



April 14, 2022

Reference No. 11209494

Renee Wawczak – Project Manager
United States Environmental Protection Agency
Region 5 [Mail Code LU-16J]
77 W. Jackson Boulevard
Chicago, Illinois 60604-3590

Send Via E-mail
(Wawczak.Renee@epa.gov)

Dear Renee:

**Re: Quarterly Progress Report – Q1-2022
EPA Docket No. RCRA-05-2020-0005
CITGO Terminal, East Chicago, Indiana**

This submission has been prepared on behalf of CITGO Petroleum Corporation (CITGO) in accordance with the Section 3008(h) Resource Conservation and Recovery Act (RCRA), 42 U.S.C. § 6928(h) Administrative Order on Consent (AOC) (RCRA Docket No: RCRA-05-2020-0005 with an effective date of January 24, 2020) for the CITGO Terminal at 2500 East Chicago Avenue, East Chicago, Indiana (EPA ID: IND 095267381) (Site).

This report is organized to address reporting requirements set out in Section VII of the AOC. This report summarizes the activities conducted at the Site from January 1, 2022 through March 31, 2022.

1. Summary of Work Performed during the Reporting Period (January 1, 2022 – March 31, 2022)

- Participated in monthly project status calls including discussion on RFI progress and upcoming public meeting presentation with OXY, EPA, CITGO, and GHD on January 20th, February 17th, and March 17th, 2022.
- Quarterly groundwater gauging and sampling event was conducted between March 14th - 18th, 2022.

2. Summary of Reports, and Other Deliverables Completed During the Reporting Period

- Q4 2021 Quarterly Progress Report submitted January 14th, 2022.
- EPA provided draft comments on the RFI on January 19th, 2022 via email, which were discussed during the monthly progress status call on January 20th, 2022. On January 31, 2022, a response to EPA's draft comments were submitted to memorialize the discussion on January 20th, 2022 which were approved by EPA on February 1, 2022.

3. Summary of Problems Encountered and Planned Resolutions

- None

4. Summary of Results of Sampling, Tests, or Other Data Received or Generated

- RFI field activities were completed in accordance with the plan outlined in the RFI Report submitted October 1, 2021, and slightly modified based on the response to EPA comments on the RFI dated January 31st, 2022.
- Figure 1 presents the groundwater contours for the March 2022 gauging event.
- Figure 2 presents a summary of exceedances of screening levels in groundwater, including the most recent quarterly groundwater monitoring event completed in December 2021. The March 2022 sampling event data is undergoing validation and will be provided in the next quarterly status report.
- Table 1 presents the validated groundwater sampling results from the December 2021 quarterly monitoring event.



- During the December 2021 sampling event, LNAPL was measured at CITGO-MW16-20 with sufficient volume that chemical analysis and transmissivity testing could be completed in accordance with the RFI Work Plan:
Transmissivity testing was completed on January 6, 2022. Results from the transmissivity testing were indicative of 'de minimus' conditions (i.e. extremely low LNAPL transmissivity). Relevant American Petroleum Institute (API) transmissivity worksheets are provided in Attachment A. It should be noted that not all calculations from the API worksheets could be completed due to the lack of LNAPL recharge (i.e. qualitatively very low results). From the initial LNAPL draw down, minimal recharge occurred through the day, with a calculated LNAPL transmissivity value of 0.003 ft²/day, which is nearly two orders of magnitude below the Interstate Technology and Regulatory Council (ITRC) guideline value for de minimis conditions. These results will be discussed with EPA and incorporated in further detail into subsequent reports as required by the AOC.
- LNAPL characterization results and fingerprinting analysis results are indicative of a mixture of petroleum hydrocarbons including diesel range compounds and other heavier constituent(s) as summarized in Table 2. A copy of the analytical report is provided in Attachment B. These results will be discussed with EPA and incorporated in further detail into subsequent reports as required by the AOC.

5. Anticipated Activities During the Next Reporting Period

- Complete validation of Q1-2022 quarterly sampling data
- Conduct Q2-2022 quarterly sampling event (June 2022).
- Participation in public meeting.

6. Project Schedule

- Attachment C presents the currently anticipated project schedule completed in accordance with the AOC.

7. Percent Project Completed

- At the time of this report, the project is approximately 63% completed.

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



CITGO Petroleum Corporation

2316 Terminal Drive
Arlington Heights, IL 60005

Should you have any questions on the above, please do not hesitate to contact us.

Respectfully submitted,

CITGO Petroleum Corporation

Scott Buckner, CITGO Project Manager

JEP/kf/12

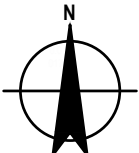
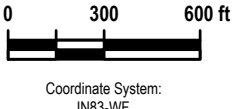
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LEGEND

- CITGO PROPERTY (228.5 ACRES)
- FORMER CITIES REFINERY PROPERTY (93.2 ACRES)
- CITGO RFI MONITORING WELL LOCATION
- GSH RFI MONITORING LOCATION
- GROUNDWATER ELEVATION (FT AMSL)
- MONITORING WELL LOCATION (SURVEYED SEPTEMBER 5, 2019. NAVD88)
- STAFF GAUGE LOCATION (SURVEYED JUNE 2, 2017. NAVD88)
- A CORRECTED GROUNDWATER WAS CALCULATED BY SUBTRACTING THE DEPTH TO PRODUCT FROM THE TOP OF CASING AND ADDING THE RELATIVE DENSITY OF THE LNAPL (0.9) MULTIPLIED BY THE THICKNESS OF THE LNAPL
- GROUNDWATER ELEVATION CONTOUR (FT AMSL)
- GROUNDWATER FLOW DIRECTION

NOTE:
FORMER REFINERY AND CITGO TERMINAL MEASURED MARCH 14 & 15, 2022



CITGO TERMINAL
EAST CHICAGO, INDIANA

**GROUNDWATER CONTOUR MAP
MARCH 2022**

Project No. 11208111
Date March 2022

FIGURE 1

Table 1

**CITGO Terminal
Groundwater Analytical Results Summary**

Location ID:		CITGO-MW01-20	CITGO-MW02-20	CITGO-MW03-20	CITGO-MW04-20	CITGO-MW06-20	CITGO-MW08-20	CITGO-MW08-20
Sample Name:		WG-121621-DS-03	WG-121621-DS-04	WG-121721-DS-05	WG-121521-DS-01	WG-121521-DS-02	WG-121721-DS-06	WG-121721-DS-08
Sample Date:		12/16/2021	12/16/2021	12/17/2021	12/15/2021	12/15/2021	12/17/2021	12/17/2021
Depth:		--	--	--	--	--	--	--
								Duplicate
Parameters	Unit							
Volatile Organic Compounds								
Benzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Semivolatile Organic Compounds								
2-Methylnaphthalene	µg/L	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
Naphthalene	µg/L	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.14 J
Metals								
Arsenic	µg/L	31	10 U	10 U	10 U	10 U	10 U	10 U
Iron	µg/L	13000	6000	210	1500	1200	5000	5000
Manganese	µg/L	580	480	24	530	350	250	250
Thallium	µg/L	20 U	20 U	20 U	20 U	20 U	20 U	20 U

Footnotes:

U Not detected at the associated reporting limit.

J Estimated concentration.

Table 1

**CITGO Terminal
Groundwater Analytical Results Summary**

Location ID:	CITGO-MW10-20	CITGO-MW11-20	CITGO-MW17-20	CITGO-MW18-20	CITGO-MW19-20
Sample Name:	WG-122021-JN-11	WG-121721-DS-10	WG-121721-DS-09	WG-122021-JN-13	WG-121721-DS-07
Sample Date:	12/20/2021	12/17/2021	12/17/2021	12/20/2021	12/17/2021
Depth:	--	--	--	--	--

Parameters	Unit					
Volatile Organic Compounds						
Benzene	µg/L	1.0 U	1.0 U	1.0 U	0.77 J	1.0 U
Semivolatile Organic Compounds						
2-Methylnaphthalene	µg/L	0.10 J	0.18 U	0.18 U	0.18 U	0.18 U
Naphthalene	µg/L	0.072 J	0.52	0.18 U	0.18 U	0.18 U
Metals						
Arsenic	µg/L	10 U	10 U	10 U	10 U	10 U
Iron	µg/L	3900	4900	7300	11000	4300
Manganese	µg/L	700	740	490	490	450
Thallium	µg/L	20 U	20 U	3.0 J	20 U	20 U

Footnotes:

U Not detected at the associated reporting limit.

J Estimated concentration.

Table 2

CITGO Terminal
LNAPL Analytical Results Summary

Sample Location:	CITGO-MW16-20	
Sample ID:	LNAPL-010622-DS-01	
Sample Date:	1/6/2022	
Parameters	Units	
Metals		
Arsenic	mg/kg	2.0
Iron	mg/kg	24
Manganese	mg/kg	1.9
Mercury	mg/kg	0.16 UH
Thallium	mg/kg	0.90 U
SVOAs		
1,4-Dioxane	ug/kg	480000 UH
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	ug/kg	120000 UH
2,4,5-Trichlorophenol	ug/kg	110000 UH
2,4,6-Trichlorophenol	ug/kg	110000 UH
2,4-Dichlorophenol	ug/kg	120000 UH
2,4-Dimethylphenol	ug/kg	110000 UH
2,4-Dinitrophenol	ug/kg	2900000 UH
2,4-Dinitrotoluene	ug/kg	480000 UH
2,6-Dinitrotoluene	ug/kg	110000 UH
2-Chloronaphthalene	ug/kg	96000 UH
2-Chlorophenol	ug/kg	110000 UH
2-Methylnaphthalene	ug/kg	7100000 H Dup 5100000
2-Methylphenol	ug/kg	140000 UH
2-Nitroaniline	ug/kg	140000 UH
2-Nitrophenol	ug/kg	140000 UH
3,3'-Dichlorobenzidine	ug/kg	480000 UH
3-Nitroaniline	ug/kg	480000 UH
4,6-Dinitro-2-methylphenol	ug/kg	1400000 UH
4-Bromophenyl phenyl ether	ug/kg	110000 UH
4-Chloro-3-methylphenol	ug/kg	140000 UH
4-Chloroaniline	ug/kg	480000 UH
4-Chlorophenyl phenyl ether	ug/kg	110000 UH
4-Methylphenol	ug/kg	140000 UH
4-Nitroaniline	ug/kg	480000 UH
4-Nitrophenol	ug/kg	1400000 UH
Acenaphthene	ug/kg	48000 UH
Acenaphthylene	ug/kg	48000 UH
Acetophenone	ug/kg	140000 UH
Anthracene	ug/kg	220000 H
Atrazine	ug/kg	480000 UH
Benzaldehyde	ug/kg	480000 UH
Benzo(a)anthracene	ug/kg	280000 H
Benzo(a)pyrene	ug/kg	130000 H
Benzo(b)fluoranthene	ug/kg	140000 H
Benzo(g,h,i)perylene	ug/kg	120000 H
Benzo(k)fluoranthene	ug/kg	25000 JH
Biphenyl (1,1-Biphenyl)	ug/kg	110000 UH
bis(2-Chloroethoxy)methane	ug/kg	110000 UH
bis(2-Chloroethyl)ether	ug/kg	110000 UH
bis(2-Ethylhexyl)phthalate (DEHP)	ug/kg	480000 UH
Butyl benzylphthalate (BBP)	ug/kg	480000 UH
Caprolactam	ug/kg	480000 UH
Carbazole	ug/kg	110000 UH
Chrysene	ug/kg	620000 H
Dibenz(a,h)anthracene	ug/kg	48000 UH
Dibenzofuran	ug/kg	310000 H
Diethyl phthalate	ug/kg	480000 UH
Dimethyl phthalate	ug/kg	480000 UH
Di-n-butylphthalate (DBP)	ug/kg	480000 UH
Di-n-octyl phthalate (DnOP)	ug/kg	480000 UH
Fluoranthene	ug/kg	260000 H
Fluorene	ug/kg	630000 H
Hexachlorobenzene	ug/kg	48000 UH
Hexachlorobutadiene	ug/kg	140000 UH
Hexachlorocyclopentadiene	ug/kg	1400000 UH
Hexachloroethane	ug/kg	480000 UH
Indeno(1,2,3-cd)pyrene	ug/kg	58000 H
Isophorone	ug/kg	190000 UH
Naphthalene	ug/kg	88000 Dup 48000 UH
Nitrobenzene	ug/kg	110000 UH
N-Nitrosodi-n-propylamine	ug/kg	190000 UH
N-Nitrosodiphenylamine	ug/kg	110000 UH
Pentachlorophenol	ug/kg	480000 UH
Phenanthrene	ug/kg	2900000 H
Phenol	ug/kg	110000 UH
Pyrene	ug/kg	920000 H
SVOAsSIM		
B(H),17a(H),20R-cholestane	ug/kg	47000 UH
B(H),17a(H),20S-cholestane	ug/kg	59000 H
a(H) Diahopane	ug/kg	47000 UH

CITGO Terminal
LNAPL Analytical Results Summary

Sample Location: CITGO-MW16-20
Sample ID: LNAPL-010622-DS-01
Sample Date: 1/6/2022

Parameters	Units	
A(H),21B(H),22R-bishomohopane	ug/kg	47000 UH
A(H),21B(H),22R-homohopane	ug/kg	47000 UH
A(H),21B(H),22R-pentakishomohopane	ug/kg	47000 UH
A(H),21B(H),22R-tetrakishomohopane	ug/kg	47000 UH
A(H),21B(H),22R-trishomohopane	ug/kg	47000 UH
A(H),21B(H),22S-bishomohopane	ug/kg	47000 UH
A(H),21B(H),22S-homohopane	ug/kg	47000 UH
A(H),21B(H),22S-pentakishomohopane	ug/kg	47000 UH
A(H),21B(H),22S-tetrakishomohopane	ug/kg	47000 UH
A(H),21B(H),22S-trishomohopane	ug/kg	47000 UH
A(H),21B(H)-30-norhopane	ug/kg	47000 UH
A(H),21B(H)-hopane	ug/kg	47000 UH
a(H)-22,29,30- Trisnorhopane-Tm	ug/kg	47000 UH
B(H),21A(H)-hopane	ug/kg	47000 UH
B(H)-21A(H)-30-norhopane	ug/kg	150000 H
a(H)-22,29,30-trisnorhopane	ug/kg	47000 UH
A(H)-30-norneohopane	ug/kg	35000 JH
A(H)-oleanane	ug/kg	47000 UH
1-Methyl-7-isopropylphenanthrene	ug/kg	47000 UH*+
1-Methylnaphthalene	ug/kg	4900000 H
-ethyl-5A(H), 14A(H), 17A(H), 20(R)-cholestane	ug/kg	47000 UH
-ethyl-5A(H), 14A(H), 17A(H), 20(S)-cholestane	ug/kg	47000 UH
-ethyl-5A(H), 14B(H), 17B(H), 20(R)-cholestane	ug/kg	47000 UH
-ethyl-5A(H), 14B(H), 17B(H), 20(S)-cholestane	ug/kg	47000 UH
-methyl-5A(H),14A(H),17A,20R-cholestane	ug/kg	47000 UH
-methyl-5A(H),14B(H),17B,20R-cholestane	ug/kg	47000 UH
-methyl-5A(H),14B(H),17B,20S-cholestane	ug/kg	47000 UH
2-Methylnaphthalene	ug/kg	8400000 H
5a(H),14B(H),17B(H),20R-cholestane	ug/kg	47000 UH
5a(H),14B(H),17B(H),20S-cholestane	ug/kg	47000 UH
Acenaphthene	ug/kg	230000 H
Acenaphthylene	ug/kg	47000 UH
Anthracene	ug/kg	280000 H
Benzo(a)anthracene	ug/kg	320000 H
Benzo(a)pyrene	ug/kg	150000 H
Benzo(b)fluoranthene	ug/kg	190000 H
Benzo(b)naphtho(2,1-d)thiophene	ug/kg	310000 H
Benzo(e)pyrene	ug/kg	310000 H
Benzo(g,h,i)perylene	ug/kg	95000 H
Benzo(k)fluoranthene	ug/kg	47000 UH
Biphenyl (1,1-Biphenyl)	ug/kg	47000 UH
C1-Benzanthracene/chrysenes	ug/kg	580000 H
C1-Decalins	ug/kg	2000000 H
C1-Dibenzothiophenes	ug/kg	1800000 H
C1-Fluoranthenes/Pyrenes	ug/kg	1500000 H
C1-Fluorenes	ug/kg	1200000 H
C1-Naphthalenes	ug/kg	8900000 H
C1-Naphthobenzothiophenes	ug/kg	410000 H
C1-Phenanthrenes/Anthracenes	ug/kg	4400000 H
C20-Triaromatic steroid	ug/kg	47000 UH
C21-Triaromatic steroid	ug/kg	17000 JH
c26,20R+C27,20S-Triaromatic steroid	ug/kg	47000 UH
C26,20S-Triaromatic steroid	ug/kg	47000 UH
C27,20R-Triaromatic steroid	ug/kg	47000 UH
C28 Triaromatic steroid-20R	ug/kg	47000 UH
C28 Triaromatic steroid-20S	ug/kg	47000 UH
C2-Benzanthracene/chrysenes	ug/kg	260000 H
C2-Decalins	ug/kg	3600000 H
C2-Dibenzothiophenes	ug/kg	1500000 H
C2-Fluoranthenes/Pyrenes	ug/kg	990000 H
C2-Fluorenes	ug/kg	1500000 H
C2-Naphthalenes	ug/kg	12000000 H
C2-Naphthobenzothiophenes	ug/kg	220000 H
C2-Phenanthrenes/Anthracenes	ug/kg	2800000 H
C3-Benzanthracene/chrysenes	ug/kg	93000 H
C3-Decalins	ug/kg	2200000 H
C3-Dibenzothiophenes	ug/kg	860000 H
C3-Fluoranthenes/Pyrenes	ug/kg	460000 H
C3-Fluorenes	ug/kg	1000000 H
C3-Naphthalenes	ug/kg	9200000 H
C3-Naphthobenzothiophenes	ug/kg	70000 H
C3-Phenanthrenes/Anthracenes	ug/kg	2100000 H
C4-Benzanthracene/chrysenes	ug/kg	47000 UH
C4-Decalins	ug/kg	2200000 H
C4-Dibenzothiophenes	ug/kg	300000 H
C4-Fluoranthenes/Pyrenes	ug/kg	150000 H
C4-Naphthalenes	ug/kg	4700000 H
C4-Phenanthrenes/Anthracenes	ug/kg	410000 H
Cholestane	ug/kg	47000 UH
Chrysene	ug/kg	670000 H
Dibenz(a,h)anthracene	ug/kg	35000 JH
Dibenzofuran	ug/kg	330000 H

CITGO Terminal
LNAPL Analytical Results Summary

Sample Location: CITGO-MW16-20
Sample ID: LNAPL-010622-DS-01
Sample Date: 1/6/2022

Parameters	Units	
Dibenzothiophene	ug/kg	1100000 H
Fluoranthene	ug/kg	370000 H
Fluorene	ug/kg	560000 H
Gammacerane	ug/kg	47000 UH
Indeno(1,2,3-cd)pyrene	ug/kg	38000 JH
Naphthalene	ug/kg	270000 H
Naphthalene, decahydronaphthalene	ug/kg	920000 H
Perylene	ug/kg	47000 UH*+
Phenanthrene	ug/kg	3400000 H
Pyrene	ug/kg	1400000 H
S18-Ethylidiacholestane	ug/kg	47000 UH
S19-Ethylidiacholestane	ug/kg	47000 UH
S20-Methylcholestane	ug/kg	47000 UH
T10-C29-Tricyclic triterpane(R)	ug/kg	42000 JH
T4-C23-Diterpane	ug/kg	47000 UH
T5-C24-Diterpane	ug/kg	47000 UH
T6A-C24-Tetracyclic Terpane	ug/kg	34000 JH
T6B-Tricyclic Terpane(S)	ug/kg	47000 UH
T6-C25 Diterpane	ug/kg	47000 UH
T6C-Tricyclic Terpane(R)	ug/kg	92000 H
T7-C28-Tricyclic triterpane(S)	ug/kg	47000 UH
T8-C28-Tricyclic triterpane(R)	ug/kg	47000 UH
T9-C29-Tricyclic triterpane(S)	ug/kg	47000 UH
VOAs		
1,1,1-Trichloroethane	ug/kg	25000 UH
1,1,2,2-Tetrachloroethane	ug/kg	25000 UH
1,1,2-Trichloroethane	ug/kg	25000 UH
1,1-Dichloroethane	ug/kg	25000 UH
1,1-Dichloroethene	ug/kg	25000 UH
1,2,4-Trichlorobenzene	ug/kg	50000 UH
1,2-Dibromo-3-chloropropane (DBCP)	ug/kg	25000 UH
1,2-Dibromoethane (Ethylene dibromide)	ug/kg	25000 UH
1,2-Dichlorobenzene	ug/kg	25000 UH
1,2-Dichloroethane	ug/kg	25000 UH
1,2-Dichloropropane	ug/kg	25000 UH
1,3-Dichlorobenzene	ug/kg	25000 UH
1,4-Dichlorobenzene	ug/kg	25000 UH
2-Butanone (Methyl ethyl ketone) (MEK)	ug/kg	50000 UH
2-Hexanone	ug/kg	50000 UH
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	ug/kg	50000 UH
Acetone	ug/kg	100000 UH
Benzene	ug/kg	82000 H Dup 47000
Bromodichloromethane	ug/kg	25000 UH
Bromoform	ug/kg	50000 UH
Bromomethane (Methyl bromide)	ug/kg	25000 UH*+
Carbon disulfide	ug/kg	25000 UH
Carbon tetrachloride	ug/kg	25000 UH
Chlorobenzene	ug/kg	25000 UH
Chloroethane	ug/kg	25000 UH
Chloroform (Trichloromethane)	ug/kg	25000 UH
Chloromethane (Methyl chloride)	ug/kg	25000 UH
cis-1,2-Dichloroethene	ug/kg	25000 UH
cis-1,3-Dichloropropene	ug/kg	25000 UH
Cyclohexane	ug/kg	25000 UH
Dibromochloromethane	ug/kg	25000 UH
Dichlorodifluoromethane (CFC-12)	ug/kg	25000 UH*+
Ethylbenzene	ug/kg	85000 H
Isopropyl benzene	ug/kg	220000 H
Methyl acetate	ug/kg	25000 UH
Methyl cyclohexane	ug/kg	910000 H
Methyl tert butyl ether (MTBE)	ug/kg	25000 UH
Methylene chloride	ug/kg	25000 UH
Styrene	ug/kg	25000 UH
Tetrachloroethene	ug/kg	25000 UH
Toluene	ug/kg	25000 UH
trans-1,2-Dichloroethene	ug/kg	25000 UH
trans-1,3-Dichloropropene	ug/kg	25000 UH
Trichloroethene	ug/kg	25000 UH
Trichlorofluoromethane (CFC-11)	ug/kg	25000 UH
Trifluorotrichloroethane (CFC-113)	ug/kg	50000 UH
Vinyl chloride	ug/kg	25000 UH
Xylenes (total)	ug/kg	82000 H

Footnotes:

U Not detected at the associated reporting limit.

J Estimated concentration.

*+ LCS and/or LCSD is outside acceptance limits, high biased.

H Sample was prepped or analyzed beyond the specified holding time.



CITGO Petroleum Corporation

2316 Terminal Drive
Arlington Heights, IL 60005

ATTACHMENT A

API Worksheets – Transmissivity

Well Designation:	MW16-20	Citgo East Chicago
Date:	6-Jan-22	

Ground Surface Elev (ft msl)	0.0	Enter These Data	Drawdown Adjustment (ft) 0
Top of Casing Elev (ft msl)	0.0		
Well Casing Radius, r_c (ft):	0.083		
Well Radius, r_w (ft):	0.354		
LNAPL Specific Yield, S_y :	0.175		
LNAPL Density Ratio, ρ_l :	0.840	Calculated Parameters	
Top of Screen (ft bgs):	45.5		
Bottom of Screen (ft bgs):	65.5		
LNAPL Baildown Vol. (gal.):	4.0		
Effective Radius, r_{e3} (ft):	0.166		
Effective Radius, r_{e2} (ft):	0.064		
Initial Casing LNAPL Vol. (gal.):	0.17		
Initial Filter LNAPL Vol. (gal.):	-17.88		

	Enter Data Here						Water Table		LNAPL		LNAPL							LNAPL		Ave.
	Time (min)	DTP (ft btoc)	DTW (ft btoc)	DTP (ft bgs)	DTW (ft bgs)		Depth (ft)	Drawdown s_n (ft)	Average Time (min)	Discharge Q_n (ft ³ /d)	s_n (ft)	b_n (ft)	r_e (ft)	DTP (ft bgs)	DTW (ft bgs)	Volume (gallons)	r_e (ft)			
Initial Fluid Levels:	0	7.75	8.81	7.75	8.81		7.92					1.06								
Enter Test Data:	1.0	7.80	8.12	7.80	8.12		7.85	0.05				0.32				0	0.083			
	2.0	7.80	8.12	7.80	8.12		7.85	0.05	1.5	0.000	0.05	0.32	0.083	7.80	8.12	0.00	0			
	3.0	7.80	8.14	7.80	8.14		7.85	0.05	2.5	0.628	0.05	0.34	0.083	7.80	8.13	0.00	0.083			
	4.0	7.80	8.15	7.80	8.15		7.86	0.05	3.5	0.314	0.05	0.35	0.083	7.80	8.15	0.00	0.167			
	5.0	7.80	8.15	7.80	8.15		7.86	0.05	4.5	0.000	0.05	0.35	0.083	7.80	8.15	0.00	0.250			
	6.0	7.80	8.17	7.80	8.17		7.86	0.05	5.5	0.628	0.05	0.37	0.083	7.80	8.16	0.01	0.333			
	7.0	7.80	8.18	7.80	8.18		7.86	0.05	6.5	0.314	0.05	0.38	0.083	7.80	8.18	0.01	0.417			
	8.0	7.80	8.20	7.80	8.20		7.86	0.05	7.5	0.628	0.05	0.40	0.083	7.80	8.19	0.01	0.500			
	9.0	7.80	8.20	7.80	8.20		7.86	0.05	8.5	0.000	0.05	0.40	0.083	7.80	8.20	0.01	0.583			
	10.0	7.80	8.20	7.80	8.20		7.86	0.05	9.5	0.000	0.05	0.40	0.083	7.80	8.20	0.01	0.667			
	20.0	7.80	8.20	7.80	8.20		7.86	0.05	15.0	0.000	0.05	0.40	0.083	7.80	8.20	0.01	1.125			
	30.0	7.80	8.20	7.80	8.20		7.86	0.05	25.0	0.000	0.05	0.40	0.083	7.80	8.20	0.01	1.958			
	40.0	7.8	8.20	7.80	8.20		7.86	0.05	35.0	0.000	0.05	0.40	0.083	7.80	8.20	0.01	2.792			
	50.0	7.8	8.20	7.80	8.20		7.86	0.05	45.0	0.000	0.05	0.40	0.083	7.80	8.20	0.01	3.625			
	60.0	7.8	8.20	7.80	8.20		7.86	0.05	55.0	0.000	0.05	0.40	0.083	7.80	8.20	0.01	4.458			
	90.0	7.8	8.20	7.80	8.20		7.86	0.05	75.0	0.000	0.05	0.40	0.083	7.80	8.20	0.01	6.125			
	120.0	7.8	8.20	7.80	8.20		7.86	0.05	105.0	0.000	0.05	0.40	0.083	7.80	8.20	0.01	8.625			
	150.0	7.8	8.35	7.80	8.35		7.89	0.05	135.0	0.157	0.05	0.55	0.083	7.80	8.28	0.04	11.125			
	180.0	7.8	8.35	7.80	8.35		7.89	0.05	165.0	0.000	0.05	0.55	0.083	7.80	8.35	0.04	13.625			
	210.0	7.8	8.35	7.80	8.35		7.89	0.05	195.0	0.000	0.05	0.55	0.083	7.80	8.35	0.04	16.125			
240.0	7.8	8.35	7.80	8.35		7.89	0.05	225.0	0.000	0.05	0.55	0.083	7.80	8.35	0.04	18.625				

Figure 1

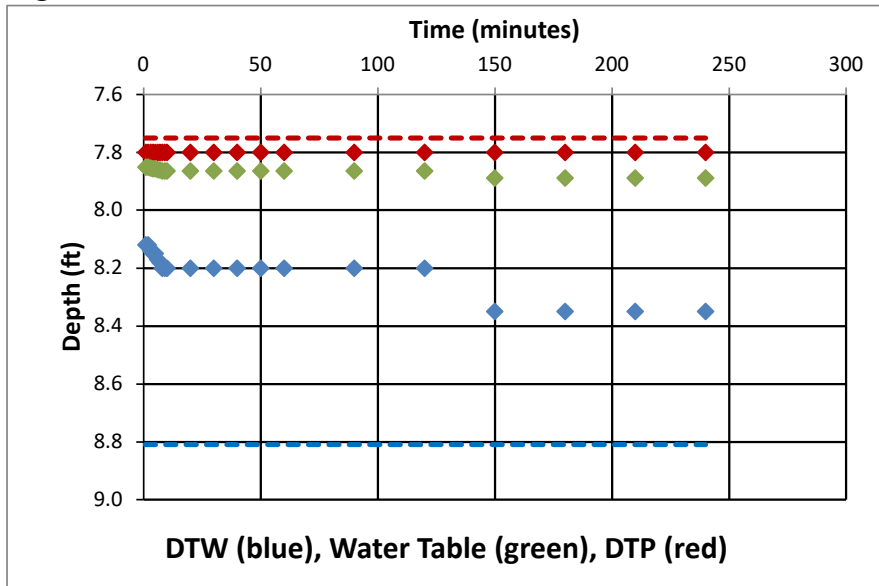


Figure 2

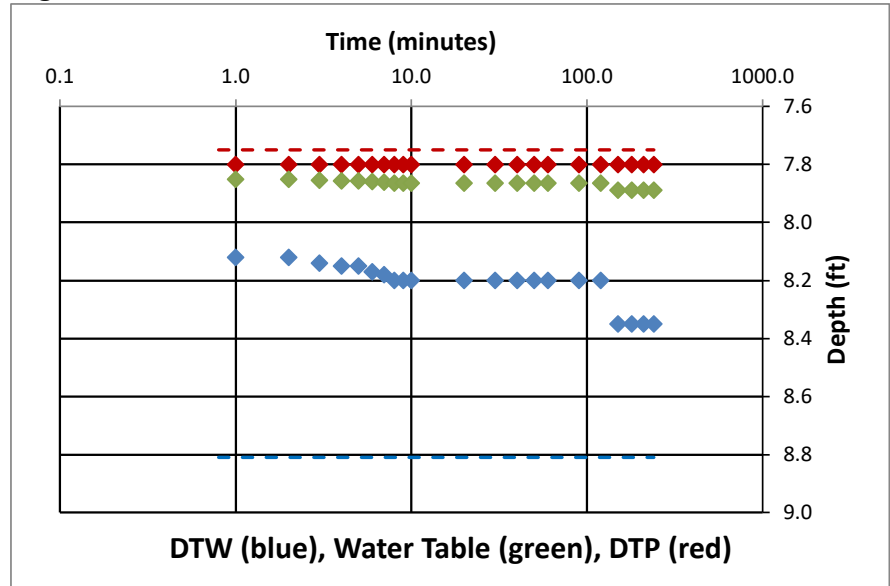


Figure 3

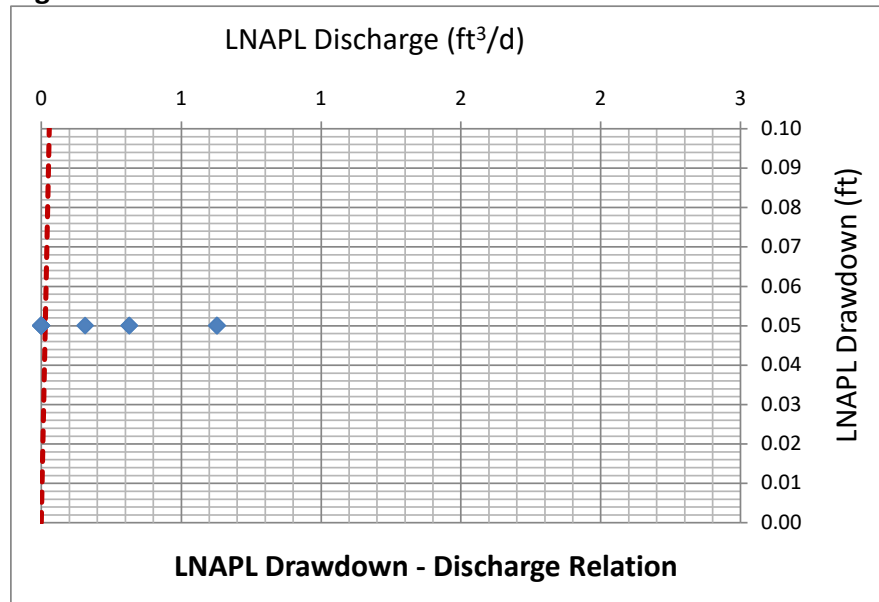
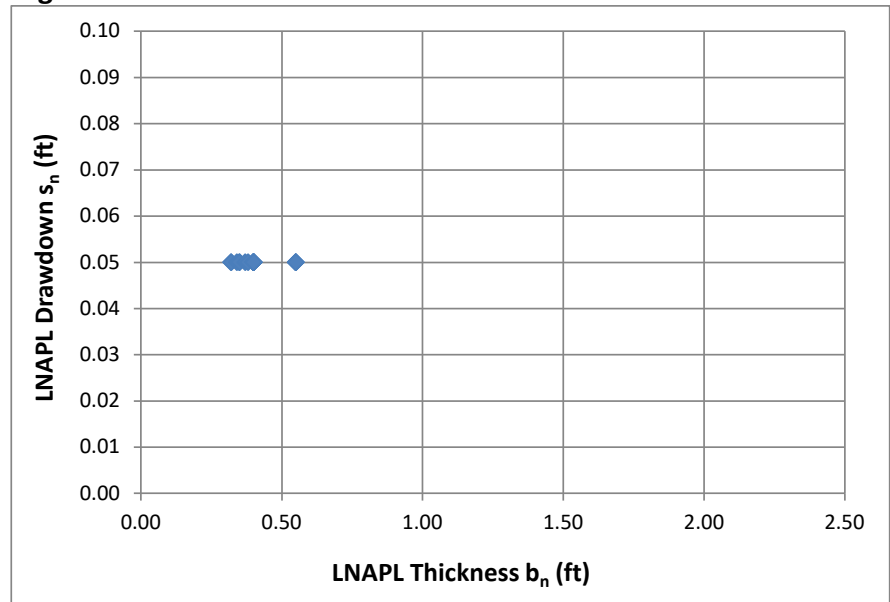


Figure 4



Discharge (ft³/d)

0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7

DTP (ft bgs)

0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00

Depth to Product vs. LNAPL Discharge

Discharge (ft³/d)

DTW (ft bgs)

Depth to Water vs. LNAPL Discharge

Discharge (ft ³ /d)	DTW (ft bgs)
0.0	8.15
0.0	8.18
0.0	8.22
0.15	8.28
0.32	8.18
0.32	8.22
0.62	8.15
0.62	8.18
0.62	8.22
0.0	8.38

Scatter plot showing LNAPL Thickness b_n (ft) versus Time (min) on a log-log scale. The data points indicate a rapid increase in thickness from approximately 0.32 ft at 1 min to about 0.40 ft at 10 min, followed by a plateau around 0.40 ft until 100 min, and then a sharp increase to approximately 0.55 ft at 200 min.

Time (min)	LNAPL Thickness b_n (ft)
1.0	0.32
2.0	0.32
3.0	0.34
4.0	0.35
5.0	0.35
6.0	0.37
7.0	0.38
8.0	0.40
9.0	0.40
10.0	0.40
20.0	0.40
30.0	0.40
40.0	0.40
50.0	0.40
60.0	0.40
100.0	0.40
150.0	0.40
200.0	0.55
220.0	0.55
240.0	0.55
260.0	0.55
280.0	0.55

The scatter plot displays the relationship between LNAPL discharge and time. The x-axis represents time in minutes, ranging from 0.0 to 250.0. The y-axis represents discharge in cubic feet per day (ft³/d), ranging from 0.0 to 0.7. The data points show a very high initial discharge rate (around 0.65 ft³/d) that drops sharply to near zero within the first 10 minutes. A few scattered data points are visible at later times, including one around 130 minutes with a discharge of approximately 0.18 ft³/d.

Time (minutes)	Discharge (ft³/d)
0.0	0.65
2.0	0.65
4.0	0.65
6.0	0.65
8.0	0.65
10.0	0.65
12.0	0.65
14.0	0.65
16.0	0.65
18.0	0.65
20.0	0.65
22.0	0.65
24.0	0.65
26.0	0.65
28.0	0.65
30.0	0.65
32.0	0.65
34.0	0.65
36.0	0.65
38.0	0.65
40.0	0.65
42.0	0.65
44.0	0.65
46.0	0.65
48.0	0.65
50.0	0.65
52.0	0.65
54.0	0.65
56.0	0.65
58.0	0.65
60.0	0.65
62.0	0.65
64.0	0.65
66.0	0.65
68.0	0.65
70.0	0.65
72.0	0.65
74.0	0.65
76.0	0.65
78.0	0.65
80.0	0.65
82.0	0.65
84.0	0.65
86.0	0.65
88.0	0.65
90.0	0.65
92.0	0.65
94.0	0.65
96.0	0.65
98.0	0.65
100.0	0.65
102.0	0.65
104.0	0.65
106.0	0.65
108.0	0.65
110.0	0.65
112.0	0.65
114.0	0.65
116.0	0.65
118.0	0.65
120.0	0.65
122.0	0.65
124.0	0.65
126.0	0.65
128.0	0.65
130.0	0.65
132.0	0.65
134.0	0.65
136.0	0.65
138.0	0.65
140.0	0.65
142.0	0.65
144.0	0.65
146.0	0.65
148.0	0.65
150.0	0.65
152.0	0.65
154.0	0.65
156.0	0.65
158.0	0.65
160.0	0.65
162.0	0.65
164.0	0.65
166.0	0.65
168.0	0.65
170.0	0.65
172.0	0.65
174.0	0.65
176.0	0.65
178.0	0.65
180.0	0.65
182.0	0.65
184.0	0.65
186.0	0.65
188.0	0.65
190.0	0.65
192.0	0.65
194.0	0.65
196.0	0.65
198.0	0.65
200.0	0.65
202.0	0.65
204.0	0.65
206.0	0.65
208.0	0.65
210.0	0.65
212.0	0.65
214.0	0.65
216.0	0.65
218.0	0.65
220.0	0.65
222.0	0.65
224.0	0.65
226.0	0.65
228.0	0.65
230.0	0.65
232.0	0.65
234.0	0.65
236.0	0.65
238.0	0.65
240.0	0.65
242.0	0.65
244.0	0.65
246.0	0.65
248.0	0.65
250.0	0.65
130.0	0.18
160.0	0.05
190.0	0.05
220.0	0.05

Figure 9

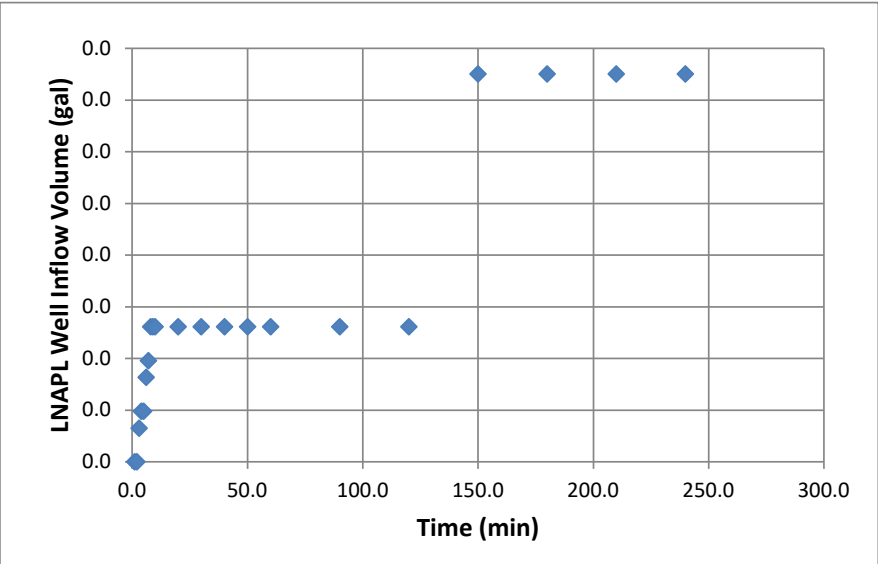
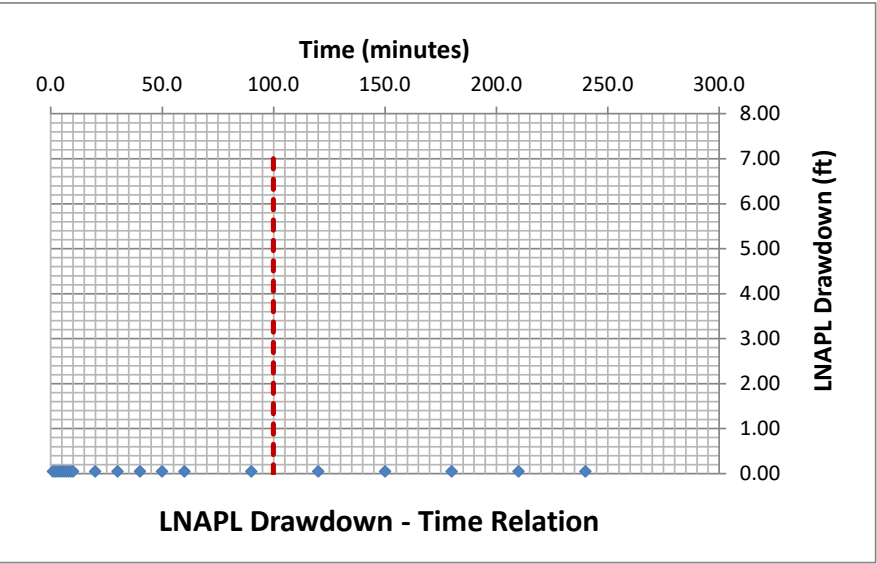


Figure 10



Generalized Bouwer and Rice (1976)

Well Designation:	MW16-20
Date:	6-Jan-22

$$T_n = \frac{r_e^2 \ln(R/r_e) \ln(s_n(t_1)/s_n(t))}{2(-J)(t-t_1)}$$

Enter early time cut-off for least-squares model fit

Time_{cut}

10

<- Enter or change value here

Model Results:

T_n (ft²/d) = #NUM!

 +/-

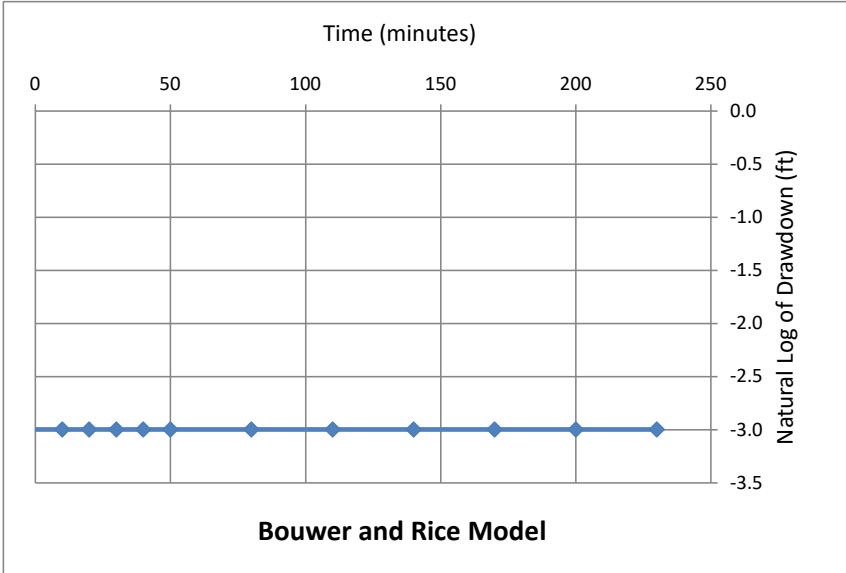
#NUM!

 ft²/d

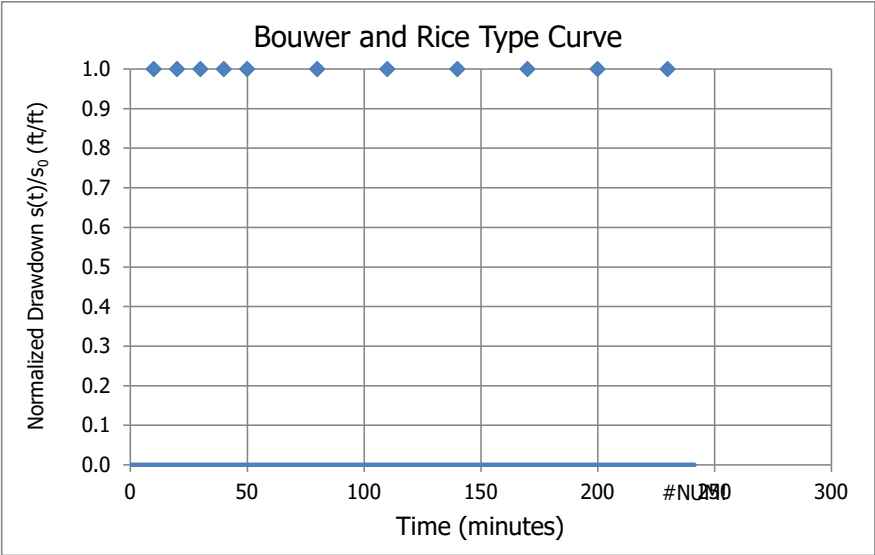
L _e /r _e
-220.5
C
#DIV/0!
R/r _e
#NUM!

J-Ratio
-1.136

Coef. Of Variation
#NUM!



C coefficient calculated from Eq. 6.5(c) of Butler, The Design, Performance, and Analysis of Slug Tests, CRC Press, 2000.



Well Designation:	MW16-20
Date:	6-Jan-22

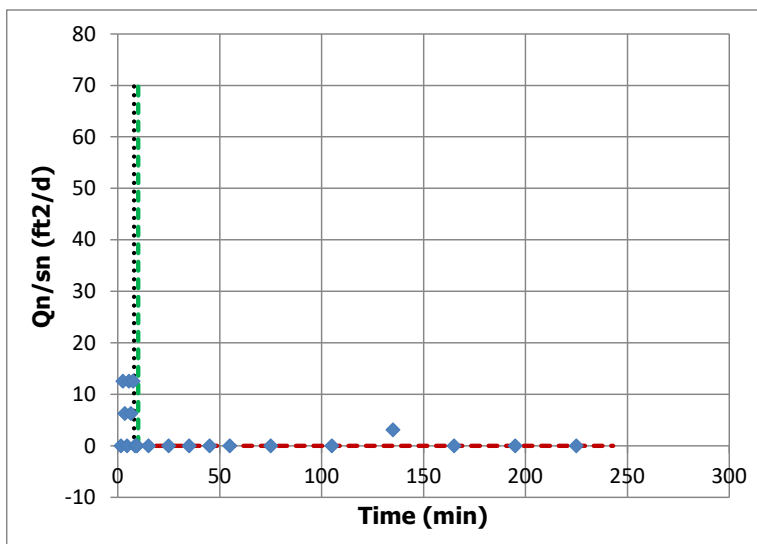
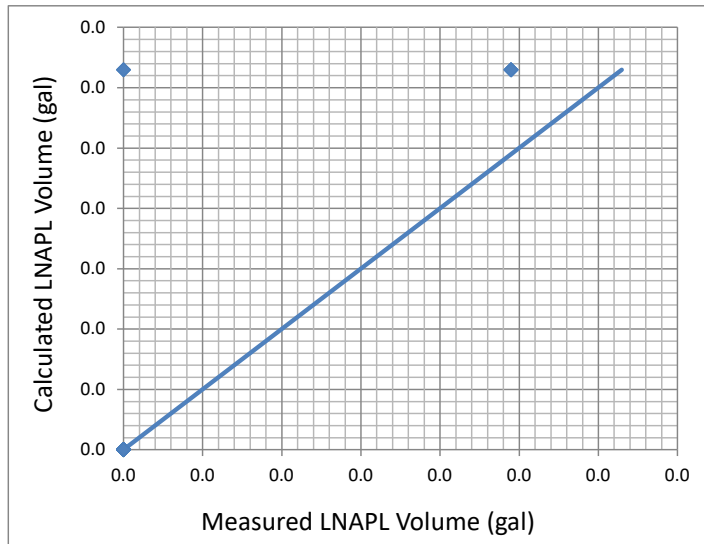
$$V_n(t_i) = \sum_j^i \frac{4\pi T_n s_j}{\ln\left(\frac{2.25 T_n t_j}{r_e^2 S_n}\right)} \Delta t_j$$

Time _{cut} (min):	10	← Enter or change values here
Time Adjustment (min):	8	

Root-Mean-Square Error:	0.047	<-- Minimize this using "Solver"
	0.000	<-- Working S_n

Add constraint $T_n > 0.00001$

Model Result:



70

Cooper, Bredehoeft and Papadopoulos (1967)

Well Designation:	MW16-20
Date:	6-Jan-22

Enter early time cut-off for least-squares model fit

Time _{cut} (min):	10	<-- Enter or change values here
Initial Drawdown s_n (ft):	0.2	

Trial S_n : d <-- Enter d for default

Root-Mean-Square Error: 0.045 <-- Minimize this using "Solver"

Trial T_n (ft²/d): 0.003 <-- By changing T_n through "Solver"

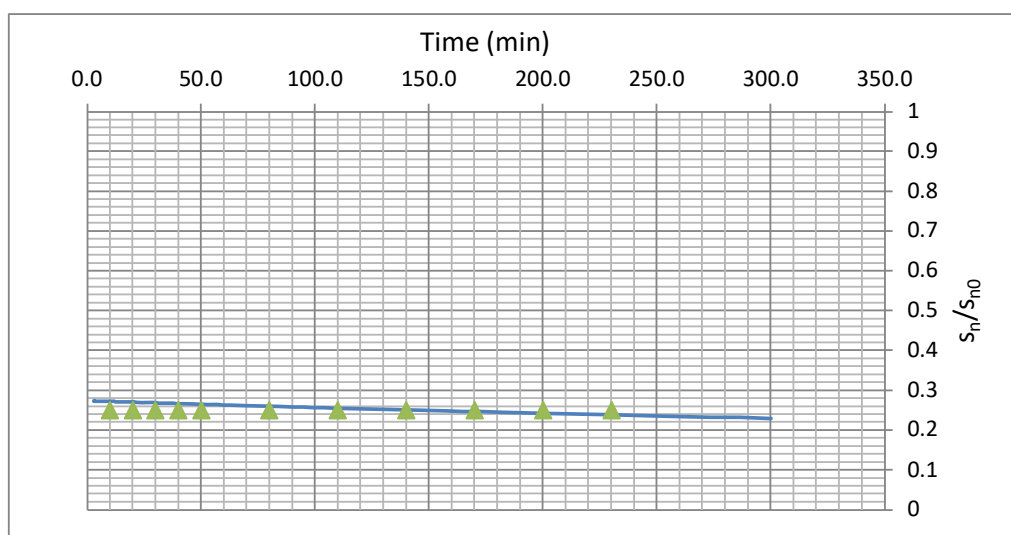
1.600 <-- Working S_n

Add constraint $T_n > 0.00001$

Model Result:

T_n (ft²/d) = 0.003

T_{min}	3
T_{max}	300



J-Ratio
-1.136



CITGO Petroleum Corporation

2316 Terminal Drive
Arlington Heights, IL 60005

ATTACHMENT B

Analytical Report - LNAPL

ANALYTICAL REPORT

Eurofins Chicago
2417 Bond Street
University Park, IL 60484
Tel: (708)534-5200

Laboratory Job ID: 500-210676-2

Client Project/Site: 11209494, CITGO East Chicago Terminal

For:

GHD Services Inc.
26850 Haggerty Rd.
Farmington Hills, Michigan 48331

Attn: Mr. James Abston



Authorized for release by:
3/3/2022 4:37:28 PM

Denise Heckler, Project Manager II
(330)966-9477

Denise.Heckler@Eurofinset.com

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Job ID: 500-210676-2

Laboratory: Eurofins Chicago

Narrative

Job Narrative 500-210676-2

Comments

Additional analysis was requested by GHD on February 7, 2022.

Additional analysis was requested by GHD on February 14, 2022.

Receipt

The sample was received on 1/7/2022 11:20 AM. Unless otherwise noted below, the sample arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was -9.6° C.

GC/MS VOA

Method 8260C: Surrogate recovery for the following sample was outside control limits: LNAPL-010622-DS-01 (500-210676-1). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8260C: The request for VOCs was received outside of holding time: LNAPL-010622-DS-01 (500-210676-1).

Method 8260C: The continuing calibration verification (CCV) associated with batch 410-228368 recovered outside acceptance criteria, low biased, for 2-Butanone, 2-Hexanone, 4-Methyl-2-pentanone and Methyl acetate. A reporting limit (RL) standard was analyzed, and the target analyte was detected. Non-detections of the affected analytes are reported. Any detections are considered estimated.

Method 8260C: The continuing calibration verification (CCV) associated with batch 410-228368 recovered above the upper control limit for Bromomethane. Non-detections of the affected analytes are reported. Any detections are considered estimated.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA

Method 8270D: The continuing calibration verification (CCV) associated with batch 410-224212 recovered above the upper control limit for Caprolactam. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated samples: LNAPL-010622-DS-01 (500-210676-1).

Method 8270D: The following sample was diluted due to the nature of the sample matrix: LNAPL-010622-DS-01 (500-210676-1). Elevated reporting limits (RLs) are provided.

Method 8270D: The request for SVOCs was received outside of holding time: LNAPL-010622-DS-01 (500-210676-1).

Method 8270D SIM: The following sample was diluted due to the nature of the sample matrix: LNAPL-010622-DS-01 (500-210676-1). Elevated reporting limits (RLs) are provided.

Method 8270D SIM: Benzo(b)fluoranthene and benzo(k)fluoranthene were not resolved under the sample analysis conditions. The result reported for benzo(b)fluoranthene represents the combined total of both isomers for samples LNAPL-010622-DS-01 (500-210676-1).

Method 8270D SIM: The continuing calibration verification (CCV) associated with batch 410-227555 recovered above the upper control limit for Fluoranthene, Fluoranthene-d10 (Surr), Benzo[k]fluoranthene, Dibenzothiophene and Pyrene. The sample associated with this CCV had some detections for the affected analytes.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC Semi VOA

Method 8015C: The request for 8015 was received outside of holding time: LNAPL-010622-DS-01 (500-210676-1).

Case Narrative

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Job ID: 500-210676-2 (Continued)

Laboratory: Eurofins Chicago (Continued)

Method 8015C: The GC fingerprint for sample LNAPL-010622-DS-01 (500-210676-1) most closely resembles the laboratory's reference standard for Diesel/#2 fuel oil. Differences in relative peak ratios and intensities indicate the product in the sample is weathered. The degree of weathering is outside the scope of this analysis.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

Method 7471A: The request for mercury was received outside of holding time: LNAPL-010622-DS-01 (500-210676-1).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Client Sample ID: LNAPL-010622-DS-01

Lab Sample ID: 500-210676-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	85000	H	25000	2000	ug/Kg	500		8260C	Total/NA
Methylcyclohexane	910000	H	25000	3000	ug/Kg	500		8260C	Total/NA
Xylenes, Total	82000	H	50000	7000	ug/Kg	500		8260C	Total/NA
Benzene	82000	H	25000	2500	ug/Kg	500		8260C	Total/NA
Isopropylbenzene	220000	H	25000	2000	ug/Kg	500		8260C	Total/NA
1-Methylnaphthalene	4900000	H F2	47000	19000	ug/Kg	100		8270D SIM	Total/NA
2-Methylnaphthalene	8400000	H F2	47000	28000	ug/Kg	100		8270D SIM	Total/NA
A2-C21-TAS	17000	J H	47000	9400	ug/Kg	100		8270D SIM	Total/NA
Acenaphthene	230000	H F2	47000	19000	ug/Kg	100		8270D SIM	Total/NA
Anthracene	280000	H F2	47000	9400	ug/Kg	100		8270D SIM	Total/NA
Benzo[a]anthracene	320000	H F2	47000	19000	ug/Kg	100		8270D SIM	Total/NA
Benzo[a]pyrene	150000	H F2	47000	19000	ug/Kg	100		8270D SIM	Total/NA
Benzo[e]pyrene	310000	H F2	47000	19000	ug/Kg	100		8270D SIM	Total/NA
Benzo[g,h,i]perylene	95000	H F2	47000	19000	ug/Kg	100		8270D SIM	Total/NA
Benzo[b]fluoranthene	190000	H F2	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C1-Benzo(a)anthracenes/Chrysenes	580000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C1-Decalins	2000000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C1-Dibenzothiophenes	1800000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C1-Fluoranthene/Pyrenes	1500000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C1-Fluorenes	1200000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C1-Naphthalenes	8900000	H	66000	38000	ug/Kg	100		8270D SIM	Total/NA
C1-Naphthobenzothiophenes	410000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C1-Phenanthrenes/Anthracenes	4400000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C2-Benzo(a)anthracenes/Chrysenes	260000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C2-Decalins	3600000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C2-Dibenzothiophenes	1500000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C2-Fluoranthenes/Pyrene	990000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C2-Fluorenes	1500000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C2-Naphthalenes	12000000	H	66000	38000	ug/Kg	100		8270D SIM	Total/NA
C2-Naphthobenzothiophenes	220000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C2-Phenanthrenes/Anthracenes	2800000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C3-Benzo(a)Anthracenes/Chrysenes	93000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C3-Decalins	2200000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C3-Dibenzothiophenes	860000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C3-Fluoranthenes/Pyrene	460000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C3-Fluorenes	1000000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C3-Naphthalenes	9200000	H	66000	38000	ug/Kg	100		8270D SIM	Total/NA
C3-Naphthobenzothiophenes	70000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C3-Phenanthrenes/Anthracenes	2100000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C4-Decalins	2200000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C4-Dibenzothiophenes	300000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C4-Fluoranthenes/Pyrene	150000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
C4-Naphthalenes	4700000	H	66000	38000	ug/Kg	100		8270D SIM	Total/NA
C4-Phenanthrenes/Anthracenes	410000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
Chrysene	670000	H F2	47000	9400	ug/Kg	100		8270D SIM	Total/NA
cis/trans Decalin	920000	H F2	47000	19000	ug/Kg	100		8270D SIM	Total/NA
Dibenz(a,h)anthracene	35000	J H F2	47000	19000	ug/Kg	100		8270D SIM	Total/NA
Dibenzofuran	330000	H F2	47000	19000	ug/Kg	100		8270D SIM	Total/NA
Dibenzothiophene	1100000	H F2	47000	19000	ug/Kg	100		8270D SIM	Total/NA
Fluoranthene	370000	H F2	47000	19000	ug/Kg	100		8270D SIM	Total/NA
Fluorene	560000	H F2	47000	19000	ug/Kg	100		8270D SIM	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Chicago

Detection Summary

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Client Sample ID: LNAPL-010622-DS-01 (Continued)

Lab Sample ID: 500-210676-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Indeno[1,2,3-cd]pyrene	38000	J H F2	47000	19000	ug/Kg	100		8270D SIM	Total/NA
Naphthalene	270000	H F2	66000	38000	ug/Kg	100		8270D SIM	Total/NA
Naphthobenzothiophene	310000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
Phenanthrene	3400000	H F2	47000	19000	ug/Kg	100		8270D SIM	Total/NA
Pyrene	1400000	H F2	47000	19000	ug/Kg	100		8270D SIM	Total/NA
S4-Diacholestane	59000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
T10-C29Tricyclitriterpane(R)	42000	J H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
T16-Norneohopane	35000	J H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
T17-C30-Normoretane	150000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
T6a-C24Tetracyclic Terpane	34000	J H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
T6c-Tricyclic Terpane(R)	92000	H	47000	19000	ug/Kg	100		8270D SIM	Total/NA
Benzo[a]anthracene	280000	H	48000	9600	ug/Kg	10		8270D	Total/NA
Benzo[a]pyrene	130000	H F1	48000	9600	ug/Kg	10		8270D	Total/NA
Benzo[b]fluoranthene	140000	H F1	48000	9600	ug/Kg	10		8270D	Total/NA
Benzo[g,h,i]perylene	120000	H	48000	9600	ug/Kg	10		8270D	Total/NA
Benzo[k]fluoranthene	25000	J H F1	48000	9600	ug/Kg	10		8270D	Total/NA
Anthracene	220000	H	48000	9600	ug/Kg	10		8270D	Total/NA
Chrysene	620000	H	48000	9600	ug/Kg	10		8270D	Total/NA
Dibenzofuran	310000	H	110000	48000	ug/Kg	10		8270D	Total/NA
Fluoranthene	260000	H	48000	9600	ug/Kg	10		8270D	Total/NA
Fluorene	630000	H	48000	9600	ug/Kg	10		8270D	Total/NA
Indeno[1,2,3-cd]pyrene	58000	H	48000	12000	ug/Kg	10		8270D	Total/NA
Phenanthrene	2900000	H	48000	12000	ug/Kg	10		8270D	Total/NA
Pyrene	920000	H	48000	9600	ug/Kg	10		8270D	Total/NA
2-Methylnaphthalene	7100000	H	48000	14000	ug/Kg	10		8270D	Total/NA
Qualitative Method	66	H			% by Wt	10		8015C	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Chicago

Method Summary

Client: GHD Services Inc.

Job ID: 500-210676-2

Project/Site: 11209494, CITGO East Chicago Terminal

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds by GC/MS	SW846	ELLE
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	ELLE
8270D SIM	Semivolatile Organic Compounds (GC/MS SIM)	SW846	ELLE
8015C	Hydrocarbon Product Identification (GC)	SW846	ELLE
7471A	Mercury (CVAA)	SW846	ELLE
3580A	Waste Dilution	SW846	ELLE
5030C	Purge and Trap	SW846	ELLE
7471A	Preparation, Mercury	SW846	ELLE

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Env, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Sample Summary

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
500-210676-1	LNAPL-010622-DS-01	Waste	01/06/22 12:30	01/07/22 11:20

1

2

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Client Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Client Sample ID: LNAPL-010622-DS-01

Lab Sample ID: 500-210676-1

Date Collected: 01/06/22 12:30

Matrix: Waste

Date Received: 01/07/22 11:20

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,3-Dichloropropene	25000	U H	25000	2000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
trans-1,3-Dichloropropene	25000	U H	25000	2500	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Ethylbenzene	85000	H	25000	2000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Styrene	25000	U H	25000	2000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
1,4-Dichlorobenzene	25000	U H	25000	2000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
1,2-Dibromoethane	25000	U H	25000	2000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
1,2-Dichloroethane	25000	U H	25000	3000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
4-Methyl-2-pentanone	50000	U H	50000	5000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Methylcyclohexane	910000	H	25000	3000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Toluene	25000	U H	25000	3000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Chlorobenzene	25000	U H	25000	2500	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Cyclohexane	25000	U H	25000	2500	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
1,2,4-Trichlorobenzene	50000	U H	50000	25000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Dibromochloromethane	25000	U H	25000	10000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Xylenes, Total	82000	H	50000	7000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Tetrachloroethene	25000	U H	25000	2500	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
cis-1,2-Dichloroethene	25000	U H	25000	2500	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
trans-1,2-Dichloroethene	25000	U H	25000	2500	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Methyl tertiary butyl ether	25000	U H	25000	2500	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
1,3-Dichlorobenzene	25000	U H	25000	2500	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Carbon tetrachloride	25000	U H	25000	10000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
2-Hexanone	50000	U H	50000	5000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Acetone	100000	U H	100000	30000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Chloroform	25000	U H	25000	3000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Benzene	82000	H	25000	2500	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
1,1,1-Trichloroethane	25000	U H	25000	3000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Bromomethane	25000	U H *+	25000	3500	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Chloromethane	25000	U H	25000	3000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Chloroethane	25000	U H	25000	5000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Vinyl chloride	25000	U H	25000	3000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Methylene Chloride	25000	U H	25000	10000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Carbon disulfide	25000	U H	25000	3000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Bromoform	50000	U H	50000	25000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Bromodichloromethane	25000	U H	25000	2000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
1,1-Dichloroethane	25000	U H	25000	2500	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
1,1-Dichloroethene	25000	U H	25000	2500	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Trichlorofluoromethane	25000	U H	25000	3500	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Dichlorodifluoromethane	25000	U H *+	25000	3000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Freon 113	50000	U H	50000	3000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
1,2-Dichloropropane	25000	U H	25000	2500	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
2-Butanone	50000	U H	50000	5000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
1,1,2-Trichloroethane	25000	U H	25000	2500	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Trichloroethene	25000	U H	25000	2500	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Methyl acetate	25000	U H	25000	5000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
1,1,2,2-Tetrachloroethane	25000	U H	25000	2000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
1,2-Dichlorobenzene	25000	U H	25000	2500	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
1,2-Dibromo-3-Chloropropane	25000	U H	25000	5000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500
Isopropylbenzene	220000	H	25000	2000	ug/Kg		02/24/22 14:25	02/28/22 22:36	500

Eurofins Chicago

Client Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Client Sample ID: LNAPL-010622-DS-01

Lab Sample ID: 500-210676-1

Date Collected: 01/06/22 12:30

Matrix: Waste

Date Received: 01/07/22 11:20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	92		54 - 135	02/24/22 14:25	02/28/22 22:36	500
Dibromofluoromethane (Surr)	88		50 - 141	02/24/22 14:25	02/28/22 22:36	500
4-Bromofluorobenzene (Surr)	194	S1+	50 - 131	02/24/22 14:25	02/28/22 22:36	500
Toluene-d8 (Surr)	164	S1+	52 - 141	02/24/22 14:25	02/28/22 22:36	500

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene	4900000	H F2	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
17a(H)-diahopane	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
2-Methylnaphthalene	8400000	H F2	47000	28000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
A1-C20-TAS	47000	U H	47000	9400	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
A2-C21-TAS	17000	J H	47000	9400	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
A3-C26-TAS(20S)	47000	U H	47000	9400	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
A4-C26/C27-TAS	47000	U H	47000	9400	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
A5-C27-TAS(20R)	47000	U H	47000	9400	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
A6-TAS(20S)	47000	U H	47000	9400	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
A7-TAS(20R)	47000	U H	47000	9400	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Acenaphthene	230000	H F2	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Acenaphthylene	47000	U H	47000	9400	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Anthracene	280000	H F2	47000	9400	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Benzo[a]anthracene	320000	H F2	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Benzo[a]pyrene	150000	H F2	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Benzo[e]pyrene	310000	H F2	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Benzo[g,h,i]perylene	95000	H F2	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Benzo[b]fluoranthene	190000	H F2	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Benzo[k]fluoranthene	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Biphenyl	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C1-Benzo(a)anthracenes/Chrysenes	580000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C1-Decalins	2000000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C1-Dibenzothiophenes	1800000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C1-Fluoranthene/Pyrenes	1500000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C1-Fluorenes	1200000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C1-Naphthalenes	8900000	H	66000	38000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C1-Naphthobenzothiophenes	410000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C1-Phenanthrenes/Anthracenes	4400000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C2-Benzo(a)anthracenes/Chrysenes	260000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C2-Decalins	3600000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C2-Dibenzothiophenes	1500000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C2-Fluoranthenes/Pyrene	990000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C2-Fluorenes	1500000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C2-Naphthalenes	12000000	H	66000	38000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C2-Naphthobenzothiophenes	220000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C2-Phenanthrenes/Anthracenes	2800000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C3-Benzo(a)Anthracenes/Chrysenes	93000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C3-Decalins	2200000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C3-Dibenzothiophenes	860000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C3-Fluoranthenes/Pyrene	460000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C3-Fluorenes	1000000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100

Eurofins Chicago

Client Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Client Sample ID: LNAPL-010622-DS-01

Lab Sample ID: 500-210676-1

Date Collected: 01/06/22 12:30

Matrix: Waste

Date Received: 01/07/22 11:20

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C3-Naphthalenes	920000	H	66000	38000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C3-Naphthobenzothiophenes	70000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C3-Phenanthrenes/Anthracenes	210000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C4-Benzo(a)anthracenes/Chrysenes	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C4-Decalins	220000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C4-Dibenzothiophenes	300000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C4-Fluoranthenes/Pyrene	150000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C4-Naphthalenes	470000	H	66000	38000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
C4-Phenanthrenes/Anthracenes	410000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Cholestane	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Chrysene	670000	H F2	47000	9400	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
cis/trans Decalin	920000	H F2	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Dibenz(a,h)anthracene	35000	J H F2	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Dibenzofuran	330000	H F2	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Dibenzothiophene	1100000	H F2	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Fluoranthene	370000	H F2	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Fluorene	560000	H F2	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Indeno[1,2,3-cd]pyrene	38000	J H F2	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Naphthalene	270000	H F2	66000	38000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Naphthobenzothiophene	310000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Perylene	47000	U H *+	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Phenanthrene	340000	H F2	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Pyrene	140000	H F2	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
Retene	47000	U H *+	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
S12-Cholestane	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
S14-Cholestane(20R)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
S15-Cholestane(20S)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
S18-Ethylcholestanol	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
S19-Ethylcholestanol	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
S20-Methylcholestanol	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
S22-Methylcholestanol(20R)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
S23-Methylcholestanol(20S)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
S24-Methylcholestanol	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
S25-Ethylcholestanol	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
S26-Ethylcholestanol(20R)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
S27-Ethylcholestanol(20S)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
S28-Ethylcholestanol	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
S4-Diacholestane	59000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
S5-Diacholestane	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T10-C29Tricyclitriterpane(R)	42000	J H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T11-Trisnorhopane(TS)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T12-Trisnorhopane(TM)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T15-C29-Norhopane	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T16-Norneohopane	35000	J H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T17-C30-Normoretane	150000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T18-C30-Oleanane	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T19-C30-Hopane	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T20-Moretane	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T21-C31-Homohopane(S)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100

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Client Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Client Sample ID: LNAPL-010622-DS-01

Lab Sample ID: 500-210676-1

Date Collected: 01/06/22 12:30

Matrix: Waste

Date Received: 01/07/22 11:20

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
T22-C31-Homohopane(R)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T22a-Gammacerane	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T26-C32-Bishomohopane(S)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T27-C32-Bishomohopane(R)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T30-C33-Trishomohopane(S)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T31-C33-Trishomohopane(R)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T32-Tetrakishomohopane(S)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T33-Tetrakishomohopane(R)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T34-Pentakishomohopane(S)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T35-Pentakishomohopane(R)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T4-C23Diterpane	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T5-C24Diterpane	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T6-C25Diterpane	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T6a-C24Tetracyclic Terpene	34000	J H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T6b-Tricyclic Terpene(S)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T6c-Tricyclic Terpene(R)	92000	H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T7-C28Tricyclitriterpane(S)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T8-C28Tricyclitriterpane(R)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100
T9-C29Tricyclitriterpane(S)	47000	U H	47000	19000	ug/Kg		02/14/22 13:13	02/25/22 15:55	100

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene-d10 (Surr)	0	S1-	45 - 99	02/14/22 13:13	02/25/22 15:55	100
Benzo(a)pyrene-d12 (Surr)	0	S1-	38 - 109	02/14/22 13:13	02/25/22 15:55	100
Fluoranthene-d10 (Surr)	0	S1-	46 - 121	02/14/22 13:13	02/25/22 15:55	100

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1'-Biphenyl	110000	U H F1	110000	48000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
2,4-Dichlorophenol	120000	U H F1	120000	58000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
2,4-Dimethylphenol	110000	U H F1	110000	48000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
2,4-Dinitrophenol	2900000	U H	2900000	480000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
2,4-Dinitrotoluene	480000	U H F1	480000	96000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
2,4,5-Trichlorophenol	110000	U H F1	110000	48000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
2,4,6-Trichlorophenol	110000	U H F1	110000	48000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
2,2'-oxybis[1-chloropropane]	120000	U H	120000	58000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Di-n-butyl phthalate	480000	U H	480000	190000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Di-n-octyl phthalate	480000	U H	480000	190000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Benzo[a]anthracene	280000	H	48000	9600	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
1,4-Dioxane	480000	U H F1	480000	96000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Benzo[a]pyrene	130000	H F1	48000	9600	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Benzo[b]fluoranthene	140000	H F1	48000	9600	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Benzo[g,h,i]perylene	120000	H	48000	9600	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Benzo[k]fluoranthene	25000	J H F1	48000	9600	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Acenaphthene	48000	U H F1	48000	9600	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Acenaphthylene	48000	U H F1	48000	12000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Acetophenone	140000	U H F1	140000	48000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Anthracene	220000	H	48000	9600	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Atrazine	480000	U H	480000	190000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Benzaldehyde	480000	U H F1	480000	96000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Butylbenzylphthalate	480000	U H	480000	190000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10

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Client Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Client Sample ID: LNAPL-010622-DS-01

Lab Sample ID: 500-210676-1

Date Collected: 01/06/22 12:30

Matrix: Waste

Date Received: 01/07/22 11:20

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Caprolactam	480000	U H F1	480000	96000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Carbazole	110000	U H F1	110000	48000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Chrysene	620000	H	48000	9600	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Dibenz(a,h)anthracene	48000	U H F1	48000	19000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Dibenzofuran	310000	H	110000	48000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Diethyl phthalate	480000	U H	480000	190000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Dimethyl phthalate	480000	U H	480000	190000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Hexachlorobenzene	48000	U H	48000	19000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Hexachlorobutadiene	140000	U H	140000	58000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Hexachlorocyclopentadiene	1400000	U H	1400000	480000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Hexachloroethane	480000	U H F1	480000	96000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Fluoranthene	260000	H	48000	9600	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Fluorene	630000	H	48000	9600	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Indeno[1,2,3-cd]pyrene	58000	H	48000	12000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Isophorone	190000	U H F1	190000	48000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
N-Nitrosodi-n-propylamine	190000	U H F1	190000	96000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
N-Nitrosodiphenylamine	110000	U H F1	110000	48000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Naphthalene	48000	U H F1	48000	19000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Nitrobenzene	110000	U H F1	110000	48000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Pentachlorophenol	480000	U H F1	480000	190000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Phenanthrene	2900000	H	48000	12000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Phenol	110000	U H	110000	48000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Pyrene	920000	H	48000	9600	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
2-Chloronaphthalene	96000	U H	96000	38000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
2-Chlorophenol	110000	U H	110000	48000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
2-Methylnaphthalene	7100000	H	48000	14000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
2-Methylphenol	140000	U H F1	140000	58000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
2-Nitroaniline	140000	U H F1 F2	140000	48000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
2-Nitrophenol	140000	U H F1	140000	58000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
3,3'-Dichlorobenzidine	480000	U H	480000	96000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
3-Nitroaniline	480000	U H F1	480000	96000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
4,6-Dinitro-2-methylphenol	1400000	U H	1400000	480000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
4-Bromophenyl-phenylether	110000	U H F1	110000	48000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
4-Methylphenol	140000	U H	140000	48000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
4-Nitroaniline	480000	U H F1	480000	96000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
4-Nitrophenol	1400000	U H	1400000	480000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Bis(2-chloroethoxy)methane	110000	U H F1	110000	48000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Bis(2-chloroethyl)ether	110000	U H	110000	48000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
Bis(2-ethylhexyl) phthalate	480000	U H	480000	190000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
2,6-Dinitrotoluene	110000	U H F1	110000	48000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
4-Chloro-3-methylphenol	140000	U H F1	140000	58000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
4-Chloroaniline	480000	U H F1 F2	480000	96000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10
4-Chlorophenyl-phenyl ether	110000	U H F1	110000	48000	ug/Kg		02/15/22 12:50	02/16/22 06:41	10

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,4,6-Tribromophenol (Surr)	81		13 - 121	02/15/22 12:50	02/16/22 06:41	10
2-Fluorobiphenyl (Surr)	89		39 - 100	02/15/22 12:50	02/16/22 06:41	10
2-Fluorophenol (Surr)	88		26 - 96	02/15/22 12:50	02/16/22 06:41	10
Nitrobenzene-d5 (Surr)	114	S1+	32 - 97	02/15/22 12:50	02/16/22 06:41	10
p-Terphenyl-d14 (Surr)	92		45 - 108	02/15/22 12:50	02/16/22 06:41	10

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Client Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Client Sample ID: LNAPL-010622-DS-01

Lab Sample ID: 500-210676-1

Date Collected: 01/06/22 12:30

Matrix: Waste

Date Received: 01/07/22 11:20

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Phenol-d5 (Surr)	86		27 - 104	02/15/22 12:50	02/16/22 06:41	10

Method: 8015C - Hydrocarbon Product Identification (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Qualitative Method	66	H			% by Wt		02/15/22 14:54	02/15/22 20:12	10

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Chlorobenzene (Surr)	78		50 - 150	02/15/22 14:54	02/15/22 20:12	10
o- terphenyl (Surr)	93		50 - 150	02/15/22 14:54	02/15/22 20:12	10

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.16	U H	0.16	0.065	mg/Kg		02/24/22 09:31	02/25/22 17:53	1

Definitions/Glossary

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
H	Sample was prepped or analyzed beyond the specified holding time
S1+	Surrogate recovery exceeds control limits, high biased.
U	Indicates the analyte was analyzed for but not detected.

GC/MS Semi VOA

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
*3	ISTD response or retention time outside acceptable limits.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
E	Result exceeded calibration range.
F1	MS and/or MSD recovery exceeds control limits.
F2	MS/MSD RPD exceeds control limits
H	Sample was prepped or analyzed beyond the specified holding time
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
S1-	Surrogate recovery exceeds control limits, low biased.
S1+	Surrogate recovery exceeds control limits, high biased.
U	Indicates the analyte was analyzed for but not detected.

GC Semi VOA

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time

Metals

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent

Definitions/Glossary

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Glossary (Continued)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

QC Association Summary

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

GC/MS VOA

Prep Batch: 227387

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-210676-1	LNAPL-010622-DS-01	Total/NA	Waste	5030C	

Analysis Batch: 228368

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-210676-1	LNAPL-010622-DS-01	Total/NA	Waste	8260C	227387
MB 410-228368/11	Method Blank	Total/NA	Waste	8260C	
LCS 410-228368/8	Lab Control Sample	Total/NA	Waste	8260C	
LCSD 410-228368/9	Lab Control Sample Dup	Total/NA	Waste	8260C	

GC/MS Semi VOA

Prep Batch: 223608

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-210676-1	LNAPL-010622-DS-01	Total/NA	Waste	3580A	
MB 410-223608/1-A	Method Blank	Total/NA	Waste	3580A	
LCS 410-223608/2-A	Lab Control Sample	Total/NA	Waste	3580A	
LCSD 410-223608/3-A	Lab Control Sample Dup	Total/NA	Waste	3580A	
500-210676-1 MS	LNAPL-010622-DS-01	Total/NA	Waste	3580A	
500-210676-1 MSD	LNAPL-010622-DS-01	Total/NA	Waste	3580A	

Prep Batch: 224088

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-210676-1	LNAPL-010622-DS-01	Total/NA	Waste	3580A	
MB 410-224088/1-A	Method Blank	Total/NA	Waste	3580A	
LCS 410-224088/2-A	Lab Control Sample	Total/NA	Waste	3580A	
LCSD 410-224088/3-A	Lab Control Sample Dup	Total/NA	Waste	3580A	
500-210676-1 MS	LNAPL-010622-DS-01	Total/NA	Waste	3580A	
500-210676-1 MSD	LNAPL-010622-DS-01	Total/NA	Waste	3580A	

Analysis Batch: 224212

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-210676-1	LNAPL-010622-DS-01	Total/NA	Waste	8270D	224088
MB 410-224088/1-A	Method Blank	Total/NA	Waste	8270D	224088
LCS 410-224088/2-A	Lab Control Sample	Total/NA	Waste	8270D	224088
LCSD 410-224088/3-A	Lab Control Sample Dup	Total/NA	Waste	8270D	224088

Analysis Batch: 224956

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-210676-1 MS	LNAPL-010622-DS-01	Total/NA	Waste	8270D	224088
500-210676-1 MSD	LNAPL-010622-DS-01	Total/NA	Waste	8270D	224088

Analysis Batch: 227555

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-210676-1	LNAPL-010622-DS-01	Total/NA	Waste	8270D SIM	223608
MB 410-223608/1-A	Method Blank	Total/NA	Waste	8270D SIM	223608
LCS 410-223608/2-A	Lab Control Sample	Total/NA	Waste	8270D SIM	223608
LCSD 410-223608/3-A	Lab Control Sample Dup	Total/NA	Waste	8270D SIM	223608
500-210676-1 MS	LNAPL-010622-DS-01	Total/NA	Waste	8270D SIM	223608
500-210676-1 MSD	LNAPL-010622-DS-01	Total/NA	Waste	8270D SIM	223608

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QC Association Summary

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

GC Semi VOA

Prep Batch: 224130

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-210676-1	LNAPL-010622-DS-01	Total/NA	Waste	3580A	
MB 410-224130/1-A	Method Blank	Total/NA	Waste	3580A	

Analysis Batch: 224136

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-210676-1	LNAPL-010622-DS-01	Total/NA	Waste	8015C	224130
MB 410-224130/1-A	Method Blank	Total/NA	Waste	8015C	224130

Metals

Prep Batch: 227256

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-210676-1	LNAPL-010622-DS-01	Total/NA	Waste	7471A	
MB 410-227256/1-A	Method Blank	Total/NA	Waste	7471A	
LCS 410-227256/2-A	Lab Control Sample	Total/NA	Waste	7471A	
LCSD 410-227256/3-A	Lab Control Sample Dup	Total/NA	Waste	7471A	

Analysis Batch: 227897

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
500-210676-1	LNAPL-010622-DS-01	Total/NA	Waste	7471A	227256
MB 410-227256/1-A	Method Blank	Total/NA	Waste	7471A	227256
LCS 410-227256/2-A	Lab Control Sample	Total/NA	Waste	7471A	227256
LCSD 410-227256/3-A	Lab Control Sample Dup	Total/NA	Waste	7471A	227256

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Waste

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		DCA (54-135)	DBFM (50-141)	BFB (50-131)	TOL (52-141)
500-210676-1	LNAPL-010622-DS-01	92	88	194 S1+	164 S1+
LCS 410-228368/8	Lab Control Sample	106	105	100	100
LCSD 410-228368/9	Lab Control Sample Dup	102	104	98	100
MB 410-228368/11	Method Blank	107	102	97	100

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)

DBFM = Dibromofluoromethane (Surr)

BFB = 4-Bromofluorobenzene (Surr)

TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Waste

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)					
		TBP (13-121)	FBP (39-100)	2FP (26-96)	NBZ (32-97)	TPHd14 (45-108)	PHL (27-104)
500-210676-1	LNAPL-010622-DS-01	81	89	88	114 S1+	92	86
500-210676-1 MS	LNAPL-010622-DS-01	86	91	94	121 S1+	96	90
500-210676-1 MSD	LNAPL-010622-DS-01	86	91	93	118 S1+	92	87
LCS 410-224088/2-A	Lab Control Sample	102	104 S1+	103 S1+	100 S1+	111 S1+	96
LCSD 410-224088/3-A	Lab Control Sample Dup	106	108 S1+	103 S1+	100 S1+	112 S1+	96
MB 410-224088/1-A	Method Blank	106	113 S1+	102 S1+	104 S1+	122 S1+	95

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)

FBP = 2-Fluorobiphenyl (Surr)

2FP = 2-Fluorophenol (Surr)

NBZ = Nitrobenzene-d5 (Surr)

TPHd14 = p-Terphenyl-d14 (Surr)

PHL = Phenol-d5 (Surr)

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Matrix: Waste

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		MNPd10 (45-99)	BAPd12 (38-109)	FLN10 (46-121)
500-210676-1	LNAPL-010622-DS-01	0 S1-	0 S1-	0 S1-
500-210676-1 MS	LNAPL-010622-DS-01	0 S1-	0 S1-	0 S1-
500-210676-1 MSD	LNAPL-010622-DS-01	0 S1-	0 S1-	0 S1-
LCS 410-223608/2-A	Lab Control Sample	147 S1+ *3	90 *3	107 *3
LCSD 410-223608/3-A	Lab Control Sample Dup	503 S1+	84	120
MB 410-223608/1-A	Method Blank	106 S1+	86	125 S1+

Surrogate Legend

MNPd10 = 1-Methylnaphthalene-d10 (Surr)

BAPd12 = Benzo(a)pyrene-d12 (Surr)

FLN10 = Fluoranthene-d10 (Surr)

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Surrogate Summary

Client: GHD Services Inc.

Job ID: 500-210676-2

Project/Site: 11209494, CITGO East Chicago Terminal

Method: 8015C - Hydrocarbon Product Identification (GC)

Matrix: Waste

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	CBNZ (50-150)	OTP (50-150)
500-210676-1	LNAPL-010622-DS-01	78	93
MB 410-224130/1-A	Method Blank	86	90

Surrogate Legend

CBNZ = Chlorobenzene (Surr)

OTP = o- terphenyl (Surr)

QC Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 410-228368/11

Matrix: Waste

Analysis Batch: 228368

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,3-Dichloropropene	250	U	250	20	ug/Kg			02/28/22 21:30	50
trans-1,3-Dichloropropene	250	U	250	25	ug/Kg			02/28/22 21:30	50
Ethylbenzene	250	U	250	20	ug/Kg			02/28/22 21:30	50
Styrene	250	U	250	20	ug/Kg			02/28/22 21:30	50
1,4-Dichlorobenzene	250	U	250	20	ug/Kg			02/28/22 21:30	50
1,2-Dibromoethane	250	U	250	20	ug/Kg			02/28/22 21:30	50
1,2-Dichloroethane	250	U	250	30	ug/Kg			02/28/22 21:30	50
4-Methyl-2-pentanone	500	U	500	50	ug/Kg			02/28/22 21:30	50
Methylcyclohexane	250	U	250	30	ug/Kg			02/28/22 21:30	50
Toluene	250	U	250	30	ug/Kg			02/28/22 21:30	50
Chlorobenzene	250	U	250	25	ug/Kg			02/28/22 21:30	50
Cyclohexane	250	U	250	25	ug/Kg			02/28/22 21:30	50
1,2,4-Trichlorobenzene	500	U	500	250	ug/Kg			02/28/22 21:30	50
Dibromochloromethane	250	U	250	100	ug/Kg			02/28/22 21:30	50
Xylenes, Total	500	U	500	70	ug/Kg			02/28/22 21:30	50
Tetrachloroethene	250	U	250	25	ug/Kg			02/28/22 21:30	50
cis-1,2-Dichloroethene	250	U	250	25	ug/Kg			02/28/22 21:30	50
trans-1,2-Dichloroethene	250	U	250	25	ug/Kg			02/28/22 21:30	50
Methyl tertiary butyl ether	250	U	250	25	ug/Kg			02/28/22 21:30	50
1,3-Dichlorobenzene	250	U	250	25	ug/Kg			02/28/22 21:30	50
Carbon tetrachloride	250	U	250	100	ug/Kg			02/28/22 21:30	50
2-Hexanone	500	U	500	50	ug/Kg			02/28/22 21:30	50
Acetone	1000	U	1000	300	ug/Kg			02/28/22 21:30	50
Chloroform	250	U	250	30	ug/Kg			02/28/22 21:30	50
Benzene	250	U	250	25	ug/Kg			02/28/22 21:30	50
1,1,1-Trichloroethane	250	U	250	30	ug/Kg			02/28/22 21:30	50
Bromomethane	250	U	250	35	ug/Kg			02/28/22 21:30	50
Chloromethane	250	U	250	30	ug/Kg			02/28/22 21:30	50
Chloroethane	250	U	250	50	ug/Kg			02/28/22 21:30	50
Vinyl chloride	250	U	250	30	ug/Kg			02/28/22 21:30	50
Methylene Chloride	250	U	250	100	ug/Kg			02/28/22 21:30	50
Carbon disulfide	250	U	250	30	ug/Kg			02/28/22 21:30	50
Bromoform	500	U	500	250	ug/Kg			02/28/22 21:30	50
Bromodichloromethane	250	U	250	20	ug/Kg			02/28/22 21:30	50
1,1-Dichloroethane	250	U	250	25	ug/Kg			02/28/22 21:30	50
1,1-Dichloroethene	250	U	250	25	ug/Kg			02/28/22 21:30	50
Trichlorofluoromethane	250	U	250	35	ug/Kg			02/28/22 21:30	50
Dichlorodifluoromethane	250	U	250	30	ug/Kg			02/28/22 21:30	50
Freon 113	500	U	500	30	ug/Kg			02/28/22 21:30	50
1,2-Dichloropropane	250	U	250	25	ug/Kg			02/28/22 21:30	50
2-Butanone	500	U	500	50	ug/Kg			02/28/22 21:30	50
1,1,2-Trichloroethane	250	U	250	25	ug/Kg			02/28/22 21:30	50
Trichloroethene	250	U	250	25	ug/Kg			02/28/22 21:30	50
Methyl acetate	250	U	250	50	ug/Kg			02/28/22 21:30	50
1,1,2,2-Tetrachloroethane	250	U	250	20	ug/Kg			02/28/22 21:30	50
1,2-Dichlorobenzene	250	U	250	25	ug/Kg			02/28/22 21:30	50
1,2-Dibromo-3-Chloropropane	250	U	250	50	ug/Kg			02/28/22 21:30	50
Isopropylbenzene	250	U	250	20	ug/Kg			02/28/22 21:30	50

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QC Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 410-228368/11

Matrix: Waste

Analysis Batch: 228368

Client Sample ID: Method Blank

Prep Type: Total/NA

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	107		54 - 135		02/28/22 21:30	50
Dibromofluoromethane (Surr)	102		50 - 141		02/28/22 21:30	50
4-Bromofluorobenzene (Surr)	97		50 - 131		02/28/22 21:30	50
Toluene-d8 (Surr)	100		52 - 141		02/28/22 21:30	50

Lab Sample ID: LCS 410-228368/8

Matrix: Waste

Analysis Batch: 228368

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,3-Dichloropropene	1000	1020		ug/Kg		102	66 - 120
trans-1,3-Dichloropropene	1000	1030		ug/Kg		103	68 - 122
Ethylbenzene	1000	983		ug/Kg		98	78 - 120
Styrene	1000	1000		ug/Kg		100	76 - 120
1,4-Dichlorobenzene	1000	1040		ug/Kg		104	80 - 120
1,2-Dibromoethane	1000	994		ug/Kg		99	76 - 120
1,2-Dichloroethane	1000	1010		ug/Kg		101	71 - 128
4-Methyl-2-pentanone	12500	10300		ug/Kg		82	67 - 128
Methylcyclohexane	1000	1030		ug/Kg		103	61 - 124
Toluene	1000	1000		ug/Kg		100	80 - 120
Chlorobenzene	1000	1020		ug/Kg		102	80 - 120
Cyclohexane	1000	974		ug/Kg		97	58 - 126
1,2,4-Trichlorobenzene	1000	983		ug/Kg		98	56 - 130
Dibromochloromethane	1000	1050		ug/Kg		105	69 - 125
Xylenes, Total	3000	3010		ug/Kg		100	75 - 120
Tetrachloroethene	1000	1100		ug/Kg		110	73 - 120
cis-1,2-Dichloroethene	1000	1090		ug/Kg		109	80 - 125
trans-1,2-Dichloroethene	1000	1050		ug/Kg		105	80 - 126
Methyl tertiary butyl ether	1000	973		ug/Kg		97	72 - 120
1,3-Dichlorobenzene	1000	1020		ug/Kg		102	75 - 120
Carbon tetrachloride	1000	1140		ug/Kg		114	64 - 134
2-Hexanone	12500	9390		ug/Kg		75	54 - 140
Acetone	12500	10400		ug/Kg		83	41 - 150
Chloroform	1000	1030		ug/Kg		103	80 - 120
Benzene	1000	1020		ug/Kg		102	80 - 120
1,1,1-Trichloroethane	1000	1080		ug/Kg		108	69 - 123
Bromomethane	1000	1430	*+	ug/Kg		143	45 - 140
Chloromethane	1000	1020		ug/Kg		102	56 - 120
Chloroethane	1000	1200		ug/Kg		120	43 - 135
Vinyl chloride	1000	1090		ug/Kg		109	52 - 120
Methylene Chloride	1000	1030		ug/Kg		103	76 - 122
Carbon disulfide	1000	1060		ug/Kg		106	64 - 133
Bromoform	1000	991		ug/Kg		99	51 - 127
Bromodichloromethane	1000	1050		ug/Kg		105	70 - 120
1,1-Dichloroethane	1000	950		ug/Kg		95	79 - 120
1,1-Dichloroethene	1000	1100		ug/Kg		110	73 - 129
Trichlorofluoromethane	1000	1200		ug/Kg		120	55 - 134
Dichlorodifluoromethane	1000	1310	*+	ug/Kg		131	21 - 127

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QC Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 410-228368/8

Matrix: Waste

Analysis Batch: 228368

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Freon 113	1000	1170		ug/Kg		117	64 - 135
1,2-Dichloropropane	1000	938		ug/Kg		94	80 - 120
2-Butanone	12500	7800		ug/Kg		62	57 - 128
1,1,2-Trichloroethane	1000	994		ug/Kg		99	80 - 120
Trichloroethene	1000	1030		ug/Kg		103	80 - 120
Methyl acetate	1000	906		ug/Kg		91	67 - 128
1,1,2,2-Tetrachloroethane	1000	927		ug/Kg		93	69 - 125
1,2-Dichlorobenzene	1000	1020		ug/Kg		102	76 - 120
1,2-Dibromo-3-Chloropropane	1000	791		ug/Kg		79	48 - 134
Isopropylbenzene	1000	1020		ug/Kg		102	77 - 120

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	106		54 - 135
Dibromofluoromethane (Surr)	105		50 - 141
4-Bromofluorobenzene (Surr)	100		50 - 131
Toluene-d8 (Surr)	100		52 - 141

Lab Sample ID: LCSD 410-228368/9

Matrix: Waste

Analysis Batch: 228368

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
cis-1,3-Dichloropropene	1000	995		ug/Kg		99	66 - 120	2	30
trans-1,3-Dichloropropene	1000	1020		ug/Kg		102	68 - 122	0	30
Ethylbenzene	1000	982		ug/Kg		98	78 - 120	0	30
Styrene	1000	987		ug/Kg		99	76 - 120	1	30
1,4-Dichlorobenzene	1000	1020		ug/Kg		102	80 - 120	1	30
1,2-Dibromoethane	1000	981		ug/Kg		98	76 - 120	1	30
1,2-Dichloroethane	1000	992		ug/Kg		99	71 - 128	2	30
4-Methyl-2-pentanone	12500	9910		ug/Kg		79	67 - 128	4	30
Methylcyclohexane	1000	1030		ug/Kg		103	61 - 124	1	30
Toluene	1000	999		ug/Kg		100	80 - 120	1	30
Chlorobenzene	1000	1010		ug/Kg		101	80 - 120	1	30
Cyclohexane	1000	958		ug/Kg		96	58 - 126	2	30
1,2,4-Trichlorobenzene	1000	984		ug/Kg		98	56 - 130	0	30
Dibromochloromethane	1000	1060		ug/Kg		106	69 - 125	1	30
Xylenes, Total	3000	3020		ug/Kg		101	75 - 120	0	30
Tetrachloroethene	1000	1100		ug/Kg		110	73 - 120	0	30
cis-1,2-Dichloroethene	1000	1050		ug/Kg		105	80 - 125	3	30
trans-1,2-Dichloroethene	1000	1030		ug/Kg		103	80 - 126	3	30
Methyl tertiary butyl ether	1000	939		ug/Kg		94	72 - 120	4	30
1,3-Dichlorobenzene	1000	1020		ug/Kg		102	75 - 120	0	30
Carbon tetrachloride	1000	1130		ug/Kg		113	64 - 134	1	30
2-Hexanone	12500	9300		ug/Kg		74	54 - 140	1	30
Acetone	12500	8890		ug/Kg		71	41 - 150	15	30
Chloroform	1000	1010		ug/Kg		101	80 - 120	2	30
Benzene	1000	1000		ug/Kg		100	80 - 120	2	30
1,1,1-Trichloroethane	1000	1060		ug/Kg		106	69 - 123	1	30

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QC Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 410-228368/9

Matrix: Waste

Analysis Batch: 228368

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromomethane	1000	1400		ug/Kg		140	45 - 140	2	30
Chloromethane	1000	985		ug/Kg		99	56 - 120	3	30
Chloroethane	1000	1160		ug/Kg		116	43 - 135	4	30
Vinyl chloride	1000	1060		ug/Kg		106	52 - 120	3	30
Methylene Chloride	1000	988		ug/Kg		99	76 - 122	4	30
Carbon disulfide	1000	1040		ug/Kg		104	64 - 133	2	30
Bromoform	1000	998		ug/Kg		100	51 - 127	1	30
Bromodichloromethane	1000	1040		ug/Kg		104	70 - 120	1	30
1,1-Dichloroethane	1000	941		ug/Kg		94	79 - 120	1	30
1,1-Dichloroethene	1000	1090		ug/Kg		109	73 - 129	1	30
Trichlorofluoromethane	1000	1190		ug/Kg		119	55 - 134	1	30
Dichlorodifluoromethane	1000	1230		ug/Kg		123	21 - 127	6	30
Freon 113	1000	1170		ug/Kg		117	64 - 135	1	30
1,2-Dichloropropane	1000	918		ug/Kg		92	80 - 120	2	30
2-Butanone	12500	7500		ug/Kg		60	57 - 128	4	30
1,1,2-Trichloroethane	1000	966		ug/Kg		97	80 - 120	3	30
Trichloroethene	1000	1040		ug/Kg		104	80 - 120	1	30
Methyl acetate	1000	811		ug/Kg		81	67 - 128	11	30
1,1,2,2-Tetrachloroethane	1000	913		ug/Kg		91	69 - 125	2	30
1,2-Dichlorobenzene	1000	1000		ug/Kg		100	76 - 120	2	30
1,2-Dibromo-3-Chloropropane	1000	807		ug/Kg		81	48 - 134	2	30
Isopropylbenzene	1000	1010		ug/Kg		101	77 - 120	1	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	102		54 - 135
Dibromofluoromethane (Surr)	104		50 - 141
4-Bromofluorobenzene (Surr)	98		50 - 131
Toluene-d8 (Surr)	100		52 - 141

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 410-224088/1-A

Matrix: Waste

Analysis Batch: 224212

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 224088

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1'-Biphenyl	11000	U	11000	5000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
2,4-Dichlorophenol	13000	U	13000	6000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
2,4-Dimethylphenol	11000	U	11000	5000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
2,4-Dinitrophenol	300000	U	300000	50000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
2,4-Dinitrotoluene	50000	U	50000	10000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
2,4,5-Trichlorophenol	11000	U	11000	5000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
2,4,6-Trichlorophenol	11000	U	11000	5000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
2,2'-oxybis[1-chloropropane]	13000	U	13000	6000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Di-n-butyl phthalate	50000	U	50000	20000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Di-n-octyl phthalate	50000	U	50000	20000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Benzo[a]anthracene	5000	U	5000	1000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
1,4-Dioxane	50000	U	50000	10000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Benzo[a]pyrene	5000	U	5000	1000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1

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QC Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 410-224088/1-A

Matrix: Waste

Analysis Batch: 224212

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 224088

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[b]fluoranthene	5000	U	5000	1000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Benzo[g,h,i]perylene	5000	U	5000	1000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Benzo[k]fluoranthene	5000	U	5000	1000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Acenaphthene	5000	U	5000	1000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Acenaphthylene	5000	U	5000	1200	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Acetophenone	15000	U	15000	5000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Anthracene	5000	U	5000	1000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Atrazine	50000	U	50000	20000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Benzaldehyde	50000	U	50000	10000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Butylbenzylphthalate	50000	U	50000	20000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Caprolactam	50000	U	50000	10000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Carbazole	11000	U	11000	5000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Chrysene	5000	U	5000	1000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Dibenz(a,h)anthracene	5000	U	5000	2000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Dibenzofuran	11000	U	11000	5000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Diethyl phthalate	50000	U	50000	20000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Dimethyl phthalate	50000	U	50000	20000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Hexachlorobenzene	5000	U	5000	2000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Hexachlorobutadiene	15000	U	15000	6000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Hexachlorocyclopentadiene	150000	U	150000	50000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Hexachloroethane	50000	U	50000	10000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Fluoranthene	5000	U	5000	1000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Fluorene	5000	U	5000	1000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Indeno[1,2,3-cd]pyrene	5000	U	5000	1200	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Isophorone	20000	U	20000	5000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
N-Nitrosodi-n-propylamine	20000	U	20000	10000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
N-Nitrosodiphenylamine	11000	U	11000	5000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Naphthalene	5000	U	5000	2000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Nitrobenzene	11000	U	11000	5000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Pentachlorophenol	50000	U	50000	20000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Phenanthrene	5000	U	5000	1200	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Phenol	11000	U	11000	5000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Pyrene	5000	U	5000	1000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
2-Chloronaphthalene	10000	U	10000	4000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
2-Chlorophenol	11000	U	11000	5000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
2-Methylnaphthalene	5000	U	5000	1500	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
2-Methylphenol	15000	U	15000	6000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
2-Nitroaniline	15000	U	15000	5000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
2-Nitrophenol	15000	U	15000	6000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
3,3'-Dichlorobenzidine	50000	U	50000	10000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
3-Nitroaniline	50000	U	50000	10000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
4,6-Dinitro-2-methylphenol	150000	U	150000	50000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
4-Bromophenyl-phenylether	11000	U	11000	5000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
4-Methylphenol	15000	U	15000	5000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
4-Nitroaniline	50000	U	50000	10000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
4-Nitrophenol	150000	U	150000	50000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Bis(2-chloroethoxy)methane	11000	U	11000	5000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Bis(2-chloroethyl)ether	11000	U	11000	5000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
Bis(2-ethylhexyl) phthalate	50000	U	50000	20000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1

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QC Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 410-224088/1-A

Matrix: Waste

Analysis Batch: 224212

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 224088

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,6-Dinitrotoluene	11000	U	11000	5000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
4-Chloro-3-methylphenol	15000	U	15000	6000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
4-Chloroaniline	50000	U	50000	10000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1
4-Chlorophenyl-phenyl ether	11000	U	11000	5000	ug/Kg		02/15/22 12:50	02/15/22 23:18	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,4,6-Tribromophenol (Surr)	106		13 - 121	02/15/22 12:50	02/15/22 23:18	1
2-Fluorobiphenyl (Surr)	113	S1+	39 - 100	02/15/22 12:50	02/15/22 23:18	1
2-Fluorophenol (Surr)	102	S1+	26 - 96	02/15/22 12:50	02/15/22 23:18	1
Nitrobenzene-d5 (Surr)	104	S1+	32 - 97	02/15/22 12:50	02/15/22 23:18	1
p-Terphenyl-d14 (Surr)	122	S1+	45 - 108	02/15/22 12:50	02/15/22 23:18	1
Phenol-d5 (Surr)	95		27 - 104	02/15/22 12:50	02/15/22 23:18	1

Lab Sample ID: LCS 410-224088/2-A

Matrix: Waste

Analysis Batch: 224212

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 224088

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1'-Biphenyl	100000	103000		ug/Kg		103	62 - 120
2,4-Dichlorophenol	100000	108000		ug/Kg		108	62 - 120
2,4-Dimethylphenol	100000	104000		ug/Kg		104	65 - 120
2,4-Dinitrophenol	200000	125000	J	ug/Kg		62	44 - 120
2,4-Dinitrotoluene	100000	94500		ug/Kg		94	68 - 120
2,4,5-Trichlorophenol	100000	104000		ug/Kg		104	61 - 120
2,4,6-Trichlorophenol	100000	99600		ug/Kg		100	59 - 120
2,2'-oxybis[1-chloropropane]	100000	96500		ug/Kg		96	48 - 120
Di-n-butyl phthalate	100000	100000		ug/Kg		100	65 - 120
Di-n-octyl phthalate	100000	91400		ug/Kg		91	60 - 125
Benzo[a]anthracene	100000	99900		ug/Kg		100	73 - 120
1,4-Dioxane	100000	101000		ug/Kg		101	26 - 120
Benzo[a]pyrene	100000	107000		ug/Kg		107	80 - 123
Benzo[b]fluoranthene	100000	99000		ug/Kg		99	63 - 120
Benzo[g,h,i]perylene	100000	105000		ug/Kg		105	77 - 120
Benzo[k]fluoranthene	100000	103000		ug/Kg		103	68 - 120
Acenaphthene	100000	104000		ug/Kg		104	61 - 120
Acenaphthylene	100000	102000		ug/Kg		102	69 - 120
Acetophenone	100000	98400		ug/Kg		98	54 - 120
Anthracene	100000	104000		ug/Kg		104	75 - 120
Atrazine	100000	104000		ug/Kg		104	63 - 127
Benzaldehyde	100000	104000		ug/Kg		104	25 - 120
Butylbenzylphthalate	100000	92000		ug/Kg		92	66 - 120
Caprolactam	100000	118000		ug/Kg		118	54 - 120
Carbazole	100000	102000		ug/Kg		102	74 - 120
Chrysene	100000	105000		ug/Kg		105	66 - 120
Dibenz(a,h)anthracene	100000	102000		ug/Kg		102	72 - 120
Dibenzofuran	100000	105000		ug/Kg		105	68 - 120
Diethyl phthalate	100000	99600		ug/Kg		100	65 - 120
Dimethyl phthalate	100000	100000		ug/Kg		100	67 - 120

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QC Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 410-224088/2-A

Matrix: Waste

Analysis Batch: 224212

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 224088

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hexachlorobenzene	100000	102000		ug/Kg		102	58 - 120
Hexachlorobutadiene	100000	99800		ug/Kg		100	48 - 120
Hexachlorocyclopentadiene	100000	96900	J	ug/Kg		97	43 - 120
Hexachloroethane	100000	97800		ug/Kg		98	48 - 120
Fluoranthene	100000	97100		ug/Kg		97	71 - 120
Fluorene	100000	104000		ug/Kg		104	68 - 120
Indeno[1,2,3-cd]pyrene	100000	104000		ug/Kg		104	71 - 122
Isophorone	100000	101000		ug/Kg		101	62 - 120
N-Nitrosodi-n-propylamine	100000	93500		ug/Kg		93	55 - 120
N-Nitrosodiphenylamine	85000	88300		ug/Kg		104	71 - 120
Naphthalene	100000	107000		ug/Kg		107	60 - 120
Nitrobenzene	100000	108000		ug/Kg		108	56 - 120
Pentachlorophenol	200000	196000		ug/Kg		98	41 - 120
Phenanthrene	100000	102000		ug/Kg		102	74 - 120
Phenol	100000	101000		ug/Kg		101	57 - 120
Pyrene	100000	104000		ug/Kg		104	70 - 120
2-Chloronaphthalene	100000	103000		ug/Kg		103	61 - 120
2-Chlorophenol	100000	103000		ug/Kg		103	59 - 120
2-Methylnaphthalene	100000	106000		ug/Kg		106	63 - 120
2-Methylphenol	100000	104000		ug/Kg		104	63 - 120
2-Nitroaniline	100000	98900		ug/Kg		99	64 - 120
2-Nitrophenol	100000	97000		ug/Kg		97	55 - 120
3,3'-Dichlorobenzidine	200000	80000		ug/Kg		40	19 - 120
3-Nitroaniline	100000	76900		ug/Kg		77	31 - 120
4,6-Dinitro-2-methylphenol	200000	152000		ug/Kg		76	59 - 120
4-Bromophenyl-phenylether	100000	101000		ug/Kg		101	65 - 120
4-Methylphenol	100000	95700		ug/Kg		96	56 - 120
4-Nitroaniline	100000	92400		ug/Kg		92	59 - 120
4-Nitrophenol	200000	176000		ug/Kg		88	58 - 120
Bis(2-chloroethoxy)methane	100000	104000		ug/Kg		104	55 - 120
Bis(2-chloroethyl)ether	100000	101000		ug/Kg		101	49 - 120
Bis(2-ethylhexyl) phthalate	100000	97800		ug/Kg		98	65 - 120
2,6-Dinitrotoluene	100000	98600		ug/Kg		99	67 - 120
4-Chloro-3-methylphenol	100000	102000		ug/Kg		102	67 - 120
4-Chloroaniline	100000	56800		ug/Kg		57	10 - 120
4-Chlorophenyl-phenyl ether	100000	106000		ug/Kg		106	64 - 120

Surrogate	LCS %Recovery	LCS Qualifier	Limits
2,4,6-Tribromophenol (Surr)	102		13 - 121
2-Fluorobiphenyl (Surr)	104	S1+	39 - 100
2-Fluorophenol (Surr)	103	S1+	26 - 96
Nitrobenzene-d5 (Surr)	100	S1+	32 - 97
p-Terphenyl-d14 (Surr)	111	S1+	45 - 108
Phenol-d5 (Surr)	96		27 - 104

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QC Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 410-224088/3-A

Matrix: Waste

Analysis Batch: 224212

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 224088

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1'-Biphenyl	100000	108000		ug/Kg		108	62 - 120	5	30
2,4-Dichlorophenol	100000	112000		ug/Kg		112	62 - 120	3	30
2,4-Dimethylphenol	100000	109000		ug/Kg		109	65 - 120	4	30
2,4-Dinitrophenol	200000	149000	J	ug/Kg		75	44 - 120	18	30
2,4-Dinitrotoluene	100000	96400		ug/Kg		96	68 - 120	2	30
2,4,5-Trichlorophenol	100000	107000		ug/Kg		107	61 - 120	2	30
2,4,6-Trichlorophenol	100000	108000		ug/Kg		108	59 - 120	8	30
2,2'-oxybis[1-chloropropane]	100000	99800		ug/Kg		100	48 - 120	3	30
Di-n-butyl phthalate	100000	100000		ug/Kg		100	65 - 120	0	30
Di-n-octyl phthalate	100000	91100		ug/Kg		91	60 - 125	0	30
Benzo[a]anthracene	100000	100000		ug/Kg		100	73 - 120	0	30
1,4-Dioxane	100000	98700		ug/Kg		99	26 - 120	2	30
Benzo[a]pyrene	100000	109000		ug/Kg		109	80 - 123	2	30
Benzo[b]fluoranthene	100000	98900		ug/Kg		99	63 - 120	0	30
Benzo[g,h,i]perylene	100000	108000		ug/Kg		108	77 - 120	3	30
Benzo[k]fluoranthene	100000	106000		ug/Kg		106	68 - 120	2	30
Acenaphthene	100000	110000		ug/Kg		110	61 - 120	6	30
Acenaphthylene	100000	108000		ug/Kg		108	69 - 120	6	30
Acetophenone	100000	99300		ug/Kg		99	54 - 120	1	30
Anthracene	100000	109000		ug/Kg		109	75 - 120	5	30
Atrazine	100000	105000		ug/Kg		105	63 - 127	0	30
Benzaldehyde	100000	103000		ug/Kg		103	25 - 120	1	30
Butylbenzylphthalate	100000	92100		ug/Kg		92	66 - 120	0	30
Caprolactam	100000	112000		ug/Kg		112	54 - 120	5	30
Carbazole	100000	103000		ug/Kg		103	74 - 120	2	30
Chrysene	100000	106000		ug/Kg		106	66 - 120	1	30
Dibenz(a,h)anthracene	100000	105000		ug/Kg		105	72 - 120	3	30
Dibenzofuran	100000	108000		ug/Kg		108	68 - 120	3	30
Diethyl phthalate	100000	106000		ug/Kg		106	65 - 120	6	30
Dimethyl phthalate	100000	108000		ug/Kg		108	67 - 120	8	30
Hexachlorobenzene	100000	100000		ug/Kg		100	58 - 120	2	30
Hexachlorobutadiene	100000	105000		ug/Kg		105	48 - 120	5	30
Hexachlorocyclopentadiene	100000	106000	J	ug/Kg		106	43 - 120	9	30
Hexachloroethane	100000	103000		ug/Kg		103	48 - 120	5	30
Fluoranthene	100000	98700		ug/Kg		99	71 - 120	2	30
Fluorene	100000	109000		ug/Kg		109	68 - 120	4	30
Indeno[1,2,3-cd]pyrene	100000	105000		ug/Kg		105	71 - 122	0	30
Isophorone	100000	104000		ug/Kg		104	62 - 120	3	30
N-Nitrosodi-n-propylamine	100000	99400		ug/Kg		99	55 - 120	6	30
N-Nitrosodiphenylamine	85000	88600		ug/Kg		104	71 - 120	0	30
Naphthalene	100000	108000		ug/Kg		108	60 - 120	1	30
Nitrobenzene	100000	109000		ug/Kg		109	56 - 120	2	30
Pentachlorophenol	200000	194000		ug/Kg		97	41 - 120	1	30
Phenanthrene	100000	107000		ug/Kg		107	74 - 120	5	30
Phenol	100000	106000		ug/Kg		106	57 - 120	5	30
Pyrene	100000	107000		ug/Kg		107	70 - 120	2	30
2-Chloronaphthalene	100000	108000		ug/Kg		108	61 - 120	4	30
2-Chlorophenol	100000	104000		ug/Kg		104	59 - 120	1	30

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QC Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 410-224088/3-A

Matrix: Waste

Analysis Batch: 224212

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 224088

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Methylnaphthalene	100000	108000		ug/Kg		108	63 - 120	2	30
2-Methylphenol	100000	108000		ug/Kg		108	63 - 120	4	30
2-Nitroaniline	100000	103000		ug/Kg		103	64 - 120	4	30
2-Nitrophenol	100000	102000		ug/Kg		102	55 - 120	5	30
3,3'-Dichlorobenzidine	200000	81100		ug/Kg		41	19 - 120	1	30
3-Nitroaniline	100000	83600		ug/Kg		84	31 - 120	8	30
4,6-Dinitro-2-methylphenol	200000	164000		ug/Kg		82	59 - 120	8	30
4-Bromophenyl-phenylether	100000	102000		ug/Kg		102	65 - 120	1	30
4-Methylphenol	100000	99200		ug/Kg		99	56 - 120	4	30
4-Nitroaniline	100000	95800		ug/Kg		96	59 - 120	4	30
4-Nitrophenol	200000	198000		ug/Kg		99	58 - 120	12	30
Bis(2-chloroethoxy)methane	100000	105000		ug/Kg		105	55 - 120	1	30
Bis(2-chloroethyl)ether	100000	104000		ug/Kg		104	49 - 120	3	30
Bis(2-ethylhexyl) phthalate	100000	98000		ug/Kg		98	65 - 120	0	30
2,6-Dinitrotoluene	100000	98200		ug/Kg		98	67 - 120	0	30
4-Chloro-3-methylphenol	100000	103000		ug/Kg		103	67 - 120	1	30
4-Chloroaniline	100000	60600		ug/Kg		61	10 - 120	6	30
4-Chlorophenyl-phenyl ether	100000	109000		ug/Kg		109	64 - 120	3	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
2,4,6-Tribromophenol (Surr)	106		13 - 121
2-Fluorobiphenyl (Surr)	108	S1+	39 - 100
2-Fluorophenol (Surr)	103	S1+	26 - 96
Nitrobenzene-d5 (Surr)	100	S1+	32 - 97
p-Terphenyl-d14 (Surr)	112	S1+	45 - 108
Phenol-d5 (Surr)	96		27 - 104

Lab Sample ID: 500-210676-1 MS

Matrix: Waste

Analysis Batch: 224956

Client Sample ID: LNAPL-010622-DS-01

Prep Type: Total/NA

Prep Batch: 224088

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1'-Biphenyl	110000	U H F1	99200	131000	F1	ug/Kg		132	62 - 120
2,4-Dichlorophenol	120000	U H F1	99200	166000	F1	ug/Kg		167	62 - 120
2,4-Dimethylphenol	110000	U H F1	99200	157000	F1	ug/Kg		158	65 - 120
2,4-Dinitrophenol	2900000	U H	198000	3000000	U	ug/Kg		NC	44 - 120
2,4-Dinitrotoluene	480000	U H F1	99200	553000	F1	ug/Kg		557	68 - 120
2,4,5-Trichlorophenol	110000	U H F1	99200	136000	F1	ug/Kg		137	61 - 120
2,4,6-Trichlorophenol	110000	U H F1	99200	138000	F1	ug/Kg		139	59 - 120
2,2'-oxybis[1-chloropropane]	120000	U H	99200	99100	J	ug/Kg		100	48 - 120
Di-n-butyl phthalate	480000	U H	99200	500000	U	ug/Kg		NC	65 - 120
Di-n-octyl phthalate	480000	U H	99200	500000	U	ug/Kg		NC	60 - 125
Benzo[a]anthracene	280000	H	99200	395000		ug/Kg		116	73 - 120
1,4-Dioxane	480000	U H F1	99200	105000	J	ug/Kg		106	26 - 120
Benzo[a]pyrene	130000	H F1	99200	325000	F1	ug/Kg		193	80 - 123
Benzo[b]fluoranthene	140000	H F1	99200	387000	F1	ug/Kg		251	63 - 120
Benzo[g,h,i]perylene	120000	H	99200	238000		ug/Kg		118	77 - 120
Benzo[k]fluoranthene	25000	J H F1	99200	18200	J F1	ug/Kg		-7	68 - 120

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QC Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 500-210676-1 MS

Matrix: Waste

Analysis Batch: 224956

Client Sample ID: LNAPL-010622-DS-01

Prep Type: Total/NA

Prep Batch: 224088

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Acenaphthene	48000	U H F1	99200	320000	F1	ug/Kg		322	61 - 120
Acenaphthylene	48000	U H F1	99200	225000	F1	ug/Kg		227	69 - 120
Acetophenone	140000	U H F1	99200	188000	F1	ug/Kg		189	54 - 120
Anthracene	220000	H	99200	342000		ug/Kg		119	75 - 120
Atrazine	480000	U H	99200	500000	U	ug/Kg		NC	63 - 127
Benzaldehyde	480000	U H F1	99200	153000	J F1	ug/Kg		154	25 - 120
Butylbenzylphthalate	480000	U H	99200	500000	U	ug/Kg		NC	66 - 120
Caprolactam	480000	U H F1	99200	448000	J F1	ug/Kg		452	54 - 120
Carbazole	110000	U H F1	99200	191000	F1	ug/Kg		192	74 - 120
Chrysene	620000	H	99200	706000	4	ug/Kg		90	66 - 120
Dibenz(a,h)anthracene	48000	U H F1	99200	166000	F1	ug/Kg		168	72 - 120
Dibenzofuran	310000	H	99200	427000		ug/Kg		114	68 - 120
Diethyl phthalate	480000	U H	99200	500000	U	ug/Kg		NC	65 - 120
Dimethyl phthalate	480000	U H	99200	500000	U	ug/Kg		NC	67 - 120
Hexachlorobenzene	48000	U H	99200	101000		ug/Kg		102	58 - 120
Hexachlorobutadiene	140000	U H	99200	96200	J	ug/Kg		97	48 - 120
Hexachlorocyclopentadiene	1400000	U H	99200	1500000	U	ug/Kg		NC	43 - 120
Hexachloroethane	480000	U H F1	99200	754000	F1	ug/Kg		760	48 - 120
Fluoranthene	260000	H	99200	370000		ug/Kg		115	71 - 120
Fluorene	630000	H	99200	753000	4	ug/Kg		120	68 - 120
Indeno[1,2,3-cd]pyrene	58000	H	99200	167000		ug/Kg		111	71 - 122
Isophorone	190000	U H F1	99200	183000	J F1	ug/Kg		185	62 - 120
N-Nitrosodi-n-propylamine	190000	U H F1	99200	285000	F1	ug/Kg		288	55 - 120
N-Nitrosodiphenylamine	110000	U H F1	84300	815000	F1	ug/Kg		967	71 - 120
Naphthalene	48000	U H F1	99200	325000	F1	ug/Kg		328	60 - 120
Nitrobenzene	110000	U H F1	99200	820000	F1	ug/Kg		826	56 - 120
Pentachlorophenol	480000	U H F1	198000	331000	J	ug/Kg		NC	41 - 120
Phenanthrene	2900000	H	99200	3060000	4	ug/Kg		169	74 - 120
Phenol	110000	U H	99200	101000	J	ug/Kg		102	57 - 120
Pyrene	920000	H	99200	1080000	4	ug/Kg		169	70 - 120
2-Chloronaphthalene	96000	U H	99200	114000		ug/Kg		115	61 - 120
2-Chlorophenol	110000	U H	99200	101000	J	ug/Kg		102	59 - 120
2-Methylnaphthalene	7100000	H	99200	7360000	4	ug/Kg		299	63 - 120
2-Methylphenol	140000	U H F1	99200	150000	U F1	ug/Kg		0	63 - 120
2-Nitroaniline	140000	U H F1 F2	99200	115000	J	ug/Kg		116	64 - 120
2-Nitrophenol	140000	U H F1	99200	126000	J F1	ug/Kg		127	55 - 120
3,3'-Dichlorobenzidine	480000	U H	198000	117000	J	ug/Kg		59	19 - 120
3-Nitroaniline	480000	U H F1	99200	298000	J F1	ug/Kg		300	31 - 120
4,6-Dinitro-2-methylphenol	1400000	U H	198000	1500000	U	ug/Kg		NC	59 - 120
4-Bromophenyl-phenylether	110000	U H F1	99200	121000	F1	ug/Kg		122	65 - 120
4-Methylphenol	140000	U H	99200	106000	J	ug/Kg		107	56 - 120
4-Nitroaniline	480000	U H F1	99200	135000	J F1	ug/Kg		136	59 - 120
4-Nitrophenol	1400000	U H	198000	1500000	U	ug/Kg		NC	58 - 120
Bis(2-chloroethoxy)methane	110000	U H F1	99200	196000	F1	ug/Kg		197	55 - 120
Bis(2-chloroethyl)ether	110000	U H	99200	112000		ug/Kg		113	49 - 120
Bis(2-ethylhexyl) phthalate	480000	U H	99200	500000	U	ug/Kg		NC	65 - 120
2,6-Dinitrotoluene	110000	U H F1	99200	333000	F1	ug/Kg		335	67 - 120
4-Chloro-3-methylphenol	140000	U H F1	99200	238000	F1	ug/Kg		239	67 - 120
4-Chloroaniline	480000	U H F1 F2	99200	107000	J	ug/Kg		107	10 - 120

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QC Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 500-210676-1 MS

Matrix: Waste

Analysis Batch: 224956

Client Sample ID: LNAPL-010622-DS-01

Prep Type: Total/NA

Prep Batch: 224088

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Chlorophenyl-phenyl ether	110000	U H F1	99200	125000	F1	ug/Kg		126	64 - 120
Surrogate	%Recovery	MS Qualifier	Limits						
2,4,6-Tribromophenol (Surr)	86		13 - 121						
2-Fluorobiphenyl (Surr)	91		39 - 100						
2-Fluorophenol (Surr)	94		26 - 96						
Nitrobenzene-d5 (Surr)	121	S1+	32 - 97						
p-Terphenyl-d14 (Surr)	96		45 - 108						
Phenol-d5 (Surr)	90		27 - 104						

Lab Sample ID: 500-210676-1 MSD

Matrix: Waste

Analysis Batch: 224956

Client Sample ID: LNAPL-010622-DS-01

Prep Type: Total/NA

Prep Batch: 224088

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
1,1'-Biphenyl	110000	U H F1	97500	141000	F1	ug/Kg		145	62 - 120	7	30
2,4-Dichlorophenol	120000	U H F1	97500	154000	F1	ug/Kg		158	62 - 120	7	30
2,4-Dimethylphenol	110000	U H F1	97500	122000	F1	ug/Kg		125	65 - 120	25	30
2,4-Dinitrophenol	2900000	U H	195000	2900000	U	ug/Kg		NC	44 - 120	NC	30
2,4-Dinitrotoluene	480000	U H F1	97500	574000	F1	ug/Kg		589	68 - 120	4	30
2,4,5-Trichlorophenol	110000	U H F1	97500	137000	F1	ug/Kg		140	61 - 120	1	30
2,4,6-Trichlorophenol	110000	U H F1	97500	141000	F1	ug/Kg		144	59 - 120	2	30
2,2'-oxybis[1-chloropropane]	120000	U H	97500	99000	J	ug/Kg		102	48 - 120	0	30
Di-n-butyl phthalate	480000	U H	97500	490000	U	ug/Kg		NC	65 - 120	NC	30
Di-n-octyl phthalate	480000	U H	97500	490000	U	ug/Kg		NC	60 - 125	NC	30
Benzo[a]anthracene	280000	H	97500	394000		ug/Kg		117	73 - 120	0	30
1,4-Dioxane	480000	U H F1	97500	490000	U F1	ug/Kg		0	26 - 120	NC	30
Benzo[a]pyrene	130000	H F1	97500	312000	F1	ug/Kg		182	80 - 123	4	30
Benzo[b]fluoranthene	140000	H F1	97500	378000	F1	ug/Kg		246	63 - 120	2	30
Benzo[g,h,i]perylene	120000	H	97500	223000		ug/Kg		104	77 - 120	7	30
Benzo[k]fluoranthene	25000	J H F1	97500	23500	J F1	ug/Kg		-2	68 - 120	26	30
Acenaphthene	48000	U H F1	97500	309000	F1	ug/Kg		317	61 - 120	3	30
Acenaphthylene	48000	U H F1	97500	215000	F1	ug/Kg		220	69 - 120	5	30
Acetophenone	140000	U H F1	97500	179000	F1	ug/Kg		183	54 - 120	5	30
Anthracene	220000	H	97500	327000		ug/Kg		105	75 - 120	4	30
Atrazine	480000	U H	97500	218000	J	ug/Kg		NC	63 - 127	NC	30
Benzaldehyde	480000	U H F1	97500	154000	J F1	ug/Kg		158	25 - 120	1	30
Butylbenzylphthalate	480000	U H	97500	490000	U	ug/Kg		NC	66 - 120	NC	30
Caprolactam	480000	U H F1	97500	500000	F1	ug/Kg		514	54 - 120	11	30
Carbazole	110000	U H F1	97500	198000	F1	ug/Kg		203	74 - 120	4	30
Chrysene	620000	H	97500	702000	4	ug/Kg		87	66 - 120	1	30
Dibenz(a,h)anthracene	48000	U H F1	97500	167000	F1	ug/Kg		172	72 - 120	1	30
Dibenzofuran	310000	H	97500	423000		ug/Kg		112	68 - 120	1	30
Diethyl phthalate	480000	U H	97500	490000	U	ug/Kg		NC	65 - 120	NC	30
Dimethyl phthalate	480000	U H	97500	490000	U	ug/Kg		NC	67 - 120	NC	30
Hexachlorobenzene	48000	U H	97500	78400		ug/Kg		80	58 - 120	25	30
Hexachlorobutadiene	140000	U H	97500	104000	J	ug/Kg		106	48 - 120	7	30
Hexachlorocyclopentadiene	1400000	U H	97500	1500000	U	ug/Kg		NC	43 - 120	NC	30

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QC Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 500-210676-1 MSD

Matrix: Waste

Analysis Batch: 224956

Client Sample ID: LNAPL-010622-DS-01

Prep Type: Total/NA

Prep Batch: 224088

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hexachloroethane	480000	U H F1	97500	709000	F1	ug/Kg		728	48 - 120	6	30
Fluoranthene	260000	H	97500	359000		ug/Kg		107	71 - 120	3	30
Fluorene	630000	H	97500	748000	4	ug/Kg		117	68 - 120	1	30
Indeno[1,2,3-cd]pyrene	58000	H	97500	162000		ug/Kg		107	71 - 122	3	30
Isophorone	190000	U H F1	97500	163000	J F1	ug/Kg		167	62 - 120	12	30
N-Nitrosodi-n-propylamine	190000	U H F1	97500	328000	F1	ug/Kg		337	55 - 120	14	30
N-Nitrosodiphenylamine	110000	U H F1	82800	823000	F1	ug/Kg		993	71 - 120	1	30
Naphthalene	48000	U H F1	97500	293000	F1	ug/Kg		301	60 - 120	10	30
Nitrobenzene	110000	U H F1	97500	790000	F1	ug/Kg		811	56 - 120	4	30
Pentachlorophenol	480000	U H F1	195000	324000	J F1	ug/Kg		166	41 - 120	2	30
Phenanthrene	2900000	H	97500	3060000	4	ug/Kg		171	74 - 120	0	30
Phenol	110000	U H	97500	94100	J	ug/Kg		97	57 - 120	8	30
Pyrene	920000	H	97500	1030000	4	ug/Kg		119	70 - 120	5	30
2-Chloronaphthalene	96000	U H	97500	106000		ug/Kg		109	61 - 120	7	30
2-Chlorophenol	110000	U H	97500	94100	J	ug/Kg		97	59 - 120	7	30
2-Methylnaphthalene	7100000	H	97500	7240000	4	ug/Kg		187	63 - 120	2	30
2-Methylphenol	140000	U H F1	97500	97000	J	ug/Kg		100	63 - 120	NC	30
2-Nitroaniline	140000	U H F1 F2	97500	194000	F1 F2	ug/Kg		199	64 - 120	51	30
2-Nitrophenol	140000	U H F1	97500	132000	J F1	ug/Kg		135	55 - 120	5	30
3,3'-Dichlorobenzidine	480000	U H	195000	122000	J	ug/Kg		63	19 - 120	5	30
3-Nitroaniline	480000	U H F1	97500	297000	J F1	ug/Kg		305	31 - 120	0	30
4,6-Dinitro-2-methylphenol	1400000	U H	195000	1500000	U	ug/Kg		NC	59 - 120	NC	30
4-Bromophenyl-phenylether	110000	U H F1	97500	109000	J	ug/Kg		112	65 - 120	10	30
4-Methylphenol	140000	U H	97500	102000	J	ug/Kg		105	56 - 120	4	30
4-Nitroaniline	480000	U H F1	97500	136000	J F1	ug/Kg		140	59 - 120	1	30
4-Nitrophenol	1400000	U H	195000	1500000	U	ug/Kg		NC	58 - 120	NC	30
Bis(2-chloroethoxy)methane	110000	U H F1	97500	181000	F1	ug/Kg		186	55 - 120	8	30
Bis(2-chloroethyl)ether	110000	U H	97500	101000	J	ug/Kg		103	49 - 120	11	30
Bis(2-ethylhexyl) phthalate	480000	U H	97500	490000	U	ug/Kg		NC	65 - 120	NC	30
2,6-Dinitrotoluene	110000	U H F1	97500	311000	F1	ug/Kg		319	67 - 120	7	30
4-Chloro-3-methylphenol	140000	U H F1	97500	215000	F1	ug/Kg		221	67 - 120	10	30
4-Chloroaniline	480000	U H F1 F2	97500	154000	J F1 F2	ug/Kg		158	10 - 120	36	30
4-Chlorophenyl-phenyl ether	110000	U H F1	97500	110000		ug/Kg		113	64 - 120	13	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
2,4,6-Tribromophenol (Surr)	86		13 - 121
2-Fluorobiphenyl (Surr)	91		39 - 100
2-Fluorophenol (Surr)	93		26 - 96
Nitrobenzene-d5 (Surr)	118	S1+	32 - 97
p-Terphenyl-d14 (Surr)	92		45 - 108
Phenol-d5 (Surr)	87		27 - 104

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QC Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Lab Sample ID: MB 410-223608/1-A

Matrix: Waste

Analysis Batch: 227555

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 223608

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
1-Methylnaphthalene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
17a(H)-diahopane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
2-Methylnaphthalene	490	U	490	290	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
A1-C20-TAS	490	U	490	97	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
A2-C21-TAS	490	U	490	97	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
A3-C26-TAS(20S)	490	U	490	97	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
A4-C26/C27-TAS	490	U	490	97	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
A5-C27-TAS(20R)	490	U	490	97	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
A6-TAS(20S)	490	U	490	97	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
A7-TAS(20R)	490	U	490	97	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Acenaphthene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Acenaphthylene	490	U	490	97	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Anthracene	490	U	490	97	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Benzo[a]anthracene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Benzo[a]pyrene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Benzo[e]pyrene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Benzo[g,h,i]perylene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Benzo[b]fluoranthene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Benzo[k]fluoranthene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Biphenyl	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C1-Benzo(a)anthracenes/Chrysenes	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C1-Decalins	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C1-Dibenzothiophenes	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C1-Fluoranthene/Pyrenes	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C1-Fluorenes	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C1-Naphthalenes	680	U	680	390	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C1-Naphthobenzothiophenes	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C1-Phenanthrenes/Anthracenes	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C2-Benzo(a)anthracenes/Chrysenes	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C2-Decalins	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C2-Dibenzothiophenes	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C2-Fluoranthenes/Pyrene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C2-Fluorenes	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C2-Naphthalenes	680	U	680	390	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C2-Naphthobenzothiophenes	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C2-Phenanthrenes/Anthracenes	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C3-Benzo(a)Anthracenes/Chrysenes	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C3-Decalins	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C3-Dibenzothiophenes	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C3-Fluoranthenes/Pyrene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C3-Fluorenes	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C3-Naphthalenes	680	U	680	390	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C3-Naphthobenzothiophenes	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C3-Phenanthrenes/Anthracenes	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C4-Benzo(a)anthracenes/Chrysenes	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C4-Decalins	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C4-Dibenzothiophenes	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C4-Fluoranthenes/Pyrene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1

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QC Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Lab Sample ID: MB 410-223608/1-A

Matrix: Waste

Analysis Batch: 227555

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 223608

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
C4-Naphthalenes	680	U	680	390	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
C4-Phenanthrenes/Anthracenes	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Cholestane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Chrysene	490	U	490	97	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
cis/trans Decalin	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Dibenz(a,h)anthracene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Dibenzofuran	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Dibenzothiophene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Fluoranthene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Fluorene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Indeno[1,2,3-cd]pyrene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Naphthalene	680	U	680	390	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Naphthobenzothiophene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Perylene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Phenanthrene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Pyrene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
Retene	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
S12-Cholestane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
S14-Cholestane(20R)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
S15-Cholestane(20S)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
S18-Ethylcholestane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
S19-Ethylcholestane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
S20-Methylcholestane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
S22-Methylcholestane(20R)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
S23-Methylcholestane(20S)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
S24-Methylcholestane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
S25-Ethylcholestane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
S26-Ethylcholestane(20R)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
S27-Ethylcholestane(20S)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
S28-Ethylcholestane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
S4-Diacholestane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
S5-Diacholestane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T10-C29Tricyclitriterpane(R)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T11-Trisnorhopane(TS)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T12-Trisnorhopane(TM)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T15-C29-Norhopane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T16-Norneohopane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T17-C30-Normoretane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T18-C30-Oleanane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T19-C30-Hopane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T20-Moretane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T21-C31-Homohopane(S)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T22-C31-Homohopane(R)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T22a-Gammacerane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T26-C32-Bishomohopane(S)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T27-C32-Bishomohopane(R)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T30-C33-Trishomohopane(S)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T31-C33-Trishomohopane(R)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T32-Tetrakishomohopane(S)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1

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QC Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Lab Sample ID: MB 410-223608/1-A

Matrix: Waste

Analysis Batch: 227555

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 223608

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
T33-Tetrakishomohopane(R)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T34-Pentakishomohopane(S)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T35-Pentakishomohopane(R)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T4-C23Diterpane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T5-C24Diterpane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T6-C25Diterpane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T6a-C24Tetracyclic Terpane	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T6b-Tricyclic Terpane(S)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T6c-Tricyclic Terpane(R)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T7-C28Tricyclitriterpane(S)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T8-C28Tricyclitriterpane(R)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1
T9-C29Tricyclitriterpane(S)	490	U	490	190	ug/Kg		02/14/22 13:13	02/25/22 13:40	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene-d10 (Surr)	106	S1+	45 - 99	02/14/22 13:13	02/25/22 13:40	1
Benzo(a)pyrene-d12 (Surr)	86		38 - 109	02/14/22 13:13	02/25/22 13:40	1
Fluoranthene-d10 (Surr)	125	S1+	46 - 121	02/14/22 13:13	02/25/22 13:40	1

Lab Sample ID: LCS 410-223608/2-A

Matrix: Waste

Analysis Batch: 227555

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 223608

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1-Methylnaphthalene	1950	1610	*3	ug/Kg		83	53 - 101
2-Methylnaphthalene	1950	1660	*3	ug/Kg		85	63 - 114
Acenaphthene	1950	1830	*3	ug/Kg		94	55 - 112
Acenaphthylene	1960	1720	*3	ug/Kg		88	53 - 102
Anthracene	1960	1600	*3	ug/Kg		82	66 - 115
Benzo[a]anthracene	1960	1780		ug/Kg		91	71 - 127
Benzo[a]pyrene	1950	1640	*3	ug/Kg		84	67 - 124
Benzo[e]pyrene	2100	1910	*3	ug/Kg		91	80 - 120
Benzo[g,h,i]perylene	1970	1590	*3	ug/Kg		81	66 - 116
Benzo[b]fluoranthene	1970	2010	*3	ug/Kg		102	71 - 134
Benzo[k]fluoranthene	1960	2060	*3	ug/Kg		105	68 - 122
Biphenyl	1950	1800	*3	ug/Kg		92	70 - 130
Chrysene	1970	1670		ug/Kg		85	65 - 113
cis/trans Decalin	1960	1790	*3	ug/Kg		92	70 - 130
Dibenz(a,h)anthracene	1960	1320	*3	ug/Kg		67	66 - 119
Dibenzofuran	1960	1840	*3	ug/Kg		94	70 - 130
Dibenzothiophene	1970	1790	*3	ug/Kg		91	70 - 130
Fluoranthene	1950	1910	*3	ug/Kg		98	65 - 126
Fluorene	1970	1520	*3	ug/Kg		77	67 - 118
Indeno[1,2,3-cd]pyrene	1960	1440	*3	ug/Kg		74	69 - 123
Naphthalene	1950	1440	*3	ug/Kg		74	60 - 101
Perylene	1950	2890	*+ *3	ug/Kg		148	80 - 120
Phenanthrene	1970	1680	*3	ug/Kg		85	67 - 111
Pyrene	1960	1770		ug/Kg		90	61 - 119
Retene	1960	2450	*3	ug/Kg		125	70 - 130

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QC Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Lab Sample ID: LCS 410-223608/2-A

Matrix: Waste

Analysis Batch: 227555

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 223608

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
1-Methylnaphthalene-d10 (Surr)	147	S1+ *3	45 - 99
Benzo(a)pyrene-d12 (Surr)	90	*3	38 - 109
Fluoranthene-d10 (Surr)	107	*3	46 - 121

Lab Sample ID: LCSD 410-223608/3-A

Matrix: Waste

Analysis Batch: 227555

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 223608

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec.		RPD	Limit
							Limits			
1-Methylnaphthalene	1910	1740		ug/Kg		91	53 - 101		8	30
2-Methylnaphthalene	1910	1800		ug/Kg		94	63 - 114		8	30
Acenaphthene	1910	1850		ug/Kg		97	55 - 112		1	30
Acenaphthylene	1920	1490		ug/Kg		78	53 - 102		15	30
Anthracene	1920	1400		ug/Kg		73	66 - 115		13	30
Benzo[a]anthracene	1910	1770		ug/Kg		92	71 - 127		1	30
Benzo[a]pyrene	1910	1540		ug/Kg		80	67 - 124		7	30
Benzo[e]pyrene	2060	2140		ug/Kg		104	80 - 120		11	30
Benzo[g,h,i]perylene	1930	1650		ug/Kg		86	66 - 116		4	30
Benzo[b]fluoranthene	1930	1930		ug/Kg		100	71 - 134		4	30
Benzo[k]fluoranthene	1920	2010		ug/Kg		105	68 - 122		2	30
Biphenyl	1910	1910		ug/Kg		100	70 - 130		6	30
Chrysene	1930	1650		ug/Kg		86	65 - 113		1	30
cis/trans Decalin	1920	1950		ug/Kg		102	70 - 130		8	30
Dibenz(a,h)anthracene	1920	1550		ug/Kg		81	66 - 119		16	30
Dibenzofuran	1920	1820		ug/Kg		95	70 - 130		1	30
Dibenzothiophene	1930	1910		ug/Kg		99	70 - 130		7	30
Fluoranthene	1910	2080		ug/Kg		109	65 - 126		9	30
Fluorene	1930	1490		ug/Kg		77	67 - 118		2	30
Indeno[1,2,3-cd]pyrene	1920	1590		ug/Kg		83	69 - 123		9	30
Naphthalene	1910	1620		ug/Kg		85	60 - 101		12	30
Perylene	1910	2930	*+	ug/Kg		153	80 - 120		2	30
Phenanthrene	1930	1790		ug/Kg		93	67 - 111		7	30
Pyrene	1920	2070		ug/Kg		108	61 - 119		15	30
Retene	1920	3090	*+	ug/Kg		161	70 - 130		23	30

Surrogate	LCSD LCSD		Limits
	%Recovery	Qualifier	
1-Methylnaphthalene-d10 (Surr)	503	S1+	45 - 99
Benzo(a)pyrene-d12 (Surr)	84		38 - 109
Fluoranthene-d10 (Surr)	120		46 - 121

Lab Sample ID: 500-210676-1 MS

Matrix: Waste

Analysis Batch: 227555

Client Sample ID: LNAPL-010622-DS-01

Prep Type: Total/NA

Prep Batch: 223608

Analyte	Sample Result	Sample Qualifier	Spike Added	MS MS		Unit	D	%Rec	%Rec.	
				Result	Qualifier				Limits	
1-Methylnaphthalene	4900000	H F2	1960	9200000	4	ug/Kg		21783	53 - 101	
2-Methylnaphthalene	8400000	H F2	1960	15800000	E 4	ug/Kg		37629	63 - 114	

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QC Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Lab Sample ID: 500-210676-1 MS

Matrix: Waste

Analysis Batch: 227555

Client Sample ID: LNAPL-010622-DS-01

Prep Type: Total/NA

Prep Batch: 223608

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Acenaphthene	230000	H F2	1960	409000	4	ug/Kg		8982	55 - 112
Acenaphthylene	47000	U H	1970	49000	U	ug/Kg		NC	53 - 102
Anthracene	280000	H F2	1970	480000	4	ug/Kg		10213	66 - 115
Benzo[a]anthracene	320000	H F2	1970	597000	4	ug/Kg		13939	71 - 127
Benzo[a]pyrene	150000	H F2	1960	278000	4	ug/Kg		6601	67 - 124
Benzo[e]pyrene	310000	H F2	2120	598000	4	ug/Kg		13382	80 - 120
Benzo[g,h,i]perylene	95000	H F2	1980	222000	4	ug/Kg		6401	66 - 116
Benzo[b]fluoranthene	190000	H F2	1980	369000	4	ug/Kg		8928	71 - 134
Benzo[k]fluoranthene	47000	U H	1970	49000	U	ug/Kg		NC	68 - 122
Biphenyl	47000	U H	1960	49000	U	ug/Kg		NC	70 - 130
Chrysene	670000	H F2	1980	1240000	4	ug/Kg		28338	65 - 113
cis/trans Decalin	920000	H F2	1970	1860000	4	ug/Kg		47698	70 - 130
Dibenz(a,h)anthracene	35000	J H F2	1970	81800	4	ug/Kg		2354	66 - 119
Dibenzofuran	330000	H F2	1970	587000	4	ug/Kg		12929	70 - 130
Dibenzothiophene	1100000	H F2	1980	1910000	4	ug/Kg		42288	70 - 130
Fluoranthene	370000	H F2	1960	633000	4	ug/Kg		13535	65 - 126
Fluorene	560000	H F2	1980	935000	4	ug/Kg		18991	67 - 118
Indeno[1,2,3-cd]pyrene	38000	J H F2	1970	89100	4	ug/Kg		2591	69 - 123
Naphthalene	270000	H F2	1960	523000	4	ug/Kg		13057	60 - 101
Perylene	47000	U H *+	1960	49000	U	ug/Kg		NC	80 - 120
Phenanthrene	3400000	H F2	1980	6410000	4	ug/Kg		15247	67 - 111
Pyrene	1400000	H F2	1970	2420000	4	ug/Kg		53959	61 - 119
Retene	47000	U H *+	1970	49000	U	ug/Kg		NC	70 - 130

Surrogate	MS %Recovery	MS Qualifier	Limits
1-Methylnaphthalene-d10 (Surr)	0	S1-	45 - 99
Benzo(a)pyrene-d12 (Surr)	0	S1-	38 - 109
Fluoranthene-d10 (Surr)	0	S1-	46 - 121

Lab Sample ID: 500-210676-1 MSD

Matrix: Waste

Analysis Batch: 227555

Client Sample ID: LNAPL-010622-DS-01

Prep Type: Total/NA

Prep Batch: 223608

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
1-Methylnaphthalene	4900000	H F2	1980	4440000	4 F2	ug/Kg		-2396	53 - 101	70	30
2-Methylnaphthalene	8400000	H F2	1980	7300000	4 F2	ug/Kg		-5756	63 - 114	74	30
Acenaphthene	230000	H F2	1980	292000	4 F2	ug/Kg		3032	55 - 112	33	30
Acenaphthylene	47000	U H	1990	49000	U	ug/Kg		NC	53 - 102	NC	30
Anthracene	280000	H F2	1990	304000	4 F2	ug/Kg		1271	66 - 115	45	30
Benzo[a]anthracene	320000	H F2	1980	332000	4 F2	ug/Kg		481	71 - 127	57	30
Benzo[a]pyrene	150000	H F2	1980	156000	4 F2	ug/Kg		423	67 - 124	56	30
Benzo[e]pyrene	310000	H F2	2130	334000	4 F2	ug/Kg		894	80 - 120	57	30
Benzo[g,h,i]perylene	95000	H F2	2000	110000	4 F2	ug/Kg		753	66 - 116	68	30
Benzo[b]fluoranthene	190000	H F2	2000	216000	4 F2	ug/Kg		1215	71 - 134	52	30
Benzo[k]fluoranthene	47000	U H	1990	49000	U	ug/Kg		NC	68 - 122	NC	30
Biphenyl	47000	U H	1980	49000	U	ug/Kg		NC	70 - 130	NC	30

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QC Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Lab Sample ID: 500-210676-1 MSD

Matrix: Waste

Analysis Batch: 227555

Client Sample ID: LNAPL-010622-DS-01

Prep Type: Total/NA

Prep Batch: 223608

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chrysene	670000	H F2	2000	710000	4 F2	ug/Kg		1811	65 - 113	54	30
cis/trans Decalin	920000	H F2	1980	1020000	4 F2	ug/Kg		5231	70 - 130	58	30
Dibenz(a,h)anthracene	35000	J H F2	1990	39200	J 4 F2	ug/Kg		192	66 - 119	71	30
Dibenzofuran	330000	H F2	1990	356000	4 F2	ug/Kg		1232	70 - 130	49	30
Dibenzothiophene	1100000	H F2	2000	1050000	4 F2	ug/Kg		-1314	70 - 130	58	30
Fluoranthene	370000	H F2	1980	360000	4 F2	ug/Kg		-322	65 - 126	55	30
Fluorene	560000	H F2	2000	630000	4 F2	ug/Kg		3558	67 - 118	39	30
Indeno[1,2,3-cd]pyrene	38000	J H F2	1990	43700	J 4 F2	ug/Kg		288	69 - 123	68	30
Naphthalene	270000	H F2	1980	248000	4 F2	ug/Kg		-909	60 - 101	71	30
Perylene	47000	U H *+	1980	49000	U	ug/Kg		NC	80 - 120	NC	30
Phenanthrene	3400000	H F2	2000	3370000	4 F2	ug/Kg		-628	67 - 111	62	30
Pyrene	1400000	H F2	1990	1500000	4 F2	ug/Kg		7311	61 - 119	47	30
Retene	47000	U H *+	1980	49000	U	ug/Kg		NC	70 - 130	NC	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
1-Methylnaphthalene-d10 (Surr)	0	S1-	45 - 99
Benzo(a)pyrene-d12 (Surr)	0	S1-	38 - 109
Fluoranthene-d10 (Surr)	0	S1-	46 - 121

Method: 8015C - Hydrocarbon Product Identification (GC)

Lab Sample ID: MB 410-224130/1-A

Matrix: Waste

Analysis Batch: 224136

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 224130

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Qualitative Method	0.000				% by Wt		02/15/22 14:54	02/15/22 19:24	1
Surrogate	MB	MB	Limits				Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier							
Chlorobenzene (Surr)	86		50 - 150				02/15/22 14:54	02/15/22 19:24	1
o- terphenyl (Surr)	90		50 - 150				02/15/22 14:54	02/15/22 19:24	1

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 410-227256/1-A

Matrix: Waste

Analysis Batch: 227897

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 227256

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.18	U	0.18	0.075	mg/Kg		02/24/22 09:31	02/25/22 17:43	1

Lab Sample ID: LCS 410-227256/2-A

Matrix: Waste

Analysis Batch: 227897

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 227256

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.500	0.504		mg/Kg		101	80 - 120

Eurofins Chicago

QC Sample Results

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Method: 7471A - Mercury (CVAA) (Continued)

Lab Sample ID: LCSD 410-227256/3-A
Matrix: Waste
Analysis Batch: 227897

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 227256

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.500	0.507		mg/Kg		101	80 - 120	1	20

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Client Sample ID: LNAPL-010622-DS-01

Lab Sample ID: 500-210676-1

Date Collected: 01/06/22 12:30

Matrix: Waste

Date Received: 01/07/22 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030C			227387	02/24/22 14:25	Y6ZN	ELLE
Total/NA	Analysis	8260C		500	228368	02/28/22 22:36	UCB5	ELLE
Total/NA	Prep	3580A			224088	02/15/22 12:50	UKQ8	ELLE
Total/NA	Analysis	8270D		10	224212	02/16/22 06:41	P7EB	ELLE
Total/NA	Prep	3580A			223608	02/14/22 13:13	UKQ8	ELLE
Total/NA	Analysis	8270D SIM		100	227555	02/25/22 15:55	UJM0	ELLE
Total/NA	Prep	3580A			224130	02/15/22 14:54	UHEW	ELLE
Total/NA	Analysis	8015C		10	224136	02/15/22 20:12	UHEW	ELLE
Total/NA	Prep	7471A			227256	02/24/22 09:31	UJLA	ELLE
Total/NA	Analysis	7471A		1	227897	02/25/22 17:53	UEFS	ELLE

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Env, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Accreditation/Certification Summary

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Laboratory: Eurofins Lancaster Laboratories Env, LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
A2LA	Dept. of Defense ELAP	1.01	11-30-22
A2LA	ISO/IEC 17025	0001.01	11-30-22
Alaska	State	PA00009	06-30-22
Alaska (UST)	State	17-027	02-28-22
Arizona	State	AZ0780	03-11-22
Arkansas DEQ	State	88-0660	08-10-22
California	State	2792	02-02-22 *
Colorado	State	PA00009	06-30-22
Connecticut	State	PH-0746	06-30-23
DE Haz. Subst. Cleanup Act (HSCA)	State	019-006 (PA cert)	01-31-23
Delaware (DW)	State	N/A	01-31-23
Florida	NELAP	E87997	06-30-22
Georgia (DW)	State	C048	01-31-22 *
Hawaii	State	N/A	01-31-23
Illinois	NELAP	200027	01-31-23
Iowa	State	361	03-02-22
Kansas	NELAP	E-10151	10-31-22
Kentucky (DW)	State	KY90088	12-31-22
Kentucky (UST)	State	1.01	11-30-22
Kentucky (WW)	State	KY90088	01-01-23
Louisiana	NELAP	02055	06-30-22
Maine	State	2019012	03-12-22
Maryland	State	100	06-30-22
Massachusetts	State	M-PA009	06-30-22
Michigan	State	9930	01-31-23
Minnesota	NELAP	042-999-487	12-31-22
Missouri	State	450	01-31-25
Montana (DW)	State	0098	01-01-23
Montana (UST)	State	<cert No.>	02-01-23
Nebraska	State	NE-OS-32-17	01-31-23
New Hampshire	NELAP	2730	01-10-23
New Jersey	NELAP	PA011	06-30-22
New York	NELAP	10670	04-01-22
North Carolina (DW)	State	42705	07-31-22
North Carolina (WW/SW)	State	521	12-31-22
North Dakota	State	R-205	01-31-22 *
Oklahoma	NELAP	R-205	08-31-22
Oregon	NELAP	PA200001	09-11-22
PALA	Canada	1978	09-16-24
Pennsylvania	NELAP	36-00037	01-31-23
Rhode Island	State	LAO00338	12-30-22
South Carolina	State	89002	01-31-23
Tennessee	State	02838	01-31-22 *
Texas	NELAP	T104704194-21-40	08-31-22
Vermont	State	VT - 36037	10-28-22
Virginia	NELAP	460182	06-14-22
Washington	State	C457	04-12-22
West Virginia (DW)	State	9906 C	12-31-22
West Virginia DEP	State	055	02-28-22
Wyoming	State	8TMS-L	01-31-23

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins Chicago

Accreditation/Certification Summary

Client: GHD Services Inc.
Project/Site: 11209494, CITGO East Chicago Terminal

Job ID: 500-210676-2

Laboratory: Eurofins Lancaster Laboratories Env, LLC (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Wyoming (UST)	A2LA	1.01	11-30-22



CHAIN OF CUSTODY RECORD

COC NO.: 53682

Address: _____ PAGE 1 OF 1

Phone: _____ Fax: _____

Project No/Phase/Task Code: 11209494				Laboratory Name: Test American				Lab Location:				SSOW ID:			
Project Name: Citgo East Chicago Terminal				Lab Contact:								Cooler No: 1			
Project Location: East IM				SAMPLE TYPE				ANALYSIS REQUESTED (See Back of COC for Definitions)				Carrier			
GHD Chemistry Contact: James Abston				Matrix Code (see back of COC) Grab (G) or Comp (C) Filtered (Y/N) 6010C-A5 Fe Mn Pb 2260C, 11-Benzene 8770D, 11-Naphthalene				 500-210676 COC				Airbill No:			
Sampler(s): J Showalter												Total Containers/sample			
SAMPLE IDENTIFICATION (Containers for each sample may be combined on one line)				DATE (mm/dd/yy)				TIME (hh:mm)				COMMENTS/ SPECIAL INSTRUCTIONS:			
PRESERVATION - (SEE BACK OF COC FOR ABBREVIATIONS)												500-210676			
1	LNAPL-010622-DS-01			01/06/22	1230	0	G	X	X	X					
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															

TAT Required in business days (use separate COCs for different TATs)

☐ 1 Day ☐ 2 Days ☐ 3 Days ☒ 1 Week ☐ 2 Week ☐ Other

Notes/ Special Requirements

- 9.6

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
1 DSW	GHD	1/06/22	1700	1 [Signature]	GHD	1/07/22	1120
2 [Signature]	GHD	1/07/22	1120	2 [Signature]	EETA	1/7/22	1120
3				3			

THE CHAIN OF CUSTODY IS A LEGAL DOCUMENT - ALL FIELDS MUST BE COMPLETED ACCURATELY

Distribution

WHITE - Fully Executed Copy (CRA)

YELLOW - Receiving Laboratory Copy

PINK - Shipper

GOLDENROD - Sampling Crew

GHD Form COC-10/3/2022

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 500-210676-2

Login Number: 210676

List Source: Eurofins Chicago

List Number: 1

Creator: Buckley, Paula M

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	-9.6 samples were not frozen
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 500-210676-2

Login Number: 210676

List Number: 2

Creator: Phillips, Ann-Marie E

List Source: Eurofins Lancaster Laboratories Env, LLC

List Creation: 02/10/22 06:05 PM

Question	Answer	Comment
The cooler's custody seal is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable ($\leq 6^{\circ}\text{C}$, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable ($\leq 6^{\circ}\text{C}$, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	



CITGO Petroleum Corporation

2316 Terminal Drive
Arlington Heights, IL 60005

ATTACHMENT C

Project Schedule

Draft Project Schedule - AOC CITGO Terminal East Chicago, IN																	
ID	Task Name	Duration	Start	Finish	2022 Q1	Q2	Q3	Q4	2023 Q1	Q2	Q3	Q4	2024 Q1	Q2	Q3		
1	<u>Administrative</u>	965 days	<u>Fri 1/24/20</u>	<u>Mon 10/16/23</u>													
2	Effective Date of AOC	1 day	Fri 1/24/20	Fri 1/24/20													
3	Semi-Annual Meetings - Meeting with EPA either by phone or in person on at least a semi-annual basis	261 days	Fri 7/29/22	Fri 7/28/23													
7	Quarterly Reports - Fifteenth day of the month after the end of each quarter	392 days	Fri 4/15/22	Mon 10/16/23													
15	Financial Assurance Update (Updated annually and/or with subsequent work plans)	523 days	Mon 9/20/21	Thu 9/21/23													
18	<u>RFI</u>	444 days	<u>Fri 10/1/21</u>	<u>Thu 6/15/23</u>													
19	On-going Quarterly Groundwater Monitoring and Off-Site Investigation (Exact Dates TBD)	262 days	Wed 6/15/22	Thu 6/15/23													
25	Additional RFI Work Plan(s), as needed	1 day	Fri 7/1/22	Fri 7/1/22		◆ To Be Determined											
26	EPA Review and Approval of RFI Work Plan(s), as needed	1 day	Fri 7/1/22	Fri 7/1/22		◆ To Be Determined											
27	RFI Field Activities, as needed	1 day	Fri 7/1/22	Fri 7/1/22		◆ To Be Determined											
28	Submit RFI Report - No later than October 1, 2021	1 day	Fri 10/1/21	Fri 10/1/21													
29	<u>Interim Corrective Measures, as needed</u>	1 day	<u>Fri 7/1/22</u>	<u>Fri 7/1/22</u>													
30	Interim Corrective Measures Work Plan(s), as needed	1 day	Fri 7/1/22	Fri 7/1/22		◆ To Be Determined											
31	Interim Corrective Measures Implementation, as needed (90 days following submittal of Interim Corrective Measures Work Plan and Schedule)	1 day	Fri 7/1/22	Fri 7/1/22		◆ To Be Determined											
32	Interim Corrective Measures Report (Either prior to or as part of the Environmental Indicators Report)	1 day	Fri 7/1/22	Fri 7/1/22		◆ To Be Determined											
33	<u>Final Corrective Measures</u>	541 days	<u>Mon 5/16/22</u>	<u>Mon 6/10/24</u>													
34	Public Meeting, including 30-Day Comment Period (Exact Date TBD)	30 days	Mon 5/16/22	Fri 6/24/22													
35	Environmental Indicators Report(s) - 60 Days following EPA Final Comments on RFI	1 day	Mon 8/22/22	Mon 8/22/22			◆										
36	Final Corrective Measures Proposal - Within 135 Days following EPA Final Comments on RFI	1 day	Mon 10/31/22	Mon 10/31/22				◆									
37	EPA review and comments, supplemental information / investigation request (if needed)	3 mons	Tue 11/1/22	Mon 1/23/23													
38	Public review and comment	2 mons	Tue 1/24/23	Mon 3/20/23													
39	EPA Final Decision	2 mons	Tue 3/21/23	Mon 5/15/23													
40	Final Corrective Measures Implementation - (According to the schedule in the Final Decision, i.e. much of the construction completed within one year, or within a reasonable period of time after EPA selects the final corrective measures)	12 mons	Tue 5/16/23	Mon 4/15/24													
41	Final Remedy Construction Completion Report (Including an Operation and Maintenance Plan)	2 mons	Tue 4/16/24	Mon 6/10/24													
Project: CITGO Terminal, East Chicago, IN Date: Wed 4/13/223:36 PM		Expected Timeframe Expected Date Contingent Timeframe Fixed Date	Summary Manual Progress														
Note: Per AOC, 'days' refers to calendar days Schedule subject to change based on regulatory reviews/approvals, weather, and other factors beyond Respondent's control DRAFT																	