2); 270.28	Section D.2 Section D.3 Section D.9
327	V.A.1.*c.20.b.*	- Delineation of the waste management units	270.14(c)(3); 270.28	Figure B-6
328	V.A.1.*c.20.c.*	- Property boundary	270.14(c)(3); 270.28	Figure B-6
329	V.A.1.*c.20.d.*	- Proposed "Point of Compliance" as defined under 264.95	270.14(c)(3); 270.28	Section D.8 Section D.9 Figure D-3 Figure D-4

TABLE A-2. APPLICABLE SECTIONS OF 40 CFR AND LOCATION IN APPLICATION
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Item Number	Section	Description	Federal Hazardous Waste Regulations at 40 CFR (*not needed for titles etc.)	Location of Information (Section)
330	V.A.1.*c.20.e.*	- Proposed location of GW monitoring wells as required under 264.97	270.14(c)(3); 270.28	Section D.9 Figure D-3
331	V.A.1.*c.21.*	- Information requirements for Solid Waste Management units: (If any of the following information has been submitted as part of the Preliminary Review Checklist, provide a reference to it here)	270.14(d)(1); 270.28	Section F
332	V.A.1.*c.21.a.*	- Location of the unit on a topographic map	270.14(d)(1)(i); 270.28	Section F
333	V.A.1.*c.21.b.*	- Designation of type of unit	270.14(d)(1)(ii); 270.28	Section F
334	V.A.1.*c.21.c.*	- General dimensions and structural description	270.14(d)(1)(iii); 270.28	Section F
335	V.A.1.*c.21.d.*	- When unit was operated	270.14(d)(1)(iv); 270.28	Section F
336	V.A.1.*c.21.e.*	- Specification of wastes that have been managed at the unit, to the extent available	270.14(d)(1)(v); 270.28	Section F
336.1	*V.A.1.c.21.f.*	- Information on release of hazardous waste or hazardous constituents; conduct and provide results of sampling and analysis of groundwater, land surface, and subsurface strata, surface water or air	270.14(d)(2) 270.14(d)(3); 270.28	Section F
629	V.F.10.*h.5.*	- A description of land treatment program as required under 264.271 that includes: the list of wastes; design and operating procedures; waste application rates and methods; control of pH; microbial enhancement/ chemical reactions; and moisture control	270.20(b)	Section C; Appendix A
633	V.F.11.	Provide unsaturated zone monitoring program addressing:	264.278; 270.20(b)(3)	Section D.8
637	V.F.11.*b.*	- Sampling location	264.278(b); 270.20(b)(3)(ii)	Section D.8
638	V.F.11.*c.*	- Background values	264.278(c); 270.20(b)(3)(v)	Section D.3
639	V.F.11.*d.*	- Sampling frequency for soil and soil-pore liquid monitoring	264.278(d); 270.20(b)(3)(i)	Section D.8
640	V.F.11.*e.*	- Sampling and analysis procedures:	264.278(e); 270.20(b)(3)(i)	Section D.7.1
641	V.F.11.*e.1.*	- Sample collection	264.278(e)(1)	Section D.7.1
642	V.F.11.*e.2.*	- Sample preservation and shipment	264.278(e)(2)	Section D.7.1
643	V.F.11.*e.3.*	- Analytical procedures	264.278(e)(3); 270.20(b)(3)(iii)	Section D.11
644	V.F.11.*e.4.*	- Chain of custody	264.278(e)(4); 270.20(b)(3)(iv)	Section D.10
645	V.F.11.*f.*	- Statistical methods	264.278(f-g); 270.20(b)(3)(vi)	Section D.11
646	V.F.12.	Demonstrate conditions met for food chain crop:	264.276; 270.20(d)	Section D.14
1175	VI.	**GEOLOGY REPORT**	*	Section B
1177	VI.A.	**Geology and Topography**	270.14; Guidance: "Sensitive Environments and the Siting of Hazardous Waste Management Facilities" (530K97003)	Section B.3

TABLE A-2. APPLICABLE SECTIONS OF 40 CFR AND LOCATION IN APPLICATION
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Item Number	Section	Description	Federal Hazardous Waste Regulations at 40 CFR (*not needed for titles etc.)	Location of Information (Section)
1179	VI.A.1.a.	- Submit or address Identification of faults, active, potentially active or inactive:	270.14(b)(11); 270.28 The information which is requested in VI.A1.a.a. through VI.A1.a.e. is not specifically identified in 270.14(b)(11); however, it may be requested by Regional Directors. (as delegated)	Section B.3
1246	VI.B.	**Facility Ground-Water**	As applicable, see 264.90(b); 270.14(c); 264.93; 264.97; Note: Much of the corrective action program is managed via guidance (reg citations are not found for all the requirement).	Section D
1247	VI.B.1.	Provide description of Regional Aquifers:	270.14(c)(2)	Section D.2
1248	VI.B.1.a.	- Aquifers and associated geologic units	270.14(c)(2)	Section D.2
1252	VI.B.1.e.	- If aquifers are hydraulically connected	270.14(c)(2)	Section D.2
1254	VI.B.1.g.	- Rate of groundwater flow, ft/yr estimated	270.14(c)(2)	Section D.2
1312	VI.B.3.c.	- Submit a proposed sampling and analysis plan, including:	270.14(c)(7)(vi)), 264.97	Section D.7 Section D.11
1313	VI.B.3.c.*1.*	- Sampling and analytical methods	264.97(d); 264.97(e); 270.14(c)(6)(iv)	Section D.7 Section D.11
1325	VI.B.3.g.	- Submit drawings depicting the monitoring well design, current and proposed	270.14(c)(3)	Section D.5
1326	VI.B.3.h.	- Submit at least one map of the entire facility on one or more 8 1/2-inch X 11-inch sheets with a scale to show:	270.14(b)(19)	Figure D-3
1327	VI.B.3.h.1.	- Monitoring well location design, current and proposed	270.14(c)(3)	Section D.5 Figure D-3
1329	VI.B.3.h.3.	- Waste management unit(s) area	270.14(b)(19)	Figure D-3
1330	VI.B.3.h.4.	- Property boundary	270.14(b)(19)	Figure D-3
1331	VI.B.3.h.5.	- Point of compliance	270.14(c)(3)	Section D.5 Figure D-3
1332	VI.B.3.h.6.	- Direction of groundwater	270.14(c)(2)	Section D.2
1359	VII.	**CLOSURE AND POST-CLOSURE PLANS**	*	Section D
1360	VII.	Submit a closure plan and/or post-closure plan, as applicable, including the following information:	270.14(b)(13); 270.28 (including unless the Regional Administrator determines that additional information from §§270.14, 270.16, 270.17, 270.18, 270.20, or 270.21 is necessary.) 264 Subpart G	Section D
1455	VII.C.	**Post-Closure**	*	Sections D and E
1458	VII.C.1.*a.*	- Monitoring activities and frequency at which they will be performed during post-closure	264.118(b)(1); 264.280(c); 264.310(b); 264.228(b); 264.258(b); 264.603; 270.21(e); 270.14(b)(13); 270.28	Section D
1469	VII.C.1.*i.1.*	- During post-closure of land treatment facilities, the owner or operator must comply with the following:	264.280(c)	Section D
1471	VII.C.1.*i.1.b.*	- Maintain vegetative cover	264.280(c)(2); 270.20(f); 270.14(b)(13); 270.28	Section D.14
1472	VII.C.1.*i.1.c.*	- Maintain run-on control system	264.280(c)(3)	Section D.14

TABLE A-2. APPLICABLE SECTIONS OF 40 CFR AND LOCATION IN APPLICATION
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Item Number	Section	Description	Federal Hazardous Waste Regulations at 40 CFR (*not needed for titles etc.)	Location of Information (Section)
1473	VII.C.1.*i.1.d.*	- Maintain run-off management system	264.280(c)(4)	Section D.14
1474	VII.C.1.*i.1.e.*	- Control wind dispersal of waste;	264.280(c)(5)	Section D.14
1475	VII.C.1.*i.1.f.*	- Continue to comply with food-chain crops prohibitions	264.280(c)(6)	Section D.14
1476	VII.C.1.*i.1.g.*	- Continue Unsaturated Zone Monitoring and Check state-specific standards. Some states may require ground water monitoring	264.280(c)(7)	Section D.8
1483	VII.D.	**Post-closure cost estimate (except state and federal facilities)**	264.144; 270.14(b)(16); 270.28	Appendix C
1492	VIII.	**FINANCIAL ASSURANCE**	264.143, 264.145; 270.14(b)(16); 270.28	Appendix C
1507	VIII.A.2.	FINANCIAL ASSURANCE FOR POST-CLOSURE CARE	264.145	Appendix C
1543	IX.	**SWMU AND CORRECTIVE ACTION**	264 Subpart F; 264.101 270.14(c)	Section F
1544	IX.	Provide status of Corrective Action	*	Section F

Notes:
grey items are part of Permit Administrative Review

40 CFR - Chapter 40 of the Code of Federal Regulations
CWA - Clean Water Act
EPA - Environmental Protection Agency
FEMA - Federal Emergency Management Agency
ft/yr - feet per year
HWM - Hazardous Waste Management
I.D. - Identification
NESHAP - National Emissions Standards for Hazardous Air Pollutants
NPDES - National Pollutant Discharge Elimination System
PSD - Prevention of Significant Deterioration
RCRA - Resource Conservation and Recovery Act
SIC - Standard Industrial Classification
SWDA - Solid Waste Disposal Act
SWMU - Solid Waste Management Unit
UIC - Underground Injection Control
yr - year

Attachment A-1 – LTU Photo Log

ATTACHMENT A-1. LTU PHOTO LOG, WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Photo 1. Land Treatment Unit (LTU) Gate

Photo 2. LTU

ATTACHMENT A-1. LTU PHOTO LOG, WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Photo 3. LTU Berm

Photo 4. LTU Warning Sign

B.0 – General Description

Western Refining Southwest LLC

(D/B/A Marathon Gallup Refinery)

Gallup, New Mexico

EPA ID# NMD000333211

JUNE 23, 2023

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B-1. Peak Discharge and Run-off Calculations, Western Refining Southwest LLC D/B/A Marathon Gallup Refinery, Gallup, New Mexico

B.0 General Description

Western Refining Southwest LLC D/B/A Marathon Gallup Refinery (Refinery) is a small crude oil refining facility located in McKinley County, New Mexico at Township 15 North, Range 15 West, Sections 28 and 33, in the northern one-third of Section 4 of the New Mexico coordinate system. The Refinery's mailing address is: Western Refining Southwest LLC D/B/A Marathon Gallup Refinery, 92 Giant Crossing Road, New Mexico 87301 and the physical address is Western Refining Southwest, Gallup Refinery, Interstate 40 (I-40), Exit 39, Jamestown, New Mexico 87347. The Refinery is located just north of I-40 at Exit 39 (approximately 17 miles east of Gallup, New Mexico) as shown on Figure B-1.

Built in the 1950s, the Refinery is located within a rural and sparsely populated area east of Gallup, New Mexico. The nearest population centers are the Pilot Flying J Travel Center refueling plaza, the I-40 corridor, and a small cluster of residential homes located on the south side of I-40 approximately 2 miles southwest of the Refinery.

The Refinery was idled indefinitely in October 2020. Post-closure of the Land Treatment Unit (LTU), as well as Area of Concern and Solid Waste Management Unit corrective action/closure (as applicable) is being performed per the 2013 Permit, as modified in 2017 and 2022 (current permit).

This document includes discussion of LTU applicability to Title 20 of the New Mexico Administrative Code, Chapter 4, Part 1.900 (Chapter 40 of the Code of Federal Regulations [CFR] 270.14(b)(19)), however, these sections are no longer applicable due to the closure of the LTU. The LTU was certified closed by the New Mexico Environment Department (NMED) on April 26, 2011.

B.1 Description of the LTU

The LTU is located within the Refinery property boundary. The primary purpose of the LTU was the degradation, transformation, or immobilization of hazardous wastes using microbial activity and soil characteristics. The LTU is approximately 1500 feet (ft) northwest of the refinery process area (Figure B-2) and is above the 100-year flood plain (Figure B-3). When operational, the LTU consisted of three 480 ft x 240 ft sections located immediately east of evaporation pond 12B. Each section was diked and contained 2.6 acres (1.0 hectare) of available treatment surface divided into three cells (Cell 1, Cell 2, and Cell 3). No hazardous waste was applied to Cell 3.

The LTU operated at the Refinery collecting hazardous waste from approximately October 10, 1980, through November 8, 1990 (DiSorbo 2020a). The top 12 inches of soil served as the Zone of Incorporation and was periodically plowed and diked to encourage aerobic microbial activity and improve chemical reaction rates. Non-hazardous waste continued to be placed in Cells 2 and 3 through February 19, 1994. A closure plan was submitted in 2000. The Refinery's 2010 post-closure permit renewal application also addressed LTU closure requirements (Western Inc. 2010). The LTU was certified closed by the NMED on April 26, 2011.

Post-closure care has been implemented at the LTU per the current permit, including the following:

1. Groundwater monitoring as specified in the current permit.
2. Corrective action as necessary to protect human health and the environment.
3. Inspection, maintenance, and repair of the vegetative cover, fencing, security signs and locks.
4. Maintenance of training, operating, inspection, monitoring, and other required records.

With the exception of the addition of soil nutrients during maintenance activities, no hazardous waste, non-hazardous waste, refinery waste, or other material has been nor will be applied to the LTU since its closure.

B.2 Topographic Maps

The maps identified in this section demonstrate compliance with 40 CFR 270.14(b)(19). These sections are included to provide details and figures from the 2010 post-closure Resource Conservation and Recovery Act renewal application. All maps clearly show a map scale, date, and north arrow.

B.2.1 Legal Boundaries and Access Control

The topographic map of the Refinery (Figure B-4) shows the legal boundaries of the Gallup Refinery, access control features (e.g., fences, gates) and location of the LTU. As shown on the topographic map, the nearest property line is approximately 1,000 ft from the LTU perimeter.

B.2.2 Surface Waters and Wells

Floodplain information is provided on Figure B-3 and in Section B.4. Surface waters and wells are shown on Figure B-5. In the event of a 100-year flood, water is diverted away from the LTU via surrounding berms, grading, and natural topography.

B.2.3 Surrounding Land Uses

The Refinery is located within a rural and sparsely populated section of McKinley County. The setting is a high desert plain on the western slope of the continental divide. The nearest population centers are the Pilot (formerly Giant) Travel Center refueling plaza, the I-40 highway corridor, and a small cluster of residential homes located on the south side of I-40 approximately 2 miles south of the Refinery. The surrounding land (as shown in Figure B-6) is comprised primarily of public lands and is used for cattle and sheep grazing. McKinley County is predominantly rural, as are the adjoining portions of neighboring counties.

When in operation, the Refinery maintains residences for several employees approximately 0.5 mile south of the refinery process area. A truck stop is located within one mile south-southwest of the process area at I-40 exit 39. A rural residential area, Whispering Cedars, with a density of eight to 10 residents per square mile is about 2 miles south of the refinery. A railroad is within two miles to the north; the small community of lyanbito (approximately 1,200 people) (US Census Bureau 2021), is within three miles to the northwest; the Fort Wingate Military Reservation is within six miles to the west and the Cibola National Forest is within two miles to the southwest. The largest residential community near the Refinery is the city of Gallup, New Mexico, which is 17 miles west of the Refinery.

B.2.4 Wind Rose

Wind rose data for Gallup, New Mexico (17 miles west of the Refinery) is shown on Figure B-7. Surface winds at the Refinery vary throughout the year. Wind speeds are strongest from March through May and are weakest in November. The strongest winds are generally west-southwest. Winds from March to October decrease linearly in average speed from 50 to 10 miles per hour.

B.2.5 Structures

Runoff control systems, barriers for drainage or flood control, access and internal roads, storm systems, and fire control facilities are shown on Figure B-8. Most structures have been idled since the indefinite idled status. Buildings include the laboratory building, the boiler house, the warehouse and maintenance shop area, and several office buildings near the entrance to the Refinery.

B.3 Seismic Standard

McKinley County, New Mexico, is not listed in Appendix VI of 40 CFR Part 264. Compliance with the seismic standard does not need to be demonstrated.

B.4 Floodplain Standard

In accordance with 40 CFR 270.14(b)(11)(iii), the 100-year floodplain is shown on Figure B-3. The LTU lies outside the 100-year floodplain boundary.

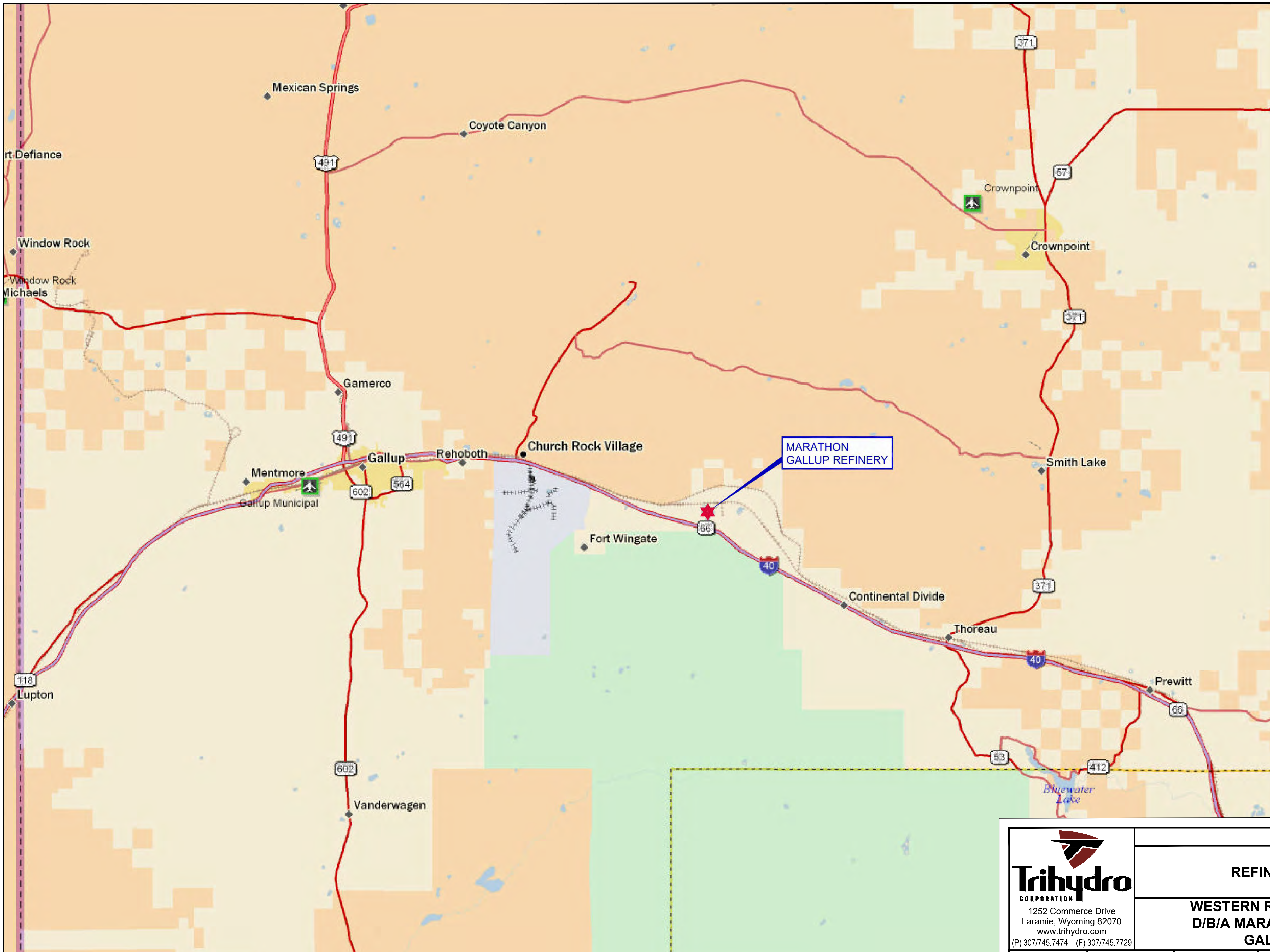
Figure B-3 shows the drainage areas and 100-year floodplain relative to the Refinery and the LTU. The drainage area, which flows northwest of the LTU, includes 6,965 acres south of I-40 draining through Four Mile Canyon. Existing drainage control structures at I-40 are three 10 ft x 12 ft concrete box culverts and one 6 ft x 7 ft concrete box culvert. The 100-year peak flow at these points (Table B-1) totals 3,175 cubic ft per second (cfs). After passing east of the Refinery, the drainage turns west (bounded on the north by the railroad bed) and flows past the refinery at 3,607 cfs. Existing drainage channels can contain the 100-year event within the areas delineated on Figure B-8. The 100-year floodplain is approximately 300 ft south of the railroad track and is adjacent to the northeast end of the Refinery landing strip. Table B-1 provides additional detailed floodplain information.

Approximately 2,572 acres drain 1,800 ft to the southwest of the Refinery. These flows originate south of I-40 and peak at 700 cfs for the 100-year event. Existing drainage control structures for Refinery roads and the evaporation ponds divert the 100-year flows away from the refinery, as shown on Figure B-3. These estimates were completed by Delta H Engineering, LTD in 1983 and were carried over from previous permit applications (Delta 1983). There have been no major drainage changes to the Refinery or area.

B.5 Traffic

Roads are asphalt paved, with the exception of the section starting from the sewage lagoon west to the LTU. During post-closure, an estimated 52 trips per year by vehicle are expected for the LTU maintenance and monitoring. The LTU is inspected weekly for any required maintenance. If maintenance is required additional trips are made. The LTU is an isolated area and restricted to personnel involved with the maintenance and monitoring activities. Vehicle access to the LTU requires entry through the Refinery process area.

Figures



N

0 5 MILES

M:\TON\MARATHON\CADD\GALLUP_REPORTS\RCRAPERMITAPP\202303\697-RCRA-PA-SITELOC-2007

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FIGURE B-1

REFINERY LOCATION MAP

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: KML	Checked By: CF	Scale: 1" = 5 MILES	Date: 5/7/2023	File: 697-RCRA-PA-SITELOC-2007

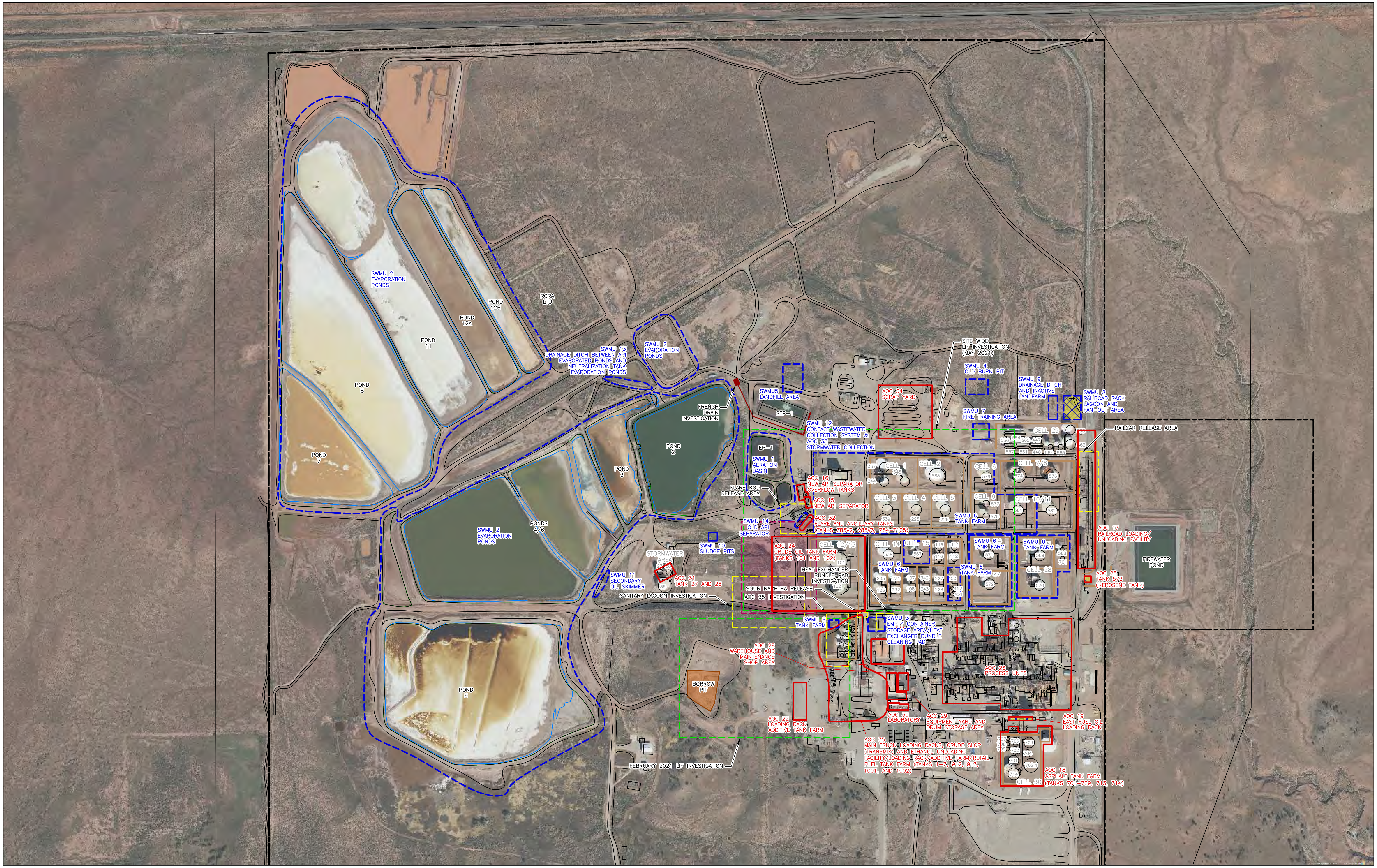

Image Cite: DigitalGlobe © CNES (2022) Distribution Airbus DS © Microsoft Corporation, BING Imagery

EXPLANATION

- PROPERTY BOUNDARY (APPROXIMATE)
- AOC LOCATION
- SWMU LOCATION
- FRENCH DRAIN
- RELEASE AREA
- LIF (LASER INDUCED FLUORESCENCE)
- BORROW PIT (APPROXIMATE)
- HYDROCARBON SEEP AREA
- CORRECTIVE ACTION COMPLETE WITHOUT CONTROLS

NOTE:

THE FOLLOWING WORK INVESTIGATIONS ARE COMPLETED SITE WIDE: GROUNDWATER MONITORING, FENCELINE MONITORING, WEEKLY ON-SITE SUPPORT.

WARNING
IF THIS BAR DOES NOT MEASURE 1" THEN THIS DRAWING IS NOT TO SCALE

N

0 400' 800'

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FIGURE B-2

REFINERY MAP

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: KML	Checked By: CF	Scale: 1" = 400'	Date: 3/23/2023	File: 697-RCRA-PA-REFINERYMAP

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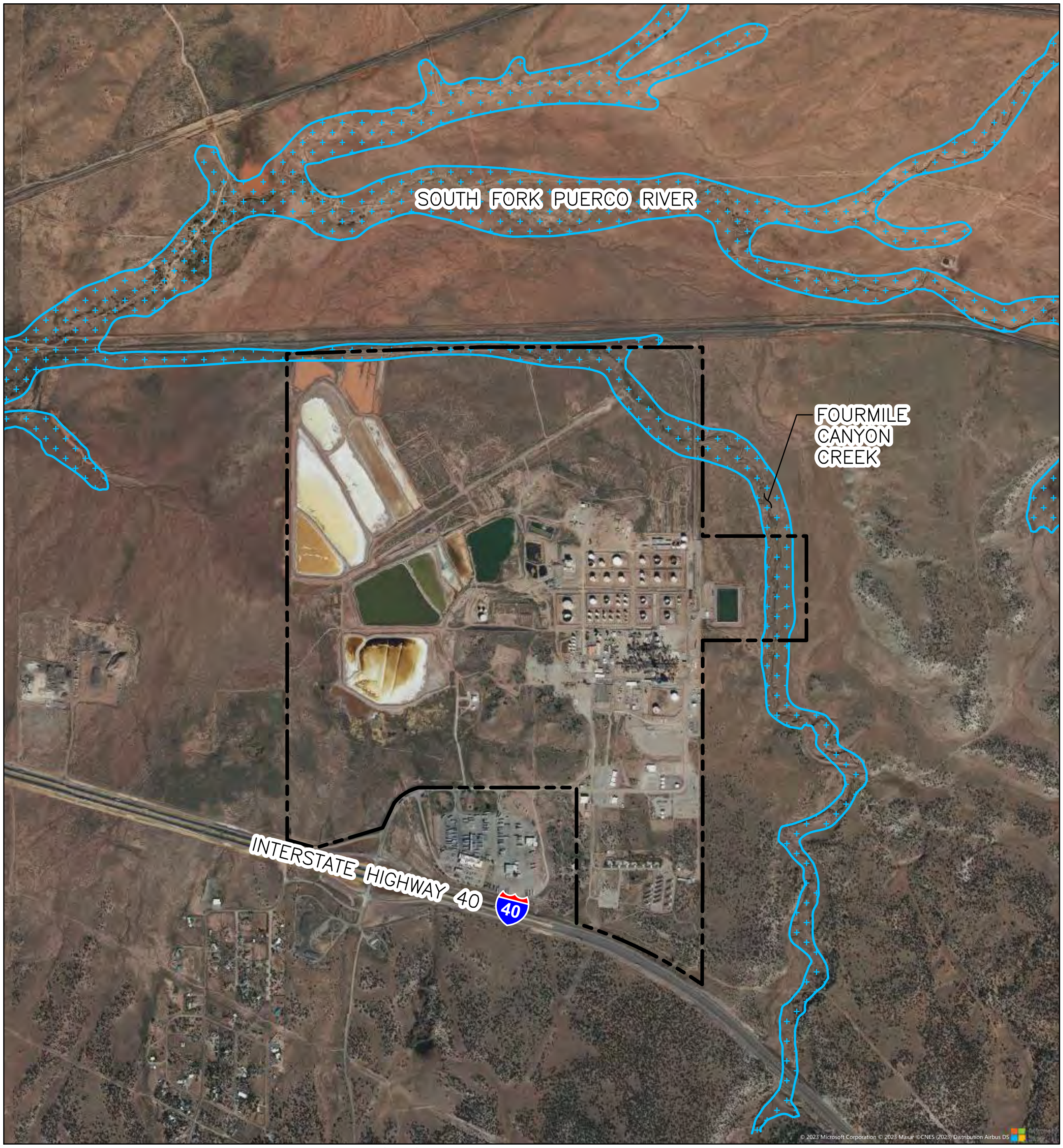

Flood Data Source: Federal Emergency Management Agency (FEMA) Mitigation Division National Flood Insurance Program, Circa 2007

EXPLANATION

INTERSTATE HIGHWAY

PROPERTY BOUNDARY

1% ANNUAL CHANCE FLOOD (100-YEAR FLOOD)

N

0 2,000'

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FIGURE B-3

100-YEAR FLOODPLAIN MAP

WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 2,000'	Date: 4/10/2023	File: 697-RCRA-PA-100YRFLOODPLAN

M:\TON\MARATHON\CADD\GALLUP_REPORTS\RCRAPERMITAPP\202303\697-RCRA-PA-100YRFLOODPLAN

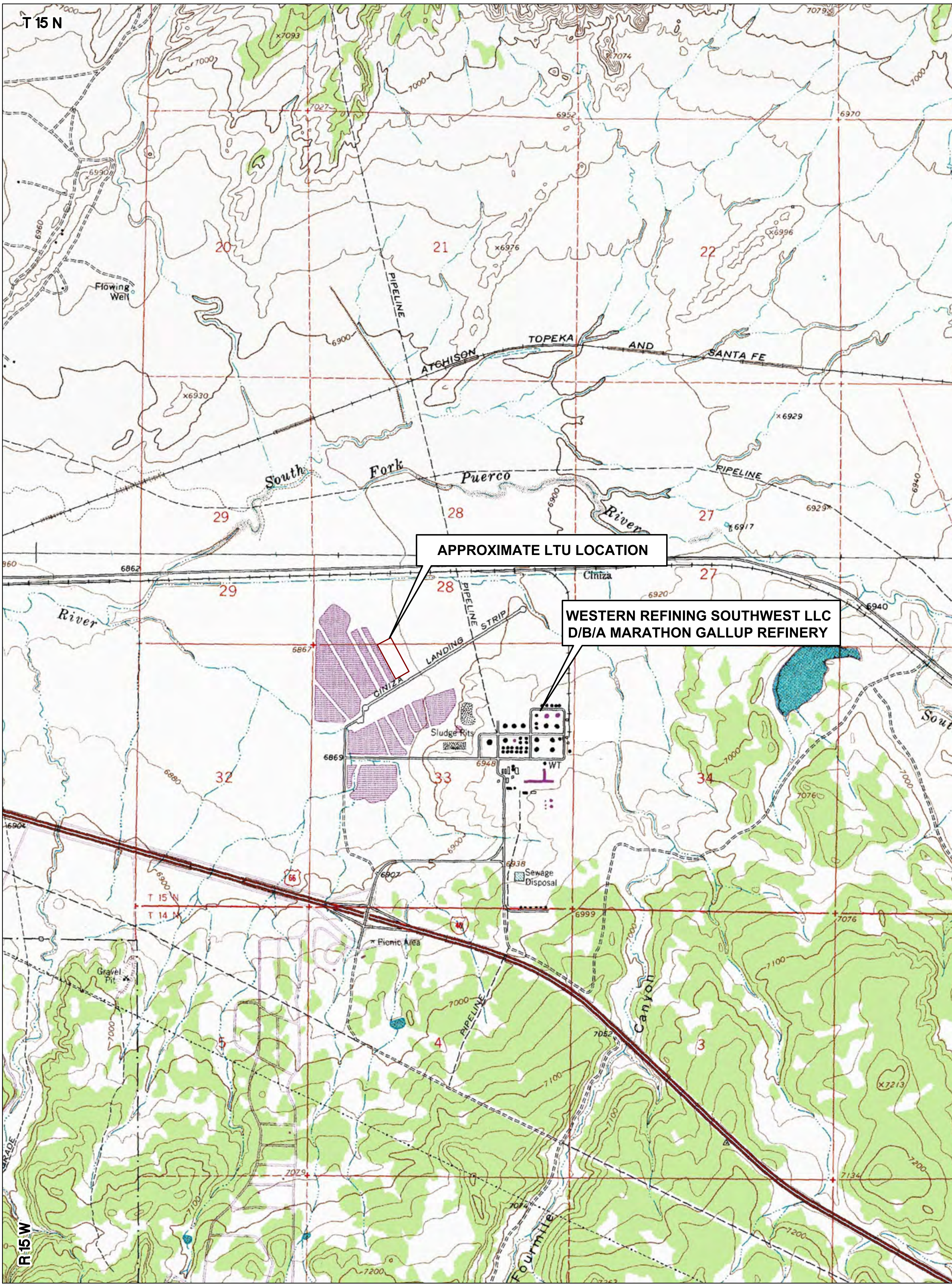
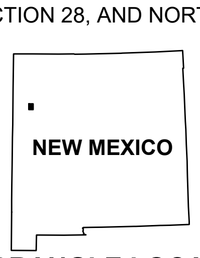


Image Cite: U.S. Geological Survey, 1:24,000–Scale 7.5 Minute Digital Raster Graphic Quadrangle, McKinley County, Publication: 2004

NOTE:
SITE LEGAL DESCRIPTION - TOWNSHIP 15 NORTH, RANGE 15 WEST, SECTION 33, LOWER QUARTER SECTION 28, AND NORTHEAST QUARTER SECTION 4.



QUADRANGLE LOCATION

N

0 2,000'

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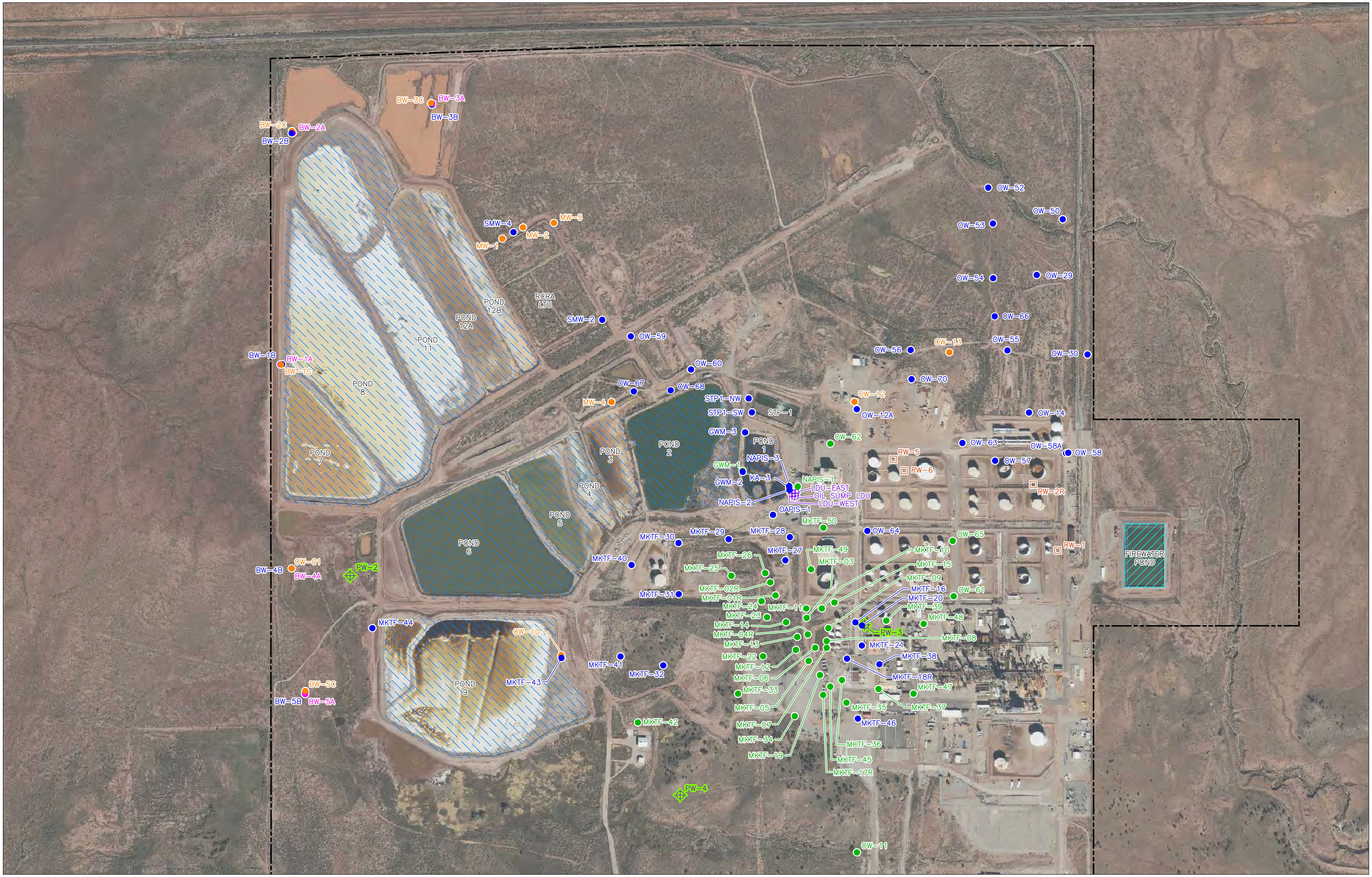
FIGURE B-4

REFINERY LOCATION AND TOPOGRAPHIC MAP

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: KML	Checked By: CF	Scale: 1" = 2,000'	Date: 3/20/2023	File: 697-RCRA-PA-TOPOMAP

M:\TON\MARATHON\CADD\GALLUP_REPORTS\RCRAPERMITAPP\2023\03\697-RCRA-PA-TOPOMAP



M:\TON\MARATHON\CADD\GALLUP_REPORTS\RCRAPERMITAPP\2023\697-RCRA-PA-SURFWATER

EXPLANATION

- BW-5A ALLUVIAL/FLUVIAL UPPER SAND AQUIFER MONITORING WELL AND DESIGNATION
- BW-5B CHINLE/ALLUVIUM AQUIFER MONITORING WELL AND DESIGNATION
- MKTF-14 SPH MONITORING WELL AND DESIGNATION (BASED ON THRID QUARTER SPH DATA)
- BW-5C SONSELA AQUIFER MONITORING WELL AND DESIGNATION
- PW-4 RAW WATER PRODUCTION WELL AND DESIGNATION
- RW-6 RECOVERY WELL AND DESIGNATION
- LDU-EAST LEAK DETECTION UNIT AND DESIGNATION

- FIREWATER POND
- EVAPORATION POND (MAY CONTAIN REFINERY WASTEWATER)
- PROPERTY BOUNDARY (APPROXIMATE)
- LDU LEAK DETECTION UNIT
- LTU LAND TREATMENT UNIT
- SPH SEPARATE PHASE HYDROCARBON

NOTE:
LDU-EAST, LDU-WEST, OIL SUMP LDU, STP-1 TO EP-2, AND ALL PONDS ARE SURFACE WATER SAMPLE LOCATIONS.

N

0 400' 800'

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FIGURE B-5

EVAPORTION PONDS, FIREWATER POND, AND MONITORING WELLS

**WESTERN REFINING SOUTHWEST LLC
MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO**

Drawn By: KML	Checked By: CF	Scale: 1" = 400'	Date: 5/18/2023	File: 697-RCRA-PA-SURFWATER

EXPLANATION

INTERSTATE HIGHWAY

EXISTING FENCE

PROPERTY BOUNDARY

N

0 1,000'

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FIGURE B-6

REFINERY AND SURROUNDING LAND USES

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 1,000'	Date: 4/10/2023	File: 697-RCRA-PA-SURLANDUSEMAP

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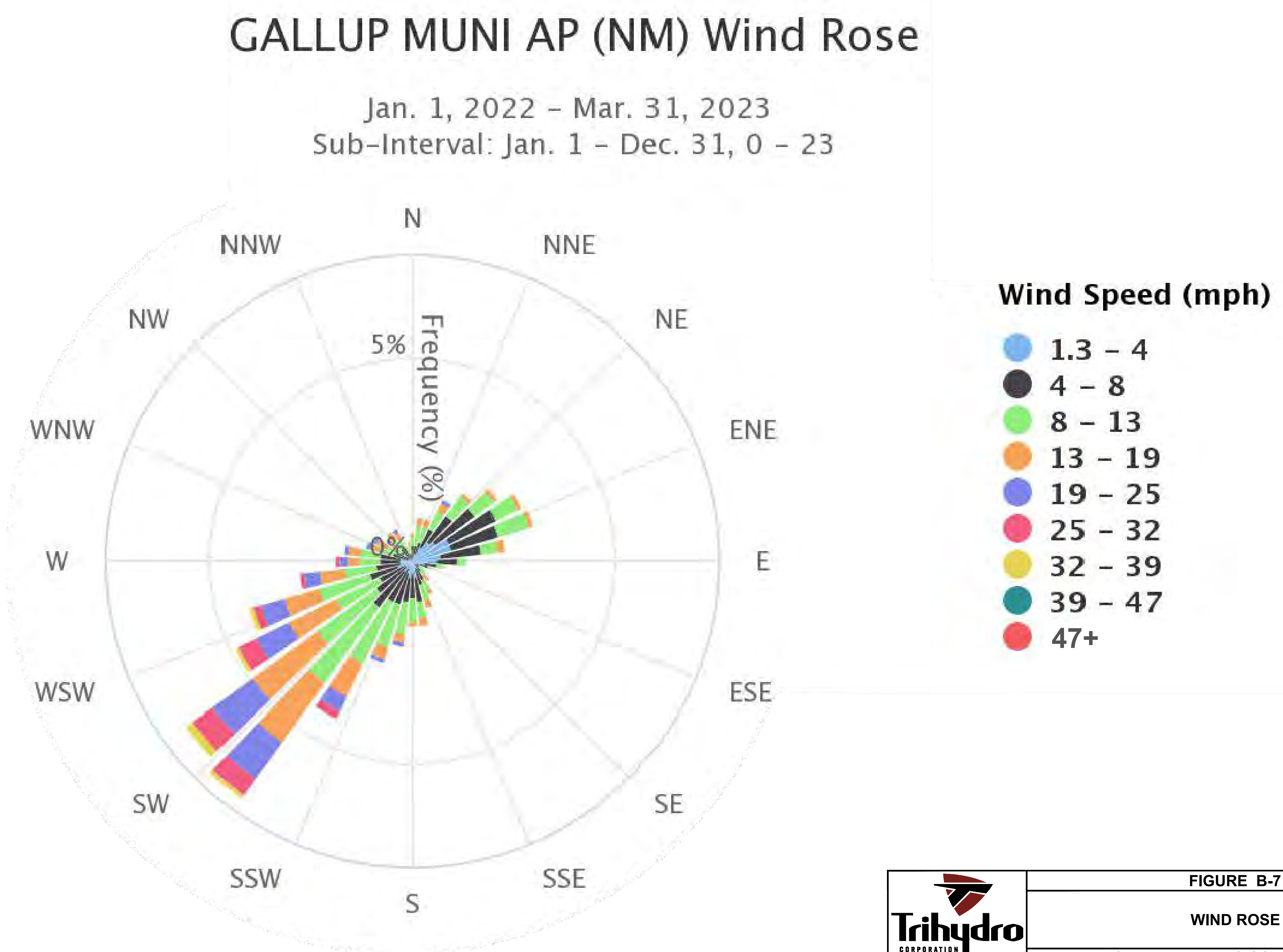
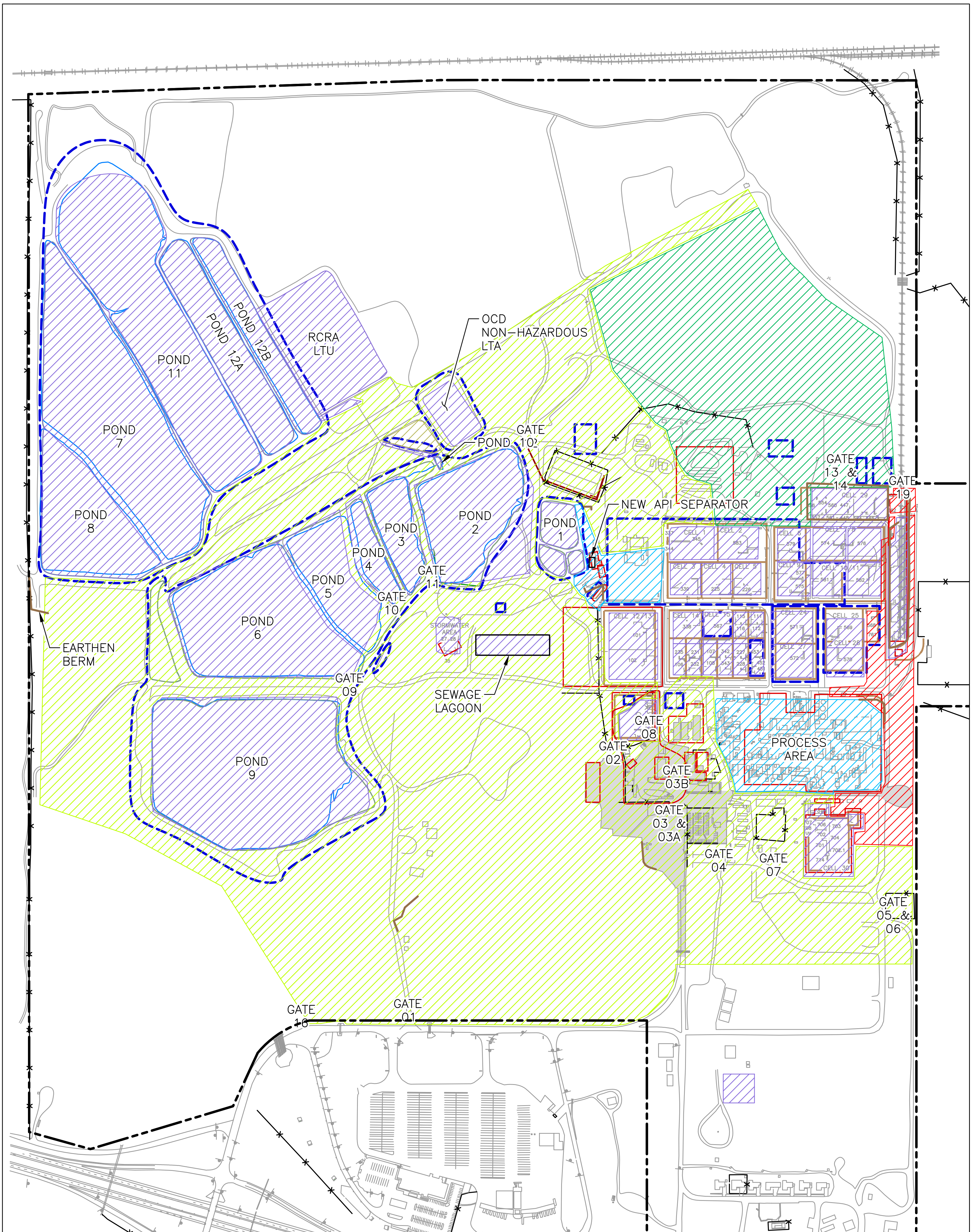


M:\TON\MARATHON\CADD\GALLUP_REPORTS\RCRAPERMITAPP\202303\697-RCRA-PA-WINDROSE

Trihydro CORPORATION 1252 Commerce Drive Laramie, Wyoming 82070 www.trihydro.com (P) 307/745.7474 (F) 307/745.7729	FIGURE B-7 WIND ROSE WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: NONE	Date: 5/15/2023	File: 697-RCRA-PA-WINDROSE



EXPLANATION

- NEW FACILITY BOUNDARY
- EARTHEN BERM
- CONTAINED/BERMED AREA, NO STORMWATER RUN OFF DISCHARGED TO ANOTHER POINT
- AREA CONTRIBUTING FLOW TO OUTFALL 2
- DRAINS TO GRASSY AREA, DOES NOT LEAVE SITE
- NEW STORMWATER COLLECTION BASIN
- AREA CONTRIBUTING FLOW TO OUTFALL 1
- PROCESS AREA, STORMWATER DRAINS TO POND 1
- IMPERVIOUS SURFACE

NOTE:

IMPERVIOUS AREAS ARE IDENTIFIED FOR DISCHARGING AREAS ONLY. IMPERVIOUS SURFACES WITHIN AREAS WHERE STORMWATER DOES NOT DISCHARGE HAVE NOT BEEN IDENTIFIED, CONSIDERING THESE AREAS DO NOT PRODUCE REGULATED STORMWATER DISCHARGES.

N

0 600'

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FIGURE B-8

REFINERY STRUCTURES AND STORMWATER CATCH BASINS

WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY GALLUP, NEW MEXICO

Drawn By: REP	Checked By: MS	Scale: 1" = 600'	Date: 4/16/2023	File: 697-RCRA-PA-STRMCTCHBASIN

M:\TON\MARATHON\CADD\GALLUP_REPORTS\RCRAPERMITAPP\202303\697-RCRA-PA-STRMCTCHBASIN

Tables

TABLE B-1. PEAK DISCHARGE AND RUNOFF CALCULATION
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Reference	**Chapter 2 - Engineering Field Manual for Conservation Practices: USDA, Soil Conservation Service**
Location	Area NW, Four Mile Canyon, Gallup Refinery, Gallup, New Mexico
Soil and Cover	Subarea I, B/C soil, 75 percent cover, good condition, Ponderosa Pine
Date:	December 15, 1983
Purpose:	100-year floodplain at Gallup Refinery, Gallup New Mexico

Variable	**Value**	**Units**
Drainage Area **(A)**	5071	acres
Length **(L)**	20000	feet
Elevation Differences **(H)**	900	feet
Runoff Curve Number **(CN)**	58	unitless
Time of Concentration **(Tc)**	8.82	hours
Rainfall, 24-hour / 100 year event **(P24)**	2.8	inches
Direct Runoff **(Q)**	0.3	inches
Distribution Curve Number **(DC)**	70	unitless
Runoff Rate **(R)**	0.84	cubic feet per second/acre inches

Calculations:

Peak Discharge **(q)**	**= A*Q*R**	1278	cubic feet/second
Runoff Volume **(v)**	**= A*Q/12**	127	acre-feet

Notes:

Delta H Engineering, LTD., 1983

TABLE B-1. PEAK DISCHARGE AND RUNOFF CALCULATION
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Reference	**Chapter 2 - Engineering Field Manual for Conservation Practices: USDA, Soil Conservation Service**
Location	Area NW, Four Mile Canyon, Gallup Refinery, Gallup, New Mexico
Soil and Cover	Subarea II, B/C soil, 50 percent cover, mountain brush and juniper grass
Date:	December 15, 1983
Purpose:	100-year floodplain at Gallup Refinery, Gallup New Mexico

Variable		**Value**	**Units**
Drainage Area **(A)**		1894	acres
Length **(L)**		17000	feet
Elevation Differences **(H)**		200	feet
Runoff Curve Number **(CN)**		65	unitless
Time of Concentration **(Tc)**		1.3	hours
Rainfall, 24-hour / 100 year event **(P24)**		2.8	inches
Direct Runoff **(Q)**		0.4	inches
Distribution Curve Number **(DC)**		70	unitless
Runoff Rate **(R)**		0.55	cubic feet per second/acre inches
Calculations:			
Peak Discharge **(q)**	**= A*Q*R**	1895	cubic feet/second
Runoff Volume **(v)**	**= A*Q/12**	3175	acre-feet[1]

Notes:

Delta H Engineering, LTD., 1983

[1]Calculations indicate approximate number as 63 acre-feet, Becnhmark 1998.

TABLE B-1. PEAK DISCHARGE AND RUNOFF CALCULATION
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Reference	**Chapter 2 - Engineering Field Manual for Conservation Practices: USDA, Soil Conservation Service**
Location	Area NW, Four Mile Canyon, Gallup Refinery, Gallup, New Mexico
Soil and Cover	Subarea III, B/C soil, 50 percent cover, herbaceous and mountain brush
Date:	December 15, 1983
Purpose:	100-year floodplain at Gallup Refinery, Gallup New Mexico

Variable		**Value**	**Units**
Drainage Area **(A)**		1028	acres
Length **(L)**		14000	feet
Elevation Differences **(H)**		2500	feet
Runoff Curve Number **(CN)**		70	unitless
Time of Concentration **(Tc)**		0.95	Hours
Rainfall, 24-hour / 100 year event **(P24)**		2.8	inches
Direct Runoff **(Q)**		0.6	inches
Distribution Curve Number **(DC)**		70	unitless
Runoff Rate **(R)**		0.7	cubic feet per second/acre inches
Calculations:			
Peak Discharge **(q)**	**= A*Q*R**	432	cubic feet/second
Runoff Volume **(v)**	**= A*Q/12**	51.4	acre-feet

Notes:

Delta H Engineering, LTD., 1983

TABLE B-1. PEAK DISCHARGE AND RUNOFF CALCULATION
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Reference	**Chapter 2 - Engineering Field Manual for Conservation Practices: USDA, Soil Conservation Service**
Location	Area SW, immediately west of Four Mile Canyon, Gallup Refinery, Gallup, New Mexico
Soil and Cover	B/C soil, 60 Ponderosa Pine, 40 percent mountain brush
Date:	December 15, 1983
Purpose:	100-year floodplain at Gallup Refinery, Gallup New Mexico

Variable	**Value**	**Units**
Drainage Area **(A)**	2572	acres
Length **(L)**	22000	feet
Elevation Differences **(H)**	690	feet
Runoff Curve Number **(CN)**	64	unitless
Time of Concentration **(Tc)**	1.0	Hours
Rainfall, 24-hour / 100 year event **(P24)**	2.8	inches
Direct Runoff **(Q)**	0.4	inches
Distribution Curve Number **(DC)**	70	unitless
Runoff Rate **(R)**	0.68	cubic feet per second/acre inches

Calculations:

Peak Discharge **(q)**	**= A*Q*R**	700	cubic feet/second
Runoff Volume **(v)**	**= A*Q/12**	86	acre-feet

Notes:

Delta H Engineering, LTD., 1983

C.0 – Land Treatment Unit History

Western Refining Southwest LLC

(D/B/A Marathon Gallup Refinery)

Gallup, New Mexico

EPA ID# NMD000333211

JUNE 23, 2023

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C.3 Operating Procedures 4
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C.0 Land Treatment Unit Program History

In August 1980, Western Refining Southwest LLC D/B/A Marathon Gallup Refinery (Refinery), owned by Shell Oil at the time, notified the United States Environmental Protection Agency (USEPA) that it was a generator and operator of a hazardous waste treatment facility. In November 1980, the Refinery submitted a Part A permit application as an "existing facility" (defined in Chapter 40 of the Code of Federal Regulations [CFR] Part 264.10). This granted the Refinery interim status for their Land Treatment Unit (LTU) operations. The purpose of the LTU was the degradation, transformation, or immobilization of hazardous wastes generated at the facility. Over time, microbial activity occurring in the soil, enhanced with application of fertilizer, degraded the hazardous constituents in the waste.

The LTU is approximately 1,500 feet (ft) northwest of the refinery process area and consists of three 480 ft x 240 ft sections, as shown on Figure C-1. In response to a notice from the Regional Administrator, the Refinery submitted a Part B permit application in December 1983. Based on revised guidance, the Refinery submitted a land treatment demonstration plan (LTD) and an application for a two-phase LTD permit in April 1985. On February 9, 1987, the Refinery was issued a short-term LTD Permit (NMD000333211-1) to conduct a hazardous waste land LTD. The LTD was conducted to identify the land treatment capabilities for refinery waste generated by the Refinery. The LTD defined waste management parameters (e.g., rate limiting constituent, application limiting constituent, capacity limiting constituent, and unit life of the LTU). This was accomplished by identifying the Principal Hazardous Constituents present in refinery waste streams and measuring their degradation, transformation, and immobilization in the treatment zone (TZ) of the LTU.

From the results of the LTD and 1983 Part B permit application, the Refinery was issued a Hazardous Waste Facility Permit (NMD 000333211-2) on November 4, 1988, which established operational requirements for the LTU (NMEID 1988). These requirements included procedural and engineering controls necessary to ensure that hazardous constituents were fully treated within the LTU without uncontrolled release to the environment. The LTU received hazardous wastes from October 10, 1980, to November 8, 1990, and non-hazardous waste between 1990 and 1994. No waste has been added to the LTU since 1994 (DiSorbo 2020). A closure plan was submitted in 2000 as part of the hazardous waste permit renewal application. The New Mexico Environment Department (NMED) issued a Resource Conservation and Recovery Act (RCRA) Post-Closure Permit (Permit No. NM000333211) on October 31, 2013 (with an effective date of December 2, 2013), and the LTU was certified closed by the NMED on April 26, 2011.

Additional details regarding the historical LTU operations and operating data extracted from existing permit applications, operating permits, operating records, and other source documents were previously provided in the 2000 hazardous waste permit renewal application (Giant 2000). A summary is provided below in sections C.2, and C.3, however, per 40 CFR 270.28, the summary below is not required as part of a post-closure permit application but is provided herein for context.

C.1 Treatment Zone Description

The LTU consists of three 480 by 240 ft sections, each of which contains 2.6 acres (1.0 hectares) of available treatment surface. Each section is delineated by a continuous dike to prevent run on and run off. The TZ extended 5 ft deep from the top of the soil within the dike section. The top 12 inches (in.) of the TZ is the zone of incorporation (ZOI). The ZOI was tilled when the LTU was operational to encourage aerobic degradation of organics and to maintain moisture content of the soil. This left 4 ft of the TZ undisturbed.

The soil within the TZ is silty clay with a saturated hydraulic conductivity rating of "moderately low" by the United States Department of Agriculture Class (Giant 1984). The silty clay has a high cation exchange capacity (CEC). The CEC is the total amount of exchangeable cations that the soil has to exchange with cations in the soil solution. The exchangeable cations in the LTU were the heavy metals present in the wastes. The high CEC results in high sorption of heavy metals in the LTU soils, assuming other factors (such as soil pH) were favorable.

C.2 Chemical and Physical Properties of Wastes Treated at Former LTU

The LTU operating permit authorized the land treatment of the following waste types: D001 (ignitable waste) at a maximum of 50 tons annually; D007 (ignitable waste) at a maximum of 5 tons annually; K049 (slop oil emulsion solids) at a maximum of 200 tons annually; K050 (heat exchanger bundle cleaning sludge) at a maximum of 15 tons annually; K051 (American Petroleum Institute [API] separator sludge) at a maximum of 1,000 tons annually and K052 (leaded tank bottoms). The Refinery treated refinery sludge associated with said USEPA hazardous waste numbers at the LTU in accordance with the operating permit until November 8, 1990 (NMED 2017a). During its operational life, the Refinery treated approximately 2,600 tons of hazardous waste at the LTU. The Refinery sludge treated at the LTU was generally viscous oil-water-solid mixtures. Appendix A of this application for renewal of the post-closure permit describes the chemical and physical properties of the hazardous waste steams historically treated at the LTU. The Refinery maintains laboratory reports detailing the chemical and physical analysis of representative samples of the waste applied to the LTU during its operation.

C.3 Operating Procedures

Approved waste streams applied to the LTU were managed so that annual hazardous waste volumes did not exceed the 1,270 tons authorized by the operating permit (NMEID 1988). The volume of each waste stream placed in the LTU was also monitored to ensure that annual application limits for each waste stream were not exceeded.

Wastes were collected from the Refinery using a vacuum truck or through mechanical methods and containerized within the vacuum truck or drums. Wastes were transported to the LTU via the vacuum truck or flatbed truck. All vehicles contaminated with LTU soils and wastes were washed sufficiently to prevent contamination from being transported to uncontaminated areas. Contaminated rinse water was either routed to the Refinery's API separator or spread on the LTU. Wastes were applied uniformly to the LTU to prevent pooling on the surface. No hazardous wastes were ever applied to Cell 3.

Wastes were distributed over the treatment area surface so as not to exceed 10 percent by weight of oils and greases anywhere with the ZOI and the top 12 in. of soil were tilled twice following waste application to ensure vertical distribution. During degradation season (April through October) Cells 1, 2, and 3 of the LTU were tilled at least once per month to enhance microbial and chemical degradation of the waste.

To protect microbial viability, treatment maintenance parameters (e.g., oil and grease, pH, moisture content) were monitored to ensure that said parameters did not exceed acceptable ranges. If acceptable ranges were exceeded, activities such as reduction in waste loading rates or addition of fertilizer, lime, acid, or moisture were conducted to maintain proper treatment. Refinery personnel inspected the LTU weekly to ensure compliance with the Hazardous Waste Facility Permit (No. NMD 0000333211-2) (NMEID 1988).

C.4 LTU Closure

In correspondence dated February 14, 2011, the NMED required submittal of a certification of closure for the LTU in accordance with Title 20 of the New Mexico Administrative Code (NMAC) Chapter 4, Section 1.500 (40 CFR 264.115). Said certification was required prior to NMED issuing the post-closure care (PCC) permit that was being drafted at the time.

Accordingly, the Refinery contracted Gannett Fleming West, Inc. (GFW) to prepare a closure certification for the LTU. GFW relied on available documents, including the LTU closure criteria in the *"RCRA Part A and Part B Post-Closure Permit Application, Land Treatment Unit, Giant Refining Company Gallup Refinery",* dated May 2000, LTU soil monitoring reports, and a site inspection conducted on March 2, 2011.

On March 10, 2011, GFW filed a Request for Public Records with the NMED to seek any documents after May 2000 that might relate to the LTU closure. A response to this request was received on March 21, 2011. Although several post-2000 documents were identified, no documents relevant to the closure requirements beyond what was specified in May 2000 were found. Therefore, GFW assumed that the May 2000 closure criteria were still in effect at the time of actual LTU closure and a closure certification was prepared and submitted to NMED on April 4, 2011 (GFW 2011). The closure certification was based on conditions encountered during the 2011 site visit and was approved by NMED on April 26, 2011 (NMED 2011a). PCC began in 2000 and per the 2013 Permit, as modified in 2017 and 2022, is required through 2029.

C.5 Waste Management After LTU Closure

Subsequent to the LTU closure, the Refinery manages all hazardous wastes according to 20 NMAC 4.1.300 (40 CFR 262). These wastes are shipped off-site to approved treatment, storage, and disposal facilities for treatment and disposal. No hazardous wastes are stored for more than 90 days pursuant to 20 NMAC 4.1.300 (40 CFR 262).

The Refinery has historically operated as a large quantity generator and managed hazardous waste in accordance with 40 CFR 262. Since the Refinery has become idled, the Refinery's hazardous waste generation is now less than 1,000 kilograms per month.

Figure

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EXPLANATION

- APPROXIMATE LAND TREATMENT UNIT BOUNDARY
- MAJOR GRID
- MINOR GRID

NOTE:

SAMPLED GRIDS ARE DETERMINED USING RANDOM.ORG RANDOM INTEGER GENERATOR.

N

0 ~40' ~80'

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FIGURE C-1

LAND TREATMENT UNIT

**WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO**

Drawn By: REP	Checked By: GP	Scale: 1" = ~40'	Date: 5/4/2023	File: 697-RCRA-PA-LTU-GRID

D.0 – Post-Closure Care Plan

Western Refining Southwest LLC

(D/B/A Marathon Gallup Refinery)

Gallup, New Mexico

EPA ID# NMD000333211

JUNE 23, 2023

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D.1 Introduction

D.1.1 Overview

Western Refining Southwest LLC D/B/A Marathon Gallup Refinery (Refinery) historically operated the Resource conservation and Recovery Act (RCRA) permitted Land Treatment Unit (LTU) for management of hazardous and non-hazardous waste. The LTU was certified closed by the New Mexico Environment Department (NMED) on April 26, 2011, per Chapter 40 of the Code of Federal Regulations (CFR) 264 Subpart G and is currently in the post-closure care period.

In accordance with 40 CFR 270.14(b)(13), the Refinery has included this Post-Closure Care Plan (PCCP) as part of the RCRA Part B Permit Renewal Application (Renewal Application). This PCCP details the maintenance, monitoring, and recordkeeping activities at the LTU during the post-closure period, and includes the following information as required under 40 CFR 264.118:

- Soil and groundwater monitoring activities and frequencies
- Maintenance and inspection activities and the frequencies that they will be performed, and
- Refinery contact information and recordkeeping procedures.

Since closure, the Refinery has implemented a PCCP for the LTU in accordance with requirements of Title 20 of the New Mexico Administrative Code (NMAC) Chapter 4 Section 1.900 (40 CFR 264.118, 270.14 and 270.20). The Refinery previously submitted the post-closure monitoring plan as part of the 2010 Renewal Application (Appendix E; Western Inc. 2010), which in turn informed the requirements in Section III and Appendix D of the 2013 Permit, as modified in 2017 and 2022 (current permit) (Permit No. NM000333211). As described in Table A-1 of this Renewal Application, the Refinery is requesting that NMED consider incorporating this updated PCCP incorporated by reference as part of Appendix D of the renewal permit. Per 40 CFR 264.118(a), the approved post-closure plan becomes a condition of any RCRA permit issued.

The post-closure care (PCC) monitoring program at the LTU consists of two types of environmental monitoring activities, which will continue over the remainder of the PCC period.

1. Detection monitoring in the unsaturated zone as required by 20 NMAC 4.1.500 (40 CFR 264.280(a)(7)): the purpose of detection monitoring in soil below the former treatment zone (TZ) is to discern whether migration of hazardous constituents from the TZ has occurred.
2. Detection monitoring in the groundwater at the point of compliance to protect human health and environment as required by 20 NMAC 4.1.500 (40 CFR 264.98): the purpose of detection monitoring is to evaluate conditions of groundwater quality around the LTU. The uppermost aquifer beneath the LTU is the Sonsela, which is a confined aquifer that generally flows to the north/northeast under the LTU. Detection monitoring will yield samples that represent the quality of groundwater hydraulically up-gradient and down-gradient of the LTU

passing the point of compliance. Per the current permit Appendix D, the point of compliance is a vertical subsurface located at the hydraulically downgradient limit of the LTU that extends down into the uppermost aquifer underlying the unit.

Maintenance activities for the LTU include maintenance of the vegetative cover, control of run-on and run-off, upkeep of signage, upkeep of fencing, and control of wind dispersal (dust suppression).

Additional applicable post-closure requirements (i.e., security, hazard preparedness, etc.) of 40 CFR Subpart C are included in Section E of the Renewal Application.

D.1.2 Post-Closure Care Period

The PCC period is set by 40 CFR 264.117(a)(1) as thirty (30) years from the date of closure of the hazardous waste management unit. Per the current Permit, the PCC period is from 2000 to 2029 and the first sampling event (9th year of PCC) was conducted in 2009. The second sampling event (19th year of PCC) was conducted in 2018. The third sampling event (30th year of PCC) is scheduled to be completed in 2029.

As previously discussed in Section C of this Renewal Application, the closure criteria were met for the LTU under the 2000 RCRA Permit Application (Giant 2000). The closure certification was submitted to NMED on April 4, 2011 (GFW 2011) and was approved by NMED on April 26, 2011 (NMED 2011a).

D.2 LTU Description

The Refinery is located approximately 17 miles east of Gallup, New Mexico along the north side of Interstate Highway 40 (I-40). The physical address is I-40, Exit #39 Jamestown, New Mexico 87347. The Refinery property covers approximately 810 acres.

The LTU is located within the Refinery property boundary. The LTU consists of three 480 feet (ft) by 240 ft sections. Each section is diked and contains 2.6 acres (1.0 hectare) of surface area. The LTU TZ is defined as the top 5 ft of soil. This depth is shallow enough to ensure the TZ was more than 3 ft above the seasonal high-water table. The zone of incorporation (ZOI) within the TZ is the volume of soil to which the waste was directly applied. The ZOI is the top 12 inches (in.) of the TZ. The LTU was designed and constructed with a continuous berm, which surrounds the LTU at an elevation of approximately 3 ft above the natural grade. Additional information regarding LTU operation and closure history can be found in Section C of this Renewal Application.

D.2.1 Geological and Hydrological Characteristics

The Refinery is located on a layered geologic formation, which slopes gently to the northwest. Surface soils consist of varied fluvial and alluvial deposits (clay, silt, sand) and imported fill. Below is the Chinle formation, which consists of very low-permeability claystone and shales, and effectively serves as an aquiclude, or confinement layer that lies directly above the Sonsela sandstone. The Sonsela sandstone is a water saturated unit and represents the uppermost aquifer in the region. The claystone and shale of the Chinle aquiclude have a hydraulic conductivity of 10^{-9} centimeters per second.

Just above the Chinle aquiclude is a zone of water bearing, weathered alluvium known as the Chinle slope wash. Based on hydrologic investigations performed at the site, it has been determined that the Chinle slope wash is hydraulically interconnected with water located in shallow, localized sand lenses located between the Chinle slope wash and the ground surface (Precision Engineering 1996). Unlike the shallow, localized sand lenses, the Chinle slope wash is continuous and saturated throughout the region underneath the LTU. However, the Chinle slope wash does not meet the regulatory definition of the uppermost aquifer. The water table above the aquiclude slopes to the northwest at a gradient of 0.01 ft/ft. The rate of water movement in this claystone is estimated to be less than one ft per year (NMED 2017a). The most recent Chinle slope wash potentiometric surface is shown in Figure D-1.

The Sonsela aquifer is considered to be the uppermost aquifer even though it does not meet the water quality standards for drinking water. The most recent Sonsela aquifer potentiometric surface is shown in Figure D-2. The Sonsela aquifer is a bed of fine to medium grained sandstone, 12 to 15 ft thick, within the upper most portion of the Chinle formation. The top of the unit is at 100 to 112 ft, and it is overlain by reddish-brown, weathered claystones and sandy claystones. Groundwater in the uppermost aquifer is under artesian confinement in the vicinity of the LTU. The potentiometric surface for groundwater in the aquifer is 70 to 100 ft above the top of the aquifer, or 9 to 31 ft below the surface. The direction of flow in the Sonsela aquifer is northwest and the potentiometric gradient is approximately 0.01 ft/ft directly beneath the Refinery. The average linear velocity for water in the uppermost aquifer beneath the LTU is 8.2 ft per year (Giant 1984). The Sonsela sandstone bed is separated from lower aquifers by a thick sequence of mudstones and siltstones, with a few beds of sandstone and conglomerate. There appears to be no significant hydraulic connection between the Sonsela aquifer and the lower aquifers (Shinarump Member of the Chinle Formation, the Moenkopi Formation, and the Permian-age San Andres Limestone-Glorieta Sandstone aquifer). The lower aquifers lie at depths greater than 700 ft. Attachment D-1 of the Renewal Application depicts the stratigraphy beneath the LTU.

D.3 Background and Regulatory Values

Background soil samples were collected in 1981 prior to any waste being applied at the LTU. These analytical data are used to determine if there are any statistically significant increases in hazardous constituent concentrations, as described further in Section D.11.2 below.

D.3.1 Background Samples

Background soil samples were collected in 1981 from the LTU, prior to any waste application, as part of the Refinery's Groundwater Monitoring Program. Background values for Chinle slope wash alluvium samples were not established.

D.3.1.1 Background Soil Samples

In 1987, the Refinery was issued a Short-Term Land Treatment Demonstration (LTD) Permit to conduct a hazardous waste LTD. The LTD included sampling of both ZOI and below treatment zone (BTZ) soils. In 1988, the Refinery was issued a Hazardous Waste Facility Permit (NMEID 1988). Sampling of ZOI and BTZ soils was established as a condition of the operating permit. Permitted sampling provides ten years of LTU soil data. No hazardous waste was applied to Cell 3 of the LTU. Samples obtained from Cell 3 while in operation (analyzed in accordance with soil detection monitoring) is used as the background for determining statistically significant increases in hazardous constituents as required by 20 NMAC 4.1.500 (40 CFR 264.278(f)). Detection of any constituents from Table D-1 may generate additional sampling in consultation with NMED.

D.3.1.2 Background Sonsela Groundwater Samples

Samples obtained from MW-4 and analyzed in accordance with the detection monitoring are used as background for determining statistically significant increases in hazardous constituents in the Sonsela aquifer as required by 20 NMAC 4.1.500 (40 CFR 264.97(a)). MW-4 is located between the LTU and the evaporation ponds directly to the south of the LTU (Figure D-3). Using MW-4 as background ensures that any potential impacts from the evaporation ponds can be identified and evaluated in comparison to the other monitoring well sampling data.

D.3.2 Regulatory Screening Levels

Groundwater analytical monitoring results are compared to the following cleanup levels:

- Water Quality Control Commission (WQCC) NMAC 20.6.2.3103
- United States Environmental Protection Agency (USEPA) Drinking Water Maximum Contaminant Levels (MCL) (USEPA 2022a)
- NMED Tap Water Screening Levels (NMED 2022a)
- USEPA Tap Water Screening Levels, Hazard Quotient of 1.0 (USEPA 2022b)
- NMED Total Petroleum Hydrocarbons (TPH) Levels (NMED 2022b)

Per the RCRA Post-Closure Permit (NMED 2017a) Section IV.D.1,

> *"the cleanup levels for all contaminants in groundwater shall be the WQCC groundwater quality standards, 20.6.2.3103 NMAC, the cleanup levels for toxic pollutants calculated in accordance with 20.6.2.3103 NMAC, and the drinking water MCLs adopted by USEPA under the federal Safe Drinking Water Act (42 [United States Code] §§ 300f to 300j-26) or the New Mexico Environmental Improvement Board, 20.7.10 NMAC. If both a WQCC water quality standard and an MCL have been established for an individual substance, then the lower of the levels shall be the cleanup level for that substance.*
>
> *The most recent version of NMED's Tap Water Screening Levels listed in Table A-1 of Technical Background Document for Development of Soil Screening Levels (as updated) shall be used to establish the cleanup level if either a WQCC standard or an MCL has not been established for a specific substance. In the absence of an NMED tap water screening level then the USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites for tap water shall be used."*

Soil analytical monitoring results are compared to the following cleanup levels:

- NMED Risk Assessment Guidance for Site Investigations, Residential Soil Screening Level (SSL) (all samples) (NMED 2022a)
- NMED Risk Assessment Guidance for Site Investigations, Industrial SSL (0 to 1 ft below ground surface) (NMED 2022a)
- NMED Risk Assessment Guidance for Site Investigations, Construction Worker SSL (1 to 10 ft below ground surface) (NMED 2022a)

The most updated cleanup levels are used to evaluate analytical results as required by the current post-closure permit (NMED 2017a).

D.4 Responsibilities

This section presents the project personnel/positions and certain key duties that are important to the implementation and performance of the post-closure monitoring.

D.4.1 Environmental, Safety, and Security Manager

During the post-closure period, the Refinery's Environmental, Safety, and Security Manager (ESSM) will serve as the Refinery's PCC contact:

John Moore, PE
505-879-7643
JMoore5@Marathonpetroleum.com

The ESSM is responsible for the overall design and implementation of this PCCP. The ESSM develops and approves specific procedures for all post-closure care activities, and reviews and approves reports. The ESSM oversees interactions between the Refinery and NMED regarding environmental monitoring of the LTU. The ESSM appoints a PCCP project manager (PM) (Section D.4.2) and field team (Section D.4.3), assigning responsibilities as described below.

D.4.2 Project Manager

The PM, either the ESSM or a designee, coordinates and oversees field sampling activities, ensuring that sampling and associated procedures are followed, and that quality assurance (QA)/quality control (QC) and safety guidelines are met. The PM reviews and evaluates sample data, prepares and reviews LTU reports, and assures that appropriate samples are collected and analyzed.

D.4.3 Field Team

The LTU field team consists of one or more scientists, engineers, or technicians, who are responsible for sample collection, handling, shipping, and preparation and maintenance of appropriate data sheets, and completion of sample tracking documentation under the direction of the PM, in accordance with this PCCP and associated Refinery field procedures. The field team inspects, maintains, and ensures proper calibration of equipment prior to use at the LTU, while ensuring that site health and safety requirements are always met. The field team communicates any problems or project changes to the PM.

D.4.4 Analytical Laboratory

The contract laboratory used for sample analysis is responsible for supplying sample collection containers and sample shipping containers to the field team. Sample collection containers supplied by the laboratory will be certified as clean by either the laboratory or their supplier. The contract laboratory is responsible for performing analysis in accordance with this PCCP and the data are supported by adequate documentation that meet NMED and USEPA requirements. The laboratory maintains documentation of sample handling and custody, analytical results, and internal QC data. Additionally, the laboratory analyzes QC samples in accordance with this PCCP and its own internal QC program for indicators of analytical accuracy and precision. Data generated outside laboratory acceptance limits trigger an inquiry and, if appropriate, corrective action, as directed by the PM. The laboratory reports the result of the environmental sample and QC sample analyses and any necessary corrective actions that were performed. If more than one contract laboratory is used (e.g., for different analyses), each one has the responsibilities described above.

D.5 Post-Closure Monitoring Well Configuration

Well SMW-4 is used to monitor the Chinle slope wash. MW-1, MW-2, MW-4, and MW-5 are used to monitor the Sonsela. MW-4 is located up gradient of the LTU to provide background values. Wells MW-1, MW-2 and MW-5 are located down gradient of the LTU at the point of compliance. The well locations ensure detection of releases from the LTU (Figure D-3). All well locations are based on current potentiometric surfaces (Figures D-1 and D-2).

D.5.1 Well Siting

Well locations were selected following guidance in the USEPA Groundwater Monitoring Technical Enforcement Guidance Document, and in consideration of the groundwater flow characteristics at the site. In September 1985, shallow monitoring wells were installed around the LTU perimeter. Groundwater monitoring for the LTU has historically been incorporated into the Refinery-wide Groundwater Monitoring Program (USEPA 1986), as required under the current permit (Section IV.C.2). The original shallow monitoring wells were installed in pockets of sand above the Chinle formation that exists as thin lenses above the Chinle shale between the ground surface and the top of the Sonsela sandstone. These shallow wells (SMW-1, SMW-2, SMW-3, SMW-5, and SMW-6) have performed poorly because they were completed within different sand lenses, which does not provide consistent data sets applicable to the LTU and are no longer monitored.

Wells MW-1, MW-2, MW-5 were completed in the Sonsela aquifer and are located directly down gradient of the LTU. Figure D-2 shows the direction of groundwater flow in the Sonsela aquifer. The locations of the three down gradient wells were selected to intercept the groundwater flow moving beneath the LTU. The upper gradient well, MW-4 completed in the Sonsela aquifer, was also chosen based on groundwater flow vectors derived using the potentiometric surface across the site. Appendix B of this Renewal Application provides the well logs for the LTU monitoring wells.

D.5.2 Well Construction Specifications

SMW-4 was completed using mud rotary drilling techniques following established well construction guidance from the RCRA Groundwater Monitoring Technical Enforcement Guidance Document (USEPA 1986). The well was drilled into the Chinle slope wash and screened across the water bearing zone within the unit. The well was logged during drilling and completed using an appropriately sized gravel pack and screen slot size. The screened interval is isolated from the remainder of the well using a low permeability annular seal to prevent cross contamination. Appendix B of this Renewal Application provides the well logs for the LTU monitoring wells.

Four monitoring wells (MW-1, MW-2, MW-3, MW-4) were installed and completed in October 1981, pursuant to 40 CFR Part 265. Construction of the LTU monitoring wells began in October 1981, and was completed in April 1984.

Current flow patterns in the Sonsela aquifer show that the configuration of the LTU monitoring well network provides sound, defensible data throughout the post-closure monitoring period.

D.6 Quality Assurance/Quality Control

The Refinery developed this QA/QC program for post-closure monitoring to ensure that data integrity and quality are maintained for all samples collected and that equipment and records are maintained in accordance with NMED guidance. The QA/QC program identifies data quality objectives (DQOs), processes for assuring sample quality, and processes for generating and maintaining quality records. Detailed QA/QC parameters are described in Tables D-2A and D-2B.

D.6.1 Data Quality Objectives

DQOs are qualitative and quantitative objectives that specify the quality of data required to support PCC monitoring. DQOs are established to ensure that the data collected are of a sufficient and known quality for their intended uses. The overall DQO for the PCC of the LTU is to collect accurate and defensible data that are sufficient to assess whether constituents are migrating from soil in the ZOI and TZ and monitor the concentrations of constituents in the groundwater underlying the LTU over time.

D.6.2 Quality Assurance Objectives

Each QA/QC objective is described below.

D.6.2.1 Accuracy

Accuracy is the closeness of agreement between a measurement and an accepted reference value. Measurements of accuracy for laboratory activities will include analysis of calibration standards, laboratory control samples (LCS), matrix spike samples, and surrogate spike samples. The bias component of accuracy is expressed as percent recovery (%R). Percent recovery is expressed as follows:

$$\%R = \frac{\text{Measure Sample Concentration}}{\text{True Concentration}} X100 \qquad \text{(Eq. 4-1)}$$

D.6.2.2 Accuracy Objectives for Field Sampling Activities

For field sampling activities, accuracy is measured with equipment and trip blanks. Equipment blanks are analyzed to check for contamination due to improper/insufficient decontamination procedures. These blanks are used for non-dedicated boring and sampling equipment.

To ensure equipment is sufficiently decontaminated, de-ionized water is poured over and through the sampling equipment and poured into the sample bottles. One equipment blank is taken randomly during each monitoring event involving non-dedicated equipment.

One trip blank is used for each monitoring event involving analysis for volatile organic compounds (VOCs). The trip blank is prepared and labeled by the laboratory. One 40 milliliter (mL) septum vial is filled with reagent grade water, transported to the site with the empty sample bottles, carried with the sample bottles during all sampling and shipping activities, and returned to the laboratory for analysis. The trip blank is not opened at any time prior to analysis.

D.6.2.3 Accuracy Objectives for Laboratory Measurements

Analytical system accuracy is quantified using the following laboratory accuracy QC checks: calibration standards, LCSs, laboratory blanks, matrix, and surrogate spike samples. Single LCSs and matrix spike and surrogate spike sample analysis is expressed as %R. Laboratory analytical accuracy is parameter dependent and is prescribed in appropriate laboratory standard operating procedures (SOPs).

D.6.3 Precision

Precision is the agreement among a set of replicate measurements without assumption or knowledge of true value. Precision of data will be derived from duplicate field and laboratory measurements.

D.6.3.1 Precision Objectives for Field Sampling Activities

To measure the precision of field sampling activities, duplicate samples are collected and analyzed. Duplicates are collected at a frequency of one duplicate sample for each sampling event. Duplicates are analyzed for all parameters listed in Table D-1.

To evaluate the precision of the analysis the relative percent difference (RPD) between the two results of the duplicate analysis is calculated. The RPD calculation is as follows:

$$RPD = \frac{(S1-S2)}{(S1+S2)/2} X100 \qquad \text{(Eq. 4-2)}$$

Where:
S1 = Sample Result 1
S2 = Sample Result 2

The RPD should be less than or equal to 10 percent for values 5 times greater than the method detection limit (MDL) and plus or minus the detection limit for values less than 5 times the MDL.

D.6.3.2 Precision Objectives for Laboratory Measurements

Precision of laboratory analyses is assessed by performing the analyses of two aliquots extracted from one sample or on a matrix spike and matrix spike duplicate with each analytical batch assessed at a minimum frequency of 1 analysis for every 20 samples. The laboratory determines the analytical precision control limits by performing replicate analyses of control samples. Precision measurements are expressed as RPD. Laboratory analytical precision is also parameter dependent and is prescribed in laboratory SOPs.

D.6.3.3 Contamination

In addition to measurements of accuracy and precision, QC checks for contamination are performed. QC samples including trip blanks, equipment blanks, field blanks, calibration and method blanks are analyzed to assess and document contamination attributable to sample collection equipment, sample handling and shipping, and laboratory reagents, glassware, and equipment. Trip blanks are used to assess VOC sample contamination during shipment and handling and will be collected and analyzed at a frequency of 1 sample per sample shipment. Field blanks are used to assess field sample collection methods and are collected and analyzed at a frequency of 1 per 20 samples (5 percent of the samples collected). Method blanks are used to assess contamination resulting from the analytical process and will be analyzed at a frequency of each preparation batch or every 20 samples, whichever is more frequent. Sample blanks will be evaluated following USEPA National Functional Guidelines for Organic Data Review (USEPA 1991) and Functional Guidelines for Evaluating Inorganic Analyses (USEPA 1988). Only method blanks are analyzed by classical chemistry methods. If method blank results exceed specified detection limits, then that value becomes the detection limit for the sample batch. Detection of analytes of interest in blank samples may be used to disqualify some samples, requiring re-sampling and additional analyses on a case-by-case basis.

D.6.3.4 Completeness

Completeness is the degree to which sample analyses accurately and precisely represent the media they are intended to represent.

Occurrences that reduce the amount of data collected include sample container breakage in the laboratory and data generated while the laboratory was operating outside prescribed QC limits. All attempts are made to minimize data loss and to recover lost data whenever possible. The completeness objective for non-critical measurements (i.e., field measurement) is 90 percent and 100 percent for critical measurements (i.e., compliance data). If the completeness objective is not met, the PM will determine the need for re-sampling on a case-by-case basis. Numerical expression of the completeness (%C) of data is as follows:

$$\%\mathrm{C} = \frac{\text{number of samples with valid results}}{\text{total number of samples taken}} X100 \qquad \text{(Eq. 4-3)}$$

D.6.3.5 Representativeness

Data representativeness for post-closure monitoring is accomplished through implementing approved sampling procedures and the use of validated analytical methods. Representativeness is the degree to which sample analyses accurately and precisely represent the media they are intended to represent. Data representativeness is accomplished through implementing approved sampling procedures and analytical methods. Sampling procedures are designed to minimize factors affecting the integrity of the samples. The analytical methods selected are those that will most accurately and precisely represent the true concentration of analytes of interest.

D.6.3.6 Comparability

Comparability is the extent to which one set of data can be compared to another. Comparability is achieved through reporting data in consistent units and collection and analysis of samples using consistent methodology. Samples are to be reported in units of measure dictated by the analytical method. Units of measure include:

- Milligrams per liter for groundwater samples for alkalinity, inorganic compounds, and metals
- Micrograms per liter for groundwater samples for VOCs and semi-volatile organic compounds (SVOCs)
- Milligrams per kilogram for all soil results

D.6.4 Design Control

The monitoring system is designed to meet requirements in 20 NMAC 4.1.500 (40 CFR 264.97 and 40 CFR 264.278). The specific components are described in Sections D.5 (groundwater) and D.7.1 (soil).

D.6.5 Procedures

Activities performed by or on behalf of the Refinery for monitoring of the LTU are required to be performed in accordance with approved procedures which meet the requirements of 20 NMAC 4.1.500 (40 CFR 264.97) for groundwater and 20 NMAC 4.1.500 (40 CFR 264.278) for soils.

SOPs specific to the monitoring activities at the LTU are maintained by onsite personnel at the Refinery. The procedures include quantitative and qualitative acceptance criteria.

D.6.6 Document Control

Document control is overseen by personnel to ensure that the latest approved version of procedures is used during post-closure monitoring and other post-closure care activities at the LTU.

D.6.7 Monitoring and Data Collection Equipment

Equipment is calibrated and/or disinfected to ensure continued accuracy. Results of calibrations, maintenance, and repair are documented and included in LTU monitoring reports submitted to the NMED.

If the equipment is found to be out of tolerance, the equipment is tagged, and it is not used until corrections are made.

D.6.8 Quality Assurance Records

QA results are included in LTU PCC reports and groundwater monitoring reports submitted to the NMED per the current permit. QA records include the laboratory analytical reports and data validation. All LTU monitoring data are Level II analytical data packages and undergoes Tier II data validation.

D.7 Sampling Procedures

This section describes equipment and supplies, and provides general instructions for sample collection, preservation, packaging, and shipping, decontamination, and documentation. By following these instructions sampling personnel can ensure that the sample collected is representative of the soil and groundwater, thus providing scientifically valid and legally defensible analytical data.

The ZOI, TZ, Chinle slope wash and the Sonsela aquifer are routinely sampled and monitored. These activities are detailed in Sections D.8 and D.9. Monitoring related activities include sample collection, lithological logging, borehole filling, static water level measurements, equipment calibration, field water quality analyses, and sample handling, shipping, and management.

D.7.1 Soil Procedures

D.7.1.1 Borehole/Core Sampling

Boreholes for sampling are advanced by a drilling rig and qualified drillers. There is no compositing of soil samples. Samples are collected using a split spoon or a direct push rig with an acetate liner.

The sample is transferred to the sample container in a timely manner to maintain the integrity of the sample and to prevent the potential loss of VOCs if present. Split core barrels will be used for obtaining samples of consolidated soil and to penetrate some types of rock.

D.7.1.2 Soil Screening

Should visual inspection or detection of odors warrant its use, a photoionization detector (PID) is used to screen for VOCs. Since prior sampling has not shown significant contamination, the use of a PID is not expected. If the PID is used, all readings are recorded in the logbook. The PID will be equipped with a 10.6 electron volt (eV) lamp, combustible gas indicator, or other instrument approved by the NMED for VOC screening. However, higher energy lamps tend to produce both a weaker ionization current and have an increased tendency towards drift. The 10.6 eV lamp usually produces better resolution and accuracy, generally have much longer service lives, and have an energy output sufficient to detect a wide range of VOCs. Consequently, 10.6 eV lamps tend to be the most widely used.

The sample will be collected from the sampling equipment and split into two aliquots. Aliquot #1 will be placed into a plastic bag and used for PID screening, if necessary. Aliquot #2 will be placed into appropriate sample containers with appropriate preservatives (e.g., methyl chloride), sealed, placed in a cooler, and stored on ice for potential VOC laboratory analysis. Aliquot #1 materials will not be submitted for laboratory analysis.

Aliquot #1 will be shaken gently to expose the soil to the air trapped in the container. Aliquot #1 will be allowed to rest while vapors equilibrate. Headspace vapors will be measured by inserting the probe of the PID in a small opening in Aliquot #1's container (plastic bag). The maximum value and the ambient air temperature will be recorded on the field boring log for each interval. Note that if samples are cold (i.e., below 32 degrees Fahrenheit), they will be warmed in a heated building and/or vehicle before screening. Aliquot #2 sample containers from the selected depths will be labeled and placed in a cooler.

D.7.1.3 Lithologic Logging

Detailed logs are maintained for each boring. Listed below is a general description of terms used to describe the soil characteristics for each boring.

- Lithology
- Color (i.e., light, dark, mottled, mixed)
- Size (fine, medium, coarse)
- Moisture (dry, moist, wet)
- Odor (or no odor)
- Other Descriptive terms: Lens <1-inch (in.) layer >1-in. Interbedded Slickenside — soils having inclined planes of weakness, glossy in appearance.

Lithologic logs of the entire core are documented. Samples for VOCs are obtained before logging to preclude potential loss of VOCs.

D.7.1.4 Disposition of Soils

All drill cuttings generated by borehole advancement for soil samples are spread within the LTU.

D.7.1.5 Backfill of Borings

All borings are backfilled with bentonite clay to prevent migration from the TZ.

D.7.1.6 Sample Collection

To ensure that soil samples obtained for monitoring of LTU post-closure are of a consistently high quality, the following procedure will be used for their collection.

- Use an amber glass bottle to protect the sample from ultraviolet light.
- When sampling wet soils, leave enough headspace in the bottle to allow for expansion.
- Take extreme care to avoid contaminating the bottles or caps. Remove the cap just before filling and replace it as soon as possible after filling. Avoid touching the inside of the bottle or cap. See Section D.7.3.1 for specific guidelines for organic analytes.

D.7.1.7 Sample Preservation

Appropriate preservation of collected samples is important for ensuring analytical results are not impacted during transportation and handling before analyses. Sample container selection, preservation techniques, and holding times are important to ensure that the sample does not deteriorate or become contaminated. Sample deterioration can occur through biological degradation or chemical precipitation. Sample contamination can occur through absorption, adsorption, or leaching effects due to the interaction of the sample and the container material. Sample container selection, preservation techniques, and holding times are listed in Table D-1.

To ensure that LTU samples are properly preserved the following procedure are followed:

- If required by analytical protocol, place the container in a cooler. Maintain the samples at or below 4 degrees Celsius (°C).
- Do not expose the sample to extreme hot or cold temperatures or intense sunlight, even if no specific preservation is recommended.
- Deliver the samples to the contract laboratory as soon as practicable.

D.7.2 Groundwater Procedures

The Refinery field personnel follow the guidelines outlined below for collecting groundwater samples. These samples consist of both field measurements and samples to be sent to the contract laboratory.

D.7.2.1 Fluid Level Monitoring

The static groundwater level elevation is measured in each well prior to well purging. This is accomplished using a steel tape, acoustic well probe, or other approved methodology.

D.7.2.2 Well Purging

The wells are purged prior to the collection of any groundwater samples, to ensure that a representative sample of the groundwater can be collected. To eliminate the possibility of cross-contamination between wells, a dedicated pump with tubing for each well is used to complete the well purging.

The monitoring wells are purged before sample collection until the field parameters (pH, temperature, specific conductance, etc.) are stabilized to within 10 percent. Groundwater samples are obtained from the monitoring wells within 24 hours of the completion of the well purging. The well volumes are calculated based on the measured water level elevation and the size of well bore and gravel pack used during well construction. If sampling results indicate that SMW-4 is dry, this result is recorded and reported to NMED. Then, the necessary samples are collected and containerized in the order of the analyte's volatilization sensitivity.

D.7.2.3 Sample Collection

To ensure that LTU groundwater samples are meeting DQOs, the following procedure are used for their collection:

- Take extreme care to avoid contaminating the sample container or caps. Remove the cap just before filling and replace it as soon as possible after filling. Avoid touching the inside of the bottle or cap.

- Do not filter the sample unless specified by analytical personnel.
- Do not rinse the sample container.
- Slowly fill each container almost full, except volatile organic analyte (VOA) vials. See Section D.7.3.1 for sampling guidelines for organic analytes.

D.7.2.4 Sample Preservation

As with soil samples, appropriate preservation of groundwater samples is critical for ensuring analytical results are not impacted during transportation and handling before analyses. Sample container selection, preservation techniques, and holding times are critical to ensure that the sample does not deteriorate or become contaminated. Sample deterioration can occur through biological degradation or chemical precipitation. Sample contamination can occur through absorption, adsorption, or leaching effects due to the interaction of the sample and the container material. Sample container selection, preservation techniques, and holding times are listed in Table D-1.

To ensure that LTU samples are properly preserved the following procedure will be followed.

- If directed by analytical personnel, add the prescribed preservative. After adding preservative, slowly invert the vial to mix.
- If required by protocol, place the sample in a cooler. Maintain the samples at or below 4 °C with ice. Refer to Table D-1 for preservation methods.
- Do not expose the sample to extreme hot or cold temperatures and intense sunlight, even if no specific preservation is recommended.
- Deliver the samples to the contract laboratory as soon as practicable.

D.7.3 Specific Sampling Guidelines

In addition to the general sampling guidelines described for aqueous and solids in Sections D.7.1 and D.7.2, sampling personnel follow the guidelines outlined below for collecting aqueous or solid matrix samples to be analyzed for organic analytes:

D.7.3.1 Volatile Organic Compound Sampling

- To monitor possible contamination, prepare a trip blank from organic free reagent water before leaving for the sampling site. Carry the trip blank throughout sampling, storing, and transportation.
- Do not collect or store samples in the presence of exhaust fumes from vehicles, equipment, or machinery.
- Collect only grab samples. Compositing samples pose an unknown safety risk: do not composite samples of unknown wastes with suspect organic components.
- Liquids: Use standard 40 mL glass, screw cap VOA vials with Teflon-lined silicone septa for liquid samples. Introduce liquids into the vials gently to reduce agitation that might drive off volatile

compounds. Pour aqueous samples into the VOA vial without introducing any air bubbles within the vial as it is being filled. If bubbling occurs, discard the sample, and collect another sample in a new VOA vial. Each VOA vial should be filled until a meniscus is over the lip of the vial. The vials should be completely filled at the time of sampling to minimize headspace and to have no air bubbles larger than pea sized. Additional sample volume is added to meet this criterion.

- Solids: 4 or 8 ounce (oz) amber jars are used to collect soil samples. If preservation is required, samples are collected in VOA vials.
- Seal each sample container in a separate plastic bag to prevent cross contamination between samples, particularly if the sampled waste is suspected of containing high levels of volatile organics. VOA samples may also be contaminated by diffusion of VOCs through the septum during transportation and storage at the facility.

D.7.3.2 Semi-Volatile Organic Compound Sampling

- Do not collect or store samples in the presence of exhaust fumes from vehicles, equipment, or machinery.
- Collect only grab samples. Compositing of samples pose an unknown safety risk; do not composite samples of unknown, suspect organic analytes.
- Containers used to collect SVOC samples include 1 liter amber bottles for groundwater samples and 4 or 8 oz amber bottles for soil samples. To avoid any possible contamination, sample containers should be filled with care to prevent any portion of the collected sample coming into contact with the sampler's glove.

D.7.4 Calibration

Proper calibration of equipment used to obtain samples and date for the detection monitoring program is critical for ensuring accuracy and precision of results. Due to changes in technology and sub-contractors used for monitoring activities, the Refinery will rely on manufacturer's specifications and instructions for proper calibration of equipment.

The equipment used to collect data for this PCCP is to be calibrated in accordance with manufacturers' specifications before use. The PM is responsible for verifying that needed equipment is calibrated on schedule and in accordance with specifications. The PM is also responsible for maintaining current calibration records for each piece of equipment. Calibration records will include manufacturers' specifications and instructions for each piece of equipment used in sampling and monitoring.

D.7.5 Decontamination

The following procedures are applicable to decontamination of drilling equipment, vehicles, and sampling equipment.

D.7.5.1 Drilling Equipment and Vehicles

Decontamination of large drilling equipment and vehicles is required to prevent cross contamination of boreholes from which samples will be retrieved for chemical analysis. This procedure also provides for the protection of personnel after demobilization from the LTU.

- Wash and mechanically clean augers and split spoon with biodegradable soap and brush. Rinse with potable water.
- Steam augers and split spoon.
- Protect equipment, if necessary, when transporting drilling equipment between boreholes, by covering or shielding.

Decontamination can be limited to those parts that may come into direct contact with soil sample surfaces.

D.7.5.2 Sampling Equipment

Sampling equipment includes all sampling devices and containers that are used to collect or contain a sample prior to final sample analysis. Before its use, all reusable sampling equipment that may contribute to the contamination of a sample is thoroughly cleaned.

Sampling equipment can generally be cleaned by hand. The following procedure will be used for sampling equipment.

- Scrub with biodegradable soap and potable water.
- Rinse with de-ionized water.
- Allow to air dry.
- Protect, if necessary, to prevent contamination while transporting from borehole to borehole by covering or shielding.

D.8 Post-Closure Soil Monitoring Plan

The soil monitoring portion of this PCCP is designed to meet the monitoring requirements of 20 NMAC 20.4.1.500 (40 CFR 264.90 through 264.101) and 20 NMAC 4.1.500 (40 CFR 264.278).

The detection monitoring includes sampling soil in the ZOI, the TZ, and the groundwater in the Chinle slope wash. Soil detection monitoring will yield samples that provide a reliable measurement of the quality of the soil and the potential for impacts to groundwater beneath the TZ.

Selection of analytical parameters (i.e., the modified Skinner List, TPH as gasoline range organics (GRO) and diesel range organics (DRO), and principal hazardous constituents (PHC)) was based on the hazardous constituents expected to be present in the waste and their associated degradation products. The modified Skinner List is a subset of 40 CFR 261 Appendix VIII constituents and identifies the specific hazardous constituents of concern that typically may be found in refinery waste. NMED established PHCs for the LTU in the Cinzia Hazardous Waste Facility Permit (NMED 2000). PHCs are hazardous constituents contained in waste applied to the LTU. NMED determined these PHCs most difficult to treat, considering the combined effects of degradation, transformations, and immobilization. The analytes and respective analytical methods are listed in Table D-1.

The sampling schedule (Attachment D-2) for the ZOI, TZ, and Chinle slope wash provides a sampling frequency that meets regulatory requirements while minimizing disruption of the LTU and underlying sediments. The sampling schedule and activities are described for each zone in the following subsections.

D.8.1 Pre-Sampling Operations

The Refinery will notify NMED a minimum of two weeks prior to a LTU monitoring event. The lab should specify and provide adequate materials, (i.e., coolers, bottles, custody seals, chain of custody [COC] forms, trip blanks) for the monitoring event.

D.8.2 Soil Monitoring Locations

The purpose of monitoring the ZOI and TZ is to detect potential migration of hazardous constituents and to ensure that treatment of hazardous constituents with the TZ has been successfully completed.

Sampling accuracy will be achieved by randomly selecting 6 soil monitoring locations over Cell 1 and Cell 2 of the LTU. The locations will be randomly selected each time soil samples are collected. Prior to each sampling event, the 6 locations will be selected as follows:

- Grid the sample area into 6 ft squares and establish the coordinate at the southeast corner of the LTU (Figure D-4).
- Using a random number table or generator, select four sampling locations taking care to locate at least one location in each cell.

At least 6 in. of topsoil will be added to the LTU surface during closure activities. ZOI samples will be taken from the 12 in. below the topsoil-ZOI surface. The TZ is identified as the top 5 ft of soil and is defined as the environmental control level. Both ZOI and TZ samples will be taken from the boring. Sample volumes required by analytical protocol will be collected, taking care not to sample beyond the defined sampling depths.

D.8.3 Number of Soil Samples

For each monitoring event a total of two samples is taken from each boring: one sample from the ZOI and one sample from the TZ. A sample is defined as the amount of soil necessary to secure analyses for all parameters identified in Section D.8.4.1. This results in a total of 12 LTU soil samples per event. This total does not include the required QC samples. Samples are not composited for analysis. The samples are analyzed for the analytes listed in Table D-1.

D.8.4 Zone of Incorporation Sampling

The Refinery samples the ZOI (upper 12 in. of the TZ) to confirm treatment and to ensure that hazardous constituents within the TZ have been successfully treated. The Refinery obtains soil samples following the protocols previously described in this Section.

D.8.4.1 Sampling Frequency and Analytical Parameters

Characterization of the ZOI was completed in 1999 during a special sampling event (Table D-3). The ZOI was characterized for analytes listed in Table D-1. Event 1 (9th year) post-closure sampling was conducted in December 2009. Table D-4 lists the results from this sampling event. Event 2 (19th year) was conducted in December 2018 (Table D-5). During the PCC period, the ZOI will be sampled three times, while trying to minimize disruption of the vegetative cover.

Events 1, 2, and 3: The three post-closure sampling events will take place in the 9th year, 19th year, and 30th year, respectively, of post-closure care. Analytical parameters selected for Events 1, 2, and 3 are listed in Table D-1.

The sampling frequency for organics and metals during the PCC period is detailed on Attachment D-2. The schedule was based on the early sampling events that demonstrate that there is no statistically significant increase for any analytes in the ZOI.

If sample results from any sampling event indicate a statistically significant increase in hazardous constituents over baseline or background values as defined in 40 CFR 264.278 and 264.97(h), then sampling frequency may be modified after consultation with NMED. A statistically significant increase represents an observed increase in concentration at one or more compliance wells. To be declared a statistically significant increase, the change in concentration must be large enough after accounting for variability in the sample data, that the result is unlikely to have occurred merely by chance. What constitutes a statistically significant result depends on the phase of monitoring and the type of statistical test being employed (USEPA 2009).

Additional sampling may be required to confirm that a statistically significant increase is occurring. The characterization, if required, will be analyzed with the analytes described in Table D-1. The additional sampling may also trigger a special sampling and analysis event of the Chinle slope wash. This special sampling event, if necessary, will provide additional information on hazardous constituents present and potential migration out of the ZOI.

D.8.5 Treatment Zone Sampling

The Refinery samples the TZ following the protocols in Section D.7.1, which identifies procedures for obtaining soil samples, determining sampling locations, decontaminating equipment; analytical parameters, analytical procedures, and QA/QC requirements.

Initial characterization of the TZ was conducted in a 1999 special sampling event (Table D-3). The zones were characterized for analytes listed in Table D-1.

The TZ sampling frequency is the same frequency of the ZOI. Per requirements of the current permit, the TZ is sampled within the 9th, 19th year, and 30th year of post-closure care. The samples are analyzed for the organics and metals listed in Table D-1. The sampling schedule is summarized in Attachment D-2.

If a statistically significant increase is indicated and confirmed following protocol established in this PCCP, appropriate notification to NMED will be provided and a permit modification may be required for further characterization of the TZ. The characterization, if required, will include the analytes listed in Table D-1. The additional sampling may also trigger a special sampling and analysis event of the Chinle slope wash. This special sampling event will provide additional information on hazardous constituents' present and potential migration out of the TZ.

D.9 Post-Closure Groundwater Monitoring

Groundwater samples are collected from SMW-4 (Chinle aquifer) and MW-1, MW-2, MW-4, and MW-5 (Sonsela aquifer). Sample volume will be determined based on analytical protocols specified by the contract laboratory.

The purpose of sampling the SMW-4, completed in the Chinle slope wash, is to detect the migration of hazardous constituents before they reach the point of compliance.

D.9.1 Chinle Slope Wash Sampling

Beneath the LTU, a water bearing unit known as the Chinle slope wash lies on top of, but is not part of, the Chinle formation. This water bearing unit is located above the Chinle formation, and consequently, is located above the Sonsela aquifer (Attachment D-1 demonstrates this stratigraphic sequence). The Sonsela is the geologic unit that meets the regulatory definition of the uppermost aquifer that must be monitored in accordance with 20 NMAC 4.1.500 (40 CFR 264). Although the Chinle slope wash does not meet the regulatory definition of an aquifer that must be monitored, as part of detection monitoring, the Refinery will continue to voluntarily sample groundwater from the Chinle slope wash to be protective of human health and the environment.

The Chinle slope wash will be sampled using one down-gradient monitoring well, SMW-4. The procedures previously identified in this PCCP are followed when obtaining groundwater samples from SMW-4 including decontaminating equipment; analytical parameters; analytical procedures; and QA/QC requirements. If SMW-4 is dry, this observance will be reported for that sampling event and no further sampling will be conducted until the next scheduled sampling event.

D.9.1.1 Background Concentrations

Background values for the Chinle slope wash samples are not established. Detection of any constituents from Table D-1, above applicable regulatory limits, may generate additional sampling after consultation with NMED.

D.9.1.2 Sampling Frequency

The Chinle slope wash was sampled annually for three years. After year three, the Chinle slope wash was sampled bi-annually up to and including year nine of the PCC period. The samples will be analyzed for the analytes listed in Table D-1.

Currently, SMW-4 is sampled annually and reported with the annual groundwater monitoring report. Historical analytical data are provided in Table D-6.

If a statistically significant increase is indicated and verified following protocol established in the PCCP, the Refinery will submit the required notification to the NMED, and a permit modification of the sampling schedule may be required to further characterize the release. Prior to submitting a modification request, the Refinery may demonstrate that the release is from a source other than the LTU. Any modification request will address compliance monitoring requirements and will consist of an approach that is tailored to the specific qualities of the release (e.g., location, depth, concentration, media, constituent identified, migration characteristics expected).

D.9.2 Sonsela Groundwater Monitoring

Groundwater samples will be collected from the four monitoring wells completed in the Sonsela aquifer. Figure D-3 shows the location of the monitoring wells in relation to the LTU. Sample volume will be determined based on analytical protocols specified by the contract laboratory.

D.9.2.1 Sampling Frequency

The Sonsela aquifer will be sampled based on the frequency described in Attachment D-2. Samples will be analyzed for the analytes listed in Table D-1. Currently, MW-1, MW-2, MW-4, and MW5 are sampled annually and reported with the annual groundwater monitoring report. Historical analytical data are provided in Table D-6.

If any sampling event indicates that there has been a statistical increase in the hazardous constituents, then sampling frequency may be modified after consultation with NMED. If a statistically significant increase is indicated and confirmed, appropriate notification to NMED will be provided and a permit modification may be required for further characterization of the Sonsela aquifer. The characterization, if required, will include all analytes listed in Table D-1.

D.9.2.2 Number of Samples

One sample will be collected from each monitoring well per sampling event. This results in four groundwater samples per event for the detection monitoring program. This number does not include the required QC samples.

D.9.3 Sample Collection

Groundwater samples will be collected following the groundwater procedures previously outlined in Section D.7.2. These samples are sent to contract laboratories and analyzed for analytes listed in Table D-1.

D.10 Sample Documentation and Custody

Standardized forms used to document sample management include identification numbers, sample labels, chain of custody seals, sample tracking logbooks, and the COC form. All sample documentation is completed for each sample and reviewed by the PM for completeness and accuracy.

D.10.1 Sample Labeling and Identification

A unique sample identification number is assigned to each sample sent to the laboratory for analysis. Field personnel will assign the numbers prior to sample collection. The sample identification numbers are used to track the sample from the time of collection through data reporting. Every sample container sent to the laboratory is identified with a label affixed to it. Sample label information is documented in permanent, indelible ink and contains the following information: sample identification number with sample matrix type; sample location; analysis requested; time and date of collection; preservative(s), if any; and the sampler's name or initials.

The sample identification numbering system is used to identify individual samples. Sample numbers may include a code number or letter attached to the end to identify the type of sample.

Samples for a typical sampling event would be labeled as:

(1)	ZOI	=	Zone of Incorporation
	TZ	=	Treatment Zone
	MW-1	=	Monitoring Well #1
(2)	234	=	Grid cell number
(3)	1	=	Monitoring event number (for the year)
(4)	98	=	Year (1998)
(5)	D	=	Duplicate
	E	=	Equipment Blank
	B	=	Trip Blank

If no letter appears here, it is the original sample.

D.10.2 Sample Logbook

Field team personnel record critical information in the sample logbook for each sample collected. The information recorded includes:

- Sample location (well number or boring location)
- Sample identification number
- Date and time of sampling
- Sampling personnel
- Sample collection method
- Field measurements
- COC number

- Date sample(s) were sent to the analytical laboratory
- Comments and observations

Sampling personnel record observations regarding sampling conditions, including:

- Weather conditions
- Physical surrounding (water, plant growth)
- Evidence of contamination
- Odors or color abnormalities

Sample logbook information is completed in the field by the sampling team. When samples are shipped, the information remains in the custody of PM for sample tracking purposes.

D.10.3 Chain of Custody

A COC form is completed during or immediately following sample collection and accompanies the sample through analysis and disposal. The COC form is signed and dated each time the sample custody is transferred. A sample is in a person's custody if: the sample is in his/her physical possession; a sample is in his/her obstructed view, and/or the sample is placed, by the last person in possession of it, in a secured area with restricted access. During shipment, the carrier's bill number serves as custody verification. Upon receipt of the samples at the laboratory, the laboratory sample custodian acknowledges possession of the samples by signing and dating the COC. The completed COC is included in the laboratory analytical report and becomes part of the permanent record of the sampling event. The COC also may contain specific instructions to the laboratory for sample analysis, potential hazards, and disposal information.

The COC includes the following information:

- Facility name
- Type and number of samples
- Sample location and identification
- Collection dates/times
- Analysis required
- Number of containers for each sample
- Additional remarks or comments as needed
- Sampler's signature
- Signatures of all individuals in the COC

The original COC accompanies the samples. One copy of the COC form is kept in the project files.

D.10.4 Custody Seals

Custody seals are used to detect sample tampering from collection through analysis. The custody seals are adhesive backed strips that are destroyed when removed or when the container is opened. The seal is affixed to the sample cooler in such a manner that it is necessary to break the seal to open the container. Seals are affixed to the sample cooler prior to delivery to the laboratory. Upon receipt at the laboratory, the laboratory custodian inspects the seal for integrity; a broken seal invalidates the sample.

D.11 Data Analysis

Selection of analytical parameters was based on the contaminants expected to be present in the waste and their associated degradation products, as previously summarized. Table D-1 contains the parameters that will be analyzed for during the various phases of sampling operations.

D.11.1 Laboratory Analysis

Samples are analyzed by a commercial laboratory that participates in USEPA's Contract Laboratory Program. Methods are specified in the Refinery's procurement documents and are selected to be consistent with EPA recommended procedures in Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (USEPA 1997). Data analysis is to provide an objective and reliable means for interpreting data in relation to the objectives of the data collection program. For these monitoring programs, the principal goal of data analysis is the comparison of a data point or data set to a fixed standard or to equivalent data collected at another location and time (such as during the operational phase of the LTU, background data, or data collected at a control location). Additional detail on analytical techniques and methods are given in laboratory SOPs.

D.11.2 Statistical Evaluation of Laboratory Data

As required by 20 NMAC 4.1.500 (40 CFR 264.271(c) and 264.278(f)(3)), data collected during monitoring will be evaluated using appropriate techniques per USEPA guidance, to determine whether there is a statistically significant increase in concentrations of analytical parameters measured in soil and groundwater below the treatment zone. The statistical procedure will be selected such that migration from the treatment zone will be identified with reasonable confidence, as follows:

(i) Statistical procedure is appropriate for the distribution of the data used to establish background values; and

(ii) Statistical procedure provides a reasonable balance between the probability of falsely identifying migration from the treatment zone and the probability of failing to identify real migration from the treatment zone.

D.11.3 Analytical Procedures

D.11.3.1 Methods and Method Detection Limits

USEPA-approved methods are used for this PCC monitoring work plan to provide accurate data and are listed in Table D-1.

Detection limits should be chosen such that they are less than the cleanup standards or action levels. Clean up standards for this plan are discussed in Section D.3.

D.11.3.2 Laboratory QA/QC

If necessary, the Refinery will request that the laboratory's QA/QC program be modified to conform to the NMED QA/QC program.

D.12 Reporting

Laboratory data are provided as electronic copy reports to the Refinery. Laboratory data reports are reviewed and contain the following information for each analytical report.

- A brief narrative summarizing laboratory analyses performed, date of issue, deviations from the analytical method, technical problems affecting data quality, laboratory quality checks, corrective actions (if any), and the laboratory PM signature approving issuance of the data report.
- Sample number and corresponding laboratory identification number, sample matrix; dates of collection, receipt, preparation, and analysis; and analyst's name.
- Results of QC sample analyses for all concurrently analyzed QC samples.
- Laboratory reports will be submitted to NMED as part of the reporting requirements.

D.13 Records Management

Records generated during detection monitoring events are maintained for the Refinery. Project records include, but are not limited to:

- Sampling and Analysis Plans
- SOPs
- COC Records
- Contract Analytical Laboratory Data Reports
- Field Logbooks/Notes

D.14 LTU Post-Closure Maintenance

The Refinery maintains the LTU to minimize the possibility of any unplanned, sudden, or non-sudden release of hazardous waste or hazardous constituents to air, soil, ground water, or surface water, which could threaten human health or the environment (40 CFR 264.31). The primary means of accomplishing said goal is through maintenance activities to ensure the integrity of the LTUs' surface cover over time. The vegetative cover is maintained as described below and activities which could disturb the integrity of the final cover are prohibited.

Routine maintenance practices to preserve the integrity of the cover include:

- Maintaining the integrity and effectiveness of the vegetative cover to correct the effects of settling, subsidence, erosion, and other events through fertilization, watering, mowing, and reseeding, as applicable.
- Completing routine repairs to the covers and berm systems, as necessary, to correct and control the effects of settling, subsidence, erosion, etc.

D.14.1 Control of Run-on and Run-off

Maintenance of a berm surrounding the LTU effectively controls run-off, preventing potential contamination of adjacent surface water and surface water channels. To that end, the Refinery maintains the LTU surface as necessary to prevent ponding of rainfall water. The Refinery has access to equipment necessary to maintain berms surrounding the LTU.

The climate of western New Mexico is classified as continental semi-arid. The capacity of the berm is sufficient to contain the volume of rainwater from an estimated 24-hour, 100-year storm event (2.94 in.) (NOAA 2023). Likewise, the berm system prevents run-on. Low rainfall rates and the generally flat surface terrain minimize run-on potential as well. The Refinery routinely inspects run-on and run-off controls and make any repairs that are necessary to ensure the integrity of the controls. Additional information regarding inspections and inspection schedules is provided in Section E.

D.14.2 Control of Wind Dispersal

Potential releases of airborne particulate matter by windstorms will continue to be controlled through the PCCP. During the winter months (November through March) snow cover and frozen ground effectively inhibit wind erosion. Vegetative cover growth controls particulate lift from the soil-atmosphere interface through decreased turbulent air flow. Soil moisture supplemented by irrigation, if necessary, will also be a temporary means to control wind dispersal from any bare areas of the vegetative cover. Routine inspections scheduled for the post-closure period will evaluate the cover system's ability to control wind erosion and initiate any necessary remedies.

D.14.3 Compliance with Food Chain Crop Restrictions

The LTU is closed and in PCC. Food chains crops have not been, and are not currently, grown on the LTU. The Refinery will not allow the cultivation of food chain crops on the closed LTU, except for the scientific testing of such cultivation with the intent of providing data only or with the intent of plowing under such a crop for mulch to enhance topsoil growth conditions of the final cover (with approval of the Secretary of the NMED).

Figures

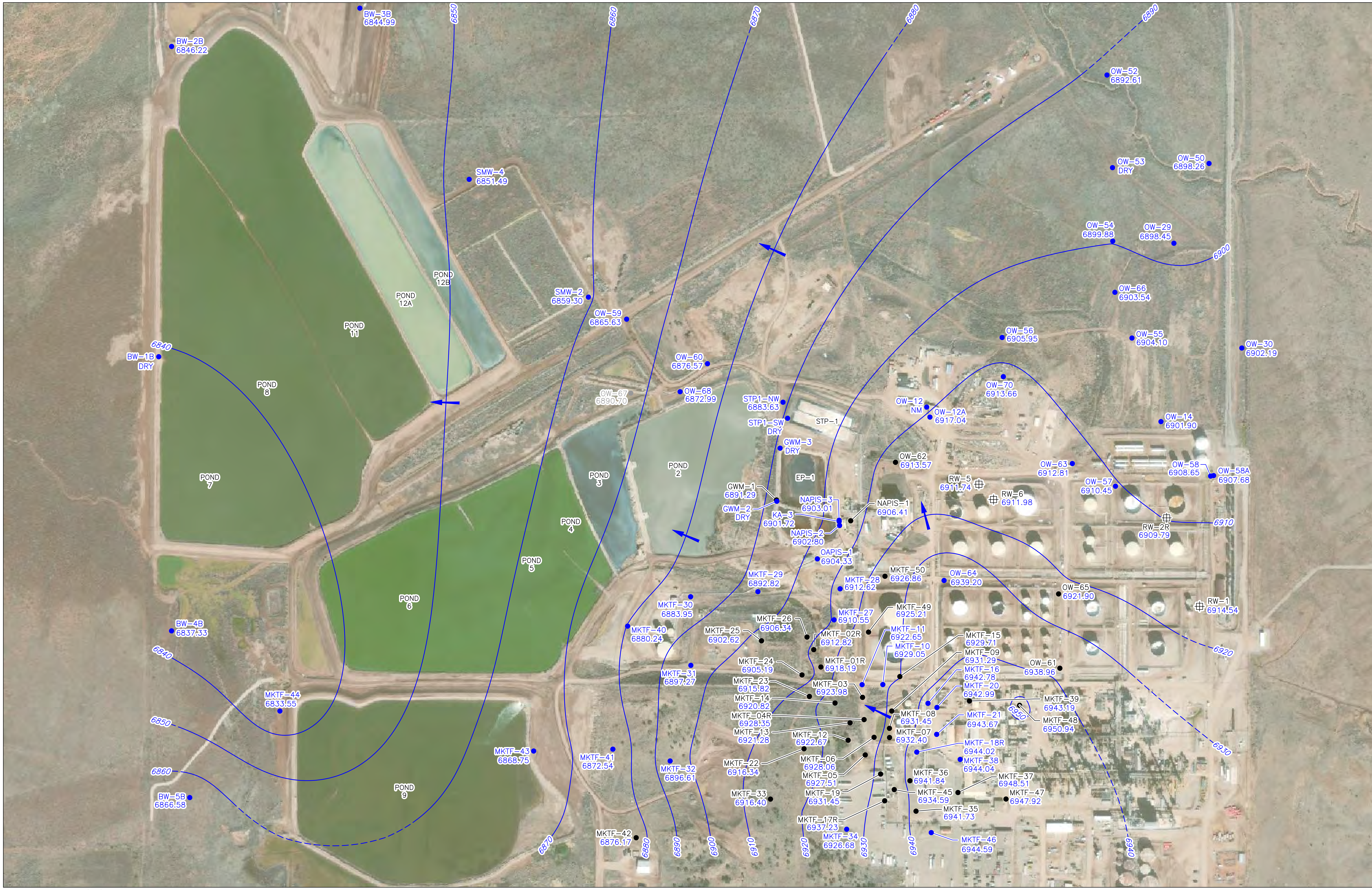

Image Cite: DigitalGlobe © CNES (2022) Distribution Airbus DS © Microsoft Corporation, BING Imagery

EXPLANATION

BW-5B 6866.58	CHINLE / ALLUVIUM AQUIFER WELL AND DESIGNATION (SHOWING GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL)
6860	LINE OF EQUAL ELEVATION OF POTENTIOMETRIC SURFACE (FEET ABOVE MEAN SEA LEVEL, DASHED WHERE INFERRED)
	ESTIMATED GROUNDWATER FLOW DIRECTION
MKTF-06	SPH MONITORING WELL AND DESIGNATION (BASED ON THIRD QUARTER 2022 SPH DATA)
RW-1	RECOVERY WELL
NM	NOT MEASURED
SPH	SEPARATE PHASE HYDROCARBON

NOTES:

1. POTENTIOMETRIC SURFACE GENERATED USING THIRD QUARTER 2022 ANNUAL MONITORING EVENT DATA.
2. DATA FROM WELL OW-67 APPEARS TO BE ANOMALOUS AND WAS NOT USED IN THE CONTOUR GENERATION FOR THIS REPORTING PERIOD.

N

0 300' 600'

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE D-1

CHINLE/ALLUVIUM AQUIFER POTENTIOMETRIC SURFACE MAP (2022)

WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY GALLUP, NEW MEXICO

Drawn By: REP	Checked By: BN	Scale: 1" = 300'	Date: 2/27/2023	File: 697-RCRA-PA-PS-CHINLE2022

M:\TON\MARATHON\CADD\GALLUP_REPORTS\RCRAPERMIT\APP\2023\03\697-RCRA-PA-PS-CHINLE2022

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EXPLANATION

BW-5C 6872.75	SONSELA AQUIFER MONITORING WELL AND DESIGNATION (SHOWING GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL)
6875	LINE OF EQUAL ELEVATION OF POTENTIOMETRIC SURFACE (FEET ABOVE MEAN SEA LEVEL, DASHED WHERE INFERRED)
	ESTIMATED GROUNDWATER FLOW DIRECTION
PW-4	RAW WATER PRODUCTION WELL AND DESIGNATION
NM	NOT MEASURED

0 600'

N

NOTES:

1. POTENTIOMETRIC SURFACE GENERATED USING THIRD QUARTER 2022 ANNUAL MONITORING EVENT.
2. OW-01 AND OW-10 NOT INCLUDED IN CONTOUR DUE TO ARTESIAN CONDITIONS PRESENT.
3. DATA FROM WELL OW-12A APPEARS TO BE ANOMALOUS AND WAS NOT USED IN THE CONTOUR GENERATION FOR THIS REPORTING PERIOD.

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FIGURE D-2

SONSELA AQUIFER POTENTIOMETRIC SURFACE MAP (2022)

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: BN	Scale: 1" = 600'	Date: 12/12/2022	File: 697-RCRA-PA-PS-SONSELA2022

M:\TON\MARATHON\CADD\GALLUP_REPORTS\RCRAPERMITAPP\202303\697-RCRA-PA-PS-SONSELA2022

Image Cite: DigitalGlobe © CNES (2022) Distribution Airbus DS © Microsoft Corporation, BING Imagery

EXPLANATION

MW-4 ●	SONSELA AQUIFER MONITORING WELL LOCATION AND DESIGNATION
SMW-4 ●	CHINLE / ALLUVIUM AQUIFER MONITORING WELL LOCATION AND DESIGNATION
	RESOURCE CONSERVATIONAND RECOVERY ACT (RCRA) LAND TREATMENT UNIT BOUNDARY
	PROPERTY BOUNDARY

N

0 500'

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FIGURE D-3

LAND TREATMENT UNIT MONITORING WELL LOCATIONS

WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 500'	Date: 5/14/2023	File: 697-RCRA-PA-LTU-WELLS

M:\TON\MARATHON\CADD\GALLUP_REPORTS\RCRAPERMITAPP\202303\697-RCRA-PA-LTU-WELLS

Image Cite: DigitalGlobe © CNES (2022) Distribution Airbus DS © Microsoft Corporation, BING Imagery

EXPLANATION

- APPROXIMATE LAND TREATMENT UNIT BOUNDARY
- MAJOR GRID
- MINOR GRID

NOTE:

SAMPLED GRIDS ARE DETERMINED USING RANDOM.ORG RANDOM INTEGER GENERATOR.

N

0 ~40' ~80'

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FIGURE D-4

LAND TREATMENT UNIT

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: GP	Scale: 1" = ~40'	Date: 5/4/2023	File: 697-RCRA-PA-LTU-GRID

Tables

TABLE D-1. LTU SAMPLING ANALYTICAL COMPOUNDS AND METHODS
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Analyte	EPA Method SW-846	Description	Container	Preservative	Holding Time/Days
Volatile Organic Compounds					
Benzene	8260	GC/MS	G	4°C	14
2-Butanone (MEK)	8260	GC/MS	G	4°C	14
Carbon Disulfide	8260	GC/MS	G	4°C	14
Chlorobenzene	8260	GC/MS	G	4°C	14
Chloroform	8260	GC/MS	G	4°C	14
Chloromethane	8260	GC/MS	G	4°C	14
1,1 Dichloroethane	8260	GC/MS	G	4°C	14
1,2 Dichloroethane	8260	GC/MS	G	4°C	14
1,1 Dichloroethene	8260	GC/MS	G	4°C	14
trans-1,2-Dichloroethene	8260	GC/MS	G	4°C	14
1,4-Dioxane	8260	GC/MS	G	4°C	14
Ethylbenzene[a]	8260	GC/MS	G	4°C	14
Methylene Chloride	8260	GC/MS	G	4°C	14
Styrene	8260	GC/MS	G	4°C	14
1,1,2,2-Tetrachloroethane[b]	8260	GC/MS	G	4°C	14
Tetrachloroethene[b]	8260	GC/MS	G	4°C	14
Toluene	8260	GC/MS	G	4°C	14
1,1,1-Trichloroethane	8260	GC/MS	G	4°C	14
Trichloroethene	8260	GC/MS	G	4°C	14
Total Xylenes[a]	8260	GC/MS	G	4°C	14
Ethylene Dibromide[b]	8260	GC/MS	G	4°C	14
Acetone	8260	GC/MS	G	4°C	14
Semi-volatile Organic Compounds					
Anthracene	8270	GC/MS	G	4°C	14
Acenaphthene	8270	GC/MS	G	4°C	14
Benzo(a)anthracene	8270	GC/MS	G	4°C	14
Benzo(b)fluoranthene	8270	GC/MS	G	4°C	14
Benzo(k)fluoranthene	8270	GC/MS	G	4°C	14
Benzo(a)pyrene[a]	8270	GC/MS	G	4°C	14
Butyl Benzyl Phthalate	8270	GC/MS	G	4°C	14
Chrysene[a]	8270	GC/MS	G	4°C	14
Diethyl Phthalate	8270	GC/MS	G	4°C	14
7,12-Dimethylbenz(a)-anthracene	8270	GC/MS	G	4°C	14
Dimethyl Phthalate	8270	GC/MS	G	4°C	14
Di-n-Octyl Phthalate	8270	GC/MS	G	4°C	14
Fluoranthene	8270	GC/MS	G	4°C	14
Fluorene	8270	GC/MS	G	4°C	14
Indeno(1,2,3-cd)Pyrene	8270	GC/MS	G	4°C	14
2-Methylnaphthalene[a]	8270	GC/MS	G	4°C	14

TABLE D-1. LTU SAMPLING ANALYTICAL COMPOUNDS AND METHODS
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Analyte	EPA Method SW-846	Description	Container	Preservative	Holding Time/Days
2-Methyiphenol (Cresol)	8270	GC/MS	G	4°C	14
3/4-Methylphenol (Cresol)	8270	GC/MS	G	4°C	14
Naphthalene	8270	GC/MS	G	4°C	14
Nitrobenzene	8270	GC/MS	G	4°C	14
4-Nitrophenol	8270	GC/MS	G	4°C	14
Phenanthrene[a]	8270	GC/MS	G	4°C	14
Pyrene[a]	8270	GC/MS	G	4°C	14
Pyridine	8270	GC/MS	G	4°C	14
Quinoline	8270	GC/MS	G	4°C	14
Benzenethiole	8270	GC/MS	G	4°C	14
Phenol	8270	GC/MS	G	4°C	14
Bis(2-Ethylhexyl)phthalate[b]	8270	GC/MS	G	4°C	14
Dibenz(a,j)acridine[b]	8270	GC/MS	G	4°C	14
Dibenz(a,h)-anthracene	8270	GC/MS	G	4°C	14
Dichlorobenzene[b]	8270	GC/MS	G	4°C	14
1-Methylnaphthalene	8270	GC/MS	G	4°C	14
2-Methylnaphthalene	8270	GC/MS	G	4°C	14
2,4-Dimethylphenol	8270	GC/MS	G	4°C	14
2,4-Dinitrotoluene	8270	GC/MS	G	4°C	14
2,4-Dinitrophenol[b]	8270	GC/MS	G	4°C	14
Benzo(j)Fluoranthene	8270	GC/MS	G	4°C	14
2-Chlorophenol	8270	GC/MS	G	4°C	14
2,4,6-Trichlorophenol	8270	GC/MS	G	4°C	14
Di-n-Butyl Phthalate	8270	GC/MS	G	4°C	14
Benzyl Alcohol[b]	8270	GC/MS	G	4°C	14
Methyl Chrysene	8270	GC/MS	G	4°C	14
Total Cresols[a]	8270	GC/MS	G	4°C	14
Metals					
Antimony	7060(aq), 6010	GFAA/ICP	P or G[c]	4°C	180
Arsenic	6010	ICP-AES	P or G[c]	4°C	180
Barium	6010	ICP-AES	P or G[c]	4°C	180
Beryllium	6010	ICP-AES	P or G[c]	4°C	180
Cadmium	6010	ICP-AES	P or G[c]	4°C	180
Chromium[a]	6010	ICP-AES	P or G[c]	4°C	180
Cobalt	6010	ICP-AES	P or G[c]	4°C	180
Lead[a]	6010	ICP-AES	P or G[c]	4°C	180
Nickel	6010	ICP-AES	P or G[c]	4°C	180
Selenium	6010	ICP-AES	P or G[c]	4°C	180
Silver	6010	ICP-AES	P or G[c]	4°C	180

**TABLE D-1. LTU SAMPLING ANALYTICAL COMPOUNDS AND METHODS
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO**

Analyte	EPA Method SW-846	Description	Container	Preservative	Holding Time/Days
Vanadium	6010	ICP-AES	P or G[c]	4°C	180
Zinc	6010	ICP-AES	P or G[c]	4°C	180
General Chemistry					
Mercury[a]	7470/7471	CVAA	P or G[c]	4°C	28
Cyanide	9014	Colorimetry	P or G[c]	4°C	14
Diesel Range Organics	8015m	GC	G	4°C	7
Gasoline Range Organics	8015m	GC	G	4°C	7
Oil Range Organics	8015m	GC	G	4°C	7

Notes:
[a]PHC
[b]Additional constituents
[c]Aqueous samples are field acidified to pH < 2 with HNO_3 and must not be refrigerated. Non-aqueous samples are cooled to 4°C.

°C = degrees Celsius
CVAA = cold vapor atomic absorption
G = glass
GC = gas chromatography
GC/MS = gas chromatography/mass spectrometry
ICP-AES = Inductively Coupled Plasma - Atomic Emission Spectroscopy
P = liner polyethylene, polypropylene, or Teflon
PHC = principal hazardous constituents
SW-846 = Test method for evaluating solid waste: Physical/Chemical Methods Compendium

TABLE D-2A. SUMMARY OF LABORATORY QUALITY CONTROL PROCEDURES FOR VOCS BY GC/MS
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHONG GALLUP REFINERY
GALLUP, NEW MEXICO

Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
BFB Tune	Before each initial calibration and calibration verification (every 12 hours)	Method 8260B, Table 4 aceptance criteria	Perform necessary instrument maintenance/repair and re-analyze.
Instrument Calibration Minimum 5 standards)	Inititally and as needed (calibration standards to contain all analytes and surrogates)	Not applicable	Not applicable
SPCC	Initial calibration: Immediately after calibration and before sample analysis	RFs: Chloromethane ≥ 0.10 1,1-Dichloromethane ≥ 0.10 Bromoform ≥ 0.10 Chlorobenzene ≥ 0.30 1,1,2,2-Tetrachloroethane ≥ 0.30	Evaluate analytical system and perform corrective maintenance/repair as necessary. Recalibrate instrument.
	Calibration verification: At the beginning of each 12 hour analytical shift	As for initial calibration	Evaluate analytical system and perform corrective action. Re-analyze and recalibrate if necessary.
CCC	Initial calibration: Immediately after calibration and before sample analysis	% RSDs for CCCs ≤ 30% % RSDs for target analytes ≤ 15%	Evaluate analytival system and perfrom corrective maintenance/repair as necessary. Recalibrate if necessary.
	Calibration verification: At the beginning of each 12 hour analytical shift	% difference or % drift ≤ 20% for CCCs and all target analytes	Evaluate analytical system and perform corrective action. Re-analyze and recalibrate if necessary.
Linearity of target analytes	After calibration and before sample analysis	RSD ≤ 15%	Recalibrate or use alternate calibration options provided in SW-846, Method 8000.
RT Windows	Initially, establish an absolute retention time for each analyte and surrogate compound according to established and documented procedures	Not applicable	Not applicable
	Assess the rention times of target analytes in each calibration standard	± 0.06 RRT	Evaluate analytical system and perform corrective maintenance/repair as necessary. Recalibrate instrument.
	The center of the retention time window for analytes and surrogates is established from the calibration verification standard	Not applicable	Not applicable
	Assess retention time of internal standards in the calibration verification standard	Within 30 secs of RT in the mid-point initial calibration standard	Investigate analytical system and apply corrective actions as necessary. Re-analyze samples processed while malfunction was in operation. Recalibrate as necessary.
IS	Assess IS response in the calibration verification standard	EICP area ≥ -50% or ≤ +100% of most recent initial calibration	Investigate analytical system and apply corrective actions as necessary. Re-analyze samples processed while malfunction was in operation. Recalibrate as necessary.
Calibration Verification	At the beginning of each 12 hour analytical shift	See acceptance criteria for DFTPP, SPCCs, CCCs, MB, RTs, IS	Evaluate analytical system, perform corrective action, re-calibrate as necessary.
Surrogates	Each field sample, blank, and QC sample	Laboratory established accedance limits	Review surrogate recoveries in comparison with other QC sample results (MS/MSD, LCS). Re-extract and/or re-analyze samples, flag data.
MB	Immediately after the calibration verification standard. With every analytical batch (once per 20 samples prepared using the same procedures and the same time)	≤5% of the regulatory/contract required limit for analytes. If not regulatory/contract limit applies, ≤ 3 x MDL	Identify and reduce the source of contamination. Re-extract/re-analyze samples associated with a contaminated blank. Recalibrate as necessary.
MS[a]	One per batch per matrix or every 20 samples, whichever is more frequent	± 30% of spiked value[b]	Flag data.
MSD[a]	One per batch per matrix or every 20 samples, whichever is more frequent	± 30% of spiked value[b] 0-20% RPD[b]	Flag data.
Duplicates[a]	One per batch per matrix or every 20 samples, whichever is more frequent	0-20% RPD[b]	Flag data.
LCS	Once per analytical batch or every 20 samples whichever is more frequent	70-130% recovery[b]	Identify and correct problem. Re-analyze all samples associated with failed LCS.
MDL	Annually, at a minimum.	≤ 5% regulary/contract required detection limit	Review analytical protocol, rerun MDL samples, select an alternative method of analysis.

Notes:
MS/MSD samples completed pre-digestion.
[a]Requirement for analysis of duplicate/MS or MS/MSD is sample dependent; if samples are not expected to contain target analytes, MS/MSD should be used.
[b]Laboratory developed in-house control limits must be used if available.

BFB - 4-Bromofluorobenzene
CCC - Calibration Check Compounds
DFTPP - Decafluorotriphenylphosphine solution
EICP - Enzyme induced carbonate precipitation
GC/MS - Gas Chromatography/Mass Spectrometry
IS - Internal Standards
LCS - laboratory control sample
MB - method blank
MDL - method detection limit
MS - matrix spike
MSD - matrix spike duplicate
QC - quality control
RF- retention factor
RPD - Relative Percent Difference
RRT - relative retention time
RSD - relative standard deviation
RT - Retention Time
SPCC - System Performance Check Compounds
SW-846 - United States Environmental Protection Agency, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods
VOC - volatile organic compounds

TABLE D-2B. SUMMARY OF LABORATORY QUALITY CONTROL PROCEDURES FOR SVOCS BY GC/MS
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHONG GALLUP REFINERY
GALLUP, NEW MEXICO

Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
DFTPP Tune	Before initial each calibration and calibration verification (every 12 hours)	Method 8270C, Table 3	Perform necessary instrument maintainance/repair and re-analyze.
Column performance and injection port inertness	Before initial each calibration and calibration verification (every 12 hours)	DDT - DDE and DDD < 20%	Perform necessary instrument maintainance/repair and re-analyze.
Instrument Calibration Minimum 5 standards)	Inititally and as needed (calibration standards to contain all analytes and surrogates)	Not applicable	Not applicable
SPCC	Initial calibration: Immediately after calibration and before sample analysis	RFs for SPCCs > 0.050	Evaluate analytical system and perform corrective maintenance/repair as necessary. Recalibrate instrument.
	Calibration verification: At the beginning of each 12 hour analytical shift	RFs for SPCCs > 0.050	Evaluate analytical system and perform corrective action. Re-analyze and recalibrate if necessary.
CCC	Initial calibration: Immediately after calibration and before sample analysis	% RSDs for CCCs ≤ 30% % RSDs for target analytes ≤ 15%	Evaluate analytical system and perform corrective action. Re-analyze and recalibrate if necessary.
	Calibration verification: At the beginning of each 12 hour analytical shift	% difference or % drift ≤ 20% for CCCs and all target analytes	Evaluate analytical system and perform corrective action. Re-analyze and recalibrate if necessary.
Linearity of target analytes	After calibration and before sample analysis	RSD ≤ 15%	Recalibrate or use alternate calibration options provided in SW-846, Method 8000.
RT Windows	Initially, establish an absolute retention time for each analyte and surrogate compound according to established and documented procedures	Not applicable	Not applicable
	Assess the rention times of target analytes in each calibration standard	± 0.06 RRT	Evaluate analytical system and perform corrective maintenance/repair as necessary. Recalibrate instrument.
	The center of the retention time window for analytes and surrogates is established from the calibration verification standard	Not applicable	Not applicable
	Assess retention time of internal standards in the calibration verification standard	Within 30 secs of RT in the mid-point initial calibration standard	Investigate analytical system and apply corrective actions as necessary. Re-analyze samples processed while malfunction was in operation. Recalibrate as necessary.
IS	Assess IS response in the calibration verification standard	EICP area ≥ -50% or ≤ +100% of most recent initial calibration	Investigate analytical system and apply corrective actions as necessary. Re-analyze samples processed while malfunction was in operation. Recalibrate as necessary.
Calibration Verification	At the beginning of each 12 hour analytical shift	See acceptance criteria for DFTPP, SPCCs, CCCs, MB, RTs, IS	Evaluate analytical system, perform corrective action, re-calibrate as necessary.
MS[a]	One per batch per matrix or every 20 samples, whichever is more frequent	± 30% of spiked value[b]	Flag data.
MSD[a]	One per batch per matrix or every 20 samples, whichever is more frequent	± 30% of spiked value[b] 0-20% RPD[b]	Flag data.
Duplicates[a]	One per batch per matrix or every 20 samples, whichever is more frequent	0-20% RPD[b]	Flag data.
Surrogates	Each field sample, blank, and QC sample	Laboratory established accedance limits	Review surrogate recoveries in comparison with other QC sample results (MS/MSD, LCS). Re-extract and/or re-analyze samples, flag data.
LCS	Once per analytical batch or every 20 samples whichever is more frequent	70-130% recovery[b]	Identify and correct problem. Re-analyze all samples associated with failed LCS.
MDL	Annually, at a minimum.	≤ 5% regulary/contract required detection limit	Review analytical protocol, rerun MDL samples, select an alternative method of analysis.

Notes:
MS/MSD samples completed pre-digestion.
[a]Requirement for analysis of duplicate/MS or MS/MSD is sample dependent; if samples are not expected to contain target analytes, MS/MSD should be used.
[b]Laboratory developed in-house control limits must be used if available.

CCC - Calibration Check Compounds
DDD - dichlorodiphenyldichloroethane
DDE - dichlorodiphenyldichloroethylene
DDT - dichlorodiphenyltrichloroethane
DFTPP - Decafluorotriphenylphosphine solution
EICP - Enzyme induced carbonate precipitation
GC/MS - Gas Chromatography/Mass Spectrometry
IS - Internal Standards
LCS - laboratory control sample
MB - method blank
MDL - method detection limit
MS - matrix spike
MSD - matrix spike duplicate
QC - quality control
RF- retention factor
RPD - Relative Percent Difference
RRT - relative retention time
RSD - relative standard deviation
RT - Retention Time
SPCC - System Performance Check Compounds
SVOC - semi-volatile organic compounds
SW-846 - United States Environmental Protection Agency, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods

TABLE D-3. LTU ANALYTICAL RESULTS (1999)
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Sample Number	Date Sampled	Moisture %	pH Std. Units	Antimony mg/kg	Arsenic mg/kg	Barium mg/kg	Beryllium mg/kg	Cadmium mg/kg	Chromium mg/kg	Cobalt mg/kg	Lead mg/kg	Mercury mg/kg	Nickel mg/kg	Selenium mg/kg	Vanadium mg/kg	Acetone mg/kg	Anthracene mg/kg	Benz(a)anthracene mg/kg
ZOI-3-97-051899	5/18/1999	18	8.01	ND(1.2)	1.6	360	1.4	ND(1.2)	24	7	12	ND(0.1)	14	ND(1.2)	30	ND(0.07)	ND[a]	ND[a]
ZOI-3-38-051899	5/18/1999	21	6.6	ND(1.2)	3.9	340	ND(1.2)	ND(1.2)	190	5.1	21	ND(0.1)	11	ND(1.2)	16	ND(0.07)	ND[a]	ND[a]
ZOI-3-152-051899	5/18/1999	16	8.4	ND(1.2)	1.5	350	1.5	ND(1.2)	8.5	5.3	10	ND(0.1)	11	ND(1.2)	17	ND(0.07)	ND[a]	ND[a]
ZOI-3-135-051899	5/18/1999	16	8.48	3.8	17	3400	11	ND(1.2)	130	63	120	ND(0.1)	130	ND(1.2)	220	ND(0.07)	ND[a]	ND[a]
ZOI-2-41-051899	5/18/1999	16	8.09	1.2	10	550	ND(1.2)	ND(1.2)	310	8.2	54	8.4	32	3.3	35	ND(0.07)	ND[a]	ND[a]
ZOI-2-40-051899	5/18/1999	17	7.09	ND(1.1)	20	710	ND(1.1)	ND(1.1)	200	9.7	87	13	54	ND(1.1)	40	ND(0.07)	ND[a]	ND[a]
ZOI-2-107-051899	5/18/1999	18	7.47	ND(2.5)	7.5	350	ND(1)	0.78	220	6.2	40	1.6	24	ND(2.5)	21	ND(0.07)	ND[a]	ND[a]
ZOI-1-98-051899	5/18/1999	18	7.2	ND(2.5)	ND(2.5)	1100	ND(1)	ND(0.5)	58	6.6	18	2	13	ND(2.5)	13	ND(0.07)	ND[a]	ND[a]
ZOI-1-40-051899	5/18/1999	20	7.61	ND(2.5)	ND(2.5)	290	ND(1)	ND(0.5)	190	7.1	40	0.13	28	ND(2.5)	30	ND(0.07)	ND[a]	ND[a]
ZOI-1-143-051899	5/18/1999	19	7.9	ND(2.5)	14	350	ND(1)	ND(0.5)	140	5.7	53	1.4	39	ND(2.5)	35	ND(0.07)	ND[a]	ND[a]
3FT-3-97-051899	5/18/1999	27	NR	ND(1.2)	1.6	310	1.8	ND(1.2)	27	8.8	13	ND(0.1)	19	ND(1.2)	40	ND(0.07)	ND[a]	ND[a]
3FT-3-38-051899	5/18/1999	21	NR	ND(1.2)	1.5	200	1.4	ND(1.2)	8.9	5	11	ND(0.1)	9.8	ND(1.2)	18	ND(0.07)	ND[a]	ND[a]
3FT-3-152-051899	5/18/1999	14	NR	ND(1.1)	1.4	370	1.4	ND(1.1)	17	7	11	ND(0.1)	15	ND(1.1)	27	ND(0.07)	ND[a]	ND[a]
3FT-3-135-051899	5/18/1999	14	NR	ND(1.1)	1.7	360	1.5	ND(1.1)	24	8.4	12	ND(0.1)	18	ND(1.1)	36	ND(0.07)	ND[a]	ND[a]
3FT-2-41-051899	5/18/1999	20	NR	ND(1.2)	13	290	1.7	ND(1.2)	18	7	13	ND(0.1)	15	ND(1.2)	28	ND(0.07)	ND[a]	ND[a]
3FT-2-40-051899	5/18/1999	9	NR	ND(1.2)	1.2	310	1.3	ND(1.2)	7.4	4.9	9.6	ND(0.1)	9.4	ND(1.2)	14	ND(0.07)	ND[a]	ND[a]
3FT-2-107-051899	5/18/1999	20	NR	ND(2.5)	ND(2.5)	290	ND(1)	ND(0.5)	9.4	4.3	11	ND(0.1)	9.4	ND(2.5)	15	ND(0.07)	ND[a]	ND[a]
3FT-1-98-051899	5/18/1999	14	NR	ND(2.5)	ND(2.5)	140	ND(1)	ND(0.5)	7	ND(2.5)	7.9	ND(0.1)	7	ND(2.5)	12	ND(0.07)	ND[a]	ND[a]
3FT-1-40-051899	5/18/1999	20	NR	16	ND(2.5)	180	1.1	ND(0.5)	9.5	4.1	11	ND(0.1)	9.4	ND(2.5)	16	ND(0.07)	ND[a]	ND[a]
3FT- I -143-051899	5/18/1999	17	NR	ND(2.5)	ND(2.5)	240	ND(1)	ND(0.5)	14	5.7	10	ND(0.1)	13	ND(2.5)	20	ND(0.07)	ND[a]	ND[a]
BTZ-3-97-051899	5/18/1999	14	8.57	ND(1.1)	1.6	330	1.2	ND(1.1)	10	5.3	9.1	ND(0.1)	11	ND(1.1)	22	ND(0.07)	ND[a]	ND[a]
BTZ-3-38-051899	5/18/1999	18	8.35	ND(1.2)	2.4	300	1.4	ND(1.2)	25	8.6	12	ND(0.1)	20	ND(1.2)	43	ND(0.07)	ND[a]	ND[a]
BTZ-3-152-051899	5/18/1999	10	8.93	ND(1.1)	1.1	430	ND(1.1)	ND(1.1)	7.8	4.7	8.5	ND(0.1)	8.8	ND(1.1)	18	ND(0.07)	ND[a]	ND[a]
BTZ-3-135-051899	5/18/1999	16	8.41	ND(1.2)	1.4	330	1.6	ND(1.2)	6.2	4.1	10	ND(0.1)	7.6	ND(1.2)	16	ND(0.07)	ND[a]	ND[a]
BTZ-2-41-051899	5/18/1999	16	8.1	ND(1.1)	1.8	270	1.4	ND(1.1)	18	7.1	12	ND(0.1)	15	ND(1.1)	30	ND(0.07)	ND[a]	ND[a]
BTZ-2-40-051899	5/18/1999	16	8.05	ND(1.2)	1.4	260	1.5	ND(1.2)	17	6.9	12	0.18	15	ND(1.2)	27	ND(0.07)	ND[a]	ND[a]
BTZ-2-107-051899	5/18/1999	15	8.4	ND(2.5)	ND(2.5)	230	1.1	ND(0.5)	12	5.1	10	ND(0.1)	12	ND(2.5)	19	ND(0.07)	ND[a]	ND[a]
BTZ-1-40-051899	5/18/1999	14	8.39	ND(2.5)	ND(2.5)	210	ND(1)	ND(0.5)	12	5.2	8.9	ND(0.1)	13	ND(2.5)	20	ND(0.07)	ND[a]	ND[a]
BTZ-1-143-051899	5/18/1999	13	8.54	ND(2.5)	ND(2.5)	240	1	ND(0.5)	9.2	ND(2.5)	9.1	ND(0.1)	10	ND(2.5)	13	ND(0.07)	ND[a]	ND[a]
BTZ- I -98-051899	5/18/1999	15	8.42	ND(2.5)	ND(2.5)	210	1.1	ND(0.5)	15	5.7	11	ND(0.1)	13	ND(2.5)	19	ND(0.07)	ND[a]	ND[a]

Notes:
[a]Specific reporting limits not provided. Reporting limit varies with dilution and % moisture: 0.38-4.23 mg/kg for 2, 4-Dinitrophenol, and 4-Nitrophenol, Benzyl alcohol, 0.186-2.11 mg/kg for all other compounds
Results are reported on a dry weight basis

% - percent
BTZ - Below Treatment Zone
mg/kg - milligrams per kilogram
ND (X) - Not detected at the reporting limit X
NR - Analysis not required
Std. Units - standard units
ZOI - Zone of Incorporation

TABLE D-3. LTU ANALYTICAL RESULTS (1999)
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Sample Number	Date Sampled	Benzene mg/kg	Benzo(a)pyrene mg/kg	Benzo(b)&(j)fluoranthene mg/kg	Benz(k)fluoranthene mg/kg	Benzyl alcohol mg/kg	Bis(2-ethylhexyl)phthalate mg/kg	2-Butanone mg/kg	Butyl benzyl phthalate mg/kg	Carbon Disulfide mg/kg	Chlorobenzene mg/kg	Chloroform mg/kg
ZOI-3-97-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
ZOI-3-38-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
ZOI-3-152-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
ZOI-3-135-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
ZOI-2-41-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
ZOI-2-40-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
ZOI-2-107-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
ZOI-1-98-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
ZOI-1-40-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
ZOI-1-143-051899	5/18/1999	ND(0.07)	2.5	2.44	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
3FT-3-97-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
3FT-3-38-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
3FT-3-152-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
3FT-3-135-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
3FT-2-41-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
3FT-2-40-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
3FT-2-107-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
3FT-1-98-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
3FT-1-40-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
3FT- I -143-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
BTZ-3-97-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
BTZ-3-38-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
BTZ-3-152-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
BTZ-3-135-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
BTZ-2-41-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
BTZ-2-40-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
BTZ-2-107-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
BTZ-1-40-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
BTZ-1-143-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)
BTZ- I -98-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.6)	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)

Notes:
[a]Specific reporting limits not provided. Reporting limit varies with dilution and % moisture: 0.38-4.23 mg/kg for 2, 4-Dinitrophenol, and 4-Nitrophenol, Benzyl alcohol, 0.186-2.11 mg/kg for all other compounds
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TABLE D-3. LTU ANALYTICAL RESULTS (1999)
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Sample Number	Date Sampled	Chloromethane mg/kg	2-Chlorophenol mg/kg	Chrysene mg/kg	Dibenz(a,h)acridine mg/kg	Dibenz(a,h)anthracene mg/kg	Dibenz(a,j)acridine mg/kg	1,2-Dibromoethane mg/kg	1,2-Dichlorobenzene mg/kg	1,3-Dichlorobenzene mg/kg
ZOI-3-97-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
ZOI-3-38-051899	5/18/1999	ND(0.07)	ND[a]	2.33	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
ZOI-3-152-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
ZOI-3-135-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
ZOI-2-41-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
ZOI-2-40-051899	5/18/1999	ND(0.07)	ND[a]	3.13	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
ZOI-2-107-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
ZOI-1-98-051899	5/18/1999	ND(0.07)	ND[a]	3.39	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
ZOI-1-40-051899	5/18/1999	ND(0.07)	ND[a]	2.31	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
ZOI-1-143-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
3FT-3-97-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
3FT-3-38-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
3FT-3-152-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
3FT-3-135-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
3FT-2-41-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
3FT-2-40-051899	5/18/1999	ND(0.07)	ND[a]	ND	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
3FT-2-107-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
3FT-1-98-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
3FT-1-40-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
3FT- I -143-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
BTZ-3-97-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
BTZ-3-38-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
BTZ-3-152-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
BTZ-3-135-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
BTZ-2-41-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
BTZ-2-40-051899	5/18/1999	ND(0.07)	ND[a]	ND	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
BTZ-2-107-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
BTZ-1-40-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
BTZ-1-143-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]
BTZ- I -98-051899	5/18/1999	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]	ND[a]

Notes:
[a]Specific reporting limits not provided. Reporting limit varies with dilution and % moisture: 0.38-4.23 mg/kg for 2, 4-Dinitrophenol, and 4-Nitrophenol, Benzyl alcohol, 0.186-2.11 mg/kg for all other compounds
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TABLE D-3. LTU ANALYTICAL RESULTS (1999)
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Sample Number	Date Sampled	1,4-Dichlorobenzene mg/kg	1,1- Dichloroethane mg/kg	1,2-Dichloroethane mg/kg	1,1-Dichloroethene mg/kg	trans-1,2-Dichloroethene mg/kg	Diethylphthalate mg/kg	Dimethylphthalate mg/kg	7,12-Dimethylbenz(a) anthracene mg/kg	Di-n-butyl phthalate mg/kg
ZOI-3-97-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
ZOI-3-38-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
ZOI-3-152-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
ZOI-3-135-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
ZOI-2-41-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
ZOI-2-40-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
ZOI-2-107-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
ZOI-1-98-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
ZOI-1-40-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
ZOI-1-143-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	4.18	ND[a]
3FT-3-97-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
3FT-3-38-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
3FT-3-152-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
3FT-3-135-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
3FT-2-41-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
3FT-2-40-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
3FT-2-107-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
3FT-1-98-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
3FT-1-40-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
3FT- I -143-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
BTZ-3-97-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
BTZ-3-38-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
BTZ-3-152-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
BTZ-3-135-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
BTZ-2-41-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
BTZ-2-40-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
BTZ-2-107-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
BTZ-1-40-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
BTZ-1-143-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]
BTZ- I -98-051899	5/18/1999	ND[a]	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND[a]	ND[a]	ND[a]

Notes:
[a]Specific reporting limits not provided. Reporting limit varies with dilution and % moisture: 0.38-4.23 mg/kg for 2, 4-Dinitrophenol, and 4-Nitrophenol, Benzyl alcohol, 0.186-2.11 mg/kg for all other compounds
Results are reported on a dry weight basis

% - percent
BTZ - Below Treatment Zone
mg/kg - milligrams per kilogram
ND (X) - Not detected at the reporting limit X
NR - Analysis not required
Std. Units - standard units
ZOI - Zone of Incorporation

TABLE D-3. LTU ANALYTICAL RESULTS (1999)
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Sample Number	Date Sampled	Di-n-octyl phthalate mg/kg	2,4-Dimethylphenol mg/kg	2,4-Dinitrophenol mg/kg	1,4-Dioxane mg/kg	Fluoranthene mg/kg	Indene mg/kg	Indeno(1,2,3-cd)pyrene mg/kg	3-Methylcholanthrene mg/kg	Methylene Chloride mg/kg	6-Methyl Chrysene mg/kg
ZOI-3-97-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
ZOI-3-38-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
ZOI-3-152-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
ZOI-3-135-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
ZOI-2-41-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
ZOI-2-40-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
ZOI-2-107-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
ZOI-1-98-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
ZOI-1-40-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
ZOI-1-143-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	7.43
3FT-3-97-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
3FT-3-38-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
3FT-3-152-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
3FT-3-135-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
3FT-2-41-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
3FT-2-40-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
3FT-2-107-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
3FT-1-98-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
3FT-1-40-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
3FT- I -143-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
BTZ-3-97-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
BTZ-3-38-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
BTZ-3-152-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
BTZ-3-135-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
BTZ-2-41-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
BTZ-2-40-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
BTZ-2-107-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
BTZ-1-40-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
BTZ-1-143-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]
BTZ- I -98-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND(6.3)	ND[a]	ND[a]	ND[a]	ND[a]	ND(0.07)	ND[a]

Notes:
[a]Specific reporting limits not provided. Reporting limit varies with dilution and % moisture: 0.38-4.23 mg/kg for 2, 4-Dinitrophenol, and 4-Nitrophenol, Benzyl alcohol, 0.186-2.11 mg/kg for all other compounds
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TABLE D-3. LTU ANALYTICAL RESULTS (1999)
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Sample Number	Date Sampled	1-Methylnaphthalene mg/kg	2-Methylnaphthalene mg/kg	2-Methylphenol mg/kg	3&4-Methylphenol mg/kg	Naphthalene mg/kg	4-Nitrophenol mg/kg	Oil and Grease mg/kg	Phenanthrene mg/kg	Phenol mg/kg	Pyrene mg/kg	Pyridine mg/kg	Quinoline mg/kg	Total Kjeldahl Nitrogen mg/kg
ZOI-3-97-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	900	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	190
ZOI-3-38-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	3500	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	500
ZOI-3-152-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(50)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	300
ZOI-3-135-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND(50)	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	320
ZOI-2-41-051899	5/18/1999	2.76	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	4500	5.32	ND[a]	ND[a]	ND[a]	ND[a]	540
ZOI-2-40-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	18000	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	700
ZOI-2-107-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	7000	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	510
ZOI-1-98-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	4900	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	500
ZOI-1-40-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	6600	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	730
ZOI-1-143-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	10000	5.38	ND[a]	ND[a]	ND[a]	ND[a]	230
3FT-3-97-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR
3FT-3-38-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR
3FT-3-152-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR
3FT-3-135-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR
3FT-2-41-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR
3FT-2-40-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR
3FT-2-107-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR
3FT-1-98-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR
3FT-1-40-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR
3FT- I -143-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR
BTZ-3-97-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR
BTZ-3-38-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR
BTZ-3-152-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR
BTZ-3-135-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR
BTZ-2-41-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR
BTZ-2-40-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR
BTZ-2-107-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR
BTZ-1-40-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR
BTZ-1-143-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR
BTZ- I -98-051899	5/18/1999	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR	ND[a]	ND[a]	ND[a]	ND[a]	ND[a]	NR

Notes:

[a]Specific reporting limits not provided. Reporting limit varies with dilution and % moisture: 0.38-4.23 mg/kg for 2, 4-Dinitrophenol, and 4-Nitrophenol, Benzyl alcohol, 0.186-2.11 mg/kg for all other compounds

Results are reported on a dry weight basis

% - percent

BTZ - Below Treatment Zone

mg/kg - milligrams per kilogram

ND (X) - Not detected at the reporting limit X

NR - Analysis not required

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TABLE D-3. LTU ANALYTICAL RESULTS (1999)
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Sample Number	Date Sampled	Total Organic Carbon %	Total Phosphorous mg/kg	Styrene mg/kg	1,1,2,2-Tetrachlorothane mg/kg	Tetrachlorothene mg/kg	Toluene mg/kg	1,1,1,-Trichloroethane mg/kg	Trichloroethane mg/kg	2,4,6-Trichlorophenol mg/kg	o-Xylenes mg/kg	m&p-Xylenes mg/kg
ZOI-3-97-051899	5/18/1999	0.5	0.54	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
ZOI-3-38-051899	5/18/1999	1.7	0.06	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
ZOI-3-152-051899	5/18/1999	0.36	0.19	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
ZOI-3-135-051899	5/18/1999	0.26	0.24	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
ZOI-2-41-051899	5/18/1999	3.2	0.2	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
ZOI-2-40-051899	5/18/1999	5.8	0.24	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
ZOI-2-107-051899	5/18/1999	3.4	0.17	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
ZOI-1-98-051899	5/18/1999	2.6	0.27	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
ZOI-1-40-051899	5/18/1999	2.8	0.13	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
ZOI-1-143-051899	5/18/1999	5.5	0.18	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
3FT-3-97-051899	5/18/1999	NR	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
3FT-3-38-051899	5/18/1999	NR	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
3FT-3-152-051899	5/18/1999	NR	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
3FT-3-135-051899	5/18/1999	NR	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
3FT-2-41-051899	5/18/1999	NR	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
3FT-2-40-051899	5/18/1999	NR	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
3FT-2-107-051899	5/18/1999	NR	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
3FT-1-98-051899	5/18/1999	NR	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
3FT-1-40-051899	5/18/1999	NR	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
3FT- I -143-051899	5/18/1999	NR	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
BTZ-3-97-051899	5/18/1999	0.18	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
BTZ-3-38-051899	5/18/1999	0.27	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
BTZ-3-152-051899	5/18/1999	0.14	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
BTZ-3-135-051899	5/18/1999	0.32	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
BTZ-2-41-051899	5/18/1999	0.31	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
BTZ-2-40-051899	5/18/1999	0.31	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
BTZ-2-107-051899	5/18/1999	0.22	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
BTZ-1-40-051899	5/18/1999	0.22	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
BTZ-1-143-051899	5/18/1999	0.37	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)
BTZ- I -98-051899	5/18/1999	0.29	NR	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND(0.07)	ND[a]	ND(0.07)	ND(0.07)

Notes:
[a]Specific reporting limits not provided. Reporting limit varies with dilution and % moisture: 0.38-4.23 mg/kg for 2, 4-Dinitrophenol, and 4-Nitrophenol, Benzyl alcohol, 0.186-2.11 mg/kg for all other compounds
Results are reported on a dry weight basis

% - percent
BTZ - Below Treatment Zone
mg/kg - milligrams per kilogram
ND (X) - Not detected at the reporting limit X
NR - Analysis not required
Std. Units - standard units
ZOI - Zone of Incorporation

TABLE D-4. LTU ANALYTICAL RESULTS (2009)
WESTERN REFINING SOUTHEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Sample ID	Date Sampled	Moisture %	TPH DRO mg/kg	TPH GRO mg/kg	Antimony mg/kg	Arsenic mg/kg	Barium mg/kg	Beryllium mg/kg	Cadmium mg/kg	Chromium mg/kg	Cobalt mg/kg	Cyanide mg/kg	Lead mg/kg	Mercury mg/kg	Nickel mg/kg	Selenium mg/kg	Silver mg/kg	Vanadium mg/kg	Zinc mg/kg	Anthracene mg/kg	Benzene mg/kg
ZOI-1-371-120809	12/8/2009	12.4	ND	ND	ND	1.71	314	1.51	ND	26.1	8.54	ND	13.6	ND	18.9	ND	ND	29	32.4	NM	NM
ZOI-1-2521-120909	12/9/2009	30.1	ND	ND	ND	1.56	389	1.73	ND	26.4	8.99	ND	15.5	ND	19.5	ND	ND	30.8	30.1	NM	NM
ZOI-2-8334-120909	12/9/2009	18.6	7000	ND	ND	14.5	481	1.03	ND	123	12.6	10.8	89.7	6.14	46.7	ND	ND	43.7	718	NM	0.00629
ZOI-2-4139-120909	12/9/2009	19.4	9400	ND	ND	10.5	619	1.47	1.11	638	11.4	28.9	79.4	4.23	33.8	1.75	ND	43.9	924	NM	NM
ZOI-3-3414-120909	12/9/2009	10.4	1800	ND	ND	6.96	302	1.1	ND	122	12.4	5.22	61.1	1.31	26.9	ND	ND	34.1	235	0.088	NM
ZOI-3-7544-121109	12/11/2009	14.5	270	ND	ND	2.69	441	1.61	ND	135	9.59	6.74	23.6	0.399	24.2	ND	ND	40.9	152	NM	NM
TZ-1-371-121109	12/11/2009	12.6	ND	ND	ND	1.49	275	1.5	ND	22.1	8.01	ND	13.3	ND	16.1	ND	ND	29.6	25.4	NM	NM
TZ-1-2521-121109	12/11/2009	20	ND	ND	ND	1.72	281	1.7	ND	29.6	9.54	ND	14.6	ND	22.8	ND	ND	35.7	36.8	NM	NM
TZ-2-4139-121109	12/11/2009	15.7	ND	ND	ND	1.6	326	1.91	ND	32.3	10.3	ND	15.6	ND	21.9	ND	ND	40.3	35.3	NM	NM
TZ-2-8334-121109	12/11/2009	16.9	ND	ND	ND	1.68	328	1.53	ND	27.6	8.61	ND	16.6	0.135	17.9	ND	ND	33.2	44.7	NM	NM
TZ-3-3414-121109	12/11/2009	14.7	ND	ND	ND	1.71	462	1.85	ND	29.5	9.93	ND	15.5	ND	20.8	ND	ND	36.2	33.2	NM	NM
TZ-3-7544-121109	12/11/2009	12.9	ND	ND	ND	1.4	393	1.7	ND	28.3	9.2	ND	14.8	ND	18.7	ND	ND	35.7	30.5	NM	NM

Notes:
mg/kg - milligrams per kilogram
ND - Non Detect
TPH DRO - total petroleum hydrocarbon diesel range organics
TPH GRO - total petroleum hydrocarbon gasoline range organics
TZ - Treatment Zone
ZOI - Zone of Incorporation

TABLE D-4. LTU ANALYTICAL RESULTS (2009)
WESTERN REFINING SOUTHEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Sample ID	Date Sampled	Benzenethiole mg/kg	Benzo(a)anthracene mg/kg	Benzo(a)pyrene mg/kg	Benzo(b)fluoranthene mg/kg	Butylbenzylphthalate mg/kg	bis(2-Ethylhexyl)phthalate mg/kg	Carbon Disulfide mg/kg	Chrysene mg/kg	Cresol(total) mg/kg	Dibenz(a,h)anthracene mg/kg
ZOI-1-371-120809	12/8/2009	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
ZOI-1-2521-120909	12/9/2009	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
ZOI-2-8334-120909	12/9/2009	0.292	1.22	8.18	1.27	NM	NM	0.00845	9.12	NM	0.943
ZOI-2-4139-120909	12/9/2009	3.04	0.889	12.1	NM	0.436	NM	0.00536	13	0.454	NM
ZOI-3-3414-120909	12/9/2009	0.292	NM	0.701	NM	NM	NM	NM	0.401	0.104	NM
ZOI-3-7544-121109	12/11/2009	0.401	0.361	2.6	NM	NM	NM	NM	1.54	NM	0.531
TZ-1-371-121109	12/11/2009	NM	NM	NM	NM	NM	0.082	NM	NM	NM	NM
TZ-1-2521-121109	12/11/2009	NM	NM	NM	NM	NM	0.101	NM	NM	NM	NM
TZ-2-4139-121109	12/11/2009	NM	NM	NM	NM	NM	0.093	NM	NM	NM	NM
TZ-2-8334-121109	12/11/2009	NM	NM	0.237	NM	NM	0.195	NM	0.328	NM	NM
TZ-3-3414-121109	12/11/2009	NM	NM	NM	NM	NM	0.101	NM	NM	NM	NM
TZ-3-7544-121109	12/11/2009	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Notes:
mg/kg - milligrams per kilogram
ND - Non Detect
TPH DRO - total petroleum hydrocarbon diesel range organics
TPH GRO - total petroleum hydrocarbon gasoline range organics
TZ - Treatment Zone
ZOI - Zone of Incorporation

TABLE D-4. LTU ANALYTICAL RESULTS (2009)
WESTERN REFINING SOUTHEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Sample ID	Date Sampled	Diethylphthalate mg/kg	Di-n-octylphthalate mg/kg	Ethylbenzene mg/kg	Ideno(1,2,3 - cd)pyrene mg/kg	1-Methylnaphthalene mg/kg	2-Methylnaphthalene mg/kg	3+4-Methylphenol mg/kg	5+6 Methylchrysene mg/kg	Naphthalene mg/kg	Phenanthrene mg/kg	Phenol mg/kg	Pyrene mg/kg
ZOI-1-371-120809	12/8/2009	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
ZOI-1-2521-120909	12/9/2009	0.408	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
ZOI-2-8334-120909	12/9/2009	0.204	NM	0.0074	0.45	0.246	0.408	NM	38.5	0.161	NM	NM	2.88
ZOI-2-4139-120909	12/9/2009	NM	NM	NM	NM	NM	NM	0.454	40.8	NM	NM	0.2	3.63
ZOI-3-3414-120909	12/9/2009	0.378	NM	NM	NM	NM	NM	0.104	0.74	NM	NM	0.151	NM
ZOI-3-7544-121109	12/11/2009	NM	NM	NM	0.294	NM	NM	NM	4.73	NM	0.121	NM	0.125
TZ-1-371-121109	12/11/2009	0.158	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TZ-1-2521-121109	12/11/2009	0.185	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TZ-2-4139-121109	12/11/2009	0.143	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TZ-2-8334-121109	12/11/2009	0.133	0.135	NM	NM	NM	NM	NM	0.817	NM	NM	NM	0.105
TZ-3-3414-121109	12/11/2009	0.063	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TZ-3-7544-121109	12/11/2009	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Notes:
mg/kg - milligrams per kilogram
ND - Non Detect
TPH DRO - total petroleum hydrocarbon diesel range organics
TPH GRO - total petroleum hydrocarbon gasoline range organics
TZ - Treatment Zone
ZOI - Zone of Incorporation

TABLE D-4. LTU ANALYTICAL RESULTS (2009)
WESTERN REFINING SOUTHEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Sample ID	Date Sampled	Toluene mg/kg	m+p-Xylene mg/kg	o-Xylene mg/kg
ZOI-1-371-120809	12/8/2009	NM	0.00566	NM
ZOI-1-2521-120909	12/9/2009	NM	NM	NM
ZOI-2-8334-120909	12/9/2009	0.0153	0.0179	0.00709
ZOI-2-4139-120909	12/9/2009	NM	0.00773	NM
ZOI-3-3414-120909	12/9/2009	0.00832	0.00882	NM
ZOI-3-7544-121109	12/11/2009	NM	NM	NM
TZ-1-371-121109	12/11/2009	NM	NM	NM
TZ-1-2521-121109	12/11/2009	NM	NM	NM
TZ-2-4139-121109	12/11/2009	NM	NM	NM
TZ-2-8334-121109	12/11/2009	NM	NM	NM
TZ-3-3414-121109	12/11/2009	NM	NM	NM
TZ-3-7544-121109	12/11/2009	NM	NM	NM

Notes:
mg/kg - milligrams per kilogram
ND - Non Detect
TPH DRO - total petroleum hydrocarbon diesel range organics
TPH GRO - total petroleum hydrocarbon gasoline range organics
TZ - Treatment Zone
ZOI - Zone of Incorporation

TABLE D-5. LTU ANALYTICAL RESULTS (2018)
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Sample ID	Date Sampled	TPH GRO mg/kg	TPH DRO mg/kg	TPH MRO mg/kg	Antimony mg/kg	Arsenic mg/kg	Barium mg/kg	Beryllium mg/kg	Cadmium mg/kg	Chromium mg/kg	Cobalt mg/kg	Cyanide mg/kg	Lead mg/kg	Mercury mg/kg	Nickel mg/kg	Selenium mg/kg	Silver mg/kg	Vanadium mg/kg	Zinc mg/kg
LTU C2L2 ZOI	12/11/2018	ND(1.4)	5300	5500	ND(1.8343)	16	350	1.4	ND(0.121)	92	8	53	44	4.9	40	ND(6.2586)	ND(0.1598)	36	390
LTU C3L2 ZOI	12/11/2018	ND(1.4)	ND(2)	ND(49.7)	ND(1.7795)	ND(6.9026)	330	1.6	ND(0.1174)	16	6.5	ND(0.269)	3.9	ND(0.0067)	16	ND(6.0717)	ND(0.155)	26	21
LTU C2L1 ZOI	12/11/2018	ND(1.4)	51	ND(49.4)	ND(1.8072)	ND(7.0097)	410	1.5	ND(0.1192)	21	6.3	1.2	6.6	0.026	17	ND(6.1658)	ND(0.1574)	27	45
LTU C3L1 ZOI	12/11/2018	ND(1.4)	61	84	ND(1.7637)	ND(6.8411)	360	1.7	ND(0.1163)	95	7.7	0.48	15	1.4	22	ND(6.0176)	ND(0.1537)	35	230
LTU C1L1 ZOI	12/11/2018	ND(1.5)	ND(1.9)	ND(48.2)	ND(1.7737)	ND(6.88)	240	1.6	ND(0.117)	20	7.1	ND(0.22)	1.3	ND(0.007)	18	ND(6.0518)	ND(0.1545)	34	26
LTU C1L2 ZOI	12/11/2018	ND(1.4)	ND(2)	ND(49.9)	ND(1.84)	ND(7.1372)	310	1.7	ND(0.1214)	17	6.9	ND(0.248)	3	0.0079	16	ND(6.278)	ND(0.1603)	28	24
LTU C2L2 TZ	12/11/2018	ND(1.4)	1100	850	ND(1.8111)	7.7	320	1.6	ND(0.1195)	55	19	0.98	19	0.033	23	ND(6.1792)	ND(0.1578)	33	150
LTU C3L2 TZ	12/11/2018	ND(1.4)	ND(2)	ND(48.7)	ND(1.8104)	ND(7.0221)	350	1.3	ND(0.1194)	12	5.5	ND(0.196)	3.6	ND(0.0068)	12	ND(6.1768)	ND(0.1577)	22	18
LTU C2L1 TZ	12/11/2018	ND(1.4)	55	78	ND(1.8148)	ND(7.0394)	280	1.7	ND(0.1197)	24	6.9	0.43	4.8	0.3	18	ND(6.192)	ND(0.1581)	28	45
LTU C3L1 TZ	12/11/2018	ND(1.4)	ND(1.9)	ND(47.6)	ND(1.8391)	ND(7.1337)	280	1.8	ND(0.1213)	19	7	ND(0.271)	ND(1.213)	0.0085	17	ND(6.2749)	ND(0.1602)	31	26
LTU C1L1 TZ	12/11/2018	ND(1.4)	ND(2)	ND(49.7)	ND(1.7807)	ND(6.9073)	230	1.3	ND(0.1175)	18	8.1	ND(0.259)	1.9	ND(0.007)	18	ND(6.0758)	ND(0.1551)	32	31
LTU C1L2 TZ	12/11/2018	ND(1.4)	ND(1.9)	ND(48)	ND(1.7759)	ND(6.8886)	340	1.7	ND(0.1171)	19	7.4	ND(0.254)	2.9	ND(0.007)	18	ND(6.0594)	ND(0.1547)	33	27

Notes:
mg/kg - milligrams per kilogram
ND (X) - Not detected at the reporting limit X
TZ - Treatment Zone
ZOI - Zone of Incorporation
TPH DRO - total petroleum hydrocarbon diesel range organics
TPH GRO - total petroleum hydrocarbon gasoline range organics
TPH MRO - total petroleum hydrocarbon motor oil range organics

TABLE D-5. LTU ANALYTICAL RESULTS (2018)
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Sample ID	Date Sampled	Acenaphthene mg/kg	Anthracene mg/kg	Benzene mg/kg	Benzo(a)anthracene mg/kg	Benzo(a)pyrene mg/kg	Benzo(b)fluoranthene mg/kg	Benzo(k)fluoranthene mg/kg	bis(2-Ethylhexyl)phthalate mg/kg	2-Butanone mg/kg	Carbon Disulfide mg/kg	Chlorobenzene mg/kg
LTU C2L2 ZOI	12/11/2018	ND(0.1)	ND(0.1)	ND(0.0039)	2.7	0.41	0.51	ND(0.1)	0.32	ND(0.0551)	ND(0.0157)	ND(0.0061)
LTU C3L2 ZOI	12/11/2018	ND(0.1)	ND(0.1)	ND(0.004)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0562)	ND(0.016)	ND(0.0062)
LTU C2L1 ZOI	12/11/2018	ND(0.1)	ND(0.1)	ND(0.004)	0.27	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0569)	ND(0.0162)	ND(0.0063)
LTU C3L1 ZOI	12/11/2018	ND(0.1)	ND(0.1)	ND(0.0041)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0573)	ND(0.0164)	ND(0.0063)
LTU C1L1 ZOI	12/11/2018	ND(0.1)	ND(0.1)	ND(0.0041)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0578)	ND(0.0165)	ND(0.0064)
LTU C1L2 ZOI	12/11/2018	ND(0.1)	ND(0.1)	ND(0.0039)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0557)	ND(0.0159)	ND(0.0062)
LTU C2L2 TZ	12/11/2018	ND(0.1)	ND(0.1)	ND(0.0037)	0.65	0.1	0.11	ND(0.1)	ND(0.1)	ND(0.053)	ND(0.0151)	ND(0.0059)
LTU C3L2 TZ	12/11/2018	ND(0.1)	ND(0.1)	ND(0.0039)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0556)	ND(0.0159)	ND(0.0062)
LTU C2L1 TZ	12/11/2018	ND(0.1)	ND(0.1)	ND(0.0039)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0552)	ND(0.0158)	ND(0.0061)
LTU C3L1 TZ	12/11/2018	ND(0.1)	ND(0.1)	ND(0.004)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0562)	ND(0.016)	ND(0.0062)
LTU C1L1 TZ	12/11/2018	ND(0.1)	ND(0.1)	ND(0.0039)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0556)	ND(0.0159)	ND(0.0062)
LTU C1L2 TZ	12/11/2018	ND(0.1)	ND(0.1)	ND(0.0039)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0557)	ND(0.0159)	ND(0.0062)

Notes:
mg/kg - milligrams per kilogram
ND (X) - Not detected at the reporting limit X
TZ - Treatment Zone
ZOI - Zone of Incorporation
TPH DRO - total petroleum hydrocarbon diesel range organics
TPH GRO - total petroleum hydrocarbon gasoline range organics
TPH MRO - total petroleum hydrocarbon motor oil range organics

TABLE D-5. LTU ANALYTICAL RESULTS (2018)
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Sample ID	Date Sampled	Chloroform mg/kg	Chrysene mg/kg	Dibenz(a,h)anthracene mg/kg	1,2-Dibromoethane mg/kg	1,2-Dichloroethane mg/kg	1,3-Dichlorobenzene mg/kg	1,4-Dichlorobenzene mg/kg	1,1- Dichloroethane mg/kg	Diethylphthalate mg/kg	2,4-Dimethylphenol mg/kg
LTU C2L2 ZOI	12/11/2018	ND(0.0038)	ND(0.1)	0.62	ND(0.0043)	ND(0.0049)	ND(0.0041)	ND(0.1)	ND(0.003)	ND(0.1)	ND(0.1)
LTU C3L2 ZOI	12/11/2018	ND(0.0039)	ND(0.1)	ND(0.1)	ND(0.0044)	ND(0.005)	ND(0.0042)	ND(0.1)	ND(0.0031)	ND(0.1)	ND(0.1)
LTU C2L1 ZOI	12/11/2018	ND(0.004)	ND(0.1)	ND(0.1)	ND(0.0045)	ND(0.005)	ND(0.0043)	ND(0.1)	ND(0.0031)	ND(0.1)	ND(0.1)
LTU C3L1 ZOI	12/11/2018	ND(0.004)	ND(0.1)	ND(0.1)	ND(0.0045)	ND(0.0051)	ND(0.0043)	ND(0.1)	ND(0.0032)	ND(0.1)	ND(0.1)
LTU C1L1 ZOI	12/11/2018	ND(0.004)	ND(0.1)	ND(0.1)	ND(0.0046)	ND(0.0051)	ND(0.0043)	ND(0.1)	ND(0.0032)	ND(0.1)	ND(0.1)
LTU C1L2 ZOI	12/11/2018	ND(0.0039)	ND(0.1)	ND(0.1)	ND(0.0044)	ND(0.0049)	ND(0.0042)	ND(0.1)	ND(0.0031)	ND(0.1)	ND(0.1)
LTU C2L2 TZ	12/11/2018	ND(0.0037)	ND(0.1)	0.12	ND(0.0042)	ND(0.0047)	ND(0.004)	ND(0.1)	ND(0.0029)	ND(0.1)	ND(0.1)
LTU C3L2 TZ	12/11/2018	ND(0.0039)	ND(0.1)	ND(0.1)	ND(0.0044)	ND(0.0049)	ND(0.0042)	ND(0.1)	ND(0.0031)	ND(0.1)	ND(0.1)
LTU C2L1 TZ	12/11/2018	ND(0.0038)	ND(0.1)	ND(0.1)	ND(0.0044)	ND(0.0049)	ND(0.0041)	ND(0.1)	ND(0.0031)	ND(0.1)	ND(0.1)
LTU C3L1 TZ	12/11/2018	ND(0.0039)	ND(0.1)	ND(0.1)	ND(0.0044)	ND(0.005)	ND(0.0042)	ND(0.1)	ND(0.0031)	ND(0.1)	ND(0.1)
LTU C1L1 TZ	12/11/2018	ND(0.0039)	ND(0.1)	ND(0.1)	ND(0.0044)	ND(0.0049)	ND(0.0042)	ND(0.1)	ND(0.0031)	ND(0.1)	ND(0.1)
LTU C1L2 TZ	12/11/2018	ND(0.0039)	ND(0.1)	ND(0.1)	ND(0.0044)	ND(0.0049)	ND(0.0042)	ND(0.1)	ND(0.0031)	ND(0.1)	ND(0.1)

Notes:
mg/kg - milligrams per kilogram
ND (X) - Not detected at the reporting limit X
TZ - Treatment Zone
ZOI - Zone of Incorporation
TPH DRO - total petroleum hydrocarbon diesel range organics
TPH GRO - total petroleum hydrocarbon gasoline range organics
TPH MRO - total petroleum hydrocarbon motor oil range organics

TABLE D-5. LTU ANALYTICAL RESULTS (2018)
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Sample ID	Date Sampled	Dimethylphthalate mg/kg	Di-n-butylphthalate mg/kg	2,4-Dinitrophenol mg/kg	1,4-Dioxane mg/kg	Ethylbenzene mg/kg	Fluoranthene mg/kg	Fluorene mg/kg	Ideno(1,2,3 -cd)pyrene mg/kg	Methyl tert-butyl ether mg/kg	1-Methylnaphthalene mg/kg	2-Methylphenol mg/kg
LTU C2L2 ZOI	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.13)	ND(0.0028)	ND(0.1)	ND(0.1)	0.34	ND(0.0113)	ND(0.1)	ND(0.1)
LTU C3L2 ZOI	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.14)	ND(0.0028)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0115)	ND(0.1)	ND(0.1)
LTU C2L1 ZOI	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.14)	ND(0.0029)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0117)	ND(0.1)	ND(0.1)
LTU C3L1 ZOI	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.14)	ND(0.0029)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0118)	ND(0.1)	ND(0.1)
LTU C1L1 ZOI	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.14)	ND(0.0029)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0118)	ND(0.1)	ND(0.1)
LTU C1L2 ZOI	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.13)	ND(0.0028)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0114)	ND(0.1)	ND(0.1)
LTU C2L2 TZ	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.13)	ND(0.0027)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0109)	ND(0.1)	ND(0.1)
LTU C3L2 TZ	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.13)	ND(0.0028)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0114)	ND(0.1)	ND(0.1)
LTU C2L1 TZ	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.13)	ND(0.0028)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0113)	ND(0.1)	ND(0.1)
LTU C3L1 TZ	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.14)	ND(0.0028)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0115)	ND(0.1)	ND(0.1)
LTU C1L1 TZ	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.13)	ND(0.0028)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0114)	ND(0.1)	ND(0.1)
LTU C1L2 TZ	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.13)	ND(0.0028)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0114)	ND(0.1)	ND(0.1)

Notes:
mg/kg - milligrams per kilogram
ND (X) - Not detected at the reporting limit X
TZ - Treatment Zone
ZOI - Zone of Incorporation
TPH DRO - total petroleum hydrocarbon diesel range organics
TPH GRO - total petroleum hydrocarbon gasoline range organics
TPH MRO - total petroleum hydrocarbon motor oil range organics

TABLE D-5. LTU ANALYTICAL RESULTS (2018)
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Sample ID	Date Sampled	3&4-Methylphenol mg/kg	Naphthalene mg/kg	4-Nitrophenol mg/kg	Phenanthrene mg/kg	Phenol mg/kg	Pyrene mg/kg	Pyridine mg/kg	Quinoline mg/kg	Styrene mg/kg	Tetrachlorothene mg/kg	Toluene mg/kg	1,1,1-Trichloroethane mg/kg	Trichloroethene mg/kg	Xylenes, Total mg/kg
LTU C2L2 ZOI	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	0.19	ND(0.1)	0.26	ND(0.1)	ND(0.1)	ND(0.0037)	ND(0.0038)	ND(0.0046)	ND(0.0043)	ND(0.0055)	ND(0.012)
LTU C3L2 ZOI	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0038)	ND(0.0039)	ND(0.0046)	ND(0.0044)	ND(0.0056)	ND(0.0122)
LTU C2L1 ZOI	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0039)	ND(0.0039)	ND(0.0047)	ND(0.0044)	ND(0.0057)	ND(0.0124)
LTU C3L1 ZOI	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0039)	ND(0.004)	ND(0.0047)	ND(0.0045)	ND(0.0057)	ND(0.0125)
LTU C1L1 ZOI	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0039)	ND(0.004)	ND(0.0048)	ND(0.0045)	ND(0.0058)	ND(0.0126)
LTU C1L2 ZOI	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0038)	ND(0.0038)	ND(0.0046)	ND(0.0043)	ND(0.0056)	ND(0.0121)
LTU C2L2 TZ	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0036)	ND(0.0037)	ND(0.0044)	ND(0.0041)	ND(0.0053)	ND(0.0116)
LTU C3L2 TZ	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0038)	ND(0.0038)	ND(0.0046)	ND(0.0043)	ND(0.0056)	ND(0.0121)
LTU C2L1 TZ	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0037)	ND(0.0038)	ND(0.0046)	ND(0.0043)	ND(0.0055)	ND(0.012)
LTU C3L1 TZ	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0038)	ND(0.0039)	ND(0.0046)	ND(0.0044)	ND(0.0056)	ND(0.0123)
LTU C1L1 TZ	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0038)	ND(0.0038)	ND(0.0046)	ND(0.0043)	ND(0.0056)	ND(0.0121)
LTU C1L2 TZ	12/11/2018	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.0038)	ND(0.0038)	ND(0.0046)	ND(0.0043)	ND(0.0056)	ND(0.0121)

Notes:
mg/kg - milligrams per kilogram
ND (X) - Not detected at the reporting limit X
TZ - Treatment Zone
ZOI - Zone of Incorporation
TPH DRO - total petroleum hydrocarbon diesel range organics
TPH GRO - total petroleum hydrocarbon gasoline range organics
TPH MRO - total petroleum hydrocarbon motor oil range organics

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	Acenaph- thene (ug/L)	Acenaph- thylene (ug/L)	Acetone (ug/L)	Aluminum, Dissolved (mg/L)	Aluminum, Total (mg/L)	Aniline (ug/L)	Anthracene (ug/L)	Antimony, Dissolved (mg/L)	Antimony, Total (mg/L)	Arsenic, Dissolved (mg/L)	Arsenic, Total (mg/L)	Azo- benzene (ug/L)
MW-1	08/24/12	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	ND(0.0025)	ND(10)
	09/09/13	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	**0.0016** [c,d]	ND(10)
	09/16/14	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	**0.0012** [c,d]	ND(10)
	08/14/15	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	**0.0013** [c,d]	ND(10)
	09/07/16	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	**0.0013** [c]	**0.0015** [c,d]	ND(10)
	09/20/17	ND(10)	ND(10)	4.4	--	--	ND(10)	ND(10)	--	--	**0.0013** [c]	**0.00097** [c,d]	ND(10)
	09/13/18	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	ND(0.001)	ND(0.001)	**0.0013** [c]	**0.0013** [c,d]	ND(10)
	12/06/18	ND(0.5)	ND(0.5)	ND(10)	--	--	ND(0.5)	ND(0.5)	--	ND(0.001)	--	**0.0011** [c,d]	--
	08/12/19	ND(10)	ND(10)	ND(10)	0.01	0.26	ND(10)	ND(10)	ND(0.001)	ND(0.001)	**0.0012** [c]	**0.0013** [c,d]	ND(10)
	09/22/20	ND(0.51)	ND(0.51)	ND(10)	0.011 J	0.081 J+	ND(0.51)	ND(0.51)	ND(0.001) UJ	ND(0.001)	**0.0015** [c]	**0.0014** [c,d]	--
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	ND(10)	--	--	--	--	--	--	**0.002** [c]	**0.0021** [c,d]	--
	09/27/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	ND(0.3) UJ	--	3.3J/ND(10)U*	--	--	--	ND(0.3)	ND(0.001)	ND(0.001)	**0.0014** [c]	**0.0013** [c,d]	--
MW-1 Dup	09/29/22	ND(0.3) UJ	--	ND(10)	--	--	--	ND(0.3)	ND(0.001)	ND(0.001)	**0.0013** [c]	**0.0015** [c,d]	--
MW-2	08/24/12	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	ND(0.0025)	ND(10)
	09/10/13	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	ND(0.001)	ND(10)
	09/16/14	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	**0.0012** [c,d]	ND(10)
	08/14/15	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	ND(0.001)	ND(10)
	09/07/16	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	**0.0011** [c]	**0.0013** [c,d]	ND(10)
	09/20/17	ND(10)	ND(10)	4.3	--	--	ND(10)	ND(10)	--	--	**0.0011** [c]	**0.00073** [d]	ND(10)
	09/13/18	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	ND(0.001)	ND(0.001)	**0.00098** [c]	**0.00099** [c,d]	ND(10)
	12/06/18	ND(0.5)	ND(0.5)	ND(10)	--	--	ND(0.5)	ND(0.5)	--	ND(0.001)	--	**0.0011** [c,d]	--
	08/13/19	ND(10)	ND(10)	ND(10)	0.0027	0.015	ND(10)	ND(10)	ND(0.001)	ND(0.001)	**0.0011** [c]	**0.0012** [c,d]	ND(10)
	09/18/20	ND(0.51)	ND(0.51)	ND(10)	ND(0.02)	0.069 JB	ND(0.51)	ND(0.51)	ND(0.001)	ND(0.001)	**0.001** [c]	**0.001** [c,d]	--
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	ND(10)	--	--	--	--	--	--	ND(0.02)	**0.0013 J** [c,d]	--
	09/29/22	ND(0.3) UJ	--	ND(10)	--	--	--	ND(0.3)	ND(0.001)	ND(0.001)	**0.001** [c]	**0.001** [c,d]	--
MW-4	08/21/12	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	ND(0.0025)	ND(10)
	09/10/13	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	ND(0.001)	ND(10)
	09/17/14	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	ND(0.001)	ND(10)
	08/17/15	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	ND(0.001)	ND(10)
	09/07/16	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	**0.00089** [c]	**0.00098** [c,d]	ND(10)
	09/21/17	ND(10)	ND(10)	3.7	--	--	ND(10)	ND(10)	--	--	**0.00087** [c]	**0.00084** [d]	ND(10)
	09/13/18	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	ND(0.001)	ND(0.001)	0.00072	**0.00076** [d]	ND(10)
	12/06/18	ND(0.5)	ND(0.5)	ND(10)	--	--	ND(0.5)	ND(0.5)	--	ND(0.001)	--	ND(0.001)	--
	08/13/19	ND(10)	ND(10)	ND(10)	0.0056	0.011	ND(10)	ND(10)	ND(0.001)	ND(0.001)	0.00078	**0.00071** [d]	ND(10)
	09/18/20	ND(0.51) UJ	ND(0.51) UJ	ND(10) UJ	0.0073 J+	0.3	ND(0.51) UJ	ND(0.51) UJ	ND(0.001)	ND(0.001)	0.00075 J	**0.00078 J** [d]	--
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	ND(10)	--	--	--	--	--	--	ND(0.02)	**0.00091 J** [c,d]	--
	09/30/22	ND(0.3)	--	ND(10)	--	--	--	ND(0.3) UJ	ND(0.001)	ND(0.001)	0.00072 J	**0.00068 J** [d]	--
MW-4 Dup	09/18/20	ND(0.51) UJ	ND(0.51) UJ	ND(10) UJ	0.006 J+	0.31	ND(0.51) UJ	ND(0.51) UJ	ND(0.001)	ND(0.001)	0.00077 J	**0.00077 J** [d]	--
	09/30/22	ND(0.3)	--	ND(10)	--	--	--	ND(0.3) UJ	ND(0.001)	ND(0.001)	0.00073 J	**0.00078 J** [d]	--
[a] NMED Groundwater Cleanup		NA	NA	NA	NA	NA	NA	NA	NA	0.006	0.01	0.01	NA
[b] 40 CFR 141.62		NA	NA	NA	NA	NA	NA	NA	0.006	0.006	0.01	0.01	NA
[c] NMED Tap Water		535	NA	14,100	19.9	19.9	NA	1,720	0.00726	0.00726	0.000855	0.000855	NA
[d] USEPA RSL Tap Water HQ 1.		530	NA	14,000	NA	20	13	1,800	NA	0.0078	NA	0.000052	0.12
[e] NMED TPH Levels		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

ProjectDirect: Analytical LTU Wells PK:8111 RK:104027

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	Barium, Dissolved (mg/L)	Barium, Total (mg/L)	Benzene (ug/L)	Benzidine (ug/L)	Benzo(a)-anthracene (ug/L)	Benzo(a)- pyrene (ug/L)	Benzo(b)- fluor-anthene (ug/L)	Benzo(ghi)-perylene (ug/L)	Benzo(k) fluor-anthene (ug/L)	Benzoic Acid (ug/L)	Benzyl Alcohol (ug/L)	Beryllium, Dissolved (mg/L)
MW-1	08/24/12	--	0.014	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	09/09/13	--	0.012	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(40)	ND(10)	--
	09/16/14	--	0.0095	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	08/14/15	--	0.013	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	09/07/16	0.011	0.012	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	9.8	ND(10)	--
	09/20/17	0.013	0.015	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	09/13/18	0.012	0.013	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	6.6	ND(10)	ND(0.002)
	12/06/18	--	ND(0.02)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	--	ND(0.5)	--
	08/12/19	0.012	0.014	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	ND(0.002)
	09/22/20	0.012	0.013	ND(1)	ND(0.51)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.51)	ND(0.51)	ND(0.51)	0.77	ND(0.002)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	0.011	0.013	ND(1)	--	--	--	--	--	--	ND(20)	--	--
	09/27/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	0.013	0.013	ND(1)	--	ND(0.3)	--	ND(0.3)	--	--	ND(20)	--	ND(0.002) UJ
MW-1 Dup	09/29/22	0.013	0.013	ND(1)	--	ND(0.3)	--	ND(0.3)	--	--	ND(20)	--	ND(0.002) UJ
MW-2	08/24/12	--	0.021	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	09/10/13	--	0.02	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(40)	ND(10)	--
	09/16/14	--	0.017	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	08/14/15	--	0.02	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	09/07/16	0.018	0.02	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	18	ND(10)	--
	09/20/17	0.018	0.022	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	7.3	ND(10)	--
	09/13/18	0.018	0.017	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	6.8	ND(10)	ND(0.002)
	12/06/18	--	ND(0.02)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	--	ND(0.5)	--
	08/13/19	0.017	0.018	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	ND(0.002)
	09/18/20	0.017	0.021	ND(1)	ND(0.51)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.51)	ND(0.51)	1.1/ND(1.1)U*	ND(0.51)	ND(0.002)
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	0.018	0.021	ND(1)	--	--	--	--	--	--	ND(20)	--	--
	09/29/22	0.019	0.021	ND(1)	--	ND(0.3)	--	ND(0.3)	--	--	ND(20)	--	ND(0.002) UJ
MW-4	08/21/12	--	0.02	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	09/10/13	--	0.022	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(40)	ND(10)	--
	09/17/14	--	0.018	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	08/17/15	--	0.02	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	09/07/16	0.02	0.022	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	9.3	ND(10)	--
	09/21/17	0.02	0.02	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	14	ND(10)	--
	09/13/18	0.021	0.02	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	6.5	ND(10)	ND(0.002)
	12/06/18	--	0.021	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	--	ND(0.5)	--
	08/13/19	0.021	0.021	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	ND(0.002)
	09/18/20	0.019	0.029	ND(1) UJ	ND(0.51) UJ	ND(0.1) UJ	ND(0.1) UJ	ND(0.1) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.002)
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	0.019	0.027	ND(1)	--	--	--	--	--	--	ND(20)	--	--
	09/30/22	0.021	0.021	ND(1)	--	ND(0.3)	--	ND(0.3)	--	--	ND(20)	--	ND(0.002) UJ
MW-4 Dup	09/18/20	0.02	0.031	ND(1) UJ	ND(0.51) UJ	ND(0.1) UJ	ND(0.1) UJ	ND(0.1) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.002)
	09/30/22	0.018	0.021	ND(1)	--	ND(0.3)	--	ND(0.3)	--	--	ND(20)	--	ND(0.002)
[a]	NMED Groundwater Cleanup	2	2	5	NA	NA	0.2	NA	NA	NA	NA	NA	NA
[b]	40 CFR 141.62	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.004
[c]	NMED Tap Water	3.28	3.28	4.55	0.00109	0.12	0.251	0.343	NA	3.43	NA	NA	0.0124
[d]	USEPA RSL Tap Water HQ 1.	NA	3.8	0.46	0.00011	0.03	0.025	0.25	NA	2.5	75,000	2,000	NA
[e]	NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	Beryllium, Total (mg/L)	Bis(2chloro ethoxy)- methane (ug/L)	Bis(2- chloro ethyl)ether (ug/L)	Bis(2chloro isopropyl)- ether (ug/L)	Bis(2-ethyl hexyl)- phthalate (ug/L)	Boron, Dissolved (mg/L)	Boron, Total (mg/L)	Bromide (mg/L)	Bromo- benzene (ug/L)	Bromo- dichloro- methane (ug/L)	Bromoform (ug/L)	Bromo- methane (ug/L)
MW-1	08/24/12	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	ND(0.1)	ND(1)	ND(1)	ND(1)	ND(3)
	09/09/13	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	ND(0.1)	ND(1)	ND(1)	ND(1)	ND(3)
	09/16/14	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	0.11	ND(1)	ND(1)	ND(1)	ND(3)
	08/14/15	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	ND(0.1)	ND(1)	ND(1)	ND(1)	ND(3)
	09/07/16	--	ND(10)	ND(10)	ND(10)	4	--	--	0.1	ND(1)	ND(1)	ND(1)	ND(3)
	09/20/17	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	0.29	ND(1)	ND(1)	ND(1)	ND(3)
	09/13/18	ND(0.002)	ND(10)	ND(10)	ND(10)	ND(10)	--	--	ND(0.5)	ND(1)	ND(1)	ND(1)	ND(3)
	12/06/18	ND(0.003)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	--	--	--	ND(1)	ND(1)	ND(1)	ND(3)
	08/12/19	ND(0.002)	ND(10)	ND(10)	ND(10)	ND(10)	0.75	0.7	ND(0.5)	ND(1)	ND(1)	ND(1)	ND(3)
	09/22/20	ND(0.002)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	0.74	0.76	ND(0.5)	ND(1)	ND(1)	ND(1)	ND(3)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	ND(10)	--	--	0.11	--	--	--	--
	09/27/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	ND(0.002)	--	--	--	ND(10)	--	--	--	--	--	--	ND(3)
MW-1 Dup	09/29/22	ND(0.002)	--	--	--	ND(10)	--	--	--	--	--	--	ND(3)
MW-2	08/24/12	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	ND(0.1)	ND(1)	ND(1)	ND(1)	ND(3)
	09/10/13	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	0.1	ND(1)	ND(1)	ND(1)	ND(3)
	09/16/14	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	0.11	ND(1)	ND(1)	ND(1)	ND(3)
	08/14/15	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	ND(0.1)	ND(1)	ND(1)	ND(1)	ND(3)
	09/07/16	--	ND(10)	ND(10)	ND(10)	3.8	--	--	0.095	ND(1)	ND(1)	ND(1)	ND(3)
	09/20/17	--	ND(10)	ND(10)	ND(10)	**6** [d]	--	--	0.28	ND(1)	ND(1)	ND(1)	ND(3)
	09/13/18	ND(0.002)	ND(10)	ND(10)	ND(10)	ND(10)	--	--	0.15	ND(1)	ND(1)	ND(1)	ND(3)
	12/06/18	ND(0.003)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	--	--	--	ND(1)	ND(1)	ND(1)	ND(3)
	08/13/19	ND(0.002)	ND(10)	ND(10)	ND(10)	ND(10)	0.78	0.75	ND(0.5)	ND(1)	ND(1)	ND(1)	ND(3)
	09/18/20	ND(0.002)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	0.73	0.77	ND(0.5)	ND(1)	ND(1)	ND(1)	ND(3)
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	--	--	ND(10)	--	--	--	--	--	--	--
	09/29/22	ND(0.002)	--	--	--	ND(10)	--	--	--	--	--	--	ND(3)
MW-4	08/21/12	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	0.11	ND(1)	ND(1)	ND(1)	ND(3)
	09/10/13	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	0.13	ND(1)	ND(1)	ND(1)	ND(3)
	09/17/14	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	0.14	ND(1)	ND(1)	ND(1)	ND(3)
	08/17/15	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	0.13	ND(1)	ND(1)	ND(1)	ND(3)
	09/07/16	--	ND(10)	ND(10)	ND(10)	3.5	--	--	0.13	ND(1)	ND(1)	ND(1)	ND(3)
	09/21/17	--	ND(10)	ND(10)	ND(10)	5.1	--	--	0.25	ND(1)	ND(1)	ND(1)	ND(3)
	09/13/18	ND(0.002)	ND(10)	ND(10)	ND(10)	ND(10)	--	--	ND(0.5)	ND(1)	ND(1)	ND(1)	ND(3)
	12/06/18	ND(0.003)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	--	--	--	ND(1)	ND(1)	ND(1)	ND(3)
	08/13/19	ND(0.002)	ND(10)	ND(10)	ND(10)	ND(10)	0.38	0.38	ND(0.5)	ND(1)	ND(1)	ND(1)	ND(3)
	09/18/20	ND(0.002)	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	0.28 J	0.36	0.38	ND(0.5) UJ	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(3) UJ
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	--	--	ND(10)	--	--	--	--	--	--	--
	09/30/22	ND(0.002)	--	--	--	ND(10)	--	--	--	--	--	--	ND(3)
MW-4 Dup	09/18/20	ND(0.002)	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	0.36	0.38	ND(0.5) UJ	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(3) UJ
	09/30/22	ND(0.002)	--	--	--	ND(10)	--	--	--	--	--	--	ND(3)
[a] NMED Groundwater Cleanup		0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[b] 40 CFR 141.62		0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c] NMED Tap Water		0.0124	NA	0.137	9.81	55.6	3.95	3.95	NA	NA	1.34	32.9	7.54
[d] USEPA RSL Tap Water HQ 1.		0.025	59	0.014	NA	5.6	NA	4	NA	62	0.13	3.3	7.5
[e] NMED TPH Levels		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	4-Bromo- phenyl-phenylether (ug/L)	2-Butanone (ug/L)	n-Butyl- benzene (ug/L)	sec-Butylbenzene (ug/L)	tert-Butyl-benzene (ug/L)	Benzyl Butyl Phthalate (ug/L)	Cadmium, Dissolved (mg/L)	Cadmium, Total (mg/L)	Calcium, Dissolved (mg/L)	Calcium, Total (mg/L)	Car- bazole (ug/L)	Carbon Disulfide (ug/L)
MW-1	08/24/12	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	1.6	ND(10)	ND(10)
	09/09/13	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	1.9	ND(10)	ND(10)
	09/16/14	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	1.6	ND(10)	ND(10)
	08/14/15	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	1.6	ND(10)	ND(10)
	09/07/16	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	1.6	--	ND(10)	ND(10)
	09/20/17	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	1.7	--	ND(10)	ND(10)
	09/13/18	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	1.7	--	ND(10)	ND(10)
	12/06/18	ND(0.5)	ND(10)	ND(3)	ND(1)	ND(1)	ND(0.5)	--	ND(0.002)	--	--	ND(0.5)	ND(10)
	08/12/19	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	1.8	--	ND(10)	ND(10)
	09/22/20	ND(0.51)	ND(10)	ND(3)	ND(1)	ND(1)	ND(0.51)	ND(0.002)	ND(0.002)	1.6	--	ND(0.51)	ND(10)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	--	ND(0.002)	--	--	--	--	--
	09/27/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	--	ND(10)	ND(3)	ND(1)	--	--	ND(0.002)	ND(0.002)	--	--	--	ND(10)
MW-1 Dup	09/29/22	--	ND(10)	ND(3)	ND(1)	--	--	ND(0.002)	ND(0.002)	--	--	--	ND(10)
MW-2	08/24/12	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	1.4	ND(10)	ND(10)
	09/10/13	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	1.8	ND(10)	ND(10)
	09/16/14	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	1.5	ND(10)	ND(10)
	08/14/15	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	1.5	ND(10)	ND(10)
	09/07/16	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	1.5	--	ND(10)	ND(10)
	09/20/17	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	1.5	--	ND(10)	ND(10)
	09/13/18	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	1.6	--	ND(10)	ND(10)
	12/06/18	ND(0.5)	ND(10)	ND(3)	ND(1)	ND(1)	ND(0.5)	--	ND(0.002)	--	--	ND(0.5)	ND(10)
	08/13/19	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	1.5	--	ND(10)	ND(10)
	09/18/20	ND(0.51)	ND(10)	ND(3)	ND(1)	ND(1)	ND(0.51)	ND(0.002) UJ	ND(0.002)	1.6	--	ND(0.51)	ND(10)
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	--	--	--	--	ND(0.002)	--	--	--	--	--
	09/29/22	--	ND(10)	ND(3)	ND(1)	--	--	ND(0.002)	ND(0.002)	--	--	--	ND(10)
MW-4	08/21/12	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	1.8	ND(10)	ND(10)
	09/10/13	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	6.3	ND(10)	ND(10)
	09/17/14	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	1.9	ND(10)	ND(10)
	08/17/15	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	1.7	ND(10)	ND(10)
	09/07/16	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	1.8	--	ND(10)	ND(10)
	09/21/17	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	1.9	--	ND(10)	ND(10)
	09/13/18	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	1.9	--	ND(10)	ND(10)
	12/06/18	ND(0.5)	ND(10)	ND(3)	ND(1)	ND(1)	ND(0.5)	--	ND(0.002)	--	--	ND(0.5)	ND(10)
	08/13/19	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	1.8	--	ND(10)	ND(10)
	09/18/20	ND(0.51) UJ	ND(10) UJ	ND(3) UJ	ND(1) UJ	ND(1) UJ	ND(0.51) UJ	ND(0.002) UJ	ND(0.002)	1.9	--	ND(0.51) UJ	ND(10) UJ
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	--	--	--	--	ND(0.002)	--	--	--	--	--
	09/30/22	--	ND(10)	ND(3)	ND(1)	--	--	ND(0.002)	ND(0.002)	--	--	--	ND(10)
MW-4 Dup	09/18/20	ND(0.51) UJ	ND(10) UJ	ND(3) UJ	ND(1) UJ	ND(1) UJ	ND(0.51) UJ	ND(0.002) UJ	ND(0.002)	1.9	--	ND(0.51) UJ	ND(10) UJ
	09/30/22	--	ND(10)	ND(3)	ND(1)	--	--	ND(0.002)	ND(0.002)	--	--	--	ND(10)
[a]	NMED Groundwater Cleanup	NA	NA	NA	NA	NA	NA	0.005	0.005	NA	NA	NA	NA
[b]	40 CFR 141.62	NA	NA	NA	NA	NA	NA	0.005	0.005	NA	NA	NA	NA
[c]	NMED Tap Water	NA	5,560	NA	NA	NA	NA	0.00624	0.00624	NA	NA	NA	810
[d]	USEPA RSL Tap Water HQ 1.	NA	5,600	1,000	2,000	690	16	NA	0.0092	NA	NA	NA	810
[e]	NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	Carbon tetrachloride (ug/L)	Chloride (mg/L)	4-Chloro-3-Methyl phenol (ug/L)	4-Chloro- aniline (ug/L)	Chlorobenzene (ug/L)	Chloroethane (ug/L)	Chloroform (ug/L)	Chloromethane (ug/L)	2-Chloro- naphthalene (ug/L)	2-Chloro- phenol (ug/L)	4-Chloro- phenyl- phenylether (ug/L)	2-Chloro- toluene (ug/L)
MW-1	08/24/12	ND(1)	47	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/09/13	ND(1)	44	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/16/14	ND(1)	44	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	08/14/15	ND(1)	23	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/07/16	ND(1)	44	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/20/17	ND(1)	48	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/13/18	ND(1)	48	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	12/06/18	ND(1)	--	ND(0.5)	ND(0.5)	ND(1)	ND(2)	ND(1)	ND(3)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)
	08/12/19	ND(1)	47	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/22/20	ND(1)	48	ND(0.51)	ND(0.51)	ND(1)	ND(2)	ND(1)	ND(3)	ND(0.51)	ND(0.51)	ND(0.51)	ND(1)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	49	--	--	--	--	--	--	--	--	--	--
	09/27/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	--	--	--	--	ND(1)	--	ND(1)	ND(3)	--	--	--	--
MW-1 Dup	09/29/22	--	--	--	--	ND(1)	--	ND(1)	ND(3)	--	--	--	--
MW-2	08/24/12	ND(1)	49	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/10/13	ND(1)	50	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/16/14	ND(1)	51	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	08/14/15	ND(1)	35	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/07/16	ND(1)	50	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/20/17	ND(1)	56	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/13/18	ND(1)	56	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	12/06/18	ND(1)	--	ND(0.5)	ND(0.5)	ND(1)	ND(2)	ND(1)	ND(3)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)
	08/13/19	ND(1)	54	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/18/20	ND(1)	55	ND(0.51)	ND(0.51)	ND(1)	ND(2)	ND(1)	ND(3)	ND(0.51)	ND(0.51)	ND(0.51)	ND(1)
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	56	--	--	--	--	--	--	--	--	--	--
	09/29/22	--	--	--	--	ND(1)	--	ND(1)	ND(3)	--	--	--	--
MW-4	08/21/12	ND(1)	16	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/10/13	ND(1)	18	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/17/14	ND(1)	18	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	08/17/15	ND(1)	18	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/07/16	ND(1)	18	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/21/17	ND(1)	16	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/13/18	ND(1)	16	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	12/06/18	ND(1)	--	ND(0.5)	ND(0.5)	ND(1)	ND(2)	ND(1)	ND(3)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)
	08/13/19	ND(1)	16	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/18/20	ND(1) UJ	16 J	ND(0.51) UJ	ND(0.51) UJ	ND(1) UJ	ND(2) UJ	ND(1) UJ	ND(3) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(1) UJ
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	16	--	--	--	--	--	--	--	--	--	--
	09/30/22	--	--	--	--	ND(1)	--	ND(1)	ND(3)	--	--	--	--
MW-4 Dup	09/18/20	ND(1) UJ	16 J	ND(0.51) UJ	ND(0.51) UJ	ND(1) UJ	ND(2) UJ	ND(1) UJ	ND(3) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(1) UJ
	09/30/22	--	--	--	--	ND(1)	--	ND(1)	ND(3)	--	--	--	--
[a]	NMED Groundwater Cleanup	5	250	NA	NA	NA	NA	100	NA	NA	NA	NA	NA
[b]	40 CFR 141.62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c]	NMED Tap Water	4.55	NA	NA	NA	77.6	20,900	2.29	20.3	733	91	NA	NA
[d]	USEPA RSL Tap Water HQ 1.	0.46	NA	1,400	0.37	78	21,000	0.22	190	750	91	NA	240
[e]	NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	4-Chloro- toluene (ug/L)	Chromium, Dissolved (mg/L)	Chromium, Total (mg/L)	Chrysene (ug/L)	Cobalt, Dissolved (mg/L)	Cobalt, Total (mg/L)	Specific Conductance Fiel (umhos/cm)	Copper, Dissolved (mg/L)	Copper, Total (mg/L)	Cyanide, Total (mg/L)	Dibenz- (a,h)- acridine (ug/L)	Dibenz (a,h) anthracene (ug/L)
MW-1	08/24/12	ND(1)	--	ND(0.006)	ND(10)	--	--	--	--	ND(0.006)	--	--	ND(10)
	09/09/13	ND(1)	--	ND(0.006)	ND(10)	--	--	--	--	ND(0.006)	**0.041** [c,d]	--	ND(10)
	09/16/14	ND(1)	--	ND(0.006)	ND(10)	--	--	--	--	ND(0.006)	ND(0.01)	--	ND(10)
	08/14/15	ND(1)	--	ND(0.006)	ND(10)	--	--	--	--	ND(0.006)	ND(0.01)	--	ND(10)
	09/07/16	ND(1)	ND(0.006)	ND(0.006)	ND(10)	--	--	--	ND(0.006)	ND(0.006)	ND(0.01)	--	ND(10)
	09/20/17	ND(1)	ND(0.006)	**0.0074** [c]	ND(10)	--	--	--	ND(0.006)	0.0018	ND(0.005)	--	ND(10)
	09/13/18	ND(1)	0.0024	0.0018	ND(10)	--	--	--	ND(0.006)	ND(0.006)	ND(0.005)	--	ND(10)
	12/06/18	ND(1)	--	ND(0.006)	ND(0.5)	--	ND(0.006)	--	--	--	ND(0.01)	ND(0.5)	ND(0.5)
	08/12/19	ND(1)	0.0021	0.0017	ND(10)	ND(0.006)	ND(0.006)	--	ND(0.006)	ND(0.006)	ND(0.005)	--	ND(10)
	09/22/20	ND(1)	ND(0.006)	ND(0.006)	ND(0.51)	ND(0.006)	ND(0.006)	10306.4	ND(0.006)	ND(0.006)	ND(0.01)	--	ND(0.03)
	09/28/21	--	--	--	--	--	--	1000	--	--	--	--	--
	09/29/21	--	ND(0.006)	ND(0.006)	--	--	--	--	ND(0.001)	--	--	--	--
	09/27/22	--	--	--	--	--	--	1020	--	--	--	--	--
	09/29/22	--	ND(0.006)	0.0029J/ND (0.006)U*	ND(0.3)	ND(0.006)	ND(0.006)	--	--	--	ND(0.005)	--	--
MW-1 Dup	09/29/22	--	ND(0.006)	0.0033J/ND (0.006)U*	ND(0.3)	ND(0.006)	ND(0.006)	--	--	--	ND(0.005)	--	--
MW-2	08/24/12	ND(1)	--	ND(0.006)	ND(10)	--	--	--	--	ND(0.006)	--	--	ND(10)
	09/10/13	ND(1)	--	ND(0.006)	ND(10)	--	--	--	--	ND(0.006)	ND(0.01)	--	ND(10)
	09/16/14	ND(1)	--	ND(0.006)	ND(10)	--	--	--	--	ND(0.006)	ND(0.01)	--	ND(10)
	08/14/15	ND(1)	--	ND(0.006)	ND(10)	--	--	--	--	ND(0.006)	ND(0.01)	--	ND(10)
	09/07/16	ND(1)	ND(0.006)	ND(0.006)	ND(10)	--	--	--	ND(0.006)	ND(0.006)	ND(0.01)	--	ND(10)
	09/20/17	ND(1)	ND(0.006)	ND(0.006)	ND(10)	--	--	--	ND(0.006)	ND(0.006)	ND(0.005)	--	ND(10)
	09/13/18	ND(1)	ND(0.006)	ND(0.006)	ND(10)	--	--	--	ND(0.006)	ND(0.006)	ND(0.005)	--	ND(10)
	12/06/18	ND(1)	--	ND(0.006)	ND(0.5)	--	ND(0.006)	--	--	--	ND(0.01)	ND(0.5)	ND(0.5)
	08/13/19	ND(1)	ND(0.006)	ND(0.006)	ND(10)	ND(0.006)	ND(0.006)	--	ND(0.006)	ND(0.006)	ND(0.005)	--	ND(10)
	09/18/20	ND(1)	ND(0.006)	ND(0.006) UJ	ND(0.51)	ND(0.006)	ND(0.006)	1240	ND(0.006)	ND(0.006)	ND(0.01)	--	ND(0.03)
	09/16/21	--	--	--	--	--	--	1010	--	--	--	--	--
	09/17/21	--	ND(0.006)	ND(0.006)	--	--	--	--	0.27	--	ND(0.005)	--	--
	09/29/22	--	ND(0.006)	0.005J/ND(0.006) U*	ND(0.3)	ND(0.006)	ND(0.006)	1120	--	--	ND(0.005)	--	--
MW-4	08/21/12	ND(1)	--	ND(0.006)	ND(10)	--	--	--	--	ND(0.006)	--	--	ND(10)
	09/10/13	ND(1)	--	ND(0.006)	ND(10)	--	--	--	--	ND(0.006)	ND(0.01)	--	ND(10)
	09/17/14	ND(1)	--	ND(0.006)	ND(10)	--	--	--	--	ND(0.006)	ND(0.01)	--	ND(10)
	08/17/15	ND(1)	--	ND(0.006)	ND(10)	--	--	--	--	ND(0.006)	ND(0.01)	--	ND(10)
	09/07/16	ND(1)	ND(0.006)	ND(0.006)	ND(10)	--	--	--	ND(0.006)	ND(0.006)	ND(0.01)	--	ND(10)
	09/21/17	ND(1)	ND(0.006)	ND(0.006)	ND(10)	--	--	--	ND(0.006)	0.0019	ND(0.005)	--	ND(10)
	09/13/18	ND(1)	ND(0.006)	ND(0.006)	ND(10)	--	--	--	ND(0.006)	ND(0.006)	ND(0.005)	--	ND(10)
	12/06/18	ND(1)	--	ND(0.006)	ND(0.5)	--	ND(0.006)	--	--	--	ND(0.01)	ND(0.5)	ND(0.5)
	08/13/19	ND(1)	ND(0.006)	ND(0.006)	ND(10)	ND(0.006)	ND(0.006)	--	ND(0.006)	ND(0.006)	ND(0.005)	--	ND(10)
	09/18/20	ND(1) UJ	0.0022 J	0.0037 J	ND(0.51) UJ	ND(0.006) UJ	ND(0.006)	1290	ND(0.006)	ND(0.006)	ND(0.01) UJ	--	ND(0.03) UJ
	09/16/21	--	--	--	--	--	--	1022	--	--	--	--	--
	09/17/21	--	ND(0.006)	0.0031 J	--	--	--	--	ND(0.02)	--	ND(0.005)	--	--
	09/30/22	--	ND(0.006)	0.0036 J+	ND(0.3)	ND(0.006)	ND(0.006)	1180	--	--	ND(0.005)	--	--
MW-4 Dup	09/18/20	ND(1) UJ	ND(0.006)	ND(0.006)	ND(0.51) UJ	ND(0.006) UJ	ND(0.006)	--	ND(0.006)	ND(0.006)	ND(0.01) UJ	--	ND(0.031) UJ
	09/30/22	--	ND(0.006)	ND(0.006)	ND(0.3)	ND(0.006)	ND(0.006)	--	--	--	ND(0.005)	--	--
[a] NMED Groundwater Cleanup		NA	0.05	0.05	NA	NA	NA	NA	NA	NA	0.2	NA	NA
[b] 40 CFR 141.62		NA	0.1	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c] NMED Tap Water		NA	NA	0.0057	34.3	0.00598	0.00598	NA	0.79	0.79	0.00146	NA	0.0343
[d] USEPA RSL Tap Water HQ 1.		250	NA	NA	25	NA	0.006	NA	NA	0.8	0.0015	NA	0.025
[e] NMED TPH Levels		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	Dibenzo- furan (ug/L)	1,2-Dibromo 3-chloro- propane (ug/L)	Dibromo- chloromethane (ug/L)	1,2- Dibromo- ethane (ug/L)	Dibromomethane (ug/L)	1,2-Di- chloro- benzene (ug/L)	1,3-Di- chloro- benzene (ug/L)	1,4-Di- chloro- benzene (ug/L)	3,3'-Di- chloro- benzidine (ug/L)	Dichloro- difluoro- methane (ug/L)	1,1-Dichloro- ethane (ug/L)	1,2- Dichloro- ethane (ug/L)
MW-1	08/24/12	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/09/13	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/16/14	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	08/14/15	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/07/16	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/20/17	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/13/18	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	12/06/18	ND(0.5)	ND(2)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(1)	ND(1)
	08/12/19	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/22/20	ND(0.51)	ND(2)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.51)	ND(1)	ND(1)	ND(1)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/27/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	--	--	--	ND(0.0092)	--	--	--	ND(5)	--	--	ND(1)	ND(1)
MW-1 Dup	09/29/22	--	--	--	ND(0.0094)	--	--	--	ND(5)	--	--	ND(1)	ND(1)
MW-2	08/24/12	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/10/13	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/16/14	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	08/14/15	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/07/16	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/20/17	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/13/18	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	12/06/18	ND(0.5)	ND(2)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(1)	ND(1)
	08/13/19	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/18/20	ND(0.51)	ND(2)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.51)	ND(1)	ND(1)	ND(1)
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	--	--	--	ND(0.0093)	--	--	--	ND(5)	--	--	ND(1)	ND(1)
MW-4	08/21/12	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/10/13	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/17/14	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	08/17/15	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/07/16	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/21/17	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/13/18	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	12/06/18	ND(0.5)	ND(2)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(1)	ND(1)
	08/13/19	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/18/20	ND(0.51) UJ	ND(2) UJ	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(0.51) UJ	ND(1) UJ	ND(1) UJ	ND(1) UJ
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/30/22	--	--	--	ND(0.0094)	--	--	--	ND(5)	--	--	ND(1)	ND(1)
MW-4 Dup	09/18/20	ND(0.51) UJ	ND(2) UJ	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(0.51) UJ	ND(1) UJ	ND(1) UJ	ND(1) UJ
	09/30/22	--	--	--	ND(0.0094)	--	--	--	ND(5)	--	--	ND(1)	ND(1)
[a]	NMED Groundwater Cleanup	NA	NA	NA	0.05	NA	600	NA	75	NA	NA	25	5
[b]	40 CFR 141.62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c]	NMED Tap Water	NA	0.00334	1.68	0.0747	8	302	NA	4.82	1.25	197	27.5	1.71
[d]	USEPA RSL Tap Water HQ 1.	7.9	0.00033	0.87	0.0075	8.3	300	NA	0.48	0.13	200	2.8	0.17
[e]	NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	1,1-Dichloro-ethene (ug/L)	cis-1,2- Dichloro-ethene (ug/L)	trans-1,2-Dichloro- ethene (ug/L)	2,4- Dichloro-phenol (ug/L)	1,2-Dichloro-propane (ug/L)	1,3-Dichloro-propane (ug/L)	2,2-Dichloro-propane (ug/L)	1,1-Dichloro-propene (ug/L)	Cis-1,3- dichloro-propene (ug/L)	trans-1,3-Dichloro- propene (ug/L)	Diethyl- phthalate (ug/L)	7,12-Dimethyl benz(a) anthracen (ug/L)
MW-1	08/24/12	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/09/13	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/16/14	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	08/14/15	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/07/16	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/20/17	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/13/18	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	12/06/18	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)
	08/12/19	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/22/20	ND(1)	ND(1)	ND(1)	ND(0.51)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(0.51)	--
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	--	--	--	--	--	ND(10)	--
	09/27/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	ND(1)	ND(1)	--	--	--	--	--	--	--	--	ND(10)	--
MW-1 Dup	09/29/22	ND(1)	ND(1)	--	--	--	--	--	--	--	--	ND(10)	--
MW-2	08/24/12	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/10/13	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/16/14	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	08/14/15	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/07/16	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/20/17	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/13/18	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	12/06/18	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)
	08/13/19	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/18/20	ND(1)	ND(1)	ND(1)	ND(0.51)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(0.51)	--
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	--	--	--	--	--	--	--	--	ND(10)	--
	09/29/22	ND(1)	ND(1)	--	--	--	--	--	--	--	--	ND(10)	--
MW-4	08/21/12	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/10/13	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/17/14	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	08/17/15	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/07/16	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/21/17	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/13/18	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	12/06/18	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)
	08/13/19	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/18/20	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(0.51) UJ	ND(1) UJ	ND(1) UJ	ND(2) UJ	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(0.51) UJ	--
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	--	--	--	--	--	--	--	--	ND(10)	--
	09/30/22	ND(1)	ND(1)	--	--	--	--	--	--	--	--	ND(10)	--
MW-4 Dup	09/18/20	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(0.51) UJ	ND(1) UJ	ND(1) UJ	ND(2) UJ	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(0.51) UJ	--
	09/30/22	ND(1)	ND(1)	--	--	--	--	--	--	--	--	ND(10)	--
[a]	NMED Groundwater Cleanup	7	70	100	NA	5	NA	NA	NA	NA	NA	NA	NA
[b]	40 CFR 141.62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c]	NMED Tap Water	284	36.5	93.2	45.3	4.38	NA	NA	NA	NA	NA	14,800	NA
[d]	USEPA RSL Tap Water HQ 1.	280	36	360	46	0.85	370	NA	NA	NA	NA	15,000	0.0001
[e]	NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	2,4- Dimethyl- phenol (ug/L)	Dimethyl Phthalate (ug/L)	Di-n- butyl- phthalate (ug/L)	2-Methyl- 4,6- dinitro phenol (ug/L)	2,4- Dinitro- phenol (ug/L)	2,4-Dinitro Toluene (ug/L)	2,6-Dinitro Toluene (ug/L)	Di-n- octyl- phthalate (ug/L)	1,4-Dioxane (ug/L)	1,2-Diphenyl hydrazine (ug/L)	Dissolved Oxygen, Field (mg/L)	Ethyl- benzene (ug/L)
MW-1	08/24/12	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/09/13	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/16/14	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(20)	--	--	--	ND(1)
	08/14/15	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/07/16	ND(10)	5.1	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	4.4	--	--	--	ND(1)
	09/20/17	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/13/18	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	ND(10)	--	--	ND(1)
	12/06/18	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(50)	ND(0.5)	--	ND(1)
	08/12/19	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/22/20	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51) UJ	ND(0.51)	ND(0.2)	ND(0.51)	ND(0.51)	--	0.62	ND(1)
	09/28/21	--	--	--	--	--	--	--	--	--	--	3.84	--
	09/29/21	--	ND(10)	--	--	--	--	--	ND(20)	ND(1)	--	--	ND(1)
	09/27/22	--	--	--	--	--	--	--	--	--	--	2.07	--
	09/29/22	ND(10)	ND(10)	ND(10)	--	ND(20)	--	--	ND(20)	ND(1) UJ	--	--	ND(1)
MW-1 Dup	09/29/22	ND(10)	ND(10)	ND(10)	--	ND(20)	--	--	ND(20)	ND(1) UJ	--	--	ND(1)
MW-2	08/24/12	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/10/13	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/16/14	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(20)	--	--	--	ND(1)
	08/14/15	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/07/16	ND(10)	5	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	3.5	--	--	--	ND(1)
	09/20/17	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/13/18	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	ND(10)	--	--	ND(1)
	12/06/18	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(50)	ND(0.5)	--	ND(1)
	08/13/19	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/18/20	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.2)	ND(0.51)	ND(0.51)	--	0.98	ND(1)
	09/16/21	--	--	--	--	--	--	--	--	--	--	1.23	--
	09/17/21	--	ND(10)	--	--	--	--	--	ND(20)	--	--	--	ND(1)
	09/29/22	ND(10)	ND(10)	ND(10)	--	ND(20)	--	--	ND(20)	ND(1) UJ	--	1.26	ND(1)
MW-4	08/21/12	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/10/13	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/17/14	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(20)	--	--	--	ND(1)
	08/17/15	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/07/16	ND(10)	4.5	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	3.7	--	--	--	ND(1)
	09/21/17	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/13/18	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	ND(10)	--	--	ND(1)
	12/06/18	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(50)	ND(0.5)	--	ND(1)
	08/13/19	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/18/20	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.2) UJ	ND(0.51) UJ	ND(0.51) UJ	--	3.29	ND(1) UJ
	09/16/21	--	--	--	--	--	--	--	--	--	--	2.12	--
	09/17/21	--	ND(10)	--	--	--	--	--	ND(20)	--	--	--	ND(1)
	09/30/22	ND(10)	ND(10)	ND(10)	--	ND(20)	--	--	ND(20)	ND(1)	--	1.32	ND(1)
MW-4 Dup	09/18/20	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.2) UJ	ND(0.51) UJ	ND(0.51) UJ	--	--	ND(1) UJ
	09/30/22	ND(10)	ND(10)	ND(10)	--	ND(20)	--	--	ND(20)	ND(1)	--	--	ND(1)
[a]	NMED Groundwater Cleanup	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	700
[b]	40 CFR 141.62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c]	NMED Tap Water	354	612	885	1.52	38.7	2.37	0.485	NA	4.59	0.78	NA	15
[d]	USEPA RSL Tap Water HQ 1.	360	NA	900	1.5	39	0.24	0.049	200	0.46	0.078	NA	1.5
[e]	NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	Fluor- anthene (ug/L)	Fluorene (ug/L)	Fluoride, Total (mg/L)	Hexachloro Benzene (ug/L)	Hexachloro- butadiene (ug/L)	Hexachloro- cyclopenta- diene (ug/L)	Hexachloro- ethane (ug/L)	2-Hexanone (ug/L)	Indeno- (1,2,3-cd) pyrene (ug/L)	Iron, Dissolved (mg/L)	Iron, Total (mg/L)	Isophorone (ug/L)
MW-1	08/24/12	ND(10)	ND(10)	0.67	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	0.078	ND(10)
	09/09/13	ND(10)	ND(10)	0.61	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	ND(0.02)	ND(10)
	09/16/14	ND(10)	ND(10)	0.69	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	ND(0.02)	ND(10)
	08/14/15	ND(10)	ND(10)	0.39	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	0.048	ND(10)
	09/07/16	ND(10)	ND(10)	0.63	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.02)	ND(0.02)	ND(10)
	09/20/17	ND(10)	ND(10)	0.61	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.02)	0.26	ND(10)
	09/13/18	ND(10)	ND(10)	0.8	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.02)	0.16	ND(10)
	12/06/18	ND(0.5)	ND(0.5)	--	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(10)	ND(0.5)	--	--	ND(0.5)
	08/12/19	ND(10)	ND(10)	0.73	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.02)	0.12	ND(10)
	09/22/20	ND(0.51)	ND(0.51)	0.63	ND(0.51)	ND(1)	ND(0.51)	ND(0.51)	ND(10)	ND(0.2)	ND(0.02)	0.037 J+	ND(0.51)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	0.51	--	--	--	--	--	--	ND(0.02)	0.12	--
	09/27/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	ND(0.3)	ND(0.3) UJ	--	--	--	--	--	--	ND(0.3)	--	--	--
MW-1 Dup	09/29/22	ND(0.3)	ND(0.3) UJ	--	--	--	--	--	--	ND(0.3)	--	--	--
MW-2	08/24/12	ND(10)	ND(10)	0.67	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	0.022	ND(10)
	09/10/13	ND(10)	ND(10)	0.77	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	ND(0.02)	ND(10)
	09/16/14	ND(10)	ND(10)	0.73	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	ND(0.02)	ND(10)
	08/14/15	ND(10)	ND(10)	0.54	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	0.023	ND(10)
	09/07/16	ND(10)	ND(10)	0.66	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.02)	ND(0.02)	ND(10)
	09/20/17	ND(10)	ND(10)	0.63	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.02)	0.097	ND(10)
	09/13/18	ND(10)	ND(10)	**0.87** [d]	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.02)	0.01	ND(10)
	12/06/18	ND(0.5)	ND(0.5)	--	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(10)	ND(0.5)	--	--	ND(0.5)
	08/13/19	ND(10)	ND(10)	0.74	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.02)	0.069	ND(10)
	09/18/20	ND(0.51)	ND(0.51)	**0.84** [d]	ND(0.51)	ND(1)	ND(0.51)	ND(0.51)	ND(10)	ND(0.2)	ND(0.02)	0.036 J	ND(0.51)
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	**0.86** [d]	--	--	--	--	--	--	ND(0.02)	0.016 J	--
	09/29/22	ND(0.3)	ND(0.3) UJ	--	--	--	--	--	--	ND(0.3)	--	--	--
MW-4	08/21/12	ND(10)	ND(10)	0.29	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	ND(0.02)	ND(10)
	09/10/13	ND(10)	ND(10)	0.32	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	ND(0.02)	ND(10)
	09/17/14	ND(10)	ND(10)	0.31	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	ND(0.02)	ND(10)
	08/17/15	ND(10)	ND(10)	0.29	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	ND(0.02)	ND(10)
	09/07/16	ND(10)	ND(10)	0.21	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.02)	0.028	ND(10)
	09/21/17	ND(10)	ND(10)	ND(0.5)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.02)	0.021	ND(10)
	09/13/18	ND(10)	ND(10)	0.42	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.02)	ND(0.02)	ND(10)
	12/06/18	ND(0.5)	ND(0.5)	--	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(10)	ND(0.5)	--	--	ND(0.5)
	08/13/19	ND(10)	ND(10)	0.34	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.02)	ND(0.02)	ND(10)
	09/18/20	ND(0.51) UJ	ND(0.51) UJ	0.3 J	ND(0.51) UJ	ND(1) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(10) UJ	ND(0.2) UJ	ND(0.02)	0.13	ND(0.51) UJ
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	0.4 J	--	--	--	--	--	--	ND(0.02)	0.25	--
	09/30/22	ND(0.3) UJ	ND(0.3)	--	--	--	--	--	--	ND(0.3) UJ	--	--	--
MW-4 Dup	09/18/20	ND(0.51) UJ	ND(0.51) UJ	0.31 J	ND(0.51) UJ	ND(1) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(10) UJ	ND(0.2) UJ	ND(0.02)	0.14	ND(0.51) UJ
	09/30/22	ND(0.3) UJ	ND(0.3)	--	--	--	--	--	--	ND(0.3) UJ	--	--	--
[a] NMED Groundwater Cleanup		NA	NA	1.6	NA	NA	NA	NA	NA	NA	NA	NA	NA
[b] 40 CFR 141.62		NA	NA	4	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c] NMED Tap Water		802	288	1.18	0.0976	1.39	0.411	3.28	NA	0.343	13.8	13.8	781
[d] USEPA RSL Tap Water HQ 1.		800	290	0.8	0.0098	0.14	0.41	0.33	38	0.25	NA	14	78
[e] NMED TPH Levels		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	Isopropyl-benzene (ug/L)	p-Isopropyl-toluene (ug/L)	Lead, Dissolved (mg/L)	Lead, Total (mg/L)	Magnesium, Dissolved (mg/L)	Magnesium, Total (mg/L)	Manganese, Dissolved (mg/L)	Manganese, Total (mg/L)	Mercury, Dissolved (mg/L)	Mercury, Total (mg/L)	4-Methyl- 2-Pentanone (ug/L)	Methylene Chloride (ug/L)
MW-1	08/24/12	ND(1)	ND(1)	--	ND(0.005)	--	ND(1)	--	0.0071	--	ND(0.0002)	ND(10)	ND(3)
	09/09/13	ND(1)	ND(1)	--	ND(0.001)	--	ND(1)	--	ND(0.002)	--	ND(0.0002)	ND(10)	ND(3)
	09/16/14	ND(1)	ND(1)	--	ND(0.001)	--	ND(1)	--	0.0027	--	ND(0.0002)	ND(10)	ND(3)
	08/14/15	ND(1)	ND(1)	--	0.00051	--	ND(1)	--	0.0033	--	ND(0.0002)	ND(10)	ND(3)
	09/07/16	ND(1)	ND(1)	ND(0.0005)	0.00014	ND(1)	--	0.0031	0.0032	--	0.000056	ND(10)	ND(3)
	09/20/17	ND(1)	ND(1)	ND(0.0005)	0.0016	ND(1)	--	0.0018	0.014	--	ND(0.0002)	ND(10)	ND(3)
	09/13/18	ND(1)	ND(1)	ND(0.0005)	0.0013	ND(1)	--	0.002	0.01	--	0.00017	ND(10)	0.41
	12/06/18	ND(1)	ND(1)	--	ND(0.001)	--	--	--	--	--	ND(0.0002)	ND(10)	ND(3)
	08/12/19	ND(1)	ND(1)	0.000099	0.00037	0.19	--	0.0017	0.0046	--	0.000054	ND(10)	ND(3)
	09/22/20	ND(1)	ND(1)	0.000082 J	0.00042J/ND (0.0005)U*	0.17 J	--	0.002 J	0.0047	--	ND(0.0002) UJ	ND(10)	ND(3)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	0.00011 J	0.00052	--	--	0.0014 J	0.0049	--	ND(0.0002)	--	ND(3)
	09/27/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	ND(1)	ND(1)	0.00013 J	0.00073	--	--	--	--	ND(0.0002)	ND(0.0002)	--	ND(3)
MW-1 Dup	09/29/22	ND(1)	ND(1)	0.00012 J	0.00066	--	--	--	--	ND(0.0002)	ND(0.0002)	--	ND(3)
MW-2	08/24/12	ND(1)	ND(1)	--	ND(0.005)	--	ND(1)	--	0.0072	--	ND(0.0002)	ND(10)	ND(3)
	09/10/13	ND(1)	ND(1)	--	ND(0.001)	--	ND(1)	--	0.0051	--	ND(0.0002)	ND(10)	ND(3)
	09/16/14	ND(1)	ND(1)	--	ND(0.001)	--	ND(1)	--	0.0026	--	ND(0.0002)	ND(10)	ND(3)
	08/14/15	ND(1)	ND(1)	--	ND(0.0005)	--	ND(1)	--	0.0035	--	ND(0.0002)	ND(10)	ND(3)
	09/07/16	ND(1)	ND(1)	ND(0.0005)	ND(0.0005)	ND(1)	--	0.0024	0.0031	--	0.000056	ND(10)	ND(3)
	09/20/17	ND(1)	ND(1)	ND(0.0005)	0.00055	ND(1)	--	0.0028	0.018	--	0.00004	ND(10)	ND(3)
	09/13/18	ND(1)	ND(1)	ND(0.0005)	ND(0.0005)	ND(1)	--	0.0024	0.0026	--	0.00014	ND(10)	ND(3)
	12/06/18	ND(1)	ND(1)	--	ND(0.001)	--	--	--	--	--	ND(0.0002)	ND(10)	ND(3)
	08/13/19	ND(1)	ND(1)	ND(0.0005)	ND(0.0005)	0.15	--	0.0018	0.0027	--	0.000046	ND(10)	ND(3)
	09/18/20	ND(1)	ND(1)	ND(0.0005)	0.00039J/ND (0.0005)U*	0.15 J	--	0.0033/ND (0.0033)U*	0.021	--	ND(0.0002) UJ	ND(10)	ND(3)
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	ND(0.01)	ND(0.0025)	--	--	0.0018 J	0.0036	ND(0.0002)	ND(0.0002)	--	ND(3)
	09/29/22	ND(1)	ND(1)	ND(0.0005)	ND(0.0005)	--	--	--	--	ND(0.0002)	ND(0.0002)	--	ND(3)
MW-4	08/21/12	ND(1)	ND(1)	--	ND(0.005)	--	ND(1)	--	0.0034	--	ND(0.0002)	ND(10)	ND(3)
	09/10/13	ND(1)	ND(1)	--	ND(0.001)	--	ND(1)	--	0.0057	--	ND(0.0002)	ND(10)	ND(3)
	09/17/14	ND(1)	ND(1)	--	ND(0.001)	--	ND(1)	--	0.0057	--	ND(0.0002)	ND(10)	ND(3)
	08/17/15	ND(1)	ND(1)	--	ND(0.0005)	--	ND(1)	--	0.0052	--	ND(0.0002)	ND(10)	ND(3)
	09/07/16	ND(1)	ND(1)	ND(0.0005)	0.00017	ND(1)	--	0.0046	0.0064	--	ND(0.0002)	ND(10)	ND(3)
	09/21/17	ND(1)	ND(1)	ND(0.0005)	0.00017	ND(1)	--	0.0052	0.0069	--	ND(0.0002)	ND(10)	ND(3)
	09/13/18	ND(1)	ND(1)	ND(0.0005)	ND(0.0005)	ND(1)	--	0.0064	0.0059	--	0.00011	ND(10)	ND(3)
	12/06/18	ND(1)	ND(1)	--	ND(0.001)	--	--	--	--	--	ND(0.0002)	ND(10)	ND(3)
	08/13/19	ND(1)	ND(1)	ND(0.0005)	ND(0.0005)	0.2	--	0.0052	0.0056	--	ND(0.0002)	ND(10)	ND(3)
	09/18/20	ND(1) UJ	ND(1) UJ	ND(0.0005)	0.0027	0.2 J	--	0.004	0.12	--	ND(0.0002)	ND(10) UJ	ND(3) UJ
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	ND(0.01)	0.014	--	--	0.0035	0.03	ND(0.0002)	ND(0.0002)	--	ND(3)
	09/30/22	ND(1)	ND(1)	ND(0.0005)	ND(0.0005)	--	--	--	--	0.000098 J	ND(0.0002)	--	ND(3)
MW-4 Dup	09/18/20	ND(1) UJ	ND(1) UJ	ND(0.0005)	0.0028	0.2 J	--	0.0045	0.13	--	ND(0.0002)	ND(10) UJ	ND(3) UJ
	09/30/22	ND(1)	ND(1)	ND(0.0005)	ND(0.0005)	--	--	--	--	ND(0.0002)	ND(0.0002)	--	ND(3)
[a]	NMED Groundwater Cleanup	NA	NA	0.015	0.015	NA	NA	NA	NA	NA	0.002	NA	5
[b]	40 CFR 141.62	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.002	NA	NA
[c]	NMED Tap Water	447	NA	NA	NA	NA	NA	2.02	2.02	NA	NA	1,240	118
[d]	USEPA RSL Tap Water HQ 1.	450	NA	NA	0.015	NA	NA	NA	0.43	NA	0.00063	6,300	11
[e]	NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	1-Methyl-naphthalene (ug/L)	2-Methyl-naphthalene (ug/L)	2-Methyl phenol (ug/L)	3,4- Methyl phenol (ug/L)	Molybdenum, Dissolved (mg/L)	Molybdenum, Total (mg/L)	Motor Oil (mg/L)	MTBE (ug/L)	Naphthalene (ug/L)	Nickel, Dissolved (mg/L)	Nickel, Total (mg/L)	Nitrate & Nitrite (mg/L)
MW-1	08/24/12	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	09/09/13	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	4.1
	09/16/14	ND(10)	ND(10)	ND(20)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	08/14/15	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	09/07/16	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	09/20/17	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	09/13/18	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	--
	12/06/18	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	--	--	--	ND(1)	ND(0.5)	--	ND(0.01)	--
	08/12/19	ND(4)	ND(4)	ND(10)	ND(10)	0.0076	0.0095	ND(5)	ND(1)	ND(2)	ND(0.01)	ND(0.01)	--
	09/22/20	ND(0.51)	ND(4)	ND(0.51)	ND(0.51)	0.0071 J	ND(0.008)	--	ND(1)	ND(0.51)	ND(0.01)	ND(0.01)	--
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	--	--	ND(1)	--	--	--	--
	09/27/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	ND(0.3) UJ	ND(0.3) UJ	ND(10)	ND(10)	--	--	--	ND(1)	ND(0.3) UJ	0.022 J	ND(0.01)	--
MW-1 Dup	09/29/22	ND(0.3) UJ	ND(0.3) UJ	ND(10)	ND(10)	--	--	--	ND(1)	ND(0.3) UJ	ND(0.01) UJ	ND(0.01)	--
MW-2	08/24/12	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	09/10/13	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	--
	09/16/14	ND(10)	ND(10)	ND(20)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	21
	08/14/15	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	09/07/16	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	09/20/17	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	09/13/18	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	--
	12/06/18	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	--	--	--	ND(1)	ND(0.5)	--	ND(0.01)	--
	08/13/19	ND(4)	ND(4)	ND(10)	ND(10)	0.0091	0.0085	ND(5)	ND(1)	ND(2)	ND(0.01)	ND(0.01)	--
	09/18/20	ND(4)	ND(4)	ND(0.51)	ND(0.51)	ND(0.008)	0.0086	--	ND(1)	ND(2)	ND(0.01)	ND(0.01) UJ	ND(1)
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	--	--	--	--	--	ND(1)	--	--	--	--
	09/29/22	ND(0.3) UJ	ND(0.3) UJ	ND(10)	ND(10)	--	--	--	ND(1)	ND(0.3) UJ	ND(0.01)	ND(0.01)	--
MW-4	08/21/12	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	09/10/13	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	--
	09/17/14	ND(10)	ND(10)	ND(20)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	08/17/15	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	09/07/16	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	09/21/17	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	09/13/18	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	--
	12/06/18	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	--	--	--	ND(1)	ND(0.5)	--	ND(0.01)	--
	08/13/19	ND(4)	ND(4)	ND(10)	ND(10)	0.0097	0.0081	ND(5)	ND(1)	ND(2)	ND(0.01)	ND(0.01)	--
	09/18/20	ND(4) UJ	ND(4) UJ	ND(0.51) UJ	ND(0.51) UJ	0.0066 J	ND(0.008)	--	ND(1) UJ	ND(2) UJ	ND(0.01)	ND(0.01) UJ	--
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	--	--	--	--	--	ND(1)	--	--	--	--
	09/30/22	ND(0.3)	ND(0.3)	ND(10)	ND(10)	--	--	--	ND(1)	ND(0.3)	ND(0.01)	ND(0.01)	--
MW-4 Dup	09/18/20	ND(4) UJ	ND(4) UJ	ND(0.51) UJ	ND(0.51) UJ	0.0078 J	0.0085	--	ND(1) UJ	ND(2) UJ	0.0045 J	ND(0.01) UJ	--
	09/30/22	ND(0.3)	ND(0.3)	ND(10)	ND(10)	--	--	--	ND(1)	ND(0.3)	ND(0.01)	ND(0.01)	--
[a] NMED Groundwater Cleanup		NA	NA	NA	NA	NA	NA	NA	NA	30	NA	NA	NA
[b] 40 CFR 141.62		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c] NMED Tap Water		11.4	35.1	NA	NA	0.0987	0.0987	NA	143	1.65	0.372	0.372	NA
[d] USEPA RSL Tap Water HQ 1.		1.1	36	930	NA	NA	0.1	NA	14	0.17	NA	0.39	NA
[e] NMED TPH Levels		NA	NA	NA	NA	NA	NA	0.0858	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	2-Nitro- aniline (ug/L)	3-Nitro- aniline (ug/L)	4-Nitro- aniline (ug/L)	Nitro- benzene (ug/L)	Nitrogen, Nitrate (mg/L)	Nitrogen, Nitrate & Nitrite (mg/L)	Nitrogen, Nitrite (mg/L)	2-Nitro- phenol (ug/L)	4-Nitro- phenol (ug/L)	N-Nitroso- dimethyl- amine (ug/L)	N-Nitrosodi- n- propyl- amine (ug/L)	N-Nitroso- diphenyl- amine (ug/L)
MW-1	08/24/12	ND(10)	ND(10)	ND(20)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/09/13	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/16/14	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	08/14/15	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/07/16	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/20/17	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/13/18	ND(10)	ND(10)	ND(10)	ND(10)	0.049	--	ND(0.5)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	12/06/18	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	--	--	--	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
	08/12/19	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.5)	--	ND(0.5)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/22/20	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.5)	--	ND(0.5)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	0.034J/ND(0.1)U*	--	ND(0.1)	--	--	--	--	--
	09/27/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	--	--	--	--	--	--	--	--	--	--	--	--
MW-1 Dup	09/29/22	--	--	--	--	--	--	--	--	--	--	--	--
MW-2	08/24/12	ND(10)	ND(10)	ND(20)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/10/13	ND(10)	ND(10)	ND(10)	ND(10)	0.11	--	ND(0.1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/16/14	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	08/14/15	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/07/16	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/20/17	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/13/18	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.5)	--	ND(0.5)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	12/06/18	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	--	--	--	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
	08/13/19	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.5)	--	ND(0.5)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/18/20	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	--	--	--	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	--	--	ND(0.5)	--	ND(0.5)	--	--	--	--	--
	09/29/22	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	08/21/12	ND(10)	ND(10)	ND(20)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/10/13	ND(10)	ND(10)	ND(10)	ND(10)	0.14	--	ND(0.1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/17/14	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	08/17/15	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/07/16	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/21/17	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/13/18	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.5)	--	ND(0.5)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	12/06/18	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	--	--	--	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
	08/13/19	ND(10)	ND(10)	ND(10)	ND(10)	--	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/18/20	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.5) UJ	--	ND(0.5) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	--	--	ND(0.5)	--	ND(0.5)	--	--	--	--	--
	09/30/22	--	--	--	--	--	--	--	--	--	--	--	--
MW-4 Dup	09/18/20	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	0.16 J	--	ND(0.5) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.51) UJ
	09/30/22	--	--	--	--	--	--	--	--	--	--	--	--
[a] NMED Groundwater Cleanup		NA	NA	NA	NA	10	NA	1	NA	NA	NA	NA	NA
[b] 40 CFR 141.62		NA	NA	NA	NA	10	10	1	NA	NA	NA	NA	NA
[c] NMED Tap Water		NA	NA	NA	1.4	NA	NA	NA	NA	NA	0.00491	NA	122
[d] USEPA RSL Tap Water HQ 1.		190	NA	3.8	0.14	32	NA	2	NA	NA	0.00011	0.011	12
[e] NMED TPH Levels		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	ORP, Field (mV)	Penta- chloro- phenol (ug/L)	pH, Field (Std Units)	Phen- anthrene (ug/L)	Phenol (ug/L)	Ortho-Phosphate (mg/L)	Ortho- Phosphorus (mg/L)	Potassium, Dissolved (mg/L)	Potassium, Total (mg/L)	n-Propyl- benzene (ug/L)	Pyrene (ug/L)	Pyridine (ug/L)
MW-1	08/24/12	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	ND(1)	ND(1)	ND(10)	ND(10)
	09/09/13	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	ND(1)	ND(1)	ND(10)	ND(10)
	09/16/14	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	1.5	ND(1)	ND(10)	ND(10)
	08/14/15	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	ND(1)	ND(1)	ND(10)	ND(10)
	09/07/16	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	0.71	--	ND(1)	ND(10)	ND(10)
	09/20/17	--	ND(20)	--	ND(10)	ND(10)	ND(2.5)	--	0.69	--	ND(1)	ND(10)	ND(10)
	09/13/18	--	ND(20)	--	ND(10)	ND(10)	ND(2.5)	--	0.57	--	ND(1)	ND(10)	ND(10)
	12/06/18	--	ND(0.5)	--	ND(0.5)	ND(0.5)	--	--	--	--	ND(1)	ND(0.5)	ND(0.5)
	08/12/19	--	ND(20)	--	ND(10)	ND(10)	--	ND(2.5)	0.59	--	ND(1)	ND(10)	ND(10)
	09/22/20	219.9	ND(0.51)	9.83	ND(0.51)	ND(0.51)	ND(2.5)	--	0.55 J	--	ND(1)	ND(0.51)	ND(0.51)
	09/28/21	230.2	--	9.07	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	ND(0.5)	--	--	--	--	ND(0.2)	--
	09/27/22	10.5	--	9.29	--	--	--	--	--	--	--	--	--
	09/29/22	--	--	--	ND(0.3)	ND(20)	--	--	--	--	ND(1)	ND(1)	ND(40)
MW-1 Dup	09/29/22	--	--	--	ND(0.3)	ND(20)	--	--	--	--	ND(1)	ND(1)	ND(40)
MW-2	08/24/12	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	ND(1)	ND(1)	ND(10)	ND(10)
	09/10/13	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	1	ND(1)	ND(10)	ND(10)
	09/16/14	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	1.5	ND(1)	ND(10)	ND(10)
	08/14/15	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	ND(1)	ND(1)	ND(10)	ND(10)
	09/07/16	--	**3.9** [a,c,d]	--	ND(10)	ND(10)	ND(0.5)	--	0.71	--	ND(1)	5.2	ND(10)
	09/20/17	--	ND(20)	--	ND(10)	ND(10)	ND(2.5)	--	0.64	--	ND(1)	ND(10)	ND(10)
	09/13/18	--	ND(20)	--	ND(10)	ND(10)	ND(2.5)	--	0.5	--	ND(1)	ND(10)	ND(10)
	12/06/18	--	ND(0.5)	--	ND(0.5)	ND(0.5)	--	--	--	--	ND(1)	ND(0.5)	ND(0.5)
	08/13/19	--	ND(20)	--	ND(10)	ND(10)	--	ND(2.5)	0.61	--	ND(1)	ND(10)	ND(10)
	09/18/20	221.8	ND(0.51)	7.01	ND(0.51)	ND(0.51)	ND(2.5) UJ	--	0.69 J	--	ND(1)	ND(0.51)	ND(0.51)
	09/16/21	198.5	--	9.01	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	--	--	ND(5)	ND(2.5)	--	--	--	--	ND(5)	--
	09/29/22	-19.2	--	9.2	ND(0.3)	ND(20)	--	--	--	--	ND(1)	ND(1)	ND(40)
MW-4	08/21/12	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	ND(1)	ND(1)	ND(10)	ND(10)
	09/10/13	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	1.1	ND(1)	ND(10)	ND(10)
	09/17/14	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	1.7	ND(1)	ND(10)	ND(10)
	08/17/15	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	ND(1)	ND(1)	ND(10)	ND(10)
	09/07/16	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	0.81	--	ND(1)	3.2	ND(10)
	09/21/17	--	ND(20)	--	ND(10)	ND(10)	ND(2.5)	--	0.74	--	ND(1)	ND(10)	ND(10)
	09/13/18	--	ND(20)	--	ND(10)	ND(10)	ND(2.5)	--	0.59	--	ND(1)	ND(10)	ND(10)
	12/06/18	--	ND(0.5)	--	ND(0.5)	ND(0.5)	--	--	--	--	ND(1)	ND(0.5)	ND(0.5)
	08/13/19	--	ND(20)	--	ND(10)	ND(10)	--	ND(2.5)	0.75	--	ND(1)	ND(10)	ND(10)
	09/18/20	216.7	ND(0.51) UJ	8.9	ND(0.51) UJ	ND(0.51) UJ	ND(2.5) UJ	--	0.72 J	--	ND(1) UJ	ND(0.51) UJ	ND(0.51) UJ
	09/16/21	147.3	--	8.58	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	--	--	--	ND(2.5)	--	--	--	--	ND(5)	--
	09/30/22	42.4	--	8.75	ND(0.3)	ND(20)	--	--	--	--	ND(1)	ND(1) UJ	ND(40)
MW-4 Dup	09/18/20	--	ND(0.51) UJ	--	ND(0.51) UJ	ND(0.51) UJ	ND(2.5) UJ	--	0.69 J	--	ND(1) UJ	ND(0.51) UJ	ND(0.51) UJ
	09/30/22	--	--	--	ND(0.3)	ND(20)	--	--	--	--	ND(1)	ND(1) UJ	ND(40)
[a]	NMED Groundwater Cleanup	NA	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[b]	40 CFR 141.62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c]	NMED Tap Water	NA	0.413	NA	170	5,760	NA	NA	NA	NA	NA	117	NA
[d]	USEPA RSL Tap Water HQ 1.	NA	0.041	NA	NA	5,800	NA	NA	NA	NA	660	120	20
[e]	NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	Quinoline (ug/L)	Selenium, Dissolved (mg/L)	Selenium, Total (mg/L)	Silver, Dissolved (mg/L)	Silver, Total (mg/L)	Sodium, Dissolved (mg/L)	Sodium, Total (mg/L)	Solids, Total Dissolved, Field (mg/L)	Styrene (ug/L)	Sulfate (mg/L)	Temperature, Field (oC)	1,1,1,2-Tetrachloro- ethan (ug/L)
MW-1	08/24/12	--	--	ND(0.0025)	--	ND(0.005)	--	260	--	ND(1)	140	--	ND(1)
	09/09/13	--	--	ND(0.001)	--	ND(0.005)	--	260	--	ND(1)	150	--	ND(1)
	09/16/14	--	--	ND(0.001)	--	ND(0.005)	--	250	--	ND(1)	150	--	ND(1)
	08/14/15	--	--	ND(0.001)	--	ND(0.005)	--	260	--	ND(1)	73	--	ND(1)
	09/07/16	--	0.00054	0.00053	ND(0.005)	ND(0.005)	260	--	--	ND(1)	150	--	ND(1)
	09/20/17	--	0.00088	ND(0.001)	ND(0.0005)	ND(0.0005)	260	--	--	ND(1)	170	--	ND(1)
	09/13/18	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	270	--	--	ND(1)	160	--	ND(1)
	12/06/18	ND(0.5)	--	ND(0.001)	--	ND(0.005)	--	--	--	ND(1)	--	--	ND(1)
	08/12/19	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	260	--	--	ND(1)	170	--	ND(1)
	09/22/20	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	260	--	773.5	ND(1)	160	14.5	ND(1)
	09/28/21	--	--	--	--	--	--	--	1208	--	--	13.4	--
	09/29/21	--	ND(0.001)	ND(0.001)	--	--	--	--	--	--	150	--	--
	09/27/22	--	--	--	--	--	--	--	663	--	--	14.1	--
	09/29/22	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	--	--	--	ND(1)	--	--	--
MW-1 Dup	09/29/22	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	--	--	--	ND(1)	--	--	--
MW-2	08/24/12	--	--	ND(0.0025)	--	ND(0.005)	--	270	--	ND(1)	150	--	ND(1)
	09/10/13	--	--	ND(0.001)	--	ND(0.005)	--	250	--	ND(1)	150	--	ND(1)
	09/16/14	--	--	ND(0.001)	--	ND(0.005)	--	250	--	ND(1)	150	--	ND(1)
	08/14/15	--	--	ND(0.001)	--	ND(0.005)	--	270	--	ND(1)	100	--	ND(1)
	09/07/16	--	0.0006	0.00058	ND(0.005)	ND(0.005)	270	--	--	ND(1)	150	--	ND(1)
	09/20/17	--	0.00081	ND(0.001)	ND(0.0005)	ND(0.0005)	270	--	--	ND(1)	170	--	ND(1)
	09/13/18	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	270	--	--	ND(1)	170	--	ND(1)
	12/06/18	ND(0.5)	--	ND(0.001)	--	ND(0.005)	--	--	--	ND(1)	--	--	ND(1)
	08/13/19	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	280	--	--	ND(1)	170	--	ND(1)
	09/18/20	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	250	--	806	ND(1)	170	14.5	ND(1)
	09/16/21	--	--	--	--	--	--	--	655	--	--	13.8	--
	09/17/21	--	ND(0.02)	ND(0.005)	--	--	--	--	--	--	180	--	--
	09/29/22	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	--	--	728	ND(1)	--	13.5	--
MW-4	08/21/12	--	--	ND(0.0025)	--	ND(0.005)	--	290	--	ND(1)	140	--	ND(1)
	09/10/13	--	--	ND(0.001)	--	ND(0.005)	--	280	--	ND(1)	150	--	ND(1)
	09/17/14	--	--	ND(0.001)	--	ND(0.005)	--	280	--	ND(1)	140	--	ND(1)
	08/17/15	--	--	ND(0.001)	--	ND(0.005)	--	300	--	ND(1)	140	--	ND(1)
	09/07/16	--	0.00072	0.00065	ND(0.005)	ND(0.005)	300	--	--	ND(1)	140	--	ND(1)
	09/21/17	--	0.00088	ND(0.001)	ND(0.0005)	ND(0.0005)	280	--	--	ND(1)	160	--	ND(1)
	09/13/18	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	300	--	--	ND(1)	150	--	ND(1)
	12/06/18	ND(0.5)	--	ND(0.001)	--	ND(0.005)	--	--	--	ND(1)	--	--	ND(1)
	08/13/19	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	310	--	--	ND(1)	160	--	ND(1)
	09/18/20	--	ND(0.001)	ND(0.001) UJ	ND(0.025)	ND(0.005)	--	--	838.5	ND(1) UJ	160 J	14.3	ND(1) UJ
	09/16/21	--	--	--	--	--	--	--	667	--	--	13.9	--
	09/17/21	--	ND(0.02)	ND(0.005)	--	--	--	--	--	--	160	--	--
	09/30/22	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	--	--	767	ND(1)	--	14.5	--
MW-4 Dup	09/18/20	--	ND(0.001)	ND(0.001) UJ	ND(0.025)	ND(0.005)	270	--	--	ND(1) UJ	160 J	--	ND(1) UJ
	09/30/22	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	--	--	--	ND(1)	--	--	--
[a] NMED Groundwater Cleanup		NA	0.05	0.05	0.05	0.05	NA	NA	NA	100	600	NA	NA
[b] 40 CFR 141.62		NA	0.05	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c] NMED Tap Water		NA	0.0987	0.0987	0.0812	0.0812	NA	NA	NA	1,210	NA	NA	5.74
[d] USEPA RSL Tap Water HQ 1.		0.024	NA	0.1	NA	0.094	NA	NA	NA	1,200	NA	NA	0.57
[e] NMED TPH Levels		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	1,1,2,2-Tetrachloro- ethan (ug/L)	Tetrachloro-ethene (ug/L)	2,3,4,6-Tetrachlorophenol (ug/L)	2,3,5,6-Tetrachlorophenol (ug/L)	Thallium, Dissolved (mg/L)	Thallium, Total (mg/L)	Thiophenol (Benzene thiol) (ug/L)	Toluene (ug/L)	Diesel Range Organics (mg/L)	Gasoline Range Organics (mg/L)	Oil Range Organics (mg/L)	1,2,3- Trichloro-benzene (ug/L)
MW-1	08/24/12	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/09/13	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/16/14	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	08/14/15	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/07/16	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	**0.025** [e]	ND(5)	ND(1)
	09/20/17	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/13/18	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	12/06/18	ND(2)	ND(1)	ND(0.5)	ND(0.5)	--	--	ND(0.5)	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	08/12/19	ND(2)	ND(1)	--	--	ND(0.0005)	ND(0.0005)	--	ND(1)	ND(1)	ND(0.05)	--	ND(1)
	09/22/20	ND(2)	ND(1)	ND(0.51)	ND(0.51)	ND(0.0005)	ND(0.00025)	--	ND(1)	ND(0.07)	ND(0.05)	ND(0.6)	ND(1)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	--	--	ND(1)	ND(0.064)	ND(0.05)	ND(0.08)	--
	09/27/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	--	ND(1)	--	--	--	--	--	ND(1)	0.017J/ND(0.064) U*	ND(0.05)	ND(0.08)	--
MW-1 Dup	09/29/22	--	ND(1)	--	--	--	--	--	ND(1)	0.03J/ND(0.064) U*	ND(0.05)	ND(0.08)	--
MW-2	08/24/12	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/10/13	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/16/14	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	08/14/15	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/07/16	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	**0.021** [e]	ND(5)	ND(1)
	09/20/17	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/13/18	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	12/06/18	ND(2)	ND(1)	ND(0.5)	ND(0.5)	--	--	ND(0.5)	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	08/13/19	ND(2)	ND(1)	--	--	ND(0.0005)	ND(0.0005)	--	ND(1)	ND(1)	ND(0.05)	--	ND(1)
	09/18/20	ND(2)	ND(1)	ND(0.51)	ND(0.51)	ND(0.0005)	ND(0.00025) UJ	--	ND(1)	ND(0.07)	ND(0.05)	ND(0.6)	ND(1)
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	--	--	--	--	--	ND(1)	**0.018 J**[e]	ND(0.05)	ND(0.08)	--
	09/29/22	--	ND(1)	--	--	--	--	--	ND(1)	0.038J/ND(0.064) U*	ND(0.05)	ND(0.08)	--
MW-4	08/21/12	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/10/13	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/17/14	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	08/17/15	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/07/16	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	**0.02** [e]	ND(5)	ND(1)
	09/21/17	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/13/18	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	12/06/18	ND(2)	ND(1)	ND(0.5)	ND(0.5)	--	--	ND(0.5)	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	08/13/19	ND(2)	ND(1)	--	--	ND(0.0005)	ND(0.0005)	--	ND(1)	ND(1)	ND(0.05)	--	ND(1)
	09/18/20	ND(2) UJ	ND(1) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.0005)	ND(0.00025)	--	ND(1) UJ	ND(0.07) UJ	ND(0.05) UJ	ND(0.6) UJ	ND(1) UJ
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	--	--	--	--	--	ND(1)	ND(0.064)	ND(0.05)	ND(0.08)	--
	09/30/22	--	ND(1)	--	--	--	--	--	ND(1)	0.02J/ND(0.064) U*	ND(0.05)	ND(0.08)	--
MW-4 Dup	09/18/20	ND(2) UJ	ND(1) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(0.0005)	ND(0.00025)	--	ND(1) UJ	ND(0.07) UJ	ND(0.05) UJ	ND(0.6) UJ	ND(1) UJ
	09/30/22	--	ND(1)	--	--	--	--	--	ND(1)	0.022J/ND(0.064) U*	ND(0.05)	ND(0.08)	--
[a]	NMED Groundwater Cleanup	10	5	NA	NA	NA	0.002	NA	1,000	NA	NA	NA	NA
[b]	40 CFR 141.62	NA	NA	NA	NA	0.002	0.002	NA	NA	NA	NA	NA	NA
[c]	NMED Tap Water	0.757	113	NA	NA	0.000197	0.143	NA	1,090	NA	NA	NA	NA
[d]	USEPA RSL Tap Water HQ 1.	0.076	11	240	NA	NA	0.0002	17	1,100	NA	NA	NA	7
[e]	NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	0.0167	0.0101	0.0858	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	1,2,4- Trichloro-benzene (ug/L)	1,1,1- Trichloro-ethane (ug/L)	1,1,2- Trichloro-ethane (ug/L)	Trichloro- ethene (ug/L)	Trichloro-fluoromethane (ug/L)	2,4,5-Tri- chloro-phenol (ug/L)	2,4,6-Tri- chloro-phenol (ug/L)	1,2,3- Trichloro-propane (ug/L)	1,2,4- Trimethyl-benzene (ug/L)	1,3,5-Trimethyl-benzene (ug/L)	Uranium, Dissolved (mg/L)	Uranium, Total (mg/L)
MW-1	08/24/12	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	0.011
	09/09/13	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	0.012
	09/16/14	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	0.011
	08/14/15	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	0.011
	09/07/16	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.011	0.01
	09/20/17	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	--
	09/13/18	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.0095	0.0094
	12/06/18	ND(0.5)	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)	ND(2)	ND(1)	ND(1)	--	--
	08/12/19	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.01	0.01
	09/22/20	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.51)	ND(0.51)	ND(2)	ND(1)	ND(1)	0.0097	0.0094
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/27/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	--	ND(1)	--	ND(1)	--	--	ND(10)	--	ND(1)	ND(1)	--	--
MW-1 Dup	09/29/22	--	ND(1)	--	ND(1)	--	--	ND(10)	--	ND(1)	ND(1)	--	--
MW-2	08/24/12	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	0.0097
	09/10/13	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	0.0095
	09/16/14	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	0.0093
	08/14/15	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	0.0094
	09/07/16	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.0095	0.0088
	09/20/17	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	--
	09/13/18	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.008	0.008
	12/06/18	ND(0.5)	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)	ND(2)	ND(1)	ND(1)	--	--
	08/13/19	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.0084	0.0086
	09/18/20	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.51)	ND(0.51)	ND(2)	ND(1)	ND(1)	0.0077	0.0094
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	--	ND(1)	--	ND(1)	--	--	ND(10)	--	ND(1)	ND(1)	--	--
MW-4	08/21/12	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	0.018
	09/10/13	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	0.018
	09/17/14	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	0.017
	08/17/15	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	0.016
	09/07/16	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.017	0.016
	09/21/17	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	--
	09/13/18	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.014	0.014
	12/06/18	ND(0.5)	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)	ND(2)	ND(1)	ND(1)	--	--
	08/13/19	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.014	0.013
	09/18/20	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(2) UJ	ND(1) UJ	ND(1) UJ	0.02 J	0.016
	09/16/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/17/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/30/22	--	ND(1)	--	ND(1)	--	--	ND(10)	--	ND(1)	ND(1)	--	--
MW-4 Dup	09/18/20	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(1) UJ	ND(0.51) UJ	ND(0.51) UJ	ND(2) UJ	ND(1) UJ	ND(1) UJ	0.014 J	0.015
	09/30/22	--	ND(1)	--	ND(1)	--	--	ND(10)	--	ND(1)	ND(1)	--	--
[a] NMED Groundwater Cleanup		70	200	5	5	NA	NA	NA	NA	NA	NA	NA	0.03
[b] 40 CFR 141.62		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c] NMED Tap Water		11.5	8,000	2.75	2.59	1,140	1,170	41.1	0.00835	NA	NA	NA	NA
[d] USEPA RSL Tap Water HQ 1.		1.2	8,000	0.28	0.49	5,200	1,200	4.1	0.00075	56	60	NA	NA
[e] NMED TPH Levels		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	Vanadium, Dissolved (mg/L)	Vanadium, Total (mg/L)	Vinyl Chloride (ug/L)	Xylenes, Total (ug/L)	Zinc, Dissolved (mg/L)	Zinc, Total (mg/L)
MW-1	08/24/12	--	--	ND(1)	ND(1.5)	--	ND(0.01)
	09/09/13	--	--	ND(1)	ND(1.5)	--	ND(0.01)
	09/16/14	--	--	ND(1)	ND(1.5)	--	0.014
	08/14/15	--	--	ND(1)	ND(1.5)	--	ND(0.01)
	09/07/16	--	--	ND(1)	ND(1.5)	ND(0.01)	ND(0.01)
	09/20/17	--	--	ND(1)	ND(1.5)	0.011	ND(0.01)
	09/13/18	0.0022	0.0023	ND(1)	ND(1.5)	0.0069	ND(0.01)
	12/06/18	--	ND(0.05)	ND(1)	ND(1.5)	--	ND(0.02)
	08/12/19	--	--	ND(1)	ND(1.5)	0.0059	ND(0.01)
	09/22/20	--	--	ND(1)	ND(1.5)	0.0081 J	ND(0.01) UJ
	09/28/21	--	--	--	--	--	--
	09/29/21	--	--	--	ND(1.5)	0.02	ND(0.01)
	09/27/22	--	--	--	--	--	--
	09/29/22	ND(0.05)	ND(0.05)	ND(1)	ND(1.5)	0.096 J	0.0047J/ND(0.01) U*
MW-1 Dup	09/29/22	ND(0.05)	ND(0.05)	ND(1)	ND(1.5)	0.029 JB	ND(0.01)
MW-2	08/24/12	--	--	ND(1)	ND(1.5)	--	ND(0.01)
	09/10/13	--	--	ND(1)	ND(1.5)	--	ND(0.01)
	09/16/14	--	--	ND(1)	ND(1.5)	--	0.026
	08/14/15	--	--	ND(1)	ND(1.5)	--	ND(0.01)
	09/07/16	--	--	ND(1)	ND(1.5)	ND(0.01)	ND(0.01)
	09/20/17	--	--	ND(1)	ND(1.5)	ND(0.01)	ND(0.01)
	09/13/18	ND(0.05)	ND(0.05)	ND(1)	ND(1.5)	0.0079	ND(0.01)
	12/06/18	--	ND(0.05)	ND(1)	ND(1.5)	--	ND(0.02)
	08/13/19	--	--	ND(1)	ND(1.5)	0.01	0.0075
	09/18/20	--	--	ND(1)	ND(1.5)	0.019/ND(0.019) U*	ND(0.01)
	09/16/21	--	--	--	--	--	--
	09/17/21	--	--	--	ND(1.5)	0.23 J	ND(0.01) UJ
	09/29/22	ND(0.05)	ND(0.05)	ND(1)	ND(1.5)	0.037 JB	ND(0.01)
MW-4	08/21/12	--	--	ND(1)	ND(1.5)	--	ND(0.01)
	09/10/13	--	--	ND(1)	ND(1.5)	--	0.017
	09/17/14	--	--	ND(1)	ND(1.5)	--	ND(0.01)
	08/17/15	--	--	ND(1)	ND(1.5)	--	ND(0.01)
	09/07/16	--	--	ND(1)	ND(1.5)	ND(0.01)	ND(0.01)
	09/21/17	--	--	ND(1)	ND(1.5)	0.011	ND(0.01)
	09/13/18	ND(0.05)	0.00091	ND(1)	ND(1.5)	0.011	ND(0.01)
	12/06/18	--	ND(0.05)	ND(1)	ND(1.5)	--	ND(0.02)
	08/13/19	--	--	ND(1)	ND(1.5)	0.0066	ND(0.01)
	09/18/20	--	--	ND(1) UJ	ND(1.5) UJ	0.0069 J	ND(0.01)
	09/16/21	--	--	--	--	--	--
	09/17/21	--	--	--	ND(1.5)	ND(0.01)	ND(0.01)
	09/30/22	ND(0.05)	ND(0.05)	ND(1)	ND(1.5)	0.026 JB	ND(0.01)
MW-4 Dup	09/18/20	--	--	ND(1) UJ	ND(1.5) UJ	0.011	ND(0.01)
	09/30/22	ND(0.05)	ND(0.05)	ND(1)	ND(1.5)	0.056 JB	ND(0.01)
[a] NMED Groundwater Cleanup		NA	NA	2	620	NA	NA
[b] 40 CFR 141.62		NA	NA	NA	NA	NA	NA
[c] NMED Tap Water		0.0631	0.0631	0.324	193	5.96	5.96
[d] USEPA RSL Tap Water HQ 1.		NA	0.086	0.019	190	NA	6
[e] NMED TPH Levels		NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	Acenaph- thene (ug/L)	Acenaph- thylene (ug/L)	Acetone (ug/L)	Aluminum, Dissolved (mg/L)	Aluminum, Total (mg/L)	Aniline (ug/L)	Anthracene (ug/L)	Antimony, Dissolved (mg/L)	Antimony, Total (mg/L)	Arsenic, Dissolved (mg/L)	Arsenic, Total (mg/L)	Azo- benzene (ug/L)
MW-5	08/23/12	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	ND(0.0025)	ND(10)
	09/10/13	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	**0.001** [c,d]	ND(10)
	09/17/14	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	**0.0012** [c,d]	ND(10)
	08/14/15	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	ND(0.001)	ND(10)
	09/07/16	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	**0.001** [c]	**0.0012** [c,d]	ND(10)
	09/11/17	ND(10)	ND(10)	5	--	--	ND(10)	ND(10)	--	--	**0.0012** [c]	**0.001** [c,d]	ND(10)
	09/17/18	ND(10)	ND(10)	0.99	--	--	ND(10)	ND(10)	ND(0.001)	ND(0.001)	**0.00093** [c]	**0.0011** [c,d]	ND(10)
	12/06/18	ND(0.5)	ND(0.5)	ND(10)	--	--	ND(0.5)	ND(0.5)	--	ND(0.001)	--	**0.001** [c,d]	--
	08/14/19	ND(10)	ND(10)	ND(10)	0.0033	0.0098	ND(10)	ND(10)	ND(0.001)	ND(0.001)	**0.00098** [c]	**0.00099** [c,d]	ND(10)
	09/21/20	ND(0.51)	ND(0.51)	13 JB	ND(0.02)	0.14	ND(0.51)	ND(0.51)	ND(0.001)	ND(0.001)	**0.00091 J** [c]	**0.00093 J** [c,d]	--
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	ND(10)	--	--	--	--	--	--	**0.0011** [c]	**0.0011** [c,d]	--
	09/29/22	ND(0.3) UJ	--	ND(10)	--	--	--	ND(0.3)	ND(0.001)	ND(0.001)	**0.00086 J** [c]	**0.00097 J** [c,d]	--
SMW-2	08/23/12	ND(10)	ND(10)	ND(100)	--	--	ND(10)	ND(10)	--	--	--	**0.005** [c,d]	ND(10)
	09/09/13	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	**0.0055** [c,d]	ND(10)
	09/11/14	ND(11)	ND(11)	ND(10)	--	--	ND(11)	ND(11)	--	--	--	ND(0.01)	ND(11)
	08/17/15	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	ND(0.01)	ND(10)
	09/09/16	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	**0.0066** [c]	**0.011** [a,b,c,d]	ND(10)
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	--
	09/11/17	ND(10)	ND(10)	6.2	--	--	ND(10)	ND(10)	--	--	**0.0098** [c]	**0.0092** [c,d]	ND(10)
	09/18/18	ND(10)	ND(10)	6.7	--	--	ND(10)	ND(10)	--	--	**0.0041** [c]	**0.0056** [c,d]	ND(10)
	08/22/19	ND(10)	ND(10)	ND(10)	ND(0.02)	0.85	ND(10)	ND(10)	ND(0.005)	ND(0.005)	**0.0026** [c]	**0.0026** [c,d]	ND(10)
	09/19/20	ND(0.51)	ND(0.51)	2.8J/ND(10)U*	ND(0.02)	0.7	ND(0.51)	ND(0.51)	ND(0.005)	ND(0.005)	**0.0024 J** [c]	**0.0023 J** [c,d]	--
	09/29/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/30/21	--	--	ND(10)	--	--	--	--	--	--	**0.0019 J** [c]	**0.0026** [c,d]	--
	09/30/22	ND(0.3)	--	ND(10)	--	--	--	ND(0.3) UJ	ND(0.001)	ND(0.001)	**0.0021** [c]	**0.0019** [c,d]	--
SMW-4	08/24/12	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	**0.0033** [c,d]	ND(10)
	09/09/13	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	**0.0026** [c,d]	ND(10)
	09/11/14	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	**0.0033** [c,d]	ND(10)
	08/14/15	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	--	**0.003** [c,d]	ND(10)
	09/07/16	ND(10)	ND(10)	ND(10)	--	--	ND(10)	ND(10)	--	--	**0.003** [c]	**0.003** [c,d]	ND(10)
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	--
	09/11/17	ND(50)	ND(50)	3.9	--	--	ND(50)	ND(50)	--	--	**0.0032** [c]	**0.0032** [c,d]	ND(50)
	09/12/18	ND(10)	ND(10)	4.5	--	--	ND(10)	ND(10)	ND(0.001)	ND(0.001)	**0.0029** [c]	**0.0031** [c,d]	ND(10)
	12/06/18	ND(0.5)	ND(0.5)	ND(10)	--	--	ND(0.5)	ND(0.5)	--	ND(0.001)	--	**0.0029** [c,d]	--
	08/13/19	ND(10)	ND(10)	ND(10)	0.011	0.9	ND(10)	ND(10)	ND(0.001)	ND(0.001)	**0.0031** [c]	**0.0034** [c,d]	ND(10)
	09/20/20	ND(0.57) UJ	ND(0.57) UJ	ND(10)	0.043	3.7	ND(0.57) UJ	ND(0.57) UJ	ND(0.001)	ND(0.001)	**0.0029** [c]	**0.0026** [c,d]	--
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	ND(10)	--	--	--	--	--	--	**0.0034** [c]	**0.0032** [c,d]	--
	09/28/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	ND(0.3) UJ	--	3.7J/ND(10)U*	--	--	--	ND(0.3)	ND(0.001)	ND(0.001)	**0.0029** [c]	**0.003** [c,d]	--
[a] NMED Groundwater Cleanup		NA	NA	NA	NA	NA	NA	NA	NA	0.006	0.01	0.01	NA
[b] 40 CFR 141.62		NA	NA	NA	NA	NA	NA	NA	0.006	0.006	0.01	0.01	NA
[c] NMED Tap Water		535	NA	14,100	19.9	19.9	NA	1,720	0.00726	0.00726	0.000855	0.000855	NA
[d] USEPA RSL Tap Water HQ 1.		530	NA	14,000	NA	20	13	1,800	NA	0.0078	NA	0.000052	0.12
[e] NMED TPH Levels		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	Barium, Dissolved (mg/L)	Barium, Total (mg/L)	Benzene (ug/L)	Benzidine (ug/L)	Benzo(a)-anthracene (ug/L)	Benzo(a)- pyrene (ug/L)	Benzo(b)- fluor-anthene (ug/L)	Benzo(ghi)-perylene (ug/L)	Benzo(k) fluor-anthene (ug/L)	Benzoic Acid (ug/L)	Benzyl Alcohol (ug/L)	Beryllium, Dissolved (mg/L)
MW-5	08/23/12	--	0.026	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	09/10/13	--	0.018	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(40)	ND(10)	--
	09/17/14	--	0.015	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	08/14/15	--	0.09	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	09/07/16	0.017	0.041	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	6.5	ND(10)	--
	09/11/17	0.017	0.02	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	09/17/18	0.017	0.021	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	7	ND(10)	ND(0.002)
	12/06/18	--	ND(0.02)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	--	ND(0.5)	--
	08/14/19	0.016	0.03	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	ND(0.002)
	09/21/20	0.017	0.049	ND(1)	ND(0.51)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.51)	ND(0.51)	3.3	ND(0.51)	ND(0.002)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	0.015	0.018	ND(1)	--	--	--	--	--	--	ND(20)	--	--
	09/29/22	0.017	0.06	ND(1)	--	ND(0.3)	--	ND(0.3)	--	--	ND(20)	--	ND(0.01) UJ
SMW-2	08/23/12	--	0.038	ND(10)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	09/09/13	--	0.016	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(40)	ND(10)	--
	09/11/14	--	0.015	ND(1)	--	ND(11)	ND(11)	ND(11)	ND(11)	ND(11)	ND(22)	ND(11)	--
	08/17/15	--	0.018	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	09/09/16	0.018	0.042	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	6.9	ND(10)	--
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	--
	09/11/17	0.016	0.082	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	6.5	ND(10)	--
	09/18/18	0.014	0.03	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	08/22/19	0.014	0.023	0.23	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	0.00042
	09/19/20	0.015	0.021	ND(1)	ND(0.51)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.002)
	09/29/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/30/21	0.017	0.017	ND(1)	--	--	--	--	--	--	ND(20)	--	--
	09/30/22	0.015	0.026	ND(1)	--	ND(0.3)	--	ND(0.3)	--	--	ND(20)	--	ND(0.002) UJ
SMW-4	08/24/12	--	0.019	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	09/09/13	--	0.021	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(40)	ND(10)	--
	09/11/14	--	0.021	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	08/14/15	--	0.028	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	--
	09/07/16	0.019	0.043	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	9.9	ND(10)	--
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	--
	09/11/17	0.023	0.065	ND(1)	--	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	33	ND(50)	--
	09/12/18	0.019	0.027	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	6.4	ND(10)	ND(0.002)
	12/06/18	--	0.032	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	--	ND(0.5)	--
	08/13/19	0.017	0.023	ND(1)	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	ND(0.002)
	09/20/20	0.014	0.049	ND(1)	ND(0.57) UJ	ND(0.11) UJ	ND(0.11) UJ	ND(0.11) UJ	ND(0.57) UJ	ND(0.57) UJ	ND(0.57) UJ	0.49 J	ND(0.002)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	0.014	0.027	ND(1)	--	--	--	--	--	--	ND(20)	--	--
	09/28/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	0.016	0.023	ND(1)	--	ND(0.3)	--	ND(0.3)	--	--	ND(20)	--	ND(0.002) UJ

		Barium, Dissolved	Barium, Total	Benzene	Benzidine	Benzo(a)-anthracene	Benzo(a)- pyrene	Benzo(b)- fluor-anthene	Benzo(ghi)-perylene	Benzo(k) fluor-anthene	Benzoic Acid	Benzyl Alcohol	Beryllium, Dissolved
a	NMED Groundwater Cleanup	2	2	5	NA	NA	0.2	NA	NA	NA	NA	NA	NA
b	40 CFR 141.62	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.004
c	NMED Tap Water	3.28	3.28	4.55	0.00109	0.12	0.251	0.343	NA	3.43	NA	NA	0.0124
d	USEPA RSL Tap Water HQ 1.	NA	3.8	0.46	0.00011	0.03	0.025	0.25	NA	2.5	75,000	2,000	NA
e	NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	Beryllium, Total (mg/L)	Bis(2chloro ethoxy)- methane (ug/L)	Bis(2- chloro ethyl)ether (ug/L)	Bis(2chloro isopropyl)- ether (ug/L)	Bis(2-ethyl hexyl)- phthalate (ug/L)	Boron, Dissolved (mg/L)	Boron, Total (mg/L)	Bromide (mg/L)	Bromo- benzene (ug/L)	Bromo- dichloro- methane (ug/L)	Bromoform (ug/L)	Bromo- methane (ug/L)
MW-5	08/23/12	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	ND(0.1)	ND(1)	ND(1)	ND(1)	ND(3)
	09/10/13	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	0.11	ND(1)	ND(1)	ND(1)	ND(3)
	09/17/14	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	0.12	ND(1)	ND(1)	ND(1)	ND(3)
	08/14/15	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	0.11	ND(1)	ND(1)	ND(1)	ND(3)
	09/07/16	--	ND(10)	ND(10)	ND(10)	3.3	--	--	0.095	ND(1)	ND(1)	ND(1)	ND(3)
	09/11/17	--	ND(10)	ND(10)	ND(10)	**5.7** [d]	--	--	0.21	ND(1)	ND(1)	ND(1)	ND(3)
	09/17/18	ND(0.002)	ND(10)	ND(10)	ND(10)	ND(10)	--	--	ND(0.5)	ND(1)	ND(1)	ND(1)	ND(3)
	12/06/18	ND(0.003)	ND(0.5)	ND(0.5)	ND(0.5)	1.1	--	--	--	ND(1)	ND(1)	ND(1)	ND(3)
	08/14/19	ND(0.002)	ND(10)	ND(10)	ND(10)	**18** [d]	0.75	0.76	ND(0.5)	ND(1)	ND(1)	ND(1)	ND(3)
	09/21/20	ND(0.002)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	0.73	0.76	0.086 J	ND(1)	ND(1)	ND(1)	ND(3)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	ND(10)	--	--	0.1	--	--	--	--
	09/29/22	ND(0.002)	--	--	--	ND(10)	--	--	--	--	--	--	ND(3)
SMW-2	08/23/12	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	8.4	ND(10)	ND(10)	ND(10)	ND(30)
	09/09/13	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	2.1	ND(1)	ND(1)	ND(1)	ND(3)
	09/11/14	--	ND(11)	ND(11)	ND(11)	ND(11)	--	--	2.9	ND(1)	ND(1)	ND(1)	ND(3)
	08/17/15	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	5.1	ND(1)	ND(1)	ND(1)	ND(3)
	09/09/16	--	ND(10)	ND(10)	ND(10)	**7** [d]	--	--	2.9	ND(1)	ND(1)	ND(1)	ND(3)
	06/28/17	--	--	--	--	--	--	--	2.8	--	--	--	--
	09/11/17	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	2.5	ND(1)	ND(1)	ND(1)	ND(3)
	09/18/18	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	2.3	ND(1)	ND(1)	ND(1)	ND(3)
	08/22/19	0.00039	ND(10)	ND(10)	ND(10)	ND(10)	1.4	1.3	2.8	ND(1)	ND(1)	ND(1)	ND(3)
	09/19/20	ND(0.002)	ND(0.51)	ND(0.51)	ND(0.51)	0.23 J	1.3	1.3	2.8	ND(1)	ND(1)	ND(1)	ND(3)
	09/29/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/30/21	--	--	--	--	ND(10)	--	--	3.1	--	--	--	--
	09/30/22	ND(0.002)	--	--	--	ND(10)	--	--	--	--	--	--	ND(3)
SMW-4	08/24/12	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	0.35	ND(1)	ND(1)	ND(1)	ND(3)
	09/09/13	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	0.16	ND(1)	ND(1)	ND(1)	ND(3)
	09/11/14	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	0.19	ND(1)	ND(1)	ND(1)	ND(3)
	08/14/15	--	ND(10)	ND(10)	ND(10)	ND(10)	--	--	0.17	ND(1)	ND(1)	ND(1)	ND(3)
	09/07/16	--	ND(10)	ND(10)	ND(10)	3.8	--	--	0.15	ND(1)	ND(1)	ND(1)	ND(3)
	06/28/17	--	--	--	--	--	--	--	0.26	--	--	--	--
	09/11/17	--	ND(50)	ND(50)	ND(50)	**34** [d]	--	--	0.15	ND(1)	ND(1)	ND(1)	ND(3)
	09/12/18	ND(0.002)	ND(10)	ND(10)	ND(10)	ND(10)	--	--	0.21	ND(1)	ND(1)	ND(1)	ND(3)
	12/06/18	ND(0.003)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	--	--	--	ND(1)	ND(1)	ND(1)	ND(3)
	08/13/19	ND(0.002)	ND(10)	ND(10)	ND(10)	ND(10)	1.7	1.6	ND(0.5)	ND(1)	ND(1)	ND(1)	ND(3)
	09/20/20	ND(0.002)	ND(0.57) UJ	ND(0.57) UJ	ND(0.57) UJ	ND(0.57) UJ	1.7	1.7	0.12	ND(1)	ND(1)	ND(1)	ND(3)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	ND(10)	--	--	0.15	--	--	--	--
	09/28/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	ND(0.002)	--	--	--	ND(10)	--	--	--	--	--	--	ND(3)

[a] NMED Groundwater Cleanup	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[b] 40 CFR 141.62	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c] NMED Tap Water	0.0124	NA	0.137	9.81	55.6	3.95	3.95	NA	NA	1.34	32.9	7.54
[d] USEPA RSL Tap Water HQ 1.	0.025	59	0.014	NA	5.6	NA	4	NA	62	0.13	3.3	7.5
[e] NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	4-Bromo- phenyl-phenylether (ug/L)	2-Butanone (ug/L)	n-Butyl- benzene (ug/L)	sec-Butylbenzene (ug/L)	tert-Butyl-benzene (ug/L)	Benzyl Butyl Phthalate (ug/L)	Cadmium, Dissolved (mg/L)	Cadmium, Total (mg/L)	Calcium, Dissolved (mg/L)	Calcium, Total (mg/L)	Car- bazole (ug/L)	Carbon Disulfide (ug/L)
MW-5	08/23/12	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	1.4	ND(10)	ND(10)
	09/10/13	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	1.6	ND(10)	ND(10)
	09/17/14	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	1.6	ND(10)	ND(10)
	08/14/15	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	1.5	ND(10)	ND(10)
	09/07/16	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	1.4	--	ND(10)	ND(10)
	09/11/17	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	1.5	--	ND(10)	ND(10)
	09/17/18	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	1.4	--	ND(10)	ND(10)
	12/06/18	ND(0.5)	ND(10)	ND(3)	ND(1)	ND(1)	ND(0.5)	--	ND(0.002)	--	--	ND(0.5)	ND(10)
	08/14/19	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	1.4	--	ND(10)	ND(10)
	09/21/20	ND(0.51)	ND(10)	ND(3)	ND(1)	ND(1)	ND(0.51)	ND(0.002)	ND(0.002)	1.6	--	ND(0.51)	ND(10)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	--	ND(0.002)	--	--	--	--	--
	09/29/22	--	ND(10)	ND(3)	ND(1)	--	--	ND(0.01)	ND(0.002)	--	--	--	ND(10)
SMW-2	08/23/12	ND(10)	ND(100)	ND(30)	ND(10)	ND(10)	ND(10)	--	ND(0.002)	--	260	ND(10)	ND(100)
	09/09/13	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	270	ND(10)	ND(10)
	09/11/14	ND(11)	ND(10)	ND(3)	ND(1)	ND(1)	ND(11)	--	ND(0.002)	--	280	ND(11)	ND(10)
	08/17/15	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	270	ND(10)	ND(10)
	09/09/16	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	320	--	ND(10)	ND(10)
	06/28/17	--	--	--	--	--	--	--	--	300	--	--	--
	09/11/17	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	340	--	ND(10)	ND(10)
	09/18/18	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	320	--	ND(10)	ND(10)
	08/22/19	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	320	--	ND(10)	ND(10)
	09/19/20	ND(0.51)	ND(10)	ND(3)	ND(1)	ND(1)	ND(0.51)	ND(0.002) UJ	ND(0.002)	300	--	ND(0.51)	ND(10)
	09/29/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/30/21	--	--	--	--	--	--	ND(0.002)	ND(0.002)	--	--	--	--
	09/30/22	--	ND(10)	ND(3)	0.2 J	--	--	ND(0.002)	ND(0.002)	--	--	--	ND(10)
SMW-4	08/24/12	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	3	ND(10)	ND(10)
	09/09/13	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	4.5	ND(10)	ND(10)
	09/11/14	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	4.5	ND(10)	ND(10)
	08/14/15	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	--	ND(0.002)	--	5	ND(10)	ND(10)
	09/07/16	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	3.5	--	ND(10)	ND(10)
	06/28/17	--	--	--	--	--	--	--	--	4.5	--	--	--
	09/11/17	ND(50)	ND(10)	ND(3)	ND(1)	ND(1)	ND(50)	ND(0.002)	ND(0.002)	4.4	--	ND(50)	ND(10)
	09/12/18	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	3.7	--	ND(10)	ND(10)
	12/06/18	ND(0.5)	ND(10)	ND(3)	ND(1)	ND(1)	ND(0.5)	--	ND(0.002)	--	--	ND(0.5)	ND(10)
	08/13/19	ND(10)	ND(10)	ND(3)	ND(1)	ND(1)	ND(10)	ND(0.002)	ND(0.002)	3.5	--	ND(10)	ND(10)
	09/20/20	ND(0.57) UJ	ND(10)	ND(3)	ND(1)	ND(1)	ND(0.57) UJ	ND(0.002)	ND(0.002)	3.1	--	ND(0.57) UJ	ND(10)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	--	ND(0.002)	ND(0.002)	--	--	--	--
	09/28/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	--	ND(10)	ND(3)	ND(1)	--	--	ND(0.002)	ND(0.002)	--	--	--	ND(10)
[a]	NMED Groundwater Cleanup	NA	NA	NA	NA	NA	NA	0.005	0.005	NA	NA	NA	NA
[b]	40 CFR 141.62	NA	NA	NA	NA	NA	NA	0.005	0.005	NA	NA	NA	NA
[c]	NMED Tap Water	NA	5,560	NA	NA	NA	NA	0.00624	0.00624	NA	NA	NA	810
[d]	USEPA RSL Tap Water HQ 1.	NA	5,600	1,000	2,000	690	16	NA	0.0092	NA	NA	NA	810
[e]	NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	Carbon tetrachloride (ug/L)	Chloride (mg/L)	4-Chloro-3-Methyl phenol (ug/L)	4-Chloro- aniline (ug/L)	Chlorobenzene (ug/L)	Chloroethane (ug/L)	Chloroform (ug/L)	Chloromethane (ug/L)	2-Chloro- naphthalene (ug/L)	2-Chloro- phenol (ug/L)	4-Chloro- phenyl- phenylether (ug/L)	2-Chloro- toluene (ug/L)
MW-5	08/23/12	ND(1)	55	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/10/13	ND(1)	57	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/17/14	ND(1)	56	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	08/14/15	ND(1)	58	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/07/16	ND(1)	56	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/11/17	ND(1)	60	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/17/18	ND(1)	63	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	12/06/18	ND(1)	--	ND(0.5)	ND(0.5)	ND(1)	ND(2)	ND(1)	ND(3)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)
	08/14/19	ND(1)	60	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/21/20	ND(1)	54	ND(0.51)	ND(0.51)	ND(1)	ND(2)	ND(1)	ND(3)	ND(0.51)	ND(0.51)	ND(0.51)	ND(1)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	57	--	--	--	--	--	--	--	--	--	--
	09/29/22	--	--	--	--	ND(1)	--	ND(1)	ND(3)	--	--	--	--
SMW-2	08/23/12	ND(10)	**2400** [a]	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	ND(30)	ND(10)	ND(10)	ND(10)	ND(10)
	09/09/13	ND(1)	**2500** [a]	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/11/14	ND(1)	**2500** [a]	ND(11)	ND(11)	ND(1)	ND(2)	ND(1)	ND(3)	ND(11)	ND(11)	ND(11)	ND(1)
	08/17/15	ND(1)	**3000** [a]	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/09/16	ND(1)	**2500** [a]	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	06/28/17	--	**2600** [a]	--	--	--	--	--	--	--	--	--	--
	09/11/17	ND(1)	**2900** [a]	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/18/18	ND(1)	**2900** [a]	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	08/22/19	ND(1)	**2900** [a]	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/19/20	ND(1)	**2700** [a]	ND(0.51)	ND(0.51)	ND(1)	ND(2)	ND(1)	ND(3)	ND(0.51)	ND(0.51)	ND(0.51)	ND(1)
	09/29/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/30/21	--	**3000** [a]	--	--	--	--	--	--	--	--	--	--
	09/30/22	--	--	--	--	ND(1)	--	ND(1)	ND(3)	--	--	--	--
SMW-4	08/24/12	ND(1)	58	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/09/13	ND(1)	59	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/11/14	ND(1)	53	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	08/14/15	ND(1)	55	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/07/16	ND(1)	53	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	06/28/17	--	63	--	--	--	--	--	--	--	--	--	--
	09/11/17	ND(1)	56	ND(50)	ND(50)	ND(1)	ND(2)	ND(1)	ND(3)	ND(50)	ND(50)	ND(50)	ND(1)
	09/12/18	ND(1)	59	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	12/06/18	ND(1)	--	ND(0.5)	ND(0.5)	ND(1)	ND(2)	ND(1)	ND(3)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)
	08/13/19	ND(1)	59	ND(10)	ND(10)	ND(1)	ND(2)	ND(1)	ND(3)	ND(10)	ND(10)	ND(10)	ND(1)
	09/20/20	ND(1)	50	ND(0.57) UJ	ND(0.57) UJ	ND(1)	ND(2)	ND(1)	ND(3)	ND(0.57) UJ	ND(0.57) UJ	ND(0.57) UJ	ND(1)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	55	--	--	--	--	--	--	--	--	--	--
	09/28/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	--	--	--	--	ND(1)	--	ND(1)	ND(3)	--	--	--	--

		Carbon tetrachloride	Chloride	4-Chloro-3-Methyl phenol	4-Chloro- aniline	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	2-Chloro- naphthalene	2-Chloro- phenol	4-Chloro- phenyl- phenylether	2-Chloro- toluene
a	NMED Groundwater Cleanup	5	250	NA	NA	NA	NA	100	NA	NA	NA	NA	NA
b	40 CFR 141.62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
c	NMED Tap Water	4.55	NA	NA	NA	77.6	20,900	2.29	20.3	733	91	NA	NA
d	USEPA RSL Tap Water HQ 1.	0.46	NA	1,400	0.37	78	21,000	0.22	190	750	91	NA	240
e	NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	4-Chloro- toluene (ug/L)	Chromium, Dissolved (mg/L)	Chromium, Total (mg/L)	Chrysene (ug/L)	Cobalt, Dissolved (mg/L)	Cobalt, Total (mg/L)	Specific Conductance Fiel (umhos/cm)	Copper, Dissolved (mg/L)	Copper, Total (mg/L)	Cyanide, Total (mg/L)	Dibenz- (a,h)- acridine (ug/L)	Dibenz (a,h) anthracene (ug/L)
MW-5	08/23/12	ND(1)	--	ND(0.006)	ND(10)	--	--	--	--	ND(0.006)	--	--	ND(10)
	09/10/13	ND(1)	--	ND(0.006)	ND(10)	--	--	--	--	ND(0.006)	ND(0.01)	--	ND(10)
	09/17/14	ND(1)	--	ND(0.006)	ND(10)	--	--	--	--	ND(0.006)	ND(0.01)	--	ND(10)
	08/14/15	ND(1)	--	ND(0.006)	ND(10)	--	--	--	--	ND(0.006)	ND(0.01)	--	ND(10)
	09/07/16	ND(1)	ND(0.006)	ND(0.006)	ND(10)	--	--	--	ND(0.006)	ND(0.006)	ND(0.01)	--	ND(10)
	09/11/17	ND(1)	ND(0.006)	ND(0.006)	ND(10)	--	--	--	ND(0.006)	ND(0.006)	ND(0.005)	--	ND(10)
	09/17/18	ND(1)	ND(0.006)	ND(0.006)	ND(10)	--	--	--	ND(0.006)	ND(0.006)	ND(0.01)	--	ND(10)
	12/06/18	ND(1)	--	ND(0.006)	ND(0.5)	--	ND(0.006)	--	--	--	ND(0.01)	ND(0.5)	ND(0.5)
	08/14/19	ND(1)	ND(0.006)	ND(0.006)	ND(10)	ND(0.006)	ND(0.006)	--	ND(0.006)	ND(0.006)	ND(0.005)	--	ND(10)
	09/21/20	ND(1)	ND(0.006)	ND(0.006)	ND(0.51)	ND(0.006) UJ	ND(0.006)	1220	ND(0.006)	ND(0.006)	ND(0.01)	--	ND(0.031)
	09/28/21	--	--	--	--	--	--	1010	--	--	--	--	--
	09/29/21	--	ND(0.006)	ND(0.006)	--	--	--	--	ND(0.001)	--	--	--	--
	09/29/22	--	ND(0.03)	ND(0.006)	ND(0.3)	ND(0.03)	ND(0.006)	1150	--	--	ND(0.005)	--	--
SMW-2	08/23/12	ND(10)	--	**0.17** [a,b,c]	ND(10)	--	--	--	--	ND(0.006)	--	--	ND(10)
	09/09/13	ND(1)	--	ND(0.006)	ND(10)	--	--	--	--	ND(0.006)	**0.041** [c,d]	--	ND(10)
	09/11/14	ND(1)	--	ND(0.006)	ND(11)	--	--	--	--	ND(0.006)	**0.0456** [c,d]	--	ND(11)
	08/17/15	ND(1)	--	**0.0071** [c]	ND(10)	--	--	--	--	ND(0.006)	**0.045** [c,d]	--	ND(10)
	09/09/16	ND(1)	ND(0.006)	**0.13** [a,b,c]	ND(10)	--	--	--	ND(0.006)	ND(0.006)	**0.041** [c,d]	--	ND(10)
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	--
	09/11/17	ND(1)	0.0014	**0.39** [a,b,c]	ND(10)	--	--	--	ND(0.006)	0.0042	**0.036** [c,d]	--	ND(10)
	09/18/18	ND(1)	ND(0.006)	**0.026** [c]	ND(10)	--	--	--	ND(0.006)	ND(0.006)	--	--	ND(10)
	08/22/19	ND(1)	ND(0.006)	**0.047** [c]	ND(10)	ND(0.006)	ND(0.006)	--	0.0037	ND(0.006)	**0.0374** [c,d]	--	ND(10)
	09/19/20	ND(1)	ND(0.006)	**0.02 J** [c]	ND(0.51)	ND(0.006)	ND(0.006)	12880	ND(0.006)	ND(0.006)	**0.0337** [c,d]	--	ND(0.031)
	09/29/21	--	--	--	--	--	--	1050	--	--	--	--	--
	09/30/21	--	ND(0.006)	ND(0.006)	--	--	0.0042 J	--	ND(0.005)	ND(0.005)	--	--	--
	09/30/22	--	ND(0.006)	**0.022 J+** [c]	ND(0.3)	ND(0.006)	**0.013** [c,d]	12000	--	--	**0.0284** [c,d]	--	--
SMW-4	08/24/12	ND(1)	--	ND(0.006)	ND(10)	--	--	--	--	ND(0.006)	--	--	ND(10)
	09/09/13	ND(1)	--	**0.012** [c]	ND(10)	--	--	--	--	ND(0.006)	ND(0.01)	--	ND(10)
	09/11/14	ND(1)	--	ND(0.006)	ND(10)	--	--	--	--	ND(0.006)	ND(0.01)	--	ND(10)
	08/14/15	ND(1)	--	**0.0078** [c]	ND(10)	--	--	--	--	ND(0.006)	ND(0.01)	--	ND(10)
	09/07/16	ND(1)	0.0028	**0.036** [c]	ND(10)	--	--	--	ND(0.006)	0.0099	ND(0.01)	--	ND(10)
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	--
	09/11/17	ND(1)	0.0043	**0.06** [a,c]	ND(50)	--	--	--	ND(0.006)	0.0035	ND(0.005)	--	ND(50)
	09/12/18	ND(1)	0.0042	**0.017** [c]	ND(10)	--	--	--	ND(0.006)	ND(0.006)	ND(0.005)	--	ND(10)
	12/06/18	ND(1)	--	**0.011** [c]	ND(0.5)	--	**0.019** [c,d]	--	--	--	ND(0.01)	ND(0.5)	ND(0.5)
	08/13/19	ND(1)	0.0026	0.0034	ND(10)	**0.0066** [c]	**0.0092** [c,d]	--	ND(0.006)	ND(0.006)	ND(0.005)	--	ND(10)
	09/20/20	ND(1)	ND(0.006)	**0.015** [c]	ND(0.57) UJ	**0.077** [c]	**0.0087** [c,d]	1340	ND(0.006)	ND(0.006)	ND(0.01)	--	ND(0.034) UJ
	09/28/21	--	--	--	--	--	--	1090	--	--	--	--	--
	09/29/21	--	ND(0.006)	**0.0067** [c]	--	--	**0.0063** [c,d]	--	ND(0.001)	0.0005 J	ND(0.005)	--	--
	09/28/22	--	--	--	--	--	--	1210	--	--	--	--	--
	09/29/22	--	ND(0.006)	0.004J/ND(0.006) U*	ND(0.3)	**0.028** [c]	**0.072** [c,d]	--	--	--	ND(0.005)	--	--

[a] NMED Groundwater Cleanup	NA	0.05	0.05	NA	NA	NA	NA	NA	NA	0.2	NA	NA
[b] 40 CFR 141.62	NA	0.1	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c] NMED Tap Water	NA	NA	0.0057	34.3	0.00598	0.00598	NA	0.79	0.79	0.00146	NA	0.0343
[d] USEPA RSL Tap Water HQ 1.	250	NA	NA	25	NA	0.006	NA	NA	0.8	0.0015	NA	0.025
[e] NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	Dibenzo- furan (ug/L)	1,2-Dibromo 3- chloro- propane (ug/L)	Dibromo- chloromethane (ug/L)	1,2- Dibromo- ethane (ug/L)	Dibromomethane (ug/L)	1,2-Di- chloro- benzene (ug/L)	1,3-Di- chloro- benzene (ug/L)	1,4-Di- chloro- benzene (ug/L)	3,3'-Di- chloro- benzidine (ug/L)	Dichloro- difluoro- methane (ug/L)	1,1-Dichloro- ethane (ug/L)	1,2- Dichloro- ethane (ug/L)
MW-5	08/23/12	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/10/13	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/17/14	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	08/14/15	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/07/16	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/11/17	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/17/18	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	12/06/18	ND(0.5)	ND(2)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(1)	ND(1)
	08/14/19	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/21/20	ND(0.51)	ND(2)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.51)	ND(1)	ND(1)	ND(1)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	--	--	--	ND(0.0093)	--	--	--	ND(5)	--	--	ND(1)	ND(1)
SMW-2	08/23/12	ND(10)	ND(20)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/09/13	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/11/14	ND(11)	ND(2)	ND(1)	ND(1)	ND(1)	ND(11)	ND(11)	ND(11)	ND(11)	ND(1)	ND(1)	ND(1)
	08/17/15	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/09/16	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	--
	09/11/17	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/18/18	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	08/22/19	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/19/20	ND(0.51)	ND(2)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.51)	ND(1)	ND(1)	ND(1)
	09/29/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/30/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/30/22	--	--	--	ND(0.0094)	--	--	--	ND(5)	--	--	ND(1)	ND(1)
SMW-4	08/24/12	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/09/13	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/11/14	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	08/14/15	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/07/16	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	--
	09/11/17	ND(50)	ND(2)	ND(1)	ND(1)	ND(1)	ND(50)	ND(50)	ND(50)	ND(50)	ND(1)	ND(1)	ND(1)
	09/12/18	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	12/06/18	ND(0.5)	ND(2)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(1)	ND(1)	ND(1)
	08/13/19	ND(10)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1)	ND(1)	ND(1)
	09/20/20	ND(0.57) UJ	ND(2)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.57) UJ	ND(1)	ND(1)	ND(1)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/28/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	--	--	--	ND(0.0094)	--	--	--	ND(5)	--	--	ND(1)	ND(1)

[a] NMED Groundwater Cleanup	NA	NA	NA	0.05	NA	600	NA	75	NA	NA	25	5
[b] 40 CFR 141.62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c] NMED Tap Water	NA	0.00334	1.68	0.0747	8	302	NA	4.82	1.25	197	27.5	1.71
[d] USEPA RSL Tap Water HQ 1.	7.9	0.00033	0.87	0.0075	8.3	300	NA	0.48	0.13	200	2.8	0.17
[e] NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	1,1-Dichloro- ethene (ug/L)	cis-1,2- Dichloro- ethene (ug/L)	trans-1,2- Dichloro- ethene (ug/L)	2,4- Dichloro- phenol (ug/L)	1,2-Dichloro- propane (ug/L)	1,3-Dichloro- propane (ug/L)	2,2-Dichloro- propane (ug/L)	1,1-Dichloro- propene (ug/L)	Cis-1,3- dichloro- propene (ug/L)	trans-1,3- Dichloro- propene (ug/L)	Diethyl- phthalate (ug/L)	7,12-Dimethyl benz(a) anthracen (ug/L)
MW-5	08/23/12	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/10/13	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/17/14	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	08/14/15	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/07/16	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/11/17	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/17/18	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	12/06/18	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)
	08/14/19	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/21/20	ND(1)	ND(1)	ND(1)	ND(0.51)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(0.51)	--
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	--	--	--	--	--	ND(10)	--
	09/29/22	ND(1)	ND(1)	--	--	--	--	--	--	--	--	ND(10)	--
SMW-2	08/23/12	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	ND(10)	ND(20)	ND(10)	ND(10)	ND(10)	ND(10)	--
	09/09/13	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/11/14	ND(1)	ND(1)	ND(1)	ND(22)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(11)	--
	08/17/15	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/09/16	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	--
	09/11/17	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/18/18	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	08/22/19	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/19/20	ND(1)	ND(1)	ND(1)	ND(0.51)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(0.51)	--
	09/29/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/30/21	--	--	--	--	--	--	--	--	--	--	ND(10)	--
	09/30/22	ND(1)	ND(1)	--	--	--	--	--	--	--	--	ND(10)	--
SMW-4	08/24/12	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/09/13	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/11/14	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	08/14/15	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/07/16	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	--
	09/11/17	ND(1)	ND(1)	ND(1)	ND(100)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(50)	--
	09/12/18	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	12/06/18	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)
	08/13/19	ND(1)	ND(1)	ND(1)	ND(20)	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(10)	--
	09/20/20	ND(1)	ND(1)	ND(1)	ND(0.57) UJ	ND(1)	ND(1)	ND(2)	ND(1)	ND(1)	ND(1)	ND(0.57) UJ	--
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	--	--	--	--	--	ND(10)	--
	09/28/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	ND(1)	ND(1)	--	--	--	--	--	--	--	--	ND(10)	--

[a] NMED Groundwater Cleanup	7	70	100	NA	5	NA	NA	NA	NA	NA	NA	NA
[b] 40 CFR 141.62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c] NMED Tap Water	284	36.5	93.2	45.3	4.38	NA	NA	NA	NA	NA	14,800	NA
[d] USEPA RSL Tap Water HQ 1.	280	36	360	46	0.85	370	NA	NA	NA	NA	15,000	0.0001
[e] NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	2,4- Dimethyl-phenol (ug/L)	Dimethyl Phthalate (ug/L)	Di-n- butyl-phthalate (ug/L)	2-Methyl- 4,6-dinitro phenol (ug/L)	2,4- Dinitro-phenol (ug/L)	2,4-Dinitro Toluene (ug/L)	2,6-Dinitro Toluene (ug/L)	Di-n- octyl-phthalate (ug/L)	1,4-Dioxane (ug/L)	1,2-Diphenyl hydrazine (ug/L)	Dissolved Oxygen, Field (mg/L)	Ethyl- benzene (ug/L)
MW-5	08/23/12	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/10/13	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/17/14	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(20)	--	--	--	ND(1)
	08/14/15	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/07/16	ND(10)	5.1	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	3.4	--	--	--	ND(1)
	09/11/17	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/17/18	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	ND(10)	--	--	ND(1)
	12/06/18	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(50)	ND(0.5)	--	ND(1)
	08/14/19	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/21/20	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51) UJ	ND(0.51)	ND(0.2)	ND(0.51)	ND(0.51)	--	0.47	ND(1)
	09/28/21	--	--	--	--	--	--	--	--	--	--	0.74	--
	09/29/21	--	ND(10)	--	--	--	--	--	ND(20)	--	--	--	ND(1)
	09/29/22	ND(10)	ND(10)	ND(10)	--	ND(20)	--	--	ND(20)	ND(1) UJ	--	1.57	ND(1)
SMW-2	08/23/12	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)
	09/09/13	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/11/14	ND(11)	ND(11)	ND(11)	ND(22)	ND(22)	ND(11)	ND(11)	ND(22)	--	--	--	ND(1)
	08/17/15	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/09/16	ND(10)	3	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	3.3	--	--	--	ND(1)
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	--
	09/11/17	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/18/18	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	08/22/19	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/19/20	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.2)	ND(0.51)	**9.1** [c,d]	--	2.46	ND(1)
	09/29/21	--	--	--	--	--	--	--	--	--	--	3.51	--
	09/30/21	--	ND(10)	--	--	--	--	--	ND(20)	--	--	--	ND(1)
	09/30/22	ND(10)	ND(10)	ND(10)	--	ND(20)	--	--	ND(20)	**8.3** [c,d]	--	1.8	ND(1)
SMW-4	08/24/12	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/09/13	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/11/14	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(20)	--	--	--	ND(1)
	08/14/15	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/07/16	ND(10)	5.4	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	4.9	--	--	--	ND(1)
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	--
	09/11/17	ND(50)	ND(50)	ND(50)	ND(100)	ND(100)	ND(50)	ND(50)	ND(50)	--	--	--	ND(1)
	09/12/18	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	ND(10)	--	--	ND(1)
	12/06/18	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(50)	ND(0.5)	--	ND(1)
	08/13/19	ND(10)	ND(10)	ND(10)	ND(20)	ND(20)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)
	09/20/20	ND(0.57) UJ	ND(0.57) UJ	ND(0.57) UJ	ND(0.57) UJ	ND(0.57) UJ	ND(0.57) UJ	ND(0.23) UJ	ND(0.57) UJ	ND(1) UJ	--	1.04	ND(1)
	09/28/21	--	--	--	--	--	--	--	--	--	--	2.04	--
	09/29/21	--	ND(10)	--	--	--	--	--	ND(20)	ND(1)	--	--	ND(1)
	09/28/22	--	--	--	--	--	--	--	--	--	--	1.38	--
	09/29/22	ND(10)	ND(10)	ND(10)	--	ND(20)	--	--	ND(20)	ND(1) UJ	--	--	ND(1)

	2,4- Dimethyl-phenol	Dimethyl Phthalate	Di-n- butyl-phthalate	2-Methyl- 4,6-dinitro phenol	2,4- Dinitro-phenol	2,4-Dinitro Toluene	2,6-Dinitro Toluene	Di-n- octyl-phthalate	1,4-Dioxane	1,2-Diphenyl hydrazine	Dissolved Oxygen, Field	Ethyl- benzene
[a] NMED Groundwater Cleanup	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	700
[b] 40 CFR 141.62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c] NMED Tap Water	354	612	885	1.52	38.7	2.37	0.485	NA	4.59	0.78	NA	15
[d] USEPA RSL Tap Water HQ 1.	360	NA	900	1.5	39	0.24	0.049	200	0.46	0.078	NA	1.5
[e] NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	Fluor- anthene (ug/L)	Fluorene (ug/L)	Fluoride, Total (mg/L)	Hexachloro Benzene (ug/L)	Hexachloro- butadiene (ug/L)	Hexachloro- cyclopenta- diene (ug/L)	Hexachloro- ethane (ug/L)	2-Hexanone (ug/L)	Indeno- (1,2,3-cd) pyrene (ug/L)	Iron, Dissolved (mg/L)	Iron, Total (mg/L)	Isophorone (ug/L)
MW-5	08/23/12	ND(10)	ND(10)	0.67	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	ND(0.02)	ND(10)
	09/10/13	ND(10)	ND(10)	0.76	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	ND(0.02)	ND(10)
	09/17/14	ND(10)	ND(10)	0.73	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	ND(0.02)	ND(10)
	08/14/15	ND(10)	ND(10)	0.72	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	ND(0.02)	ND(10)
	09/07/16	ND(10)	ND(10)	0.65	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.02)	ND(0.02)	ND(10)
	09/11/17	ND(10)	ND(10)	0.68	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.02)	ND(0.02)	ND(10)
	09/17/18	ND(10)	ND(10)	0.7	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.02)	ND(0.02)	ND(10)
	12/06/18	ND(0.5)	ND(0.5)	--	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(10)	ND(0.5)	--	--	ND(0.5)
	08/14/19	ND(10)	ND(10)	0.77	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.02)	ND(0.02)	ND(10)
	09/21/20	ND(0.51)	ND(0.51)	0.6	ND(0.51)	ND(1)	ND(0.51)	ND(0.51)	ND(10)	ND(0.2)	ND(0.02)	0.053 J+	ND(0.51)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	0.68	--	--	--	--	--	--	ND(0.02)	ND(0.05)	--
	09/29/22	ND(0.3)	ND(0.3) UJ	--	--	--	--	--	--	ND(0.3)	--	--	--
SMW-2	08/23/12	ND(10)	ND(10)	0.16	ND(10)	ND(10)	ND(10)	ND(10)	ND(100)	ND(10)	--	1.5	ND(10)
	09/09/13	ND(10)	ND(10)	ND(0.1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	0.028	ND(10)
	09/11/14	ND(11)	ND(11)	ND(2)	ND(11)	ND(11)	ND(11)	ND(11)	ND(10)	ND(11)	--	0.049	ND(11)
	08/17/15	ND(10)	ND(10)	ND(2)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	0.26	ND(10)
	09/09/16	ND(10)	ND(10)	ND(0.1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	0.032	1.4	ND(10)
	06/28/17	--	--	ND(0.5)	--	--	--	--	--	--	--	--	--
	09/11/17	ND(10)	ND(10)	ND(0.5)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	0.054	4	ND(10)
	09/18/18	ND(10)	ND(10)	ND(0.5)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	0.031	0.76	ND(10)
	08/22/19	ND(10)	ND(10)	0.093	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	0.026	0.52	ND(10)
	09/19/20	ND(0.51)	ND(0.51)	ND(0.5)	ND(0.51)	ND(1)	ND(0.51)	ND(0.51)	ND(10)	ND(0.2)	0.02	0.39	ND(0.51)
	09/29/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/30/21	--	--	ND(0.1)	--	--	--	--	--	--	0.022	0.18	--
	09/30/22	ND(0.3) UJ	ND(0.3)	--	--	--	--	--	--	ND(0.3) UJ	--	--	--
SMW-4	08/24/12	ND(10)	ND(10)	**1** [d]	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	0.13	ND(10)
	09/09/13	ND(10)	ND(10)	**0.93** [d]	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	ND(0.02)	ND(10)
	09/11/14	ND(10)	ND(10)	**1.1** [d]	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	0.041	ND(10)
	08/14/15	ND(10)	ND(10)	**1** [d]	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	--	0.32	ND(10)
	09/07/16	ND(10)	ND(10)	**0.95** [d]	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	0.078	1.6	ND(10)
	06/28/17	--	--	**1.1** [d]	--	--	--	--	--	--	--	--	--
	09/11/17	ND(50)	ND(50)	**0.96** [d]	ND(50)	ND(50)	ND(50)	ND(50)	ND(10)	ND(50)	0.12	3.1	ND(50)
	09/12/18	ND(10)	ND(10)	**0.97** [d]	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	0.079	0.71	ND(10)
	12/06/18	ND(0.5)	ND(0.5)	--	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(10)	ND(0.5)	--	--	ND(0.5)
	08/13/19	ND(10)	ND(10)	**1** [d]	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.02)	0.41	ND(10)
	09/20/20	ND(0.57) UJ	ND(0.57) UJ	0.77	ND(0.57) UJ	ND(1)	ND(0.57) UJ	ND(0.57) UJ	ND(10)	ND(0.23) UJ	0.017 J	1.7 J+	ND(0.57) UJ
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	**0.9** [d]	--	--	--	--	--	--	0.021	0.68	--
	09/28/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	ND(0.3)	ND(0.3) UJ	--	--	--	--	--	--	ND(0.3)	--	--	--

		Fluor- anthene	Fluorene	Fluoride, Total	Hexachloro Benzene	Hexachloro- butadiene	Hexachloro- cyclopenta- diene	Hexachloro- ethane	2-Hexanone	Indeno- (1,2,3-cd) pyrene	Iron, Dissolved	Iron, Total	Isophorone
a	NMED Groundwater Cleanup	NA	NA	1.6	NA	NA	NA	NA	NA	NA	NA	NA	NA
b	40 CFR 141.62	NA	NA	4	NA	NA	NA	NA	NA	NA	NA	NA	NA
c	NMED Tap Water	802	288	1.18	0.0976	1.39	0.411	3.28	NA	0.343	13.8	13.8	781
d	USEPA RSL Tap Water HQ 1.	800	290	0.8	0.0098	0.14	0.41	0.33	38	0.25	NA	14	78
e	NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	Isopropyl-benzene (ug/L)	p-Isopropyl-toluene (ug/L)	Lead, Dissolved (mg/L)	Lead, Total (mg/L)	Magnesium, Dissolved (mg/L)	Magnesium, Total (mg/L)	Manganese, Dissolved (mg/L)	Manganese, Total (mg/L)	Mercury, Dissolved (mg/L)	Mercury, Total (mg/L)	4-Methyl- 2-Pentanone (ug/L)	Methylene Chloride (ug/L)
MW-5	08/23/12	ND(1)	ND(1)	--	ND(0.005)	--	ND(1)	--	0.012	--	ND(0.0002)	ND(10)	ND(3)
	09/10/13	ND(1)	ND(1)	--	ND(0.001)	--	ND(1)	--	0.0034	--	ND(0.0002)	ND(10)	ND(3)
	09/17/14	ND(1)	ND(1)	--	ND(0.001)	--	ND(1)	--	0.0045	--	ND(0.0002)	ND(10)	ND(3)
	08/14/15	ND(1)	ND(1)	--	ND(0.0005)	--	ND(1)	--	0.0031	--	ND(0.0002)	ND(10)	ND(3)
	09/07/16	ND(1)	ND(1)	ND(0.0005)	ND(0.0005)	ND(1)	--	0.0035	0.0046	--	0.000055	ND(10)	ND(3)
	09/11/17	ND(1)	ND(1)	ND(0.0005)	ND(0.0005)	ND(1)	--	0.0042	0.0043	--	ND(0.0002)	ND(10)	ND(3)
	09/17/18	ND(1)	ND(1)	ND(0.0005)	ND(0.0005)	ND(1)	--	0.0039	0.0045	--	0.000096	ND(10)	ND(3)
	12/06/18	ND(1)	ND(1)	--	ND(0.001)	--	--	--	--	--	ND(0.0002)	ND(10)	ND(3)
	08/14/19	ND(1)	ND(1)	ND(0.0005)	ND(0.0005)	0.14	--	0.0037	0.0059	--	ND(0.0002)	ND(10)	ND(3)
	09/21/20	ND(1)	ND(1)	ND(0.0005)	0.00011 J	0.15 J	--	0.0035	0.013	--	ND(0.0002)	ND(10)	ND(3)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	ND(0.0005)	ND(0.0005)	--	--	0.0033	0.0041	--	ND(0.0002)	--	ND(3)
	09/29/22	ND(1)	ND(1)	ND(0.0005)	ND(0.0005)	--	--	--	--	ND(0.0002)	ND(0.0002)	--	ND(3)
SMW-2	08/23/12	ND(10)	ND(10)	--	ND(0.005)	--	84	--	0.25	--	ND(0.0002)	ND(100)	ND(30)
	09/09/13	ND(1)	ND(1)	--	ND(0.01)	--	75	--	0.17	--	ND(0.0002)	ND(10)	ND(3)
	09/11/14	ND(1)	ND(1)	--	ND(0.02)	--	84	--	0.27	--	ND(0.0002)	ND(10)	ND(3)
	08/17/15	ND(1)	ND(1)	--	ND(0.005)	--	88	--	0.33	--	ND(0.0002)	ND(10)	ND(3)
	09/09/16	ND(1)	ND(1)	ND(0.0005)	0.0013	96	--	0.24	0.3	--	0.000096	ND(10)	ND(3)
	06/28/17	--	--	--	--	90	--	--	--	--	--	--	--
	09/11/17	ND(1)	ND(1)	ND(0.0025)	0.0027	96	--	0.31	**0.49** [d]	--	ND(0.0002)	ND(10)	ND(3)
	09/18/18	ND(1)	ND(1)	ND(0.0025)	ND(0.0025)	96	--	0.33	0.34	--	0.00006	ND(10)	ND(3)
	08/22/19	ND(1)	ND(1)	ND(0.0025)	0.00059	100	--	0.36	0.37	--	0.000094	ND(10)	ND(3)
	09/19/20	ND(1)	ND(1)	ND(0.0025)	0.00027J/ND (0.0025)U*	100	--	0.4	0.34	--	ND(0.0002) UJ	ND(10)	ND(3)
	09/29/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/30/21	--	--	ND(0.0025)	0.00016 J	--	--	0.38	0.38	--	ND(0.0002)	--	--
	09/30/22	0.27 J	ND(1)	0.000058 J	0.00064	--	--	--	--	ND(0.0002)	ND(0.0002)	--	ND(3)
SMW-4	08/24/12	ND(1)	ND(1)	--	ND(0.005)	--	ND(1)	--	0.0046	--	ND(0.0002)	ND(10)	ND(3)
	09/09/13	ND(1)	ND(1)	--	ND(0.001)	--	1.1	--	ND(0.002)	--	ND(0.0002)	ND(10)	ND(3)
	09/11/14	ND(1)	ND(1)	--	ND(0.01)	--	1.2	--	0.0033	--	ND(0.0002)	ND(10)	ND(3)
	08/14/15	ND(1)	ND(1)	--	0.00053	--	1.5	--	0.01	--	ND(0.0002)	ND(10)	ND(3)
	09/07/16	ND(1)	ND(1)	0.00021	0.0017	0.87	--	0.0064	0.035	--	0.000058	ND(10)	ND(3)
	06/28/17	--	--	--	--	1.2	--	--	--	--	--	--	--
	09/11/17	ND(1)	ND(1)	0.00059	0.0032	1.1	--	0.01	0.068	--	ND(0.0002)	ND(10)	ND(3)
	09/12/18	ND(1)	ND(1)	ND(0.0005)	0.00088	0.99	--	0.0042	0.022	--	ND(0.0002)	ND(10)	ND(3)
	12/06/18	ND(1)	ND(1)	--	0.001	--	--	--	--	--	ND(0.0002)	ND(10)	ND(3)
	08/13/19	ND(1)	ND(1)	ND(0.0005)	0.00037	0.81	--	0.00056	0.0086	--	0.000054	ND(10)	ND(3)
	09/20/20	ND(1)	ND(1)	0.000038 J	0.0019	0.67 J	--	0.0014 J	0.042	--	ND(0.0002)	ND(10)	ND(3)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	ND(0.0005)	0.0006	--	--	0.00073 J	0.014	--	ND(0.0002)	--	--
	09/28/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	ND(1)	ND(1)	ND(0.0005)	0.00036 J	--	--	--	--	ND(0.0002) UJ	ND(0.001) UJ	--	ND(3)

		Isopropyl-benzene	p-Isopropyl-toluene	Lead, Dissolved	Lead, Total	Magnesium, Dissolved	Magnesium, Total	Manganese, Dissolved	Manganese, Total	Mercury, Dissolved	Mercury, Total	4-Methyl- 2-Pentanone	Methylene Chloride
[a]	NMED Groundwater Cleanup	NA	NA	0.015	0.015	NA	NA	NA	NA	NA	0.002	NA	5
[b]	40 CFR 141.62	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.002	NA	NA
[c]	NMED Tap Water	447	NA	NA	NA	NA	NA	2.02	2.02	NA	NA	1,240	118
[d]	USEPA RSL Tap Water HQ 1.	450	NA	NA	0.015	NA	NA	NA	0.43	NA	0.00063	6,300	11
[e]	NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	1-Methyl-naphthalene (ug/L)	2-Methyl-naphthalene (ug/L)	2-Methyl phenol (ug/L)	3,4- Methyl phenol (ug/L)	Molybdenum, Dissolved (mg/L)	Molybdenum, Total (mg/L)	Motor Oil (mg/L)	MTBE (ug/L)	Naphthalene (ug/L)	Nickel, Dissolved (mg/L)	Nickel, Total (mg/L)	Nitrate & Nitrite (mg/L)
MW-5	08/23/12	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	09/10/13	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	--
	09/17/14	ND(10)	ND(10)	ND(20)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	1.1
	08/14/15	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	09/07/16	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	09/11/17	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	09/17/18	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	--
	12/06/18	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	--	--	--	ND(1)	ND(0.5)	--	ND(0.01)	--
	08/14/19	ND(4)	ND(4)	ND(10)	ND(10)	0.0083	0.008	ND(5)	ND(1)	ND(2)	ND(0.01)	ND(0.01)	--
	09/21/20	ND(4)	ND(4)	ND(0.51)	ND(0.51)	0.0081	ND(0.008)	--	ND(1)	ND(2)	ND(0.01)	ND(0.01)	--
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	--	--	ND(1)	--	--	--	--
	09/29/22	ND(0.3) UJ	ND(0.3) UJ	ND(10)	ND(10)	--	--	--	ND(1)	ND(0.3) UJ	ND(0.05)	ND(0.01)	--
SMW-2	08/23/12	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	12	ND(10)	--	--	ND(2)
	09/09/13	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	9.7	ND(10)	--	--	ND(4)
	09/11/14	ND(11)	ND(11)	ND(22)	ND(11)	--	--	--	12	ND(11)	--	--	ND(2)
	08/17/15	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	11	ND(10)	--	--	ND(4)
	09/09/16	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	13	ND(10)	--	--	ND(2)
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	ND(2)
	09/11/17	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	11	ND(10)	--	--	ND(2)
	09/18/18	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	11	ND(10)	--	--	--
	08/22/19	ND(4)	ND(4)	ND(10)	ND(10)	ND(0.008)	ND(0.008)	ND(5)	12	ND(2)	0.039	0.047	--
	09/19/20	ND(4)	ND(4)	ND(0.51)	ND(0.51)	ND(0.008)	ND(0.008)	--	13	ND(2)	0.042	0.041 J	--
	09/29/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/30/21	--	--	--	--	--	--	--	14	--	0.041	0.038	--
	09/30/22	ND(0.3)	ND(0.3)	ND(10)	ND(10)	--	--	--	9.3	ND(0.3)	0.041	0.042	--
SMW-4	08/24/12	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	09/09/13	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	09/11/14	ND(10)	ND(10)	ND(20)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	08/14/15	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	09/07/16	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	ND(1)
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	0.21
	09/11/17	ND(50)	ND(50)	ND(50)	ND(50)	--	--	--	ND(1)	ND(50)	--	--	0.35
	09/12/18	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(1)	ND(10)	--	--	--
	12/06/18	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	--	--	--	ND(1)	ND(0.5)	--	ND(0.01)	--
	08/13/19	ND(4)	ND(4)	ND(10)	ND(10)	0.012	0.01	ND(5)	ND(1)	ND(2)	ND(0.01)	0.0041	--
	09/20/20	ND(4)	ND(4)	ND(0.57) UJ	ND(0.57) UJ	0.0093	0.0091	--	ND(1)	ND(2)	ND(0.01)	0.019 J+	--
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	--	--	ND(1)	--	ND(0.01)	ND(0.01)	--
	09/28/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	ND(0.3) UJ	ND(0.3) UJ	ND(10)	ND(10)	--	--	--	ND(1)	ND(0.3) UJ	ND(0.01)	ND(0.01)	--
[a]	NMED Groundwater Cleanup	NA	NA	NA	NA	NA	NA	NA	NA	30	NA	NA	NA
[b]	40 CFR 141.62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c]	NMED Tap Water	11.4	35.1	NA	NA	0.0987	0.0987	NA	143	1.65	0.372	0.372	NA
[d]	USEPA RSL Tap Water HQ 1.	1.1	36	930	NA	NA	0.1	NA	14	0.17	NA	0.39	NA
[e]	NMED TPH Levels	NA	NA	NA	NA	NA	NA	0.0858	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	2-Nitro- aniline (ug/L)	3-Nitro- aniline (ug/L)	4-Nitro- aniline (ug/L)	Nitro- benzene (ug/L)	Nitrogen, Nitrate (mg/L)	Nitrogen, Nitrate & Nitrite (mg/L)	Nitrogen, Nitrite (mg/L)	2-Nitro- phenol (ug/L)	4-Nitro- phenol (ug/L)	N-Nitroso- dimethyl- amine (ug/L)	N-Nitrosodi- n- propyl- amine (ug/L)	N-Nitroso- diphenyl- amine (ug/L)
MW-5	08/23/12	ND(10)	ND(10)	ND(20)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/10/13	ND(10)	ND(10)	ND(10)	ND(10)	0.8	--	ND(0.1)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/17/14	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	08/14/15	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/07/16	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/11/17	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/17/18	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.5)	--	ND(0.5)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	12/06/18	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	--	--	--	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
	08/14/19	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.5)	--	ND(0.5)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/21/20	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.1)	--	ND(0.1)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	0.019J/ND(0.1)U*	--	ND(0.1)	--	--	--	--	--
	09/29/22	--	--	--	--	--	--	--	--	--	--	--	--
SMW-2	08/23/12	ND(10)	ND(10)	ND(20)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/09/13	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/11/14	ND(11)	ND(11)	ND(11)	ND(11)	--	--	--	ND(11)	ND(11)	ND(11)	ND(11)	ND(11)
	08/17/15	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/09/16	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	--
	09/11/17	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/18/18	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.5)	--	ND(2)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	08/22/19	ND(10)	ND(10)	ND(10)	ND(10)	ND(0.5)	--	**3.3** [a,b,d]	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/19/20	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.5)	--	ND(2)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)	ND(0.51)
	09/29/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/30/21	--	--	--	--	0.14 JB	--	ND(2)	--	--	--	--	--
	09/30/22	--	--	--	--	--	--	--	--	--	--	--	--
SMW-4	08/24/12	ND(10)	ND(10)	ND(20)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/09/13	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/11/14	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	08/14/15	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/07/16	ND(10)	ND(10)	ND(10)	ND(10)	--	--	--	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	--
	09/11/17	ND(50)	ND(50)	ND(50)	ND(50)	--	--	--	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)
	09/12/18	ND(10)	ND(10)	ND(10)	ND(10)	0.12	--	ND(0.5)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	12/06/18	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	--	--	--	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
	08/13/19	ND(10)	ND(10)	ND(10)	ND(10)	0.11	--	ND(0.5)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
	09/20/20	ND(0.57) UJ	ND(0.57) UJ	ND(0.57) UJ	ND(0.57) UJ	0.034 J	--	ND(0.1)	ND(0.57) UJ	ND(0.57) UJ	ND(0.57) UJ	ND(0.57) UJ	ND(0.57) UJ
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	0.06J/ND(0.1)U*	--	ND(0.1)	--	--	--	--	--
	09/28/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	--	--	--	--	--	--	--	--	--	--	--	--

[a]	NMED Groundwater Cleanup	NA	NA	NA	NA	10	NA	1	NA	NA	NA	NA	NA
[b]	40 CFR 141.62	NA	NA	NA	NA	10	10	1	NA	NA	NA	NA	NA
[c]	NMED Tap Water	NA	NA	NA	1.4	NA	NA	NA	NA	NA	0.00491	NA	122
[d]	USEPA RSL Tap Water HQ 1.	190	NA	3.8	0.14	32	NA	2	NA	NA	0.00011	0.011	12
[e]	NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	ORP, Field (mV)	Penta- chloro- phenol (ug/L)	pH, Field (Std Units)	Phen- anthrene (ug/L)	Phenol (ug/L)	Ortho-Phosphate (mg/L)	Ortho- Phosphorus (mg/L)	Potassium, Dissolved (mg/L)	Potassium, Total (mg/L)	n-Propyl- benzene (ug/L)	Pyrene (ug/L)	Pyridine (ug/L)
MW-5	08/23/12	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	ND(1)	ND(1)	ND(10)	ND(10)
	09/10/13	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	ND(1)	ND(1)	ND(10)	ND(10)
	09/17/14	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	1.6	ND(1)	ND(10)	ND(10)
	08/14/15	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	ND(1)	ND(1)	ND(10)	ND(10)
	09/07/16	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	0.67	--	ND(1)	ND(10)	ND(10)
	09/11/17	--	ND(20)	--	ND(10)	ND(10)	ND(2.5)	--	0.54	--	ND(1)	ND(10)	ND(10)
	09/17/18	--	ND(20)	--	ND(10)	ND(10)	ND(2.5)	--	0.6	--	ND(1)	ND(10)	ND(10)
	12/06/18	--	ND(0.5)	--	ND(0.5)	ND(0.5)	--	--	--	--	ND(1)	ND(0.5)	ND(0.5)
	08/14/19	--	ND(20)	--	ND(10)	ND(10)	--	ND(2.5)	0.61	--	ND(1)	ND(10)	ND(10)
	09/21/20	209.7	ND(0.51)	9.29	ND(0.51)	ND(0.51)	ND(0.5)	--	0.51 J	--	ND(1)	ND(0.51)	ND(0.51)
	09/28/21	222.6	--	9.12	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	ND(0.5)	--	--	--	--	ND(5)	--
	09/29/22	35.8	--	9.11	ND(0.3)	ND(20)	--	--	--	--	ND(1)	ND(1)	ND(40)
SMW-2	08/23/12	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	1.9	ND(10)	ND(10)	ND(10)
	09/09/13	--	ND(20)	--	ND(10)	ND(10)	ND(10)	--	--	1.7	ND(1)	ND(10)	ND(10)
	09/11/14	--	ND(22)	--	ND(11)	ND(11)	ND(0.5)	--	--	3.7	ND(1)	ND(11)	ND(11)
	08/17/15	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	1.4	ND(1)	ND(10)	ND(10)
	09/09/16	--	ND(20)	--	ND(10)	ND(10)	ND(10)	--	1.9	--	ND(1)	4.6	ND(10)
	06/28/17	--	--	--	--	--	ND(10)	--	0.75	--	--	--	--
	09/11/17	--	ND(20)	--	ND(10)	ND(10)	ND(2.5)	--	0.98	--	ND(1)	ND(10)	ND(10)
	09/18/18	--	ND(20)	--	ND(10)	ND(10)	ND(2.5)	--	0.74	--	ND(1)	ND(10)	ND(10)
	08/22/19	--	ND(20)	--	ND(10)	ND(10)	--	ND(2.5)	0.72	--	ND(1)	ND(10)	ND(10)
	09/19/20	224.6	ND(0.51)	7.64	ND(0.51)	ND(0.51)	ND(2.5)	--	0.81 J	--	ND(1)	ND(0.51)	ND(0.51)
	09/29/21	232.2	--	7.18	--	--	--	--	--	--	--	--	--
	09/30/21	--	--	--	--	ND(5)	--	--	--	--	--	ND(0.2)	--
	09/30/22	29.2	--	7.08	ND(0.3)	ND(20)	--	--	--	--	ND(1)	ND(1) UJ	ND(40)
SMW-4	08/24/12	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	ND(1)	ND(1)	ND(10)	ND(10)
	09/09/13	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	ND(1)	ND(1)	ND(10)	ND(10)
	09/11/14	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	1.4	ND(1)	ND(10)	ND(10)
	08/14/15	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	--	ND(1)	ND(1)	ND(10)	ND(10)
	09/07/16	--	ND(20)	--	ND(10)	ND(10)	ND(0.5)	--	0.57	--	ND(1)	ND(10)	ND(10)
	06/28/17	--	--	--	--	--	ND(2.5)	--	0.52	--	--	--	--
	09/11/17	--	ND(100)	--	ND(50)	ND(50)	ND(2.5)	--	0.5	--	ND(1)	ND(50)	ND(50)
	09/12/18	--	ND(20)	--	ND(10)	ND(10)	ND(2.5)	--	0.62	--	ND(1)	ND(10)	ND(10)
	12/06/18	--	ND(0.5)	--	ND(0.5)	ND(0.5)	--	--	--	--	ND(1)	ND(0.5)	ND(0.5)
	08/13/19	--	ND(20)	--	ND(10)	ND(10)	--	ND(2.5)	0.48	--	ND(1)	ND(10)	ND(10)
	09/20/20	190	ND(0.57) UJ	8.7	ND(0.57) UJ	ND(0.57) UJ	ND(0.5)	--	0.5 J	--	ND(1)	ND(0.57) UJ	ND(0.57) UJ
	09/28/21	229.3	--	8.6	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	ND(5)	--	--	--	--	--	ND(0.2)	--
	09/28/22	52.1	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	--	--	--	ND(0.3)	ND(20)	--	--	--	--	ND(1)	ND(1)	ND(40)
[a] NMED Groundwater Cleanup		NA	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[b] 40 CFR 141.62		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c] NMED Tap Water		NA	0.413	NA	170	5,760	NA	NA	NA	NA	NA	117	NA
[d] USEPA RSL Tap Water HQ 1.		NA	0.041	NA	NA	5,800	NA	NA	NA	NA	660	120	20
[e] NMED TPH Levels		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	Quinoline (ug/L)	Selenium, Dissolved (mg/L)	Selenium, Total (mg/L)	Silver, Dissolved (mg/L)	Silver, Total (mg/L)	Sodium, Dissolved (mg/L)	Sodium, Total (mg/L)	Solids, Total Dissolved, Field (mg/L)	Styrene (ug/L)	Sulfate (mg/L)	Temperature, Field (oC)	1,1,1,2-Tetrachloro- ethan (ug/L)
MW-5	08/23/12	--	--	ND(0.0025)	--	ND(0.005)	--	270	--	ND(1)	160	--	ND(1)
	09/10/13	--	--	ND(0.001)	--	ND(0.005)	--	260	--	ND(1)	160	--	ND(1)
	09/17/14	--	--	ND(0.001)	--	ND(0.005)	--	250	--	ND(1)	150	--	ND(1)
	08/14/15	--	--	ND(0.001)	--	ND(0.005)	--	260	--	ND(1)	160	--	ND(1)
	09/07/16	--	0.0005	0.00038	ND(0.005)	ND(0.005)	270	--	--	ND(1)	160	--	ND(1)
	09/11/17	--	0.0012	ND(0.001)	ND(0.005)	ND(0.005)	260	--	--	ND(1)	170	--	ND(1)
	09/17/18	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	260	--	--	ND(1)	170	--	ND(1)
	12/06/18	ND(0.5)	--	ND(0.001)	--	ND(0.005)	--	--	--	ND(1)	--	--	ND(1)
	08/14/19	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	290	--	--	ND(1)	180	--	ND(1)
	09/21/20	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	260	--	806	ND(1)	150	14.3	ND(1)
	09/28/21	--	--	--	--	--	--	--	649.5	--	--	14.5	--
	09/29/21	--	ND(0.001)	ND(0.001)	--	--	--	--	--	--	160	--	--
	09/29/22	--	ND(0.001)	ND(0.001)	ND(0.025)	ND(0.005)	--	--	723.5	ND(1)	--	13.4	--
SMW-2	08/23/12	--	--	0.0072	--	ND(0.005)	--	2100	--	ND(10)	**1600** [a]	--	ND(10)
	09/09/13	--	--	0.011	--	ND(0.025)	--	2200	--	ND(1)	**1500** [a]	--	ND(1)
	09/11/14	--	--	0.021	--	ND(0.005)	--	2100	--	ND(1)	**1400** [a]	--	ND(1)
	08/17/15	--	--	ND(0.01)	--	ND(0.005)	--	2100	--	ND(1)	**1600** [a]	--	ND(1)
	09/09/16	--	0.015	0.016	ND(0.005)	ND(0.005)	2300	--	--	ND(1)	**1300** [a]	--	ND(1)
	06/28/17	--	--	--	--	--	2300	--	--	--	**1500** [a]	--	--
	09/11/17	--	0.024	0.024	ND(0.005)	ND(0.005)	2200	--	--	ND(1)	**1400** [a]	--	ND(1)
	09/18/18	--	ND(0.005)	ND(0.005)	0.0079	0.0073	2300	--	--	ND(1)	**1500** [a]	--	ND(1)
	08/22/19	--	ND(0.005)	ND(0.005)	0.0048	0.0051	2400	--	--	ND(1)	**1400** [a]	--	ND(1)
	09/19/20	--	ND(0.005)	ND(0.005)	0.0041 J	0.0053	2200	--	841.8	ND(1)	**1200** [a]	15.1	ND(1)
	09/29/21	--	--	--	--	--	--	--	6849	--	--	13	--
	09/30/21	--	ND(0.005)	0.0014	--	--	--	--	--	--	**1300** [a]	--	--
	09/30/22	--	ND(0.001)	ND(0.001)	0.0078	0.0057	--	--	7800	ND(1)	--	14.9	--
SMW-4	08/24/12	--	--	ND(0.0025)	--	ND(0.005)	--	290	--	ND(1)	150	--	ND(1)
	09/09/13	--	--	ND(0.001)	--	ND(0.005)	--	290	--	ND(1)	170	--	ND(1)
	09/11/14	--	--	0.0013	--	ND(0.005)	--	300	--	ND(1)	150	--	ND(1)
	08/14/15	--	--	ND(0.001)	--	ND(0.005)	--	310	--	ND(1)	160	--	ND(1)
	09/07/16	--	0.0011	0.00096	ND(0.005)	ND(0.025)	300	--	--	ND(1)	150	--	ND(1)
	06/28/17	--	--	--	--	--	310	--	--	--	180	--	--
	09/11/17	--	ND(0.005)	0.00097	ND(0.005)	ND(0.005)	300	--	--	ND(1)	160	--	ND(1)
	09/12/18	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	300	--	--	ND(1)	160	--	ND(1)
	12/06/18	ND(0.5)	--	ND(0.001)	--	ND(0.005)	--	--	--	ND(1)	--	--	ND(1)
	08/13/19	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	300	--	--	ND(1)	170	--	ND(1)
	09/20/20	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	280	--	902.7	ND(1)	140	16.1	ND(1)
	09/28/21	--	--	--	--	--	--	--	708	--	--	13.6	--
	09/29/21	--	ND(0.001)	ND(0.001)	--	--	--	--	--	--	150	--	--
	09/28/22	--	--	--	--	--	--	--	786.5	--	--	14.7	--
	09/29/22	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.005)	--	--	--	ND(1)	--	--	--

	Quinoline (ug/L)	Selenium, Dissolved (mg/L)	Selenium, Total (mg/L)	Silver, Dissolved (mg/L)	Silver, Total (mg/L)	Sodium, Dissolved (mg/L)	Sodium, Total (mg/L)	Solids, Total Dissolved, Field (mg/L)	Styrene (ug/L)	Sulfate (mg/L)	Temperature, Field (oC)	1,1,1,2-Tetrachloro- ethan (ug/L)
[a] NMED Groundwater Cleanup	NA	0.05	0.05	0.05	0.05	NA	NA	NA	100	600	NA	NA
[b] 40 CFR 141.62	NA	0.05	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c] NMED Tap Water	NA	0.0987	0.0987	0.0812	0.0812	NA	NA	NA	1,210	NA	NA	5.74
[d] USEPA RSL Tap Water HQ 1.	0.024	NA	0.1	NA	0.094	NA	NA	NA	1,200	NA	NA	0.57
[e] NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	1,1,2,2- Tetrachloro- ethan (ug/L)	Tetrachloro- ethene (ug/L)	2,3,4,6- Tetrachlorophenol (ug/L)	2,3,5,6- Tetrachlorophenol (ug/L)	Thallium, Dissolved (mg/L)	Thallium, Total (mg/L)	Thiophenol (Benzene thiol) (ug/L)	Toluene (ug/L)	Diesel Range Organics (mg/L)	Gasoline Range Organics (mg/L)	Oil Range Organics (mg/L)	1,2,3- Trichloro- benzene (ug/L)
MW-5	08/23/12	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/10/13	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/17/14	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	08/14/15	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/07/16	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	**0.027** [e]	ND(5)	ND(1)
	09/11/17	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/17/18	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	12/06/18	ND(2)	ND(1)	ND(0.5)	ND(0.5)	--	--	ND(0.5)	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	08/14/19	ND(2)	ND(1)	--	--	ND(0.0005)	ND(0.0005)	--	ND(1)	ND(1)	ND(0.05)	--	ND(1)
	09/21/20	ND(2)	ND(1)	ND(0.51)	ND(0.51)	ND(0.0005)	ND(0.00025)	--	ND(1)	ND(0.07) UJ	ND(0.05)	ND(0.6)	ND(1)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	--	--	ND(1)	ND(0.064)	ND(0.05)	ND(0.08)	--
	09/29/22	--	ND(1)	--	--	--	--	--	ND(1)	**1.1** [e]	ND(0.05)	**0.5** [e]	--
SMW-2	08/23/12	ND(20)	ND(10)	--	--	--	--	--	ND(10)	ND(1)	**0.28** [e]	ND(5)	ND(10)
	09/09/13	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	**0.15** [e]	ND(5)	ND(1)
	09/11/14	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	**0.23** [e]	ND(5)	ND(1)
	08/17/15	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	**0.78** [e]	ND(5)	ND(1)
	09/09/16	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	**1** [e]	ND(5)	ND(1)
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	--
	09/11/17	ND(2)	ND(1)	--	--	--	--	--	ND(1)	**0.41** [e]	**0.23** [e]	ND(5)	ND(1)
	09/18/18	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	**0.25** [e]	ND(5)	ND(1)
	08/22/19	ND(2)	ND(1)	--	--	ND(0.0025)	ND(0.0025)	--	ND(1)	**1.1** [e]	**0.21** [e]	--	ND(1)
	09/19/20	ND(2)	ND(1)	ND(0.51)	ND(0.51)	ND(0.0025)	ND(0.0012) UJ	--	ND(1)	**0.1 J-** [e]	**0.57** [e]	ND(0.6) UJ	ND(1)
	09/29/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/30/21	--	--	--	--	--	--	--	ND(1)	**0.38 JB** [e]	**0.74** [e]	ND(0.08)	--
	09/30/22	--	ND(1)	--	--	--	--	--	ND(1)	**0.34 JB** [e]	**0.11 J+** [e]	ND(0.08)	--
SMW-4	08/24/12	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/09/13	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/11/14	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	08/14/15	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/07/16	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	**0.028** [e]	ND(5)	ND(1)
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	--
	09/11/17	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	09/12/18	ND(2)	ND(1)	--	--	--	--	--	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	12/06/18	ND(2)	ND(1)	ND(0.5)	ND(0.5)	--	--	ND(0.5)	ND(1)	ND(1)	ND(0.05)	ND(5)	ND(1)
	08/13/19	ND(2)	ND(1)	--	--	ND(0.0005)	ND(0.0005)	--	ND(1)	ND(1)	ND(0.05)	--	ND(1)
	09/20/20	ND(2)	ND(1)	ND(0.57) UJ	ND(0.57) UJ	ND(0.0005)	ND(0.00025)	--	ND(1)	ND(0.07) UJ	ND(0.05)	ND(0.6) UJ	ND(1)
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	--	--	ND(1)	ND(0.064)	ND(0.05)	ND(0.08)	--
	09/28/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	--	ND(1)	--	--	--	--	--	ND(1)	0.022J/ND(0.064) U*	ND(0.05)	ND(0.08)	--

[a]	NMED Groundwater Cleanup	10	5	NA	NA	NA	0.002	NA	1,000	NA	NA	NA	NA
[b]	40 CFR 141.62	NA	NA	NA	NA	0.002	0.002	NA	NA	NA	NA	NA	NA
[c]	NMED Tap Water	0.757	113	NA	NA	0.000197	0.143	NA	1,090	NA	NA	NA	NA
[d]	USEPA RSL Tap Water HQ 1.	0.076	11	240	NA	NA	0.0002	17	1,100	NA	NA	NA	7
[e]	NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	0.0167	0.0101	0.0858	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	1,2,4- Trichloro- benzene (ug/L)	1,1,1- Trichloro- ethane (ug/L)	1,1,2- Trichloro- ethane (ug/L)	Trichloro- ethene (ug/L)	Trichloro- fluoromethane (ug/L)	2,4,5-Tri- chloro- phenol (ug/L)	2,4,6-Tri- chloro- phenol (ug/L)	1,2,3- Trichloro- propane (ug/L)	1,2,4- Trimethyl- benzene (ug/L)	1,3,5-Trimethyl- benzene (ug/L)	Uranium, Dissolved (mg/L)	Uranium, Total (mg/L)
MW-5	08/23/12	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	0.0095
	09/10/13	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	0.01
	09/17/14	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	0.0094
	08/14/15	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	0.0093
	09/07/16	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.0094	0.0092
	09/11/17	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.0095	0.0099
	09/17/18	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.0075	0.0082
	12/06/18	ND(0.5)	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)	ND(2)	ND(1)	ND(1)	--	--
	08/14/19	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.0078	0.009
	09/21/20	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.51)	ND(0.51)	ND(2)	ND(1)	ND(1)	0.0077	0.009
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	--	ND(1)	--	ND(1)	--	--	ND(10)	--	ND(1)	ND(1)	--	--
SMW-2	08/23/12	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(20)	ND(10)	ND(10)	--	**0.11** [a]
	09/09/13	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	**0.1** [a]
	09/11/14	ND(11)	ND(1)	ND(1)	ND(1)	ND(1)	ND(11)	ND(11)	ND(2)	ND(1)	ND(1)	--	**0.11** [a]
	08/17/15	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	**0.12** [a]
	09/09/16	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.11	**0.11** [a]
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	--
	09/11/17	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.12	**0.12** [a]
	09/18/18	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.099	**0.091** [a]
	08/22/19	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.11	**0.092** [a]
	09/19/20	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.51)	ND(0.51)	ND(2)	ND(1)	ND(1)	0.088	**0.085** [a]
	09/29/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/30/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/30/22	--	ND(1)	--	ND(1)	--	--	ND(10)	--	0.21 J	ND(1)	--	--
SMW-4	08/24/12	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	**0.033** [a]
	09/09/13	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	**0.031** [a]
	09/11/14	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	**0.033** [a]
	08/14/15	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	--	**0.036** [a]
	09/07/16	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.032	**0.031** [a]
	06/28/17	--	--	--	--	--	--	--	--	--	--	--	--
	09/11/17	ND(50)	ND(1)	ND(1)	ND(1)	ND(1)	ND(50)	ND(50)	ND(2)	ND(1)	ND(1)	0.031	**0.033** [a]
	09/12/18	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.029	0.03
	12/06/18	ND(0.5)	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.5)	ND(0.5)	ND(2)	ND(1)	ND(1)	--	--
	08/13/19	ND(10)	ND(1)	ND(1)	ND(1)	ND(1)	ND(10)	ND(10)	ND(2)	ND(1)	ND(1)	0.031	0.03
	09/20/20	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.57) UJ	ND(0.57) UJ	ND(2)	ND(1)	ND(1)	0.026	0.024
	09/28/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/21	--	--	--	--	--	--	--	--	--	--	--	--
	09/28/22	--	--	--	--	--	--	--	--	--	--	--	--
	09/29/22	--	ND(1)	--	ND(1)	--	--	ND(10)	--	ND(1)	ND(1)	--	--

[a] NMED Groundwater Cleanup	70	200	5	5	NA	NA	NA	NA	NA	NA	NA	0.03
[b] 40 CFR 141.62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[c] NMED Tap Water	11.5	8,000	2.75	2.59	1,140	1,170	41.1	0.00835	NA	NA	NA	NA
[d] USEPA RSL Tap Water HQ 1.	1.2	8,000	0.28	0.49	5,200	1,200	4.1	0.00075	56	60	NA	NA
[e] NMED TPH Levels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Location ID	Date Sampled	Vanadium, Dissolved (mg/L)	Vanadium, Total (mg/L)	Vinyl Chloride (ug/L)	Xylenes, Total (ug/L)	Zinc, Dissolved (mg/L)	Zinc, Total (mg/L)
MW-5	08/23/12	--	--	ND(1)	ND(1.5)	--	ND(0.01)
	09/10/13	--	--	ND(1)	ND(1.5)	--	0.012
	09/17/14	--	--	ND(1)	ND(1.5)	--	0.025
	08/14/15	--	--	ND(1)	ND(1.5)	--	ND(0.01)
	09/07/16	--	--	ND(1)	ND(1.5)	ND(0.01)	ND(0.01)
	09/11/17	--	--	ND(1)	ND(1.5)	0.029	ND(0.01)
	09/17/18	ND(0.05)	ND(0.05)	ND(1)	ND(1.5)	0.011	ND(0.01)
	12/06/18	--	ND(0.05)	ND(1)	ND(1.5)	--	ND(0.02)
	08/14/19	--	--	ND(1)	ND(1.5)	0.006	ND(0.01)
	09/21/20	--	--	ND(1)	ND(1.5)	0.021 J	ND(0.01) UJ
	09/28/21	--	--	--	--	--	--
	09/29/21	--	--	--	ND(1.5)	0.008 J	ND(0.01)
	09/29/22	ND(0.25)	ND(0.05)	ND(1)	ND(1.5)	0.029J/ND(0.05) U*	ND(0.01)
SMW-2	08/23/12	--	--	ND(10)	ND(15)	--	0.021
	09/09/13	--	--	ND(1)	ND(1.5)	--	0.014
	09/11/14	--	--	ND(1)	ND(1.5)	--	ND(0.01)
	08/17/15	--	--	ND(1)	ND(1.5)	--	ND(0.01)
	09/09/16	--	--	ND(1)	ND(1.5)	0.005	0.011
	06/28/17	--	--	--	--	--	--
	09/11/17	--	--	ND(1)	ND(1.5)	0.033	0.008
	09/18/18	--	--	ND(1)	ND(1.5)	0.0065	0.0065
	08/22/19	--	--	ND(1)	ND(1.5)	ND(0.01)	ND(0.01)
	09/19/20	--	--	ND(1)	ND(1.5)	0.012/ND(0.012) U*	ND(0.01)
	09/29/21	--	--	--	--	--	--
	09/30/21	--	0.0034 J	--	ND(1.5)	0.014 JB	ND(0.01)
	09/30/22	ND(0.05)	ND(0.05)	ND(1)	ND(1.5)	0.02 JB	ND(0.01)
SMW-4	08/24/12	--	--	ND(1)	ND(1.5)	--	ND(0.01)
	09/09/13	--	--	ND(1)	ND(1.5)	--	ND(0.01)
	09/11/14	--	--	ND(1)	ND(1.5)	--	ND(0.01)
	08/14/15	--	--	ND(1)	ND(1.5)	--	ND(0.01)
	09/07/16	--	--	ND(1)	ND(1.5)	0.0029	0.011
	06/28/17	--	--	--	--	--	--
	09/11/17	--	--	ND(1)	ND(1.5)	0.046	0.016
	09/12/18	0.045	0.049	ND(1)	ND(1.5)	0.0094	0.0058
	12/06/18	--	0.05	ND(1)	ND(1.5)	--	ND(0.02)
	08/13/19	--	--	ND(1)	ND(1.5)	0.0075	0.0058
	09/20/20	--	--	ND(1)	ND(1.5)	0.011	0.0088 J
	09/28/21	--	--	--	--	--	--
	09/29/21	--	0.056	--	ND(1.5)	0.014	ND(0.01)
	09/28/22	--	--	--	--	--	--
	09/29/22	0.046 J	0.06	ND(1)	ND(1.5)	0.055 JB	ND(0.01)

a	NMED Groundwater Cleanup	NA	NA	2	620	NA	NA
b	40 CFR 141.62	NA	NA	NA	NA	NA	NA
c	NMED Tap Water	0.0631	0.0631	0.324	193	5.96	5.96
d	USEPA RSL Tap Water HQ 1.	NA	0.086	0.019	190	NA	6
e	NMED TPH Levels	NA	NA	NA	NA	NA	NA

TABLE D-6. LTU MONITORING WELL ANALYTICAL DATA
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Notes:
*Non-cancer tap water values were less than the cancer tap water values; the smaller of the two standards was used.
a-NMED GW Cleanup Levels - New Mexico Environment Department Groundwater Cleanup Levels, New Mexico Administrative Code 20.6.2.2101 and 3103
b-40 CFR 141.62 - Code of Federal Regulations, Chapter 40, Section 141.62 Maximum Contaminant Levels
c-NMED Tap Water - New Mexico Environment Department, Risk Assessment Guidance, Table A-1, Tap Water, November 2022
d-USEPA RSL Tap Water HQ 1.0 - United States Environmental Protection Agency Regional Screening Levels, Hazardous Quotient 1.0, November 2022
e-NMED TPH Levels – New Mexico Environment Department, Total Petroleum Hydrocarbons Screening Levels, Risk Assessment Guidance for Investigations and Remediation, Table 6-4, November 2022
LTU = Land Treatment Unit
NA = Not applicable
ND(x) = Not detected, where x = the reporting limit
ug/L = micrograms per liter

Bolded detections and italicized non-detections exceeded the cleanup levels.
Data prior to July 2019 was not validated and flags have not been applied.

J+ - Estimated concentration, possibly biased high
J- - Estimated concentration, possibly biased low
J - Estimated concentration
UJ - Estimated reporting limit
U - Evaluated to be undetected at the reported concent
JB - Estimated concentration due to blank contamination
* - The first result represents the laboratory reported concentration. The second result was evaluated to be undetected at the reported concentration by the data validator. The result was determined to be a false positive.

Attachment D-1

LTU Sections and Profiles

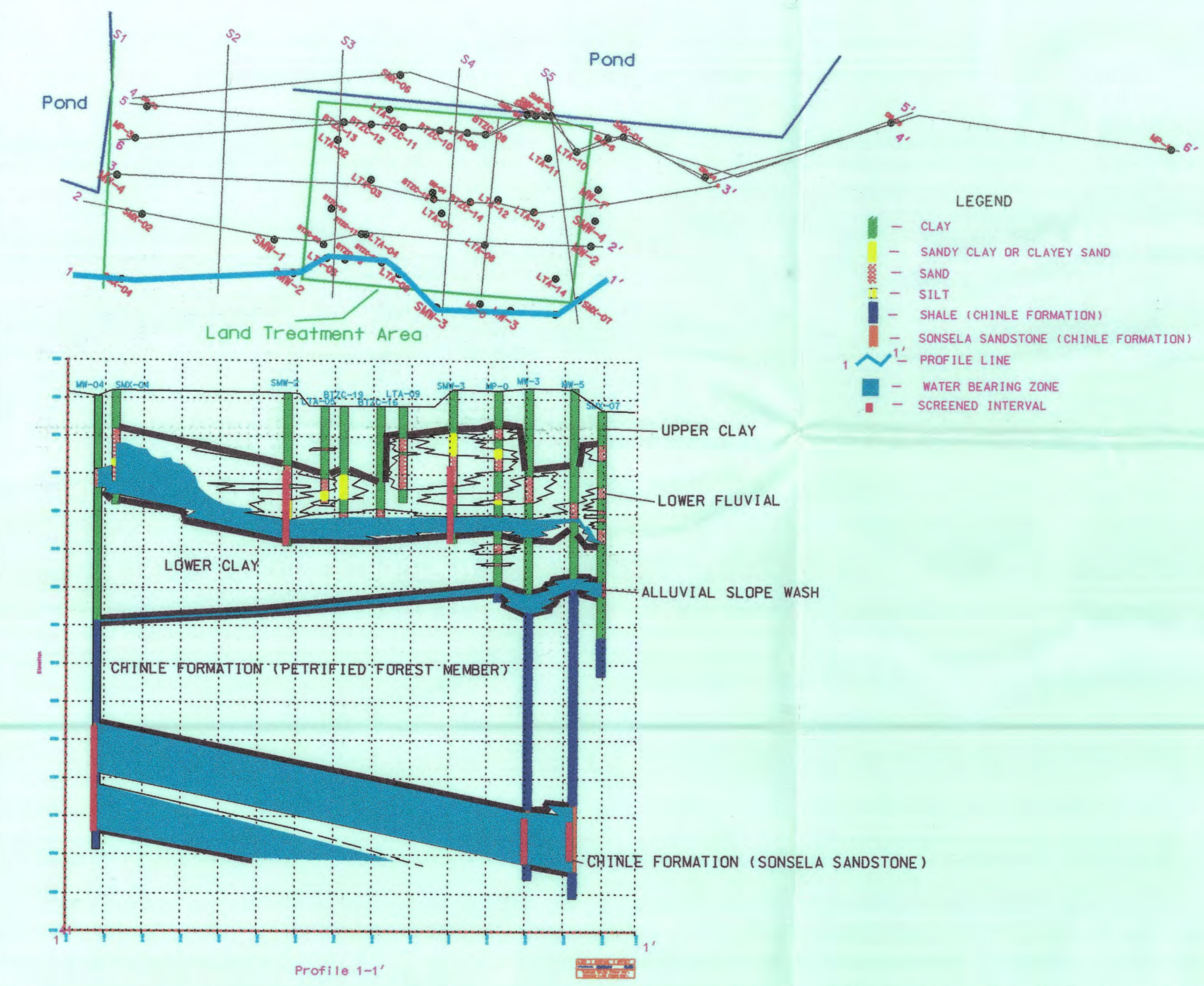
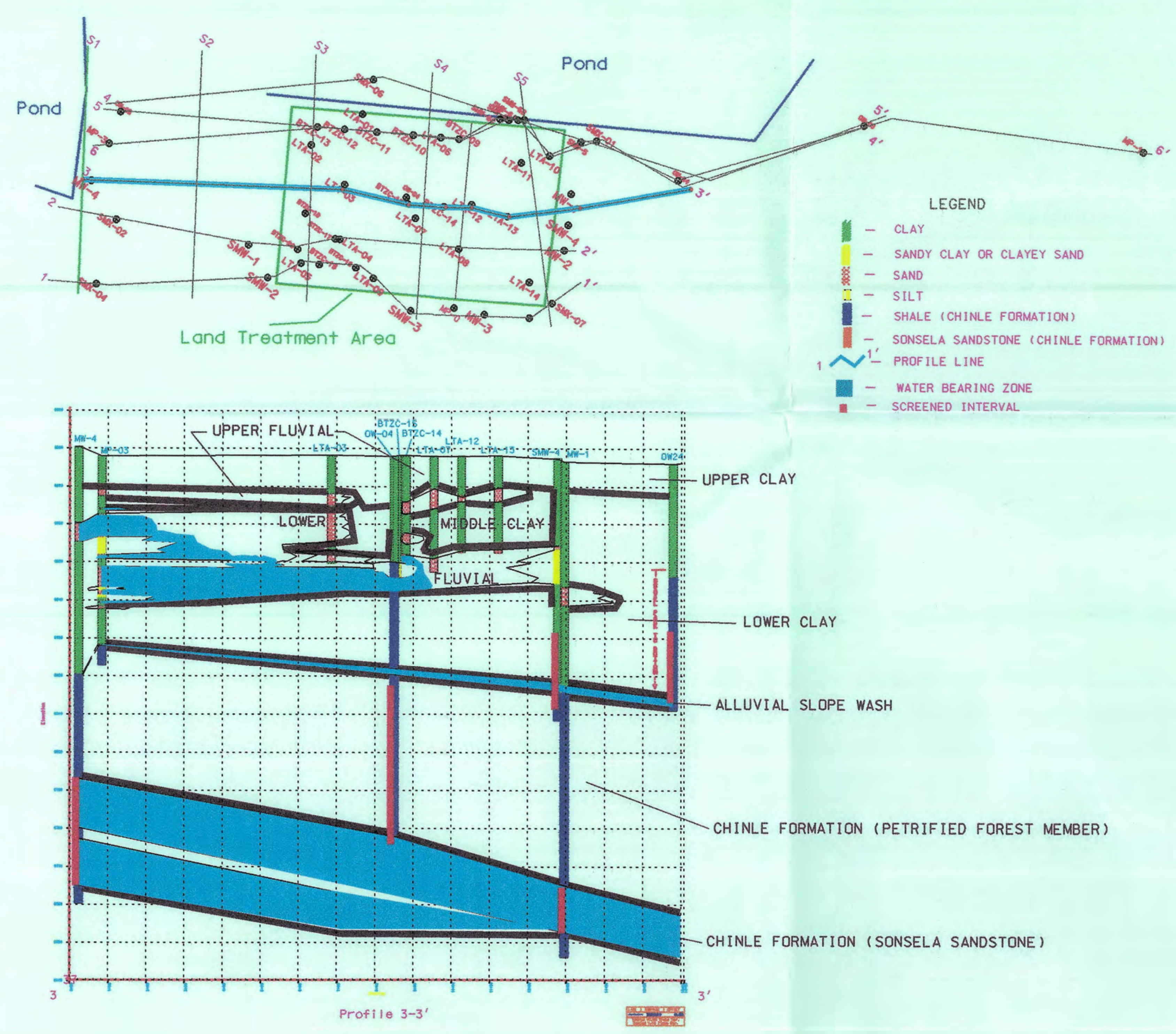
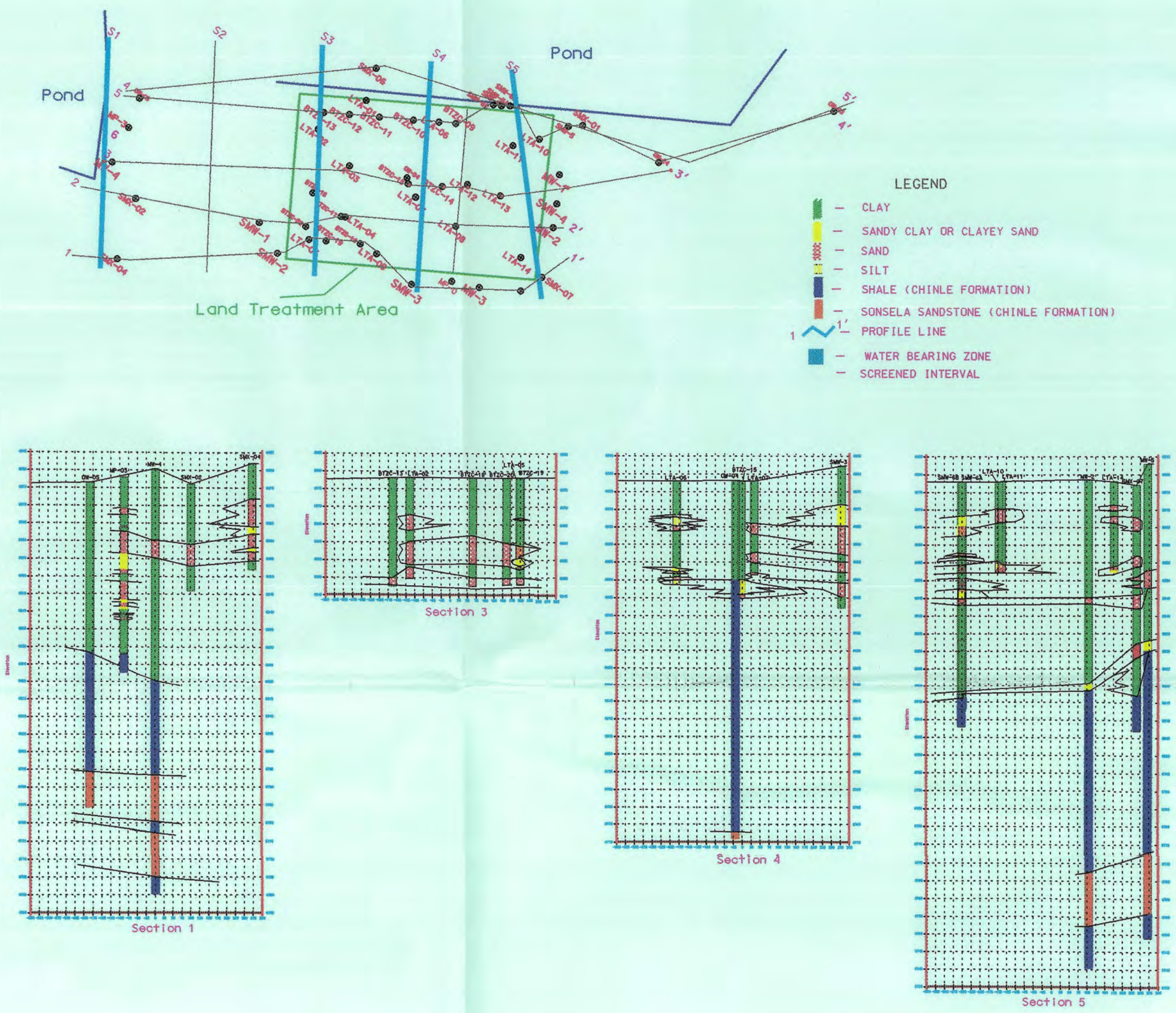
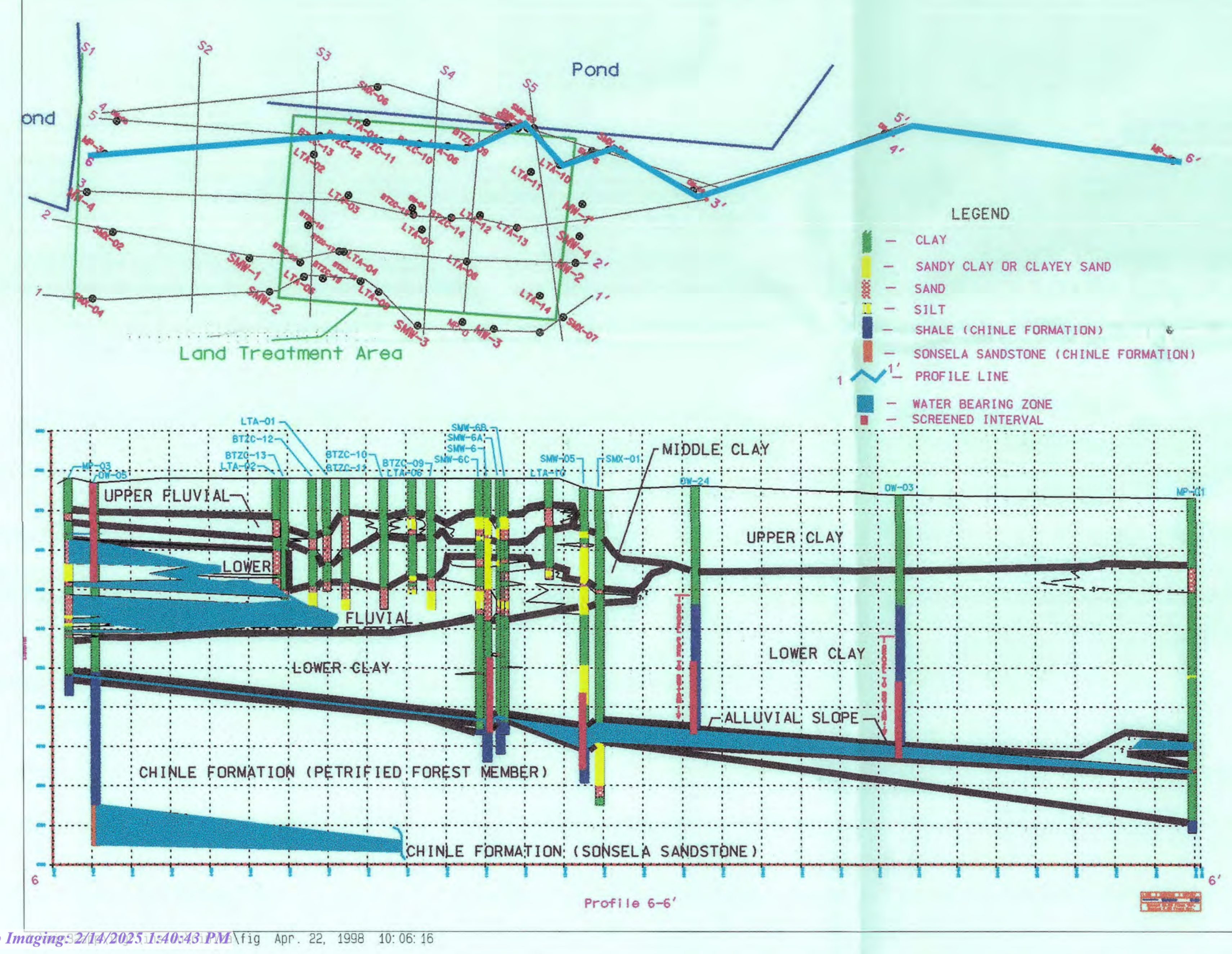


Figure I-1

Sections and Profiles







Attachment D-2

Sampling Schedule

ATTACHMENT D-2. LTU POST-CLOSURE SAMPLING SCHEDULE
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

	c	Start	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
ZOI	X										X										X											X
Treatment Zone	X										X										X											X
Chinle Slope Wash SMW-4			X	X	X		X		X		X										X											X
Sonsela			X	X	X		X		X		X										X											X

Notes

c - May 1999 Special Sampling Event

Start - Begin sampling activities within 90 days of post-closure permit issuance

Sampling includes the Modified Skinner List for Metals and Organics

E.0 – Security, Inspection, and Preparedness/Prevention Plans

Western Refining Southwest LLC

(D/B/A Marathon Gallup Refinery)

Gallup, New Mexico

EPA ID# NMD000333211

JUNE 23, 2023

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E-2. Land Treatment Unit Inspection Checklist, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery, Gallup, New Mexico

E.1 Introduction

In accordance with the applicable requirements of Title 20 of the New Mexico Administrative Code (NMAC) Chapter 4, Section 1.500 (Chapter 40 of the Code of Federal Regulations [CFR] 264) and 20 NMAC 4.1.900 (40 CFR 270), this section of the Resource Conservation and Recovery Act Part B Permit Renewal Application (Renewal Application) summarizes procedures to prevent and prepare for hazards at the Land Treatment Unit (LTU), as well as security and inspection procedures for Western Refining Southwest LLC D/B/A Marathon Gallup Refinery (Refinery). The Refinery has been implementing the plans contained in this section since closure of the LTU in 2000, per Appendix C and Appendix D of the 2013 permit, as modified in 2017 and 2022 (current permit).

Although currently idled, the Refinery maintains an Emergency Response Plan (ERP) that details prevention of hazards as well as Refinery-wide procedures and equipment to be used in response to emergencies (Western LLC 2022a). Per 40 CFR 270.28 (Part B Information Requirements for Post-Closure Permits), the Refinery is not submitting a copy of the Refinery ERP since that is not a post-closure permitting requirement. In addition, although included in the last permit renewal application in 2010, the Refinery is not including a contingency plan as part of this Renewal Application as contingency plans are also not required for post-closure permits per 40 CFR 270.28. However, the Refinery has developed the following Security, Inspection, and Preparedness/Prevention Plan, as required by 40 CFR 264, Subpart C.

The LTU is designed and will be maintained during the post-closure period to minimize the possibility of fire, explosion, or unplanned releases of hazardous constituents to any environmental medium that could potentially harm human health and the environment. Information on the procedures to prevent hazards at the LTU is provided for the following subject areas:

- Subsection E.2: Security procedures and equipment 20 NMAC 4.1.900 (40 CFR 270.14(b)(4)) and 20 NMAC 4.1.500 (40 CFR 264.14); and access control 20 NMAC 4.1.900 (40 CFR 270.14(b)(19)(viii))
- Subsection E.3: Inspection requirements of 40 CFR 264.15 for general facility inspections, and in accordance with 40 CFR 264.273 for the inspection of the closed LTU
- Subsection E.4: Preparedness and prevention requirements 20 NMAC 4.1.500 (40 CFR 264, Subpart C), as well as procedures, structures, and equipment for preventing hazards per 20 NMAC 4.1.900 (40 CFR 270.14(b)(8))

E.2 Security

The Refinery has developed security policies and procedures to prevent the accidental or unknowing entry of persons or livestock inside the boundaries of the Refinery, and to ensure the safety of both the Refinery and its employees. This sub-section fulfills the requirements of 40 CFR 264.14 and 40 CFR 270.14(b)(4). The LTU is in post-closure care (PCC) and the Refinery is idled, therefore modified signage as described in Section E.2.2 is appropriate.

E.2.1 Surveillance, Barriers, and Controlled Entry

The Refinery prevents unknowing entry and minimizes the possibility of unauthorized entry of persons or livestock onto the LTU through access controls to the Refinery property. The Refinery property boundary is fenced with a 4 foot (ft) high, three-strand, barbed wire fence. The Refinery always has security on-site to allow access to the property. When operating, the rail access into the Refinery through the north boundary fence is closed and locked unless in use. In accordance with 20 NMAC 4.1.900 (40 CFR 270.14(b)(19)(viii)), the location of the security fence along the Refinery property boundary and access gate are shown on Figure E-1. Any failures in the fence are reported immediately and repairs are scheduled as soon as possible. Lastly, a Safe Work permit is also required before entry into the LTU.

E.2.2 Warning Signs

Signs legible from a minimum distance of 25 ft are posted around the perimeter of the LTU and state "Danger - Unauthorized Personnel Keep out" in English and Spanish. There are 8 signs posted and visible from all angles of approach.

E.3 Inspection Plan

Refinery personnel are trained to inspect the LTU on a regular schedule to identify problems or potential problems and correct them before they cause harm to human health or the environment. Inspection frequencies may be increased at the discretion of the Refinery. The frequency of inspections are provided in Attachment E-1.

E.3.1 Weekly Inspections

Each week and following every major precipitation event, trained personnel inspect the LTU for water accumulation, odors, soil coloration changes, wind dispersion, site level/plowing, dike erosion, dike run-on, and any other warning sign condition. The trained personnel also inspect the LTU gates and fences. Trained personnel record the following inspection information on the LTU inspection checklist (Attachment E-2):

- Inspection date
- Name of person inspecting the LTU
- Observations
- Date and nature of repairs or remedial action taken

Inspection activities during PCC ensure the early detection of structural defects. The dikes are inspected to ensure that integrity is maintained to effectively control stormwater run-off and run-on. The LTU is also inspected for evidence of wind erosion after windstorms. A checklist is used for inspection and is provided in Attachment E-2. The dikes will be maintained at the minimum height of two ft above the surface of the LTU and with two to one side slopes to ensure that each dike has sufficient capacity to control run-off during the PCC period. If the integrity of the dikes is compromised, the inspecting personnel will see that corrective action is taken promptly.

Monitoring wells are inspected periodically to ensure the caps are in place, inspect any damage to the surface casing, and that the protection barriers are in place. Signs will also be inspected weekly for condition and legibility.

The Refinery maintains work orders and repair logs for all LTU inspections. All inspection records and work orders are maintained for at least three years following the date of inspection or latest remedial action as a result of an inspection.

E.4 Preparedness and Prevention Plan

As required by 40 CFR 264.31, the Refinery is designed, constructed, maintained, and operated (not applicable during the current idle period) to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment. The Refinery ERP provides an overview of the preventative procedures and equipment available in case of a hazardous waste emergency within the Refinery during the current period of idling. The ERP addresses the following topics (Western 2022a):

1. Required emergency equipment
2. A testing and maintenance schedule for all emergency equipment
3. Employee access to communications or alarm systems
4. Existing arrangements with local authorities

The design and PCC activities of the LTU meet the requirements of 20 NMAC 4.1.900 (40 CFR 270.14(b)(8)) to prevent run-off from the LTU, prevent contamination of water, minimize the effects of equipment and power failure, prevent undue exposure of personnel to hazardous waste, and prevent releases to the atmosphere. This section describes the applicable procedures, structures, and equipment used to prevent hazards at the LTU during the post-closure period.

E.4.1 Run-off Prevention

Per 20 NMAC 4.1.900 (40 CFR 270.14(b)(8)(ii)), and as shown in Figure E-2, the LTU does not lie within a 100-year floodplain. No major surface water bodies are within ten miles of the site and the nearest river, the Puerco River, is approximately one mile north and remains predominantly dry. Protection from flooding or ponding caused by possible maximum precipitation events is provided by diverting water away from the LTU by a system of dikes, berms, and swales (Figure E-3). Additionally, grade elevations of roads are designed so that stormwater will not collect on the site under the most severe conditions. Flood control structures within the LTU, such as dikes and berms, are inspected regularly (Attachment E-1). During LTU inspections, the structures are checked to ensure that no wind or rain erosion, nor animal, has caused the system to fail. Furthermore, the areas around the LTU are also inspected to ensure that they are free of vegetation, debris, or other items that would impede water diversion. Experience with the LTU during the operational phase has shown that weekly structural inspections are adequate for the climate and soil conditions at the Refinery. However, inspections are also conducted after significant storm events.

E.4.2 Water Supplies

The Refinery will continue to monitor the Sonsela and Chinle aquifers during the PCC period, as described in the Post-Closure Care Plan (PCCP) (Section D).

E.4.3 Equipment Failure and Power Outages

LTU post-closure operational activities will be limited to applying fertilizer as necessary and sampling as detailed in the PCCP (Section D). If equipment fails, it will be repaired or replaced before continuing PCC operations by a certified repairman. A power outage would have no effect on LTU activities as the monitoring and maintenance activities are performed during daylight hours.

E.4.4 Personal Protective Equipment

Refinery personnel responsible for LTU PCC activities will use personal protective equipment (PPE) to protect themselves from the hazards in the workplace under normal conditions. PPE required for personnel involved with LTU PCC activities may include protective overalls, safety toe/steel toed shoes, and protective shoe coverings.

Emergency equipment will be maintained at the Refinery so that personnel and emergency response personnel can protect themselves and respond appropriately to an incident at the LTU. All personnel who may be required to use PPE and emergency equipment to respond to a LTU incident are trained to use the equipment.

Figures

Image Cite: DigitalGlobe © CNES (2022) Distribution Airbus DS © Microsoft Corporation, BING Imagery

EXPLANATION

PROPERTY BOUNDARY (APPROXIMATE)

FENCE

N

0 400' 800'

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE E-1

REFINERY FENCES AND ACCESS GATES

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 400'	Date: 4/21/2021	File: 697-RCRA-PA-FENCELOC

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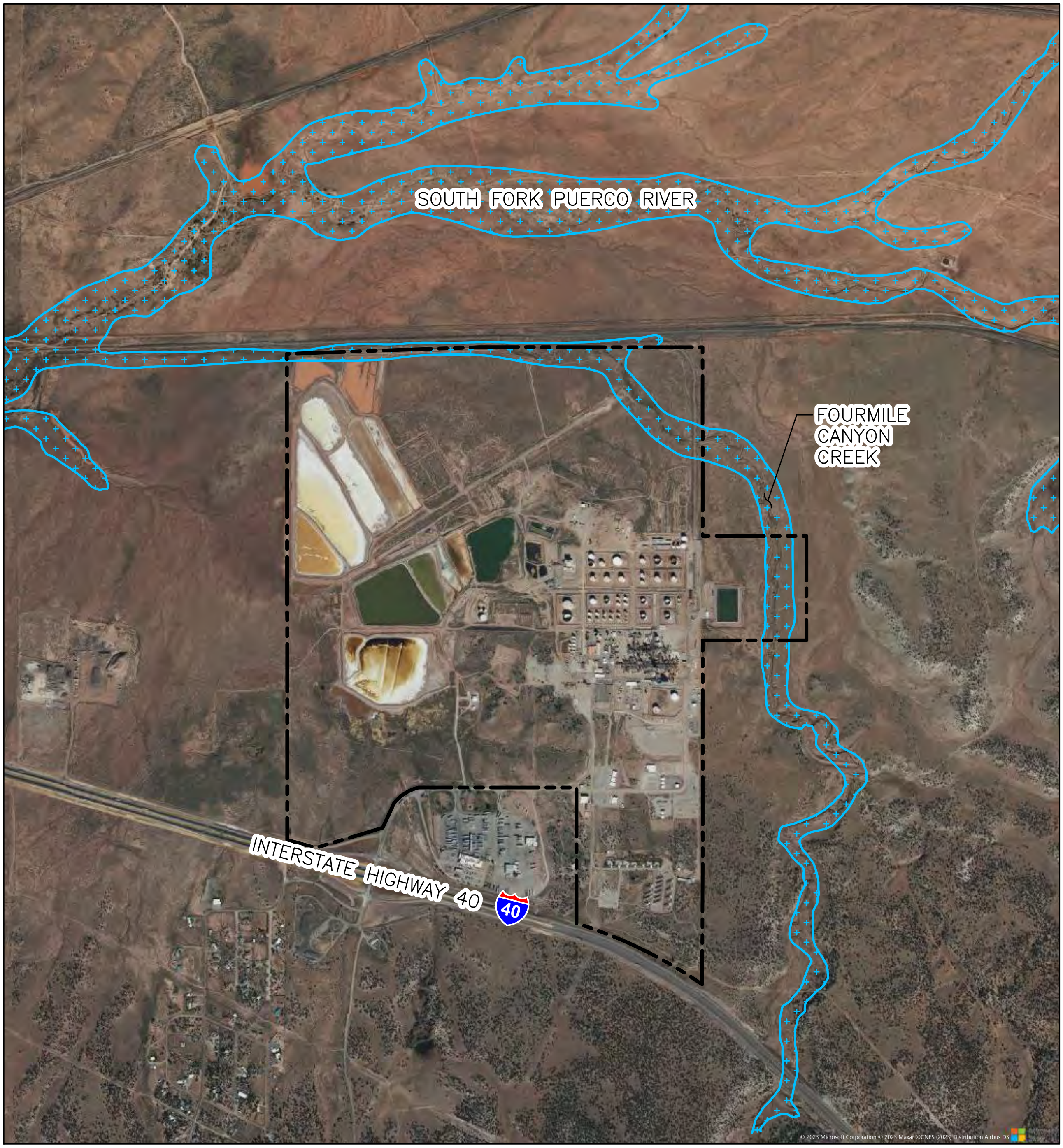


Flood Data Source: Federal Emergency Management Agency (FEMA) Mitigation Division National Flood Insurance Program, Circa 2007

EXPLANATION

40	INTERSTATE HIGHWAY
	PROPERTY BOUNDARY
	1% ANNUAL CHANCE FLOOD (100-YEAR FLOOD)

N

0 2,000'

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

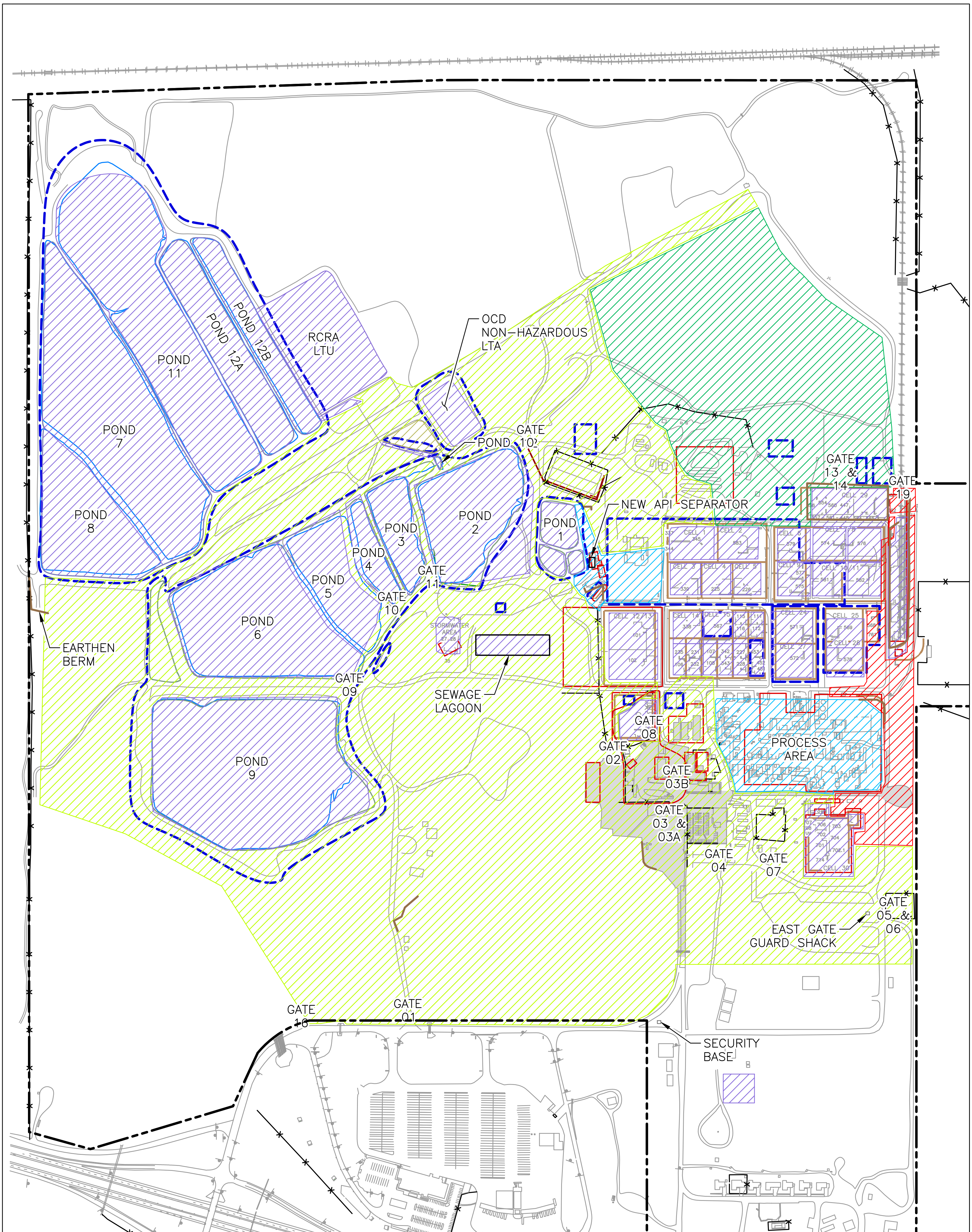
FIGURE E-2

100-YEAR FLOODPLAIN MAP

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 2,000'	Date: 4/10/2023	File: 697-RCRA-PA-100YRFLOODPLAN

M:\TON\MARATHON\CADD\GALLUP_REPORTS\RCRAPERMITAPP\202303\697-RCRA-PA-100YRFLOODPLAN



EXPLANATION

- NEW FACILITY BOUNDARY
- EARTHEN BERM
- CONTAINED/BERMED AREA, NO STORMWATER RUN OFF DISCHARGED TO ANOTHER POINT
- AREA CONTRIBUTING FLOW TO OUTFALL 2
- DRAINS TO GRASSY AREA, DOES NOT LEAVE SITE
- NEW STORMWATER COLLECTION BASIN
- AREA CONTRIBUTING FLOW TO OUTFALL 1
- PROCESS AREA, STORMWATER DRAINS TO POND 1
- IMPERVIOUS SURFACE

NOTE:

IMPERVIOUS AREAS ARE IDENTIFIED FOR DISCHARGING AREAS ONLY. IMPERVIOUS SURFACES WITHIN AREAS WHERE STORMWATER DOES NOT DISCHARGE HAVE NOT BEEN IDENTIFIED, CONSIDERING THESE AREAS DO NOT PRODUCE REGULATED STORMWATER DISCHARGES.

N

0 600'

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE E-3

REFINERY STRUCTURES AND STORMWATER CATCH BASINS

**WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO**

Drawn By: REP	Checked By: MS	Scale: 1" = 600'	Date: 4/16/2023	File: 697-RCRA-PA-STRMCTCHBASIN

M:\...TON\MARATHON\CADD\GALLUP_REPORTS\RCRAPERMITAPP\202303\697-RCRA-PA-STRMCTCHBASIN

Attachment E-1 – Inspection Schedule

ATTACHMENT E-1. INSPECTION SCHEDULE
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Area	Specific Problems	Type of Problems	Frequency
LTU	General Conditions	Water Accumulation	Weekly
		Odors	After each major storm event
		Soil coloration changes	
		Wind Dispersion	
		Site level, needs plowing	
	Dikes/Berms	Erosion	Weekly
		Evidence of Run-on	After each major storm event
	Signs	Condition and legibility	Weekly
	Water Wells	Caps in place	Weekly
		Damage to Surface Casing	
		Protection barriers in place	
Security	Fence	Gate properly locked	In operation continually - failures immediately reported
Communication Systems	Telephones/Radio	Audibility	In operation continually - failures immediately reported
	Emergency Generator	East of start	Monthly
		Lubrication	
		Power Generation	

Attachment E-2 – LTU Inspection Checklist

ATTACHMENT E-2. LTU INSPECTION CHECKLIST
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

LTU Surface			
Condition:	Water Standing?	☐ Yes	☐ No
	Wet?	☐ Yes	☐ No
	Dry?	☐ Yes	☐ No
	Odor?	☐ Yes	☐ No
	Erosion?	☐ Yes	☐ No
	Is vegetation growing?	☐ Yes	☐ No
Monitoring Wells			
Condition:			
	Caps and locks:		
Dikes/Berms			
Condition:	Water Standing?	☐ Yes	☐ No
	Wet?	☐ Yes	☐ No
	Dry?	☐ Yes	☐ No
Vehicle, Fence, and Locks			
Condition:			
Signs (8)			
Condition:	In place?	☐ Yes	☐ No
	Legible?	☐ Yes	☐ No
Repairs Needed			
Time:		Date:	
Name of Inspector:			
Repairs Completed		Date:	
Signature	______________________________		

F.0 – SITE-WIDE CORRECTIVE ACTION: GROUNDWATER MONITORING, SOLID WASTE MANAGEMENT UNITS AND AREAS OF CONCERN

Western Refining Southwest LLC

(D/B/A Marathon Gallup Refinery)

Gallup, New Mexico

EPA ID# NMD000333211

JUNE 23, 2023

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F.1 Introduction

This section provides specific information on Western Refining Southwest LLC D/B/A Marathon Gallup Refinery's (Refinery) solid waste management units (SWMUs) and areas of concern (AOCs). The information provided in this section is submitted in accordance with the applicable requirements of Title 20 of the New Mexico Administrative Code (NMAC) Chapter 4, Section 1.500 (Chapter 40 of the Code of Federal Regulations [CFR] 264 Subpart F [releases from SWMUs]) and 20 NMAC 4.1.900 (40 CFR Part 270.28 [requirements for post-closure permit applications]). Regulatory sections addressed below include 40 CFR 270(c) and 270.14(d)(1), (2), and (3). The SWMUs and AOCs identified at the Refinery are listed in the 2013 Resource Conservation and Recovery Act (RCRA) Post-Closure Permit, as modified in 2017 and 2022 (current permit) NM000333211 (2017 Permit) (NMED 2017a). Attachment F-1 provides recent photographs of the SWMUs and AOCs.

In August 1987, a RCRA Facility Assessment (RFA) was conducted at the Refinery that identified 17 SWMUs and 10 AOCs requiring investigation as sources of suspected releases of hazardous material to the environment. From the original 27 SWMUs and AOCs identified in the RFA, the United States Environmental Protection Agency (USEPA) identified and designated 13 SWMUs in the 1988 Hazardous and Solid Waste Act (HSWA) permit (NMEID 1988). The Aeration Basin, not previously classified as either a SWMU or AOC in the 1987 RFA, was added to the list in the 1988 HSWA permit as (i) Aeration Basin bringing the total to 14 SWMUs (NMEID 1988). In 1990, in response to permit requirements, the Refinery conducted a release verification and source characterization study and developed a site-specific RCRA Facility Investigation (RFI) Work Plan. In the RFI Work Plan, the 14 SWMUs were reduced to 13 (AES 1990). The Inactive Land Treatment Area and the Drainage Ditch were combined to become SWMU 9, the Drainage Ditch near the Inactive Land Treatment Area.

The Refinery SWMU numbering system differs in the various site-specific and USEPA reference documents related to SWMUs. The 1988 HSWA permit lists each SWMU preceded by a lowercase roman numeral, not SWMU identification number (NMEID 1988). The 1990 RFI Work Plan provides the first SWMU numbering system for the 14 SWMUs. Various correspondence from USEPA in 1994, refers to both the RFI Work Plan numbering system and to Arabic numbers assigned to the roman numerals used in the 1988 HSWA permit as a format numbering system.

On August 17, 2000, the New Mexico Environment Department (NMED) issued a Post-Closure Care (PCC) Permit to the former owner, Giant Refining Company. The permit authorized the PCC at the hazardous waste land treatment unit and included corrective action provisions. The American Petroleum Institute (API) Separator was not originally included as a SWMU in the 1998 HSWA permit or the subsequent 1990 RFI Work Plan. The API Separator was first added as SWMU-14 in the August 2000 PCC permit (NMED 2000). This Part B PCC Permit Renewal Application continues to use the SWMU numbering system from the RFI 2000 PCC permit.

Between November 1990 and October 1992, the Refinery prepared three RFI reports covering the original 14 SWMUs (i.e., before SWMU-9 and SWMU-14 were combined and a new SWMU-14 added) and submitted them to the USEPA for review and comment (Giant 1991a, Giant 1991b, Giant 1991c). Based on the nature and extent of contamination detected during the RFI, 10 of the SWMUs were recommended for no further action (NFA). The four remaining SWMUs were recommended for corrective action. Voluntary Corrective Action Plans (VCAPs) were prepared for these four SWMUs and submitted to USEPA for review.

On September 16, 2011, NMED issued a draft renewal Permit for RCRA PCC of the hazardous waste land treatment unit (LTU) and corrective action requirements at multiple SWMUs and AOCs. The Refinery was the only party that submitted comments. NMED issued the renewal permit on October 31, 2013 (NMED 2013), which was appealed by the Refinery on November 27, 2013. The appeal was primarily prompted by NMED's addition of 20 RCRA AOCs for investigation and remediation in addition to the SWMUs and AOCs listed in the previous permit. Following the filing of the appeal, the Refinery and NMED entered mediation and NMED agreed to address the Refinery's objections to the addition of the AOCs by means of an Order on Consent that was entered on January 20, 2017 (Consent Order). The parties agreed to modify the permit to transfer the AOCs from the Permit to the Consent Order. The Consent Order required the Refinery to submit assessment reports for each of the AOCs over a period of four years (to be completed by June 2021), after which NMED would decide as to whether the AOCs would be eliminated from corrective action requirements or added to the permit as requiring corrective action. Eleven AOC assessment reports were prepared and submitted to the NMED between 2018 and 2021. In accordance with the Consent Order, NMED determined on August 19, 2021, that all of the AOCs would be added to the Permit as requiring corrective action and directed the Refinery to submit a permit modification request to add the AOCs to the Permit.

A Class 1 Permit Modification (Modification) was requested pursuant to 40 CFR 270.42(a) to restore the 11 AOCs to Attachment G, Table F-1 of the current permit (NMED 2017a). This Modification included combining five AOCs into a revised AOC 35 and was submitted on December 3, 2021. NMED approved the Permit Modification Request and added the units to the Permit in February 2022 (NMED 2022b). The Refinery submitted a request to terminate the Consent Order on October 8, 2021, and on May 6, 2022, NMED determined the Refinery fulfilled the requirements and terminated the Consent Order.

There are 14 SWMUs and 17 AOCs identified in the current permit (NMED 2017a). Characterization and remediation activities have taken place throughout the Refinery which led to a better understanding of soil and groundwater conditions in the footprints of the SWMUs and AOCs. A summary of these investigations and activities are provided in the following sections.

F.2 Groundwater Monitoring

The Refinery has implemented a site-wide groundwater monitoring program that provides alternative requirements to 40 CFR 264.91 through 264.100 to satisfy the groundwater monitoring for the LTU that is currently in PCC, as well as monitoring associated with corrective action for the SWMUs and AOCs, in accordance with 40 CFR 264.90(f).

Site-wide groundwater monitoring takes place quarterly, semiannually, and annually, depending on the requirements, to monitor the effectiveness of remediation efforts taking place at the Refinery. Groundwater monitoring activities include fluid level measurements and sample collection for laboratory analysis. The site-wide monitoring program is implemented per the current permit

(Section IV.C.2). An annual groundwater monitoring report detailing these activities is submitted no later than September 1 of the following year (NMED 2017a). However, as part of this Renewal Application, the Refinery proposes that the annual groundwater monitoring report will be submitted no later than March 31 of the following year.

The objective of the site-wide groundwater monitoring program is to provide analytical data on the nature and extent of the dissolved phase and separate phase hydrocarbon (SPH) plumes underlying the Refinery (including the SWMUs, AOCs, and the LTU) and to assess any remedial progress or corrective action measures that have been implemented.

The monitoring network at the Refinery consists of 131 locations. There are 113 monitoring wells: 95 monitoring wells in the Chinle/Alluvium aquifer, 13 monitoring wells in the Sonsela aquifer, and 5 monitoring wells in the Alluvial/Fluvial upper sand aquifer. In addition to the monitoring wells, there are three water production wells at the Refinery: PW-2, PW-3, and PW-4. There are 11 surface water samples collected at the evaporation ponds (EP) (EP-2 through EP-12). Three Leak Detection Units associated with the New API Separator (NAPIS) are monitored. There is also one surface monitoring location near the EPs, identified as STP-1 to EP-2.

The monitoring program network is sampled quarterly, semiannually, or annually depending on the requirements. The frequency of sampling for each location in the monitoring program is listed in Table F-1. The groundwater monitoring analyte list is provided in Table F-2. Per the current permit, a facility-wide groundwater monitoring work plan is submitted annually by April 1 of the monitoring year. This work plan has historically been prepared using facility-wide monitoring data and evaluation of the current program. Revisions are currently made annually that may include, but are not limited to, a reduction or change in monitoring locations, monitoring frequency, and/or target constituents of concern to be analyzed.

However, the Refinery is requesting that the work plan be submitted to NMED for review every five years (or as needed and as further described below), but proposes to submit a revised map, analytical list, and well locations for NMED review each year no later than January 31. This request is to ensure continuity in the collection of groundwater samples under an approved work plan. The work plan will be maintained by the Refinery and revised each year internally to reflect any activities on-site.

Although the groundwater monitoring work plan will be submitted every five years to NMED for review and consideration, the work plan will be revised as investigations are completed and remedies are selected and implemented. The NMED may require additional monitoring, including the installation of additional monitoring wells or monitoring for additional parameters, as investigations proceed. These changes will be incorporated into the work plan as necessary and/or as part of and discussed in the annual groundwater monitoring report.

F.3 SWMUs

The purpose of this section is to provide information on the SWMUs at the Refinery, as well as provide a summary of site characterization and/or corrective action activities for each SWMU. The locations of known SWMUs and AOCs at the Refinery are shown on Figure F-1. The SWMUs identified at the Refinery are discussed in the following sections and a summary of activities at each SWMU is provided in Table F-3.

F.3.1 Aeration Basins (SWMU 1)

SWMU 1 consists of two former aeration lagoons (AL), AL-1 and AL-2, and an EP, EP-1, as shown in Figure F-2. AL-1 and AL-2 are approximately 0.3 acres and 0.5 acres, respectively, and EP-1 is approximately 1.3 acres. AL-1, AL-2, and EP-1 are earthen surface impoundments constructed in 1987 with native clay bottoms (DiSorbo 2018). The lagoons served as primary and secondary separation of petroleum refinery wastewater. Releases of primary and secondary sludges (F037/F038), which are listed hazardous waste, may have historically occurred. After separation occurred in AL-1 and AL-2, water flowed by gravity to EP-1 for initial evaporation, and then to additional EPs (EP-2 through EP-12) downstream (SWMU 2). The lagoons operated until 2013 when they were replaced by the current wastewater treatment (WWT) system, which includes a new aeration basin. AL-1 and AL-2 have a combined estimated holding capacity of 1 million gallons (Western Inc. 2009) and EP-1 has an estimated holding capacity of 3 million gallons (NMED 2017b). Two monitoring wells (GMW-1 and GWM-2) are located along the down-gradient side of the ALs. These monitoring wells are sampled quarterly, if not dry and do not contain SPH.

NMED has documented that releases into AL-1, AL-2, and EP-1 have likely occurred (NMED 2022c). Therefore, the Refinery requested a No Longer Contained-In (NLCI) determination in September of 2022 (Western LLC 2022b) to manage the sludges and soil removed from SWMU 1 as non-hazardous (i.e., as special waste). NMED issued an Approval with Modifications for the NLCI request in November 2022 (NMED 2022d) and a response to comments was submitted by the Refinery in December 2022 (Western LLC 2022c).

A revised Corrective Measures Implementation Work Plan (CMIWP) was submitted to NMED in March 2023. The proposed corrective action for SWMU 1 includes excavation and disposal of the accumulated waste (Western LLC 2023a).

The Refinery proposed the following general elements for this CMIWP:

- Excavation of SWMU 1 waste.
- Disposal of SWMU 1 waste as dictated by post-excavation stockpile waste sampling (i.e., hazardous, or non-hazardous waste).
- Confirmation sampling of the excavation sidewall and floor.
- SWMU 1 will be backfilled with clean fill to match the existing grade and maintain positive drainage.

Following approval of the CMIWP, the Refinery will begin to excavate and backfill SWMU 1.

F.3.2 Evaporation Ponds (SWMU 2)

SWMU 2 is collectively the EPs to the northwest of the Refinery (Figure F-3). There are eleven EPs that were used as part of the Refinery's WWT system. The 11 EPs include EP-2, EP-3, EP-4, EP-5, EP-6, EP-7, EP-8, EP-9, EP-11, EP-12A, and EP-12B. EP-1 is a part of SWMU 1. Effluent from the WWT was directed to the ponds and allowed to evaporate. The total ponds area is approximately 115 acres.

The ponds are man-made earthen basins with bermed sides and unlined natural high clay-content pond floors. The initial ponds (i.e., EP-2 through EP-9 [Giant 1985]) were constructed in the late 1950s, with additional ponds constructed at various times thereafter. Surface water samples are collected from each of the EPs on a semiannual basis.

The most recent investigation work plan (IWP) was submitted to NMED in March 2023. This work plan proposed collecting pond sediment and underlying clay samples at each of the EPs. The results from the proposed investigation will be used to guide future remedy investigations and evaluation. This work will take place following approval of the work plan from NMED.

F.3.3 Empty Container Storage Area and Heat Exchanger Bundle Cleaning Pad (SWMU 3)

SWMU 3 is a concrete pad with a Bundle Pad cleaning area and storage for empty containers. SWMU 3 is approximately 90 feet (ft) by 50 ft and is located north of the truck loading rack, northwest of the process units, and southwest of the tank farm (Figure F-4). While the Refinery was active, the Bundle Pad was used as an empty container storage area and to clean heat exchanger bundles. The sludge from cleaning the heat exchanger bundles was historically collected using vacuum hoses. The sludge collected was characterized as hazardous waste (K050) and disposed of as such. A drain located along the west end of the Bundle Pad collected wash water that drained to the sewer line. There is no record of releases within the Bundle Pad footprint. The Bundle Pad is now used to store transfer totes and vacuum truck supplies while the Refinery is idle.

An investigation took place during 2022 to characterize the nature and extent of possible soil contamination in the area. These soil samples were analyzed for several volatile organic compounds and total petroleum hydrocarbons. There were detections of hydrocarbon-related constituents in the soil, however the investigation report concluded that the soils do not pose a risk to industrial or construction workers (Western LLC 2022d). An investigation report was submitted to NMED in November 2022.

F.3.4 Old Burn Pit (SWMU 4)

The Old Burn Pit is identified as SWMU 4 (Figure F-5). SWMU 4 was historically used to burn acid soluble oils from the refinery's alkylation unit from 1958 to 1976. It encompasses an area approximately 20 ft by 40 ft and varied in depth from 10 to 12 ft below the ground surface (DiSorbo 2015).

SWMU 4 was included in the 1990 RFI Work Plan (AES 1990). Historic investigations have taken place including the implementation of the Phase III RFI. Based on the soil sample analytical results from the Phase III RFI a clay soil cap was installed in 1997. Installation of the soil cap was conducted under the review and authority of the USEPA and NMED. Since the installation of the soil cap, no additional activities have occurred at SWMU 4.

SWMU 4 is in the vicinity of SWMU 5 – Landfill Areas and AOC 34 – Scrap Yard. These three areas have been combined for investigative purposes. The most recent IWP combined the three areas to better understand the subsurface conditions of the area between SWMUs 4 and 5, within AOC 34. This work plan was submitted to NMED in April 2022 (Western LLC 2022e). This work will take place following NMED approval of the work plan.

F.3.5 Landfill Areas (SWMU 5)

The Landfill Areas, collectively known as SWMU 5, include areas historically used to dispose of waste generated during Refinery construction, maintenance, and operations activities (Figure F-5). Construction waste was reported to have included asphalt paving, concrete, and scrap metal. Wastes associated with operations may have included defluorinator bauxite and hydrotreating catalyst (cobalt, molybdenum, and nickel) and possibly outdated laboratory chemicals. The main landfill area is estimated to have been 100 ft wide by 350 ft long in a kidney shape. The landfill area to the north is estimated to have been 20 ft by 20 ft. Additionally, office, residential, and shop wastes were identified as having been placed in the landfill areas. The landfill areas were operated from 1979 through 1985 (DiSorbo 2015).

An RFI was conducted in the area in May 1992 resulting in the recommendation of the placement of an impermeable soil cap over the area encompassing the landfill footprints. Installation of the impermeable soil cap was completed in early 1998. A Landfill Closure Certification Report was prepared to document the construction of the low permeability soil cap of the landfill areas (Practical Environmental Services 1998a). Installation of the soil cap was conducted under the review and authority of the USEPA and NMED, in accordance with the VCAP approved by the USEPA on January 5, 1994. Since the installation of the soil cap, no additional activities have occurred in SWMU 5.

SWMU 5 is in the vicinity of SWMU 4 – Old Burn Pit and AOC 34 – Scrap Yard. These three areas have been combined for investigative purposes. The most recent IWP combined the three areas to better understand the subsurface conditions of the area between SWMUs 4 and 5, within AOC 34. This work plan was submitted to NMED in April 2022 (Western LLC 2022e). This work will take place following approval of the work plan from NMED.

F.3.6 Tank Farm (SWMU 6)

The Tank Farm consists of ten tanks in the Refinery storage area that were used for the storage of leaded gasoline and is identified as SWMU 6 (Figure F-6). This area was identified as a SWMU during the RFI conducted in the 1990s at the Refinery. Trace organics and metals were detected during the investigation of eleven borings and two monitoring wells. Laboratory analysis indicated product observed during the investigation was gasoline. SWMU 6 encompasses several tank areas within the Refinery that range in approximate size from 40 ft by 40 ft to 250 ft by 450 ft (Figure F-6).

A VCAP was submitted for the remediation and recovery of hydrocarbons found in the installed monitoring wells in April 1996 (Giant 1996).

F.3.7 Fire Training Area (SWMU 7)

SWMU 7 consists of the fire training area located adjacent to the process equipment storage area (Figure F-7). The fire training area consisted of a fire water header, a 4 ft by 16 ft diameter tank, and an industrial pump on a cement pedestal. The fire training area is approximately 50 ft by 175 ft.

The fire training area was identified as a SWMU and designated as SWMU 7 during an RFI conducted at the Refinery in the early 1990s (AES 1990). The infrastructure was removed, and a soil cap was placed.

F.3.8 Railroad Rack Lagoon and Fan-Out Area (SWMU 8)

SWMU 8 is listed as a Corrective Action Complete without Controls in the current permit. SWMU 8 consists of the railroad rack lagoon and its overflow ditch and fan-out (Figure F-8). This area is located to the north of the refinery tank farm area near the railway spur. SWMU 8 is approximately 40 ft by 130 ft.

Soil samples from adjacent and under the railroad rack lagoon and within the overflow ditch and fan-out area were collected and analyzed during the initial RFI investigation. A Final Remedy Plan was proposed in the Phase I RFI supplemental report (Giant 1991b), which included diverting drainage water around the railroad rack from the existing lagoon to the refinery WWT system; plugging the old system; transferring the lagoon liquids to the refinery WWT system and treating contaminated soils. This procedure was formalized through a VCAP for the Railroad Rack Lagoon. The VCAP was submitted to the USEPA in December 1992 and approved in 1993; however, additional site monitoring during soil remediation was required (USEPA 1994).

A final excavation report was submitted to the NMED in September 2010 (Trihydro 2010). This report summarized the delineation, sampling, and excavation activities that occurred following the October 2006 subsurface investigation. The information presented in the final excavation report demonstrated that diesel range organic concentrations above the applicable cleanup standards had been excavated and that no further remediation activities needed to be conducted. NMED responded to the remedy completion report with an approval with modifications on January 26, 2011 (NMED 2011b).

F.3.9 Drainage Ditch and Inactive Landfarm (SWMU 9)

SWMU 9 is the Inactive Landfarm, formerly referred to as the Land Treatment Area #1, and the Drainage Ditch (Figure F-9). The dimensions of the Inactive Landfarm are approximately 300 ft by 80 ft. The Drainage Ditch collects stormwater in the immediate area of the Inactive Landfarm and is approximately 2 to 3 ft wide and up to 2 ft deep, running south to north along the east side of the Inactive Landfarm.

The Inactive Landfarm did not receive waste after 1975 and was closed on November 19, 1980. Typical refinery wastes such as API separator sludge, tank bottoms, and waste oil may have been disposed in

SWMU 9. The Inactive Landfarm and Drainage Ditch were formerly identified as two separate SWMUs (9 and 14, respectively) but are now identified together as SWMU 9. SWMU 14 is now identified as the Old API Separator (OAPIS) and is described in Section F.3.14.

The most recent investigation was conducted in April 2022 when soil borings were drilled in the area and two temporary monitoring wells were installed. A report summarizing the investigation results was provided to NMED in December 2022 (Western LLC 2022f).

F.3.10 Sludge Pits (SWMU 10)

The sludge pits are identified as SWMU 10. It contains two former API separator sludge pits located to the west of the NAPIS (Figure F-10). These pits were backfilled in 1980. Clean soil was placed on top of the pits. The two pits covered an area of approximately 130 ft by 80 ft and 70 ft by 50 ft, respectively, each with a depth of approximately 2 ft.

A VCAP was submitted for in place remediation of the soils was formalized in December 1992 and included additional monitoring (USEPA 1994).

F.3.11 Secondary Oil Skimmer (SWMU 11)

SWMU 11 consists of the secondary oil skimmer located south of the main EPs (Figure F-11). Prior to removal, it was used as a backup oil skimmer during maintenance activities on the primary oil skimmer.

A petition for NFA was submitted to NMED in 2001 (Giant 2001). Additional information was requested and provided to NMED by 2002, and NMEDs response is pending.

F.3.12 Contact Wastewater Collection System (SWMU 12)

SWMU 12 consists of piping and catch basins of the Contact Wastewater Collection System (Figure F-12). A Vactor system was used to clean the sewer boxes and underground lines. Once cleaned, the lines were inspected by inserting cameras inside the pipe and videotaping the inside of the lines. The inspection showed evidence of pitting and corrosion throughout the systems; however, it did not show any evidence of leaks or migration of hydrocarbons into the surrounding soils.

The original AOC 33 (Stormwater Collection System) was combined with SWMU 12 because the systems were combined.

F.3.13 Drainage Ditch Between API Evaporation Ponds and Neutralization Tank Evaporation Ponds (SWMU 13)

SWMU 13 consists of the small overflow lagoon known as Pond No. 10 and its associated drainage ditch (Figure F-13). The drainage ditch was identified as a SWMU as part of the RFI conducted at the Refinery in the early 1990s (AES 1990). Based on the results of soil collected on the perimeter of the pond and beside the ditch, the Refinery recommended NFA for this SWMU in the 1990s. The USEPA required that the area be sampled every five years as the Refinery planned to continue using the ditch (DiSorbo 2020b).

A visual inspection, data evaluation, and status assessment of SWMU 13 was completed in 1998 (Practical Environmental Services 1998b). This assessment confirmed that the NFA with continued sampling was appropriate for SWMU 13.

Previous documents from 2015 indicated that the drainage ditch was being used to convey non-contact stormwater and that no flow from the EP was received. Since that time, the area has since been regraded such that stormwater is no longer conveyed through the ditch. The only water entering these areas now is rainfall and there is no active use of the ditch features (DiSorbo 2020b).

F.3.14 Old API Separator (SWMU 14)

SWMU 14 is compromised of the OAPIS near the Refinery's WWT unit (Figure F-14). The original AOC 32 (Flare and Ancillary Tanks, tanks Z85V2, V85V3, and Z84-T105) was combined with SWMU 14 due to their proximity. The OAPIS was a concrete structure with metal components that was approximately 135 ft long, 22 ft wide, and 6 ft high constructed on compact clay soils. The unit was mostly below ground level with the southern side mostly at grade. The OAPIS was demolished in June 2012, except for a portion of the southern wall which was required to maintain structural integrity of other structures in the area (e.g., the flare knock-out drum). The land surface slopes down to the north and roughly 2 ft of the OAPIS is above grade in some northern locations. The OAPIS was excluded as a SWMU in the 1998 Hazardous and Solid Waste Act Permit and subsequent 1990 RFI Work Plan. It was added as a SWMU in the August 2000 PCC Permit (DiSorbo 2018).

The OAPIS was the first step in the Refinery's process WWT, removing free oil and suspended solids from the wastewater prior to subsequent downstream treatment. An API separator contains three phases: (1) oil at the top, which is constantly skimmed, (2) wastewater in the middle, and (3) accumulated sediment in the bottom, which is removed, as necessary. Flow from the OAPIS was directed through two benzene strippers prior to the wastewater being discharged to AL-1 and AL-2.

The OAPIS was put into service in 1957 to receive process wastewater, and in 1996 began receiving stormwater from a newly installed stormwater sewer system. The OAPIS primarily handled petroleum hydrocarbon materials, with a potential for refinery catalyst and gasoline additives to enter the sewer systems.

The OAPIS treated both process wastewater and stormwater until October 2004, when a NAPIS was put into service. The process wastewater was subsequently redirected to the NAPIS, leaving only the stormwater sewer system discharge managed by the OAPIS. When the process wastewater was diverted to the NAPIS, all residual materials/waste were removed from the OAPIS using vacuum trucks and subsequently sent off-site for recycling at the NORCO refinery (DiSorbo 2018). In preparation for inspections and repairs, the OAPIS was then steam cleaned and sand blasted. Minor repairs, including patching the concrete and rebuilding the weir walls, were completed at this time. Approximately 4,500 pounds of stained soil around the perimeter of the OAPIS was removed and sent off-site for proper disposal as hazardous waste.

In 2006, the Refinery investigated the sewer systems to determine if process wastewater was continuing to flow to the OAPIS (DiSorbo 2018). During the investigation, flows from the OAPIS were directed to the NAPIS. This investigation did not find any connections between the process wastewater and the stormwater sewers, and process wastewater was not flowing to the OAPIS.

In 2011, a new WWT plant was constructed, and the OAPIS was cleaned out and subsequently removed from service. Demolition occurred in June of 2012 and included "removal of the metal components and the concrete containment with the exception of a portion of the southern wall, which was required to remain in place to maintain the physical integrity of the structures (e.g., the flare knockout drum) located immediately south of the OAPIS" (DiSorbo 2018). The 2012 investigation found that the soils and groundwater surrounding the OAPIS were impacted by petroleum hydrocarbons and metals. While there were limited Residential soil screening level (SSL) exceedances, there were no non-residential SSL exceedances identified in the 2012 report (DiSorbo 2014). The highest concentrations of constituents were found directly beneath the former location of the OAPIS and at borings immediately adjacent to the OAPIS (DiSorbo 2018). An IWP response to approval with modifications proposed soil sampling in in the vicinity of the OAPIS was submitted to the NMED in June 2021 (Western LLC 2021a). The investigation will take place after receiving IWP approval from NMED.

F.4 AOCs

Corrective action for non-SWMU related releases is typically required in RCRA permits under the "omnibus authority". To reflect a more holistic approach, permits use the term 'AOC' to refer to releases which warrant investigation or remediation.

The purpose of this section is to provide information on AOCs (as defined in the current permit), as well as provide a summary of site characterization and/or corrective action activities for each AOC. The locations of known SWMUs and AOCs at the Refinery are shown on Figure F-1. The list of AOCs in the current permit is provided in Table F-3, as well as a summary of activities at each AOC.

F.4.1 New API Separator (AOC 15)

The NAPIS is identified as AOC 15 and was put into service in October 2004 (Figure F-15). Refinery process wastewater and the sewer systems flow to the NAPIS as part of the Refinery's WWT system. The NAPIS was constructed with two concrete treatment bays (East and West) that provide redundancy for continuous operations of the oil/water separator system. The NAPIS bays were retrofitted in 2007 to address potential leakage. The work included repairing cracks within the concrete followed by application of a 60 – 100-millimeter Pelseal (fluoroelastomer) coating. A 3/16-inch(in.) stainless steel liner was installed into each bay to provide the primary containment with the concrete bays serving as secondary containment. A 3/8-in. interstitial space separates the steel liner from the coated concrete wall. This interstitial space is monitored by a leak detection unit for each respective bay.

An IWP for AOC 15 and 16 was submitted to NMED in March 2022 (Western LLC 2022g). A revised IWP was submitted in May 2023. This investigation will include soil and groundwater samples to determine if the NAPIS is leaking and releasing contaminants to the subsurface. The investigation work will take place after receiving IWP approval from NMED.

F.4.2 New API Separator Overflow Tanks (AOC 16)

AOC 16 consists of an approximately 80 ft by 190 ft area where five temporary Baker frac tanks were used as NAPIS overflow tanks between 2007 and 2010 (Figure F-15). The frac tanks were installed approximately in 2007 and removed in 2010, when the NAPIS was connected to Tank 35. The dissolved gas flotation tank was installed in 2012 in a portion of AOC 16.

An IWP was submitted combined with AOC 15 to NMED in March 2022 (Western LLC 2022g). A revised IWP was submitted in May 2023. The investigation work will take place after receiving IWP approval from NMED.

F.4.3 Railroad Loading/Unloading Facility (AOC 17)

AOC 17 is the railroad loading and unloading facility along the eastern boundary of the Refinery area (Figure F-16). It was used for loading and unloading petroleum products and additives (e.g., methyl tert-butyl ether) to and from railcars (MPC 2018). The area is approximately 50 ft by 650 ft but has never been fully defined by sampling and analysis. The facility is believed to have been in continuous operation since 1958, and there were multiple historic spills in the area.

The IWP for AOC 17 was submitted to NMED in January 2023 (Western LLC 2023b). The investigation work will take place after receiving IWP approval from NMED. This IWP proposes to fill in the data gaps from previous investigations and identify, or rule out, additional soil impacts within AOC 17 as access to the area allows.

F.4.4 Asphalt Tank Farm (Tanks 701-709, 713, 714) (AOC 18)

AOC 18 encompasses the tanks in the Asphalt Tank Farm (tanks 701 through 709, 713, and 714) (Figure F-17). There were multiple historic spills in the area and some, but not all, of the spilled material was recovered. The Asphalt Tank Farm is estimated to cover an area approximately 250 ft wide by 400 ft long (Western Inc 2019). The capacity of the tanks ranged from 1,000 gallons to 37,000 gallons. Most of the tanks within AOC 18 were demolished when the Refinery became idled. Only tanks 702 and 714 remain in AOC 18.

Due to similar types of contamination, the investigative activities for AOC 18 have been combined with AOC 24 (see Section F.4.6). This IWP proposes to evaluate the extent of contamination in the areas of AOC 18 and AOC 24. Soil borings will be installed, and temporary monitoring wells will be completed to collect soil and groundwater samples. The IWP for AOC 18 and AOC 24 was submitted to NMED in June 2022 (Western LLC 2022h). The investigation work will take place after receiving IWP approval from NMED.

F.4.5 East Fuel Loading Rack (AOC 19)

AOC 19 is the East Fuel Loading Rack (Figure F-18). It is listed as Corrective Action Complete without Controls. The East Fuel Loading Rack was located near the southeast corner of the process area. Petroleum products (fuel oil) were loaded onto trucks at this location (Western Inc. 2015). The area was approximately 60 ft by 90 ft. AOC 19 was operated from before 1997 to 2011.

Impacted soils were removed in 2007 and concrete containment was installed. This concrete containment remained in-place for the remainder of operation of AOC 19. AOC 19 was removed in 2011 to construct a new unit for the Refinery. During this construction, soil was excavated in the area and sampling indicated that concentrations were below NMED residential soil screening levels (Western Inc. 2015).

F.4.6 Crude Oil Tank Farm (Tanks 101 and 102) (AOC 24)

The Crude Oil Tank Farm consists of Tanks 101 and 102, is AOC 24 (Figure F-19). Tanks 101 and 102 were placed into service in approximately 1957 and 1991, respectively. The tanks each had an approximate diameter of 110 ft and both had a capacity of 80,000 barrels. During Refinery operations, the tanks were used to store crude oil. While removing contaminated soil from a 2007 release, unrelated impacts to deeper soils were observed (Western Inc. 2015).

Due to similar types of contamination, the investigative activities for AOC 24 have been combined with AOC 18 (See Section F.4.4). This IWP proposes to evaluate the extent of contamination in the areas of AOC 18 and AOC 24. Soil borings will be installed, and temporary monitoring wells will be completed to collect soil and groundwater samples. The IWP for AOC 18 and AOC 24 was submitted to NMED in June 2022 (Western LLC 2022h). The investigation work will take place after receiving IWP approval from NMED.

F.4.7 Tank 573 (Kerosene Tank) (AOC 25)

AOC 25 is Tank 573 (Kerosene Tank) (Figure F-20). It is listed as Corrective Action Complete without Controls. Tank 573 was an aboveground steel tank with a fixed steel roof that stored kerosene. It was designed to hold approximately 250 barrels. The lines near the tank were located above ground. Tank 573 was emptied and placed out of service in the early 1990s. There are no documented releases from Tank 573. It was demolished in 2012 (Western Inc. 2015).

F.4.8 Process Units (AOC 26)

AOC 26 includes the process units in the southeastern corner of the Refinery (Figure F-21). The process unit area is approximately 570 ft by 720 ft (Western Inc. 2015). The Refinery's capacity was 28,600 barrels per day.

Process units included the following:

- Crude Distillation Unit
- Fluidized Catalytic Cracking Unit
- Alkylation Unit
- Reforming Unit
- Diesel Hydro-Treating Unit
- Naphtha Hydro-Treating Unit

- Treater Unit
- Ammonium Thiosulfate Unit
- Sulfur Recovery Unit
- Saturated Gas Unit
- Isomerization Unit
- Blended Gas Unit
- Gas Conditioning Unit

Operation began in the late 1950s and spills were documented at various times during its operation, with the most recent documented spill occurring in 2017. Any discovered spills were reported and addressed in accordance with applicable regulations at the time.

For purposes of determining the nature and extent of contamination, AOC 26 has been combined with AOC 27 (See Section F.4.9). The IWP proposes to evaluate the gasoline and diesel occurrences in the process, boiler, and cooling unit areas by collecting soil samples and SPH samples from groundwater monitoring wells within the area. The IWP for AOC 26 and AOC 27 was submitted to NMED in November 2021 (Western LLC 2021b). The Refinery received NMED's disapproval in March 2022, and submitted a response to NMED's comments in June 2022 (NMED 2022e, Western LLC 2022i). An approval with modifications was received in March 2023 (NMED 2023a). The investigation is scheduled to be completed during 2023 and a report summarizing investigation activities will be submitted to NMED.

F.4.9 Boiler and Cooling Unit Area (AOC 27)

AOC 27 consists of the boilers and cooling unit areas (Figure F-21). It is believed that these units were in continuous operation beginning in the late 1950s. The four cooling towers extended over an area of 35 ft by 100 ft. The four boilers were mounted aboveground on concrete pads in an area approximately 50 ft by 90 ft (Western Inc 2020a).

The boiler area consisted of four boilers that were the primary source of heat for refining operations. The feedwater was made of softened well water and historically included an oxygen scavenger additive and a proprietary boiler-treatment additive. Raw water from the onsite water wells was pumped into a water purification system that consisted of a softener which fed into a reverse osmosis purification system. The reject water from the process was pumped to SWMU 2. The water was converted to steam by the boilers and then used in various processes throughout the Refinery. After the steam was used in the processing equipment, a heated condensate was formed. The condensate was then sent to the cooling tower units for conversion back to water.

The cooling tower units were used to dispose of waste heat. Historic operations utilized evaporation as part of the cooling process leading to elevated concentrations of total dissolved solids (TDS) in the cooling water. The latest cooling tower process, prior to the Refinery indefinitely idling, was changed to a closed loop system that no longer generated a high TDS water.

For investigative activities, AOC 27 has been combined with AOC 26 (See Section F.4.8). The IWP proposes to evaluate the gasoline and diesel occurrences in the process, boiler, and cooling unit areas by collecting soil samples and SPH samples from groundwater monitoring wells within the area. The IWP for AOC 26 and AOC 27 was submitted to NMED in November 2021 (Western LLC 2021b). The Refinery received NMED's disapproval in March 2022, and submitted a response to NMED's comment in June 2022 (NMED 2022e, Western LLC 2022i). An approval with modifications was received in March 2023 (NMED 2023a). The investigation is scheduled to be completed during 2023 and a report summarizing investigation activities will be submitted to NMED.

F.4.10 Warehouse and Maintenance Shop Area (AOC 28)

AOC 28 is the warehouse and maintenance shop area (Figure F-22) and includes a total of 5 buildings. Activities conducted within AOC 28 included general site maintenance and equipment repair (e.g., pipe fitting and welding, instrumentation repairs, and electrical repairs) (Western Inc 2020b). The original buildings (e.g., welding shop, mechanical shop, instrumentation and electrical shop, and warehouse) were constructed in the late 1950s, with some additions being constructed later at unknown dates. There are several larger maintenance buildings, two of which are approximately 40 ft by 100 ft, and the third is 40 ft by 140 ft. The two smaller buildings are the instrumentation and electrical shop and the mechanical shop. The largest building is the pipe fitting and welding shop. A fifth building, which is approximately 30 ft by 40 ft, is located to the north of the welding shop and it is used to store flammable materials. The original main warehouse building is located south the welding shop and is 40 ft wide by 100 ft long. A new addition lies to the south with an east/west orientation and is 40 ft wide by 100 ft long.

For investigative activities, AOC 28 has been combined with AOC 29 (See Section F.4.11) and AOC 30 (See Section F.4.12). The IWP proposes a sampling plan to evaluate the absence of residual contamination within the AOCs through soil borings and soil sample collections. The IWP for AOCs 28, 29, and 30 was submitted to NMED in September 2022 (Western LLC 2022j). A disapproval was received from NMED on March 29, 2023, and a response will be submitted no later than July 30, 2023 (NMED 2023b). The investigation work will take place after receiving IWP approval from NMED.

F.4.11 Equipment Yard and Drum Storage Area (AOC 29)

AOC 29 consists of two warehouse buildings, the old firehouse, and an exterior storage area (Figure F-22). AOC 29 was utilized for storage of equipment and supplies, dating back to the late 1950s. No hazardous wastes are known to have been managed at AOC 29. There are two warehouse buildings, approximately 40 ft by 100 ft and 60 ft by 100 ft, respectively. The old firehouse is also located on the northeast corner of AOC 29. An exterior storage area measures approximately 100 ft by 130 ft.

For investigative activities, AOC 29 has been combined with AOC 28 (See Section F.4.10) and AOC 30 (See Section F.4.12). The IWP for AOCs 28, 29, and 30 was submitted to NMED in September 2022 (Western LLC 2022j). The IWP proposes a sampling plan to evaluate the absence of residual contamination within the AOCs. The IWP will include soil borings and soil sample collection. A disapproval was received from NMED on March 29, 2023, and a response will be submitted no later than

July 30, 2023 (NMED 2023b). The investigation work will take place after receiving IWP approval from NMED.

F.4.12 Laboratory (AOC 30)

AOC 30 is the laboratory building which was used for on-site analysis of petroleum products, related materials, and water samples (Figure F-22). It is believed that the laboratory was in service from the late 1950s until the Refinery was idled. The building has floor drains that connect to the Contact Wastewater Collection System (SWMU 12) (See Section F.3.12). The building in which the laboratory is located is approximately 40 ft by 120 ft.

For investigative activities, AOC 30 has been combined with AOC 28 (See Section F.4.10) and AOC 29 (See Section F.4.11). The IWP for AOCs 28, 29, and 30 was submitted to NMED in September 2022 (Western LLC 2022j). The IWP proposes a sampling plan to evaluate the absence of residual contamination within the AOCs. The IWP will include soil borings and soil sample collection. A disapproval was received from NMED on March 29, 2023, and a response will be submitted no later than July 30, 2023 (NMED 2023b). The investigation work will take place after receiving IWP approval from NMED.

F.4.13 Tanks 27 and 28 (AOC 31)

Tanks 27 and 28 (collectively known as AOC 31) are surge tanks that are used to temporarily store combined wastewater and contact stormwater flows prior to treatment in the Refinery's WWT plant (Figure F-23). Prior to the construction of the current treatment plant, the tanks served a similar purpose and allowed temporary storage of wastewater/contact stormwater to prevent an overflow at the API separator during storm events. Tanks 27 and 28 are only used when the main equalization tank (Tank 35) has reached its capacity or is out of service for inspection and/or repairs. Tank 35 is located south of AOC 31 and is used as the Refinery's primary wastewater collection tank (Western LLC 2021c).

The two tanks have a diameter of 33.5 ft and are 32 ft tall with a working volume of almost 4,000 barrels (166,000 gallons). The tanks are made of welded steel with an internal floating roof. AOC 31 is within a containment area associated with Tank 35, and that has adequate capacity for spill containment from all three tanks. There are no documented spills from Tanks 27 and 28.

F.4.16 Scrap Yard (AOC 34)

The scrap yard is located on the far north side of the Refinery and is identified as AOC 34. The scrap yard was used primarily to store used equipment (e.g., used steel pipe) before being recycled or sold for scrap (Western Inc 2015). It was also used as a short-term staging area for empty trash bins. The area of AOC 34 is approximately 550 ft by 500 ft. There are no permanent structures in AOC 34. The area was routinely checked to make sure only appropriate materials were stored in the area. Wastes that were historically stored in AOC 34 included paint cans.

AOC 34 is in the vicinity of SWMU 4 – Old Burn Pit and SWMU 5 – Landfill Areas. These three areas have been combined for investigative purposes. The most recent IWP combined the three areas to better understand the subsurface conditions of the area between SWMUs 4 and 5, within AOC 34. This work plan was submitted to NMED in April 2022 (Western LLC 2022d). This work will take place following approval of the work plan from NMED.

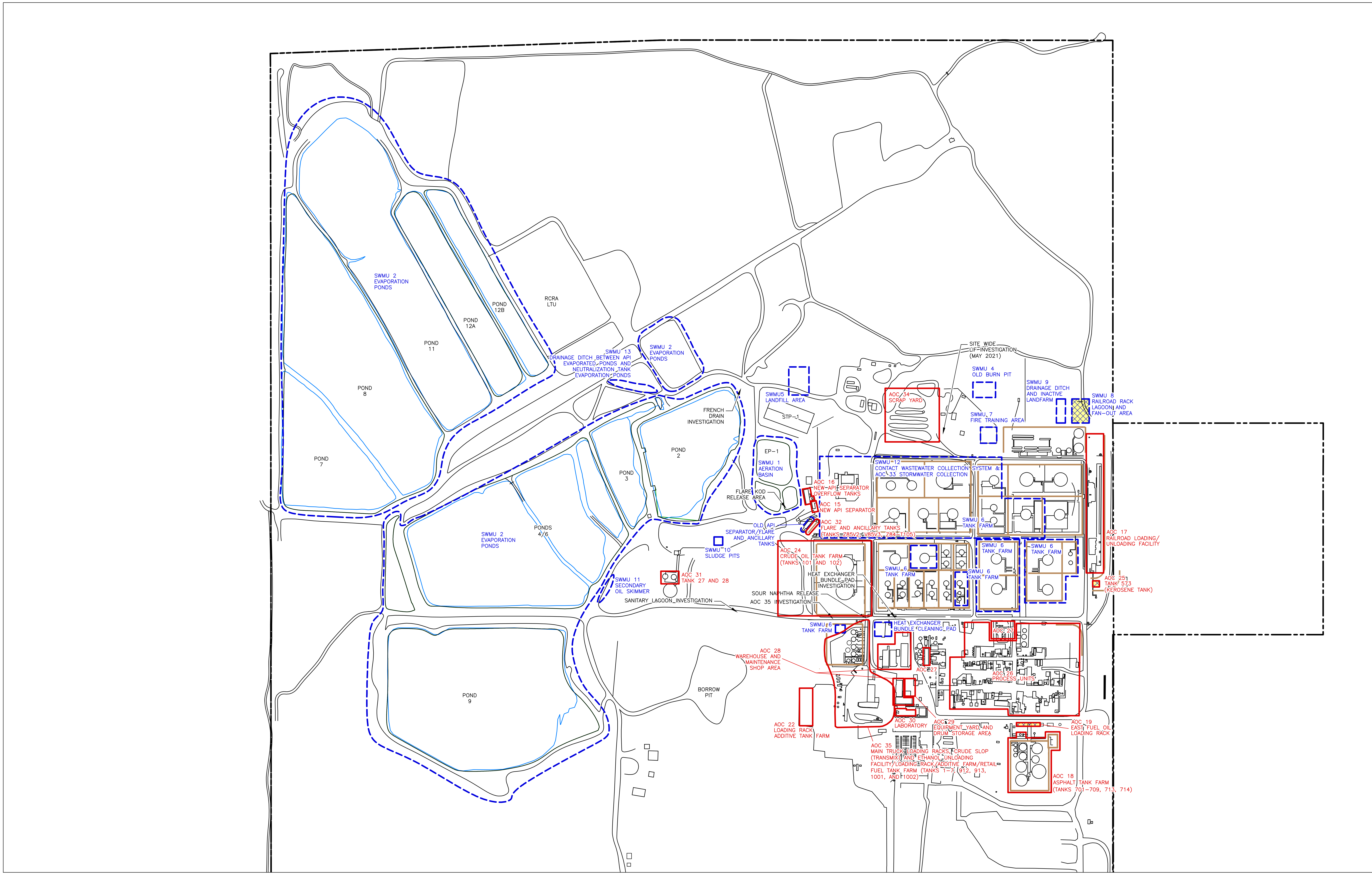
F.4.17 Main Truck Loading Rack, Crude Slop and Ethanol Unloading Facility, Additive Tank Farm/Loading Rack, and Retail Tank Farm (Tanks 1-7, 912, 913, 1001, and 1002) (AOC 35)

The revised AOC 35 is comprised of previously identified AOCs 20, 21, 22, 23, and 35. These AOCs were combined in the 2022 permit modification (NMED 2022b) due to their overlapping footprints. This AOC includes the main truck loading rack, the crude slop and ethanol unloading facility, the additive tank farm loading rack, and the retail tank farm.

An initial AOC 35 IWP was provided to the NMED in August 2018 and approved by NMED in September 2019. The initial IWP was subsequently revised following discovery of a leaking underground transfer line in the vicinity of the main truck loading rack (October 2019). The revised work plan was submitted to NMED in February 2020 and approved by NMED in February 2021 (Western Inc 2020c, NMED 2021). Concurrently with development of the revised IWP, laser-induced fluorescence/hydraulic profiling (LIF/HP) events were scheduled and conducted at the Refinery in November 2019, February 2021, and May 2021. These LIF/HP events were conducted to further assess the boundaries of gasoline and diesel type SPHs due to the release in October 2019.

A revised IWP that incorporates the LIF/HP events was submitted to NMED in March 2023 (Western LLC 2023c). This work will take place following approval of the IWP from NMED. The investigation's purpose is to align the LIF/HP results with analytical data. This IWP includes collecting soil samples within the area and identify which product types based on the LIF/HP results.

Figures



EXPLANATION

PROPERTY BOUNDARY (APPROXIMATE)

AOC LOCATION

SWMU LOCATION

CORRECTIVE ACTION COMPLETE WITHOUT CONTROLS

WARNING

IF THIS BAR DOES NOT MEASURE 1" THEN THIS DRAWING IS NOT TO SCALE

N

0 400' 800'

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
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FIGURE F-1

SWMU AND AOC LOCATIONS

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 400'	Date: 3/20/2023	File: 697-RCRA-PA-SITEMAP

Image Cite: DigitalGlobe © CNES (2022) Distribution Airbus DS © Microsoft Corporation, BING Imagery

EXPLANATION

SWMU BOUNDARY

SWMU SOLID WASTE MANAGEMENT UNIT

N

0 100'

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FIGURE F-2

SWMU 1 - AERATION LAGOONS AND EVAPORATION POND 1

WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 100'	Date: 3/28/2023	File: 697-RCRA-PA-SWMU1

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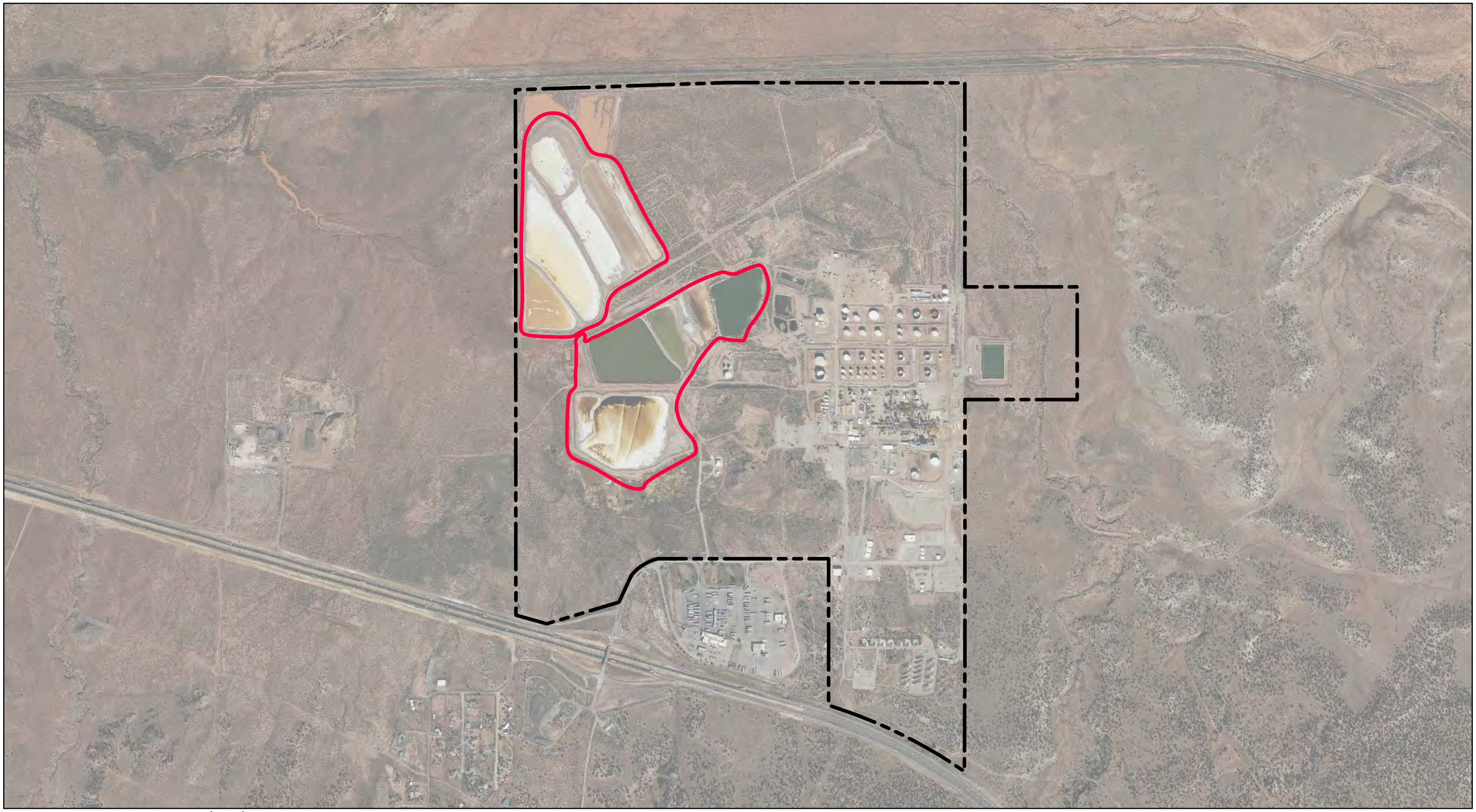

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EXPLANATION

— · —	PROPERTY BOUNDARY (APPROXIMATE)
—	SWMU BOUNDARY
SWMU	SOLID WASTE MANAGEMENT UNIT

N

0 1,800'

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FIGURE F-3

SWMU 2 - EVAPORATION PONDS

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 1,800'	Date: 5/7/2023	File: 697-RCRA-PA-SWMU2

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Image Cite: USDA /fsa – Aerial Photography Field Office, NAIP MrSID – Publication: 2014

EXPLANATION

SWMU BOUNDARY

SWMU SOLID WASTE MANAGEMENT UNIT

N

0 30'

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FIGURE F-4

SWMU 3 - HEAT EXCHANGER CLEANING BUNDLE PAD

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 30'	Date: 5/7/2023	File: 697-RCRA-PA-SWMU3

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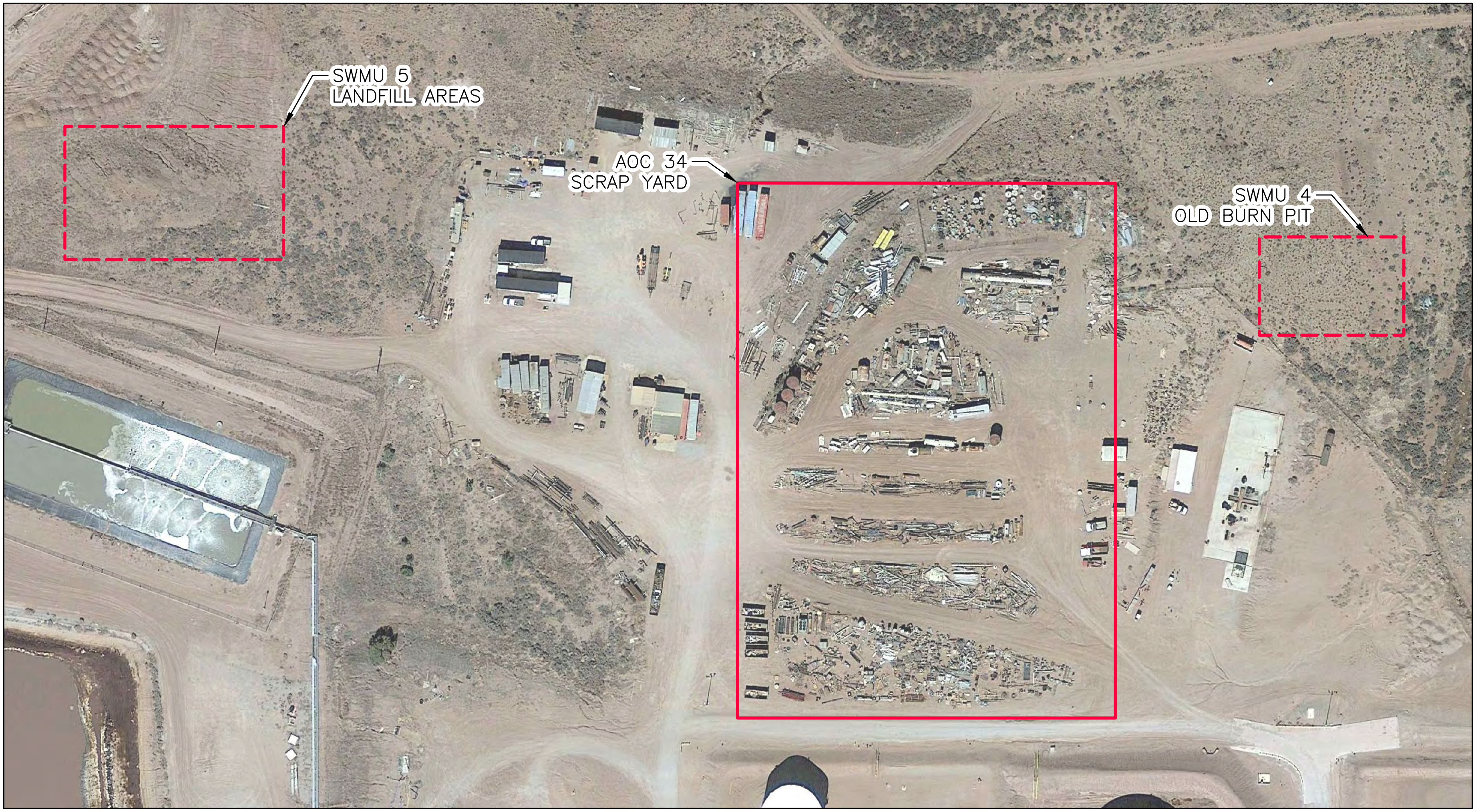

Image Citation: Google Earth Pro Imagery, Publication: March 2016.

EXPLANATION

(solid line)	AOC BOUNDARY
(dashed line)	SWMU BOUDARY
AOC	AREA OF CONCERN
SWMU	SOLID WASTE MANAGEMENT UNIT

N

0 150'

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FIGURE F-5
SWMU 4 - OLD BURN PIT
SWMU 5 - LANDFILL AREAS
AOC 34 - SCRAP YARD

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 100'	Date: 3/24/2023	File: 697-RCRA-PA-AOC34

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EXPLANATION

SWMU BOUNDARY

SWMU SOLID WASTE MANAGEMENT UNIT

N

0 200'

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FIGURE F-6

SWMU 6 - TANK FARM

**WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO**

Drawn By: REP	Checked By: CF	Scale: 1" = 200'	Date: 5/7/2023	File: 697-RCRA-PA-SWMU6

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EXPLANATION

SWMU BOUNDARY

SWMU SOLID WASTE MANAGEMENT UNIT

NOTE:
SWMU 7 IS THE OLD FIRE TRAINING AREA. THE NEW FIRE TRAINING AREA IS NOT LISTED AS A SWMU.

N

0 100'

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FIGURE F-7

SWMU 7 - FIRE TRAINING AREA

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 200'	Date: 3/28/2023	File: 697-RCRA-PA-SWMU7

Received by OCD: 6/26/2023 10:02:15 AM

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EXPLANATION

SWMU BOUNDARY

SWMU SOLID WASTE MANAGEMENT UNIT

N

0 100'

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FIGURE F-8

SWMU 8 - RAILROAD RACK LAGOON AND FAN-OUT AREA

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 200'	Date: 5/7/2023	File: 697-RCRA-PA-SWMU8

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Released to Imaging: 2/14/2025 1:40:43 PM

Image Citation: Google Earth Pro Imagery, Publication: March 2016.

EXPLANATION

SWMU BOUNDARY

DRAINAGE DITCH CENTERLINE

SWMU SOLID WASTE MANAGEMENT UNIT

N

0 100'

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FIGURE F-9

SWMU 9 - DRAINAGE DITCH AND INACTIVE LANDFARM

WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 100'	Date: 3/24/2023	File: 697-RCRA-PA-SWMU9

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EXPLANATION

	SWMU BOUNDARY
SWMU	SOLID WASTE MANAGEMENT UNIT

N

0 100'

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FIGURE F-10

SWMU 10 - SLUDGE PITS

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 100'	Date: 3/28/2023	File: 697-RCRA-PA-SWMU10

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EXPLANATION

SWMU BOUNDARY

SWMU SOLID WASTE MANAGEMENT UNIT

N

0 100'

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FIGURE F-11

SWMU 11 - SECONDARY OIL SKIMMER

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 100'	Date: 3/28/2023	File: 697-RCRA-PA-SWMU11

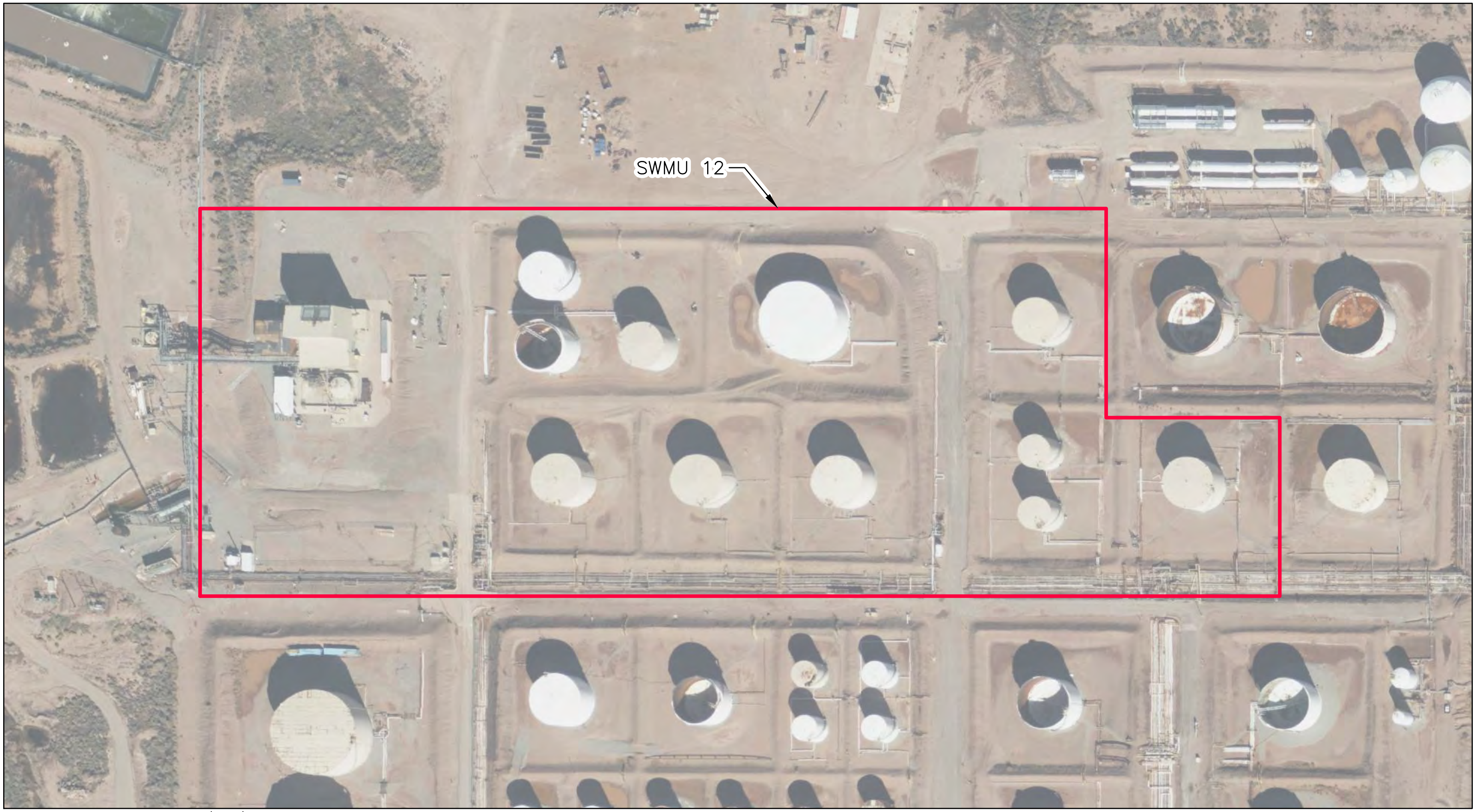

Image Cite: DigitalGlobe © CNES (2022) Distribution Airbus DS © Microsoft Corporation, BING Imagery

EXPLANATION

(red line)	SWMU BOUNDARY
SWMU	SOLID WASTE MANAGEMENT UNIT

N

0 200'

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FIGURE F-12

SWMU 12- CONTACT WASTEWATER COLLECTION SYSTEM AND STORMWATER COLLECTION SYSTEM

**WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO**

Drawn By: REP	Checked By: CF	Scale: 1" = 200'	Date: 3/28/2023	File: 697-RCRA-PA-SWMU12

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EXPLANATION

SWMU BOUNDARY

SWMU SOLID WASTE MANAGEMENT UNIT

N

0 100'

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FIGURE F-13

SWMU 13 - DRAINAGE DITCH BETWEEN API EVAPORATION PONDS AND NEUTRALIZATION TANK EVAPORATION PONDS

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 100'	Date: 3/28/2023	File: 697-RCRA-PA-SWMU13

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Image Cite: Trihydro Corporation – UAS Aerial Photography – Publication: 2018

EXPLANATION

SWMU BOUNDARY

SWMU SOLID WASTE MANAGEMENT UNIT

N

0 50'

NOTE:

FLARE AND ANCILLARY TANKS INCLUDE TANKS ZV85V2, Z85V3, AND Z84-T105.

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FIGURE F-14

SWMU 14 - OLD API SEPARATOR/FLARE AND ANCILLARY TANKS

WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 50'	Date: 3/24/2023	File: 697-RCRA-PA-SWMU14

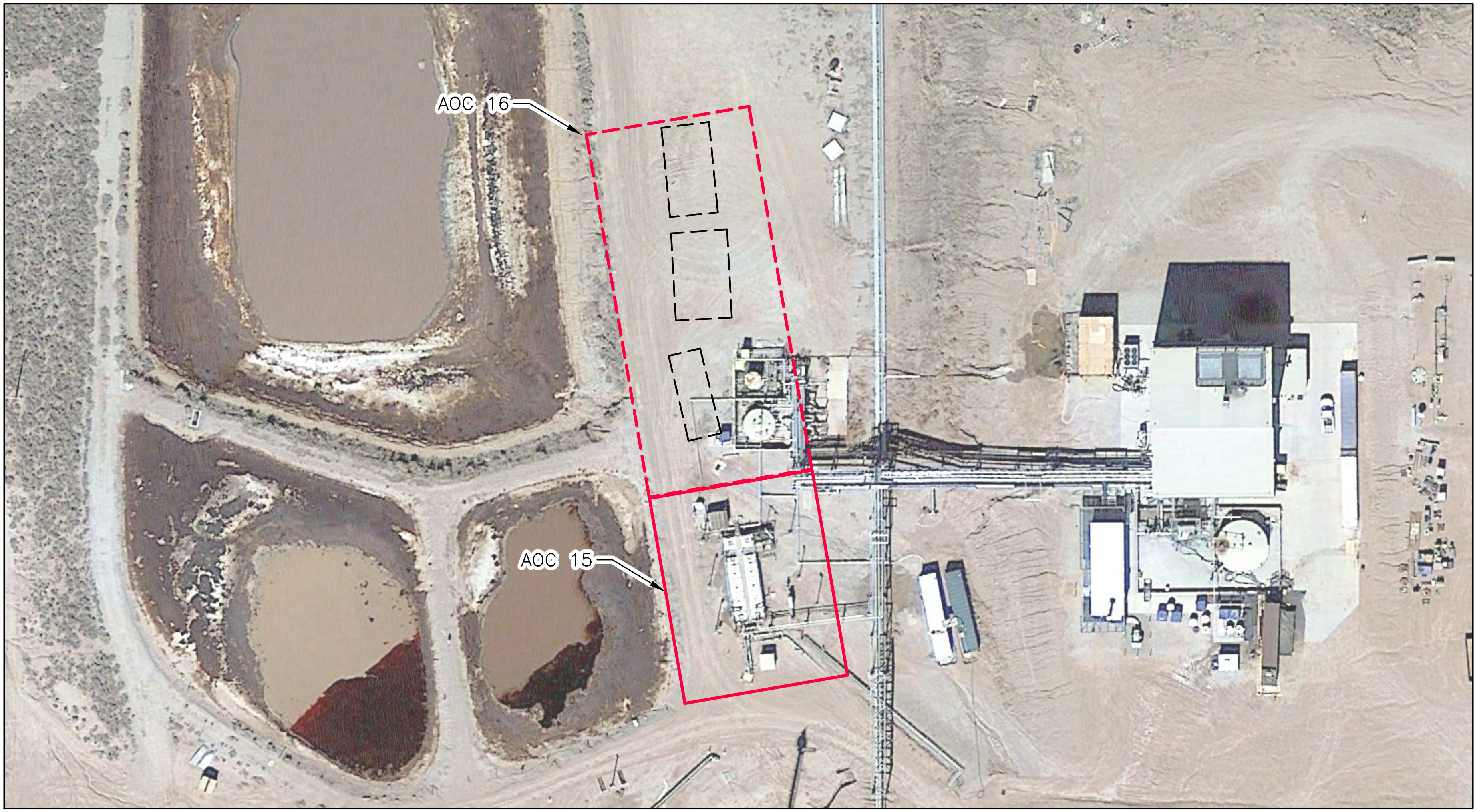

Image Cite: Google Earth Pro, Publication: March, 2016.

EXPLANATION

(solid red line)	AOC 15 NAPIS
(dashed red line)	AOC 16 NAPIS OVERFLOW TANKS
(dashed black line)	ESTIMATED FORMER LOCATION OF NAPIS OVERFLOW TANKS
AOC	AREA OF CONCERN
NAPIS	NEW AMERICAN PETROLEUM INSTITUTE SEPARATOR

0 80'

N

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FIGURE F-15

AOC 15 - NEW API SEPARATOR AND AOC 16 - NEW API SEPARATOR OVERFLOW TANKS

WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 80'	Date: 5/5/2023	File: 697-RCRA-PA-AOC15-16

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EXPLANATION

AOC BOUNDARY

AOC AREA OF CONCERN

N

0 200'

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FIGURE F-16

AOC 17 - RAILROAD LOADING/UNLOADING FACILITY

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 200'	Date: 3/24/2023	File: 697-RCRA-PA-AOC17

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EXPLANATION

AOC BOUNDARY

AOC AREA OF CONCERN

N

0 150'

NOTE:

ASPHALT TANK FARM INCLUDES TANKS 701-709, 713, AND 714.

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FIGURE F-17

AOC 18 - ASPHALT TANK FARM

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 150'	Date: 5/5/2023	File: 697-RCRA-PA-AOC18

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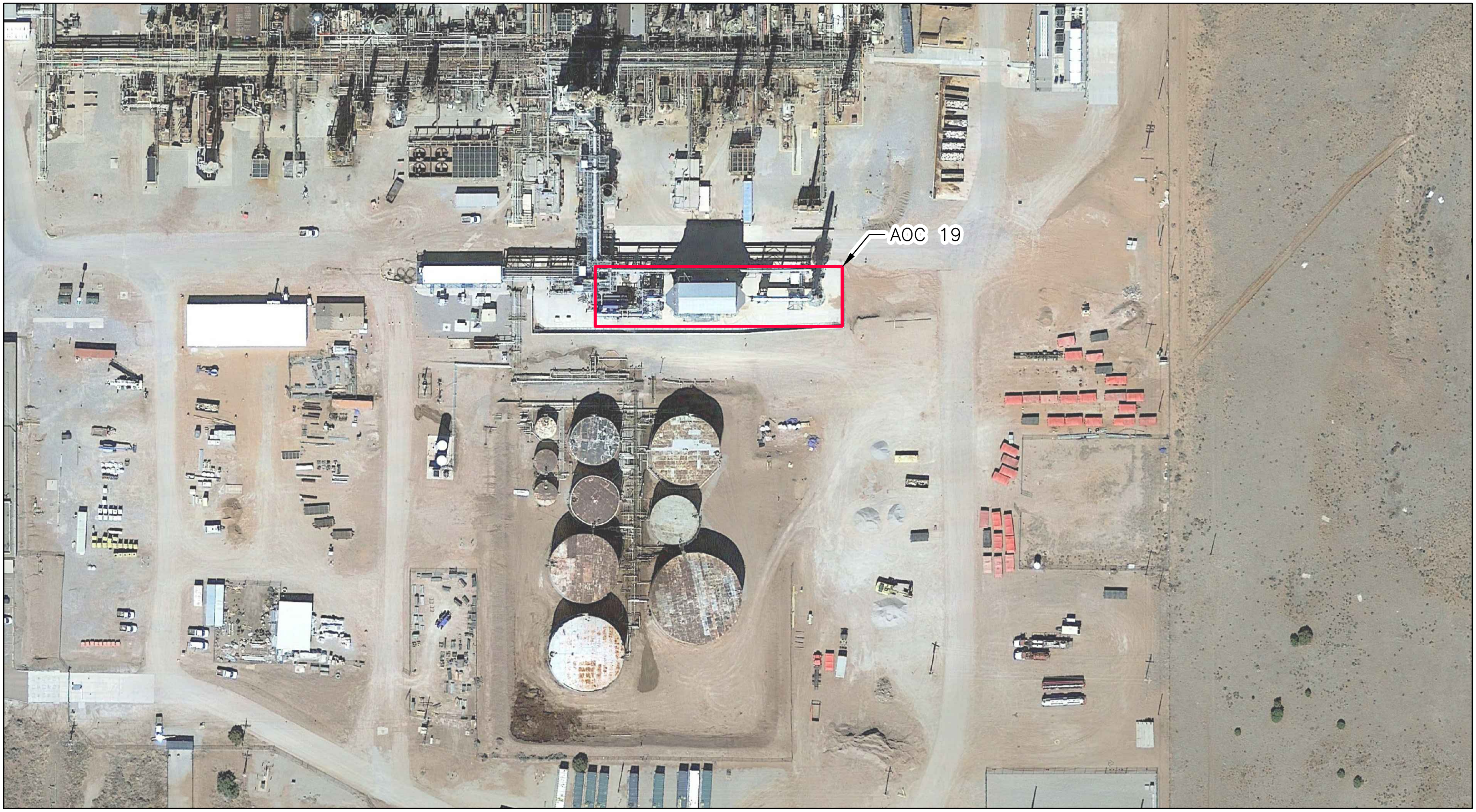

Image Citation: Google Earth Pro Imagery, Publication June 2016.

EXPLANATION

AOC BOUNDARY

AOC AREA OF CONCERN

N

0 150'

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FIGURE F-18

AOC 19 - EAST FUEL OIL LOADING RACK

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 150'	Date: 3/28/2023	File: 697-RCRA-PA-AOC19

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Image Citation: Google Earth Pro Imagery, Publication: March 2016.

EXPLANATION

AOC BOUNDARY

AOC — AREA OF CONCERN

NOTE:
AOC 24 CONTAINS TANKS 101 AND 102

N

0 150'

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FIGURE F-19

AOC 24 - CRUDE OIL TANK FARM

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 150'	Date: 3/24/2023	File: 697-RCRA-PA-AOC24

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EXPLANATION

(red line)	AOC BOUNDARY
AOC	AREA OF CONCERN

N

0 100'

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FIGURE F-20

AOC 25 - TANK 573 (KEROSENE TANK)

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 100'	Date: 3/28/2023	File: 697-RCRA-PA-AOC25

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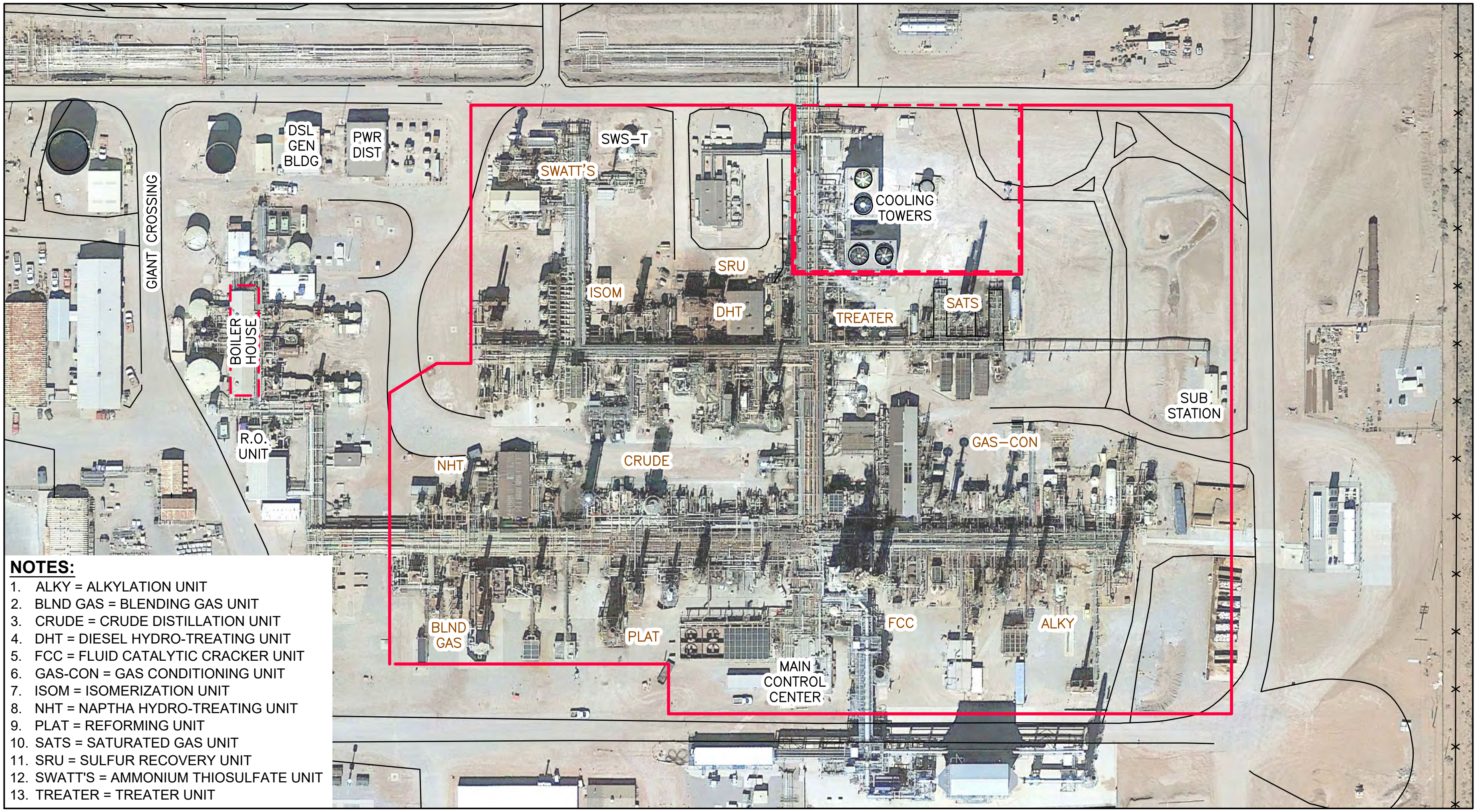

NOTES:
1. ALKY = ALKYLATION UNIT
2. BLND GAS = BLENDING GAS UNIT
3. CRUDE = CRUDE DISTILLATION UNIT
4. DHT = DIESEL HYDRO-TREATING UNIT
5. FCC = FLUID CATALYTIC CRACKER UNIT
6. GAS-CON = GAS CONDITIONING UNIT
7. ISOM = ISOMERIZATION UNIT
8. NHT = NAPTHA HYDRO-TREATING UNIT
9. PLAT = REFORMING UNIT
10. SATS = SATURATED GAS UNIT
11. SRU = SULFUR RECOVERY UNIT
12. SWATT'S = AMMONIUM THIOSULFATE UNIT
13. TREATER = TREATER UNIT

Image Citation: Google Earth Pro Imagery, Publication: March 2016.

EXPLANATION

AOC 26 - PROCESS UNITS

AOC 27 - BOILER AND COOLING UNIT AREA

AOC AREA OF CONCERN

0 100'

N

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FIGURE F-21

AOC 26 - PROCESS UNITS AND AOC 27 - BOILER AND COOLING UNIT AREAS

WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 100'	Date: 3/24/2023	File: 697-RCRA-PA-AOC26-27

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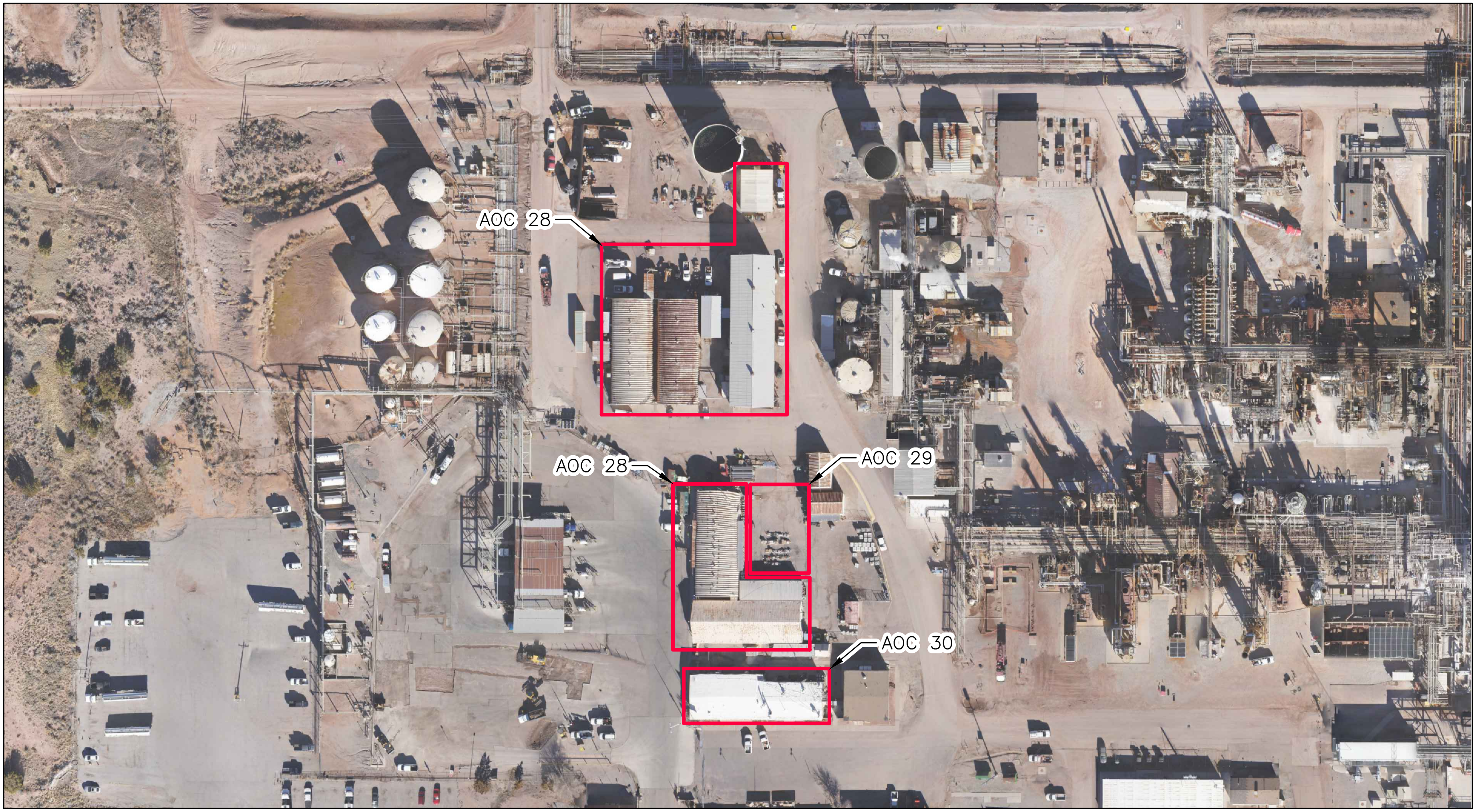
M:\ITON\MARATHON\CADD\GALLUP_REPORTS\RCRAPERMITAPP\202303\697-RCRA-PA-AOC28



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EXPLANATION

AOC BOUNDARY

AOC AREA OF CONCERN

N

0 100'

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FIGURE F-22

AOC 28 - WAREHOUSE AND MAINTENANCE SHOP AREA, AOC 29 - EQUIPMENT YARD AND STORAGE AREA AND AOC 30 - LABORATORY

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 100'	Date: 3/28/2023	File: 697-RCRA-PA-AOC28

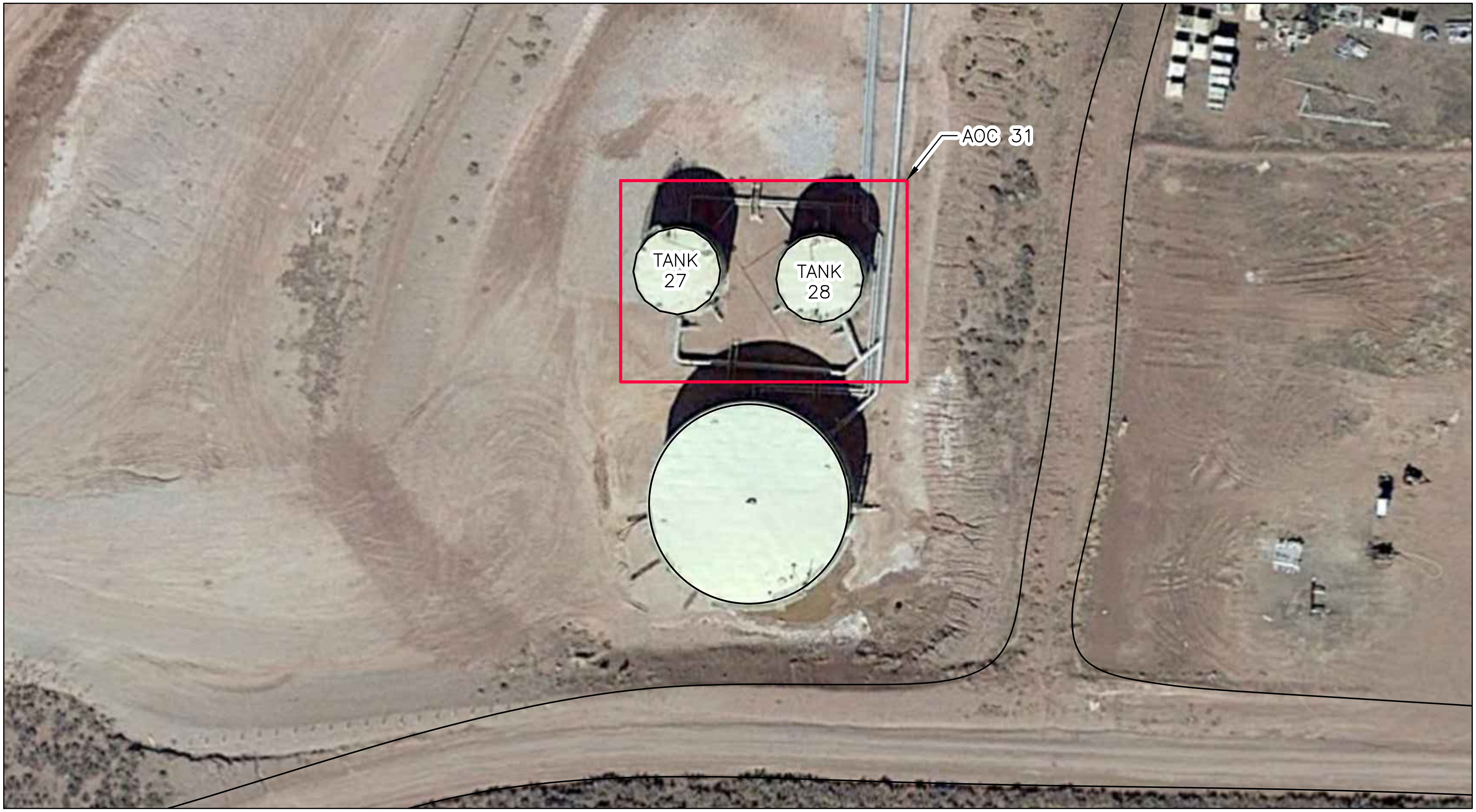

Image Citation: Google Earth Pro Imagery, Publication: October 2016.

EXPLANATION

AOC BOUNDARY

AOC AREA OF CONCERN

N

0 60'

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FIGURE F-23

AOC 31 - TANK 27 AND TANK 28

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 60'	Date: 5/6/2023	File: 697-RCRA-PA-AOC31

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EXPLANATION

AOC BOUNDARY

AOC AREA OF CONCERN

N

0 200'

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FIGURE F-24

AOC 35 - MAIN LOADING RACKS/CRUDE SLOP (TRANSMIX) AND ETHANOL UNLOADING FACILITY/LOADING RACK ADDITIVE ADDITIVE TANK FARM/RETAIL FUEL TANK FARM

WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY GALLUP, NEW MEXICO

Drawn By: REP	Checked By: CF	Scale: 1" = 200'	Date: 3/24/2023	File: 697-RCRA-PA-AOC35

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Tables

TABLE F-1. 2023 GROUNDWATER MONITORING NETWORK AND SAMPLING FREQUENCY
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Well Network	Sample Frequency
Western Boundary	
BW-1A	Annual
BW-1B	Annual
BW-1C	Annual
BW-2A	Annual
BW-2B	Annual
BW-2C	Annual
BW-3A	Annual
BW-3B	Annual
BW-3C	Annual
BW-4A	Annual
BW-4B	Annual
BW-5A	Annual
BW-5B	Quarterly
BW-5C	Quarterly
Land Treatment Unit	
MW-1	Annual
MW-2	Annual
MW-4	Annual
MW-5	Annual
SMW-2	Annual
SMW-4	Annual
OW-67	Quarterly
OW-68	Quarterly
SWMU 1	
GWM-1	Quarterly
GWM-2	Quarterly
GWM-3	Quarterly
OW-59	Quarterly
OW-60	Quarterly
NAPIS-1	Quarterly
NAPIS-2	Quarterly
NAPIS-3	Quarterly
KA-3	Quarterly
OAPIS-1	Quarterly
STP1-NW	Quarterly
STP1-SW	Quarterly
East LDU	Quarterly
West LDU	Quarterly
Oil Sump LDU	Quarterly

TABLE F-1. 2023 GROUNDWATER MONITORING NETWORK AND SAMPLING FREQUENCY
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Well Network	Sample Frequency
Eastern Boundary	
OW-12A	Quarterly
OW-14	Quarterly, if no measurable SPH is detected
OW-29	Quarterly, if no measurable SPH is detected
OW-30	Quarterly, if no measurable SPH is detected
OW-50	Quarterly
OW-52	Quarterly
OW-53	Quarterly
OW-54	Quarterly
OW-55	Quarterly
OW-56	Quarterly
OW-66	Quarterly
OW-70	Quarterly
Tank Farm	
OW-57	Quarterly
OW-58	Quarterly
OW-58A	Quarterly
OW-61	Quarterly
OW-62	Quarterly
OW-63	Quarterly
OW-64	Quarterly
OW-65	Quarterly
RW-1	Quarterly, if no measurable SPH is detected
RW-2R	Quarterly, if no measurable SPH is detected
RW-5	Quarterly, if no measurable SPH is detected
RW-6	Quarterly, if no measurable SPH is detected
Production Wells	
PW-2	Annual[1]
PW-3	Quarterly
PW-4	Annual
Deep Wells	
OW-1	Quarterly
OW-10	Quarterly
OW-11	Annual
OW-12	Semiannual
OW-13	Quarterly, if no measurable SPH is detected

TABLE F-1. 2023 GROUNDWATER MONITORING NETWORK AND SAMPLING FREQUENCY
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Well Network	Sample Frequency
Marketing Tank Farm	
MKTF-01R	Quarterly
MKTF-02R	Quarterly; MNA Annually
MKTF-03	Quarterly
MKTF-04R	Quarterly; MNA Annually
MKTF-05	Quarterly
MKTF-06	Quarterly
MKTF-07	Quarterly
MKTF-08	Quarterly
MKTF-09	Quarterly; MNA Annually
MKTF-10	Quarterly; MNA Annually
MKTF-11	Quarterly
MKTF-12	Quarterly
MKTF-13	Quarterly; MNA Annually
MKTF-14	Quarterly
MKTF-15	Quarterly
MKTF-16	Quarterly; MNA Annually
MKTF-17R	Quarterly; MNA Annually
MKTF-18R	Quarterly
MKTF-19	Quarterly; MNA Annually
MKTF-20	Quarterly; MNA Annually
MKTF-21	Quarterly; MNA Annually
MKTF-22	Quarterly; MNA Annually
MKTF-23	Quarterly
MKTF-24	Quarterly; MNA Annually
MKTF-25	Quarterly; MNA Annually
MKTF-26	Quarterly
MKTF-27	Quarterly
MKTF-28	Quarterly
MKTF-29	Quarterly
MKTF-30	Quarterly
MKTF-31	Quarterly
MKTF-32	Quarterly
MKTF-33	Quarterly
MKTF-34	Quarterly
MKTF-35	Quarterly
MKTF-36	Quarterly
MKTF-37	Quarterly
MKTF-38	Quarterly
MKTF-39	Quarterly
MKTF-40	Quarterly
MKTF-41	Quarterly
MKTF-42	Quarterly
MKTF-43	Quarterly
MKTF-44	Quarterly

TABLE F-1. 2023 GROUNDWATER MONITORING NETWORK AND SAMPLING FREQUENCY
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Well Network	Sample Frequency
MKTF-45	Quarterly
MKTF-46	Quarterly
MKTF-47	Quarterly
MKTF-48	Quarterly
MKTF-49	Quarterly
MKTF-50	Quarterly
Evaporation Ponds	
EP-2	Semiannual
EP-3	Semiannual
EP-4	Semiannual
EP-5	Semiannual
EP-6	Semiannual
EP-7	Semiannual
EP-8	Semiannual
EP-9	Semiannual
EP-11	Semiannual
EP-12A	Semiannual
EP-12B	Semiannual
STP-1 to EP-2	Quarterly

MNA - Monitored Natural Attenuation
SPH - Separate phase hydrocarbon

Notes:
[1] Sampled in 3 year intervals; will sample in 2023; next event is 2026.

TABLE F-2. 2023 GROUNDWATER MONITORING ANALYTE LIST
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

CONSTITUENT	COMMENTS
VOC	
1,1,1-Trichloroethane	Facility-wide analyte
1,1-Dichloroethane (1,1-DCA)	Facility-wide and MNA analyte[1]
1,1-Dichloroethene (1,1-DCE)	Facility-wide and MNA analyte
1,2,4-Trimethylbenzene	Facility-wide analyte
1,2-Dibromoethane (EDB)	Facility-wide analyte
1,2-Dichloroethane (1,2-DCA)	Facility-wide and MNA analyte
1,3,5-Trimethylbenzene	Facility-wide analyte
2-Butanone (MEK)	Facility-wide analyte
Acetone	Facility-wide analyte
Benzene	Facility-wide and MNA analyte
Bromomethane	Facility-wide analyte
Carbon Disulfide	Facility-wide analyte
Chlorobenzene	Facility-wide analyte
Chloroform	Facility-wide analyte
Chloromethane	Facility-wide analyte
cis-1,2-Dichloroethene (cis-1,2-DCE)	Facility-wide and MNA analyte
Ethylbenzene	Facility-wide and MNA analyte
Isopropyl benzene	Facility-wide analyte
Methylene Chloride	Facility-wide analyte
Methyl Tert-Butyl Ether (MTBE)	Facility-wide and MNA analyte
n-Butylbenzene	Facility-wide analyte
n-Propyl benzene	Facility-wide analyte
Pentafluorobenzene	Facility-wide analyte
p-Isopropyl toluene	Facility-wide analyte
sec-Butylbenzene	Facility-wide analyte
Styrene	Facility-wide analyte
Tetrachloroethene (PCE)	Facility-wide and MNA analyte
Toluene	Facility-wide and MNA analyte
Trichloroethene (TCE)	Facility-wide and MNA analyte
Vinyl Chloride	Facility-wide and MNA analyte
Xylenes, Total	Facility-wide and MNA analyte
SVOC	
1,4-Dichlorobenzene	Facility-wide analyte
1,4-Dioxane	Facility-wide analyte
1-Methylnaphthalene	Facility-wide analyte
2,4,6-Trichlorophenol	Facility-wide analyte
2,4-Dimethylphenol	Facility-wide analyte
2,4-Dinitrophenol	Facility-wide analyte
2-Methylnaphthalene	Facility-wide analyte
2-Methylphenol	Facility-wide analyte
3,4-Methylphenol	Facility-wide analyte
Acenaphthene	Facility-wide analyte
Anthracene	Facility-wide analyte
Benzo(a)anthracene	Facility-wide analyte
Benzoic Acid	Facility-wide analyte
Bis(2-ethylhexyl)phthalate	Facility-wide analyte
Chrysene	Facility-wide analyte
Diethyl phthalate	Facility-wide analyte
Dimethyl phthalate	Facility-wide analyte

TABLE F-2. 2023 GROUNDWATER MONITORING ANALYTE LIST
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

CONSTITUENT	COMMENTS
Di-n-butyl phthalate	Facility-wide analyte
Di-n-octylphthalate	Facility-wide analyte
Fluoranthene	Facility-wide analyte
Fluorene	Facility-wide analyte
Indeno(1,2,3-cd)pyrene	Facility-wide analyte
Naphthalene	Facility-wide analyte
Phenanthrene	Facility-wide analyte
Phenol	Facility-wide analyte
Pyrene	Facility-wide analyte
Pyridine	Facility-wide analyte
METALS[2]	
Antimony, Total	Facility-wide analyte
Arsenic, Total	Facility-wide analyte
Barium, Total	Facility-wide analyte
Beryllium, Total	Facility-wide analyte
Cadmium, Total	Facility-wide analyte
Chromium, Total	Facility-wide analyte
Cobalt, Total	Facility-wide analyte
Lead, Total	Facility-wide analyte
Mercury, Total	Facility-wide analyte
Nickel, Total	Facility-wide analyte
Selenium, Total	Facility-wide analyte
Silver, Total	Facility-wide analyte
Vanadium, Total	Facility-wide analyte
Zinc, Total	Facility-wide analyte
GENERAL CHEMISTRY	
Biochemical Oxygen Demand	Evaporation Pond Samples Only
Chemical Oxygen Demand	Evaporation Pond Samples Only
Coliform, E-Coli	Evaporation Pond Samples Only
Cyanide, Total	Facility-wide analyte
TPH DRO	Facility-wide analyte
TPH GRO	Facility-wide analyte
TPH ORO	Facility-wide analyte

TABLE F-2. 2023 GROUNDWATER MONITORING ANALYTE LIST
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

CONSTITUENT	COMMENTS
2023 SPECIFIC WELL PARAMETERS	
Pesticides (Method 8081B)	**Per NMED 2019 Comment 25 (2020)[3] and Comment 10 (2021)[4]**
2,4-DDE	EP-2 only
4,4-DDD	EP-2 only
4,4-DDE	EP-2 only
4,4-DDT	EP-2 only
a-BHC	EP-2 only
Aldrin	EP-2 only
b-BHC	EP-2 only
Chlordane	EP-2 only
d-BHC	EP-2 only
Dieldrin	EP-2 only
Endosulfan I	EP-2 only
Endosulfan II	EP-2 only
Endosulfan sulfate	EP-2 only
Endrin	EP-2 only
Endrin aldehyde	EP-2 only
g-BHC (Lindane)	EP-2 only
Heptachlor	EP-2 only
Heptachlor epoxide	EP-2 only
Methoxychlor	EP-2 only
Toxaphene	EP-2 only
PFAS (Method 537.1)	**Per NMED Comment 30 (2020)[3]**
PFBA	OW-63 only
PFPeA	OW-63 only
PFBS	OW-63 only
4:2 FTS	OW-63 only
PFHxA	OW-63 only
PFPeS	OW-63 only
PFHpA	OW-63 only
PFHxS	OW-63 only
6:2 FTS	OW-63 only
PFOA	OW-63 only
PFHpS	OW-63 only
PFNA	OW-63 only
PFOSA	OW-63 only
PFDA	OW-63 only
8:2 FTS	OW-63 only
PFNS	OW-63 only
MeFOSAA	OW-63 only
EtFOSAA	OW-63 only
PFUnA	OW-63 only
PFDS	OW-63 only
PFDoA	OW-63 only
PFTrDA	OW-63 only
PFTeDA	OW-63 only

TABLE F-2. 2023 GROUNDWATER MONITORING ANALYTE LIST
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

CONSTITUENT	COMMENTS
FIELD PARAMETERS	
Conductivity	Facility-wide analyte
DO	Facility-wide and MNA analyte
ORP	Facility-wide and MNA analyte
pH	Facility-wide and MNA analyte
Salinity	Facility-wide analyte
Temperature	Facility-wide and MNA analyte
Total Dissolved Solids	Facility-wide analyte
Turbidity	Facility-wide analyte

DO - Dissolved oxygen
DRO - Diesel Range Organic
GRO - Gasoline Range Organic
NMED - New Mexico Environment Department
MNA - Monitored Natural Attenuation
ORO - Oil Range Organic
ORP - Oxidation Reduction Potential
PFAS - Pre- and Polyfluoroalkyl substances
SVOC - Semi-volatile organic compound
TPH - Total Petroleum Hydrocarbon
VOC - Volatile Organic Compound

Notes:

[1]Analytes are included in both the facility-wide groundwater monitoring program and the MNA groundwater program (see Table F-1).

[2] Personal Communication. 2022. Marathon Gallup - 2022 Groundwater Work Plan Revised Analyte List. Emails between Mr. Michiya Suzuki (NMED) and Ms. Lesli Alexander (Trihydro). January 5 through January 20.

[3] NMED. 2020. Disapproval, Annual Groundwater Monitoring Report Gallup Refinery -2019, Western Refining Southwest Inc., Gallup Refinery, EPA ID #NMD000333211, HWB-WRG-20-013. November 23. Comments 25 (Pesticides) and 30 (PFAS).

[4] NMED. 2021. Second Disapproval, [Revised] Facility Wide Groundwater Monitoring Work Plan - Updates for 2021, Western Refining Southwest Inc., Gallup Refinery, McKinley County, Gallup, New Mexico, EPA ID #NMD000333211, HWB-WRG-21-006. November 15. Comment 10.

TABLE F-3. SOLID WASTE MANAGEMENT UNITS AND AREAS OF CONCERN
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

SWMU/AOC	Title	Status
SWMU 1	Aeration Basins	CMIWP submitted to NMED in March 2023. The proposed corrective action includes excavation and disposal of the accumulated waste.
SWMU 2	Evaporation Ponds	A work plan to collect pond sediment and underlying clay samples of the evaporation ponds to evaluate future remedy was submitted to NMED in March 2023.
SWMU 3	Heat Exchanger Bundle Cleaning Pad	A investigation took place during 2022 to characterize the nature and extent of possible soil contamination in the area. The investigation report was submitted to NMED in November 2022.
SWMU 4	Old Burn Pit	A work plan to evaluate the subsurface conditions between SWMU 4 and SWMU 5 (known as AOC 34) was submitted to NMED in April 2022.
SWMU 5	Landfill Areas	A work plan to evaluate the subsurface conditions between SWMU 4 and SWMU 5 (known as AOC 34) was submitted to NMED in April 2022.
SWMU 6	Tank Farm	A VCAP was submitted for the remediation and recovery of hydrocarbons in April 1996.
SWMU 7	Fire Training Area	A soil cap is in place.
SWMU 8	Railroad Rack Lagoon and Fan-Out Area	Corrective action complete without controls.
SWMU 9	Drainage Ditch and Inactive Landfarm	An investigation took place in April 2022 to characterize the nature of the soil and groundwater. The investigation report was submitted to NMED in December 2022.
SWMU 10	Sludge Pits	A VCAP was submitted for in place remediation of the soils in December 1992.
SWMU 11	Secondary Oil Skimmer	A petition for no further action was submitted to NMED in 2001 with additional information provided to NMED in 2002.
SWMU 12	Contact Wastewater Collection System/Stormwater Collection System	The system is currently blocked off.
SWMU 13	Drainage Ditch Between API Evaporation Ponds and Neutralization Tank Evaporation Ponds	The area has been regraded and no stormwater is conveyed through the ditch and there is no active use of the features.
SWMU 14	Old API Separator/Flare and Ancillary Tanks (tanks Z85V2, Z85V3, Z84-T105)	The OAPIS was demolished in June 2012. A work plan was submitted to NMED in June 2021 to investigate the soil in the vicinity of the OAPIS.
AOC 15	New API Separator	A revised work plan was submitted to NMED in May 2023. This investigation will evaluate the potential migration of contaminants from the NAPIS.
AOC 16	New API Separator Overflow Tanks	A revised work plan was submitted to NMED in May 2023. This investigation will evaluate the potential migration of contaminants from the NAPIS.
AOC 17	Railroad Loading/Unloading Facility	A work plan was submitted to NMED in January 2023 to fill in the data gaps from previous investigations and identify, or rule out, additional soil impacts within the area comprised of AOC 17.
AOC 18	Asphalt Tank Farm (Tanks 701-709, 713, 714)	A work plan to investigate AOC 18 and 24 to evaluate the extent of contamination was submitted to the NMED in June 2022.
AOC 19	East Fuel Oil Loading Rack	Corrective action complete without controls.
AOC 24	Crude Oil Tank Farm (Tanks 101 and 102)	A work plan to investigate AOC 18 and 24 to evaluate the extent of contamination was submitted to the NMED in June 2022.
AOC 25	Tank 573 (Kerosene Tank)	Corrective action complete without controls.
AOC 26	Process Units	A revised work plan to investigate AOC 26 and AOC 27 was submitted in May 2023 to evaluate the gasoline and diesel occurrences in the process area.

TABLE F-3. SOLID WASTE MANAGEMENT UNITS AND AREAS OF CONCERN
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

SWMU/AOC	Title	Status
AOC 27	Boiler and Cooling Unit Area	A revised work plan to investigate AOC 26 and AOC 27 was submitted in May 2023 to evaluate the gasoline and diesel occurrences in the process area.
AOC 28	Warehouse and Maintenance Shop Area	A revised work plan to investigate AOC 28, AOC 29, and AOC 30 will be submitted in July 2023 to evaluate the absence of residual contamination in the AOCs.
AOC 29	Equipment Yard and Drum Storage Area	A revised work plan to investigate AOC 28, AOC 29, and AOC 30 will be submitted in July 2023 to evaluate the absence of residual contamination in the AOCs.
AOC 30	Laboratory	A revised work plan to investigate AOC 28, AOC 29, and AOC 30 will be submitted in July 2023 to evaluate the absence of residual contamination in the AOCs.
AOC 31	Tanks 27 and 28	The tanks are used as equalization tanks when Tank 35 is at capacity or is out of service.
AOC 34	Scrap Yard	A work plan to evaluate the subsurface conditions between SWMU 4 and SWMU 5 (known as AOC 34) was submitted to NMED in April 2022.
AOC 35	Main Loading Racks/Crude Slop (Transmix) and Ethanol Unloading Facility/Loading Rack Additive Tank Farm/Retail Fuel Tank Farm (Tanks 1-7, 912, 913, 1001, 1002)	A revised work plan to evaluate the subsurface contamination in AOC 35 was submitted to NMED in April 2023.

Notes:
AOC - Area of Concern
CMIWP - Corrective Measures Implementation Work Plan
NAPIS - New American Petroleum Institute Separator
NMED - New Mexico Environment Department
OAPIS - Old American Petroleum Institute Separator
SWMU - Solid Waste Management Unit
VCAP - voluntary corrective action plan

Attachment F-1 – SWMU and AOC Photo Log

ATTACHMENT F-1. SWMU and AOC PHOTO LOG
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Photo 1. SWMU 1 – Aeration Lagoons

Photo 2. SWMU 1 – Evaporation Pond 1

ATTACHMENT F-1. SWMU and AOC PHOTO LOG
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Photo 3. SWMU 2 – Evaporation Ponds

Photo 4. SWMU 2 – Evaporation Ponds

ATTACHMENT F-1. SWMU and AOC PHOTO LOG
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Photo 5. SWMU 3 – Heat Exchanger Cleaning Bundle Pad

Photo 6. SWMU 4 – Old Burn Pit

Photo 7. SWMU 5 – Landfill Areas

Photo 8. SWMU 6 – Tank Farm

Photo 9. SWMU 6 – Tank Farm

Photo 10. SWMU 6 – Tank Farm

ATTACHMENT F-1. SWMU and AOC PHOTO LOG
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

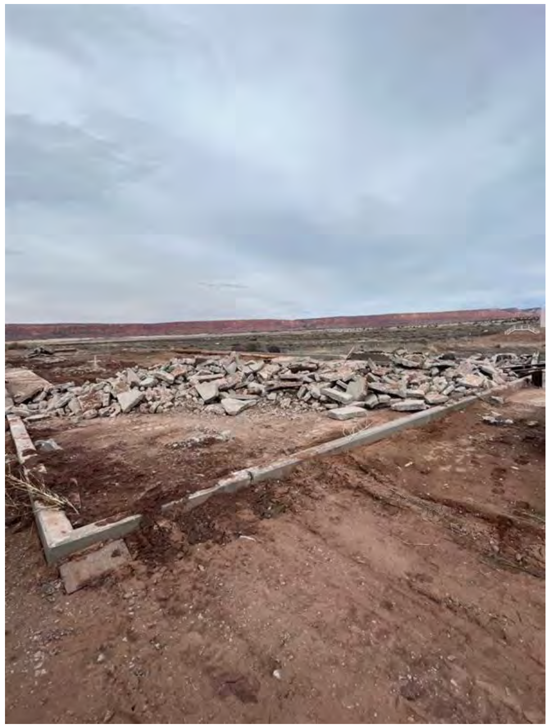

Photo 11. SWMU 7 – Fire Training Area

Photo 12. SWMU 8 – Railroad Rack Lagoon and Fan-Out Area

ATTACHMENT F-1. SWMU and AOC PHOTO LOG
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Photo 13. SWMU 9 – Drainage Ditch and Inactive Landfarm

Photo 14. SWMU 10 – Sludge Pits

ATTACHMENT F-1. SWMU and AOC PHOTO LOG
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Photo 15. SWMU 11 – Secondary Oil Skimmer

Photo 16. SWMU 12 – Contact Wastewater Collection System

ATTACHMENT F-1. SWMU and AOC PHOTO LOG
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Photo 17. SWMU 13 – Drainage Ditch

Photo 18. SWMU 14 – Old API Separator/Flare and Ancillary Tanks

ATTACHMENT F-1. SWMU and AOC PHOTO LOG
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Photo 19. SWMU 14 – Flare

Photo 20. AOC 15 – New API Separator

ATTACHMENT F-1. SWMU and AOC PHOTO LOG
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Photo 21. AOC 16 – New API Separator Overflow Tanks

Photo 22. AOC 17 – Railroad Loading/Unloading Facility

ATTACHMENT F-1. SWMU and AOC PHOTO LOG
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Photo 23. AOC 18 – Asphalt Tank Farm

Photo 24. AOC 19 – East Fuel Oil Loading Rack

ATTACHMENT F-1. SWMU and AOC PHOTO LOG
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Photo 25. AOC 24 – Crude Oil Tank Farm

Photo 26. AOC 25 – Tank 573 (Kerosene Tank)

ATTACHMENT F-1. SWMU and AOC PHOTO LOG
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Photo 27. AOC 26 – Process Units

Photo 28. AOC 26 – Process Units

ATTACHMENT F-1. SWMU and AOC PHOTO LOG
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Photo 29. AOC 26 – Process Units

Photo 30. AOC 27 – Boiler Area

ATTACHMENT F-1. SWMU and AOC PHOTO LOG
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Photo 31. AOC 28 – Warehouse and Maintenance Shop

Photo 32. AOC 29 – Equipment Yard and Storage Area

ATTACHMENT F-1. SWMU and AOC PHOTO LOG
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Photo 33. AOC 30 – Laboratory

Photo 34. AOC 31 – Tanks 27 and 28

Photo 35. AOC 34 – Scrap Yard

Photo 36. AOC 34 – Scrap Yard

ATTACHMENT F-1. SWMU and AOC PHOTO LOG
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Photo 37. AOC 35 – Main Loading Racks

Photo 38. AOC 35 – Ethanol Unloading Facility

ATTACHMENT F-1. SWMU and AOC PHOTO LOG
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Photo 39. AOC 35 – Loading Rack Additive and Retail Fuel Tank Farm

G.0 – OTHER FEDERAL LAWS

Western Refining Southwest LLC

(D/B/A Marathon Gallup Refinery)

Gallup, New Mexico

EPA ID# NMD000333211

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G.0 Other Federal Laws 3

G.0 Other Federal Laws

Title 20 of the New Mexico Administrative Code Chapter 4 Section 1.900 adopts Chapter 40 of the Code of Federal Regulations (CFR) Part 270. This regulation requires that the following federal laws be given consideration when applying for a Resource Conservation Recovery Act Permit. When any of these laws is applicable, its procedure must be followed.

- The Wild and Scenic Rivers Act (16 United States Code [U.S.C.] 1273 et seq. Section 7). This Act provides for a national wild and scenic rivers system and prohibits construction of any waterway that would have direct adverse effect on the values for which a wild and scenic river was established.
  - This Act is not applicable to Western Refining Southwest LLC D/B/A Marathon Gallup Refinery activities.
- The National Historic Preservation Act of 1966 (16 U.S.C. 470 et seq. Section 106). This Act and implementing regulations (36 CFR Part 800) require the Regional Administrator, before issuing a license, to adopt measures when feasible to mitigate potential adverse effects of the licensed activity and properties listed or eligible for listing in the National Register of Historic Places. The Act's requirements are to be implemented in cooperation with State Historic Preservation Officers and upon notice to, and when appropriate, in consultation with the Advisory Council on Historic Preservation.
  - This Act was taken into consideration during the application preparation.
- The Endangered Species Act (16 U.S.C. 1531 et seq. Section 7). This Act and implementing regulations (50 CFR part 402) require the Regional Administrator to ensure, in consultation with the Secretary of the Interior or Commerce, that any action authorized by the United States Environmental Protection Agency (USEPA) is not likely to jeopardize the continued existence of any endangered or threatened species or adversely affect its critical habitat.
  - This Act was taken into consideration during the application preparation.
- The Coastal Zone Management Act (16 U.S.C. 1451 et seq. Section 307(c)). This Act and implementing regulations (15 CFR part 930) prohibit USEPA from issuing a permit for an activity affecting land or water use in the coastal zone until the applicant certifies that the proposed activity complies with the State Coastal Zone Management program, and the State or its designated agency concurs with the certification (or the Secretary of Commerce overrides the State's nonconcurrence).
  - This Act is not applicable to Refinery activities.
- The Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) requires that the Regional Administrator, before issuing a permit proposing or authorizing the impoundment (with certain exemptions), diversion, or other control or modification of any body of water, consult with the appropriate State agency exercising jurisdiction over wildlife resources to conserve those resources.
  - This Act was taken into consideration during the application preparation.

H.0 – CERTIFICATION

Western Refining Southwest LLC

(D/B/A Marathon Gallup Refinery)

Gallup, New Mexico

EPA ID# NMD000333211

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H.0 Certification

This section is included in accordance with Title 20 of the New Mexico Administrative Code Section 4 Chapter 1.900 and Chapter 40 of the Code of Federal Regulations Section 270.11(d).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to 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 responses 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.

Timothy J. Peterkoski
Director of Environment and Climate Strategy
Marathon Petroleum Company LP

I.0 – REFERENCES

Western Refining Southwest LLC

(D/B/A Marathon Gallup Refinery)

Gallup, New Mexico

EPA ID# NMD000333211

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B. LTU Well Logs

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Appendix A – Characterization for Waste Applied to the LTU

Appendix A - Chemical and Physical Properties of Hazardous Waste Streams

Western Refining Southwest LLC

(D/B/A Marathon Gallup Refinery)

Gallup, New Mexico

EPA ID# NMD000333211

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1-1B. API Separator Sludge Waste, Method B, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery, Gallup, New Mexico

1-1C. API Separator Sludge Waste, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery, Gallup, New Mexico

1-1D. API Separator Sludge Waste, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery, Gallup, New Mexico

1-1E. API Separator Sludge Waste, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery, Gallup, New Mexico

1-2. API Separator and Cooling Tower Sludge Waste, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery, Gallup, New Mexico

1-3A. API Separator, Leaded Tank Bottoms, Cooling Tower Sludge, Heat Exchanger Bundle Cleaning Sludge, and Slop Oil Emulsion Solids Waste, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery, Gallup, New Mexico

1-3B. API Separator, Leaded Tank Bottoms, Cooling Tower Sludge, Heat Exchanger Bundle Cleaning Sludge, and Slop Oil Emulsion Solids Waste, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery, Gallup, New Mexico

1-4. API Separator and Slop Oil Solids Waste, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery, Gallup, New Mexico

1-5. Refinery Sludge Waste, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery, Gallup, New Mexico

1-6. API Separator Sludge and Composite Oily Sludge (Slop Oil Emulsion Solids) Waste, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery, Gallup, New Mexico

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1. Characterization for Waste Applied to the LTU

1.0 Chemical and Physical Properties of Hazardous Waste

Western Refining Southwest LLC D/B/A Marathon Gallup Refinery generated the following listed hazardous wastes when in operation:

- D007 Cooling water filter sludge
- K049 Slop Oil emulsion solids
- K050 Heat Exchanger Bundle Cleaning Sludge
- K051 API separator sludge
- K052 Leaded Tank bottoms

The wastes were generated through intermittent cleaning operations. Because small volumes were generated on an intermittent schedule, development of characterization analysis were accomplished by waste analyses at each cleaning event.

These wastes were applied to the LTU in accordance with the Refinery permit.

1.1 Hazardous Waste Properties – Industry Data

Characterization of hazardous waste was completed using industry-wide reports and available Refinery data. The following tables provide information on different wastes applied to the LTU.

- Table 1-1A. API Separator Sludge Waste, Method A
- Table 1-1B. API Separator Sludge Waste, Method B
- Table 1-1C. API Separator Sludge Waste
- Table 1-1D. API Separator Sludge
- Table 1-1E. API Separator Sludge
- Table 1-2. API Separator and Cooling Tower Sludge Waste
- Table 1-3A. API Separator Sludge, Leaded Tank Bottoms, Cooling Tower Sludge, Heat Exchanger Bundle Cleaning Sludge, Slop Oil Emulsion Solids Waste
- Table 1-3B. API Separator Sludge, Leaded Tank Bottoms, Cooling Tower Sludge, Heat Exchanger Bundle Cleaning Sludge, Slop Oil Emulsion Solids Waste
- Table 1-4. API Separator and Slop Oil Solids Waste
- Table 1-5. Refinery Sludge Waste
- Table 1-6. API Separator Sludge and Composite Oily Sludge (Slop Oil Emulsion Solids) Waste

Received by OCD: 6/26/2023 10:02:15 AM

1.2 Hazardous Waste Properties – Refinery Data

Appendix A contains reports for the wastes land treated at the Refinery which cover the period November 1980 through March 1984 and performed by the private laboratory, Controls for Environmental Pollution, Inc., Santa Fe, New Mexico.

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Tables

TABLE 1-1A. API SEPARATOR SLUDGE WASTE, METHOD A
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Parameter	Value	Units
Density	1.2	g/cm^3
Cadmium	3.3	ppm
Chromium	51	ppm
Copper	227.7	ppm
Lead	14.1	ppm
Nickel	14.1	ppm
Selenium	9.2	ppm
Sodium	1734.8	ppm
Vanadium	6.5	ppm
Zinc	555.2	ppm
Water	46	%
Residue	49.3	%
Total Carbon	7.3	%
Ash	41	%
Sulfur	0.9	%
Total N	0.1	%
Total extractable C	10	%
Pentane extractable	72	%
Benzene extractable	22	%
CH_3C_{12} extractable	6	%

Notes:
g/cm^3 - grams per cubic centimeter
ppm - parts per million
% - percent
H_2O - water
N - nitrogen
C - carbon
H - hydrogen

Reference: Brown, K.W.; Deuel, Jr., L.E.; Thomas, J.C.; Land Treatability of Refinery and Petrochemical Sludges; July 30, 1982; Grant No. R 805474013; USEPA, Cincinnati, OH 45268; pages 15 and 101.

Method A was determined by distillation. Solvent extractables were quantified gravimetrically after being refluxed five times with the respective solvents in a Soxhlet apparatus. Residues were heated at 750°C to determine ash content. Total sulfur was ascertained by an iodometric titration of sulfur dioxide (SO_2) after oxidative combustion using a Leco induction furnace. Total Nitrogen (N) was found by Nesslerization following ammonification of all N sources with sulfuric acid: potassium sulfate (H_2SO_4 :K_2SO_4) and mercuric oxide solution. Wet combustion with potassium dichromate and sulfuric acid: phosphoric acid ($H\text{-}_2SO_4$: H_3PO_4) was used to determine carbon (C) by gravimetric analysis of carbon dioxide (CO_2) evolution. Metals were measured using atomic absorption spectrophotometry following a nitrous acid- hydrogen peroxide (HNO_2-H_20_2) digestion of the sludge.

TABLE 1-1B. API SEPARATOR SLUDGE WASTE, METHOD B
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Parameter	New Percent (weight)of Bulk Sludge
Water	45.7
Soxhlet Extractable (total)	9.93
Pentane fraction	7.17
Benzene fraction	2.2
Dichloromethane fraction	0.56
Residue	
Air dry	40.6
Stable to 750 degrees Celsius	37.8
Sulfur	0.88
Nitrogen	0.09
Carbon (wet combustion)	7.3

Distribution of hydrocarbons gravimetrically determined after fractionation of extracts on silica gel.

Saturates, percent 64
Aromatics, percent 36

Notes

Reference: Brown, K.W.; Deuel, Jr., L.E.; Thomas, J.C.; Land Treatability of Refinery and Petrochemical Sludges; July 30, 1982; Grant No. R 805474013; USEPA, Cincinnati, OH 45268; pages 15 and 101.

Composition of the API separator sludge is in percent of wet weight. Sequential Soxhlet extraction showed that 9.9 percent of the waste was solvent extractable. Reversing the order of solvent had no effect on the total extractable value but drastically altered the distribution. Dichloromethane extracted 100 percent of the materials partitioned by solvents, with succeeding benzene and pentane fractions coming up clean. Greater than 85 percent of the API separator sludge wet mass was attributed to water and a non-extractable residue. An average of 37.8 percent of the wet weight components or 95 percent of the non-extractable and heat stable residue is attributed to structural water loss from the mineral fraction. The average total organic carbon determined by wet oxidation and gravimetric assay of CO_2 absorbed was 7.3 percent on a wet weight basis. This value compares favorably to the total extracted value considering that hydrocarbons contain other elements than just carbon.

The API separator sludge material contained approximately 10 percent extractable hydrocarbons distributed as 60 percent saturates and 40 percent aromatic in character. Eighty-six percent of the carbon value assayed by wet combustion technique was quantified by GLC, standardized to a carbon response. Nearly 80 percent of the total extracted hydrocarbons were recovered following fractionation on silica gel. The saturate fraction was characteristically 88 percent carbon. No attempt was made to characterize the aromatic fraction of the API separator sludge, other than by gas-liquid chromatographic analysis.

TABLE 1-1C. API SEPARATOR SLUDGE WASTE
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Parameter	Percent by weight
Water	55
Oil	11
Solids	34

Notes:

Reference: Berkowits, J.B. et al; A.D. Little, Inc.; Land Treatment Field Studies, Volume 2. Oily Waste From a Petroleum Refinery; May 1981; Contract No.60-03-2602; USEPA, Cincinnati, OH 45268; page 7.

TABLE 1-1D. API SEPARATOR SLUDGE WASTE
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Parameter	mg/Kg
Benzene	230
Toluene	1200
Phenol	0.19
Benzo-a-anthracene	160
Chrysene	140

Notes:
mg/kg - milligrams per kilogram

Can Viro Consultants, 1983. The Significance of Trace Substances in Petroleum Industry Sludges Disposed of on Land: A Literature Survey. PACE Report No. 83-2.

Analysis Method:
Reference: ERT, May 1984, Page 3-8

TABLE 1-1E. API SEPARATOR SLUDGE WASTE
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Parameter	Value	Units
Oil	25	%
Water	60	%
Solids	15	%
Chromium	100-500	ppm
Copper	500-1500	ppm
Nickel	100-500	ppm
Zinc	500-1000	ppm
pH	8	Standard Units

Notes:
ppm - parts per million
% - percent

Analysis Method:	American Petroleum Institute. 1983. Personal communique with participating companies. API, Washington, D.C.
Reference:	Environmental Research and Technology, Inc., June 1983, page A-12

TABLE 1-2. API SEPARATOR AND COOLING TOWER SLUDGE WASTE
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Waste	Percent		
	Hydrocarbons or Oil	Water	Solids
API Separator Sludge	8	73	19
Cooling Tower Sludge	1	74	25

Notes:
API - American Petroleum Institute
Analytical Method: Engineering-Science, Inc. 1976. The 1976 API Refinery Solid Waste Survey. Prepared for the American Petroleum Institute, Washington D.C.
Reference: Environmental Research and Technology, Inc.; The Land Treatability of Appendix VIII Constituents Present in Petroleum Industry Wastes; Document B-974-220, May 1984, American Petroleum Institute(API).

TABLE 1-3A. API SEPARATOR, LEADED TANK BOTTOMS, COOLING TOWER SLUDGE, HEAT EXCHANGER BUNDLE CLEANING SLUDGE, AND SLOP OIL EMULSION SOLIDS WASTE
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Waste	Arsenic		Breyllium	Cadium		Chromium		Cyanide		Flouride	Lead		Mercury	
	Eng/SC[a]	Jacobs[b]	Jacobs	Eng/SC	Jacobs	Eng/SC	Jacobs	Eng/SC	Jacobs	Eng/Sc	Eng/SC	Jacobs	Eng/SC	Jacobs
API Separator Sludge	2	6.2	0.0025	1.04	0.42	161.5	253	0.29	0.001	4.5	45	26	0.3	0.4
Tank Bottoms (Leaded)	NA	294	0.0025	NA	6.3	NA	11.4	NA	0.009	NA	NA	790	0.12	0.09
Cooling Tower Sludge[a]	8.3	8.2	0.0013	0.9	0.3	865	55.4	NA	0.1	NA	487	38	NA	0.57
Heat Exchanger Bundle Cleaning Sludge	NA	10.6	0.2	NA	1.3	NA	331	NA	1.7	NA	NA	78	NA	1.9
Slop Oil Emulsions Solids	NA	7.4	0.0025	NA	0.19	NA	525	NA	0.001	NA	NA	28.1	NA	0.59

Waste	Nickel		Selenium		Vanaduim		Copper		Zinc	
	Eng/SC	Jacobs	Eng/SC	Jacobs	Eng/SC	Jacobs	Eng/SC	Jacobs	Eng/SC	Jacobs
API Separator Sludge	11.7	19.3	0.2	0.001	13.7	9.8	55.2	18.6	191.6	298
Tank Bottoms (Leaded)	15	6.8	1.6	0.015	29	7.8	170	50	490	675
Cooling Tower Sludge[a]	NA	314	NA	6.95	NA	5.4	NA	141	NA	9092
Heat Exchanger Bundle Cleaning Sludge	NA	116	NA	27.2	NA	25	NA	71	NA	194
Slop Oil Emulsions Solids	NA	50	NA	1	NA	25	NA	48	NA	250

Notes:
[a]Engineering Science (Eng/Sc) data is solid phase only.
[b]Jacobs data reported in a dry weight basis, Eng/Sc is on a whole/weight Basis.
API - American Petroleum Institute
NA - Not Analyzed
Units reported in mg/kg

Reference: Environmental Research and Technology, Inc., May 1984, Page 3-8

TABLE 1-3B. API SEPARATOR, LEADED TANK BOTTOMS, COOLING TOWER SLUDGE, HEAT EXCHANGER BUNDLE CLEANING SLUDGE, AND SLOP OIL EMULSION SOLIDS WASTE
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Waste	Benzo-a-pyrene (mg/kg)	Phenol (mg/kg)
API Separator Sludge	0.004	6.5
Leaded Tank Bottoms	0.21	126
Cooling Tower Slude	0.004	3.5
Heat Exchanger Bundle Cleaning Sludge	2.2	13.3
Slop Oil Emulsion Soilids	0.003	15

Notes:

API - American Petroleum Institute

mg/kg - milligrams per kilogram

Environmental Research and Technology, Inc., May 1984, Page 3-8
Jacobs Engineering Co., 1976. Assessment of Hazardous Waste practices in the Petroleum Refining Industry. PB-219-059. United States

Reference:
Analysis Method:

TABLE 1-4. API SEPARATOR AND SLOP OIL SOLIDS WASTE
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Parameter	EP Toxicity Extracts mg/L in extract[a]	
	API Separator	Slop Oil Emulsion Solids
Toluene	0.31-5.7	4.8-13
Napthalene	0.01-.0.24	0.14-1.6
Flouroanthene	0.035-9.4	1.7
Chrysene/ Benzanthracene	0.14-15	0.40-1.5
Benzo-a-pyrene/ Benzofluoranthene	22.7	2.9

Notes:

[a]The concentracion in micrograms/grams of original solid is at least 20 times the value given for mg/L in extract

API - American Petroleum Institute

EP - Extraction Procedure

mg/L - milligrams per liter

Reference: Environmental Research and Technology, Inc., May 1984, Page 3-8

Analysis Method: Burke, S.L. and Wagner, I, 1982. Characterization and Treatment of Aqueous Waste and Residues from Petroleum Refineries. EPA Cooperative Agreement No. CR 806798.

API - American Petroleum Institute

mg/kg - milligrams per kilogram

TABLE 1-5. REFINERY SLUDGE WASTE
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Parameter	Range of values (mg/kg)	Mean of values (mg/kg)	Median of Values (mg/kg)	Number of Samples
Arsenic	0-317	31.3	8.3	30
Cadmium	0-19.4	4.3	1.59	30
Chromium, Total	1-5009	387.3	66.6	30
Copper	0-527	80.5	17.6	29
Lead	0-1914	191.6	31.2	30
Mercury	0-26.4	2.5	0.4	30
Nickel	2.3-520	57.3	20.7	30
Selenium	0-437.7	33.7	4.15	30
Vanadium	0-176.9	30.1	10.6	30
Zinc	2.5-3130	413.5	66.1	30

Notes:
mg/kg - milligrams per kilogram

Analysis Method: Engineering Science, Inc., 1976. The 1976 API Refinery Solid Waste Survey. Prepared for the American Petroleum Institute (API), Washing, D.C.

Reference: (ERT, June 1983) Environmental Research and Technology, Inc. June 1983; Land Treatement Practicies in the Petroleum Industry; prepared for the American Petroleum Institute (API).

TABLE 1-6. API SEPARATOR SLUDGE AND COMPOSITE OILY SLUDGE (SLOP OIL EMULSION SOLIDS) WASTE
WESTERN REFINING SOUTHWEST LLC D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Parameter	Value, percent	Weight/range
Sludge Oil Content	9	4.6-17.6
Oil Phase		
Hydrocarbon Fractions		
Saturates	53.5	48.0-66.1
Olefins	1.3	0-2.3
Aromatics	33.3	30.3-36.0
Polar/Asphaltenes	12.6	8.5-19.9
Phenols	2.8 mg/L	--
Composite Oily Sludge		
Sludge Oil Content	21.8	3.2-41.0
Oil Phase		
Hydrocarbon Fractions		
Saturates	59.6	51.3-70.2
Olefins	2.6	0.9-2.9
Aromatics	30.2	24.7-35.5
Polar/Asphaltenes	7.6	5.9-12.8
Phenols	6.7 mg/L	0.9-14.9 mg/L

Notes:
% - percent
API - American Petroleum Institute
mg/L - milligrams per liter

Reference: Environmental Research and Technology, Inc., June 1983, Page 3-8

Analysis Method: Weldon, R., 1982. Biodegradation of Oily Sludge by Soil Microorganisms. Prepared for the American Petroleum Institute (API), Washington, D.C.

Appendix A – Characterization for Waste Applied to the LTU

CUSTOMER Dames and Moore
ADDRESS Suite 398W, City Center
CITY 6400 Uptown Blvd., N.E.
ATTENTION Albuquerque, NM 87110
CODE NO Bill Mead
012050

REPORT OF ANALYSIS

SAMPLES RECEIVED 11/10/80 CUSTOMER ORDER NUMBER

TYPE OF ANALYSIS Sludge

EPA ID K052

Sample Identification	Type of Analysis	
Leaded Tank Sludge;	Lead (Total)	690 ug/g
Tank ~~5~~9 6	EP Lead	0.08 mg/liter
Date Collected 11/4/80	Total Organic Lead	2.4 ug/gm

APPROVED BY
Elmer D. Martinez, Operations Division, Mg
12/11/80 PAGE 19 OF 19 PAGE

Controls for Environmental Pollution, Inc.
... Rosina • Santa Fe, New Mexico 87502

CUSTOMER Dames & Moore
ADDRESS Suite 398W, City Center
CITY 6400 Uptown Blvd., N.E.
ATTENTION Albuquerque, NM 37110
P.O. Bill Mead
012179

REPORT OF ANALYSIS

SAMPLES RECEIVED 11/10/80 CUSTOMER ORDER NUMBER

TYPE OF ANALYSIS Sludge (Date Collected 11/6/80)

Sample Identification	Type of Analysis		mg/liter
API Seperator Emulsion	Arsenic	<	0.01
E... ID – K051	Barium	<	10
	Cadmium	<	0.001
	Chromium		0.006
	Chromium 6+	<	0.01
	Lead (Total)		6.1
	Mercury	<	0.004
	Selenium	<	0.01
	Silver	<	0.01
	Total Chrome		200 ug/gm
			percent by weight
	Total Organic Carbon		17.8

APPROVED BY
Elmer D. Martinez, Operations Division, Mgr
12/24/80 PAGE 1 OF 1 PAGES

CEP
Controls for Environmental Pollution, Inc.
Santa Fe, New Mexico 87502

Controls for Environmental Pollution, Inc.
P.O. BOX [illegible] • Santa Fe, New Mexico 87502
[illegible]
OUT OF STATE [illegible]

CEP, Inc. REPORT LAB # 84-03-404

[RECEI]VED: 03/30/84 04/25/84 15:22:12

[REP]ORT TO Giant Refining Company
Route 3 Box 7
Gallup, NM 87301

PREPARED BY Controls for Environmental Pollution, Inc.
1925 Rosina Street
Santa Fe, NM 87502

CERTIFIED BY

[A]TTEN R C Anderson

ATTEN
PHONE (505) 982-9841

CONTACT GAIL

[C]LIENT GIANT REF SAMPLES 3
[CO]MPANY Giant Refining Company
[FAC]ILITY

Analyses reported as mg/liter were done on an EP Toxicity prep.

[WO]RK ID Water Quality
[TAKEN]
[T]RANS Self
TYPE Sludge
[P] O # 75623
[IN]VOICE under separate cover

[S]AMPLE IDENTIFICATION

[C]ooling Tower Sludge
[H]eat Exchanger Sludge
API Seperator Sludge

CEP, Inc. TEST CODES and NAMES used on this report

AG 1	Silver
AS 1	Arsenic
BA 1	Barium
CD 1	Cadmium
CR 1	Chromium
CR 6 1	Chromium, Hexavalent (6+)
CR S	Chromium
HG 1	Mercury
O G 5	Oil and Grease
PB 1	Lead
PB S	Lead
PH S	pH
SE 1	Selenium
TOC 5	Total Organic Carbon

Controls for Environmental Pollution, Inc.
P O BOX 5351 • Santa Fe, New Mexico 87502
IN STATE [illegible]
OUT OF STATE 800/545 [illegible]

REPORT OF ANALYSIS

LAB # 84-03-404

IDENTIFICATION	DATE COLLECTED	TYPE OF ANALYSIS	mg/liter	
...g Tower Sludge	03/29/84	Silver	<0.01	
		Arsenic	<0.01	
		Barium	0.4	
		Cadmium	<0.001	
		Chromium	0.063	
		Chromium, Hexavalent	<0.01	
		Chromium	170	(ug/gram)
		Mercury	<0.0004	
		Oil and Grease	29,000	(ug/gram)
		Lead	0.001	
		Lead	140	(ug/gram)
		pH	9.15	(units)
		Selenium	<0.01	
		Total Organic Carbon	>400,000	

Controls for Environmental Pollution, Inc.
P.O. BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982-9841
OUT OF STATE 800/545-2188

E-3

REPORT OF ANALYSIS

LAB # 84-03-404

SAMPLE IDENTIFICATION	DATE COLLECTED	TYPE OF ANALYSIS	mg/liter	
t Exchanger Sludge	03/29/84	Silver	<0.01	
		Arsenic	<0.01	
		Barium	0.1	
		Cadmium	0.001	
		Chromium	<0.001	
		Chromium, Hexavalent	<0.01	
		Chromium	15	(ug/gram)
		Mercury	<0.0004	
		Oil and Grease	22,500	(ug/gram)
		Lead	0.003	
		Lead	330	(ug/gram)
		pH	11.2	(units)
		Selenium	<0.01	
		Total Organic Carbon	>400,000	

Controls for Environmental Pollution, Inc.
P O BOX 5351 • Santa Fe, New Mexico 87502
IN STATE 505/982 9841
OUT OF STATE 800/545-2188

4

REPORT OF ANALYSIS

LAB # 84-03-404

...E IDENTIFICATION	DATE COLLECTED	TYPE OF ANALYSIS	mg/liter	
...eperator Sludge	03/13/84	Silver	<0.01	
		Arsenic	<0.01	
		Barium	0.4	
		Cadmium	<0.001	
		Chromium	0.036	
		Chromium, Hexavalent	<0.01	
		Chromium	10	(ug/gram)
		Mercury	<0.0004	
		Oil and Grease	26,000	(ug/gram)
		Lead	<0.001	
		Lead	340	(ug/gram)
		pH	9.30	(units)
		Selenium	<0.01	
		Total Organic Carbon	>400,000	

Appendix B – LTU Well Logs

Received by OCD: 6/26/2023 10:02:15 AM

MONITORING WELL MW-1

SURFACE ELEVATION: 6876 FEET
(Unsurveyed)

LABORATORY TEST DATA

DEPTH IN FEET	TESTS REPORTED ELSEWHERE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH TEST DATA: TYPE OF TEST	STRENGTH TEST DATA: NORMAL OR CONFINING PRESSURE (PSF)	STRENGTH TEST DATA: SHEAR STRENGTH (PSF)	STRENGTH TEST DATA: DEVIATOR STRESS (PSF)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	BLOWS/FT.	SAMPLES
0											
10											
20											
30											
40											
50											
60											
70											
80											
90											
100											
110											
120											
130											
140											
150											
160											

SYMBOLS	DESCRIPTION
CL	REDDISH-BROWN SILTY CLAY, TRACE OF MEDIUM TO COARSE SAND AS BLEBS AND THIN INTERBEDS
	WATER LEVEL 14.1 FEET B.G. 10/18/81
SC	PINKISH-PURPLE, SLIGHTLY SANDY (FINE) CLAY
SH	VARIEGATED SILTY SHALE, REDDISH BROWN GRADING TO GREEN AND LIGHT PURPLE
CL	REDDISH-BROWN SILTY CLAY, FIRM
LS/SH	VARIEGATED LIGHT GREEN AND DARK RED LIMESTONE INTERBEDDED WITH SHALE
SH	REDDISH-ORANGE SHALE
LS	LIGHT-GREEN LIMESTONE DENSE, HARD
SS	LIGHT GREENISH-GRAY, MEDIUM TO FINE, LOOSELY CEMENTED SANDSTONE INTERBEDDED WITH LIGHT GRAY, LOOSE CLAY
SH	REDDISH-PURPLE SHALE

BORING COMPLETED AT 130.4 FEET ON 10/14/81.

SCREENED INTERVAL

FIGURE 30.2-1

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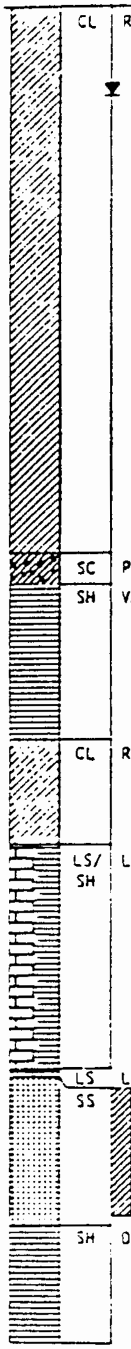
MONITORING WELL MW-2

SURFACE ELEVATION: 6877 FEET
(Unsurveyed)

LABORATORY TEST DATA

DEPTH IN FEET	TESTS REPORTED ELSEWHERE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH TEST DATA: TYPE OF TEST	STRENGTH TEST DATA: NORMAL OR CONFINING PRESSURE (PSF)	STRENGTH TEST DATA: SHEAR STRENGTH (PSF)	STRENGTH TEST DATA: DEVIATOR STRESS (PSF)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	BLOWS/FT.	SAMPLES
0											
10											
20											
30											
40											
50											
60											
70											
80											
90											
100											
110											
120											
130											
140											
150											
160											



SYMBOLS	DESCRIPTION
CL	REDDISH-BROWN SILTY CLAY, TRACE MEDIUM TO COARSE SAND AS LOOSE TO FIRM BLEBS
	WATER LEVEL 9.1 FEET B.G. 10/18/81
SC	PINKISH-PURPLE, SLIGHTLY SANDY (FINE) CLAY
SH	VARIEGATED REDDISH-BROWN, GREEN AND LIGHT PURPLE, SANDY TO SILTY SHALE
CL	REDDISH-BROWN SILTY CLAY, FIRM
LS/SH	LIGHT GREEN TO DARK RED LIMESTONE INTERBEDDED WITH SHALE
LS	LIGHT GREEN LIMESTONE, HARD
SS	WHITE TO LIGHT-GRAY, FINE TO MEDIUM SAND; SOME CLAY; GRADES GREENISH GRAY TO PINK, COARSE TO MEDIUM SAND
SH	DEEP PURPLE SHALE, FIRM

BORING COMPLETED AT 138.0 FEET ON 10/15/81.

SCREENED INTERVAL

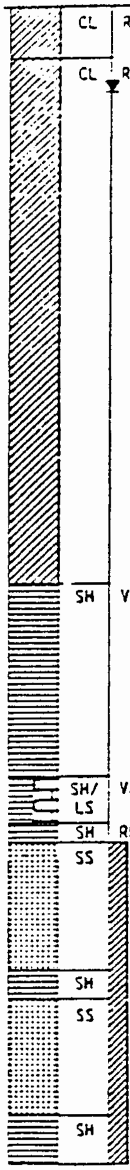
FIGURE 30.2-2

MONITORING WELL MW-4

SURFACE ELEVATION: 6883 FEET
(Unsurveyed)

LABORATORY TEST DATA

DEPTH IN FEET	TESTS REPORTED ELSEWHERE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH TEST DATA: TYPE OF TEST	STRENGTH TEST DATA: NORMAL OR CONFINING PRESSURE (PSF)	STRENGTH TEST DATA: SHEAR STRENGTH (PSF)	STRENGTH TEST DATA: DEVIATOR STRESS (PSF)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	BLOWS/FT.	SAMPLES
0											
10											
20											
30											
40											
50											
60											
70											
80											
90											
100											
110											
120											
130											
140											
150											
160											



SYMBOLS	DESCRIPTION
CL	REDDISH-BROWN SILTY CLAY, LOOSE
CL	REDDISH-BROWN CLAY, FIRM WATER LEVEL 8.7 FEET B.G. 10/18/81 GRADES SILTY AND SANDY (COARSE) 20-25 FEET
SH	VARIEGATED REDDISH-BROWN, GREEN AND LIGHT PURPLE SILTY SHALE GRADES REDDISH-BROWN TO RED-ORANGE, 65-70 FEET
SH/LS	VARIEGATED LIGHT GREEN TO DARK RED SHALE AND THIN LIMESTONE BED
SH	REDDISH-ORANGE, SLIGHTLY SANDY SHALE
SS	WHITE TO LIGHT GRAY, CLAYEY SANDSTONE
SH	PURPLE SANDY SHALE
SS	WHITE TO LIGHT GRAY SANDSTONE, HARD
SH	PURPLE SHALE WITH THIN LENSES OF CLAYEY SAND

BORING COMPLETED AT 120.0 FEET ON 10/16/81.

SCREENED INTERVAL

FIGURE 30.2-4

GCL

WELL LOGGING FO.

Page 1 of 3

Client Giant Well Number MW-5

1/4 1/4 1/4 1/4 S T R State New Mexico

County Contractor Stewart Bros.

Spud Date 7/23/86 Completion Date 7/28/86

Logs Run Lithology Logged By Selke

Elevation [illegible] Spud In (Fm.) Chinle Formation

Remarks Drilled w/failing F-10 rig - hollow stem auger to 65' and rotary core to 135'. Rig and all tools steam cleaned prior to drilling split spoon and cutting samples w/auger - core w/rotary

DEPTH	LITHO.	RECOV.	RUN	FROM	TO	SAMPLE DEPTH	REMARKS
0			1	0	3.5	0.0 3.5	0-30.0 Reddish-brown, silty clay w/minor sandy lenses.
5			2	3.5	8.5	8.5-10.0 38 blows	
10			3	8.5	13.5	13.5	
15			4	13.5	18.5	18.5-20 90 blows	
20			5	18.5	23.5	23.5	
25			6	23.5	28.5	28.5-30.0 26 blows	
30			7	28.5	30.0	30.0-31.5	
			8	30.0	31.5	31.5-33.0	30.0-35.0 fn-med grained grading to slightly clayey silt to fn sand w/minor clay lenses
			9	31.5	33.0	33.0-34.5	
35			10	33.0	34.5	34.5-36.0	
			11	34.5	36.0	36.0-37.5	35.0-50 Reddish-brown clay w/locally minor silt and silty clay
40			12	36.0	37.5	37.5-39.0	
			13	37.5	40.0	40.0-41.5	
			14	40.0	42.5	42.5-44.0	
45							

SCL

WELL LOGGING F. .M

Page 2 of 3

Client Giant Well Number MW-5

1/4 1/4 1/4 1/4 S T R State New Mexico

County Contractor Stewart Bros.

Spud Date 7/23/86 Completion Date 7/29/86

Logs Run Lithology Logged By Selke

Elevation Spud In (Fm.) Chinle Formation

Remarks

DEPTH	LITHO.	RECOV.	RUN	FROM	TO	SAMPLE DEPTH	REMARKS
45			15	42.5	45.0	45.0-46.5	
			16	45.0	47.5	47.5-49.8 57 blows	
50			17	47.5	50.0	50.0-51.5 43 blows	
			18	50.0	52.5	52.5-54.0 53 blows	50-53 Reddish-brown clay w/minor sand/gravel lenses
55			19	52.5	55.0	55.0-56.5 54 blows	
			20	55.0	57.5	57.5-59.0 100 blows	53-97 Reddish to purple shale and/or clay w/greenish colored blebs
60			21	57.5	60.0	60.0-61.5	
			22	60.0	68.5		
65							
			23	68.5	77	68.5-77	
70							
75							
80			24	77	87	77-87	
85							
90							

GCL

WELL LOGGING FORM

Page 3 of 3

Client: Giant Well Number: MW-5

1/4 1/4 1/4 1/4 S T R State: New Mexico

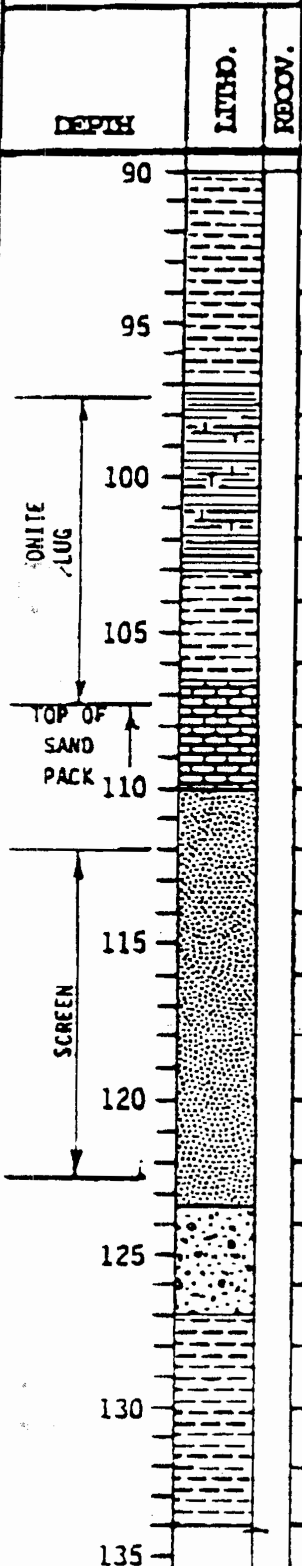
County: Contractor: Stewart Bros

Spud Date: 7/23/86 Completion Date: 7/29/86

Logs Run: Lithology Logged By: Selke

Elevation: 6981.4 Spud In (Fm.): Chinle Formation

Remarks: TOC

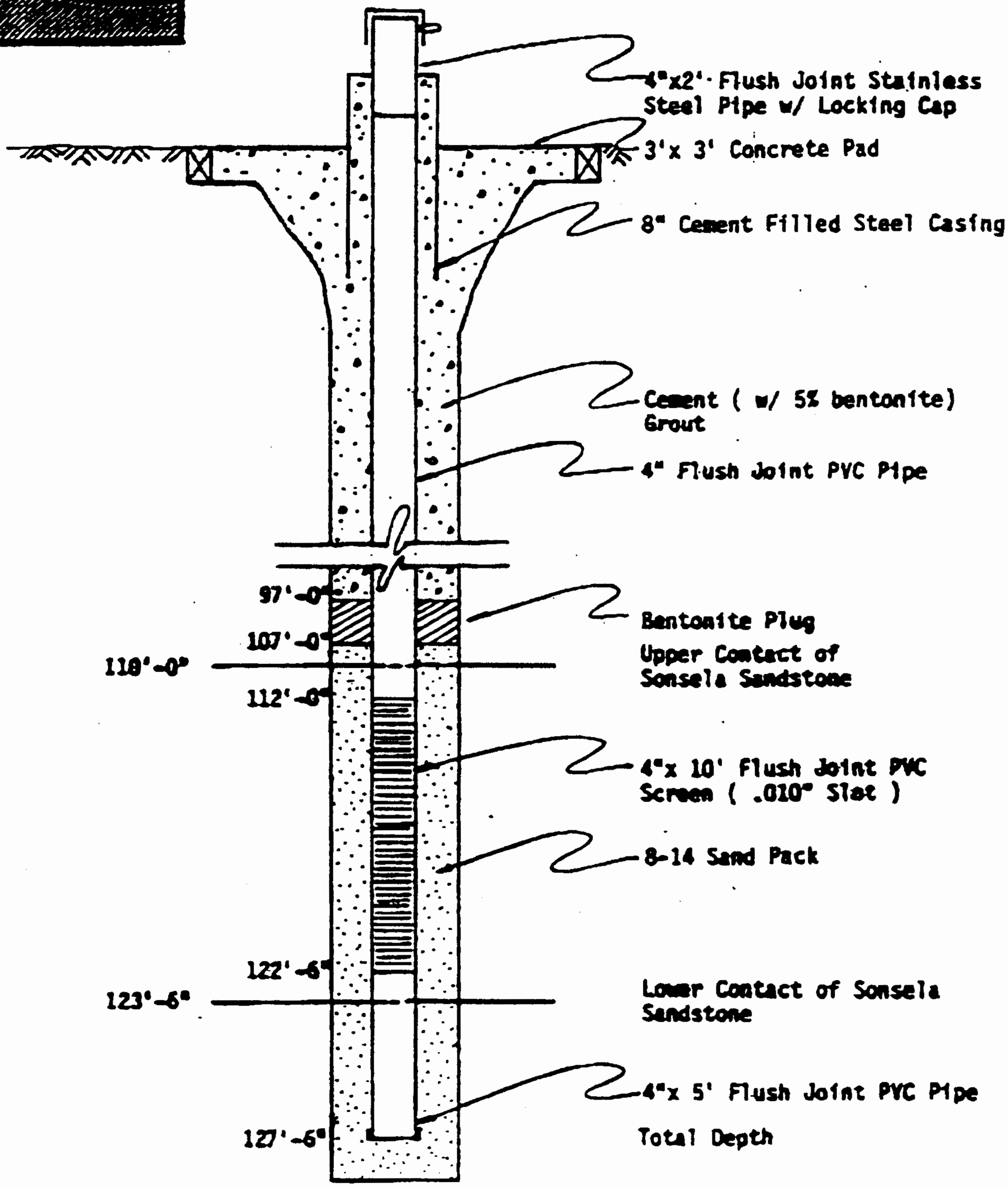


RUN	FROM	TO	SAMPLE DEPTH	REMARKS
25	97	107	97-107	97-103 Reddish shale w/limestone stringers
				103-106.5 red shale/clay
25	107	117	107-117	106.5-110 reddish colored limestone w/greenish white blebs
				110-123.5 grayish to reddish (?) colored, fine to medium grained, subrounded to rounded, moderately well sorted, moderately well indurated, quartz sandstone. Bedding planes dipping approx. 15°.
27	117	125	117.0-125.0	
				123.5-127 Basal conglomerate is similar colored to above sandstone but less consolidated than sandstone.
28	125	134	125.0-134	
				127-134 dk red clay/shale

GCL

COMPLETION DIAGRAM

MW-5



MAJOR DIVISIONS			GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT HUMUS SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

UNIFIED SOIL CLASSIFICATION SYSTEM

FIGURE 30.2-5

MONITORING WELL IDENTIFICATION REPORT

ENVIRONMENTAL IMPROVEMENT DIVISION
HAZARDOUS WASTE SECTION
1190 ST. FRANCIS DR./HAROLD RUNNELS BLDG.
SANTA FE, NEW MEXICO 87503

FACILITY NAME Giant Refining Company

EPA I.D. NUMBER NMD000333211-2

COUNTY McKinley

WELL NUMBER SMW-2

WELL LOCATION (LONGITUDE) ° ' ''

WELL LOCATION (LATITUDE) ° ' ''

AQUIFER NAME Ciniza Sand

AQUIFER CONFINED X UNCONFINED

WELL INSTALLATION DATE 9-26-85

DRILLING METHOD HLWAG

INNER CASING DIAMETER 2.0"

BOREHOLE DIAMETER 6.5"

CASING MATERIAL SS304

METHOD OF DEVELOPMENT COMPR

ELEV BOTTOM OF BOREHOLE 6826.73

ELEV BOTTOM OF WELL CASING 6827.13

ELEV BOTTOM OF SCREENED INT 6830.13

ELEVATION OF SCREENED INT 6850.13

SURVEYED ELEV OF CASING TOP 6881.73

DATE OF REPORT Jan. 28, 1991 SIGNATURE Claud C. Rosendale

NAME (TYPED) Claud C. Rosendale

b:wellid/bas

MONITORING WELL IDENTIFICATION REPORT

ENVIRONMENTAL IMPROVEMENT DIVISION
HAZARDOUS WASTE SECTION
1190 ST. FRANCIS DRIVE/HAROLD RUNNELS BLDG.
SANTA FE, NEW MEXICO 87503

FACILITY NAME GIANT REFINING COMPANY

EPA I.D. NUMBER NMD000333211-2

COUNTY McKinley

WELL NUMBER SMW-2

WELL LOCATION (LONGITUDE) ________

WELL LOCATION (LATITUDE) ________

NEW MEXICO STATE PLANE (X) 321,542.80

(Y) 1.635,592.65

AQUIFER NAME Ciniza Sand

AQUIFER CONFINED X UNCONFINED ________

WELL INSTALLATION DATE 9-26-85

DRILLING METHOD HLWAG

INNER CASING DIAMETER 2.0"

BOREHOLE DIAMETER 6.5"

CASING MATERIAL SS304

METHOD OF DEVELOPMENT COMPR

ELEV BOTTOM OF BOREHOLE 6826.73

ELEV BOTTOM OF WELL CASING 6827.13

ELEV BOTTOM OF SCREENED INT 6830.13

ELEVATION OF SCREENED INT 6850.13

SURVEYED ELEV OF CASING TOP 6884.44

DATE OF REPORT 11-1-91 SIGNATURE Chad Rosendale

NAME (TYPED) Chad Rosendale

Geoscience Consultants, Ltd.

WELL LOGGING FORM

Page ____ of ____

Client GIANT REFINING COMPANY Well Number SMK-2

____ ¼ ____ ¼ ____ ¼ ____ ¼ S ____ T 15 N R 15 W State New Mexico

County McKinley Contractor Fox

Spud Date 9-26-85 Completion Date ____

Logs Run Lith from Cores Logged By J.C. Hunter

Elevation 6883 Spud In (Fm.) Chinle

Remarks Drilled w/Hollow Stem Auger & Continuous Sampler. Collected samples @ 2.5 and 5.0' intervals for %H_2O. Comp. as SS monitor Well

Depth | Litho | Recov

Depth scale: 0, 5, 10, 15, 17, 20, 23, 25, 30

Sand ~17' [illegible] 23'

RUN	From	To	Sample#/Ft	Lith/Remarks
				~ 81' N62E FROM MW-4
			850926	
1	0	5	1015/2.5 1016/5.0	0-2.5' soil light - buff some
2	5	10	1018/7.5 1019/10.0	calcification [illegible] silty clay
3	10	15	1023/12.5 1024/15.0	2.5' - 9.0' clay red slightly moist very cohesive
4	15	20	1050/17.5 1051/20.0	9.0'-9.1 sand buff fine - med [illegible]
5	20	25	1059/22.5 1100/25.0	dry 9.1' - ~17.0' CLAY; Red; slightly moist, plastic
6	25	30	1112/27.5 1113/30.0	~17.0'-~23.0' SAND (WET) fn-med gr
				23' - 30' CLAY: red, slightly moist, plastic
				WATER LEVEL 15'-7" . 1150

Geoscience Consultants, Ltd.

WELL LOGGING FORM

Page ___ of ___

Client GIANT REFINING COMPANY Well Number SMW-2

___ ¼ ___ ¼ ___ ¼ ___ ¼ S ___ T 15 N R 15 W State New Mexico

County McKinley Contractor Fox

Spud Date 9/26/85 Completion Date ___

Logs Run Lith from Cores Logged By J.C. Hunter

Elevation 6882.83 Spud In (Fm.) Chinle

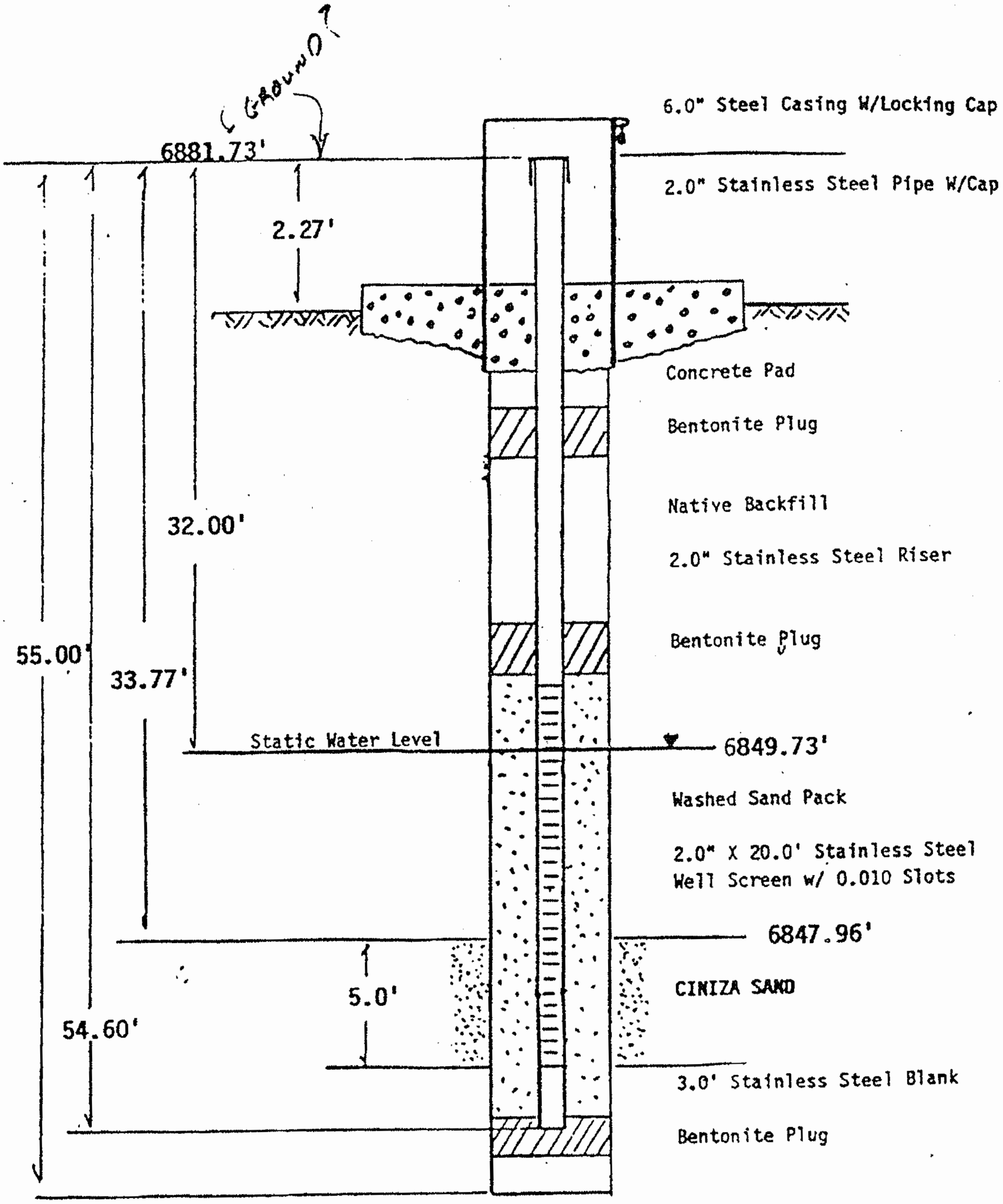
Remarks Drilled w/Hollow Stem Auger & Continuous Sampler. Collected samples @ 2.5 and 5.0' intervals for %H_2O. Comp. as SS monitor Well

Depth	RUN	From	To	Sample#/Ft	Lith/Remarks
					SE corner of LTA Times should be
				850925	15 XX, not 14 XX etc
0					
	∅	0	5	SDY CLY 1415/4.0	0-1.5 SOIL
5	2	5	10	CLY SD 1420/10.0	
10	3	10	15	CLY 1426/15'	1.5-4.0 CLAY
15	4	15	20	SD 1432/20'	
20	5	20	25	CLY 1438/25'	4.0-19.0 SANDY CLAY
25	6	25	30	1445/27.5 SD; CLY SD 1446/30.0	
30	7	30	35	CLY 1452/32.5; 1453 35.0 SD	19.0-24 SAND; gr rd (5R4/2); med gr,
35	8	35	40	1458/37.5; 1459/40.0	poor sort, qtz & lithic rx frags
40					24-25 CLAY
					25-28 SAND, as above
					28-33 CLAYEY SAND & CLAY
				5'	33-38 SAND (WET) mod rd brn (10R4/6) med grn, mod sort, qtz rnd
					38-40 CLAY

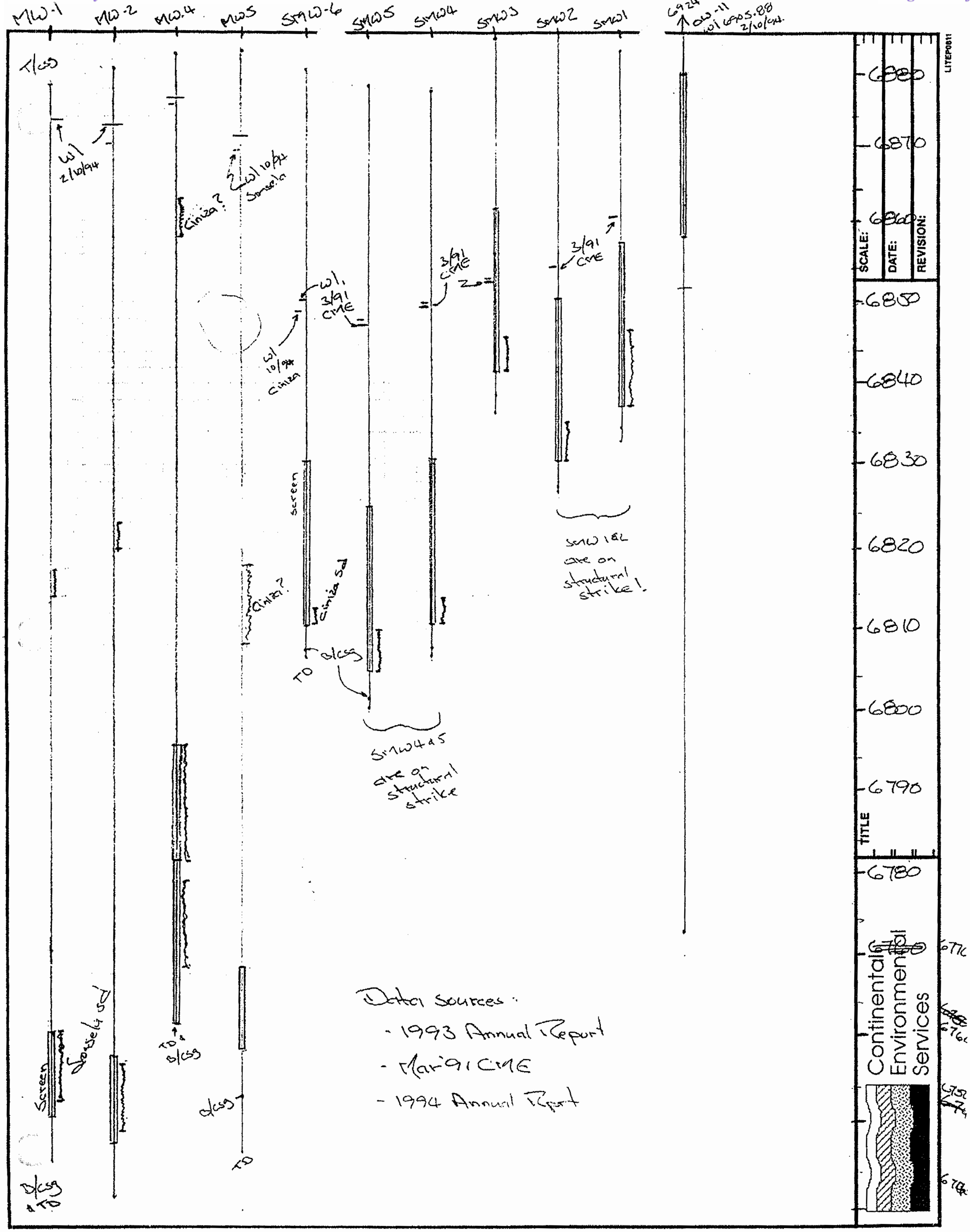
9/26/85 H_2O level 29'7" 9:40

N 120° to SMW2

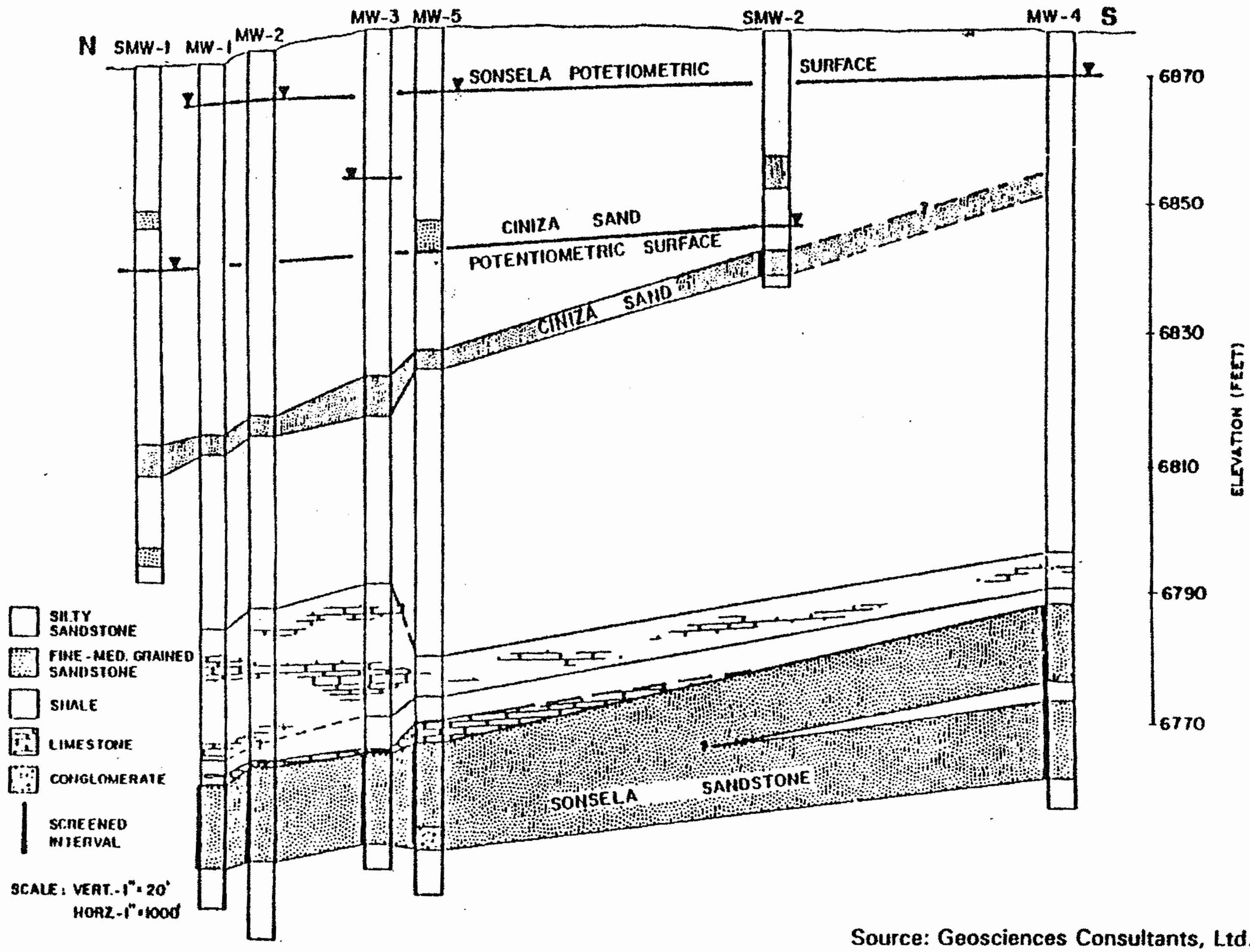
pH 7.1 #850926 1445



COMPLETION DIAGRAM FOR WELL SMW-2


MW-1
MW-2
MW-4
MW5
SMW-6
SMW5
SMW4
SMW3
SMW2
SMW1
6924
OW-11
T/csg
WL 2/10/94
WL 10/94 Soseda
Ciniza?
WL 3/91 CME
WL 10/94 Ciniza
3/91 CME
screen
Ciniza Sd
b/csg
TD
SMW 1&2 are on structural strike!
SMW 4 & 5 are on structural strike
TD & b/csg
b/csg
Screen
Soseda Sd
D/csg & TD
Data sources:
- 1993 Annual Report
- Mar '91 CME
- 1994 Annual Report
6880
6870
6860
6850
6840
6830
6820
6810
6800
6790
6780
SCALE:
DATE:
REVISION:
TITLE
Continental Environmental Services
LITEP0811

CHECKED BY | APPROVED BY | DRAWN BY



Source: Geosciences Consultants, Ltd. 1986

SEC DONOHUE
Environment & Infrastructure

FIGURE 3
GEOLOGIC CROSS SECTION

CINIZA REFINERY

GIANT REFINING COMPANY
GALLUP, NEW MEXICO

MONITORING WELL IDENTIFICATION REPORT

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS WASTE SECTION
P.O. BOX 26110
SANTA FE, NEW MEXICO 87502

FACILITY NAME		Giant Refining Co. - Ciniza
EPA I.D. NUMBER		NMD000333211-2
COUNTY		McKinley
WELL NUMBER		SMW-4
WELL LOCATION (LONGITUDE)		108 26' 01"
WELL LOCATION (LATITUDE)		35 29' 44"
NEW MEXICO STATE PLANE	(X)	321,397.90
	(Y)	1,635,948.75
AQUIFER NAME		Ciniza Sand
AQUIFER CONFINED? xx		UNCONFINED?
WELL INSTALLATION DATE		9-25-85
DRILLING METHOD		HLWAG
INNER CASING DIAMETER		2.0"
BOREHOLE DIAMETER		6.5"
CASING MATERIAL		SS304
METHOD OF DEVELOPMENT		Compr
ELEV. BOTTOM OF BOREHOLE		6806.74
ELEV. BOTTOM OF WELL CASING		6807.84
ELEV. BOTTOM OF SCREENED INT.		6810.84
ELEVATION OF SCREENED INTERVAL		6830.84
SURVEYED ELEVATION OF CASING TOP		6880.08

DATE OF REPORT 2-22-96

SIGNATURE Dorinda Mancini
NAME (TYPED) Dorinda Mancini

WELLID96.xls SMW-4 2/13/97

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Page SMW-4 of

Client GIANT REFINING COMPANY Well Number SMW-4

___ ¼ ___ ¼ ___ ¼ ___ ¼ S ___ T 15 N R 15 W State New Mexico

County McKinley Contractor Fox

Spud Date 9/25/85 Completion Date 9/25/85

Logs Run Lith from Cores Logged By J.C. Hunter

Elevation 6878.84 Spud In (Fm.) Chinle

Remarks Drilled w/Hollow Stem Auger & Continuous Sampler. Collected samples @ 2.5 and 5.0' intervals for $\%H_2O$. Comp. as SS monitor Well

Depth	RUN	From	To	Sample#/Ft
0	1	0	5	080925: cl 0840/4.0
5 (TTR 0830)	2	5	10	0847 cl /10.0
10	3	10	15	0852 cl /15'
15	4	15	20	0859 cl /20'
20	5	20	25	0906 SD /25'
25	6	25	30	0913/27.5 cl; 0914/30.0 slt
30	7	30	35	0917/32.5 cl; 0920/35.0 cl
35	8	35	40	0927/37.5 cl; 0928/40.0 cl
40	9	40	45	0936/42.5 cl; 0937/45.0 cl
45	10	45	50	0950/47.5 SD/cly; 0951/50.0 cly
50	11	50	55	0954/52.5 SD cly; 1000/55.0 cly
55 (TD 1000)	13	55	60	850 4 20 1213/57.5' cly; 1216/60.0
	14	60	65	1241/62.5; 1242/65.0
	15	65	69	1253/67.5; 1255/69.0

More 10 20

Restarted 9/30/85 @ 1100

Lith/Remarks

Between MW1- & MW-2 Depths from tip of auger, ~1.5' AGL (typical)

0-1.5' (1.5') SOIL; gry rd (10R 4/2); silty cly w/ minor sd; roots & org matter

1.5-9.0 (7.5') CLAY; gry rd (5R4/2) - dk rd brn (10R 3/4); dense, plastic, 1-5% silt

9.0-16.0 (6.0') SANDY CLAY; gry rd (10R 4/2) - dsky rd (5R 3/4); cly w/ 15-20% med (cly Bells @ 36') gr - cr gr sd, local f grvl, poor sort

(auto cuttings @ 45')

15.0-23.0 (7.0) CLAY; gry rd (5R 4/2), loc. sandy, 5-10% sd

23.0-24.0 (1.0) SAND; pale rd brn (10R 5/4) - med rd brn (10R 4/6); f g, mod srt, loose, qtz ± K-spar

24.0-33.0 (9.0) SILTY CLAY; mod rd (5R 5/4) cly w/ 10-20% slt, loc f g sand

33.0-~~55.0~~ 59 (~~22~~ 26) CLAY; mod rd brn (10R 4/6) loc slty - sandy

57.5 - 59.5

59 - 61 (2') Sand (wet) mod rd brn ~~cl~~ (10R 4/6); f g, mod sort

61 - 69 Silty Sandstone (dry) pale red (10R 6/2) loc (indurated)

... f ... ll ... (...)

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WELL LOGGING FORM

Page____ of ____

Client GIANT REFINING COMPANY Well Number SMX-4

___ ¼ ___ ¼ ___ ¼ ___ ¼ S ___ T 15 N R 15 W State New Mexico

County McKinley Contractor Fox

Spud Date 9-26-85 Completion Date ____

Logs Run Lith from Cores Logged By J.C. Hunter

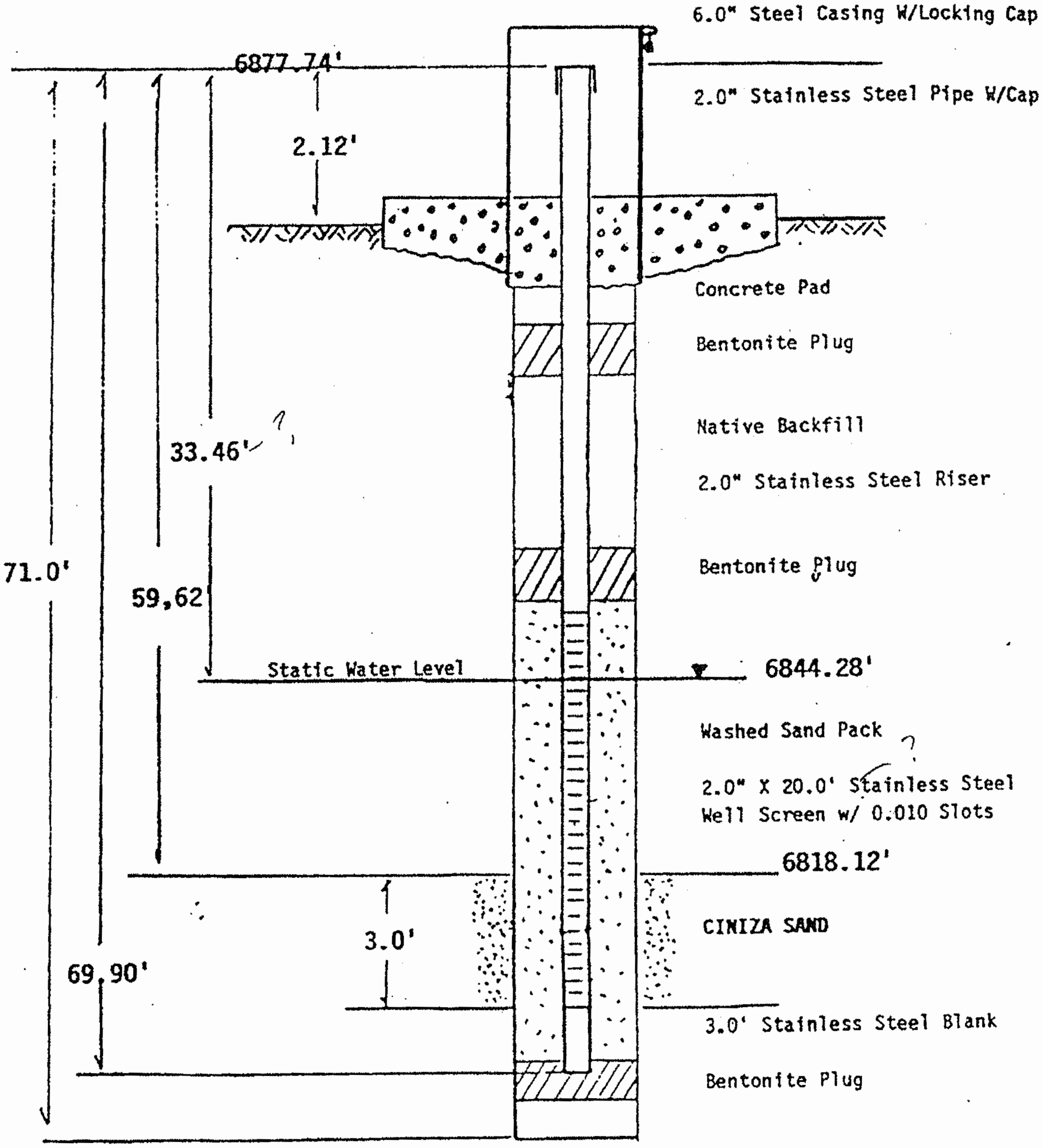
Elevation ____ Spud In (Fm.) Chinle

Remarks Drilled w/Hollow Stem Auger & Continuous Sampler. Collected samples @ 2.5 and 5.0' intervals for %H_2O. Comp. as SS monitor Well

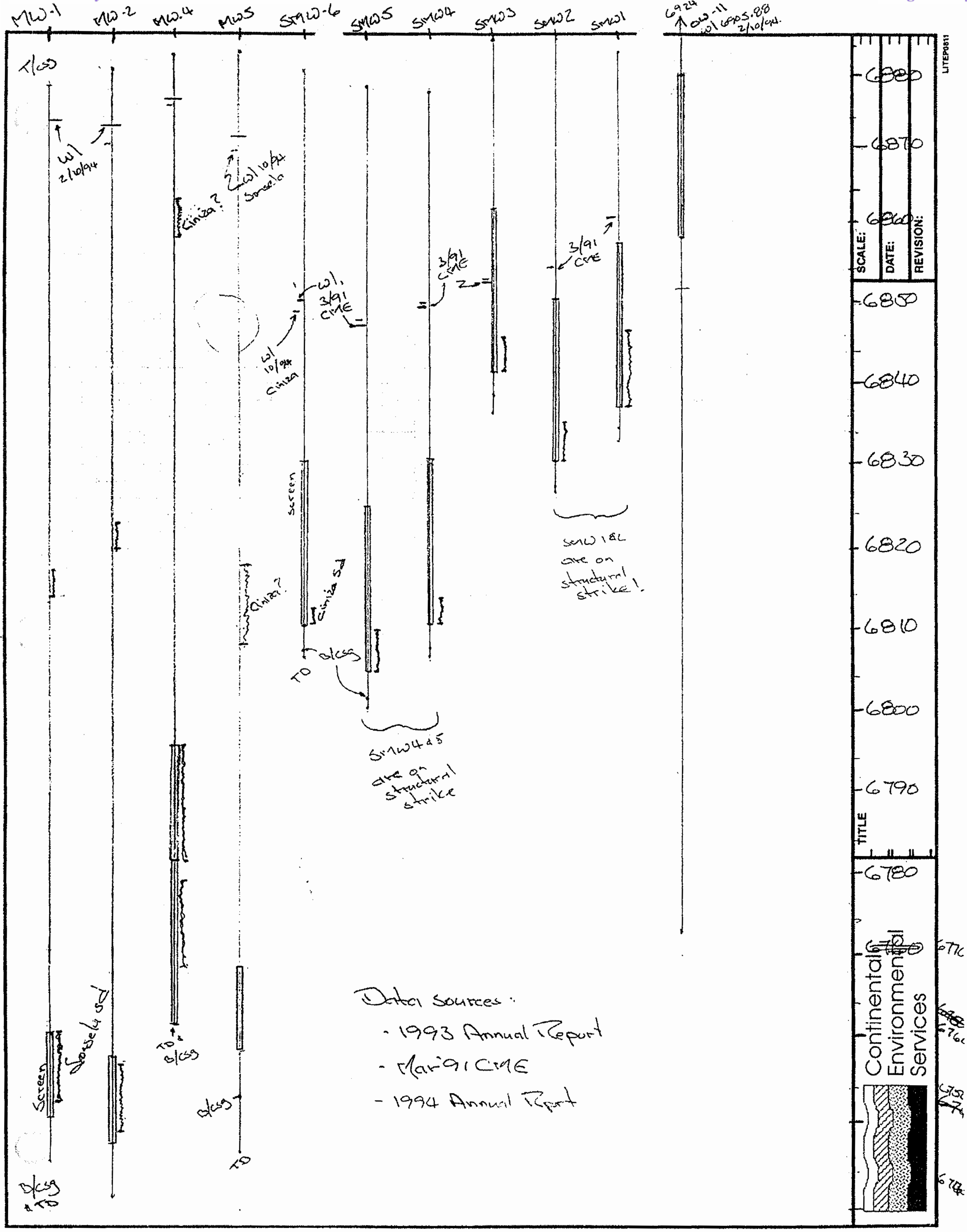
Depth	Litho	Recov	RUN	From	To	Sample#/Ft	Lith/Remarks
						850926	
0			1	0	5	1325/0.0 1326/2.5 1327/5.0	0-10 shale/clay red slightly moist cohesive
5			2	5	10	1330/7.5 1331/10.0	
10			3	10	15	1335/12.5 1336/15.0	10-15 sand encountered at 10' dry coarse-fine gr low recovery
15			4	15	20	1345/17.5 1346/20.0	water level 15'5"
20			5	20	25	1354/22.5 1355/25.0	18-20 clayey sand (saturated) brn, fn-med gr w/ abundant clay
25			6	25	30	1402/27.5 1403/30.0	W.L. 26'-10 #850926 1410
30							22-24 sand; brn, fngr (saturated) w/v. minor clay
							24-25 sandy clay; brn (saturated) w/ silt + fn sand
							25-27.5 sand; fn-med gr (saturated) v. minor clay
							27.5-29 sandy clay (moist) silt + fn sand
							29-30+ silty clay; (dry) reddish brn w/ ~~sx~~ greenish reduction nodules

pH 7.4

Conductance 4850



COMPLETION DIAGRAM FOR WELL SMW-4


MW-1
MW-2
MW-4
MW-5
SMW-6
SMW5
SMW4
SMW3
SMW2
SMW1
6924
OW-11
wl 6905.88 2/10/94.
T/csg
wl 2/10/94
2 wl 10/94 Soscela
Ciniza?
wl 10/94 Ciniza
wl 3/91 CME
3/91 CME
3/91 CME
screen
Ciniza?
Ciniza sd
b/csg
TD
SMW 1&2 are on structural strike!
SMW 4&5 are on structural strike
TD & b/csg
Screen
Soscela sd
b/csg
TD
b/csg & TD
Data sources:
- 1993 Annual Report
- Mar'91 CME
- 1994 Annual Report
6880
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6770
6760
SCALE:
DATE:
REVISION:
TITLE
LITEP0511
Continental Environmental Services

Appendix C – Financial Assurance

MARATHON

Western Refining Southwest LLC
A subsidiary of Marathon Petroleum Corporation

I-40 Exit 39
Jamestown, NM 87347

March 15, 2023

Mr. Dave Cobrain, Chief
New Mexico Environmental Department
2905 Rodeo Park Drive East, Bldg. 1
Santa Fe, NM 87SOS-6303

RE: 2023 RCRA Financial Assurance Cost Estimate
Western Refining Southwest LLC
(D/B/A Marathon Gallup Refinery)
EPA ID# NMD000333211

Dear Mr. Cobrain:

Western Refining Southwest LLC (D/B/A Marathon Gallup Refinery) (Western) is submitting the 2023 Financial Assurance (FA) Cost Estimate.

This FA estimate includes costs to address those activities specified in the Complaint and Consent Agreement and Final Order (CAFO) (dated August 26, 2009) for implementation of a remedy for Aeration Lagoons (ALs) AL-1 and AL-2 and the requirements of the Resource Conservation and Recovery Act (RCRA) modified permit effective September 2017. The FA estimates were prepared in accordance with the Code of Federal Regulations Chapter 264 Part 101 and substantially in compliance with the requirements of 40 CFR 264.142 and 264.144.

In addressing the requirements of the CAFO, the original 2009 cost estimate for the ALs ($1,257,000) has been adjusted annually for inflation each year. The most recent update was conducted in January 2022 (revised February 2023) with an inflation adjusted estimate of $1,548,900. To prepare the 2023 estimate, the 2022 estimate of $1,548,900 was multiplied by an annual inflation factor (AIF) of 1.070. The AIF is calculated by taking the most recent fiscal year Gross Domestic Product (GDP) (averaged over the four quarters of 127.1828) and dividing by the previous year's GDP (averaged over the four quarters of 118.866). The GDP is calculated by taking the average of each quarter. The GDP is taken from "Table 1.1.9 – Implicit Price Deflators for Gross Domestic Product" (Bureau of Economic Analysis 2023). The 2023 estimate for the ALs is $1,657,323 (Table 1).

MARATHON

Western Refining Southwest LLC
A subsidiary of Marathon Petroleum Corporation

I-40 Exit 39
Jamestown, NM 87347

In addition, the 2017 Modified RCRA permit was updated in February 2022. This update included restoring eleven Areas of Concern (AOC) to Attachment G, Table G-1 of the Modified RCRA permit as directed by the New Mexico Environment Department. The eleven AOCs have been added to Table 1, but no costs have been added to the AOCs at this time as no remedy activities have been finalized. There are two separate provisions in the 2017 Modified RCRA permit, which require FA estimates. These two provisions can be found in Sections II.D.1 and II.D.2 of the 2017 Modified RCRA permit, and address the post-closure care of the Land Treatment Unit (LTU) and the facility-wide groundwater monitoring, respectively. The FA estimate also includes the Solid Waste Management Units and AOCs (Table 1).

A revised FA estimate for post-closure care of the LTU was prepared in 2010, reflecting the work that had been completed since the first RCRA permit issued in 2000. The 2023 FA estimate includes revisions for updated labor costs and years remaining (Table 2). The FA estimate for 2023 is $159,357.

Section II.D.2 requires a FA estimate for 20 years of facility-wide groundwater monitoring starting in February of 2014. The initial estimated cost was $1,762,340 in 2014. The FA estimate reflects the “2022 Facility-Wide Groundwater Monitoring Work Plan” (submitted February 4, 2022). The Facility-Wide Ground Water Monitoring was estimated for 2023 and the years following 2023 (Table 3). The cost estimate for 2023 and subsequent sampling years is $5,135,322 (Table 1).

The current total FA estimated cost is $6,952,002 for addressing the Aeration Lagoons pursuant to the CAFO and implementation of the 2017 Modified RCRA Post-Closure Permit LTU and groundwater monitoring.

If you have any questions or comments regarding the information contained herein, please do not hesitate to contact Mr. John Moore at 505-879-7643.

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Certification

I certify under penalty of law that this document and all attachments were prepared under my direction of supervision according to 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.

Sincerely,
Western Refining Southwest LLC, Marathon Gallup Refinery

Timothy J. Peterkoski
Director of Environment and Climate Strategy

Enclosure

cc: L. Tsinnajinnie, NMED HWB
L. Andress, NMED HWB
C. Eads, NMED HWB
L. King, EPA
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J. Moore, Marathon Gallup Refinery
H. Jones, Trihydro Corporation

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References

Bureau of Economic Analysis. 2023. Table 1.1.9. Implicit Price Deflators for Gross Domestic Product. January 3.

New Mexico Environment Department (NMED). 2022. Resource Conservation and Recovery Act Modified Permit, Effective September 2017. February.

United States Environmental Protection Agency (USEPA). 2009. Complaint and Consent Agreement and Final Order. August 26.

Western Refining Southwest LLC. 2023. 2023 Facility-Wide Groundwater Monitoring Work Plan, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery. , EPA ID #NMD000333211. January 31.

ATTACHMENT A

ATTACHMENT A-1. JANUARY 2023 COST ESTIMATE FOR RCRA POST-CLOSURE PERMIT
WESTERN REFINING SOUTHWEST LLC, D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Waste Management Area	Corrective Action/Project	Investigation Costs	Remediation Costs	O&M Costs	Total Costs	Notes
RCRA Regulated Units						
LTU	Groundwater & Soil Monitoring	$0	$0	$159,357	$159,357	Post-closure care for LTU, Table 1A updated to reflect work completed through end of 2022
SWMUs and AOCs						
SWMU 1 – Aeration Basin	Soil investigation & potential remediation	$0	$0	$0	$0	remediation cost estimate developed Nov. 2009 pursuant to EPA CAFO; remedy not selected by NMED under the Permit
SWMU 2 - Evaporation Ponds	IWP deferred	$0	$0	$0	$0	
SWMU 3 – Empty Container Storage Area/Bundle Cleaning Pad	IWP deferred	$0	$0	$0	$0	Investigation Report submitted November 28, 2022
SWMU 4 – Old Burn Pit	IWP due 6/30/2014	$0	$0	$0	$0	IWP submitted April 22, 2022
SWMU 5 – Landfill Areas	IWP due 9/30/2014	$0	$0	$0	$0	
SWMU 6 – Tank Farm	IWP deferred	$0	$0	$0	$0	No final remedy selected; voluntary SPH recovery is conducted once a quarter at three wells & a small passive bioventing system is present, but the operations costs are minimal and no timeframe for operation is specified. No additional O&M costs are included as these actions would be conducted during other routine monitoring events.
SWMU 7 – Fire Training Area	IWP deferred	$0	$0	$0	$0	already capped; IWP submittal deferred
SWMU 8 – Railroad Rack Lagoon, ditch & fan area	CAC without Controls Approved	$0	$0	$0	$0	Remediation completed and reports approved by NMED
SWMU 9 – Drainage Ditch Near Inactive Landfarm	IWP due 12/30/2018	$0	$0	$0	$0	Investigation Report submitted December 31, 2022
SWMU 10 – Sludge Pits	IWP due 9/20/2014	$0	$0	$0	$0	IWP submitted September 14, 2014 with investigation conducted in 2015 and 2016
SWMU 11 – Secondary Oil Skimmer	IWP due 11/1/2018	$0	$0	$0	$0	IWP completed in October 2018
SWMU 12 – Contact Wastewater Collection System	IWP deferred	$0	$0	$0	$0	
SWMU 13 – Drainage Ditch between API Evaporation Ponds and Neutralization Tank Evaporation Ponds	IWP due 6/30/2019	$0	$0	$0	$0	IWP submitted in May 2019
SWMU 14 – Old API Separator	Soil investigation & potential remediation	$0	$0	$0	$0	IWP submitted December 1, 2022
AOC 15 – NAPIS	IWP deferred	$0	$0	$0	$0	IWP Response to Disapproval due March 31, 2023
AOC 16 – NAPIS Overflow Tanks	RA due 9/30/2018	$0	$0	$0	$0	
AOC 17 – Railroad Loading/Unloading Facility	RA due 12/31/2018	$0	$0	$0	$0	IWP to be submitted 1st Quarter 2023
AOC 18 – Asphalt Tank Farm	RA due 3/31/2019	$0	$0	$0	$0	IWP, combined with AOC 24, submitted June 15, 2022
AOC 19 – East Fuel Oil Loading Rack	CAC without Controls Approved	$0	$0	$0	$0	
AOC 24 – Crude Oil Tank Farm	RA due 12/31/2019	$0	$0	$0	$0	IWP, combined with AOC 18, submitted June 15, 2022
AOC 25 – Tank 573	CAC without Controls Approved	$0	$0	$0	$0	
AOC 26 – Process Units	RA due 9/30/2020	$0	$0	$0	$0	IWP Response to Disapproval submitted June 10, 2022
AOC 27 – Boiler & Cooling Unit Area	RA due 3/31/2020	$0	$0	$0	$0	
AOC 28 – Warehouse & Maintenance Shop Area	RA due 6/30/2020	$0	$0	$0	$0	IWP submitted September 16, 2022
AOC 29 – Equipment Yard & Drum Storage Area	RA due 12/31/2020	$0	$0	$0	$0	
AOC 30 – Laboratory	RA due 6/30/2020	$0	$0	$0	$0	
AOC 31 – Tank 27 & 28	IWP due 3/31/2021	$0	$0	$0	$0	Assessment Report submitted March 25, 2021
AOC 34 – Scrap Yard	RA due 6/30/2021	$0	$0	$0	$0	IWP submitted April 22, 2022 with SWMU 4 and 5
AOC 35 – Main Loading Racks, Crude Slop & Ethanol Unloading /Loading rack, Additive Tank Farm, Retail Tank Farm	IWP due 8/31/2018	$0	$0	$0	$0	IWP approved December 12, 2022

ATTACHMENT A-1. JANUARY 2023 COST ESTIMATE FOR RCRA POST-CLOSURE PERMIT
WESTERN REFINING SOUTHWEST LLC, D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Waste Management Area	Corrective Action/Project	Investigation Costs	Remediation Costs	O&M Costs	Total Costs	Notes
Groundwater						
Site-wide	Facility-Wide Groundwater Monitoring	$0	$0	$0	$5,135,322	2023 at $395,892 (including PW-2 triennial event) + 6 years at $460,244 (even years included Total Metals) + 5 years at $395,144 (odd years), and 3 events of PW-2 sampling ; see Table 3
Other Costs						
Aeration Lagoons	CAFO	$1,657,323	$0	$0	$1,657,323	2022 at $1,548,900 adjusted by the annual inflation factor of 1.070 to adjust to 2023.
	Total Estimated Costs	$1,657,323	$0	$159,357	$6,952,002	

AOC - Area of Concern
API - American Petroleum Institute
CAC - Corrective Action Complete
CAFO - Consent Agreement and Final Order
EPA - Environmental Protection Agency
IWP - Investigation Work Plan
LTU - Land Treatment Unit
NAPIS - New American Petroleum Institute Separator
NMED - New Mexico Environment Department
O&M - Operations and Maintenance
RA - Release Assessment
RCRA - Resource Conservation and Recovery Act
SPH - Separate phase hydrocarbon
SWMU - Solid Waste Management Unit

Note: New estimates for the LTU and Groundwater costs were prepared by revising quantity of sample analyses and laboratory costs. Because they are new estimates, an inflation adjustment was not necessary.

ATTACHMENT A-2. LAND TREATMENT UNIT DETAILED COST ESTIMATE (2023)
WESTERN REFINING SOUTHWEST LLC, D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

	Cost Estimate in 2000 Part B Permit Application			Updated 2023 Cost Estimate		
Activity	**Material**	**Cost Frequency (over 30 years)**	**Estimated Cost**	**Material**	**Cost Frequency (remaining 8 years)**	**2023 Estimated Costs**
MONITORING						
Sample by Zone						
ZOI	4 samples at $1,450	3	$17,400	4 samples at $500 [1]	1	$2,000
Treatment Zone	4 samples at $1,450	3	$17,400	4 samples at $500 [1]	1	$2,000
Chinle Slope Wash	1 sample at $1,650	8	$13,200	1 sample at $710 [2]	1	$710
Sonsela	4 samples at $1,650	8	$52,800	4 samples at $710 [2]	1	$2,840
Sample QC	25% of $100,800		$25,200	25% of $7,550		$1,888
Mobilization/labor						
ZOI & Treatment Zone	3 events at $1,000/event	3	$3,000	1 event at $16,000/event	1	$16,000
Chinle Slope Wash & Sonsela	8 events at $2,000/event	8	$16,000	1 event at $8,000/event	1	$8,000
COVER ESTABLISHMENT						
Field Technician	$10,000	1	$10,000	completed		$0
Microtox	$300 per test	9	$2,700	completed		$0
Soil Amendments	352,000 sqft at 0.02/sqft		$7,040	completed		$0
Establish Vegetative Cover						
Top Soil	7.8 acres at $2,000/acre		$15,600	completed		$0
Level LTU	7.8 acres at $950/acre		$7,410	completed		$0
Plant Seed	7.8 acres at $750/acre		$5,850	completed		$0
Water	1140 Mgal. At $1/Mgal		$1,140	completed		$0
ROUTINE INSPECTION, MAINTENANCE, & REPAIR						
Site Inspection	Weekly inspection ($200 annually)	30	$6,000	$100 per weekly inspection	416	$41,600
Security Device	$100 annually	30	$3,000	$220 annually	8	$1,760
Run-on/Run-off	$1,000 annually to maintain perimeter berm	30	$30,000	$2,500 annually to maintain perimeter berm	8	$20,000
PREPARE CERTIFICATION						
Certify LTU Closure	120 hours at $125/hour	120	$15,000	120 hours at $144/hour	120	$17,280
Notice in Deed	6 hours at $150/hour	6	$900	6 hours at $120/hour	6	$720
Certify Final Closure	120 hours at $125/hour	120	$15,000	120 hours at $144/hour	120	$17,280
Notice in Deed	6 hours at $150/hour	6	$900	6 hours at $120/hour	6	$720
Task Total			$265,540			$132,798
Gallup Overhead (10%)			$26,554			$13,280
Contingency (10%)			$26,554			$13,280
TOTAL			$318,648			$159,357

LTU - Land Treatment Unit
Mgal. - Million gallons
QC - Quality control
sqft - Square feet
ZOI - Zone of Incorporation

[1] Analytical cost breakdown: Method 8260 at $45/sample; Method 8270 at $180/sample; Method 8015 at $75/sample, Method 200.7/200.8 at $200/sample

[2] Analytical cost breakdown: Method 8260 at $45/sample; Method 8270 at $180/sample; Method 8015 at $75/sample; Method 200.7/200.8 at $200/sample; SM4500 at $115/sample; Method 300.0 at $95/sample

ATTACHMENT A-3. FACILITY-WIDE GROUNDWATER MONITORING ANNUAL COST ESTIMATE (2023)
WESTERN REFINING SOUTHWEST LLC, D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Analysis	Frequency	# of Sample Locations[1]	# of QAQC Samples[2]	# of Samples	Cost/Sample	Cost per Year
Quarterly Sampling Events						
8260B - VOCs	Quarterly	96	45	564	$45	$25,380
8270C - SVOCs	Quarterly	96	45	564	$90	$50,760
8270SIM - SVOCs	Quarterly	96	45	564	$90	$50,760
200.7/200.8/245.1 - Metals - Total[3]	Quarterly	96	45	564	$100	$56,400
200.7/200.8/245.1 - Metals - Dissolved[3]	Quarterly, Even Years	96	45	564	$100	$56,400
8015B - GRO, DRO	Quarterly	96	45	564	$75	$42,300
537.1 - PFAS[4]	Quarterly	1	1	8	$250	$2,000
8011 - EDB	Quarterly	96	45	564	$30	$16,920
335.4 - Cyanide	Quarterly	96	45	564	$25	$14,100
Gen Chem - BOD, COD, E. Coli	Quarterly	1	0	4	$80	$320
					analyses subtotal (odd years)	$258,940
					analyses subtotal (even years)	$315,340
Level III Data Package					5% of analysis	
					analyses and lab package subtotal (odd years)	$271,887
					analyses and lab package subtotal (even years)	$331,107
Sampling Supplies[5]	Quarterly	NA	NA	4	$525	$2,100
Filters	Quarterly	96	45	564	$15	$8,460
					Quarterly Events subtotal (Even Years)[3]	$341,667
					Quarterly Events subtotal (Odd Years)[3]	$282,447
Semi-Annual Sampling Events[6]						
8260B - VOCs	Semi-Annual	12	NA	24	$45	$1,080
8270C - SVOCs	Semi-Annual	12	NA	24	$90	$2,160
8270SIM	Semi-Annual	12	NA	24	$90	$2,160
Method 200.7/200.8/245.1 - Metals - Total[3]	Semi-Annual	12	NA	24	$100	$2,400
Method 200.7/200.8/245.1 - Metals - Dissolved[3]	Semi-Annual, Even Years	12	NA	24	$100	$2,400
8015B - GRO, DRO	Semi-Annual	12	NA	24	$75	$1,800
Gen Chem - BOD, COD, E. Coli	Semi-Annual	11	NA	22	$80	$1,760
8081 - Pesticides[7]	Semi-Annual	1	NA	2	$70	$140
8011 - EDB	Semi-Annual	12	NA	24	$30	$720
335.4 - Cyanide	Semi-Annual	12	NA	24	$25	$600
					analyses subtotal (odd years)	$12,820
					analyses subtotal (even years)	$15,220
Level III Data Package					5% of analysis	
					analyses and lab package subtotal (odd years)	$13,461
					analyses and lab package subtotal (even years)	$15,981
Filters	Semi-Annual	12	NA	24	$15	$360
					Semiannual Events subtotal (Even Years)[3]	$16,341
					Semiannual Events subtotal (Odd Years)[3]	$13,821
Annual Sampling Event[1]						
8260B - VOCs	Annual	23	9	32	$45	$1,440
8270C - SVOCs	Annual	23	9	32	$90	$2,880
8270SIM - SVOCs	Annual	23	9	32	$90	$2,880
Method 200.7/200.8/245.1 - Metals - Total[3]	Annual	23	9	32	$100	$3,200
Method 200.7/200.8/245.1 - Metals - Dissolved[3]	Annual, Even Years	23	9	32	$100	$3,200
8015B - GRO, DRO	Annual	23	9	32	$75	$2,400
8011 - EDB	Annual	23	9	32	$30	$960
335.4 - Cyanide	Annual	23	9	32	$25	$800
					analyses subtotal (odd years)	$14,560
					analyses subtotal (even years)	$17,760
Level III Data Package					5% of analysis	
					analyses and lab package subtotal (odd years)	$15,288
					analyses and lab package subtotal (even years)	$18,648
Filters	Annual	23	9	32	$15	$480
					Annual Events subtotal (Even Years)[3]	$19,128
					Annual Events subtotal (Odd Years)[3]	$15,768

ATTACHMENT A-3. FACILITY-WIDE GROUNDWATER MONITORING ANNUAL COST ESTIMATE (2023)
WESTERN REFINING SOUTHWEST LLC, D/B/A MARATHON GALLUP REFINERY, GALLUP, NEW MEXICO

Analysis	Frequency	# of Sample Locations[1]	# of QAQC Samples[2]	# of Samples	Cost/Sample	Cost per Year
MNA Annual Sampling Event[8]						
8260B - TBA	Annual	13	6	19	$45	$855
300.0 - Anions	Annual	13	6	19	$35	$665
Method 200.7/200.8 - Metals - Total Fe and Mn	Annual	13	6	19	$25	$475
Method 200.7/200.8 - Metals - Dissolved Fe	Annual	13	6	19	$15	$285
Methane	Annual	3	1	4	$55	$220
4500 - Sulfide	Annual	13	6	19	$35	$665
					analyses subtotal	$3,165
Level III Data Package					5% of analysis	
					analyses and lab package subtotal	$3,323
Filters	Annual	13	6	19	$15	$285
					MNA Annual Event subtotal	$3,608
Three-Year Sampling Events (next event 2023)[9]						
8260B - VOCs	Every third year	1	NA	1	$45	$45
8270C - SVOCs	Every third year	1	NA	1	$90	$90
8270SIM - SVOCs	Every third year	1	NA	1	$90	$90
Method 200.7/200.8/245.1 - Metals - Total[3]	Every third year	1	NA	1	$100	$100
Method 200.7/200.8/245.1 - Metals - Dissolved[3]	Every third year	1	NA	1	$100	$100
8015B - GRO, DRO	Every third year	1	NA	1	$75	$75
8011 - EDB	Every third year	1	NA	1	$30	$30
335.4 - Cyanide	Every third year	1	NA	1	$25	$25
					analyses subtotal	$555
Level III Data Package					5% of analysis	
					analyses and lab package subtotal	$583
Filters	Every third year	1	NA	1	$15	$15
					Sampling Event subtotal	$598
Sampling Labor[10]	Four Quarterly Events		12 Days, 10 hour days		$83/hour $67/hour	$72,000
	Two Semiannual Events		1 Day, 10 hour day		$83/hour $67/hour	$3,000
	Annual Event		3 Days, 10 hour days		$83/hour $67/hour	$4,500
	PW-2 event (every 3 years)		1 hour		$83/hour $67/hour	$150
					Labor subtotal	$79,650
					Annual Total (without PW-2 event) - Even Years[3]	**$460,244**
					Annual Total (without PW-2 event) - Odd Years[3]	**$395,144**
					PW-2 Event Total - Every 3 Years	**$748**

Notes:
Annual Total (without PW-2 event) - Even Years: This line item is used for all even years of monitoring.
Annual Total (without PW-2 event) - Odd Years: This line item is used for all odd years of monitoring.
PW-2 Event Total: Used every 3 years including 2023, 2026, 2029, 2032

- Number
BOD - Biological Oxygen Demand
COD - Chemical Oxygen Demand
DRO - Diesel Range Organics
EDB - 1,2 Dibromoethane
EPA - Environmental Protection Agency
Fe - Iron
Gen Chem - General Chemistry
GRO - Gasoline Range Organics
Mn - Manganese
MNA - Monitored Natural Attenuation
NA - Not applicable
NMED - New Mexico Environment Department
PFAS - Per- and polyfluoroalkyl substances
QA/QC - Quality assurance/quality control
SIM - Selected Ion Monitoring
SVOCs - Semi-volatile organic compounds
TBA - tert-Butyl alcohol
VOCs - Volatile organic compounds

[1] New monitoring wells were installed in 2021 and added to the 2022 and subsequent sampling events: OW-12A, OW-66, OW-67, OW-68, OW-70, RW-2R, MKTF-01R, MKTF-02R, MKTF-04R, MKTF-17R, and MKTF-18R.

[2] QAQC samples are accounted for in quarterly and annual events. Samples include field duplicates, field blanks, equipment blanks, and trip blanks. QAQC samples are collected at minimum of 1 per day.

[3] Total metals are sampled every year. Dissolved metals are only samples in even years. Metals analyses include EPA Methods 200.7, 200.8, and 245.1.
[4] PFAS analysis completed for monitoring well OW-63 per NMED Comment. NMED. 2020. Disapproval, Annual Groundwater Monitoring Report Gallup Refinery -2019, Western Refining Southwest Inc., Gallup Refinery, EPA ID #NMD000333211, HWB-WRG-20-013. November 23. Comments 25 (Pesticides) and 30 (PFAS).
[5] Sampling supplies include, bailers, deionized water, and miscellaneous items for sampling.
[6] QAQC samples included with quarterly sampling event
[7] Pesticide sample completed for evaporation pond EP-2 semiannually per NMED comment. NMED. 2020. Disapproval, Annual Groundwater Monitoring Report Gallup Refinery -2019, Western Refining Southwest Inc., Gallup Refinery, EPA ID #NMD000333211, HWB-WRG-20-013. November 23. Comments 25 (Pesticides) and 30 (PFAS) and NMED. 2021. Second Disapproval, [Revised] Facility Wide Groundwater Monitoring Work

[8] MNA sampling includes the following monitoring wells: MKTF-02R, MKTF-04R, MKTF-09, MKTF-10, MKTF-13, MKTF-16, MKTF-17R, MKTF-19, MKTF-20, MKTF-21, MKTF-22, MKTF-24, MKTF-25.

[9] Production well PW-2 sampled once every 3 years, will be sampled in 2023..
[10] Sampling labor is calculated using two field staff members ($83/hour and $67/hour).
[11] The sampling requirements addressed in the table are per the Facility-Wide Ground Water Monitoring Work Plan - Updates for 2022 (dated February 2022 - pending approval).

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State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 232683

CONDITIONS

Operator:	OGRID:
Western Refining Southwest LLC 539 South Main Street Findlay, OH 45840	267595
	Action Number: 232683
	Action Type: [UF-DP] Discharge Permit (DISCHARGE PERMIT)

CONDITIONS

Created By	Condition	Condition Date
joel.stone	Approved for OCD record retention purposes.	2/14/2025