Arnold F. Fleming, P.E.
&

Fleming
Lee Shue

Environmental Management & Consulting

June 23, 2016

Mr. Michael Haggerty
Project Manager
New York State Department of Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-7020

Re: Bedrock NAPL Recovery Remedial Design Report
Queens Plaza Residential Development – Site B – BCP Site No. C241151
LIC Development Owner, L.P. (Tishman Speyer)

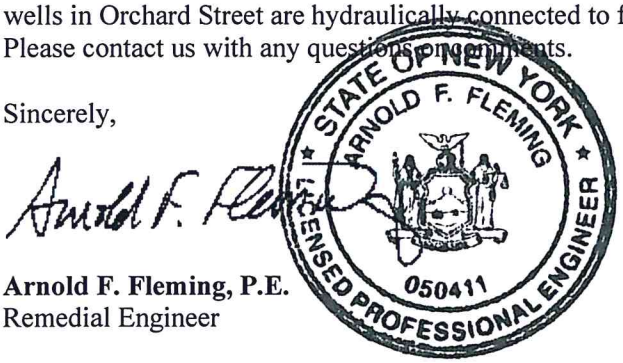
Dear Mr. Haggerty:

On behalf of LIC Development Owner, L.P.; Arnold F. Fleming, P. E.; and Fleming-Lee Shue, Inc. (collectively FLS) are submitting this Bedrock NAPL Recovery Remedial Design Report (Report) for the Queens Plaza Residential Development (QPRD) Brownfield Cleanup Program (BCP) Site B located at 28-10 Jackson Avenue, Long Island City, New York (referred to herein as the 'Site' or 'BCP Site B'). The Report presents the results of Non-aqueous Phase Liquid (NAPL) recovery following efforts detailed in the earlier report entitled Bedrock Investigation Results – Remedial Design (attached), submitted to the New York State Department of Environmental Conservation (NYSDEC) on February 5, 2016. The Report includes a summary of a bedrock geophysical investigation; the results of delineation rock coring; the results of recent product recovery and monitoring; and the proposed Remedial Design for monitoring and recovering NAPL in the future. This report was revised per the Department's comments in the annotated May 6, 2016 Remedial Design Report sent June 8, 2016.

After reviewing the data from numerous manual recovery and two product vacuum removal events, there remains limited NAPL accumulation in the bedrock and as of this date, recovery efforts have removed as much product as practicable. After drilling 20 rock cores and removing NAPL on 18 separate occasions, from January 6, 2016 through April 11, 2016, including two product vacuum removal events, less than 11 gallons of product has been recovered and removal has become asymptotic. Additionally, the rock cores were monitored periodically for the presence of DNAPL accumulation at the bottom of the rock cores. No DNAPL was observed during the approximate three-month monitoring period.

The Remedial Design presented below consists of installing rock wells in the sidewalk along Orchard Street to allow continued monitoring and collection of any NAPL that may potentially accumulate. The rock wells in Orchard Street are hydraulically connected to fractures that reach inside the Site.
Please contact us with any questions or comments.

Sincerely,



Arnold F. Fleming, P.E.
Remedial Engineer

Attachments: Bedrock Investigation Results– Remedial Design, February 5, 2016

Introduction and Background

A Remedial Investigation (RI) for BCP Site B was completed by Fleming Lee-Shue, Inc. (FLS) and Roux Associates, Inc. (Roux) in June 2015. The RI included the installation of 20 soil borings over the entire BCP Site B. Non-aqueous Phase Liquid (NAPL)-stained soil was observed directly atop the bedrock in three of the 20 borehole locations. All three locations were on the western side of BCP Site B.

A parallel geotechnical investigation, carried out by Mueser Rutledge Consulting Engineers (MRCE), took place during the RI in June 2015. As part of this investigation MRCE drilled 19 rock cores throughout BCP Site B. The cores extended approximately 10 feet into bedrock. Two MRCE rock cores, MR-2 and MR-7, were installed near locations where NAPL-stained soil was observed at the soil-rock contact during the Site B RI. (NAPL was not observed in any of 19 rock cores (FLS/Roux Site B Remedial Investigation Report, June 2015). In addition, MRCE installed rock cores in a 2007 geotechnical investigation of Site A. Two of the rock cores, A-10 and A-12P, were advanced near grid cells where NAPL-stained soil was observed at the soil-rock contact in the RI. Free NAPL product was not observed in either of these rock cores. Both MRCE cores extended 10 to 11 feet into rock.

At the request of NYSDEC, a Shallow Bedrock Investigation was completed in August 2015. NAPL in bedrock was subsequently observed during the Shallow Bedrock Investigation in August 2015 (rock cores RC-1, RC-2, RC-3, and RC-4) and in December 2015 during installation of rock anchors on the western portion of BCP Site B at elevations of approximately (-21 ft.) to (-25 ft.) North American Vertical Datum 88 (NAVD88). A subsequent bedrock geophysical investigation showed that the NAPL was likely emanating from shallower fractures between (-6 ft.) NAVD88 and (-11 ft.) NAVD88. Due to the evidence of NAPL in the bedrock and previous observations of NAPL-stained soils during the June 2015 RI, NYSDEC requested further bedrock investigation on BCP Site B.

On December 24, 2015, FLS proposed the installation of seven additional bedrock cores located on the western side of BCP Site B. The proposed plan was approved by NYSDEC on December 28, 2015. The purpose of the rock cores was as follows:

- Investigate NAPL impacts in bedrock (assess potential free-phase NAPL and NAPL quantity)
- Evaluate potential migration pathways and explore the potential fractures in the bedrock trace where NAPL was observed
- Identify potential NAPL impacts to Orchard Street
- Identify additional potential zones of NAPL and/or DNAPL accumulation
- Identify locations/intervals for NAPL recovery along Orchard Street and on BCP Site B

NYSDEC approved the rock core locations with the understanding that the results would be evaluated and used to support recommendations for additional rock cores, if warranted. The rock cores were converted to rock core wells for subsequent gauging and monitoring in these and subsequent rock cores. NAPL recovery, as noted in the approved Remedial Action Work Plan for

Site B, will be part of the remedy and executed as an Engineering Control. Figure 1 shows the rock core locations completed as part of this investigation.

The Bedrock Investigation (December 31, 2015 through January 8, 2016) included installation of seven additional rock core wells to assess the extent of NAPL in bedrock and measure NAPL levels (RC-5, RC-6, RC-7, RC-8/8B, RC-9, RC-10, and RC-11). The investigation found measurable free-phase NAPL in six of the seven rock core wells with product thicknesses ranging from 0.01 feet to 4.6 feet. Most of the product (98 percent) occurred in three wells (RC-6, RC-7, and RC-10). Free-phase NAPL in the remaining wells ranged from zero to 0.22 feet. Following the installation of the rock cores, a geophysical investigation to examine the fabric of the bedrock and identify the location, orientation, and elevations of NAPL-bearing fractures was conducted. The investigation identified hydraulically active fractures which were then used to position the subsequent rock cores.

Based on the results of the December/January rock cores and the subsequent geophysical investigation, nine additional rock cores (RC-12, RC-13, RC-14, RC-15, RC-17, RC-18, RC-19, RC-26, and RC-27) were advanced from March 18, 2016 through March 28, 2016 to identify the extent of NAPL impacts in bedrock (Figure 1). These rock cores had no observable free-phase NAPL in the rock matrix with the exception of RC-12 on Orchard Street. Rock cores RC-15, RC-17, RC-18, RC-19, and RC-27 were devoid of NAPL staining.

NAPL recovery began nearly as soon as the first rock core wells were installed (January 6, 2016) using a vacuum truck, submersible pumps and bailers, and continued periodically until April 11, 2016, when it became evident that nearly all free-phase NAPL had been removed and it was impracticable to continue removal efforts. NAPL removal efforts using pumps and bailers occurred during one very heavy rainfall, one heavy snowfall, and pile installation and attendant water injection. All of these events would have been expected to promote mobilization of free-phase NAPL. As a result, it is expected that isolated pockets of remaining free-phase NAPL have been largely purged and available free-phase NAPL has been collected as of April 11, 2016, when NAPL recovery was suspended because of asymptotic recovery. Product and fluid removal by vacuum extraction occurred twice during this period, once on February 19, 2016, and again on April 6, 2016.

The estimated total quantity of free-phase NAPL recovered after all removal efforts is 10.6 gallons. Among the six wells accessible for gauging during the last recovery effort, the total NAPL volume available for recovery was approximately 0.013 gallons (*less than 2 ounces).*

Bedrock NAPL Investigation

NAPL in bedrock was investigated by two separate means: (1) bedrock coring and examination of the rock cores along with gauging the cores for NAPL and (2) a geophysical investigation to examine the fabric of the bedrock and identify the location, orientation, and elevations of NAPL-bearing fractures. The geophysical investigation results were reported in detail in the February 2, 2016 report entitled *Bedrock Investigation Results*. A total of 20 rock cores were examined for NAPL within the rock matrix. Table 1 lists the rock cores and their surface and bottom elevations in NAVD88.

Table 1 – Rock Cores
Elevations in NAVD88

Rock Core	Surface Elevation	Bottom Elevation	Installation Date
RC-1	6.6	-3.4	8/10/15
RC-2	4.5	-5.4	8/11/15
RC-3	4.5	-5.4	8/11/15
RC-4	7.3	3.6	8/12/15
RC-5	7	-25	12/22/15
RC-6	4	-38	12/23/15
RC-7	2	-28	1/7/16
RC-8/8B	-2	-33	1/6/16
RC-9	2	-39	12/28/15
RC-10	4	-33	1/6/16
RC-11	14	-42	1/8/16
RC-12	14	-31	3/21/16
RC-13	13	-33	3/19 /16
RC-14	14	-33	3/25/16
RC-15	4	-32	3/23/16
RC-17	6	-59	3/21/16
RC-18	7	-37	3/18/16
RC-19	7	-33	3/20/16
RC-26	10	-47	3/15/16
RC-27	6	-46	3/26/16

The 20 rock cores yielded 119 individual rock sections each of which was examined for NAPL. After the initial rock cores (RC-1, RC-2, RC-3, and RC-4) in August 2015, subsequent rock cores (RC-5 through RC-15, RC-17, RC-18, RC-19, RC-26, and RC-27) extended to elevation -30 ft. NAVD88 or deeper, where feasible, to ensure that rock coring encountered fractures potentially containing NAPL as determined by the bedrock investigation and in consultation with the NYSDEC. In the final round of rock coring in March 2016, the cores extended to elevations deeper than -30 ft. NAVD88, so as to account for the bedrock dip. Table 2 presents the breakdown of visual NAPL observation in the bedrock core sections.

Table 2 – NAPL Visual Observations

NAPL Observation	Frequency	Percent	Cumulative
No NAPL Stain or Product	95	80	80
NAPL Staining Only	17	14	94
Free-phase NAPL	7	6	100
Total	119	100	

As shown, 80 percent of the individual rock core sections were entirely free of free-phase NAPL or NAPL staining. Fourteen percent had NAPL staining only and no observable free-phase NAPL.

In only seven instances (6 percent) was free-phase NAPL observed in a rock core section. Tables 3.1 and 3.2 list the rock cores where FLS/Roux observed NAPL-stained rock and/or free-phase NAPL.

Table 3.1 – Rock Cores with NAPL Staining Only

Rock Core[1]	NAPL Observation
RC-4	NAPL stain only
RC-13	NAPL stain only
RC-14	NAPL stain only
RC-26	NAPL stain only

Table 3.2 – Rock Cores with Free-phase NAPL

Rock Core	NAPL Observation
RC-5	Free-phase NAPL/NAPL Staining
RC-6	Free-phase NAPL/NAPL Staining
RC-7	Free-phase NAPL/NAPL Staining
RC-9	Free-phase NAPL/NAPL Staining
RC-10	Free-phase NAPL/NAPL Staining
RC-11	Free-phase NAPL/NAPL Staining
RC-12	Free-phase NAPL/NAPL Staining

The rock cores with free-phase NAPL identified in Table 3.2 are all near the bedrock mound in the western portion of Site B or lie along Orchard Street and form the Area of Retention (Figure 1). The remaining rock cores (RC-17, RC-18, RC-19, and RC-27) were entirely free of free-phase NAPL or NAPL staining within the rock fractures.[2]

Three rock core wells (RC-18, RC-13, and RC-26) accumulated trace amounts of free-phase NAPL after installation, although none was observed during examination of the rock cores at the time of installation. The median NAPL thickness in these rock core wells measured 0.02 feet in 27 measurements.

All contaminated material and source material were removed to the extent practicable during excavation and the exact source of this small volume of NAPL is unknown. During the last time FLS removed NAPL on April 11, 2016, the volume of NAPL in each of these wells measured 0.0065 gallons (0.8 ounces) in RC-18; 0.02 gallons (2.6 ounces) in RC-13; and 0.013 gallons (1.7

[1] Rock cores RC-1, RC-2, RC-3 and RC-4 were initial rock cores to shallow depths. RC-2 and RC-3 are on Site A outside the scope of this investigation. Rock core RC-1 excluded from analysis as it was shallow and not comparable with the deeper cores. RC-4 is shallow but included in analysis because it is in the Area of Retention.

[2] RC-18 had slight NAPL staining in the uppermost weathered rock in the core.

ounces) in RC-26. Nonetheless, these NAPL volumes, while very small, are probably biased high because of the difficulty in obtaining accurate probe measurements with such small NAPL thicknesses. All NAPL that accumulated in the wells post installation has been removed.

Combined, this yields a biased high estimate of 0.04 gallons (5 ounces) in the three locations (and 0.195 gallons (2.5 ounces) in the two rock cores on Site B). This volume is too small to migrate through soil and would not be expected to have any measurable adverse impact on groundwater quality. The odds that this small NAPL volume could migrate through the soil/rock matrix and adversely impact groundwater quality is expected to be infinitesimal.

Activating capture wells along the border with LIRR in response to this NAPL would not likely yield any benefit. The potential harm derived from pulling contaminated water from off-Site by activating the capture wells would likely negate any benefit of mitigating the potential effects arising from 2.5 ounces of NAPL.

The March 2016 geophysical investigation involved down-hole probes in seven of the rock cores (RC-5 through RC-11) using instrumentation to measure the strike and dip of the rock and the number and orientation of rock fractures. The geophysical investigation found the rock fabric (strike) trends northeast to southwest and the rock structure dips, primarily, to the southeast. The geophysical investigation identified hydraulically active fractures and the highest density of fractures predominantly between the elevations of (-6 ft.) NAVD88 and (-11 ft.) NAVD88. These fractures were consistent with field observations of free-phase NAPL during rock coring. Details of the geophysical investigation may be found in the February 2, 2016 *Bedrock Investigation Results* report. The results of the geophysical investigation were used to position the additional rock cores that were advanced in March 2016.

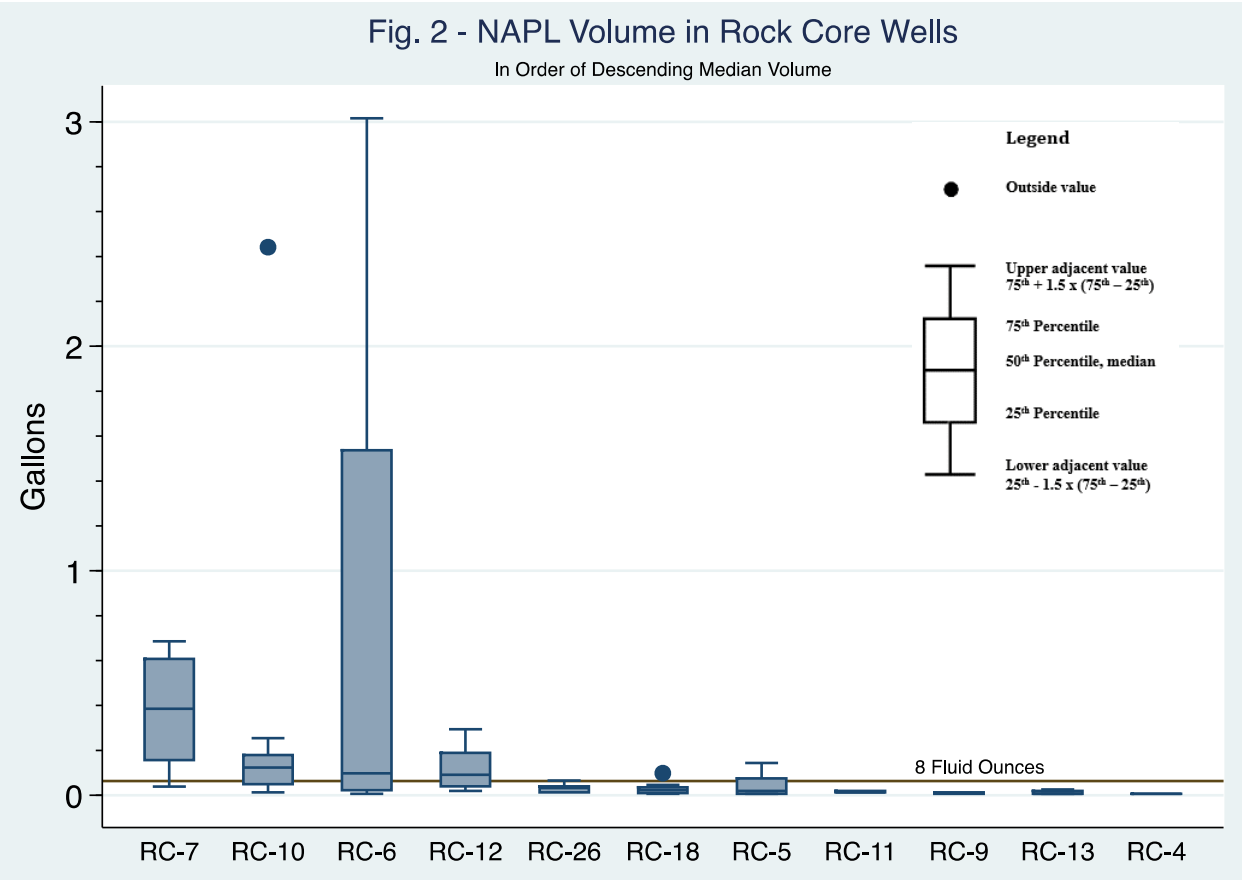
Area of Retention

The area containing free-phase NAPL within the bedrock is limited to the southwest portion of BCP Site B centered near the top of the bedrock ridge. Figure 1 shows the limits of the Area of Retention (AOR), the area where free-phase NAPL was observed within the bedrock prior to removal. The AOR in Site B encompassed approximately 4,820 square feet (ft^2) compared with the total Site B area of 82,328 ft^2, or approximately 6 percent of the total area. Within the AOR was a total recoverable NAPL volume of approximately 10.6 gallons, or approximately 0.002 gallons (0.26 ounces)/ft^2.

Fluid level Monitoring and Product Recovery

Free-phase NAPL level gauging and product recovery in the rock core wells occurred 18 times from January 6, 2016, through April 11, 2016. The product volumes ranged from no measurable NAPL in most rock core wells, to 3 gallons in RC-6 during gauging/recovery activities. The median NAPL volume in 122 measurements was 0.009 gallons (1.2 ounces). Figure 2 shows the volume of product measured in each rock core well where free-phase NAPL appeared. As shown in Figure 2, nearly all of the NAPL occurred in three rock core wells, RC-6, RC-7, and RC-10, where the median and maximum volumes were highest. These three rock core wells were located

near the top of the bedrock ridge, and encompassed approximately 90 percent of the total NAPL volume measured. To a lesser extent, NAPL occurred in RC-12, which is also located close to the top of the bedrock ridge. Including RC-12, 93 percent of the NAPL occurred in four of the 20 rock core locations.



NAPL was removed episodically from each of the rock core wells, while gauging, using submersible pumps and bailers until the NAPL reached near zero volume and removal became asymptotic. The exception was RC-10, where removal ceased when it became inaccessible. The last measurement in RC-10 (March 25, 2016) recorded approximately 0.063 gallons (8 ounces) of product. All other wells measured near zero product volume.

Several weather and construction events occurred during fluid level monitoring and removal that would be expected to enhance fluid accumulation in the rock core wells. These included pile driving and associated water injections, a major rainfall (1.8 inches) on January 10, 2016, and 27

inches of snowfall (equivalent to 2.3 inches of rain)[3] and associated melt on January 23 and 24, 2016. The implication is that natural precipitation aided recovery in that it helped promote NAPL flushing that enhanced recovery.

The rock core wells were also probed for Dense Non-aqueous Phase Liquid (DNAPL) on a number of occasions. No DNAPL was ever observed in any of the rock core wells. Several qualitative agitation tests of NAPL found near the AOR while excavating found the NAPL to float on water. In addition to probing, floating product was observed in the drill pan at some core locations, proof of Light Non-aqueous Phase Liquid (LNAPL). NAPL was also tested for specific gravity in a sample from RC-7 and from Lot 14. The specific gravity in RC-7 measured 0.98 and the specific gravity in Lot 14 measured 0.96, positive, measurable proof of a LNAPL. Thus, all quantitative and qualitative measurements of NAPL found it to be a LNAPL. All fluids generated during coring or development of the rock core wells were sent to the treatment unit before being discharged to the sewer.

LNAPL can be found deep in soil or rock and still be less dense than water. LNAPL occurs at depth due to two factors. These include fluctuating water tables that allow LNAPL to penetrate deeper into the soil/rock when the water table falls and subsequently becomes entrapped in the soil/rock matrix. LNAPL can also be driven deeper into soil and rock due to hydraulic pressure gradients that develop when LNAPL pools. In this instance, the column of LNAPL is heavy enough to push below the water table and/or drive LNAPL to deeper level via areas with a higher frequency of fractures that dip with the rock angle.

Vacuum Removal

Vacuum removal of NAPL took place on two separate occasions, in addition to removal by submersible pump and bailers. The first vacuum event took place on February 19, 2016. The available rock core wells subject to vacuuming included RC-4, RC-5, RC-9, and RC-10.

The rock core wells were vacuumed by inserting a pipe close to the bottom of each well so as to draw water or NAPL levels down and promote entry of fluids into the rock core wells. The pipe was then sealed against the well casing or rock core wall to ensure a good vacuum. A vacuum of 137 inches of negative water column pressure (3,800 cubic feet/minute of vacuum air flow) was applied for approximately 45 to 60 minutes on each well. In all, approximately 2,000 gallons (between 1,900 and 2,200 gallons) of water and an estimated 2.4 gallons of NAPL were removed by vacuuming, all from RC-10. FLS estimated the NAPL removed by estimating the total free-phase NAPL volume in the rock cores before vacuuming and inspecting the vacuum truck tank after product removal. Visual observations of NAPL thickness in the 3,750-gallon vacuum truck tank found no measurable NAPL in the vacuum truck. These measurements and observations formed the basis for estimating the volume of NAPL recovered. The liquid extracted from

[3] Based on National Climatic Data Center Preliminary (NCDC) Monthly/Daily Climate Data for Central Park Weather Station, January 2016.

vacuuming the wells was transferred to the on-Site water management system for treatment before discharge to the City sewer.

A second vacuum event took place on April 6, 2016. Once again, the available wells were vacuumed in the same manner as the first vacuum event. The available rock core wells included RC-12, RC-13, RC-14, RC-18, and RC-26. The total volume of NAPL removed from all wells measured approximately 0.05 gallons (~6 ounces). Approximately 2,000 gallons of water was removed and no measurable product was observed in the vacuum truck. The NAPL volume recovered was estimated using the same methodology as in the first vacuum event; it was disposed in the same manner.

The total estimated NAPL volume removed between December 31, 2015 and April 6, 2016 by all means measured 10.6 gallons. Figure 3 shows the cumulative NAPL removed as well as the volume removed during each time FLS/Roux gauged the wells.

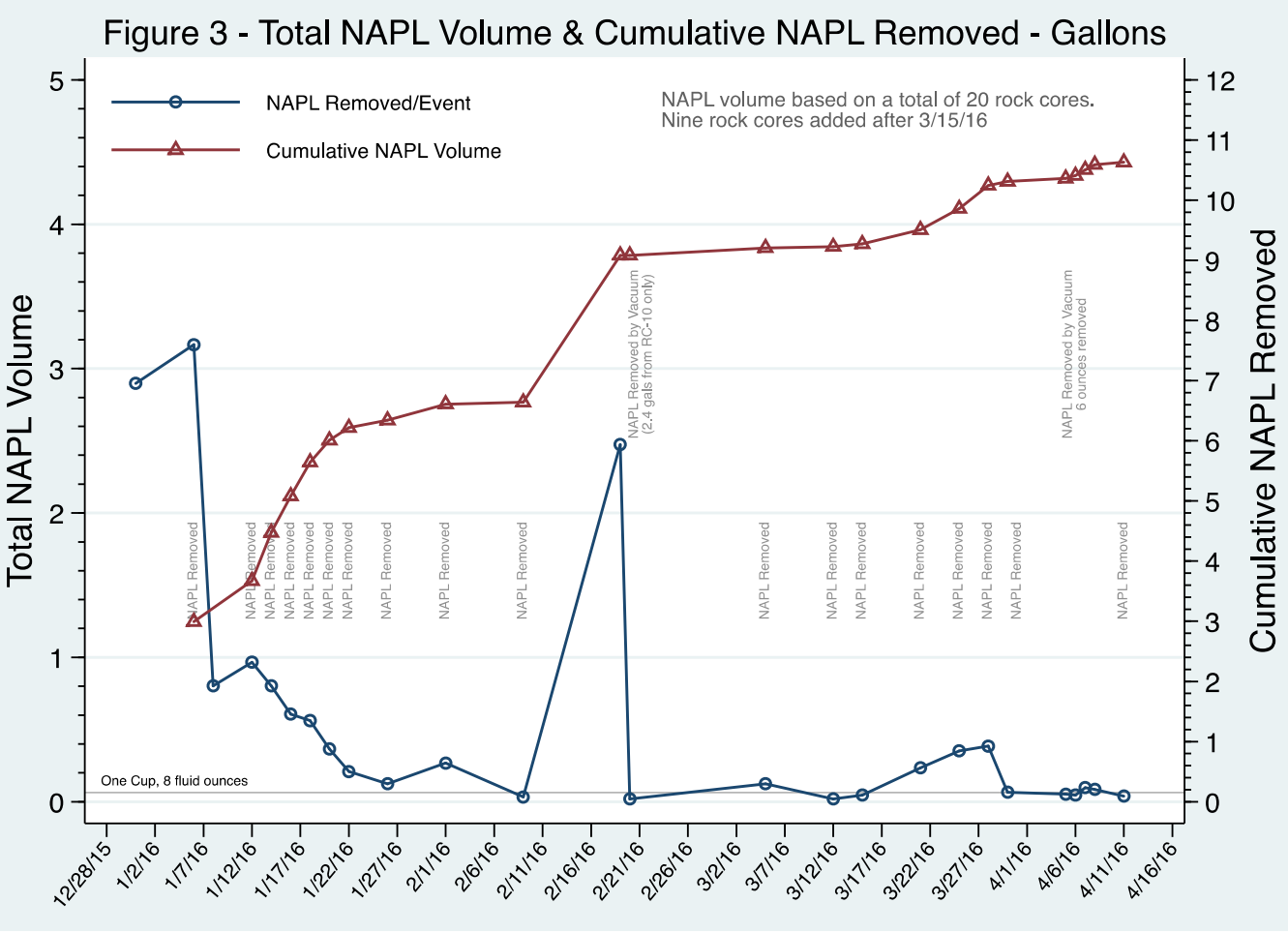


Figure 3 shows that the total volume removed was comparatively small—10.6 gallons—and that that rate of removal has reached asymptotic levels. Product recovery increased during the early period, from December 2015 through January 2016, and then increased one time in response to the first vacuum event (February 19, 2016), where NAPL recovery subsequently plateaued. The volume increased slightly, by approximately 0.4 gallons, beginning March 22, 2016 and ending on March 28, but this *de minimus* volume reflects NAPL primarily entering off-Site rock core well RC-12 and to a much lesser degree in off-Site rock core well RC-13, and RC-10 on the western property line. The second vacuum event (April 6, 2016) yielded an estimated 0.05 gallons (~6 ounces) of product, whereupon the recovery again began to plateau. At the end of the gauging and recovery efforts on April 11, 2016, there remained an estimated NAPL volume of 0.013 gallons (less than 2 ounces) of product available from all the wells gauged.[4] While the exact NAPL quantity is difficult to determine precisely, the gauging results indicate only a miniscule volume of product remains in on-Site bedrock.

Remedial Design - Description of the Remedy

NAPL impacts to bedrock have been assessed and delineated by advancing 20 rock cores and defining the former AOR and depth of NAPL in rock. NAPL has been recovered on an ongoing basis (approximately three months) using a submersible pump and bailer at the beginning of rock core installation and continuing until April 6, 2016. Two vacuum recovery events were completed and NAPL removal by all means became asymptotic and recovery effectively ceased.

Recovery efforts occurring for over more than three months yielded an estimated total of 10.6 gallons from all rock cores. Most of the 10.6 gallons of NAPL was removed from three rock core wells (RC-6, RC-7, and RC-10) during initial recovery attempts and during the first vacuum effort. The latest gauging round of the rock cores indicated approximately 0.013 gallons (less than 2 ounces) of product available for recovery among six rock core wells (RC-12, RC-14, RC-14, RC-15, RC-18, and RC-26).[5]

RC-6 is near the western property boundary and RC-10 is on the western property boundary, where most of the recovered NAPL originated. Although NAPL has been removed to the extent practicable, this portion of the Site remains an area of potential NAPL recovery. Therefore, so as to provide adequate coverage, active NAPL recovery will occur in wells CW-3 (Site A), CW-4, and CW-5.

Based upon the delineation and recovery efforts to date, the proposed remedy will consist of the following:

- Quarterly monitoring of rock core wells CW-3 (Site A), CW-4, and CW-5.

[4] The wells accessible for gauging on this date included RC-12, RC-13, RC-14, RC-15, RC-18, and RC-26.

[5] The product thickness is so small in these wells that FLS believes the probe cannot accurately measure these very small levels. There is a reasonable chance that there is no recoverable product remaining at all.

- Removal of accumulated NAPL in wells CW-3 (Site A), CW-4, and CW-5. Each well will have a submersible pump to remove NAPL. All fluids will be transferred to the on-Site treatment system prior to disposal. Due to the low pumping rate of the submersible pumps and the fact that we believe any product observed will be a LNAPL, FLS will gauge the wells quarterly and remove any accumulated NAPL not captured by the pumps; and

- Tracking the NAPL recovered and monitoring the trend of NAPL recovery.

All recovered NAPL will be stored in labeled drums and properly disposed of in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal. All activities associated with the monitoring and recovery of NAPL will be presented in the quarterly groundwater monitoring reports and the annual Period Review Report (PRR) for BCP Site B. When the NYSDEC agrees that the monitoring and recovery efforts are no longer needed, the rock wells will be decommissioned according to the specifications in CP-43.

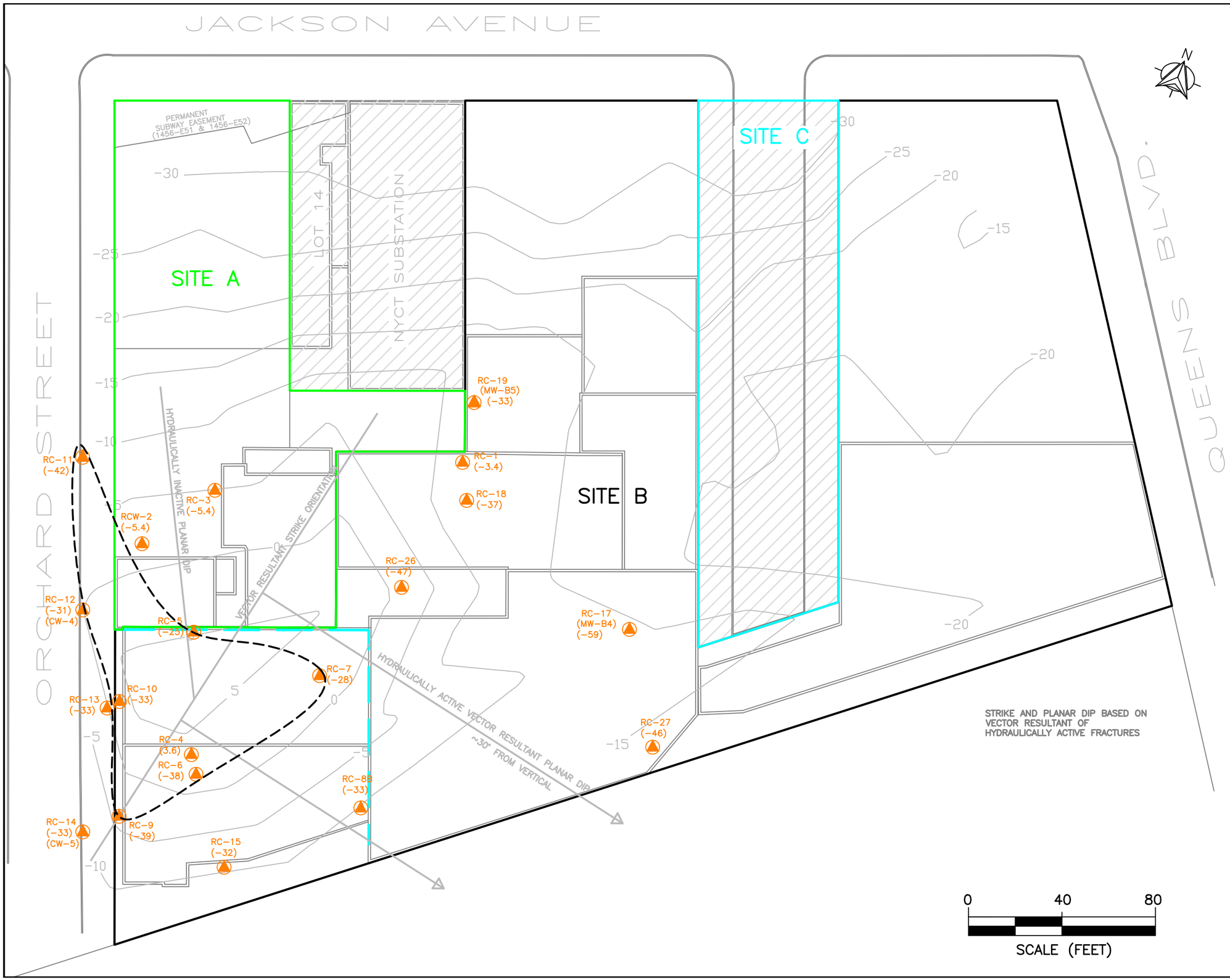
References

- Fleming-Lee Shue, Inc. and Roux Associates, Inc., June 2015. *Queens Plaza Residential Development Site B Remedial Investigation Report,* Site ID # BCP No. C 241151, 28-34 Jackson Avenue, Long Island City, New York, Prepared for LIC Development Owner, LP & TST LIC Development, LLC.

- Fleming-Lee Shue, Inc., February 2, 2016, *Bedrock Investigation Results* report. Queens Plaza Residential Development - Site B - BCP No. C241151. LIC Development Owner, L.P.

- Mueser Rutledge, April 2007. *Geotechnical Summary Report Queens Plaza Project – Site A.* Long Island City, Queens, New York.

- Mueser Rutledge, January 8, 2015. *Geotechnical Investigation, Queens Plaza Residential Development.* Long Island City, Queens, New York.



FILE: P:\99999 - Tishman\Figures\Site B - Rock Core Design\FIG 1- Rock Core Locations_04.15.2016.dwg DATE: 8/5/2014

Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

ROUX

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Queens Plaza Residential Development
BCP No. C241151

FIGURE 1

NAPL Delineation Rock Cores

May 2016

Project Number
10112-005

LEGEND

RC-7 (-33) ▲ ROCK CORE AND BOTTOM CORE ELEVATION (NAVD88)

-20 BEDROCK CONTOUR (NAVD88) SOURCE: MUESER RUTLEDGE, JANUARY 2015

[ ] AREA OF RETENTION: WHERE FREE PHASE NAPL OBSERVED IN ROCK MATRIX

NOTE: LOCATIONS ARE APPROXIMATE

Rock Core Logs

Rock Core : RC-1

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Rich Crockett
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	08/10/2015 - 08/11/2015		
TOTAL DEPTH:	10'		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
0	0.1	8/10/2015 10:45	54.00"	18" Fracture: Staining and odor	Black Patches from 3'9" to 3'11" with no odor or PID readings
	0			51" and 54.6" Mechanical fractures: No staining, No odor	
				60" Mechnical fracture	
5	0		36"	0.00 Mechnical fracture: No odor or PID readings	No odors, staining, observed from 8'9" to 10'
				25.2" Mechanical fracture: No odor or PID readings	
				33" and 36" Mechnical fracture: No odor or PID readings	
10				End of Rock Core 10'	
13					
15					
20					
25					
30					
35					
40					

ROCK CORE LOG

DATE:
SCALE:
FILE NAME:
DRAWN BY:
REV. BY:

Fleming-Lee Shue, Inc.
158 West 29th St. 9Fl.
New York, New York 10001
(212) 675-3225

Rock Core : RC-2

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Rich Crockett
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	08/7/2015		
TOTAL DEPTH:	10'		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
0		8/7/2015 11:00	36.00"	13.2" Mechanical Fracture	Socketed steel casing ~2 feet into rock for open bedrock well
				33.6" Mechnical Fracture	
				38.4" Fracture: No staining, No odor	
5	0	8/10/2015 10:45	40.8"	22.8" - 25.2" Mechanical Fracture	
				56.4" - 58.8" Mechanical Fracture	
10				End of Rock Core 10'	
13					
15					
20					
25					
30					
35					
40					

ROCK CORE LOG

DATE:
SCALE:
FILE NAME:
DRAWN BY:
REV. BY:

Fleming-Lee Shue, Inc.
158 West 29th St. 9Fl.
New York, New York 10001
(212) 675-3225

Rock Core : RC-3

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Rich Crockett
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	08/6/2015		
TOTAL DEPTH:	10'		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
0	0	8/6/2015 10:45	48.00"	18.00" Weathered Fracture: Staining and Odor Observed, fracture surface was rounded	Top of core had odor and staining. Odors on sides of core.
	0			54" Weathered Fractures: Staining and Odors Observed, Fractures were rounded	
				18" - 48" Mechnaical Fractures	
5	0		25.2"	57.6" - 61.2" Weathered Fractures (fracture zone): No staining or odors observed, Surfaces were heavily oxidized and sub-rounded to rounded +6	No Observed fractures below 5'.1"
10				End of Rock Core 10'	
13					
15					
20					
25					
30					
35					
40					

ROCK CORE LOG

DATE:
SCALE:
FILE NAME:
DRAWN BY:
REV. BY:

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158 West 29th St. 9Fl.
New York, New York 10001
(212) 675-3225

Rock Core : RC-4

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Rich Crockett
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	08/11/2015		
TOTAL DEPTH:	10'		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
0		8/11/2015 14:00	60.00"	1" and 4" and 8.5" Fractures: Staining and Odors 12" and 14" Fractures: Staining and Odors 19" and 22" Fractures: Staining and Odors 25" and 28.5" Fractures: Staining and Odors 34.5" Fractures: Staining and Odors 37" and 41" Fractures: Staining and Odors 45.4" and 47.4 " Fractures: Staining and Odors 51" and 52" Fractures: Staining and Odors 56" Fractures: Staining and Odors	Micro fractures visible throughout core
5			60"	0.00" - 60.00" Mechanical Fractures (10) were visible throughout core	During drilling operations drill water began to percolate out of fractures and joints. Product seep was discovered on southwest face of outcrop
10				End of Rock Core 10'	
13					
15					
20					
25					
30					
35					
40					

ROCK CORE LOG

DATE:
SCALE:
FILE NAME:
DRAWN BY:
REV. BY:

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(212) 675-3225

Rock Core : RC-5

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Rich Crockett
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	12/22/2015		
TOTAL DEPTH:	32		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
0			63.72"	26.4"-54.96" Mechanical Fractures: No NAPL staining, oxidation	
	11.1			58.2" Weathered Fracture: Oxidation and odor, no NAPL	
				58.2" - 63.72" Micro-fractures: Oxidation	
5				4.8" and 11.4" Weathered fractures: Oxidation and Odor	
	10.2 / 11.1			25.20" and 28.80" Weathered fractures: Oxidation and Odor	
	11.2 / 671.2		57.6"	39.6" and 60" Weathered Fractures: Oxidation and Odor	
10				14.22" Mechanical Fracture: Odor	
				31.2" and 33.6" Weathered Fractures: Staining, Oxidation, Odor	Free Product observed in fractures from ~10-15'
				39.6" and 46.8" Weathered Fractures: Staining, Oxidation, Odor	
			58.2"	51.6" and 56.4" Weathered Fractures: Staining, Oxidation, Odor	
				70.2" Not Weathered Fractures: Staining, Oxidation, Odor	
15				00.0" Mechanical Fractures: Odors. No Staining or Free Product	
				46.8" Mechanical Fractures: Odors. No Staining or Free Product	
				58.8" Mechanical Fracture: No Staining, Odor or Free Product	
			60.00"	63" and 66" and 67.8" Mechanical Fracture: No Staining, Odor or Free Product	
				73.2" Mechanical Fracture: No Staining, Odor or Free Product	
20				47.4" Weathered Fracture: Odor, Oxidation	
				51" Weathered Fracture: Odor, Oxidation	
			60.00"	67.8" Weathered Fracture: Odor, Oxidation	
25				34.2" Weathered Fracture: Odor. No Staining or No Free Product	
				43.2" Weathered Fracture: Odor. No Staining or Free Product	
			60.00"	48" and 59.4" Weathered Fracture: Odor. No Staining or Free Product	
30				00.0" and 24" Weathered Fracture: Odor, Rounded Surfaces	
				End of Rock Core 32'	
			24.00"		
35			54.50"		
40					

ROCK CORE LOG

DATE:
SCALE:
FILE NAME:
DRAWN BY:
REV. BY:

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New York, New York 10001
(212) 675-3225

Rock Core : RC-6

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Rich Crockett
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	12/23/2015 - 12/28/2015		
TOTAL DEPTH:	39		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
0	49.9	12/23/2015 11:00		6" Weathered and Micro Fractures: Oxidation, Odors, Staining	
	152.2 / 226.5			12" and 18" Weathered and Micro Fractures: Oxidation, Odors, Staining	
	381.7 / 462.8		59.4"	24" and 30" Weathered and Micro Fractures: Oxidation, Odors, Staining	
	777.1			36" Weathered and Micro Fractures: Oxidation, Odors, Staining	
	166.4 / 38.6			48"-55.8" Weathered and Micro Fractures: Staining, Oxidation, Odor	
5	4.7			11.4" Weathered Fractures: Odors, Oxidation	
	4.9 / 3.6			12" and 14.4" Weathered Fractures: Odors, Oxidation	
	2.1		60.00"	28.8" Weathered Fractures: Oxidation, Odors	
	1.1			54.6" Weathered Fractures: Oxidation, Odors	
10	1076	12/24/2015 8:00		6" Mechanical Fractures: Odor, Free Product, Staining, Oxidation	
	630.7 / 265.3			27" and 31.68" Weathered Fractures: Odor, Free Product, Staining, Oxidation	At 12' into rock, product began coming up core into Drilling Pan. A product seem was encountered at ~15'.
	981.2			32.64" Weathered Fractures: Odor, Free Product, Staining, Oxidation	
	1070		54.36"	40.8" Weathered Fractures: Odor, Oxidation, Staining, Free Product	
	300.1			54.36" Weathered Fractures: Odors, Oxidation, Free Product, Staining	
15	399.1	12/24/2015 10:30		12" Weathered Fracture: Odor, Staining, Free Product	
	305.7			18" Weahtered Fracture: Odor, Staining, Free Product	
	88.3		54.36"	39.6 " Weathered Fracture: Odor, Staining, Free Product	
	161.8			52.2" Weathered Fracture: Odor, Staining, Free Product	
	109.4			60" Weathered Fracture: Odor, Staining, Free Product	
	212.5 / 98.5			66.6" and 69.96" Weathered Fracture: Odor, Staining, Free Product	
	364.2 / 206.7			71.4" and 73.2" Weathered Fracture: Odor, Staining, Free Product	
20	300	12/24/2015 12:30		49.8" Mechanical Fracture	
	888			18.6" Weathered Fracture: Odor and Staining	
	307		73.2"	72.84" Weathered Fracture: Odor and Staining	
25	100.2			2.4" Weathered Fracture: Odor and Staining	
	50.2 / 19.1			6" and 11.4" Weathered Fracture: Odor and Staining	
	58.4			21.6" Weathered Fracture: Odor and Staining	
	14.1		62.40"	48.12" Weathered Fracture: Odor and Staining	
	121.9 / 13.1			57.6" and 57.96" Weathered Fracture: Odor and Staining	
30		12/28/2015 07:05		0.00" - 82.8" Weathered Fractures: No Staining, No Oxidation, No Odors, No Free Product	
			82.8"	End of Rock Core 39'	
35					
40					

ROCK CORE LOG

DATE:
SCALE:
FILE NAME:
DRAWN BY:
REV. BY:

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158 West 29th St. 9Fl.
New York, New York 10001
(212) 675-3225

Rock Core : RC-7

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Rich Crockett
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	1/7/2016 - 1/8/2016		
TOTAL DEPTH:	35'		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
0		1/7/2016 11:10	53.4"	0"- 53.4" No Weathered Fractures: Sheen and Odors on outside of core.	1ft into rock product began leaking out into mud pan
5	10.1		58.8"	0.00" - 58.8" Mechanical Fractures: Staining, Odors, Free Product	
				25.2" Weathered Fractures: Staining, Odors, Free Product	
10	424		62.4"	0.00" - 60.00" Fracture: Staining, Odors	Free Product on outside of Core
				10.8" Weathered Fractures: Staining, Odors	Free Product on outside of Core
15	671		61.2"	0.00" Weathered Fractures: Staining	
	104.1/55.4			6.6" and 12" Weathered Fractures: Staining	
	197.6			29.4" Weathered Fractures: Staining	
	233.8			40.8" Weathered Fractures: Staining	
	0			61.2" Mechanical Fractures: Staining	
20		1/8/2016 7:45	58.8	0.00" - 58.8" Mechanical Fractures:	Free Product and Odors on the Outside
25			60.00"	0.00" - 60.00" Weathered Fractures: Staining and Free Product	
				57.6" Weathered Fracture: Oxidation, Free Product and Staining	
30			61.2"	0.00" - 61.2" Weathered Fractures: Staining and Free Product	
35				End of Rock Core 35'	
40					

ROCK CORE LOG

DATE: DRAWN BY:
SCALE: REV. BY:
FILE NAME:

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158 West 29th St. 9Fl.
New York, New York 10001
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Rock Core : RC-8B

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Rich Crockett
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	1/5/2016 - 1/6/2016		
TOTAL DEPTH:	20'		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
0	0	1/6/2016 10:30	62.4"	0"- 62.4" Mechanical Fractures: No Oxidation, No Staining, No free Product, No Odor	0 - 2.7 collected on 1/5/2016, 1st foot highly fractured, No staining free product or oxidation observed
	0				
5	0		63.6"	0.00" - 63.6" Mechanical Fractures: No Oxidation, No, Staining or Free Product, No Odor	No impacts oberved throughout core
10			62.4"	0.00" - 62.4" Mechanical Fractures: No Weathering, No Staining, No free product, No odor	
15				End of Rock Core: 18.4'	
20					
25					
30					
35					
40					

ROCK CORE LOG

DATE:
SCALE:
FILE NAME:
DRAWN BY:
REV. BY:

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158 West 29th St. 9Fl.
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Rock Core : RC-9

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Rich Crockett
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	12/28/2015 - 12/29/2015		
TOTAL DEPTH:	34		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
0	2.7	12/28/2015 10:50	60.00"	0"- 60" Weathered Fractures: Staining, Odor, Oxidation, Free Product	
5				0.00" - 66" Weathered Fractures: Oxidation, Odor, Staining, Free Product	
	232.7		64.80"	36" - 64.8" Weathered Fractures: Oxidation, Odor, Heavy Staining, Free Product	
10	40.9			0.00" Weathered Fracture: Odors and Staining	
	166.4/36.4		62.4"	36.6" - 40.2" Weathered Fractures: Odor and Staining	
	72.6			62.4" Weathered Fractures: Odor and Staining.	
15	390.2			0.00" Weathered Fracture: Staining, Oxidation, Odor	
	101.2/45.1			18" - 20.4" Weathered Fracture: Staining, Oxidation, Odor	
	48.8		63.00"	51" Weathered Fracture: Staining, Oxidation, Odor	
	93.3/33.4			58.8" - 63" Weathered Fracture: Staining, Oxidation, Odor	
20		12/29/2015 07:05	56.4"	0.00" - 56.4" Weathered Fracture: Odor	Drill water and Product began coming up already completed RC-6
25			45"	0.00" - 45" Weathered Fracture: No signs of impact	
30			60"	0.00" - 60.00" Weathered Fractures: No Staining, No Oxidation, No Free Product	
				End of Core 34'	
35					
40					

ROCK CORE LOG

DATE:
SCALE:
FILE NAME:
DRAWN BY:
REV. BY:

Fleming-Lee Shue, Inc.
158 West 29th St. 9Fl.
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Rock Core : RC-10

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Rich Crockett
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	01/6/2016		
TOTAL DEPTH:	35		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
0	27.1 - 401.1		64.8"	0"- 64.8" Weathered Fractures throughout: Oxidation, Staining, Odors	
5	62.1		61.2"	8.4" Weathered Fractures: Staining, Oxidation, Free Product, Odors	7ft: Product observed coming up rock core into drilling pan.
	49.2			12" Weathered Fractures: Staining, Oxidation, Free Product, Odors	
	141.7			22.2" Weathered Fractures: Staining, Oxidation, Free Product, Odors	
10			58.8"	0.00" - 58.8" Mechanical Fractures: No Staining, Oxidation, Free Product	Free product on outside of core due to pulling up through NAPL Layer
15			60"	0.00" - 60.00" Mechanical Fractures: No Staining, Oxidation, Free Product	Free product on outside of core due to pulling up through NAPL Layer
20			56.4"	0.00" - 56.4" Mechanical Fractures: No Staining, Oxidation, Free Product	Free product on outside of core due to pulling up through NAPL Layer
25			62.4"	0.00" - 62.4" Mechanical Fractures:No Staining, Oxidation, Free Product	Free product on outside of core due to pulling up through NAPL Layer
30			61.2"	0.00" - 61.2" Mechanical Fractures:No Staining, Oxidation, Free Product	Free product on outside of core due to pulling up through NAPL Layer
35				End of Rock Core 35'	
40					

ROCK CORE LOG

DATE:
SCALE:
FILE NAME:
DRAWN BY:
REV. BY:

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158 West 29th St. 9Fl.
New York, New York 10001
(212) 675-3225

Rock Core : RC-11

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Rich Crockett
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	1/9/2016 - 1/11/2016		
TOTAL DEPTH:	33'		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
				7.8" and 14.4" Weather Fractures: Filled with silt, Odors	
0		1/8/2016 14:40		19.6" Weathered Fractures: Odors	
			55.80"	31.2" Weathered Fractures: Odors	Casing driven back down for another 2ft to isolate the silt
				47.4" Weathered Fractures: Odors	
				50.4" - 54" Weathered Gravel: Odors	
5					
			63.6"	97.2" - 120": Mechanical Fractures: No Staining or free product. Odors	
10					
		1/11/2016 7:30	52.8"	0.00" - 52.8" Mechanical Fractures: No Staining, No Free product, Odors	
15					
				25.2" Weathered Fracture: Staining, Free Product, Oxidation.	Product at -28.9. Silt and sand observed in fractures
20	103.7		57.6"	52.8" Weathered Fracture: No Staining, No Free Product, Oxidation or Odors	
				6.0" Weathered Fracture: No Staining, No Free Product, Oxidation or Odors	
	28.3		62.4"	8.4" Weathered Fracture:No Staining, No Free Product, Oxidation or Odors	
25				20.4" Weathered Fracture: No staining, No free product, no oxidation. Odors	Free product on outside of core due to pulling up through NAPL layer
				34.8" Weathered Fracture: No Staining, No Free Product, Oxidation or Odors	
				34.8" - 62.4 Mechanical Fractures: No Staining, No Free Product, Oxidation or Odors	
			60.00"	14.4" Weathered Fracture: No Staining, No Free Product, Oxidation or Odors	
				26.4" Weathered Fracture: No Staining, No Free Product, Oxidation or Odors	
30				37.2" Weathered Fracture: No Staining, No Free Product, Oxidation or Odors	Free product on outside of core due to pulling up through NAPL layer
				49.2" Mechanical Fracture: No Staining, No Free Product, Oxidation or Odors	
				End of Rock Core 33'	
35					
40					

ROCK CORE LOG

DATE:
SCALE:
FILE NAME:

DRAWN BY:
REV. BY:

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Rock Core : RC-12

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Ed Ryan
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	03/11/2016-03/12/2016		
TOTAL DEPTH:	30		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
0	PID Malfunction No Meas.	3/11/2016 11:40	53.25"	16" Fracture: No NAPL staining, slight petroleum odor	
				24" Fracture: No NAPL staining, slight petroleum odor	
				45.50" Mechanical Fracture	
		3/11/2016 11:50		53.25" Mechanical Fracture	
5		3/12/2016 7:53	59.50"	26" Mechanical Fracture	
				28" Fracture: No NAPL staining, oxidation	
				35" Fracture: No NAPL staining, petroleum odor	
				59.50" Fracture; No NAPL staining	
10		3/12/2016 8:35	57.25"	26.50" Mechanical Fracture	
				34" Fracture: Oxidation, petroleum odor	
				42" Fracture: Oxidation, petrolem odor, NAPL staining	
				50" Fracture: Oxidation, NAPL staining, Free product	NAPL observed in wash tub
				57.25" Fracture: No NAPL staining	
15		3/12/2016 9:10	55.50"	21" Fracture: Petroleum odor, NAPL staining	
				33.50" Fracture: NAPL staining	
				40" Fracture: NAPL staining	
				44.25" Fracture: No NAPL staining, oxidation	
				48" Fracture: No NAPL staining	
				55.50" Fracture: No NAPL staining	
20		3/12/2016 10:20	60.00"	12" Mechanical Fracture	
				26" Fracture: No NAPL staining, oxidation	
				36" Fracture: No NAPL staining, oxidation	
				49.50" Fracture: No NAPL staining, oxidation	
				60" Fracture: No NAPL staining	
25		3/12/2016 11:40	56.00"	6.75" Fracture: No NAPL staining	
				40" Fracture: No NAPL staining	
				45" Fracture: No NAPL staining	
				56" Mechanical Fracture	
30				End of Rock Core: 30'	
35					

ROCK CORE LOG

DATE:
SCALE:
FILE NAME:
DRAWN BY:
REV. BY:

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158 West 29th St. 9Fl.
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Rock Core : RC-13

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Ed Ryan
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	03/14/2016		
TOTAL DEPTH:	40		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
0	ND	3/14/2016 7:40	49.00"	0"-26" Fractures throughout core: No NAPL staining, oxidation	
	ND			26"-49" Fractures every 4": No NAPL staining, oxidation	
5	ND	3/14/2016 9:30	60.00"	4" and 6.50" Fractures: No NAPL staining, oxidation	
	ND			11.50" and 16.50" Fractures: No NAPL staining, oxidation	
	ND			22" and 29" Fractures: No NAPL staining, oxidation	
	ND			35" and 42.50" Fractures: No NAPL staining, oxidation	
	ND			51" and 56" Fractures: No NAPL staining, oxidation	
10	ND	3/14/2016 10:10	58.00"	5" Fracture: No NAPL staining, oxidation, slight petroleum sheen	
	ND			9"-17" Fractures: No NAPL staining, oxidation, slight petroleum sheen	
	ND			23" and 25" Fractures: No NAPL staining, oxidation,slight petroleum sheen	
	ND			32" Fractures: No NAPL staining, oxidation, slight petroleum sheen	
	ND			38"- 42" Fractures: No NAPL staining, oxidation, slight petroleum sheen	
	ND			55" Fractures: No NAPL staining, oxidation, slight petroleum sheen	
15	ND		60.00"	6" Fracture: Slight NAPL staining, oxidation	
	ND			11" Fracture: Slight NAPL staining, oxidation	
	ND			21" Fracture: No NAPL staining, oxidation	
	ND			41" Fracture: No NAPL staining, oxidation	
	ND			49.50" Fracture: No NAPL staining, oxidation	
20	ND		60.00"	13" Fracture: Slight NAPL staining	
	ND			19.25" Fracture: No NAPL staining	
	ND			34.25" Fracture: No NAPL staining	
	ND			42" Fracture: No NAPL staining	
25	ND	3/14/2016 11:30	60.00"	23.50" Fracture: No NAPL staining	
	ND			27" Fracture: No NAPL staining	
	ND			35.50" Fracture: No NAPL staining	
	ND			51" Fracture: No NAPL staining	
30	ND	3/14/2016 11:55	59.00"	14.25" Fracture: No NAPL staining	
	ND			18.50" Fracture: No NAPL staining	
	ND			21" Fracture: No NAPL staining	
	ND			41.50" Fracture: No NAPL staining	
	ND			54" Fracture: No NAPL staining	
35	ND	3/14/2016 13:30	54.50"	5.75" Fracture: No NAPL staining	
	ND			31" Fracture: No NAPL staining	
	ND			54.50 Fracture: No NAPL staining	
40				End of Rock Core: 40'	

ROCK CORE LOG

DATE:
SCALE:
FILE NAME:
DRAWN BY:
REV. BY:

Fleming-Lee Shue, Inc.
158 West 29th St. 9Fl.
New York, New York 10001
(212) 675-3225

Rock Core : RC-14

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Rich Crockett
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	03/25/2016 - 3/26/2016		
TOTAL DEPTH:	35		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
0	8.9	3/25/2016 15:15	51.2"	9" Weathered Fractures: Staining, Oxidation and Odor	
				13.68" and 22.8 Mechanical Fractures: Staining, Oxidation and Odor	
	115.4/100.6			29.4" and 33" Weathered Fractures: Staining, Oxidation and Odor	
	116.9			40.8" Weathered Fractures: Staining, Oxidation and Odor	
	76.2/94.4			45.6" and 46.8" Weathered Fractures:Staining, Oxidation and Odor	
	17.5			49.2" Weathered Fractures: Staining, Oxidation and Odor	
5			60.00"	6" Mechanical Fractures	
				13.8" and 19.2" Mechanical Fractures	
				22.2" and 28.2" Mechanical Fractures	
				39.6" Mechanical Fractures	
				46.8" Mechanical Fractures	
				60" Mechanical Fractures	
10			60.00"	18.6" Mechanical Fracture	At Approximatley 15 ft into rock. Began losing return and drill water began coming up already completed RC-9
				34.8" Mechanical Fractures	
15			61.20"	0.00" Mechanical Fracture	Large Fracture zone from 22.8' to 24.5'
				21.6" Mechanical Fracture	
				37.2" Mechanical Fracture	
				52.8" Mechanical Fracture	
				61.2" Mechanical Fracture	
20			61.20"	16.8" Mechanical Fracture	
				20.4" Mechanical Fracture	
	90.1			40.8" Weathered Fracture: Decomposing fragmented rock	
				49.44" Weathered Fracture: Staining, Oxidation and Odor	
	52.6			61.2" Weathered Fracture: Decomposing fragmented rock, Staining, Oxidation and Odor	
25			59.4"	10.8" Mechanical Fracture	
				24" Weathered Fracture: Oxidation, Rounded Surfaces	
				30.60" Weathered Fracture: Oxidation, Rounded Surfaces	
				36" Mechanical Fracture	
				48" Mechanical Fracture	
30			63.60"	21.6" Mechanical Fracture	
				33" Mechanical Fracture	
				44.4" Mechanical Fracture	
				55.8" Mechanical Fracture	
				63.6" Mechanical Fracture	
35				End of Rock Core: 35'	
40					

ROCK CORE LOG

DATE:
SCALE:
FILE NAME:
DRAWN BY:
REV. BY:

Fleming-Lee Shue, Inc.
158 West 29th St. 9Fl.
New York, New York 10001
(212) 675-3225

Rock Core : RC-15

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Rich Crockett
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	03/23/2016		
TOTAL DEPTH:	24		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
0		3/23/2016 9:53	45.00"	12" Mechanical Fracture: Odor. No Staining	Product observed in Drilling Pan while drilling at ~4'
	14.2			18" Inherent Fracture: Odor. No Staining	
				45" Mechanical Fracture: Odor. No Staining	
4			57.6"	0.00" Inherent Fractures: Odor. No Staining or Oxidation	
				15" Mechanical Fractures: Odor. No Staining	
				24" Mechanical Fractures: Odor. No Staining	
	42.9			42" Inherent Fractures (Silt Observed in fracture): Odor. No Staining	
9			60.00"	0.00" Mechanical Fractures: Odor. No Staining	
				12" Mechanical Fracture: Odor. No Staining	
	93.9/1270			25.2" and 26.4" Inherent Fractures(Sand in Fractures):Odor. No Staining	
				42" Mechanical Fractures: Odor. No Staining	
14			57.00"	21" Mechanical Fractures: No Staining	
				36" Mechanical Fracture: No Staining	Multiple Mechanical fractures throughout core
				42"- 60" Multiple Mechanical Fractures: No Staining	
19			60.00"	15.6" Mechanical Fracture: No Staining	
				27" Mechanical Fracture: No Staining	
				36" and 45" Mechanical Fracture: No Staining	
				49.2" Mechanical Fracture: No Staining	
24				End of Rock Core at 24'	
29					
34					
39					

ROCK CORE LOG

DATE:
SCALE:
FILE NAME:
DRAWN BY:
REV. BY:

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158 West 29th St. 9Fl.
New York, New York 10001
(212) 675-3225

Rock Core : RC-17

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Rich Crockett
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	03/21/2016 - 3/22/2016		
TOTAL DEPTH:	50		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
0		3/21/2016 9:00	60.00"	2.4" Mechanical Fractures: No Staining, No Odor	
				33" Mechanical Fractures: : No Staining, No Odor	
				57" mechanical Fracture: : No Staining, No Odor	
5	ND		57.00"	0.00" Mechanical Fractures: : No Staining, No Odor	
	ND			14.4" Weathered Fractures: : No Staining, No Odor	
	ND			39.6" Mechanical Fractures: : No Staining, No Odor	
10	1.1		60.00"	3" Inherent Fracture: : No Staining, No Odor	
	11.4			16.8" Inherent Fracture: : No Staining, No Odor	Fine Silt and Sand was observered in fractures
	0.8			33" Mechanical Fracture	
				36" Inherent Fracture: : No Staining, No Odor	
				39" Mechanical Fractures: No Staining, No Odor	
				54" Mechanical Fractures: No Staining, No Odor	
15			57.00"	6" Mechanical Fracture: No Staining, No Odor	
				18" and 21" Mechanical Fracture: No Staining, No Odor	
				26.4" Inherent Fracture: No Staining, No Odor	Sand and Silt observed in fractures
				34.8" Inherent Fracture: No Staining, No Odor	
20			57.00"	10.8" Mechanical Fracture: No Staining, No Odor	
				27.6" Mechcanical Fracture: No Staining, No Odor	
				42" Mechanical Fracture: No Staining, No Odor	
				47" Mechanical Fracture: No Staining, No Odor	
25			61.20"	15.6" Mechanical Fracture: No Staining, No Odor	
	3.1			30" Inherent Fracture: No Staining, No Odor	
				42" and 43.2" Mechanical Fracture: No Staining, No Odor	
30			59.00"	18" Mechanical Fracture: No Staining, No Odor	
				24" and 33" Mechanical Fracture: No Staining, No Odor	
				36" Mechanical Fracture: No Staining, No Odor	
				42" - 60" Bedrock broken into 1-2" pieces: No Staining, No Odor	
35			60.00"	9.6" Mechanical Fracture: No Staining, No Odor	
				24" Mechanical Fracture: No Staining, No Odor	
				42" Mechanical Fracture: No Staining, No Odor	
				57" Mechanical Fracture: No Staining, No Odor	
40			60.00"	16.8" Mechanical Fracture: No Staining, No Odor	
				37.2" and 38.4" Mechanical Fracture: No Staining, No Odor	
				39.6" Mechanical Fracture: No Staining, No Odor	
45			48.00"	15" Inherent Fracture: No Staining, No Odor	Fine Sand in fracture
				27.6" Mechanical Fracture: No Staining, No Odor	
50				End oif Rock Core 50'	

ROCK CORE LOG

DATE:
SCALE:
FILE NAME:
DRAWN BY:
REV. BY:

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158 West 29th St. 9Fl.
New York, New York 10001
(212) 675-3225

Rock Core : RC-18

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Rich Crockett
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	03/19/2016		
TOTAL DEPTH:	35		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
0	66.2	3/19/2016 7:50	48.00"	2.4" Weathered Fracture: Staining, Oxidation, Odor	Product emerging from over rock surface. In soil atop rock
				16.2" Mechanical Fracture	
5			66.00"	60" - 123.6" Mechanical Fractures	Mechanical fractures from drillers hammering shoe
10			61.8"	34.8" Mechanical Fracture	
				52.8" Mechanical Fracture	
15			60.00"	0.00" Mechanical Fractures	
	3.2/38.7			12" and 16.8" Weathered Fractures: Oxidation and Odor	
				27.6" Mechanical Fractures	
				41" Fracture: No Staining or Oxidation	
				47.40" Mechanical Fractures	
20			60.00"	15.6" and 20.4" Weathered Fractures (Subrounded-Rounded): Odor	
				36.3" Weathered Fracture (Subrounded-Rounded): Odor	
				41.4" Weathered Fracture: Odor	Fractures filled with Silt and Sand
				52.8" Weathered Fractures: Odor	Fractures filled with Silt and Sand
25			45.6"	4.5" and 9" Weathered Fracture: Odor	Fractures have rounded surfaces
				25.2" Weathered Fracture: Odor	
				36.60" Weatered Fracture: Odor, Light Oxidation	
				48" and 52.2" Weathered Fracture: Odor	
30			61.2"	9" Mechanical Fracture	
				25.80" Mechanical Fracture	
				47.4" Mechanical Fracture	
				41.50" Fracture: No Staining	
35				End of Rock Core: 35'	
40					

ROCK CORE LOG

DATE:
SCALE:
FILE NAME:
DRAWN BY:
REV. BY:

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158 West 29th St. 9Fl.
New York, New York 10001
(212) 675-3225

Rock Core : RC-19

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Rich Crockett
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	3/20/2016		
TOTAL DEPTH:	10'		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
0			60"	Continuous Core: No Fractures	
5			50"	61.8" Mechnical fracture 66" Mechanical fracture 108" Mechnical fracture	
10			56.4"	127.8" Mechanical fracture 177" Mechanical fracture 179.4" Mechanical fracture	
15			34.8"	184.2" Mechanical fracture 201.6" Mechanical fracture 219" Mechanical fracture	
20				End of Rock Core 23.25'	
25					
30					
35					
40					

ROCK CORE LOG

DATE: DRAWN BY:
SCALE: REV. BY:
FILE NAME:

Fleming-Lee Shue, Inc.
158 West 29th St. 9Fl.
New York, New York 10001
(212) 675-3225

Rock Core : RC-26

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Rich Crockett
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	03/15/2016 - 3/18/2016		
TOTAL DEPTH:	30		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
0		3/15/2016 17:48	48.00"	0"- 48" Mechanical Fractures: No Staining	
	13.8			48"- 60" Inherent Fracture: No staining	
5	18		64.2"	72" Inherent Fracture: No Staining	
				84" Mechanical Fracture: No staining	
10	133.4		64.8"	6" Inherent Fractures: Staining and Oxidation	
				36" Mechanical Fractures	
	10.2			48" Inherent Fractures: Staining and Oxidation	
	5.2			51.36" Inherent Fractures: Staining and Oxidation	
15	266.8		49.32"	6" Inherent Fracture: No Staining observed	Product Observed in coming up intp drilling pan at ~16'
				38.5" Mechanical Fracture: No Staining	
				51.6" Mechanical Fracture: No Staining.	
20	51.2		30"	18" Mechanical Fracture: No Staining	
	1.8		30"	30" Mechanical Fracture: No Staining	
				60" Mechanical Fracture: No Staining	
25				0.0" Mechanical Fracture: No staining	
	4.5			18" Mechanical Fracture: No staining	
				30.0" Mechanical Fracture: No staining	
	97.3		60.00"	54" Mechanical Fracture: No staining	
30				0.0" Mechanical Fracture: No staining	
				12" Mechanical Fracture: No staining	
	5.7			18" Mechanical Fracture: No staining	
			60.00"	48" Mechnical Fracture: No staining	
35				End of Rock Core 35'	
40					

ROCK CORE LOG

DATE:
SCALE:
FILE NAME:
DRAWN BY:
REV. BY:

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Rock Core : RC-27

PROJECT ID:	Queens Plaza	FLS PROJECT NO.:	
LOCATION:	Queens Plaza	GEOLOGIST:	Rich Crockett
DRILLER:	ADT		
DRILLING METHOD:	Rotary Rig		
DATE BORING INSTALLED:	03/26/2016 - 03/28/2016		
TOTAL DEPTH:	42		

DEPTH (FT) INTO ROCK	PID READING (PPM)	Time	REC.	FRACTURE DESCRIPTION	
0		3/26/2016 10:45	60.06"	9.6" and 10.8" Mechanical Fracture: Oxidation	
				36" Weathered Fractures: Oxidation	
				37.8" Mechnical Fracture: Oxidation	
5				19.8" Mechnical Fracture	No Weathered Fractures observed below 3'.
				38.4" Mechnical Fracture	
			60.00"	52.2" Mechnical Fracture	
10			37.2"	0.00" and 3.6" Mechanical Fracture	
				27.6" Mechanical Fracture	
				36.6" Mechanical Fracture	
13			40.8"	No Fractures Observed	
15			54.00"	15.6" Mechanical Fracture	
				30" and 33.6" Mechanical Fracture	
				54" Mechanical Fracture	
20		3/28/2016 07:30	66.00"	6.42" and 8.28" Mechanical Fracture: No Odor, No Staining	
				10.68" Mechanical Fracture: No Odor, No Staining	
				23.28" Mechanical Fracture: No Odor, No Staining	
				41.82" Mechanical Fracture: No Odor, No Staining	
				49.68" and 46.2" Mechanical Fracture: No Odor, No Staining	
				66" Mechanical Fracture: No Odor, No Staining	
25			57.6"	25.2" Mechanical Fracture: No Odor, No Staining	
				40.8" Mechanical Fracture: No Odor, No Staining	
				49.2" Mechanical Fracture: No Odor, No Staining	
				54" and 58.8" Mechanical Fracture: No Odor, No Staining	
30			60.00"	16.8" Mechanical Fracture: No Odor, No Staining	
				20.4" Mechanical Fracture: No Odor, No Staining	
				34.8" and 37.2" Mechanical Fracture: No Odor, No Staining	
				61.2" Mechanical Fracture: No Odor, No Staining	
35			60.00"	19.2" Mechanical Fracture: No Odor, No Staining	
				32.4" Mechanical Fracture: No Odor, No Staining	
				51.6" Mechanical Fracture: No Odor, No Staining	
40				End of Rock Core: 42'	

ROCK CORE LOG

DATE:
SCALE:
FILE NAME:
DRAWN BY:
REV. BY:

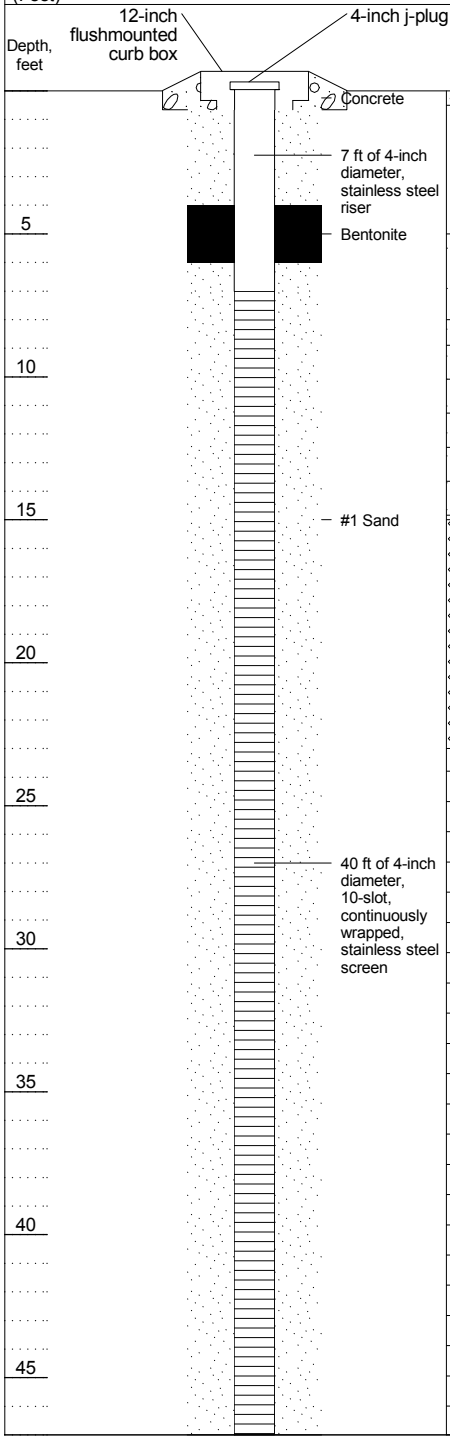
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158 West 29th St. 9Fl.
New York, New York 10001
(212) 675-3225

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

209 Shafter Street
Islandia, NY 11749
Telephone: (631) 232-2600
Fax: (631) 232-9898

WELL CONSTRUCTION LOG

WELL NO. **CW-3A**	NORTHING **Not Measured**	EASTING **Not Measured**		
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**		
APPROVED BY **Jeff Wills**	LOGGED BY **Rich Crockett**			
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Tony Palomeque**		GEOGRAPHIC AREA **Orchard Street Sidewalk**		
DRILL BIT DIAMETER/TYPE **7-in / Sonic**	BOREHOLE DIAMETER **7-inches**	DRILLING EQUIPMENT/METHOD **Compact C-17 / Rotosonic**	SAMPLING METHOD **Sonic**	START-FINISH DATE **6/20/16-6/20/16**
CASING MAT./DIA. **Stainless Steel / 4-inch**	SCREEN: TYPE **V-Wire** MAT. **Stainless Steel** TOTAL LENGTH **40.0**ft DIA. **4-inch** SLOT SIZE **10-Slot**			
ELEVATION OF: (Feet) GROUND SURFACE	TOP OF WELL CASING	TOP & BOTTOM SCREEN **/**	GRAVEL PACK SIZES **#1**	



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
0		CONCRETE			
		FILL (Dark grey, fine SAND, some Silt, little medium Sand, trace coarse sand and gravel; moist).		1.7	Hand cleared to 8' bls.
5		Grey to brown, SILT, some fine Sand, little medium Sandm trace coarse sand and gravel; moist.		1.4	Odor observed.
		Brown, fine SAND, some Silt, little medium Sand, trace coarse sand and gravel; wet		3.6	4 ft recovery. Water table observed at ~8 ft bls. Odor observed.
10				21	4.3 ft recovery. Odor observed.
15		Grey, medium SAND, some fine Sand, little coarse Sand, trace silt and gravel; wet		788.7	Odor observed.
				1604	Sample CW-3A (17-18) collected for TCL VOCs, SVOCs, Pesticides, PCBs, TAL Metals and TPH DRO/GRO.
20					3.8 ft recovery. Odor observed Sample CW-3A (22-23) collected for TCL VOCs, SVOCs, Pesticides, PCBs, TAL Metals and TPH DRO/GRO.
25		BEDROCK (Gneiss)			Bedrock encountered at 23 ft bls. (See CW-3A bedrock log for bedrock details).
30					
35					
40					
45					Bottom of boring at 47' bls.

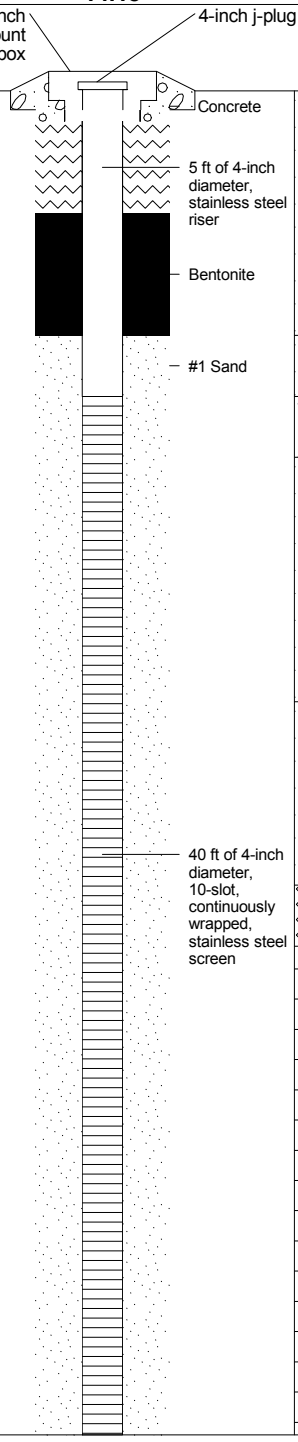
BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 6/22/16

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WELL CONSTRUCTION LOG

WELL NO. **CW-4/RC-12**	NORTHING **Not Measured**	EASTING **Not Measured**		
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**		
APPROVED BY **Jeff Wills**	LOGGED BY **Lauren Dolginko**			
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Dave Moon**		GEOGRAPHIC AREA **Orchard Street Sidewalk**		
DRILL BIT DIAMETER/TYPE **7-in. / Sonic**	BOREHOLE DIAMETER **7-inches**	DRILLING EQUIPMENT/METHOD **Compact C-17 / Rotosonic**	SAMPLING METHOD **Sonic**	START-FINISH DATE **3/10/16-3/10/16**
CASING MAT./DIA. **Stainless Steel / 7-inch**	SCREEN: TYPE **V-Wire** MAT. **Stainless Steel** TOTAL LENGTH **40.0**ft DIA. **7-inch** SLOT SIZE **10-Slot**			
ELEVATION OF: (Feet)	GROUND SURFACE **14.18**	TOP OF WELL CASING **11.73**	TOP & BOTTOM SCREEN **9.2 / -30.8**	GRAVEL PACK SIZES **#1**



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		Brown to dark brown, fine SAND, trace silt and gravel; moist.		1.5	Hand cleared to 5 ft bls.
				1.0	
				0.9	
				1.0	
		Brown, fine SAND, trace gravel; moist.		0.0	
5		CONCRETE.		0.1	5
		Brown, fine SAND, trace gravel; moist.		0.0	
				0.1	
				0.2	
10		Brown to grey, fine SAND, trace gravel; wet.		33.5	10
				45.6	Stained soils and odors observed from 11 to 14 ft bls.
				100.8	
		Dark grey, fine SAND; wet.		246.7	
		BEDROCK		255.9	Bedrock encountered at 14 ft bls. Cored into bedrock to 45 ft bls. Well screen installed to continuously screen both overburden and bedrock zones.
15					15
20					20

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 6/23/16

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WELL CONSTRUCTION LOG

WELL NO.	NORTHING	EASTING
CW-4/RC-12	**Not Measured**	**Not Measured**

PROJECT NO./NAME	LOCATION
2409.0001Y000 / Queens Plaza	**28-10 Jackson Avenue**
APPROVED BY: **Jeff Wills** / LOGGED BY: **Lauren Dolginko**	**Long Island City, New York**

Depth, feet	Graphic Log	Visual Description (continued)	Blow Counts per 6"	PID Values (ppm)	REMARKS
		BEDROCK *(continued)*			
25	40 ft of 4-inch diameter, 10-slot, continuously wrapped, stainless steel screen				25
30					30
35					35
40					40
45					Bottom of boring at 45 ft bls. 45

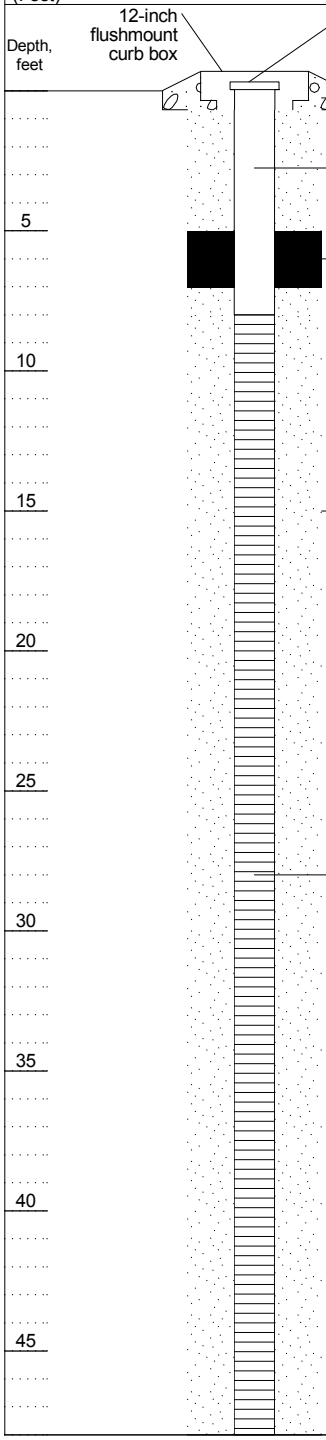
BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 6/23/16

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WELL CONSTRUCTION LOG

WELL NO. **CW-5/RC-14**	NORTHING **Not Measured**	EASTING **Not Measured**		
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**		
APPROVED BY **Jeff Wills**	LOGGED BY **Rich Crockett**			
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Tony Palomeque**		GEOGRAPHIC AREA **Orchard Street Sidewalk**		
DRILL BIT DIAMETER/TYPE **7-in. / Sonic**	BOREHOLE DIAMETER **7-inches**	DRILLING EQUIPMENT/METHOD **Compact C-17 / Rotosonic**	SAMPLING METHOD **Sonic**	START-FINISH DATE **3/25/16-6/15/16**
CASING MAT./DIA. **Stainless Steel / 4-inch**	SCREEN: TYPE **V-Wire** MAT. **Stainless Steel** TOTAL LENGTH **40.0**ft DIA. **4-inch** SLOT SIZE **10-Slot**			
ELEVATION OF: (Feet) GROUND SURFACE	TOP OF WELL CASING	TOP & BOTTOM SCREEN **/**	GRAVEL PACK SIZES **#1**	



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		FILL (Brown, medium to coarse SAND, some Gravel, little Brick and Lumber, trace plastic; moist).		4.5	Hand cleared to 5' bls.
		CONCRETE.		1.4	
		FILL (Brown, fine to coarse SAND, some Silt and Gravel, little Brick and Concrete; moist).		0.5	
5		Brown, fine SAND and SILT, some medium to coarse Sand and Gravel; moist.	G	0.7	5
		Dark grey, fine SAND and SILT, little Gravel; moist.		151	Odor observed.
		Grey, fine SAND and SILT, little Gravel and coarse Sand; wet.		413.6	Odor, sheen, and product observed.
10		Grey, fine to medium SAND and SILT, some Gravel; wet.		482 561 147	Sample RC-14 (7.5-8.5) collected for TCL VOCs, TCL SVOCs, TCL Pest, TAL Metals, TPH GRO/DRO. Odor and sheen observed. 10
		BEDROCK (Gneiss).		314.8	Sample "RC-14 (12-13)" collected for TCL VOCs, TCL SVOCs, TCL Pest, TAL Metals, TPH GRO/DRO. Bedrock encountered 13' bls. Cored through bedrock to 48' bls. (See RC-14 bedrock log for bedrock details).
15					15
20					20
25					25
30					30
35					35
40					40
45					45
					Bottom of boring at 48' bls.

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 6/22/16

Field Notes

RC Queens Plaza TUE 12/22/15

5-10 PID readings:
CONTD 7.1 : 10.2
7.4 : 11.1
10.0 : 11.2
10.65 : 671.2
10-15 4.85 ft recovery
Mechanical break at
11.85, odor
Weathered fractures
12.6, 12.8, 13.3, 13.9
14.3 ; 14.7, odors, staining
oxidation. → Not weathered fract.
15.85 (bottom). Free
product observed. Sheen
observed on outside
of core 11.5 – 15.85
15-20 5ft recovery
Mechanical fractures
15.85, 15.9, 19.9, 20.25
20.5, 20.65
21.1 bottom. odors
observed, no staining, free
product, sheen or signs
of weathering.

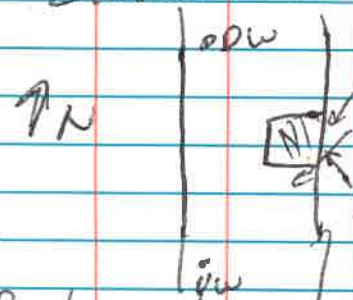
RC Queens Plaza TUE 12/22/15

20-25 5ft recovery
Weathered fracture at
23.95, 24.25, odor,
oxidation observed. 25-65 BOT
25-30 ~~Next~~ 5 ft recovery
Weathered fractures
not observed. No oxidation
Mechanical fractures
27.85, 28.6, 29, 29.45
odors observed, no staining
free product or sheen.
30-32 2ft recovery
weathered fractures.
odor, no staining
free product or
oxidation, rounded
surfaces.
Unable to advance core
barrel beyond 32 ft. Burned
up bit, back at water
circulation. Losing water
in fractures and voids.
Will attempt to refill
w/ additional water source

RC Queens Plaza TUE 12/22/15

1630 ADT offsite, R. Crockett assisting DK (Rouz) with CAMP setup for orchard street sewer work.

1650 D. Klem takes field back from R. Crockett
Weather - Overcast
T - 39°F H - 85%
P - 29.95in W - SW @ 7 mph



1645 Back up truck into position
1650 line bed of dump truck with poly sheeting
1655 check CAMP
UW: PID = 0.1 ppm DT = 5 ug/m³
DW: PID = 0.1 ppm DT = 16 ug/m³
1700 - Lift road plates to begin excavation
1705 Take ambient air reading - 0.2 ppm
1710 - Begin excavating Sewer C on orchard St.

(40)

DK Queens Plaza 12/22/15

Sewer C:
0-1 - Asphalt
1-3 - PID = 1.7 ppm
Greyish brown fine sand, little silt, trace gravel, moist, no odor
3-5 - PID = 0.8 ppm
Light Brown fine sand, some silt, trace gravel, moist, no odor
1725 Ambient air - 0.4 ppm
1750 - Ambient air - 0.3 ppm
1755 Check CAMP
UW: PID = 0.3 ppm DT = 5 ug/m³
DW: PID = 0.0 ppm DT = 30 ug/m³
1815 - Ambient air - 0.1 ppm
1825 - expose sewer line
1840 - Ambient air - 0.3 ppm
1855 Check CAMP
UW: PID = 0.1 ppm DT = 15 ug/m³
DW: PID = 0.1 ppm DT = 40 ug/m³
1905 collect discreet sample ~~from~~ @
Sewer C (2-3) - PID = 0.9 ppm
- Greyish Brown fine sand, little silt trace gravel, moist, no odor

(41)

DW Queens Plaza 12/22/15

1920 - Collect sewer C - S-E (3) - 0.6 ppm
1925 - sewer C - S - S (3) - 0.2 ppm
1930 - Sewer C - S - N (3) - 0.3 ppm
1935 - Sewer C - S - W (3) - 0.2 ppm
1940 - Sewer C - B1 (4-6) - 0.2 ppm
1945 - Sewer & C B2 (4-6) - 0.1 ppm
1950 - FB 122215
2010 - Ambient air - 0.2 ppm
2020 - start installing logging on Sewer C
2025 - check CAMP
UW: PID = 0.1 ppm PT: 17 ug/m³
DW: PID = 0.1 ppm PT: 53 ug/m³
- Sewer C - continued
5-6 PID - 0.2 ppm
Light Brown fine sand, ~~some~~
some silt, moist, no odor
2030 - reach bottom of sewer pipe, done excavating for the night
2120 - Check CAMP
UW: PID - 0.1 ppm PT: 21 ug/m³
DW: PID - 0.0 ppm PT: 18 ug/m³
2215 - finish installing logging, cover excavation with Road plates

(42)

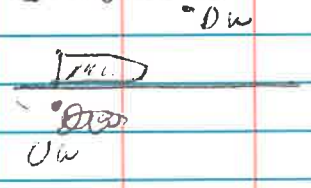
DW Queens Plaza 12/23/15

2220 - Check CAMP
UW: PID = 0.1 ppm PT: ~~[illegible]~~ N/A
DW: PID: 0.0 ppm PT: 36 ug/m³

CAMP meter

	UW	DW
PID	592-906051	592-000687
PT	027733	20537
Telemetry	027813	27156

2220 - upwind DustTrak found off, will not turn back on, will use 0 ug/m³ as background value
2235 - loading roll off container with poly sheeting
2240 - backing truck into position to transfer soil
2245 - transferring soil from dump truck to containers
2248 - Move CAMP meters to roll off container area



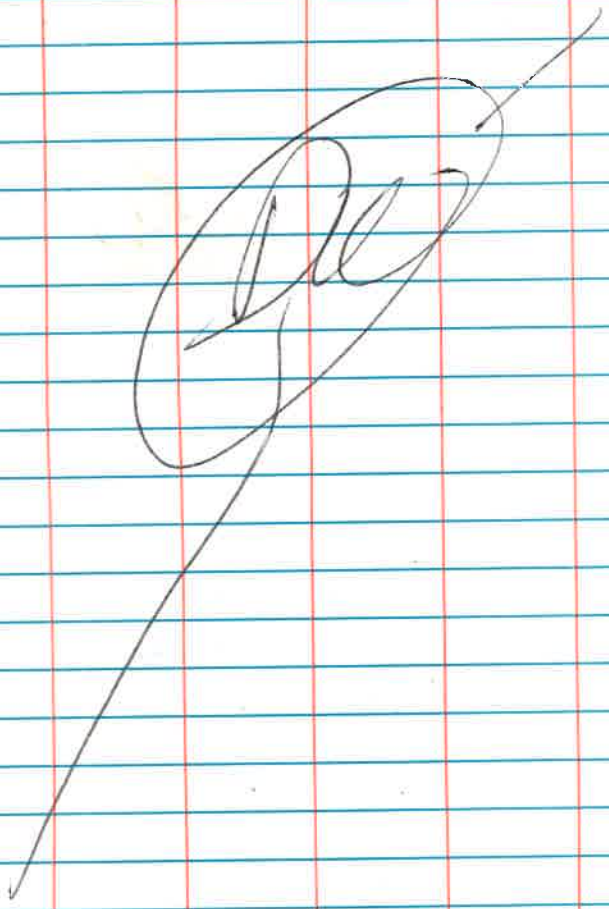
(43)

DO Queens Plaza 12/24/15

2325- finish transferring soil, covering containers with poly

2335- Remobe CAMP

0015- Dkaklarde



(44)

RC Queens Plaza WED 12/23/15

Weather: 55-59°, cloudy, Humidity: 86%
Wind: E, 10-15 mph, precip: Rain

Scope: Rock Cores, excavations, form work, rebar work, waterproofing, SOE work, pouring concrete, plumbing, electrical

Subs: ADT, Posillico, Atlantic, Restor, Pace, Crane, Pinnacle

Personnel: R. Crockett (Day)
D. Klein (Night)

FLS: JL, JG, MH

06'15 R. Crockett onsite. Prep for drilling oversight. Prep samples for Alpha Courier.

07'00 ADT onsite. Health and Safety Mtg. Set up CAMP. ADT begins equip. breakdown to mobilize to next rock core location.

07'20 RC (Row) requests to RD (Pos) to backfill and move equipment for ADT work area

(45)

RC Queens Plaza WED 12/23/15

0800 Posillico grants Kovac/ADT use of CAT 308 to create work areas for Rock core operations. Removing materials and grading working surface continue w/ breakdown to mobilize.

0915 Set up on RC-46 Take coffee break.

0935 Relinquish samples from Orchard St excavation to Alpha Courier.

0950 Begin Rock core at RC-21

1030 ADT having issues advancing core barrel, troubleshooting Posillico backfilling, importing material (RCA), pouring concrete installing forms. Atlantic - rebar work, Pace - Plumbing, Cruna - electrical. Pinnacle forming out 1st floor deck (B4). Restor waterproofing. Entech drilling in sewer

(46)

RC Queens Plaza WED 12/23/15

1030 Cont'd onsite excavating and working on gas line in Orchard St.

1100 ADT resumes coring operations at RC-46 RC

0-5 4.5 ft recovery
Entire length of core consists of weathered fractures and micro fractures. Oxidation, odors and staining observed for entire length of core
PID Readings:
0.5 : 49.9
1.0 : 192.2
1.5 : 226.5
2.0 : 351.7
2.5 : 462.8
3.0 : 277.1
4.0 : 166.4
4.65 : 35.6

5-10 Cored 5 ft, 2.7 ft recovery, will go back down to recover additional core run lost

(47)

RC Queens Plaza WED 12/23/15

RC-4/6 RC

5-10 5ft recovery weathered fractures at 5.95, 6.0, 6.2, 7.4/ 9.55. Odors, oxidation observed. No staining. No propagation of micro fractures

PID Readings
5.95 : 4.7
6.0 : 4.9
6.2 : 3.6
7.4 : 2.1
9.55 : 1.1
10.0 (BOT) 0.7

1400 At ≈ 12 ft into rock, product began coming out of the core and into the mud pan. At ≈ 15 ft into rock, we encountered a seam of product. Product began filling mud pan. RC (Rory) stops work and has ADT set up trash pump to pump product to water treatment system.

(48)

RC Queens Plaza WED 12/23/15

1420 Begin pumping all contents of mud pan to water treatment system.

1500 ADT's pump unable to pump to water treatment system. Will bring stronger pump tomorrow. Lay down spill pads, oil booms and cover mud pan w/plastic sheeting to prevent overflow resulting from overnight storing.

1530 ADT offsite.

1630 Take down CAMP.

1730 & Crackel offsite.

(49)

RC Queens Plaza THU 12/24/15

Weather: 64-73°F, cloudy, Humidity 60%
Wind: SW, 10-20mph, precip: 0.1in
Scope: Rock core drilling, pouring concrete foam work, rebar work, waterproofing, plumbing, electrical excavations
Subs: ADT, Positive, Atlantic, Kestor Crane, Pace, Pinnacle
Personnel: R. Crockett
FLS: JL

06-10 R. Crockett onsite. Prep for drilling oversight
0700 ADT onsite. Health and safety Mtg.
07-10 Begin setting up materials and equip.
07-30 Conduct site walk w/ LD (Pos) for survey of RC locations. Waiting for Positive to set up pump to pump drill water / product to water treatment system. Will not allow ADT to use air compressor for their pump.

(50)

RC Queens Plaza THU 12/24/15

08-00 Pumping of drill water to frac tank. Begin rock coring operation at RC-46
10-15 4.53 ft recovery
Mechanical fracture at 6.50
weathered fractures at 12.25, 12.64, 12.72, 13.4
14.53 (BOT)
Odors, free product, staining and sheen observed on core and in weathered fractures. oxidation
PID Readings:
10.5: 1076
12.25: 630.7
12.64: 265.3
12.72: 981.2
13.4: 1070
14.53: 300.1
10-15 Stop to change out core barrel bit.
10-30 Resume coring rock at RC-46
15-20 5ft recovery. Recover remainder of core 10-15

(51)

RC Queens Plaza THV 12/24/15

RC-6
15-20 Weathered fractures at 15.53, 16.03, 17.93, 18.95, 19.53, 20.08, 20.36, 20.48, 20.63 (BOT), odors, staining observed. Free product may be due to pulling core up through NAPL layer.

PID Readings:
15.53: 399.0
16.03: 305.7
17.53: 55.3
18.55: 161.8
19.53: 109.4
20.08: 212.5
20.36: 99.5
20.48: 364.2
20.63: 206.7

12:00 Lunch
12:30 Resume rock coring at RC-6, recovered 1.6' of 20-25. Going back down to get remaining core.

20.63-26.73 6.1 ft recovery

(52)

RC Queens Plaza THV 12/24/15

20.63-26.73 (1) mechanical fracture at 24.74'. All other fractures in core weathered. Odors and staining observed.
All PID readings 300+ Max at 8888 (22.58')
Min at 307 (26.70')
Decrease w/ depth for length of core.

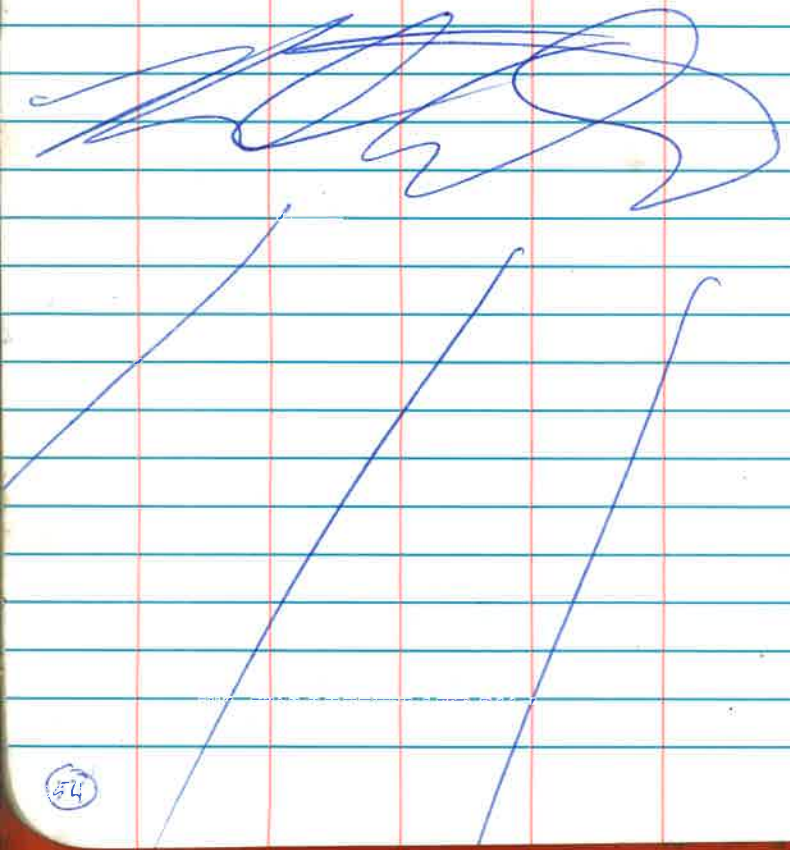
26.73-31.93 5.2 ft recovery
Weathered fractures at 26.93, 27.23, 27.58, 28.43, 30.69, 31.46, 31.93 (BOT)

PID Readings
26.93: 100.2
27.23: 50.2
27.58: 19.1
28.43: 58.4
30.69: 14.1
31.46: 13.1
31.93: 121.9
Odors & staining observed

(53)

RC Queens Plaza THU 12/24/15

31.93-
14[30] Lost core in bore hole. Will retrieve Monday. drilled 38' to elevation -32. Begin clean up and equipment breakdown
15[00] ADT offsite.
15[45] R. Crocker offsite



54

RC Queens Plaza MON 12/28/15

Weather: 35-40°, cloudy, Humidity: 50%
Wind: 10-20 mph, NE, PRCP: none
Scope: Rock cores, framework, rebar work SOE, water proofing, plumbing, electrical, excavations, paving concrete
Subs: ADT, Posillico, Atlantic, Restoration, Pace, Pinnacle, Entech
Personnel: R. Crocker (Day)
D. Klein (Night)
FLS: AC, SP (Day)
JG (Night)
06[30] R. Crocker onsite. Prep for drilling oversight
06[40] ADT onsite. Begin setting up materials and equipment
07[00] Health and Safety Mtg.
07[05] Set up at RC-6. Attempting to retrieve core from 32-37'.
31.93-38.86: 6.9 ft recovery weathered fractures. No staining, oxidation, odors or free product observed Below 33 ft.

55

RC Queens Plaza MON 12/25/15

09[30] Finish rock core at RC-6
Begin clean up / break down and setting up at RC-9

10[05] Begin driving casing to TOR at RC-9

10[50] Begin rock core at RC-9

0-5 5ft recovery
Weathered fractures, staining, odor, oxidation
Max PID: 2.7

5-10.4 5.4 ft recovery
Weathered fractures
oxidation, odor, staining and free product observed
Heavy staining 8-10' in fractures and on outer core
Max PID: 232.7

10.4-15.6 5.2ft recovery
(4) weathered fractures in core (6) at 10.4 (top) 13.45, 13.85 and 15.6 (Bot)
Odors, staining observed in fractures and outer core.

(32)

RC Queens Plaza MON 12/25/15

10.4-15.6 COAT
PID:
10.4 40.9
13.45 166.4
13.85 36.4
15.6 72.6

15.6-20.85 5.25 ft recovery
Weathered fractures at 15.6[ft] 17.1, 17.3, 19.85, 20.5
20.85 (bot). Staining, odor, oxidation
PID: Readings
15.6 390.2
17.1 101.2
17.3 45.1
19.85 46.8
20.5 93.3
20.85 33.4

15[30] ADT begins equip. break down and cleanup. Will finish RC-9 tomorrow

4[00] ADT offsite

1530 J. Pierantozzi

1700 JC marks out work zone inside perimeter fence

(33)

Queens Plaza — Mon 12/26/16

1700 - Weather - Clear
T = 40°F H = 50%
P = 30.52 in V: NE @ 12 mph

1905 - Calibrate PID w/ Isobutylene = 100 ppm
S/N: 592-906051
Zero: 0.0 ppm Span 99.7 ppm
Isobutylene
Lot # EAP-248-100-26
Exp: 5/8/19

1725 - SC begins saw cutting street at location

1810 - Backing up dump truck to load out soil, which will be transferred onto roll off container

1825 - Loading out asphalt into dump truck

1845 - Begins to scan
0-1' asphalt
1-3 - PID = 0.8 ppm
Brown fine sand, little medium sand, some gravel, moist, wood

1951 - [illegible] pipe 3.5' bls, may have to install underneath

Queens Plaza — Mon 12/28/16

3-5' - PID = 3.6 ppm
SAA

2115 - transferring soil from dump truck to roll off container

2135 - line roll off container w/ poly sheeting

2140 - continue transferring soil into roll off container

2225 - start packing up & performing general housekeeping

2245 - cover roll off container w/ poly

2251 - Cover excavation w/ road plates

2340 - DK off site.

RC Queens Plaza TUE 12/29/15

Weather: 41-52°, cloudy, Humidity: 86%
Wind: 16-20 mph, precip: Rain
Scope: Rock core Drilling, Excavations, foundation work
Subs: ADT, Positico, Entech, Koster Atlantic, Lema, Pace, Pinnacle
Personnel: R. Crockett (Day)
D. Klein (Night)
FLS: AC, SP (Day)
MZ, JG (Night)

0630 R. Crockett onsite. Prep for drilling oversight.

0700 All onsite. Health and Safety Mtg.

0715 Begin setting up materials and equip. Warming up rig.

RC-9
20.55 - 25.55 4.7 Ft recovery
Weathered fractures odor, No staining, Free product or oxidation on core or fracture surfaces.
During drilling of the above

RC Queens Plaza TUE 12/29/15

core interval, drill water and product began emerging from RC-6. Suggest fractures connect ~~to~~ cores with - slightly free product was observed at -11ft elevation, consistent w/ RC-5 + RC-6
25.55 - 29.05 3.75 ft recovery
25 - 30
Weathered fractures
No evidence of impacts
Attempting to recover lost core (1.3ft) over drilling to 34 ft BLS
elevation -35 ft
29.05 - 33.05 5ft recovery
weathered fractures. No staining, free product, no oxidation
1130 Finish core at RC-9
Begin equip break down to mobilize to RC-
Excavator grading out work area and assisting in relocation.

RC Queens Plaza TUE 12/29/15

1230 Begin driving casing to TOR at RC-8

1300 Drive casing to TOR. Need to seat. Take bench

1330 Seat casing to TOR (-4 elev.) 9' BLS to TOR Right -2ft

1350 Begin rock core at RC-8 Product from BR surface came up into mud pan during use of roller-bit

0-5 4.15 ft recovery Fractures mechanical. No oxidation, staining or free product observed. Oxidation present at 0 on bedrock surface

1445 Retrieve additional 3' of C-5, 4.45 ft recovered weathered overburden 4.15. No staining, free product, oxidation observed. Odor Moving to next remaining core (4-9) down the hole. Will retrieve tomorrow

(62)

RC Queens Plaza 12/15

1405 Begin cleanup and equip. breakdown

1530 RC Crockett, ADT offsite

1530 - D. Klem onsite

1545 - calibrate PID w/ Isobutylene gas Lot # CAP 248-100-26 Exp 5/8/19 S/N - 592-906051 Zero-0.0 ppm Span 100.0 ppm

1610 - SCC at Right of Way position on Orchard St.

1625 - SC opens up sewer A

1630 - SCC starts pumping out water in Sewer-A

*1720 - Collect Orchard-Sewer-A (6-8) PID=0.0 ppm Brown fine sand, some silt, trace gravel, wet, no odor

1745 - SCC starts loading soil into dump truck

1755 - Digging to connect sewer to trench inside the site Perimeter

1915 - cover sewer A w/ steel plate

(63)

TUES 12/29/15

QC Queens Plaza

1925- SC installing lagging inside trench

2010- Finish installing lagging cover trench w/ road plates

2045- Begin to transfer soil from Dump truck to roll off container

2120- finish loading out dump truck and cover roll off container w/ poly

2140- SC cleaning up work zone & conducting general housekeeping

2250- Off site

(62)

RC Queens Plaza

WED 12/30/15

Weather: 41-47°, cloudy, Humidity: 87%
wind: 5-10 mph, NE, precip:

Scope: Rock core drilling, ~~form work~~, rebar work, SOE, pouring concrete, waterproofing, electrical, Plumbing

Subs: ADT, Posillico, Atlantic, Rester, Entech, Crana, Pace, Pinnacle

Personnel: R. Crockett (Day)
D. Illem (Night)
FLS: MZ (Day)
JG (Night)

06:20 R. Crockett onsite. Locked out of HMCG office.

06:45 FLS onsite open office. RC Preps for drilling oversight. ADT onsite.

07:00 Health and Safety Mtg

07:10 Begin setting up equipment

07:30 Begin over drilling last core.
Extract 4.4 - 7.6 3.2 ft
weathered fractures. Some oxidation present on fracture surfaces. No staining, free grout

(65)

RC Queens Plaza WED 12/30/15

4.4-7.6 PID Readings
4.4: 16.1
5.35: 11.3
6.4: 1.2
6.8: 4.0
6.9: 0.0
7.6 (Bot) 0.0

0750 Having trouble advancing core barrel and retaining cores, cleaning out hole w/ roller bit.

7.6 - 10.[illegible] 3.25 ft recovered
Weathered fractures at
7.6, 7.9, 8.3, 8.[illegible], 10.[illegible]
No staining, free product or oxidation observed
PID: Readings
7.6: 0.0
7.9: 6.0
8.3: 0.1
8.[illegible]: 0.0
10.[illegible]: 0.0

10.7 - 13.95 3.25 ft recovered
Mechanical fractures at

(66)

RC Queens Plaza WED 12/30/15

10.7-13.95 CONT'D
10.7 (Top), 11.7, 13.15, 13.95 (Bot). No staining, weathering, free product, oxidation or odor observed

1050 Stop drilling to ream out casing to TOR. Casing lost seal and engineered fill began entering the core.

1105 Sink and seat the casing. Dropped the casing ~ 1ft

1125 Pulling core barrel - stuck under casing. Have to pull casing, pull core barrel then reset casing to TOR.

1300 Unable to remove core barrel from RC-8. Will remove tomorrow by overdrilling w/ Sonic rig. Need to release off hole, seat to TOR and clean out w/ roller bit. Take lunch.

(67)

RC Queens Plaza WED 12/30/15

13:30 Conduct site walk w/ RD (POS) and ADT to discuss and lay out rock core locations RC-7 and RC-10. Discuss plan for tomorrow and next week

14:00 Begin cleanup and equip breakdown. Prep to move crews to next location.

15:00 ADT offsite.

Other site work included:
Posillico: Formwork, pouring concrete, importing engineered fill and backfilled excavations installed rake, (at 14 side wall)
Atlantic: Rebar installation, bending and fabrication of cages
Rester: Waterproofing
Crana: Electrical
Pace: Plumbing
Pinnacle (Turner): Formwork
Entech (DEP): Drilling in sewer line.

(69)

RC Queens Plaza WED 12/30/15

15:30 (20) cubic yards of soil removed from site. Generated during orchard St sewer work.

16:30 Posillico continues importing and backfilling engineered fill, utilizing our Rental Corp. extending conveyor to backfill, tamping and grading. 1st round of night trucking (30) loads going to Bayshore.

15:30 PID on site
15:45 Calibrate PID w/ Isobutylene
Lot # EAP 248-100-26
Exp 5/8/19
S/N-592-806651
Span-100.3ppm zero-0.0ppm
16:10 SC onsite; installing line from sewer to building
- weather-clear
T-45°F H-80%
P-30.21in W-NE 5 mph

(69)

DW Queens Plaza Wed 9/30/15

1615- open up sewer A to install piping
1635- installing piping in sewer A
1730- hooked up connection in sewer A, working on extending pipe
1810- excavate soil & dump into dump truck
1940- transfer soil from dump truck to roll off containers
2015- extend pipe from sewer A to inside the site perimeter
2040- cover roll off container with poly
2135- go underneath piping inside site perimeter fence with line
2250 JCC performing general housekeeping
2325- JCC covers trench w/ road plates
2340- DW off site

RC Queens Plaza THU 12/3/15

Weather: 46 - 45°, Partly Cloudy, Humid. 4:35
wind: W 5-15 mph, precip: none
Scope: Rock core drilling, Excavations, soil load outs, form/rebar work, SOE, waterproofing, Plumbing, Electrical
Subs: ADT, Posillico, Atlantic, Kestor, Cranes, Pace, Entech
Personnel: R. Crockett
L Agnew
FLS: MCC
06:20 R. Crockett onsite, ADT onsite, Begin mobilizing sonic rig to RC-8 and offloading support truck Pavic onsite to remove (20) yard container w/excavated soils from orchard St sewer work.
06:45 LA (Roux) onsite.
07:00 H&S mtg.
07:10 Posillico backfilling and prepping for concrete pour installing forms, SOE elements

71

RC Queens Plaza — THV 12/31/15

07:10 cont Importing fill, cutting piles chipping grout installing hardware excavating/ stockpiling soil. Atlantic installing/bending rebar and fabricating cages. Kiston installing waterproofing on foundation elements (B1 & B2) Crane installing grounding cable/wire and conduit. Pace installing sanitary and water lines.

08:00 Surveyors mark out RC-7 elev. 5' 2" and RC-10 elev. 6' 2"

08:30 Utilizing Munoz trucks to import engineered fill. ATT begins driving 5" to rock in an attempt to remove core barrel locked in the borehole.

(72)

RC Queens Plaza — THV 12/31/15

Time	DTP	DTW	DTB	ID	Surface Elev.
08:58	1.96	1.97	5.01	RC-4	
09:28	—	6.0	31.80	RC-5	+7
09:37	2.49	6.90	41.73	RC-6	+4
~~09:37~~	~~2.49~~		(A)	~~RC-9~~	~~+4~~
09:47	0	0.02	40.57	RC-9	+2

Note! RC-5: probe did not detect product, but product coated on probe/visible when taking probe out.

Excavator crushed J-plug into borehole at RC-5. Soft bottom from soil and bentonite falling into hole. Sealed and marked out location.

10:30 Finish driving casing at RC-8, back filling hole w/ sand to encase core barrel for extraction.

(73)

RC Queens Plaza Mon 1/4/16

Weather: 29-32°, cloudy, Humidity: 99%
Wind: NW 10-20 mph, Precip: None
Scope: Rock core drilling, excavations, soil load offs, form/rebar work, SOE, pouring concrete, backfilling, waterproofing, plumbing, electrical
Subs: ADT, Posillico, Atlantic, Restar, Cruna, Pace, Pinnacle, Entech
Personnel: R. Crockett
FLS: JL (Day)
JG, ER (Night)

06⁴⁰ R. Crockett onsite. Prep for drilling oversight.

07⁰⁰ H2S mtg. Man. Test 20yd container of soil from Orchard St. sewer work. (Louie)

07⁵⁰ ADT onsite. Begin setting up materials and equip. at location adjacent to RC-5

08⁰⁰ Posillico takes control. ADT on hold until excavator available to move boxes.

(71)

RC Queens Plaza Mon 1/4/16

10⁰⁰ ADT begins driving casing to TOR at RC-5B. Still waiting for Posillico excavator

11⁰⁰ Went down w/ roller bit to clean out hole. Continue driving casing to TOR

11⁵⁰ Surface elev. -2 ft
11 ft of casing to TOR
TOR at elev. -13 ft

11⁴⁵ Unable to circulate water through core barrel. Troubleshooting.

12⁰⁰ Lunch

12³⁰ ADT continues troubleshooting core barrel

13³⁰ Unable to get core barrel circulating water. Clean up.

14⁰⁰ ADT offsite

1530 - D. Klein onsite, takes over field book duties

1545 collocate PID w/ Isobutylene Cal #: EHP-248-100-26 Exp. 5/18/19

(72)

Mon

DC

Queens Plaza 1/4/16

- PID (3000) SN: 592-9000 BT
Zero: 0.0ppm Span: 99.9ppm

1600 - Weather: Clear
T - 27°F H - 53%
P: 30.16in W - NW @ 6 mph

1605 - JCI onsite, set up work zone.

1615 - remove road plates for sewer A

1625 - JCI performing general housekeeping in sewer A

1640 - Dubuque Water to inspect hydrants

1710 - JCI installing lagging in sewer A at Orchard St. curb line in order to backfill from the street to curb.

1740 - 1 load of backfill imported onsite

1745 - JCI backfilling from curb line to the street in sewer A

1820 - JCI tamping down backfilled dirt

2000 - JCI still backfilling sewer A

76

Mon

DW

Queens Plaza 1/4/16

2030 - finish backfilling sewer A, cover w/ road plates

2055 - open up Sewer C to dig underneath sewer line

2215 - line rolloff container with poly sheeting

2225 - transfer dirt onto rolloff container

2240 - cover container with poly

2310 - expose sewer line

2330 - JCI conducting general housekeeping

0020 - DC off site

DW

77

RC Queens Plaza TUE 1/5/16

Weather: 11-30°, Clear, Humidity: 46%
Wind: N, 9-15 mph, precip: None
Scope: Rock Core Drilling, excavations soil load outs, Foundation work
Sub: ADT, Posillico, Atlantic, Rester Grana, Pace, Entech, Pinnacle
Personnel: R. Crockett (Day)
D. Klein (Night)
FLS: JL, SP (Day)
ER, JG (Night)

06[45] R. Crockett onsite, ADT onsite, Prep for drilling oversight, ADT waiting to get support truck onsite.

0[100] H&S mtg.

07[30] ADT pulls truck onsite. Begin offloading materials and eqi. P.

08[40] Begin rock core at RC-8B

09[30] Water lines and pumps frocon. Unable to drill Rock core at RC-8B

11[30] ADT winterizes rig and leave site.

38

RC Queens Plaza TUE 1/5/16

ID	DTP	DTW	DTB	Gal. Removed
RC-4	1.36	1.37	5.01	Not Meas.
RC-5	6.21	6.43	31.45	211.80 mL
RC-6	7.4	7.22	41.73	2.9 ft
RC-9	1.4	0.0	40.57	Not Meas.

1530 - D. Klein onsite takes over for Crockett

1540 - Calibrate PID (300) w/ Isobutylene = 100ppm
w/ EAP 248-100-28
Exp 5/8/19
PID S/N - 592-[illegible]
200-0.0ppm Span - 100 ppm

1600 - Weather - Clear
T - 31°F H - 30%
P 30.63in W. NE @ 2 mph

1615 - Left road for asbestos sewer A and pour concrete

1720 - Begin excavating at sewer B to expose sewer line

1725 - JCC began saw cutting asphalt at sewer B location

1755 - JCC begins excavating at sewer B location

39

Tues 1/5/16

Queens Plaza

Sewer-B

- 0-1 - asphalt
- 1-3 - PID-0.5 ppm
Light Brown fine sand, little medium sand & silt, trace gravel, moist, no odor
3-5 - PID-0.5 ppm
Light Brown fine sand, little medium sand & silty, trace gravel, moist, no odor
5-7 - PID = 0.4 ppm
SAA
7-8 - PID = 0.6 ppm
SAA

1945 - collect @ Orchard - Sewer B (6-8) PID = 0.6 ppm

2010 - JCC begins installing sheeting at Sewer-B

2455 - JCC transferring soil from Dumptruck to poly lined roll off container

2415 loading out more soil from sewer-B to dumptruck

2450 transferring soil from Dumptruck to roll off container

Tues 1/5/16

Queens Plaza

2255 - chopping asphalt to fit roadplate

2335 - load out asphalt

2340 - Cover roll off container

2355 - JCC packing up

0020 - D.K. leaving site

Weather: 20-41°, cloudy, Humidity: 39%
wind: W. 5-10 mph, precip: None.
Scope: Rock core drilling, excavations, soil load outs, foundation work
Subs: Posillico, ADT, Atlantic, Nestor, Crane, Pace, Pinnacle, Entech
Personnel: R. Crockett (Day)
D. Klein (Night)
FLS: JL, MH (Day)
ER, JG

06:50 R. Crockett onsite. Prep for drilling oversight.
07:00 H&S Mtg.
07:10 Posillico excavating/stockpiling soil, installing/stripping forms, backfilling and prepping piles. Atlantic installing/bending rebar and fabricating cages. Crane electrical. Pace - Plumbing. Nestor waterproofing. Pinnacle farming out 1st floor (B1). Entech drilling in sewer line.
07:40 ADT onsite. Begin setting up water source for drilling operation.

(82)

09:30 Finish setting up water and discharge lines. Begin core at RC-SB
10:30 Relinquish sample Orchard Sewer B (6-8) to Alpha courier. Cont'd onsite working on gas line. DEP onsite. Conveyor truck onsite for backfill
0-2.7 collected yesterday 1st (1) ft highly fractured rounded surfaces. No staining free product or oxidation observed.
2.7-7.9 5.2 ft recovery. Fractures mechanical. No staining. Free product, oxidation, odors observed. 0.0 PID readings on fracture surfaces.
7.9-13.2 5.3 ft recovery. Mechanical fractures. No weathering or impacts observed.

(83)

RC Queens Plaza WED 1/6/16

13.2-18.4 5.2 ft recovery. Mechanical Fractures. No weathering, staining, free product, odors observed.
Surface elev: -2
TOR: -13
Borehole: -31.4

11:30 RC-SB core complete. Break down equip. and prep to move to RC-10. Positive backfilling RC-10 area to build ramp and work area

12:30 Lunch

13:00 Begin set up at RC-10

14:00 Begin driving casing to TOR on RC-10

14:45 Finish cleaning out w/ roller bit. Begin core

0-5.4 5.4 ft recovery heavily fractured. No mech. fractures. Weathered fractures. Oxidation, staining, odors observed Micro fractures

(84)

RC Queens Plaza WED 1/6/16

PID from BR surface to 5.4 ft
46.6
302.4
761.9
292
354.4
93.3
276.6
401.1
93.5
27.1
114
169
99.9
153.2
104.6 (BOH)

PID readings taken on fracture surfaces.

* On 2nd run at 2 ft into rock, product began daylighting in the mud pan 2-5

5.4-10.5 5.1 ft recovery
Weathered fracture at
6.1 PID 62.1
8.4 PID 49.2
7.25 PID 114.7. Free product
staining, odors, oxidation

10.5-15.4 4.9 ft recovery
Mechanical fractures.

(85)

RC Queens Plaza WED 1/6/16

10.5-15.4 CONT'D
No staining, oxidation. Free product on outside of core from pulling up through NAPL layer

15.4-20.4 5ft. recovery
Mechanical fractures, no weathered fractures observed, no staining, free product outside of core from pulling up through NAPL layer

1530- D. Klein onsite, taking over field book duties

1600- JCC onsite at Orchard St.

1625- JCC creates work zone

1705- JCC begins excavating on manhole location, just North of Sewer-A

20.4-25.1 - 4.7 ft. recovery
Mechanical fractures, no weathered fractures observed, no staining, free product on outside of core from pulling up through NAPL layer

(56)

DC Queens Plaza Wed 1/6/16

1835- Rovic removed 30yd roll off container of Orchard St. Sewer soil.

~~1840~~ During drilling operation at RC-10, drill water ~~[illegible]~~ product emerging out of RC-9

1905- JCC excavator soil into dump truck on Orchard St.
- RC-10 cont'd

~~25.1-30.3 - 5.2~~

25.1-30.3 - 5.2 ft. recovery
Mechanical fractures, no weathered fractures observed, no staining, free product on outside of core from pulling up through NAPL layer

30.3-35.4 - 5.1 ft. recovery
Mechanical fractures, no weathered fractures observed, no staining, free product on outside of core from pulling up through NAPL layer

(57)

wed 1/6/16

Queens Plaza

1950- APT finished coring rock, packing up, cleaning out pipes and getting equipment ready for tomorrow.
RC-40
TOR- +2
Borehole - 35 ft. from TOR which is elevation -33. Reached final depth, no product present.

2010- JCC dug down to 6 ft., putting up laggings
- 0-1 - asphalt
1-3. PID 0.4 ppm
Brown fine sand, little medium sand, silt, and gravel, moist, no odor
3-5. PID - 0.5 ppm
SAA

2055 ADT at site

2210- JCC exposes sewer line about 6-7 ft bls
5 to 7 - PID = 0.1 ppm

2315- JCC transferring soil from
Dump truck to roll off container

wed

Queens Plaza

2315 finish transferring soil, JCC packing up

0015 DT at site

RC Queens Plaza THU 1/7/16

Weather: 35-45°, clear, Humidity: 30%
Wind: N. 4-10 mph, precip: None
Scope: Rock coring drilling, preclearance foundation work, excavations coal load outs
Subs: ADT, Positive, Atlantic, Restor Pace, Crane, Entech, M-Vac Pinnacle
Personnel: K. Crockett (Day)
FLS: JL, MH (Day)
ER, JG (Night)

07:00 K. Crockett, ADT onsite- H&S mtg, prep for drilling oversight. ADT prepping to move rig and set up on RC-7

08:00 Using excavator to move equip and prep work area. Request to Positive to mark out RC-7 and Crane pad / Loaded vault for preclearance

09:00 Positive takes coffee M-Vac Unclog out frac tanks

(90)

RC Queens Plaza THU 1/7/16

10:30 Begin driving casing to TOR at RC-7

11:00 Cleaning out casing w/ roller bit

11:10 Begin core at RC-7

0-5 4.45 ft recovery
No weathered fractures.
No staining or free product sheen on outside of core.
odors
pft into rock product began emerging from casing into mud pan.

4.45-9.35 4.9 ft recovery
Weathered fracture at 6.55
staining, odors observed
other fractures in core
mechanical PID 10.1 free product

9.35-14.55 5.2 ft recovery
Weathered fracture at 10.25
staining, odors observed. free product on outside of core due to bringing up core through WATER layer. PID 42.4

(91)

RC Queens Plaza THU 1/7/15

14.55 - 19.65 5.1 ft recovery weathered fractures w/ staining. Staining on outside of core due to pulling core up through NAPL layer
Fracture at bottom of core mechanical to
impacts observed
PID readings from fracture surfaces Top to bottom

14.55	67.1
15.1	104.1
15.55	55.4
17.0	197.6
17.95	233.8
19.65 (BOT)	0.0

1600 ADT begins winterizing and cleanup. Had to stop work due to sustained VOC readings over 100 ppm. Positive did not have cartridges to fit respirators ADT brought

RC Queens Plaza THU 1/7/15

1700 ADT offsite. Positive night shift loading out soil and waiting material and equipment around site.

RC Queens Plaza — FRI 1/8/16

Weather: 35-44°, clear, humidity 53%
Wind: NE 9-15 mph, precip: none
Scope: Rock core drilling, utility clearance, excavations, soil loadouts, foundation work
Subs: ADT, Positive, Atlantic, Kistor Frama, Pace, Pinnacle, Entech
Personnel: R. Crockett (Day)
D. Klein (Night)
FLS: JL, MH (Day)
ER, JG (Night)

06[15] R. Crockett onsite. Prep for drilling oversight
06[30] Rovic onsite to swap (20) cu.yd. containers. -Orchard St sewer soil
ADT onsite
06[45] H&S mtg. Begin setup at RC-7. ADT in Level C PPE
07[45] Continuing rock core at RC-7
19.65 - 24.55 4.9 ft recovery
Mech. fractures. No staining or weathering. Free product & odors on outside of core due to bringing core up through NAPL layer

(94)

RC Queens Plaza — FRI 1/8/16

24.55 - 29.55 5 ft recovery
Weathered fractures - Oxidation on fracture surface at 29.35. No staining. Free product and odors due to bringing up core through NAPL layer
29.55 - 34.65 5.1 ft recovery
(1) mech. fracture. No staining. Free product on outside of core due to bringing core up through NAPL layer
Surface elev. 2
TOR: -1
Borehole: 34.65 ft, elev. -33
RC-7 complete. Begin clean up and breakdown to move to RC-11

1330 - D. Klein onsite
1325 ADT getting into position at RC-11
1440 Start drilling at RC-11

(95)

FT
1/9/16

Queens Plaza

RC-11

0-5 - 1.5' recovery

6-2.5 - PID = 139.5 ppm

Grey ~~Dark brown~~ f-m sand, some silt, little coarse sand + gravel, trace asphalt, wet, odor

2.5-5 - PID = 11,275.0 ppm

Grey ~~Dark brown~~ fine sand, some silt, little medium sand, trace gravel, ~~wet, odor~~

~~5-10~~ coal clay, wet/odor

5-10 - 4' recovery

5-7.5 - PID = 15,600 ppm

Grey silt, little fine sand, trace clay moist, odor

7.5-10 - PID = 15,000.0 ppm

Greyish Brown silt, little fine sand, trace clay, moist no odor

1630 - Hit refusal at 9 ft, can advance with the roller bit but not the 4" high casing, cannot advance any further today.

(96)

FT
1/9/16

Queens Plaza

will have to come back tomorrow with larger casing ~~to~~ and clear out area with roller bit to advance ~~the~~ further

1640 - ADT packing up drilling and work area, winterizing drilling

1750 - ADT, Driller off-site

(97)

RC Queens Plaza SAT 1/9/16

Weather: 41-47°, cloudy, Humidity 26%
Wind: E, 10-15mph, precipitation
Scope: Rock core drilling, excavations
Foundation work
Subs: ADT, Positive, Atlantic, Roster
Crane, Pure Pumping
Personnel: R. Crockett
TLS: AC

06'15 R. Crockett onsite. Prep for drilling oversight.
07'00 ADT onsite. Orchard St gate locked. No access until Turner unlocks gate. Health and safety mtg.
08'00 Gate still locked. No rep. from Turner onsite. Water material and equip. Around from West St. gate.
08'00 Begin driving casing at RC-11 Will begin sampling at 10ft BLS
10-14 Drilled through cobble/boulders
14-19 3ft recovery
14-16 Greyish brown coarse sand some med sand. Little fine sand trace silt & gravel, wet, odor PID: 21

(88)

RC Queens Plaza SAT 1/9/16

16-19 Greyish brown med. sand some fine sand, little silt trace coarse sand and gravel, wet, odor, PID: 1954
19-23 4ft recovery
19-21 SA4: PID 522
21-23 SA4: PID: 9671
Bedrock at 23 ft BLS
Surface elev. 14 ft
TOR +9
09'50 Driving casing to TOR
10'40 Finish driving casing to TOR. Cleaning out hole w/ Roller bit
0-5 3.4ft recovery
.65 and 1.2 ft silt filled joints/fractures
fractures weathered
Odors observed, no staining or free product. Have to drive casing into rock bore hole filling w/ silt from fractures.
AC Casing driven 2' deeper, ADT

(89)

Queens Plaza 4/9/16

Will attempt to drill out obstruction

1330 Competest rock at 23' 28.5' bgs, casing at 26' bgs

1416 Continuing to hammer casing, bac at 26' bg

1551 Driller confirmed top of competest bedrock is 26.5bg, pulling 0-5 now

0-5 4.65 ft recovery

3.45-8.1 Weather fractures at 1.6, 2.6, 3.95 Weathered zone at 4.2-4.5

Odors observed, no stain or free product

(100)

RC Queens Plaza MON 1/11/16

Weather: 33-35°, cloudy, humidity: 45%
Wind: SW, 17-25mph, precip: None
Scope: Rock core drilling, Soil boring, well installation, excavations soil load outs, Foundation work
Subs: ADT, Positive Atlantic, Roter Entech, Luna, Penc
Personnel: R. Crockett
FLS: JL MH (Day)
ER, JG (Night)

0640 R. Crockett / ADT onsite prep for drilling at RC-11

0700 H2S mtg. Waiting for delivery to complete need to offload support truck.

0730 Continuing rock core at RC-11

8.1-13.4 5.3 ft recovery
(2) mechanical fractures
No staining or free product.
odors - impacted GW

13.4-17.8 4.4 ft recovery
Mech. fractures. No staining or free products. Odors due to impacted GW

(101)

RC Queens Plaza MON 1/11/16

17.8 - 22.6 4.8 ft recovery
(2) weathered fractures
19.9 - staining, free product
oxidation silt and sand
22.2 - No staining or
free product, oxidation.
Rounded. PID: 19.9 = 103.7
22.2 = 28.3
Product elev. - 28.9
Bottom of core = -31.9
Continuing core
22.6 - 27.8 5.2 ft recovery
Weathered fractures at
23.1; 23.3, 24.3, 25.5
No staining, free product
or oxidation observed. Rounded
Free product and odors on
outside of core due to pulling
core up through NAPL layer
mech. frac. below 25.5 to
27.8 ft (3)
11:30 ADT talks lunch. Contact MH
(DEC). He requests additional
5ft of core

(102)

RC Queens Plaza MON 1/11/16

12:00 ADT continuing core
27.8 - 33.8 5ft recovery
Weathered fractures at
29, 30, 30.9. Mech at 31.9
No staining, free product,
oxidation. Rounded. Free
product on outside of core
due to pulling core up
through NAPL layer
13:40 Finish core at RC-11
Surface elev. 14
TOR: -9
Overburden 23ft
Cored 33ft in to rock
Borehole depth 56ft
Bottom elev. -42.8
14:00 ADT breaking down equip.
and prepping rig for demob.
15:00 ADT offsite.
15:30 R. Crockett offsite

(103)

3/15/16 2409.0001/000 LD

1200 L Dalgliesh (Roux) onsite goes over site & scope of work w/ R. Crockett.
Weather: 53F, Cloudy, rh: 70%, wind: calm
Objective: bedrock core drilling for product delineation.

1245 ADT onsite (Tony & Danny)

1430 Waiting for electrical truck to be moved in order to access location.

1622 Posillico continues to pour concrete → trucks continue
Extend well at CW-9
PVC 2-ft riser coupling

1710 Walk drill down to RC-26
location - begin setup
PID Cal: Roux #: 073540
Lot #: JA0-248-100-20
Exp Date: 9/29/2018
Zero Cal: 0.0ppm
150 Cal: 99.5 ppm

1738 Begin drilling at RC-26:
→ starting elevation: +10'
→ hit bedrock at 5' bls; +5' elev.

(44)

~~PREREADING~~ DEPTH INTO BEDROCK
~~ELEV~~ 2409.0001/000 16

PID	~~DEPTH~~	ELEV	DESCRIPTIONS
13.8 ppm ~~5.8 ppm~~ @ 5' into bedrock	~~5-10~~ ~~5~~ 0-5'	5'-0'	Recovery: 4 ft mechanical fractures at ~0' into BR & ~~5' inherent~~ NO staining ~~observed~~ observed @ 5' into bedrock (LD)
18.0 ppm @ 6' into bedrock	5-10'	0-5'	Recovery: ~~5.5'~~ 5.35 ft Inherent fracture at ~6' & mechanical fracture at ~7' NO staining observed
133.4 ppm @ 10.5' 5.2 ppm @ 14.25' 10.2 @ 14'	10-15'	5-10'	Recovery: 5'4" ~~1 yes~~ two inherent fracture ~10.5' @ 10-15' mechanical ~13' inherent fractures ~14' & 14.25' ~~NO~~ staining & oxidation at 10.5' & ~~5'~~ into BR (LD)

2030 All offsite

LD

(45)

3/16/16 2409.000/4000 LD

0630 LDolginko (Crew) onsite.
Weather: 49 F, clear, m. 75%, Wind: calm
Objective: continue bedrock core drilling at RC-26 for product delineation
PID CAL: (rae ux #: 073840)
Lot #: JAD-248-100-20
Exp Date: 9/29/2018
Zero Cal: 0.0 ppm
ISO CAL: 99.2 ppm
→ ADT onsite

0705 Begin drilling at RC-26 left off at elevation -10' : ~15' into bedrock

PID	DEPTH INTO BR	ELEV	DESCRIPTION
			→ product observed in pan ~116' into bedrock
2008 ppm @ 15.5' into BR	15'-20'	-10'--15'	Recovery: 4'11" inherent fracture ~ 15.5' Mechanical fractures ~ 18'1" & 19'3" NO staining observed.

(96)

2409.000/4000

0810 Drill gets clogged at ~22.5' into BR - ADT goes to truck to get equipment to pump water into tank

PID	DEPTH INTO BR	ELEV	DESCRIPTION
51.2 ppm @ 21.5' into BR	20-22.5'	-15--17.5'	RECOVERY: 2.5' → NOT FULL 5' recovery due to log. mechanical ~~inherent~~ fracture ~ 21.5' - no staining observed

0842 Begin pumping drill water into frac tank & ADT drums cuttings from bottom of pan.
0900 Resume drilling at RC-26
0950 Packing is shot on the top of drill - cannot get engage pressure ADT is trying to get new packing from shop or a new setup.
1022 New parts are ~~being~~ will be brought from shop to site.
1150 Rig repaired & drilling resumes.

(47)

3/16/16 2409.00014000 LD

→ product observed in pan right when drilling resumed depth ~ 22.5 into BR.

1200 Handle breaks on rig.

1215 ADT will bring rig back to shop to repair handle & properly repair packing (was still leaking).

→ pull up remaining core

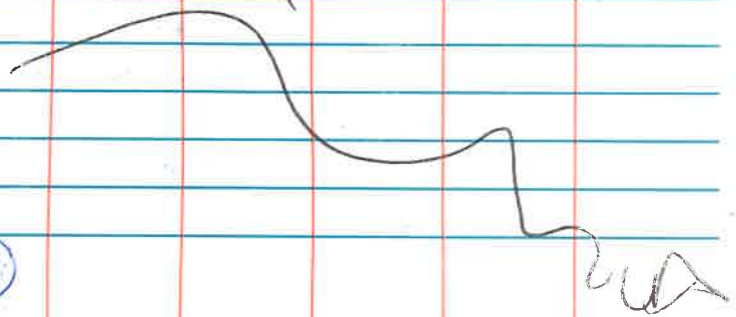
PID	DEPTH INTO BR	ELEV	DESCRIPTION
1.8 ppm @ 17.5' into BR	22.5-25	17.5-20	RECOVERY 2.5' Mechanical fracture @ 17.5' & 20' - NO staining

1230 ADT begins breaking down

1310 ADT parks rig on street offsite & drive to shop to pickup flatbed.

1500 ADT (Tony) returns & picks up rig.

1515 LD offsite



(48)

3/18/16 2409.00014000 LD

0630 LD daily onsite

Weather: 50F, Sunny, clear, rh: 35%, bp: 29.81 in, wind WNW 8 mph

Objective: bedrock core drilling continued at RC-26 for Product elimination

PID cal. (roux #: 073840)

Lot #: JAD-245-100-20

Exp Date: 9/29/2018

Zero: 0.0 ppm

ISO: 99.2 ppm

0730 Set up camp

ADT onsite — waiting on Jackson Ave for soil trucking to die down.

0915 Drilling onsite begin setting up at RC-26

0950 Resume drilling at RC-26 left off at 25' into bedrock & -20' elevation on 3/16/16

PID	DEPTH INTO BR	ELEV	DESCRIPTION

→ product observed coming up when putting rods in hole in prep for drilling

(49)

3/18/16 2409.00014000 LD

PID	DEPTH IN/OUT BR	ELEV	DESCRIPTION
1015			Sediment has built up at bottom of boring & keeps clogging the rods. ADT continues to put rods up to unclog & then again.
1050			Pull first rods
4.5 ppm at 26.5' into BR 97.3 ppm at 29.5'	25'-30'	20'-25'	Recovery: 5' mechanical fracture at ~25 mechanical (LD) ~~natural~~ fracture at ~26.5'
			mechanical ~~mechanical~~ fracture ~27.5' mechanical ~~natural~~ fracture at ~29.5' → no staining observed
5.7 ppm at 31.5' into BR	30'-35'	25'-30'	Recovery: 5' mechanical fracture ~30 & ~31 ~~natural~~ mech fracture ~31.5 mechanical fracture ~34' → no staining observed
1157			Break for Lunch
1440			Got approval to be done with

(SC)

3/18/16 2409.00014000 LD

RC-26. Waiting for concrete pour to finish to gain access to RC-18.

1540 Last concrete truck offsite. Begin bringing 2nd rig onsite & setting up at RC-18

1610 ADT drills casing down to BR at RC-18. Starting elevation: +7

1650 NO water hooked

1700 ADT offsite

(5)

RC Queens Plaza SAT 3/12/16

BR Cores

Weather: 37-47°, cloudy, H: 48%
Wind: NE, 6-10 mph, precip: None

Scope: Core drilling

Sub: ADT

Personnel: R. Crockett (Roux)

07⁰⁰ R. Crockett + ADT onsite ~~ADT~~ begins setting up materials and equipment prepping to drive casing to rock. Roux, FLS, MRLE locked out of HMCG office

07³⁰ HMCG onsite - open office

07⁵⁰ Rep for drilling oversight

Begin core at RC-18

Rig elev. +7 ft

TOR elev. -2 ft

10 ft of casing

Product emerging from core - From BR surface.

0-5 4.00 ft recovery

Weathered fracture at 0.2 ft oxidized, rounded surfaces and staining. Odor. Mech. Fracture at 1.35 ft

(52)

RC Queens Plaza SAT 3/19/16

BR Cores

PID: 0.2 ft: 66.2

5-10.3 21:23 mins

5.5 ~~4.95~~ ft recovery

Continuous core. Fractured from drillers hammering off shoe

10.3-15.45 15: 58 mins

5.15 ft recovery

Mech. fractures at 12.9 ft and 14.4 ft

15-20 12:31 mins

5 ft recovery

Weathered fractures at 16 ft and 16.4 ft. Oxidation and odor observed. No staining or free product.

Mech. fractures at 15 ft, 17.3 ft, 18.95 ft

PID: 16 ft: 3.2

16.4 ft: 38.7

20-25 29: 25 mins

5 ft recovery

Weathered fractures at 21.3 ft 21.2 ft, 23.05 ft, 23.45 ft, 24.4 ft

(53)

RC Queens Plaza SAT 3/19/11

BR cores

20:45-25:46 Fracture surfaces are sub-rounded to rounded, odor observed. No oxidation, staining or free product observed. Silt and fine sand observed in fractures at 23.45 ft and 24.4 ft

25.45-29.35. 12:47 mins 3.4 ft recovery

Weathered fractures at 25.45 ft, 25.75 ft 27.1 ft, 28.05 ft 29.0 ft, 29.35

Fractures have rounded surfaces. Odor observed Fracture at 28.05 has light oxidation. No staining or free product observed.

29.35-34.45. 11:33 mins 5.1 ft recovery

Mech. fractures at 30.75 ft, 32.15, 33.95

Final elevation: -36.45

1430 Set up on RC-19. Driving casing to rock

RC Queens Plaza SAT 3/19/11

BR Cores

1515 Seat casing to TOR

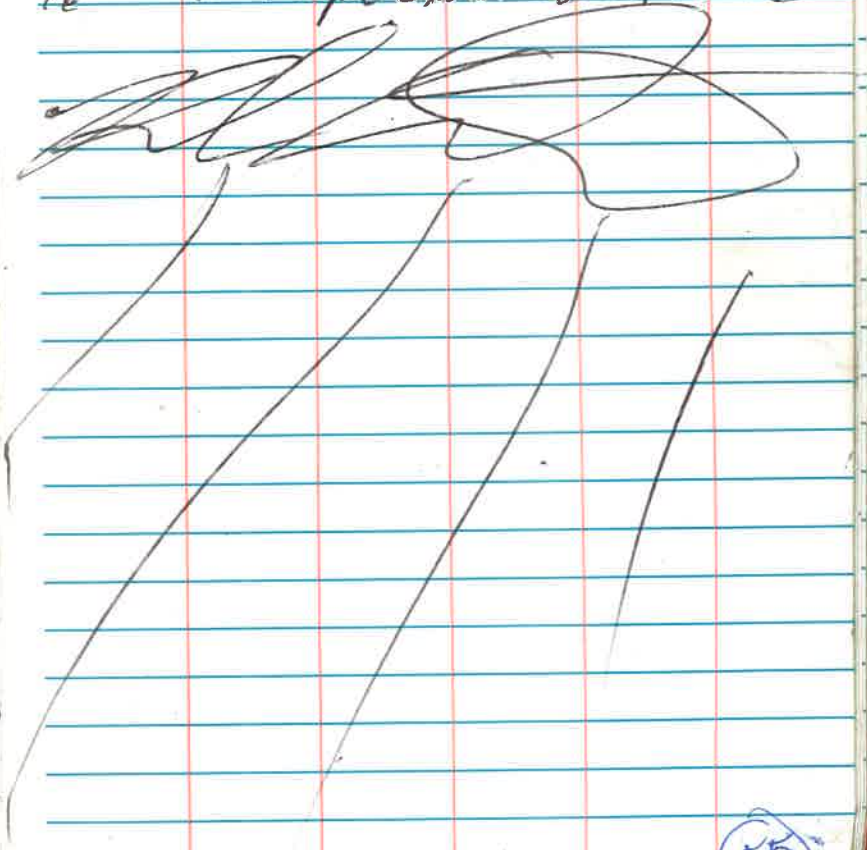
TOR - elev -4.5

Rig elev. 6.0

1530 Clean out w/displacement bit.

1540 Clean up

1600 All personnel offsite



RC Queens Plaza SUN 3/20/16

BR Cores

Weather: 33-40°, clear, Humidity: 36%
Wind: NE 9-20mph, precip: none

Scope: Core drilling
Sub: ADT
Personnel: L. Crockett (Rout)
0730 R. Crockett onsite. Prep for drilling oversight. ADT onsite running H2O lines and conducting equipment on rig
0800 Begin coring on RC-19.
0-5 30:22 mins
5ft recovery
Continuous core
5-10.65 25:44
1.6 ft recovery (o)t core in the hole. change out shoe on core barrel
Mech. Fractures at 6.15ft
6.55 ft
Retrive core - 4.1ft recovery
Mech. Fractures at 6.65ft, 9.0ft
9.9ft, 10.5ft
10.65-15.35 - 33mins
4.7 ft recovery

(56)

RC Queens Plaza SUN 3/20/16

BR Cores

10.65-15.35 - Mech. fractures at 10.65ft, 14.75ft, 14.95ft
15.35-18.25 - 29mins
2.9 ft recovery
Mech. fractures at 15.35ft, 16.85ft, 18.25
Final elev. -23.25 ft
1145 Breakdown, clean up and moving to RC-17

(57)

3/21/16 2409.000\4000 CD

0700 LD aligned onsite

Weather: 34F, mostly cloudy

rh: 80%, bp: 29.55in Wind: W1 mph

objective: bedrock core drilling at RC-17 to -55' elev.

ADT onsite (Tony & Danny)

PID Cal: ppm x #: 073840

Lot #: MO-248-100-20

Exp Date: 9/29/2018

Zero Cal: 0.0ppm

ISO Cal: 99.6ppm

0730 Begin drilling casing at RC-17. Starting elev: +10'.

0900 Reach bedrock at 17' bls ~ -11' elev. Begin drilling bedrock.

PID	DEPTH INTO BR	ELEV	DESCRIPTION
	0-5'	-11'-16'	Recovery: 5' Mechanical fractures at ~ 0.2', 2.75', & 4.75' - no staining or odor observed.
	5-10'	-16'-21'	Recovery: 4.75' Mechanical fractures at ~ 5', 1.2' & 3.3'. no staining or odor observed.

58

3/21/16 2409.000\4000 CD

1100 Drill casing & recirculation hose clogged w/ sediment?

1120 Tony-Hills (CD) they need to tighten the packing to bring water pressure back up

1145 Resume drilling - nearby caisson overflowing w/ water at ~ 12 ft into bedrock. Drill continues to lose water. (CD) Caisson is located east of drilling location RC-17.

Product is observed around & inside overflowing caisson → water began communicating w/ nearby caisson ~12 ft into bedrock / elev. -23 ft.

PID	DEPTH INTO BR	ELEV	DESCRIPTION
1.1 ppm at 10.25' 0.5 ppm at 11.4' 0.8 ppm at 13'	10-15'	-21-26'	Recovery: 5' Inherent fractures at ~ 10.25', 11.4' & 13.00' - f sand & silt observed in fractures no odor or staining. Mech. fractures at ~ 12.75' ~ 13.25' & 14.5'

59

3/21/16 2409.0001.4000 CD

1250 Break for Lunch

1400 Resume drilling at RC-17

~~→ No longer see water overflowing from caisson. Casing is now blocking connecting fracture.~~ (CD)

1420 → some water is observed overflowing from caisson. Casing is only down from grade to top of rock. Drill is losing water pressure but OK for now

PID	DEPTH INTO BR	ELEV	DESCRIPTION
25.6 ppm at 18.2'	15-20'	-26-31'	Recovery 4.75' Mechanical fracture at 15.5', 16.5', 16.75' Inherent fracture at ~18.2' & 18.9' w/ f sand & silt in fractures & odor. No staining observed.
5.9 ppm at 18.9'			

1505 ADT begin breaking down

1515 ADT offsite

1520 CD offsite

(60)

3/22/16 2409.0001.4000 CD

0645 LDO Giniko onsite

Weather: 36°F high of 56°, Sunny, rh: 45%, bp: 30.14 in, Wind W 5 mph

Objective: continue bedrock coring at RC-17 TD-55 elev.

PID cal: 073840 hour #

Lot #: JAD-248-100-20

Exp Date: 9/29/2018

Zero cal: 0.0 ppm

iso cal: 98 ppm

ADT onsite (Tony & Danny) begin setting up to continue RC-17

Set-up tremie pipe to flush out casing.

0750 Resume drilling at RC-17

PID	DEPTH INTO BR	ELEV	DESCRIPTION
	20-25'	-31-36'	Recovery: 4.75' Mech fractures at 20.9', 22.5', 23.5' & 24.75'. No Staining. Odor observed
3.1 ppm at 27.5' ~~into BR~~	25-30'	-36-41'	Recovery: 5.1' Mech fractures at 26.3', 28.5' & 28.6' Inherent fracture at 27.5' - No odor No staining

(61)

3/22/10 2409.000\4000 CD

PID	DEPTH IN TO BR	ELEV	DESCRIPTION
	30-35'	-41--46	Recovery 5.3' Mech fractures at ~31.5', 32', 32.75', 33', BR broken into +/-2 in diameter pieces from 33.5-35' no odor or staining observed.
	35-40'	-46--51'	Recovery 5' Mech. fractures at 35.8', 37', 35.5', & 39.75' no odor or staining observed.
	40-45'	-51--56	Recovery: 5' Mech. fractures at ~41.4', 42.5', 43.1' & 43.2', & 43.3' NO odor or staining observed.

1140 Break for lunch.
1210 Resume drilling - need to drill

(62)

3/22/10 2409.000\4000 CD

An additional 10' into BR.
1235 Seal on rig broke only got down on additional ~3 ft

PID	DEPTH IN TO BR	ELEV	DESCRIPTION
	45-49'	-56-60	RECOVERY: 4' inherent fracture at ~ 46.25' & sand in fracture mechanical fracture at 47.3' no odor or staining observed

1315 Drill continued to lose water pressure due to communication w/ pales through fractures. Unable to drill any deeper - ADT pulls casing.
1412 Relocate to RC-15 & Begin setup
Starting elev: +4
1520 ADT offsite
1530 CD Dgn to offsite

(63)

3/23/16 2409 0001 4000 LD

0635 Dolanko onsite

Weather: 50F high of 70F, Sunny, hr. 50%, bp: 29.94 in

Wind: W 9 mph

Objective: bedrock core drilling at RC-15 to elev. -32.

0700 ADT onsite (Tony & Danny), will repair seal on rig first thing

PID Cal: Foux # 073840

Zero Cal: 0.0 ppm

ISO Cal: 100.1 ppm

0815 Rig repaired. Steel beam coming off of whaler located in line w/ drill. Cannot get piece of equipment moved to the left → must move location to right, over 10' from original marked

0830 Begin drilling casing into ground

Starting elev: +4 ft

Bedrock elev: -8.0 ft

Depth bls to bedrock: 11.5 ft

0915 DEC onsite (Nathan & Mike)

0930 Casing not seated correctly - redrill casing.

64

3/23/16 2409 0001 4000 LD

0947 Clear out casing

TOR elev. -8.0 ft

0953 Begin drilling bedrock at RC-15

PID	DEPTH INTO BR	ELEV	DESCRIPTION
14.2 ppm at ~1.5' into BR	0-4	-8 -12	Recovery: 3.75' Mech. fracture at ~1.0' & ~~3.75'~~ (LD) ~3.75' Inherent fracture ~1.5' Odor observed, no staining observed. Oxidation at ~3.75'
	→ product observed in pan at ~4' into BR		
42.9 ppm at 7.5' into BR	4-9'	-12-17	Recovery: 4.8' Inherent fracture ~4' & 7.5' → silt observed in fracture Mech. fracture ~5.25' & 6' odor observed. no staining observed. Oxidation observed at ~4'
93.9 at 11.1' into BR 127.0 at 11.2' into BR	9-14'	17-22'	Recovery: 5' Mech. fracture at ~9', 10' & 12.5' Inherent fracture ~11.1' & 11.2' - f sand observed in fracture - odor observed no staining observed

65

3/23/16 2409.0001/4000 LD

PID	DEPTH INTO BH	ELEV	DESCRIPTION
	14-19'	-22-27'	Recovery: 4.75' Mech fractures @ 15.75', 17' & from 17.5-19' → no multiple mech. fractures due to increase in mica content, no staining observed
	19-24'	-27-32'	Recovery: 5' Mech. fractures at ~20.3, 21.25, 22', 22.75', 23.1' no staining observed

1209 Break for Lunch.
1240 Begin breaking down rig & cleaning up & loading.
1400 ADT offsite.
1530 LD logged offsite

(66) LD

3/24/16 2409-0001/4000 LD

0640 LD logged onsite
Weather: 44F high of 57F, Sunny, rh: 70%, bp: 30.11 in, Wind: ENE 6 mph.
Objective: Preclear location RC-14 to 8' bls.
PID cal: hour #: 073840
Zero cal: 0.0ppm
ISO cal: 100.0ppm
ADT onsite (Tony & Danny)
0730 Soil trucking blocking road to entrance. Tony speaks w/ Guiseppe → cannot get truck in until after soil trucking is over.
0950 ADT able to get onsite & begin unpacking to preclear.
1015 Guiseppe tells Russ to drill for soil mixing sample now.
1055 Waiting for surveyor to mark grid.
1115 Begin drilling in grid B7

B7:

0-5' Loose Sed. (0-1) solid mix (1-5) Mike (DEC) says it hasn't

(67)

3/24/16 2409.0001.000 LD

Solidified. Will not drill in 87 any further. Will move to grid 86.

86:

0-5' Loose sed → backfill
5-10' Well mixed - not solid, crumbles.
10-15' Well mixed - not solid, crumbles
15-20' Well mixed? - not solid - clay-silt
↳ wet → hard to tell
20-25' ~~Well mixed~~ same material? - not solid - sand-medium
↳ wet → hard to tell
→ bedrock encountered ~25' bgs
12:25 ADT takes lunch
Mike (DEC) debating whether last interval (20-25') is "same material" - Sheen & odor observed by Mike.
1340 Begin drilling second location in 86:
0-5' Loose Sed → backfill
5-8' Well mixed - not solid - crumbles
8-10' Some loose sed observed
10-15' Well mixed - crumbles, some clay-like material observed
15-20' Well mixed

3/24/16 2409.0001.000 LD

20-25' No Recovery
1425 Move to 3rd location in grid 86
0-5' Loose sed → backfill
RC RC (Rory) discusses location of RC-14 with Dean (HMCG). Review drawings for future utility connections. Dean approves location directly south of site B ramp.
5-7' Loose sed
7-10' Well mixed - crumbles
10-11 Loose sed.
11-15' Well mixed - crumbles
15-20' Mixed well
1512 ADT has to move truck will be towed
RQD Measurements.
RC-15
0-4: 44"
Segment 1: 16"
Segment 2: 28"

3/24/16 2409.0001YDDD LD

4-9': 56.5"
Segment 1: 42.5"
Segment 2: 13.5"
9-14': 59"
Segment 1: 25"
Segment 2: 31"
14-19': 57.25"
Seg 1: 57.25"
19-24: 59.25"
Seg 1: 59.25"
1520 Resume drilling
20-25' Gravel- Mike (DEC) interpretsas Stuff.
1535 ADT breaks down rig.
RQD Measurements
RC-18
0-5': 57.5"
Seg 1: 12.5"
Seg. 2: 42.5"
5-10.3: 5.3'
Seg 1: 5.3'
10.3-15.45: 5.15ft
Seg. 1: 5.15ft
15.45-20.45: 59"
Seg. 1: 17"

3/24/16 2409.0001YDDD LD

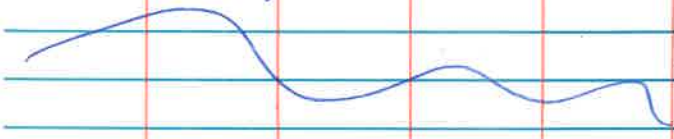
Seg 2: 11"
Seg 3: 31"
20.45-25.45': 59"
Seg. 1: 15"
Seg 2: 4.5"
Seg. 3: 16"
Seg 4: 5"
Seg. 5: 11.5"
Seg. 6: 6.5"
1550 ADT offsite
25.45-30.75 61.5"
Seg 1: 4.5"
seg 2 7"
seg 3: ~~8.25"~~ 19"
Seg 4: ~~10.0"~~ ~~X~~ 10"
Seg 5: ~~X.5"~~ 0"
Seg 6: ~~20.5'~~ 17"
30.75-34.45: 44.25"
Seg. 1: 44.25"
RC-17
0-5: 58"
seg 1: 58"
5-10: 56"
Seg 1: ~~14.25'~~ 56"
Seg 2 ~~41.5"~~

3/24/16 2409.000 14000 LD

10-15': 58.5"
Seg 1: 11"
Seg 2: 25.5"
Seg 3: 18"
15-20': 57.5"
Seg 1: 38.5"
Seg 2: 8"
Seg 3: 10.5"
20-25: 57"
Seg 1: 57"
25-28.6: 46"
Seg 1: 29.5"
Seg 2: 16.5"
28.6-32: 45.5"
Seg 1: 14.75
Seg 2: 30.75
32-36: 46"
Seg 1: 9"
Seg 2: 34"
36-40: 49"
Seg 1: 49"
40-43.3: 40"
Seg 1: 40"
43.3-47.3: 49"
Seg 1: 36"
Seg 2: 125"

3/24/16 2409.000 14000 LD

47.3-49: 17"
RC-26
0-5.9: 55"
Seg 1: 55"
5.9-10: 55.25
Seg 1: 17"
Seg 2: 37.5"
10-15': 55"
Seg 1: 41.5"
Seg 2: 10.5"
15-20: 59.25"
Seg 1: 8.25"
Seg 2: 51"
20-24: 55.5"
Seg 1: 55.5
24-27.5: 43.25"
Seg 1: 43.25"
27.5-30": 31.5"
Seg 1: 31.5"
30-35": 57.5"
Seg 1: 57.5"
1700 LD olginko offsite



LD

3/25/16 2409.00014000 LD

0625 LDolginko onsite
weather: 51F high of 71F, Clear, possible rain, rh 85%, bp: 29.72in Wind E 3mph.
objective: Lot 14 grout wall oversight & RC-14 preclear oversight.
PID cal: rae x # 073840
zero cal: 0.0ppm
150cal: 100.4ppm

0700 Setup camp.
Cal pid: #
zero: 0.0ppm
150: 100.3ppm

0715 Lot 14 drill crew tells LD drill will be down all day.
ADT onsite
2 crews: Tony & Danny, Brian & Dylan

0730 Speak w/ Turner about walking equipment into site, past crane safely

0745 Brian & Dylan set up at RC-14 to preclear to 8' bls.
Tony & Danny set up at RC-19

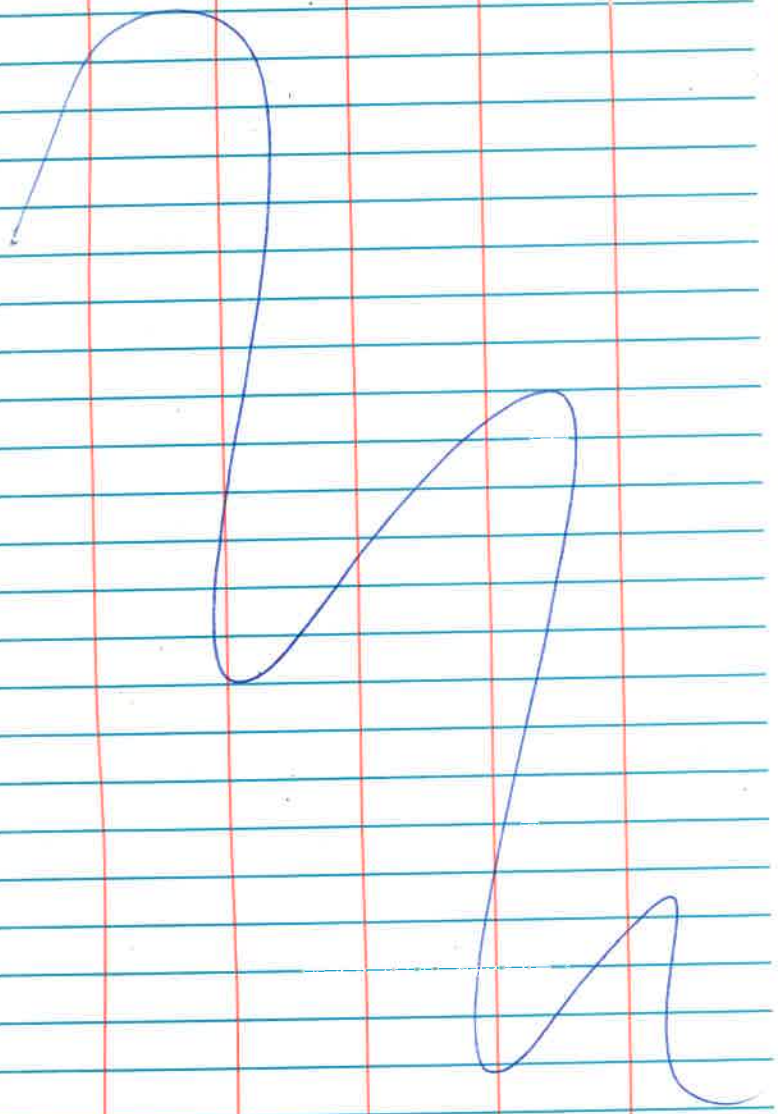
3/25/16 2409.00014000 LD

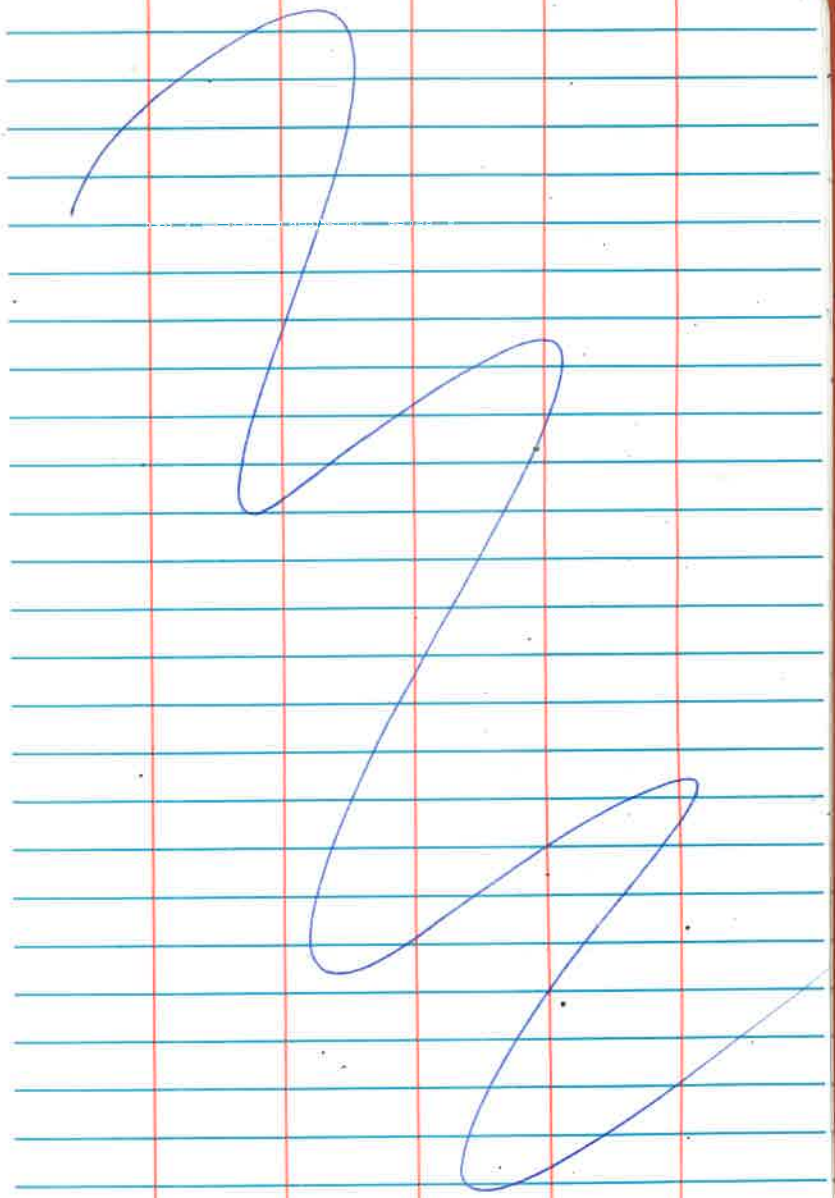
to drill additional 10' before

0810 Begin preclearing RC-14

RC-14 Lithology

4.5ppm RC-14 (0-1): Brown, m-c sand, some gravel, little brick & wood, trace pieces of PVC, moist (fill)
RC-14 (1-1'8"): Concrete.
1.4ppm RC-14 (1'8"-3): Brown f-c sand, some silt & gravel, little brick & concrete moist (fill).
0.5ppm RC-14 (3-5'): f sand & silt, some m-c sand & gravel, moist.
Wt @ 5'5.5'
0.7ppm RC-14 (5-5.5): SAA
151ppm RC-14 (5.5-5.8): Very dark gray f sand & silt, little gravel, odor observed.
4136ppm @6.5'bls RC-14 (5.8-8): Gray, f sand & silt, little gravel & c sand, wet. odor observed, sheen observed, free product observed.
482ppm @7.5'bls
1025 ADT reaches 8' bls preclearing RC-19
561ppm @8'bls





3/25/16 2409.00014000 LD

RC-19 (18.25)

PID	DEPTH INTO BR	ELEV	DESCRIPTION
	18.25-23.25	-23.25-28.25	RECOVERY: 5' Mech fractures at ~~LD~~ LD 20.2, 20.5, 22.3', 22.4', 22.5' & 23.25' no odor or staining observed
	23.25- 28.25	-28.25- -33.25	Recovery: 5' Mech. fractures at 29.6', 31.25', 33', & 33.25' No odor or staining observed.

FINAL ELEV:

RQD Measurements:

RC-19

(0-5): 60"

Seg1: 60"

(5-9.9): 58.5"

Seg1: ~~60~~ LD 58.5"

(9.9-14.75): 58.5"

Seg1: 58.5

(14.75-18.25): 42"

Seg1: 42"

3/25/16 2409.00014000 LD

1055 Preclear crew begins packing up equipment.

1117 Set up sonic rig at RC-14.

RC-14 Lithology CONT

147 ppm RC-14 (8-13) (3ft recovery) Gray, f-m sand & silt, some gravel, wet, sheen & odor observed.

348 ppm RC-14 (12-13): SAA, sheen & odor

Bedrock encountered @ 13' bls

1235 ADT sets casing at RC-14.

Call J Wills → will collect samples RC-14 (7.5-8.5) & RC-14 (12-13).

1305 Break for lunch.

SAMPLE TIMES:

RC-14 (7.5-8.5) @ 1345

RC-14 (12-13) @ 1400

~~Samp~~ Analyze for:

TCL VOCs, TCL SVOCs, TCL Pest, TAL Metals, TPH GRO & DRO

1350 ADT breaks down rig at RC-19 & brings to RC-14 for bedrock core drilling

RL Queens Plaza FRF 3/25/16

BR cores

15[15] Begin rock core at RC-14

0-5 4.3 ft recovery

0-5 Fragmented weathered rock stained, odor

Weathered fractures at 0.75 ft ~~1.05 ft~~ 2.45 ft, 2.75 ft 3.4 ft, 3.8 ft, 3.95 ft 4.1 ft. Fractures surfaces are oxidized, stained and are odorous.

PID Readings:

.75: 8.9

2.45: 115.4

2.75: 100.6

3.4: 116.9

3.8: 76.2

3.95: 94.4

4.1: 17.5

mech. frac: at 1.1 ft and 1.9 ft

4.3-9.3 5 ft recovery

No weathered fractures

mech. fractures at 4.8 ft 5.45, 5.90, 6.15, 6.65, 7.6 8.2, 9.3

(80)

RC Queens Plaza FRF 3/25/16

BR Cores

9.3-14.3 5 ft recovery

No weathered fractures

Mech. frac. at 10.85 and 12.2

17[00] At ≈ 15 ft into rock elev -13. Began losing return. Product and drill water began escaping from casing on RC-9

↳ 5.1 ft recovery

14.3-19.4 - No weathered fractures

Mech. fractures at 14.3 ft 16.1 ft, 17.4 ft, 18.7 ft and 19.4 ft

19.4-24.5 - 5.1 ft recovery

Mech. frac. at 20.85 and 21.7

Large fracture zone from 22.8 - 24.5. Consists of weathered fractures, decomposing, fragmented rock. Oxidation, staining and odors observed. 23.5 24.5 fragmented section.

(81)

RC Queens Plaza FRI 3/25/16
BR Cores

19.4-24.5
PID Readings
22.6; 90.1
Fragmented section: 52.6
24.5-29.45 4.95 ft recovery
Weathered fractures at
26.5 & 27.05
Mech frac at 25.4
27.5 and 28.5.
Oxidation in weathered
fractures & rounded surfaces
no staining observed
@ 20'.
2100 Rig down. ADT will
return w/ mechanic
tomorrow to make
repairs.
2130 R. Crockett offsite

(82)

RC Queens Plaza SAT 3/26/16
BR Cores

Weather: 39-55°, clear, Humidity: 55%
wind: NE, 11-18 mph precip: None
Scope: Core drilling
Sub: ADT
Personnel: R. Crockett (Rwx)
0700 R. Crockett onsite.
Prep for drilling oversight.
ADT crew and mechanic
making repairs on
CME 55.
0730 H & S Mtg / Scope
0740 Continuing rock core on
RC-14
29.45-34.75 - 5.3 ft recovery
No weathered fractures
observed. Mech. frac.
at 31.25ft, 32.2ft, 33.15ft
34.1ft, 34.75
0815 Finish core on RC-14.
Finaldepth -32.75. RC-14
complete. Breaking down
rig and moving to RC-27
0930 Take coffee break.
0945 Begin driving casing to
TOR on RC-27

(83)

RC Queens Plaza SAT 3/26/16

BR Cores

10[70] Going down w/ displacement bit to clean out casing and confirm TOR

10[45] Begin core on RC-27
Start elev. +6 ft
TOR elev. -5 ft

0-5.05 5.05 Ft recovery
Weathered fracture at 3 ft - oxidation observed
Micro fracture not fully propagated - separated during drilling. Mech. Frac - at 0.8 ft, 0.9 ft, 3.35 ft

5.05-10.05 - 5 ft recovery
No weathered fractures observed. Mech. Frac. at 6.65 ft, 8.2 ft, 9.35 ft

12[20] Not getting good return - core barrel not advancing
Bit worn out - Change out bit and take Lunch.

13[00] Continue coring on RC-27

10.05-13.1 - 3.1 ft recovery
No weathered frac observed
Mech. frac. at 10.05 ft, 10.8 12.35, 13.1 ft.

(54)

RC Queens Plaza SAT 3/26/16

BR Cores

13.1-16.5 - 3.4 ft recovery
No fractures observed continuous core

16.5-21 4.5 ft recovery
No weathered fractures observed. Mech. Frac at 17.95 ft, 18.0 ft, 19.3, 21

15[00] Will continue RC-27 on Monday. Begin clean up and breakdown

(55)

3/28/16 2409.0001.4000 LD

0640 LD onsite

Weather: 42 F high of 61 F, rain, rh: 90%; bp: 29.89 in. Wind: ENE 7 mph.

Objective: continue bedrock core at RC-27 to -45 elev.

Calibrate PID: #: 073840

Zero Cal: 0.0 ppm

ISO Cal: 100.0 ppm

0730 Begin drilling at RC-27 ADT TONY & DANNY

PID	DEPTH INTO BR	ELEV	DESCRIPTION
	21-26.5	-26-31.5	RECOVERY: 5.5' Mech fractures at 21'9.5", 21'11.5", 22'1.5", 23'2", 24'7", 25'4", 25'11" & 26'3". NO odor or staining
	26.5-31.3	-31-36.3	RECOVERY: 4.8' Mech fractures at 28'6", 29'9", 30'6", 31'8 & 31'4" no odor or staining observed.
	31.3-36.3	36.3-41.3	Recovery: 5'

(RV)

3/28/16 2409.0001.4000 LD

DEPTH INTO BR	ELEV	DESCRIPTION
~~31.3~~ 30.3-~~41.25~~	~~-41.3~~ -46.25 (LD)	Mechanical fractures at 32'7", 33'[illegible], 34'2", 34'4", & 36'4" NO odor or staining observed
36.3-41.25'	-41.3-46.25'	Recovery: 5' Mech. fractures at ~~38'~~ 37'9", 39', & 40'6" NO odor or staining observed.

1050 Wait for surveyor to mark out location for CW-7. Break down at RC-27 & ask positive to move grout pump away from location CW-7.

1220 Take lunch.

1330 Grout pump moved - Set up Sonic at CW-7. Starting elev: 55'

1350 ADT is able to bring support truck onsite → begin unloading for capture well install.

(ST)

3/28/16 2409.0001.4000 LD

1405 Begin drilling at CW-7

CW-7 LITHOLOGY

6.0 ppm CW-7 (0-5): 3ft recovery Brown to gray, f-c sand & gravel, trace brick, moist (fill). (5-10)

154 ppm CW-7 (5-8): 4.5ft recovery. Brown to gray, gravel, some f-c sand & silt, wet

2023 ppm CW-7 (8-10): gray, silt, some clay, odor observed.

144.1 ppm CW-7 (10-12) (10-15): 2.75' recovery SAA, wet

755.8 ppm CW-7 (12-15): gray, f-m sand, some gravel, wet, staining odor & sheen observed.

430 ppm CW-7 (15-19): (recovery: 1.3') SAA, sheen & odor observed

→ Bedrock encountered @ 19' bls. no free product observed directly above bedrock.

ADT will install 15' of screen from 19.25 bls to 4.25 bls.

1630 Set well used 40 #1 sand to fill around casing to 3' bls

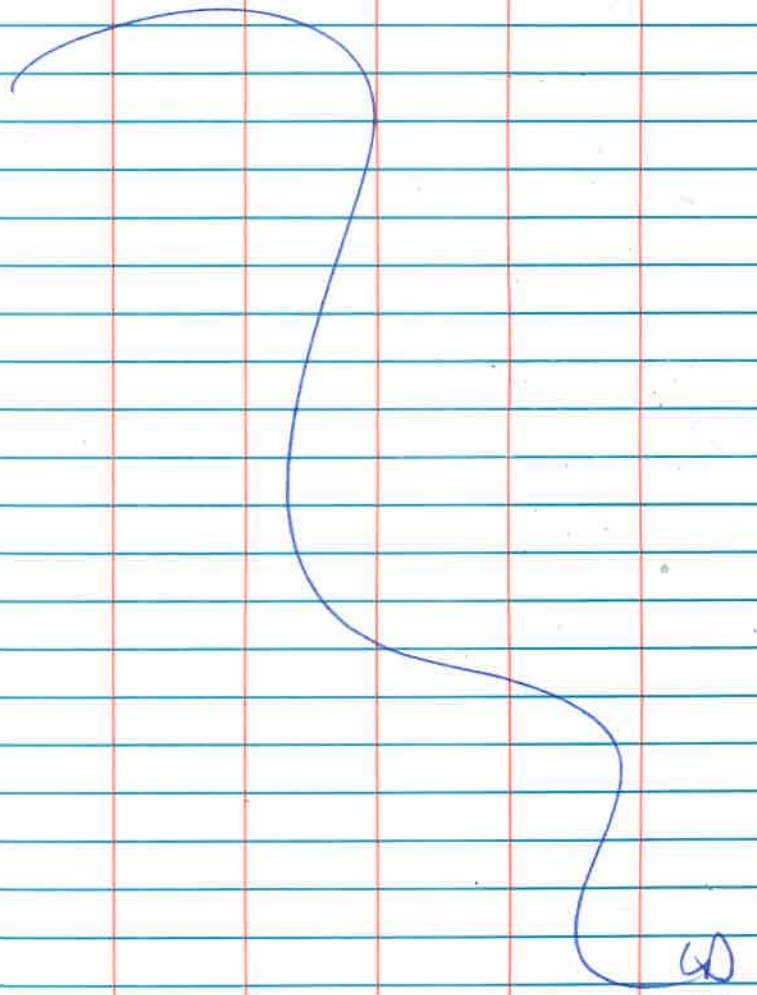
(88)

3/28/16 2409.0001.4000 LD

& seal w/ bentonite

1650 ADT offsite

1700 LD/Ginko offsite



LD

(89)

@PRD Tishman 3/11/86

1020 ADT continue set up on RC-12
1100 ADT can not recycle water and Posillico treatment can not handle it. ER contacts Jeff Wilk (PRO-X)
1130 ER suggest placing filter fabric around sump pump and pump filtered water into tote and continue to recycle the water.

1140 RC-12 16-5

RQD	Run	Run length		
	1	60"	L_1	15.5"
			L_2	9.5"
			L_3	20.5"
			L_4	8.75"

Rec 53.25"

PID Fractures

Frac @ 0-16"; No staining fracture @ 16" slight odor
16"
24" 16-24 ~~slight staining~~ ER fracture @ 24" odor ~~and staining in fracture~~ ER

24-45.5" ~~slight staining~~ mechanical fracture @ 45.5"
45.5"-53.25" ~~slight staining~~ ER mechanical fractures

Note: No staining on core; may be interpreted from drill water

CQPRD - Tishman 3/12/14

weather 45 S cum
80°C humidity
Variable

obj Remedial over
sub ADT
equip Same as 3/9

630 ER on site setup CAMP, ADT onsite

Time	ID	zero	VOC
645	12526	0	100.2
650	21257	0	99.4
655	22209	0	99.8
700	19078	0	100.1

710 ADT continue to repair
730 ADT resumes drilling RC-12
753 RC-12 15-10

RQD

Run	Run length
2	60.1

L1 34.5"
L2 24.25"

Rec 59.5"
Fracture 25" 35"

0-26 mechanical Fracture
26-28 ~~Fracture~~ oxidized
28-35 Fracture odor No stain
35-59.5 No stain

80

QPRD - Tishman

3/12/16

895 RC-12 /10-15

RQD

Run	Run length		
3	60"	L1	27.25
		L2	7.5
		L3	6.75
		L4	7.25
		L5	7.75

Rec 57.25

0-26.5 Mechanical Frac
No staining

Fractures @ 34" 26.5-34 Fracture; oxidation
40" odor
50" 34-42 Fracture; oxidation
odor; staining
42-50 Fractur; oxidation
Free Product; staining
50-57.25 No staining

First signs staining at elevation: -14.5' NAVD88
First signs of free product at elevation: -14.15' NAVD88

81

QPRD - Tishman

3/12/16

910 RC-12 /15-20

RQD

Run	Run length		
4	60"	L1	21.02'
		L2	12.50"
		L3	6.50
		L4	4.25
		L5	7.5

Rec 55.5"

0-21 Fractur staining
odor

Fractures 21" 21-33.5 Fracture; staining
33.5" 33.5-40 Fractur staining
40.0" 40-44.25 Fracture; oxidation; No stain
44.25 44.25-48 Fracture No stain
48.00 48-55.3 No staining

1020 RC-12 /20-25

RQD

Run	Run length		
5	60"	L1	26"
		L2	10
		L3	13.5
		L4	10.5

Rec: 60"

Fractures: 26" 0-12 Mechanical Frac
36" 12-26 Fractur No staining
49.5' Oxidation
26-35 No stain No Free product 26-36 Fractur No staining
Oxidation
36-49.5 Fractur Oxidation

GPRD - Tishman

3/12/16

1140 RC-12 / 25-30

RQD
Run 6

Run Length 60"

L_1 6.75
L_2 33.25
L_3 4.75
L_4 8.50

Rec: 5-6" 0-6.75 Fractur No staining

6.75-40.00" Fracture No stain

Fracture @ 6.75' 40.00" 40-48 Fracture

40.00"-48" Fractured area No stain

48.00-56.00 No stains Machnica

EO Rack Core

Total elevation -30' NAVD88

Free product @ elevation ~14'

Staining @ elevation -13.5', -14', -15', -18'

18'-30' elevation free of staining and Free Product

1230 Break Lunch

1240 ER confirms w/ MH and mobs rig to RC-13

650 ADT begins taking down Fense

740 Begin coring RC-13

RC-13 / 0-5

RQD

Run 1 — Run length 60"

L1 6.50"
L2 5.50"

Rec "49."

PZD ND

Fracture @ 26"

0-26" fractures throughout core oxidation

26-49 Fracture every 4" Oxidation

815 Replace seal on drill rig

855 Resum drilln

QPRD - Tishman

3/14/ke

930 RC-13 / 5-10

RQD

Run	Run length
2	60"

L1	4.50
L2	5.25
L3	4.50
L4	5.25
L5	6.00
L6	7.50
L7	8.00
L8	7.00
L9	5.25

Rec 60" PID

Fractures		
	4"	ND
	6.5"	ND
	11.50	ND
	16.5	ND
	22.00	ND
	29.00	ND
	35.00	ND
	42.5	ND
	51.00	ND
	56.00	ND

0-60" all fractures show signs of oxidation
No stains

QPRD - Tishman

3/14/16

RC-13 / 10-15

RQD

Run 3 — Run Length 60"

L1 4.50'
L2 4.00
L3 7.25
L4 5.5
L5 7.00
L6 14.00
L7 4.00

REC 58"

Fractures @ 5.00" PID
9"-17" ND
23" ND
25" ND
32" ND
38-42 ND
55' ND

058 Fractures all coated oxidation and slight sheen on surface No staining or freepetrol

RC-13 / 15-20

RQD

Run 4 — Run length 60"

L1 8
L2 5
L3 9
L4 19.5
L5 8.25
L6 9.50

QPRD - Tishman

3/14/16

RC-13 / 15-20

Rec 60" PID
Fractures @ 6" ND
11" ND
21" ND
41" ND
49.5" ND

0-6" fracture slight staining, oxidation
6-11" fracture slight stain oxidation
11-21 fracture oxidation
21-41 fracture oxidation
41-49.5 fracture oxidation

RC-13 / 20-25

RQD

Run 5 — Run length 60"

L1 13.00
L2 6.50
L3 15.00
L4 8.00
L5 17.50

Rec 60" PID
Fractures @ 13" ND
19.25 ND
34.25 ND
42.00 ND

0-1" slight stain
1-60" No signs staining on fractures

88

QPRD - Tishman

3/14/16

1130 RC-13 / 25-30

RQD

Run 6 — Run length 60"

L1 23.5
L2 8.5
L3 15.25
L4 9.75

Rec 60"

Fracture @ 23.5" ND
27.6" ND
35.5" ND
51" ND

G-60 No visible staining in fracture clean rock

1155 RC-13 / 30-35

RQD

Run 7 — Run Length 60"

L1 14.25
L2 20.25
L3 12.5
L4 4.5

Rec 57" ~~60"~~

Fracture @ ~~57"~~ ND
14.25 ND
18.5 ND
21 ND
41.5 ND
54 ND

G-57 No visible staining in fracture Clean rock

89

QPRD - Tishman

3/14/16

1330 RC-13 / 35-40'

RQD

Run 8 — Runlen 60"

L1 5.1250
L2 25.50
L3 23.20

Rec 54.50" ND

Fracture @ 5.75 ND
31.00 ND
54.5 ND

0-54.5 No visible staining of free Product

Rock core Mids targeted depth of elevation -30'. Last 10' is clean with no staining of free product; RC-13 complete

1336 ADT clean up and secure area
1500 ADT offsite
Positive continues excavation grid # 78, 80N for grave pad
1600 Positive recieve 6 loads RCA throughout the day
Site work complete
Draft email.

Arnold F. Fleming, P.E. &

Fleming Lee Shue

Environmental Management & Consulting

February 5, 2016

Mr. Michael Haggerty
Project Manager
New York State Department of Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-7020

Re: Bedrock Investigation Results – Remedial Design
Queens Plaza Residential Development – Site B – BCP Site No. C241151
LIC Development Owner, L.P. (Tishman Speyer)

Dear Mr. Haggerty,

On behalf of LIC Development Owner, L.P.; Arnold F. Fleming, P. E.; Fleming-Lee Shue, Inc. (FLS); and Roux Associates, Inc. (Roux), we are submitting the results of the bedrock investigation on BCP Site B. The proposed bedrock investigation was submitted on December 24, 2015 and approved by the New York State Department of Environmental Conservation (NYSDEC) on December 28, 2015. All rock coring was completed by January 8, 2016.

The purpose of these borings was to identify potential bedrock impacts in Orchard Street, explore the potential fracture in the bedrock trace where Non-aqueous Phase Liquid (NAPL) was observed in bedrock to date on BCP B, identify potential zones of NAPL accumulation, and identify locations/intervals for NAPL recovery along Orchard Street and BCP Site B.

FLS and Roux advanced seven bedrock cores (RC-5, RC-6, RC-7, RC-8B, RC-9, RC-10, and RC-11) to investigate the extent of NAPL in bedrock to a depth of approximately 5 feet (ft.) deeper than where NAPL in rock was first identified during rock anchor installation. Each location was drilled to a minimum elevation of approximately (-30 ft.) into bedrock (North American Vertical Datum 88) and produced a nominal 2-inch-diameter bedrock core in nominal 5-foot sections. Where required to prevent soil from filling the bore, boreholes were cased in unconsolidated material to maintain an open borehole for geophysical logging of the core holes.

During the bedrock investigation, each bedrock core was examined for evidence of NAPL staining, fractures, volatile organic compounds (using a photoionization detector), coring rate (minutes/foot), and rock quality designation (RQD). The digital photo log of each core was completed as part of the investigation.

In addition to visual observations, the seven rock boreholes were logged using geophysical equipment to characterize the physical structure of the bedrock. Geophysical logging included continuous fluid temperature, fluid resistivity, caliper, and acoustical televiewer measurements. Optical televiewer (digital video image of the borehole oriented with respect to magnetic north) logs and heat pulse flowmeter logging was not feasible due to the opacity of the water, clogging nature of NAPL, and injected water from drilling rock cores and drilling piles while logging was ongoing.

Please contact us with any questions or comments.

Sincerely,



Arnold F. Fleming, P.E.
Remedial Engineer

Attachments:

Geophysical Application Geophysical Report
Rock Core Photographs
Laboratory Report – Specific Gravity and Forensic Testing
NOAA Local Weather Data

INTRODUCTION

A Remedial Investigation (RI) for BCP Site B was completed by Fleming Lee-Shue, Inc. (FLS) and Roux Associates, Inc. (Roux) in June 2015. The RI included the installation of 20 soil borings over the entire BCP Site B. NAPL-stained soil was observed directly atop the bedrock in three of the 20 borehole locations. All three locations were on the western side of BCP Site B.

A parallel geotechnical investigation, carried out by Mueser Rutledge Consulting Engineers, took place during the RI in June 2015. As part of this investigation 19 rock cores were advanced throughout BCP Site B. These cores extended approximately 10 feet into bedrock. NAPL was not observed in any of 19 rock cores (FLS/Roux Site B Remedial Investigation Report, June 2015).

NAPL in bedrock was observed during the shallow bedrock evaluation in August 2015 and in December 2015 during installation of rock anchors and on the western portion of BCP Site B at elevations of approximately (-21 ft.) to (-25 ft.) North American Vertical Datum 88 (NAVD88). Due to the evidence of NAPL in the bedrock and previous observation of NAPL stained soils during the June 2015 RI, NYSDEC requested further bedrock investigation on BCP Site B.

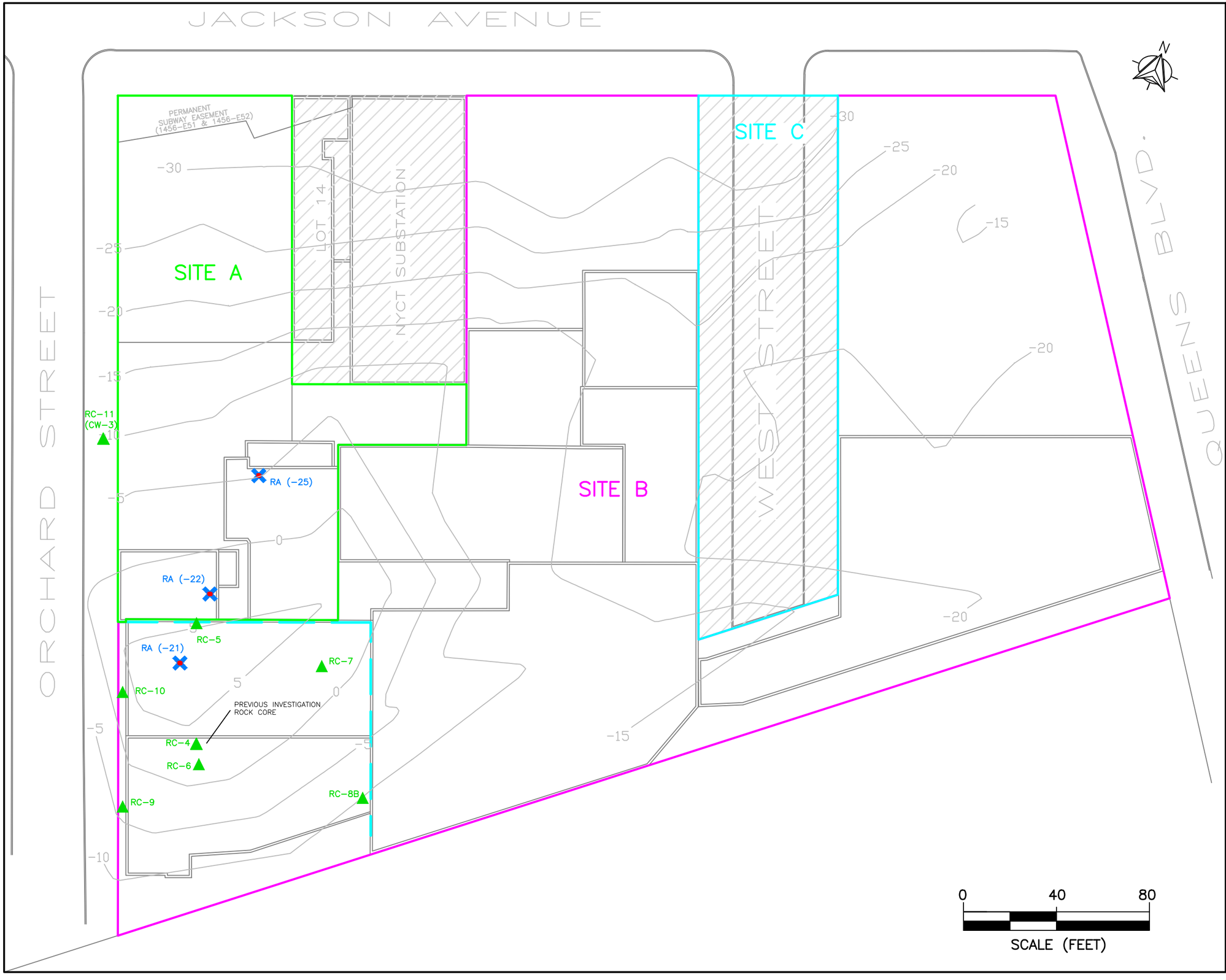
On December 24, 2015, FLS proposed the installation of seven bedrock cores on the western side of BCP Site B. The proposed plan was approved by NYSDEC on December 28, 2015. The purpose of the rock cores was to investigate NAPL impacts in bedrock, assess potential free-phase NAPL and NAPL quantity, evaluate potential migration pathways, explore the potential fracture in the bedrock trace where NAPL was observed, identify potential NAPL impacts to Orchard Street, identify potential zones of NAPL accumulation, and identify locations/intervals for NAPL recovery along Orchard Street and on BCP Site B. NYSDEC approved the rock core locations with the understanding that the results would be analyzed and used to support recommendations for additional rock cores, if warranted. NAPL recovery, as noted in the approved Remedial Action Work Plan for Site B, will be part of the remedy and executed as an Engineering Control. Figure 1 shows the rock core locations completed as part of this investigation.

METHODOLOGY

The rock core investigation employed three general methodologies: (1) drilling and examination of physical rock cores, (2) fluid level monitoring of the boreholes, and (3) geophysical logging of the boreholes. In addition, the NAPL was also tested for forensic analysis and specific gravity and the rock core wells were probed for signs of Dense Non-Aqueous Phase Liquid (DNAPL). The methodologies employed during the investigation are described in the following sections.

Rock Core Installation and Examination

Seven rock core locations (RC-5, RC-6, RC-7, RC-8B, RC-9, RC-10, and RC-11) were drilled to depths of approximately 30 to 40 ft. into bedrock (to a minimum elevation of -30 ft. NAVD88) from December 2015 through January 2016. Rock coring produced a 2-inch-diameter bedrock cores in nominal 5-foot sections. Drilling left a nominal 4-inch-diameter borehole to accommodate subsequent geophysical logging equipment. Each bedrock core was examined for evidence of NAPL staining or product, fractures, total volatile organic compounds via PID measurements,



FILE: P:\99999 - Tishman\Figures\Site B - Rock Core Design\FIG 1 - Rock Core Locations.dwg DATE: 8/5/2014

Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

ROUX

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Queens Plaza Residential Development
BCP No. C241151

FIGURE 1

ROCK CORE LOCATIONS

February 2016

Project Number
10112-005

LEGEND

- RC-7 ▲ ROCK CORE LOCATION
- RA-22 (-25) ✕ APPROX. ROCK ANCHOR LOCATION (ELEVATION IN NAVD88)
- -20 BEDROCK CONTOUR (NAVD88) SOURCE: MUESER RUTLEDGE, JANUARY 2015

coring rate (minutes/foot), and Rock Quality Designation (RQD). Where required to prevent soil from filling the bore, boreholes were cased in unconsolidated material to maintain an open borehole for geophysical logging.

Each rock core was subdivided into runs that were typically five ft. long. Each run was then examined, measured for RQD, and coded as to the level of NAPL observed (none, staining only, and free product). Rock core boreholes and basic construction details are presented in Table 1.

Table 1. Summary of Rock Core Locations

Rock Core	Installation Date	Surface Elev.	Rock Core Length, ft.	Top of Core Elev. ft.	Bottom of Core Elev. ft.
RC-5	12/22/15	7	35	7	-28*
RC-6	12/23/15	4	40	4	-36
RC-7	1/7/16	2	35	-1	-36
RC-8B	12/29/15	-2	20	-13	-33
RC-9	12/28/15	2	40	-1	-41
RC-10	1/6/16	4	35	2	-33
RC-11	1/8/16	14	33	-9	-42

Elevations in NAVD88. * Did not extent to (-30 ft.) due to equipment damage.
The original RC-8 core was re-drilled because of a lost tool in the core. The core was destroyed retrieving the tool, requiring that a new core, RC-8B, be drilled.

The rock core locations were selected so as to evaluate the bedrock over a representative area to depths that would extend slightly beyond the elevations where NAPL was encountered during installation of the rock anchors. The rock cores were positioned so as to allow geophysical logging to explore the putative north-south oriented fracture along a line formed by rock anchor (RA) locations RA (-25), RA (-22), and RA (-21) and evaluate the area where NAPL was believed to have impacted bedrock.

Fluid Monitoring and Sampling

Groundwater and product level measurements were collected periodically in the rock core wells from December 31, 2015 through February 1, 2016. Rock core wells were gauged to estimate the magnitude of NAPL in the rock wells. After each gauging episode, the NAPL was removed using a submersible pump and/or bailer and the volumes recorded from each rock well. Periodically removing NAPL also served two purposes: (1) to observe NAPL behavior with time so as to gauge the magnitude of NAPL in the ground, and (2) to remove contaminant from the site. An overall volume estimate was also computed.

NAPL was removed from the boreholes (rock core wells) on nine occasions between January 6, 2016 and February 1, 2016. The volume in the boreholes as well as the volume removed was

recorded, totaled and plotted. Table 2 presents the results of fluid level gauging (Table 2a Fluid level by date; Table 2b Fluid Level by Rock Core).

On January 21, 2016, a NAPL sample was collected from RC-7. The NAPL sample was transported to Accutest Laboratories, a NYSDOH Accredited Laboratory, and analyzed for specific gravity and forensic fingerprint testing.

The rock core wells RC-5, RC-6, and RC-10 were probed for signs of DNAPL. This was done first by developing the wells and removing sediment, rock flour from rock coring, and bentonite from the mud pad that may have entered the rock core during drilling activities, followed by measurement with a Solinst Model 122 Interface Probe for evidence of DNAPL.

The rock core wells were developed using a Waterra surge action pump with a ball and check valve prior to probing for DNAPL. This pump agitates and loosens sediments for removal. RC-5, RC-6, and RC-10 were purged on January 27 and 28, 2016. RC-8B was partially developed but ceased because the pump surge block became jammed in the rock core. RC-7 and RC-11 were not developed because they were destroyed by construction equipment. RC-9 could not be developed because the Waterra Pump surge block became jammed in the rock core.

Table 2a. Fluid Level Monitoring by Date

Rock Core	Meas. Date	Depth to Water, ft.	Depth to Product, ft.	Product Thickness, ft.	Calculated Volume, gals.	Volume Removed, gals.	Cumulative Volume Removed, All Cores, gals.
RC-4	12/31/15	1.97	1.96	0.01	0.007	--	--
RC-5	12/31/15	6	na	0	0	--	--
RC-6	12/31/15	6.9	2.49	4.41	2.9	--	--
RC-9	12/31/15	0.02	0	0.02	0.013	--	0
RC-4	1/6/16	1.37	1.36	0.01	0.007	0	--
RC-5	1/6/16	6.43	6.21	0.22	0.144	0.021	--
RC-9	1/6/16	0	0	0	0		--
RC-6	1/6/16	7.22	2.6	4.62	3.1	2.99	--
Subtotal	1/6/16	--	--	--	--	--	3
RC-10	1/8/16	6.31	6.29	0.02	0.01	--	--
RC-4	1/8/16	4.06	4.05	0	0.01	--	--
RC-5	1/8/16	5.91	5.72	0.19	0.12	--	--
RC-6	1/8/16	2.3	2	0.3	0.2	--	--
RC-7	1/8/16	4.26	3.56	0.7	0.46	--	--
RC-9	1/8/16	0.55	0.54	0.01	0.01	0	--
Subtotal	1/8/16	--	--	--	--	--	3
RC-10	1/12/16	5.76	5.6	0.16	0.10	--	
RC-11	1/12/16	13.83	13.81	0.12	0.01	--	

Table 2a. Fluid Level Monitoring by Date

Rock Core	Meas. Date	Depth to Water, ft.	Depth to Product, ft.	Product Thickness, ft.	Calculated Volume, gals.	Volume Removed, gals.	Cumulative Volume Removed, All Cores, gals.
RC-6	1/12/16	0.7	0.45	0.25	0.16	--	
RC-7	1/12/16	7.91	6.86	1.05	0.69	--	
RC-8B	1/12/16	3.46	na	0	0	0.68	
Subtotal	1/12/16	--	--	--	--	--	3.7
RC-10	1/14/16	4.99	4.81	0.18	0.11	0.11	
RC-11	1/14/16	13.77	13.74	0.03	0.02	0.02	
RC-4	1/14/16	3.88	na	0	0	0	
RC-5	1/14/16	4.05	4.01	0.04	0.03	0.03	
RC-6	1/14/16	0.6	0.55	0.05	0.03	0.03	
RC-7	1/14/16	6.96	6.03	0.93	0.61	0.61	
RC-8B	1/14/16	3.81	na	0	0	0.80	
Subtotal	1/14/16	--	--	--	--	--	4.5
RC-5	1/16/16	4.52	4.5	0.02	0.013	0.013	
RC-10	1/16/16	5.67	5.67	0.31	0.21	0.21	
RC-6	1/16/16	1.56	na	0	0	0	
RC-8B	1/16/16	3.19	na	0	0	0	
RC-7	1/16/16	7.5	6.91	0.59	0.39	0.39	
RC-4	1/16/16	3.88	na	0	0	0.61	
Subtotal	1/16/16	--	--	--	--	--	5.1
RC-7	1/18/16	7.45	6.95	0.5	0.33	0.33	
RC-8B	1/18/16	3.22	na	0	0	0	
RC-6	1/18/16	1.57	na	0	0	0	
RC-4	1/18/16	3.89	na	0	0	0	
RC-10	1/18/16	6.01	5.68	0.33	0.22	0.22	
RC-5	1/18/16	4.51	4.5	0.01	0.007	0.007	
RC-11	1/18/16	13.72	13.7	0.02	0.013	0.013	
Subtotal	1/18/16	--	--	--	--	--	5.6
RC-10	1/20/16	6.15	5.92	0.23	0.15	0.15	
RC-4	1/20/16	4.18	na	0	0	0	
RC-5	1/20/16	4.8	4.76	0.04	0.03	0.03	
RC-6	1/20/16	1.8	1.75	0.05	0.03	0.03	
RC-7	1/20/16	7.35	7.11	0.24	0.16	0.16	
RC-8B	1/20/16	3.44	na	0	0	0	
Subtotal	1/20/16	--	--	--	--	--	6.0
RC-7	1/22/16	6.56	6.5	0.06	0.039	0.039	
RC-8B	1/22/16	3.16	na	0	0	0	
RC-9	1/22/16	3.55	na	0	0	0	
RC-6	1/22/16	1.16	1.14	0.02	0.013	0.013	
RC-4	1/22/16	4.11	na	0	0	0	
RC-10	1/22/16	5.45	5.22	0.23	0.15	0.15	
RC-5	1/2.2/16	3.15	3.14	0.01	0.001	0.001	

Table 2a. Fluid Level Monitoring by Date

Rock Core	Meas. Date	Depth to Water, ft.	Depth to Product, ft.	Product Thickness, ft.	Calculated Volume, gals.	Volume Removed, gals.	Cumulative Volume Removed, All Cores, gals.
Subtotal	1/22/16	--	--	--	--	--	6.2
RC-8B	1/26/16	3.18	na	0	0		
RC-9	1/26/16	3.31	na	0	0		
RC-4	1/26/16	3.82	na	0	0		
RC-10	1/26/16	5.18	4.99	0.19	0.12	0.12	
Subtotal	1/26/16	--	--	--	--	--	6.3
RC-5	2/1/16	3.41	3.4	0.01	0.0065	0.0065	
RC-6	2/1/16	1.25	1.24	0.01	0.0065	0.0065	
RC-10	2/1/16	5.8	5.41	0.39	0.25	0.25	
Total	2/1/16	--	--	--	--	--	**6.6**

Table 2b. Fluid Level Monitoring by Rock Core

Rock Core	Meas. Date	Depth to Water, ft.	Depth to Product, ft.	Product Thickness, ft.	Calculated Volume, gals.
RC-4	12/31/15	1.97	1.96	0.01	0.007
RC-4	1/6/16	1.37	1.36	0.01	0.007
RC-4	1/8/16	4.06	4.05	0.01	0.007
RC-4	1/14/16	3.88	--	0	0
RC-4	1/16/16	3.88	--	0	0
RC-4	1/18/16	3.89	--	0	0
RC-4	1/20/16	4.18	--	0	0
RC-4	1/22/16	4.11	--	0	0
RC-4	1/26/16	3.82	--	0	0
RC-5	12/31/15	6	--	0	0
RC-5	1/6/16	6.43	6.21	0.22	0.14
RC-5	1/8/16	5.91	5.72	0.19	0.12
RC-5	1/14/16	4.05	4.01	0.04	0.026
RC-5	1/16/16	4.52	4.5	0.02	0.013
RC-5	1/18/16	4.51	4.5	0.01	0.007
RC-5	1/20/16	4.8	4.76	0.04	0.026
RC-5	1/22/16	3.15	3.14	0.01	0.007
RC-5	2/1/16	3.41	3.4	0.01	0.007
RC-6	12/31/15	6.9	2.49	4.4	2.9
RC-6	1/6/16	7.22	2.6	4.6	3
RC-6	1/8/16	2.3	2	0.3	0.2
RC-6	1/12/16	0.7	0.45	0.25	0.16

Table 2b. Fluid Level Monitoring by Rock Core

Rock Core	Meas. Date	Depth to Water, ft.	Depth to Product, ft.	Product Thickness, ft.	Calculated Volume, gals.
RC-6	1/14/16	0.6	0.55	0.05	0.033
RC-6	1/16/16	1.56	--	0	0
RC-6	1/18/16	1.57	--	0	0
RC-6	1/20/16	1.8	1.75	0.05	0.033
RC-6	1/22/16	1.16	1.14	0.02	0.013
RC-6	2/1/16	1.25	1.24	0.01	0.007
RC-7	1/8/16	4.26	3.56	0.7	0.46
RC-7	1/12/16	7.91	6.86	1	0.69
RC-7	1/14/16	6.96	6.03	0.93	0.61
RC-7	1/16/16	7.5	6.91	0.59	0.39
RC-7	1/18/16	7.45	6.95	0.5	0.33
RC-7	1/20/16	7.35	7.11	0.24	0.16
RC-7	1/22/16	6.56	6.5	0.06	0.039
RC-8B	1/12/16	3.46	--	0	0
RC-8B	1/14/16	3.81	--	0	0
RC-8B	1/16/16	3.19	--	0	0
RC-8B	1/18/16	3.22	--	0	0
RC-8B	1/20/16	3.44	--	0	0
RC-8B	1/22/16	3.13	--	0	0
RC-8B	1/26/16	3.18	--	0	0
RC-9	12/31/15	0	0	0	0.013
RC-9	1/6/16	0	0	0	0
RC-9	1/8/16	0.55	0.54	0.01	0.007
RC-9	1/22/16	3.55	--	0	0
RC-9	1/26/16	3.31	--	0	0
RC-10	1/8/16	6.31	6.29	0.02	0.013
RC-10	1/12/16	5.76	5.6	0.16	0.1
RC-10	1/14/16	4.99	4.81	0.18	0.12
RC-10	1/16/16	5.99	5.67	0.32	0.21
RC-10	1/18/16	6.01	5.68	0.33	0.22
RC-10	1/20/16	6.15	5.92	0.23	0.15
RC-10	1/22/16	5.45	5.22	0.23	0.15
RC-10	1/26/16	5.18	4.99	0.19	0.12
RC-10	2/1/16	5.8	5.41	0.39	0.25
RC-11	1/12/16	13.83	13.81	0.02	0.013
RC-11	1/14/16	13.77	13.74	0.03	0.02
RC-11	1/18/16	13.72	13.7	.02	0.013

Geophysical Testing

Geophysical logging of the seven boreholes included continuous caliper, fluid temperature, fluid resistivity, and acoustical televiewer measurements. Optical televiewer (digital video image of the borehole oriented with respect to magnetic north) logs and heat pulse flowmeter logging was not feasible due to the opacity of the water, clogging nature of NAPL, and injected water from drilling rock cores, and drilling piles while geophysical logging was ongoing. Geophysical Applications of Holliston, Massachusetts logged the rock cores.

FINDINGS

Rock Core Visual Observations

Each of the seven cores was subdivided into separate runs, whereupon the core was extracted and visually examined for evidence of NAPL staining and free-phase NAPL before the next run began. The seven rock cores yielded 47 separate rock core runs. Rock core observations yield qualitative information about the extent and degree of NAPL in rock. Table 3a presents the overall results of the visual observations for NAPL; Table 3b presents a breakdown by rock core.

Table 3a. NAPL Visual Observations in Rock Cores

NAPL Observations	Frequency	Percent	Cumulative
Free of NAPL stain or product	31	65.96	65.96
NAPL stain only, no product	11	23.40	89.36
Free-phase NAPL	5	10.64	100
Total	47	100	

Table 3b. NAPL Observations by Rock Core

Rock Core	Free of NAPL Stain or Product	NAPL Stain Only, No Product	Free-phase NAPL	Total
RC-5	6	0	1	7
RC-6	3	4	1	8
RC-7	3	2	1	6
RC-8B	4	0	0	4
RC-9	4	3	1	8
RC-10	4	2	0	6
RC-11	7	0	1	8
Total	31 (66%)	11 (23%)	5 (11%)	47 (100%)

Visible free-phase NAPL was observed in five of the 47 rock core runs, approximately 11 percent. Where free-phase NAPL was observed, it was noted in one rock core run per boring only. This occurred most frequently in the second and third runs. All observations of free-phase NAPL were limited to a 5-foot band with elevations ranging from approximately (-6) ft. NAVD88 to (-11) ft. NAVD88. Table 4 presents the cores and elevations with visually observed free-phase NAPL.

Table 4. Free-phase NAPL Locations

Rock Core	Run	Depth	Elevation
RC-5	3	15	-8
RC-6	3	15	-11
RC-9	2	10	-8
RC-7	2	10	-8
RC-11	5	19.9	-6

Eleven of the 47 rock core runs, approximately 23 percent, exhibited signs of NAPL staining but without any discernable signs of free-phase NAPL. Most of these observations (7 out of 11), approximately 64 percent, were at elevations of (-13) ft. or lower. The observations of NAPL staining, without free-phase NAPL, possibly represent older NAPL that has since degraded and left only a residue and no longer is a source of free-phase NAPL. Table 5 lists the cores and locations with NAPL staining only.

Table 5. NAPL Staining Only

Core	Run	Depth	Elevation
RC-6	1	5	-1
RC-6	4	20	-16
RC-6	5	25	-21
RC-6	6	30	-26
RC-9	1	5	-3
RC-9	3	15	-13
RC-9	4	20	-18
RC-10	1	5	-1
RC-10	2	10	-6
RC-7	3	15	-13
RC-7	4	20	-18

Thirty-one of the 47 rock core runs, approximately 66 percent, were free of any signs of NAPL. Rock cores from two borings, RC-8B and RC-10, were entirely free of free-phase NAPL during rock coring. RC-8B had no signs of any NAPL staining or free-phase NAPL.

In summary, the visual observations of the rock cores found two-thirds of the rock cores entirely free of NAPL staining. Of the remainder, approximately one-quarter had aged NAPL staining but no free-phase NAPL. The remaining five rock core runs with free-phase NAPL appeared in RC-5, RC-6, RC-7, RC-9, and RC-11. Free-phase NAPL occurred between elevations of (-6 ft.) to (-11 ft.).

Rock Description

The Rock Quality Designation (RQD) is an index that measures rock soundness. Originally developed to qualitatively describe rock quality for tunneling purposes, it is now used as a standard parameter in drill core logging (D. U. Deere 1988). RQD is determined by summing the lengths of sound rock, rock >10 centimeters (3.94 inches) long, in a core run and dividing by the total core run length. RQD is classified according to the following ASTM categories.

RQD	Rock Quality
0 – 25%	Very poor
25 – 50%	Poor
50 – 75%	Fair
75 – 90%	Good
>90%	Excellent

Out of the 47 rock cores collected, rock quality ranged from poor to excellent. Slightly less than 10 percent was of poor quality, somewhat less than 50 percent measured fair to good quality, and the balance was of excellent quality as shown in Table 6.

Table 6. Rock Quality Designations

RQD Description	Frequency	Percent	Cumulative
Poor	4	8.5	8.5
Fair	11	23.4	31.9
Good	11	23.4	55.3
Excellent	21	44.7	100
Total	47	100	--

RQD was reviewed for any correlation with observations of NAPL in rock and whether RQD could signify any important patterns or trends affecting NAPL in bedrock. Review of the RQD measurements and observations of NAPL in the rock cores found no observable association between RQD and observations of NAPL. Therefore, no meaningful inferences about NAPL in bedrock can be drawn from the RQD measurements.

The rock was typically hard and in some instances it was extremely hard as evidenced by the coring rate. The typical rock-coring rate for most rock core runs measured 0.25 ft. per minute (4 minutes/foot). At times the core barrel encountered a vein of quartz that substantially increased resistance and the coring rate decreased to approximately 60 minutes/foot.

In summary, the RQD measurements did not reveal any information about NAPL extent or location in rock.

Fluid Monitoring

Free-phase NAPL levels in the rock core wells were monitored over a four-week period, from December 31, 2015, through February 1, 2016. Several events occurred during fluid level monitoring that would be expected to enhance fluid accumulation in the rock core wells. These included pile driving and associated water injection, a major rainfall (1.8 inches) on January 10, 2016, and 27 inches of snowfall (equivalent to 2.3 inches of rain)[1] and associated melt on January 23 and 24, 2016. Table 7 presents summary statistics for the NAPL level measurements over the monitoring period.

Table 7. NAPL Thickness in Rock Cores (ft.)

Core	No. Obs.*	Min.	p25	Median	p75	Max.
RC-4[2]	9	0	0	0	0.01	0.01
RC-5	9	0	0.01	0.02	0.04	0.22
RC-6	10	0	0.01	0.05	0.3	4.6
RC-7	7	0.06	0.24	0.59	0.93	1.1
RC-8B	8	0	0	0	0	0
RC-9	5	0	0	0	0	0.01
RC-10	8	0.02	0.18	0.23	0.32	0.39
RC-11	3	0.02	0.02	0.02	0.03	0.03
Total	60	0	0	0.02	0.22	4.6

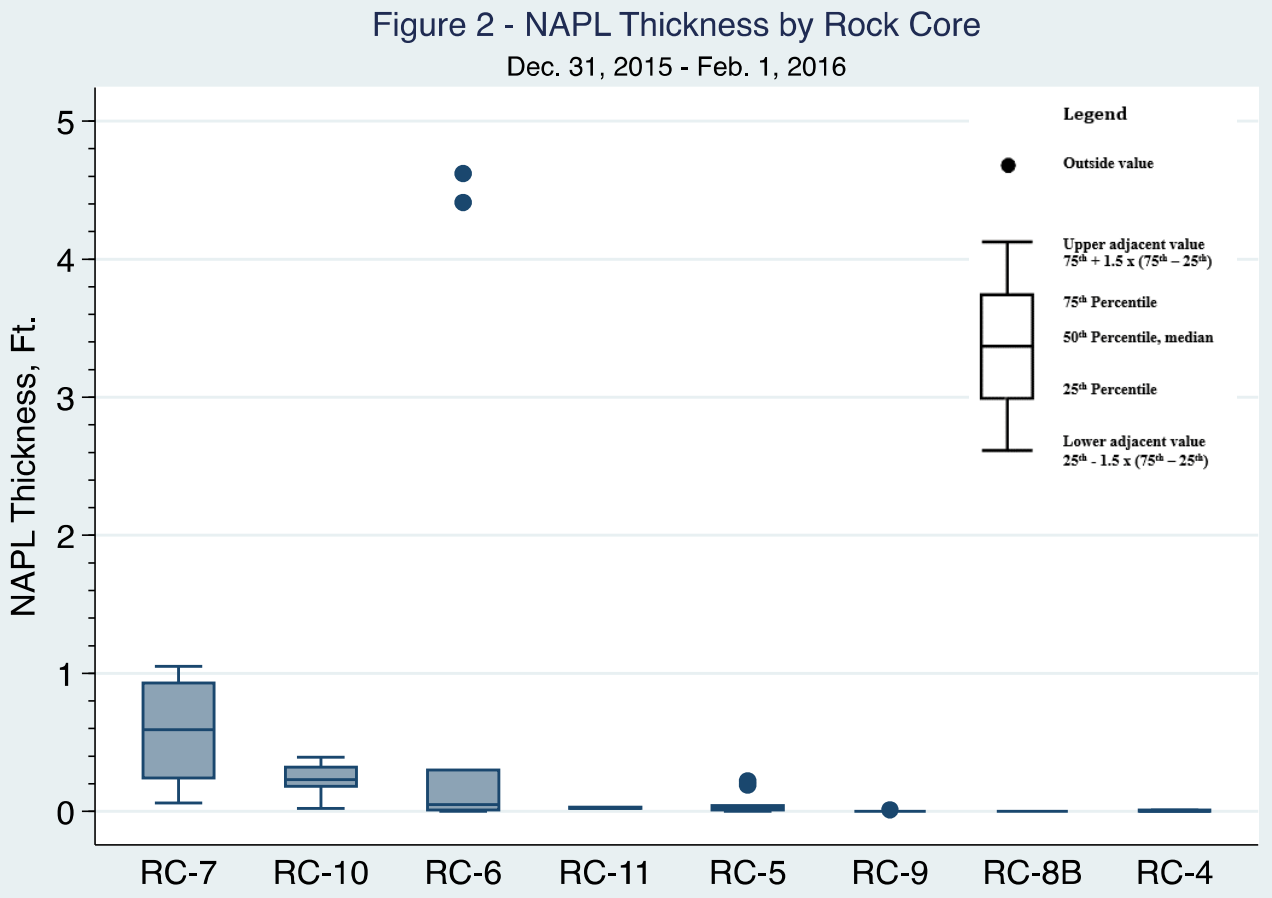
* The number of fluid level observations varies because some rock cores were installed before others and some cores were inaccessible at different times due to construction activity.

Product levels ranged from no measurable NAPL to 4.6 ft. in RC-6 during the four-week monitoring period. The median product thickness in 60 measurements measured 0.02 ft. There was no measureable NAPL in RC-8B during any of the eight measurements and the maximum NAPL thickness of 4.6 ft. appeared in RC-6 during the first measurement only. Outside these two extremes, the maximum NAPL thickness was on the order of 0.01 to 1.1 ft.

[1] Based on National Climatic Data Center Preliminary (NCDC) Monthly/Daily Climate Data for Central Park Weather Station, January 2016.

[2] RC-4 was installed as part of an earlier investigation and is shallower than the rock cores completed in the current program. It extended to a depth of approximately five feet below grade.

Figure 2 presents the product level measurements in Table 7 graphically by rock core, sorted by descending median thickness. Figure 2 also highlights the behavior of NAPL over the four-week monitoring period.

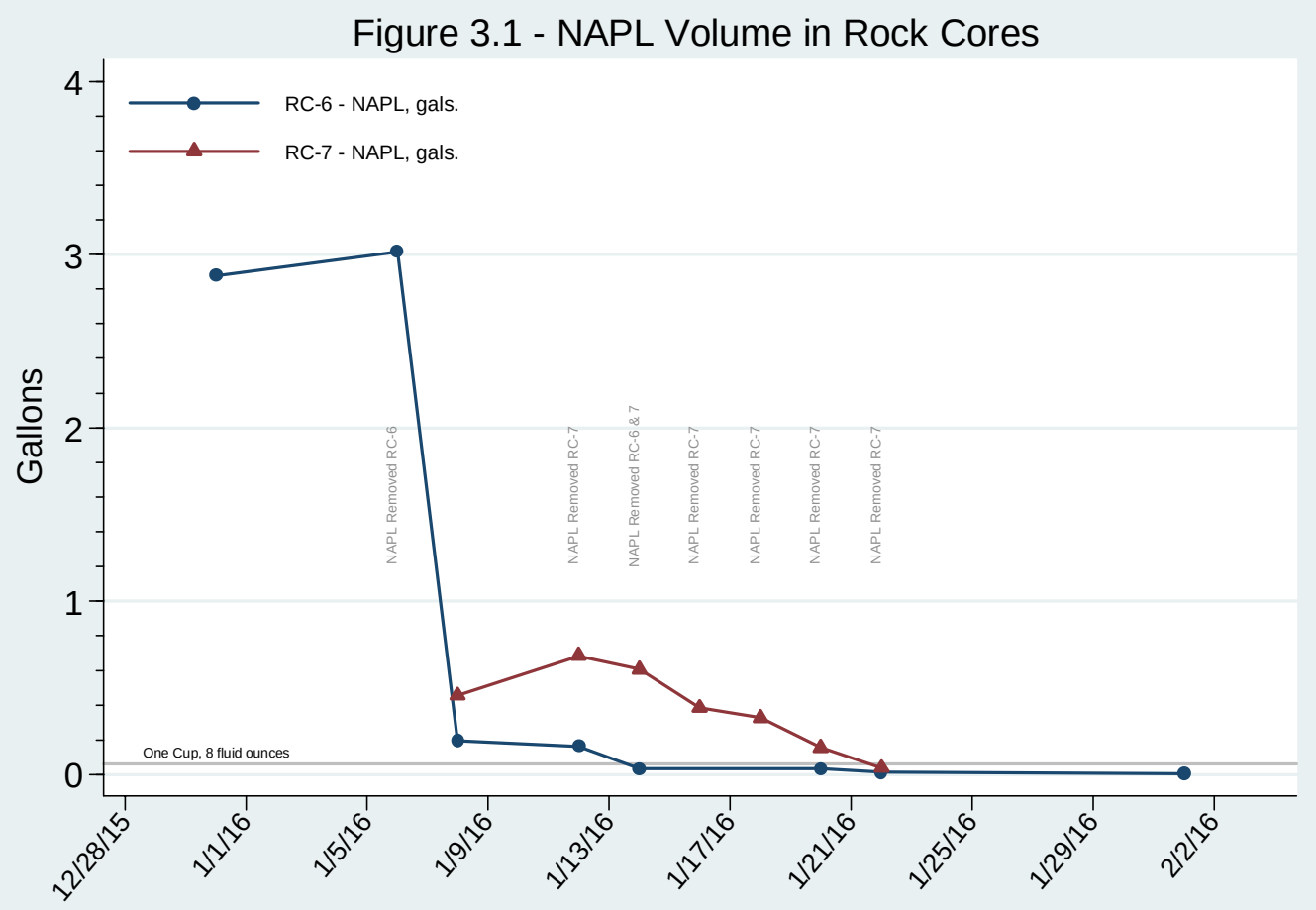


The thickest initial product level occurred in RC-6 (4.6 ft.) followed by RC-7 (1.1 ft.). As product was removed from the rock core wells the NAPL thicknesses decreased, indicating that NAPL was being removed from the rock. As of January 14, 2016, NAPL had been removed from RC-6 whereupon it remained at asymptotic levels. The two higher thickness measurements in RC-6 (4.6 ft. and 4.4 ft.) on Figure 2 illustrate this observation: they were higher before RC-6 was evacuated and never recovered after NAPL was removed (see Figure 3.1). In all other rock core wells except RC-10, NAPL similarly drained and did not fully recover. The median NAPL thickness in the rock core wells reflects the decline in product levels with time as a result of product removal. Measuring NAPL thickness is an initial step in estimating the volume of NAPL.

NAPL volume (like mass) is instrumental in measuring the magnitude of impacts. Figures 3.1 and 3.2 show the volume (in gallons) of NAPL per rock core well with time. NAPL volume is plotted separately for RC-6 and RC-7 because the remaining rock core wells had much smaller volumes, measuring near zero to a maximum of approximately 0.25 gallons.

Figure 3.1 illustrates that for both RC-6 and RC-7 NAPL volume decreased with product removal and experienced ever-declining levels until both rock wells approached less than one ounce in RC-6 and approximately five ounces in RC-7. All the NAPL removed was floating on the water table, i.e., Light Non-aqueous Phase Liquid (LNAPL).

Figure 3.2 illustrates that NAPL volume in the remaining rock core wells experienced the same pattern of decline as in RC-6 and RC-7, although the volume of NAPL is very low in all of these rock core wells. The exception is RC-10, which experienced fluctuation and appears in a position to collect NAPL from a hydraulically active fracture. All rock core wells except RC-10 had on the order of zero to less than two ounces of product by 2/1/16. RC-10 contained approximately one liter on 2/1/16 (Figures 3.1 and 3.2).



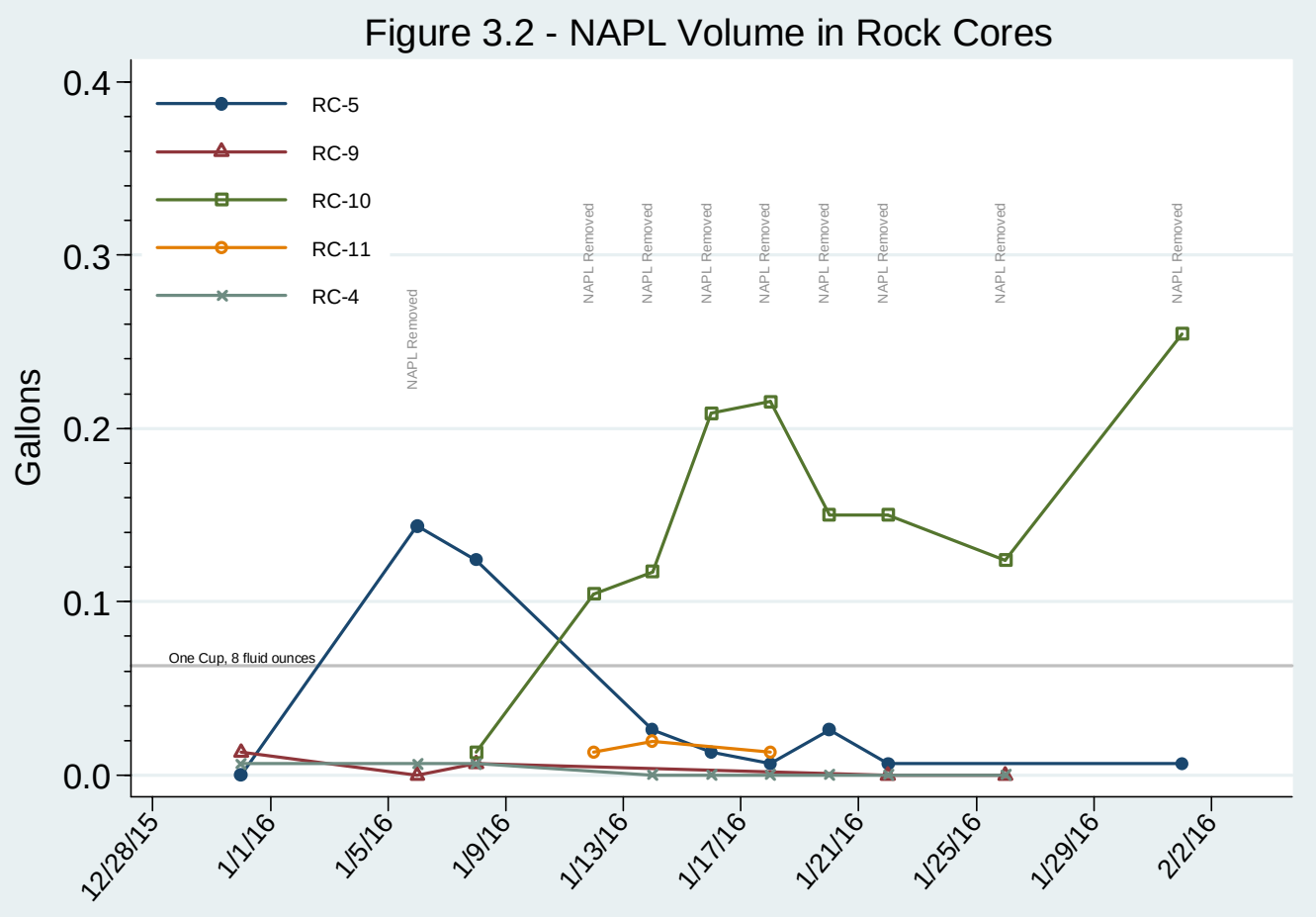
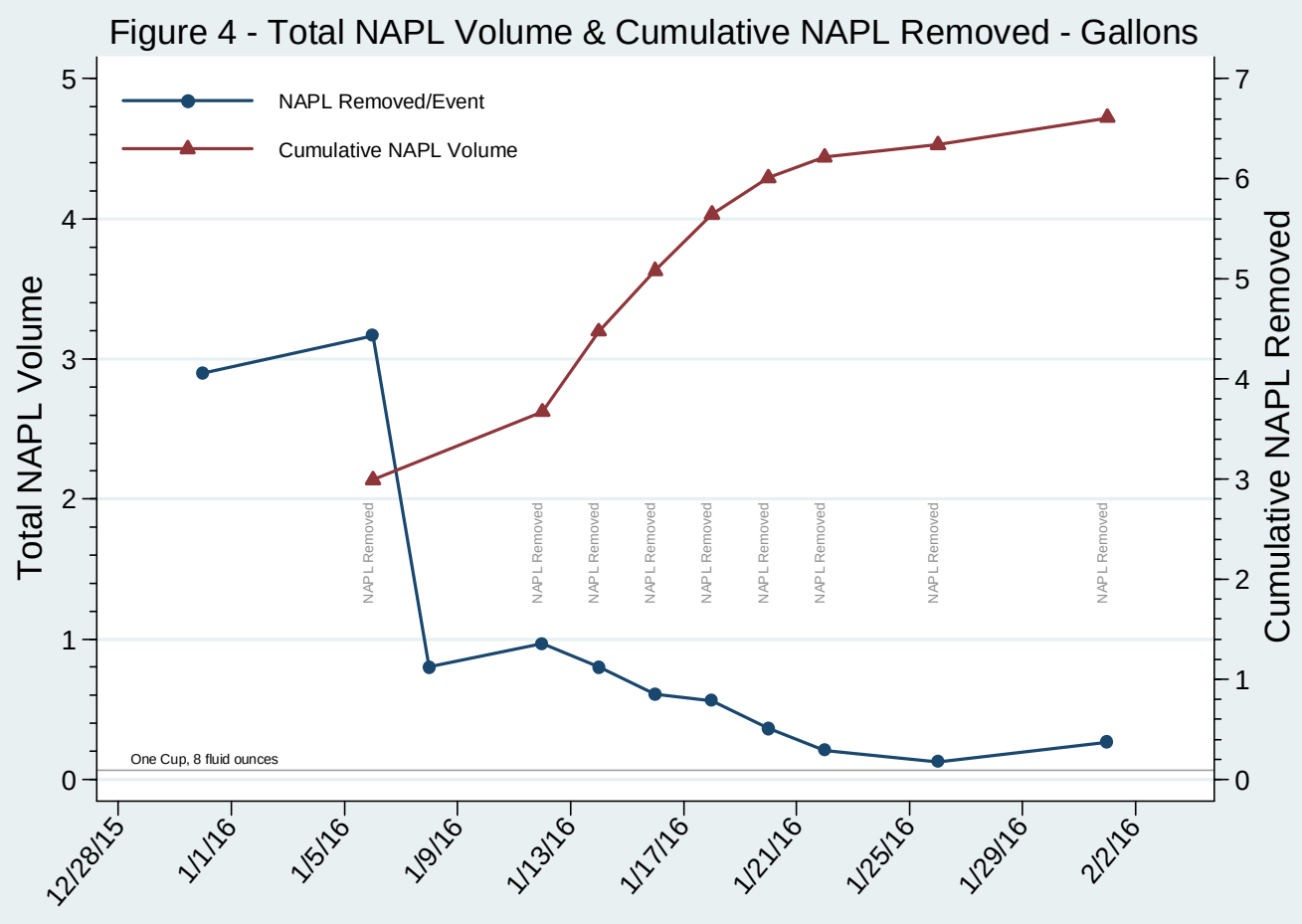


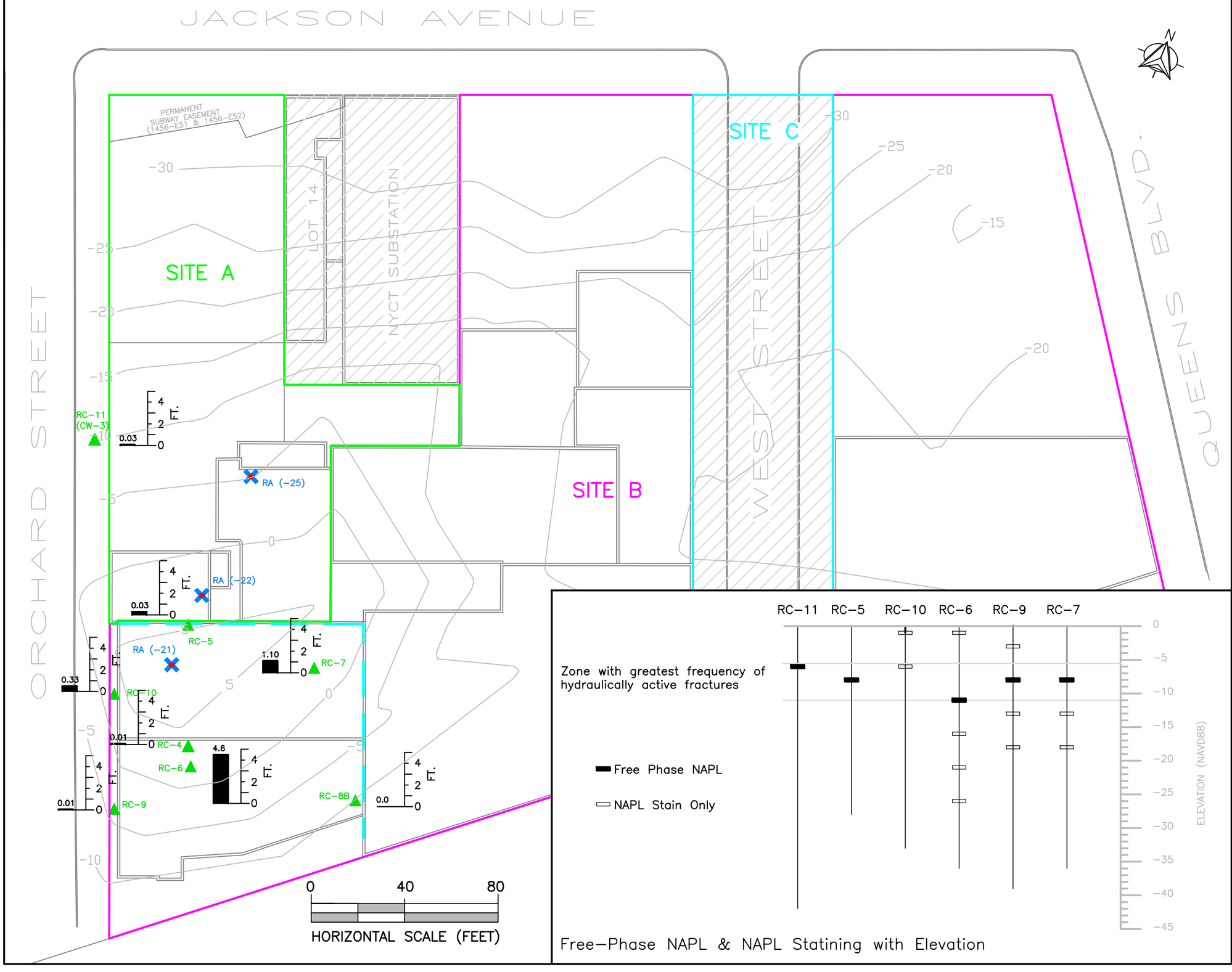
Figure 4 illustrates the total NAPL volume measured and the cumulative volume of NAPL removed from the rock core wells. The cumulative volume of NAPL removed in nine separate events measured approximately 6.6 gallons. Of this total, approximately 80 percent came from RC-6 and RC-7 and approximately 18 percent from RC-10.



Product removal was greatest during the initial removal events and then declined rapidly. Figure 4 shows the NAPL volume approaching asymptotic levels, while at the same time the cumulative volume removed is approaching steady-state. Together, these observations indicate that the bulk of free-phase NAPL has been removed and that only incremental removal volumes can be expected in the future.

Figure 5 illustrates the maximum product levels in rock wells and their spatial distribution. Product thickness decrease radically with increasing distance from the bedrock mound (or ridge running east-west across the center of the Site.

In summary, during one month of product recovery a total of 6.6 gallons of LNAPL was recovered. The volume of NAPL in all rock core wells except RC-10 has decreased following removal and not recovered. All rock core wells except RC-10 demonstrate asymptotic NAPL levels and a volume of zero to a few ounces.



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BCP No. C241151

FIGURE 5

MAXIMUM PRODUCT THICKNESS IN ROCK CORES

February 2016

Project Number
10112-005

LEGEND

- RC-7 ▲ — ROCK CORE LOCATION
- RA-22 (-25) ✕ — APPROX. ROCK ANCHOR LOCATION (ELEVATION IN NAVD88)
- -20 — BEDROCK CONTOUR (NAVD88) SOURCE: MUESER RUTLEDGE, JANUARY 2015
- 0.33 / 4 2 0 FT. — THICKNESS (FEET) OF PRODUCT ENCOUNTERED IN ROCK CORE

FILE: P:\99999 - Tishman\Figures\Site B - Rock Core Design\FIG 5 - Max Product Thickness in Rock Cores_v2.dwg DATE: 8/5/2014

Geophysical Testing

Geophysical instruments logged seven rock cores in order to evaluate the depth and orientation of fractures, their dip angle (planar dip angle), and gauge the openness and connectivity of the fractures. Each rock core was logged continuously using down-hole equipment for caliper, fluid resistivity, and temperature measurements and probed with acoustical signals to measure fracture orientation and planar dip to assess whether the fracture openings were hydraulically active. The Geophysical Applications report along with the individual plots and measurements for each rock core area are attached. Table 8 summarizes the types of geophysical measurements gathered in each rock core.

Table 8. Summary of Geophysical Testing

Rock Core	Caliper Log	Fluid Resistivity	Temp.	Acoustical Televiewer	Optical Televiewer*	Heat Pulse Flowmeter*
RC-5	x	x	x	x	--	--
RC-6	x	x	x	x	--	--
RC-7	x	x	x	x	--	--
RC-8B	x	x	x	x	--	--
RC-9	x	x	x	x	--	--
RC-10	x	x	x	x	--	--
RC-11	x	x	x	x	--	--

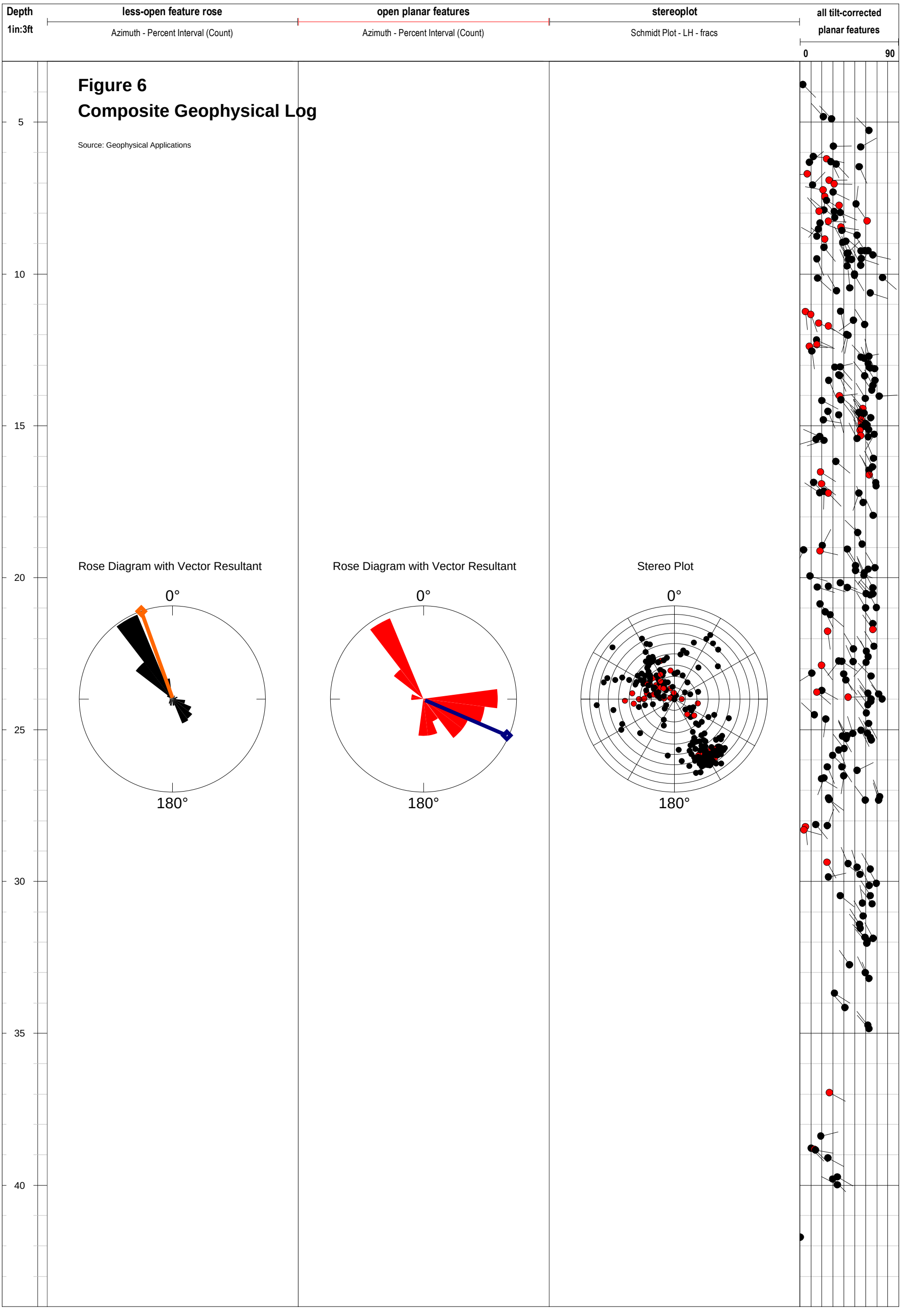
* Infeasible due to turbidity, NAPL in well, and/or water injection from pile installation.

The geophysical logging identified inferred "open" fractures as shown by red tadpole plots and "less-open" as shown by black tadpole plots (see Figure 6 and attached Geophysical Applications report). The "open" red tadpoles signify hydraulically connected fractures, i.e., fractures more likely to contain fluid and serve as fluid repositories or channels. Geophysical logging found the bulk of the fractures to be "less-open." Out of 302 measurements among all rock cores, 86 percent of the fractures were inferred "less-open" and the remaining 14 percent "open."

The "open" fracture clusters are more frequent in the upper portion of the rock cores. Approximately 80 percent of the "open" fractures were found at elevations of (-16 ft. NAVD88) or shallower. Among these "open" fractures, the greatest density is in the shallow intervals. One-third lie between elevations (-8 ft. NAVD88) to (-10 ft. NAVD88) and 21 percent lie between elevations 2 ft. NAVD88 to (-1 ft. NAVD88). In each of the individual rock cores, "open" fractures frequently form two clusters separated by an interval ranging from 12 to 25 ft. but are typically separated by 15 to 20 ft. The elevations with the highest frequency of hydraulically active fractures coincide very nearly exactly with where free-phase NAPL was observed during rock coring, from elevations (-6 ft. NAVD88) to (-11 ft. NAVD88). (See Inset Figure 5.)

The fractures lie at an angle (planar dip angle) and slope in a particular direction. The more hydraulically active "open" fractures have a dip angle that ranges from approximately 4 degrees

Fleming-Lee Shue / Long Island City, NY - all planar features from boreholes RC-5 through RC-10



off the horizontal to 67 degrees, but approximately 80 percent have a dip angle of 40 degrees or less. The average dip angle is 28 degrees. Planar dip angles for hydraulically active fractures in RC-6, RC-9, RC-10, and RC-11 all measured less than 40 degrees. The steeper planar dip angles occurred in RC-5, RC-7, and RC-8B. The steeper dip angles occur in the shallower elevations and may have reached the bedrock surface, particularly in RC-5. As a result, areas near RC-5 and RC-7 may therefore have been potential entry points for NAPL into bedrock. In addition to dip angle, the open fractures have a directional component (i.e., a vector).[3] The "less-open" fractures dip predominantly to the northwest and exhibit planar dip angles from 40 to 75 degrees (average 45 degrees). They appear to mirror the rock contours on the north side of the bedrock ridge. The "less-open" apertures appear to be bedding planes or thin, mineral-filled joints (Geophysical Applications 2016). The dividing line for the "open" and "less-open" fractures appears to lie near the top of the bedrock ridge.

While nominally dipping 30 degrees, the hydraulically active fractures dip predominantly toward the east, east-southeast, southeast, south-southeast; a number of fractures also dip to the northwest (Figure 6). "The dominant direction in a set of vectors can be found by computing the *vector resultant*" (Davis 1986, p. 316). The vector resultant for all "open" fractures is 112^0 from magnetic north or 99^0 from true north. Thus, the hydraulically active fractures dip predominantly to the east-southeast. The predominant fracture dip direction mirrors the rock contours from the bedrock mound to the southeast. The strike, or general trend of the rock is 90 degrees from the dip and is therefore approximately 10 degrees, to the north-northeast (Figure 7).

The mean resultant length measures the spread of the vectors about the average (Davis 1985, p. 318-319) and ranges between zero and one. Large values signify little dispersion while low values indicate greater dispersion. The mean resultant length for the hydraulically active fractures measured 0.33, indicating a significant amount of dispersion.

The vector resultant for the "less-open" fractures is 340^0 from magnetic north or 327^0 from true north, to the northwest. The mean resultant length for the hydraulically inactive fractures measured 0.22, indicating a significant amount of dispersion. The hydraulically inactive fractures are about 11 percent more dispersed compared with the hydraulically active fractures.

In summary, there a relatively few open fractures that contain NAPL. The fractures with NAPL are shallow and most are at elevations of (-16 ft.) or shallower. The elevations with the highest frequency of hydraulically active fractures coincide very nearly exactly with where free-phase NAPL was observed during rock coring (- 6 ft. to -11 ft.). The open fractures containing NAPL dip at a nominal average angle of 30 degrees predominantly to the east-southeast and southeast. This is the primary direction of NAPL flow.

[3] The magnitude of all vectors in this analysis is assumed to be one (unit vector).

NAPL Testing and Rock Core Well Development

The results of the NAPL testing found the material had a specific gravity of 0.98 (nearly identical to the specific gravity of the NAPL found on Lot 14, 0.96). The forensic testing identified the NAPL as coal tar distillate produced by a coal carbonization processes and creosote (similar to the NAPL on Lot 14). It likely represents a low molecular weight such as coal tar naphtha or naphthalene. The forensic report is included in the Attachments.

Purging of RC-5, RC-6, and RC-7 found the purge water to eventually become clear or very nearly so. The rock core wells continued to yield sufficient water. Very little NAPL was produced while purging the wells, which was completed on January 29, 2016.

RC-5, RC-6, and RC-10 were probed for DNAPL on February 1 and February 3, 2016. The wells equilibrated for several days after purging to allow time for DNAPL to enter the rock wells. Probing found all rock wells free of DNAPL. This is consistent with the specific gravity testing that found the NAPL to have a specific gravity less than one.

In summary, NAPL testing found the material to be lighter than water and physical probing confirmed the absence of DNAPL. Forensic testing found the NAPL be effectively identical to the NAPL found in soils on Sites A and B.

DISCUSSION AND SITE CONCEPTUAL MODEL

The dominant dip direction of the hydraulically active fractures is to the east-southeast beginning near the top of the bedrock ridge at an average dip angle of approximately 30 degrees from horizontal (Figure 7). The hydraulically active fractures are largely within an elevation of (-16 ft.) and the fractures at shallower elevations appear to be the principal apertures containing free-phase NAPL. All observations of free-phase NAPL were limited to a 5-foot-wide band between elevations of approximately (-6 ft.) to (-11 ft.). Many of the steeper planar dip angles are shallow and also seem centered close to the bedrock ridge (RC-5 and RC-7). Fractures with the steeper dip angles are more likely to intersect the bedrock surface and serve as entry points for free-phase NAPL to enter the bedrock.

The three rock core wells containing 98 percent of the recovered NAPL (RC-6, RC-7, and RC-10) are near the bedrock ridge. These rock core wells also lie near the former Building 4 basement wall, where it was thought NAPL collected and likely entered the bedrock. Thus, the confluence of several factors: NAPL flowing over the bedrock, NAPL accumulating near the bedrock ridge caused by the former Building 4 foundation wall that allowed NAPL to pool, and the steep fracture angles near the bedrock ridge, are thought to have created conditions forming the principal area for NAPL to have entered the bedrock.

After entering the bedrock, the NAPL spread horizontally and remained in the shallower, hydraulically active fractures near the entry area. If an estimated 5,000 gallons were released

JACKSON AVENUE

ORCHARD STREET

WEST STREET

QUEENS BLVD.

SITE A

SITE B

SITE C

LOT 14

NYCT SUBSTATION

PERMANENT SUBWAY EASEMENT (1456-E51 & 1456-E52)

AREA BELIEVED TO BE CENTER OF 1950S CREOSOTE RELEASE

RESULTANT

HYDRAULICALLY INACTIVE PLANAR DIP

VECTOR RESULTANT STRIKE ORIENTATION

HYDRAULICALLY ACTIVE VECTOR RESULTANT PLANAR DIP ~30° FROM VERTICAL

RC-11 (CW-3)

RA (-25)

RA (-22)

RA (-21)

RC-5

RC-7

RC-10

RC-4

RC-6

RC-9

RC-8B

CW-5

MW-B4

-30

-25

-20

-15

-10

-5

0

5

STRIKE AND PLANAR DIP BASED ON VECTOR RESULTANT OF HYDRAULICALLY ACTIVE FRACTURES

0 40 80

SCALE (FEET)

FILE: P:\99999 - Tishman\Figures\Site B - Rock Core Design\FIG 7 - Rock Core Locations.dwg DATE: 8/5/2014

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Queens Plaza Residential Development
BCP No. C241151

FIGURE 7

HYDRAULICALLY ACTIVE FRACTURE ORIENTATION

February 2016

Project Number
10112-005

LEGEND

- RC-7 — ROCK CORE LOCATION
- RA-22 (-25) — APPROX. ROCK ANCHOR LOCATION (ELEVATION IN NAVD88)
- PROPOSED DELINEATION ROCK CORE
- -20 — BEDROCK CONTOUR (NAVD88) SOURCE: MUESER RUTLEDGE, JANUARY 2015

during the 1950s fire, then the 6.6 gallons collected to date represents on the order of 0.1 percent of the release volume (FLS and Roux, June 2015). The comparatively small volume is therefore expected to have limited migration primarily in the direction of the dominant direction of the hydraulically active fractures—to the east-southeast; the principal NAPL migration avenue is expected to be in the direction of the vector resultant. The strike of the bedrock is thought to have fractures that also act as an entry feature for NAPL, but the principal migration path is the dominant direction of the hydraulically active fractures.

NAPL migration in the direction of the bedding planes and "less-open" fractures appears negligible. The one rock core well in this direction, RC-11 along Orchard Street, had minimal NAPL. The median NAPL thickness in three measurements was 0.02 ft., the maximum thickness 0.03 ft.

Other noteworthy observations occurred while drilling the rock cores. While drilling, potable water is introduced into the core for cooling the drill bit. While drilling RC-9, fluid levels rose in RC-6 indicating a hydraulic connection between the two locations. Similarly, fluid levels rose in RC-9 while coring RC-10, an indication of hydraulic connection between the two core locations. These cores appear in the same plane of the hydraulically active fractures and demonstrate a level of interconnectivity. This indicates is that NAPL over a large area can be removed from one or a limited number of hydraulically interconnected locations.

In summary, RC-6, RC-7, and RC-10 contained 98 percent of the NAPL identified by the rock cores. These rock cores are near the bedrock ridge where it appears that NAPL pooled because of the foundation wall of former Building 4. NAPL does not appear to have migrated far from this area. NAPL migration to the northwest appears negligible.

Interference and Data Qualification

Electrical energy from utilities in the sidewalk (power line and electrical manhole) along Orchard Street is believed to have interfered with the geophysical electrical signals while logging RC-11. A subway tunnel also runs along Jackson Avenue. The high electrical energy in the subway tunnel is another interfering element. Consequently, RC-11 directional (not planar dip) data were omitted from the analysis for these reasons.

Observations of free-phase NAPL during rock coring can be heavily influenced by the dynamic effect of cooling drilling fluids injected during coring. Fluids move rapidly and this action can obscure the depth and location where free-phase NAPL entered the core. For this reason, more weight is given to the geophysical measurements in identifying fractures containing and transmitting NAPL. For example, free-phase NAPL was not identified in RC-10 during drilling, but NAPL eventually accumulated in RC-10, coinciding with the geophysical study's determination that a hydraulically active or open fracture is present in RC-10.

NAPL staining observed in rock sections that were free of accumulated free-phase NAPL during monitoring implies that the NAPL was very old and that free-phase NAPL is no longer present in these locations.

RECOMMENDATIONS

The following recommendations provide for collecting remaining traces of NAPL in rock, ensuring that all NAPL can be feasibly collected, monitoring for a reasonable period to verify that NAPL has been removed, and delineate the extent of NAPL in bedrock. The recommendations are based on the evidence collected and the data presented above.

1. **Retain RC-7 (new), and RC-11 (new) as product recovery wells**. RC-7 is somewhat downslope and initially appeared to have some NAPL recharge (not observed in later measurements). It therefore appears to intersect a hydraulically active fracture and is in a position to collect additional NAPL in the fracture, if available. RC-11, for NAPL recovery along Orchard Street, should be retained as a rock well collection point for the small volume of NAPL identified on the north side of the bedrock ridge. An additional product recovery well is proposed west of RC-10 on the Orchard Street sidewalk to both capture NAPL (if present) and delineate RC-10 to the west. The overall volume of product is now very small, but these wells should be monitored and product removed periodically using bailers, socks, or other means suitable to very low NAPL volume.

2. **NAPL removal via vacuum extraction.** Vacuum should be applied moving up slope from RC-7, vacuuming the rock core locations near the top of the bedrock ridge last. Avoid vacuuming RC-8B or any other rock core where free-phase NAPL was absent so as to prevent drawing NAPL into uncontaminated locations. The goal of vacuuming is to enhance removal of any small volume of NAPL that might remain in the fractures. The rock wells should be vacuumed periodically until the foundation elements restrict access to a vacuum truck.

3. **Quarterly NAPL monitoring.** Continue product level measurements and removal in the wells on a quarterly basis during groundwater sampling. The volume of NAPL is so small that removal by means of bailers, absorbent socks, or small pumps on an as-needed basis is the only practicable means of product removal.

4. **Additional rock core NAPL delineation.** Drill additional rock cores in the locations shown on Figure 7 to delineate the extent of NAPL in bedrock. Two cores are proposed east of RC-7 based on the results of the bedrock geophysical evaluation. For each linear foot east from RC-7, the rock core should extend 0.58 ft. vertically (assuming a 30^0 dip angle) plus the distance from the surface to elevation (-16 ft.) to ensure the cores encounter potential open fractures at elevation (-16 ft.). An additional 10 ft. of drilling footage should be included as a safety factor to encounter hydraulically connected fractures. For example, if the rock core is 40 ft. east of RC-7, then the rock core needs to extend 23 ft. to encounter the fracture accounting for dip angle from RC-7, adding another 10 ft. yields 33 ft. of core, plus the distance from grade to elevation (-16 ft.) to obtain the coring depth. An additional core is proposed west of RC-10 along the Orchard Street sidewalk to delineate the NAPL found in this rock core.

References

Davis. J. C. 1986. *Statistics and Data Analysis in Geology.* Second Edition. John Wiley & Sons. New York, Chichester, Brisbane, Toronto, Singapore.

Deere, D. U. and Deere, D. W. *The Rock Quality Designation (RQD) Index in Practice. Rock Classification Systems for Engineering Purposes.* ASTM STP 984. Louis Kirkaldie Ed. American Society for Testing Materials, Philadelphia, 1988, pp. 91-101.

Fleming-Lee Shue, Inc. and Roux Associates, Inc., June 2015. *Queens Plaza Residential Development Site B Remedial Investigation Report,* Site ID # BCP No. C241151, 28-34 Jackson Avenue, Long Island City, New York, Prepared for LIC Development Owner, LP & TST LIC Development, LLC.

Attachments

Geophysical Report

Borehole Geophysics Logging Report
Queens Plaza Site – Well RC-5 through RC-11
28-18 Jackson Avenue
Long Island City (Queens), New York

Prepared for
FLEMING-LEE SHUE, INC.
January 2016

GEOPHYSICAL APPLICATIONS INCORPORATED

January 25, 2016

Mr. Steve Panter, CGWP
Fleming-Lee Shue, Inc.
158 W. 29th Street
New York, NY 10001

phone: 212-675-3225
email: steve@flemingleeshue.com

Subject: Borehole Geophysics Logging Report
Queens Plaza Site – Wells RC-5 through RC-11
28-18 Jackson Avenue
Long Island City (Queens), New York

Dear Mr. Panter:

This report describes borehole geophysics logging performed by Geophysical Applications, Inc. at the above-noted site, to help identify and characterize bedrock fractures encountered by seven bedrock core holes. The logged holes were designated RC-5, RC-6, RC-7, RC-8, RC-9, RC-10, and RC-11. Fieldwork was performed between January 6 – 12, 2016, at times when ambient air temperatures were near or above freezing (to allow proper decon of the logging cable and probes).

The proposed log suite included fluid temperature (FTemp), fluid resistivity (FRes), caliper, acoustic and optical televiewers, and heat-pulse flowmeter. Oily borehole fluids would have prevented acquisition of satisfactory optical televiewer images, and would likely have clogged the flowmeter's screens (resulting in under-estimation of flow rates). The oil would also have been very difficult to clean off the flowmeter's internal plastic parts that are routinely exposed to borehole fluids. Consequently, the log suite that was actually performed in these core holes included FTemp, FRes, caliper, and acoustic televiewer, as described below.

METHODS OF INVESTIGATION

Survey Control

All borehole logs were referenced to depth below either the top of steel casing, or ground surface (in the case of locations RC-5 and RC-6; these boreholes were drilled into exposed bedrock and did not have any steel casing). The geophysical logging winch contains an optical depth encoder, to maintain depth measurements accurate within approximately ± 0.2 feet throughout a borehole's depth range.

Borehole Geophysics Logging

A Mount Sopris model 4MXB logging winch equipped with a Mount Sopris model MGX-II electronics console recorded most log data during this project. FTemp, FRes, and caliper logs

were recorded at 0.1-foot depth increments, as determined by the logging winch's digital depth encoder.

FTemp and FRes logs were recorded during the first downward logging run by a Mount Sopris caliper probe with a fluid temperature and fluid resistivity subassembly. These fluid logs were obtained with a downward logging speed of approximately four feet per minute. Caliper data were subsequently recorded while pulling the same probe upward at approximately 8 to 10 feet per minute.

Acoustic televiewer (ABI) data were obtained using an Advanced Logic Technologies (ALT) model ABI40 acoustic televiewer probe, with the Mount Sopris winch and an ALT model Abox electronics console. ABI data were recorded at 0.01-foot depth intervals, with 288 pixels for each 360-degree scan around the borehole wall. The cable speed for this probe was approximately three feet per minute, while logging upward.

A pair of centralizer assemblies positioned the televiewer probe near the middle of a borehole. Each centralizer contains four non-magnetic bow springs, clamped to the probe housing with brass compression fittings, at positions recommended by the probe manufacturer to minimize the risk of interference with the probe's internal three-component magnetometers.

All geophysical log data were recorded on a laptop computer's hard drive, and copied to CD-ROM as a backup precaution.

Post-survey plot scales were adjusted to display as much detail as possible. All conventional logs, and tadpoles representing planar-feature dip angles and down-dip azimuths (inferred from the acoustic televiewer image) were merged onto one plot for each logged well, to aid data correlation. Acoustic televiewer images are shown on separate plots at an expanded vertical scale.

Equipment Decontamination Procedures

Decontamination consisted of a citrus-cleaner scrub, followed by an Alconox scrub and tap water rinse of the logging cable and probes after each logging run.

SURVEY LIMITATIONS

Measured geophysical-log depths are estimated to be accurate within $\pm$ 0.2 feet at this site, allowing for some slippage of the winch's depth-measurement wheel.

Caliper-probe arms can measure borehole diameters up to approximately 17 inches. Caliper logs can most-confidently detect fractures that cross a borehole at moderate angles, e.g. less than approximately 70 degrees from horizontal. Caliper logs may not accurately detect near-vertical fractures.

Hydraulically-active fractures were inferred by comparing the fluid-property and caliper logs, and televiewer images. These interpretations are a subjective judgment based upon the available data.

The acoustic televiewer probe relies on tri-axial magnetometers to orient the recorded images with respect to magnetic north. Dip orientations of televiewer-inferred features within four to six feet of a steel casing are therefore approximate. The proper operation of these magnetometers was verified prior to each logging run with a handheld compass.

Calculated down-dip compass azimuths of nearly-horizontal planar features have larger uncertainties than azimuths of steeper-dipping features.

RESULTS

Geophysical log data and generalized log interpretations are described below. Specific interpretations regarding possible hydraulically-active planar-feature depths are listed in the "comments" column on the conventional log plot.

All geophysical logs described in this report are presented in Appendix A. Summary televiewer interpretations are provided in Appendix B. Each televiewer-interpretation table is an Excel spreadsheet listing observed planar-feature depths, down-dip compass azimuths for each inferred feature (note that this is perpendicular to the strike direction), feature dip angles with respect to horizontal, and whether an inferred feature was judged to be relatively open or less-open.

Caliper logs are presented in the left-most conventional log-plot column. Inflections to the right indicate borehole enlargements, for example where the drill bit passed through a fracture zone.

Fluid temperature (FTemp) and fluid resistivity (FRes) logs are presented in the next panel of each conventional-log plot. Localized inflections or changes in slope of FTemp or FRes logs typically represent water entering or exiting a borehole. Large inflections at the very bottom of a borehole may represent only accumulated sediments with temperature or electrical properties that contrast with the water column.

Acoustic televiewer images are presented via two columns (ABI40 "traveltime" and "amplitude"), where each column represents a cylindrical image sliced down the north edge and laid flat on the printed page. For each column, magnetic north is at the left edge, and the plot progresses through east, south, west, and back to north at the right-hand edge.

Acoustic televiewer logs were evaluated using WellCAD's image-processing module, to measure planar-feature dip angles and down-dip azimuths. All interpreted down-dip azimuths are referenced to magnetic north. Measured feature orientations are indicated by tadpole plots, where each filled-circle indicates a feature's dip angle from horizontal (plotted on a graph that ranges between 0 and 90 degrees from left to right). Each tadpole tail points in the down-dip azimuth; magnetic north is oriented straight up on the printed page. Note that the down-dip azimuth indicated by each tadpole tail is perpendicular to the feature's strike direction.

Features represented on both the ABI travel-time and amplitude plots are denoted as "open". Features represented only on the ABI amplitude plots are likely to have smaller apertures (or possibly represent bedding planes or thin, mineral-filled joints), and are judged relatively "less open". Red tadpoles, and red sine-curve lines superimposed on the ABI plots, represent inferred "open" fractures. Black tadpoles and black sine curves on the ABI plots represent interpreted "less-open" planar features.

Televiewer interpretations are also summarized using rose diagrams, to indicate the predominant down-dip azimuths of planar features observed in each well. These rose diagrams are presented with magnetic north oriented straight up on the printed page. The red rose diagram represents inferred open planes, and the black rose diagram represents inferred less-open features.

A stereoplot also summarizes the open and less-open feature orientations inferred from each acoustic televiewer log. The stereoplots were prepared using an equal-area (Schmidt) projection of the lower hemisphere.

Annotations on the conventional log plot describe interpreted hydraulically-active depths, based on correlations between all of the available log data. Selected observations that may be of particular interest are described below.

Core holes RC-5 through RC-10

These wells all showed relatively similar planar-feature orientations, and are therefore discussed together.

FTemp and/or FRes variations judged to possibly represent hydraulically-active zones in each of these core holes are listed in the "comments" column on each conventional log plot. Fluid-property variations that coincide with either caliper enlargements or televiewer-inferred planar features are identified as possibly hydraulically-active. Fluid-property variations that appear to coincide with accumulated sediments, or that do not correlate with visible openings in the borehole wall (e.g. in the absence of caliper enlargements or planar features) are judged unlikely to represent transmissive fractures.

Inferred planar-feature orientations from all six of these boreholes are summarized on a single plot that follows the RC-10 log plots. The following observations refer to this summary diagram for all six core holes. Most less-open planar features (black rose diagram) dip down toward the northwest; a few additional less-open features dip down toward the southeast. The northwest-dipping less-open planes resemble bedding planes on the televiewer images.

Most open planar features (red rose diagram) dip down toward the east, east-southeast, southeast, south-southeast, and northwest.

The stereoplot diagram shows a tight cluster of mostly-black poles (and a few red poles) located in the stereoplot's lower-right quadrant. These poles represent mostly less-open planes (and a few open planes) that dip down toward the northwest and north-northwest between roughly 40 to 75 degrees from horizontal.

A small group of red and black poles, located slightly below and right of the stereoplot's center, represents open and less-open planes that dip down toward approximately the northwest, between approximately 15 to 25 degrees from horizontal.

Most red poles, and numerous black poles, are plotted in the stereoplot diagram's upper-left quadrant. The red poles represent open planar features that dip down toward the east, east-southeast, southeast, and south-southeast, mostly at dip angles less than 40 degrees from horizontal. The black poles represent less-open planar features that dip down toward the east-southeast, southeast, and south-southeast, but at a wider range of dip angles (mostly between 10 to 65 degrees from horizontal).

Core Hole RC-11

This borehole's caliper log shows a distinct enlargement near 30 feet deep, and two televiewer-inferred open planar features within this enlargement. The caliper log shows an additional small but distinct enlargement near 50 feet deep.

FRes and/or FTemp inflections judged to represent hydraulically active zones were observed near 30.5, 35, 39.5, 48, and 49.5 feet.

Note that planar-feature down-dip compass directions inferred at this location are significantly different from planar-feature orientations observed at all of the other boreholes. For example,

the RC-11 stereoplot shows a large group of black poles in the stereoplot's upper-left quadrant, indicating less-open planes that dip down toward the southeast and south-southeast between 30 to 65 degrees from horizontal. Two red poles are plotted immediately right of the stereoplot's center, indicating open planes that dip down toward the west at approximately 5 degrees from horizontal. Two additional red poles are located in the stereoplot's lower-right quadrant; they represent open planes that dip down toward the northwest and north-northwest at roughly 30 degrees from horizontal.

The numerous black less-open planar features resemble the bedding-planes inferred at the other core holes, except that they dip down approximately in the opposite direction (southeast in this core hole, versus northwest in the other holes). The two northwest-dipping red (open) planes at RC-11 are also dipping in approximately the opposite compass direction compared to most open planes observed dipping 30 degrees from horizontal at all other holes.

The acoustic-televiewer's magnetometers were functionally checked immediately prior to logging this core hole, and their reported probe azimuth compared favorably with a handheld compass. This televiewer probe also performed properly at two bedrock boreholes logged at a different site, a week after the Queens Plaza fieldwork's conclusion.

Consequently, we suspect that the RC-11 planar-feature orientations may have been adversely affected by underground ferrous-metal objects, or possibly underground electrical fields. Subsequent to this fieldwork, Fleming-Lee Shue personnel told us that there was an underground subway station near the intersection of Jackson Avenue and Orchard Street, a short distance from RC-11. That subway station may have caused magnetic or electromagnetic interference that resulted in incorrect planar-feature orientations. The RC-11 planar-feature depths and inferences regarding possible RC-11 hydraulically-active depths are still relevant, but we suspect that the planar-feature down-dip compass orientations may be incorrect due to this magnetic or electromagnetic interference.

Because of this likely discrepancy, the RC-11 planar-feature orientations are not included in the site-wide summary rose and stereoplot diagrams.

* * * * *

We appreciate this opportunity to provide geophysical services, and we welcome questions concerning this report. Please call the undersigned at 508/429-2430 if we may provide additional information that would benefit your project.

Sincerely,

GEOPHYSICAL APPLICATIONS, INC.

M. Blackey

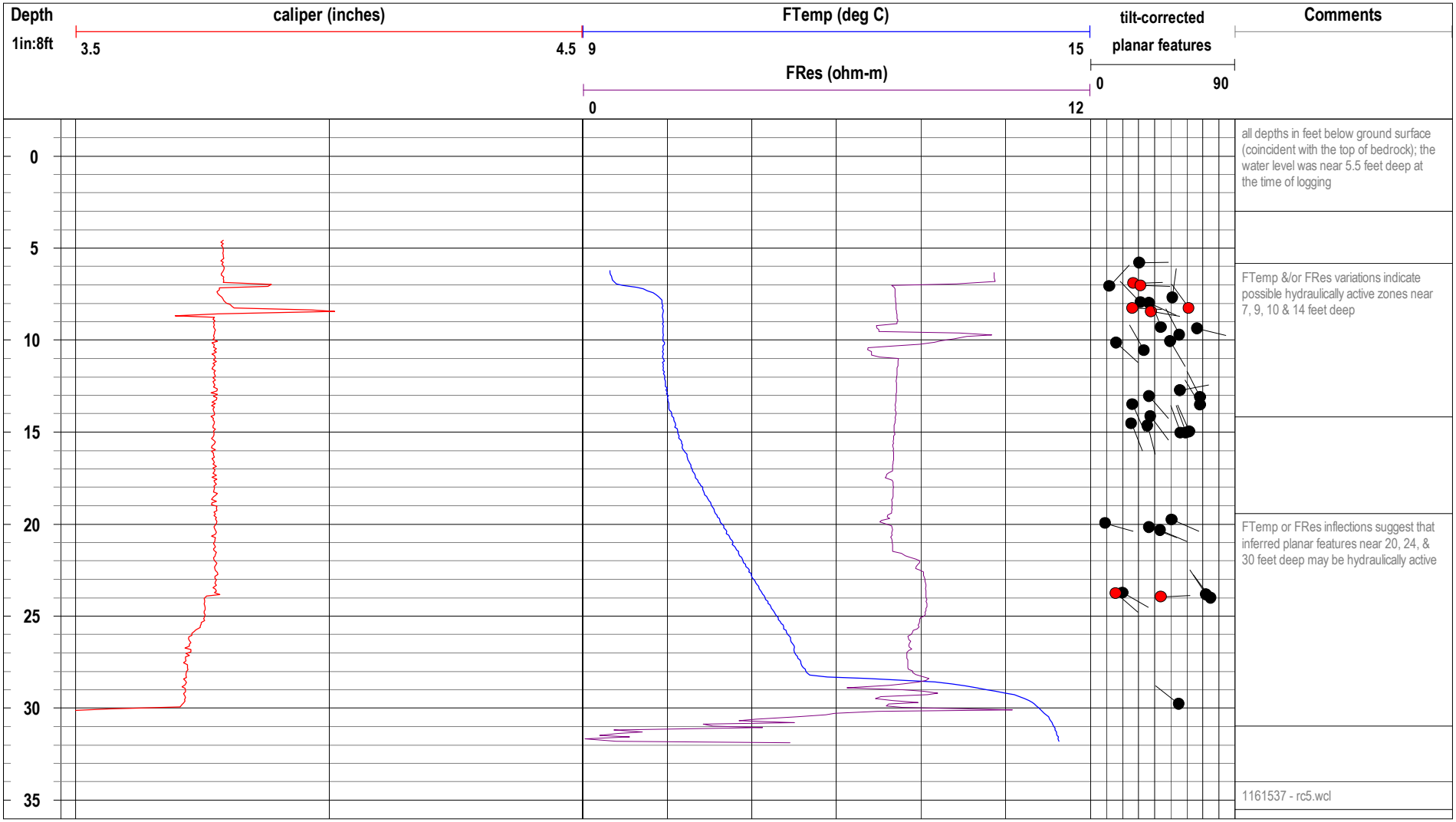
Mark E. Blackey
Principal and Geophysicist

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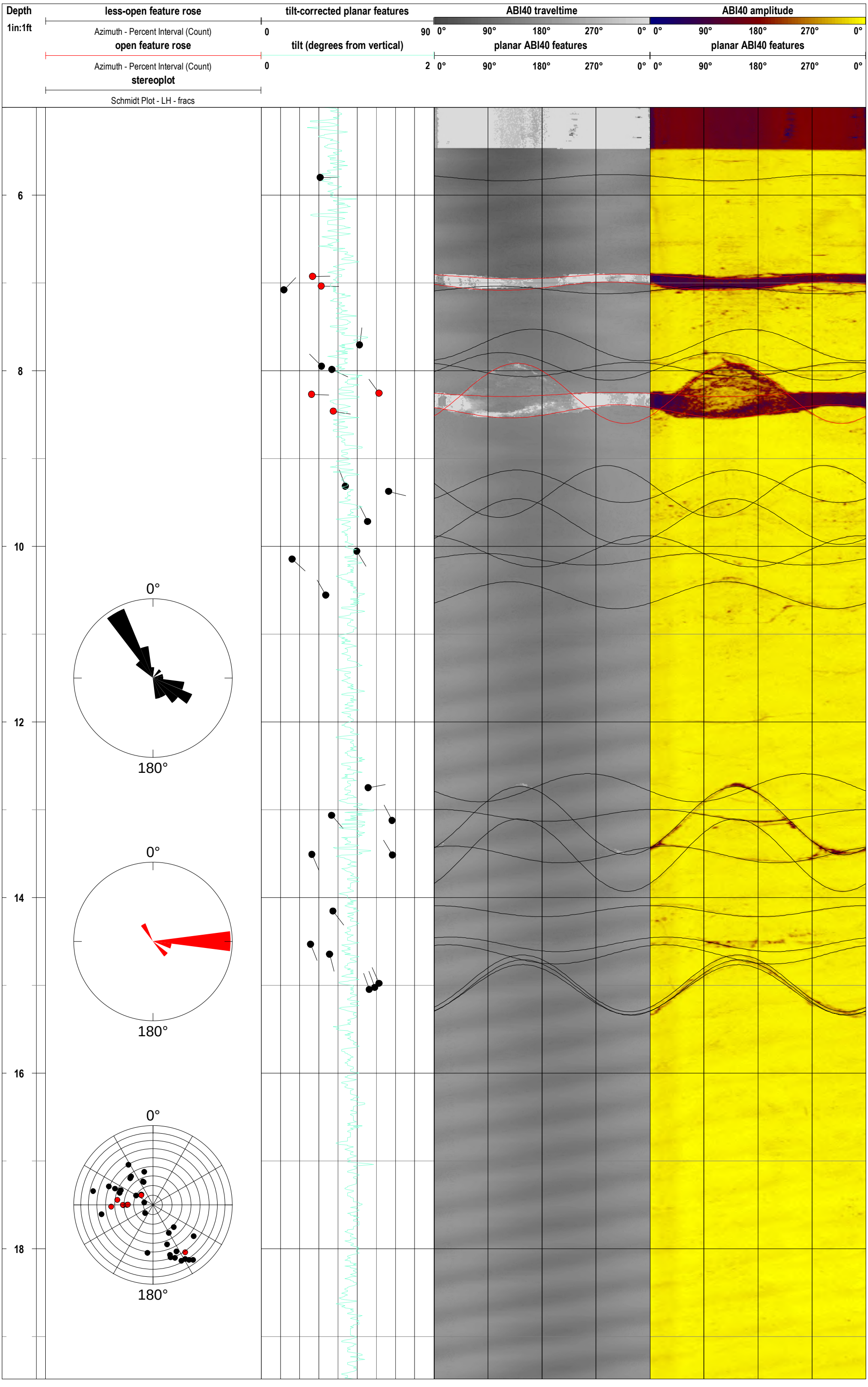
Appendix A

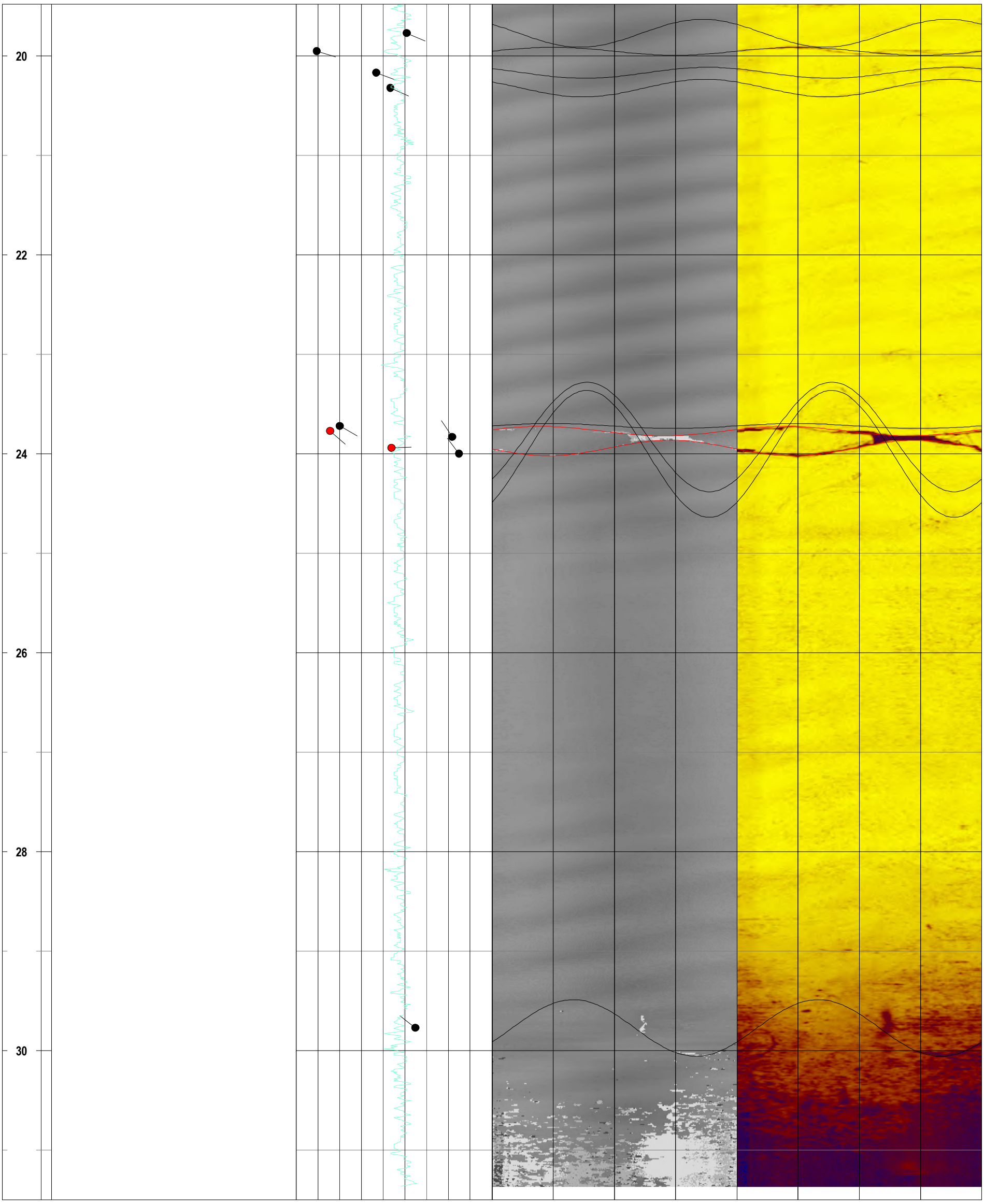
Borehole Geophysics Log Plots

Fleming-Lee Shue / Long Island City, NY - RC-5 conventional log plot

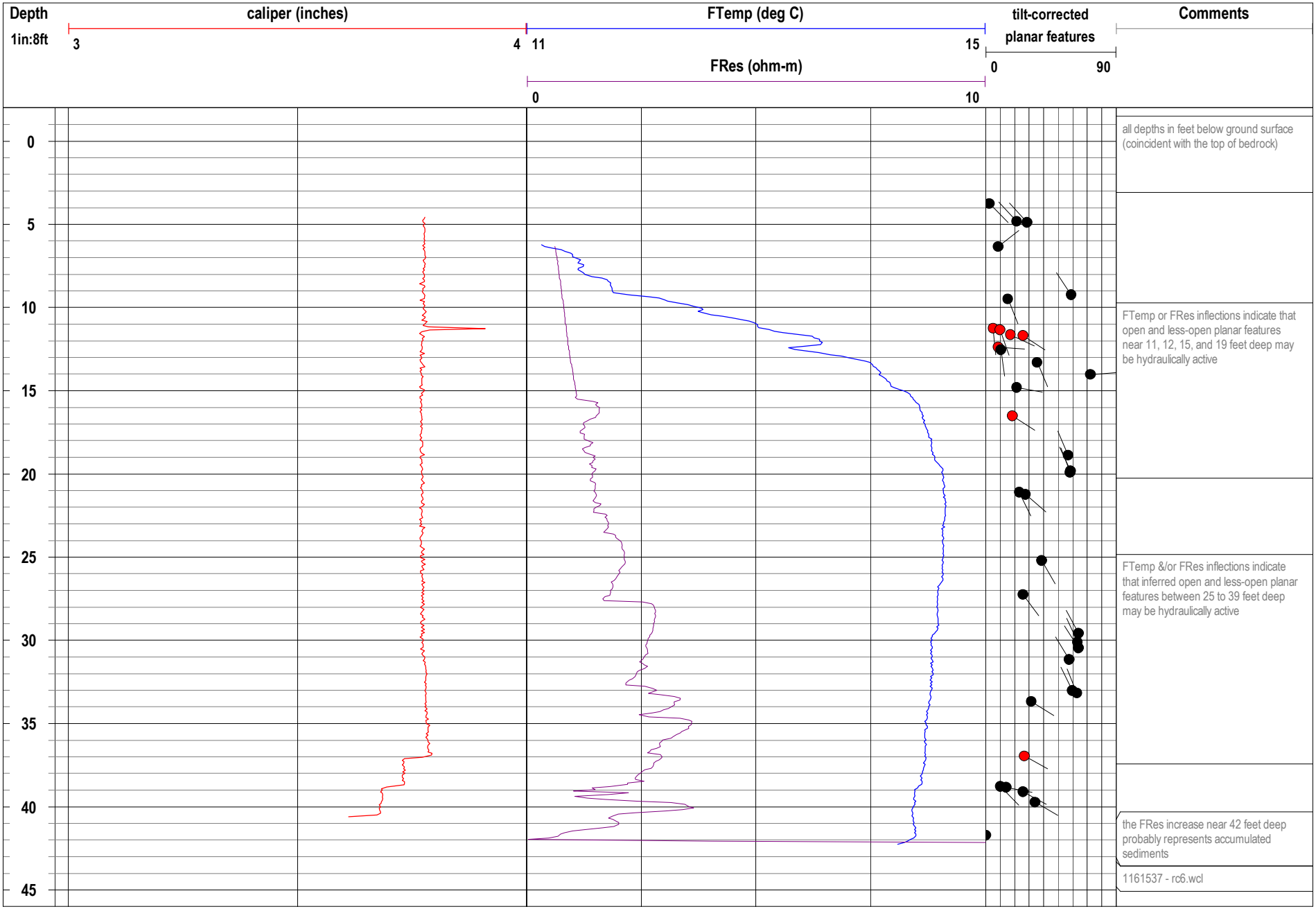


Fleming-Lee Shue / Long Island City, NY - RC-5 acoustic televiewer log plot

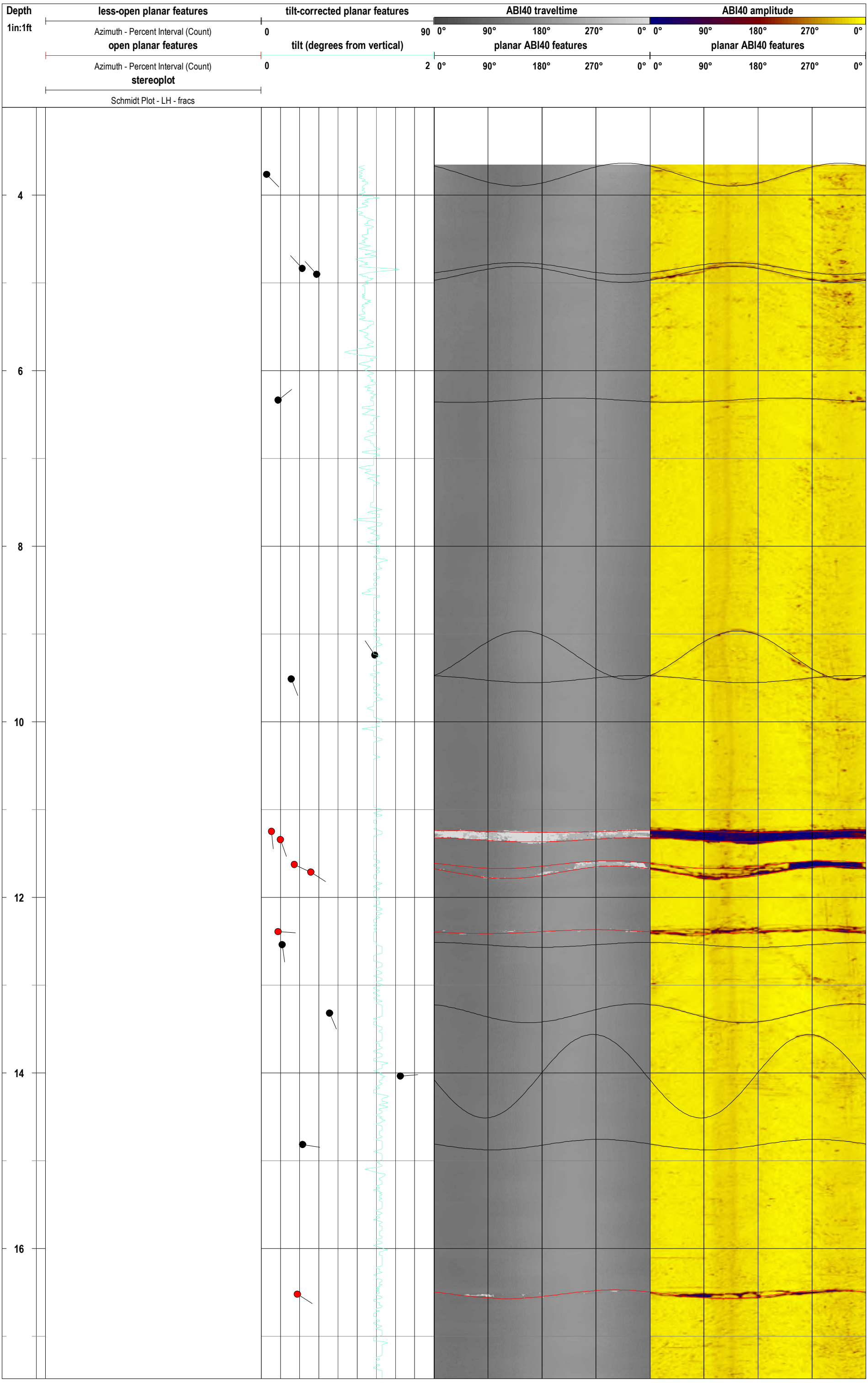


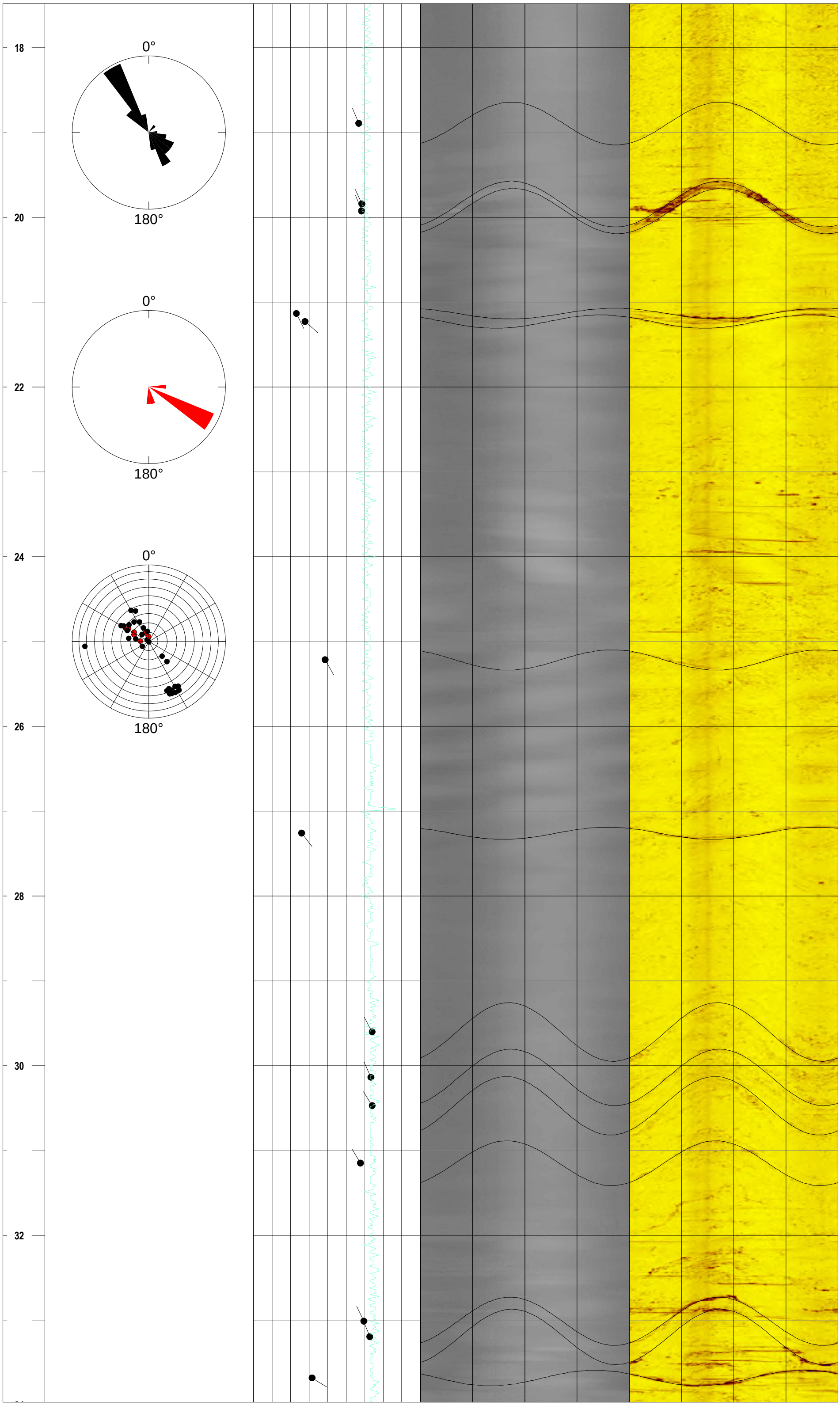

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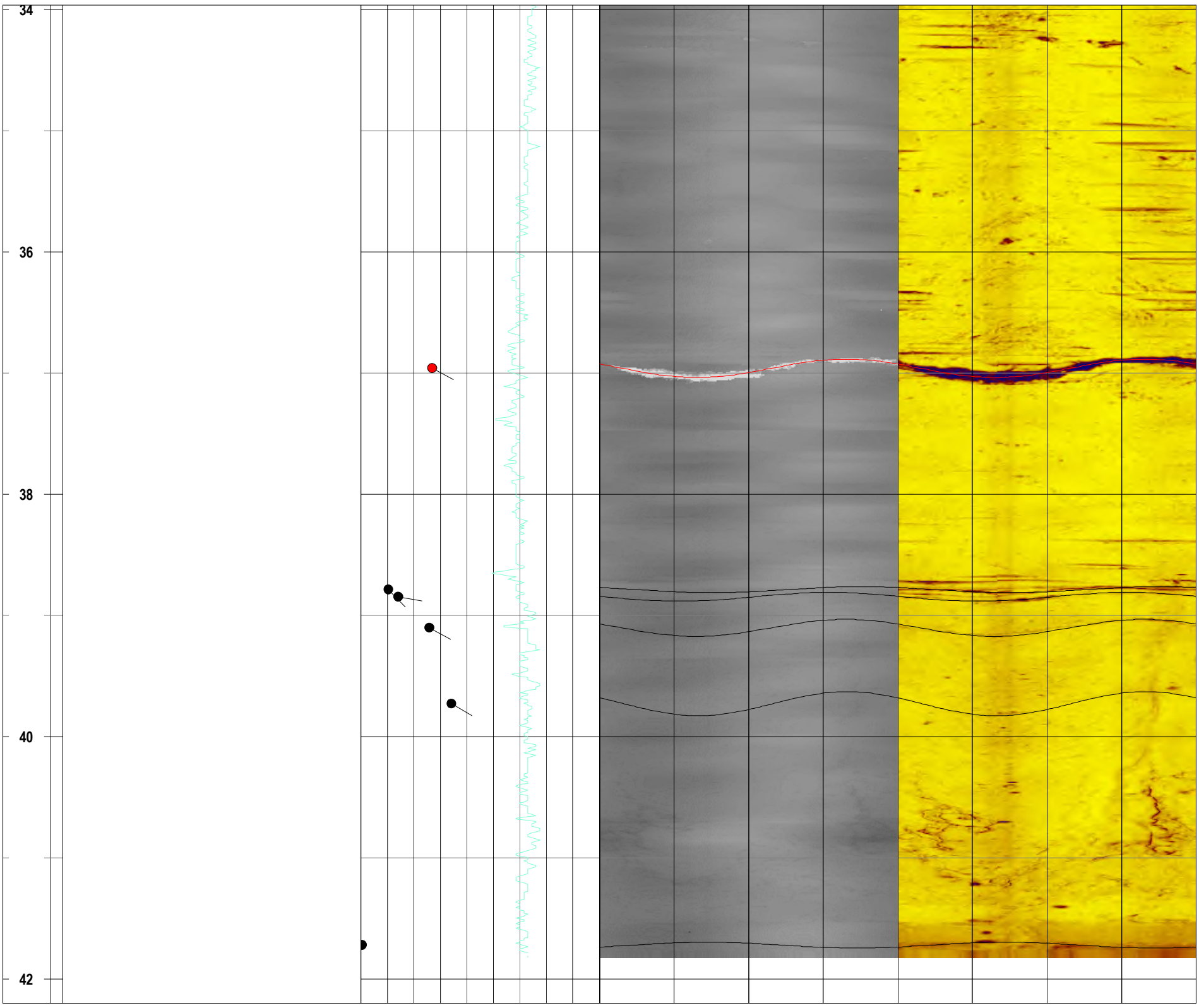
Fleming-Lee Shue / Long Island City, NY - RC-6 conventional log plot



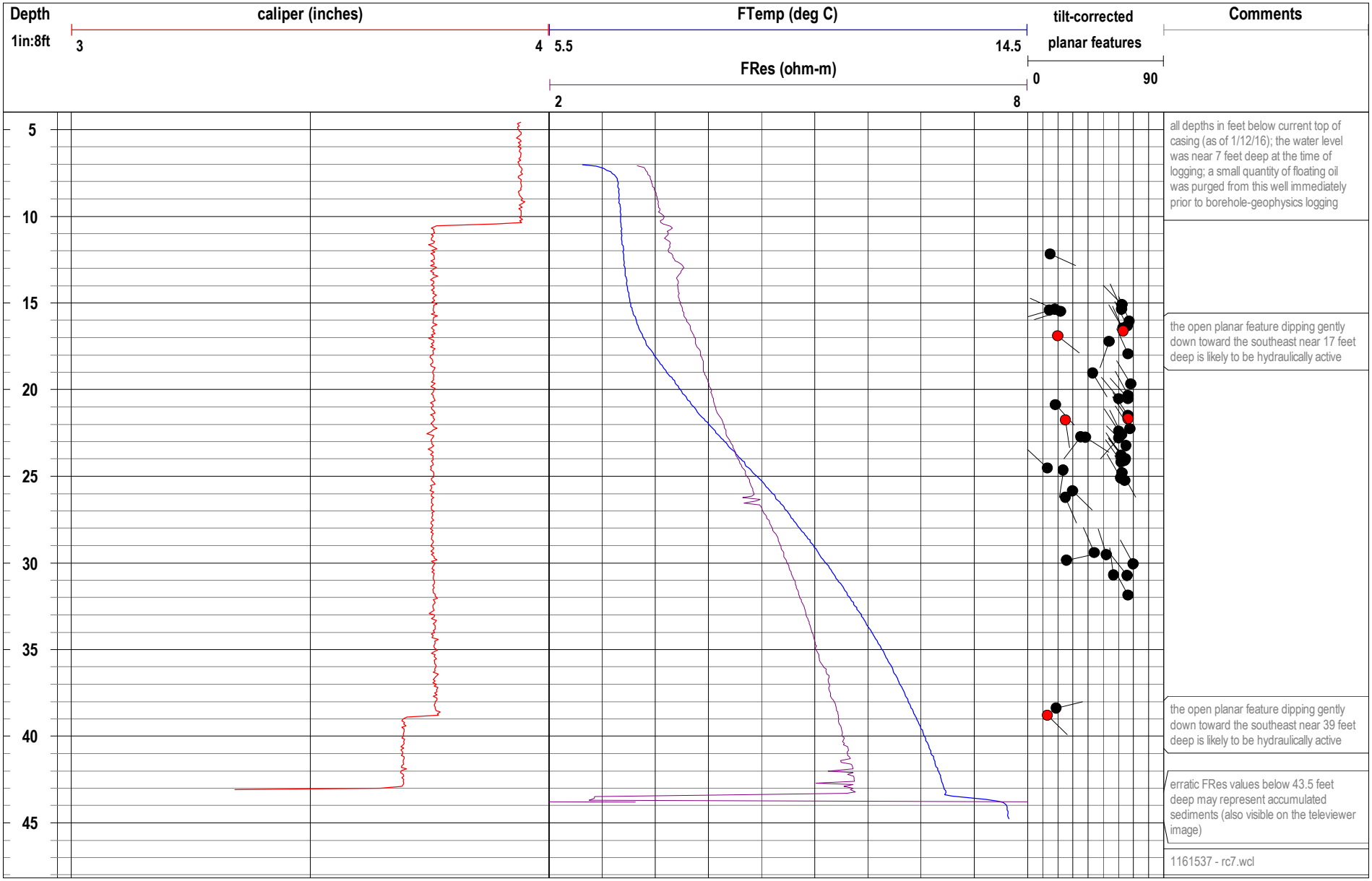
Fleming-Lee Shue / Long Island City, NY - RC-6 acoustic televiewer log plot



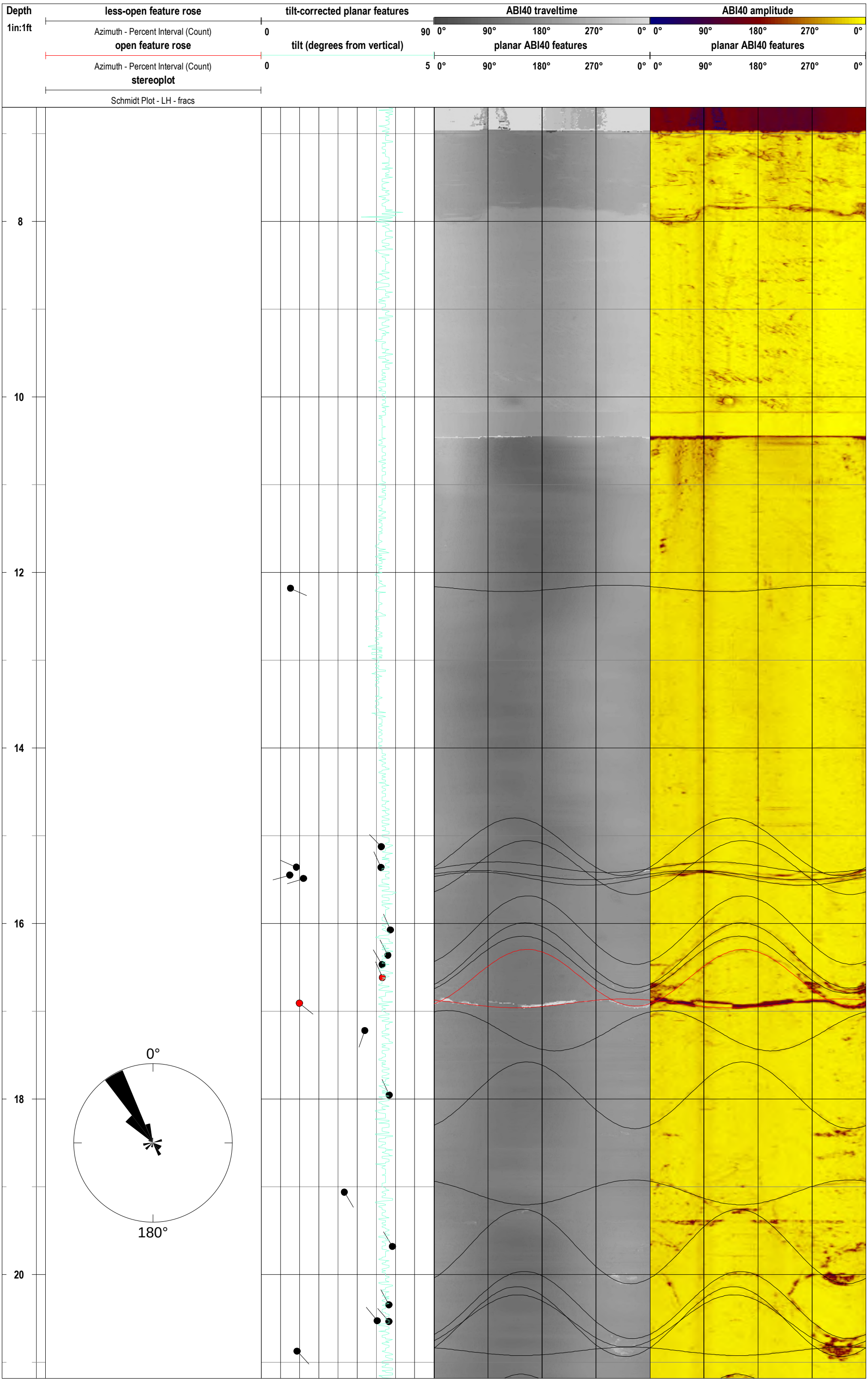

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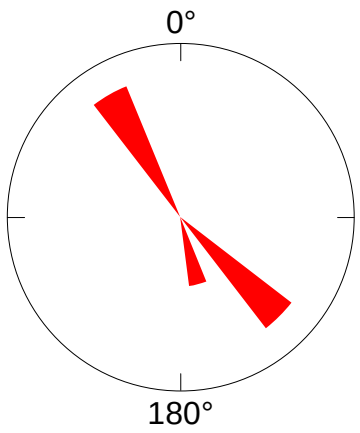
Fleming-Lee Shue / Long Island City, NY - RC-7 conventional log plot



Fleming-Lee Shue / Long Island City, NY - RC-7 acoustic televiewer log plot

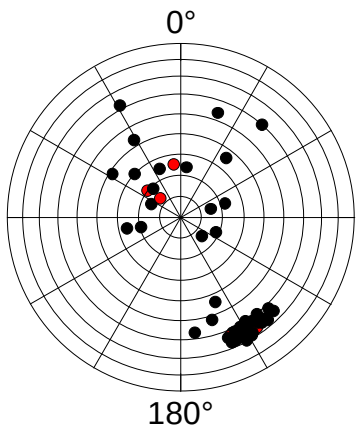


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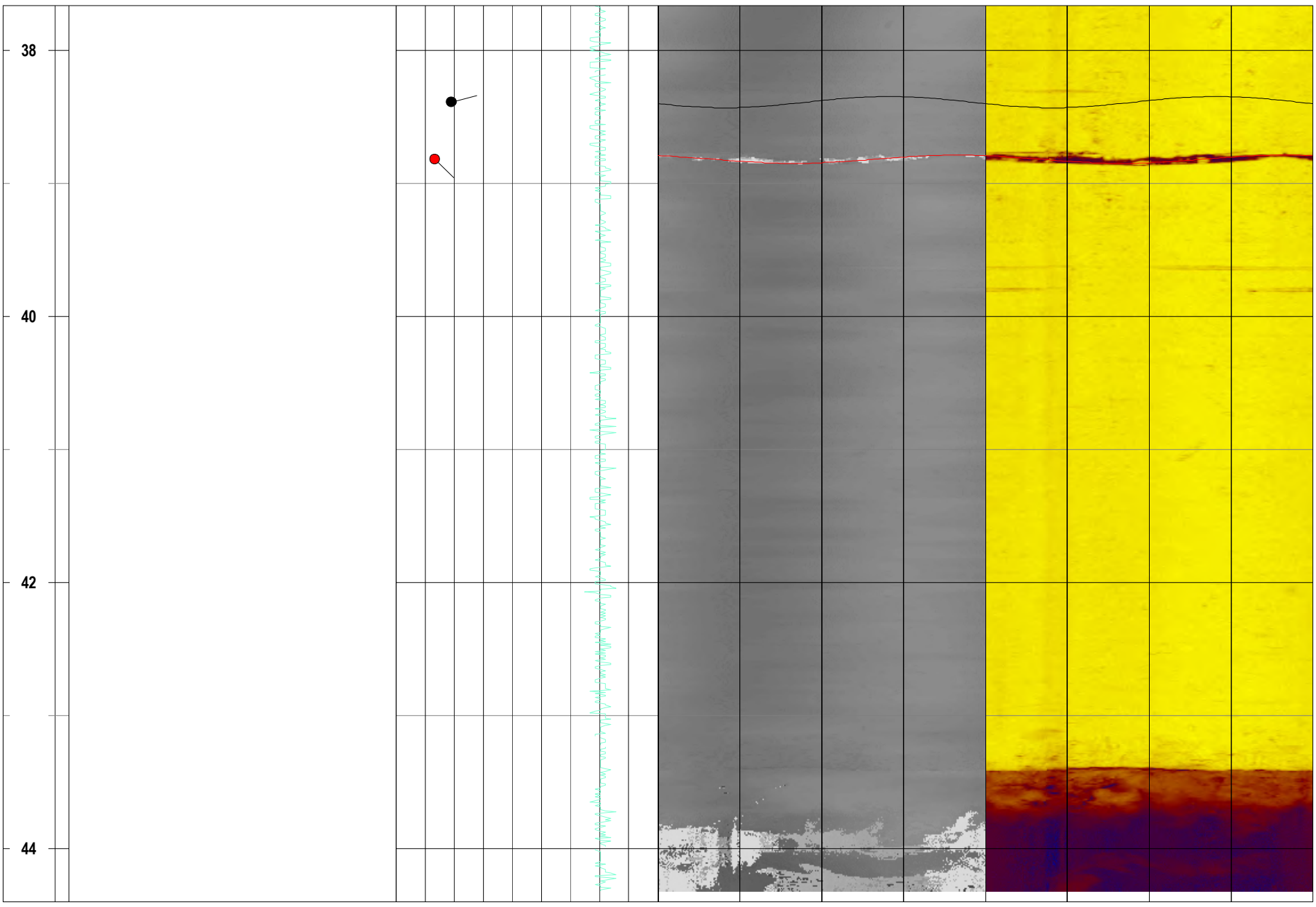
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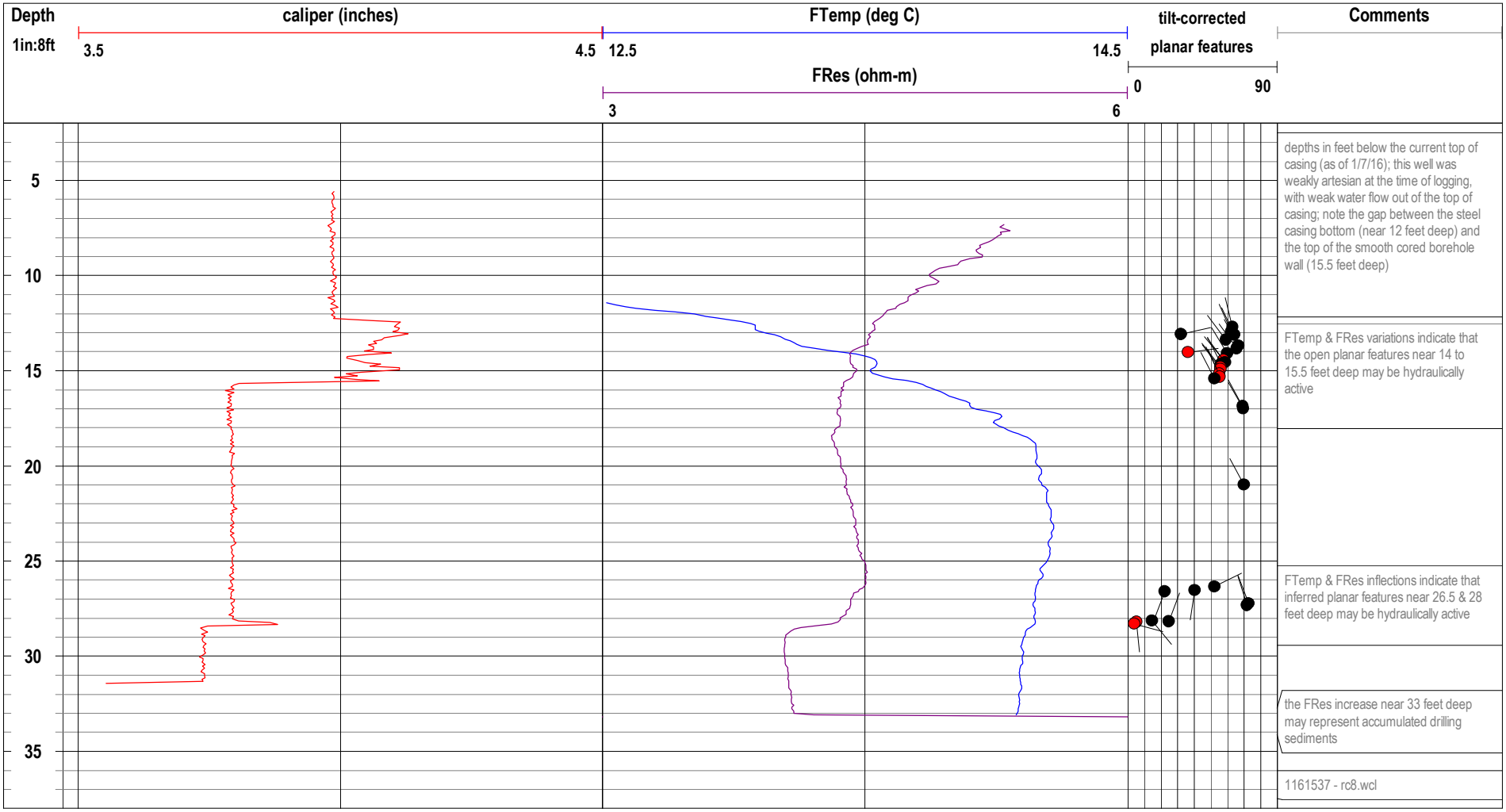
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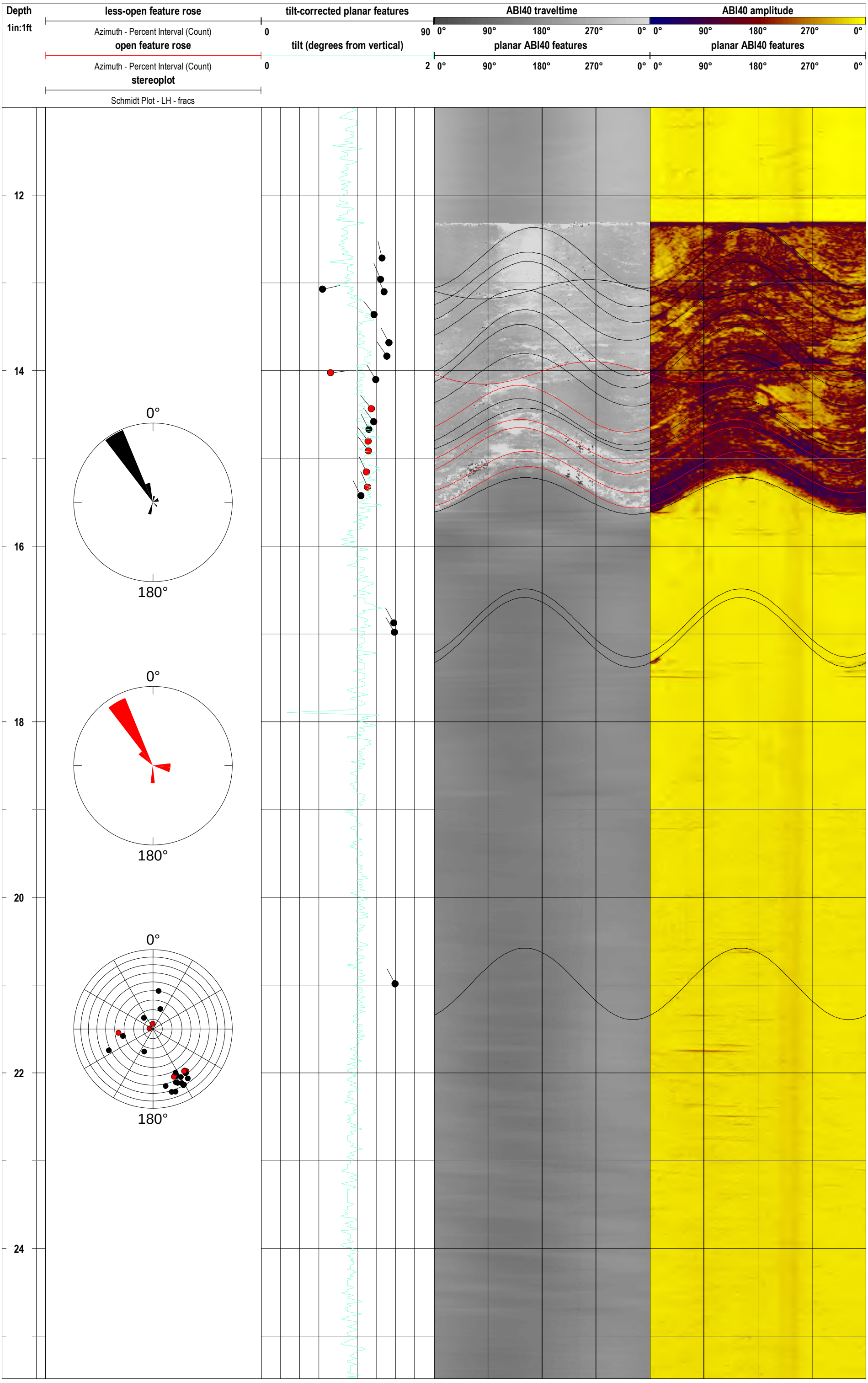
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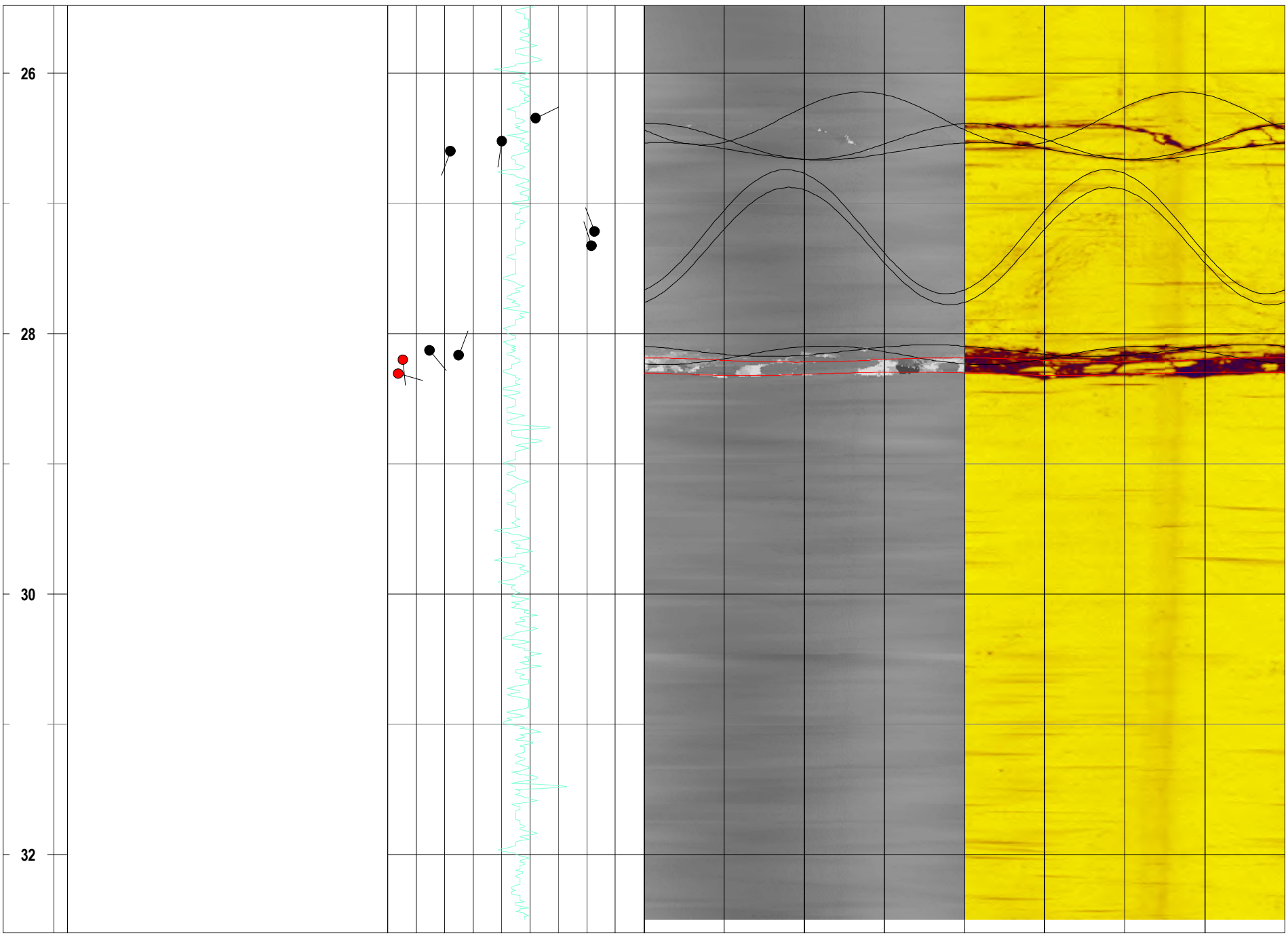

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Fleming-Lee Shue / Long Island City, NY - RC-8 conventional log plot

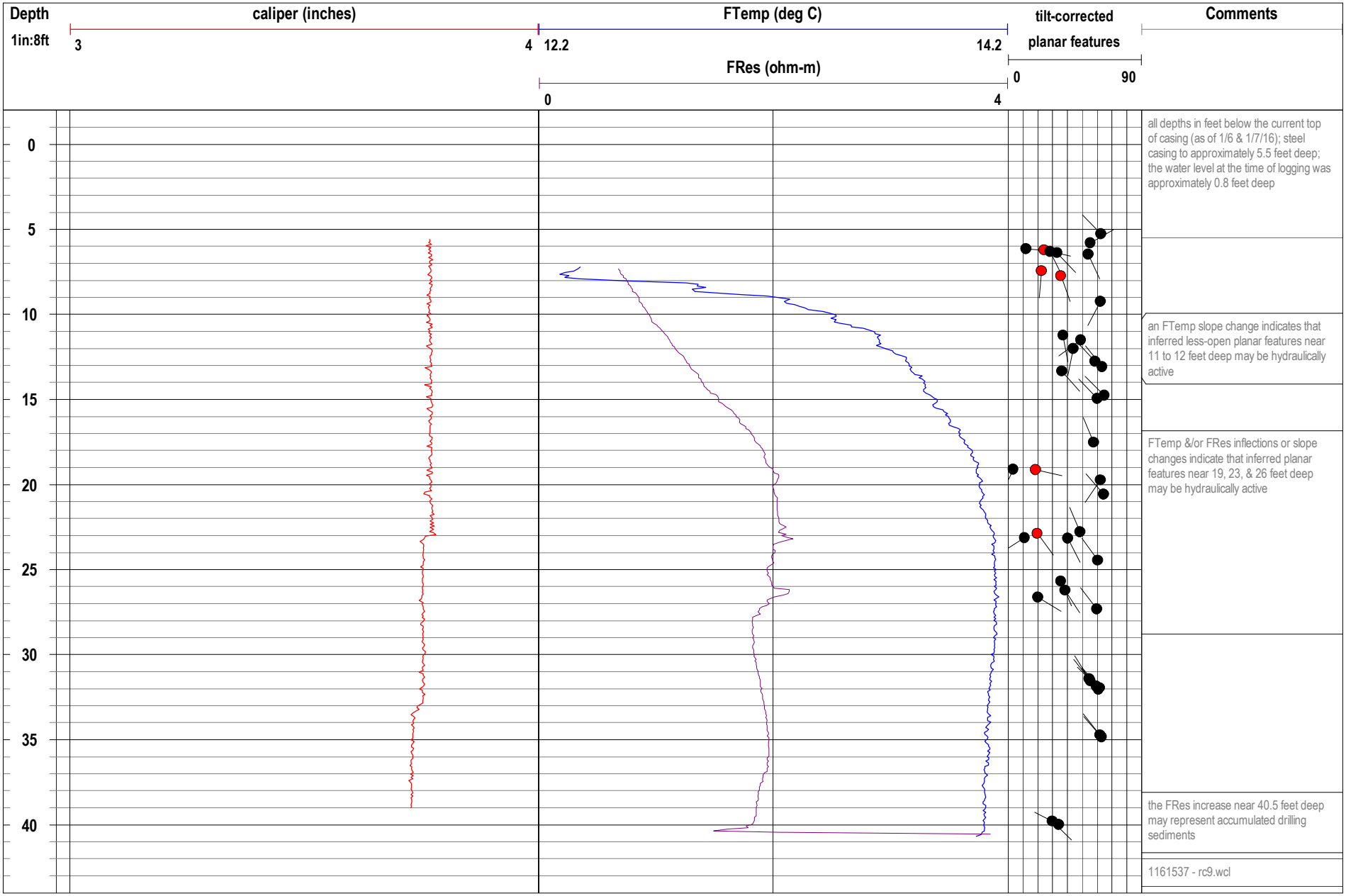


Fleming-Lee Shue / Long Island City, NY - RC-8 acoustic televiewer log plot

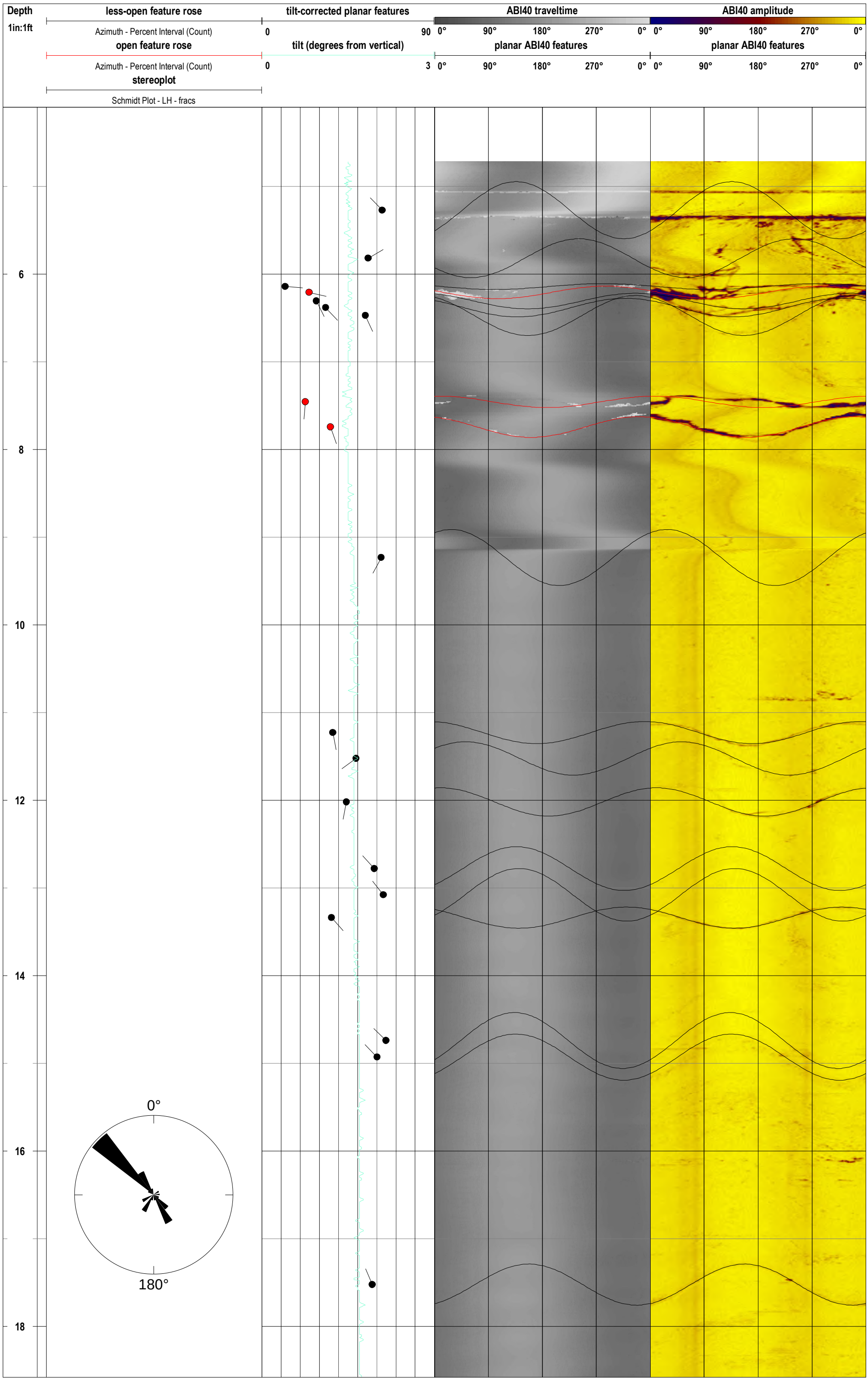


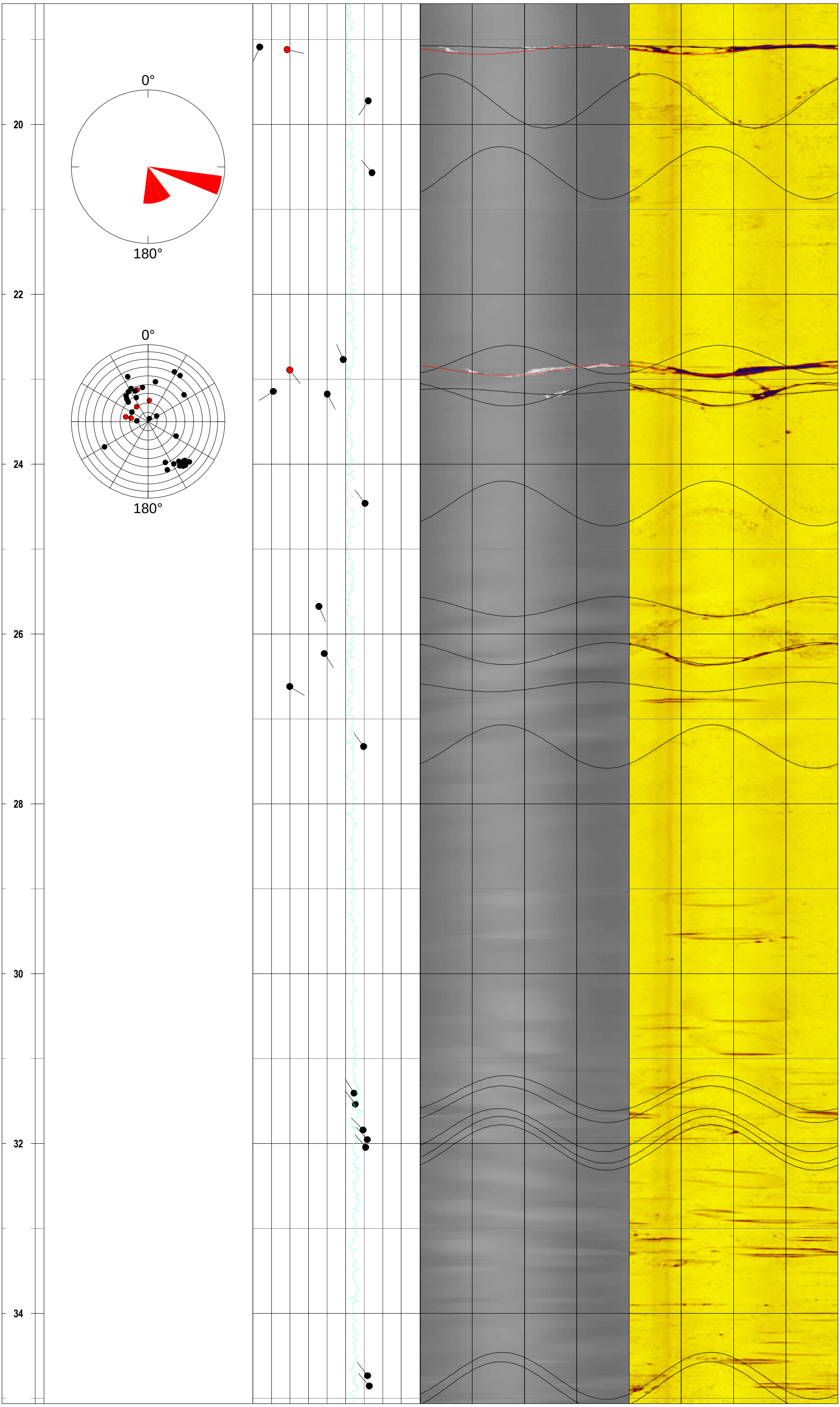

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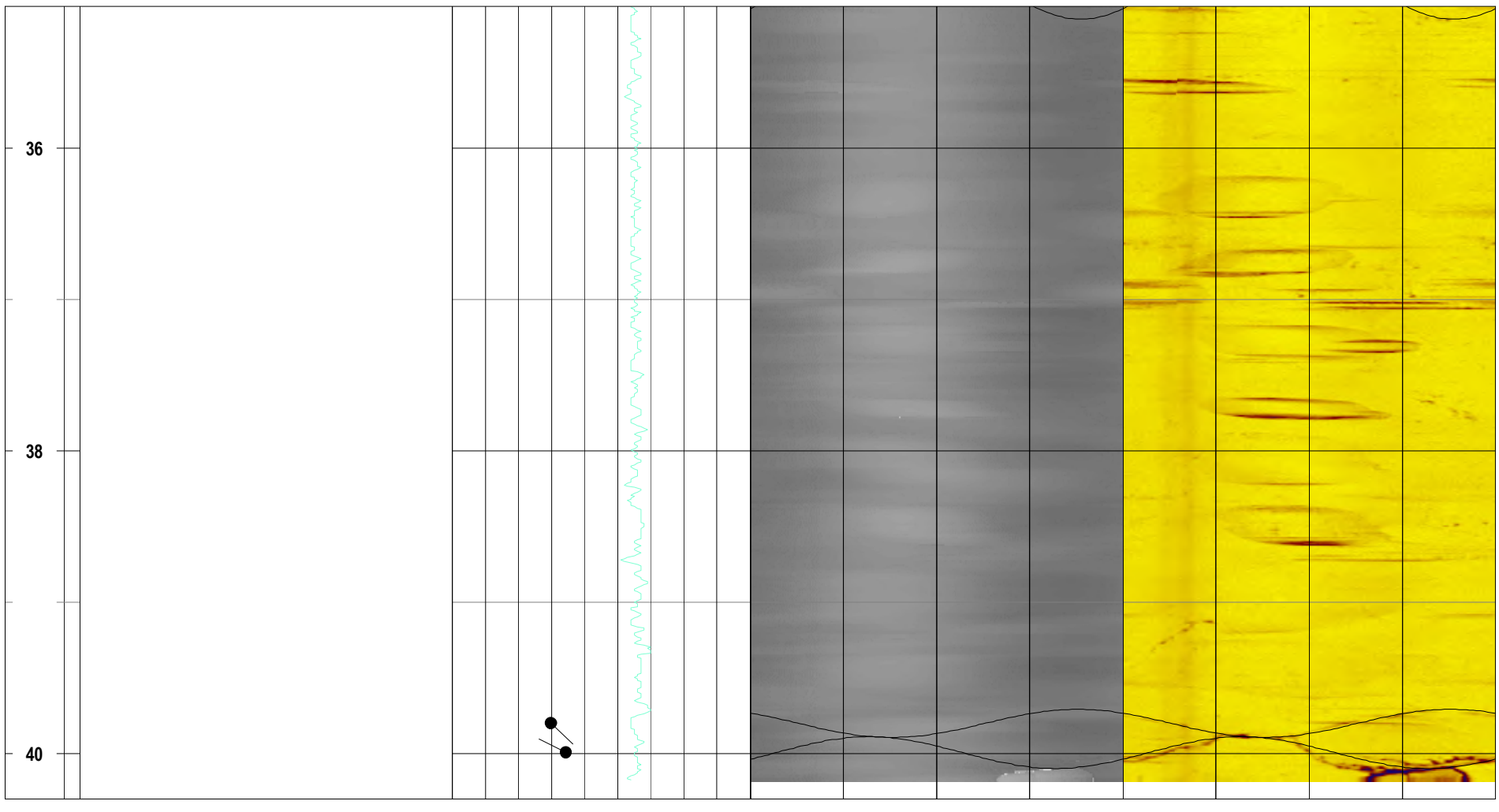
Fleming-Lee Shue / Long Island City, NY - RC-9 conventional log plot



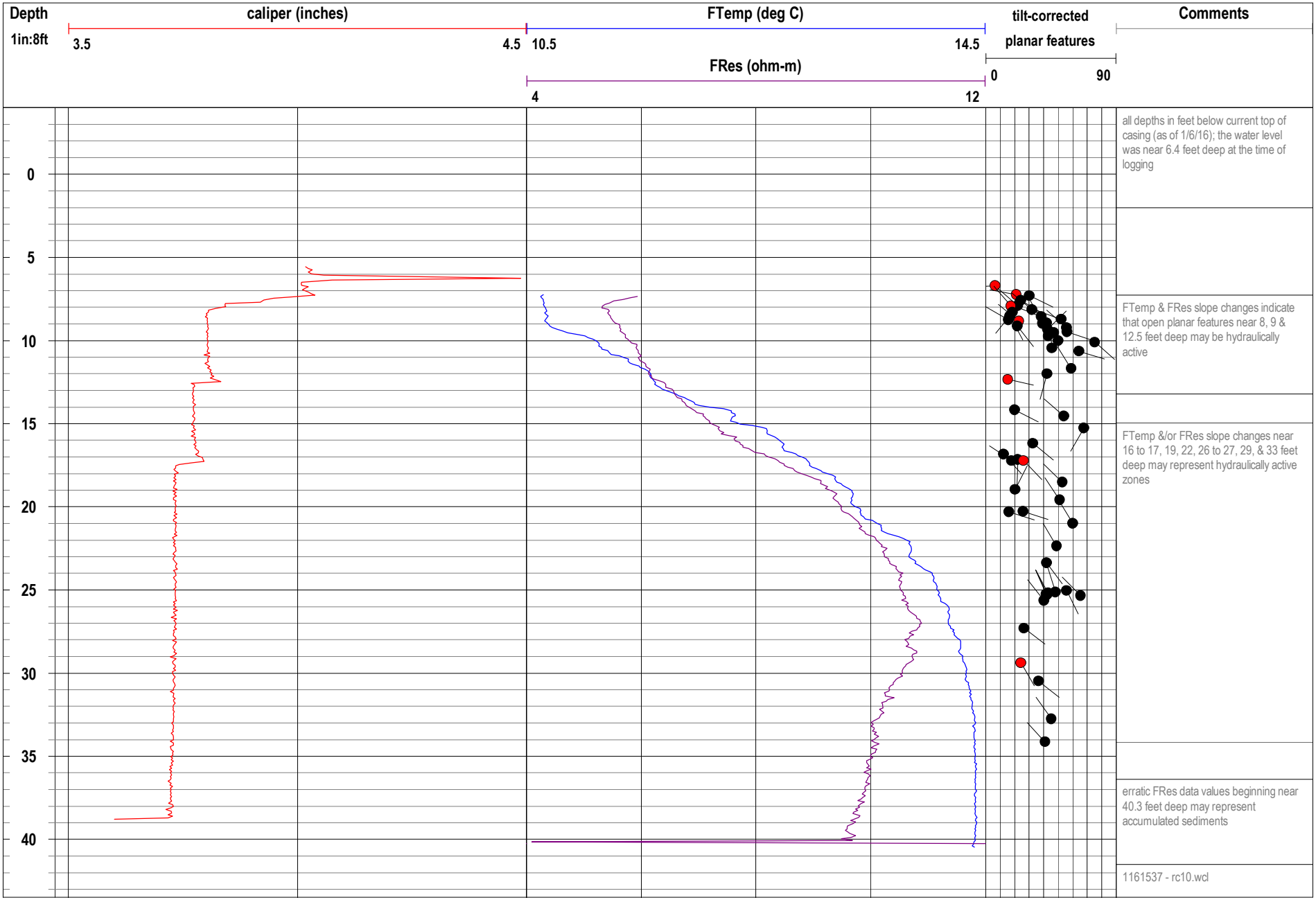
Fleming-Lee Shue / Long Island City, NY - RC-9 acoustic televiewer log plot



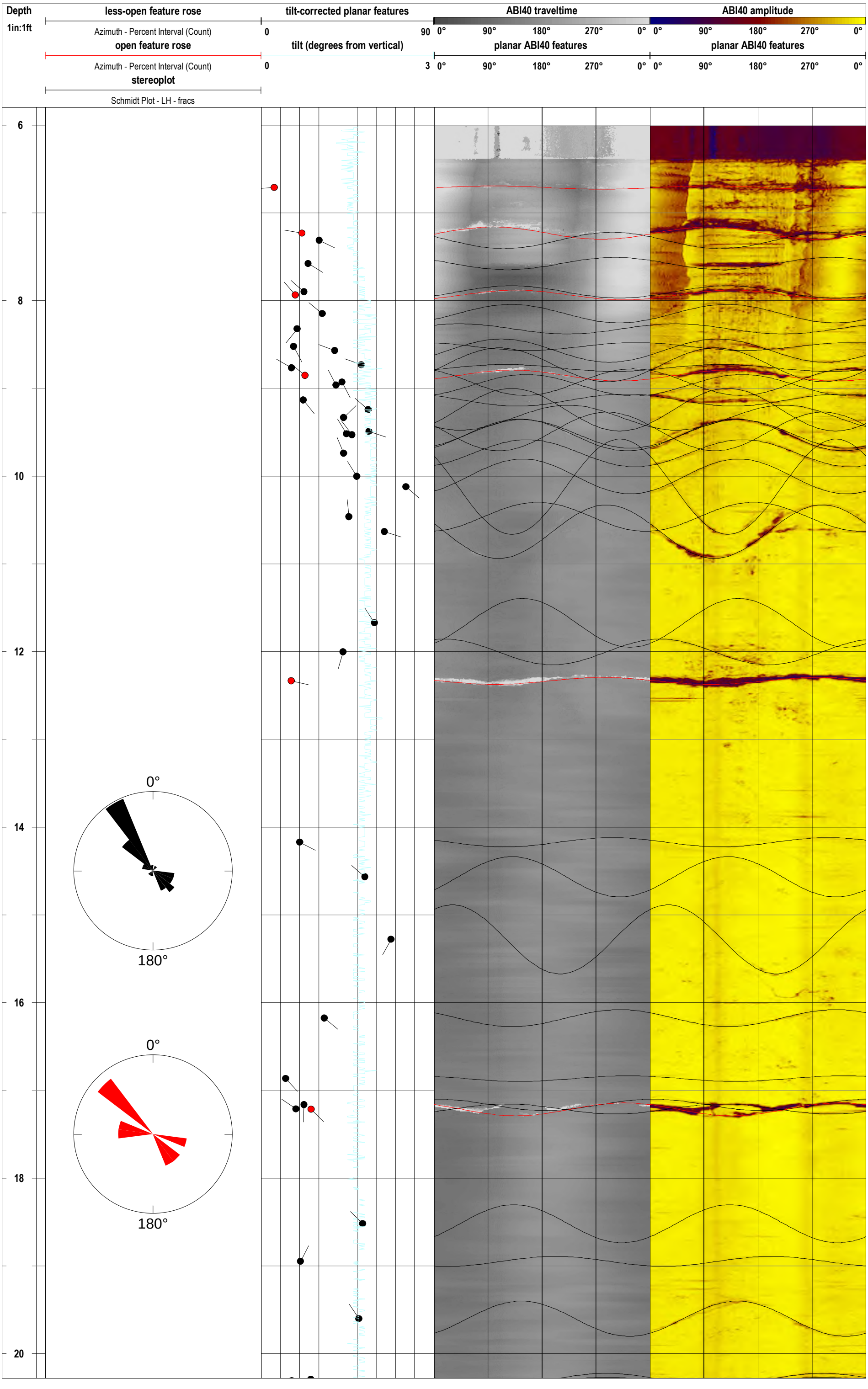

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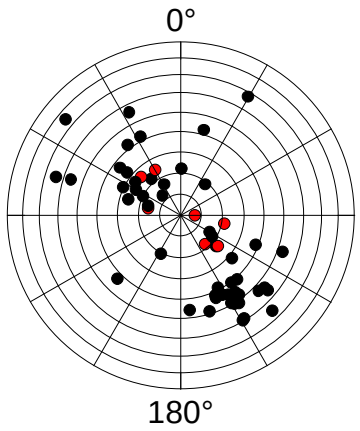

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Fleming-Lee Shue / Long Island City, NY - RC-10 conventional log plot

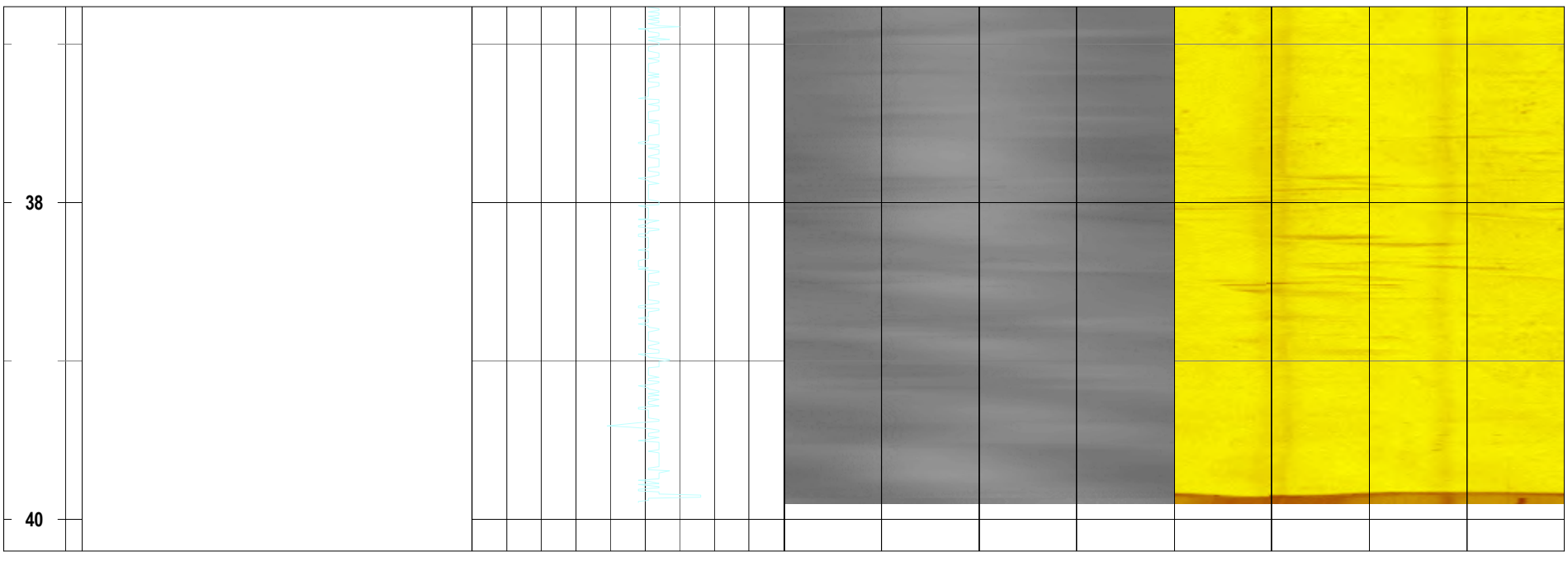


Fleming-Lee Shue / Long Island City, NY - RC-10 acoustic televiewer log plot

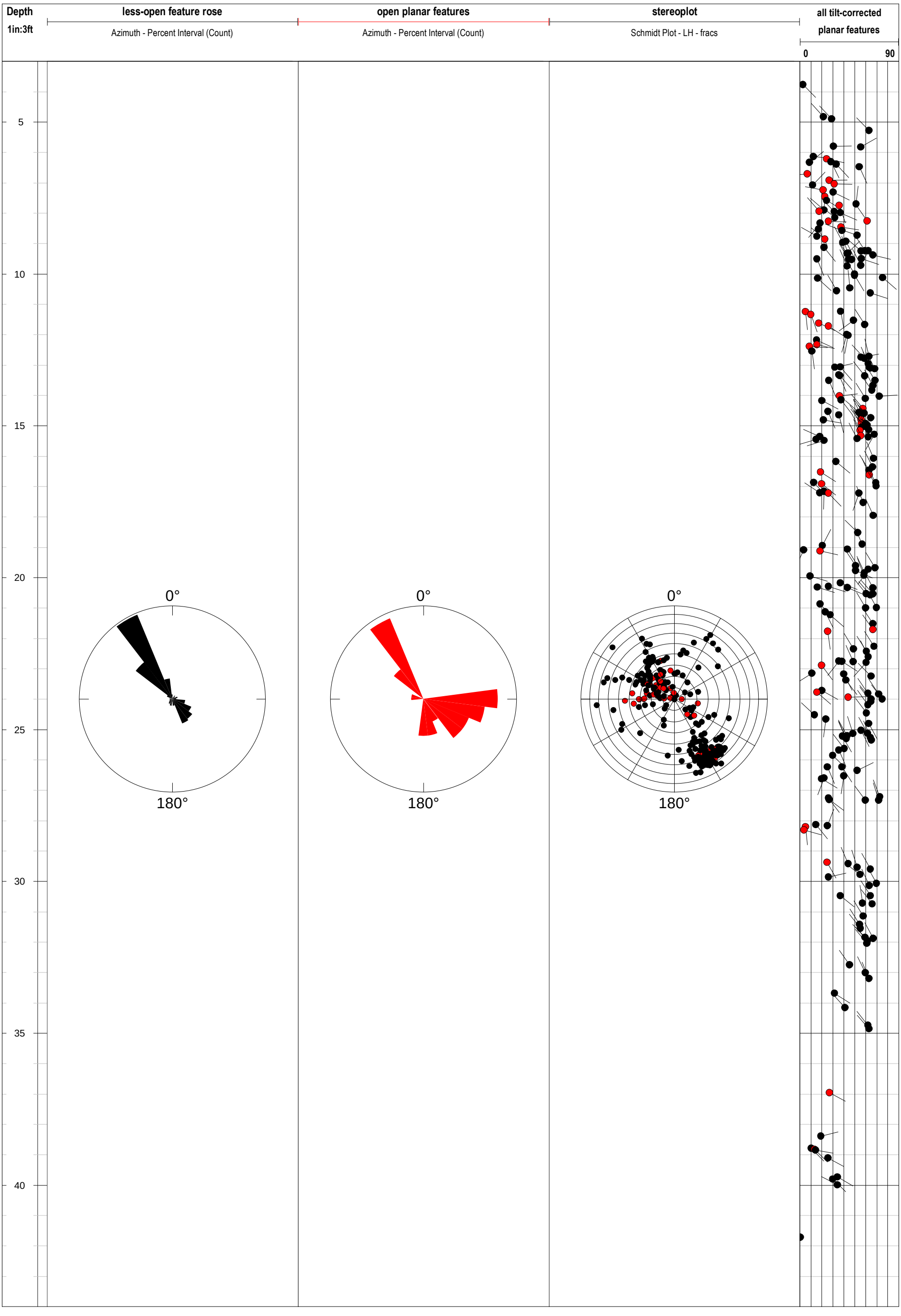




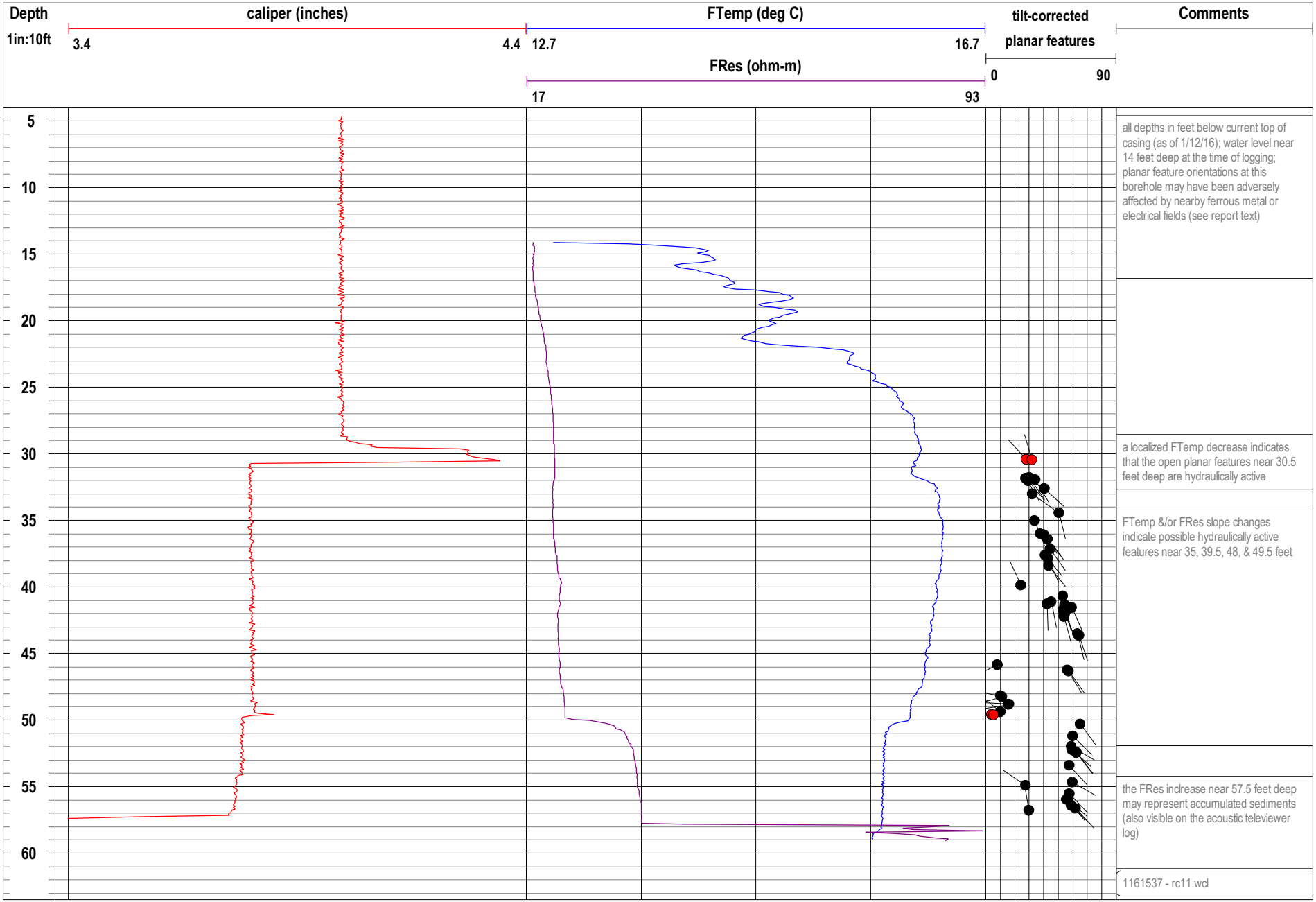
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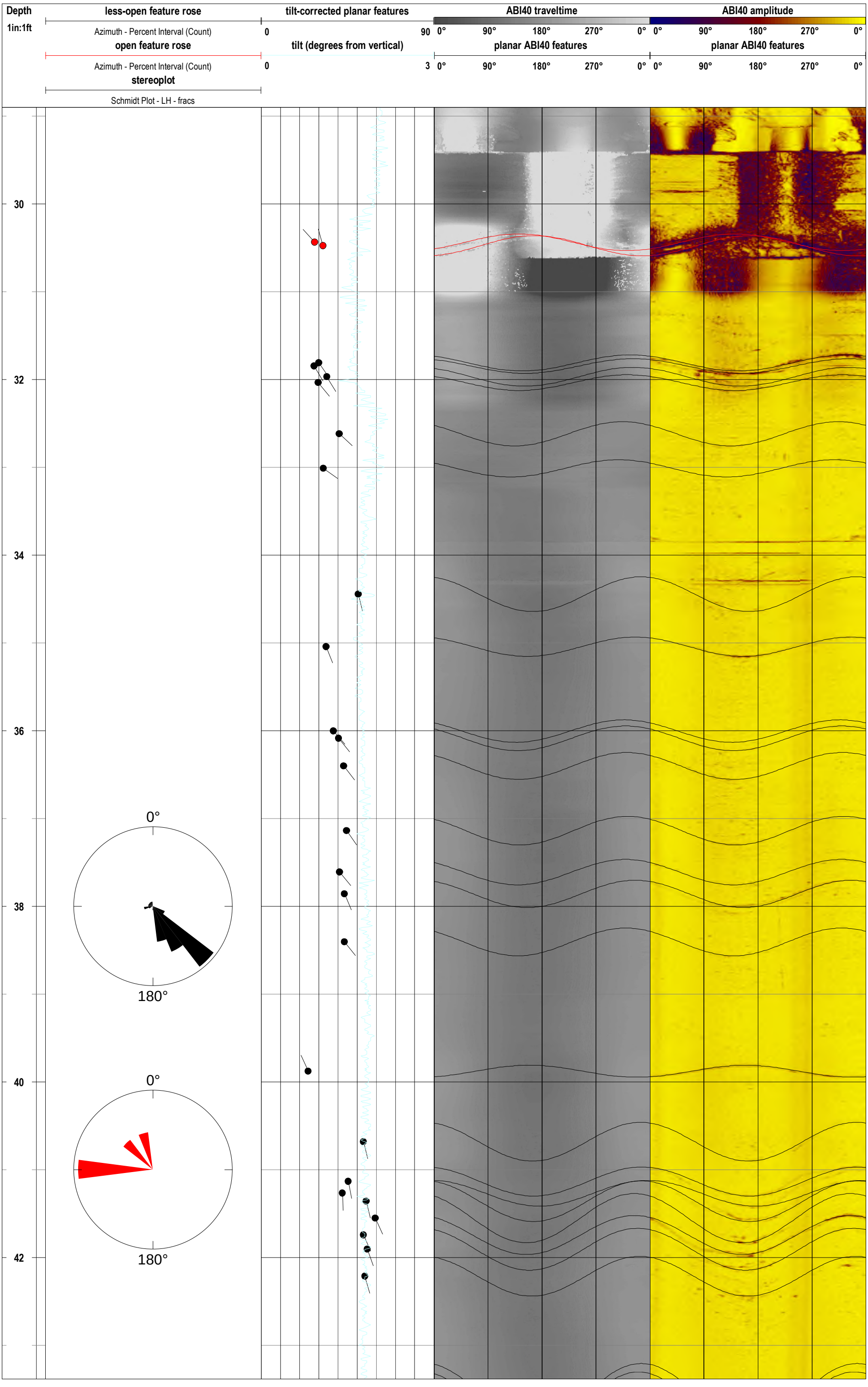
Fleming-Lee Shue / Long Island City, NY - all planar features from boreholes RC-5 through RC-10

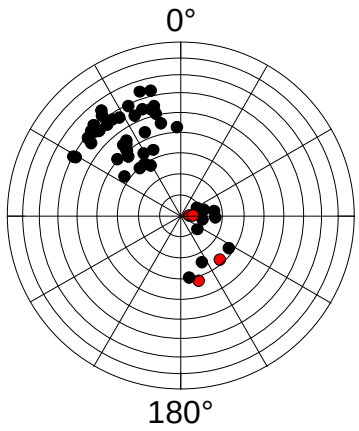


Fleming-Lee Shue / Long Island City, NY - RC-11 conventional log plot



Fleming-Lee Shue / Long Island City, NY - RC-11 acoustic televiewer log plot




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Appendix B

Planar Features Interpreted from the Acoustic Televiewer Images

Planar-feature Orientations Interpreted from the RC-5 Acoustic Televiewer Log
Long Island City, Borough of Queens, New York
Prepared for: Fleming-Lee Shue, Inc.
1161537 - rc5i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
5.8	88.99	30.76	less-open
6.92	89.4	26.9	open
7.04	90.5	31.2	open
7.08	43.3	11.9	less-open
7.70	6.6	51.3	less-open
7.95	316.7	31.5	less-open
7.99	114.3	36.9	less-open
8.26	325.8	61.3	open
8.27	91.2	26.2	open
8.46	98.17	37.65	open
9.32	340.07	43.97	less-open
9.37	103.2	66.5	less-open
9.72	333.1	55.5	less-open
10.05	148.5	49.8	less-open
10.15	131.6	16.3	less-open
10.56	330.6	33.6	less-open
12.75	79.5	55.9	less-open
13.06	139.4	36.8	less-open
13.12	333.1	68.3	less-open
13.51	156.4	26.5	less-open
13.52	329.4	68.5	less-open
14.15	142.2	37.4	less-open
14.53	157.8	25.7	less-open
14.65	165.0	35.7	less-open
14.98	337.1	61.4	less-open
15.02	341.2	59.3	less-open
15.05	341.04	56.25	less-open
19.77	112.58	50.85	less-open
19.95	106.2	9.5	less-open
20.17	110.3	36.8	less-open
20.32	113.2	43.4	less-open
23.72	119.0	20.2	less-open
23.77	129.9	15.7	open
23.83	326.9	71.8	less-open
23.94	87.6	43.9	open
24.00	323.8	74.9	less-open
29.77	307.7	54.9	less-open

Note that down-dip compass azimuth is perpendicular to the strike direction.

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

Planar-feature Orientations Interpreted from the RC-6 Acoustic Televiewer Log
Long Island City, Borough of Queens, New York
Prepared for: Fleming-Lee Shue, Inc.
1161537 - rc6i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
3.76	135.9	2.9	less-open
4.84	317.6	21.5	less-open
4.90	318.1	28.9	less-open
6.34	52.1	8.9	less-open
9.24	326.5	59.2	less-open
9.51	157.8	15.6	less-open
11.25	174.6	5.3	open
11.34	160.41	10.06	open
11.62	114.73	17.2	open
11.71	122.3	26.0	open
12.39	92.6	8.9	open
12.54	172.2	11.0	less-open
13.32	156.3	35.6	less-open
14.04	85.5	72.5	less-open
14.81	99.0	21.7	less-open
16.52	122.6	18.8	open
18.89	337.1	56.8	less-open
19.84	336.2	58.6	less-open
19.93	340.0	58.3	less-open
21.13	154.0	23.3	less-open
21.23	130.4	27.8	less-open
25.21	150.3	38.7	less-open
27.26	143.1	26.0	less-open
29.60	332.4	64.2	less-open
30.14	336.11	63.42	less-open
30.47	328.03	64.09	less-open
31.15	329.8	57.8	less-open
33.01	334.7	59.6	less-open
33.20	337.9	62.9	less-open
33.68	121.6	31.7	less-open
36.96	118.7	26.9	open
38.79	135.9	10.5	less-open
38.85	100.1	14.2	less-open
39.10	117.8	25.9	less-open
39.73	119.9	34.3	less-open
41.72	316	0.5	less-open

Note that down-dip compass azimuth is perpendicular to the strike direction.

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

Planar-feature Orientations Interpreted from the RC-7 Acoustic Televiewer Log
Long Island City, Borough of Queens, New York
Prepared for: Fleming-Lee Shue, Inc.
1161537 - rc7i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
12.18	113.9	15.3	less-open
15.13	316.2	62.6	less-open
15.36	293.4	18.4	less-open
15.36	335.8	62.4	less-open
15.45	253.9	14.9	less-open
15.49	252.9	22.11	less-open
16.07	337.53	67.24	less-open
16.36	333.7	66.1	less-open
16.47	329.4	62.9	less-open
16.62	337.5	63.2	open
16.91	128.2	20.0	open
17.22	199.6	53.9	less-open
17.95	335.9	66.8	less-open
19.06	148.7	43.3	less-open
19.68	329.1	68.4	less-open
20.34	332.1	66.7	less-open
20.53	321.5	60.5	less-open
20.53	319.8	66.7	less-open
20.87	136.7	18.6	less-open
21.52	326.6	66.6	less-open
21.71	325.3	66.5	open
21.76	172.5	25.3	open
22.26	328	67.63	less-open
22.43	328.02	60.5	less-open
22.61	334.5	62.3	less-open
22.75	217.7	35.4	less-open
22.76	122.6	38.5	less-open
22.80	221.7	60.4	less-open
23.25	315.2	65.0	less-open
23.81	327.1	61.8	less-open
23.99	320.4	64.8	less-open
24.09	323.5	64.6	less-open
24.19	325.9	62.0	less-open
24.52	312.36	13.48	less-open
24.66	187.44	23.7	less-open
24.81	151.6	62.61	less-open
25.12	331.28	61.56	less-open
25.26	338.4	64.3	less-open
25.85	133.2	29.9	less-open
26.23	156.2	25.2	less-open
29.42	337.6	44.1	less-open
29.54	342.7	52.3	less-open
29.86	77.8	26.1	less-open
30.08	331.9	69.8	less-open
30.72	352.9	57.0	less-open

Note that down-dip compass azimuth is perpendicular to the strike direction.

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

Planar-feature Orientations Interpreted from the RC-7 Acoustic Televiewer Log
Long Island City, Borough of Queens, New York
Prepared for: Fleming-Lee Shue, Inc.
1161537 - rc7i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
30.74	322.2	65.8	less-open
31.88	332.1	66.7	less-open
38.39	75.6	19.1	less-open
38.82	133.6	13.3	open

Planar-feature Orientations Interpreted from the RC-8 Acoustic Televiewer Log
Long Island City, Borough of Queens, New York
Prepared for: Fleming-Lee Shue, Inc.
1161537 - rc8i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
12.72	347.3	63.1	less-open
12.96	336.8	62.2	less-open
13.07	77.0	32.1	less-open
13.1	335.38	64.08	less-open
13.36	323.06	58.92	less-open
13.68	332.0	66.6	less-open
13.83	324.6	65.5	less-open
14.02	83.3	36.3	open
14.10	329.8	59.7	less-open
14.43	321.5	57.5	open
14.58	323.6	58.7	less-open
14.67	333.0	56.3	less-open
14.80	322.7	55.7	open
14.91	323.5	56.0	open
15.15	334.9	54.9	open
15.33	336.6	55.5	open
15.42	332.8	52.0	less-open
16.87	331.4	69.1	less-open
16.98	330.7	69.5	less-open
20.98	331.6	69.9	less-open
26.35	64.02	52.07	less-open
26.52	188.57	40.17	less-open
26.60	200.4	22.2	less-open
27.22	340.1	72.7	less-open
27.33	343.5	71.7	less-open
28.13	140.9	14.8	less-open
28.16	21.5	25.0	less-open
28.20	173.7	5.4	open
28.31	105.0	3.8	open

Note that down-dip compass azimuth is perpendicular to the strike direction.

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

Planar-feature Orientations Interpreted from the RC-9 Acoustic Televiewer Log
Long Island City, Borough of Queens, New York
Prepared for: Fleming-Lee Shue, Inc.
1161537 - rc9i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
5.27	316.4	62.8	less-open
5.82	59.57	55.37	less-open
6.14	94.19	12.27	less-open
6.21	101.9	24.6	open
6.31	153.9	28.4	less-open
6.39	136.8	33.2	less-open
6.47	155.6	54.0	less-open
7.46	184.2	22.7	open
7.75	160.4	35.8	open
9.23	208.3	62.2	less-open
11.23	170.1	37.2	less-open
11.53	233.3	49.1	less-open
12.02	190.8	44.1	less-open
12.78	317.8	58.8	less-open
13.08	321.7	63.4	less-open
13.34	139.1	36.4	less-open
14.74	314.1	64.7	less-open
14.93	316.6	60.1	less-open
17.52	338.07	57.6	less-open
19.09	205.26	3.71	less-open
19.12	101.7	18.6	open
19.73	214.9	62.2	less-open
20.57	319.3	64.3	less-open
22.77	336.8	48.7	less-open
22.89	142.6	19.9	open
23.15	238.7	11.1	less-open
23.18	152.4	40.2	less-open
24.46	324.42	60.55	less-open
25.68	156.68	35.56	less-open
26.23	146.8	38.6	less-open
26.62	120.3	20.0	less-open
27.33	323.26	59.72	less-open
31.41	328.56	54.59	less-open
31.54	322.29	55.26	less-open
31.84	316.78	59.34	less-open
31.96	320.1	61.7	less-open
32.05	321.4	60.9	less-open
34.74	322.0	61.9	less-open
34.86	320.2	62.8	less-open
39.80	134.3	29.9	less-open
39.99	297.7	34.3	less-open

Note that down-dip compass azimuth is perpendicular to the strike direction.

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

Planar-feature Orientations Interpreted from the RC-10 Acoustic Televiewer Log
Long Island City, Borough of Queens, New York
Prepared for: Fleming-Lee Shue, Inc.
1161537 - rc10i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
6.71	267.38	6.75	open
7.23	280.8	21.2	open
7.32	116.0	30.3	less-open
7.58	120.3	24.5	less-open
7.90	311.5	22.3	less-open
7.94	320.2	17.8	open
8.15	309.9	31.9	less-open
8.32	218.6	18.7	less-open
8.52	151.8	16.9	less-open
8.57	291.7	38.3	less-open
8.73	289.6	52.3	less-open
8.77	299.9	15.8	less-open
8.85	309.6	22.9	open
8.93	152.7	42.2	less-open
8.97	332.7	39.1	less-open
9.14	141.1	22.0	less-open
9.24	310.64	55.83	less-open
9.33	45.09	42.96	less-open
9.49	108.1	56.2	less-open
9.52	329.0	44.4	less-open
9.53	323.7	47.3	less-open
9.74	336.6	43.0	less-open
10.00	328.6	49.9	less-open
10.12	130.0	75.4	less-open
10.46	354.5	45.8	less-open
10.64	107.41	64.32	less-open
11.67	328.16	59.1	less-open
12.00	195.5	42.6	less-open
12.34	102.2	15.7	open
14.17	116.54	20.17	less-open
14.57	310.94	53.95	less-open
15.28	209.61	67.69	less-open
16.18	128.92	32.93	less-open
16.87	137.3	12.7	less-open
17.17	181.3	22.3	less-open
17.21	303.9	18.1	less-open
17.22	134.8	26.2	open
18.52	314.2	52.9	less-open
18.95	26.9	20.6	less-open
19.6	326.56	51	less-open
20.3	107.39	25.98	less-open
20.31	107.0	16.1	less-open
21.00	329.4	60.0	less-open
22.35	329.8	49.0	less-open
23.37	142.9	42.1	less-open

Note that down-dip compass azimuth is perpendicular to the strike direction.

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

Planar-feature Orientations Interpreted from the RC-10 Acoustic Televiewer Log
Long Island City, Borough of Queens, New York
Prepared for: Fleming-Lee Shue, Inc.
1161537 - rc10i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
25.03	153.4	55.9	less-open
25.14	343.1	48.4	less-open
25.2	332.45	43.07	less-open
25.27	336.62	41.84	less-open
25.30	336.4	42.4	less-open
25.35	316.1	65.4	less-open
25.63	322.9	40.4	less-open
27.31	126.2	26.8	less-open
29.38	150.2	24.7	open
30.47	128.2	36.9	less-open
32.75	324.6	45.4	less-open
34.15	318.4	41.0	less-open

Planar-feature Orientations Interpreted from the RC-11 Acoustic Televiewer Log
Long Island City, Borough of Queens, New York
Prepared for: Fleming-Lee Shue, Inc.
1161537 - rc11i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
30.44	318.5	27.9	open
30.47	344.5	32.1	open
31.81	144.8	30.1	less-open
31.84	148.6	27.6	less-open
31.97	149.0	34.3	less-open
32.04	139.6	29.7	less-open
32.62	131.9	40.8	less-open
33.01	125.0	32.5	less-open
34.44	166.3	50.6	less-open
35.04	157.5	33.8	less-open
36.00	138.4	37.7	less-open
36.09	140.4	40.3	less-open
36.40	142.4	43.0	less-open
37.14	144.1	44.5	less-open
37.61	140.31	40.94	less-open
37.85	156.63	43.38	less-open
38.40	140.7	43.5	less-open
39.88	335.9	24.5	less-open
40.68	165.7	53.4	less-open
41.13	168.0	45.4	less-open
41.27	177.5	42.3	less-open
41.36	166.4	54.7	less-open
41.55	154.6	59.3	less-open
41.74	155.27	53.36	less-open
41.9	160.16	55.25	less-open
42.21	163.9	53.9	less-open
43.53	166.3	63.3	less-open
43.65	161.65	64.52	less-open
45.85	244.33	8.44	less-open
46.23	148.11	56.45	less-open
46.32	144.42	57.42	less-open
48.18	280.4	10.6	less-open
48.23	254.3	11.6	less-open
48.79	273.4	16.3	less-open
48.85	261.5	15.9	less-open
49.39	309.7	10.4	less-open
49.57	266.4	4.2	open
49.62	268.82	5.9	open
50.29	142.96	65.08	less-open
51.21	133.5	60.1	less-open
51.97	119.1	59.0	less-open
52.24	130.0	59.5	less-open
52.41	141.6	62.6	less-open
52.46	141.9	62.5	less-open
53.41	136.5	57.6	less-open

Note that down-dip compass azimuth is perpendicular to the strike direction.

Note that interpreted down-dip compass azimuths are with respect to magnetic north.

Down-dip azimuths & dip angles were corrected for borehole deviation from vertical.

Note that planar-feature orientations at this borehole may have been adversely affected by nearby ferrous metal or electrical fields (see report text).

Planar-feature Orientations Interpreted from the RC-11 Acoustic Televiewer Log
Long Island City, Borough of Queens, New York
Prepared for: Fleming-Lee Shue, Inc.
1161537 - rc11i.xls

depth (feet)	down-dip compass azimuth (degrees)	dip angle (degrees)	interpreted planar feature category
54.69	118.93	59.85	less-open
54.9	303.96	27.8	less-open
55.52	135.9	57.5	less-open
55.97	129.3	55.9	less-open
56.03	140.9	57.0	less-open
56.43	132.9	59.1	less-open
56.63	136.2	61.8	less-open
56.81	351.8	29.8	less-open

Rock Core Photographic Log



Figure 1. (Above) RC-5: 0-10 ft. below grade mechanical fracturing.

Figure 2. (Below) RC-5: 10-20 ft. below grade some fractures observed from the 10-15 ft. interval.





Figure 3. (Above) Free product observed on weathered fracture surfaces in the 10-15 ft. interval of RC-5.

Figure 4. (Below) Sheen observed on sides of core in the 10-15 ft. interval of RC-5.





Figure 5. (Above) RC-5: 20-30 ft. below grade minor mechanical fracturing.

Figure 6. (Below) RC-5: 30-35 ft. below grade some mechanical fracturing.





Figure 7. (Above) RC-6: 0-10 ft. below grade 0-5 ft. interval (top section) was highly fractured with stained, rounded and oxidized fracture surfaces.

Figure 8. (Below) Weathered, stained and oxidized fracture surface from the 0-5 ft. interval of RC-6.





Figure 9. (Above) RC-6: 10-20 ft. below grade 10-15 ft. interval was highly fractured with stained, rounded and oxidized fracture surfaces containing free product. 15-20 ft. interval contained weathered fractures with stained surfaces. Free product on sides of core was due to pulling core up through the NAPL layer observed in the 10-15 ft. interval.

Figure 10. (Below) Weathered, stained and oxidized fracture surface containing free product from the 12-13 ft. interval of RC-6.





Figure 11. (Above) Close up of staining in fractures and on sides of core in the 10-20 ft. interval of RC-6.

Figure 12. (Below) 20-30 ft. below grade from RC-6 was highly fractured with stained, rounded and oxidized fracture surfaces.





Figure 13. (Above) RC-6: 30-40 ft. below grade 30-35 ft. interval (top section) contained fractures exhibiting staining, rounding and oxidation. 35-40 ft. (bottom section) contained fracture surfaces that were rounded. No staining or oxidation observed.

Figure 14. (Below) RC-7: 0-10 ft. below grade 0-5 ft. interval has mechanical fracturing with no evidence of staining or free product. In the 5-10 ft. interval, a weathered fracture at 6.55 ft. contained free product and stained fracture surface.





Figure 15. (Above) RC-7: 10-20 ft. below grade, some fracturing throughout.

Figure 16. (Below) RC-7: 10-15 ft. below grade. At 10.25 ft. (top section) a weathered fracture with rounded, oxidized and stained surfaces was observed.





Figure 17. (Above) RC-7: 15-20 ft. below grade. (Bottom Core) Weathered fractures with stained surfaces were observed at 15.1 ft., 15.55 ft., 17.0 ft. and 17.95 ft. intervals.

Figure 18. (Below) RC-7: 20-30 ft. below grade. No weathered fractures observed from 20-25 ft. below grade (top section). Weathered fractures with staining were observed 25-30 ft. below grade. (bottom section).





Figure 19. (Above) RC-7: 30-35 ft. below grade. Minor mechanical fracture observed.

Figure 20. RC-8: 0-8.7 ft. below grade. Weathered and mechanical fractures observed throughout core. Some oxidation on fracture surfaces with no staining or free product observed.





Figure 21. (Above) RC-8: 8.7-10.7 ft. below grade. Final run on RC-8; unable to retrieve remainder of core and core barrel from borehole. Completed off-set rock core RC-8B to depth.

Figure 22. RC-8B: 0-7.9 ft. below grade. Mechanical fractures observed throughout with no staining, free product or weathered surfaces.





Figure 23. (Above) RC-8B 7.9-14.3 ft. below surface. Mechanical fractures observed throughout with no staining, free product or weathered surfaces.

Figure 24. (Below) RC-8B 14.3-18.5 ft. below grade. No fractures, staining, free product, or weathering observed.





Figure 25. (Above) RC-9: 0-10 ft. below grade: 0-5 ft. interval (top section) contained of weathered, stained and oxidized fractures. 5-10 ft. interval (bottom section) had weathered, stained and oxidized fractures containing free product. Product staining on sides of core was due to mobilization of product by drilling activity.

Figure 26. (Below) RC-9: 10-17.3 ft. below grade. Both core sections contained weathered, stained and oxidized fracture surfaces. Staining on sides of core was due to pulling core up through NAPL layer above.





Figure 27. (Above) RC-9: 17.3-25.55 ft. below grade. 17.3-20.85 ft. interval (top section) contained weathered, stained and oxidized fracture surfaces. 20.85-25.55 ft. interval contained weathered fractures with no staining, oxidation, or free product.

Figure 28. (Below) RC-9: 25.55-33.05 ft. below grade. Mechanical and weathered fractures were present throughout both with no staining, oxidation, or free product.





Figure 29. (Above) RC-10: 0-10 ft. below grade. 0-5 ft. interval was highly fractured with no mechanical breaks. Fracture surfaces were oxidized and stained. The 5-10 ft. interval contained 3 weathered fractures with oxidation, staining and contained free product.

Figure 30. (Below) RC-10: 10-20 ft. below grade. Fractures throughout cores were mechanical. Staining observed on the sides of core was due to pulling the core up through the NAPL layer above (0-5 ft. interval).





Figure 31. (Above) RC-10: 20-25 ft. below grade. (Bottom Core) Fractures in core are mechanical. No staining, weathering, or free product observed. Staining on the sides of core was due to pulling the core up through the NAPL layer above.

Figure 32. (Below) RC-10: 25-30 ft. below grade. (Bottom Core) Fractures in core are mechanical. No staining, weathering, or free product observed. Staining on the sides of core was due to pulling the core up through the NAPL layer above.





Figure 33. (Above) RC-10: 30-35 ft. below grade. (Bottom Core) Fractures in core were mechanical. No staining, weathering, or free product observed. Staining on the sides of core was due to pulling the core up through the NAPL layer above.

Figure 34. (Below) RC-11: 0-8.1 ft. below grade. Weathered fractures throughout core contained silt and fine sand. No staining or free product observed.





Figure 35. (Above) RC-11 8.1-15.8 ft. below grade. Fractures are mechanical in both runs. No staining or free product observed.

Figure 36. (Below) RC-11 15.8-24.6 ft. below grade. Weathered fracture at 19.9 ft. was stained, oxidized and contained free product, silt and fine sand. Weathered fracture at 22.2 ft. did not exhibit any impacts.





Figure 37. (Below) RC-11: 24.6-33.8 ft. below grade. Both core runs contained mechanical and weathered fractures. No impacts, staining or free product observed.

Laboratory Data

New England ACCUTEST LABORATORIES

01/27/16

Effective January 1, 2016, SGS has acquired all of the assets of Accutest Laboratories and will continue to operate as SGS-Accutest. SGS-Accutest is part of SGS, the world's leading inspection, verification, testing and certification company.



Technical Report for

Fleming-Lee Shue, Inc.

Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

FP0917

Accutest Job Number: MC44075

Sampling Date: 01/21/16

Report to:

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Total number of pages in report: **143**

NELAP ACCREDITED LABORATORY

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Sample Summary

Fleming-Lee Shue, Inc.

Job No: MC44075

Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY
Project No: FP0917

Sample Number	Collected Date	Time	By	Received	Matrix Code	Matrix Type	Client Sample ID
MC44075-1	01/21/16	08:00	FR	01/23/16	SO	Oil	RC-7 NAPL

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client: Fleming-Lee Shue, Inc. **Job No:** MC44075

Site: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY **Report Date** 1/27/2016 4:19:46 PM

1 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were collected on 01/21/2016 and were received at Accutest on 01/23/2016 properly preserved, at 2 Deg. C and intact. These Samples received an Accutest job number of MC44075. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Extractables by GCMS By Method D5739-06/8270M SIM

Matrix: SO **Batch ID:** OP46170

- All samples were extracted within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) MC44075-1DUP were used as the QC samples indicated.
- Sample(s) MC44075-1 have compounds reported with “E” qualifiers indicating estimated value exceeding calibration range.

Extractables by GC By Method ASTM D3328-06

Matrix: SO **Batch ID:** OP46169

- All samples were extracted within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) MC44075-1DUP were used as the QC samples indicated.
- MC44075-1 for C-18: Coelutes with Phenanthrene . Value represents combined total.
- MC44075-1 for C-16: Coelutes with Florene . Value represents combined total.
- MC44075-1 for Phytane: Coelutes with Anthracene . Value represents combined total.
- MC44075-1 for C-15: Coelutes with Acenapthene. Value represents combined total.

Wet Chemistry By Method ASTM D1429

Matrix: ALL **Batch ID:** GN52924

- Sample(s) MC44075-1DUP were used as the QC samples for Specific Gravity.

The Accutest Laboratories of New England certifies that all analysis were performed within method specification. It is further recommended that this report to be used in its entirety.The Accutest Laboratories of NE, Laboratory Director or assignee as verified by the signature on the cover page has authorized the release of this report(MC44075).

Summary of Hits

Job Number: MC44075
Account: Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY
Collected: 01/21/16

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
MC44075-1	**RC-7 NAPL**					
Benzene		43600	6900	3400	ug/kg	D5739-06/8270M SIM
C1-Benzene		486000	6900	3400	ug/kg	D5739-06/8270M SIM
C2-Benzenes		2410000	6900	3400	ug/kg	D5739-06/8270M SIM
C3-Benzenes		5270000	6900	3400	ug/kg	D5739-06/8270M SIM
C4-Benzenes		4370000	6900	3400	ug/kg	D5739-06/8270M SIM
C5-Benzenes		1560000	6900	3400	ug/kg	D5739-06/8270M SIM
Toluene		673000	6900	3400	ug/kg	D5739-06/8270M SIM
Ethylbenzene		966000	6900	3400	ug/kg	D5739-06/8270M SIM
m,p-Xylene		2500000	6900	3400	ug/kg	D5739-06/8270M SIM
Styrene		489000	6900	3400	ug/kg	D5739-06/8270M SIM
o-Xylene		1250000	6900	3400	ug/kg	D5739-06/8270M SIM
Isopropylbenzene		286000	6900	3400	ug/kg	D5739-06/8270M SIM
n-Propylbenzene		180000	6900	3400	ug/kg	D5739-06/8270M SIM
1,3,5-Trimethylbenzene		1440000	6900	3400	ug/kg	D5739-06/8270M SIM
1,2,3-Trimethylbenzene		1480000	6900	3400	ug/kg	D5739-06/8270M SIM
1,2,4-Trimethylbenzene		4040000	6900	3400	ug/kg	D5739-06/8270M SIM
sec-Butylbenzene		104000	6900	3400	ug/kg	D5739-06/8270M SIM
p-Isopropyltoluene		1400000	6900	3400	ug/kg	D5739-06/8270M SIM
n-Butylbenzene		161000	6900	3400	ug/kg	D5739-06/8270M SIM
trans-Decalin		58600	6900	3400	ug/kg	D5739-06/8270M SIM
cis-Decalin		13100	6900	3400	ug/kg	D5739-06/8270M SIM
Benzo(b)thiophene		6050000	6900	3400	ug/kg	D5739-06/8270M SIM
Naphthalene		118000000	140000	69000	ug/kg	D5739-06/8270M SIM
2-Methylnaphthalene		117000000	140000	69000	ug/kg	D5739-06/8270M SIM
1-Methylnaphthalene		54400000	140000	69000	ug/kg	D5739-06/8270M SIM
C1-Naphthalenes		109000000	140000	69000	ug/kg	D5739-06/8270M SIM
C2-Naphthalenes		27500000	6900	3400	ug/kg	D5739-06/8270M SIM
C3-Naphthalenes		5810000	6900	3400	ug/kg	D5739-06/8270M SIM
C4-Naphthalenes		1350000	6900	3400	ug/kg	D5739-06/8270M SIM
Biphenyl		12400000	6900	3400	ug/kg	D5739-06/8270M SIM
Acenaphthylene		348000	6900	3400	ug/kg	D5739-06/8270M SIM
Acenaphthene		14200000 E	6900	3400	ug/kg	D5739-06/8270M SIM
Dibenzofuran		14000000 E	6900	3400	ug/kg	D5739-06/8270M SIM
Fluorene		8770000	6900	3400	ug/kg	D5739-06/8270M SIM
C1-Fluorenes		926000	6900	3400	ug/kg	D5739-06/8270M SIM
C2-Fluorenes		355000	6900	3400	ug/kg	D5739-06/8270M SIM
C3-Fluorenes		199000	6900	3400	ug/kg	D5739-06/8270M SIM
Dibenzothiophene		507000	6900	3400	ug/kg	D5739-06/8270M SIM
C1-Dibenzothiophenes		402000	6900	3400	ug/kg	D5739-06/8270M SIM
C2-Dibenzothiophenes		190000	6900	3400	ug/kg	D5739-06/8270M SIM
C3-Dibenzothiophenes		94900	6900	3400	ug/kg	D5739-06/8270M SIM
C4-Dibenzothiophenes		70600	6900	3400	ug/kg	D5739-06/8270M SIM
Phenanthrene		6530000	6900	3400	ug/kg	D5739-06/8270M SIM

Summary of Hits

Job Number: MC44075
Account: Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY
Collected: 01/21/16

Lab Sample ID Client Sample ID Analyte	Result/ Qual	RL	MDL	Units	Method
Anthracene	2110000	6900	3400	ug/kg	D5739-06/8270M SIM
C1-Phenanthrenes/Anthracenes	1600000	6900	3400	ug/kg	D5739-06/8270M SIM
C2-Phenanthrenes/Anthracenes	563000	6900	3400	ug/kg	D5739-06/8270M SIM
C3-Phenanthrenes/Anthracenes	198000	6900	3400	ug/kg	D5739-06/8270M SIM
C4-Phenanthrenes/Anthracenes	50200	6900	3400	ug/kg	D5739-06/8270M SIM
Retene	87600	6900	3400	ug/kg	D5739-06/8270M SIM
Benzo(b)naphtho(2,1-d)thiophene	16500	6900	3400	ug/kg	D5739-06/8270M SIM
Fluoranthene	1190000	6900	3400	ug/kg	D5739-06/8270M SIM
Pyrene	901000	6900	3400	ug/kg	D5739-06/8270M SIM
C1-Fluoranthenes/Pyrenes	378000	6900	3400	ug/kg	D5739-06/8270M SIM
C2-Fluoranthenes/Pyrenes	107000	6900	3400	ug/kg	D5739-06/8270M SIM
C3-Fluoranthenes/Pyrenes	40400	6900	3400	ug/kg	D5739-06/8270M SIM
Benzo(b)fluorene	53400	6900	3400	ug/kg	D5739-06/8270M SIM
Benzo(c)fluorene	27200	6900	3400	ug/kg	D5739-06/8270M SIM
2-Methylpyrene	40800	6900	3400	ug/kg	D5739-06/8270M SIM
4-Methylpyrene	32900	6900	3400	ug/kg	D5739-06/8270M SIM
1-Methylpyrene	27900	6900	3400	ug/kg	D5739-06/8270M SIM
Benz(a)anthracene	142000	6900	3400	ug/kg	D5739-06/8270M SIM
Chrysene/triphenylene	133000	6900	3400	ug/kg	D5739-06/8270M SIM
C1-Benzo(a)anthracenes/Chrysenes	53200	6900	3400	ug/kg	D5739-06/8270M SIM
C2-Benzo(a)anthracenes/Chrysenes	15800	6900	3400	ug/kg	D5739-06/8270M SIM
C3-Benzo(a)anthracenes/Chrysenes	7070	6900	3400	ug/kg	D5739-06/8270M SIM
Benzo(b)fluoranthene	35200	6900	3400	ug/kg	D5739-06/8270M SIM
Benzo(j/k)fluoranthene	36700	6900	3400	ug/kg	D5739-06/8270M SIM
Benzo(e)pyrene	26800	6900	3400	ug/kg	D5739-06/8270M SIM
Benzo(a)pyrene	45300	6900	3400	ug/kg	D5739-06/8270M SIM
Perylene	10300	6900	3400	ug/kg	D5739-06/8270M SIM
Indeno(1,2,3-cd)pyrene	10000	6900	3400	ug/kg	D5739-06/8270M SIM
Dibenzo(a,h)anthracene	3780 J	6900	3400	ug/kg	D5739-06/8270M SIM
Benzo(g,h,i)perylene	12100	6900	3400	ug/kg	D5739-06/8270M SIM
C-10	2800	1400	690	mg/kg	ASTM D3328-06
C-11	1590	1400	690	mg/kg	ASTM D3328-06
C-12	6570	1400	690	mg/kg	ASTM D3328-06
C-13	4110	1400	690	mg/kg	ASTM D3328-06
2,6,10-trimethyldodecane (1380)	886 J	1400	690	mg/kg	ASTM D3328-06
C-14	3800	1400	690	mg/kg	ASTM D3328-06
2,6,10-trimethyltridecane (1470)	1550	1400	690	mg/kg	ASTM D3328-06
C-15 [a]	21000	1400	690	mg/kg	ASTM D3328-06
C-16 [b]	13100	1400	690	mg/kg	ASTM D3328-06
2,6,10-trimethylpentadecane (1650)	2890	1400	690	mg/kg	ASTM D3328-06
C-17	1850	1400	690	mg/kg	ASTM D3328-06
Pristane	1570	1400	690	mg/kg	ASTM D3328-06
C-18 [c]	9670	1400	690	mg/kg	ASTM D3328-06
Phytane [d]	3520	1400	690	mg/kg	ASTM D3328-06
C-19	1380 J	1400	690	mg/kg	ASTM D3328-06

Summary of Hits

Job Number: MC44075
Account: Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY
Collected: 01/21/16

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C-20		1050 J	1400	690	mg/kg	ASTM D3328-06
TPH (C8-C40)		854000	140000	69000	mg/kg	ASTM D3328-06
Specific Gravity		0.98				ASTM D1429

(a) Coelutes with Acenapthene. Value represents combined total.
(b) Coelutes with Florene . Value represents combined total.
(c) Coelutes with Phenanthrene . Value represents combined total.
(d) Coelutes with Anthracene . Value represents combined total.

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Sample Results

Report of Analysis

Accutest Laboratories

Report of Analysis

Client Sample ID: RC-7 NAPL
Lab Sample ID: MC44075-1 **Date Sampled:** 01/21/16
Matrix: SO - Oil **Date Received:** 01/23/16
Method: D5739-06/8270M SIM SW846 3580A **Percent Solids:** n/a
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Z06355.D	5	01/26/16	SZ	01/26/16	OP46170	MSZ235
Run #2	Z06357.D	100	01/27/16	SZ	01/26/16	OP46170	MSZ235

	Initial Weight	Final Volume
Run #1	0.015 g	2.0 ml
Run #2	0.015 g	2.0 ml

Alkylated PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	43600	6900	3400	ug/kg	
	C1-Benzene	486000	6900	3400	ug/kg	
	C2-Benzenes	2410000	6900	3400	ug/kg	
	C3-Benzenes	5270000	6900	3400	ug/kg	
	C4-Benzenes	4370000	6900	3400	ug/kg	
	C5-Benzenes	1560000	6900	3400	ug/kg	
108-88-3	Toluene	673000	6900	3400	ug/kg	
100-41-4	Ethylbenzene	966000	6900	3400	ug/kg	
	m,p-Xylene	2500000	6900	3400	ug/kg	
100-42-5	Styrene	489000	6900	3400	ug/kg	
95-47-6	o-Xylene	1250000	6900	3400	ug/kg	
98-82-8	Isopropylbenzene	286000	6900	3400	ug/kg	
103-65-1	n-Propylbenzene	180000	6900	3400	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	1440000	6900	3400	ug/kg	
526-73-8	1,2,3-Trimethylbenzene	1480000	6900	3400	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	4040000	6900	3400	ug/kg	
98-06-6	t-Butylbenzene	ND	6900	3400	ug/kg	
135-98-8	sec-Butylbenzene	104000	6900	3400	ug/kg	
99-87-6	p-Isopropyltoluene	1400000	6900	3400	ug/kg	
104-51-8	n-Butylbenzene	161000	6900	3400	ug/kg	
493-02-7	trans-Decalin	58600	6900	3400	ug/kg	
493-01-6	cis-Decalin	13100	6900	3400	ug/kg	
11095-43-5	Benzo(b)thiophene	6050000	6900	3400	ug/kg	
91-20-3	Naphthalene	118000000 [a]	140000	69000	ug/kg	
91-57-6	2-Methylnaphthalene	117000000 [a]	140000	69000	ug/kg	
90-12-0	1-Methylnaphthalene	54400000 [a]	140000	69000	ug/kg	
	C1-Naphthalenes	109000000 [a]	140000	69000	ug/kg	
	C2-Naphthalenes	27500000	6900	3400	ug/kg	
	C3-Naphthalenes	5810000	6900	3400	ug/kg	
	C4-Naphthalenes	1350000	6900	3400	ug/kg	
92-52-4	Biphenyl	12400000	6900	3400	ug/kg	
208-96-8	Acenaphthylene	348000	6900	3400	ug/kg	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RC-7 NAPL
Lab Sample ID: MC44075-1 **Date Sampled:** 01/21/16
Matrix: SO - Oil **Date Received:** 01/23/16
Method: D5739-06/8270M SIM SW846 3580A **Percent Solids:** n/a
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Alkylated PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	14200000	6900	3400	ug/kg	E
132-64-9	Dibenzofuran	14000000	6900	3400	ug/kg	E
86-73-7	Fluorene	8770000	6900	3400	ug/kg	
	C1-Fluorenes	926000	6900	3400	ug/kg	
	C2-Fluorenes	355000	6900	3400	ug/kg	
	C3-Fluorenes	199000	6900	3400	ug/kg	
132-65-0	Dibenzothiophene	507000	6900	3400	ug/kg	
	C1-Dibenzothiophenes	402000	6900	3400	ug/kg	
	C2-Dibenzothiophenes	190000	6900	3400	ug/kg	
	C3-Dibenzothiophenes	94900	6900	3400	ug/kg	
	C4-Dibenzothiophenes	70600	6900	3400	ug/kg	
85-01-8	Phenanthrene	6530000	6900	3400	ug/kg	
120-12-7	Anthracene	2110000	6900	3400	ug/kg	
	C1-Phenanthrenes/Anthracene	1600000	6900	3400	ug/kg	
	C2-Phenanthrenes/Anthracene	563000	6900	3400	ug/kg	
	C3-Phenanthrenes/Anthracene	198000	6900	3400	ug/kg	
	C4-Phenanthrenes/Anthracene	50200	6900	3400	ug/kg	
483-65-8	Retene	87600	6900	3400	ug/kg	
239-35-0	Benzo(b)naphtho(2,1-d)thioph	16500	6900	3400	ug/kg	
206-44-0	Fluoranthene	1190000	6900	3400	ug/kg	
129-00-0	Pyrene	901000	6900	3400	ug/kg	
	C1-Fluoranthenes/Pyrenes	378000	6900	3400	ug/kg	
	C2-Fluoranthenes/Pyrenes	107000	6900	3400	ug/kg	
	C3-Fluoranthenes/Pyrenes	40400	6900	3400	ug/kg	
243-17-4	Benzo(b)fluorene	53400	6900	3400	ug/kg	
205-12-9	Benzo(c)fluorene	27200	6900	3400	ug/kg	
3442-78-2	2-Methylpyrene	40800	6900	3400	ug/kg	
3353-12-6	4-Methylpyrene	32900	6900	3400	ug/kg	
2381-21-7	1-Methylpyrene	27900	6900	3400	ug/kg	
56-55-3	Benz(a)anthracene	142000	6900	3400	ug/kg	
	Chrysene/triphenylene	133000	6900	3400	ug/kg	
	C1-Benzo(a)anthracenes/Chrys	53200	6900	3400	ug/kg	
	C2-Benzo(a)anthracenes/Chrys	15800	6900	3400	ug/kg	
	C3-Benzo(a)anthracenes/Chrys	7070	6900	3400	ug/kg	
	C4-Benzo(a)anthracenes/Chrys	ND	6900	3400	ug/kg	
205-99-2	Benzo(b)fluoranthene	35200	6900	3400	ug/kg	
	Benzo(j/k)fluoranthene	36700	6900	3400	ug/kg	
192-97-2	Benzo(e)pyrene	26800	6900	3400	ug/kg	
50-32-8	Benzo(a)pyrene	45300	6900	3400	ug/kg	
198-55-0	Perylene	10300	6900	3400	ug/kg	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RC-7 NAPL		
Lab Sample ID:	MC44075-1	**Date Sampled:**	01/21/16
Matrix:	SO - Oil	**Date Received:**	01/23/16
Method:	D5739-06/8270M SIM SW846 3580A	**Percent Solids:**	n/a
Project:	Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY		

Alkylated PAHs

CAS No.	Compound	Result	RL	MDL	Units	Q
193-39-5	Indeno(1,2,3-cd)pyrene	10000	6900	3400	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	3780	6900	3400	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	12100	6900	3400	ug/kg	
191-07-1	Coronene	ND	6900	3400	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
2037-26-5	Toluene-D8	77%	94%	40-140%
1146-65-2	Naphthalene-d8	78%	93%	40-140%
1517-22-2	Phenanthrene-d10	89%	100%	40-140%
	Perylene-d12	76%	85%	40-140%

(a) Result is from Run# 2

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID: RC-7 NAPL
Lab Sample ID: MC44075-1 **Date Sampled:** 01/21/16
Matrix: SO - Oil **Date Received:** 01/23/16
Method: ASTM D3328-06 SW846 3580A **Percent Solids:** n/a
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GF567.D	10	01/27/16	MEW	01/26/16	OP46169	GGF18
Run #2							

	Initial Weight	Final Volume
Run #1	0.015 g	2.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	C-8	ND	1400	690	mg/kg	
	C-9	ND	1400	690	mg/kg	
	C-10	2800	1400	690	mg/kg	
	C-11	1590	1400	690	mg/kg	
	C-12	6570	1400	690	mg/kg	
	C-13	4110	1400	690	mg/kg	
3891-98-3	2,6,10-trimethyldodecane (138	886	1400	690	mg/kg	J
	C-14	3800	1400	690	mg/kg	
3891-99-4	2,6,10-trimethyltridecane (147	1550	1400	690	mg/kg	
	C-15 [a]	21000	1400	690	mg/kg	
	C-16 [b]	13100	1400	690	mg/kg	
3892-00-0	2,6,10-trimethylpentadecane (1	2890	1400	690	mg/kg	
	C-17	1850	1400	690	mg/kg	
1921-70-6	Pristane	1570	1400	690	mg/kg	
	C-18 [c]	9670	1400	690	mg/kg	
638-36-8	Phytane [d]	3520	1400	690	mg/kg	
	C-19	1380	1400	690	mg/kg	J
	C-20	1050	1400	690	mg/kg	J
	C-21	ND	1400	690	mg/kg	
	C-22	ND	1400	690	mg/kg	
	C-23	ND	1400	690	mg/kg	
	C-24	ND	1400	690	mg/kg	
	C-25	ND	1400	690	mg/kg	
	C-26	ND	1400	690	mg/kg	
	C-27	ND	1400	690	mg/kg	
	C-28	ND	1400	690	mg/kg	
	C-29	ND	1400	690	mg/kg	
	C-30	ND	1400	690	mg/kg	
	C-31	ND	1400	690	mg/kg	
	C-32	ND	1400	690	mg/kg	
	C-33	ND	1400	690	mg/kg	
	C-34	ND	1400	690	mg/kg	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: RC-7 NAPL
Lab Sample ID: MC44075-1 **Date Sampled:** 01/21/16
Matrix: SO - Oil **Date Received:** 01/23/16
Method: ASTM D3328-06 SW846 3580A **Percent Solids:** n/a
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

CAS No.	Compound	Result	RL	MDL	Units	Q
	C-35	ND	1400	690	mg/kg	
	C-36	ND	1400	690	mg/kg	
	C-37	ND	1400	690	mg/kg	
	C-38	ND	1400	690	mg/kg	
	C-39	ND	1400	690	mg/kg	
	C-40	ND	1400	690	mg/kg	
	TPH (C8-C40)	854000	140000	69000	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	92%		40-140%

(a) Coelutes with Acenapthene. Value represents combined total.
(b) Coelutes with Florene . Value represents combined total.
(c) Coelutes with Phenanthrene . Value represents combined total.
(d) Coelutes with Anthracene . Value represents combined total.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	RC-7 NAPL		
Lab Sample ID:	MC44075-1	**Date Sampled:**	01/21/16
Matrix:	SO - Oil	**Date Received:**	01/23/16
		Percent Solids:	n/a
Project:	Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Specific Gravity	0.98			1	01/26/16	CF	ASTM D1429

RL = Reporting Limit

New England ACCUTEST LABORATORIES

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody
- FDI Form: Forensic Data Interpretation

CHAIN OF CUSTODY

PAGE 1 OF 1

ACCUTEST LABORATORIES
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.accutest.com

FED-EX Tracking #: | Bottle Order Control #:
Accutest Quote #: | Accutest Job #: MC44075

Client / Reporting Information

Company Name: FLS
Street Address: 158 w 29th st #9
City: NY State: NY Zip: 10001
Project Contact: E-mail:
Phone #: M. Hutson Fax #:
Sampler(s) Name(s): F. Ryan Phone #:

Project Information

Project Name: Queens Plaza
Street:
City: State:
Project #:
Client Purchase Order #: FP0917
Project Manager:
Attention:

Billing Information (if different from Report to)

Company Name:
Street Address:
City: State: Zip:

Requested Analysis (see TEST CODE sheet)

Forensic Testing
Specific Gravity

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL - Sludge
SED-Sediment
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe
FB-Field Blank
EB-Equipment Blank
RB- Rinse Blank
TB-Trip Blank

Accutest Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	NONE	Di Water	MEOH	ENCORE	LAB USE ONLY
-1	RC-7 NAPL		1/21/16	800	ER	AQ	1					1				
																20C

Turnaround Time (Business days)

- [ ] Std. 10 Business Days
- [ ] 5 Day RUSH
- [x] 3 Day RUSH
- [ ] 2 Day RUSH
- [ ] 1 Day RUSH
- [ ] other

Approved By (Accutest PM): / Date:

RUSH

Emergency & Rush T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [ ] FULLT1 (Level 3+4)
- [ ] NJ Reduced
- [ ] Commercial "C"
- [ ] NJ Data of Known Quality Protocol Reporting
- [ ] NYASP Category A
- [x] NYASP Category B
- [ ] State Forms
- [ ] EDD Format
- [ ] Other

Commercial "A" = Results Only, Commercial "B" = Results + QC Summary
NJ Reduced = Results + QC Summary + Partial Raw data

Comments / Special Instructions

INITIAL ASESSMENT Hood Dam
LABEL VERIFICATION

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	Edward Ryan	1/21/16 17:05	1 Fedex packaging	2 Fedex packaging	1/21/16 15:40	2
3		1/21/16 1540	3 FEDEX	4 FEDEX	1/23/16 12:10	4
5	Relinquished by:	Date Time:	Received By:	Custody Seal # 673 [ ] Intact [ ] Not Intact	Preserved where applicable [ ]	On Ice [x] 2.0C Cooler Temp. 3.6 C

MC44075: Chain of Custody
Page 1 of 2

Accutest Laboratories Sample Receipt Summary

Accutest Job Number: MC44075 **Client:** FLS **Project:** QUEEN PLAZA

Date / Time Received: 1/23/2016 12:15:00 PM **Delivery Method:** **Airbill #'s:**

Cooler Temps (Initial/Adjusted): #1: (2/2);

Cooler Security	Y	or	N		Y	or	N
1. Custody Seals Present:	☑		☐	3. COC Present:	☑		☐
2. Custody Seals Intact:	☑		☐	4. Smpl Dates/Time OK	☑		☐

Cooler Temperature	Y	or	N
1. Temp criteria achieved:	☑		☐
2. Thermometer ID:	;		
3. Cooler media:	Ice (Bag)		
4. No. Coolers:	1		

Quality Control Preservation	Y	or	N	N/A
1. Trip Blank present / cooler:	☐		☐	☐
2. Trip Blank listed on COC:	☐		☐	☐
3. Samples preserved properly:	☑		☐	
4. VOCs headspace free:	☐		☐	☐

Sample Integrity - Documentation	Y	or	N
1. Sample labels present on bottles:	☑		☐
2. Container labeling complete:	☑		☐
3. Sample container label / COC agree:	☑		☐

Sample Integrity - Condition	Y	or	N
1. Sample recvd within HT:	☑		☐
2. All containers accounted for:	☑		☐
3. Condition of sample:	Intact		

Sample Integrity - Instructions	Y	or	N	N/A
1. Analysis requested is clear:	☑		☐	
2. Bottles received for unspecified tests	☐		☑	
3. Sufficient volume recvd for analysis:	☑		☐	
4. Compositing instructions clear:	☐		☐	☑
5. Filtering instructions clear:	☐		☐	☑

Comments

Forensic Data Interpretation

Scope

One non-aqueous phase liquid (NAPL) sample was provided to SGS Accutest by Fleming Lee Shue from the Queens Plaza Residential Development site in Queens, NY on January 23rd, 2016 for hydrocarbon characterization. The sample was analyzed to determine, if possible, the types of hydrocarbon impacts present; the level of degradation of any identified material(s); and the estimated age of release of any identified materials.

Methods

The sample was processed in duplicate by solvent dilution (EPA 3580) using dichloromethane. The sample extracts were analyzed by gas chromatography with flame ionization detection (GC/FID; EPA 8015M) for normal alkanes, isoprenoid hydrocarbons, total petroleum hydrocarbons (TPH), and a qualitative hydrocarbon fingerprint; and by gas chromatography with mass spectrometric detection in the selective ion monitoring mode, full scan dual-mode (GC/MS/SIM/SCAN; EPA 8270M) for mono- and polycyclic aromatic hydrocarbons, MAH and PAH homologues, heterocyclic aromatics, and other selected compounds. This narrative describes the results.

Sample Specific Comments

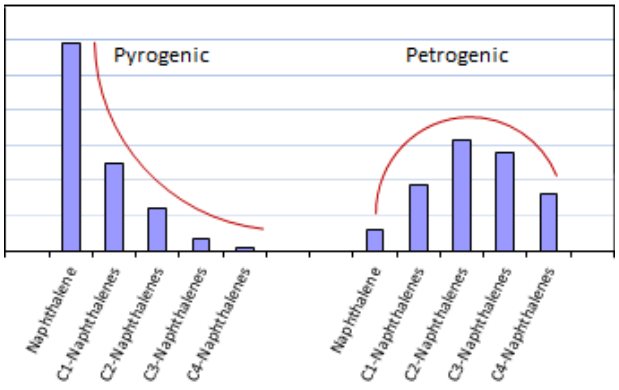
RC-7 NAPL – (MC44075-1)

Sample RC-7 NAPL contained a mixture of pyrogenic and petrogenic materials with the pyrogenic material representing the majority of hydrocarbon mass.

The pyrogenic material was indicated by high concentrations of low molecular weight PAHs (LPAH) with naphthalene and methylnaphthalenes most abundant. Higher alkylated naphthalenes decreased with increasing molecular weight, a pyrogenic characteristic. See Figure 1 for an example. This LPAH distribution is visible in the GC/FID chromatograms included in Appendix A, and MAH and PAH histograms included in Appendix B. Other 3-ring PAHs including fluorene and phenanthrene; dibenzofuran, an oxygen containing heterocyclic PAH; and several MAHs were also present at lower relative concentrations.

Diagnostic ratios utilizing aromatic and heterocyclic aromatic PAHs were evaluated and presented in Chart 1. The pyrogenic material plots in sample RC-7 NAPL plots closest to tars produced by coal carbonization processes, as well as coke oven tars and creosote. However, the LPAH distribution is narrow and inconsistent with typical coal tars, coke oven tars, or creosotes in SGS Accutest's reference library which are typically of a higher average molecular weight. The pattern likely represents a lower molecular weight coal tar distillate such as coal tar naphtha or naphthalene oil but this could not be confirmed with the available data.

Figure 1. Example of Pyrogenic vs. Petrogenic Histograms of Naphthalene Series



Also present was a regular distribution of normal alkane hydrocarbons (paraffins) from about 15 minutes (n-C10; n-decane) to about 41 minutes (n-C22; n-pentacosane). Isoprenoid hydrocarbons (isoparaffins) including pristane and phytane were also present at a lower abundance relative to the normal alkane hydrocarbons. This distribution was not visible in the GC/FID chromatogram but can be seen in the n-alkanes section of the GC/MS extracted ion current profiles (EICPs) presented in Appendix C. In addition, sesquiterpane petroleum biomarkers were present within the range, confirming the petrogenic nature of this fraction.

These characteristics are consistent with petroleum distillates such as No. 2 fuel oils, diesel fuels, and some gas oils. The abundance of paraffins relative to isoparaffins indicates the material had not been substantially degraded by microbial activity. However, an estimated age of release could not be calculated due to the presence of higher concentrations of the pyrogenic material which may inhibit biodegradation processes.

Finally, it was not possible to determine if the mixture of materials in sample RC-7 NAPL represent an intentional blend or by-product, or are an example of environmental comingling of two unrelated materials from separate sources.

The laboratory duplicate analysis displayed similar characteristics and confirm the results.

Please contact me at 508-481-6200 or rubenp@accutest.com if you have any questions regarding the results.

Sincerely,

Ruben Parrilla, Technical Supervisor

Attachments

Appendix A – GC/FID Fingerprints
Appendix B – MAH/PAH Histograms
Appendix C – GC/MS Extracted Ion Current Profiles (EICPs)

References

1. Mauro, D.M., and Roush, J.A., "Examination of the sources of Polycyclic Aromatic Hydrocarbon (PAH) in Urban Background Soil," EPRI Report 1015888, December 2008.

2. Douglas, G. S., Emsbo-Mattingly, S.D., Stout, S. A., Uhler, A. D., & McCarthy, K.J., (2007), Chemical Fingerprinting Methods. In B.L. Murphy & R.D. Morrison (Eds.), Introduction to *Environmental Forensics*. (2nd Edition, pp. 312-454). San Diego, CA: Academic Press.

3. Kaplan, Isaac R. (2003) 'Age Dating of Environmental Organic Residues', Environmental Forensics, 4:2, 95 – 141.

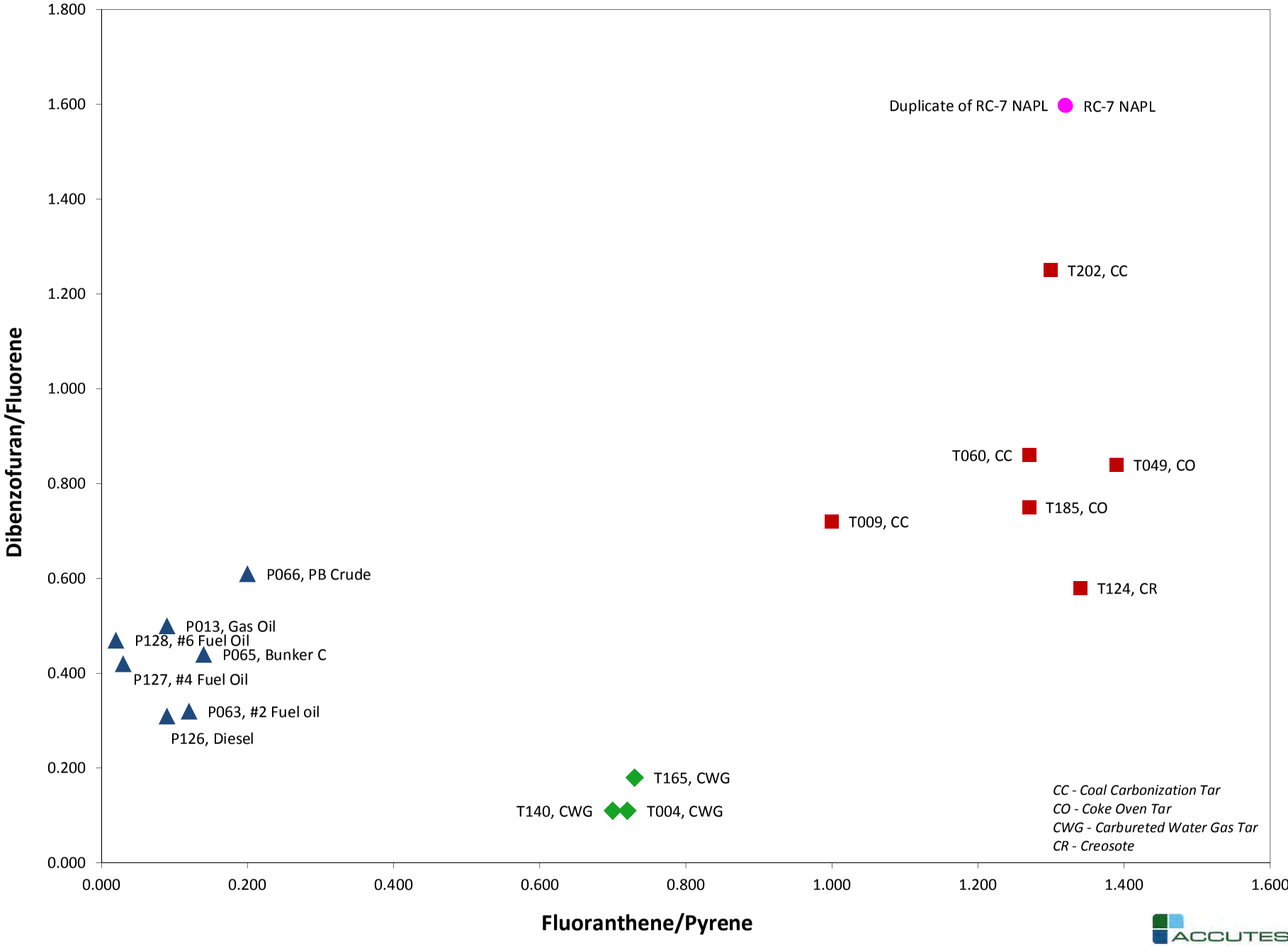
4. Sauer, Ted C., Costa, Helder J. "Fingerprinting of Gasoline and Coal Tar NAPL Volatile Hydrocarbons Dissolved in Groundwater." Environmental Forensics, 4:319-329, 2003.

Definitions

Pyrogenic – Pyrogenic materials are produced from organic matter subjected to intense heat but with insufficient oxygen for complete combustion. Pyrogenic materials are produced by fires, internal combustion engines, and furnaces. They also are formed when coke or gas are produced from coal or petroleum. Coal-tar based products, such as some roofing materials, pavement sealers, waterproofing materials, pesticides, and some shampoos contain pyrogenic materials.

Petrogenic – Petrogenic materials are produced from within rock formations under high pressure and low temperature. Crude oil, coal, and kerogen are some examples of raw petrogenic materials. Petrogenic materials also include refined or processed materials derived from raw products including gasoline, diesel fuel, motor oil, and asphalt, among many others.

Chart 1. Double Ratio Plot: Fluoranthene/Pyrene vs. Dibenzofuran/Fluorene



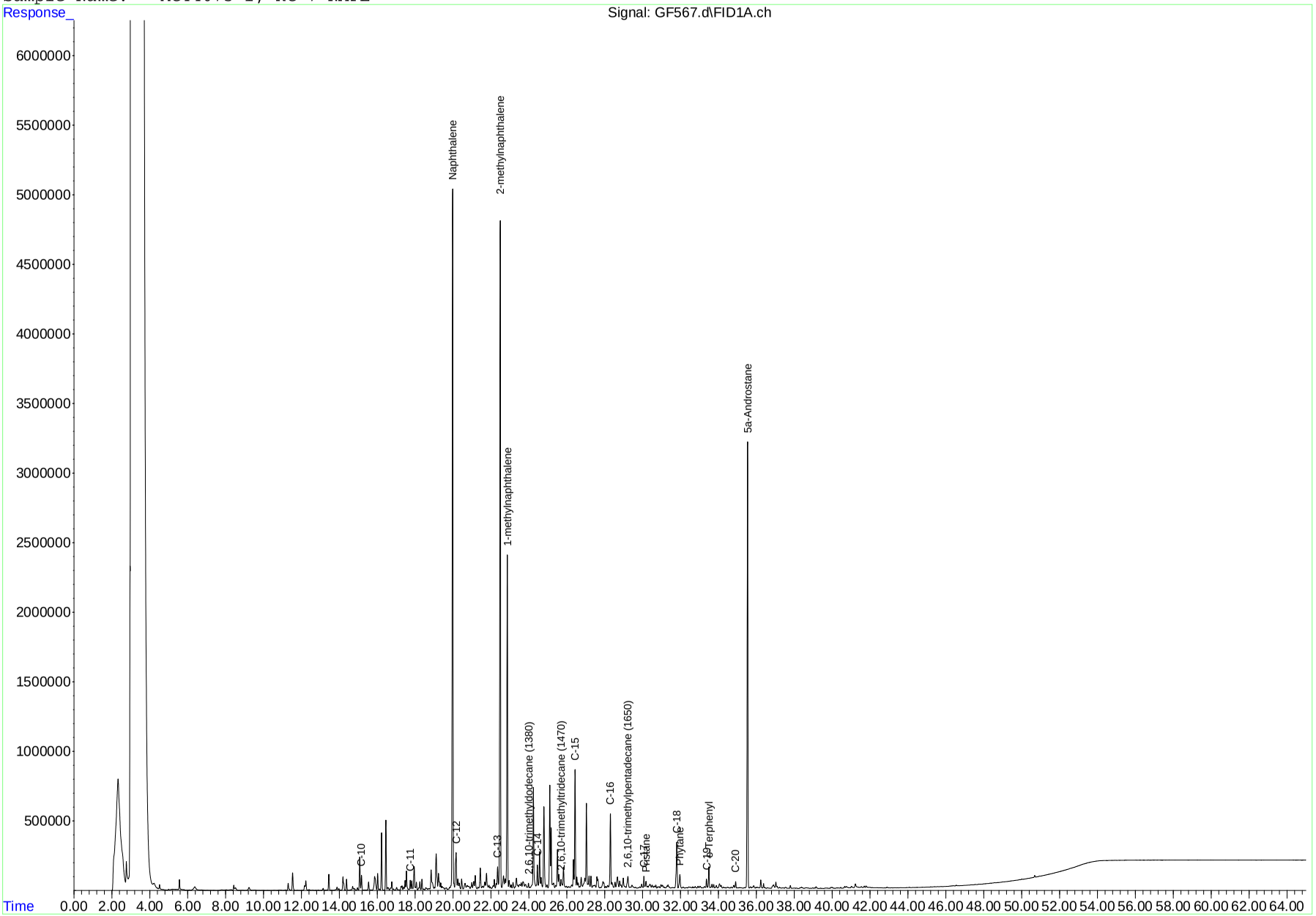
Appendix A

GC/FID Fingerprints

ACCUTEST

GC/FID CHROMATOGRAM

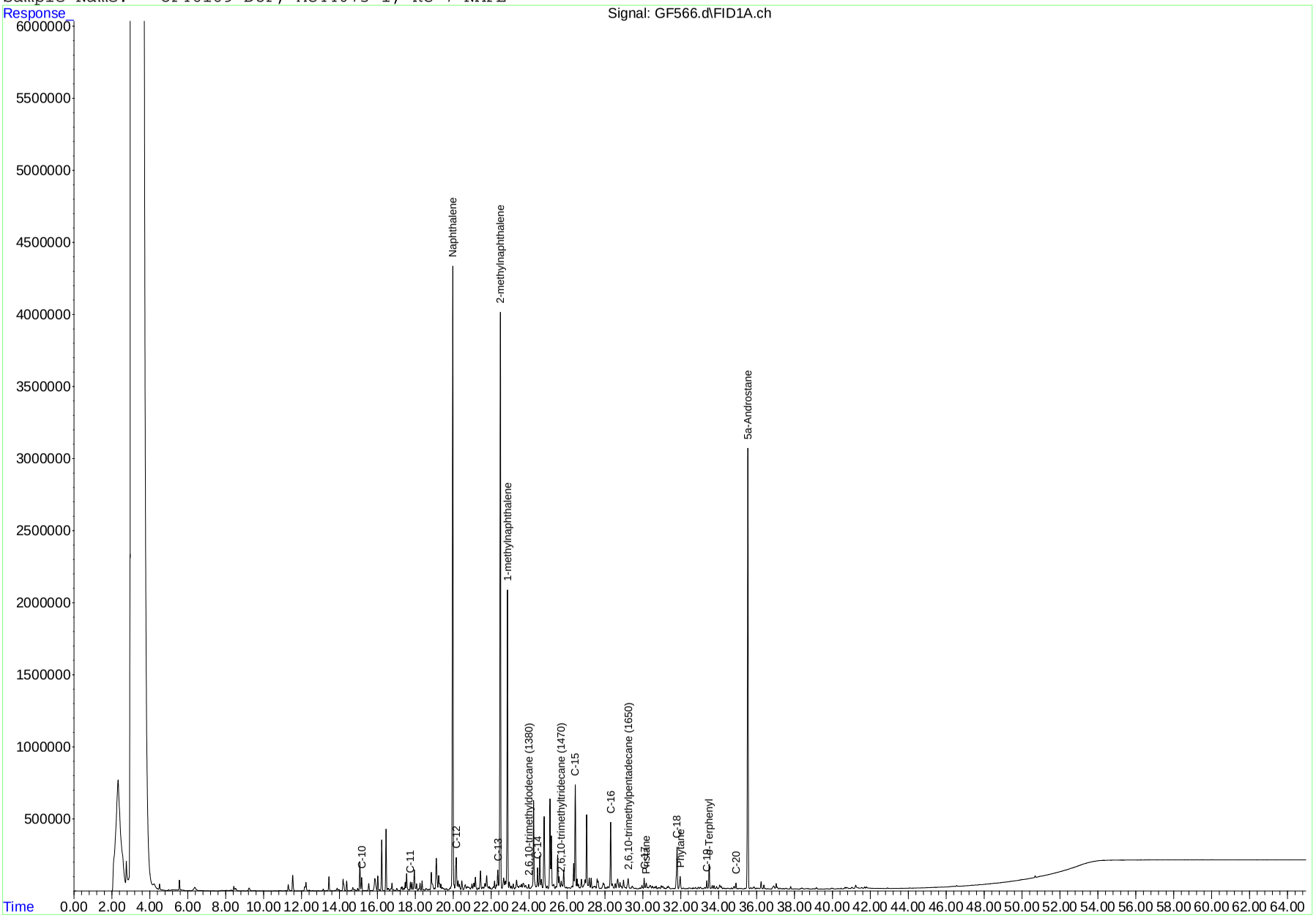
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ACCUTEST

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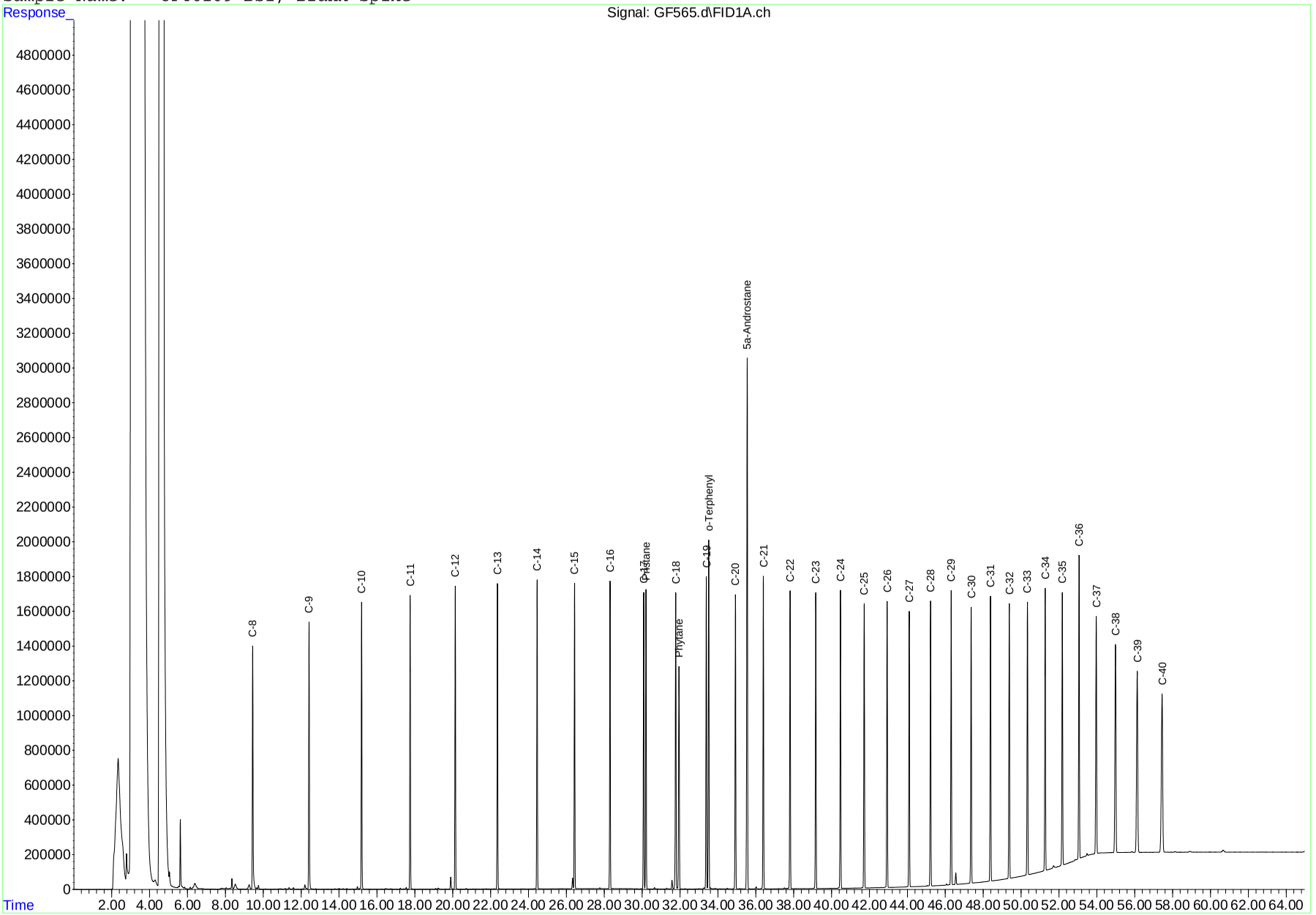
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Sample Name: OP46169-DUP, MC44075-1, RC-7 NAPL



ACCUTEST

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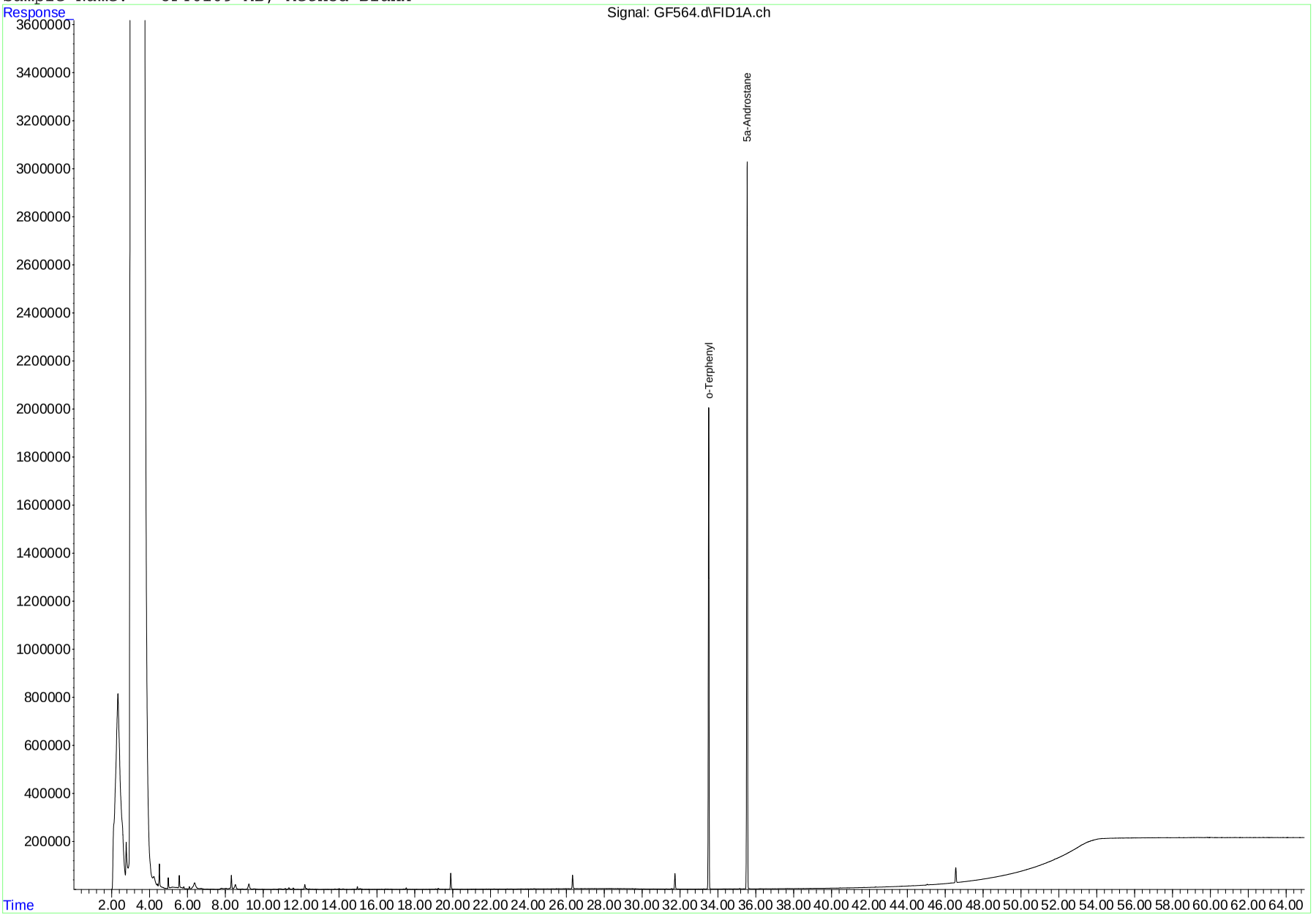
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Date Acquired: 27 Jan 2016 6:24 am
Sample Name: OP46169-BS1, Blank Spike



ACCUTEST

GC/FID CHROMATOGRAM

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Sample Name: OP46169-MB, Method Blank

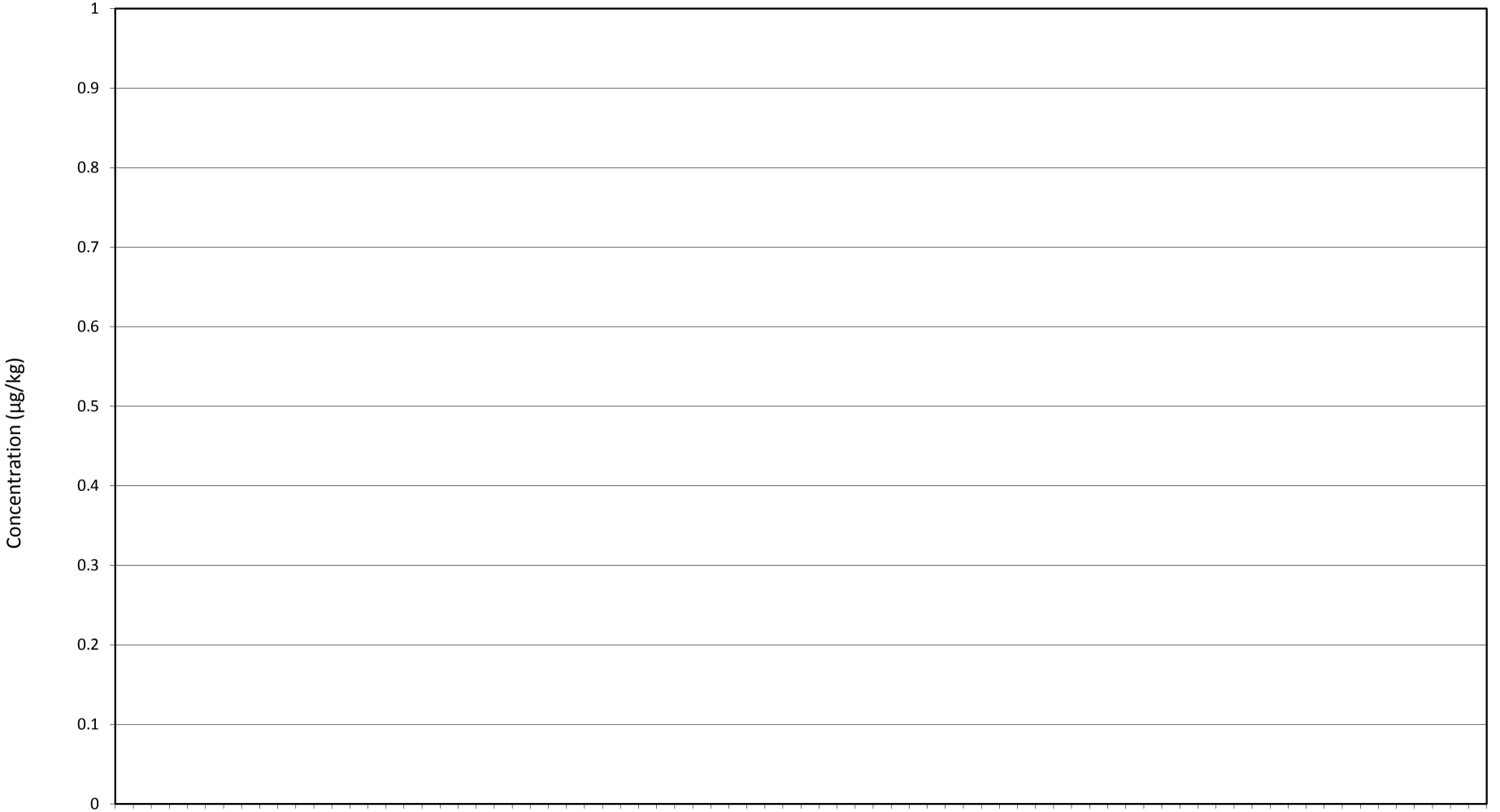


Appendix B

MAH and PAH Histograms

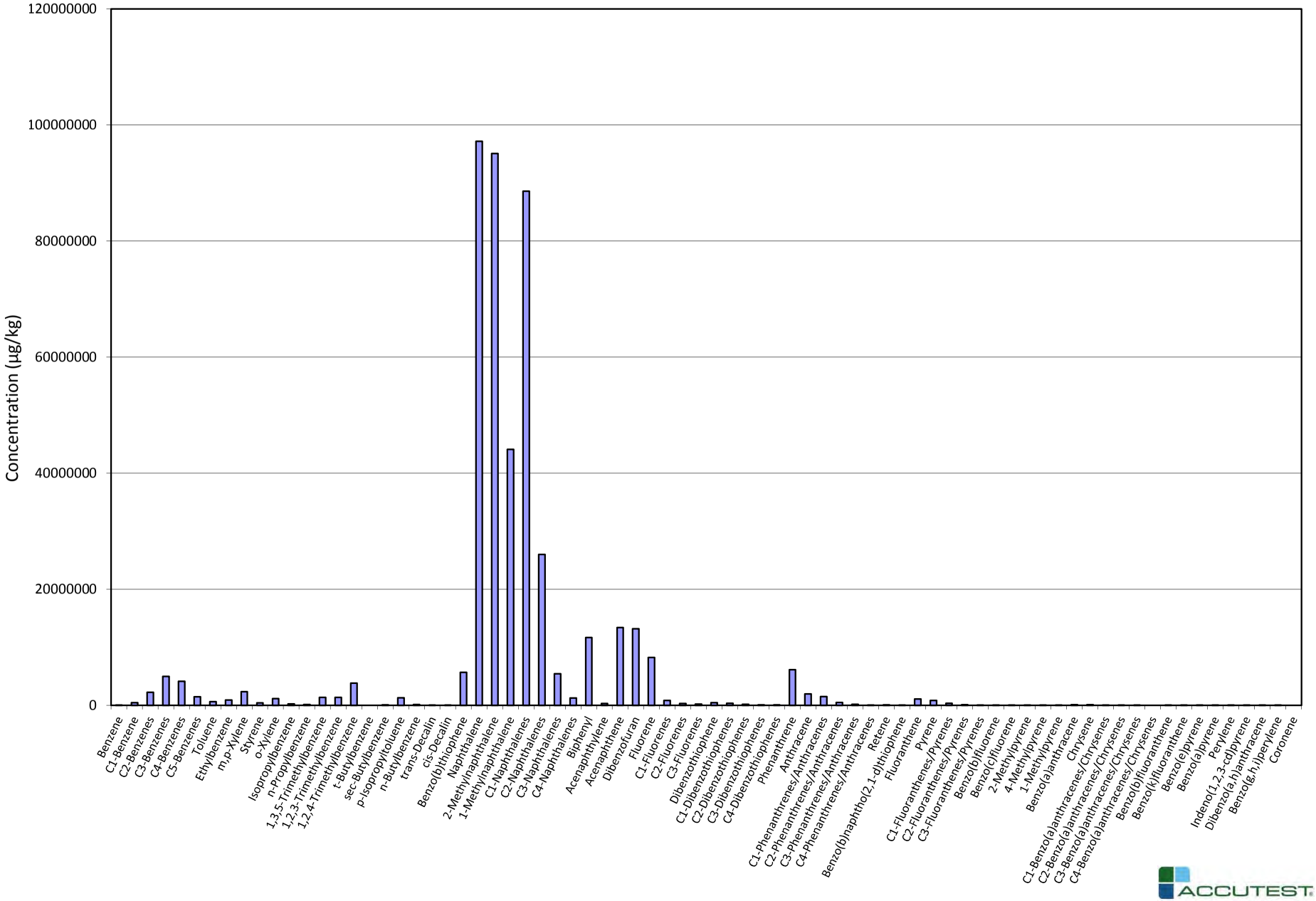
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OP46170-MB



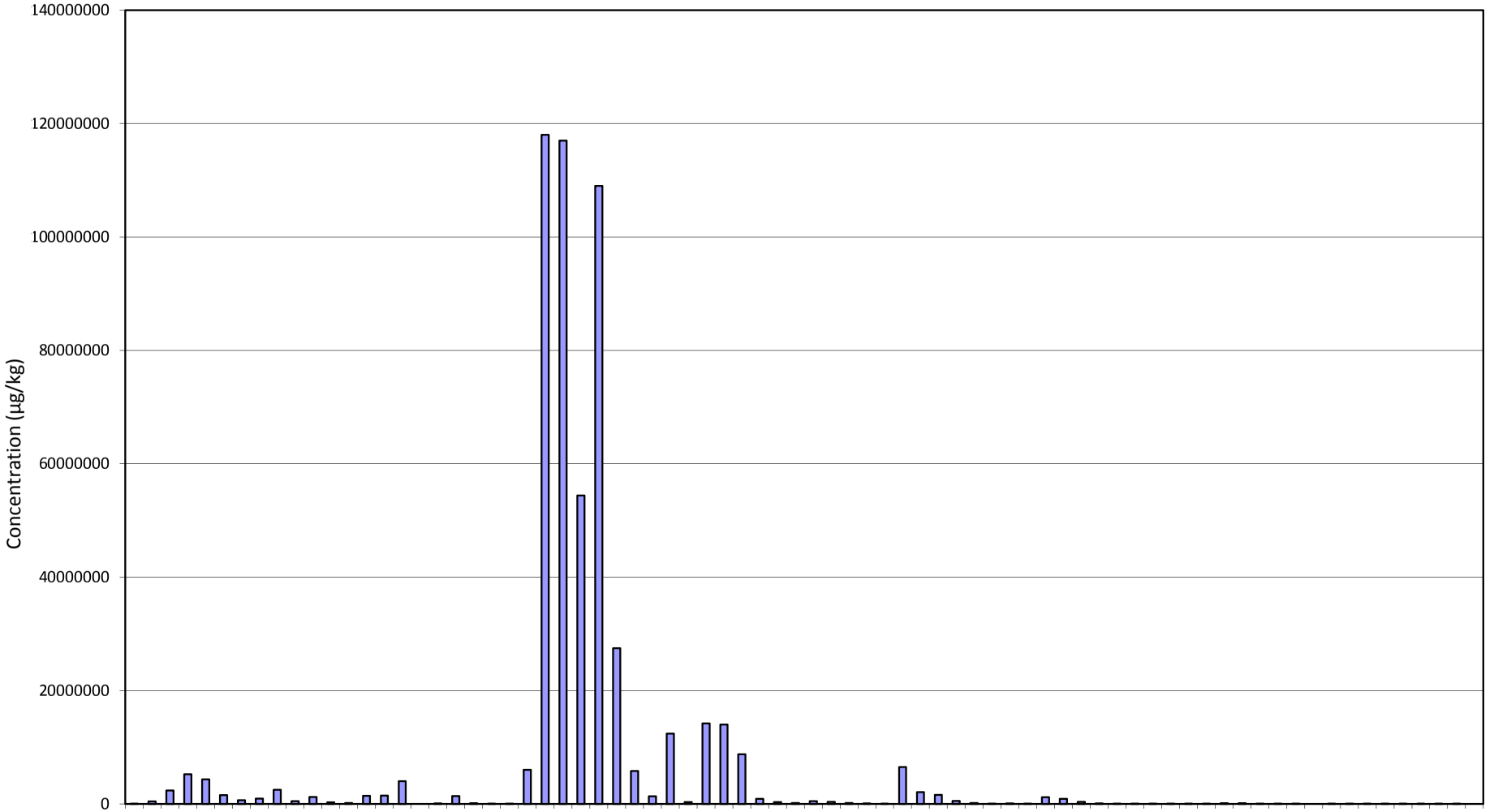
Duplicate of RC-7 NAPL

OP46170-DUP



RC-7 NAPL

MC44075-1



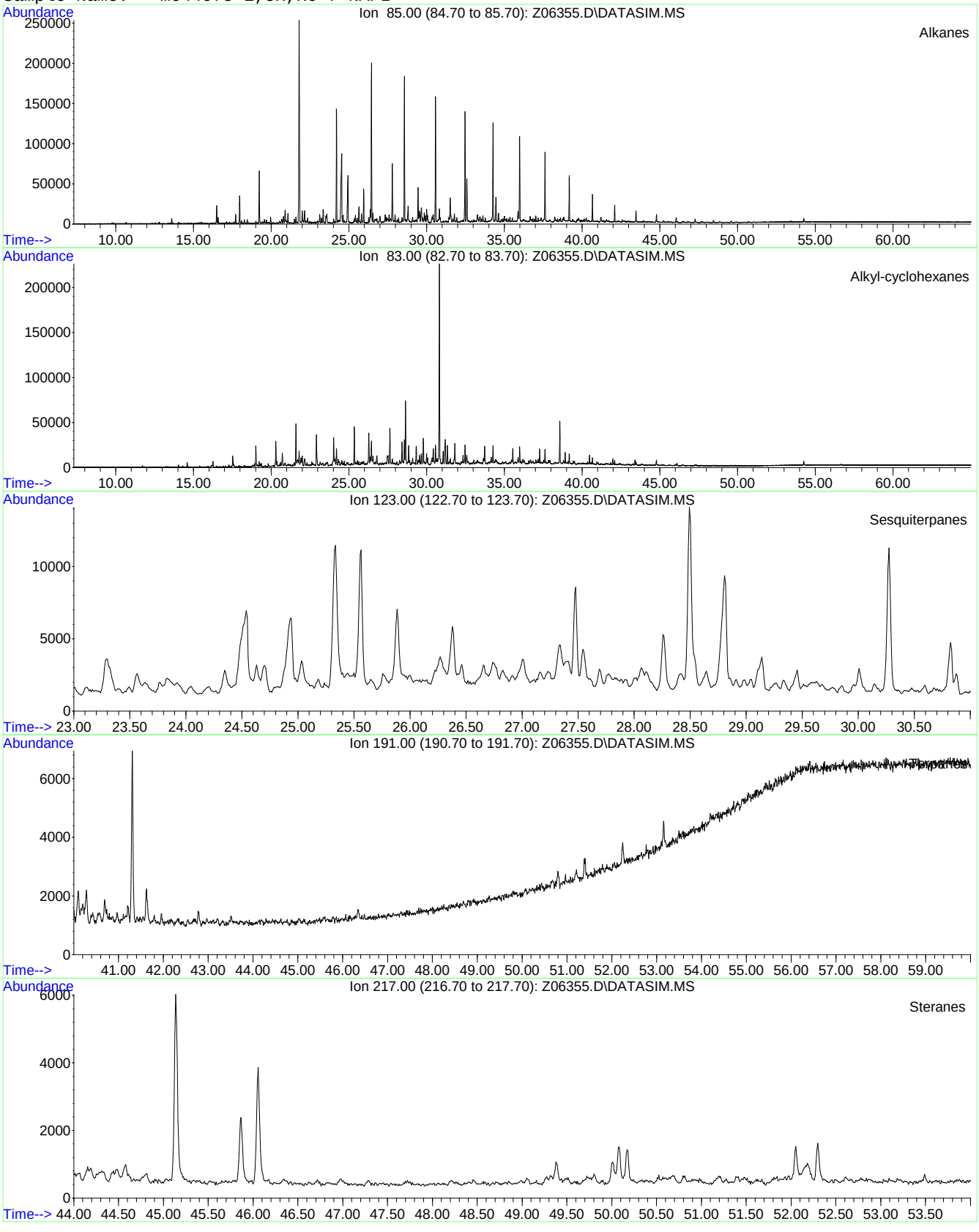
Appendix C

Extracted Ion Current Profiles (EICPs)

ACCUTEST

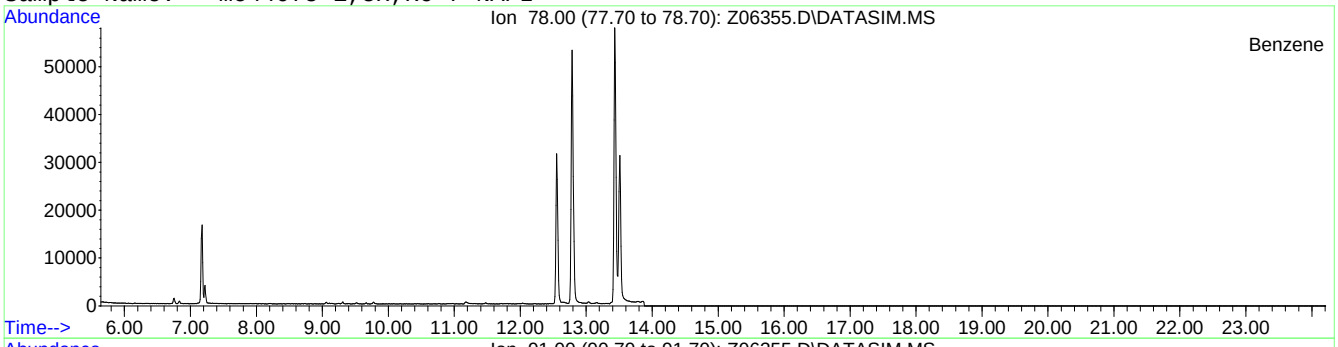
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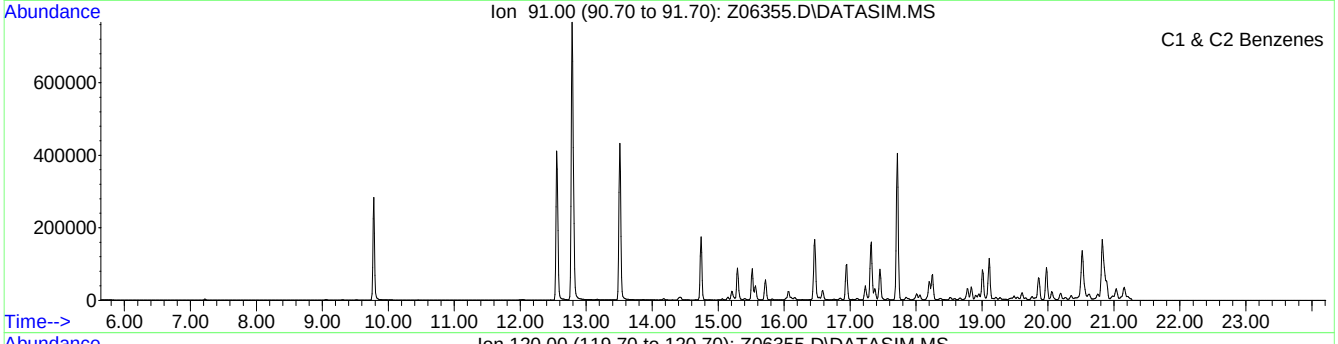
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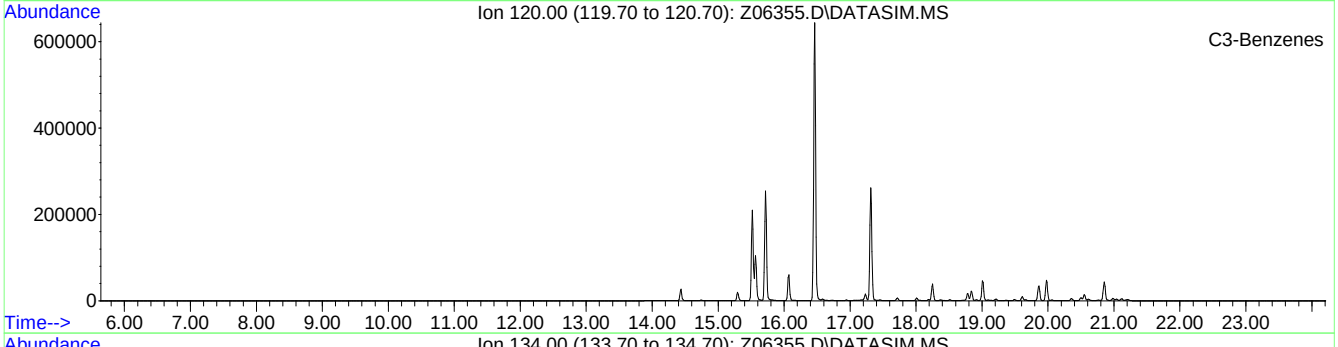


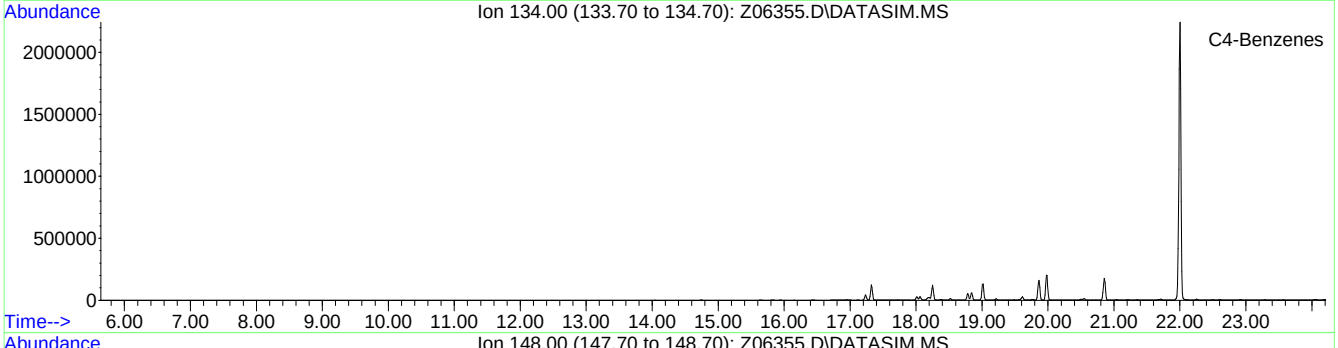
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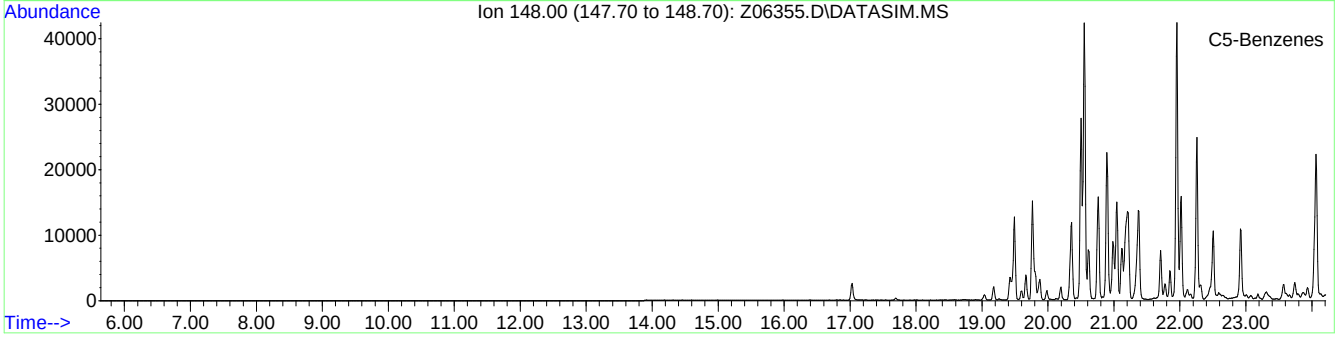
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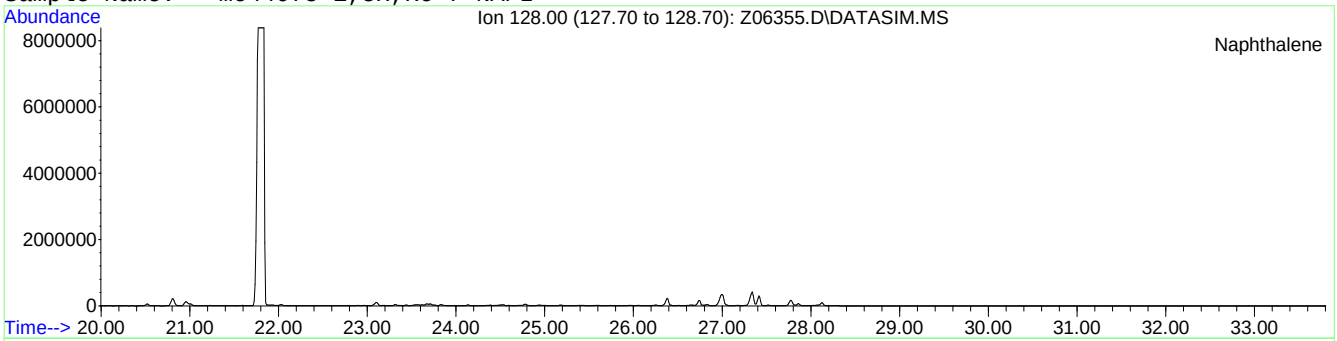


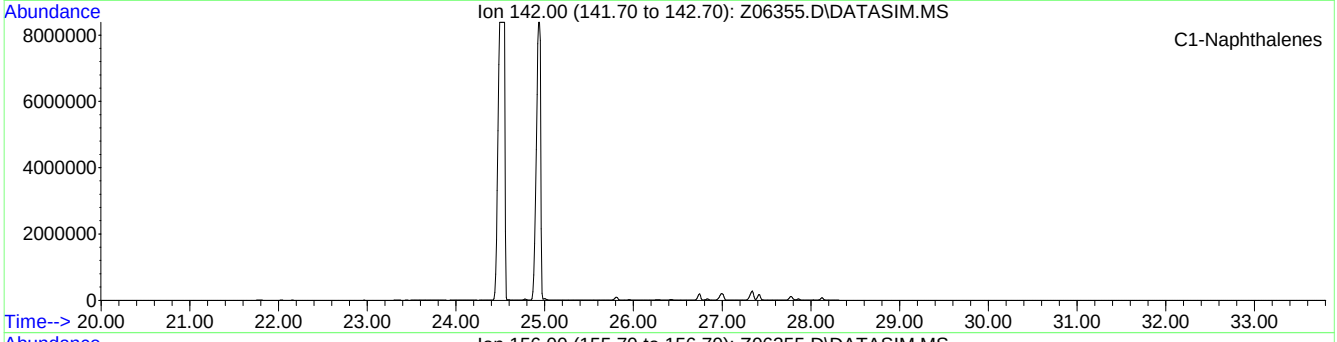


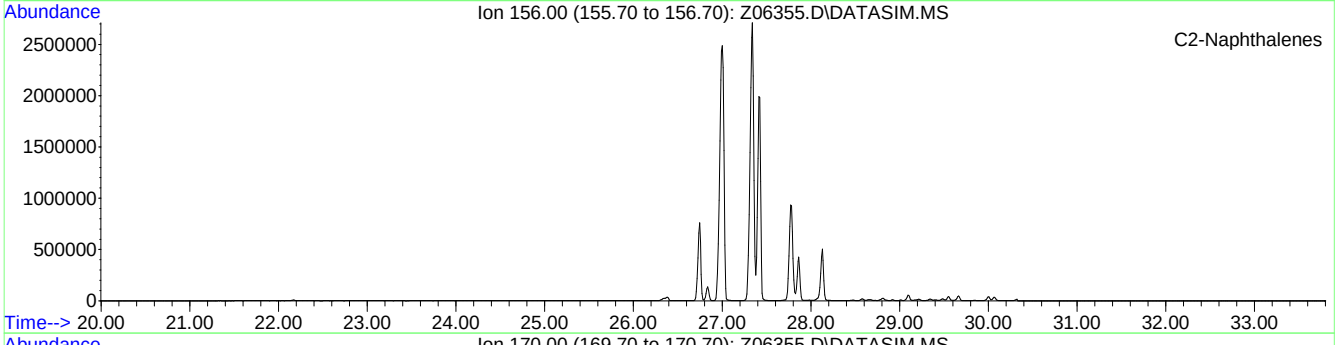
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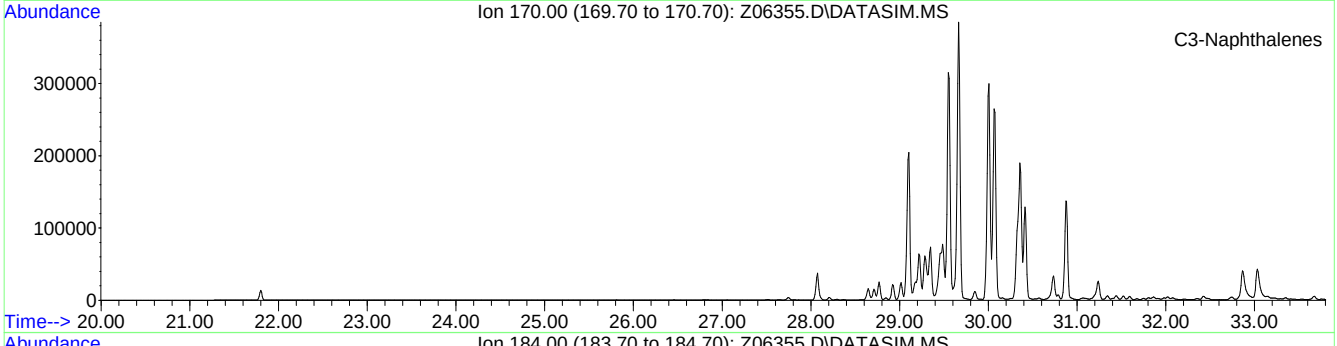
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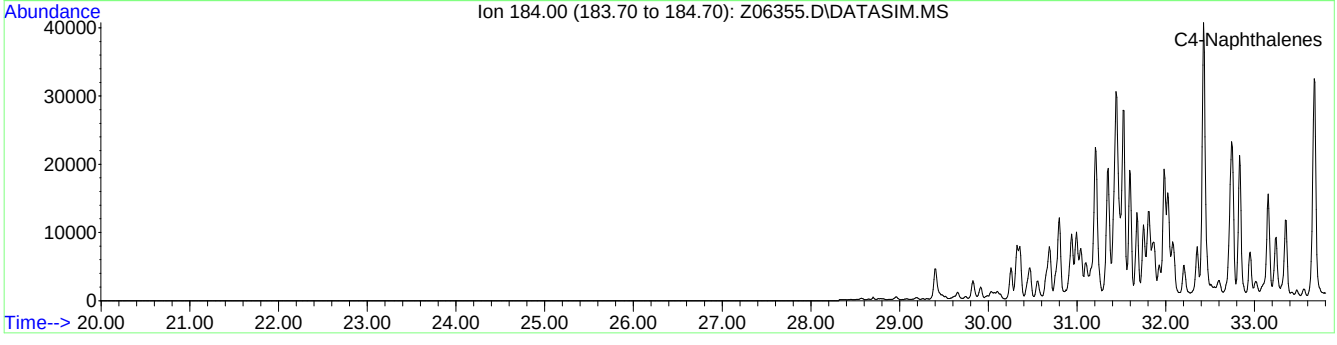
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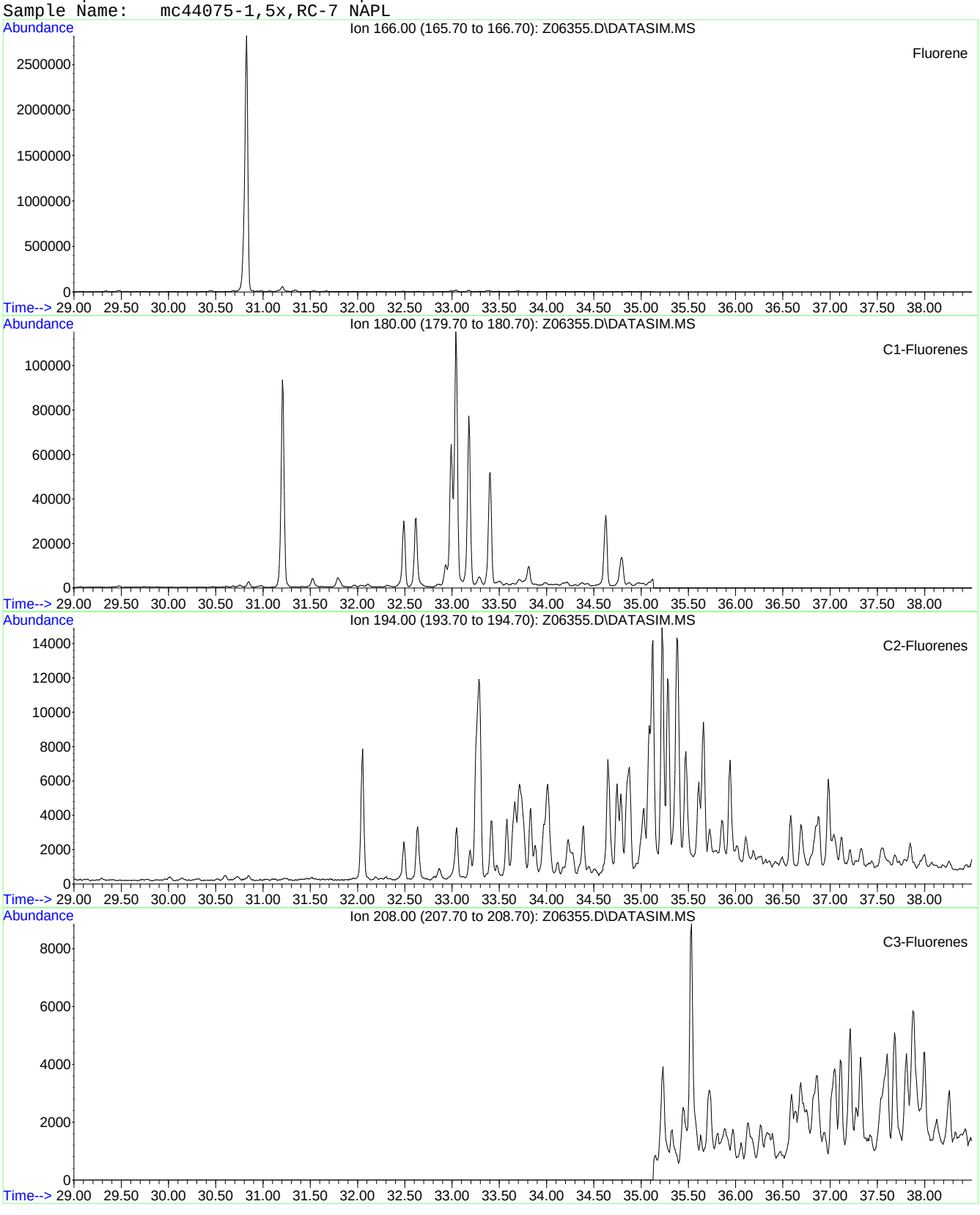




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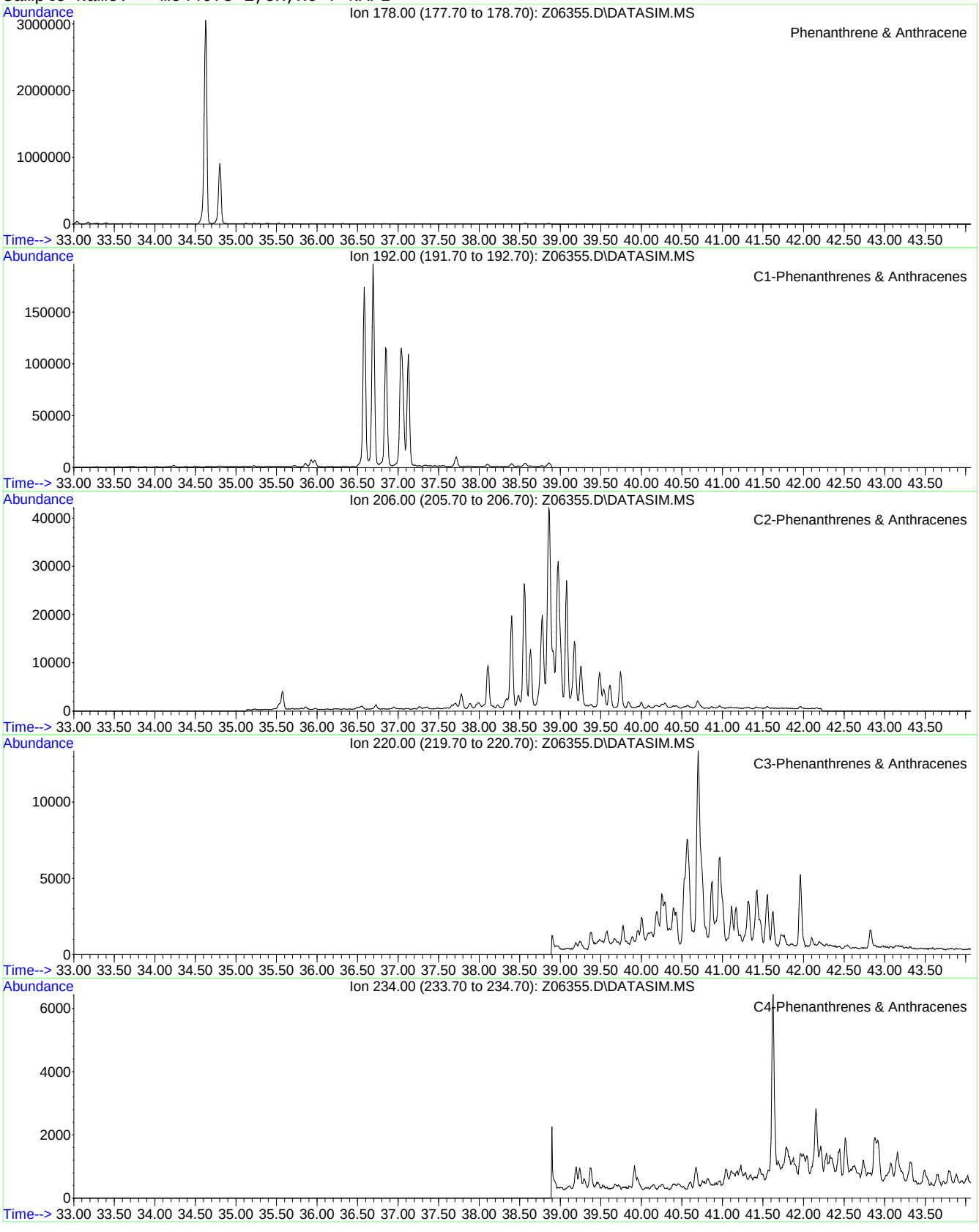
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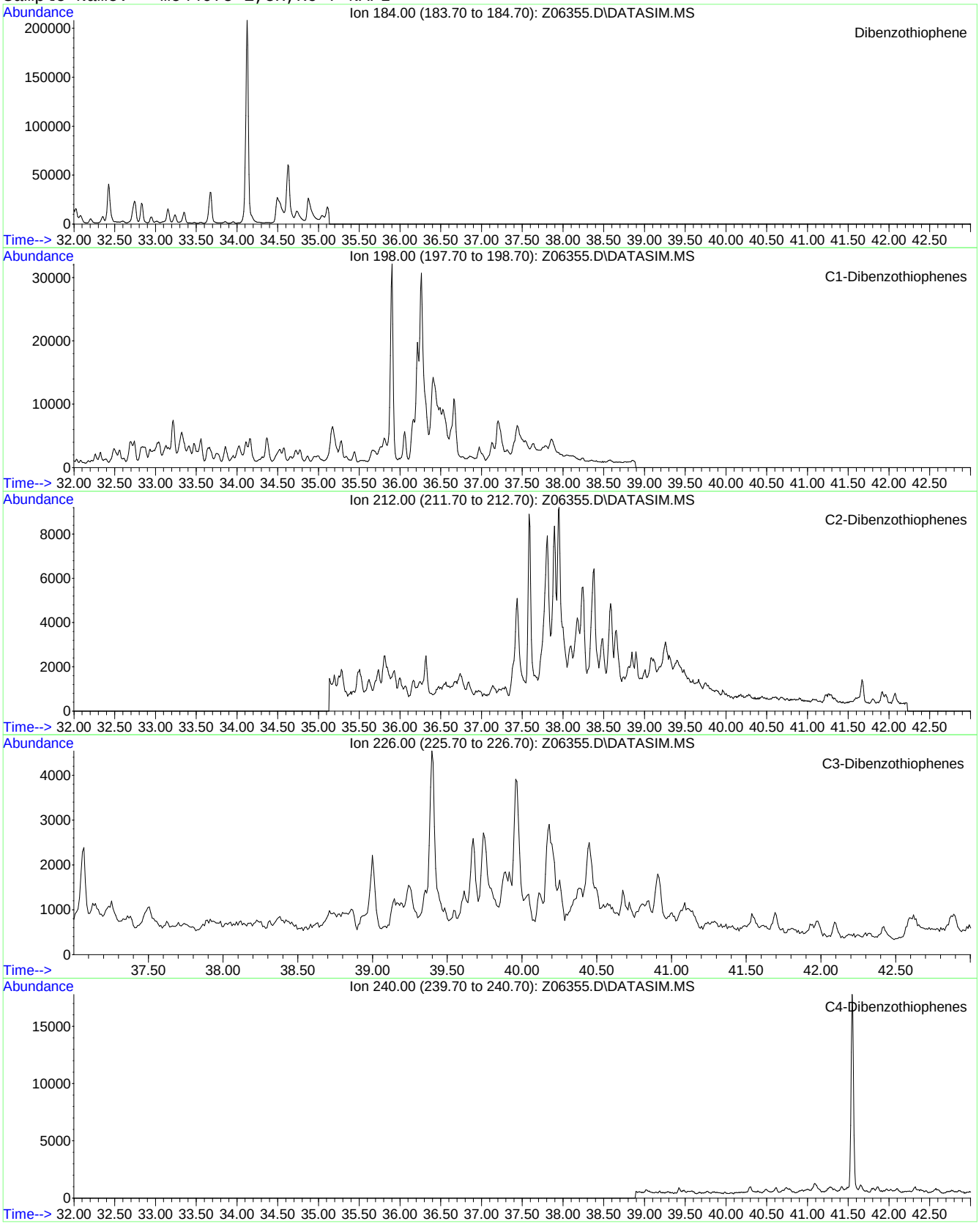
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Sample Name: mc44075-1,5x,RC-7 NAPL



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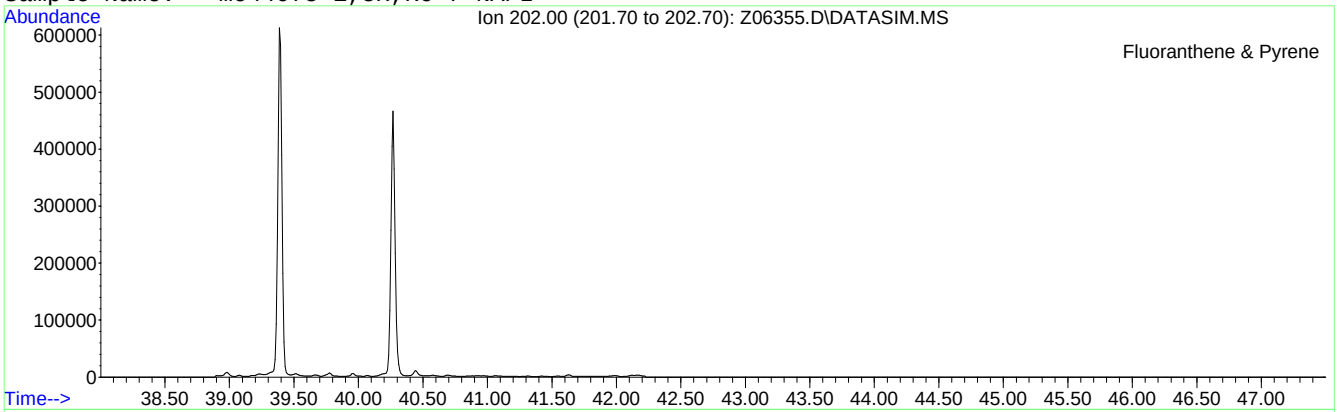
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Sample Name: mc44075-1,5x,RC-7 NAPL

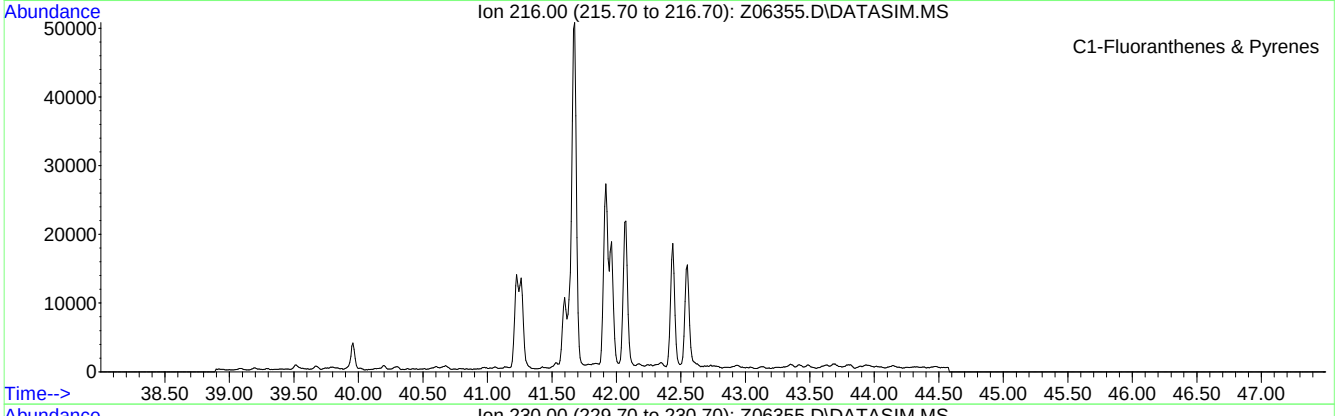


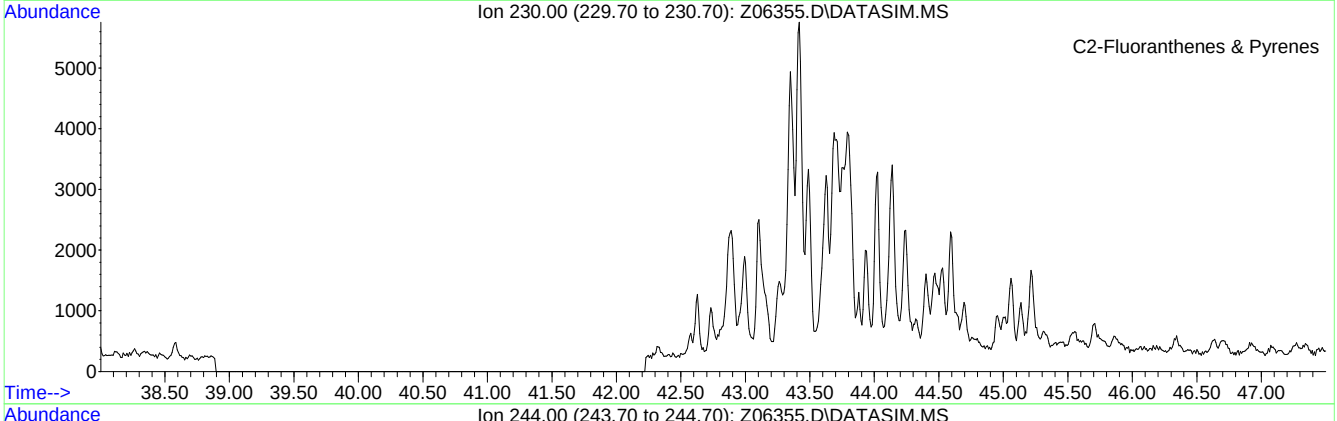
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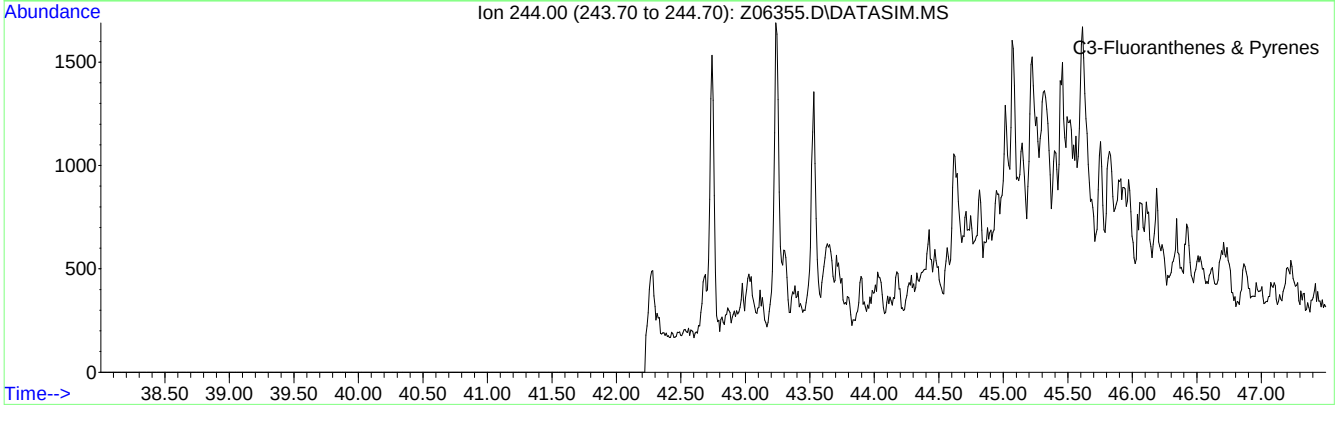
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Date Acquired: 26 Jan 2016 10:25 pm
Sample Name: mc44075-1,5x,RC-7 NAPL





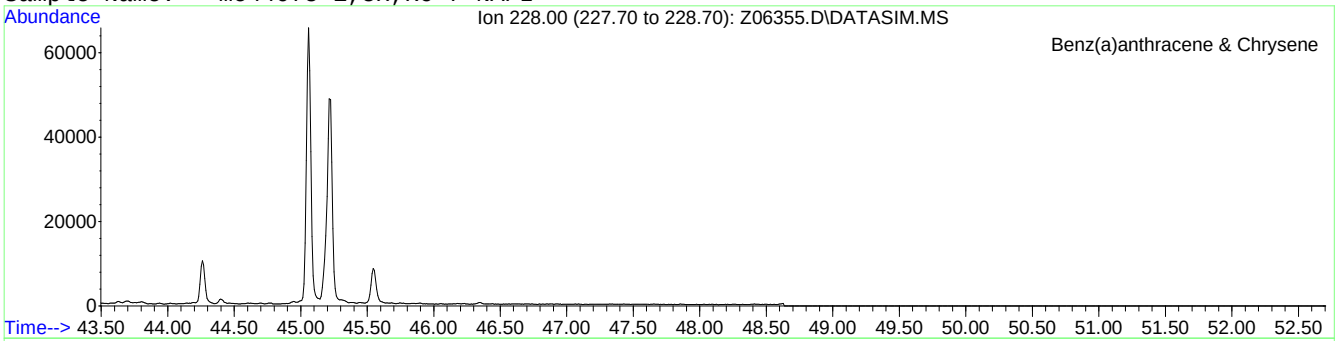


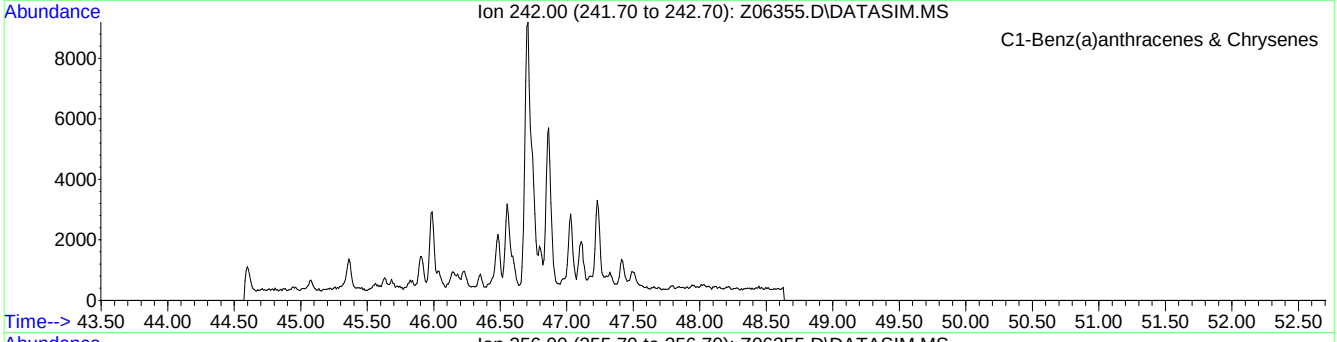


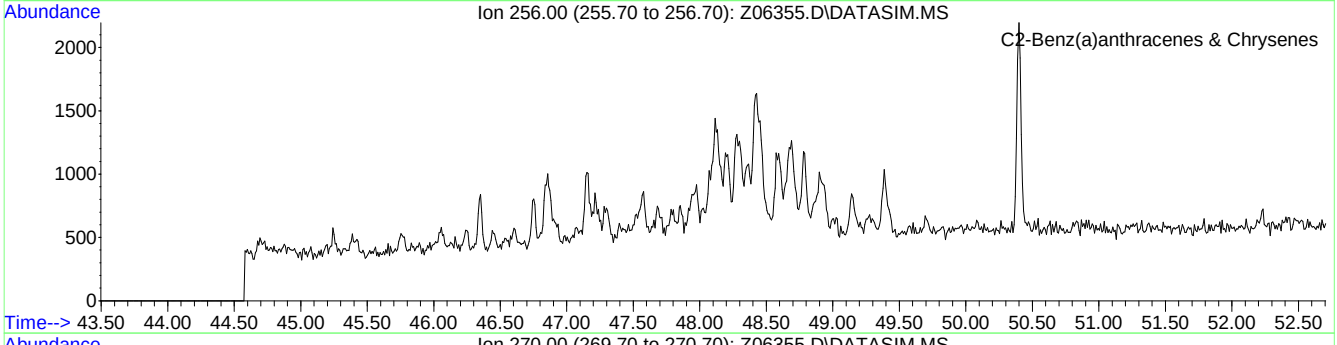
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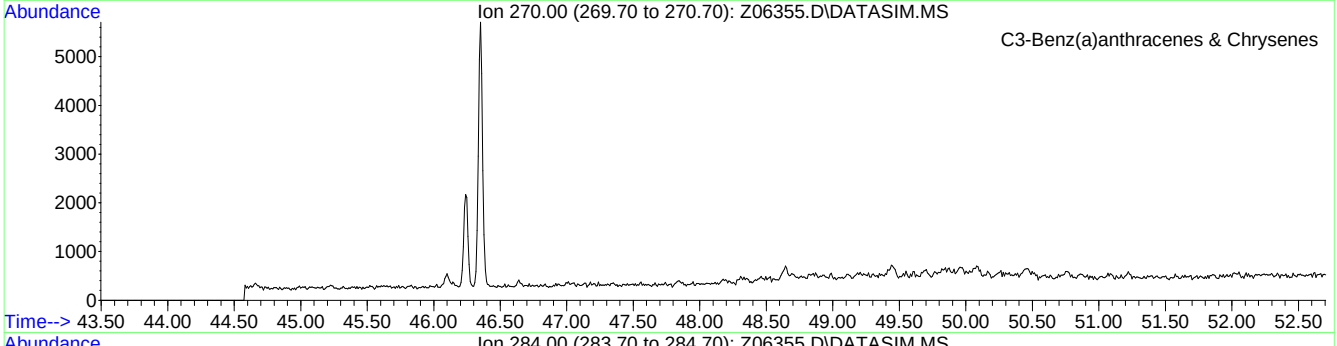
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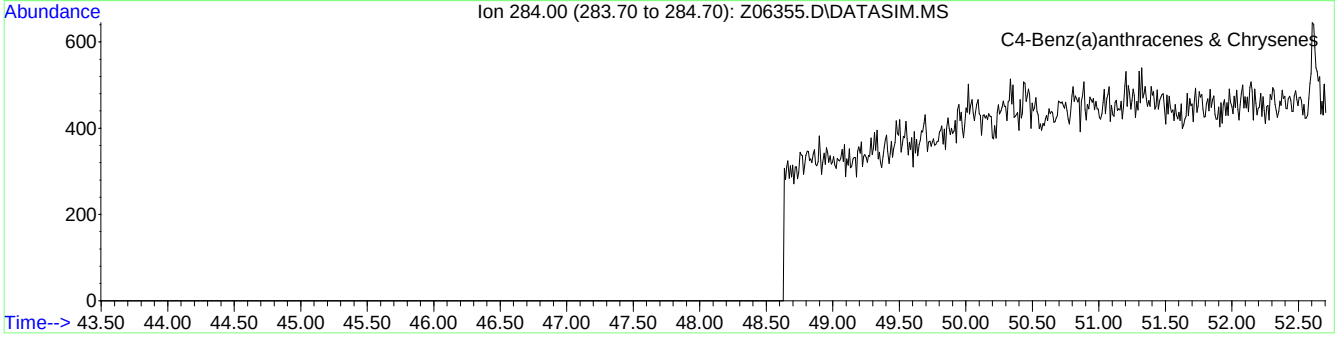
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Sample Name: mc44075-1,5x,RC-7 NAPL







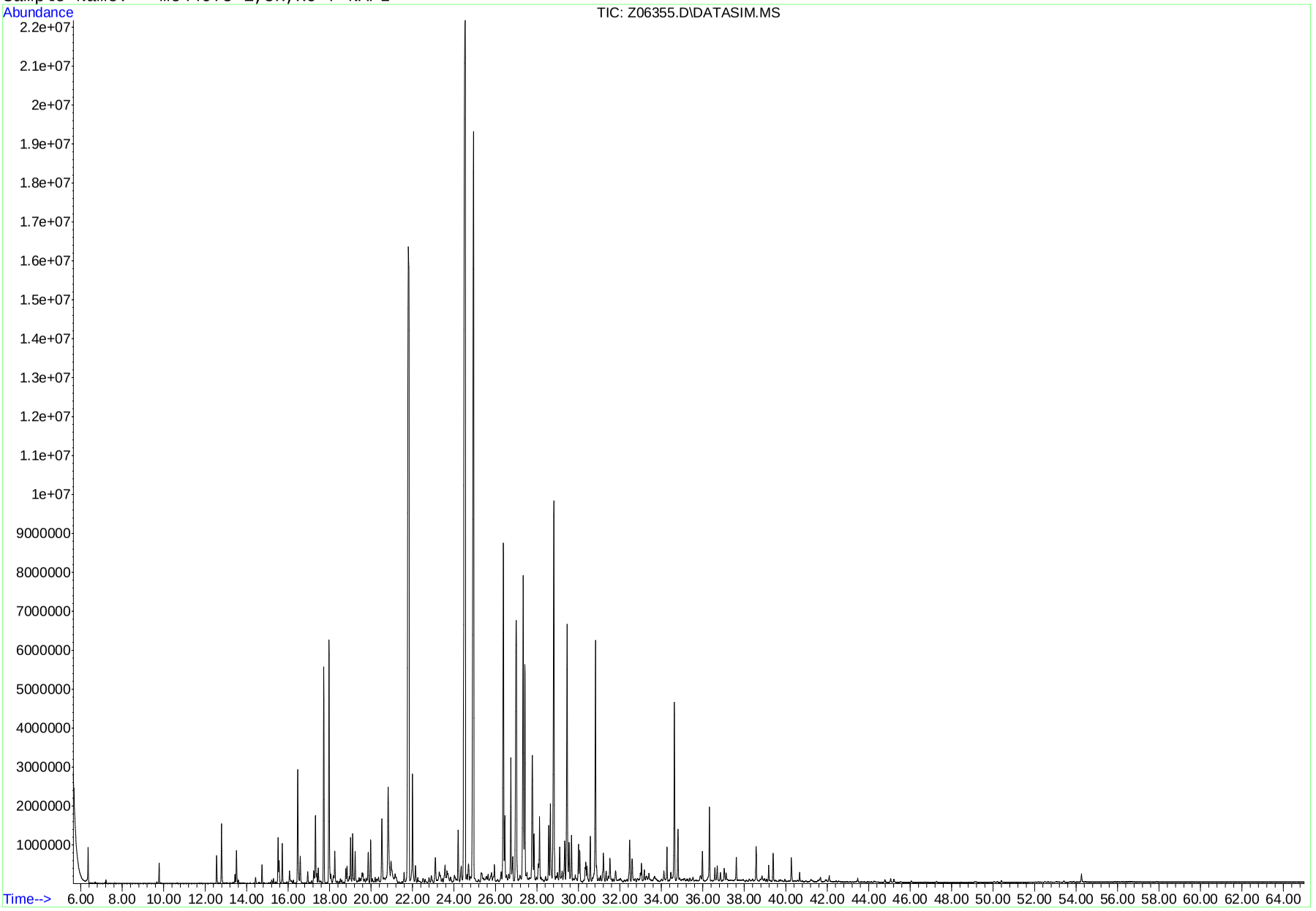




ACCUTEST

GC/MS TOTAL ION CHROMATOGRAM

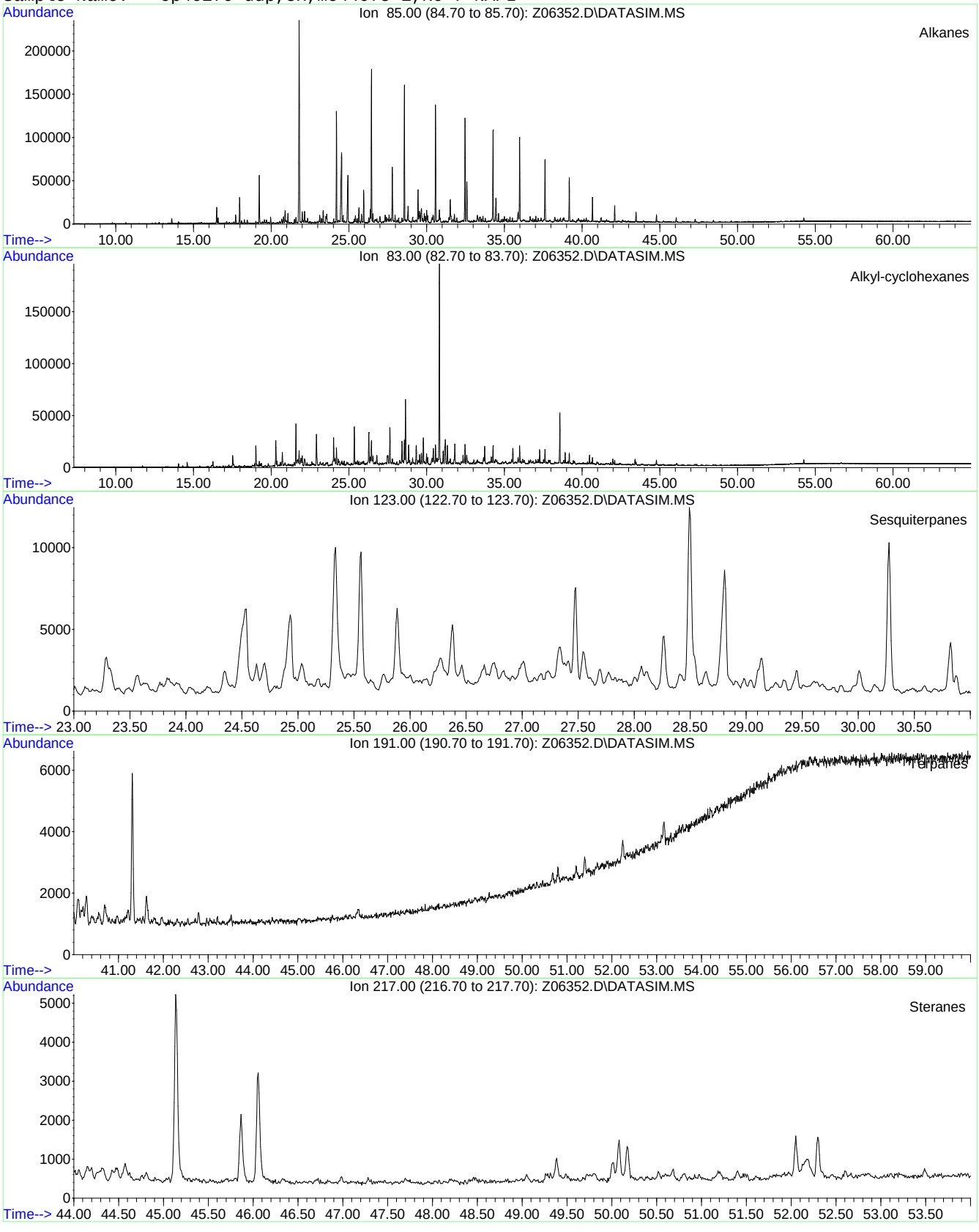
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Sample Name: mc44075-1,5x,RC-7 NAPL



ACCUTEST

GC/MS EXTRACTED ION CHROMATOGRAM

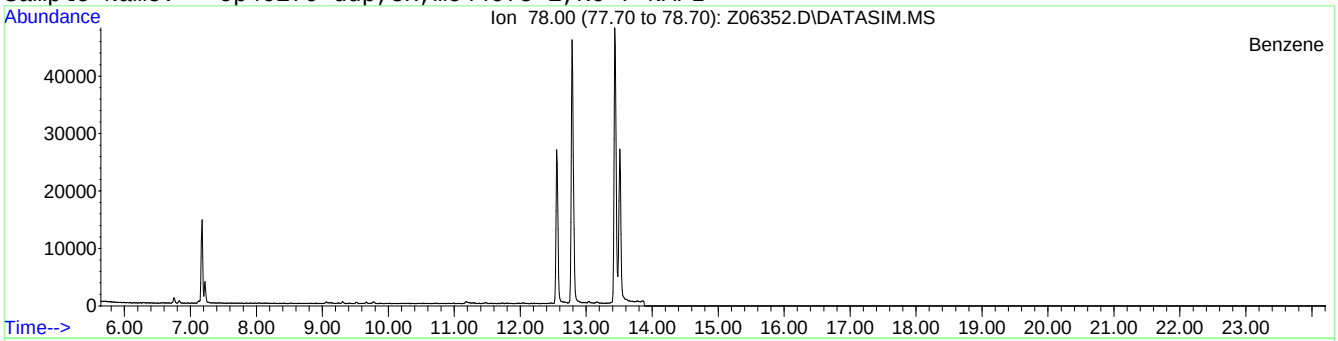
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Date Acquired: 26 Jan 2016 6:31 pm
Sample Name: op46170-dup,5x,mc44075-1,RC-7 NAPL

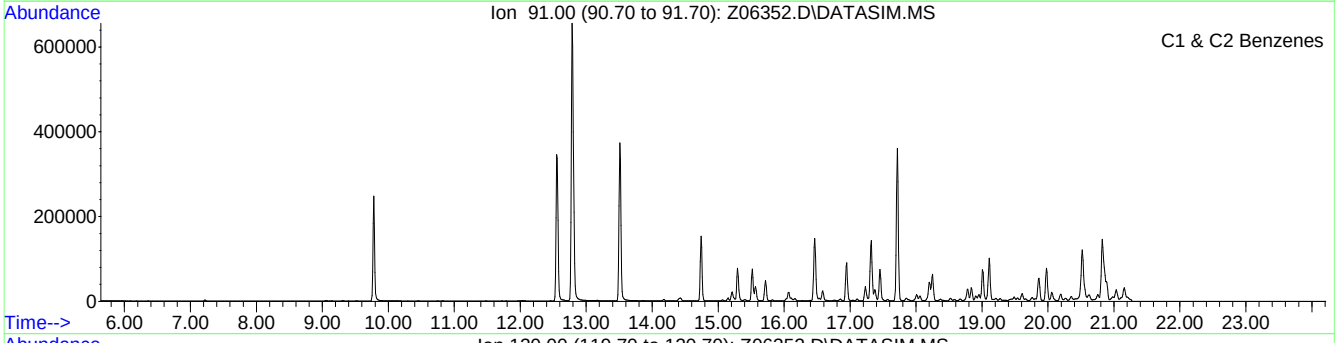


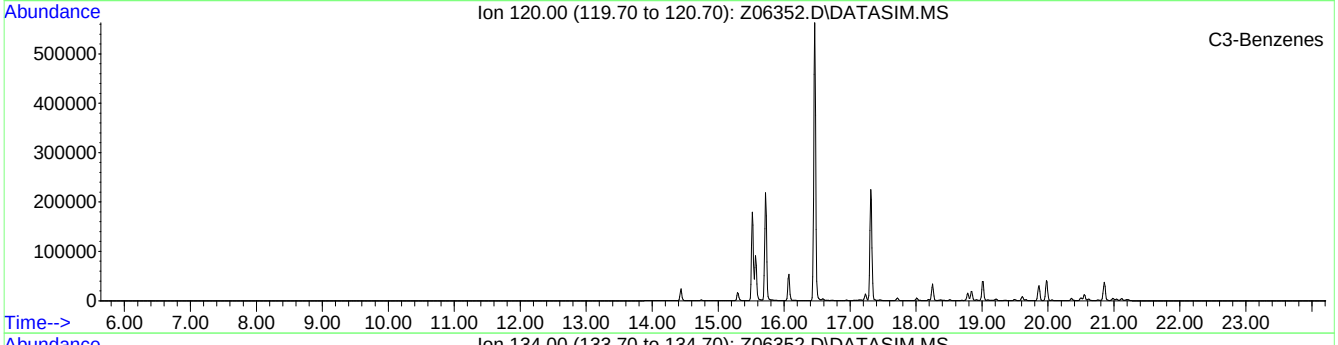
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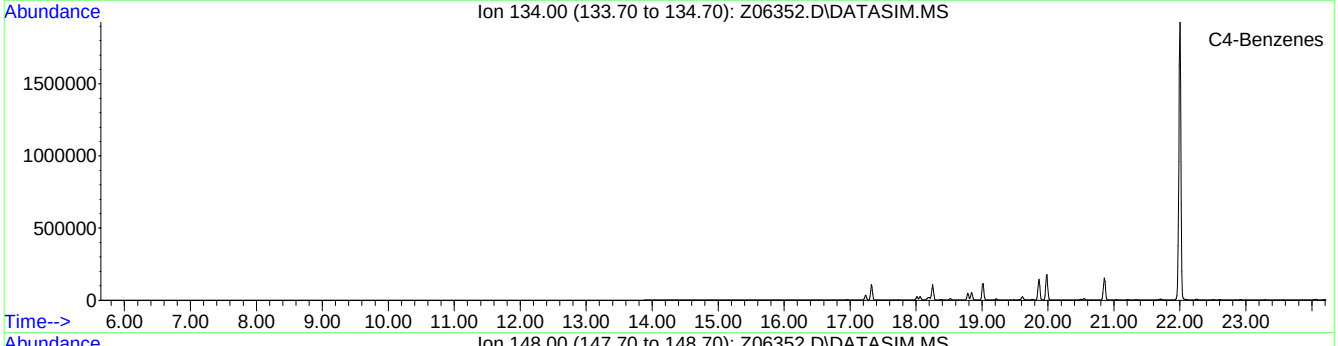
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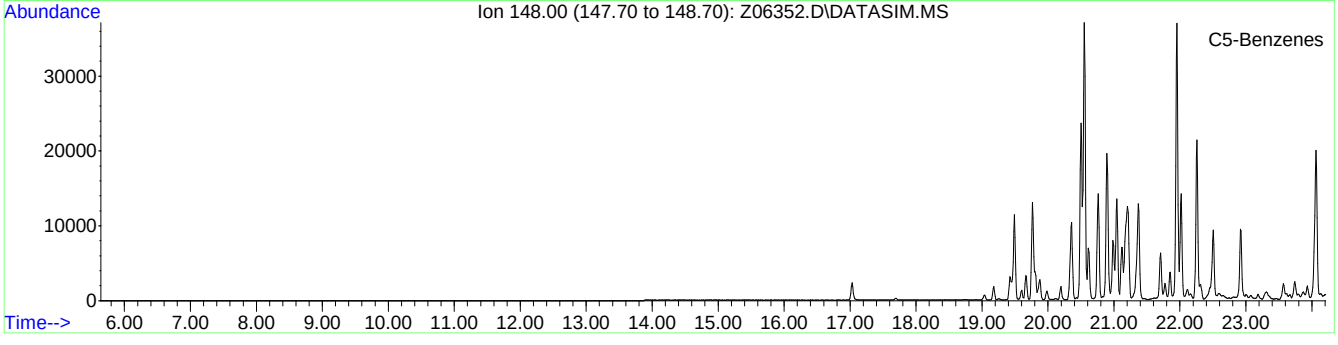
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Sample Name: op46170-dup,5x,mc44075-1,RC-7 NAPL







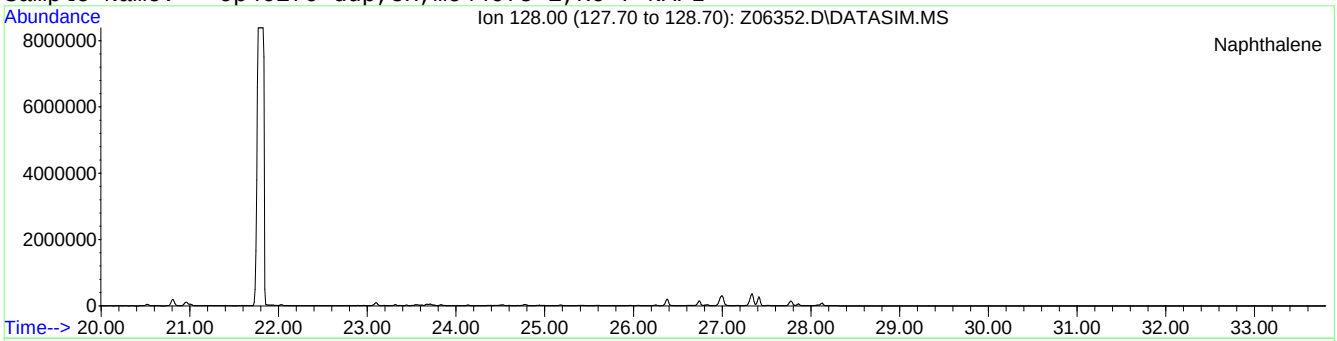


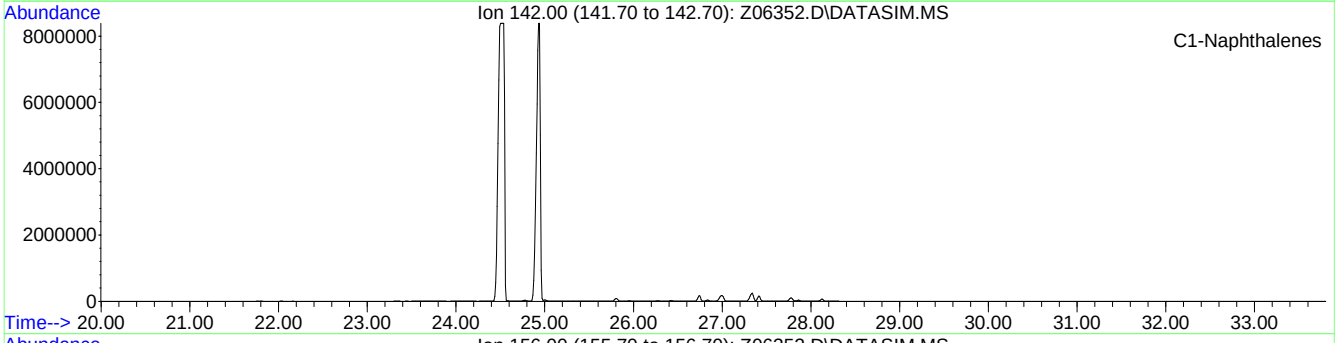


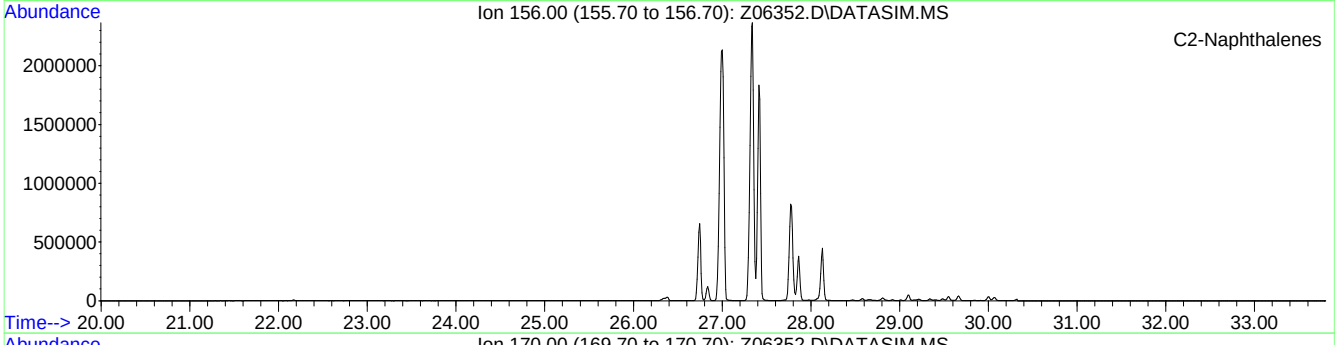
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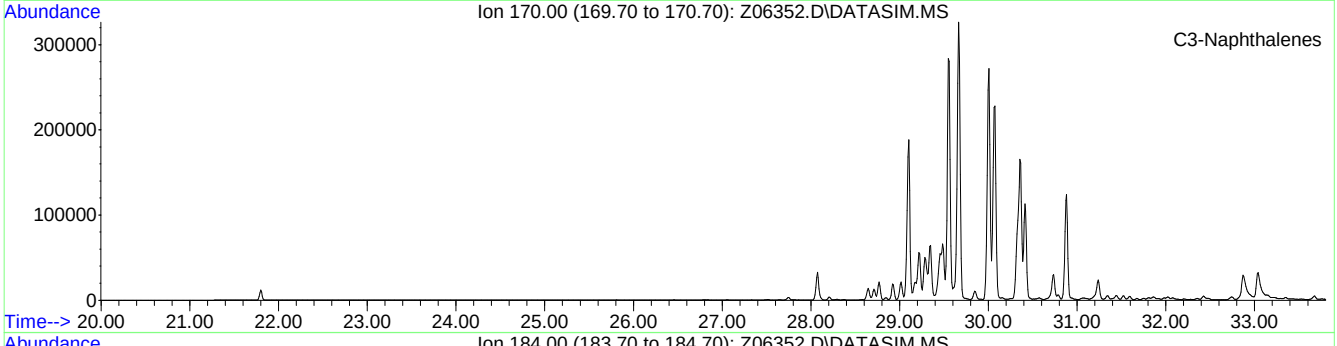
GC/MS EXTRACTED ION CHROMATOGRAM

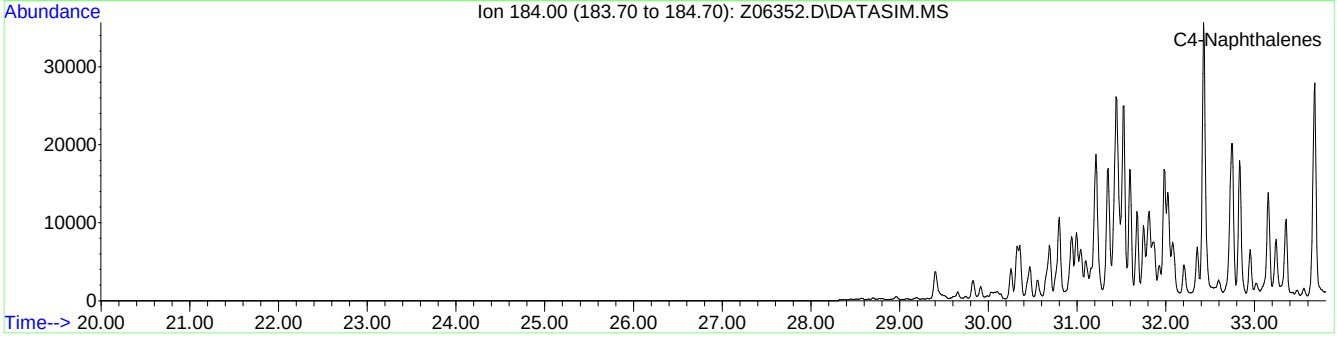
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Date Acquired: 26 Jan 2016 6:31 pm
Sample Name: op46170-dup,5x,mc44075-1,RC-7 NAPL







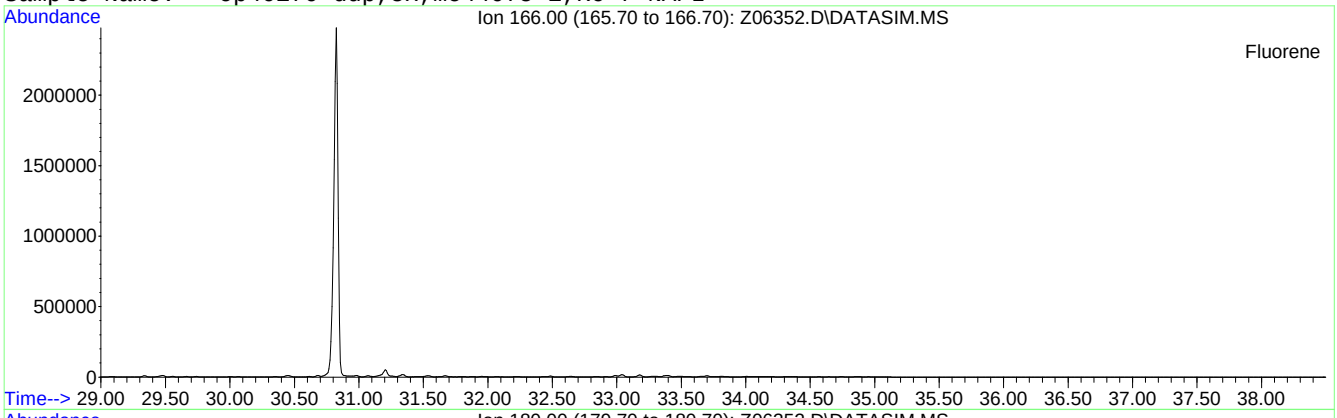


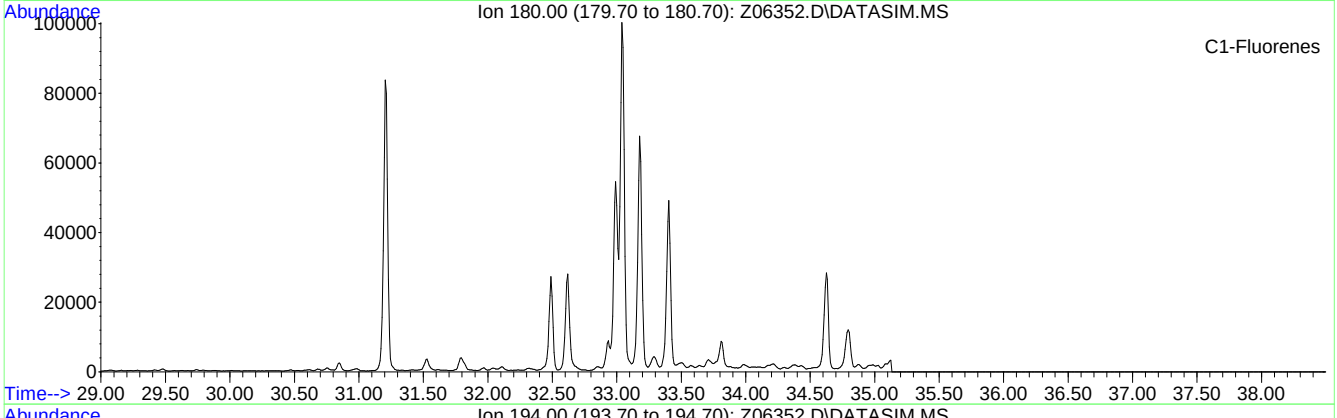


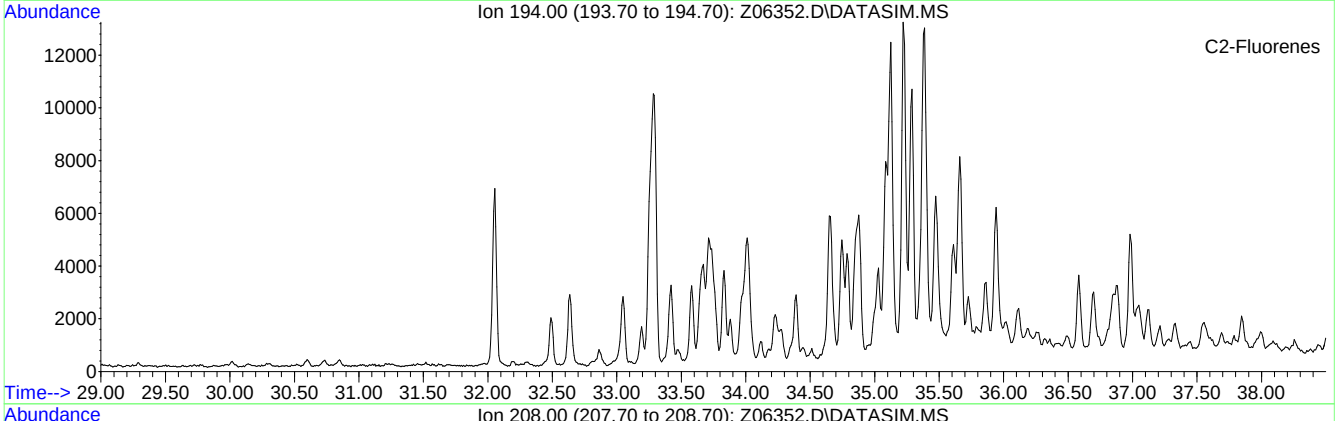
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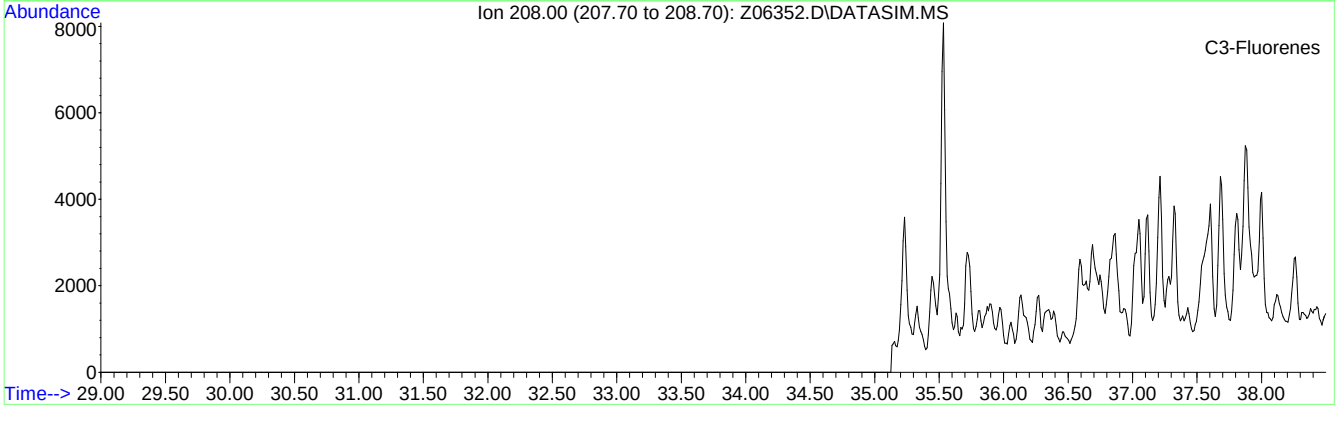
GC/MS EXTRACTED ION CHROMATOGRAM

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Date Acquired: 26 Jan 2016 6:31 pm
Sample Name: op46170-dup,5x,mc44075-1,RC-7 NAPL





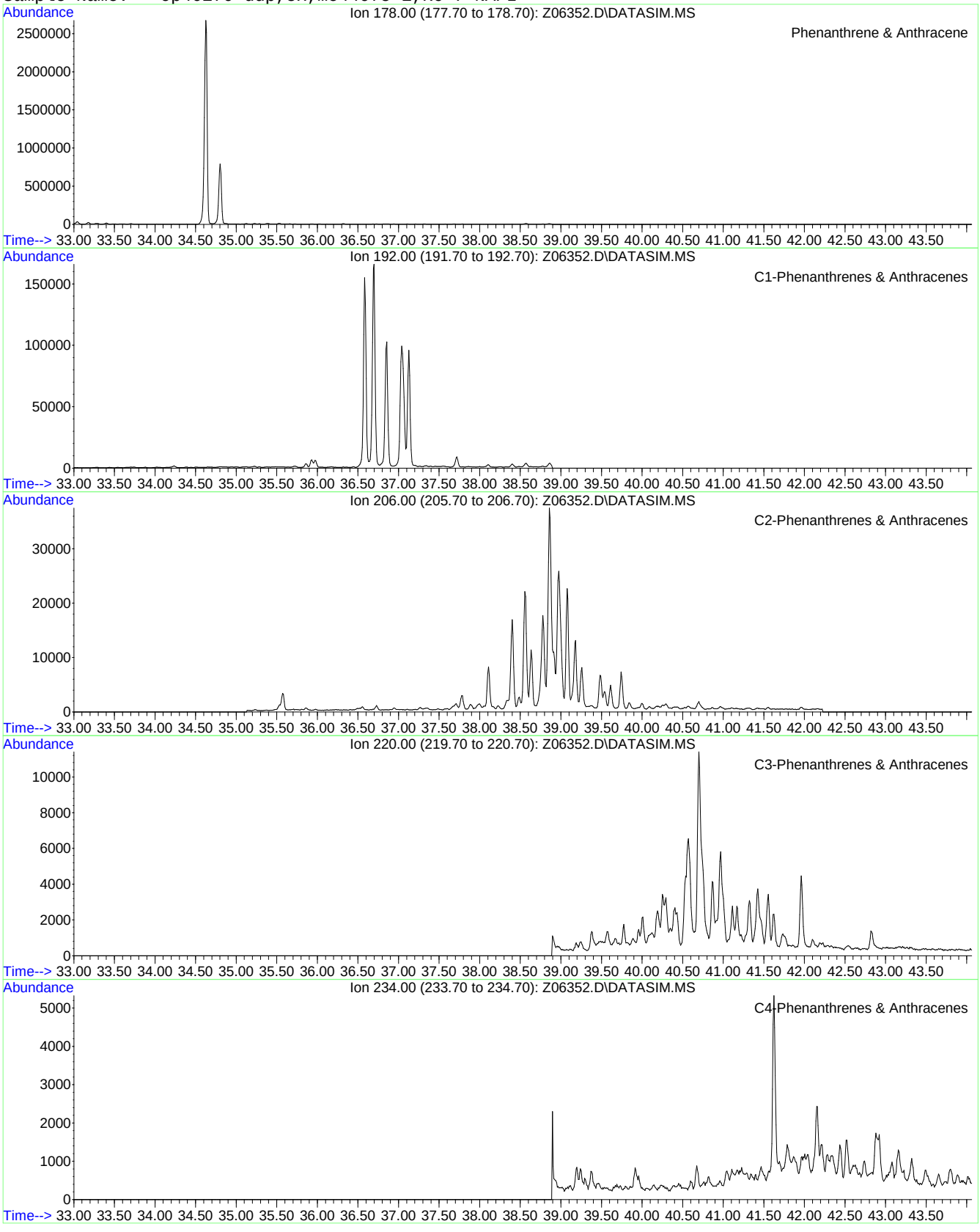




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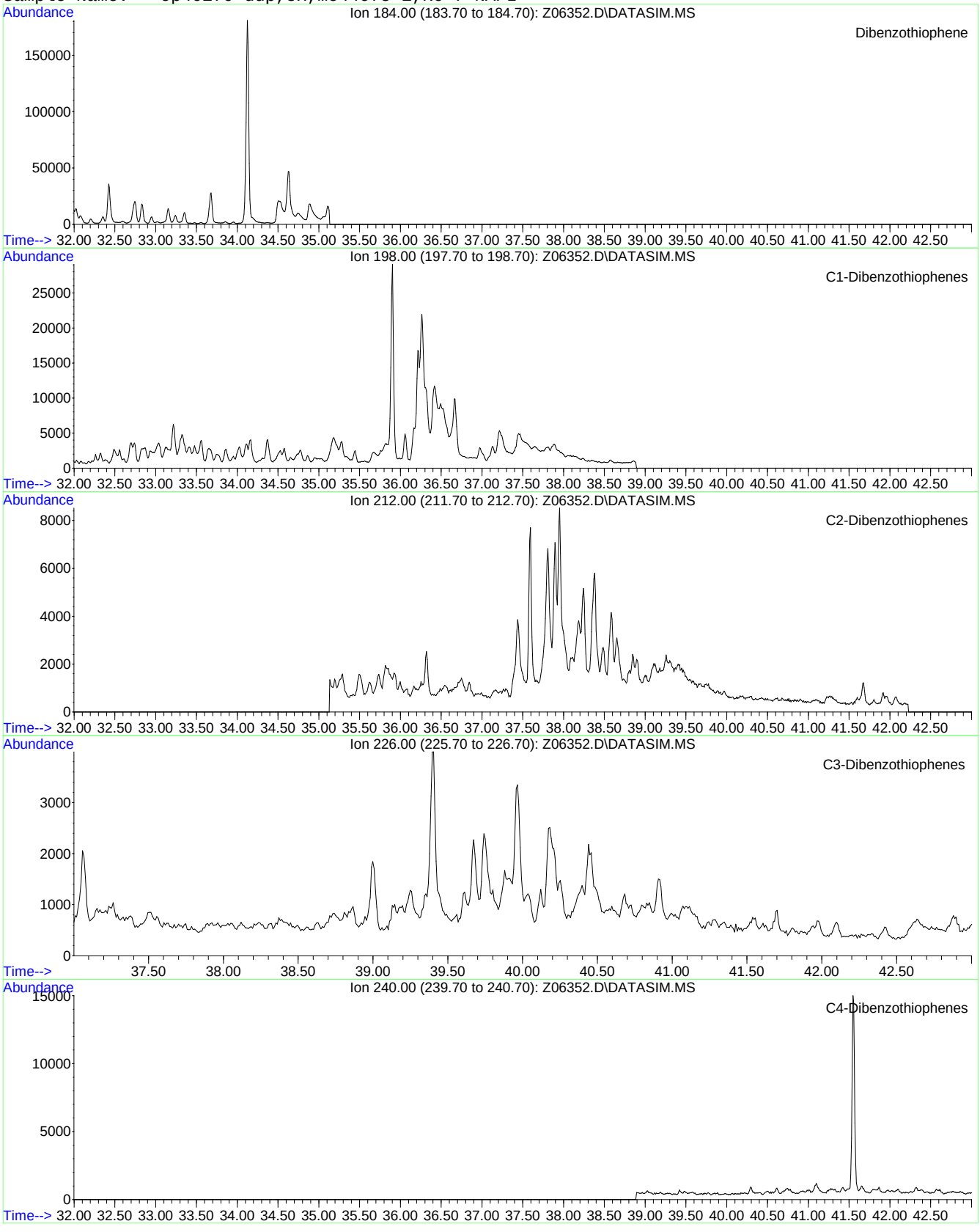
GC/MS EXTRACTED ION CHROMATOGRAM

File: Z:\1\data\Z160126\Z06352.D
Date Acquired: 26 Jan 2016 6:31 pm
Sample Name: op46170-dup,5x,mc44075-1,RC-7 NAPL



GC/MS EXTRACTED ION CHROMATOGRAM

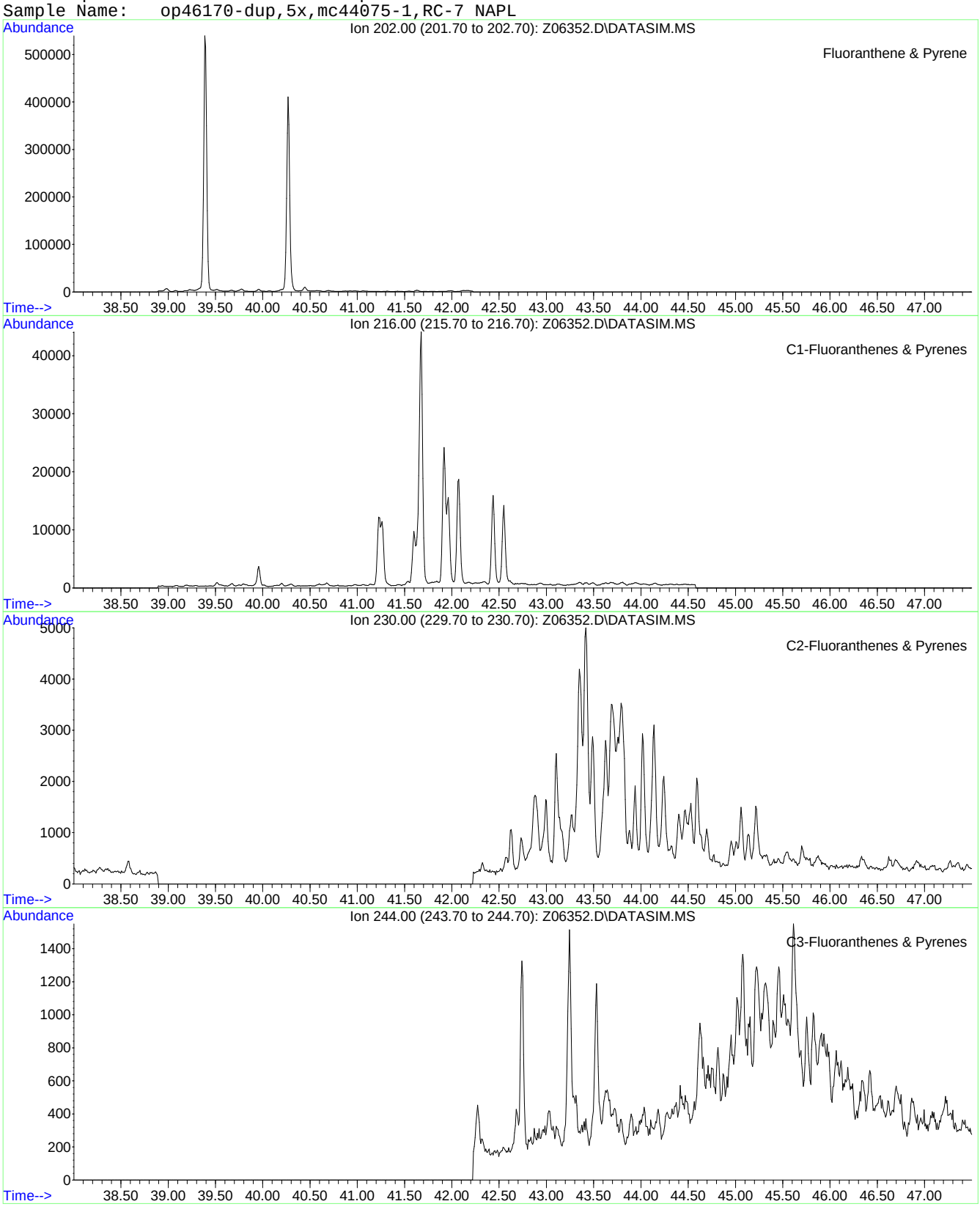
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ACCUTEST

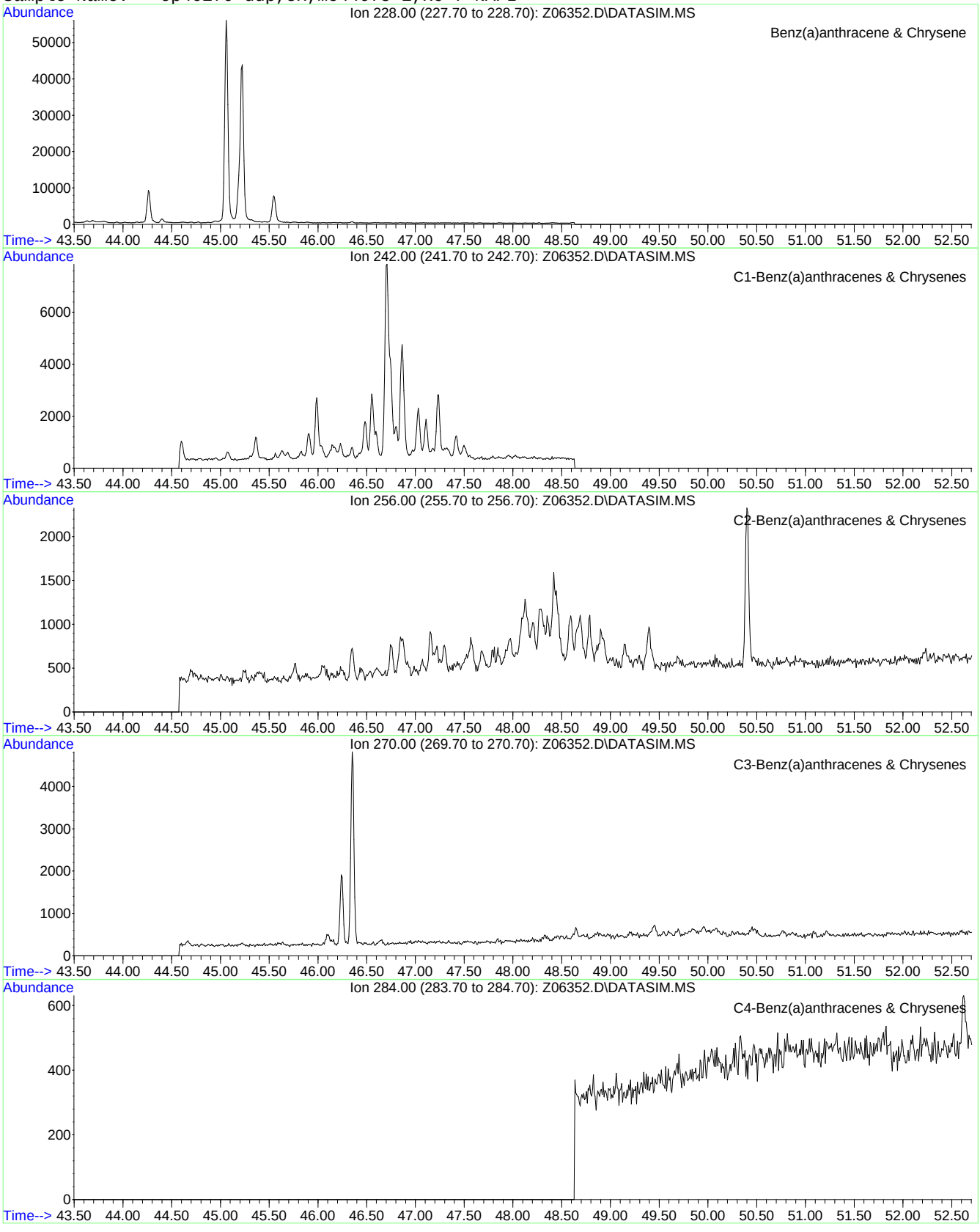
GC/MS EXTRACTED ION CHROMATOGRAM

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Sample Name: op46170-dup,5x,mc44075-1,RC-7 NAPL



GC/MS EXTRACTED ION CHROMATOGRAM

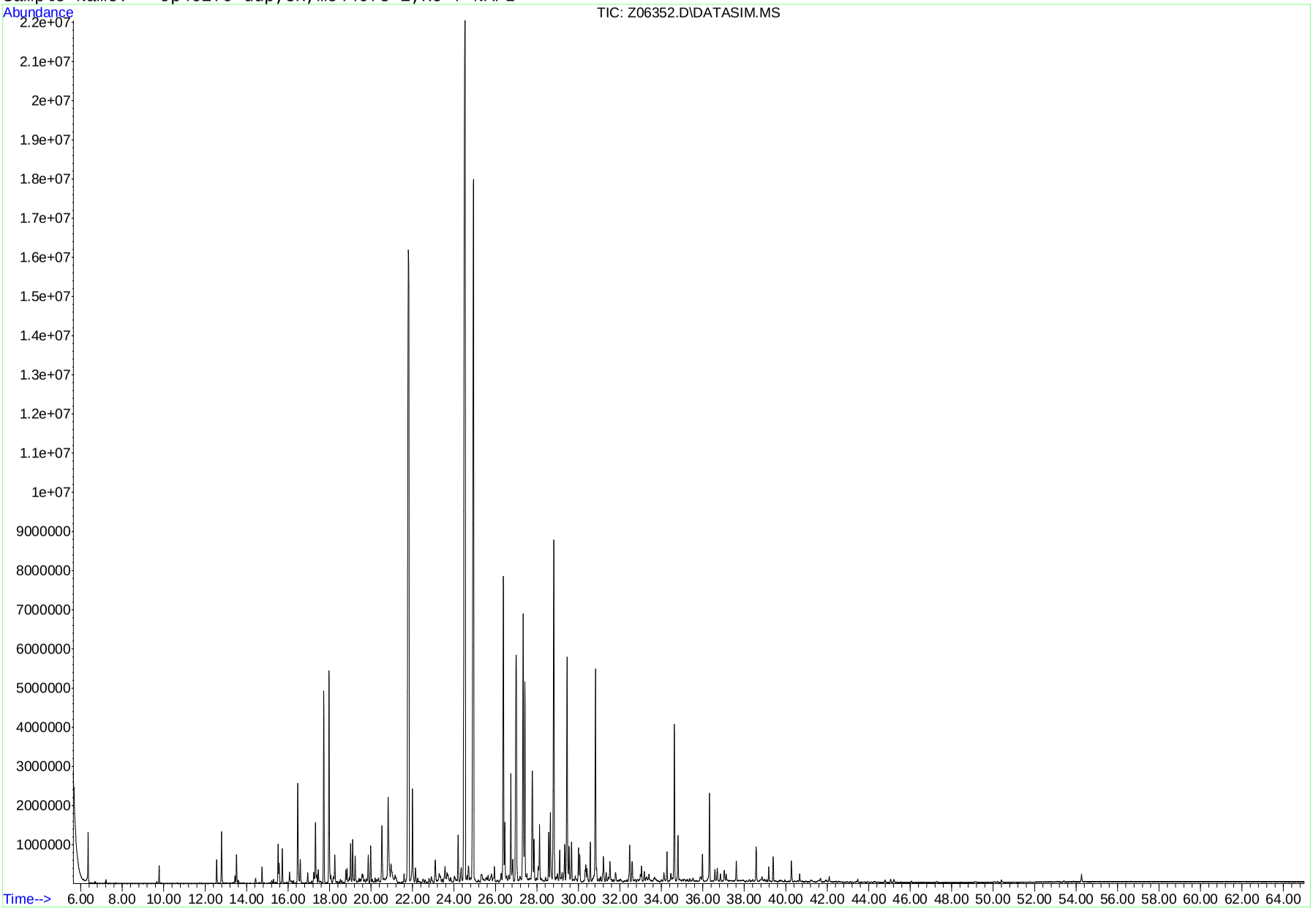
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Sample Name: op46170-dup,5x,mc44075-1,RC-7 NAPL



ACCUTEST

GC/MS TOTAL ION CHROMATOGRAM

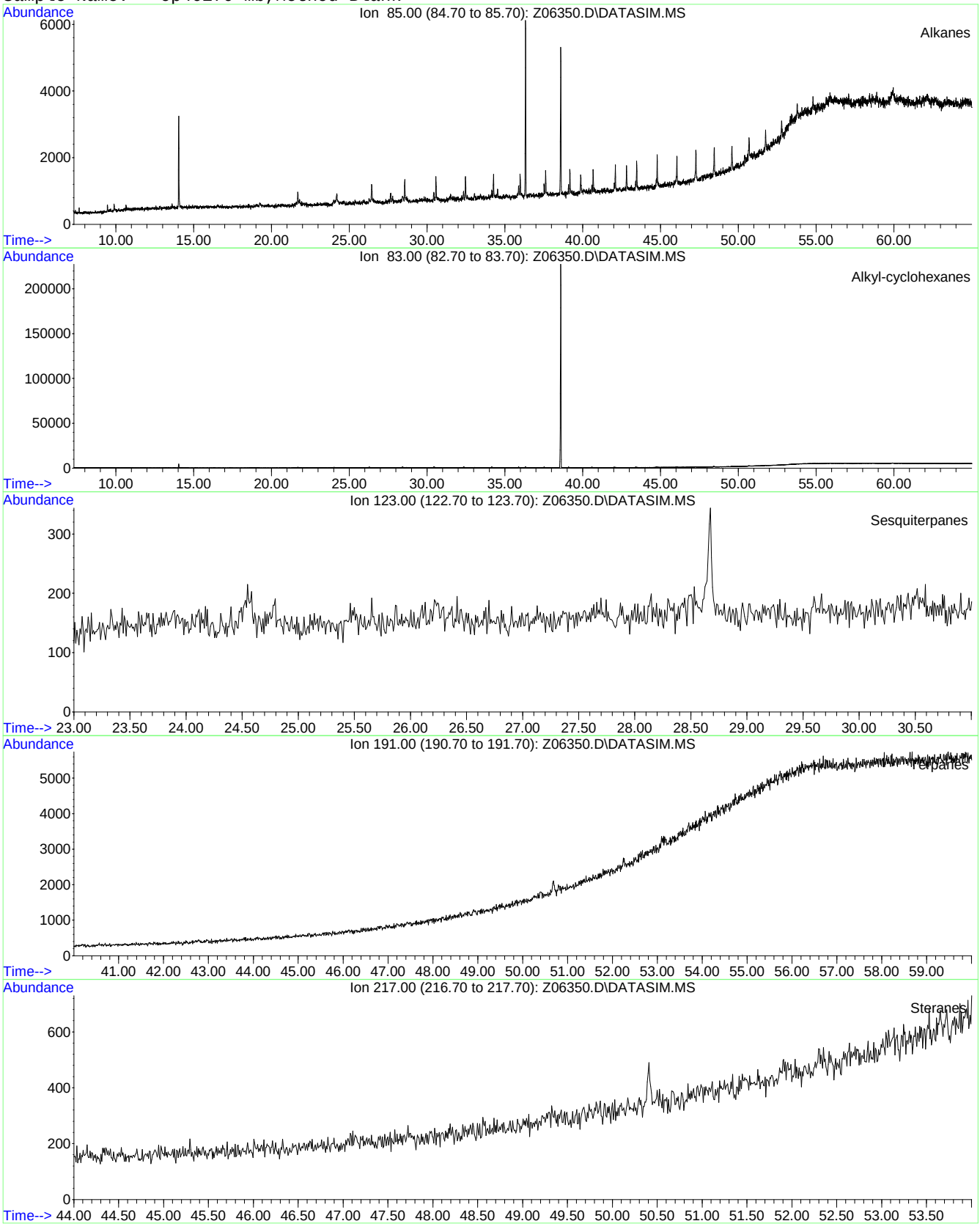
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Sample Name: op46170-dup,5x,mc44075-1,RC-7 NAPL



ACCUTEST

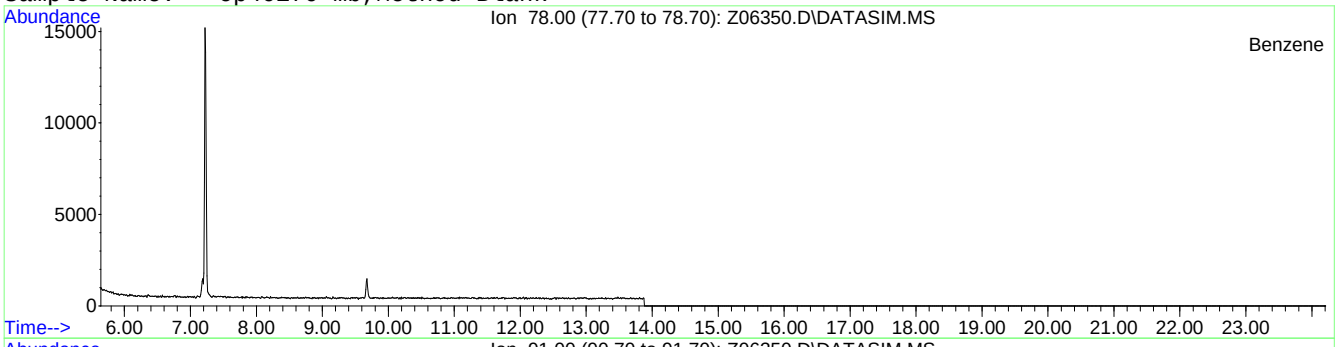
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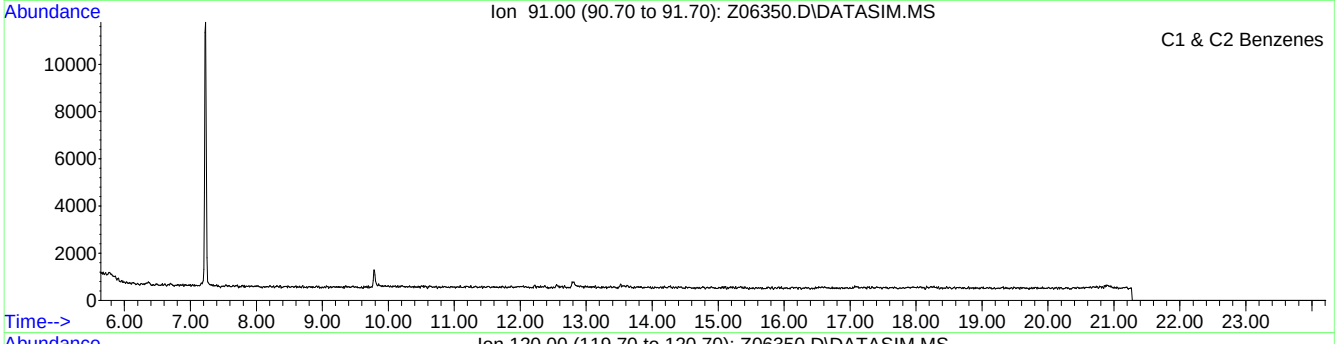
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Date Acquired: 26 Jan 2016 3:56 pm
Sample Name: op46170-mb,Method Blank

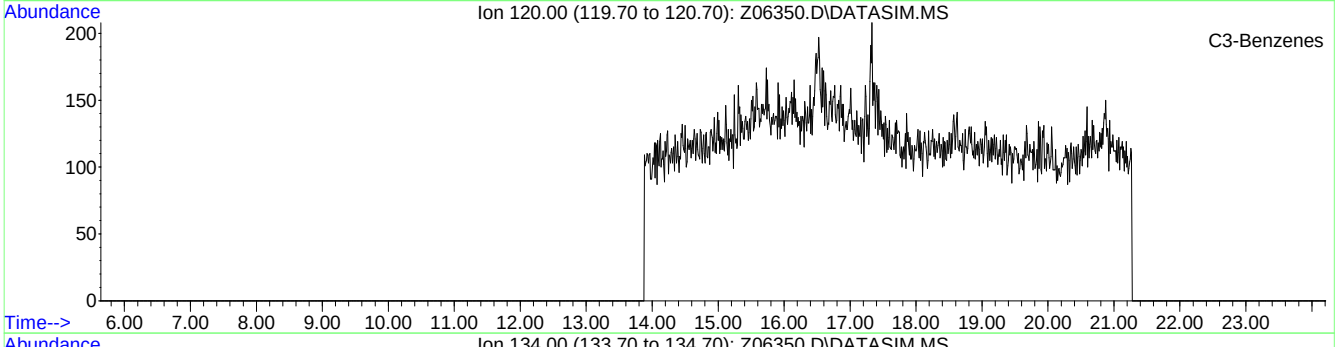


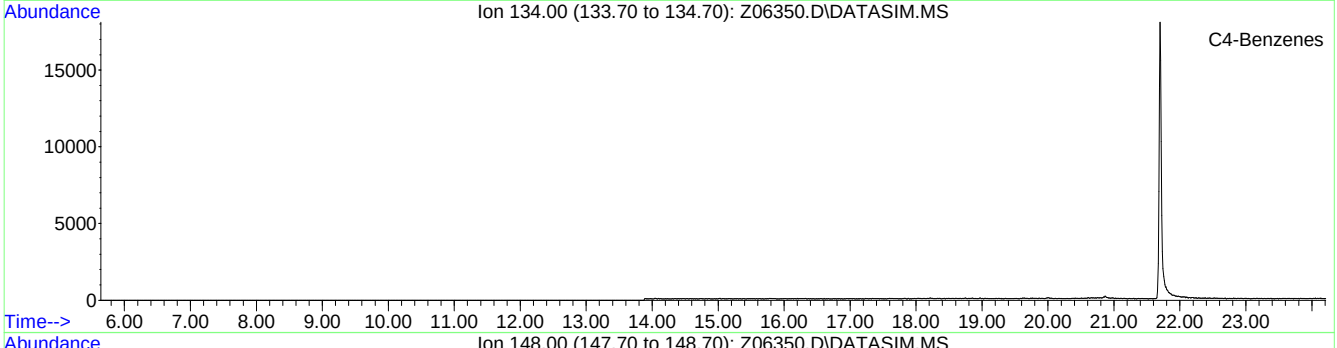
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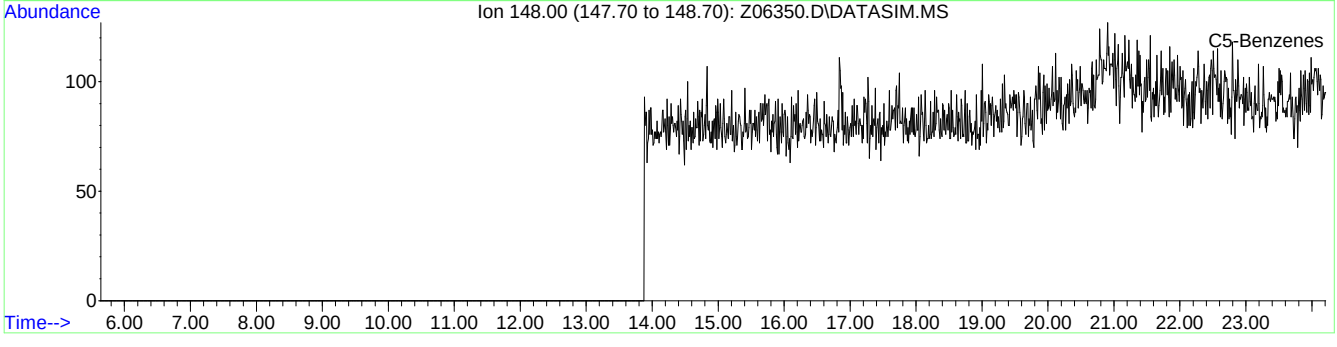
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Sample Name: op46170-mb,Method Blank







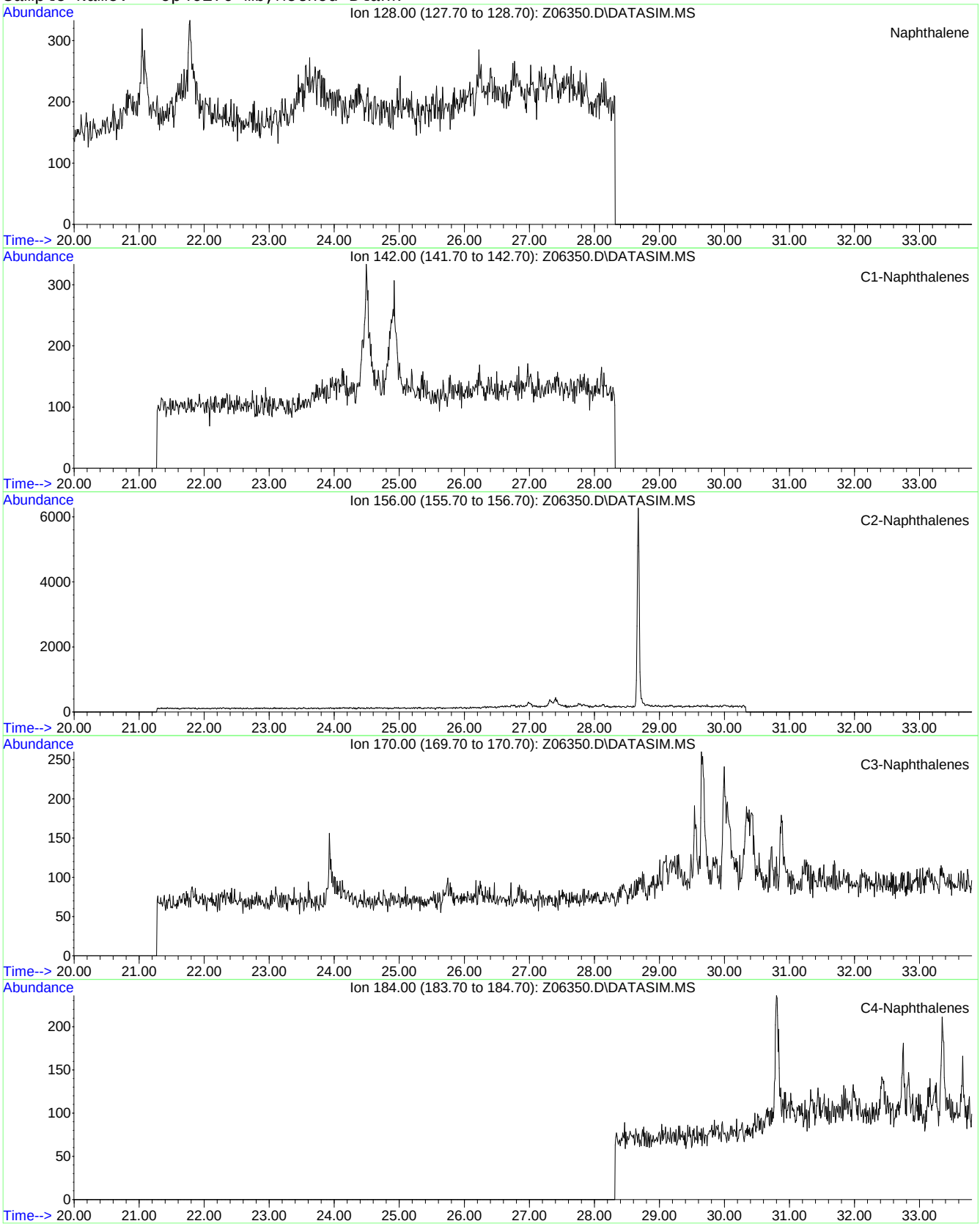




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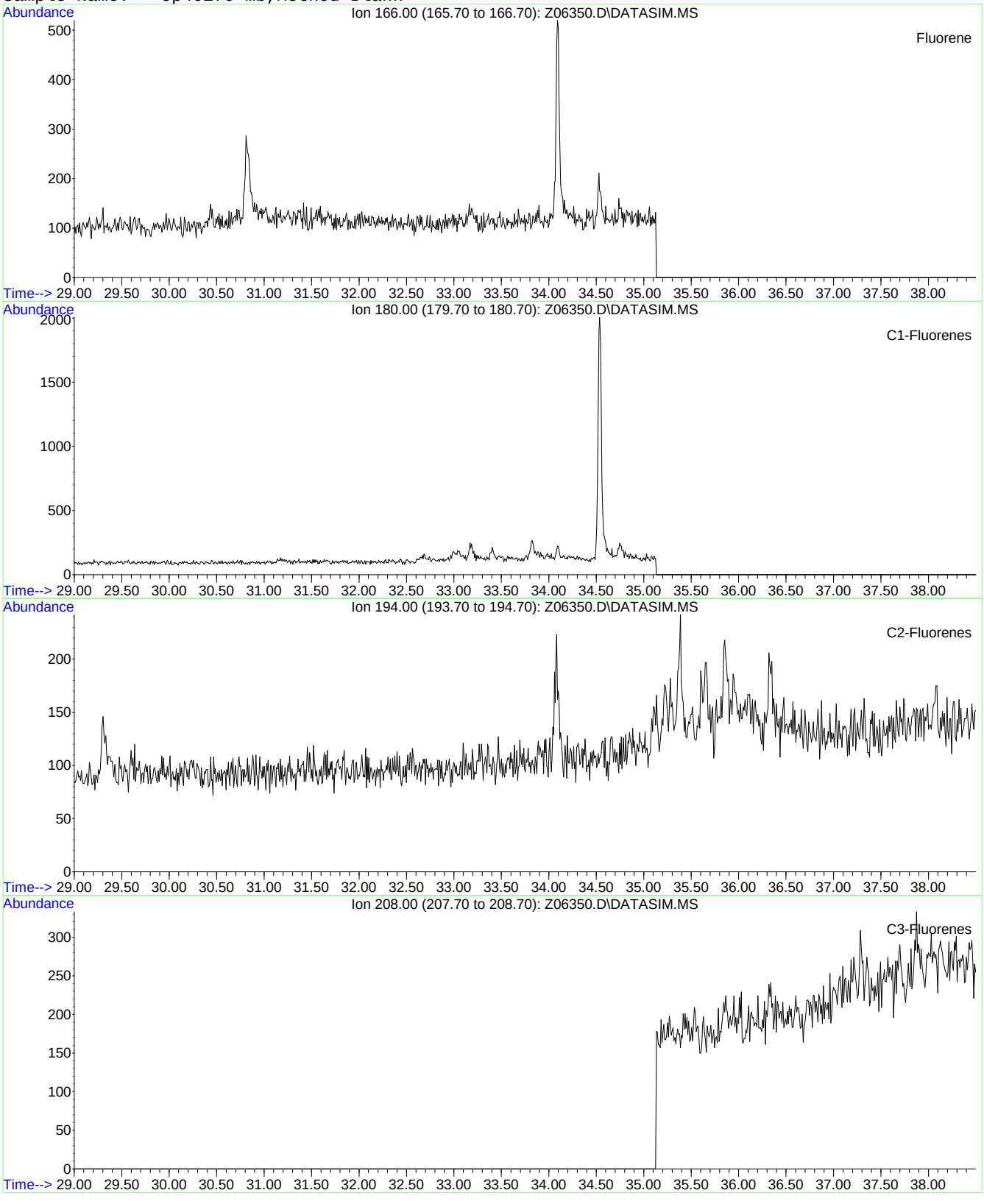
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Sample Name: op46170-mb,Method Blank



ACCUTEST

GC/MS EXTRACTED ION CHROMATOGRAM

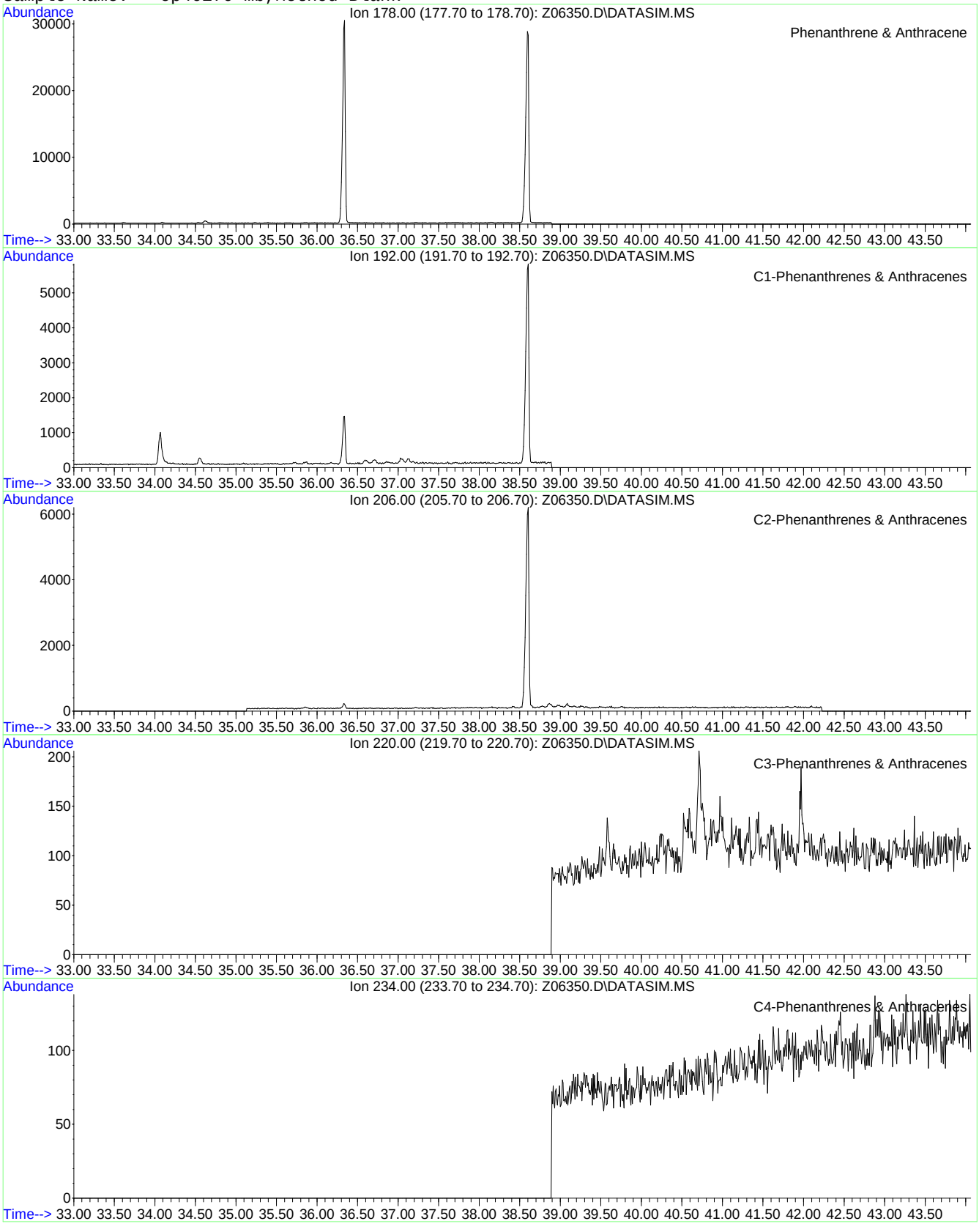
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ACCUTEST

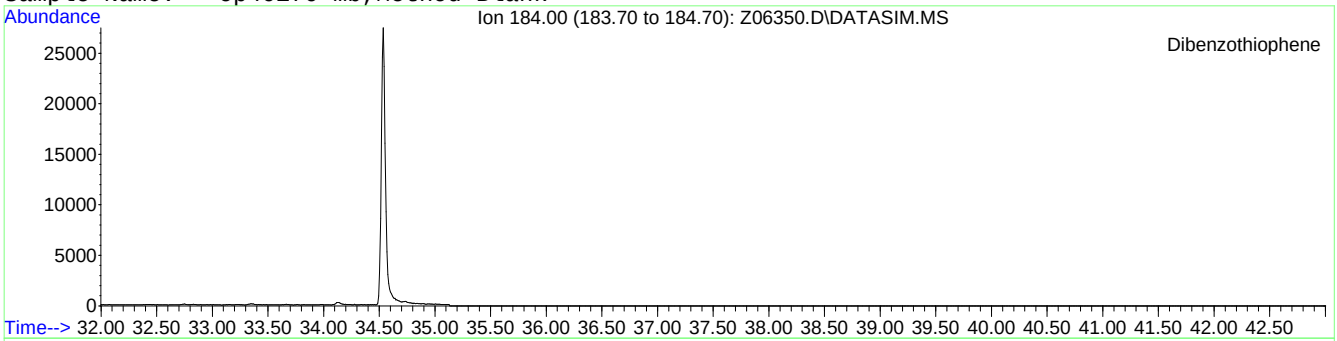
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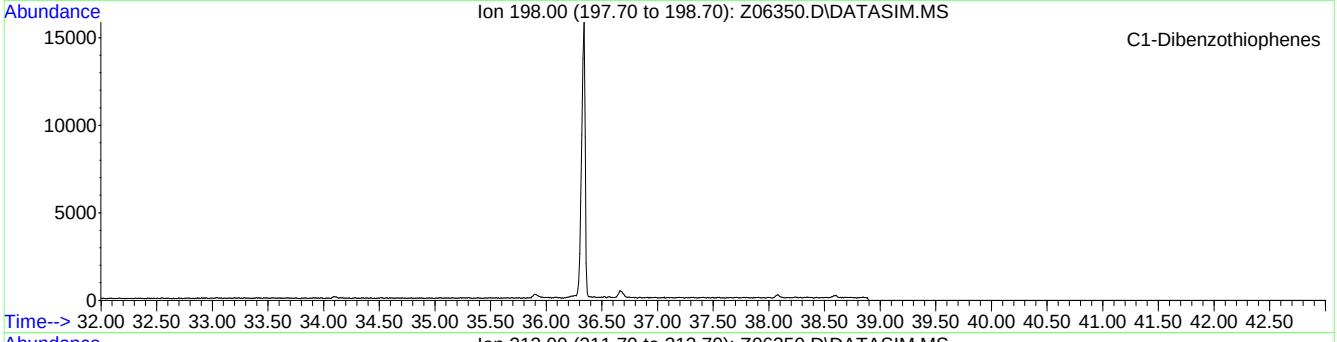
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Sample Name: op46170-mb,Method Blank

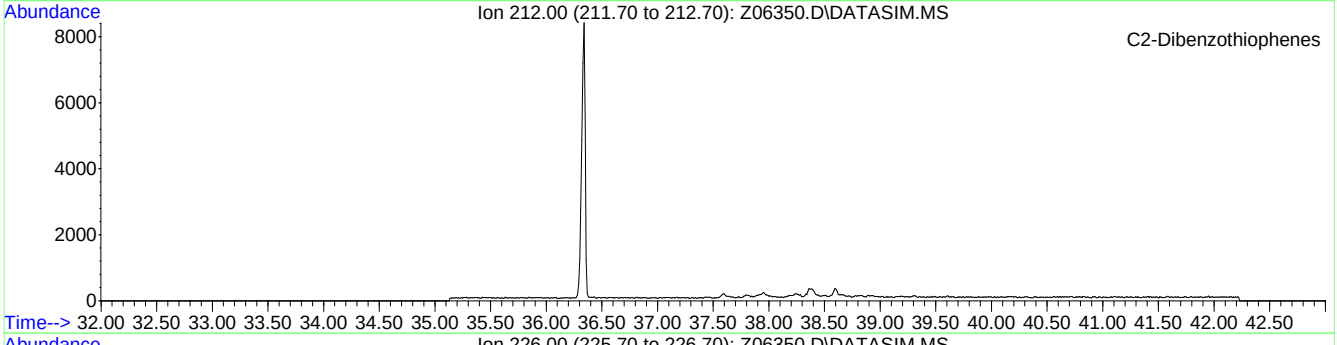


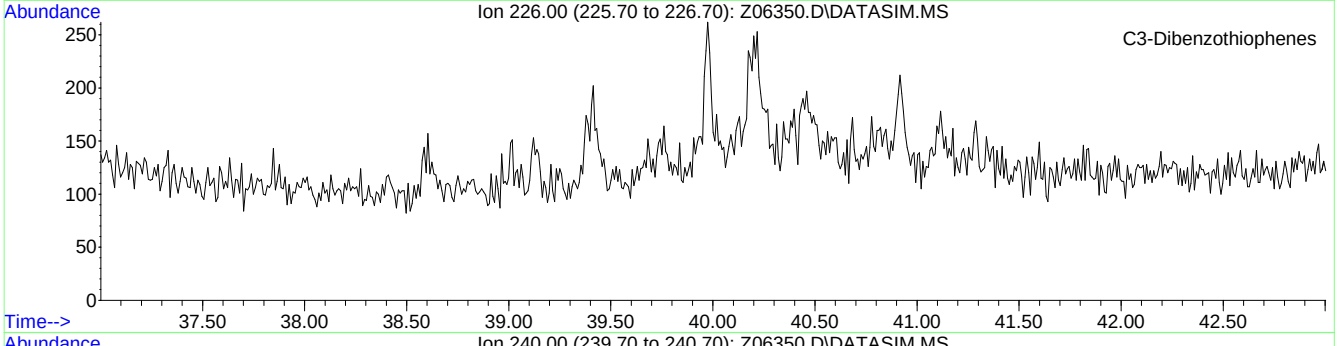
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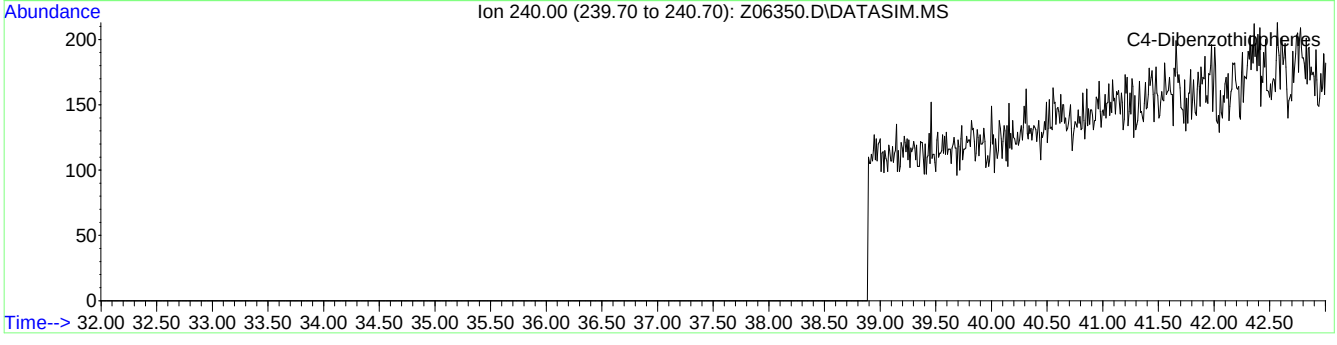
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Sample Name: op46170-mb,Method Blank







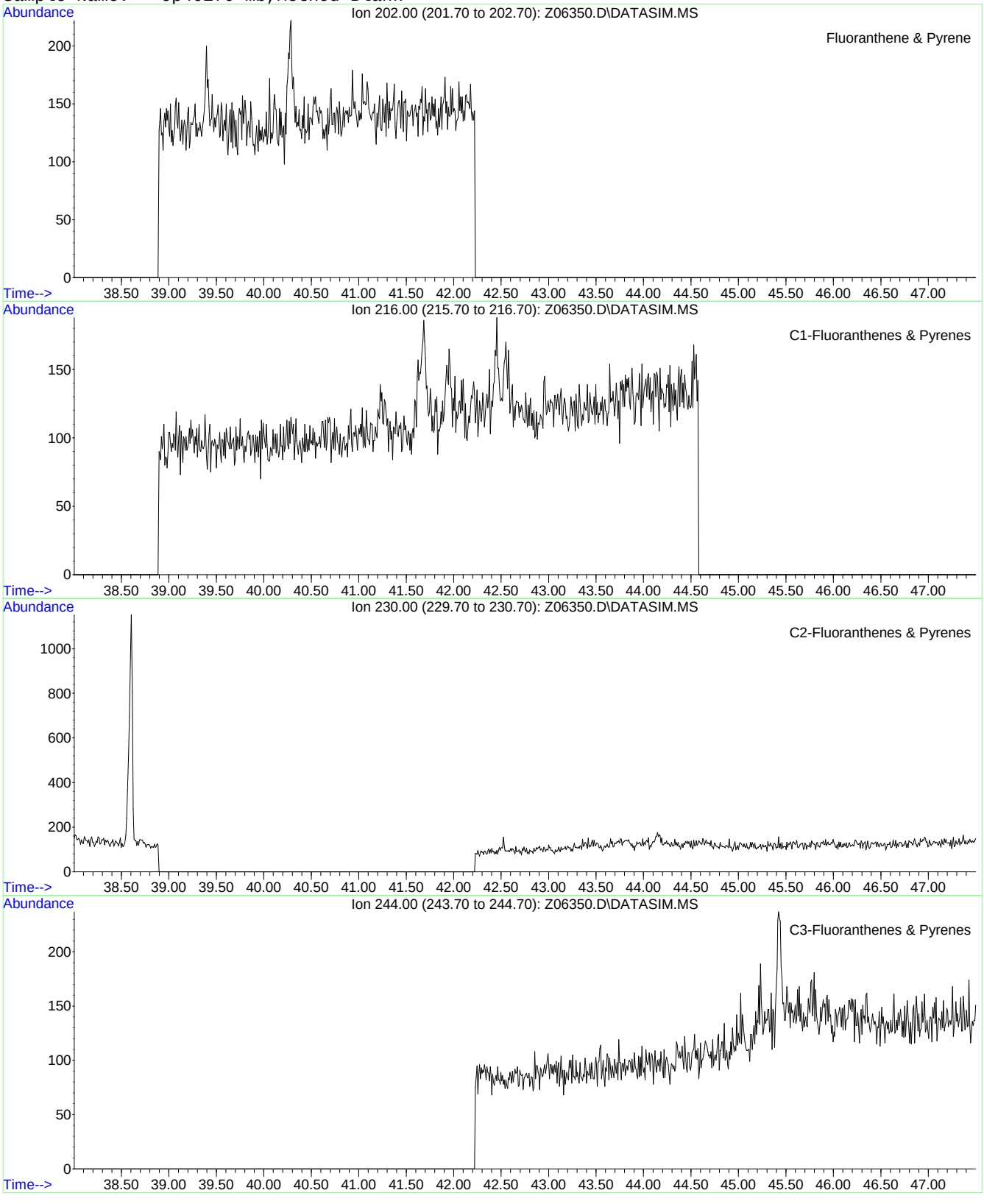




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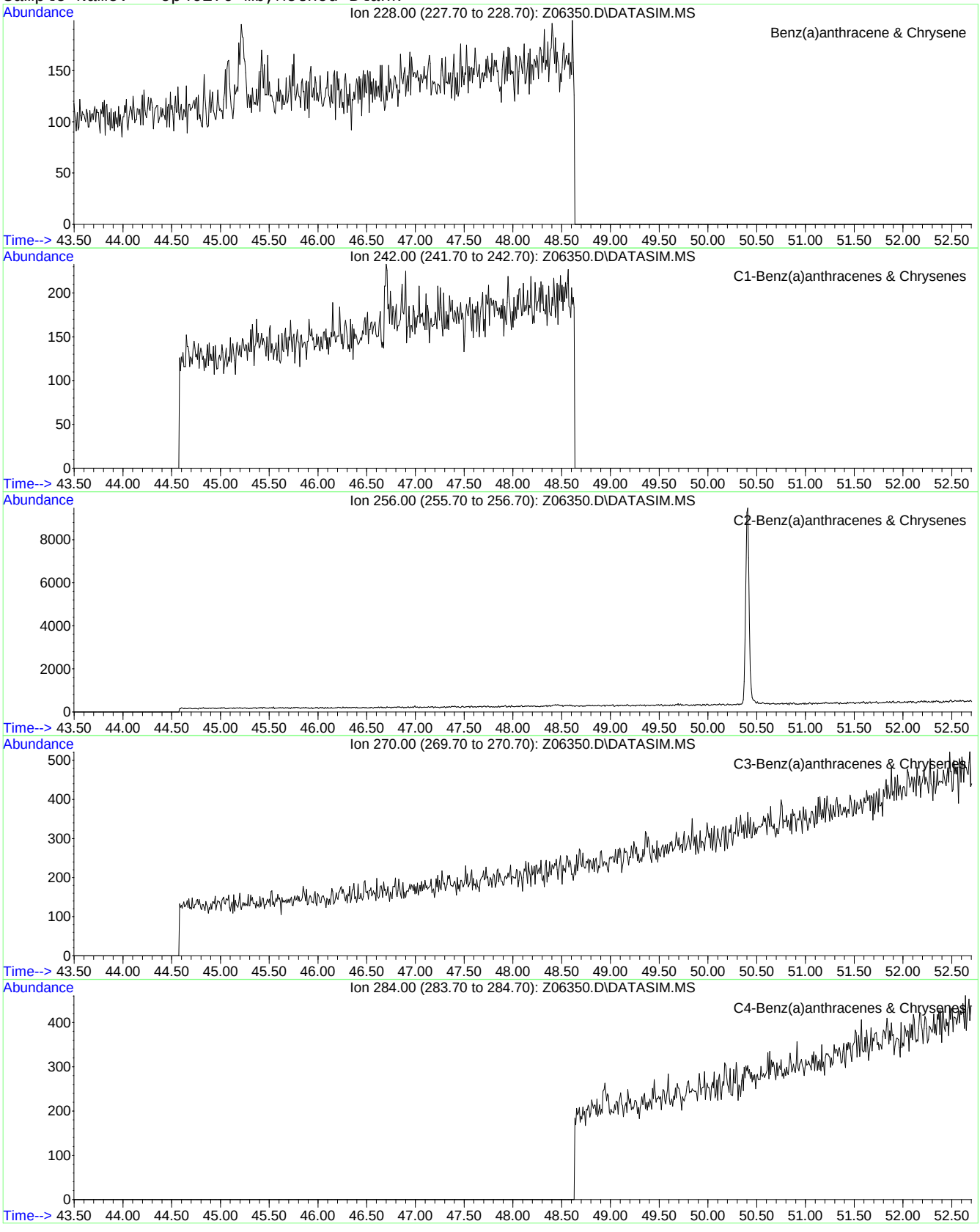
GC/MS EXTRACTED ION CHROMATOGRAM

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Date Acquired: 26 Jan 2016 3:56 pm
Sample Name: op46170-mb,Method Blank



GC/MS EXTRACTED ION CHROMATOGRAM

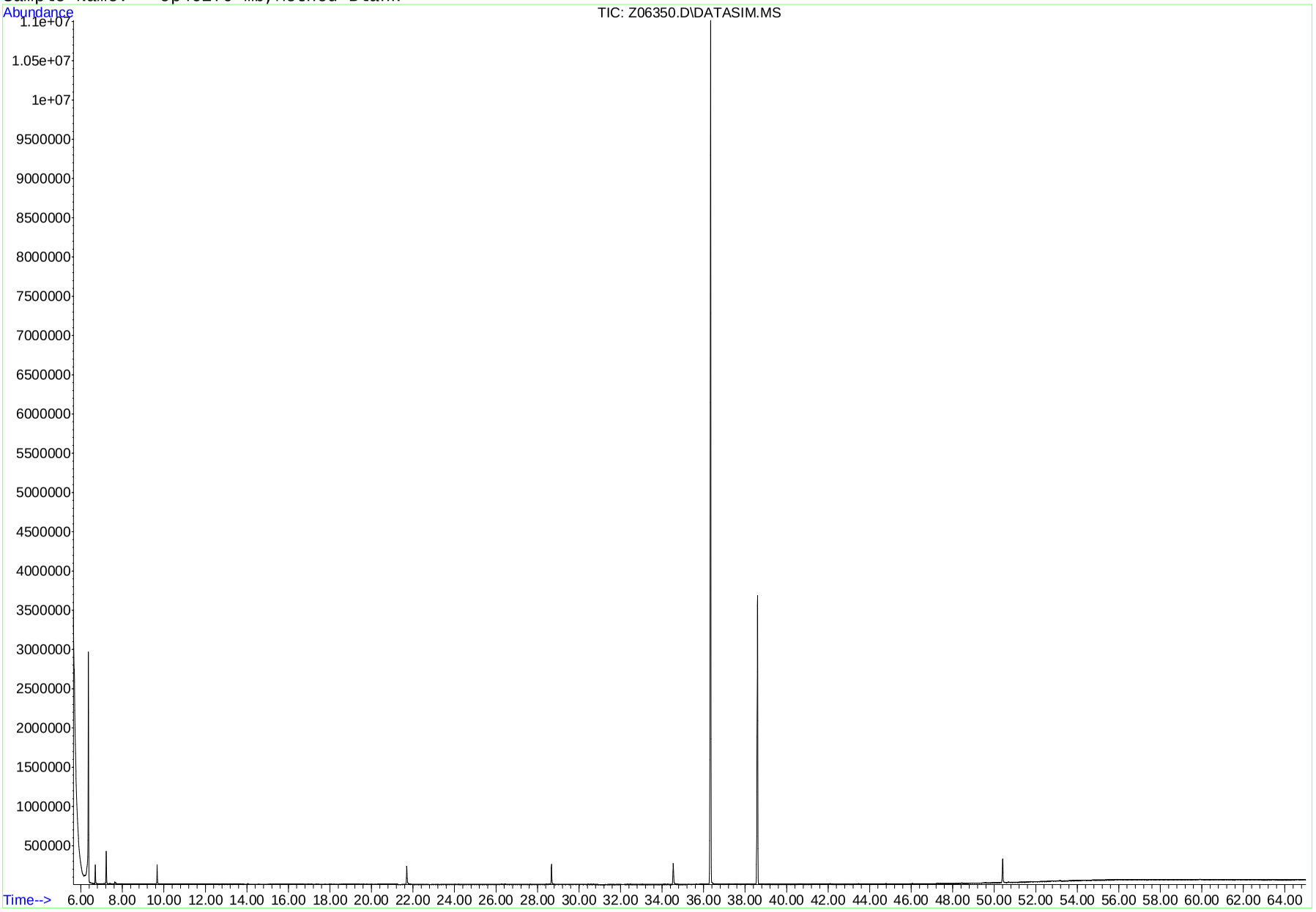
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Date Acquired: 26 Jan 2016 3:56 pm
Sample Name: op46170-mb,Method Blank



ACCUTEST

GC/MS TOTAL ION CHROMATOGRAM

File: Z:\1\data\Z160126\Z06350.D
Date Acquired: 26 Jan 2016 3:56 pm
Sample Name: op46170-mb,Method Blank



New England ACCUTEST LABORATORIES

GC/MS Semi-volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries
- Surrogate Recovery Summaries

Method Blank Summary

Job Number: MC44075
Account: FLSNYNY Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP46170-MB	Z06350.D	1	01/26/16	SZ	01/26/16	OP46170	MSZ235

The QC reported here applies to the following samples: **Method:** D5739-06/8270M SIM

MC44075-1

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	2000	1000	ug/kg	
	C1-Benzene	ND	2000	1000	ug/kg	
	C2-Benzenes	ND	2000	1000	ug/kg	
	C3-Benzenes	ND	2000	1000	ug/kg	
	C4-Benzenes	ND	2000	1000	ug/kg	
	C5-Benzenes	ND	2000	1000	ug/kg	
108-88-3	Toluene	ND	2000	1000	ug/kg	
100-41-4	Ethylbenzene	ND	2000	1000	ug/kg	
	m,p-Xylene	ND	2000	1000	ug/kg	
100-42-5	Styrene	ND	2000	1000	ug/kg	
95-47-6	o-Xylene	ND	2000	1000	ug/kg	
98-82-8	Isopropylbenzene	ND	2000	1000	ug/kg	
103-65-1	n-Propylbenzene	ND	2000	1000	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	2000	1000	ug/kg	
526-73-8	1,2,3-Trimethylbenzene	ND	2000	1000	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	2000	1000	ug/kg	
98-06-6	t-Butylbenzene	ND	2000	1000	ug/kg	
135-98-8	sec-Butylbenzene	ND	2000	1000	ug/kg	
99-87-6	p-Isopropyltoluene	ND	2000	1000	ug/kg	
104-51-8	n-Butylbenzene	ND	2000	1000	ug/kg	
493-02-7	trans-Decalin	ND	2000	1000	ug/kg	
493-01-6	cis-Decalin	ND	2000	1000	ug/kg	
11095-43-5	Benzo(b)thiophene	ND	2000	1000	ug/kg	
91-20-3	Naphthalene	ND	2000	1000	ug/kg	
91-57-6	2-Methylnaphthalene	ND	2000	1000	ug/kg	
90-12-0	1-Methylnaphthalene	ND	2000	1000	ug/kg	
	C1-Naphthalenes	ND	2000	1000	ug/kg	
	C2-Naphthalenes	ND	2000	1000	ug/kg	
	C3-Naphthalenes	ND	2000	1000	ug/kg	
	C4-Naphthalenes	ND	2000	1000	ug/kg	
92-52-4	Biphenyl	ND	2000	1000	ug/kg	
208-96-8	Acenaphthylene	ND	2000	1000	ug/kg	
83-32-9	Acenaphthene	ND	2000	1000	ug/kg	
132-64-9	Dibenzofuran	ND	2000	1000	ug/kg	
86-73-7	Fluorene	ND	2000	1000	ug/kg	
	C1-Fluorenes	ND	2000	1000	ug/kg	

Method Blank Summary

Job Number: MC44075
Account: FLSNYNY Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP46170-MB	Z06350.D	1	01/26/16	SZ	01/26/16	OP46170	MSZ235

The QC reported here applies to the following samples: **Method:** D5739-06/8270M SIM

MC44075-1

CAS No.	Compound	Result	RL	MDL	Units	Q
	C2-Fluorenes	ND	2000	1000	ug/kg	
	C3-Fluorenes	ND	2000	1000	ug/kg	
132-65-0	Dibenzothiophene	ND	2000	1000	ug/kg	
	C1-Dibenzothiophenes	ND	2000	1000	ug/kg	
	C2-Dibenzothiophenes	ND	2000	1000	ug/kg	
	C3-Dibenzothiophenes	ND	2000	1000	ug/kg	
	C4-Dibenzothiophenes	ND	2000	1000	ug/kg	
85-01-8	Phenanthrene	ND	2000	1000	ug/kg	
120-12-7	Anthracene	ND	2000	1000	ug/kg	
	C1-Phenanthrenes/Anthracene	ND	2000	1000	ug/kg	
	C2-Phenanthrenes/Anthracene	ND	2000	1000	ug/kg	
	C3-Phenanthrenes/Anthracene	ND	2000	1000	ug/kg	
	C4-Phenanthrenes/Anthracene	ND	2000	1000	ug/kg	
483-65-8	Retene	ND	2000	1000	ug/kg	
239-35-0	Benzo(b)naphtho(2,1-d)thioph	ND	2000	1000	ug/kg	
206-44-0	Fluoranthene	ND	2000	1000	ug/kg	
129-00-0	Pyrene	ND	2000	1000	ug/kg	
	C1-Fluoranthenes/Pyrenes	ND	2000	1000	ug/kg	
	C2-Fluoranthenes/Pyrenes	ND	2000	1000	ug/kg	
	C3-Fluoranthenes/Pyrenes	ND	2000	1000	ug/kg	
243-17-4	Benzo(b)fluorene	ND	2000	1000	ug/kg	
205-12-9	Benzo(c)fluorene	ND	2000	1000	ug/kg	
3442-78-2	2-Methylpyrene	ND	2000	1000	ug/kg	
3353-12-6	4-Methylpyrene	ND	2000	1000	ug/kg	
2381-21-7	1-Methylpyrene	ND	2000	1000	ug/kg	
56-55-3	Benz(a)anthracene	ND	2000	1000	ug/kg	
	Chrysene/triphenylene	ND	2000	1000	ug/kg	
	C1-Benzo(a)anthracenes/Chrys	ND	2000	1000	ug/kg	
	C2-Benzo(a)anthracenes/Chrys	ND	2000	1000	ug/kg	
	C3-Benzo(a)anthracenes/Chrys	ND	2000	1000	ug/kg	
	C4-Benzo(a)anthracenes/Chrys	ND	2000	1000	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	2000	1000	ug/kg	
	Benzo(j/k)fluoranthene	ND	2000	1000	ug/kg	
192-97-2	Benzo(e)pyrene	ND	2000	1000	ug/kg	
50-32-8	Benzo(a)pyrene	ND	2000	1000	ug/kg	
198-55-0	Perylene	ND	2000	1000	ug/kg	

Method Blank Summary

Job Number: MC44075
Account: FLSNYNY Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP46170-MB	Z06350.D	1	01/26/16	SZ	01/26/16	OP46170	MSZ235

The QC reported here applies to the following samples: **Method:** D5739-06/8270M SIM

MC44075-1

CAS No.	Compound	Result	RL	MDL	Units	Q
193-39-5	Indeno(1,2,3-cd)pyrene	ND	2000	1000	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	2000	1000	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	2000	1000	ug/kg	
191-07-1	Coronene	ND	2000	1000	ug/kg	

CAS No.	Surrogate Recoveries		Limits
2037-26-5	Toluene-D8	108%	40-140%
1146-65-2	Naphthalene-d8	108%	40-140%
1517-22-2	Phenanthrene-d10	115%	40-140%
	Perylene-d12	108%	40-140%

Blank Spike Summary

Job Number: MC44075
Account: FLSNYNY Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP46170-BS2	Z06351.D	1	01/26/16	SZ	01/26/16	OP46170	MSZ235

The QC reported here applies to the following samples: **Method:** D5739-06/8270M SIM

MC44075-1

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
71-43-2	Benzene	1000000	873000	87	50-150
	C1-Benzene		ND		50-150 [a]
	C2-Benzenes		ND		50-150 [a]
	C3-Benzenes		ND		50-150 [a]
	C4-Benzenes		ND		50-150 [a]
	C5-Benzenes		ND		50-150 [a]
108-88-3	Toluene	1000000	815000	82	50-150
100-41-4	Ethylbenzene	1000000	861000	86	50-150
	m,p-Xylene	1000000	814000	81	50-150
100-42-5	Styrene	1000000	806000	81	50-150
95-47-6	o-Xylene	1000000	852000	85	50-150
98-82-8	Isopropylbenzene	1000000	922000	92	50-150
103-65-1	n-Propylbenzene	1000000	872000	87	50-150
108-67-8	1,3,5-Trimethylbenzene	1000000	855000	86	50-150
526-73-8	1,2,3-Trimethylbenzene	1000000	849000	85	50-150
95-63-6	1,2,4-Trimethylbenzene	1000000	859000	86	50-150
98-06-6	t-Butylbenzene	1000000	919000	92	50-150
135-98-8	sec-Butylbenzene	1000000	878000	88	50-150
99-87-6	p-Isopropyltoluene	1000000	939000	94	50-150
104-51-8	n-Butylbenzene	1000000	895000	90	50-150
493-02-7	trans-Decalin	1000000	940000	94	50-150
493-01-6	cis-Decalin	1000000	984000	98	50-150
11095-43-5	Benzo(b)thiophene	1000000	983000	98	50-150
91-20-3	Naphthalene	1000000	965000	97	50-150
91-57-6	2-Methylnaphthalene	1000000	987000	99	50-150
90-12-0	1-Methylnaphthalene	1000000	946000	95	50-150
	C1-Naphthalenes		ND		50-150 [a]
	C2-Naphthalenes		ND		50-150 [a]
	C3-Naphthalenes		ND		50-150 [a]
	C4-Naphthalenes		ND		50-150 [a]
92-52-4	Biphenyl	1000000	964000	96	50-150
208-96-8	Acenaphthylene	1000000	957000	96	50-150
83-32-9	Acenaphthene	1000000	925000	93	50-150
132-64-9	Dibenzofuran	1000000	968000	97	50-150
86-73-7	Fluorene	1000000	959000	96	50-150
	C1-Fluorenes		ND		50-150 [a]

* = Outside of Control Limits.

Blank Spike Summary

Job Number: MC44075
Account: FLSNYNY Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP46170-BS2	Z06351.D	1	01/26/16	SZ	01/26/16	OP46170	MSZ235

The QC reported here applies to the following samples: **Method:** D5739-06/8270M SIM

MC44075-1

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
	C2-Fluorenes		ND		50-150 [a]
	C3-Fluorenes		ND		50-150 [a]
132-65-0	Dibenzothiophene	1000000	971000	97	50-150
	C1-Dibenzothiophenes		ND		50-150 [a]
	C2-Dibenzothiophenes		ND		50-150 [a]
	C3-Dibenzothiophenes		ND		50-150 [a]
	C4-Dibenzothiophenes		ND		50-150 [a]
85-01-8	Phenanthrene	1000000	949000	95	50-150
120-12-7	Anthracene	1000000	1060000	106	50-150
	C1-Phenanthrenes/Anthracene		ND		50-150 [a]
	C2-Phenanthrenes/Anthracene		ND		50-150 [a]
	C3-Phenanthrenes/Anthracene		ND		50-150 [a]
	C4-Phenanthrenes/Anthracene		ND		50-150 [a]
483-65-8	Retene	1000000	1040000	104	50-150
239-35-0	Benzo(b)naphtho(2,1-d)thioph	1000000	1010000	101	50-150
206-44-0	Fluoranthene	1000000	985000	99	50-150
129-00-0	Pyrene	1000000	974000	97	50-150
	C1-Fluoranthenes/Pyrenes		ND		50-150 [a]
	C2-Fluoranthenes/Pyrenes		ND		50-150 [a]
	C3-Fluoranthenes/Pyrenes		ND		50-150 [a]
243-17-4	Benzo(b)fluorene		ND		50-150 [a]
205-12-9	Benzo(c)fluorene		ND		50-150 [a]
3442-78-2	2-Methylpyrene		ND		50-150 [a]
3353-12-6	4-Methylpyrene		ND		50-150 [a]
2381-21-7	1-Methylpyrene		ND		50-150 [a]
56-55-3	Benz(a)anthracene	1000000	995000	100	50-150
	Chrysene/triphenylene	1000000	960000	96	50-150
	C1-Benzo(a)anthracenes/Chrys		ND		50-150 [a]
	C2-Benzo(a)anthracenes/Chrys		ND		50-150 [a]
	C3-Benzo(a)anthracenes/Chrys		ND		50-150 [a]
	C4-Benzo(a)anthracenes/Chrys		ND		50-150 [a]
205-99-2	Benzo(b)fluoranthene	1000000	924000	92	50-150
	Benzo(j/k)fluoranthene	1000000	903000	90	50-150
192-97-2	Benzo(e)pyrene	1000000	972000	97	50-150
50-32-8	Benzo(a)pyrene	1000000	1070000	107	50-150
198-55-0	Perylene	1000000	1030000	103	50-150

* = Outside of Control Limits.

Blank Spike Summary

Job Number: MC44075
Account: FLSNYNY Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP46170-BS2	Z06351.D	1	01/26/16	SZ	01/26/16	OP46170	MSZ235

The QC reported here applies to the following samples: **Method:** D5739-06/8270M SIM

MC44075-1

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
193-39-5	Indeno(1,2,3-cd)pyrene	1000000	890000	89	50-150
53-70-3	Dibenzo(a,h)anthracene	1000000	908000	91	50-150
191-24-2	Benzo(g,h,i)perylene	1000000	864000	86	50-150
191-07-1	Coronene	1000000	916000	92	50-150 [a]

CAS No.	Surrogate Recoveries	BSP	Limits
2037-26-5	Toluene-D8	103%	40-140%
1146-65-2	Naphthalene-d8	111%	40-140%
1517-22-2	Phenanthrene-d10	115%	40-140%
	Perylene-d12	106%	40-140%

(a) Advisory control limits.

* = Outside of Control Limits.

Duplicate Summary

Job Number: MC44075
Account: FLSNYNY Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP46170-DUP	Z06352.D	5	01/26/16	SZ	01/26/16	OP46170	MSZ235
MC44075-1	Z06355.D	5	01/26/16	SZ	01/26/16	OP46170	MSZ235

The QC reported here applies to the following samples: **Method:** D5739-06/8270M SIM

MC44075-1

CAS No.	Compound	MC44075-1 ug/kg	Q	DUP ug/kg	Q	RPD	Limits
71-43-2	Benzene	43600		40900		6	30
	C1-Benzene	486000		458000		6	30 [a]
	C2-Benzenes	2410000		2270000		6	30 [a]
	C3-Benzenes	5270000		4990000		5	30 [a]
	C4-Benzenes	4370000		4140000		5	30 [a]
	C5-Benzenes	1560000		1480000		5	30 [a]
108-88-3	Toluene	673000		634000		6	30
100-41-4	Ethylbenzene	966000		913000		6	30
	m,p-Xylene	2500000		2360000		6	30
100-42-5	Styrene	489000		454000		7	30
95-47-6	o-Xylene	1250000		1190000		5	30
98-82-8	Isopropylbenzene	286000		268000		6	30
103-65-1	n-Propylbenzene	180000		169000		6	30
108-67-8	1,3,5-Trimethylbenzene	1440000		1370000		5	30
526-73-8	1,2,3-Trimethylbenzene	1480000		1400000		6	30
95-63-6	1,2,4-Trimethylbenzene	4040000		3830000		5	30
98-06-6	t-Butylbenzene	ND		ND		nc	30
135-98-8	sec-Butylbenzene	104000		98200		6	30
99-87-6	p-Isopropyltoluene	1400000		1320000		6	30
104-51-8	n-Butylbenzene	161000		149000		8	30
493-02-7	trans-Decalin	58600		54900		7	30
493-01-6	cis-Decalin	13100		13300		2	30
11095-43-5	Benzo(b)thiophene	6050000		5710000		6	30
	C2-Naphthalenes	27500000		26000000		6	30 [a]
	C3-Naphthalenes	5810000		5450000		6	30 [a]
	C4-Naphthalenes	1350000		1270000		6	30 [a]
92-52-4	Biphenyl	12400000		11700000		6	30
208-96-8	Acenaphthylene	348000		322000		8	30
83-32-9	Acenaphthene	14200000	E	13400000		6	30
132-64-9	Dibenzofuran	14000000	E	13200000		6	30
86-73-7	Fluorene	8770000		8260000		6	30
	C1-Fluorenes	926000		875000		6	30 [a]
	C2-Fluorenes	355000		337000		5	30 [a]
	C3-Fluorenes	199000		209000		5	30 [a]
132-65-0	Dibenzothiophene	507000		478000		6	30
	C1-Dibenzothiophenes	402000		362000		10	30 [a]

* = Outside of Control Limits.

Duplicate Summary

Job Number: MC44075
Account: FLSNYNY Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP46170-DUP	Z06352.D	5	01/26/16	SZ	01/26/16	OP46170	MSZ235
MC44075-1	Z06355.D	5	01/26/16	SZ	01/26/16	OP46170	MSZ235

The QC reported here applies to the following samples: **Method:** D5739-06/8270M SIM

MC44075-1

CAS No.	Compound	MC44075-1 ug/kg	Q	DUP ug/kg	Q	RPD	Limits
	C2-Dibenzothiophenes	190000		198000		4	30 [a]
	C3-Dibenzothiophenes	94900		95600		1	30 [a]
	C4-Dibenzothiophenes	70600		70100		1	30 [a]
85-01-8	Phenanthrene	6530000		6150000		6	30
120-12-7	Anthracene	2110000		1990000		6	30
	C1-Phenanthrenes/Anthracene	1600000		1510000		6	30 [a]
	C2-Phenanthrenes/Anthracene	563000		521000		8	30 [a]
	C3-Phenanthrenes/Anthracene	198000		190000		4	30 [a]
	C4-Phenanthrenes/Anthracene	50200		46400		8	30 [a]
483-65-8	Retene	87600		83800		4	30
239-35-0	Benzo(b)naphtho(2,1-d)thioph	16500		16300		1	30
206-44-0	Fluoranthene	1190000		1120000		6	30
129-00-0	Pyrene	901000		849000		6	30
	C1-Fluoranthenes/Pyrenes	378000		360000		5	30 [a]
	C2-Fluoranthenes/Pyrenes	107000		107000		0	30 [a]
	C3-Fluoranthenes/Pyrenes	40400		38500		5	30 [a]
243-17-4	Benzo(b)fluorene	53400		49400		8	30 [a]
205-12-9	Benzo(c)fluorene	27200		26700		2	30 [a]
3442-78-2	2-Methylpyrene	40800		38700		5	30 [a]
3353-12-6	4-Methylpyrene	32900		30700		7	30 [a]
2381-21-7	1-Methylpyrene	27900		26600		5	30 [a]
56-55-3	Benz(a)anthracene	142000		132000		7	30
	Chrysene/triphenylene	133000		126000		5	30
	C1-Benzo(a)anthracenes/Chrys	53200		49300		8	30 [a]
	C2-Benzo(a)anthracenes/Chrys	15800		14900		6	30 [a]
	C3-Benzo(a)anthracenes/Chrys	7070		7850		10	30 [a]
	C4-Benzo(a)anthracenes/Chrys	ND		ND		nc	30 [a]
205-99-2	Benzo(b)fluoranthene	35200		33300		6	30
	Benzo(j/k)fluoranthene	36700		34400		6	30
192-97-2	Benzo(e)pyrene	26800		25500		5	30
50-32-8	Benzo(a)pyrene	45300		43800		3	30
198-55-0	Perylene	10300		10200		1	30
193-39-5	Indeno(1,2,3-cd)pyrene	10000		10800		8	30
53-70-3	Dibenzo(a,h)anthracene	3780	J	4180	J	10	30
191-24-2	Benzo(g,h,i)perylene	12100		12000		1	30
191-07-1	Coronene	ND		ND		nc	30 [a]

* = Outside of Control Limits.

Duplicate Summary

Job Number: MC44075
Account: FLSNYNY Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP46170-DUP	Z06352.D	5	01/26/16	SZ	01/26/16	OP46170	MSZ235
MC44075-1	Z06355.D	5	01/26/16	SZ	01/26/16	OP46170	MSZ235

The QC reported here applies to the following samples: **Method:** D5739-06/8270M SIM

MC44075-1

CAS No.	Surrogate Recoveries	DUP	MC44075-1	Limits
2037-26-5	Toluene-D8	91%	77%	40-140%
1146-65-2	Naphthalene-d8	95%	78%	40-140%
1517-22-2	Phenanthrene-d10	104%	89%	40-140%
	Perylene-d12	91%	76%	40-140%

(a) Advisory control limits.

* = Outside of Control Limits.

Duplicate Summary

Job Number: MC44075
Account: FLSNYNY Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP46170-DUP	Z06354.D	100	01/26/16	SZ	01/26/16	OP46170	MSZ235
MC44075-1	Z06357.D	100	01/27/16	SZ	01/26/16	OP46170	MSZ235

The QC reported here applies to the following samples: **Method:** D5739-06/8270M SIM

MC44075-1

CAS No.	Compound	MC44075-1 ug/kg	Q	DUP ug/kg	Q	RPD	Limits
91-20-3	Naphthalene	118000000		97200000		19	30
91-57-6	2-Methylnaphthalene	117000000		95100000		21	30
90-12-0	1-Methylnaphthalene	54400000		44100000		21	30
	C1-Naphthalenes	109000000		88600000		21	30 [a]

CAS No.	Surrogate Recoveries	DUP	MC44075-1	Limits
2037-26-5	Toluene-D8	93%	94%	40-140%
1146-65-2	Naphthalene-d8	93%	93%	40-140%
1517-22-2	Phenanthrene-d10	103%	100%	40-140%
	Perylene-d12	82%	85%	40-140%

(a) Advisory control limits.

* = Outside of Control Limits.

Semivolatile Surrogate Recovery Summary

Job Number: MC44075
Account: FLSNYNY Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Method: D5739-06/8270M SIM **Matrix:** SO

Samples and QC shown here apply to the above method

Lab Sample ID	Lab File ID	S1	S2	S3	S4
MC44075-1	Z06357.D	94	93	100	85
MC44075-1	Z06355.D	77	78	89	76
OP46170-BS2	Z06351.D	103	111	115	106
OP46170-DUP	Z06352.D	91	95	104	91
OP46170-DUP	Z06354.D	93	93	103	82
OP46170-MB	Z06350.D	108	108	115	108

Surrogate Compounds	Recovery Limits
S1 = Toluene-D8	40-140%
S2 = Naphthalene-d8	40-140%
S3 = Phenanthrene-d10	40-140%
S4 = Perylene-d12	40-140%

New England ACCUTEST LABORATORIES

GC/MS Semi-volatiles

Raw Data

Manual Integrations APPROVED (compounds with "m" flag)
Ruben Parrilla
01/27/16 13:35

Quantitation Report (QT Reviewed)

Data File: Z:\1\data\Z160126\Z06355.D
Sample : mc44075-1,5x,RC-7 NAPL
Misc : op46170,msz235,0.0145,,,2,5
ALS Vial : 16 Sample Multiplier: 1
Acq On : 26 Jan 2016 10:25 pm Operator: sofyaz

Quant Time: Jan 27 10:37:01 2016
Quant Method : Z:\1\methods\Z151222-MAHPAHEXT-A.M
Quant Title : PAHs & Alkylated PAHs by GC/MS/SIM

Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) Acenaphthene-d10	28.674	164	386587	1200.00	ng/mL	0.00
System Monitoring Compounds						
2) Toluene-d8	9.667	98	56955	153.77	ng/mL	0.00
Spiked Amount 1000.000			Recovery =	15.38%		
3) Naphthalene-d8	21.707	136	90654	156.27	ng/mL	0.00
Spiked Amount 1000.000			Recovery =	15.63%		
4) Phenanthrene-d10	34.528	188	97967	178.85	ng/mL	0.00
Spiked Amount 1000.000			Recovery =	17.88%		
5) Perylene-d12	50.399	264	86075	151.24	ng/mL	0.00
Spiked Amount 1000.000			Recovery =	15.12%		
Target Compounds						Qvalue
7] Benzene	7.176	78	27271	63.285	ng/mL	95
8] C1-Benzene	9.780	92	303604	704.538	ng/mL	100
9] C2-Benzenes	12.787	106	1507343m	3497.913	ng/mL	
10] C3-Benzenes	16.465	120	3293061m	7641.818	ng/mL	
11] C4-Benzenes	19.976	134	2730066m	6335.342	ng/mL	
12] C5-Benzenes	21.955	148	975244m	2263.134	ng/mL	
14] Toluene	9.780	91	519694	975.266	ng/mL	99
15] Ethylbenzene	12.552	91	821803	1400.832	ng/mL	99
16] m,p-xylene	12.787	91	1770799	3626.160	ng/mL	100
17] Styrene	13.433	104	268254	709.734	ng/mL	98
18] o-Xylene	13.508	91	856705	1816.260	ng/mL	99
19] Isopropylbenzene	14.427	105	224148	415.304	ng/mL	98
20] n-Propylbenzene	15.295	91	180172	260.346	ng/mL	98
21] 1,3,5-Trimethylbenzene	15.719	105	1047675	2093.830	ng/mL	97
23] 1,2,4-Trimethylbenzene	16.465	105	2954467	5855.159	ng/mL	100
24] sec-Butylbenzene	16.949	105	96666	151.495	ng/mL#	80
25] 1,2,3-Trimethylbenzene	17.312	105	1134399	2149.085	ng/mL	98
26] p-Isopropyltoluene	17.322	119	1101249	2025.104	ng/mL	100
27] n-Butylbenzene	18.200	91	121268	234.009	ng/mL#	40
28] trans-Decalin	18.301	96	8215m	84.936	ng/mL	
29] cis-Decalin	19.532	96	2344m	19.038	ng/mL	
34] Benzo(b)thiophene	22.001	134	4741035	8772.708	ng/mL	100
44] Naphthalene	21.772	128	46015892m	66773.876	ng/mL	
45] 2-Methylnaphthalene	24.492	142	43616641m	100621.005	ng/mL	
46] 1-Methylnaphthalene	24.932	142	28208553	64219.741	ng/mL	96
47] C1-Naphthalenes	24.492	142	71980927m	104451.860	ng/mL	
48] C2-Naphthalenes	27.341	156	27519659m	39933.906	ng/mL	
49] C3-Naphthalenes	29.665	170	5806970m	8426.521	ng/mL	
50] C4-Naphthalenes	32.426	184	1351537m	1961.222	ng/mL	
51] Biphenyl	26.379	154	10751088	17963.739	ng/mL	100
52] Acenaphthylene	28.065	152	360486	504.727	ng/mL#	70
53] Acenaphthene	28.817	154	8794252	20520.529	ng/mL	99
54] Dibenzofuran	29.455	168	12488764	20256.518	ng/mL	99
55] Fluorene	30.825	166	6569573	12712.738	ng/mL	98
56] C1-Fluorenes	33.040	180	693937m	1342.833	ng/mL	
57] C2-Fluorenes	35.222	194	265980m	514.696	ng/mL	
58] C3-Fluorenes	37.875	208	148884m	288.104	ng/mL	
59] Dibenzothiophene	34.124	184	496243	734.728	ng/mL#	93
60] C1-Dibenzothiophenes (...	35.902	198	400027m	592.272	ng/mL	
61] C1-Dibenzothiophenes (...	36.311	198	6423m	9.510	ng/mL	
62] C2-Dibenzothiophenes	37.953	212	185673m	274.904	ng/mL	
63] C3-Dibenzothiophenes	39.397	226	92907m	137.556	ng/mL	
64] C4-Dibenzothiophenes	41.547	240	69173m	102.416	ng/mL	
65] Phenanthrene	34.625	178	7082056	9465.025	ng/mL	100
66] Anthracene	34.803	178	2091535	3066.069	ng/mL#	88
67] C1-Phenanthrenes/anthr...	36.690	192	1738818m	2323.895	ng/mL	
68] C2-Phenanthrenes/anthr...	38.857	206	610725m	816.222	ng/mL	
70] C3-Phenanthrenes/anthr...	40.701	220	214398m	286.539	ng/mL	

Quantitation Report (QT Reviewed)

Data File: Z:\1\data\Z160126\Z06355.D
Sample : mc44075-1,5x,RC-7 NAPL
Misc : op46170,msz235,0.0145,,,2,5
ALS Vial : 16 Sample Multiplier: 1
Acq On : 26 Jan 2016 10:25 pm Operator: sofyaz

Quant Time: Jan 27 10:37:01 2016
Quant Method : Z:\1\methods\Z151222-MAHPAHEXT-A.M
Quant Title : PAHs & Alkylated PAHs by GC/MS/SIM

	Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
71]	C4-Phenanthrenes/anthr...	42.151	234	54457m	72.781	ng/mL	
72]	Retene	41.624	234	12771m	127.038	ng/mL	
73]	Benzo(b)naphtho(2,1-d)...	44.121	234	17419m	23.895	ng/mL	
78]	Fluoranthene	39.388	202	1393372	1728.361	ng/mL	98
79]	Pyrene	40.269	202	1082870	1306.502	ng/mL	98
80]	C1-Fluoranthenes/pyrenes	41.676	216	454854m	548.789	ng/mL	
81]	Benzo(b)fluorene	41.918	216	64124	77.367	ng/mL#	61
82]	Benzo(c)fluorene	41.961	216	32688m	39.439	ng/mL	
83]	2-Methylpyrene	42.073	216	49045	59.174	ng/mL#	53
84]	4-Methylpyrene	42.437	216	39548	47.715	ng/mL#	75
85]	1-Methylpyrene	42.550	216	33568	40.500	ng/mL#	75
86]	C2-Fluoranthenes/pyrenes	43.418	230	128250m	154.736	ng/mL	
87]	C3-Fluoranthenes/pyrenes	45.614	244	48525m	58.546	ng/mL	
88]	Benz(a)anthracene	45.059	228	153958	205.477	ng/mL	96
89]	Chrysene/triphenylene	45.215	228	139089	193.550	µg/mL	98
90]	C1-Benz(a)anthracenes/...	46.708	242	63975m	77.187	ng/mL	
91]	C2-Benz(a)anthracenes/...	48.427	256	18989m	22.911	ng/mL	
92]	C3-Benz(a)anthracenes/...	49.440	270	8502m	10.258	ng/mL	
94]	Benzo(b)fluoranthene	49.106	252	43248	50.974	ng/mL	98
95]	Benzo(j/k)fluoranthene	49.178	252	45964	53.192	µg/mL	100
96]	Benzo(e)pyrene	50.037	252	29879	38.830	ng/mL	95
97]	Benzo(a)pyrene	50.209	252	46696	65.724	ng/mL	97
98]	Perylene	50.480	252	10137	14.993	ng/mL	98
99]	Indeno(1,2,3-cd)pyrene	53.717	276	14566m	14.541	ng/mL	
100]	Dibenz(a,h)anthracene	53.742	278	4781m	5.484	ng/mL	
101]	Benzo(g,h,i)perylene	54.458	276	16148	17.493	ng/mL	100
102]	Coronene	59.594	300	2459	2.771	ng/mL#	49

(#) = qualifier out of range (m) = manual integration (+) = signals summed

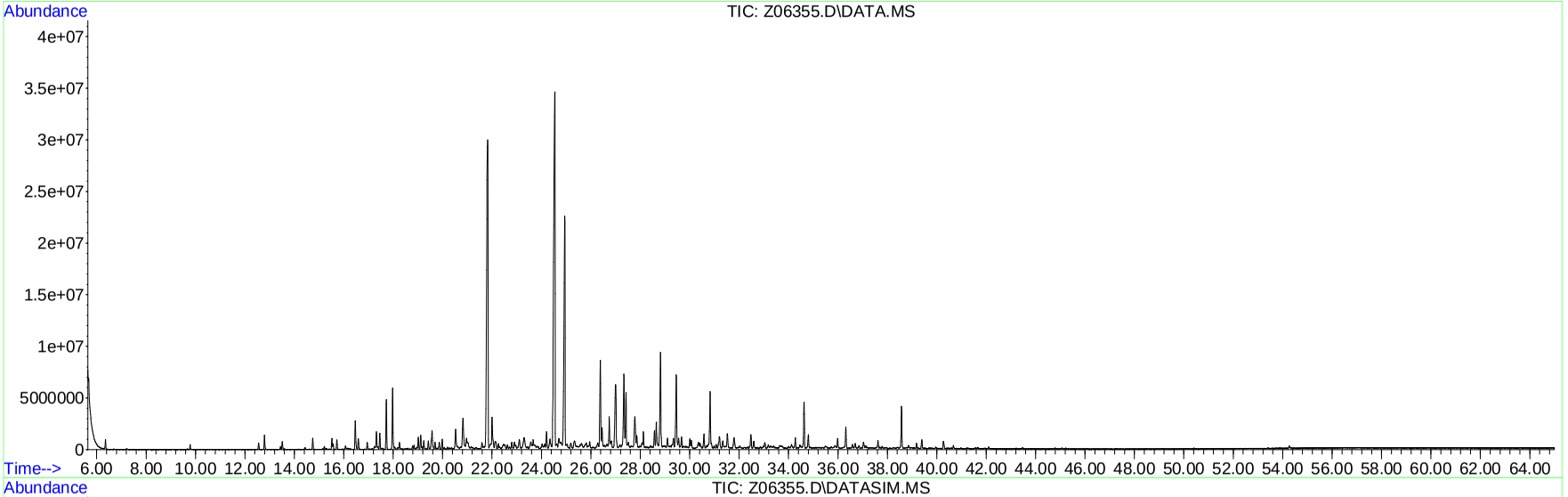
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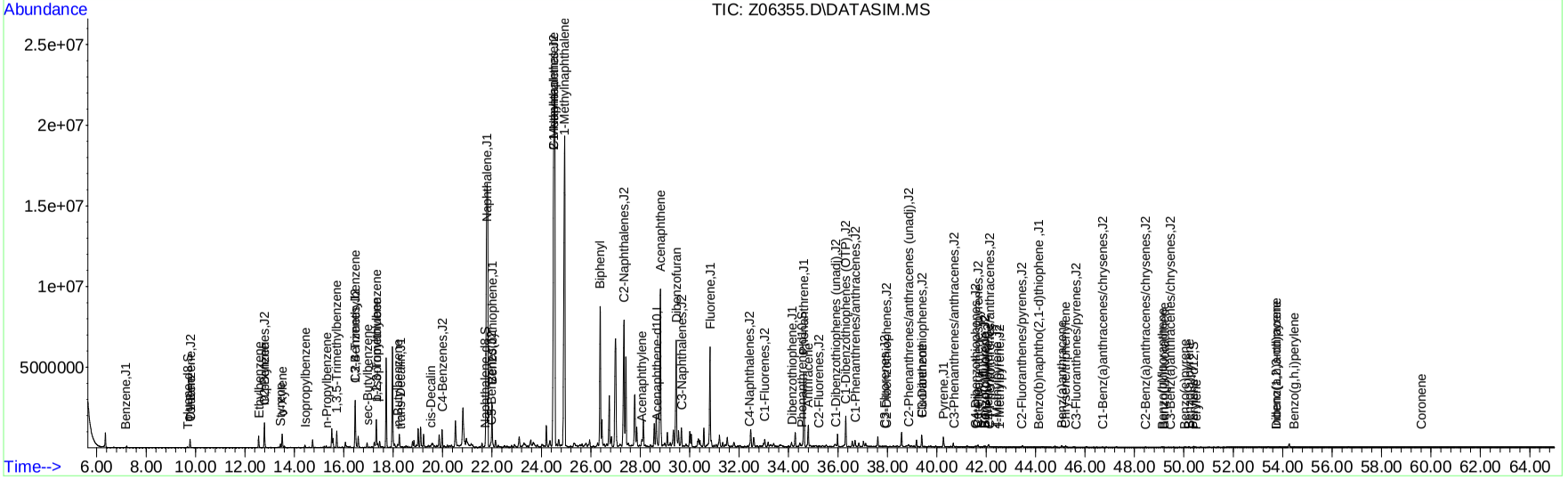
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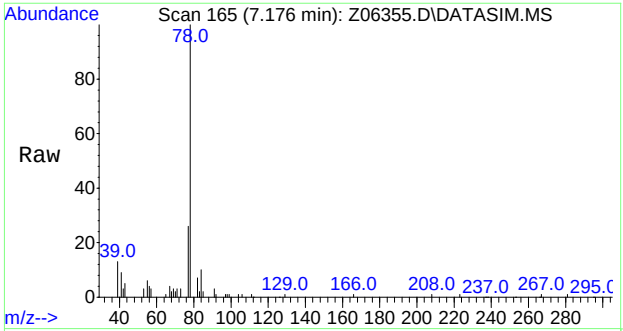
Quantitation Report (QT Reviewed)

Data File: Z:\1\data\Z160126\Z06355.D
Sample : mc44075-1,5x,RC-7 NAPL
Misc : op46170,msz235,0.0145,,,2,5
ALS Vial : 16 Sample Multiplier: 1
Acq On : 26 Jan 2016 10:25 pm Operator: sofyaz

Quant Time: Jan 27 10:37:01 2016
Quant Method : Z:\1\methods\Z151222-MAHPAHEXT-A.M
Quant Title : PAHs & Alkylated PAHs by GC/MS/SIM



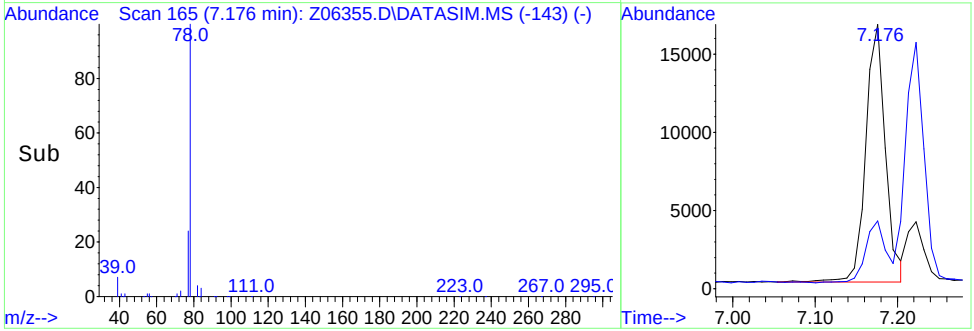


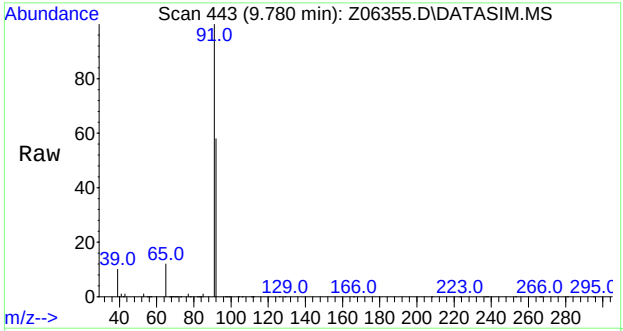


#7
Benzene
Concen: 63.285 ng/mL
RT: 7.176 min Scan# 165
Delta R.T. 0.008 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion: 78 Resp: 27271

Ion	Ratio	Lower	Upper
78	100		
77	25.6	18.6	28.0

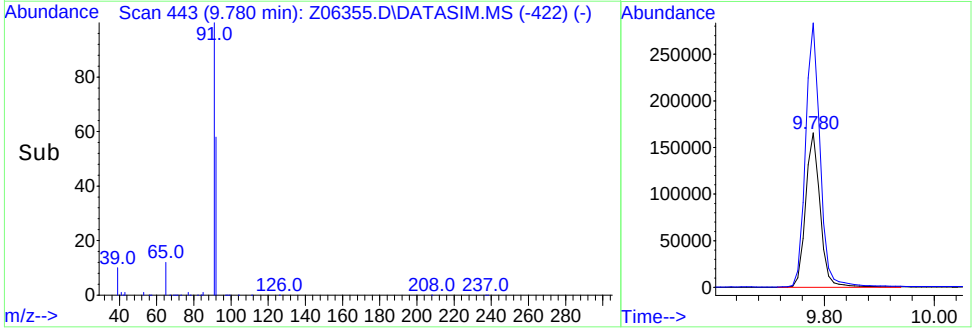


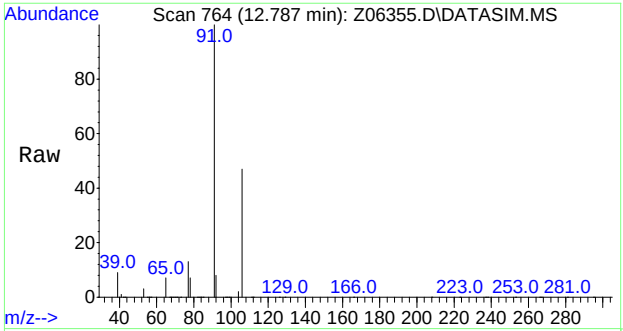


#8
C1-Benzene
Concen: 704.538 ng/mL
RT: 9.780 min Scan# 443
Delta R.T. 0.000 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion: 92 Resp: 303604

Ion	Ratio	Lower	Upper
92	100		
91	171.2	137.0	205.4

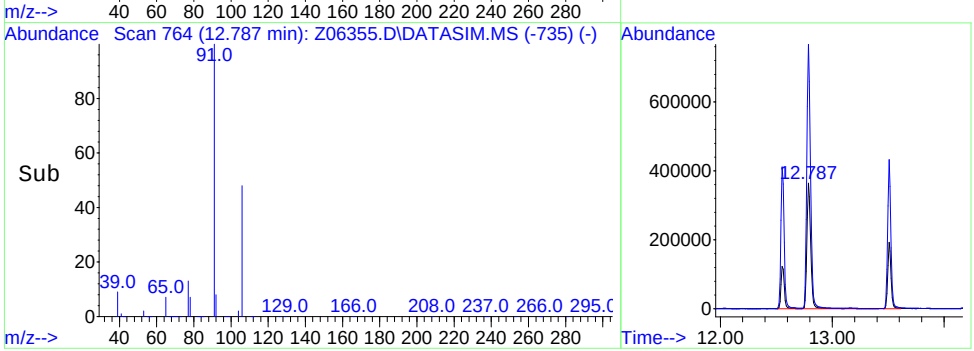


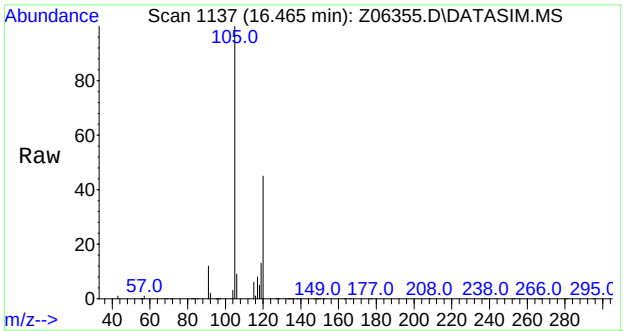


#9
C2-Benzenes
Concen: 3497.913 ng/mL m
RT: 12.787 min Scan# 764
Delta R.T. 0.000 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:106 Resp: 1507343

Ion	Ratio	Lower	Upper
106	100		
91	231.6	169.0	253.4

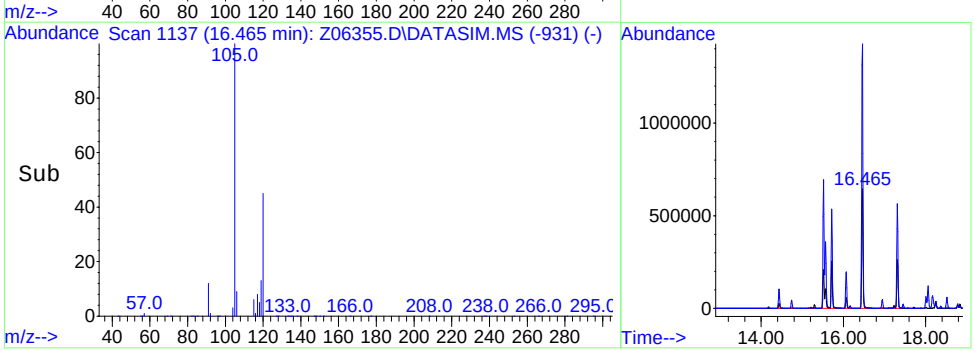


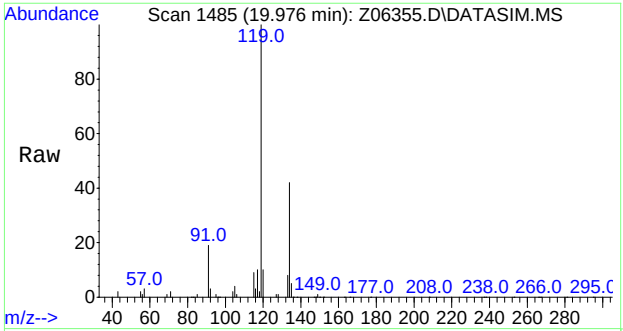


#10
C3-Benzenes
Concen: 7641.818 ng/mL m
RT: 16.465 min Scan# 1137
Delta R.T. 0.000 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:120 Resp: 3293061

Ion	Ratio	Lower	Upper
120	100		
105	249.4	183.2	274.8

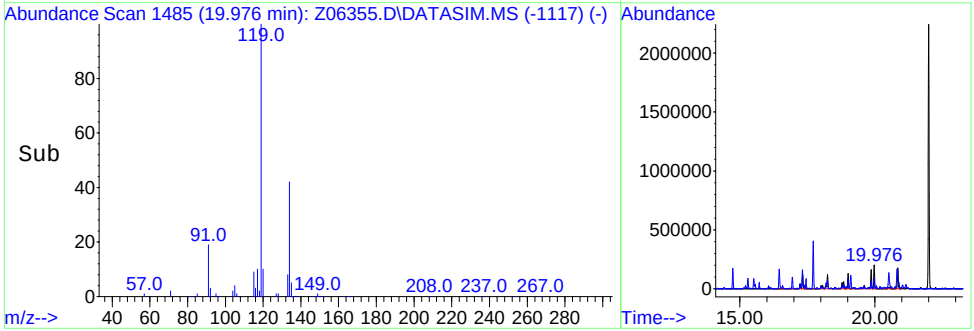


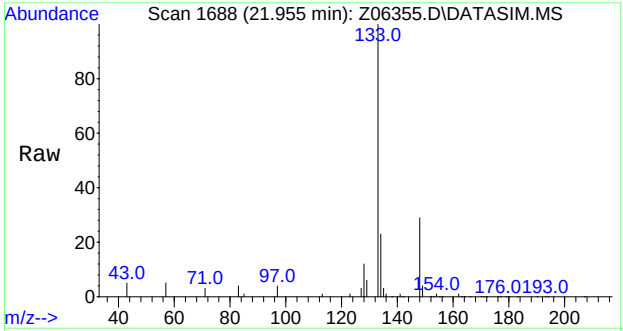


#11
C4-Benzenes
Concen: 6335.342 ng/mL m
RT: 19.976 min Scan# 1485
Delta R.T. -0.878 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:134 Resp: 2730066

Ion	Ratio	Lower	Upper
134	100		
91	197.3	37.0	55.4#

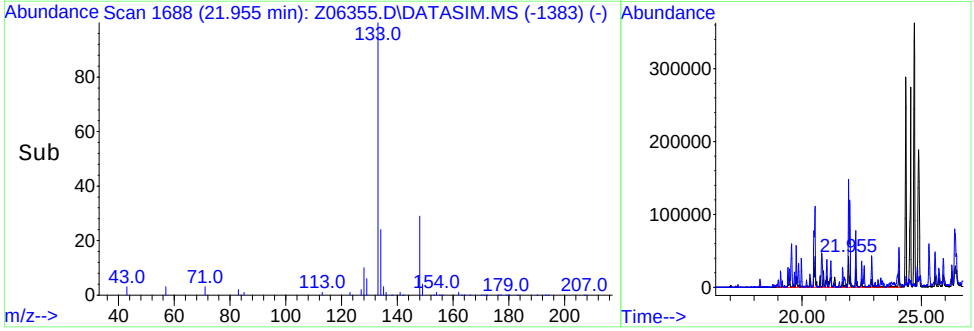


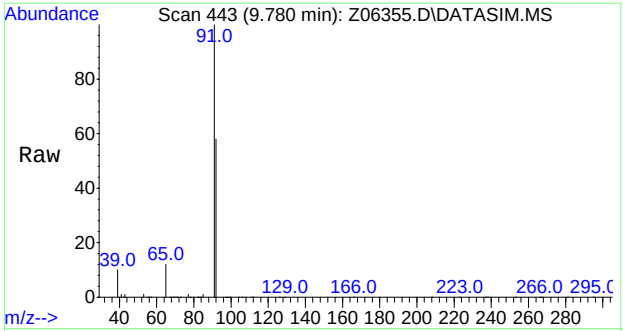


#12
C5-Benzenes
Concen: 2263.134 ng/mL m
RT: 21.955 min Scan# 1688
Delta R.T. 1.404 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:148 Resp: 975244

Ion	Ratio	Lower	Upper
148	100		
133	342.6	139.3	208.9#

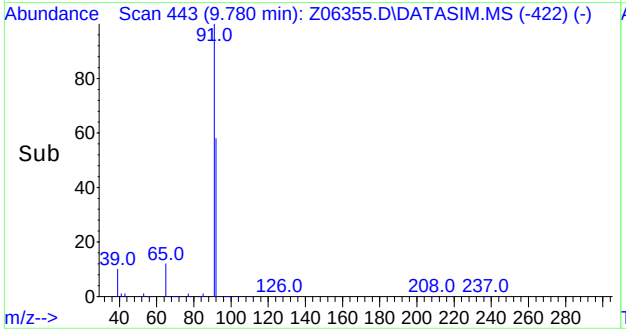


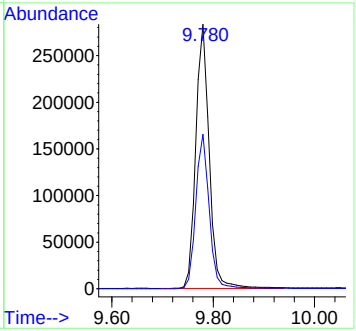


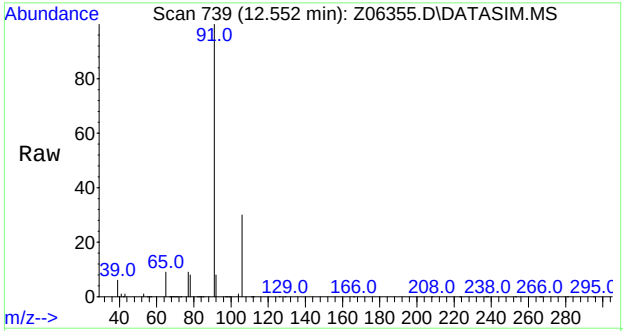
#14
Toluene
Concen: 975.266 ng/mL
RT: 9.780 min Scan# 443
Delta R.T. -0.001 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion: 91 Resp: 519694

Ion	Ratio	Lower	Upper
91	100		
92	58.4	47.0	70.6



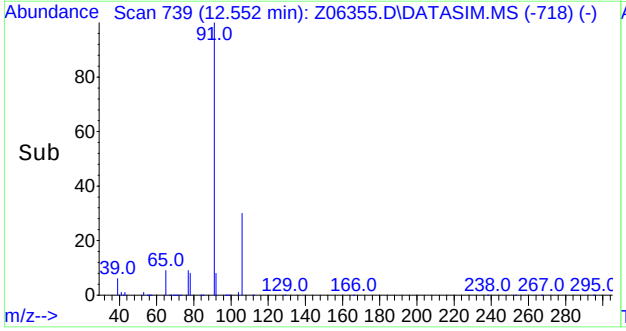


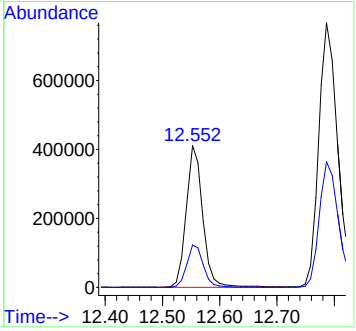


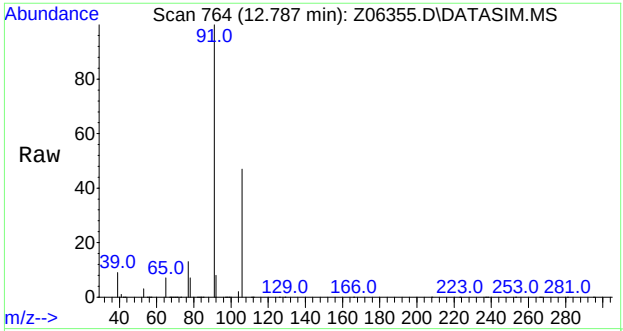
#15
Ethylbenzene
Concen: 1400.832 ng/mL
RT: 12.552 min Scan# 739
Delta R.T. -0.001 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion: 91 Resp: 821803

Ion	Ratio	Lower	Upper
91	100		
106	30.4	23.8	35.6



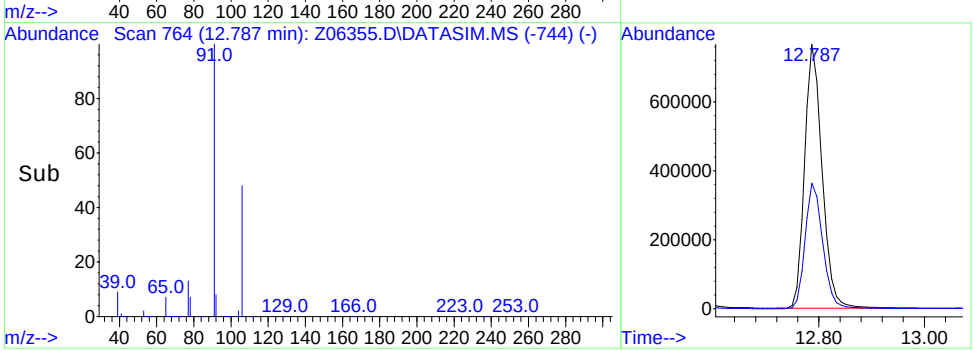


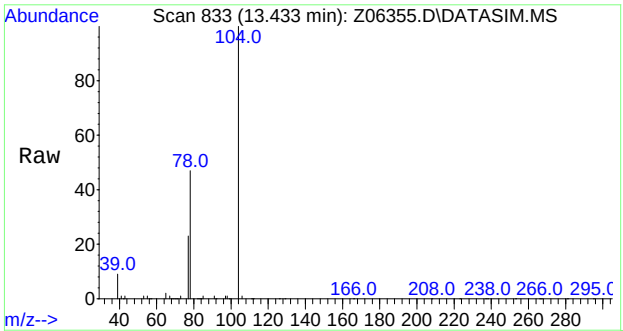


#16
m,p-xylene
Concen: 3626.160 ng/mL
RT: 12.787 min Scan# 764
Delta R.T. -0.010 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion: 91 Resp: 1770799

Ion	Ratio	Lower	Upper
91	100		
106	47.9	38.1	57.1

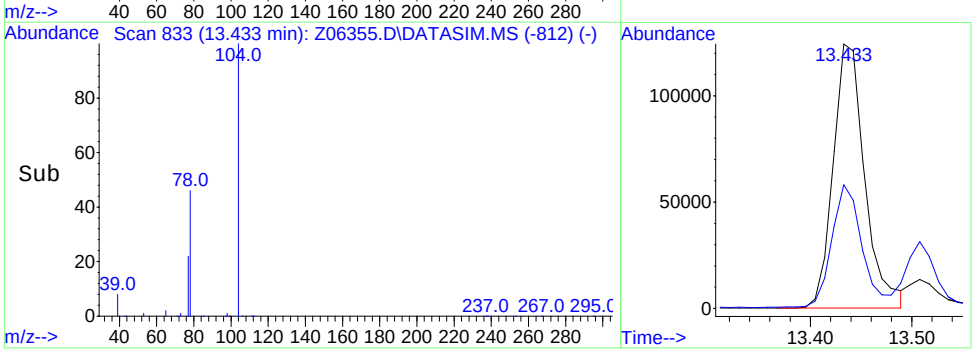


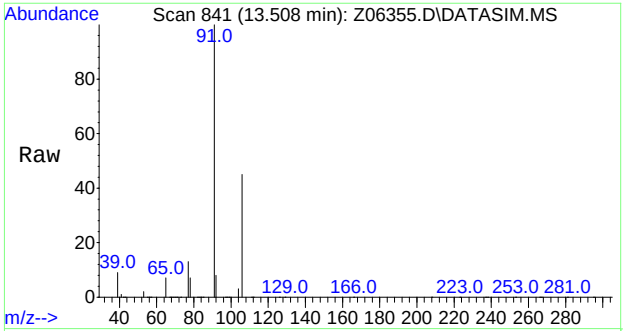


#17
Styrene
Concen: 709.734 ng/mL
RT: 13.433 min Scan# 833
Delta R.T. -0.001 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:104 Resp: 268254

Ion	Ratio	Lower	Upper
104	100		
78	44.8	37.0	55.6

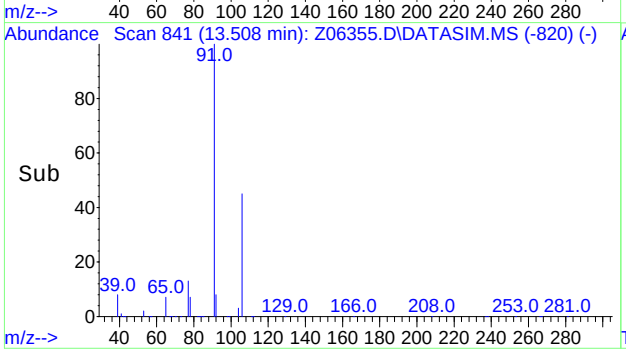


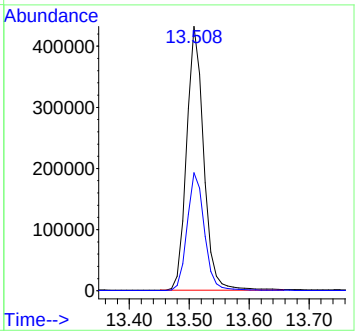


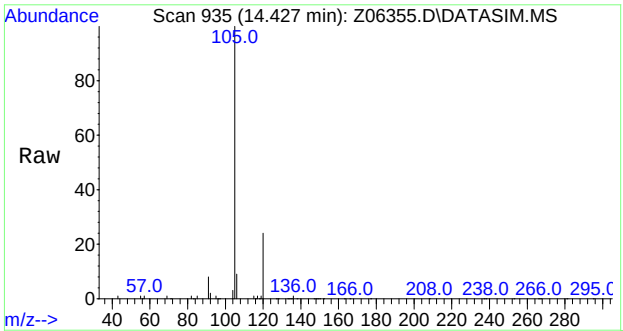
#18
o-Xylene
Concen: 1816.260 ng/mL
RT: 13.508 min Scan# 841
Delta R.T. -0.001 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion: 91 Resp: 856705

Ion	Ratio	Lower	Upper
91	100		
106	45.0	35.6	53.4



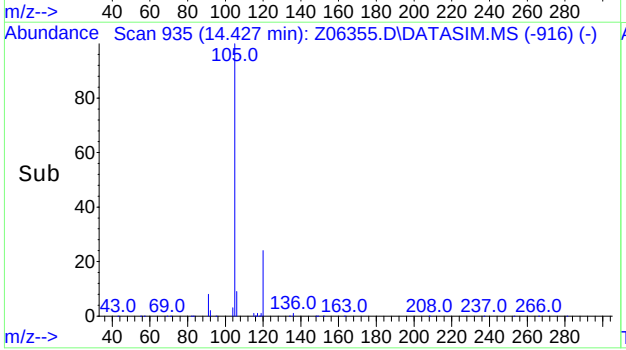


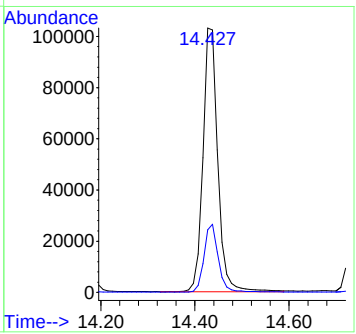


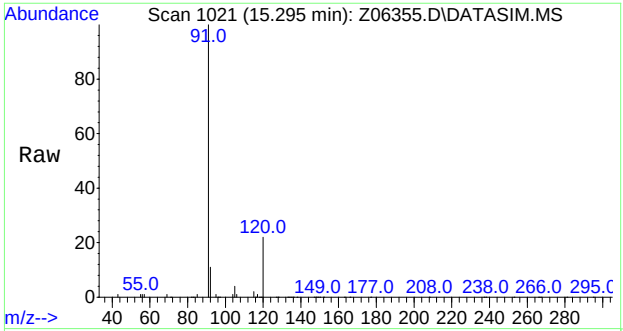
#19
Isopropylbenzene
Concen: 415.304 ng/mL
RT: 14.427 min Scan# 935
Delta R.T. -0.007 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:105 Resp: 224148

Ion	Ratio	Lower	Upper
105	100		
120	24.8	20.6	31.0



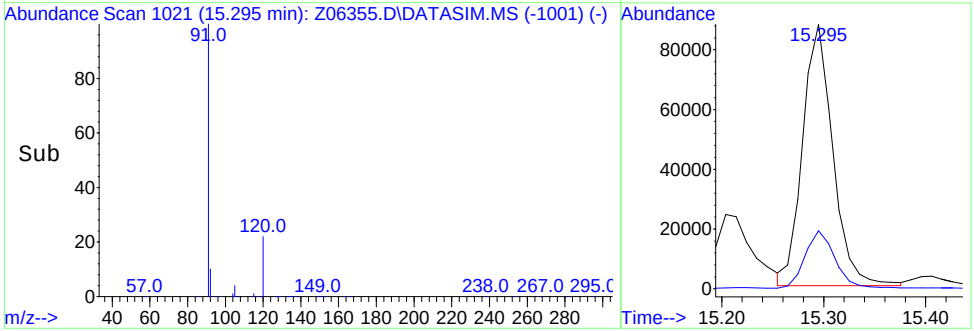


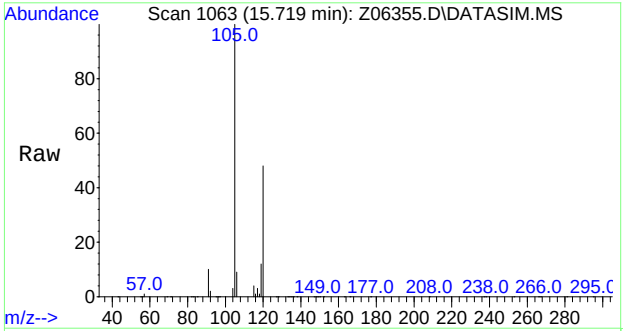


#20
n-Propylbenzene
Concen: 260.346 ng/mL
RT: 15.295 min Scan# 1021
Delta R.T. 0.003 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion: 91 Resp: 180172

Ion	Ratio	Lower	Upper
91	100		
120	21.7	16.5	24.7

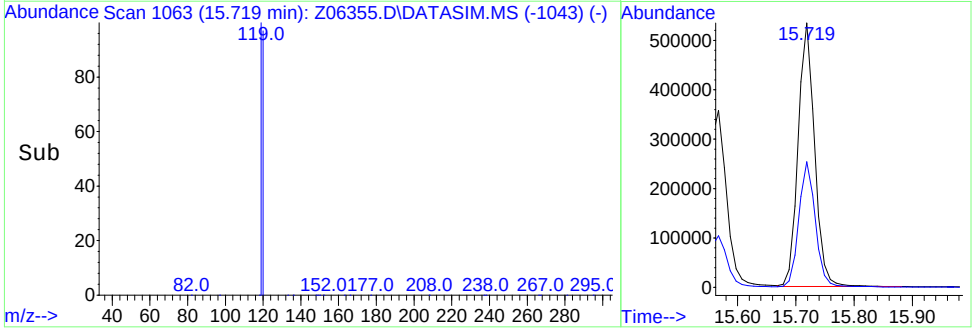


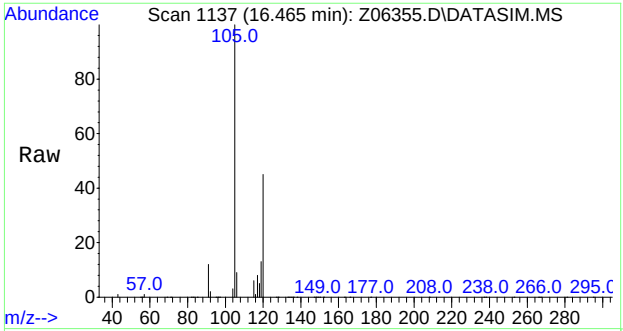


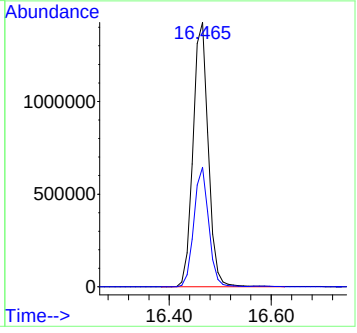
#21
1,3,5-Trimethylbenzene
Concen: 2093.830 ng/mL
RT: 15.719 min Scan# 1063
Delta R.T. 0.003 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:105 Resp: 1047675

Ion	Ratio	Lower	Upper
105	100		
120	47.6	36.6	54.8



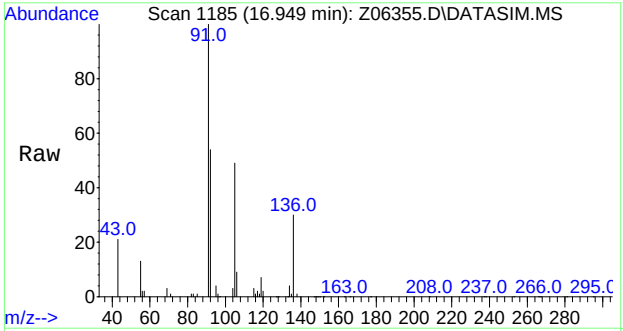


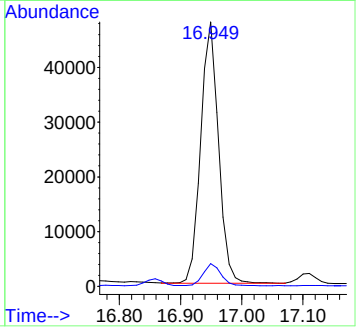


#23
1,2,4-Trimethylbenzene
Concen: 5855.159 ng/mL
RT: 16.465 min Scan# 1137
Delta R.T. 0.003 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:105 Resp: 2954467

Ion	Ratio	Lower	Upper
105	100		
120	43.9	35.2	52.8

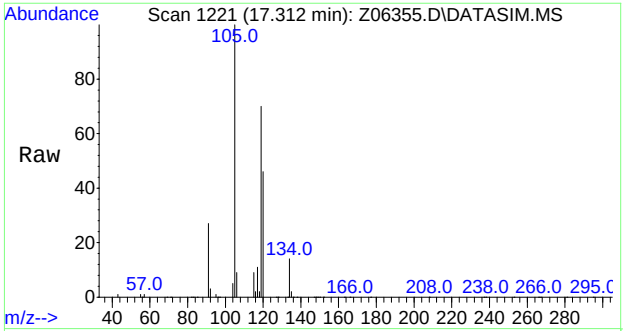




#24
sec-Butylbenzene
Concen: 151.495 ng/mL
RT: 16.949 min Scan# 1185
Delta R.T. 0.003 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:105 Resp: 96666

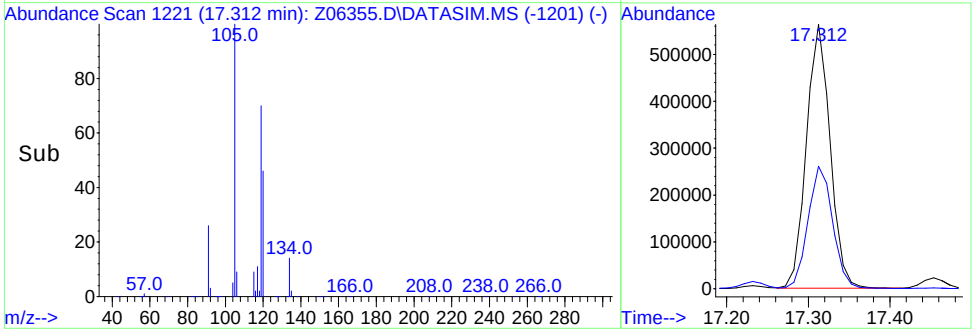
Ion	Ratio	Lower	Upper
105	100		
134	8.5	13.9	20.9#

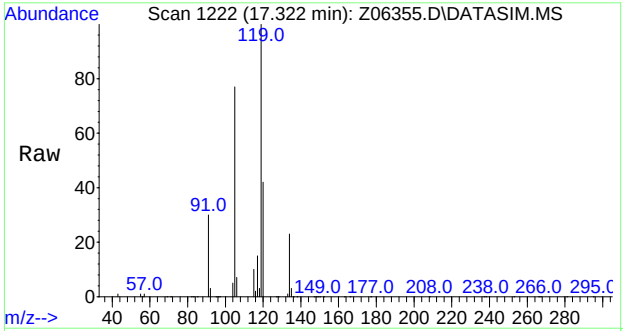


#25
1,2,3-Trimethylbenzene
Concen: 2149.085 ng/mL
RT: 17.312 min Scan# 1221
Delta R.T. -0.000 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:105 Resp: 1134399

Ion	Ratio	Lower	Upper
105	100		
120	48.2	37.3	55.9

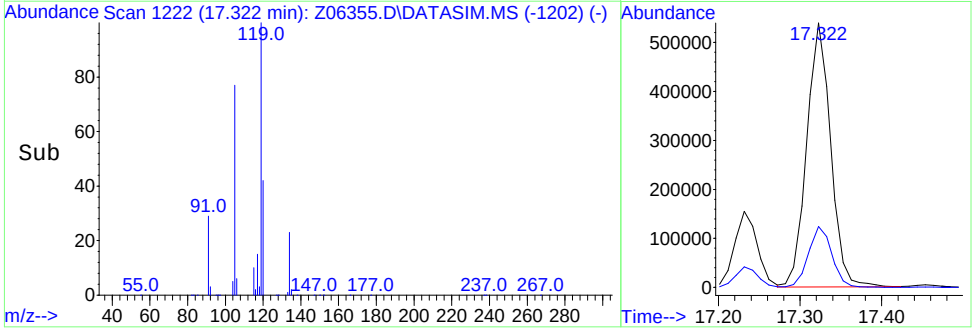


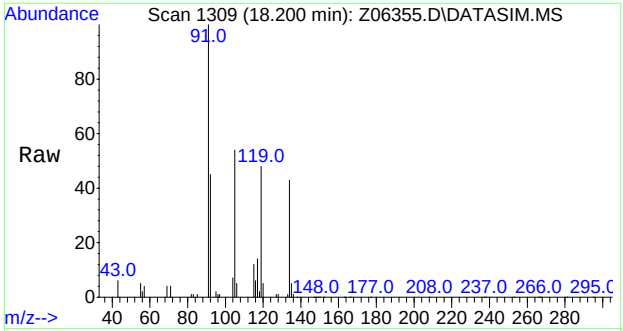


#26
p-Isopropyltoluene
Concen: 2025.104 ng/mL
RT: 17.322 min Scan# 1222
Delta R.T. 0.003 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:119 Resp: 1101249

Ion	Ratio	Lower	Upper
119	100		
134	22.4	17.8	26.6

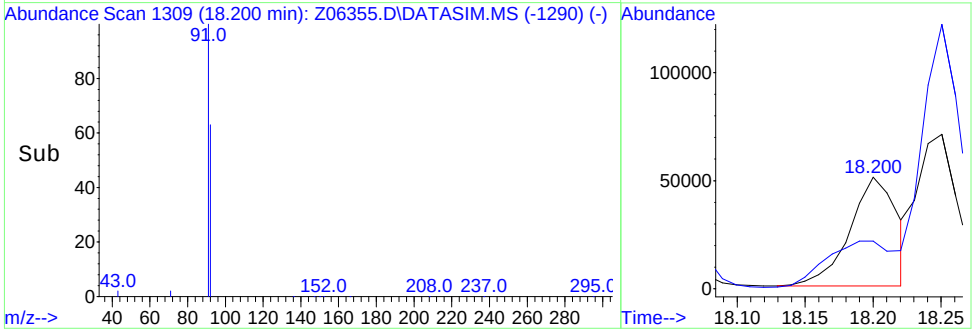


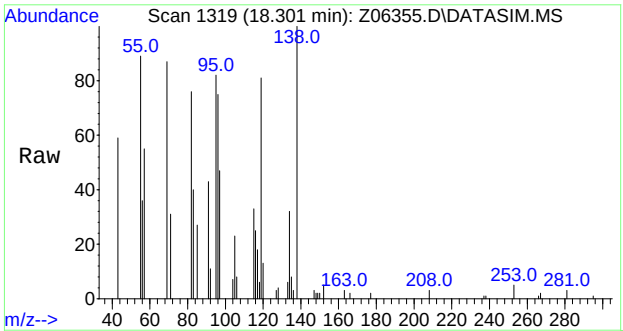


#27
n-Butylbenzene
Concen: 234.009 ng/mL
RT: 18.200 min Scan# 1309
Delta R.T. -0.007 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion: 91 Resp: 121268

Ion	Ratio	Lower	Upper
91	100		
134	54.7	19.8	29.8#

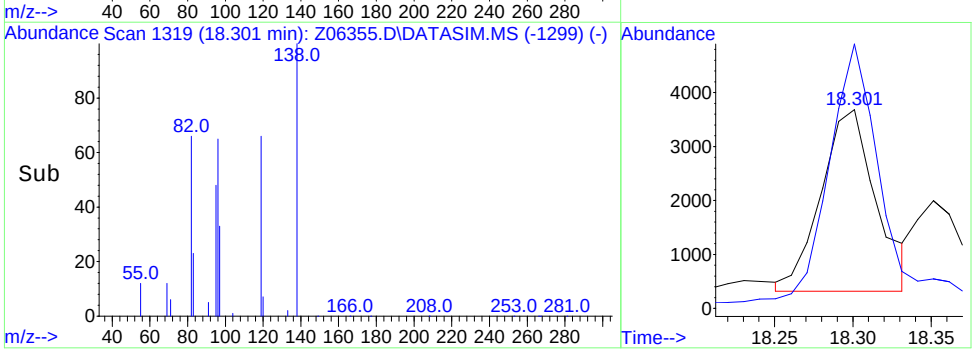


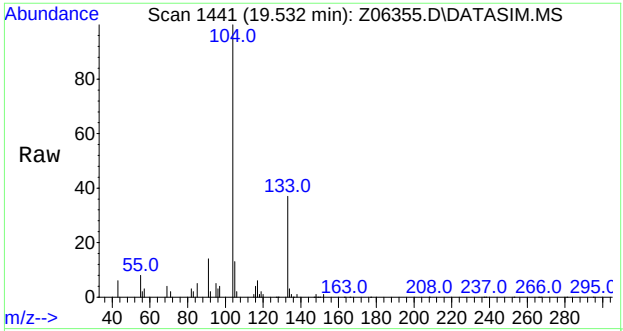


#28
trans-Decalin
Concen: 84.936 ng/mL m
RT: 18.301 min Scan# 1319
Delta R.T. 0.003 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion: 96 Resp: 8215

Ion	Ratio	Lower	Upper
96	100		
138	134.7	107.6	161.4

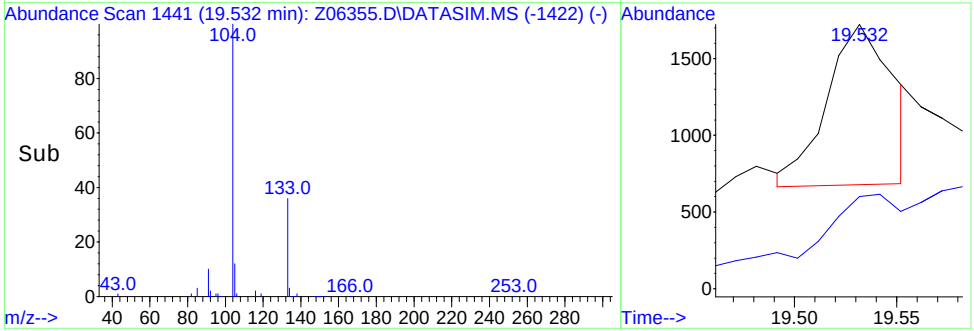


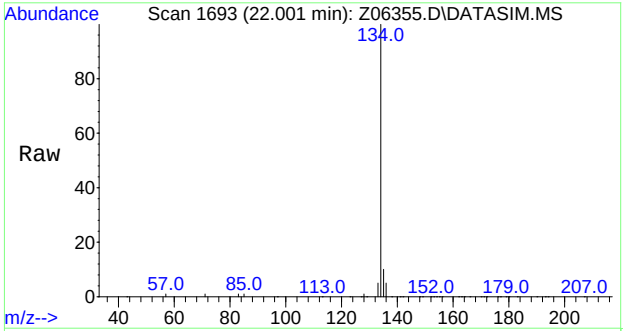


#29
cis-Decalin
Concen: 19.038 ng/mL m
RT: 19.532 min Scan# 1441
Delta R.T. -0.007 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion: 96 Resp: 2344

Ion	Ratio	Lower	Upper
96	100		
138	50.7	67.6	101.4#

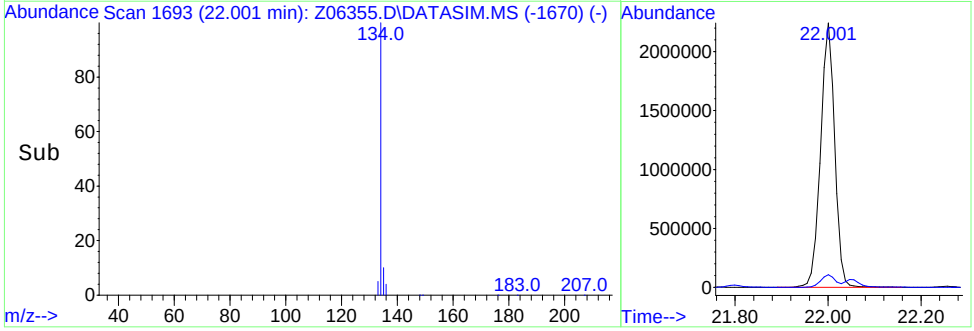


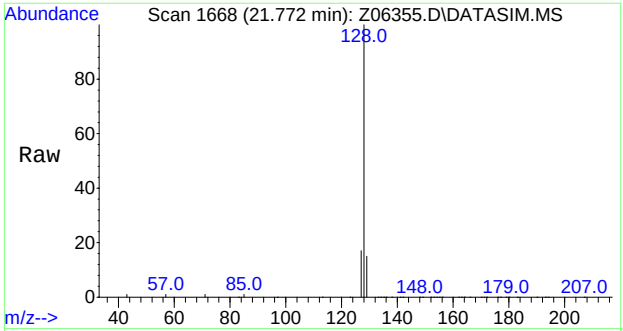


#34
Benzo(b)thiophene
Concen: 8772.708 ng/mL
RT: 22.001 min Scan# 1693
Delta R.T. 0.007 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:134 Resp: 4741035

Ion	Ratio	Lower	Upper
134	100		
136	5.0	3.9	5.9

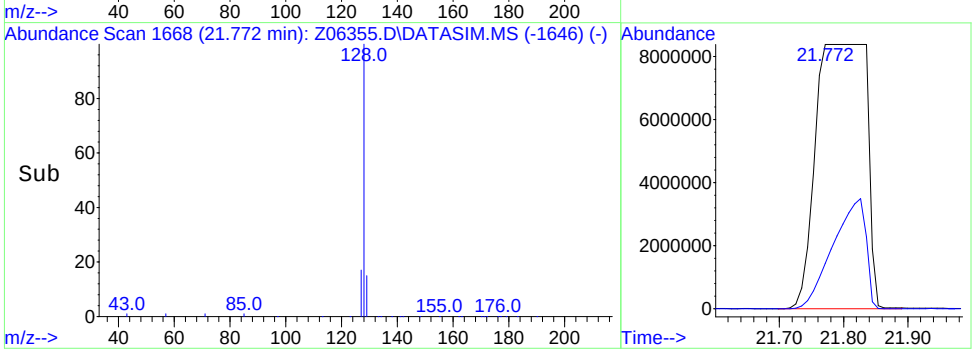


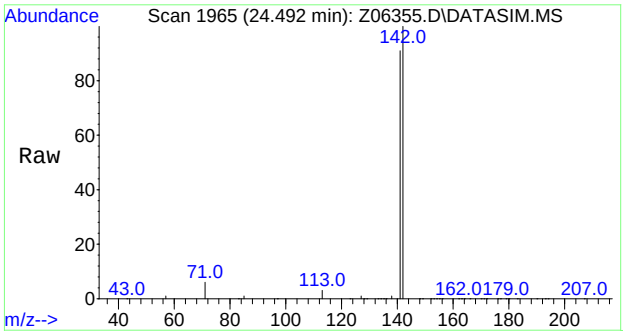


#44
Naphthalene
Concen: 66773.876 ng/mL m
RT: 21.772 min Scan# 1668
Delta R.T. -0.002 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:128 Resp:46015892

Ion	Ratio	Lower	Upper
128	100		
127	27.0	10.0	15.0#

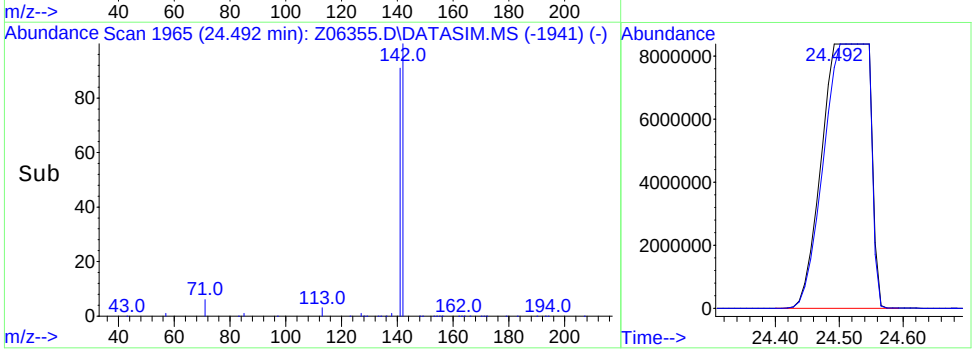


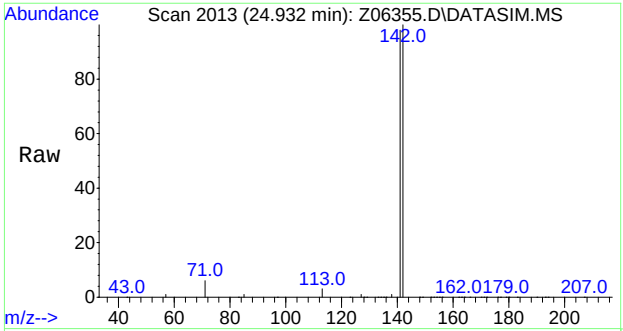


#45
2-Methylnaphthalene
Concen: 100621.005 ng/mL m
RT: 24.492 min Scan# 1965
Delta R.T. 0.016 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:142 Resp:43616641

Ion	Ratio	Lower	Upper
142	100		
141	95.5	68.6	102.8

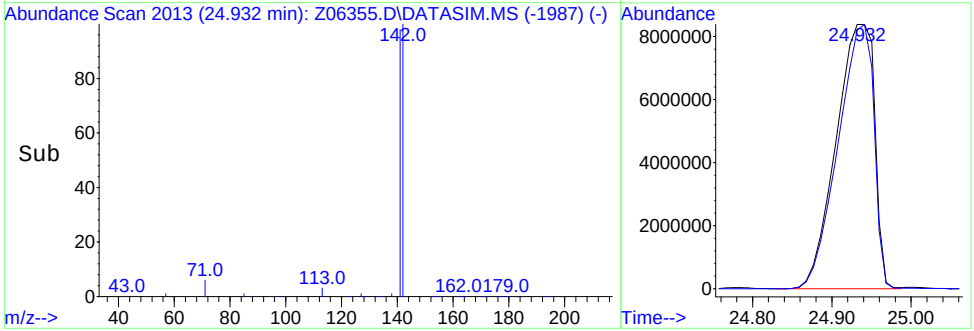


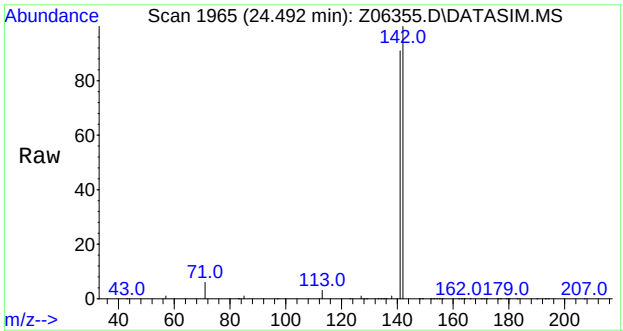


#46
1-Methylnaphthalene
Concen: 64219.741 ng/mL
RT: 24.932 min Scan# 2013
Delta R.T. 0.035 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:142 Resp:28208553

Ion	Ratio	Lower	Upper
142	100		
141	92.8	71.1	106.7

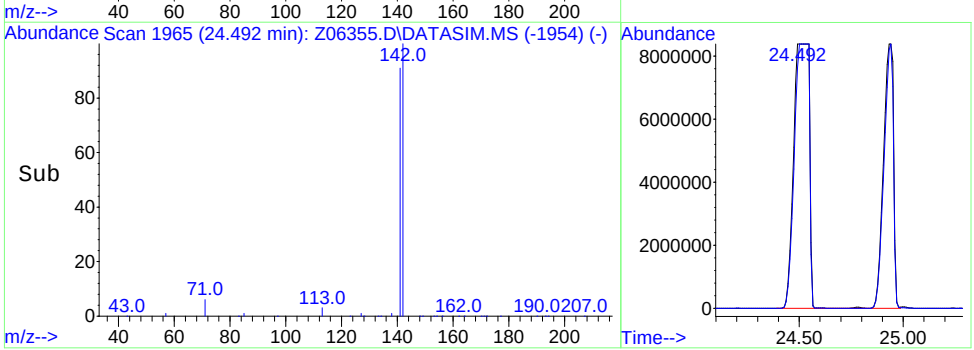


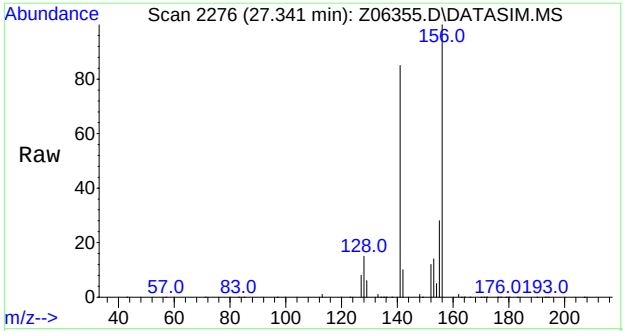


#47
C1-Naphthalenes
Concen: 104451.860 ng/mL m
RT: 24.492 min Scan# 1965
Delta R.T. 0.009 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:142 Resp:71980927

Ion	Ratio	Lower	Upper
142	100		
141	94.3	68.8	103.2

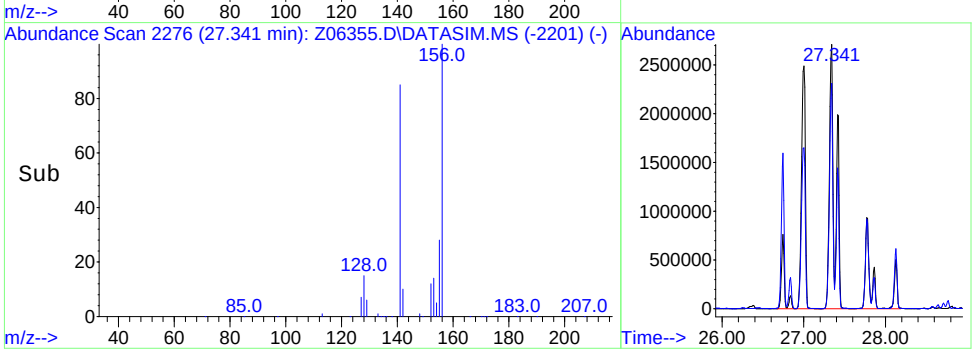


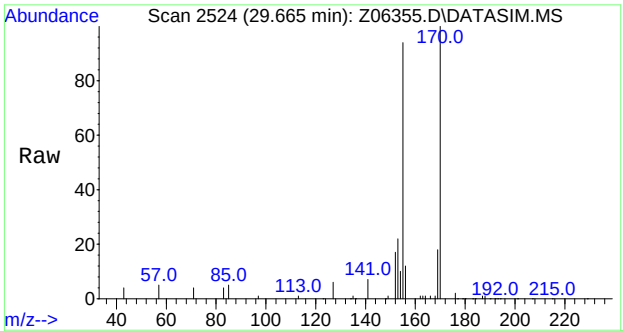


#48
C2-Naphthalenes
Concen: 39933.906 ng/mL m
RT: 27.341 min Scan# 2276
Delta R.T. -0.073 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:156 Resp:27519659

Ion	Ratio	Lower	Upper
156	100		
141	88.4	56.6	84.8#

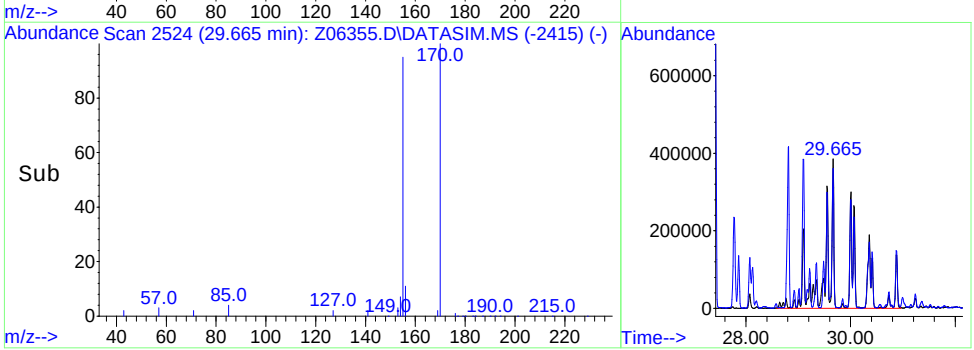


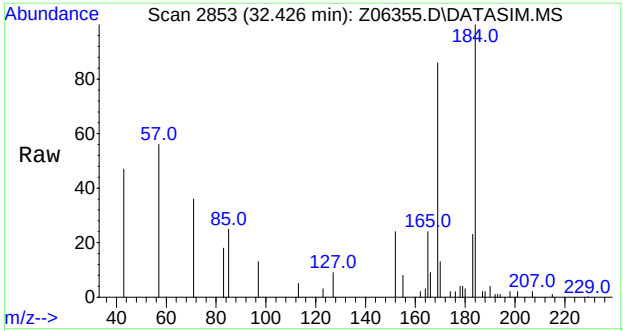


#49
C3-Naphthalenes
Concen: 8426.521 ng/mL m
RT: 29.665 min Scan# 2524
Delta R.T. -0.010 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:170 Resp: 5806970

Ion	Ratio	Lower	Upper
170	100		
155	125.1	75.4	113.2#

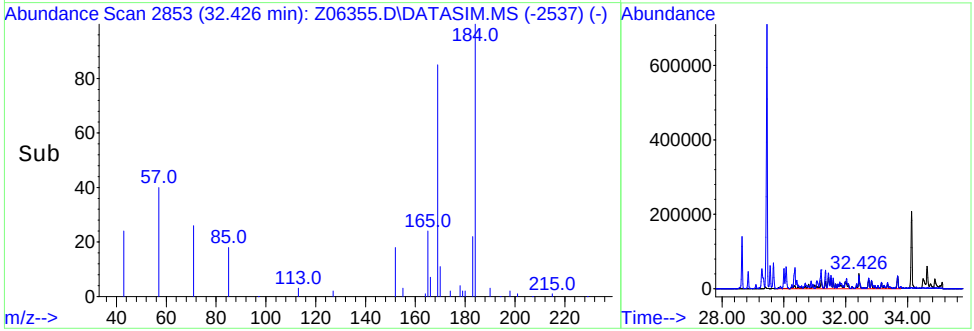


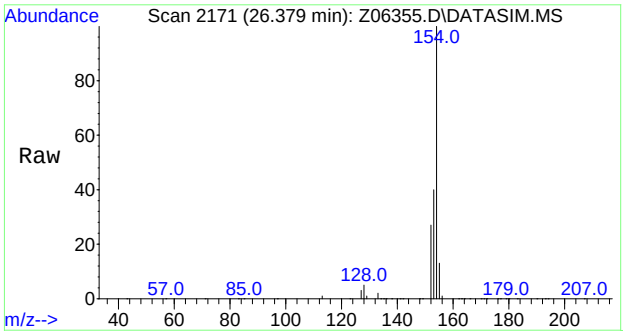


#50
C4-Naphthalenes
Concen: 1961.222 ng/mL m
RT: 32.426 min Scan# 2853
Delta R.T. -0.008 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:184 Resp: 1351537

Ion	Ratio	Lower	Upper
184	100		
169	177.5	74.7	112.1#

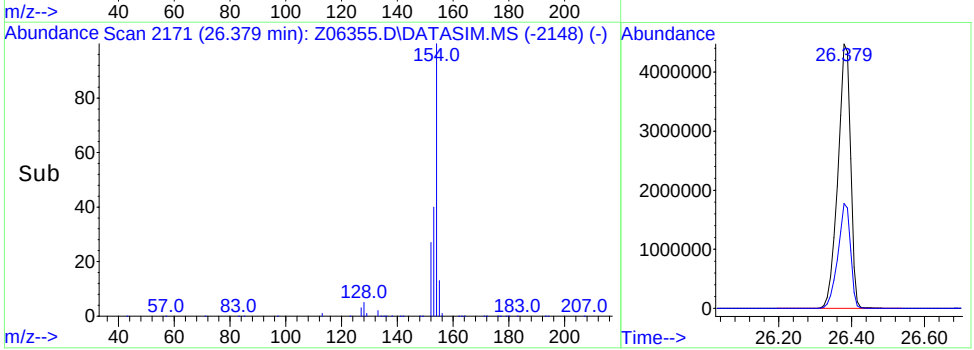


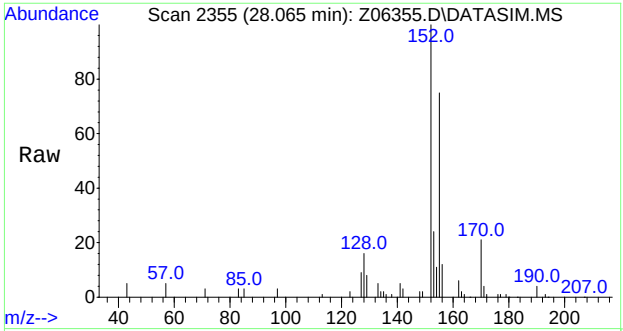


#51
Biphenyl
Concen: 17963.739 ng/mL
RT: 26.379 min Scan# 2171
Delta R.T. 0.007 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:154 Resp:10751088

Ion	Ratio	Lower	Upper
154	100		
153	39.3	31.5	47.3

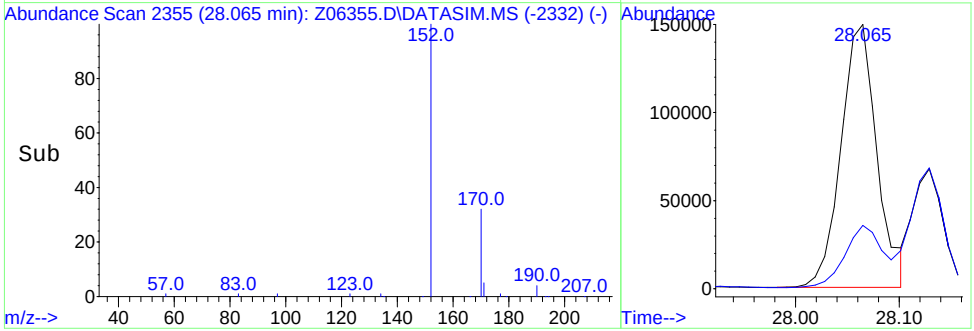


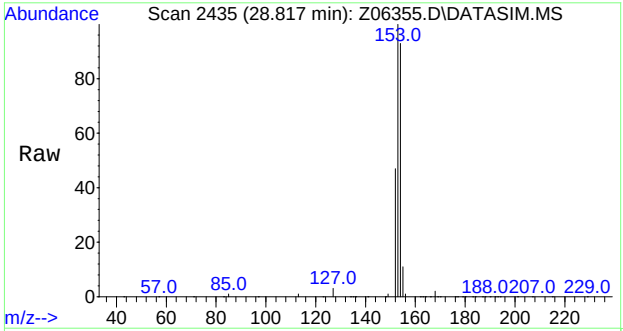


#52
Acenaphthylene
Concen: 504.727 ng/mL
RT: 28.065 min Scan# 2355
Delta R.T. 0.007 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:152 Resp: 360486

Ion	Ratio	Lower	Upper
152	100		
153	24.8	10.2	15.4#

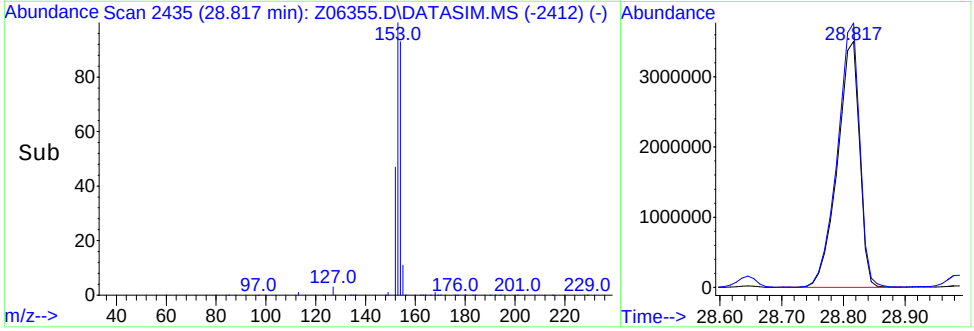


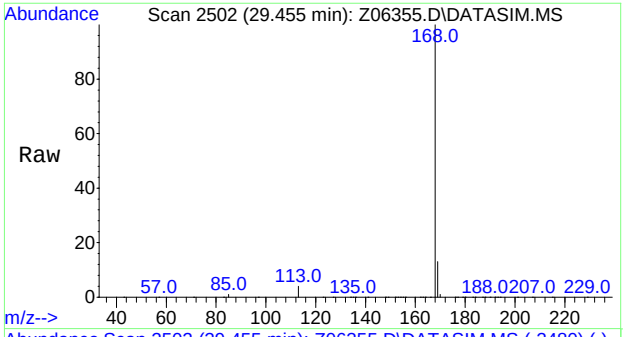


#53
Acenaphthene
Concen: 20520.529 ng/mL
RT: 28.817 min Scan# 2435
Delta R.T. 0.020 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:154 Resp: 8794252

Ion	Ratio	Lower	Upper
154	100		
153	108.3	85.7	128.5

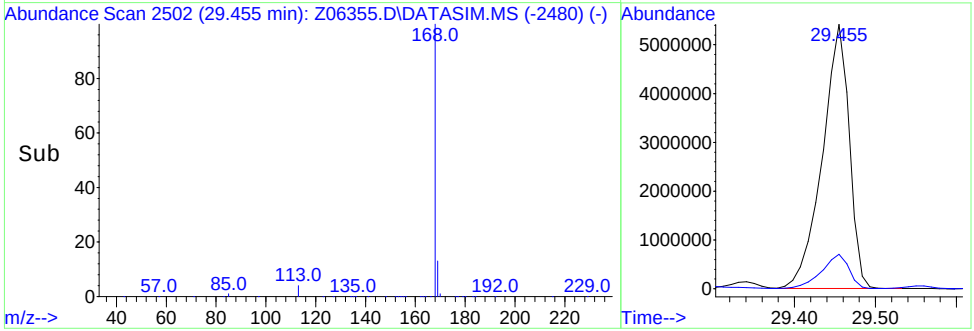


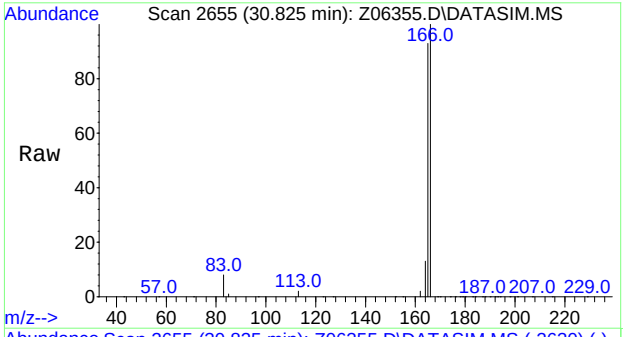


#54
Dibenzofuran
Concen: 20256.518 ng/mL
RT: 29.455 min Scan# 2502
Delta R.T. 0.010 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:168 Resp:12488764

Ion	Ratio	Lower	Upper
168	100		
169	13.1	10.1	15.1

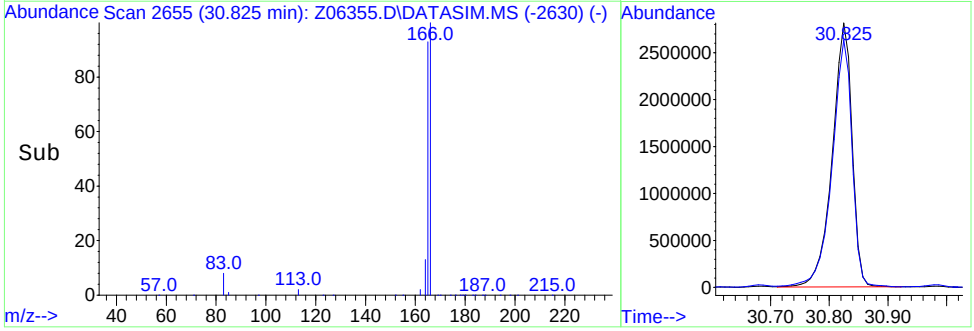


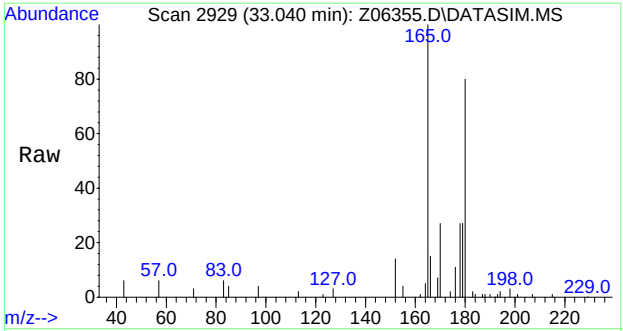


#55
Fluorene
Concen: 12712.738 ng/mL
RT: 30.825 min Scan# 2655
Delta R.T. 0.005 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:166 Resp: 6569573

Ion	Ratio	Lower	Upper
166	100		
165	94.4	73.8	110.8

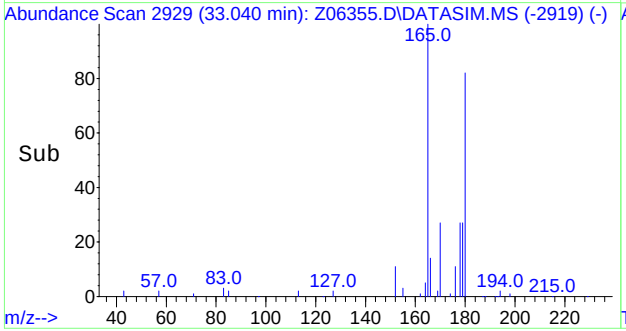


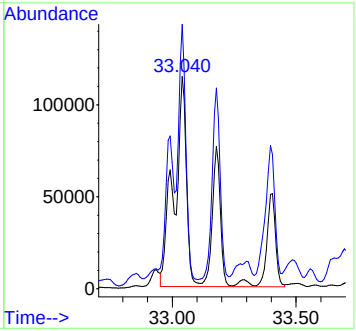


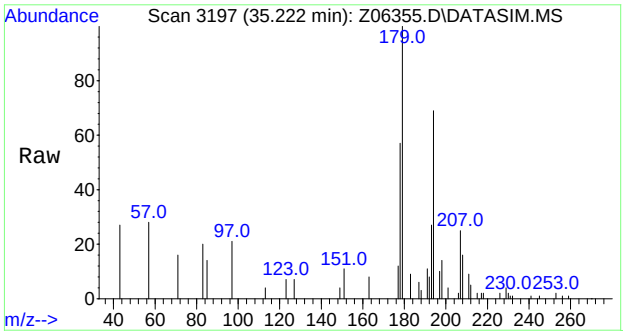
#56
C1-Fluorenes
Concen: 1342.833 ng/mL m
RT: 33.040 min Scan# 2929
Delta R.T. -0.146 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:180 Resp: 693937

Ion	Ratio	Lower	Upper
180	100		
165	136.3	121.8	182.6



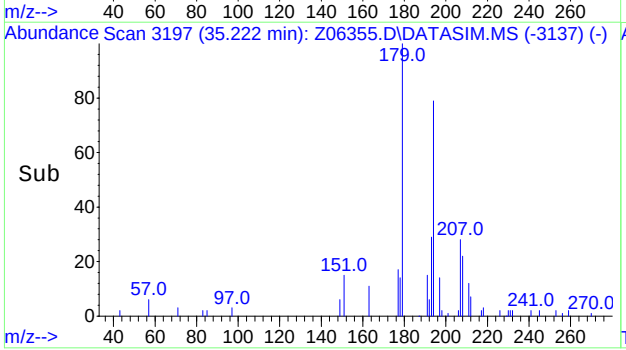


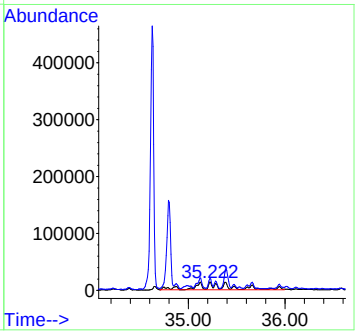


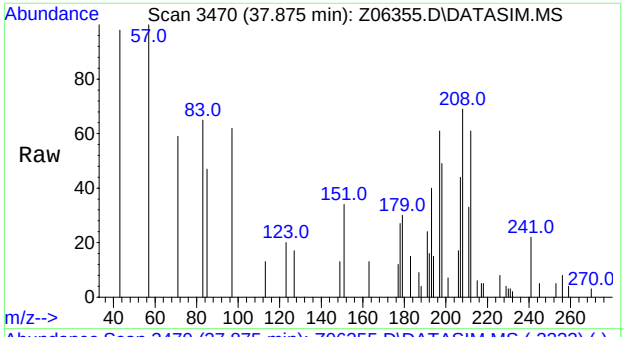
#57
C2-Fluorenes
Concen: 514.696 ng/mL m
RT: 35.222 min Scan# 3197
Delta R.T. -0.165 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:194 Resp: 265980

Ion	Ratio	Lower	Upper
194	100		
179	330.7	114.6	172.0#



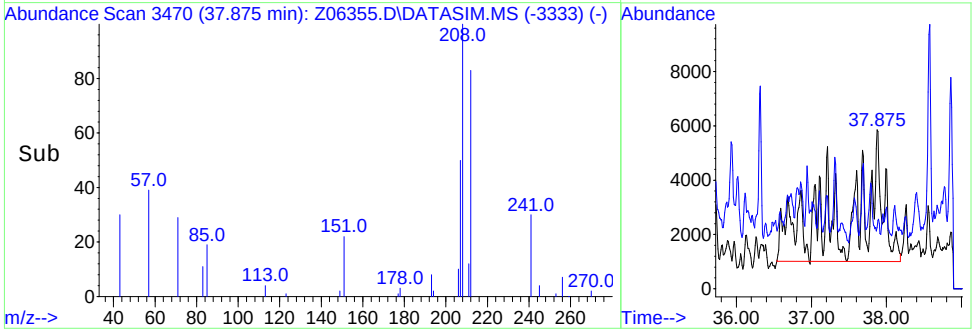


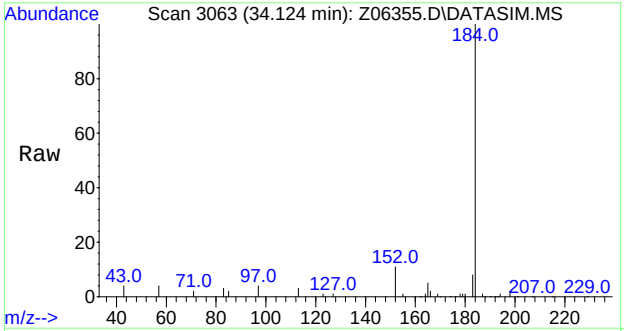


#58
C3-Fluorenes
Concen: 288.104 ng/mL m
RT: 37.875 min Scan# 3470
Delta R.T. 0.651 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:208 Resp: 148884

Ion	Ratio	Lower	Upper
208	100		
178	60.4	48.1	72.1

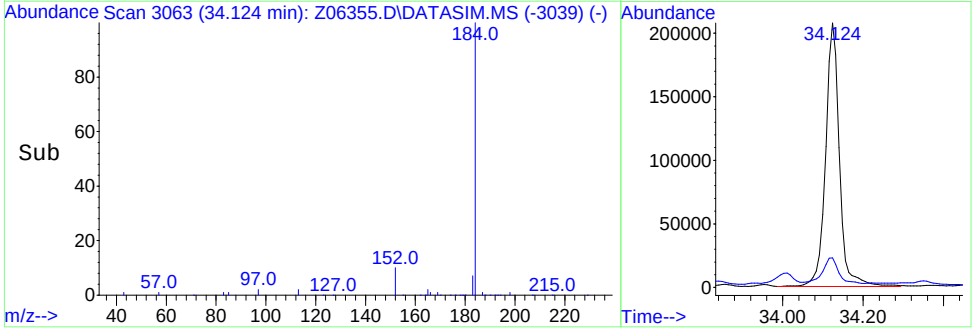


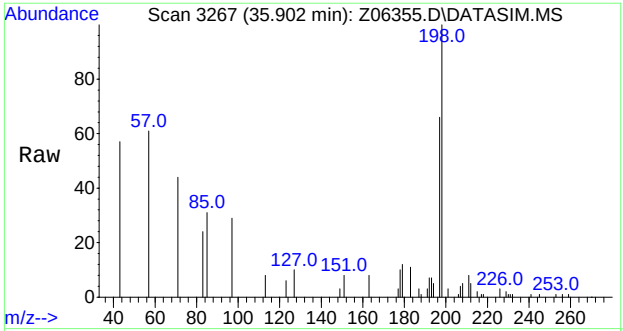


#59
Dibenzothiophene
Concen: 734.728 ng/mL
RT: 34.124 min Scan# 3063
Delta R.T. -0.003 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:184 Resp: 496243

Ion	Ratio	Lower	Upper
184	100		
152	11.0	6.8	10.2#

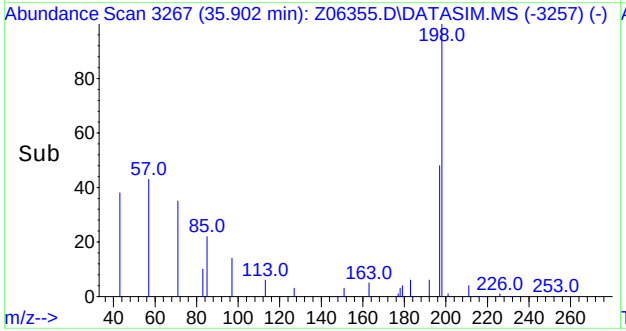


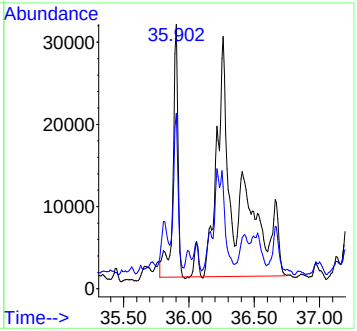


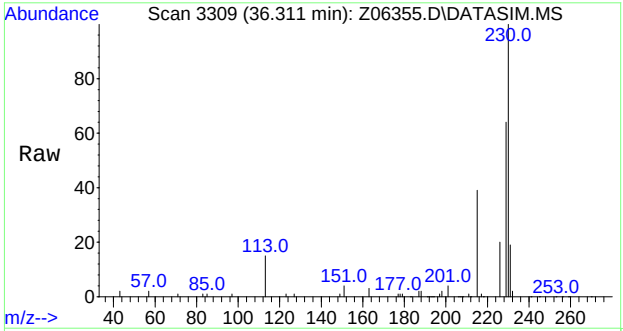
#60
C1-Dibenzothiophenes (unadj)
Concen: 592.272 ng/mL m
RT: 35.902 min Scan# 3267
Delta R.T. -0.010 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:198 Resp: 400027

Ion	Ratio	Lower	Upper
198	100		
197	53.4	52.0	78.0



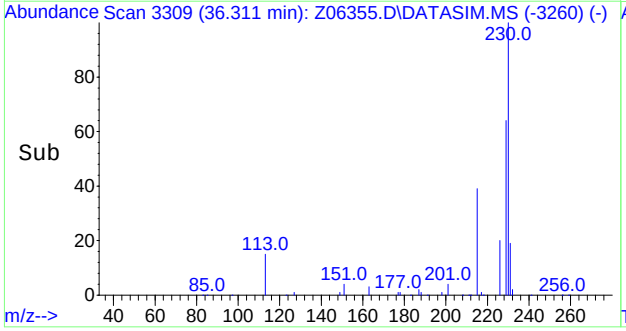


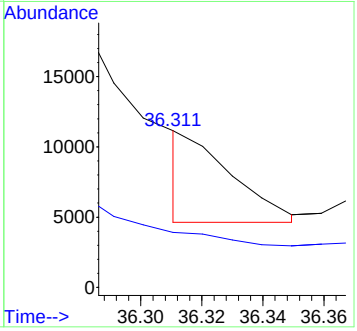


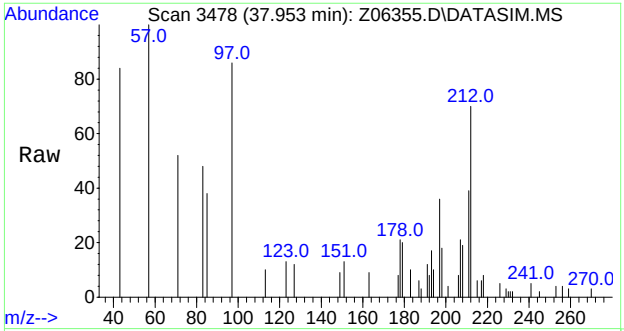
#61
C1-Dibenzothiophenes (OTP)
Concen: 9.510 ng/mL m
RT: 36.311 min Scan# 3309
Delta R.T. -0.019 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:198 Resp: 6423

Ion	Ratio	Lower	Upper
198	100		
197	10.0	8.7	13.1



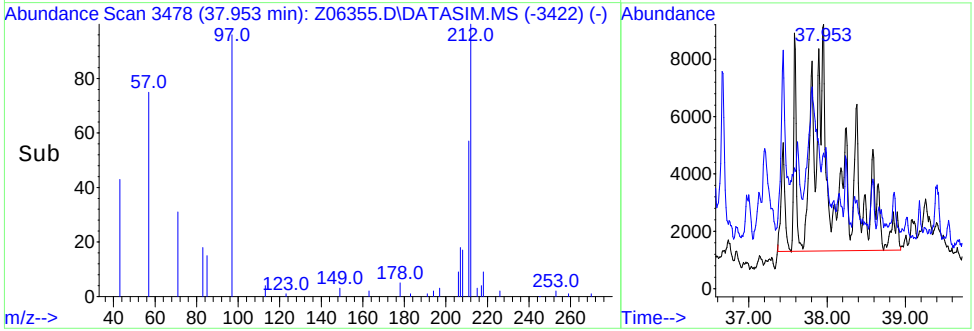


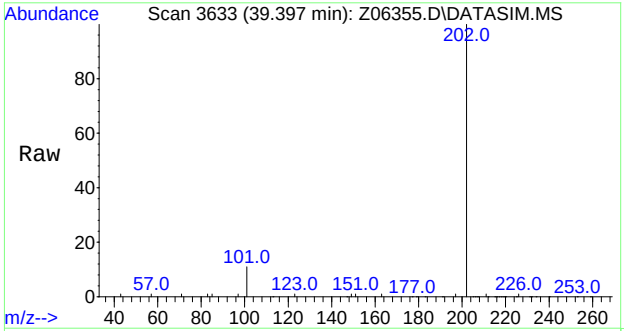


#62
C2-Dibenzothiophenes
Concen: 274.904 ng/mL m
RT: 37.953 min Scan# 3478
Delta R.T. -0.010 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:212 Resp: 185673

Ion	Ratio	Lower	Upper
212	100		
197	73.1	17.1	25.7#

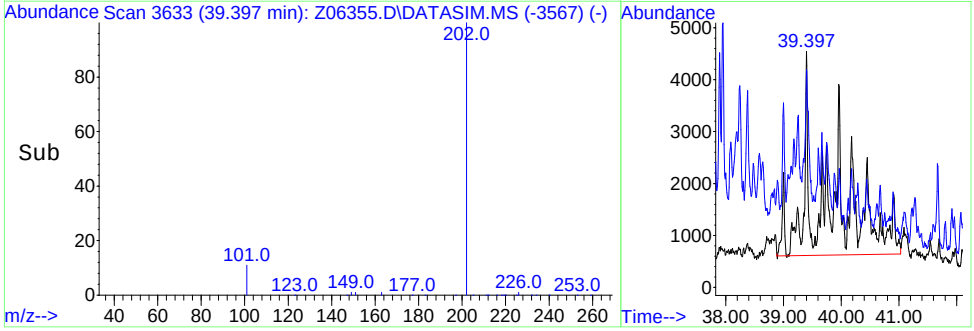


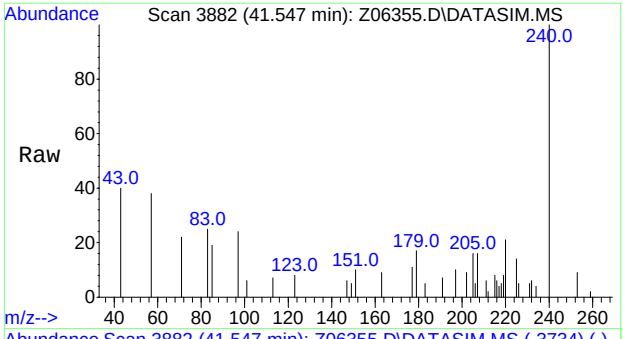


#63
C3-Dibenzothiophenes
Concen: 137.556 ng/mL m
RT: 39.397 min Scan# 3633
Delta R.T. -0.017 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:226 Resp: 92907

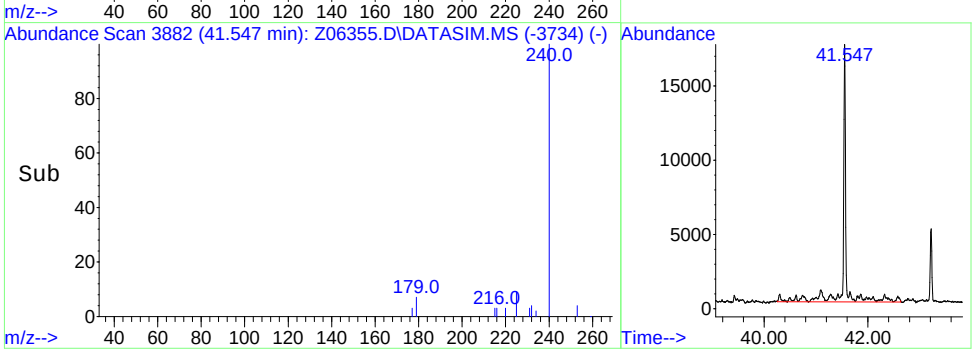
Ion	Ratio	Lower	Upper
226	100		
211	107.0	45.4	68.0#

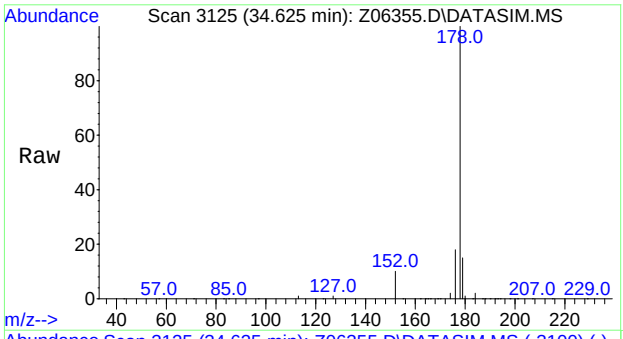




#64
C4-Dibenzothiophenes
Concen: 102.416 ng/mL m
RT: 41.547 min Scan# 3882
Delta R.T. 0.432 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:240 Resp: 69173

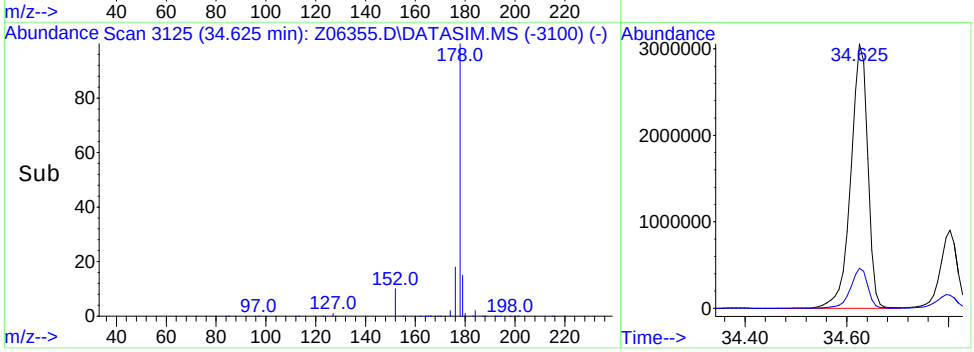


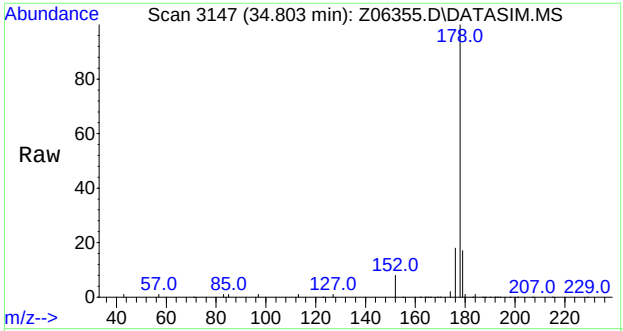


#65
Phenanthrene
Concen: 9465.025 ng/mL
RT: 34.625 min Scan# 3125
Delta R.T. 0.005 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:178 Resp: 7082056

Ion	Ratio	Lower	Upper
178	100		
179	15.3	12.2	18.2

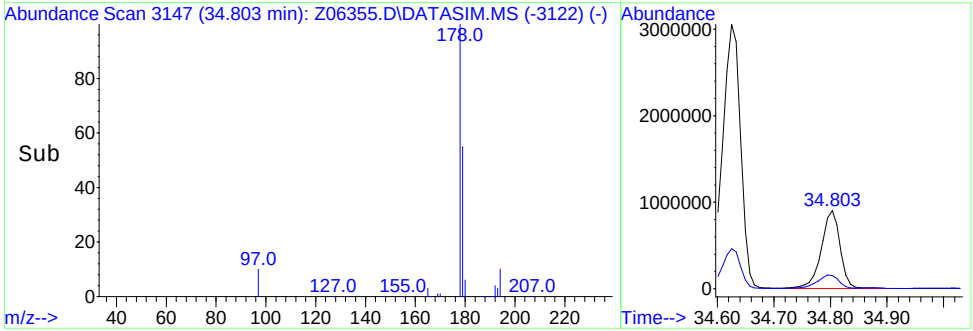


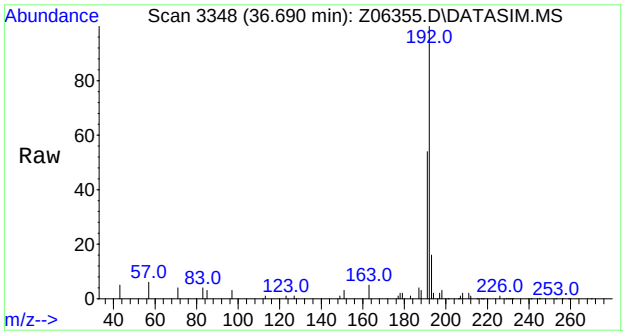


#66
Anthracene
Concen: 3066.069 ng/mL
RT: 34.803 min Scan# 3147
Delta R.T. 0.005 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:178 Resp: 2091535

Ion	Ratio	Lower	Upper
178	100		
179	20.2	12.2	18.4#

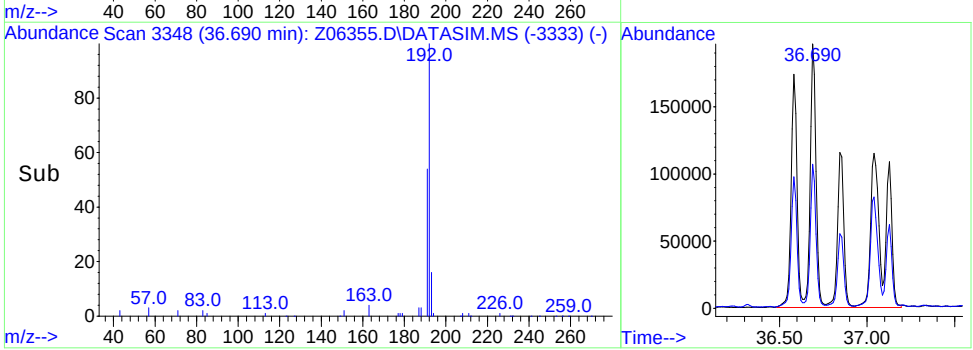


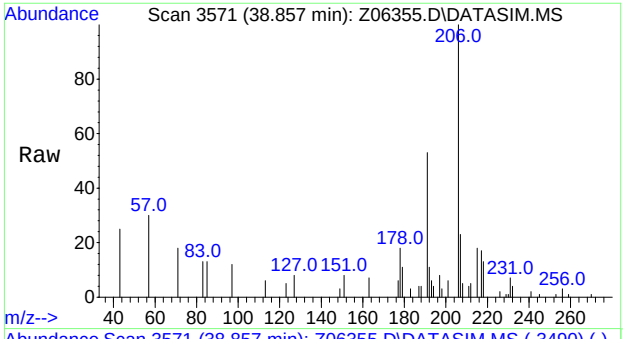


#67
C1-Phenanthrenes/anthracenes
Concen: 2323.895 ng/mL m
RT: 36.690 min Scan# 3348
Delta R.T. -0.360 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:192 Resp: 1738818

Ion	Ratio	Lower	Upper
192	100		
191	56.7	45.8	68.8

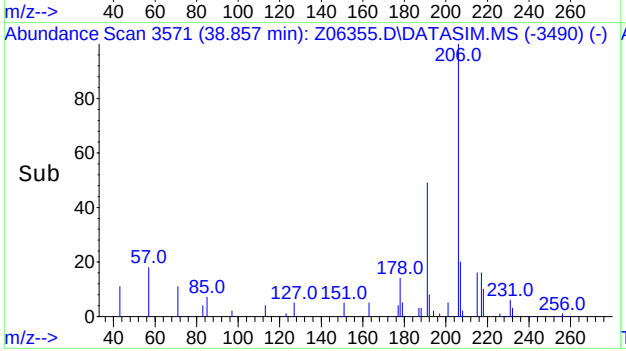


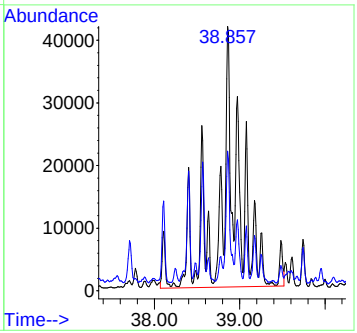


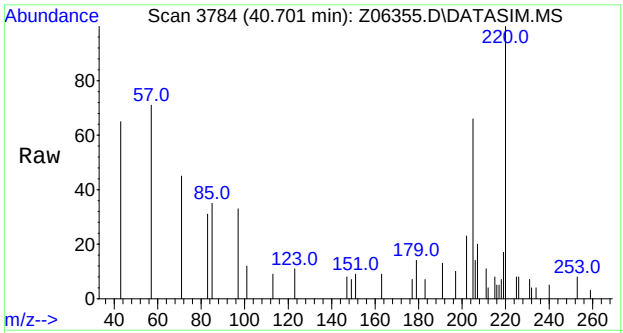
#68
C2-Phenanthrenes/anthracenes (unadj)
Concen: 816.222 ng/mL m
RT: 38.857 min Scan# 3571
Delta R.T. -0.019 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:206 Resp: 610725

Ion	Ratio	Lower	Upper
206	100		
191	56.2	40.8	61.2



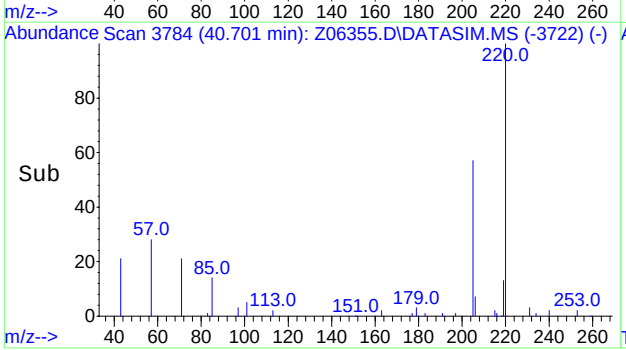


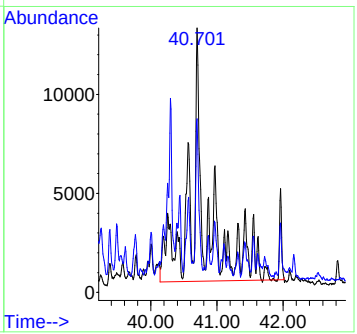


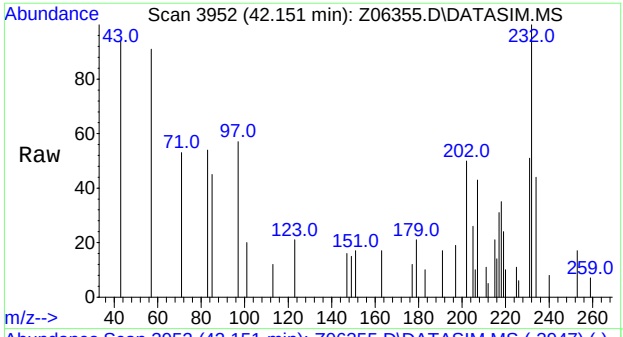
#70
C3-Phenanthrenes/anthracenes
Concen: 286.539 ng/mL m
RT: 40.701 min Scan# 3784
Delta R.T. -0.017 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:220 Resp: 214398

Ion	Ratio	Lower	Upper
220	100		
205	79.6	39.4	59.2#



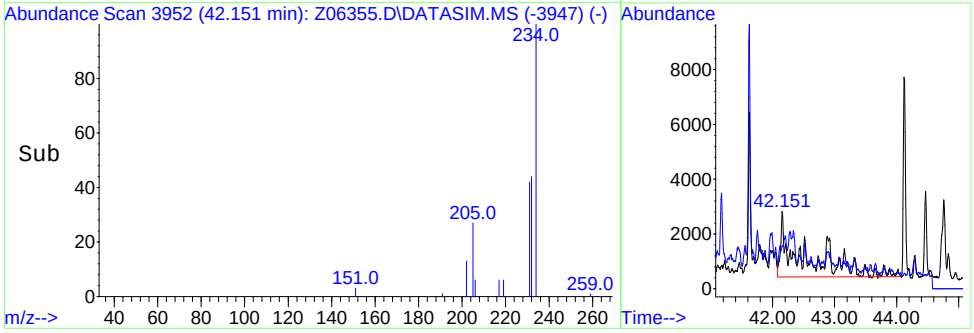


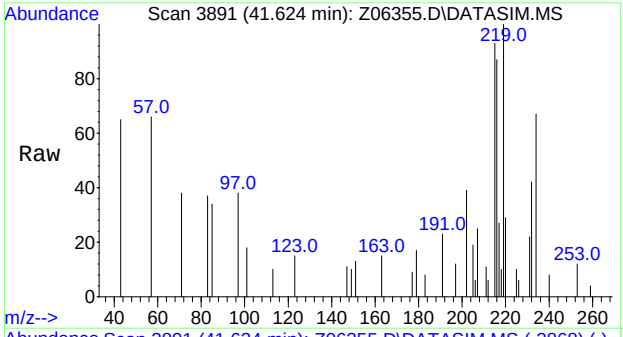


#71
C4-Phenanthrenes/anthracenes
Concen: 72.781 ng/mL m
RT: 42.151 min Scan# 3952
Delta R.T. -0.755 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:234 Resp: 54457

Ion	Ratio	Lower	Upper
234	100		
219	108.3	45.9	68.9#

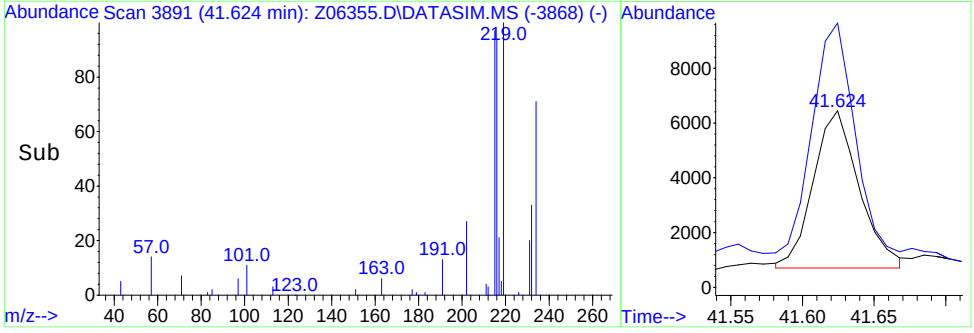


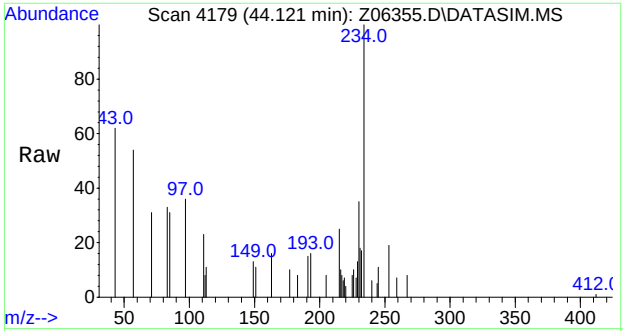


#72
Retene
Concen: 127.038 ng/mL m
RT: 41.624 min Scan# 3891
Delta R.T. -0.001 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:234 Resp: 12771

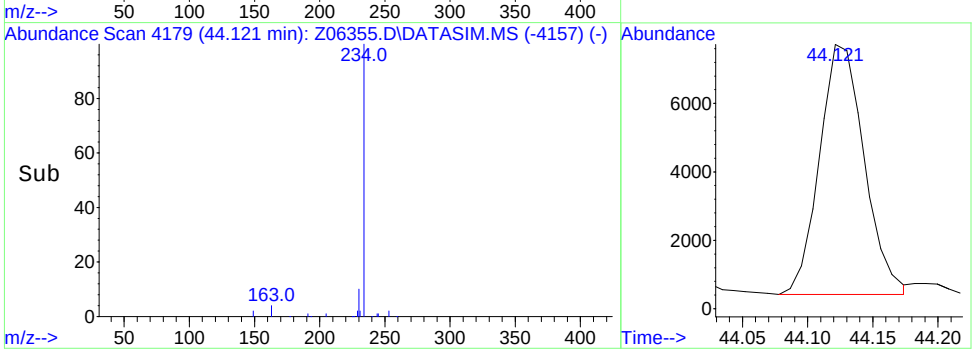
Ion	Ratio	Lower	Upper
234	100		
219	150.9	134.5	201.7

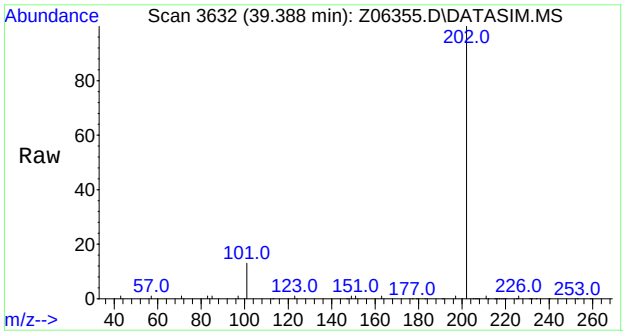




#73
Benzo(b)naphtho(2,1-d)thiophene
Concen: 23.895 ng/mL m
RT: 44.121 min Scan# 4179
Delta R.T. -0.009 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:234 Resp: 17419

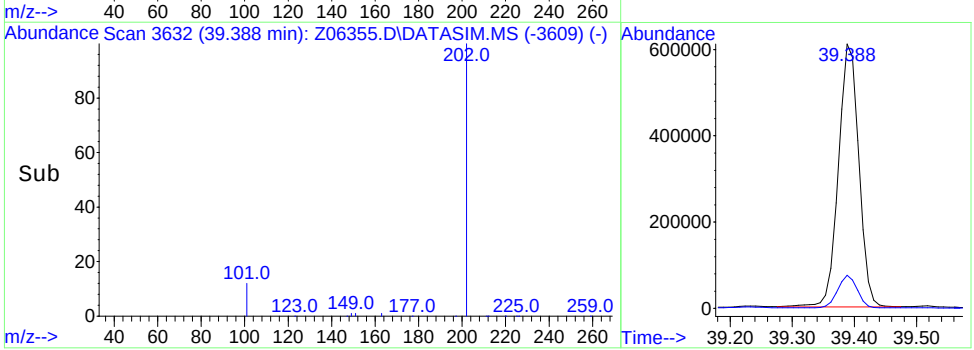


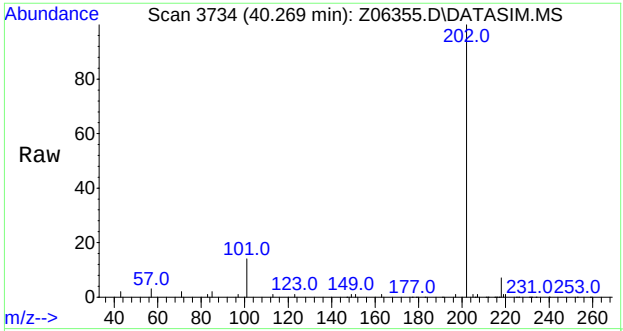


#78
Fluoranthene
Concen: 1728.361 ng/mL
RT: 39.388 min Scan# 3632
Delta R.T. -0.001 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:202 Resp: 1393372

Ion	Ratio	Lower	Upper
202	100		
101	11.9	10.2	15.2

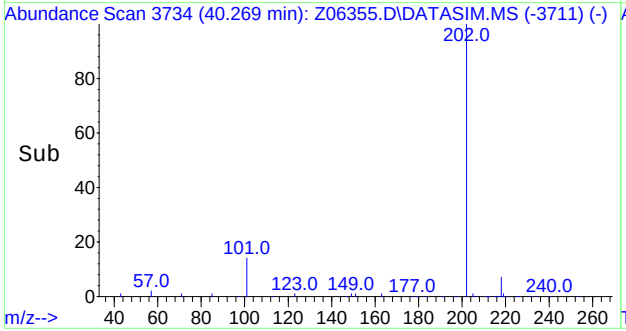


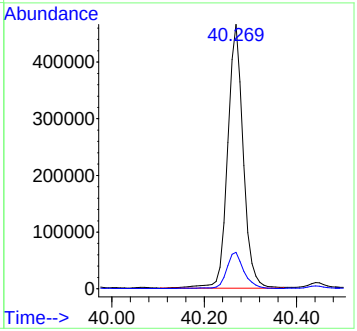


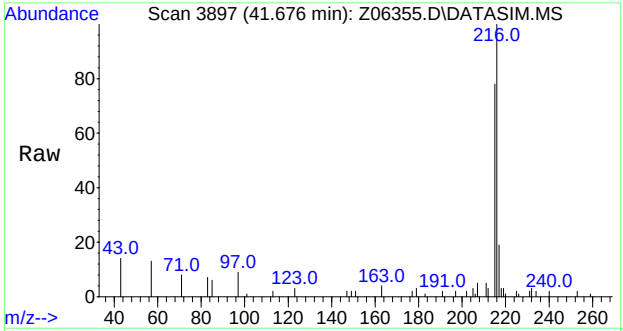
#79
Pyrene
Concen: 1306.502 ng/mL
RT: 40.269 min Scan# 3734
Delta R.T. -0.001 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:202 Resp: 1082870

Ion	Ratio	Lower	Upper
202	100		
101	15.3	11.4	17.2



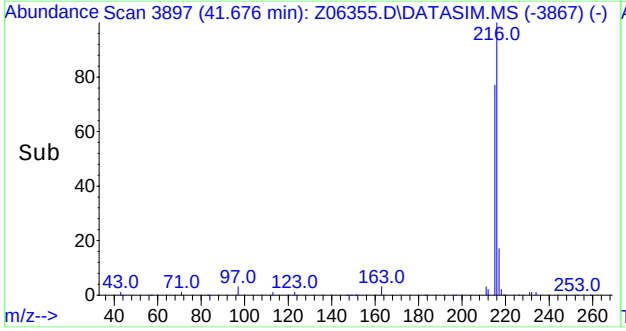


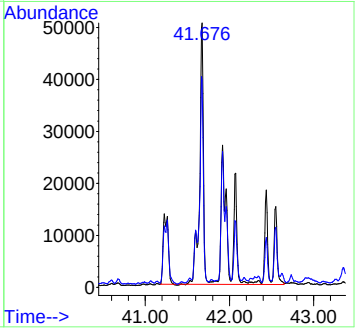


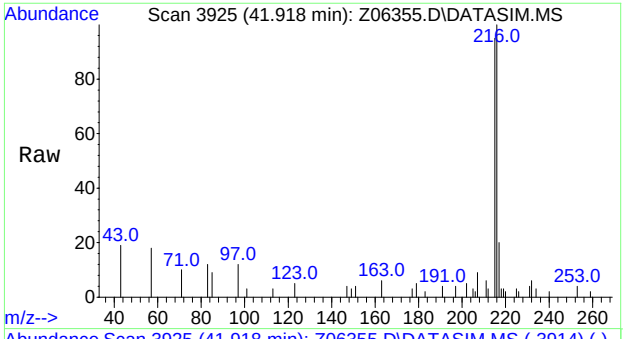
#80
C1-Fluoranthenes/pyrenes
Concen: 548.789 ng/mL m
RT: 41.676 min Scan# 3897
Delta R.T. -0.009 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:216 Resp: 454854

Ion	Ratio	Lower	Upper
216	100		
215	86.5	76.0	114.0



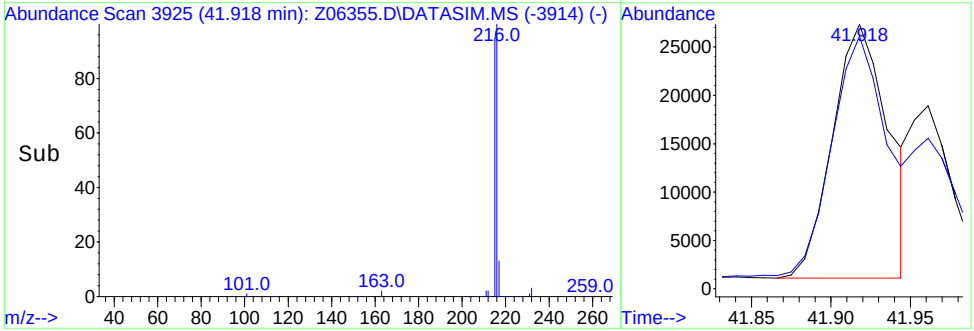


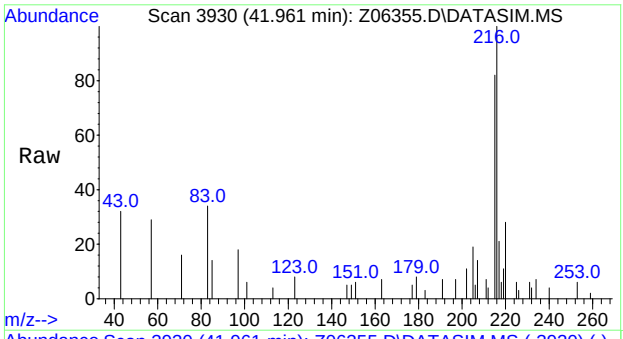


#81
Benzo(b)fluorene
Concen: 77.367 ng/mL
RT: 41.918 min Scan# 3925
Delta R.T. -0.009 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:216 Resp: 64124

Ion	Ratio	Lower	Upper
216	100		
215	92.9	112.2	168.4#

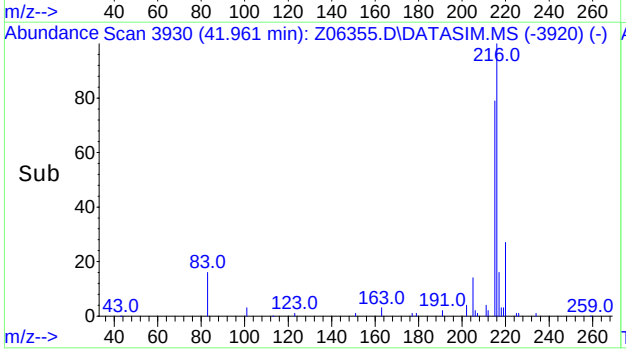


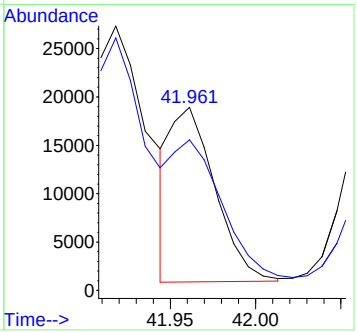


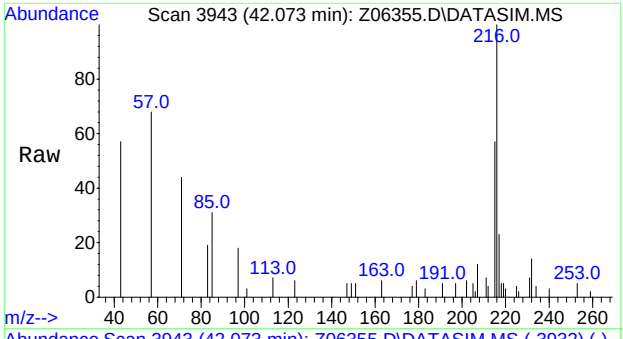
#82
Benzo(c)fluorene
Concen: 39.439 ng/mL m
RT: 41.961 min Scan# 3930
Delta R.T. -0.017 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:216 Resp: 32688

Ion	Ratio	Lower	Upper
216	100		
215	97.8	127.0	190.4#



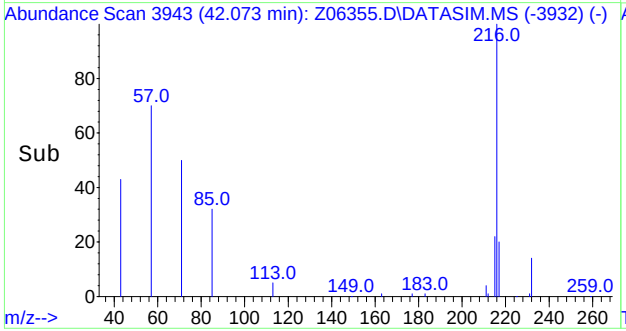


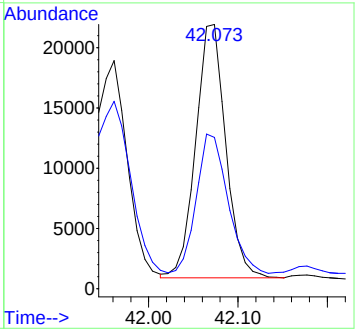


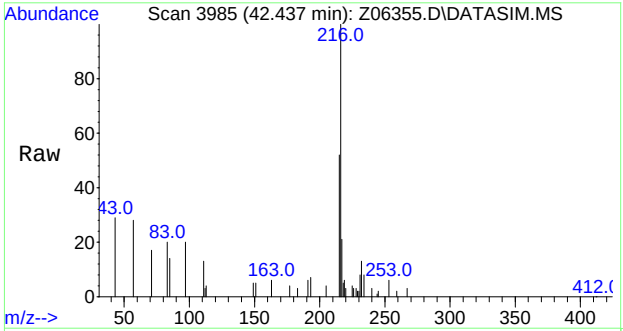
#83
2-Methylpyrene
Concen: 59.174 ng/mL
RT: 42.073 min Scan# 3943
Delta R.T. -0.009 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:216 Resp: 49045

Ion	Ratio	Lower	Upper
216	100		
215	57.6	84.8	127.2#



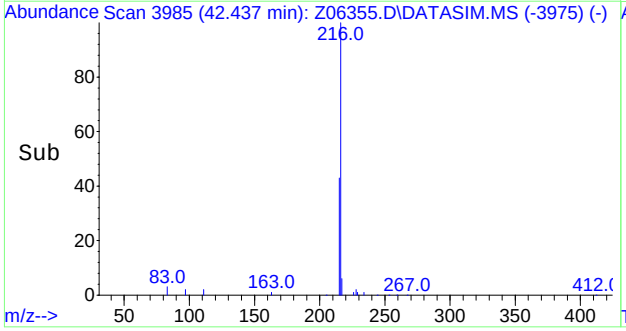


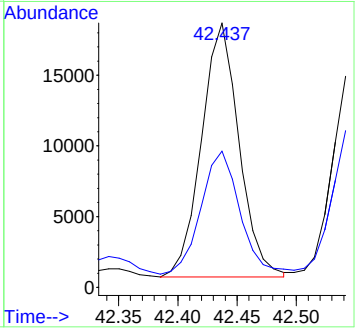


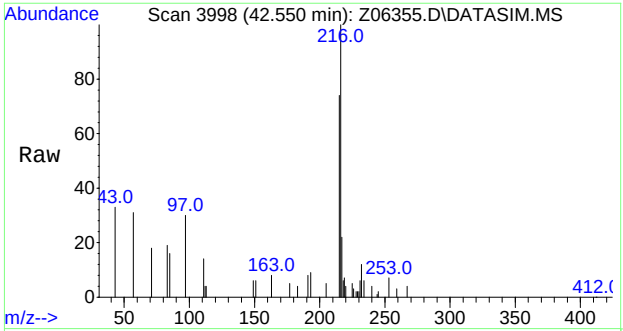
#84
4-Methylpyrene
Concen: 47.715 ng/mL
RT: 42.437 min Scan# 3985
Delta R.T. -0.017 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:216 Resp: 39548

Ion	Ratio	Lower	Upper
216	100		
215	50.2	57.0	85.6#



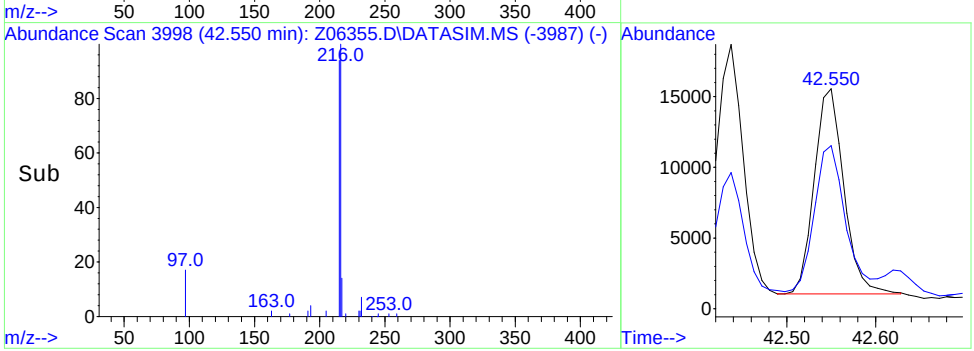


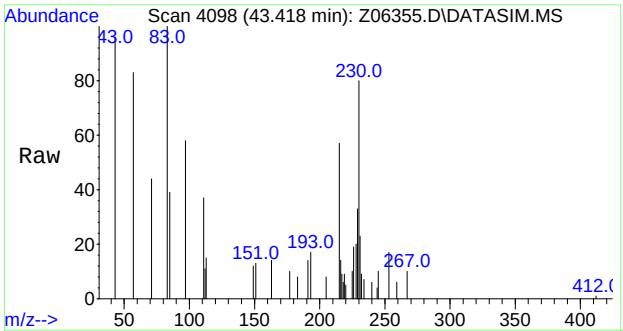


#85
1-Methylpyrene
Concen: 40.500 ng/mL
RT: 42.550 min Scan# 3998
Delta R.T. -0.009 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:216 Resp: 33568

Ion	Ratio	Lower	Upper
216	100		
215	73.2	78.0	117.0#

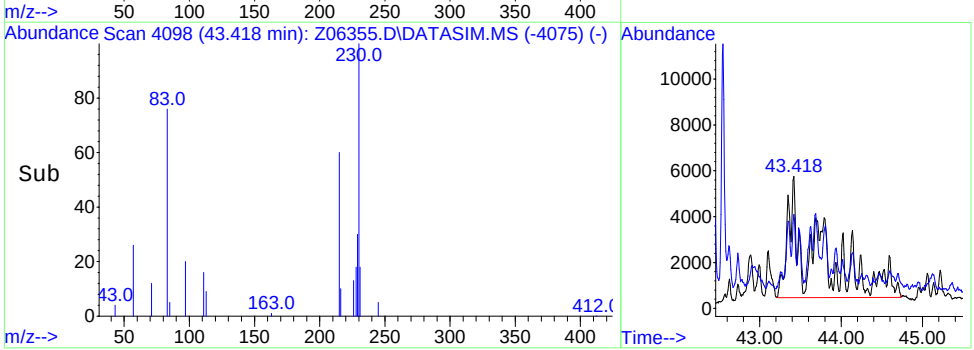


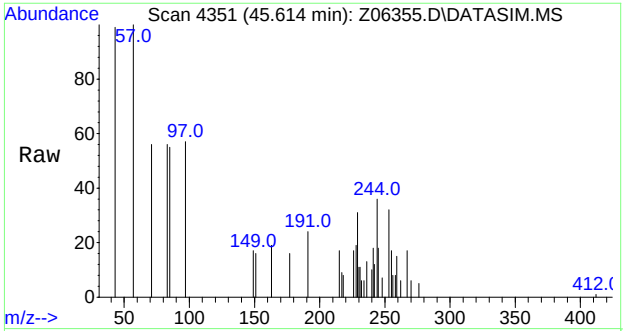


#86
C2-Fluoranthenes/pyrenes
Concen: 154.736 ng/mL m
RT: 43.418 min Scan# 4098
Delta R.T. -1.189 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:230 Resp: 128250

Ion	Ratio	Lower	Upper
230	100		
215	74.2	71.4	107.0

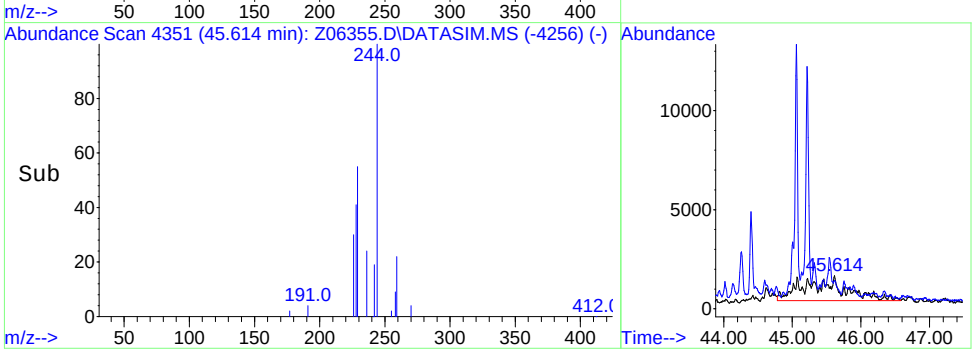


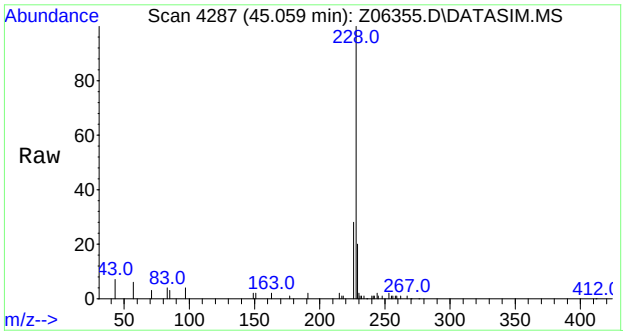


#87
C3-Fluoranthenes/pyrenes
Concen: 58.546 ng/mL m
RT: 45.614 min Scan# 4351
Delta R.T. 0.095 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:244 Resp: 48525

Ion	Ratio	Lower	Upper
244	100		
229	252.7	75.6	113.4#

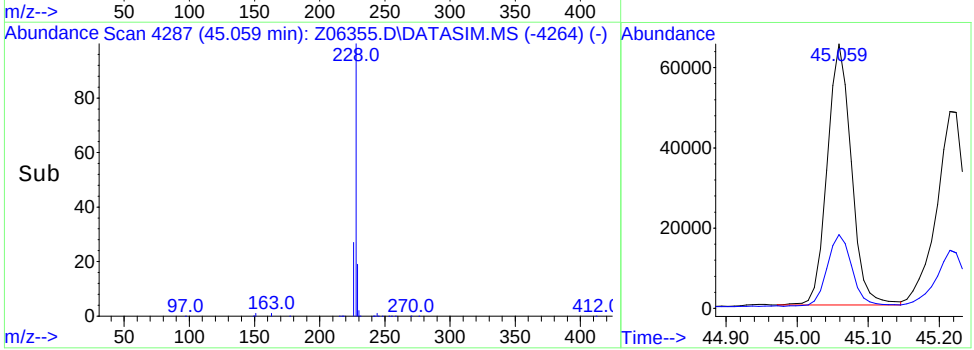


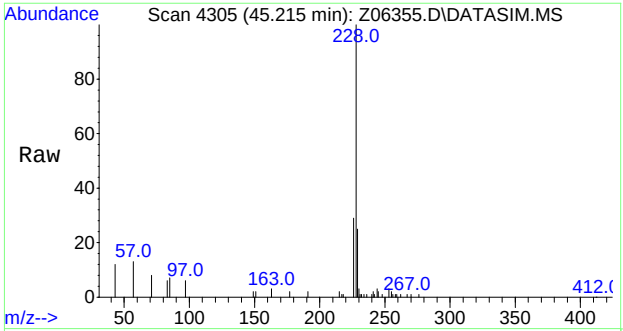


#88
Benz(a)anthracene
Concen: 205.477 ng/mL
RT: 45.059 min Scan# 4287
Delta R.T. -0.001 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:228 Resp: 153958

Ion	Ratio	Lower	Upper
228	100		
226	28.5	21.0	31.4

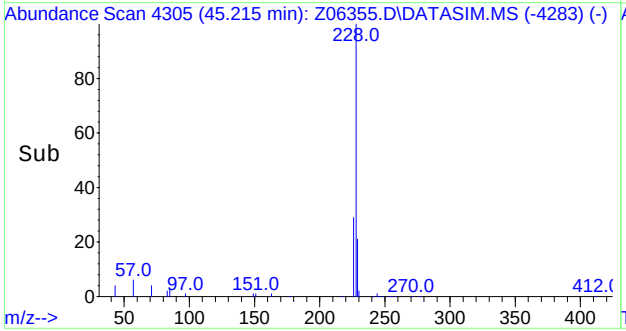


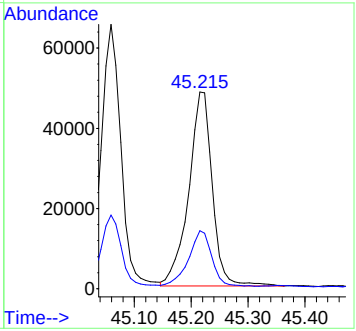


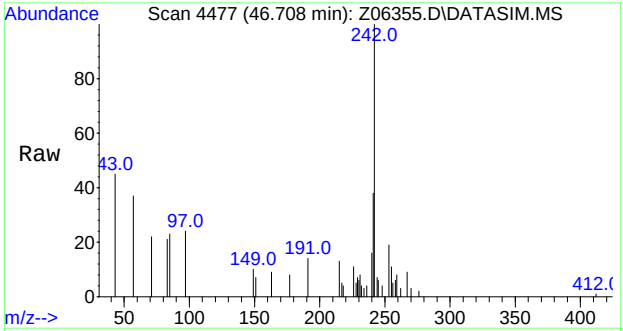
#89
Chrysene/triphenylene
Concen: 193.550 µg/mL
RT: 45.215 min Scan# 4305
Delta R.T. -0.009 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:228 Resp: 139089

Ion	Ratio	Lower	Upper
228	100		
226	27.8	23.0	34.6



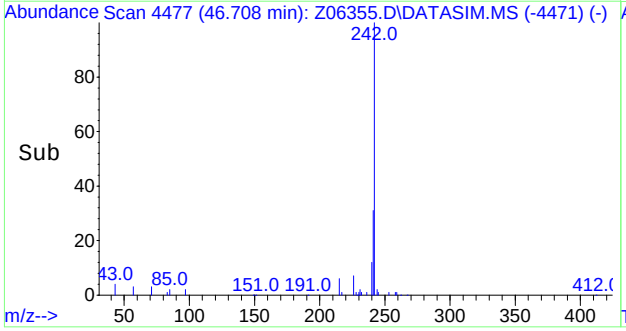


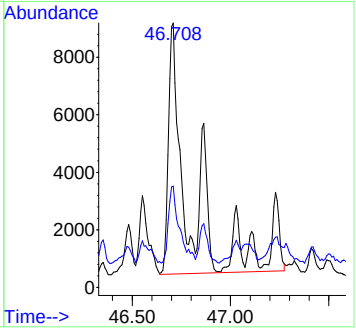


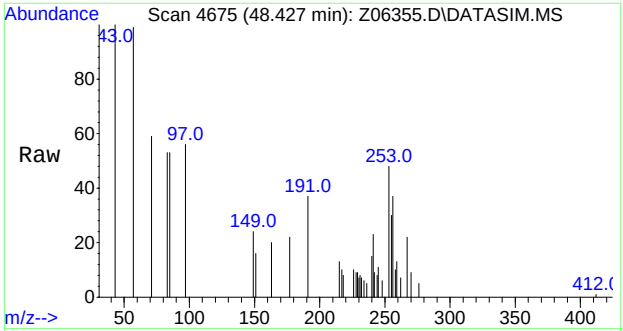
#90
C1-Benz(a)anthracenes/chrysenes
Concen: 77.187 ng/mL m
RT: 46.708 min Scan# 4477
Delta R.T. -0.009 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:242 Resp: 63975

Ion	Ratio	Lower	Upper
242	100		
241	37.4	34.2	51.2



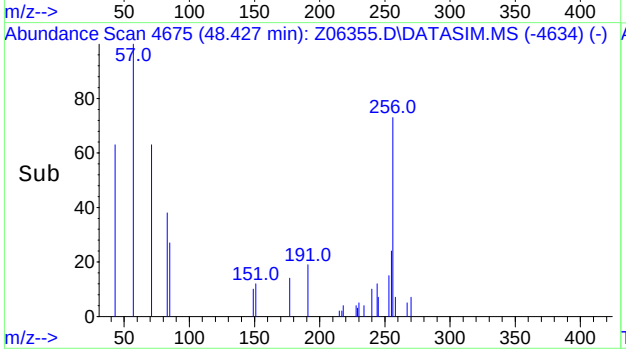


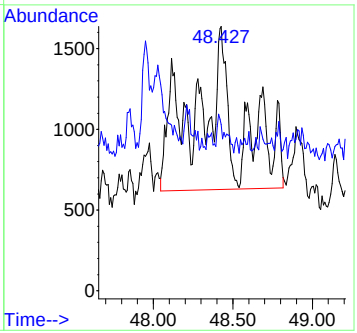


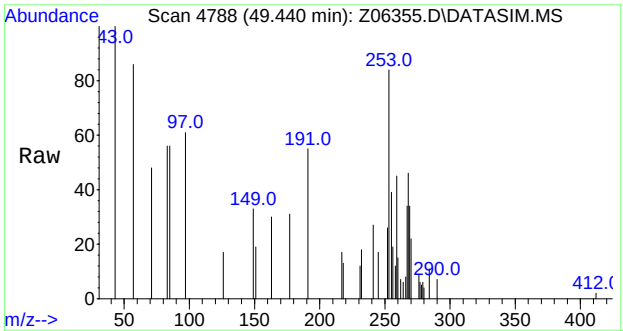
#91
C2-Benz(a)anthracenes/chrysenes
Concen: 22.911 ng/mL m
RT: 48.427 min Scan# 4675
Delta R.T. -0.371 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:256 Resp: 18989

Ion	Ratio	Lower	Upper
256	100		
241	30.8	24.0	36.0



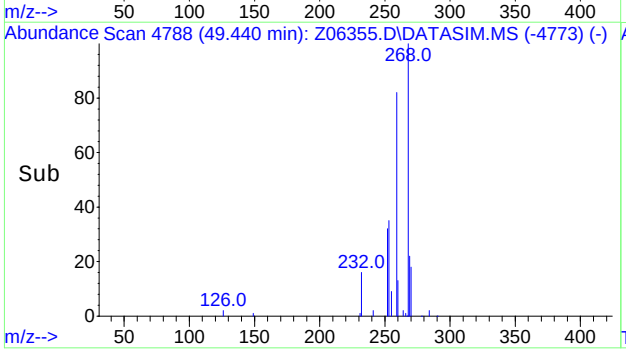


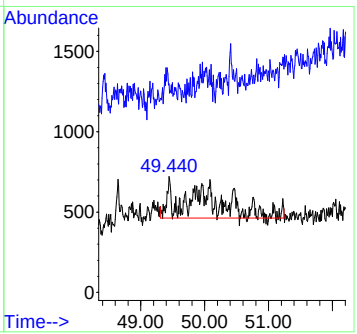


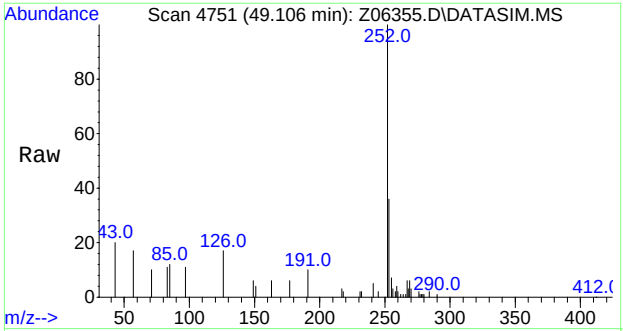
#92
C3-Benz(a)anthracenes/chrysenes
Concen: 10.258 ng/mL m
RT: 49.440 min Scan# 4788
Delta R.T. -1.790 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:270 Resp: 8502

Ion	Ratio	Lower	Upper
270	100		
255	128.3	33.4	50.2#



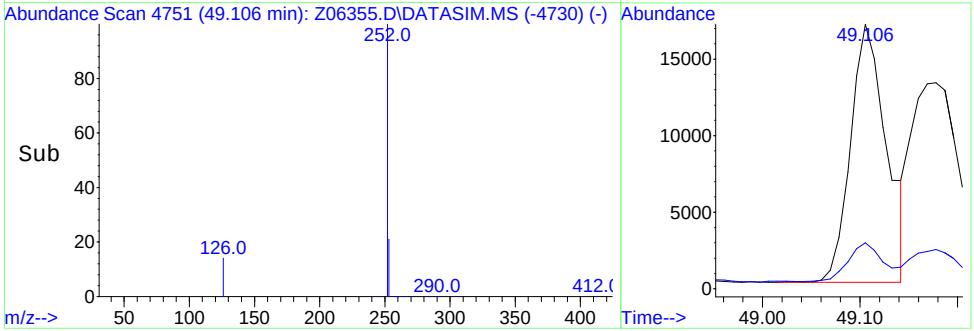


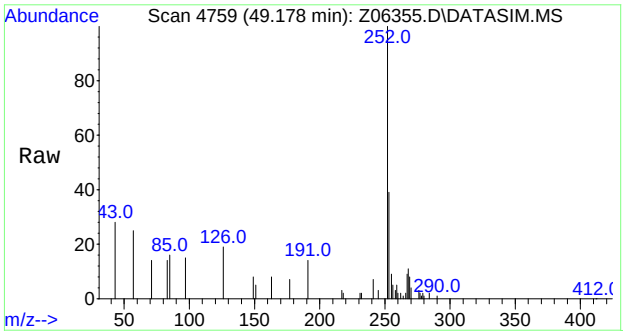


#94
Benzo(b)fluoranthene
Concen: 50.974 ng/mL
RT: 49.106 min Scan# 4751
Delta R.T. -0.008 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:252 Resp: 43248

Ion	Ratio	Lower	Upper
252	100		
126	14.0	11.7	17.5

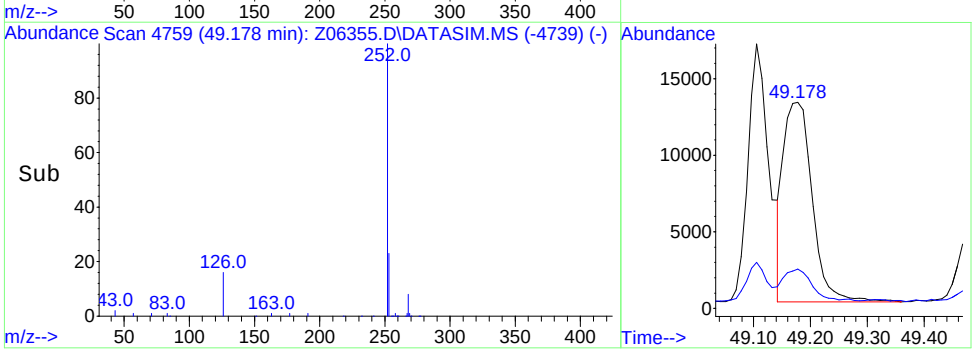


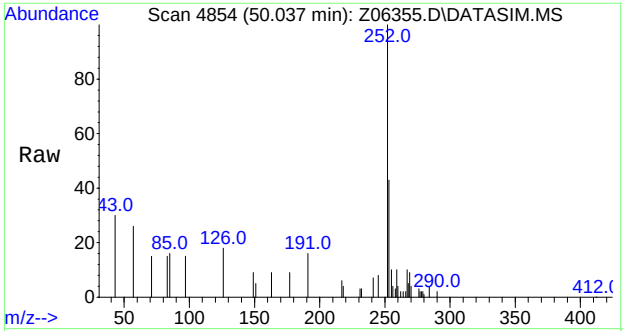


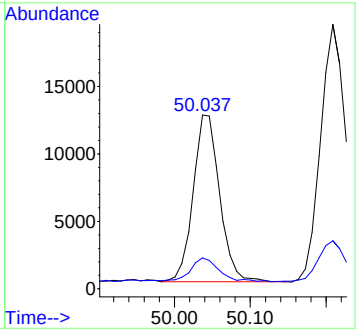
#95
Benzo(j/k)fluoranthene
Concen: 53.192 µg/mL
RT: 49.178 min Scan# 4759
Delta R.T. -0.017 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:252 Resp: 45964

Ion	Ratio	Lower	Upper
252	100		
126	16.5	13.0	19.6



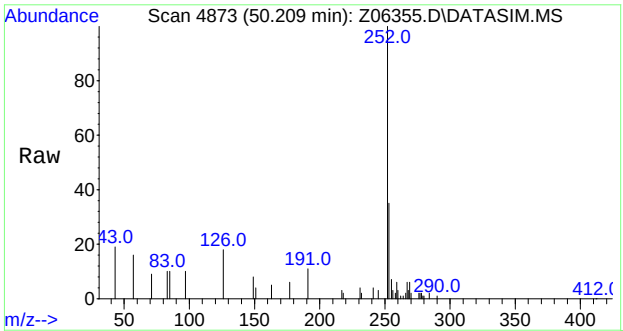


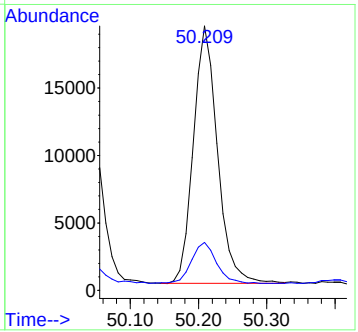


#96
Benzo(e)pyrene
Concen: 38.830 ng/mL
RT: 50.037 min Scan# 4854
Delta R.T. -0.008 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:252 Resp: 29879

Ion	Ratio	Lower	Upper
252	100		
126	15.4	10.8	16.2

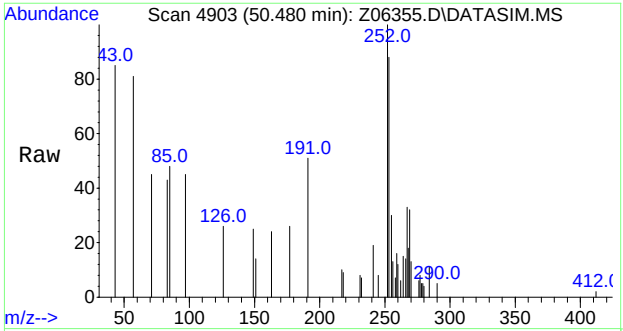




#97
Benzo(a)pyrene
Concen: 65.724 ng/mL
RT: 50.209 min Scan# 4873
Delta R.T. -0.008 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:252 Resp: 46696

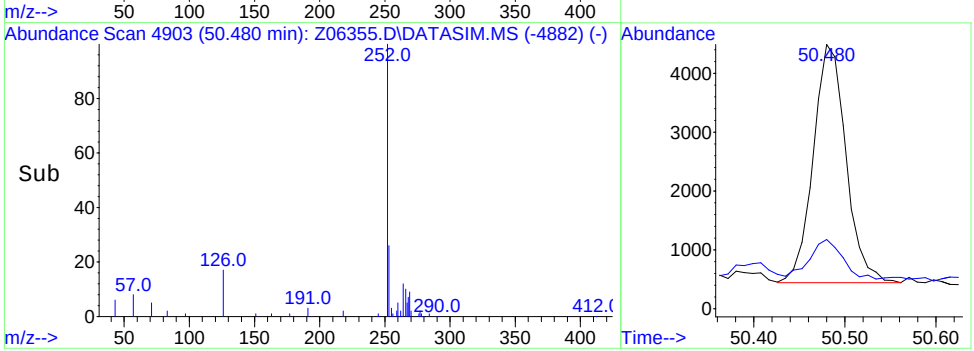
Ion	Ratio	Lower	Upper
252	100		
126	16.6	12.3	18.5

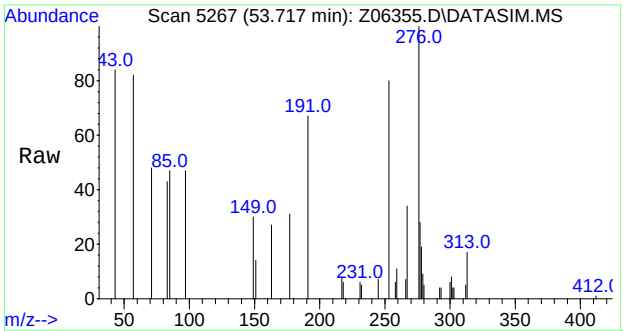


#98
Perylene
Concen: 14.993 ng/mL
RT: 50.480 min Scan# 4903
Delta R.T. -0.008 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:252 Resp: 10137

Ion	Ratio	Lower	Upper
252	100		
126	15.4	13.0	19.4

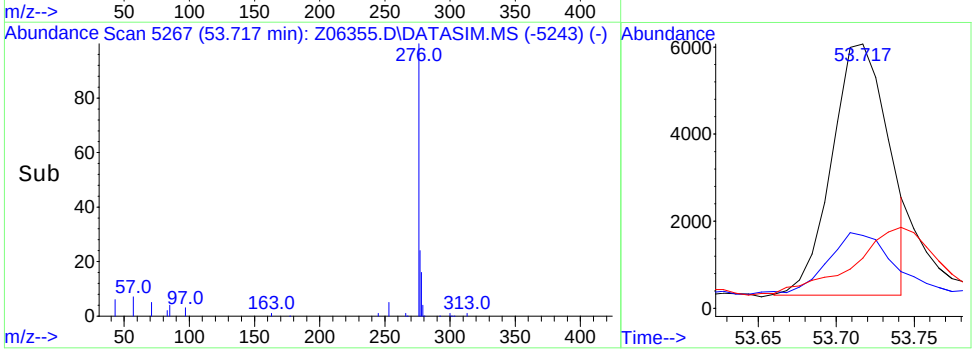


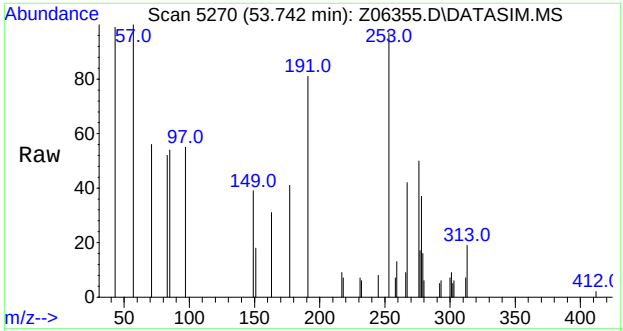


#99
Indeno(1,2,3-cd)pyrene
Concen: 14.541 ng/mL m
RT: 53.717 min Scan# 5267
Delta R.T. -0.005 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:276 Resp: 14566

Ion	Ratio	Lower	Upper
276	100		
277	29.2	19.0	28.6#
278	43.8	16.6	25.0#

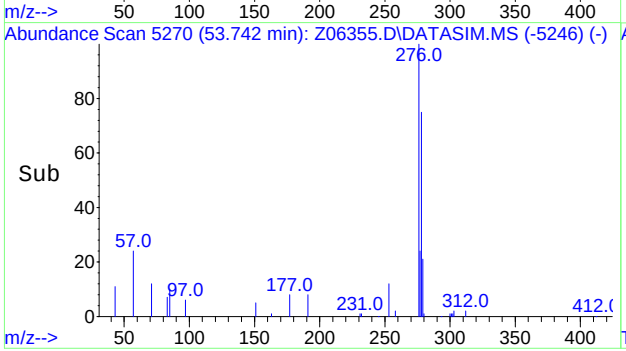


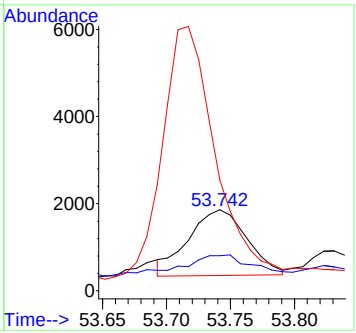


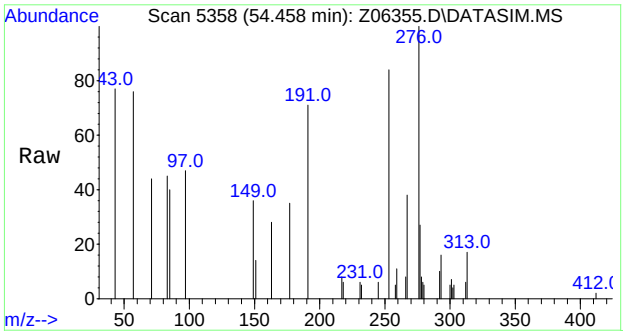
#100
Dibenz(a,h)anthracene
Concen: 5.484 ng/mL m
RT: 53.742 min Scan# 5270
Delta R.T. -0.005 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:278 Resp: 4781

Ion	Ratio	Lower	Upper
278	100		
279	40.1	19.2	28.8#
276	360.0	34.3	51.5#



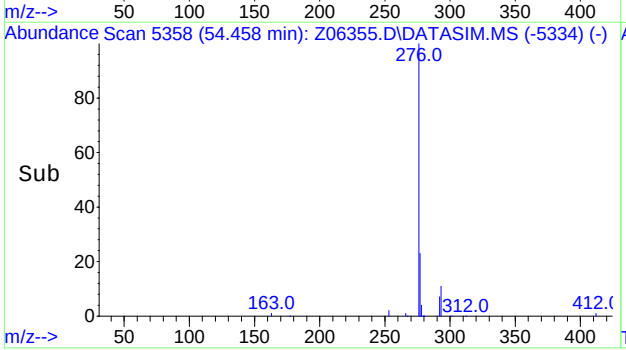


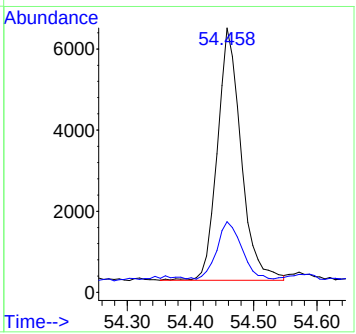


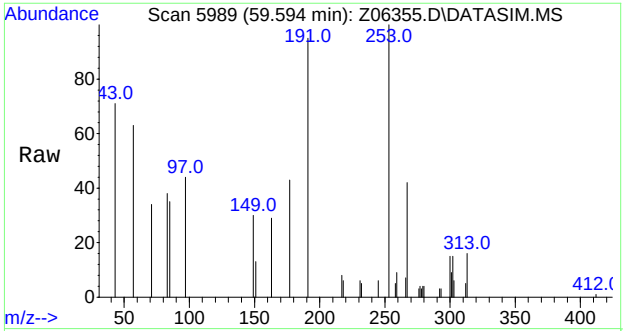
#101
Benzo(g,h,i)perylene
Concen: 17.493 ng/mL
RT: 54.458 min Scan# 5358
Delta R.T. -0.005 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:276 Resp: 16148

Ion	Ratio	Lower	Upper
276	100		
277	23.8	19.0	28.6



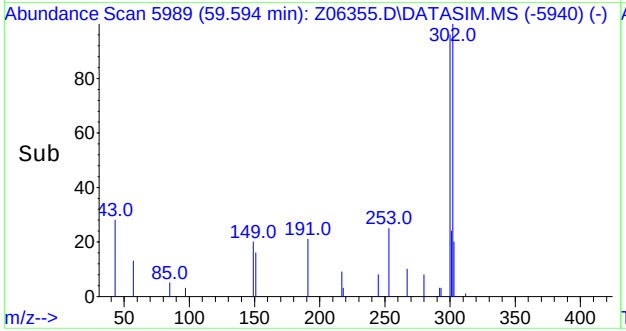


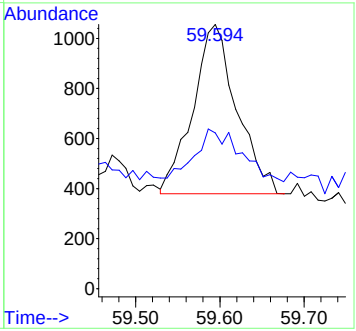


#102
Coronene
Concen: 2.771 ng/mL
RT: 59.594 min Scan# 5989
Delta R.T. 0.003 min
Lab File: Z06355.D
Acq: 26 Jan 2016 10:25 pm

Tgt Ion:300 Resp: 2459

Ion	Ratio	Lower	Upper
300	100		
301	0.0	20.8	31.2#





7.11

Manual Integrations APPROVED (compounds with "m" flag)
Ruben Parrilla
01/27/16 13:35

Quantitation Report (QT Reviewed)

Data File: Z:\1\data\Z160126\Z06357.D
Sample : mc44075-1,100x,RC-7 NAPL
Misc : op46170,msz235,0.0145,,,2,100
ALS Vial : 18 Sample Multiplier: 1
Acq On : 27 Jan 2016 1:02 am Operator: sofyaz

Quant Time: Jan 27 13:27:10 2016
Quant Method : Z:\1\methods\Z151222-MAHPAHEXT-A.M
Quant Title : PAHs & Alkylated PAHs by GC/MS/SIM

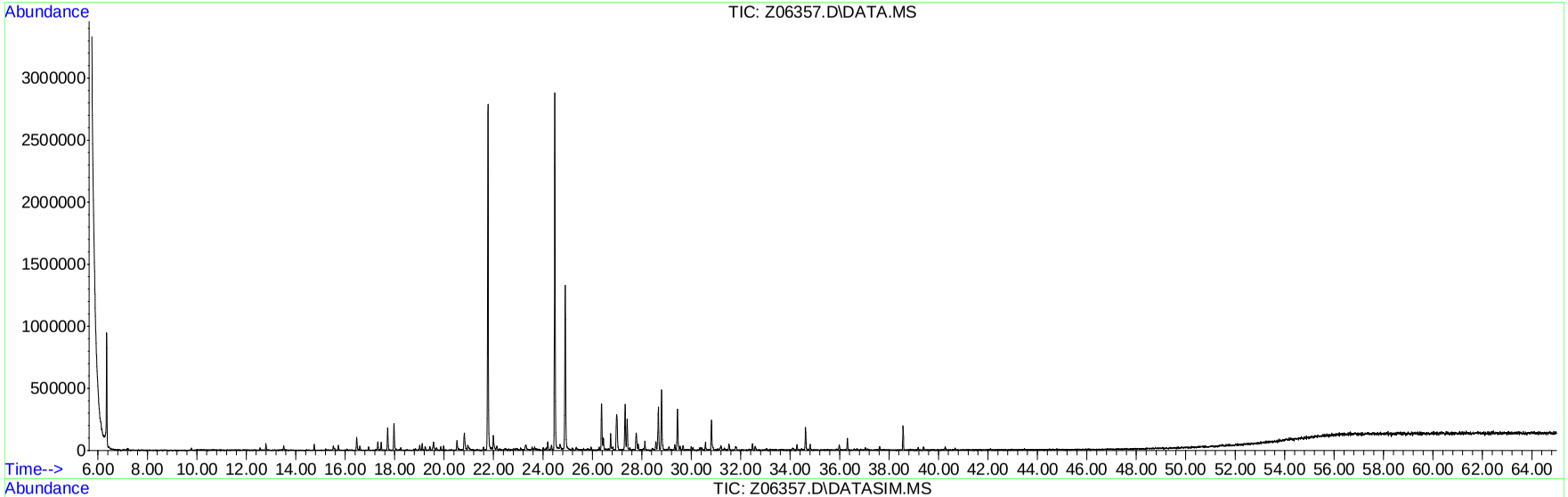
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) Acenaphthene-d10	28.674	164	268351	1010.00	ng/mL	0.00
System Monitoring Compounds						
2) Toluene-d8	9.667	98	2872	9.40	ng/mL	0.00
Spiked Amount 1000.000			Recovery =	0.94%		
3) Naphthalene-d8	21.689	136	4446	9.29	ng/mL	-0.01
Spiked Amount 1000.000			Recovery =	0.93%		
4) Phenanthrene-d10	34.528	188	4531	10.03	ng/mL	0.00
Spiked Amount 1000.000			Recovery =	1.00%		
5) Perylene-d12	50.407	264	4004	8.53	ng/mL	0.00
Spiked Amount 1000.000			Recovery =	0.85%		
Target Compounds						Qvalue
44] Naphthalene	21.771	128	4879071	8584.599	ng/mL	100
45] 2-Methylnaphthalene	24.483	142	3037476	8496.371	ng/mL	100
46] 1-Methylnaphthalene	24.895	142	1428630	3943.589	ng/mL	100
47] C1-Naphthalenes	24.483	142	4489505m	7899.168	ng/mL	

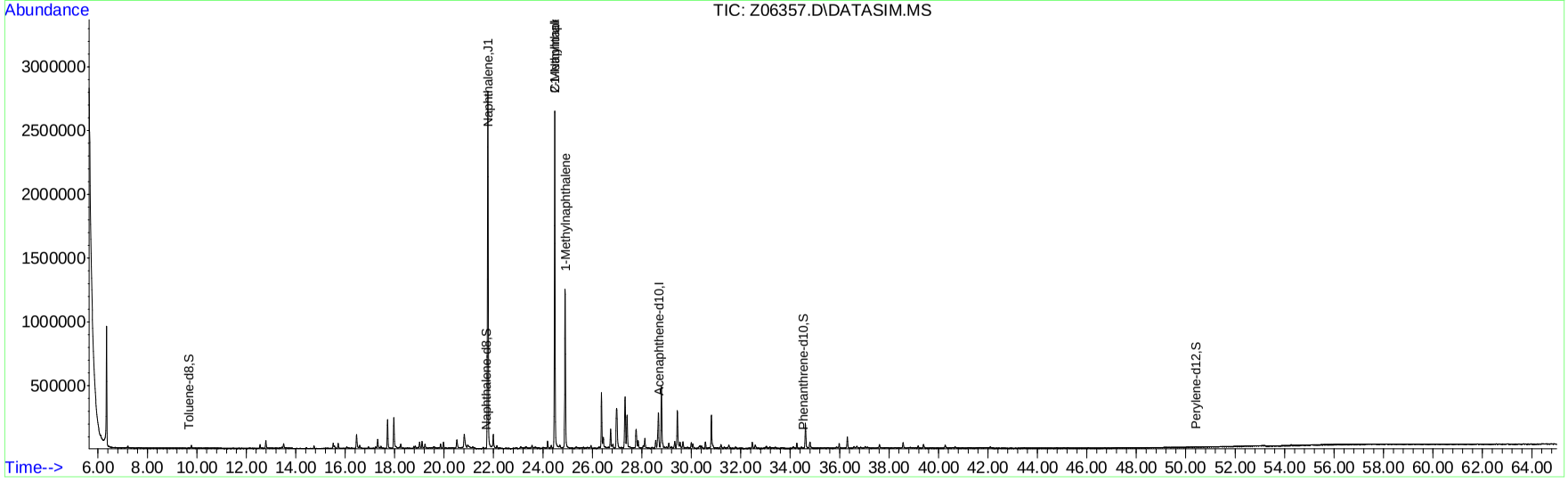
(#) = qualifier out of range (m) = manual integration (+) = signals summed

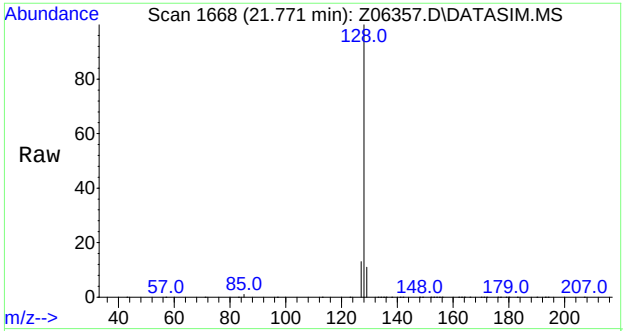
Quantitation Report (QT Reviewed)

Data File: Z:\1\data\Z160126\Z06357.D
Sample : mc44075-1,100x,RC-7 NAPL
Misc : op46170,msz235,0.0145,,,2,100
ALS Vial : 18 Sample Multiplier: 1
Acq On : 27 Jan 2016 1:02 am Operator: sofyaz

Quant Time: Jan 27 13:27:10 2016
Quant Method : Z:\1\methods\Z151222-MAHPAHEXT-A.M
Quant Title : PAHs & Alkylated PAHs by GC/MS/SIM



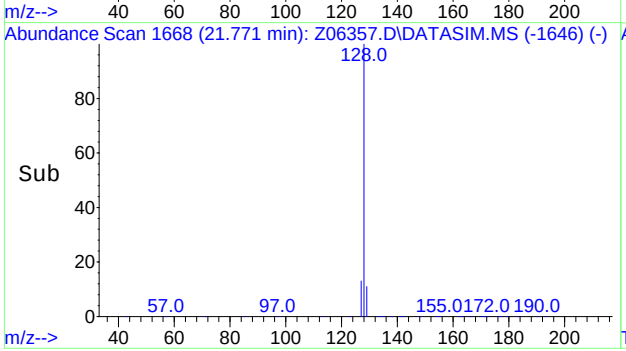


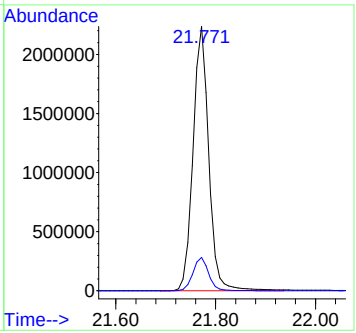


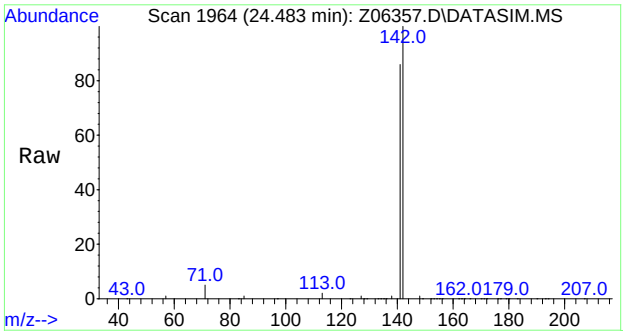
#44
Naphthalene
Concen: 8584.599 ng/mL
RT: 21.771 min Scan# 1668
Delta R.T. -0.002 min
Lab File: Z06357.D
Acq: 27 Jan 2016 1:02 am

Tgt Ion:128 Resp: 4879071

Ion	Ratio	Lower	Upper
128	100		
127	12.7	10.0	15.0



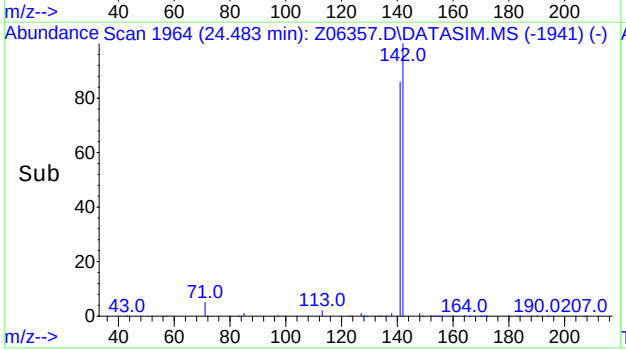


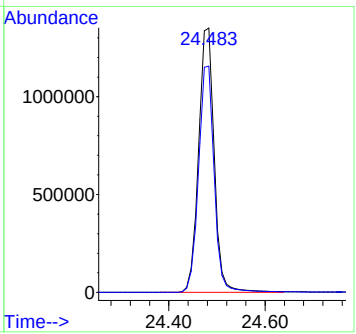


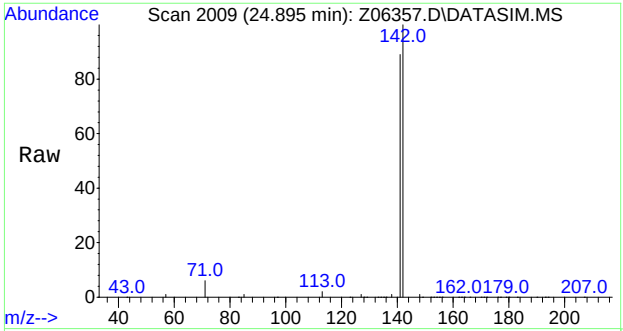
#45
2-Methylnaphthalene
Concen: 8496.371 ng/mL
RT: 24.483 min Scan# 1964
Delta R.T. 0.007 min
Lab File: Z06357.D
Acq: 27 Jan 2016 1:02 am

Tgt Ion:142 Resp: 3037476

Ion	Ratio	Lower	Upper
142	100		
141	85.6	68.6	102.8



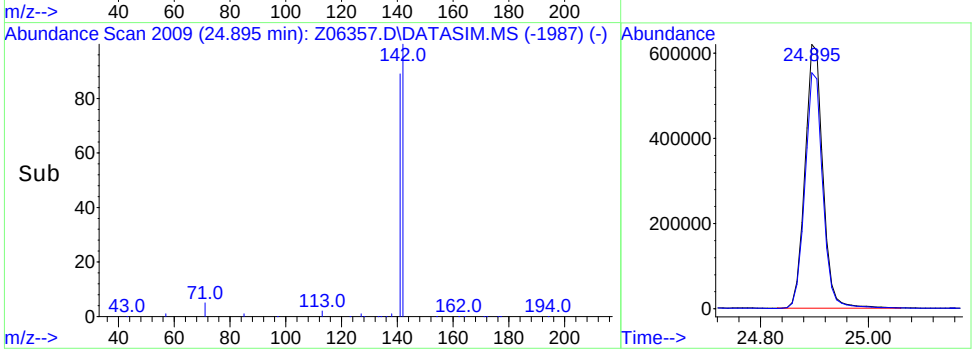


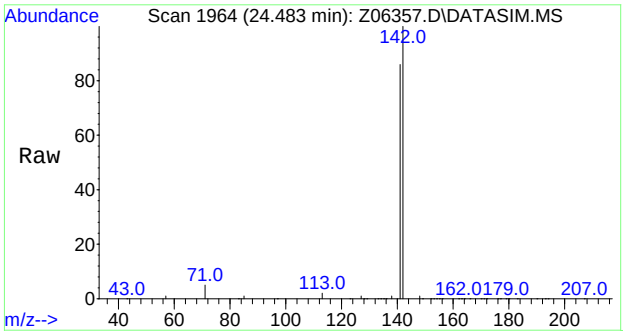


#46
1-Methylnaphthalene
Concen: 3943.589 ng/mL
RT: 24.895 min Scan# 2009
Delta R.T. -0.002 min
Lab File: Z06357.D
Acq: 27 Jan 2016 1:02 am

Tgt Ion:142 Resp: 1428630

Ion	Ratio	Lower	Upper
142	100		
141	88.8	71.1	106.7

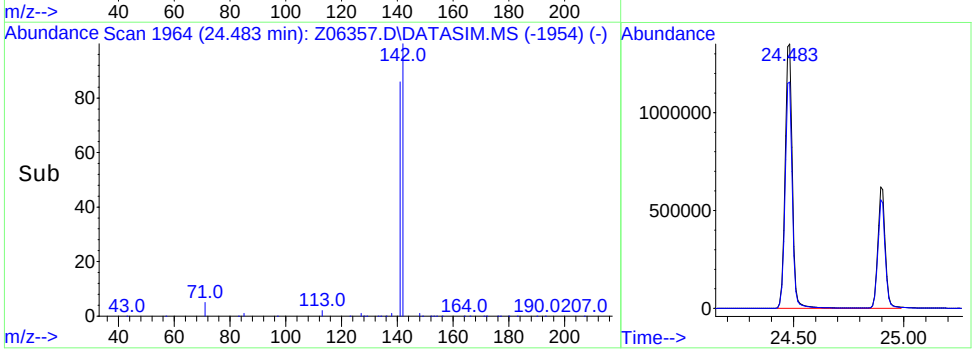




#47
C1-Naphthalenes
Concen: 7899.168 ng/mL m
RT: 24.483 min Scan# 1964
Delta R.T. -0.000 min
Lab File: Z06357.D
Acq: 27 Jan 2016 1:02 am

Tgt Ion:142 Resp: 4489505

Ion	Ratio	Lower	Upper
142	100		
141	86.4	68.8	103.2



Manual Integrations APPROVED (compounds with "m" flag)
Ruben Parrilla
01/27/16 12:47

Quantitation Report (QT Reviewed)

Data File: Z:\1\data\Z160126\Z06350.D
Sample : op46170-mb,Method Blank
Misc : op46170,msz235,0.0100,,,2,1
ALS Vial : 11 Sample Multiplier: 1
Acq On : 26 Jan 2016 3:56 pm Operator: sofyaz

Quant Time: Jan 27 08:27:31 2016
Quant Method : Z:\1\methods\Z151222-MAHPAHEXT-A.M
Quant Title : PAHs & Alkylated PAHs by GC/MS/SIM

Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) Acenaphthene-d10	28.674	164	263928	1000.00	ng/mL	0.00
System Monitoring Compounds						
2) Toluene-d8	9.677	98	327301	1078.58	ng/mL	0.00
Spiked Amount 1000.000			Recovery = 107.86%			
3) Naphthalene-d8	21.698	136	515397	1084.48	ng/mL	0.00
Spiked Amount 1000.000			Recovery = 108.45%			
4) Phenanthrene-d10	34.536	188	517176	1152.45	ng/mL	0.00
Spiked Amount 1000.000			Recovery = 115.25%			
5) Perylene-d12	50.408	264	505419	1083.99	ng/mL	0.00
Spiked Amount 1000.000			Recovery = 108.40%			
Target Compounds						Qvalue
7] Benzene	7.185	78	1698m	4.810	ng/mL	
14] Toluene	9.780	91	1732	3.967	ng/mL#	21
16] m,p-xylene	12.787	91	1099	2.747	ng/mL#	29
45] 2-Methylnaphthalene	24.492	142	1163	3.275	ng/mL#	7
46] 1-Methylnaphthalene	24.923	142	1122	3.118	ng/mL#	5
47] C1-Naphthalenes	24.492	142	2266m	4.014	ng/mL	
65] Phenanthrene	34.625	178	1027	1.675	ng/mL#	64

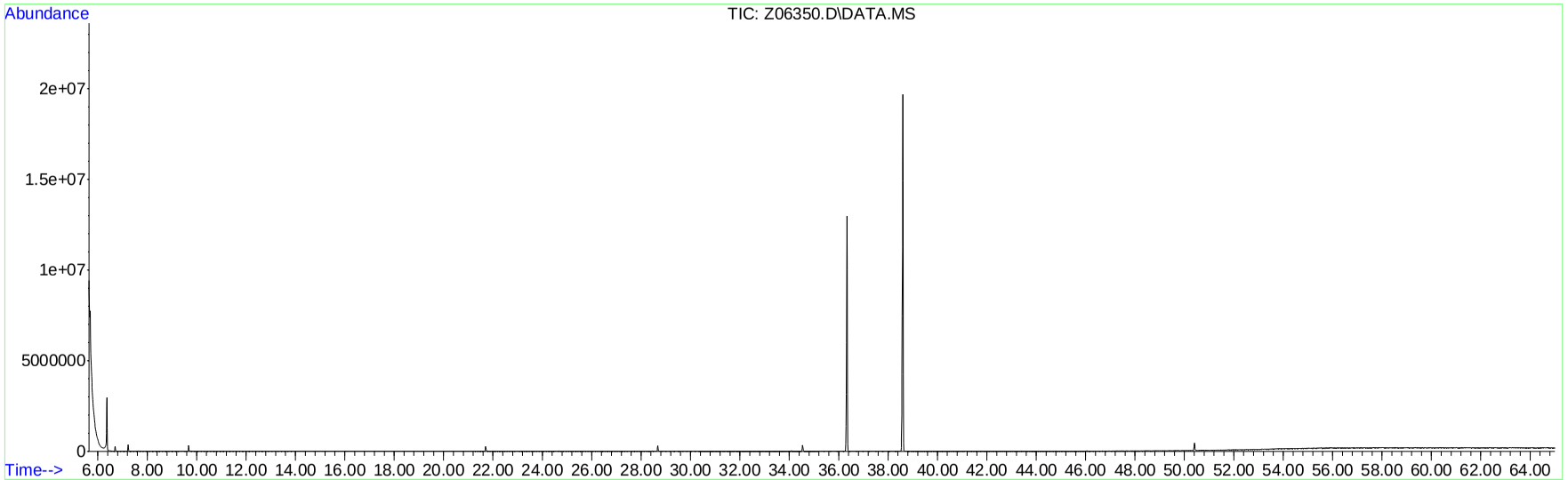
(#) = qualifier out of range (m) = manual integration (+) = signals summed

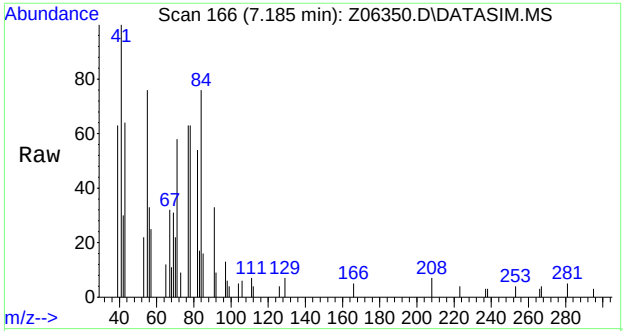
7.2.1
7

Quantitation Report (QT Reviewed)

Data File: Z:\1\data\Z160126\Z06350.D
Sample : op46170-mb,Method Blank
Misc : op46170,msz235,0.0100,,,2,1
ALS Vial : 11 Sample Multiplier: 1
Acq On : 26 Jan 2016 3:56 pm Operator: sofyaz

Quant Time: Jan 27 08:27:31 2016
Quant Method : Z:\1\methods\Z151222-MAHPAHEXT-A.M
Quant Title : PAHs & Alkylated PAHs by GC/MS/SIM

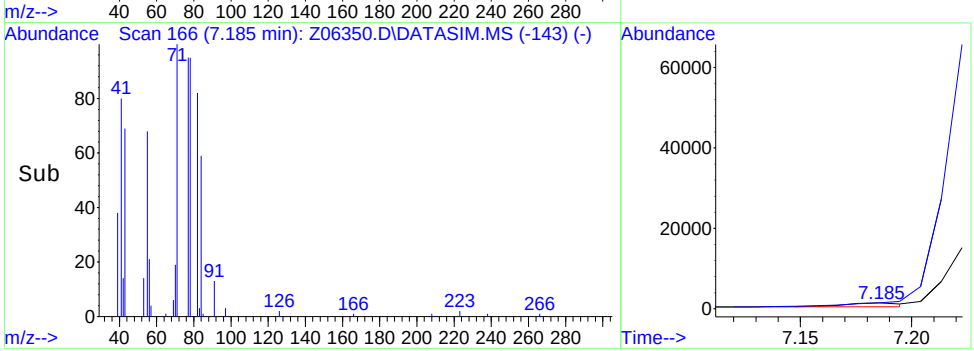


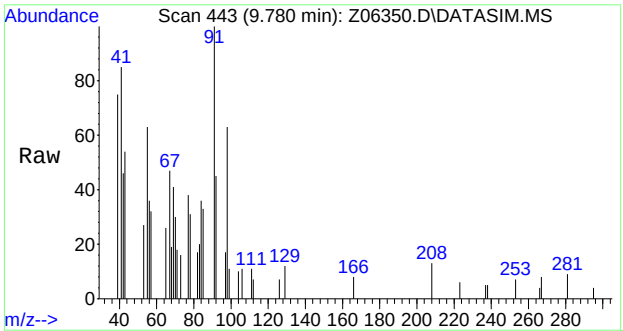


#7
Benzene
Concen: 4.810 ng/mL m
RT: 7.185 min Scan# 166
Delta R.T. 0.018 min
Lab File: Z06350.D
Acq: 26 Jan 2016 3:56 pm

Tgt Ion: 78 Resp: 1698

Ion	Ratio	Lower	Upper
78	100		
77	6481.3	18.6	28.0#

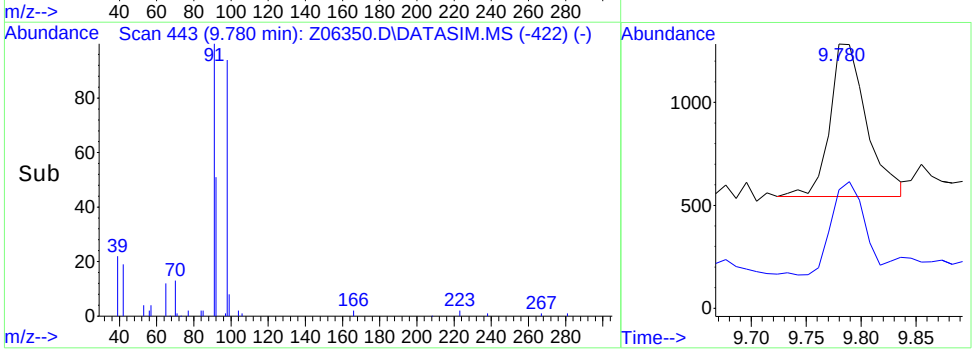


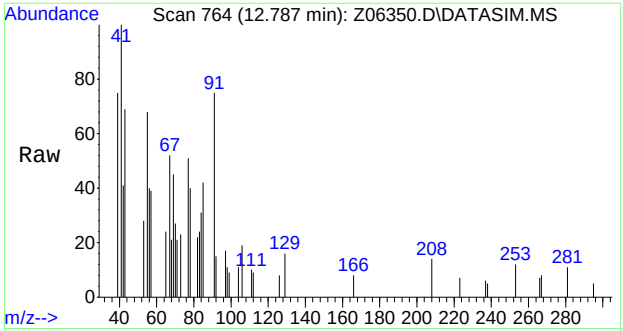


#14
Toluene
Concen: 3.967 ng/mL
RT: 9.780 min Scan# 443
Delta R.T. -0.001 min
Lab File: Z06350.D
Acq: 26 Jan 2016 3:56 pm

Tgt Ion: 91 Resp: 1732

Ion	Ratio	Lower	Upper
91	100		
92	0.0	47.0	70.6#

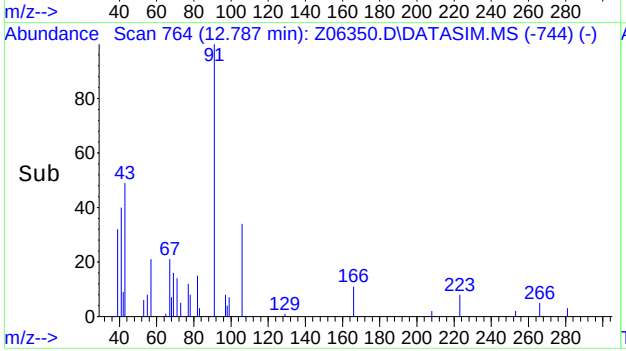


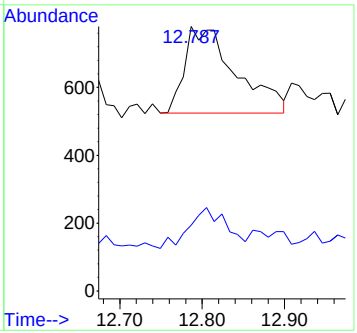


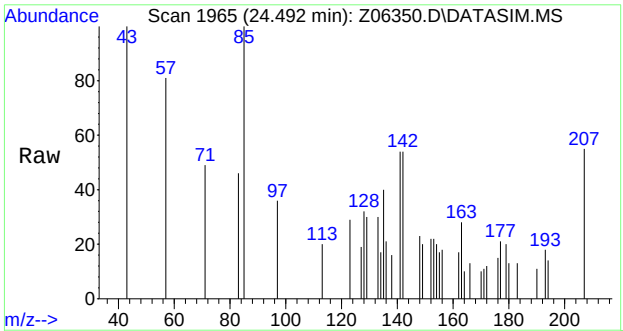
#16
m,p-xylene
Concen: 2.747 ng/mL
RT: 12.787 min Scan# 764
Delta R.T. -0.010 min
Lab File: Z06350.D
Acq: 26 Jan 2016 3:56 pm

Tgt Ion: 91 Resp: 1099

Ion	Ratio	Lower	Upper
91	100		
106	0.0	38.1	57.1#



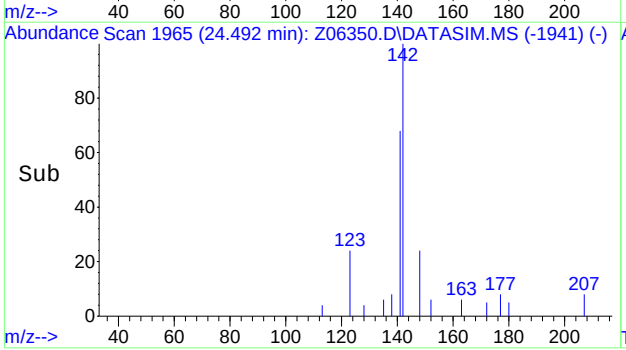


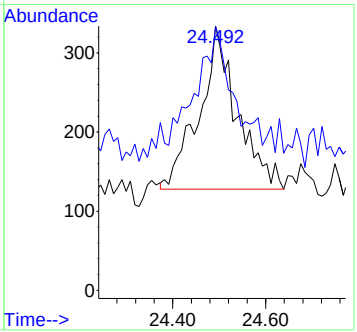


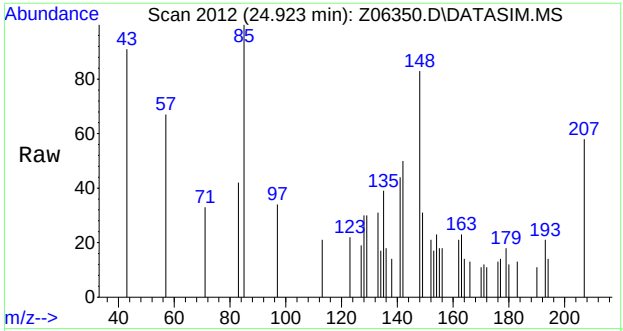
#45
2-Methylnaphthalene
Concen: 3.275 ng/mL
RT: 24.492 min Scan# 1965
Delta R.T. 0.016 min
Lab File: Z06350.D
Acq: 26 Jan 2016 3:56 pm

Tgt Ion:142 Resp: 1163

Ion	Ratio	Lower	Upper
142	100		
141	0.0	68.6	102.8#



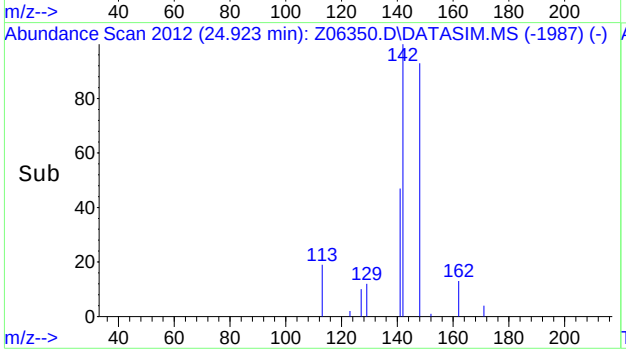


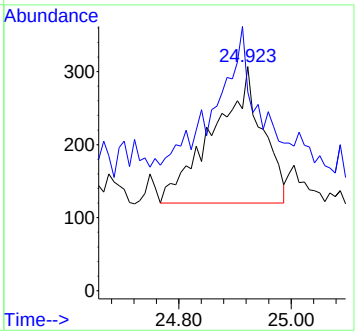


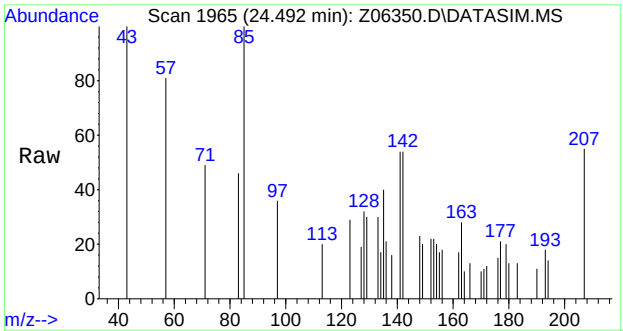
#46
1-Methylnaphthalene
Concen: 3.118 ng/mL
RT: 24.923 min Scan# 2012
Delta R.T. 0.025 min
Lab File: Z06350.D
Acq: 26 Jan 2016 3:56 pm

Tgt Ion:142 Resp: 1122

Ion	Ratio	Lower	Upper
142	100		
141	0.0	71.1	106.7#



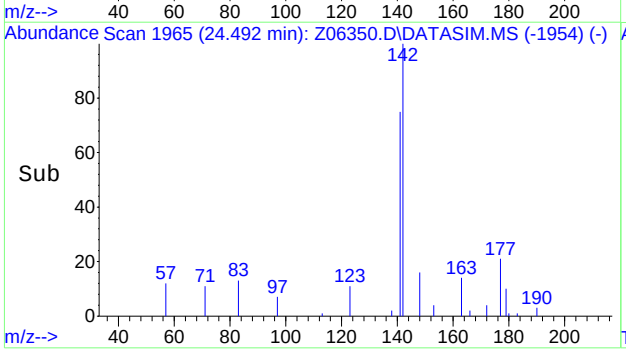


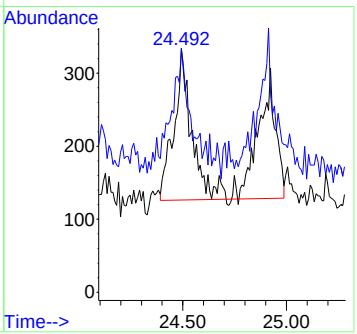


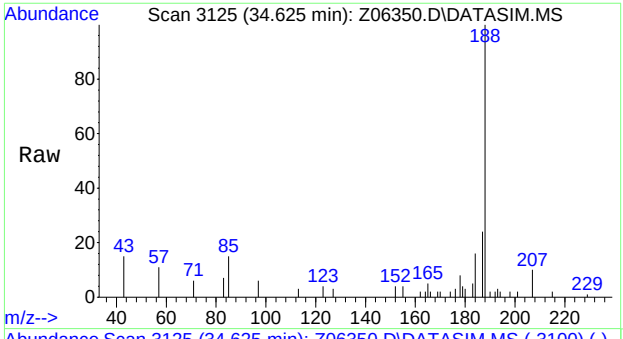
#47
C1-Naphthalenes
Concen: 4.014 ng/mL m
RT: 24.492 min Scan# 1965
Delta R.T. 0.009 min
Lab File: Z06350.D
Acq: 26 Jan 2016 3:56 pm

Tgt Ion:142 Resp: 2266

Ion	Ratio	Lower	Upper
142	100		
141	0.0	68.8	103.2#



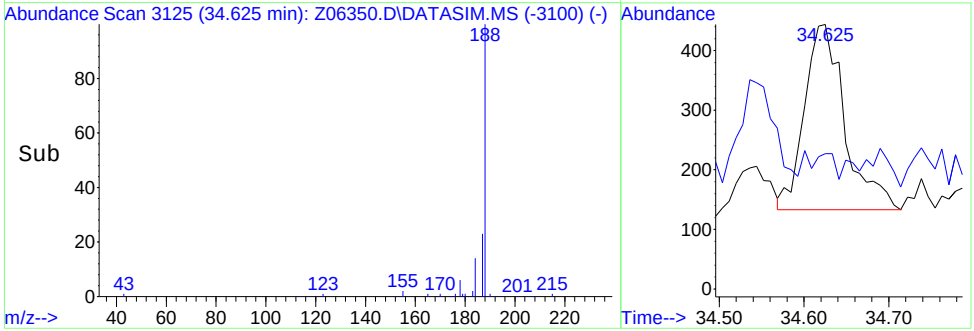




#65
Phenanthrene
Concen: 1.675 ng/mL
RT: 34.625 min Scan# 3125
Delta R.T. 0.005 min
Lab File: Z06350.D
Acq: 26 Jan 2016 3:56 pm

Tgt Ion:178 Resp: 1027

Ion	Ratio	Lower	Upper
178	100		
179	0.0	12.2	18.2#



7.2.1

7

New England ACCUTEST LABORATORIES

GC Semi-volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries
- Surrogate Recovery Summaries

Method Blank Summary

Job Number: MC44075
Account: FLSNYNY Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP46169-MB	GF564.D	1	01/27/16	MEW	01/26/16	OP46169	GGF18

The QC reported here applies to the following samples: **Method:** ASTM D3328-06

MC44075-1

CAS No.	Compound	Result	RL	MDL	Units	Q
	C-8	ND	200	100	mg/kg	
	C-9	ND	200	100	mg/kg	
	C-10	ND	200	100	mg/kg	
	C-11	ND	200	100	mg/kg	
	C-12	ND	200	100	mg/kg	
	C-13	ND	200	100	mg/kg	
3891-98-3	2,6,10-trimethyldodecane (138	ND	200	100	mg/kg	
	C-14	ND	200	100	mg/kg	
3891-99-4	2,6,10-trimethyltridecane (147	ND	200	100	mg/kg	
	C-15	ND	200	100	mg/kg	
	C-16	ND	200	100	mg/kg	
3892-00-0	2,6,10-trimethylpentadecane (1	ND	200	100	mg/kg	
	C-17	ND	200	100	mg/kg	
1921-70-6	Pristane	ND	200	100	mg/kg	
	C-18	ND	200	100	mg/kg	
638-36-8	Phytane	ND	200	100	mg/kg	
	C-19	ND	200	100	mg/kg	
	C-20	ND	200	100	mg/kg	
	C-21	ND	200	100	mg/kg	
	C-22	ND	200	100	mg/kg	
	C-23	ND	200	100	mg/kg	
	C-24	ND	200	100	mg/kg	
	C-25	ND	200	100	mg/kg	
	C-26	ND	200	100	mg/kg	
	C-27	ND	200	100	mg/kg	
	C-28	ND	200	100	mg/kg	
	C-29	ND	200	100	mg/kg	
	C-30	ND	200	100	mg/kg	
	C-31	ND	200	100	mg/kg	
	C-32	ND	200	100	mg/kg	
	C-33	ND	200	100	mg/kg	
	C-34	ND	200	100	mg/kg	
	C-35	ND	200	100	mg/kg	
	C-36	ND	200	100	mg/kg	
	C-37	ND	200	100	mg/kg	
	C-38	ND	200	100	mg/kg	

Method Blank Summary

Job Number: MC44075
Account: FLSNYNY Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP46169-MB	GF564.D	1	01/27/16	MEW	01/26/16	OP46169	GGF18

The QC reported here applies to the following samples: **Method:** ASTM D3328-06

MC44075-1

CAS No.	Compound	Result	RL	MDL	Units	Q
	C-39	ND	200	100	mg/kg	
	C-40	ND	200	100	mg/kg	
	TPH (C8-C40)	ND	20000	10000	mg/kg	

CAS No.	Surrogate Recoveries		Limits
84-15-1	o-Terphenyl	114%	40-140%

Blank Spike Summary

Job Number: MC44075
Account: FLSNYNY Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP46169-BS1	GF565.D	1	01/27/16	MEW	01/26/16	OP46169	GGF18

The QC reported here applies to the following samples: **Method:** ASTM D3328-06

MC44075-1

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	C-8	5000	4790	96	40-140
	C-9	5000	4790	96	40-140
	C-10	5000	4810	96	40-140
	C-11	5000	4840	97	40-140
	C-12	5000	4870	97	40-140
	C-13	5000	4860	97	40-140
3891-98-3	2,6,10-trimethyldodecane (138		ND		40-140
	C-14	5000	4880	98	40-140
3891-99-4	2,6,10-trimethyltridecane (147		ND		40-140
	C-15	5000	4870	97	40-140
	C-16	5000	4870	97	40-140
3892-00-0	2,6,10-trimethylpentadecane (1		ND		40-140
	C-17	5000	4860	97	40-140
1921-70-6	Pristane	5000	4870	97	40-140
	C-18	5000	5110	102	40-140
638-36-8	Phytane	5000	4870	97	40-140
	C-19	5000	4850	97	40-140
	C-20	5000	4870	97	40-140
	C-21	5000	4860	97	40-140
	C-22	5000	4860	97	40-140
	C-23	5000	4810	96	40-140
	C-24	5000	4860	97	40-140
	C-25	5000	4800	96	40-140
	C-26	5000	4860	97	40-140
	C-27	5000	4850	97	40-140
	C-28	5000	4860	97	40-140
	C-29	5000	4860	97	40-140
	C-30	5000	4840	97	40-140
	C-31	5000	4850	97	40-140
	C-32	5000	4850	97	40-140
	C-33	5000	4840	97	40-140
	C-34	5000	4850	97	40-140
	C-35	5000	4860	97	40-140
	C-36	5000	4880	98	40-140
	C-37	5000	4860	97	40-140
	C-38	5000	4900	98	40-140

* = Outside of Control Limits.

Blank Spike Summary

Job Number: MC44075
Account: FLSNYNY Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP46169-BS1	GF565.D	1	01/27/16	MEW	01/26/16	OP46169	GGF18

The QC reported here applies to the following samples: **Method:** ASTM D3328-06

MC44075-1

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	C-39	5000	4930	99	40-140
	C-40	5000	4950	99	40-140
	TPH (C8-C40)		ND		40-140

CAS No.	Surrogate Recoveries	BSP	Limits
84-15-1	o-Terphenyl	112%	40-140%

* = Outside of Control Limits.

Duplicate Summary

Job Number: MC44075
Account: FLSNYNY Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP46169-DUP	GF566.D	10	01/27/16	MEW	01/26/16	OP46169	GGF18
MC44075-1	GF567.D	10	01/27/16	MEW	01/26/16	OP46169	GGF18

The QC reported here applies to the following samples: **Method:** ASTM D3328-06

MC44075-1

CAS No.	Compound	MC44075-1 mg/kg	Q	DUP mg/kg	Q	RPD	Limits
	C-8	ND		ND		nc	30
	C-9	ND		ND		nc	30
	C-10	2800		2670		5	30
	C-11	1590		1560		2	30
	C-12	6570		6130		7	30
	C-13	4110		4050		1	30
3891-98-3	2,6,10-trimethyldodecane (138	886	J	889	J	0	30
	C-14	3800		3600		5	30
3891-99-4	2,6,10-trimethyltridecane (147	1550		1520		2	30
	C-15	21000		20100		4	30
	C-16	13100		12600		4	30
3892-00-0	2,6,10-trimethylpentadecane (1	2890		2790		4	30
	C-17	1850		1770		4	30
1921-70-6	Pristane	1570		1540		2	30
	C-18	9670		9340		3	30
638-36-8	Phytane	3520		3390		4	30
	C-19	1380	J	1310	J	5	30
	C-20	1050	J	1000	J	5	30
	C-21	ND		ND		nc	30
	C-22	ND		ND		nc	30
	C-23	ND		ND		nc	30
	C-24	ND		ND		nc	30
	C-25	ND		ND		nc	30
	C-26	ND		ND		nc	30
	C-27	ND		ND		nc	30
	C-28	ND		ND		nc	30
	C-29	ND		ND		nc	30
	C-30	ND		ND		nc	30
	C-31	ND		ND		nc	30
	C-32	ND		ND		nc	30
	C-33	ND		ND		nc	30
	C-34	ND		ND		nc	30
	C-35	ND		ND		nc	30
	C-36	ND		ND		nc	30
	C-37	ND		ND		nc	30
	C-38	ND		ND		nc	30

* = Outside of Control Limits.

Duplicate Summary

Job Number: MC44075
Account: FLSNYNY Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP46169-DUP	GF566.D	10	01/27/16	MEW	01/26/16	OP46169	GGF18
MC44075-1	GF567.D	10	01/27/16	MEW	01/26/16	OP46169	GGF18

The QC reported here applies to the following samples: **Method:** ASTM D3328-06

MC44075-1

CAS No.	Compound	MC44075-1 mg/kg	Q	DUP mg/kg	Q	RPD	Limits
	C-39	ND		ND		nc	30
	C-40	ND		ND		nc	30
	TPH (C8-C40)	854000		817000		4	30

CAS No.	Surrogate Recoveries	DUP	MC44075-1	Limits
84-15-1	o-Terphenyl	112%	92%	40-140%

8.3.1

8

* = Outside of Control Limits.

Semivolatile Surrogate Recovery Summary

Job Number: MC44075
Account: FLSNYNY Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Method: ASTM D3328-06 **Matrix:** SO

Samples and QC shown here apply to the above method

Lab Sample ID	Lab File ID	S1 [a]
MC44075-1	GF567.D	92
OP46169-BS1	GF565.D	112
OP46169-DUP	GF566.D	112
OP46169-MB	GF564.D	114

Surrogate Compounds	Recovery Limits
S1 = o-Terphenyl	40-140%

(a) Recovery from GC signal #1

New England ACCUTEST LABORATORIES

GC Semi-volatiles

Raw Data

Manual Integrations APPROVED (compounds with "m" flag)
Ruben Parrilla
01/27/16 12:09

Quantitation Report (QT Reviewed)

Data File: X:\1\data\G160126\GF567.d
Sample : MC44075-1, RC-7 NAPL
Misc : OP46169,GGF18,0.0145,,,2,10
ALS Vial : 16 Sample Multiplier: 1
Acq On : 27 Jan 2016 9:12 am Operator: MIKEW

Quant Time: Jan 27 10:58:48 2016
Quant Method : X:\1\methods\GCGR151221ALK-Front.m
Quant Title : n-C8 - n-C40 normal alkanes w/ isoprenoids

	Compound	R.T.	Response	Conc Units
	Internal Standards			
1) I	5a-Androstane	35.539	90165829	55.000 µg/mLm
	System Monitoring Compounds			
2) S	o-Terphenyl	33.497	4090533	2.308 µg/mLm
Spiked Amount	25.000		Recovery =	9.23%
	Target Compounds			
6)	C-10	15.168	3096594	2.029 µg/mLm
7)	C-11	17.742	1763744	1.153 µg/mLm
8)	C-12	20.160	7389964	4.762 µg/mLm
9) J1	C-13	22.350	4636347	2.980 µg/mLm
10) J2	2,6,10-trimethyldodec...	23.979	999355	0.642 µg/mLm
11) J1	C-14	24.448	4350145	2.752 µg/mLm
12) J2	2,6,10-trimethyltride...	25.695	1776215	1.124 µg/mLm
13)	C-15	26.436	24085954	15.202 µg/mLm
14) J1	C-16	28.301	15181337	9.527 µg/mLm
15) J2	2,6,10-trimethylpenta...	29.224	3342849	2.098 µg/mLm
16)	C-17	30.068	2118252	1.338 µg/mLm
17)	Pristane	30.179	1837172	1.138 µg/mLm
18)	C-18	31.804	11396420	7.013 µg/mLm
19)	Phytane	31.966	3607151	2.550 µg/mLm
20)	C-19	33.369	1645121	1.000 µg/mLm
21)	C-20	34.910	1222759	0.759 µg/mLm
42) H	TPH (C8-C40)	20.780	1000317671	618.905 µg/mLm

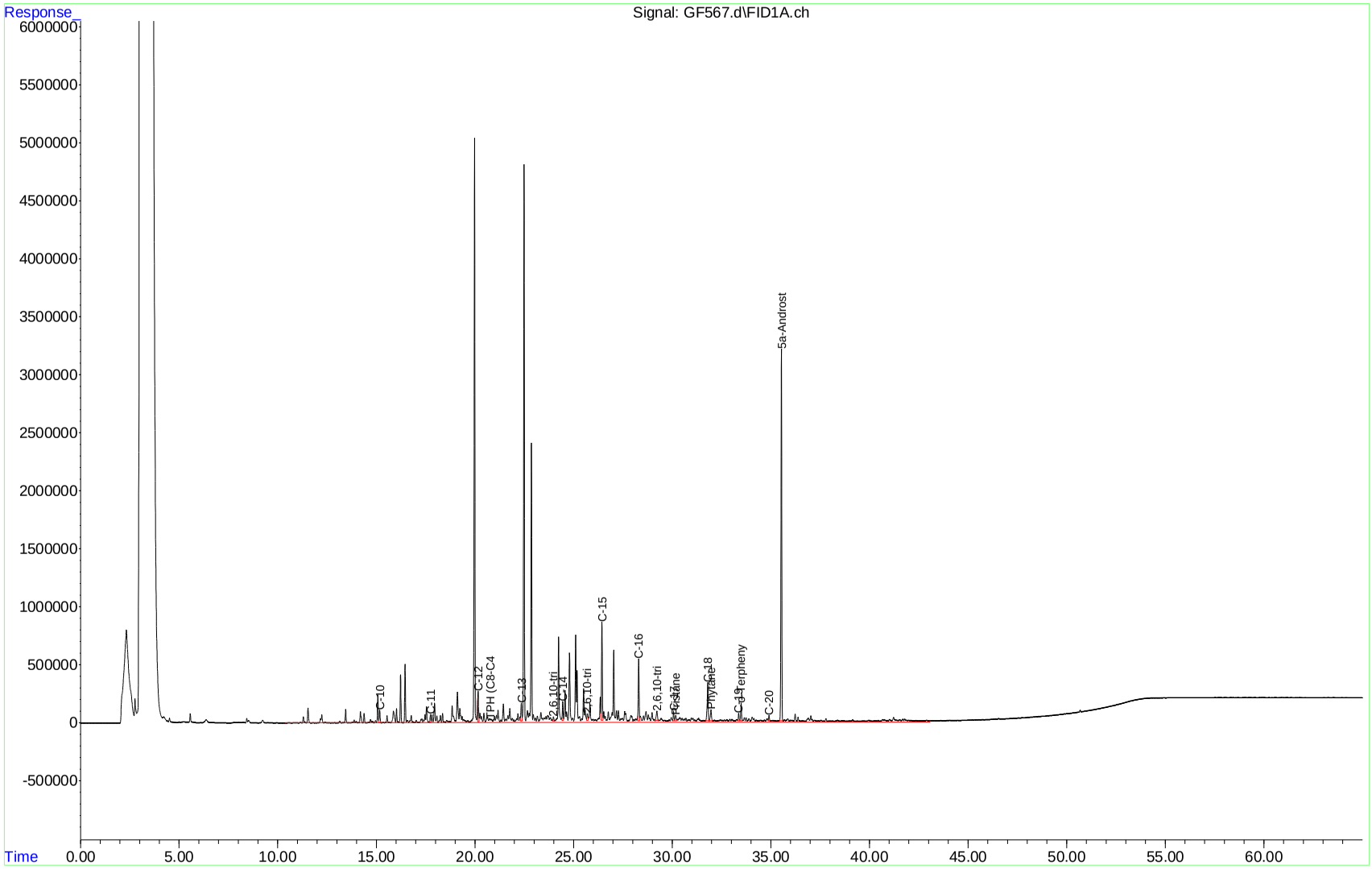
SemiQuant Compounds - Not Calibrated on this Instrument

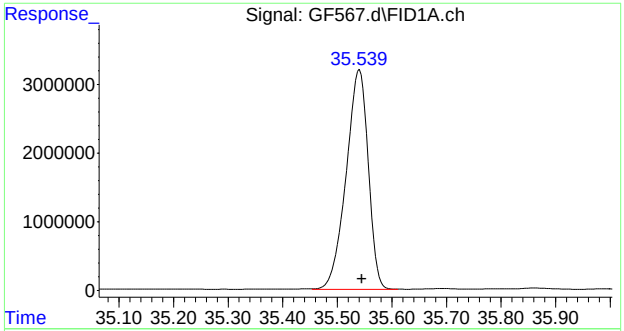
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data File: X:\1\data\G160126\GF567.d
Sample : MC44075-1, RC-7 NAPL
Misc : OP46169,GGF18,0.0145,,,2,10
ALS Vial : 16 Sample Multiplier: 1
Acq On : 27 Jan 2016 9:12 am Operator: MIKEW

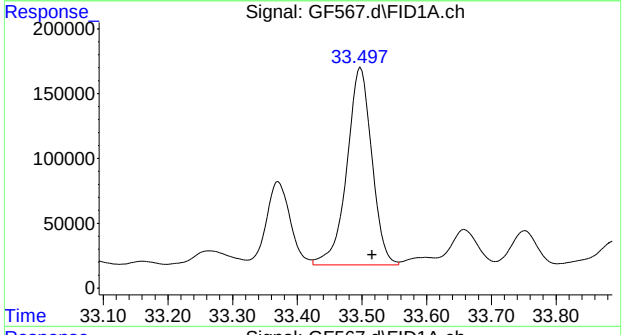
Quant Time: Jan 27 10:58:48 2016
Quant Method : X:\1\methods\GCGR151221ALK-Front.m
Quant Title : n-C8 - n-C40 normal alkanes w/ isoprenoids





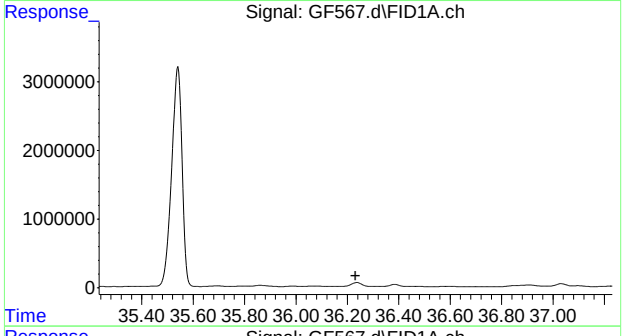
#1 5a-Androstane

R.T.: 35.539 min
Delta R.T.: -0.005 min
Response: 90165829
Conc: 55.00 µg/mL m



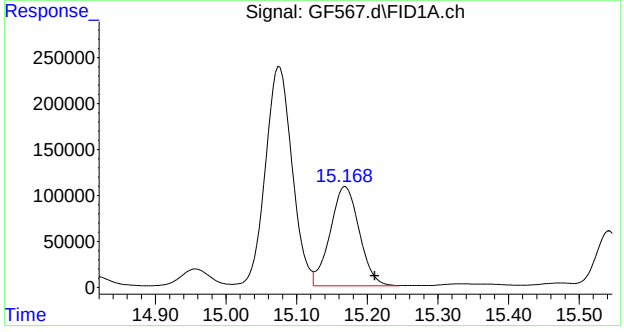
#2 o-Terphenyl

R.T.: 33.497 min
Delta R.T.: -0.019 min
Response: 4090533
Conc: 2.31 µg/mL m



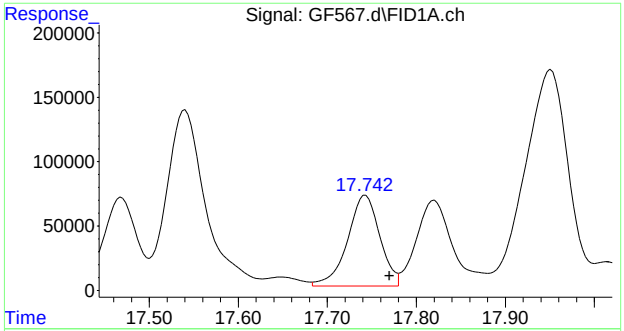
#3 1-chlorooctadecane

R.T.: 0.000 min
Exp R.T. : 36.232 min
Response: 0
Conc: N.D.



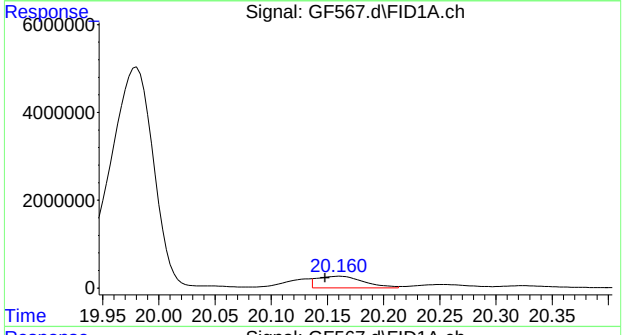
#6 C-10

R.T.: 15.168 min
Delta R.T.: -0.043 min
Response: 3096594
Conc: 2.03 µg/mL m



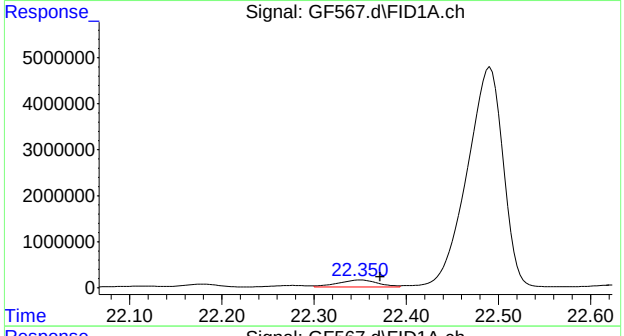
#7 C-11

R.T.: 17.742 min
Delta R.T.: -0.028 min
Response: 1763744
Conc: 1.15 µg/mL m



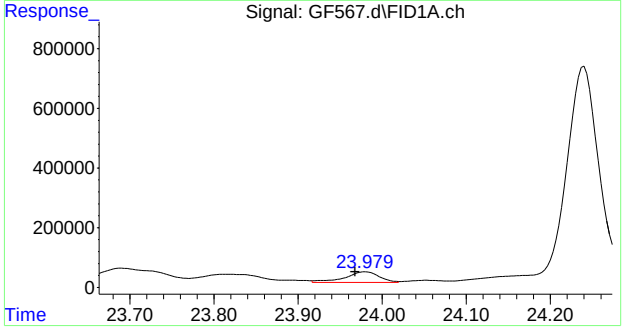
#8 C-12

R.T.: 20.160 min
Delta R.T.: 0.012 min
Response: 7389964
Conc: 4.76 µg/mL m



#9 C-13

R.T.: 22.350 min
Delta R.T.: -0.022 min
Response: 4636347
Conc: 2.98 µg/mL m

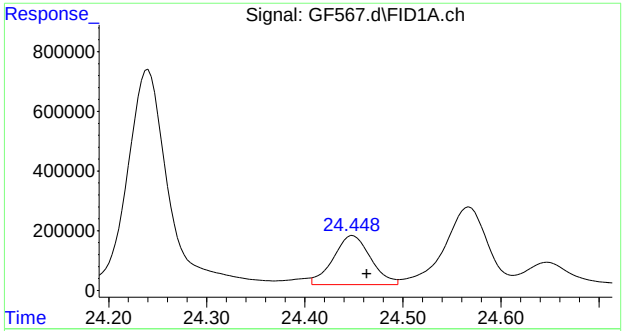


#10 2,6,10-trimethyldodecane (1380)

R.T.: 23.979 min
Delta R.T.: 0.011 min
Response: 999355
Conc: 0.64 µg/mL m

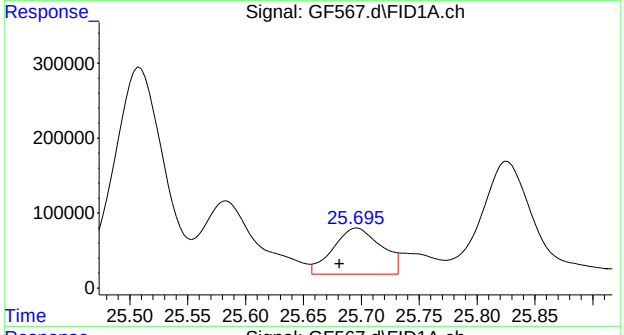
9.1.1

9



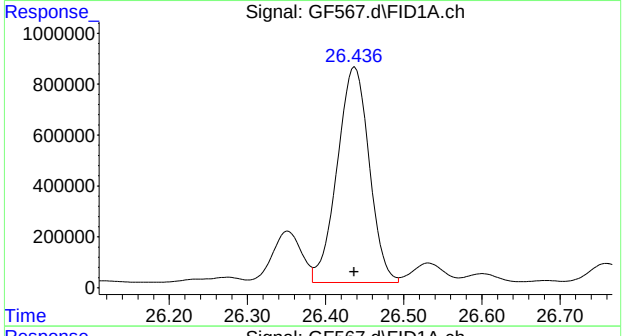
#11 C-14

R.T.: 24.448 min
Delta R.T.: -0.015 min
Response: 4350145
Conc: 2.75 µg/mL m



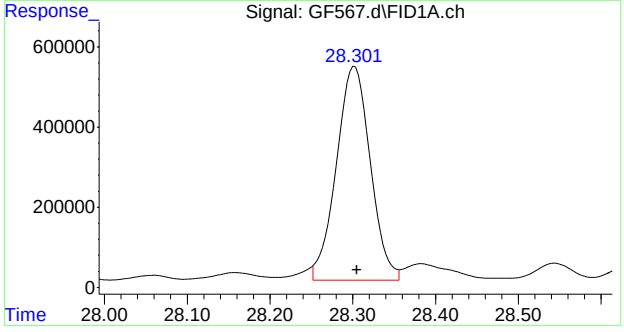
#12 2,6,10-trimethyltridecane (1470)

R.T.: 25.695 min
Delta R.T.: 0.014 min
Response: 1776215
Conc: 1.12 µg/mL m



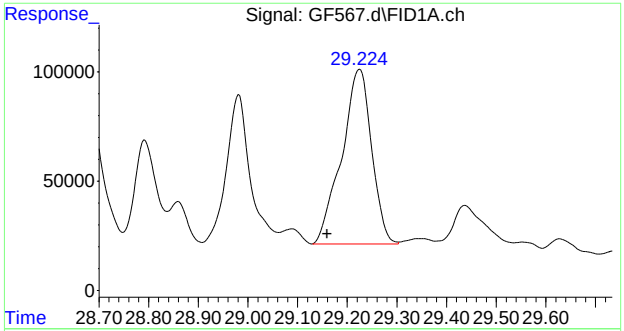
#13 C-15

R.T.: 26.436 min
Delta R.T.: 0.000 min
Response: 24085954
Conc: 15.20 µg/mL m



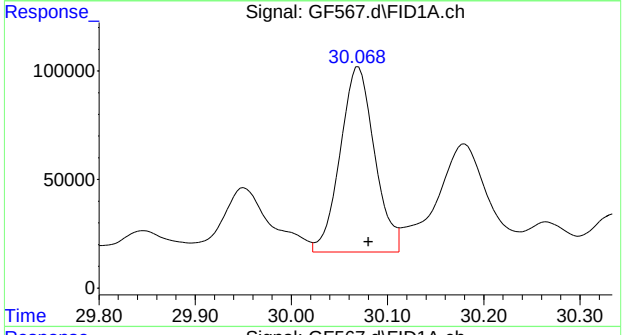
#14 C-16

R.T.: 28.301 min
Delta R.T.: -0.004 min
Response: 15181337
Conc: 9.53 µg/mL m



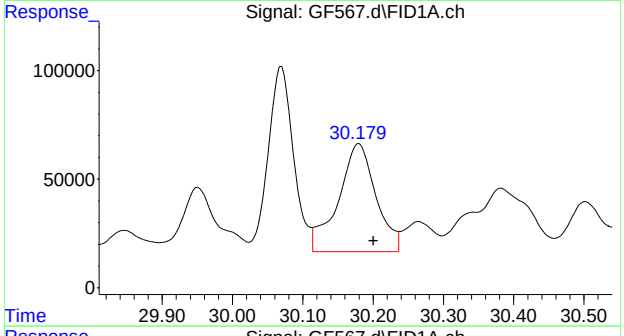
#15 2,6,10-trimethylpentadecane (1650)

R.T.: 29.224 min
Delta R.T.: 0.065 min
Response: 3342849
Conc: 2.10 µg/mL m



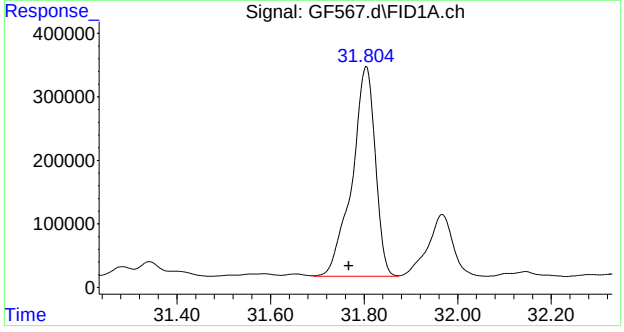
#16 C-17

R.T.: 30.068 min
Delta R.T.: -0.012 min
Response: 2118252
Conc: 1.34 µg/mL m



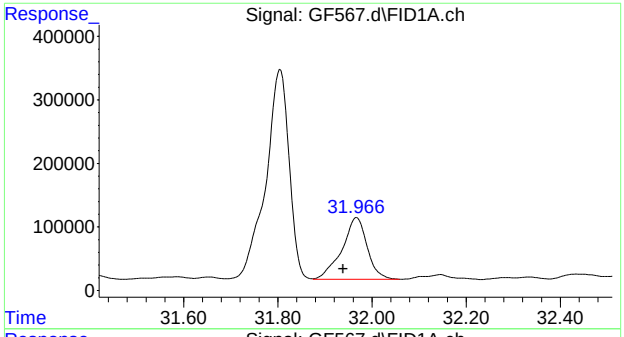
#17 Pristane

R.T.: 30.179 min
Delta R.T.: -0.022 min
Response: 1837172
Conc: 1.14 µg/mL m



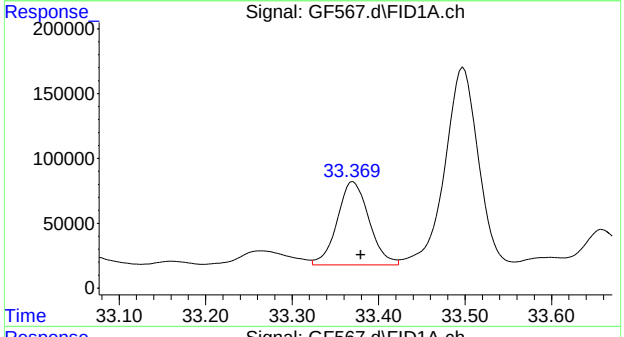
#18 C-18

R.T.: 31.804 min
Delta R.T.: 0.037 min
Response: 11396420
Conc: 7.01 µg/mL m



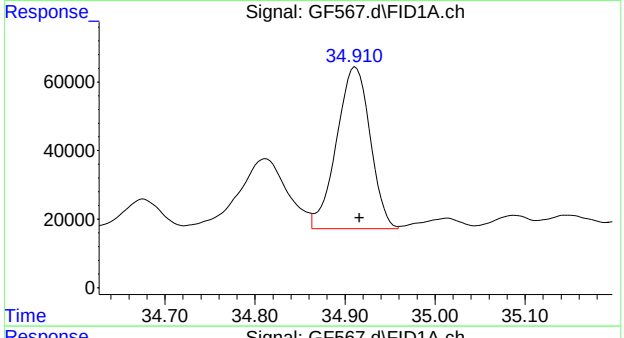
#19 Phytane

R.T.: 31.966 min
Delta R.T.: 0.028 min
Response: 3607151
Conc: 2.55 µg/mL m



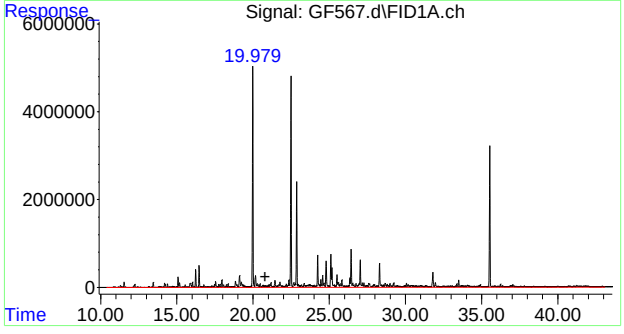
#20 C-19

R.T.: 33.369 min
Delta R.T.: -0.010 min
Response: 1645121
Conc: 1.00 µg/mL m



#21 C-20

R.T.: 34.910 min
Delta R.T.: -0.006 min
Response: 1222759
Conc: 0.76 µg/mL m



#42 TPH (C8-C40)

R.T.: 20.780 min
Delta R.T.: 0.000 min
Response: 1000317671
Conc: 618.90 µg/mL m

Quantitation Report (QT Reviewed)

Data File: X:\1\data\G160126\GF564.d
Sample : OP46169-MB, Method Blank
Misc : OP46169,GGF18,0.01,,,2,1
ALS Vial : 13 Sample Multiplier: 1
Acq On : 27 Jan 2016 5:01 am Operator: MIKEW

Quant Time: Jan 27 07:58:37 2016
Quant Method : X:\1\methods\GCGR151221ALK-Front.m
Quant Title : n-C8 - n-C40 normal alkanes w/ isoprenoids

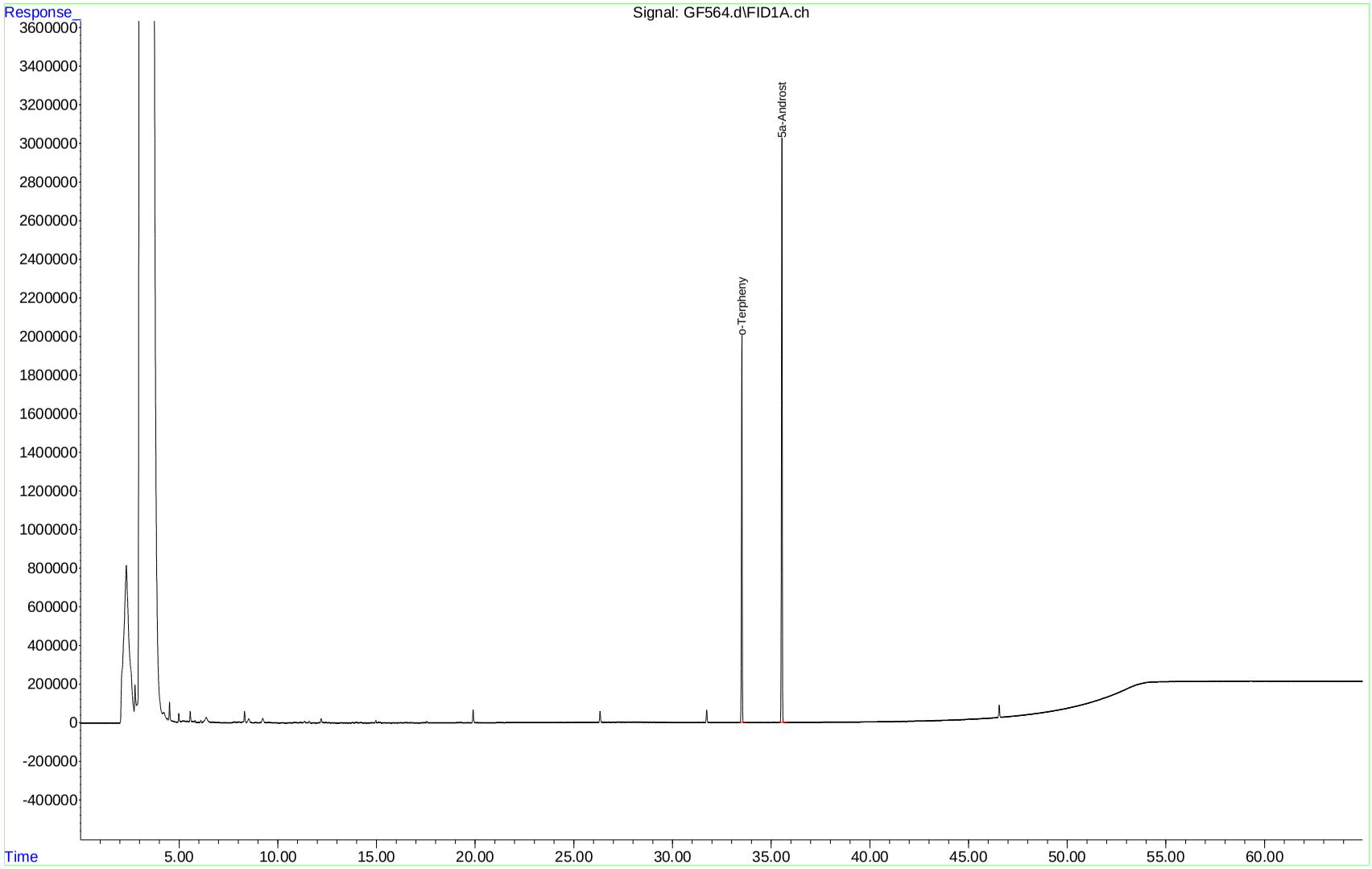
Compound	R.T.	Response	Conc Units
Internal Standards			
1) I 5a-Androstane	35.547	84561682	50.000 µg/mL
System Monitoring Compounds			
2) S o-Terphenyl	33.517	52149773	28.519 µg/mL
Spiked Amount 25.000		Recovery = 114.08%	
Target Compounds			
SemiQuant Compounds - Not Calibrated on this Instrument			

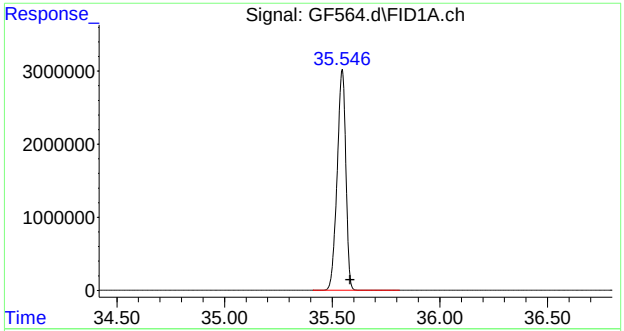
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data File: X:\1\data\G160126\GF564.d
Sample : OP46169-MB, Method Blank
Misc : OP46169,GGF18,0.01,,,2,1
ALS Vial : 13 Sample Multiplier: 1
Acq On : 27 Jan 2016 5:01 am Operator: MIKEW

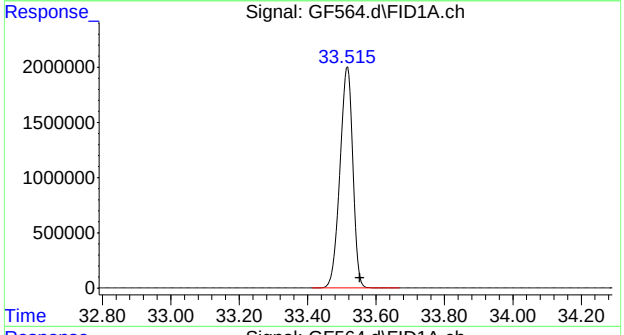
Quant Time: Jan 27 07:58:37 2016
Quant Method : X:\1\methods\GCGR151221ALK-Front.m
Quant Title : n-C8 - n-C40 normal alkanes w/ isoprenoids





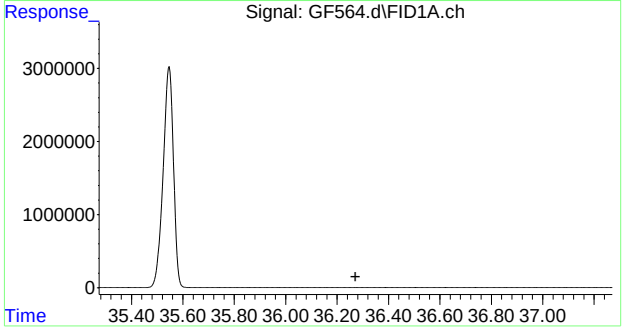
#1 5a-Androstane

R.T.: 35.547 min
Delta R.T.: -0.037 min
Response: 84561682
Conc: 50.00 µg/mL



#2 o-Terphenyl

R.T.: 33.517 min
Delta R.T.: -0.036 min
Response: 52149773
Conc: 28.52 µg/mL



#3 1-chlorooctadecane

R.T.: 0.000 min
Exp R.T. : 36.272 min
Response: 0
Conc: N.D.

New England ACCUTEST LABORATORIES

General Chemistry

QC Data Summaries

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: MC44075
Account: FLSNYNY - Fleming-Lee Shue, Inc.
Project: Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Specific Gravity	GN52924	MC44075-1		0.98	0.98	0.0	0-20%

Associated Samples:
Batch GN52924: MC44075-1
(*) Outside of QC limits

Weather Data

Select Other Date

[Explanation of the Preliminary Monthly Climate Data (F6) Product]

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

WFO Monthly/Daily Climate Data

```
000
CXUS51 KOKX 310703
CF6NYC
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                                STATION:   CENTRAL PARK NY
                                                MONTH:     JANUARY
                                                YEAR:      2016
                                                LATITUDE:   40 46 N
                                                LONGITUDE:  73 58 W
```

TEMPERATURE IN F:							:PCPN:		SNOW:	WIND			:SUNSHINE:		SKY		:PK WND	
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18
									12Z	AVG	MX	2MIN						
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR
1	42	34	38	5	27	0	0.00	0.0	0	7.6	17	290	M	M	7		26	300
2	40	32	36	3	29	0	0.00	0.0	0	6.7	15	290	M	M	3		23	270
3	45	35	40	7	25	0	0.00	0.0	0	7.9	17	270	M	M	1		26	240
4	36	14	25	-8	40	0	0.00	0.0	0	8.6	21	40	M	M	4		31	40
5	29	11	20	-13	45	0	0.00	0.0	0	5.1	20	10	M	M	0		30	20
6	41	25	33	0	32	0	0.00	0.0	0	3.5	13	250	M	M	0		18	250
7	46	31	39	6	26	0	0.00	0.0	0	2.4	7	260	M	M	3		M	M
8	46	31	39	6	26	0	0.00	0.0	0	4.2	14	80	M	M	10		21	80
9	47	40	44	12	21	0	T	0.0	0	8.1	15	70	M	M	10	18	20	80
10	59	40	50	18	15	0	1.80	0.0	0	9.9	22	280	M	M	8	1	35	290
11	40	26	33	1	32	0	0.00	0.0	0	10.4	20	280	M	M	1		35	280
12	44	25	35	3	30	0	T	T	0	6.1	22	290	M	M	5	8	35	280
13	30	22	26	-6	39	0	0.00	0.0	0	9.8	21	280	M	M	1		35	260
14	38	22	30	-2	35	0	T	T	0	4.8	15	260	M	M	9	8	23	280
15	51	34	43	11	22	0	T	0.0	0	5.2	12	170	M	M	3		18	170
16	52	42	47	15	18	0	0.24	0.0	0	6.7	15	310	M	M	9	18	22	270
17	42	30	36	4	29	0	0.05	0.4	0	5.5	13	60	M	M	7	18	19	10
18	31	18	25	-7	40	0	T	T	T	11.8	22	290	M	M	2	8	35	280
19	28	16	22	-10	43	0	0.00	0.0	T	11.0	20	280	M	M	1		34	280
20	37	27	32	0	33	0	0.00	0.0	T	5.5	14	310	M	M	3		22	290
21	36	26	31	-1	34	0	0.00	0.0	0	6.1	15	310	M	M	2		23	10
22	30	21	26	-6	39	0	0.01	0.2	0	6.5	16	50	M	M	3	8	22	30
23	27	24	26	-6	39	0	2.31	26.6	6	15.7	25	30	M	M	10	128	42	40
24	35	20	28	-4	37	0	T	T	22	5.8	17	10	M	M	3	8	28	20

25	39	28	34	2	31	0	0.00	0.0	19	3.4	9	190	M	M	3		17	180
26	48	38	43	10	22	0	0.00	0.0	17	6.5	16	230	M	M	2		29	250
27	47	34	41	8	24	0	T	0.0	9	6.6	15	290	M	M	4		25	320
28	42	32	37	4	28	0	0.00	0.0	6	4.5	14	250	M	M	1		22	260
29	41	30	36	3	29	0	0.00	0.0	6	7.9	17	310	M	M	5		32	320
30	39	28	34	1	31	0	0.00	0.0	6	7.0	16	240	M	M	0		25	250
SM	1208	836		921		0	4.41		27.2	210.8			M		120			
AV	40.3	27.9								7.0	FASTST		M	M	4	MAX(MPH)		
								MISC ---->	# 25	30						# 42	40	

NOTES:
LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: CENTRAL PARK NY
MONTH: JANUARY
YEAR: 2016
LATITUDE: 40 46 N
LONGITUDE: 73 58 W

[TEMPERATURE DATA]

AVERAGE MONTHLY: 34.1
DPTR FM NORMAL: 1.6
HIGHEST: 59 ON 10
LOWEST: 11 ON 5

[PRECIPITATION DATA]

TOTAL FOR MONTH: 4.41
DPTR FM NORMAL: 0.88
GRTST 24HR 2.32 ON 22-23

SNOW, ICE PELLETS, HAIL
TOTAL MONTH: 27.2 INCHES
GRTST 24HR 26.6 ON M
GRTST DEPTH: 22 ON 24

SYMBOLS USED IN COLUMN 16

1 = FOG OR MIST
2 = FOG REDUCING VISIBILITY TO 1/4 MILE OR LESS
3 = THUNDER
4 = ICE PELLETS
5 = HAIL
6 = FREEZING RAIN OR DRIZZLE
7 = DUSTSTORM OR SANDSTORM: VSBY 1/2 MILE OR LESS
8 = SMOKE OR HAZE
9 = BLOWING SNOW
X = TORNADO

[NO. OF DAYS WITH]

MAX 32 OR BELOW: 6
MAX 90 OR ABOVE: 0
MIN 32 OR BELOW: 22
MIN 0 OR BELOW: 0

[WEATHER - DAYS WITH]

0.01 INCH OR MORE: 5
0.10 INCH OR MORE: 3
0.50 INCH OR MORE: 2
1.00 INCH OR MORE: 2

[HDD (BASE 65)]

TOTAL THIS MO. 921
DPTR FM NORMAL -54
TOTAL FM JUL 1 1943
DPTR FM NORMAL -717

CLEAR (SCALE 0-3) 16
PTCLDY (SCALE 4-7) 8
CLOUDY (SCALE 8-10) 6

[CDD (BASE 65)]

TOTAL THIS MO. 0
DPTR FM NORMAL 0
TOTAL FM JAN 1 0
DPTR FM NORMAL 0

[PRESSURE DATA]

HIGHEST SLP M ON M
LOWEST SLP 29.27 ON 10

[REMARKS]