REMOVAL ACTION REPORT

Treoil Industries Biorefinery
Removal Action
Ferndale, Whatcom County, Washington

Contract No.: 68HE0720D0005
Task Order Nos.: 68HE0722F0129
68HE0722F0130

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LIST OF ABBREVIATIONS AND ACRONYMS

ACM	Asbestos-containing material
AM	Action memorandum
AO	Administrative order
AST	Aboveground storage tank
bgs	Below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of concern
CWA	Clean Water Act
CY	Cubic yard
DE	Diatomaceous earth
DOT	Department of Transportation
DU	Decision unit
E&E	Ecology and Environment, Inc.
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
EQM	Environmental Quality Management
ERRS	Emergency and Rapid Response Services
FP	Flashpoint
FTIR	Fourier Transform Infrared Spectroscopy
GRO	Gasoline range organics
HASP	Health and Safety Plan
ID	Identification
mg/m^3	Milligrams per cubic meter
MTCA	Model Toxics Control Act
NCP	National Contingency Plan
NOV	Notice of violation
NPDES	National Pollutant Discharge Elimination System
NWTPH	Northwest total petroleum hydrocarbons

LIST OF ABBREVIATIONS AND ACRONYMS (CONTINUED)

NWTPH-Dx	Northwest total petroleum hydrocarbons – diesel range organics
NWTPH-Gx	Northwest total petroleum hydrocarbons – gasoline range organics
O&G	Oil and gas
OLEM	Office of Land and Emergency Management
OPA	Oil Pollution Act
OSC	On-Scene Coordinator
PACM	Presumed asbestos containing material
PAH	Polycyclic aromatic hydrocarbons
PLM	Polarized Light Microscopy
PPE	Personal Protective Equipment
QC	Quality control
RCRA	Resource Conservation and Recovery Act
RDMP	Regional Data Management Plan
RRO	Residual range organic
RSE	Removal Site Evaluation
SAP	Sampling and Analysis Plan
SEMD	Superfund and Emergency Management Division
SEMS	Superfund Enterprise Management System
SOW	Scope of Work
SSDMP	Site-Specific Data Management Plan
SSID	Site/Spill Identification
START	Superfund Technical Assessment and Response Team
SVOC	Semi-volatile organic compound
TAL	Target Analyte List
TCLP	Toxicity Characteristic Leaching Procedure
TCRA	Time-Critical Removal Action
TO	Task Order
TPH	Total Petroleum Hydrocarbons

LIST OF ABBREVIATIONS AND ACRONYMS (CONTINUED)

UAS	Unmanned aircraft system
U.S.C	United States Code
VOC	Volatile organic compound
WESTON®	Weston Solutions, Inc.
WOTUS	Waters of the United States

EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency (EPA) tasked Weston Solutions, Inc. (WESTON®), the Superfund Technical Assessment and Response Team (START) contractor, to provide technical support and document activities conducted by EPA during a removal action at the Treoil Industries Biorefinery (Site) located in Ferndale, Whatcom County, Washington (see **Figure 1**). EPA completed a Removal Site Evaluation (RSE) in June 2022 that established the release and continued threat of release of hazardous substances from this Site to the environment, as well as the threat of discharge of oil to waters of the US (WOTUS). Following completion of the RSE, EPA issued an Action Memorandum and an Oil Pollution Act Removal Project Plan authorizing the removal of hazardous substances and oil under the authorities in Subparts E and D of the National Contingency Plan.

EPA along with contractors from START and Emergency and Rapid Response Services conducted the removal from September 12, 2022, to November 18, 2022. The removal focused on mitigating threats to human health and the environment by removing and disposing of 45 aboveground storage tanks (ASTs) and their contents. The removal also addressed oily liquids in secondary containment, impacted surface soils, and containers with unknown chemicals.

Each of the 46 ASTs were assessed to determine their contents and to establish a method of removal. The material within most ASTs was solidified by mechanically mixing its contents with diatomaceous earth. The resulting solidified material was characterized and sent to an off-site disposal facility. Emptied ASTs were decontaminated, cut into manageable pieces, and sent off-site to either be recycled or disposed of.

Removal activities included the removal of oily liquids from two secondary containment structures surrounding compromised tanks. The contents of secondary containments were pumped into frac tanks, characterized, and disposed of at appropriate waste facilities.

The removal also addressed numerous abandoned chemical containers with incompatible labels that appeared to be used for laboratory analyses. The chemical containers ranged from small off-the-shelf cans to several five-gallon buckets, along with a few gas cylinders. Chemical containers were gathered, and their contents assessed using First Step Hazard Categorization screening and Raman Fourier transform infrared technology. The results of the survey were used to determine appropriate disposal.

Finally, the removal addressed soils contaminated with either hazardous substances or oil. After materials were removed from ASTs, impacted surface soil was excavated to prevent off-site migration. Excavated soil was subsequently disposed of at an appropriate landfill.

Before the EPA demobilized from the Site, a locally sourced, native seed mixture was applied to areas of the Site that were disturbed by removal activities. The application of the seed mixture was intended to stabilize soil and reduce the migration of surface soil.

The approximate quantities of materials removed from the Site include:

- 4,800 gallons of pumpable oily material
- 3,316 tons of solidified material
- 1,890 gallons of corrosive liquids
- Eight cubic yards (CY) of solidified hazardous materials
- 97,400 gallons of oily liquid from secondary containment
- 18,000 gallons of hazardous liquids

START provided written, photographic, and video documentation of daily activities on-site. In addition, three unmanned aircraft system flights were conducted to capture the removal activity progress at the Site.

This report presents removal activities and the technical scope of work completed between September 12, 2022, and November 18, 2022.

1 INTRODUCTION

The Treoil Industries Biorefinery Site, located in Ferndale, Whatcom County, Washington, is a former biorefinery that consisted of more than 45 ASTs, a distillation tower, two warehouse buildings, office trailers, and laboratory trailers. The U.S. Environmental Protection Agency (EPA) used removal response authority, granted through several federal statutes and regulations, to conduct a Time-Critical Removal Action (TCRA) at the Site. Section 104(a)(1) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Title 42 of the United States Code (U.S.C.), Section (§) 9604(a)(1), authorizes EPA to act, consistent with the National Contingency Plan (NCP), to remove or arrange for the removal of, or to take any action deemed necessary to protect human health and the environment from a release or substantial threat of release of a hazardous substance. Section 311(c) of the Clean Water Act (CWA), 33 U.S.C. § 1321(c), as amended by the Oil Pollution Act (OPA), 33 U.S.C. 2701 et seq., grants EPA the authority to ensure effective and immediate removal of a discharge and mitigation or prevention of a substantial threat of discharge of oil to waters of the US (WOTUS), in accordance with the NCP and any area contingency plan. The NCP, Title 40 of the Code of Federal Regulations (CFR) Part 300, establishes procedures for conducting responses to oil and hazardous substance incidents and designates the On-Scene Coordinator (OSC) as the director and coordinator of response actions for discharges of oil or releases of hazardous substances.

EPA tasked Weston Solutions, Inc. (WESTON®) to provide technical support at the Site under the Superfund Technical Assessment and Response Team (START) Contract No. 68HE0720D0005.

In June 2022, EPA and its contractors conducted a Removal Site Evaluation (RSE) investigation following the identification of recent concerns by the Washington State Department of Ecology (Ecology) at the Site. The results of the 2022 RSE identified discharges of oil and oily materials to the ground surface and a large sheen in rainwater accumulated in the large secondary containment structure, as well as a substantial threat of oil discharge to WOTUS. The investigation confirmed the ongoing release of hazardous substances to the environment, as well as a substantial threat of future release.

On July 26, 2022, Ecology formally requested EPA's assistance in mitigating environmental hazards. The request from Ecology was a culmination of the imminent environmental threat from oil and hazardous waste, the potential impacts to public health, and a history of noncompliance by the property owner.

On August 8, 2022, EPA Region 10's Superfund and Emergency Management Division (SEMD) authorized a removal action at the Site, pursuant to both CERCLA and OPA authorities to prevent further releases of hazardous substances to the environment and discharges of oil to WOTUS. Following removal field activities, EPA released the Site to Ecology for further investigation and, if necessary, remediation.

1.1 PROJECT OBJECTIVES

The objectives of this removal are defined in TO Nos. 68HE0722F0129 and 68HE0722F0130, dated August 12, 2022, and are summarized herein. The purpose of this removal was to eliminate or greatly reduce the release and significant threat of further release of oil and hazardous substances to the environment and to WOTUS. This objective was achieved by:

- Segregating and securing oil and hazardous substances
- Solidifying aboveground storage tank (AST) contents and residues
- Arranging proper disposal of solidified tank contents
- Arranging proper disposal of CERCLA hazardous substances
- Decontaminating residues from ASTs
- Disposing contaminated liquids from secondary containments
- Removing impacted surface soils

1.2 SCOPE OF WORK

START was tasked with providing written, photographic, and video documentation of Site activities; conducting work zone air monitoring; collecting and inventorying chemical containers; categorizing unknown chemical container hazards; collecting samples for laboratory analysis and validating results; managing data; and preparing reports. START also updated project costs throughout field activities.

START scope of work (SOW) for removal activities:

- Develop a site-specific Health and Safety Plan (HASP)
- Develop a site-specific Sampling and Analysis Plan (SAP)
- Develop a Site-Specific Data Management Plan (SSDMP)
- Schedule unmanned aircraft system (UAS) flights
- Mobilize sampling equipment and supplies
- Document field activities and costs
- Collect time-lapsed camera footage to capture progression of removal actions
- Collect air monitoring for personnel safety
- Collect and inventory orphan small containers for subsequent disposal
- Conduct First Step Hazard Categorization for unknown materials
- Collect and submit samples for waste characterization
- Review and validate analytical laboratory results
- Compile findings into a removal action report

Emergency and Rapid Response Services (ERRS) prepared the Site for waste disposal and was responsible for the physical removal of hazardous materials while maintaining engineering controls to minimize off-site migration of contaminants. ERRS also secured resources and managed logistics to transport removal waste streams to EPA-approved disposal facilities.

2 SITE BACKGROUND

2.1 SITE LOCATION AND DESCRIPTION

Site Name:	Treoil Industries Biorefinery
Location:	4242 Aldergrove Road Ferndale, WA, 98248
Superfund Enterprise Management System (SEMS):	WAH000050091
Site/Spill ID (SSID):	10PZ
Federal Project Number (FPN):	UCGPE22002
Latitude, Longitude:	48.8789186° North, 122.710728° West

The Site is located on a privately-owned property with an industrial biorefinery in the northwest portion of unincorporated Whatcom County, approximately five miles northwest of the City of Ferndale, Washington (**Figure 1**), eight miles south of the U.S./Canadian border, and four miles north of the Lummi Nation Reservation. Biorefinery operations were conducted on approximately 3.5-acres of a 34-acre parcel. The developed portion of the property is surrounded by wetlands and woodland/meadow habitat.

The Treoil Industries Biorefinery consists of two primary warehouse buildings, three separate tank farms within secondary containment, a distillation tower, additional tank farm structures, and piping. The property also has two mobile homes, two former laboratory trailers, and numerous pieces of abandoned heavy equipment and collision-damaged vehicles. Various Site features are shown on **Figure 2**.

2.2 SITE HISTORY

Treoil Industries Biorefinery distilled tall oil, a viscous byproduct of pine trees from pulp mills. Tall oil contains various wood components, including pitch, pine oil, fatty acids, wood alcohols, resin acids, and wood breakdown byproducts. The distillation fractions were pulled off the column at various stages and cooled. The remaining substrate was treated using an oil/water separator and filtration, then discharged off the property by a settlement sump. The four fractions were cooled using a non-contact cooling water system (or air), and cooling towers were drained into the settlement sump and ditch system quarterly (Ecology, 1991).

The Site has been the focus of numerous environmental inspections and compliance concerns since the late 1980s. Ecology issued a Notice of Violation (NOV) to facility operators for "the discharge of spilled material to a drainage ditch that eventually leads to the Strait of Georgia." This spill occurred in October 1991. The spill was described at that time as "pine oil" in Ecology's documents, but was later referred to as "tall oil," a byproduct of kraft processes and used commercially in rubber products, inks, adhesives, and as an emulsifier in asphalt. Facility operators at that time were not aware of the approximately 1,000-gallon spill until alerted by an adjacent facility. Ecology's NOV notes this was the second oil spill this facility failed to report to the State, as required by law. During this event, it was also discovered that the facility was discharging industrial wastewater to the same ditch without a National Pollutant Discharge Elimination System (NPDES) permit (EPA, 2017).

2.3 PREVIOUS INVESTIGATIONS AND ACTIONS

2.3.1 Removal Site Evaluation

EPA conducted an RSE in 2000 to determine if there was a potential threat of discharge of oil to WOTUS (E&E, 2000). EPA's RSE referenced the Ecology files showing "many years of poor housekeeping" at the Site. At that time, the OSC conducting the RSE was led to believe that the tall oil in ASTs was solidified and immobile. Based on this information, the OSC determined there was not a threat of discharge of oil to WOTUS. The final report outlined several suggested actions at the Site for the removal of drums and chemical containers, sludge and water in secondary containment, uncontained sandblast material, and stained soil.

2.3.2 Site Hazard Assessment

Between 2000 and 2001, Ecology and Whatcom County conducted a Site Hazard Assessment under the Model Toxics Control Act (MTCA) and placed the biorefinery on the Hazardous Sites

List for confirmed soil contamination with metals, petroleum hydrocarbons, and polycyclic aromatic hydrocarbons (PAH) (Ecology, 2001).

2.3.3 Dangerous Waste Compliance Inspection

In 2006, Ecology conducted an inspection to determine whether waste stored on-site complied with Washington State Dangerous Waste Regulations (Ecology, 2006) and identified several areas not in compliance. A compliance report was issued to T.G. Energy/Treoil Industries, Ltd. with corrective actions to occur within 90 days.

2.3.4 Inspections

In 2014, Whatcom County Health Department and Ecology's Hazardous Waste and Water Quality program conducted inspections following a formal complaint about the Site (Ecology, 2015). In 2015, Ecology issued an Amended Administrative Order (AO) to comply with State Dangerous Waste Regulations.

2.3.5 Emergency Removal Site Evaluation

In 2017, EPA carried out an RSE in response to a request for assistance from Ecology. The request from Ecology came as the agency struggled to get the owner to comply with the 2015 Amended AO (see section 2.4.5). The RSE documented the presence of hazardous substances in several hundred containers throughout the Site (E&E, 2017). There was evidence of chemical releases, threats of release, and improper storage and labeling of containers. EPA also documented ASTs that were actively leaking oil, a failing or non-existent secondary containment, and a direct pathway for uncontained oil to flow to WOTUS. As a result, EPA conducted an emergency action to remove the oil and hazardous substances.

In 2017, EPA removed:

- 93,000 gallons of liquid tall oil and tall oil derivative wastes
- 275 tons of soil, sludge, and debris
- 430 containers, 35 drums, and nine cylinders of hazardous chemicals
- Eight cubic yards (CY) of asbestos-containing material (ACM)

2.3.6 EPA Site Visit

In early 2022, EPA observed renewed activity on-site from aerial photographs taken after the 2017 emergency removal. In February 2022, EPA obtained a warrant for site entry and observed conditions that had deteriorated since the 2017 emergency removal. Three ASTs (Tanks 1, 2 and 3) were being used to pump and store an unknown oily material (these tanks were sealed in 2017 after pumpable tall oil was removed). Oily material was also observed floating on an estimated 100,000 gallons of water inside secondary containment. Oil was observed floating on puddles in roadways, as well as staining in multiple areas of surface soil. New containers with unknown material were also identified during the site walk, while trespassers and vandals had uncontrolled access to the property. Site features observed during the February 2022 site visit are documented in the March 2022 report (WESTON, 2022a).

2.3.7 Removal Site Evaluation

Following EPA's February 2022 site visit, EPA conducted an RSE between June 21, 2022 and June 23, 2022 to assess, categorize, and quantify waste streams deemed potential threats to the environment.

EPA, START, and ERRS mobilized to the Site to document and collect samples for laboratory analysis. The volume and contents of 15 ASTs were assessed by sampling and testing for various CERCLA and OPA contaminants of concern (COCs). In addition, stained surface soil and numerous chemical containers were observed.

During the RSE, an estimated 39,000 gallons of a mixed liquid and tarlike substance were observed in two large tanks and several small tanks. Sample analytical results for the material indicated the presence of toxic, semi-volatile organic compounds (SVOCs), including o-cresol (2 methylphenol), p-cresol (3,4 methylphenol), 2,4 dimethylphenol and phenol, all of which are hazardous substances pursuant to Section 101(14) of CERCLA.

A large AST containing approximately 15,000 gallons of liquid and 8,000 gallons of sludge had a pH of 14 and elevated concentrations of sodium. Due to its severe corrosivity and observed reactivity, the contents were designated as a Resource Conservation and Recovery Act (RCRA) hazardous waste.

Approximately 45 CY of stained surface soil containing a mixture of oil residue with lead and chromium were quantified. More than 100 small chemical containers, some labeled as hazardous, including strong acids and bases, were found weathering in derelict buildings.

Contaminants found on-site contained regulated substances and some ASTs containing hazardous substances were leaking. Stained soil was visible around certain ASTs while oily material had leaked into secondary containment. Oily surface water with the potential for runoff into a nearby waterway was observed accumulating on the Site and flowing into the adjacent wetland. The threat of release into surrounding soil and WOTUS from the unmanaged and deteriorating ASTs was imminent. Based on information gathered during the RSE (WESTON, 2022b), EPA determined that the Site posed an unacceptable risk to human health and the environment and issued an Action Memorandum (AM) and developed an OPA Removal Project Plan to conduct a removal action (EPA, 2022a, 2022b).

3 REMOVAL ACTIONS

Given the potential threat of discharge of oil to WOTUS and hazardous substances to the environment, EPA took action pursuant to OPA and CERCLA authorities (EPA, 2022a, 2022b). EPA, START, and ERRS contractors mobilized to the Site to commence the removal on September 12, 2022, and demobilized on November 18, 2022 (See Appendix I, Photograph Log).

ERRS Task Summary:

- Secure field team (equipment operators and support staff) for operations
- Identify disposal facilities and trucking contractors to haul materials
- Install engineering controls to prevent runoff and prepare the Site for disposal activities.
- Open each AST, inspect contents and determine disposition for removal
    - Identify and group hazardous and non-hazardous waste streams
- Pump and dispose secondary containment liquids
- Remove impacted soil
- Dispose of waste/debris

START Task Summary:

- Document site conditions using logbooks, photographs, videos and time-lapse camera
- Set up operational geospatial viewer for data collection
- Collect real-time air monitoring data for dust particulate concentrations
- Assess and inventory chemical containers and AST materials
    - Perform field analysis through presumptive identification instrument
    - Perform field analysis using First Step Hazard Categorization method
    - Identify container transportation hazard classes
- Collect samples for analytical laboratory analysis

START activities were performed in accordance with an EPA-approved SAP (WESTON, 2022c), which adhered to standard operating procedures for field activities, in accordance with the SSDMP (WESTON, 2022d).

3.1 HEALTH AND SAFETY

HASPs were developed by START and ERRS before mobilizing to the Site. START developed an umbrella HASP for EPA and stakeholders visiting the Site as guests. The HASPs included:

- Safety and health risk or hazard analysis
- PPE
- Air monitoring
- Site control measures
- Decontamination procedures
- Emergency response plan

Before removal operations began, field team members reviewed the Site HASP, walked the Site to observe hazardous conditions, including contaminated materials and physical hazards. Daily safety meetings were held at the beginning of each workday. EPA guests were escorted by an OSC.

START used DustTrak® particulate monitors equipped with VIPER telemetry to monitor particulates in work zones at four stationary locations. No significant exceedances over the action level of 1.5 milligrams per cubic meter (mg/m^3) were noted.

MultiRAE five-gas meters were used to monitor air for hazardous concentrations whenever ASTs were opened, and during container inventory and hazard categorization.

Workers monitored volatile organic compound (VOC) ambient air concentrations within the AST or work area. A stop work protocol was implemented to ensure any exceedances of air quality parameters triggered a stoppage of work until safe air concentrations could be confirmed once again.

3.2 PRELIMINARY REMOVAL ACTIVITIES

Excavation equipment and supplies were delivered to the Site and staged beginning on September 12, 2022, with equipment added or swapped out throughout field operations. Excavation equipment included two excavators, hydraulic sheers, front-end loader, skid steer, boom lift, rock box, plasma cutter, water truck, and water buffalos. Equipment for the temporary storage of AST contents and secondary containment liquids included frac tanks, a generator pump, vacuum and tanker trucks, roll-off bins, poly totes, and cubic yard boxes. The workflow for treating and disposing materials evolved throughout field activities according to logistical challenges.

Following initial mobilization, ERRS identified areas throughout the Site for staging equipment, supplies, and debris. Blackberry brambles and some trees throughout the property were cleared for access to tanks, space for equipment, and worker safety. Approximately 2.25 acres of vegetation, including grasses, forbs, and shrubs, were cleared for removal activities.

On September 14, 2022, ERRS set up office trailers near the southeast boundary and two Conex boxes to secure rental equipment and materials. ERRS rented a diesel generator to provide power to the trailers as well as temporary outhouses and handwashing stations for workers.

Additional preparation for removal included clearing debris inside and around Warehouse A (**Figure 2**), so that the warehouse could be used as a workspace and to stage chemical containers, waste totes, and field supplies. Inoperable vehicles were relocated away from active work zones. Road base gravel was placed throughout the Site to enable truck and machine access.

3.3 ACTIONS TAKEN

During field activities, START identified decision units (DUs) for removal tasks and created a progress dashboard to monitor and communicate the progress of all field tasks, updated daily. DUs were reorganized and relabeled according to shifts in workflow. To consolidate similar operations, the DUs in this removal report deviate slightly from the progress dashboard.

Once the Site was prepped, removal activities commenced. ERRS identified the order of operations for removal field tasks: ASTs, secondary containment, stained soil, distillation tower, and other waste materials. Activities for each of the DUs are discussed in the sections below.

Three UAS flights were completed to photograph and document removal progress from a bird’s eye perspective. START contracted Empire Unmanned from Hayden, Idaho, to complete the UAS flights. The first flight occurred on September 15, 2022 (**Figure 6),** the second flight on October 19, 2022 (**Figure 7**), and the third flight on November 11, 2022 (**Figure 8**).

3.3.1 Decision Unit 1 - Aboveground Storage Tanks

Forty-six ASTs were located (**Figures 3 and 4**) in DU 1. This included 32 ASTs outside of secondary containment (referenced as Non-Tank Farm in the progress dashboard) and 14 ASTs inside secondary containment (referenced as Tank Farm in the progress dashboard). ERRS assessed AST contents and planned for the removal of liquid, sludge, and solid material.

Each AST was labeled with an identification number using the same nomenclature as the 2017 emergency response (EQM, 2017). Hydraulic shears were used to open each tank top and assess contents visually, estimate the volume of material in each, and mark the fill line. ASTs that appeared to be empty were denoted with ‘MT’. Physical characteristics of AST contents were documented, including viscosity, phases, and other relevant observations.

After initial assessment, AST contents were removed using one or more of the following methods:

- The AST was sheared open above the fill line to provide access for a pump/vacuum hose.
- The AST was sheared open above the fill line to create an opening for an excavator that transferred materials to another vessel for solidification.
- An opening was sheared at the top of the AST to solidify material within.

After pumpable material was removed, the AST was sheared completely open to recover any residues. In some instances, ASTs previously assessed as empty were found to contain minor amounts of sludge and/or residue, often hidden by pipes or other tank features.

Throughout field activities, various workflows were implemented to extract, solidify, and manage AST material for disposal. ERRS initially planned to load sludge into sludge boxes for transporting to disposal facilities however this method had to be ruled out once it was determined that the sludge did not have a high enough viscosity. ERRS utilized a vacuum truck to remove materials, though this process proved inefficient due to several factors including the vacuum truck capacity, i.e., 2,200 gallons, plus an unexpected backlog at the closest disposal facility able to accept sludge material. ERRS therefore switched to solidifying oil/liquid/sludge contents of all ASTs.

The solidification process utilized DE, with truckloads of this material delivered daily. Where possible, DE was dumped directly into ASTs and mixed using an excavator. When DE could not be mixed directly in an AST, a front-end loader transported AST contents into another vessel, such as a rock box or repurposed storage tank, where it was then mixed with DE. Once the mixture was sufficiently solidified (consistency of gooey cake batter) it was transferred to lined roll-off bins or lined truck beds, then hauled off-site to a disposal facility by waste transport trucks.

Once AST contents and residues were scraped from tank walls, each tank was demolished into manageable pieces for scrap metal recycling and placed into 20-CY scrap metal bins. Scrap metal with excessive contamination was deemed non-recyclable and was segregated for proper disposal. The steel from most ASTs was recyclable, resulting in approximately 286 tons of salvaged steel and $36,886 to offset disposal costs. A description of each AST's final disposition is provided in Appendix A.

3.3.1.1 CERCLA

Based on sample results from the 2022 RSE, the contents of three ASTs (20, 35, and 37) were classified as CERCLA hazardous wastes. Tank 20 contained cresols but did not exceed Toxicity Characteristic Leaching Procedure (TCLP) thresholds. Tank 35 contained high levels of sodium and was highly reactive and corrosive, with a pH of 14. Tank 37 contained sludge that exceeded TCLP levels for total cresols and SVOCs that included phenols.

Because of the unique hazards associated with these hazardous contents, additional safety measures were taken to protect workers, including Tyvek PPE and full-face respirators (Level C). The liquid in AST 20 was pumped into frac tanks dedicated to CERCLA liquids. The liquid from AST 35 was pumped into poly totes and the sludge was excavated into cubic yard boxes. Sludge from AST 37 was solidified with DE and added to a CERCLA waste stream.

Approximately 20,000 gallons of CERCLA liquids were removed from ASTs and over 406 tons of CERCLA waste was solidified.

3.3.1.2 OPA

Forty-three ASTs were managed under the OPA waste stream. The oily material in ASTs were previously identified as tall oil – a dark, viscous substance (EPA, 2022b). Physical properties of tall oil, most notably viscosity, varied greatly from tank to tank and even within tanks. Most tanks assessed contained at least small pockets of sludge and residue, often hidden by pipes and features in the bottom of vessels and were recoverable after the AST was sheared open.

Over 25,000 gallons of oily material were removed from ASTs and over 3,038 tons of OPA waste was solidified.

3.3.2 Decision Unit 2 - Secondary Containment

The Site had three secondary containment structures for 13 ASTs (**Figure 2**). Two of these were flooded with a mixture of oil and rainwater. As observed during the February 2022 Site walk and RSE field activities, the largest containment had cracks in the concrete sidewalls and contents were observed seeping to surface soils. DU 2 (referenced as ‘Containment Liquids’ in the progress dashboard) included tasks associated with the secondary containment structures (A, B and C).

The largest north-south oriented containment (Secondary Containment C) held nine ASTs (34 through 42) with a combined storage capacity of nearly 450,000 gallons (EQM, 2017). The smallest east-west oriented containment (Secondary Containment A), adjacent to Containment C, held two ASTs (43 and 44) with a combined storage capacity of approximately 12,000 gallons. The deepest east-west oriented containment (Secondary Containment B) consisted of two ASTs (25 and 26) with a combined storage capacity of approximately 13,000 gallons. A surface trench from Containment B was connected to three underground sumps.

During removal activities, Secondary Containment B and C and underground sumps were more than three-fourths full of rainwater and oily residue was observed floating on the surface of

Containment C. The sheen can be seen in initial UAS flight images (**Figures 4 and 6)**. No standing water was observed in Containment A.

ERRS pumped out secondary containment oily liquids to help gain access to ASTs within the containments and dispose of the oily rainwater. ERRS used three 20,000-gallon frac tanks to transfer liquids from Secondary Containment B and C. Approximately 65,000 gallons of oily water were pumped from the two secondary containment areas and from the three sumps into 20,000-gallon frac tanks using an external pump and associated hoses. Pumping was conducted in a manner to minimize the amount of floating tall oil that was removed from the containment. Frac tanks were monitored for the accumulation of oily residue material buildup in the event that a layer needed to be skimmed off and transferred to a separate disposal waste stream.

Approximately 77,000 gallons of OPA liquids were removed from the secondary containments.

After liquids were removed from Secondary Containments B and C, the bottom of Secondary Containment B was observed to be enclosed with a concrete floor. Secondary Containment C, however, had no concrete bottom except in the southwest corner. ASTs within the containment were observed to be placed on a gravel bed or on a concrete ring. The majority of ASTs inside Secondary Containment C were found to be corroded and leaking oil through steel bottoms to the gravel ground surface. Because the bottom of Secondary Containment C did not have a concrete bottom, the surface soil and gravel contained dark oily residues, most notably around AST 34. The residue radiated out to the middle of the secondary containment from AST 34.

EPA requested ERRS to excavate inside Secondary Containment C to determine the vertical extent of contamination within the gravel layer and to determine the construction of the containment floor. The investigation revealed that the oily gravel layer was approximately 3 inches thick and was underlain by an approximately 1-foot-thick uniform, gray, sandy fill layer. A silt layer (believed to be native) was observed beneath the gravel and sand fill layers. The silt layer may have acted as a confining layer contributing to the accumulation of rainwater in the secondary containment. Subsurface soil samples were collected from the gravel and sand layers and from the native silt layer to determine the extent and nature of potential contamination.

ERRS excavated four test pits in Secondary Containment C and START collected a discrete grab sample from each test pit. Samples were collected between 6 to 36 inches below ground surface (bgs), from the northwest corner, northeast corner, center, and southeast corner (**Figure 5**) and submitted for laboratory analysis. Following soil sampling, ERRS excavated impacted soil around stained areas and stockpiled material for waste disposal. Near the end of removal activities, the concrete walls of Secondary Containment C were removed, except for a small portion that was part of a building. Additionally, all walls of Secondary Containment A were removed to prevent rainwater from accumulating within.

Secondary Containment B was enclosed with a concrete bottom. Once liquids were removed, the containment was used to solidify AST sludge material for off-site disposal. Upon completion of solidification activities, Secondary Containment B was decontaminated and filled with clean gravel to prevent pooling.

3.3.3 Decision Unit 3 – Soil Removal Activities

During removal activities, areas having stained soil from leaking ASTs or surface water migration were observed and ERRS completed a shallow soil excavation on any stained or oily ground surfaces to reduce the threat of runoff or leaching into the environment. EPA and ERRS assessed ground surface soils visually and identified several areas with dark staining and/or oily material, notably around ASTs 1, 2, and 3; AST 32; a section along the southwest property fence line; and surface soil in Secondary Containment C.

The surface soil surrounding ASTs 1 through 3 was saturated with a dark-red oily material extending west. During the February 2022 Site Walk (WESTON, 2022a), a valve from AST 3 was observed leaking oily material to surface soil. The soil surrounding AST 32 was uncovered during the removal and its valve was observed leaking dark-brown oily material to surface soil and migrating outward. After removing a metal shipping container from the southwest property fence line, oily material on surface soil was found pooled underneath and congealing.

ERRS excavated soils in each area described above, temporarily stockpiling it on-site, then later hauled it off-site for disposal. Soil removal was completed after emergency consultation was conducted with the Lummi Tribe and Washington State Department of Archeology and Historic Preservation to ensure the team was aware of the potential for subsurface cultural resources and had appropriate stop-work measures in place should resources be discovered during the course of excavation.

3.3.4 Decision Unit 4 - Distillation Tower

The distillation tower is the Site's tallest feature, encompassing a system of distillation columns and pipe network (also known as the "pipe maze") that transferred materials to adjacent ASTs within secondary containment.

The insulation around the distillation tower and ancillary equipment was weathered and deteriorated, with sections of presumed asbestos-containing material (PACM) released to the environment. Due to worker health and safety, START documented PACM throughout the pipe maze and secondary containments work zones and collected samples (**Figure 5**) for laboratory analysis. Samples included the entire cross-section of the insulation material. None of the samples analyzed contained asbestos (see Section 4.2).

During field operations, some structures were removed to access ASTs in Secondary Containment C. A metal shed between the distillation tower and Secondary Containment C was dismantled and recycled. Pipes connected to ASTs from the distillation tower were cut and recycled to facilitate AST removal tasks. Following removal of conveyance pipes, ERRS inspected the remaining pipe stubs to verify that material was not leaking and would not lead to surface contamination. In addition, ERRS inspected the distillation tower columns for oily material. The distillation tower and any associated infrastructure left in place were not found to contain oil.

3.3.5 Decision Unit 5 - CERCLA Orphan Containers

START gathered orphan containers from around the Site and staged the containers in Warehouse A for further assessment. All containers were documented in an inventory form and assigned a unique identifier based on container type. Information recorded on each container included a photograph, size, estimated quantity, container condition, labels, and other useful information.

Containers with manufacturer labels matching the contents and not apparently tampered with were compared with Safety Data Sheets or other reference materials. These items were generally not subject to additional field screening and staged in the appropriate DOT class for transportation to a disposal facility. Containers with illegible labels or no markings were segregated and sampled for further field screening by FTIR and/or First Step Hazard Categorization.

The TruDefender FTIR instrument was used to conduct the initial field screening of the unknown container contents. Sample aliquots were extracted from a container and run on TruDefender for presumptive identification. Results identified in the instrument library were documented and categorized into the appropriate DOT class. Inconclusive results were set aside for First Step Hazard Categorization. START inventoried 102 containers (Appendix B) and ran 19 for FTIR field analysis. A summary of TruDefender FTIR results is presented in Appendix D.

START conducted additional field analysis for containers where FTIR results were inconclusive. Sample aliquots were extracted from a container and run through the First Step Hazard Categorization method to assign a DOT hazard class (or classes) for the unknown chemicals.

The results of these tests were documented and provided to ERRS to ensure that unknown chemicals entered appropriate disposal waste streams. In addition, hazard categorization was performed on several AST contents from former biodiesel operations.

START completed First Step Hazard Categorization on seven samples. A summary of the results is presented in Appendix B.

Containers were grouped in associated Department of Transportation (DOT) hazard classes. Contents included six of the nine DOT hazard classes (Table 3-1). Containers were packed into 55-gallon drum overpacks by DOT classes and shipped to appropriate disposal waste facilities. A complete list of the container inventory is provided in Appendix B.

Table 3-1 Container Inventory and DOT Hazard Class Summary

DOT Hazard Class	Quantity
2 – Compressed Gases	13
3 – Flammable and Combustible Liquids	11
5 – Oxidizers & Organic Peroxides	2
6 – Poisonous/Toxic Materials	2
8 – Corrosive Materials	5
9 – Miscellaneous Hazardous Materials	63

3.3.6 Other Waste Materials Identified and Removed

Any materials of unknown origin and nature were identified and sampled. If laboratory results confirmed a CERCLA hazardous substance, EPA and ERRS were notified, and the material was disposed of in appropriate landfills. On September 29, 2022, ERRS personnel observed friable insulation between a double-walled AST while it was being sheared open. The stop work protocol was initiated and START collected samples (**Figure 5**) for laboratory analysis, following the AST was then encapsulated. Sample analytical results (see Section 4.2) indicated that insulation material contained asbestos. ERRS contracted Petrochem, a certified asbestos abatement contractor, to assist with abatement activities. Petrochem arrived on November 12, 2022, and completed proper containment and disposal of AST 16. The entire AST unit was wrapped securely and ERRS used their existing disposal contractor (Waste Management) to remove the waste.

The Site had two nonfunctional incinerators which contained a residue. On September 20, 2022 START collected two samples (**Figure 5**) of residue (one from each incinerator) for laboratory analysis to determine whether the residue contained CERCLA contaminants. START also performed presumptive identification using FTIR technology. Sample analytical results (see Section 4.2) indicated no COCs above CERCLA regulatory limits and both incinerator units were therefore left on-site.

4 ANALYTICAL METHODOLOGY AND DATA VALIDATION

Throughout the removal action, START collected soil, PACM, and other samples from various DUs. A total of 22 samples were submitted for laboratory analysis, including four soil samples from the secondary containment, fourteen asbestos samples from the pipe maze, incinerators, and AST 16, two residue samples from two incinerators, and two solid samples from ASTs 1 and 20.

ERRS collected soil, sludge, and liquid samples for waste characterization from various DUs and waste stockpiles around the Site. A total of 16 samples collected by ERRS were submitted for laboratory analysis.

4.1 AIR MONITORING

START conducted real-time air monitoring to evaluate and document particulate concentrations during removal operations. Four DustTrak stationary air monitoring stations were placed at select locations in the active work zone(s).

START used DustTrak monitoring stations connected VIPER telemetry units to distribute real-time monitoring results, transmitting readings at 15-second intervals to EPA servers. Users could remotely monitor particulate levels at each monitoring station. The VIPER system also included an alert function to monitor dust generation when particulates neared the site-specific action level of 2.5 mg/m^3 over a five-minute time weighted average. The alarm notification would be sent to EPA and START indicating when to adjust work practices and/or dust suppression efforts to reduce worker exposure.

Particulate monitoring with DustTrak instrumentation occurred daily from September 23, 2022 through October 22, 2022, when rain began to fall consistently. Daily average air particulate concentrations remained below action levels, except for occasional brief exceedances that were attributed to vehicular traffic or wind. The conditions were addressed immediately by wetting the roads and ground surface in the work area with a water truck.

From October 18, 2022 through October 19, 2022, wildland fires in Eastern Washington caused smoky conditions in Western Washington. These conditions were reflected in DustTrak particulate monitoring readings, which ranged up to 0.567 mg/m^3 for the daily average at one monitoring station on October 18, 2022. Air particulate readings were highest during this period; however, they were still below 2.5 mg/m^3 action level. A summary of DustTrak monitoring data is provided in Appendix C.

4.2 START FIELD AND ANALYTICAL SAMPLES

START collected and submitted samples from potentially hazardous waste streams to characterize toxicity and determine appropriate waste disposal. Section 3 describes the location and rationale for collection of each sample Section 4 summarizes the analytical results.

4.2.1 Asbestos

START collected 10 bulk samples (TRE-AS-01 through TRE-AS-10) from sections throughout the pipe maze and 2 bulk samples (TRE-AS-11 and TRE-AS-12) from residue inside two incinerators. Samples were submitted for Polarized Light Microscopy (PLM) analysis with a 24-hour turnaround time. The analytical results indicated that no asbestos was present in any of the samples. A summary of the analytical results is presented in **Table 4-1**.

START collected two samples from AST 16 (TRE-AS-13 and TRE-AS-14) and submitted them for PLM analysis with a 24-hour turnaround time. The analytical results indicated the presence of asbestos (chrysotile) ranging in concentrations from 20% to 25%. A summary of the analytical results is presented in **Table 4-1**.

4.2.2 Soil

Soil grab samples were collected in Secondary Containment C from the northwest corner (TRE-OT-05), northeast corner (TRE-OT-06), the center (TRE-OT-07), and southeast corner (TRE-OT-08). Soil was analyzed for VOCs, SVOCs, TAL Metals, and oil and grease (O&G) with standard turnaround time. Results were compared to MTCA Industrial Soil action levels; and indicated that COCs were below regulatory action levels. Analytical results are summarized in **Table 4-2**.

4.2.3 Residue & Toxicity Samples

START collected residue from the two incinerators for laboratory analysis. Solid composite samples were collected from th grey incinerator (TRE-OT-01) and the red incinerator (TRE-OT-02). Both samples were submitted for TAL Metals analysis with a standard turnaround time. Sample analytical results indicated that no COCs were present above regulatory action levels (**Table 4-3**). Laboratory analytical results are presented in Appendix F.

START collected samples of the sludge/solid material inside select ASTs for toxicity concerns. One composite sample was collected from AST 20 (TRE-OT-03) and another from AST 1 (TRE-OT-04). Both samples were submitted for Fish Bioassay analysis with a standard turnaround time. Sample analytical results were negative for toxicity to the environment (**Table 4-4**). Laboratory analytical results are presented in Appendix F.

4.3 ERRS ANALYTICAL SAMPLES

ERRS collected samples for waste characterization, analyzing for various COCs, including TCLP, TAL Metals, gasoline range organics (GRO), residual range organics (RRO), Pesticides, and Flashpoint (FP). A summary of sample information is presented in **Table 4-5**; laboratory analytical results are presented in Appendix G.

Table 4-5 ERRS Sample Description Summary

Sample Identification	Sample Location
TRE-WB-01	Warehouse B - Black Tote
TRE-OT-01	Grey Incinerator
TRE-OT-02	Red Incinerator
TRE-T7-01	Tank 7
TRE-T19-01	Tank 19
TRE-SW1-01 (TRE-T15)	Storm Water - Location 1 (Under Tower)
TRE-T37-01	Tank 37
TRE-SCN-1013	Secondary Containment North (Comp)
TRE-SCS-1013	Secondary Containment South (Comp)

TRE-SCNNW-1020	Secondary Containment North - Northwest
TRE-SCNNE-1020	Secondary Containment North - Northeast
TRE-SCNSE-1020	Secondary Containment North - Southeast
TRE-SCNSW-1020	Secondary Containment North - Southwest
TRE-SCNC-1020	Secondary Containment North (Comp)
TRE-T34-01	Tank 34

4.4 SAMPLE ANALYSES AND DATA REPORTING

START submitted bulk, residue, soil, and solid samples for laboratory analysis in accordance with the site-specific SAP (WESTON, 2022c).

Solid samples were submitted to Pace Analytical Services, LLC, in Minneapolis, Minnesota, for:

- SVOCs by EPA Method 8270E
- VOCs by EPA Method 8260D
- O&G by EPA Method 9071B
- TAL Metals by EPA Methods 6010D and 7471A

Residue samples were submitted to Analytical Resources, Inc., in Tukwila, Washington, for:

- TAL Metals by EPA Methods 6020B and 7471B

Soil samples were submitted to Rainier Environmental Laboratory, in Fife, Washington, for:

- Standard Fish Toxicity by Washington Department of Ecology 80-12

Bulk and residue samples were submitted to Lab/Cor, Inc. in Seattle, Washington, for:

- Asbestos by EPA/600/R-93/116 Method

All laboratory analytical results collected from START are presented in Appendix F.

ERRS submitted solid, sludge/liquid, and liquid samples to Anatek Labs Inc., in Spokane, Washington, for:

- Soil samples-
  - TAL Metals by EPA Methods 6020B and 7471B
  - SVOCs by EPA Methods 8151A, 8081B, and 8141B
  - Hydrocarbons by Northwest Total Petroleum Hydrocarbons (NWTPH)-Diesel Range (Dx)
  - Volatiles by NWTPH-Gasoline Range (Gx)
- Solid Samples-
  - TCLP Metals by EPA Methods 6080B/6020B/1311
  - TCLP 3+4 Methylphenol and TCLP Cresol (total) by EPA Method 8270E
  - SVOCs by EPA Method 8270E
  - VOCs by EPA Method 8260D
  - Percent Solid by SM 2540G
- Liquid/sludge and liquid samples-
  - TCLP Metals by EPA Method 6020B
  - SVOCs by EPA Method 8270E
  - VOCs by EPA Method 8260D
  - FP by EPA Method 1010

Laboratory analytical results from samples collected by ERRS are provided in Appendix G.

4.5 DATA VALIDATION

Data validation for samples collected by START was performed by a qualified chemist, as listed in the EPA Region 10 Emergency Management Program Standard Operating Guidance 144J (Analytical Data Validation) (EPA, 2016), and in accordance with the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (EPA, 2009) and National Functional Guidelines for Superfund Methods Data Review (EPA, 2020a, 2020b).

The following final qualifiers were used during data validation:

J = The associated numerical value is an estimated quantity because the reported concentrations were less than the sample quantitation limits or because quality control (QC) criteria limits were not met.

An additional qualifier was appended to the "J" qualifier that indicates the bias in the reported results:

- L Low bias
- H High bias
- K Unknown bias
- Q The reported concentration is less than the sample quantitation limit for the specific analyte in the sample.

R = The sample results are rejected (analyte may or may not be present) due to gross deficiencies in QC criteria. Any reported value is unusable. Resampling and/or reanalysis is necessary for verification.

U = The material was analyzed for the analyte, but it was not detected. The associated numerical value is the sample quantitation limit.

UJ = The material was analyzed for the analyte, but it was not detected. The reported detection limit is estimated because QC criteria were not met.

ERRS identified appropriate state and federal criteria to profile hazardous and non-hazardous waste for transportation and disposal, and conducted a data review process in conjunction with waste disposal service providers to ensure all regulatory requirements were met.

4.6 DATA USABILITY

START and ERRS reviewed analytical results to verify that data were acceptable for their intended use in meeting the objectives of the removal action. In general, data quality was acceptable. This section summarizes the START validation findings for bulk, residue, soil, and solid samples. A detailed evaluation is included in Appendix E.

The standard fish toxicity and asbestos samples were validated according to Stage 1 protocol. The SVOC, VOC, O&G, and TAL Metal analyses were validated according to Stage 2B protocol. Additionally, approximately 10% of the SVOC, VOC, O&G, and TAL Metals sample results were validated according to the Stage 4 protocol. Findings of the data validation are summarized below.

Data from samples collected by START were validated in accordance with the EPA National Functional Guidelines for Inorganic Superfund Methods Data Review (EPA, 2020a), EPA

National Functional Guidelines for Organic Superfund Methods Data Review (EPA, 2020b), Quality Assurance/Quality Control Guidance for Removal Activities (EPA, 1990), and/or the analytical methods. Data were of acceptable overall quality for their intended use in meeting the objectives of the removal.

4.7 DATA STORAGE

A standard data management system included the use of Site photographs, sample management and tracking procedures, document control, and inventory procedures laboratory data and field measurements. Scribe software was used to create chain-of-custody forms; asbestos samples were completed using the laboratory's chain-of-custody forms. Scribe was also used to manage and track laboratory sample information. Analytical results from the RSE and removal action were added to the 2017 Scribe.net ID 3162. Additional data collection tasks were included in the SSDMP.

5 POST REMOVAL

5.1 REMAINING WASTE MATERIALS

EPA conducted a removal action at the Site to remove environmental threats: the migration of oil and hazardous substances. All ASTs were inspected to verify contents and to confirm the removal of residues. AST 33 was not safely accessible due to its location at the top of the distillation tower. ERRS inspected this AST, verified it was empty, and EPA determined it did not pose a threat, so it was left in place.

ERRS opened columns on the distillation tower and inspected them for oily material. Since the columns did not contain material, access points were closed and left in place. Distillation tower pipes were sheared between the tower and secondary containment ASTs, and inspected for safety concerns and to verify the absence of oily material.

5.2 FINAL SITE CONDITIONS

Upon completion of removal activities, the following buildings/items remain on-site:

- Two large warehouses containing various disheveled and weathered materials
- Four dilapidated mobile home structures (two partially collapsed)
- The distillation tower with associated ancillary equipment and structures
- Numerous abandoned heavy equipment and inoperable vehicles
- Various debris scattered throughout the property

Given solid debris left in place, this Site may continue to pose hazards not addressed during EPA's removal.

In support of soil stabilization best practices, areas disturbed during the removal action were seeded using a locally available native grass and legume mixture. Disturbed areas were seeded upon an applied organic layer to create favorable conditions for seed germination and plant growth.

5.3 OTHER SITE CONCERNS

Throughout this removal, EPA's response authority was for the removal of oil and hazardous substances that posed a threat of release to the environment. START and ERRS identified, collected, and disposed of any materials that could be safely removed within this scope of work.

EPA removed environmental threats identified during the RSE and removal, then relinquished the Site to Ecology. Ecology's Toxic Cleanup Program will evaluate the need for longer-term remediation, including a soil and groundwater study, pursuant to its authority under MTCA.

6 SUMMARY OF ACTIONS TAKEN

Between September 12, 2022 and November 18, 2022, the Treoil removal action removed waste materials under both CERCLA (**Table 6-1**) and OPA (**Table 6-2**). Below is a disposal summary.

Table 6-1 Summary of CERCLA Removed Debris

CERCLA Waste Description	Quantity
Solidified Tall Oil, site soils and non-hazardous sludge, non-RCRA debris	Approximately 406 tons
State-Regulated Liquids (Tanks 2 & 20)	18,000 gallons
Corrosive Liquids - Sodium Hydroxide Solution (Tank 35)	7 totes of approximately 1,890 gallons
Corrosive Solids - Sodium Hydroxide Solidified Sludge (Tank 35)	8 CY boxes
Asbestos	Approximately 13 CY
Fire Extinguishers	5 cylinders
Argon	1 cylinder
Non-RCRA Hazardous Waste Liquid (Used Oil)	3 – 55-gallon Drums (overpacked small containers)
Environmentally Hazardous Substances, Liquid	1 – 55-gallon Drum (overpacked small containers)
Flammable Liquids	1 – 55-gallon Drum (overpacked small containers)
Hypochlorites	2 – 55-gallon Drums (overpacked small containers)
Corrosive Liquid, Acid	1 – 55-gallon Drum (overpacked small containers)
Corrosive Liquid, Base	1 – 55-gallon Drum (overpacked small containers)
Aerosols	1 – 55-gallon Drum (overpacked small containers)
Diesel Fuel	2 – 55-gallon Drums (used fuel from site vehicles)

Table 6-2 Summary of OPA Removed Debris

OPA Waste Description	Quantity
Solidified Tall Oil, site soils and non-hazardous sludge, non-RCRA debris	Approximately 3,038 tons
Secondary containment liquids	77,000 gallons
State-Regulated Liquids (Tanks 2 & 20)	20,400 gallons
Tall Oil Sludge Bulk (non-solidified)	4,800 gallons
Scrap Metal	26 roll-off bins ~286 tons

EPA worked closely with Ecology during the removal action to share removal activities and status updates. Following the removal, the Site was relinquished to Ecology for additional investigation and longer-term remediation. No additional EPA activities at the Treoil Site are anticipated.

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WESTON, 2022d. Site Specific Data Management Plan for Treoil Industries Biorefinery Removal Action.

TABLES

Table 4-1
Asbestos Containing Material Analytical Results
Treoil Industries Biorefinery TCRA

		Location	TRE-AS-01	TRE-AS-02	TRE-AS-02	TRE-AS-02	TRE-AS-02	TRE-AS-02	TRE-AS-03	TRE-AS-03	TRE-AS-04	TRE-AS-05
		Sample ID	TRE-AS-01	TRE-AS-02-Layer 01	TRE-AS-02-Layer 02	TRE-AS-02-Layer 03	TRE-AS-02-Layer 04	TRE-AS-02-Layer 05	TRE-AS-03-Layer 01	TRE-AS-03-Layer 02	TRE-AS-04	TRE-AS-05-Layer 01
		Date	9/20/2022	9/20/2022	9/20/2022	9/20/2022	9/20/2022	9/20/2022	9/20/2022	9/20/2022	9/20/2022	9/20/2022
		Type	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
Analyte	**CAS.NO**	**Units**										
PLM - Visual Estimate Extended, %												
Asbestos, Total		%	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD
Cellulose		%										
Chrysotile		%										
Fiberglass		%		**65**	**80**	**80**						
Non-Fibrous		%	**100**	**35**	**20**	**20**	**30**	**100**	**100**	**100**	**100**	**100**
Synthetic		%					**70**					

Notes
FS = Field Sample
% = Percent
PLM = Polarized Light Microscopy
NAD = No Asbestos Detected

Table 4-1
Asbestos Containing Material Analytical Results
Treoil Industries Biorefinery TCRA

		Location	TRE-AS-05	TRE-AS-05	TRE-AS-06	TRE-AS-07	TRE-AS-07	TRE-AS-08	TRE-AS-08	TRE-AS-08	TRE-AS-09	TRE-AS-09
		Sample ID	**TRE-AS-05-Layer 02**	**TRE-AS-05-Layer 03**	**TRE-AS-06**	**TRE-AS-07-Layer 01**	**TRE-AS-07-Layer 02**	**TRE-AS-08-Layer 01**	**TRE-AS-08-Layer 02**	**TRE-AS-08-Layer 03**	**TRE-AS-09-Layer 01**	**TRE-AS-09-Layer 02**
		Date	**9/20/2022**	**9/20/2022**	**9/20/2022**	**9/20/2022**	**9/20/2022**	**9/20/2022**	**9/20/2022**	**9/20/2022**	**9/20/2022**	**9/20/2022**
		Type	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**	**FS**
Analyte	**CAS.NO**	**Units**										
PLM - Visual Estimate Extended, %												
Asbestos, Total		%	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD
Cellulose		%			**80**	**5**	**5**					
Chrysotile		%										
Fiberglass		%	**80**	**20**		**5**	**4**	**5**		**100**	**100**	
Non-Fibrous		%	**20**	**80**	**20**	**90**	**91**	**95**	**100**			**100**
Synthetic		%										

Notes
FS = Field Sample
% = Percent
PLM = Polarized Light Microscopy
NAD = No Asbestos Detected

Table 4-1
Asbestos Containing Material Analytical Results
Treoil Industries Biorefinery TCRA

		Location	TRE-AS-09	TRE-AS-10	TRE-AS-11	TRE-AS-11	TRE-AS-12	TRE-AS-13	TRE-AS-13	TRE-AS-14	TRE-AS-14
		Sample ID	TRE-AS-09-Layer 03	TRE-AS-10	TRE-AS-11-Layer 01	TRE-AS-11-Layer 02	TRE-AS-12	TRE-AS-13-Layer 01	TRE-AS-13-Layer 02	TRE-AS-14-Layer 01	TRE-AS-14-Layer 02
		Date	9/20/2022	9/20/2022	9/20/2022	9/20/2022	9/20/2022	9/29/2022	9/29/2022	9/29/2022	9/29/2022
		Type	FS	FS	FS	FS	FS	FS	FS	FS	FS
Analyte	**CAS.NO**	**Units**									
PLM - Visual Estimate Extended, %											
Asbestos, Total		%	NAD	NAD	NAD	NAD	NAD	NAD	**30**	NAD	**35**
Cellulose		%			**0 Trace**	**0 Trace**		**90**	**60**	**90**	**55**
Chrysotile		%							**30**		**35**
Fiberglass		%	**100**		**0 Trace**	**0 Trace**					
Non-Fibrous		%		**100**	**100**	**100**	**100**	**10**	**10**	**10**	**10**
Synthetic		%									

Notes
FS = Field Sample
% = Percent
PLM = Polarized Light Microscopy
NAD = No Asbestos Detected

Table 4-2
Secondary Containment C Soil Analytical Results
Treoil Industries Biorefinery TCRA

Analyte	CAS.NO	Units	PAL	EPA Hazardous Total	MTCA Industrial Soil	Location	OT05	OT06	OT07	OT08
						Sample ID	TRE-OT-05	TRE-OT-06	TRE-OT-07	TRE-OT-08
						Date	10/24/2022	10/24/2022	10/24/2022	10/24/2022
						Type	FS	FS	FS	FS
						Media	Surface Soil	Surface Soil	Surface Soil	Surface Soil
ASTM D2974, %										
Percent Moisture		%				--	**25.3**	**15.6**	**31.2**	**25.2**
EPA 6010D, mg/Kg										
Aluminum	7429-90-5	mg/kg				--	**18200**	**7490**	**21200**	**22400**
Antimony	7440-36-0	mg/kg				--	1.3 UJK	1.1 UJK	1.5 UJK	1.3 UJK
Arsenic	7440-38-2	mg/kg	20	100	20	--	**3.2**	**2.3**	**4.8**	**4.3**
Barium	7440-39-3	mg/kg	2000	2000		--	**76.9**	**46.7**	**121**	**128**
Beryllium	7440-41-7	mg/kg				--	0.32 U	0.27 U	0.36 U	0.31 U
Cadmium	7440-43-9	mg/kg	2	20	2	--	**0.26**	**0.18**	**0.32**	0.19 U
Calcium	7440-70-2	mg/kg				--	**2270**	**6730**	**3590**	**2980**
Chromium	7440-47-3	mg/kg	100	100		--	**30.2**	**26.1**	**34.7**	**59.2**
Cobalt	7440-48-4	mg/kg				--	**8.2**	**7.1**	**9.4**	**8.6**
Copper	7440-50-8	mg/kg				--	**15**	**22.2**	**20.2**	**20.3**
Iron	7439-89-6	mg/kg				--	**20300**	**16400**	**24100**	**22600**
Lead	7439-92-1	mg/kg	100	100	1000	--	**10.8**	**3**	**7.6**	**4.2**
Magnesium	7439-95-4	mg/kg				--	**3960**	**7490**	**3570**	**4880**
Manganese	7439-96-5	mg/kg				--	**189**	**394**	**336**	**237**
Nickel	7440-02-0	mg/kg				--	**26.4**	**44**	**27.6**	**37.1**
Potassium	7440-09-7	mg/kg				--	**757**	**603**	**550**	**763**
Selenium	7782-49-2	mg/kg	20	20		--	1.3 U	1.1 U	1.5 U	1.3 U
Silver	7440-22-4	mg/kg	100	100		--	0.64 U	0.55 U	0.73 U	0.63 U
Sodium	7440-23-5	mg/kg				--	**244**	**217**	**216**	**227**
Thallium	7440-28-0	mg/kg				--	1.3 U	1.1 U	1.5 U	1.3 U
Vanadium	7440-62-2	mg/kg				--	**49.5**	**35.4**	**59.2**	**58.8**
Zinc	7440-66-6	mg/kg				--	**75**	**34.7**	**61.7**	**36.2**
EPA 7471B, mg/Kg										
Mercury	7439-97-6	mg/kg	0.2	4	2	--	**0.051**	0.02 U	**0.049**	**0.04**
EPA 8260D, mg/Kg										
1,1,1,2-Tetrachloroethane	630-20-6	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
1,1,1-Trichloroethane	71-55-6	mg/Kg	2		2	--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
1,1,2,2-Tetrachloroethane	79-34-5	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
1,1,2-Trichloroethane	79-00-5	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
1,1,2-Trichlorotrifluoroethane	76-13-1	mg/Kg				--	0.281 U	0.245 U	0.372 U	0.294 U
1,1-Dichloroethane	75-34-3	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
1,1-Dichloroethene	75-35-4	mg/Kg	6	14		--	0.0702 UJK	0.0612 UJK	0.0929 UJK	0.0734 UJK
1,1-Dichloropropene	563-58-6	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
1,2,3-Trichlorobenzene	87-61-6	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
1,2,3-Trichloropropane	96-18-4	mg/Kg				--	0.281 U	0.245 U	0.372 U	0.294 U
1,2,4-Trichlorobenzene	120-82-1	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
1,2,4-Trimethylbenzene	95-63-6	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
1,2-Dibromo-3-chloropropane	96-12-8	mg/Kg				--	0.702 U	0.612 U	0.929 U	0.734 U
1,2-Dibromoethane (EDB)	106-93-4	mg/Kg	0.01		0.01	--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
1,2-Dichlorobenzene	95-50-1	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
1,2-Dichloroethane	107-06-2	mg/Kg	6	10		--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
1,2-Dichloropropane	78-87-5	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U

Table 4-2
Secondary Containment C Soil Analytical Results
Treoil Industries Biorefinery TCRA

Analyte	CAS.NO	Units	PAL	EPA Hazardous Total	MTCA Industrial Soil	Location	OT05	OT06	OT07	OT08
						Sample ID	TRE-OT-05	TRE-OT-06	TRE-OT-07	TRE-OT-08
						Date	10/24/2022	10/24/2022	10/24/2022	10/24/2022
						Type	FS	FS	FS	FS
						Media	Surface Soil	Surface Soil	Surface Soil	Surface Soil
1,3,5-Trimethylbenzene	108-67-8	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
1,3-Dichlorobenzene	541-73-1	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
1,3-Dichloropropane	142-28-9	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
1,4-Dichlorobenzene	106-46-7	mg/Kg	6	150		--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
2,2-Dichloropropane	594-20-7	mg/Kg				--	0.281 U	0.245 U	0.372 U	0.294 U
2-Butanone (MEK)	78-93-3	mg/Kg	36	4000		--	1.4 U	1.22 U	1.86 U	1.47 U
2-Chlorotoluene	95-49-8	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
4-Chlorotoluene	106-43-4	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
4-Methyl-2-pentanone (MIBK)	108-10-1	mg/Kg				--	0.351 U	0.306 U	0.465 U	0.367 U
Acetone	67-64-1	mg/Kg				--	1.4 U	1.22 U	1.86 U	1.47 U
Allyl chloride	107-05-1	mg/Kg				--	0.281 U	0.245 U	0.372 U	0.294 U
Benzene	71-43-2	mg/Kg	0.03	10	0.03	--	0.0281 U	0.0245 U	0.0372 U	0.0294 U
Bromobenzene	108-86-1	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
Bromochloromethane	74-97-5	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
Bromodichloromethane	75-27-4	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
Bromoform	75-25-2	mg/Kg				--	0.281 U	0.245 U	0.372 U	0.294 U
Bromomethane	74-83-9	mg/Kg				--	0.702 U	0.612 U	0.929 U	0.734 U
Carbon tetrachloride	56-23-5	mg/Kg	6	10		--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
Chlorobenzene	108-90-7	mg/Kg	6	2000		--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
Chloroethane	75-00-3	mg/Kg				--	0.702 U	0.612 U	0.929 U	0.734 U
Chloroform	67-66-3	mg/Kg	6	120		--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
Chloromethane	74-87-3	mg/Kg				--	0.281 U	0.245 U	0.372 U	0.294 U
cis-1,2-Dichloroethene	156-59-2	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
cis-1,3-Dichloropropene	10061-01-5	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
Dibromochloromethane	124-48-1	mg/Kg				--	0.281 U	0.245 U	0.372 U	0.294 U
Dibromomethane	74-95-3	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
Dichlorodifluoromethane	75-71-8	mg/Kg				--	0.281 UJK	0.245 UJK	0.372 UJK	0.294 UJK
Dichlorofluoromethane	75-43-4	mg/Kg				--	0.702 U	0.612 U	0.929 U	0.734 U
Diethyl ether (Ethyl ether)	60-29-7	mg/Kg				--	0.281 U	0.245 U	0.372 U	0.294 U
Ethylbenzene	100-41-4	mg/Kg	6		6	--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
Hexachloro-1,3-butadiene	87-68-3	mg/Kg	5.6	10		--	0.351 U	0.306 U	0.465 U	0.367 U
Isopropylbenzene (Cumene)	98-82-8	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
m&p-Xylene	179601-23-1	mg/Kg				--	0.14 U	0.122 U	0.186 U	0.147 U
Methylene Chloride	75-09-2	mg/Kg	0.02		0.02	--	0.281 U	0.245 U	0.372 U	0.294 U
Methyl-tert-butyl ether	1634-04-4	mg/Kg	0.1		0.1	--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
Naphthalene	91-20-3	mg/Kg	5		5	--	0.281 U	0.245 U	0.372 U	0.294 U
n-Butylbenzene	104-51-8	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
n-Propylbenzene	103-65-1	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
o-Xylene	95-47-6	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
p-Isopropyltoluene	99-87-6	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
sec-Butylbenzene	135-98-8	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
Styrene	100-42-5	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
tert-Butylbenzene	98-06-6	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
Tetrachloroethene	127-18-4	mg/Kg	0.05	14	0.05	--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
Tetrahydrofuran	109-99-9	mg/Kg				--	2.81 U	2.45 U	3.72 U	2.94 U

Table 4-2
Secondary Containment C Soil Analytical Results
Treoil Industries Biorefinery TCRA

Analyte	CAS.NO	Units	PAL	EPA Hazardous Total	MTCA Industrial Soil	Location	OT05	OT06	OT07	OT08
						Sample ID	TRE-OT-05	TRE-OT-06	TRE-OT-07	TRE-OT-08
						Date	10/24/2022	10/24/2022	10/24/2022	10/24/2022
						Type	FS	FS	FS	FS
						Media	Surface Soil	Surface Soil	Surface Soil	Surface Soil
Toluene	108-88-3	mg/Kg	7		7	--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
trans-1,2-Dichloroethene	156-60-5	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
trans-1,3-Dichloropropene	10061-02-6	mg/Kg				--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
Trichloroethene	79-01-6	mg/Kg	0.03	10	0.03	--	0.0702 U	0.0612 U	0.0929 U	0.0734 U
Trichlorofluoromethane	75-69-4	mg/Kg				--	0.281 U	0.245 U	0.372 U	0.294 U
Vinyl chloride	75-01-4	mg/Kg	4	4		--	0.0281 U	0.0245 U	0.0372 U	0.0294 U
Xylene (Total)	1330-20-7	mg/Kg	9		9	--	0.211 U	0.184 U	0.279 U	0.22 U
EPA 8270E, mg/Kg										
1,2,4-Trichlorobenzene	120-82-1	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
1,2-Dichlorobenzene	95-50-1	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
1,2-Diphenylhydrazine	122-66-7	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
1,3-Dichlorobenzene	541-73-1	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
1,4-Dichlorobenzene	106-46-7	mg/Kg	6	150		--	0.44 U	0.389 U	0.476 U	0.441 U
1-Methylnaphthalene	90-12-0	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
2,4,5-Trichlorophenol	95-95-4	mg/Kg	7.4	8000		--	0.44 U	0.389 U	0.476 U	0.441 U
2,4,6-Trichlorophenol	88-06-2	mg/Kg	7.4	40		--	0.44 U	0.389 U	0.476 U	0.441 U
2,4-Dichlorophenol	120-83-2	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
2,4-Dimethylphenol	105-67-9	mg/Kg				--	0.44 UJK	0.389 UJK	0.476 UJK	0.441 UJK
2,4-Dinitrophenol	51-28-5	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
2,4-Dinitrotoluene	121-14-2	mg/Kg	2.6	2.6		--	0.44 UJK	0.389 UJK	0.476 UJK	0.441 UJK
2,6-Dinitrotoluene	606-20-2	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
2-Chloronaphthalene	91-58-7	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
2-Chlorophenol	95-57-8	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
2-Methylnaphthalene	91-57-6	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
2-Methylphenol(o-Cresol)	95-48-7	mg/Kg	5.6	4000		--	0.44 U	0.389 U	0.476 U	0.441 U
2-Nitroaniline	88-74-4	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
2-Nitrophenol	88-75-5	mg/Kg				--	0.44 UJK	0.389 UJK	0.476 UJK	0.441 UJK
3&4-Methylphenol(m&p Cresol)		mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
3,3'-Dichlorobenzidine	91-94-1	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
3-Nitroaniline	99-09-2	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
4,6-Dinitro-2-methylphenol	534-52-1	mg/Kg				--	2.26 U	2.01 U	2.45 U	2.27 U
4-Bromophenylphenyl ether	101-55-3	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
4-Chloro-3-methylphenol	59-50-7	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
4-Chloroaniline	106-47-8	mg/Kg				--	0.44 UJK	0.389 UJK	0.476 UJK	0.441 UJK
4-Chlorophenylphenyl ether	7005-72-3	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
4-Nitroaniline	100-01-6	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
4-Nitrophenol	100-02-7	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Acenaphthene	83-32-9	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Acenaphthylene	208-96-8	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Anthracene	120-12-7	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Benzo(a)anthracene	56-55-3	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Benzo(a)pyrene	50-32-8	mg/Kg	2		2	--	0.44 U	0.389 U	0.476 U	0.441 U
Benzo(b)fluoranthene	205-99-2	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Benzo(g,h,i)perylene	191-24-2	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Benzo(k)fluoranthene	207-08-9	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U

Table 4-2
Secondary Containment C Soil Analytical Results
Treoil Industries Biorefinery TCRA

Analyte	CAS.NO	Units	PAL	EPA Hazardous Total	MTCA Industrial Soil	Location	OT05	OT06	OT07	OT08
						Sample ID	TRE-OT-05	TRE-OT-06	TRE-OT-07	TRE-OT-08
						Date	10/24/2022	10/24/2022	10/24/2022	10/24/2022
						Type	FS	FS	FS	FS
						Media	Surface Soil	Surface Soil	Surface Soil	Surface Soil
bis(2-Chloroethoxy)methane	111-91-1	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
bis(2-Chloroethyl) ether	111-44-4	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
bis(2-Chloroisopropyl) ether	108-60-1	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
bis(2-Ethylhexyl)phthalate	117-81-7	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Butylbenzylphthalate	85-68-7	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Carbazole	86-74-8	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Chrysene	218-01-9	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Dibenz(a,h)anthracene	53-70-3	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Dibenzofuran	132-64-9	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Diethylphthalate	84-66-2	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Dimethylphthalate	131-11-3	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Di-n-butylphthalate	84-74-2	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Di-n-octylphthalate	117-84-0	mg/Kg				--	0.44 UJK	0.389 UJK	0.476 UJK	0.441 UJK
Fluoranthene	206-44-0	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Fluorene	86-73-7	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Hexachloro-1,3-butadiene	87-68-3	mg/Kg	5.6	10		--	0.44 U	0.389 U	0.476 U	0.441 U
Hexachlorobenzene	118-74-1	mg/Kg	2.6	2.6		--	0.44 U	0.389 U	0.476 U	0.441 U
Hexachloroethane	67-72-1	mg/Kg	30	60		--	0.44 U	0.389 U	0.476 U	0.441 U
Indeno(1,2,3-cd)pyrene	193-39-5	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Isophorone	78-59-1	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Naphthalene	91-20-3	mg/Kg	5		5	--	0.44 U	0.389 U	0.476 U	0.441 U
Nitrobenzene	98-95-3	mg/Kg	14	40		--	0.44 U	0.389 U	0.476 U	0.441 U
N-Nitrosodimethylamine	62-75-9	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
N-Nitroso-di-n-propylamine	621-64-7	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
N-Nitrosodiphenylamine	86-30-6	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Pentachlorophenol	87-86-5	mg/Kg	7.4	2000		--	0.893 UJK	0.79 UJK	0.967 UJK	0.896 UJK
Phenanthrene	85-01-8	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Phenol	108-95-2	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
Pyrene	129-00-0	mg/Kg				--	0.44 U	0.389 U	0.476 U	0.441 U
EPA 9071, mg/Kg										
Oil and Grease		mg/kg				--	**966 JL**	323 UJK	393 UJK	359 UJK

Notes
FS = Field Sample
mg/Kg = milligrams per kilogram
% = percent
U = not detected above displayed limit
J = estimated concentration
K = unknown biased
L = biased low

Table 4-3
Incinerator Residue Analytical Results
Treoil Industries Biorefinery TCRA

Analyte	CAS.NO	Units	PAL	EPA Hazardous Total	Universal Treatment Standards	Location	INC01	INC02
						Sample ID	TRE-OT-01	TRE-OT-02
						Date	9/22/2022	9/22/2022
						Type	FS	FS
						Media	Solid	Solid
Metals mg/kg								
Silver-107	7440-22-4	mg/kg	100	100		--	**0.06 JQK**	**0.61**
Aluminum-27	7429-90-5	mg/kg				--	**3340**	**10700**
Arsenic-75a	7440-38-2	mg/kg	100	100		--	**4.17**	**5.23**
Barium-135	7440-39-3	mg/kg	2000	2000		--		**101 JH**
Barium-137	7440-39-3	mg/kg	2000	2000		--	**29.1 JH**	
Beryllium-9	7440-41-7	mg/kg				--	**0.19**	**0.07 JQK**
Calcium-44	7440-70-2	mg/kg				--	**3700**	**19700**
Cadmium-111	7440-43-9	mg/kg	20	20		--	**3.19**	**0.94**
Cobalt-59	7440-48-4	mg/kg				--	**1.08**	**2.51**
Chromium-52	7440-47-3	mg/kg	100	100		--	**6.49**	**23.1**
Copper-63	7440-50-8	mg/kg				--	**9.75**	**2360**
Iron-54	7439-89-6	mg/kg				--	**900**	**4980**
Potassium-39	9/7/7440	mg/kg				--	**1090 JK**	**1740 JK**
Magnesium-24	7439-95-4	mg/kg				--	**391**	**1370**
Manganese-55	7439-96-5	mg/kg				--	**44.2**	**472**
Sodium-23	7440-23-5	mg/kg				--	**803**	**3250**
Nickel-60	7440-02-0	mg/kg				--	**3.59**	**15.1**
Lead-208	7439-92-1	mg/kg	100	100		--	**45.7 JL**	**24.6 JL**
Antimony-121	7440-36-0	mg/kg				--	**0.48 JL**	**0.34 JL**
Selenium-78	7782-49-2	mg/kg	20	20		--	**1.17**	**0.36 JQK**
Thallium-205	7440-28-0	mg/kg				--	0.02 U	**0.07 JQK**
Vanadium-51a	7440-62-2	mg/kg				--	**21.3**	**10.3**
Zinc-66	7440-66-6	mg/kg				--	**687**	**371**
Mercury	7439-97-6	mg/kg	0.2	4	0.2	--	**0.0861 JH**	**0.0861 JH**

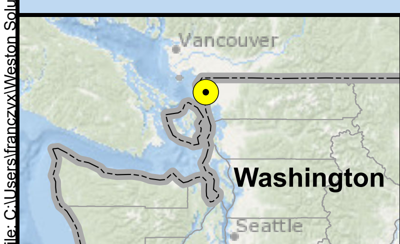
Notes
FS = Field Sample
mg/Kg = milligram per kilogram
U = not detected above displayed limit
J = estimated concentration
K = unknown biased
L = biased low
D = diluted sample
H = biased high
Q = between detection limit and quantitation limit

Table 4-4
Fish Bioassay Toxicity Results
Treoil Industries Biorefinery TCRA

			Location	TK20	TK01
			Sample ID	TRE-OT-03	TRE-OT-04
			Date	10/5/2022	10/5/2022
			Type	FS	FS
Analyte	CAS.NO	Units	Media	Solid	Solid
Standard Fish Toxicity Test, %					
Mortality (10 mg/L copper sulfate)		%	--	**0**	**0**
Mortality (100 mg/L copper sulfate)		%	--	**0**	**0**

Notes
FS = Field Sample
mg/L = milligram per liter
% = percent

FIGURES



Coordinate System:
WGS 1984 Web Mercator Auxiliary Sphere
Source:
Background: ESRI World Street Map
Task Order No.:
68HE0722F0074

N
0 1.25 2.5 5 Miles

Legend:
Site Location

EPA Region 10

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FIGURE 1
SITE LOCATION MAP
TREOIL INDUSTRIES BIOREFINERY
4242 ALDER GROVE ROAD
FERNDALE, WHATCOM COUNTY WASHINGTON
June 2022

File: C:\Users\franczyx\Weston Solutions, Inc\EPA Region 10 - Documents\01_Project Site Folders\0089 Treoil Biorefinery\Data Technical\Maps & Figures\Fig1_2.aprx

Path: C:\Users\jensen\Weston Solutions, Inc\EPA Region 10 - Documents\01_Project Site Folders\0108 Treoil OPA Removal 2022\Data Technical\Maps & Figures\Treoil TCRA Report Figures\20230131_Figure1_2.aprx

Coordinate System:
WGS 1984 Web Mercator Auxiliary Sphere
Source:
Background: UAS Flight 2022-09-15/ESRI World Imagery
Task Order No.:
68HE0722F0129 / 68HE0722F0130

0 90 180 360 Feet

Legend:
- AST
- AST missing during TCRA
- Site Boundary
- Distillation Tower
- Lab Trailer
- Secondary Containment
- Warehouse

EPA Region 10

Weston Solutions Inc.
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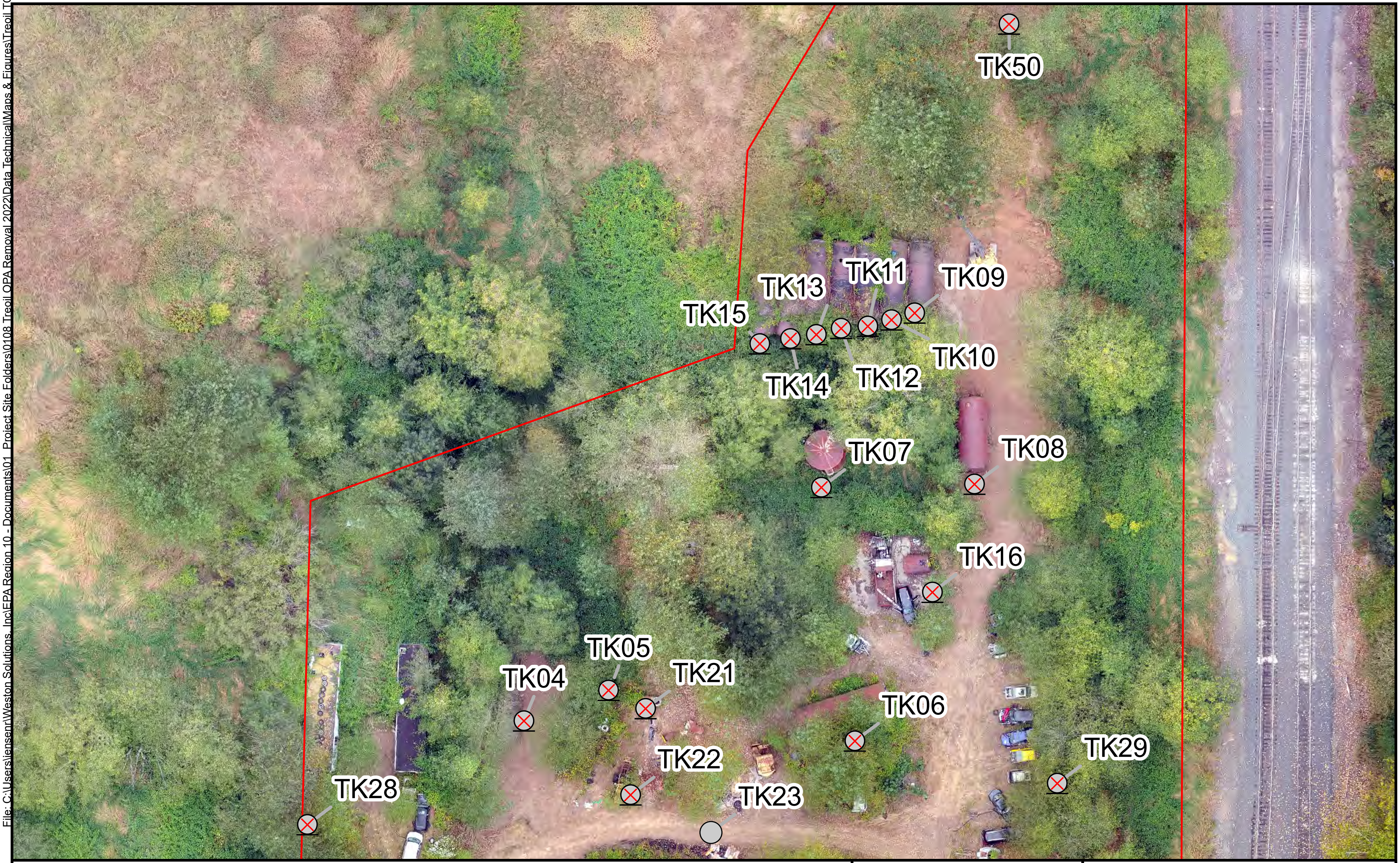
FIGURE 2
SITE VICINITY MAP
TREOIL INDUSTRIES BIOREFINERY
4242 ALDER GROVE ROAD
FERNDALE, WHATCOM COUNTY
WASHINGTON

February 2023



File: C:\Users\jensenr\Weston Solutions, Inc\EPA Region 10 - Documents\01_Project Site Folders\0108 Treoil OPA Removal 2022\Data Technical\Maps & Figures\Treoil TCRA R

Coordinate System:
WGS 1984 Web Mercator Auxiliary Sphere
Source:
Background: UAS Flight 2022-09-15
Task Order No.:
68HE0722F0129 / 68HE0722F0130

0 0.01 0.03 0.05 Miles

Legend:
- AST
- AST missing during TCRA
- Site Boundary

EPA Region 10

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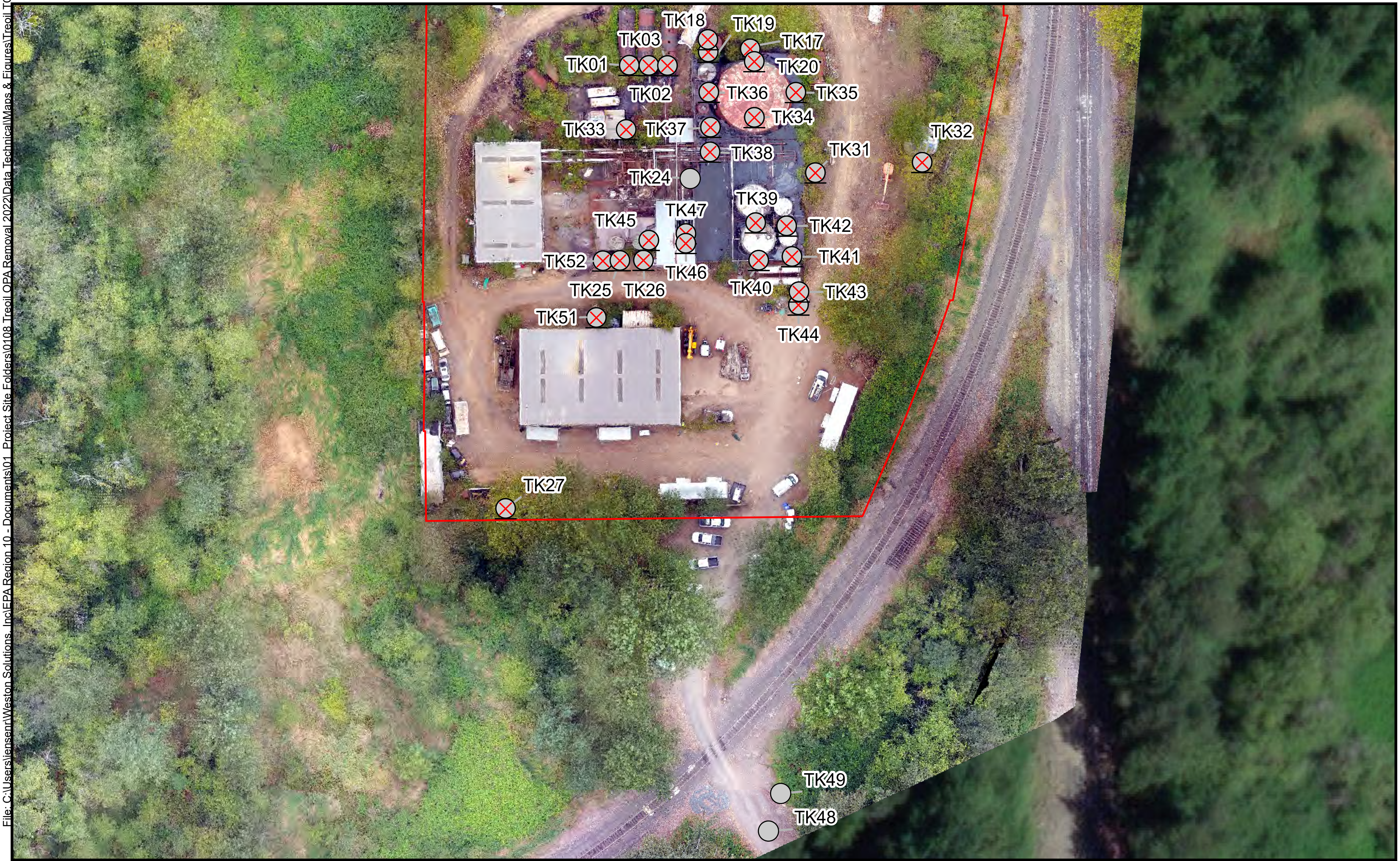
FIGURE 3
NORTHERN SITE VICINITY MAP
TREOIL INDUSTRIES
BIOREFINERY
4242 ALDER GROVE ROAD
FERNDALE, WHATCOM COUNTY
WASHINGTON

February 2023



Coordinate System:
WGS 1984 Web Mercator Auxiliary Sphere
Source:
Background: UAS Flight 2022-09-15
Task Order No.:
68HE0722F0129 / 68HE0722F0130

0 0.02 0.04 0.08 Miles

Legend:
AST
AST missing during TCRA
Site Boundary

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
EPA Region 10

WESTON SOLUTIONS
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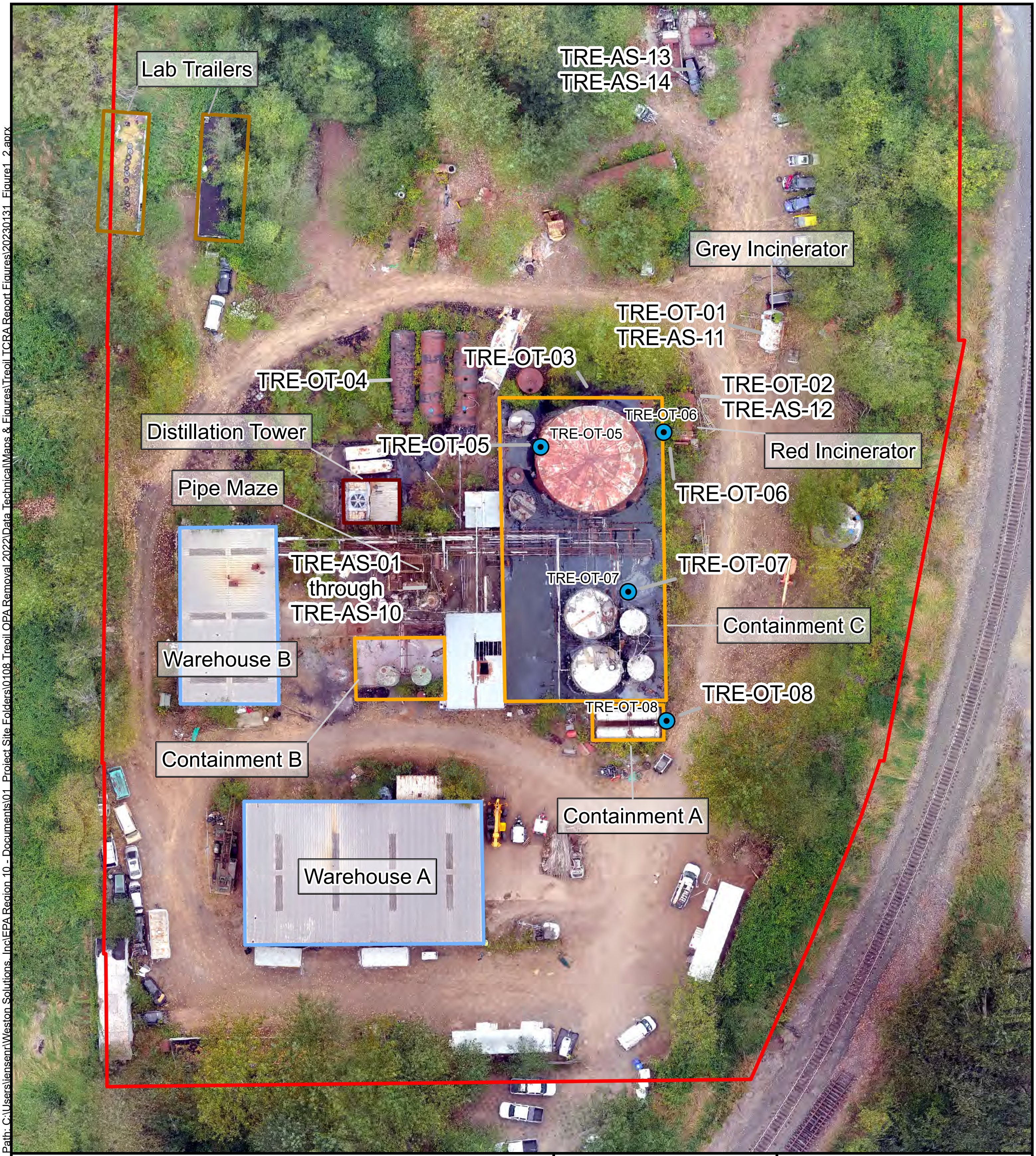
FIGURE 4
SOUTHERN SITE VICINITY MAP
TREOIL INDUSTRIES
BIOREFINERY
4242 ALDER GROVE ROAD
FERNDALE, WHATCOM COUNTY
WASHINGTON

February 2023

File: C:\Users\jensent\Weston Solutions, Inc\EPA Region 10 - Documents\01_Project Site Folders\0108 Treoil OPA Removal 2022\Data Technical\Maps & Figures\Treoil TCRA R

Path: C:\Users\jensenr\Weston Solutions, Inc\EPA Region 10 - Documents\01_Project Site Folders\0108 Treoil OPA Removal 2022\Data Technical\Maps & Figures\Treoil TCRA Report Figures\20230131_Figure1_2.aprx



Coordinate System:
WGS 1984 Web Mercator Auxiliary Sphere
Source:
Background: UAS Flight 2022-09-15/ESRI World Imagery
Task Order No.:
68HE0722F0129 / 68HE0722F0130

0 50 100 200 Feet

Legend:
- Sample Locations
- Site Boundary
- Distillation Tower
- Lab Trailer
- Secondary Containment
- Warehouse

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

EPA Region 10

WESTON SOLUTIONS

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FIGURE 5
SAMPLE LOCATION MAP
TREOIL INDUSTRIES
BIOREFINERY
4242 ALDER GROVE ROAD
FERNDALE, WHATCOM COUNTY
WASHINGTON

February 2023

Path: C:\Users\jensen\Weston Solutions, Inc\EPA Region 10 - Documents\01_Project Site Folders\0108 Treoil OPA Removal 2022\Data Technical\Maps & Figures\Treoil TCRA Report Figures\20230131_Figure1_2.aprx

Coordinate System:
WGS 1984 Web Mercator Auxiliary Sphere
Source:
Background: UAS Flight 2022-09-15/ESRI World Imagery
Task Order No.:
68HE0722F0129 / 68HE0722F0130

N

0 95 190 380
Feet

Legend:
Site Boundary

EPA Region 10

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FIGURE 6
INITIAL SITE UAS FLIGHT
TREOIL INDUSTRIES BIOREFINERY
4242 ALDER GROVE ROAD
FERNDALE, WHATCOM COUNTY WASHINGTON

February 2023

Path: C:\Users\jensen\Weston Solutions, Inc\EPA Region 10 - Documents\01_Project Site Folders\0108 Treoil OPA Removal 2022\Data Technical\Maps & Figures\Treoil TCRA Report Figures\20230206_Figure1_2.aprx

Coordinate System:
WGS 1984 Web Mercator Auxiliary Sphere
Source:
Background: UAS Flight 2022-10-19/ESRI World Imagery
Task Order No.:
68HE0722F0129 / 68HE0722F0130

N

0 95 190 380 Feet

Legend:
Site Boundary

EPA Region 10

Weston Solutions Inc.
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FIGURE 7
MID SITE UAS FLIGHT
TREOIL INDUSTRIES BIOREFINERY
4242 ALDER GROVE ROAD
FERNDALE, WHATCOM COUNTY
WASHINGTON

February 2023

Path: C:\Users\jensen\Weston Solutions, Inc\EPA Region 10 - Documents\01_Project Site Folders\0108 Treoil OPA Removal 2022\Data Technical\Maps & Figures\Treoil TCRA Report Figures\20230206_Figure1_2.aprx

Coordinate System:
WGS 1984 Web Mercator Auxiliary Sphere
Source:
Background: UAS Flight 2022-11-11/ESRI World Imagery
Task Order No.:
68HE0722F0129 / 68HE0722F0130

N

0 95 190 380
Feet

Legend:
Site Boundary

EPA Region 10

Weston Solutions Inc.
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FIGURE 8
FINAL SITE UAS FLIGHT
TREOIL INDUSTRIES
BIOREFINERY
4242 ALDER GROVE ROAD
FERNDALE, WHATCOM COUNTY
WASHINGTON

February 2023