Robert Singletary
Executive Director

OKLAHOMA Environmental Quality

Kevin Stitt
Governor

September 5, 2024

CERTIFIED MAIL

Mr. Gregory Michael
Senior Director of Remediation
Clean Harbors Environmental Services, Inc.
4705 Benthall Road
Mount Vernon, IN 47620

Re: RCRA Corrective Action Permit – Public Draft Permit;
Tulsa Disposal, LLC, Tulsa, Oklahoma;
Tulsa Disposal, LLC; EPA ID # OKD000632737, Permit # OKD000632737

Dear Mr. Michael:

On October 21, 2015, the Land Protection Division of the Department of Environmental Quality (DEQ) received Tulsa Disposal, LLC's Application for the renewal of the above-referenced Resource Conservation and Recovery Act (RCRA) Corrective Action Permit. The Application was reviewed for administrative and technical 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 through 2-7-134), and Oklahoma Administrative Code (OAC) 252:4 and OAC 252:205, and DEQ determined the Application to be administratively complete on April 7, 2017, and technically complete on July 11, 2024.

On July 11, 2024, DEQ issued a courtesy draft of the Permit to Tulsa Disposal for review and comment. On August 16, 2024, DEQ received comments from Tulsa Disposal. DEQ has reviewed the comments and incorporated them into the enclosed RCRA Corrective Action Permit for public comment.

The enclosed draft Permit has been finalized for public review and comment. Tulsa Disposal 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, Tulsa Disposal 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 CFR 124.10(c)(1)(ix) and (x). 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 Tulsa 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 James Wilkins of my staff at (405) 702 – 5171 or james.wilkins@deq.ok.gov.

Sincerely,

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

HY / jw

Enclosures: Draft Permit
Public Notices
Fact Sheet

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

TULSA DISPOSAL, LLC
TULSA, OKLAHOMA

CORRECTIVE ACTION PERMIT

FACT SHEET

Proposed Action:	Oklahoma Department of Environmental Quality (DEQ) Resource Conservation and Recovery Act (RCRA) renewal Permit for conducting corrective actions under the Hazardous and Solid Waste Amendments to RCRA of 1984 (HSWA) and the Oklahoma Hazardous Waste Management Act (OHWMA).
Type of Facility:	Tulsa Disposal, LLC owns a closed solvent reclamation facility and is conducting corrective action to monitor, recover, and treat various solvents present beneath the facility.
EPA ID Number:	OKD000632737
Location:	5354 West 46th Street South, Tulsa, Oklahoma 74107
Legal Description:	Township 19 North, Range 12 East, Section 29, Tulsa County, Tulsa, Oklahoma.
Geographic Location:	Latitude: 36° 05' 50" North Longitude: 96° 03' 15" West
Landowner:	Tulsa Disposal, LLC
Facility Operator:	Tulsa Disposal, LLC
Comment Period:	Forty-five (45) days from date of publication

Basis of the Draft Permit:

On October 21, 2015, DEQ received a RCRA Part B Permit Renewal Application (Application) for the renewal of the Tulsa Disposal, LLC RCRA Corrective Action Permit. DEQ determined the Application to be administratively complete on April 7, 2017, at which time a technical review commenced. During the technical review process Tulsa Disposal submitted a Corrective Measures

Work Plan (CMWP) dated September 27, 2019. The remedial measures conducted under the CMWP necessitated updates to various sections of the Application. DEQ requested additional information in correspondence dated October 3, 2023, and Tulsa Disposal responded on December 11, 2023.

Tulsa Disposal, LLC owns a closed solvent reclamation facility and is conducting corrective action to monitor, recover, and treat various solvents present beneath the facility. The Permit renewal and its conditions propose that Tulsa Disposal continue groundwater monitoring and operation of remediation systems. The draft Permit contains conditions for employee training, inspection requirements, emergency procedures, financial assurance, groundwater monitoring and remediation systems. The requirements of OHWMA, the Oklahoma Administrative Code Hazardous Waste Management Regulations (OAC 252:205) as amended, RCRA, and Title 40 of the Code of Federal Regulations (40 C.F.R.) have been met, and DEQ has prepared proposed permit conditions. The proposed Corrective Action Permit allows the Permittee to continue managing hazardous waste in accordance with the Permit.

The administrative record supporting the potential permit conditions consists of the initial Application dated October 21, 2015, and all supplemental information submitted that relates to the Application or is referenced in the draft Permit and this Fact Sheet.

The proposed permit conditions incorporate the applicable requirements of OAC 252:205 and 40 C.F.R. Part 270 and other such conditions as are required to achieve environmentally sound hazardous waste management.

Information Resources:

Copies of the proposed draft permit conditions, this Fact Sheet, and the Application are available for review during normal business hours at the locations listed below:

Tulsa Public Library
2224 W 51st Street
Tulsa, OK 74103
Phone: (918) 549-7323

Oklahoma Department of Environmental Quality
Office of Central Records
707 North Robinson, 2nd Floor
Oklahoma City, Oklahoma 73102
Phone: (405) 702-1188

DEQ Website:
https://www.deq.ok.gov/land-protection-division/permit-public-participation-process/

Telephone inquiries may be directed to:

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

Tulsa Disposal: Gregory Michael, Operations Manager
Clean Harbors Environmental Services.
Phone: (812) 270-2029

Comment Period and Procedures:

Persons wishing to comment on the proposed permit conditions may submit written comments to DEQ at the address listed below. DEQ will consider and formally respond to all relevant comments in the issuance of the final permit decision. Comments should be directed to the appropriateness of the permit decision and the permit conditions and should be factual in nature. All comments must be received at DEQ at the address below no later than forty-five (45) days after the publication of the Notice for the Draft Permit.

Hillary Young, P.E.
Chief Engineer
Land Protection Division
Oklahoma Department of Environmental Quality
707 N. Robinson Ave
P. O. Box 1677
Oklahoma City, OK 73101-1677

The applicable comment period and public hearing procedures may be found at OAC 252:004 and 40 C.F.R. Part 124. The comment period during which written comments on the draft Permit may be submitted extends for forty-five (45) days from the date of notice of the proposed action.

Notice of Final Determination

DEQ will notify the applicant and each person who has submitted written comments or requested notice when the final permit decision is made. Within thirty (30) days after a RCRA permit decision has been made, any person who filed comments on the draft Permit or participated in the public meeting/hearing may petition the Executive Director or DEQ 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 which 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, which incorporates 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 Ave
Oklahoma City, Oklahoma 73101-1677

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

Newspaper Notice Text

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY
NOTICE OF DRAFT PERMIT RENEWAL
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 continued corrective action and groundwater monitoring at Tulsa Disposal, LLC, located at 5354 West 46th Street South, Tulsa, Oklahoma 74107 in Township 19 North, Range 12 East, Section 29, Tulsa County, Tulsa, Oklahoma.

DEQ has tentatively found that the application meets the requirements of Title 40 of the Code of Federal Regulations Parts 264 and 270, Title 27A of the Oklahoma Statutes §§ 2-7-101 through 2-7-134, and Oklahoma Administrative Code 252:4 and 252:205 and has prepared a draft permit renewal for public review.

Tulsa Disposal, LLC owns a closed solvent reclamation facility and is conducting corrective action to monitor, recover, and treat various solvents present in groundwater beneath the facility. The draft corrective action permit and its conditions propose the continued corrective action and groundwater monitoring throughout the facility. The 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 during normal business hours at:

- Tulsa Public Library 2224 W 51st St, Tulsa, Oklahoma 74103;
- Department of Environmental Quality, Office of Central Records, 707 N. Robinson Avenue, Oklahoma City, OK 73102-1677; and
- DEQ's website at deq.ok.gov

The application, draft permit, and related documents may also be reviewed on the DEQ website https://www.deq.ok.gov/land-protection-division/permit-public-participation-process/.

Specific information may be obtained by contacting DEQ or the applicant at the contact information below:

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

Mr. Gregory Michael
Clean Harbors Environmental Services
4705 Benthall Road
Mount Vernon, IN 47620
812-270-2029

Persons wishing to comment on the draft permit should submit their comments in writing to DEQ at the above address or the DEQ website given above. 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 a 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 Clean Harbors Environmental Services contact given above or by contacting DEQ at the contact listed above.

Radio Broadcast Text

Oklahoma Department of Environmental Quality
Notice of Potential Permit Renewal
For a Hazardous Waste Management Facility

The Oklahoma Department of Environmental Quality has reviewed a permit application submitted by Tulsa Disposal, LLC for the continued corrective action and groundwater monitoring at 5354 West 46th Street South, Tulsa, Oklahoma 74107 in Township 19 North, Range 12 East, Section 29, Tulsa County, Tulsa, Oklahoma. DEQ has made a tentative decision to renew a corrective action permit for Tulsa Disposal, LLC in Tulsa, Oklahoma.

The draft corrective action permit and its conditions propose the continued corrective action and groundwater monitoring throughout the facility. The 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 during normal business hours at:

- Tulsa Public Library 2224 W 51st St, Tulsa, Oklahoma 74103;
- Department of Environmental Quality, Office of Central Records, 707 N. Robinson Avenue, Oklahoma City, OK 73102-1677; and
- DEQ's website at deq.ok.gov

Persons wishing to comment on the draft permit or request a public meeting should submit their comments or requests in writing to DEQ no later than forty-five 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.

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY
CORRECTIVE ACTION PERMIT
FOR A HAZARDOUS WASTE MANAGEMENT FACILITY

EPA ID #: OKD000632737 **Permit #:** 000632737

Permittee: Tulsa Disposal, LLC
Tulsa, Oklahoma

Effective Date: xx-xx-2024
Expiration Date: xx-xx-2034

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 (C.F.R.)); and the Oklahoma Hazardous Waste Management Act (OHWMA), 27A O.S. §§ 2-7-101 *et seq*., as amended; and regulations promulgated thereunder in the Oklahoma Administrative Code (OAC) 252:205; and 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 is hereby issued by the Oklahoma Department of Environmental Quality (DEQ) to Tulsa Disposal, LLC (hereafter called the Permittee). The facility has the street address of 5354 West 46th Street South, Tulsa, OK 74107. The geographical location is latitude 36°05'50" North and longitude 96°03'15" West.

The legal description of the facility is as follows:

Lot 1, Block 1, West Park Plaza Amended, an Addition in Tulsa County, State of Oklahoma, being a Subdivision of West Park Plaza, a Subdivision of a part of the Northwest Quarter of the Southeast Quarter of Section 29, Township 19 North, Range 12 East less and except a part of said Lot 1 being more particularly described as follows: Beginning at the Northeast corner of said Lot 1; THENCE South 00°48'41" East along the East line of said Lot 1 a distance of 575.00 feet; THENCE South 89°11'04" West parallel with the North line of said Lot 1 a distance of 469.14 feet; THENCE due North a distance of 575.06 feet to the North line of said Lot 1; THENCE North 89°11'04" East along the North line of said Lot 1 a distance of 461.00 feet to the point of beginning.

The Tulsa Disposal, LLC site is located at 5354 West 46th Street South, Tulsa, Oklahoma on ten (10) acres. The facility was established in 1979 as Hydrocarbon Recyclers, Inc. (HRI) to recycle waste oil. Waste solvent storage and recycling operations were added in 1983. In 1987, a new processing plant for waste oil was completed. Processing activities were conducted in two separate plant areas. These included the solvent operations in the solvent recycling plant and non-hazardous industrial wastewater treatment in the former waste oil plant. Historically, three major types of waste streams were handled at the facility: chlorinated solvents, non-chlorinated solvents (including paint and lacquer thinners), and waste oils. The facility ceased operations on June 3, 1996, and is now conducting corrective action to monitor, recover, and treat various solvents present beneath the facility.

The Permittee must comply with all terms and conditions of this Permit. This Permit consists of the conditions contained herein (including those in any attachments), and the applicable regulations

contained in 40 C.F.R. Parts 124, 260 through 264, 266, 268, and 270, as specified in the Permit. 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 under RCRA of the provisions of this Permit lies with DEQ. This Permit is based on the assumption that the information submitted in the Part B Permit Application dated October 21, 2015, as modified by subsequent amendments, the last one received on December 11, 2023, (hereafter referred to as the Application) is accurate and that the facility will be operated as specified in the Application and this Permit.

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.

This Permit is effective as of ------, --, 2024 and shall remain in effect until ------, --, 2034 unless revoked and reissued 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), the Oklahoma Rules and Regulations for Hazardous Waste Management (OAC 252:205), and the Oklahoma Administrative Procedures Act (75 O.S. §§ 250 *et seq.*).

Issued this --th day of --- 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

TULSA DISPOSAL, LLC
TULSA, OKLAHOMA

TABLES

PERMIT ATTACHMENTS

SECTION I GENERAL PERMIT CONDITIONS

A. GENERAL

The Permittee shall monitor and maintain the permitted facility in compliance with the provisions of the Oklahoma Hazardous Waste Management Act (OHWMA), 27A O.S. §§ 2-6-101, *et. seq*. as amended, the Oklahoma Department of Environmental Quality rules for Hazardous Waste Management (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 this Permit as specified through the Permit Conditions set herein.

B. BASIS OF PERMIT

This Permit is issued based on the information submitted and the design criteria presented in the Application. 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 Land Protection Division (LPD) of 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. 40 C.F.R. § 270.50. This Permit may be reviewed by 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 Condition I.F.3 (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 252:205-3-1 through OAC 252:205-3-6.

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 DEQ to be indicators for protection of human health and the environment.

"Alternate Concentration Level" (ACL) means a risk-based action or cleanup level derived from a site-specific risk assessment established under 40 C.F.R. § 264.94.

"Area of Concern" (AOC) means any discernable unit or area which, in the opinion of 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.

"CMS" means Corrective Measures Study.

"DEQ" means the Oklahoma Department of Environmental Quality.

"Director" means the Executive Director of DEQ, or his/her designee or authorized representative.

"Division Director" means the Director of the Land Protection Division of DEQ, or his/her designee or authorized representative.

"EPA" means the United States Environmental Protection Agency.

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

"GWPS" means Groundwater Protection Standard which will be site-specific risk-based levels as established under 40 C.F.R. § 264.94.

"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 a solid waste that meets the definition of hazardous waste specified by DEQ in the Oklahoma Hazardous Waste Management Act and at OAC §252:205-3-2 incorporating the EPA definition found at 40 C.F.R. Part 261.

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

"MCL" means maximum contaminant level as required by the Safe Drinking Water Act and codified in 40 C.F.R. Part 142.

"OHWMA" means the Oklahoma Hazardous Waste Management Act, 27A O.S. §§ 2-7-101 through 2-7-134, as amended.

"Permit" means this Permit, all Permit Attachments, and all provisions and documents that are incorporated herein or are in the administrative record.

"Permittee" means Tulsa Disposal, LLC, 5354 West 46th Street South, Tulsa, Oklahoma 74107, EPA ID # OKD000632737.

"Point of Compliance" (POC) means the vertical plane in the uppermost aquifer located at the hydraulically downgradient limit of the property boundary at which the applicable GWPS applies and at which monitoring must be conducted.

"Point of Exposure" (POE) means the location(s) within an environmental medium where a human or ecological receptor could potentially come into contact with constituents of concern.

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

"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 (including hazardous constituents) into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing hazardous wastes or hazardous constituents). RCRA section 3004(u) corrective action authority does not routinely reevaluate permitted releases.

"**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, DEQ may, at its discretion, apply the new definition to this Permit by modifying the Permit in accordance with 40 C.F.R. § 270.41.

E. EFFECT OF PERMIT

The Permittee is allowed to monitor, recover and treat contaminated groundwater in accordance with the conditions of this Permit. Any receipt, treatment, storage and/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. 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 or property, any invasion of other private rights, or any infringement of state or local laws or regulations. 40 C.F.R. §§ 270.4, 270.30(g).

Compliance with the terms of this Permit does not constitute a defense to any order issued or any actions brought under the Oklahoma Environmental Quality Code to address an imminent and substantial endangerment; 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. §§ 9601-9675, commonly known as CERCLA), or any other law providing for protection of public health or the environment from an imminent or substantial endangerment.

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. §§ 270.30(f), 270.41, 270.42, and 270.43. The filing of a request for a Permit modification, revocation and re-issuance, 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), 270.30(f).

2. Permit Renewal

   This Permit may be renewed as specified in 40 C.F.R. § 270.30(b), OAC 252:205-1-3(a), 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), HSWA Sec. 212, and 27A O.S. § 2-7-127(B).

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. This Permit and all conditions herein will remain in effect beyond the Permit's expiration date, if the Permittee has submitted a timely, complete application (see 40 C.F.R. §§ 270.10, 270.13 through 270.29) and, through no fault of the Permittee, 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 expired or expiring Permit, DEQ may choose to do any one or more of the following:

a. Initiate enforcement action based upon the Permit which has been continued;

b. Issue a notice of intent to deny the new Permit under 40 C.F.R. § 124.6. 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;

c. Issue a new Permit under 40 C.F.R. Part 124 with appropriate conditions; or

d. Take other action authorized by these regulations.

4. Permit Enforcement

When the Permittee is not in compliance with the conditions of the Continued Permit, DEQ may do any or all 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;

b. Issue a final denial of the new Permit. If the Permit is denied, the owner or operator shall 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 through 2-7-134, OAC 252:205-1-1 *et seq*. or other applicable laws or regulations.

5. Transfer of Permit

This Permit is not transferable to any person, except after notice to DEQ as required by 40 C.F.R. § 270.40. DEQ may require modification or revocation and re-issuance of the Permit pursuant to 40 C.F.R. § 270.40. Before transferring ownership or operation of the facility during its operating life, 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. If any provisions of this Permit, or the application of any provisions 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, except as otherwise provided by 40 C.F.R. 124.16, be affected thereby. The provisions of this permit are severable. 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, except as otherwise provided by 40 C.F.R. 124.16, be affected thereby.

H. DUTIES AND REQUIREMENTS

1. Duty to Comply

The Permittee shall comply with all conditions of this Permit, except to the extent and for the duration that noncompliance is authorized by an emergency Permit. 40 C.F.R. § 270.61. 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 wishes to continue an activity allowed 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. §§ 270.10(h) and 270.30(b).

3. Biennial Report

The Permittee shall comply with the biennial reporting requirements of OAC 252:205-3-2 and 40 C.F.R. § 264.75.

4. Permit Expiration

Refer to Permit Condition I.F.3.

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 include 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 DEQ, within a reasonable time, any relevant information which 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 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) and 27A O.S. § 2-3-501(A), the Permittee shall allow 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, for the purposes of assuring Permit compliance or as otherwise authorized by RCRA, any substances or parameters at any location.

10. Monitoring and Records

a. Samples and measurements taken for the purpose of monitoring shall be in accordance with the Permit Attachment 1 – Waste Analysis Plan and Attachment 9 – Sampling and Analysis Plan for Groundwater Monitoring. The method used to obtain a representative sample of the waste to be analyzed must be the appropriate method from Appendix I of 40 C.F.R. Part 261 or an equivalent method approved by DEQ. Laboratory methods must be those specified in the most recent edition of Test Methods for Evaluating Solid Waste: Physical/Chemical Methods Compendium SW-846, Standard Methods for the Examination of Water and Wastewater, Fifteenth Edition, 1980, and 1981 supplement, or current adopted edition; RCRA Ground-Water Monitoring: Draft Technical Guidance, 1992, OSWER Directive 9950.1 or an equivalent method approved in writing by DEQ. 40 C.F.R. § 270.30(j)(1).

b. The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports and records required by this Permit, the certification required by 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 three (3) years from the date of the sample, measurement, report, record, certification, or application. These periods may be extended by request of DEQ at any time and are automatically extended during the course of any unresolved enforcement action regarding this facility. 40 C.F.R. §§ 264.74(b) and 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 DEQ, as soon as possible, of any planned physical alterations or additions to the permitted facility 40 C.F.R. § 270.30(l)(1).

12. Reporting Anticipated Noncompliance

The Permittee shall give advance notice to 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. Transfer of Permits

Refer to Permit Condition I.F.5.

14. Monitoring Reports

Groundwater monitoring results shall be reported Semi-annually. The report for the January-June period shall be presented to DEQ by September 1, and the report for the July-December period shall be presented to DEQ by March 1, of each year. Physical, chemical and other relevant characteristics of the waste streams' constituency shall be reported. 40 C.F.R. § 270.30(1)(4).

15. Compliance Schedule

Reports of compliance with or any progress reports on, interim and final requirements contained in any compliance schedule of this Permit shall be submitted no later than fourteen (14) days following each schedule date. 40 C.F.R. § 270.30(1)(5).

16. Incident Reporting [OAC 252:205-13-1, 40 C.F.R. § 270.30(l)]

Upon discovery of a release of materials that are or become hazardous waste whether by spillage, leakage, or discharge to soils or to air or to surface or groundwater (outside the limits of a discharge Permit), or by other means, and which could threaten human health or the environment, the owner or operator shall immediately notify DEQ and take all necessary action to contain, remediate, and mitigate hazards from the release. The Permittee is not required to notify DEQ of a release if it is completely contained in a secondary containment area.

a. The report shall include the following:

i. Information concerning release of any hazardous waste that may cause an endangerment to public drinking water supplies.
ii. Any information of a release or discharge of hazardous waste, or of a fire or explosion from the hazardous waste management facility

which could threaten the environment or human health outside the facility.

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

i. Name, address, and telephone number of the owner or operator;
ii. Name, address, and telephone number of the facility;
iii. Date, time, and type of incident;
iv. Name and quantity of materials involved;
v. The extent of injuries, if any;
vi. An assessment of actual or potential hazards to the environment and human health outside the facility, where 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. DEQ may waive the five-day written notice requirement in favor of a written report within fifteen (15) days.

17. Other Noncompliance

The Permittee shall report all other instances of noncompliance not otherwise required to be reported above in Permit Conditions I.H.12-18 at the time monitoring reports are submitted. The reports shall contain the information listed in Permit Condition I.H.18. 40 C.F.R. § 270.30(l)(10).

18. 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 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 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 DEQ

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

Chief Engineer, Land Protection Division
Oklahoma Department of Environmental Quality
707 North Robinson
P.O. Box 1677
Oklahoma City, Oklahoma 73101-1677

Phone Number (405) 702-5100

K. CONFIDENTIAL INFORMATION

In accordance with 40 C.F.R. § 270.12 and OAC 252:4-1-5(d) and 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, EPA and 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) and the Oklahoma Open Records Act, 51 O.S. § 24A.5. 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 corrective action is completed, and certified by an independent, registered professional engineer, as needed, the following documents and all amendments, revisions and modifications to these documents:

1. Waste Analysis Plan (Attachment 1), as required by 40 C.F.R. § 264.13;

2. General Inspection Plan (Attachment 2), as required by 40 C.F.R. § 264.15(b)(2);

3. Personnel Training Documents and Records (Attachment 3), as required by 40 C.F.R. § 264.16(d);

4. Contingency Plan (Attachment 4), as required by 40 C.F.R. § 264.53(a);

5. Closure Plan (Attachment 5), as required by 40 C.F.R. § 264.112(a);

6. Post-Closure Plan (Attachment 6), as required by 40 C.F.R. § 264.118(a) and this Permit;

7. Sampling and Analysis Plan (Attachment 9), as required by 40 C.F.R. § 264.97(d); and

8. All other documents required by Permit Condition I.H.

SECTION II GENERAL FACILITY CONDITIONS

A. DESIGN AND OPERATION OF FACILITY

The Permittee shall monitor and maintain the facility to minimize the possibility of a fire, explosion, or any unplanned, sudden or non-sudden release of 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 and OAC 252:205-9-1.

B. REQUIRED NOTICES

1. Hazardous Waste Imports

   The Permittee shall not receive hazardous waste from a foreign source.

2. Hazardous Waste from Off-Site Sources

   The Permittee shall not receive hazardous waste from an off-site source.

C. GENERAL WASTE ANALYSIS

The Permittee shall follow the waste analysis procedures required by 40 C.F.R. § 264.13, as described in the attached Waste Analysis Plan, Permit Attachment 1.

The Permittee shall analyze each waste stream in accordance with Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, EPA Publication SW-846, or equivalent methods approved by DEQ. At a minimum, the Permittee shall maintain proper functional instruments, use approved sampling and analytical methods, verify the validity of sampling and analytical procedures, and perform correct calculations.

The Permittee shall repeat the analysis when it is notified or has reason to believe that the process or operation generating the waste has changed. 40 C.F.R. § 264.13(a)(3)(i).

D. SECURITY

The Permittee shall comply with the security provisions of 40 C.F.R. § 264.14(b)(2) and (c). The six (6) feet high perimeter chain link fence must be maintained in good repair. Fence gates must be locked when facility personnel are not present.

E. GENERAL INSPECTION REQUIREMENTS

The Permittee shall follow the inspection schedule 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).

F. PERSONNEL TRAINING

The Permittee shall conduct personnel training, as required by 40 C.F.R. § 264.16 and Permit Attachment 3. This training program shall follow Permit Attachment 3. The Permittee shall maintain training documents and records, as required by 40 C.F.R. § 264.16(d) and (e).

G. PREPAREDNESS AND PREVENTION

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.H.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. CONTINGENCY PLAN

1. Implementation of Plan

   The Permittee shall immediately carry out the provisions of the Contingency Plan, Permit Attachment 4, whenever there is a fire, explosion, or release of hazardous waste or constituents which could threaten human health or the environment.

2. Copies of Plan

   The Permittee shall comply with the requirements of 40 C.F.R. § 264.53.

3. Amendments to Plan

   The Permittee shall review and immediately amend, if necessary, the Contingency Plan, as required by 40 C.F.R. § 264.54. Such amendment may require Permit modification in accordance with 40 C.F.R. § 270.42.

4. Emergency Coordinator

   A trained emergency coordinator shall be available at all times in case of an emergency, as required by 40 C.F.R. § 264.55.

I. MANIFEST SYSTEM

The Permittee shall comply with the manifest requirements of 40 C.F.R. §§ 264.71, 264.72, and 264.76.

J. GENERAL CLOSURE REQUIREMENTS

1. Performance Standard

   The Permittee shall close the facility, as required by 40 C.F.R. § 264.111 and in accordance with the Closure Plan, Permit Attachment 5.

2. Amendments to Closure Plan

   The Permittee shall amend the Closure Plan, in accordance with 40 C.F.R. § 264.112(c), whenever necessary. Such amendment may require Permit modification in accordance with 40 C.F.R. § 270.42.

3. Notification of Closure

The Permittee shall notify DEQ in writing at least forty-five (45) days prior to the date on which he expects to begin final closure of the facility, as required by 40 C.F.R. § 264.l 12(d).

4. Time Allowed for Closure

After receiving the final volume of hazardous waste; the Permittee shall treat, remove from the unit or facility, or dispose of on-site all hazardous waste and shall complete closure activities, in accordance with 40 C.F.R. § 264.113 and the schedules specified in the Closure Plan, Permit Attachment 5.

5. Disposal or Decontamination of Equipment, Structures and Soils

The Permittee shall decontaminate and/or dispose of all contaminated equipment, structures, and soils, as required by 40 C.F.R. § 264.114 and the Closure Plan, Permit Attachment 5.

6. Certification of Closure

The Permittee shall certify that the facility has been closed in accordance with the specifications in the Closure Plan, Permit Attachment 5, as required by 40 C.F.R. § 264.115.

K. COST ESTIMATE FOR FACILITY CLOSURE

1. The Permittee must adjust the closure cost estimate for inflation within sixty (60) days prior to the anniversary date of the establishment of the financial instrument(s) used to comply with 40 C.F.R. § 264.143 or when using an approved state required mechanism, upon such date as required by the state. 40 C.F.R. § 264. l42(b).

2. The Permittee must revise the closure cost estimate whenever there is a change in the facility's Closure Plan, as required by 40 C.F.R. § 264.142(c).

L. FINANCIAL ASSURANCE FOR FACILITY CLOSURE

The Permittee shall demonstrate continuous compliance with the requirement of 40 C.F.R. § 264.143 by providing documentation of financial assurance, as required by 40 C.F.R. § 264.151 or 264.149. Changes in financial assurance mechanisms must be approved by DEQ pursuant to 40 C.F.R. § 264.143 or 264.149.

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

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

SECTION III CORRECTIVE MEASURE AND GROUNDWATER MONITORING

A. SECTION HIGHLIGHTS

The Corrective Measure consists of one (1) containment trench along the north and west perimeter of the facility and one (1) recovery trench near the volatile organic compound (VOC) source area in SWMU 1. The groundwater extraction trenches have been in operation since 1996. The containment trench is five-hundred forty (540) feet in length and is located downgradient of the probable on-site VOC source areas at the property boundary. Three (3) separately located recovery pumps remove groundwater from the containment trench. The recovery trench is seventy (70) feet in length and is located immediately downgradient of the probable VOC source area. One (1) recovery pump removes groundwater from the recovery trench. Groundwater is pumped from the trenches to a 500,000 gallon on-site storage tank. The collected groundwater is discharged to the City of Tulsa Publicly Owned Treatment Works (POTW) in compliance with the POTW discharge permit obtained from the City of Tulsa. The pump and treat system handles approximately one million gallons of groundwater per year.

Groundwater flow volumes from the groundwater extraction trenches and groundwater levels are measured. Groundwater samples are collected and analyzed for VOCs. Monitoring events have been conducted since 1996 and are now performed semi-annually. The monitoring well network consists of thirty-four (34) wells, associated sumps and recovery trench wells.

B. WELL LOCATION, INSTALLATION AND CONSTRUCTION

The Permittee shall maintain and operate the groundwater monitoring system as specified below: 40 C.F.R. § 264.99(b).

1. Monitoring Wells:

   The Permittee shall maintain the following groundwater monitoring wells at the locations specified on the map presented in Permit Attachment 7.

   Off-Site (Outside Facility Fence line): MW-20, MW-23, MW-24, MW-25, MW-38, MW-39, MW-40, MW-41, MW-42, MW-43, MW-46, MW-47, MW-48, MW-49 and MW-50. These wells are located downgradient and off-site of the containment recovery trench.

   On Site (Inside Facility Fence line): MW-1, MW-3, MW-5, MW-8, MW-10, MW-11, MW-12, MW-13, MW-14, MW-21, MW-22, MW-26, MW-31, MW-32, MW-33, MW-34, MW-35, MW-44, and MW-45. These wells are located on-site and upgradient of the containment recovery trench.

   Recovery Sump Wells: RS-1, RS-2, RS-3, and RS-4.

Trench Observation Wells: TOW-A, TOW-B, TOW-C, TOW-D, TOW-E, TOW-F, TOW-G, TOW-H, TOW-I, TOW-J, TOW-K, TOW-L, TOW-M, and TOW-N.

2. Well Maintenance:

   The Permittee shall maintain the monitoring wells in accordance with the specifications presented in Permit Attachment 8.

3. Monitoring Well Removal:

   The Permittee must apply for a Permit modification, as applicable, to request a change in the number, location, depth, or design of groundwater monitoring wells as required under 40 C.F.R. § 270.42 Appendix I(C)(1).

   All wells deleted from the monitoring program shall be plugged and abandoned in accordance with procedures specified by the Oklahoma Water Resources Board (OWRB). A list of plugged wells and corresponding certification shall be submitted to DEQ at least semi-annually, as appropriate.

4. Well Log Submission:

   The Permittee shall submit all well logs to DEQ in the report following the work element performed.

C. GROUNDWATER PROTECTION STANDARD (GWPS)

1. The Permittee shall monitor the ground water semi-annually to determine the concentration of hazardous constituents as compared to the following site-specific target levels (SSTLs) with completion of Permit Condition III.C.2.

Hazardous Constituents	SSTL (mg/L)	
	Off-site	On-site
Benzene	0.05	0.50
1,1-Dichloroethylene	0.07	2.40
1, 4-Dioxane	0.03	0.12
Methylene Chloride	0.05	0.25
Tetrachloroethylene	0.05	3.90
1,1,1-Trichloroethane	2.00	37.00
Trichloroethylene	0.05	0.90
Vinyl chloride	0.02	0.14

D. SAMPLING AND ANALYSIS PROCEDURES

The Permittee shall use the techniques and procedures described in the Permittee's Sampling and Analysis Plan, Permit Attachment 9 when obtaining and analyzing samples from the groundwater monitoring wells.

E. ELEVATION OF THE GROUNDWATER SURFACE

The Permittee shall determine the groundwater surface elevation at each monitoring well each time groundwater is sampled in accordance with the Permittee's Sampling and Analysis Plan, Permit Attachment 9.

F. OPERATION OF RECOVERY TRENCHES AND WATER TREATMENT

1. The Permittee shall operate the perimeter containment trench and the source area recovery trench to remove contaminated groundwater as described in Permit Attachment 10.

2. The Permittee shall operate the groundwater treatment system, including tankage, and discharge treated groundwater to the City of Tulsa as described in Permit Attachment 9.

G. MONITORING PROGRAM AND DATA EVALUATION

The Permittee shall determine groundwater quality as follows:

1. The Permittee shall collect, preserve, and analyze groundwater samples pursuant to Permit Condition III.D.

2. The Permittee shall determine the concentration of hazardous constituents (as specified in Permit Condition III.C) in groundwater at each monitoring well (off-site wells, on-site wells and sump wells). These determinations shall be made semi-annually.

3. The Permittee shall determine the groundwater flow rate and direction in the uppermost aquifer at least annually.

H. RECORDKEEPING AND REPORTING

1. The Permittee shall enter all monitoring, testing, and analytical data obtained pursuant to Permit Conditions III.E-III.G in the operating record.

2. The Permittee shall submit the analytical results required by Permit Conditions III.E-III.G, by September 1 of each year for samples collected from January-June of that year and by March 1 of each year for samples collected from July-December of that year.

I. REQUEST FOR PERMIT MODIFICATION

If the Permittee or DEQ determines the corrective action system has achieved the SSTLs, the Permittee may submit to DEQ an application for a Permit modification to request a "No Further Action" determination and site closure.

SECTION IV SPECIAL CONDITIONS PURSUANT TO HAZARDOUS AND SOLID WASTE AMENDMENTS (HSWA)

A. PREAMBLE AND GENERAL COMMENTS TO HSWA CONDITIONS, INCLUDING SWMUS AND THEIR STATUS

Past activities at the Facility included solvent recycling, waste oil treatment, and wastewater treatment. A RCRA Facility Assessment (RFA) was performed in 1988 which identified 53 SWMUs which were later consolidated into six (6) SWMUs by DEQ. These SWMUs are:

- SWMU 1 - Solvent Recycling Plant;
- SWMU 2 - Former Waste Oil Process Area;
- SWMU 3 - Heat Vapor Recovery System;
- SWMU 4 - Stormwater Storage Tank 1;
- SWMU 5 - Stormwater Storage Tank 2; and
- SWMU 6 - Former Drum Storage Area.

In 1991, VOCs were detected in the groundwater below the facility. An RFI was completed in 1994 and concluded that the solvent release was within the limits of SWMU 1. An Interim Measure Plan was developed in 1995. The Interim Measure was installed in 1996 and consisted of groundwater monitoring wells, a containment trench and a source area recovery trench. A corrective Measures Study was completed in 1998 which recommended the continued operation of the Interim Measure as the selected corrective measure. Groundwater monitoring and groundwater recovery and discharge to the City of Tulsa have continued since 1996. On January 7, 2016, a thirty-five (35) well in-situ biological reactor (ISBR) system began full-time operation to augment the existing groundwater remediation (pump and treat trench recovery) system in SWMU 1. Tulsa Disposal submitted a Corrective Measures Work Plan (CMWP) dated September 27, 2019, requesting to excavate contaminated soil, remove the ISBR system, remove parts of the concrete pad, and remove monitoring wells BP-1, MW-28, MW-29, and MW-30. In a letter dated November 21, 2019, DEQ approved the CMWP. Removal of the wells and ISBR system took place on April 8 and 9, 2021. The excavation took place April 28 through August 11, 2021.

B. STANDARD CONDITIONS

1. Waste Minimization

The Permittee shall submit a certification according to 40 C.F.R. § 270.11(d) annually by December 1, for the previous year ending September 30, as required by 40 C.F.R. § 264.73(b)(9), specifying:

a. 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

b. That 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;

2. Dust Suppression

Pursuant to 40 C.F.R. § 266.23(b), OAC 252:205-3-2(m), and the Toxic Substances Control Act, the Permittee shall not use waste or used oil or any other material which is contaminated with dioxins, 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 the reasons specified in 40 C.F.R. § 270.41, DEQ determines that modification of this Permit is necessary, DEQ 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, where 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 in initiating such proceedings.

c. Modification of Corrective Action Schedules of Compliance (CASC) for SWMUs

The Permittee shall adhere to CASCs developed for newly identified and previously identified SWMUs covered by this 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 DEQ and submit a request for an extension of time with a justification as to why the current CASC cannot be met. Such extension is only effective if approved in writing by DEQ or otherwise approved in accordance with the provisions of this Permit. If DEQ determines that a Permit modification is necessary, either DEQ or the Permittee, as appropriate, shall initiate a Permit modification under Permit Condition IV.B.3.a or IV.B.3.b.

4. Permit Review

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

5. Compliance with Permit

   See Permit Condition I.E.

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. Changes to the waste analysis plan will be considered Permit modifications at the request of the Permittee, pursuant to 40 C.F.R. § 270.42.

   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 requirements of this Permit. Failure to comply with the regulations may subject the Permittee to enforcement action under the OHWMA, this Permit, and 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, suspension, or denial of Permit renewal application. Falsification of any submitted information may also constitute 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 DEQ required in this Permit are signed and certified in accordance with 40 C.F.R. § 270.11. Two (2) hard copies and one (1) electronic copy of each of these plans, reports, notifications or other submissions shall be submitted to DEQ by Certified Mail or hand delivered to:

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

8. Plans and Schedules Incorporated into Permit

   All plans and schedules required by this Permit are, upon approval by 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 and under the OHWMA which may include fines, suspension, or revocation of the Permit.

   Any noncompliance with approved plans and schedules shall be termed noncompliance with this Permit. Written requests for extensions of due dates for submittals may be granted by DEQ in accordance with Permit Condition IV.B.3.c.

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

9. Data Retention

   All raw data related 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 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 as 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. Regulations under Subpart S - Corrective Action for Solid Waste Management Units - 40 C.F.R. §§ 264.550, 264.551 and 264.552, Federal Register, Friday, July 27, 1990, pp 30798-30884, shall be applicable as guidance for managing these wastes. Approval of units for managing wastes and conditions for operating the units, if approved, shall be granted through the permitting process.

C. SPECIFIC CONDITION – INVESTIGATION OF AREA(S) OF CONCERN

Within one hundred and eighty (180) days of the identification of newly identified Areas of Concern (AOCs), the Permittee shall submit a plan to determine if the AOCs are SWMUs. The work plan shall describe the objective of the investigation and the overall technical and analytical approach to completing all actions necessary to determine if activity at the AOC resulted in solid waste management at any time. If such determination is made, the AOC shall be designated as a newly identified SWMU. If hazardous wastes including hazardous constituents are determined to be managed at the SWMU or potential AOC, and if DEQ

determines that further investigation is necessary, a plan for the investigation shall be prepared according to Permit Condition IV.E.

D. NOTIFICATION REQUIREMENTS FOR AND ASSESSMENT OF NEWLY IDENTIFIED SWMUs AND POTENTIAL AOCs

The Permittee shall notify DEQ, in writing, of any newly identified SWMU(s) and potential AOCs (i.e., a unit or area not specifically identified during the RFA), discovered in the course of groundwater monitoring, field investigations, environmental audits, or other means, no later than thirty (30) calendar days after discovery. The Permittee shall also notify DEQ of any newly constructed land-based SWMUs (including but not limited to, surface impoundments, waste piles, landfills, land treatment units) and newly constructed SWMUs where any release of hazardous constituents may be difficult to identify (e.g., underground storage tanks) no later than thirty (30) days after construction. The notification shall include the following items, to the extent available:

1. The location of the newly identified SWMU or potential AOC on the topographic map required in 40 C.F.R. § 270.14(b)(19). Indicate all existing units (in relation to other SWMUs);

2. The type and function of the unit;

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

4. The period during which the unit was operated;

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

6. 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 from the SWMU or whether the AOC should be considered a SWMU.

Based on the results of this Notification DEQ will designate the newly identified SWMU(s) or AOC(s). Based on the results of this notification or investigation conducted, DEQ will determine the need for further investigations or corrective measures at any newly identified SWMU(s) or AOC(s). If DEQ determines that such investigations are needed, DEQ may require the Permittee to prepare a plan for such investigations. The Permit will be modified to incorporate the investigation requirements for the newly identified AOC(s) or SWMU(s).

E. NOTIFICATION REQUIREMENTS FOR NEWLY DISCOVERED RELEASES AT SWMU(s) AND AOC(s)

The Permittee shall notify DEQ in writing, no later than fifteen (15) calendar days after discovery, of any release(s) from a SWMU or AOC of hazardous waste or hazardous constituents discovered during the course of ground water monitoring, field investigation, environmental auditing, or other means. Such newly discovered releases may be from newly identified SWMUs or AOCs, newly constructed SWMUs, or from SWMUs or AOCs for which, based on the findings of the RFA, completed RFI, or investigation of an AOC(s), 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. 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 Workplan or a new RFI Workplan. The Permit will be modified to incorporate the investigation, if required.

F. INTERIM MEASURES

a. If, during the course of any activity initiated under this Permit, DEQ determines that a release or potential release of hazardous constituents from a SWMU or AOC poses a threat to human health and the environment, DEQ may require interim measures. 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. DEQ shall notify the Permittee in writing of the requirement to perform interim measures. DEQ may modify this Permit to incorporate interim measures into the Permit.

b. 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.

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

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

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

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

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

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

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

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

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

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

G. CORRECTIVE ACTION

1. Corrective Action for Releases

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 or hazardous constituents from any SWMU at the facility, regardless of when the waste was placed in the unit.

2. Releases Beyond Facility Boundary

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

b. 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.

H. REPORTING REQUIREMENTS

1. The Permittee shall submit signed semi-annual progress reports of all activities conducted pursuant to the provisions of this Permit on the schedule and incorporated in the semi-annual groundwater monitoring report described in Condition III.H.2. These reports 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; and

e. Summaries of contacts pertaining to corrective action with representatives of the local community, public interest groups or State government 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 DEQ upon request.

I. DETERMINATION OF NO FURTHER ACTION

a. Based on the results of the site investigations, screening, risk evaluations, and risk management activities, the Permittee may submit an application to DEQ for a Class 3 Permit modification under 40 C.F.R. § 270.42 to terminate further corrective action 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.

If, based upon review of the Permittee's request for a Permit modification, the results of the site investigations, and other information, including comments received during the sixty (60) day public comment period required for Class 3 Permit modifications, 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, DEQ may grant the requested modification.

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

c. A determination of no further action shall not preclude 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 or AOC at the facility that is likely to pose a threat to human health or the environment. In such a case, DEQ shall initiate a modification to the Permit according to 40 C.F.R. § 270.41.

Table IV-1: RFI/CMS SUBMISSION SUMMARY AND SCHEDULE
Below is a summary of the planned reporting requirements pursuant to this Permit which may be required by DEQ:

ACTION	DUE DATE (examples)
Progress reports on all activities	Semi-annual (in conjunction with routine semi-annual groundwater reporting)
Risk Assessment Work Plan	As determined by DEQ
Notification of newly identified SWMUs	Thirty (30) calendar days after discovery
Notification of newly discovered releases	Fifteen (15) calendar days after discovery
Interim Measures Plan	As determined by DEQ
Revised Interim Measure Plan	As determined by DEQ
Demonstration of Financial Assurance at the facility	One hundred and twenty (120) calendar days after Permit modification to implement corrective measures unless Permittee is utilizing an annual Financial Test or Corporate Guarantee as demonstration of financial responsibility

Table IV-2: SWMUs IDENTIFIED IN RFI

SWMU Number	SWMU Name
1	Solvent Recycling Plant
2	Former Waste Oil Process Area
3	Heat Vapor Recovery System
4	Stormwater Storage Tank 1
5	Stormwater Storage Tank 2
6	Former Drum Storage Area

TULSA DISPOSAL, LLC
TULSA, OKLAHOMA

PERMIT ATTACHMENT 1

WASTE ANALYSIS PLAN

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

TULSA DISPOSAL, LLC

TULSA, OKLAHOMA

TAB VII

WASTE ANALYSIS PLAN

In Compliance With
40 CFR 270.14 (b) (2 and 3)

Revised December 2023

TABLE OF CONTENTS

7.0 - WASTE ANALYSIS PLAN
ODEQ Item Number B-2, B-3
40 CFR 270.14 (b)(2 and 3)

Tab VII provides a description of the waste analysis plan for Tulsa Disposal, LLC (the Facility). Because waste management operations at the Facility ceased in June 1996, the Waste Analysis Plan (as required by 40 CFR 270.14 (b)(3)) is limited to waste generated in connection with the operation of the groundwater pumping, recovery and treatment system and the wells used to monitor the effectiveness of this system. Analysis of waste generated during final closure of the facility is described in Tab XI.

The original Waste Analysis Plan covered waste analysis procedures for the Facility until waste handling operations were ceased on June 3 1996. Previous activities at the Facility have included the solvent operations in the solvent recycling plant, waste oil treatment in the waste oil plant, and, when waste oil treatment operations were discontinued, non-hazardous industrial wastewater treatment in the former waste oil plant. Three major types of waste streams have historically been managed by these activities:

- chlorinated solvents;
- non-chlorinated solvents (including paint and lacquer thinners); and
- waste oils.

The objective of this Waste Analysis Plan is to describe the constant waste streams generated from the groundwater pumped from the Corrective Measure system with the water discharged to the City of Tulsa, Oklahoma Publicly Owned Treatment Works (POTW) and the solids removed from the site via a licensed hazardous waste commercial transporter.

Groundwater from the four recovery sumps (RS-1 through RS-2) is collected in the 500,000 gallon V-69 storage tank. The recovered water is then batch treated through a granular activated carbon system to remove volatile organic carbon (VOCs), prior to discharge to the POTW. As required by the City of Tulsa POTW Permit No. 3620, treated water is sampled at the designated sample chamber located approximately 75 feet west and 6 feet north of the south double swing gate at Beard Avenue. The effluent has remained so stable over the years that the POTW Permit has a minimum sample collection frequency of at least once per year. The analytical methods or parameters may change as the permit is renewed and updated but the Facility will operate in accordance with the permit conditions as required by the City of Tulsa Permit. As required, an ODEQ certified laboratory is used for analyzing samples required by the Facility's permit.

Two solid waste streams are removed from the facility. The first stream, granular activated carbon that was used to remove volatile organic carbon from the groundwater is replaced in the system on an annual basis. Monitoring constituents in the groundwater confirms that break through in the carbon does not

occur within a one year timeframe. The characterization is based on the compounds found in the groundwater while collecting data for the Corrective Measures Study. The chemicals of concern are all spent solvents, (F001 to F005) which was the nature of HRI's business, and 1, 1 dichloroethane (U076) and 1, 2 dichloroethane (U077).

The second waste stream is debris and personal protective equipment (PPE) used for sampling and working around the groundwater system. This waste stream is considered hazardous by association with the contaminated groundwater.

Attachment 9 provides a Groundwater Sampling and Analysis Plan (SAP) based on the current Resource Conservation and Recovery Act (RCRA)-approved Corrective Measure activities. The Sampling and Analysis Plan provides a description of the procedures to be used in the groundwater monitoring events and for the regulatory agency-approved discharge of groundwater containing volatile organic compounds at the Facility. The objective of the SAP is to provide a sampling, analysis, operation, and maintenance plan for the Corrective Measure at the Facility in fulfillment of 40 CFR 270.14 (c). Since it is a separate document, the SAP can be amended by mutual written consent of the Oklahoma Department of Environmental Quality (ODEQ) and the Facility without a permit modification being required.

Because the Facility is under partial closure and no longer handles hazardous waste, the SAP included as Attachment 9 covers tasks related to groundwater sampling and analysis. The objectives of the groundwater monitoring program are:

- Define the groundwater flow direction and gradient in the shallow saturated zone;
- Assess the hydraulic impact of the containment and recovery trenches;
- Assess the distribution and migration of contaminants identified in the groundwater at the Facility during the RCRA Facility Investigation (RFI) and subsequent investigations;
- Delineate VOC concentration gradients across the Facility and downgradient of the Facility;
- Verify any significant changes in concentrations from previous sampling events;
- Assess the groundwater and VOC mass removal for the containment and recovery trenches;
- Adequately maintain the Corrective Measure containment and recovery trenches in order to ensure attainment of Corrective Measures objectives; and
- Determine when Corrective Measures may cease.

TULSA DISPOSAL, LLC
TULSA, OKLAHOMA

PERMIT ATTACHMENT 2

INSPECTION SCHEDULE

TULSA DISPOSAL, LLC

TULSA, OKLAHOMA

TAB VIII

GENERAL INSPECTION PLAN

In Compliance With
40 CFR 270.14 (b)(5)

Revised December 2023

TABLE OF CONTENTS

Section

8.0 - GENERAL INSPECTION PLAN
ODEQ Item Number B-4, B-5
40 CFR 270.14(b)(5)

Tab VIII provides information on the current general inspection program for Tulsa Disposal, LLC (the Facility) as required by 40 CFR 270.14(b)(5).

8.1. GENERAL

The inspection plan was prepared for the Facility based on current activities at the Facility. Current activities are limited to operation of the groundwater treatment and recovery system including all associated monitoring wells and remediation equipment. The inspection program enables the Facility to detect, prevent, or respond to malfunctions in the recovery system.

8.2. GROUNDWATER EXTRACTION AND TREATMENT SYSTEM INSPECTION

The groundwater remediation system at the Facility will be visually inspected at least twice per month to ensure the system is functioning properly. The bi-monthly system inspections consist of the following:

1) The control panel will be inspected to ensure that recovered groundwater is being pumped to the 500,000-gallon holding tank (Tank V-69).

2) The water level in Tank V-69 will be monitored using a level gauge to ensure that sufficient space is maintained in the tank.

3) The secondary containment for the unused Tank V-68 will be monitored for accumulation of excess precipitation. If excess precipitation is observed, then a sump pump will be used to transfer the precipitation into Tank V-69 or through the granular activated carbon system.

4) Tank V-69 and associated piping will be examined for punctures, cracks, and overall external condition.

5) During the corrective action monitoring, each groundwater monitoring well will be visually inspected to verify each well is locked and has not been subjected to vandalism or exterior deterioration.

8.3. SECURITY INSPECTION

Facility fences, gates, warning signs, alarm systems, and motion sensors will be checked monthly to ensure each is in good condition and functioning properly. If malfunctions in the security equipment are detected, the Facility Authorized Representative will be contacted, and arrangements will be made to correct the problem.

TULSA DISPOSAL, LLC
TULSA, OKLAHOMA

PERMIT ATTACHMENT 3

PERSONNEL TRAINING

TULSA DISPOSAL, LLC

TULSA, OKLAHOMA

TAB X

PERSONNEL TRAINING

In Compliance With
40 CFR 270.14 (b)(12)

Revised December 2023

TABLE OF CONTENTS

10.0 - PERSONNEL TRAINING
ODEQ Item Number B-12
40 CFR 270.14(b)(12)

Tab X includes information on personnel training for Tulsa Disposal, LLC (the Facility) as required by 40 CFR 270.14 (b)(12) and the permit renewal.

10.1. PERSONNEL TRAINING

The personnel training program is based on current activities at the Facility. These are limited to operation, maintenance, and monitoring of the Corrective Measure. All waste handling operations at the Facility ceased in June 1996.

10.2. REQUIREMENTS

All Clean Harbors personnel and subcontractors entering and working at the Facility in connection with monitoring activities and operation of the corrective measure will have successfully completed the 40-Hour Health and Safety Course and the 8-Hour Refresher Health and Safety Course, in accordance with 29 CFR 1910.120, as required. While at the Facility, such personnel will carry written proof of compliance with this requirement or have current training records on file with Clean Harbors Environmental Services, Inc.

All personnel involved with semi-annual monitoring will be properly trained in sampling techniques and operation and maintenance as they relate to Corrective Measure activities.

All personnel will be trained in and will be familiar with the incident prevention and emergency procedures outlined in the Contingency Plan (Tab IX).

It is the responsibility of the Emergency Response Coordinator (ERC) identified in the Contingency Plan (Tab IX) to assure compliance with these requirements.

TULSA DISPOSAL, LLC
TULSA, OKLAHOMA

PERMIT ATTACHMENT 4

CONTINGENCY PLAN

TULSA DISPOSAL, LLC

TULSA, OKLAHOMA

TAB IX

CONTINGENCY PLAN

In Compliance With
40 CFR 270.14 (b) (7)

Revised December 2023

TABLE OF CONTENTS

9.0 - CONTINGENCY PLAN
ODEQ Item Number B-7
40 CFR 270.14(b)(7)

Tab IX provides contingency and emergency response information for Tulsa Disposal, LLC (the Facility) as required by 40 CFR 270.14(b)(7). This Contingency Plan will be included with the Final Renewal Permit for the Facility, but is also intended to serve as a stand-alone document for use by emergency responders.

9.1. GENERAL

This Contingency Plan was prepared based on current conditions at the Facility. Current conditions consist of the Corrective Measure approved by the Oklahoma Department of Environmental Quality (ODEQ) on October 13, 1998, and that is currently operating at the Facility. The Corrective Measure activities include groundwater recovery system operation and monitoring and are part of the Facility's approved Resource Conservation and Recovery Act (RCRA) corrective action. The Corrective Measure was implemented to prevent further migration of contaminants, and to limit the threat to human health and the environment.

As described in Tab VI, all waste handling at the Facility ceased in June 1996. With the exception of the Corrective Measure, all waste processing and handling equipment was removed as outlined in Appendix 3, Attachment 4.

9.1.1. NAME AND ADDRESS OF FACILITY

The name and address of the Facility is:

Tulsa Disposal, LLC
5354 West 46th Street South
Tulsa, Oklahoma 74107.

9.1.2. FACILITY TYPE

The Facility is an inactive waste handling facility with an ongoing corrective action program under RCRA.

9.1.3. CURRENT OWNER AND OPERATOR

Tulsa Disposal, LLC
42 Longwater Drive
Norwell, Massachusetts 02061

9.1.4. CORRECTIVE ACTION STATUS

The approved Corrective Measure consists of one containment trench along the north and west perimeter of the Facility and one recovery trench near the VOC source area at SWMU 1. The groundwater extraction trenches were completed on July 2, 1996, as an Interim Measure and began operating on October 9, 1996. A description of corrective measures is included in Tab XIII of the Application.

As part of the Corrective Measure, semi-annual monitoring is conducted at the Facility. The groundwater and Corrective-measure monitoring consists of measuring flow volumes from the two groundwater extraction trenches, measuring groundwater levels, collecting groundwater samples, analyzing groundwater samples for VOCs and operation and maintenance of the system.

Impacted groundwater recovered from the containment and recovery trenches and generated during semi-annual groundwater sampling events is temporarily stored on site in one 500,000-gallon storage tank. The groundwater is treated through the carbon adsorption system and batch-discharged to the Publicly Owned Treatment Works facility.

9.1.5. HAZARDOUS SPILL HISTORY

In August 1991, Hydrocarbon Recycling Inc. notified the Oklahoma State Department of Health (OSDH) of a potential release from the Solvent Plant formerly located at the Facility. Information regarding this potential release and subsequent investigations is discussed in the RCRA Facility Investigation report (October 1994). Insofar as is known, no other reportable hazardous spills have occurred at the Facility.

9.1.6. EMERGENCY RESPONSE AUTHORIZATION

The Facility Contact (identified in Appendix 1, Table 1) shall act as the primary Emergency Response Coordinator (ERC). In the event that the ERC is unavailable, the persons listed in Table 1 shall assume the duties of the ERC (in the order listed). The ERC has full authority to act on the Facility's behalf in responding to any emergency at the site.

Appendix 1, Table 2 presents a list of agencies and agency contacts to be notified in the event of an emergency requiring a response as described below.

9.1.7. SECURITY

Current security at the Tulsa Facility consists of a six-foot-high perimeter chain link fence. Gates are securely locked and checked during inspections as scheduled and described in Tab VIII.

9.2. ANTICIPATED EMERGENCIES

Based on the current corrective actions at the Tulsa Facility, the following will be considered potential emergencies and/or a threat to human health and the environment.

1) Violent storms;
2) Fire;
3) Leaks from the 500,000-gallon groundwater recovery holding tank and associated piping; and
4) Human contact with impacted groundwater.

9.3. INCIDENT PREVENTION

9.3.1. VIOLENT STORMS

Violent storms include tornadoes and thunderstorms with lightening. The following measures will be implemented to prevent harm to individuals at the Facility:

1) Weather forecasts will be monitored by personnel working at the Facility for severe storm warnings issued by the National Weather Service (NWS); and
2) In the event of a storm warning or observed violent weather, personnel working at the Facility will seek shelter in a place of safety.

For tornadoes, there is no structurally secure place of safety at the Facility; consequently, if a funnel cloud is observed or a tornado warning is issued, personnel will evacuate and secure the site.

9.3.2. FIRE

The following fundamental and appropriate precautions for fire prevention will be maintained when personnel are on site:

1) Smoking is prohibited; 'No Smoking' signs are prominently posted where required;
2) Non-sparking tools and grounding of electrical units will be used during corrective activities;
3) All electrical components within the plant conform to the National Electric Code (1981) and are installed and maintained in a safe manner; and
4) Fire fighting equipment includes hand held fire extinguishers located throughout the site as well as in buildings. Water for fire fighting is available from three city hydrants on the east side of the plant (Appendix 2, Figure 5).

9.3.3. LEAK PREVENTION

The potential for leaks at the Facility is estimated to be low. One 500,000-gallon holding tank used as storage for recovered groundwater is maintained on site. The following measures will be used to prevent leaks from the tank and/or associated piping.

1) The tank and associated piping will be examined routinely in accordance with the General Inspection Schedule (Tab VIII) for punctures, cracks, and overall external condition;
2) If a problem is encountered during the tank examination, maintenance will be performed immediately;
3) The 500,000-gallon-tank is double-walled, which provides secondary containment; and
4) Tank water levels are monitored by personnel during routine inspections and corrective action activities.

9.3.4. HUMAN CONTACT WITH IMPACTED GROUNDWATER

To minimize the potential for personnel to come in contact with impacted groundwater, the following measures will be adhered to:

1) All personnel will be properly trained in sampling techniques and operation and maintenance as they relate to corrective action activities on site. This will be done as outlined in the Waste Analysis Plan (Tab VII)or Sampling and Analysis Plan (Appendix 3, Attachment 3);
2) All sampling personnel will have completed the 40-Hour Health and Safety Course in accordance with 29 CFR 1910.120; and
3) Appropriate Personal Protective Equipment (to be determined by the on-site Field Manager) will be worn by personnel during corrective action activities.

9.4. EQUIPMENT

9.4.1. WARNING SIGNS

ODEQ and RCRA regulations require that Warning Signs be posted at each entrance of the Facility. These signs read "Warning - Unauthorized Personnel Keep Out".

9.4.2. EMERGENCY AND SAFETY EQUIPMENT

Safety equipment and basic first aid supplies as determined by the ERC will be brought on site by personnel conducting site inspections and semi-annual corrective action activities such as groundwater sampling. This equipment will be inspected prior to the initiation of the site activities pursuant to the site Health and Safety Plan and shall include fitness for service (e.g., proper fire extinguisher charge, operable cell phone, etc.).

Should an injury occur, the immediate well-being of the injured party is the prime consideration. Emergency phone numbers and the route to the nearest hospital will be available on site. Emergency phone numbers and directions to the nearest hospital are included in Appendix 1, Table 2, and a map in Appendix 2, Figure 6.

9.5. EMERGENCY PROCEDURES FOR ANTICIPATED EVENTS

9.5.1. VIOLENT STORMS

In the event of inclement weather, any personnel on site will adhere to the following procedures.

1) Personnel on site will take shelter immediately in a place of safety. For tornadoes, this means evacuating and securing the Facility. For thunderstorms, a vehicle is the appropriate place of safety;
2) If necessary and time allows, the proper local authorities will be contacted;
3) The acting ERC, Site Supervisor, and appropriate emergency personnel should be contacted following the weather event if damage or human injury occurs;
4) Following the weather event, the ERC will inspect the Facility and the groundwater treatment and recovery system for damage; and
5) In the event of damage, the ERC will prepare a preliminary assessment report describing the damage and outlining a schedule for damage repair. This will be prepared within 24 hours of the event.

9.5.2. FIRES

Should a fire occur at the Facility, the acting ERC and/or the personnel on site will comply with the following procedures:

1) Contact the local Fire Department;
2) Evacuate the Facility; and
3) Contact the ERC and Site Supervisor.

9.5.3. LEAKS

In the event of a leak from the 500,000-gallon holding tank, the ERC or acting ERC and/or personnel on site will be responsible for the following:

1) Take immediate response action to stop flow or release of spilled material;
2) Activate necessary containment procedures using absorbent pads as a dike preventing flow to drains or waterways;
3) Notify Site Supervisor and Emergency Response Coordinator (ERC); and
4) Acquire any additional assistance needed to prevent harm to human-health and the environment.

The ERC or acting ERC is responsible for the activities listed below:

1) Assist in spill control if required;
2) Coordinate cleanup with outside assistance if required;
3) Arrange for disposal of any proper contaminated materials;
4) Notify governmental agencies as required by existing rules and regulations; and
5) Preparing an incident report if required.

9.5.4. HUMAN CONTACT WITH IMPACTED GROUNDWATER

Should on-site personnel come in contact with impacted groundwater, the personnel will adhere to the following procedures:

1) The area of the body that came in contact with the impacted groundwater will be rinsed thoroughly with deionized water;

2) If appropriate, personnel should seek medical treatment for injuries sustained; and
3) The ERC and Site Supervisor should be contacted.

9.5.5. EVACUATION

The ERC, acting ERC, or most senior person at the Facility will determine if an evacuation is required based on the nature of the emergency. The Facility area should be evacuated in the event of an emergency such as a major fire or a major storm (such as a tornado).

When an evacuation is deemed necessary, all personnel on site will leave the Facility. In the event of violent weather, personnel will seek shelter. The acting ERC will make sure all personnel are accounted for. Additional action after a Facility emergency evacuation will depend on the nature of the emergency.

9.6. MANAGEMENT

9.6.1. ARRANGEMENTS WITH LOCAL AGENCIES

The Tulsa Fire Department has agreed to respond to an emergency at the site in accordance with its policy for such service to properties outside the city limits. Law enforcement and traffic control will be provided by the Tulsa County Sheriff's Department. The Sheriff's Department will limit access to the Facility by blocking West 46th Street during an emergency. Other agency assistance may be coordinated through the Tulsa Area Emergency Management Agency (LEPC). The appropriate local agencies (Appendix 2, Table 2) will be given a current copy of this Emergency Response Plan.

The Concentra Urgent Care – Town West minor emergency clinic, located at 5682 West Skelly Drive, will be used for medical services in the event of a medical emergency. Concentra Urgent Care - Town West will receive one copy of this Emergency Response Plan.

In the event that an ERC is not present, the operator or operator-helper (Acting ERC) shall have full authority to call upon the Fire Department, Sheriff's Department, or any other emergency agency for assistance.

9.6.2. DISTRIBUTION OF THE CONTINGENCY PLAN

One copy of this contingency plan will be maintained in the plant office at all times; all designated ERC's will have a copy. Copies of the plan will be provided to LEPC, the City of Tulsa Fire Department, the

Tulsa City-County Health Department, the Tulsa County Sheriff's office and a local emergency care center.

9.6.3. PLAN UPDATE AND REVIEW

The plan will be updated when:

- The facility changes its design, construction, operation, maintenance or other circumstances that potentially change the response necessary in an emergency.
- The list of emergency coordinators changes.
- The plan fails in an emergency.

Revisions to the plan will be initiated immediately upon updating. Appropriate authorities will be notified of the revisions and assumed acceptable unless a written response of objection is received.

TULSA DISPOSAL, LLC
TULSA, OKLAHOMA

PERMIT ATTACHMENT 5

CLOSURE PLAN

TULSA DISPOSAL, LLC

TULSA, OKLAHOMA

TAB XI

CLOSURE PLAN

In Compliance With
40 CFR 270.14 (b)(13)

Revised December 2023

TABLE OF CONTENTS

11.0 – CLOSURE PLAN
ODEQ Item Number B-13
40 CFR 270.14 (b)(13)

The Tulsa Disposal, LLC facility (the Facility) is an inactive hazardous waste recycling and handling facility. The only permitted unit, which is operated at the Facility, is an approved corrective action system for contaminated groundwater. Upon completion of corrective action, Clean Harbors will decommission and close the corrective action system in accordance with the closure requirements of 40 CFR 270.14(b)(13) and 40 CFR 264 Subpart G. Closure of the corrective action system at this Facility will be carried out in accordance with the steps outlined in this plan. Appendix 2, Figure 7 and Appendix 1, Table 3 contain an estimated schedule and cost for the completion of final closure, respectively.

11.1. PURPOSE

This closure plan identifies the steps necessary to complete closure of the corrective action system. Additionally, this closure plan includes provisions for re-use of portions of the closed unit on site or off site. Clean Harbors will remove all hazardous wastes and residuals from the Facility to a level determined to be protective of human health and the environment; therefore, upon completion of closure activities, the need for further maintenance and care will be minimized or eliminated.

The corrective action system is the only unit at the Facility subject to closure. The previous permitted waste handling units ceased operation in June 1996 (Appendix 3). Laidlaw Environmental Services, Inc. conducted closure activities in accordance with the ODEQ-approved closure plan contained in Appendix XII of the 1993 Permit Application (Appendix 3, Attachment 4). The ODEQ issued a letter approving partial closure for the Facility on March 17, 1997 (Appendix 3, Attachment 7).

11.2. DESCRIPTION OF CORRECTIVE ACTION SYSTEM

The corrective system consists of one 540-foot long containment trench located along the north and west perimeter of the Facility, and one 70-foot long recovery trench located on the northwest corner of the solvent recycling area. The layout of the trench system is shown in Appendix 2, Figure 8. The trenches consist of trench-observation wells, filter media, perforated conduit at the bottom of the trenches, recovery sumps, mechanical and operational controls, and double-containment discharge piping. Recovered groundwater is pumped via a dual-lined underground piping system to an aboveground 500,000-gallon storage tank (Tank V-69). The collected groundwater is then treated through carbon adsorption. The carbon adsorption unit is approximately six feet high and five feet in diameter, and holds

approximately 2,000 pounds of granular activated carbon. From the carbon unit, the water is discharged to the City of Tulsa Publicly Owned Treatment Works (POTW) under industrial pretreatment and discharge permit (Permit Number 3620). Tank V-69 and the carbon adsorption unit are associated with the permitted POTW discharge, and as such, are not permitted hazardous waste management units.

37 monitoring wells were installed for site assessment purposes during the RCRA Facility Investigation. All wells not previously plugged and abandoned, with ODEQ approval, will be plugged and abandoned during closure.

11.3. CORRECTIVE ACTION SYSTEM CLOSURE

Decommissioning and closure of the corrective action system will occur when the ODEQ site-specific target levels (SSTLs) are met. It is presumed this will result in a "no further action" determination by the ODEQ. The following components of the corrective action system will be decommissioned and closed:

- Trench observation wells;
- Containment and recovery trenches;
- Monitoring wells;
- Carbon adsorption treatment system;
- Aboveground storage tanks V-68 and V-69; and
- Ancillary Equipment.

Closure activities will be conducted under the oversight of an Oklahoma-registered Professional Engineer (PE) in accordance with the approved closure plan.

All equipment and supplies used in the decommissioning and closure activities will also be decontaminated or collected for appropriate disposal. This may include: temporary suction or vacuum hoses, used temporary containment supplies, personal protective equipment (PPE) and disposable sampling equipment. Arrangements for proper collection, containerization, and characterization of this equipment (e.g., post cleaning confirmation sampling, characterization sampling, etc.) will be included in closure planning. Documentation of the actions taken will be included in the closure documentation.

11.3.1. TRENCH OBSERVATION WELL AND MONITORING WELL CLOSURE

There are currently 14 trench observation wells and 37 groundwater monitoring wells used to measure water levels during routine groundwater monitoring. The trench observation wells are 2-inch diameter, polyvinyl chloride (PVC) wells completed at approximately 13 to 18 feet below land surface. The

monitoring wells are 2-inch or 4-inch diameter PVC wells completed at 10 to 65 feet below land surface. Each well will be abandoned using the following method:

- The total depth and diameter of each well will be verified prior to closure;
- The casing and screen of each well will be removed from the borehole, and the borehole will be grouted with a cement-bentonite mixture from the bottom of the borehole to the surface using a tremie pipe. If the casing and screen cannot readily be removed, then the well casing will be cut to approximately one-foot below land surface, and the well will be pressure-grouted as described above;
- All screen and casing that can readily be removed from the wells will be pressure washed (water/detergent solution) and rinsed (water) and then disposed of at an ODEQ-approved facility;
- Abandonment will be conducted by a certified and licensed drilling contractor; and
- All abandonment activities will be observed and documented by a qualified geologist or engineer.

11.3.2. TRENCH CLOSURE

The containment trench and recovery trench will be closed in place by grouting. The trenches will be closed as follows:

- Prior to grouting the trenches, any recovered groundwater remaining in the four recovery sumps and associated pumps and piping will be transferred to Tank V-69;
- The sumps, pumps, and ancillary equipment (water level indicators, floats, meters, etc.) will be disassembled and decontaminated using high pressure water or steam. The decontamination water will be containerized and transferred to Tank V-69 for final treatment and discharge;
- Washing/rinsing will continue until the sumps, pumps, associated piping and appurtenances appear visually clean. These will be considered properly decontaminated when free of waste-related residue/staining and visually clean to the extent practicable.
- The sumps, pumps and ancillary equipment will be disassembled and removed for possible reuse at another company facility or for disposal as scrap metal.
- The filter media, perforated conduit located at the base of the trenches, and the underground discharge piping will be pressure-grouted and abandoned in place; and
- Abandonment of the lines will be conducted by certified and licensed contractors and all associated activities will be observed and documented by a qualified geologist or engineer.

11.3.3. ABOVEGROUND TANKS (V-68 AND V-69) AND ASSOCIATED PIPING

The aboveground storage tanks V-68 and V-69 are not required to be permitted as hazardous waste storage tanks. However, as part of the corrective action system decommissioning and closure, the tanks

will be emptied and cleaned in accordance with the following activities. The aboveground tanks will not necessarily be removed or scrapped. The following activities will be performed during partial or final closure (as appropriate). The activities will be sequenced to minimize the amount of liquids and cleaning residuals that may be discharged to POTW in accordance with the Facility's discharge permit. The remaining materials will be disposed of at an ODEQ-approved facility.

The following steps will result in closing the tanks:

- Remove the remaining material from the tanks undergoing closure, and discharge to the carbon adsorption system for treatment and discharge to POTW;
- Provide access to the tanks undergoing decontamination;
- Visually inspect the tank, secondary containment, and appurtenant piping and equipment for evidence of staining and residue;
- Pressure wash (water/detergent solution) and rinse (water), and as necessary scrape and squeegee the tank interiors, removing all residual waste material and rinsate;
- Disconnect and decontaminate applicable appurtenant piping and pumping equipment and clean the concrete secondary containment (if appropriate) around the tanks undergoing decontamination. Appurtenant piping and equipment will also be pressure washed with detergent-water solution and rinsed with water; and
- Transport and dispose all waste material generated during the project. Liquids will be discharged to the POTW. All associated cleaning equipment will be thoroughly rinsed with a detergent solution and the rinsate will be collected and properly disposed.
- Washing/rinsing will continue until the tank, associated piping and appurtenances appear visually clean. If to be removed and scrapped, the tank and ancillary equipment will be considered properly decontaminated when free of waste-related residue/staining and visually clean to the extent practicable.

The secondary containment area will be inspected during partial and final closure activities. If visual inspection during closure indicates an absence of waste-related staining, cleaning of the secondary containment area may be deemed unnecessary. The secondary containment area will be thoroughly cleaned (i.e. scrubbed, scraped, pressure washed and rinsed) to the extent practicable, if waste-related staining is observed during closure activities.

11.3.3.1. REMOVAL OF WASTE MATERIAL AND OPENING OF THE TANKS

The contents of the tanks will be removed using a pump, vacuum pump unit or similar equipment. The waste will be discharged to the POTW or a disposal facility.

To gain access to aboveground tanks, the manways at the sides of the tank will be used. Depending on the type of opening and the condition of the equipment, a variety of tools may be used to open the manway. Care must be exercised to minimize spark generation when working on the tank.

Prior to entering a tank, personnel should have full-face respiratory protection and protective clothing. Procedures for tank entry purging or venting the tank are described in API RP 1604 *Removal and Disposal of Used Petroleum Storage Tank*, API PUB 1604 *Cleaning Petroleum Storage Tanks* and OSHA *Permit Required Confined Spaces* (29 CFR Section 1910.146). The tanks will then be inspected to determine the approximate quantity and physical conditions of any remaining waste material.

11.3.3.2. REMOVAL OF RESIDUAL WASTE AND CLEANING OF TANKS

Before removing any residual waste from the tank, all piping and appurtenant equipment will be flushed with a detergent water-solution, and then rinsed with water. The method used to remove the residual waste material from the tanks will depend on the physical properties and quantities of that material. Prior to any person entering the tank, an effort will be made to remove as much liquid and sediment as possible.

Subsequent to removing the majority of the material from the tank, it may be necessary to use a high pressure wash system and a detergent water-solution to rinse residual material from the walls and floor of the tank. The evacuated material and the rinse solution will be discharged to the POTW or a disposal facility. The quantity of wash/rinse water used will be kept to a minimum in order to limit the amount of waste material.

Storage tanks are considered confined spaces (as defined in 29 CFR 1910) and confined space entry requires special procedures (29 CFR 1910.146):

- Tanks are to be washed, neutralized and/or purged (where a flammable atmosphere is present) prior to being entered;
- Supply valves must be closed and tagged and bleeder valves left open; or supply piping should be disconnected;
- Pumps or motors normally activated by automatic controls shall be operated manually to be sure they have been disconnected. Appurtenant power switches should be locked and tagged “Off”;
- All sources of ignition must be removed from tanks where flammable vapors may be present;
- Under circumstances where “hot work” (welding, burning, grinding, etc.) is to be performed in or on the vessel, a test for combustible gases shall be taken. In all tank entering situations, an oxygen deficiency test shall also be performed prior to tank entry. Tests for combustible gas concentration and oxygen deficiency will be performed by the supervisor of the area in which the work is being done;

- There must be a set of wristlets or a rescue harness and sufficient rope at the job site to effect a rescue. Any other rescue equipment considered necessary must also be on the job site;
- Workers should wear rescue harnesses if entering a tank to enable easy rescue. In tanks with small openings, only wristlets may be used. In cases where there are agitator shafts, drums or other hazards in which the lifeline would be entangled and the supervisor in charge feels that wearing the lifeline may entrap a man and increase the hazard, the wearing of a harness or wristlets may be eliminated;
- Appropriate personal protective equipment and supplied air breathing devices should be used during tank entry. In cases of short-term entry for inspection or removal of objects, a self-contained breathing apparatus (SCBA) is recommended;
- When a ladder is required to enter a tank, the ladder must be secured and not removed while anyone is in the vessel. In cases where a rigid ladder could become an obstacle, a chain ladder may be used;
- Adequate illumination must be provided and a flashlight or other battery operated light must also be on hand to provide illumination for a safe exit in the event of an electrical power failure;
- All electrical equipment to be used inside the tank must be in good repair and grounded;
- Other people working in the immediate area will be informed of the work being done, and they must inform the watcher or supervisor immediately of any unusual occurrence, which makes it necessary to evacuate the tank;
- The Watcher or Standby Observer System must be implemented. It consists of the following:
  (1) Workers inside a confined space must be under the constant observation of a fully instructed watcher.
  (2) Before anyone enters the tank, an entry authorization must be obtained from the person in charge and a rescue harness or wristlets must be used on the job.
  (3) The watcher must also know the location of the nearest telephone (with emergency numbers posted), eyewash and/or shower, fire extinguisher and oxygen inhalator. For all "hot work" on a tank, the watcher must be instructed how to shut down the welding/burning equipment.
  (4) As long as anyone is inside the vessel, the watcher must remain in continuous contact with the worker. *He/she is not to leave the job site except to report an emergency*. In the event of an emergency, he/she does not enter the tank until help is available.
- All welding and burning equipment must be provided with a shutoff under the control of the watcher; and the watcher must be shown how to shut off the equipment if it becomes necessary. Welding and burning equipment will only be taken into a tank immediately prior to its use and must be removed from the tank immediately after the job is finished; and
- For all "hot work" inside a tank, a properly executed permit, if needed, must be displayed at the job site and standard welding and burning safety precautions will always be followed.

Following removal of the residual waste, the tank will be pressure washed with detergent-water solution and rinsed with tap water. Washing/rinsing will continue until the tank, associated piping and appurtenances appear visually clean. If to be removed and scrapped, the tank will be considered properly decontaminated when free of waste-related residue/staining and visually clean to the extent practicable.

If the tank is to be reused, the final rinsate will be sampled to determine the cleanliness of the tank. The final rinsate sample(s) will be submitted to a qualified laboratory and analyzed for the applicable toxicity characteristic (40 CFR 261.24) parameters (i.e. volatile organic compounds) using SW-846 Methods. If the sample analytical results indicate the final rinsate does not exhibit the toxicity characteristics of hazardous waste, the tank will be considered properly decontaminated and suitable for reuse.

The residual waste materials and rinsate will be collected and discharged to the POTW or a disposal facility. The quantity of wash/rinse water that may be generated has been estimated at approximately 5,000 gallons per tank.

11.3.3.3. CLEANING AND INSPECTION OF SECONDARY CONTAINMENT AREAS

The diked areas will be dry swept prior to decontamination. All cracked areas shall be sealed prior to commencement of cleaning to prevent migration of rinsate out of the containment area. The containment dike and floor area will be pressure washed using a detergent-water solution and rinsed with water at final closure. Following the final wash/rinse, the area will be inspected to determine the effectiveness and completeness of decontamination. If necessary, the containment area will be rewashed/rinsed until visually clean. The containment area will be considered properly decontaminated when free of waste-related residue/staining and visually clean to the extent practicable.

11.3.4. CARBON ADSORPTION UNIT CLOSURE

Subsequent to treating and batch discharging the last of the recovered groundwater, the activated carbon unit will be closed as follows.

- The activated carbon will be vacuumed out and transferred to 55-gallon drums. The carbon will then be transferred into cubic yard bags, and properly labeled as hazardous waste;
- The carbon will be shipped to an ODEQ-approved disposal and/or recycling facility for processing and/or disposal;
- The inlet sock filter and basket strainer will be disassembled and any waste collected within the filter or basket will be containerized and assessed for proper off-site disposal at an ODEQ-approved facility;

- The carbon unit housing and ancillary equipment will be disassembled and decontaminated with high pressure water and/or steam. The residual from the steam-cleaning will be containerized for proper off-site recycling or disposal at an ODEQ-approved facility; and
- The carbon housing unit and ancillary equipment will be disassembled and removed for possible reuse at another company facility or for disposal as scrap metal.

11.3.5. ISBR UNIT CLOSURE

Pursuant to the approved *Supplemental CMWP* (July 2020 revised), the ISBR Interim Measure system was removed from service. On April 8-9, 2021, four groundwater monitor wells and 35 ISBR wells were abandoned by a licensed OK well driller in accordance with applicable OK regulations. Details of the removal activities are provided in the *Supplemental CMWP: Soil Excavation Report (November 2021).*

In general, the initial implementation of the CMWP consisted of abandonment of groundwater monitoring and In-situ bioreactor (ISBR) wells within the footprint of the excavation. Four Groundwater Monitoring wells (BP-1, MW-28, MW-29, and MW-30) and 35 ISBR (ISBR-1 – 35) wells were abandoned in accordance with the State of Oklahoma Water Resources Board requirements. All associated piping and aboveground equipment was removed and decommissioned.

11.4. WASTE ANALYSIS

Decontamination water and rinsate are the only closure wastes requiring analysis prior to disposal. It is proposed to discharge these wastes to the POTW in the same manner as currently used for treated groundwater from the facility. Consequently, samples of rinsate and decontamination water will be collected and tested for the parameters specified in the facility's POTW discharge permit in effect at the time of closure. Sampling frequency will also be determined by the discharge permit.

11.5. FACILITY CLOSURE SCHEDULE AND CERTIFICATION

Clean Harbors will commence Facility closure upon notification from the ODEQ that no further corrective action is necessary at the site. Within 90 days of notification of no further action, Clean Harbors will commence closure activities. Clean Harbors will complete the planned closure activities in accordance with the approved closure plan within 180 days after receiving notification of no further action. A tentative schedule is presented in Appendix 2, Figure 7. If necessary, a request for closure period extension may be submitted to ODEQ for review and approval. The request for closure period extension will be prepared in accordance with 40 CFR 264.113.

Within 60 days of completion of the planned closure activities, Clean Harbors will prepare and submit to the ODEQ, a closure report summarizing the closure activities. This report will include a description of the unit(s) which underwent closure, field tasks performed, field log, sampling protocols, results of analyses, a summary of the Facility status, quantity of waste removed, and supporting documentation including manifests and photographic documentation.

When closure is completed, Clean Harbors Environmental Services, Inc. shall submit to the ODEQ certification, both by the operator and by an independent registered Professional Engineer, that the Facility has been closed in accordance with the approved closure plan. The closure progress/certification report will also document any modifications or deviations from the approved plan(s).

TULSA DISPOSAL, LLC
TULSA, OKLAHOMA

PERMIT ATTACHMENT 6

CLOSURE AND POST-CLOSURE COST ESTIMATES

TABLE 3
Tulsa Disposal, LLC
Closure Cost Estimate

Revised : December 2023

Description	Units	Unit Cost	Number	Estimated Cost	Notes
Surface Equipment (Tank V-68, V-69 & Carbon Unit)					
Discharge water to POTW					Assumed drained in final operating costs
Decontaminate (high pressure wash) carbon unit, tank, sumps, piping 5-days total					
Bobtail Vac Truck, operated	hr	$160	50	$8,000	EWI Unit Costs 2023
3 man crew	hr	$78	150	$11,700	EWI Unit Costs 2023
Pressure Washer	hr	$160	50	$8,000	EWI Unit Costs 2023
Response Crew Truck w/ hand tools	hr	$45	50	$2,250	EWI Unit Costs 2023
PPE	day	$150	15	$2,250	EWI Unit Costs 2023
Trans for Vac Truck to AEL	Trip	$299	3	$897	Based on Tulsa Excavation, 2021 adjusted
Disposal, AEL	ton	$80	16	$1,280	Non-Haz T&D Lone Mountain *
Empty Carbon Bed	LS	$1,438	1	$1,438	2021 Miller Estimate adjusted
Disposal, Site PPE/Debris	drum	$560	3	$1,680	T&D (haz incin)/drum (400 lb) **
Analyze rinsate samples					
laboratory analysis for hazardous constituents	sample	$309	3	$927	Pace Analytical Oct 2023 rates
Collect and dispose of rinsate					
2000 gallons (36 drums)	drum	$560	36	$20,160	T&D (haz incin)/drum (400 lb) **
Dissassmble tanks, load and send to recycling (4-days)					
Dismantle and remove steel (recycling option)					
Excavator w/demo	hr	$135	40	$5,400	EWI Unit Costs 2023
Dump Truck	hr	$90	40	$3,600	EWI Unit Costs 2023
3 man crew	hr	$78	120	$9,360	EWI Unit Costs 2023
Pressure Washer	hr	$160	120	$19,200	EWI Unit Costs 2023
Response Crew Truck w/ hand tools	hr	$45	120	$5,400	EWI Unit Costs 2023
PPE	day	$150	12	$1,800	EWI Unit Costs 2023
Trans for Vac Truck to AEL	Trip	$173	4	$690	Based on Tulsa Excavation, 2021 adjusted
Abandonment of Trenches and Wells (3-days)					
Dissassmble misc. valves, pumps, piping					
Decontaminate (high pressure wash) equipment/sump trenches					
Bobtail Vac Truck, operated	hr	$160	30	$4,800	EWI Unit Costs 2023
3 man crew	hr	$78	90	$7,020	EWI Unit Costs 2023
Pressure Washer	hr	$160	30	$4,800	EWI Unit Costs 2023
Response Crew Truck w/ hand tools	hr	$45	30	$1,350	EWI Unit Costs 2023
PPE	day	$150	9	$1,350	EWI Unit Costs 2023
Trans for Vac Truck to AEL	Trip	$299	1	$299	Based on Tulsa Excavation, 2021 adjusted
Disposal, AEL	ton	$80	16	$1,280	Non-Haz T&D Lone Mountain *
Grout Trenches and Wells					
Grout 29 wells	per well	$345	29	$10,005	Mohawk Drilling, 2021 Tulsa Excavation adjusted
Prepare 29 abandonment reports sheets	ea	$58	29	$1,668	Mohawk Drilling, 2021 Tulsa Excavation adjusted
Grout 2 trenches	$/trench	$2,300	2	$4,600	Mohawk Drilling, 2021 Tulsa Excavation adjusted
Engineering Supervision and Inspection					
50 hrs over 3 week period	hr	$155	50	$7,750	EWI Unit Costs 2023
Certification Report					
Technical Writer	hr	$110	60	$6,600	EWI Unit Costs 2023
Clerk	hr	$60	16	$960	EWI Unit Costs 2023
Estimated Total Closure Cost				**$156,513**	

*Non-haz T&D: Disposal $30/ton. Transportation to Lone Mountain - 195 miles @ $5/mi = $975/20 ton load or $48.75/ton. Total T&D = $80/ton.

**Haz. Incineration T&D: Disposal @ $1.00/#. Transportation to Aragonite - 1255 miles @$5/mi. = $3451.25/16000# partial load or $0.40/#

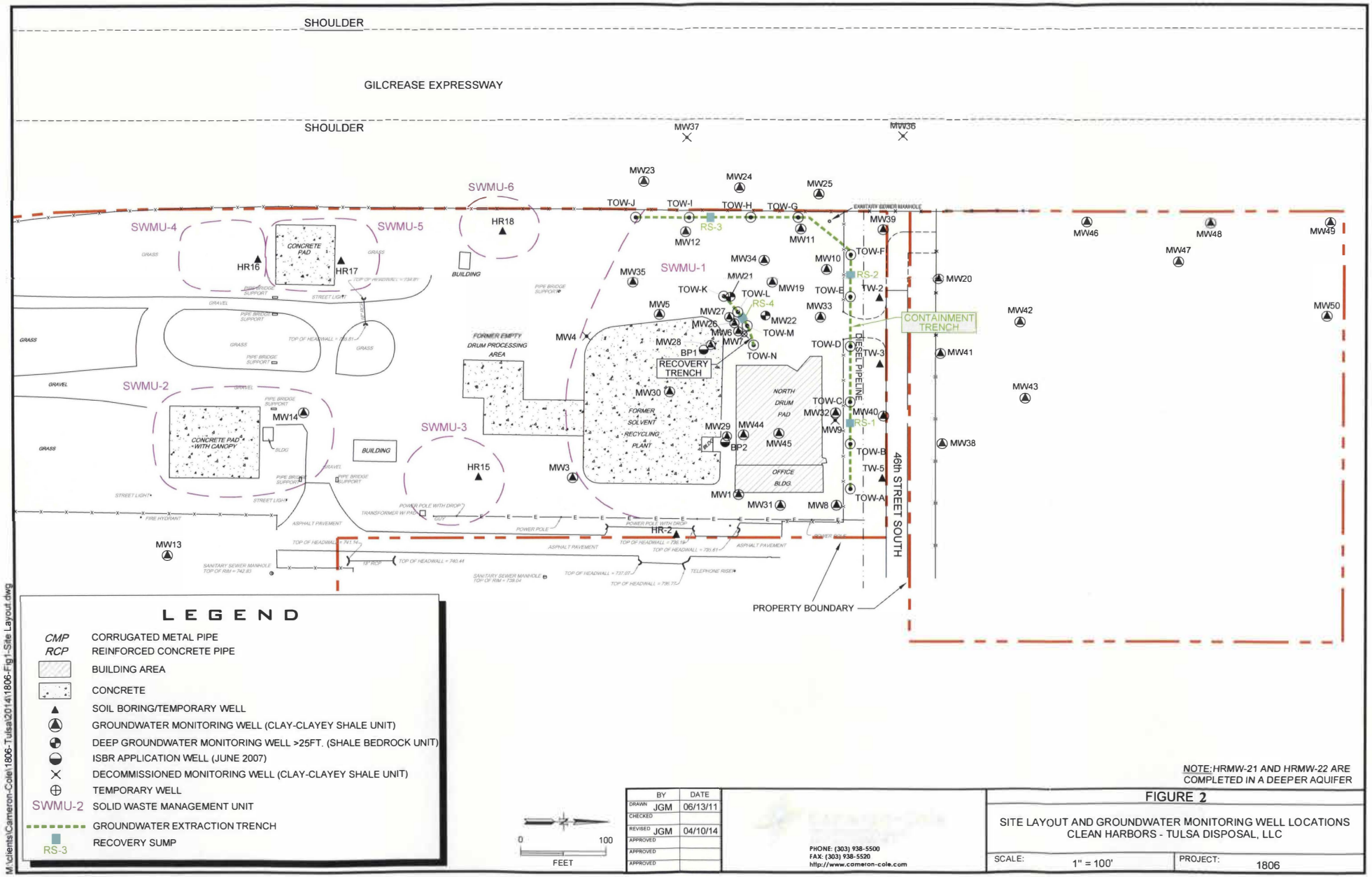
TABLE 3A
POST CLOSURE COST ESTIMATE
TULSA DISPOSAL, LLC

Description	Number	Units	Unit Costs	Annual Costs	Total Costs
Groundwater Corrective Action System O&M					
Labor (10 hours/week x 52 weeks/year)	520	hours	$45	$23,400	
Repairs ($2500/year)	1	lump sum	$2,500	$2,500	
Utilities, site maintenance, etc. ($100/month)	12	months	$100	$1,200	
Subtotal				**$27,100**	
Grounds & Site Maintenance					
Grass Cutting (1 time per year)	1	lump sum	$1,000	$1,000	
Subtotal				**$1,000**	
Groundwater Sampling & Testing					
Analytical Testing (Semi-Annual 41 wells x 2 sampling events - VOCs, only)	82	each	$75	$6,150	
Analytical Testing (POTW @ $160/event - 1 event per year)	1	each	$160	$160	
Groundwater Sampling (4 man-days @ 10 hours per day, 2 times per year = 80 hours)	80	each	$45	$3,600	
Sample Shipment (2 events per year)	2	each	$100	$200	
Sample Supplies (2 events per year)	2	each	$100	$200	
Subtotal				**$10,310**	
Groundwater Data Evaluation & Semi-Annual Reporting					
Engineer II (40 hours/event - 2 events per year)	80	hours	$70	$5,600	
Reproduction ($500/event)	2	events	$500	$1,000	
Subtotal				**$6,600**	
Total Annual Costs (15 years)				**$45,010**	**$ 675,150**
Total Annual Costs w/o Groundwater Corrective Action System O&M (15yrs)				**$17,910**	**$ 268,650**
Post-Closure Basis (Assume operation and maintenance of Corrective Action System for 15 years and Site Maintenance and Groundwater Monitoring for the entire 30 years)					**$ 943,800**

TULSA DISPOSAL, LLC
TULSA, OKLAHOMA

PERMIT ATTACHMENT 7

GROUNDWATER MONITORING WELL LOCATIONS



LEGEND

CMP	CORRUGATED METAL PIPE
RCP	REINFORCED CONCRETE PIPE
	BUILDING AREA
	CONCRETE
▲	SOIL BORING/TEMPORARY WELL
	GROUNDWATER MONITORING WELL (CLAY-CLAYEY SHALE UNIT)
	DEEP GROUNDWATER MONITORING WELL >25FT. (SHALE BEDROCK UNIT)
	ISBR APPLICATION WELL (JUNE 2007)
×	DECOMMISSIONED MONITORING WELL (CLAY-CLAYEY SHALE UNIT)
⊕	TEMPORARY WELL
SWMU-2	SOLID WASTE MANAGEMENT UNIT
	GROUNDWATER EXTRACTION TRENCH
RS-3	RECOVERY SUMP

NOTE: HRMW-21 AND HRMW-22 ARE COMPLETED IN A DEEPER AQUIFER

0 100 FEET

	BY	DATE
DRAWN	JGM	06/13/11
CHECKED		
REVISED	JGM	04/10/14
APPROVED		
APPROVED		
APPROVED		

PHONE: (303) 938-5500
FAX: (303) 938-5520
http://www.cameron-cole.com

FIGURE 2

SITE LAYOUT AND GROUNDWATER MONITORING WELL LOCATIONS
CLEAN HARBORS - TULSA DISPOSAL, LLC

SCALE: 1" = 100'

PROJECT: 1806

M:\clients\Cameron-Cole\1806-Tulsa\2014\1806-Fig1-Site Layout.dwg

TULSA DISPOSAL, LLC
TULSA, OKLAHOMA

PERMIT ATTACHMENT 8

GROUNDWATER MONITORING WELL SPECIFICATIONS

TABLE 2
GROUNDWATER MONITORING WELL CONSTRUCTION DETAILS
SECOND QUARTER (APRIL 1998) MONITORING EVENT
LAIDLAW ENVIRONMENTAL SERVICES (TULSA), INC.
TULSA, OKLAHOMA

Monitor Well Designation	Casing Diameter (Inches)	Total Depth (Feet FTOC)	Screened Interval (Feet FTOC)	Elevation of Top of Casing (Feet MSL)	Depth to Groundwater (Feet FTOC) (1/19/98)	Groundwater Elevation (Feet MSL) (1/19/98)	Depth to Groundwater (Feet FTOC) (4/28/98)	Groundwater Elevation (Feet MSL) (4/28/98)
MW-1	2	17.70	7.70 - 17.70	737.49	6.11	731.38	6.25	731.24
MW-3	2	14.82	4.82 - 14.82	734.67	3.08	731.59	1.90	732.77
MW-4[1]	2	17.32	7.32 - 17.32	735.54	NM	NC	NM	NC
MW-5	2	17.36	7.36 - 17.36	734.92	7.15	727.77	5.96	728.96
MW-6	2	16.82	6.82 - 16.82	734.33	8.87	725.46	8.67	725.66
MW-7	2	33.60	28.60 - 33.60	734.81	14.08	720.73	14.14	720.67
MW-8	2	13.65	8.65 - 13.65	736.57	9.14	727.43	11.25	725.32
MW-9	2	9.95	4.95 - 9.95	735.09	9.15	725.94	9.82	725.27
MW-10	2	15.20	10.20 - 15.20	732.61	12.14	720.47	13.86	718.75
MW-11	2	17.04	12.04 - 17.04	731.96	11.96	720.00	14.66	717.30
MW-12	2	18.02	13.02 - 18.02	733.26	12.13	721.13	12.46	720.80
MW-13	2	12.98	7.98 - 12.98	745.26	4.62	740.64	5.06	740.20
MW-14	2	11.78	6.78 - 11.78	741.99	5.07	736.92	6.34	735.65
MW-19	2	16.32	11.32 - 16.32	731.17	11.33	719.84	11.97	719.20
MW-20	2	14.95	9.95 - 14.95	729.79	8.85	720.94	9.19	720.60
MW-21	2	64.13	54.13 - 64.13	730.98	63.00	667.98	62.08	668.90
MW-22	2	64.93	54.93 - 64.93	730.43	59.12	671.31	58.71	671.72
MW-23	2	14.95	9.95 - 14.95	733.38	14.02	719.36	11.83	721.55
MW-24	2	19.95	14.95 - 19.95	731.93	12.17	719.76	13.59	718.34

Notes: First quarter 1998 groundwater level measurements conducted on January 19, 1998.
NM = Not measured.
NC = Not calculated due to the lack of groundwater level measurement.
[1] MW-4 decommissioned in June 1995.

TABLE 2 (continued)
GROUNDWATER MONITORING WELL CONSTRUCTION DETAILS
SECOND QUARTER (APRIL 1998) MONITORING EVENT
LAIDLAW ENVIRONMENTAL SERVICES (TULSA), INC.
TULSA, OKLAHOMA

Monitor Well Designation	Casing Diameter (Inches)	Total Depth (Feet FTOC)	Screened Interval (Feet FTOC)	Elevation of Top of Casing (Feet MSL)	Depth to Groundwater (Feet FTOC) (1/19/98)	Groundwater Elevation (Feet MSL) (1/19/98)	Depth to Groundwater (Feet FTOC) (4/28/98)	Groundwater Elevation (Feet MSL) (4/28/98)
MW-25	2	19.91	14.91 - 19.91	729.88	8.62	721.26	10.83	719.05
MW-26	4	24.17	4.50 - 20.50	731.88	10.04	721.84	10.25	721.63
MW-27	4	24.45	5.50 - 20.50	731.51	10.41	721.10	10.82	720.69
MW-28	4	26.23	5.00 - 20.00	735.55	7.19	728.36	7.30	728.25
MW-29	4	22.69	4.50 - 19.50	734.19	3.47	730.72	4.31	729.88
MW-30	4	25.74	5.00 - 20.00	736.70	6.52	730.18	5.96	730.74
MW-31	2	19.93	4.93 - 19.93	734.19	4.03	730.16	4.70	729.49
MW-32	2	19.92	4.92 - 19.92	731.47	11.17	720.30	13.39	718.08
MW-33	2	19.58	4.58 - 19.58	729.87	8.86	721.01	10.25	719.62
MW-34	2	20.05	5.05 - 20.05	730.40	10.83	719.57	12.09	718.31
MW-35	2	19.49	4.49 - 19.49	731.94	6.82	725.12	6.55	725.39
MW-36	2	18.00	3.00 - 18.00	726.19	6.74	719.45	7.05	719.14
MW-37	2	17.96	2.96 - 17.96	728.74	8.47	720.27	7.25	721.49
MW-38	2	17.76	2.76 - 17.76	730.32	6.73	723.59	6.80	723.52
MW-39	2	20.14	5.14 - 20.14	726.93	8.13	718.80	8.01	718.92
MW-40	2	20.10	5.10 - 20.10	731.13	10.28	720.85	11.00	720.13
MW-41	2	19.90	4.90 - 19.90	728.67	6.99	721.68	7.59	721.08
MW-42	2	20.00	5.00 - 20.00	727.52	8.13	719.39	7.79	719.73
MW-43	2	20.06	5.06 - 20.06	728.37	8.68	719.69	7.08	721.29

Notes: First quarter 1998 groundwater level measurements conducted on January 19, 1998.
NM = Not measured.
NC = Not calculated due to the lack of groundwater level measurement.

TABLE 2 (continued)
GROUNDWATER MONITORING WELL CONSTRUCTION DETAILS
SECOND QUARTER (APRIL 1998) MONITORING EVENT
LAIDLAW ENVIRONMENTAL SERVICES (TULSA), INC.
TULSA, OLKAHOMA

Monitor Well Designation	Casing Diameter (Inches)	Total Depth (Feet FTOC)	Screened Interval (Feet FTOC)	Elevation of Top of Casing (Feet MSL)	Depth to Groundwater (Feet FTOC) (1/19/98)	Groundwater Elevation (Feet MSL) (1/19/98)	Depth to Groundwater (Feet FTOC) (4/28/98)	Groundwater Elevation (Feet MSL) (4/28/98)
TOW-A	2	18.14	8.14 - 18.14	732.73	17.71	715.02	17.81	714.92
TOW-B	2	17.63	7.63 - 17.63	731.86	16.88	714.98	17.11	714.75
TOW-C	2	16.17	6.17 - 16.17	730.43	15.43	715.00	15.64	714.79
TOW-D	2	15.33	5.33 - 15.33	730.24	15.00	715.24	15.01	715.23
TOW-E	2	16.34	6.34 - 16.34	729.03	15.27	713.76	15.21	713.82
TOW-F	2	16.55	6.55 - 16.55	728.31	14.56	713.75	14.48	713.83
TOW-G	2	13.98	3.98 - 13.98	726.99	13.02	713.97	13.33	713.66
TOW-H	2	13.66	3.66 - 13.66	726.85	12.77	714.08	13.20	713.65
TOW-I	2	15.17	5.17 - 15.17	728.39	14.33	714.06	14.77	713.62
TOW-J	2	15.73	5.73 - 15.73	729.09	15.02	714.07	15.44	713.65
TOW-K	2	19.27	9.27 - 19.27	731.61	18.18	713.43	18.25	713.36
TOW-L	2	17.80	7.80 - 17.80	730.71	17.31	713.40	17.36	713.35
TOW-M	2	18.26	8.26 - 18.26	730.58	17.19	713.39	17.23	713.35
TOW-N	2	17.76	7.76 - 17.76	730.83	17.45	713.38	17.46	713.37
RS-1	2	15.32	5.32 - 15.32	728.68	13.93	714.75	14.73	713.95
RS-2	2	14.10	4.10 - 14.10	725.85	12.08	713.77	12.03	713.82
RS-3	2	13.40	3.40 - 13.40	726.30	12.18	714.12	12.64	713.66
RS-4	2	14.78	4.78 - 14.78	727.34	13.92	713.42	13.98	713.36
Average Depths to Groundwater and Groundwater Elevations (Clay - Clayey Shale)					12.66	718.83	12.95	718.54

Notes: First quarter 1998 groundwater level measurements conducted on January 19, 1998.
NM = Not measured.
NC = Not calculated due to the lack of groundwater level measurement.
* - Average depths to groundwater and groundwater elevations do not include MW-9 values for comparison purposes

TULSA DISPOSAL, LLC
TULSA, OKLAHOMA

PERMIT ATTACHMENT 9

SAMPLING AND ANALYSIS PLAN FOR GROUNDWATER MONITORING

TULSA DISPOSAL, LLC

TULSA, OKLAHOMA

ATTACHMENT 3

SAMPLING AND ANALYSIS PLAN

TABLE OF CONTENTS

Section **Page**

1.1. INTRODUCTION

This Sampling and Analysis Plan (SAP) has been developed for the Tulsa Disposal, LLC facility (the Facility) in accordance with U.S. Environmental Protection Agency (EPA) requirements. The SAP may be amended by mutual written consent of the Oklahoma Department of Environmental Quality (ODEQ) and the Facility.

The following subsections present the field methodologies implemented for the semi-annual monitoring program:

- Well Inspection;
- Equipment Decontamination Procedures;
- Total Depth and Groundwater Level Measurements;
- Well Purging;
- Groundwater and Trench Sampling;
- Groundwater Sample Analysis;
- Quality Assurance and/ Quality Control (QA/QC);
- Review of the Precision and Accuracy of Reported Data; and
- Corrective Measure Operation and Maintenance.

1.2. WELL INSPECTION

During each groundwater sampling event, the physical integrity of each well, including the concrete pad and protective casing, will be inspected for damage. The cap will be checked to ensure it is closed and locked. Damage or irregularities will be noted in the Groundwater Level Measurement/Well Inspection Log, and corrected as necessary.

1.3. EQUIPMENT DECONTAMINATION PROCEDURES

Commercially-prepared or laboratory-prepared deionized/distilled water will be used during equipment decontamination procedures and for the collection of quality assurance/quality control (QA/QC) blank samples. During semi-annual groundwater sampling, at least one complete blank (bottle blank) will be

collected as a QA/QC check using this water. This blank will be in addition to trip blanks, field blanks, and equipment blanks collected during the sampling event. The bottle blank will be collected away from the Corrective Measure wells and pumping system.

1.3.1. DECONTAMINATION OF GROUNDWATER LEVEL INDICATOR

Groundwater levels in Facility wells are measured using an electronic groundwater level indicator. Prior to use in each well, the groundwater level indicator will be decontaminated as described below.

- Rinse (or spray) the indicator with a low alkaline, low phosphate detergent solution. Laboratory or commercially prepared deionized water will be used for the solution.
- Thoroughly rinse (or spray) the indicator with a reagent-grade water immediately prior to use.
- Wipe the probe and permanent line/cable with a clean paper towel to remove excess water.

1.3.2. DECONTAMINATION OF SAMPLING AND BAILING EQUIPMENT

Monitoring wells will be purged and groundwater samples collected using disposable, bottom-entry, high density polyethylene (HDPE) bailers. Each bailer will be lowered into the well using nylon cord. A new bailer and cord will be used for each well to eliminate the possibility of cross-contamination.

1.3.3. DECONTAMINATION WATER DISPOSAL

All water associated with decontamination procedures will be placed in labeled drums. The Facility will collect and properly dispose of the decontamination water by pumping it into the on-site 500,000-gallon holding tank (V-69) prior to discharge to the POTW. This will be done in accordance with regulatory requirements.

1.4. TOTAL DEPTH AND GROUNDWATER LEVEL MEASUREMENTS

Prior to beginning each groundwater sampling event a complete round of groundwater levels will be measured in all permanent monitoring wells, in trench observation wells TOW-A through TOW-N, and in

the trench-sump observation wells RS-1 through RS-4. The groundwater levels will be measured to the nearest 0.01 foot and recorded on the Groundwater Level Measurement/Well Inspection Log.

Based on these water level measurements, groundwater elevations will be determined for each well by subtracting the depth to groundwater from the surveyed top of casing elevation. The value obtained will be the groundwater elevation referenced to mean sea level (MSL), and will be used to generate potentiometric surface maps of the groundwater-bearing zones monitored at the Facility.

The groundwater levels will be measured using an electronic groundwater level probe or equivalent measuring device. The groundwater level probe will be decontaminated as described previously in Subsection 1.3.1. The probe will be lowered into the well until the instrument indicates the groundwater surface has been contacted.

Total depth readings for each well will be measured on an annual basis as part of the regularly scheduled groundwater sampling event. The total depth of each well will be measured using the groundwater level probe or equivalent.

1.5. WELL PURGING

Prior to sampling each monitoring well, the volume of water in the well will be calculated, and a minimum of three casing volumes will be removed, except for wells in which water recovery is extremely slow. These wells will be purged dry and sampled within 24 hours. Evacuation of standing water will be performed through the use of disposable HDPE bailers. Data collected prior to and during well purging activities will include the following:

- initial depth to water;
- well purge start and end times;
- volume of water purged;
- well inspection information; and
- other pertinent information.

1.5.1. PURGE WATER VOLUME

Groundwater data will be collected prior to and during purging activities and recorded on the Groundwater Sampling Field Data Sheet. The Facility has 2-inch and 4-inch diameter wells of various depths. The standing water volume from each well will be calculated by using the following formula:

Water volume to be purged (gal) = (Casing Length in Ft - Depth to Water in Ft) * X * 3

Where: X = 0.147 for 2-inch wells
X = 0.650 for 4-inch wells

Gallons may be converted to liters by multiplying by 3.785. Values for additional casing sizes are available and values may change as construction materials vary.

At least two consecutive field measurements of temperature, pH, and turbidity will be measured before purging is complete. These measurements will be made after each purge volume has been evacuated to establish that the stagnant water within the well casing has been removed. All readings will be recorded on the field data sheet.

1.5.2. PURGE WATER DISPOSAL

All groundwater removed during purging will be placed in labeled drums. The Facility will collect and dispose of the decontamination water by pumping it into the on-site 500,000-gallon holding tank (V-69) prior to discharge to the POTW. This will be done in accordance with regulatory requirements.

1.6. GROUNDWATER AND TRENCH SAMPLING

Following completion of well purging activities, the water in the well will be allowed to recover and groundwater samples will be collected using a disposable HDPE bailer. If practical, groundwater samples will be collected beginning with monitoring wells known to be the least impacted to monitoring wells known to be the most impacted. This will be determined based on historical groundwater data. All wells except those with low recovery rates will be sampled the same day they are purged. Regardless, the wells will be sampled within 24 hours of purging activities. This general sampling approach may be modified, as necessary, to accommodate access restrictions due to inclement weather or other factors.

1.6.1. SAMPLE COLLECTION

Groundwater samples will be collected in containers supplied by the analytical laboratory. The supplied containers will have been cleaned before being shipped to the Facility in accordance with the laboratories QA/QC programs. Sample containers requiring preservative will be preserved prior to shipment to the Facility. Sampling personnel will wear protective gloves during each phase of sampling. Gloves will be changed as appropriate, and at least one new pair of gloves will be worn at each well site. Samples will be collected and containerized for laboratory analysis, taking into consideration the volatilization sensitivity of the analytical parameters.

1.6.1.1. WELL SAMPLING

Groundwater samples will be collected from all monitoring wells designated for sampling during the semi-annual monitoring program. The revised monitoring well network for the semi-annual groundwater monitoring events at the Tulsa Disposal Facility are listed in Attachment 1, Table 4. The samples collected from these wells will be submitted to an ODEQ- and EPA-certified laboratory for analysis of VOCs by EPA Method 8260.

1.6.1.2. TRENCH SAMPLING

Groundwater samples will also be collected from the sample ports of recovery sumps RS-1, RS-2, RS-3, and RS-4. Recovery sumps RS-1 through RS-3 are located in the containment trench and recovery sump RS-4 is located in the recovery trench. Each recovery sump is located immediately adjacent to a piezometer from which groundwater-level measurements are obtained. The sample ports consist of a T-valve in the discharge line from each recovery sump. The samples collected will be submitted to the ODEQ- and EPA-certified laboratory for analysis of VOCs by EPA Method 8260.

1.6.2. SAMPLE CONTAINERS, PRESERVATION AND FILTRATION

All groundwater samples will be collected in hydrochloric acid (HCL) preserved, 40-milliliter (ml) volatile organic analyte (VOA) vials containing Teflon lined caps. The samples will be submitted to the lab and analyzed for VOCs by EPA Method 8260 within 14 days.

Containers used to transport samples for laboratory analyses will be provided by the laboratory performing the analyses. The bottles will be prepared according to EPA specifications (EPA, 1987).

Documentation of bottle preparatory procedures must be available to the Facility upon request. Once prepared, the bottles will not be opened until they are to be filled with sample preservative or sampled groundwater.

Sample preservation is intended to retard biological action, retard hydrolysis, and reduce absorption effects. Methods which will be used to preserve groundwater samples collected at the Facility include pH adjustment of selected samples, refrigeration, and protection from light.

For preservation of samples for VOC analysis, a sufficient amount of HCl will be added to the sample vials to modify the pH of the samples to less than two. The HCl will normally be added to the sample vials prior to shipment of the containers to the site. However, additional preservative will be available during the sampling event to supplement the preservative provided in the sample containers, if necessary. Care will be taken not to overfill prepreserved bottles during sample collection.

1.6.2.1. VOLATILE ORGANIC MONITORING PARAMETERS

All groundwater samples collected during the Corrective Measure sampling events will be submitted to the certified laboratory for analysis of VOCs by EPA Method 8260. Sample containers for VOC analyses will be filled with unfiltered groundwater. Bottles containing samples to be analyzed for volatile organic parameters will be slowly filled until a positive meniscus is achieved, thus minimizing the possibility that the sample becomes aerated during transport to the laboratory as a result of trapped air within the bottle. Care will be taken so that bottles that contain preservatives are not over-filled to prevent diluting the preservative. In the unlikely event that a VOC vial sample container is overfilled, the vial will be discarded and a new VOC vial with preservative will be filled.

Once capped, the bottle will be checked for air bubbles by turning the bottle upside down, tapping the cap of the inverted bottle and visually inspecting the bottle for air bubbles. If air bubbles are present, the vial will be uncapped and additional sample will be carefully added to displace the bubble. Care will be taken not to overfill the vial. The container will again be checked for bubbles as previously described. If after two attempts bubbles are still present in the container, this sample will be discarded and a separate sample will be collected.

1.6.3. SAMPLE STORAGE AND TRANSPORT

All samples will be placed in airtight plastic bags, cooled and transported to the laboratory within two days of sampling. The sample containers will be placed in an insulated ice chest containing ice

immediately after collection to maintain the sample temperature at or as near four degrees Celsius as possible.

1.6.4. SAMPLE DOCUMENTATION

A sample documentation program will be implemented to document possession and handling of groundwater samples from the time of field collection through laboratory analysis. The program will include:

- sample labels which clearly identify sample locations;
- custody seals to preserve the integrity of each shipping container of samples during sample shipment to the laboratory;
- completing the Groundwater Sampling Field Data Sheet with information about each sample collected during the monitoring event;
- chain-of-custody record to establish sample possession from the time of collection to laboratory analysis. (The chain-of-custody will serve as official communication to the laboratory of the particular analysis required for each sample, and provide further evidence that the chain-of-custody is complete); and
- laboratory log or record, which is maintained at the laboratory and records all pertinent information about the sample.

1.6.4.1. SAMPLE LABELS

Legible, waterproof labels will be affixed to each sample container and will be sufficiently durable to remain legible even when wet. Each label will contain the following information:

- Facility/project identification;
- sampling point identification name and/or number;
- date and time of collection;
- analysis required; and
- preservative inside bottle, if applicable.

1.6.4.2. CUSTODY SEALS

In cases where samples are to be shipped off-site by a commercial carrier, a custody seal will be placed on each container of sample bottles to ensure the samples have not been disturbed during transportation.

1.6.4.3. SAMPLING RECORD

A Groundwater Sampling Field Data Sheet will be maintained for all sample collection activities. The following specific data will be documented during the groundwater sampling event:

- name of collector(s);
- identification of well or sampling point;
- depth to groundwater in wells referenced from top of casing;
- purge volume, time, and date;
- results of field analyses (pH, temperature, and turbidity);
- sample observations;
- field observations (broken lock, cracked casing, etc.); and
- any other pertinent data.

A log or record of each day's events will be kept by sampling personnel during the collection of the samples. All pertinent information, including the time and date of sample collection, all measurements, observations, and other information as indicated in this Plan, will be recorded in the field log.

A field map showing the well locations and the Groundwater Sampling Field Data Sheet will be checked to ensure that all wells requiring sampling are sampled.

1.6.4.4. CHAIN-OF-CUSTODY DOCUMENTATION

Evidence of collection, shipment, and laboratory receipt of groundwater samples will be documented using chain-of-custody forms. Groundwater samples will be considered in custody if the samples are:

- in a person's actual possession;
- in view, after being in physical possession;

- sealed so that no one can enter the shipping container after having been in physical custody; and/or
- in a secured area restricted to authorized personnel.

Chain-of-custody documentation will be used to record collection and shipment of all samples. The chain-of-custody record will specify the analyses to be performed. The chain-of-custody should contain at least the following information:

- project name, site address and location;
- any pertinent comments or instructions to laboratory;
- sample type (e.g., groundwater);
- listing of all sample bottles and type of analysis to be performed by the laboratory;
- well number or sampling point;
- date and time of sample collection;
- signature of sample collector; and
- "relinquished by" and "received by" signatures, with date/time.

The chain-of-custody procedure will be as follows:

- The chain-of-custody record for all samples and blanks shall be initiated in the field. The name(s) of the sampler(s) will be listed on the chain-of-custody record. Samples can be grouped for shipment on a common form.

- Each time responsibility for custody of the samples changes, the receiving and relinquishing custodians will sign the record and denote the data and time.

- If the samples are shipped to the laboratory by commercial carrier, the chain-of-custody record shall be sealed in a water resistant container and placed in the shipping container with the samples. The shipping container will be sealed prior to submittal to the carrier. The carrier waybill shall serve as an extension of the chain-of-custody record between the final field custodian and receipt in the laboratory.

- Upon receipt in the laboratory, a designated individual shall open the shipping containers, measure and record cooler temperature, compare the contents with the chain-of-custody record, and sign and date the record. Any discrepancies shall be noted on the chain-of-custody record.

- If discrepancies occur, the project manager will be notified for clarification.

- The chain-of-custody record is completed after sample disposal. Samples not consumed during analysis shall be kept for a minimum of six months, or as otherwise established by the laboratory.

- Chain-of-custody records, including waybills, if any, shall be maintained as part of the project records.

1.7. GROUNDWATER SAMPLE ANALYSIS

1.7.1. ANALYTICAL PARAMETERS

All samples will be analyzed for VOCs by EPA Method 8260.

1.8. QUALITY ASSURANCE AND/QUALITY CONTROL (QA/QC)

Quality assurance and quality control (QA/QC) address both field and laboratory activities. QA/QC for both the field and laboratory activities is described below.

1.8.1. FIELD QUALITY ASSURANCE/QUALITY CONTROL

The Field Quality Assurance/Quality Control program includes collection of trip blanks, equipment blanks, field blanks, and field duplicate samples. Methods for collecting each QA/QC sample are listed below.

1.8.1.1. TRIP BLANKS

A trip blank will consist of deionized/distilled water prepared by the laboratory and will be analyzed for VOCs by EPA Method 8260. A trip blank for the remaining analytes in the sample set will not be required. Each trip blank will consist of a minimum of two 40 ml VOA vials filled with deionized/deionized water. Trip blanks will originate at the laboratory, remain with a shipment cooler during all sampling activities, and will be returned to the laboratory with sample shipments for analysis.

The trip blank is laboratory-supplied, certified VOC-free ASTM Type-II water included in the thermally-insulated ice chest during sampling and shipping. The trip blank provides a measure of the positive

interferences which may be introduced by the sample preservation, transportation, storage, and analysis. The concentration levels of any artifact found in the trip blank will be noted and compared to the groundwater sample results.

1.8.1.2. FIELD BLANKS

Field blanks will be taken with the same care as regular samples and treated the same as a groundwater sample collected from a monitoring well. At a minimum, at least one complete field blank will be collected during each week (seven days) of sampling. A complete field blank means one full set of analytes similar to a sample set collected from a point-of-compliance monitoring well. Field blanks will be collected at a sample location (i.e. wellhead) or in the immediate vicinity of facility activity (such as near an active cell). The sample team leader will be responsible for selecting the location for collection of the field blank.

1.8.1.3. FIELD DUPLICATES

One duplicate sample will be collected from two different monitoring wells. Each duplicate will be analyzed for the same parameters as the original sample. Duplicates will be collected by alternating the filling of bottles between the sample and the duplicate sets. Each duplicate will be labeled to disguise the sample location from the laboratory. The location and identity of each duplicate sample will be maintained in the field documentation. Each field duplicate sample will be submitted as a "blind" sample to the laboratory. Pertinent information regarding each duplicate sample will be noted on the Groundwater Sampling Field Data Sheet.

1.8.2. LABORATORY QUALITY ASSURANCE/QUALITY CONTROL

The laboratory QA/QC procedures that will be performed by the selected laboratory are described below.

1.8.2.1. LABORATORY SELECTION

The laboratory selected to analyze groundwater and QA/QC samples collected at the Facility will be ODEQ- and EPA-certified. In addition, the laboratory will maintain a written QA/QC program which conforms, as a minimum standard, with QA/QC protocol set forth in the latest edition of U.S. EPA's *Test Methods for Evaluating Solid Waste*, EPA SW-846. If requested, the laboratory will provide its own laboratory standard operating procedures (LSOP) as part of the QA requirements.

1.8.2.2. LABORATORY QA/QC PROCEDURES

In accordance with EPA SW-846, the selected laboratory's QA/QC will include analysis of the following quality control samples:

- matrix spiked samples (one per analytical batch or every 20 samples whichever is more frequent);
- method blanks (one per analytical batch);
- for organic analyses, surrogate spiked samples (every method blank, laboratory control sample, matrix spike, and matrix spike duplicate sample);
- laboratory control sample (one per analytical batch or every 20 samples whichever is more frequent);
- continuing calibration standard (performed at least daily, frequently varies with test method);
- for applicable organic analyses, column check sample (after activating or deactivating a batch of adsorbent);
- initial and continuing calibration blanks (where applicable per reference method); and
- development of standard curves at a frequency specified by the method.

The results of the laboratory QA\QC samples will be compared to EPA limits (where available) or to laboratory limits that are generated per EPA guidelines and are statistically consistent with EPA limits. If the laboratory QA\QC results are not within EPA-specified or laboratory limits (as applicable), the samples will be reanalyzed within the sample's required holding time. Data for samples reanalyzed outside of holding time will be qualified.

In addition to the QA/QC procedures described above, the laboratory will have in place an internal QA/QC plan. This laboratory QA/QC plan will include the following:

laboratory sample handling procedures;
- laboratory quality assurance organization and responsibilities;
- equipment calibration procedures and frequencies;
- data reduction, validation, and reporting procedures;
internal quality control analysis procedures and frequencies; and
- performance and system audit procedures and frequencies.

1.8.2.3. LABORATORY LOG OR RECORD

Samples will generally be delivered to the laboratory in coolers by an overnight courier. Upon receipt, any associated chain-of-custody is signed and dated. The chain-of-custody is reviewed to ensure it contains the following information:

- sample collection date/time;
- field sampler's identification;
- requested analyses;
- signature of the delivery individual;
- date of delivery; and
- client technical contact.

A copy of the chain-of-custody form is provided to the person relinquishing the samples (when that person is not an overnight courier). The original chain-of-custody is retained by the laboratory and included if necessary as a part of the final data package.

Shipping container(s) are to be examined for the presence, absence, and/or condition of custody seals; the examination is to be documented. The container exterior and interior is subject to a radiological screen. If a temperature blank was included in the cooler, its temperature is to be measured and recorded.

Bottles in the shipping container are inspected for damage. If sample bottles have been broken in shipment, appropriate safety procedures are taken and the client is notified. Enclosed sample documents are removed and the following information is recorded:

- presence/absence of chain-of-custody forms;
- presence/absence of request for analysis forms; and
- presence/absence of bill of lading or other sample information documents.

Information on the sample containers is compared with that on the chain-of-custody and any discrepancies are documented. The physical condition of the samples is checked and documented for the following:

- cracked or broken container or cap;
- improper sample container;
- insufficient sample volume for analyses;
- improper bottle filling technique (i.e. headspace in volatiles, etc.);

- improper preservation (cooler not chilled);
- missing, mismarked, or unlabeled bottles;
- leaking bottles;
- samples needing to be divided for different analyses;
- samples needing to be composited prior to analysis; and
- samples containing hazardous substances or high concentrations of analytes.

The pH of all volatiles samples will be checked and documented by the laboratory at the time of analysis.

Aliquots of aqueous samples assigned to parameters requiring other chemical preservation are checked to ensure that they are labeled, preserved, and that the preservative (if described) is the correct one for the parameter. The results of the sample review, any discrepancies, and resolution with the client are documented.

Once the assessment of the samples' condition has been completed and documented, the following sample information is recorded in a logbook:

- initials of technician entering the data;
- date received;
- client identification (name and project number);
- client sample identification and laboratory sample number;
- matrix;
- number of bottles, by type;
- parameters tested; and
- storage location(s).

Each sample is then entered into an interim database in Laboratory Information Management System (LIMS) and a unique sequential laboratory control number is assigned to each sample. The information entered as a part of each sample's record in the interim database includes the following:

- client's identification for the sample;
- sampling date;
- sample matrix;

- the laboratory number assigned to the sample;
- the analyses requested in the documentation arriving with the sample; and

- the number and types of bottles provided.

The information entered for the batch of samples received includes:

- initials of the technician entering the data;
- client identification, site, and client job number;
- data of the sample receipt at the laboratory;
- project manager;
- laboratory submission ID number;
- sample delivery group (SDG) number and data deliverable QC level(s) requested for the analysis; and
- storage location for the samples.

All aliquots of a sample are to be labeled with the sample's laboratory number for identification. Sample containers are then to be moved to designated storage areas.

A hard copy of the above information is generated ("project sheet") and combined with documented checks of the received samples, the chain-of-custody, and any supporting documentation shipped with the sample containers and provided to the laboratory project manager for review.

The laboratory project manager reviews the documentation package, making any necessary changes to the project sheet based on consultation with the client as well as on the information provided. When the laboratory project manager is satisfied that the project sheet represents the client's needs for the batch, the project manager assigns a due date for the batch and signs and dates the project sheet.

Once approved and returned by the project manager, the original project sheet along with a copy of the rest of the sample documentation package is filed. The project sheet covering the batch of samples is electronically transferred form the interim database to the laboratory schedule system on the LIMS.

Sample aliquots which are scheduled for VOC analyses and metals analyses are to be stored in the refrigerators, freezer, and/or cabinets assigned to these parameters. All other non-hazardous aqueous samples are to be stored in designated walk-in coolers.

The retrieval of samples for analysis will be initiated through a request by the analyst to sample log-in personnel who retrieve the specified samples. Both the request and subsequent return of the same samples are to be documented on internal chain-of-custody. Samples will be disposed in accordance with

applicable regulations. Disposal requires project manager approval and client consent and is documented.

1.9. REVIEW OF THE PRECISION AND ACCURACY OF REPORTED DATA

QA/QC data review procedures that will be used by the Facility or its consultant are described below. Any discrepancies or corrective measure actions and their resolution which occur during analysis of groundwater samples will be included as part of the required groundwater monitoring report.

1.9.1. REPORTING LIMITS

Reporting limits for a specific compound will be checked for variation among sampling points. Higher reporting limits can occur when a different, less sensitive analytical technique is used or when the chemical matrix of the sample interferes with the analytical technique. Where reporting limits are higher than the PQL specified in the test method or than those previously reported, the limit will be reduced in future samples, if possible, by using an alternative test method or by using alternative laboratory procedures that remove or control interfering constituents.

1.9.2. MISSING DATA VALUES

Care will be taken to complete all analyses in order to provide a complete data set for statistical comparison. If a value is found to be missing during the initial data review, the laboratory will be contacted immediately to determine if the omission is due to data entry or other transmittal error. Missing values will be reported immediately to the Facility and/or its representatives.

1.9.3. PRECISION AND ACCURACY OF REPORTED DATA

Analytical data will be qualitatively reviewed for apparent outliers or detected quantities of analytes. In general terms, an outlier is an observation which is markedly different from all other observations in a group of observations. Causes for outliers in groundwater samples may be due to inconsistent sampling or analysis procedures or errors in transcription of the data values.

Where a suspect value is reported, the internal QA/QC data relevant to the Facility's sample set (method blanks, matrix and method spikes, spike duplicates and charge balances) will be requested from the

laboratory if not already provided. The Facility and/or its representatives may also request that the laboratory check calculations performed in completing analyses and/or check for data transcription errors. These data will be reviewed to evaluate the precision and accuracy of the analytical results. In particular, the data will be compared to EPA control limits for blank, spike, and duplicate samples, where applicable.

Where lab error is apparent, corrective action will be taken. Corrective action may include re-analysis of the sample and/or deletion of the erroneous data from the groundwater data base. Documentation of the cause of any outlier will be provided prior to correcting or excluding data values from evaluations. Where the cause of the outlier cannot be attributed to sampling, laboratory or reporting error, or to laboratory contamination, the value will not be excluded from the data base.

Tentative values will be defined as any measured concentration for an analyte less than the PQL, but otherwise meeting criteria for identification using GC/MS techniques. These values shall be reported as values identified by the letter J, but shall not be used as indications of detections.

A tentatively identified compound is a non-target compound which is detected using GC/MS technology. The mass spectrum is compared to standard reference spectra for potential identification. Manual interpretation may be necessary. Identification and quantitation may vary significantly when compared to authentic standards. These values shall be reported as values identified by the letter A.

The laboratory provides additional information related to sample analysis as part of the laboratory narrative which accompanies the laboratory reports. The narrative will summarize all aspects of data analysis performed at the laboratory. Any additional qualifiers or data flags will be described within the narrative

TULSA DISPOSAL, LLC
TULSA, OKLAHOMA

PERMIT ATTACHMENT 10

CORRECTIVE MEASURES

TULSA DISPOSAL, LLC

TULSA, OKLAHOMA

TAB XIII

CORRECTIVE MEASURES

In Compliance With
40 CFR 270.14 (c)

Revised December 2023

TABLE OF CONTENTS

13.0 - CORRECTIVE MEASURES
ODEQ Item Numbers B-22 to B-28
40 CFR 270.14(c)

13.1. INTRODUCTION

Corrective measures at the Tulsa Disposal, LLC facility, the Facility, while approved separately from this permit, are herein described including a detailed description of the approved Corrective Measure that has been implemented. The Corrective Measure is designed to contain volatile organic compounds (VOCs) on-site and to reduce contaminant mass in the saturated clay-clayey shale unit at Solid Waste Management Unit 1 (SWMU 1).

The Corrective Measure Study, Appendix 3, Attachment 9, was approved by the Oklahoma Department of Environmental Quality (ODEQ) in an October 13, 1998 letter to Safety-Kleen (Tulsa), Inc. Approval was granted separately from this permit thereby allowing the Corrective Measure, in its entirety, including sampling locations, frequency, and analytes, to be amended based on the written consent of the ODEQ and the Facility without a permit modification being required.

Tab XIII has been prepared in accordance with 40 CFR 270.14(c)(1-8). It presents:

- A summary of environmental investigations at the Facility;
- A description of the ODEQ-approved groundwater site-specific target levels and Corrective Measure including objectives;
- A discussion of effectiveness of the Corrective Measure; and
- A discussion of the criteria for determining when Corrective Measure objectives have been achieved.

13.2. SITE HISTORY

13.2.1. FORMER FACILITY OPERATIONS

The Facility (Appendix 2, Figure 9) began operations in 1979 as Hydrocarbon Recyclers, Inc. (HRI) to recycle waste oil. Waste solvent storage and recycling operations were added in 1983. In 1987, a new processing plant for waste oil was completed. Processing activities were conducted in two separate plant areas until June 3, 1996, when operations ceased. On May 30, 1997, the Facility underwent a name change. The company name was changed from Hydrocarbon Recyclers, Inc. to Laidlaw Environmental Services

(Tulsa), Inc. to reflect the acquisition of the Facility by Laidlaw. The Facility underwent a second name change on July 2, 1998, when the name was changed to Safety-Kleen (Tulsa), Inc. to reflect the merger between Safety-Kleen, Inc. and Laidlaw. The name of the facility was changed to Tulsa Disposal, LLC to reflect the acquisition by Clean Harbors, Inc. on September 6, 2002.

Past activities at the Facility have included the solvent operations in the solvent recycling plant, waste oil treatment in the waste oil plant, and, when waste oil treatment operations were discontinued, non-hazardous industrial wastewater treatment in the former waste oil plant. Three major types of waste streams have historically been managed by these activities:

- chlorinated solvents;
- non-chlorinated solvents (including paint and lacquer thinners); and
- waste oils.

Laidlaw submitted a partial closure plan to the ODEQ on April 18, 1996; the plan was approved by ODEQ on April 19, 1996. The Facility ceased waste handling operations on June 3, 1996, and partial closure in accordance with ODEQ requirements was certified by ODEQ on March 17, 1997.

13.2.2. INITIAL INVESTIGATIONS

Numerous investigations have been conducted at the Facility in accordance with the corrective action conditions of the existing Part B Permit. A *RCRA Facility Assessment (RFA) Preliminary Review and Visual Site Inspection (PR/VSI) Report* dated May 1988 was prepared by Science Application International Corporation (SAIC) for EPA Region VI. In the PR/VSI, a total of 53 SWMUs were identified, but no areas of concern were identified. The 53 SWMUs were subsequently consolidated into six SWMUs by the Oklahoma State Department of Health (OSDH) and the Facility.

Discolored water was recovered from beneath the concrete secondary containment liner of the solvent processing area on August 21, 1991. On August 22, 1991, HRI, the operator at the time, notified OSDH of a potential release from the solvent recycling plant at the Facility. Volatile organic compounds (VOCs) were detected in the groundwater immediately below the secondary containment liner.

After the discovery of the potential release, OSDH requested a preliminary investigation, in a September 10, 1991 letter to HRI, to identify any immediate threats to human health or the environment resulting from the potential release. HRI issued the results of the preliminary investigation to OSDH in two letters dated October 10 and November 8, 1991. These included analytical results of samples collected from three locations below the concrete containment pad for the solvent recycling plant. VOCs were detected in the three samples. The VOCs detected included components of materials managed in the recycling plant. However, the source of the contamination discovered below the solvent recycling plant could not

be determined at that time. There was no visual evidence to indicate that contamination existed outside the limits of the concrete secondary containment pad for the solvent recycling plant.

On December 24, 1991, OSDH issued a letter to HRI requesting additional information regarding a potential release of solvents from the solvent plant. OSDH stated additional information was necessary to identify any immediate threats to human health and the environment related to the potential release. OSDH requested the following additional information:

- The groundwater flow direction and velocity in the area of solvent recycling plant;
- Additional data to determine whether the solvents were isolated beneath the solvent recycling plant's concrete secondary containment; and
- Additional data to estimate the potential for contaminant migration to sanitary sewers, and subsequent migration along the sewer lines.

HRI retained USPCI Remedial Services, now Cameron-Cole, LLC, to gather the additional information requested by OSDH in the December 24, 1991, letter. In February USPCI submitted a document titled *Workplan Outline Site Investigation HRI Tulsa Facility* to OSDH for approval. OSDH approved the workplan, and USPCI conducted the field work from May 14 to 16, 1992. The objective of the investigation was to determine if an immediate threat to human health and the environment existed. The investigation consisted of drilling and collecting soil samples from six soil borings (HR-1 through HR-6), constructing groundwater monitoring wells in five of the borings, well development, surveying, and collection of groundwater samples from the newly constructed wells (MW-1 and MW-3 through MW-6). Soil boring and monitor well locations are shown on Appendix 2, Figure 9. The investigation also included identification of potential receptors, migration pathways, and an ecology survey.

Sample results indicated that the concentrations of individual VOCs detected in soil samples ranged from less than 0.005 milligrams per kilogram (mg/kg) to 0.45 mg/kg. The range in the concentration of VOCs detected in soil samples was not indicative of a surface spill in the source area.

VOCs were detected in groundwater samples collected from wells installed in the shallow clay layer and an underlying weathered clayey shale zone within approximately 20 feet of ground surface. Concentrations of individual VOCs detected in monitoring wells east of the solvent recycling plant ranged from less than 0.005 parts per billion (ppb) to 60 ppb. The groundwater flow direction in the clay and clayey shale zones was to the northwest.

The results of the additional preliminary investigation demonstrated that soil and groundwater at the Facility had been impacted by VOCs. However, USPCI concluded that an immediate threat to human health and the environment was not present based on the following:

- VOC impacts to surface soil were negligible;
- Groundwater within a one-mile radius of the Facility was not used as a source of potable water supply;
- No surface water bodies were present at the Facility to support biota; and
- The Facility ecology survey identified no federally listed endangered or threatened fauna of plant species occurring on the Facility.

Based upon the results of the preliminary investigations, USPCI, with the concurrence of OSDH, recommended a RCRA Facility Investigation (RFI) at the Facility.

13.2.3. RCRA FACILITY INVESTIGATION

The goal of the RFI, presented in a USPCI (1993) workplan, was to characterize the Facility hydrogeology and the distribution of VOCs in soil and groundwater. Specifically, the RFI developed site-specific data necessary to characterize the nature and extent of any potential releases of VOCs associated with the following six solid waste management units (SWMUs) (Appendix 2, Figure 9):

- SWMU 1 - Solvent Recycling Plant;
- SWMU 2 - Former Waste Oil Process Area;
- SWMU 3 - Heat Vapor Recovery System;
- SWMU 4 - Stormwater Storage Tank 1;
- SWMU 5 - Stormwater Storage Tank 2; and
- SWMU 6 - Former Drum Storage Area.

The field investigation was conducted at the Facility from August 1993 through July 1994. The investigation included the installation of soil borings HR-2 and HR-15 through HR-18, installation of groundwater monitoring wells MW-1 through MW-25 (Appendix 2, Figure 9), water quality sampling and analyses, and data interpretation. Quarterly groundwater monitoring, which began in November 1993 as part of the RFI, was continued beyond the submittal date of the RFI through December 1994.

Results of the soil-quality investigation indicated that soil in the vicinity of SWMU 1 has been impacted with VOCs. SWMU 1 roughly encompasses the entire width of the property north of the southern edge of the former solvent recycling plant, including the north drum pad and the office building as shown in Appendix 2, Figure 9. The distribution of VOCs in vadose zone soils and in groundwater suggested that releases of VOCs to the unsaturated portions of the near surface clay unit have been principally confined to the solvent recycling and drum storage areas of SWMU 1. The principal source area of the VOCs was believed to be within the limits of the solvent recycling plant (SWMU 1). Soil in the vicinity of SWMU 2 through SWMU 6 was not impacted with VOCs.

Results of the RFI indicated that groundwater beneath and downgradient of SWMU 1 had been impacted by VOCs. The solvent recycling plant encompassing SWMU 1 was identified as the probable source area for the VOCs detected in groundwater. The groundwater sample analytical results from the RFI and more recent sampling events in 1994 indicated that the lateral extent of dissolved VOCs was reasonably well defined. Trichloroethylene was the most prevalent and elevated VOC detected in groundwater samples.

13.2.4 INTERIM MEASURE FIELD INVESTIGATIONS

Based on the results of the RFI, an Interim Measure investigation and implementation program was initiated. Laidlaw submitted an *Interim Measure Plan* for field investigation and Interim Measure installation activities at SWMU 1. The plan was accepted by the Oklahoma Department of Environmental Quality (ODEQ) in their May 25, 1995, letter.

Interim Measure field investigations were conducted at SWMU 1 and off-site between June 5 and 11, 1995, and between October 30 and November 3, 1995, to further characterize the Facility hydrogeology and lateral distribution of VOCs in groundwater preparatory to selecting interim measures. The investigations included the completion of the tasks listed below:

- Constructing eighteen permanent groundwater monitoring wells (MW-26 through MW-43), seven temporary wells (TW-1 through TW-7), and one soil boring (SB-1);
- Collecting soil samples and analyzing for selected physical properties, including horizontal specific permeability to air, vertical hydraulic conductivity and intrinsic permeability, total and effective porosity, volumetric water content, dry and wet bulk density, and total organic carbon content;
- Developing the groundwater monitoring wells, including surveying and collecting initial groundwater-level measurements;
- Sampling groundwater and analyzing for VOCs and general inorganic cations and anions; and
- Conducting an aquifer pumping test and vacuum test.

As a result of the field investigations, the horizontal extent of VOC contamination in the clay-clayey shale unit was well defined. The results indicated the presence of elevated concentrations of VOCs, defined as greater than 1 ppm, in two main areas of the Facility. The first was along the northern portion of the solvent recycling plant (in the area of wells MW-1, MW-26, MW-27, and MW-29). The second was to the north of the north drum pad area (in the area of wells MW-32 and MW-40). Previous results from MW-9 and MW-32 had demonstrated that the concentrations were higher at the top of the clayey shale than they are in the upper portion of the saturated portion in the clay zone.

13.2.5 INTERIM MEASURE INSTALLATION

The Interim Measure was installed in June and July 1996 (final completion on July 2) and became operational on October 9, 1996. The Interim Measure consisted of a perimeter containment trench and a source area recovery trench at SWMU 1. The trenches were designed to remove groundwater containing VOCs. The hydrostratigraphic zones addressed by the measure are the clay and clayey shale units encountered at shallow depth beneath the Facility. Appendix 2, Figure 9 shows a plan view of the trenches.

The trench recovery system consists of a 70-foot long recovery trench near the northwest corner of the recycling plant and a 540-foot long containment trench along the north and west edges of the Facility property boundary. The recovery trench is located immediately downgradient of the contaminant source. Its purpose is to reduce the levels of contaminants migrating toward the containment trench. The containment trench is located downgradient at the property boundary to recover dissolved VOCs in groundwater and to prevent the further off-site migration of contaminants. Both trenches are completed to a depth below the contact of the clayey shale and shale interface to insure the collection of any contaminants perched on the shale. Groundwater is extracted from the trenches and stored on-site in a 500,000 gallon storage tank, Tank V-69. The collected groundwater is treated through carbon adsorption by the Facility prior to permitted discharge to the City of Tulsa Publicly Operated Treatment Works (POTW) on a batch basis after treatment. A more detailed discussion of the system is provided in Section 13.3.

13.2.6. SITE-SPECIFIC TARGET LEVELS (SSTLS)

On July 12, 1996, Laidlaw submitted a report to the ODEQ entitled *Groundwater Site-Specific Target Level Assessment, Treatment and Recovery Services, Tulsa, Oklahoma, Volumes I and II.* This document proposed site-specific groundwater target levels for the groundwater in the clay-clayey shale units at the Facility and a technical rationale for the SSTLs. The SSTLs were determined for eight chemicals of concern both on-site (which included the Facility and the immediately surrounding property owned by the Facility) and off-site (non-Facility-owned property).

Laidlaw received approval with modifications for the SSTL report in the ODEQ's letter dated February 24, 1997. A revised SSTL document and cover letter were prepared, both dated May 8, 1997, that incorporated the ODEQ modifications. Laidlaw received a draft letter dated December 16, 1997 from the ODEQ allowing for the establishment of SSTLs for chemicals of concern both on-site and off-site from the Laidlaw Facility. On March 20, 1998, Laidlaw prepared a letter to the ODEQ requesting clarification of the SSTLs listed in the draft letter.

On August 5, 1998, Safety-Kleen (as successor to Laidlaw) received approval from the ODEQ for the SSTLs proposed in Table 9 of the revised SSTL document (1997). The approved SSTLs are set at ten times the maximum concentration levels (MCLs) for the off-site chemicals of concern (COCs) and tens to several

tens times drinking water MCLs for the on-site COCs. The off-site SSTLs approved by the ODEQ are:

- Benzene 0.05 mg/L
- 1,1-Dichloroethylene 0.07 mg/L
- 1, 4-Dioxane 0.03 mg/L
- Methylene Chloride 0.05 mg/L
- Tetrachloroethylene 0.05 mg/L
- 1,1,1-Trichloroethane 2.0 mg/L
- Trichloroethylene 0.05 mg/L
- Vinyl chloride 0.02 mg/L

These are the VOC concentrations in groundwater that are acceptable to the ODEQ for an off-site receptor on the non-company owned property surrounding the Facility. The values for off-site COCs represent ten times their MCLs, with the exception of the value for 1,4-dioxane, for which a target level concentration of ten times the calculated RCRA Subpart-S Screening Level was used.

The on-site SSTLs are:

- Benzene 0.50 mg/L
- 1,1-Dichloroethylene 2.4 mg/L
- 1, 4-Dioxane 0.12 mg/L
- Methylene Chloride 0.25 mg/L
- Tetrachloroethylene 3.9 mg/L
- 1,1,1-Trichloroethane 37 mg/L
- Trichloroethylene 0.90 mg/L
- Vinyl chloride 0.14 mg/L

13.2.7. CORRECTIVE MEASURES STUDY

Following implementation of the Interim Measure, Laidlaw conducted and completed a Corrective Measures Study (CMS). On August 25, 1998, a *Corrective Measures Study (CMS) Report,* Appendix 3, Attachment 9, was submitted to the ODEQ. The report evaluated eight Corrective Measure alternatives for addressing the VOC contamination identified and delineated during the RFI and Interim Measures work. These measures included:

- Slurry trenches;
- Vertical recovery wells;

- Vertical dual-phase recovery wells;
- Horizontal recovery wells;
- A trench recovery system;
- Enhanced liquid bioremediation;
- Air sparging;
- Reaction wall technology; and
- Continued operation of the Interim Measure.

The Corrective Measures were evaluated based on the following criteria:

- Protection of human health and environment;
- Ability to attain Corrective Measures objectives (i.e. SSTLs);
- Control of sources of release;
- Compliance with applicable waste management standards;
- Long-term reliability and effectiveness;
- Reduction in toxicity, mobility, and volume of waste;
- Short-term effectiveness; and
- Cost-effectiveness.

The alternative which best met the Corrective Measure objectives was the continued operation of the Interim Measure. The Interim Measure was designed to hydraulically contain the VOCs in groundwater on-site and to remediate the saturated zone in the clay-clayey shale unit to the ODEQ-approved site-specific target levels. Consequently, it was recommended in the CMS Report that the existing Interim Measure be used as the final remedy for addressing the VOCs in the clay-clayey shale unit. This recommended approach was approved by the ODEQ in an October 13, 1998 letter to Safety-Kleen (Tulsa), Inc.

13.2.8 SUPPLEMENTAL CORRECTIVE MEASURES WORK PLAN

In July 2020, Clean Harbors Tulsa Disposal, LLC submitted a *Supplemental Corrective Measures Work Plan (CMWP)* for the purpose of source removal within Solid Waste Management Unit 1 (SWMU 1) through soil excavation. The desired goal was removal of approximately 75% of the mass of chemicals of concern (COCs) within the vadose zone and saturated soils with SWMU 1. In addition, the plan anticipated demonstration that the soils within the excavation zone did not exceed onsite target soil concentrations based on U.S. EPA Universal Treatment Standards for non-wastewater (UTS), U.S. EPA Regional Screening Levels (RSLs) for industrial soil if no UTS is available, or an alternative treatment standard such as 10X the UTS where applicable. The purpose of this comparison is to show that soils within the excavation footprint are not a hazardous waste and are eligible for special handling.

Following review by ODEQ and incorporation of revisions requested, Tulsa Disposal LLC received approval to implement a revised CMWP via letter from ODEQ dated January 26, 2021. Implementation of the approved CMWP was initiated on April 8, 2021, and consisted of well abandonments, concrete removal, soil excavation, and soil disposal. On April 8-9, four groundwater monitor wells and 35 ISBR wells were abandoned by a licensed OK well driller in accordance with applicable OK regulations (Figure 4). Well abandonment was completed by Mohawk Drilling and was completed on April 9, 2021. From the period April 12 – April 27, 2021, in preparation for subsurface excavation activities, surface concrete, asphalt, and other surface obstructions were demolished and stockpiled on-site. From the period April 28 – August 11, 2021, approximately 6,700 cubic yards of soil was excavated as described in the approved CMWP and sent to American Environmental Landfill (AEL) in Sand Springs, OK for disposal. This volume represented 450 truckloads totaling 10,025 tons for disposal at AEL. Soils were direct-loaded for disposal as described in CMWP. An additional 135 cubic yards of soils was excavated, stockpiled on-site, sampled for VOC's and used in combination with offsite fill to back fill the excavation. Approximately 7,000 cubic yards of soil was used to backfill the excavation.

Tulsa Disposal, LLC submitted the *Supplemental CMWP: Soil Excavation Report* to ODEQ for review and approval on November 17, 2021 and additional information on January 27 and 28, 2022. Oklahoma Department of Environmental Quality approved this report detailing the excavation activities on February 22, 2022. Full details of the implementation of the CMWP are provided within the *Supplemental CMWP: Soil Excavation Report*.

13.3. CORRECTIVE MEASURE

13.3.1. SYSTEM OBJECTIVES AND OVERVIEW

The Corrective Measure objectives as presented in the CMS include:

- Containing the contaminant, and
- Removing contaminant mass to the greatest extent practicable.

The Corrective Measure consists of one containment trench along the north and west perimeter of the Facility and one recovery trench near the VOC source area at SWMU 1. The conceptual design of the Corrective Measure was presented in the ODEQ-approved *Interim Measure Plan* dated March 1995. The groundwater extraction trenches were completed on July 2, 1996 and began operating on October 9, 1996. The locations of the containment trench and recovery trench are presented in Appendix 2, Figure 9.

The containment trench is 540 feet in length and is located downgradient of the probable on-site source areas at the property boundary. It recovers dissolved VOCs in groundwater to prevent the further off-site migration of contaminants. The containment trench consists of 10 trench-observation wells (TOW-A

through TOW-J), filter media, perforated conduit at the bottom of the trench, three recovery sumps (RS-1, RS-2, and RS-3), mechanical and operational controls, and double-containment discharge piping. The trench observation wells are used to monitor groundwater levels in the trench during the course of groundwater extraction.

The recovery trench is 70 feet in length and is located immediately downgradient of the probable source area in the former solvent recycling plant. Its purpose is to reduce the levels of contaminants migrating toward the containment trench. The recovery trench consists of four trench-observation wells (TOW-K through TOW-N), filter media, perforated conduit at the bottom of the trench, a recovery sump (RS-4), mechanical and operational controls, and double containment discharge piping. Each of the four recovery sumps consists of a recovery sump and an immediately adjacent piezometer for measuring groundwater levels.

To capture perched contaminants, both trenches are completed to a depth below the contact of the clayey-shale and shale interface where the pooling of contaminants would be expected. Contaminated groundwater is recovered by operating the submersible total-fluids recovery pumps in each recovery sump. The relatively porous filter media, perforated conduit, and trench bottoms with slopes directed toward each of the four sumps allow groundwater to flow toward each recovery sump within both trenches.

The groundwater is pumped from the trenches to a 500,000-gallon on-site storage tank, Tank V-69. The collected groundwater is treated through carbon adsorption, and the treated water is discharged to the City of Tulsa Publicly Operated Treatment Works (POTW). The groundwater is discharged in compliance with the POTW discharge permit obtained from the City of Tulsa Public Works Department, Industrial Pretreatment Section.

13.3.1.1. SYSTEM OPERATIONAL CONTROLS

The recovery system is equipped with process controls to operate the recovery pumps and notify maintenance personnel when alarm conditions exist. The pump controls and alarm notification device are installed in the control panel near the northwest corner of the former solvent recycling plant (see Appendix 2, Plate 2). Pump controls and safety interlocks are processed by a programmable logic controller (PLC), which is housed in the control panel. The PLC can be programmed for different operational configurations which allows the groundwater recovery system to be modified or upgraded with relative ease.

A pressure sensor controls operation of the recovery pump in each well. The pressure sensor has an operating range of approximately 12 inches. When the water level increases in the recovery sump the pressure sensor monitors the pressure caused by the water level above the pressure sensor. When the water level increases above the actuation pressure of the pressure sensor, a signal is sent to the PLC. The PLC

then turns the recovery pump "ON". When the water levels drop below the operating range of the pressure sensor, the PLC turns the pump "OFF". To minimize cavitation, and provide adequate pressure head for priming the recovery pumps, the lower operating range of the pressure sensor in each recovery sump has been placed several inches above the intake of each pump.

Five alarm conditions are monitored on the recovery system:

- Loss of electrical power;
- High fluid level in any recovery well;
- High fluid level in vaults RS-1 and RS-3;
- High fluid levels in vaults RS-2 and RS-4; and
- High water pressure in the discharge piping.

Alarm conditions are monitored via an automatic telephone dial-up system which notifies maintenance personnel when one of the alarm conditions exists. In the event of a power outage, the phone monitoring system will switch to an alternate power source and notify maintenance personnel that the power is off.

If a recovery pump should fail to operate properly or a discharge line becomes clogged, the high level alarm in the recovery well will be activated. This alarm will allow the recovery pump to continue operating, but will notify maintenance personnel that this alarm condition exists.

A high fluid level alarm condition from either recovery vault RS-1 or RS-3 indicates that rainwater may have collected in one of the vaults. This alarm will notify maintenance personnel, but will allow all of the recovery pumps to continue operating.

A high fluid level alarm condition from vault RS-2 or RS-4 indicates that rainwater has collected in these vaults or that a discharge line has ruptured. Since a ruptured discharge line would eventually cause the recovered water to overfill the double containment system, an alarm from RS-2 or RS-4 disrupts power to the recovery pumps and the phone monitoring system notifies maintenance personnel that this alarm condition exists.

Groundwater recovered by the system is pumped by the recovery pumps to a 500,000-gallon storage tank (Tank V-69). The storage tank is equipped with a high-level shut-off valve. When the shut-off valve is actuated, the recovery pumps create an increase of water pressure in the discharge piping. In recovery vault RS-4, a pressure sensor, mounted on the discharge piping, detects an increase in pressure. When a high-pressure signal is detected, the PLC shuts off the recovery pumps and starts a 1-hour timer. After one hour has elapsed, the pumps will re-start. If high pressure does not develop in the discharge line, the pumps will continue to operate until another high pressure event occurs. If eight or more high-pressure events occur in a ten-hour period, then the recovery pumps will be turned off and an alarm will be sent to the maintenance personnel. The pumps will not re-start until the PLC is manually reset.

13.3.2. CORRECTIVE MEASURE MONITORING PROGRAM

The Corrective-Measure monitoring program at the Facility was approved by ODEQ separately from the permit on October 13, 1998. It consists of measuring flow volumes from the two groundwater extraction trenches, measuring groundwater levels, collecting groundwater samples, analyzing the groundwater samples for VOCs, and performing operation and maintenance activities related to the groundwater extraction system. Prior to the start-up of the Interim Measure extraction system on October 9, 1996, baseline groundwater monitoring was conducted between June 24 and 29, 1996. These data were collected to document the pre-pumping groundwater surface and VOC distribution in groundwater.

Groundwater-level and analytical data were collected quarterly between June 1996 and December 1998. Pursuant to the approval of Mr. Greg Garber of the ODEQ in April 1999, the monitoring schedule has been changed to semi-annually. The semi-annual reports will be submitted in July and January of each calendar year, covering the first half and second half of the year, respectively.

In the CMS and subsequent monitoring reports, it has been demonstrated that the containment and recovery trenches maintain hydraulic control of the on-site portion of the VOC plume and effectively remove significant VOC mass from groundwater. As demonstrated by the monitoring events since the start-up of the trench recovery system in June 1996, the VOC plume has steadily and consistently decreased in area and concentration compared to the June 1996 plume. This indicates that the trench recovery system is hydraulically controlling the migration of the VOC plume and recovering significant contaminant mass, as presented in greater detail in Section 13.4.

The monitoring well network is part of the ODEQ-approved Corrective Measure and consists of 37 wells and associated sumps and recovery trench wells. These wells were originally installed for site investigation purposes. The well network is currently sampled and monitored in accordance with the ODEQ-approved Corrective Measure using on-site and off-site monitoring wells to observe system performance and attainment of the SSTLs. The wells have been selected based on their location relative to the groundwater plume, current and past VOC concentrations, and groundwater gradient under pumping and pre-pumping/static conditions. To monitor the continued effectiveness of the Corrective Measure system to hydraulically contain the impacted groundwater at the site, all of the existing monitoring wells will be monitored for fluid-levels during each semi-annual monitoring event. In addition, groundwater samples will be collected from on- and off-site wells.

Off-Site (Outside Facility Fenceline) Corrective Action Monitoring Wells

The following wells will be used as off-site monitoring points: MW-20, MW-23, MW-24, MW-25, MW-36, MW-37, MW-38, MW-39, MW-40, MW-41, MW-42, and MW-43. These wells are located downgradient and off-site of the containment recovery trench. The wells will be used to demonstrate

attainment of the off-site SSTLs, and the containment of the VOC plume.

On-Site (Inside Facility Fenceline) Corrective Action Monitoring Wells

The following wells will be used as on-site monitoring points: MW-1, MW-3, MW-5, MW-8, MW-10, MW-11, MW-12, MW-13, MW-14, MW-21, MW-22, MW-26, MW-28, MW-29, MW-30, MW-31, MW-32, MW-33, MW-34, and MW-35. These wells are located on-site and upgradient of the containment recovery trench and include the wells with the historically highest total VOC concentrations (e.g. well MW-29), in addition to wells with intermediate to low concentrations located between the source recovery trench and the containment trench. The selected wells will provide an accurate depiction of the VOC plume on a semi-annual basis, and will allow demonstration of progress toward the on-site SSTLs.

ODEQ granted permission on March 4, 204 to plug and abandon monitoring wells MW-7 and MW-9 thus permanently eliminating them from the monitoring program. These wells would be decommissioned, plugged, and abandoned in accordance with the ODEQ standards. The rationale for eliminating these two wells from the semi-annual monitoring program is presented below:

Decommissioning of Deep Monitoring Well MW-7

Tulsa Disposal, LLC proposed that MW-7, screened within the Coffeyville Shale, be abandoned to remove the potential for preferential vertical VOC migration from the upper clay and clayey shale units into the underlying bedrock shale unit. Of special concern was the possibility that VOCs could enter the well and migrate down into the hydraulically separate Coffeyville Shale. It was proposed that MW-7 be decommissioned, plugged, and abandoned in accordance with ODEQ requirements to prevent this well from potentially serving as a conduit from the shallow clay-clayey shale unit into the underlying shale. Although MW-7 showed a decreasing VOC trend (see the total VOC concentration vs. time plot for this well in Appendix 2), Tulsa Disposal, LLC felt that the well may be detrimental to the on-site cleanup. Based on the one-sided Mann-Kendall statistical test for trends, a downward trend was evident from March 1994 through March 2003 with a statistical significance greater than 95%. The well underwent abandonment procedures in July 2005.

Decommissioning of Shallow Monitoring Well MW-9

The Facility also proposed that MW-9 be decommissioned, plugged, and abandoned. Installed early in the site characterization process, it was completed to only 10 feet below ground surface and contains groundwater only sporadically, generally during summer sampling events. MW-9 has historically been gauged for groundwater level, but it has not been sampled since June 1995 since it produces inadequate sample volumes. Moreover, well MW-9 is immediately adjacent to a newer well, MW-32, which was completed to the shale and thus yields representative water samples on a consistent basis. During the sampling events in which it has been possible to analyze the groundwater from the MW-9, the concentration of constituents were in all cases non-detectable, while MW-32 has generally shown total VOC concentrations greater than 10 mg/l. MW-9 was plugged and abandoned in July 2005 and replaced by MW-

32.

Appendix 3, Attachment 3 provides the detailed groundwater Sampling and Analysis Plan (SAP) presenting the field methodologies implemented during the semi-annual events as part of the Corrective Measure. As with all aspects of the Corrective Measure, the SAP can be amended without requiring modification of the permit. However, the SAP is provided for informational purposes.

The sections below provide only a general overview of the monitoring program as a preliminary to the discussion of the demonstration of adequacy of the Corrective Measure and the program for the attainment of site-specific target levels presented in Sections 13.4 and 13.5, respectively. For specifics, reference is made to the SAP.

13.3.2.1. GROUNDWATER SAMPLING

Groundwater samples are collected in accordance with the SAP. Prior to sampling, the depth to groundwater is measured in all applicable on-site and off-site wells, in each of the fourteen trench observation wells (TOW-A through TOW-N), and in the four trench-sump observation wells (RS-1 through RS-4). Prior to sampling, a minimum of three casing volumes are purged from each well except in those wells in which water recovery is extremely slow.

The samples are to be analyzed for VOCs by EPA Method 8260, at an ODEQ-certified analytical testing laboratory. Quality Assurance/Quality Control (QA/QC) samples are also collected and analyzed in accordance with the SAP.

13.3.2.2. CORRECTIVE MEASURE OPERATION AND MAINTENANCE

The operation and maintenance program, Appendix 3, Attachment 10, consists of collecting flow and volume readings, routine maintenance of the system, and groundwater treatment and discharge in accordance with regulatory agency requirements. Cumulative flow readings of the volumes of groundwater pumped from the trenches are collected as part of program. Flow meters are positioned at the discharge point of each recovery sump and in the discharge line after the flow from all sumps is combined. The groundwater recovered from the two trenches is pumped to Tank V-69. The facility is responsible for managing the recovered groundwater pumped to the storage tank. The groundwater pumped from the trenches is treated through the carbon adsorption system prior to discharge to the POTW. When collecting flow readings, the amount of water stored in the tank is also recorded.

Details regarding monthly maintenance and monitoring are included in each semi- annual report prepared for the Facility.

13.4. DEMONSTRATION OF ADEQUACY OF CORRECTIVE MEASURE

This section presents a summary of the adequacy of the Corrective Measure at achieving CMS objectives. As discussed in detail below, the containment and recovery trenches continue to maintain hydraulic control of the on-site portion of the VOC plume and to effectively remove significant VOC mass from groundwater. The results from the groundwater monitoring program underscore the significant reduction in VOC mass in the water-bearing zone beneath the Facility since the trench recovery system began full-time operation in October 1996. Since this time, the VOC plume has steadily and consistently decreased in area and concentration while the system has recovered significant contaminant mass.

13.4.1. TRENCH HYDRAULICS

Appendix 2, Figure 10 presents a contour map of the pre-pumping (June 1996) groundwater surface at the Facility. The direction of natural groundwater flow under non-pumping conditions for the shallow, unconfined aquifer is predominantly to the west along the western portion of SWMU 1 and to the north-northwest in the north portion of the solid waste management unit. Appendix 2, Figure 11 presents the groundwater surface at the Facility and off-site in April 2015, the first semi-annual monitoring event for 2015. In Appendix 2, Figures 10 and 11, it is apparent that the regional groundwater flow direction and hydraulic gradient are significantly affected by groundwater pumping from the two trenches.

In April 2015, the groundwater elevation difference between trench observation wells TOW-K through TOW-N and the monitor wells adjacent to the recovery trench (MW-6, MW-26, and MW-27) was approximately 11 feet. This result indicates that the hydraulic gradient towards the recovery trench is extremely steep.

The differences in groundwater elevations between the containment trench and adjacent monitoring wells are less dramatic than those at the recovery trench, but are still significant. The differences in the groundwater elevations between the containment trench and adjacent wells MW-10, MW-11, MW-12, and MW-32 ranged from approximately 2 to 10 feet in April 2015 (Appendix 2, Figure 11). The results indicate relatively steep hydraulic gradients towards the containment trench.

13.4.2. GROUNDWATER ANALYTICAL RESULTS

The comprehensive groundwater analytical results indicate that the VOC plume at SWMU 1 has not migrated off-site at levels above SSTLs for individual VOCs along the western property line or western edge of SWMU 1. Prior to installation of the recovery system, the plume had, however, migrated beyond

46th Street South approximately 150 feet north of SWMU 1, at levels above SSTLs for selected VOCs. Since the June-1996 baseline sampling event, the trench recovery system has been effective in minimizing and reducing further migration of the leading edge of the plume, and containing the plume on company property as well. This is illustrated in Appendix 2, Figures 12 and 13, which present the distribution of total VOCs in shallow groundwater at SWMU 1 and off-site in June 1996 (baseline sampling event) and April 2015, respectively. The analytical results indicate that the Corrective Measure trenches are significantly reducing chemical concentrations in groundwater.

13.4.3. GROUNDWATER PUMPING AND VOC RECOVERY

To estimate the amount of contaminants recovered by each of the four recovery sumps, groundwater volume readings are collected on a weekly basis and groundwater samples are collected from each recovery sump discharge on a semi-annual basis. Groundwater volume readings and cumulative groundwater recovery estimates are compiled semi-annually along with VOC mass recovery of the individual contaminants based on samples collected from sample ports of RS-1, RS-2, RS-3, and RS-4. Between full-time system start-up in October 1996 and June 2015, a total of 213 Kg of VOC contaminant mass was recovered. The amount of mass recovered calculates to an annual recovery rate of approximately 11.4 Kg per year. The cumulative amount of groundwater recovered from the Corrective Measure recovery trenches for the above time period has been approximately 20,600,000 gallons.

13.4.4. IN-SITU BIOLOGICAL REACTOR (ISBR)

To expedite attainment of SSTLs and closure of the site, an in-situ biological reactor (ISBR) pilot-scale system was proposed to ODEQ in the In-*Situ Field Treatability Study and Bioplug Testing Workplan* dated March 1, 2007. An ISBR is a patented immobilized microbial bioreactor used for in-situ bioremediation of impacted soil and groundwater. The pilot system, consisting of two ISBR wells, was installed and the results of the study were presented in the *2009 First Semi-Annual (January – June) Groundwater and Corrective Measure Monitoring, and In-Situ Biological Reactor Pilot Test Summary Report*. An *Addendum to Corrective Measures Study* (CMS) *Report: Bioaugmentation of Groundwater Trench Recovery System Using In-Situ Biological Reactors* was submitted to ODEQ on August 20, 2010. The CMS addendum proposed augmenting the trench recovery system with additional ISBR wells in the primary source area to address the impacted groundwater at the site. The CMS addendum was approved by the ODEQ in its October 4, 2010 letter to Clean Harbors.

In response to an ODEQ request, Clean Harbors submitted a Class 1 Permit Modification, dated July 8, 2014, to the ODEQ for the planned ISBR Interim Measure system that will be used to augment the existing groundwater Corrective Measure at SWMU 1. The permit modification was submitted in accordance with Code of Federal Regulations (CFR) 270.42(d)(1) and pursuant to the ODEQ's request in its May 8, 2014, letter to Clean Harbors addressing the implementation of the ISBR Interim Measure. The permit

modification included a description of the planned ISBR Interim Measure system and a general implementation schedule. The permit modification was based on the ODEQ-approved CMS Addendum.

Between August 3 and 14, 2015 and September 7 through 10, 2015, a total of 35 ISBR wells were installed and developed at the site, in accordance with the Class I Permit Modification. The ISBR system will augment the existing trench recovery system and remediate soil and groundwater impacted by the full suite of COCs in the source area beneath the North Drum Pad, Former Solvent Recycling Plant, and other areas of the site exceeding groundwater SSTLs. The design of the full-scale system was based on the operational and performance data gathered during the pilot scale demonstration. The 35-well ISBR system is scheduled to undergo startup testing in November 2015 and become fully operational in December 2015, augmenting the existing groundwater trench recovery system.

Pursuant to the approved *Supplemental CMWP* (July 2020 revised), the ISBR Interim Measure system was removed from service. On April 8-9, 2021, four groundwater monitor wells and 35 ISBR wells were abandoned by a licensed OK well driller in accordance with applicable OK regulations. Details of the removal activities are provided in the *Supplemental CMWP: Soil Excavation Report (November 2021).*

Tulsa Disposal LLC maintains an active pumping system from the on-site recovery and containment trenches to expedite attainment of the groundwater SSTLs and closure of the facility.

13.4.5. SUMMARY

Based on years of site monitoring, it is concluded that the system is operating effectively and meeting the CMS objectives of source removal and hydraulic containment while protecting human health and the environment. The trenches are maintaining hydraulic control of the on-site portion of the VOC plume in groundwater. The results from the hydraulic steady-state capture zone modeling in the CMS show that the containment and recovery trenches together intercept the entire VOC plume on the Facility property and most of the plume off the boundary. The results from the monitoring program indicate decreasing VOC trends in most of the monitoring wells at the Facility.

The containment and recovery trenches continue to effectively remove significant VOC mass from groundwater. During the sampling events, the VOC plume has steadily and consistently decreased in area and concentration compared to the June 1996 plume. This indicates that the trench recovery system is hydraulically controlling the migration of the VOC plume and recovering significant contaminant mass. The additional removal of approximately 6,700 cubic yards of impacted source soils from the area of SWMU 1 pursuant to the implementation of the Supplemental CMWP should further aid in the reduction the Chemicals of Concern to site specific target levels.

13.5. ATTAINMENT OF CORRECTIVE MEASURES OBJECTIVES

This section presents a discussion of the criteria to be used to demonstrate that corrective action is complete. In as much as the Corrective Measure was approved separately from the permit, operation of individual components of the Corrective Measure may be modified and/or ceased, with ODEQ approval and without requiring a permit modification, to optimize the system performance. Thus, the recovery trench might remain in operation longer than the containment trench, or vice versa. In addition, the operating components of the system may be shut down for periods of time to determine if rebound of COC concentrations occur. However, termination of the corrective action program will be determined based on:

- The verification of attainment of the ODEQ-approved SSTLs, or
- When it can be demonstrated that further reducing contaminant mass is no longer feasible, or
- Receipt of a "no further action" letter from ODEQ.

The Corrective Measures objectives (Subsection 13.3.1) are currently being met by the recovery system. The Corrective Measure objectives target both the VOC source and the solute-phase contaminants, while at the same time providing for the protection of human health and the environment and complying with waste management standards. The SSTLs provide thresholds to be met and verified to determine that the corrective action program can be terminated unless it can be demonstrated that reducing contaminant mass is no longer feasible or ODEQ issues a "no further action" letter.

As with all aspects of the Corrective Measure, the determination that Corrective Measures objective have been met are not part of this permit and can be made separate from it with ODEQ approval.

13.5.1. ATTAINMENT OF ON-SITE TARGET LEVELS

The Corrective Measure at the Facility will continue to operate until all wells in the groundwater monitoring program are below the on-site SSTLs listed in Subsection 13.2.6 for two consecutive groundwater monitoring events, when it can be demonstrated that reducing contaminant mass is no longer feasible, or ODEQ issues a "no further action" letter. The first monitoring event providing evidence of contaminant concentrations below SSTLs will be considered preliminary until the second event verifies that the on-site SSTLs have been attained for all eight of the chemicals of concern. At that time the recovery and containment trench recovery system will be shut-off. The system will not be decommissioned, however, until further groundwater monitoring verification has been completed, as presented below.

13.5.2. ATTAINMENT OF OFF-SITE TARGET LEVELS

Once the on-site target levels have been attained and the Corrective Measure has been turned off, natural attenuation will be employed to reduce contaminant levels to below off-site SSTL concentrations. Natural attenuation, resulting from the combined effects of dispersion, retardation, and decay due to biodegradation, takes advantage of nature's ability to intrinsically remediate or degrade VOCs. From the SSTL document, the receptor was a hypothetical irrigation water supply well located 107 meters (351 feet) downgradient from SWMU 1. Thus, once cleanup to the on-site target levels was achieved, chemical concentrations are required to be below off-site groundwater target level concentrations before reaching this hypothetical worst-case receptor. The VOC concentrations in groundwater that were acceptable to the ODEQ for the hypothetical off-site receptor are presented in Subsection 13.2.6.

To provide field verification that the concentrations of the chemicals of concern do not exceed the target concentrations downgradient of SWMU 1, it is proposed that the on and off-site monitoring wells be monitored semi-annually for two years after completion of active remediation and shutdown of the system. This monitoring could be completed as part of the post-closure monitoring for the Facility. The wells will comprise a sentinel well network to verify that off-site target levels are not being exceeded. If the off-site target levels presented in Subsection 13.2.6 above are exceeded in any of these wells, then appropriate contingency action would be taken with the concurrence of ODEQ. In this case, the Corrective Measure could be turned back on or the risk assessment reevaluated to determine what concentrations would be considered acceptable at this distance from the hypothetical closest future receptor. The ODEQ would be contacted in the event of an off-site SSTL exceedance and discussions pursued to determine appropriate contingency action.

13.5.3. DECOMMISSIONING OF CORRECTIVE MEASURE

If after two years, there was no exceedance of an off-site SSTL in any one of the wells presented above, when it can be demonstrated that reducing contaminant mass is no longer feasible or ODEQ issues a "no further action" letter, then the Corrective Measure system would be decommissioned permanently, and closed in accordance with the Closure Plan in Tab XI.

13.5.4. SUMMARY

In summary, the Corrective Measure approach presented above is consistent with EPA guidance and is protective of public health and the environment. It does not pose any unacceptable potential health risks to future potential irrigation water well receptors in the area. The approach provides a level of protection of human health and the environment that is consistent with anticipated future land use and does not inappropriately exceed the level of protection required. It incorporates a monitoring system that can provide

early warning if levels potentially exceed those that could be expected downgradient of the Facility. This will provide sufficient time to design contingent response action, should such action be necessary.