



ARM Group LLC

Engineers and Scientists

October 5, 2021

Ms. Barbara Brown
Project Coordinator
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230

Re: Test Pit Completion Report
B6-066 Delineation Area
Area B: Parcel B6
Tradepoint Atlantic
Sparrows Point, MD 21219

Dear Ms. Brown:

ARM Group LLC (ARM), on behalf of Tradepoint Atlantic (TPA), has prepared this Completion Report to document the test pitting activities in Parcel B6 (the Site) on the TPA Property located in Sparrows Point, Maryland. This completion report is being provided to the Maryland Department of the Environment (MDE) and United States Environmental Protection Agency (USEPA) to present the observations of the test pitting investigation.

Background

On July 5, 2016, soil boring B6-066-SB was completed during the Parcel B6 Phase II Investigation. The soil boring was completed in the northwestern portion of Parcel B6 and targeted an historical Waste Oil Pit. During the completion of this boring, a strong petroleum odor and non-aqueous phase liquid (NAPL) were observed. Screening piezometer B6-066-PZ was installed at this location (refer to **Figure 1**) in accordance with the NAPL delineation protocols provided in the Parcel B6 Phase II Investigation Work Plan. Non-aqueous phase liquid (NAPL) was observed in this screening piezometer immediately following installation. The MDE was notified of this NAPL detection on July 5, 2016. In accordance with the standard Phase II Investigation procedures across the TPA property, 69 NAPL screening piezometers were subsequently installed between July 6, 2016 and April 26, 2017 in the shallow hydrogeologic zone surrounding B6-066-PZ to delineate the source area. The final configuration of the screening piezometers is presented on **Figure 1**. Of the 69 installed piezometers, 49 had trace or measurable NAPL detections. The

delineation investigation was summarized in the NAPL Delineation Completion Report for B6-066-PZ (Revision 0 dated April 14, 2021).

Following a period of routine gauging and reporting between July 2016 and April 2021, all available piezometers in the B6-066-PZ NAPL delineation area that had not been previously destroyed were properly abandoned on May 3, 2021 in accordance with COMAR 26.04.04.34 through 36. Abandonment of these piezometers was proposed as part of the NAPL Delineation Completion Report Comment Response Letter and Piezometer Abandonment Request (dated March 26, 2021) in order to provide space for material and equipment storage. Piezometer abandonment details were presented in the B6-066 Test Pitting Work Plan and Piezometer Abandonment Completion Report (Revision 0 dated June 4, 2021).

In March 2021, prior to piezometer network abandonment, a NAPL sample was collected from the delineation piezometers for hydrocarbon fingerprinting analysis. The hydrocarbon fingerprinting analysis determined that the NAPL is most likely a lubricating oil. Results of this analysis are included as **Attachment 1**.

Test Pit Investigation

On July 8, 2021, in order to further assess the presence of NAPL on the site, an excavator was used to dig four test pits at the locations shown on **Figure 2**. Test pitting was conducted in accordance with the methods specified in QAPP Worksheet 21 – Field SOPs, SOP No. 015 – Test Pitting. Test pitting procedures were outlined in the B6-066 Test Pitting Work Plan and Piezometer Abandonment Completion Report (Revision 0 dated June 4, 2021).

The test pits were each dug to a depth of approximately 2 feet below the observed water table. Each test pit was approximately 20 feet in length and 5 feet in width (one excavator bucket width). Subsurface material above the water table was relatively uniform between each of the four test pits. The subsurface above the water table in all four test pits was typically comprised of a mixture of silt, sand, and slag fill in varying thicknesses with some clay at depth. All excavated material was screened using a hand-held photoionization detector (PID) as well as visual and olfactory methods to determine if there was evidence of NAPL contamination. Photographs of each test pit are included in **Attachment 2**. Further details on the observations within each test pit are presented below.

TP-1:

Groundwater in TP-1 was observed at approximately 6 feet below ground surface (bgs). TP-1 was excavated to a total depth of approximately 8 feet bgs. Material below the water table was dark, odorous, and appeared to have petroleum impacts. Material removed from below the water table in the test pit had PID readings of up to 80 parts per million (ppm). Dark material excavated from



below the water table was placed in a designated stockpile and covered. The water surface within TP-1 showed a moderate LNAPL sheen.

TP-2:

Groundwater in TP-2 was observed at approximately 6 feet bgs. TP-2 was excavated to a total depth of approximately 10 feet bgs. Material below the water table was dark, odorous, and appeared to have petroleum impacts. Material removed from below the water table in the test pit had PID readings of up to 100 ppm. Dark material excavated from below the water table was placed in a designated covered stockpile at the surface. The water surface within TP-2 showed LNAPL accumulation of less than 1 inch. TP-2 showed the most LNAPL accumulation of the four test pits. Due to the observed NAPL accumulation, an observation point was installed in TP-2 during backfilling. Details of the observation point's construction are further described in the trailing sections.

TP-3:

Groundwater in TP-3 was observed at approximately 4 feet bgs. TP-3 was excavated to a total depth of approximately 6 feet bgs. TP-3 had no elevated PID readings or evidence (visual or olfactory) of petroleum impacts. Material from TP-3 was not separated into segregated stockpiles at the surface and the water surface did not show signs of LNAPL sheen or accumulation.

TP-4:

Groundwater in TP-4 was observed at approximately 5 feet bgs. TP-4 was excavated to a total depth of approximately 7 feet bgs. Material removed from below the water table was dark and appeared to have petroleum impacts, but did not have odors or PID readings above 10 ppm. Dark material excavated from below the water table was placed in a designated stockpile and covered. The water table showed only a light LNAPL sheen.

Excavated Material Handling

Three test pits (TP-1, TP-2, and TP-4) contained material below the water table that showed visible evidence of petroleum impacts when stockpiled at the surface. Material removed from TP-1 and TP-2 also had high (80-100 ppm) PID readings. Impacted material was segregated based on evidence of contamination and placed on and covered with plastic sheeting adjacent to each test pit. The segregated material will be sampled and properly disposed of in accordance with its sample results. Unimpacted material (including all material removed from TP-3) was utilized as backfill. Details on the post-closure monitoring are described in the designated section below.



Backfill Procedure

The four test pit locations were backfilled on August 6, 2021. Prior to backfilling, one temporary observation point was constructed in the most impacted test pit, TP-2, by installing 4-inch diameter PVC screen and riser. This observation point will serve as a temporary monitoring location. The observation point was installed with 5 feet of screen and 10 feet of riser that extends above the surface. The screen was placed at the bottom of the test pit to screen across the groundwater table. Self-compacting recycled aggregate (#57 stone) was used to backfill from the bottom of TP-2 to approximately 1 foot above the water table. The remainder of the test pit was backfilled using the unimpacted excavated and stockpiled material. The material was placed in 1-foot lifts and compacted with an excavator bucket. The PVC was secured at the surface and backfill material was placed around the PVC with extra precaution taken to not damage the screen or riser. The observation point was left in place for future monitoring. The remaining three test pits (TP-1, TP-3, -TP-4) were backfilled with the unimpacted material removed from each test pit.

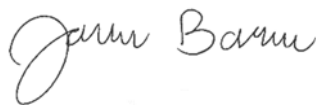
Post-Closure Monitoring

The 4-inch observation point was installed during backfilling and subsequently monitored for the accumulation of NAPL. The monitoring point did not show evidence of NAPL accumulation after 30 days of equilibration. At this time, TPA is requesting approval to remove the observation point.

The NAPL present in this portion of Parcel B6 will be considered for its proximity to any excavations and/or utility installations that may be proposed for any potential future development plans in this area. If future utilities are proposed in the vicinity, appropriate protocols for the protection of workers and the mitigation of potential NAPL migration via preferential flow paths will be included in a future Response and Development Work Plan. Monitoring wells or extraction wells in the area may also be proposed as part of the forthcoming Site-Wide Groundwater Corrective Measures Study (CMS) and the Sitewide Groundwater Monitoring Plan.

Following your review of this interim report, if you have any questions, or if we can provide any additional information, please do not hesitate to contact ARM Group LLC at 410-290-7775.

Respectfully Submitted,
ARM Group LLC



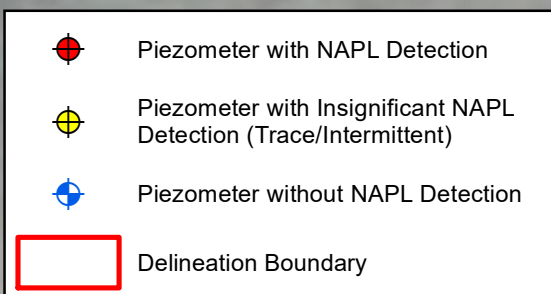
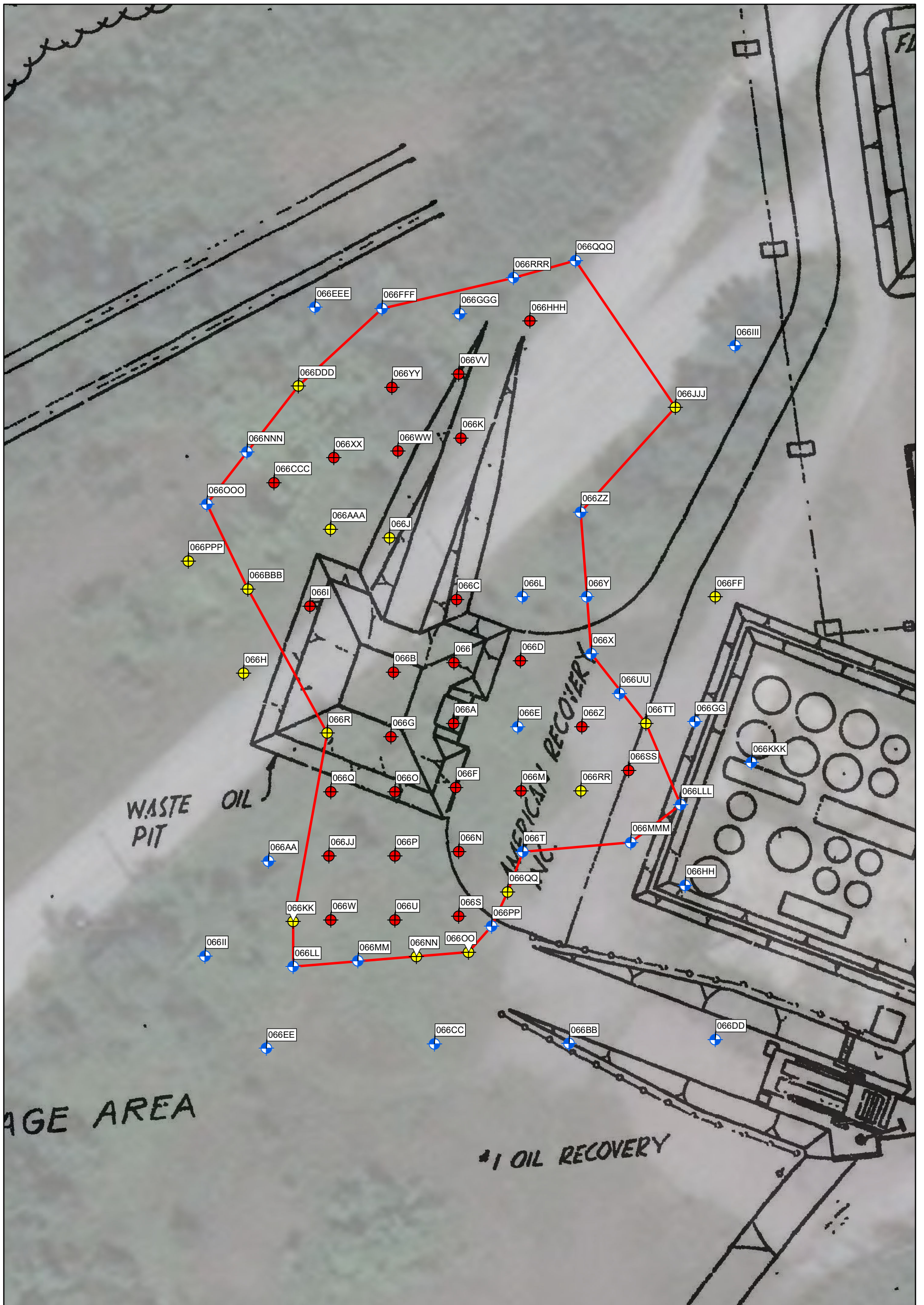
Joshua M. Barna, G.I.T.
Staff Geologist



Kaye Guille, P.E., PMP
Senior Engineer



FIGURES



Parcel B6: B6-066 NAPL Delineation
Piezometer NAPL Status
May 27, 2021

Figure 1





ARM Group LLC
 Engineers and Scientists

0 15 30 60
 Feet

Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 20010206


Source: E
IGN, and t




-  TP-2 Observation Point
-  Historic Piezometer with NAPL Detection
-  Historic Piezometer with Insignificant NAPL Detection (Trace/Intermittent)
-  Historic Piezometer without NAPL Detection

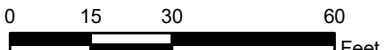
Parcel B6: B6-066 NAPL Delineation
Test Pits
 August 24, 2021

Figure
2





ARM Group LLC
 Engineers and Scientists



Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 20010206

Source: B
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ATTACHMENT 1



Torkelson Geochemistry, Inc.

2528 South Columbia Place, Tulsa, Oklahoma 74114-3233
Voice 918-749-8441

April 13, 2021

Bob Tworkowski
Tradepoint Atlantic
1600 Sparrows Point Blvd,
Sparrows Point, MD 21219

DRAFT

Subject: Hydrocarbon fingerprint analysis and evaluation of six product samples from the Sparrows Point IM, Sparrows Point, MD.

Introduction

Six product samples were submitted to Torkelson Geochemistry by Tradepoint Atlantic for hydrocarbon fingerprint (capillary gas chromatography) analysis and interpretation of results, see chain of Custodies, Figures 1 and 2.

The following are my interpretations/opinions of the data. Please keep in mind that these interpretations are made without any hands on knowledge of the site or other analyses done on the samples. In addition, the petroleum in the samples has probably been altered/weathered which can make an accurate interpretation of product type somewhat more difficult since some of the key features of the product may have been altered or removed by the evaporation, water washing and perhaps bacterial processes.

Discussion of Results

The B17 LNAPL sample appears to be a lubricating oil of some sort with a very small amount of unidentifiable light ends. The B17 LNAPL sample chromatogram (Figures 3 and 10) shows a series of peaks that starts at benzene (Bnz) and continues to the end of the chromatogram and an unresolved hump that starts at about nC13, reaches a maximum between nC24 and nC25 and continues to the end of the chromatogram. The large unresolved hump and associated peaks is most likely a lubricating oil of some sort. The identity of the very small amount of light ends in the benzene to nC14 range is not obvious.

The B18 LNAPL sample appears to be a mixture of a heavy material, perhaps a #5 or #6 fuel oil and a smaller amount of coal tar. The B18 LNAPL sample chromatogram (Figures 4 and 11) shows a series of peaks that starts at benzene (Bnz) and continues to about the end of the chromatogram and a broad unresolved hump that starts at about nC10, reaches a maximum at about nC33 and continues to the end of the chromatogram. The broad unresolved hump and smaller peaks may be a heavy fuel oil such as #5 or #6. The naphthalene and larger unlabeled peaks are probably polynuclear aromatic compounds and are typical of a coal tar.

The B6-066 LNAPL sample appears to be a lubricating oil of some sort with a small amount of unidentifiable light ends. The B6-066 LNAPL sample chromatogram (Figures 5 and 12) shows a series of peaks that starts at normal butane (nC4) and continues to the end of the chromatogram and an unresolved hump that starts at about nC13, reaches a maximum at about nC30 and continues to the end of the chromatogram. The large unresolved hump and associated peaks is most likely a lubricating oil of some sort. The identity of the small amount of light ends in the nC4 to nC14 range is not obvious.

The CO124 DNAPL sample appears to be a coal tar. The CO124 DNAPL sample chromatogram (Figures 6 and 13) shows a series of peaks that starts at benzene (Bnz) and continues to about the end of the chromatogram. The larger unlabeled peaks are probably polynuclear aromatic compounds and are typical of a coal tar.

The CO125 DNAPL sample appears to be a coal tar. The CO125 DNAPL sample chromatogram (Figures 7 and 14) shows a series of peaks that starts at benzene (Bnz) and continues to about the end of the chromatogram. The larger unlabeled peaks are probably polynuclear aromatic compounds and are typical of a coal tar.

The identity of the CO173 LNAPL sample is not obvious but may be a mixture of two products. The CO173 LNAPL sample chromatogram (Figures 8 and 15) shows a series of peaks that starts at about normal butane (nC5) and continues to the end of the chromatogram. The early peaks from the beginning of the chromatogram to about nC12 are some sort of highly aromatic mixture. The heavier portion from about nC12 to the end of the chromatogram has some fairly large normal paraffin peaks but the identity of this material is not obvious.

Please let me know if you have any questions regarding this preliminary interpretation.

A handwritten signature in black ink, appearing to read "Bruce Torkelson". The signature is fluid and cursive, with a long horizontal stroke extending from the end of the name.

Bruce Torkelson



Torkelson Geochemistry, Inc.

2528 S. Columbia Place
Tulsa, OK 74114-3233

Phone: 918-749-8441
Fax: 918-749-6005

e-mail: BTorkelson@torkelsongeochemistry.com

CHAIN-OF-CUSTODY RECORD

Page 1 of 2

Project: Sparrows Point IM
Sparrows Point, MD
Client: _____
Contract #: _____
Account #: GLD(443)610-0211

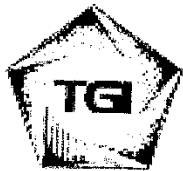
Analyst: ap@tradepointatlantic.com
Address: 1600 Sparrows Point Blvd
Sparrows Point, MD 21219
Phone: (210) 461-0750 (B. Workowski)
Email: btworkowski@
tradepointatlantic.com

Additional Instructions
Please report to
btworkowski@tradepointatlantic.com
mnewman@tradepointatlantic.com
adavis@armgroup.net
ahamilton@armgroup.net
Reference: STD

ITEM NO	SAMPLE DESCRIPTION	DATE	MATRIX	LAB NO	Total # OF Vials	PRESERVATIVES		ANALYSES REQUESTED										REMARKS							
						None		GC Characterization	Density	Viscosity	Water Surface Tension	NAPL Surface Tension	NAPL/Water Interfac Tens	Lead	Sulfur										
1	CO124 DNAPL	3/11/21	DNAPL		2	X																			
2	CO125 DNAPL	↓	DNAPL		2	X																			
3	CO173 LNAPL	3/11/21	LNAPL		2	X																			
4																									
5																									
6																									
7																									
8																									
9																									
10																									

RELINQUISHED BY	DATE	TIME	ACCEPTED BY	DATE	TIME
<u>[Signature]</u>	<u>3/11/21</u>	<u>1410</u>	<u>[Signature]</u>	<u>3/14/21</u>	<u>1:40</u>
			<u>[Signature]</u>	<u>3-26-21</u>	<u>13020</u>

Figure 1, Chain of Custody 1 of 2.



Torkelson Geochemistry, Inc.

2528 S. Columbia Place
Tulsa, OK 74114-3233

Phone 918-749-8441
Fax 918-749-6005

e-mail BTorkelson@torkelsongeochemistry.com

CHAIN-OF-CUSTODY RECORD

Project Sparrows Point IM
 Location Sparrows Point, MD

 Proj No _____
 P.O. _____
 Sampled By BEU LP (110) 961 3494

Reported To ap@tradeportatlantic.com
 Address 1600 Sparrows Point Blvd
Sparrows Point, MD 21219

 Phone 240 461-0750 (B. Tworowski)
 Fax _____
 e-mail btworowski@
tradeportatlantic.com

Additional Instructions
Please report to btworowski@
tradeportatlantic.com
mnewman@tradeportatlantic.com
gdavis@armgroup.net
dhamilton@armgroup.net
 Requested Turn-Around Time 5DD

ITEM NO.	SAMPLE DESCRIPTION	DATE	MATRIX	LAB NO.	PRESERVATIVES		ANALYSES REQUESTED										REMARKS						
					Total # of Vials	None	35 Chloroform	Density	Viscosity	Water Surface Tension	NAPL Surface Tension	NAPL:Water Interfacial Tension	Lead	Sulfur									
1	B17 LNAPL	3/17/21	LNAPL		2	X																	
2	B6-066 LNAPL	3/17/21	LNAPL		2	X																	
3	B18 LNAPL	3/17/21	LNAPL		2	X																	
4																							
5																							
6																							
7																							
8																							
9																							
10																							

RELINQUISHED BY	DATE	TIME	ACCEPTED BY	DATE	TIME
	3/17/21	1315		3/17	1340
				3-26-21	1320

Figure 1, Chain of Custody 2 of 2.

Torkelson Geochemistry, Inc.
GC/FID

Sparrows Point IM, Sparrows Point, MD
Sample ID : B17 LNAPL
Acquired : Apr 06, 2021 08:53:38

c:\ezchrom\chrom21016\b17 -- Channel A

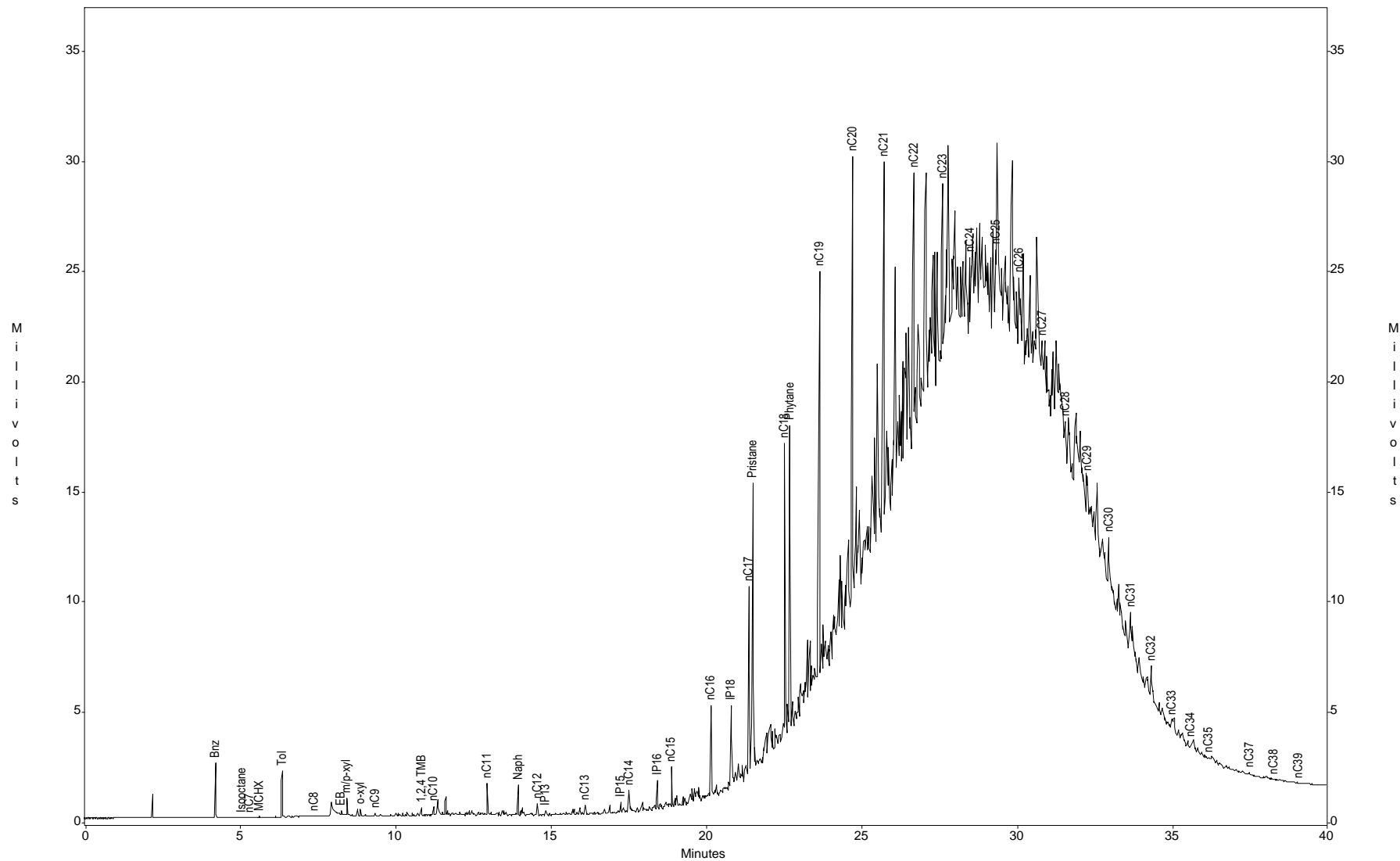


Figure 3, Gas chromatogram of the B17 LNAPL sample.

Torkelson Geochemistry, Inc.
GC/FID

Sparrows Point IM, Sparrows Point, MD
Sample ID : B18 LNAPL
Acquired : Apr 06, 2021 15:41:57

c:\ezchrom\chrom\21016\b18.2 -- Channel A

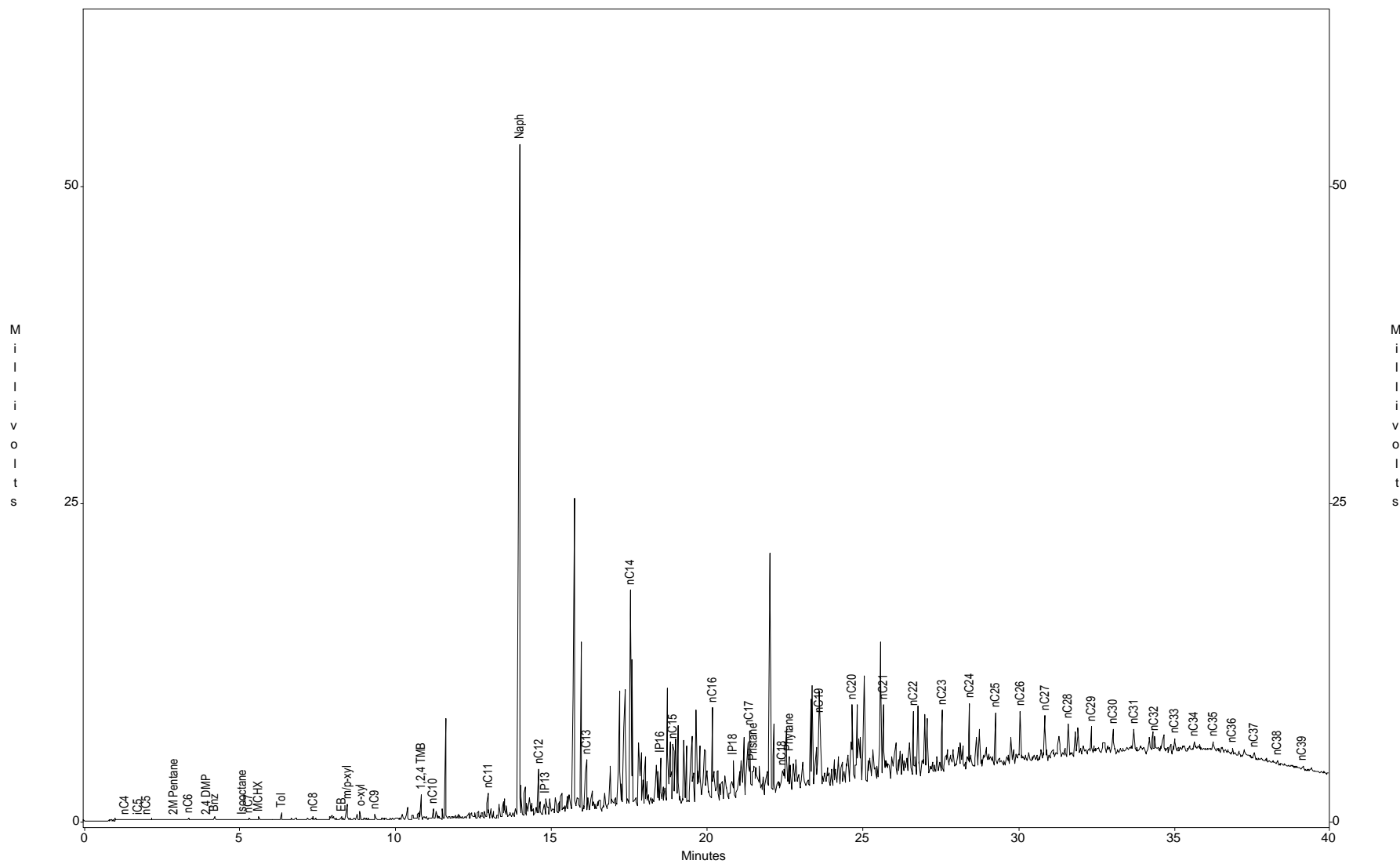


Figure 4, Gas chromatogram of the B18 LNAPL sample.

Torkelson Geochemistry, Inc.
GC/FID

Sparrows Point IM, Sparrows Point, MD
Sample ID : B6-066 LNAPL
Acquired : Apr 06, 2021 09:44:19

c:\ezchrom\chrom\21016\b6-066 -- Channel A

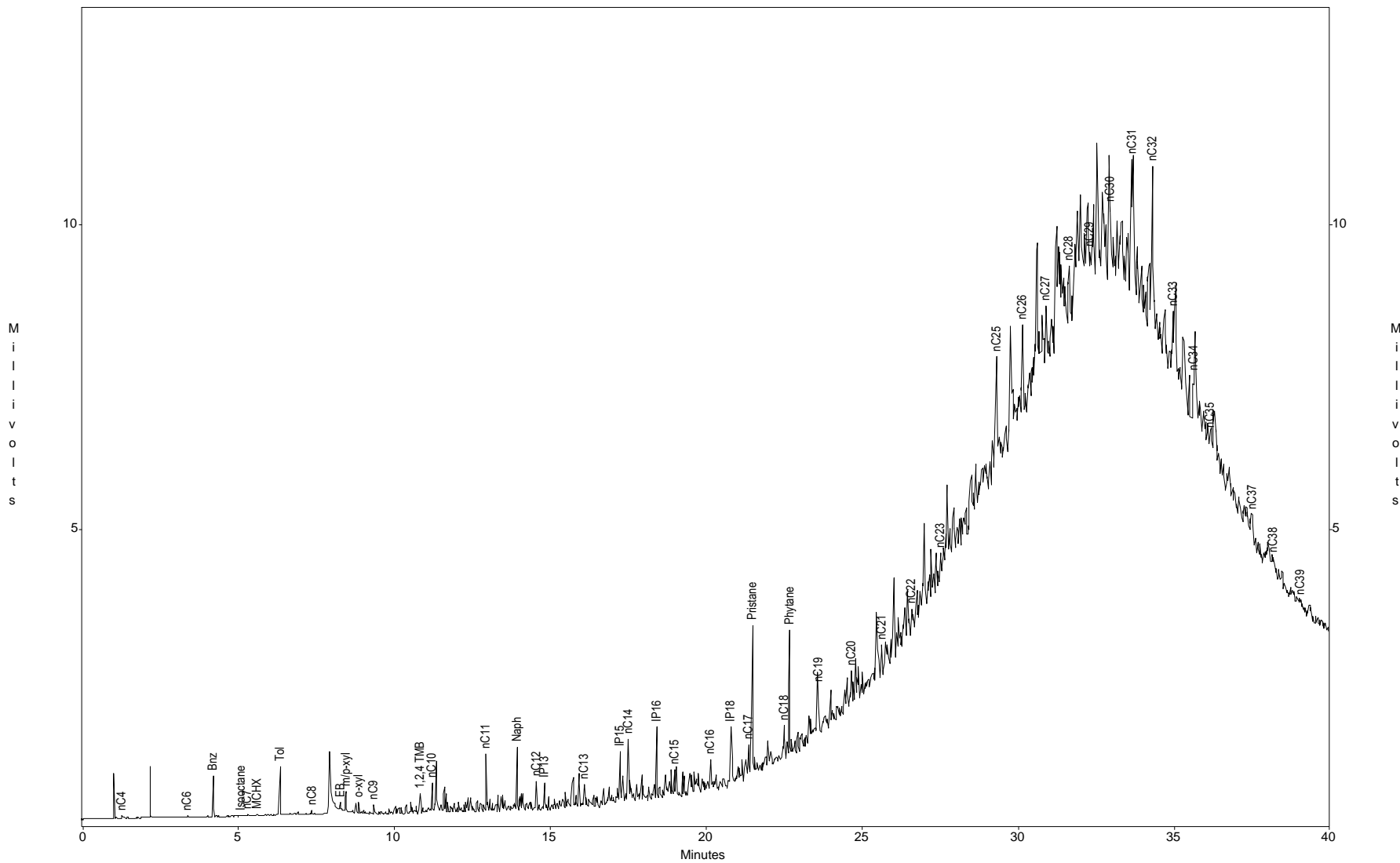


Figure 5, Gas chromatogram of the B6-066 LNAPL sample.

Torkelson Geochemistry, Inc.
GC/FID

Sparrows Point IM, Sparrows Point, MD
Sample ID : CO124 DNAPL
Acquired : Apr 06, 2021 14:00:28

c:\ezchrom\chrom2\21016\co124.2 -- Channel A

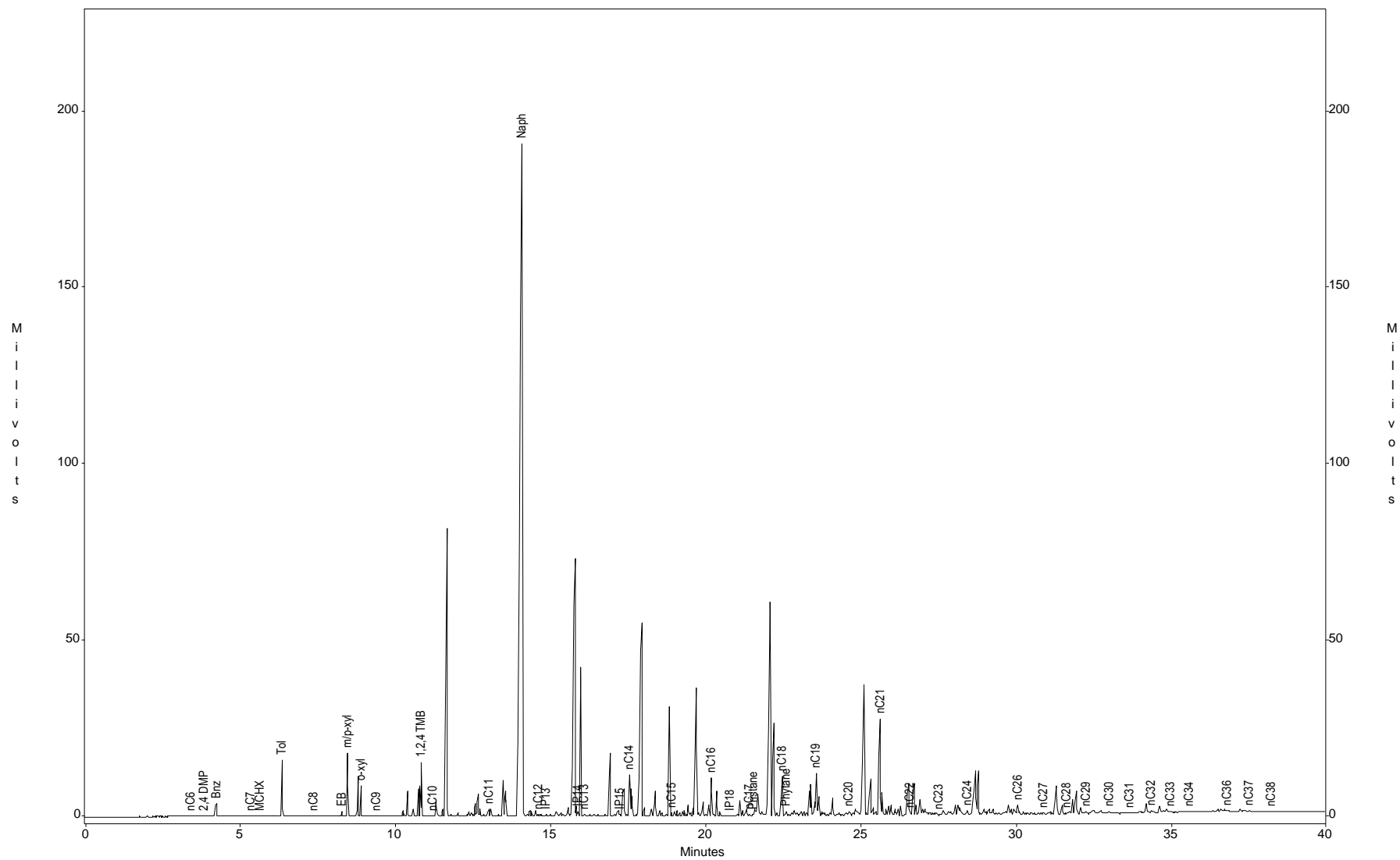


Figure 6, Gas chromatogram of the CO124 DNAPL sample.

Torkelson Geochemistry, Inc.
GC/FID

Sparrows Point IM, Sparrows Point, MD
Sample ID : CO125 DNAPL
Acquired : Apr 06, 2021 12:17:21

c:\ezchrom\chrom\21016\co125.2 -- Channel A

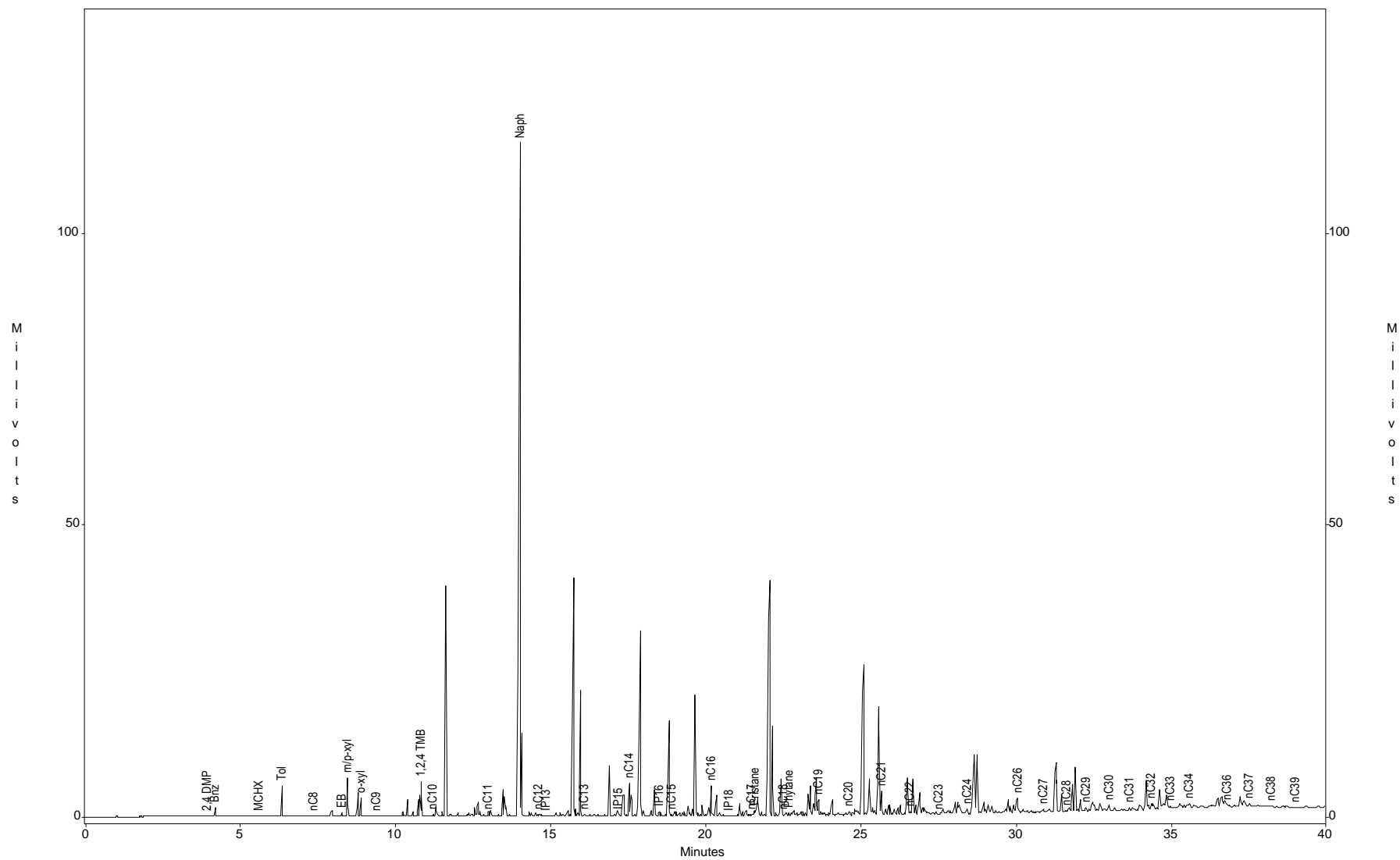


Figure 7, Gas chromatogram of the CO125 DNAPL sample.

Torkelson Geochemistry, Inc.
GC/FID

Sparrows Point IM, Sparrows Point, MD
Sample ID : CO173 LNAPL
Acquired : Apr 06, 2021 08:04:42

c:\ezchrom\chrom\21016\co173 -- Channel A

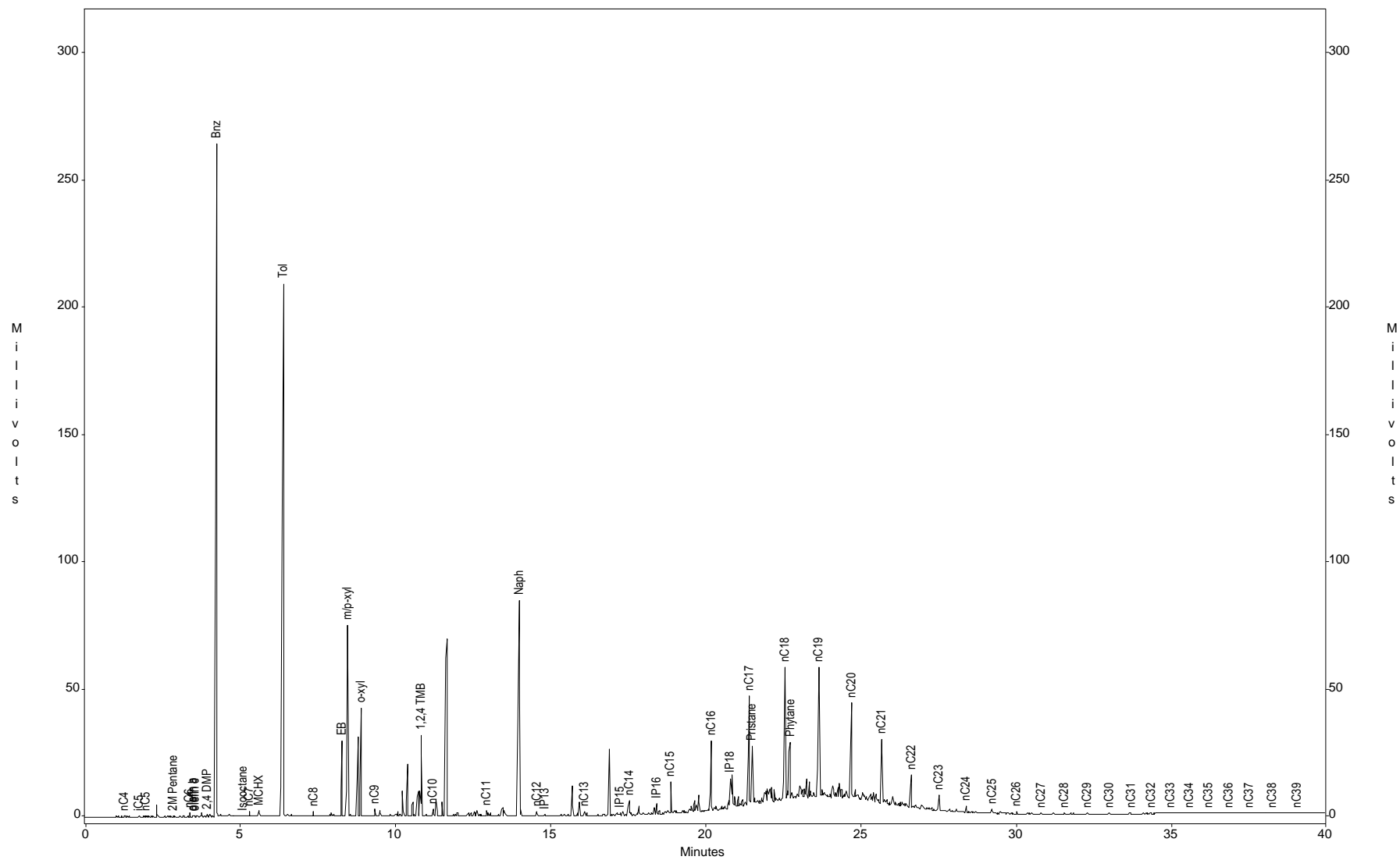


Figure 8, Gas chromatogram of the CO173 LNAPL sample.

Torkelson Geochemistry, Inc.
GC/FID

Sparrows Point IM, Sparrows Point, MD
Sample ID : Gas/Dies/Wax std
Acquired : Apr 06, 2021 10:35:22

c:\ezchrom\chrom\21016\gadiwax2 -- Channel A

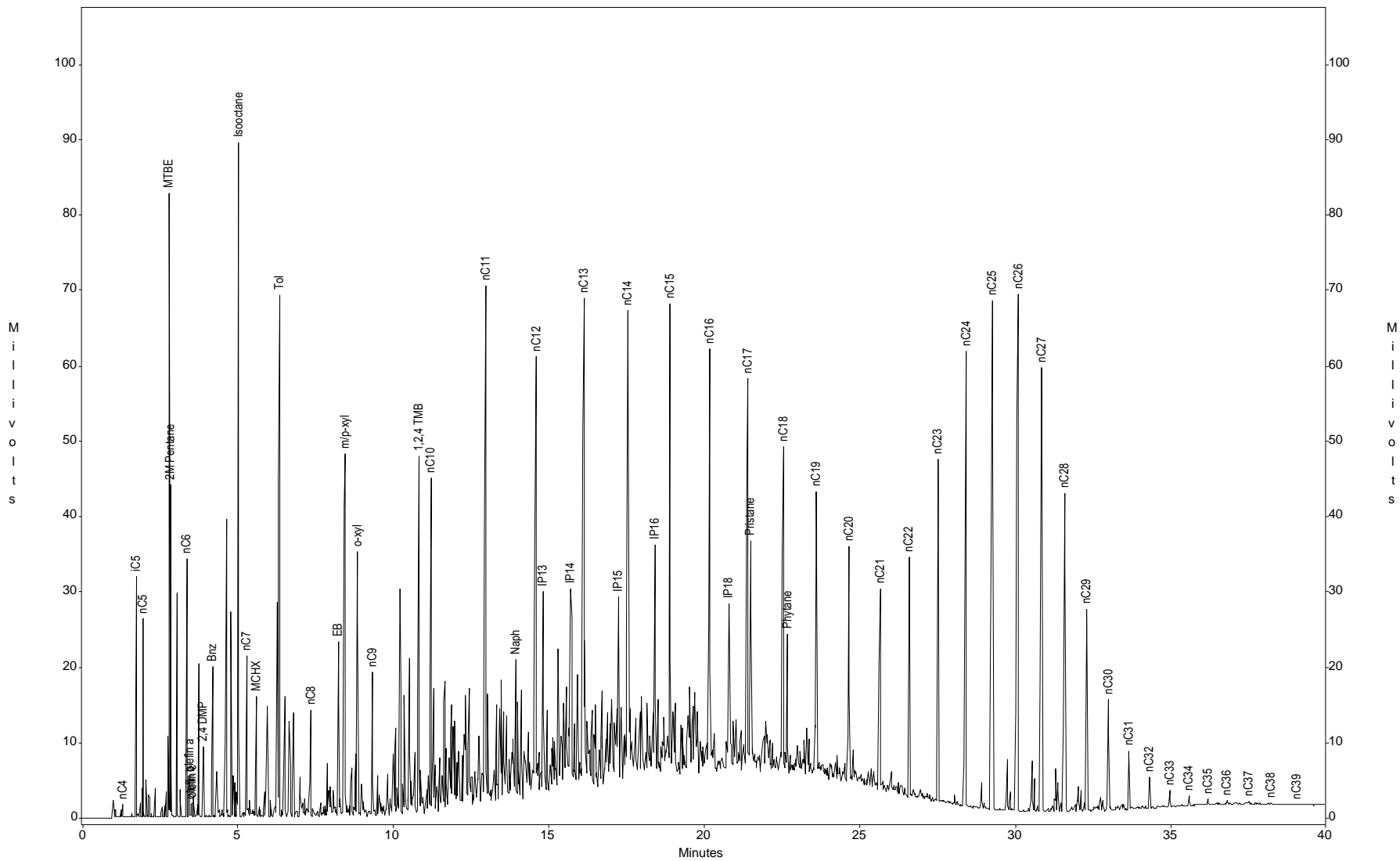
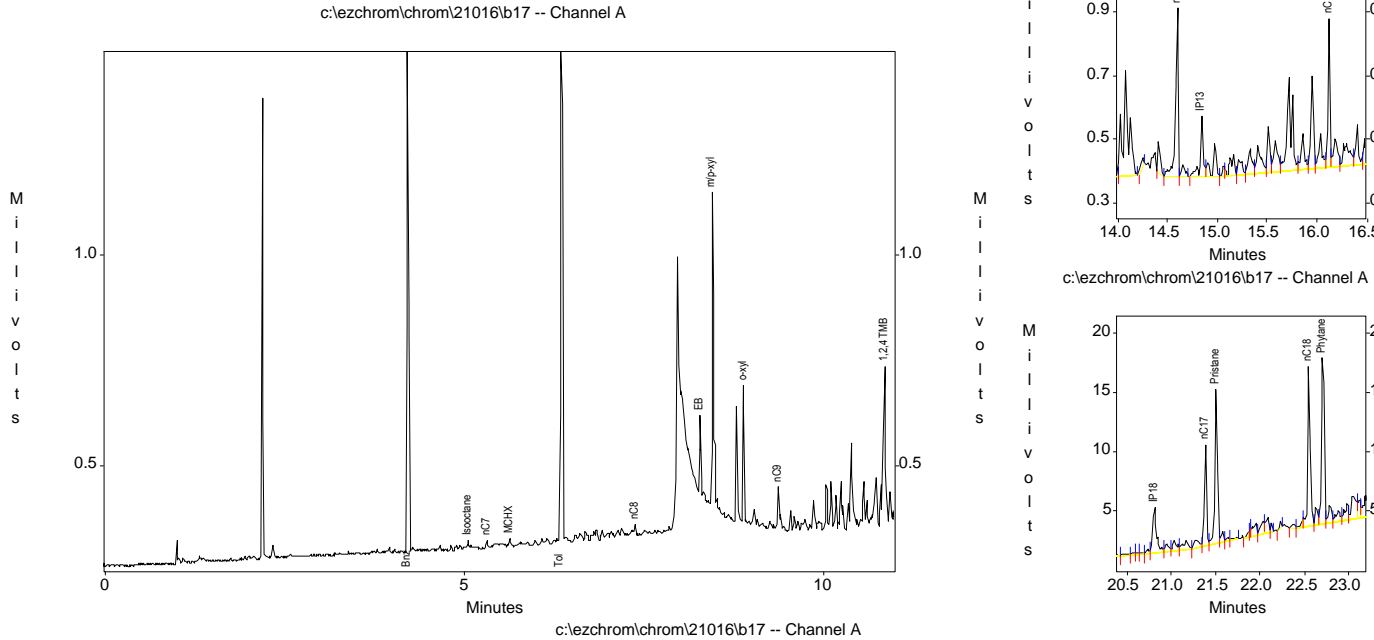


Figure 9, Gas chromatogram of laboratory standard (gasoline/diesel/wax mixture).

Sparrows Point IM, Sparrows Point, MD
 Sample ID : B17 LNAPL
 Acquired : Apr 06, 2021 08:53:38

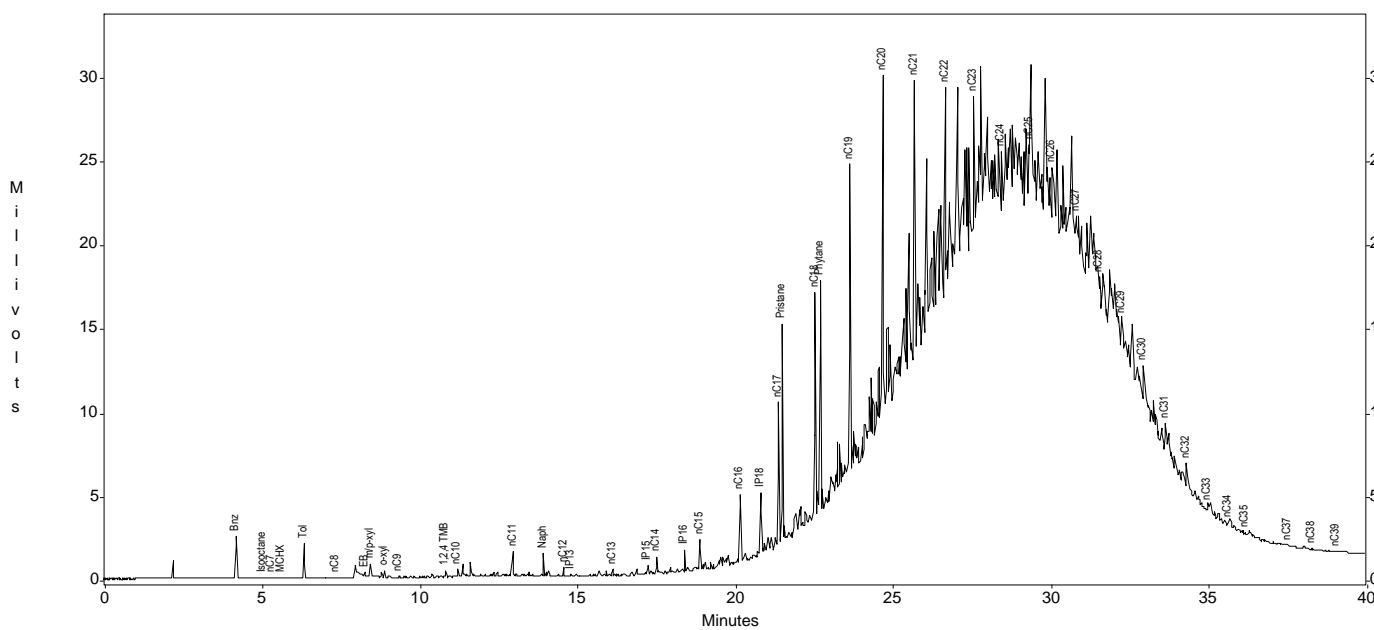
Torkelson Geochemistry, Inc.
 GC/FID

Channel A Results



M
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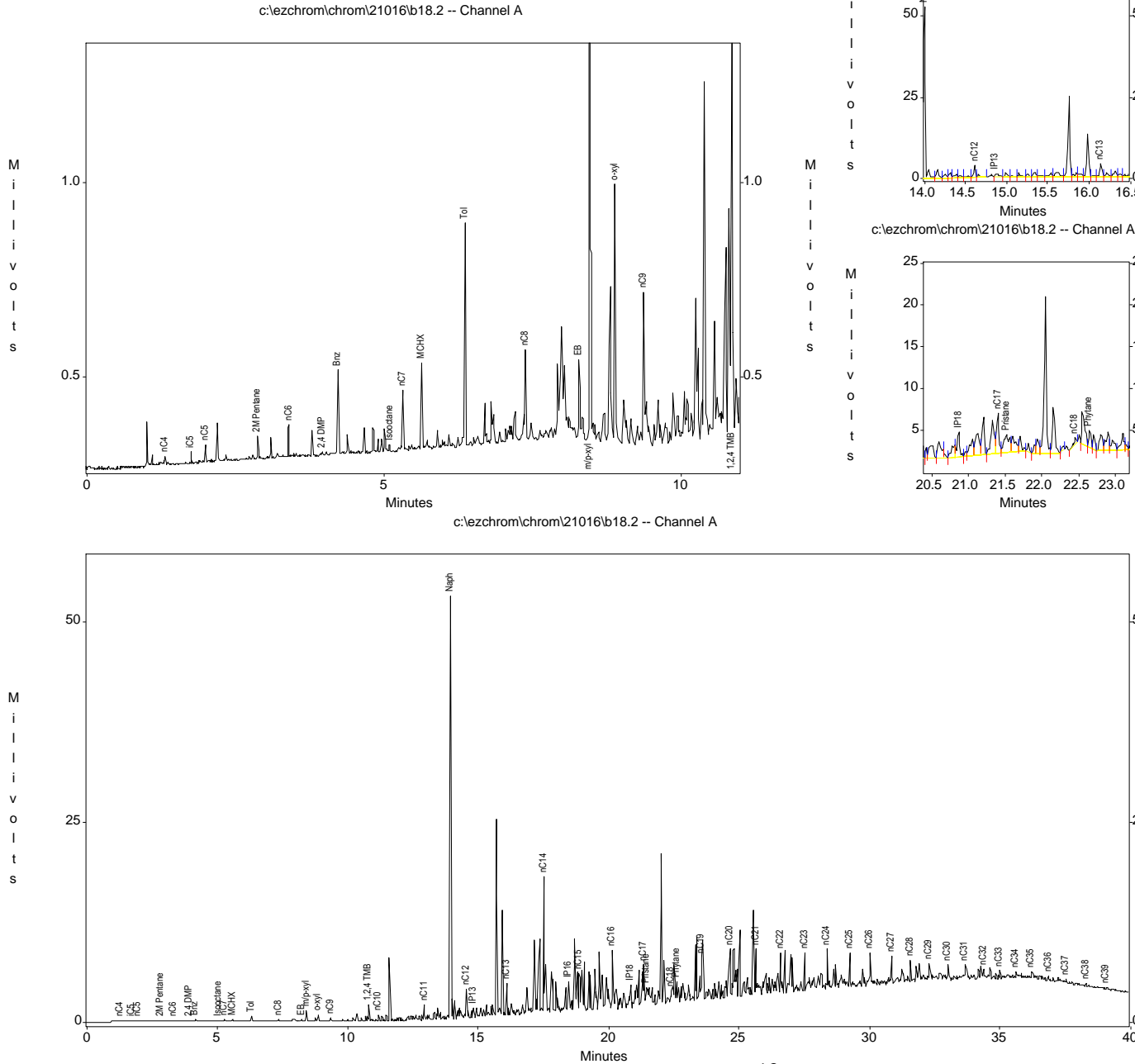
Peak	Area	Height
nC4	0	0
iC5	0	0
nC5	0	0
MTBE	0	0
2M Pentane	0	0
nC6	0	0
olefin a	0	0
olefin b	0	0
olefin c	0	0
2,4 DMP	0	0
Bnz	2594	2489
Isooctane	18	17
nC7	20	16
MCHX	23	19
Tol	2516	2103
nC8	24	19
EB	532	271
m/p-xy	2051	801
o-xy	517	344
nC9	247	108
1,2,4 TMB	841	382
nC10	849	427
nC11	2215	1454
Naph	2276	1416
nC12	903	534
IP13	376	192
IP14	0	0
nC13	677	470
IP15	810	497
nC14	2462	998
IP16	2257	1311
nC15	3333	1864
nC16	7157	4152
IP18	10599	3770
nC17	13407	8601
Pristane	26652	13088
nC18	23870	13405
Phytane	28731	14004
nC19	41771	19764
nC20	56274	23637
nC21	65602	22137
nC22	66234	20451
nC23	85880	18800
nC24	40476	14302
nC25	29755	13646
nC26	33507	11382
nC27	24745	7582
nC28	9250	2955
nC29	1606	806
nC30	4738	1871
nC31	3843	1426
nC32	2438	1272
nC33	153	142
nC34	119	95
nC35	176	88
nC36	0	0
nC37	295	72
nC38	55	15
nC39	59	18
nC40	0	0

Figure 10, Multipanel display of gas chromatogram of the B17 LNAPL sample.

Sparrows Point IM, Sparrows Point, MD
 Sample ID : B18 LNAPL
 Acquired : Apr 06, 2021 15:41:57

Torkelson Geochemistry, Inc.
 GC/FID

Channel A Results



Peak	Area	Height
nC4	12	20
iC5	17	27
nC5	31	44
MTBE	0	0
2M Pentane	52	57
nC6	79	83
olefin a	0	0
olefin b	0	0
olefin c	0	0
2,4 DMP	11	8
Bnz	236	214
Isooctane	17	15
nC7	176	154
MCHX	264	222
Tol	739	576
nC8	290	235
EB	326	207
m/p-xy1	2215	1208
o-xy1	954	670
nC9	547	395
1,2,4 TMB	3055	1914
nC10	1107	733
nC11	3551	1869
Naph	113057	52776
nC12	5569	3537
IP13	4156	1163
IP14	0	0
nC13	7055	4102
IP15	0	0
nC14	25848	15397
IP16	10040	3245
nC15	13462	4490
nC16	13363	7111
IP18	7773	2922
nC17	11348	4910
Pristane	10800	2054
nC18	1231	622
Phytane	3478	2156
nC19	10446	5303
nC20	10747	6077
nC21	8563	5273
nC22	9961	5099
nC23	8751	4929
nC24	9421	5200
nC25	7271	4222
nC26	7630	3888
nC27	6411	3494
nC28	4625	2672
nC29	3087	1943
nC30	3273	1602
nC31	4702	1568
nC32	1920	1049
nC33	699	583
nC34	993	572
nC35	908	535
nC36	1076	425
nC37	893	395
nC38	760	289
nC39	408	156
nC40	0	0

Figure 11, Multipanel display of gas chromatogram of the B18 LNAPL sample.

Torkelson Geochemistry, Inc.

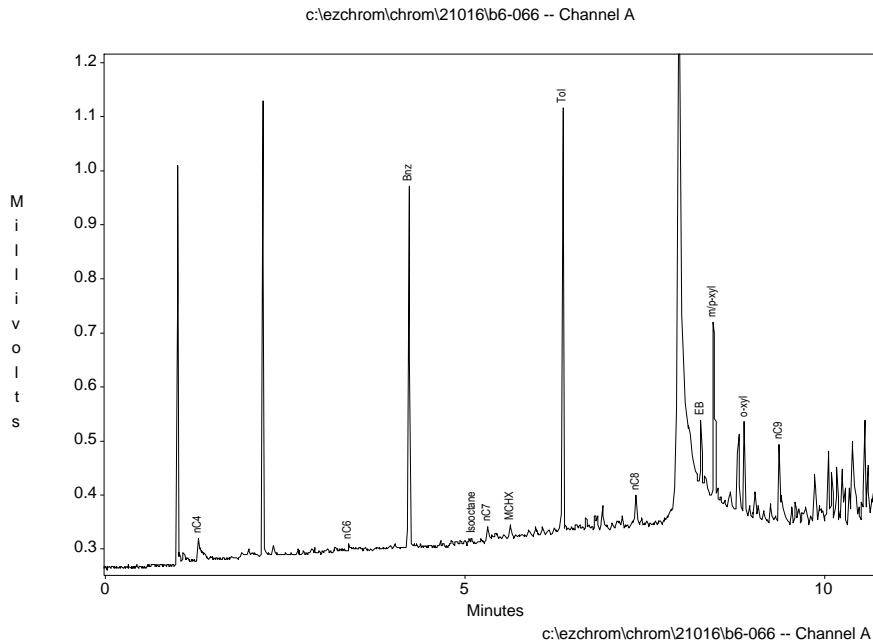
Sparrows Point IM, Sparrows Point, MD

Sample ID : B6-066 LNAPL

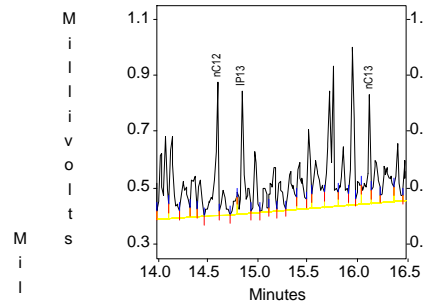
Acquired : Apr 06, 2021 09:44:19

GC/FID

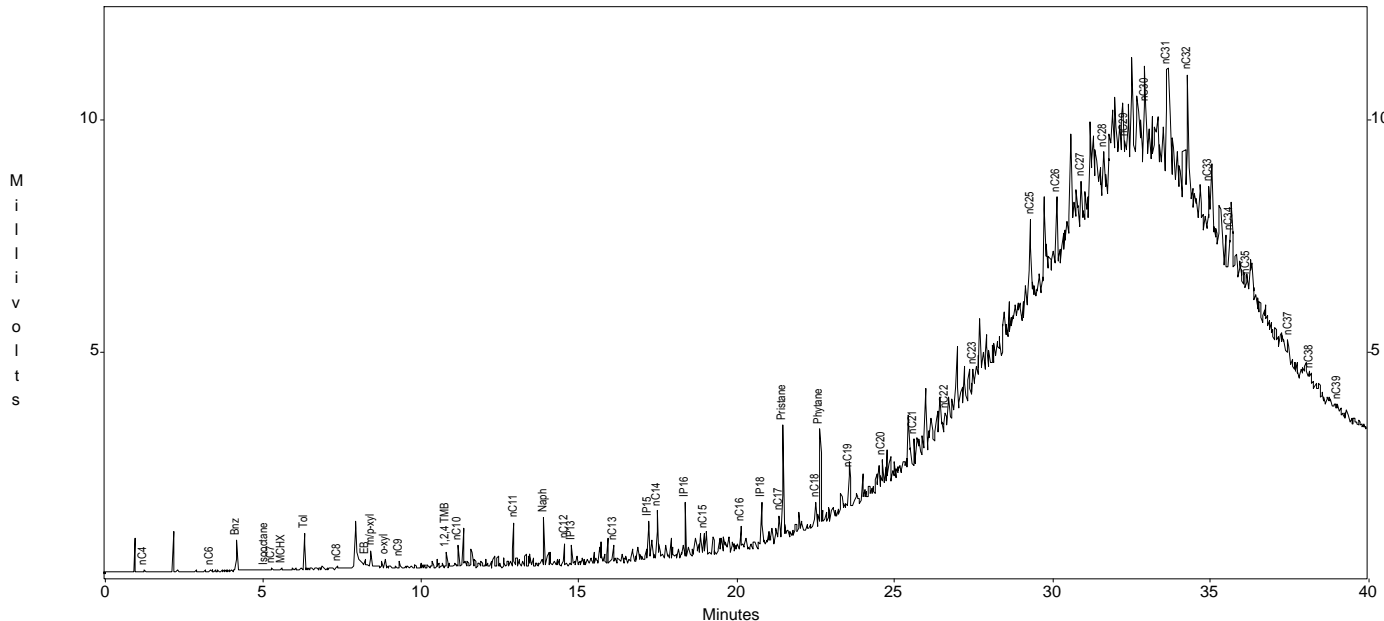
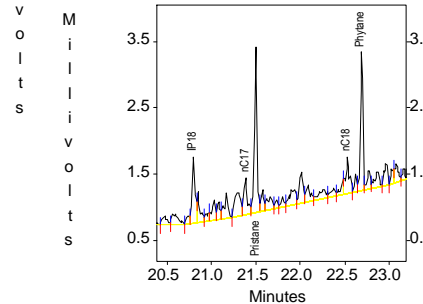
Channel A Results



c:\ezchrom\chrom\21016\b6-066 -- Channel A



c:\ezchrom\chrom\21016\b6-066 -- Channel A



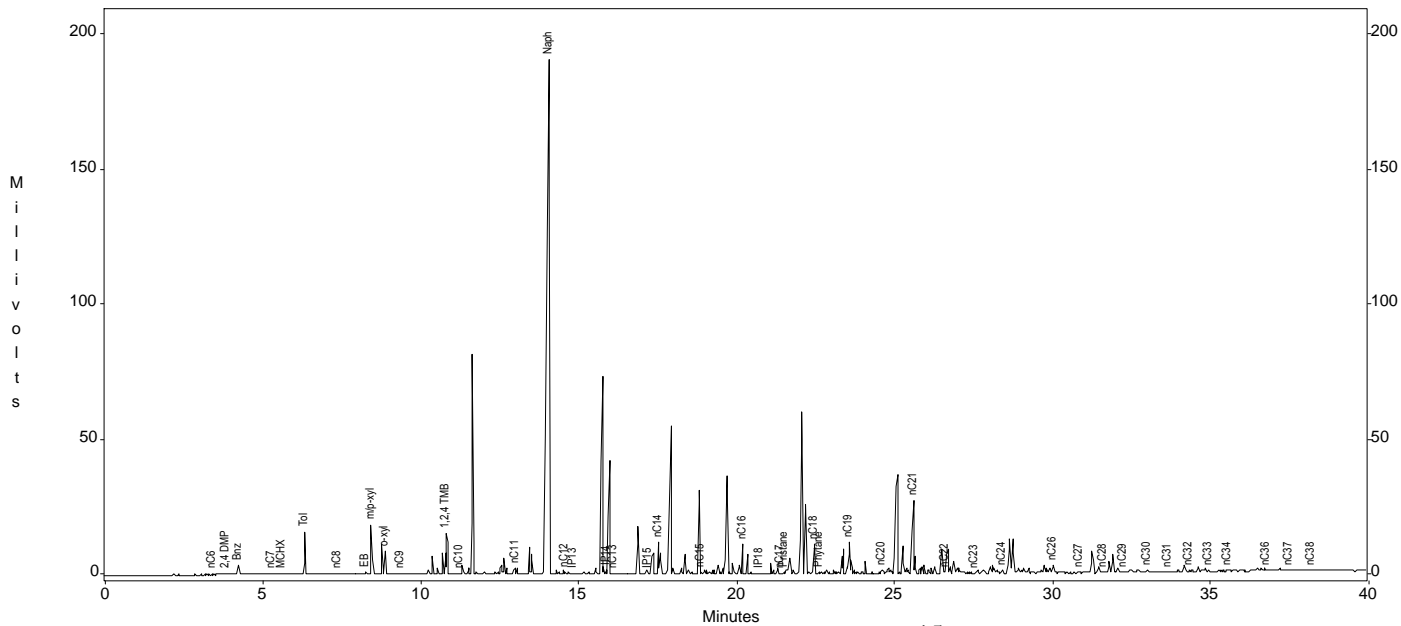
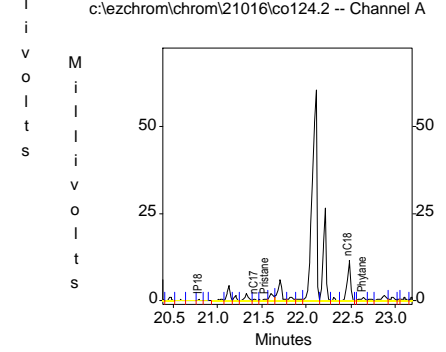
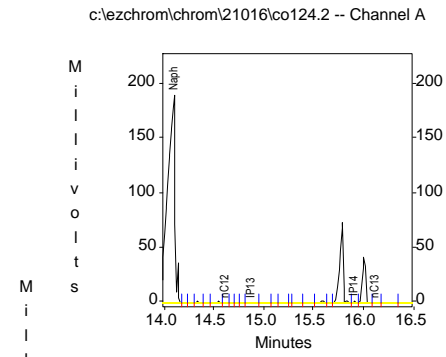
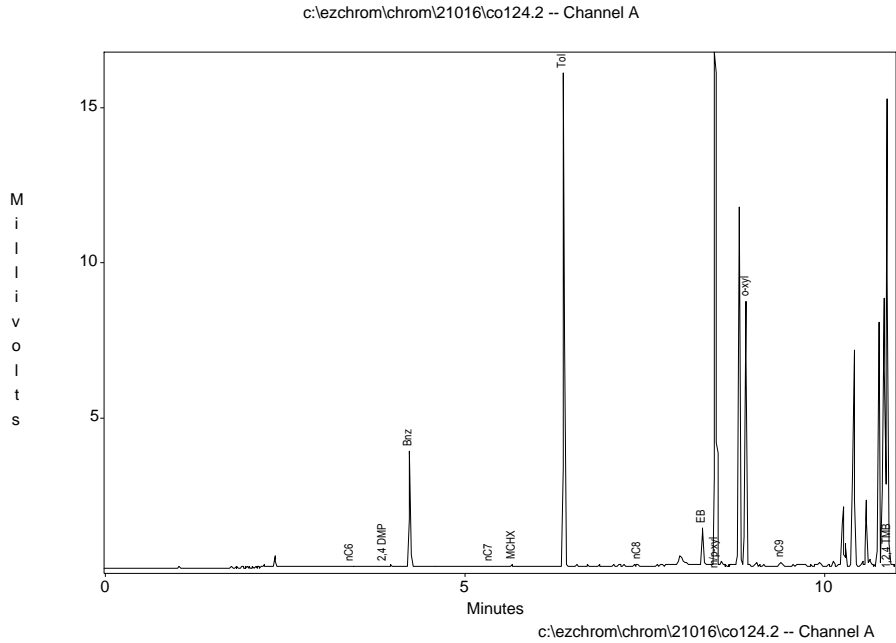
Peak	Area	Height
nC4	52	38
iC5	0	0
nC5	0	0
MTBE	0	0
2M Pentane	0	0
nC6	12	10
olefin a	0	0
olefin b	0	0
olefin c	0	0
2,4 DMP	0	0
Bnz	702	668
Isooctane	19	10
nC7	39	26
MCHX	26	21
Tol	928	780
nC8	115	56
EB	381	186
m/p-xy1	1118	369
o-xy1	309	187
nC9	380	146
1,2,4 TMB	578	330
nC10	873	467
nC11	1790	947
Naph	1858	1056
nC12	1035	476
IP13	986	440
IP14	0	0
nC13	806	391
IP15	1674	867
nC14	2040	1060
IP16	1958	1196
nC15	692	424
nC16	928	481
IP18	2106	984
nC17	1364	559
Pristane	4887	2482
nC18	1564	553
Phytane	4258	2079
nC19	1352	799
nC20	1396	587
nC21	912	510
nC22	1217	408
nC23	983	478
nC24	0	0
nC25	8287	1924
nC26	4940	1564
nC27	3334	1118
nC28	2074	1048
nC29	265	210
nC30	440	155
nC31	2935	1236
nC32	4281	2187
nC33	1137	621
nC34	540	286
nC35	191	94
nC36	0	0
nC37	447	205
nC38	110	73
nC39	189	89
nC40	0	0

Figure 12, Multipanel display of gas chromatogram of the B6-066 LNAPL sample.

Sparrows Point IM, Sparrows Point, MD
 Sample ID : CO124 DNAPL
 Acquired : Apr 06, 2021 14:00:28

Torkelson Geochemistry, Inc.
 GC/FID

Channel A Results



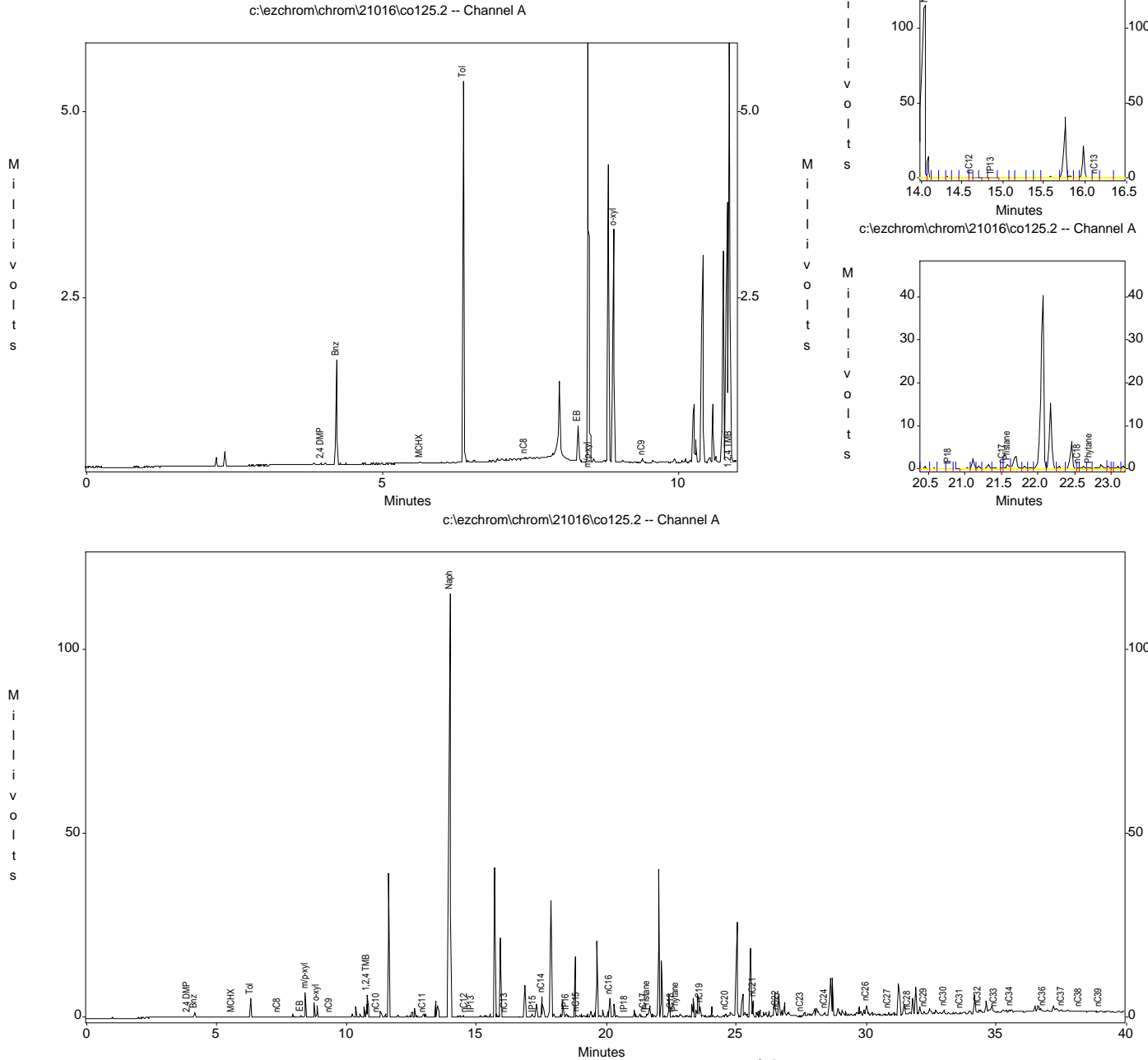
Peak	Area	Height
nC4	0	0
iC5	0	0
nC5	0	0
MTBE	0	0
2M Pentane	0	0
nC6	11	13
olefin a	0	0
olefin b	0	0
olefin c	0	0
2,4 DMP	32	31
Bnz	3909	3723
Isooctane	0	0
nC7	27	24
MCHX	69	54
Tol	18847	15821
nC8	63	46
EB	1579	1185
m/p-xy1	32466	18046
o-xy1	10902	8493
nC9	188	110
1,2,4 TMB	26643	15012
nC10	482	230
nC11	3663	2020
Naph	964319	190527
nC12	1385	615
IP13	1123	375
IP14	2846	1407
nC13	1298	529
IP15	1420	554
nC14	21515	11735
IP16	0	0
nC15	1701	741
nC16	20486	10910
IP18	648	244
nC17	1026	400
Pristane	2157	558
nC18	29134	11362
Phytane	3124	1075
nC19	28497	11895
nC20	3017	1201
nC21	78441	27297
nC22	2258	852
nC23	459	217
nC24	5656	1210
nC25	0	0
nC26	11564	2888
nC27	1354	547
nC28	478	243
nC29	2221	515
nC30	2019	722
nC31	747	301
nC32	926	492
nC33	988	219
nC34	672	149
nC35	0	0
nC36	66	0
nC37	491	168
nC38	30	14
nC39	0	0
nC40	0	0

Figure 13, Multipanel display of gas chromatogram of the CO124 DNAPL sample.

Sparrows Point IM, Sparrows Point, MD
 Sample ID : CO125 DNAPL
 Acquired : Apr 06, 2021 12:17:21

Torkelson Geochemistry, Inc.
 GC/FID

Channel A Results



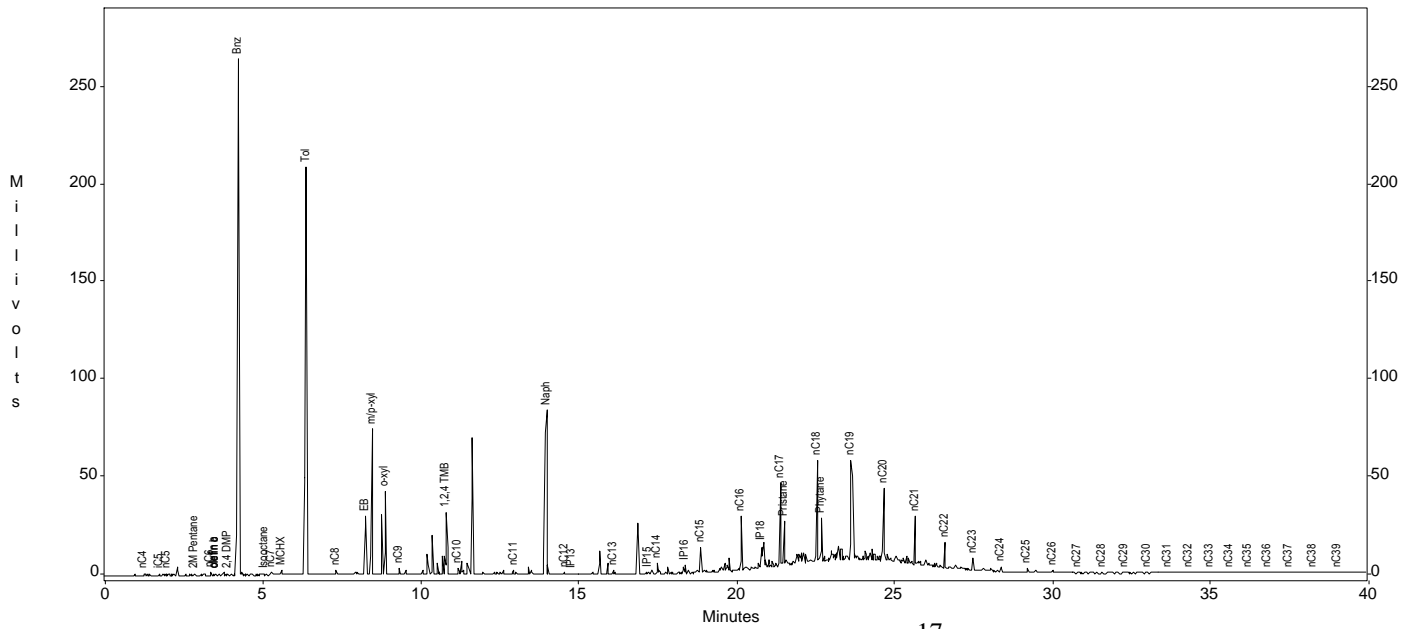
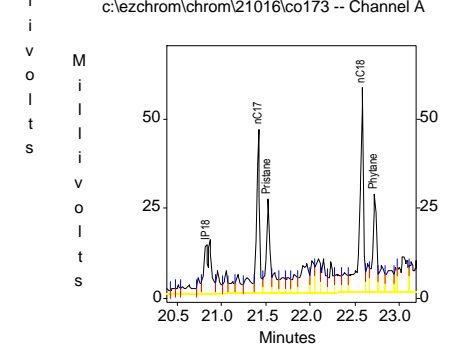
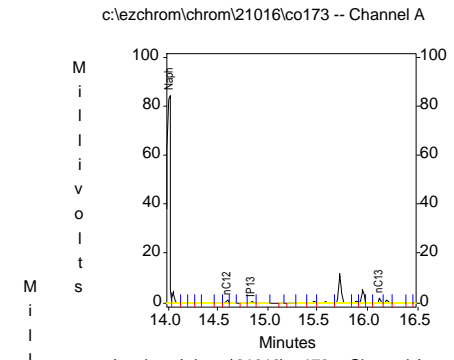
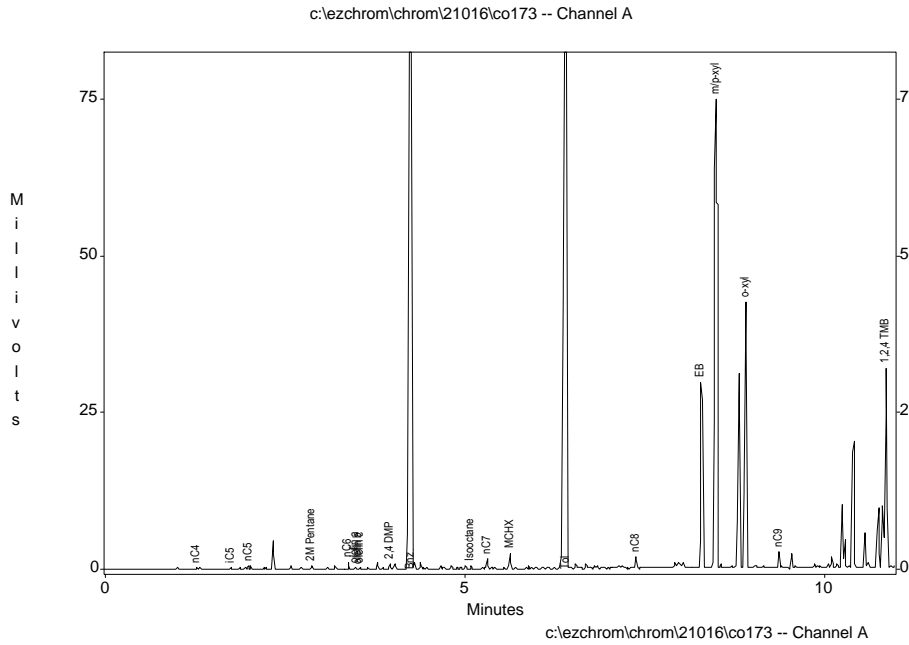
Peak	Area	Height
nC4	0	0
iC5	0	0
nC5	0	0
MTBE	0	0
2M Pentane	0	0
nC6	0	0
olefin a	0	0
olefin b	0	0
olefin c	0	0
2,4 DMP	24	22
Bnz	1460	1392
Isooctane	0	0
nC7	0	0
MCHX	23	20
Tol	6067	5093
nC8	63	39
EB	670	471
m/p-xy1	11243	6667
o-xy1	4032	3120
nC9	78	43
1,2,4 TMB	10263	5966
nC10	601	184
nC11	1642	219
Naph	370883	115171
nC12	494	263
IP13	427	151
IP14	0	0
nC13	562	246
IP15	564	252
nC14	10224	5605
IP16	1475	864
nC15	843	376
nC16	9686	5254
IP18	337	135
nC17	469	259
Pristane	2979	878
nC18	260	125
Phytane	821	340
nC19	6276	2660
nC20	1606	695
nC21	8481	4102
nC22	1504	565
nC23	369	176
nC24	4150	911
nC25	0	0
nC26	9945	2684
nC27	1314	554
nC28	421	230
nC29	2192	610
nC30	2827	1001
nC31	1088	444
nC32	1507	779
nC33	233	147
nC34	1268	352
nC35	0	0
nC36	69	0
nC37	1573	533
nC38	339	67
nC39	104	39
nC40	0	0

Figure 14, Multipanel display of gas chromatogram of the CO125 DNAPL sample.

Sparrows Point IM, Sparrows Point, MD
 Sample ID : CO173 LNAPL
 Acquired : Apr 06, 2021 08:04:42

Torkelson Geochemistry, Inc.
 GC/FID

Channel A Results



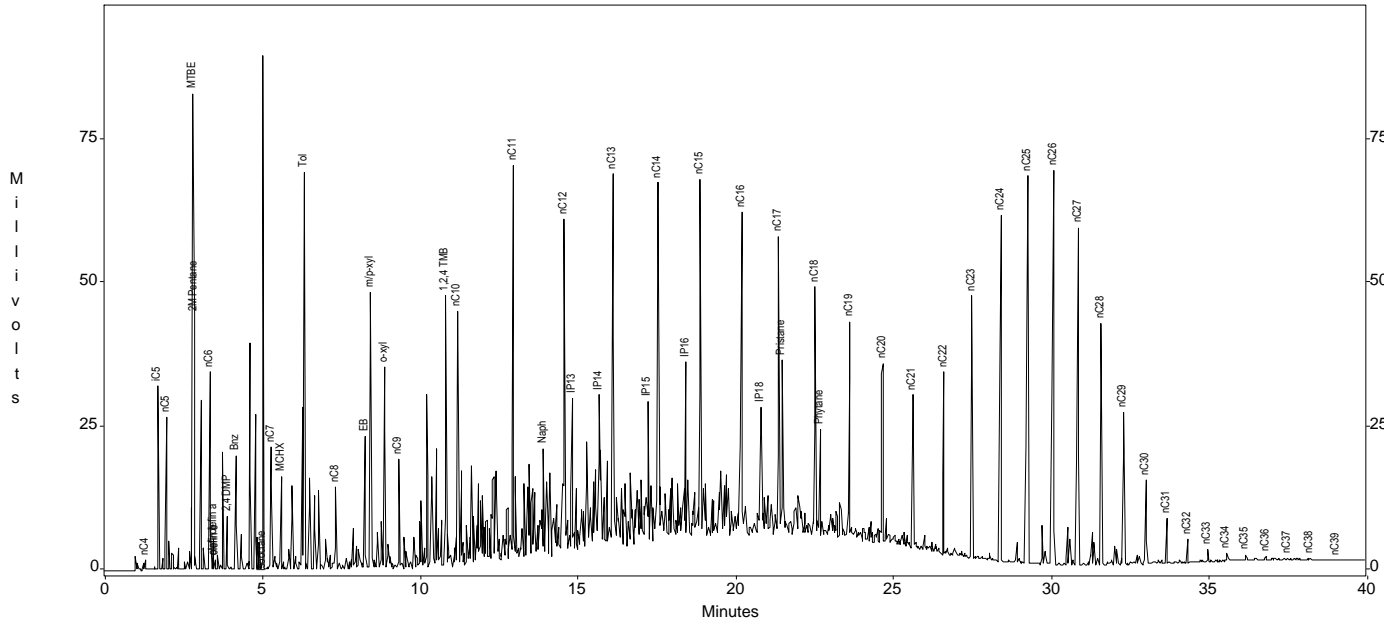
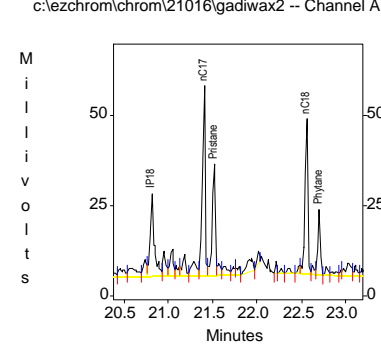
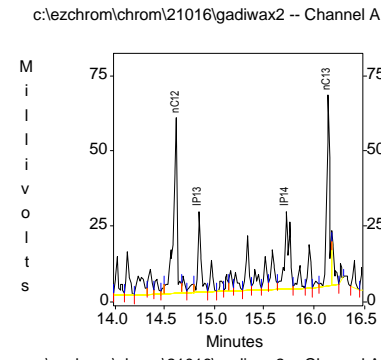
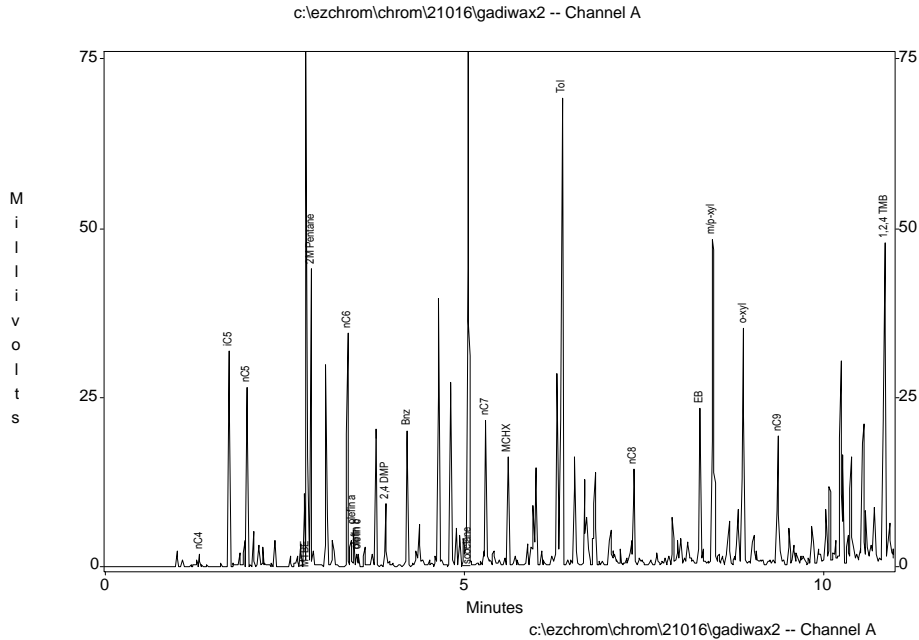
Peak	Area	Height
nC4	88	152
iC5	140	201
nC5	342	453
MTBE	0	0
2M Pentane	386	416
nC6	1124	1135
olefin a	132	89
olefin b	51	50
olefin c	89	72
2,4 DMP	963	866
Bnz	540876	264459
Isooctane	517	457
nC7	1885	1676
MCHX	2875	2368
Tol	536021	209565
nC8	2245	1816
EB	39352	29639
m/p-xy1	203543	75074
o-xy1	62153	42474
nC9	3457	2693
1,2,4 TMB	56528	31915
nC10	4557	2952
nC11	5037	2144
Naph	229103	84620
nC12	2343	1467
IP13	805	457
IP14	0	0
nC13	2527	1808
IP15	2013	931
nC14	10646	5535
IP16	7449	4300
nC15	20392	12717
nC16	56495	28294
IP18	72476	13573
nC17	102146	45389
Pristane	65920	25810
nC18	157667	56701
Phytane	77091	27247
nC19	140606	56147
nC20	105141	41985
nC21	55923	27362
nC22	24677	13184
nC23	11578	6141
nC24	4372	2656
nC25	3114	1756
nC26	1561	895
nC27	1089	580
nC28	938	497
nC29	451	301
nC30	431	277
nC31	596	257
nC32	368	197
nC33	305	160
nC34	121	65
nC35	120	68
nC36	110	54
nC37	101	42
nC38	197	42
nC39	158	30
nC40	0	0

Figure 15, Multipanel display of gas chromatogram of the CO173 LNAPL sample.

Sparrows Point IM, Sparrows Point, MD
 Sample ID : Gas/Dies/Wax std
 Acquired : Apr 06, 2021 10:35:22

Torkelson Geochemistry, Inc.
 GC/FID

Channel A Results



Peak	Area	Height
nC4	936	1737
iC5	21249	31866
nC5	18624	26408
MTBE	79122	82880
2M Pentane	39748	44038
nC6	34618	34368
olefin a	5926	5224
olefin b	1727	1767
olefin c	2098	1789
2,4 DMP	9742	9273
Bnz	22255	19876
Isooctane	132234	89426
nC7	26173	21362
MCHX	19992	16022
Tol	120686	69156
nC8	17675	14139
EB	33040	23208
m/p-xy	115617	48126
o-xy	53186	35143
nC9	31442	19107
1,2,4 TMB	83931	47371
nC10	69605	44298
nC11	128658	68455
Naph	31452	18542
nC12	149650	58252
IP13	54331	26756
IP14	92527	25850
nC13	140048	63459
IP15	58577	24866
nC14	198196	62850
IP16	75306	31288
nC15	137246	63109
nC16	145395	56815
IP18	71126	22680
nC17	113647	52253
Pristane	68915	30626
nC18	91190	43114
Phytane	37507	18318
nC19	78094	37796
nC20	60045	31193
nC21	48775	26661
nC22	63730	31872
nC23	102634	45679
nC24	158930	60430
nC25	191653	67503
nC26	197849	68620
nC27	151235	58802
nC28	95146	42212
nC29	51756	26569
nC30	23509	14302
nC31	13473	7760
nC32	7103	4181
nC33	3810	2124
nC34	2412	1313
nC35	1267	739
nC36	827	413
nC37	584	229
nC38	331	110
nC39	249	70
nC40	0	0

Figure 16, Multipanel display of gas chromatogram of laboratory standard (gasoline/diesel/wax mixture).

Table 1. Results of physical property analyses.

Torkelson Geochemistry, Inc.							
Physical Properties Measurements							
Sample	TGI Job	Density of NAPL (gm/ml)	Viscosity of NAPL (centipoise)	Surface Tension Air/Water (dynes/cm)	Interfacial Tension NAPL/Water (dynes/cm)	Surface Tension Air/NAPL (dynes/cm)	Temperature of Measurements
CO173 LNAPL	21016	NR	6.2	NR	NR	NR	60F

NR = Not Requested

ATTACHMENT 2

Test Pit Observations
Area B: Parcel B6 – B6-066 NAPL Area
Sparrows Point, Maryland



070821-1: TP-1 – Test Pit following excavation



070821-2: TP -1 – Excavated Material Stockpiles

Test Pit Observations
Area B: Parcel B6 – B6-066 NAPL Area
Sparrows Point, Maryland



071221-1: TP-2 – Test Pit following extraction



070821-3: TP-2 – Excavated Material Stockpile

**Test Pit Observations
Area B: Parcel B6 – B6-066 NAPL Area
Sparrows Point, Maryland**



080621-1: TP-2 – Observation Point (While Backfilling)



080621-2: TP-2 – Temporary Monitoring Point (Backfilled)

Test Pit Observations
Area B: Parcel B6 – B6-066 NAPL Area
Sparrows Point, Maryland



070821-4: TP-3 – Test Pit following excavation



070821-5: TP-3 – Excavated Material Stockpile

Test Pit Observations
Area B: Parcel B6 – B6-066 NAPL Area
Sparrows Point, Maryland



070821-6: TP-4 – Test Pit following excavation



070821-7: TP-4 – Excavated Material Stockpile