REGION 6

SOURCE CONTROL RECORD OF DECISION SUMMARY

WILCOX OIL COMPANY SUPERFUND SITE
BRISTOW, CREEK COUNTY, OKLAHOMA
OK0001010917

SEPTEMBER 2018

9951975

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LIST OF ACRONYMS

ARARs	Applicable or Relevant and Appropriate Requirements
ATSDR	Agency for Toxic Substances and Disease Registry
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COCs	Contaminants of Concern
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
ESI	Expanded Site Investigation
FS	Feasibility Study
ft	Feet or Foot
HRS	Hazard Ranking System
ICs	Institutional Controls
LDR	Land Disposal Restrictions
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NCP	National Contingency Plan
ng	nanograms
NPL	National Priorities List
O&M	Operations and Maintenance
ODEQ	Oklahoma Department of Environmental Quality
ODOT	Oklahoma Department of Transportation
PAH(s)	Polycyclic Aromatic Hydrocarbon(s)
PRP	Potentially Responsible Party
PTW	Principal Threat Waste
RAO(s)	Remedial Action Objective(s)
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SL	Screening Level
TCLP	Toxicity Characteristic Leaching Procedure
µg/L	micrograms per liter
$\mu g/m^3$	micrograms per cubic meter
XRF	X-ray fluorescence
y^3	cubic yard

SOURCE CONTROL RECORD OF DECISION - PART 1: THE DECLARATION

1. SITE NAME AND LOCATION

Wilcox Oil Company Superfund Site
Bristow, Creek County, Oklahoma
OK0001010917

2. STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for cleaning up the refinery tank waste and the lead additive area source materials at the Wilcox Oil Company Superfund Site (Site), Bristow, Oklahoma. This source control remedial action is a limited in scope to addressing tank waste and lead additive area source materials through excavation, treatment, and offsite disposal. Because this source control action does not constitute the final remedy for the Site, subsequent actions to address the threats posed by conditions at this Site will be documented in a future final Site-wide decision document.

The selected source control remedial action is chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), 42 U.S.C. § 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300 as amended. The Director of the Superfund Division, United States Environmental Protection Agency (EPA) Region 6, is delegated the authority to approve this Record of Decision (ROD).

This decision is based on the Administrative Record, which is developed in accordance with Section 113 (k) of CERCLA, 42 U.S.C. § 9613 (k), and which is available for review at the Bristow Public Library in Bristow, Oklahoma, and the Oklahoma Department of Environmental Quality (ODEQ) in Oklahoma City, Oklahoma. The Administrative Record Index identifies each of the items comprising the Administrative Record upon which the selection of the source control remedial action is based.

The State of Oklahoma concurs with the selected source control remedy (Appendix A). The EPA consulted with the Muscogee (Creek) Nation, Cherokee Nation, and Sac and Fox Nation to coordinate review and discussion of the source control remedial action.

3. ASSESSMENT OF THE SITE

The source control response action selected in this Record of Decision (ROD) is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

4. DESCRIPTION OF THE SELECTED REMEDY

This source control ROD documents the selected source control remedial action for cleaning up the refinery tank waste and the lead additive area source materials at the Site. This action is an early action limited in scope to address tank waste and an interim action limited in scope to address the lead additive area. These early/interim response actions target the removal of source

materials while EPA continues to investigate the nature and extent of contamination and develop and implement a final Site-wide remedy decision.

The major components of the remedy include excavation, treatment and offsite disposal at an estimated present worth cost of $4,135,294.

- Approximately 2,269 cubic yards (y^3) of lead additive area source material and 28,093 y^3 of tank waste source material will be excavated for a total of approximately 30,362 y^3.
- Approximately 2,269 y^3 of lead additive area source material will be treated through stabilization/solidification.
- All excavated and treated source material will be transported to an offsite permitted and regulated disposal facility.
- Excavated areas will be sampled, backfilled with clean soil from an offsite location, and re-vegetated.
- All excavated areas will be graded for drainage.

5. STATUTORY DETERMINATIONS

The source control remedial action is protective of human health and the environment in the short term; is intended to provide adequate protection until a final Site-wide ROD is signed; complies with those federal and state requirements that are applicable or relevant and appropriate for this limited early/interim source control action; and is cost-effective. Although this early/interim source control action is not intended to address fully the statutory mandate for permanence and treatment to the maximum extent practicable, this early/interim source control action does utilize treatment and thus supports that statutory mandate. This early/interim source control remedy satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment). The lead additive area source material is considered principal threat waste (PTW) because it is toxic and mobile. The lead additive area source material will be treated through stabilization/solidification prior to offsite disposal.

This source control action is an early/interim action that does not constitute the final remedy for the Site, therefore, any subsequent actions to address the threats posed by conditions at this Site will be documented in a final Site-wide decision document. This source control action will not preclude implementation of or be inconsistent with any future final side-wide decisions. In addition, further discussion related to the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element will be presented in the final Site-wide decision document.

Because this source control remedy is an early/interim action and a full investigation and risk assessment have not been completed, a review of this action will be conducted to ensure that the remedy continues to provide adequate protection of human health and the environment within five years after commencement of the early/interim source control remedial action [40 C.F.R. §300.430(f)(4)(ii)]. These reviews will be ongoing as EPA continues Site investigation activities and develops and implements a final Site-wide remedy.

6. DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD. Additional information can be found in the Administrative Record file for this Site.

1. How source materials constituting principal threats are addressed. See Sections 5 and 18.
2. Contaminants of Concern (COCs) and their respective concentrations. See Sections 12, 14, and 15 and Table 5.
3. Current and reasonably anticipated future land use assumptions used in the ROD. See Section 13.
4. Risk summary represented by the COCs. See Section 14 and Table 3.
5. Cleanup levels established for COCs and the basis for these levels. See Section 15 and Table 5.
6. Potential land use that will be available at the Site as a result of the Selected Remedy. See Section 19.
7. Estimated capital, annual operations and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected. See Sections 16 and 20 and Appendix B.
8. Key factor(s) that led to selecting the remedy (i.e., describe how the selected source control remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision). See Sections 19 and 20.

7. AUTHORIZING SIGNATURES

This Source Control ROD documents the selected early/interim remedial action for cleaning up the refinery tank waste and the lead additive area source materials at the Wilcox Oil Company Superfund Site, Bristow, Oklahoma. This remedy is selected by EPA with concurrence from the Oklahoma Department of Environmental Quality.

_____ _____

Carl E. Edlund, P.E. Date
Division Director, Superfund
U.S. Environmental Protection Agency

8. SITE NAME, LOCATION, AND BRIEF DESCRIPTION

The Site is an abandoned and mostly demolished oil refinery located northeast of Bristow, Creek County, Oklahoma (Figure 1; EPA, 2013). The approximate geographic coordinates for the Site are 35°50'31" North latitude and 96°23'02" West longitude. The Site spans approximately 140 to 150 acres located in the N ½ of the NW ¼ of S29 T16N R9E and the SW ¼ of the SW ¼ of S20 T16N R9E in Creek County, Oklahoma (EA, 2016).

On May 24, 2013, EPA proposed Wilcox Oil Company to the National Priorities List (NPL). On December 12, 2013, the Site officially became a Federal Superfund Site (EPA Identification No. OK0001010917), when it was added to the NPL.

The U.S. Environmental Protection Agency (EPA) is the lead agency for Site activities, and the Oklahoma Department of Environmental Quality (ODEQ) is the support agency. The EPA consulted with the Muscogee (Creek) Nation, Cherokee Nation, and Sac and Fox Nation to coordinate review and discussion of the source control remedial action.

9. SITE HISTORY AND ENFORCEMENT ACTIVITIES

Records indicate the property was used for oil refinery operations from 1915 until November 1963 (ODEQ, 1994), and consisted of two refinery process areas and two tank farm storage areas (Figure 2). Oil refining began in 1915 at the Lorraine Refinery followed by operations at the Wilcox Oil Refinery. A modern skimming and cracking plant with an operating capacity of 4,000 barrels of crude oil per day was constructed for the Wilcox Oil Refinery in 1929 (Reid, 1930). The main components of the plant consisted of a skimming plant, cracking unit, and re-distillation battery with a vapor recovery system and treatment equipment (ODEQ, 1994). The Wilcox Oil Company expanded when it acquired the Lorraine Refinery in 1937.

Sanborn Fire Insurance Maps (EA, 2016) show the properties contained approximately 80 storage tanks of various sizes, a cooling pond, and approximately 10 buildings housing refinery operations. The maps also indicate that crude oil, fuel oil, gas oil, distillate, kerosene, naphtha, and benzene (petroleum ether) were all stored on the property (ODEQ, 1994).

Wilcox Oil Company sold the property to private individuals in 1963. Most of the equipment and storage tanks were auctioned or salvaged for scrap metal. Wilcox Oil Company no longer operates in Oklahoma, and based on information from the Oklahoma Secretary of States' office, the company merged with Tenneco Oil Company in 1967 (ODEQ 1994).

The EPA and the ODEQ have conducted multiple investigations at the Site since 1994. The associated historical documents are listed below.

- Preliminary Assessment of the Wilcox Oil Company (ODEQ, 1994)
- Expanded Site Inspection (ESI) Report – Wilcox Oil Company (Weston, 1997)
- Site Assessment Report for Wilcox Refinery (Ecology and Environment, Inc., 1999)
- Preliminary Assessment of the Lorraine Refinery Site (ODEQ, 2008)
- Site Inspection Report – Lorraine Refinery (ODEQ, 2009)
- ESI Report – Lorraine Refinery (ODEQ, 2010)

- ESI Report – Wilcox Refinery (ODEQ, 2011)
- Supplemental Sampling Report for Wilcox ESI (ODEQ, 2012)

Following Site listing on the NPL, the EPA, in conjunction with ODEQ, performed additional Site investigations. The EPA is currently working on the Site-wide remedial investigation (RI) to fully characterize the nature and extent of contamination, potential transport pathways, and potential human health and environmental risks. This information will be provided in the final RI and Risk Assessment reports for the Site.

- *Removal Assessment Report for Wilcox Oil Company* (Weston Solutions Inc., 2016). During May/June/July 2015, EPA performed residential soil sampling and fenced potential exposure areas to restrict access.
- *Trip Report: November 30 through December 16, 2015, Wilcox Oil Company Superfund Site* (LMS, 2016). In 2015, EPA conducted a geophysical survey, a Rapid Optical Scanning Tool laser-induced fluorescence survey, and a field-portable X-ray fluorescence (XRF) survey across portions of Wilcox and Lorraine Process Areas and the East Tank Farm.
- Phase 2 – Mobilization 1, Field Events 1, 2, 3, and 4 August 2016-April 2017: Passive Soil Gas Sampling, Vapor Intrusion Sampling, Residential Well Sampling, Soil Sampling, Naturally Occurring Radioactive Material Survey (ODEQ, 2016), and Sand Creek Surface Water Sampling (Field Event Sampling Data, unpublished).
- Removal Action – September/October 2017: removal of approximately 1349 tons of tank waste was removed from a residential property. The area was backfilled with clean dirt, graded, and reseeded (Weston Solutions Inc., 2017).
- Phase 2 – Mobilization 2, Field Event 5 October/November 2017: Soil, sediment and surface water sampling (Field Event Sampling, unpublished).
- Phase 2 – Mobilization 2, Field Event 6 March 2018: Soil sampling in the North Tank Farm (Field Event Sampling, unpublished).

The EPA completed two searches for potentially responsible parties, and identified five. Information request letters and special notice letters were issued requesting specific Site information and notifying the parties of potential liability for Site response activity. The EPA offered the parties the option to negotiate performance of the work. All parties declined. Based on these responses and Site research, the Agency determined that further negotiations would not move the project forward in a timely manner; therefore, the Site remedial investigation (RI) and feasibility study (FS) is being completed as an EPA fund-lead project.

10. COMMUNITY PARTICIPATION

Throughout the investigation process, the community has been interested and involved with Site activity. The ODEQ and EPA have kept the community and other interested parties updated on Site activities through informational meetings, Site informational web pages, fact sheets, and public meetings. In addition, residents living within the Site boundaries have participated in one-on-one meetings.

- NPL Listing: On April 1, 2013, EPA released a notice indicating that EPA received a letter of support from ODEQ for placing the Site on the National Priorities List (NPL). On May 22, 2013, EPA released a Public Notice notifying the community that EPA and

ODEQ were proposing the Site to the NPL and requested public comments on the NPL proposal package. The Site was placed on the NPL December 12, 2013, followed by a second Public Notice to inform the public on the same day.

- Community Relations Plan: The EPA released a Community Relations Plan in April 2014 outlining a program to address community concerns and keep citizens informed about and involved in the remedial activities. Updated: 4/2015 and 1/2016.
- Open Houses and Status Fact Sheets: The EPA and ODEQ have held several open houses, individual property owner meetings, and mailed out fact sheets to provide information related to Site activities. Past dates include 1/2014; 3/2015; 4/2015; 5/2015; 10/2015; 7/2016; 3/2017; 4/2017; and 11/2017.
- Site meetings with Tribes: The EPA and ODEQ have held meetings with the Muscogee (Creek) Nation, Cherokee Nation, and the Sac and Fox Nation. Past dates include 3/2015; 4/2015; 5/2015; 8/2015; 9/2015; 4/2017; and 7/2017 (Inter-tribal Environmental Council Conference). In preparation for the Source Control Record of Decision, Consultation letters were provided to Cherokee Nation, Muscogee (Creek) Nation, and the Sac and Fox Nation on February 6, 2018. Documentation and review requests were provided directly to environmental staff on February 6, 2018, with a meeting to discuss the Site proposal on April 16, 2018. Following completion of the proposed plan comment period, the draft source control ROD was provided directly to environmental staff via email on July 27, 2018, for review and comment.
- Technical Assistance Grant: On February 11, 2014, the EPA published a public notice announcing the availability of a technical assistance grant. No technical assistance grants were issued for this Site.
- Site Repository: The Bristow Public Library is the repository for Site information where the community can review documents and fact sheets related to the Site.
- EPA and ODEQ Website status summaries: These websites are updated regularly to keep the public informed of Site issues and progress as well as provide them with access to Site documentation.
- Proposed Plan Fact Sheet and Public Meeting: The Proposed Plan was released on June 28, 2018. The formal Proposed Plan Public Meeting was held on July 10, 2018, and the comment period lasted from June 28, 2018, through July 31, 2018. Only oral comments submitted during the public meeting were received.

11. SCOPE AND ROLE OF RESPONSE ACTION

This source control action is an early action limited in scope to address tank waste and an interim action limited in scope to address the lead additive area. This action is considered an early final action for the tank waste due to the complete removal of the tank waste source material. This action is considered an interim action for lead because only source material in the lead additive area is being addressed. Final Site-wide remediation, including lead, will be addressed in the final remedy selected for the Site. Because this source control action does not constitute the final remedy for the Site, subsequent actions to address the threats posed by conditions at this Site will be documented in a final Site-wide decision document. Addressing these sources early in the process is consistent with current regulations and guidance and will not preclude or be inconsistent with the implementation of a final Site-wide remedy. The EPA will continue to investigate the nature and extent of contamination during the Site-wide RI.

The tank waste and lead additive area are source materials; however, only the lead source material is identified as principal threat waste (PTW). The source control action addresses these sources through removal, treatment of the lead additive area, and offsite disposal. Addressing the tank waste and the lead additive area early in the remedial process eliminates sources that are a continual source of direct exposure to humans living on or near these areas, eliminates immediate human health and ecological risk, eliminates a continual source of migration to wetland and surface water body environments, and reduces limitations on reuse and redevelopment, specifically the use of the properties as residential. In addition, removal of these source materials eliminates the migration of contaminants to ground water.

The EPA expects to use treatment to address the principal threats posed by a Site, wherever practicable, and engineering controls for waste that poses a relatively low long-term threat or where treatment is impracticable [40 C.F.R. § 300.430(a)(l)(iii)(A)]. The tank waste is not a listed hazardous waste nor is it identified as a characteristic hazardous waste under 40 CFR § 261 Subpart C based on current Site data. Treatment prior to disposal in an appropriately permitted and regulated offsite Resource Conservation and Recovery Act (RCRA) landfill is not necessary. Treatment of tank waste will increase cost, increase volume, and increase schedule and time to meet cleanup levels. The increase in cost and schedule far exceeds risk reduction benefit (EPA, 2018).

The lead additive area is not a listed hazardous waste; however, it is identified as a characteristic waste under 40 CFR § 261.24 based on current Site data. Toxicity Characteristic Leaching Procedure results show that lead leaches from the lead additive area source material above criteria that would allow for land disposal. Because of this, the lead additive area source material will need to be treated such that the lead does not leach above land disposal criteria. The use of treatment will meet the statutory preference for treatment.

For the purposes of this source control action, it is assumed that all areas will be addressed during one remedial action. Because these are distinct source areas, each area can be addressed independently; therefore, if all areas are not addressed under one action, then these areas can be prioritized based on potential exposure risk and addressed as funding is available. Source areas would be addressed in accordance with the selected source control action remedial alternative, albeit on different schedules.

12. SITE CHARACTERISTICS

This section summarizes the current information available about Site characteristics. The EPA is currently working on the Site-wide RI to fully characterize the nature and extent of contamination, potential transport pathways, and potential human health and environmental risks. This information will be provided in the final RI and Risk Assessment reports for the Site.

General Description

After the refinery operations ceased and most of the tanks and buildings were demolished and sold for scrap, the property was sold to private interests (ODEQ, 1994). Beginning in 1975 with the construction of a church and parsonage, private residences were constructed on six parcels of land that were part of the former refinery operations, with the most recent being constructed in 2003/2004. One of these residences is the former office/lab building associated with the refinery. As a result, there are seven residential properties located within former tank or refinery operation

areas, three of which are occupied and one periodically rented. In addition, two occupied residential properties on the eastern portion of the Site (East Tank Farm) use water from domestic/private wells (ODEQ, 1994).

The Site is flanked by Route 66 to the west; a residential area and Turner Turnpike to the northwest and north; Sand Creek to the west and southwest; and residential, agricultural, and wooded areas to the east and south (Figure 2). The topography of the Site slopes to the south. The drainage pattern of the property is primarily towards Sand Creek. An intermittent stream (West Tributary), a perennial stream (East Tributary), and several drainage channels transect the property east of the railroad (Wilcox Process Area and East Tank Farm), all of which flow into Sand Creek (EA, 2016).

The facility can be divided into five (5) major former operational areas (Figure 2): the Wilcox and Lorraine Process Areas, the East and North Tank Farms, and the Loading Dock Area (EA, 2016). An active railroad divides the two former process areas and product storage areas. Historical waste management practices are not known at this Site. Historical Sanborn maps are available for some areas of the Site and were reviewed to identify the possible locations where contamination may have originated (Figure 3). Waste associated with crude oil refining may include the following: petroleum-related compounds, tank sludges/solids, crude oil, fuel oil, gas oil, petroleum distillate, kerosene, benzene, petroleum ether, brine, acid and caustic sludge, heavy metals, coke, sulfur compounds, solvents, and naturally-occurring radioactive material. Hexavalent chromium may be present where activities associated with cooling towers and cooling ponds took place (EA, 2016).

Source material is defined as material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to ground water, to surface water, to air, or acts as a source for direct exposure (EPA, 1991). Site investigation activities identified the two source materials, tank sludge/solids and the lead additive area solids, that are the focus of this source control action. These are described in the following paragraphs.

Tank Sludge/Solid Waste

Data collected during historic and current Site investigations show that refinery operations resulted in the presence of tank sludge/solid waste that can be either a contaminated oily tar-like viscous liquid and/or a black dry solid (Figures 4a - c). The tank sludge/solid waste is found throughout the property at various locations, primarily associated with former tank storage locations (Figure 5). Both the liquid and solid forms are found at and below the surface to depths estimated as deep as 6 feet below ground surface (bgs). The oily tar-like viscous liquid present at or just below a thin layer of soil migrates to the surface and spreads out when heated by the summer sun. Throughout this document, the tank sludge/solid waste will be referred to as tank waste.

The Hazard Ranking System (HRS; EPA, 2013) document identified ten (10) potential source areas with associated releases of polycyclic aromatic hydrocarbons (PAHs) and metals to the nearby wetlands and Sand Creek. The RI investigation verified the presence of tank waste at eight (8) former tank areas and one separation pit (Figure 5). In 2015, fencing was constructed around the separation pit and the church property to restrict access to source areas. Due to its

proximity to a residential home, the EPA performed a removal action in October 2017, at one of the former tank locations to address approximately 1,349 tons of tank waste. The remaining former tank areas (7) and separation pit are source materials identified for remediation due to the presence of high contaminant concentrations, proximity to residential homes, and the proximity to the creek.

Results for samples collected from the tank waste are as high as 3,660 milligrams per kilogram (mg/kg) lead, 12 mg/kg Benzo(a)pyrene, 1,400 mg/kg 2-methylnaphthalene, and 875,000 mg/kg total petroleum hydrocarbons (Table 1). These wastes are not identified as listed hazardous wastes and data results indicate that the tank waste is not a characteristic hazardous waste.

During August 2016 to August 2017 Phase 2 field events, passive soil gas and indoor air data were collected. The passive soil gas data show the tank waste has the potential to generate soil gases that can contain contaminants (Beacon, 2016), while the indoor air data from all three sampled structures show some contaminants, including benzene and ethylbenzene, are present above indoor air health-based screening numbers (Table 2).

Soil data collected within close proximity to the tank waste show elevated levels of PAHs with minor concentration of other semivolatile organics. Benzo(a)pyrene ranges from 0.018 – 12 mg/kg, benzo(a)anthracene ranges from 0.16 to 11 mg/kg, and benzo(b)fluoranthene ranges from 0.16 to 20 mg/kg.

Lead additive area

In addition to the tank waste, an area located on the Wilcox Process area is contaminated with high levels of lead and phenols (Figures 4d and 5; LMS, 2016). This area is denuded of vegetation and covered by silty sparkling sand and a white, salt-like substance (LMS, 2016). Significant surface erosion from this area extends to the south towards Sand Creek. According to the Sanborn Maps, acid tanks were located in this area as well. Throughout this document, this area will be referred to as the lead additive area.

According to a 1930 article published in, *The Refiner and Natural Gasoline Manufacturer*, the Wilcox Oil Company refinery used sodium plumbite (Na_2PbO_2) as an additive for gasoline to remove sulfur impurities and meet corrosion specifications (Reid, 1930). The presence of high levels of phenols in conjunction with high levels of lead in this area appears to indicate that chemicals from the additive process are the sources for the contamination (LMS, 2016).

The source area was tested extensively using a field portable sampling device, called an x-ray fluorescence device (XRF). When tested with XRF, the sand and white, salt-like substance tested very high for lead content. Readings were above the calibration range, indicating percent levels of lead are present (LMS, 2016). Lead results for samples collected during Site investigations range as high as 43,200 to 105,000 mg/kg (Table 1; Weston 1997; ODEQ, 2012; EPA, unpublished). In general, lead appears to attenuate quickly with depth falling to <100 mg/kg at about 1-foot depth (LMS, 2016). This is based on data collected from 3 boring locations; therefore, a more comprehensive vertical delineation is needed throughout this area. This area is likely impacting Sand Creek due to high lead concentrations at the surface throughout this area and associated drainages that flow to Sand Creek (LMS, 2016). Lead in sediment has been

detected at levels exceeding two times the human health bioaccumulation screening level of 17 mg/kg and the ecological screening level of 35 mg/kg with concentrations of 37 mg/kg (ODEQ, 2009), 117 mg/kg (Weston 1997), and 224 mg/kg (EPA, unpublished).

Temporary piezometers were installed within the lead additive area and associated Tank 12 area to collect shallow water encountered when installing soil borings within the lead additive area. The shallow water is present in an area underlain by clay, it's quantity appears to be directly related to rainfall events, and the piezometers were slow to recharge or did not recharge at all. Only three piezometers yielded enough water for a sample, albeit not enough to satisfy the entire volume required by the laboratory. High concentrations of contaminants were detected in samples (Table 1), including total and dissolved lead as high as 752 micrograms per liter (µg/l), 2-methylphenol as high as $1.5x10^6$ µg/l, phenol as high as 270,000 u/l, 2,4 dimethylphenol as high as $1.3x10^6$ µg/l, and benzene as high as 2400 µg/l (LMS, 2016).

Migration and Exposure Pathways

Previous and current Site investigations document releases of hazardous substances to indoor air, sediment, and soil. These migration pathways are a major concern because of the potential for direct exposure for human and ecological receptors, the proximity to residential homes, and the proximity to surface water bodies. Currently, impacts to ground water and surface water have not been fully evaluated; however, it is noted that shallow water samples had concentrations of contaminants and there is evidence of water migration through the banks of Sand Creek.

Tank waste is present in numerous areas across the Site either at the surface or just below the surface. During the warm summer months, the liquid wastes migrate to the surface and spread across the soil. The heat softens the tank waste facilitating migration. In addition, heavier objects (e.g., human, cow, deer, vehicle) that travel across these sources will sink into or push the tank waste to the surface. This has been observed during Site investigation activities.

Runoff from the Wilcox Site flows south and southwest into Sand Creek, and east into the East Tributary which flows into Sand Creek. Sand Creek flows southeast until it merges with Little Deep Fork Creek approximately 3.5 miles from the Site (EPA, 2013). According to the State of Oklahoma, Sand Creek is considered a Habitat Limited Aquatic Community, and a Secondary Body Contact Beneficial Use, as well as having agricultural and aesthetic beneficial uses. Little Deep Fork Creek downstream from Sand Creek is considered a Warm Water Aquatic Community, and a Primary Body Contact Beneficial Use, as well as having agricultural and aesthetic beneficial uses. Also, within 15-miles of the Site is the Heyburn Wildlife Management Area. This area and its associated watershed are designated sensitive areas by the Oklahoma Department of Wildlife Conservation (ODEQ, 2011).

Wetland areas are present onsite (EA, 2017), in the downstream segments of Sand Creek and further downgradient in Little Deep Fork Creek. There is no documentation or evidence to indicate that the tank areas or the lead additive area had or maintained a run-on control system or runoff management system (including treatment of diked liquids), liner, or an engineered cover (EPA, 2013). These conditions remain a concern as the presence of tank waste and metals contamination has been verified along Sand Creek (Figure 5). The tank waste and lead additive sources have limited or no containment features for floods and many of the original berms have

either been leveled or cut to allow drainage from the sources to run off (Weston 1997 and field observations, unpublished, 2016-2018). In addition, the lead additive area has no containment features and runoff drains directly to a ditch that flows to Sand Creek.

A total of 9 source areas are identified for source control action (Table 3): Two (2) are within 225 - 300 feet of a residence, 5 are within 225 feet of either Sand Creek or the East Tributary that drains to Sand Creek, 1 is located on a residential property, and the last is located within a cow pasture. Fencing currently restricts and limits direct exposure for the short-term.

13. CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

The Site includes residential, agricultural, and business property that drains directly to two perennial waterbodies. The current residential and business land uses and surface water uses are not expected to change. In addition, the owner of the agricultural land indicated that this property may be used as residential property in the future. This early/interim action does not address groundwater.

The Site-wide RI/FS is currently ongoing. Likewise, the Site-wide ecological and human health risk assessments are ongoing. This action is an early action limited in scope to address tank waste and an interim action limited in scope to address the lead additive area. Because this action is not the final remedy for the Site, the remaining areas of the Site will be addressed and documented in a future final Site-wide decision document. Final expected land and resource use will be evaluated in the final decision document for the Site.

14. SITE RISKS

The final Human Health Risk Assessment which will define the full extent of human health risks at the Site has not been completed. Based on data collected during RI activities, concentrations of contaminants associated with the tank waste and the lead additive area exceed residential cancer and noncancer screening levels by orders of magnitude (Table 4). In addition, RI data show that the indoor air and direct exposure pathways are complete for the tank waste while the direct exposure pathway is complete for the lead additive area. Tank waste has been verified within 300 feet of two residential properties. If no action is taken, these sources will continue to pose a long-term health threat to human and ecological receptors.

The final Ecological Risk Assessment which will define the full extent of ecological risks at the Site has not been completed. Based on data collected during RI activities, contaminants from the tank waste and the lead additive area have migrated to soil and sediment. These sources are found on or near the ground surface. The source areas have limited or no containment features for floods and many of the original berms have either been leveled or cut to allow drainage from the sources to surrounding areas. No containment features are present around the lead additive area allowing runoff to drain directly to a ditch that discharges to Sand Creek. Tank waste has been verified within one cow pasture while tank waste and lead additive area sources have been verified within 225 feet of perennial waterbodies. If no action is taken, these sources, present at or near the ground surface, will continue to pose a long-term threat of release of hazardous substance to the environment, specifically the perennial water bodies.

Neither a formal RI/FS report nor a human health or ecological risk assessment have been completed. Excess risk exposures to tank waste and lead additive area source materials are not

calculated. The contaminants of concern (COCs) are selected using the November 2017 Regional Screening Levels (SLs; Table 5) for residential and industrial exposures to soil (EPA, 2017a). The SLs for residential exposures to soil include exposures by incidental ingestion of soil, dermal contact of soil, and inhalation of fugitive dust generated from soil. The SLs correspond to an excess carcinogenic risk of 1 E-06 or a non-carcinogenic hazard index of 1. Contaminants are considered potential contributors to risk if either the carcinogenic SL or the hazard index SL are exceeded.

Lead and benzo(a)pyrene are selected as the COCs. Lead is present throughout the lead additive area and exceeds the soil health-based target level. Benzo(a)pyrene is a polycyclic aromatic hydrocarbon (PAH) present in the tank waste and is carcinogenic to humans based on strong and consistent evidence in animals and humans (EPA, 2017b). Benzo(a)pyrene is selected as the representative contaminant for the PAH group because of its low soil health-based target level, it is most commonly detected in the tank waste, and it is co-located with the other PAHs.

Basis for Action

This action is an early action limited in scope to address tank waste and an interim action limited in scope to address the lead additive area. The source control action selected in this ROD is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment which may present an imminent and substantial endangerment to public health or welfare or the environment.

By taking this source control action, significant human health and ecological risk reduction will be accomplished through removal of primary sources located throughout the Site at or near the soil surface, specifically residential properties. In addition, further migration and environmental degradation of adjacent waterways (e.g., Sand Creek and the East Tributary), wetlands, and stream riparian areas will be eliminated.

15. REMEDIAL ACTION OBJECTIVES

Taking appropriate source control actions at sites during the investigation stage of the process is consistent with the National Contingency Plan (NCP) and existing EPA guidance. The NCP [40 CFR § 300.430(a)(1)] states, “Remedial actions are to be implemented as soon as site data and information make it possible to do so.” This is further clarified in the preamble to the NCP (Federal Register, 1990),

EPA expects to take early action at sites where appropriate and to remediate sites in phases using operable units as early actions to eliminate, reduce or control the hazards posed by a site or to expedite the completion of total site cleanup. In deciding whether to initiate early actions. EPA must balance the desire to definitively characterize site risks and analyze alternative remedial approaches for addressing those threats in great detail with the desire to implement protective measures quickly.

EPA promotes the responsiveness and efficiency of the Superfund program by encouraging action prior to or concurrent with conduct of an RI/FS as information is sufficient to support a remedy selection. These actions may be taken under removal or remedial authorities as appropriate.

The source control action is appropriate and consistent with the NCP and existing EPA guidance. The source control action will

- eliminate, reduce, or control actual or potential risks and hazards posed by the source material;
- eliminate, reduce, or control actual or potential migration of contaminants or further environmental degradation posed by the source material;
- expedite Site cleanup completion;
- promote prompt risk reduction and increase Site response efficiency; and,
- be consistent with the final Site remedy.

The remedial action objectives (RAOs) for the source materials are listed below.

- RAO-1: Prevent ingestion and dermal contact exposure to human and ecological receptors through the removal of tank waste to reach a target health-based concentration of 0.11 mg/kg benzo(a)pyrene and the removal of the lead additive area to reach a target health-based concentration of 800 mg/kg lead.
- RAO-2: Prevent contaminant migration to soil, sediment, and indoor air through the removal of tank waste to reach a target health-based concentration of 0.11 mg/kg benzo(a)pyrene and the removal of the lead additive area to reach a target health-based concentration of 800 mg/kg lead.
- RAO-3: Removal of source materials to eliminate and prevent further degradation of the surrounding environment as a result of exposure to or migration from tank waste and the lead additive area.

Tank waste and the lead additive area will be addressed to target health-based concentrations (Table 5). Numeric cleanup levels for soil are not appropriate for this source control action because the scope is limited to source material removal. Final soil cleanup levels will be established during the risk assessments and final Site-wide remedy selection process. After excavation, soil will be sampled to verify concentrations remaining. Soil remaining after this source control action will be evaluated in accordance with the remedial action objectives and remediation goals identified for soil and established as part of the final Site-wide selected remedy.

16. DESCRIPTION OF ALTERNATIVES

The NCP acknowledges that the final RI/FS and risk assessments may not be complete and encourages action prior to and concurrent with these processes. In such cases, data from the ongoing RI is used to support the early/interim action and evaluate an appropriate set of alternatives for the limited source control action.

Because this is a source control action taken concurrent with RI/FS process, a complete FS was not performed; however, EPA performed and documented the alternatives screening process used to identify cleanup alternatives evaluated for this source control action (EPA, 2018). The following paragraphs describe the retained alternatives.

Common Elements of all Alternatives except for Alternative 1 - No Action

- The tank waste and the lead additive area will be addressed as source materials to target health-based concentrations (Table 5). After excavation, soil will be sampled to verify

concentrations remaining. Soil remaining after this source control action will be evaluated in accordance with the remedial action objectives and remediation goals identified for soil and established as part of the final Site-wide selected remedy.

- For cost and alternative evaluation purposes, operations and maintenance (O&M) activities are estimated for a 30-year period. The 30-year time frame is chosen as a comparison timeframe only. In addition, a discount factor of 7% is used to calculate present worth costs.
- Currently, no listed hazardous waste has been identified.
- Based on current data (40 CFR 261 Subpart C), the tank waste is not identified as a characteristic hazardous waste. Treatment prior to disposal in a permitted landfill is not required, and land disposal restrictions (LDRs; 40 CFR 268) do not apply.
- Based on current toxicity characteristic leaching procedure (TCLP) data (40 CFR § 261.24), the lead additive area is identified as a characteristic hazardous waste. Treatment prior to disposal in a permitted landfill is required, and land disposal restrictions (LDRs; 40 CFR 268.34) apply.

<u>Alternative 1: No Action</u>
Estimated Capital Cost: $0
Estimated O&M Cost: $0
Estimated Present Worth cost: $0
Estimated Construction Timeframe: None

Regulations governing the Superfund program generally require that the "no action" alternative be evaluated to establish a baseline for comparison. Under this alternative, the ODEQ and EPA would take no action at the Site to prevent exposure to or possible migration of contamination. Contaminants and hazardous substances will continue to be or threaten to be released into the environment. Neither RAOs nor applicable or relevant and appropriate requirements (ARARs) will be met.

<u>Alternative 2: Excavation, Treatment, and Offsite Disposal</u>
Estimated Capital Cost: $4,084,124
Estimated O&M Cost: $51,170
Estimated Present Worth cost: $4,135,294
Estimated Construction Timeframe: 4 months
Estimated Time to Achieve RAOs: 4 months

Approximately 30,362 cubic yards (y^3) of source material will be excavated and transported to an offsite permitted non-hazardous disposal facility. The estimated volume of tank waste is 28,093 y^3 while the estimated volume in the lead additive area is 2269 y^3. These source materials are not listed hazardous waste. The tank waste is not a characteristic waste based on Site data; however, the lead additive area is identified as a characteristic waste based on TCLP results. The TCLP data indicate that lead leaches above disposal criteria and in order to meet land disposal restrictions (40 CFR 268.34) it must be treated prior to disposal.

Site preparation activities will include mobilization to the Site of personnel, equipment, and subcontractors. Areas requiring excavation will be flagged and cleared of surface vegetation.

Excavation will continue vertically and horizontally based on field screening methods and visual observations. If buried pipe is encountered during excavation, the pipe will be cut off at the extent of excavation and sealed. During excavation activities, dust control measures, such as water spray, will be used to mitigate fugitive dust. Air monitoring equipment will be used to establish a safety perimeter based on the presence of potential vapors and/or dust to ensure the health and safety of onsite workers, the surrounding community, and the environment. Onsite workers directly involved in the excavation may be required to use respirators. After removal of source materials, the excavated area will be documented and sampled to determine area, depth, cubic yards removed, and concentrations of soil at base and sides of excavation. The excavated areas will be backfilled with clean soil from an offsite location and re-vegetated. All excavation areas will be graded for drainage and appropriate erosion controls implemented. It is expected that excavated areas meeting the source material target health-based concentrations will not require further action while those that do not meet the source material target health-based concentration may require further action based on the final soil alternative RAOs and remediation goals developed under the final decision document for the Site.

The lead additive area source material will be excavated to a depth of no more than 2 feet in depth. This source material will be treated through Solidification/Stabilization. Solidification/stabilization is the process where contaminants are physically and/or chemically bound to produce a final solidified/stabilized mass that restricts the leachability and mobility of the contaminant. There are many treatment and binding additives that can be used to address the lead additive area source material. Common agents include fly ash, lime, polymers, and cement as well as commercially available products. The appropriate mixture will be determined through small treatment studies to determine the most effective and efficient mixture at a reasonable cost. Once treated, samples will be sent to the laboratory for analysis to ensure that the mixture does not leach lead prior to disposal.

Excavated material will be transported to the appropriate offsite permitted RCRA disposal facility by truck. All trucks will be decontaminated prior to leaving the Site, will be tarped to contain source materials within the bed of the truck, and will only transport material via the pre-approved transportation route.

This alternative will comply with Federal and State applicable or relevant and appropriate requirements. This alternative will meet substantive requirements of Oklahoma Air Pollution Control Act (OAC 252:100-25-3, 100-29-2 and 100-29-3) related to visible emissions and particulates and fugitive dust. This alternative requires transportation of contamination and wastes to an offsite disposal facility and will be conducted pursuant to Federal (Department of Transportation Requirements Governing the Transportation of Hazardous Materials 49 CFR 171, 172, 173, 177, and 178; manifest and record keeping identified in Standards Applicable to Generators of Hazardous Waste 40 CFR 262 Subpart B; manifest, record keeping, and response actions identified in Standards Applicable to Transporters of Hazardous Waste 40 CFR 263, Subpart B) and State (Oklahoma Highway Remediation and Cleanup Services Act, OAC 252:210-1-3) transportation and disposal regulations. Facilities accepting these wastes will be certified to accept the respective wastes in accordance with the Offsite Rule (40 CFR 300.440) and Oklahoma Solid Waste Management Act (OAC 252: 515-321-3). Land disposal restrictions (LDRs, 40 CFR 268.34) apply to the disposal of lead additive area source material.

Excavation, treatment, and offsite disposal will achieve RAOs by preventing exposure, environmental degradation, and migration due to the removal and offsite disposal of source material. Once source material is removed, these areas will be subject to the final soil alternative RAOs and remediation goals developed under the final Site-wide decision document. This alternative does not require implementation of long-term O&M or monitoring. However, since the final risk assessment for lead has not been completed, the lead concentrations remaining after the lead interim action may not support residential use. Until a final risk assessment and final decision document are completed, the property will remain fenced and will not be used for residential purposes. In addition, because this is not the final remedy for the Site and contaminants will remain onsite until the final remedy is implemented, five-year reviews will be required. This alternative will be compatible with the expected future uses.

Alternative 3: Excavation, Treatment, Consolidation, and Capping
Estimated Capital Cost: $3,548,459
Estimated O&M Cost: $1,084,810
Estimated Present Worth cost: $4,633,269
Estimated Construction Timeframe: 6 months
Estimated Time to Achieve RAOs: 6 months

Approximately 30,362 cubic yards (y^3) of source material will be excavated, consolidated, and capped onsite. The estimated volume of tank waste is 28,093 y^3 while the estimated volume in the lead additive area is 2269 y^3. These source materials are not listed hazardous waste. The tank waste is not a characteristic waste based on Site data; however, the lead additive area is identified as a characteristic waste based on TCLP results. The TCLP data indicate that lead leaches above disposal criteria and in order to meet land disposal restrictions (40 CFR 268.34) it must be treated prior to disposal.

Site preparation activities will include mobilization to the Site of personnel, equipment, and subcontractors. Areas requiring excavation will be flagged and cleared of surface vegetation. Excavation will continue vertically and horizontally based on field screening methods and visual observations. If buried pipe is encountered during excavation, the pipe will be cut off at the extent of excavation and sealed. During excavation activities, dust control measures, such as water spray, will be used to mitigate fugitive dust. Air monitoring equipment will be used to establish a safety perimeter based on the presence of potential vapors and/or dust to ensure the health and safety of onsite workers, the surrounding community, and the environment. Onsite workers directly involved in the excavation may be required to use respirators. After removal of source materials, the excavated area will be documented and sampled to determine area, depth, cubic yards removed, and concentrations of soil at base and sides of excavation. The excavated areas will be backfilled with clean soil from an offsite location and re-vegetated. All excavation areas will be graded for drainage and appropriate erosion controls implemented. It is expected that excavated areas meeting the source material target health-based concentrations will not require further action while those that do not meet the source material target health-based concentration may require further action based on the final soil alternative RAOs and remediation goals developed under the final decision document for the Site.

The lead additive area source material will be excavated to a depth of no more than 2 feet in depth. These materials will be treated through Solidification/Stabilization. Solidification/stabilization is the process where contaminants are physically and/or chemically bound to produce a final solidified/stabilized mass that restricts the leachability and mobility of the contaminant. There are many treatment and binding additives that can be used to address the lead additive area source material. Common agents include fly ash, lime, polymers, and cement as well as commercially available products. The appropriate mixture will be determined through small treatment studies to determine the most effective and efficient mixture at a reasonable cost. Once treated, samples will be sent to the laboratory for analysis to ensure that the mixture does not leach lead prior to disposal.

All excavated tank source material and treated lead additive area source material will be consolidated into an onsite repository and capped with a geomembrane and soil cover. The most appropriate location for the consolidated source materials will be determined during the design. Consolidation will minimize the extent of the capped area allowing for greater reuse of the Site, reduce the number of source area locations across the Site, and reduce the source areas requiring O&M activities and Institutional Controls (ICs).

Signs will be posted at the property boundary to provide notification of the presence of contamination and to warn against intrusive activities. A fence will be installed around the onsite repository to separate it from the highway, railroad, and adjacent properties. ICs will be required to aid in the management of the contamination capped onsite. ICs will include a deed notice to notify current and potential future deed holders of the presence of contaminants and of the capped area to prevent intrusive activities (i.e., digging) at the property and to ensure protectiveness of the remedy. The deed notices will identify the reason for the notice, the affected property, the remedy, engineering controls, and land use restrictions. The ODEQ will request that the landowner grant an easement for continued remedial response. The deed notice and easement will be filed by the ODEQ. Site inspections will occur on an annual basis to verify that the fencing, soil cap and warning signs remain in place and to replace them, as necessary. ICs will be reviewed and monitored to verify that they remain in place, continue to be effective, are protective, and are enforced. In addition, Five-year reviews will be required to monitor the effectiveness of the remedy.

This alternative will comply with Federal and State applicable or relevant and appropriate requirements. This alternative will meet substantive requirements of Oklahoma Air Pollution Control Act (OAC 252:100-25-3, 100-29-2, and 100-29-3) related to visible emissions and particulates and fugitive dust. This alternative requires containment and will have to be conducted pursuant to Federal (Closure and Post Closure Part 264 Subpart G) and State (Oklahoma Hazardous Waste Management Act 27A O.S. § 2-7-101 *et seq,* Solid Waste Management rules OAC 252:515) disposal regulations. Land disposal restrictions (LDRs, 40 CFR 268.34) apply to disposal of the lead additive area source material.

This alternative will achieve all RAOs by preventing exposure through engineering controls, institutional controls, and monitoring for offsite migration. Where source material is removed, these areas will be subject to the final soil alternative RAOs and remediation goals developed under the final Site-wide decision document. This alternative requires implementation of long-

term O&M, monitoring, ICs, and land use restrictions. Since the final risk assessment for lead has not been completed, the lead concentrations remaining after the lead interim action may not support residential use. Until a final risk assessment and final decision document are completed, the property will remain fenced and will not be used for residential purposes. In addition, because source material is consolidated onsite and remain onsite for perpetuity, five-year reviews will be required. This alternative will restrict and limit some future uses.

17. COMPARISON OF ALTERNATIVES

The EPA uses nine NCP criteria to evaluate alternatives for cleanup. These nine criteria are categorized into three groups: threshold, balancing, and modifying. The threshold criteria must be met in order for an alternative to be eligible for selection. The threshold criteria are overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The balancing criteria are used to weigh major tradeoffs among alternatives. The five balancing criteria are long-term effectiveness and permanence; reduction of toxicity, mobility or volume through treatment; short-term effectiveness; implementability; and cost. The modifying criteria are state acceptance and community acceptance. In the following analysis, the alternatives are evaluated in relation to each other with regard to the nine criteria noting the relative advantages and disadvantages of each alternative.

1. Overall Protection of Human Health and the Environment

All of the alternatives, except the "no action" alternative, provide adequate protection of human health and the environment by eliminating, reducing, or controlling risk through excavation, treatment, removal, containment, engineering controls, and/or institutional controls.

Because the "no action" alternative is not protective of human health and the environment, it is eliminated from consideration under the remaining eight criteria.

2. Compliance with ARARS

As noted under the descriptions of the alternatives, each alternative will meet their respective Federal and State Applicable or Relevant and Appropriate Requirements (ARARs).

3. Long-term Effectiveness and Permanence

Alternative 2 (Excavation, Treatment, and Offsite Disposal) is most effective and permanent in the long-term as the potential for exposure or offsite migration is completely eliminated through removal of contamination from the Site. This alternative does not require implementation of long-term O&M or monitoring. However, since the final risk assessment for lead has not been completed, the lead concentrations remaining after the lead interim action may not support residential use. Until a final risk assessment and final decision document are completed, the property will remain fenced and will not be used for residential purposes. Five-year reviews will be required to monitor the effectiveness of the remedy until a final Site-wide remedy is selected. This alternative will be compatible with the expected future uses (residential, industrial, agricultural, etc).

Alternative 3 (Excavation, Treatment, Consolidation, and Capping) will be effective and permanent in the long-term as long as O&M is performed and institutional and engineering controls are enforced. This remedy will be less effective in the long-term than Alternative 2 (Excavation, Treatment, and Offsite Disposal) because consolidated source material will be left

onsite. This remedy will eliminate the potential for exposure and migration through consolidation, treatment, and construction of a barrier provided long-term monitoring, O&M, and enforcement of institutional and engineering controls to assure protectiveness are performed.

4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment

Alternative 2 (Excavation, Treatment, and Offsite Disposal) removes source materials from the Site. Toxicity, mobility, and volume with respect to onsite conditions is reduced for the tank waste, albeit not through treatment. Reduction in toxicity and mobility for the lead additive area is achieved through treatment, however, treatment will increase volume requiring disposal.

Alternative 3 (Excavation, Treatment, Consolidation, and Capping) removes source materials from multiple Site locations and consolidates it at one location. Toxicity, mobility, and volume with respect to onsite conditions is reduced for the tank waste, albeit not through treatment. Reduction in toxicity and mobility for the lead additive area is achieved through treatment, however, treatment will increase volume. Toxicity and mobility are managed through engineering controls where source material is capped onsite while volume increases due to treatment.

5. Short-term Effectiveness

Both alternatives are effective in the short-term but vary in the degree of time to reach RAOs and control potential short-term exposure. Alternative 2 (Excavation, Treatment, and Offsite Disposal) will meet RAOs in approximately 4 months while Alternative 3 (Excavation, Treatment, Consolidation, and Capping) will meet RAOs in approximately 6 months.

Potential risks to the onsite workers and the community through excavation, treatment, and removal of source material and potential dust emissions will be encountered with both alternatives. Alternative 2 (Excavation, Treatment, and Offsite Disposal) will pose the least amount of potential risk to onsite workers and community because contaminated source material is removed from the Site in a short amount of time and with reduced contamination handling. There is additional potential risk to onsite workers preforming treatment activities, while there is some additional potential risk due to offsite hauling and disposal. This alternative will be compatible with the expected future uses (residential, industrial, agricultural, etc).

Alternative 3 (Excavation, Treatment, Consolidation, and Capping) has an increased potential risk to onsite workers and the community as compared to Alternative 2 (Excavation, Treatment, and Offsite Disposal) due to a slightly longer remediation timeframe. In addition, Alternative 3 presents a higher potential risk to onsite workers, the community, and the environment because of consolidation activities, an extended time period to reach RAOs, contamination being left onsite, and the complexity of enforcing institutional and engineering controls. This option restricts and limits property reuse and is not currently compatible with the expected future use of residential.

6. Implementability

Alternative 2 (Excavation, Treatment, and Offsite Disposal) is a common easily implemented practice where equipment and services are readily and commercially available. This remedy does involve additional material handling and treatment and is a common construction practice of

which most companies are experienced. This remedy is not expected to require specialized equipment, and is a straight-forward implementation process. This alternative does not require implementation of long-term O&M or monitoring. However, since the final risk assessment for lead has not been completed, the lead concentrations remaining after the lead interim action may not support residential use. Until a final risk assessment and final decision document are completed, the property will remain fenced and will not be used for residential purposes. Five-year reviews will be required to monitor the effectiveness of the remedy until a final Site-wide remedy is selected. This alternative will be compatible with the expected future uses (residential, industrial, agricultural, etc).

Although the expectation is that all areas will be addressed at the same time, implementation of this alternative is not contingent on the entire estimated alternative cost as each area can be addressed independently. Because these are distinct source areas, the areas can be prioritized based on potential exposure risk and addressed as funding is available. Source areas would be addressed in accordance with the selected source control action remedial alternative, albeit on different schedules.

Alternative 3 (Excavation, Treatment, Consolidation, and Capping) is a common cleanup method that requires some expertise in the construction of an onsite repository and the installation of a geomembrane/soil cap. This remedy will include additional materials handling for treatment and specialized equipment to properly install the geomembrane. This remedy requires coordination with the property owner to identify an appropriate location for the repository. It also requires coordination with ongoing investigation activities since the Site-wide RI investigation has not been completed. In addition, there are uncertainties associated with the location of the repository, the quantity of source material needing to be consolidated, the potential for identification of additional source material that may need to be managed under this remedy, and the risk of having to close and reopen the repository to accommodate the final cleanup option. This remedy will require implementation of long-term O&M and monitoring, establishment and enforcement of institutional and engineering controls, and completion of five-year reviews. This option restricts and limits property reuse and is not currently compatible with the expected future uses (residential, industrial, agricultural, etc). Implementation of this alternative is contingent on receiving the entire estimated alternative cost as all areas will need to be excavated within the same timeframe as the construction of the onsite repository to be effective, efficient, and cost beneficial.

7. Cost

The estimated cost for implementation of Alternative 2 (Excavation, Treatment, and Offsite Disposal) is $4,135,294. The estimated cost for implementation of Alternative 3 (Excavation, Treatment, Consolidation, and Capping) is $4,633,269.

It should be noted the estimate for Alternative 2 (Excavation, Treatment, and Offsite Disposal) assumes total remedy funding. If Alternative 2 (Excavation, Treatment, and Offsite Disposal) is implemented in phases, then the cost will increase due to multiple mobilization/demobilization activities, varying disposal rates for material quantities, varying backfill rates for materials, and multiple oversight and reporting activities.

8. State/Support Agency Acceptance

The State of Oklahoma supports the Selected Alternative.

9. Community Acceptance

Throughout the Site project there is continued public interest. During the public comment period for the Proposed Plan, only oral comments were received. The responses to these comments are included in the Responsiveness Summary to this ROD (Part 3). Based on the comments received during the comment period, the public does not disagree with the preferred alternative as presented in the Source Control Proposed Plan, Alternative 2 (Excavation, Treatment, and Offsite Disposal).

18. PRINCIPAL THREAT WASTE

The lead additive area source material is identified as a principal threat waste because it is highly toxic and mobile. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. Redevelopment of the Site under any future use scenario will result in an unacceptable risk through direct exposure and ingestion.

The EPA expects to use treatment to address the principal threats posed by a Site, wherever practicable, and engineering controls for waste that poses a relatively low long-term threat or where treatment is impracticable. Although this early/interim action is not intended to address fully the statutory mandate for permanence and treatment to the maximum extent practicable, this early/interim action does utilize treatment and thus supports that statutory mandate. This remedy satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment). The lead additive area source material will be treated through solidification/stabilization prior to offsite disposal.

19. SELECTED REMEDY

1. Summary of the Rationale for the Selected Remedy

The selected source control remedy for cleaning up the thank waste and lead additive area source materials is Alternative 2 (Excavation, Treatment, and Offsite Disposal). Alternative 2 (Excavation, Treatment, and Offsite Disposal) meets the RAOs and health-based target levels by preventing exposure and contaminant migration through the excavation of tank waste and lead additive area source material, the treatment of the lead additive area source material, and the offsite disposal of both tank waste and treated lead additive area source material.

This alternative is permanent and effective in the long-term because source material will be removed rather than remaining onsite. Alternative 2 (Excavation, Treatment, and Offsite Disposal) implementation is less complicated, it requires the least amount of time to reach RAOs and health-based target levels, and presents minimal short-term risks to onsite workers and the community. The final action will not require long-term monitoring, Site inspections, O&M, or ICs.

The source control remedial action is protective of human health and the environment in the short term; is intended to provide adequate protection until a final Site-wide ROD is signed; complies with those federal and state requirements that are applicable or relevant and

appropriate for this limited early/interim source control action; and is cost-effective. This early/interim source control remedy satisfies the statutory preference for treatment as a principal element of the remedy by treating the lead additive area source material through stabilization/solidification prior to offsite disposal. This source control action will not preclude implementation of or be inconsistent with any future final side-wide decisions.

Because this source control remedy is an early/interim action and a full investigation and risk assessment have not been completed, a review of this action will be conducted to ensure that the remedy continues to provide adequate protection of human health and the environment within five years after commencement of the early/interim source control remedial action [40 C.F.R. §300.430(f)(4)(ii)]. These reviews will be ongoing as EPA continues Site investigation activities and develops and implements a final Site-wide remedy.

2. Description of the Selected Remedy

This source control ROD documents the selected source control remedial action for cleaning up the refinery tank waste and the lead additive area source materials at the Site. This action is an early action limited in scope to address tank waste and an interim action limited in scope to address the lead additive area. These early/interim response actions target the removal of source materials while EPA continues to investigate the nature and extent of contamination and develop and implement a final Site-wide remedy decision.

The major components of the remedy include excavation, treatment and offsite disposal at an estimated present worth cost of $4,135,294.

- Approximately 2,269 cubic yards (y^3) of lead additive area source material and 28,093 y^3 of tank waste source material will be excavated for a total of approximately 30,362 y^3.
- Approximately 2,269 y^3 of lead additive area source material will be treated through stabilization/solidification.
- All excavated and treated source material will be transported to an offsite permitted and regulated disposal facility.
- Excavated areas will be sampled, backfilled with clean soil from an offsite location, and re-vegetated.
- All excavated areas will be graded for drainage.

3. Summary of the Estimated Cost

Appendix B shows the estimated consolidated costs for the early/interim source control remedy. This consolidated table is based on the best available information regarding the anticipated scope of the early/interim source control remedy. Changes in the cost elements are likely to occur as a result of new information and data collected during Site activity. Major changes may be documented in the form of a memorandum in the Administrative Record file, an Explanation of Significant Differences (ESD), or a ROD amendment. This is an order-of- magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost. There are no costs or assumptions related to O&M and ICs. Five-year reviews will be ongoing as EPA continues Site investigation activities and develops and implements a final Site-wide remedy.

4. Expected Outcomes of the Selected Remedy

The expected outcome of the selected source control remedy is that the Site will no longer present an unacceptable risk to human health and the environment because the source materials are removed, the lead additive area is treated, and the source material is disposed offsite in a regulated and permitted disposal facility. The remedy will be permanent and protective because source material will be disposed offsite within an estimated 4-month period.

The source control remedial action targets a health-based level of 0.11 mg/kg benzo(a)pyrene and 800 mg/kg lead. It is expected that excavated areas meeting the source material target health-based concentrations will not require further action while those that do not meet the source material target health-based concentration may require further action based on the final soil alternative RAOs and remediation goals developed under the final decision document for the Site.

The source control action does not require long-term monitoring, Site inspections, or O&M, due to the removal of contamination from the Site. However, since the final risk assessment for lead has not been completed, the lead concentrations remaining after the lead interim action may not support residential use. Until a final risk assessment and final decision document are completed, the property will remain fenced and will not be used for residential purposes. This is not the final remedy for the Site and contaminants will remain onsite until the final remedy is implemented; therefore, five-year reviews will be required. This alternative will be compatible with potential future remedial actions as well as current (residential, industrial, agricultural, etc) and expected future uses (residential, industrial, agricultural, etc).

20. STATUTORY DETERMINATION

The source control remedial action selected for implementation at the Wilcox Oil Company Superfund Site is consistent with CERCLA and, to the extent practicable, the NCP. The source control action is protective of human health and the environment in the short term; is intended to provide adequate protection until a final Site-wide ROD is signed; complies with those federal and state requirements that are applicable or relevant and appropriate for this limited early/interim source control action; and is cost-effective. This source control action will not preclude implementation of or be inconsistent with any future final side-wide decisions.

1. Protection of Human Health and the Environment

The selected source control remedy at this Site will protect human health and the environment by eliminating, reducing or controlling exposures to human and ecological receptors through excavation, treatment, and offsite disposal of tank waste and lead additive area source material. The selected source control remedy targets health-based levels and reduces potential ingestion and dermal contact exposure risks associated with lead and benzo(a)pyrene. In addition, lead additive area source material will be treated to reduce toxicity and mobility prior to offsite disposal. The remedy is anticipated not to pose any unacceptable short-term risks to either onsite workers or the community. No cross-media impacts are expected due to excavation, treatment, and offsite disposal of contamination.

Since the final risk assessment for lead has not been completed, the lead concentrations remaining after the lead interim action may not support residential use. Until a final risk assessment and final decision document are completed, the property will remain fenced and will not be used for residential purposes.

2. Compliance with Applicable or Relevant and Appropriate Requirements

ARARs include substantive provisions of any promulgated Federal or more stringent State environmental standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate requirements for a CERCLA site or action. Applicable requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Relevant and appropriate requirements are requirements that, while not legally "applicable" to circumstances at a particular CERCLA site, address problems or situations sufficiently similar to those encountered at the site that their use is well-suited.

The selected source control remedy will comply with those federal and state requirements that are ARARs for this limited source control action. Section 121(d) of CERCLA states that remedial actions must attain or exceed ARARs. The ARARs for this source control action are divided into three categories, chemical-specific, action specific, and location-specific and are discussed in further detail in Tables 6 through 9.

3. Cost Effectiveness

The selected source control remedy is cost-effective because the remedy's costs are proportional to its overall effectiveness [see 40 CFR § 300.430(f)(1)(ii)(D)]. This determination was made by evaluating the overall effectiveness of those alternatives that satisfied the threshold criteria (i.e., that are protective of human health and the environment and comply with all Federal and any more stringent State ARARs, or as appropriate, waive ARARs). Overall effectiveness was evaluated by assessing three of the five balancing criteria -- long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness, in combination. Then, the overall effectiveness of each alternative was compared to the alternative's costs to determine cost-effectiveness.

Both, Alternative 2 (Excavation, Treatment, and Offsite Disposal) and Alternative 3 (Excavation, Treatment, Consolidation, and Capping) reduce toxicity and mobility for the lead additive area through treatment and pose potential risks to the onsite workers and the community through excavation and removal of contaminated source material and the generation of potential dust emissions. Short-term effectiveness is only slightly better for Alternative 2 (Excavation, Treatment, and Offsite Disposal) due to the reduced time needed to meet RAOs.

The primary difference is the final disposition of the tank waste and treated lead additive area source material. Alternative 2 (Excavation, Treatment, and Offsite Disposal) removes the source material and disposes of it in an offsite permitted and regulated disposal facility while

Alternative 3 (Excavation, Treatment, Consolidation, and Capping) consolidates the source material and disposes of it onsite. Alternative 2 (Excavation, Treatment, and Offsite Disposal) will be the most effective and permanent in the long-term as the potential for exposure or offsite migration is eliminated through removal of contamination from the Site while Alternative 3 (Excavation, Treatment, Consolidation, and Capping) will be effective and permanent in the long-term as long as O&M, five-year reviews, and institutional and engineering controls are enforced.

Compared with Alternative 3 (Excavation, Treatment, Consolidation, and Capping), Alternative 2 (Excavation, Treatment, and Offsite Disposal) is less expensive at an estimated present worth cost of $4,135,294. The present worth cost of Alternative 3 (Excavation, Treatment, Consolidation, and Capping) is slightly higher at an estimated present worth cost of $4,633,269. At a reduced cost, the selected source control remedy provides for treatment, shorter time to meet RAOs, and provides a higher degree of long-term effectiveness and permanence.

4. Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

EPA has determined that the selected source control remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practical manner at the Site. The selected source control remedy provides the best balance of trade-offs in terms of the five balancing criteria, considering State and community acceptance, while also considering the statutory preference for treatment as a principal element and the bias against offsite treatment and disposal.

The tank waste is not a listed hazardous waste nor is it identified as a characteristic hazardous waste under 40 CFR § 261 Subpart C based on current Site data. Treatment prior to disposal in an appropriately permitted and regulated offsite Resource Conservation and Recovery Act (RCRA) landfill is not necessary. Treatment of tank waste will increase cost, increase volume, and increase schedule and time to meet cleanup levels. The increase in cost and schedule far exceeds risk reduction benefit (EPA, 2018).

The lead additive area is not a listed hazardous waste; however, it is identified as a characteristic waste under 40 CFR § 261.24 based on current Site data. Toxicity Characteristic Leaching Procedure results show that lead leaches from the lead additive area source material above criteria that would allow for land disposal. Because of this, the lead additive area source material will need to be treated such that the lead does not leach above land disposal criteria. The use of treatment will meet the statutory preference for treatment.

Alternative 2 (Excavation, Treatment, and Offsite Disposal) will be the most effective and permanent in the long-term as the potential for exposure or offsite migration is eliminated through removal of contamination from the Site. This alternative will not require O&M or monitoring. Alternative 3 (Excavation, Treatment, Consolidation, and Capping) will be effective and permanent in the long-term as long as O&M, five-year reviews, and institutional and engineering controls are enforced.

Both, Alternative 2 (Excavation, Treatment, and Offsite Disposal) and Alternative 3 (Excavation, Treatment, Consolidation, and Capping) reduce toxicity and mobility for the lead additive area through treatment, however, treatment will increase volume requiring disposal.

Potential risks to the onsite workers and the community through excavation and removal of contaminated source material and potential dust emissions will be encountered by both alternatives. Despite additional potential risk related to hauling, Alternative 2 (Excavation, Treatment, and Offsite Disposal) will pose the least overall potential risk to onsite workers and community because contaminated soils are removed from the Site and RAOs are met in a shortest amount of time.

Alternative 2 (Excavation, Treatment, and Offsite Disposal) is a common practice and equipment and services are readily available. Unlike Alternative 3 (Excavation, Treatment, Consolidation, and Capping), this alternative does not require additional onsite construction, monitoring, or maintenance.

Compared with Alternative 3 (Excavation, Treatment, Consolidation, and Capping), Alternative 2 (Excavation, Treatment, and Offsite Disposal) is least expensive at an estimated present worth cost of $4,135,294. The present worth cost of Alternative 3 (Excavation, Treatment, Consolidation, and Capping) is slightly higher at an estimated present worth cost of $4,633,269.

The State supports Alternative 2 (Excavation, treatment, and offsite disposal), and no objections were received from the community.

5. Preference for Treatment as a Principal Element

The EPA expects to use treatment to address the principal threats posed by a site, wherever practicable, and engineering controls for waste that poses a relatively low long-term threat or where treatment is impracticable. Although this early/interim action is not intended to address fully the statutory mandate for permanence and treatment to the maximum extent practicable, this early/interim action does utilize treatment and thus supports that statutory mandate. This remedy satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment). The lead additive area source material is considered PTW because it is highly toxic and mobile and will be treated through stabilization/solidification prior to offsite disposal.

6. Five-year Review Requirements

This action does not constitute the final remedy for the Site, therefore, any subsequent actions to address the threats posed by conditions at this Site will be documented in a final Site-wide decision document. Because this remedy is an early/interim source control remedy and a full investigation and risk assessment have not been completed, a review will be conducted to ensure that the remedy continues to provide adequate protection of human health and the environment within five years after commencement of the early/interim source

control remedial action [40 C.F.R. §300.430(f)(4)(ii)]. These reviews will be ongoing as EPA continues Site investigation activities and develops and implements a final Site-wide remedy.

21. DOCUMENTATION OF SIGNIFICANT CHANGES

The Source Control Proposed Plan for the Wilcox Oil Company Superfund Site was released on June 28, 2018. The Proposed Plan identified alternatives considered at the Site, as well as the preferred alternative. The public comment period was held from June 28, 2018, through July 31, 2018. The ODEQ and EPA responded to verbal comments submitted during the public comment period (see Part 3: The Responsiveness Summary). There are no significant changes to the remedy, as originally identified in the Source Control Proposed Plan.

22. STATE ROLE

The Oklahoma Department of Environmental Quality, on behalf of the State of Oklahoma, reviewed the various alternatives, indicated its support for the Selected Remedy, and determined that the selected source control remedy satisfies applicable or relevant and appropriate State environmental laws and regulations. The State of Oklahoma concurs with the selected source control remedy for the Wilcox Oil Company Superfund Site (Appendix A).

23. STAKEHOLDER COMMENTS AND AGENCY RESPONSES

The Responsiveness Summary provides information about the views of the public and the support agency regarding both the alternatives and general concerns about the Site submitted during the public comment period. The concerns of the community should be considered when selecting a remedial alternative. Since the Site was listed on the NPL in December 2013, Site information has been exchanged with the area residents and community leaders.

The ODEQ and EPA held a public meeting on July 10, 2018, in Bristow, Oklahoma, to provide information to the public regarding source control cleanup activities. The public comment period for the Proposed Plan was held from June 28, 2018, through July 31, 2018. Based on the comments received at the public meeting, the public does not disagree with the preferred alternative presented in the Proposed Plan. During the public meeting ODEQ and EPA provided verbal discussion to questions from the public. The questions and answers discussed during this meeting can be found in the meeting transcript included as part of the Administrative Record. Formal answers to the questions and concerns raised about the preferred alternative during the public meeting are addressed below.

During the public comment period, no written comments were received by either EPA or ODEQ.

Comments specific to the preferred alternative are provided below. The comments are transcribed from the public transcript and summarized for clarity with minimal alterations.

Comment 1: (a) 15 feet down; y'all went 15 feet down with a core sample. And it was contaminated all the way down. How would that be cleaned up with an excavator, 15 feet down? That would have to be mining equipment, large-scale mining equipment, to come in as strip mining. (b) Would it be just those little spots, or will it be the whole area?

Answer 1: The construction industry has equipment, for example the long-arm excavator, that can reach to depths of around 15 feet below ground surface (ft bgs). This type of equipment, along with other construction practices involving terracing, have been used successfully at sites to complete excavation work at depth.

Although data from the refinery process areas indicate contamination may be as deep as 10 to 15 ft bgs, these areas are not the focus of the early/interim action. These areas require additional data collection and will be further evaluated during the ongoing investigation activities. When investigation activities are complete, a Site-wide remedy strategy will be presented to address these areas.

The Source Control Action is limited to the 9 source areas, including 8 tank waste source areas and the lead additive area. The estimated depth range for the tank waste source areas is 5-8 ft bgs while the depth for the lead additive is 2 ft bgs. At these depths, common excavation equipment can be used to complete excavation.

Comment 2: What about the water table throughout Bristow and Wilcox Refinery? It's all the same water table. Because I know the wells up there on property are bad. There's two of them. The church was using that well at one time, and it did have black stuff in the well.

Answer 2: During 2014 and 2015, the ODEQ sampled all residential wells being used for drinking water on a quarterly basis. In 2016, these wells were sampled during the investigation activities. Data results show the ground water did not exceed Safe Drinking water standards or residential screening levels for tap water. Based on these results, the water is considered acceptable for drinking.

One well located on the Lorraine Process area was not considered acceptable for drinking and oil was present floating on the surface. Use of this well had been abandoned when city water was made available. In 2014, the well was capped to prevent potential future use, and in 2017 this well was permanently plugged and abandoned and no longer exists.

The Site remedial investigation is ongoing and will include further investigation and evaluation of the ground water.

Comment 3: So, in digging the dirt, what's to keep this dust debris from blowing over Bristow or any other areas that people live in?

Answer 3: While performing construction activities, control measures are put in place and implemented to control dust. For example, water can be sprayed on the excavation area to control dust and worker monitors and perimeter monitors can be used to monitor real-time conditions and indicate the need for adjustments to activities. The details and the exact control measures will be determined during the design.

Comment 4: I've pulled up reports from 1989 from the EPA off of the internet showing thallium, arsenic, radium, and everything else out on these properties. Why weren't the people informed of it?

Answer 4: Site information and reports are available for review in the administrative record and on the EPA and ODEQ Wilcox Oil Company web pages, https://epa.gov/superfund/wilcox-oil and www.deq.state.ok.us/lpdnew/index.htm, respectively. The administrative record is available for review in the Bristow Public Library and on the Site web pages.

ODEQ began Site assessment activities in 1994. During Site assessment and investigation, EPA and ODEQ have continued to update and meet with the residents that live on and near the Site. In addition, EPA and ODEQ hold regular community meetings to update and share information about the Site as well as make accessible the planning and summary documents related to investigation activities.

Since the Site was listed in December 2013, Site screening, residential soil and ground water sampling, 6 separate field events to collect Site data, a removal action, and multiple open houses/factsheets/meetings have been completed. EPA and ODEQ continue to investigate the Site and work towards completing the risk assessments. This collection, compilation, and

evaluation of data to define contamination, understand the potential risks, and identify processes and technologies that can address contamination that presents an unacceptable risk to human health and the environment takes time and can require a series of complex and complicated steps.

EPA and ODEQ are committed to the completion of Site investigation activities and the sharing of information and data with the community as Site activities progress.

Comment 5: Source, I take it that means that you've identified the source of all the pollution? Is that what that word means here in this context? The source of all the contaminants came from these things you're cleaning up. Is that what that word means? Are there other source areas?

Answer 5: Source material is defined as material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to ground water, to surface water, to air, or acts as a source for direct exposure (EPA, 1991). Site investigation activities identified the two source materials, tank sludge/solids and the lead additive area solids.

Data collected show that these source areas are finite in extent and specific to these locations. In addition, these source materials contain contaminants at levels that are of potential concern. Because of this, the EPA and ODEQ are selecting an early/interim action to address these source areas during Site investigation. By taking this early/interim action, significant human health and ecological risk reduction will be accomplished through removal of primary sources located throughout the Site at or near the soil surface, specifically residential properties. In addition, further migration and environmental degradation of adjacent waterways (e.g., Sand Creek and the East Tributary), wetlands, and stream riparian areas will be eliminated.

The Site investigation is ongoing and there is the potential for the identification of additional source material. At the completion of the investigation activities, a Site-wide evaluation will be completed and any actions needed to address additional contamination and potential risks at the Site will be documented in a final Site-wide remedy decision.

Comment 6: (a) it looks like your lead table is 131 times what you would like it to be, roughly? You list the health-based screening, that was 800. And the data results are 105,000. I simply did the math. It's 131 times too high. And I understand that 105 was only the highest one found. It may vary a little. (b) Your benzo(a)pyrene looks to be 100 times what it should be?

Answer 6: Correct. The lead concentrations are extremely high, and the benzo(a)pyrene concentrations are 2 orders of magnitude higher than the health-based screening number. Concentrations of lead vary across the lead additive area and range from 43,200 to 105,000 mg/kg, and the concentrations of benzo(a)pyrene range from 1.6 to 20 mg/kg. The target health-based screening numbers for the cleanup action are 800 mg/kg lead and 0.11 mg/kg benzo(a)pyrene.

Comment 7: "These wastes are not identified as listed hazardous wastes and data results indicate that the tank waste is not a characteristic hazardous waste." I don't understand that. So, the fact that these wastes are not listed in a technical sense has nothing to do with their toxicity or lack of toxicity?

Answer 7: The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) is required under Section 105 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, 42U.S.C. 9605, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA: 40 CFR 300.2). The purpose of the NCP is to provide the organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substance, pollutants, and contaminants (40 CFR 300.1). Responses under CERCLA can be taken in response to releases of hazardous substances, and pollutants or contaminants into the environment which may present an imminent and substantial danger to public health or welfare of the United States (40 CFR 300.3(a)(2). Therefore, responses under CERCLA are not predicated on releases being identified as either a listed hazardous waste or a characteristic hazardous waste.

Listed hazardous waste and characteristic hazardous waste are defined under the Resource Conservation Recovery Act (RCRA) as well as regulations on the management and handling of such waste. Prior to a response action, the materials must be evaluated to determine if they are listed hazardous waste or characteristic hazardous waste. The management and handling of the material during cleanup actions depends on the category of the waste.

The tank waste and lead additive area source material were reviewed and evaluated to determine whether they are a listed or characteristic hazardous waste. Neither the tank waste nor lead additive area source materials are identified as a listed hazardous waste. The tank waste source material is not a characteristic waste; however, the lead additive area is a characteristic hazardous waste based on its toxicity. Because of this characteristic, management and handling of the lead additive area source material must comply with additional regulations as set forth under RCRA and as listed in the Applicable or Relevant and Appropriate Requirements tables.

Comment 8: We hear we have toxic materials here. No question about it. You've identified them. Is it your responsibility to advise this community to have, like, the Oklahoma Department of Health to run tests? Do we have cancer anomalies clusters here? What is the current health hazards caused – being caused by this Site? Isn't there sufficient information being given to the general public as to what exactly can happen with contamination by lead? You've got one particular type of benzoid. There's another type or two. So that's my question. Who is responsible to be advising the health risks that are being incurred right now today until 2020 when you are completely finished? Should you have a representative from the Oklahoma Department of Health at these community hearings?

Same subject comment: Last I knew, there were 807 plus deaths from cancer when everyone started this back in '13, and your organizations came into this. And those have grown. There's a lot of sick people. Initially, that was at another site. And then you guys went to this Site. And so I just wondered if the cancer is going to be addressed at some point.

Answer 8: Only your doctor can advise you about your health concerns. If you have any health concerns, then you should talk with your doctor.

During the Site investigation, the agencies work with the state health departments and the Agency for Toxic Substances and Disease Registry. The Oklahoma Department of Health is the health authority for Oklahoma. The contact information for the Oklahoma Department of Health is Local: (405) 271-5600 or Toll Free: (800) 522-0203. The contact information for the Agency for Toxic Substances and Disease Registry (ATSDR) is Jack Hanley and the number is (770) 448-7100. Jack Hanley, as well as his predecessor representative, have participated in several Site meetings.

Information related to the Site is posted on the EPA and ODEQ Wilcox Oil Company web pages, https://epa.gov/superfund/wilcox-oil and www.deq.state.ok.us/lpdnew/index.htm, respectively, and can be found in the administrative record. Meetings, conversations, and information sharing with the property owners take place on a regular basis. Site open houses and information sharing sessions have been held on a routine basis to share, present, and relay information related to the Site investigation activities and progress. Investigation activities are ongoing and a full understanding of the extent of contamination and the potential risks associated with the contamination have not been completed. The risk assessment will provide information about the potential risks that these contaminants may pose based on exposure populations and exposure scenarios.

Comment 9: Over on 8th Street, there's a bridge that they took out. And if I recall, they had to remove all the dirt, because it was contaminated, and bring new dirt in. Well, that was on that creek, and that creek borders my property on two sides. How am I going to know or when will I know if my property is contaminated?

Answer 9: Surface water and sediment samples have been collected from Sand Creek. The data are under review and evaluation and a full description will be provided in the remedial investigation report. When the evaluation is complete, the data will be shared with the public.

The Oklahoma Department of Transportation (ODOT) was the lead agency for the activities involving the construction of the 8th Street Bridge. Documents developed by ODOT to investigate and remove the soil used as fill are included on the Wilcox Oil Company webpage at https://epa.gov/superfund/wilcox-oil. For further information, please refer to the ODOT reports or call them at (405) 521-3050 or by email at environment @odot.org. [Note: contact information has been provided to the commenter directly.]

Comment 10: I'm just wondering if you'd ever looked at biodegradation technology molecularly to clean this up. It's not all tank waste and it wouldn't all be the lead. So, we've got the benzene and the other chemicals. You may address that in the future?

Answer 10: One of the alternatives evaluated in the screening process was land farming which is a type of bioremediation. Bioremediation is effective on organic material, specifically the tank waste source material. It would not be effective on metals, specifically the lead additive area source materials. The land farming process takes years, and it is more effective when you have soils that are contaminated with organics rather than actual source materials like the tank waste source material. There is uncertainty related to effectiveness, efficiency, and the timeframe of the

treatment process. In addition, there is uncertainty in whether there would be residual contamination that would still need to be managed after treatment.

Although land farming is not a technology selected for further evaluation as an early/interim action, it may be one of the technologies evaluated during the Site-wide feasibility study.

Comment 11: Where would this material be disposed of, what offsite spot?

Answer 11: The exact offsite disposal facility is not known; however, a disposal facility in Tulsa was the location for disposal of source material removed from the Site during the cleanup actions taken in September/October 2017. The landfill in Tulsa is a regulated and permitted facility that can accept these source materials for disposal. It is anticipated that it would be the same facility in Tulsa or a similar facility in the area.

Comment 12: How is the waste going to be transported from Bristow to Tulsa? What kind of a truck? Are we talking about an enclosed truck?

Answer 12: The source material will be transported by truck. The specific type of tuck will be determined during the design. Before leaving the Site, the trucks will be decontaminated and the load will be secured and covered during transport. The truck will travel on a predetermined and acceptable route from the Site to the final disposal destination. Plans will be put in place to respond to any accident or spill/release.

Comment 13: And then what do I need to worry about? I'm a resident here. I'm, you know – until this cleanup plan is put into motion for the next six months, eight months, ten months, what do I need to be worried about as a resident here in Bristow? I mean, you know, how can I sleep soundly tonight? What can you tell me that will help me go to bed tonight until this plan starts?

Answer 13: These source areas are finite in extent and specific to these locations. Based on sampling data, the lateral and horizontal extent is defined and is not expected to extend significantly outside of this boundary. In addition, these areas are fenced to limit and restrict access.

Comment 14: You're not saying then that you have identified all of the potential contaminants on the Site as a whole? You're just addressing these specific ones. So, there could be a whole host of other potential contaminants. And according to this for future work, you're looking at 2019 or 2020 for the completion of this. Do you have any estimate of when your data gathering and investigation will finish on the rest of the Site and when you will get a final proposal? On comparable sites just as an estimate, what's your time frame?

Answer 14: Correct. This early/interim action only addresses the specific tank waste and lead additive area source materials. The Site-side investigation is ongoing, and the full extent and evaluation of the contamination is underway. We need to collect additional data and complete the human health and ecological risk assessments before we can make a Site-side decision related to the remaining areas of the Site. The locations and the data results for these source areas support taking early/interim action during and prior to completion of the investigation activities.

The plan for implementation of this early/interim action is 2019/2020 while the investigation activities are ongoing. The estimated timeframe for completion of investigation activities is not known; however, completion is targeted for 2022. On average, comparable sites can take ten plus years to complete investigation activities and reach a final remedy decision.

Comment 15: Since this stuff is in the air, how far south do you think these contaminants that you know of so far have gone?

Answer 15: During the remedial investigation, indoor air samples were collected from three structures along with three background air samples collected upwind of the structures. Data results show detections of some contaminants just above the health-based screening numbers while most detected contaminants are below the health-based screening numbers. These structures are unoccupied and the concentrations are not at levels that raise immediate health concerns or require immediate response actions. Further evaluation of the air pathway and data will be completed during the human health risk assessment.

During the remedial action, we will be performing worker safety air monitoring and construction perimeter monitoring. The monitoring program will alert the construction crew if unsafe conditions exist and corrective actions are needed.

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APPENDIX A

Oklahoma Department of Environmental Quality Concurrence Letter

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APPENDIX B

Cost estimate for Alternative 2 (Excavation, Treatment, and Offsite Disposal)

Phase Cost Summary Report
(with Markups)

System:

RACER Version: RACER® Version 11.2.16.0
Database Location: C:\Users\KHiggins\Documents\RACER 11.2\Racer.mdb

Folder:

Folder Name: Wilcox RI

Project:

ID: Wilcox Early Action
Name: Early Action
Category: None

Location
State / Country: OKLAHOMA
City: OKLAHOMA STATE AVERAGE

Location Modifier	Default	User	Reason for changes
	0.920	0.920	

Options
Database: System Costs
Cost Database Date: 2015
Report Option: Fiscal

Description source removal

Phase Cost Summary Report
(with Markups)

Site:

ID: Wilcox
Name: Interim Action-Excavate-Treat-Offsite Disposal-all areas
Type: None

Media/Waste Type

Primary: Sediment/Sludge
Secondary: Soil

Contaminant

Primary: Semi-Volatile Organic Compounds (SVOCs)
Secondary: Metals

Phase Names

- Pre-Study ☐
- Study ☐
- Design ☑
- Removal/Interim Action ☑
- Remedial Action ☑
- Operations & Maintenance ☑
- Long Term Monitoring ☐
- Site Closeout ☑

Documentation

Description: reports
Support Team: Documentation of personnel used to provide support for estimator and preparation of the estimate.
References: Documentation of reference sources used in the preparation of the estimate.

Estimator Information

Estimator Name: Katrina Higgins-Coltrain
Estimator Title: RPM
Agency/Org./Office: EPA R6
Business Address: 1445 ross Ave, Dallas, 75202
Telephone Number: 2146658143
Email Address: coltrain.katrina@epa.g0v
Estimate Prepared Date: 04/03/2018

Estimator Signature: _____ **Date:** _____

Reviewer Information

Reviewer Name:
Reviewer Title:
Agency/Org./Office:
Business Address:
Telephone Number:

Phase Cost Summary Report
(with Markups)

Email Address:
Date Reviewed: 04/03/2018

Reviewer Signature: _____ **Date:** _____

Phase Cost Summary Report
(with Markups)

Phase Documentation:

Phase Type:	**Remedial Action**
Phase Name:	**excavation, treatment, offsite disposal**
Description:	**remediation**
Approach:	**Ex Situ**
Start Date:	**April, 2018**
Labor Rate Group:	**System Labor Rate**
Analysis Rate Group:	**System Analysis Rate**
Phase Markup Template:	**System Defaults**

Technology Markups	Markup	% Prime	% Sub.
Ex Situ Solidification/Stabilization	True	100	0
Excavation	True	100	0
Off-site Transportation and Waste Disposal	True	100	0
Demolition, Fencing	True	100	0
Site Close-Out Documentation	True	100	0
Five-Year Review	True	100	0

Total Marked-up Cost: **$4,135,293.52**

Technologies:

Phase Cost Summary Report
(with Markups)

Technology	Direct Cost	Markups	Total Cost
Demolition, Fencing	$2,153	$1,073	$3,226
Ex Situ Solidification/Stabilization	$276,438	$108,738	$385,176
Excavation	$1,537,687	$764,602	$2,302,289
Five-Year Review	$21,049	$30,121	$51,170
Off-site Transportation and Waste Disposal	$1,111,809	$254,239	$1,366,048
Site Close-Out Documentation	$9,846	$17,538	$27,385
Total Phase Cost	$2,958,983	$1,176,311	$4,135,294

Phase Technology Cost Detail Report
(with Markups)

System:

RACER Version: RACER® Version 11.2.16.0
Database Location: C:\Users\KHiggins\Documents\RACER 11.2\Racer.mdb

Folder:

Folder Name: Wilcox RI

Project:

ID: Wilcox Early Action
Name: Early Action
Category: None

Location
State / Country: OKLAHOMA
City: OKLAHOMA STATE AVERAGE

Location Modifier	Default	User	Reason for changes
	0.920	0.920	

Options
Database: System Costs
Cost Database Date: 2015
Report Option: Fiscal

Description source removal

Site:

ID: Wilcox
Name: Interim Action-Excavate-Treat-Offsite Disposal-all areas
Type: None

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Contaminant

Primary: Semi-Volatile Organic Compounds (SVOCs)
Secondary: Metals

Phase Names

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- Study ☐
- Design ☑
- Removal/Interim Action ☑
- Remedial Action ☑
- Operations & Maintenance ☑
- Long Term Monitoring ☐
- Site Closeout ☑

Documentation

Description: reports
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Estimator Signature: _____ **Date:** _____

Reviewer Information

Reviewer Name:
Reviewer Title:
Agency/Org./Office:
Business Address:
Telephone Number:
Email Address:
Date Reviewed: 04/03/2018

Reviewer Signature: _____ **Date:** _____

Phase Documentation:

Phase Type:	Remedial Action
Phase Name:	excavation, treatment, offsite disposal
Description:	remediation
Approach:	Ex Situ
Start Date:	April, 2018
Labor Rate Group:	System Labor Rate
Analysis Rate Group:	System Analysis Rate
Phase Markup Template:	System Defaults

Technology Markups	Markup	% Prime	% Sub.
Ex Situ Solidification/Stabilization	True	100	0
Excavation	True	100	0
Off-site Transportation and Waste Disposal	True	100	0
Demolition, Fencing	True	100	0
Site Close-Out Documentation	True	100	0
Five-Year Review	True	100	0

Total Marked-up Cost: $4,135,293.52

Technologies:

Technology: Ex Situ Solidification/Stabilization

Technology: Ex Situ Solidification/Stabilization

Element:

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030220	910, 1.25 CY, Wheel Loader	379.00	HR	0.00	98.25	42.91	0.00	$53,499.32	False
17030285	12 CY, Dump Truck	379.00	HR	0.00	91.44	60.28	0.00	$57,503.41	False
19040401	Wastewater holding tanks, above ground, ss, DOT approved, monthly rental, 550 gal	3.00	MO	0.00	0.00	0.00	421.53	$1,264.58	False
19040408	Wastewater holding tanks, above ground, steel, open, stationary, monthly rental, 21,000 gal	3.00	MO	0.00	0.00	0.00	1,285.43	$3,856.28	False
33150405	Portland Cement Type I (Bulk)	490.10	TON	133.60	0.00	0.00	0.00	$65,478.37	False
33150408	Urrichem by Soliditech	122.53	TON	110.29	0.00	0.00	0.00	$13,513.78	False
33150418	1 CY Plywood Boxes	3.00	EA	38.46	32.78	0.00	0.00	$213.74	False
33150420	Operational Labor for Process Equipment	757.00	HR	0.00	87.25	0.00	0.00	$66,048.89	False
33150421	Bulk Chemical Transport (40,000 Lb Truckload)	32.00	EA	0.00	0.00	0.00	2,775.36	$88,811.54	False
33150422	2 CY Mixing System	3.00	MO	0.00	0.00	0.00	7,444.25	$22,332.75	False
33150435	Solidification/Stabilization Ancillary Equipment	1.00	EA	2,067.92	0.00	0.00	0.00	$2,067.92	False
33150437	Maintenance of Solidification/Stabilization Unit	0.18	YR	0.00	13,611.13	0.00	0.00	$2,450.00	False
33199921	DOT steel drums, 55 gal., open, 17C	11.00	EA	116.93	0.00	0.00	0.00	$1,286.28	False
33420201	Diesel Fuel	1,135.00	GAL	5.35	0.00	0.00	0.00	$6,071.17	False
33420301	Process Water, Supplied by Tanker Truck	47.00	KGA	16.54	0.00	0.00	0.00	$777.54	False

Total Element Cost:	$385,175.58
Total 1st Year Tech Cost:	$385,175.58

Technology: Excavation

Element:

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17020416	12 CY Dump Truck Haul/Hour	3,760.00	HR	0.00	91.44	60.28	0.00	$570,482.42	False
17030242	22 CY Scraper by BCY	30,362.00	CY	0.00	1.53	2.83	0.00	$132,181.19	False
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	39,470.60	CY	36.09	1.52	1.24	0.02	$1,533,818.09	False
18050402	Seeding, Vegetative Cover	4.52	ACR	4,579.55	694.30	289.06	0.00	$25,144.35	False
33020401	Disposable Materials per Sample	200.00	EA	14.40	0.00	0.00	0.00	$2,880.57	False
33021709	Testing, TAL metals (6010/7000s)	50.00	EA	0.00	0.00	0.00	138.61	$6,930.32	False
33021721	Testing, semi-volatile organics (625, 8270)	50.00	EA	0.00	0.00	0.00	401.41	$20,070.34	False
33220102	Project Manager	9.00	HR	0.00	235.52	0.00	0.00	$2,119.65	False
33220108	Project Scientist	31.00	HR	0.00	196.40	0.00	0.00	$6,088.42	False
33220110	QA/QC Officer	5.00	HR	0.00	196.40	0.00	0.00	$982.00	False
33220112	Field Technician	5.00	HR	0.00	98.72	0.00	0.00	$493.61	False
33220114	Word Processing/Clerical	5.00	HR	0.00	106.01	0.00	0.00	$530.07	False
33220115	Draftsman/CADD	5.00	HR	0.00	113.68	0.00	0.00	$568.42	False

Total Element Cost:	$2,302,289.46
Total 1st Year Tech Cost:	$2,302,289.46

Technology: Off-site Transportation and Waste Disposal

Element:

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33190102	Bulk Solid Waste Loading Into Disposal Vehicle or Bulk Disposal Container	31,082.00	BCY	1.31	1.72	0.54	0.00	$110,875.64	False
33190205	Transport Bulk Solid Hazardous Waste, Maximum 20 CY (per Mile)	77,750.00	MI	0.00	0.00	0.00	2.87	$222,950.43	False
33190317	Waste Stream Evaluation Fee, Not Including 50% Rebate on 1st Shipment	1.00	EA	0.00	0.00	0.00	55.14	$55.14	False
33190807	32 Ft. Dump Truck, 6 Mil Liner, disposable	1,555.00	EA	35.49	0.00	0.00	0.00	$55,180.23	False
33197270	Landfill Nonhazardous Solid Bulk Waste by CY	31,082.00	CY	0.00	0.00	0.00	31.43	$976,986.10	False

Total Element Cost:	$1,366,047.54
Total 1st Year Tech Cost:	$1,366,047.54

Technology: Demolition, Fencing

Element:

Technology: Demolition, Fencing

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17020228	Fencing demolition, remove barbed wire, 3 strands	1,100.00	LF	0.00	1.25	0.00	0.00	$1,370.01	False
17020401	Dump Charges	14.00	EA	22.48	0.00	0.00	0.00	$314.69	True
17030220	910, 1.25 CY, Wheel Loader	1.00	HR	0.00	98.25	42.91	0.00	$141.16	False
17030284	8 CY, Dump Truck	9.00	HR	0.00	91.44	64.18	0.00	$1,400.60	False

Total Element Cost: $3,226.45

Total 1st Year Tech Cost: $3,226.45

Technology: Site Close-Out Documentation

Element: Meetings

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	14.00	HR	0.00	235.52	0.00	0.00	$3,297.23	False
33220106	Staff Engineer	13.00	HR	0.00	208.91	0.00	0.00	$2,715.85	False
33220114	Word Processing/Clerical	5.00	HR	0.00	106.01	0.00	0.00	$530.07	False
33220115	Draftsman/CADD	1.00	HR	0.00	113.68	0.00	0.00	$113.68	False

Total Element Cost: $6,656.84

Element: Work Plans & Reports

Technology: Site Close-Out Documentation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220101	Senior Project Manager	7.00	HR	0.00	241.39	0.00	0.00	$1,689.72	False
33220102	Project Manager	49.00	HR	0.00	235.52	0.00	0.00	$11,540.32	False
33220104	Senior Staff Engineer	4.00	HR	0.00	241.39	0.00	0.00	$965.55	False
33220109	Staff Scientist	2.00	HR	0.00	113.68	0.00	0.00	$227.37	False
33220114	Word Processing/Clerical	43.00	HR	0.00	106.01	0.00	0.00	$4,558.64	False
33220115	Draftsman/CADD	1.00	HR	0.00	113.68	0.00	0.00	$113.68	False

Total Element Cost: $19,095.28

Element: Documents

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	2.00	HR	0.00	235.52	0.00	0.00	$471.03	False
33220106	Staff Engineer	4.00	HR	0.00	208.91	0.00	0.00	$835.65	False
33220114	Word Processing/Clerical	2.00	HR	0.00	106.01	0.00	0.00	$212.03	False
33220115	Draftsman/CADD	1.00	HR	0.00	113.68	0.00	0.00	$113.68	False

Total Element Cost: $1,632.39

Total 1st Year Tech Cost: $27,384.51

Technology: Five-Year Review

Technology: Five-Year Review

Element: Document Review

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220105	Project Engineer	5.00	HR	0.00	172.36	0.00	0.00	$861.81	False
33220108	Project Scientist	2.00	HR	0.00	196.40	0.00	0.00	$392.80	False
33220109	Staff Scientist	6.00	HR	0.00	113.68	0.00	0.00	$682.11	False

Total Element Cost: $1,936.72

Element: Interviews

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	8.00	HR	0.00	235.52	0.00	0.00	$1,884.13	False

Total Element Cost: $1,884.13

Element: Site Inspection

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	3.00	HR	0.00	235.52	0.00	0.00	$706.55	False
33220105	Project Engineer	3.00	HR	0.00	172.36	0.00	0.00	$517.09	False
33220108	Project Scientist	3.00	HR	0.00	196.40	0.00	0.00	$589.20	False
33220109	Staff Scientist	3.00	HR	0.00	113.68	0.00	0.00	$341.05	False

					Total Element Cost:			$2,153.89	

Element: Report

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	6.00	HR	0.00	235.52	0.00	0.00	$1,413.10	False
33220105	Project Engineer	16.00	HR	0.00	172.36	0.00	0.00	$2,757.79	False
33220108	Project Scientist	13.00	HR	0.00	196.40	0.00	0.00	$2,553.21	False
33220109	Staff Scientist	26.00	HR	0.00	113.68	0.00	0.00	$2,955.81	False

					Total Element Cost:			$9,679.91	

Element: Travel

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010108	Sedan, Automobile, Rental	2.00	DAY	0.00	0.00	0.00	43.00	$86.00	False
33010202	Per Diem (per person)	4.00	DAY	0.00	0.00	0.00	129.00	$516.00	True
33041101	Airfare	2.00	LS	0.00	0.00	0.00	400.00	$800.00	True

					Total Element Cost:			$1,402.00	
					Total 1st Year Tech Cost:			$17,056.66	
					Total Phase Element Cost			$4,101,180.20	

Phase Markups Report

Phase Markups Report

Project: Early Action
Site: Interim Action-Excavate-Treat-Offsite Disposal-all areas
Phase: excavation, treatment, offsite disposal

Subcontracted Portion of Work

	Professional Labor	MLE	SubBid	Total
Total Direct Cost	$0	$0	$1,121,244	$1,121,244
Overhead %	132.00%	25.00%	0.00%	
Overhead	$0	$0	$0	$0
Subtotal	$0	$0	$1,121,244	$1,121,244
Subcontractor Profit %	8.00%	8.00%	0.00%	
Subcontractor Profit	$0	$0	$0	$0
Total Subcontract Cost	$0	$0	$1,121,244	$1,121,244

Prime Contractor Portion of Work

	Professional Labor	MLE	SubBid	Total
Total Direct Cost	$30,609	$1,803,182	$0	$1,833,791
Overhead %	132.00%	25.00%	0.00%	
Overhead	$40,404	$450,795	$0	$491,200
Prime Subtotal	$71,013	$2,253,977	$0	$2,324,991
Prime + Subcontract	$71,013	$2,253,977	$1,121,244	$3,446,234
Prime Profit %	8.00%	8.00%	8.00%	
Prime Profit Cost	$5,681	$180,318	$89,699	$275,699
Prime + Subcontract + Prime Profit	$76,694	$2,434,296	$1,210,943	$3,721,933

Other Project Costs

Contingency %	0.00%	0.00%	0.00%	
Contingency Allowance	$0	$0	$0	$0
Total Contract Cost + Contingency	$76,694	$2,434,296	$1,210,943	$3,721,933
Owner Cost %	11.00%	11.00%	11.00%	
Owner Cost	$8,436	$267,773	$133,204	$409,413
Total Contract Cost + Contingency + Owner Cost	$85,131	$2,702,068	$1,344,147	$4,131,346
Total No-Markup Items				$3,948
Grand Total				$4,135,294

Phase Cost Over Time Report
(with Markups)

System:

RACER Version: RACER® Version 11.2.16.0
Database Location: C:\Users\KHiggins\Documents\RACER 11.2\Racer.mdb

Folder:

Folder Name: Wilcox RI

Project:

ID: Wilcox Early Action
Name: Early Action
Category: None

Location
State / Country: OKLAHOMA
City: OKLAHOMA STATE AVERAGE

Location Modifier	Default	User	Reason for changes
	0.920	0.920	

Options
Database: System Costs
Cost Database Date: 2015
Report Option: Fiscal

Description source removal

Site:

Phase Cost Over Time Report
(with Markups)

ID: Wilcox
Name: Interim Action-Excavate-Treat-Offsite Disposal-all areas
Type: None

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Primary: Sediment/Sludge
Secondary: Soil

Contaminant

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Secondary: Metals

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- Study ☐
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- Removal/Interim Action ☑
- Remedial Action ☑
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Description: reports
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Business Address: 1445 ross Ave, Dallas, 75202
Telephone Number: 2146658143
Email Address: coltrain.katrina@epa.g0v

Phase Cost Over Time Report
(with Markups)

Estimate Prepared Date: **04/03/2018**

Estimator Signature: _____ **Date:** _____

Reviewer Information

Reviewer Name:
Reviewer Title:
Agency/Org./Office:
Business Address:
Telephone Number:
Email Address:
Date Reviewed: **04/03/2018**

Reviewer Signature: _____ **Date:** _____

Phase Cost Over Time Report
(with Markups)

Technology Name	Technology	2018	2019	2020	2021	2022	2023
Demolition, Fencing	1	$3,226	$0	$0	$0	$0	$0
Ex Situ Solidification/Stabilization	1	$385,176	$0	$0	$0	$0	$0
Excavation	1	$2,302,289	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	1	$1,366,048	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$0	$0	$0	$17,057
Site Close-Out Documentation	2	$27,385	$0	$0	$0	$0	$0
Total Phase Cost		$4,084,124	$0	$0	$0	$0	$17,057

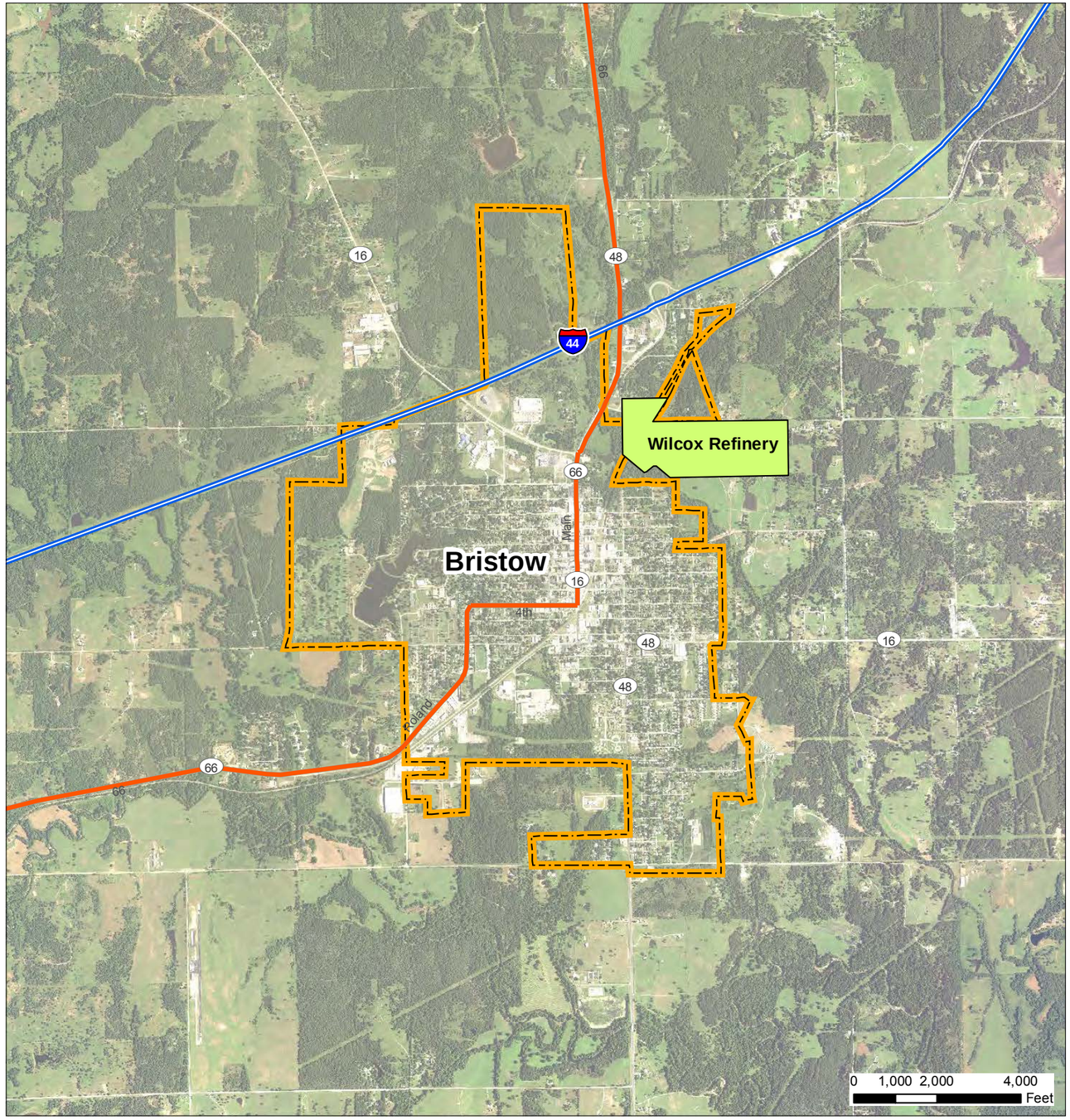
Phase Cost Over Time Report
(with Markups)

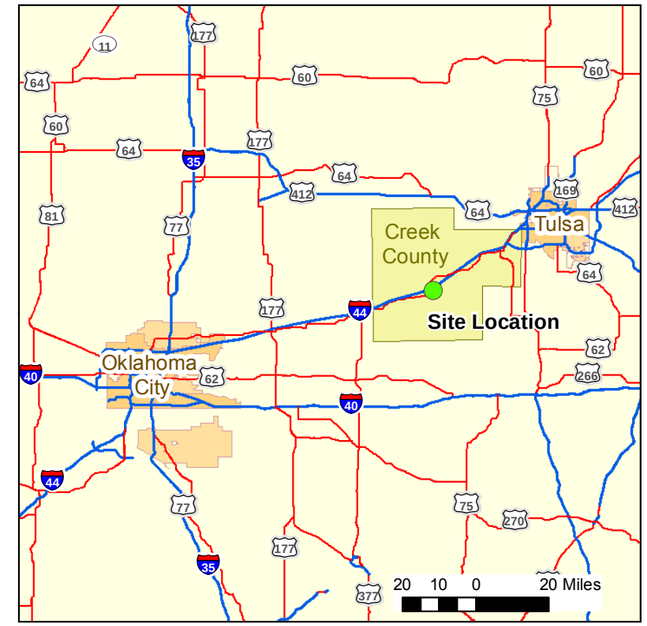
Technology Name	Technology	2024	2025	2026	2027	2028	2029
Demolition, Fencing	1	$0	$0	$0	$0	$0	$0
Ex Situ Solidification/Stabilization	1	$0	$0	$0	$0	$0	$0
Excavation	1	$0	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	1	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$0	$0	$17,057	$0
Site Close-Out Documentation	2	$0	$0	$0	$0	$0	$0
Total Phase Cost		$0	$0	$0	$0	$17,057	$0

Phase Cost Over Time Report
(with Markups)

Technology Name	Technology	2030	2031	2032	2033	Total	
Demolition, Fencing	1	$0	$0	$0	$0	$3,226	
Ex Situ Solidification/Stabilization	1	$0	$0	$0	$0	$385,176	
Excavation	1	$0	$0	$0	$0	$2,302,289	
Off-site Transportation and Waste Disposal	1	$0	$0	$0	$0	$1,366,048	
Five-Year Review	2	$0	$0	$0	$17,057	$51,170	
Site Close-Out Documentation	2	$0	$0	$0	$0	$27,385	
Total Phase Cost		$0	$0	$0	$17,057	$4,135,294	$0

FIGURES





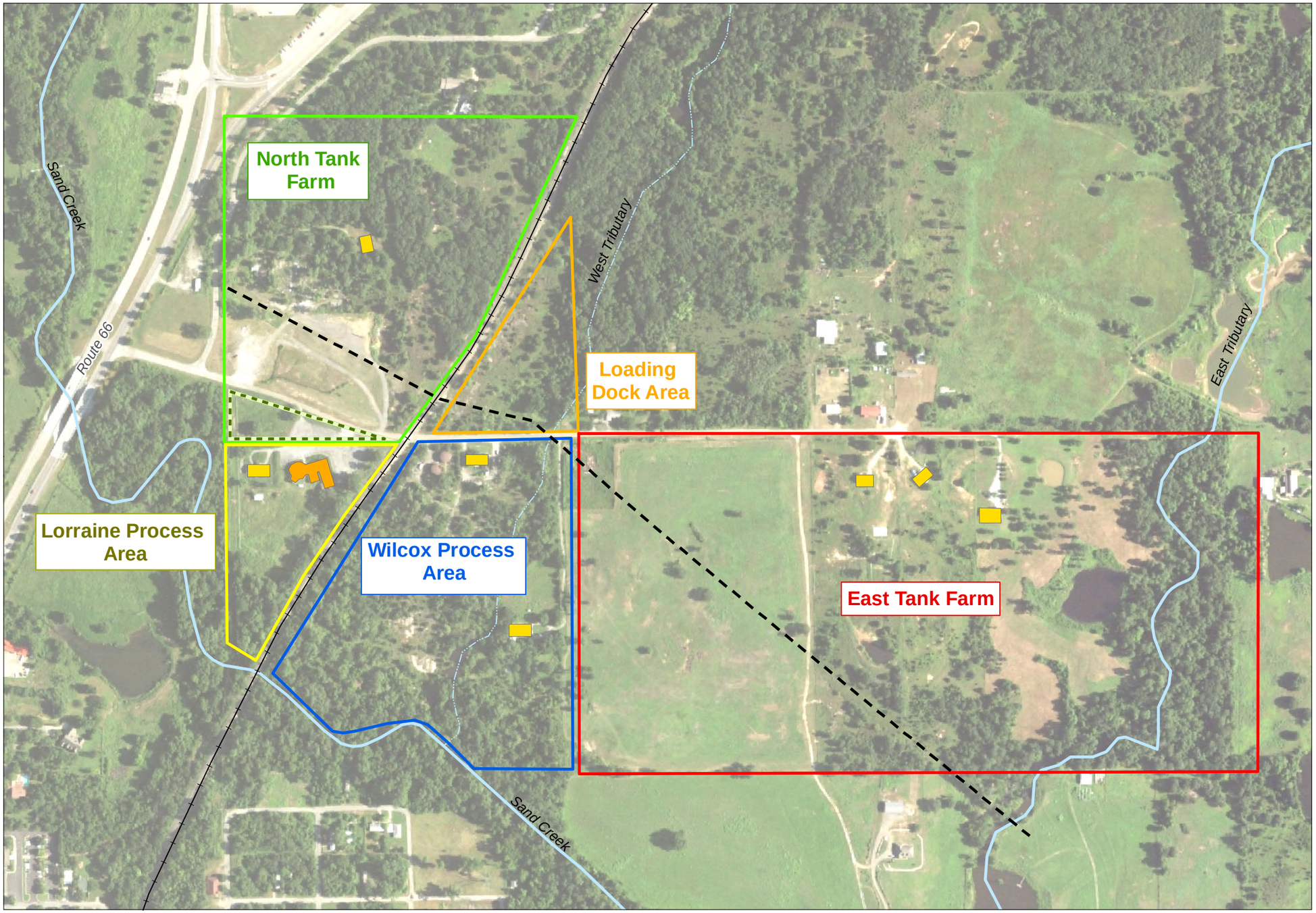
Legend

- Interstate
- Highway
- Bristow City Boundary

Wilcox Oil Company Superfund Site
Bristow, Creek County, Oklahoma

Image Source: National Agriculture Imagery Program 2015

FIGURE 1
SITE LOCATION



0 200 400 800 Feet

1 inch = 400 feet

Legend

- Stream, Intermittent
- Stream, Perennial
- Pipeline
- Railroad

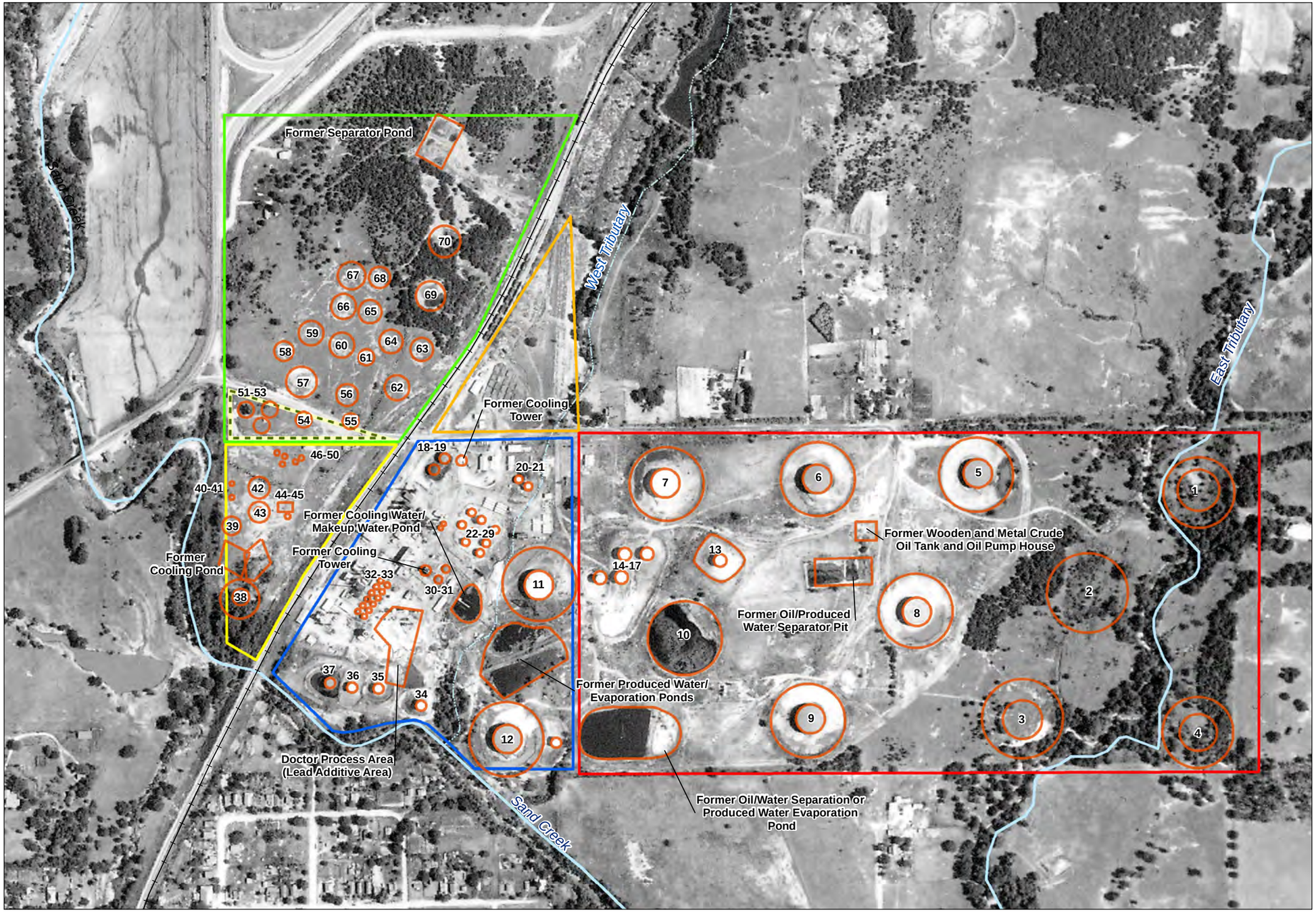
On-Site Building

- Church
- Residence
- Area will be designated as part of Lorraine Process Area for this investigation.

Image Source: National Agriculture Imagery Program 2015.

Wilcox Oil Company Superfund Site
Bristow, Creek County, Oklahoma

FIGURE 2
SITE LAYOUT



0 200 400 800 Feet

1 inch = 400 feet

Legend

- Historical Feature
- Railroad
- Stream, Intermittent
- Stream, Perennial
- East Tank Farm
- Loading Dock Area
- Lorraine Process Area
- North Tank Farm
- Wilcox Process Area
- Area will be designated as part of Lorraine Process Area for this investigation.

Image Source: 1956 Aerial Photograph.

Wilcox Oil Company Superfund Site
Bristow, Creek County, Oklahoma

FIGURE 3
HISTORICAL SITE FEATURES

Figure 4a: Waste material at surface.

Figure 4b: Waste material at surface.

Figure 4c: Waste material at surface.

Figure 4d: Lead Sweetening Area

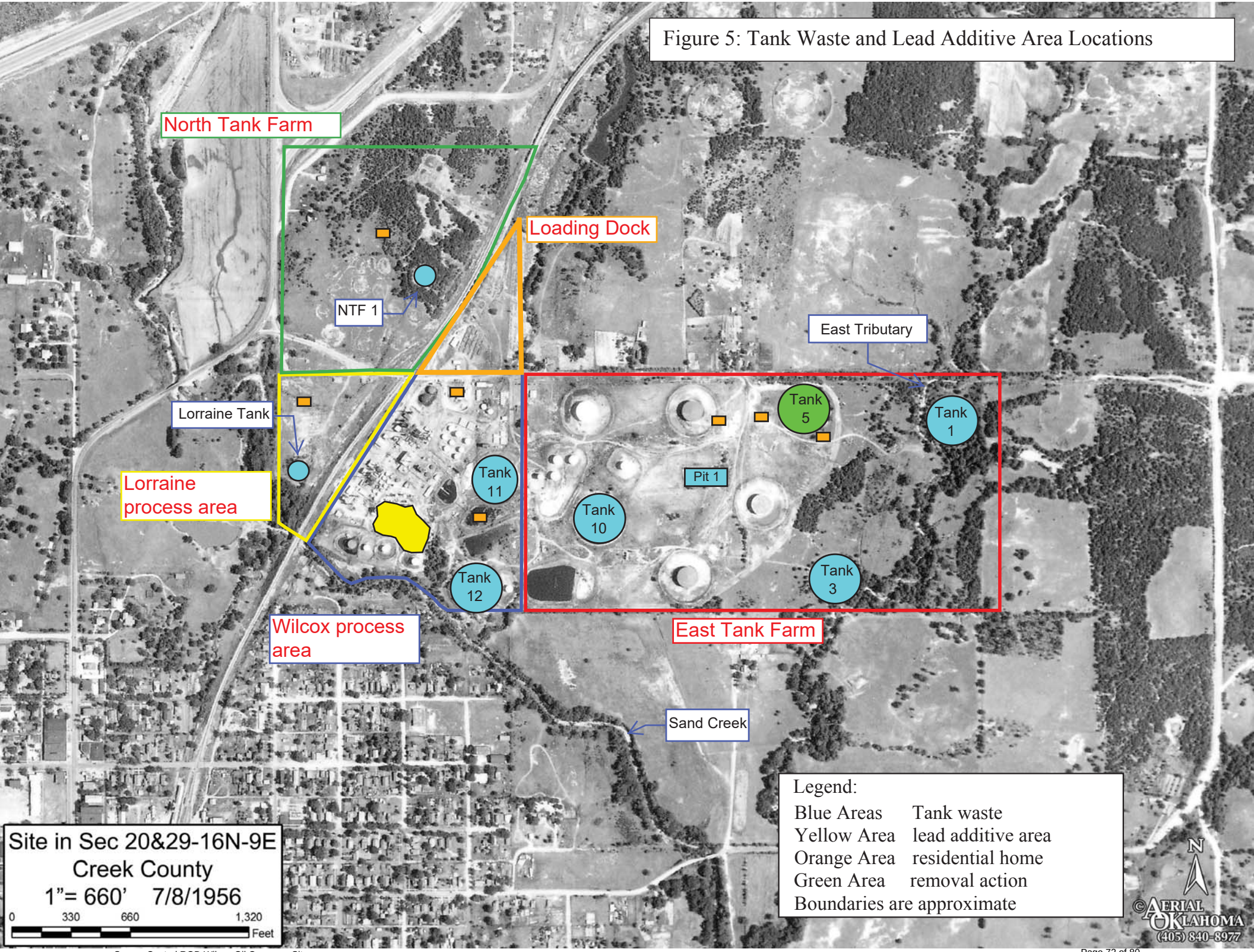


Figure 5: Tank Waste and Lead Additive Area Locations
North Tank Farm
Loading Dock
NTF 1
East Tributary
Lorraine Tank
Tank 5
Tank 1
Lorraine process area
Tank 11
Pit 1
Tank 10
Tank 12
Tank 3
Wilcox process area
East Tank Farm
Sand Creek
Legend:
Blue Areas Tank waste
Yellow Area lead additive area
Orange Area residential home
Green Area removal action
Boundaries are approximate
Site in Sec 20&29-16N-9E
Creek County
1"= 660' 7/8/1956
0 330 660 1,320 Feet
N
©Aerial Oklahoma
(405) 840-8977

TABLES

Table 1: Summary of Data and Potential Exposure Scenarios				
Description	**Locations**	**Data Results[1]**	**Potential Impacts/Exposure Scenarios**	**Data Source(s)**
Lead Additive Area	Lead Additive Area	Lead 43,200 – 105,000 mg/kg <u>Shallow Water:</u> 2-methylphenol $1.5x10^6$ µg/l Phenol 270,000 µg/l 2,4 dimethylphenol $1.3x10^6$ µg/l Lead >752 µg/l Benzene 2400 µg/l	Sand Creek (direct discharge/migration to surface water and sediment) Ecological and Human Receptors (direct exposure)	RI Field Data, 2016 LMS, 2016 Removal Assessment, 2016 ESI Wilcox Oil, 1997 ESI Wilcox/Lorraine 2011 Lorraine Refinery SI, 2009 ESI Wilcox Oil, 2012 EPA, unpublished, 2017 EPA, unpublished, 2018
Tank Waste	Lorraine Process Area Tank 1 Tank 3 NTF-1 Tank 10 Tank 11 Tank 12 Pit 1	TPH 23,200 - 875,000 mg/kg Lead 513 – 3,660 mg/kg total xylenes 0.28 – 0.45 mg/kg toluene 0.27 mg/kg **PAHs** Benzo(a)anthracene 0.76 - 12 mg/kg Benzo(a)pyrene 1.2 - 12 mg/kg Benzo(b)fluoranthene 2.4 - 20 mg/kg Benzo(k)fluoranthene 7.5 mg/kg Chrysene 13 - 37 mg/kg Fluoranthene 2.5 - 17 mg/kg Indeno(1,2,3-cd)pyrene 3.1 – 4.4 mg/kg phenanthrene 27 - 520 mg/kg pyrene 2.1 - 230 mg/kg 2-methylnaphthalene 49 - 1,400 mg/kg	Human Receptors (indoor air)	

1 This column is not all inclusive. This is a limited summary of detected contaminants, specifically listing those with the highest concentrations.

Abbreviations: TPH=total petroleum hydrocarbon mg/kg=milligram per kilogram µg/l=micrograms per liter
NTF=north tank farm ESI=Expanded Site Investigation SI=Site Investigation
RI=remedial investigation PAHs=polycyclic aromatic hydrocarbons
LMS= Lockheed Martin SERAS ERT=Environmental Response Team

Table 2: Passive Soil Gas and Indoor Air/Sub-slab Data		
Passive Soil Gas Results		
COMPOUNDS	Result: ng	
Benzene	8652	
Toluene	2,682	
Ethylbenzene	8,453	
p & m-Xylene	15,656	
o-Xylene	6,326	
Naphthalene	2,145	
2-Methylnaphthalene	10,027	
Results are nanograms (ng). There are no screening numbers for mass comparison. Data presented are the highest recorded results.		
Indoor Air/Sub-slab		
Analyte	Result: ($\mu g/m^3$)[1]	Health-Based Screening Level ($\mu g/m^3$)[2]
Chloroform	0.93	0.12
1,4-Dichlorobenzene	1.08	0.26
Benzene	5.57	0.36
Ethylbenzene	1.44	1.1
1,3-Butadiene	11.7	0.094
Trichlorofluoromethane	43.4	--
(--): no health based screening number available. 1-Results are micrograms per cubic meter ($\mu g/m^3$). Data presented are the highest recorded results. 2-Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2017		

Table 3: Areas of Remediation – Estimated Volume	
Area Name	**Volume Estimated (cubic yards)**
Lorraine Waste	953
Lead Additive Area	2,269
Tank 1	3,323
Tank 3	3,608
NTF-1	818
Tank 10	9,902
Tank 11	431
Tank 12	4,788
Pit 1	4,270
Total	30,362 (5 Acres)
NTF=north tank farm	

Table 4: Comparison of Site data to Health-Based Screening Levels[1]				
	Contaminant	**Data Results (mg/kg)**	**Health-Based Screening Level (mg/kg)**	**Health-Based Screening Level Basis**
Lead Additive Area	Lead	105,000	800	Protection of blood lead levels in workers
Tank Waste	Benzo(a)anthracene	12	1.1	Residential Cancer Screening Number at 10-6 Risk
	Benzo(a)pyrene	12	0.11	Residential Cancer Screening Number at 10-6 Risk
	Benzo(b)fluoranthene	20	1.1	Residential Cancer Screening Number at 10-6 Risk
	Indeno(1,2,3-cd)pyrene	4.4	1.1	Residential Cancer Screening Number at 10-6 Risk
	2-methylnaphthalene	1400	240	Residential Non-cancer Screening Number at Hazard Index=1
	Naphthalene	14	3.8	Residential Cancer Screening Number at 10-6 Risk
Contamination resulting from source material migration				
	Contaminant	**Data Results (µg/l)**	**Health-Based Screening Level (µg/l)**	**Health-Based Screening Level Basis**
Shallow ground water	2-methylphenol	$1.5x10^6$	930	Residential Non-Cancer Screening Number at Hazard Index=1 for Drinking Water
	Phenol	340,000	5800	Residential Non-Cancer Screening Number at Hazard Index=1 for Drinking Water
	2,4 dimethylphenol	$1.8x10^6$	360	Residential Non-Cancer Screening Number at Hazard Index=1 for Drinking Water
	Lead	>752	15	Action Level for Drinking Water
	Benzene	2400	5	Maximum Contaminant Level for Drinking Water
	Contaminant	**Data Results (mg/kg)**	**Health -Based Screening Level (mg/kg)**	**Health/Eco -Based Screening Level Basis**
Sediment	Lead	224	17	Human Health Bioaccumulation Screening Level[2]
			35	Protection of Benthic Invertebrates Screening Level[3]

1- Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2017
2- State of Oregon Department of Environmental Quality, *Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment* (2007), Table A-1a. Used for chemicals bioaccumulating into fish with subsequent human ingestion.
3- Ecological Screening Values for Freshwater Sediment from TCEQ's *Draft Conducting Ecological Risk Assessments at Remediation Sites in Texas* . January 2014.
mg/kg=milligram per kilogram µg/l=micrograms per liter Data presented are the highest recorded results.

Table 5: Source Material Health-Based Target Levels[1]			
Contaminant	**Data Results (mg/kg)**	**Health-Based Target Level (mg/kg)**	**Health-Based Target Level Basis**
Lead	105,000	800	Protection of blood lead levels in workers
Benzo(a)pyrene	12	0.11	Residential Cancer Screening Number at 10-6 Risk

1- Regional Screening Levels for Chemical Contaminants at Superfund Sites, November 2017
mg/kg = milligram per kilogram

Table 6: Action-Specific ARARs		
Potential Applicable Relevant and Appropriate Requirements	**Description**	**Comment**
FEDERAL		
Land Disposal Restrictions (LDRs)	Establishes restriction for land disposal of hazardous wastes.	
40 CFR 268 Subpart C, 268.34	Waste specific prohibitions—toxicity characteristic metals wastes	Applicable: Lead Additive Area source material
Proceedures for planning and implementing offsite response actions 40 CFR 300.440	Criteria set forth for facilities regulated under RCRA that can accept CERCLA wastes	Applicable: offiste disposal of site source material
Standards Applicable to Generators of Hazardous Waste	Regulates the manifesting, pre-transport requirements, and record keeping and reporting for hazardous waste generators.	
40 CFR 262 Subpart B	The manifest	Relevanat and Appropriate: solid waste source materials will be generated and transported offsite
40 CFR 262 Subpart C	Pre-Transport Requirements	Relevanat and Appropriate: solid waste source materials will be generated and transported offsite
40 CFR 262 Subpart D	Recordkeeping and Reporting	Relevanat and Appropriate: solid waste source materials will be generated and transported offsite
40 CFR 262 Subpart M	Preparedness, Prevention, and Emergency Procedures for Large Quantity Generators	Relevanat and Appropriate: onsite construction.
Standards Applicable to Transporters of Hazardous Waste	Establishes standards which apply to persons transporting hazardous waste within the United States if the transportation requires a manifest under RCRA.	
40 CFR 263 Subpart B	Compliance with the manifest system and Recordkeeping	Relevanat and Appropriate: solid waste source materials will be generated and transported offsite
40 CFR 263 Subpart C	Hazardous Waste Discharges	Relevanat and Appropriate: solid waste source materials will be generated and transported offsite
Department of Transportation Requirements Governing the Transportation of Hazardous Materials 49 CFR 171, 172, 173, 177, and 178	Establishes the requirements for the transportation of hazardous materials as defined by the US Department of Transportation. Regulations prescribed in this law shall govern safety aspects, including security of the transportation of hazardous wastes. prescribes the requirements for shipping papers, package marking, labeling, and transport vehicle placarding applicable to the shipment and transportation of those hazardous materials.	Applicable: solid waste source materials will be generated and transported offsite.
Construction and Development Effluent Guidelines 40 CFR 450.21	regulations associated with discharges from construction activity	Applicable: construction activities at the site.
The National Pollutant discharge Elimination System	Establishes requirements for management of stormwater and associated discharges, including best management practices	
40 CFR 122.26(b)(14)(x)	stormwater discharges	Substantive requirements are relevant and appropriate to site storm water runoff
40 CFR 122.26(c)(1)(ii)	stormwater discharges	Substantive requirements are relevant and appropriate to site storm water runoff
40 CFR 122.41	Conditions applicable to all permits	Substantive requirements are relevant and appropriate to site storm water runoff
40 CFR 122.42(d)	Additional conditions applicable to specified categories of NPDES permits	Substantive requirements are relevant and appropriate to site storm water runoff
40 CFR 122.44(k)(1), (k)(2), and (k)(4)	Best Management Practice	Substantive requirements are relevant and appropriate to site storm water runoff

Table 6: Action-Specific ARARs		
Potential Applicable Relevant and Appropriate Requirements	**Description**	**Comment**
STATE		
Oklahoma Highway Remediation and Cleanup Services Act OAC 252:210-1-3	Provides rules for regulation of highway spill remediation and cleanup services and regulation of cleanup service operators as necessary for protection of the waters of the state, the public health and the environment.	Applicable: if a spill or release occurs during transportation a licensed operator will be used to remediate the spill or release.
Oklahoma Hazardous Waste Management Act 27A O.S. § 2-7-101 et seq. Hazardous Waste Management rules	Implements the Oklahoma Hazardous Waste Management Act (OHWMA), which provides rules for the handling, transportation, treatment, storage, recycling, and/or disposal of hazardous waste regulated by the OHWMA	
OAC 252:205-5-1	disposal plan	Substantive requirements are Relevanat and Appropriate: solid waste source materials will be generated and transported offsite.
OAC 252:205-5-5	manifest requirements	Relevanat and Appropriate: solid waste source materials will be generated and transported offsite
OAC 252:205-7-2	Leakage, other releases prohibited in transport	Applicable: solid waste source materials will be generated and transported offsite.
OAC 252:205-7-4	Additional transporter Rules	Relevanat and Appropriate: solid waste source materials will be generated and transported offsite.
OAC 252:205-9-6	Additional waste analysis requirements	Applicable: solid waste source materials will be generated and transported offsite.
Oklahoma Solid Waste Management Actv27A O.S. § 2-10-101 et seq. Solid Waste Management rules	Regulates the collection, transportation, processing, and/or disposal of solid waste and/or tires.	
OAC 252:515-31-3	Non-hazardous Industrial Solid Waste (NHIW) Management	Applicable: solid waste source materials will be generated and transported offsite.
OAC 252:515-33-2	Transportation to permitted facility - No person shall transport solid waste to a disposal facility unless such facility has a currently active permit or other authorization from the DEQ to accept solid waste.	Applicable: solid waste source materials will be generated and transported offsite.
OAC 252:515-33-4	Adequate enclosure - All persons transporting solid waste to a disposal facility shall provide an adequate enclosure to prevent waste from spilling, falling, leaking, or blowing en route to the disposal site. The person hauling solid waste to a disposal site shall collect any waste that spills, falls, leaks, or blows from the waste-hauling vehicle.	Applicable: solid waste source materials will be generated and transported offsite.
Oklahoma Pollutant discharge Elimination System (OPDES) OAC 252:606-5-5	stormwater discharges	Substantive requirements are relevant and appropriate to contruction activities.
General Water Quality Standards OAC 252:611-1-6	Nonpoint source Pollution controls	Substantive requirements are relevant and appropriate to contruction activities.

Table 7: Chemical -Specific ARARs		
FEDERAL		
Potential Applicable Relevant and Appropriate Requirements	**Description**	**Comment**
Identification and Listing of Hazardous Waste 40 CFR 261 Subpart C, 261.24	Provides criteria for identification of characteristic hazardous wastes.	Applicable: Lead additive area source material is a characteristic hazardous waste.
Standards Applicable to Generators of Hazardous Waste 40 CFR 262.11	Regulates the identification of hazardous and characteristic hazardous waste.	Applicable: source materials will be excavated, treated, and disosed in an offsite facility.
Land Disposal Restrictions (LDRs)	Establishes treatment standards for land disposal of hazardous wastes.	
40 CFR 268 Subpart D, 268.40	Applicability of Treatment Standards	Applicable: Lead Additive Area source material
40 CFR 268 Subpart D, 268.45	Treatment Standards for Hazardous Debris	Applicable: Lead Additive Area source material
40 CFR 268 Subpart D, 268.48	Universal Treatment Standards	Applicable: Lead Additive Area source material
40 CFR 268 Subpart D, 268.49	Alternative LDR treatment standards for contaminated soil	Applicable: Lead Additive Area source material
STATE		
Oklahoma Clean Air Act Air Pollution Control Rules OAC	Sets ambient air quality standards for a variety of constituents, including particulate matter.	
OAC 252-100-25-3	Visible Emissions and Particulates	Applicable during remedial
OAC 252-100-29-2	Control of Fugitive Dust	Applicable during remedial
OAC 252-100-29-3	Control of Fugitive Dust	Applicable during remedial

Table 8: Location-Specific ARARs		
FEDERAL		
Potential Applicable Relevant and Appropriate Requirements	**Description**	**Comment**
The Native American Graves Protection And Repatriation Act –25 United States Code (USC) Section 3001 et seq and its regulations Title 43 CFR Part 10	Protects Native American graves from desecration through the removal and trafficking of human remains and cultural items including funerary and sacred objects.	Substantive requirements applicable if Native American burials or cultural items are identified within area to be disturbed
National Historic Preservation Act –16 USC 470 et seq; 36 CFR Part 800	Provides for the protection of sites with historic places and structures	Substantive requirements applicable if eligible resources are identified within area to be disturbed
Archeological Resources Protection Act of 1979 – 16 USC Sections 47000-47011; 43 CFR Part 7	Prohibits removal of or damage to archaeological resources unless by permit or exception	Substantive requirements applicable if eligible resources are identified within area to be disturbed
American Indian Religious Freedom Act –42 USC Section 1996 et seq.	Protects religious, ceremonial, and burial sites, and the free practice of religions by Native American groups.	Substantive requirements applicable if Native American sacred sites are identified within area to be disturbed.
Endangered Species Act – 16 USC Sections 15331-1548, Title 50 CFR Parts 17 and 402	Regulates the protection of threatened and endangered species or critical habitat of such species.	Substantive requirements applicable if protected species are identified within area to be disturbed

Table 9: To Be Considered		
FEDERAL		
Potential Applicable Relevant and Appropriate Requirements	**Description**	**Comment**
Executive Order on Floodplain Management Order No. 11988	Requires federal agencies to evaluate the potential effects of actions they may take in a floodplain to avoid, to the extent possible, the adverse impacts associated with direct and indirect development of a floodplain.	To Be considered during remedial actions since portions of the site are within the 100-year floodplain.
Executive Order 11990, Protection of Wetlands	Require Federal agencies, wherever possible, to avoid or minimize adverse impacts of Federal actions upon wetlands and to preserve and enhance the natural values of wetlands.	To Be considered during remedial actions since portions of the site are within or near wetlands.