

Site Investigation Report of Findings

Former Little Lakes Industries

Arcata, California

EPA Grant ID No. BF99T62301

RWQCB Case No. 1NHU018



Prepared for:

City of Arcata



October 2019

018022.030

Reference: 018022.030

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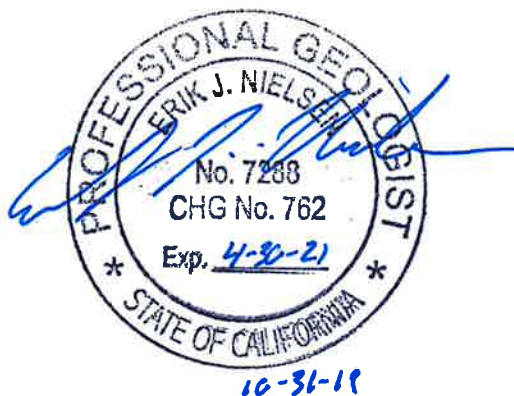
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October 2019

QA/QC:EJN 



Executive Summary

Site investigation activities were conducted at the former Little Lakes Industries mill in Arcata, California, to assess impacts from historical operations. Work was conducted at the site in March and July 2019 in accordance with the sampling and analysis plan (SAP) and subsequent SAP Addendum, approved by the North Coast Regional Water Quality Control Board. The objective of this work was to address data gaps from previous site investigations for the release of regulated materials to shallow soils and groundwater. SHN completed site investigation activities and prepared this report on behalf of the City of Arcata under funding provided by a U.S. Environmental Protection Agency Brownfields grant.

Eleven test pits and nine soil borings were completed as part of the 2019 site investigation. Soil samples were collected from each test pit and temporary well points were installed at each boring location for the collection of groundwater samples for chemical analysis. Laboratory analyses completed on samples collected during the subsurface investigations included petroleum hydrocarbons (diesel and gasoline range), metals, semi-volatile organic compounds, and dioxin and furans. Analyses were targeted for select constituents based upon the area of historical use and detections from previous site investigations.

Results of the site investigation showed soil samples collected from test pits in the location of the former kiln buildings recorded elevated dioxin/furan total toxicity equivalence (TEQ) concentrations. A water sample collected from the drainage ditch in this area of the former kiln buildings additionally contained elevated dioxin/furan TEQ concentrations. Almost all other constituents of concern tested during the site investigation program for soil and groundwater samples were either non-detect, below applicable environmental screening levels or within the range of background concentrations for the area.

Observed levels of constituents of concern show the risk to human health and the environment is very low across most of the site. In the location of the former kiln buildings, dioxin TEQ concentrations in soil were elevated above applicable screening levels for unrestricted use, and consideration for control during future site development activities will need to be implemented. Isolation of the material to prevent contact or excavation and removal from the site are recommended. In addition, further delineation of shallow soils to the north of the former kiln buildings may be necessary as part of site development to ensure adequate mitigation of impacted soils is addressed.

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Abbreviations and Acronyms

---	analysis not performed on sample/cannot be determined
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
pg/g	picograms per gram
pg/L	picograms per liter
ppt	parts per trillion
ug/L	micrograms per liter
<	denotes a value that is "less than" the method reporting limit
APN	Assessor's parcel number
BGS	below ground surface
Cal-EPA	California Environmental Protection Agency
CHHSL	California human health screening level
COC	contaminants of concern
DTSC	Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
ESA	environmental site assessment
ESL	environmental screening level
FES	Freshwater Environmental Services
HHRA	Human Health Risk Assessment
HpCDD	hexachlorodibenzo-p-dioxin mixture
J	result is less than the reporting limit/method limit but greater than the method detection limit
LCS/LCSD	laboratory control standard/laboratory control standard duplicate
LLI	Little Lakes Industries
MS/MSD	matrix spikes/matrix-spike duplicates
NATO 88	North Atlantic Treaty Organization 1988
NR	no reference
OCDD	octachlorodibenzo-p-dioxin
OEHHA	Office of Environmental Health Hazard Assessment
PAHs	polyaromatic hydrocarbons
PCBs	polychlorinated biphenyls
PCP	pentachlorophenol
PHG	public health goal
PNA	polynuclear aromatic hydrocarbons
PVC	polyvinyl chloride
QAPP	quality assurance project plan
QC	quality control
R	designates duplicate sample
RPD	relative percent difference
RSL	regional screening levels
RWQCB	North Coast Regional Water Quality Control Board
SAP	sampling and analysis plan
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SGC	silica gel cleanup
SVOCs	semi-volatile organic compounds

TPH	total petroleum hydrocarbons
TPHD	total petroleum hydrocarbons as diesel
TPHG	total petroleum hydrocarbons as gasoline
USDA	United States Department of Agriculture
USGS	United States Geological Society
UST	underground storage tank
VOCs	volatile organic compounds
WP-#	temporary well point-number
WQO	water quality objectives

1.0 Introduction

This report presents the results of site investigation activities conducted at the former Little Lake Industries Mill site (LLI) located in Arcata, California (Figure 1). The purpose of the investigation was to assess subsurface conditions at the site that may have been impacted by historical mill operations. Previous investigations at the site have identified impacts from the release of regulated materials, and this investigation was intended to address identified data gaps. SHN completed site investigation activities and prepared this report on behalf of the City of Arcata under funding provided by a U.S. Environmental Protection Agency (EPA) Brownfields grant, ID No. BF99T62301.

1.1 Background

The original mill property consists of three parcels (Assessor's parcel number [APN] 503-251-014, 503-232-013, and 503-232-004) shown in Figure 2, and was historically referred to as the South "I" Street Mill. The LLI site investigation occurred on the two parcels on the east side of South "I" Street, and the Johnson Tract (APN 503-251-014) located west of the LLI site across South "I" Street was not included. The City of Arcata currently owns the former South "I" Street mill parcels.

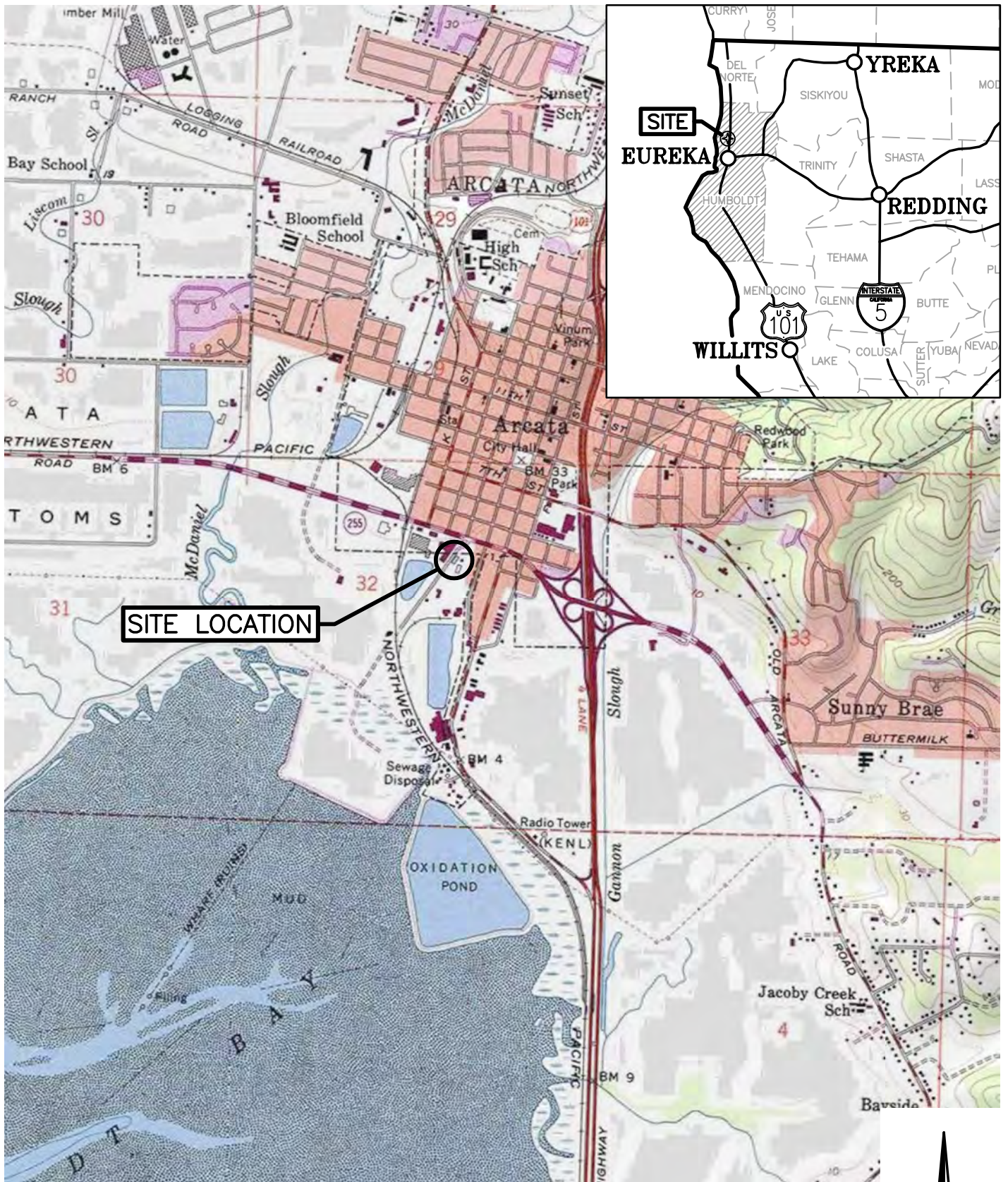
From 1950 to 1988, the site was primarily used for timber-related operations that included log storage, milling, and drying. The Johnson Tract site was used for a log pond. Structures on the site consisted of a remanufacturing complex, kilns, maintenance shed, boiler building, drying shed, conical burner, and office building. There has been no historical reporting of wood treatment occurring at the LLI site; however, chemicals associated with treated wood have been identified from samples collected during previous assessments. Prior to 1950, the area was used for agricultural purposes.

The City of Arcata acquired the property in 2001. By 2010, the structures located on the property had been demolished and removed. The site currently consists of building foundations and footings, bare ground, vegetated areas, and various stockpiles of soil and gravel. The City of Arcata indicated several soil stockpiles located at the site were created during bank maintenance of Jolly Giant Creek.

1.2 Historical Site Assessment Activities

Documents available for review discussing previous operations at the site include two Phase I environmental site assessments (ESAs) completed by Winzler and Kelly in 1998 (W&K, 1998) and Innovative Technical Solutions, Inc. in 2002 (ITSI, 2002). A summary of historical investigation and remediation activities performed at the LLI site is presented in the following sections.

Two 1,000-gallon underground storage tanks (USTs) installed in 1959 for diesel fuel were removed from the former Maintenance Building area in August 1987 (W&K, 1991). In 1990, the tank area was re-excavated and approximately 200 cubic yards of soil was removed and stockpiled at the site. Five borings and three monitoring wells were installed in August 1991 during the subsurface investigation. Groundwater monitoring identified total petroleum hydrocarbons as diesel (TPHD) in one of the three monitoring wells (MW-1) at a concentration of 140 micrograms per liter ($\mu\text{g/L}$). The highest concentration of TPHD recorded in soil borings was 43 milligrams per kilogram (mg/kg). Excavated soil tested from the UST removal contained up to 2,000 mg/kg of TPHD. The UST site received closure from the North Coast Regional Water Quality Control Board (RWQCB) in March 2000.



SOURCE: ESRI



City of Arcata
Former Little Lake Industries Mill
Arcata, California

Site Location Map

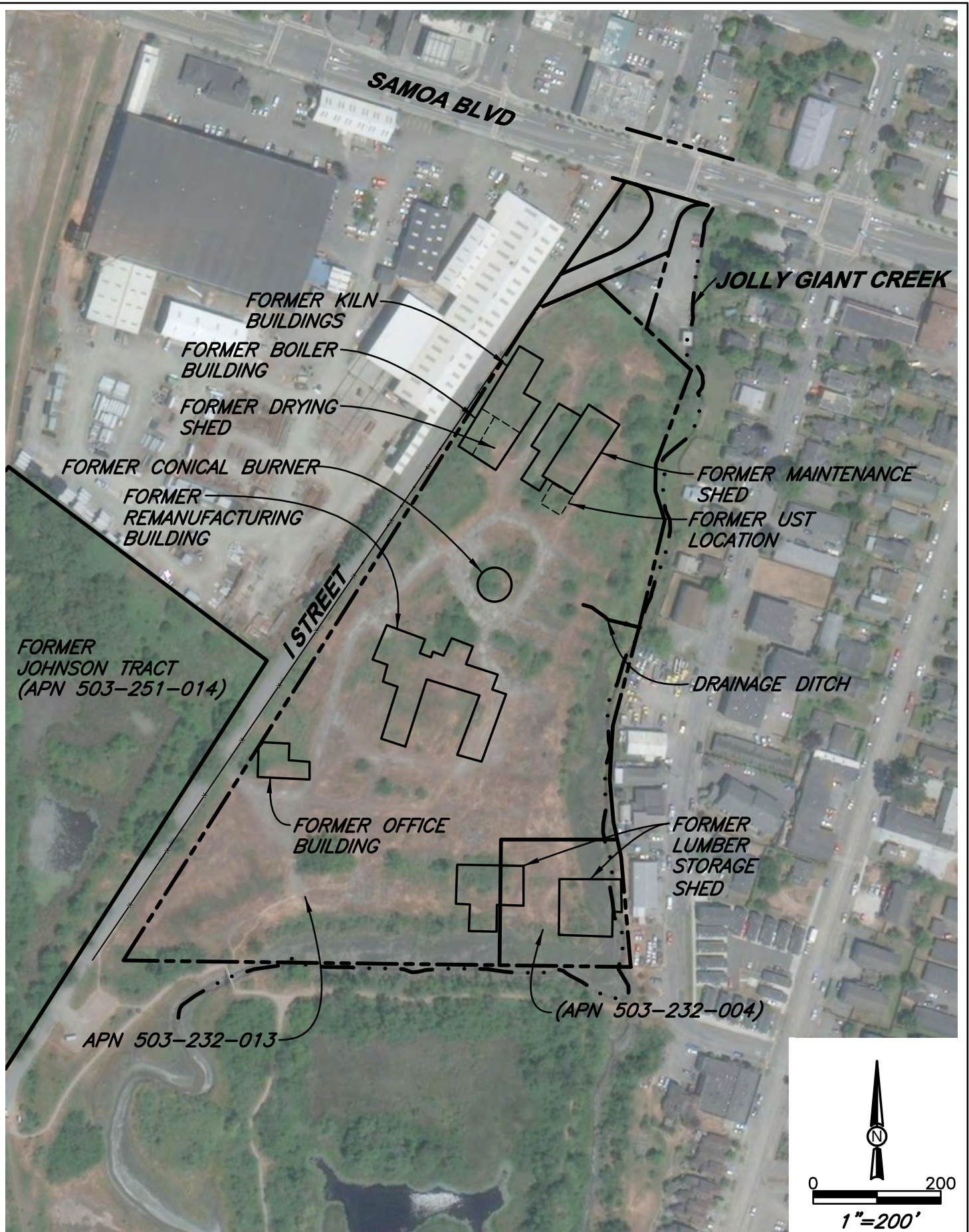
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Figure 1

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City of Arcata
Former Little Lake Industries Mill
Arcata, California

Site Plan with
Historic Structure Locations
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October 2019

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Figure 2

Two targeted Brownfields assessments (TBA) were conducted at the site by Weston Solutions in December 2002 (Phase II) and April 2004 (Phase IIB) to determine if soil and groundwater at the site were impacted by contaminants from historical use. The initial investigation work scope in December 2002 included 26 soil borings, installation of 7 temporary well points, and the collection of 29 soil samples and 7 groundwater samples (Weston, 2003). Areas of concern that were evaluated included the remanufacturing complex, conical burner, drying shed, fuel storage locations, and soil stockpiles.

Sample analysis for soils during this initial work phase was extensive and included:

- total petroleum hydrocarbons (TPH),
- volatile organic compounds (VOCs),
- semi-volatile organic compounds (SVOCs),
- pesticides,
- polychlorinated biphenyls (PCBs), and
- metals.

Sample analysis for groundwater included:

- TPH,
- VOCs,
- SVOCs, and
- dissolved metals.

The Phase II sampling results indicated soil and groundwater at the site have been impacted by historical use. Primary contaminants of concern (COCs) identified consisted of:

- TPHD,
- pentachlorophenol (PCP), and
- dissolved metals.

Based on results of the Phase II TBA and correspondence from the RWQCB, a second investigation was completed at the site in April 2004 to address outstanding issues related to contaminant leachability to groundwater and the presence of PCP. The presence of PCP was not anticipated at the site, and its presence could suggest that dioxins and furans may be present. The second phase of work (Phase IIB) included 10 soil borings and the installation of 5 monitoring wells in areas of concern (Weston, 2004). The testing suite was similar to the Phase II work, but additionally included two soil samples for dioxin/furan analysis from the vicinity of the remanufacturing complex where PCP was previously detected.

Results of the second TBA indicated that TPH, VOCs, SVOCs, and metals present in site soils do not pose a substantial threat to groundwater. This assertion was based on the second TBA finding the constituents were either not present or did not show an increase in concentrations from previous results (Weston, 2004). However, the following text relating to the presence of dioxins at the site was excerpted from the Weston Phase IIB report:

Two samples were analyzed for dioxins from areas where PCP was detected in the Phase II investigation. Dioxins were detected in these two samples at concentrations of 3,900 parts per trillion and 400 parts per trillion, exceeding the action level of 3.9 parts per trillion.

No additional corresponding information related to this statement was included in the 2004 Weston report. The samples were believed to be collected in the area of previously identified PCP, which was north of the remanufacturing complex near the conical burner. No supporting sample location map, sample identification, or corresponding laboratory report was included in the October 2004 Weston document. Based on the absence of supporting information for dioxin testing in the Weston report, the results are unsubstantiated at this time.

During October and November 2009, SHN oversaw the demolition and disposal of the kiln buildings, drying shed, their foundations, and the boiler house located in the northwest corner of the site. Contamination issues for the kiln buildings were identified in surface coating on the inside of the kiln buildings, which contained elevated levels of dioxins. Additional activities conducted during this work phase included the destruction of a water production well adjacent to the boiler building.

In September 2016, Freshwater Environmental Services (FES) summarized all available sample results for the LLI site. The results were evaluated to provide a detailed summary for each contaminant identified at the site for comparison to regulatory screening levels and to determine if additional evaluation was warranted (FES, 2016). Based on this evaluation of site conditions, the following COCs were assessed for location specific impacts:

- Dioxins/furans in soil and groundwater
- PCP in soil and groundwater
- TPHD in soil and groundwater
- Lead in soil
- Dissolved metals in groundwater
- Total petroleum hydrocarbons as gasoline (TPHG) in groundwater
- SVOCs in groundwater

Table 1 summarizes available data for COCs identified at the LLI site compiled by FES. It should be noted that certain COCs identified may not have corroborative analytical results or showed no detectable concentrations with reporting limits above regulatory screening levels, and were, therefore, identified as a data gap in the sample set.

**Table 1. Contaminants of Concern, Previous Investigations
Little Lake Industries Mill, Arcata, California**

Analytical Parameter (Contaminants of Concern)	Date of Sampling	Sampling Contractor	Laboratory Analytical Results	Screening Level
Soil (mg/kg) ¹ unless noted				
PCP ²	April 2004	Weston	0.072 to 0.46	1.0 ³
Lead	December 2002		5.9 to 200	80/320 ⁴
TPHD ⁵	December 2002		4.9 to 390	230 ³
Dioxins and Furans	April 2004		Undetermined	50, 220-700 (ppt) ⁶
Groundwater (ug/L) ⁷				
PCP	December 2002	Weston	74	0.3 ⁸
Dissolved Antimony	December 2002		1.7 to 3.5	2.8 ⁸
Dissolved Arsenic	December 2002 and April 2004		0.2 to 16.3	0.004 ⁸

**Table 1. Contaminants of Concern, Previous Investigations
Little Lake Industries Mill, Arcata, California**

Analytical Parameter (Contaminants of Concern)	Date of Sampling	Sampling Contractor	Laboratory Analytical Results	Screening Level
Dissolved Barium	December 2002	Weston	3.76 to 2,930	1,000 ³
Dissolved Beryllium	December 2002		3.9	1 ⁸
Dissolved Cadmium	December 2002		2.5	0.04 ⁹
Dissolved Chromium	December 2002 and April 2004		0.54 to 84.4	50 ³
Dissolved Cobalt	December 2002 and April 2004		0.78 to 105	3.0 ³
Dissolved Lead	December 2002		1.7 to 92.4	0.2 ⁸
Dissolved Nickel	December 2002 and April 2004		3.8 to 148	12 ⁸
Dissolved Thallium	December 2002		6.9 to 15.8	0.1 ⁸
Dissolved Vanadium	December 2002		0.72 to 113	63 ³
TPHD	December 2002		140 to 1,100	100 ⁸
TPHG ¹⁰	December 2002		5 to 16	5 ¹¹
SVOCs ¹²	December 2002 and April 2004		0.5 to 820	Varies by constituent
1. mg/kg: milligram per kilogram 2. PCP: pentachlorophenol 3. San Francisco Bay Regional Water Quality Control Board, Tier 1 Environmental Screening Level (ESL), February 2016 4. California Environmental Protection Agency (Cal-EPA) Office of Environmental Health Hazard Assessment (OEHHA), Revised California Human Health Screening Levels (CHHSLs) for Residential/Industrial, September 2009 5. TPHD: total petroleum hydrocarbons as diesel 6. California Department of Toxic Substances Control, Human Health Risk Assessment Note Number 2, April 2017. Residential, Commercial and Industrial Dioxin total toxicity equivalence (TEQ), ppt: parts per trillion 7. µg/L: microgram per liter 8. California Public Health Goal (PHG), Cal-EPA OEHHA 9. Groundwater Water Quality Objectives, North Coast Regional Water Quality Control Board, September 2016 10. TPHG: total petroleum hydrocarbons as gasoline 11. Water Quality Objective, North Coast Regional Water Quality Control Board, September 2016 12. SVOCs: semi-volatile organic compounds				

Various dissolved metals were detected across the site in groundwater samples at concentrations exceeding RWQCB water quality objectives (WQOs). The primary dissolved metals that exceeded environmental screening levels (ESLs) included arsenic, chromium, cobalt, lead, nickel, and thallium.

Soil and groundwater samples tested during the previous investigations indicated the presence of SVOCs was limited in occurrence and only a few detections in specific locations that exceeded ESLs. Although reporting limits for several SVOCs were above their respective ESLs, the primary SVOC identified for additional investigation at the LLI site is PCP.

1.3 Objective

Project objectives included addressing data gaps in the extent of contaminants identified in site soils and shallow groundwater to complete an adequate conceptual site model for risk-based screening to human health and the environment posed by the materials onsite.

1.4 Scope of Work

The scope of work was developed to provide information needed to meet the objectives of this investigation and include:

- Project implementation, permitting, and Underground Service Alert notification
- Field program
 - Install shallow test pits for the collection of soil samples.
 - Complete soil borings with temporary well points for groundwater sample collection.
 - Collect surface water samples.
 - Submit the soil and water samples for laboratory analysis.
 - Conduct a survey using a global positioning system for each sample location.
 - Properly dispose of investigation-derived waste.
- Reporting—Prepare a report of findings that includes the results of the field investigation, data analysis, and provides recommendations to move the site toward closure or future work, as needed.

Work was performed in general accordance with the site investigation SAP (SHN, December 2018) and SAP Addendum (SHN, 2019), in addition to the site safety plan and quality assurance project plan (QAPP).

2.0 Site Investigation Activities

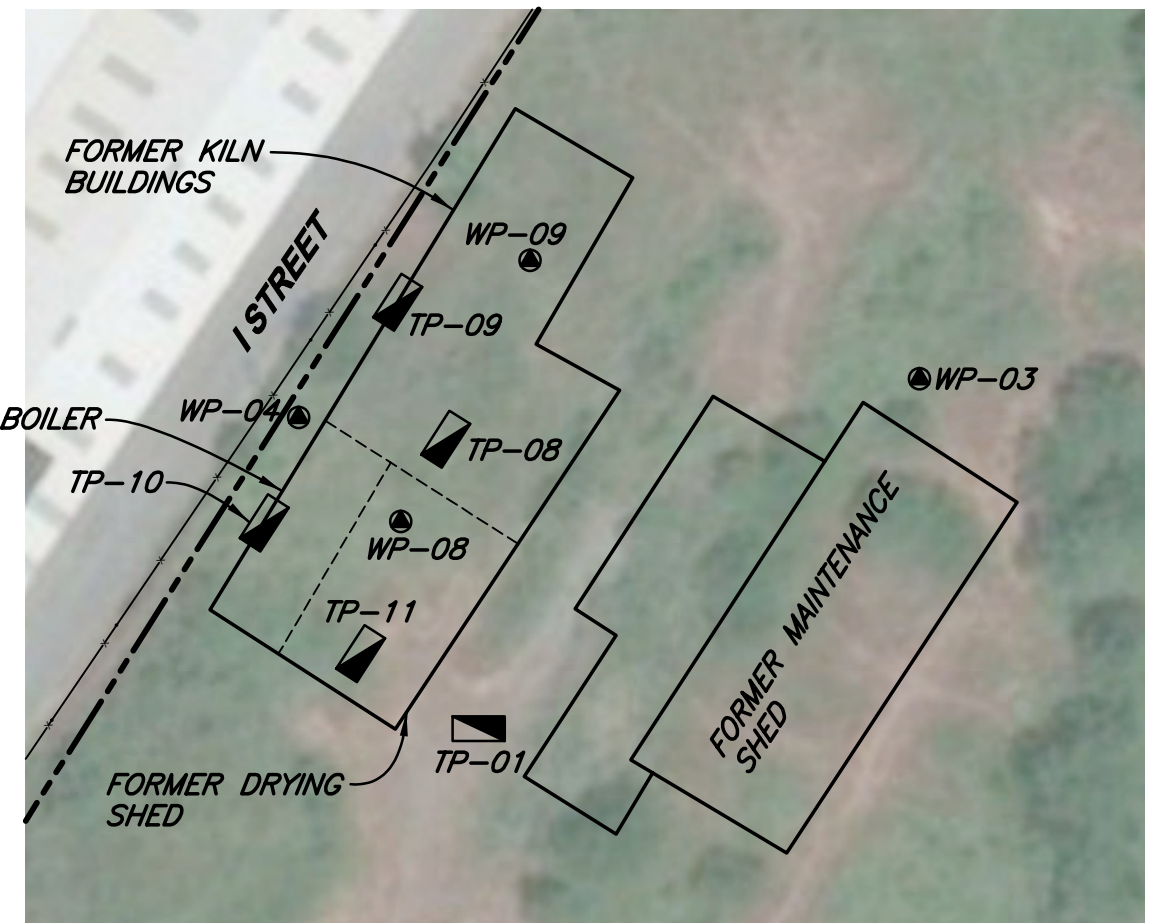
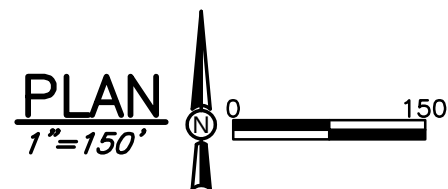
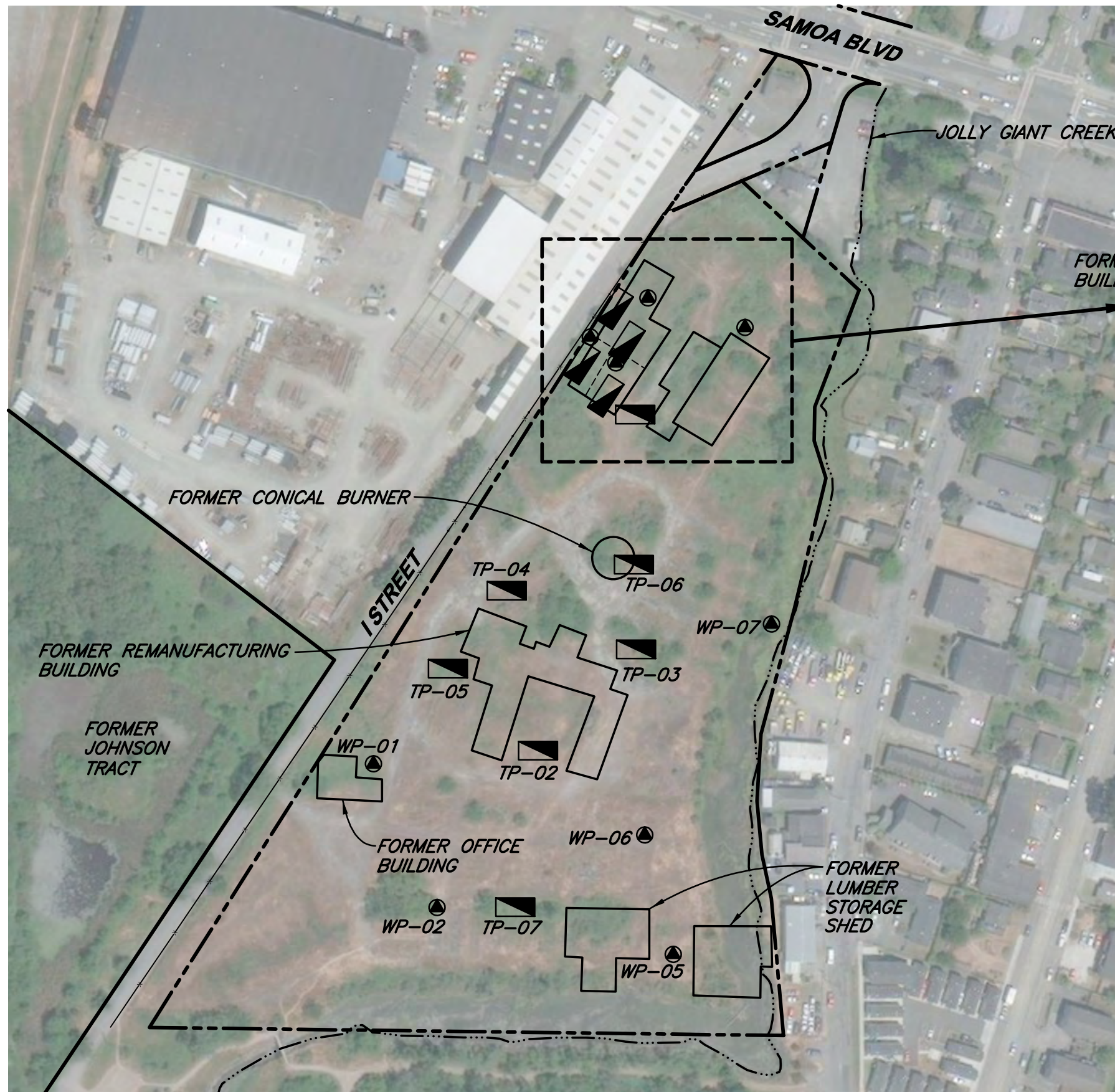
Field activities to complete the site investigation occurred on March 4 and 5, 2019, and on July 17, 2019. The second round of sampling performed in July 2019 under the SAP Addendum was conducted due to an exceedance of dioxin total toxicity equivalence (TEQ) concentration for a water sample collected from a ditch located adjacent to the former kiln buildings. Further investigation of the former kiln area was conducted to determine the extent of dioxins/furans and the potential for an upland source of the compounds.

2.1 Test Pit Excavation

Eleven test pits were completed at the LLI site (Figure 3) to observe shallow soils and collect soil samples. Test pits were excavated using a backhoe to approximately 4 feet below ground surface (BGS). Soil was sampled from each test pit sidewall with efforts focused on material that appeared to provide evidence of previous mill working surfaces.

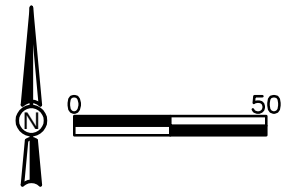
Stainless steel trowels were used to collect soil samples for placement in laboratory-supplied containers in accordance with methods described in the SAP. Soil samples were then placed in an iced cooler and transported under chain-of-custody documentation to a State of California-certified analytical laboratory. Soil samples were analyzed for the constituents described in the “Laboratory Analysis” section of this report. Test pit excavation field notes are included in Appendix 1.

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ENLARGED PLAN

1"=50'



EXPLANATION

- TEST PIT LOCATION
TP-01
- TEMPORARY WELL POINT LOCATION
WP-02



City of Arcata
Former Little Lake Industries Mill
Arcata, California

October 2019

018022-030-SITE-SAMP-LCTNS

Site Plan with
Sample Locations
SHN 018022.030

Figure 3

2.2 Temporary Well Point Installation

Nine temporary well points were constructed in hand-auger soil borings for collection of groundwater samples (Figure 3). Each temporary well point consisted of ¾-inch diameter Schedule 40 polyvinyl chloride (PVC) with 5 feet of 0.010-inch sized slot well screen and blank well casing. Following installation, each temporary well point was measured for depth-to-water and total well depth BGS prior to sampling.

Temporary well points were purged and sampled using a peristaltic pump and new disposable tubing. Each well point was monitored for pH and temperature during purging activities using portable instrumentation. Groundwater samples were then collected by decanting directly into laboratory-supplied sample containers. Each sample container was labeled with location, date and time of collection, and analysis requested. Sample containers were then placed in an iced cooler and transported under chain-of-custody documentation to the testing laboratory. Groundwater samples were analyzed for constituents described in Section 2.3 "Laboratory Analysis."

Following the collection of groundwater samples at each temporary well point location, the well casing was removed, and the boreholes were backfilled with bentonite chips and soil cuttings to match the existing surface conditions. Field notes for temporary well point construction and groundwater sampling are included in Appendix 1.

2.3 Laboratory Analysis

Select soil samples were analyzed for the following constituents:

- TPHD using EPA Method 8015B with silica gel cleanup
- Lead using EPA Method SW6020
- Dioxin and furans by EPA Method 1613
- PCP by EPA Method 8270C-SIM

Select water samples were analyzed for the following constituents:

- TPHD using EPA Method 8015B with silica gel cleanup
- TPHG using EPA Method 8260
- Dissolved metals using EPA Method SW6020/200.8
- Dioxin and furans by EPA Method 1613
- PCP, polyaromatic hydrocarbons (PAHs) and polynuclear aromatic hydrocarbons (PNAs) by EPA Method 8270C-SIM

Soil and water samples were submitted to McCampbell Analytical, Inc. located in Pittsburg, California, an accredited State of California laboratory. Table 2 summarizes laboratory analyses performed on specific samples.

**Table 2. Laboratory Analyses for Soil and Groundwater Samples
Little Lake Industries Mill, Arcata, California**

Sample Medium	Sample Location Identification	Collection Date	TPHD ¹ with SGC ² (EPA ³ 8015)	TPHG ⁴ (EPA 8260)	Lead (EPA SW6020)	Dissolved Metals (EPA SW6020)	Dioxins and Furans (EPA 1613)	PCP ⁵ (EPA 8270 SIM)	PCP, PAHs ⁶ , PNA ⁷ (EPA 8270 SIM)
Soil	TP-01	3/4/19	X		X		X	X	
	TP-01R ⁸		X		X		X	X	
	TP-02				X		X	X	
	TP-03				X		X	X	
	TP-04				X		X	X	
	TP-05				X		X	X	
	TP-06				X		X	X	
	TP-07		X		X				
	TP-08	7/17/19					X		
	TP-09						X		
	TP-10						X		
	TP-11						X		
Groundwater	WP-01	3/5/19	X	X			X	X	
	WP-01R						X		
	WP-02		X						
	WP-03		X						
	WP-04		X				X	X	
	WP-05		X						
	WP-06		X			X			
	WP-07	3/4/19	X			X			X
	WP-07R		X			X			X
	WP-08	7/17/19					X		
	WP-09						X		
1. TPHD: total petroleum hydrocarbons as diesel 2. SGC: silica gel cleanup 3. EPA: U.S. Environmental Protection Agency 4. TPHG: total petroleum hydrocarbons as gasoline 5. PCP: pentachlorophenol 6. PAHs: polyaromatic hydrocarbons 7. PNAs: polynuclear hydrocarbons 8. R: designates duplicate sample									

2.4 Equipment Decontamination Procedures

All sampling equipment and the hand auger were cleaned prior to being taken onsite. The equipment was first washed in a water solution containing Liquinox[®] cleaner, followed by two distilled water rinses.

2.5 Investigation Derived Materials Handling

Following soil sampling at each test pit, the soil was placed back into the test pit and compacted with the backhoe bucket. The small volume of soil from the hand-augured temporary well point borings was spread on site. Purge water generated from the temporary well point sampling and equipment decontamination water was transported to SHN's purge water storage tank in Eureka for temporary storage and characterization. The water will be discharged, under permit, to the City of Eureka wastewater collection system.

3.0 Results of the Site Investigation

This section presents the results of the soil and groundwater samples collected and observations of subsurface characteristics during the site investigation. Complete laboratory analytical reports are included in Appendix 2.

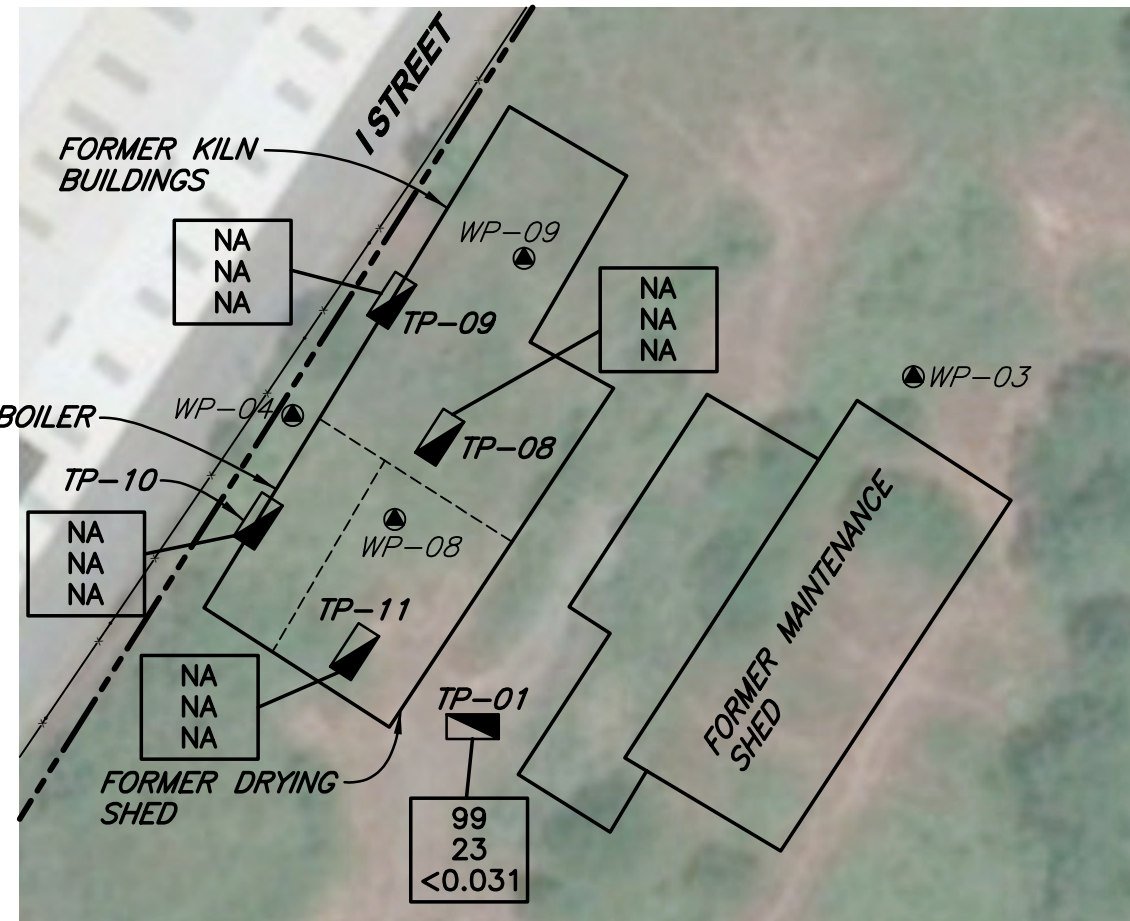
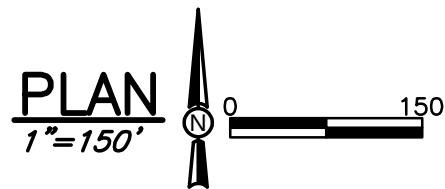
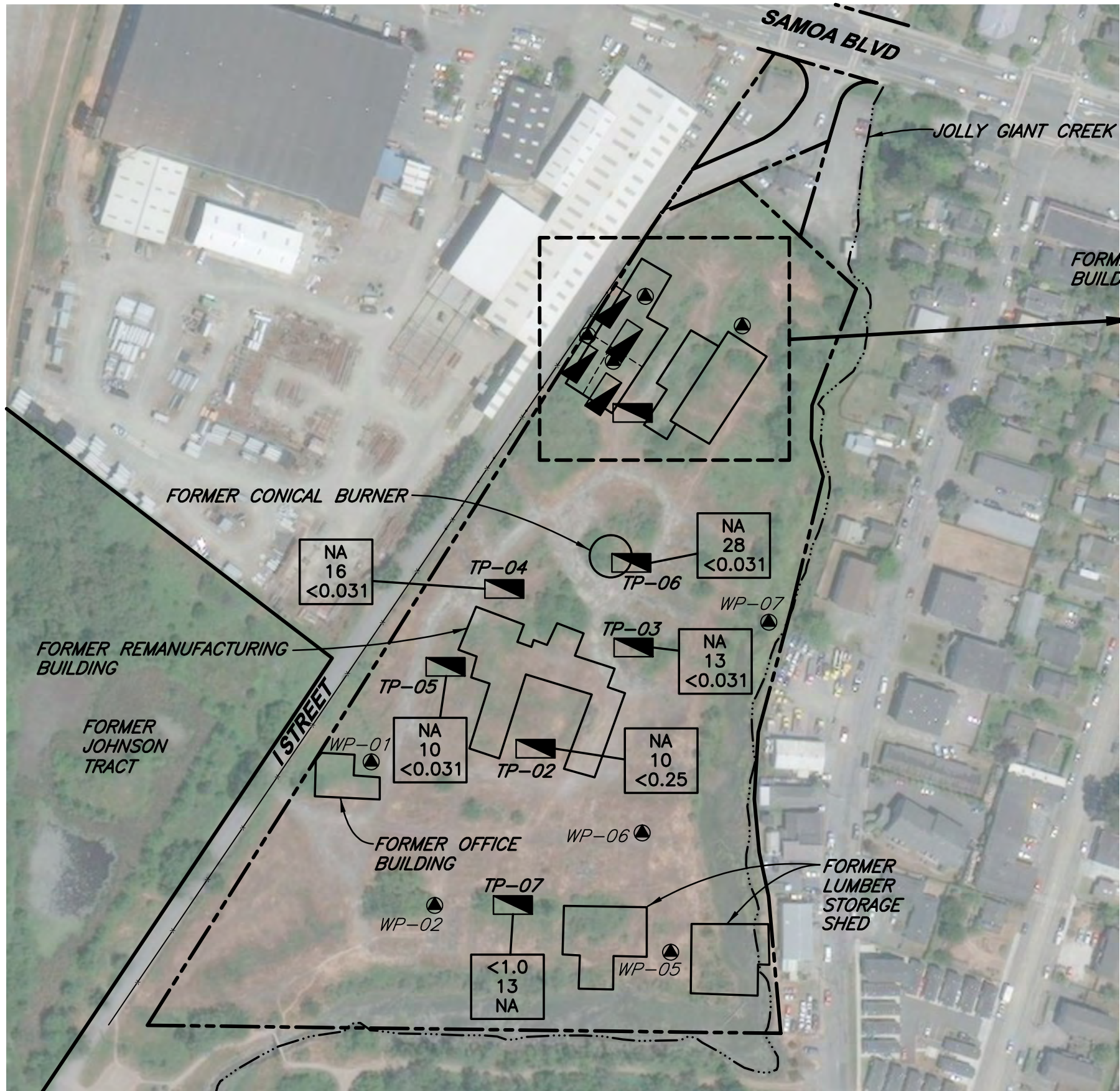
3.1 Soil Analytical Results

Laboratory analytical results from soil samples collected during March and July 2019 site investigation activities are presented in Tables 3 and 4. Figure 4 presents laboratory results recorded for TPHD, lead, and pentachlorophenol in soil for samples collected during the site investigation field program.

Table 3. Total Petroleum Hydrocarbons as diesel, lead, and pentachlorophenol in soil Little Lake Industries Mill, Arcata, California (mg/Kg)¹

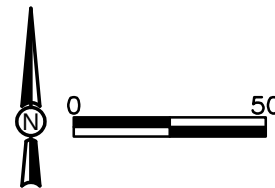
Sample Identification	TPHD with Silica gel Cleanup	Lead	Pentachlorophenol
Environmental Screening Level ²	230	80	1.0
TP-01	99	28	<0.031 ³
TP-01R ⁴	150	27	<0.25
TP-02	--- ⁵	10	<0.25
TP-03	---	13	<0.031
TP-04	---	16	<0.031
TP-05	---	10	<0.031
TP-06	---	28	<0.031
TP-07	<1.0	13	---
TP-08	---	---	---
TP-09	---	---	---
TP-10	---	---	---
TP-11	---	---	---
1. mg/Kg: milligram per kilogram 2. San Francisco Bay Regional Water Quality Control Board, Tier 1 Environmental Screening Level (ESL), February 2016 3. <: concentration less than laboratory reporting limit 4. R: designates duplicate sample 5. ---: analysis not performed on sample			

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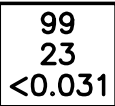


ENLARGED PLAN

1"=50'



EXPLANATION

-  **TEST PIT LOCATION**
TP-01
-  **TEMPORARY WELL POINT LOCATION**
WP-02
-  **TPHD
LEAD
PENTACHLOROPHENOL** } **RESULTS IN mg/Kg**
- NA** **NOT APPLICABLE**
- <** **CONCENTRATION BELOW REPORTING LIMIT**



City of Arcata Former Little Lake Industries Mill Arcata, California		Soil Analytical Results SHN 018022.030	
October 2019	018022-030-SLCT-SAR	Figure 4	

**Table 4. Total Toxicity Equivalence and 2,3,7,8-TCDD in soil
Little Lake Industries Mill, Arcata, California
(pg/g)¹**

Sample Identification	Total Toxicity Equivalence (NATO 88) ²	2,3,7,8-TCDD ³
Remediation Goal	50/220/700 ⁴	4.8/22 ⁵
TP-01	0.157	<1.0 ⁶
TP-01R ⁷	0.380	<1.0
TP-02	8.01	<1.0
TP-03	0.0154	<1.0
TP-04	0.0120	<1.0
TP-05	5.24	<1.0
TP-06	0.920	<1.0
TP-08 ⁸	40.0	<1.0
TP-09 ⁸	372	2.78
TP-10 ⁸	35.0	<1.0
TP-11 ⁸	1.51	<1.0

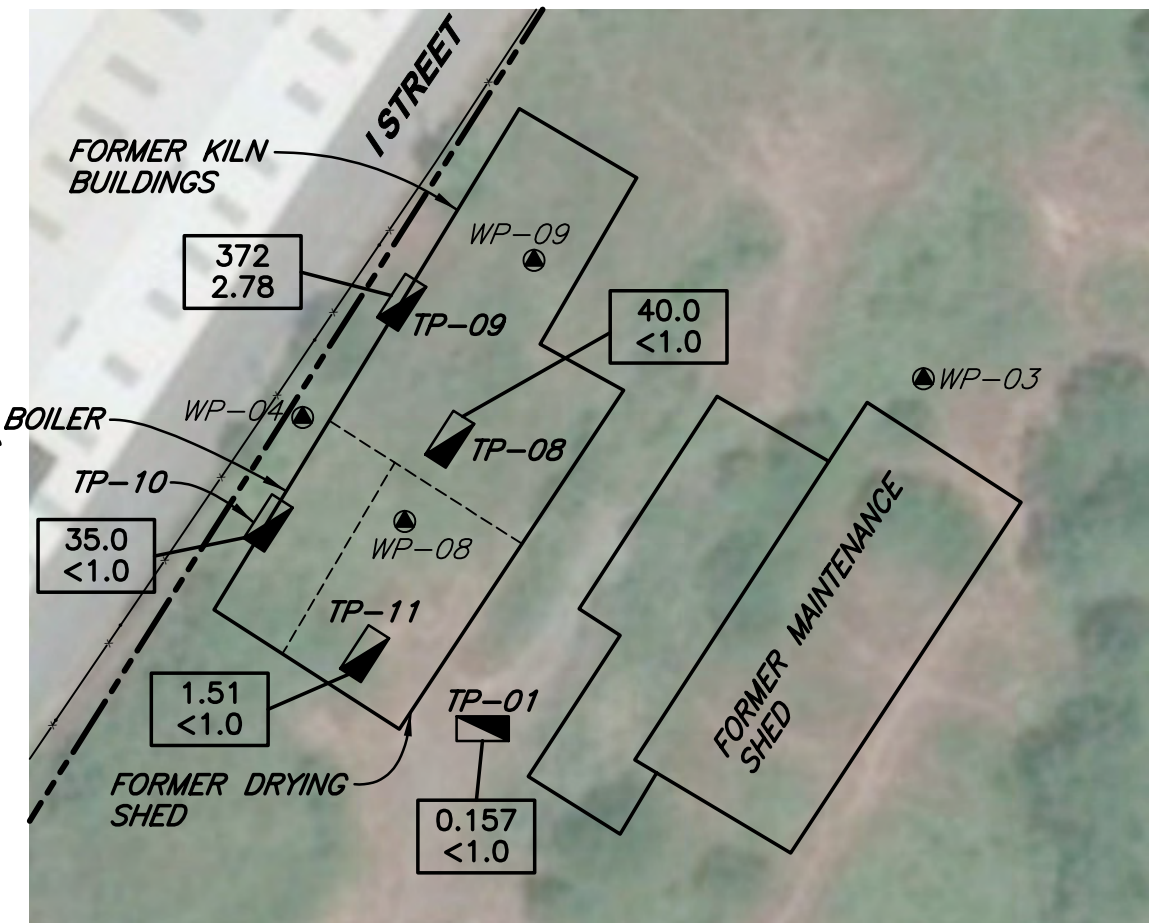
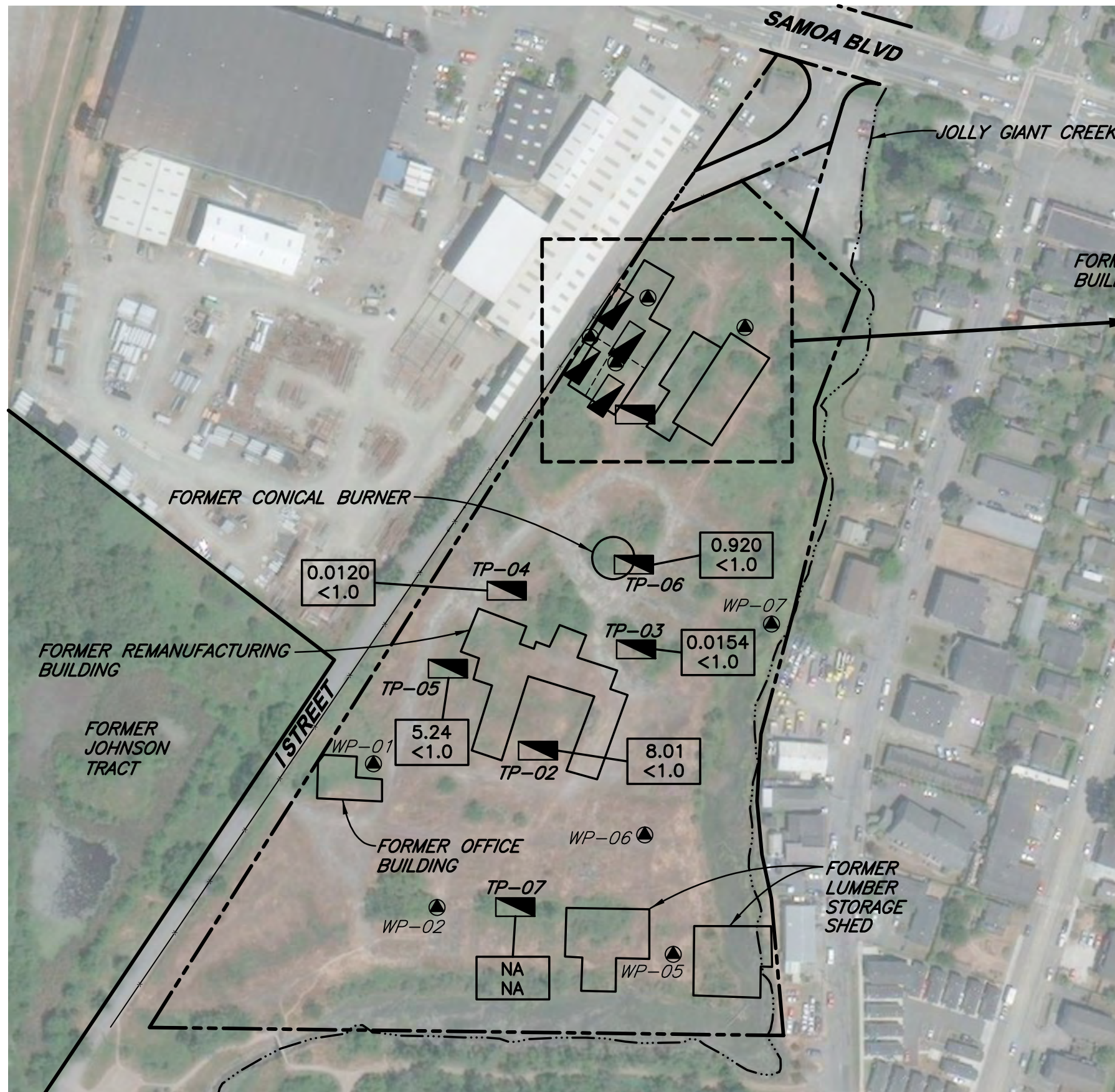
1. pg/g: picogram per gram
2. NATO 88: total toxicity equivalence based on North Atlantic Treaty Organization's 1988 Total equivalency factors (TEFs)
3. TCDD: tetrachlorobenzene-p-dioxin
4. Remediation goals derived from Department of Toxic Substances Control (DTSC), Human Health Risk Assessment (HHRA) Note Number 2, April 2017; Residential, Commercial and Industrial Dioxin TEQ
5. Regional Screening Levels, Residential/Industrial Soil, EPA 2019
6. <: concentration less than laboratory reporting limit
7. R: designates duplicate sample
8. Results reported in World Health Organization 2005 TEFs

Figure 5 presents TEQ and 2,3,7,8-TCDD analysis results reported for soil samples. A complete summary of dioxin and furan congeners in soil is provided in Appendix 3. The TEQ results for March 2019 samples are reported by the testing laboratory using the North Atlantic Treaty Organization 1988 (NATO 88) TEF method of risk assessment. An evaluation of individual congener results for comparison to the World Health Organization (WHO) 2005 method of TEQ calculation showed the reported results are actually more conservative using the NATO 88 Method. The July 2019 samples are reported using the WHO 05 method of calculation.

3.2 Groundwater Analytical Results

Laboratory analytical results from groundwater samples collected during the March 2019 site investigation activities are presented in Tables 5 through 7. Results reported for groundwater samples collected from well point locations for hydrocarbon analyses are presented in Table 5, results for dissolved metals are presented in Table 6, and results reported for groundwater samples for dioxin and furan analysis are presented in Table 7. Laboratory analytical reports are included as Appendix 2.

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EXPLANATION

- TEST PIT LOCATION
TP-01
- TEMPORARY WELL POINT LOCATION
WP-02
- TEQ 2,3,7,8-TCDD RESULTS IN pg/g
40.0 <1.0
- NA NOT APPLICABLE
- < CONCENTRATION BELOW REPORTING LIMIT



City of Arcata Former Little Lake Industries Mill Arcata, California		Dioxins/Furans in Soil SHN 018022.030	
October 2019	018022-030-SLCT-DIOX-FRNS-SOIL	Figure 5	

**Table 5. Petroleum Hydrocarbons in Groundwater
Little Lake Industries Mill, Arcata, California
(ug/L)¹**

Sample Identification	TPHD	TPHG	PCP	PAH/PNA ²
Water Quality Objective	100 ³	5.0 ⁴	0.1 ⁵	varies by constituent
WP-01	<50 ⁶	<50	<0.25	--- ⁷
WP-02	<50	<50	---	---
WP-03	<50	<50	---	---
WP-04	<50	<50	<1.2	---
WP-05	<50	<50	---	---
WP-06	<50	<50	---	---
WP-07	<50	<50	<0.25	<0.0051 - 0.25
WP-07R ⁸	<50	<50	<0.25	<0.0051 - 0.25
WP-08	---	---	---	---
WP-09	---	---	---	---

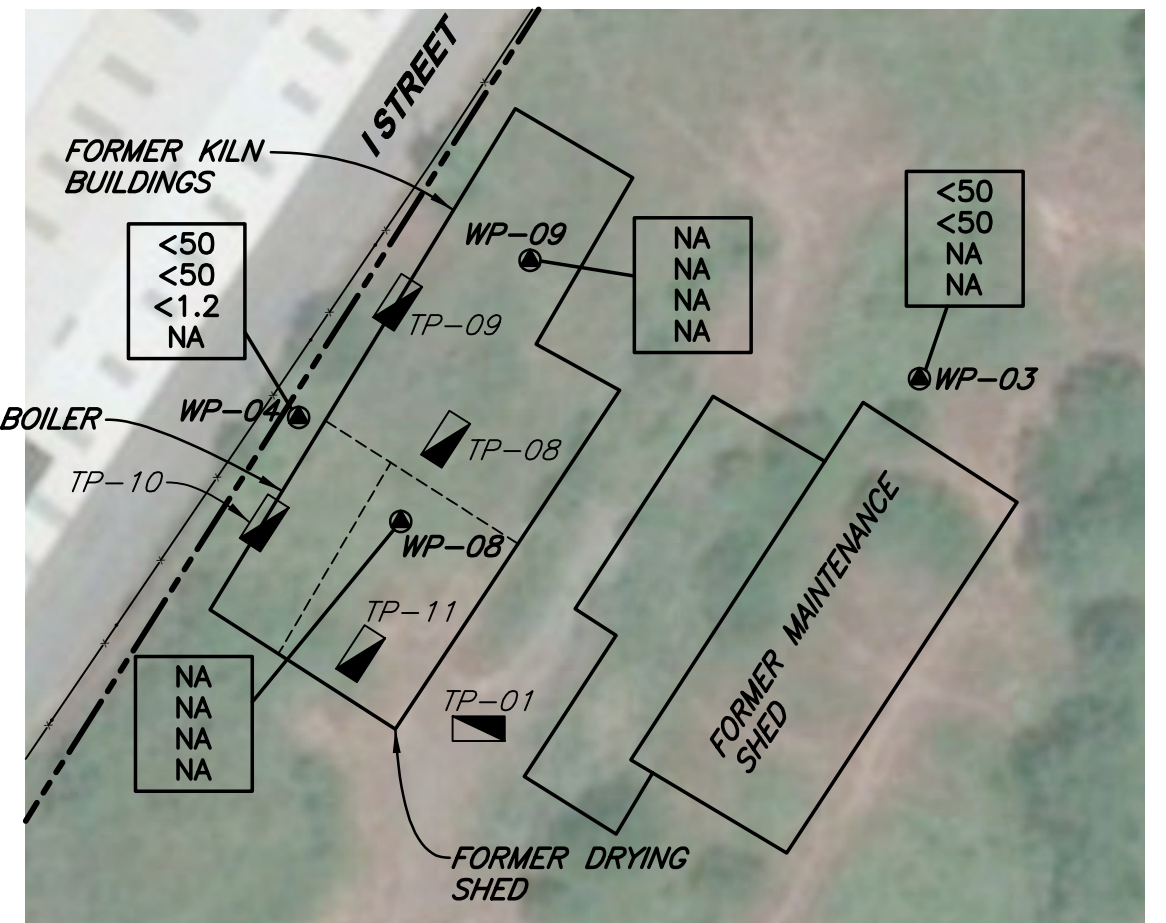
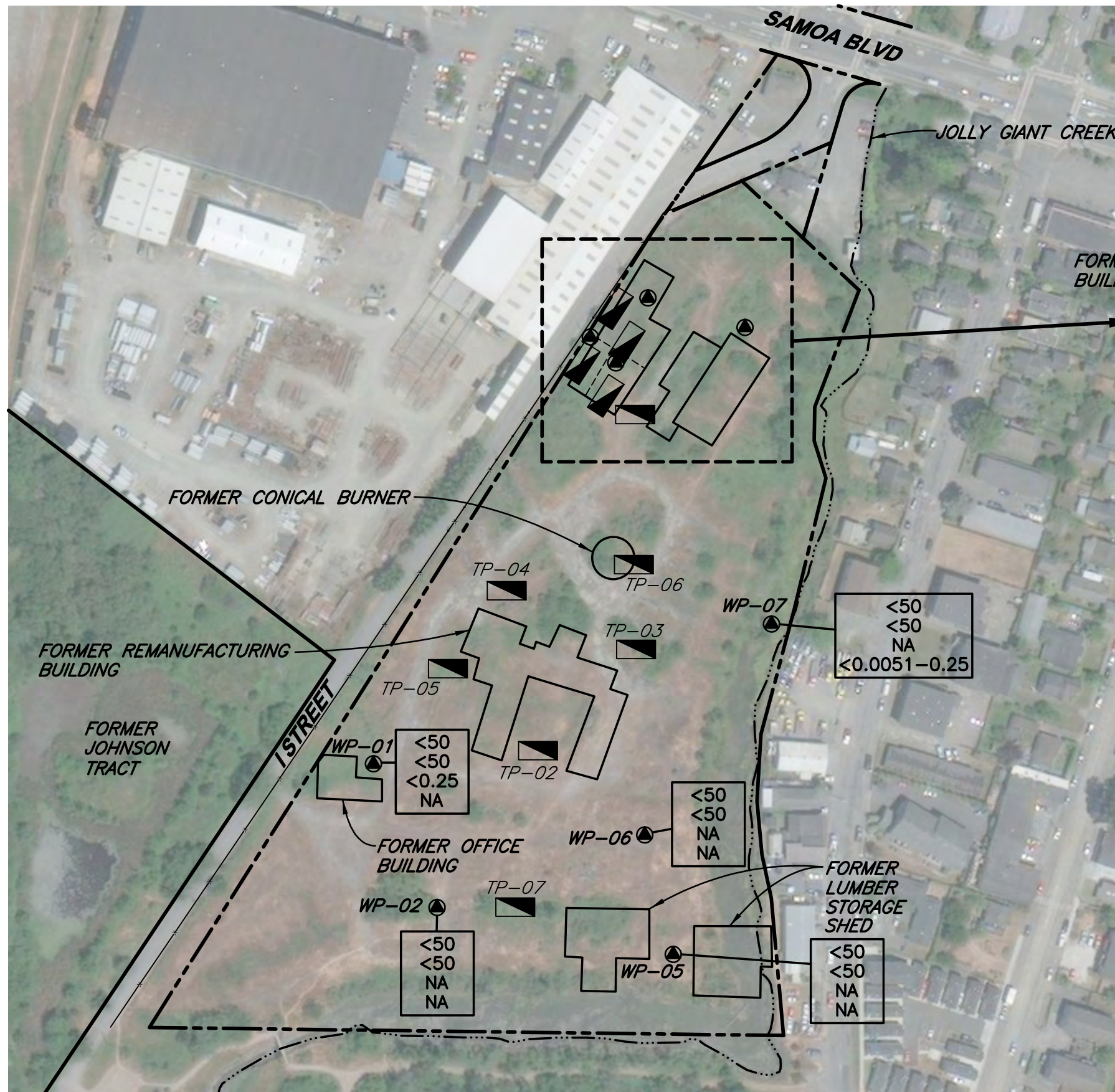
1. ug/L: microgram per liter
2. PAH/PNA: polyaromatic hydrocarbons/ polynuclear aromatic hydrocarbons
3. Water Quality Objective derived on August 7, 2019 from <http://www.waterboards.ca.gov:8080/WaterQualityGoal/index.jsp>
4. Water Quality Objective, North Coast Regional Water Quality Control Board, September 2016
5. San Francisco Bay Regional Water Quality Control Board, Tier 1 ESL, February 2016
6. <: concentration less than laboratory reporting limit
7. ---: analysis not performed on sample
8. R: designates duplicate sample

Figure 6 presents TPHD, TPHG, pentachlorophenol and PAH/PNA analytical results recorded for water samples. A summary of laboratory results for pentachlorophenol and 18 additional polynuclear aromatic hydrocarbons in groundwater from sample WP-07 are presented in Appendix 3.

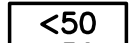
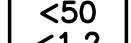
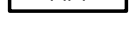
**Table 6. Dissolved Metals in Groundwater
Little Lake Industries Mill, Arcata, California
(ug/L)¹**

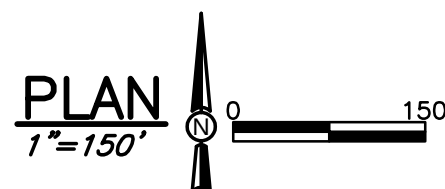
Analyte	Sample Identification			
	WP-06	WP-07	WP-07R ²	Water Quality Objective ³
Antimony	0.24 J ⁴	0.090 J	0.11	2.8 ³
Arsenic	1.9	6.9	6.7	0.004 ³
Barium	140	160	160	1,000 ⁵
Beryllium	0.071	<0.50 ⁶	<0.50	1.0 ³
Cadmium	<0.25	<0.25	<0.25	0.04 ³
Chromium	2.1	0.38 J	0.35 J	50 ⁵

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EXPLANATION

-  **TEST PIT LOCATION**
-  **TEMPORARY WELL POINT LOCATION**
-  **TPHD**
-  **TPHG**
-  **PENTACHLOROPHENOL**
-  **POLYAROMATIC HYDROCARBONS**
-  **POLYNUCLEAR HYDROCARBONS**
- RESULTS IN ug/L**
- NA NOT APPLICABLE**
- < CONCENTRATION BELOW REPORTING LIMIT**



City of Arcata Former Little Lake Industries Mill Arcata, California		Hydrocarbons and SVOCs in Groundwater	
October 2019		SHN 018022.030	
018022-030-DSOLVD-HYDRO		Figure 6	

Table 6. Dissolved Metals in Groundwater
Little Lake Industries Mill, Arcata, California
(ug/L)¹

Analyte	Sample Identification			
	WP-06	WP-07	WP-07R ²	Water Quality Objective ³
Cobalt	5.8	6.8	6.7	3.0 ⁵
Lead	5.5	<0.50	<0.50	0.2 ³
Nickel	14	11	11	12 ³
Thallium	<0.50	<0.50	<0.50	0.1 ³
Vanadium	4.6	0.93	1.0	19 ⁵

1. ug/L: microgram per liter
2. R: designates duplicate sample
3. Groundwater Water Quality Objectives, North Coast Regional Water Quality Control Board, September 2016
4. J: result is less than the reporting limit/method limit but greater than the method detection limit. The reported concentration is an estimated value.
5. San Francisco Bay Regional Water Quality Control Board, Tier 1 ESL, February 2016
6. <: concentration less than laboratory reporting limit

Figure 7 presents dissolved metals analytical results for groundwater samples. A complete summary of results for dissolved metals is provided in Appendix 3.

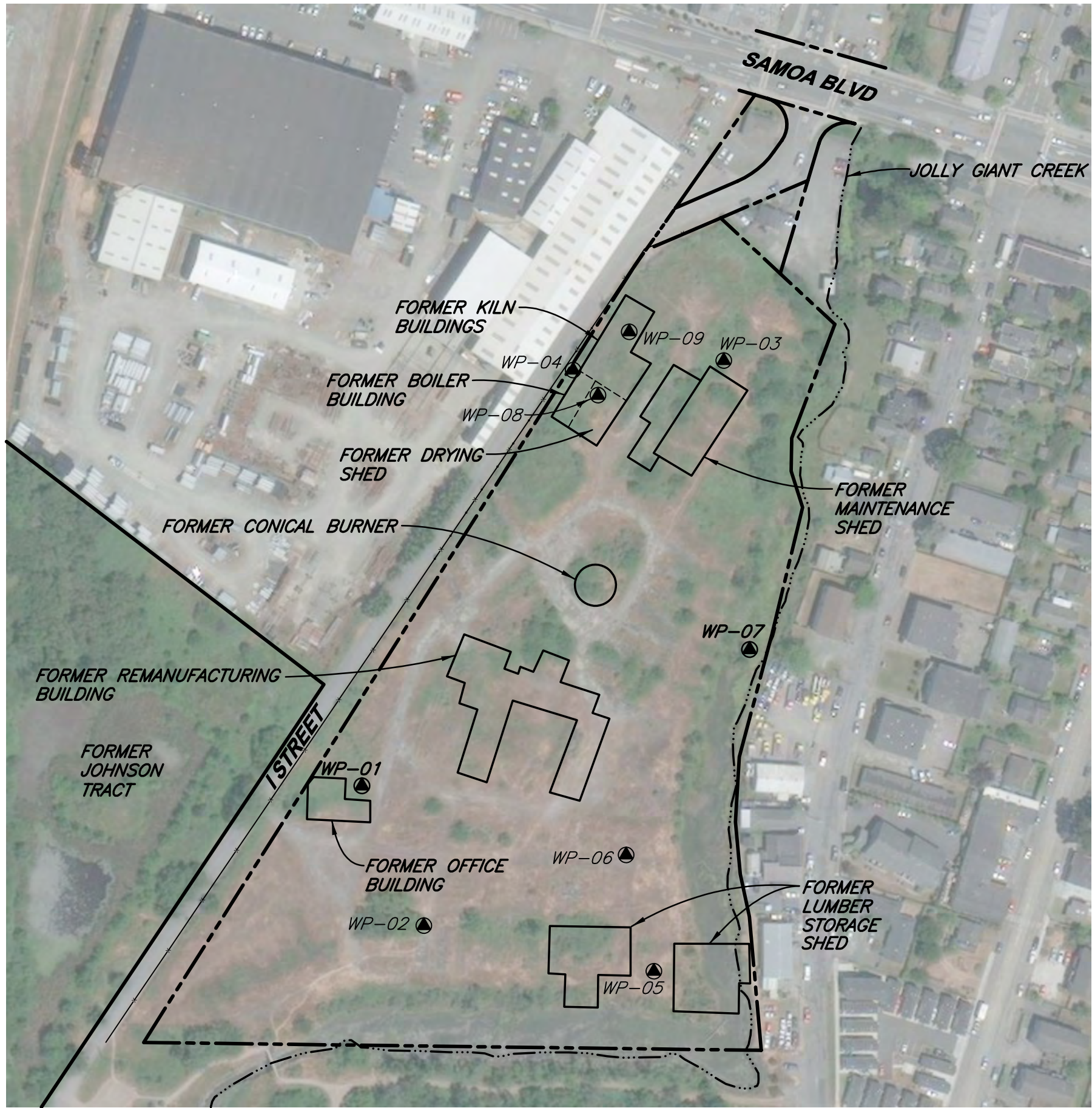
Table 7. Dioxins and Furans in Groundwater
Little Lake Industries Mill, Arcata, California (pg/L)¹

Sample Identification	2,3,7,8-TCDD	Total Toxicity Equivalence (NATO 88) ²
Water Quality Objective ³	0.05	NA ⁴
WP-01	<10.0 ⁵	1.67
WP-01R ⁶	<11.2	4.35
WP-04	<10.0	102
WP-08	<9.78	0.0816 ⁷
WP-09	<9.60	0.0 ⁷

1. pg/L: picogram per liter
2. NATO 88: North Atlantic Treaty Organization 1988 Total equivalency factors (TEFs)
3. California Public Health Goal, California Environmental Protection Agency (Cal-EPA), Office of Environmental Health Hazard Assessment (OEHHA)
4. NA: not applicable
5. <: concentration less than laboratory reporting limit
6. R: designates duplicate sample
7. Results reported using World Health Organization TEFs.

Figure 8 presents TEQ and 2,3,7,8-TCDD analysis results reported for groundwater samples. Laboratory analytical results for dioxins and furans congeners in groundwater from the March and July 2019 sampling events are presented in Appendix 3.

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EXPLANATION

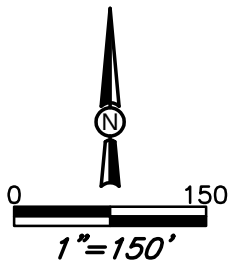
● WP-01 TEMPORARY WELL POINT LOCATION

WP-01
ANTIMONY=0.24
ARSENIC=1.9
BARIUM=140
BERYLLIUM=0.071
CADMIUM=<0.25
CHROMIUM=2.1
COBALT=5.8
LEAD=5.5
NICKEL=14
THALLIUM=<0.50
VANADIUM=4.6

WP-07
ANTIMONY=0.090
ARSENIC=6.9
BARIUM=160
BERYLLIUM=<0.50
CADMIUM=<0.25
CHROMIUM=0.38
COBALT=6.8
LEAD=<0.50
NICKEL=11
THALLIUM=<0.50
VANADIUM=0.93

RESULTS IN ug/L

< CONCENTRATION BELOW REPORTING LIMIT



City of Arcata
Former Little Lake Industries Mill
Arcata, California

Dissolved Metals in Groundwater

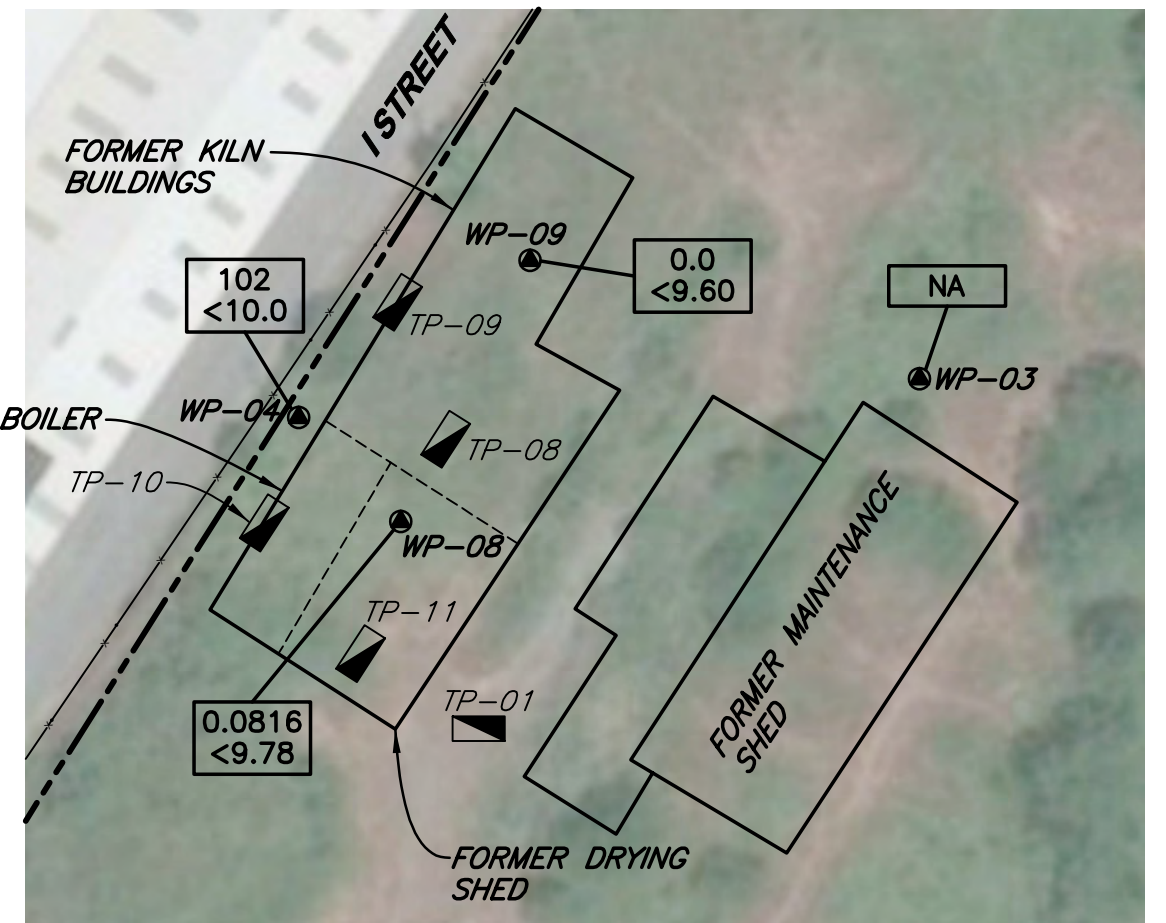
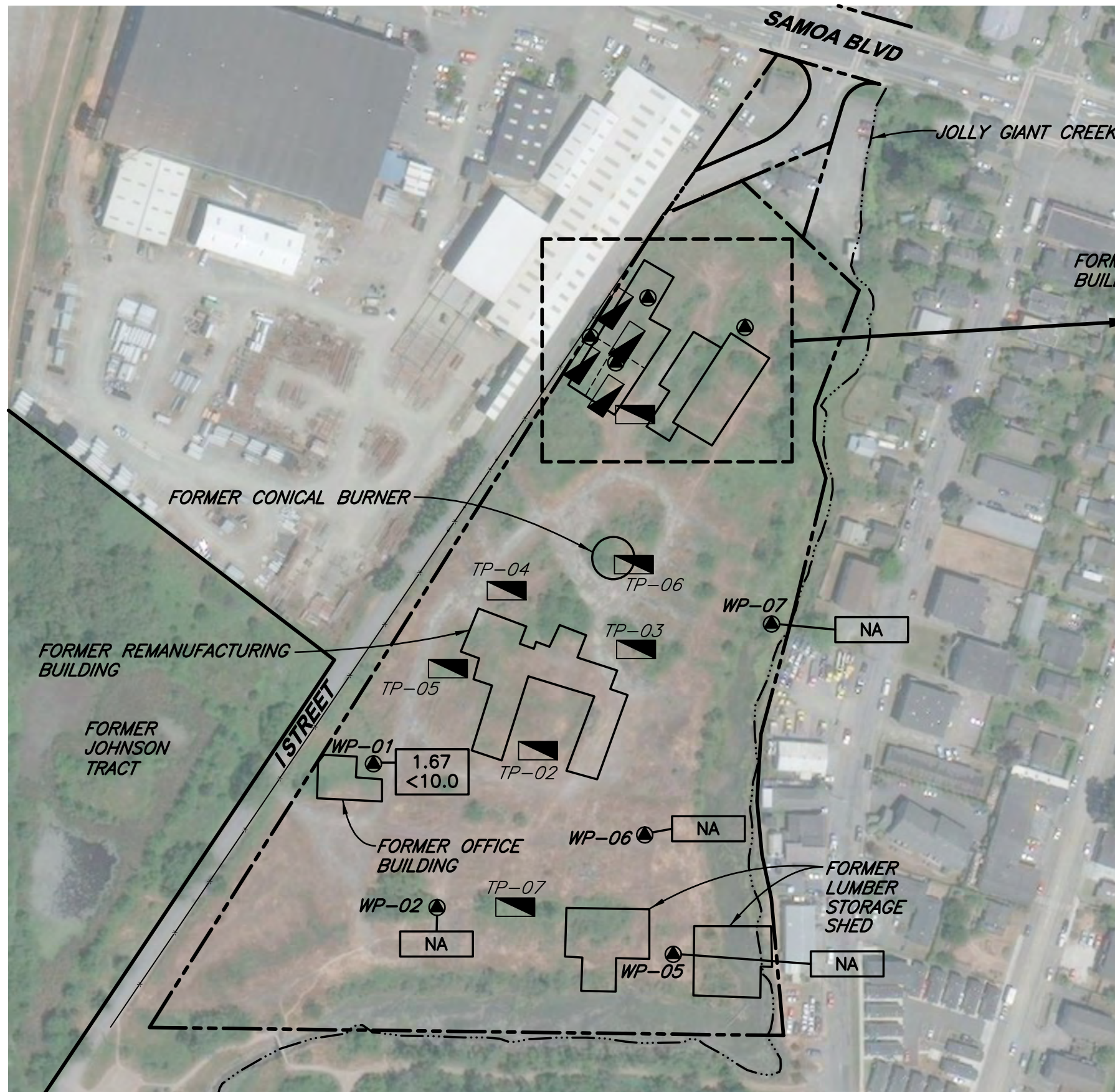
SHN 018022.030

October 2019

018022-030-DSOLVD-MTLS

Figure 7

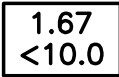
\\Eureka\Projects\2018\018022-Arcata-BF\030-Little-Lake-P\Drawings\10/18/2019 12:38 PM\DOWNNEY, PLOTTED: 10/18/2019 12:38 PM, NATHAN DOWNEY

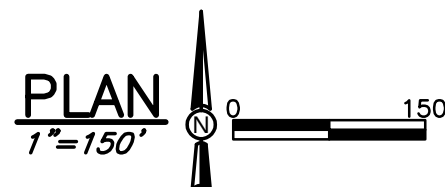


ENLARGED PLAN

1"=50'

EXPLANATION

-  TEST PIT LOCATION
-  TEMPORARY WELL POINT LOCATION
-  $1.67 < 10.0$ } *TEQ 2,3,7,8-TCDD RESULTS IN pg/L*
-  NOT APPLICABLE
-  CONCENTRATION BELOW REPORTING LIMIT



City of Arcata
Former Little Lake Industries Mill
Arcata, California

Dioxins/Furans in Groundwater

SHN 018022.030

October 2019

018022-030-SLCT-DIOX-FRNS-WATR

Figure 8

3.3 Site Geology

Subsurface soils encountered during site investigation activities consisted primarily of fill material comprised of angular rock, rounded gravels with sand and fines (silt and clay) to a depth of approximately 4 feet BGS. Soils encountered during hand auguring for temporary well point construction generally comprised the above described fill overlying organic silt with sand, sandy silt, and silty sand to the total depth of exploration up to approximately 10 feet BGS.

3.4 Hydrogeology

Depth to water encountered in the temporary well points ranged from less than 4 feet to approximately 9.56 feet BGS, with shallower measurements taken during a period of precipitation at the end of wet weather season, and deeper groundwater levels were recorded in mid-July 2019. Although a survey for depth to water elevation was not completed, groundwater flow is assumed to be in an easterly direction, toward Jolly Giant Creek.

3.5 Quality Control and Data Validation

Laboratory reports submitted by McCampbell Analytical to SHN (See Appendix 2) were validated by SHN staff. All laboratory QC batches were checked to ensure that the correct number of samples were analyzed, the holding times were not exceeded, surrogates recoveries were within the stated control limits, and that the laboratory method blank, matrix spikes (MS), matrix spike duplicates (MSD), laboratory control samples (LCS), and laboratory control samples duplicates (LCSD) were all tested and within the acceptable limits.

All soil samples were analyzed within the recommended holding times; all groundwater samples were analyzed within the recommended holding times except for aqueous PCP samples from WP-01 and WP-04, which were analyzed twice, with the second analysis occurring outside of the recommended holding time. All samples were received at the analytical laboratory in coolers with ice at temperatures below 6° Celsius.

Duplicate soil samples were collected from TP-01 (TP-01R), and duplicate groundwater samples were collected from well point locations WP-01 (WP-01R) and WP-07 (WP-07R). Relative percent differences (RPDs) were calculated for all constituents of concern for each sample with a corresponding sample duplicate. However, RPD was not calculated for samples with results below the method reporting limit. The RPD is used to evaluate the precision of the analytical results and is calculated using the following equation:

$$RPD = \frac{2(S_1 - S_2)}{S_1 + S_2} \times 100$$

Where: RPD: Relative Percent Difference
S₁: Sample
S₂: Duplicate

RPDs for soil and groundwater duplicates are presented in Table 8.

**Table 8. Relative Percent Difference for Field Duplicate Samples; March 2019
Little Lakes Industries, Arcata, California**

Little Lakes Industries, Arcata, California						
Sample Identification	TP-01	TP-01R ¹	WP-01	WP-01R	WP-07	WP-07R
Sample Medium	Soil		Groundwater			
TPHD ²	41%		--- ³		---	
1,2,3,4,6,7,8 HpCDD ⁴	---		65%		---	
OCDD ⁵	---		88%		---	
Arsenic	---		---		3%	
Barium	---		---		0%	
Cobalt	---		---		1%	
Nickel	---		---		0%	
Vanadium	---		---		7%	
Lead	4%		---		---	
1. R: designates duplicate sample 2. TPHD: total petroleum hydrocarbons as diesel 3. ---: cannot be determined 4. HpCDD: heptachlorodibenzo-para-dioxin 5. OCDD: octachlorodibenzo-p-dioxin						

RPDs for 1,2,3,4,6,7,8-heptachlorodibenzo-para-dioxin mixture (HpCDD) and octachlorodibenzo-p-dioxin (OCDD) in groundwater exceeded the quality assurance goals for dioxin/furan analysis using EPA 1613 of less than 50% (EPA, 1999); therefore, results for associated samples are qualified with “J” in Table 3-1.

The laboratory noted that the spike recovery for OCDD for the MS/MSD was outside accepted recover limits. However, the MS/MSD was not a project sample, so the results were accepted.

The laboratory noted that the relative percent difference for benzidene was out of the acceptance criteria for the MB/LCS/LCSD sample; however, the MB/LCS/LCSD was not a project sample, so the results were accepted.

The laboratory noted that dilution test was outside control limits for sample MB/LCS/LCSD, and that physical or chemical interferences exist due to sample matrix; and that sample results may be estimated. However, the MB/LCS/LCSD was not a project sample, so the results were accepted.

Complete laboratory analytical reports along with the summary of primary and duplicate samples RPD are included in Appendix 2.

4.0 Discussion of Results

4.1 Soil

The contaminants of concern in soil for the LLI site investigation included diesel, lead, PCP, and dioxins/furans. A summary of results showed the following:

- Diesel-range petroleum hydrocarbons were detected at test pit location TP-01 at a concentration of 150 mg/kg, below the ESL for diesel (230 mg/kg).
- PCP was reported below detection limits and ESLs for all soil samples collected from LLI test pits installed.
- Lead concentrations present in site soils were below applicable ESLs and generally equivalent to background conditions for this area.
- Elevated dioxin/furan TEQ levels were identified in the area of the former kiln buildings.

Test pits TP-08 through TP-11 were installed to characterize soil conditions in the area of the former kiln building following an elevated TEQ value calculated for the water sample collected at well point WP-04. TEQ values for soil samples collected at TP-08, TP-09, and TP-10 were elevated relative to other dioxins/furans soil sample locations, with TP-09 TEQ value calculated for soil exceeding Department of Toxic Substances Control (DTSC) soil remediation goals for residential and commercial soils (DTSC, 2017).. All 2,3,7,8 TCDD concentrations were reported below EPA residential and commercial RSLs (EPA, 2019).

Dioxin/furan impacts recorded for soil samples collected from between 2.0 and 3.0 feet below ground surface at TP-08, TP-09, and TP-10, and the absence of impacts for water samples collected from native soils at WP-08 and WP-09, infers that dioxin/furan impacts are likely within shallow fill soils in the immediate vicinity of former kiln area. Soil sample results reported for TP-01 and TP-11 indicate that dioxin/furan impacts exceeding action levels do not extend to these locations and provides a southern boundary to the distribution of impacts. No such boundary has been established to the north of the test pit TP-09 at the former kiln buildings.

4.2 Groundwater

TPHD, TPHG, PCP, and PAHs/PNAs were all reported below detection limits for groundwater samples collected during site investigation activities. Dissolved arsenic, cobalt, lead, and nickel concentrations exceeded water quality objectives for groundwater samples collected at WP-01 and WP-07.

Dioxin TEQs were calculated for well points WP-01 (1.67 pg/L), WP-04 (102 pg/L), WP-08 (0.0816 pg/L), and WP-09 (0 pg/L). Although TEQ concentrations were elevated above applicable screening levels, concentrations of 2,3,7,8-TCDD were reported below detection limits at all sample locations. The calculated TEQ for sample WP-04, collected from a well point installed in a shallow ditch located along the eastern side of I Street, provided evidence of relatively higher dioxin/furan isomer concentrations in this portion of the site. The water sample collected at WP-04 was turbid, and the sample was not field filtered. The ditch from which WP-04 was collected is limited in length, does not discharge into any other features, and is interpreted to be an artifact of the former kiln. Since dioxins and furans do not readily dissolve, and have an affinity to adhere to soil/organic carbon, it is assumed that dioxins/furans reported for WP-04 resulted from suspended sediments in the water sample.

To further evaluate dioxins/furans concentrations in the WP-04 area of the site, the *Site Investigation Work Plan and Sampling and Analysis Plan Addendum* (SHN, 2019) was developed. The work scope was approved by the RWQCB; the approved Addendum was implemented in July 2019. During the July 2019 field effort, four test pits (TP-08 through TP-11) and two wells points (WP-08 and WP-09) were installed and soil and groundwater samples were collected in the former kiln building area. Depth to water in July was several feet deeper than during the March effort, and groundwater samples were collected from a depth interval that was interpreted to be from native soils (not fill). TEQs calculated for WP-08 and WP-09 water samples were orders of magnitude lower than that calculated for WP-04, providing evidence that groundwater below fill does not appear to be impacted by historical site activities.

The constituents of concern in groundwater for the LLI site investigation included diesel, gasoline, dissolved metals, PCP, SVOCs, and dioxins/furans. A summary of results showed the following:

- No detectable concentrations of gasoline or diesel-range petroleum hydrocarbons were detected in groundwater samples collected from site well point locations.
- Pentachlorophenol was not detected in groundwater; however, the reporting limit was slightly raised above the applicable screening level.
- No detectable SVOCs were identified in the well point groundwater sample collected at the eastern site boundary drainage ditch leading to Jolly Giant Creek.
- Dissolved metals consisting of arsenic, cobalt, lead, and nickel were present at levels above the applicable WQOs but were generally within an order of magnitude or consistent with background for this region.
- Elevated dioxins/furans levels were identified in surface water and shallow soils in the area of the former kiln buildings.

The water sample collected from location WP-04 in the shallow ditch adjacent to the former kiln buildings along South I Street was relatively shallow standing water. The likely source of dioxins/furans in water sample WP-04 is runoff from an upland sediment source. An evaluation of the ditch by the City of Arcata Public Works Department determined no hydraulic connection to a storm drain network or nearby water body.

4.3 Project Objectives

Project objectives for a majority of the former LLI mill site have been completed that included:

1. Determine the presence or absence, and relative concentrations of hazardous or regulated materials in shallow soils and groundwater at the site.
2. Address data gaps associated with historical investigations at the site.

Observed levels for contaminants of concern indicate the risk from hazardous or regulated materials at the former LLI mill site is very low to human health and the environment for all areas outside the general footprint of the former kiln buildings.

5.0 Recommendations

It is recommended that development of an engineered remediation plan occur to address shallow soils and the drainage ditch in the vicinity of the former kiln buildings. Filling of the ditch with clean low permeable material, and encapsulation or removal of impacted material for disposal would be considered suitable options to address the elevated dioxin levels present. Further delineation of shallow soils in the area of the former kiln buildings may also be necessary as part of site development to ensure adequate mitigation of impacted soils is addressed.

6.0 References Cited

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Field Notes **1**



Daily Field Report		Job No.	018022.030	
		Page	1 of 2	
Project Name	Client/Owner	Weather		
Little Lake Industries Mill	City of Arcata/David Loya	Rain		
General Location of Work	Project Manager	Date	Day of Week	
South I Street, Arcata, CA	Erik Nielsen - SHN	3-4-19	Mon	
Type of Work	Project Supervisor	Field Personnel		
Field Sampling	John Wellik - SHN	ESN, JMW, WB		
0730	@ SHN, Prep gear, Calibrate Equipment, Load/Inspect Vehicles			
0840	Enroute site, 2 vehicles, JMW/ESN/WB			
0900	@ LLI Mill Arcata. Site Accessible through gate - open Setup work Area, Coolers, Decon Station, Equip. Rain occurring, cover ground & Equip w/ Poly Sheeting			
0935	Walk through OPS/HQS, Sample Locations Checked No Access Issues to Locations, Wait for COA staff.			
1015	COA staff onsite, Seth M. & Mike C., Backhoe present			
1030	Conduct Site Safety Mdy (signed in), OPS Review ESN to work w/ Seth on Backhoe for test pit installation, WB & JMW conduct TWP installation - site walkdown, Equip. Inspection - Backhoe good.			
1055	M. Clinton offsite, Begin site invest. field activities			
1100	@ TP-03, Start Excavation w/ Backhoe, 24" Bucket place spoils ~ 4' from EXC, Stop EXC @ ~ 4' BLS Profile - 0.6" veg w/ AB, 6"-2.0' GW/SP/M, 2'-2.5' Transverse into ML/CL, D-14, wet Bottom, Collect 2.25' @ 1110			
1120	Backfill TP-03. w/ EXC material, Tamp w/ Bucket, Flag			
1125	Mobilize to TP-02, Start Excavation, TD @ 4.0 BLS Profile: veg/AB to 0.5', Fill ~ 2.0', Trans ML/CL - 2.5', collect sample @ 2.5', water in EXC, Backfill, Demob			
1145	Mobilize to TP-05, Roman-West, Start TP Excavation - TD @ 4.0' Profile: surf AB/veg, .25'-1.5' lg cobbles, 2.0' trans ML/CL collect sample @ 2.0' - 1155, Backfill TP, Tamp down, Demob			
1215	Stop TP EXC, Decon, Take Lunch			
		OVER →		
		Copy given to:	Reported By: ef 3/4/19	



Daily Field Report		Job No.	018022.030
		Page	2 of 2
Project Name Little Lake Industries Mill	Client/Owner City of Arcata/David Loya	Weather Rain	
General Location of Work South I Street, Arcata, CA	Project Manager Erik Nielsen - SHN	Date 3-4-19	Day of Week Mon
Type of Work Field Sampling	Project Supervisor John Wellik - SHN	Field Personnel ESN, JMW, WB	
1300	Rev WP installation w/ SW & WB for completed TWP's. All TWP to 4.5' Depth BGS - WP-3, -4, -5, -7 water present @ 1.5'-2.0' BGS, TWP-04 installed in ditch, surface water w/ sed @ 2.5' BGS, well set in sed. - Likely not Rep of GW conditions, Cont w/ TWP inst. - Backhoe Ass't @ WP-01, WP-02, WP-06 w/ 2' Removal complete WP instal, purge all, sample 3-5-19		
1400	Mobilize Backhoe to TP-06, Excavate to 4.0' BGS, Water Present Profile: surf - veg w/ AB, 0.25' cobbles, 1.25' trans, 2.5' ML collect sample @ 1.5', 1410, Backfill, Compact, Demob		
1415	Mobilize to TP-01, Excavate to ~3.5' BGS, wet - No water Profile: surf veg/AB, 0.25' lg cobbles, 1.5' trans, 2.0' ML/CL collect sample @ 2.0' w/ Dup, -1425/1430, Backfill, Demob		
1435	Mobilize to TP-04, Excavate to 4.0', water entering TP Profile: surf veg, 0.25' AB, 1.0' lg cobbles, 1.75' trans, 2.0' ML/CL collect sample @ 2.0' - 1445, Backfill, Turn down, demob		
1450	w/ & w @ WP-07, Purging gaining well, collect parameters Decide to sample WP-07 / WP-07R @ 1500/1505		
1500	@ TP-07, Excavate to 3.5' BGS, water present Profile: veg surf, 0.25' AB, 1.5' cobbles trans ML/CL? collect sample @ 1.5' - 1530, Backfill TP, compact.		
1530	EB sample for GC on equipment collected by JMW. TWP installed to 5.0' BGS @ WP-01, 02 & 06. all TWP installed and purged.		
1600	Decon, cleanups, demob from site - enroute SHN		
1600	@ SHN, unload gear, document control update - END DAY		
		Copy given to:	Reported By 

**Hazardous Materials Site Operations
Site Safety Meeting Attendance
Little Lake Industries Mill Site
Arcata, California**

Job Name: *Little Lake Mill*

Activity:

Job #:

Given By: *Erik Nielsen*

Signature:

Erik Nielsen

Date: *3-4-19*

Time:

Company/Agency	Name	Operation/ Function	Signature	Read SSP	29CFR1910.120(e)	
					40 hr	24 hr
SHN	Erik Nielsen	Supervisor	<i>Erik Nielsen</i>	(Y)N	(Y)N	(Y)N
SHN	JOHN WELLIK	GEOLOGIST	<i>John Wellik</i>	(Y)N	(Y)N	(Y)N
SHN	WHITNEY BROWN	ENGINEER	<i>W. Brown</i>	(Y)N	(Y)N	(Y)N
COA	Seth Magnuson	Supervisor	<i>Seth Magnuson</i>	(Y)N	(Y)N	Y/(Y)
COA	Mike Clinton	Deputy Director	<i>Mike Clinton</i>	(Y)N	(Y)N	Y/(Y)
				Y/N	Y/N	Y/N
				Y/N	Y/N	Y/N
				Y/N	Y/N	Y/N
				Y/N	Y/N	Y/N



Equipment Calibration Sheet

Name: Erik Nulsen

Project Name: LL1 Mill

Reference No.: 018022-030

Date: 3-4-14

Equipment:

☒ pH & EC

☐ PID

☐ GTCO₂

☐ GTLEL

☐ Turbidity

☐ Other _____

Description of Calibration Procedure and Results:

pH meter calibrated using 3 Buffer
method... 10.0, 7.0, 4.01.
meter set to parameters

ejn 3-4-14

Suspended Particle Matter Monitoring
Little Lake Industries
Arcata, California

Project Number: 018022-030
 Work Area/Activities: Test Pit Excavation
 Date: 3-4-19 Monitored By: ESN

Instructions: If using qualitative method, observe project for dust emissions and note presence/absence. If using quantitative method, use aerosol monitor in accordance with manufacturer's instructions. Ensure that background samples are collected when debris pile disturbances are not taking place.

Project Action Levels	Quantitative: 5 mg/m ³ or Qualitative: visible airborne dust emissions
-----------------------	---

Time of Day	Site Location/Activity	Total Dust Concentration ¹
1100	Rain w/Damp Soil	N/A
	Conditions - No Monitoring	
	Conducted - No Visible	
	Dusts ejn 3/4/19	



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Soil Sampling Data Sheet

Project Name:	Little Lake Industries Mill	Date/Time:	3-4-19/1415
Project No.:	018022.030	Sampler Name:	JMW / ESN
Location:	Arcata, CA	Sample Type:	Soil - COC Assessment
Sample #:	TP-01	Weather	Rain

	Time	Depth (ft BGS)	Soil Type	Color	Odor	Moisture	Comments
1	1425	1.5	ML/CL	gray/Blk	None	Damp	Duplicate Location
2	1430	1.5	ML/CL	gray/Blk	None	Damp	#01R
3							
4							
5							
6							
7							
8							
9							
10							

Laboratory Information				
Sample ID	# & Type of Containers	Preservative / Type	Laboratory	Analyses
TP-01-1.5	2-8oz Glass	None	MAL	TPHD
TP-01R-1.5	2-8oz Glass		MAL	D/F
↓		↓	MAL	PCP
			MAL	Pb

Sampler Signature/Date:

Reviewer Signature/Date:

3/4/19
3/4/19



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Soil Sampling Data Sheet

Project Name:	Little Lake Industries Mill	Date/Time:	3-4-19 / 1125
Project No.:	018022.030	Sampler Name:	DMW / ESN
Location:	Arcata, CA	Sample Type:	Soil
Sample #:	TP-02	Weather	Rain

	Time	Depth (ft BGS)	Soil Type	Color	Odor	Moisture	Comments
1	1125	2.5	ML/CL	Bk/gray	None	Damp	Fill w/ fines
2							
3							
4							
5							
6							
7							
8							
9							
10							

Laboratory Information				
Sample ID	# & Type of Containers	Preservative / Type	Laboratory	Analyses
TP-02-2.5	2-8oz bags, jar	NONE	MAL	Pb, D/F, PCP

Sampler Signature/Date:

Reviewer Signature/Date:

3/4/19

3/4/19



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Soil Sampling Data Sheet

Project Name:	Little Lake Industries Mill	Date/Time:	3-4-19 / 1100
Project No.:	018022.030	Sampler Name:	JMW / GJN
Location:	Arcata, CA	Sample Type:	Soil
Sample #:	TP-03	Weather	Rain

	Time	Depth (ft BGS)	Soil Type	Color	Odor	Moisture	Comments
1	1110	2.25	M/LCL	gray/BK	None	Damp	Fine w/ gravel - Filler
2							
3							
4							
5							
6							
7							
8							
9							
10							

Laboratory Information				
Sample ID	# & Type of Containers	Preservative / Type	Laboratory	Analyses
TP-03-2.25	2-8 oz 4642	NA	MAL	D/F, PCB, Pb

Sampler Signature/Date:

Reviewer Signature/Date:

3/4/19

3/4/19



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Soil Sampling Data Sheet

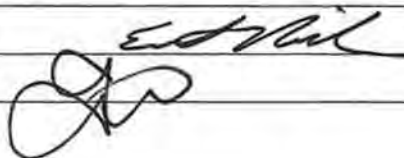
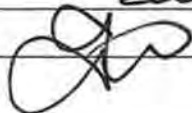
Project Name:	Little Lake Industries Mill	Date/Time:	3-4-19/1435
Project No.:	018022.030	Sampler Name:	IMW / ESN
Location:	Arcata, CA	Sample Type:	Soil
Sample #:	TP-04	Weather	Rain

	Time	Depth (ft BGS)	Soil Type	Color	Odor	Moisture	Comments
1	1445	2.0	ML/CL	Gray/Blk	None	Damp	Fill
2							
3							
4							
5							
6							
7							
8							
9							
10							

Laboratory Information				
Sample ID	# & Type of Containers	Preservative / Type	Laboratory	Analyses
TP-04-2.0	2- 802 4/93 jar	None	MAC	D/F, PCP, Pb

Sampler Signature/Date:

Reviewer Signature/Date:

 3/4/19
 3/4/19



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Soil Sampling Data Sheet

Project Name:	Little Lake Industries Mill	Date/Time:	3-4-19 / 1145
Project No.:	018022.030	Sampler Name:	IMW / EJN
Location:	Arcata, CA	Sample Type:	Soil
Sample #:	TP-05	Weather	Rain

	Time	Depth (ft BGS)	Soil Type	Color	Odor	Moisture	Comments
1	1155	2.0	MLCL	Blk/gray	None	Damp	Fill
2							
3							
4							
5							
6							
7							
8							
9							
10							

Laboratory Information

Sample ID	# & Type of Containers	Preservative / Type	Laboratory	Analyses
TP-05-2.0	2-8 oz y/lrs	None	MAL	D/E, PCP, Pb

Sampler Signature/Date:

Reviewer Signature/Date:

3/4/19

3/4/19



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Soil Sampling Data Sheet

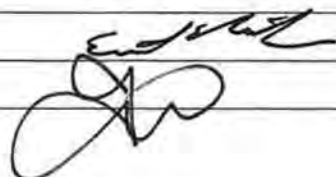
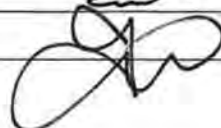
Project Name:	Little Lake Industries Mill	Date/Time:	3-4-19 / 1400
Project No.:	018022.030	Sampler Name:	JMW/EJN
Location:	Arcata, CA	Sample Type:	Soil
Sample #:	TP-06	Weather	Rain

	Time	Depth (ft BGS)	Soil Type	Color	Odor	Moisture	Comments
1	1410	1.5	mc/cl	Blk	None	Damp	Fill
2							
3							
4							
5							
6							
7							
8							
9							
10							

Laboratory Information				
Sample ID	# & Type of Containers	Preservative / Type	Laboratory	Analyses
TP-06-1.5	2-802 g/lacs	None	MAL	D/F, PCP, Pb

Sampler Signature/Date:

Reviewer Signature/Date:

 3/4/19
 3/4/19

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Soil Sampling Data Sheet

Project Name:	Little Lake Industries Mill	Date/Time:	3-4-19 / 1520
Project No.:	018022.030	Sampler Name:	JMW / ESN
Location:	Arcata, CA	Sample Type:	Soil
Sample #:	TP-07	Weather	Rain

	Time	Depth (ft BGS)	Soil Type	Color	Odor	Moisture	Comments
1	1530	1.5	ml/cl	Blk/gray	None	Dry	Fill
2							
3							
4							
5							
6							
7							
8							
9							
10							

Laboratory Information

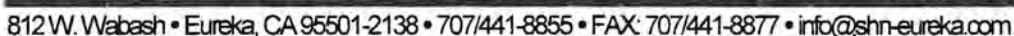
Sample ID	# & Type of Containers	Preservative / Type	Laboratory	Analyses
TP-07-1.5	2- 800 Glass	None	MAL	TPHD / Pb

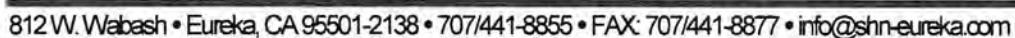
Sampler Signature/Date:

Reviewer Signature/Date:

3/4/19

3/4/19





SHN Tailgate Safety Meeting Form

Date: 3/5/19 Time: 9:00am Job Number: 018022.030
 Client: City of Arcata
 Site Location: Little Lakes Arcata EJN

Safety Topics Presented:

FILE COPY

Work Activity: Site Investigation

PPE :

- | | | | |
|---|---|--|--------------------------------------|
| ☒ Safety (High Visibility) Vest | ☐ Eye Protection | ☐ Fall Restraint | ☐ TLD Badge |
| ☐ Hard hat | ☐ Ear Protection | ☐ Skin Protection | ☐ FR Clothing |
| ☒ Gloves | ☒ Boots | ☐ Other _____ | |

Hazards:

- | | | | |
|---|--|---|--|
| ☐ ALARA ⁽¹⁾ | ☐ Electrical | ☐ Moving Equip. | ☐ Traffic |
| ☐ Biological | ☒ Excavation/Open Trench | ☐ Noise | ☒ Weather |
| ☒ Chemical | ☐ Explosion | ☐ Overhead Work | ☐ Welding Flash & Fumes |
| ☐ Climbing/Manlifts ⁽²⁾ | ☐ Fire | ☒ Pedestrian | ☐ Work Elevation |
| ☐ Cold | ☐ Heavy Lifting & Moving | ☐ Pressure | ☐ Special Hazards _____ |
| ☐ Confined Spaces/Entrapment | ☐ Hot Work | ☒ Slips, Trips, & Falls | |
| ☐ Other _____ | | | |

(1) Requires nuclear density gauge training and TLD badge

(2) Requires fall restraint

Emergency Services:

Hospital

- | | | |
|--|---------------|---------------|
| ☐ St Joseph Hospital, 2700 Dolbeer St., Eureka, CA | 707-445-8121; | 707- 445-4907 |
| ☒ Mad River Hospital, 3800 Janes Rd, Arcata, CA 95521 | 707- 822-3621 | 707-822-3353 |
| ☐ Sutter Coast Hospital, 800 E Washington Blvd, Crescent City, CA | 707-464-8511 | 707-487-1116 |
| ☐ Six Rivers Medical Clinic, 850 CA-96, Willow Creek, CA | 530-629-3116 | 530-625-4180 |
| ☐ Kimaw Medical Center, 12000 Airport Rd., Hoopa, CA | 530-625-4314 | 530-625-4180 |
| ☐ Trinity Hospital, 60 Easter Ave, Weaverville, CA | 530-623-5541 | 530-623-2500 |
| ☐ Shasta Regional Med Center, 1100 Butte St, Redding, CA | 530-244-5400 | 530-225-6290 |
| ☐ Redwood Memorial Hospital, 3300 Renner Dr, Fortuna, CA | 707-725-3361 | 707- 445-4907 |
| ☐ Jerold Phelps Community Hospital, 733 Cedar St, Garberville, CA | 707-923-3921 | 707-923-2855 |
| ☐ Howard Memorial Hospital, 1 Marcela Dr, Willits, CA | 707-459-6801 | 707-462-3111 |
| ☐ Ukiah Valley Medical Center, 275 Hospital Dr, Ukiah, CA | 707-462-3111 | 707-462-3111 |
| ☐ Other: _____ | | |

Telephone

Ambulance

Attendees:

Name Printed

Signature

WHITNEY BROWN
JOHN WELIK

Meeting Conducted By: WHITNEY BROWN

Project Safety Officer: [Signature]

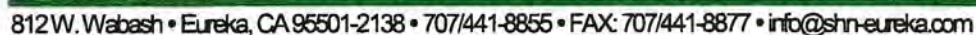
Name Printed

3/5/19

Project Manager: [Signature]

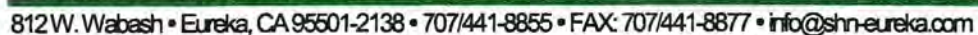
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3-5-19



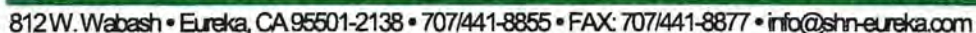
3/5/19





MRB
3/5/17

epi
3/5/17



3/5/19

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Water Sampling Data Sheet

Project Name:	LLI	Date/Time:	3/5/19 12:20
Project No.:	018022.030	Sampler Name:	WB
Location:	ARCATA	Sample Type:	Ground Water
Well #:	WP-05	Weather:	RAIN
Hydrocarbon Thickness/Depth (feet):	NA	Key Needed:	NO

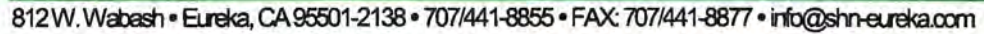
Total Well Depth (feet)	-	Initial Depth to Water (feet)	=	Height of Water Column (feet)	x	0.163 gal/ft (2-inch well) / 0.653 gal/ft (4-inch well)	=	1 Casing Volume (gal)
5.0	-	/	=	/	x	/	=	/

Time	DO (ppm)	CO ₂ (ppm)	ORP (mV)	EC (uS/cm)	Temp (°F)	pH	Water Removed (gal)	Comments
12:30	/	/	/	/	10.4	7.13	1.0	
12:40	/	/	/	/	10.3	7.02	2.5	
12:50	/	/	/	/	10.2	6.99	4.0	MURKIL
N/A								

Purge Method: PUMPTotal Volume Removed: 4.0 (gal)

Laboratory Information				
Sample ID	# & Type of Containers	Preservative / Type	Laboratory	Analyses
WP-05	VDA's (2)	HCL	MAL	TPHG
WP-05	VDA's (2)	N/A	MAL	TPHD

Well Condition: GOODRemarks: Well recharged to: NAAt: sample col time @ 1255



3/5/19

Page 1 of 2



1534 Willow Pass Rd. Pittsburg, Ca. 94565-1701

Telephone: (877) 252-9262 / Fax: (925) 252-9269

www.mccampbell.com

main@mccampbell.com

CHAIN OF CUSTODY RECORD

Turn Around Time: 1 Day Rush		2 Day Rush		3 Day Rush		STD	X	Quote #	
J-Flag / MDL	X	ESL		Cleanup Approved				Bottle Order #	
Delivery Format:	PDF		GeoTracker EDF	X	EDD		Write On (DW)		EQuS

Report To: Erik Nielsen Bill To: SHN

Company: SHN

Email: enielsen@shn-engr.com

Alt Email: dward@shn-engr.com Tele: 707-441-8855

Project Name:	Little Like Industries	Project #:	018022.030
---------------	------------------------	------------	------------

Project Location:	Arcata, CA	PO #
-------------------	------------	------

Sampler Signature:

End Page

Analysis Requested

SAMPLE ID Location / Field Point	Sampling		#Containers	Matrix	Preservative	TPH as Gas by		TPH as Diesel		Dioxin/Furans		Pentachlorophenol		Dissolved Metals		EPA 8270 SIN						
	Date	Time																				
WP-01	3/5/19	1200	7	GW	1, 2	X		X		X		X										
WP-01R	3/5/19	1205	2	GW	1, 2					X												
WTP-02	3/5/19	1230	4	GW	1, 2	X		X														
WP-03	3/5/19	1130	4	GW	1, 2	X		X														
WP-04	3/5/19	1055	7	GW	1, 2	X		X		X		X										
WP-05	3/5/19	1255	4	GW	1, 2	X		X														
WP-06	3/5/19	1320	5	GW	1, 2, 4	X		X						X								
WP-07	3/4/19	1500	6	GW	1, 2, 4	X		X						X		X						
WP-07R	3/4/19	1505	6	GW	1, 2, 4	X		X						X		X						
WP-EB	3/4/19	1530	1	DW	1, 4									X								

MAI clients MUST disclose any dangerous chemicals known to be present in their submitted samples in concentrations that may cause immediate harm or serious future health endangerment as a result of brief, gloved, open air, sample handling by MAI staff. Non-disclosure incurs an immediate \$250 surcharge and the client is subject to full legal liability for harm suffered. Thank you for your understanding and for allowing us to work safely.

* If metals are requested for water samples and the water type (Matrix) is not specified on the chain of custody, MAI will default to metals by E200.8.

Please provide an adequate volume of sample. If the volume is not sufficient for a MS/MSD a LCS/LCSD will be prepared in its place and noted in the report.

Comments / Instructions

Samples for Dissolved Metals has been field filtered.

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
Erik Nielsen/SHN 	3/6/2019	1400			

Matrix Code: DW=Drinking Water, GW=Ground Water, WW=Waste Water, SW=Seawater, S=Soil, SL=Sludge, A=Air, WP=Wipe, O=Other

Preservative Code: 1=4°C 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=ZnOAc/NaOH 7=None

Temp	°C	Initials
------	----	----------



Shipping

Tracking

Printing Services

Locations

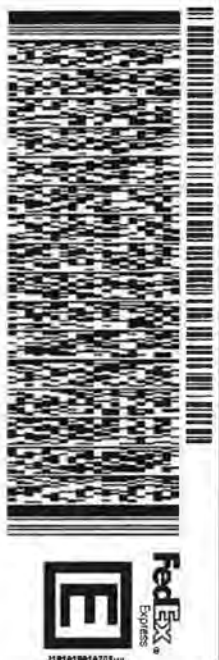
Support

TRK# 7746 3585 4493
0201

81 CCRA

THU - 07 MAR 10:30A
PRIORITY OVERNIGHT

94565
CA-US OAK



PO (877) 252-9262
NW REF 018022 030
DEPT

PITTSBURG CA 94565

TO **MCCAMPBELL ANALYTICAL**
MCCAMPBELL ANALYTICAL
1534 WILLOW PASS RD

ORIGIN ID: EKX
LAURE SIMMONS
SHN CONSULTING ENGINEERS
812 W WABASH AVE
EUREKA, CA 95501
UNITED STATES US

SHIP DATE: 06MAR19
ACT WGT: 50.00 LB
CAD: 3017351/NE14100
BILL SENDER

565J146D3/23AD

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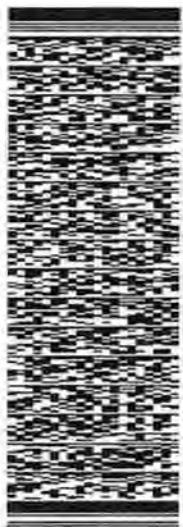
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PITTSBURG CA 94565
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565J1A6D3/23AD

TO MCCAMPBELL ANALYTICAL
 MCCAMPBELL ANALYTICAL
 1534 WILLOW PASS RD

ORIGIN ID: EKAA (707) 441-8855
 LAURE SIMMONS
 SHI CONSULTING ENGINEERS
 812 W WABASH AVE
 EUREKA, CA 95501
 UNITED STATES US

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TO **MCCAMPBELL ANALYTICAL**
MCCAMPBELL ANALYTICAL
1534 WILLOW PASS RD
PITTSBURG CA 94565

ORIGIN DEKAA (707) 441-8855
 LAURE SIMMONS
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 812 W WABASH AVE
 EUREKA, CA 95501
 UNITED STATES US

SHIP DATE: 08MAR19
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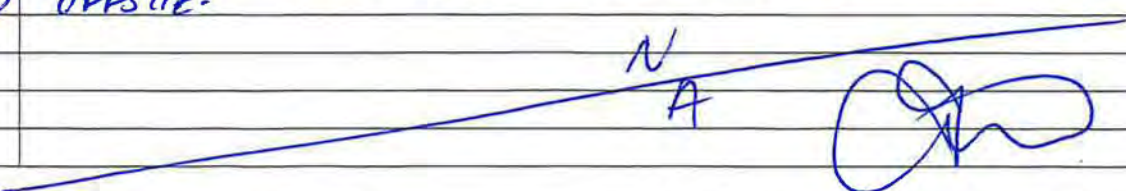
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Daily Field Report		Job No. 018022	
		Page 1	of 1
Project Name LITTLE LAKE MILL	Client/Owner CITY OF ARCATA	Weather RAIN	
General Location of Work ARCATA - I ST.	Project Engineer	Date 5/15/19	Day of Week WEDNESDAY
Type of Work RECONNAISSANCE	Supervisor E. NIELSEN	Technician JMW	
1520	ARRIVE ONSITE. PERFORM TAILBOARD SAFETY MEETING. MOBILIZE TO SAMPLE LOCATION WP-04 TO CHARACTERIZE PHYSICAL SETTING AND IDENTIFY POTENTIAL UPLAND SAMPLING LOCATIONS. VEGETATION IS APPROXIMATELY 3' TALL, OBSCURING THE GROUND SURFACE. WP-04 IS LOCATED APPROXIMATELY 700' NORTH OF THE PRIMARY DRIVEWAY ENTRANCE TO SITE FROM I STREET, AND APPROXIMATELY 420 FEET SOUTH OF SAMOA BLVD., WEST OF WP-04, APPROXIMATELY 10 FEET WEST, IS THE ASPHALT SURFACE OF I ST., THE DIFFERENCE IN ELEVATION BETWEEN I ST. AND WP-04 GROUND SURFACE IS AN ESTIMATED 6", WITH WP-04 THE LOWER SURFACE. PERHAPS THE MOST APT DESCRIPTION OF THIS AREA OF THE SITE WOULD BE A VERY SHALLOW FULLY ENCLOSED SWALE WITH NO OUTLET FOR WATER FLOW, THE EASTERN SIDE OF THE SWALE IS BOUND BY PRESUMED STOCKPILED DEBRIS RANGING FROM TWO TO SIX FEET ABOVE THE BOTTOM OF THE SWALE, WITH THE GREATER ELEVATION BEING SOUTH-EASTERLY OF THE SWALE, WP-04 IS CENTRALLY LOCATED WITHIN THE SWALE; I ST. BOUNDS THE WESTERN SIDE; A TRUE DRAINAGE DITCH IS PRESENT ALONG THE WESTERN SIDE OF I ST.; ADJACENT TO THE MILL BUILDING PRESENT WEST OF I ST., SEWER MANHOLES WERE OBSERVED ALIGNED ALONG THE EASTERN HALF OF I ST., A VAULT OF UNKNOWN FUNCTION IS LOCATED APPROXIMATELY 5 FEET SOUTHWEST OF WP-04. THE LENGTH OF THE SHALLOW BASIN IS APPROXIMATELY 75 FEET AND WIDTH IS ESTIMATED AT 10 FEET. INTERPRETATION IS THAT THIS FEATURE IS AN ARTIFACT OF STOCKPILED DEBRIS ON THE EAST AND ACCUMULATION OF SOIL, SAND, ROCK AND ORGANIC MATTER AT THE BASE OF THE FENCE ALONG THE EASTERN SIDE OF I ST., AND THERE WAS NO EVIDENCE OBSERVED TO SUGGEST THAT A DRAINAGE FEATURE HAS EVER BEEN PRESENT HERE. PHOTOS TAKEN.		
1630	OFFSITE.		
			
		Copy given to:	Reported By: JMW

SHN Tailgate Safety Meeting Form

Date: 5/15/19 Time: 1520 Job Number: 018022
 Client: CITY OF ARCATA
 Site Location: I ST. - LITTLE LAKE MILL SITE.

Safety Topics Presented:

Work Activity: SITE RECONNAISSANCE

PPE :

- | | | | |
|---|---|--|--------------------------------------|
| ☒ Safety (High Visibility) Vest | ☐ Eye Protection | ☐ Fall Restraint | ☐ TLD Badge |
| ☐ Hard hat | ☐ Ear Protection | ☐ Skin Protection | ☐ FR Clothing |
| ☐ Gloves | ☐ Boots | ☐ Other | |

Hazards:

- | | | | |
|---|---|---|--|
| ☐ ALARA ⁽¹⁾ | ☐ Electrical | ☐ Moving Equip. | ☐ Traffic |
| ☒ Biological | ☐ Excavation/Open Trench | ☐ Noise | ☐ Weather |
| ☒ Chemical | ☐ Explosion | ☐ Overhead Work | ☐ Welding Flash & Fumes |
| ☐ Climbing/Manlifts ⁽²⁾ | ☐ Fire | ☐ Pedestrian | ☐ Work Elevation |
| ☐ Cold | ☐ Heavy Lifting & Moving | ☐ Pressure | ☐ Special Hazards |
| ☐ Confined Spaces/Entrapment | ☐ Hot Work | ☒ Slips, Trips, & Falls | |
| ☐ Other | | | |

(1) Requires nuclear density gauge training and TLD badge

(2) Requires fall restraint

Emergency Services:

Hospital

- | | | |
|--|---------------|---------------|
| ☒ St Joseph Hospital, 2700 Dolbeer St., Eureka, CA | Telephone | Ambulance |
| ☐ Mad River Hospital, 3800 Janes Rd, Arcata, CA 95521 | 707-445-8121; | 707- 445-4907 |
| ☐ Sutter Coast Hospital, 800 E Washington Blvd, Crescent City, CA | 707- 822-3621 | 707-822-3353 |
| ☐ Six Rivers Medical Clinic, 850 CA-96, Willow Creek, CA | 707-464-8511 | 707-487-1116 |
| ☐ Kimaw Medical Center, 12000 Airport Rd., Hoopa, CA | 530-629-3116 | 530-625-4180 |
| ☐ Trinity Hospital, 60 Easter Ave, Weaverville, CA | 530-625-4314 | 530-625-4180 |
| ☐ Shasta Regional Med Center, 1100 Butte St, Redding, CA | 530-623-5541 | 530-623-2500 |
| ☐ Redwood Memorial Hospital, 3300 Renner Dr, Fortuna, CA | 530-244-5400 | 530-225-6290 |
| ☐ Jerold Phelps Community Hospital, 733 Cedar St, Garberville, CA | 707-725-3361 | 707- 445-4907 |
| ☐ Howard Memorial Hospital, 1 Marcela Dr, Willits, CA | 707-923-3921 | 707-923-2855 |
| ☐ Ukiah Valley Medical Center, 275 Hospital Dr, Ukiah, CA | 707-459-6801 | 707-462-3111 |
| ☐ Other: | 707-462-3111 | 707-462-3111 |

Attendees:

<u>JOHN WELLIK</u>	<u>Name Printed</u>		<u>Signature</u>
Meeting Conducted By: <u>JOHN WELLIK</u>			
<u>JOHN WELLIK</u>			
<u>Name Printed</u>		<u>Signature</u>	
Project Safety Officer:		Project Manager:	



Daily Field Report		Job No. 018022	
		Page 1	of 2
Project Name LITTLE LAKES WND. PHASE II	Client/Owner CITY OF ARCATA	Weather SUNNY	
General Location of Work I STREET, ARCATA	Project Engineer —	Date 7/17/19	Day of Week WEDNESDAY
Type of Work SOIL AND WATER SAMPLING.	Supervisor E. NIELSEN	Technician J. WELLIK	
0955 ARRIVE ONSITE, E. NIELSEN ONSITE IDENTIFYING SAMPLE LOCATIONS,			
1020 BETH MAGNUSON FROM CITY OF ARCATA ENVIRONMENTAL SERVICES			
ARRIVES ONSITE WITH A BACKHOE. DISCUSS WORK SCOPE AND			
CONDUCT TAIRBOARD SAFETY MEETING. E.N. DIRECTS S.M. ON			
DESIRED POT HOLE LOCATION AND TARGET DEPTHS.			
1030 COLLECT SOIL SAMPLE TP-10 FROM APPROXIMATELY 2.5 FEET BELOW			
GROUND SURFACE, TOTAL DEPTH OF TP-10 IS APPROXIMATELY 3 FEET.			
TP-10 POT HOLE STRATIGRAPHY COMPRISES BROWN WELL GRADED GRAVEL			
WITH SAND AND SILT (USCS GM), SOILS ARE DRY, DENSE TO MEDIUM			
DENSE, COARSE ANGULAR ROCK, WELL GRADED ROUNDED GRAVEL,			
SAND AND SILT. TP-10 LOCATION IS SOUTH OF TP-04 AND ADJACENT			
TO I STREET. (SEE MAP) EXPOSED SOILS ARE INTERPRETED AS HISTORIC FILL.			
1045 COLLECT SOIL SAMPLE TP-09 FROM APPROXIMATELY 2.5 FEET BGS,			
POT HOLE STRATIGRAPHY IDENTICAL TO THAT OBSERVED AT TP-10; TP-09			
LOCATED NORTH OF TP-04 AND ADJACENT TO I STREET.			
1105 COLLECT SOIL SAMPLE TP-08 FROM APPROXIMATELY 2.0 FEET			
BGS. SAMPLE COLLECTED AT TRANSITION FROM YELLOWISH BROWN TO			
GRAYISH BROWN SOIL COLOR CHANGE; METAL DEBRIS OBSERVED			
AT SAMPLE DEPTH. HISTORICAL FILL SOIL DESCRIPTION IS THE SAME			
AS AT TP-10 AND TP-09.			
1125 POTHOLES EXCAVATED THROUGH GRAVEL FILL LAYER DOWN TO NATIVE			
SOIL AT WELL POINT LOCATIONS WP-08 AND WP-09, NATIVE			
SOILS ARE BROWNISH/GRAYISH, SOFT, MOIST ORGANIC SILT/SILT			
(USCS OL/ML). SOIL SAMPLE TP-08 COLLECTED FROM VERY DENSE			
ROCKY LAYER, COARSE ANGULAR ROCK IN ROUNDED GRAVEL, SAND,			
SILT MATRIX. S.M. BACKFILLS TP-10, TP-09 AND TP-08, DECON-			
TAMINATE SAMPLING EQUIPMENT. ALL SOIL SAMPLES PLACED ON			
ICE FOLLOWING COLLECTION. J.W. USES HAND AUGER FITTED WITH			
3.5'-INCH DIAMETER BUCKET TO EXCAVATE AT WP-09, SOILS ARE			
BROWNISH/GRAYISH SILT AND SAND (USCS ML WITH SAND), MOIST, SOFT,			
GRADING TO WET AT APPROXIMATELY 8.5 FEET BGS, WATER ON TIP			
OF AUGER BUCKET. ADVANCE BOREHOLE TO APPROXIMATELY 10 FEET			
BGS AND CONSTRUCT WELL POINT USING 3/4'-INCH PUC, 0.010-INCH			
SLOTTED SCREEN FROM 10 TO 5 FEET BGS, BLANK CASING TO GRADE,			
#2/12 SAND PACK IN SCREEN INTERVAL. REPEAT PROCESS AT			
WP-08 LOCATION, SAND FRACTION AT 8.5 FEET BGS INCREASES, SILT FRACTION			
DECREASES.			
		Copy given to:	Reported By: J. WELLIK



Daily Field Report		Job No. 018022	
		Page 2	of 2
Project Name LITTLE LAKES IND. PHASE II	Client/Owner CITY OF ARCATA	Weather SUNNY	
General Location of Work I STREET, ARCATA	Project Engineer —	Date 7/17/19	Day of Week WEDNESDAY
Type of Work SOIL AND WATER SAMPLING	Supervisor E. NIELSEN	Technician J. WELLM	
1210	INSTALL WP-08. EXCAVATION THROUGH GRAVELLY FILL LAYER EXTENDS TO APPROXIMATELY 3.5' BGS INTO THE TOP OF THE NATIVE ORGANIC SILT LAYER. APPROXIMATELY 4.5 FEET OF SANDY ORGANIC SILT GRADING INTO SANDY SILT OVERLIES SILTY SAND AT APPROXIMATELY 8 FEET BGS. THE SILTY SAND DEPOSIT IS WATER BEARING. HALT AT APPROXIMATELY 9.0 FEET BGS AS HOLE DOES NOT WANT TO STAY OPEN AT DEPTH. INSTALL WELL POINT WP-08 USING 3/4-INCH DIAMETER PVC TRI-LOC, WITH 0.010-INCH SLOT SCREEN FROM 9.0 FEET BGS TO 4.0 FEET BGS, EMPLACE #2/12 SAND AROUND SCREEN TO APPROXIMATELY 3.5 FEET BGS.		
1220	PURGE APPROXIMATELY 0.75 GALLONS FROM WP-08, STEADY BUT SLOW FLOW, MEASURE TEMPERATURE AND PH OF PURGE WATER TEMP. = 19.1°C, PH = 6.42, DEPTH TO WATER AT WP-08 = 8.56' BELOW TOP OF CASING.		
1325	COLLECT 1 X 1 LITER BROWN GLASS UNPRESERVED BOTTLE FROM WP-08, MOBILIZE TO WP-09 AND PURGE APPROXIMATELY 0.5 GALLONS FOLLOWING DEPTH TO WATER MEASUREMENT (DTW = 9.62 FEET BELOW TOP OF CASING. TEMPERATURE = 19.1°C, PH = 6.39.		
1350	COLLECT BOTTLE 1 AT WP-09 FOLLOWING PERIOD FOR RECHARGE. OFFSITE.		
1420	CONTACT S. MAGNUSON FOR HOLE BACKFILLING. DEPTH TO WATER AT WP-08 = 8.16' BELOW TOP OF CASING; DEPTH TO WATER AT WP-09 = 9.56' BELOW TOP OF CASING. COLLECT BOTTLE 2 AT WP-08, COLLECT BOTTLE 2 AT WP-09, REMOVE CASING AND BACKFILL VOID WITH BENTONITE, HYDRATE BENTONITE WITH CLEAN DISTILLED WATER, DEMOBILIZE.		
1500	OFFSITE.		
Copy given to: EJN		Reported By: JMW	

SHN Tailgate Safety Meeting Form

Date: 7/17/19 Time: 1015 Job Number: /
 Client: _____
 Site Location: LITTLE LAKES

Safety Topics Presented:

Work Activity: SOIL + WATER SAMPLING

PPE :

- | | | | |
|---|---|--|--------------------------------------|
| ☒ Safety (High Visibility) Vest | ☐ Eye Protection | ☐ Fall Restraint | ☐ TLD Badge |
| ☐ Hard hat | ☐ Ear Protection | ☐ Skin Protection | ☐ FR Clothing |
| ☒ Gloves | ☒ Boots | ☐ Other _____ | |

Hazards:

- | | | | |
|---|--|---|--|
| ☐ ALARA ⁽¹⁾ | ☐ Electrical | ☒ Moving Equip. | ☐ Traffic |
| ☒ Biological | ☒ Excavation/Open Trench | ☐ Noise | ☐ Weather |
| ☒ Chemical | ☐ Explosion | ☐ Overhead Work | ☐ Welding Flash & Fume |
| ☐ Climbing/Manlifts ⁽²⁾ | ☐ Fire | ☐ Pedestrian | ☐ Work Elevation |
| ☐ Cold | ☐ Heavy Lifting & Moving | ☐ Pressure | ☐ Special Hazards _____ |
| ☐ Confined Spaces/Entrapment | ☐ Hot Work | ☒ Slips, Trips, & Falls | |
| ☐ Other _____ | | | |

(1) Requires nuclear density gauge training and TLD badge

(2) Requires fall restraint

Emergency Services:

Hospital

- | |
|--|
| ☒ St Joseph Hospital, 2700 Dolbeer St., Eureka, CA |
| ☐ Mad River Hospital, 3800 Janes Rd, Arcata, CA 95521 |
| ☐ Sutter Coast Hospital, 800 E Washington Blvd, Crescent City, CA |
| ☐ Six Rivers Medical Clinic, 850 CA-96, Willow Creek, CA |
| ☐ Kimaw Medical Center, 12000 Airport Rd., Hoopa, CA |
| ☐ Trinity Hospital, 60 Easter Ave, Weaverville, CA |
| ☐ Shasta Regional Med Center, 1100 Butte St, Redding, CA |
| ☐ Redwood Memorial Hospital, 3300 Renner Dr, Fortuna, CA |
| ☐ Jerold Phelps Community Hospital, 733 Cedar St, Garberville, CA |
| ☐ Howard Memorial Hospital, 1 Marcela Dr, Willits, CA |
| ☐ Ukiah Valley Medical Center, 275 Hospital Dr, Ukiah, CA |
| ☐ Other: _____ |

Telephone

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 530-625-4314
 530-623-5541
 530-244-5400
 707-725-3361
 707-923-3921
 707-459-6801
 707-462-3111

Ambulance

707-445-4907
 707-822-3353
 707-487-1116
 530-625-4180
 530-625-4180
 530-623-2500
 530-225-6290
 707-445-4907
 707-923-2855
 707-462-3111
 707-462-3111

Attendees:

Name Printed

JOHN WELLIK
Eric Nelson
Sam Morgan

Signature

[Signature]

Meeting Conducted By: JOHN WELLIK

Project Safety Officer: [Signature] 7/17/19

Project Manager: [Signature] 7-17-19



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Boring Log

Boring Number WP-08

Project	<u>LITTLE LAKES IND. PHASE II</u>	Job No.	<u>018022</u>
Location	<u>I STREET, ARCATA</u>	Date Drilled	<u>7/17/19</u>
Ground Surface Elevation	<u>16 FEET WGS84</u>	Sampler Type	<u>PERISTALTIC Pump</u>
Boring Method	<u>HAND AUGER, BACK HOE</u>	Depth to Water	<u>8.16 FEET BELOW CASING TIP</u>
Logged By	<u>JOHN WELLER</u>	Boring Total Depth	<u>9.0 FEET BELOW GROUND SURFACE</u>

Notes	Depth (ft)	USCS Class	GROUNDWATER	WELL POINT CONSTRUCTION	Lithologic Description
3/4-INCH DIAMETER BLANK PVC	0	FILL (6m)			BROWN, DRY, MEDIUM DENSE, COARSE ANGULAR ROCK FRAGMENTS, WELL GRADED ROUNDED GRAVEL, SAND, SILT; SILTY WELL GRADED GRAVEL
	1				
	2				
	3				
0.010-INCH SLOT SCREEN 3/4" DIAM. PVC	4	OL ML			BROWN GRADING TO GRAY AT APPROXIMATELY 5 FEET BGS, SOFT, MOIST, SILT, SAND; SANDY ORGANIC SILT, GRADING TO SANDY SILT.
#2/12 SAND PACK	5				
	6				
	7		8.16		
	8	SM/ML			GRAY, LOOSE, MOIST GRADING TO WET, FINE SAND, SILT; SILTY SAND. HALT AT 9.0 FEET BGS IN SAME
HALT AT APPROX. 9' BGS	9				
	10				

Boring Log

Boring Number WP-09

Project	LITTLE LAKES IND. PHASE II	Job No.	018022
Location	I STREET, ARCATA	Date Drilled	7/17/19
Ground Surface Elevation	16 FEET WGS84	Sampler Type	PERISTALTIC PUMP
Boring Method	HAND AUGER, BACKHOE	Depth to Water	9.56 FEET BTDC
Logged By	JOHN WELLIK	Boring Total Depth	10.0 FEET BGS

Notes	Depth (ft)	USCS Class	Blow Count	Sample Interval	Lithologic Description
3/4-INCH DIAMETER BLANK PVC	0	FILL (GM)			BROWN, DRY, MEDIUM DENSE, COARSE ANGULAR ROCK FRAGMENTS, WELL GRADED ROUNDED GRAVEL, SAND, SILT; SILTY WELL GRADED GRAVEL.
	1				
	2				
	3				
	4				
0.010-8NCH SLOT SCREEN 3/4-INCH DIAMETER PVC	5	OL/ML			BROWN GRADING TO GRAY AT APPROXIMATE 5 FEET BGS, SOFT, MOIST, SILT, SAND; SANDY ORGANIC SILT GRADING TO SANDY SILT AT APPROXIMATELY 5 FEET BGS.
#2/12 SAND PACK	6				
	7				
	8				
	9	SM/ML	9.56		GRAY, SOFT/LOOSE, MOIST GRADING TO WET, SAND, SILT; SILTY SAND.
HALT AT 10 FEET BGS.	10				



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Soil Sampling Data Sheet

Project Name:	LLI Mill	Date/Time:	7-17-19/1055
Project No.:	018022.030	Sampler Name:	JMW
Location:	Arcata, CA	Sample Type:	Soil
Sample #:	TP-08	Weather:	Clear - 60°

	Time	Depth (ft bgs)	Soil Type	Color	Odor	Moisture	Comments
1	1105	2.0	GM	log. Brn	None	Dry	Fill - Minor Debris
2							
3							
4							
5							
6							
7							
8							
9							
10							

Laboratory Information				
Sample ID	# & Type of Containers	Preservative/ Type	Laboratory	Analyses
TP-08	8 oz glass	None	MAC	D/E-1613

Sampler Signature/Date:

Reviewer Signature/Date:

7/17/19

7-17-19



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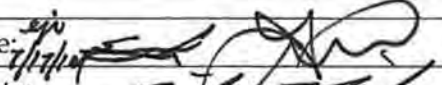
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Soil Sampling Data Sheet

Project Name:	LLI Mill	Date/Time:	7-17-19 / 1035
Project No.:	018022-030	Sampler Name:	JMW
Location:	Arcata, CA	Sample Type:	Soil
Sample #:	TP-09	Weather:	Clear 60s

	Time	Depth (ft bgs)	Soil Type	Color	Odor	Moisture	Comments
1	1045	2.5	GM	light-Brown	None	Dry	Fill - Reworked
2							
3							
4							
5							
6							
7							
8							
9							
10							

Laboratory Information				
Sample ID	# & Type of Containers	Preservative / Type	Laboratory	Analyses
TP-09	8 oz Glass	None	MAL	D/X-1613

Sampler Signature/Date:  7/17/19
Reviewer Signature/Date:  7-17-19



CONSULTING ENGINEERS & GEOLOGISTS, INC.

812 W. Wabash • Eureka, CA 95501-2138 • 707/441-8855 • FAX: 707/441-8877 • info@shn-eureka.com

Soil Sampling Data Sheet

Project Name:	<u>LLI Mill</u>	Date/Time:	<u>7-17-19 / 1000</u>
Project No.:	<u>018022.030</u>	Sampler Name:	<u>JMW</u>
Location:	<u>Arcata, CA</u>	Sample Type:	<u>Soil</u>
Sample #:	<u>TP-10</u>	Weather:	<u>Clear - 60s</u>

	Time	Depth (ft bgs)	Soil Type	Color	Odor	Moisture	Comments
1	<u>1030</u>	<u>2.5</u>	<u>GM</u>	<u>log-brn</u>	<u>None</u>	<u>Dry</u>	<u>Fill - Mix</u>
2							
3							
4							
5							
6							
7							
8							
9							
10							

Laboratory Information				
Sample ID	# & Type of Containers	Preservative / Type	Laboratory	Analyses
<u>TP-10</u>	<u>900 Glass</u>	<u>None</u>	<u>MAU</u>	<u>D/F - 16B</u>

Sampler Signature/Date:

Reviewer Signature/Date:

7/17/19

7-17-19

**CONSULTING ENGINEERS & GEOLOGISTS, INC.**

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Soil Sampling Data Sheet

Project Name:	<u>LLI Mill</u>	Date/Time:	<u>7-17-19 / 1110</u>
Project No.:	<u>018022-030</u>	Sampler Name:	<u>JMW</u>
Location:	<u>Arcata, CA</u>	Sample Type:	<u>Soil</u>
Sample #:	<u>TP-11</u>	Weather	<u>Clear - 60s</u>

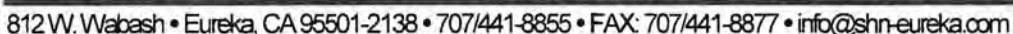
	Time	Depth (ft bgs)	Soil Type	Color	Odor	Moisture	Comments
1	<u>1125</u>	<u>2.5</u>	<u>GW</u>	<u>Blk-Brn</u>	<u>None</u>	<u>Dry</u>	<u>Fill - Mixed</u>
2							
3							
4							
5							
6							
7							
8							
9							
10							

Laboratory Information				
Sample ID	# & Type of Containers	Preservative / Type	Laboratory	Analyses
<u>TP-11</u>	<u>8oz glass</u>	<u>None</u>	<u>MAC</u>	<u>D/P-1613</u>

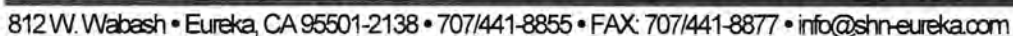
Sampler Signature/Date:

Reviewer Signature/Date:

7/17/197-17-19



7/17/19



7/17/19



Daily Field Report

Job No. **018022**Page No.: **1** of **1**

Project Name:

LITTLE LAKES INDUST.

Client/Owner:

CITY OF ARCATA

Date:

8/28/19

General Location of Work:

1 ST ARCATA

Owner/Client Representative:

NA

Day of Week:

WEDNESDAY

General Contractor:

NA

Contractors On Site:

NA

Project Engineer:

Type of Work:

SURVEY OF SAMPLE LOCAT.

Weather:

COOL

Technician:

Jmw**1530 ONSITE WITH H. HUMMEL, H.H. SETTING UP GPS SYSTEM, CONDUCT SAFETY TAILBOARD.****1540 REOCCUPY TP-01, PREVIOUS DATA ACCURATE FOR TP-01 LOCATION, SURVEY TP-11, WP-08, WP-09, TP-09, TP-08, TP-10.****1610 OFFSITE.****N****A**

Reported By:

JOHN WELLUK

Date:

8/28/19

Copy given to:

E. NIELSEN.

SHN Tailgate Safety Meeting Form

Date: 8/28/19 Time: 1540 Job Number: 018022.030
 Client: CITY OF ARCATA
 Site Location: 1st.

Safety Topics Presented:

Work Activity: Survey

PPE :

- | | | | |
|---|---|--|--------------------------------------|
| ☒ Safety (High Visibility) Vest | ☐ Eye Protection | ☐ Fall Restraint | ☐ TLD Badge |
| ☐ Hard hat | ☐ Ear Protection | ☐ Skin Protection | ☐ FR Clothing |
| ☐ Gloves | ☐ Boots | ☐ Other _____ | |

Hazards:

- | | | | |
|---|---|---|--|
| ☐ ALARA ⁽¹⁾ | ☐ Electrical | ☐ Moving Equip. | ☐ Traffic |
| ☒ Biological | ☐ Excavation/Open Trench | ☐ Noise | ☐ Weather |
| ☐ Chemical | ☐ Explosion | ☐ Overhead Work | ☐ Welding Flash & Fumes |
| ☐ Climbing/Manlifts ⁽²⁾ | ☐ Fire | ☐ Pedestrian | ☐ Work Elevation |
| ☐ Cold | ☐ Heavy Lifting & Moving | ☐ Pressure | ☐ Special Hazards _____ |
| ☐ Confined Spaces/Entrapment | ☐ Hot Work | ☒ Slips, Trips, & Falls | |
| ☐ Other _____ | | | |

(1) Requires nuclear density gauge training and TLD badge

(2) Requires fall restraint

Emergency Services:

Hospital

- ☒ St Joseph Hospital, 2700 Dolbeer St., Eureka, CA
☐ Mad River Hospital, 3800 Janes Rd, Arcata, CA 95521
☐ Sutter Coast Hospital, 800 E Washington Blvd, Crescent City, CA
☐ Six Rivers Medical Clinic, 850 CA-96, Willow Creek, CA
☐ Kimaw Medical Center, 12000 Airport Rd., Hoopa, CA
☐ Trinity Hospital, 60 Easter Ave, Weaverville, CA
☐ Shasta Regional Med Center, 1100 Butte St, Redding, CA
☐ Redwood Memorial Hospital, 3300 Renner Dr, Fortuna, CA
☐ Jerold Phelps Community Hospital, 733 Cedar St, Garberville, CA
☐ Howard Memorial Hospital, 1 Marcela Dr, Willits, CA
☐ Ukiah Valley Medical Center, 275 Hospital Dr, Ukiah, CA
☐ Other: _____

Telephone

707-445-8121;
 707- 822-3621
 707-464-8511
 530-629-3116
 530-625-4314
 530-623-5541
 530-244-5400
 707-725-3361
 707-923-3921
 707-459-6801
 707-462-3111

Ambulance

707- 445-4907
 707-822-3353
 707-487-1116
 530-625-4180
 530-625-4180
 530-623-2500
 530-225-6290
 707- 445-4907
 707-923-2855
 707-462-3111
 707-462-3111

Attendees:

Name Printed
JOHN WELLIK
Harrison Hummel

Signature


Meeting Conducted By: JOHN WELLIK
 Name Printed

Project Safety Officer: _____

Project Manager: _____

Signature


Laboratory Analytical Reports 2



McC Campbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1903344 **Amended:** 03/27/2019

Report Created for: SHN Consulting Engineers & Geologists, Inc.

812 W. Wabash Ave.
Eureka, CA 95501

Project Contact: Erik Nielsen

Project P.O.:

Project: 018022.030; Little Lake Industries

Project Received: 03/07/2019

Analytical Report reviewed & approved for release on 03/26/2019 by:

Yen Cao

Project Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.





Glossary of Terms & Qualifier Definitions

Client: SHN Consulting Engineers & Geologists, Inc.
Project: 018022.030; Little Lake Industries
WorkOrder: 1903344

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
TZA	TimeZone Net Adjustment for sample collected outside of MAI's UTC.
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)



Glossary of Terms & Qualifier Definitions

Client: SHN Consulting Engineers & Geologists, Inc.
Project: 018022.030; Little Lake Industries
WorkOrder: 1903344

Analytical Qualifiers

H	Samples were analyzed out of hold time.
J	Result is less than the RL/ML but greater than the MDL. The reported concentration is an estimated value.
M	Estimated Maximum Possible Concentration.
R	RPD outside accepted recovery limits.
S	Spike recovery outside accepted recovery limits.
a3	Sample diluted due to high organic content.
a4	Reporting limits raised due to the sample's matrix prohibiting a full volume extraction.
b1	Aqueous sample that contains greater than ~1 vol. % sediment.
c2	Surrogate recovery outside of the control limits due to matrix interference.
e2	Diesel range compounds are significant; no recognizable pattern.
e7	Oil range compounds are significant.
e8	Pattern resembles kerosene/kerosene range/jet fuel range.

Quality Control Qualifiers

F2	LCS/LCSD recovery and/or RPD/RSD is out of acceptance criteria.
F11	DLT outside control limits. Physical or chemical interferences exist due to sample matrix. Sample results may be estimated.



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/14/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-01	1903344-001A	Soil	03/04/2019 14:25	GC36	174839

Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
2,3,7,8-TCDD		ND		0.110	1.00	1				03/21/2019 15:07
1,2,3,7,8-PeCDD		ND		0.280	5.00	1				03/21/2019 15:07
1,2,3,4,7,8-HxCDD		ND		0.560	5.00	1				03/21/2019 15:07
1,2,3,6,7,8-HxCDD		0.420	JM	0.380	5.00	1	1.6	1		03/21/2019 15:07
1,2,3,7,8,9-HxCDD		ND		0.450	5.00	1				03/21/2019 15:07
1,2,3,4,6,7,8-HpCDD	0.01	8.38		0.620	5.00	1	1.01	1	0.0838	03/21/2019 15:07
OCDD	0.001	72.9		1.70	10.0	1	0.85	1	0.0729	03/21/2019 15:07
2,3,7,8-TCDF		0.280	J	0.210	1.00	1	0.74	1		03/21/2019 15:07
1,2,3,7,8-PeCDF		ND		0.350	5.00	1				03/21/2019 15:07
2,3,4,7,8-PeCDF		ND		0.330	5.00	1				03/21/2019 15:07
1,2,3,4,7,8-HxCDF		ND		0.570	5.00	1				03/21/2019 15:07
1,2,3,6,7,8-HxCDF		ND		0.570	5.00	1				03/21/2019 15:07
1,2,3,7,8,9-HxCDF		ND		0.520	5.00	1				03/21/2019 15:07
2,3,4,6,7,8-HxCDF		ND		0.410	5.00	1				03/21/2019 15:07
1,2,3,4,6,7,8-HpCDF		3.40	J	0.370	5.00	1	0.98	1		03/21/2019 15:07
1,2,3,4,7,8,9-HpCDF		ND		0.440	5.00	1				03/21/2019 15:07
OCDF		3.86	J	1.30	10.0	1	1.01	1.01		03/21/2019 15:07
Total-Tetradoxins		ND		0.110	1.00	1				03/21/2019 15:07
Total-Pentadoxins		ND		0.280	5.00	1				03/21/2019 15:07
Total-Hexadoxins		1.72	J	0.560	5.00	1				03/21/2019 15:07
Total-Heptadoxins		16.9		0.620	5.00	1				03/21/2019 15:07
Total-Tetrafurans		29.8		0.210	1.00	1				03/21/2019 15:07
Total-Pentafurans		6.34		0.350	5.00	1				03/21/2019 15:07
Total-Hexafurans		5.84		0.570	5.00	1				03/21/2019 15:07
Total-Heptafurans		3.40	J	0.440	5.00	1				03/21/2019 15:07

Total Toxicity Equivalence (TEQ):

0.157

Cleanup Standard	REC (%)	Limits	
37Cl-2,3,7,8-TCDD	79	35-197	03/21/2019 15:07
Labeled Compound Recovery	REC (%)	Limits	
13C-2,3,7,8-TCDD	70	25-164	03/21/2019 15:07
13C-1,2,3,7,8-PeCDD	79	25-181	03/21/2019 15:07
13C-1,2,3,4,7,8-HxCDD	61	32-141	03/21/2019 15:07
13C-1,2,3,6,7,8-HxCDD	64	28-130	03/21/2019 15:07
13C-1,2,3,4,6,7,8-HpCDD	57	23-140	03/21/2019 15:07
13C-OCDD	61	17-157	03/21/2019 15:07

(Cont.)



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/14/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-01	1903344-001A	Soil	03/04/2019 14:25	GC36	174839

Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
<u>Labeled Compound Recovery</u>		<u>REC (%)</u>			<u>Limits</u>					
13C-2,3,7,8-TCDF		70			24-169					03/21/2019 15:07
13C-1,2,3,7,8-PeCDF		73			24-185					03/21/2019 15:07
13C-2,3,4,7,8-PeCDF		74			21-178					03/21/2019 15:07
13C-1,2,3,4,7,8-HxCDF		55			26-152					03/21/2019 15:07
13C-1,2,3,6,7,8-HxCDF		55			26-123					03/21/2019 15:07
13C-2,3,4,6,7,8-HxCDF		56			28-136					03/21/2019 15:07
13C-1,2,3,7,8,9-HxCDF		60			29-147					03/21/2019 15:07
13C-1,2,3,4,6,7,8-HpCDF		48			28-143					03/21/2019 15:07
13C-1,2,3,4,7,8,9-HpCDF		55			26-138					03/21/2019 15:07

Analyst(s): KBO



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/14/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-01R	1903344-002A	Soil	03/04/2019 14:30	GC36	174839

Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
2,3,7,8-TCDD		ND		0.110	1.00	1				03/21/2019 16:32
1,2,3,7,8-PeCDD		ND		0.280	5.00	1				03/21/2019 16:32
1,2,3,4,7,8-HxCDD		ND		0.560	5.00	1				03/21/2019 16:32
1,2,3,6,7,8-HxCDD		0.780	J	0.380	5.00	1	1.29	1		03/21/2019 16:32
1,2,3,7,8,9-HxCDD		0.460	J	0.450	5.00	1	1.31	1.01		03/21/2019 16:32
1,2,3,4,6,7,8-HpCDD	0.01	17.5		0.620	5.00	1	1.16	1	0.175	03/21/2019 16:32
OCDD	0.001	146		1.70	10.0	1	0.87	1	0.146	03/21/2019 16:32
2,3,7,8-TCDF		0.700	J	0.210	1.00	1	0.76	1		03/21/2019 16:32
1,2,3,7,8-PeCDF		ND		0.350	5.00	1				03/21/2019 16:32
2,3,4,7,8-PeCDF		0.500	J	0.330	5.00	1	1.54	1		03/21/2019 16:32
1,2,3,4,7,8-HxCDF		ND		0.570	5.00	1				03/21/2019 16:32
1,2,3,6,7,8-HxCDF		ND		0.570	5.00	1				03/21/2019 16:32
1,2,3,7,8,9-HxCDF		ND		0.520	5.00	1				03/21/2019 16:32
2,3,4,6,7,8-HxCDF		0.520	J	0.410	5.00	1	1.24	1		03/21/2019 16:32
1,2,3,4,6,7,8-HpCDF	0.01	5.90		0.370	5.00	1	1.17	1	0.059	03/21/2019 16:32
1,2,3,4,7,8,9-HpCDF		ND		0.440	5.00	1				03/21/2019 16:32
OCDF		9.66	J	1.30	10.0	1	0.78	1.01		03/21/2019 16:32
Total-Tetradoxins		1.14		0.110	1.00	1				03/21/2019 16:32
Total-Pentadoxins		0.960	J	0.280	5.00	1				03/21/2019 16:32
Total-Hexadoxins		13.0		0.560	5.00	1				03/21/2019 16:32
Total-Heptadoxins		42.7		0.620	5.00	1				03/21/2019 16:32
Total-Tetrafurans		25.9		0.210	1.00	1				03/21/2019 16:32
Total-Pentafurans		10.2		0.350	5.00	1				03/21/2019 16:32
Total-Hexafurans		8.42		0.570	5.00	1				03/21/2019 16:32
Total-Heptafurans		5.90		0.440	5.00	1				03/21/2019 16:32

Total Toxicity Equivalence (TEQ):

0.380

Cleanup Standard	REC (%)	Limits	
37Cl-2,3,7,8-TCDD	71	35-197	03/21/2019 16:32
Labeled Compound Recovery	REC (%)	Limits	
13C-2,3,7,8-TCDD	73	25-164	03/21/2019 16:32
13C-1,2,3,7,8-PeCDD	66	25-181	03/21/2019 16:32
13C-1,2,3,4,7,8-HxCDD	62	32-141	03/21/2019 16:32
13C-1,2,3,6,7,8-HxCDD	64	28-130	03/21/2019 16:32
13C-1,2,3,4,6,7,8-HpCDD	51	23-140	03/21/2019 16:32
13C-OCDD	54	17-157	03/21/2019 16:32

(Cont.)



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/14/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-01R	1903344-002A	Soil	03/04/2019 14:30	GC36	174839

Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
<u>Labeled Compound Recovery</u>		<u>REC (%)</u>			<u>Limits</u>					
13C-2,3,7,8-TCDF		58			24-169					03/21/2019 16:32
13C-1,2,3,7,8-PeCDF		54			24-185					03/21/2019 16:32
13C-2,3,4,7,8-PeCDF		54			21-178					03/21/2019 16:32
13C-1,2,3,4,7,8-HxCDF		52			26-152					03/21/2019 16:32
13C-1,2,3,6,7,8-HxCDF		53			26-123					03/21/2019 16:32
13C-2,3,4,6,7,8-HxCDF		56			28-136					03/21/2019 16:32
13C-1,2,3,7,8,9-HxCDF		60			29-147					03/21/2019 16:32
13C-1,2,3,4,6,7,8-HpCDF		50			28-143					03/21/2019 16:32
13C-1,2,3,4,7,8,9-HpCDF		58			26-138					03/21/2019 16:32

Analyst(s): KBO



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/14/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID					
TP-02	1903344-003A	Soil	03/04/2019 11:35	GC36	174839					
Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
2,3,7,8-TCDD		ND		0.110	1.00	1				03/21/2019 17:28
1,2,3,7,8-PeCDD		1.20	J	0.280	5.00	1	1.76	1		03/21/2019 17:28
1,2,3,4,7,8-HxCDD		4.10	J	0.560	5.00	1	1.27	1		03/21/2019 17:28
1,2,3,6,7,8-HxCDD	0.1	11.7		0.380	5.00	1	1.21	1	1.17	03/21/2019 17:28
1,2,3,7,8,9-HxCDD		4.58	J	0.450	5.00	1	1.1	1.01		03/21/2019 17:28
1,2,3,4,6,7,8-HpCDD	0.01	248		0.620	5.00	1	1.1	1	2.48	03/21/2019 17:28
OCDD	0.001	2920		1.70	10.0	1	0.89	1	2.92	03/21/2019 17:28
2,3,7,8-TCDF		ND		0.210	1.00	1				03/21/2019 17:28
1,2,3,7,8-PeCDF		ND		0.350	5.00	1				03/21/2019 17:28
2,3,4,7,8-PeCDF		ND		0.330	5.00	1				03/21/2019 17:28
1,2,3,4,7,8-HxCDF		2.30	J	0.570	5.00	1	1.41	1		03/21/2019 17:28
1,2,3,6,7,8-HxCDF		1.80	J	0.570	5.00	1	1.15	1		03/21/2019 17:28
1,2,3,7,8,9-HxCDF		0.940	JM	0.520	5.00	1	0.87	1		03/21/2019 17:28
2,3,4,6,7,8-HxCDF		ND		0.410	5.00	1				03/21/2019 17:28
1,2,3,4,6,7,8-HpCDF	0.01	116		0.370	5.00	1	1.07	1	1.16	03/21/2019 17:28
1,2,3,4,7,8,9-HpCDF	0.01	5.18		0.440	5.00	1	1.19	1	0.0518	03/21/2019 17:28
OCDF	0.001	231		1.30	10.0	1	0.87	1.01	0.231	03/21/2019 17:28
Total-Tetradoxins		0.740	J	0.110	1.00	1				03/21/2019 17:28
Total-Pentadoxins		11.4		0.280	5.00	1				03/21/2019 17:28
Total-Hexadoxins		108		0.560	5.00	1				03/21/2019 17:28
Total-Heptadoxins		544		0.620	5.00	1				03/21/2019 17:28
Total-Tetrafurans		37.1		0.210	1.00	1				03/21/2019 17:28
Total-Pentafurans		37.7		0.350	5.00	1				03/21/2019 17:28
Total-Hexafurans		112		0.570	5.00	1				03/21/2019 17:28
Total-Heptafurans		378		0.440	5.00	1				03/21/2019 17:28
Total Toxicity Equivalence (TEQ):									8.01	

Cleanup Standard	REC (%)	Limits	
37Cl-2,3,7,8-TCDD	67	35-197	03/21/2019 17:28
Labeled Compound Recovery	REC (%)	Limits	
13C-2,3,7,8-TCDD	63	25-164	03/21/2019 17:28
13C-1,2,3,7,8-PeCDD	64	25-181	03/21/2019 17:28
13C-1,2,3,4,7,8-HxCDD	58	32-141	03/21/2019 17:28
13C-1,2,3,6,7,8-HxCDD	59	28-130	03/21/2019 17:28
13C-1,2,3,4,6,7,8-HpCDD	51	23-140	03/21/2019 17:28
13C-OCDD	56	17-157	03/21/2019 17:28

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Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/14/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-02	1903344-003A	Soil	03/04/2019 11:35	GC36	174839

Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
<u>Labeled Compound Recovery</u>		<u>REC (%)</u>			<u>Limits</u>					
13C-2,3,7,8-TCDF		52			24-169					03/21/2019 17:28
13C-1,2,3,7,8-PeCDF		52			24-185					03/21/2019 17:28
13C-2,3,4,7,8-PeCDF		53			21-178					03/21/2019 17:28
13C-1,2,3,4,7,8-HxCDF		49			26-152					03/21/2019 17:28
13C-1,2,3,6,7,8-HxCDF		50			26-123					03/21/2019 17:28
13C-2,3,4,6,7,8-HxCDF		50			28-136					03/21/2019 17:28
13C-1,2,3,7,8,9-HxCDF		57			29-147					03/21/2019 17:28
13C-1,2,3,4,6,7,8-HpCDF		47			28-143					03/21/2019 17:28
13C-1,2,3,4,7,8,9-HpCDF		58			26-138					03/21/2019 17:28

Analyst(s): KBO



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/14/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-03	1903344-004A	Soil	03/04/2019 11:10	GC36	174839

Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
2,3,7,8-TCDD		ND		0.110	1.00	1				03/22/2019 00:25
1,2,3,7,8-PeCDD		ND		0.280	5.00	1				03/22/2019 00:25
1,2,3,4,7,8-HxCDD		ND		0.560	5.00	1				03/22/2019 00:25
1,2,3,6,7,8-HxCDD		ND		0.380	5.00	1				03/22/2019 00:25
1,2,3,7,8,9-HxCDD		ND		0.450	5.00	1				03/22/2019 00:25
1,2,3,4,6,7,8-HpCDD		1.72	J	0.620	5.00	1	0.97	1		03/22/2019 00:25
OCDD	0.001	15.4		1.70	10.0	1	0.86	1	0.0154	03/22/2019 00:25
2,3,7,8-TCDF		ND		0.210	1.00	1				03/22/2019 00:25
1,2,3,7,8-PeCDF		ND		0.350	5.00	1				03/22/2019 00:25
2,3,4,7,8-PeCDF		ND		0.330	5.00	1				03/22/2019 00:25
1,2,3,4,7,8-HxCDF		ND		0.570	5.00	1				03/22/2019 00:25
1,2,3,6,7,8-HxCDF		ND		0.570	5.00	1				03/22/2019 00:25
1,2,3,7,8,9-HxCDF		ND		0.520	5.00	1				03/22/2019 00:25
2,3,4,6,7,8-HxCDF		ND		0.410	5.00	1				03/22/2019 00:25
1,2,3,4,6,7,8-HpCDF		0.980	J	0.370	5.00	1	0.93	1		03/22/2019 00:25
1,2,3,4,7,8,9-HpCDF		ND		0.440	5.00	1				03/22/2019 00:25
OCDF		ND		1.30	10.0	1				03/22/2019 00:25
Total-Tetradoxins		ND		0.110	1.00	1				03/22/2019 00:25
Total-Pentadoxins		ND		0.280	5.00	1				03/22/2019 00:25
Total-Hexadoxins		0.580	J	0.560	5.00	1				03/22/2019 00:25
Total-Heptadoxins		3.30	J	0.620	5.00	1				03/22/2019 00:25
Total-Tetrafurans		5.94		0.210	1.00	1				03/22/2019 00:25
Total-Pentafurans		ND		0.350	5.00	1				03/22/2019 00:25
Total-Hexafurans		ND		0.570	5.00	1				03/22/2019 00:25
Total-Heptafurans		0.980	J	0.440	5.00	1				03/22/2019 00:25

Total Toxicity Equivalence (TEQ):

0.0154

Cleanup Standard	REC (%)	Limits	
37Cl-2,3,7,8-TCDD	65	35-197	03/22/2019 00:25
Labeled Compound Recovery	REC (%)	Limits	
13C-2,3,7,8-TCDD	66	25-164	03/22/2019 00:25
13C-1,2,3,7,8-PeCDD	65	25-181	03/22/2019 00:25
13C-1,2,3,4,7,8-HxCDD	62	32-141	03/22/2019 00:25
13C-1,2,3,6,7,8-HxCDD	62	28-130	03/22/2019 00:25
13C-1,2,3,4,6,7,8-HpCDD	59	23-140	03/22/2019 00:25
13C-OCDD	61	17-157	03/22/2019 00:25

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Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/14/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-03	1903344-004A	Soil	03/04/2019 11:10	GC36	174839

Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
Labeled Compound Recovery		REC (%)	Limits							
13C-2,3,7,8-TCDF		56			24-169					03/22/2019 00:25
13C-1,2,3,7,8-PeCDF		57			24-185					03/22/2019 00:25
13C-2,3,4,7,8-PeCDF		55			21-178					03/22/2019 00:25
13C-1,2,3,4,7,8-HxCDF		56			26-152					03/22/2019 00:25
13C-1,2,3,6,7,8-HxCDF		57			26-123					03/22/2019 00:25
13C-2,3,4,6,7,8-HxCDF		58			28-136					03/22/2019 00:25
13C-1,2,3,7,8,9-HxCDF		62			29-147					03/22/2019 00:25
13C-1,2,3,4,6,7,8-HpCDF		60			28-143					03/22/2019 00:25
13C-1,2,3,4,7,8,9-HpCDF		66			26-138					03/22/2019 00:25

Analyst(s): KBO



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/14/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-04	1903344-005A	Soil	03/04/2019 14:45	GC36	174839

Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
2,3,7,8-TCDD		ND		0.110	1.00	1				03/22/2019 01:29
1,2,3,7,8-PeCDD		ND		0.280	5.00	1				03/22/2019 01:29
1,2,3,4,7,8-HxCDD		ND		0.560	5.00	1				03/22/2019 01:29
1,2,3,6,7,8-HxCDD		ND		0.380	5.00	1				03/22/2019 01:29
1,2,3,7,8,9-HxCDD		ND		0.450	5.00	1				03/22/2019 01:29
1,2,3,4,6,7,8-HpCDD		1.48	J	0.620	5.00	1	1.01	1		03/22/2019 01:29
OCDD	0.001	12.0		1.70	10.0	1	0.79	1	0.012	03/22/2019 01:29
2,3,7,8-TCDF		0.400	JM	0.210	1.00	1	1.08	1		03/22/2019 01:29
1,2,3,7,8-PeCDF		ND		0.350	5.00	1				03/22/2019 01:29
2,3,4,7,8-PeCDF		ND		0.330	5.00	1				03/22/2019 01:29
1,2,3,4,7,8-HxCDF		ND		0.570	5.00	1				03/22/2019 01:29
1,2,3,6,7,8-HxCDF		ND		0.570	5.00	1				03/22/2019 01:29
1,2,3,7,8,9-HxCDF		ND		0.520	5.00	1				03/22/2019 01:29
2,3,4,6,7,8-HxCDF		ND		0.410	5.00	1				03/22/2019 01:29
1,2,3,4,6,7,8-HpCDF		ND		0.370	5.00	1				03/22/2019 01:29
1,2,3,4,7,8,9-HpCDF		ND		0.440	5.00	1				03/22/2019 01:29
OCDF		ND		1.30	10.0	1				03/22/2019 01:29
Total-Tetradoxins		ND		0.110	1.00	1				03/22/2019 01:29
Total-Pentadoxins		ND		0.280	5.00	1				03/22/2019 01:29
Total-Hexadoxins		ND		0.560	5.00	1				03/22/2019 01:29
Total-Heptadoxins		2.74	J	0.620	5.00	1				03/22/2019 01:29
Total-Tetrafurans		8.08		0.210	1.00	1				03/22/2019 01:29
Total-Pentafurans		ND		0.350	5.00	1				03/22/2019 01:29
Total-Hexafurans		ND		0.570	5.00	1				03/22/2019 01:29
Total-Heptafurans		ND		0.440	5.00	1				03/22/2019 01:29

Total Toxicity Equivalence (TEQ):

0.0120

Cleanup Standard	REC (%)	Limits	
37Cl-2,3,7,8-TCDD	60	35-197	03/22/2019 01:29
Labeled Compound Recovery	REC (%)	Limits	
13C-2,3,7,8-TCDD	58	25-164	03/22/2019 01:29
13C-1,2,3,7,8-PeCDD	63	25-181	03/22/2019 01:29
13C-1,2,3,4,7,8-HxCDD	62	32-141	03/22/2019 01:29
13C-1,2,3,6,7,8-HxCDD	64	28-130	03/22/2019 01:29
13C-1,2,3,4,6,7,8-HpCDD	54	23-140	03/22/2019 01:29
13C-OCDD	61	17-157	03/22/2019 01:29

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Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/14/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-04	1903344-005A	Soil	03/04/2019 14:45	GC36	174839

Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
Labeled Compound Recovery		REC (%)			Limits					
13C-2,3,7,8-TCDF		52			24-169					03/22/2019 01:29
13C-1,2,3,7,8-PeCDF		52			24-185					03/22/2019 01:29
13C-2,3,4,7,8-PeCDF		54			21-178					03/22/2019 01:29
13C-1,2,3,4,7,8-HxCDF		59			26-152					03/22/2019 01:29
13C-1,2,3,6,7,8-HxCDF		58			26-123					03/22/2019 01:29
13C-2,3,4,6,7,8-HxCDF		58			28-136					03/22/2019 01:29
13C-1,2,3,7,8,9-HxCDF		60			29-147					03/22/2019 01:29
13C-1,2,3,4,6,7,8-HpCDF		55			28-143					03/22/2019 01:29
13C-1,2,3,4,7,8,9-HpCDF		62			26-138					03/22/2019 01:29

Analyst(s): KBO



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/14/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID					
TP-05	1903344-006A	Soil	03/04/2019 11:55	GC36	174839					
Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
2,3,7,8-TCDD		ND		0.110	1.00	1				03/22/2019 02:25
1,2,3,7,8-PeCDD		1.64	J	0.280	5.00	1	1.38	1		03/22/2019 02:25
1,2,3,4,7,8-HxCDD		4.32	J	0.560	5.00	1	1.18	1		03/22/2019 02:25
1,2,3,6,7,8-HxCDD	0.1	11.8		0.380	5.00	1	1.37	1	1.18	03/22/2019 02:25
1,2,3,7,8,9-HxCDD		2.28	J	0.450	5.00	1	1.24	1.01		03/22/2019 02:25
1,2,3,4,6,7,8-HpCDD	0.01	158		0.620	5.00	1	1.09	1	1.58	03/22/2019 02:25
OCDD	0.001	1140		1.70	10.0	1	0.9	1	1.14	03/22/2019 02:25
2,3,7,8-TCDF		ND		0.210	1.00	1				03/22/2019 02:25
1,2,3,7,8-PeCDF		ND		0.350	5.00	1				03/22/2019 02:25
2,3,4,7,8-PeCDF		ND		0.330	5.00	1				03/22/2019 02:25
1,2,3,4,7,8-HxCDF		1.04	J	0.570	5.00	1	1.14	1		03/22/2019 02:25
1,2,3,6,7,8-HxCDF	0.1	5.24		0.570	5.00	1	1.35	1	0.524	03/22/2019 02:25
1,2,3,7,8,9-HxCDF		ND		0.520	5.00	1				03/22/2019 02:25
2,3,4,6,7,8-HxCDF		ND		0.410	5.00	1				03/22/2019 02:25
1,2,3,4,6,7,8-HpCDF	0.01	57.2		0.370	5.00	1	1.06	1	0.572	03/22/2019 02:25
1,2,3,4,7,8,9-HpCDF		2.06	J	0.440	5.00	1	0.93	1		03/22/2019 02:25
OCDF	0.001	242		1.30	10.0	1	0.93	1.01	0.242	03/22/2019 02:25
Total-Tetradoxins		6.42		0.110	1.00	1				03/22/2019 02:25
Total-Pentadoxins		11.5		0.280	5.00	1				03/22/2019 02:25
Total-Hexadoxins		59.3		0.560	5.00	1				03/22/2019 02:25
Total-Heptadoxins		329		0.620	5.00	1				03/22/2019 02:25
Total-Tetrafurans		3.02		0.210	1.00	1				03/22/2019 02:25
Total-Pentafurans		24.7		0.350	5.00	1				03/22/2019 02:25
Total-Hexafurans		142		0.570	5.00	1				03/22/2019 02:25
Total-Heptafurans		266		0.440	5.00	1				03/22/2019 02:25
Total Toxicity Equivalence (TEQ):									5.24	

Cleanup Standard	REC (%)	Limits	
37Cl-2,3,7,8-TCDD	67	35-197	03/22/2019 02:25
Labeled Compound Recovery	REC (%)	Limits	
13C-2,3,7,8-TCDD	58	25-164	03/22/2019 02:25
13C-1,2,3,7,8-PeCDD	61	25-181	03/22/2019 02:25
13C-1,2,3,4,7,8-HxCDD	56	32-141	03/22/2019 02:25
13C-1,2,3,6,7,8-HxCDD	59	28-130	03/22/2019 02:25
13C-1,2,3,4,6,7,8-HpCDD	52	23-140	03/22/2019 02:25
13C-OCDD	61	17-157	03/22/2019 02:25

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Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/14/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-05	1903344-006A	Soil	03/04/2019 11:55	GC36	174839

Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
Labeled Compound Recovery		REC (%)	Limits							
13C-2,3,7,8-TCDF		52			24-169					03/22/2019 02:25
13C-1,2,3,7,8-PeCDF		52			24-185					03/22/2019 02:25
13C-2,3,4,7,8-PeCDF		52			21-178					03/22/2019 02:25
13C-1,2,3,4,7,8-HxCDF		49			26-152					03/22/2019 02:25
13C-1,2,3,6,7,8-HxCDF		50			26-123					03/22/2019 02:25
13C-2,3,4,6,7,8-HxCDF		50			28-136					03/22/2019 02:25
13C-1,2,3,7,8,9-HxCDF		55			29-147					03/22/2019 02:25
13C-1,2,3,4,6,7,8-HpCDF		53			28-143					03/22/2019 02:25
13C-1,2,3,4,7,8,9-HpCDF		56			26-138					03/22/2019 02:25

Analyst(s): KBO



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/14/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-06	1903344-007A	Soil	03/04/2019 14:10	GC36	174839

Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
2,3,7,8-TCDD		ND		0.110	1.00	1				03/22/2019 03:21
1,2,3,7,8-PeCDD		ND		0.280	5.00	1				03/22/2019 03:21
1,2,3,4,7,8-HxCDD		0.580	J	0.560	5.00	1	1.20	1		03/22/2019 03:21
1,2,3,6,7,8-HxCDD		1.50	J	0.380	5.00	1	1.25	1		03/22/2019 03:21
1,2,3,7,8,9-HxCDD		1.06	J	0.450	5.00	1	1.11	1.01		03/22/2019 03:21
1,2,3,4,6,7,8-HpCDD	0.01	46.2		0.620	5.00	1	1.06	1	0.462	03/22/2019 03:21
OCDD	0.001	379		1.70	10.0	1	0.89	1	0.379	03/22/2019 03:21
2,3,7,8-TCDF		ND		0.210	1.00	1				03/22/2019 03:21
1,2,3,7,8-PeCDF		ND		0.350	5.00	1				03/22/2019 03:21
2,3,4,7,8-PeCDF		ND		0.330	5.00	1				03/22/2019 03:21
1,2,3,4,7,8-HxCDF		ND		0.570	5.00	1				03/22/2019 03:21
1,2,3,6,7,8-HxCDF		1.50	J	0.570	5.00	1	1.06	1		03/22/2019 03:21
1,2,3,7,8,9-HxCDF		ND		0.520	5.00	1				03/22/2019 03:21
2,3,4,6,7,8-HxCDF		ND		0.410	5.00	1				03/22/2019 03:21
1,2,3,4,6,7,8-HpCDF	0.01	6.24		0.370	5.00	1	1.11	1	0.0624	03/22/2019 03:21
1,2,3,4,7,8,9-HpCDF		ND		0.440	5.00	1				03/22/2019 03:21
OCDF	0.001	16.9		1.30	10.0	1	1.00	1.01	0.0169	03/22/2019 03:21
Total-Tetradoxins		ND		0.110	1.00	1				03/22/2019 03:21
Total-Pentadoxins		ND		0.280	5.00	1				03/22/2019 03:21
Total-Hexadoxins		14.0		0.560	5.00	1				03/22/2019 03:21
Total-Heptadoxins		84.8		0.620	5.00	1				03/22/2019 03:21
Total-Tetrafurans		24.0		0.210	1.00	1				03/22/2019 03:21
Total-Pentafurans		8.48		0.350	5.00	1				03/22/2019 03:21
Total-Hexafurans		12.8		0.570	5.00	1				03/22/2019 03:21
Total-Heptafurans		21.6		0.440	5.00	1				03/22/2019 03:21

Total Toxicity Equivalence (TEQ):

0.920

Cleanup Standard	REC (%)	Limits	
37Cl-2,3,7,8-TCDD	77	35-197	03/22/2019 03:21
Labeled Compound Recovery	REC (%)	Limits	
13C-2,3,7,8-TCDD	63	25-164	03/22/2019 03:21
13C-1,2,3,7,8-PeCDD	65	25-181	03/22/2019 03:21
13C-1,2,3,4,7,8-HxCDD	61	32-141	03/22/2019 03:21
13C-1,2,3,6,7,8-HxCDD	66	28-130	03/22/2019 03:21
13C-1,2,3,4,6,7,8-HpCDD	54	23-140	03/22/2019 03:21
13C-OCDD	61	17-157	03/22/2019 03:21

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Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/14/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-06	1903344-007A	Soil	03/04/2019 14:10	GC36	174839

Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
<u>Labeled Compound Recovery</u>		<u>REC (%)</u>			<u>Limits</u>					
13C-2,3,7,8-TCDF		59			24-169					03/22/2019 03:21
13C-1,2,3,7,8-PeCDF		57			24-185					03/22/2019 03:21
13C-2,3,4,7,8-PeCDF		56			21-178					03/22/2019 03:21
13C-1,2,3,4,7,8-HxCDF		57			26-152					03/22/2019 03:21
13C-1,2,3,6,7,8-HxCDF		57			26-123					03/22/2019 03:21
13C-2,3,4,6,7,8-HxCDF		58			28-136					03/22/2019 03:21
13C-1,2,3,7,8,9-HxCDF		60			29-147					03/22/2019 03:21
13C-1,2,3,4,6,7,8-HpCDF		56			28-143					03/22/2019 03:21
13C-1,2,3,4,7,8,9-HpCDF		63			26-138					03/22/2019 03:21

Analyst(s): KBO



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/22/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/L

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID					
WP-01	1903344-009C	Water	03/05/2019 12:00	GC36	175002					
Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
2,3,7,8-TCDD		ND		2.00	10.0	1				03/25/2019 17:53
1,2,3,7,8-PeCDD		ND		10.0	50.0	1				03/25/2019 17:53
1,2,3,4,7,8-HxCDD		ND		12.0	50.0	1				03/25/2019 17:53
1,2,3,6,7,8-HxCDD		ND		8.00	50.0	1				03/25/2019 17:53
1,2,3,7,8,9-HxCDD		ND		8.50	50.0	1				03/25/2019 17:53
1,2,3,4,6,7,8-HpCDD	0.01	104		12.0	50.0	1	1.13	1	1.04	03/25/2019 17:53
OCDD	0.001	632		25.0	100	1	0.88	1	0.632	03/25/2019 17:53
2,3,7,8-TCDF		ND		2.20	10.0	1				03/25/2019 17:53
1,2,3,7,8-PeCDF		ND		7.20	50.0	1				03/25/2019 17:53
2,3,4,7,8-PeCDF		ND		8.50	50.0	1				03/25/2019 17:53
1,2,3,4,7,8-HxCDF		ND		7.60	50.0	1				03/25/2019 17:53
1,2,3,6,7,8-HxCDF		ND		10.0	50.0	1				03/25/2019 17:53
1,2,3,7,8,9-HxCDF		ND		8.00	50.0	1				03/25/2019 17:53
2,3,4,6,7,8-HxCDF		ND		9.90	50.0	1				03/25/2019 17:53
1,2,3,4,6,7,8-HpCDF		48.0	J	13.0	50.0	1	1.05	1		03/25/2019 17:53
1,2,3,4,7,8,9-HpCDF		ND		8.10	50.0	1				03/25/2019 17:53
OCDF		27.0	J	20.0	100	1	0.84	1.01		03/25/2019 17:53
Total-Tetradoxins		ND		2.00	10.0	1				03/25/2019 17:53
Total-Pentadoxins		ND		10.0	50.0	1				03/25/2019 17:53
Total-Hexadoxins		81.5		12.0	50.0	1				03/25/2019 17:53
Total-Heptadoxins		188		12.0	50.0	1				03/25/2019 17:53
Total-Tetrafurans		154		2.20	10.0	1				03/25/2019 17:53
Total-Pentafurans		63.7		8.50	50.0	1				03/25/2019 17:53
Total-Hexafurans		81.5		10.0	50.0	1				03/25/2019 17:53
Total-Heptafurans		48.0	J	13.0	50.0	1				03/25/2019 17:53
Total Toxicity Equivalence (TEQ):									1.67	

Cleanup Standard	REC (%)	Limits	
37Cl-2,3,7,8-TCDD	78	35-197	03/25/2019 17:53
Labeled Compound Recovery	REC (%)	Limits	
13C-2,3,7,8-TCDD	72	25-164	03/25/2019 17:53
13C-1,2,3,7,8-PeCDD	71	25-181	03/25/2019 17:53
13C-1,2,3,4,7,8-HxCDD	65	32-141	03/25/2019 17:53
13C-1,2,3,6,7,8-HxCDD	72	28-130	03/25/2019 17:53
13C-1,2,3,4,6,7,8-HpCDD	69	23-140	03/25/2019 17:53
13C-OCDD	84	17-157	03/25/2019 17:53

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Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/22/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/L

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-01	1903344-009C	Water	03/05/2019 12:00	GC36	175002

Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
<u>Labeled Compound Recovery</u>		<u>REC (%)</u>	<u>Limits</u>							
13C-2,3,7,8-TCDF		63			24-169					03/25/2019 17:53
13C-1,2,3,7,8-PeCDF		65			24-185					03/25/2019 17:53
13C-2,3,4,7,8-PeCDF		65			21-178					03/25/2019 17:53
13C-1,2,3,4,7,8-HxCDF		64			26-152					03/25/2019 17:53
13C-1,2,3,6,7,8-HxCDF		66			26-123					03/25/2019 17:53
13C-2,3,4,6,7,8-HxCDF		65			28-136					03/25/2019 17:53
13C-1,2,3,7,8,9-HxCDF		70			29-147					03/25/2019 17:53
13C-1,2,3,4,6,7,8-HpCDF		68			28-143					03/25/2019 17:53
13C-1,2,3,4,7,8,9-HpCDF		75			26-138					03/25/2019 17:53

Analyst(s): KBO

Analytical Comments: b1



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/22/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/L

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID					
WP-01R	1903344-010A	Water	03/05/2019 12:05	GC36	175002					
Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
2,3,7,8-TCDD		ND		2.24	11.2	1				03/25/2019 22:50
1,2,3,7,8-PeCDD		ND		11.2	56.1	1				03/25/2019 22:50
1,2,3,4,7,8-HxCDD		ND		13.5	56.1	1				03/25/2019 22:50
1,2,3,6,7,8-HxCDD		ND		8.97	56.1	1				03/25/2019 22:50
1,2,3,7,8,9-HxCDD		ND		9.53	56.1	1				03/25/2019 22:50
1,2,3,4,6,7,8-HpCDD	0.01	204		13.5	56.1	1	1.04	1	2.04	03/25/2019 22:50
OCDD	0.001	1630		28.0	112	1	0.87	1	1.63	03/25/2019 22:50
2,3,7,8-TCDF		ND		2.47	11.2	1				03/25/2019 22:50
1,2,3,7,8-PeCDF		ND		8.07	56.1	1				03/25/2019 22:50
2,3,4,7,8-PeCDF		ND		9.53	56.1	1				03/25/2019 22:50
1,2,3,4,7,8-HxCDF		ND		8.52	56.1	1				03/25/2019 22:50
1,2,3,6,7,8-HxCDF		ND		11.2	56.1	1				03/25/2019 22:50
1,2,3,7,8,9-HxCDF		ND		8.97	56.1	1				03/25/2019 22:50
2,3,4,6,7,8-HxCDF		ND		11.1	56.1	1				03/25/2019 22:50
1,2,3,4,6,7,8-HpCDF	0.01	67.7		14.6	56.1	1	1.02	1	0.677	03/25/2019 22:50
1,2,3,4,7,8,9-HpCDF		ND		9.08	56.1	1				03/25/2019 22:50
OCDF		32.3	J	22.4	112	1	0.87	1.01		03/25/2019 22:50
Total-Tetradoxins		ND		2.24	11.2	1				03/25/2019 22:50
Total-Pentadoxins		ND		11.2	56.1	1				03/25/2019 22:50
Total-Hexadoxins		78.0		13.5	56.1	1				03/25/2019 22:50
Total-Heptadoxins		441		13.5	56.1	1				03/25/2019 22:50
Total-Tetrafurans		106		2.47	11.2	1				03/25/2019 22:50
Total-Pentafurans		83.0		9.53	56.1	1				03/25/2019 22:50
Total-Hexafurans		143		11.2	56.1	1				03/25/2019 22:50
Total-Heptafurans		125		14.6	56.1	1				03/25/2019 22:50
Total Toxicity Equivalence (TEQ):									4.35	

Cleanup Standard	REC (%)	Limits	
37Cl-2,3,7,8-TCDD	76	35-197	03/25/2019 22:50
Labeled Compound Recovery	REC (%)	Limits	
13C-2,3,7,8-TCDD	56	25-164	03/25/2019 22:50
13C-1,2,3,7,8-PeCDD	58	25-181	03/25/2019 22:50
13C-1,2,3,4,7,8-HxCDD	51	32-141	03/25/2019 22:50
13C-1,2,3,6,7,8-HxCDD	55	28-130	03/25/2019 22:50
13C-1,2,3,4,6,7,8-HpCDD	57	23-140	03/25/2019 22:50
13C-OCDD	68	17-157	03/25/2019 22:50

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Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/22/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/L

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-01R	1903344-010A	Water	03/05/2019 12:05	GC36	175002

Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
<u>Labeled Compound Recovery</u>		<u>REC (%)</u>	<u>Limits</u>							
13C-2,3,7,8-TCDF		49			24-169					03/25/2019 22:50
13C-1,2,3,7,8-PeCDF		51			24-185					03/25/2019 22:50
13C-2,3,4,7,8-PeCDF		53			21-178					03/25/2019 22:50
13C-1,2,3,4,7,8-HxCDF		48			26-152					03/25/2019 22:50
13C-1,2,3,6,7,8-HxCDF		50			26-123					03/25/2019 22:50
13C-2,3,4,6,7,8-HxCDF		49			28-136					03/25/2019 22:50
13C-1,2,3,7,8,9-HxCDF		55			29-147					03/25/2019 22:50
13C-1,2,3,4,6,7,8-HpCDF		55			28-143					03/25/2019 22:50
13C-1,2,3,4,7,8,9-HpCDF		61			26-138					03/25/2019 22:50

Analyst(s): KBO

Analytical Comments: b1



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/22/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/L

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-04	1903344-013C	Water	03/05/2019 10:55	GC36	175002

Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
2,3,7,8-TCDD		ND		2.00	10.0	1				03/25/2019 23:46
1,2,3,7,8-PeCDD		ND		10.0	50.0	1				03/25/2019 23:46
1,2,3,4,7,8-HxCDD		23.3	J	12.0	50.0	1	1.11	1		03/25/2019 23:46
1,2,3,6,7,8-HxCDD	0.1	96.1		8.00	50.0	1	1.19	1	9.61	03/25/2019 23:46
1,2,3,7,8,9-HxCDD		49.7	J	8.50	50.0	1	1.21	1.01		03/25/2019 23:46
1,2,3,4,6,7,8-HpCDD	0.01	3210		12.0	50.0	1	1.06	1	32.1	03/25/2019 23:46
OCDD	0.001	38,600		25.0	100	1	0.88	1	38.6	03/25/2019 23:46
2,3,7,8-TCDF		ND		2.20	10.0	1				03/25/2019 23:46
1,2,3,7,8-PeCDF		ND		7.20	50.0	1				03/25/2019 23:46
2,3,4,7,8-PeCDF		ND		8.50	50.0	1				03/25/2019 23:46
1,2,3,4,7,8-HxCDF		25.8	J	7.60	50.0	1	1.24	1		03/25/2019 23:46
1,2,3,6,7,8-HxCDF	0.1	90.1		10.0	50.0	1	1.25	1	9.01	03/25/2019 23:46
1,2,3,7,8,9-HxCDF		ND		8.00	50.0	1				03/25/2019 23:46
2,3,4,6,7,8-HxCDF		ND		9.90	50.0	1				03/25/2019 23:46
1,2,3,4,6,7,8-HpCDF	0.01	1080		13.0	50.0	1	1.06	1	10.8	03/25/2019 23:46
1,2,3,4,7,8,9-HpCDF		31.8	J	8.10	50.0	1	1.11	1		03/25/2019 23:46
OCDF	0.001	1640		20.0	100	1	0.90	1.01	1.64	03/25/2019 23:46
Total-Tetradoxins		5.92	J	2.00	10.0	1				03/25/2019 23:46
Total-Pentadoxins		80.3		10.0	50.0	1				03/25/2019 23:46
Total-Hexadoxins		1270		12.0	50.0	1				03/25/2019 23:46
Total-Heptadoxins		6350		12.0	50.0	1				03/25/2019 23:46
Total-Tetrafurans		156		2.20	10.0	1				03/25/2019 23:46
Total-Pentafurans		564		8.50	50.0	1				03/25/2019 23:46
Total-Hexafurans		1790		10.0	50.0	1				03/25/2019 23:46
Total-Heptafurans		2570		13.0	50.0	1				03/25/2019 23:46

Total Toxicity Equivalence (TEQ):

102

Cleanup Standard	REC (%)	Limits	
37Cl-2,3,7,8-TCDD	75	35-197	03/25/2019 23:46
Labeled Compound Recovery	REC (%)	Limits	
13C-2,3,7,8-TCDD	72	25-164	03/25/2019 23:46
13C-1,2,3,7,8-PeCDD	76	25-181	03/25/2019 23:46
13C-1,2,3,4,7,8-HxCDD	70	32-141	03/25/2019 23:46
13C-1,2,3,6,7,8-HxCDD	74	28-130	03/25/2019 23:46
13C-1,2,3,4,6,7,8-HpCDD	74	23-140	03/25/2019 23:46
13C-OCDD	94	17-157	03/25/2019 23:46

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Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/22/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/L

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-04	1903344-013C	Water	03/05/2019 10:55	GC36	175002

Analytes	I-TEF NATO '88	Result	Qualifiers	MDL	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
<u>Labeled Compound Recovery</u>		<u>REC (%)</u>	<u>Limits</u>							
13C-2,3,7,8-TCDF		64			24-169					03/25/2019 23:46
13C-1,2,3,7,8-PeCDF		68			24-185					03/25/2019 23:46
13C-2,3,4,7,8-PeCDF		69			21-178					03/25/2019 23:46
13C-1,2,3,4,7,8-HxCDF		64			26-152					03/25/2019 23:46
13C-1,2,3,6,7,8-HxCDF		66			26-123					03/25/2019 23:46
13C-2,3,4,6,7,8-HxCDF		68			28-136					03/25/2019 23:46
13C-1,2,3,7,8,9-HxCDF		73			29-147					03/25/2019 23:46
13C-1,2,3,4,6,7,8-HpCDF		70			28-143					03/25/2019 23:46
13C-1,2,3,4,7,8,9-HpCDF		78			26-138					03/25/2019 23:46

Analyst(s): KBO

Analytical Comments: b1



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/8/19-3/9/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

TPH(g)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-01	1903344-009A	Water	03/05/2019 12:00	GC38 03081912.D	174293

Analytes	Result	MDL	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	11	50	1	03/08/2019 13:32

Surrogates	REC (%)	Limits
Dibromofluoromethane	95	81-144

Analyst(s): TK **Analytical Comments:** b1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WTP-02	1903344-011A	Water	03/05/2019 12:30	GC38 03081913.D	174293

Analytes	Result	MDL	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	11	50	1	03/08/2019 14:10

Surrogates	REC (%)	Limits
Dibromofluoromethane	96	81-144

Analyst(s): TK **Analytical Comments:** b1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-03	1903344-012A	Water	03/05/2019 11:30	GC38 03081914.D	174293

Analytes	Result	MDL	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	11	50	1	03/08/2019 14:47

Surrogates	REC (%)	Limits
Dibromofluoromethane	96	81-144

Analyst(s): TK **Analytical Comments:** b1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-04	1903344-013A	Water	03/05/2019 10:55	GC38 03081915.D	174293

Analytes	Result	MDL	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	11	50	1	03/08/2019 15:25

Surrogates	REC (%)	Limits
Dibromofluoromethane	96	81-144

Analyst(s): TK **Analytical Comments:** b1

(Cont.)



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/8/19-3/9/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

TPH(g)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-05	1903344-014A	Water	03/05/2019 12:55	GC38 03081927.D	174293

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH(g) (C6-C12)	ND	11	50	1	03/08/2019 23:09

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>			
Dibromofluoromethane	96	81-144			03/08/2019 23:09

Analyst(s): AK Analytical Comments: b1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-06	1903344-015A	Water	03/05/2019 13:20	GC38 03081928.D	174293

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH(g) (C6-C12)	ND	11	50	1	03/08/2019 23:47

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>			
Dibromofluoromethane	95	81-144			03/08/2019 23:47

Analyst(s): AK Analytical Comments: b1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-07	1903344-016A	Water	03/04/2019 15:00	GC38 03081929.D	174293

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH(g) (C6-C12)	ND	11	50	1	03/09/2019 00:24

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>			
Dibromofluoromethane	94	81-144			03/09/2019 00:24

Analyst(s): AK Analytical Comments: b1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-07R	1903344-017A	Water	03/04/2019 15:05	GC38 03081930.D	174293

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH(g) (C6-C12)	ND	11	50	1	03/09/2019 01:02

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>			
Dibromofluoromethane	94	81-144			03/09/2019 01:02

Analyst(s): AK Analytical Comments: b1



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/8/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E625
Analytical Method: SW8270C-SIM
Unit: µg/L

Polynuclear Aromatic Hydrocarbons (PAHs / PNAs) using SIM Mode

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-07	1903344-016D	Water	03/04/2019 15:00	GC21 03121938.D	174261

Analytes	Result	MDL	RL	DE	Date Analyzed
Acenaphthene	ND	0.0052	0.010	1	03/13/2019 03:07
Acenaphthylene	ND	0.0051	0.010	1	03/13/2019 03:07
Anthracene	ND	0.0044	0.010	1	03/13/2019 03:07
Benzo (a) anthracene	ND	0.019	0.020	1	03/13/2019 03:07
Benzo (a) pyrene	ND	0.0065	0.010	1	03/13/2019 03:07
Benzo (b) fluoranthene	ND	0.0041	0.0051	1	03/13/2019 03:07
Benzo (g,h,i) perylene	ND	0.0073	0.020	1	03/13/2019 03:07
Benzo (k) fluoranthene	ND	0.0064	0.010	1	03/13/2019 03:07
Chrysene	ND	0.0095	0.010	1	03/13/2019 03:07
Dibenzo (a,h) anthracene	ND	0.0096	0.010	1	03/13/2019 03:07
Fluoranthene	ND	0.0070	0.010	1	03/13/2019 03:07
Fluorene	ND	0.0065	0.010	1	03/13/2019 03:07
Indeno (1,2,3-cd) pyrene	ND	0.0066	0.020	1	03/13/2019 03:07
1-Methylnaphthalene	ND	0.0053	0.010	1	03/13/2019 03:07
2-Methylnaphthalene	ND	0.0054	0.010	1	03/13/2019 03:07
Naphthalene	ND	0.0049	0.010	1	03/13/2019 03:07
Pentachlorophenol	ND	0.055	0.25	1	03/13/2019 03:07
Phenanthrene	ND	0.0056	0.020	1	03/13/2019 03:07
Pyrene	ND	0.0058	0.020	1	03/13/2019 03:07

Surrogates	REC (%)	Limits	
2-Fluorobiphenyl	62	40-140	03/13/2019 03:07
2-Fluorophenol	40	8-130	03/13/2019 03:07

Analyst(s): REB

Analytical Comments: b1

(Cont.)



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/8/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E625
Analytical Method: SW8270C-SIM
Unit: µg/L

Polynuclear Aromatic Hydrocarbons (PAHs / PNAs) using SIM Mode

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-07R	1903344-017D	Water	03/04/2019 15:05	GC17 03111930.D	174261

Analytes	Result	MDL	RL	DE	Date Analyzed
Acenaphthene	ND	0.0052	0.010	1	03/11/2019 22:03
Acenaphthylene	ND	0.0051	0.010	1	03/11/2019 22:03
Anthracene	ND	0.0044	0.010	1	03/11/2019 22:03
Benzo (a) anthracene	ND	0.019	0.020	1	03/11/2019 22:03
Benzo (a) pyrene	ND	0.0065	0.010	1	03/11/2019 22:03
Benzo (b) fluoranthene	ND	0.0041	0.0051	1	03/11/2019 22:03
Benzo (g,h,i) perylene	ND	0.0072	0.020	1	03/11/2019 22:03
Benzo (k) fluoranthene	ND	0.0064	0.010	1	03/11/2019 22:03
Chrysene	ND	0.0094	0.010	1	03/11/2019 22:03
Dibenzo (a,h) anthracene	ND	0.0095	0.010	1	03/11/2019 22:03
Fluoranthene	ND	0.0069	0.010	1	03/11/2019 22:03
Fluorene	ND	0.0065	0.010	1	03/11/2019 22:03
Indeno (1,2,3-cd) pyrene	ND	0.0066	0.020	1	03/11/2019 22:03
1-Methylnaphthalene	ND	0.0053	0.010	1	03/11/2019 22:03
2-Methylnaphthalene	ND	0.0054	0.010	1	03/11/2019 22:03
Naphthalene	ND	0.0049	0.010	1	03/11/2019 22:03
Pentachlorophenol	ND	0.055	0.25	1	03/11/2019 22:03
Phenanthrene	ND	0.0056	0.020	1	03/11/2019 22:03
Pyrene	ND	0.0058	0.020	1	03/11/2019 22:03

Surrogates	REC (%)	Limits	
2-Fluorobiphenyl	43	40-140	03/11/2019 22:03
2-Fluorophenol	38	8-130	03/11/2019 22:03

Analyst(s): REB

Analytical Comments: b1



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/20/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: SW3640Am
Analytical Method: SW8270C
Unit: µg/L

Semi-Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-01	1903344-009D	Water	03/05/2019 12:00	GC21 03201929.D	174861

Analytes	Result	Qualifiers	MDL	RL	DF	Date Analyzed
Pentachlorophenol	ND	H	0.11	0.25	1	03/20/2019 22:20

Surrogates	REC (%)	Qualifiers	Limits	
2-Fluorobiphenyl	50	H	40-140	03/20/2019 22:20

Analyst(s): REB

Analytical Comments: b1,c2

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-04	1903344-013D	Water	03/05/2019 10:55	GC21 03201931.D	174861

Analytes	Result	Qualifiers	MDL	RL	DF	Date Analyzed
Pentachlorophenol	ND	H	0.55	1.2	5	03/20/2019 23:15

Surrogates	REC (%)	Qualifiers	Limits	
2-Fluorobiphenyl	64	H	40-140	03/20/2019 23:15

Analyst(s): REB

Analytical Comments: a3,b1



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/7/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: SW3550B
Analytical Method: SW8270C
Unit: mg/Kg

Semi-Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-01	1903344-001A	Soil	03/04/2019 14:25	GC21 03111929.D	174141

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Pentachlorophenol	ND	0.014	0.031	1	03/11/2019 22:11

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>			
2,4,6-Tribromophenol	45	25-166			03/11/2019 22:11

Analyst(s): REB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-01R	1903344-002A	Soil	03/04/2019 14:30	GC21 03111930.D	174141

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Pentachlorophenol	ND	0.11	0.25	1	03/11/2019 22:38

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>			
2,4,6-Tribromophenol	45	25-166			03/11/2019 22:38

Analyst(s): REB

Analytical Comments: a4

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-02	1903344-003A	Soil	03/04/2019 11:35	GC21 03111931.D	174141

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Pentachlorophenol	ND	0.11	0.25	1	03/11/2019 23:06

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>			
2,4,6-Tribromophenol	43	25-166			03/11/2019 23:06

Analyst(s): REB

Analytical Comments: a4

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-03	1903344-004A	Soil	03/04/2019 11:10	GC21 03111932.D	174141

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Pentachlorophenol	ND	0.014	0.031	1	03/11/2019 23:33

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>			
2,4,6-Tribromophenol	46	25-166			03/11/2019 23:33

Analyst(s): REB

(Cont.)



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/7/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: SW3550B
Analytical Method: SW8270C
Unit: mg/Kg

Semi-Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-04	1903344-005A	Soil	03/04/2019 14:45	GC21 03111933.D	174141

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Pentachlorophenol	ND	0.014	0.031	1	03/12/2019 00:00

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>			
2,4,6-Tribromophenol	37	25-166			03/12/2019 00:00

Analyst(s): REB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-05	1903344-006A	Soil	03/04/2019 11:55	GC21 03111934.D	174141

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Pentachlorophenol	ND	0.014	0.031	1	03/12/2019 00:27

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>			
2,4,6-Tribromophenol	27	25-166			03/12/2019 00:27

Analyst(s): REB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-06	1903344-007A	Soil	03/04/2019 14:10	GC21 03111935.D	174141

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Pentachlorophenol	ND	0.014	0.031	1	03/12/2019 00:54

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>			
2,4,6-Tribromophenol	25	25-166			03/12/2019 00:54

Analyst(s): REB



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/8/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E625
Analytical Method: SW8270C
Unit: µg/L

Semi-Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-01	1903344-009D	Water	03/05/2019 12:00	GC17 03111927.D	174261

Analytes	Result	MDL	RL	DF	Date Analyzed
Pentachlorophenol	ND	0.53	2.4	10	03/11/2019 20:40

Surrogates	REC (%)	Limits	
2,4,6-Tribromophenol	26	1-159	03/11/2019 20:40

Analyst(s): REB Analytical Comments: a3,b1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-04	1903344-013D	Water	03/05/2019 10:55	GC17 03111928.D	174261

Analytes	Result	MDL	RL	DF	Date Analyzed
Pentachlorophenol	ND	2.6	12	50	03/11/2019 21:08

Surrogates	REC (%)	Limits	
2,4,6-Tribromophenol	83	1-159	03/11/2019 21:08

Analyst(s): REB Analytical Comments: a3,b1



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.

WorkOrder: 1903344

Date Received: 3/7/19 9:56

Extraction Method: E200.8

Date Prepared: 3/7/19

Analytical Method: E200.8

Project: 018022.030; Little Lake Industries

Unit: µg/L

Dissolved Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-06	1903344-015C	Water	03/05/2019 13:20	ICP-MS3 172SMPL.D	174185

Analytes	Result	Qualifiers	MDL	RL	DF	Date Analyzed
Antimony	0.24	J	0.060	0.50	1	03/09/2019 01:53
Arsenic	1.9		0.19	0.50	1	03/09/2019 01:53
Barium	140		1.0	5.0	1	03/09/2019 01:53
Beryllium	0.071	J	0.050	0.50	1	03/09/2019 01:53
Cadmium	ND		0.040	0.25	1	03/09/2019 01:53
Chromium	2.1		0.14	0.50	1	03/09/2019 01:53
Cobalt	5.8		0.050	0.50	1	03/09/2019 01:53
Lead	5.5		0.080	0.50	1	03/09/2019 01:53
Nickel	14		0.18	0.50	1	03/09/2019 01:53
Thallium	ND		0.026	0.50	1	03/09/2019 01:53
Vanadium	4.6		0.060	0.50	1	03/09/2019 01:53

Analyst(s): DB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-07	1903344-016C	Water	03/04/2019 15:00	ICP-MS3 173SMPL.D	174185

Analytes	Result	Qualifiers	MDL	RL	DF	Date Analyzed
Antimony	0.090	J	0.060	0.50	1	03/09/2019 01:59
Arsenic	6.9		0.19	0.50	1	03/09/2019 01:59
Barium	160		1.0	5.0	1	03/09/2019 01:59
Beryllium	ND		0.050	0.50	1	03/09/2019 01:59
Cadmium	ND		0.040	0.25	1	03/09/2019 01:59
Chromium	0.38	J	0.14	0.50	1	03/09/2019 01:59
Cobalt	6.8		0.050	0.50	1	03/09/2019 01:59
Lead	ND		0.080	0.50	1	03/09/2019 01:59
Nickel	11		0.18	0.50	1	03/09/2019 01:59
Thallium	ND		0.026	0.50	1	03/09/2019 01:59
Vanadium	0.93		0.060	0.50	1	03/09/2019 01:59

Analyst(s): DB

(Cont.)



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/7/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: E200.8
Analytical Method: E200.8
Unit: µg/L

Dissolved Metals

Client ID	Lab ID	Matrix	Date Collected			Instrument	Batch ID
WP-07R	1903344-017C	Water	03/04/2019 15:05			ICP-MS3 174SMPL.D	174185
<u>Analytes</u>	<u>Result</u>	<u>Qualifiers</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>	
Antimony	0.11	J	0.060	0.50	1	03/09/2019 02:05	
Arsenic	6.7		0.19	0.50	1	03/09/2019 02:05	
Barium	160		1.0	5.0	1	03/09/2019 02:05	
Beryllium	ND		0.050	0.50	1	03/09/2019 02:05	
Cadmium	ND		0.040	0.25	1	03/09/2019 02:05	
Chromium	0.35	J	0.14	0.50	1	03/09/2019 02:05	
Cobalt	6.7		0.050	0.50	1	03/09/2019 02:05	
Lead	ND		0.080	0.50	1	03/09/2019 02:05	
Nickel	11		0.18	0.50	1	03/09/2019 02:05	
Thallium	ND		0.026	0.50	1	03/09/2019 02:05	
Vanadium	1.0		0.060	0.50	1	03/09/2019 02:05	

Analyst(s): DB

Client ID	Lab ID	Matrix	Date Collected			Instrument	Batch ID
WP-EB	1903344-018A	Water	03/04/2019 15:30			ICP-MS3 175SMPL.D	174185
<u>Analytes</u>	<u>Result</u>	<u>Qualifiers</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>	
Antimony	ND		0.060	0.50	1	03/09/2019 02:11	
Arsenic	ND		0.19	0.50	1	03/09/2019 02:11	
Barium	6.2		1.0	5.0	1	03/09/2019 02:11	
Beryllium	ND		0.050	0.50	1	03/09/2019 02:11	
Cadmium	ND		0.040	0.25	1	03/09/2019 02:11	
Chromium	0.92		0.14	0.50	1	03/09/2019 02:11	
Cobalt	0.51		0.050	0.50	1	03/09/2019 02:11	
Lead	0.40	J	0.080	0.50	1	03/09/2019 02:11	
Nickel	3.6		0.18	0.50	1	03/09/2019 02:11	
Thallium	ND		0.026	0.50	1	03/09/2019 02:11	
Vanadium	0.45	J	0.060	0.50	1	03/09/2019 02:11	

Analyst(s): DB



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/7/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg

Lead

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-01	1903344-001A	Soil	03/04/2019 14:25	ICP-MS3 035SMPL.D	174156

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Lead	28	0.094	0.50	1	03/08/2019 11:48

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>			
Terbium	105	70-130			03/08/2019 11:48

Analyst(s): ND

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-01R	1903344-002A	Soil	03/04/2019 14:30	ICP-MS3 036SMPL.D	174156

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Lead	27	0.094	0.50	1	03/08/2019 11:54

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>			
Terbium	108	70-130			03/08/2019 11:54

Analyst(s): ND

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-02	1903344-003A	Soil	03/04/2019 11:35	ICP-MS3 037SMPL.D	174156

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Lead	10	0.094	0.50	1	03/08/2019 12:00

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>			
Terbium	106	70-130			03/08/2019 12:00

Analyst(s): ND

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-03	1903344-004A	Soil	03/04/2019 11:10	ICP-MS3 046SMPL.D	174156

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Lead	13	0.094	0.50	1	03/08/2019 12:55

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>			
Terbium	108	70-130			03/08/2019 12:55

Analyst(s): MIG

(Cont.)



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/7/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg

Lead

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-04	1903344-005A	Soil	03/04/2019 14:45	ICP-MS3 047SMPL.D	174156

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Lead	16	0.094	0.50	1	03/08/2019 13:01

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>			
Terbium	105	70-130			03/08/2019 13:01

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-05	1903344-006A	Soil	03/04/2019 11:55	ICP-MS3 048SMPL.D	174156

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Lead	10	0.094	0.50	1	03/08/2019 13:07

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>			
Terbium	103	70-130			03/08/2019 13:07

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-06	1903344-007A	Soil	03/04/2019 14:10	ICP-MS3 049SMPL.D	174156

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Lead	28	0.094	0.50	1	03/08/2019 13:13

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>			
Terbium	103	70-130			03/08/2019 13:13

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-07	1903344-008A	Soil	03/04/2019 15:30	ICP-MS3 050SMPL.D	174156

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
Lead	13	0.094	0.50	1	03/08/2019 13:20

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>			
Terbium	109	70-130			03/08/2019 13:20

Analyst(s): MIG



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/7/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: SW3550B/3630C
Analytical Method: SW8015B
Unit: mg/Kg

Total Extractable Petroleum Hydrocarbons with Silica Gel Clean-Up

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-01	1903344-001A	Soil	03/04/2019 14:25	GC6A 03081966.D	174148

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH-Diesel (C10-C23)	99	0.86	1.0	1	03/09/2019 08:28

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>	
C9	111	74-123	03/09/2019 08:28

Analyst(s): JIS Analytical Comments: e2,e7,e8

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-01R	1903344-002A	Soil	03/04/2019 14:30	GC6A 03081970.D	174148

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH-Diesel (C10-C23)	150	0.86	1.0	1	03/09/2019 09:46

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>	
C9	114	74-123	03/09/2019 09:46

Analyst(s): JIS Analytical Comments: e2,e7,e8

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-07	1903344-008A	Soil	03/04/2019 15:30	GC9b 03121927.D	174148

<u>Analytes</u>	<u>Result</u>	<u>MDL</u>	<u>RL</u>	<u>DF</u>	<u>Date Analyzed</u>
TPH-Diesel (C10-C23)	ND	0.86	1.0	1	03/12/2019 20:01

<u>Surrogates</u>	<u>REC (%)</u>	<u>Limits</u>	
C9	81	74-123	03/12/2019 20:01

Analyst(s): JIS



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/7/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: SW3510C/3630C
Analytical Method: SW8015B
Unit: µg/L

Total Extractable Petroleum Hydrocarbons with Silica Gel Clean-Up

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-01	1903344-009B	Water	03/05/2019 12:00	GC11A 03071968.D	174175

Analytes	Result	MDL	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	ND	45	50	1	03/08/2019 06:30

Surrogates	REC (%)	Limits	
C9	89	61-139	03/08/2019 06:30

Analyst(s): JIS **Analytical Comments:** b1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WTP-02	1903344-011B	Water	03/05/2019 12:30	GC11A 03071970.D	174175

Analytes	Result	MDL	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	ND	45	50	1	03/08/2019 07:07

Surrogates	REC (%)	Limits	
C9	89	61-139	03/08/2019 07:07

Analyst(s): JIS **Analytical Comments:** b1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-03	1903344-012B	Water	03/05/2019 11:30	GC6A 03081988.D	174175

Analytes	Result	MDL	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	ND	45	50	1	03/09/2019 15:38

Surrogates	REC (%)	Limits	
C9	110	61-139	03/09/2019 15:38

Analyst(s): JIS **Analytical Comments:** b1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-04	1903344-013B	Water	03/05/2019 10:55	GC6A 03081992.D	174175

Analytes	Result	MDL	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	ND	45	50	1	03/09/2019 16:56

Surrogates	REC (%)	Limits	
C9	111	61-139	03/09/2019 16:56

Analyst(s): JIS **Analytical Comments:** b1

(Cont.)



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 3/7/19 9:56
Date Prepared: 3/7/19
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
Extraction Method: SW3510C/3630C
Analytical Method: SW8015B
Unit: µg/L

Total Extractable Petroleum Hydrocarbons with Silica Gel Clean-Up

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-05	1903344-014B	Water	03/05/2019 12:55	GC6B 03081965.D	174175

Analytes	Result	MDL	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	ND	45	50	1	03/09/2019 08:28

Surrogates	REC (%)	Limits	
C9	98	61-139	03/09/2019 08:28

Analyst(s): JIS Analytical Comments: b1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-06	1903344-015B	Water	03/05/2019 13:20	GC6A 03111912.D	174175

Analytes	Result	MDL	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	ND	45	50	1	03/11/2019 12:20

Surrogates	REC (%)	Limits	
C9	93	61-139	03/11/2019 12:20

Analyst(s): JIS Analytical Comments: b1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-07	1903344-016B	Water	03/04/2019 15:00	GC6A 03081984.D	174175

Analytes	Result	MDL	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	ND	45	50	1	03/09/2019 14:19

Surrogates	REC (%)	Limits	
C9	109	61-139	03/09/2019 14:19

Analyst(s): JIS Analytical Comments: b1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-07R	1903344-017B	Water	03/04/2019 15:05	GC11B 03071961.D	174175

Analytes	Result	MDL	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	ND	45	50	1	03/08/2019 04:38

Surrogates	REC (%)	Limits	
C9	95	61-139	03/08/2019 04:38

Analyst(s): JIS Analytical Comments: b1

CLIENT: SHN Consulting Engineers & Geologists, Inc.

ANALYTICAL QC SUMMARY REPORT

Work Order: 1903344

Project: 018022.030; Little Lake Industries

BatchID:

174839

SampleID	MB-174839	TestCode: 1613_FULL_S			Units: pg/g			Prep Date: 3/14/2019				
Batch ID:	174839	TestNo: E1613B			Run ID: GC36_190322A			Analysis Date: 3/21/2019				
Analyte		Result	MDL	PQL	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD		ND	0.110	1.00				-				
1,2,3,7,8-PeCDD		ND	0.280	5.00				-				
1,2,3,4,7,8-HxCDD		ND	0.560	5.00				-				
1,2,3,6,7,8-HxCDD		ND	0.380	5.00				-				
1,2,3,7,8,9-HxCDD		ND	0.450	5.00				-				
1,2,3,4,6,7,8-HpCDD		ND	0.620	5.00				-				
OCDD		ND	1.70	10.0				-				
2,3,7,8-TCDF		ND	0.210	1.00				-				
1,2,3,7,8-PeCDF		ND	0.350	5.00				-				
2,3,4,7,8-PeCDF		ND	0.330	5.00				-				
1,2,3,4,7,8-HxCDF		ND	0.570	5.00				-				
1,2,3,6,7,8-HxCDF		ND	0.570	5.00				-				
1,2,3,7,8,9-HxCDF		ND	0.520	5.00				-				
2,3,4,6,7,8-HxCDF		ND	0.410	5.00				-				
1,2,3,4,6,7,8-HpCDF		ND	0.370	5.00				-				
1,2,3,4,7,8,9-HpCDF		ND	0.440	5.00				-				
OCDF		ND	1.30	10.0				-				
Total-Tetradoxins		ND	0.110	1.00				-				
Total-Pentadoxins		ND	0.280	5.00				-				
Total-Hexadoxins		ND	0.560	5.00				-				
Total-Heptadoxins		ND	0.620	5.00				-				
Total-Tetrafurans		ND	0.210	1.00				-				
Total-Pentafurans		ND	0.350	5.00				-				
Total-Hexafurans		ND	0.570	5.00				-				
Total-Heptafurans		ND	0.440	5.00				-				

Cleanup Standard

37Cl-2,3,7,8-TCDD	7.42		10	74	35 - 197
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Labeled Compound Recovery

13C-2,3,7,8-TCDD	56.5		100	56	25 - 164
13C-1,2,3,7,8-PeCDD	47.7		100	48	25 - 181
13C-1,2,3,4,7,8-HxCDD	43.9		100	44	32 - 141
13C-1,2,3,6,7,8-HxCDD	45.2		100	45	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	46.0		100	46	23 - 140
13C-OCDD	98.6		200	49	17 - 157
13C-2,3,7,8-TCDF	47.5		100	47	24 - 169
13C-1,2,3,7,8-PeCDF	47.7		100	48	24 - 185
13C-2,3,4,7,8-PeCDF	49.6		100	50	21 - 178
13C-1,2,3,4,7,8-HxCDF	44.3		100	44	26 - 152
13C-1,2,3,6,7,8-HxCDF	43.6		100	44	26 - 123
13C-2,3,4,6,7,8-HxCDF	44.3		100	44	28 - 136
13C-1,2,3,7,8,9-HxCDF	46.1		100	46	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	43.1		100	43	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	47.6		100	48	26 - 138

CLIENT: SHN Consulting Engineers & Geologists, Inc.
Work Order: 1903344
Project: 018022.030; Little Lake Industries

ANALYTICAL QC SUMMARY REPORT

BatchID: 174839

SampleID	LCS-174839	TestCode: 1613_FULL_S				Units: pg/g		Prep Date: 3/14/2019				
Batch ID: 174839		TestNo: E1613B				Run ID: GC36_190322B		Analysis Date: 3/21/2019				
Analyte		Result	MDL	PQL	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD		9.98	0.110	1.00	10	0	100	67 - 158				
1,2,3,7,8-PeCDD		49.6	0.280	5.00	50	0	99	70 - 142				
1,2,3,4,7,8-HxCDD		50.7	0.560	5.00	50	0	101	70 - 164				
1,2,3,6,7,8-HxCDD		52.9	0.380	5.00	50	0	106	76 - 134				
1,2,3,7,8,9-HxCDD		52.2	0.450	5.00	50	0	104	64 - 162				
1,2,3,4,6,7,8-HpCDD		53.6	0.620	5.00	50	0	107	70 - 140				
OCDD		108	1.70	10.0	100	0	108	78 - 144				
2,3,7,8-TCDF		10.2	0.210	1.00	10	0	102	75 - 158				
1,2,3,7,8-PeCDF		53.2	0.350	5.00	50	0	106	80 - 134				
2,3,4,7,8-PeCDF		52.6	0.330	5.00	50	0	105	68 - 160				
1,2,3,4,7,8-HxCDF		56.2	0.570	5.00	50	0	112	72 - 134				
1,2,3,6,7,8-HxCDF		56.8	0.570	5.00	50	0	114	84 - 130				
1,2,3,7,8,9-HxCDF		55.8	0.520	5.00	50	0	112	78 - 130				
2,3,4,6,7,8-HxCDF		57.9	0.410	5.00	50	0	116	70 - 156				
1,2,3,4,6,7,8-HpCDF		54.6	0.370	5.00	50	0	109	82 - 122				
1,2,3,4,7,8,9-HpCDF		54.3	0.440	5.00	50	0	109	78 - 138				
OCDF		140	1.30	10.0	100	0	140	63 - 170				

Cleanup Standard

37Cl-2,3,7,8-TCDD	7.12		10	71	31 - 191
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Labeled Compound Recovery

13C-2,3,7,8-TCDD	69.4	100	69	20 - 175
13C-1,2,3,7,8-PeCDD	73.3	100	73	21 - 227
13C-1,2,3,4,7,8-HxCDD	65.5	100	65	21 - 193
13C-1,2,3,6,7,8-HxCDD	66.9	100	67	25 - 163
13C-1,2,3,4,6,7,8-HpCDD	61.9	100	62	26 - 166
13C-OCDD	134	200	67	13 - 199
13C-2,3,7,8-TCDF	55.7	100	56	22 - 152
13C-1,2,3,7,8-PeCDF	59.8	100	60	21 - 192
13C-2,3,4,7,8-PeCDF	60.0	100	60	13 - 328
13C-1,2,3,4,7,8-HxCDF	59.6	100	60	19 - 202
13C-1,2,3,6,7,8-HxCDF	57.7	100	58	21 - 159
13C-2,3,4,6,7,8-HxCDF	59.6	100	60	22 - 176
13C-1,2,3,7,8,9-HxCDF	65.5	100	65	17 - 205
13C-1,2,3,4,6,7,8-HpCDF	59.6	100	60	21 - 158
13C-1,2,3,4,7,8,9-HpCDF	68.8	100	69	20 - 186

CLIENT: SHN Consulting Engineers & Geologists, Inc.
Work Order: 1903344
Project: 018022.030; Little Lake Industries

ANALYTICAL QC SUMMARY REPORT

BatchID: 174839

SampleID	LCSD-174839	TestCode: 1613_FULL_S				Units: pg/g		Prep Date: 3/14/2019				
Batch ID: 174839		TestNo: E1613B				Run ID: GC36_190322B		Analysis Date: 3/21/2019				
Analyte		Result	MDL	PQL	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD		9.52	0.110	1.00	10	0	95	67 - 158	9.98	4.72	20	
1,2,3,7,8-PeCDD		50.5	0.280	5.00	50	0	101	70 - 142	49.58	1.84	20	
1,2,3,4,7,8-HxCDD		51.7	0.560	5.00	50	0	103	70 - 164	50.68	1.95	20	
1,2,3,6,7,8-HxCDD		51.5	0.380	5.00	50	0	103	76 - 134	52.88	2.72	20	
1,2,3,7,8,9-HxCDD		53.2	0.450	5.00	50	0	106	64 - 162	52.22	1.78	20	
1,2,3,4,6,7,8-HpCDD		55.6	0.620	5.00	50	0	111	70 - 140	53.64	3.66	20	
OCDD		109	1.70	10.0	100	0	109	78 - 144	108.26	0.461	20	
2,3,7,8-TCDF		10.5	0.210	1.00	10	0	105	75 - 158	10.22	2.89	20	
1,2,3,7,8-PeCDF		52.6	0.350	5.00	50	0	105	80 - 134	53.24	1.13	20	
2,3,4,7,8-PeCDF		54.6	0.330	5.00	50	0	109	68 - 160	52.62	3.73	20	
1,2,3,4,7,8-HxCDF		53.9	0.570	5.00	50	0	108	72 - 134	56.2	4.14	20	
1,2,3,6,7,8-HxCDF		56.1	0.570	5.00	50	0	112	84 - 130	56.78	1.17	20	
1,2,3,7,8,9-HxCDF		58.4	0.520	5.00	50	0	117	78 - 130	55.78	4.52	20	
2,3,4,6,7,8-HxCDF		58.1	0.410	5.00	50	0	116	70 - 156	57.92	0.276	20	
1,2,3,4,6,7,8-HpCDF		59.6	0.370	5.00	50	0	119	82 - 122	54.64	8.68	20	
1,2,3,4,7,8,9-HpCDF		56.2	0.440	5.00	50	0	112	78 - 138	54.32	3.40	20	
OCDF		138	1.30	10.0	100	0	138	63 - 170	139.72	1.34	20	

Cleanup Standard

37Cl-2,3,7,8-TCDD	6.50	10	65	31 - 191
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Labeled Compound Recovery

13C-2,3,7,8-TCDD	61.5	100	62	20 - 175
13C-1,2,3,7,8-PeCDD	65.2	100	65	21 - 227
13C-1,2,3,4,7,8-HxCDD	58.8	100	59	21 - 193
13C-1,2,3,6,7,8-HxCDD	60.8	100	61	25 - 163
13C-1,2,3,4,6,7,8-HpCDD	57.5	100	57	26 - 166
13C-OCDD	132	200	66	13 - 199
13C-2,3,7,8-TCDF	52.2	100	52	22 - 152
13C-1,2,3,7,8-PeCDF	55.7	100	56	21 - 192
13C-2,3,4,7,8-PeCDF	55.2	100	55	13 - 328
13C-1,2,3,4,7,8-HxCDF	55.2	100	55	19 - 202
13C-1,2,3,6,7,8-HxCDF	52.0	100	52	21 - 159
13C-2,3,4,6,7,8-HxCDF	53.1	100	53	22 - 176
13C-1,2,3,7,8,9-HxCDF	57.4	100	57	17 - 205
13C-1,2,3,4,6,7,8-HpCDF	52.2	100	52	21 - 158
13C-1,2,3,4,7,8,9-HpCDF	62.7	100	63	20 - 186

CLIENT: SHN Consulting Engineers & Geologists, Inc.

Work Order: 1903344

Project: 018022.030; Little Lake Industries

ANALYTICAL QC SUMMARY REPORT

BatchID:

174839

SampleID	1903344-001AMS	TestCode: 1613_FULL_S				Units: pg/g		Prep Date: 3/14/2019			
Batch ID: 174839		TestNo: E1613B				Run ID: GC36_190322C		Analysis Date: 3/22/2019			
Analyte	Result	MDL	PQL	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD	10.6	0.110	1.00	10	0	106	67 - 158				
1,2,3,7,8-PeCDD	51.1	0.280	5.00	50	0	102	70 - 142				
1,2,3,4,7,8-HxCDD	53.7	0.560	5.00	50	0	107	70 - 164				
1,2,3,6,7,8-HxCDD	52.7	0.380	5.00	50	0.42	105	76 - 134				
1,2,3,7,8,9-HxCDD	53.1	0.450	5.00	50	0	106	64 - 162				
1,2,3,4,6,7,8-HpCDD	70.6	0.620	5.00	50	8.38	124	70 - 140				
OCDD	222	1.70	10.0	100	72.92	149	78 - 144				S
2,3,7,8-TCDF	10.2	0.210	1.00	10	0.28	99	75 - 158				
1,2,3,7,8-PeCDF	56.7	0.350	5.00	50	0	113	80 - 134				
2,3,4,7,8-PeCDF	55.6	0.330	5.00	50	0	111	68 - 160				
1,2,3,4,7,8-HxCDF	58.2	0.570	5.00	50	0	116	72 - 134				
1,2,3,6,7,8-HxCDF	57.0	0.570	5.00	50	0	114	84 - 130				
1,2,3,7,8,9-HxCDF	54.9	0.520	5.00	50	0	110	78 - 130				
2,3,4,6,7,8-HxCDF	57.2	0.410	5.00	50	0	114	70 - 156				
1,2,3,4,6,7,8-HpCDF	58.0	0.370	5.00	50	3.4	109	82 - 122				
1,2,3,4,7,8,9-HpCDF	53.0	0.440	5.00	50	0	106	78 - 138				
OCDF	146	1.30	10.0	100	3.86	142	63 - 170				

Cleanup Standard

37Cl-2,3,7,8-TCDD	6.84		10	68	31 - 191
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Labeled Compound Recovery

13C-2,3,7,8-TCDD	68.5	100	68	20 - 175
13C-1,2,3,7,8-PeCDD	72.5	100	72	21 - 227
13C-1,2,3,4,7,8-HxCDD	65.6	100	66	21 - 193
13C-1,2,3,6,7,8-HxCDD	69.5	100	69	25 - 163
13C-1,2,3,4,6,7,8-HpCDD	63.8	100	64	26 - 166
13C-OCDD	144	200	72	13 - 199
13C-2,3,7,8-TCDF	63.1	100	63	22 - 152
13C-1,2,3,7,8-PeCDF	61.1	100	61	21 - 192
13C-2,3,4,7,8-PeCDF	63.5	100	64	13 - 328
13C-1,2,3,4,7,8-HxCDF	62.5	100	62	19 - 202
13C-1,2,3,6,7,8-HxCDF	61.1	100	61	21 - 159
13C-2,3,4,6,7,8-HxCDF	63.7	100	64	22 - 176
13C-1,2,3,7,8,9-HxCDF	67.6	100	68	17 - 205
13C-1,2,3,4,6,7,8-HpCDF	62.2	100	62	21 - 158
13C-1,2,3,4,7,8,9-HpCDF	68.0	100	68	20 - 186

CLIENT: SHN Consulting Engineers & Geologists, Inc.

Work Order: 1903344

Project: 018022.030; Little Lake Industries

ANALYTICAL QC SUMMARY REPORT

BatchID:

174839

SampleID	1903344-001AMSD	TestCode: 1613_FULL_S				Units: pg/g		Prep Date: 3/14/2019			
Batch ID: 174839		TestNo: E1613B				Run ID: GC36_190322C		Analysis Date: 3/22/2019			
Analyte	Result	MDL	PQL	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD	10.0	0.110	1.00	10	0	100	67 - 158	10.64	5.80	20	S
1,2,3,7,8-PeCDD	51.1	0.280	5.00	50	0	102	70 - 142	51.08	0.117	20	
1,2,3,4,7,8-HxCDD	49.7	0.560	5.00	50	0	99	70 - 164	53.68	7.70	20	
1,2,3,6,7,8-HxCDD	51.1	0.380	5.00	50	0.42	101	76 - 134	52.68	3.08	20	
1,2,3,7,8,9-HxCDD	50.6	0.450	5.00	50	0	101	64 - 162	53.1	4.90	20	
1,2,3,4,6,7,8-HpCDD	74.4	0.620	5.00	50	8.38	132	70 - 140	70.58	5.30	20	
OCDD	279	1.70	10.0	100	72.92	206	78 - 144	221.96	22.7	20	
2,3,7,8-TCDF	10.3	0.210	1.00	10	0.28	100	75 - 158	10.16	1.17	20	
1,2,3,7,8-PeCDF	53.8	0.350	5.00	50	0	108	80 - 134	56.66	5.18	20	
2,3,4,7,8-PeCDF	53.7	0.330	5.00	50	0	107	68 - 160	55.58	3.48	20	
1,2,3,4,7,8-HxCDF	59.4	0.570	5.00	50	0	119	72 - 134	58.18	2.04	20	
1,2,3,6,7,8-HxCDF	55.1	0.570	5.00	50	0	110	84 - 130	56.96	3.36	20	
1,2,3,7,8,9-HxCDF	56.6	0.520	5.00	50	0	113	78 - 130	54.88	3.16	20	
2,3,4,6,7,8-HxCDF	56.6	0.410	5.00	50	0	113	70 - 156	57.24	1.20	20	
1,2,3,4,6,7,8-HpCDF	61.2	0.370	5.00	50	3.4	116	82 - 122	58.04	5.23	20	
1,2,3,4,7,8,9-HpCDF	51.1	0.440	5.00	50	0	102	78 - 138	52.96	3.65	20	
OCDF	153	1.30	10.0	100	3.86	149	63 - 170	145.9	4.93	20	

Cleanup Standard

37Cl-2,3,7,8-TCDD	6.98	10	70	31 - 191
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Labeled Compound Recovery

13C-2,3,7,8-TCDD	68.2	100	68	20 - 175
13C-1,2,3,7,8-PeCDD	71.6	100	72	21 - 227
13C-1,2,3,4,7,8-HxCDD	63.3	100	63	21 - 193
13C-1,2,3,6,7,8-HxCDD	65.2	100	65	25 - 163
13C-1,2,3,4,6,7,8-HpCDD	61.8	100	62	26 - 166
13C-OCDD	136	200	68	13 - 199
13C-2,3,7,8-TCDF	60.1	100	60	22 - 152
13C-1,2,3,7,8-PeCDF	64.0	100	64	21 - 192
13C-2,3,4,7,8-PeCDF	64.9	100	65	13 - 328
13C-1,2,3,4,7,8-HxCDF	54.0	100	54	19 - 202
13C-1,2,3,6,7,8-HxCDF	56.9	100	57	21 - 159
13C-2,3,4,6,7,8-HxCDF	57.9	100	58	22 - 176
13C-1,2,3,7,8,9-HxCDF	61.8	100	62	17 - 205
13C-1,2,3,4,6,7,8-HpCDF	54.0	100	54	21 - 158
13C-1,2,3,4,7,8,9-HpCDF	69.5	100	69	20 - 186

CLIENT: SHN Consulting Engineers & Geologists, Inc.

ANALYTICAL QC SUMMARY REPORT

Work Order: 1903344

Project: 018022.030; Little Lake Industries

BatchID: 174839

SampleID	MB-174839	TestCode: 1613_FULL_S			Units: pg/g			Prep Date: 3/14/2019				
Batch ID: 174839		TestNo: E1613B			Run ID: GC36_190322A			Analysis Date: 3/21/2019				
Analyte		Result	MDL	PQL	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD		ND	0.110	1.00				-				
1,2,3,7,8-PeCDD		ND	0.280	5.00				-				
1,2,3,4,7,8-HxCDD		ND	0.560	5.00				-				
1,2,3,6,7,8-HxCDD		ND	0.380	5.00				-				
1,2,3,7,8,9-HxCDD		ND	0.450	5.00				-				
1,2,3,4,6,7,8-HpCDD		ND	0.620	5.00				-				
OCDD		ND	1.70	10.0				-				
2,3,7,8-TCDF		ND	0.210	1.00				-				
1,2,3,7,8-PeCDF		ND	0.350	5.00				-				
2,3,4,7,8-PeCDF		ND	0.330	5.00				-				
1,2,3,4,7,8-HxCDF		ND	0.570	5.00				-				
1,2,3,6,7,8-HxCDF		ND	0.570	5.00				-				
1,2,3,7,8,9-HxCDF		ND	0.520	5.00				-				
2,3,4,6,7,8-HxCDF		ND	0.410	5.00				-				
1,2,3,4,6,7,8-HpCDF		ND	0.370	5.00				-				
1,2,3,4,7,8,9-HpCDF		ND	0.440	5.00				-				
OCDF		ND	1.30	10.0				-				
Total-Tetradoxins		ND	0.110	1.00				-				
Total-Pentadoxins		ND	0.280	5.00				-				
Total-Hexadoxins		ND	0.560	5.00				-				
Total-Heptadoxins		ND	0.620	5.00				-				
Total-Tetrafurans		ND	0.210	1.00				-				
Total-Pentafurans		ND	0.350	5.00				-				
Total-Hexafurans		ND	0.570	5.00				-				
Total-Heptafurans		ND	0.440	5.00				-				

Cleanup Standard

37Cl-2,3,7,8-TCDD	7.42		10	74	35 - 197
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Labeled Compound Recovery

13C-2,3,7,8-TCDD	56.5		100	56	25 - 164
13C-1,2,3,7,8-PeCDD	47.7		100	48	25 - 181
13C-1,2,3,4,7,8-HxCDD	43.9		100	44	32 - 141
13C-1,2,3,6,7,8-HxCDD	45.2		100	45	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	46.0		100	46	23 - 140
13C-OCDD	98.6		200	49	17 - 157
13C-2,3,7,8-TCDF	47.5		100	47	24 - 169
13C-1,2,3,7,8-PeCDF	47.7		100	48	24 - 185
13C-2,3,4,7,8-PeCDF	49.6		100	50	21 - 178
13C-1,2,3,4,7,8-HxCDF	44.3		100	44	26 - 152
13C-1,2,3,6,7,8-HxCDF	43.6		100	44	26 - 123
13C-2,3,4,6,7,8-HxCDF	44.3		100	44	28 - 136
13C-1,2,3,7,8,9-HxCDF	46.1		100	46	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	43.1		100	43	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	47.6		100	48	26 - 138

CLIENT: SHN Consulting Engineers & Geologists, Inc.
Work Order: 1903344
Project: 018022.030; Little Lake Industries

ANALYTICAL QC SUMMARY REPORT

BatchID: 174839

SampleID	LCS-174839			TestCode: 1613_FULL_S			Units: pg/g		Prep Date: 3/14/2019			
Batch ID: 174839		TestNo: E1613B			Run ID: GC36_190322B			Analysis Date: 3/21/2019				
Analyte	Result	MDL	PQL	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual	
2,3,7,8-TCDD	9.98	0.110	1.00	10	0	100	67 - 158					
1,2,3,7,8-PeCDD	49.6	0.280	5.00	50	0	99	70 - 142					
1,2,3,4,7,8-HxCDD	50.7	0.560	5.00	50	0	101	70 - 164					
1,2,3,6,7,8-HxCDD	52.9	0.380	5.00	50	0	106	76 - 134					
1,2,3,7,8,9-HxCDD	52.2	0.450	5.00	50	0	104	64 - 162					
1,2,3,4,6,7,8-HpCDD	53.6	0.620	5.00	50	0	107	70 - 140					
OCDD	108	1.70	10.0	100	0	108	78 - 144					
2,3,7,8-TCDF	10.2	0.210	1.00	10	0	102	75 - 158					
1,2,3,7,8-PeCDF	53.2	0.350	5.00	50	0	106	80 - 134					
2,3,4,7,8-PeCDF	52.6	0.330	5.00	50	0	105	68 - 160					
1,2,3,4,7,8-HxCDF	56.2	0.570	5.00	50	0	112	72 - 134					
1,2,3,6,7,8-HxCDF	56.8	0.570	5.00	50	0	114	84 - 130					
1,2,3,7,8,9-HxCDF	55.8	0.520	5.00	50	0	112	78 - 130					
2,3,4,6,7,8-HxCDF	57.9	0.410	5.00	50	0	116	70 - 156					
1,2,3,4,6,7,8-HpCDF	54.6	0.370	5.00	50	0	109	82 - 122					
1,2,3,4,7,8,9-HpCDF	54.3	0.440	5.00	50	0	109	78 - 138					
OCDF	140	1.30	10.0	100	0	140	63 - 170					

Cleanup Standard

37Cl-2,3,7,8-TCDD	7.12		10	71	31 - 191
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Labeled Compound Recovery

13C-2,3,7,8-TCDD	69.4		100	69	20 - 175
13C-1,2,3,7,8-PeCDD	73.3		100	73	21 - 227
13C-1,2,3,4,7,8-HxCDD	65.5		100	65	21 - 193
13C-1,2,3,6,7,8-HxCDD	66.9		100	67	25 - 163
13C-1,2,3,4,6,7,8-HpCDD	61.9		100	62	26 - 166
13C-OCDD	134		200	67	13 - 199
13C-2,3,7,8-TCDF	55.7		100	56	22 - 152
13C-1,2,3,7,8-PeCDF	59.8		100	60	21 - 192
13C-2,3,4,7,8-PeCDF	60.0		100	60	13 - 328
13C-1,2,3,4,7,8-HxCDF	59.6		100	60	19 - 202
13C-1,2,3,6,7,8-HxCDF	57.7		100	58	21 - 159
13C-2,3,4,6,7,8-HxCDF	59.6		100	60	22 - 176
13C-1,2,3,7,8,9-HxCDF	65.5		100	65	17 - 205
13C-1,2,3,4,6,7,8-HpCDF	59.6		100	60	21 - 158
13C-1,2,3,4,7,8,9-HpCDF	68.8		100	69	20 - 186

CLIENT: SHN Consulting Engineers & Geologists, Inc.
Work Order: 1903344
Project: 018022.030; Little Lake Industries

ANALYTICAL QC SUMMARY REPORT

BatchID: 174839

SampleID	LCSD-174839	TestCode: 1613_FULL_S				Units: pg/g		Prep Date: 3/14/2019			
Batch ID: 174839		TestNo: E1613B				Run ID: GC36_190322B		Analysis Date: 3/21/2019			
Analyte	Result	MDL	PQL	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD	9.52	0.110	1.00	10	0	95	67 - 158	9.98	4.72	20	
1,2,3,7,8-PeCDD	50.5	0.280	5.00	50	0	101	70 - 142	49.58	1.84	20	
1,2,3,4,7,8-HxCDD	51.7	0.560	5.00	50	0	103	70 - 164	50.68	1.95	20	
1,2,3,6,7,8-HxCDD	51.5	0.380	5.00	50	0	103	76 - 134	52.88	2.72	20	
1,2,3,7,8,9-HxCDD	53.2	0.450	5.00	50	0	106	64 - 162	52.22	1.78	20	
1,2,3,4,6,7,8-HpCDD	55.6	0.620	5.00	50	0	111	70 - 140	53.64	3.66	20	
OCDD	109	1.70	10.0	100	0	109	78 - 144	108.26	0.461	20	
2,3,7,8-TCDF	10.5	0.210	1.00	10	0	105	75 - 158	10.22	2.89	20	
1,2,3,7,8-PeCDF	52.6	0.350	5.00	50	0	105	80 - 134	53.24	1.13	20	
2,3,4,7,8-PeCDF	54.6	0.330	5.00	50	0	109	68 - 160	52.62	3.73	20	
1,2,3,4,7,8-HxCDF	53.9	0.570	5.00	50	0	108	72 - 134	56.2	4.14	20	
1,2,3,6,7,8-HxCDF	56.1	0.570	5.00	50	0	112	84 - 130	56.78	1.17	20	
1,2,3,7,8,9-HxCDF	58.4	0.520	5.00	50	0	117	78 - 130	55.78	4.52	20	
2,3,4,6,7,8-HxCDF	58.1	0.410	5.00	50	0	116	70 - 156	57.92	0.276	20	
1,2,3,4,6,7,8-HpCDF	59.6	0.370	5.00	50	0	119	82 - 122	54.64	8.68	20	
1,2,3,4,7,8,9-HpCDF	56.2	0.440	5.00	50	0	112	78 - 138	54.32	3.40	20	
OCDF	138	1.30	10.0	100	0	138	63 - 170	139.72	1.34	20	

Cleanup Standard

37Cl-2,3,7,8-TCDD	6.50	10	65	31 - 191
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Labeled Compound Recovery

13C-2,3,7,8-TCDD	61.5	100	62	20 - 175
13C-1,2,3,7,8-PeCDD	65.2	100	65	21 - 227
13C-1,2,3,4,7,8-HxCDD	58.8	100	59	21 - 193
13C-1,2,3,6,7,8-HxCDD	60.8	100	61	25 - 163
13C-1,2,3,4,6,7,8-HpCDD	57.5	100	57	26 - 166
13C-OCDD	132	200	66	13 - 199
13C-2,3,7,8-TCDF	52.2	100	52	22 - 152
13C-1,2,3,7,8-PeCDF	55.7	100	56	21 - 192
13C-2,3,4,7,8-PeCDF	55.2	100	55	13 - 328
13C-1,2,3,4,7,8-HxCDF	55.2	100	55	19 - 202
13C-1,2,3,6,7,8-HxCDF	52.0	100	52	21 - 159
13C-2,3,4,6,7,8-HxCDF	53.1	100	53	22 - 176
13C-1,2,3,7,8,9-HxCDF	57.4	100	57	17 - 205
13C-1,2,3,4,6,7,8-HpCDF	52.2	100	52	21 - 158
13C-1,2,3,4,7,8,9-HpCDF	62.7	100	63	20 - 186

CLIENT: SHN Consulting Engineers & Geologists, Inc.
Work Order: 1903344
Project: 018022.030; Little Lake Industries

ANALYTICAL QC SUMMARY REPORT

BatchID: 174839

SampleID 1903344-001AMS		TestCode: 1613_FULL_S			Units: pg/g			Prep Date: 3/14/2019			
Batch ID: 174839		TestNo: E1613B			Run ID: GC36_190322C			Analysis Date: 3/22/2019			
Analyte	Result	MDL	PQL	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD	10.6	0.110	1.00	10	0	106	67 - 158				
1,2,3,7,8-PeCDD	51.1	0.280	5.00	50	0	102	70 - 142				
1,2,3,4,7,8-HxCDD	53.7	0.560	5.00	50	0	107	70 - 164				
1,2,3,6,7,8-HxCDD	52.7	0.380	5.00	50	0.42	105	76 - 134				
1,2,3,7,8,9-HxCDD	53.1	0.450	5.00	50	0	106	64 - 162				
1,2,3,4,6,7,8-HpCDD	70.6	0.620	5.00	50	8.38	124	70 - 140				
OCDD	222	1.70	10.0	100	72.92	149	78 - 144				S
2,3,7,8-TCDF	10.2	0.210	1.00	10	0.28	99	75 - 158				
1,2,3,7,8-PeCDF	56.7	0.350	5.00	50	0	113	80 - 134				
2,3,4,7,8-PeCDF	55.6	0.330	5.00	50	0	111	68 - 160				
1,2,3,4,7,8-HxCDF	58.2	0.570	5.00	50	0	116	72 - 134				
1,2,3,6,7,8-HxCDF	57.0	0.570	5.00	50	0	114	84 - 130				
1,2,3,7,8,9-HxCDF	54.9	0.520	5.00	50	0	110	78 - 130				
2,3,4,6,7,8-HxCDF	57.2	0.410	5.00	50	0	114	70 - 156				
1,2,3,4,6,7,8-HpCDF	58.0	0.370	5.00	50	3.4	109	82 - 122				
1,2,3,4,7,8,9-HpCDF	53.0	0.440	5.00	50	0	106	78 - 138				
OCDF	146	1.30	10.0	100	3.86	142	63 - 170				

Cleanup Standard

37Cl-2,3,7,8-TCDD	6.84		10		68	31 - 191
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Labeled Compound Recovery

13C-2,3,7,8-TCDD	68.5		100		68	20 - 175
13C-1,2,3,7,8-PeCDD	72.5		100		72	21 - 227
13C-1,2,3,4,7,8-HxCDD	65.6		100		66	21 - 193
13C-1,2,3,6,7,8-HxCDD	69.5		100		69	25 - 163
13C-1,2,3,4,6,7,8-HpCDD	63.8		100		64	26 - 166
13C-OCDD	144		200		72	13 - 199
13C-2,3,7,8-TCDF	63.1		100		63	22 - 152
13C-1,2,3,7,8-PeCDF	61.1		100		61	21 - 192
13C-2,3,4,7,8-PeCDF	63.5		100		64	13 - 328
13C-1,2,3,4,7,8-HxCDF	62.5		100		62	19 - 202
13C-1,2,3,6,7,8-HxCDF	61.1		100		61	21 - 159
13C-2,3,4,6,7,8-HxCDF	63.7		100		64	22 - 176
13C-1,2,3,7,8,9-HxCDF	67.6		100		68	17 - 205
13C-1,2,3,4,6,7,8-HpCDF	62.2		100		62	21 - 158
13C-1,2,3,4,7,8,9-HpCDF	68.0		100		68	20 - 186

CLIENT: SHN Consulting Engineers & Geologists, Inc.
Work Order: 1903344
Project: 018022.030; Little Lake Industries

ANALYTICAL QC SUMMARY REPORT

BatchID: 174839

SampleID 1903344-001AMSD		TestCode: 1613_FULL_S				Units: pg/g		Prep Date: 3/14/2019			
Batch ID: 174839		TestNo: E1613B				Run ID: GC36_190322C		Analysis Date: 3/22/2019			
Analyte	Result	MDL	PQL	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD	10.0	0.110	1.00	10	0	100	67 - 158	10.64	5.80	20	S
1,2,3,7,8-PeCDD	51.1	0.280	5.00	50	0	102	70 - 142	51.08	0.117	20	
1,2,3,4,7,8-HxCDD	49.7	0.560	5.00	50	0	99	70 - 164	53.68	7.70	20	
1,2,3,6,7,8-HxCDD	51.1	0.380	5.00	50	0.42	101	76 - 134	52.68	3.08	20	
1,2,3,7,8,9-HxCDD	50.6	0.450	5.00	50	0	101	64 - 162	53.1	4.90	20	
1,2,3,4,6,7,8-HpCDD	74.4	0.620	5.00	50	8.38	132	70 - 140	70.58	5.30	20	
OCDD	279	1.70	10.0	100	72.92	206	78 - 144	221.96	22.7	20	
2,3,7,8-TCDF	10.3	0.210	1.00	10	0.28	100	75 - 158	10.16	1.17	20	
1,2,3,7,8-PeCDF	53.8	0.350	5.00	50	0	108	80 - 134	56.66	5.18	20	
2,3,4,7,8-PeCDF	53.7	0.330	5.00	50	0	107	68 - 160	55.58	3.48	20	
1,2,3,4,7,8-HxCDF	59.4	0.570	5.00	50	0	119	72 - 134	58.18	2.04	20	
1,2,3,6,7,8-HxCDF	55.1	0.570	5.00	50	0	110	84 - 130	56.96	3.36	20	
1,2,3,7,8,9-HxCDF	56.6	0.520	5.00	50	0	113	78 - 130	54.88	3.16	20	
2,3,4,6,7,8-HxCDF	56.6	0.410	5.00	50	0	113	70 - 156	57.24	1.20	20	
1,2,3,4,6,7,8-HpCDF	61.2	0.370	5.00	50	3.4	116	82 - 122	58.04	5.23	20	
1,2,3,4,7,8,9-HpCDF	51.1	0.440	5.00	50	0	102	78 - 138	52.96	3.65	20	
OCDF	153	1.30	10.0	100	3.86	149	63 - 170	145.9	4.93	20	

Cleanup Standard

37Cl-2,3,7,8-TCDD	6.98		10		70	31 - 191
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Labeled Compound Recovery

13C-2,3,7,8-TCDD	68.2		100		68	20 - 175
13C-1,2,3,7,8-PeCDD	71.6		100		72	21 - 227
13C-1,2,3,4,7,8-HxCDD	63.3		100		63	21 - 193
13C-1,2,3,6,7,8-HxCDD	65.2		100		65	25 - 163
13C-1,2,3,4,6,7,8-HpCDD	61.8		100		62	26 - 166
13C-OCDD	136		200		68	13 - 199
13C-2,3,7,8-TCDF	60.1		100		60	22 - 152
13C-1,2,3,7,8-PeCDF	64.0		100		64	21 - 192
13C-2,3,4,7,8-PeCDF	64.9		100		65	13 - 328
13C-1,2,3,4,7,8-HxCDF	54.0		100		54	19 - 202
13C-1,2,3,6,7,8-HxCDF	56.9		100		57	21 - 159
13C-2,3,4,6,7,8-HxCDF	57.9		100		58	22 - 176
13C-1,2,3,7,8,9-HxCDF	61.8		100		62	17 - 205
13C-1,2,3,4,6,7,8-HpCDF	54.0		100		54	21 - 158
13C-1,2,3,4,7,8,9-HpCDF	69.5		100		69	20 - 186

CLIENT: SHN Consulting Engineers & Geologists, Inc.

Work Order: 1903344

Project: 018022.030; Little Lake Industries

ANALYTICAL QC SUMMARY REPORT

BatchID:

175002

SampleID	MB-175002	TestCode: 1613_FULL_W			Units: pg/L			Prep Date: 3/22/2019			
Batch ID: 175002		TestNo: E1613B			Run ID: GC36_190326A			Analysis Date: 3/25/2019			
Analyte	Result	MDL	PQL	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD	ND	2.00	10.0				-				
1,2,3,7,8-PeCDD	ND	10.0	50.0				-				
1,2,3,4,7,8-HxCDD	ND	12.0	50.0				-				
1,2,3,6,7,8-HxCDD	ND	8.00	50.0				-				
1,2,3,7,8,9-HxCDD	ND	8.50	50.0				-				
1,2,3,4,6,7,8-HpCDD	ND	12.0	50.0				-				
OCDD	ND	25.0	100				-				
2,3,7,8-TCDF	ND	2.20	10.0				-				
1,2,3,7,8-PeCDF	ND	7.20	50.0				-				
2,3,4,7,8-PeCDF	ND	8.50	50.0				-				
1,2,3,4,7,8-HxCDF	ND	7.60	50.0				-				
1,2,3,6,7,8-HxCDF	ND	10.0	50.0				-				
1,2,3,7,8,9-HxCDF	ND	8.00	50.0				-				
2,3,4,6,7,8-HxCDF	ND	9.90	50.0				-				
1,2,3,4,6,7,8-HpCDF	ND	13.0	50.0				-				
1,2,3,4,7,8,9-HpCDF	ND	8.10	50.0				-				
OCDF	ND	20.0	100				-				
Total-Tetradoxins	ND	2.00	10.0				-				
Total-Pentadoxins	ND	10.0	50.0				-				
Total-Hexadoxins	ND	12.0	50.0				-				
Total-Heptadoxins	ND	12.0	50.0				-				
Total-Tetrafurans	ND	2.20	10.0				-				
Total-Pentafurans	ND	8.50	50.0				-				
Total-Hexafurans	ND	10.0	50.0				-				
Total-Heptafurans	ND	13.0	50.0				-				

Cleanup Standard

37Cl-2,3,7,8-TCDD	75.6	100	76	35 - 197
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Labeled Compound Recovery

13C-2,3,7,8-TCDD	750	1000	75	25 - 164
13C-1,2,3,7,8-PeCDD	735	1000	74	25 - 181
13C-1,2,3,4,7,8-HxCDD	691	1000	69	32 - 141
13C-1,2,3,6,7,8-HxCDD	763	1000	76	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	760	1000	76	23 - 140
13C-OCDD	1830	2000	92	17 - 157
13C-2,3,7,8-TCDF	665	1000	66	24 - 169
13C-1,2,3,7,8-PeCDF	671	1000	67	24 - 185
13C-2,3,4,7,8-PeCDF	700	1000	70	21 - 178
13C-1,2,3,4,7,8-HxCDF	651	1000	65	26 - 152
13C-1,2,3,6,7,8-HxCDF	675	1000	68	26 - 123
13C-2,3,4,6,7,8-HxCDF	696	1000	70	28 - 136
13C-1,2,3,7,8,9-HxCDF	768	1000	77	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	742	1000	74	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	833	1000	83	26 - 138

CLIENT: SHN Consulting Engineers & Geologists, Inc.
Work Order: 1903344
Project: 018022.030; Little Lake Industries

ANALYTICAL QC SUMMARY REPORT

BatchID: 175002

SampleID	LCS-175002			TestCode: 1613_FULL_W			Units: pg/L			Prep Date: 3/22/2019		
Batch ID:	175002			TestNo: E1613B			Run ID: GC36_190326C			Analysis Date: 3/25/2019		
Analyte		Result	MDL	PQL	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual

2,3,7,8-TCDD	95.8	2.00	10.0	100	0	96	67 - 158				
1,2,3,7,8-PeCDD	531	10.0	50.0	500	0	106	70 - 142				
1,2,3,4,7,8-HxCDD	510	12.0	50.0	500	0	102	70 - 164				
1,2,3,6,7,8-HxCDD	540	8.00	50.0	500	0	108	76 - 134				
1,2,3,7,8,9-HxCDD	537	8.50	50.0	500	0	107	64 - 162				
1,2,3,4,6,7,8-HpCDD	555	12.0	50.0	500	0	111	70 - 140				
OCDD	1070	25.0	100	1000	0	107	78 - 144				
2,3,7,8-TCDF	101	2.20	10.0	100	0	101	75 - 158				
1,2,3,7,8-PeCDF	563	7.20	50.0	500	0	113	80 - 134				
2,3,4,7,8-PeCDF	561	8.50	50.0	500	0	112	68 - 160				
1,2,3,4,7,8-HxCDF	581	7.60	50.0	500	0	116	72 - 134				
1,2,3,6,7,8-HxCDF	556	10.0	50.0	500	0	111	84 - 130				
1,2,3,7,8,9-HxCDF	576	8.00	50.0	500	0	115	78 - 130				
2,3,4,6,7,8-HxCDF	560	9.90	50.0	500	0	112	70 - 156				
1,2,3,4,6,7,8-HpCDF	554	13.0	50.0	500	0	111	82 - 122				
1,2,3,4,7,8,9-HpCDF	569	8.10	50.0	500	0	114	78 - 138				
OCDF	1310	20.0	100	1000	0	131	63 - 170				

Cleanup Standard

37Cl-2,3,7,8-TCDD	73.2			100		73	31 - 191				
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Labeled Compound Recovery

13C-2,3,7,8-TCDD	770			1000		77	20 - 175				
13C-1,2,3,7,8-PeCDD	887			1000		89	21 - 227				
13C-1,2,3,4,7,8-HxCDD	761			1000		76	21 - 193				
13C-1,2,3,6,7,8-HxCDD	772			1000		77	25 - 163				
13C-1,2,3,4,6,7,8-HpCDD	757			1000		76	26 - 166				
13C-OCDD	1790			2000		90	13 - 199				
13C-2,3,7,8-TCDF	672			1000		67	22 - 152				
13C-1,2,3,7,8-PeCDF	737			1000		74	21 - 192				
13C-2,3,4,7,8-PeCDF	788			1000		79	13 - 328				
13C-1,2,3,4,7,8-HxCDF	708			1000		71	19 - 202				
13C-1,2,3,6,7,8-HxCDF	725			1000		73	21 - 159				
13C-2,3,4,6,7,8-HxCDF	740			1000		74	22 - 176				
13C-1,2,3,7,8,9-HxCDF	772			1000		77	17 - 205				
13C-1,2,3,4,6,7,8-HpCDF	774			1000		77	21 - 158				
13C-1,2,3,4,7,8,9-HpCDF	820			1000		82	20 - 186				

CLIENT: SHN Consulting Engineers & Geologists, Inc.

Work Order: 1903344

Project: 018022.030; Little Lake Industries

ANALYTICAL QC SUMMARY REPORT

BatchID:

175002

SampleID	LCSD-175002		TestCode: 1613_FULL_W		Units: pg/L		Prep Date: 3/22/2019				
Batch ID:	175002		TestNo: E1613B		Run ID: GC36_190326C		Analysis Date: 3/25/2019				
Analyte	Result	MDL	PQL	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD	102	2.00	10.0	100	0	102	67 - 158	95.8	6.07	20	
1,2,3,7,8-PeCDD	523	10.0	50.0	500	0	105	70 - 142	531.2	1.52	20	
1,2,3,4,7,8-HxCDD	524	12.0	50.0	500	0	105	70 - 164	509.6	2.75	20	
1,2,3,6,7,8-HxCDD	535	8.00	50.0	500	0	107	76 - 134	539.6	0.894	20	
1,2,3,7,8,9-HxCDD	541	8.50	50.0	500	0	108	64 - 162	536.8	0.705	20	
1,2,3,4,6,7,8-HpCDD	547	12.0	50.0	500	0	109	70 - 140	554.8	1.38	20	
OCDD	1090	25.0	100	1000	0	109	78 - 144	1074	1.61	20	
2,3,7,8-TCDF	103	2.20	10.0	100	0	103	75 - 158	100.8	1.96	20	
1,2,3,7,8-PeCDF	565	7.20	50.0	500	0	113	80 - 134	563	0.355	20	
2,3,4,7,8-PeCDF	565	8.50	50.0	500	0	113	68 - 160	560.8	0.817	20	
1,2,3,4,7,8-HxCDF	565	7.60	50.0	500	0	113	72 - 134	580.8	2.79	20	
1,2,3,6,7,8-HxCDF	561	10.0	50.0	500	0	112	84 - 130	556.4	0.895	20	
1,2,3,7,8,9-HxCDF	567	8.00	50.0	500	0	113	78 - 130	575.6	1.58	20	
2,3,4,6,7,8-HxCDF	549	9.90	50.0	500	0	110	70 - 156	560.4	2.09	20	
1,2,3,4,6,7,8-HpCDF	549	13.0	50.0	500	0	110	82 - 122	554.2	0.906	20	
1,2,3,4,7,8,9-HpCDF	574	8.10	50.0	500	0	115	78 - 138	568.6	0.945	20	
OCDF	1330	20.0	100	1000	0	133	63 - 170	1312.8	1.08	20	

Cleanup Standard

37Cl-2,3,7,8-TCDD	76.6		100	77	31 - 191
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Labeled Compound Recovery

13C-2,3,7,8-TCDD	776	1000	78	20 - 175
13C-1,2,3,7,8-PeCDD	798	1000	80	21 - 227
13C-1,2,3,4,7,8-HxCDD	711	1000	71	21 - 193
13C-1,2,3,6,7,8-HxCDD	786	1000	79	25 - 163
13C-1,2,3,4,6,7,8-HpCDD	873	1000	87	26 - 166
13C-OCDD	1980	2000	99	13 - 199
13C-2,3,7,8-TCDF	686	1000	69	22 - 152
13C-1,2,3,7,8-PeCDF	720	1000	72	21 - 192
13C-2,3,4,7,8-PeCDF	733	1000	73	13 - 328
13C-1,2,3,4,7,8-HxCDF	683	1000	68	19 - 202
13C-1,2,3,6,7,8-HxCDF	696	1000	70	21 - 159
13C-2,3,4,6,7,8-HxCDF	736	1000	74	22 - 176
13C-1,2,3,7,8,9-HxCDF	772	1000	77	17 - 205
13C-1,2,3,4,6,7,8-HpCDF	843	1000	84	21 - 158
13C-1,2,3,4,7,8,9-HpCDF	914	1000	91	20 - 186



Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/8/19
Date Analyzed: 3/8/19
Instrument: GC38
Matrix: Water
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174293
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L
Sample ID: MB/LCS/LCSD-174293

QC Summary Report for SW8260B

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
TPH(g) (C6-C12)	ND	11	50	-	-	-
Surrogate Recovery						
Dibromofluoromethane	23			25	92	82-142

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
TPH(g) (C6-C12)	210	210	200	105	104	70-130	0.772	20
Surrogate Recovery								
Dibromofluoromethane	23	23	25	93	91	82-142	2.33	20



Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/20/19
Date Analyzed: 3/20/19
Instrument: GC17
Matrix: Water
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174861
Extraction Method: SW3640Am
Analytical Method: SW8270C
Unit: µg/L
Sample ID: MB/LCS/LCSD-174861

QC Summary Report for SW8270C

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Acenaphthene	ND	0.0045	0.010	-	-	-
Acenaphthylene	ND	0.0040	0.010	-	-	-
Anthracene	ND	0.0033	0.010	-	-	-
Benzidine	ND	0.70	5.0	-	-	-
Benzo (a) anthracene	ND	0.018	0.020	-	-	-
Benzo (a) pyrene	ND	0.0043	0.010	-	-	-
Benzo (b) fluoranthene	ND	0.0031	0.0050	-	-	-
Benzo (g,h,i) perylene	0.0098,J	0.0019	0.020	-	-	-
Benzo (k) fluoranthene	ND	0.0058	0.010	-	-	-
Benzyl Alcohol	ND	3.8	5.0	-	-	-
Bis (2-chloroethoxy) Methane	ND	0.71	1.0	-	-	-
Bis (2-chloroethyl) Ether	ND	0.0019	0.0050	-	-	-
Bis (2-chloroisopropyl) Ether	ND	0.0052	0.010	-	-	-
Bis (2-ethylhexyl) Adipate	ND	2.9	3.0	-	-	-
Bis (2-ethylhexyl) Phthalate	ND	0.030	0.040	-	-	-
4-Bromophenyl Phenyl Ether	ND	0.52	1.0	-	-	-
Butylbenzyl Phthalate	ND	0.10	0.20	-	-	-
4-Chloroaniline	ND	0.012	0.020	-	-	-
4-Chloro-3-methylphenol	ND	0.25	1.0	-	-	-
2-Chloronaphthalene	ND	0.39	1.0	-	-	-
2-Chlorophenol	ND	0.011	0.020	-	-	-
4-Chlorophenyl Phenyl Ether	ND	0.19	1.0	-	-	-
Chrysene	0.0072,J	0.0035	0.010	-	-	-
Dibenzo (a,h) anthracene	ND	0.0053	0.010	-	-	-
Dibenzofuran	ND	0.38	1.0	-	-	-
Di-n-butyl Phthalate	ND	0.016	0.020	-	-	-
1,2-Dichlorobenzene	ND	0.16	2.0	-	-	-
1,3-Dichlorobenzene	ND	0.11	2.0	-	-	-
1,4-Dichlorobenzene	ND	0.11	2.0	-	-	-
3,3-Dichlorobenzidine	ND	0.012	0.020	-	-	-
2,4-Dichlorophenol	ND	0.0062	0.010	-	-	-
Diethyl Phthalate	ND	0.012	0.020	-	-	-
2,4-Dimethylphenol	ND	0.52	1.0	-	-	-
Dimethyl Phthalate	ND	0.011	0.020	-	-	-
4,6-Dinitro-2-methylphenol	ND	3.1	5.0	-	-	-
2,4-Dinitrophenol	ND	0.17	0.50	-	-	-
2,4-Dinitrotoluene	ND	0.0043	0.025	-	-	-
2,6-Dinitrotoluene	ND	0.0091	0.010	-	-	-

(Cont.)



Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/20/19
Date Analyzed: 3/20/19
Instrument: GC17
Matrix: Water
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174861
Extraction Method: SW3640Am
Analytical Method: SW8270C
Unit: µg/L
Sample ID: MB/LCS/LCSD-174861

QC Summary Report for SW8270C

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Di-n-octyl Phthalate	ND	0.013	0.12	-	-	-
1,2-Diphenylhydrazine	ND	0.11	1.0	-	-	-
Fluoranthene	0.0063,J	0.0042	0.010	-	-	-
Fluorene	ND	0.0050	0.010	-	-	-
Hexachlorobenzene	ND	0.0048	0.0050	-	-	-
Hexachlorobutadiene	ND	0.0062	0.010	-	-	-
Hexachlorocyclopentadiene	ND	0.65	5.0	-	-	-
Hexachloroethane	ND	0.0060	0.010	-	-	-
Indeno (1,2,3-cd) pyrene	0.0064,J	0.0033	0.020	-	-	-
Isophorone	ND	0.54	1.0	-	-	-
2-Methylnaphthalene	ND	0.0061	0.010	-	-	-
2-Methylphenol (o-Cresol)	ND	0.47	1.0	-	-	-
3 & 4-Methylphenol (m,p-Cresol)	ND	0.28	1.0	-	-	-
Naphthalene	ND	0.0056	0.010	-	-	-
2-Nitroaniline	ND	1.4	5.0	-	-	-
3-Nitroaniline	ND	3.4	5.0	-	-	-
4-Nitroaniline	ND	4.4	5.0	-	-	-
Nitrobenzene	ND	0.88	1.0	-	-	-
2-Nitrophenol	ND	3.3	5.0	-	-	-
4-Nitrophenol	ND	0.63	5.0	-	-	-
N-Nitrosodiphenylamine	ND	0.30	1.0	-	-	-
N-Nitrosodi-n-propylamine	ND	0.85	1.0	-	-	-
Pentachlorophenol	ND	0.11	0.25	-	-	-
Phenanthrene	ND	0.0040	0.020	-	-	-
Phenol	ND	0.0068	0.020	-	-	-
Pyrene	0.0046,J	0.0043	0.020	-	-	-
Pyridine	ND	0.53	1.0	-	-	-
1,2,4-Trichlorobenzene	ND	0.090	1.0	-	-	-
2,4,5-Trichlorophenol	ND	0.0051	0.050	-	-	-
2,4,6-Trichlorophenol	ND	0.0048	0.050	-	-	-
N-Nitrosodimethylamine	ND	3.5	5.0	-	-	-

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Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/20/19
Date Analyzed: 3/20/19
Instrument: GC17
Matrix: Water
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174861
Extraction Method: SW3640Am
Analytical Method: SW8270C
Unit: µg/L
Sample ID: MB/LCS/LCSD-174861

QC Summary Report for SW8270C

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Surrogate Recovery						
2-Fluorophenol	4.0			5	80	8-130
Phenol-d5	4.1			5	82	5-130
Nitrobenzene-d5	5.1			5	102	20-140
2-Fluorobiphenyl	4.0			5	80	40-140
2,4,6-Tribromophenol	4.6			5	92	16-180
Terphenyl-d14	3.4			5	67	40-170



Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/20/19
Date Analyzed: 3/20/19
Instrument: GC17
Matrix: Water
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174861
Extraction Method: SW3640Am
Analytical Method: SW8270C
Unit: µg/L
Sample ID: MB/LCS/LCSD-174861

QC Summary Report for SW8270C

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Acenaphthene	0.42	0.42	0.50	85	84	27-117	0.775	25
Acenaphthylene	0.41	0.41	0.50	83	82	18-128	1.52	25
Anthracene	0.43	0.43	0.50	86	85	31-126	1.47	25
Benzidine	38	29	50	76	59	14-115	25.9,F2	25
Benzo (a) anthracene	0.38	0.38	0.50	77	76	27-129	0.936	25
Benzo (a) pyrene	0.38	0.38	0.50	75	76	10-161	0.611	25
Benzo (b) fluoranthene	0.37	0.38	0.50	74	77	24-140	3.64	25
Benzo (g,h,i) perylene	0.40	0.37	0.50	79	74	2-155	6.83	25
Benzo (k) fluoranthene	0.40	0.40	0.50	79	79	2-168	0	25
Benzyl Alcohol	36	42	50	72	84	22-114	15.8	25
Bis (2-chloroethoxy) Methane	8.2	8.4	10	82	84	28-109	2.28	25
Bis (2-chloroethyl) Ether	0.36	0.38	0.50	72	75	24-105	4.87	25
Bis (2-chloroisopropyl) Ether	0.39	0.37	0.50	79	75	21-106	5.44	25
Bis (2-ethylhexyl) Adipate	7.9	8.6	10	79	86	13-143	8.25	25
Bis (2-ethylhexyl) Phthalate	0.44	0.44	0.50	88	88	7-156	0	25
4-Bromophenyl Phenyl Ether	8.1	8.9	10	81	89	31-121	9.45	25
Butylbenzyl Phthalate	0.42	0.42	0.50	83	83	20-146	0	25
4-Chloroaniline	0.42	0.44	0.50	85	87	15-122	2.61	25
4-Chloro-3-methylphenol	9.8	9.6	10	98	96	29-125	1.86	25
2-Chloronaphthalene	8.1	7.5	10	81	75	27-113	8.57	25
2-Chlorophenol	0.37	0.37	0.50	74	74	24-108	0	25
4-Chlorophenyl Phenyl Ether	7.5	7.5	10	75	75	24-127	0	25
Chrysene	0.38	0.37	0.50	75	73	31-131	2.62	25
Dibenzo (a,h) anthracene	0.41	0.39	0.50	81	78	12-157	4.91	25
Dibenzofuran	8.4	8.1	10	84	81	21-124	3.82	25
Di-n-butyl Phthalate	0.52	0.45	0.50	105	91	18-147	14.4	25
1,2-Dichlorobenzene	6.4	7.3	10	64	73	22-101	13.0	25
1,3-Dichlorobenzene	6.8	7.1	10	68	71	20-99	4.70	25
1,4-Dichlorobenzene	6.2	6.8	10	62	68	21-99	8.43	25
3,3-Dichlorobenzidine	0.47	0.43	0.50	93	86	29-139	7.76	25
2,4-Dichlorophenol	8.7	8.9	10	87	89	28-115	1.44	25
Diethyl Phthalate	0.44	0.42	0.50	88	85	19-139	4.08	25
2,4-Dimethylphenol	8.7	9.3	10	87	93	23-108	6.57	25
Dimethyl Phthalate	0.42	0.42	0.50	84	84	22-132	0	25
4,6-Dinitro-2-methylphenol	42	51	50	85	102	27-129	18.6	25
2,4-Dinitrophenol	2.5	2.6	2.5	99	105	12-141	5.31	25
2,4-Dinitrotoluene	0.48	0.47	0.50	96	95	22-141	1.55	25
2,6-Dinitrotoluene	0.44	0.45	0.50	88	91	24-136	2.82	25

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Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/20/19
Date Analyzed: 3/20/19
Instrument: GC17
Matrix: Water
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174861
Extraction Method: SW3640Am
Analytical Method: SW8270C
Unit: µg/L
Sample ID: MB/LCS/LCSD-174861

QC Summary Report for SW8270C

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Di-n-octyl Phthalate	0.44	0.47	0.50	88	94	18-153	6.22	25
1,2-Diphenylhydrazine	8.9	9.6	10	89	96	31-121	7.89	25
Fluoranthene	0.51	0.44	0.50	101	88	30-138	14.3	25
Fluorene	0.42	0.40	0.50	83	80	24-127	3.82	25
Hexachlorobenzene	0.38	0.42	0.50	77	85	32-117	9.98	25
Hexachlorobutadiene	0.37	0.40	0.50	74	79	22-107	6.34	25
Hexachlorocyclopentadiene	37	35	50	75	70	14-102	6.50	25
Hexachloroethane	0.32	0.38	0.50	65	75	22-101	15.2	25
Indeno (1,2,3-cd) pyrene	0.40	0.38	0.50	80	76	10-160	5.40	25
Isophorone	9.3	9.5	10	93	95	27-117	2.23	25
2-Methylnaphthalene	0.42	0.42	0.50	84	84	2-134	0	25
2-Methylphenol (o-Cresol)	7.4	7.9	10	74	79	30-109	6.26	25
3 & 4-Methylphenol (m,p-Cresol)	7.5	8.2	10	75	82	28-112	8.62	25
Naphthalene	0.37	0.38	0.50	74	76	16-120	2.88	25
2-Nitroaniline	47	41	50	94	82	18-137	14.0	25
3-Nitroaniline	47	45	50	95	90	15-144	5.65	25
4-Nitroaniline	46	41	50	92	81	11-152	11.8	25
Nitrobenzene	7.7	8.3	10	77	83	22-115	7.65	25
2-Nitrophenol	44	45	50	87	91	29-114	4.26	25
4-Nitrophenol	47	40	50	94	80	13-150	16.3	25
N-Nitrosodiphenylamine	8.5	9.7	10	85	97	33-121	12.7	25
N-Nitrosodi-n-propylamine	6.3	7.3	10	63	73	26-112	13.7	25
Pentachlorophenol	2.4	2.4	2.5	98	98	37-140	0	25
Phenanthrene	0.39	0.38	0.50	79	76	32-122	2.95	25
Phenol	1.5	1.5	2	77	77	22-111	0	25
Pyrene	0.41	0.37	0.50	83	74	33-130	10.9	25
Pyridine	7.5	7.7	10	75	77	40-160	3.15	25
1,2,4-Trichlorobenzene	7.3	7.6	10	73	76	24-107	3.68	25
2,4,5-Trichlorophenol	0.45	0.39	0.50	91	78	26-124	14.7	25
2,4,6-Trichlorophenol	0.44	0.38	0.50	87	77	28-121	12.9	25

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Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/20/19
Date Analyzed: 3/20/19
Instrument: GC17
Matrix: Water
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174861
Extraction Method: SW3640Am
Analytical Method: SW8270C
Unit: µg/L
Sample ID: MB/LCS/LCSD-174861

QC Summary Report for SW8270C

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Surrogate Recovery								
2-Fluorophenol	3.9	4.4	5	78	88	23-101	11.5	25
Phenol-d5	4.0	4.5	5	80	90	27-116	11.0	25
Nitrobenzene-d5	4.5	5.0	5	90	101	29-116	12.0	25
2-Fluorobiphenyl	4.1	4.0	5	83	79	29-112	4.15	25
2,4,6-Tribromophenol	5.3	5.7	5	106	114	34-125	7.69	25
Terphenyl-d14	3.4	3.2	5	69	64	23-136	7.28	25



Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/6/19
Date Analyzed: 3/7/19 - 3/8/19
Instrument: GC17, GC21
Matrix: Soil
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174141
Extraction Method: SW3550B
Analytical Method: SW8270C
Unit: mg/Kg
Sample ID: MB/LCS/LCSD-174141

QC Summary Report for SW8270C

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
1-Methylnaphthalene	ND	0.0011	0.0013	-	-	-
2,6-Dichlorophenol	ND	0.24	0.25	-	-	-
Benzoic Acid	ND	0.64	1.2	-	-	-
Acenaphthene	ND	0.00077	0.0013	-	-	-
Acenaphthylene	ND	0.00041	0.0013	-	-	-
Acetochlor	ND	0.25	0.25	-	-	-
Anthracene	ND	0.00082	0.0013	-	-	-
Benzidine	ND	0.67	1.2	-	-	-
Benzo (a) anthracene	ND	0.0043	0.0050	-	-	-
Benzo (a) pyrene	ND	0.0012	0.0025	-	-	-
Benzo (b) fluoranthene	ND	0.00074	0.0013	-	-	-
Benzo (g,h,i) perylene	ND	0.0011	0.0025	-	-	-
Benzo (k) fluoranthene	ND	0.00079	0.0013	-	-	-
Benzyl Alcohol	ND	0.76	1.2	-	-	-
1,1-Biphenyl	ND	0.0023	0.013	-	-	-
Bis (2-chloroethoxy) Methane	ND	0.15	0.25	-	-	-
Bis (2-chloroethyl) Ether	ND	0.0016	0.0025	-	-	-
Bis (2-chloroisopropyl) Ether	ND	0.0014	0.0025	-	-	-
Bis (2-ethylhexyl) Adipate	ND	0.15	0.50	-	-	-
Bis (2-ethylhexyl) Phthalate	ND	0.0034	0.0050	-	-	-
4-Bromophenyl Phenyl Ether	ND	0.15	0.25	-	-	-
Butylbenzyl Phthalate	ND	0.021	0.025	-	-	-
4-Chloroaniline	ND	0.0016	0.0025	-	-	-
4-Chloro-3-methylphenol	ND	0.20	0.25	-	-	-
2-Chloronaphthalene	ND	0.14	0.25	-	-	-
2-Chlorophenol	ND	0.0020	0.0050	-	-	-
4-Chlorophenyl Phenyl Ether	ND	0.16	0.25	-	-	-
Chrysene	ND	0.00080	0.0025	-	-	-
Dibenzo (a,h) anthracene	ND	0.0015	0.0025	-	-	-
Dibenzofuran	ND	0.16	0.25	-	-	-
Di-n-butyl Phthalate	ND	0.0020	0.0025	-	-	-
1,2-Dichlorobenzene	ND	0.15	0.25	-	-	-
1,3-Dichlorobenzene	ND	0.13	0.25	-	-	-
1,4-Dichlorobenzene	ND	0.18	0.25	-	-	-
3,3-Dichlorobenzidine	ND	0.0016	0.0025	-	-	-
2,4-Dichlorophenol	ND	0.0017	0.013	-	-	-
Diethyl Phthalate	ND	0.0036	0.0050	-	-	-
2,4-Dimethylphenol	ND	0.16	0.25	-	-	-

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Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/6/19
Date Analyzed: 3/7/19 - 3/8/19
Instrument: GC17, GC21
Matrix: Soil
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174141
Extraction Method: SW3550B
Analytical Method: SW8270C
Unit: mg/Kg
Sample ID: MB/LCS/LCSD-174141

QC Summary Report for SW8270C

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Dimethyl Phthalate	ND	0.0025	0.0025	-	-	-
4,6-Dinitro-2-methylphenol	ND	0.81	1.2	-	-	-
2,4-Dinitrophenol	ND	0.051	0.13	-	-	-
2,4-Dinitrotoluene	ND	0.0011	0.0063	-	-	-
2,6-Dinitrotoluene	ND	0.0013	0.0025	-	-	-
Di-n-octyl Phthalate	ND	0.0043	0.0050	-	-	-
1,2-Diphenylhydrazine	ND	0.15	0.25	-	-	-
Fluoranthene	ND	0.0011	0.0013	-	-	-
Fluorene	ND	0.00086	0.0025	-	-	-
Hexachlorobenzene	ND	0.00057	0.0013	-	-	-
Hexachlorobutadiene	ND	0.00042	0.0025	-	-	-
Hexachlorocyclopentadiene	ND	0.11	2.0	-	-	-
Hexachloroethane	ND	0.0011	0.0025	-	-	-
Indeno (1,2,3-cd) pyrene	ND	0.0010	0.0025	-	-	-
Isophorone	ND	0.15	0.25	-	-	-
2-Methylnaphthalene	ND	0.0017	0.0025	-	-	-
2-Methylphenol (o-Cresol)	ND	0.27	0.50	-	-	-
3 & 4-Methylphenol (m,p-Cresol)	ND	0.24	0.25	-	-	-
Naphthalene	ND	0.00069	0.0013	-	-	-
2-Nitroaniline	ND	0.69	1.2	-	-	-
3-Nitroaniline	ND	0.84	1.2	-	-	-
4-Nitroaniline	ND	1.1	1.2	-	-	-
Nitrobenzene	ND	0.16	0.25	-	-	-
2-Nitrophenol	ND	0.66	1.2	-	-	-
4-Nitrophenol	ND	0.77	1.2	-	-	-
N-Nitrosodimethylamine	ND	0.65	1.2	-	-	-
N-Nitrosodiphenylamine	ND	0.15	0.25	-	-	-
N-Nitrosodi-n-propylamine	ND	0.14	0.25	-	-	-
Pentachlorophenol	ND	0.014	0.031	-	-	-
Phenanthrene	ND	0.00067	0.0050	-	-	-
Phenol	ND	0.00094	0.0050	-	-	-
Pyrene	ND	0.0014	0.0025	-	-	-
Pyridine	ND	0.18	0.25	-	-	-
1,2,4-Trichlorobenzene	ND	0.15	0.25	-	-	-
2,4,5-Trichlorophenol	ND	0.0013	0.0025	-	-	-
2,4,6-Trichlorophenol	ND	0.0012	0.013	-	-	-

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Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/6/19
Date Analyzed: 3/7/19 - 3/8/19
Instrument: GC17, GC21
Matrix: Soil
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174141
Extraction Method: SW3550B
Analytical Method: SW8270C
Unit: mg/Kg
Sample ID: MB/LCS/LCSD-174141

QC Summary Report for SW8270C

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Surrogate Recovery						
2-Fluorophenol	1.3			1.25	100	54-131
Phenol-d5	1.2			1.25	94	52-129
Nitrobenzene-d5	1.0			1.25	81	43-127
2-Fluorobiphenyl	1.0			1.25	84	42-116
2,4,6-Tribromophenol	0.57			1.25	46	39-119
4-Terphenyl-d14	1.1			1.25	89	36-118



Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/6/19
Date Analyzed: 3/7/19 - 3/8/19
Instrument: GC17, GC21
Matrix: Soil
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174141
Extraction Method: SW3550B
Analytical Method: SW8270C
Unit: mg/Kg
Sample ID: MB/LCS/LCSD-174141

QC Summary Report for SW8270C

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
1-Methylnaphthalene	0.12	0.12	0.12	99	94	65-134	5.43	30
2,6-Dichlorophenol	2.6	2.5	2.5	105	99	75-143	5.67	30
Benzoic Acid	3.8	3.7	12.5	30	30	11-183	0	30
Acenaphthene	0.11	0.11	0.12	91	87	68-134	5.18	30
Acenaphthylene	0.12	0.11	0.12	96	92	65-141	5.21	30
Anthracene	0.12	0.11	0.12	93	86	65-147	7.43	30
Benzidine	5.6	5.0	12.5	45	40	7-97	13.0	30
Benzo (a) anthracene	0.10	0.097	0.12	84	78	61-136	7.66	30
Benzo (a) pyrene	0.13	0.12	0.12	105	94	59-150	11.8	30
Benzo (b) fluoranthene	0.12	0.10	0.12	94	84	43-160	11.0	30
Benzo (g,h,i) perylene	0.13	0.12	0.12	102	94	54-142	8.74	30
Benzo (k) fluoranthene	0.11	0.097	0.12	88	78	59-141	12.2	30
Benzyl Alcohol	12	11	12.5	96	88	48-145	9.26	30
Bis (2-chloroethoxy) Methane	2.4	2.2	2.5	96	88	71-138	8.95	30
Bis (2-chloroethyl) Ether	0.11	0.10	0.12	88	82	60-128	6.60	30
Bis (2-chloroisopropyl) Ether	0.12	0.11	0.12	98	91	67-129	8.04	30
Bis (2-ethylhexyl) Adipate	2.0	2.0	2.5	79	79	56-162	0	30
Bis (2-ethylhexyl) Phthalate	0.14	0.13	0.12	114	106	49-168	7.88	30
4-Bromophenyl Phenyl Ether	2.2	2.0	2.5	86	80	68-136	7.92	30
Butylbenzyl Phthalate	0.14	0.13	0.12	115	106	57-161	7.60	30
4-Chloroaniline	0.12	0.11	0.12	96	87	46-130	9.44	30
4-Chloro-3-methylphenol	2.8	2.5	2.5	112	100	78-149	11.0	30
2-Chloronaphthalene	2.4	2.3	2.5	94	92	71-133	2.55	30
2-Chlorophenol	0.13	0.12	0.12	102	94	73-133	8.29	30
4-Chlorophenyl Phenyl Ether	2.3	2.2	2.5	91	87	71-132	5.29	30
Chrysene	0.10	0.096	0.12	83	76	58-140	8.25	30
Dibenzo (a,h) anthracene	0.13	0.12	0.12	105	95	57-151	10.5	30
Dibenzofuran	2.3	2.2	2.5	91	86	70-134	5.11	30
Di-n-butyl Phthalate	0.13	0.12	0.12	102	93	65-147	9.33	30
1,2-Dichlorobenzene	2.2	2.0	2.5	87	81	68-114	6.81	30
1,3-Dichlorobenzene	2.2	2.1	2.5	86	82	69-116	5.07	30
1,4-Dichlorobenzene	2.3	2.1	2.5	91	85	64-117	7.13	30
3,3-Dichlorobenzidine	0.11	0.10	0.12	90	83	11-163	7.26	30
2,4-Dichlorophenol	2.7	2.6	2.5	110	103	78-144	6.38	30
Diethyl Phthalate	0.12	0.12	0.12	98	93	67-146	5.29	30
2,4-Dimethylphenol	2.7	2.5	2.5	107	101	71-152	5.64	30
Dimethyl Phthalate	0.11	0.10	0.12	86	84	70-135	3.37	30
4,6-Dinitro-2-methylphenol	4.3	4.0	12.5	35	32	14-155	7.16	30

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Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/6/19
Date Analyzed: 3/7/19 - 3/8/19
Instrument: GC17, GC21
Matrix: Soil
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174141
Extraction Method: SW3550B
Analytical Method: SW8270C
Unit: mg/Kg
Sample ID: MB/LCS/LCSD-174141

QC Summary Report for SW8270C

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
2,4-Dinitrophenol	0.065	0.060	0.62	10	10	1-156	0	30
2,4-Dinitrotoluene	0.13	0.12	0.12	103	98	68-144	5.42	30
2,6-Dinitrotoluene	0.13	0.13	0.12	106	103	69-148	2.93	30
Di-n-octyl Phthalate	0.14	0.13	0.12	111	101	51-175	10.1	30
1,2-Diphenylhydrazine	2.1	2.1	2.5	86	84	62-142	2.07	30
Fluoranthene	0.12	0.11	0.12	100	88	66-146	12.1	30
Fluorene	0.12	0.12	0.12	97	93	72-142	4.60	30
Hexachlorobenzene	0.10	0.097	0.12	82	77	65-127	5.17	30
Hexachlorobutadiene	0.12	0.11	0.12	97	91	68-131	6.23	30
Hexachlorocyclopentadiene	8.9	9.0	12.5	71	72	38-134	0.630	30
Hexachloroethane	0.11	0.10	0.12	86	82	57-117	5.14	30
Indeno (1,2,3-cd) pyrene	0.13	0.12	0.12	104	95	57-145	9.36	30
Isophorone	2.5	2.4	2.5	101	96	69-139	5.94	30
2-Methylnaphthalene	0.13	0.12	0.12	101	94	72-139	7.08	30
2-Methylphenol (o-Cresol)	2.5	2.3	2.5	99	91	69-138	9.13	30
3 & 4-Methylphenol (m,p-Cresol)	2.4	2.2	2.5	96	89	69-128	7.33	30
Naphthalene	0.12	0.11	0.12	94	88	64-127	7.45	30
2-Nitroaniline	12	11	12.5	96	92	72-143	4.72	30
3-Nitroaniline	12	11	12.5	94	87	57-122	6.75	30
4-Nitroaniline	13	11	12.5	102	90	68-133	12.1	30
Nitrobenzene	2.4	2.2	2.5	98	89	66-136	8.81	30
2-Nitrophenol	13	13	12.5	107	102	80-141	5.14	30
4-Nitrophenol	14	12	12.5	110	95	67-144	14.5	30
N-Nitrosodiphenylamine	2.1	2.0	2.5	85	81	67-138	4.85	30
N-Nitrosodi-n-propylamine	2.1	1.9	2.5	85	77	74-118	9.86	30
Pentachlorophenol	0.43	0.36	0.62	69	58	50-153	17.1	30
Phenanthrene	0.10	0.096	0.12	83	77	66-129	7.08	30
Phenol	0.46	0.42	0.50	91	83	58-136	8.63	30
Pyrene	0.10	0.098	0.12	81	78	55-148	3.85	30
Pyridine	1.4	1.4	2.5	57	57	46-93	0	30
1,2,4-Trichlorobenzene	2.4	2.2	2.5	94	89	69-130	5.68	30
2,4,5-Trichlorophenol	0.14	0.13	0.12	113	104	68-150	8.50	30
2,4,6-Trichlorophenol	0.13	0.13	0.12	105	101	70-144	3.46	30

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Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/6/19
Date Analyzed: 3/7/19 - 3/8/19
Instrument: GC17, GC21
Matrix: Soil
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174141
Extraction Method: SW3550B
Analytical Method: SW8270C
Unit: mg/Kg
Sample ID: MB/LCS/LCSD-174141

QC Summary Report for SW8270C

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Surrogate Recovery								
2-Fluorophenol	1.3	1.2	1.25	106	99	68-128	6.86	30
Phenol-d5	1.2	1.1	1.25	97	91	73-121	5.53	30
Nitrobenzene-d5	1.3	1.2	1.25	103	98	59-138	4.95	30
2-Fluorobiphenyl	1.1	1.1	1.25	90	87	59-129	3.07	30
2,4,6-Tribromophenol	1.2	1.1	1.25	99	91	46-142	8.93	30
4-Terphenyl-d14	1.1	1.1	1.25	84	84	50-143	0	30



Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/8/19
Date Analyzed: 3/8/19
Instrument: GC17
Matrix: Water
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174261
Extraction Method: E625
Analytical Method: SW8270C
Unit: µg/L
Sample ID: MB/LCS/LCSD-174261

QC Summary Report for SW8270C

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
2,6-Dichlorophenol	ND	0.48	1.0	-	-	-
Benzoic Acid	ND	2.7	5.0	-	-	-
Acenaphthene	ND	0.0051	0.010	-	-	-
Acenaphthylene	ND	0.0050	0.010	-	-	-
Acetochlor	ND	0.49	2.0	-	-	-
Anthracene	ND	0.0043	0.010	-	-	-
Benzydine	ND	0.55	5.0	-	-	-
Benzo (a) anthracene	ND	0.019	0.020	-	-	-
Benzo (a) pyrene	ND	0.0064	0.010	-	-	-
Benzo (b) fluoranthene	ND	0.0040	0.0050	-	-	-
Benzo (g,h,i) perylene	ND	0.0071	0.020	-	-	-
Benzo (k) fluoranthene	ND	0.0063	0.010	-	-	-
Benzyl Alcohol	ND	2.9	5.0	-	-	-
1,1-Biphenyl	ND	0.012	0.050	-	-	-
Bis (2-chloroethoxy) Methane	ND	0.84	1.0	-	-	-
Bis (2-chloroethyl) Ether	ND	0.0021	0.0050	-	-	-
Bis (2-chloroisopropyl) Ether	ND	0.0089	0.010	-	-	-
Bis (2-ethylhexyl) Adipate	ND	0.39	3.0	-	-	-
Bis (2-ethylhexyl) Phthalate	ND	0.034	0.040	-	-	-
4-Bromophenyl Phenyl Ether	ND	0.45	1.0	-	-	-
Butylbenzyl Phthalate	ND	0.097	0.20	-	-	-
4-Chloroaniline	ND	0.0051	0.020	-	-	-
4-Chloro-3-methylphenol	ND	0.55	1.0	-	-	-
2-Chloronaphthalene	ND	0.57	1.0	-	-	-
2-Chlorophenol	ND	0.0086	0.020	-	-	-
4-Chlorophenyl Phenyl Ether	ND	0.48	1.0	-	-	-
Chrysene	ND	0.0093	0.010	-	-	-
Dibenzo (a,h) anthracene	ND	0.0094	0.010	-	-	-
Dibenzofuran	ND	0.37	1.0	-	-	-
Di-n-butyl Phthalate	ND	0.0068	0.020	-	-	-
1,2-Dichlorobenzene	ND	1.1	2.0	-	-	-
1,3-Dichlorobenzene	ND	1.2	2.0	-	-	-
1,4-Dichlorobenzene	ND	1.0	2.0	-	-	-
3,3-Dichlorobenzidine	ND	0.0081	0.020	-	-	-
2,4-Dichlorophenol	ND	0.0061	0.010	-	-	-
Diethyl Phthalate	ND	0.015	0.020	-	-	-
2,4-Dimethylphenol	ND	0.81	1.0	-	-	-
Dimethyl Phthalate	ND	0.011	0.020	-	-	-

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Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/8/19
Date Analyzed: 3/8/19
Instrument: GC17
Matrix: Water
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174261
Extraction Method: E625
Analytical Method: SW8270C
Unit: µg/L
Sample ID: MB/LCS/LCSD-174261

QC Summary Report for SW8270C

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
4,6-Dinitro-2-methylphenol	ND	1.8	5.0	-	-	-
2,4-Dinitrophenol	ND	0.15	0.50	-	-	-
2,4-Dinitrotoluene	ND	0.0066	0.025	-	-	-
2,6-Dinitrotoluene	ND	0.0053	0.010	-	-	-
Di-n-octyl Phthalate	ND	0.020	0.12	-	-	-
1,2-Diphenylhydrazine	ND	0.40	1.0	-	-	-
Fluoranthene	ND	0.0068	0.010	-	-	-
Fluorene	ND	0.0064	0.010	-	-	-
Hexachlorobenzene	ND	0.0043	0.0050	-	-	-
Hexachlorobutadiene	ND	0.0035	0.010	-	-	-
Hexachlorocyclopentadiene	ND	0.48	5.0	-	-	-
Hexachloroethane	ND	0.0068	0.010	-	-	-
Indeno (1,2,3-cd) pyrene	ND	0.0065	0.020	-	-	-
Isophorone	ND	0.66	1.0	-	-	-
2-Methylnaphthalene	ND	0.0053	0.010	-	-	-
2-Methylphenol (o-Cresol)	ND	0.53	1.0	-	-	-
3 & 4-Methylphenol (m,p-Cresol)	ND	0.41	1.0	-	-	-
Naphthalene	ND	0.0048	0.010	-	-	-
2-Nitroaniline	ND	1.8	5.0	-	-	-
3-Nitroaniline	ND	3.1	5.0	-	-	-
4-Nitroaniline	ND	2.7	5.0	-	-	-
Nitrobenzene	ND	0.95	1.0	-	-	-
2-Nitrophenol	ND	2.4	5.0	-	-	-
4-Nitrophenol	ND	1.1	5.0	-	-	-
N-Nitrosodiphenylamine	ND	0.41	1.0	-	-	-
N-Nitrosodi-n-propylamine	ND	0.65	1.0	-	-	-
Pentachlorophenol	ND	0.055	0.25	-	-	-
Phenanthrene	ND	0.0055	0.020	-	-	-
Phenol	ND	0.0088	0.020	-	-	-
Pyrene	ND	0.0057	0.020	-	-	-
Pyridine	ND	0.49	1.0	-	-	-
1,2,4-Trichlorobenzene	ND	0.089	1.0	-	-	-
2,4,5-Trichlorophenol	ND	0.0061	0.050	-	-	-
2,4,6-Trichlorophenol	ND	0.0049	0.050	-	-	-
1-Methylnaphthalene	ND	0.0052	0.010	-	-	-
N-Nitrosodimethylamine	ND	2.8	5.0	-	-	-

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Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/8/19
Date Analyzed: 3/8/19
Instrument: GC17
Matrix: Water
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174261
Extraction Method: E625
Analytical Method: SW8270C
Unit: µg/L
Sample ID: MB/LCS/LCSD-174261

QC Summary Report for SW8270C

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Surrogate Recovery						
2-Fluorophenol	4.8			5	96	36-131
Phenol-d5	4.6			5	91	43-149
Nitrobenzene-d5	4.4			5	88	39-150
2-Fluorobiphenyl	3.4			5	68	43-133
2,4,6-Tribromophenol	4.6			5	91	42-147
4-Terphenyl-d14	3.0			5	60	44-124



Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/8/19
Date Analyzed: 3/8/19
Instrument: GC17
Matrix: Water
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174261
Extraction Method: E625
Analytical Method: SW8270C
Unit: µg/L
Sample ID: MB/LCS/LCSD-174261

QC Summary Report for SW8270C

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
2,6-Dichlorophenol	8.7	8.5	10	87	85	57-117	1.82	25
Acenaphthene	0.38	0.38	0.50	76	77	55-112	1.18	25
Acenaphthylene	0.38	0.39	0.50	76	78	53-109	2.55	25
Acetochlor	7.7	8.2	10	77	82	52-119	5.57	25
Anthracene	0.37	0.40	0.50	75	79	57-112	6.38	25
Benzidine	24	28	50	49	56	33-87	13.5	25
Benzo (a) anthracene	0.32	0.33	0.50	64	66	54-103	2.07	25
Benzo (a) pyrene	0.38	0.40	0.50	77	80	50-116	4.08	25
Benzo (b) fluoranthene	0.35	0.38	0.50	71	75	49-111	5.99	25
Benzo (g,h,i) perylene	0.37	0.38	0.50	75	76	48-106	1.25	25
Benzo (k) fluoranthene	0.35	0.37	0.50	69	74	52-111	5.99	25
Benzyl Alcohol	38	41	50	76	82	38-130	7.69	25
1,1-Biphenyl	0.36	0.37	0.50	71	74	54-111	3.87	25
Bis (2-chloroethoxy) Methane	8.1	8.0	10	81	80	52-120	0.625	25
Bis (2-chloroethyl) Ether	0.38	0.39	0.50	75	78	37-142	4.15	25
Bis (2-chloroisopropyl) Ether	0.42	0.36	0.50	85	73	40-140	15.5	25
Bis (2-ethylhexyl) Adipate	5.2	6.1	10	52	61	49-109	15.4	25
Bis (2-ethylhexyl) Phthalate	0.34	0.35	0.50	67	70	39-136	4.35	25
4-Bromophenyl Phenyl Ether	7.2	8.1	10	72	81	53-108	11.5	25
Butylbenzyl Phthalate	0.32	0.35	0.50	65	69	48-124	7.24	25
4-Chloroaniline	0.43	0.44	0.50	86	87	57-121	1.68	25
4-Chloro-3-methylphenol	9.5	9.4	10	95	94	60-126	1.12	25
2-Chloronaphthalene	7.3	7.4	10	73	74	54-109	1.33	25
2-Chlorophenol	0.37	0.41	0.50	75	81	51-117	8.43	25
4-Chlorophenyl Phenyl Ether	7.4	7.2	10	74	72	59-108	1.96	25
Chrysene	0.34	0.35	0.50	69	70	53-104	1.95	25
Dibenzo (a,h) anthracene	0.39	0.40	0.50	79	79	51-112	0	25
Dibenzofuran	7.7	7.8	10	77	78	57-108	1.81	25
Di-n-butyl Phthalate	0.40	0.42	0.50	81	84	52-121	3.74	25
1,2-Dichlorobenzene	7.1	7.6	10	71	76	43-125	6.45	25
1,3-Dichlorobenzene	7.0	7.6	10	70	76	55-108	8.52	25
1,4-Dichlorobenzene	6.7	7.0	10	67	70	52-108	5.23	25
3,3-Dichlorobenzidine	0.39	0.40	0.50	77	79	52-118	2.61	25
2,4-Dichlorophenol	8.7	8.7	10	87	87	56-121	0	25
Diethyl Phthalate	0.42	0.42	0.50	84	83	56-122	1.46	25
2,4-Dimethylphenol	8.4	8.5	10	84	85	47-112	2.07	25
Dimethyl Phthalate	0.37	0.37	0.50	74	74	49-121	0	25
4,6-Dinitro-2-methylphenol	39	42	50	78	83	33-117	6.06	25

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Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/8/19
Date Analyzed: 3/8/19
Instrument: GC17
Matrix: Water
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174261
Extraction Method: E625
Analytical Method: SW8270C
Unit: µg/L
Sample ID: MB/LCS/LCSD-174261

QC Summary Report for SW8270C

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
2,4-Dinitrophenol	2.0	1.9	2.5	81	77	29-114	4.44	25
2,4-Dinitrotoluene	0.50	0.45	0.50	100	90	59-128	10.8	25
2,6-Dinitrotoluene	0.44	0.45	0.50	87	91	56-118	3.94	25
Di-n-octyl Phthalate	0.33	0.38	0.50	67	75	36-152	11.4	25
1,2-Diphenylhydrazine	7.4	8.2	10	74	82	53-110	9.44	25
Fluoranthene	0.43	0.42	0.50	85	84	56-117	0.987	25
Fluorene	0.40	0.40	0.50	81	79	58-119	1.50	25
Hexachlorobenzene	0.34	0.37	0.50	68	74	51-107	7.66	25
Hexachlorobutadiene	0.37	0.38	0.50	73	77	54-109	4.66	25
Hexachlorocyclopentadiene	27	31	50	55	62	26-107	13.1	25
Hexachloroethane	0.31	0.36	0.50	62	71	52-109	13.2	25
Indeno (1,2,3-cd) pyrene	0.39	0.40	0.50	77	79	50-107	2.72	25
Isophorone	8.6	9.0	10	86	90	58-120	4.78	25
2-Methylnaphthalene	0.42	0.42	0.50	84	85	51-132	0.999	25
2-Methylphenol (o-Cresol)	8.2	8.5	10	82	85	47-127	3.56	25
3 & 4-Methylphenol (m,p-Cresol)	8.1	9.1	10	81	91	51-126	11.7	25
Naphthalene	0.37	0.38	0.50	75	76	49-116	1.99	25
2-Nitroaniline	44	43	50	87	85	56-126	1.88	25
3-Nitroaniline	44	43	50	89	86	57-124	2.72	25
4-Nitroaniline	49	45	50	97	89	58-130	8.68	25
Nitrobenzene	7.8	8.1	10	78	81	52-119	4.55	25
2-Nitrophenol	44	46	50	88	92	60-119	4.36	25
4-Nitrophenol	53	47	50	105	95	34-143	10.5	25
N-Nitrosodiphenylamine	6.7	7.5	10	67	75	56-106	10.6	25
N-Nitrosodi-n-propylamine	7.7	8.1	10	77	81	55-122	5.91	25
Pentachlorophenol	1.9	1.9	2.5	77	76	45-119	2.11	25
Phenanthrene	0.34	0.36	0.50	68	73	56-108	6.40	25
Phenol	1.5	1.6	2	77	82	50-118	6.00	25
Pyrene	0.29	0.32	0.50	58	64	49-104	9.68	25
Pyridine	7.6	8.7	10	76	87	36-96	13.3	25
1,2,4-Trichlorobenzene	7.2	7.6	10	72	76	54-112	4.50	25
2,4,5-Trichlorophenol	0.45	0.45	0.50	89	90	52-119	0.994	25
2,4,6-Trichlorophenol	0.40	0.41	0.50	81	82	53-115	1.83	25
1-Methylnaphthalene	0.41	0.42	0.50	83	84	55-123	0.907	25

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Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/8/19
Date Analyzed: 3/8/19
Instrument: GC17
Matrix: Water
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174261
Extraction Method: E625
Analytical Method: SW8270C
Unit: µg/L
Sample ID: MB/LCS/LCSD-174261

QC Summary Report for SW8270C

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Surrogate Recovery								
2-Fluorophenol	4.0	3.9	5	80	78	36-131	1.73	25
Phenol-d5	4.3	4.2	5	86	85	43-149	1.55	25
Nitrobenzene-d5	4.7	4.2	5	93	85	39-150	9.69	25
2-Fluorobiphenyl	4.1	4.0	5	81	79	43-133	2.72	25
2,4,6-Tribromophenol	4.6	4.6	5	92	92	42-147	0	25
4-Terphenyl-d14	2.5	2.5	5	51	50	44-124	1.22	25



Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/7/19
Date Analyzed: 3/11/19 - 3/13/19
Instrument: ICP-MS2
Matrix: Water
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174185
Extraction Method: E200.8
Analytical Method: E200.8
Unit: µg/L
Sample ID: MB/LCS/LCSD-174185
1903344-015CMS/MSD

QC Summary Report for Dissolved Metals

Analyte	MB Result	MDL	RL			
Antimony	0.13,J	0.061	0.50	-	-	-
Arsenic	ND	0.19	0.50	-	-	-
Barium	ND	1.1	5.0	-	-	-
Beryllium	ND	0.051	0.50	-	-	-
Cadmium	ND	0.040	0.25	-	-	-
Chromium	ND	0.14	0.50	-	-	-
Cobalt	ND	0.048	0.50	-	-	-
Lead	ND	0.078	0.50	-	-	-
Nickel	ND	0.18	0.50	-	-	-
Thallium	0.060,J	0.026	0.50	-	-	-
Vanadium	ND	0.059	0.50	-	-	-

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CA ELAP 1644 • NELAP 4033ORELAP



Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/7/19
Date Analyzed: 3/11/19 - 3/13/19
Instrument: ICP-MS2
Matrix: Water
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174185
Extraction Method: E200.8
Analytical Method: E200.8
Unit: µg/L
Sample ID: MB/LCS/LCSD-174185
1903344-015CMS/MSD

QC Summary Report for Dissolved Metals

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Antimony	52	52	50	104	104	85-115	0	20
Arsenic	53	53	50	106	105	85-115	0.530	20
Barium	540	540	500	107	109	85-115	1.32	20
Beryllium	54	55	50	108	110	85-115	1.14	20
Cadmium	50	50	50	100	101	85-115	0.279	20
Chromium	52	52	50	103	104	85-115	0.329	20
Cobalt	55	56	50	109	111	85-115	1.58	20
Lead	51	51	50	102	102	85-115	0	20
Nickel	52	52	50	104	103	85-115	0.908	20
Thallium	51	52	50	103	104	85-115	1.60	20
Vanadium	51	52	50	103	103	85-115	0	20

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Antimony	1	54	53	50	ND	107	106	70-130	0.374	20
Arsenic	1	56	57	50	1.930	109	110	70-130	1.11	20
Barium	1	700	700	500	136.0	112	112	70-130	0	20
Beryllium	1	53	52	50	ND	106	105	70-130	1.48	20
Cadmium	1	52	52	50	ND	104	104	70-130	0	20
Chromium	1	59	60	50	2.148	114	115	70-130	0.437	20
Cobalt	1	59	58	50	5.784	106	105	70-130	0.936	20
Lead	1	57	57	50	5.515	104	103	70-130	0.175	20
Nickel	1	71	70	50	14.16	113	112	70-130	0.412	20
Thallium	1	53	53	50	ND	106	105	70-130	0.625	20
Vanadium	1	61	61	50	4.577	113	113	70-130	0	20

Analyte	DLT Result	DLTRef Val	%D	%D Limit
Antimony	ND<2.5	ND	-	-
Arsenic	ND<2.5	1.930	-	-

(Cont.)

CA ELAP 1644 • NELAP 4033ORELAP



Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/7/19
Date Analyzed: 3/11/19 - 3/13/19
Instrument: ICP-MS2
Matrix: Water
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174185
Extraction Method: E200.8
Analytical Method: E200.8
Unit: µg/L
Sample ID: MB/LCS/LCSD-174185
1903344-015CMS/MSD

QC Summary Report for Dissolved Metals

Analyte	DLT Result	DLTRef Val	%D	%D Limit
Barium	130	136.0	4.41	20
Beryllium	ND<2.5	ND	-	-
Cadmium	ND<1.2	ND	-	-
Chromium	7.9	2.148	268	-
Cobalt	6.4	5.784	10.7	-
Lead	5.7	5.515	3.35	-
Nickel	21	14.16	48.3,F11	20
Thallium	ND<2.5	ND	-	-
Vanadium	9.6	4.577	110	-

%D Control Limit applied to analytes with concentrations greater than 25 times the reporting limits.



Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/6/19
Date Analyzed: 3/7/19
Instrument: ICP-MS2, ICP-MS3
Matrix: Soil
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174156
Extraction Method: SW3050B
Analytical Method: SW6020
Unit: mg/Kg
Sample ID: MB/LCS/LCSD-174156

QC Summary Report for Metals

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Lead	ND	0.094	0.50	-	-	-

Surrogate Recovery

Terbium	530			500	106	70-130
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Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Lead	49	52	50	99	103	75-125	4.51	20

Surrogate Recovery

Terbium	540	540	500	107	109	70-130	1.48	20
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Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/6/19
Date Analyzed: 3/7/19 - 3/8/19
Instrument: GC11A, GC9b
Matrix: Soil
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174148
Extraction Method: SW3550B/3630C
Analytical Method: SW8015B
Unit: mg/Kg
Sample ID: MB/LCS/LCSD-174148

QC Report for SW8015B w/ SG Clean-Up

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
TPH-Diesel (C10-C23)	ND	0.86	1.0	-	-	-
TPH-Motor Oil (C18-C36)	ND	3.5	5.0	-	-	-
Surrogate Recovery						
C9	23			25	93	72-122

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
TPH-Diesel (C10-C23)	42	41	40	105	102	75-128	2.32	30
Surrogate Recovery								
C9	23	22	25	93	89	72-122	4.33	30



Quality Control Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Prepared: 3/7/19
Date Analyzed: 3/8/19
Instrument: GC11A
Matrix: Water
Project: 018022.030; Little Lake Industries

WorkOrder: 1903344
BatchID: 174175
Extraction Method: SW3510C/3630C
Analytical Method: SW8015B
Unit: µg/L
Sample ID: MB/LCS/LCSD-174175

QC Report for SW8015B w/ SG Clean-Up

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
TPH-Diesel (C10-C23)	ND	45	50	-	-	-
TPH-Motor Oil (C18-C36)	ND	150	250	-	-	-
Surrogate Recovery						
C9	530			625	85	68-127

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
TPH-Diesel (C10-C23)	1100	1200	1000	114	118	86-142	3.91	30
Surrogate Recovery								
C9	530	580	625	85	92	68-127	7.71	30



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CHAIN-OF-CUSTODY RECORD

Page 1 of 2

WorkOrder: 1903344

ClientCode: SHNE

☐ Excel ☐ EQuIS ☒ Email ☐ HardCopy ☐ ThirdParty ☒ J-flag
☐ Detection Summary ☐ Dry-Weight

Report to:

Erik Nielsen
SHN Consulting Engineers & Geologists
812 W. Wabash Ave.
Eureka, CA 95501
(707) 441-8855 FAX:

Email: enielsen@shn-engr.com
cc/3rd Party: dward@snn-engr.com;
PO:
Project: 018022.030; Little Lake Industries

Bill to:

Leanne Stevens
SHN Consulting Engineers & Geologists
812 W. Wabash Ave.
Eureka, CA 95501
lstevens@shn-engr.com

Requested TATs: 15 days;
5 days;

Date Received: 03/07/2019

Date Logged: 03/07/2019

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
1903344-001	TP-01	Soil	3/4/2019 14:25	☐	A				A			A	A	A		
1903344-002	TP-01R	Soil	3/4/2019 14:30	☐	A				A			A		A		
1903344-003	TP-02	Soil	3/4/2019 11:35	☐	A				A			A				
1903344-004	TP-03	Soil	3/4/2019 11:10	☐	A				A			A				
1903344-005	TP-04	Soil	3/4/2019 14:45	☐	A				A			A				
1903344-006	TP-05	Soil	3/4/2019 11:55	☐	A				A			A				
1903344-007	TP-06	Soil	3/4/2019 14:10	☐	A				A			A				
1903344-008	TP-07	Soil	3/4/2019 15:30	☐								A		A		
1903344-009	WP-01	Water	3/5/2019 12:00	☐		C	A			D					B	
1903344-010	WP-01R	Water	3/5/2019 12:05	☐		A										
1903344-011	WTP-02	Water	3/5/2019 12:30	☐			A								B	
1903344-012	WP-03	Water	3/5/2019 11:30	☐			A								B	
1903344-013	WP-04	Water	3/5/2019 10:55	☐		C	A			D					B	
1903344-014	WP-05	Water	3/5/2019 12:55	☐			A								B	
1903344-015	WP-06	Water	3/5/2019 13:20	☐			A				C				B	

Test Legend:

1	1613_FULL_S
5	8270_SCSM_S [J]
9	PREDF REPORT

2	1613_FULL_W
6	8270_SCSM_W
10	TPH(D)WSG_S

3	8260GAS_W
7	METALSMS_FF DISS
11	TPH(D)WSG_W

4	8270_PNA_W
8	PBMS_TTLC_S
12	

Project Manager: Rosa Venegas

Prepared by: Kena Ponce

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.



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Pittsburg, CA 94565-1701
(925) 252-9262

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CHAIN-OF-CUSTODY RECORD

Page 2 of 2

WorkOrder: 1903344

ClientCode: SHNE

☐ Excel

☐ EQuIS

☒ Email

☐ HardCopy

☐ ThirdParty

☒ J-flag

☐ Detection Summary

☐ Dry-Weight

Report to:

Erik Nielsen

SHN Consulting Engineers & Geologists

812 W. Wabash Ave.

Eureka, CA 95501

(707) 441-8855 FAX:

Email: enielsen@shn-engr.com

cc/3rd Party: dward@snn-engr.com;

PO:

Project: 018022.030; Little Lake Industries

Bill to:

Leanne Stevens

SHN Consulting Engineers & Geologists

812 W. Wabash Ave.

Eureka, CA 95501

lstevens@shn-engr.com

Requested TATs: 15 days;
5 days;

Date Received: 03/07/2019

Date Logged: 03/07/2019

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
1903344-016	WP-07	Water	3/4/2019 15:00	☐			A	D			C				B	
1903344-017	WP-07R	Water	3/4/2019 15:05	☐			A	D			C				B	
1903344-018	WP-EB	Water	3/4/2019 15:30	☐							A					

Test Legend:

1	1613_FULL_S
5	8270_SCSM_S [J]
9	PREDF REPORT

2	1613_FULL_W
6	8270_SCSM_W
10	TPH(D)WSG_S

3	8260GAS_W
7	METALSMS_FF DISS
11	TPH(D)WSG_W

4	8270_PNA_W
8	PBMS_TTLC_S
12	

Project Manager: Rosa Venegas

Prepared by: Kena Ponce

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.



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http://www.mcccampbell.com / E-mail: main@mcccampbell.com

WORK ORDER SUMMARY

Client Name: SHN CONSULTING ENGINEERS & GEOLOGISTS, I **Project:** 018022.030; Little Lake Industries

Client Contact: Erik Nielsen

Contact's Email: enielsen@shn-engr.com

Comments:

Work Order: 1903344

QC Level: LEVEL 2

Date Logged: 3/7/2019

☐ WaterTrax ☐ WriteOn ☒ EDF ☐ Excel ☐ EQUIS ☒ Email ☐ HardCopy ☐ ThirdParty ☒ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De- chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1903344-001A	TP-01	Soil	SW8015B (Diesel w/ S.G. Clean-Up)	1	16OZ GJ, Unpres	☐	3/4/2019 14:25	5 days		☐	
			SW6020 (Lead)			☐		5 days		☐	
			SW8270C (SVOCs)			☐		5 days		☐	
			<Pentachlorophenol>								
			E1613B (PCDDs & PCDFs)			☐		15 days		☐	
1903344-002A	TP-01R	Soil	SW8015B (Diesel w/ S.G. Clean-Up)	1	16OZ GJ, Unpres	☐	3/4/2019 14:30	5 days		☐	
			SW6020 (Lead)			☐		5 days		☐	
			SW8270C (SVOCs)			☐		5 days		☐	
			<Pentachlorophenol>								
			E1613B (PCDDs & PCDFs)			☐		15 days		☐	
1903344-003A	TP-02	Soil	SW6020 (Lead)	1	16OZ GJ, Unpres	☐	3/4/2019 11:35	5 days		☐	
			SW8270C (SVOCs)			☐		5 days		☐	
			<Pentachlorophenol>								
			E1613B (PCDDs & PCDFs)			☐		15 days		☐	
1903344-004A	TP-03	Soil	SW6020 (Lead)	1	16OZ GJ, Unpres	☐	3/4/2019 11:10	5 days		☐	
			SW8270C (SVOCs)			☐		5 days		☐	
			<Pentachlorophenol>								
			E1613B (PCDDs & PCDFs)			☐		15 days		☐	
1903344-005A	TP-04	Soil	SW6020 (Lead)	1	16OZ GJ, Unpres	☐	3/4/2019 14:45	5 days		☐	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.



WORK ORDER SUMMARY

Client Name: SHN CONSULTING ENGINEERS & GEOLOGISTS, I **Project:** 018022.030; Little Lake Industries

Client Contact: Erik Nielsen

Contact's Email: enielsen@shn-engr.com

Comments:

Work Order: 1903344

QC Level: LEVEL 2

Date Logged: 3/7/2019

☐ WaterTrax ☐ WriteOn ☒ EDF ☐ Excel ☐ EQUIS ☒ Email ☐ HardCopy ☐ ThirdParty ☒ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1903344-005A	TP-04	Soil	SW8270C (SVOCs) <Pentachlorophenol> E1613B (PCDDs & PCDFs)	1	16OZ GJ, Unpres	☐ ☐	3/4/2019 14:45	5 days 15 days		☐ ☐	
1903344-006A	TP-05	Soil	SW6020 (Lead) SW8270C (SVOCs) <Pentachlorophenol> E1613B (PCDDs & PCDFs)	1	16OZ GJ, Unpres	☐ ☐ ☐	3/4/2019 11:55	5 days 5 days 15 days		☐ ☐ ☐	
1903344-007A	TP-06	Soil	SW6020 (Lead) SW8270C (SVOCs) <Pentachlorophenol> E1613B (PCDDs & PCDFs)	1	16OZ GJ, Unpres	☐ ☐ ☐	3/4/2019 14:10	5 days 5 days 15 days		☐ ☐ ☐	
1903344-008A	TP-07	Soil	SW8015B (Diesel w/ S.G. Clean-Up) SW6020 (Lead)	1	16OZ GJ, Unpres	☐ ☐	3/4/2019 15:30	5 days 5 days		☐ ☐	
1903344-009A	WP-01	Water	SW8260B (TPH-gas)	2	VOA w/ HCl	☐	3/5/2019 12:00	5 days	1%+	☐	
1903344-009B	WP-01	Water	SW8015B (Diesel w/ S.G. Clean-Up)	2	aVOA, Unpres	☐	3/5/2019 12:00	5 days	1%+	☐	
1903344-009C	WP-01	Water	E1613B (PCDDs & PCDFs)	2	1LA Narrow Mouth, Unpres	☐	3/5/2019 12:00	15 days	1%+	☐	
1903344-009D	WP-01	Water	SW8270C (SVOCs) <Pentachlorophenol>	1	1LA, Unpres	☐	3/5/2019 12:00	5 days	1%+	☐	
1903344-010A	WP-01R	Water	E1613B (PCDDs & PCDFs)	2	1LA Narrow Mouth, Unpres	☐	3/5/2019 12:05	15 days	1%+	☐	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

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http://www.mccampbell.com / E-mail: main@mccampbell.com

WORK ORDER SUMMARY

Client Name: SHN CONSULTING ENGINEERS & GEOLOGISTS, I **Project:** 018022.030; Little Lake Industries

Client Contact: Erik Nielsen

Contact's Email: enielsen@shn-engr.com

Comments:

Work Order: 1903344

QC Level: LEVEL 2

Date Logged: 3/7/2019

☐ WaterTrax ☐ WriteOn ☒ EDF ☐ Excel ☐ EQUIS ☒ Email ☐ HardCopy ☐ ThirdParty ☒ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1903344-011A	WTP-02	Water	SW8260B (TPH-gas)	2	VOA w/ HCl	☐	3/5/2019 12:30	5 days	1%+	☐	
1903344-011B	WTP-02	Water	SW8015B (Diesel w/ S.G. Clean-Up)	2	aVOA, Unpres	☐	3/5/2019 12:30	5 days	1%+	☐	
1903344-012A	WP-03	Water	SW8260B (TPH-gas)	2	VOA w/ HCl	☐	3/5/2019 11:30	5 days	1%+	☐	
1903344-012B	WP-03	Water	SW8015B (Diesel w/ S.G. Clean-Up)	2	aVOA, Unpres	☐	3/5/2019 11:30	5 days	1%+	☐	
1903344-013A	WP-04	Water	SW8260B (TPH-gas)	2	VOA w/ HCl	☐	3/5/2019 10:55	5 days	1%+	☐	
1903344-013B	WP-04	Water	SW8015B (Diesel w/ S.G. Clean-Up)	2	aVOA, Unpres	☐	3/5/2019 10:55	5 days	1%+	☐	
1903344-013C	WP-04	Water	E1613B (PCDDs & PCDFs)	2	1LA Narrow Mouth, Unpres	☐	3/5/2019 10:55	15 days	1%+	☐	
1903344-013D	WP-04	Water	SW8270C (SVOCs) <Pentachlorophenol>	1	1LA, Unpres	☐	3/5/2019 10:55	5 days	1%+	☐	
1903344-014A	WP-05	Water	SW8260B (TPH-gas)	2	VOA w/ HCl	☐	3/5/2019 12:55	5 days	1%+	☐	
1903344-014B	WP-05	Water	SW8015B (Diesel w/ S.G. Clean-Up)	2	aVOA, Unpres	☐	3/5/2019 12:55	5 days	1%+	☐	
1903344-015A	WP-06	Water	SW8260B (TPH-gas)	2	VOA w/ HCl	☐	3/5/2019 13:20	5 days	1%+	☐	
1903344-015B	WP-06	Water	SW8015B (Diesel w/ S.G. Clean-Up)	2	aVOA, Unpres	☐	3/5/2019 13:20	5 days	1%+	☐	
1903344-015C	WP-06	Water	E200.8 (Metals) (Dissolved-Field Filtered) <Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Lead, Nickel, Thallium, Vanadium>	1	250mL HDPE w/ HNO3	☐	3/5/2019 13:20	5 days	None	☐	
1903344-016A	WP-07	Water	SW8260B (TPH-gas)	2	VOA w/ HCl	☐	3/4/2019 15:00	5 days	1%+	☐	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

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WORK ORDER SUMMARY

Client Name: SHN CONSULTING ENGINEERS & GEOLOGISTS, I **Project:** 018022.030; Little Lake Industries

Client Contact: Erik Nielsen

Contact's Email: enielsen@shn-engr.com

Comments:

Work Order: 1903344

QC Level: LEVEL 2

Date Logged: 3/7/2019

☐ WaterTrax ☐ WriteOn ☒ EDF ☐ Excel ☐ EQUIS ☒ Email ☐ HardCopy ☐ ThirdParty ☒ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1903344-016B	WP-07	Water	SW8015B (Diesel w/ S.G. Clean-Up)	2	aVOA, Unpres	☐	3/4/2019 15:00	5 days	1%+	☐	
1903344-016C	WP-07	Water	E200.8 (Metals) (Dissolved-Field Filtered) <Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Lead, Nickel, Thallium, Vanadium>	1	250mL HDPE w/ HNO3	☐	3/4/2019 15:00	5 days	None	☐	
1903344-016D	WP-07	Water	SW8270C (PAHs/PNAs)	1	1LA, Unpres	☐	3/4/2019 15:00	5 days	1%+	☐	
1903344-017A	WP-07R	Water	SW8260B (TPH-gas)	2	VOA w/ HCl	☐	3/4/2019 15:05	5 days	1%+	☐	
1903344-017B	WP-07R	Water	SW8015B (Diesel w/ S.G. Clean-Up)	2	aVOA, Unpres	☐	3/4/2019 15:05	5 days	1%+	☐	
1903344-017C	WP-07R	Water	E200.8 (Metals) (Dissolved-Field Filtered) <Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Lead, Nickel, Thallium, Vanadium>	1	250mL HDPE w/ HNO3	☐	3/4/2019 15:05	5 days	None	☐	
1903344-017D	WP-07R	Water	SW8270C (PAHs/PNAs)	1	1LA, Unpres	☐	3/4/2019 15:05	5 days	1%+	☐	
1903344-018A	WP-EB	Water	E200.8 (Metals) (Dissolved-Field Filtered) <Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Lead, Nickel, Thallium, Vanadium>	1	250mL HDPE w/ HNO3	☐	3/4/2019 15:30	5 days	None	☐	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.



CHAIN OF CUSTODY RECORD

Telephone: (877) 252-9262 / Fax: (925) 252-9269

main@mccampbell.com

Company:	SHN
----------	-----

Email: enielsen@shn-engr.com

Alt Email: dward@shn-engr.com Tele: 707-441-8855

Project Name:	Little Lake Industries	Project #:	018022.030
---------------	------------------------	------------	------------

Project Location:	Arcata, CA	PO #
-------------------	------------	------

Sampler Signature:

SAMPLE ID Location / Field Point	Sampling		#Containers	Matrix	Preservative
	Date	Time			
TP-01	3/4/19	1425	1	S	7
TP-01R	3/4/19	1430	1	S	7
TP-02	3/4/19	1135	1	S	7
TP-03	3/4/19	1110	1	S	7
TP-04	3/4/19	1445	1	S	7
TP-05	3/4/19	1155	1	S	7
TP-06	3/4/19	1410	1	S	7
TP-07	3/4/19	1530	1	S	7

Turn Around Time:1 Day Rush		2 Day Rush		3 Day Rush		STD	X	Quote #	
J-Flag / MDL	X	ESL		Cleanup Approved				Bottle Order #	
Delivery Format:	PDF		GeoTracker EDF	X	EDD		Write On (DW)		EQUIS

Analysis Requested

[illegible]

MAI clients MUST disclose any dangerous chemicals known to be present in their submitted samples in concentrations that may cause immediate harm or serious future health endangerment as a result of brief, gloved, open air, sample handling by MAI staff. Non-disclosure incurs an immediate \$250 surcharge and the client is subject to full legal liability for harm suffered. Thank you for your understanding and for allowing us to work safely.

* If metals are requested for water samples and the water type (Matrix) is not specified on the chain of custody, MAI will default to metals by E200.8.

Please provide an adequate volume of sample. If the volume is not sufficient for a MS/MSD a LCS/LCSD will be prepared in its place and noted in the report.

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
Erik Nielsen/SHN <i>Erik Nielsen</i>	3/6/2019	1400	<i>Fedex</i>		
TRK# 7746 2588 014F	3/7/19	0956	<i>[Signature]</i>	3/7/19	0956

Comments / Instructions

* SET up by 200.5/6020

TRK# 7746 3588 9145
0201

Matrix Code: 0201 7746 3388 9143 und Water, WW=Waste Water, SW=Seawater, S=Soil, SL=Sludge, A=Air, WP=Wipe, O=Other

Preservative code: 1=4°C 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=ZnOAc/NaOH 7=None

Temp 3.8 °C Initials

Page 2 of 2
Page 84 of 86

**Table 4. Contaminants of Concern, Laboratory Analysis and Action Levels
Little Lake Industries Mill, Arcata, California**

Analytical Parameter in Soil (Contaminants of Concern)	Laboratory Reporting or Quantitation Limits (mg/kg) ¹	Soil Action Level (mg/kg)
EPA Method 1613		
Dioxins/Furans	1.0 E-6	50 E-06 ²
EPA Method 6010		
Lead	1.0	80 ³
EPA Method 8270		
PCP ⁴	0.5	1.0 ³
EPA Method 8015		
TPHD ⁵	1.0	230 ³
Analytical Parameter in Groundwater (Contaminants of Concern)	Laboratory Reporting or Quantitation Limits (µg/L) ⁶	Groundwater Action Level (µg/L)
EPA Method 1613		
Dioxins and Furans	1.0 E-07	3.0 E-07 ⁷
EPA Method 8270		
PCP	0.1	0.1 ³
EPA Method 8015B		
TPHD	0.5	100 ⁸
EPA Method 8260B Modified		
TPHG	0.1	5 ⁸
Dissolved Metals EPA Method 200.8		
Antimony	1.0	2.8 ⁸
Arsenic	1.0	0.004 ⁸
Barium	1.0	1,000 ³
Beryllium	1.0	1 ⁸
Cadmium	5.0	0.04 ⁸
Chromium	5.0	50 ³
Cobalt	5.0	3.0 ³
Lead	5.0	0.2 ⁸
Nickel	5.0	12 ⁸
Thallium	10	0.1 ⁸
Vanadium	1.0	19 ³
SVOCs by Method 8270 SIM		
SVOCs ⁹	0.1	Varies per constituent



Sample Receipt Checklist

Client Name: **SHN Consulting Engineers & Geologists, Inc.**
Project: **018022.030; Little Lake Industries**

Date and Time Received **3/7/2019 09:56**

Date Logged: **3/7/2019**

Received by:

Logged by: **Kena Ponce**

WorkOrder No: **1903344**

Matrix:

Carrier: **FedEx**

Chain of Custody (COC) Information

Chain of custody present?	Yes ☒	No ☐	
Chain of custody signed when relinquished and received?	Yes ☒	No ☐	
Chain of custody agrees with sample labels?	Yes ☒	No ☐	
Sample IDs noted by Client on COC?	Yes ☒	No ☐	
Date and Time of collection noted by Client on COC?	Yes ☒	No ☐	
Sampler's name noted on COC?	Yes ☒	No ☐	
COC agrees with Quote?	Yes ☐	No ☐	NA ☒

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☒
Shipping container/cooler in good condition?	Yes ☒	No ☐	
Samples in proper containers/bottles?	Yes ☒	No ☐	
Sample containers intact?	Yes ☒	No ☐	
Sufficient sample volume for indicated test?	Yes ☒	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☒	No ☐	NA ☐
Samples Received on Ice?	Yes ☒	No ☐	

(Ice Type: WET ICE)

Sample/Temp Blank temperature	Temp: 3.8°C	NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☒ No ☐	NA ☐
Sample labels checked for correct preservation?	Yes ☒ No ☐	
pH acceptable upon receipt (Metal: <2; Nitrate 353.2/4500NO3: <2; 522: <4; 218.7: >8)?	Yes ☒ No ☐	NA ☐

UCMR Samples:

pH tested and acceptable upon receipt (200.8: ≤2; 525.3: ≤4; 530: ≤7; 541: <3; 544: <6.5 & 7.5)?	Yes ☐ No ☐	NA ☒
Free Chlorine tested and acceptable upon receipt (<0.1mg/L)?	Yes ☐ No ☐	NA ☒

Comments:



McC Campbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1907931

Report Created for: SHN Consulting Engineers & Geologists, Inc.

812 W. Wabash Ave.
Eureka, CA 95501

Project Contact: Erik Nielsen

Project P.O.:

Project: 018022; Little Lakes Industries Phase II

Project Received: 07/19/2019

Analytical Report reviewed & approved for release on 08/08/2019 by:

Yen Cao

Project Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.





Glossary of Terms & Qualifier Definitions

Client: SHN Consulting Engineers & Geologists, Inc.
Project: 018022; Little Lakes Industries Phase II
WorkOrder: 1907931

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
LQL	Lowest Quantitation Level
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
TZA	TimeZone Net Adjustment for sample collected outside of MAI's UTC.
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 7/19/19 9:31
Date Prepared: 7/31/19
Project: 018022; Little Lakes Industries Phase II

WorkOrder: 1907931
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-08	1907931-001A	Soil	07/17/2019 11:05	GC36	182753

Analytes	TEF WHO '05	Result	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
2,3,7,8-TCDD		ND	1.00	1				08/06/2019 20:28
1,2,3,7,8-PeCDD		ND	5.00	1				08/06/2019 20:28
1,2,3,4,7,8-HxCDD	0.1	9.96	5.00	1	1.28	1	0.996	08/06/2019 20:28
1,2,3,6,7,8-HxCDD	0.1	38.8	5.00	1	1.22	1	3.88	08/06/2019 20:28
1,2,3,7,8,9-HxCDD	0.1	12.1	5.00	1	1.3	1.01	1.21	08/06/2019 20:28
1,2,3,4,6,7,8-HpCDD	0.01	1100	5.00	1	1.04	1	11	08/06/2019 20:28
OCDD	0.0003	15,100	10.0	1	0.89	1	4.53	08/06/2019 20:28
2,3,7,8-TCDF	0.1	1.64	1.00	1	0.86	1	0.164	08/06/2019 20:28
1,2,3,7,8-PeCDF		ND	5.00	1				08/06/2019 20:28
2,3,4,7,8-PeCDF		ND	5.00	1				08/06/2019 20:28
1,2,3,4,7,8-HxCDF	0.1	15.2	5.00	1	1.29	1	1.52	08/06/2019 20:28
1,2,3,6,7,8-HxCDF	0.1	72.7	5.00	1	1.28	1	7.27	08/06/2019 20:28
1,2,3,7,8,9-HxCDF		ND	5.00	1				08/06/2019 20:28
2,3,4,6,7,8-HxCDF	0.1	5.58	5.00	1	1.22	1	0.558	08/06/2019 20:28
1,2,3,4,6,7,8-HpCDF	0.01	844	5.00	1	1.08	1	8.44	08/06/2019 20:28
1,2,3,4,7,8,9-HpCDF	0.01	17.8	5.00	1	1.09	1	0.178	08/06/2019 20:28
OCDF	0.0003	703	10.0	1	0.90	1.01	0.2109	08/06/2019 20:28
Total-Tetradoxins		25.7	1.00	1				08/06/2019 20:28
Total-Pentadoxins		28.5	5.00	1				08/06/2019 20:28
Total-Hexadoxins		277	5.00	1				08/06/2019 20:28
Total-Heptadoxins		2480	5.00	1				08/06/2019 20:28
Total-Tetrafurans		399	1.00	1				08/06/2019 20:28
Total-Pentafurans		413	5.00	1				08/06/2019 20:28
Total-Hexafurans		1430	5.00	1				08/06/2019 20:28
Total-Heptafurans		1750	5.00	1				08/06/2019 20:28

Total Toxicity Equivalence (TEQ):

40.0

Cleanup Standard	REC (%)	Limits	
37Cl-2,3,7,8-TCDD	83	35-197	08/06/2019 20:28
Labeled Compound Recovery	REC (%)	Limits	
13C-2,3,7,8-TCDD	88	25-164	08/06/2019 20:28
13C-1,2,3,7,8-PeCDD	74	25-181	08/06/2019 20:28
13C-1,2,3,4,7,8-HxCDD	82	32-141	08/06/2019 20:28
13C-1,2,3,6,7,8-HxCDD	77	28-130	08/06/2019 20:28
13C-1,2,3,4,6,7,8-HpCDD	66	23-140	08/06/2019 20:28
13C-OCDD	82	17-157	08/06/2019 20:28

(Cont.)



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 7/19/19 9:31
Date Prepared: 7/31/19
Project: 018022; Little Lakes Industries Phase II

WorkOrder: 1907931
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-08	1907931-001A	Soil	07/17/2019 11:05	GC36	182753

Analytes	TEF WHO '05	Result	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
Labeled Compound Recovery	REC (%)	Limits						
13C-2,3,7,8-TCDF	87		24-169					08/06/2019 20:28
13C-1,2,3,7,8-PeCDF	78		24-185					08/06/2019 20:28
13C-2,3,4,7,8-PeCDF	73		21-178					08/06/2019 20:28
13C-1,2,3,4,7,8-HxCDF	90		26-152					08/06/2019 20:28
13C-1,2,3,6,7,8-HxCDF	85		26-123					08/06/2019 20:28
13C-2,3,4,6,7,8-HxCDF	87		28-136					08/06/2019 20:28
13C-1,2,3,7,8,9-HxCDF	83		29-147					08/06/2019 20:28
13C-1,2,3,4,6,7,8-HpCDF	73		28-143					08/06/2019 20:28
13C-1,2,3,4,7,8,9-HpCDF	73		26-138					08/06/2019 20:28

Analyst(s): KBO



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 7/19/19 9:31
Date Prepared: 7/31/19
Project: 018022; Little Lakes Industries Phase II

WorkOrder: 1907931
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-09	1907931-002A	Soil	07/17/2019 10:45	GC36	182753

Analytes	TEF WHO '05	Result	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
2,3,7,8-TCDD	1	2.78	1.00	1	0.79	1	2.78	08/06/2019 21:33
1,2,3,7,8-PeCDD	1	20.7	5.00	1	1.51	1	20.7	08/06/2019 21:33
1,2,3,4,7,8-HxCDD	0.1	46.0	5.00	1	1.16	1	4.6	08/06/2019 21:33
1,2,3,6,7,8-HxCDD	0.1	754	5.00	1	1.21	1	75.4	08/06/2019 21:33
1,2,3,7,8,9-HxCDD	0.1	171	5.00	1	1.24	1.01	17.1	08/06/2019 21:33
1,2,3,4,6,7,8-HpCDD	0.01	14,000	5.00	1	1.04	1	140	08/06/2019 21:33
OCDD	0.0003	87,700	10.0	1	0.89	1	26.31	08/06/2019 21:33
2,3,7,8-TCDF	0.1	2.78	1.00	1	0.81	1	0.278	08/06/2019 21:33
1,2,3,7,8-PeCDF	0.03	14.0	5.00	1	1.67	1	0.42	08/06/2019 21:33
2,3,4,7,8-PeCDF	0.3	28.7	5.00	1	1.55	1	8.61	08/06/2019 21:33
1,2,3,4,7,8-HxCDF	0.1	158	5.00	1	1.28	1	15.8	08/06/2019 21:33
1,2,3,6,7,8-HxCDF	0.1	360	5.00	1	1.27	1	36	08/06/2019 21:33
1,2,3,7,8,9-HxCDF	0.1	13.0	5.00	1	1.32	1	1.3	08/06/2019 21:33
2,3,4,6,7,8-HxCDF	0.1	61.6	5.00	1	1.28	1	6.16	08/06/2019 21:33
1,2,3,4,6,7,8-HpCDF	0.01	1560	5.00	1	1.08	1	15.6	08/06/2019 21:33
1,2,3,4,7,8,9-HpCDF	0.01	56.5	5.00	1	1.12	1	0.565	08/06/2019 21:33
OCDF	0.0003	979	10.0	1	0.90	1.01	0.2937	08/06/2019 21:33
Total-Tetradoxins		191	1.00	1				08/06/2019 21:33
Total-Pentadoxins		316	5.00	1				08/06/2019 21:33
Total-Hexadoxins		6240	5.00	1				08/06/2019 21:33
Total-Heptadoxins		29,500	5.00	1				08/06/2019 21:33
Total-Tetrafurans		1730	1.00	1				08/06/2019 21:33
Total-Pentafurans		4370	5.00	1				08/06/2019 21:33
Total-Hexafurans		11,600	5.00	1				08/06/2019 21:33
Total-Heptafurans		5430	5.00	1				08/06/2019 21:33

Total Toxicity Equivalence (TEQ):

372

Cleanup Standard	REC (%)	Limits	
37Cl-2,3,7,8-TCDD	52	35-197	08/06/2019 21:33
Labeled Compound Recovery	REC (%)	Limits	
13C-2,3,7,8-TCDD	59	25-164	08/06/2019 21:33
13C-1,2,3,7,8-PeCDD	40	25-181	08/06/2019 21:33
13C-1,2,3,4,7,8-HxCDD	59	32-141	08/06/2019 21:33
13C-1,2,3,6,7,8-HxCDD	62	28-130	08/06/2019 21:33
13C-1,2,3,4,6,7,8-HpCDD	46	23-140	08/06/2019 21:33
13C-OCDD	64	17-157	08/06/2019 21:33

(Cont.)



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 7/19/19 9:31
Date Prepared: 7/31/19
Project: 018022; Little Lakes Industries Phase II

WorkOrder: 1907931
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-09	1907931-002A	Soil	07/17/2019 10:45	GC36	182753

Analytes	TEF WHO '05	Result	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
Labeled Compound Recovery	REC (%)	Limits						
13C-2,3,7,8-TCDF	60		24-169					08/06/2019 21:33
13C-1,2,3,7,8-PeCDF	46		24-185					08/06/2019 21:33
13C-2,3,4,7,8-PeCDF	43		21-178					08/06/2019 21:33
13C-1,2,3,4,7,8-HxCDF	76		26-152					08/06/2019 21:33
13C-1,2,3,6,7,8-HxCDF	67		26-123					08/06/2019 21:33
13C-2,3,4,6,7,8-HxCDF	72		28-136					08/06/2019 21:33
13C-1,2,3,7,8,9-HxCDF	58		29-147					08/06/2019 21:33
13C-1,2,3,4,6,7,8-HpCDF	48		28-143					08/06/2019 21:33
13C-1,2,3,4,7,8,9-HpCDF	49		26-138					08/06/2019 21:33

Analyst(s): KBO



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 7/19/19 9:31
Date Prepared: 7/31/19
Project: 018022; Little Lakes Industries Phase II

WorkOrder: 1907931
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-10	1907931-003A	Soil	07/17/2019 10:30	GC36	182753

Analytes	TEF WHO '05	Result	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
2,3,7,8-TCDD		ND	1.00	1				08/06/2019 22:29
1,2,3,7,8-PeCDD		ND	5.00	1				08/06/2019 22:29
1,2,3,4,7,8-HxCDD	0.1	9.36	5.00	1	1.23	1	0.936	08/06/2019 22:29
1,2,3,6,7,8-HxCDD	0.1	42.0	5.00	1	1.28	1	4.2	08/06/2019 22:29
1,2,3,7,8,9-HxCDD	0.1	17.2	5.00	1	1.38	1.01	1.72	08/06/2019 22:29
1,2,3,4,6,7,8-HpCDD	0.01	1120	5.00	1	1.03	1	11.2	08/06/2019 22:29
OCDD	0.0003	12,300	10.0	1	0.89	1	3.69	08/06/2019 22:29
2,3,7,8-TCDF	0.1	1.38	1.00	1	0.84	1	0.138	08/06/2019 22:29
1,2,3,7,8-PeCDF		ND	5.00	1				08/06/2019 22:29
2,3,4,7,8-PeCDF		ND	5.00	1				08/06/2019 22:29
1,2,3,4,7,8-HxCDF	0.1	11.5	5.00	1	1.31	1	1.15	08/06/2019 22:29
1,2,3,6,7,8-HxCDF	0.1	47.2	5.00	1	1.34	1	4.72	08/06/2019 22:29
1,2,3,7,8,9-HxCDF		ND	5.00	1				08/06/2019 22:29
2,3,4,6,7,8-HxCDF	0.1	7.64	5.00	1	1.31	1	0.764	08/06/2019 22:29
1,2,3,4,6,7,8-HpCDF	0.01	622	5.00	1	1.06	1	6.22	08/06/2019 22:29
1,2,3,4,7,8,9-HpCDF	0.01	12.8	5.00	1	1.13	1	0.128	08/06/2019 22:29
OCDF	0.0003	489	10.0	1	0.91	1.01	0.1467	08/06/2019 22:29
Total-Tetradoxins		24.7	1.00	1				08/06/2019 22:29
Total-Pentadoxins		39.6	5.00	1				08/06/2019 22:29
Total-Hexadoxins		332	5.00	1				08/06/2019 22:29
Total-Heptadoxins		2370	5.00	1				08/06/2019 22:29
Total-Tetrafurans		476	1.00	1				08/06/2019 22:29
Total-Pentafurans		388	5.00	1				08/06/2019 22:29
Total-Hexafurans		1090	5.00	1				08/06/2019 22:29
Total-Heptafurans		1330	5.00	1				08/06/2019 22:29

Total Toxicity Equivalence (TEQ):

35.0

Cleanup Standard	REC (%)	Limits	
37Cl-2,3,7,8-TCDD	73	35-197	08/06/2019 22:29
Labeled Compound Recovery	REC (%)	Limits	
13C-2,3,7,8-TCDD	79	25-164	08/06/2019 22:29
13C-1,2,3,7,8-PeCDD	63	25-181	08/06/2019 22:29
13C-1,2,3,4,7,8-HxCDD	78	32-141	08/06/2019 22:29
13C-1,2,3,6,7,8-HxCDD	81	28-130	08/06/2019 22:29
13C-1,2,3,4,6,7,8-HpCDD	63	23-140	08/06/2019 22:29
13C-OCDD	77	17-157	08/06/2019 22:29

(Cont.)



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 7/19/19 9:31
Date Prepared: 7/31/19
Project: 018022; Little Lakes Industries Phase II

WorkOrder: 1907931
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-10	1907931-003A	Soil	07/17/2019 10:30	GC36	182753

Analytes	TEF WHO '05	Result	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
Labeled Compound Recovery	REC (%)		Limits					
13C-2,3,7,8-TCDF	80		24-169					08/06/2019 22:29
13C-1,2,3,7,8-PeCDF	70		24-185					08/06/2019 22:29
13C-2,3,4,7,8-PeCDF	67		21-178					08/06/2019 22:29
13C-1,2,3,4,7,8-HxCDF	87		26-152					08/06/2019 22:29
13C-1,2,3,6,7,8-HxCDF	86		26-123					08/06/2019 22:29
13C-2,3,4,6,7,8-HxCDF	86		28-136					08/06/2019 22:29
13C-1,2,3,7,8,9-HxCDF	77		29-147					08/06/2019 22:29
13C-1,2,3,4,6,7,8-HpCDF	65		28-143					08/06/2019 22:29
13C-1,2,3,4,7,8,9-HpCDF	69		26-138					08/06/2019 22:29

Analyst(s): KBO



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 7/19/19 9:31
Date Prepared: 7/31/19
Project: 018022; Little Lakes Industries Phase II

WorkOrder: 1907931
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-11	1907931-004A	Soil	07/17/2019 11:25	GC36	182753

Analytes	TEF WHO '05	Result	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
2,3,7,8-TCDD		ND	1.00	1				08/08/2019 13:12
1,2,3,7,8-PeCDD		ND	5.00	1				08/08/2019 13:12
1,2,3,4,7,8-HxCDD		ND	5.00	1				08/08/2019 13:12
1,2,3,6,7,8-HxCDD		ND	5.00	1				08/08/2019 13:12
1,2,3,7,8,9-HxCDD		ND	5.00	1				08/08/2019 13:12
1,2,3,4,6,7,8-HpCDD	0.01	92.1	5.00	1	1.04	1	0.921	08/08/2019 13:12
OCDD	0.0003	1130	10.0	1	0.88	1	0.339	08/08/2019 13:12
2,3,7,8-TCDF		ND	1.00	1				08/08/2019 13:12
1,2,3,7,8-PeCDF		ND	5.00	1				08/08/2019 13:12
2,3,4,7,8-PeCDF		ND	5.00	1				08/08/2019 13:12
1,2,3,4,7,8-HxCDF		ND	5.00	1				08/08/2019 13:12
1,2,3,6,7,8-HxCDF		ND	5.00	1				08/08/2019 13:12
1,2,3,7,8,9-HxCDF		ND	5.00	1				08/08/2019 13:12
2,3,4,6,7,8-HxCDF		ND	5.00	1				08/08/2019 13:12
1,2,3,4,6,7,8-HpCDF	0.01	23.9	5.00	1	1.04	1	0.239	08/08/2019 13:12
1,2,3,4,7,8,9-HpCDF		ND	5.00	1				08/08/2019 13:12
OCDF	0.0003	34.6	10.0	1	0.88	1.01	0.01038	08/08/2019 13:12
Total-Tetradoxins		ND	1.00	1				08/08/2019 13:12
Total-Pentadoxins		ND	5.00	1				08/08/2019 13:12
Total-Hexadoxins		26.7	5.00	1				08/08/2019 13:12
Total-Heptadoxins		197	5.00	1				08/08/2019 13:12
Total-Tetrafurans		406	1.00	1				08/08/2019 13:12
Total-Pentafurans		106	5.00	1				08/08/2019 13:12
Total-Hexafurans		70.0	5.00	1				08/08/2019 13:12
Total-Heptafurans		65.2	5.00	1				08/08/2019 13:12
Total Toxicity Equivalence (TEQ):							1.51	

Cleanup Standard	REC (%)	Limits	
37Cl-2,3,7,8-TCDD	68	35-197	08/08/2019 13:12
Labeled Compound Recovery	REC (%)	Limits	
13C-2,3,7,8-TCDD	79	25-164	08/08/2019 13:12
13C-1,2,3,7,8-PeCDD	74	25-181	08/08/2019 13:12
13C-1,2,3,4,7,8-HxCDD	78	32-141	08/08/2019 13:12
13C-1,2,3,6,7,8-HxCDD	82	28-130	08/08/2019 13:12
13C-1,2,3,4,6,7,8-HpCDD	71	23-140	08/08/2019 13:12
13C-OCDD	70	17-157	08/08/2019 13:12

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Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 7/19/19 9:31
Date Prepared: 7/31/19
Project: 018022; Little Lakes Industries Phase II

WorkOrder: 1907931
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/g

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-11	1907931-004A	Soil	07/17/2019 11:25	GC36	182753

Analytes	TEF WHO '05	Result	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
Labeled Compound Recovery	REC (%)	Limits						
13C-2,3,7,8-TCDF	79	24-169						08/08/2019 13:12
13C-1,2,3,7,8-PeCDF	76	24-185						08/08/2019 13:12
13C-2,3,4,7,8-PeCDF	74	21-178						08/08/2019 13:12
13C-1,2,3,4,7,8-HxCDF	83	26-152						08/08/2019 13:12
13C-1,2,3,6,7,8-HxCDF	84	26-123						08/08/2019 13:12
13C-2,3,4,6,7,8-HxCDF	82	28-136						08/08/2019 13:12
13C-1,2,3,7,8,9-HxCDF	81	29-147						08/08/2019 13:12
13C-1,2,3,4,6,7,8-HpCDF	80	28-143						08/08/2019 13:12
13C-1,2,3,4,7,8,9-HpCDF	73	26-138						08/08/2019 13:12

Analyst(s): KBO



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 7/19/19 9:31
Date Prepared: 7/30/19
Project: 018022; Little Lakes Industries Phase II

WorkOrder: 1907931
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/L

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-08	1907931-005A	Water	07/17/2019 13:25	GC36	182756

Analytes	TEF WHO '05	Result	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
2,3,7,8-TCDD		ND	9.78	1				08/02/2019 16:20
1,2,3,7,8-PeCDD		ND	48.9	1				08/02/2019 16:20
1,2,3,4,7,8-HxCDD		ND	48.9	1				08/02/2019 16:20
1,2,3,6,7,8-HxCDD		ND	48.9	1				08/02/2019 16:20
1,2,3,7,8,9-HxCDD		ND	48.9	1				08/02/2019 16:20
1,2,3,4,6,7,8-HpCDD		ND	48.9	1				08/02/2019 16:20
OCDD	0.0003	272	97.8	1	0.92	1	0.0816	08/02/2019 16:20
2,3,7,8-TCDF		ND	9.78	1				08/02/2019 16:20
1,2,3,7,8-PeCDF		ND	48.9	1				08/02/2019 16:20
2,3,4,7,8-PeCDF		ND	48.9	1				08/02/2019 16:20
1,2,3,4,7,8-HxCDF		ND	48.9	1				08/02/2019 16:20
1,2,3,6,7,8-HxCDF		ND	48.9	1				08/02/2019 16:20
1,2,3,7,8,9-HxCDF		ND	48.9	1				08/02/2019 16:20
2,3,4,6,7,8-HxCDF		ND	48.9	1				08/02/2019 16:20
1,2,3,4,6,7,8-HpCDF		ND	48.9	1				08/02/2019 16:20
1,2,3,4,7,8,9-HpCDF		ND	48.9	1				08/02/2019 16:20
OCDF		ND	97.8	1				08/02/2019 16:20
Total-Tetradoxins		ND	9.78	1				08/02/2019 16:20
Total-Pentadoxins		ND	48.9	1				08/02/2019 16:20
Total-Hexadoxins		ND	48.9	1				08/02/2019 16:20
Total-Heptadoxins		56.9	48.9	1				08/02/2019 16:20
Total-Tetrafurans		31.9	9.78	1				08/02/2019 16:20
Total-Pentafurans		ND	48.9	1				08/02/2019 16:20
Total-Hexafurans		ND	48.9	1				08/02/2019 16:20
Total-Heptafurans		ND	48.9	1				08/02/2019 16:20

Total Toxicity Equivalence (TEQ):

0.0816

Cleanup Standard	REC (%)	Limits	
37Cl-2,3,7,8-TCDD	74	35-197	08/02/2019 16:20
Labeled Compound Recovery	REC (%)	Limits	
13C-2,3,7,8-TCDD	57	25-164	08/02/2019 16:20
13C-1,2,3,7,8-PeCDD	54	25-181	08/02/2019 16:20
13C-1,2,3,4,7,8-HxCDD	49	32-141	08/02/2019 16:20
13C-1,2,3,6,7,8-HxCDD	52	28-130	08/02/2019 16:20
13C-1,2,3,4,6,7,8-HpCDD	50	23-140	08/02/2019 16:20
13C-OCDD	47	17-157	08/02/2019 16:20

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Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 7/19/19 9:31
Date Prepared: 7/30/19
Project: 018022; Little Lakes Industries Phase II

WorkOrder: 1907931
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/L

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-08	1907931-005A	Water	07/17/2019 13:25	GC36	182756

Analytes	TEF WHO '05	Result	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
Labeled Compound Recovery	REC (%)	Limits						
13C-2,3,7,8-TCDF	59		24-169					08/02/2019 16:20
13C-1,2,3,7,8-PeCDF	51		24-185					08/02/2019 16:20
13C-2,3,4,7,8-PeCDF	56		21-178					08/02/2019 16:20
13C-1,2,3,4,7,8-HxCDF	46		26-152					08/02/2019 16:20
13C-1,2,3,6,7,8-HxCDF	48		26-123					08/02/2019 16:20
13C-2,3,4,6,7,8-HxCDF	51		28-136					08/02/2019 16:20
13C-1,2,3,7,8,9-HxCDF	50		29-147					08/02/2019 16:20
13C-1,2,3,4,6,7,8-HpCDF	48		28-143					08/02/2019 16:20
13C-1,2,3,4,7,8,9-HpCDF	48		26-138					08/02/2019 16:20

Analyst(s): KBO



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 7/19/19 9:31
Date Prepared: 7/30/19
Project: 018022; Little Lakes Industries Phase II

WorkOrder: 1907931
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/L

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-09	1907931-006A	Water	07/17/2019 13:50	GC36	182756

Analytes	TEF WHO '05	Result	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
2,3,7,8-TCDD		ND	9.60	1				08/02/2019 17:16
1,2,3,7,8-PeCDD		ND	48.0	1				08/02/2019 17:16
1,2,3,4,7,8-HxCDD		ND	48.0	1				08/02/2019 17:16
1,2,3,6,7,8-HxCDD		ND	48.0	1				08/02/2019 17:16
1,2,3,7,8,9-HxCDD		ND	48.0	1				08/02/2019 17:16
1,2,3,4,6,7,8-HpCDD		ND	48.0	1				08/02/2019 17:16
OCDD		ND	96.0	1				08/02/2019 17:16
2,3,7,8-TCDF		ND	9.60	1				08/02/2019 17:16
1,2,3,7,8-PeCDF		ND	48.0	1				08/02/2019 17:16
2,3,4,7,8-PeCDF		ND	48.0	1				08/02/2019 17:16
1,2,3,4,7,8-HxCDF		ND	48.0	1				08/02/2019 17:16
1,2,3,6,7,8-HxCDF		ND	48.0	1				08/02/2019 17:16
1,2,3,7,8,9-HxCDF		ND	48.0	1				08/02/2019 17:16
2,3,4,6,7,8-HxCDF		ND	48.0	1				08/02/2019 17:16
1,2,3,4,6,7,8-HpCDF		ND	48.0	1				08/02/2019 17:16
1,2,3,4,7,8,9-HpCDF		ND	48.0	1				08/02/2019 17:16
OCDF		ND	96.0	1				08/02/2019 17:16
Total-Tetradoxins		ND	9.60	1				08/02/2019 17:16
Total-Pentadoxins		ND	48.0	1				08/02/2019 17:16
Total-Hexadoxins		ND	48.0	1				08/02/2019 17:16
Total-Heptadoxins		ND	48.0	1				08/02/2019 17:16
Total-Tetrafurans		ND	9.60	1				08/02/2019 17:16
Total-Pentafurans		ND	48.0	1				08/02/2019 17:16
Total-Hexafurans		ND	48.0	1				08/02/2019 17:16
Total-Heptafurans		ND	48.0	1				08/02/2019 17:16

Total Toxicity Equivalence (TEQ):

0

Cleanup Standard	REC (%)	Limits	
37Cl-2,3,7,8-TCDD	83	35-197	08/02/2019 17:16
Labeled Compound Recovery	REC (%)	Limits	
13C-2,3,7,8-TCDD	62	25-164	08/02/2019 17:16
13C-1,2,3,7,8-PeCDD	60	25-181	08/02/2019 17:16
13C-1,2,3,4,7,8-HxCDD	55	32-141	08/02/2019 17:16
13C-1,2,3,6,7,8-HxCDD	56	28-130	08/02/2019 17:16
13C-1,2,3,4,6,7,8-HpCDD	56	23-140	08/02/2019 17:16
13C-OCDD	54	17-157	08/02/2019 17:16

(Cont.)



Analytical Report

Client: SHN Consulting Engineers & Geologists, Inc.
Date Received: 7/19/19 9:31
Date Prepared: 7/30/19
Project: 018022; Little Lakes Industries Phase II

WorkOrder: 1907931
Extraction Method: E1613B
Analytical Method: E1613B
Unit: pg/L

Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
WP-09	1907931-006A	Water	07/17/2019 13:50	GC36	182756

Analytes	TEF WHO '05	Result	RL	DF	Ion Ratio	RRT	TEQ	Date Analyzed
Labeled Compound Recovery	REC (%)	Limits						
13C-2,3,7,8-TCDF	64		24-169					08/02/2019 17:16
13C-1,2,3,7,8-PeCDF	56		24-185					08/02/2019 17:16
13C-2,3,4,7,8-PeCDF	60		21-178					08/02/2019 17:16
13C-1,2,3,4,7,8-HxCDF	52		26-152					08/02/2019 17:16
13C-1,2,3,6,7,8-HxCDF	53		26-123					08/02/2019 17:16
13C-2,3,4,6,7,8-HxCDF	55		28-136					08/02/2019 17:16
13C-1,2,3,7,8,9-HxCDF	55		29-147					08/02/2019 17:16
13C-1,2,3,4,6,7,8-HpCDF	55		28-143					08/02/2019 17:16
13C-1,2,3,4,7,8,9-HpCDF	55		26-138					08/02/2019 17:16

Analyst(s): KBO

CLIENT: SHN Consulting Engineers & Geologists, Inc.

ANALYTICAL QC SUMMARY REPORT

Work Order: 1907931

Project: 018022; Little Lakes Industries Phase II

BatchID:

182753

SampleID	MB-182753	TestCode:	1613_FULL_S			Units:	pg/g		Prep Date:	7/31/2019	
Batch ID:	182753	TestNo:	E1613B			Run ID:	GC36_190808A		Analysis Date:	8/6/2019	
Analyte		Result	PQL	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD		ND	1.00				-				
1,2,3,7,8-PeCDD		ND	5.00				-				
1,2,3,4,7,8-HxCDD		ND	5.00				-				
1,2,3,6,7,8-HxCDD		ND	5.00				-				
1,2,3,7,8,9-HxCDD		ND	5.00				-				
1,2,3,4,6,7,8-HpCDD		ND	5.00				-				
OCDD		ND	10.0				-				
2,3,7,8-TCDF		ND	1.00				-				
1,2,3,7,8-PeCDF		ND	5.00				-				
2,3,4,7,8-PeCDF		ND	5.00				-				
1,2,3,4,7,8-HxCDF		ND	5.00				-				
1,2,3,6,7,8-HxCDF		ND	5.00				-				
1,2,3,7,8,9-HxCDF		ND	5.00				-				
2,3,4,6,7,8-HxCDF		ND	5.00				-				
1,2,3,4,6,7,8-HpCDF		ND	5.00				-				
1,2,3,4,7,8,9-HpCDF		ND	5.00				-				
OCDF		ND	10.0				-				
Total-Tetradoxins		ND	1.00				-				
Total-Pentadoxins		ND	5.00				-				
Total-Hexadoxins		ND	5.00				-				
Total-Heptadoxins		ND	5.00				-				
Total-Tetrafurans		ND	1.00				-				
Total-Pentafurans		ND	5.00				-				
Total-Hexafurans		ND	5.00				-				
Total-Heptafurans		ND	5.00				-				

Cleanup Standard

37Cl-2,3,7,8-TCDD	7.70	10	77	35 - 197
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Labeled Compound Recovery

13C-2,3,7,8-TCDD	80.7	100	81	25 - 164
13C-1,2,3,7,8-PeCDD	70.4	100	70	25 - 181
13C-1,2,3,4,7,8-HxCDD	78.7	100	79	32 - 141
13C-1,2,3,6,7,8-HxCDD	77.7	100	78	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	80.6	100	81	23 - 140
13C-OCDD	134	200	67	17 - 157
13C-2,3,7,8-TCDF	85.4	100	85	24 - 169
13C-1,2,3,7,8-PeCDF	75.4	100	75	24 - 185
13C-2,3,4,7,8-PeCDF	74.4	100	74	21 - 178
13C-1,2,3,4,7,8-HxCDF	80.4	100	80	26 - 152
13C-1,2,3,6,7,8-HxCDF	83.1	100	83	26 - 123
13C-2,3,4,6,7,8-HxCDF	83.5	100	83	28 - 136
13C-1,2,3,7,8,9-HxCDF	86.3	100	86	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	84.0	100	84	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	82.9	100	83	26 - 138

CLIENT: SHN Consulting Engineers & Geologists, Inc.

Work Order: 1907931

Project: 018022; Little Lakes Industries Phase II

ANALYTICAL QC SUMMARY REPORT

BatchID:

182753

SampleID	LCS-182753	TestCode: 1613_FULL_S	Units: pg/g	Prep Date: 7/31/2019						
Batch ID: 182753	TestNo: E1613B	Run ID: GC36_190808D	Analysis Date: 8/6/2019							
Analyte	Result	PQL	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD	10.3	1.00	10	0	103	67 - 158				
1,2,3,7,8-PeCDD	55.8	5.00	50	0	112	70 - 142				
1,2,3,4,7,8-HxCDD	54.8	5.00	50	0	110	70 - 164				
1,2,3,6,7,8-HxCDD	55.4	5.00	50	0	111	76 - 134				
1,2,3,7,8,9-HxCDD	56.0	5.00	50	0	112	64 - 162				
1,2,3,4,6,7,8-HpCDD	54.8	5.00	50	0	110	70 - 140				
OCDD	110	10.0	100	0	110	78 - 144				
2,3,7,8-TCDF	11.0	1.00	10	0	110	75 - 158				
1,2,3,7,8-PeCDF	56.4	5.00	50	0	113	80 - 134				
2,3,4,7,8-PeCDF	55.2	5.00	50	0	110	68 - 160				
1,2,3,4,7,8-HxCDF	54.4	5.00	50	0	109	72 - 134				
1,2,3,6,7,8-HxCDF	56.3	5.00	50	0	113	84 - 130				
1,2,3,7,8,9-HxCDF	55.0	5.00	50	0	110	78 - 130				
2,3,4,6,7,8-HxCDF	56.7	5.00	50	0	113	70 - 156				
1,2,3,4,6,7,8-HpCDF	57.1	5.00	50	0	114	82 - 122				
1,2,3,4,7,8,9-HpCDF	55.0	5.00	50	0	110	78 - 138				
OCDF	117	10.0	100	0	117	63 - 170				

Cleanup Standard

37Cl-2,3,7,8-TCDD	8.24	10	82	31 - 191
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Labeled Compound Recovery

13C-2,3,7,8-TCDD	88.1	100	88	20 - 175
13C-1,2,3,7,8-PeCDD	79.3	100	79	21 - 227
13C-1,2,3,4,7,8-HxCDD	86.0	100	86	21 - 193
13C-1,2,3,6,7,8-HxCDD	86.6	100	87	25 - 163
13C-1,2,3,4,6,7,8-HpCDD	86.0	100	86	26 - 166
13C-OCDD	147	200	73	13 - 199
13C-2,3,7,8-TCDF	89.4	100	89	22 - 152
13C-1,2,3,7,8-PeCDF	84.4	100	84	21 - 192
13C-2,3,4,7,8-PeCDF	83.1	100	83	13 - 328
13C-1,2,3,4,7,8-HxCDF	92.1	100	92	19 - 202
13C-1,2,3,6,7,8-HxCDF	91.8	100	92	21 - 159
13C-2,3,4,6,7,8-HxCDF	93.4	100	93	22 - 176
13C-1,2,3,7,8,9-HxCDF	93.0	100	93	17 - 205
13C-1,2,3,4,6,7,8-HpCDF	91.1	100	91	21 - 158
13C-1,2,3,4,7,8,9-HpCDF	86.4	100	86	20 - 186

CLIENT: SHN Consulting Engineers & Geologists, Inc.

Work Order: 1907931

Project: 018022; Little Lakes Industries Phase II

ANALYTICAL QC SUMMARY REPORT

BatchID:

182753

SampleID	LCSD-182753	TestCode: 1613_FULL_S	Units: pg/g				Prep Date: 7/31/2019			
Batch ID: 182753		TestNo: E1613B	Run ID: GC36_190808D				Analysis Date: 8/6/2019			
Analyte	Result	PQL	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD	10.3	1.00	10	0	103	67 - 158	10.28	0	20	
1,2,3,7,8-PeCDD	55.1	5.00	50	0	110	70 - 142	55.82	1.30	20	
1,2,3,4,7,8-HxCDD	54.3	5.00	50	0	109	70 - 164	54.78	0.880	20	
1,2,3,6,7,8-HxCDD	56.1	5.00	50	0	112	76 - 134	55.38	1.29	20	
1,2,3,7,8,9-HxCDD	56.7	5.00	50	0	113	64 - 162	56.02	1.14	20	
1,2,3,4,6,7,8-HpCDD	53.4	5.00	50	0	107	70 - 140	54.78	2.55	20	
OCDD	109	10.0	100	0	109	78 - 144	109.94	1.02	20	
2,3,7,8-TCDF	10.8	1.00	10	0	108	75 - 158	10.96	1.84	20	
1,2,3,7,8-PeCDF	56.1	5.00	50	0	112	80 - 134	56.44	0.569	20	
2,3,4,7,8-PeCDF	54.8	5.00	50	0	110	68 - 160	55.2	0.800	20	
1,2,3,4,7,8-HxCDF	55.5	5.00	50	0	111	72 - 134	54.4	2.00	20	
1,2,3,6,7,8-HxCDF	56.5	5.00	50	0	113	84 - 130	56.28	0.426	20	
1,2,3,7,8,9-HxCDF	57.0	5.00	50	0	114	78 - 130	54.98	3.64	20	
2,3,4,6,7,8-HxCDF	56.1	5.00	50	0	112	70 - 156	56.68	0.993	20	
1,2,3,4,6,7,8-HpCDF	55.8	5.00	50	0	112	82 - 122	57.12	2.34	20	
1,2,3,4,7,8,9-HpCDF	55.5	5.00	50	0	111	78 - 138	54.98	0.977	20	
OCDF	119	10.0	100	0	119	63 - 170	117.38	1.32	20	

Cleanup Standard

37Cl-2,3,7,8-TCDD	7.82	10	78	31 - 191
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Labeled Compound Recovery

13C-2,3,7,8-TCDD	85.3	100	85	20 - 175
13C-1,2,3,7,8-PeCDD	76.0	100	76	21 - 227
13C-1,2,3,4,7,8-HxCDD	80.8	100	81	21 - 193
13C-1,2,3,6,7,8-HxCDD	81.1	100	81	25 - 163
13C-1,2,3,4,6,7,8-HpCDD	82.3	100	82	26 - 166
13C-OCDD	141	200	70	13 - 199
13C-2,3,7,8-TCDF	85.7	100	86	22 - 152
13C-1,2,3,7,8-PeCDF	82.3	100	82	21 - 192
13C-2,3,4,7,8-PeCDF	80.6	100	81	13 - 328
13C-1,2,3,4,7,8-HxCDF	85.6	100	86	19 - 202
13C-1,2,3,6,7,8-HxCDF	86.5	100	87	21 - 159
13C-2,3,4,6,7,8-HxCDF	87.6	100	88	22 - 176
13C-1,2,3,7,8,9-HxCDF	86.3	100	86	17 - 205
13C-1,2,3,4,6,7,8-HpCDF	87.1	100	87	21 - 158
13C-1,2,3,4,7,8,9-HpCDF	81.9	100	82	20 - 186

CLIENT: SHN Consulting Engineers & Geologists, Inc.

ANALYTICAL QC SUMMARY REPORT

Work Order: 1907931

Project: 018022; Little Lakes Industries Phase II

BatchID:

182756

SampleID	MB-182756	TestCode:	1613_FULL_W			Units:	pg/L		Prep Date:	7/30/2019	
Batch ID:	182756	TestNo:	E1613B			Run ID:	GC36_190805A		Analysis Date:	8/2/2019	
Analyte		Result	PQL	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD		ND	10.0				-				
1,2,3,7,8-PeCDD		ND	50.0				-				
1,2,3,4,7,8-HxCDD		ND	50.0				-				
1,2,3,6,7,8-HxCDD		ND	50.0				-				
1,2,3,7,8,9-HxCDD		ND	50.0				-				
1,2,3,4,6,7,8-HpCDD		ND	50.0				-				
OCDD		ND	100				-				
2,3,7,8-TCDF		ND	10.0				-				
1,2,3,7,8-PeCDF		ND	50.0				-				
2,3,4,7,8-PeCDF		ND	50.0				-				
1,2,3,4,7,8-HxCDF		ND	50.0				-				
1,2,3,6,7,8-HxCDF		ND	50.0				-				
1,2,3,7,8,9-HxCDF		ND	50.0				-				
2,3,4,6,7,8-HxCDF		ND	50.0				-				
1,2,3,4,6,7,8-HpCDF		ND	50.0				-				
1,2,3,4,7,8,9-HpCDF		ND	50.0				-				
OCDF		ND	100				-				
Total-Tetradoxins		ND	10.0				-				
Total-Pentadoxins		ND	50.0				-				
Total-Hexadoxins		ND	50.0				-				
Total-Heptadoxins		ND	50.0				-				
Total-Tetrafurans		ND	10.0				-				
Total-Pentafurans		ND	50.0				-				
Total-Hexafurans		ND	50.0				-				
Total-Heptafurans		ND	50.0				-				

Cleanup Standard

37Cl-2,3,7,8-TCDD	73.8	100	74	35 - 197
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Labeled Compound Recovery

13C-2,3,7,8-TCDD	629	1000	63	25 - 164
13C-1,2,3,7,8-PeCDD	607	1000	61	25 - 181
13C-1,2,3,4,7,8-HxCDD	557	1000	56	32 - 141
13C-1,2,3,6,7,8-HxCDD	622	1000	62	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	522	1000	52	23 - 140
13C-OCDD	984	2000	49	17 - 157
13C-2,3,7,8-TCDF	648	1000	65	24 - 169
13C-1,2,3,7,8-PeCDF	582	1000	58	24 - 185
13C-2,3,4,7,8-PeCDF	612	1000	61	21 - 178
13C-1,2,3,4,7,8-HxCDF	561	1000	56	26 - 152
13C-1,2,3,6,7,8-HxCDF	592	1000	59	26 - 123
13C-2,3,4,6,7,8-HxCDF	593	1000	59	28 - 136
13C-1,2,3,7,8,9-HxCDF	571	1000	57	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	528	1000	53	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	504	1000	50	26 - 138

CLIENT: SHN Consulting Engineers & Geologists, Inc.

Work Order: 1907931

Project: 018022; Little Lakes Industries Phase II

ANALYTICAL QC SUMMARY REPORT

BatchID:

182756

SampleID	LCS-182756	TestCode: 1613_FULL_W	Units: pg/L	Prep Date: 7/30/2019						
Batch ID: 182756	TestNo: E1613B	Run ID: GC36_190805C	Analysis Date: 8/2/2019							
Analyte	Result	PQL	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD	88.6	10.0	100	0	89	67 - 158				
1,2,3,7,8-PeCDD	483	50.0	500	0	97	70 - 142				
1,2,3,4,7,8-HxCDD	489	50.0	500	0	98	70 - 164				
1,2,3,6,7,8-HxCDD	502	50.0	500	0	100	76 - 134				
1,2,3,7,8,9-HxCDD	485	50.0	500	0	97	64 - 162				
1,2,3,4,6,7,8-HpCDD	497	50.0	500	0	99	70 - 140				
OCDD	1050	100	1000	0	105	78 - 144				
2,3,7,8-TCDF	87.8	10.0	100	0	88	75 - 158				
1,2,3,7,8-PeCDF	452	50.0	500	0	90	80 - 134				
2,3,4,7,8-PeCDF	456	50.0	500	0	91	68 - 160				
1,2,3,4,7,8-HxCDF	473	50.0	500	0	95	72 - 134				
1,2,3,6,7,8-HxCDF	481	50.0	500	0	96	84 - 130				
1,2,3,7,8,9-HxCDF	466	50.0	500	0	93	78 - 130				
2,3,4,6,7,8-HxCDF	472	50.0	500	0	94	70 - 156				
1,2,3,4,6,7,8-HpCDF	501	50.0	500	0	100	82 - 122				
1,2,3,4,7,8,9-HpCDF	485	50.0	500	0	97	78 - 138				
OCDF	1020	100	1000	0	102	63 - 170				

Cleanup Standard

37Cl-2,3,7,8-TCDD	70.8	100	71	31 - 191
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Labeled Compound Recovery

13C-2,3,7,8-TCDD	830	1000	83	20 - 175
13C-1,2,3,7,8-PeCDD	780	1000	78	21 - 227
13C-1,2,3,4,7,8-HxCDD	739	1000	74	21 - 193
13C-1,2,3,6,7,8-HxCDD	782	1000	78	25 - 163
13C-1,2,3,4,6,7,8-HpCDD	658	1000	66	26 - 166
13C-OCDD	1210	2000	61	13 - 199
13C-2,3,7,8-TCDF	827	1000	83	22 - 152
13C-1,2,3,7,8-PeCDF	782	1000	78	21 - 192
13C-2,3,4,7,8-PeCDF	767	1000	77	13 - 328
13C-1,2,3,4,7,8-HxCDF	695	1000	70	19 - 202
13C-1,2,3,6,7,8-HxCDF	725	1000	73	21 - 159
13C-2,3,4,6,7,8-HxCDF	743	1000	74	22 - 176
13C-1,2,3,7,8,9-HxCDF	706	1000	71	17 - 205
13C-1,2,3,4,6,7,8-HpCDF	638	1000	64	21 - 158
13C-1,2,3,4,7,8,9-HpCDF	618	1000	62	20 - 186

CLIENT: SHN Consulting Engineers & Geologists, Inc.

Work Order: 1907931

Project: 018022; Little Lakes Industries Phase II

ANALYTICAL QC SUMMARY REPORT

BatchID:

182756

SampleID	LCSD-182756	TestCode: 1613_FULL_W				Units: pg/L		Prep Date: 7/30/2019		
Batch ID: 182756		TestNo: E1613B				Run ID: GC36_190805C		Analysis Date: 8/2/2019		
Analyte	Result	PQL	SPKValue	SPKRefVal	%REC	Limits	RPDRefVal	%RPD	RPDLimit	Qual
2,3,7,8-TCDD	94.2	10.0	100	0	94	67 - 158	88.6	6.13	20	
1,2,3,7,8-PeCDD	511	50.0	500	0	102	70 - 142	483.2	5.59	20	
1,2,3,4,7,8-HxCDD	538	50.0	500	0	108	70 - 164	488.8	9.66	20	
1,2,3,6,7,8-HxCDD	569	50.0	500	0	114	76 - 134	502.2	12.5	20	
1,2,3,7,8,9-HxCDD	529	50.0	500	0	106	64 - 162	484.8	8.72	20	
1,2,3,4,6,7,8-HpCDD	565	50.0	500	0	113	70 - 140	497	12.7	20	
OCDD	1160	100	1000	0	116	78 - 144	1054.4	9.31	20	
2,3,7,8-TCDF	90.2	10.0	100	0	90	75 - 158	87.8	2.70	20	
1,2,3,7,8-PeCDF	478	50.0	500	0	96	80 - 134	451.6	5.60	20	
2,3,4,7,8-PeCDF	494	50.0	500	0	99	68 - 160	455.8	7.96	20	
1,2,3,4,7,8-HxCDF	525	50.0	500	0	105	72 - 134	473.4	10.3	20	
1,2,3,6,7,8-HxCDF	529	50.0	500	0	106	84 - 130	481.4	9.46	20	
1,2,3,7,8,9-HxCDF	535	50.0	500	0	107	78 - 130	466	13.9	20	
2,3,4,6,7,8-HxCDF	511	50.0	500	0	102	70 - 156	472.2	7.97	20	
1,2,3,4,6,7,8-HpCDF	557	50.0	500	0	111	82 - 122	500.6	10.7	20	
1,2,3,4,7,8,9-HpCDF	540	50.0	500	0	108	78 - 138	485	10.7	20	
OCDF	1100	100	1000	0	110	63 - 170	1020.2	7.98	20	

Cleanup Standard

37Cl-2,3,7,8-TCDD	71.8	100	72	31 - 191
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Labeled Compound Recovery

13C-2,3,7,8-TCDD	796	1000	80	20 - 175
13C-1,2,3,7,8-PeCDD	715	1000	72	21 - 227
13C-1,2,3,4,7,8-HxCDD	664	1000	66	21 - 193
13C-1,2,3,6,7,8-HxCDD	694	1000	69	25 - 163
13C-1,2,3,4,6,7,8-HpCDD	564	1000	56	26 - 166
13C-OCDD	1050	2000	52	13 - 199
13C-2,3,7,8-TCDF	816	1000	82	22 - 152
13C-1,2,3,7,8-PeCDF	722	1000	72	21 - 192
13C-2,3,4,7,8-PeCDF	686	1000	69	13 - 328
13C-1,2,3,4,7,8-HxCDF	631	1000	63	19 - 202
13C-1,2,3,6,7,8-HxCDF	659	1000	66	21 - 159
13C-2,3,4,6,7,8-HxCDF	673	1000	67	22 - 176
13C-1,2,3,7,8,9-HxCDF	612	1000	61	17 - 205
13C-1,2,3,4,6,7,8-HpCDF	552	1000	55	21 - 158
13C-1,2,3,4,7,8,9-HpCDF	523	1000	52	20 - 186



1534 Willow Pass Rd
Pittsburg, CA 94565-1701
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CHAIN-OF-CUSTODY RECORD

Page 1 of 1

WorkOrder: 1907931
ClientCode: SHNE
☒ Excel

☐ EQUIS

☒ Email

☐ HardCopy

☐ ThirdParty

☐ J-flag

☐ Detection Summary

☐ Dry-Weight

Report to:

Erik Nielsen

SHN Consulting Engineers & Geologists

812 W. Wabash Ave.

Eureka, CA 95501

(707) 441-8855 FAX:

Email: enielsen@shn-engr.com

cc/3rd Party:

PO:

Project: 018022; Little Lakes Industries Phase II

Bill to:

Leanne Stevens

SHN Consulting Engineers & Geologists

812 W. Wabash Ave.

Eureka, CA 95501

lstevens@shn-engr.com

Requested TAT: 15 days;
Date Received: 07/19/2019
Date Logged: 07/19/2019

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
1907931-001	TP-08	Soil	7/17/2019 11:05	☐	A		A									
1907931-002	TP-09	Soil	7/17/2019 10:45	☐	A											
1907931-003	TP-10	Soil	7/17/2019 10:30	☐	A											
1907931-004	TP-11	Soil	7/17/2019 11:25	☐	A											
1907931-005	WP-08	Water	7/17/2019 13:25	☐		A										
1907931-006	WP-09	Water	7/17/2019 13:50	☐		A										

Test Legend:

1	1613_FULL_S
5	
9	

2	1613_FULL_W
6	
10	

3	PREDF REPORT
7	
11	

4	
8	
12	

Project Manager: Rosa Venegas
Prepared by: Nancy Palacios
Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.



McC Campbell Analytical, Inc.

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1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mcccampbell.com / E-mail: main@mcccampbell.com

WORK ORDER SUMMARY

Client Name: SHN CONSULTING ENGINEERS & GEOLOGISTS, I **Project:** 018022; Little Lakes Industries Phase II

Client Contact: Erik Nielsen

Contact's Email: enielsen@shn-engr.com

Comments:

Work Order: 1907931

QC Level: LEVEL 2

Date Logged: 7/19/2019

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Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De- chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1907931-001A	TP-08	Soil	E1613B (PCDDs & PCDFs)	1	8OZ GJ, Unpres	☐	7/17/2019 11:05	15 days		☐	
1907931-002A	TP-09	Soil	E1613B (PCDDs & PCDFs)	1	8OZ GJ, Unpres	☐	7/17/2019 10:45	15 days		☐	
1907931-003A	TP-10	Soil	E1613B (PCDDs & PCDFs)	1	8OZ GJ, Unpres	☐	7/17/2019 10:30	15 days		☐	
1907931-004A	TP-11	Soil	E1613B (PCDDs & PCDFs)	1	8OZ GJ, Unpres	☐	7/17/2019 11:25	15 days		☐	
1907931-005A	WP-08	Water	E1613B (PCDDs & PCDFs)	1	1LA Narrow Mouth, Unpres	☐	7/17/2019 13:25	15 days	Trace	☐	
1907931-006A	WP-09	Water	E1613B (PCDDs & PCDFs)	1	1LA Narrow Mouth, Unpres	☐	7/17/2019 13:50	15 days		☐	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

Matrix Code: DW=Drinking Water, GW=Ground Water, WW=Waste Water, SW=Seawater, S=Soil, SL=Sludge, A=Air, WP=Wipe, O=Other
Preservative Code: 1=4°C 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=ZnOAc/NaOH 7=None

**Table 4. Contaminants of Concern, Laboratory Analysis and Action Levels
Little Lake Industries Mill, Arcata, California**

Analytical Parameter in Soil (Contaminants of Concern)	Laboratory Reporting or Quantitation Limits (mg/kg) ¹	Soil Action Level (mg/kg)
EPA Method 1613		
Dioxins/Furans	1.0 E-6	50 E-06 ²
EPA Method 6010		
Lead	1.0	80 ³
EPA Method 8270		
PCP ⁴	0.5	1.0 ³
EPA Method 8015		
TPHD ⁵	1.0	230 ³
Analytical Parameter in Groundwater (Contaminants of Concern)	Laboratory Reporting or Quantitation Limits (µg/L) ⁶	Groundwater Action Level (µg/L)
EPA Method 1613		
Dioxins and Furans	1.0 E-07	3.0 E-07 ⁷
EPA Method 8270		
PCP	0.1	0.1 ³
EPA Method 8015B		
TPHD	0.5	100 ⁸
EPA Method 8260B Modified		
TPHG	0.1	5 ⁸
Dissolved Metals EPA Method 200.8		
Antimony	1.0	2.8 ⁸
Arsenic	1.0	0.004 ⁸
Barium	1.0	1,000 ³
Beryllium	1.0	1 ⁸
Cadmium	5.0	0.04 ⁸
Chromium	5.0	50 ³
Cobalt	5.0	3.0 ³
Lead	5.0	0.2 ⁸
Nickel	5.0	12 ⁸
Thallium	10	0.1 ⁸
Vanadium	1.0	19 ³
SVOCs by Method 8270 SIM		
SVOCs ⁹	0.1	Varies per constituent



Sample Receipt Checklist

Client Name: **SHN Consulting Engineers & Geologists, Inc.**
Project: **018022; Little Lakes Industries Phase II**

Date and Time Received **7/19/2019 09:31**

Date Logged: **7/19/2019**

Received by: **Nancy Palacios**

Logged by: **Nancy Palacios**

WorkOrder No: **1907931** Matrix: Soil/Water

Carrier: FedEx

Chain of Custody (COC) Information

Chain of custody present?	Yes ☒	No ☐	
Chain of custody signed when relinquished and received?	Yes ☒	No ☐	
Chain of custody agrees with sample labels?	Yes ☒	No ☐	
Sample IDs noted by Client on COC?	Yes ☒	No ☐	
Date and Time of collection noted by Client on COC?	Yes ☒	No ☐	
Sampler's name noted on COC?	Yes ☒	No ☐	
COC agrees with Quote?	Yes ☐	No ☐	NA ☒

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☒
Shipping container/cooler in good condition?	Yes ☒	No ☐	
Samples in proper containers/bottles?	Yes ☒	No ☐	
Sample containers intact?	Yes ☒	No ☐	
Sufficient sample volume for indicated test?	Yes ☒	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☒	No ☐	NA ☐
Samples Received on Ice?	Yes ☒	No ☐	

(Ice Type: WET ICE)

Sample/Temp Blank temperature	Temp: 2.6°C	NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☒ No ☐	NA ☐
Sample labels checked for correct preservation?	Yes ☒ No ☐	
pH acceptable upon receipt (Metal: <2; Nitrate 353.2/4500NO3: <2; 522: <4; 218.7: >8)?	Yes ☐ No ☐	NA ☒

UCMR Samples:

pH tested and acceptable upon receipt (200.8: ≤2; 525.3: ≤4; 530: ≤7; 541: <3; 544: <6.5 & 7.5)?	Yes ☐ No ☐	NA ☒
Free Chlorine tested and acceptable upon receipt (<0.1mg/L)?	Yes ☐ No ☐	NA ☒

Comments:

**RELATIVE PERCENT DIFFERENCES BETWEEN
PRIMARY AND FIELD DUPLICATE SAMPLES**

Constituent ¹	Reporting Limit ²	Primary Sample Concentration (S)	Duplicate Sample Concentration (D)	Relative Percent Difference ³	Absolute Difference Between Sample Results ⁴
Dioxins & Furans (pg/g) Primary Sample TP-01 and Duplicate Sample TP-01R					
1,2,3,4,6,7,8-HxCDD	5.0	0.42	0.78	NA	0.36
1,2,3,4,6,7,8-HpCDD	5.0	8.38	17.5	NA	9.12
OCDD	10.0	72.9	146	67%	NA
2,3,7,8-TCDF	1.0	0.28	0.70	86%	0.42
1,2,3,4,6,7,8-HpCDF	5.0	3.4	5.9	NA	2.5
OCDF	10.0	3.86	9.66	NA	5.8
TEQ		0.16	0.38	83%	
Dioxins & Furans (pg/L) Primary Sample WP-01 and Duplicate Sample WP-01R					
1,2,3,4,6,7,8-HpCDD	50.0/56.1	104	204	65%	NA
OCDD	100/112	632	1,630	88%	NA
1,2,3,4,6,7,8-HpCDF	50.0/56.1	48.0	67.7	NA	19.7
OCDF	100/112	27.0	32.3	NA	5.3
TEQ		1.67	4.35	89%	
Metals (µg/L) Primary Sample WP-07 and Duplicate Sample WP-07R					
Antimony	0.50	0	0	0%	NA
Arsenic	0.50	6.9	6.7	3%	0.2
Barium	0.50	160	160	0%	NA
Chromium	0.50	0	0.00	NA	0
Cobalt	0.50	6.8	6.7	1%	NA
Nickel	0.50	11.0	11	0%	NA
Vanadium	0.50	0.93	1	7%	NA
Metals (mg/kg) Primary Sample TP-01 and Duplicate Sample TP-01R					
Lead	0.5	28	27	4%	NA
Total Petroleum Hydrocarbons (mg/kg) Primary Sample TP-01 and Duplicate Sample TP-01R					
TPHd	1	99	150	41%	NA

Notes

- Only constituents detected in at least one of the primary or duplicate samples are shown.
- The reporting limit shown is the analytical laboratory calibration limit for dioxins and furans. The SMP reporting limit or the analytical laboratory reporting limit (if higher than the SMP reporting limit), is shown for the remaining constituents.

- Relative percent difference (RPD) is calculated by:
$$RPD = \frac{S_1 - S_2}{S_{avg}} \times 100$$

Bold font indicates that the result does not meet the acceptance criteria of less than or equal to 30%.

- RPD is not applicable when at least one of the sample results is less than or equal to two times the reporting limit. In those cases, duplicate results are considered to be within acceptable QC limits when the absolute difference between the results is less than the reporting limit. When a compound is detected in one duplicate sample but is not detected at or above the reporting limit in the other sample, the results are considered to be within acceptable QC limits when the absolute difference between the detected result and the reporting limit is less than or equal to the reporting limit.

Sample Results Data Tables 3

Table 3-1
Dioxins and Furans Congeners in Soil, March and July 2019
Little Lake Industries Mill, Arcata, California
(pg/g)¹

Analyte	Sample Identification										
	TP-01	TP-01R ²	TP-02	TP-03	TP-04	TP-05	TP-06	TP-08	TP-09	TP-10	TP-11
2,3,7,8 TCDD	<1.00 ³	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	2.78	<1.00	<1.00
1,2,3,7,8,PeCDD	<5.00	<5.00	1.20 J⁴	<5.00	<5.00	1.64 J	<5.00	<5.00	20.7	<5.00	<5.00
1,2,3,4,7,8 HxCDD	<5.00	<5.00	4.10 J	<5.00	<5.00	4.32 J	0.580 J	9.96	46	9.36	<5.00
1,2,3,6,7,8 HxCDD	0.420 JMJ⁵	0.780 JJ*	11.7	<5.00	<5.00	11.8	1.50 J	38.8	754	42	<5.00
1,2,3,7,8,9 HxCDD	<5.00	0.460 JJ*	4.58 J	<5.00	<5.00	2.28 J	1.06 J	12.1	171	17.2	<5.00
1,2,3,4,6,7,8 HpCDD	8.38 J*	17.5 J*	248	1.72 J	1.48 J	158	46.2	1,100	14,000	1,120	92.1
OCDD	72.9 J*	146 J*	2,920	15.4	12	1,140	379	15,100	87,000	12,300	1,130
2,3,7,8 TCDF	0.280 JJ*	0.700 JJ*	<1.00	<1.00	0.400 JM	<1.00	<1.00	1.64	2.78	1.38	<1.00
1,2,3,7,8 PeCDF	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	14.0	<5.00	<5.00
2,3,4,7,8 PeCDF	<5.00	0.500 JJ*	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	28.7	<5.00	<5.00
1,2,3,4,7,8 HxCDF	<5.00	<5.00	2.30 J	<5.00	<5.00	1.04 J	<5.00	15.2	158	11.5	<5.00
1,2,3,6,7,8 HxCDF	<5.00	<5.00	1.80 J	<5.00	<5.00	5.24	1.50 J	72.7	360	47.2	<5.00
1,2,3,7,8,9 HxCDF	<5.00	<5.00	0.940 JM	<5.00	<5.00	<5.00	<5.00	<5.00	13.0	<5.00	<5.00
2,3,4,6,7,8 HxCDF	<5.00	0.520 JJ*	<5.00	<5.00	<5.00	<5.00	<5.00	5.58	61.6	7.64	<5.00
1,2,3,4,6,7,8 HpCDF	3.40 JJ*	5.9 J*	116	0.980 J	0.980 J	57.2	6.24	844	1560	622	23.9
1,2,3,4,7,8,9 HpCDF	<5.00	<5.00	5.18	<5.00	<5.00	2.06 J	<5.00	17.8	56.5	12.8	<5.00
OCDF	3.86 JJ*	9.66 J*	231	<10.0	<10.0	242	16.9	703	979	489	34.6
TEQ	0.157 J*	0.38 J*	8.01	0.0154	0.0120	5.24	0.920	40.0	372	35.0	1.51

1. pg/g: picogram per gram

2. R: designates duplicate sample

3. <: concentration less than laboratory reporting limit

4. J: result is less than the reporting limit/method limit but greater than the method detection limit. The reported concentration is an estimated value.

5. J*: RPD is greater than 50%; J* included based on EPA recommendation to qualify all positive results when RPD is greater than 50%, the * was used to differentiate the EPA flag from the laboratory J flag.

Table 3-2 Polynuclear Aromatic Hydrocarbons in Groundwater, March 2019 Little Lake Industries Mill, Arcata, California ug/L¹		
Analyte	Sample ID	
	WP-07	WP-07R²
Acenaphthene	<0.010 ³	<0.010
Acenaphthylene	<0.010	<0.010
Anthracene	<0.010	<0.010
Benzo (a) anthracene	<0.020	<0.020
Benzo (a) pyrene	<0.010	<0.010
Benzo (b) fluoranthene	<0.0051	<0.0051
Benzo (g,h,i) perylene	<0.020	<0.020
Benzo (k) fluoranthene	<0.010	<0.010
Chrysene	<0.010	<0.010
Dibenzo (a,h) anthracene	<0.010	<0.010
Fluoranthene	<0.010	<0.010
Fluorene	<0.010	<0.010
Indeno (1,2,3-cd) pyrene	<0.020	<0.020
1-Methylnaphthalene	<0.010	<0.010
2-Methylnaphthalene	<0.010	<0.010
Naphthalene	<0.010	<0.010
Pentachlorophenol	<0.25	<0.25
Phenanthrene	<0.020	<0.020
Pyrene	<0.020	<0.020
1. ug/L: micrograms per liter 2. R: designates duplicate sample 3. <: less than reporting limit		

Table 3-3
Dissolved Metals in Groundwater, March 2019
Little Lake Industries Mill, Arcata, California
(ug/L)¹

Analyte	Sample Identification		
	WP-06	WP-07	WP-07R²
Antimony	0.24 J³	0.090 J	0.11
Arsenic	1.9	6.9	6.7
Barium	140	160	160
Beryllium	0.071	<0.50 ⁴	<0.50
Cadmium	<0.25	<0.25	<0.25
Chromium	2.1	0.38 J	0.35 J
Cobalt	5.8	6.8	6.7
Lead	5.5	<0.50	<0.50
Nickel	14	11	11
Thallium	<0.50	<0.50	<0.50
Vanadium	4.6	0.93	1

1. ug/L: microgram per liter

2. R: designates duplicate sample

3. J: result is less than the reporting limit/method limit but greater than the method detection limit. The

4. <: concentration less than laboratory reporting limit

Table 3-4 Dioxins and Furans Congeners in Groundwater, March and July 2019 Little Lake Industries Mill, Arcata, California (pg/L)¹					
Analyte	Sample Identification				
	WP-01	WP-01R ²	WP-04	WP-08	WP-09
2,3,7,8 TCDD	<10.0 ³	<11.2	<10.0	<9.78	<9.60
1,2,3,7,8,PeCDD	<50.0	<56.1	<50.0	<48.9	<48.0
1,2,3,4,7,8 HxCDD	<50.0	<56.1	23.2 J⁴	<48.9	<48.0
1,2,3,6,7,8 HxCDD	<50.0	<56.1	96.1	<48.9	<48.0
1,2,3,7,8,9 HxCDD	<50.0	<56.1	49.7	<48.9	<48.0
1,2,3,4,6,7,8 HpCDD	104	204	3,210	<48.9	<48.0
OCDD	632	1,630	38,600	272	<96.0
2,3,7,8 TCDF	<10.0	<11.2	<10.0	<9.78	<9.60
1,2,3,7,8 PeCDF	<50.0	<56.1	<50.0	<48.9	<48.0
2,3,4,7,8 PeCDF	<50.0	<56.1	<50.0	<48.9	<48.0
1,2,3,4,7,8 HxCDF	<50.0	<56.1	25.8 J	<48.9	<48.0
1,2,3,6,7,8 HxCDF	<50.0	<56.1	90.1	<48.9	<48.0
1,2,3,7,8,9 HxCDF	<50.0	<56.1	<50.0	<48.9	<48.0
2,3,4,6,7,8 HxCDF	<50.0	<56.1	<50.0	<48.9	<48.0
1,2,3,4,6,7,8 HpCDF	48.0 J	67.7	1,080	<48.9	<48.0
1,2,3,4,7,8,9 HpCDF	<50.0	<56.1	31.8	<48.9	<48.0
OCDF	27.0 J	32.3 J	1,640	<97.8	<96.0
TEQ	1.67	4.35	102	0.0816	0.0
1. pg/L: picogram per liter 2. R: designates duplicate sample 3. <: concentration less than laboratory reporting limit 4. J: result is less than the reporting limit/method limit but greater than the method detection limit. The reported concentration is an estimated value.					



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