Robert Singletary
Executive Director

OKLAHOMA Environmental Quality

Kevin Stitt
Governor

March 5, 2025

David Sweeten
Director of Operations
Glenn Springs Holdings, Inc., affiliate of Anadarko E&P Onshore LLC
5 Greenway Plaza, Suite 110
Houston, TX, 77046

RE: RCRA Post-Closure and Corrective Action Permit Renewal - Public Draft;
Anadarko E&P Onshore (Anadarko), Enid, Oklahoma;
EPA ID No. OKD007234586, Permit No. 007234586-PC

Dear Mr. Sweeten:

On October 20, 2023, the Department of Environmental Quality's Land Protection Division (DEQ) received the above-referenced post-closure and corrective action permit renewal application. The application was reviewed for administrative completeness in accordance with Title 40 of the Code of Federal Regulations (40 C.F.R.) Parts 264 and 270, the Oklahoma Hazardous Waste Management Act (27A O.S. §§ 2-7-101 *et seq.*), and Oklahoma Administrative Code (OAC) 252:004 and OAC 252:205. DEQ determined that the application addressed the requirements of the applicable laws and regulations and found the application to be administratively complete in a letter dated December 19, 2023, and technically complete in a letter dated October 31, 2024.

On October 31, 2024, DEQ issued a courtesy draft of the permit to Anadarko for review and comment. On November 11, 2024, DEQ received comments from Anadarko. On December 4, 2024, DEQ met with Anadarko to review the courtesy draft permit. On February 6, 2025, DEQ received an additional response from Anadarko containing a revised clean copy of Attachment 5, suggested grammatical error corrections to the permit sections, and suggested minor changes to the draft permit section III.F. DEQ reviewed the February 6, 2025, Anadarko response, incorporated Anadarko's suggested changes in the draft permit and prepared the enclosed RCRA Post-Closure and Corrective Action Permit for public comment.

Anadarko is required to publish notice of opportunity to comment and request a public meeting on the draft permit in at least one (1) local newspaper of general circulation. Concurrently, a notice should be broadcast on a local radio station. These notices will announce the opening of a forty-five (45) day comment period. Additionally, Anadarko is to send a notice of the draft permit to all persons on the facility mailing list and to appropriate state and local government agencies as specified in 40 C.F.R. § 124.10(c)(1)(viii) and (ix). Subsequently, proofs of publication and broadcasts must be furnished to DEQ within twenty (20) days after the date of publication pursuant to OAC 252:4-7-13(d).

A fact sheet is included in the draft permit for public information. Please ensure that a copy of the draft permit is made available at the Enid Public Library. A copy of the draft permit will also be available at DEQ's office and on the DEQ website at https://www.deq.ok.gov/land-protection-division/permit-public-participation-process/.

If you have any questions, please contact Mike Schornick at (405) 702-5166 or mike.schornick@deq.ok.gov.

Sincerely,

Hillary Young, P.E.
Chief Engineer
Land Protection Division

Enclosure: Public Draft Permit Documents

cc: Harry Shah (6PD-O) EPA Region VI (via email)

Newspaper Notice Text

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY
NOTICE OF DRAFT POST-CLOSURE AND CORRECTIVE ACTION PERMIT OF AN EXISTING HAZARDOUS WASTE MANAGEMENT FACILITY

The Oklahoma Department of Environmental Quality (DEQ) has received an application to renew a hazardous waste permit for the remediation and monitoring of closed Hazardous Waste Management Units at Anadarko E&P Onshore LLC, 2529 E. Willow Street, Enid, OK, 73701 (Anadarko) located in Sections 3 and 4, Township 22 North, Range 6 West, Garfield County, Oklahoma. The application was filed on October 20, 2023.

DEQ has tentatively found that the application meets the requirements of Title 40 of the Code of Federal Regulations (40 CFR) Parts 264 and 270, Title 27A of the Oklahoma Statutes (27A O.S. §§ 2-7-101, *et seq.*), and Oklahoma Administrative Code (OAC) 252:004 and 252:205 and has prepared a draft post-closure and corrective action permit for public review.

The draft post-closure and corrective action permit and its conditions propose that the Anadarko facility continue to remediate and monitor the existing closed Hazardous Waste Management Units. It includes semi-annual groundwater monitoring of a closed Land Treatment Unit and ongoing onsite and offsite (adjacent to the facility boundary) corrective actions. The post-closure and corrective action permit would be issued under the authority of the Oklahoma Hazardous Waste Management Act and the federal Resource Conservation and Recovery Act.

The application, draft permit, and related documents may be reviewed on DEQ's website at https://www.deq.ok.gov/land-protection-division/permit-public-participation-process/ and at the Enid Public Library at 120 West Main Street, Enid, Oklahoma 73701. The DEQ and Anadarko contacts are:

Hillary Young, P.E., Chief Engineer
Land Protection Division
Oklahoma Department of Environmental Quality
P. O. Box 1677
Oklahoma City, Oklahoma 73101-1677
(405) 702-5100

David Sweeten
Director of Operations
Glenn Springs Holdings, Inc, an affiliate of Anadarko E&P Onshore LLC
5 Greenway Plaza, Suite 110
Houston, TX, 77046
(713) 552-8941

Persons wishing to comment on the draft permit should submit their comments in writing to DEQ at the above address or website. Also, any person may request, in writing, a formal public meeting to present written or oral statements and data concerning the draft permit. A request for a public meeting must identify the nature of the issues to be raised in the meeting. If DEQ determines, based on the requests it receives, that there is significant degree of public interest in the draft permit, it will schedule a public meeting and provide notice of the date, time, and place.

Written comments and requests for a public meeting must be received by DEQ within forty-five (45) days after the date of this publication at the DEQ address or website given above. More specific information may be obtained by contacting the applicant at the Anadarko contact given above or by contacting DEQ at the contact listed above.

Radio Broadcast Text

Oklahoma Department of Environmental Quality
Notice of Potential Post-Closure and Corrective Action Permit Conditions
For a Hazardous Waste Management Facility

The Oklahoma Department of Environmental Quality (DEQ) has reviewed a permit application submitted by Anadarko E&P LLC for the remediation and monitoring of closed Hazardous Waste Management Units at the former refinery facility located in Sections 3 and 4, Township 22 North, Range 6 West, Garfield County, Oklahoma. The street address for the facility is 2529 East Willow Street, Enid, Oklahoma, 73701. DEQ has made a tentative determination to renew a post-closure and corrective action permit for Anadarko E&P Onshore LLC for its closed refinery facility in Enid, Oklahoma.

The draft permit and its conditions propose that the Anadarko E&P Onshore LLC facility continue to remediate and monitor the existing closed Hazardous Waste Management Units which includes semi-annual groundwater monitoring and ongoing onsite and offsite corrective actions. The draft permit would be issued under the authority of the Oklahoma Hazardous Waste Management Act and the federal Resource Conservation and Recovery Act.

Further information, including the application, public draft permit, and a fact sheet may be reviewed on the DEQ's website at www.deq.ok.gov.; and at the Enid Public Library at 120 West Main Street, Enid, Oklahoma, 73701, telephone number 580-234-6313.

Persons wishing to comment on the public draft permit or to request a public meeting should submit their comments or requests in writing to DEQ no later than forty-five (45) days from the date of this broadcast. DEQ's mailing address is P. O. Box 1677, Oklahoma City, Oklahoma, 73101-1677.

For further information about this notice, please contact Hillary Young with DEQ at 405-702-5100. That number again is 405-702-5100.

ANADARKO E&P ONSHORE LLC
FORMER REFINERY
FACT SHEET

Potential Permit Conditions for the renewal of a Resource Conservation and Recovery Act (RCRA) Post-Closure and Corrective Action Permit. This is a Tier II Permit Action.

Type of Proposed Action:	Renewal RCRA Post-Closure and Corrective Action Permit.
Type of Facility:	Hazardous Waste Disposal Facility (Land Treatment Unit and Corrective Action)
Facility Name:	Anadarko E&P Onshore LLC
EPA ID Number:	OKD007234586
Location:	2529 E. Willow Street, Enid, Oklahoma, 73701
Legal Description:	Sections 3 and 4, Township 22 North, Range 6 West, Garfield County, Oklahoma.
Geographic Location:	Latitude: 36° 24' 51.3" North Longitude: 97° 50' 28.8" West
Landowner:	Anadarko E&P Onshore LLC 5 Greenway Plaza, Houston, TX, 77046
Facility Operator:	Anadarko E&P Onshore LLC 5 Greenway Plaza, Houston, TX, 77046
Comment Period:	45 days from the date of publication

Basis of the Draft Permit

Anadarko E&P Onshore LLC (Anadarko or the Permittee) is located within Township 22 North, Range 6 West, Section 3 and 4, Garfield County, Oklahoma, at 2529 East Willow Street, Enid, OK 73701. Anadarko is a closed former petroleum refinery, previously operated by the Champlin Refinery, located on approximately three hundred sixty-two (362) acres. The refinery operated from 1916 until 1983. The refinery was dismantled, with decommissioning and demolition work completed between 1983 and 1987. The main products produced at the facility were leaded gasoline, unleaded gasoline, diesel fuel, and heating oil. Lubricating oils, greases, and JP-4 jet fuel were also produced on a limited basis.

The RCRA post-closure and corrective action permit is for a closed hazardous waste land treatment unit (LTU) having previous waste application Plots 1 to 6 located on the facility property. The Permittee is also required to implement corrective action to address contaminated groundwater present onsite and offsite.

The closed LTU was previously used for land treatment operations. Historically, waste applied to the LTU consisted of hazardous and non-hazardous waste generated from various refinery operations and refinery dismantling. The most recent RCRA post-closure permit for the facility, Permit # 007234586-PC, was renewed on April 17, 2014. DEQ approved closure for LTU Plots 1, 2, and 3 in 1986 and LTU Plots 4, 5, and 6 on July 17, 1997. Post-closure care began on July 17, 1997. The closed LTU has an established vegetative cover.

The current Permit Renewal Application submitted to DEQ for review is dated October 20, 2023. DEQ determined the application to be administratively complete on December 19, 2023. A revision to the application with attachments, dated September 18, 2024, was submitted to address technical deficiencies and completed the permit application. DEQ reviewed the technical deficiency update documents and determined the application was technically complete October 31, 2024.

The basic requirements of the Oklahoma Hazardous Waste Management Act (OHWMA) 27A O.S. §§ 2-7-101 *et seq*; the Oklahoma Administrative Code (OAC 252:205), as amended; the federal Resource Conservation and Recovery Act (RCRA); and the Hazardous and Solid Waste Amendments of 1984 (HSWA) having been met, DEQ has prepared draft permit conditions. DEQ has the authority to issue permits for these activities and to enforce compliance with RCRA and HSWA programs.

DEQ developed the draft permit conditions and incorporated applicable conditions from OAC 252:205 and Title 40 of the Code of Federal Regulations (C.F.R.) Part 270, additional conditions to enhance compliance with OAC 252:205 and 40 C.F.R. Part 264, and other conditions (as required) to achieve environmentally sound hazardous waste management.

The administrative record supporting this draft permit consists of the Part B permit application, additional supporting documentation, the draft permit, and this Fact Sheet.

Information Resources

Copies of the proposed draft Permit conditions, this Fact Sheet, and the Part B application are available for review on DEQ's website: https://www.deq.ok.gov/land-protection-division/permit-public-participation-process/ and during normal business hours at the Enid Public Library at 120 West Main Street, Enid, OK 73701.

Telephone inquiries may be directed to:

Hillary Young, Chief Engineer
Land Protection Division, DEQ
(405) 702-5100

Comment Period and Procedures

Persons wishing to comment on the draft permit conditions may submit their comments in writing to the agency at the address listed below and on DEQ's website: https://www.deq.ok.gov/land-protection-division/permit-public-participation-process/.Comments should be directed to the appropriateness of the permit decision and the permit conditions and should be of a factual nature. All comments must be received at the Oklahoma Department of Environmental Quality no later than forty-five days (45) after notice of this Permit action has been published, at the address below.

Oklahoma Department of Environmental Quality
Land Protection Division
707 N. Robinson, Oklahoma City, OK 73102 or
P.O. Box 1677, Oklahoma City, OK 73101-1677

Attn: Hillary Young, PE, Chief Engineer
Land Protection Division

DEQ's comment and public hearing procedures may be found in OAC 252:004 and 40 C.F.R. §§ 124.10 and 124.12. A public meeting will be held by DEQ upon written request when there is a significant degree of public interest. If a public meeting is requested, public notice will be given at least thirty (30) days before the meeting.

Public Meeting

The purpose of any public meeting is to clarify issues involved in the permit decision. Any person may submit oral or written statements and data concerning the draft permit conditions. The public is urged to address the issues set forth in the Notice of Draft Permit Conditions and this Fact Sheet and to present factual, relevant statements on these issues. All such pertinent and material testimony will be considered in reaching a final determination on the permit. A reasonable limit may be set upon time allowed for oral statements, and the submission of statements in writing may be required.

Notice of Final Determination

DEQ will notify the applicant and each person who has submitted written comments or requested notice of the final permit decision. Within thirty (30) days after a RCRA permit decision has been issued, any person who filed comments on the draft permit renewal or participated in the public meeting/hearing may petition the Executive Director of the Department of Environmental Quality to review any condition of the permit decision. The petition shall include a statement of the reasons supporting that review, including a demonstration that any issues being raised were raised during the public comment period, and when appropriate a showing that the condition in question is based on a finding of fact or conclusion of law that is clearly erroneous or an exercise of discretion or important policy consideration which DEQ should review. A petition to DEQ is a prerequisite to judicial review under OAC 252:205-3-2 and 40 C.F.R. § 124.19 and should be directed to the address listed below:

Robert Singletary, Executive Director
Department of Environmental Quality
707 N. Robinson
Oklahoma City, Oklahoma 73101-1677

If no comments are received during the comment period, the permit will become final and effective immediately upon issuance.

OKLAHOMA
Environmental
Quality

ANADARKO E&P ONSHORE LLC
(FORMER CHAMPLIN REFINERY)
TULSA, OKLAHOMA

EPA ID # OKD007234586

POST-CLOSURE AND CORRECTIVE ACTION PERMIT FOR THE REMEDIATION AND MONITORING OF CLOSED HAZARDOUS WASTE MANAGEMENT UNITS

ISSUED BY

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

[MONTH DAY], 2025

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY
POST-CLOSURE CARE AND CORRECTIVE ACTION PERMIT
FOR A HAZARDOUS WASTE FACILITY

EPA ID Number: OKD007234586 **Permit Number:** 007234586-PC

Permittee: Anadarko E&P Onshore LLC
2529 E. Willow Street, Enid, Oklahoma 73701

Effective Date: Month, Day, 2025
Expiration Date: Month, Day, 2035

Pursuant to the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. §§ 6901 *et seq*., commonly known as RCRA), including the Hazardous and Solid Waste Amendments of 1984 (HSWA) and regulations promulgated thereunder by the U.S. Environmental Protection Agency (EPA) (codified in Title 40 of the Code of Federal Regulations), and the Oklahoma Hazardous Waste Management Act (OHWMA) at 27A O.S. §§ 2-7-101 *et. seq.,* as amended, and regulations promulgated thereunder in the Oklahoma Administrative Code (OAC) 252:205, the Oklahoma Uniform Environmental Permitting Act at 27A O.S. § 2-14-101 *et. seq.,* and rules promulgated thereunder in OAC 252:4-7, this Permit to perform post-closure care for the closed hazardous waste Land Treatment Unit (LTU) of a former refinery, is issued by the Oklahoma Department of Environmental Quality (DEQ) to Anadarko E&P Onshore LLC (hereafter called the Permittee or Anadarko). T he Anadarko facility is located at 2529 East Willow Street on approximately 362 acres in Sections 3 and 4, Township 22 North, Range 6 West Indian Meridian, on the northeast side of the City of Enid, in Garfield County, Oklahoma, (Latitude 36.414246 and Longitude -97.841324).

The facility is a closed and dismantled refinery. The facility was previously occupied by the Champlin Refinery, which operated from 1916 until 1983. The main products of the refinery were leaded gasoline, unleaded gasoline, diesel fuel, and heating oil. Lubricating oils, greases, and JP-4 jet fuel were also produced on a limited basis. The refinery was dismantled, with decommissioning and demolition work completed between 1983 and 1987. The Permittee performs post-closure care (i.e., monitoring and maintenance) for the closed hazardous waste land treatment unit (LTU), Plots 1 to 6, which are located in the east area of the former refinery location. DEQ approved closure for LTU Plots 1, 2, and 3 in 1986 and LTU Plots 4, 5, and 6 on July 17, 1997. Post-closure care began on July 17, 1997. Contaminated groundwater is present at the Site due to past refinery operations, and the Permittee is required to implement sitewide corrective action to address groundwater contamination.

The Permittee must comply with all terms and conditions of this permit. This permit consists of the conditions contained herein (including those in any of the attachments); the applicable regulations contained in 40 C.F.R. Parts 124, 260 through 264, 266, 268, and 270, as specified in the permit; and other applicable State and Federal Statutes and regulations. Applicable regulations are those which are in effect on the date of issuance of the permit, in accordance with 40 C.F.R. § 270.32(c). Primary responsibility for the enforcement of the provisions of this permit lies with the DEQ.

This permit is based on the assumption that all the information submitted in the Part B permit application dated October 20, 2023, revised by subsequent submittals dated September 18, 2024 and January 8, 2025, hereafter referred to as the application, is accurate and that the facility will be maintained as specified in the application.

Any inaccuracies found in the submitted information may be grounds for the termination, revocation and reissuance, or modification of this permit in accordance with 40 C.F.R. §§ 270.41, 270.42, and 270.43

and for enforcement action.

This permit is effective as of Month, Day, 2025, and shall remain in effect until Month, Day, 2035, unless revoked and Preissued under 40 C.F.R. § 270.41, terminated under 40 C.F.R. § 270.43, or continued in accordance with 40 C.F.R. § 270.51(a) and Title 252, Oklahoma Administrative Code, Chapter 205, Hazardous Waste Management (OAC 252:205), otherwise known as the Department's Hazardous Waste Management Rules, and the Oklahoma Administrative Procedures Act Title 75 O.S. §§ 250 *et. seq.*

Issued this ____ day of Month , 2024

Hillary Young, P.E. Date
Chief Engineer
Land Protection Division
Oklahoma Department of Environmental Quality

Kelly Dixon Date
Director
Land Protection Division
Oklahoma Department of Environmental Quality

TABLE OF CONTENTS ANADARKO E&P ONSHORE LLC, ENID, OKLAHOMA

ATTACHMENTS

SECTION I – GENERAL PERMIT CONDITION

A. GENERAL

The Permittee shall operate, monitor, and maintain the facility described herein, in compliance with the provisions of the Oklahoma Hazardous Waste Management Act (OHWMA), 27A O.S. Sec 2-7-101 *et. seq.* as amended, the Oklahoma Administrative Code (OAC) 252:205, the Federal Resource Conservation and Recovery Act (RCRA), the Hazardous and Solid Waste Amendments of 1984 (HSWA), the federal rules for hazardous waste management, 40 C.F.R. § Parts 260-270, and the approved Permit application as further modified through Permit conditions set herein.

B. BASIS OF PERMIT

This Permit renewal is granted based on the information presented in the application for the former Champlin Refinery, now owned by Anadarko E&P Onshore LLC. This permit requires the Permittee to perform post-closure care activities for a closed hazardous waste land treatment unit (LTU) and sitewide corrective actions to address contaminated groundwater.

Any inaccuracies found in this information could provide cause for the termination or modification of this Permit and for enforcement action. The Permittee is to inform the Oklahoma Department of Environmental Quality (DEQ) of any deviation from, or changes in the design or operation of the facility which could affect the Permittee's ability to comply with the applicable regulations or Permit conditions.

The term of this Permit is ten (10) years however, this Permit may be reviewed by the DEQ at any time after the date of Permit issuance and shall be modified as necessary, as provided in 40 C.F.R. § 270.41 and 27A O.S. § 2-7-127(B). Except as provided in Permit Condition I.F.3. and 40 C.F.R. § 270.51, the term of this Permit shall not be extended by modification beyond the expiration date appearing on the face of this Permit. 40 C.F.R. § 270.50(b).

C. INCORPORATION BY REFERENCE

All the referenced Code of Federal Regulations 40 C.F.R. Parts 124, 260 through 266, 268 and 270 as specified in the Permit are, unless otherwise stated, incorporated in their entirety by OAC 252:205-3-2.

D. DEFINITIONS

For purposes of this Permit and the special conditions pursuant to the 1984 Hazardous and Solid Waste Amendments to RCRA, terms used herein shall have the same meaning as those in 40 C.F.R. Parts 124, 260 through 266, 268, and 270; and OAC 252:205-1-2 through OAC 252:205-3-6; unless this Permit specifically provides otherwise. Where terms are not defined in the Oklahoma Administrative Code or the Permit, the meaning associated with such terms shall be defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.

"Action Levels" means health and environmental-based levels of constituent concentrations determined by the DEQ to be indicators for protection of human health and the environment.

"Administrative Authority" means the Oklahoma Department of Environmental Quality or DEQ.

"Area of Concern" (AOC) means any discernable unit or area which, in the opinion of the DEQ, may have received solid or hazardous waste or waste containing hazardous constituents at any time. DEQ may require investigation of the unit as if it were a Solid Waste Management Unit (SWMU). If shown to be a SWMU by the investigation, the AOC must be reported by the Permittee as a newly identified SWMU. If the AOC is shown not to be a SWMU by the investigation, DEQ may determine that no further action is necessary and notify the Permittee in writing.

"BTEX" means the analytical parameters of Benzene, Toluene, Ethylbenzene, and Xylene.

"CMS" means Corrective Measures Study.

"Constituent of Concern" (COC) means those chemical compounds which have been detected during sampling events and have been selected as having a reasonable likelihood of having been or might be released and pose an adverse hazard or risk to human health or the environment.

"DEQ" means the Oklahoma Department of Environmental Quality.

"Director" means the Executive Director of the Oklahoma Department of Environmental Quality or his/her designee or authorized representative.

"Division Director" means the Director of the Land Protection Division of the Oklahoma Department of Environmental Quality or his/her designee or authorized representative.

"EPA" means the United Stated Environmental Protection Agency.

"Facility" means all contiguous property under the control of the owner or operator seeking a permit under Subtitle C of RCRA.

"HSWA" means the 1984 Hazardous and Solid Waste Amendments to RCRA.

"Hazardous Constituent" means any constituent identified in Appendix VIII of 40 C.F.R. Part 261, or any constituent identified in Appendix IX of 40 C.F.R. Part 264.

"Hazardous Waste" means any waste that is identified in 40 C.F.R. §§ 261.3.

"Land Protection Division" (LPD) means the Land Protection Division of the Oklahoma DEQ.

"OCC" means the Oklahoma Corporation Commission.

"OHWMA" means the Oklahoma Hazardous Waste Management Act.

"**Permittee**" means the Anadarko E&P Onshore LLC facility located at 2529 E. Willow Street Enid, Oklahoma, 73701 having EPA ID # OKD007234586.

"RCRA" means the Resource Conservation and Recovery Act of 1976, as amended by HSWA in 1984 and subsequent amendments.

"RFA" means RCRA Facility Assessment.

"RFI" means RCRA Facility Investigation.

"**RSL**" means Regional Screening Levels established by U.S. EPA.

"Regional Administrator" means the Regional Administrator of EPA Region VI, or his/her designee or authorized representative.

"Release" means any spilling, leaking, pouring, emitting, emptying, discharging, injecting, pumping, escaping, leaching, dumping, or disposing of hazardous wastes or hazardous constituents into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing hazardous wastes or hazardous waste constituents). RCRA Section 3004(u) corrective action authority does not routinely re-evaluate permitted releases.

"Remediation Waste" means all solid waste and/or hazardous waste; and all media (including groundwater, surface water, soils, and sediments) and debris that contain listed hazardous waste or that exhibit a hazardous characteristic and are managed for implementing cleanup.

"Site" means the land or water area where any facility or activity is physically located or conducted, including adjacent land used in connection with the facility or activity.

"Solid Waste Management" means the systematic administration of activities which provide for the collection, source separation, storage, transportation, transfer, processing, treatment, and disposal of solid waste.

"Solid Waste Management Unit" (SWMU) means any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at a facility at which solid wastes have been routinely and systematically released. The definition includes regulated units (i.e., landfills, surface impoundments, waste piles and land treatment units) but does not include passive leakage or one-time spills from production areas and units in which wastes have not been managed (e.g., product storage areas).

If, subsequent to the issuance of this Permit, regulations are promulgated which redefine any of the above terms, the DEQ, at its discretion, may apply the new definition to this Permit by modifying the Permit in accordance with 40 C.F.R. § 270.41.

E. EFFECT OF PERMIT

Any storage, treatment, or disposal of hazardous waste not authorized in this Permit is prohibited, unless exempted from Permit requirements.

Pursuant to 40 C.F.R. § 270.4, compliance with this permit constitutes compliance, for purposes of enforcement, with Subtitle C of RCRA, except for those requirements not included in the Permit which: (1) become effective by statute; (2) are promulgated under 40 C.F.R. Part 268 of Chapter 40, Code of Federal Regulations restricting the placement of hazardous wastes in or on the land, or (3) are promulgated under 40 C.F.R. Part 264 regarding leak detection systems for

new and replacement surface impoundment, waste pile, and landfill units, and lateral expansions of surface impoundment, waste pile, and landfill units.

Issuance of this Permit does not convey any property rights of any sort or any exclusive privilege; nor does it authorize any injury to persons, animals, or property, any invasion of other private rights, or any infringement of state or local laws or regulations.

Compliance with the terms of this Permit does not constitute a defense to any order issued or any action brought under the OHWMA; sections 3008(a), 3008(h), 3013, or 7003 of RCRA; Sections 104, 106(a) or 107 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §§ 9601 et seq., commonly known as CERCLA), or any other law providing for protection of public health or the environment from an imminent or substantial endangerment. 40 C.F.R. §§ 270.4 and 270.30(g).

F. PERMIT ACTIONS

1. Permit Modification, Revocation and Reissuance, and Termination

   This Permit may be modified, revoked and reissued, or terminated for cause, as specified in 40 C.F.R. § 270.41, 270.42, and 270.43. The filing of a request for a permit modification, revocation and reissuance, or termination, or the notification of planned changes or anticipated noncompliance on the part of the Permittee, does not stay the applicability or enforceability of any Permit condition. 40 C.F.R. § 270.4(a) and 270.30(f).

2. Permit Renewal

   This Permit may be renewed as specified in 40 C.F.R. §. 270.30(b) and Permit Condition I.H.2. Review of any application for a Permit renewal shall consider improvements in the state of control and measurement technology, as well as changes in applicable regulations. 40 C.F.R. §. 270.30(b) and HSWA Sec. 212.

3. Permit Expiration

   Pursuant to 40 C.F.R. § 270.50 and OAC 252:205-3-2, this Permit shall be effective for a fixed term not to exceed ten (10) years from its effective date. This Permit and all conditions herein will remain in effect, beyond the Permits expiration date, if the Permittee has submitted a timely, complete application (see 40 C.F.R. §. 270.10, 270.13 through 270.29) and, through no fault of the Permittee, the DEQ has not issued a new Permit, as set forth in 40 C.F.R. §. 270.51. Permits continued under this section remain fully effective and enforceable. When the Permittee is not in compliance with the conditions of the expiring or expired Permit, the DEQ may choose to do any one or more of the following:

   a. Pursuant to 27A O.S. § 2-7-126, § 2-7-127, § 2-7-129, § 2-7-130, § 2-7-131 and/or § 2-7-134, issue an order with penalties; require corrective action; temporarily suspend the Continued Permit; revoke the Continued Permit and/or cause proceedings to be instituted in the district court for civil or criminal penalties; and

b. Issue a notice of intent to deny the new Permit under 40 C.F.R. § 124.6 and 27A O.S. § 2-7-113.1. If the Permit is denied, the owner or operator would then be required to cease the activities authorized by the continued Permit or be subject to enforcement action for operating without a Permit; or

c. Take other actions authorized by 27A O.S. § 2-1-101 et seq., OAC 252:205-1-1 et seq., or other applicable laws or regulations.

4. Transfer of Permits

This permit is not transferable, except after notice to the DEQ. The DEQ will consider information submitted by the Permittee or the proposed transferor as required in 27A O.S. § 2-7-109 and may require modification or revocation and reissuance of the permit pursuant to 40 C.F.R. § 270.40 to identify the new Permittee and incorporate such other necessary requirements. Before transferring ownership or operation of the facility, the Permittee shall notify the new owner or operator in writing of the requirements of 40 C.F.R. Parts 264 and 270 and this permit. 40 C.F.R. § 270.30(l)(3) and 264.12(c).

G. SEVERABILITY

The provisions of this Permit are severable, and if any provision of this Permit, or the application of any provision of this Permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this Permit shall not be affected thereby (40 C.F.R. §. 124.16(a)).

H. DUTIES AND REQUIREMENTS

1. Duty to Comply

The Permittee shall comply with the approved Permit application and all conditions of this Permit, except to the extent and for the duration that noncompliance is authorized by an emergency Permit. Any Permit noncompliance, other than noncompliance authorized by an emergency Permit, constitutes a violation of OHWMA and RCRA and is grounds for enforcement action; for Permit termination, revocation and reissuance, or modification; or for denial of a Permit renewal application. 40 C.F.R. § 270.30(a).

2. Duty to Reapply

If the Permittee intends to continue an activity allowed or required by this Permit after the expiration date of this Permit, the Permittee shall submit a complete application for a new Permit at least 180 days prior to Permit expiration. 40 C.F.R. § 270.30(b).

3. Monthly Reports

The Permittee shall submit monthly reports in accordance with OHWMA, 27A O.S. § 2-7-101 and OAC 252:205-9-2, as applicable. Occasional waste is generated due to remediation activities. Monthly reports are only required if hazardous waste is generated/managed for that month. Quarterly Reports are required if the facility is a Large Quantity Generator for any given month of the year.

4. Biennial Report

The Permittee shall comply with the Biennial Reporting (BR) requirements of 40 C.F.R. § 262.41. Large Quantity Generators (LQGs) are facilities generating more than 2,200 pounds of hazardous waste for any given month.

5. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for the Permittee, in an enforcement action, that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Permit. 40 C.F.R. § 270.30(c).

6. Duty to Mitigate

In the event of noncompliance with this Permit, the Permittee shall take all reasonable steps to minimize releases to the environment and shall carry out such measures as are reasonable to prevent significant adverse impacts on human health or the environment. 40 C.F.R. § 270.30(d).

7. Proper Operation and Maintenance

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this Permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance/quality control procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this Permit. 40 C.F.R. § 270.30(e).

8. Duty to Provide Information

The Permittee shall furnish to the DEQ, within a reasonable time, any relevant information which the DEQ may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Permit, or to determine compliance with this Permit. The Permittee shall also furnish to the DEQ, upon request, copies of records required to be kept by this Permit. 40 C.F.R. § 270.30(h).

9. Inspection and Entry

Pursuant to 40 C.F.R. § 270.30(i), the Permittee shall allow the DEQ or an authorized representative, upon the presentation of credentials and other documents, as may be required by law, to:

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

b. Have access to and copy, at reasonable times, any records that must be kept under

the conditions of this Permit;

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

d. Sample or monitor, at reasonable times, any substances or parameters at any location for the purposes of assuring Permit compliance or as otherwise authorized by RCRA.

10. Monitoring and Records

a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The method used to obtain a representative sample of the waste and/or contaminated media to be analyzed must be the appropriate method from Appendix I of 40 C.F.R. Part 261 or an equivalent method approved by the DEQ. Laboratory methods must be those specified in the most recent edition of Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, EPA Method SW-846, or an equivalent method approved by DEQ. 40 C.F.R. § 270.30(j)(1).

b. The Permittee shall retain all pertinent records of all monitoring information, including maintenance records and recordings for monitoring instrumentation, copies of reports and records required by this Permit, the certification required under 40 C.F.R. § 264.73(b)(9), and records of all data used to complete the application for this Permit for a period of at least 3 years from the date of the pertinent sample, measurement, report, record, certification, or application. These periods may be extended by request of the DEQ at any time and will be automatically extended during the course of any unresolved enforcement action regarding this facility. 40 C.F.R. § 270.30(j)(2).

c. Pursuant to 40 C.F.R. § 270.30(j)(3), records of monitoring information shall specify:

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

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

iii. The date(s) analyses were performed;

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

v. The analytical techniques or methods used; and

vi. The results of such analyses.

11. Reporting Planned Changes

The Permittee shall give notice to the DEQ, as soon as possible, of any planned physical alterations or additions to the permitted facility, only if such changes relate to hazardous waste management or corrective action operations. 40 C.F.R. § 270.30(l)(1).

12. Reporting Anticipated Noncompliance

The Permittee shall give advance notice to the DEQ of any planned changes in the permitted facility or activity which may result in noncompliance with Permit requirements. 40 C.F.R. § 270.30(l)(2).

13. Monitoring Reports

a. The Permittee shall conduct the sampling at the intervals specified elsewhere in the permit.

b. The Permittee must report the results of all environmental monitoring to DEQ per the schedules set forth in the Permit or other DEQ approved time frame. 40 C.F.R. § 270.30(l)(4).

14. Compliance Schedules

Reports of compliance with, or any progress reports on, interim and final requirements contained in any compliance schedule in this Permit shall be submitted no later than thirty (30) days following each schedule date. 40 C.F.R. § 270.30(l)(5).

15. Incident Reporting

The Permittee shall report to DEQ any noncompliance which may endanger health or the environment. OAC 252:205-13-1, 40 C.F.R. § 270.30(l). Any such information shall be reported orally within twenty-four (24) hours from the time the Permittee becomes aware of the circumstances.

a. The report shall include the following:
   i. Information concerning release of any hazardous waste that may cause an endangerment to personnel or drinking water supplies;
   ii. Any information of a release or discharge of contaminated groundwater or of a compromise to remedial operations which could threaten the environment or human health on-site or outside the facility.

b. The description of the occurrence and its cause shall include:
   i. Name, address and telephone number of the owner or operator;
   ii. Name, address, and telephone number of the person reporting the incident;
   iii. Date, time, and type of incident;
   iv. Location of the incident;
   v. Name and quantity of materials involved;
   vi. The extent of injuries, if any;

iii. An assessment of actual or potential hazards to the environment and human health on- site and/or outside the facility, where this is applicable; and

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

c. A written submission shall also be provided within five (5) days of the time the Permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period(s) of noncompliance (including exact dates and times); whether the noncompliance has been corrected; and, if not, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. The DEQ may waive the five-day written notice in favor of a written report within fifteen (15) days.

16. Other Noncompliance

The Permittee shall report all other instances of known noncompliance with this Permit, not otherwise required to be reported, by Permit Conditions I.H.11-15 above, at the time monitoring reports related to that activity are submitted. The reports shall contain information listed in Permit Condition I.H.15. 40 C.F.R. § 270.30(l)(10).

17. Other Information

Whenever the Permittee becomes aware that it failed to submit any relevant facts in the Permit application or submitted incorrect information in a Permit application or in any report to the DEQ, the Permittee shall promptly submit such facts or information. 40 C.F.R. § 270.30(l)(11).

I. SIGNATORY REQUIREMENT

All applications, reports, or information submitted to or requested by, the DEQ, its designee or authorized representative, shall be signed and certified in accordance with 40 C.F.R. §§ 270.11 and 270.30(k).

J. REPORTS, NOTIFICATIONS, AND SUBMISSIONS TO THE DEQ

All reports, notifications, or other submissions which are required by this Permit to be sent or given to the DEQ should be sent by certified mail or overnight delivery, or given to:

Chief Engineer
Land Protection Division
Oklahoma Department of Environmental
Quality 707 North Robinson
P.O. Box 1677
Oklahoma City, OK, 73101-1677
Phone Number (405) 702-5100

K. CONFIDENTIAL INFORMATION

In accordance with 40 C.F.R. § 270.12, OAC 252:4-1-5(d), and OAC 252:205-1-4, the Permittee may claim confidential any information required to be submitted by this Permit. Any such claim must be asserted at the time of submission in the manner prescribed on the application form or instructions, or in the case of other submissions, by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of the submission, DEQ may make the information available to the public without further notice. If a claim is asserted, the information will be treated in accordance with the procedures in 40 C.F.R. Part 2 (Public Information). Claims of confidentiality for the name and address of any permit applicant or Permittee will be denied.

L. DOCUMENTS TO BE MAINTAINED AT THE FACILITY

The Permittee shall maintain at the facility, until all corrective measures and monitoring are complete, and closure is completed and certified by an independent, registered professional engineer, the following documents and all amendments, revisions and modifications to these documents:

1. Inspection and Maintenance Plan, as required by 40 C.F.R. § 264.15(b)(2) and this Permit, (Permit Attachment 2);

2. Security Plan, as required by 40 C.F.R. § 264.53(a) and this Permit;

3. Operating Record, as required by 40 C.F.R. § 264.73 and this Permit;

4. Sampling and Analysis Plan associated with the Groundwater Monitoring Plan (GMP) as required by 40 C.F.R. § 264.92 and this Permit; (Permit Attachment 5);

5. Post-Closure Care Plan for Land Treatment Unit (LTU), as required by 40 C.F.R. § 264.118(a) and this Permit (Permit Attachment 3);

6. Annually adjusted cost estimate for facility closure and post-closure, as required by 40 C.F.R. §§ 264.142(d) and 264.144 (d) and this Permit (Permit Attachment 4);

7. Waste Management Plan (Permit Attachment 6);

8. Facility Mailing List (Permit Attachment 1);

9. All other documents required by Section I, Permit Condition I.H and Section IV.

SECTION II - GENERAL FACILITY CONDITIONS

A. DESIGN AND OPERATION OF FACILITY

The Permittee shall maintain and operate the facility to minimize the possibility of a fire, explosion, or any unplanned, sudden or non-sudden release of hazardous waste constituents to air, soil, groundwater, or surface water which could threaten human health or the environment, as required by 40 C.F.R. § 264.31.

B. REQUIRED NOTICES

The Permittee is not authorized to receive any hazardous waste from any source either on-site, offsite or from a foreign source unless the conditions, notices, and requirements of 40 C.F.R. § 264.12 are met.

C. SECURITY

The Permittee shall comply with the applicable security provisions of 40 C.F.R. § 264.14 and the Post- Closure Care Plan (Permit Attachment 3).

D. GENERAL INSPECTION REQUIREMENTS

The Permittee shall follow the inspection provisions of 40 C.F.R. § 264.15 and the inspection requirements set out in Permit Attachment 2. The Permittee shall remedy any deterioration or malfunction discovered by an inspection, as required by 40 C.F.R. § 264.15(c). Records of inspections shall be kept, as required by 40 C.F.R. § 264.15(d).

E. PERSONNEL TRAINING

The Permittee shall conduct personnel training, as required by 40 C.F.R. § 264.16. The Permittee shall maintain training documents and records, as required by 40 C.F.R. § 264.16(d) and (e).

F. SPECIAL PROVISIONS FOR IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTE

The Permittee shall comply with the requirements concerning the management of ignitable, reactive, and incompatible wastes as required by 40 C.F.R. § 264.17.

G. PREPAREDNESS AND PREVENTION

The Permittee shall follow the provisions of 40 C.F.R. Part 264, Subpart C.

1. Required Equipment

   At a minimum, the Permittee shall maintain at the facility the equipment required by 40 C.F.R. § 264.32.

2. Testing and Maintenance of Equipment

   The Permittee shall test and maintain the equipment specified in Permit Condition II.G.1, as necessary, to assure its proper operation in time of emergency as required by 40 C.F.R. § 264.33.

3. Access to Communications or Alarm System

   The Permittee shall maintain access to the communications or alarm system, as required by 40 C.F.R. § 264.34.

4. Arrangements with Local Authorities

   The Permittee shall maintain arrangements with state and local authorities, as required by 40 C.F.R. § 264.37. If state or local officials refuse to enter into preparedness and prevention arrangements with the Permittee, the Permittee must document this refusal in the operating record.

H. GENERAL CLOSURE REQUIREMENTS

The refinery portion of this facility was closed in 1983 and subsequently dismantled. All clean-up, remediation, and post-closure activities are subject to the corrective action measures specified in Section V of this Permit.

I. GENERAL POST-CLOSURE REQUIREMENTS

1. Post-Closure Care Period

   The facility shall be maintained in accordance with 40 C.F.R. § 264.117; the Post-Closure Care Plan for Land Treatment Unit (LTU); Permit Attachment 3, and Permit Section IV Post-Closure Care and Maintenance. The Permittee shall conduct post-closure activities in accordance with 40 C.F.R. §§ 264.117 through 120 and 264.280.

2. Post-Closure Security

   The Permittee shall maintain security at the regulated unit during the post-closure care period, in accordance with the Inspection and Maintenance Activities, Permit Attachment 2, and 40 C.F.R. § 264.117(b).

3. Amendment to Post-Closure Care Plan

   The Permittee shall amend the Post-Closure Care Plan in accordance with 40 C.F.R. § 264.118(d), whenever necessary.

J. COST ESTIMATE FOR FACILITY CLOSURE

1. The Permittee will prepare post-closure and corrective action cost estimates in accordance with 40 CFR §§ 264.144. The Permittee's most recent post-closure and corrective action scope and cost estimates prepared in accordance with 40 C.F.R. §§ 264.144, are presented in the Post-Closure Care and Corrective Action Cost Estimate, Permit Attachment 4.

2. The Permittee will comply with the financial assurance requirements of 40 C.F.R. § 264.145 for the post-closure and corrective action costs set forth in the Post-Closure Care and Corrective Action Cost Estimate, Permit Attachment 4.

3. The Permittee must revise the post-closure cost and corrective action cost estimates presented in Post-Closure Care and Corrective Action Cost Estimate, Permit Attachment 4, whenever there is a change in the facility's post closure and corrective action scope and/or cost estimates, as required by 40 C.F.R. § 264.144(c) and whenever the LTU is released from the requirements of this Permit.

4. The Permittee will review and update the post-closure and corrective action cost estimates in Post-Closure Care and Corrective Action Cost Estimate, Permit Attachment 4, as considered necessary by the DEQ. Estimates for the duration of post closure care may also be revised. Permittee will revise the cost estimates for post-closure care and corrective action and related financial assurances, as directed by the DEQ.

K. FINANCIAL ASSURANCE FOR FACILITY POST-CLOSURE AND CORRECTIVE ACTION

The Permittee shall annually demonstrate continuous compliance with 40 C.F.R. § 264.145 and 264.146 by providing documentation of financial assurance, as required by 40 C.F.R. § 264.151 or 264.149, in at least the amount of the cost estimates required by Permit Condition II.J. Changes in financial assurance mechanisms must be approved by the DEQ pursuant to 40 C.F.R. § 264.145 or 264.149.

L. INCAPACITY OF OWNERS OR OPERATORS, GUARANTORS, OR FINANCIAL INSTITUTIONS

The Permittee shall comply with 40 C.F.R. § 264.148, whenever necessary.

SECTION III – GROUNDWATER MONITORING PROGRAM

A. SECTION HIGHLIGHTS

The Permittee shall maintain a sitewide groundwater monitoring program in accordance with 40 C.F.R. §§ 264.97, through 264.100. The Permittee shall sample at frequencies and for the analytes summarized in the Groundwater Sampling and Analysis Plan and Quality Assurance Project Plan (SAP-QAPP), Permit Attachment 5. Consistent sampling and analysis procedures designed to ensure monitoring results that provide a reliable indication of groundwater quality beneath and beyond the former refinery property will be used, in accordance with the procedures for groundwater monitoring contained in the SAP-QAPP, Permit Attachment 5.

Groundwater monitoring will be conducted sitewide and in areas where contaminated groundwater has migrated offsite. The monitoring is for the Enid Isolated Terrace Aquifer, with site wide semi-annual sampling. A groundwater monitoring report is due on an annual basis per Permit Condition I.H.13. In practice, this system includes monitoring wells both within and beyond the site boundary/property line and beyond the extent of the identified hydrocarbon-impacted groundwater plume, as listed in Table 1-1 and depicted on Figure 1-1 of the SAP-QAPP, Permit Attachment 5. From time-to-time, with DEQ concurrence or direction, new wells may be added to the system, as applicable and deemed necessary.

The sitewide groundwater monitoring system has been and shall continue to be designed, constructed, operated and maintained to enable evaluation of the groundwater protection standard (GWPS) established for constituents of concern (COCs) at the facility Point-of-Compliance (POC), which is defined as the current boundary/property line of the facility, and other locations specified in Table 1-1 of the SAP-QAPP, Permit Attachment 5. Groundwater monitoring beyond (outside) the facility boundary is required for groundwater contamination from the facility which extends beyond the facility property boundary. The monitoring system will be maintained in accordance with the specifications presented in this section and the SAP-QAPP, Permit Attachment 5. The monitoring system consists of numerous wells specified in Table 1-1 of the SAP-QAPP, Permit Attachment 5, which are monitored on a semi-annual basis. Monitoring will continue for at least the duration of this Permit.

The primary remediation and corrective action objective for this facility is for groundwater contamination to be reduced in extent so that it is totally contained on-site, no longer extends beyond the property boundary, and the DEQ agrees that there is no likelihood of further offsite groundwater contamination occurring.

An annual groundwater monitoring program and corrective action program monitoring combined report will be submitted to DEQ no later than March 15 of the year following the year of the groundwater monitoring activities.

B. WELL LOCATION, INSTALLATION AND CONSTRUCTION

1. The Permittee shall install and maintain the groundwater monitoring system to comply with the requirements of 40 C.F.R. §§ 264.97 through 264.100.

2. The Permittee shall maintain a groundwater monitoring system with monitoring wells at the locations specified in Table 1-1 and Figure1-1 of the SAP-QAPP, Permit Attachment 5, and in accordance with the plans and specifications presented in the SAP-QAPP for the duration of this Permit unless later modified.

3. The Permittee shall construct and/or maintain the monitoring wells identified above to assure the wells remain in working order.

4. The Permittee must apply for a Class 2 permit modification to request a change in the number, location, depth, or design of wells of the network groundwater monitoring system, as required under 40 C.F.R. § 270.42 Appendix I (C)(1). Such changes may not be implemented until approval of the permit modification.

5. Deletion of wells from the monitoring program shall require a Class 2 permit modification in accordance with 40 C.F.R. § 270.42. Deleted wells shall be plugged and abandoned in accordance with the Oklahoma Water Resources Board guidelines. OWRB plugging reports will be provided to DEQ in the Annual Report for wells plugged in the report year.

C. GROUNDWATER PROTECTION STANDARD

The COCs established to determine the groundwater protection standard at the facility are listed in Table 1-2 of the SAP-QAPP, Permit Attachment 5. The National Drinking Water Standards, Maximum Contaminant Levels (MCLs) set by EPA, or if there is no established MCL, then the EPA Regional Screening Level (RSL) for Tap Water for each of the COCs is defined as the applicable GWPS. 40 C.F.R. § 264.93 and 94.

1. The Permittee shall monitor groundwater program wells as listed and as specified in Table 1-1 of the SAP-QAPP, Permit Attachment 5, to determine whether the facility is in compliance with the GWPS under 40 C.F.R. § 264.92. The COCs and their GWPS concentration limits for each groundwater monitoring system well, as applicable, are specified in Table 1-1 and Table 1-2 of the SAP-QAPP, Permit Attachment 5.

2. The Permittee shall monitor all groundwater program monitoring wells in Table 1-1 as designated and as specified in and in accordance with the procedures of the SAP-QAPP, Permit Attachment 5. 40 C.F.R. § 264.95.

3. The period during which the GWPS applies shall begin at the time the Permittee begins the groundwater monitoring specified herein and continues until the end of the post-closure care period. 40 C.F.R. § 264.96(b). If the Permittee is conducting corrective action at the end of the period specified, then the period shall be extended until the Permittee demonstrates that the groundwater protection standard has not been exceeded in the wells listed in Table 1-1 for three consecutive years. 40 C.F.R. § 264.96(c).

D. SAMPLING AND ANALYSIS PROCEDURES

The Permittee shall follow the following techniques and procedures when obtaining and analyzing samples from the groundwater monitoring wells described in Permit Condition III.B.2. 40 C.F.R. § 264.97(d) and (e).

1. Samples shall be collected using the techniques and procedures described and specified in the SAP-QAPP, Permit Attachment 5;

2. Samples shall be preserved and shipped in accordance with the procedures specified in SAP-QAPP, Permit Attachment 5;

3. Samples shall be analyzed in accordance with the procedures specified in the SAP-QAPP, Permit Attachment 5;

4. Samples shall be tracked and controlled using the chain-of-custody procedures specified in the SAP-QAPP, Permit Attachment 5.

E. ELEVATION OF THE GROUNDWATER SURFACE

1. The Permittee shall determine the elevation of the groundwater surface at each well listed in Table 1-1 of the SAP-QAPP, Permit Attachment 5, each time the groundwater is sampled. 40 C.F.R. § 264.97(f).

2. The Permittee shall conduct water level measurements and report light non-aqueous phase liquid (LNAPL) thickness in each well listed in Table 1-1 of the SAP-QAPP, Permit Attachment 5.

3. The Permittee shall record the surveyed elevation of new monitoring well(s) when installed (with as-built drawings) and present the records (i.e., records for new monitoring wells) in the annual report, for the applicable year of reporting, required in Permit Condition III.H. In the event that a monitoring well is damaged, the Permittee shall re-survey the monitoring well after it is repaired.

4. The Permittee shall determine the groundwater flow rate and direction in the uppermost aquifer at least annually. 40 C.F.R. § 264.98 (e) and 264.99(e).

F. GWPS EXCEEDANCE AND INCREASING TREND ANALYSIS AND PROCEDURES

The Permittee is in corrective action and shall determine semiannually whether there is significant evidence that the groundwater contamination plume existing at the facility as of the date of permit issuance is stable or expanding and, if expanding, implement an appropriate response by implementing the following GWPS exceedance and increasing trend evaluations and procedures. Because the Permittee is in corrective action, DEQ approves the following procedures in lieu of and as an alternate to the statistical procedures in 40 C.F.R §§ 264.97 and 264.98:

The wells designated as detection wells in Table 1-1 of the SAP-QAPP, Permit Attachment 5,

are intended to define a perimeter buffer zone just beyond the groundwater contamination plume. Sampling and analysis of detection wells will be performed semiannually.

If any semiannual sampling event shows that a COC (listed in Table 1-1 or Table 1-2 of the SAP-QAPP, Permit Attachment 5) concentration exceeds a GWPS for a designated detection well, the Permittee shall proceed as follows:

1. Within thirty (30) days of receipt of the sampling data identifying the GWPS exceedance, the Permittee shall resample detection well(s) and repeat the analysis for the COC(s) having GWPS exceedances.

2. If re-sampling confirms the COC(s) GWPS exceedance(s), the Permittee shall report the confirmation to DEQ within seven (7) days of receipt of the resampling data and follow Permit Condition III.F.3 for the confirmed exceedances. If the GWPS exceedance(s) is not confirmed, the Permittee will note same in the Annual Report submitted to DEQ, but otherwise no action is required.

3. Should the same detection well(s) reconfirm the same confirmed COC(s) GWPS exceedance(s) at the next consecutive semiannual sampling event, the Permittee shall submit a workplan proposing a path forward which, if necessary, includes an investigation to determine suitable locations for new detection well(s) to redefine the extent of COC(s) contamination and the buffer zone. The workplan shall contain an implementation schedule for DEQ's review and approval. The workplan shall be submitted to DEQ within sixty (60) days of receipt of the second confirmation (third sample) sampling data. Once approved by DEQ, the workplan shall be promptly executed in accordance with the approved implementation schedule. The Permittee shall include the workplan completion and findings report in the Annual Report required for the year during which the workplan was implemented. If the workplan completion and findings report determines new detection wells are to be installed, the Permittee shall submit an application for permit modification meeting the requirements of Permit Condition III.I and 40 C.F.R. § 270.42 to DEQ for review and approval. If the COC(s) GWPS exceedance(s) is not reconfirmed at the same detection well(s) at the next semiannual sampling event, the Permittee will note same in the Annual Report submitted to DEQ, but otherwise no action is required.

4. Should increasing COC GWPS exceedances occur so as to indicate the groundwater contamination plume is increasing, DEQ may require the Permittee to perform further investigations to determine the reason(s) for the expansion and to develop and install appropriate remedies as deemed necessary.

A trend evaluation of groundwater monitoring well data will be performed annually on the monitoring wells designated as trendline monitoring wells in Table 1-1 of the SAP-QAPP, Permit Attachment 5. The trendline wells are located along the downgradient perimeter of and within the groundwater contamination plume known to exist at the facility as of the date of Permit issuance. The trend evaluation method and method details used by the Permittee and trendline evaluation determinations will be submitted in the Annual Report for DEQ review and approval.

If an annual trend evaluation of two (2) consecutive semiannual sampling events shows a trendline well COC concentration is increasing, the increasing COC trendline will continue to be evaluated by the same trendline method for reconfirmation over the following year. If the increasing COC trend is not reconfirmed by the next annual trend evaluation of two (2) semiannual sampling events, the Permittee shall document the finding in the Annual Report required subsequent to the trend reconfirmation evaluation semiannual sampling events, but otherwise no further action is required. If the increasing COC trendline is reconfirmed by annual trend evaluation of the next two (2) semi-annual sampling events, the Permittee will develop a workplan proposing a path forward to determine the reason for the increasing trend and to identify appropriate remedies and permit modifications as deemed necessary. The workplan will be submitted for DEQ review and approval within sixty (60) days of the date on which the increasing trend was reconfirmed. The workplan shall include an implementation schedule for DEQ's review and approval. Once approved, the workplan shall be promptly executed in accordance with the approved schedule. The Permittee shall include a workplan completion and findings report in the Annual Report required for the year during which the workplan was implemented.

G. MONITORING PROGRAM AND DATA EVALUATION

1. The Permittee shall determine groundwater quality at each groundwater monitoring program well, designated for sampling and analysis in Table 1-1 of the SAP-QAPP, Permit Attachment 5, semiannually, during the post-closure period. 40 C.F.R. § 264.98(d).

2. The Permittee shall determine the concentration of the COCs specified in Permit Condition III.C, in the groundwater program monitoring wells as specified in Table 1-1 of the SAP-QAPP, Permit Attachment 5, to demonstrate conformance and/or non-conformance with the GWPS. 40 C.F.R. § 264.96. Samples must be collected semiannually. 40 C.F.R. § 264.99(d) and (f).

3. The Permittee shall submit a groundwater monitoring report annually to the DEQ. The report will include the information listed in Permit Condition III.H.2 from the semiannual monitoring events, typically scheduled in April and October. This information must be submitted no later than March 15, of the following year.

4. At the LTU, groundwater monitoring will continue, in accordance with the requirements specified in this Permit and in the SAP-QAPP, Permit Attachment 5, until it is released from the terms defined in this permit.

5. The Permittee shall sample and determine the concentration of designated COCs (COCs listed in Table 1-2 of the SAP QAPP, Attachment 5) in all wells specified as POC wells in Table 1-1 of the SAP-QAPP, Permit Attachment 5, once every two (2) years during the term of this Permit beginning with the year following the approval date of this Permit. POC wells containing measurable LNAPL are not required to be sampled. The POC well test results shall be reported in the annual groundwater monitoring report (required by Permit Condition III.H) to be submitted in the following year.

H. RECORDKEEPING AND REPORTING

1. The Permittee shall enter all monitoring, testing, and analytical data obtained in accordance with Permit Condition III.G. in the operating record, 40 C.F.R. § 264.97(j). The data must include all methods and procedures used for the trend evaluations.

2. The Permittee shall report on an annual basis, in writing, to the DEQ on the results of the sitewide groundwater monitoring program and on the effectiveness of the corrective action activities undertaken to bring groundwater contamination to below the GWPS. The groundwater monitoring and corrective action program annual report shall provide a chronology of the events during the preceding calendar year and provide a summary of the planned activities for the current calendar year. The annual report shall be submitted no later than March 15 of the year following the sampling events, 40 C.F.R. § 264.97(j), and include:

    a. Groundwater monitoring program analytical and gauging measurement results;

    b. Data evaluation results;

    c. Groundwater potentiometric map, COC plume map(s), and LNAPL map;

    d. Groundwater elevations;

    e. Groundwater trend evaluation determinations and charts;

    f. Groundwater detection monitoring determinations;

    g. Corrective action program activities for the reporting period;

    h. Corrective action program monitoring and performance results;

    i. Private water well program activities and monitoring results;

    j. All groundwater and corrective action performance analytical data and reports;

    k. All field notes, monitoring well inspection logs, and other field logs completed during groundwater sampling and corrective action performance monitoring activities; and

    l. All information and data specified in the SAP-QAPP , Permit Attachment 5, for reporting;

I. REQUEST FOR PERMIT MODIFICATION

If the Permittee or the DEQ determines the groundwater monitoring program no longer satisfies the requirements of the regulations, the Permittee must, within ninety (90) days of the determination, submit an application for a permit modification to make any appropriate changes to the program, which will satisfy the regulations. 40 C.F.R. § 264.98(h).

SECTION IV – POST-CLOSURE CARE AND MAINTENANCE

A. SECTION HIGHLIGHTS

The Permittee performs post-closure care (i.e., monitoring and maintenance) for the closed hazardous waste land treatment unit (LTU), Plots 1 through 6. DEQ approved closure for LTU Plots 1, 2, and 3 in 1986 and LTU Plots 4, 5, and 6 on July 17, 1997. The LTU has been under post-closure care since July 17, 1997. Permit items covered by this section include a summary of the types of wastes, the remaining length of post-closure care, continued monitoring and maintenance activities, any special features associated with the post-closure care operation; and a reference to any special Permit conditions.

B. UNIT IDENTIFICATION

The LTU is composed of six (6) plots consisting of approximately 16.94 acres. The unit was operated during the life of the former refinery beginning in 1977. Plots 1, 2, and 3 were permitted for hazardous waste and Plots 4, 5, and 6 were permitted for non-hazardous waste. The last waste application to Plots 1, 2, and 3 was in March 1986. The final application of waste to Plots 4, 5 and 6 was in April 1994. The hazardous wastes that were applied to the LTU are listed in the table below. All plots are under post-closure care pending application for release from Permit requirements. The Permittee shall provide post-closure care for the LTU in accordance with the terms and conditions of this Permit in the manner set forth in this Permit section.

Type of Waste Unit	*Unit No. or other Designation*	*Description of Wastes Contained*	*Hazardous Waste No.*
Land Treatment Unit	Plots 1, 2 & 3	Separator sludge	K051
		Slop oil emulsion solids	K049
		Dissolved air flotation (DAF) float	K048
		Heat exchanger bundle cleaning sludges	K050
		Petroleum refinery primary oil/water/solids separation sludge	F037
	Plots 4, 5 & 6	Biological pond bottom sludge and sediments	Non-hazardous

C. POST-CLOSURE PROCEDURES AND USE OF PROPERTY

1. The Permittee shall conduct post-closure care for the LTU in Permit Condition B above, to begin after completion of closure of the unit and continue for thirty (30) years after that date, except that the 30 year post-closure care period may be shortened upon application and demonstration approved by the DEQ that the facility is secure or may be extended by the DEQ if necessary to protect human health or the environment. 40 C.F.R. § 264.117(a).

2. The Permittee shall maintain and monitor the groundwater monitoring system and comply with all other applicable requirements of 40 C.F.R. Part 264 Subpart F during the post-closure period, 40 C.F.R. § 264.117(a), for the LTU in accordance with the provisions set forth in Permit Attachment 3. Groundwater monitoring program provisions of Section III apply to the LTU.

3. The Permittee shall comply with all security requirements, as specified in Permit Attachment 2. 40 C.F.R. § 264.117(b).

4. The Permittee shall not allow any use of the units designated in Permit Condition IV.B that are currently owned by the Permittee, which will disturb the integrity of the final cover, any components of the containment system, or the function of the facility's groundwater monitoring systems, during the post-closure care period. 40 C.F.R. § 264.117(c).

5. The Permittee shall implement the Post-Closure Care Plan, as specified in Permit Attachment 3. All post-closure care activities must be conducted in accordance with the provisions of the Post-Closure Care Plan specified in Permit Attachment 3. 40 C.F.R. §§ 264.117(d) and 264.118(b).

6. During the post-closure care period, the Permittee shall comply with the requirements for LTUs as follows. 40 C.F.R. § 264.280(c):
    a. Maintain a vegetative cover over the closed portions of the facility.
    b. Maintain the run-on control system required under 40 C.F.R. § 264.273(c).
    c. Maintain the run-off management system required under 40 C.F.R. § 264.273(d).
    d. Continue to comply with any prohibitions concerning growth of food-chain crops required under 40 C.F.R. § 264.276.
    e. Continue all operations, including pH control, necessary to enhance degradation and transformation and sustain immobilization of hazardous constituents in the LTU treatment zone to the extent that the measures are consistent with other post-closure care activities.
    f. Control wind dispersal of hazardous waste as required under 40 C.F.R. § 264.273(f).

D. INSPECTIONS

The Permittee shall inspect the components, structures, and equipment at the site in accordance with the Inspection Schedule, as provided in the Inspection and Maintenance Activities, Permit Attachment 2. 40 C.F.R. § 264.117(a)(1)(ii).

E. NOTICES AND CERTIFICATION

When the LTU has achieved a "No Further Action" (NFA) certification from the DEQ, it may be released from the conditions of this Permit, provided:

1. No later than sixty (60) days after certification of release for the LTU, the Permittee shall submit to the local zoning authority, or the authority with jurisdiction over land use, and to the DEQ a record of the type, location and quantity of hazardous wastes contained within the LTU. 40 C.F.R. § 264.119(a). If the Permittee is unable to provide this record, DEQ may do so at its own discretion.

2. Within sixty (60) days of a release for the LTU, the Permittee shall:
    a. Record, in accordance with Oklahoma law, a notation on the deed to the facility property, or on some other instrument that is normally examined during a title search, that will in perpetuity notify any potential purchaser of the property that:
        i. The land has been used to manage hazardous waste.
        ii. Its use is restricted under 40 C.F.R. Part 264 Subpart G regulations.
        iii. The survey plat and record of the type, location, and quantity of hazardous wastes disposed of within each LTU plot have been filed with the DEQ and the local zoning authority: the City of Enid, Oklahoma.
        iv. The contaminated properties may be listed on "Appendix H" of OAC Title 252, Chapter 730 as a known area of groundwater contamination.
    b. Submit a certification to the DEQ, signed by the Permittee, that the Permittee has recorded the notation specified in Permit Condition IV.E.2.a, including a copy of the document in which the notation has been placed. 40 C.F.R. § 264.119(b)(2).

3. If the Permittee or subsequent owner or operator of the land upon which the LTU is located wishes to remove hazardous wastes and hazardous waste residues, the liner, if any, or contaminated soils, then he shall request a modification to this Post-Closure Permit in accordance with the applicable requirements in 40 C.F.R. Parts 124 and 270. The Permittee or any subsequent owner or operator of the land shall demonstrate that the removal of hazardous wastes will satisfy the criteria of 40 C.F.R. § 264.117(c). 40 C.F.R. § 264.119(c).

4. No later than sixty (60) days after completion of the established post-closure care period for the LTU, the Permittee shall submit to the DEQ, by registered mail, a certification that the post-closure care for the LTU was performed in accordance with the specifications in the approved Post-Closure Care Plan, Permit Attachment 3. The certification must be signed

by the Permittee and an independent, registered professional engineer. Documentation supporting the independent, registered professional engineer's certification must be furnished to the DEQ upon request until the DEQ releases the Permittee from the financial assurance requirements for post-closure care under 40 C.F.R. § 264.145(i). 40 C.F.R. § 264.120.

F. FINANCIAL ASSURANCE

The Permittee shall maintain financial assurance during the post-closure and corrective action periods as set forth in Permit Condition II.K and the Permit Attachment 4 cost estimate and comply with all applicable requirements of 40 C.F.R. Part 264 Subpart H and 40 C.F.R. § 264.145. Financial Assurance must be provided for post-closure care of the LTU and the corrective actions. The Permit Attachment 4 cost estimate will be updated as considered necessary by DEQ for inflation and any changes associated with post-closure care and corrective action.

During the post-closure care period, the DEQ may approve a decrease in the required post-closure cost estimate if the Permittee demonstrates to the DEQ that the amount exceeds the remaining cost of post-closure care. 40 C.F.R. § 264.145(c)(8).

G. POST-CLOSURE PERMIT MODIFICATIONS

The Permittee must request a permit modification to authorize a change in the approved Post-Closure Care Plan. This request must be in accordance with applicable requirements of 40 C.F.R. Parts 124 and 270 and must include a copy of the proposed amended Post-Closure Care Plan for approval by the DEQ. The Permittee shall request a permit modification when changes in operating plans or design prompt a change in the approved Post-Closure Care Plan, whenever there is a change in the expected year of final closure, or other events occurring during the term of this Permit that affect the approved Post-Closure Care Plan. The Permittee must submit a written request for a permit modification at least sixty (60) days prior to the proposed change in facility design or operation, or no later than sixty (60) days after an unexpected event has occurred which has affected the Post-Closure Care Plan. 40 C.F.R. § 264.118(d).

SECTION V – CORRECTIVE ACTION and SPECIAL CONDITIONS PURSUANT TO THE 1984 HAZARDOUS AND SOLID WASTE AMENDMENTS (HSWA)

A. STANDARD CONDITIONS

1. Waste Minimization

Annually, by December 1, for the previous year ending September 30, the Permittee shall enter into the operating record as required by 40 C.F.R. § 264.73(b)(9), a statement certified according to 40 C.F.R. § 270.11(d) specifying that the Permittee has a program in place to reduce the volume and toxicity of hazardous wastes generated by the facility's operation to the degree determined by the Permittee to be economically practicable; and the proposed method of treatment, storage, or disposal is that practicable method currently available to the Permittee which minimizes the present and future threat to human health and the environment. A current description of the program shall be maintained in the operating record and a copy of the annual certified statement shall be submitted to the DEQ. The following are suggested criteria for the program:

a. Any written policy or statement that outlines goals, objectives, and/or methods for source reduction and recycling of hazardous waste at the facility;

b. Any employee training or incentive programs designed to identify and implement source reduction and recycling opportunities;

c. Any source reduction and/or recycling measures implemented in the last five (5) years or planned for the near future;

d. An itemized list of the dollar amounts of capital expenditures (plant and equipment) and operating costs devoted to source reduction and recycling of hazardous waste;

e. Factors that have prevented implementation of source reduction and/or recycling;

f. Sources of information on source reduction and/or recycling received at the facility (e.g., local government, trade associations, suppliers, etc.);

g. An investigation of additional waste minimization efforts which could be implemented at the facility. This investigation would analyze the potential for reducing the quantity and toxicity of each waste stream through production reformulation, recycling, and all other appropriate means. The analysis would include an assessment of the technical feasibility, cost, and potential waste reduction for each option;

h. A flow chart or matrix detailing all hazardous wastes it produces by quantity, type, and building/area;

i. A demonstration of the need to use those processes, which produce a particular hazardous waste, due to a lack of alternative processes or available technology that would produce less hazardous waste.

j. A description of the waste minimization methodology employed for each related process at the facility. The description should show whether source reduction or recycling is being employed.

k. A description of the changes in volume and toxicity of waste actually achieved during the year in comparison to previous years.

2. Dust Suppression

Pursuant to 40 C.F.R. § 266.23(b), and the Toxic Substances Control Act, the Permittee shall not use waste or used oil or any other material which is contaminated with dioxin, polychlorinated biphenyls (PCBs), or any other hazardous waste (other than a waste identified solely on the basis of ignitability), for dust suppression or road treatment.

3. Permit Modification

a. DEQ Initiated Modifications

If at any time for any of the reasons specified in 40 C.F.R. § 270.41, DEQ determines that modification of this Permit is necessary, it may initiate permit modification proceedings in accordance with the regulations set forth at 40 C.F.R. § 270.41.

b. Permittee Initiated Modifications

The Permittee may, when appropriate, initiate permit modifications in accordance with the regulations set forth at 40 C.F.R. § 270.42. All applicable requirements and procedures as specified in 40 C.F.R. § 270.42 shall be followed by the Permittee in initiating such proceedings.

c. Modification of Corrective Action Schedules of Compliance (CASCs)

i. The Permittee shall adhere to CASCs contained in the Permit. If at any time the Permittee determines that such schedules cannot be met, the Permittee shall, within fifteen (15) days of such determination, notify the DEQ and submit a request for a permit modification under 40 C.F.R. § 270.42, with a justification as to why the current CASC cannot be met.

ii. If the DEQ determines that a modification of the CASCs is required, the following procedure will apply. CASCs modifications made under this procedure are not subject to administrative appeal.

iii. The DEQ will notify the Permittee in writing of the proposed modification. Such notice will:

iv. Describe the exact changes to be made to the Permit conditions;

v. Provide an explanation of why the modification is needed;

vi. Provide notification of the date by which comments on the proposed modification must be received. Such date will not be less than twenty (20) days from the date the notice of proposed modification is received by the Permittee, or after the public notice is published;

vii. Provide notification that supporting documentation or data may be available for inspection at the State or EPA Regional office; and

viii. Include the name and address of a representative of the DEQ to whom comments may be sent.

d. The DEQ shall cause to be:

i. Published a notice of the proposed modification in a newspaper distributed in the locality of the facility, which includes notice of items in Permit Condition V.A.3.c.iv-viii;

ii. Mailed a notice of the proposed modification to all persons on the facility mailing list, Permit Attachment 1, maintained according to 40 C.F.R. § 124.10(c)(1). Such notice will include items under Permit Condition V.A.3.c.iv-viii, and shall be mailed concurrently with notice to the Permittee;

iii. For facilities which have established an information repository pursuant to Permit Condition V.C., the DEQ shall cause to be placed a notification of the proposed modification, including items under Permit Condition V.A.3.c.iv-viii, in the information repository concurrently with actions taken under those items.

e. DEQ's Decision Regarding Modification:

i. If the DEQ receives no written comment on the proposed modification, the modification shall become effective five (5) calendar days after the close of the comment period. The DEQ shall:

ii. Notify the Permittee in writing of the final decision.

iii. Notify individuals on the facility mailing list in writing that the modification has become effective and shall place a copy of the modified

permit in the information repository if a repository is required for the facility.

f. If the DEQ receives written comment on the proposed modification, the DEQ shall make a final determination concerning the modification after the end of the comment period. The DEQ shall:

i. Notify the Permittee in writing of the final decision.

ii. Provide notice of the final modification decision in a locally distributed newspaper and place a copy of the modified permit in the information repository if a repository is required for the facility.

4. Permit Review

This Permit shall be reviewed by the DEQ five (5) years after the date of Permit issuance and may be modified as necessary as provided for in Permit Condition V.A.3. Nothing in this section shall preclude the DEQ from reviewing and modifying the Permit at any time during the term of the Permit.

5. Compliance with Permit

Compliance with a RCRA Post-Closure permit during its term constitutes compliance, for purposes of enforcement, with Subtitle C of RCRA except for those requirements not included in the permit which:

a. Become effective by statute; or

b. Are promulgated under 40 C.F.R. Part 268 restricting the placement of hazardous wastes in or on the land.

6. Specific Waste Ban

a. The Permittee shall not place in any land disposal unit the wastes specified in 40 C.F.R. Part 268 after the effective date of the prohibition, unless the Regional Administrator has established disposal or treatment standards for the hazardous waste, and the Permittee meets such standards and other applicable conditions of this Permit.

b. The Permittee may store wastes restricted under 40 C.F.R. Part 268 solely for the purpose of accumulating quantities necessary to facilitate proper recovery, treatment, or disposal, provided that it meets the requirements of 40 C.F.R. § 268.50(a)(2) including, but not limited to, clearly marking each tank or container.

c. The Permittee is required to comply with all requirements of 40 C.F.R. § 268.7 as amended.

d. The Permittee must comply with requirements restricting placement of hazardous wastes in or on land, which become effective by statute or promulgated under Part 268, regardless of the requirements of this Permit. Failure to comply with the regulations

may subject the Permittee to enforcement action under Section 3008 of RCRA.

7. Information Submittal

Failure to comply with any condition of the Permit, including information submittal, constitutes a violation of the Permit and is grounds for enforcement action; permit amendment, termination, revocation, or suspension; or denial of Permit renewal application. Falsification of any submitted information is grounds for termination of this Permit, 40 C.F.R. § 270.43.

The Permittee shall ensure that all plans, reports, notifications, and other submissions to the DEQ required in this Permit are signed and certified in accordance with 40 C.F.R. § 270.11. A summary of the planned reporting requirements pursuant to this Permit is found in Table 1 "RFI/CMS Submission Summary" at the end of this section. One (1) hard copy, and one (1) compact disc copy or Microsoft-compatible electronic storage device of these plans, reports, notifications, or other submissions shall be submitted to the DEQ by Certified Mail or hand-delivered to:

Department of Environmental
Quality Land Protection
Division 707 N. Robinson
Avenue Oklahoma City, OK
73102
Attn: Chief Engineer

8. Plans and Schedules Incorporated Into Permit

All Plans and schedules required by this Permit are, upon approval by the DEQ, incorporated into this Permit by reference and become an enforceable part of this Permit. Since required items are essential elements of this Permit, failure to submit any of the required items or submission of inadequate or insufficient information may subject the Permittee to enforcement action under Section 3008 of RCRA which may include fines or suspension or revocation of the Permit.

Any noncompliance with approved plans and schedules shall be deemed as noncompliance with this Permit. Written requests for extensions of due dates for submittals may be granted by the DEQ.

If the DEQ determines that actions beyond those provided for, or changes to what is stated herein, are warranted, the DEQ may modify this Permit according to procedures in Permit Condition V.A.3.

9. Data Retention

All raw data, relating to corrective action such as laboratory reports, drilling logs, bench-scale or pilot-scale data, and other supporting information gathered or generated during activities undertaken pursuant to this Permit shall be maintained at the facility during the term of this Permit, including corrective measures

completion reports and any reissued Permits,

10. Management of Wastes

All solid wastes which are managed pursuant to a remedial measure taken under the corrective action process or in an interim measure addressing a release or the threat of a release from a SWMU shall be managed in a manner protective of human health and the environment and in compliance with all applicable federal, state and local requirements. The regulations under 40 C.F.R. 264 Subpart S – Special Provisions for Cleanup shall be applicable for managing these wastes. Approval of units for managing wastes and conditions for operating units, if approved, shall be granted through the permitting process. The Permittee shall follow the procedures in the Waste Management Plan, Permit Attachment 6, for management of waste generated at the facility.

B. GENERAL COMMENTS TO HSWA CONDITIONS

Petroleum hydrocarbons attributable to the operation of the former refinery have extensively contaminated the uppermost Isolated Enid Terrace groundwater aquifer underlying the facility. The hydrocarbons present in the contaminated groundwater exist as dissolved phase aqueous hydrocarbons and as light non-aqueous phase liquids (LNAPL). The LNAPL exists as both mobile LNAPL and residual LNAPL. LNAPL at the facility is no longer migrating and the LNAPL footprint is stable. The residual LNAPL footprint extends off-site. The dissolved phase groundwater contamination plume extends off-site and is generally stable as well. Since the closure of the refinery in 1983, a variety of technologies have been utilized or tested for remediation of the contaminated groundwater present at the facility. Recovery of LNAPL was conducted between 1986 to 1998 and over this period approximately 1.5 million gallons of LNAPL was recovered reducing LNAPL to the extent practical.

The Permittee submitted the *NSZD Remedy Implementation Work Plan*, dated July 16, 2020 (Work Plan), to DEQ proposing implementation of natural source zone depletion (NSZD) as the sitewide groundwater corrective action remedy for the facility. DEQ approved the Work Plan and NSZD as the sitewide corrective action interim measure remedy to address the contaminated groundwater underlying the facility and areas beyond the facility boundary. Section 6.0 Corrective Action of the Permit Application (dated October 20,2023) documents the Permittee's transition to NSZD as the sitewide interim remedy to address the contaminated groundwater at the facility and states the NSZD remedy is being implemented in accordance with the DEQ approved Work Plan. Section 6.0 Corrective Action of the Permit Application proposes certain changes to the Work Plan such as changes to the groundwater geochemistry sampling schedule.

The Permittee shall submit an updated *NSZD Interim Remedy Implementation Work Plan* (Updated Work Plan) within one hundred eighty (180) days of the Permit issuance date for DEQ review and approval. The Updated Work Plan shall incorporate the changes requested and approved by DEQ subsequent to submittal of the initial Work Plan and those proposed in Section 6.0 Corrective Action of the Permit Application. Upon DEQ approval, the Updated Work Plan will become the basis for implementing the NSZD interim measure remedy during the Permit period. Changes to the Updated Work Plan may require approval of a permit modification to be determined by DEQ.

DEQ will continue to evaluate the performance and effectiveness of the NSZD interim measure remedy with information the Permittee submits in subsequent assessment reports, including the annual report, during the permit period.

The 2014 Permit identified and listed areas of interest (AOIs), A through F, which were designated to prioritize remediation of individual areas across the facility. AOIs are not retained in this Permit based on DEQ's approval of the site wide NSZD interim measure remedy to address groundwater contamination which does not factor in the need for nor use of AOIs.

A solid waste management unit (SWMU) is defined in Section I of this Permit. The SWMUs investigated during the 1992 RCRA Facility Investigation (RFI) were placed into eight (8) groups. The RFI determined SWMU Groups 2 through 8 required no further action. SWMU Group 1 (non-hazardous LTU Plots 4, 5, and 6) is subject to post-closure care and monitoring in this Permit. The hazardous waste LTU Plots 1, 2 and 3 were not included in a SWMU group but are subject to post-closure care and monitoring in this Permit. The 1992 RFI Report did not include SWMU Group 9 which was listed in Table 1 of Post-Closure Permit #3524007-PCI. Several of the individual SWMU units in Group 9 are included in Groups 1 through 8. The 2014 Permit identified other SWMUs not listed in any of the groups. The RFI determined releases of petroleum hydrocarbons were related to sitewide refinery operations and could not be directly related to releases from individual SWMUs and therefore assignment of specific SWMUs to the releases was not viable. The NSZD interim measure remedy addresses releases sitewide, including any historical releases from the SWMUs. The SWMUs identified at the facility are documented in the following historical summary and descriptions.

> The SWMU defined in Section I of this Permit includes LTUs and also "locations at which waste or other materials were released in a routine and systematic manner (such as where leaks occurred routinely over time) would be a SWMU." Since the facility was investigated according to the RFI guidance, newly identified SWMUs are not anticipated by DEQ to be discovered.
>
> While the 1992 RFI determined that historical SWMU Groups 2 through 8 warranted "no further action", all groupings defined in the RFI Report are described below for continuity of information. SWMU Group 1 continues to be subject to post-closure care and monitoring.
>
> <u>SWMU Group 1</u>:
> SWMU#1 - non-hazardous Land Treatment Unit Plot 4 (closed as hazardous)
> SWMU#2 - non-hazardous Land Treatment Unit Plot 5 (closed as hazardous)
> SWMU#3 - non-hazardous Land Treatment Unit Plot 6 (closed as hazardous)
> These plots were used for biological treatment of non-hazardous petroleum wastes. The waste consisted of solids generated during closure of the refinery's waste management units and was mostly biological pond sludge and sediments.
>
> <u>SWMU Group 2</u>:
> SWMU#36 - biological treatment aeration pond 4
> SWMU#37 - biological treatment aeration pond 5
> The ponds received discharge from the site's wastewater treatment facility. The procedure in the 1980s and 1990s was to retain the water for thirty (30) days, then

outflow to Skeleton Creek via the NPDES permitted discharge channel.

SWMU Group 3:
SWMU#4 - the stormwater lake
SWMU#5 - the lake dredge pit
SWMU#6 - the equalization basin
SWMU#29 - the wastewater treatment facility (API separator)

The approximately 10-acre lake collected runoff from the surrounding area including emergency overflow from the equalization basin. The non-hazardous lake bottom sediments were gradually applied to the land farm plots in Group 1. The 2-acre dredge pit east of the stormwater lake collected lake dredge material. The equalization basin received flow from the wastewater treatment facility. The excavated lake bottom sediments and basin sediments were placed in the non-hazardous land farm plots.

SWMU Group 3A:
SWMU#38 - one acre impoundment pond 6
SWMU#39 - one acre impoundment pond 7

This grouping bounds the National Pollutant Discharge Elimination System (NPDES) discharge channel. The two ponds at one time were part of the channel but were later separated by a berm. Water from the biological aeration ponds was directed to the channel and discharged offsite, in the southwest sector of the property under an NPDES permit.

SWMU Group 4:
SWMU#14 - old fire training area
SWMU#33 - biological pond 1
SWMU#34 - biological pond 2
SWMU#35 - biological pond 3

The fire training area was approximately 700 square feet, and each pond was approximately one-acre. Pond sediment was land-farmed. Pond 1 was backfilled with construction rubble, however Ponds 2 and 3 were not backfilled.

SWMU Group 5:
No individual SWMU units were included in this grouping. The boundary was defined as encompassing the former tank farm in the south central part of the refinery. The original tanks were constructed in the 1950s and demolished in 1987. Prior to 1940 this was part of the leaded gasoline treatment area.

SWMU Group 6:
SWMU#17 - oil reclaimer sump
SWMU#18 - oil reclaimer tank (hazardous waste storage bin)
SWMU#19 - oil reclaimer tank (tanks 353 and 354)

The oil reclaimer sump and tanks were constructed in the 1950's. the oil reclaiming system was also located within this SWMU grouping.

SWMU Group 7:
SWMU#7 - spray pond
SWMU#16 - coke fines pond
SWMU#28 - acid sludge pit

The 3.5-acre spray pond was used for processing cooling water before 1940 and later as a firewater pond. Pond sediment was excavated and transferred to the land farm. The coke fines pond (also known as the skimming pond) sludge was excavated. In 1986 the ponds were backfilled with construction rubble. The acid sludge pit contained sludge from lubrication oil treatment operations. The sludge was excavated and disposed of offsite at an approved disposal facility. The pit was partially backfilled with concrete rubble.

SWMU Group 8:
SWMU#24 - area of surficial oily waste east of tank 614
SWMU#25 - area of approximately 0.5-acre registered as a disposal site for lead-containing sludge from tank bottoms; however, extensive sampling from 1980-1987 revealed no contamination.
SWMU#26 - two-acre firewater pond south of tank 614
SWMU#27 - area of surficial oily waste southeast of tank 614

This SWMU grouping is located in the northwest sector of the refinery and contained disposal areas for oily waste. The oily material was removed and land-farmed in 1989.

The 1992 RFI Report did not include SWMU Group 9 which was listed in Table 1 of Post- Closure Permit #3524007-PCI. Several of the individual SWMU units (#18, 19, 29, 38, and 39) included in Group 9 were included in the Groups listed above. The following SWMU units were not listed in the 1992 RFI Report definition of SWMU groups:

Units 8-13	Six lime settling tanks
Unit 15	Heat exchanger bundle cleaning area
Unit 20	Cresylate caustic storage tank 118
Unit 21	Sulfuric caustic storage tank 116
Units 22-23	Waste storage area for asbestos and PCB drums
Unit 30	Flash mix tank 518 (wastewater treatment plant)
Unit 31	Flocculation tank 519 (wastewater treatment plant)
Unit 32	DAF tank 517 (wastewater treatment plant)

At the time of the 1992 RFI, the site had an existing groundwater recovery system. The Oklahoma Water Resources Board oversaw the clean-up of contamination from 1975 to approximately 1988 when the facility oversight transferred to the Oklahoma State Department of Health. The RCRA duties of the OSDH were transferred to the newly-created DEQ in 1993.

C. SPECIFIC CONDITIONS – INFORMATION REPOSITORY

1. The Permittee shall continue to maintain the information repository to provide the public opportunity to review and comment on activities specified in the Permit. This repository shall be maintained at a local public library or similar facility which is easily accessible to

the public.

2. Within thirty (30) days of the effective date of this Permit, the Permittee shall mail a notice to all individuals on the Facility Mailing List, Permit Attachment 1, maintained by the DEQ, including all individuals that submitted oral or written comments on the Permittee's draft permit during the public comment period. The Permittee shall amend this mailing list as necessary to include those individuals that submit a written request to the DEQ and the Permittee for inclusion in this list.

3. This notice shall state the location, purpose, and content of the repository. A copy of this notice shall be provided to the DEQ for approval prior to mailing to the public.

4. The Permittee shall state in this notice that written comments concerning each submittal (excluding progress reports and correspondence) required by this Permit shall be forwarded to the following representative within fifteen (15) calendar days of the date due to the DEQ:

   Kelly Dixon, Director
   Land Protection
   Division
   Department of Environmental
   Quality 707 N. Robinson Avenue
   Oklahoma City, OK 73102

5. Once established, the Permittee shall place into the repository, on or before the date due to the DEQ, all documents (e.g., all correspondence, Work Plans, Corrective Action Plans, associated periodic reports and final reports) as specified in this Permit, and those documents deemed appropriate by the DEQ. The Permittee shall specify within the text or cover letter of each document the date each submittal was placed in the repository.

6. On or before five (5) calendar days prior to the due date of each submittal (excluding progress reports and correspondence) required by this Permit, the Permittee shall mail a notice to each individual, specified in Permit Condition V.C.2., indicating the date the respective submittal will be made available for public review at the repository.

D. SPECIFIC CONDITION – PRIVATE WATER WELL PROGRAMS

The Permittee is a former petroleum refinery, which has been closed since 1983. The Land Treatment Unit (LTU) portion of this site has been in post-closure since 1998. The existing groundwater contamination at the facility is due to past refinery operations, no releases have occurred from the RCRA permitted LTU.

1. Private Water Well Program:

   a. The Permittee will continue the Private Water Well Program detailed below through the term of the Permit.

   b. The Permittee implemented the DEQ-approved *Work Plan for Private Well Testing,*

Removal of Affected Wells, and Establishment of Institutional Controls (Anadarko 2021) in 2021. The Work Plan identified 27 potential private water wells within the residential area south of the facility (i.e., the Study Area) and proposed sampling and reporting activities for private water wells. The Study Area is defined as the area where groundwater concentrations of benzene are at or above the 0.005 mg/L MCL, plus an additional 200-foot buffer zone. The Study Area is serviced by the City of Enid potable water supply system. Water samples have been collected from these private water wells in the Study Area where the property owner/resident granted access and the well was accessible to sample. In addition, the Permittee will offer to plug and abandon any private water well within the Study Area as well as the buffer zone. The Permittee shall submit an updated *Work Plan for Private Well Testing of Affected Wells, and Establishment of Institutional Controls* within one hundred eighty (180) days of the Permit issuance date for DEQ review and approval.

c. The Permittee worked with the landowners to file a Notice of Remediation and Land Use Restriction that prohibits future installation of water wells on their property. The Permittee provided these documents in English and Spanish to the residents. The results from the initial implementation of the Work Plan were provided in the Private Well Work Report (Trihydro 2022a). The Permittee will continue collection of groundwater samples from the identified private water wells within the Study Area where access is granted by the property owner. For water wells in the Study Area not sampled, the Permittee will continue to send an annual request to sample and/or plug the water wells.

d. The Permittee implemented the DEQ-approved *Groundwater Communications Plan* (Anadarko 2021) in 2021. The Plan included public and private outreach efforts and was proposed for a 3-year period. The goal of the Plan was to engage and inform the community about Site conditions and to discourage and prevent use of groundwater within the Study Area. The results from the initial year of implementation were provided in the Groundwater Communications Plan 2022 Report (Trihydro 2023). The 2021 Plan proposed a 3-year demonstration period, 2022 through 2024, where Anadarko would send property owners and residents in the Study Area an updated notification letter. The 2022 letter advised residents of current groundwater conditions and provided contact information for the Permittee project representatives. The Permittee shall submit an updated *Groundwater Communications Plan* within one hundred eighty (180) days of the Permit issuance date for DEQ review and approval. The Permittee will continue the community outreach efforts throughout the duration of the upcoming 10-year permit renewal period, including routine engagement with property owners in the Study Area as well as local water well drillers.

e. The Permittee will provide an update report on all Private Water Well Program activities and findings in the Annual Report, required by Permit Condition III.H of this Permit.

2. DEQ anticipates an additional RFI or CMS will not be needed, however provisions are included in this section of the Permit. Should a newly defined SWMU or AOC be discovered, the Permittee shall report the finding to DEQ within thirty (30) days per

Permit Condition V.G of this section, and submit an RFI Workplan per Permit Condition J., of this section. The initial Permit was renewed by the DEQ effective beginning November 20, 1998.

E. CORRECTIVE ACTIONS

1. Corrective Action for Releases: OHWMA and Section 3004(u) of RCRA, as amended by HSWA, and 40 C.F.R. § 264.101, require that permits issued after November 8, 1984, address corrective action for releases of hazardous waste including hazardous constituents from any SWMU at the facility, regardless of when the waste was placed in the unit.

   As detailed in Permit Condition V.B of this section, the Permittee proposed and DEQ approved NSZD as the sitewide interim measure remedy to address contaminated groundwater, including contaminated groundwater which has migrated beyond the facility property boundary, resulting from past refinery operations including releases which may have occurred from SWMUs. DEQ will continue to evaluate the performance and effectiveness of the NSZD interim remedy with information the Permittee submits in subsequent assessment reports, including the annual report. DEQ may determine additional corrective actions are required to address contaminated groundwater during the Permit period.

2. Releases Beyond Facility Boundary

   a. The Permittee shall notify DEQ verbally, within twenty four (24) hours of discovery of any release of hazardous waste or hazardous constituents that has the potential to migrate off-site.

   b. OHWMA and Section 3004(v) of RCRA as amended by HSWA, and federal regulations promulgated as 40 C.F.R. § 264.101(c), require corrective actions beyond the facility property boundary, where necessary to protect human health and the environment, unless the Permittee demonstrates that, despite the Permittee's best efforts, the Permittee was unable to obtain the necessary permission to undertake such actions. The Permittee is not relieved of all responsibility to clean up a release that has migrated beyond the facility boundary where offsite access is denied.

3. Risk Assessment

   a. The Permittee shall conduct human health and ecological risk assessments as necessary for the protection of human health and the environment. These risk assessments shall be used to establish baseline risk at a site and/or to derive final or interim cleanup levels at the site. These risk assessments, if necessary (should a newly defined SWMU be discovered), shall be performed concurrently with the corrective action activities specified in this Permit, including any activities undertaken during implementation of the activities proposed in the RFI Work Plan.

4. Dispute Resolution

   a. The parties shall use their best efforts to informally and in good faith resolve all

disputes or differences of opinion at the Project Manager level. If, however, disputes arise concerning the corrective action which the parties are unable to resolve at this level, including but not limited to disputes over implementation of work plans; approval of documents; scheduling of any work; selection, performance, or completion of any corrective action; or any other obligation assumed hereunder, the Permittee shall present a written notice of such dispute, and the basis for the objections, to the Chief Engineer of the Land Protection Division of the DEQ within ten (10) business days of the receipt of DEQ's original disapproval, decision or directive. The notice shall set forth the specific points of the dispute, the position the Permittee maintains should be adopted as consistent with the Permit's requirements, thereof, and any matters which it considers necessary for DEQ's proper determination. The Chief Engineer shall provide to the Permittee a written statement of his decision on the pending dispute, which shall be deemed incorporated into the final Permit.

b. If the Permittee objects to the Chief Engineer's determination, the Permittee shall, within ten (10) days of its receipt of the Chief Engineer's written decision, notify DEQ in writing of its objections, and may request that the Director of the Land Protection Division convene an informal conference. Promptly after such conference, the Director shall state in writing his/her decision regarding the issues in dispute. Such decision shall be the final resolution of the dispute and shall be implemented immediately by the Permittee according to the schedule contained therein.

F. REPORTING REQUIREMENTS

1. The Permittee shall submit in accordance with Permit Condition V.A.7, signed annual reports of all activities (i.e., RFI, CMS) conducted pursuant to the provisions of this Permit, no later than the 15th day of the month following the end of the quarter. These reports can be submitted as one document and shall contain:

   a. A description of the work completed and an estimate of the percentage of work completed;

   b. Summaries of all findings, including summaries of laboratory data;

   c. Summaries of all problems or potential problems encountered during the reporting period and actions taken to rectify problems;

   d. Projected work for the next reporting period;

   e. Summaries of contacts pertaining to corrective action or environmental matters with representatives of the local community, public interest groups or state government during the reporting period;

   f. Changes in key project personnel during the reporting period; and

   g. Summaries of all changes made in implementation during the reporting period.

2. Copies of other reports relating to or having bearing upon the corrective action work (e.g., inspection reports), drilling logs and laboratory data shall be made available to the

DEQ upon request.

G. NOTIFICATION REQUIREMENTS FOR AND ASSESSMENT OF NEWLY IDENTIFIED SWMUs

1. The Permittee shall notify the DEQ, in writing, of any newly identified SWMU(s) (i.e., a unit not specifically identified during the 1992 RFI or in the interim) discovered in the course of groundwater monitoring, field investigations, environmental audits, or other means, no later than thirty (30) calendar days after discovery. The notification shall include the following items, to the extent available:

   a. The location of the newly identified SWMU in relation to other SWMUs;

   b. The type and function of the unit;

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

   d. The period during which the unit was operated;

   e. The specifics, to the extent available, on all wastes that have been or are being managed at the SWMU; and

   f. Results of any sampling and analysis required for the purpose of determining whether releases of hazardous waste including hazardous constituents have occurred, are occurring or are likely to occur, to groundwater or surface water, from the newly identified SWMU.

2. Based on the results of this notification, DEQ will determine the need for further investigations or corrective measures at any newly identified SWMU(s). If DEQ determines that such investigations are needed, DEQ may require the Permittee to prepare a plan for such investigations. This plan will be reviewed for approval as part of the RFI Work Plan or a new RFI Work Plan under Permit Condition V.J. The Permit will be modified according to Permit Condition V.A.3 and Permit Condition V.J.3 to incorporate the investigation requirements for the newly identified SWMU(s), if required.

H. NOTIFICATION REQUIREMENTS FOR NEWLY DISCOVERED RELEASES AT SWMU(s)

The Permittee shall notify the DEQ in writing, no later than fifteen (15) calendar days after discovery, of any release(s) from a SWMU of hazardous waste or hazardous constituents discovered during the course of groundwater monitoring, field investigation, environmental auditing, or other means. Such newly discovered releases may be from newly identified SWMUs or based on the findings of the RFA, or completed RFI, even if DEQ had previously determined no further investigation was necessary. The notification shall include information concerning actual and/or potential impacts beyond the facility boundary and on human health and the environment, if available at the time of the notification. If hazardous wastes or hazardous constituents are determined to have been or are currently being managed at the SWMU, and if the

DEQ determines that there are additional adverse impacts to groundwater and further investigation is necessary, a plan for the investigation shall be prepared. The DEQ may require further investigation and/or interim measures for the newly identified release(s) and may require the Permittee to prepare a plan for the investigation and/or interim measure. The plan will be reviewed for approval as part of the RFI Work Plan or a new RFI Work Plan under Permit Condition V.J. The Permit will be modified according to Permit Condition V.A.3. and Permit Condition V.J.3 to incorporate the investigation, if required.

I. INTERIM MEASURES

1. If during the course of any activity initiated under this Permit, the DEQ determines that a release or potential release of hazardous constituents from a newly identified SWMU poses a threat to human health and the environment, the DEQ may require interim measures. The DEQ shall determine the specific measure(s) or require the Permittee to propose a measure(s). The interim measure(s) may include a permit modification, a schedule for implementation, and a written plan. The DEQ shall notify the Permittee in writing of the requirement to perform interim measures. The DEQ may modify this Permit according to Permit Condition V.A.3., and 40 C.F.R. § 270.41 to incorporate interim measures into the Permit. (27A O. S. §2-6-105; OAC 252:205-9-1 and 252:205-13-1).

2. The Permittee may propose interim measures at any time. The proposal shall include a written plan and a schedule for implementation. Depending upon the nature of the interim measure, a permit modification may not be required.

3. The following factors will be considered by the DEQ in determining the need for interim measures and the need for permit modification:

   a. Time required to develop and implement a final remedy;

   b. Actual and potential exposure to human and environmental receptors;

   c. Actual and potential contamination of drinking water supplies and sensitive ecosystems;

   d. The potential for further degradation of the medium in the absence of interim measures;

   e. Presence of hazardous wastes in containers that may pose a threat of release;

   f. Presence and concentration of hazardous waste including hazardous constituents in soil that have the potential to migrate to ground water or surface water;

   g. Weather conditions that may affect the current levels of contamination;

   h. Risks of fire, explosion, or accident; and

   i. Other situations that may pose threats to human health and the environment.

4. As detailed in Permit Condition V.B, the Permittee proposed and DEQ approved NSZD as the

sitewide interim measure remedy to address contaminated groundwater, including contaminated groundwater which has migrated beyond the facility property boundary, resulting from past refinery operations including releases which may have occurred from SWMUs. DEQ will continue to evaluate the performance and effectiveness of the NSZD interim remedy with information the Permittee submits in subsequent assessment reports, including the annual report. DEQ may determine additional corrective actions are required to address contaminated groundwater during the Permit period.

J. RFI WORK PLAN

1. For any newly identified SWMU(s), the RFI Scope of Work as specified in Permit Condition V.R., shall be submitted to the DEQ within 180 days of identification or DEQ decision. The RFI Work Plan must address releases of hazardous waste or hazardous constituents to all media as specified below.

   a. The Work Plan shall describe the objectives of the investigation and the overall technical and analytical approach to completing all actions necessary to characterize the direction, rate, movement, and concentration of releases of hazardous waste or hazardous constituents from specific units or groups of units, and their actual or potential receptors. The RFI Work Plan shall detail all proposed activities and procedures to be conducted at the facility; the schedule for implementing and completing such investigations; the qualifications of personnel performing or directing the investigations, including contractor personnel; and the overall management of the RFI. The Scope of Work for a RCRA Facility Investigation (RFI) is in Permit Condition V.R.

   b. The RFI Work Plan shall describe sampling; data collection quality assurance; and data management procedures, including formats for documenting and tracking data and other results of investigations; and health and safety procedures.

   c. Development of the RFI Work Plan and reporting of data shall be consistent with the following EPA guidance documents or the equivalent thereof:

      i. RCRA Facility Investigation Guidance Document (EPA 530/SW-89-031, May 1989);

      ii. RCRA Ground-Water Monitoring: Draft Technical Guidance (EPA/530-R-93-001, November 1992);

      iii. RCRA Groundwater Monitoring Technical Enforcement Guidance Document (OSWER 9950.1), September 1986; and

      iv. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition, November 1992 with revisions.

2. After the Permittee submits the Work Plan, the DEQ will either approve, disapprove, or modify the Work Plan in writing.

   If the DEQ approves the Work Plan, the Permittee shall begin implementation of the plan

within fourteen (14) days of receipt of approval and implement it according to the approved schedule contained in the plan. All approved Work Plans become incorporated into this Permit, as per Permit Condition V.A.7.

In the event of disapproval (in whole or in part) of the Work Plan, the DEQ shall specify deficiencies in writing. The Permittee shall modify the plan to correct these within the time frame specified in the notification of disapproval by the DEQ. The modified Work Plan shall be submitted in writing to the DEQ for review. Should the Permittee take exception to all or part of the disapproval, the Permittee shall submit a written statement of the grounds for the exception within ten (10) days of receipt of the disapproval per Permit Condition V.E.4.

3. The DEQ shall review for approval as part of the RFI Work Plan or as a new Work Plan any plans developed pursuant to Permit Condition V.G., addressing further investigations of newly identified SWMUs, or Permit Condition V.H., addressing new releases from previously identified SWMUs or AOCs.

K. RFI IMPLEMENTATION

Upon receipt of written approval from the DEQ for the RFI Work Plan, the Permittee shall implement the RFI according to the schedules and in accordance with the approved RFI Work Plan and the following:

1. The Permittee shall notify DEQ at least ten (10) days prior to any field sampling, field testing, or field monitoring activity required by this Permit to give DEQ personnel the opportunity to observe investigation procedures and/or split samples.

2. Deviations from the approved RFI Work Plan which are necessary during implementation of the investigations must be approved by the DEQ and fully documented and described in the progress reports and in the RFI Final Report.

L. RFI FINAL REPORT AND SUMMARY

1. Within sixty (60) calendar days after the completion of the RFI, the Permittee shall submit an RFI Final Report and Summary. The RFI Final Report shall describe the procedures, methods, and results of all investigations as described in Permit Condition V.R. “RFI Scope of Work [RESERVED]”. This includes SWMUs and their releases, the type and extent of contamination at the facility, sources and migration pathways, action levels, and actual or potential receptors. The RFI Final Report shall present all information gathered under the approved RFI Work Plan. The RFI Final Report must contain adequate information to support further corrective action decisions at the facility. The Summary shall summarize the RFI Final Report.

2. After the Permittee submits the RFI Final Report and Summary, the DEQ shall either approve or disapprove them in writing.

If the DEQ approves the RFI Final Report and Summary, the Permittee shall mail the

approved Summary to all individuals on the facility mailing list established pursuant to 40 C.F.R. § 124.10(c)(1)(ix), within fifteen (15) calendar days of receipt of approval.

If the DEQ determines the RFI Final Report and Summary do not fully meet the objectives stated in Permit Condition V.R., the DEQ may disapprove the RFI Final Report and Summary. If the DEQ disapproves the Report, the DEQ shall notify the Permittee in writing of the Report's deficiencies and specify a due date for submittal of a revised Final Report and Summary or the DEQ shall modify the report before approval. Once approved, the Summary shall be mailed to all individuals on the facility mailing list as specified above, unless the Permittee takes exception to the conditions of the approved Report. If the Permittee takes exception to any portion of the Report approved by the DEQ, written notification of the exception(s) should be sent to the DEQ in accordance with dispute resolution provisions of Permit Condition V.E.4.

M. DETERMINATION OF NO FURTHER ACTION

1. Based on the results of the RFI and/or other relevant information, the Permittee may submit an application to the DEQ for a Class III permit modification under 40 C.F.R. § 270.42(c) to terminate the RFI/CMS process for a specific unit. This permit modification application must contain information demonstrating that there are no releases of hazardous waste including hazardous constituents from a particular SWMU at the facility that pose threats to human health and/or the environment, as well as additional information required in 40 C.F.R. § 270.42(c).

   If, based upon review of the Permittee's request for a permit modification, the results of the RFI, and other information, including comments received during the sixty-day (60-day) public comment period required for Class III permit modifications, the DEQ determines that releases or suspected releases which were investigated either are non-existent or do not pose a threat to human health and/or the environment, the DEQ may grant the requested modification.

2. If necessary to protect human health or the environment, a determination of no further action shall not preclude the DEQ from requiring continued or periodic monitoring of air, soil, ground water, or surface water, when site-specific circumstances indicate that releases of hazardous waste or hazardous constituents are likely to occur.

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

N. CORRECTIVE MEASURES STUDY (CMS) PLAN [RESERVED]

This section will only be necessary, in the event that new sites (e.g., newly identified SWMUs) are identified. At that time, the Permit will be modified to include requirements for a CMS Plan.

O. CMS IMPLEMENTATION [RESERVED]

In the event that a CMS is required, this Permit shall be modified to include requirements for CMS implementation.

P. CMS FINAL REPORT AND SUMMARY [RESERVED]

In the event that the Permittee identifies additional SWMUs, this Permit may be modified to include the requirements for an RFI Report and Summary.

Q. CORRECTIVE MEASURE (REMEDY) SELECTION AND IMPLEMENTATION [RESERVED]

In the event that the Permittee is required to perform additional corrective measures, this Permit may be modified to include corrective measure selection and implementation requirements.

R. RFI SCOPE OF WORK [RESERVED]

In the event that the Permittee identifies additional SWMUs, this Permit may be modified to include requirements for an RFI Scope of Work.

S. CMS SCOPE OF WORK [RESERVED]

In the event that a CMS is required, this Permit shall be modified to include requirements for the CMS scope of work.

T. FINANCIAL ASSURANCE

Financial Assurance is required by Permit Conditions II.K and IV.F for costs associated with post-closure and corrective action. Estimates of post-closure and corrective action costs are required by Permit Condition II.J with current estimates presented in Permit Attachment 4. Costs will be updated on an annual basis for inflation, changes to the corrective action plan, and any changes in costs associated with post-closure or corrective action.

Table 1: RFI/CMS SUBMISSION SUMMARY

Below is a summary of the planned reporting requirements pursuant to this Permit:

Actions	Due Date (examples)
Progress reports on all activities	Annually in conjunction with annual report.
Notification of newly identified SWMUs	Thirty (30) calendar days after discovery.
RFI Work Plan (if required)	One Hundred and eighty (180) calendar days after the confirmation of a new SWMU.
Revised RFI Work Plan (if required)	As determined by DEQ, not less than thirty (30) calendar days after receipt of a Notice of Deficiency (NOD).
RFI Report and Summary (if required)	Sixty (60) calendar days after completion of a new RFI
Revised RFI Report and Summary (if required)	As determined by DEQ, not less than thirty (30) calendar days after receipt of NOD.
Notification of newly discovered releases	Thirty (30) calendar days after discovery.
Interim Measures Plan	As determined by DEQ.
Revised Interim Measure Plan	As determined by DEQ.
CMS Plan (if required)	Forty five (45) calendar days after notification of requirement to perform CMS.
Revised CMS Plan (if required)	As determined by DEQ, not less than thirty (30) calendar days after receipt of NOD.
CMS Final Report and Summary (if required)	Sixty (60) calendar days after completion of CMS.
Revised CMS Final Report (if required)	As determined by the DEQ, not less than (30) calendar days after receipt of NOD.
Demonstration of Financial Assurance at Facility	One hundred and twenty (120) calendar days after Permit modification to implement corrective measures.

Table 2: SWMUs REQUIRING AN RFI

At the time of renewal (January 31, 2025) no new SWMUs have been identified.

ANADARKO E&P LLC
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

PERMIT ATTACHMENT 1

FACILITY MAILING LIST

NOTE: ALL THE PAGES FOR THE ATTACHMENTS ARE APPENDICES TAKEN FROM THE PERMIT APPLICATION AND SECTIONS AND PAGE NUMBERS MAY NOT BE IN SEQUENCE.

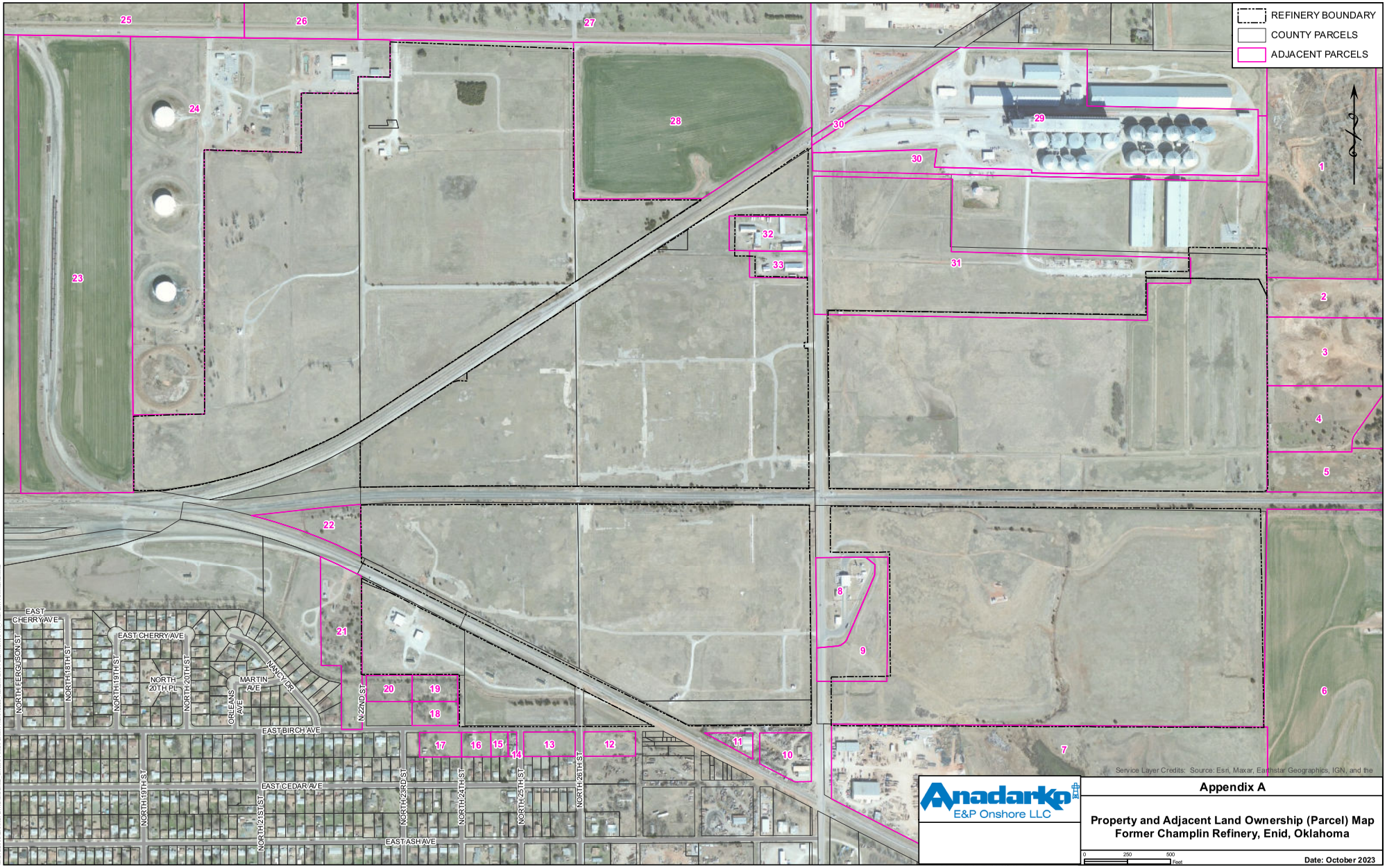
APPENDIX A

FACILITY MAILING LIST

FACILITY MAILING LIST
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

Anadarko E&P Onshore LLC
5 Greenway Plaza, Suite 110
Houston, TX 77046-0521

Figure ID	Company	Contact	Facility Address	Mailing Address	City	State	Zip	Phone - office
1-5; 23; 28-31	WB Johnston Grain Co.; Johnston Terminal LLC; Consolidated Grain and Barge Co.	Dillon Streber	2301 N. 30th St.	411 W. Chestnut	Enid	OK	73701	580-233-5800
6	N/A	William H. Easterly & Linda Easterly	9112 E. Chestnut Ave.	3017 Falcon Crest	Enid	OK	73703	
7	Marsau Enterprises, Inc.	Marlin Esau	1209 N. 30th St.	1209 N. 30th St.	Enid	OK	73701	580-233-3910
8-9	Magellan Midstream Partners L.P.	Laura Porter	1401 N. 30th St.	One Williams Center OTC-8	Tulsa	OK	74172	580-234-6748
10-11	Enid Iron & Metal, Inc.	John Boone	1202 N. 30th St.	P.O. Box 5408	Enid	OK	73702	580-237-5505
12	N/A	Phil Edwards	E. Birch Ave	P.O. Box 1753	Enid	OK	73702	
13	N/A	Jerry Ray Derr	2513 E. Birch	2524 E. Cedar	Enid	OK	73701	
14	N/A	Tony McGill	E. Birch Ave	2105 E. Chestnut Ave.	Enid	OK	73701	
15	N/A	Tony Bookout	E. Birch Ave	2018 N. 4th St.	Enid	OK	73701	
16	N/A	Bryan & Holli Willard	E. Birch Ave	2406 E. Cedar Ave.	Enid	OK	73701	
17	Prelesnick Trust	Gary L. Prelesnick, Trustee	2301 E. Birch	2 Elsworth Ln	Bella Vista	AR	72714	
18	N/A	Calvin Hollingshad	E. Birch Ave	1206 N. 12th St.	Enid	OK	73701	
19-20	N/A	Russell Meloy	2 lots S. of MPX 4	1821 Calico Lane	Enid	OK	73703	
21	N/A	Marie Gleichmann c/o Wayne Daniel	2142 E. Birch	17528 S. 30th	Bison	OK	73720	
22	BNSF Railway Company	Joshua Teets	Railroad ROW	930 E. Cherry	Enid	OK	73701	580-242-4258
24	Mid Continent Pipeline Co.	William Lassley	2501 E. Willow	2501 E. Willow	Enid	OK	73701	580-242-8612
25-27	OMES	Jennifer Ramsey	former NORCE facility 2601 E. Willow Rd. Enid, OK 73701	2401 N. Lincoln Blvd. Suite #126	Oklahoma City	OK	73105	Jennifer.Ramsey@omes.ok.gov
Operator - 27	Liberty of Oklahoma Corp. - Robert M. Greer Center	Dr. Hugh Sage or Lesley Hofberger	2501 NE Delaware	2501 NE Delaware	Enid	OK	73701	580-213-2700
32	N. 30th Autos & More	Doug Vestal	1902 N. 30th St.	1902 N. 30th St.	Enid	OK	73701	580-233-6441
33	Sanner Oil	Nettie Horner	1900 N. 30th St.	P.O. Box 5942	Enid	OK	73702	580-233-2442
N/A	N/A	Chris FawFaw	3101 N. 30th St.	3101 N. 30th St.	Enid	OK	73701	
N/A	Hamm & Phillips Service Company	Troy Terrell	2429 N. 30th	2429 N. 30th	Enid	OK	73701	580-242-1440
N/A	Mustang Gas Products	Tony Coffman	Pipeline ROW	910 W. Park	Enid	OK	73701	580-237-7404
N/A	Anadarko Minerals, Inc.	Scott Betts	Pipeline ROW	100 N. Broadway, Suite 2110	Oklahoma City	OK	73102	800-217-6664
N/A	Cattle Grazing	Marty Meyer	N. & E. of 1401 N. 30th St.	2615 S. 90th St.	Enid	OK	73701	580-237-2535
N/A	City of Enid	Murali Katta	401 West Owen K. Garriott Rd.	401 West Owen K. Garriott Rd.	Enid	OK	73701	580-234-0400


REFINERY BOUNDARY
COUNTY PARCELS
ADJACENT PARCELS
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EAST BIRCH AVE
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NORTH 23RD ST
NORTH 24TH ST
NORTH 25TH ST
NORTH 26TH ST
EAST ASH AVE
Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, IGN, and the
Anadarko
E&P Onshore LLC
Appendix A
Property and Adjacent Land Ownership (Parcel) Map
Former Champlin Refinery, Enid, Oklahoma
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Feet
Date: October 2023

ANADARKO E&P LLC
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

PERMIT ATTACHMENT 2

INSPECTION AND MAINTENANCE ACTIVITIES

NOTE: ALL THE PAGES FOR THE ATTACHMENTS ARE APPENDICES TAKEN FROM THE PERMIT APPLICATION AND SECTIONS AND PAGE NUMBERS MAY NOT BE IN SEQUENCE.

APPENDIX C

INSPECTION AND MAINTENANCE ACTIVITIES

INSPECTION AND MAINTENANCE ACTIVITIES
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

Item	Potential Problems	Maintenance Response
Monitoring Well Equipment	Broken riser tubing Tampered, broken or stolen locks Broken, lost or stolen bailers Minimal or no sample recovery Damaged well cap /casing Damaged well pad Damaged well protection equipment Erosion or deposition around the well pad	Repair or replace Replace locks Replace dedicated bailers Workover or replace monitoring well Replace cap or well Repair pad Repair or replace stick-up protection or bumpers Regrade vicinity of well
Surveyed benchmarks	Physical damage Severe weathering Evidence of tampering Physically obstructed	Establish substitute benchmark Establish substitute benchmark Establish substitute benchmark Uncover and provide protection
Security fence	Damaged or broken fence section Tampered, broken, or stolen locks Damaged or broken gates	Repair or replace section Replace lock(s) Repair or replace gate
Land Treatment Unit (LTU)	Berms damaged Drainage blocked Land cover eroded	Repair section Unblock and provide protection Replace and monitor

ANADARKO E&P LLC
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

PERMIT ATTACHMENT 3

POST-CLOSURE CARE PLAN FOR LAND TREATMENT UNIT (LTU)

NOTE: ALL THE PAGES FOR THE ATTACHMENTS ARE APPENDICES TAKEN FROM THE PERMIT APPLICATION AND SECTIONS AND PAGE NUMBERS MAY NOT BE IN SEQUENCE.

APPENDIX D

POST-CLOSURE CARE PLAN FOR LAND TREATMENT UNIT (LTU)

POST-CLOSURE CARE PLAN FOR THE LAND TREATMENT UNIT
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

This Post-Closure Care (PCC) Plan is a continuation of the plan outlined in the original 1998 Post-Closure Permit for the Land Treatment Unit (LTU). PCC at the LTU supports the final stabilization of materials historically deposited into the units, while monitoring for any unexpected changes in the system that could negatively impact human health or the environment.

1.0 PCC PLAN

PCC meeting the requirements of 40 CFR 264.117 and 264.280 has been conducted at the LTU since 1998. The LTU consists of 6 plots. Hazardous wastes were disposed of in Plots 1, 2, and 3 between 1977 and 1986. Non-hazardous wastes were disposed of in Plots 4, 5, and 6 between 1977 and 1994.

2.0 PCC ACTIVITIES AND GROUNDWATER MONITORING

The primary activity being conducted at the LTU during the PCC period is the continued implementation of the Groundwater Monitoring Plan described in Section 5.0 of the October 2023 Part B Permit Renewal Application. Groundwater monitoring at the LTU under the renewed permit will be performed in accordance with the Groundwater Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP), included as Appendix F of the Permit Renewal Application. Routine inspections of the vegetative cover, stormwater run-on/run-off control system, and the integrity of LTU are performed on a semi-annual basis and after significant storm events. In addition, Site personnel routinely inspect the LTU area and the perimeter security fencing. A summary of the PCC activities conducted each year will be presented in the Annual Groundwater Monitoring Report.

2.1 Vegetative Cover

The vegetative cover has been maintained since 1998 and will continue to be maintained. The LTU is mowed as part of a sitewide vegetative management plan, typically twice per growing season. These conditions may be modified in accordance with such provisions as 40 CFR 264.110(c) or 264.118(d) when PCC requirements have been met.

2.2 Run-On/Run-Off Control

The final grading of the LTU has maintained the berms surrounding the unit to control run-on/run-off for a 24-hour, 25-year storm event.

POST-CLOSURE CARE PLAN FOR THE LAND TREATMENT UNIT
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2.3 Wind Dispersal

The vegetative cover over the LTU prevents wind erosion. Therefore, no additional wind control measures are necessary.

2.4 Food-Chain Crops

Food-chain crops are not grown in the LTU. The secure, fenced area is maintained as a non-grazed pasture.

3.0 PCC PLAN AMENDMENTS

If modification or amendments are needed to this PCC Plan, written notification will be provided to ODEQ along with supporting documentation justifying the request.

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PERMIT ATTACHMENT 4

POST-CLOSURE CARE AND CORRECTIVE ACTION COST ESTIMATE

NOTE: ALL THE PAGES FOR THE ATTACHMENTS ARE APPENDICES TAKEN FROM THE PERMIT APPLICATION AND SECTIONS AND PAGE NUMBERS MAY NOT BE IN SEQUENCE.

APPENDIX E

POST-CLOSURE CARE AND CORRECTIVE ACTION COST ESTIMATE

FINANICAL ASSURANCE COST ESTIMATE
POST-CLOSURE CARE AND CORRECTIVE ACTION
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Groundwater Monitoring (2 events per year)					
Labor	$	10,000	2	$	20,000
Expenses	$	1,750	2	$	3,500
Laboratory & Validation	$	24,000	2	$	48,000
subtotal				**$**	**71,500**
Annual GWM Report	$	17,500	1	$	17,500
				$	**89,000**
NSZD Sampling (1 event per year)					
Labor	$	9,000	1	$	9,000
Expenses	$	4,500	1	$	4,500
Laboratory & Validation	$	22,500	1	$	22,500
subtotal				**$**	**36,000**
Annual Remediation Report	$	21,000	1	$	21,000
				$	**57,000**
Private Well Sampling					
Labor	$	3,000	1	$	3,000
Expenses	$	750	1	$	750
Laboratory & Validation	$	6,500	1	$	6,500
Summary Letters	$	9,000	1	$	9,000
subtotal				**$**	**19,250**
General O&M Activities					
Inspections & Maintenance & Security					
Labor and Expenses				**$**	**16,750**
Various data collection efforts					
Labor and Expenses				**$**	**22,500**
Vegetation Management Program (WHC)					
Labor and Expenses				**$**	**84,000**
Administrative					
communications, reporting, community engagement					
Labor and Expenses				**$**	**14,250**
Remaining Well P&A and Demolition Efforts					
Estimate of remaining scope	$	325,000	/10 years	**$**	**32,500**
			Estimated Annual Cost	**$**	**335,250**
			Permit Duration		10 years
		Estimated Annual Cost over Life of Permit		**$**	**3,352,500**
Hazardous Waste Permit Renewal					
2034 Permit Renewal	$	28,500	1	**$**	**28,500**
			Total Financial Assurance Amount	**$**	**3,381,000**

As the Sitewide remedy is proposed as "interim final" and in alignment with the current financial assurance methodology that only covers the testing period before the final remedy is confirmed, the proposed financial assurance amount is based on the duration of the current permit application 2024-2034, or until the NSZD Sitewide Remedy is finalized. Once the Sitewide final remedy is confirmed, financial assurance methodology will be reevaluated and adjusted as appropriate.

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PERMIT ATTACHMENT 5

GROUNDWATER SAMPLING AND ANALYSIS PLAN (SAP) AND QUALITY ASSURANCE PROJECT PLAN (QAPP)

NOTE: ALL THE PAGES FOR THE ATTACHMENTS ARE APPENDICES TAKEN FROM THE PERMIT APPLICATION AND SECTIONS AND PAGE NUMBERS MAY NOT BE IN SEQUENCE.

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ENID, OKLAHOMA

SAMPLING AND ANALYSIS PLAN AND QUALITY ASSURANCE PROJECT PLAN

October 20, 2023
rev. January 7, 2025

Table of Contents

Table of Contents (cont.)

Table of Contents (cont.)

Table of Contents (cont.)

List of Tables

List of Figures

List of Appendices

List of Acronyms

CFR	Code of Federal Regulations
COC	Chemicals of Concern
CSM	Conceptual Site Model
DOT	Department of Transportation
DQO	Data Quality Objectives
FCR	Former Champlin Refinery
FOC	Field Operations Coordinator
GC	Gas Chromatography
GC/MS	Gas Chromatography Mass Spectrometry
GFAA	Graphite Furnace Atomic Absorption
GWMP	Groundwater Monitoring Plan
GWPS	Groundwater Protection Standards
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
ICP	Inductively Coupled Plasma
ICPMS	Inductively Coupled Plasma Mass Spectrometry
LCS	Laboratory Control Sample
LIMS	Laboratory Information Management System
LNAPL	Light Non-aqueous Phase Liquid
MDL	Method Detection Limit
MR	Monitoring Report
MS/MSD	Matrix Spike/Matrix Spike Duplicate

List of Acronyms (cont.)

NSZD	Natural Source Zone Depletion
ODEQ	Oklahoma Department of Environmental Quality
OSHA	Occupational Safety and Health Administration
PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
PM	Project Manager
PQL	Practical Quantitation Limit
QAM	Quality Assurance Manual
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
QCI	Quality Control Indicators
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
RSD	Relative Standard Deviations
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedures
VOC	Volatile Organic Compounds

1.0 PROJECT MANAGEMENT

1.1 PROJECT ORGANIZATION AND RESPONSIBILITIES

This Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) has been prepared to identify the scope, procedures, and Quality Assurance/Quality Control (QA/QC) protocols for the collection of supporting data for the semi-annual groundwater sampling and monitoring program occurring at the Anadarko E&P Onshore LLC (Anadarko), Former Champlin Refinery (FCR), in Enid, Oklahoma (Site). The semi-annual sampling activities include collection of groundwater samples from select monitoring wells and the collection of groundwater and light non-aqueous phase liquid (LNAPL) fluid levels from the monitoring well network. The scope of the monitoring program is presented in the Resource Conservation and Recovery Act (RCRA) Post-Closure and Corrective Action Permit Renewal Application (hereafter referenced as Permit Renewal Application), Section 6.0 Groundwater Monitoring Plan (GWMP) (May 2023). A list of the monitoring well network including their designation, gauging and sampling frequency, and sample analysis is included as Table 1-1. A Groundwater Monitoring Well Network map is included as Figure 1-1.

Anadarko's environmental consultant will be responsible for performing, or providing oversight of subcontractors completing the field investigations, preparing required reports, and performing any subsequent work required to complete the semi-annual groundwater sampling and other agency required field activities related to the RCRA Permit. The Oklahoma Department of Environmental Quality (ODEQ) will review and approve this combined SAP and QAPP (hereafter referenced as SAP-QAPP). The various quality assurance and management responsibilities of key project personnel are defined below.

1.1.1 MANAGEMENT RESPONSIBILITIES

RCRA Permit & Project Manager, Oklahoma Department of Environmental Quality

The ODEQ appointed RCRA Permit and Project Manager(s)(PM) is/are responsible for oversight of RCRA permitting and compliance pertaining to the Site. The ODEQ will review and approve Anadarko's RCRA permit-related reports and other relevant documents.

Facility Project Manager, David Sweeten, Director of Operations, Glenn Springs Holdings, Inc.

Mr. Sweeten (or a designated representative), has final responsibility for environmental related issues at the Site. Mr. Sweeten provides overall direction to the Site environmental remediation staff. Mr. Sweeten serves as one of the

primary communication links between the ODEQ and Anadarko project team. Glenn Springs Holdings, Inc. is a subsidiary of Occidental Petroleum, which acquired Anadarko in 2019.

Environmental Consultant Project Manager

The Consultant PM will be involved in the planning and implementation of the semi-annual sampling events and the evaluation of the data. The Consultant PM is responsible for meeting technical, financial, and scheduling objectives for the project and is the primary communication link between Anadarko, subcontractors, and the analytical laboratory. The Consultant PM will help plan project update meetings and will provide senior technical quality control and project oversight. Duties and responsibilities of the Consultant PM include the following:

- Administrate and supervise various phases of the project.
- Ensure project objectives are met.
- Provide technical support to the project team.
- Work with the Consultant quality assurance officer (QAO) and field personnel to plan and conduct project operations, progress meetings, etc.
- Review reports and other work products prior to their issuance.

1.1.2 QUALITY ASSURANCE RESPONSIBILITIES

Environmental Consultant Quality Assurance Officer (QAO)

The Environmental Consultant QAO will be responsible for enforcing the provisions of the SAP-QAPP and will remain independent of the day-to-day operations. Specific functions and duties will be to:

- Establish QA/QC procedures for the project.
- Evaluate data quality and maintain QC records.
- Provide the final quality control review of analytical data.
- Provide a communication link between project personnel and the laboratory.
- Revise work practices or identified procedural deviations to align work with approved SAP-QAPP procedures and guidelines.

1.1.3 FIELD RESPONSIBILITIES

Environmental Consultant Field Operations Coordinator (FOC)

The Environmental Consultant FOC will be responsible for overseeing the day-to-day project activities. Duties and responsibilities of the FOC will be to:

- Ensure the sampling activities are conducted in a manner that follows the procedures outlined in this SAP-QAPP and the health and safety plan (HASP).
- Coordinate the sampling activities with the Consultant QAO and field personnel.
- Oversee the use, maintenance and operation of sampling equipment.
- Report daily activities, problems, etc. to the Consultant QAO.

The FOC will be in routine communication with field support personnel and may conduct field audits over the duration of the project.

1.1.4 LABORATORY RESPONSIBILITIES

The analytical laboratory will have its own project organization with responsibilities related to project data objectives. An Anadarko-contracted laboratory will be used to support the semi-annual groundwater sampling and analysis work.

Laboratory Director

The Laboratory Director will be responsible for the overall operation of the laboratory. The Laboratory Director will provide final review of data packages before reporting results and will be responsible for initiating corrective action measures when analytical data do not meet the requirements of this plan or the laboratory's Quality Assurance Manual (QAM).

Laboratory Project Manager

The Laboratory PM will be the primary communications link between the laboratory and the Environmental Consultant's QAO/PM. The Laboratory PM will be responsible for relating any special needs of the field operations personnel to the laboratory. The Laboratory PM will also provide the final review of data deliverables, ensuring they meet the requirements of this SAP-QAPP, before reporting results.

Laboratory Quality Assurance Officer

The Laboratory QAO will be primarily responsible for implementing the laboratory's QAM within the laboratory, and monitoring compliance with the laboratory's QAM. The Laboratory QAO's duties will also include: conducting laboratory audits, reviewing QC data, and reporting problems to the Laboratory Director for corrective action.

1.1.5 SPECIAL TRAINING REQUIREMENTS / CERTIFICATIONS

Project personnel must be qualified and trained in the project tasks for which they are responsible.

1.1.5.1 FIELD PERSONNEL

It is not anticipated that the execution of required activities will require uniquely trained personnel. However, field personnel must complete the mandatory site-specific safety classes required by Anadarko. If specialized training is required for any portions of the project, training will be provided by a qualified trainer and the date and type of training will be documented. The site-specific HASP specifies the training necessary for compliance with the Occupational Safety and Health Administration (OSHA) requirements. All field personnel will have completed OSHA 40-hour and annual 8-hour refresher Hazardous Waste Operations and Emergency Response (HAZWOPER) standard training, as required for personnel potentially exposed to hazardous substances, as specified by Title 29 Part 1910.120 of the Code of Federal Regulations (29 CFR 1910.120). If hazardous materials are moved off-site, compliance with the Department of Transportation (DOT) training requirements for shipping hazardous materials will be adhered to, as required.

1.1.5.2 LABORATORY PERSONNEL

Every employee has direct access to the QAM and training is provided in order to help each employee apply the QAM to their specific responsibilities. Records of relevant qualifications, training, skills and experience of the technical personnel are maintained by the laboratory.

Analysts that operate Graphite Furnace Atomic Absorption (GFAA), Inductively Coupled Plasma (ICP), Inductively Coupled Plasma Mass Spectrometry (ICPMS), Gas Chromatography (GC), or Gas Chromatography Mass Spectrometry (GC/MS) equipment must satisfactorily complete a short course offered by an equipment manufacturer, professional organization, university, or other qualified training facility (formal in-house training is acceptable). The minimum experience requirement for the operation of GFAA, ICP, ICPMS, GC, and GCMS equipment is 1 year.

1.2 SITE BACKGROUND INFORMATION

Site background information is detailed in the Permit Renewal Application, Part B Application, Section 1.0 Introduction (October 2023).

1.3 PROJECT DESCRIPTION AND SCHEDULE

The GWMP summarizes the monitoring requirements for the Site. As part of the RCRA permit, Anadarko is required to conduct groundwater, LNAPL fluid level gauging, groundwater sampling, and to submit annual Monitoring Reports (MRs) summarizing the field and analytical results. The groundwater monitoring well network, sampling and gauging frequency, and analytical suite per well is provided in Table 1-1. The groundwater protection standards (GWPS) and laboratory analytical limits for chemicals of concern (COC) are provided in Table 1-2. Groundwater field parameters and laboratory analytical details are contained in Table 1-3. Figure 1-1 shows the locations of monitoring wells, site-wide sampling and gauging well network, land treatment units (LTUs), and other pertinent Site features.

1.4 DATA QUALITY OBJECTIVES

1.4.1 PROJECT QUALITY OBJECTIVES

The Data Quality Objectives (DQO) process is a mechanism to translate project goals into specific tasks, which are conducted to produce data needed to support decision making for the project. The DQO process typically comprises a seven-step process. The first step is to develop a Conceptual Site Model (CSM) that includes Site-specific data such as analytical results, historic use, exposure pathways, cleanup concerns, and future land use. Section 5 of the Permit Renewal Application provides a CSM for the Site. The model will be refined as additional data is collected and evaluated. With a well-defined CSM, the goals of investigative work are translated into qualitative and quantitative statements that define the type of data needed. These data needs include the number and type of samples to be collected, analytical detection limits, and certainty. Based on the outputs of the DQO process, a detailed work plan can be prepared. The following provides the Site DQO steps that will be used for the collection of semi-annual monitoring data.

1.4.1.1 STEP 1: STATING THE PROBLEM

Routine groundwater sampling is required to monitor the conditions of the dissolved phase and LNAPL plumes in the subsurface and the potential effects of such conditions on human health and the environment, as set forth in the RCRA permit.

The purpose of this SAP-QAPP is to document methods and procedures for fluid level gauging, groundwater sampling, laboratory analyses, data evaluation, and resultant changes in sampling protocols for the sitewide groundwater sampling events. These data will be used to evaluate current conditions of groundwater and LNAPL in compliance with post-closure care and corrective action requirements set forth in the effective RCRA permit.

1.4.1.2 STEP 2: IDENTIFYING THE DECISION

Data collected during routine groundwater monitoring will be used to determine the following:

- What is the current groundwater elevation, flow direction, and estimated hydraulic gradient? Is this consistent with historical groundwater flow patterns?
- Have the COC concentrations increased or decreased for wells within the plume since the last monitoring period(s)? Have COCs been detected in detection wells?
- Does the dissolved phase plume and/or LNAPL plume appear to be migrating, expanding or shrinking?
- What is the current estimated LNAPL footprint and thickness?
- Does the LNAPL plume appear to be expanding, shrinking or stable compared to the previous reporting periods?
- Do groundwater quality parameters suggest an environment conducive to natural attenuation of COCs?
- Are changes to the monitoring well network and/or the well gauging network warranted to fill data gaps or eliminate redundancies?
- Are additional groundwater quality, chemical or geochemical parameters necessary to further evaluate plume effects, natural attenuation characteristics, and/or potential remedies?
- Is the Site in compliance with the effective RCRA Permit?
- Are additional investigations or actions warranted based on the findings of items 1 through 9?

1.4.1.3 STEP 3: IDENTIFYING INPUTS TO THE DECISION

Groundwater samples will be collected and analyzed, and wells will be gauged to support the decision and answer the questions posed in DQO step 2. The decision inputs include:

- Evaluation of semi-annual monitoring data to historical ranges of COC concentrations
- Comparison of data to groundwater protection standards established in the RCRA Permit
- Spatial and temporal variation in groundwater COC data under current conditions

- Spatial and temporal variation of LNAPL
- Spatial and temporal variation in groundwater level data and groundwater gradients
- Appropriate laboratory analysis methods and analytical limits

1.4.1.4 STEP 4: DEFINING THE BOUNDARIES OF THE STUDY

The boundary of the study refers to both the spatial and temporal boundaries. The boundaries are defined to ensure that samples are representative of the area for which decisions will be made. Practical constraints on data collection need to be recognized. These constraints include meteorological conditions that would preclude sampling; inability to secure necessary access agreements; or the unavailability of personnel, time, or equipment. The groundwater monitoring network includes wells located on- and off-site.

1.4.1.5 STEP 5: DEVELOPING A DECISION RULE

A decision rule usually compares an output parameter to an action level, which then is used to determine course of action for the Site. A series of "*if…then*" statements has been developed to define the conditions that assist in choosing courses of action. Based on analytical results obtained from previous groundwater samples, the following "if…then" statements will be applied to the data obtained during each groundwater sampling event:

- *If* analytical results demonstrate a detection of a COC at a detection well, the well may be re-sampled and/or additional investigation or remedial measures may be implemented.
- *If* analytical results demonstrate COC concentrations greater than applicable groundwater protection standards at a detection well, the well will be re-sampled and/or additional investigation or remedial measures may be implemented.
- *If* analytical results demonstrate increasing COC concentrations in monitoring wells around the periphery of the dissolved phase plume, additional investigations may be implemented to assess potential new release(s) from on- or off-site sources.
- *If* data gaps or redundancies are identified, additional monitoring wells may be installed and sampled, or select wells may be recommended to be eliminated from the monitoring or sampling plans.
- *If* evaluations of the dissolved phase and/or LNAPL plumes indicate plume expansion, mobility or migration, additional investigation or remedial measures or modifications to any existing corrective action may be implemented.

1.4.1.6 STEP 6: SPECIFYING LIMITS ON DECISION ERRORS

The monitoring well placement has been developed, in part, from current groundwater COC concentrations and predominant groundwater flow directions. The number of sampling and gauging program wells in the program are determined with respect to the ODEQ requirements.

Sampling may not capture all the variations in concentrations and analyses can only estimate the "true" value. Sampling "error" occurs when the sampling scheme does not adequately detect the variability in the amount of contaminant in the environmental matrix from point to point across the Site. The potential for these errors may be reduced by implementing the DQO process when outlining the monitoring plan.

Data may also be questionable due to measurement errors. Measurement errors can happen during sample collection, handling, preparation, analysis, data reduction, or data handling. There may be corrective steps that can be taken or additional qualifying information that can be collected that will allow for the full or limited use of the data. Corrective actions are discussed in Section 2.6.4 of this document.

1.4.1.7 STEP 7: OPTIMIZING THE DESIGN

The purpose of this step is to identify the most resource-effective sampling design that generates data to satisfy the DQOs specified in the preceding steps. The sampling and analysis program designed for this project was developed by through the evaluation of historical COC and gauging data, surrounding properties/uses, groundwater flow gradients, and the ability to meet the previously defined DQOs.

1.5 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

The QA objective for each project is to develop and implement procedures for field sampling, Chain-of-Custody, laboratory analysis, and reporting that will provide legally defensible results. Specific procedures for sampling, Chain-of-Custody, laboratory instrument calibration, laboratory analysis, reporting of data, internal quality control, audits, preventive maintenance of field equipment, and corrective action are described in other sections of this SAP-QAPP.

Data quality objectives for measurements collected during the semi-annual sampling events will be addressed in terms of precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters. The collection of data used in this project will require that the sampling and testing be performed using standard methods, with properly operated and calibrated equipment, and trained personnel. The following sections provide detailed discussion of PARCC elements.

1.5.1 PARCC ELEMENT – PRECISION

1.5.1.1 DEFINITION

Precision is a measure of the mutual agreement among individual measurements of the same property, usually under prescribed similar conditions. The overall precision of measurement data is a mixture of sampling and analytical factors. Precision is evaluated through field and laboratory duplicate samples. The precision of analytical data can be evaluated by calculating the relative percent difference (RPD) between duplicate samples. The RPD is calculated according to the following formula:

$$RPD = \frac{|C_1 - C_2|}{0.5 * (C_1 + C_2)} * 100$$

Where:

C1 = the first sample value and

C2 = the duplicate sample value

1.5.1.2 FIELD PRECISION OBJECTIVES

Field precision will be assessed through the collection and measurement of blind duplicates for groundwater samples. Blind duplicate RPDs must be < 30 percent for aqueous samples if one or both results are greater than five times the quantitation limit, otherwise results must be within +/- the absolute difference of the quantitation limit.

1.5.1.3 LABORATORY PRECISION OBJECTIVES

Precision in the laboratory is assessed through calculation of the RPD for duplicate and spike duplicate samples, and by calculation of relative standard deviations (RSD) if three or more replicate samples are analyzed. Precision control limits for the subcontracted analytical laboratory will be provided in laboratory SOPs to be supplied by the contracted laboratory selected to perform the work.

1.5.2 PARCC ELEMENT – ACCURACY

1.5.2.1 DEFINITION

Accuracy is the degree of agreement between an observed value and an accepted reference or true value.

1.5.2.2 FIELD ACCURACY OBJECTIVES

Accuracy in the field is assessed using equipment blanks and trip blanks and through the adherence to sample handling, preservation, and holding times. Equipment blanks and trip blanks will be submitted to the analytical laboratories to help assess the quality of the data resulting from the field sampling program.

1.5.2.3 LABORATORY ACCURACY OBJECTIVES

Laboratory accuracy shall be assessed by the preparation and analysis of method blank analyses for each analytical sequence. Laboratory accuracy is also assessed through the analysis of Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples, laboratory control samples (LCSs) and surrogate compounds, and the determination of percent recoveries. Accuracy control limits will be provided in laboratory SOPs to be supplied by the contracted laboratory selected to perform the work.

In order to assure the accuracy of the analytical procedures, one environmental sample will be collected for every 20 primary samples and designated as the MS/MSD sample. The increase in concentration of the analyte will be observed in the spiked sample, due to the addition of a known quantity of the analyte, compared to the reported value of the same analyte in the unspiked sample to determine the percent recovery. Daily control charts will be plotted for each commonly analyzed compound and maintained on instrument-specific, matrix-specific, and analyte-specific bases.

Percent recovery for MS/MSD results is determined according to the following equation:

$$\%R = [(\text{Spiked Sample Concentration} - \text{Sample Concentration}) / \text{Known Concentration Added}] \times 100$$

Percent recovery for LCS and surrogate compound results is determined according to the following equation:

$$\%R = (\text{Experimental Concentration} / \text{Known Concentration Added}) \times 100$$

Additional information on laboratory accuracy will be provided in the method specific SOPs to be supplied by the contracted laboratory selected to perform the work.

1.5.3 PARCC ELEMENT – REPRESENTATIVENESS

1.5.3.1 DEFINITION

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary.

1.5.3.2 MEASURES TO ENSURE REPRESENTATIVENESS OF FIELD DATA

Representativeness will be achieved by ensuring that sampling locations are properly selected and that a sufficient number of samples are collected. Representativeness is dependent upon the proper design of the sampling program and will be accomplished by ensuring that this SAP-QAPP and relevant SOPs are followed. The QA goal will be to have samples and measurements representative of the media sampled. Monitoring and stabilization of pH, temperature, specific conductance, dissolved oxygen (DO), oxidation-reduction potential (ORP), and turbidity stabilization prior to groundwater sampling will help ensure that representative samples are collected.

1.5.3.3 MEASURES TO ENSURE REPRESENTATIVENESS OF LABORATORY DATA

Using the proper analytical procedures, appropriate methods, meeting sample holding times and analyzing and assessing field duplicate samples, ensures representativeness in the laboratory.

1.5.4 PARCC ELEMENT – COMPLETENESS

1.5.4.1 DEFINITION

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected under normal conditions.

1.5.4.2 FIELD COMPLETENESS OBJECTIVES

Field completeness is a measure of the amount of valid measurements obtained from measurements taken during the project. Field completeness objective for this project will be greater than ninety percent.

1.5.4.3 LABORATORY COMPLETENESS OBJECTIVES

Laboratory completeness is a measure of the number of valid measurements obtained from measurements taken during the project. Laboratory completeness for this project will be greater than ninety percent.

Completeness is the ratio of the number of valid sample results to the total number of samples analyzed with a specific matrix and/or analysis. Following completion of the analytical testing, the percent completeness will be calculated by the following equation:

$$\text{Completeness} = \frac{\text{Number of Valid Measurements}}{\text{Numbers of Valid Measurements Planned}} \times 100$$

1.5.5 PARCC ELEMENT - COMPARABILITY

1.5.5.1 DEFINITION

Comparability is an expression of the confidence with which one data set can be compared with another. Comparability is also dependent on similar QA objectives.

1.5.5.2 MEASURES TO ENSURE COMPARABILITY OF FIELD DATA

Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that this SAP-QAPP is followed and that proper sampling techniques are used.

1.5.5.3 MEASURES TO ENSURE COMPARABILITY OF LABORATORY DATA

Planned analytical data will be comparable when similar sampling and analytical methods are used and documented in the SAP-QAPP. Comparability is also dependent on similar QA objectives.

1.6 DOCUMENTATION AND REPORTING

Data collected during the semi-annual monitoring events will be submitted to the ODEQ annually and will, at a minimum, include:

- Text describing sampling and analysis activities (focusing on deviations from the GWMP and SAP-QAPP)
- Figures showing property location, property boundaries, sampling and gauging locations
- Tables summarizing groundwater and LNAPL gauging data
- Potentiometric surface maps based on the gauging event data
- Tables summarizing analytical results
- Parameter concentration maps

- A summary of findings and recommendations for future activities
- Laboratory data reports
- Data validation reports
- Other relevant materials required to support the DQO objectives
- A bibliography of references and appendices of supporting documents

Records generated during the semi-annual monitoring events will be kept on file at the Site or a corporate storage facility. These records will include field data, annual reports, associated agency correspondence, and other relevant documents.

2.0 FIELD SAMPLING AND ANALYSIS PLAN

2.1 SAMPLING PROCESS AND DESIGN

The purpose of this section is to describe the data collection and sampling procedures that will be used during the semi-annual monitoring events. Sampling efforts will be uniform and follow the SAP-QAPP to ensure the quality of the data collected. The groundwater sampling plan for the Site consists of the following tasks:

- Semi-annual gauging of the sitewide monitoring wells (collectively known as the monitoring well network).
- Semi-annual sampling of a select set of monitoring wells.
- Annual sampling (during the second semi-annual event) of a select set of monitoring wells for geochemical analysis to support natural source zone depletion (NSZD) data collection.
- Biennial sampling (during the second semi-annual event of even numbered years) of POC wells not sampled semi-annually.

Primary COCs are listed in Table 1-2. Parameters for NSZD data collection are provided in Table 1-3. QA/QC samples will be submitted in accordance with the protocols presented in the following sections of this SAP-QAPP. Requirements for QA/QC samples are identified in Section 2.4.

2.2 GROUNDWATER AND LNAPL GAUGING

Groundwater and LNAPL fluid levels and LNAPL thickness measurements will be collected as described in Section 2.2.1. The purpose of a semi-annual gauging event is to assess current groundwater flow and LNAPL plume characteristics.

2.2.1 GROUNDWATER LEVEL AND LNAPL MEASUREMENTS

Groundwater and LNAPL level and LNAPL thickness measurements will be collected using manual methods.

2.2.1.1 MEASUREMENT LOCATIONS AND FREQUENCY

Groundwater and LNAPL fluid levels and LNAPL thickness measurements will be collected from the sitewide program wells on a semi-annual basis. The list of wells to be gauged during each semi-annual event is presented in Table 1-1.

2.2.1.2 EQUIPMENT AND PROCEDURES

Groundwater and LNAPL fluid levels and LNAPL thickness measurements will be collected using an electronic water level indicator and an oil-water interface probe. Each measurement shall be taken to the nearest hundredth of one foot from the reference point of each well. The reference point, unless otherwise marked, shall be the north side of the top of the well casing (i.e., riser). The total well depth will be measured to the nearest 0.01 foot annually during the first semi-annual event. Monitoring wells will be opened prior to gauging to allow for equilibration before water level measurements are collected. Before opening the well cap of flush-mounted wells, standing water will be removed from around the protective casing to eliminate standing water from entering the well casing.

For wells in which LNAPL is detected, measured LNAPL thickness (LT) will be recorded via measurements of product depth (PD) and groundwater depth (GD); LT will then be calculated as:

$$LT\ (measured) = GD - PD$$

To correct groundwater elevations for wells in which LNAPL is detected, the following formula will be used:

$$CPE = Well\ Datum - GD + (LT \times SG)$$

Where:

CPE = Corrected Potentiometric Elevation GD = Groundwater Depth (measured)
LT = LNAPL Thickness (measured) SG = Specific Gravity of the LNAPL

Historical LNAPL specific gravity measurements will be used to best approximate the specific gravity of LNAPL in individual wells, as outlined in the GWMP.

2.2.1.3 DOCUMENTATION

Groundwater and LNAPL level measurements will be recorded on the task-specific forms, where appropriate. These forms include site groundwater and LNAPL level measurement (fluid level) forms and groundwater monitoring forms. Appendix A includes the Site groundwater monitoring form.

2.2.1.4 DECONTAMINATION

The electronic water level indicator and oil-water interface probe will be decontaminated with mild, non-phosphate soap such as *Liquinox*, and thoroughly rinsed with tap water. The probe will be decontaminated in the field prior to use at each well.

2.2.1.5 INVESTIGATIVE DERIVED WASTE

Decontamination fluids from gauging events will be disposed off-site in accordance with the Waste Management Plan (Permit Application, Appendix G).

2.3 GROUNDWATER SAMPLING

2.3.1 GENERAL SAMPLING REQUIREMENTS

The purpose of this section is to describe the general sampling procedures for groundwater monitoring events. These procedures may be updated in the future without permit modification, to maintain most up-to-date sampling and field data collection methodologies. Sampling efforts will be uniform and follow the SAP-QAPP to ensure the quality of the data collected. Routine groundwater monitoring includes laboratory analysis for site-specific COCs and field data acquisition of water quality parameters (i.e., pH, temperature, specific conductance, DO, ORP, and turbidity) as listed in Table 1-3.

2.3.2 MONITORING WELLS REQUIRING GROUNDWATER SAMPLING

During each semi-annual groundwater sampling event, monitoring wells listed in Table 1-1 will be gauged to evaluate groundwater and LNAPL elevations and apparent LNAPL thicknesses, as described in Section 2.2. Select monitoring wells will then be sampled for target COCs. Table 1-1 Status column designates which monitoring wells are gauged only (LNAPL) and gauged and sampled (Mon) and also includes gauging and sampling frequency, and the applicable analytical suite. Any well with measurable LNAPL present will not be sampled.

Low-flow sampling techniques will be used to collect groundwater samples during each semi-annual sampling event. The groundwater sampling results will be used to evaluate current conditions of the dissolved phase plume, maintain compliance with the RCRA permit, and evaluate the need for modifications to any corrective actions and/or sampling protocol.

2.3.3 LABORATORY ANALYSIS

Environmental samples and QA/QC samples will be collected and submitted for laboratory analysis of the COCs listed in Tables 1-1 and 1-3. Samples will be analyzed on standard turn-around times.

Table 1-2 lists the practical quantitation limits (PQLs), method detection limits (MDLs), and GWPS for groundwater COCs. The purpose of Table 1-2 is to demonstrate that the laboratory limits of the selected laboratory analytical methods are less than or equal to the GWPS. Sample QA/QC requirements are detailed in Section 2.4.

2.3.4 EQUIPMENT PREPARATION AND DECONTAMINATION

Reusable sampling equipment and equipment used to develop or purge groundwater from a monitoring well (e.g., submersible pumps) will be thoroughly decontaminated between sampling locations. Decontamination will consist of washing equipment with mild, non-phosphate soap such as *Liquinox*, thoroughly rinsing with tap water, and allowing to air dry. If complete cleaning of any piece of sampling equipment is not possible, a substituted piece of clean equipment will be used.

The field team leader is responsible for ensuring that equipment coming into contact with soil or groundwater is free of contamination and will not compromise the validity of the sample results.

2.3.5 MONITORING WELL PURGING PROCEDURES

Before opening the well cap, any standing water will be removed from around the protective casing. Standing water will not be allowed to enter the well casing. Wells with slow recharge (wells unable to yield at least three casing volumes) will be pumped dry and then sampled as soon as sufficient recharge has occurred to fill the sample containers. Wells will be sampled within 24 hours of purging, including those wells that are purged dry.

If sediment has accumulated in a monitoring well or if turbidity levels cannot be maintained within acceptable limits during purging, the well may be considered for redevelopment at the discretion of the FOC or Consultant PM. Well redevelopment will be accomplished using standard methods and protocols.

2.3.5.1 LOW-FLOW PURGING PROCEDURES

When placing the pump/tubing in the well to be sampled, lower the pump/tubing with one continuous smooth motion to minimize the disturbance of any sediment that may have accumulated in the well. The water level interface probe may be lowered with the pump/tubing to monitor the depth. The pump should be placed within three feet of the bottom of

the screened interval. Do not raise and lower the pump/tubing in the well. It is important to minimize mixing of stagnant borehole water and disturbing sediment which may have collected at the bottom of the well. Secure the pump/tubing at the wellhead when it reaches the appropriate depth.

Set up the water quality meter and flow-through cell:

- Retract the water level interface probe to the top of the water and record the water level. If the water level has not changed significantly (<0.3 feet), the well will likely sustain low-flow sampling. Secure the water level interface probe at the appropriate depth to monitor draw-down as pumping proceeds.
- Record the time and depth to water.
- Begin pumping. Adjust the discharge to a rate that is just high enough to pump water to the surface. Attach the flow through cell and adjust the flow rate as necessary to maintain flow through the cell. The flow rate must be set and maintained constant throughout the purge and sampling process.
- Monitor the flow rate and draw down. The highest flow rate that produces no drawdown is ideal. The flow rate must be less than 500 milliliters per minute and create drawdown of no more than half the length of the submerged screen portion of the well. If the well will not sustain a 40 milliliters per minute purge rate the well will be pumped dry and allowed to recharge for no more than 24 hours before a grab sample is collected via low-flow. The standard suite of water quality parameters will be recorded at the time of sample collection.
- While purging, initially measure and record the stabilization parameters every five minutes. As the readings begin to stabilize, begin recording the parameters every three minutes. The monitoring well will be considered purged when all parameters are stabilized for three consecutive readings. The three readings should be within:
    - 1.5 degrees F for Temperature
    - 3% for specific conductivity
    - 10% for DO
    - 0.1 for pH
    - 10mv ORP
    - Turbidity as low as possible (<10 NTU ideal)

Once stabilization has been confirmed with three consecutive readings, sample collection may begin. All monitoring wells should be purged for a minimum of 30 minutes or one casing volume before sample collection.

2.3.5.2 SPECIFIC CASING VOLUME PURGING PROCEDURES

Wells will be purged prior to sample collection to remove stagnant well water and to ensure that representative samples are collected. Purging of wells will be accomplished using a portable purging system(s), such as a peristaltic and/or submersible pump with discharge hose, or a bailer. If a peristaltic and/or submersible pump is used, it will be powered by portable 12volt DC power source. If bailers are used, they will be pre-cleaned or new, disposable bailers.

Monitoring wells will be purged by removing one to three casing volumes of water from each well. A casing volume is equal to the amount of water present inside the well. To determine the casing volume, the depth-to-water (DTW) (in feet), the total depth (TD) of the well (feet), and the well casing radius (R) (in inches) must be known. To obtain one casing volume (in gallons), apply the following equation:

$$\text{One casing volume (gallons)} = [\pi(R)^2 \times (TD-DTW) \times (7.48)] / 144$$

Alternatively, for typical well casing diameters, the volume can be determined using the casing factor (CF) (in gallons per linear foot) as shown below:

Well Diameter (inches)	Casing Factor (CF) (gallons/foot)
1	0.04
2	0.17
4	0.65
5	1.0
6	1.5

During the purging procedures, groundwater quality parameters consisting of turbidity, pH, temperature, conductivity, ORP and DO, will be measured every five minutes. Well purging data will be recorded on the groundwater monitoring form.

The well will be sampled after a minimum of one casing volume has been purged and the groundwater quality parameters have stabilized (or five casing volumes have been purged, whichever occurs first). Groundwater quality parameters will be considered stabilized when the results of the last three measurements are within the outlined tolerance range.

2.3.6 GROUNDWATER QUALITY MEASUREMENT EQUIPMENT

Commercially available, field rugged analytical instrumentation will be used to collect field measurements. Measurements will be taken in accordance with manufacturer specifications and guidelines. The instrumentation will meet or exceed applicable state and federal guidelines associated with groundwater sampling.

2.3.7 GROUNDWATER MONITORING WELL SAMPLING PROCEDURES

Groundwater samples obtained during the semi-annual sampling events will be collected using low-flow sampling techniques. The sampler will wear disposable nitrile gloves and will change to new gloves between each monitoring well location. For samples collected for VOC analysis, the pumping rate will be no greater than 100 milliliters per minute to prevent agitation of the water. Sampling will progress from the least contaminated well to the most contaminated well. Otherwise, up-gradient wells will be sampled before down-gradient wells.

Pre-cleaned sample containers will be filled directly from the pump discharge tube or sampling device. Samples will be preserved prior to shipment to the laboratory for analysis. The groundwater sampling suite per well is provided in Table 1-1 and the analytical methods are provided in Table 1-3. COCs, GWPS, and associated detection limits are listed in Table 1-2. Samples will be collected (when applicable) in the following sequence:

- Benzene, Toluene, Ethylbenzene and Xylene (BTEX)
- Semi-Volatile Organic Compounds (SVOCs)
- Metals
- Nitrate, Sulfate, and Methane

Samples collected for dissolved metals analysis (iron and manganese) will be field filtered through a 0.45 µm membrane filter.

2.3.8 SAMPLE CONTAINERS AND PRESERVATIVES

Sample containers for environmental analysis will consist of certified laboratory supplied glass and plastic bottles. Table 1-3 lists the sample containers, preservatives, and holding times for COCs for the semi-annual sampling events. The subcontracted analytical laboratory will supply unpreserved and pre-preserved sample containers and VOC trip blanks as needed to complete the scope.

2.3.9 SAMPLE STORAGE AND TRANSPORTATION

Samples will be shipped in coolers via commercial carrier to the designated analytical laboratory(s). Coolers will be used to store and transport samples prior to shipping. Samples will be placed in an iced cooler as soon as practical after collection. The inside of each cooler will be lined with a plastic commercial grade trash bag to prevent leaking, and samples and sample packing materials will be placed inside the bag. The cooler will also be lined with bubble wrap. Should a drain hole be present on the cooler, it will be sealed with tape. Once the samples are in the cooler double-bagged ice will be placed in the cooler with the samples. A sufficient amount of ice will be added to the coolers to ensure that they arrive at the laboratory at a temperature of 4° Celsius.

The original chain-of-custody record will be placed in a watertight plastic bag and taped to the inside lid of the cooler. The cooler will be secured with shipping tape and custody seals will be affixed to the seal/lip of the cooler lid. The custody seals will be covered with wide, clear adhesive tape. Appropriate shipping labels will be placed on each cooler. These labels should identify the shipper and the laboratory, points of contact, phone numbers and street addresses. Coolers will not be shipped for Saturday delivery unless arrangements have been made with the respective laboratory prior to shipment.

2.3.10 SAMPLE HANDLING AND CUSTODY REQUIREMENTS

Custody procedures help to satisfy the two major requirements for admissibility: relevance and authenticity. Sample custody is addressed in three parts: field sample collection, laboratory analysis, and final files. The Site remediation files, including originals of laboratory reports and groundwater monitoring forms, are maintained in a secure area.

2.3.10.1 CHAIN-OF-CUSTODY PROCEDURES

The Chain-of-Custody document records the history of the sample custody from acquisition to ultimate disposal. Samples collected may be used as legal evidence. As such, the hand-to-hand custody from the point of collection to delivery at the laboratory must be clearly documented.

2.3.10.2 FIELD CUSTODY PROCEDURES

The sample packaging and shipment procedures summarized above are designed to ensure that the samples will arrive at the laboratory with the Chain-of-Custody intact. Field custody procedures include:

- The field sampler is personally responsible for the care and custody of the samples until they are transferred or properly dispatched. Field procedures have been designed to limit the handling of the samples to as few people as possible.
- Bottles will be identified using sample labels with unique sample numbers, sampling locations, date/time of collection, and type of analysis.
- Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a groundwater monitoring form notation would explain that a pencil was used to fill out the sample label because the ballpoint pen may not function appropriately under certain freezing weather.
- A properly completed Chain-of-Custody form will accompany the samples. The sample numbers will be listed on the Chain-of-Custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of custody of samples from the sampler to another person or to the permanent laboratory.
- Samples will be properly packaged and shipped according to the procedures of this SAP-QAPP.

2.3.10.3 SAMPLE LABELING

Sample containers will be labeled at the time of sampling. Each label will be completed with the required information and then secured to the container to prevent accidental loss or damage from water or mishandling. Required information on the sample label include sample identification number, date, time, and requested analyses. Additionally, any preservatives or special handling instructions will be clearly displayed on the label and the Chain-of-Custody.

2.3.10.4 SAMPLE IDENTIFICATION

Field samples will be identified by monitoring well name. Blind duplicates will be identified by a fictitious sample identification number that does not indicate to the laboratory that the sample is a duplicate (e.g., MW-2008). The blind duplicate identification number will be recorded on the groundwater sampling data sheet and the sampling notebook.

Equipment blanks will be identified as the well ID followed by “EQ BLANK” (e.g., MW-750 EQ BLANK). The equipment blank time, date, and the monitoring wells sampled before and after the collection of the equipment blank will be recorded on the groundwater monitoring form(s).

Field blanks will be identified as “FB” followed by the day of the event (e.g., FB-Day 3).

Trip blanks will be identified as "CG" followed by a unique identification number (e.g., CG-01).

2.3.10.5 FIELD SAMPLING NOTES

Field notes will be recorded on the appropriate groundwater monitoring form and will be completed for each sampling location. The following data will be recorded on the form for each well gauged/sampled:

- Groundwater and LNAPL level measurements
- Groundwater water quality field data

A copy of groundwater monitoring forms with data entries and field notes will be given to the PM after returning from the Site, while the originals will be maintained in the sampling notebook. No one shall remove information from job files, QA files, or the sampling notebook for field use or other use. If copies of previous work are required, then arrangements will be made with the Consultant FOC or Consultant PM to copy a portion of the file.

Groundwater monitoring forms will not be obscured, destroyed, or discarded, even if they contain errors or are illegible. Entries will be described in as much detail as possible so that people going to the Site can reconstruct a particular situation without reliance on memory. Entries will be made in permanent ink, signed, and dated and no erasures made. Corrections will be made by drawing a single line through the error and writing in correct information. The use of white-out, obliterating, or writing directly over the erroneous entry will be prohibited. Corrections will be dated and initialed by the person making the correction.

2.3.10.6 LABORATORY DOCUMENTATION

Workbooks, bench sheets, instrument logbooks, and instrument printouts are used to trace the history of samples through the analytical process and to document and relate important aspects of the work, including the associated quality controls. Logbooks, bench sheets, instrument logs, and instrument printouts are part of the permanent record of the laboratory. Laboratory supervisors will periodically review laboratory notebooks for accuracy, completeness, and compliance with internal QA/QC procedures. Completed workbooks and instrument logbooks will be submitted to the Laboratory QAO (or designee) for storage.

Good laboratory practices require that the following (or equivalent) procedures be used. Each entry will be dated and initialed by the analyst when the record is made. Errors in entry will be crossed out in indelible ink with a single

stroke. The use of white-out, obliterating, or writing directly over the erroneous entry will be prohibited. The individual making the correction will initial any corrections.

2.3.10.7 SITE REMEDIATION FILES

The Site remediation file(s) will be the central repository for documents, which constitute evidence relevant to sampling and analysis activities as described in this SAP-QAPP. The Site FOC is the custodian of the remediation file(s) and maintains the contents of files for the investigation, including all relevant records, reports, logs, sampling notebooks, pictures, subcontractor reports and data reviews in a secured, limited access area.

The remediation file(s) may include hard copies or electronic copies of:

- Sampling notebook.
- Field data and data deliverables.
- Photographs.
- Drawings.
- Soil boring logs/well construction logs.
- Laboratory data deliverables.
- Data validation reports.
- Data assessment reports.
- Progress reports, QA reports, project reports, etc.
- Custody documentation (tags, forms, airbills, etc.).

2.3.11 INVESTIGATIVE DERIVED WASTE

Well purge water, redevelopment fluids and decontamination fluids will be containerized and disposed off-site in accordance with the Waste Management Plan (Permit Renewal Application, Section 5 (Part B), Appendix G).

2.4 QUALITY CONTROL REQUIREMENTS

2.4.1 LEVEL OF QUALITY CONTROL EFFORT

Equipment blanks, field blanks, trip blanks, field duplicates, method blanks, laboratory duplicates, laboratory control, and matrix spike samples will be analyzed to assess the quality of the data resulting from the field sampling and analytical programs.

Equipment blanks are analyzed to check for procedural decontamination at the Site that may cause sample contamination and will be collected if non-dedicated equipment is used for sampling. Equipment blanks will be collected by pouring laboratory-prepared deionized water over or through the sampling equipment and collecting the rinsate in the proper analytical containers. Equipment blanks will be analyzed for the same parameters as the field samples. Equipment blanks are required at a rate of one per 10 investigative samples when non-dedicated equipment is used in sampling procedures.

Field blanks are analyzed to check for procedural sample handling that may cause sample contamination. Field blanks are samples of clean deionized water that are handled (i.e., collected, filtered, and preserved) in the field in the same manner as actual field samples. Field blanks are required at a rate of one per day.

Trip blanks are used to assess the potential for contamination of samples due to contaminant migration during sample shipment and storage. Trip blanks pertain to samples with volatile organic compounds (VOC) analyses only. Trip blanks are prepared by the laboratory and accompany the sample containers from the laboratory to the field and are kept with the investigative samples throughout the sampling event. They are then packaged for shipment with other samples and sent for analysis. At no time after their preparation will the sample containers be opened before they reach the laboratory. Trip blanks will be submitted for analysis at the rate of one trip blank per shipping container containing samples for VOC analyses.

Blind duplicates are used to assess analytical precision, field precision, and sample homogeneity. Blind duplicates are a second sample collected at the same time and location, under the same conditions as the field sample, and submitted in separate containers with coded sample IDs. Blind duplicate samples will be collected at a rate of one duplicate per 10 investigative samples.

Method blank samples are generated within the laboratory and used to assess contamination resulting from laboratory procedures. Duplicate samples are analyzed to check for sampling and analytical reproducibility. Laboratory control

samples provide information on analytical system biases. Matrix spikes provide information about the effect of the sample matrix on the digestion, extraction, and/or measurement methodology. Matrix spikes will be performed in duplicate and are referred to as MS/MSD samples. Additional sample containers will be filled for designated MS and MSD samples.

Samples will be sent to the designated Anadarko-approved analytical laboratory for analysis. Analyses will be completed in accordance with the specified methods. The level of laboratory QC effort for this project and the quantitation limits will be in accordance with the laboratory's SOPs, to be supplied by the contracted laboratory selected to perform the work.

2.4.2 INTERNAL QUALITY CONTROL

The purpose of internal quality control measures is to document the validity of analytical data generated by the laboratory. Laboratory internal quality control may include, but is not limited to, the analysis of blanks, reference standards, analytical spikes, and surrogate spikes. Every analytical series will include some of these controls depending on the analytical methods used. The internal quality controls used by the laboratory will be combined so they are completely representative of every aspect of the analytical task from sample preparation to sample analysis.

The following sections present a summary of, and suggested frequencies for, various quality control measures that may be used dependent upon the analytical method(s) selected.

2.4.2.1 BLANK SAMPLES

Blanks are used to assess contamination introduced in transit, storage, or in the laboratory. The types and frequencies of laboratory blank samples are specified by the analytical methods used for analysis.

Method Blanks

Method blanks identify sources of contamination throughout the analytical process, whether a contribution of specific analytes or a source of interference, which will need to be identified, isolated, and corrected. To accomplish this, the method blank must be initiated at the beginning of the analytical process and include various aspects of the analytical work. This includes glassware, reagents, and instrumentation, as well as any other possible source of contamination. Method blanks will meet the criteria specified in the subcontracted laboratory's SOPs or the analytical method.

Instrument Blanks

Instrument blanks are analyzed after a sample or dilution has run which contains a target compound at a concentration greater than 25 ug/l, a non-target compound at a concentration greater than 100 ug/l or saturated ions from a compound (excluding compound peaks in the solvent front). The results of the instrument blank analysis indicate whether there is residual contamination in the instrument from a previous sample.

2.4.2.2 ANALYTICAL SPIKES

The purpose of an analytical spike is to assess the efficiency and proficiency of an analytical series. This includes quantitation standards, sample preparation, instrument set-up, and the premises inherent in quantitation. This control reflects the competency of sample analysis within an analytical series. Matrix and surrogate spikes may also indicate influence of sample matrix interferences that are not within the control of the analyst. The types and frequencies of analytical spikes are specified by the analytical methods used for analysis.

Laboratory Control Spikes

The LCS is a matrix interference-free blank sample that is spiked with known and verified concentrations of the analytes being measured. The LCS is processed through the same preparation and analytical steps, and the recoveries of the spiked analytes obtained are used to assess the accuracy of the analytical system.

Matrix Spike

Within an analytical series, a representative sample portion is designated as a separate sample and spiked with known concentrations of the analytes under consideration. The advantages of spikes are that the spiked portion is handled and prepared in exactly the same way as the samples. Sample related interference affecting analysis would be reflected in the results from the spiked sample. Results of spikes exceeding tolerances specified by the analytical methods need to be evaluated thoroughly in conjunction with other measures of control.

Surrogate Spike

Surrogates, which have properties similar to the analytes of interest, are compounds unlikely to be found in nature. The intent of a surrogate spike is to provide broader insight into the proficiency and efficiency of an analytical method on a sample specific basis. This control reflects analytical conditions, which may not be attributable to the sample matrix. If results of a surrogate spike analysis exceed method-specified tolerances, then the analytical results need to be evaluated thoroughly in conjunction with other control measures. Re-analysis of the sample with additional controls, or different analytical methodologies, will be necessary.

2.4.2.3 REPLICATE ANALYSIS

Replicate analysis is a measure of analytical precision and can be limited in its scope. If used in conjunction with reference standards or analytical spikes, it can measure the reliability of the analytical systems. Replicate analyses can be significant in the interpretation of analytical results for samples with complex matrices.

2.4.2.4 CALIBRATION CHECK STANDARDS

The purpose of a calibration check standard is to assess an instrument's stability. A calibration check standard will be analyzed at the beginning and end of an analytical series or periodically throughout large series of samples. Calibration check standards will be run after every twelve hours. In analyses where internal standards are used, a calibration check standard needs only be run at the beginning of an analytical series. If results of the calibration check standard exceed method specified tolerances, then samples analyzed since the last acceptable calibration check standard will be re-analyzed.

2.4.2.5 INTERNAL STANDARDS

Internal standards will be monitored when required by the analytical method. The internal standard is present in the samples to be analyzed with the exception of performance standards. The standard responses must meet the criteria stipulated in the analytical method. If internal standard areas in one or more samples exceed the specified tolerances, then the instrument will be re- calibrated, and all affected samples re-analyzed.

2.4.3 SAMPLING QUALITY CONTROL

Several sampling quality control measures will be necessary to assess the integrity of samples collected and determine if the QA objectives discussed in this SAP-QAPP are being met. These measures include the use of field duplicate samples, equipment blanks, field blanks, and trip blanks to locate possible sources of sample contamination.

2.5 INSTRUMENT CALIBRATION AND MAINTENANCE REQUIREMENTS

2.5.1 FIELD INSTRUMENT CALIBRATION AND PREVENTATIVE MAINTENANCE

Field equipment for this project may include multi-parameter meters (i.e., temperature, pH conductivity meters, DO, ORP, etc.), turbidimeters, and other monitoring equipment, as needed. Specific preventative maintenance procedures to be followed for field equipment are those recommended by the manufacturer. Field instruments will be calibrated daily before use, and checked as field conditions necessitate throughout the day. Initial calibration and calibration checks will be documented in the calibration notebook.

2.5.2 LABORATORY INSTRUMENT PREVENTATIVE MAINTENANCE

As part of the QA Program Plan, a routine preventative maintenance program is conducted by the analytical subcontractor to minimize the occurrence of instrument failure and other system malfunctions. Designated laboratory employees regularly perform routine scheduled maintenance and repair of (or coordinate with the vendor for the repair of) all instruments. Maintenance that is performed is documented within the laboratory's operating record. Laboratory instruments are maintained in accordance with manufacturer's specifications and the requirements of the specific method employed. This maintenance is carried out on a regular, scheduled basis and is documented for each instrument service logbook.

2.5.3 LABORATORY INSTRUMENTATION CALIBRATION PROCEDURES

Calibration procedures for a specific laboratory instrument will consist of initial five-point calibration, initial calibration verification and continuing calibration verification. The selected analytical subcontractor will provide SOPs describing the calibration procedures for each specific laboratory instrument, including their frequency, acceptance criteria, and the conditions that will require recalibration. Laboratory instrumentation calibration procedures will meet the requirements of the appropriate Method.

2.5.4 FIELD AND LABORATORY CONSUMABLES

An adequate supply of supplies and consumables will be available for field and laboratory work. Supplies will be inspected prior to use to ensure that they are free from visible debris and defects. Sampling equipment and analytical supplies will be subject to the various QC measures (i.e., equipment blanks and method blanks) previously discussed. Any unacceptable supplies or consumables will be discarded and replaced with an acceptable item.

2.6 DATA MANAGEMENT

2.6.1 SAMPLE DOCUMENTATION

Sample documents will be legibly written in ink. Any corrections or revisions to sample documentation shall be made by drawing a single line through the error, writing in the correct information, and initialing any changes. The following sections are provided to outline sample documentation procedures that will be employed when conducting the semi-annual groundwater sampling activities.

2.6.2 FIELD DATA NOTES

Field notes will be recorded on the groundwater monitoring form using indelible ink. Copies of the documentation will be provided to the Consultant PM as necessary. Sampling notebooks or groundwater monitoring forms will not be obscured, destroyed, or discarded, even if it contains errors or is illegible. Corrections will be made by drawing a single line through the error, writing in the correct information, and initialing any changes. Corrections will be dated and initialed by the person making the correction.

2.6.3 LABORATORY DATA REDUCTION, REVIEW AND REPORTING

2.6.3.1 DATA REDUCTION

Analytical results will be reduced to the concentration units using the equations specified in the analytical procedure. Senior laboratory staff will check the calculations.

2.6.3.2 DATA REVIEW

Each laboratory section will provide extensive data review prior to reporting results. In general, there are three levels of data review.

The analyst will be responsible for primary review of data generated from sample analysis. If recoveries of the quality control samples are within the method-specified tolerances, then the data will be presented to data review groups for secondary review. If recoveries of any quality control samples exceed specified tolerances, affected samples will be re-analyzed as required by the method.

Data review groups will conduct secondary review to determine if the analytical results are acceptable. If recoveries of the quality control samples are within the method specified tolerances, then the data will be presented to the Laboratory PM for final review. If recoveries of quality control samples exceed the specified tolerances, affected samples will be submitted for re-analysis as required by the method.

Final review of analytical results will consist of the Laboratory Director's determination that the analytical results of a sample(s) are consistent. If so, the data will be presented in a final report. If discrepancies or deficiencies exist in the analytical results, corrective action will be taken. Audits of final reports by the Laboratory QAO may be conducted to determine the precision, accuracy, completeness, and representativeness of sample analyses.

2.6.3.3 DATA REPORTING

Data reporting will be in accordance with the appropriate method used for analysis and will be prepared in a standard deliverable. Laboratory reports shall include the following:

- Narrative including statement of samples received, sample condition upon receipt, description and rationale for any deviations from approved methods/SOPs, summary of data quality, and documentation of any significant problems encountered during analysis.
- Documentation of laboratory events including date/times of sample receipt, sample preparation or extraction, and sample analysis.
- Analytical data including method reference, results, reporting limits, dilutions, etc.
- A summary of QA/QC results, control limits, and supporting documentation as requested.
- A copy of the signed Chain-of-Custody for samples submitted for analysis.

The Laboratory QAO and/or the Laboratory Director should sign the laboratory reports prior to issue. Reports will be issued to the Consultant PM and Consultant QAO.

2.6.4 CORRECTIVE ACTION

Corrective actions may be required for either analytical and equipment problems or non-compliance problems. Analytical and equipment problems may occur during sampling and sample handling, sample preparation, laboratory analysis, and data review. Non-compliance problems are often associated with non-conformance to this plan or the analytical methods being used.

2.6.4.1 LABORATORY CORRECTIVE ACTION

When deficiencies or "out-of-control" situations exist, the laboratory will provide a means of detecting and correcting these situations. An "out-of-control" situation is defined as data exceeding control limits. Samples analyzed during "out-of-control" situations will be re-analyzed prior to reporting results. The laboratory's corrective action procedures are documented in their QAM and method specific SOPs. In general, there are several levels of "out-of-control" situations that may occur in the laboratory during analysis.

2.6.4.2 BENCH LEVEL

Corrective action procedures will often be handled at the bench level. If an analyst finds a non-linear response during calibration of an instrument, then the instrument will be recalibrated before sample analysis. The problem may be corrected by a careful examination of the preparation or extraction procedure, spike and calibration mixes, or instrument sensitivity. If the problem persists, it will be brought to the management level.

2.6.4.3 MANAGEMENT LEVEL

If resolution at the bench level was not achieved, or a deficiency is detected after the data has left the bench level, then corrective action becomes the responsibility of the Laboratory PM or Laboratory Director. Unacceptable laboratory control, matrix, or surrogate spike recoveries detected by data review will be reported to the Laboratory QAO. A decision to re-analyze the sample or report results will be made depending on the circumstance.

2.6.4.4 RECEIVING LEVEL

If discrepancies exist in either the documentation of a sample or its container, a decision will be made after consulting with the appropriate management personnel. Decisions will be fully documented. Some examples of container discrepancies are broken samples, inappropriate containers, or improper preservation. In these cases, corrective action will involve the Laboratory PM contacting the Consultant PM and/or Consultant QAO.

2.6.4.5 FIELD CORRECTIVE ACTION

Corrective actions for field equipment problems will consist of reporting the problem to the Consultant FOC and/or the Consultant PM so that maintenance can be performed, or new equipment can be acquired. Non-compliance problems will be reported immediately to the Consultant QAO. The Consultant QAO will consult with the Consultant PM and corrective actions will be initiated. Corrective actions may include resampling when necessary to meet the data objectives. The nature, extent, and corrective action for non-compliances will be documented.

2.6.5 QUALITY ASSURANCE REPORTS TO MANAGEMENT

2.6.5.1 LABORATORY INTERNAL REPORTING

The Laboratory QAO will report the status of the laboratory QA/QC program to the laboratory management. Each report should include:

- Periodic assessment of measurement data accuracy, precision, and completeness.

- Results of audits.
- Significant QA/QC problems and recommended solutions.
- Resolutions of previously stated problems.

The laboratory will determine the content and frequency of these reports in accordance with its QAM or SOPs. The laboratory will report to the Consultant QAO or Consultant PM if the laboratory's internal quality control issues have affected the results of the samples.

2.6.5.2 ADDITIONAL REPORTING

Laboratory analytical reports will include a summary of the quality assurance activities and quality control data for the project as related to sample analysis. The Laboratory PM will report suspected field QA/QC problems to the Consultant QAO. The Consultant QAO will report to the Consultant PM when appropriate. These reports may be either oral or written depending upon the nature and complexity of the issues in the report. The Consultant QAO will report any known issues potentially affecting the quality of the analytical or field data to the Consultant PM. The Consultant PM is responsible for further dissemination of these reports.

2.6.6 DATA MANAGEMENT

The raw data obtained during field activities will be recorded on the appropriate field forms or in dedicated sampling notebooks. This data will become part of the project files to be maintained as previously described in this SAP-QAPP. The analytical subcontractor will maintain all raw data for a minimum of seven (7) years. The analytical subcontractor will not destroy any data or records without the consent of the Environmental Consultant or Anadarko.

3.0 ASSESSMENT AND OVERSIGHT

3.1 PERFORMANCE AND SYSTEM AUDITS

Performance and system audits of both field and laboratory activities may be conducted to verify that sampling and analysis are performed within the constraints of this plan. These audits can either be conducted internally by field or laboratory staff or externally by Anadarko or state or federal agencies. The laboratory should participate in any performance or system audit conducted or requested by Anadarko or the ODEQ.

3.1.1 PERFORMANCE AUDITS

Performance audits may be conducted periodically to determine the accuracy of the total measurement system(s) or components. In this program, blind performance evaluation samples, submitted by state agencies, are analyzed and evaluated throughout the year as part of an on-going participation in their certification programs. Any deficiencies in the results of these analyses are reported to the laboratory and corrective action is initiated.

In addition to blind sample analyses, the laboratory will also participate in any audits from state and federal agencies. These agencies submit a report noting any deficiencies and necessary corrective action. The laboratory will respond with evidence of compliance within a limited time.

The laboratory also maintains a schedule of internal audits whereby the Laboratory QAO audits each section of the laboratory. When the audit is completed, a formal report will be issued to the Laboratory Director. This report shall note any deficiencies and a follow-up date to confirm corrective action.

3.1.2 SYSTEM AUDITS

A system audit is an evaluation of the various components of the measurement system to assess their proper selection and use. This includes a careful evaluation of all laboratory quality control measures. System audits will be conducted internally by the laboratory.

3.1.3 FIELD AUDITS

Anadarko or the Environmental Consultant may conduct internal audits of field activities involving sampling and measurements. These audits may include a thorough examination of field sampling records, field instrument operating records, sample collection, shipping and handling, Chain-of-Custody, etc. These audits may occur at the discretion of

Anadarko or the Consultant PM, at the beginning of the project, or when new or modified sampling procedures are introduced to verify that the established procedures are followed. Follow-up audits will be conducted to correct deficiencies and to verify the QA/QC procedures are being maintained. Additionally, audits will occur periodically throughout the monitoring period, especially when changes to sampling teams or subcontractors are implemented. When an audit is completed, a written report will be submitted to the Consultant PM and Anadarko.

Consultant personnel will participate in any external audit requested by regulatory agencies. The results and recommendations or any external audit should be reported to the Consultant QAO and/or Consultant PM in a timely manner so that corrective actions may be initiated.

3.2 REPORTS

3.2.1 INTERNAL REPORTING

Written reports of field audits will be issued to the Consultant PM. The Consultant PM is responsible for further dissemination of these reports.

The Laboratory QAO (or designees) will report the status of the laboratory QA/QC program to the laboratory management. Each report should include:

- Periodic assessment of measurement data accuracy, precision, and completeness
- Results of audits
- Significant QA/QC problems and recommended solutions
- Resolutions of previously stated problems

The laboratory will determine the content and frequency of these reports in accordance with its QAM and its SOPs. The laboratory will report to the Consultant QAO or Consultant PM if the laboratory's internal quality control issues have affected the results of the Consultant's samples.

3.2.2 ADDITIONAL REPORTING

Laboratory analytical reports will include a summary of the quality assurance activities and quality control data for the project as related to sample analysis. The Laboratory PM will report suspected field QA/QC problems to the Consultant QAO or Consultant PM.

4.0 DATA REDUCTION, VERIFICATION, VALIDATION, AND REPORTING

The quality of field and analytical data must be assessed to ensure that these data are being properly used. In order to support the conclusions of the assessment, data must meet the DQOs identified in Section 1.4. Data generated through field activities or by the laboratory operation shall be reduced, verified, and validated prior to reporting. Data shall not be disseminated until it has been subjected to these procedures, which are summarized in subsections below.

4.1 REVIEW OF FIELD DATA

Field data reduction procedures will be minimal in scope compared to those implemented in the laboratory setting. Only direct-read instrumentation will be employed in the field. Field data will be written into the groundwater monitoring form(s) immediately after measurements are taken. If corrections are required, the error will be legibly crossed out with a single line and the correction will be made in a space adjacent to the original. Corrections will be initialed and dated by the individual making the correction. Later, when the results calculation forms required for the semi-annual sampling events are being filled out (i.e., corrected LNAPL thicknesses, groundwater elevations, etc.), the FOC will review the forms to determine whether any errors have been made.

4.2 DATA VALIDATION

Data verification is the process of checking the completeness, correctness, and compliance of data with the field and analytical methods, SOPs, and this SAP-QAPP. Data validation is the process of assessing overall data quality with respect to the PARCC parameters. Data verification and validation procedures shall be performed for both field and laboratory operations as described below.

4.2.1 PROCEDURES USED TO VERIFY AND VALIDATE FIELD DATA

The Consultant PM or designee will verify all data generated during field activities. Data verification will consist of reviewing field data and documentation for transcription errors. Any data that is entered into project databases, spreadsheets, drawings, etc. will be checked against the original field measurements. Field custody records will be checked against the work plan to determine that the appropriate samples were collected. Similarly, the custody records will be checked against the analytical data generated by the laboratory to determine that requested analyses were complete.

Field measurements will be validated under the direction of the Consultant QAO according to the PARCC parameters. Additionally, the analytical results of field QC samples will be evaluated to determine that the field investigation and sampling methods employed meet the PARCC requirements. Any identified non-compliant data will be evaluated to determine the potential effect on overall validity and usability of the data generated. If the data is determined not suitable for its intended purpose it will not be used and new data may be collected.

4.2.2 PROCEDURES USED TO VERIFY AND VALIDATE LABORATORY DATA

The analytical subcontractor generating the data will perform initial data verification and validation in accordance with individual methods and the laboratory's QA/QC program prior to reporting any analytical results. Data validation on the final analytical data reported by the analytical subcontractor will be performed in accordance with individual methods and national guidelines. Data validation on the final analytical data will be performed by either the Consultant QAO or a designee.

Data verification and validation is the process through which proper quantification, recording, transcription, and calculations are confirmed. It also confirms that the data is reasonable and complete. The process should be such that errors are minimized and that corrective action steps are taken when errors are detected. The laboratory's data verification and validation processes include three steps: primary, secondary, and final review. The independent data validation is conducted by the Consultant QAO or designee after the laboratory data review process is completed.

4.2.2.1 PRIMARY REVIEW

The analyst performs the initial review of the data. The analyst is responsible for verifying the correctness of the data entered into the Laboratory Information Management System (LIMS). This review includes, but is not limited to, verifying that the quality control indicators (QCI) meet protocol criteria, calibration criteria are met, appropriate detection limits were used, and data was reduced correctly and that any corrective action was documented properly. The primary reviewer is responsible for verifying any documentation associated with the data, completing review records associated with the process, and compiling QC Reports. The analyst must perform primary review on 100% of the data generated.

4.2.2.2 SECONDARY REVIEW

The Laboratory QAO or designee can be responsible for a secondary review of the data. This step is intended as a validation of the primary review. Secondary review focuses on the calibration criteria, QCIs, compound identification, results expression, reporting limits, and level of documentation. Approximately 10% of the data is validated. If

problems exist during this review, the data is returned, a 100% review is done, and corrective action is performed as appropriate.

4.2.2.3 FINAL REVIEW

The Laboratory PM must review the completed project before releasing the final report. This review ensures that the client requirements have been met and that the final report has been properly completed. The process includes verifying that chemical relationships are evaluated, Chain-of-Custody is completed, cover letters/ narratives are present, flags are appropriate, and project specific requirements are met.

4.2.2.4 DATA VALIDATION

The Consultant QAO or designee will review the analytical data package and will provide independent validation of the laboratory data according to method and/or regulatory protocols. The basis for validation will be the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Data Review (most current versions for both organic and inorganic data), modified to accommodate the criteria in the analytical methods reported. Final data qualifiers may be assigned to the original laboratory data reported as a result of the independent validation effort.

4.2.3 LABORATORY DATA REPORTING

After the laboratory has verified and validated the analytical data it will be reported to the Consultant's QAO. The laboratory reports will consist of:

- A summary page referencing the laboratories sample number, client sample number, date/time collected, and date/time received for each sample submitted.
- Analytical results for each sample documenting the results, QC flags, units, chronology of analytical events, reporting limits, analyst, dilutions, and method references. Surrogate recoveries and other QC data (as appropriate) are also reported along with the appropriate control limits.
- Definitions of quality control flags used in report.
- Notes and comments of any identified QC problems or concerns that potentially affect the quality of the data generated.
- Copy of the completed Chain-of-Custody record and sample receipt temperature and condition.

Data will also be received electronically from the laboratory in the approved format and uploaded to the project database. These data will be double checked against the hardcopy reports for accuracy and completeness. Final qualifiers assigned during the independent data validation process will also be checked. After being double checked, the data will be tabulated for subsequent presentation for reporting purposes.

The original laboratory data received by the Consultant QAO will be maintained in the QA files after the review process is completed. The Consultant QAO will give a copy of laboratory data to the Consultant PM after review. No one shall, at any time, remove information from job files, QA files, or the project notebook for field use or other use. If additional copies of laboratory data are required, then arrangements will be made with the Consultant's QAO to copy a portion of the file. Job files, QA files, and project notebooks will be kept at the Consultant's office for a period of ten (10) years, after that they will be moved to a secure location.

4.3 RECONCILIATION WITH USER REQUIREMENTS

Data collected during the semi-annual sampling events will be used to evaluate the current conditions of the dissolved phase and LNAPL plumes beneath the Site. These data will be reconciled with the DQOs and PARCC parameters. Specifically, these data will be qualitatively and quantitatively assessed to determine that appropriate sample collection and analytical procedures were used. These assessments will include:

- Determination of adherence to applicable SOPs.
- Determination that samples were collected from the proposed sample locations.
- Evaluation of detection limits, matrix interferences, and other factors potentially biasing data.
- Evaluation of the data verification results.
- Evaluation of qualified data for environmental assessment purposes.
- Determination that the DQO procedures followed and/or refined during the investigation.
- Determination if there are any data gaps identified that need further evaluation.

5.0 REFERENCES

A variety of technical manuals, administrative documents, and publications were referred to in preparing this document. Some of the references consulted are presented below. Referenced documents and publications may or may not have been reviewed in their entirety.

Anadarko E&P Onshore LLC. RCRA Post-Closure and Corrective Action Permit Renewal Application. October 20, 2023.

USEPA. Contract Laboratory Program, National Guidelines for Data Review. January 2017.

TABLES

TABLE 1-1. GROUNDWATER MONITORING WELL NETWORK
SAMPLING AND ANALYSIS PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

Well ID	Proximity to SWMU Group	Designation	Semiannual GW Activity	Semiannual Routine Analyte/COC 2nd & 4th Quarters	Annual NSZD Analyte List 4th Quarter	Biennial POC Analyte/COC Even years, 4th Quarter
LW-1	1	LTU, POC	Mon	BTEX, Chrysene, Phenol, total Lead, total Chromium, Arsenic		
LW-2	1	LTU	Mon	BTEX, Chrysene, Phenol, total Lead, total Chromium		
LW-3	1	LTU, POC	Mon	BTEX, Chrysene, Phenol, total Lead, total Chromium		
LW-4	1	LTU, POC	Mon	BTEX, Chrysene, Phenol, total Lead, total Chromium		
LW-5R	1	LTU	Mon	BTEX, Chrysene, Phenol, total Lead, total Chromium		
LW-6	1		Mon	BTEX		
LW-7RR	1	LTU	Mon	BTEX, Chrysene, Phenol, total Lead, total Chromium		
MW-2			Gauge			
MW-3AR	3	Trendline	Mon	BTEX		
MW-3BR	3		Mon	BTEX		
MW-4	3		Gauge			
MW-7			Gauge			
MW-8			Gauge			
MW-10		POC	Gauge			BTEX, Arsenic
MW-109		POC, Trendline	Mon	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane	
MW-110	3A, 9	Trendline	Mon	BTEX		
MW-111	3A, 9	Det	Mon	BTEX, Arsenic		
MW-112	3A, 9		Mon	BTEX, Arsenic		
MW-113	2	POC, Det	Mon	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane	
MW-114		POC	Mon	BTEX, Arsenic		
MW-115		POC	Mon	BTEX, Arsenic		
MW-203			Gauge			
MW-211			Gauge			
MW-213			Gauge			
MW-215			Gauge			
MW-216			Gauge			
MW-301			Gauge			
MW-305			Gauge			
MW-311			Gauge			

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FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

Well ID	Proximity to SWMU Group	Designation	Semiannual GW Activity	Semiannual Routine Analyte/COC 2nd & 4th Quarters	Annual NSZD Analyte List 4th Quarter	Biennial POC Analyte/COC Even years, 4th Quarter
MW-315	5		Gauge		BTEX (NSZD geochem only); Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane	
MW-401			Gauge			
MW-403			Gauge			
MW-404	7	POC	Gauge			BTEX, Arsenic
MW-405			Gauge			
MW-413	8		Gauge			
MW-414		Det	Mon	BTEX		
MW-419R			Mon	BTEX, Arsenic		
MW-420	8		Gauge			
MW-424			Gauge			
MW-430	5		Gauge			
MW-432	5		Gauge			
MW-434S		POC, Det	Mon	BTEX		
MW-435SR		POC, Det	Mon	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane	
MW-437			Gauge			
MW-439		POC	Gauge			BTEX, Arsenic
MW-440	8		Gauge			
MW-443			Gauge			
MW-444			Gauge			
MW-445			Gauge			
MW-446			Gauge			
MW-447			Gauge			
MW-448			Gauge			
MW-449			Gauge			
MW-450		POC, Det	Mon	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane	
MW-451			Gauge			
MW-452			Gauge			
MW-454			Gauge		BTEX (NSZD geochem only); Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane	
MW-456			Gauge			
MW-457		POC	Gauge			BTEX, Arsenic

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SAMPLING AND ANALYSIS PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

Well ID	Proximity to SWMU Group	Designation	Semiannual GW Activity	Semiannual Routine Analyte/COC 2nd & 4th Quarters	Annual NSZD Analyte List 4th Quarter	Biennial POC Analyte/COC Even years, 4th Quarter
MW-458			Gauge			
MW-459			Gauge		BTEX (NSZD geochem only); Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane	
MW-460			Gauge			
MW-461	3		Mon	BTEX, Arsenic	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane	
MW-463			Gauge		BTEX (NSZD geochem only); Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane	
MW-464			Gauge			
MW-466			Gauge			
MW-469		POC	Gauge			BTEX, Arsenic
MW-471			Gauge			
MW-473			Gauge			
MW-474			Gauge			
MW-475		POC	Gauge			BTEX, Arsenic
MW-476			Gauge			
MW-477			Gauge			
MW-478			Gauge			
MW-480		POC	Gauge			BTEX, Arsenic
MW-482			Gauge			
MW-483			Gauge			
MW-486			Gauge			
MW-601		Det	Mon	BTEX		
MW-603			Gauge			
MW-604			Gauge			
MW-605	3	POC, Trendline	Mon	BTEX, Arsenic		
MW-606		POC	Gauge			BTEX, Arsenic
MW-607		POC	Gauge			BTEX, Arsenic
MW-608			Mon	BTEX, Arsenic		
MW-609		Trendline	Mon	BTEX, Arsenic		
MW-610		Trendline	Mon	BTEX, Arsenic		
MW-611	3		Mon	BTEX		
MW-613		Det	Mon	BTEX		
MW-614			Gauge			
MW-615			Mon	BTEX, Arsenic		

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Well ID	Proximity to SWMU Group	Designation	Semiannual GW Activity	Semiannual Routine Analyte/COC 2nd & 4th Quarters	Annual NSZD Analyte List 4th Quarter	Biennial POC Analyte/COC Even years, 4th Quarter
MW-616			Mon	BTEX, Arsenic		
MW-617		Trendline	Mon	BTEX, Arsenic		
MW-618A			Mon	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane	
MW-619A			Mon	BTEX		
MW-620			Mon	BTEX		
MW-622A			Mon	BTEX		
MW-623		Det	Mon	BTEX, Arsenic		
MW-624			Mon	BTEX, Arsenic		
MW-625		Det	Mon	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane	
MW-626A			Mon	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane	
MW-627A		Trendline	Mon	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane	
MW-628A		Det	Mon	BTEX		
MW-729			Mon	BTEX		
MW-731		Trendline	Mon	BTEX		
MW-733			Mon	BTEX, Arsenic		
MW-734			Mon	BTEX, Arsenic		
MW-735		Det	Mon	BTEX, Arsenic		
MW-736		Det	Mon	BTEX, Arsenic		
MW-737		Det	Mon	BTEX		
MW-738		Det	Mon	BTEX, Arsenic		
MW-739			Mon	BTEX, Arsenic		
MW-740		Det	Mon	BTEX, Arsenic		
MW-742		Det	Mon	BTEX, Arsenic		
MW-743			Mon	BTEX		
MW-744			Mon	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane	
MW-745		POC, Det	Mon	BTEX, Arsenic		
MW-746	3	Det	Mon	BTEX		
MW-747			Mon	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane	

TABLE 1-1. GROUNDWATER MONITORING WELL NETWORK
SAMPLING AND ANALYSIS PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

Well ID	Proximity to SWMU Group	Designation	Semiannual GW Activity	Semiannual Routine Analyte/COC 2nd & 4th Quarters	Annual NSZD Analyte List 4th Quarter	Biennial POC Analyte/COC Even years, 4th Quarter
MW-748B		POC, Det	Mon	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane	
MW-749		Det	Mon	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane	
MW-750		Det	Mon	BTEX	Nitrate (as Nitrogen), Sulfate, Dissolved Iron and Manganese (field-filtered), Methane	
MW-751		Det	Mon	BTEX		
PZ-1			Gauge			
R-56			Gauge			
R-76		POC	Gauge			BTEX, Arsenic
TW-1			Gauge			
TW-6			Gauge			

TABLE 1-1. GROUNDWATER MONITORING WELL NETWORK
SAMPLING AND ANALYSIS PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

Well ID	Proximity to SWMU Group	Designation	Semiannual GW Activity	Semiannual Routine Analyte/COC 2nd & 4th Quarters	Annual NSZD Analyte List 4th Quarter	Biennial POC Analyte/COC Even years, 4th Quarter
Wells Proposed for Removal from Groundwater Monitoring Program						
MW-409		--	Mon	BTEX		
MW-612R		Sentry	Det	BTEX		
MW-730		--	Mon	BTEX		
MW-741		--	Det	BTEX		
MW-748A		POC	Det	BTEX		

Notes:
LTU = Land Treatment Unit Well
POC = Point of Compliance Well
Det = Detection Well
Trendline = benzene concentration trendlines will be run on these wells
Mon = monitoring well is gauged and sampled
Gauge = monitoring well is only gauged
GW = groundwater
NSZD = Natural Source Zone Depletion
POC and/or Det Wells with measurable LNAPL present should not be sampled

Analytical Methods:
BTEX - EPA Method 8260C
Arsenic, Lead, and Chromium (totals) - EPA Method 6020A
Chrysene and Phenol - EPA Method 8270D
Nitrate (as Nitrogen) and Sulfate - EPA Method E300
Dissolved Iron and Manganese - EPA Method 6020A (field-filtered)
Methane - Method RSK-175

TABLE 1-2. GROUNDWATER PROTECTION STANDARDS AND LABORATORY ANALYTICAL LIMITS
SAMPLING AND ANALYSIS PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

CONSTITUENT	GWPS (mg/L)	SOURCE	APPLICABLE SWMU	ALS-Houston PQL (mg/L)	ALS-Houston MDL (mg/L)
Benzene	0.005	MCL	sitewide	0.001	0.0002
Ethylbenzene	0.7	MCL	sitewide	0.001	0.0003
Toluene	1	MCL	sitewide	0.001	0.0002
Xylene	10	MCL	sitewide	0.001	0.0003
Arsenic	0.01	MCL	sitewide	0.002	0.0004
Chromium	0.1	MCL	LTU	0.004	0.0004
Chrysene	0.0025	tap water	LTU	0.0001	0.000021
Lead (total)	0.15	MCL	LTU	0.002	0.0006
Phenol	58	tap water	LTU	0.0002	0.000035

NOTES:
GWPS - groundwater protection standard
mg/L - milligram per liter
SWMU - solid waste management unit
MCL - federal maximum contaminant level
LTU - land treament unit
tap water - value from 2023 USEPA Regoinal Screening Levels (target cancer risk of 1E-05 and target hazard
ALS-Houston - analytical laboratory
PQL - practical quantitation limit
MDL - method detection limit

TABLE 1-3. GROUNDWATER FIELD PARAMETERS AND LABORATORY ANALYSIS
SAMPLING AND ANALYSIS PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

Parameter	Container/Minimum Sample Volume	Holding Time	Preservation	Method
Water (Groundwater, Wastewater, Trip Blanks, Rinsate Blanks)				
VOC	3 X 40 mL Vial with PTFE septa cap	14 days to analysis	HCl to pH < 2 4°C with no headspace	BTEX - SW-8260C
SVOC	2 X 1L AG	7 days to extraction; 40 days to analysis	NP, 4°C	Chrysene and Phenol - SW-8270D
Metals	1 X 120 mL HDPE bottle	6 months, except for Mercury (28) days	HNO3 to pH < 2 4°C	Arsenic, Lead, Chromium (total) Iron, Manganese (dissolved) SW-6020A
Methane	3 X 40 mL Vial with PTFE septa cap	14 days to analysis	HCl to pH < 2 4°C with no headspace	RSK-175
Nitrate (as Nitrogen)	1x120 mL HDPE	48 hours to analysis	NP, 4°C	EPA-300
Sulfate		28 days to analysis	NP, 4°C	EPA-300

Field Parameters	Acroynms
pH (std. units)	°C- degrees Celsius
Specific Conductance (mS/cm)	mL - milliliter
Temp (°F)	L - liter
DO (mg/L	VOC - volatile organic compound
ORP (mV)	SVOC - semi-volatile organic compound
Turbidity (NTU)	BTEX - Benzene, Toluene, Ethylbenzene, Xylenes (total)
	SW- Solid Waste

Container type codes: PTFE: Polytetrafluoroethylene, AG: Glass Amber, HDPE: High density polythylene, Vial: VOA Vial
Preservation codes: NP: No Preservative, HCl: Hydrochloric acid, HNO3: Nitric acid
Sulfuric acid, MeOH: Methanol, ZnAc2: Zinc Acetate, Na2S203: Sodium thiosulfate

FIGURE

Monitoring/Sampled
Monitoring/Gauged
Detection
Trendline Well
Point of Compliance Well
LTU Well
NSZD Well
Ground Surface Elevation Contour (10-foot interval)

Aqueous-Phase Benzene Concentration Contour (mg/L) (April 2023)

0.005
0.1
1
Inferred
GTAP Projected Limit of Residual LNAPL
Refinery Property Boundary
Anadarko Property used by Consolidated Grain and Barge Co. (Grain Terminal)

Note:

MW-3AR and MW-3BR are co-located wells. MW-3AR is a trendline well. MW-3BR is not a trendline well.

N

Source: Esri, Maxar, Earthstar Geographics, IGN, and the GIS User Community

Anadarko E&P Onshore LLC

Figure 1-1

Groundwater Monitoring Well Network
Former Champlin Refinery, Enid, Oklahoma

0 310 620 1,240 Feet

Date: October 2023

APPENDIX A

GROUNDWATER MONITORING FORM

GROUNDWATER MONITORING FORM
ANADARKO - FORMER CHAMPLIN REFINERY FACILITY

Project Name:	Anadarko - Former Champlin Refinery Facility Groundwater Monitoring - Sitewide/LTF Wells	**Well No:**	
Measuring Point:	☐ TOC ☐ Other — Other Measuring Point	**Geographic Region:**	
Casing Diameter :	inches	**Sample Date:**	MM-DD-YYYY
Total Well Depth/Measured Well Depth:	00.00 — 00.00 feet	**Time Arrived:**	HH : MM
Depth to Product (Below TOC):	00.00 N/A	**Calculated Purge Amount:**	00.00
Depth to Groundwater (Below TOC):	00.00 N/A	**Site Conditions:** Wind Speed(mph)	00.00
Protective Casing in Good Condition:	☐ Yes ☐ No ☐ N/A — **Inner Casing in Good Condition:** ☐ Yes ☐ No	Ambient Temperature °F	00.00
Well Locked:	☐ Yes ☐ No ☐ No Lock		
Well IDed:	☐ Yes ☐ No ☐ Needs Replacing		

Wind Direction: ☐ NW ☐ N ☐ NE ☐ W ☐ E ☐ SW ☐ S ☐ SE

Method of Well Purge:	☐ Submersible Pump ☐ Waterra System ☐ Bailer	☐ Sunny ☐ Cloudy ☐ Windy ☐ Precipitation — 00.00
Type:	☐ PVC ☐ HDPE (Disposable)	
Sampling Collection Method:	☐ Submersible Pump ☐ Waterra System ☐ Bailer	**Sample Collected:** ☐ TSS ☐ TDS ☐ BTEX ☐ T.Metals ☐ Dis.Metals ☐ Gen Chem ☐ Nutrients ☐ LTF Suite ☐ Add.Nutrients ☐ VOC Metals (6010) Cr only ☐ Other — Other Sample Collected
Type:	☐ PVC ☐ HDPE (Disposable)	
Concrete Pad in Good Condition:	☐ Yes ☐ No ☐ No Pad	
Sampling Problems (if any):		**Visible Sheen :** ☐ Yes ☐ No ☐ FP

Time	pH (std. units)	Specific Conductance (mS/cm)	Temp (°F)	Cumulative Vol. of H2O Removed From Well (Gallons)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	General Comments/Notes	Same as above
HH : MM	00.00	0000.000	00.00	00.00	00.00	000.00	00.00		
HH : MM	00.00	0000.000	00.00	00.00	00.00	000.00	00.00		☐
HH : MM	00.00	0000.000	00.00	00.00	00.00	000.00	00.00		☐
HH : MM	00.00	0000.000	00.00	00.00	00.00	000.00	00.00		☐
HH : MM	00.00	0000.000	00.00	00.00	00.00	000.00	00.00		☐
HH : MM	00.00	0000.000	00.00	00.00	00.00	000.00	00.00	<------Final Value	☐

Begin Development/Purging Activities @:	HH : MM		
Sample Type Collected @:	HH : MM	**Duplicate Sample Name:**	ID

At Least 3 Well Casing Volumes Were Evacuated Before Sampling

Monitoring Information: Water in well: TD-DTW * (.17) = gallons of water in casing
Gallons per foot of water: 1" = .04 2" = 0.17, 4" = 0.65, 5" = 1.0, 6" = 1.5
*Purge volumes are calculated as follows:1" well purge vol. = 0.04 x (TD-DTW),
2" well purge vol. = 0.17 x (TD-DTW).

Legend:

TOC - top-of-casing	HDPE - high den poly
TOS - top-of-screen	TD - total depth
MSL - mean sea level	DTW – depth to water
	LTF - landfarm

Form Completed By:	Print Your Name (First and Last) *Sign Your Name*	**Date:**	MM-DD-YYYY

ANADARKO E&P LLC
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

PERMIT ATTACHMENT 6

WASTE MANAGEMENT PLAN

NOTE: ALL THE PAGES FOR THE ATTACHMENTS ARE APPENDICES TAKEN FROM THE PERMIT APPLICATION AND SECTIONS AND PAGE NUMBERS MAY NOT BE IN SEQUENCE.

APPENDIX G

WASTE MANAGEMENT PLAN

WASTE MANAGEMENT PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

This Waste Management Plan provides procedures for use by Site personnel for the management of waste materials generated at the Former Champlin Refinery in Enid, Oklahoma (Site). The objectives of the Waste Management Plan are:

1. Minimize wastes generated through material selection, segregation and recycling/reuse.
2. Manage wastes generated on-site that cannot be recycled/reused.
3. Operate in an environmentally sound manner in accordance with applicable laws, regulations, and ordinances.
4. Use only corporate approved off-site disposal/recycling facilities.

Wastes that are anticipated to be managed are divided into the following categories:

- Soils
- Groundwater and decontamination fluids
- Subsurface debris encountered during excavation
- Recyclable/reusable materials
- Liquid materials and wastes
- Universal wastes
- Municipal solid waste.

1.0 SOILS

A variety of activities conducted on-site may generate soils that need to be managed, including:

1. Machine and hand excavating
2. HydroVac excavating
3. Drill cuttings generated during well installation and abandonment
4. Drill cuttings generated during soil sampling

Soils that are encountered during Site activities will be managed based on the following methodology:

WASTE MANAGEMENT PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

Site Personnel will use a photoionization detector (PID) to screen soils as they are generated. A background PID concentration will be measured each working day prior to the start of work in order to establish baseline conditions. The background reading will be of ambient air. Soils will be observed during generation for staining and/or odor; and segregated into one of two Groups:

- **Group A Soils:**

  Soils from depths of less than 10 feet below grade with PID readings less than 100 parts per million (ppm) above background level[A] and with no staining or odors.

- **Group B Soil:**

  Soils produced from depths greater than ten feet below grade; or

  Soil in which the PID reading is greater than 100 ppm above the background level[A]; or are visibly stained and/or have odors.

As generated, soils will be segregated into stockpiles near the work area. An evaluation of the soil will be made daily to determine the grouping (Group A or B) of the soil or if the soil can be placed back into the excavation/trench. If the Site Manager decides that the soil cannot be replaced from where it was removed, the soil will be moved from the work area to a predetermined consolidation area on-site. Relocated Group A soil will be stockpiled on a minimum of 10-mil plastic sheeting, concrete, or asphalt areas until Site personnel determine how to manage the material on-site.

Group B soil will be placed in stockpiles on a minimum of 10-mil plastic sheeting, concrete, or asphalt. Unless precluded for safety reasons, newly generated Group B soil will be covered at the end of the workday and will remain covered except when additional soil is combined into the existing stockpiles. Group B soil stockpiles will be labeled so that it is legible, clearly visible, and with the following information:

1. Description of contents (e.g., Soil Cuttings - Pending Analysis)
2. Anadarko Petroleum Corporation – Contact the Site Manager; 1-918-561-4111
3. Date of first accumulation

[A] Photoionization detector (PID) readings were compared to TPH concentrations in soil from direct push borings from the South Perimeter Work conducted in 2007. The maximum TPH-GRO and TPH-DRO concentrations associated with PID readings of less than 100 ppm were 25 mg/kg and 10 mg/kg, respectively. A PID screening level of 100 ppm is therefore deemed appropriate for this program.

WASTE MANAGEMENT PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

The task supervisor will collect soil samples of Group B soils to characterize for either off-site disposal or on-site management. The number of samples and analytical parameters are listed in the table below. If the Oklahoma Department of Environmental Quality (ODEQ) approves a different analytical method, the most recent ODEQ version will be used.

Analytical Parameters	Number of Samples[1] for Group B Soils
TCLP-Benzene by EPA Method 1311/8260B	One grab sample per 20 cubic yards (cy) of material
TPH by TCEQ Method 1005	One composite sample per 20 cy, comprised of a minimum three-point composite sample
TCLP-Lead* by EPA Method 1311/6010B	One composite sample per 20 cy, comprised of a minimum three-point composite sample

The Toxicity Characteristic Leaching Procedure (TCLP) data will be evaluated to characterize the waste as either RCRA-hazardous or non-hazardous. The TCLP analytical results will be compared to the following thresholds:

Constituent	TCLP Threshold Concentration
Benzene	0.5 milligrams per Liter (mg/L)
Lead	5.0 mg/L

Although not anticipated, soils that exceed the TCLP threshold concentration for benzene and/or lead will be characterized as RCRA-hazardous waste and will be handled accordingly. Should RCRA-hazardous waste be generated, the appropriate ODEQ and/or United States Environmental Protection Agency (USEPA) forms outlining the generator status and associated requirements will be submitted.

WASTE MANAGEMENT PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

Once the analytical results are received, stockpile signage will be updated to reflect the waste characterization determination (i.e., hazardous or non-hazardous waste).

For non-hazardous waste, Total Petroleum Hydrocarbon (TPH) concentrations will be used to determine whether soils will be managed on-site or transported off-site for disposal:

Hydrocarbon Range	TPH Threshold Concentration[2]
Gasoline Range (C6-C12)	500 milligrams per kilogram (mg/kg)
Diesel Range (C12-C28)	2,500 mg/kg

If TPH concentrations are below the TPH thresholds, soils will be managed on-site as Group A soils. Soils will be applied to the ground surface with a maximum thickness of 2 inches. After application, the soils will be worked into the surface material. Spraying with potable water will be used as needed to control dust. Where appropriate Group A (i.e., non-impacted soils) may also be used for maintaining roads and building pads.

Soils that exceed the TPH thresholds will be transported for off-site disposal. Any disposal facility utilized for this Site must be included on the Anadarko list of corporate approved waste management facilities. For an up-to-date list of corporate approved facilities contact the Site Project Manager.

If the Site disposes of quantities greater than 10 cy per month of TPH-impacted soils with TPH concentrations of greater than 1,000 mg/kg, Anadarko (i.e., the generator) will complete, sign, and submit to the ODEQ a non-hazardous industrial solid waste certification form available at: https://www.deq.ok.gov/wp-content/uploads/land-division/Replacement_nhiw-disposal-request-form.pdf. [1]

2.0 GROUNDWATER AND DECONTAMINATION FLUIDS

Fluids generated during well development, purging, sampling, and decontamination activities will be containerized and characterized pending off-site disposal. These fluids may contain hydrocarbons. The holding containers will be clearly labeled and include the following information:

1. Description of contents (e.g., Well Development Water - Pending Analysis)

WASTE MANAGEMENT PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

2. Anadarko Petroleum Corporation – Contact the Site Manager; 1-(918) 561-4111

3. Date of first accumulation

3.0 SUBSURFACE DEBRIS ENCOUNTERED DURING EXCAVATION

During excavation and other types of subsurface work, there is a potential that subsurface structures/debris may be encountered. Materials encountered will most likely be concrete foundations, piping, conduit, etc. Subsurface debris, not handled as recyclable/reusable materials described below, may be placed on-site as fill material, in accordance with state, federal and local laws and regulations, at designated on-site locations.

4.0 RECYCLABLE/REUSABLE MATERIALS

Examples of recyclable/reusable materials that may be generated include, but are not limited to:

- Paper and packaging
- Scrap metal
- Wood/wood chips/organic wastes
- Corrugated and non-corrugated cardboard
- Plastic piping
- Empty waste containers (e.g., metal, plastic)

To the extent feasible, materials will be recycled or reused to minimize the amount of waste disposed. Potentially reusable materials will be inspected by Site personnel to ensure they are in reusable condition prior to being reused onsite. Scrap metal and organic debris will typically be taken to the City of Enid (COE) Landfill, 16th & Southgate Road, Enid.

5.0 LIQUID MATERIALS AND WASTES

The amount of liquid materials and wastes (e.g., paints, cleaning products) routinely generated is not expected to be significant. The following procedures will typically be used for waste minimization:

- Where equivalent substitutions can be made, less toxic products will be used
- Liquid products will be used in the manner intended by the manufacturer

WASTE MANAGEMENT PLAN
FORMER CHAMPLIN REFINERY
ENID, OKLAHOMA

- Liquid products and wastes will not be disposed of on-site
- Unused liquid products will be reused by the contractor(s) for future jobs rather than discarded as wastes, if appropriate

6.0 UNIVERSAL WASTE

Universal waste, including batteries, pesticides, mercury-containing devices, fluorescent lamps, and aerosol cans will be consolidated in a type-specific package or container. The container will be labeled to be legible, clearly visible, and with the following information:

1. Description of Contents (e.g., Used Batteries – Universal Waste)
2. Anadarko Petroleum Corporation – Contact the Site Manager; 1-918-561-4111
3. Date of first accumulation

The storage container will be shipped off-site to a corporate approved disposal/recycling facility within one year of the accumulation start date.

7.0 MUNICIPAL SOLID WASTE

Municipal solid waste dumpsters or similar containers will be used to store non-hazardous solid waste and office trash that is not addressed in previous sections. Waste and trash generated that cannot be recycled, reused, or does not require specific waste management procedures will be disposed of off-site.

[1] ODEQ, Fact Sheet: Procedures for the Remediation of Diesel & Gasoline Spills, November 2021