REDACTED VERSION

APPENDIX NOT INCLUDED

REMOVAL ACTION REPORT

FOR

WILCOX OIL RESIDENCE SITE REMOVAL

(b) (6) [redacted]

BRISTOW, CREEK COUNTY, OKLAHOMA

Prepared for

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EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency (EPA) Region 6 Superfund Technical Assessment Response Team (START) contractor Weston Solutions, Inc. (WESTON®) was tasked by EPA Region 6 Emergency Management Branch (EMB) under contract EP-S5-17-02, Technical Direction Document (TDD) 0001/17-065 to provide technical assistance with a residential removal action at the Wilcox Oil Superfund Site, located in Bristow, Creek County, Oklahoma. The Superfund Enterprise Management System (SEMS) Identification Number for the site is OK0001010917.

The focus of this removal action was to remove oily sludge and oily contaminated soils from the residential property identified as Property 006 during previous assessment activities conducted under Technical Direction Document (TDD) 5/WESTIB-042-15-004. Emergency and Rapid Response Services (ERRS) contractor Environmental Restoration LLC (ER) was responsible for the excavation/disposal of oily sludge and contaminated soil, and restoration activities at Property 006. The removal activities took place between 27 September and 11 October 2017. Removal activities and analytical results are summarized as follows:

- Removal and disposal of 1,349 tons (approximately 921 cubic yards) of oil impacted soils and sludge.
- Four five-point composite confirmation samples collected from the bottom of the excavation area, did not exceed the site-specific action level of 0.11 milligrams per kilograms (mg/kg) for benzo(a)pyrene.
- Restoration of the property and driveway to pre-removal conditions.

START compiled logbook and photographic documentation of the removal activities utilizing SCRIBE and Response Manager.

This Removal Action Report was prepared to describe the technical scope of work that was completed as part of the TDD No. 0001/17-065. The EPA On-scene Coordinator (OSC) was Steve Mason. The EPA Team Project Team Leader (PTL) was Derrick Cobb.

☐ The EPA Task Monitor did not provide final approval of this report prior to the completion date of the work assignment. Therefore, Weston Solutions, Inc. has submitted this report absent the Task Monitor's approval.

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1 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) Region 6 Superfund Technical Assessment Response Team (START) contractor, Weston Solutions, Inc. (WESTON®) was tasked by Region 6 EPA Emergency Management Branch (EMB) under Contract Number EP-S5-17-02 Technical Direction Document (TDD) No. 0001/17-065 (Appendix H) to provide technical assistance, contractor oversight, and documentation of on-site activities during the removal action at the Wilcox Oil Residence site. A Site Location Map is provided as Figure 1-1. The removal action included the excavation of oily impacted soils and sludge, confirmation sampling, and site restoration.

This removal action report describes the technical scope of work for removal activities at the Wilcox Oil Residence Site Removal conducted by Environmental Restoration LLC (ER), the Emergency and Rapid Response Services (ERRS) contractors. The EPA On-scene Coordinator (OSC) was Steve Mason. The EPA Team Project Team Leader (PTL) was Derrick Cobb. The EPA Superfund Enterprise Management System (SEMS) Identification number for the site is OK0001010917.

1.1 PROJECT OBJECTIVES

The objective of this removal action was to eliminate the imminent threat and substantial endangerment to public health and welfare and the environment posed by on-site hazardous substances, pollutants, and contaminants at the Wilcox Oil Residence site. EPA accomplished the project objective through excavation and off-site disposal of oil impacted soils and sludge.

The objectives were achieved by excavation and off-site disposal of oily impacted soils, coordinating with EPA OSC Mason, and providing written and photographic documentation of site removal activities.

1.2 SCOPE OF WORK

The Removal Action scope of work included the following activities:

- Excavated and disposed oily impacted soils and sludge off-site.

- Conducted ambient air monitoring during removal activities.
- Collected confirmation samples from the bottom of the excavation areas to document that oil impacted soils and sludge were removed.
- Conducted site restoration activities once confirmation soil results determined that removal action objectives were met.
- Provided oversight and documentation of removal activities.
- Coordinated with EPA OSC and ERRS contractors.

1.3 REPORT FORMAT

This report has been organized as follows:

- Section 1 - Introduction
- Section 2 - Site Background
- Section 3 - Actions Taken
- Section 4 – Sample Analyses and Data Evaluation
- Section 5 - Summary

Additional information is provided in the appendices following the text of this report. The appendices are as follows:

- Appendix A Site Logbook
- Appendix B Digital Photographs
- Appendix C Waste Manifests
- Appendix D Pollution Reports
- Appendix E Data Validation Packages
- Appendix F Analytical Results
- Appendix G Quality Assurance Sampling Plan
- Appendix H Technical Direction Document No. 0001/17-065

2 SITE BACKGROUND

This section presents a summary of background information for the Wilcox Oil Superfund Site including site location and description, operational and regulatory history, previous investigations, and sources of contamination.

2.1 SITE LOCATION AND DESCRIPTION

The Wilcox Oil Residence Site (Property 006) is part of the Wilcox Oil Superfund Site, an abandoned oil refinery and associated tank farm located north of Bristow, Creek County, Oklahoma. The geographic coordinates of the site are approximately Latitude 35.842144° North and Longitude -96.381456° West. The former Lorraine Refinery, including an associated tank farm, operated under numerous companies from approximately 1915 to 1937 when the property was sold to Wilcox Oil and Gas Company. Wilcox Oil and Gas Company purchased refinery operations on the remaining acres east of the railroad tracks and operated as a crude oil refinery from the 1920s until the property was sold on 01 November 1963. The site encompasses approximately 140 to 150 acres. A Site Area Map is provided as Figure 2-1, and a Site Property Map is provided as Figure 2-2.

The Wilcox Oil Superfund site is bordered by Route 66 to the west; a residential area and Turner Turnpike to the northwest and north; Sand Creek to the southwest; and residential, agricultural, and wooded areas to the east and south. The topography in the vicinity of the site slopes to the south. Surface water runoff would follow the topography in the vicinity of the site. There are several fresh water ponds on the site, and some local residents indicated that, historically, fishing has occurred. Two intermittent streams drain the eastern and western portions of the site, and these streams flow south into Sand Creek.

The former Wilcox Oil Process Area is fenced while residential and agricultural properties on the site are partially fenced with barbed wire. A chain-link fence was installed around the former Lorraine Process Area during the Phase II Removal Assessment.

The Wilcox Oil Superfund site is divided into five major former operational areas: The Wilcox Refinery, the Lorraine Refinery, the North Tank Farm, the East Tank Farm, and the Loading Dock

Area. These five areas are described as follows:

- The former Wilcox Refinery Area is fenced and covers approximately 26 acres. Most of the equipment and storage tanks that remained on-site in 1963 were auctioned and have been salvaged for scrap iron by private land owners, and what remains are in ruins. Four aboveground storage tanks (ASTs) (12,500 gallons each) remain standing. In addition to a number of buildings, discarded vegetation, barren areas, and black tarry waste of a hydrocarbon nature are visible. A building in the northern part of the former refinery has been converted to a residence. An intermittent creek flows southward across the eastern portion of the refinery area through a small pond in the southeastern corner of the refinery area and into Sand Creek.
- The former Lorraine Refinery Area covers approximately 8 acres and includes the southwestern portion of the site, south of Refinery Road and west of the railroad. No refinery structures remain in the processing area. The First Assembly of God Church, a playground, and one residence are located here. There are multiple areas of stressed vegetation, barren areas, and visible black tarry waste of hydrocarbon nature.
- The East Tank Farm was a large crude tank storage area/tank farm covering approximately 80 acres and contains pits, ponds, and a number of circular berms that surrounded tank locations. All of the tanks have been cut down and removed; however, remnants of the tank locations remain and are visible. Many of the berms surrounding the pits, ponds, and former tanks have been cut or leveled. An intermittent creek is located in the eastern portion of the tank farm and flows south to Sand Creek. A pumping or gas compressor station exists in the north-central portion of the site, and an active pipeline crosses from northwest to southeast across the middle of the site. There are four residences located on top of or directly next to former tank locations. There are multiple areas of stressed vegetation, barren areas, and visible black tarry waste of a hydrocarbon nature. Waste was also observed in several drainage channels that empty into Sand Creek.
- The North Tank Farm was a crude and fuel oil storage area consisting of approximately 20 acres. No refinery structures remain in the product storage area, and all tanks have been cut down and removed. Remnants of the tank locations are not visible, and historic locations are difficult to pinpoint. One residence is located in this area.
- The Loading Dock Area is approximately 7 acres and was used for loading and unloading product by rail. Just a few refinery structures/supports remain and are generally located parallel to the existing rail lines. There are multiple areas of stressed vegetation, barren areas, and visible black tarry waste of a hydrocarbon nature.

2.2 OPERATIONAL AND REGULATORY HISTORY

A modern oil refining plant was constructed in 1929. The upgraded facility had an operating capacity of 4,000 barrels of crude oil per day. The main components of the system consisted of a skimming plant, cracking unit, and re-distillation battery with a vapor recovery system and

continuous treating equipment. The crude oil was brought directly from the field, eliminating storage and handling facilities, but resulting in crude oil with high sediment and water.

The Wilcox Oil and Gas Company and Lorraine Refining Company Sanborn Insurance Maps indicate that 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, naptha, and benzene (petroleum ether) were all stored on the property.

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. Beginning in 1975 with the construction of the church, private residences were constructed on 6 parcels of land that were part of the former refinery operations. The most recent being constructed in 2003/2004. One former building associated with the refinery was repurposed as a residence. As a result, there is a total of seven residences on the site, all of which are located on former tank or refinery operation locations. Three of the residences located in the eastern portion of the site are known to use water from domestic/private wells. The drainage pattern of the site is primarily toward Sand Creek that serves as the western and southwestern boundaries of the site. Two intermittent streams and several drainage channels cross the portion of the site east of the railroad and flow into Sand Creek.

The refinery waste source areas of concern include a backfilled oil waste pond and pit, a breached settling pond, a former pond apparently backfilled with solid refinery waste, and a number of former tank storage areas. The contaminants of concern are metals and organic compounds (Total Petroleum Hydrocarbons [TPH] and Polycyclic Aromatic Hydrocarbons [PAHs]). These potential contaminants of concern are found in soil, sediment, and waste material.

Specifically, Property 006 (subject to this removal action) is currently occupied by a family. During previous assessment activities, benzo(a)pyrene was found at concentrations that exceeded the residential screening value of 0.11 milligrams per kilogram (mg/kg) at depths ranging from the ground surface to 24-inches below ground surface (bgs). No other PAHs or TPH exceedances were reported for Property 006.

2.3 SUMMARY OF PREVIOUS INVESTIGATIONS

Multiple investigations have been performed on the Wilcox Oil site since 1994. These documents were used to summarize the site background and regulatory history described above.

- Preliminary Assessment (PA) was performed at the former Wilcox Refinery Site by the Oklahoma Department of Environmental Quality (ODEQ) in December 1994.
- Expanded Site Inspection (ESI) was performed at the former Wilcox Refinery Site for the EPA in March 1997.
- Site Assessment (SA) was performed at the former Wilcox Refinery Site by EPA in March 1999.
- PA was performed at the former Lorraine Refinery Site by ODEQ in September 2008.
- Site Inspection (SI) was performed at the former Lorraine Refinery Site by ODEQ in August 2009.
- ESI was performed at the former Lorraine Refinery Site by ODEQ in September 2010.
- ESI was performed at the former Wilcox Refinery Site by ODEQ in September 2011.
- Hazard Ranking System Package was completed in May 2013.

In 2014, the EPA ERRS contractor capped and locked an abandoned drinking water well located near the First Assembly of God Church (no longer operating at this location) to the west of the site. ERRS also installed a fence with signage around an oily sludge pit located on a residential property developed within the historical refinery boundary (Property 001).

In 2014 and 2015, WESTON, the EPA Region 6 START contractor, was tasked by EPA Region 6 to perform a Removal Assessment at the Wilcox Oil Refinery site under TDD No. 5/WESTON-042-15-004. Phase I was conducted from 08 through 11 December 2014, and Phase II was conducted 18 May through 12 June 2015. The field sampling strategy focused on collecting soil samples from residential properties that have been built on or are in close proximity to the Wilcox Oil Refinery Site.

Prior to initiating the sampling activities in Phase I, EPA gained access to one targeted residential property (Property 001) within the former Wilcox Oil Refinery Site boundary. As part of the assessment activities, the EPA Team collected 187 soil samples including duplicate, quality

assurance/quality control (QA/QC) samples from a total of 57 grids. Two samples were also taken at the request of the EPA OSC from soil on the bank of an on-site pond and soil that was affected with a tar-like substance from an unknown source.

Prior to initiating Phase II, EPA gained access to nine residential properties. The EPA Team collected a total of 240 soil samples (including duplicate, QA/QC samples) from a total of 52 grids from 9 properties on and around the Wilcox Oil Refinery Site (5 properties located on the former refinery site and 4 properties located adjacent to the former refinery). At the direction of the EPA OSC, select locations were pushed to deeper depths to visually investigate the presence of potential refinery waste. Based on the historical site operations and historical aerial photographs, selected grids were investigated below 24-inches bgs. These grids were identified on Properties 002, 006, 008, and 011. The center point of each grid was advanced to a maximum depth of 8 feet bgs or refusal (bedrock). Visual observations were noted. No analytical samples were collected from these at-depth soil investigation borings.

Results from previous investigations are presented in the EPA START-3 *Wilcox Oil Company Superfund Site Removal Assessment Report*, (TDD No. 5/WESTON-042-15-004) dated January 2016.

3 ACTIONS TAKEN

During this Wilcox Oil Residence Site Removal action, EPA removed sludge and oil impacted soil identified during the removal assessment and transported the material off-site for disposal. On 27 September 2017, ERRS, START, and EPA mobilized to Bristow, Creek County, Oklahoma, to begin preparing the site for removal activities that commenced on 28 September 2017. Preparations included identifying utility locations following mark-outs by the utility service providers, procuring equipment and materials required for removal activities, and setup of the Mobile Mini command post.

From 28 September through 11 October 2017, the EPA Team conducted the removal action that included the excavation area to depths between 6 inches and 48 inches. While on-site, the EPA Team provided written, photographic, and cost documentation for on-site activities. On-site activities included soil excavation, confirmation sampling, ambient air monitoring, site restoration, and communicating with the property owner. Additionally, START documented the excavation boundaries on Property 006, following excavation activities using a Geographic Information System (GIS) and handheld Geographic Positioning System (GPS) unit. The following components of this removal action were completed and are described in this section:

- Soil Removal
- Confirmation Sampling
- Ambient Air Monitoring
- Site Restoration

Pollution Reports (POLREPs) were written by the EPA Team to provide status updates regarding activities at the site and are presented in Appendix C. Site logbook notes are included in Appendix A. Digital photographs taken by the EPA Team of site-related activities are presented in Appendix B.

3.1 SOIL REMOVAL

Prior to initiating the excavation activities, the Oklahoma One-Call System and local municipalities were called and utility mark-outs were performed by the utility service providers.

The area of excavation was excavated to the extent of no visible sludge remained. Confirmation samples were collected from the floor of the excavation following the completion of excavation. Excavation was considered complete when the confirmation sample results were reported below the site-specific action. All confirmation analytical results were reported at concentration below site-specific action level for benzo (a) pyrene (0.11 mg/kg); therefore further excavation was not required.

The excavation material was loaded directly into the dump trucks and transported by Yocham Trucking for off-site for disposal at the American Environmental Landfill, Inc. in Sand Springs, Oklahoma, as non-hazardous soil waste. A total of approximately 1,349 tons (approximately 921 cubic yards) of oil impacted soils and sludge were removed from the site during the removal action.

Table 3-1
Summary of Waste Disposal
Removal Report for Wilcox Oil Residence Site Removal
Bristow, Creek County, Oklahoma

Date	Designated Facility	Manifest Tracking Number	Waste Description	Containers		Total Quantity (tons)
				No.	Type	
10/27/17	American Environmental Landfill, Inc.	MN520WIL01	Non-Hazardous Soil	6	DT	99.03
10/28/17	American Environmental Landfill, Inc.	MN520WIL01	Non-Hazardous Soil	26	DT	418.02
10/29/17	American Environmental Landfill, Inc.	MN520WIL01	Non-Hazardous Soil	33	DT	487.44
10/30/17	American Environmental Landfill, Inc.	MN520WIL01	Non-Hazardous Soil	15	DT	241.19
11/2/17	American Environmental Landfill, Inc.	MN520WIL01	Non-Hazardous Soil	3	DT	54.61
11/05/17	American Environmental Landfill, Inc.	MN520WIL01	Non-Hazardous Soil	3	DT	48.36

Notes: DT - Dump Truck

3.2 CONFIRMATION SAMPLING

As part of the removal action support activities, confirmation soil samples were collected from each excavation area following the completion of removal activities. The EPA Team collected a total of five soil composite samples (including QA/QC samples) from a total of four excavation areas during the removal action. Excavation locations were established using GPS technology to obtain horizontal control of the sample locations.

Composite samples were collected from five points within the excavated area. The soil was homogenized in dedicated plastic bags then transferred to clean, unused, 8-ounce glass jars. Each sample was label, bagged, and placed in a cooler with ice. Sample coolers were shipped via FedEx to a subcontracted analytical laboratory.

The QA/QC samples were collected as part of the confirmation sample process. The EPA Team collected one blind field duplicate during the removal action. Analysis of the duplicate provides QA of sampling procedures and laboratory analytical data by evaluating reproducibility of results. Matrix spike samples were also collected to assist in the QA of the laboratory analytical procedures. One matrix spike sample was collected during the removal action. Other QA samples included temperature blanks placed in each cooler to evaluate the temperature of samples upon arrival at the laboratory. Analytical results are provided in Appendix F.

3.3 SITE RESTORATION

Post-excavation activities included restoring Property 006 to previous conditions. Prior to excavation, photographs were used to document the existing property conditions. Clean soil (as confirmed with sampling data collected from the fill material) was used to replace the excavated soil. Gravel was utilized to restore the driveway. In addition, six trees selected by Property 006 owner were planted to replace the trees removed to facilitate excavation. Where clean soil was placed, the area was hydro-seeded. A final site walk was completed to document the site conditions prior to returning to the property owner. Additionally, ERRS provided hydro-seed and tree care guidance to the property owner prior to project completion.

3.4 AIR MONITORING RESULTS

The EPA Team utilized a Multi Rae to conduct ambient air monitoring for volatile organic compounds (VOCs) during removal activities. Ambient air monitoring was completed throughout the days during removal activities. No readings above background were detected.

4 SAMPLE ANALYSES AND DATA EVALUATION

Test America Laboratories, Inc. (Test America) in Nashville, Tennessee, conducted analytical analyses of the samples collected from Property 006. Data validation was performed by START as part of the removal action in accordance with the EPA Contract Laboratory Program *National Functional Guidelines for Organic Superfund Data Review – January 2017 (*EPA-S40-R-014-002). These tasks were conducted in accordance with the EPA technical requirements, WESTON's Quality Assurance Program, and the site-specific Quality Assurance Sampling Plan (QASP) (Appendix G).

A standard data management system that includes using bound field logbooks, site photographs, sample management and tracking procedures, document control, and inventory procedures for the laboratory data was utilized. SCRIBE software was utilized to manage and track sample information for samples submitted to the laboratories, and store analytical results data.

Confirmation samples were analyzed only for the constituents that exceeded the site-specific action levels (benzo (a) pyrene) during the previous assessments for the respective area of Property 006. The following method of analysis was conducted:

- SW-846 – Method 8270D SIM – PAHs, benzo(a)pyrene

Test America provided data packages for each chain of custody submitted. The laboratory documentation in these data packages includes records of instrument readings, calculations, calibrations, and quality assurance checks. The data packages were reviewed to verify that they met the EPA technical requirements and QA guidelines established for the respective analytical methods. Analytical Results are provided as Appendix F, and the data validation packages are provided as Appendix E.

5 SUMMARY

From 27 September to 11 October 2017, EPA conducted and successfully completed the removal action at the Wilcox Soil Superfund Site, Property 006. Removal Actions consisted of the removal and disposal of 1,349 tons (approximately 921 cubic yards) of oil impacted soils and sludge and restoration of the property and driveway.

A total of five confirmation samples (including QA/QC samples) were collected and submitted for analyses for PAHs during the removal action and were submitted to Test America. The laboratory data results were validated by START, and analytical results were compared to the site-specific screening level established by the EPA in the Action Memo.

Excavated areas were backfilled with clean soil and hydro-seeded and the gravel driveway restored. On 12 October 2017, the EPA Team completed field activities and demobilized from the site.