

Five-Year Review Report

**First Five-Year Review Report
for the
Oklahoma Refining Company Superfund Site
Cyril, Caddo County, Oklahoma**



July 2002

**United States Environmental Protection Agency
Region 6
Dallas, Texas**

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FIVE-YEAR REVIEW
Oklahoma Refining Company Superfund Site
EPA ID# OKD091598870
Cyril, Caddo County, Oklahoma

This memorandum documents the United States Environmental Protection Agency's (EPA's) performance, determinations, and approval of the Oklahoma Refining Company Superfund Site First Five-Year Review, provided in the attached First Five-Year Review Report prepared by CH2M Hill, Inc., on behalf of EPA.

Summary of Five-Year Review Findings

Based on this five-year review, it appears that remedial action at the site set forth in the decision documents has been implemented as planned and is protective of human health and the environment. The remedial action construction completion report must be submitted, and review of this document to confirm completion of remedial action should be included in the next five-year review. An operation and maintenance plan, and a monitoring plan for long term ground water and surface water monitoring should be prepared and implemented. In addition to establishing wells to be monitored and procedures for monitoring ground water and LNAPL levels, this monitoring plan should include sampling of discharge from observed seeps and the surface water of Gladys Creek, as well as procedures to address maintenance of both on and offsite monitoring wells, and at a minimum, annual review of the monitoring results. Also, the plan should define monitoring criteria that will indicate the need for additional monitoring and/or further action, if necessary. Protective monitoring well casing for wells located offsite north of Highway 277 has been damaged by corrosion and needs to be repaired to restrict trespasser access to these wells, or alternatives for restricting trespasser access should be pursued (such as fencing around individual wells). Addressing these issues is necessary to ensure the remedy continues to be protective.

Actions Needed

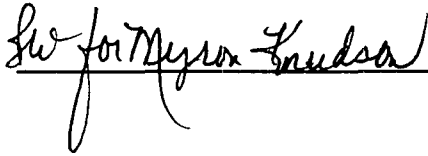
The remedial action construction completion report must be submitted. Review of this document should be included in the next five-year review. An operation and maintenance plan for the wastes remaining in place and a monitoring plan for long-term ground water and surface water monitoring should be prepared and implemented. The monitoring plan should include sampling of discharges from observed seeps and the surface water of Gladys Creek, as well as procedures to address maintenance of both on and offsite monitoring wells, and at a minimum, annual review of the monitoring results. Also, the plan should define monitoring criteria that will indicate the need for additional monitoring and/or further action, if necessary. Protective monitoring well casing for wells located offsite north of Highway 277 has been damaged by corrosion and needs to be repaired to restrict trespasser access to these wells, or alternatives for restricting trespasser access should be pursued (such as fencing around individual wells).

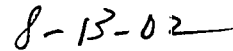
Determinations

I have determined that the remedy for the Oklahoma Refining Company Superfund Site is protective of human health and the environment, and will remain so provided the action items identified in the Five-Year Review Report are addressed as described above.

Myron O. Knudson, P.E.
Director, Superfund Division
U.S. Environmental Protection Agency, Region 6

Date





CONCURRENCES

FIVE-YEAR REVIEW

Oklahoma Refining Company Superfund Site
EPA ID# OKD091598870

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By: Joseph C. Compton, III Date: 24 July '02
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Pam Phillips, U.S. EPA
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List of Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
CAA	Clean Air Act
CAFO	Consent Agreement and Final Order
CAP	Corrective Action Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cm	centimeter
CPC	Cyril Petrochemical Corporation
CWA	Clean Water Act
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FR	Federal Register
LNAPL	Light Non-Aqueous Phase Liquid
LTU	Land Treatment Units
MCL	Maximum Contaminant Level
mg/l	milligrams per liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
ODEQ	Oklahoma Department of Environmental Quality
O&M	Operation and Maintenance
ORC	Oklahoma Refining Company
OSDH	Oklahoma State Department of Health
OUs	Operable Units
OWRB	Oklahoma Water Resources Board
PAHs	Polycyclic Aromatic Hydrocarbons
ppb	parts per billion
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SVOC	Semi-Volatile Organic Compound
TBCs	To Be Considered Compounds
TDS	Total Dissolved Solids
VOC	Volatile Organic Compound

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Executive Summary

The first five-year review of the Oklahoma Refining Company Superfund Site (“the Site”) located in Cyril, Caddo County, Oklahoma, was completed in July 2002. The results of the five-year review indicate that the remedy completed to date is currently protective of human health and the environment. Overall, the remedial actions performed appear to be functioning as designed, and the portions of the Site addressed by this five-year review have been maintained appropriately. No deficiencies were noted that currently impact the protectiveness of the remedy, although several recommendations for further action to ensure the continued protectiveness of the remedy have been identified. A report documenting performance and completion of the remedy is pending, as is the long-term ground water monitoring plan for the Site.

The Oklahoma Refining Company (ORC) Superfund Site consists of two areas: the abandoned portion of the property, and the Cyril Petrochemical Company (CPC) portion of the Site (a refinery, active off and on until 1994, and currently owned by CPC). An initial removal action was performed by EPA in 1991 for both portions of the Site. The Record of Decision for the Site was signed June 9, 1992. The Oklahoma State Department of Health entered into a Consent Agreement and Final Order (CAFO) with CPC for its portion of the Site on January 28, 1992. Under the CAFO, CPC was to address ground water contamination, stormwater drainage, and above- and below-ground storage tanks. In 1993, the new Oklahoma Department of Environmental Quality (ODEQ) assumed the OSDH responsibilities for the Site. CPC finally ceased operations on its portion of the property in 1994. The CAFO has not been implemented, and negotiations with CPC under RCRA are ongoing. The scope of this five-year review is for the abandoned portion of the Site.

The ROD specified a remedy for the Site which consisted of the following major components: insitu bioremediation of organic-contaminated sediments; insitu stabilization and capping of inorganic-contaminated sediments; removal of all onsite surface water from impoundments; treatment of all contaminated surface water taken from onsite impoundments in an onsite treatment facility; prepared-bed biotreatment of contaminated sediments and soil that could not be treated insitu followed by

stabilization, if necessary, and containment of treated residuals; excavation and containment of contaminated sediments and soil that exceeded health-based levels; excavation and neutralization of low pH sediments, followed by placement of treated materials as fill in area of origin; and excavation and recycling of asphaltic materials. The excavations involved removal of soil/sediment above target action levels set for the residential and commercial properties now present at the Site. For ground water, the ROD specified: removal and recycling of primarily petroleum-based light non-aqueous phase liquids (LNAPLs) mixed with hazardous waste from the ground water; containment of contaminated ground water using interceptor wells to prevent migration; and treatment of all collected ground water in the onsite treatment facility, with reinjection of all treated water (including both ground water and surface water) to contaminated portions of the aquifer to enhance any naturally-occurring insitu bioremediation of the ground water.

In March 1996, after approximately 60% completion of the remedial design of the ROD-specified remedy, an Explanation of Significant Differences (ESD) describing revisions to the ROD-specified remedy was signed. The significant differences between the revised remedy and the remedy selected in the ROD were:

- Stabilization and capping onsite of asphaltic materials rather than the recycling indicated by the ROD. No viable recycling option was identified during the preliminary stages of the remedial design. The ESD specified that stabilized asphaltic materials were to be placed on top of the pitch pits and capped.
- Postponement of the ground water portion of the remedy to a second construction phase. The ground water remedy selected in the ROD consisted of a line of containment wells to prevent discharge to Gladys Creek, construction and operation of an onsite water treatment facility, and reinjection of all treated water (including surface water) to contaminated portions of the aquifer to enhance insitu bioremediation. Field investigation activities performed during the initial stages of the remedial design, however, indicated that the ground water problems associated with LNAPL extent was less than originally defined. The ESD indicates that EPA and ODEQ believed that the risk posed by

contaminated ground water would be lessened by the source treatment and construction of a subsurface LNAPL trench, and the need for ground water treatment should be re-evaluated after completion of these activities.

- Construction of a temporary water treatment facility for treatment of only surface water instead of a surface water and ground water treatment facility and discharge of treated water to Gladys Creek instead of to the aquifer, as specified in the ROD. The ROD specified that onsite water (including ground water and surface water) would be treated in an onsite water treatment facility, and the discharge injected into the aquifer to enhance insitu bioremediation of the aquifer. The decision to postpone the ground water portion of the remedy, however, meant a permanent onsite water treatment facility would not be constructed during the surface remedy. However, treatment and discharge of treated water would still be necessary during performance of the surface remedy (for dewatering of surface impoundments and collection of storm water). The ESD specified construction of a temporary water treatment facility and discharge to Gladys Creek. The ESD also set discharge limits for Gladys Creek. The temporary treatment facility and discharge line were to be removed at the completion of the surface remedy.

Remedial action for the surface water and abandoned source areas was completed in October 2001. The final inspection was conducted on November 2, 2001. A second ESD, currently in draft form, was prepared to document changes incorporated during the implementation of the remedial action performed. The following is a summary of the changes indicated by the 2002 ESD:

- Further postponement of the ground water remedy, including the installation of the LNAPL trench specified by the 1996 ESD. The ESD specifies the postponement largely because of the presence of a continuing contaminant source upgradient on the CPC portion of the Site. Under the ESD, the ground water remedy is postponed until EPA Region 6 completes negotiations with CPC and a decision is made on remediation of the LNAPL plume under the CPC property, or until the ground water monitoring results indicate that the contaminated ground water threatens Gladys Creek.

- Removal of two railroad areas and Tank 177 area from the area to be remediated. It was found during remediation activities that the railroad's northeast and southern loading areas and Tank 177 areas had been included in the ROD in error; data collected during the original investigation did not exceed industrial RAOs, which should apply for these areas rather than the residential RAOs.
- Disposal of asphaltic materials and pitch pit materials off-site instead of on-site. Approximately 19,771 cubic yards of soil contaminated with asphaltic waste and 18,260 cubic yards of soil contaminated with pitch were disposed of at an off-site permitted landfill instead of being disposed on-site. During remediation activities it was determined that the pitch material would not support the intended cap material specified in the ROD, and the asphaltic waste was observed to have a propensity to flow. Addition of these materials to either of the site landfills could have compromised the structural integrity of the landfills.
- Approximately 21,000 cubic yards of metals-contaminated waste from AP-1 were unsuccessfully treated by stabilization, and evaluation of these wastes indicated that further stabilization would probably not be successful. The best solution was determined to be placement of this material in the site's hazardous waste landfill.
- The TCLP lead performance standard established in the ROD was 1.5 mg/L, based on an anticipated change in regulations. The rule change was never promulgated, and the regulatory limit for TCLP lead has remained at 5.0 mg/L. Consequently, the TCLP lead performance standard is changed in the 2002 ESD to 5.0 mg/L in accordance with the promulgated regulatory limits.
- The ROD required biotreated soils containing total metals concentrations exceeding RAOs established for direct contact hazard and/or protection of ground water to undergo chemical stabilization prior to placement. The analysis and decision protocol presented in the ROD evaluated all soils, regardless of their final disposal location, in the same way. Important differences between the potential hazards of soils with different final destinations were not addressed. The use of TCLP

testing to determine the need for stabilization resulted in a more protective remedy for soils capped on-site but not in the landfills.

- The ROD specified an RAO for beryllium at its method detection limit of 1.0 ppm. The action level for beryllium was raised from 1.0 pm to 2.0 ppm to minimize false positives and incorrect concentration results common at the method detection limit.
- Two of the ninety-eight process sewer junction boxes were not cleaned as part of the limited Superfund action on the CPC portion of the Site because these boxes were found to be structurally unsound.
- Remediation of the Tank # 1 area, on the CPC property, was halted due to the discovery of unexpected phenol soil contamination during excavation. Migration of odors offsite could not be controlled, resulting in complaints from nearby residents. Excavation was discontinued and the area was covered with eight to twelve inches of clean soil, eliminating further release of odors. No other remediation is planned by the ODEQ or EPA for this area. Under a Consent Order with the EPA, CPC is required to pursue additional investigation and/or remediation of this area.

Construction associated with the surface remedy for the abandoned portion of the Site was initiated in July 1997 and completed in October 2001. The final inspection was conducted on November 2, 2001. The completed remedy of the abandoned portion of the Site included the bioremediation of approximately 93,000 cubic yards of contaminated soil, neutralization of 16,000 cubic yards of contaminated soil, stabilization of 14,000 cubic yards of contaminated soil, and removal of 19,771 cubic yards of soil contaminated with asphaltic waste and 18,260 cubic yards of soil contaminated with pitch. As described in the 2002 ESD, two landfills, one hazardous and one non-hazardous, were completed. The EPA and ODEQ agree that all source remediation has been completed. Ground water remediation has not yet been completed. The EPA is currently in negotiations with CPC to address existing environmental problems under RCRA.

As part of the five-year review, existing documents and data were reviewed, a site inspection was conducted, interviews performed, and a review of standards conducted. Based on this five-year review, it appears that remedial action at the Site set forth in the decision documents has been implemented as planned and is protective of human health and the environment. The remedial action construction completion report must be submitted, and review of this document to confirm completion of remedial action should be included in the next five-year review. An operation and maintenance plan, and a monitoring plan for long term ground water and surface water monitoring should be prepared and implemented. In addition to establishing wells to be monitored and procedures for monitoring ground water and LNAPL levels, this monitoring plan should include sampling of the discharge from observed seeps and the surface water of Gladys Creek, as well as procedures to address maintenance of both on and offsite monitoring wells, and at a minimum, annual review of the monitoring results. Also, the plan should define monitoring criteria that will indicate the need for additional monitoring and/or further action, if necessary. Protective monitoring well casing for wells located offsite north of Highway 277 has been damaged by corrosion and needs to be repaired to restrict trespasser access to these wells, or alternatives for restricting trespasser access should be pursued (such as fencing around individual wells). Addressing these issues are necessary to ensure the remedy continues to be protective.

Five-Year Review Summary Form		
SITE IDENTIFICATION		
Site name (from WasteLAN): Oklahoma Refining Company		
EPA ID (from WasteLAN): OKD091598870		
Region: EPA Region 6	State: OK	City/County: Cyril, Caddo County
SITE STATUS		
NPL Status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify):		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Operating <input type="checkbox"/> Complete		
Multiple OUs? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Construction completion date: November 2, 2001	
Has site been put into reuse? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Portions of the site)		
REVIEW STATUS		
Reviewing agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency:		
Author: EPA Region 6, with support from RAC6 contractor CH2M HILL		
Review period: July 1997 through May 2002		
Date(s) of site inspection: April 25, 2002		
Type of review: <input checked="" type="checkbox"/> Statutory <input type="checkbox"/> Policy <input type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion		
Review number: <input checked="" type="checkbox"/> 1 (first) <input type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify):		
Triggering action: <input checked="" type="checkbox"/> Actual RA Onsite Construction <input type="checkbox"/> Actual RA Start <input type="checkbox"/> Construction Completion <input type="checkbox"/> Recommendation of Previous <input type="checkbox"/> Other (specify): Request from State Five-Year Review Report		
Triggering action date (from WasteLAN): July 1997.		
Due date (five years after triggering action date): July 2002.		

Five-Year Review Summary Form

Issues:

Remedial Action Construction Completion. Construction for the remedial action was completed in October 2001 with demobilization from the Site completed on October 5, 2001 and the final inspection conducted on November 2, 2001. A report documenting that the remedial action has been performed in accordance with the ROD and ESDs has not yet been completed.

Groundwater. LNAPL recovery and the groundwater remedy for the Site have been postponed until negotiations between Region 6 EPA and CPC or others regarding existing environmental problems under RCRA have been completed, or until groundwater monitoring results indicate that contaminated groundwater threatens Gladys Creek. The monitoring plan is in preparation by ODEQ. When submitted, this monitoring plan should include, at a minimum, in addition to groundwater monitoring parameters and procedures, sampling of discharge from observed seeps and the surface water of Gladys Creek, as well as procedures to address maintenance of both on and offsite monitoring wells. Also included should be delineation of the criteria that would necessitate an increase in monitoring or further action. Protective monitoring well casing for wells located offsite north of Highway 277 have been damaged by corrosion and need to be repaired to restrict trespasser access to these wells.

Site Access. The perimeter fence has been damaged at a location on the east side of the Site, south of groundwater monitoring well SBB-11, and the perimeter fence along the south boundary, east of groundwater monitoring well SBB-7, has been undercut by erosion. At each of these locations, access to the Site is no longer restricted.

Recommendations and Follow-up Actions:

The remedial action construction completion report must be submitted. Review of this document should be included in the next five-year review. The monitoring plan for long term groundwater and surface water monitoring should be prepared and implemented. This monitoring plan should include sampling of discharge from observed seeps and the surface water of Gladys Creek, as well as procedures to address maintenance of both on and offsite monitoring wells, and at a minimum, annual review of the monitoring results. Also, the plan should define monitoring criteria that will indicate the need for additional monitoring and/or further action, if necessary. Protective monitoring well casing for wells located offsite north of Highway 277 have been damaged by corrosion and need to be repaired to restrict trespasser access to these wells, or alternatives for restricting trespasser access should be pursued (such as fencing around individual wells).

Protectiveness Statement(s):

The remedy for source control in the abandoned portion of the ORC site is considered protective of human health and the environment in the short term because the waste has been removed or contained and is protected from erosion. The groundwater remedy for the Site has been postponed pending resolution of action for the CPC property to the north, and/or identification via monitoring of impact or potential impact to the surface water of Gladys Creek. Follow-up actions including finalization and submittal of the construction completion report for the completed portion of the remedy, and preparation and implementation of an O&M plan for the Site which includes regular inspections and maintenance of the waste covers and site structures (wells and access restrictions) as well as surface water and groundwater monitoring are necessary to ensure the remedy remains protective.

Because the completed remedial actions and expected monitoring program for the abandoned portion of the ORC Superfund Site are considered protective, the remedy for the abandoned portion of the Site is protective of human health and the environment.

Other Comments:

The Site appears to be well-maintained, and ODEQ is effectively maintaining the Site. Resolution of environmental issues at the CPC portion of the Site would benefit the groundwater remedy for the ORC portion of the Site.

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First Five-Year Review Report Oklahoma Refining Company Site

The United States Environmental Protection Agency (EPA) Region 6, in coordination with the Oklahoma Department of Environmental Quality (ODEQ), has conducted a five-year review of the remedial actions implemented at the Oklahoma Refining Company (ORC) Superfund Site (“the Site”) for the period July 1997 through May 2002. The Site is located in Caddo County, on the eastern edge of Cyril, Oklahoma. The purpose of a five-year review is to determine whether the remedy at a site remains protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and recommendations to address them. This Five Year Review report (Report) documents the results of the review for the ORC site, conducted in accordance with EPA guidance on five-year reviews. EPA RAC6 contractor CH2M HILL provided support for conducting this review and the preparation of this Report.

EPA guidance on conducting five-year reviews is provided by OSWER Directive 9355.7-03B-P, *Comprehensive Five-Year Review Guidance (EPA, June 2002)* (replaces and supercedes all previous guidance on conducting five-year reviews). Guidance provided in this document has been incorporated into the five-year review performed for the ORC site.

1.0 Introduction

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) call for five-year reviews of certain remedial actions. The EPA policy also calls for a five-year review of remedial actions in some other cases. The statutory requirement to conduct a five-year review was added to CERCLA as part of the Superfund Amendments and Reauthorization Act of 1986 (SARA). The EPA classifies each five-year review as either “statutory” or “policy” depending on whether it is being required by statute or is being conducted as a matter of policy. The five-year review for the ORC site is required by statute.

As specified by CERCLA and the NCP, statutory reviews are required for sites where, after remedial actions are complete, hazardous substances, pollutants, or contaminants will remain onsite at levels that will not allow for unrestricted use or unrestricted exposure. Statutory reviews are required only if the ROD was signed on or after the effective date of the Superfund Amendments and Reauthorization Act of 1986 (SARA). CERCLA §121(c), as amended by SARA, states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

Under the NCP, the Code of Federal Regulations (CFR) states, in 40 CFR Part 300.430(f)(4)(ii):

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

This is the first five-year review for the ORC site. The triggering action for this statutory review is the date of initiation of the remedial action for the abandoned portions of the Site in July 1997. This review is being conducted as a matter of statute because the ROD was signed after the effective date of SARA in 1986, and because hazardous substances, pollutants, or contaminants were left onsite above levels that allow for unlimited use and unrestricted exposure.

This five-year review covers the southern portion of the Site where surface water found in onsite ponds and drainage ways and sediments and soil found in onsite pits and ponds were remediated. The northern portion of the Site currently occupied by the refinery and Site ground water are not specifically addressed by this five-year review.

2.0 Site Chronology

A chronology of significant site events and dates is included in [Table 1](#), provided at the end of the report text. Sources of this information are listed in [Attachment 1 Documents Reviewed](#).

3.0 Background

This section describes the physical setting of the Site, including a description of the land use, resource use, and environmental setting. Finally, this section briefly describes the history of contamination associated with the Site, the initial response actions taken at the Site, and the basis for each action.

3.1 Physical Characteristics

The ORC site is located in Caddo County on the eastern edge of Cyril, Oklahoma, at the intersection of U.S. Highway 277 and State Highway 8. The Site is bordered by Gladys Creek to the east, U.S. Highway 277 to the north, the City of Cyril to the west, and a tributary of Gladys Creek to the south. The 1988 Oklahoma Water Quality Standards (OWQS) designated the segment of Gladys Creek adjacent to and downgradient of the Site as a habitat-limited fishery and for secondary body contact recreation. The tributary also flows continuously throughout the year and is approximately one half the size of Gladys Creek. This tributary is assumed to be capable of supporting the beneficial uses of habitat limited fishery and secondary body contact recreation. Gladys Creek and its tributary provide habitat for many forms of aquatic wildlife. Gladys Creek in turn is a tributary of Chetonia Creek, located approximately one mile downstream of the Site. Chetonia Creek empties into the Little Washita River 1.75 miles south of the ORC site.

The topography of the ORC site is basically flat, with a gentle slope to the east and south. At the eastern and southern borders of the Site, a deeply incised creek system forms a steep embankment. The highest elevation, at the northwest corner of the ORC site, is approximately 1380 feet above mean sea level (msl). The lowest elevation found at the Site, at the bottom of Gladys Creek in the southeast corner, is approximately 1290 feet above msl. The elevation of the Site places it above the 100-year flood plain.

The ORC site covers approximately 160 acres and encompasses an area that has been used for petroleum refining purposes for approximately 60 years. Approximately one-half of the ORC site consists of a refinery area and a tank farm area. The other one-half of the Site, described as abandoned, formerly consisted of grasslands and approximately 40 randomly-sized pits and wastewater ponds containing varying amounts of sediment. Prior to remediation, the abandoned portion of the Site was overgrown with weeds and grasses and provided habitat for many forms of terrestrial wildlife such as hawks, owls, coyotes, rabbits, rats and snakes. The sediment, soil, and surface water on this portion of the Site have been remediated. This portion of the Site now consists of two (2) capped landfills covered with planted grasses and wheat.

In terms of geology, the ORC site is underlain by Quaternary and Permian Age deposits. The Quaternary Age deposits, composed of clay, silt and sand, exist on top of the bedrock in many areas of the Site. These deposits include thin layers of clay spread across much of the Site and thick layers of clay, silt and sand deposited in channel fills. The Quaternary age deposits are not used as a water source in the Cyril area and are not considered an aquifer of interest.

The uppermost Permian Age strata found at the Site is the Weatherford Member of the Cloud Chief Formation. It is primarily composed of gypsum and underlies thin Quaternary Age clay deposits in the northwest portion of the Site, but outcrops or is absent in other areas of the Site. The thickness and elevation of the top of the formation varies because it is an erosional surface. The greatest measured thickness of the Weatherford Member at the Site was 31.5 feet. Ground water was found to be present in the top few feet of the formation in the northwest portion of the Site. The ROD indicated that the Weatherford member acts as an aquitard in this area and as a partial barrier to infiltration from rainfall (EPA, 1992). The cross sections in the RI show that the Weatherford member is discontinuous across the Site (Bechtel, 1991). The Weatherford may act as an aquitard in localized areas of the Site. Further study will be required to determine if the Weatherford does act as an aquitard. The Weatherford Member is not used as a water source in the area and was also not identified as an aquifer of concern in the ROD (EPA, 1992).

The Rush Springs Sandstone (RSS) Formation conformably underlies the Weatherford Member. The RSS Formation is approximately 250 feet thick in the Cyril area and consists of even-bedded to highly cross-bedded, reddish-brown, very fine grained, silty sandstone. The RSS Formation underlies the entire Cyril area and outcrops on the eastern side of the Site. The RSS Formation contains ground water and is best characterized as an unconfined, water table aquifer. The RSS Formation aquifer is the affected aquifer of concern that is addressed in the ROD (EPA, 1992). Recharge of the aquifer in the Cyril area occurs in the topographically high areas located west and north of the ORC site, and discharge areas occur where Gladys Creek and its tributaries intercept the water table along the eastern and southern borders of the Site. The general horizontal direction of ground water flow across the Site is to the southeast, at a velocity of approximately 11 feet per year. Vertical flow potentials for ground water in the RSS Formation indicated that upward flow is occurring in the area of Gladys creek and its tributaries. Ground water flow direction is primarily horizontal over the rest of the Site. Ground water from the RSS Formation is moving into Gladys Creek and its tributaries above the stream level by visible seeps and below the stream level by discharge through the alluvial fill materials. In accordance with the EPA Ground Water Protection Strategy, the RSS Formation aquifer is classified as a IIA aquifer, a current source of drinking water in the Cyril area. However, there is no one currently using the portion of the RSS formation aquifer that is contaminated from the Site.

The Marlow Formation conformably underlies the RSS Formation. This formation consists mostly of even-bedded, brick-red sandy shale and fine grained sandstone. It is estimated to be 100 feet thick in the Cyril area. Beneath the Marlow Formation, in descending order, occur the Dog Creek Shale Formation, the Blaine Formation, and the Flowerpot Shale Formation. These are all primarily red shale with some interbedded gypsum, dolomite, siltstone, and sandstone beds. The combined thickness of these formations is approximately 500 feet. These formations are considered to perform as aquitards to vertical ground water flow in the Cyril area (EPA, 1992).

3.2 Land and Resource Use

The Site was operated continuously as a refinery from 1920 through 1984. Several attempts were made to restart refining operations through 1994. The northern one-half of the Site is currently occupied by the

refinery. Surface water, soil and sediments on the southern one-half (abandoned) portion of the Site have been remediated. The City of Cyril, with a current population of approximately 1,600 (EPA, 2002a), borders the western boundary of the ORC site. Cyril obtains its drinking water from a Rural Water District which obtains its water from ground water wells located approximately 20 miles northwest of Cyril (EPA, 1992). Some residences near the ORC site obtain drinking water from the shallow Rush Springs Sandstone aquifer. The area around Cyril is rural and consists of small farms and ranches. Typical land uses include wheat farming and cattle grazing. Gladys Creek is primarily used for fishing, wading, and cattle watering in the Cyril area. Gladys Creek flows into the Little Washita River approximately two miles south of the ORC site (EPA, 1992). The Site is zoned industrial. These land and resource uses are expected to remain the same into the foreseeable future.

3.3 History of Contamination

Operations at the ORC site were begun by the Anderson Pritchard Company (APCO) in 1920. The ORC site was operated as a refinery, under several different owners, until 1994. The refining processes that were utilized included crude distillation, vacuum distillation, catalyst cracking, akylation, bimetallic reforming, and downstream processing. Wastes were placed in pits on land on the refinery property. Wastewater was sent through an oil-water separator to remove oils and then treated in a series of surface impoundments. Treated water from the surface impoundments was discharged into Gladys Creek. Leakage from crude oil tanks, product tanks, and surface impoundments occurred during the many years of production.

Site operations resulted in contamination of soil, sediment, surface water, and shallow ground water beneath the ORC site. The contaminants present at the ORC site included benzene, phenol, toluene, xylene, methyl phenol, naphthalene, ethylbenzene, polycyclic aromatic hydrocarbons, arsenic, cadmium, chromium, lead, mercury, nickel, and zinc as well as areas of low and high pH (EPA, 2002c).

The ORC site was added to the NPL in June 1988. The Oklahoma State Department of Health (OSDH) began a Remedial Investigation (RI) in 1989 and completed it in 1991. The OSDH found extensive surface and subsurface contamination by petroleum related organic compounds, heavy metals, and acidic

and caustic materials. The uppermost aquifer at the ORC site, the Rush Springs Sandstone aquifer, was found to be contaminated by dissolved organic and inorganic compounds. The OSDH risk assessment, conducted as part of the RI, concluded that exposure to nearby residents and site intruders was within EPA's acceptable risk range, but that exposure to future potential residents on the ORC site and site workers was not at an acceptable level.

A Feasibility Study (FS) was initiated in 1989 and completed in December 1991. The FS identified soil, sediment, surface water and ground water that needed to be remediated at the ORC site, and the levels of contamination to be reached during remediation. The ROD was signed in June 1992, and an Explanation of Significant Difference (ESD) to the remedy specified in the ROD was signed in March 1996.

Construction was begun on the remedy defined by the ROD and the 1996 ESD for the abandoned portion of the Site in July 1997, and construction was completed in October 2001. The completed remedy of the abandoned portion of the Site included the bioremediation of approximately 93,000 cubic yards of contaminated soil, neutralization of 16,000 cubic yards of contaminated soil, stabilization of 14,000 cubic yards of contaminated soil, and removal of 19,771 cubic yards of soil contaminated with asphaltic waste and 18,260 cubic yards of soil contaminated with pitch. Two landfills were constructed for containment of site wastes. The EPA and ODEQ agree that all source remediation is complete. Remediation of the ground water is yet to be completed (**EPA, 2002a**).

EPA is currently in negotiations with CPC to address the existing environmental problems for the CPC portion of the Site under RCRA (**EPA, 2002c**).

3.4 Initial Response

In 1984 the OSDH issued an order to ORC for corrective action of RCRA violations which included inadequate closure plans, failure to sample soil in the land treatment area, and failure to adequately sample ground water in the land treatment area. Also in 1984, ORC conducted an investigation of contamination problems on the ORC site and removed approximately 5,000 barrels of Light Non-Aqueous Phase Liquid (LNAPL) from the ground water.

An action memorandum prepared pursuant to Section 104 of CERCLA, authorizing an EPA removal action at the Site, was signed on August 30, 1990. The scope of the removal action consisted of fencing the Site, characterization of the contents and removal of drums, plugging wells in the acid pit area, and placing netting over several impoundments to protect wildlife. A Unilateral Administrative Order (UAO) was issued to CPC on January 25, 1991, ordering the company to perform the fencing on its portion of the property and the drum characterization. CPC responded to the order to undertake the actions requested; however, the work plan submitted by CPC to perform the work was not considered adequate for the drum characterization. CPC was allowed to proceed with the fencing of its property and EPA proceeded with performance of the drum characterization, the well plugging and impoundment netting. The removal action on CPC's property and the abandoned property was completed in August 1991.

3.5 Basis for Taking Action

The purpose of the action was to protect public health and welfare and the environment from release or threatened releases of hazardous substances from the ORC site. Contaminants of concern identified in the ROD for the ORC site are presented in [Table 2](#). Exposures to affected soil, ground water, surface water and sediment was determined to be associated with human health risks higher than the acceptable range.

4.0 Remedial Actions

Remedial actions performed at the ORC site after it was placed on the NPL are addressed in this first Five-Year Review for the Site. This section provides a description of the remedy objectives, selection, and implementation. It also describes the ongoing O&M, and the overall progress made at the ORC site.

4.1 Remedy Objectives

Based on data collected during the RI performed by the State after the initial removal action, Remedial Action Objectives (RAOs) were developed to aid in the development and screening of remedial alternatives to be considered for the ROD. RAOs presented in the ROD were developed for sediments

and surface soils, subsurface soils, surface water, and ground water assuming that the ORC site could be used as a residential setting.

The surface water (in impoundments onsite or runoff generated during the RA) and ground water RAOs were developed assuming use of the water as a primary drinking water source. The RAOs were set at MCLs where available; when not available, human health-based risk values were used. Water that exceeded the RAOs was to be treated to the RAOs and injected into the RSS aquifer.

Surface soil and sediment RAOs were developed assuming the following pathways of potential exposure: (1) ingestion by humans; and (2) ground water contamination through leaching. Acceptable risk-based exposure concentrations were generated for both of these exposure pathways and the more protective concentration used to determine the RAOs.

Subsurface soil RAOs were set by determining the concentrations that could leach and cause ground water to be contaminated at concentrations above ground water RAOs for the respective contaminant.

The goal of the selected sediment and soil remedial action was to prevent current or future exposure to the contaminated soils, sediments and surface water and to reduce contaminant migration into the ground water.

4.2 Remedy Selection

The remedy was selected in the ROD to accomplish the RAOs by treating soil and sediments present at concentrations above the RAOs using bioremediation, stabilization, neutralization and containment and treatment of surface water and ground water to meet drinking water quality levels. The selected remedy defined by the ROD for contaminated surface water, sediment, surface soil, and ground water was comprised of the following:

- In-situ bioremediation of organic-contaminated sediments.
- In-situ bioremediation of inorganic-contaminated sediments, followed by capping.

- Removal of all onsite surface water from impoundments.
- Treatment of all contaminated surface water taken from the surface impoundments in an onsite water treatment facility.
- Prepared-bed biotreatment of contaminated sediments and soil that could not be treated insitu, followed by stabilization, if necessary, and containment of treated residuals.
- Excavation and containment of contaminated sediments and soil that exceeded health-based levels.
- Excavation and neutralization of low pH sediment, followed by placement of treated material as fill in area of origin.
- Excavation and recycling of asphaltic materials.
- Removal and recycling of LNAPLs, primarily petroleum, floating on the ground water and commingled with hazardous waste.
- Containment of contaminated ground water using interceptor wells to prevent migration.
- Treatment of all collected water in an onsite water treatment facility. Treated water was to be injected into contaminated portions of the aquifer to enhance bioremediation treatment of the contaminated ground water (**EPA, 1992**).

In March 1996, after approximately 60% completion of the remedial design of the ROD-specified remedy, an Explanation of Significant Differences (ESD) describing revisions to the ROD-specified remedy was signed. The significant differences between the revised remedy and the remedy selected in the ROD were:

- Stabilization and capping onsite of asphaltic materials rather than the recycling indicated by the ROD. No viable recycling option was identified during the preliminary stages of the remedial design. The ESD specified that stabilized asphaltic materials were to be placed on top of the pitch pits and capped.
- Postponement of the ground water portion of the remedy to a second construction phase. The ground water remedy selected in the ROD consisted of a line of containment wells to prevent

discharge to Gladys Creek, construction and operation of an onsite water treatment facility, and reinjection of all treated water (including surface water) to contaminated portions of the aquifer to enhance insitu bioremediation. Field investigation activities performed during the initial stages of the remedial design, however, indicated that the ground water problems associated with LNAPL extent were less than originally defined. The ESD indicates that EPA and ODEQ believed that the risk posed by contaminated ground water would be lessened by the source treatment and construction of a subsurface LNAPL trench, and the need for ground water treatment should be re-evaluated after completion of these activities.

- Construction of a temporary water treatment facility and discharge of treated water to Gladys Creek instead of to the aquifer. The ROD specified that onsite water (including ground water and surface water) would be treated in an onsite water treatment facility, and the discharge injected into the aquifer to enhance insitu bioremediation of the aquifer. The decision to postpone the ground water portion of the remedy, however, meant a permanent onsite water treatment facility would not be constructed during the surface remedy. However, treatment and discharge of treated water would still be necessary during performance of the surface remedy (for dewatering of surface impoundments and collection of storm water), and the ESD specified construction of a temporary water treatment facility and discharge to Gladys Creek. The ESD also set discharge limits for Gladys Creek. The temporary treatment facility and discharge line were to be removed at the completion of the surface remedy.

Remedial action for the surface water and abandoned source areas was completed in October 2001, and a second ESD, currently in draft form, was prepared to document changes incorporated during the implementation of the remedial action performed. The following is a summary of the changes indicated by the 2002 ESD:

- Further postponement of the ground water remedy, including the installation of the LNAPL trench specified by the 1996 ESD. The ESD specifies the postponement largely because of the presence of a continuing contaminant source upgradient on the CPC portion of the Site. Under the ESD, the ground water remedy is postponed until EPA Region 6 completes negotiations with

CPC and a decision is made on remediation of the LNAPL plume under the CPC property, or until the ground water monitoring results indicate that the contaminated ground water threatens Gladys Creek.

- Removal of two railroad areas and Tank 177 area from the area to be remediated. It was found during remediation activities that the railroad's northeast and southern loading areas and Tank 177 areas had been included in the ROD in error; data collected during the original investigation did not exceed industrial RAOs, which should apply for these areas rather than the residential RAOs.
- Disposal of asphaltic materials and pitch pit materials offsite instead of onsite. Approximately 19,771 cubic yards of soil contaminated with asphaltic waste and 18,260 cubic yards of soil contaminated with pitch were disposed of at an off-site permitted landfill. During remediation activities it was determined that the pitch material would not support the intended cap material specified in the ROD, and the asphaltic waste was observed to have a propensity to flow. Addition of these materials to either of the site landfills could have compromised the structural integrity of the landfills.
- Approximately 21,000 cubic yards of metals-contaminated waste from AP-1 were unsuccessfully treated by stabilization, and evaluation of these wastes indicated that further stabilization would probably not be successful. The best solution was determined to be placement of this material in the Site's hazardous waste landfill.
- The TCLP lead performance standard established in the ROD was 1.5 mg/L, based on an anticipated change in regulations. The rule change was never promulgated, and the regulatory limit for TCLP lead has remained at 5.0 mg/L. Consequently, the TCLP lead performance standard is changed in the 2002 ESD to 5.0 mg/L in accordance with the promulgated regulatory limits.

- The ROD required biotreated soils containing total metals concentrations exceeding RAOs established for direct contact hazard and/or protection of ground water to undergo chemical stabilization prior to placement. The analysis and decision protocol presented in the ROD evaluated all soils, regardless of their final disposal location, in the same way: the ROD required soil was to undergo chemical stabilization prior to final placement in the landfill if it exceeded the total metals RAO. While total metals analysis is appropriate for evaluating direct contact hazard, and deciding whether the soil needed to be removed from direct contact, the final destination needed to be considered before deciding if chemical stabilization was necessary. If the soil was to be covered and removed from direct contact, chemical stabilization was only necessary if the TCLP results indicated the soil provided a risk to ground water. The ESD therefore modified the analysis protocol to TCLP for evaluating whether chemical stabilization was necessary prior to landfilling. The use of TCLP testing to determine the need for stabilization resulted in a more protective remedy for soils capped on-site but not in the landfills.
- The ROD specified an RAO for beryllium at its method detection limit of 1.0 ppm. The action level for beryllium was raised from 1.0 ppm to 2.0 ppm to minimize false positives and incorrect concentration results common at the method detection limit.
- Two of the ninety-eight process sewer junction boxes were not cleaned as part of the limited Superfund action on the CPC portion of the Site because these boxes were found to be structurally unsound.
- Remediation of the Tank # 1 area, on the CPC property, was halted due to the discovery of unexpected phenol soil contamination during excavation. Migration of odors offsite could not be controlled, resulting in complaints from nearby residents. Excavation was discontinued and the area was covered with eight to twelve inches of clean soil, eliminating further release of odors. No other remediation is planned by the ODEQ or EPA for this area. Under a Consent Order with the EPA, CPC is required to pursue additional investigation and/or remediation of this area.

4.3 Remedy Implementation

The remedial action was performed by Philips Services Corporation under contract to the ODEQ. Oversight activities were performed by Clayton Group Services, under contract to the ODEQ. The remedial action was begun in July 1997 and construction activities were completed at the Site in October 2001. The final inspection was conducted in November 2001. The completed remedy of the abandoned portion of the Site included the bioremediation of approximately 93,000 cubic yards of contaminated soil, neutralization of 16,000 cubic yards of contaminated soil, stabilization of 14,000 cubic yards of contaminated soil, and removal of 19,771 cubic yards of soil contaminated with asphaltic waste and 18,260 cubic yards of soil contaminated with pitch. The cover was completed on both the nonhazardous and hazardous on-site landfills, and the ORC site was landscaped and seeded. A final report documenting the performance and completion of the RA at the ORC site has not yet been provided by the contractors. EPA and ODEQ, however, agree that source remediation of the abandoned portion of the property is complete. In accordance with the ESDs, remediation of the ground water has not yet been conducted. EPA is currently in negotiations with CPC to address the existing environmental problems at the CPC portion of the Site under RCRA.

4.4 Operation and Maintenance

A long-term O&M Plan has not yet been developed for the ORC site. Because hazardous materials remain onsite, access to the ORC site and the ground water monitoring wells should be restricted appropriately. Since RCRA is an ARAR, a long-term ground water monitoring program is required. In addition, the vegetative cover and the landfill caps must be maintained. Regularly-scheduled inspections of the access controls, ground water monitoring wells, and the landfill caps must be performed.

Although not under a formal plan, ground water monitoring has been conducted at selected wells approximately annually since remediation was initiated in 1997. During the Remedial Action there was a formal plan in place to monitor the LNAPL plume quarterly and sample ground water on an annual basis. Since construction completion there has not been a formal plan in place. A draft plan is in circulation but has not been finalized. A ground water sampling event was last conducted in February 2002. This was a limited sampling event that consisted of the sampling of five offsite monitoring wells.

A LNAPL monitoring event was conducted on March 27 and 28, 2002 . Inspections occur twice monthly and maintenance of site wells and structures has been performed on an as-needed by ODEQ.

The substantial inspection for the construction phase was performed on November 7, 2001. The EPA/DEQ cooperative agreement budget was \$20,000,000. Costs for the project through December 31, 2001 are \$14,771,094, based on ODEQ's quarterly updates (**ODEQ, 2002c**). Annual O&M costs are estimated to be \$88,480. The estimated costs include mowing, surveying, site inspections, quarterly ground water/LNAPL elevation measurements, and ground water sampling (**ODEQ, 2002d**).

4.5 Progress Since Initiation of Remediation

The EPA and ODEQ agree that all source remediation is complete (**EPA, 2002a**). As indicated by the 2002 Draft ESD, remediation of ground water is being postponed. EPA is currently in negotiations with CPC to address the existing environmental problems at the CPC site under RCRA, and the ORC site ground water remedy will be implemented as necessary when these negotiations are complete, or if site monitoring indicates the need for more immediate action.

5.0 Five-Year Review Process

This five-year review has been conducted in accordance with the EPA's Comprehensive Five-Year Review Guidance, dated June 2001 (**EPA, 2001**). Interviews were conducted with relevant parties, a site inspection was conducted, and a review of applicable data and documentation covering the period of the review was evaluated. The findings of the review are described in the following sections.

5.1 Administrative Components

The five-year review for this site was initiated by the EPA in April 2002, when the EPA Contractor, CH2M HILL, was tasked by the EPA to perform the technical components of the review. A public notice announcing initiation of the five-year review was published in the Cyril News during April 2002. The review team was led by the EPA Remedial Project Manager (RPM) for this Site, Mr. Craig Carroll/EPA Region 6, assisted by the former RPM for the Site, Mr. Earl Hendrick/EPA Region 6. Agency representatives assisting the review team included Kelly Dixon and Angela Brunsman, ODEQ, who

provided information related to the ORC site and assistance during the ORC site inspection. The components of the review included community involvement, document review, data review, a site inspection, interviews, and development of this five-year review report, as described in the following paragraphs.

5.2 Community Involvement

A public notice announcing initiation of the five-year review was published in the Cyril News during April 2002. Also during April 2002, Mayor Boyd McPherson of Cyril was invited to participate in an interview related to the five-year review of the Site. The mayor's interview response had not been received at the time of publication of this five-year review. Other individuals present in the City offices were also offered the opportunity to be interviewed or to complete the interview forms to be returned at a later date, but the opportunity was declined. Upon signing of the five-year review, the report will be placed in the information repositories for the Site, including Cyril City Hall at 112 West Main Street, Cyril, Oklahoma, the ODEQ office in Oklahoma City, and the EPA Region 6 office in Dallas, Texas. A public notice will be published in the Cyril News to summarize the findings of the review and announce the report's availability at the information repositories.

5.3 Document Review

This five-year review included a review of relevant documents, including the decision documents, the RI/FS, the Remedial Action Work Plan, monthly remediation progress reports, and related monitoring data. Documents that were reviewed are listed in [Attachment 1](#).

5.4 Data Review

Various types of data have been collected since ODEQ and its contractors began the clean-up activities in 1997. Baseline sampling of site monitoring wells (water quality and LNAPL measurement) was performed in June 1997, prior to initiation of construction. Sampling of acid seeps observed during the baseline sampling event was also conducted in June 1997. Analytical results from this sample showed that concentrations of site-related semi-volatile organic compounds in the surface water and ground

water were below RAOs by an order of magnitude or more. No VOCs were detected and metals were not analyzed (ODEQ, 1997-2000).

Data collected to document the performance of the remedial action construction has included geotechnical sampling of landfill liners, asbestos sampling, air monitoring, sampling of waste encountered during remediation, and post-remediation confirmation sampling. This data has not yet been assembled into a construction completion report.

Also collected since 1997 have been ground water quality data, ground water level measurements, and LNAPL level measurements in monitoring wells. Although there is not yet a formal monitoring plan in place for the Site, selected ground water monitoring wells have been sampled by ODEQ approximately annually since the remedial action construction initiated in 1997. The last onsite ground water sampling event was performed in December 2000. In February 2002, five offsite ground water monitoring wells were sampled. In March 2002, a LNAPL monitoring event was conducted (on March 27 and 28, 2002).

Contaminant concentrations in these latest events are generally consistent with levels detected in historical sampling events. An exception is the concentration of phenol compounds detected in monitoring wells RMW09 and RMW10. Prior to the sampling event in December 2000, these wells were last sampled on October 4, 2000. Concentrations for these compounds generally increased in these wells for each event. A possible source of these compounds could be the phenols detected in soil during excavation of beryllium and arsenic impacted soil in the Tank # 1 area (on CPC property). Due to the inability to control high phenol odors, excavation of these soils could not be completed. This area was covered with eight to twelve inches of soil.

The results of the LNAPL monitoring event indicated the presence of LNAPL greater than two feet in well DLR07. This monitoring well is located at the southwest corner of the hazardous waste landfill. The LNAPL thickness in this well had been relatively stable since August 2000, but prior to August 2000 this well had been non-detect for LNAPL. This may indicate some movement of the LNAPL plume beneath the ORC site. The LNAPL monitoring event also confirmed the presence of LNAPL in several

monitoring wells located north of Highway 277. These wells are approximately 150 feet south of the north tributary to Gladys Creek.

5.5 Interviews

Interviews were conducted with representatives from the ODEQ at the ORC site on April 25, 2002. The five-year review staff briefly spoke with the Mayor of Cyril, Mr. Boyd McPherson, and an interview form was provided to be completed and forwarded to EPA subsequent to the ORC site visit (this interview record has not yet been received). The interview record form which documents the interview with representatives from ODEQ is presented in [Attachment 2](#).

The impressions from the interviews were that the remedy implementation went smoothly. One exception occurred during the attempted excavation of phenol-impacted soil located on the CPC portion of the ORC site. Phenol odors were detected offsite resulting in complaints from nearby residents. Excavation was discontinued due to the inability to control these odors, and the area was covered with eight to twelve inches of clean soil. Under a consent order with EPA, CPC is required to pursue additional investigation and/or remediation of this area. Also, some residents near the ORC site have complained about flooding caused by poorly maintained drainage ditches on the CPC portion of the ORC site ([Photograph No. 40](#)). The ditches appear to be clogged by vegetation and some debris, causing storm water runoff to back up onto residential properties. The primary community interest is in removal of the refinery and redevelopment of the ORC site.

5.6 Site Inspection

A site inspection was conducted at the Site on April 25, 2002. The completed site inspection checklist is provided in [Attachment 3](#). Photographs taken during the ORC site inspection are provided in [Attachment 4](#). The ORC site appears to be well maintained and there was no visible evidence of vandalism. Vegetative cover consists primarily of wheat with some other grasses such as bermuda grass ([Photograph Nos. 2, 25, 27](#)). Vegetative cover on the non-hazardous waste landfill embankment was sparse, likely due to heavy rainfall that occurred shortly after seeding ([Photograph No. 1](#)). It was noted that erosion had recently undercut the fence at a location on the south perimeter fence line. A small sink

hole (two feet diameter by one foot deep) was observed on the east perimeter fence line at a discharge pipe (**Photograph No. 15**). The ODEQ representatives indicated that repairs to these areas will be made. Also, damage to the perimeter fence was observed at two locations. Temporary repairs had been made.

All existing onsite ground water monitoring wells were located during the ORC site visit. All surface completions were secure and in good condition (**Photograph Nos. 6, 25, 27, 36, 41, 45**) except for three wells located north of Highway 277. The locking covers for these wells, identified as DGR-03, DOW-07 and DOW-08, have been damaged by corrosion (**Photograph Nos. 42, 43**). The ODEQ representatives indicated that the corrosion was most likely due to the presence of hydrogen sulfide gas present in these wells.

6.0 Technical Assessment

The five-year review must determine whether the remedy at a site is protective of human health and the environment. The EPA guidance describes three questions used to provide a framework for organizing and evaluating data and information and to ensure all relevant issues are considered when determining the protectiveness of a remedy. These questions are assessed for the Site in the following paragraphs. At the end of the section is a summary of the technical assessment.

6.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents?

The documents that detail the remedial decisions for the Site are the ROD, the March 1996 ESD to the ROD, and the draft 2002 ESD to the ROD. Although the report documenting construction completion has not yet been submitted by the remediation contractors, EPA and ODEQ have indicated that source remediation associated with surface water, soil, and sediment on the abandoned portion of the property is complete. In accordance with the 2002 ESD, remediation of ground water is on hold pending resolution of CPC property contamination, or until ground water monitoring indicates the contaminated ground water threatens Gladys Creek. CPC is under a consent order to pursue additional investigation and/or remediation of the CPC portion of the Site.

Based on monthly/quarterly progress reports and oversight of the remedial action performed by ODEQ and EPA, it appears that the remedy has been completed and is functioning as intended by the decision documents.

Opportunities for Optimization: Currently there is not enough ground water or surface water quality data available to identify any opportunities for optimization.

Early Indicators of Potential Remedy Problems: At the time of the site visit it was noted that recent erosion had undercut a short section of the south perimeter fence, and a small sink hole was observed on the east perimeter fence at a discharge pipe. Currently, these erosional features are far enough away to not directly affect the landfills, and do not currently represent a problem with the remedy. If the erosion were to continue unchecked, however, the covered areas could potentially be impacted.

Institutional Controls: Institutional controls, such as deed notices or deed restrictions, may be necessary once the Site is complete to protect the integrity of the landfill caps and ground water monitoring system.

6.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives (RAOs) Used at the Time of the Remedy Selection Still Valid?

This section addresses changes in ARARs, and changes in exposure pathways, toxicity, and other contaminant characteristics.

Changes in ARARs. ARARs for this site were identified in the ROD dated June 9, 1992. The five-year review for this site included identification of and evaluation of changes in the ROD-specified ARARs to determine whether such changes may affect the protectiveness of the selected remedy.

The ARARs identified by the ROD for the ORC site include chemical- and action-specific ARARs for soil and sediment, and chemical- and action-specific ARARs for ground water. These ARARs are described below.

Chemical-Specific ARARs for Soil and Sediment

1. Identification and Listing of Hazardous Waste (40 CFR Part 261), Subpart C - Characteristics of Hazardous Waste and Subpart D - Lists of Hazardous Waste.
2. Land Disposal Restrictions (40 CFR Part 268), Subpart A (268.4) - Treatment Surface Impoundment Exemption and Subpart D - Treatment Standards.
3. National Emission Standards for Hazardous Air Pollutants (40CFR Part 61).
4. Air Pollution Permits (Oklahoma Air Pollution Control Rules, OAC 310:200-7).
5. Control of Emissions of Organic Materials (Oklahoma Air Pollution Control rules, OAC 310:200-37).
6. Control of Emissions of Hazardous and Toxic Air Contaminants (Oklahoma Air Pollution Control Rules, OAC 310:200-41).

Action-Specific ARARs for Soil and Sediment

1. Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR Part 2640).
2. Treatment Surface Impoundment Exemption (40 CFR 268.4).

Chemical-Specific ARARs for Groundwater

1. Identification and Listing of Hazardous Waste (40 CFR Part 262), Subpart C - Characteristics of Hazardous Waste.
2. National Primary Drinking Water Regulations (40 CFR Part 141).
3. National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61).
4. Control of Emissions of Organic Materials (Oklahoma Air Pollution control Rules, OAC 310:200-37).
5. Control of Emissions of Hazardous and Toxic Air Contaminants (Oklahoma Air Pollution Control Rules, OAC 310:200-41).

Action-Specific ARARs for Groundwater

1. Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR Part 264).
2. Standards Applicable to Transporter of Hazardous Waste (40 CFR Part 263).

The Oklahoma Air Pollution Control Rules cited above under the chemical-specific ARARs for soil were revised and codified during the 2001 legislative session. The regulations that are relevant to activities conducted at the ORC site are now found as:

- *Control of Emission of Volatile Organic Compounds (VOCs) (Oklahoma Air Pollution Control Rules, OAC 252:100-37).*
- *Control of Emissions of Hazardous Air Pollutants and Toxic Air Contaminants (Oklahoma Air Pollution Control Rules, OAC 252:100-41).*

However, because activities relating to source remediation have now been completed for the abandoned portion of the property, the *National Emissions Standards for Hazardous Air Pollutants, Air Pollution Permits, Control of Emissions of Organic Materials, and Control of Emissions of Hazardous and Toxic Air Contaminants* regulations no longer apply for soil. No significant changes have occurred to the remaining ARARs that would call into question the effectiveness of the remedy.

Regulations for worker health and safety have been promulgated at 29 CFR Part 1910. These regulatory requirements are specifically addressed in the ORC site-specific health and safety plan.

In summary, it appears that the remedy complies with all ARARs, and no new laws or regulations have been promulgated or enacted that would call into question the effectiveness of the remedy to protect human health and the environment at the ORC site.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics. RAOs were developed for surface soil, sediment, ground water and surface water at the ORC site in the ROD. Subsurface soil RAOs were set by determining the concentrations that could leach and cause ground water to be contaminated above ground water RAOs. Ground water RAOs were set at levels which would allow use of the ground water as a primary drinking water source. The RAOs were set at MCLs where available. When MCLs were not available, human health-based risk values were used. The health-based

risk values were calculated so that the use of ground water as a drinking water source would not pose a cancer risk greater than one in one million.

No changes have occurred in the assumptions used to establish the ARARs applicable to the ORC site or the RAOs. No new exposure pathways have been identified as a result of this five-year review.

6.3 Question C: Has any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy

No other information was identified as a part of this five-year review that would call into question the protectiveness of the remedy.

6.4 Summary of the Technical Assessment

According to the data review, site inspection, and interviews, the remedial actions selected for the this site appear to have been implemented and continue to function as intended by the decision documents for the abandoned portion of the Site. There have been no changes in ARARs or the physical site conditions that would call into question the protectiveness of the remedy. Submittal of the construction completion report is necessary to document the performance of the remedy implementation, and submittal and implementation of a long-term O&M and ground water monitoring plan is necessary to ensure the remedy continues to function as designed.

7.0 Issues

Several issues are identified for this site, as described in the following paragraphs.

Remedial Action Construction Completion. Construction for the remedial action was completed in October 2001, with a final inspection conducted on November 2, 2001, and demobilization from the Site completed by October 5, 2001. A report documenting that the remedial action has been performed in accordance with the ROD and ESDs has not yet been completed.

Ground water. LNAPL recovery and the ground water remedy for the Site have been postponed until negotiations between Region 6 EPA and CPC or others regarding existing environmental problems under RCRA have been completed, or until ground water monitoring results indicate that contaminated ground water threatens Gladys Creek. The monitoring plan is in preparation by ODEQ. When submitted, this monitoring plan should include, at a minimum, in addition to ground water monitoring parameters and procedures, sampling of discharge from observed seeps and the surface water of Gladys Creek, as well as procedures to address maintenance of both on and offsite monitoring wells. Also included should be delineation of the criteria that would necessitate an increase in monitoring or further action. Protective monitoring well casing for wells located offsite north of Highway 277 have been damaged by corrosion and need to be repaired to restrict trespasser access to these wells.

Site Access. The perimeter fence has been damaged at a location on the east side of the Site, south of ground water monitoring well SBB-11, and the perimeter fence along the south boundary, east of ground water monitoring well SBB-7, has been undercut by erosion. At each of these locations, access to the Site is no longer restricted.

8.0 Recommendations and Follow-up Actions

The remedial action construction completion report must be submitted. Review of this document should be included in the next five-year review. The monitoring plan for long term ground water and surface water monitoring should be prepared and implemented. This monitoring plan should include sampling of discharge from observed seeps and the surface water of Gladys Creek, as well as procedures to address maintenance of both on and offsite monitoring wells, and at a minimum, annual review of the monitoring results. Also, the plan should define monitoring criteria that will indicate the need for additional monitoring and/or further action, if necessary. Protective monitoring well casing for wells located offsite north of Highway 277 has been damaged by corrosion and needs to be repaired to restrict trespasser access to these wells, or alternatives for restricting trespasser access should be pursued (such as fencing around individual wells).

9.0 Protectiveness Statement

The remedy for source control in the abandoned portion of the ORC site is considered protective of human health and the environment in the short term because the waste has been removed or contained and is protected from erosion. The ground water remedy for the Site has been postponed pending resolution of action for the CPC property to the north, and/or identification via monitoring of impact or potential impact to the surface water of Gladys Creek. Follow-up actions including finalization and submittal of the construction completion report for the completed portion of the remedy, and preparation and implementation of an O&M plan for the Site which includes regular inspections and maintenance of the waste covers and site structures (wells and access restrictions) as well as surface water and groundwater monitoring are necessary to ensure the remedy remains protective.

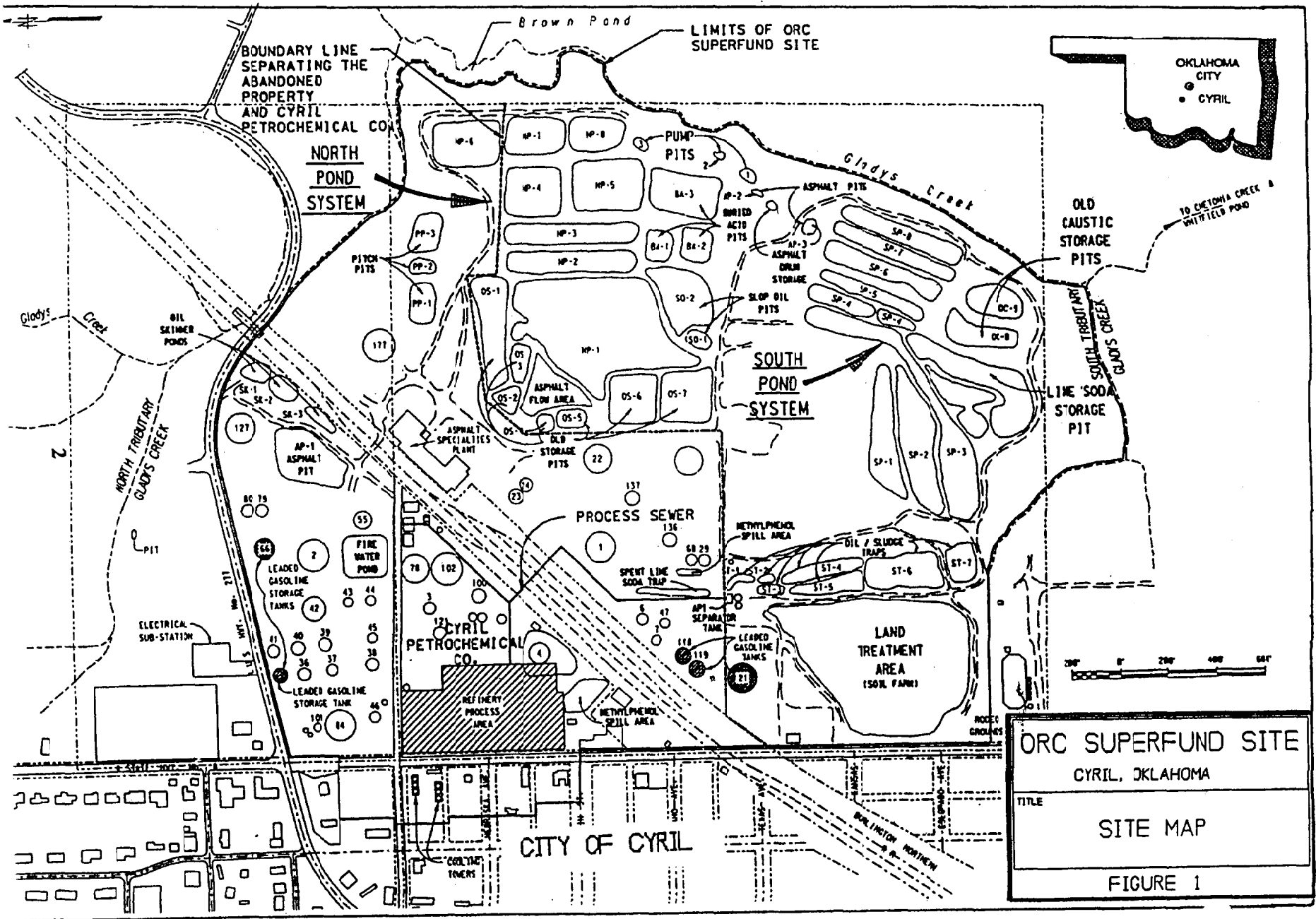
Because the completed remedial actions and expected monitoring program for the abandoned portion of the ORC Superfund Site are considered protective, the remedy for the abandoned portion of the Site is protective of human health and the environment.

10.0 Next Review

The next five-year review, the second for the Site, should be completed during or before May 2007.

EPA will continue to monitor this site to determine whether to delete the ORC site from the NPL, to perform or continue to defer the ground water remedy, or seek further response actions under CERCLA to protect human health and the environment. Five-year reviews will continue as necessary regardless of a decision to delete the Site from the NPL.

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Table 1
Chronology of Site Events
Oklahoma Refining Company Superfund Site, Cyril, Oklahoma

Date	Event
1920	Anderson-Prichard Oil Corporation (APCO) formed, production of petroleum products began.
1974	EPA issued a NPDES permit to allow for discharge of wastewater from the facility
1976	Passage of Oklahoma Controlled Industrial Waste Act (OCIDWA) and RCRA brought hazardous wastes under the regulatory authority of the Oklahoma State Dept. of Health.
1977	Facility owner began application process for a OCIDWA waste disposal site operating permit with OSDH.
1978	Facility purchased by the Oklahoma Refining Company (ORC). Maximum of 15,000 barrels of crude processed per day reached in 1983.
May 1981	RCRA Part A application
August 1981	Soils report for ORC by Nova Engineering
April 1982	USEPA Potential Hazardous Waste Site Inspection Report
1983	The Oklahoma Water Resources Board (OWRB) issued a letter requiring ORC to correct various wastewater discharge violations.
1984	OSDH issued an order to ORC for corrective action of RCRA violations such as inadequate closure plans, failure to sample soil in the land treatment area and failure to adequately sample groundwater in the land treatment area.
1984	ORC conducted an investigation of contamination problems, and removed approximately 5,000 barrels of LNAPL from the ground water table.
September 1984	ORC owners declared bankruptcy and ceased operations.
April 1985	OWRB, Water Quality Division, Inspection Report
August 1986	Stanley Engineering, Environmental Investigation
May 1986	Ecology and Environment, Inc. Memorandum, Sampling Inspection of ORC Refining Company.
1986	Bankruptcy Court allowed ORC to abandon the southern portion of the property which included the majority of surface wastes and ground water discharges into Gladys Creek. EPA investigated the ORC site for possible inclusion on the NPL. Investigation confirmed hydrocarbons and elevated levels of heavy metals in site soils and ground water.

Table 1 Chronology of Site Events Oklahoma Refining Company Superfund Site, Cyril, Oklahoma	
Date	Event
1987	Cyril Petrochemical Corporation (CPC) purchased the northern portion of the ORC property that was not abandoned with the intent of reactivating part of the refinery.
1987	Jacobs Engineering conducted a search for PRPs. CPC was identified as a PRP. CPC denied responsibility for abandoned portion of the Superfund site. CPC declined to conduct or finance RI/FS
June 1987	RCRA Facility assessment Preliminary Review Report
June 1988	The ORC site was placed on the NPL.
1988	OSDH was awarded funding through a cooperative agreement with the EPA to perform a RI/FS.
March 1989	EPA notified CPC that EPA would proceed with RI/FS using CERCLA funds.
1989	OSDH began the RI and FS
August 1990	An action memorandum, pursuant to Section 104 of CERCLA, authorizing an EPA removal action. The scope of the removal action consisted of fencing the Site, characterization of contents and removal of drums, plugging wells in the acid pit area and placing netting over several impoundments to protect wildlife.
1991	Cayman Resources purchased CPC with the intention of reopening the refinery in the spring of 1992 to refine crude oil.
January 1991	A unilateral administrative order was issued to CPC, ordering the company to perform the fencing on its portion of the property and the drum characterization.
August 1991	The removal action on CPC's property and the abandoned property was completed.
September 1991	OSDH completed the RI
December 1991	OSDH completed the FS
January 1992	OSDH entered into a Consent Agreement and Final Order (CAFO) with CPC in which CPC agreed to address ground water contamination, storm water drainage and aboveground and below ground storage tanks.
June 1992	EPA signed the Record Of Decision (ROD) and OSDH began planning the RD
July 1993	ODEQ assumed environmental responsibilities of the OSDH. ODEQ accepted the ORC project with no interruption in the Superfund process.

Table 1 Chronology of Site Events Oklahoma Refining Company Superfund Site, Cyril, Oklahoma	
Date	Event
1993	CPC refurbished, and began renewed refining operations
1994	CPC ceased refining operations
March 1996	EPA prepared Explanation of Significant Difference (ESD) to the ROD
July 1997	Philip Services Corporation (PSC) began construction
October 1997	ODEQ referred the CPC portion of the facility to the EPA. The CAFO was not implemented.
January 2002	PSC completed construction.
March 2002	EPA prepared draft ESD to the ROD.
April 2002	CH2M HILL began preparation of the initial Five-Year Review
Present	The EPA is currently in negotiations with CPC to address the existing environmental problems under RCRA.

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Table 2
Contaminants of Concern Identified in the ROD
Oklahoma Refining Company Superfund Site, Cyril, Oklahoma

Sediment	Surface Soil	Subsurface Soil	Surface Water	Groundwater
acenaphthene anthracene benzene benzo(a)anthracene benzo(a)pyrene benzo(b)fluoranthene benzo(g,h,i)perylene benzo(k)fluoranthene chrysene dibenzo(a,h)anthracene dimethylphenol ethylbenzene fluoranthene fluorene indeno(123/c,d)pyrene 2-methylnaphthalene 2-methylphenol naphthalene phenanthrene phenol pyrene toluene xylene arsenic barium beryllium cadmium chromium copper lead mercury nickel zinc	benzene chrysene 1,2-dichloroethane dimethylphenol ethylbenzene 2-methylnaphthalene 2-methylphenol phenanthrene phenol pyrene Toluene xylene arsenic barium beryllium cadmium chromium copper lead mercury nickel zinc	acenaphthene anthracene benzene benzo(a)anthracene benzo(b)fluoranthene chrysene dimethylphenol ethylbenzene fluorene 2-methylnaphthalene 2-methylphenol naphthalene phenanthrene phenol pyrene toluene xylene arsenic barium beryllium cadmium chromium copper lead mercury nickel Zinc	benzene chrysene dimethylphenol ethylbenzene 2-methylnaphthalene 2-methylphenol naphthalene phenol toluene xylene arsenic barium beryllium cadmium chromium copper lead mercury nickel zinc	benzene 1,2-dichloroethane ethylbenzene 2-methylnaphthalene naphthalene toluene xylene arsenic barium beryllium cadmium chromium copper lead mercury nickel zinc

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Attachment 1
Documents Reviewed

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Attachment 1 Documents Reviewed

- Bechtel Environmental, Inc., 1991. *Remedial Investigation Report, Oklahoma Refining Company Superfund Site*, September 1992.
- Bechtel Environmental, Inc., 1991. *Feasibility Study Report, Oklahoma Refining Company Superfund Site*, December 1991.
- Clayton Group Services, 2001-2002. Monthly Project Status Reports, Oklahoma Refining Company Superfund Site, Cyril, Oklahoma. February 2, 2001, through March 15, 2002.
- Philip Services Corporation (PSC), 1997. *Remedial Action Work Plan, Oklahoma Refining Company Superfund Site, Cyril, Oklahoma*. October, 1997.
- Oklahoma Department of Environmental Quality (ODEQ), 1997-2000. Selected Monthly or Quarterly Progress Reports. Oklahoma Refining Company, Cooperative Agreement #V-006568. Included were reports for February 1997 through October 1997, January 1998 through April 1999, June 1999 through November 1999, February 2000 through April 2000, and June 2000 through December 2000. Reviewed without attachments (Clayton progress reports).
- Oklahoma Department of Environmental Quality (ODEQ), 2002a. Spreadsheet of Groundwater Quality Monitoring Results in Samples Collected from July 1990 through December 2000 at the Oklahoma Refining Company Superfund Site. Printed May 2002.
- Oklahoma Department of Environmental Quality (ODEQ), 2002b. Spreadsheet of LNAPL Measurements Collected July 1990 through March 2002 at the Oklahoma Refining Company Superfund Site. Printed May 2002.
- U. S. Environmental Protection Agency (EPA), 1992. *Record of Decision, Oklahoma Refining Company Superfund Site, Caddo County, Oklahoma*. June 1992.
- U. S. Environmental Protection Agency (EPA), 1996. *Explanation of Significant Difference to the Record of Decision, Oklahoma Refining Company Superfund Site, Cyril, Oklahoma*. March 27, 1996.
- U. S. Environmental Protection Agency (EPA), 2001. *Comprehensive Five-Year Review Guidance*. OSWER No. 9355.7-03B-P. June 2001.

- U. S. Environmental Protection Agency (EPA), 2002a. *Site Status Summary, Oklahoma Refining Company Superfund Site, Caddo County, Oklahoma.* January 31, 2002.
- U. S. Environmental Protection Agency (EPA), 2002b. *Draft Explanation of Significant Difference to the Record of Decision, Oklahoma Refining Company Superfund Site, Cyril, Oklahoma.* March 2002.
- U. S. Environmental Protection Agency (EPA), 2002c. *Five Year Review Site Assignment Worksheet, Oklahoma Refining Company Superfund Site, Cyril, Oklahoma.* April 18, 2002.

Attachment 2
Interview Record Forms

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Five-Year Review Interview Record Oklahoma Refining Company Cyril, Oklahoma		Interviewee: ODEQ representatives Kelly Dixon and Angela Brunsmann Phone: (405) 702-5156 & (405) 702-5135			
Site Name		EPA ID No.		Date of Interview	Interview Method
Oklahoma Refining Company Superfund Site		OKD091598870		4-25-2002	in person at site
Interview Contacts	Organization	Phone	Email	Address	
Craig Carroll	EPA Region 6	214-665-2220	carroll.craig@epa.gov	1445 Ross Ave Dallas, Texas 75204	
Earl Hendrick	EPA Region 6	214-665-8519	hendrick.earl@epa.gov	1445 Ross Ave Dallas, Texas 75204	
Margaret O'Hare	CH2M HILL, as rep of EPA	972-980-2170	mohare@ch2m.com	5339 Alpha Road Suite 300 Dallas, Texas 75240	
Interview Questions					
1. What is your overall impression of the work conducted at the site? Response: The work completed met the requirements of the ROD and was constructed properly. Changes made during design and construction were appropriate and addressed by the ESDs prepared for the site. Source removal at the CPC portion of the site and the groundwater contamination remain to be addressed.					
2. From your perspective, what effect have remedial operations at the site had on the surrounding community? Response: Community interest in the performance of the remediation is not high; most of the community interest is in future use and ownership. The community would like the refinery demolished.					
3. Are you aware of any ongoing community concerns regarding the site or its operation and administration? Please provide details. Response: There is some community concern regarding the ownership and use of the remediated portion of the site, in terms of maintenance of waste covers and future use, and the condition of the remaining refinery structures on the CPC portion of the site.					

4. Are you aware of any significant events, incidents, or activities that have occurred at the site, such as dumping, vandalism, trespassing, or emergency response from local authorities? If so, please give details.

Response: A fire at the rodeo grounds (south of the Site) crossed the fence line. This occurred near the end of construction and did not affect the remediation; the remediation contractor was present. There was also a report of trespassing onsite in an attempt to locate and recover a prehistoric bone rumored to be onsite.

5. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe purpose and results.

Response: Site visits are conducted twice monthly to inspect wells and fences to inspect for vandalism and identify maintenance needs.

6. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please give summarize the events and results of the responses.

Response: Residents have complained about flooding that is caused by poorly maintained drainage ditches on CPC property. The ditches are clogged by vegetation, causing storm water runoff to back up on some residential properties. There have been no complaints regarding the remediated portion of the site.

7. Were any problems or difficulties encountered after the initiation of remedial action which impacted construction progress and implementability? Please briefly summarize the problems/difficulties.

Response: The ESDs address issues encountered during design and/or construction that affected implementation of the remedy as originally intended. Other issues: the landfill specifications as written were difficult to follow and interpret, and the water treatment plant was not designed properly to operate well in cold temperatures. A portion of the north fence line is located on CPC property giving the new owner of the remediated portion of the property access to CPC property, and installation of a new fence is being considered, as well as removal of the perimeter fence and installation of fences around site features that need access restriction (wells). Also, the waste volume encountered during remediation was double that identified during the design. Despite these issues, the construction was completed 6-8 months ahead of schedule and has been implemented to meet the protectiveness intended by the ROD.

8. Were or have any problems been encountered at either site which required or will require changes in the decision documents (Record of Decision and ESDs) or remedial action performed?

Response: These were addressed in the ESD.

9. Have there been any significant changes in the site status or maintenance requirements since completion of remedial action? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

Response: No - the The ground water remedy has not been pursued aggressively. The LNAPL plume beneath the CPC property is a contaminant source for ground water.

10. Have there been opportunities to optimize the operation, maintenance, or sampling efforts at the site since the start of the remedial action? Please describe changes and the resultant or desired cost savings or improved efficiency

Response: Remedies were adjusted as indicated in the ESD.

11. What is the status of groundwater monitoring plan?

Response: The preparation of the ground water monitoring plan has not been completed.

12. Do you feel well-informed about the site's activities and progress?

Response: There has been no enforcement by EPA regarding CPC. A lien has been placed on the CPC property but it only affects previous owners.

13. Do you have any comments, suggestions, or recommendations regarding the site?

Response: Cost recovery should be pursued from CPC and previous owners, and the continuing contamination problems at the CPC portion of the site and in the groundwater need to be addressed.

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Attachment 3
Site Inspection Checklist

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Oklahoma Refining Company, Cyril, Oklahoma Five-Year Review Site Inspection Checklist

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program. N/A means "not applicable."

I. SITE INFORMATION	
Site Name: Oklahoma Refining Company	EPA ID:
City/State: Cyril, Caddo County, Oklahoma	Date of Inspection: April 25, 2002
Agency Completing 5 Year Review: EPA	Weather/temperature: partly cloudy, windy, cool
Remedy Includes: (Check all that apply) <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Landfill cover/containment <input checked="" type="checkbox"/> Access controls <input type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other: Radon barrier placed over tailings piles 	
Attachments: <input checked="" type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached	
II. INTERVIEWS (Check all that apply)	
1. O&M site manager: Name: Title: Date: Interviewed: <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone Number: <u>Problems, suggestions:</u> <input type="checkbox"/> Additional report attached (if additional space required).	
2. O&M staff: Name: Title: Date: Interviewed: <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone Number: <u>Problems, suggestions:</u> <input type="checkbox"/> Additional report attached (if additional space required).	

3. Local regulatory authorities and response agencies (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency: ODEQ

Contact:

Name: Kelly Dixson

Title:

Date: 4/25/2002

Phone Number: (405) 702-5156

Problems, suggestions: Additional report attached (if additional space required).

Agency: ODEQ

Contact:

Name: Angela Brunsman

Title:

Date: 4/25/2002

Phone Number: (405) 702-5135

Problems, suggestions: Additional report attached (if additional space required).

Agency:

Contact:

Name:

Title:

Date:

Phone Number:

Problems, suggestions: Additional report attached (if additional space required).

Agency:

Contact:

Name:

Title:

Date:

Phone Number:

Problems, suggestions: Additional report attached (if additional space required).

4. Other interviews (optional) N/A Additional report attached (if additional space required).

Interview Record Forms are provided in Attachment 2 to the Five-Year Review Report.

III. ONSITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)			
1. O&M Documents <input type="checkbox"/> O&M Manuals <input type="checkbox"/> As-Built Drawings <input type="checkbox"/> Maintenance Logs <u>Remarks:</u>	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
2. Health and Safety Plan Documents <input type="checkbox"/> Site-Specific Health and Safety Plan <input type="checkbox"/> Contingency plan/emergency response plan <u>Remarks:</u>	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
3. O&M and OSHA Training Records <u>Remarks:</u>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
4. Permits and Service Agreements <input type="checkbox"/> Air discharge permit <input type="checkbox"/> Effluent discharge <input type="checkbox"/> Waste disposal, POTW <input type="checkbox"/> Other permits <u>Remarks:</u>	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
5. Gas Generation Records <u>Remarks:</u>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
6. Settlement Monument Records <u>Remarks:</u> Monuments were installed in October 2001. Monuments were initially surveyed at completion of construction. Survey schedule will be included in monitoring plan to be submitted to EPA. Survey of monuments is anticipated to take place every 5 years.	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
7. Groundwater Monitoring Records <u>Remarks:</u> Historic records are on file at ODEQ, Oklahoma City. Monitoring plan has not been submitted to EPA .	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
8. Leachate Extraction Records <u>Remarks:</u> Leachate measurement and extraction schedule will be addressed in the monitoring work plan to be submitted to the EPA.	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
9. Discharge Compliance Records <u>Remarks:</u>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
10. Daily Access/Security Logs <u>Remarks:</u>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
IV. O&M Costs		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A

1. O&M Organization <input checked="" type="checkbox"/> State in-house <input type="checkbox"/> Contractor for State <input type="checkbox"/> PRP in-house <input type="checkbox"/> Contractor for PRP <input type="checkbox"/> Other:			
2. O&M Cost Records <input type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input type="checkbox"/> Funding mechanism/agreement in place Original O&M cost estimate: \$15,121/year <input checked="" type="checkbox"/> Breakdown attached (described in report)			
<u>Total annual cost by year for review period if available</u>			
<u>From (Date):</u>	<u>To (Date):</u>	<u>Total cost:</u>	<input type="checkbox"/> Breakdown attached
<u>From (Date):</u>	<u>To (Date):</u>	<u>Total cost:</u>	<input type="checkbox"/> Breakdown attached
<u>From (Date):</u>	<u>To (Date):</u>	<u>Total cost:</u>	<input type="checkbox"/> Breakdown attached
<u>From (Date):</u>	<u>To (Date):</u>	<u>Total cost:</u>	<input type="checkbox"/> Breakdown attached
<u>From (Date):</u>	<u>To (Date):</u>	<u>Total cost:</u>	<input type="checkbox"/> Breakdown attached
3. Unanticipated or Unusually High O&M Costs During Review Period			<input checked="" type="checkbox"/> N/A
<u>Describe costs and reasons:</u>			
V. ACCESS AND INSTITUTIONAL CONTROLS <input type="checkbox"/> Applicable <input type="checkbox"/> N/A			
A. Fencing			
1. Fencing damaged <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Gates secured <input type="checkbox"/> N/A Remarks: Fencing has been damaged at several locations. Temporary repairs have been made.			
B. Other Access Restrictions			
1. Signs and other security measures <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A Remarks: Signs are present at regular intervals along fence; in good condition.			

C. Institutional Controls			
1. Implementation and enforcement			
Site conditions imply ICs not properly implemented:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
Site conditions imply ICs not being fully enforced:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
Type of monitoring (e.g, self-reporting, drive by): Periodic site visit (minimum once per year).			
Frequency:			
Responsible party/agency: ODEQ			
Contact:			
Name: Kelly Dixson			
Title:			
Date:			
Phone Number:			
Reporting is up-to-date:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Reports are verified by the lead agency:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Specific requirements in deed or decision documents have been met:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Violations have been reported:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Other problems or suggestions:	<input type="checkbox"/> Additional report attached (if additional space required).		
2. Adequacy			
	<input type="checkbox"/> ICs are adequate	<input type="checkbox"/> ICs are inadequate	<input checked="" type="checkbox"/> N/A
Remarks:			
D. General			
1. Vandalism/trespassing			
	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No vandalism evident	
Remarks:			
2. Land use changes onsite			
			<input checked="" type="checkbox"/> N/A
Remarks:			
3. Land use changes offsite			
			<input checked="" type="checkbox"/> N/A
Remarks:			
VI. GENERAL SITE CONDITIONS			
A. Roads			
		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1. Roads damaged			
	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Roads adequate	<input type="checkbox"/> N/A
Remarks:			
B. Other Site Conditions			
Remarks:			

VII. LANDFILL COVERS		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
A. Landfill Surface			
1. Settlement (Low spots) Areal extent: Depth: <u>Remarks:</u>	<input type="checkbox"/> Location shown on site map Depth:	<input checked="" type="checkbox"/> Settlement not evident	
2. Cracks Lengths: Widths: Depths: <u>Remarks:</u> Minor surficial cracking is present, most likely due to dessication from lack of rainfall	<input type="checkbox"/> Location shown on site map Widths: Depths:	<input type="checkbox"/> Cracking not evident	
3. Erosion Areal extent: Depth: surface <u>Remarks:</u> Some erosion evident where vegetation is sparse.	<input type="checkbox"/> Location shown on site map Depth: surface	<input type="checkbox"/> Erosion not evident	
4. Holes Areal extent: Depth: <u>Remarks:</u>	<input type="checkbox"/> Location shown on site map Depth:	<input checked="" type="checkbox"/> Holes not evident	
5. Vegetative Cover <input type="checkbox"/> Cover properly established <input type="checkbox"/> No signs of stress <input checked="" type="checkbox"/> Grass <input type="checkbox"/> Trees/Shrubs <u>Remarks:</u> Embankment of non-hazardous landfill has sparse vegetative cover due to heavy rainfall after completion of construction.			
6. Alternative Cover (armored rock, concrete, etc.) <u>Remarks:</u>		<input checked="" type="checkbox"/> N/A	
7. Bulges Areal extent: Height: <u>Remarks:</u>	<input type="checkbox"/> Location shown on site map Height:	<input checked="" type="checkbox"/> Bulges not evident	
8. Wet Areas/Water Damage <input checked="" type="checkbox"/> Wet areas <input type="checkbox"/> Location shown on site map Areal extent: <input type="checkbox"/> Ponding <input type="checkbox"/> Location shown on site map Areal extent: <input type="checkbox"/> Seeps <input type="checkbox"/> Location shown on site map Areal extent: <input type="checkbox"/> Soft subgrade <input type="checkbox"/> Location shown on site map Areal extent: <u>Remarks:</u> A low/wet area was observed between the non-hazardous waste landfill and the hazardous waste landfill, appears to be runoff from CPC property that is not draining.			
9. Slope Instability Areal extent: <u>Remarks:</u>	<input type="checkbox"/> Slides <input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of slope instability	

B. Benches <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)		
1. Flows Bypass Bench <u>Remarks:</u>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> N/A or okay
2. Bench Breached <u>Remarks:</u>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> N/A or okay
3. Bench Overtopped <u>Remarks:</u>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> N/A or okay
C. Letdown Channels <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)		
1. Settlement Areal extent: Depth: <u>Remarks:</u>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of settlement
2. Material Degradation Material type: Areal extent: <u>Remarks:</u>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of degradation
3. Erosion Areal extent: Depth: <u>Remarks:</u>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of erosion
4. Undercutting Areal extent: Depth: <u>Remarks:</u>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of undercutting
5. Obstructions Type: Areal extent: Height: <u>Remarks:</u>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
6. Excessive Vegetative Growth <input type="checkbox"/> Evidence of excessive growth <input type="checkbox"/> Location shown on site map <u>Remarks:</u>	<input type="checkbox"/> No evidence of excessive growth <input type="checkbox"/> Vegetation in channels but does not obstruct flow Areal extent:	

D. Cover Penetrations		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1. Gas Vents	<input type="checkbox"/> Active <input type="checkbox"/> Passive <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Functioning <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O& M		<input checked="" type="checkbox"/> N/A
<u>Remarks:</u>			
2. Gas Monitoring Probes	<input type="checkbox"/> Routinely sampled <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs O&M		<input checked="" type="checkbox"/> N/A
<u>Remarks:</u>			
3. Monitoring Wells (within surface area of landfill)	<input type="checkbox"/> Routinely sampled <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs O&M		<input checked="" type="checkbox"/> N/A
<u>Remarks:</u>			
4. Leachate Extraction Wells	<input type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs O&M		<input type="checkbox"/> N/A
<u>Remarks:</u> Monitoring schedule will be included in the monitoring plan to be submitted to EPA.			
5. Settlement Monuments	<input checked="" type="checkbox"/> Located <input type="checkbox"/> Routinely surveyed		<input type="checkbox"/> N/A
<u>Remarks:</u> Initially surveyed at completion of construction. Survey schedule will be included in monitoring plan to be submitted to EPA.. Monuments will be surveyed every 5 years.			
E. Gas Collection and Treatment		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. Gas Treatment Facilities	<input type="checkbox"/> Flaring <input type="checkbox"/> Thermal destruction <input type="checkbox"/> Collection for reuse <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O& M		<input type="checkbox"/> N/A
<u>Remarks:</u>			
2. Gas Collection Wells, Manifolds and Piping	<input type="checkbox"/> Good condition <input type="checkbox"/> Needs O& M		<input checked="" type="checkbox"/> N/A
<u>Remarks:</u>			
3. Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)	<input type="checkbox"/> Good condition <input type="checkbox"/> Needs O& M		<input checked="" type="checkbox"/> N/A
<u>Remarks:</u>			

F. Cover Drainage Layer		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1. Outlet Pipes Inspected	<input type="checkbox"/> Functioning	<input checked="" type="checkbox"/> N/A	
<u>Remarks:</u>			
2. Outlet Rock Inspected	<input checked="" type="checkbox"/> Functioning	<input type="checkbox"/> N/A	
<u>Remarks:</u> Consists of sand layer daylight.			
G. Detention/Sedimentation Ponds		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. Siltation	<input type="checkbox"/> Siltation evident	<input type="checkbox"/> N/A	
Areal extent:	Depth:		
<u>Remarks:</u>			
2. Erosion	<input type="checkbox"/> Erosion evident	<input type="checkbox"/> N/A	
Areal extent:	Depth:		
<u>Remarks:</u>			
3. Outlet Works	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A	
<u>Remarks:</u>			
4. Dam	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A	
<u>Remarks:</u>			
H. Retaining Walls		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. Deformations	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident	
Horizontal displacement:	Vertical displacement:	Rotational displacement:	
<u>Remarks:</u>			
2. Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Degradation not evident	
<u>Remarks:</u>			
I. Perimeter Ditches/Off-site discharge		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1. Siltation	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Siltation not evident	
Areal extent:	Depth:		
<u>Remarks:</u>			
2. Vegetative Growth	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Vegetation does not impede flow	
Areal extent:	Type:		
<u>Remarks:</u> Ditches on CPC property are poorly maintained, and clogged with vegetation, reportedly causing water to back up offsite near residences.			

<p>3. Erosion <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Erosion not evident Areal extent: Depth: <u>Remarks:</u> Area along the south perimeter fence line, east of the rodeo grounds, has been undercut by erosion, possibly causing the loss of a monitoring well. A hole approximately two feet in diameter and two feet deep was observed at approximately 250 feet south of monitoring well SBB-11 (along the east boundary fence line) at a drain pipe.</p>
<p>4. Discharge Structure <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Good Condition <u>Remarks:</u></p>
<p>VIII. VERTICAL BARRIER WALLS <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A</p>
<p>1. Settlement <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Settlement not evident Areal extent: Depth: <u>Remarks:</u></p>
<p>2. Performance Monitoring <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Performance not monitored <input type="checkbox"/> Performance monitored Frequency: <input type="checkbox"/> Evidence of breaching Head differential: <u>Remarks:</u></p>
<p>IX. GROUNDWATER/SURFACE WATER REMEDIES <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A</p>
<p>A. Groundwater Extraction Wells, Pumps, and Pipelines <input type="checkbox"/> Applicable <input type="checkbox"/> N/A</p>
<p>1. Pumps, Wellhead Plumbing, and Electrical <input type="checkbox"/> N/A <input type="checkbox"/> All required wells located <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O& M <u>Remarks:</u> Ground water remediation has been postponed.</p>
<p>2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> N/A <input type="checkbox"/> System located <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O& M <u>Remarks:</u></p>
<p>3. Spare Parts and Equipment <input type="checkbox"/> N/A <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires Upgrade <input type="checkbox"/> Needs to be provided <u>Remarks:</u></p>
<p>B. Surface Water Collection Structures, Pumps, and Pipelines <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A</p>
<p>1. Collection Structures, Pumps, and Electrical <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O& M <u>Remarks:</u></p>

<p>2. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> N/A</p> <p><input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M</p> <p>Remarks:</p>
<p>3. Spare Parts and Equipment <input type="checkbox"/> N/A</p> <p><input type="checkbox"/> Readily available <input type="checkbox"/> Good condition</p> <p><input type="checkbox"/> Requires Upgrade <input type="checkbox"/> Needs to be provided</p> <p>Remarks:</p>
<p>C. Treatment System <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A</p>
<p>1. Treatment Train (Check components that apply)</p> <p><input type="checkbox"/> Metals removal <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation</p> <p><input type="checkbox"/> Air stripping <input type="checkbox"/> Carbon adsorbers <input type="checkbox"/> Filters (list type):</p> <p><input type="checkbox"/> Additive (list type, e.g., chelation agent, flocculent)</p> <p><input type="checkbox"/> Others (list): Reverse Osmosis Plant</p> <p><input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M</p> <p><input type="checkbox"/> Sampling ports properly marked and functional</p> <p><input type="checkbox"/> Sampling/maintenance log displayed and up to date</p> <p><input type="checkbox"/> Equipment properly identified</p> <p><input type="checkbox"/> Quantity of groundwater treated annually (list volume):</p> <p><input type="checkbox"/> Quantity of surface water treated annually (list volume):</p> <p>Remarks:</p>
<p>2. Electrical Enclosures and Panels (properly rated and functional) <input type="checkbox"/> N/A</p> <p><input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M</p> <p>Remarks:</p>
<p>3. Tanks, Vaults, Storage Vessels <input type="checkbox"/> N/A</p> <p><input type="checkbox"/> Good condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs O&M</p> <p>Remarks:</p>
<p>4. Discharge Structure and Appurtenances <input type="checkbox"/> N/A</p> <p><input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M</p> <p>Remarks:</p>
<p>5. Treatment Building(s) <input type="checkbox"/> N/A</p> <p><input type="checkbox"/> Good condition (esp. roof and doorways) <input type="checkbox"/> Needs Repair</p> <p><input type="checkbox"/> Chemicals and equipment properly stored</p> <p>Remarks:</p>

6. Monitoring Wells (pump and treatment remedy)		<input type="checkbox"/> N/A
<input type="checkbox"/> All required wells located	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning
<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs O&M	<input type="checkbox"/> Routinely sampled
Remarks:		
D. Monitored Natural Attenuation		<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A
1. Monitoring Wells (natural attenuation remedy)		<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> All required wells located	<input checked="" type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning
<input checked="" type="checkbox"/> Good condition	<input type="checkbox"/> Needs O&M	<input type="checkbox"/> Routinely sampled
Remarks: All CERCLA wells appeared to be in generally good condition, however, hinged above-grade protective covers for several monitoring wells located north of Highway 277 showed severe corrosion, possibly due to off-gassing of hydrogen sulfide in the water. Repair of these well covers needs to be conducted. The ground water monitoring plan which should address such repairs has not yet been submitted to EPA.		
X. OTHER REMEDIES		<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A
(Empty section for other remedies)		

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.)

The remedy was selected to remediate the source areas at the abandoned portion of the Site. EPA and ODEQ agree that all source remediation at the abandoned portion of the Site is complete. The most recent ground water quality monitoring event was conducted for a limited number of monitoring wells in January 2002. A quarterly LNAPL monitoring event was conducted in March 2002. A long-term groundwater monitoring plan should be prepared and implemented to meet the requirements of the remedy selected for this site. In addition, surface water monitoring of the north tributary to Gladys Creek and Gladys Creek should be addressed in the monitoring plan. Remediation of ground water has yet to be completed. Based on observations made during the site visit, the remedy appears to be functioning as designed.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

The protective casings for several ground water monitoring wells have been damaged by corrosion. If possible, these damaged protective casings should be replaced with corrosion-resistant materials. The perimeter fencing has been damaged at several locations. Temporary repairs have been made, but permanent repairs should be made to restrict unauthorized access to the monitoring wells and landfill covers (alternatively, individual fences could be placed around only the restricted areas rather than around the site). The embankment at the non-hazardous waste landfill was observed to have sparse vegetative cover. The embankment should be reseeded to minimize potential erosion of these sloped areas.

C. Early Indicators of Potential Remedy Failure

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

None observed

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Not applicable at the present time. Check in next five-year review.

Attachment 3
Site Inspection Roster for Site Inspection Conducted April 25, 2002
Oklahoma Refining Company Superfund Site

Name	Agency/Company	Phone Number	Email
Craig Carroll	EPA Region 6	214-665-2220	carroll.craig@epamail.epa.gov
Earl Hendrick	EPA Region 6	214-665-8519	hendrick.earl@epamail.epa.gov
Sing Chia	EPA Region 6	214-665-8301	chia.sing@epamail.epa.gov
Angela Brunzman	ODEQ		
Kelly Dixon	ODEQ		
Ray Roberts	ODEQ		
Margaret O'Hare	CH2M HILL	972-980-2170	mohare@ch2m.com
Bill Thomas	CH2M HILL	972-980-2170	wthomas@ch2m.com

Attachment 4
Site Inspection Photographs

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Photograph 1: Sparse vegetative cover visible on embankment of non-hazardous waste landfill.



Photograph 2: Surface of non-hazardous waste landfill showing wheat cover.



Photograph 3: Settlement monument on non-hazardous waste landfill.



Photograph 4: Looking east from non-hazardous waste landfill across access road to hazardous waste landfill.



Photograph 5: Looking west along south perimeter access road. Off-site rodeo ground property is visible in left background.



Photograph 6: Typical ground water monitoring well.



Photograph 7: Storm water outfall No. 003 for off-site discharge.



Photograph 8: South perimeter fence. Unused well offsite in left center of photograph.



Photograph 9: Looking west along the south perimeter fence line and access road.



Photograph 10: Looking south, offsite at drainage feature/tributary to Gladys Creek.



Photograph 11: Looking west along south perimeter road at on-site rock outcrop.



Photograph 12: Looking north along the east perimeter road.



Photograph 13: Looking through east perimeter fence at Gladys Creek stream cut.



Photograph 14: Looking east through east perimeter fence, at Gladys Creek.



Photograph 15: Damaged fence along east perimeter and hole caused by erosion, approximately 250' south of monitoring well SBB-11.



Photograph 16: East perimeter fence.



Photograph 17: Looking east through perimeter fence to Brown pond.



Photograph 18: Looking north, from northern perimeter road.



Photograph 19: Looking south towards CPC storage tanks.



Photograph 20: Settlement monument on hazardous waste landfill.



Photograph 21: Wheat cover on hazardous waste landfill.



Photograph 22: Wheat cover on Hazardous waste landfill.



Photograph 23: Landfill sump, hazardous waste landfill.



Photograph 24: Wheat cover on south embankment of hazardous waste landfill.



Photograph 25: Ground water monitoring well at south embankment of hazardous waste landfill.



Photograph 26: Concrete foundation of former water treatment facility.



Photograph 27: Looking south across site. Groundwater monitoring well in center background.



Photograph 28: along side of hazardous waste landfill.



Photograph 29: Former site water well. Located south of hazardous waste landfill.



Photograph 30: South of hazardous waste landfill, looking south across site.



Photograph 31: Between non-hazardous waste landfill and hazardous waste landfill, looking north to CPC property.



Photograph 32: Wet area between non-hazardous waste landfill and hazardous waste landfill, looking north to CPC property.



Photograph 33: Looking north across north perimeter road and fence to CCP property. Drainage feature flows to wet area between the non-hazardous waste landfills.



Photograph 34: Looking through north perimeter fence to CPC property.



Photograph 35: On-site decon pad, CPC property with storage tanks in background.



Photograph 36: On-site ground water monitoring wells north of non-hazardous waste landfill at north perimeter fence.



Photograph 37: Looking east through fence, groundwater monitoring well on CPC property.



Photograph 38: Sign identifying site.



Photograph 39: Monitoring wells on CPC property. Damaged RCRA well in foreground.



Photograph 40: Looking west along surface water runoff ditch on CPC property, clogged by vegetation and debris.



Photograph 41: Groundwater monitoring wells on CPC property. Approximately 20 feet LNAPL measured in SBB37 (3-27-2002).



Photograph 42: Ground water monitoring well located north of Highway 277. Protective casing damaged by corrosion (possibly hydrogen sulfide).



Photograph 43: Ground water monitoring well located north of Highway 277. Protective casing damaged by corrosion (possibly hydrogen sulfide).



Photograph 44: Ground water monitoring well located in pasture, north of Highway 277.



Photograph 45: Ground water monitoring well north of Highway 277, south of tributary to Gladys Creek.



Photograph 46: Confluence of tributary and Gladys Creek in right center ground.
Ground water monitoring well (with drum) in background.