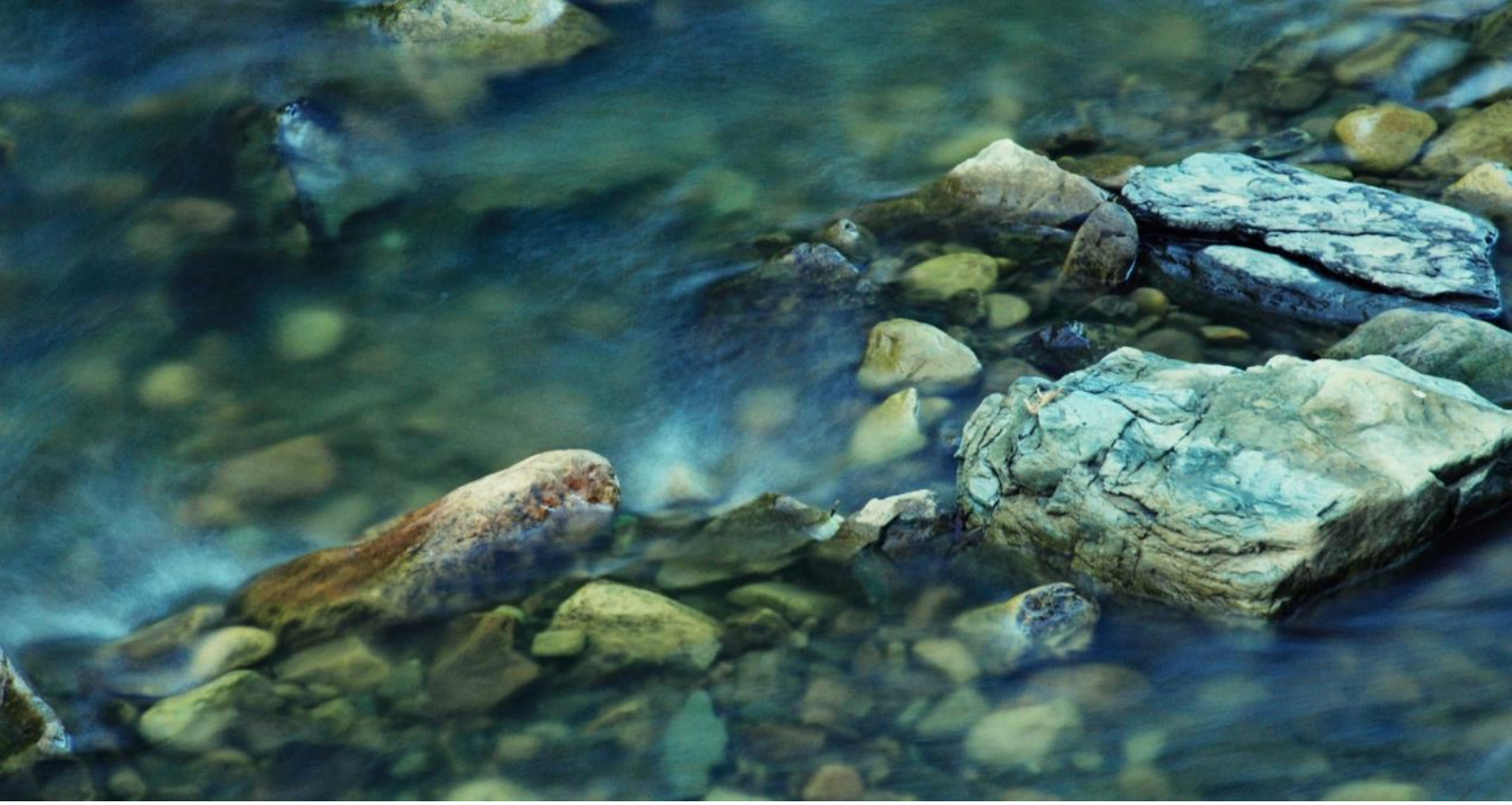


February 2019
Port Gamble Cleanup

ANCHOR QEA

Year-1 Post-Construction Monitoring Report – 2018

Prepared for Pope Resources, LP/OPG Properties, LLC

February 2019
Port Gamble Cleanup

Year-1 Post-Construction Monitoring Report

Prepared for
Pope Resources, LP/OPG Properties, LLC
19950 Seventh Avenue NE, Suite 200
Poulsbo, Washington 98370

Prepared by
Anchor QEA, LLC
720 Olive Way, Suite 1900
Seattle, Washington 98101

Project Number: 180388-02.01
\\FUJI\Anchor\Projects\Port Gamble\2018 LTM\Deliverables\Port Gamble Year-1 Post-Constr Long-Term Mon Rpt_2018_02-05-2019.docx

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

ABBREVIATIONS

ARI	Analytical Resources, Inc.
CAD	computer-aided drafting
CAP	cleanup action plan
CD	Consent Decree
cm	centimeter
COC	chemical of concern
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CRM	certified reference material
CSL	cleanup screening level
DGT	diffusive gradient thin sheet
EcoAnalysts	EcoAnalysts, Inc.
Ecology	Washington State Department of Ecology
EDR	engineering design report
EMNR	enhanced monitored natural recovery
eTrac	eTrac, Inc.
H_2S	hydrogen sulfide
mg/L	milligram per liter
MNR	monitored natural recovery
Monitoring Report	Year-1 Post-Construction Monitoring Report
MSS	Marine Sampling Systems, LLC
MTCA	Model Toxics Control Act
NAD 83	North American Datum of 1983
OMMP	operations, maintenance, and monitoring plan
PAH	polycyclic aromatic hydrocarbon
ppt	parts per thousand
PR/OPG	Pope Resources, LP/OPG Properties, LLC
PSEP	Puget Sound Estuary Protocols
QAPP	quality assurance project plan
QC	quality control
SAP	sampling and analysis plan
SCO	sediment cleanup objective
Site	Port Gamble Bay
SMA	sediment management area
SMS	Sediment Management Standards
SP	state plane
SWAC	surface-weighted average concentration

TEQ	toxic equivalency quotient
USACE	U.S. Army Corps of Engineers
WAC	Washington Administrative Code

1 Introduction

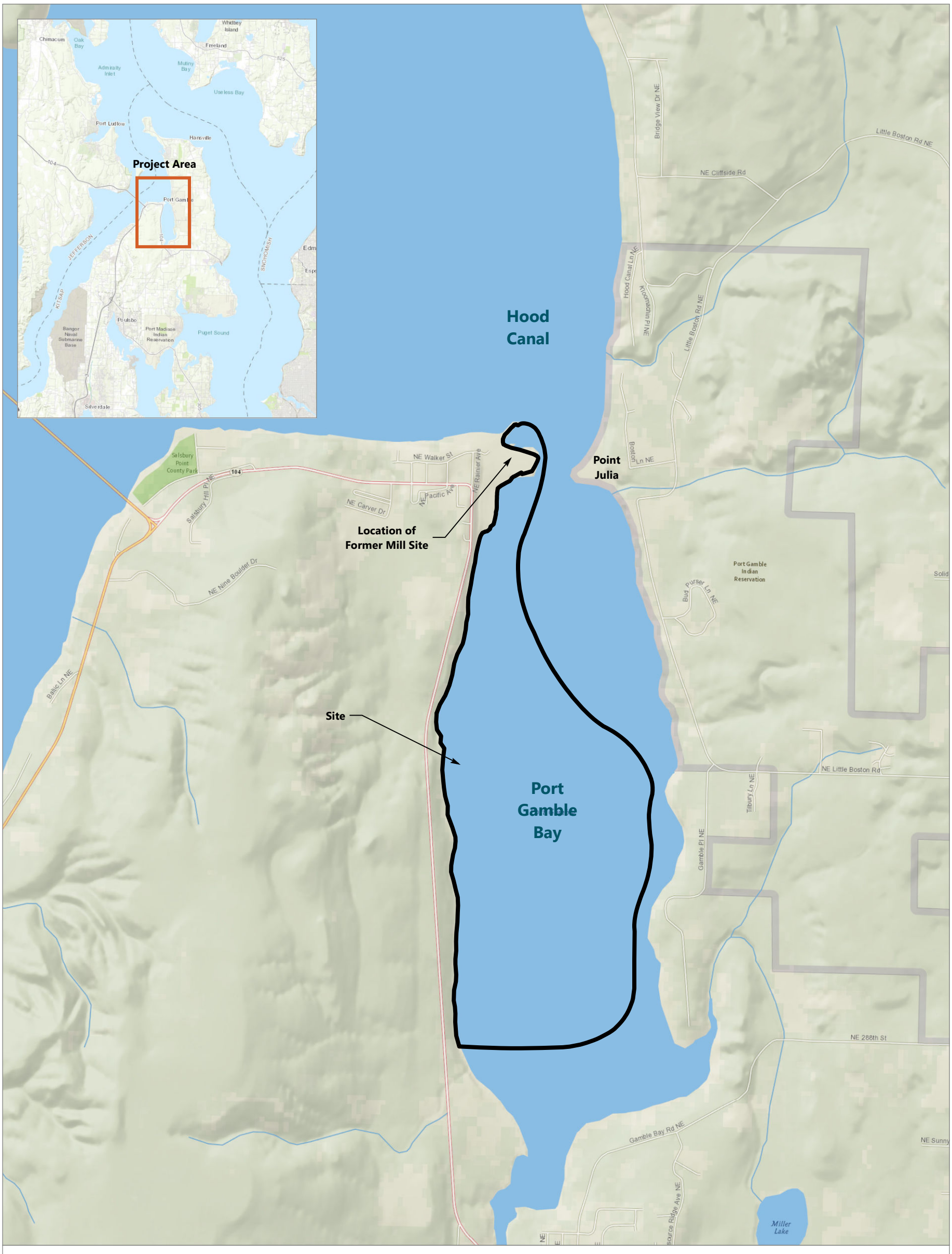
This *Year-1 Post-Construction Monitoring Report* (Monitoring Report) presents monitoring and adaptive management of engineered caps in Port Gamble Bay ("Site"; Figure 1) performed approximately 1 year after completion of remedial construction. Monitoring is being performed to ensure the long-term integrity and protectiveness of the cleanup remedy.

This Monitoring Report was prepared in accordance with the *Operations, Maintenance, and Monitoring Plan* (OMMP; Anchor QEA 2018a) and accompanying *Engineering Design Report* (EDR; Anchor QEA 2015), which describe the approach and criteria for the engineering design of sediment cleanup actions at the Site, as set forth in the *Final Cleanup Action Plan* (CAP; Ecology 2013), and in accordance with the requirements of Consent Decree (CD) 13-2-02720-0 between the Washington State Department of Ecology (Ecology) and Pope Resources, LP/OPG Properties, LLC (PR/OPG), entered in December 2013. The actions described in this Monitoring Report were performed by PR/OPG under Ecology oversight, consistent with CD requirements.

Implementation of the OMMP was also performed consistent with the requirements of the Model Toxics Control Act (MTCA), Chapter 70.105D in the Revised Code of Washington, as administered by Ecology under the MTCA Cleanup Regulation, Chapter 173-340 of the Washington Administrative Code (WAC), and the Sediment Management Standards (SMS) Chapter 173-204 WAC.

As described in more detail in the sections below, physical integrity performance monitoring (survey and visual inspection) identified a small area of the intertidal cap (approximately 3,700 square feet) within the upper portion of sediment management area (SMA)-2, where movement of the cap armor rock warranted a proactive cap repair action. This cap repair was performed in an area where the design was modified during construction to accommodate unanticipated nearshore wood debris removal, which altered the geometry of this area and rendered the shoreline more susceptible to wave forces. Importantly, post-construction sediment bioassays performed at all SMA-1 and SMA-2 engineered cap monitoring stations met the sediment cleanup objective (SCO) biological standard for the Site.

The monitoring, surveying, and inspection activities summarized in this Monitoring Report were conducted by Anchor QEA on behalf of PR/OPG. The project team also included Analytical Resources, Inc. (ARI) for chemical analyses; EcoAnalysts, Inc. (EcoAnalysts), for bioassay analyses; eTrac, Inc. (eTrac), for upland and bathymetric surveying; Marine Sampling Systems, LLC (MSS), for sediment sample collection; Laboratory Data Consultants for data validation; and Seton Construction, Inc. (Seton), for cap repairs.



Publish Date: 2018/12/18, 11:43 AM | User: ckiblinger
Filepath: \\orcas\gis\Jobs\PopeResources_0388\PortGamble\Maps\Reports\2018_LTMR\AQ_Site_Vicinity_2018_PG_LTMR.mxd

ANCHOR QEA

Figure 1
Site Vicinity Map
Year-1 Post-Construction Monitoring Report – 2018
Port Gamble Bay Cleanup

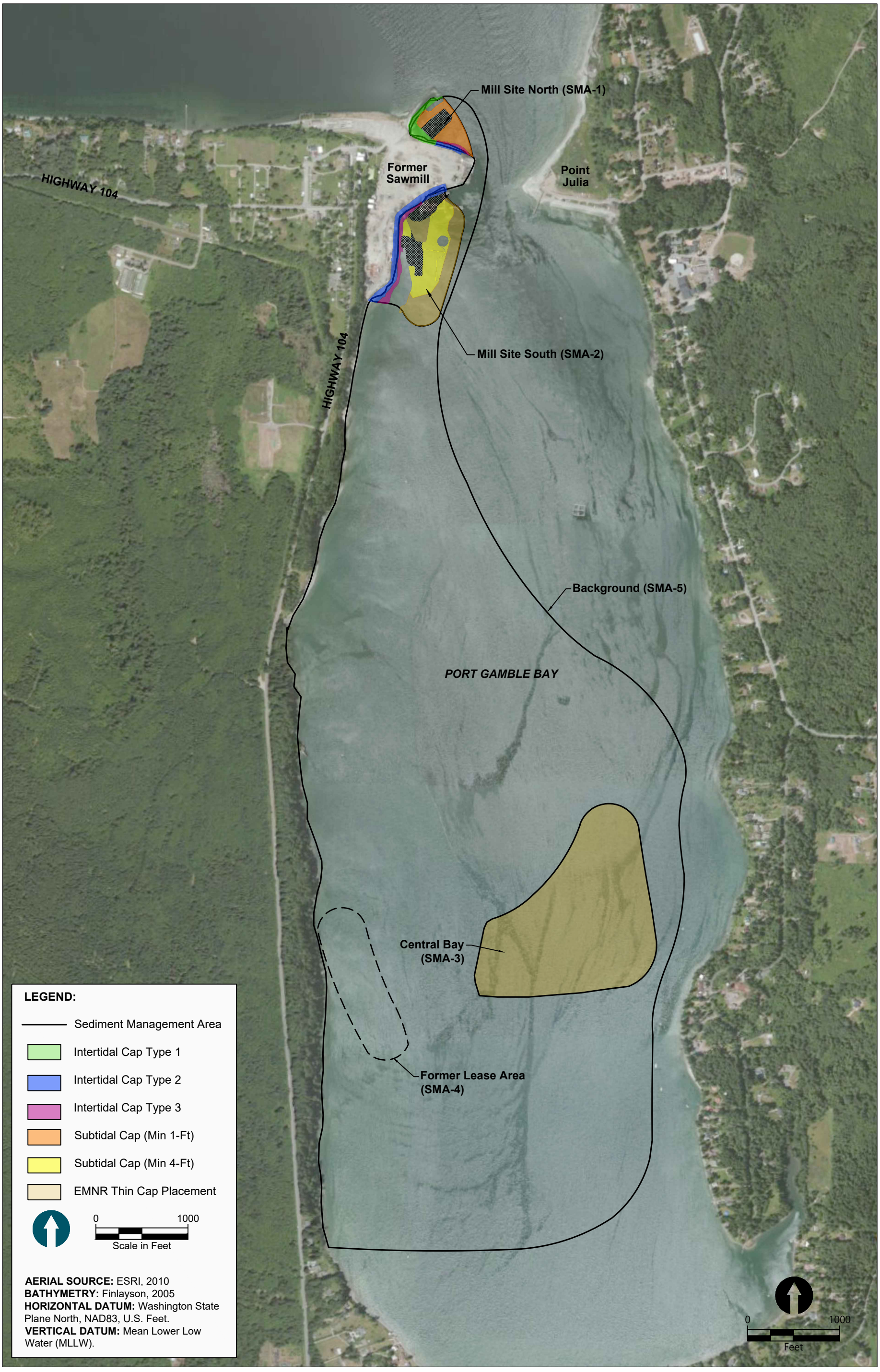
1.1 Purpose and Scope of Monitoring Activities

Between September 2015 and January 2017, the in-water construction phase of the Port Gamble Bay cleanup project was successfully completed by PR/OPG. As part of the cleanup remedy, engineered caps were placed over 10 acres of the Site, and clean silt/sand enhanced monitored natural recovery (EMNR) layers were placed over an additional 68 acres to address thin deposits sediment with relatively low concentrations of Site chemicals of concern (COCs; including carcinogenic polycyclic aromatic hydrocarbons [cPAHs], dioxins/furans, and cadmium). The extent of remedial actions in SMAs 1, 2, and 3 is shown on Figure 2. As discussed in the OMMP (Anchor QEA 2018a), long-term performance and confirmation monitoring activities will inform Ecology's 5-year reviews of the effectiveness of remedial actions at the Site, consistent with MTCA and SMS requirements. Sampling events will be scheduled to facilitate Ecology's 5-year reviews, beginning in 2020.

At SMA-1 and SMA-2, post-construction monitoring includes sediment cap field surveys and sediment quality confirmation monitoring at sentinel and nearshore wood debris cap locations. Field surveys of engineered caps include physical methods to monitor cap integrity and thickness, as well as confirmatory sediment bioassays. Post-construction monitoring began in 2018 (Year 1 following completion of construction), as described in this Monitoring Report. Follow-on monitoring will continue in Year 3 (2020), and then approximately every 5 years thereafter through 2030.

At SMA-3, long-term monitoring includes confirmatory sediment bioassays to verify the effectiveness of the constructed EMNR remedy in this area. EMNR layers (placed either as the primary remedy or as a post-dredge residuals management technique) do not require long-term physical survey monitoring or maintenance. Natural recovery processes throughout the rest of the 700-acre Site are expected to result in a reduction of surface sediment cPAH toxic equivalency quotient (TEQ) and dioxin/furan TEQ concentrations over time, particularly because ongoing sources (e.g., decaying creosote-treated piles) were removed during the 2015 to 2017 remedial action. Confirmatory chemical analyses in monitored natural recovery (MNR) areas will begin in 2020 (3 years after completion of remedial construction) and every 5 years thereafter, as needed.

Subsequent sections of this Monitoring Report describe the Year-1 (2018) post-construction environmental monitoring activities that were performed at the Site, including the details of post-construction monitoring and maintenance of capped areas to ensure the cap remains physically stable and chemically protective over time.



Publish Date: 2018/12/18 11:43 AM | User: chewett
Filepath: K:\Projects\0388-Pope Resources\Port Gamble Sediment Cleanup RI-FS\Long-term Monitoring\0388-WK-22 (OMMP-Capping).dwg F2

ANCHOR QEA

Figure 2
Capping and EMNR Areas in SMA-1, SMA-2, and SMA-3

Year-1 Post-Construction Monitoring Report – 2018
Port Gamble Bay Cleanup

1.2 Report Organization

The remainder of this Monitoring Report is organized as follows:

- **Section 2, Cap Monitoring and Inspection Methods:** This section describes surveying, inspection, and sediment quality confirmation monitoring methods.
- **Section 3, Data Quality Assessment:** This section describes information on sediment chemical data quality, including sample completeness, quality control (QC) measures, and a summary of the data validation.
- **Section 4, Physical Integrity Performance Monitoring Data:** This section presents the physical integrity performance monitoring data.
- **Section 5, Sentinel Cap Confirmation Monitoring Data:** This section presents analytical chemistry and sediment bioassay data at sentinel cap monitoring stations.
- **Section 6, Nearshore Wood Debris Cap Confirmation Monitoring Data:** This section presents porewater hydrogen sulfide chemistry and sediment bioassay data in nearshore capped wood debris areas.
- **Section 7, Corrective Actions:** This section describes the corrective actions recommended and performed based on the Year-1 post-construction monitoring.

2 Cap Monitoring and Inspection Methods

Year-1 (2018) cap monitoring in SMA-1 and SMA-2 included the following:

- Physical integrity performance monitoring (Section 2.1)
- Sediment quality confirmation monitoring at sentinel cap monitoring stations (Section 2.2)
- Sediment quality confirmation monitoring in nearshore capped wood debris areas (Section 2.3)

The sections below describe the methods for each of the monitoring activities performed in accordance with the OMMP for the Year-1 cap monitoring event. A sample collection and analysis summary for sentinel and near-shore samples is presented in Table 1.

Table 1
Summary of Sampling Locations

Station ID	SMA Composite or Transect ID	Station Coordinates (Washington SP NAD 83 North Zone)		Analysis Performed			
		Easting	Northing	Site COCs	Dissolved Sulfides	Larval Bioassay	Full Suite Bioassay
SMA1-ST1-G1	SMA1-ST (Sentinel)	1211449.6	317502.5	X	—	X	—
SMA1-ST2-G1		1211635.2	317618.0				
SMA1-ST3-G2		1211706.6	317377.4				
SMA1-ST4-G1		1211703.3	317282.6				
SMA1-ST5-G1		1211837.4	317243.7				
SMA1A-IT1-G2	SMA1A-IT (Sentinel)	1211536.3	317659.8	X	—	X	—
SMA1A-IT2-G1		1211387.3	317536.1				
SMA1A-IT3-G2		1211364.0	317391.3				
SMA1A-IT4-G2		1211660.0	317214.9				
SMA1A-IT5-G2		1211838.0	317158.0				
SMA2A-IT1-G2	SMA2A-IT (Sentinel)	1211610.2	316660.8	X	—	X	—
SMA2A-IT2-G1		1211384.1	316584.5				
SMA2A-IT3-G1		1211340.9	316517.4				
SMA2A-IT4-G1		1211226.9	316417.8				
SMA2A-IT5-G1		1211175.8	316279.7				
SMA2A-ST1-G1	SMA2A-ST (Sentinel)	1211476.2	316242.5	X	—	X	—
SMA2A-ST2-G1		1211593.0	316373.0				
SMA2A-ST3-G1		1211787.9	316466.5				
SMA2A-ST4-G1		1211507.4	316010.7				
SMA2A-ST5-G1		1211733.3	316189.8				

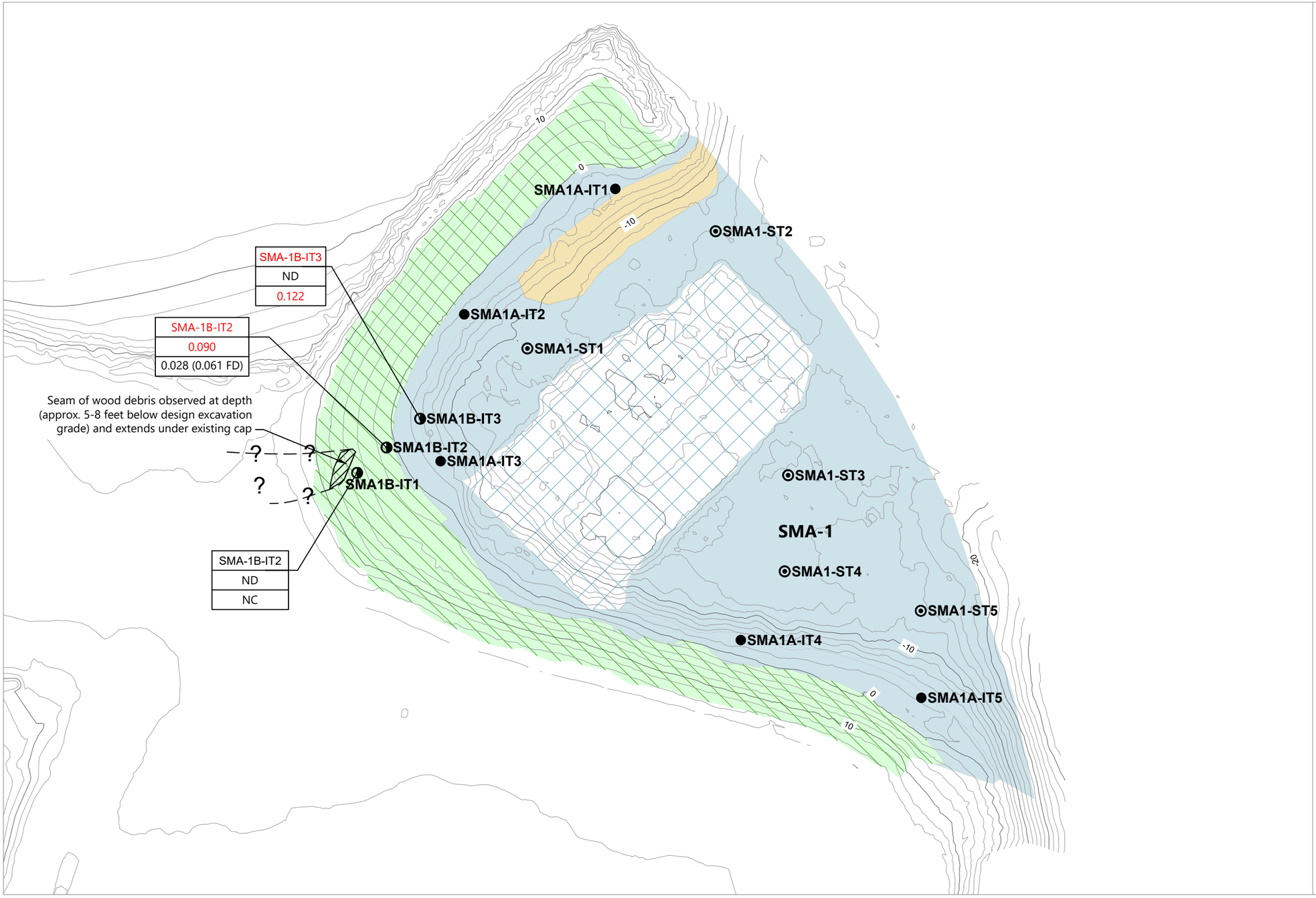
Station ID	SMA Composite or Transect ID	Station Coordinates (Washington SP NAD 83 North Zone)		Analysis Performed			
		Easting	Northing	Site COCs	Dissolved Sulfides	Larval Bioassay	Full Suite Bioassay
SMA2B-IT1-G1	SMA2B-IT (Sentinel)	1211171.0	316121.1	X	—	X	—
SMA2B-IT2-G3		1211162.7	315953.4				
SMA2B-IT3-G3		1211152.2	315760.3				
SMA2B-IT4-G1		1211093.8	315623.6				
SMA2B-IT5-G2		1211037.7	315495.3				
SMA2B-ST1-G1	SMA2B-ST (Sentinel)	1211308.0	315845.5	X	—	X	—
SMA2B-ST2-G1		1211660.5	315811.4				
SMA2B-ST3-G1		1211508.2	315738.2				
SMA2B-ST4-G1		1211336.2	315447.8				
SMA2B-ST5-G1		1211564.0	315509.5				
BW-15-G1	Natural Recovery	1212505.2	308615.4	X	—	X	—
SMA1B-IT1-0-6-180907	SMA-1 Transect 1 (Nearshore cap)	1211281.7	317379.8	—	X	—	—
SMA1B-IT1-24-180907				No	X		
SMA1B-IT2-0-6-180907		1211310.7	317404.8	—	X	—	X
SMA1B-IT2-24-180907				—	X		
SMA1B-IT102-24-180907				—	X		
SMA1B-IT3-0-6-180907		1211339.7	317428.5	—	X	—	X
SMA1B-IT3-24-180907				—	X		
SMA2C-IT1-0-6-180907	SMA-2 Transect 1 (Nearshore cap)	1211398.5	316652.6	—	X	—	—
SMA2C-IT1-24-180907				—	X		
SMA2C-IT2-0-6-180907		1211406.1	316640.4	—	X	—	—
SMA2C-IT2-24-180907				—	X		
SMA2C-IT3-0-6-180907		1211412.0	316630.8	—	X	—	X
SMA2C-IT3-24-180907				—	X		

Station ID	SMA Composite or Transect ID	Station Coordinates (Washington SP NAD 83 North Zone)		Analysis Performed			
		Easting	Northing	Site COCs	Dissolved Sulfides	Larval Bioassay	Full Suite Bioassay
SMA2C-IT4-0-6-180907	SMA-2 Transect 2 (Nearshore cap)	1211415.6	316663.1	—	X	—	—
SMA2C-IT4-24-180907				—	X		
SMA2C-IT5-0-6-180907		1211423.1	316651.0	—	X	—	—
SMA2C-IT5-24-180907				—	X		
SMA2C-IT6-0-6-180907		1211429.0	316641.3	—	X	—	X
SMA2C-IT6-24-180907				—	X		
SMA2C-IT7-0-6-180907	SMA-2 Transect 3 (Nearshore cap)	1211432.6	316673.6	—	X	—	—
SMA2C-IT107-0-6-180907				—	X		
SMA2C-IT7-24-180907				—	X		
SMA2C-IT8-0-6-180907		1211440.1	316661.5	—	X	—	—
SMA2C-IT8-24-180907				—	X		
SMA2C-IT9-0-6-180907		1211446.0	316651.9	—	X	—	X
SMA2C-IT9-24-180907				—	X		

Note:
COCs include dioxins/furans, cPAHs, and cadmium.

2.1 Physical Integrity Performance Monitoring

Physical integrity monitoring of SMA-1 and SMA-2 (Figure 2) was conducted to determine the stability of the cap areas following construction. This monitoring included visual inspection, topographic survey, and high-resolution hydrographic survey (i.e., multi-beam bathymetric survey). Bathymetric and topographic survey data were used to evaluate the cap thicknesses by comparing the measured surface elevations (immediately following construction and 1 year after construction) of the cap areas, as delineated in the final as-built survey. SMA-1 and SMA-2 cap areas are depicted on Figures 3 and 4, respectively.



LEGEND:

- 10 — Post-construction Contours (2' Intervals)
- *SMA* — Sediment Management Area
- Subtidal Dredge Sediment/Wood Debris Deposit With Residuals Cover
- Intertidal Cap (Approx. 2'-3'-Thick)
- Intertidal Excavation
- Subtidal Cap (Approx. 1.5'-Thick)
- EMNR (Approx. 6" Sand and/or Silt)
- Approximate Area of Wood Debris Under Cap
- Subtidal Sentinel Surface Sediment Sample Aliquot Location
- Intertidal Sentinel Surface Sediment Sample Aliquot Location
- Intertidal DGT (and Potential Bioassay) Sediment Sample Location - Capped Wood Debris

ND	Porewater Sulfide (mg/L as H_2S) at 6" BML
0.122	Porewater Sulfide (mg/L as H_2S) at 2' BML

ND - Not Detected
NC - Not Collected
FD - Field Duplicate Sample Result
BML - Below Mudline
Red - Bioassay Sample Location

SOURCE: Topography from Triad, dated 2012. Bathymetry from eTrac, dated January 19, 2017.
HORIZONTAL DATUM: Washington State Plane North, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

0 100
Feet

Publish Date: 2019/01/11 3:35 PM | User: chewett
Filepath: K:\Projects\0388-Pope Resources\Port Gamble Sediment Cleanup RI-FS\Long-term Monitoring\0388-WK-002 (MAF Porewater XS).dwg F3

ANCHOR QEA

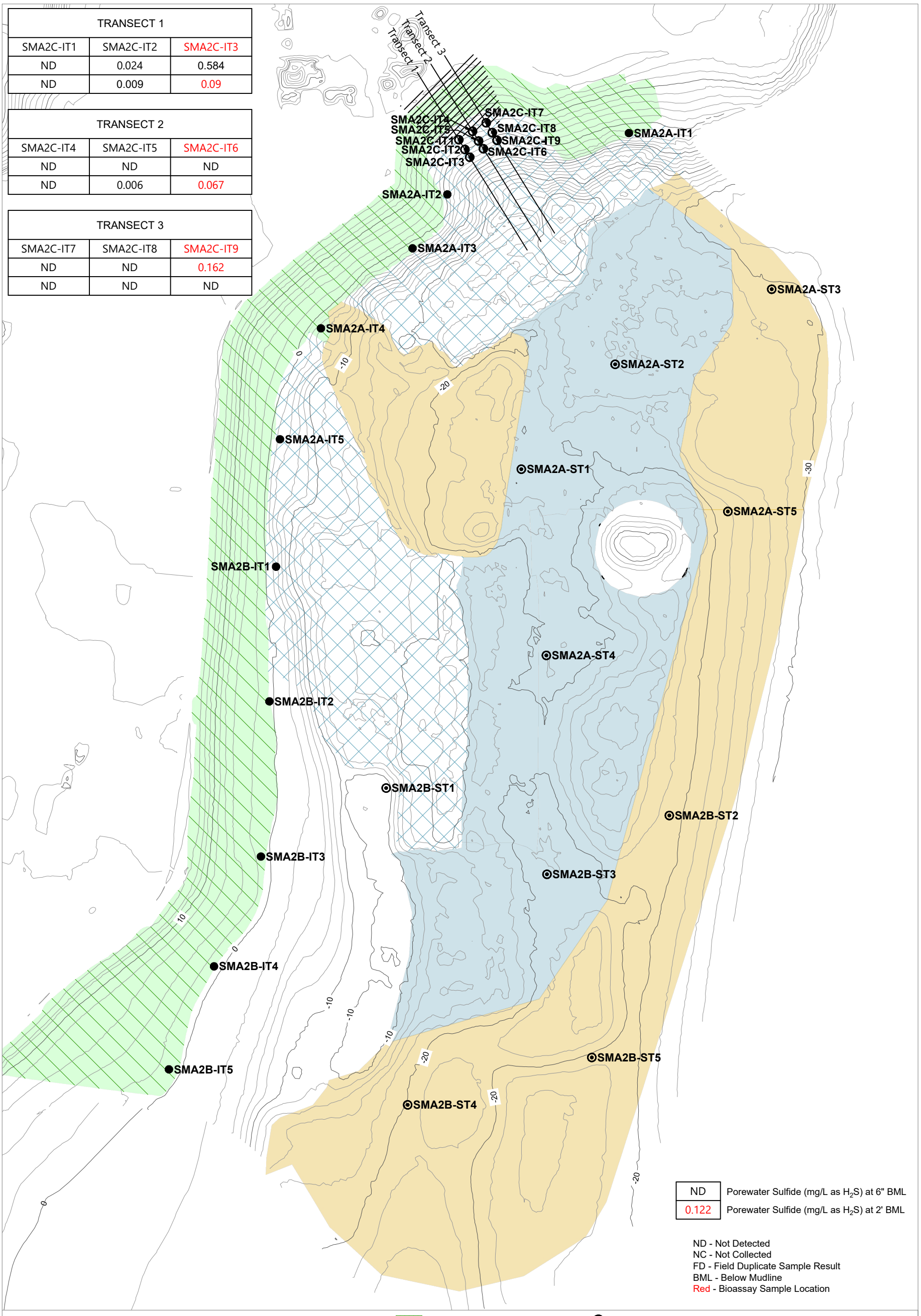
Figure 3
Sediment Sampling Stations (SMA-1)

Year-1 Post-Construction Monitoring Report – 2018
Port Gamble Bay Cleanup

TRANSECT 1		
SMA2C-IT1	SMA2C-IT2	SMA2C-IT3
ND	0.024	0.584
ND	0.009	0.09

TRANSECT 2		
SMA2C-IT4	SMA2C-IT5	SMA2C-IT6
ND	ND	ND
ND	0.006	0.067

TRANSECT 3		
SMA2C-IT7	SMA2C-IT8	SMA2C-IT9
ND	ND	0.162
ND	ND	ND



Publish Date: 2019/01/11 3:35 PM | User: chewett
Filepath: K:\Projects\0388-Pope Resources\Port Gamble Sediment Cleanup RI-FS\Long-term Monitoring\0388-WK-002 (MAF Porewater XS).dwg F4

ANCHOR QEA

Figure 4
Sediment Sampling Stations (SMA-2)

Year-1 Post-Construction Monitoring Report – 2018
Port Gamble Bay Cleanup

Bathymetric and topographic surveys were performed by eTrac using multi-beam survey equipment in subtidal and lower intertidal areas to determine mudline elevations, and light detection and ranging (LiDAR) laser scan equipment was used in the upper portions of the intertidal caps. The multi-beam surveys were conducted by a licensed surveyor and met or exceeded the accuracy standards of +/- 0.2 foot, as referenced in the U.S. Army Corps of Engineers (USACE) *Hydrographic Survey Manual*, April 2004 Revision (USACE 2004). Topographic surveys, conducted for upper intertidal cap areas not included in the bathymetric survey, were conducted by a licensed surveyor and met or exceeded the accuracy standards of +/- 0.1 foot, as referenced in the USACE *Control and Topographic Surveying Manual*, January 2007 (USACE 2007).

Following the completion of the bathymetric and topographic surveys, eTrac licensed surveyors integrated the bathymetric and topographic elevation contours into a single set of elevation contours. These contours were evaluated by computer-aided drafting (CAD) isopach methodology. The isopach comparison of surface elevations immediately following construction and 1 year after construction, for SMA-1 and SMA-2 cap areas, is depicted on Figure 5. This comparison was used to identify zones of accretion, settlement, or erosion. Based on the results of this survey cap thickness evaluation, cap areas of relatively greater erosion or settlement were further investigated during a low tide visual inspection of the caps. The results of the physical integrity monitoring are presented in Section 4.

2.2 Sentinel Cap Confirmation Monitoring

Surface sediment quality monitoring was conducted at six sentinel intertidal and subtidal stations in SMA-1 and SMA-2, in accordance with the Sampling and Analysis Plan (SAP; Attachment F-1, Anchor QEA 2018a). Samples at each intertidal and subtidal sentinel cap monitoring stations were comprised of a five-point composite, as depicted on Figures 3 and 4. In addition, a discrete 0- to 10-centimeter (cm) grab sample from location BW-15 within SMA-3 (Figure 6) was collected and submitted for larval bioassay analysis.

Sampling was conducted in September 2018 to correspond with seasonally lower dissolved oxygen levels and higher temperatures, while also optimizing daylight low-tide intertidal sampling windows and the availability of larval bioassay organisms. Samples were collected by Anchor QEA and their subcontractor MSS, using a van Veen-type hydraulic power grab sampler deployed from a winch line on the MSS sampling vessel, in accordance with Puget Sound Estuary Protocols (PSEP; PSEP 1997) and the SAP (Attachment F-1; Anchor QEA 2018a); following is a detailed description of the process:

Elevation Range Table (May 2018 Data relative to January 2017 Data)	
Elevation Difference (ft)	Color
-3.0 to -1.0	
-1.0 to -0.5	
-0.5 to 0.5	
0.5 to 1.0	
1.0 to 5.1	

Pier 4 Removal Area - Construction Revision Created Pocket Beach and Headland Areas

SOURCE: Bathymetry from eTrac, dated January 19, 2017, and May 16, 2018. Aerial from ESRI
HORIZONTAL DATUM: Washington State Plane North, NAD83, U.S. Feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

LEGEND:

- Year 1 Monitoring Survey Contours (5' and 25' Interval)
- Original Designed Shoreline Orientation
- Shoreline Cap Repair Area
- Intertidal Cap (Approx. 2'-3'-Thick)
- Sand Cap (Approx. 4'-Thick)
- Eelgrass Bench

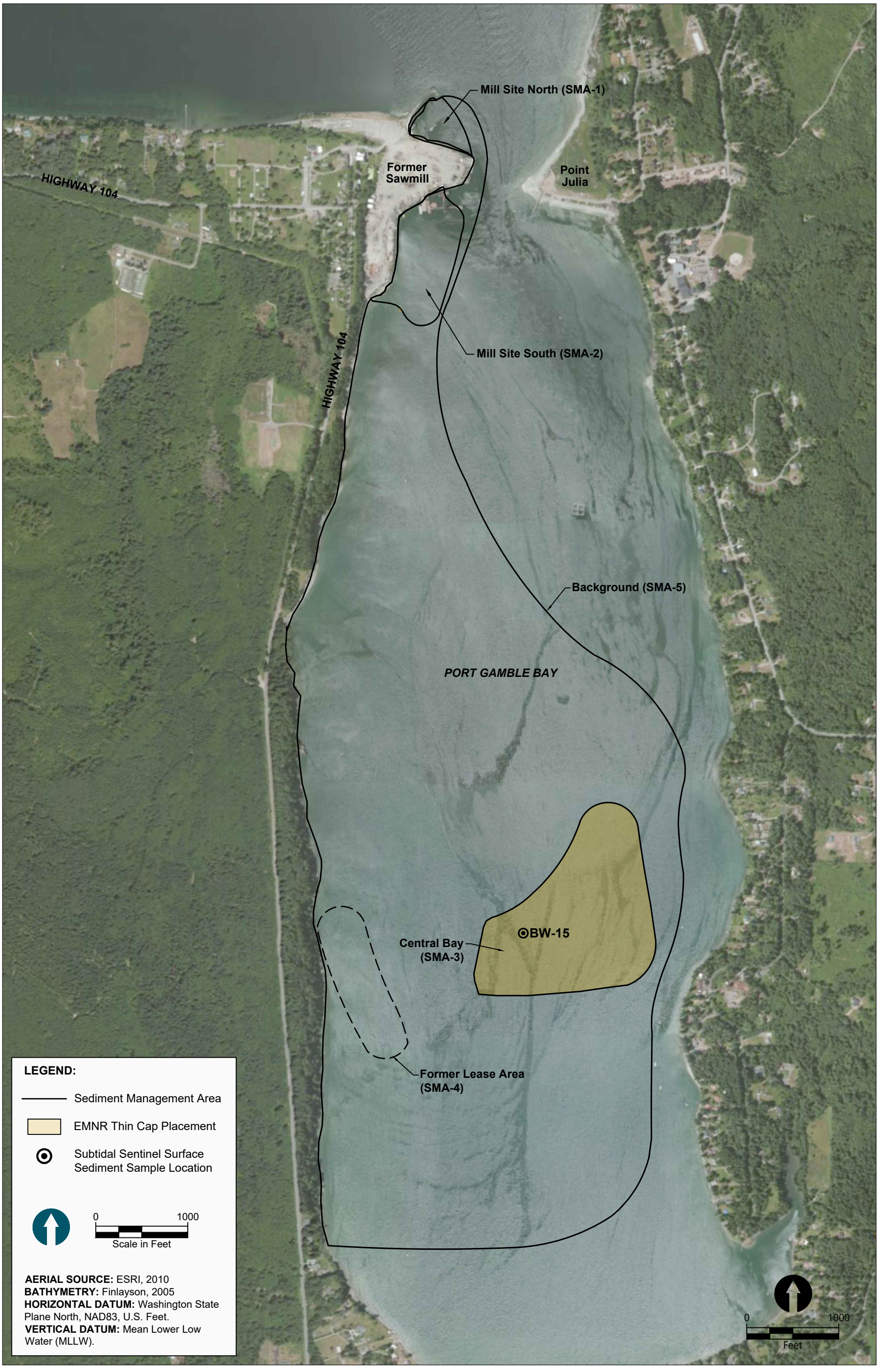
0 200 Feet

Publish Date: 2019/01/15 10:19 AM | User: chewett
Filepath: K:\Projects\0388-Pope Resources\Port Gamble Sediment Cleanup RI-FS\Long-term Monitoring\0388-WK-003 (Post-work Monitoring).dwg F5

ANCHOR QEA

Figure 5
Isopach Comparison - Post-Construction vs. Year-1 Cap Surfaces

Year-1 Post-Construction Monitoring Report – 2018
Port Gamble Bay Cleanup



Publish Date: 2018/12/18 11:43 AM | User: chewett
Filepath: K:\Projects\0388-Pope Resources\Port Gamble Sediment Cleanup RI-FS\Long-term Monitoring\0388-WK-004 (OMMP-SMA5).dwg F6

ANCHOR QEA

Figure 6
Surface Sediment Sampling Station (SMA-3)

Year-1 Post-Construction Monitoring Report – 2018
Port Gamble Bay Cleanup

1. The vessel was maneuvered to the proposed location.
2. The sampler was decontaminated.
3. The sampler was deployed to the bottom.
4. The winch cable to the grab sampler was drawn taut and vertical.
5. Location coordinates of the cable hoist were recorded by the location control person.
6. The sediment sample was retrieved aboard the vessel and evaluated against the following PSEP acceptability criteria:

    - Grab sampler was not overfilled (i.e., sediment surface was not against the top of the sampler).
    - Sediment surface was relatively flat, indicating minimal disturbance or winnowing.
    - Overlying water was present, indicating minimal leakage.
    - Overlying water had low turbidity, indicating minimal sample disturbance.
    - Desired penetration depth of at least 10 cm was achieved.

Sediment samples that met the above collection criteria were processed as follows:

1. Overlying water was siphoned off.
2. After noting their presence, any large objects or debris were removed from the sediment surface.
3. Prior to sampling, color photographs were taken, and a sediment description of each grab was recorded for the following parameters, as appropriate and present:

    - Sample recovery (depth in inches or centimeters of recovery in the grab sampler)
    - Physical soil description of the grab in accordance with the Unified Soil Classification System (includes soil type, density/consistency of soil, moisture, and color)
    - Odor (e.g., hydrogen sulfide [H_2S] and petroleum)
    - Note any vegetation
    - Debris
    - Biological activity (e.g., detritus, shells, tubes, bioturbation, or live or dead organisms)
    - Presence of oil sheen
    - Any other distinguishing characteristics or features

4. A decontaminated stainless-steel spoon was used to place sample material from the 0- to 10-cm) biologically active zone for chemical and larval bioassay testing into a clean, stainless steel bowl. To avoid cross contamination, care was taken to remove only sediment that had not contacted the sides or bottom of the grab sampler. The bowl was covered with aluminum foil until each aliquot station had been collected to form a sample composite.
5. After material had been collected from each aliquot station, the material was combined and homogenized until a uniform color and consistency was achieved.

6. Immediately after filling the sample container with sediment, the screw cap was placed on the sample container and tightened.
7. Sample containers were checked for proper identification, analysis type, and lid tightness.
8. Each container was carefully packed to prevent breakage and placed inside of a cooler with ice for storage at the proper temperature (4 °C ±2 °C for all samples).

The results of the sediment quality confirmation monitoring in sentinel cap locations are included in Section 5.

2.3 Nearshore Capped Wood Debris Confirmation Monitoring

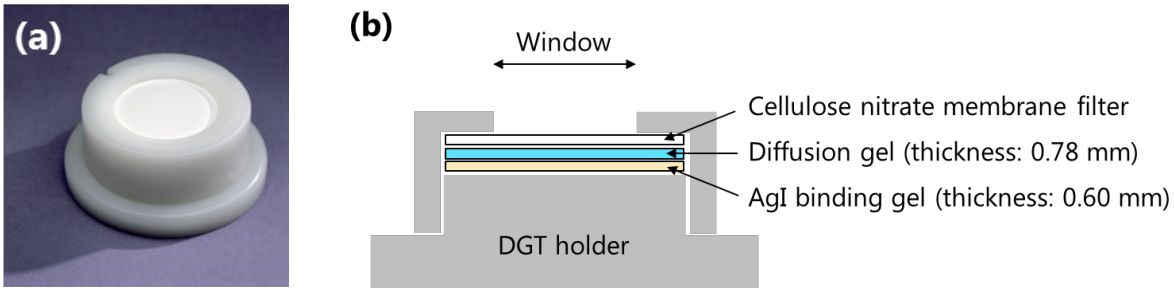
Surface sediment quality monitoring was also conducted within the two areas where nearshore wood debris deposits were capped along the shoreline (i.e., within the North Basin in SMA-1 and the Former Pier 4 Area in SMA-2). Sampling was conducted in September 2018. Nearshore sediment sampling locations for capped wood debris in SMA-1 and SMA-2 are depicted on Figures 3 and 4, respectively.

Sediment monitoring in nearshore wood debris cap locations consisted of an initial phase of passive in situ diffusive gradient thin sheet (DGT) monitoring of porewater total free sulfide (including H_2S, hydrosulfide, and disulfide) concentrations. Following this initial phase of porewater monitoring and the calculation of the H_2S fraction of the total free sulfide concentration (based on concurrent temperature, pH, and salinity sampling), confirmatory surface sediment bioassay samples were collected from all locations where the porewater H_2S concentrations exceeded the risk-based benchmark of 0.07 milligram per liter (mg/L), or from the highest porewater H_2S concentrations in a transect, if no locations exceeded 0.07 mg/L.

2.3.1 Porewater Sulfide Monitoring

DGT piston devices were obtained from DGT Research (http://www.dgtresearch.com) and preloaded for sulfide measurement using a standard DGT holder containing a 0.6-mm-thick silver iodide impregnated binding gel layer, overlain by a 0.78-mm-thick polyacrylamide diffusive gel, and held in place by a 0.45-micron cellulose nitrate membrane filter (Figure 7). The window size of the DGT sampler was 2.54 square centimeters, and prior to use, the DGT assemblies were deoxygenated by immersion in 0.01 mol sodium nitrate purged with high-purity nitrogen gas for at least 2 days to remove any residual oxygen.

Figure 7
DGT Piston Assembly (a) and Cross-Section View (b)



DGT Research: http://www.dgtresearch.com/

DGT probe field deployment consisted of a DGT piston within a plastic spear, so that the DGT could be deployed to the desired depth while the piston was protected within a wire mesh chamber (Figure 8). DGT probes were advanced at three locations along a single transect in SMA-1(Figure 3) and at three locations along three parallel transects in SMA-2 (total of nine locations; Figure 4). At each of these twelve DGT sampling locations, probes were installed at 6 and 24 inches below the mudline, for a total of 6 samples in SMA-1 and 18 samples in SMA-2.

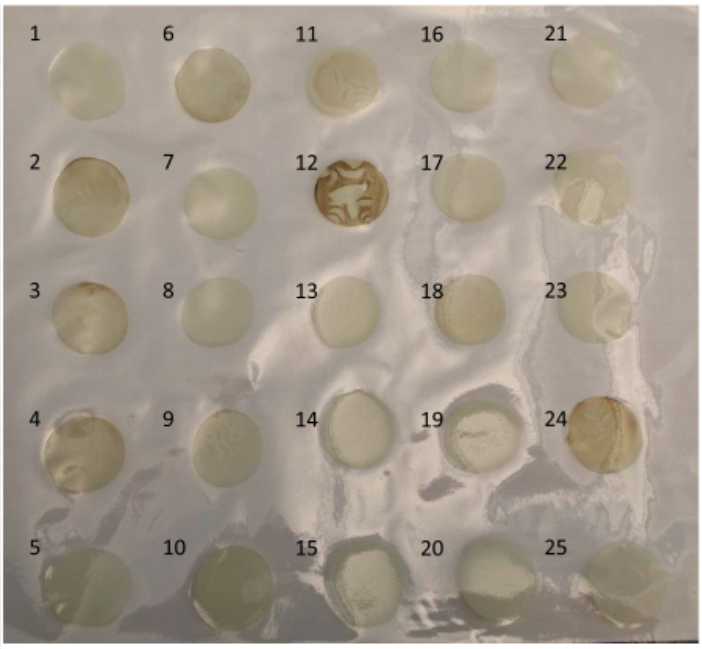
Figure 8
Probe with DGT Piston Assembly Installed (left) and Probe Installation (right)

Following a 24-hour deployment period, DGT probes were retrieved from the sediment, the DGT piston assemblies removed, rinsed with de-ionized water, and sealed in Mylar bags. Representative surface sediment (approximately 6 inches below mudline) porewater temperature, pH, and salinity (where practicable) measurements were collected at the 12 DGT sampling locations during retrieval of the DGTs. DGT piston assemblies were packaged with ice and shipped to Anchor QEA's environmental geochemistry laboratory in Portland, Oregon, for analysis.

At the laboratory, the binding gel layers were removed and placed on blotting paper. The binding gels were then laid on a thin cellophane sheet (Bio-Rad) and covered with a second cellophane sheet. The sheet assembly was then placed in a vacuum gel dryer (Bio-Rad, Model 583) and dried for 2 hours at 60 °C. The dried sheet was digitally scanned (Konica Minolta BizHub-C364) and saved as a gray-scale image (Figure 9). Gel analysis software (UN-SCAN-IT Gel Version 7.1) was used to measure and record the gray-scale intensity of each binding gel on the scanned image.

Figure 9
Gray-Scale Images of DGT Gels

Order on COCs	
1	SMA1B-IT1-0-6-180907
2	SMA1B-IT2-0-6-180907
3	SMA1B-IT2-24-180907
4	SMA1B-IT102-24-180907
5	SMA1B-IT3-0-6-180907
6	SMA1B-IT3-24-180907
7	SMA2C-IT1-0-6-180907
8	SMA2C-IT1-24-180907
9	SMA2C-IT2-24-180907
10	SMA2C-IT2-0-6-180907
11	SMA2C-IT3-0-6-180907
12	SMA2C-IT3-24-180907
13	SMA2C-IT4-0-6-180907
14	SMA2C-IT4-24-180907
15	SMA2C-IT5-0-6-180907
16	SMA2C-IT5-24-180907
17	SMA2C-IT6-0-6-180907
18	SMA2C-IT6-24-180907
19	SMA2C-IT7-0-6-180907
20	SMA2C-IT107-0-6-180907
21	SMA2C-IT7-24-180907
22	SMA2C-IT8-0-6-180907
23	SMA2C-IT8-24-180907
24	SMA2C-IT9-0-6-180907
25	SMA2C-IT9-24-180907



Porewater H_2S concentrations were calculated based on the optical densitometry of the DGT gels and the corresponding temperature, pH, and salinity measurements, using the calibration curves and equations previously developed and presented in the Draft November 10, 2017 *Method Development and Verification Study for Sulfide Measurement in Porewater Using Diffusive-Gradients-in-Thin-Films*,

included as an attachment to the OMMP (Anchor QEA, 2018a). The porewater sulfide monitoring data are presented in Section 6.1.

2.3.2 Surface Sediment Bioassay Sampling

Surface sediment samples for contingent bioassay analyses were collected from each of the probe locations and submitted to EcoAnalysts for archiving, pending the results of the porewater H_2S monitoring described in Section 2.3.1.

Bioassay samples were collected from the target locations and coordinates identified in the OMMP, as follows:

1. Sediment samples were collected directly from the cap surface, in the dry during low tide, using decontaminated hand tools (e.g., steel spoons, scoops, and bowls).
2. The sampling location for SMA1B-IT3 was submerged under water during DGT retrieval and deployment, and the bioassay sample was collected from a vessel during sampling of sentinel cap stations according to methods described in Section 2.2.
3. Prior to processing samples, color photographs were taken, and a sediment description of each grab was recorded for the following parameters, as appropriate and present:
    - Physical soil description of the grab in accordance with the Unified Soil Classification System (includes soil type, density/consistency of soil, moisture, and color)
    - Odor (e.g., hydrogen sulfide and petroleum)
    - Note any vegetation
    - Debris
    - Biological activity (e.g., detritus, shells, tubes, bioturbation, or live or dead organisms)
    - Presence of oil sheen
    - Any other distinguishing characteristics or features
4. A clean spoon was used to place sample material from the 0 to 10 cm biologically active zone for chemical and larval bioassay testing into a clean, stainless steel bowl, and the material was combined and homogenized until a uniform color and consistency was achieved.
5. Sample homogenates were placed into a 2-gallon polyethylene bag and sealed with minimal headspace.
6. Samples were checked for proper identification and bioassay testing type.
7. Each sample was placed inside of a cooler with ice for storage at the proper temperature (4 °C ±2 °C for all samples).
8. Bioassay samples were hand delivered to EcoAnalysts each day and archived at the proper temperature (4 °C ±2 °C) until test initiation.

Once porewater H_2S concentrations were calculated, bioassay analyses were triggered for samples from all locations where the surface (6-inch depth) or subsurface (24-inch depth) porewater H_2S

concentration was greater than 0.07 mg/L (the risk-based sediment porewater H_2S benchmark developed by Ecology for Port Gamble Bay). As discussed in Section 2.3, if no locations from a given transect had porewater H_2S concentrations greater than 0.07 mg/L, bioassay analysis was performed on the sample from the transect with the highest porewater H_2S concentration. Two surface sediment samples from the SMA-1 transect, along with one surface sediment sample from each of the three SMA-2 transects (i.e., a total of five samples) were submitted for the suite of SMS bioassay analyses (two acute and one chronic). The bioassay data for nearshore capped wood debris areas are presented in Section 6.

3 Data Quality Assessment

This section provides information on data quality for sediment analytical data, including field and laboratory QC measures, data validation findings, and completeness.

3.1 Field Data Quality

All samples arrived at the laboratory within temperature requirements. Sufficient volume was provided for laboratory replicates, matrix spike, and matrix spike duplicate samples, as required in the Quality Assurance Project Plan (QAPP; Anchor QEA 2018a; Appendix F, Attachment F-2).

3.2 Analytical Data Quality

Data quality objectives and quality assurance procedures are provided in the QAPP (Anchor QEA 2018; see Attachment F-2 of Appendix F). The laboratory data reports are provided in Appendix C, and the data validation report is provided in Appendix D. All data qualifiers applied to the data during final validation have been incorporated into the database for this project. All data were considered useable as reported or as qualified. Data qualifiers assigned during data validation include the following:

- "J" indicates the associated numerical value is an estimated concentration
- "U" indicates a reporting limit below which the analyte was not detected
- "UJ" indicates an approximate reporting limit below which the analyte was not detected

The validation process resulted in some qualified data based on specified protocol or technical advisory, as stated in the data validation reports, including the following:

- Due to method blank contamination, one polycyclic aromatic hydrocarbon (PAH) result and five dioxin/furan results detected below the laboratory reporting limits were qualified as non-detect at the laboratory reporting limits.
- Dioxin/furan results with estimated maximum potential concentration "EMPC" qualifiers were converted to "J" qualifiers to indicate potential presence of these compounds.
- Some PAH laboratory control sample results were outside accuracy performance criteria; results were qualified "J" or "UJ" to indicate values are estimated.
- Three dioxin/furan duplicate results in one sample were outside of precision performance criteria; results were qualified "J" to indicate values are estimated.
- The continuing calibration verification was outside laboratory accuracy performance criteria for one dioxin/furan compound; six dioxin sample results were qualified "J" to indicate values are estimated.
- One dioxin/furan result was qualified "J" due to potential matrix interference.

3.3 Sediment Reference Material

Sediment reference materials were analyzed by ARI to evaluate measurement accuracy and laboratory performance for dioxin/furan, PAH, and cadmium analyses. The Puget Sound Sediment Reference Material was analyzed in association with the dioxin/furan analysis. The Sigma-Aldrich, Inc., certified reference material (CRM) 142-50G was analyzed in association with the PAH analysis and ERA CRM D095-540 was analyzed in association with the cadmium analysis. Laboratory results for all reference materials were within required acceptance criteria with the following exceptions:

- Five PAH results recovered below the CRM acceptance limits, and sample results were qualified "J" to indicate that values are estimated.
- For the dioxin/furan analysis, one result recovered below the PS SRM acceptance limit and two dioxin/furan results recovered above the PS SRM acceptance limits. Sample results were qualified "UJ" or "J" to indicate that values are estimated.

3.4 Sample Completeness

Data completeness includes collection of required samples in the field, and laboratory analysis for target chemicals, as outlined in the QAPP. All target samples were collected and submitted for the full suite of chemical testing.

Laboratory data completeness was measured by percentage of results reported by the analytical laboratory. Data completeness levels were set at 95% for all parameters, according to data quality objectives specified in the QAPP (Anchor QEA 2018; Appendix F).

4 Physical Integrity Performance Monitoring Data

Based on initial evaluations of the isopach comparison between the as-built survey and the combined Year-1 upland topographic and bathymetric surveys performed on May 16, 2018 (Figure 5), relatively minor changes in engineered cap surface elevations were identified in several upper intertidal areas of SMA-1 and SMA-2. Cap conditions in these areas were further characterized during a low-tide visual inspection performed on June 13, 2018. Following these evaluations, Anchor QEA prepared an *Intertidal Cap Maintenance Recommendations Memorandum* (Anchor QEA 2018b), describing the causes for the changes in surface elevation of the caps and providing recommendations for proactive maintenance and repairs. Sections 4.1 and 4.2 summarize the physical integrity evaluation of the cap and recommendations from the memorandum.

4.1 Physical Integrity Evaluation of SMA-1 and SMA-2 Caps

The June 13, 2018 low-tide visual inspection revealed that all but one of the areas identified by the isopach survey comparison (Figure 5) were a result of either anticipated deformation of the slope profile consistent with the Ecology-approved remedial design, or anticipated movement of habitat substrate from the upper intertidal area to the lower intertidal area along the profile.

The one area that was not a result of anticipated slope deformation or down-slope migration of habitat substrate was within the upper intertidal cap area of SMA-2 and the adjacent upper intertidal shoreline area near the former Pier 4. Within this area, there were two sub-areas where proactive cap repairs were recommended based on observed movement of cap armor rock. These two areas are outlined in yellow and red on Figure 10. A photograph taken of the armor rock movement in the yellow area (foreground) and red area (background) during the low tide visual inspection on June 13 is also provided on Figure 10.

Figure 10
Top: Eastern Edge of Armor Movement, Yellow Outlined Area (foreground) and Red Area (background)
Bottom: Aerial View of Observed Armor Rock Movement in SMA-2

Within the yellow outlined area, armor rock was displaced from the upper intertidal slopes over an approximately 25- to 30-foot length; underlying filter material is visible in this area. Adjacent areas of about 20 to 40 feet on either side showed some armor rock removal but no exposure of underlying filter material. This area was repaired, as described in Section 7.

Within the red outlined area on Figure 10, cap performance was determined to be as designed and expected. Movement of armor rock as the slope deformed due to storm waves was observed but was generally within acceptable limits. Although this area did not exhibit movement of the armor rock beyond the acceptable limits, additional rock was also placed here, to provide additional protection for the upslope cap during future large storm events, as described in Section 7.

4.2 Cause of Intertidal Cap Armor Movement Near Former Pier 4

As shown on Figure 5, the shoreline orientation in the former Pier 4 area was changed during construction to facilitate excavation of unanticipated nearshore upland wood debris from that area. The original shoreline design was straight, through the pier 4 area; the final constructed shoreline resulted in a configuration similar to a "pocket beach" area with two headlands (i.e., corners) on either side of the Pier 4 area.

Armor layers constructed at shoreline bends and corners are generally more exposed than straight shoreline sections. This is due to refraction, which can focus wave energy on the corners. Also, armor rocks placed in corner sections can have less lateral support from adjacent armor rocks in the bend (USACE 2001). Due to these reasons, headland areas along an armored shoreline are generally more susceptible to wave forces and thus are armored with larger rock than straight sections.

Based on available guidance documents (USACE 2001; CIRIA 2007), the rock in these headland areas should be 1.3 to 1.5 times the size determined for a straight section of armored shoreline. The armor rock size for the original design in this area had a median diameter of 9 inches; therefore, armor rock recommended to repair this section of the intertidal cap was a median diameter of at least 12 to 14 inches. The repairs were completed in accordance with recommendations described in Section 7.

5 Sentinel Cap Confirmation Monitoring Data

Sentinel cap confirmation monitoring sampling was conducted from September 17 to 19, 2018, following the methods described in Section 2.2. Surface sediment/cap samples were submitted to EcoAnalysts for biological testing (larval bioassay) and ARI for analyses of Site COCs. The bioassay and chemical monitoring results are summarized in Sections 5.1 and 5.2, respectively.

5.1 Larval Bioassay Data

Biological testing data for surface sediment/cap samples collected from the six sentinel intertidal and subtidal stations in SMA-1 and SMA-2 (in addition to the subtidal sample collected from SMA-3) were evaluated using SMS criteria. The SMS bioassay evaluation uses statistical and numerical comparisons between each sediment sample and a matched reference sample. While two comparisons are identified in the SMS regulation (i.e., SCO and cleanup screening level [CSL]), the SCO biological criterion is the site-specific cleanup standard for the Site. The full EcoAnalysts bioassay testing report is included as Appendix C. Table 2 summarizes larval bioassay results.

All bioassay results met both the SCO cleanup standard. Thus, the larval bioassay analyses confirmed that cleanup standards are being maintained on the SMA-1 and SMA-2 caps.

Table 2
Summary of Larval Bioassay Results

Composite Sample ID	Sediment Cleanup Objective	Cleanup Screening Level
SMA1-ST-0-10-COMP-180917	Pass	Pass
SMA1A-IT-0-10-COMP-180917	Pass	Pass
SMA2A-IT-0-10-COMP-180919	Pass	Pass
SMA2A-ST-0-10-COMP-180918	Pass	Pass
SMA2B-IT-0-10-COMP-180918	Pass	Pass
SMA2B-ST-0-10-COMP-180918	Pass	Pass
BW-15-0-10-180917	Pass	Pass

5.2 Chemical Analysis Results

Composite samples from each of the six sentinel locations were analyzed for COCs, including cPAHs, dioxins/furans, and cadmium). Chemical analysis results from sentinel sediment sample locations are summarized in Appendix B; the complete analytical report is included in Appendix C.

Sediment chemical concentration compliance at the Site (e.g., to achieve natural background-based cleanup standards for bioaccumulative COCs by Year 10) is based on the surface-weighted average

concentration (SWAC). The SWAC will be updated and evaluated in 2020, following Year-3 post-construction monitoring when all sentinel monitoring stations at the Site are sampled (Anchor QEA 2018a).

6 Nearshore Wood Debris Cap Confirmation Monitoring Data

Sediment quality confirmation sampling of nearshore capped wood debris areas was conducted from September 6 to 7, 2018, following the methods described in Section 2.3. Samples were submitted to the Anchor QEA geochemical laboratory for analysis of the DGT gels, and to EcoAnalysts for biological testing (larval, polychaete, and amphipod bioassay analysis). In situ DGT sampling results and subsequent bioassay analysis results are summarized in Sections 6.1 and 6.2, respectively.

6.1 In Situ DGT Data

The results of the DGT analyses, including porewater temperature, pH, and salinity measurements, are summarized in Table 3. Porewater H_2S and bioassay data are summarized below.

Six DGTs were deployed in SMA-1, at three locations along a single transect at the 0.5-foot surface depth and 2-foot subsurface depth, as shown on Figure 3. The subsurface sample at location SMA1B-IT1 could not be collected because the DGT probe was damaged during installation and the damaged probe was not identified until retrieval.

Two samples exceeded the 0.07 mg/L porewater H_2S criterion:

- Surface interval at SMA1B-IT2 (0.090 mg/L)
- Subsurface interval at SMA1B-IT3 (0.122 mg/L)

Sediment from both locations were submitted for bioassay analyses, as described in Section 6.2.

Eighteen DGTs were deployed in SMA-2, at three locations along three transects at the 0.5-foot surface depth and 2-foot subsurface depth, as shown on Figure 4.

Samples exceeding the 0.07 mg/L porewater H_2S criterion included the following:

- Surface and subsurface sample at location SMA2C-IT3 (0.090 and 0.584 mg/L, respectively)
- Surface sample at SMA2C-IT9 (0.162 mg/L)

Sediment from both locations were submitted for bioassay analyses, as described in Section 6.2.

No surface or subsurface samples from SMA-2 transect 2 were greater than the 0.07 mg/L porewater H_2S criterion. The subsurface sample for SMA2C-IT6 had the highest porewater H_2S concentration (0.067 mg/L) detected in this transect and was submitted for bioassay analyses.

Table 3
Porewater Sulfide DGT Data

Sample ID	Transect	pH (SU)	Temperature (°F)	Salinity (ppt)	Hydrogen Sulfide Concentration (mg/L as H_2S)	Bioassay Analysis
SMA1B-IT1-0-6-180907	SMA-1 Transect 1	7.07	57.2	0.4	ND	No
SMA1B-IT1-24-180907					Not Collected	
SMA1B-IT2-0-6-180907		7.24	58.6	3.8	**0.090**	Yes
SMA1B-IT2-24-180907					0.028	
SMA1B-IT102-24-180907					0.061	
SMA1B-IT3-0-6-180907		NM	NM	NM	ND	Yes
SMA1B-IT3-24-180907					**0.122**	
SMA2C-IT1-0-6-180907	SMA-2 Transect 1	7.83	57.7	0.3	ND	No
SMA2C-IT1-24-180907					ND	
SMA2C-IT2-0-6-180907		8.28	58.1	0.9	0.024	No
SMA2C-IT2-24-180907					0.009	
SMA2C-IT3-0-6-180907		8.15	58.6	2.2	**0.090**	Yes
SMA2C-IT3-24-180907					**0.584**	
SMA2C-IT4-0-6-180907	SMA-2 Transect 2	8.05	57.8	1.8	ND	No
SMA2C-IT4-24-180907					ND	
SMA2C-IT5-0-6-180907		8.25	57.9	0.3	ND	No
SMA2C-IT5-24-180907					0.006	
SMA2C-IT6-0-6-180907		8.21	58.2	1.2	ND	Yes
SMA2C-IT6-24-180907					**0.067**	
SMA2C-IT7-0-6-180907	SMA-2 Transect 3	8.17	58.2	0.2	ND	No
SMA2C-IT107-0-6-180907					ND	
SMA2C-IT7-24-180907					ND	
SMA2C-IT8-0-6-180907		8.19	58.3	0.2	ND	No
SMA2C-IT8-24-180907					ND	
SMA2C-IT9-0-6-180907		8.32	57.9	0.5	**0.162**	Yes
SMA2C-IT9-24-180907					ND	

Notes:

Bold indicates triggered bioassay sample based on value >0.07 mg/L risk-based criteria or highest sulfide concentration from the transect.

SU: standard units

NM: No field data measured because the sampling station was submerged; water quality measurements (i.e., temperature, pH, and salinity) at the nearest sampling station were used for H_2S calculations

ND: Not detected at a detection limit of 0.004 mg/L

6.2 Larval, Polychaete, and Amphipod Bioassay Data

Sediment bioassay data were reviewed using SMS evaluation criteria, as described in Section 5.1. The complete bioassay testing report is included as Appendix C. Table 4 summarizes the bioassay results for the nearshore wood debris cap confirmation monitoring. All bioassay results met SCO biological standards. The bioassay analyses confirmed that cleanup standards are being maintained in the nearshore areas of capped wood debris.

Table 4
Nearshore Wood Debris Cap Confirmation Monitoring – Bioassay Summary

	Sediment Cleanup Objective			Cleanup Screening Level		
Sample ID	**Amphipod**	**Polychaete**	**Larval**	**Amphipod**	**Polychaete**	**Larval**
SMA1B-IT2-0-10-180907	Pass	Pass	Pass	Pass	Pass	Pass
SMA1B-IT3-0-10-180919	Pass	Pass	Pass	Pass	Pass	Pass
SMA2C-IT3-0-10-180907	Pass	Pass	Pass	Pass	Pass	Pass
SMA2C-IT6-0-10-180907	Pass	Pass	Pass	Pass	Pass	Pass
SMA2C-IT9-0-10-180906	Pass	Pass	Pass	Pass	Pass	Pass

7 Corrective Actions

One corrective action was identified in 2018, during physical integrity monitoring activities described in Sections 2.1 and 4. Minor repairs to the upper intertidal SMA-2 cap and the adjacent upper intertidal shoreline area to the east (Figure 5) were performed on September 4 and 5, 2018, by PR/OPG's subcontractor Seton. Anchor QEA was on site during the repairs, and the work was performed in accordance with the recommendations in the July 11, 2018 memorandum (Anchor QEA 2018b). Representatives from PR/OPG and Ecology were on site to observe the corrective actions on September 4, 2018.

Figure 5 depicts the as-built area of the repairs. A total of 360 tons of one-man armor rock (Washington State Department of Transportation [WSDOT] Specification 9-13.7(1)) ranging from 12 to 18 inches, was placed within the repaired area; 61 tons of 3-inch minus quarry spalls (WSDOT Specification 9-13.1(5)) was placed in areas where filter material was exposed.

The 3-inch minus quarry spalls were placed in a 0.5- to 1-foot-thick layer prior to placement of the larger one-man armor rock material. The quarry spalls were placed to retain the smaller underlying material within the slope. Other areas where armor rock was lost or moved but filter material was not exposed were re-armored with two layers of one-man rock.

The one-man armor rock was tapered down to a single layer at the edges of the repair area to avoid constructing an abrupt edge between the repair section and existing armored cap. The slope of the repair was re-graded as closely as possible to a 3:1 (horizontal to vertical) slope. A photograph of the repaired area in SMA-2 is shown on Figure 11.

Figure 11
Photograph of Repaired SMA-2 Intertidal Cap Area

8 Summary and Conclusions

The Year-1 post-construction monitoring and adaptive management of engineered caps in Port Gamble Bay has been performed in accordance with the OMMP. The monitoring results indicate the following:

- One area of armor rock movement, where proactive repairs were warranted, was identified within a relatively small intertidal cap area of SMA-2. Movement of the armor rock in this area was a result of changes to the shoreline geometry during construction. This area was repaired following recommendations to increase armor rock size for headland and pocket beach areas.
- Larval bioassay analyses of sentinel cap monitoring stations confirmed that cleanup standards are being maintained throughout the subtidal intertidal engineered cap areas of SMA-1 and SMA-2.
- Amphipod, polychaete, and larval bioassay analyses (informed by in situ DGT porewater H_2S monitoring) confirmed that cleanup standards have been maintained in nearshore capped wood debris areas of SMA-1 and SMA-2.

The next post-construction monitoring event will be conducted in 2020. Year-3 monitoring will include the following:

- Physical integrity performance monitoring in SMA-1 and SMA-2.
- Sediment quality confirmation monitoring of sentinel cap stations SMA-1 and SMA-2.
- Sediment quality confirmation monitoring in nearshore capped wood debris areas in SMA-1 and SMA-2.
- Natural recovery sediment quality monitoring throughout the Site.

Based on the Year-3 monitoring data, corrective actions and adaptive management would be implemented as warranted.

9 References

Anchor QEA (Anchor QEA, LLC), 2015. *Engineering Design Report – Port Gamble Bay Cleanup Project*. Prepared for Pope Resources, LP/OPG Properties, LLC. May 2015.

Anchor QEA, 2018a. *Operations, Maintenance, and Monitoring Plan – Port Gamble Bay Cleanup Project*. Prepared for Pope Resources, LP/OPG Properties, LLC. January 2018.

Anchor QEA, 2018b. *Intertidal Cap Maintenance Recommendations Memorandum – Port Gamble Bay Cleanup Project*. Prepared for Pope Resources, LP/OPG Properties, LLC. July 2018.

CIRIA (Construction Industry Research and Information Association), 2007. The Rock Manual, CIRIA Report C683, 2007.

Ecology (Washington State Department of Ecology), 2013. *Final Cleanup Action Plan*. Exhibit A to the Port Gamble Bay Consent Decree No. 13-2-02720-0.

PSEP, 1997. *Recommended Guidelines for Sampling Marine Sediment, Water Column, and Tissue in Puget Sound*. Prepared for the U.S. Environmental Protection Agency, Region 10, Office of Puget Sound, Seattle, Washington. July 1995.

USACE (U.S. Army Corps of Engineers), 2001. Coastal Engineering Manual, Part VI, September 2001.

USACE, 2004. *Engineering and Design -Hydrographic Surveying*. Publication number: EM 1110-2-1003. CECW-EE and CECW-OD. April 2004 Revision.

USACE, 2007. *Engineering and Design – Control and Topographic Surveying*. Publication number: EM 1110-1-1005. CECW-CE. January 2007.

Appendix A
Field Data

Chain of Custody Record and Laboratory Analysis Request

COC#

Date: 9/19/18
Laboratory: ARI
Project Name: Port Gamble - OMMP LTM
Project Number: 180388-01.01
Project Contact: Jason Cornetta
Phone Number: 206.971.2680
Shipment Method: Delivery

ANCHOR QEA

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	Sediment and Field QC: Cadmium	PAHs	Dioxin/Furan	Archive	Comments
1	SMA1A-IT-0-10-Comp-1809 17	9/17/18 1510	SE	2	x	x	x		
2	SMA1-ST-0-10-Comp-1809 17	9/17/18 1205	SE	2	x	x	x		
3	SMA2A-IT-0-10-Comp-1809 19	9/19/18 1025	SE	2	x	x	x		
4	SMA2A-ST-0-10-Comp-1809 18	9/18/18 1100	SE	2	x	x	x		
5	SMA2B-IT-0-10-Comp-1809 18	9/18/18 1510	SE	2	x	x	x		
6	SMA2B-ST-0-10-Comp-1809 18	9/18/18 1635	SE	2	x	x	x		
7	SMA1A-IT1-1809 17	9/17/18 1303	SE	1				x	
8	SMA1A-IT2-1809 17	9/17/18 1325	SE	1				x	
9	SMA1A-IT3-1809 17	9/17/18 1256	SE	1				x	
10	SMA1A-IT4-1809 17	9/17/18 1423	SE	1				x	
11	SMA1A-IT5-1809 17	9/17/18 1456	SE	1				x	
12	SMA1-ST1-1809 17	9/17/18 0951	SE	1				x	
13	SMA1-ST2-1809 17	9/17/18 1017	SE	1				x	
14	SMA1-ST3-1809 17	9/17/18 1047	SE	1				x	

1 See project SAP/QAPP for analyte lists and test methods

2 Email sample confirmation report to labdata@anchorqea.com

Additional notes/comments:

Relinquished By:	Company:	Received By:	Company:
Alexandra Kapoff	Anchor QEA LLC.	Jasmine Bauman	Anchor QEA LLC
Signature/Printed Name	Date/Time: 9/17/18 17:00	Signature/Printed Name	Date/Time: 9/19/18 1700
			ARI
Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

Chain of Custody Record and Laboratory Analysis Request

COC#

Date: 9/19/18
Laboratory: ARI
Project Name: Port Gamble - OMMP LTM
Project Number: 180388-01.01
Project Contact: Jason Cornetta
Phone Number: 206.971.2680
Shipment Method: Delivery

ANCHOR QEA

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	Sediment and Field QC: Cadmium	PAHs	Dioxin/Furan	Archive	Comments
1	SMA1-ST4-1809 17	9/17/18 1114	SE	1				x	
2	SMA1-ST5-1809 17	9/17/18 1148	SE	1				x	
3	SMA2A-IT1-1809 19	9/19/18 0834	SE	1				x	
4	SMA2A-IT2-1809 19	9/19/18 0903	SE	1				x	
5	SMA2A-IT3-1809 19	9/19/18 0929	SE	1				x	
6	SMA2A-IT4-1809 19	9/19/18 0956	SE	1				x	
7	SMA2A-IT5-1809 19	9/19/18 1010	SE	1				x	
8	SMA2A-ST1-1809 18	9/18/18 0911	SE	1				x	
9	SMA2A-ST2-1809 18	9/18/18 0939	SE	1				x	
10	SMA2A-ST3-1809 18	9/18/18 1005	SE	1				x	
11	SMA2A-ST4-1809 18	9/18/18 1029	SE	1				x	
12	SMA2A-ST5-1809 18	9/18/18 1045	SE	1				x	
13	SMA2B-IT1-1809 18	9/18/18 1145	SE	1				x	
14	SMA2B-IT2-1809 18	9/18/18 1219	SE	1				x	

1 See project SAP/QAPP for analyte lists and test methods

2 Email sample confirmation report to labdata@anchorqea.com

Additional notes/comments:

Relinquished By:	Company:	Received By:	Company:
Alexandra Kurpiff	Anchor QEA LLC.	Jasmine Bauman	ARI
Signature/Printed Name	Date/Time 9/19/18 1700	Signature/Printed Name	Date/Time 9/19/18 1700
Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

Chain of Custody Record and Laboratory Analysis Request COC#

Date: 9/19/18
Laboratory: ARI
Project Name: Port Gamble - OMMP LTM
Project Number: 180388-01.01
Project Contact: Jason Cornetta
Phone Number: 206.971.2680
Shipment Method: Delivery

ANCHOR QEA

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	Sediment and Field QC: Cadmium	PAHs	Dioxin/Furan	Archive															Comments
1	SMA2B-IT3-180918	9/18/18 1318	SE	1				x															
2	SMA2B-IT4-180918	9/18/18 1254	SE	1				x															
3	SMA2B-IT5-180918	9/18/18 1446	SE	1				x															
4	SMA2B-ST1-180918	9/18/18 1521	SE	1				x															
5	SMA2B-ST2-180918	9/18/18 1534	SE	1				x															
6	SMA2B-ST3-180918	9/18/18 1602	SE	1				x															
7	SMA2B-ST4-180918	9/18/18 1616	SE	1				x															
8	SMA2B-ST5-180918	9/18/18 1629	SE	1				x															
9	SMA2B-ST-0-10-Comp-180918	9/18/18 1640	SE	2	X	X	X	x	MS														
10	PGLTM-RB-180919	9/19/18 1120	W SE	5	X	X	X	x	AF														
11		9/ /18	SE					x															
12		9/ /18	SE					x															
13		9/ /18	SE					x															
14		9/ /18	SE					x															

1 See project SAP/QAPP for analyte lists and test methods

2 Email sample confirmation report to labdata@anchorqea.com

Additional notes/comments:

Relinquished By:	Company:	Received By:	Company:
Alexandra Fairpoff	Anchor QEA LLC.	Jasmine Bowman	Anchor QEA LLC
Signature/Printed Name	Date/Time 9/19/18 1700	Signature/Printed Name	Date/Time 9/19/18 1700
Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

Record and Laboratory Analysis Request

COC#

Date: 9/6/18

Laboratory: EcoAnalysts

Project Name: Port Gamble - OMMP LTM

Project Number: 180388-01.01

Project Contact: Cheronne Oreiro

Phone Number: 206.287.9130

Shipment Method: Delivery

ANCHOR QEA

COPY

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	Sediment and Field QC: Bioassay Archive	Comments
1	SMA2C-IT9-0-10-180906	9/6/18 0900	SE	1	X	
2	SMA2C-IT2-0-10-180906	0920	SE	1	X	
3	SMA2C-IT5-0-10-180906	0930	SE	1	X	
4	SMA2C-IT8-0-10-180906	0940	SE	1	X	
5	SMA2C-IT4-0-10-180906	0950	SE	1	X	
6	SMA2C-IT1-0-10-180906	1000	SE	1	X	
7	SMA2C-IT7-0-10-180906	1010	SE	1	X	
8			SE			
9			SE			
10			SE			
11			SE			
12			SE			
13			SE			
14			SE			

1 See project SAP/QAPP for analyte lists and test methods

2 Email sample confirmation report to labdata@anchorqea.com

Additional notes/comments:

Relinquished By	Company	Date/Time	Received By	Company	Date/Time
Evan Anulewicz	Anchor QEA LLC.	9/6/18 1047	Lauren Brandkamp	EcoAnalysts	9/6/18 1045
Signature/Printed Name			Signature/Printed Name		
Relinquished By:	Company:		Received By:	Company:	
Signature/Printed Name		Date/Time	Signature/Printed Name		Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

Chain of Custody Record and Laboratory Analysis Request

COC#

Date: 9/7/18
Laboratory: EcoAnalysts
Project Name: Port Gamble - OMMP LTM
Project Number: 180388-01.01
Project Contact: Cheronne Oreiro
Phone Number: 206.287.9130
Shipment Method: Delivery

ANCHOR QEA

COPY

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	Sediment and Field QC: Bioassay Archive	Comments
1	SMA1B-IT2-0-10-180907	9/7/18 0845	SE	1	X	
2	SMA1B-IT1-0-10-180907	9/7/18 0855	SE	1	X	
3	SMA2C-IT3-0-10-180907	9/7/18 0935	SE	1	X	
4	SMA2C-IT6-0-10-180907	9/7/18 0940	SE	1	X	
5			SE			
6			SE			
7			SE			
8			SE			
9			SE			
10			SE			
11			SE			
12			SE			
13			SE			
14			SE			

1 See project SAP/QAPP for analyte lists and test methods

2 Email sample confirmation report to labdata@anchorqea.com

Additional notes/comments:

Relinquished By: Evan Malczyk	Company: Anchor QEA LLC.	Received By: Lauren Brandkamp	Company: EcoAnalysts
Signature/Printed Name	Date/Time: 9/7/18 1015	Signature/Printed Name	Date/Time: 9/7/18 1015
Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

Chain of Custody Record and Laboratory Analysis Request COC#

Date:
Laboratory : Anchor QEA Geochemistry Laboratory
Project Name: Port Gamble - OMMP LTM
Project Number: 180388-01.01
Project Contact: Jason Cornetta
Phone Number: 206.971.2680
Shipment Method: Delivery

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	Sediment and Field QC: DGT - Porewater Sulfide	Comments
1	~~SMA1B-IT1-180907~~		~~DGT~~ SE			
2	SMA1B-IT1-0-6-180907	9/7/18 1014	~~SE~~	1	X	
3	SMA1B-IT2-0-6-180907	0941	~~SE~~	1	X	
4	SMA1B-IT2-24-180907	0950	~~SE~~	1	X	
5	SMA1B-IT102-24-180907	1000	~~SE~~	1	X	
6	SMA1B-IT3-0-6-180907	0853	~~SE~~	1	X	
7	SMA1B-IT3-24-180907	0911	~~SE~~	1	X	
8	SMA2C-IT1-0-6-180907	1030	~~SE~~	1	X	
9	SMA2C-IT1-24-180907	1025	~~SE~~	1	X	
10	SMA2C-IT2-24-180907	1056	~~SE~~	1	X	
11	SMA2C-IT2-0-6-180907	1117	~~SE~~	1	X	
12	SMA2C-IT3-0-6-180907	1047	~~SE~~	1	X	
13	SMA2C-IT3-24-180907	1052	~~SE~~	1	X	
14	SMA2C-IT4-0-6-180907	1036	~~SE~~	1	X	

1 See project SAP/QAPP for analyte lists and test methods

2 Email sample confirmation report to labdata@anchorqea.com

Additional notes/comments:

Relinquished By:	Company:	Received By:	Company:
Eli Patmont 09/10/2018 1500	Anchor QEA LLC.	Maia Kanematsu 9/11/2018 9:30	Anchor QEA LLC
Signature/Printed Name / Date/Time		Signature/Printed Name / Date/Time	
Signature/Printed Name / Date/Time		Signature/Printed Name / Date/Time	

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

Chain of Custody Record and Laboratory Analysis Request COC#

Date:
Laboratory : Anchor QEA Geochemistry Laboratory
Project Name: Port Gamble - OMMP LTM
Project Number: 180388-01.01
Project Contact: Jason Cornetta
Phone Number: 206.971.2680
Shipment Method: Delivery

ANCHOR QEA

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	Sediment and Field QC: DGT - Porewater Sulfide	Comments
1	SMA2C-IT4-24-180907	09/07/18 1023	SE	1	X	
2	SMA2C-IT5-0-6-180907	1135	SE	1	X	
3	SMA2C-IT5-24-180907	1116	SE	1	X	
4	SMA2C-IT6-0-6-180907	1044	SE	1	X	
5	SMA2C-IT6-24-180907	1106	SE	1	X	
6	SMA2C-IT7-0-6-180907	1125	SE	1	X	
7	SMA2C-IT107-0-6-180907	1130	SE	1	X	
8	~~SMA2C-IT8~~		SE			
9	SMA2C-IT7-24-180907	1137	SE	1	X	
10	SMA2C-IT8-0-6-180907	1100	SE	1	X	
11	SMA2C-IT8-24-180907	1108	SE	1	X	
12	SMA2C-IT9-0-6-180907	1124	SE	1	X	
13	SMA2C-IT9-24-180907	1037	SE	1	X	
14			SE			

1 See project SAP/QAPP for analyte lists and test methods

2 Email sample confirmation report to labdata@anchorqea.com

Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company: Anchor QEA LLC
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time
Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

ANCHOR QEA

DGT Sampling Form

SMA 1B
IT1

Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:**

Date:	9/6/18	Field Staff:	EM, EP
Sampling Method:	DGT Spear	Weather:	Sun
Sampling Vessel:	NA	Recorded By:	EM
Subcontractor(s):	AQ	Notes:	24" took 3 attempt, hit rock @ 7" 4th attempt successful
Station Coordinates:	N / Lat.		6" took 3 attempts, 3rd attempt successful
	E / Long.		
Datum:	NAD 83 / WGS 84	zone:	
Sample ID:			
Deployment Type:	(In-Situ) Ex-Situ	Deployment Depth:	6" 24"

(Circle Appropriate Analyses)

COC Time = 1014

DGT Deployment Date: 9/6/18

DGT Deployment Time: 6" 0727
24" 0719

DGT Retreival Date: ~~9/6/2018~~ 9/7/2018

DGT Retreival Time: 6" 0724
24" 0743

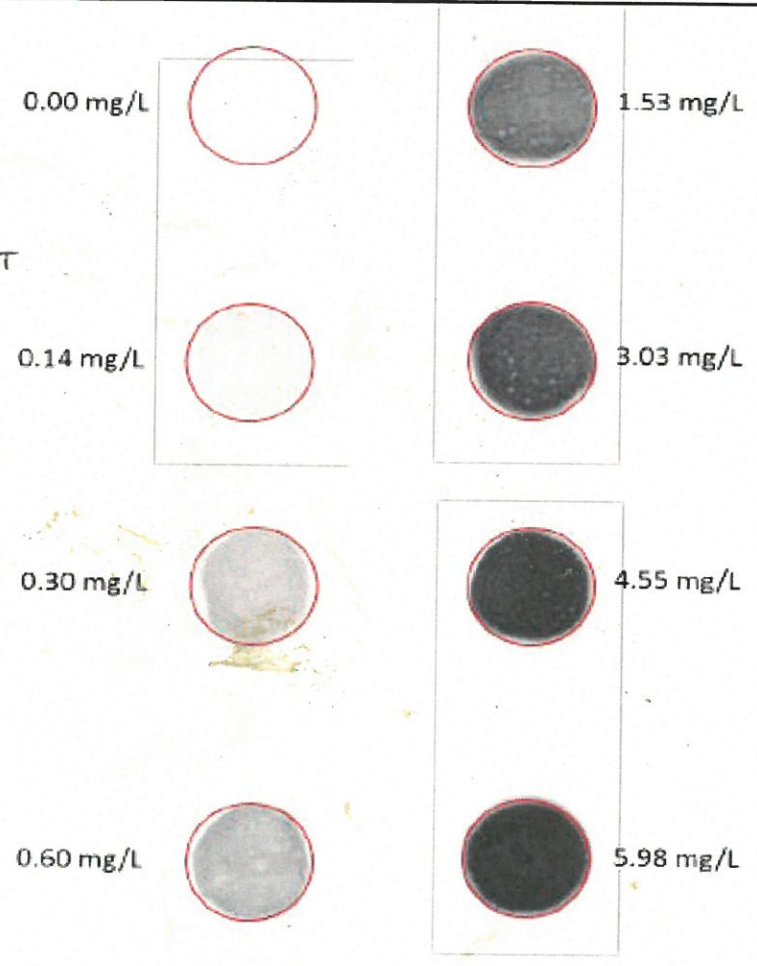
24" spear broke at base, excavated DGT manually
DGT was crushed
photo collected

Place DGT Below and Photograph:

Place DGT Here

6 inch

DGT Concentration Gray-Scale Reference



Field Parameters:

pH:	7.07	Temp: 57.2°F	Conductivity / Salinity: 1.43 mS/cm

2.44 @ 6" 0.4ppt

ANCHOR QEA

DGT Sampling Form

SMAIBIT 2

Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:**

Date:	9/6/18	Field Staff:	EM/EP
Sampling Method:	DGT Spear	Weather:	Sun
Sampling Vessel:	NA	Recorded By:	EM
Subcontractor(s):	AQ	Notes:	Duplicate in 24" fine material & trending into DGT casing @ 6 inches & 24 inch
Station Coordinates: N / Lat.			COC time: 6" = 0941 24" = 0950
E / Long.			
Datum: NAD 83 / WGS 84	zone:		
Sample ID:			
Deployment Type:	In-Situ Ex-Situ	Deployment Depth:	6" 24"

(Circle Appropriate Analyses)

24D = 0954 1002

DGT Deployment Date: 0637 9/6 0-24" 0-6"

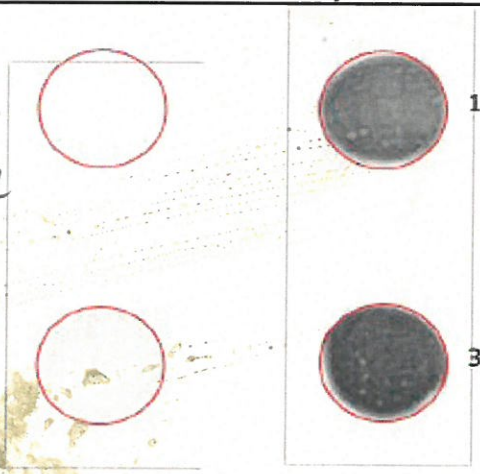
DGT Deployment Time: 6" : 0647 24" : 0637 dup - 0640

DGT Retreival Date: 9/7/18

DGT Retreival Time: 6" : 0749 24" : 0759 dup - 0802

ghost shrimp, clams, worms in sed retrieved upon retrieval,

DGT Concentration Gray-Scale Reference



6 inch

Place DGT Below and Photograph:

Place DGT Here

24 inch

24 inch dup

Field Parameters:

pH: 7.24	Temp: 14.8°C	Conductivity / Salinity: 3.8 ppt

ANCHOR QEA

DGT Sampling Form

SMA 1B
1T3

Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:**

Date:	9/6/18	Field Staff:	EM, EP
Sampling Method:	DGT Spear	Weather:	Sun
Sampling Vessel:	NA	Recorded By:	EM
Subcontractor(s):	AQ	Notes:	location moved ~5 ft shoreward
Station Coordinates: N / Lat.			~~24"~~ target too deep to deploy @ low tide
E / Long.			migration of fine material into DGT disk
Datum: NAD 83 / WGS 84	zone:		COC time: 6" = 0853 24" = 0911
Sample ID:			
Deployment Type:	(In-Situ) Ex-Situ	Deployment Depth:	6" 24"

(Circle Appropriate Analyses)

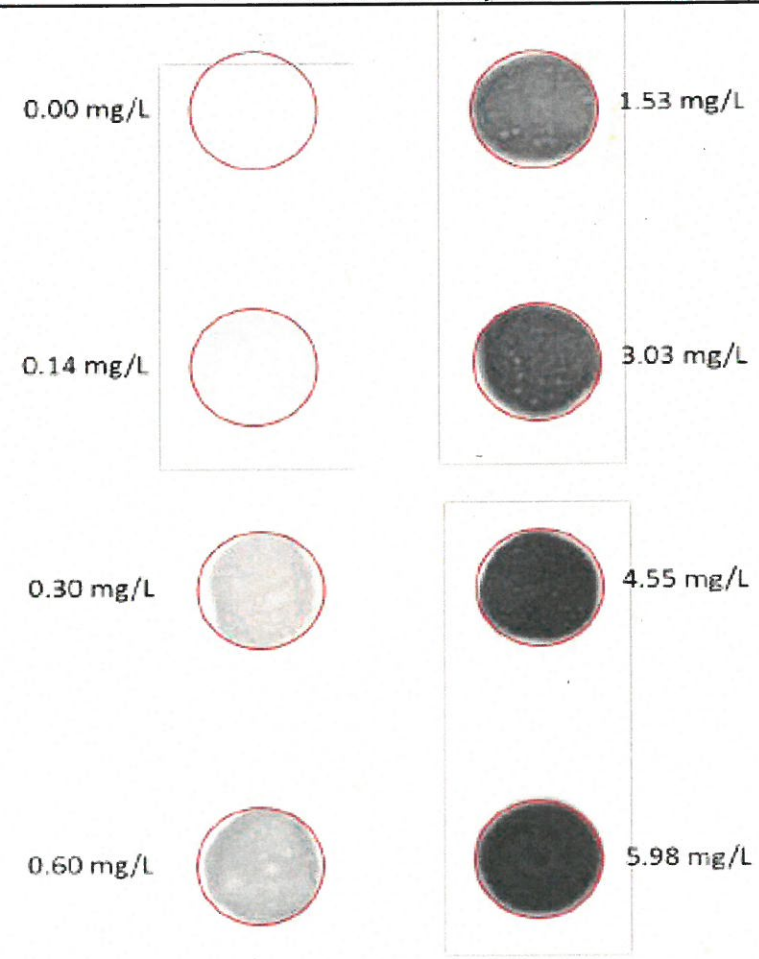
DGT Deployment Date: 9/6/18

DGT Deployment Time: 6" 0829
24" 0824

DGT Retreival Date: 9/7/18

DGT Retreival Time: 6" 0807
24" 0823

DGT Concentration Gray-Scale Reference



Place DGT Below and Photograph:

Place DGT Here

Field Parameters:

pH:	Temp:	Conductivity / Salinity:

ANCHOR QEA

DGT Sampling Form

Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:** SMA2CIT1 (S)

Date:	9/6/18	Field Staff:	CD, JC
Sampling Method:	Ride in beach	Weather:	Sunny
Sampling Vessel:	Land	Recorded By:	CD
Subcontractor(s):	—	Notes:	shallow on west COC 1030
Station Coordinates:	N / Lat.		
	E / Long.		
Datum:	NAD 83 / WGS 84	zone:	
Sample ID:			
Deployment Type:	In-Situ Ex-Situ	Deployment Depth:	6 ft

(Circle Appropriate Analyses)

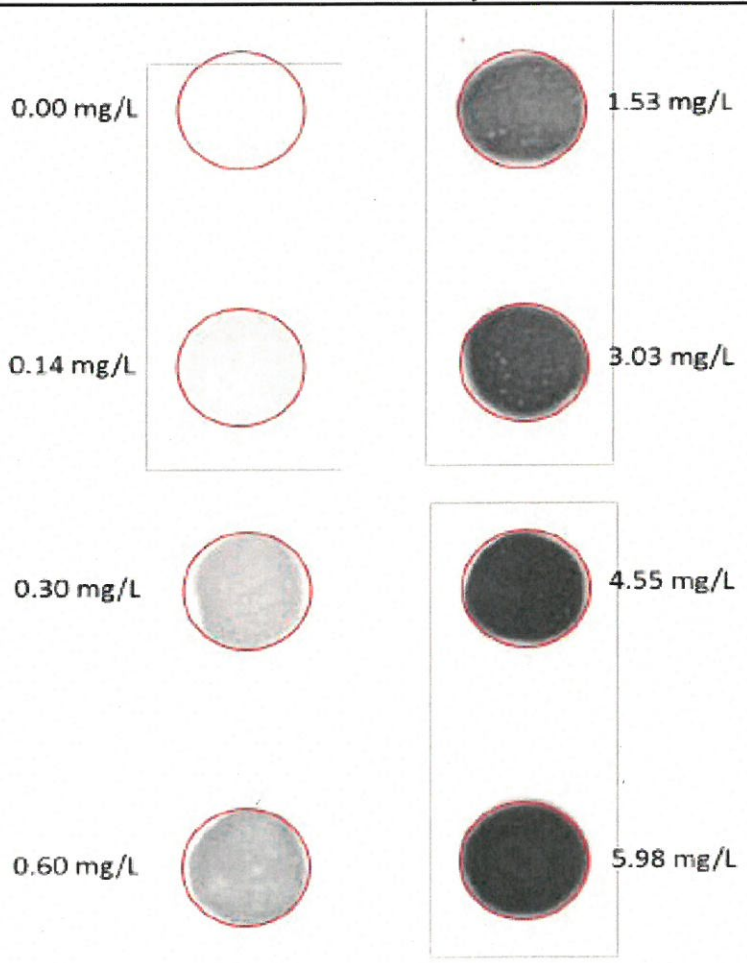
DGT Deployment Date: 9/6/18

DGT Deployment Time: 0901

DGT Retreival Date: 9/7/18

DGT Retreival Time: 0756

DGT Concentration Gray-Scale Reference



Place DGT Below and Photograph:

Place DGT Here

Field Parameters:

pH: 7.03	Temp: 57.7 F°	Conductivity / Salinity: 0.21 ms/cm

0.3 ppt

ANCHOR QEA

DGT Sampling Form

Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:** SMA2 CST1 (D)

Date:	9/6/18	Field Staff:	CD, JC
Sampling Method:	Probe on beach	Weather:	Sunny
Sampling Vessel:	Land	Recorded By:	CD
Subcontractor(s):	—	Notes:	Deep on East
Station Coordinates:	N / Lat.		
	E / Long.		
Datum:	NAD 83 / WGS 84	zone:	COC time: 1025
Sample ID:			
Deployment Type:	In-Situ Ex-Situ	Deployment Depth:	24"

(Circle Appropriate Analyses)

DGT Deployment Date: 9/6/18

DGT Deployment Time: 0911

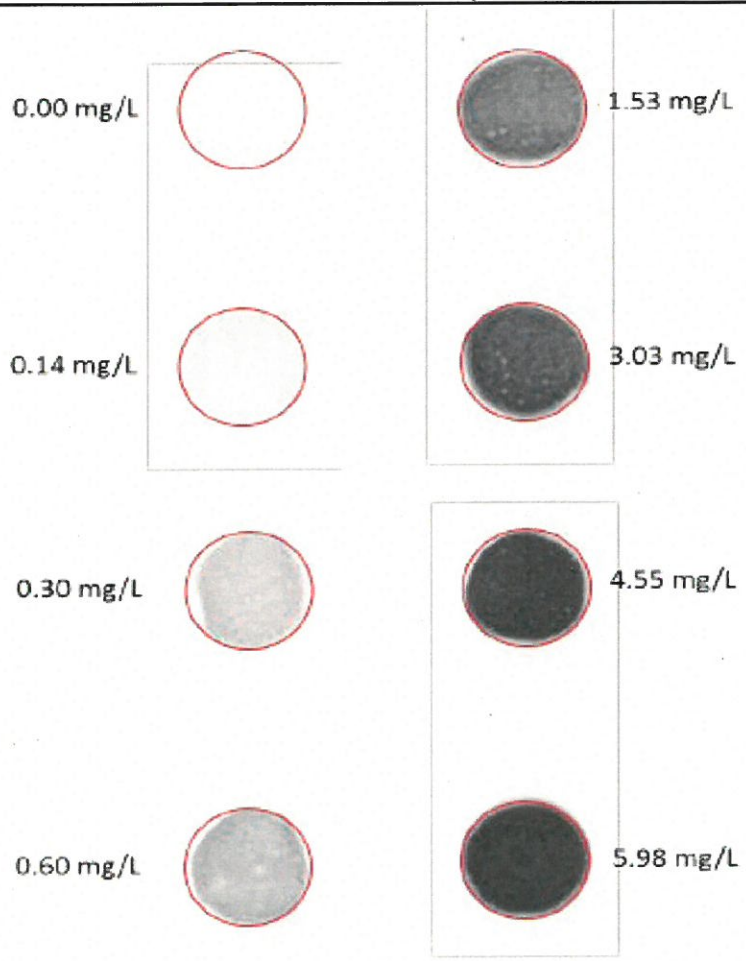
DGT Retreival Date: 9/7/18

DGT Retreival Time: ~~0756~~ 0803 CD

Place DGT Below and Photograph:

Place DGT Here

DGT Concentration Gray-Scale Reference



Field Parameters: SEE 1(5)

pH:	Temp:	Conductivity / Salinity:

ANCHOR QEA

DGT Sampling Form

Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:** SMA 2 CIT2 (CS)

Date:	9/6/19	Field Staff:	CD, JC
Sampling Method:	Probe in beach	Weather:	Sunny
Sampling Vessel:	Land	Recorded By:	CD
Subcontractor(s):	—	Notes:	Sand in sample COC 1117
Station Coordinates: N / Lat.			
E / Long.			
Datum: NAD 83 / WGS 84	zone:		
Sample ID:			
Deployment Type: In-Situ Ex-Situ		Deployment Depth:	6"

(Circle Appropriate Analyses)

DGT Deployment Date: 9/6/19

DGT Deployment Time: 0652

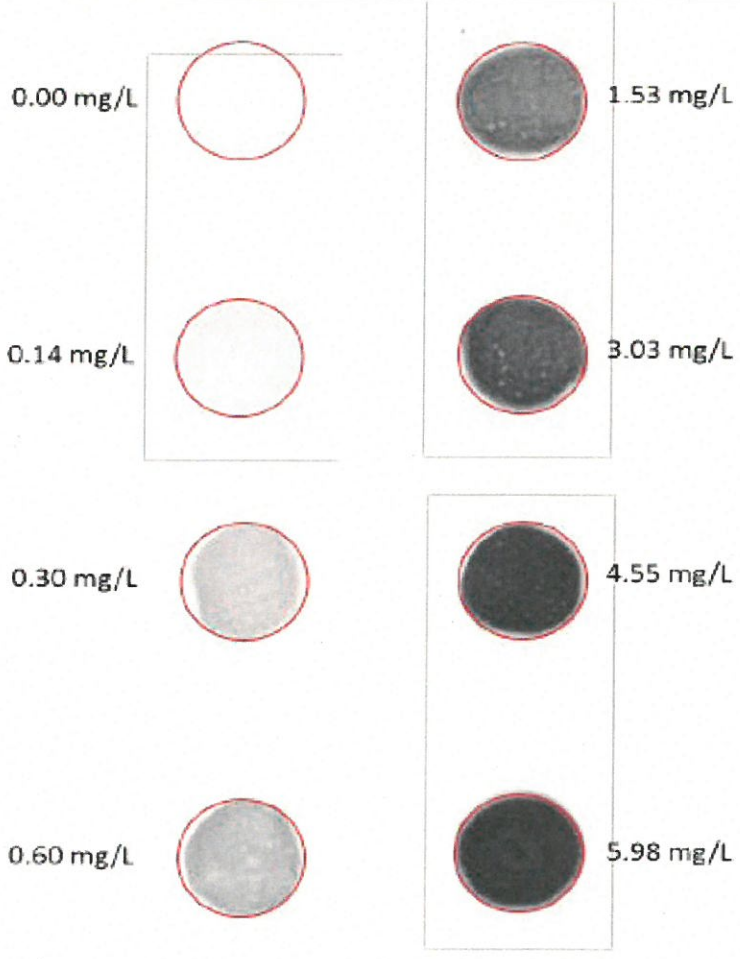
DGT Retreival Date: 9/7/19

DGT Retreival Time: 0935

Place DGT Below and Photograph:

Place DGT Here

DGT Concentration Gray-Scale Reference



Field Parameters:

pH:	Temp:	Conductivity / Salinity:
8.28	58.1 F°	0.48 ms/cm

0.90 ppt

ANCHOR QEA

DGT Sampling Form

Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:** SMA2 CIT2 (D)

Date:	9/6/18	Field Staff:	CD, SC
Sampling Method:	Probe in beach	Weather:	sunny
Sampling Vessel:	Land	Recorded By:	CD
Subcontractor(s):	—	Notes:	
Station Coordinates:	N / Lat.		
	E / Long.		
Datum:	NAD 83 / WGS 84	zone:	COC time: 1056
Sample ID:			
Deployment Type:	In-Situ Ex-Situ	Deployment Depth:	24"

(Circle Appropriate Analyses)

DGT Deployment Date: 9/6/18

DGT Deployment Time: 0655

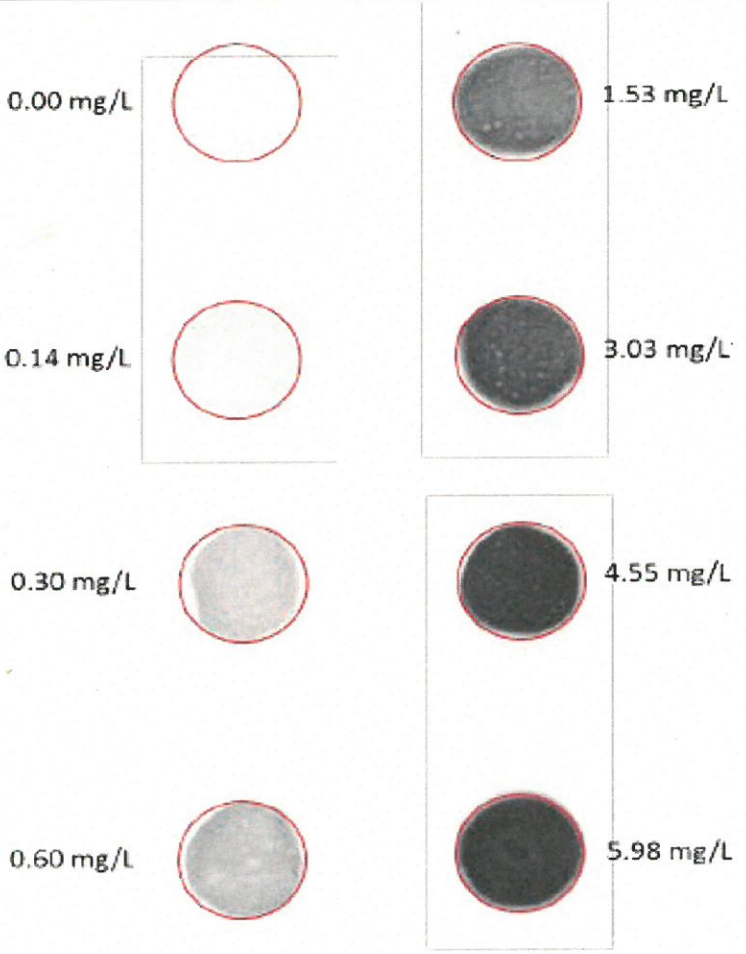
DGT Retreival Date: 9/7/18

DGT Retreival Time: 0837

Place DGT Below and Photograph:

Place DGT Here

DGT Concentration Gray-Scale Reference



Field Parameters: SEE 2(5)

pH:	Temp:	Conductivity / Salinity:

(C)

ANCHOR QEA

DGT Sampling Form

Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:** SMA2 CIT? (S)

Date:	9/6/18	Field Staff:	CD, JC
Sampling Method:	Pump in bench	Weather:	Sunny
Sampling Vessel:	Land	Recorded By:	CD
Subcontractor(s):	—	Notes:	Shallow on ~~East~~ West
Station Coordinates:	N / Lat.		
	E / Long.		
Datum:	NAD 83 / WGS 84	zone:	COC time: 1047
Sample ID:			
Deployment Type:	In-Situ Ex-Situ	Deployment Depth:	6"

(Circle Appropriate Analyses)

DGT Deployment Date: 9/6/18

DGT Deployment Time: 0817 0912

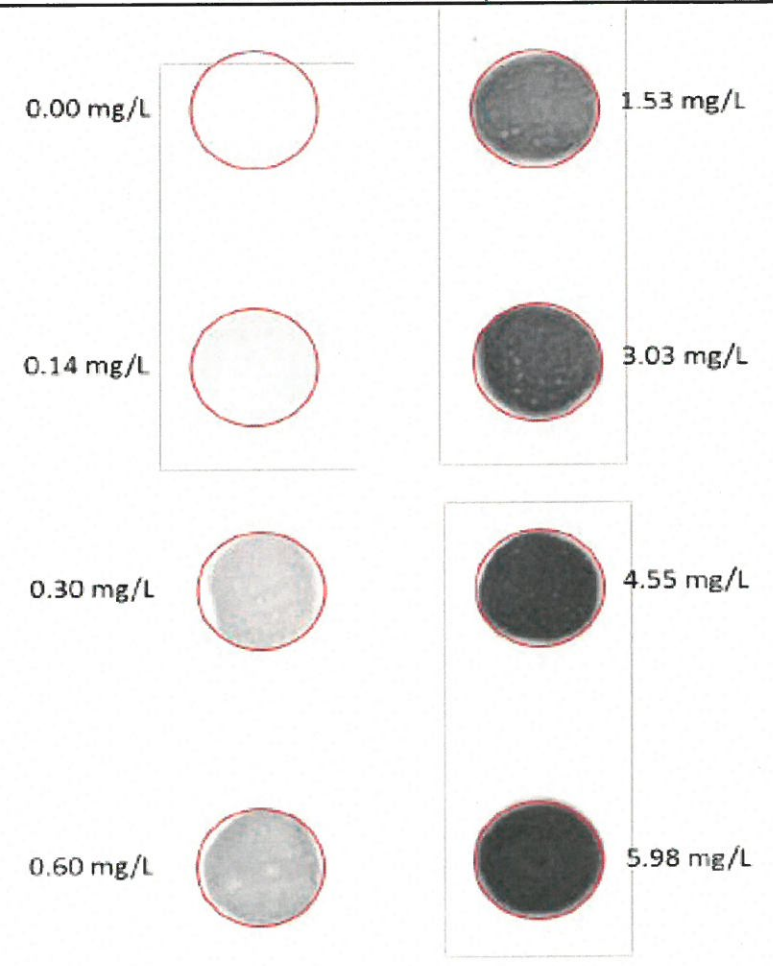
DGT Retreival Date: 9/7/18

DGT Retreival Time: 0850

Place DGT Below and Photograph:

Place DGT Here

DGT Concentration Gray-Scale Reference



Field Parameters:

pH: 8.15	Temp: 58.6 F°	Conductivity / Salinity: 4.00 max blinking ms/cm

2.2 ppt

ANCHOR QEA

DGT Sampling Form

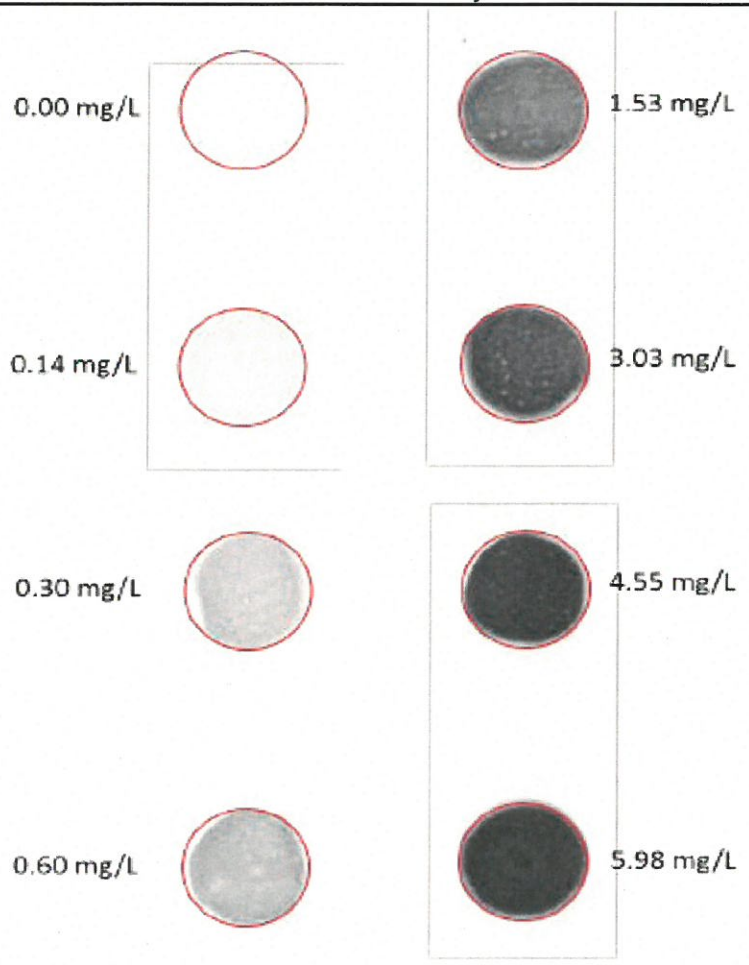
Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:** SMA2 CIT 3 (P)

Date:	9/6/18	Field Staff:	CD, JL
Sampling Method:	Probe on beach	Weather:	Sunny
Sampling Vessel:	Land	Recorded By:	CD
Subcontractor(s):	—	Notes:	Deep on Past Coc 1052
Station Coordinates:	N / Lat.		
	E / Long.		
Datum:	NAD 83 / WGS 84	zone:	
Sample ID:			
Deployment Type:	In-Situ Ex-Situ	Deployment Depth:	24"

(Circle Appropriate Analyses)

DGT Deployment Date:	9/6/18
DGT Deployment Time:	0917
DGT Retreival Date:	9/7/18
DGT Retreival Time:	0852

DGT Concentration Gray-Scale Reference



Place DGT Below and Photograph:

Place DGT Here

Field Parameters: SRK 3(5)

pH:	Temp:	Conductivity / Salinity:

ANCHOR QEA

DGT Sampling Form

Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:** SMA2CIT4(S)

Date: 9/6/18	Field Staff: CD, JC
Sampling Method: probe in beach	Weather: sunny, clear
Sampling Vessel: Land	Recorded By: CD
Subcontractor(s): —	Notes:
Station Coordinates: N / Lat.	
E / Long.	
Datum: NAD 83 / WGS 84 zone:	COC time = 1036
Sample ID: ~~SMA2CIT4~~ CD	
Deployment Type: In-Situ Ex-Situ	Deployment Depth: 6 ft

(Circle Appropriate Analyses)

DGT Deployment Date: 9/6/18

DGT Deployment Time: 0636

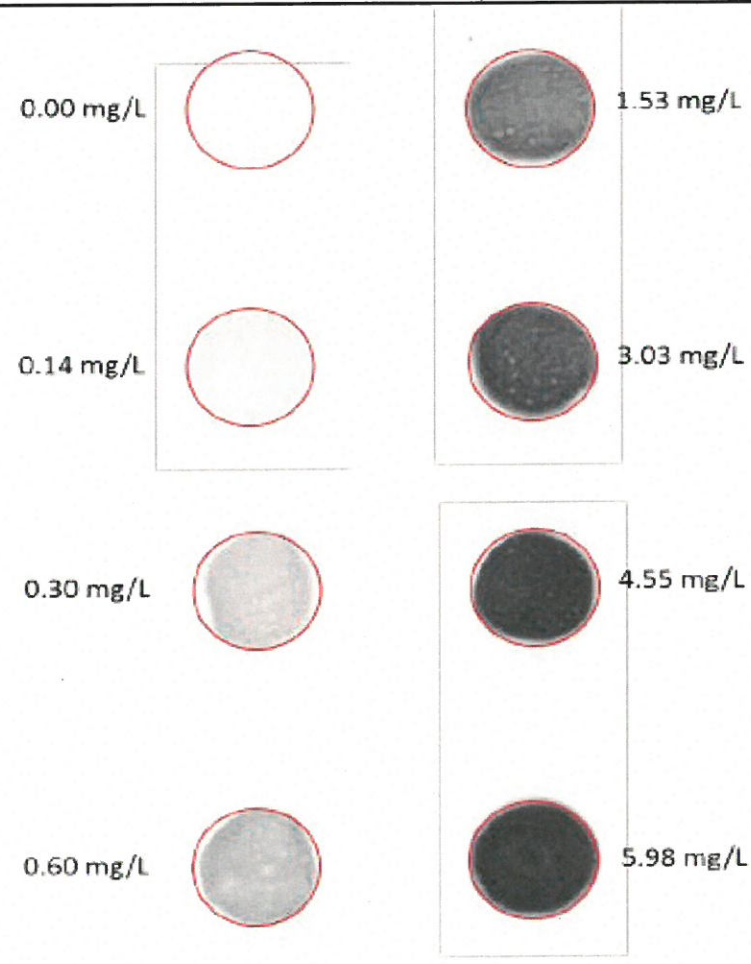
DGT Retreival Date: 9/7/18

DGT Retreival Time: 0746

Place DGT Below and Photograph:

Place DGT Here

DGT Concentration Gray-Scale Reference



Field Parameters: 57.8 F°

pH:	Temp:	Conductivity / Salinity:
~~7.93~~ CD	~~25.0 C°~~ CD	0.20 ms/cm

8.05

1.8 ppt

ANCHOR QEA

DGT Sampling Form

Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:** SMA2CIT4 (D)

Date:	9/6/18	Field Staff:	CD, JC
Sampling Method:	Probe in beach	Weather:	Sunny
Sampling Vessel:	Land	Recorded By:	CD
Subcontractor(s):	—	Notes:	COC @ 1023
Station Coordinates:	N / Lat.		
	E / Long.		
Datum:	NAD 83 / WGS 84	zone:	
Sample ID:			
Deployment Type:	In-Situ Ex-Situ	Deployment Depth:	24"

(Circle Appropriate Analyses)

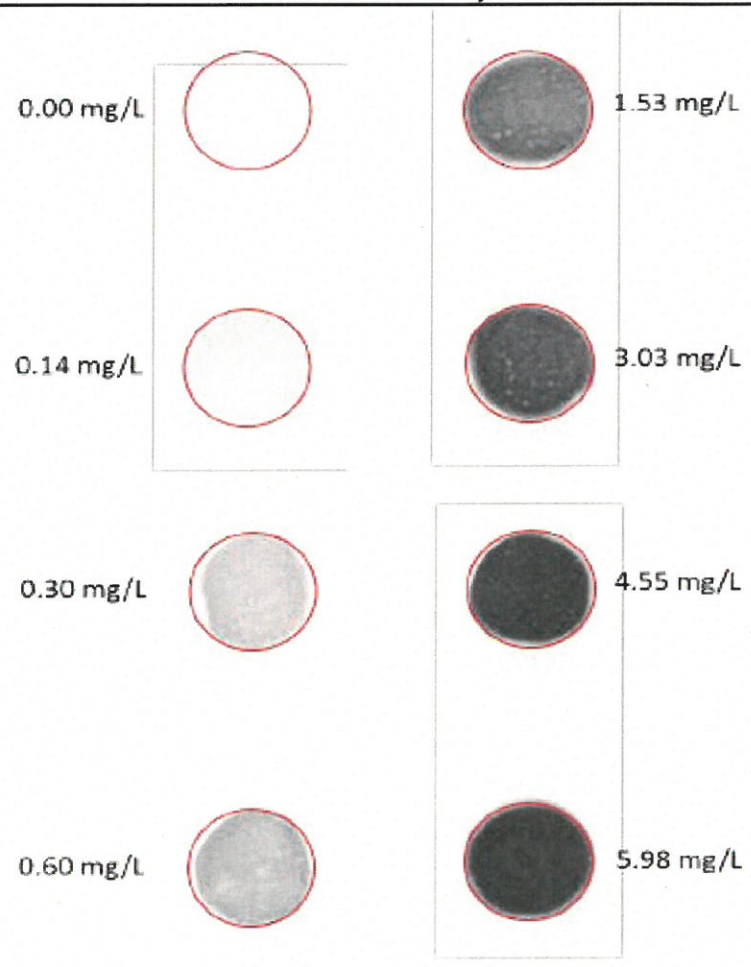
DGT Deployment Date: 9/6/18

DGT Deployment Time: 0642

DGT Retreival Date: 9/7/18

DGT Retreival Time: 0753

DGT Concentration Gray-Scale Reference



Place DGT Below and Photograph:

Place DGT Here

Field Parameters: SEE 4(S)

pH:	Temp:	Conductivity / Salinity:

ANCHOR QEA

DGT Sampling Form

Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:** SMA2 CITS (C5)

Date:	9/6/18	Field Staff:	CD, JC
Sampling Method:	Probe on beach	Weather:	Sunny
Sampling Vessel:	Land	Recorded By:	CD
Subcontractor(s):	—	Notes:	Shallow on West
Station Coordinates:	N / Lat.		
	E / Long.		
Datum:	NAD 83 / WGS 84	zone:	COC time: 1135
Sample ID:			
Deployment Type:	In-Situ Ex-Situ	Deployment Depth:	6"

(Circle Appropriate Analyses)

DGT Deployment Date: 9/6/18

DGT Deployment Time: 0736

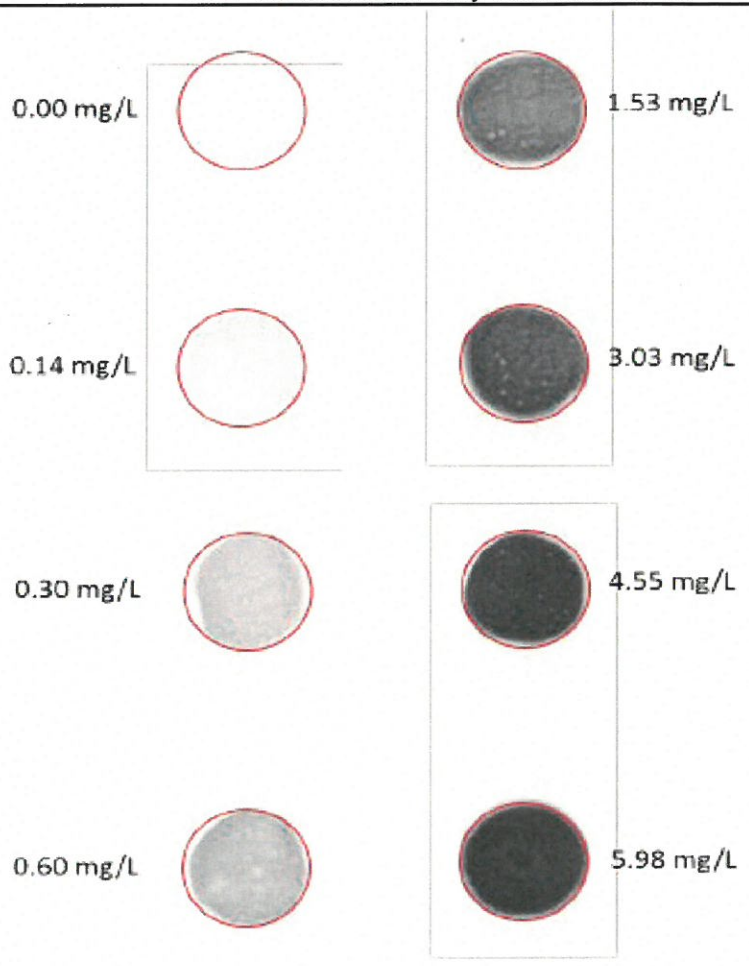
DGT Retreival Date: 9/7/18

DGT Retreival Time: 0828

Place DGT Below and Photograph:

Place DGT Here

DGT Concentration Gray-Scale Reference



Field Parameters:

pH:	Temp:	Conductivity / Salinity:
8.25	57.9 F°	0.20 ms/cm

8.25 0.3 ppt

ANCHOR QEA

DGT Sampling Form

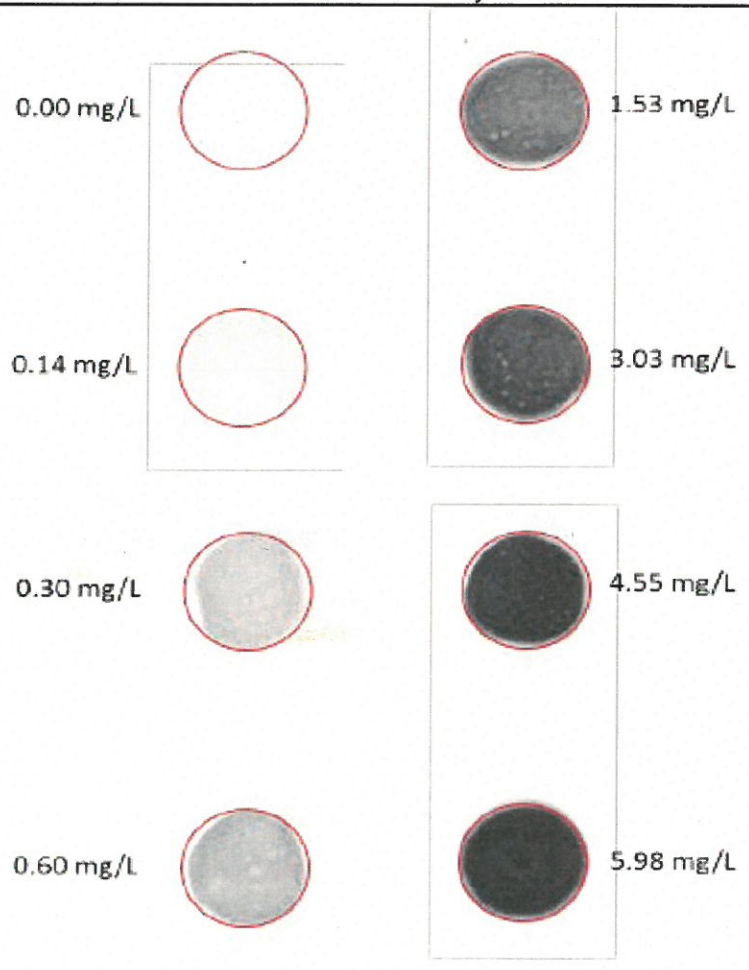
Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:** SMA2 CITS (D)

Date: 9/6/19	Field Staff: CD, SC
Sampling Method: Probe in beach Land	Weather: Sunny
Sampling Vessel:	Recorded By: CD
Subcontractor(s): —	Notes: Deep on EST
Station Coordinates: N / Lat.	
E / Long.	COC time: 1116
Datum: NAD 83 / WGS 84 zone:	
Sample ID:	
Deployment Type: In-Situ Ex-Situ	Deployment Depth: 24"

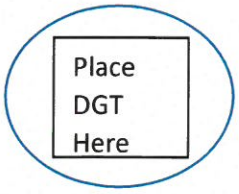
(Circle Appropriate Analyses)

DGT Deployment Date:	9/16/18
DGT Deployment Time:	0739
DGT Retreival Date:	9/7/18
DGT Retreival Time:	0831

DGT Concentration Gray-Scale Reference



Place DGT Below and Photograph:



Field Parameters: SEE S (S)

pH:	Temp:	Conductivity / Salinity:

ANCHOR QEA

DGT Sampling Form

Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:** SMA2 (IT6 CS)

Date:	9/6/18	Field Staff:	CD, SC
Sampling Method:	Probe in beach	Weather:	sunny
Sampling Vessel:	Land	Recorded By:	CD
Subcontractor(s):		Notes:	Shallow on WEST
Station Coordinates:	N / Lat.		COC 1044
	E / Long.		
Datum:	NAD 83 / WGS 84	zone:	
Sample ID:			
Deployment Type:	In-Situ Ex-Situ	Deployment Depth:	6"

(Circle Appropriate Analyses)

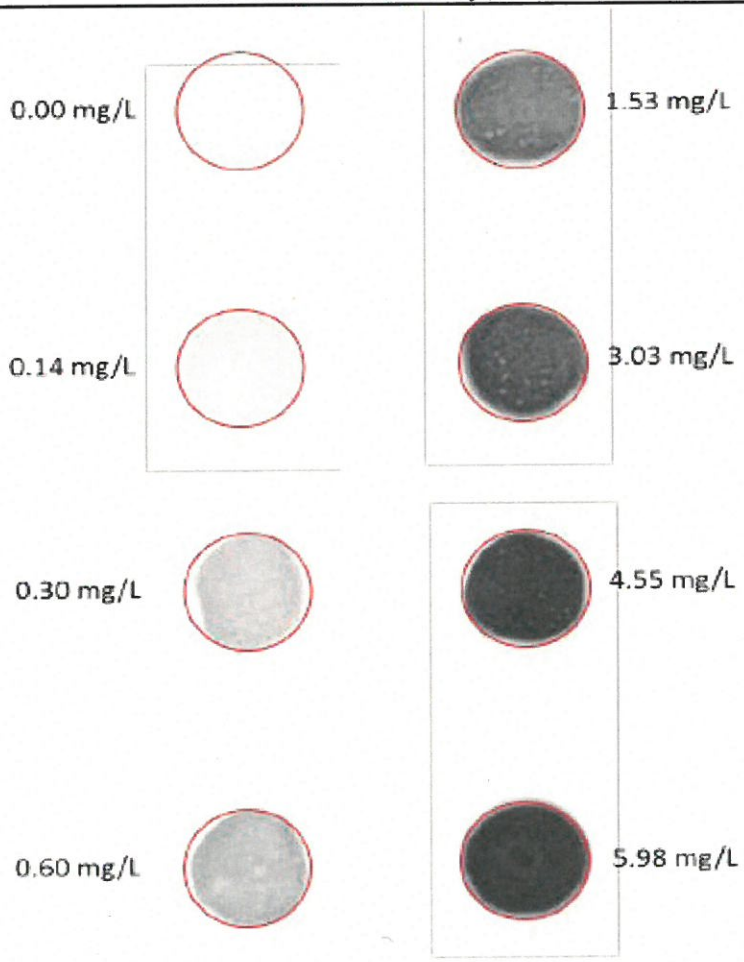
DGT Deployment Date: 9/6/18

DGT Deployment Time: 0750

DGT Retreival Date: 9/7/18

DGT Retreival Time: 0843

DGT Concentration Gray-Scale Reference



Place DGT Below and Photograph:

Place DGT Here

Field Parameters:

pH:	Temp:	Conductivity / Salinity:
8.21	58.2 F°	max out blinking 4.00 ms/cm

1.2 ppt

ANCHOR QEA

DGT Sampling Form

Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:** SMA2 CIT 2 (D)

Date:	9/6/18	Field Staff:	CD, SC
Sampling Method:	Probe on beach	Weather:	Sunny
Sampling Vessel:	Land	Recorded By:	CD
Subcontractor(s):	—	Notes:	Deep east
Station Coordinates:	N / Lat.		
	E / Long.		
Datum:	NAD 83 / WGS 84	zone:	COC time: 1106
Sample ID:			
Deployment Type:	In-Situ Ex-Situ	Deployment Depth:	24"

(Circle Appropriate Analyses)

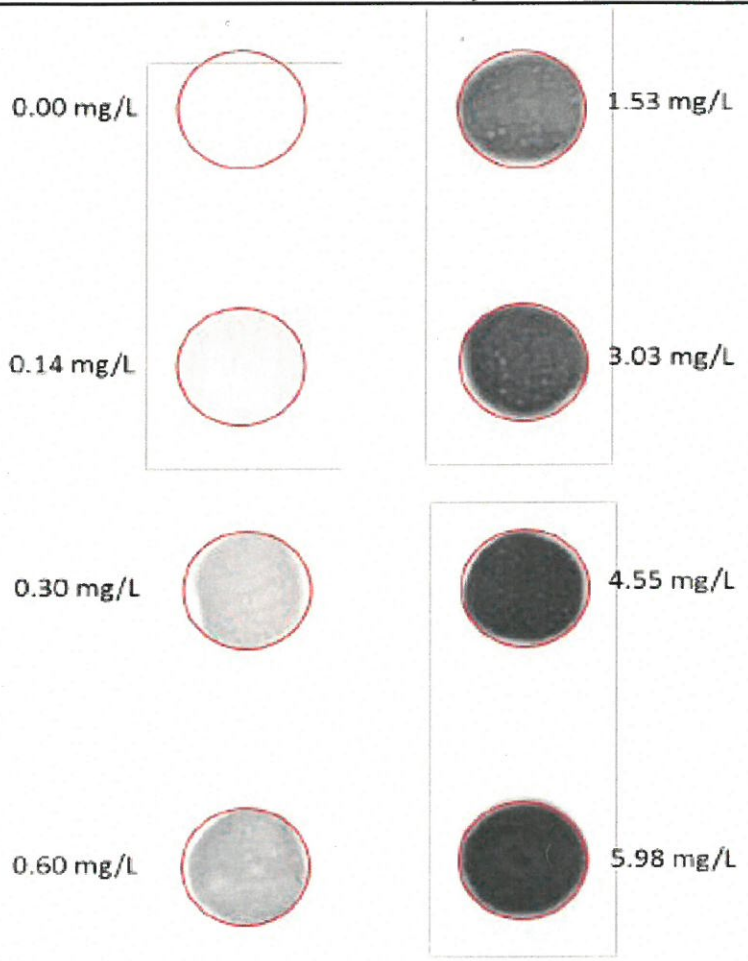
DGT Deployment Date: 9/6/18

DGT Deployment Time: 0753

DGT Retreival Date: 9/7/18

DGT Retreival Time: 0841

DGT Concentration Gray-Scale Reference



Place DGT Below and Photograph:

Place DGT Here

Field Parameters: SEE 6 (5)

pH:	Temp:	Conductivity / Salinity:

ANCHOR QEA

DGT Sampling Form

SMA2C IT7

Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:** SMA2 (IT7) (5)

Date:	9/6/18	Field Staff:	CD, SL
Sampling Method:	Probe on beach	Weather:	Sunny
Sampling Vessel:	Land	Recorded By:	CD
Subcontractor(s):	—	Notes:	Shallow on West
Station Coordinates: N / Lat.			Duplicate CoC 1125
E / Long.			
Datum: NAD 83 / WGS 84	zone:		
Sample ID:			
Deployment Type: In-Situ Ex-Situ		Deployment Depth:	6"

(Circle Appropriate Analyses)

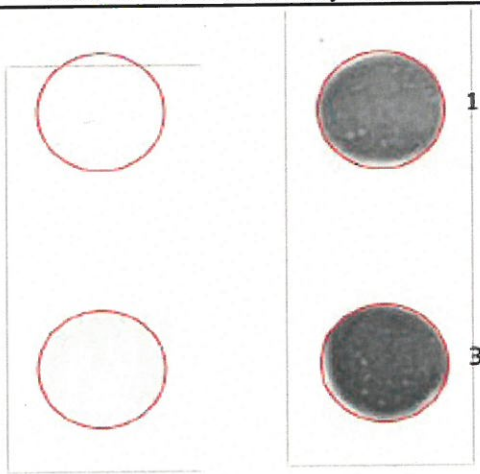
DGT Deployment Date: 9/6/18

DGT Deployment Time: 0919 dup 0920

DGT Retreival Date: 9/7/18

DGT Retreival Time: 0728 dup 0729

DGT Concentration Gray-Scale Reference



Place DGT Below and Photograph:

Place DGT Here

Field Parameters: 8.17 58.2 F°

pH:	Temp:	Conductivity / Salinity:
~~6.57~~ 7.47 CD	~~25 C°~~ CD	0.11 ms/cm

Seawater 7.52
4.00 blanks

0.2 ppt

ANCHOR QEA

DGT Sampling Form

Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:** SMA2C IT7 (D)

Date: 9/6/2018	Field Staff: CD/EP
Sampling Method: Beach probe	Weather: Sunny
Sampling Vessel: —	Recorded By: EP
Subcontractor(s): —	Notes: COC 1137
Station Coordinates: N / Lat.	
E / Long.	
Datum: NAD 83 / WGS 84 zone:	
Sample ID:	
Deployment Type: In-Situ Ex-Situ	Deployment Depth: 24"

(Circle Appropriate Analyses)

DGT Deployment Date: 9/6/2018

DGT Deployment Time: 0927

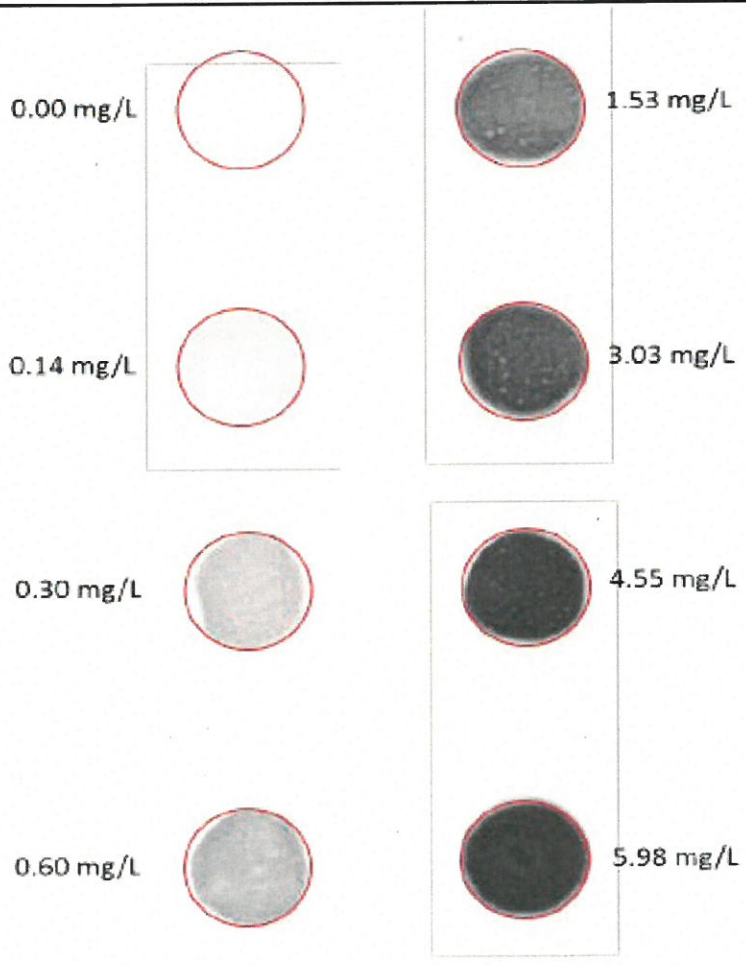
DGT Retreival Date: 9/7/18

DGT Retreival Time: 0731

Place DGT Below and Photograph:

Place DGT Here

DGT Concentration Gray-Scale Reference



Field Parameters: SEE 7(5)

pH:	Temp:	Conductivity / Salinity:

ANCHOR QEA

DGT Sampling Form

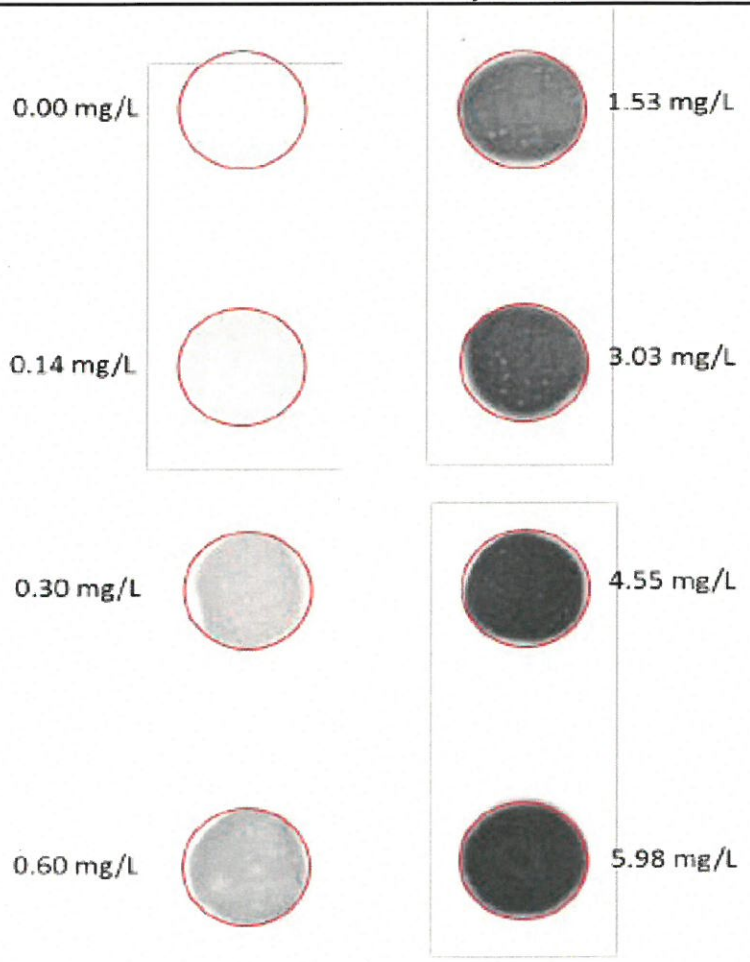
Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:** SMA2CIT8 (S)

Date:	9/6/18	Field Staff:	CD, JC
Sampling Method:	Probe in beach	Weather:	Sunny
Sampling Vessel:	Land	Recorded By:	CD
Subcontractor(s):	—	Notes:	Shallow on West COC 1100
Station Coordinates:	N / Lat.		
	E / Long.		
Datum:	NAD 83 / WGS 84 zone:		
Sample ID:			
Deployment Type:	In-Situ Ex-Situ	Deployment Depth:	6"

(Circle Appropriate Analyses)

DGT Deployment Date:	9/6/18
DGT Deployment Time:	0721
DGT Retreival Date:	9/7/18
DGT Retreival Time:	0819

DGT Concentration Gray-Scale Reference



Place DGT Below and Photograph:

Place DGT Here

Field Parameters:

pH:	8.19	Temp:	58.3 F°	Conductivity / Salinity:	0.20 ms/cm

0.4 ppt

ANCHOR QEA

DGT Sampling Form

Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:** SMA2 CIT8 (CD)

Date:	9/6/18	Field Staff:	CD, JC
Sampling Method:	Probe in beach	Weather:	Sunny
Sampling Vessel:	Land	Recorded By:	CD
Subcontractor(s):	—	Notes:	Deep on East COC 1108
Station Coordinates:	N / Lat.		
	E / Long.		
Datum:	NAD 83 / WGS 84	zone:	
Sample ID:			
Deployment Type:	In-Situ Ex-Situ	Deployment Depth:	24"

(Circle Appropriate Analyses)

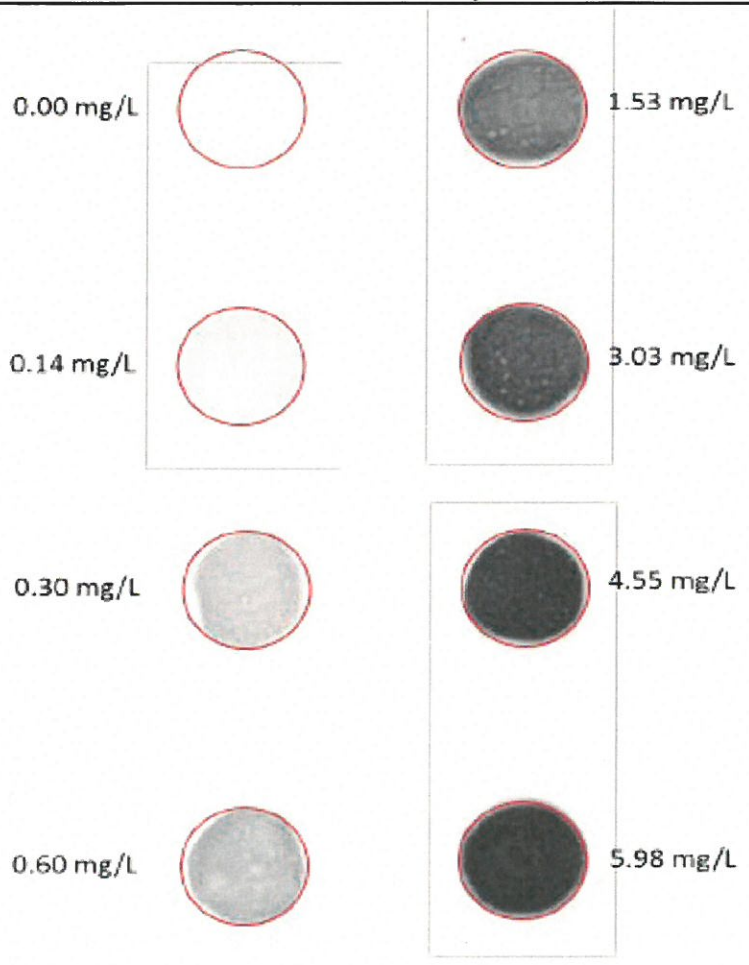
DGT Deployment Date: 9/6/18

DGT Deployment Time: 0724

DGT Retreival Date: 9/7/18

DGT Retreival Time: 0922

DGT Concentration Gray-Scale Reference



Place DGT Below and Photograph:

Place DGT Here

Field Parameters: SAL 8 (S)

pH:	Temp:	Conductivity / Salinity:

ANCHOR QEA

DGT Sampling Form

Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:** SMA2 CIT9 (5)

Date:	9/6/18	Field Staff:	CD, JC
Sampling Method:	probe in beach	Weather:	Sunny
Sampling Vessel:	Land	Recorded By:	CD
Subcontractor(s):	—	Notes:	shallow on W
Station Coordinates:	N / Lat.		
	E / Long.		
Datum:	NAD 83 / WGS 84	zone:	COC time: 1124
Sample ID:			
Deployment Type:	In-Situ Ex-Situ	Deployment Depth:	6"

(Circle Appropriate Analyses)

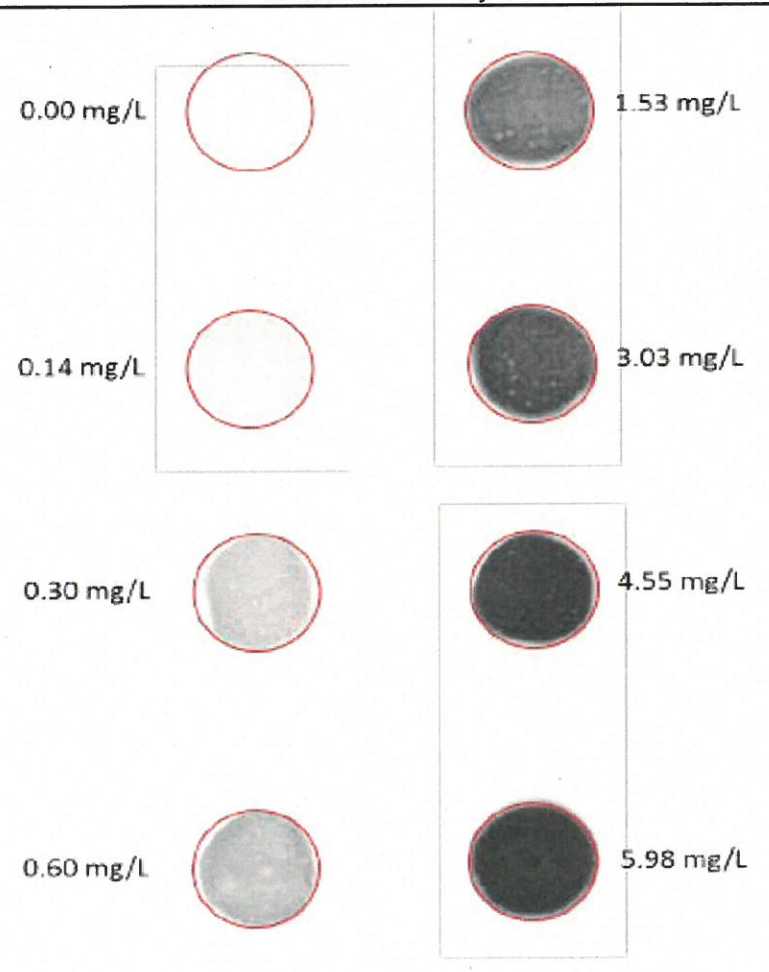
DGT Deployment Date: 9/6/18

DGT Deployment Time: 0704

DGT Retreival Date: 9/7/18

DGT Retreival Time: 0948

DGT Concentration Gray-Scale Reference



Place DGT Below and Photograph:

Place DGT Here

Field Parameters:

pH: 8.32	Temp: 57.9 F°	Conductivity / Salinity: 0.22 ms/cm

0.5 ppt

ANCHOR QEA

DGT Sampling Form

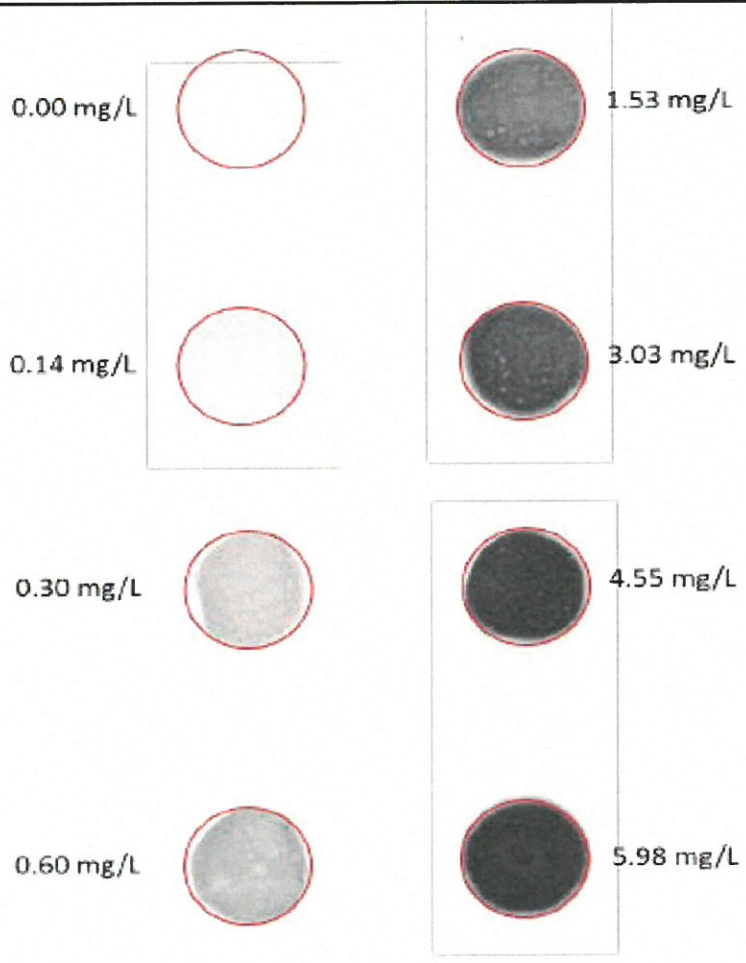
Project Name: Port Gamble LTM **Project No:180388-01.01** **Station ID:** SMA2CITG (D)

Date:	9/6/19	Field Staff:	CD, JL
Sampling Method:	Probe in beach	Weather:	Sunny
Sampling Vessel:	Land	Recorded By:	CD
Subcontractor(s):	—	Notes:	Deep on bar
Station Coordinates: N / Lat.			COC 1037
E / Long.			
Datum: NAD 83 / WGS 84	zone:		
Sample ID:			
Deployment Type: In-Situ Ex-Situ		Deployment Depth:	24"

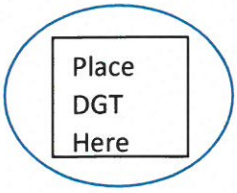
(Circle Appropriate Analyses)

DGT Deployment Date:	9/6/18
DGT Deployment Time:	0709
DGT Retreival Date:	9/7/19
DGT Retreival Time:	0947

DGT Concentration Gray-Scale Reference



Place DGT Below and Photograph:



Field Parameters: SEE 9(S)

pH:	Temp:	Conductivity / Salinity:

Daily Log

ANCHOR QEA

Anchor QEA L.L.C.
720 Olive Way, Suite 1900
Seattle, WA 98101
Phone 206.287.9130 Fax 206.287.9131

PROJECT NAME: PG OMMP Long Term Monitoring **DATE:** 9/6/18

SITE ADDRESS: Port Gamble, WA **PERSONNEL:** EM, JC, EP, CD

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | CLOUDY | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F . °C [Circle appropriate units]

TIME	COMMENTS
0545	EM, JC, EP, CD arrive on site, H&S tailgate
	EM/EP to SMA-1
	JC/CD to SMA-2
0630	install DGT @ SMA-1 IT2, dup 24"
0645	prep for SMA1 IT1
0730	IT1 complete, set up perimeter buoys, wait for tide to drop
0820	collect SMA1, IT3, in water, moved station 10 feet shoreward to allow for sampling, target was too deep
0845	EM/EP to SMA2 to assist
0900	Collect biossay SMA2C-IT9
	SMA2C-IT9-0-10-180906 @0900 ★
0920	biossay SMA2C-IT2
	SMA2C-IT2-0-10-180906 @0920 ★
0930	biossay IT5
	SMA2C-IT5-0-10-180906 @930★
	★ All is habitat substrate material ★
	SAND w/ GRAVEL, moist, gray, loose, 75% M-sand 25% F-C gravel.
0940	SMA2C-IT8-0-10-180906 @0940 ★
0950	SMA2C-IT4-0-10-180906 @0950 ★
1000	SMA2C-IT1-0-10-180906 @1000 ★
1010	SMA2C-IT7-0-10-180906 @1010 ★
1030	pack up gears take samples to Ecoanalysts
	EM

Signature: _____

Daily Log

ANCHOR QEA

Anchor QEA L.L.C.
720 Olive Way, Suite 1900
Seattle, WA 98101
Phone 206.287.9130, Fax 206.287.9131

PROJECT NAME: PG OMMP Long Term Monitoring **DATE:** 9/6/13

SITE ADDRESS: Port Gamble, WA **PERSONNEL:** CD, JC, EM, EP

WEATHER: **WIND FROM:** ~~N~~ NE | E | SE | S | SW | W | NW

~~SUNNY~~ | CLOUDY | RAIN | ?

(LIGHT) | MEDIUM | HEAVY

TEMPERATURE: °F 60. °C [Circle appropriate units]

TIME	COMMENTS
0545	Arrive site
0600	H&S meeting
0620	split into 2 groups CD+JC / EM+EP for Deployment
	Deploy Stations IT1 through 9 CD+JC
0930	Collect bio-grab samples
1015	DEmob, clean up gear
1100	Depart ~~site~~ / lunch
1200	Depart site

Signature: _____

Daily Log

ANCHOR QEA

Anchor QEA L.L.C.
720 Olive Way, Suite 1900
Seattle, WA 98101
Phone 206.287.9130 Fax 206.287.9131

PROJECT NAME: PG OMMP Long Term Monitoring **DATE:** 9/7/18

SITE ADDRESS: Port Gamble, WA **PERSONNEL:** EM, JC, EP, CD

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | CLOUDY | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F 60 . °C [Circle appropriate units]

TIME	COMMENTS
0700	team arrives on site, discuss order of operations & HASP
0720	EM/EP pull out DGTs
0815	All dgts pulled, EP to SMA2 to assist w/ DGT processing
0945	Collect bioassay @ SMA1
~~0955~~	" "
0900	EM to SMA-2 to process bioassay
	SMA1B-IT2-0-10-180907 @ 0845
	SMA1B-IT7-0-10-180907 @ 0855
	SMA2C-IT3-0-10-180907 @ 0935
	SMA2C-IT6-0-10-180907 @ 0940
1015	EM to EcoAnalysts to deliver samples

Signature: _____

Daily Log

ANCHOR QEA

Anchor QEA L.L.C.
720 Olive Way, Suite 1900
Seattle, WA 98101
Phone 206.287.9130 Fax 206.287.9131

PROJECT NAME: PG OMMP Long Term Monitoring **DATE:** 9/7/18

SITE ADDRESS: Port Gamble, WA **PERSONNEL:** CD, JL, EM, EB

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | CLOUDY | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F 60. °C [Circle appropriate units]

TIME	COMMENTS
0700	Arrive site, HAS, coordination
0725	Begin retrieval of D, JL 1 through 9
0910	clean up sample area, fill holes, Sediment data
0930	Collect Bio-Assay sampler
1010	DGT sample packaging
1145	clean up, Demob
	EM

Signature: _____

ANCHOR QEA

DATE: 9/6/18

PROJECT NAME: Port Gamble OMMP LTM

PROJECT NO: 180388-01.01

DAILY SAFETY BRIEFING

PERSON CONDUCTING MEETING: EM

HEALTH & SAFETY OFFICER: DT

PROJECT MANAGER: JC

TOPICS COVERED:

- ☐ Emergency Procedures and Evacuation Route
- ☒ Directions to Hospital
- ☒ HASP Review and Location
- ☐ Safety Equipment Location
- ☐ Proper Safety Equipment Use
- ☐ Employee Right-to-Know/MSDS Location
- ☐ Fire Extinguisher Location
- ☐ Eye Wash Station Location
- ☐ Buddy System
- ☐ Self and Coworker Monitoring
- ☐ Lines of Authority
- ☒ Communication
- ☒ Site Security
- ☐ Vessel Safety Protocols
- ☐ Work Zones
- ☒ Vehicle Safety and Driving/Road Conditions
- ☐ Equipment Safety and Operation
- ☐ Proper Use of PPE
- ☐ Decontamination Procedures
- ☐ Other:
- ☐ Lifting Techniques
- ☒ Slips, Trips, and Falls
- ☐ Hazard Exposure Routes
- ☒ Heat and Cold Stress
- ☐ Overhead and Underfoot Hazards
- ☐ Chemical Hazards
- ☐ Flammable Hazards
- ☐ Biological Hazards
- ☐ Eating/Drinking/Smoking

WEATHER CONDITIONS: Sun, cool

DAILY WORK SCOPE: install DGTS

SITE-SPECIFIC HAZARDS:

SAFETY COMMENTS:

ATTENDEES

PRINTED NAME	SIGNATURE
Evan Mulcahy	
Jason Cornelio	
Calvin Douglas	
Eli Patmont	

ANCHOR QEA

DATE: 9/7/18

PROJECT NAME: Port Gamble OMMP LTM

PROJECT NO: 180388-01.01

DAILY SAFETY BRIEFING

PERSON CONDUCTING MEETING: EM

HEALTH & SAFETY OFFICER: CT

PROJECT MANAGER: JC

TOPICS COVERED:

- ☐ Emergency Procedures and Evacuation Route
- ☐ Directions to Hospital
- ☒ HASP Review and Location
- ☐ Safety Equipment Location
- ☐ Proper Safety Equipment Use
- ☐ Employee Right-to-Know/MSDS Location
- ☐ Fire Extinguisher Location
- ☐ Eye Wash Station Location
- ☐ Buddy System
- ☐ Self and Coworker Monitoring
- ☐ Lines of Authority
- ☐ Communication
- ☐ Site Security
- ☐ Vessel Safety Protocols
- ☐ Work Zones
- ☒ Vehicle Safety and Driving/Road Conditions
- ☐ Equipment Safety and Operation
- ☐ Proper Use of PPE
- ☐ Decontamination Procedures
- ☐ Other:
- ☒ Lifting Techniques
- ☒ Slips, Trips, and Falls
- ☐ Hazard Exposure Routes
- ☒ Heat and Cold Stress
- ☐ Overhead and Underfoot Hazards
- ☐ Chemical Hazards
- ☐ Flammable Hazards
- ☐ Biological Hazards
- ☐ Eating/Drinking/Smoking

WEATHER CONDITIONS: Cloudy

DAILY WORK SCOPE: pull out DGTs process biosassay

SITE-SPECIFIC HAZARDS:

SAFETY COMMENTS:

ATTENDEES

PRINTED NAME	SIGNATURE
Evan Makzyk	
Jason Cornette	
Calvin Doyle	
Eli Patmont	

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA1-ST1
Project No: 180388-01.01	**Date:** 9/17/18
Field Staff: EM, AK	**Sample Method:** power grab
Contractor: MSS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time: 0950	(-) Water Depth + Tidal Elevation
DTM Lead Line: 17.0	Height: ~~17.0~~ 6.3ft	-10.7 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W		cm	
1	0957	47°51.4241'	122°34.8494'	Y	15	jaw slightly agape on gravel

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

at surface, substantial sub-angular cobble, macro-algae, barnacles, crab, fish.

0-15 loose, wet, dk grey silty GRAVEL, 10% sand, 10% silt, 80% f-c gravel w/ cobble throughout, ~~no~~ slight H2S odor, trace worm.

→ SILTY GRAVEL (GM) w/ SAND

Sample Identification and Time: SMA1-ST1-180917 - Archive only 7mm 095/
Composited into: SMA1-ST-0-10-Comp-180917 ~~0957~~

Sample Containers:

A

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA1-ST2
Project No: 180388-01.01	**Date:** 9/17/18
Field Staff: EM, AK	**Sample Method:** Power grab
Contractor: PBS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 21.4 ft	Height: 6.9 ft	-14.5 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in) (cm)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	1017	47° 51.4438'	122° 34.8047'	y	15	jaws closed

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

at surface substantial Sub angular cobble, macroalgae biota. crabs, barnacles.

0-15 loose, wet, dk grey, well graded GRAVEL (GW) with silt (10%), sand (15%), trace biota (wood).

Sample Identification and Time: SMA1-ST2-180917 - Archive only

Comp: SMA1-ST-0-10-Comp-180917

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM | **Station ID:** SMA1-ST3
Project No: 180388-01.01 | **Date:** 9/17/18
Field Staff: EM, AK | **Sample Method:** Power grab
Contractor: MSS | **Logged By:** AK
Vertical Datum: ft MLLW | **Horizontal Datum:** NAD83 WA SP North

Water Height	Tidal Elevations	Mudline Elevation (ft MLLW)
DTM Depth Sounder:	Time: 1047	(-) Water Depth + Tidal Elevation
DTM Lead Line: ~~22.7~~ 23.0 ft	Height: 7.5 ft	-15.5 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates: ~~Northing~~/Latitude N	~~Easting~~/Longitude W	Sample Accept (Y/N)	Recovery Depth ~~(in)~~ cm	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
1	1040	47°51.4048'	122°51.7864'	N	10cm	Jaws cocked, NOT FULLY CLOSED - GRAVEL IN JAW
2	1047	47°51.4045'	122°34.7859	Y	20cm	

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

At surface subangular cobble, Mod. biota: macroalgae, worms, barnacles

0-3 silty SAND (SP), loose, wet, silt (20%), sand (80%), dk grey

3-20 ~~Sandy~~ silty SAND (SP) w/ Mod. wood, med dense, ~~wet~~ moist, dk grey silt (10%), sand, w/ cobble (15%), slight H_2S, trace rainbow sheen (1 floret).

Sample Identification and Time: SMA1-ST3-180917 Archive

Comp info: SMA1-ST-0-10-Comp-180917

Sample Containers: 4

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA1-ST4
Project No: 180388-01.01	**Date:** 9/17/18
Field Staff: EM, AK	**Sample Method:** Power grab
Contractor: MCS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 24.1 ft	Height: 7.9 ft	-16.2 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in) cm	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	1114	47°51.3889'	122°34.7862'	Y	30	Jaws closed.

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

0-15 Wood fibers & fragments w/ Silt, Sand, ~~Mud~~ Silt, ~~stone~~, moist, ~~soft~~ dk grey, slight odor H2S, Trace biota (worms).

15-30 coarse GRAVEL (GP) w/ Trace fines. Loose, moist, dk grey gravel (60%) sand (5%) silt (5%), slight H2S.

Sample Identification and Time: SMA1-ST4-180917

Sample Containers: Comp. info: SMA1-ST-0-10-Comp-180917

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA1-ST5
Project No: 180388-01.01	**Date:** 9/19/18
Field Staff: EM, AK	**Sample Method:** Power Grab
Contractor: MSS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 22.4 ft	Height: 8.7 ft	-13.7 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in) (cm)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	1148	47°51.3830'	122°34.7532'	y	15	jaws closed

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Surface: 50% angular cobble, mod biota: macroalgae, fish, barnacles)

0-15 sandy GRAVEL (GW-GM) loose, wet, dk grey, silt (10%) sand (15%), ~~sand~~ ~~11.3~~, trace wood frag-ment, trace shell hash, trace biota (crab),

Sample Identification and Time: SMA1-ST5-180917 -- Archive
Comp. into SMA1-ST-0-10-Comp-180917

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMAIA-IT1
Project No: 180388-01.01	**Date:** 9/17/18
Field Staff: EM, AF	**Sample Method:** Power grab
Contractor: MSE	**Logged By:** AF
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 13.22; 12.9 ft	Height: 8.7 ft	-4.2 ft ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in) cm	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		Northing/Latitude	Easting/Longitude			
1	1257	47°51.4499'	122°34.8287'	N	10	Jaws not closed, poor recovery
2	1303	47°51.~~50~~4503'	122°34.8291'	Y	20	Jaws closed

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Surface: no crabs, biota (worms, shrimp, barnacles, macro algae)
0-20: SAND (SP) w/ gravel: loose, moist, grey, trace fines, gravel (30%), sand (70%), trace biota (worms).

Sample Identification and Time: SMAIA-IT1-180917 Archive

Composite: SMAIA-IT-0-10-Comp-180917

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMAIA-IT2
Project No: 180388-01.01	**Date:** 9/17/18
Field Staff: EM, AK	**Sample Method:** Power grab
Contractor: MSS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 12.4 ft	Height: 8.7 ft	-3.7 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in) cm	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	1323	47°51.4294'	122°34.8648'	Y	25	jaws closed, overlying H_2O

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Surface: Subrounded coarse gravel & cobble, few biota (algae, barnacles, worms)
0-10 SAND (SP-SM), poorly graded w/ ~~sand~~ gravel & silt; loose, wet, dk grey SAND (50%), gravel (40%), fines (10%), trace biota (worms), trace H_2S odor
10-25 poorly graded SAND w/ gravel (SP); loose, wet, grey, sand (60%), gravel (40%).

Sample Identification and Time: SMAIA-IT2-180917 - Archive
Comp. w/:
SMAIA-IT-0-10-Comp-180917

Sample Containers:

4

Analyses (circle all that apply): Cadmium, PAHs, DFs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMAIA-IT3
Project No: 180388-01.01	**Date:** 9/17/18
Field Staff: KM, MK	**Sample Method:** Power grab
Contractor: MSS	**Logged By:** MK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 12.5; 12.5 ft	Height: ~~12.5~~ 8.6 ft	-3.9 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	1344	47°51.4058'	122°34.~~8477~~ 8701	N	-	jaws agape, winnowed
2	1356	47°51.~~4058~~ 4055'	122°34.~~8701~~ 8697'	Y	18	jaws closed, overlying H2O

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Surface: Subrounded & Silty Angular loose gravel-cobble, moderate biotd (macroalgae, fish, shrimp, barnacles

0-18: poorly graded SAND w/ silt & gravel (SP-SM), loose, wet, dk grey - 30 silt (18%), sand (36%), gravel (46%),

Sample Identification and Time: SMAIA-IT3-180917 - Archive
Comp. into: SMAIA-IT-0-10-Comp-180917

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMAIA-1T4
Project No: 180388-01.01	**Date:** 9/17/18
Field Staff: EM, AK	**Sample Method:** Power Grab
Contractor: MSS	**Logged By:** AE
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 12.2; 10.2 ft	Height: 8.5; 8.5 ft	-3.7; -1.7 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	1418	47°51.3777'	122°34.7977'	N	-	Not sufficient recovery
2	1423	47°51.3776'	122°34.7964'	Y	15	Jaws closed

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Surface: Sub angular cobble (6-8"), subrounded course gravel, moderate biota (macro algal, crab, worms, barnacles)

0-15: well graded gravel (GW) with sand, loose, wet, grey, sand (25%) gravel (75%) trace biota (cockles, clams), trace shell hash

Sample Identification and Time: SMAIA-1T4-180917 - Archive

Comp info: SMAIA-1T-0-10-Comp-180917

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, (D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMAIA-IT5
Project No: 180388-01.01	**Date:** 9/17/18
Field Staff: EM AK	**Sample Method:** Power Grab
Contractor: MSS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 10.8; 11.4 ft	Height: 8.3, 8.1 ft	-2.5; +3.3 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in) cm	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	1443	47°51.3692'	122° 34.7550'	N	15	clean cobble only - nothing to sample
2	1456	47°51.3689'	122° 34.7526'	Y	15	jaws closed

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

ATTEMPT 2 MOVED ~10 FT EAST

Surface: Subangular coarse Gravel, mod-abundant biota: macroalgal, crabs, shrimp, polycheates, other worms / barnacles

0-15: well-graded GRAVEL (GW) w/ silt: loose, wet, dk grey, silt (5%), sand (5%), gravel (90%), mod shell hash, trace biota: barnacles, worms.

Sample Identification and Time: SMAIA-IT5-180917 - Archive

Comp. into: SMAIA-IT-0-10-Comp-180917

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log (SMA-3)

Project Name: Port Gamble - OMMP LTM
Station ID: BW-15
Project No: 180388-01.01
Date: 9/17/18
Field Staff: EM, AK
Sample Method: Power grab
Contractor: MSS
Logged By: AK
Vertical Datum: ft MLLW
Horizontal Datum: NAD83 WA SP North

Water Height	Tidal Elevations	Mudline Elevation (ft MLLW)
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 39.3 ft	Height: 7.7 ft	-31.6 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	1546	47°49.9666'	122°34.5423'	Y	27	overlying H_2O

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

EM 9/19 SILTY SAND (SM)
0-17: ~~SAND (SP) w/ silt~~; ~~loose~~ med-firm, wet, olive-grey, Silt (25%), sand (75%);
17-27 grades to sandy SILT (ML); Silt (70%), sand (30%), faint H_2S

Sample Identification and Time: BW-15-0-10-180917

Sample Containers: 1 bag

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA2A-ST1
Project No: 180388-01.01	**Date:** 09/18/2018
Field Staff: AK EM	**Sample Method:** HYDRAULIC GRAB
Contractor: MSS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 24.3'	Height: 3.7 ft	-20.6 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in) (cm)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	09:11	47°51.2170'	122°34.8359'	Y	24	

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

0-24: poorly graded SAND (SP), med-dense, moist, gray sand (fine-med jum) (100%), trace biota: wood, small macroalgae on surface. pockets of trace silt.

Sample Identification and Time: SMA2A-ST1-180918 - Archive
Comp into: SMA2A-ST-0-10-Comp-180918

Sample Containers:

Analyses (circle all that apply): ~~Cadmium~~, ~~PAHs~~, ~~DFs~~, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA 2A - ST2
Project No: 180388-01.01	**Date:** 9/18/18
Field Staff: EM, AK, MH	**Sample Method:** Hydraulic Grab
Contractor: MSS	**Logged By:** EM
Vertical Datum: ft MLLW	**Horizontal Datum: NAD83 WA SP North**

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 30.4 ft	Height: 4.5 ft	-25.9 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates: ~~Northing~~/Latitude N	Field Collection Coordinates: ~~Easting~~/Longitude W	Sample Accept (Y/N)	Recovery Depth (~~in~~) cm	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
1	0939	47°51.2389'	122°34.8081'	Y	24	jaws close

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

At surface: trace biota: snails, worms; occasional organics: sticks, wood fragments, + macroalgae

~~0-10~~ 0-24 cm: poorly graded SAND (SP), ~~loose~~ med. dense, wet, dk grey. Sand (95%) silt (5%). Pockets of increased fines from 0-15 cm. Trace biota (worms).

Sample Identification and Time: SMA2A-ST2-180918 — Archive

Comp info: SMA2A-ST-0-10-180918

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA2A-ST3
Project No: 180388-01.01	**Date:** 9/18/18
Field Staff: DM, AK	**Sample Method:** Power grab
Contractor: MSS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 34.3 ft	Height: 5.1 ft	-29.2 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	1005	47°51.2550'	122° 34.7610'	Y	24. ~~34.3~~	jaws closed

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

0-24: poorly graded SAND (SP), med-dense, wet, grey, ~~f-m~~ sound (100%) pockets of trace fines, trace biota (worms).
+/- surface: trace shell hash, trace biota: algae, shells.

Sample Identification and Time: SMA2A-ST3-180918 → archive

Comp into: SMA2A-ST-0-10-Comp-180918

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA2A-ST4
Project No: 180388-01.01	**Date:** 9/18/18
Field Staff: EM, AK	**Sample Method:** Power grab
Contractor: MCS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 27.8 ft	Height: 5.8 ft	-28.0 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in) cm	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	1029	47°51.1790'	122° 34.8270'	Y	20	jaws closed

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

At Surface: trace biota: macroalgae, snails, worms, fish, barnacles; trace gravel

0-20: poorly graded SAND (SP), med-dense, wet, grey, f-m sand (95%), trace silt (5%), pockets of increased fines throughout, trace biota (worms)

Sample Identification and Time: SMA2A-ST4-180918 → Archive

Comp into: SMA2A-ST-0-10-Comp-180918

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA2A-ST5
Project No: 180388-01.01	**Date:** 9/8/18
Field Staff: EM, MK	**Sample Method:** Power Grab
Contractor: MSS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum: NAD83 WA SP North**

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 28.4 ft	Height: 6.2 ft	-22.2 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in) cm	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	1045	47°51.2093'	122°34.7728'	Y	24	Jaws closed

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

At Surface: occasional biota: hermit crab, snail, worms, bryzoa, macroalgae, trace shell hash (crab claw).

0-24: SAND (SP), med-dense, wet, grey, f-m sand (100%), pockets of trace fines throughout, trace biota (worms).

Sample Identification and Time: SMA2A-ST5-180918 *Archive
Comp. into: SMA2A-ST-0-10-Comp-180918

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA2B - IT2
Project No: 180388-01.01	**Date:** 9/18/18
Field Staff: EM, AK	**Sample Method:** Power grab
Contractor: PMSS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 12.5 ft	Height: 7.5 ft	-5.0 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in) (cm)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	1145	47°51.1959'	122°34.9098'	Y	13	Surface intact.

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

At surface: trace biota: macroalgae, trace anthropogenic debris, brick fragment.

0-13: Poorly graded SAND w/ silt & gravel (SP-SM), loose, wet, dk grey - silt (10%), sand (50%), gravel (40%) → sub-rounded.

Archive

Sample Identification and Time: SMA2B - IT2 - 180918

Comp info: SMA2B-IT-0-10-Comp-180918

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA2B-IT2
Project No: 180388-01.01	**Date:** 9/18/18
Field Staff: EM, AK	**Sample Method:** Power grab
Contractor: NSS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 8.3; 8.5; 8.6 ft	Height: 8.1 ft	-0.7 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in) cm	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	1203	47°51.1690'	122°34.9109'	N	–	jaws closed, insufficient recovery
2	1211	47°51.1697'	122°34.9108'	N	–	winnowed, jaws agape.
3	1219	47°51.1683'	122°34.9109	Y	10	Desired penetration depth.

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

At Surface: Sub angular cobble, occasional biota: algae, barnacles,

0-10: well graded GRAVEL w/ Sand (GW), loose, wet, grey, Sand (40%), Silt (10%), ~~Sand~~ gravel (f-c) (50%). ~~Trace~~ biota: Worms, Clams; Trace Occasional shell hash.

Sample Identification and Time: SMA2B-IT2-180918 → Archive
SMA2B-IT-0-10-Comp-180918

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA2B-1T3
Project No: 180388-01.01	**Date:** 9/18/18
Field Staff: EM, AK	**Sample Method:** Power grab
Contractor: MSS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 8.5; 8.7; 8.6 ft	Height: ~~0.8~~ 8.5; 8.7 ft	-0.2; +0.1 ft

Notes: Station moved N/NW for attempt 3

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates: ~~Northing~~/Latitude N	~~Easting~~/Longitude W	Sample Accept (Y/N)	Recovery Depth (in) cm	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
1	1245	47°51.1333'	122°34.9109'	N		1 angular cobble in jaws
2	1256	47°51.1320'	122°34.9109'	N		3 cobbles collected
3	1318	47°51.1365'	122°34.9124'	Y	12	Sufficient material/recovery

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

ATTEMPT 3 MOVED 22FT @ 345° TRUE

At surface: Subangular cobble, occasional biota: Shrimp, worms, bivalves, macro algae
0-12 well graded gravel w/ sand (GW). Loose, wet, grey sand (40%), subrounded f-c gravel (60%), trace fines. Trace biota (worms, barnacles), trace shell hash, 1 ghost shrimp. Pockets of increased fines.

Sample Identification and Time: SMA2B-1T3-180918 Archive
SMA2B-1T-1-10-Comp-180918

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA2B-1T4
Project No: 180388-01.01	**Date:** 9/18/18
Field Staff: AK, EM	**Sample Method:** Power grab
Contractor: MCS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 9.1 ft	Height: 8.9 ft	-0.2 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in) cm	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/LatitudeN	~~Easting~~/LongitudeW			
1	1354	47°51.1138'	122°34.9259'	Y	17	Jaws closed

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

At surface: Subangular cobble, mod. biota: shrimp, barnacles, macroalgae, worms

0-17: Poorly graded SAND w/ silt + gravel (SP-SM) loose, wet, dk grey, silt (10%), gravel (40%), sand (50%), gravel is F-C, subrounded, trace biota (worms), trace shell hash.

Sample Identification and Time: SMA2B-1T4-180918 → Archive
SMA2B-1T-0-10-Comp-180918

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

Surface Sediment Field Log

ANCHOR QEA

Project Name: Port Gamble - OMMP LTM	**Station ID:** ~~SMA2B~~ - IT5
Project No: 180388-01.01	**Date:** 9/18/18
Field Staff: EM, AK	**Sample Method:** Power grab
Contractor: MCS	**Logged By:** AE
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 9.5/8.6 ft	Height: 8.9/8.9 ft	-0.6/+0.3 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates ~~Northing~~/Latitude N	~~Easting~~/Longitude W	Sample Accept (Y/N)	Recovery Depth (in) cm	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
1	1414	47°51.0920'	122°34.9367'	N	-	Insufficient recovery
2	1448	47°51.0925'	122°34.9389'	Y	15	Sufficient recovery

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

0-15: poorly graded SAND w/ gravel, (SP) loose, wet, tan-green, gravel, f-c (40%) f-m Sand (60%), Silt (0%), Trace biota worms, trace shell hash, trace organics.

on surface: occasional biota: hermit crab, barnacles, algae, worms.

Sample Identification and Time: SMA2B-IT5-180918 → Archive
SMA2B-IT-0-10-Comp-180918

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA2B-ST1
Project No: 180388-01.01	**Date:** 9/18/18
Field Staff: EM, AK	**Sample Method:** Power grab
Contractor: MSS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 20.9 ft	Height: 8.8 ft	-12.1 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	1521	~~47~~ 47°57.1511'	122°34.8748'	Y	~~20~~ 24	jaws closed, overtopping H_2O

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

0/+ Surface: trace beta (macro algae), snails, fish.
0-24. poorly graded SAND (SP), ~~grey, loose, wet~~ med dense, wet, grey sand (f-m) (100%). trace shell hash.

Sample Identification and Time: SMA2B-ST1-180918 → Archive
SMA2B-ST-0-10-Comp-180918
SMA102B-ST-0-10-Comp-180918 duplicate

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA2B-ST2
Project No: 180388-01.01	**Date:** 9/18/18
Field Staff: AK, EM	**Sample Method:** Power Grab
Contractor: MSS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 28.1 ft	Height: 8.7 ft	-19.4 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	1534	47°51.148'	122°34.788'	Y	22 cm	jaws closed

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

At Surface: trace biota, macroalgae, worms, trace shell hash.
0-22: poorly graded SAND (SP), med-dense, wet, grey, f-m Sand (100%), trace biota (worms).

Sample Identification and Time: SMA2B-ST2-180918 → Archive
SMA2B-ST-0-10-Comp-180918
SMA102B-ST-0-10-comp-180918 duplicate

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA2B-ST3
Project No: 180388-01.01	**Date:** 9/18/18
Field Staff: EM, AK	**Sample Method:** Power grab
Contractor: MES	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 30.5 ft	Height: 8.5 ft	-22.0 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates ~~Northing~~/Latitude N	~~Easting~~/Longitude W	Sample Accept (Y/N)	Recovery Depth (in) cm	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
1	1602	47°51.1342'	122°34.8253'	Y	23	jaws closed

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

0-23 poorly graded SAND (SP)
med-coarse, wet, grey - f-m sand (100%)
trace biota (worms).

At surface: trace biota (worms), shells, algae), trace shell hash, trace sub-rounded gravel.

Sample Identification and Time: SMA2B-ST3-180918 Archive
SMA2B-ST-0-10-Comp-180918
SMA1028-ST-0-10-Comp-180918 - duplicate

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA2B-ST4
Project No: 180388-01.01	**Date:** 9/18/18
Field Staff: EM, AE	**Sample Method:** Power grab
Contractor: MSS	**Logged By:** AE
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 29.4 ft	Height: 8.4 ft	-21.0 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in) (cm)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	1616	47°51.0858'	122°34.8657'	Y	~~X~~ 24	Jaws closed

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

0-24 Poorly-graded SAND (SP)
med-dense, wet, grey, Sand, f-m (100%).
Trace subrounded gravel (1"), trace biota (worms).

At surface: trace biota (snails, algae, worms).

Sample Identification and Time:
SMA2B-ST4-180918 → Archive
SMA2B-ST-0-10-180918
SMA102B-ST-0-10-180918 → duplicate

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA2B-ST5
Project No: 180388-01.01	**Date:** 9/18/18
Field Staff: EM, AK	**Sample Method:** Power grab
Contractor: MSS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 28.1 ft	Height: 8.2 ft	-19.9 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	1629	47°51.0968'	122°34.8104'	Y	23	jaws, closed.

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

At surface: trace biota (algae, worms), trace shell hash

0-23: poorly-graded SAND (f) trace gravel. med SBF, wet, grey, trace f-c gravel (5-10%), sand (95%). trace biota (jackknife clams, worms).

Sample Identification and Time: SMA2B-ST5-180918 → Archive

Comp info: → SMA2B-ST-0-10-Comp-180918 → Duplicate
→ SMA102B-ST-0-10-Comp-180918

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA2A-IT1
Project No: 180388-01.01	**Date:** 9/19/18
Field Staff: EM, AK	**Sample Method:** Power Grab
Contractor: MSS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 4.5 ft	Height: 1.7 ft	-2.8 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in) cm	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	0830	47°51.2862'	122°34.8069'	N	-	jaws across, grabbed Rg. cobble
2	0834	47°51.2863'	122°34.8055'	Y	15	

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

0-15: well-graded GRAVEL (GW) w/ sand: loose, moist, grey f-c SUBrounded gravel (60%), m-c sand (40%), SUB-angular cobble throughout, occasional biota (barnacles, worms), trace shell hash.

Sample Identification and Time: SMA2A-IT1-180919 → freeze

Comp info: SMA2A-IT-0-10-Comp-180919

Sample Containers: 4

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM
Station ID: SMAZA - IT2
Project No: 180388-01.01
Date: 9/19/18
Field Staff: EM, AK
Sample Method: Power grab
Contractor: MSS
Logged By: AK
Vertical Datum: ft MLLW
Horizontal Datum: NAD83 WA SP North

Water Height	Tidal Elevations	Mudline Elevation (ft MLLW)
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 2.5 ft	Height: 2.1 ft	-0.4 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates ~~Northing~~/Latitude N	~~Easting~~/Longitude W	Sample Accept (Y/N)	Recovery Depth (in)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
1	0903	47°51.2729'	122°34.8603'	Y	21	Sufficient recover

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

At Surface: Sub angular cobble, occasional biota (barnacles, algae, worms).

0-21: well graded gravel w/ sand (GW). Loose, moist, green f-c subrounded gravel (60%), M-C Sand (40%). Trace biota (worms), trace shell hash.

Sample Identification and Time: SMAZA-IT2-180919 → Archive
SMAZA-IT-0-10-Comp-180919

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA2A - 1T3
Project No: 180388-01.01	**Date:** 9/19/18
Field Staff: EM, AK	**Sample Method:** Power grab
Contractor: MCS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 4.8 7.5 ft	Height: 2.7 ft	-1.5 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates		Sample Accept (Y/N)	Recovery Depth (in)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		~~Northing~~/Latitude N	~~Easting~~/Longitude W			
1	0929	47°51.2617'	122°34.8705'	Y	20	jaws closed overlying H_2O

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

MOVED 15FT @ 313° TRUE

0-20 poorly-graded SAND (SP) w/ gravel, loose, MOIST, grey, f-m subrounded gravel (20%), m-c sand (80%). Occ sub-angular cobble. Trace biota (worms, barnacles), trace shell hash.

Archive

Sample Identification and Time: SMA2A-1T3-180919
SMA2A-1T-0-16-Comp-180918

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA2A-IT4
Project No: 180388-01.01	**Date:** 9/19/18
Field Staff: EM, AK	**Sample Method:** Power grab
Contractor: MCS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 6.9 ft	Height: 3.2 ft	-3.7 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates ~~Northing~~/Latitude N	~~Easting~~/Longitude W	Sample Accept (Y/N)	Recovery Depth (in)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
1	0956	47°51.2449'	122°34.8978'	Y	22	jaws closed overlying H_2O

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

At surface: trace biota (algae, barnacles), trace shell hash, trace anthropogenics (glass frag).

0-22: poorly graded SAND (SP), loose, wet, dk grey, f-C sand (90%), gravel, SSD-rounded (10%), trace biota (worms), trace shell hash, trace anthropogenics (glass fragments).

Sample Identification and Time: SMA2A-IT4-180919 → Archive
SMA2A-IT-0-10-Comp-180919

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA2A-IT5
Project No: 180388-01.01	**Date:** 9/19/18
Field Staff: EM, AK	**Sample Method:** Power grab
Contractor: MSS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum:** NAD83 WA SP North

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 6.0 ft	Height: 3.7 ft	-2.3 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates ~~Northing~~/Latitude N	~~Easting~~/Longitude W	Sample Accept (Y/N)	Recovery Depth (in) Can	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
1	1010	47°51.2220'	122°34.9095'	Y	19	jaws closed, good recovery.

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

0-19: poorly graded SAND (SP-SM) w/ silt & gravel, loose, wet, dk grey, silt (10%), f-m SAND rounded gravel (15%), f-c sand (75%), trace biota (shrimp, ghost), Trace shell hash, slight H2S!

At surface: a couple of SUBangular cobbles, trace biota (algae (ulva), barnacles).

Archive

Sample Identification and Time: SMA2A-IT5-180919
SMA2A-IT-0-10-Comp-180919

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

ANCHOR QEA

Surface Sediment Field Log

DGT Capped wood station

Project Name: Port Gamble - OMMP LTM	**Station ID:** SMA1B-IT3
Project No: 180388-01.01	**Date:** 9/19/18
Field Staff: EM, MK	**Sample Method:** Power grab
Contractor: MSS	**Logged By:** AK
Vertical Datum: ft MLLW	**Horizontal Datum: NAD83 WA SP North**

Water Height	**Tidal Elevations**	**Mudline Elevation (ft MLLW)**
DTM Depth Sounder:	Time:	(-) Water Depth + Tidal Elevation
DTM Lead Line: 8.3 ft	Height: 4.5 ft	-3.8 ft

Notes:

Sample Acceptability Criteria:
1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Grab #	Time	Field Collection Coordinates ~~Northing~~/Latitude N	~~Easting~~/Longitude W	Sample Accept (Y/N)	Recovery Depth (in) cm	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
1	1043	47° 51.4124'	122° 34.8749'	Y	20	Jaws closed

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

At surface: moderate biota (macroalgae, barnacles), trace shell hash.

0-20 well graded GRAVEL w/ silt and sand (GW). loose, wet, dk grey silt (15%), sand, m-c (25%), subrounded f-c gravel (60%). Pockets of increased fines throughout. trace biota (worms).

Sample Identification and Time: SMA1B-IT3-0-10-180919

Sample Containers:

Analyses (circle all that apply): Cadmium, PAHs, D/Fs, Larval Bioassay, Full Suite Bioassay Archive

Daily Log

ANCHOR QEA

Anchor QEA L.L.C.
720 Olive Way, Suite 1900
Seattle, WA 98101
Phone 206.287.9130 Fax 206.287.9131

PROJECT NAME: PG OMMP Long Term Monitoring **DATE:** 9/17/18

SITE ADDRESS: Port Gamble, WA **PERSONNEL:** EM/AK

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | CLOUDY | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F 65 . °C [Circle appropriate units]

TIME	COMMENTS
0815	EM/AK arrive @ boat launch, Salsbury Marina, load gear
0910	HSE Meeting
0920	Depart boat launch.
0925	AM NAVCHECK AT OFFSHORE PILE - SALSBURY PARK RAMP
	47° 51.4348' N 122° 36.4318' W
0945	on station at SMA1-ST1, take sample
1017	Sample SMA1-ST2
1040	on station SMA1-ST3, sample
1114	Sample SMA1-ST4
	- Wood fibers in grab at both ST3 & ST4
	- Larger wood chips at ST4.
1148	Sample SMA1-ST5
1205	SMA1-ST Comp Sample Collected
1215	Break for lunch
1255	on station SMA1A-IT1, station collected
1323	Collect sample at SMA1A-IT2
1356	Collect Sample at SMA1A-IT3
1418	SMA1A-IT4 - Sample collected.
1456	SMA1A-IT5 - sample collected
1510	SMA1A-IT comp sample collected.
1535	Mob to SMA-3 to collect BW-15-0-10 sample.
1540	on station at BW-15 Collect Sample
1615	Mob for dock. Drop off samples at EcoAnalysts,
1650	Arrive at dock, demob for day.

EM

Signature: _____

(360)460-5784 - Brian @ EcoAnalysts

Daily Log

ANCHOR QEA

Anchor QEA L.L.C.
720 Olive Way, Suite 1900
Seattle, WA 98101
Phone 206.287.9130 Fax 206.287.9131

PROJECT NAME: PG OMMP Long Term Monitoring **DATE:** 9/18/18

SITE ADDRESS: Port Gamble, WA **PERSONNEL:** EM, AK, MH

WEATHER: **WIND FROM:** N ~~NE~~ E SE S SW W NW ? | LIGHT MEDIUM HEAVY | SUNNY CLOUDY RAIN | **TEMPERATURE:** °F 50 °C [Circle appropriate units]

TIME	COMMENTS
0730	Arrive on site, load gear. Harbor Safety
0847	NAV CHECK AT OFFSHORE PILE AT SALSBURY POINT PARK LAUNCH RAMP
	LAT 47° 51.349' N LONG 122° 36.4316' W
0911	Sample SMA2A-ST1
0939	Sample SMA2A-ST2
1005	Sample SMA2A-ST3
1029	Sample SMA2A-ST4
1045	Sample SMA2A-ST5
1100	Composite sample at SMA-2A-ST collected.
1145	On station at SMA2B-IT1, sample collected.
1219	Sample collected SMA2B-IT2. 2 rejected attempts
1245	on station at SMA2B-IT3. 2 attempts, only Subangular cobble collected in grab. Attempt 2 had 3-5 yr old pacific oyster, suggesting material collected is older than cap we should be collecting. Station moved slightly NW to ensure cap is getting sampled.
1318	SMA2B-IT3 collected.
1354	SMA2B-IT4 collected
1446	SMA2B-IT5 Collected.
1510	SMA2B-IT comp sample collected.
1521	SMA2B-ST1 sampled
1534	SMA2B-ST2 Sampled
1602	SMA2B-ST3 sampled.
1616	SMA2B-ST4 sampleled.
1629	SMA2B-ST5- Sampled.
1635	SMA2B-ST composit sample collected. Dopricate sample for DF & PAH & Cd sampled @ 1610.
1705	Drop biocopay samples w/ Eco Analyst & meet to dock, debrief boat.

Signature: _____

pg 1 of 1

Daily Log

ANCHOR QEA

Anchor QEA L.L.C.
720 Olive Way, Suite 1900
Seattle, WA 98101
Phone 206.287.9130 Fax 206.287.9131

PROJECT NAME: PG OMMP Long Term Monitoring **DATE:** 9/19/18

SITE ADDRESS: Port Gamble, WA **PERSONNEL:** em, AK

WEATHER: **WIND FROM:** N | NE | E | SE | S | SW | W | NW

SUNNY | CLOUDY | RAIN | ?

LIGHT | MEDIUM | HEAVY

TEMPERATURE: °F 50 . °C [Circle appropriate units]

TIME	COMMENTS
0730	Em/AK arrive on site, mob gear to vessel
0750	H&S meeting
0810	Mob for SMA2
0834	SMA2A - IT1 Collected.
0903	SMA2A - IT2 Collected. (GPS export to DDM)
0929	SMA2A - IT3 Collected.
	Due to mss noted coordinates for IT2 were in deeper water than expected & did not match location on figure. Ck'd coordinates using Coreon, converted N/E from SPC to DDM.
0956	SMA2A - IT4 Collected.
1010	SMA2A - IT5 collected.
1035	SMA2A - IT Comp sample collected.
1043	SMA1B - IT3 Fill Site bioassay - Collected.
1120	Collect equipment & R/B.
1200	Arrive back at dock, demob boat

PM

Signature: _____ pg 1 of 1

ANCHOR QEA

DATE: 9/17/18

PROJECT NAME: Port Gamble OMMP LTM

PROJECT NO: 180388-01.01

DAILY SAFETY BRIEFING

PERSON CONDUCTING MEETING: EM/AK

HEALTH & SAFETY OFFICER: DT

PROJECT MANAGER: JC

TOPICS COVERED:

- ☐ Emergency Procedures and Evacuation Route
- ☐ Directions to Hospital
- ☒ HASP Review and Location
- ☐ Safety Equipment Location
- ☐ Proper Safety Equipment Use
- ☐ Employee Right-to-Know/MSDS Location
- ☒ Fire Extinguisher Location
- ☐ Eye Wash Station Location
- ☐ Buddy System
- ☐ Self and Coworker Monitoring
- ☐ Lines of Authority
- ☒ Communication
- ☒ Site Security
- ☒ Vessel Safety Protocols
- ☒ Work Zones
- ☐ Vehicle Safety and Driving/Road Conditions
- ☐ Equipment Safety and Operation
- ☐ Proper Use of PPE
- ☒ Decontamination Procedures
- ☐ Other:
- ☒ Lifting Techniques
- ☒ Slips, Trips, and Falls
- ☐ Hazard Exposure Routes
- ☒ Heat and Cold Stress
- ☐ Overhead and Underfoot Hazards
- ☒ Chemical Hazards
- ☐ Flammable Hazards
- ☐ Biological Hazards
- ☐ Eating/Drinking/Smoking

WEATHER CONDITIONS: Sun, partly cloudy

DAILY WORK SCOPE: collect surface grabs

SITE-SPECIFIC HAZARDS: on-water work

SAFETY COMMENTS:

ATTENDEES

PRINTED NAME	SIGNATURE
EVAN MALLENG	
Alexandra Kampof	
Dave Dickinson	

ANCHOR QEA

DATE: 9/18/18

PROJECT NAME: Port Gamble OMMP LTM

PROJECT NO: 180388-01.01

DAILY SAFETY BRIEFING

PERSON CONDUCTING MEETING: EM

HEALTH & SAFETY OFFICER: CT

PROJECT MANAGER: JC

TOPICS COVERED:

- ☐ Emergency Procedures and Evacuation Route
- ☒ Directions to Hospital
- ☒ HASP Review and Location
- ☒ Safety Equipment Location
- ☐ Proper Safety Equipment Use
- ☐ Employee Right-to-Know/MSDS Location
- ☒ Fire Extinguisher Location
- ☒ Eye Wash Station Location
- ☐ Buddy System
- ☐ Self and Coworker Monitoring
- ☐ Lines of Authority
- ☒ Communication
- ☒ Site Security
- ☒ Vessel Safety Protocols
- ☒ Work Zones
- ☐ Vehicle Safety and Driving/Road Conditions
- ☐ Equipment Safety and Operation
- ☐ Proper Use of PPE
- ☒ Decontamination Procedures
- ☐ Other:
- ☒ Lifting Techniques
- ☒ Slips, Trips, and Falls
- ☐ Hazard Exposure Routes
- ☒ Heat and Cold Stress
- ☐ Overhead and Underfoot Hazards
- ☒ Chemical Hazards
- ☐ Flammable Hazards
- ☐ Biological Hazards
- ☐ Eating/Drinking/Smoking

WEATHER CONDITIONS: Sun, cool and then warming

DAILY WORK SCOPE: Collect surface grabs

SITE-SPECIFIC HAZARDS: On-water work, slippery shorelines if walking on shore

SAFETY COMMENTS:

ATTENDEES

PRINTED NAME	SIGNATURE
EVAN MALLETTE	
Meredith Bee	
Alexandra Kopatz	
Dave Dickinson	
	EM

ANCHOR QEA

DATE: 9/19/18

PROJECT NAME: Port Gamble OMMP LTM

PROJECT NO: 180388-01.01

DAILY SAFETY BRIEFING

PERSON CONDUCTING MEETING: EM **HEALTH & SAFETY OFFICER:** CF **PROJECT MANAGER:** JC

TOPICS COVERED:

- ☐ Emergency Procedures and Evacuation Route
- ☐ Directions to Hospital
- ☐ HASP Review and Location
- ☐ Safety Equipment Location
- ☒ Proper Safety Equipment Use
- ☐ Employee Right-to-Know/MSDS Location
- ☐ Fire Extinguisher Location
- ☐ Eye Wash Station Location
- ☐ Buddy System
- ☐ Self and Coworker Monitoring
- ☐ Lines of Authority
- ☐ Communication
- ☐ Site Security
- ☒ Vessel Safety Protocols
- ☐ Work Zones
- ☐ Vehicle Safety and Driving/Road Conditions
- ☐ Equipment Safety and Operation
- ☐ Proper Use of PPE
- ☐ Decontamination Procedures
- ☐ Other:
- ☒ Lifting Techniques
- ☒ Slips, Trips, and Falls
- ☐ Hazard Exposure Routes
- ☐ Heat and Cold Stress
- ☐ Overhead and Underfoot Hazards
- ☐ Chemical Hazards
- ☐ Flammable Hazards
- ☐ Biological Hazards
- ☐ Eating/Drinking/Smoking

WEATHER CONDITIONS: SUN

DAILY WORK SCOPE: collect surface grabs

SITE-SPECIFIC HAZARDS: on-water work

SAFETY COMMENTS:

ATTENDEES

PRINTED NAME	SIGNATURE
EVAN MACZKO	
Alexandra Kapetan	
DAVE DICKINSON	
	EM

Appendix B
Analytical Data Table

Table B-1a
Summary Analytical Results - Sediment

Location ID	SMA1A-IT_1809	SMA1-ST_1809	SMA2A-IT_1809
Sample ID	SMA1A-IT-0-10-Comp-180917	SMA1-ST-0-10-Comp-180917	SMA2A-IT-0-10-Comp-180919
Sample Date	09/17/2018	09/17/2018	09/19/2018
Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm
Sample Type	N	N	N
Conventional Parameters (pct)			
Total Solids	**79.39**	**49.28**	**83.61**
Metals (mg/kg)			
Cadmium	**0.1 J**	**0.55**	**0.1 J**
Polycyclic Aromatic Hydrocarbons (µg/kg)			
1-Methylnaphthalene	**3.62 J**	**87.3**	**2.48 J**
2-Methylnaphthalene	**6.21**	**125**	**4.03 J**
Acenaphthene	**6.26 J**	**205 J**	**4.9 J**
Acenaphthylene	**6.3 J**	**80.7 J**	**3.33 J**
Anthracene	**11.7 J**	**252 J**	**4.81 J**
Benzo(a)anthracene	**9.73**	**260**	**3.65 J**
Benzo(a)pyrene	**7.92**	**214**	**3.54 J**
Benzo(b)fluoranthene	**9.25**	**255**	**3.25 J**
Benzo(b,j,k)fluoranthenes	**18**	**497**	**7.01 J**
Benzo(g,h,i)perylene	**8.97**	**110**	**6.24**
Benzo(j)fluoranthene	**4.06 J**	**118**	**1.79 J**
Benzo(k)fluoranthene	**4.42 J**	**125**	**1.72 J**
Chrysene	**17.4**	**433**	**4.65 J**
Dibenzo(a,h)anthracene	4.81 U	**28.4**	4.94 U
Fluoranthene	**38.2**	**715**	**20.1**
Fluorene	**6.25 J**	**220 J**	**4.64 J**
Indeno(1,2,3-c,d)pyrene	**4.2 J**	**90.7**	4.94 U
Naphthalene	**39.1**	**851**	**19.3**
Phenanthrene	**30.3**	**696**	**16.9**
Pyrene	**36.4 J**	**765 J**	**18.9 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)	**12.654 J**	**343.94**	**5.1495 J**
Dioxin Furans (ng/kg)			
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.048 U	**0.393 J**	**0.176 J**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	0.079 U	**0.894 J**	**0.483 J**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	**0.098 J**	**0.647 J**	**0.27 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	**0.232 J**	**3.28**	**1.31**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	**0.133 J**	**1.13**	**0.674 J**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	**10.7**	**128**	**9.78**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	**117 J**	**1310**	**50**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**2.8**	**24.2**	**9.87**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**1.29**	**13**	**8.11**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**5.37 J**	**66.4**	**25.8**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**59.5 J**	**647**	**27.3**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	**0.128 J**	**1.49**	**0.375 J**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.086 U	**0.705 J**	**0.534 J**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.071 U	**0.575 J**	**0.359 J**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	**0.053 J**	**0.776 J**	**0.469 J**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.04 U	**0.501 J**	**0.295 J**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.038 U	**0.278 J**	**0.126 J**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	**0.06 J**	**0.515 J**	**0.314 J**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	**1**	**12.6**	**2.47**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	**0.061 J**	**0.606 J**	0.041 U
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	**2.65 J**	**33.5**	**2.51 J**
Total Tetrachlorodibenzofuran (TCDF)	**2.18**	**24.5**	**5.12**
Total Pentachlorodibenzofuran (PeCDF)	**0.533**	**11.1**	**5.12**
Total Hexachlorodibenzofuran (HxCDF)	**1.04**	**22**	**4.7**
Total Heptachlorodibenzofuran (HpCDF)	**2.94**	**37**	**5.01**
Total Dioxin/Furan (U = 0)	**132.115 J**	**1495.89 J**	**70.145 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	**0.223905 J**	**4.15746 J**	**1.304273 J**

Notes:

Horizontal coordinate datum is NAD 1983 State Plane Washington North FIPS 4601 (US Survey Feet).

All undetect results are reported at the reporting limit or, for high-resolution analyses, at the estimated detection limit.

Totals are calculated as the sum of all detected results (U=0). If all results are not detected, the highest limit value is reported as the sum.

Total cPAH TEQ (7 minimum CAEPA 2005) calculation includes benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene and indeno(1,2,3-c,d)pyrene. Per MTCA cleanup Regulation, Table 708-2 "Toxicity Equivalency Factors for Minimum Required Carcinogenic Polyaromatic Hydrocarbons (cPAHs) under WAC 173-340-708(e).

Total dioxin/furan is the sum of all individual dioxin/furans (non-homolog) listed in this table.

Dioxin/furan TEQ values were calculated with 2005 WHO TEF values for mammals.

Bold: Detected result

--: results not reported or not applicable

µg/kg: micrograms per kilogram

cPAH: carcinogenic polycyclic aromatic hydrocarbon

FD: field duplicate sample

J: estimated value

mg/kg: milligrams per kilogram

N: normal environmental sample

ng/kg: nanograms per kilogram

PAH: polycyclic aromatic hydrocarbons

pct: percent

SE: sediment matrix

TEQ: toxic equivalency

U: compound analyzed, but not detected above detection limit

UJ: Compound analyzed, but not detected above estimated detection limit

FINAL VALIDATED DATA

Table B-1a
Summary Analytical Results - Sediment

SMA2A-ST_1809 SMA2A-ST-0-10-Comp-180918 09/18/2018 0 - 10 cm N	SMA2B-IT_1809 SMA2B-IT-0-10-Comp-180918 09/18/2018 0 - 10 cm N	SMA2B-ST_1809 SMA102B-ST-0-10-Comp-180918 09/18/2018 0 - 10 cm FD	SMA2B-ST_1809 SMA2B-ST-0-10-Comp-180918 09/18/2018 0 - 10 cm N
76.51	**79.59**	**81.95**	**78.01**
0.13	**0.1 J**	**0.07 J**	**0.09 J**
17.4	**7.08**	**5.64**	**4.8 J**
23.3	**10.6**	**9.41**	**7.65**
41.9 J	**9.21 J**	**11 J**	**7.41 J**
32.8 J	**14.5 J**	**20.2 J**	**10.8 J**
54.4 J	**15.8 J**	**15.6 J**	**10.6 J**
70.9	**13.3**	**11.1**	**5.2**
57.7	**12.3**	**24.6**	**4.14 J**
91	**10.4**	**26**	**4.44 J**
178	**22.6**	**50.7**	**9.42 J**
39.9	**15.9**	**15.1**	**6.17**
43.5	**5.79**	**10.1**	**2.41 J**
44.4	**5.88**	**14.8**	**2.51 J**
155	**27.5**	**19.1**	**10.4**
7.58	4.83 U	**3.41 J**	4.93 U
428	**57.9**	**43.4**	**34.9**
36.2 J	**9.87 J**	**8.53 J**	**5.97 J**
29.1	**6.73**	**10.8**	4.93 U
159	**131**	**112**	**57.1**
159	**58.8**	**46**	**31.7**
332 J	**67.2 J**	**46.1 J**	**31.5 J**
101.348	**18.466**	**36.472 J**	**6.401 J**
0.152 J	**0.197 J**	**0.184 J**	**0.131 J**
0.108 U	**0.303 J**	**0.077 J**	**0.142 J**
0.123 J	**0.164 J**	0.053 U	**0.059 J**
0.659 J	**0.838 J**	**0.255 J**	**0.294 J**
0.319 J	**0.378 J**	**0.112 J**	**0.152 J**
38.6	**7.85**	**6.65**	**5.47**
515	**62.3**	**75.1**	**49.1**
9.03	**7.87**	**6.52**	**2.2**
4.3	**4.35**	**1.68**	**1.23**
18.1	**10**	**4.52**	**4.09**
259	**29.4**	**36**	**25.7**
0.38 J	**0.422 J**	**0.193 J**	**0.204 J**
0.172 U	**0.332 J**	0.098 U	0.106 U
0.127 J	**0.212 J**	**0.055 J**	0.042 U
0.146 J	**0.229 J**	0.032 U	0.031 U
0.109 J	**0.188 J**	**0.04 J**	0.031 U
0.099 J	**0.126 J**	**0.058 J**	**0.057 J**
0.113 J	**0.207 J**	**0.054 J**	0.031 UJ
2.45	**1.68**	**0.697 J**	**0.721 J**
0.162 J	**0.115 J**	0.039 U	0.045 U
11.3	**2.88**	**1.88 J**	**1.56 J**
5.08	**7.78**	**3.25**	**3.03**
1.84	**3.62**	**0.866**	**0.805**
2.56	**3.19**	**0.839**	**0.854**
9	**4.22**	**1.97**	**1.88**
569.739 J	**78.421 J**	**85.355 J**	**57.89 J**
0.95491 J	**0.944764 J**	**0.445264 J**	**0.426708 J**

Table B-1b
Summary Analytical Results - Rinse Blank QC

Sample ID Sample Date Sample Type	PGLTM-RB-180919 09/19/2018 RB
Metals (µg/L)	
Cadmium	0.1 U
Polycyclic Aromatic Hydrocarbons (µg/L)	
1-Methylnaphthalene	0.1 UJ
2-Methylnaphthalene	0.1 UJ
Acenaphthene	0.1 UJ
Acenaphthylene	0.1 UJ
Anthracene	0.1 U
Benzo(a)anthracene	0.1 U
Benzo(a)pyrene	0.1 U
Benzo(b)fluoranthene	0.1 U
Benzo(b,j,k)fluoranthenes	0.2 U
Benzo(g,h,i)perylene	0.1 U
Benzo(j)fluoranthene	0.1 U
Benzo(k)fluoranthene	0.1 U
Chrysene	0.1 U
Dibenzo(a,h)anthracene	0.1 UJ
Fluoranthene	0.1 U
Fluorene	0.1 U
Indeno(1,2,3-c,d)pyrene	0.1 U
Naphthalene	0.1 UJ
Phenanthrene	0.1 U
Pyrene	0.1 U
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)	0.1 UJ
Dioxin Furans (ng/L)	
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.00039 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	0.00052 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.00049 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.0005 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.00049 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.00072 U
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	0.0016 U
Total Tetrachlorodibenzo-p-dioxin (TCDD)	-- U
Total Pentachlorodibenzo-p-dioxin (PeCDD)	-- U
Total Hexachlorodibenzo-p-dioxin (HxCDD)	-- U
Total Heptachlorodibenzo-p-dioxin (HpCDD)	-- U
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.00026 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.00046 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.00042 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.00036 U
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.00034 U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.0004 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.00034 U
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.00028 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.00044 U
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0016 U
Total Tetrachlorodibenzofuran (TCDF)	-- U
Total Pentachlorodibenzofuran (PeCDF)	-- U
Total Hexachlorodibenzofuran (HxCDF)	-- U
Total Heptachlorodibenzofuran (HpCDF)	-- U
Total Dioxin/Furan (U = 0)	0.0016 U
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	0.00052 U

FINAL VALIDATED DATA

Table B-1b
Summary Analytical Results - Rinse Blank QC

Notes:

All undetect results are reported at the reporting limit or, for high-resolution analyses, at the estimated detection limit. Totals are calculated as the sum of all detected results (U=0). If all results are not detected, the highest limit value is reported as the sum.

Total cPAH TEQ (7 minimum CAEPA 2005) calculation includes benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene and indeno(1,2,3-c,d)pyrene. Per MTCA cleanup Regulation, Table 708-2 "Toxicity Equivalency Factors for Minimum Required Carcinogenic Polyaromatic Hydrocarbons (cPAHs) under WAC 173-340-708(e).

Total dioxin/furan is the sum of all individual dioxin/furans (non-homolog) listed in this table.

Dioxin/furan TEQ values were calculated with 2005 WHO TEF values for mammals.

Bold: Detected result

--: results not reported or not applicable

µg/L: micrograms per liter

cPAH: carcinogenic polycyclic aromatic hydrocarbon

J: estimated value

N: normal environmental sample

ng/L: nanograms per liter

PAH: polycyclic aromatic hydrocarbons

RB: rinse blank sample

TEQ: toxic equivalency

U: compound analyzed, but not detected above detection limit

UJ: Compound analyzed, but not detected above estimated detection limit

FINAL VALIDATED DATA

Appendix C
EcoAnalyst Bioassay Laboratory Report

Provided under separate cover

Appendix D
ARI Laboratory Report

Analytical Resources, Incorporated
Analytical Chemists and Consultants

15 October 2018

Jascon Cornetta
Anchor QEA, LLC
720 Olive Way, Suite 1900
Seattle, WA 98101

RE: Port Gamble - OMMP LTM

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
18I0285	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

Amanda Volgardsen, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Cert# 100006-011

PJLA Testing
Accreditation # 66169

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

18I0285

Chain of Custody Record and Laboratory Analysis Request COC#

Date: 9/19/18
Laboratory : ARI
Project Name: Port Gamble - OMMP LTM
Project Number: 180388-01.01
Project Contact: Jason Cornetta
Phone Number: 206.971.2680
Shipment Method: Delivery

ANCHOR QEA

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	Sediment and Field QC: Cadmium	PAHs	Dioxin/Furan	Archive	Comments
1	SMA1A-IT-0-10-Comp-1809 17	9/17/18 1510	SE	2	x	x	x		
2	SMA1-ST-0-10-Comp-1809 17	9/17/18 1205	SE	2	x	x	x		
3	SMA2A-IT-0-10-Comp-1809 19	9/19/18 1025	SE	2	x	x	x		
4	SMA2A-ST-0-10-Comp-1809 18	9/18/18 1100	SE	2	x	x	x		
5	SMA2B-IT-0-10-Comp-1809 18	9/18/18 1510	SE	2	x	x	x		
6	SMA2B-ST-0-10-Comp-1809 18	9/18/18 1635	SE	2	x	x	x		
7	SMA1A-IT1-1809 17	9/17/18 1303	SE	1				x	
8	SMA1A-IT2-1809 17	9/17/18 1320	SE	1				x	
9	SMA1A-IT3-1809 17	9/17/18 1256	SE	1				x	
10	SMA1A-IT4-1809 17	9/17/18 1423	SE	1				x	
11	SMA1A-IT5-1809 17	9/17/18 1456	SE	1				x	
12	SMA1-ST1-1809 17	9/17/18 0951	SE	1				x	
13	SMA1-ST2-1809 17	9/17/18 1017	SE	1				x	
14	SMA1-ST3-1809 17	9/17/18 1047	SE	1				x	

1 See project SAP/QAPP for analyte lists and test methods

2 Email sample confirmation report to labdata@anchorqea.com

Additional notes/comments:

Relinquished By:	Company:	Received By:	Company:
Alexandra Kapoff	Anchor QEA LLC.	Jasmine Bowman	ARI / Anchor QEA LLC
Signature/Printed Name	Date/Time 9/17/18 17:00	Signature/Printed Name	Date/Time 9/19/18 1700
Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

2 of 1762

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

1870285

Chain of Custody Record and Laboratory Analysis Request COC#

Date: 9/19/18
Laboratory : ARI
Project Name: Port Gamble - OMMP LTM
Project Number: 180388-01.01
Project Contact: Jason Cornetta
Phone Number: 206.971.2680
Shipment Method: Delivery

ANCHOR QEA

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	Sediment and Field QC: Cadmium	PAHs	Dioxin/Furan	Archive	Comments
1	SMA1-ST4-180917	9/17/18 1114	SE	1				x	
2	SMA1-ST5-180917	9/17/18 1148	SE	1				x	
3	SMA2A-IT1-180919	9/19/18 0834	SE	1				x	
4	SMA2A-IT2-180919	9/19/18 0903	SE	1				x	
5	SMA2A-IT3-180919	9/19/18 0929	SE	1				x	
6	SMA2A-IT4-180919	9/19/18 0956	SE	1				x	
7	SMA2A-IT5-180919	9/19/18 1010	SE	1				x	
8	SMA2A-ST1-180918	9/18/18 0911	SE	1				x	
9	SMA2A-ST2-180918	9/18/18 0939	SE	1				x	
10	SMA2A-ST3-180918	9/18/18 1005	SE	1				x	
11	SMA2A-ST4-180918	9/18/18 1029	SE	1				x	
12	SMA2A-ST5-180918	9/18/18 1045	SE	1				x	
13	SMA2B-IT1-180918	9/18/18 1145	SE	1				x	
14	SMA2B-IT2-180918	9/18/18 1219	SE	1				x	

1 See project SAP/QAPP for analyte lists and test methods

2 Email sample confirmation report to labdata@anchorqea.com

Additional notes/comments:

Relinquished By:	Company:	Received By:	Company:
Alexandra Kurpiff	Anchor QEA LLC.	Jasmine Bauman	Anchor QEA LLC
Signature/Printed Name	Date/Time 9/19/18 1700	Signature/Printed Name	Date/Time 9/19/18 1700
Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

3 of 1762

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

18I0285

Chain of Custody Record and Laboratory Analysis Request COC#

Date: 9/19/18
Laboratory : ARI
Project Name: Port Gamble - OMMP LTM
Project Number: 180388-01.01
Project Contact: Jason Cornetta
Phone Number: 206.971.2680
Shipment Method: Delivery

ANCHOR QEA

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	Sediment and Field QC: Cadmium	PAHs	Dioxin/Furan	Archive															Comments
1	SMA2B-IT3-180918	9/18/18 1318	SE	1				x															
2	SMA2B-IT4-180918	9/18/18 1354	SE	1				x															
3	SMA2B-IT5-180918	9/18/18 1448	SE	1				x															
4	SMA2B-ST1-180918	9/18/18 1521	SE	1				x															
5	SMA2B-ST2-180918	9/18/18 1539	SE	1				x															
6	SMA2B-ST3-180918	9/18/18 1602	SE	1				x															
7	SMA2B-ST4-180918	9/18/18 1616	SE	1				x															
8	SMA2B-ST5-180918	9/18/18 1629	SE	1				x															
9	SMA02B-ST-0-10-Comp-180918	9/18/18 1640	SE	2	X	X	X	~~x~~	AA														
10	PGLTM-RB-180919	9/19/18 1120	W SE	5	X	X	X	~~x~~	AF														
11		9/ /18	SE					x															
12		9/ /18	SE					x															
13		9/ /18	SE					x															
14		9/ /18	SE					x															

1 See project SAP/QAPP for analyte lists and test methods

2 Email sample confirmation report to labdata@anchorqea.com

Additional notes/comments:

Relinquished By:	Company:	Received By:	Company:
Alexandra Fairpoff	Anchor QEA LLC.	Jasmine Bowman	Anchor QEA LLC
Signature/Printed Name	Date/Time 9/19/18 1700	Signature/Printed Name	Date/Time 9/19/18 1700
		ARI	
Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

4 of 1762

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

WORK ORDER

18I0285

Client: Anchor QEA, LLC | **Project Manager:** Amanda Volgardsen

Project: Port Gamble Sediment Stockpile | **Project Number:** 2017 Port Gamble Sediment Stockpile

18I0285-30 A	Glass WM, Amber, 8 oz		
18I0285-31 A	Glass WM, Amber, 8 oz		
18I0285-32 A	Glass WM, Amber, 8 oz		
18I0285-33 A	Glass WM, Amber, 8 oz		
18I0285-34 A	Glass WM, Amber, 8 oz		
18I0285-35 A	Glass WM, Amber, 8 oz		
18I0285-36 A	Glass WM, Amber, 8 oz		
18I0285-37 A	Glass WM, Clear, 16 oz		
18I0285-37 B	Glass WM, Amber, 8 oz		
18I0285-38 A	Glass NM, Amber, 1000 mL		
18I0285-38 B	Glass NM, Amber, 1000 mL		
18I0285-38 C	Glass NM, Amber, 500 mL		
18I0285-38 D	Glass NM, Amber, 500 mL		
18I0285-38 E	HDPE NM, 500 mL, 1:1 HNO3	LL	Pass

JBW
Preservation Confirmed By

09/20/18
Date

Reviewed By

Date

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Anchor QEA Project Name: Port Gamble Sediment

COC No(s): _____ NA Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 1870285 Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry): 1.8 0.6 ___ ___ ___ ___

Time: 1700

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D0052O6

Cooler Accepted by: JBS Date: 9/19/18 Time: 1700

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other:			
Was sufficient ice used (if appropriate)?	NA	YES	NO
Were all bottles sealed in individual plastic bags?		YES	NO
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA		

Was Sample Split by ARI : NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: JBW Date: 09/20/18 Time: 0814

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: _____ Date: _____

Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

Anchor QEA, LLC	Project: Port Gamble - OMMP LTM	
720 Olive Way, Suite 1900	Project Number: 180388-01.01	**Reported:**
Seattle WA, 98101	Project Manager: Jascon Cornetta	15-Oct-2018 14:14

Case Narrative

Sample receipt

Samples as listed on the preceding page were received September 19, 2018 under ARI work order 18I0285. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Polynuclear Aromatic Hydrocarbons (PAH) - EPA Method SW8270D-SIM

The samples were extracted and analyzed within the recommended holding times.

Sample SMAI-ST-0-10-COMP-180917 was reanalyzed at a dilution due to various compound concentrations exceeding the upper calibration limits. These compounds have been flagged with "E" qualifiers on the initial run. No further corrective action was taken.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank BGI06118 has Naphthalene detected below the reporting limit, but above the method detection limit. The Naphthalene has been flagged with a "J" qualifier on the method blank. There were no target compounds detected above the reporting limits in the method blanks. No further corrective action was taken.

The LCSD BGI0618 has high RPD for Dibenzo(a,h)anthracene. This is likely due to a calibration bias. All other LCS/LCSD percent recoveries and RPD were within control limits. No corrective action was taken.

A matrix spike and matrix spike duplicate were prepared in conjunction with sample SMA 2A-IT-0-10-COMP-180919. The matrix spike/matrix spike duplicate percent recoveries and RPD were within QC limits.

The SRM has various low percent recoveries. These compounds have been flagged on the SRM. The SRM is not appropriate for the method limits. All other SRM percent recoveries were within QC limits. No corrective action was taken.

Dioxin/Furans - EPA Method 1613

The samples were extracted and analyzed within the recommended holding times. Analysis was performed using an application specific column developed by Restek. The RTX-DIoxin2 column has unique isomer separation for the 2378-TCDF, eliminating the need for confirmation analysis.

Initial and continuing calibrations were within method requirements.

Labeled internal standard areas were within limits.

The cleanup surrogate percent recoveries were within control limits.

The method blanks contain reportable responses for various compounds below the reporting limits. Associated detected results and QC have been flagged with "B" qualifiers. No further corrective action was taken.

The OPR (Ongoing Precision and Recovery) standard percent recoveries were within control limits.

A duplicate was prepared in conjunction with sample PGLTM-RB-180919. The duplicate RPD were within QC limits.

A duplicate was prepared in conjunction with sample SMA 1A-IT-0-10-COMP-180917. The duplicate has high RPD for the flagged compounds. The results are advisory. All other RPD were within QC limits. No corrective action was taken.

The SRM has no recovery for 2,3,4,6,7,8-HxCDF and high percent recovery for 1,2,3,7,8,9-HxCDF. All other percent

Anchor QEA, LLC	Project: Port Gamble - OMMP LTM	
720 Olive Way, Suite 1900	Project Number: 180388-01.01	**Reported:**
Seattle WA, 98101	Project Manager: Jascon Cornetta	15-Oct-2018 14:14

Case Narrative

recoveries were within QC limits. No corrective action was taken.

Total Cadmium UCT-KED - EPA Method 6020A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blanks were clean at the reporting limits.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample SMA 1A-IT-0-10-COMP-180917. The matrix spike percent recovery and duplilcate RPD were within QC limits.

The SRM percent recovery was within QC limits.

Anchor QEA, LLC	Project: Port Gamble - OMMP LTM	
720 Olive Way, Suite 1900	Project Number: 180388-01.01	**Reported:**
Seattle, WA 98101	Project Manager: Jascon Cornetta	10/15/2018 14:14

ANALYTICAL REPORT FOR SAMPLES

Laboratory ID	Sample ID	Matrix	Date Sampled	Date Received
18I0285-01	SMA1A-IT-0-10-Comp-180917	Solid	09/17/18 15:10	09/19/18 17:00
18I0285-02	SMA1-ST-0-10-Comp-180917	Solid	09/17/18 12:05	09/19/18 17:00
18I0285-03	SMA2A-IT-0-10-Comp-180919	Solid	09/19/18 10:25	09/19/18 17:00
18I0285-04	SMA2A-ST-0-10-Comp-180918	Solid	09/18/18 11:00	09/19/18 17:00
18I0285-05	SMA2B-IT-0-10-Comp-180918	Solid	09/18/18 15:10	09/19/18 17:00
18I0285-06	SMA2B-ST-0-10-Comp-180918	Solid	09/18/18 16:35	09/19/18 17:00
18I0285-07	SMA1A-IT1-180917	Solid	09/17/18 13:03	09/19/18 17:00
18I0285-08	SMA1A-IT2-180917	Solid	09/17/18 13:20	09/19/18 17:00
18I0285-09	SMA1A-IT3-180917	Solid	09/17/18 13:56	09/19/18 17:00
18I0285-10	SMA1A-IT4-180917	Solid	09/17/18 14:23	09/19/18 17:00
18I0285-11	SMA1A-IT5-180917	Solid	09/17/18 14:56	09/19/18 17:00
18I0285-12	SMA1A-ST1-180917	Solid	09/17/18 09:51	09/19/18 17:00
18I0285-13	SMA1A-ST2-180917	Solid	09/17/18 10:17	09/19/18 17:00
18I0285-14	SMA1A-ST3-180917	Solid	09/17/18 10:47	09/19/18 17:00
18I0285-15	SMA1A-ST4-180917	Solid	09/17/18 11:14	09/19/18 17:00
18I0285-16	SMA1A-ST5-180917	Solid	09/17/18 11:48	09/19/18 17:00
18I0285-17	SMA2A-IT1-180919	Solid	09/19/18 08:34	09/19/18 17:00
18I0285-18	SMA2A-IT2-180919	Solid	09/19/18 09:03	09/19/18 17:00
18I0285-19	SMA2A-IT3-180919	Solid	09/19/18 09:29	09/19/18 17:00
18I0285-20	SMA2A-IT4-180919	Solid	09/19/18 09:56	09/19/18 17:00
18I0285-21	SMA2A-IT5-180919	Solid	09/19/18 10:10	09/19/18 17:00
18I0285-22	SMA2A-ST1-180918	Solid	09/18/18 09:11	09/19/18 17:00
18I0285-23	SMA2A-ST2-180918	Solid	09/18/18 09:39	09/19/18 17:00
18I0285-24	SMA2A-ST3-180918	Solid	09/18/18 10:05	09/19/18 17:00
18I0285-25	SMA2A-ST4-180918	Solid	09/18/18 10:29	09/19/18 17:00
18I0285-26	SMA2A-ST5-180918	Solid	09/18/18 10:45	09/19/18 17:00
18I0285-27	SMA2B-IT1-180918	Solid	09/18/18 11:45	09/19/18 17:00
18I0285-28	SMA2B-IT2-180918	Solid	09/18/18 12:19	09/19/18 17:00
18I0285-29	SMA2B-IT3-180918	Solid	09/18/18 13:18	09/19/18 17:00
18I0285-30	SMA2B-IT4-180918	Solid	09/18/18 13:54	09/19/18 17:00
18I0285-31	SMA2B-IT5-180918	Solid	09/18/18 14:48	09/19/18 17:00
18I0285-32	SMA2B-ST1-180918	Solid	09/18/18 15:21	09/19/18 17:00
18I0285-33	SMA2B-ST2-180918	Solid	09/18/18 15:34	09/19/18 17:00
18I0285-34	SMA2B-ST3-180918	Solid	09/18/18 16:02	09/19/18 17:00
18I0285-35	SMA2B-ST4-180918	Solid	09/18/18 16:16	09/19/18 17:00
18I0285-36	SMA2B-ST5-180918	Solid	09/18/18 16:29	09/19/18 17:00
18I0285-37	SMA102B-ST-0-10-Comp-180918	Solid	09/18/18 16:40	09/19/18 17:00
18I0285-38	PGLTM-RB-180919	Water	09/19/18 11:20	09/19/18 17:00

QUALIFIERS AND NOTES

Qualifier	Definition
X	Indicates possible CDPE interference.
U	This analyte is not detected above the applicable reporting or detection limit.
J	Estimated concentration value detected below the reporting limit.
EMPC	Estimated Maximum Possible Concentration qualifier for HRGCMS Dioxin
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
D	The reported value is from a dilution
B	This analyte was detected in the method blank.
*	Flagged value is not within established control limits.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Analytical Resources, Incorporated
Analytical Chemists and Consultants

SMA1A-IT-0-10-Comp-180917

Form I

ORGANIC ANALYSIS DATA SHEET

EPA 8270D-SIM

Polynuclear Aromatic Hydrocarbons

Laboratory:	Analytical Resources, Inc.				
Client:	Anchor QEA, LLC				
Project:	Port Gamble - OMMP LTM				
Matrix:	Sediment	Laboratory ID:	18I0285-01	SDG:	18I0285
Sampled:	09/17/18 15:10	Prepared:	09/26/18 15:45	File ID:	NT818100307.D
% Solids:	79.39	Preparation:	EPA 3546 (Microwave)	Analyzed:	10/03/18 13:48
Batch:	BGI0708	Sequence:	SGJ0048	Initial/Final:	13.08 g Wet / 0.5 mL
Instrument:	NT8	Column:	RXI-17Sil ms	Calibration:	BH00016
Cleanups:	Silica Gel, Sulfur				

CAS NO.	COMPOUND	DILUTION	CONC. (ug/kg dry)	Q	DL	RL
91-20-3	Naphthalene	1	39.1		1.23	4.81
91-57-6	2-Methylnaphthalene	1	6.21		1.06	4.81
90-12-0	1-Methylnaphthalene	1	3.62	J	0.39	4.81
208-96-8	Acenaphthylene	1	6.30		1.04	4.81
83-32-9	Acenaphthene	1	6.26		0.55	4.81
86-73-7	Fluorene	1	6.25		0.61	4.81
85-01-8	Phenanthrene	1	30.3		0.69	4.81
120-12-7	Anthracene	1	11.7		0.84	4.81
206-44-0	Fluoranthene	1	38.2		0.45	4.81
129-00-0	Pyrene	1	36.4		0.60	4.81
56-55-3	Benzo(a)anthracene	1	9.73		0.79	4.81
218-01-9	Chrysene	1	17.4		1.01	4.81
205-99-2	Benzo(b)fluoranthene	1	9.25		1.32	4.81
207-08-9	Benzo(k)fluoranthene	1	4.42	J	0.73	4.81
205-82-3	Benzo(j)fluoranthene	1	4.06	J	0.65	4.81
50-32-8	Benzo(a)pyrene	1	7.92		0.59	4.81
193-39-5	Indeno(1,2,3-cd)pyrene	1	4.20	J	1.01	4.81
53-70-3	Dibenzo(a,h)anthracene	1	4.81	U	0.86	4.81
191-24-2	Benzo(g,h,i)perylene	1	8.97		1.03	4.81
	Benzofluoranthenes, Total	1	18.0		2.90	9.63

SURROGATES	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC	QC LIMITS	Q
2-Methylnaphthalene-d10	144.45	84.6	58.6	32 - 120	
Dibenzo[a,h]anthracene-d14	144.45	139	96.6	21 - 133	
Fluoranthene-d10	144.45	111	77.0	36 - 134	

Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

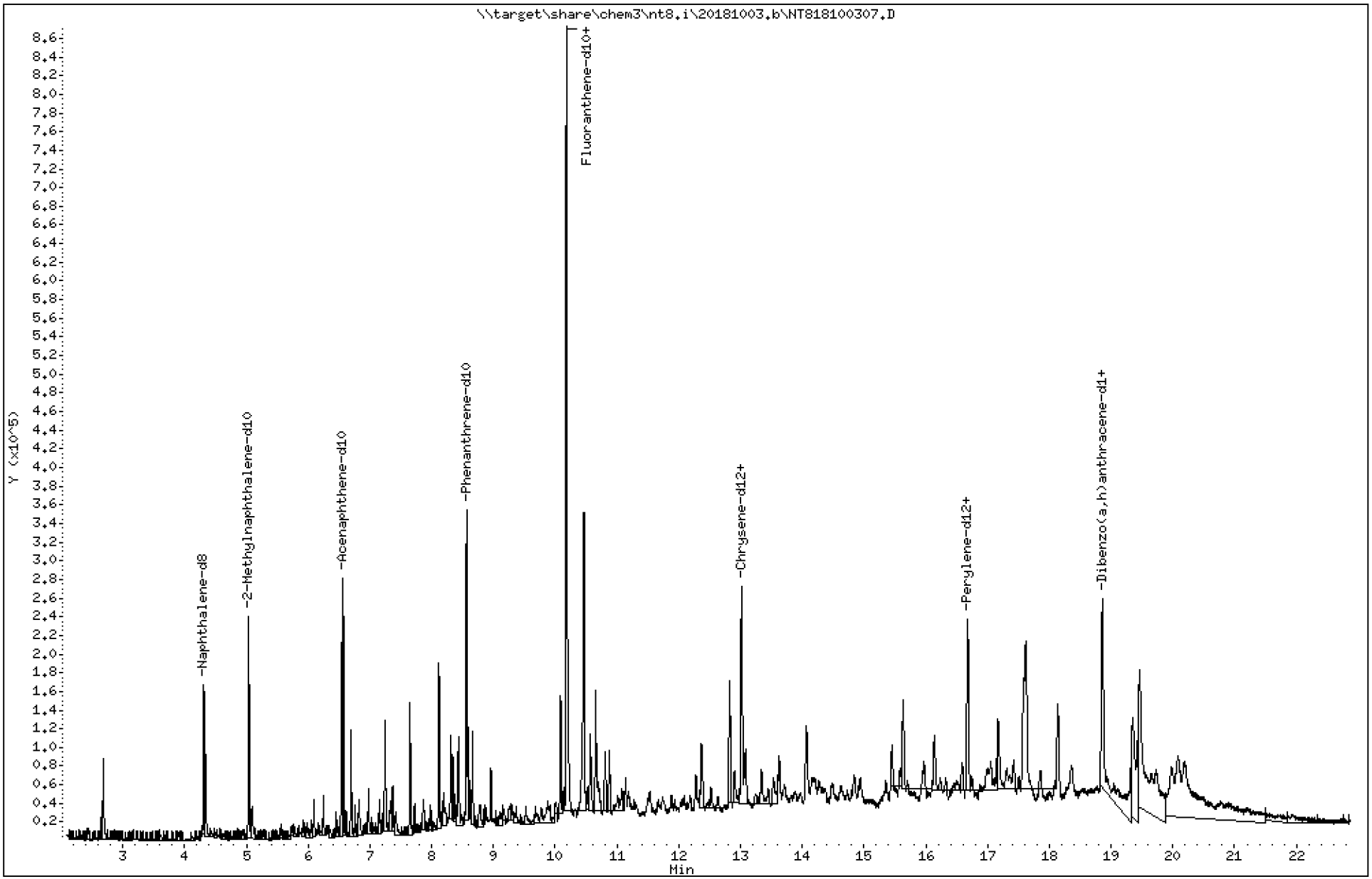
Sample Info: 18I0285-01

Column phase: Rxi-17sil

Instrument: nt8.i

Operator: JZ

Column diameter: 0.25



Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

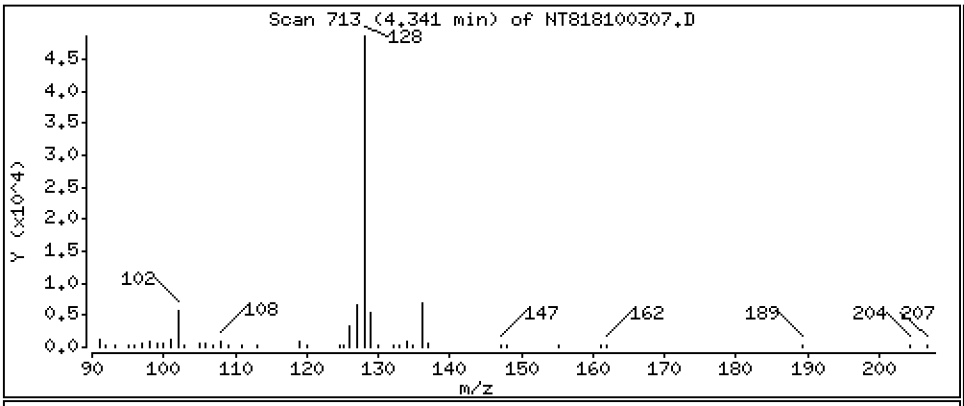
Operator: JZ

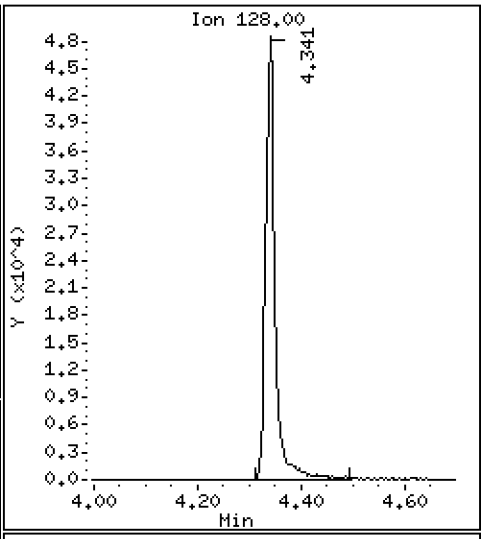
Column phase: Rxi-17sil

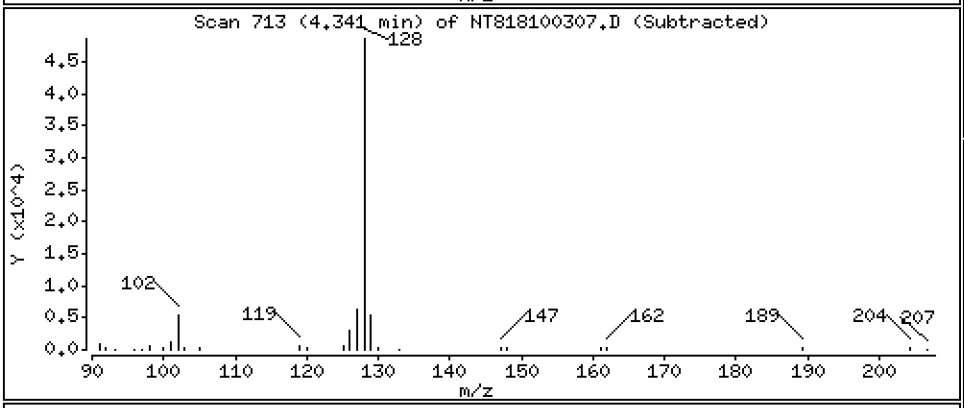
Column diameter: 0.25

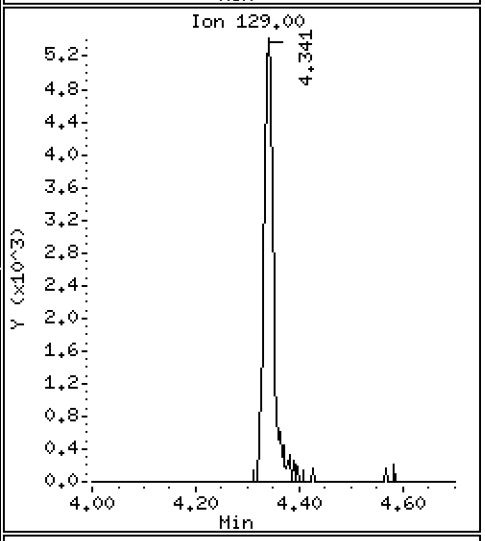
2 Naphthalene

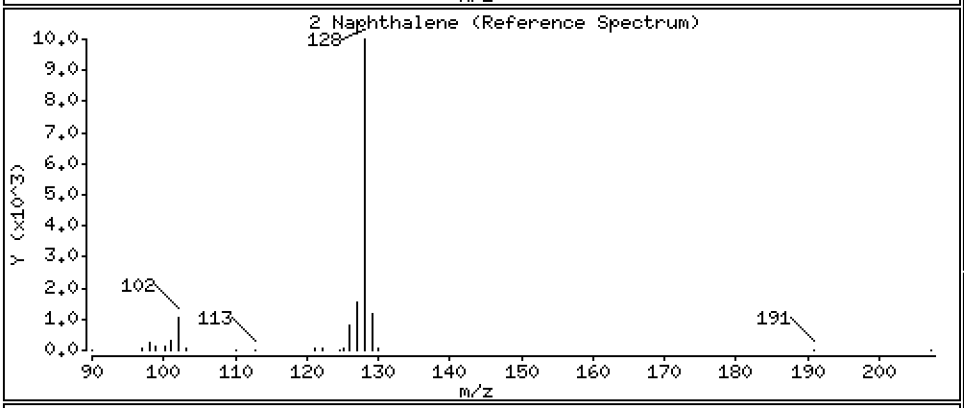
Concentration: 0.8124 ug/mL

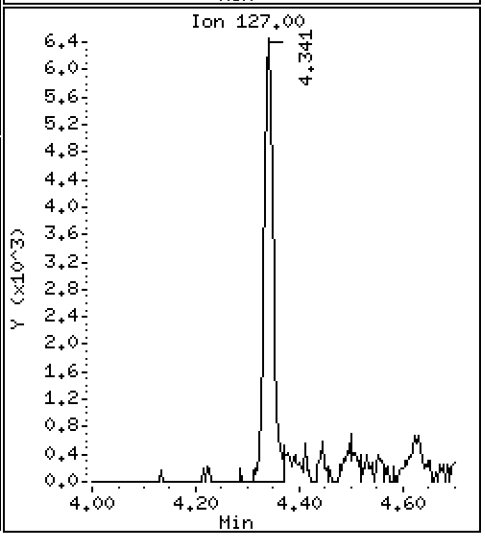


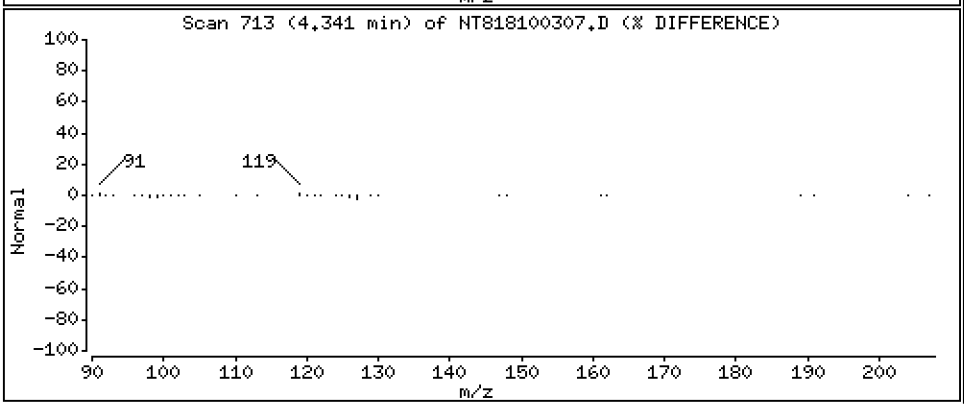












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

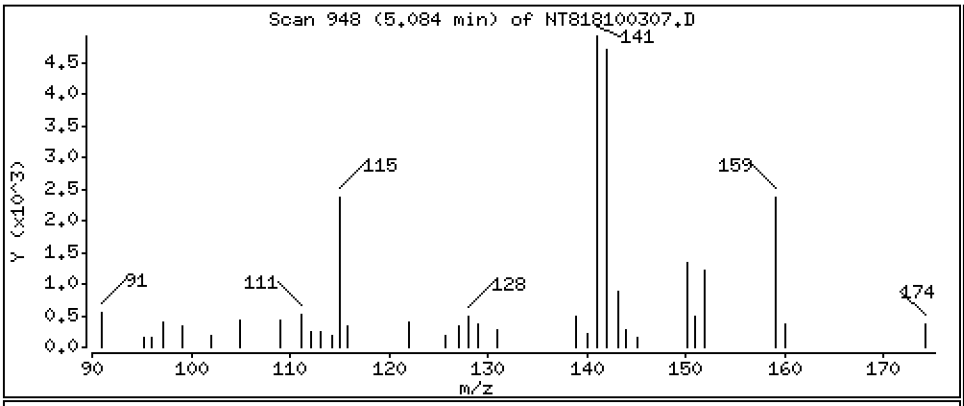
Operator: JZ

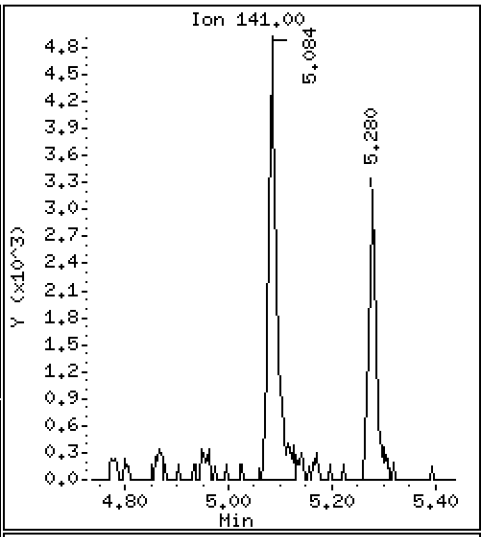
Column phase: Rxi-17sil

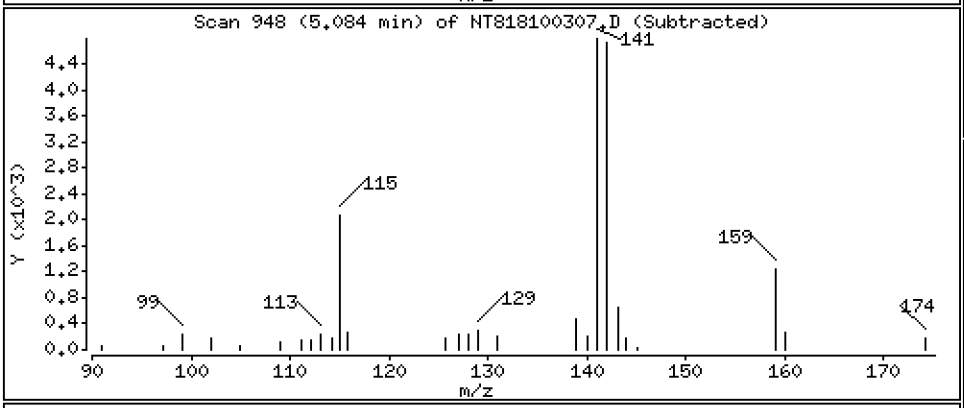
Column diameter: 0.25

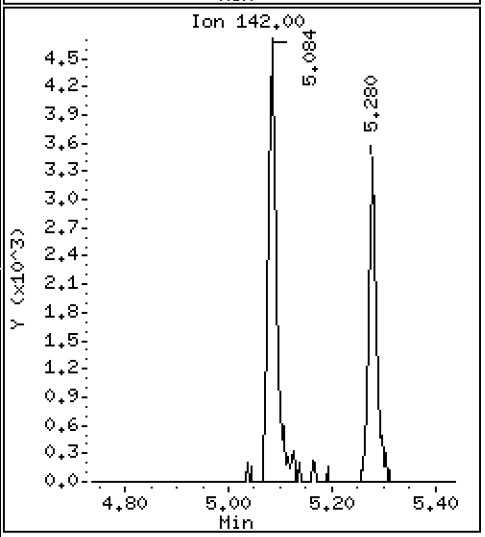
4 2-Methylnaphthalene

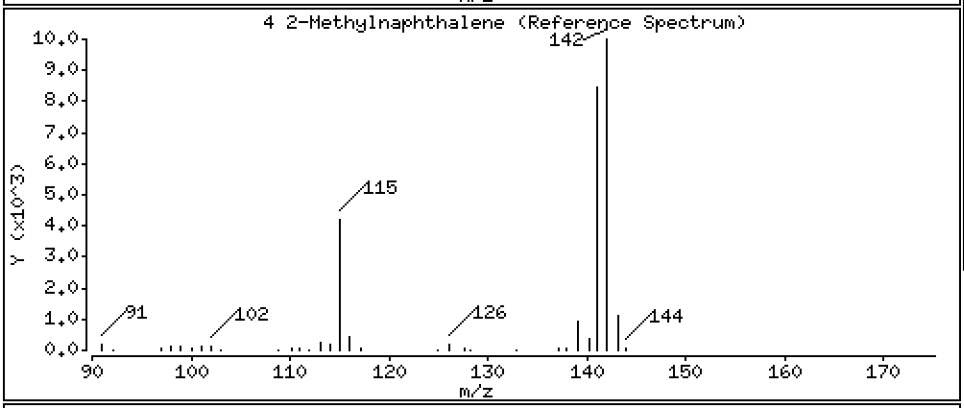
Concentration: 0.1289 ug/mL

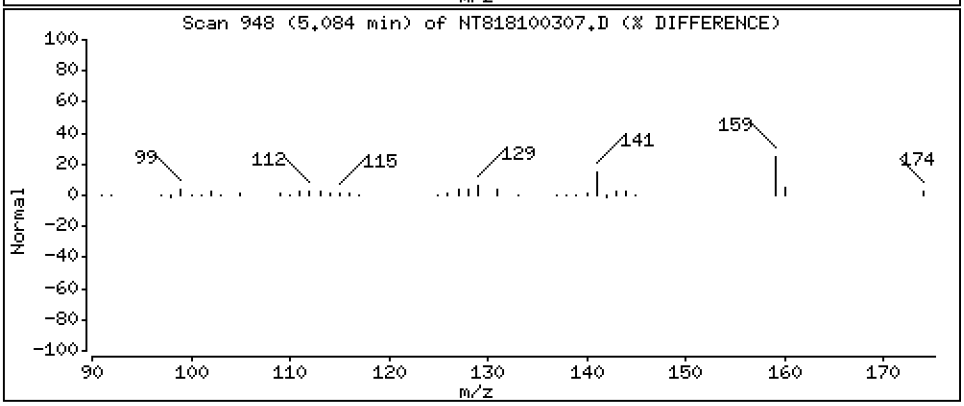












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

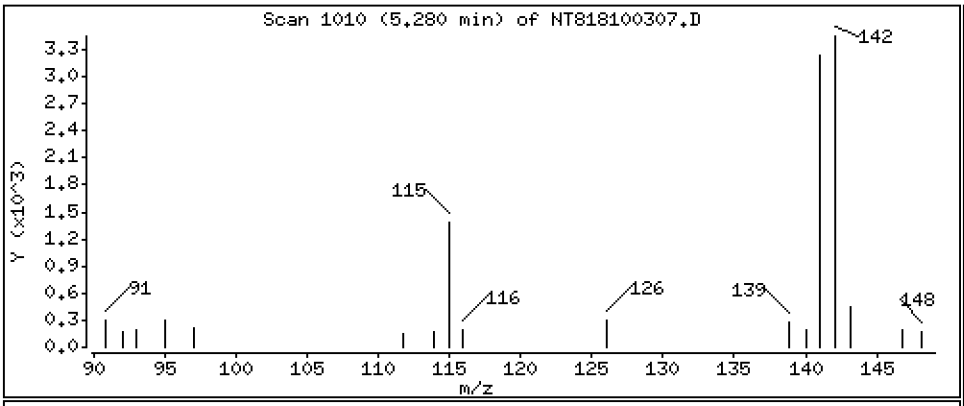
Operator: JZ

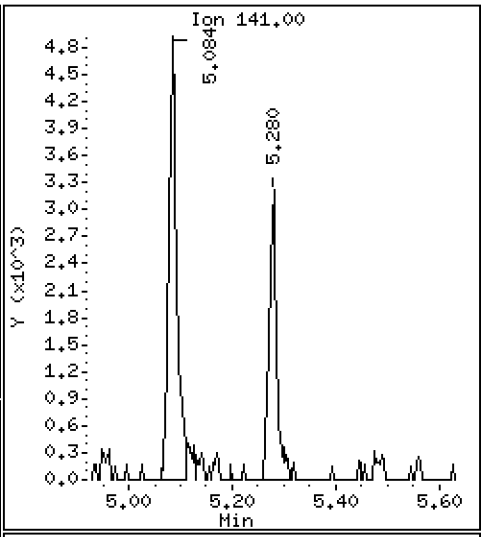
Column phase: Rxi-17sil

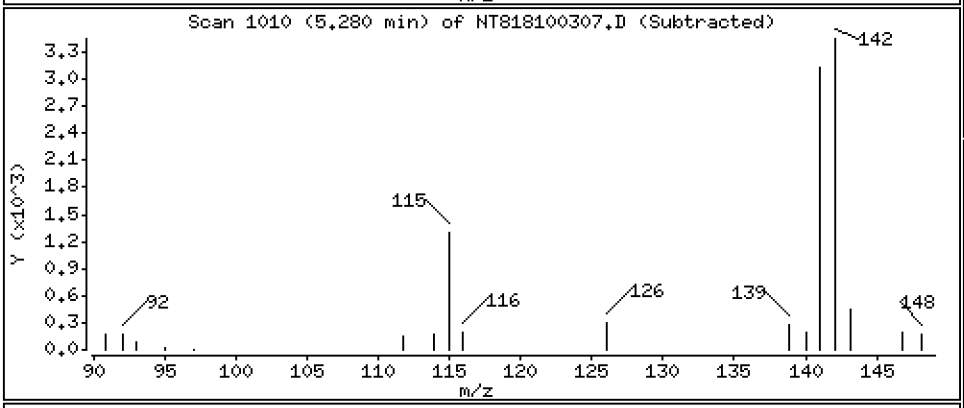
Column diameter: 0.25

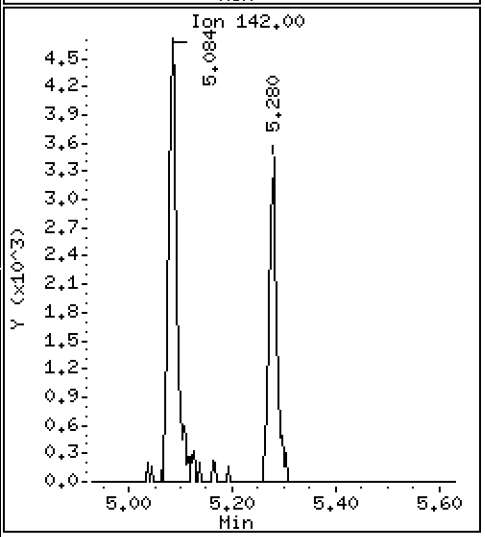
5 1-methylnaphthalene

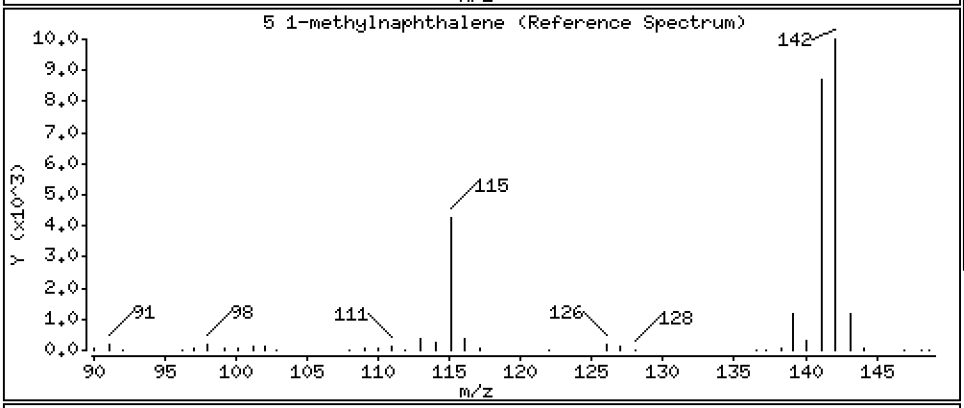
Concentration: 0.07508 ug/mL

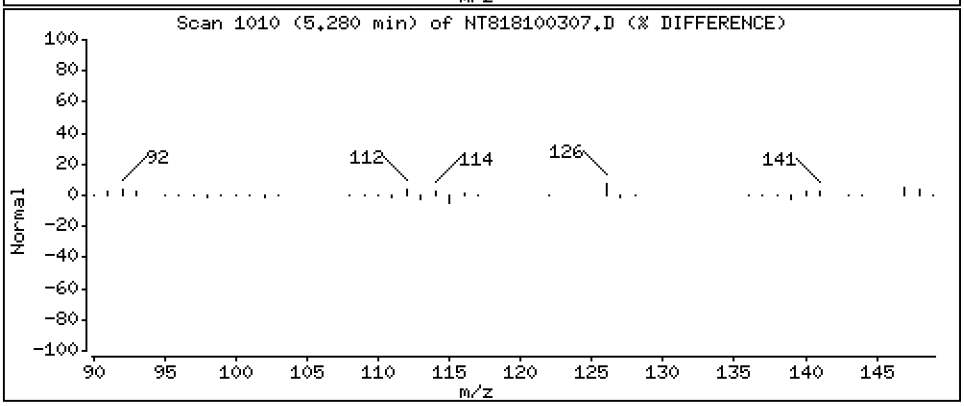












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

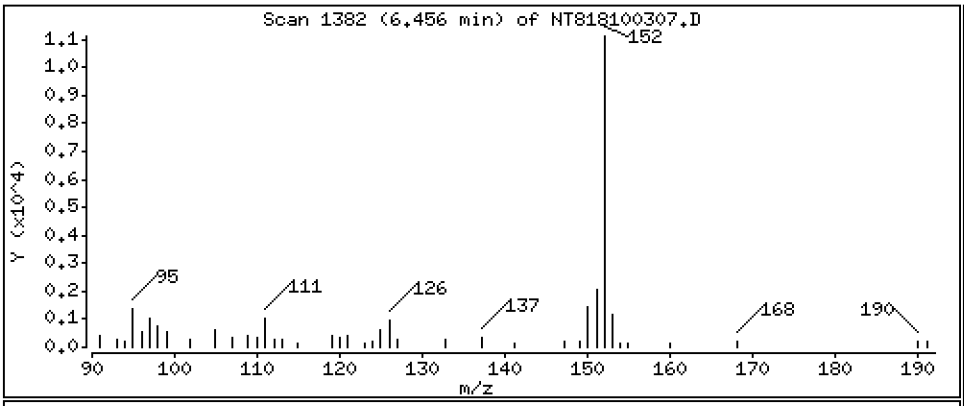
Operator: JZ

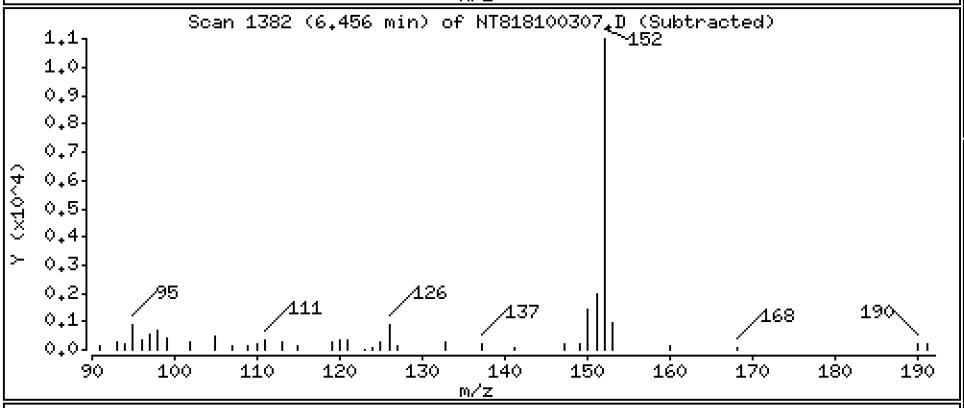
Column phase: Rxi-17sil

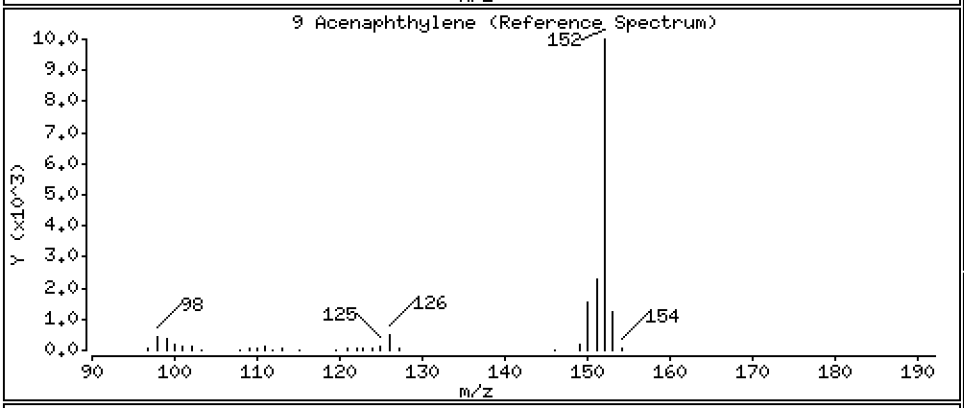
Column diameter: 0.25

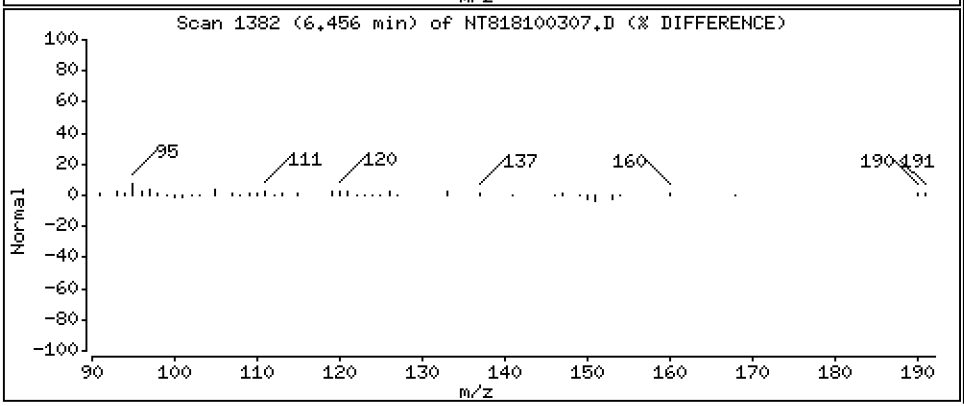
9 Acenaphthylene

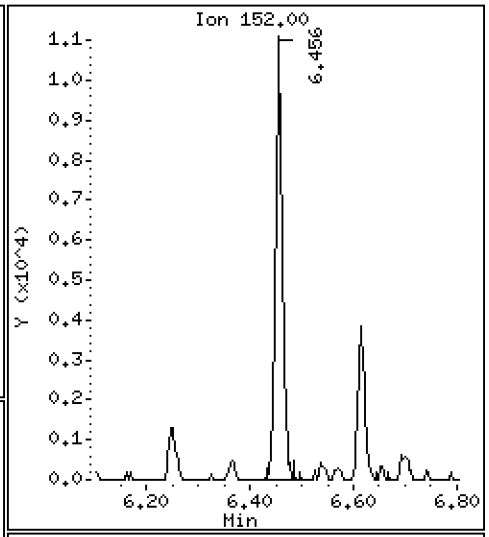
Concentration: 0.1309 ug/mL

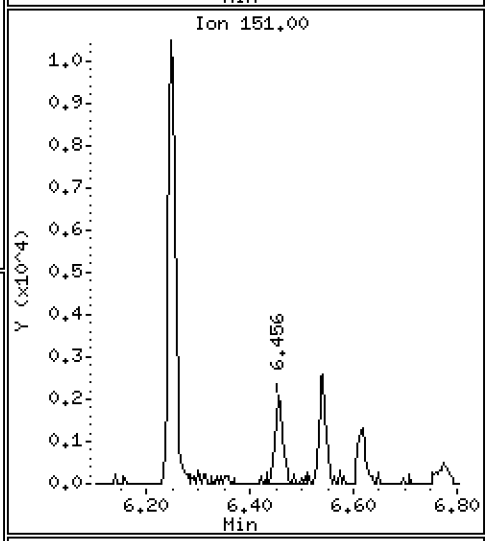


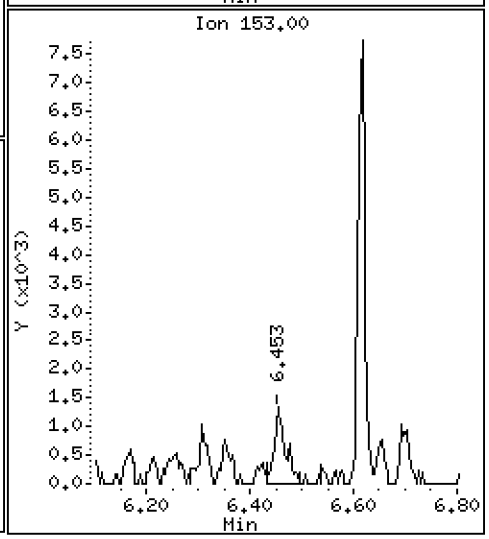












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

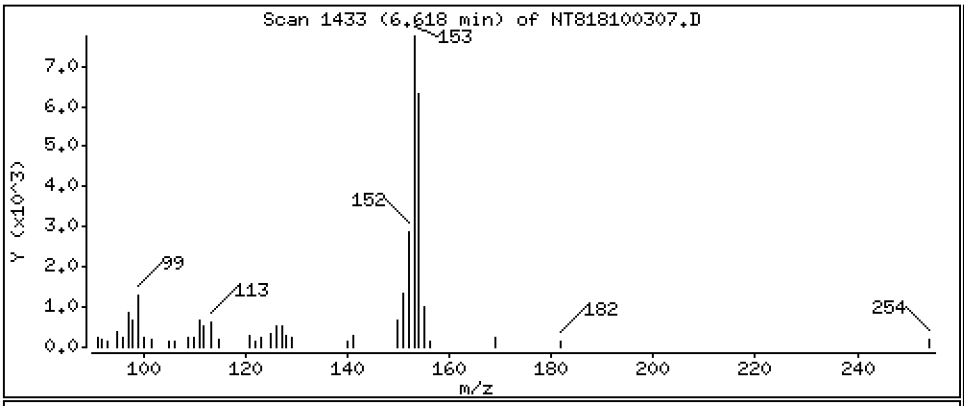
Operator: JZ

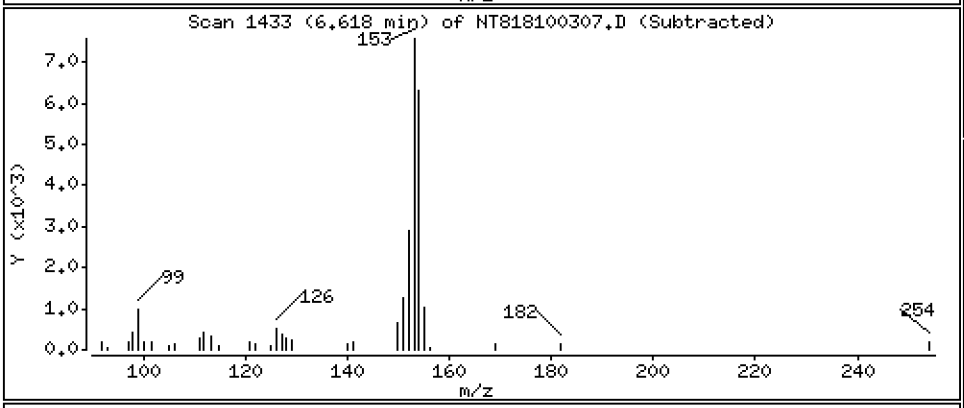
Column phase: Rxi-17sil

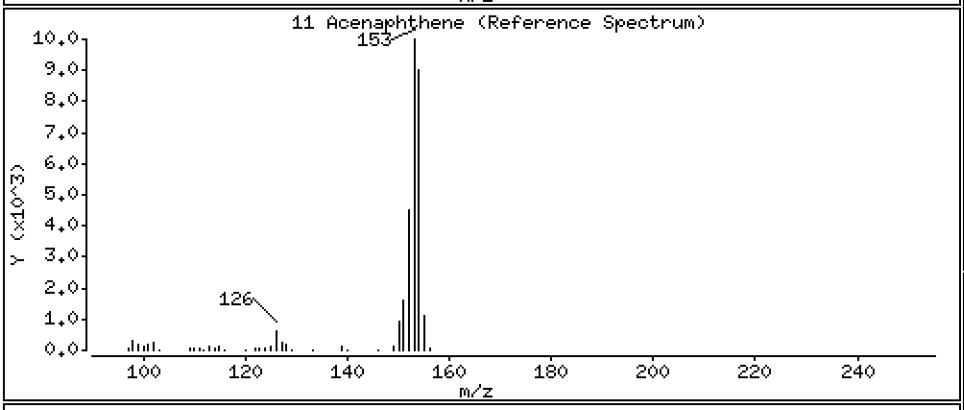
Column diameter: 0.25

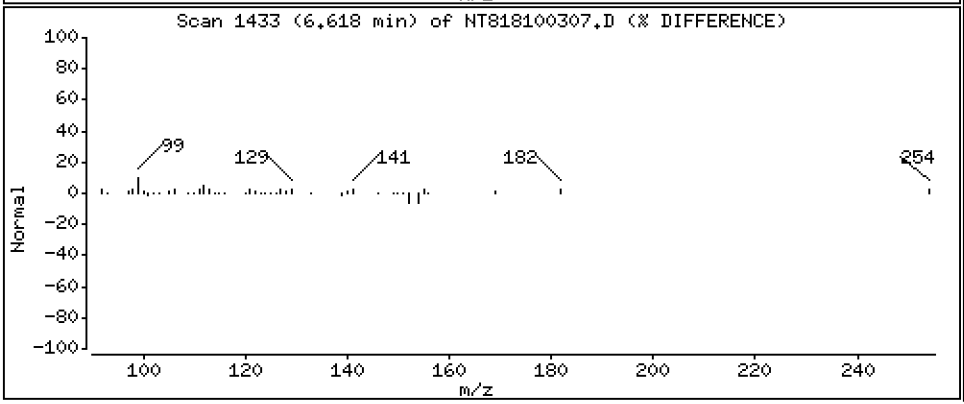
11 Acenaphthene

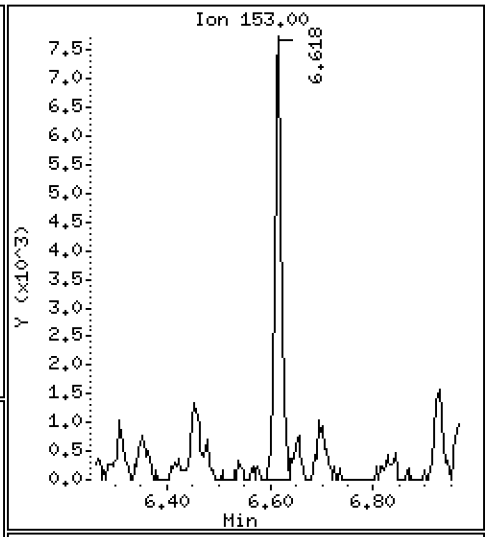
Concentration: 0.1300 ug/mL

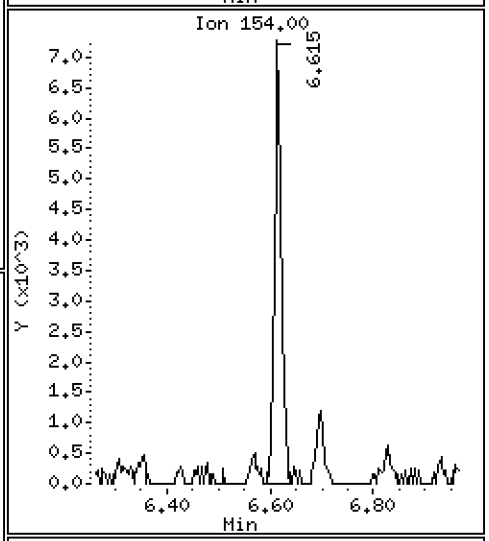


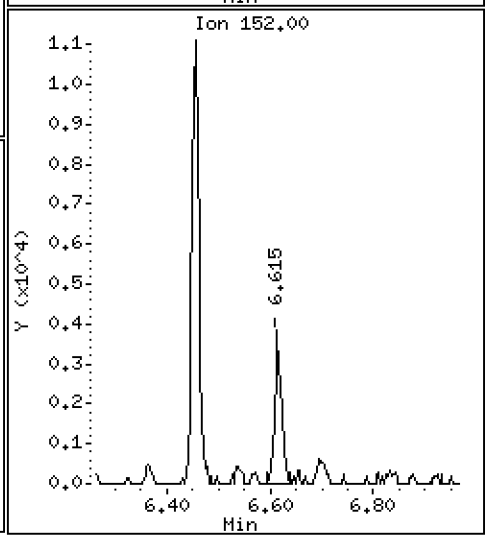












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

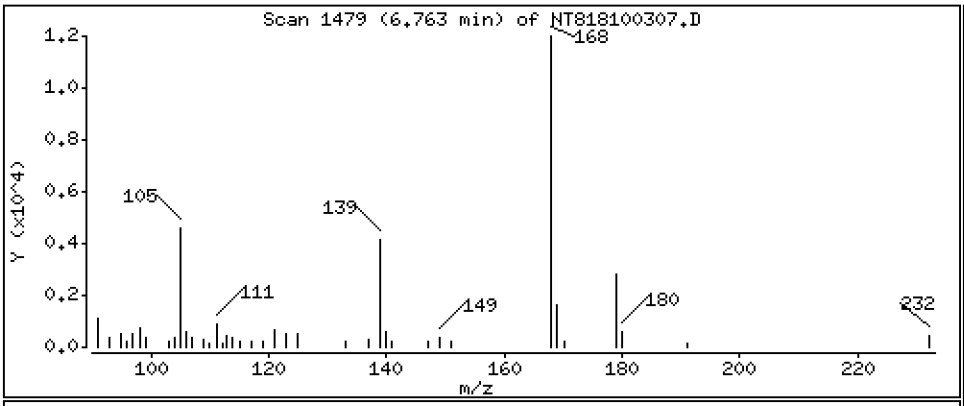
Operator: JZ

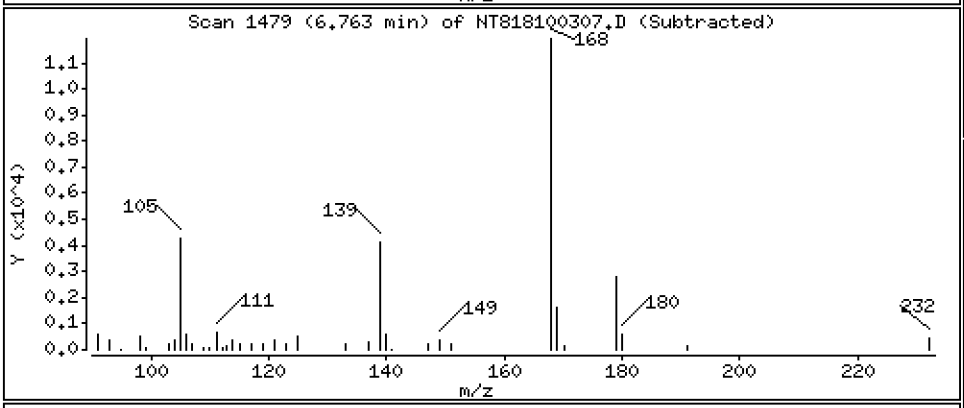
Column phase: Rxi-17sil

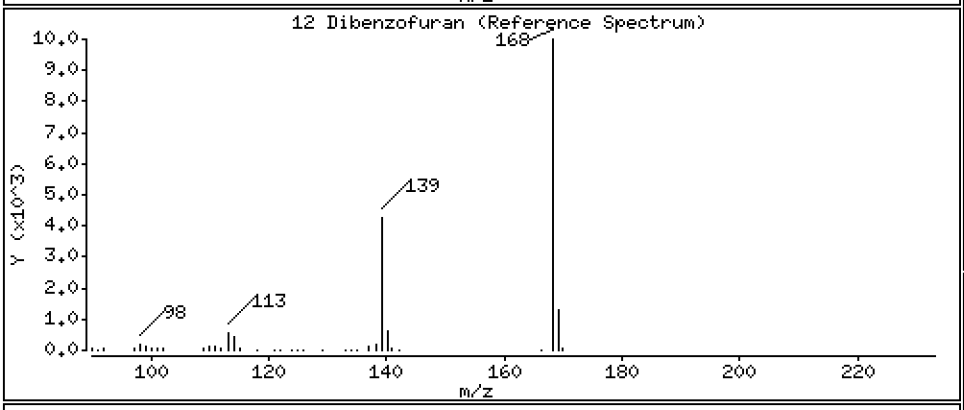
Column diameter: 0.25

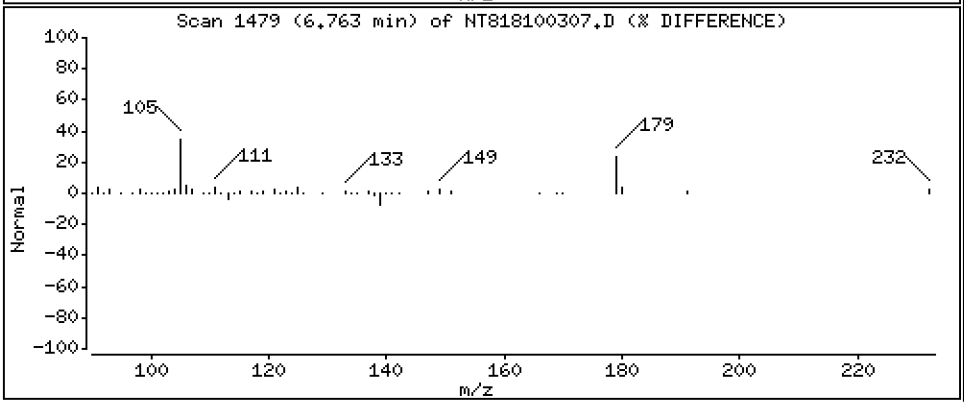
12 Dibenzofuran

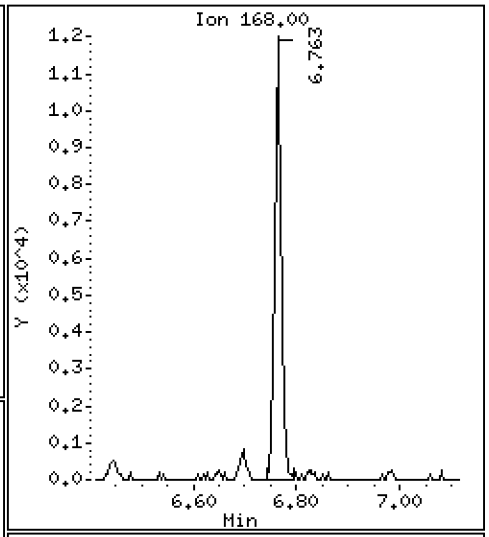
Concentration: 0.1453 ug/mL

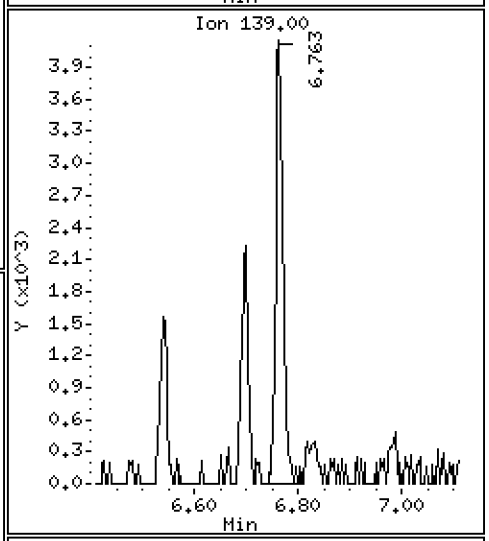


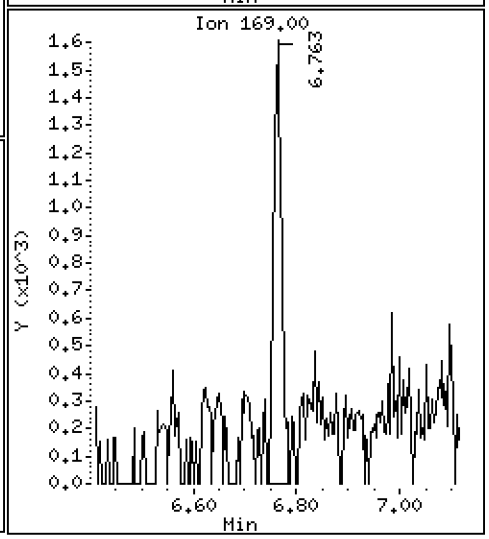












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

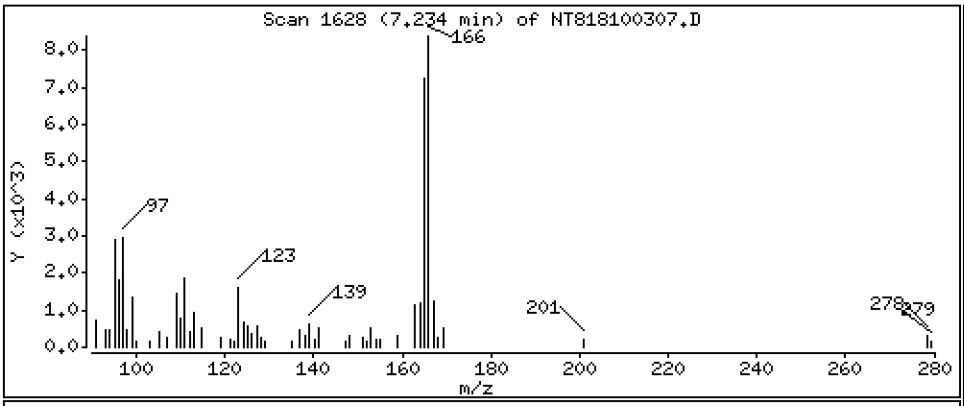
Operator: JZ

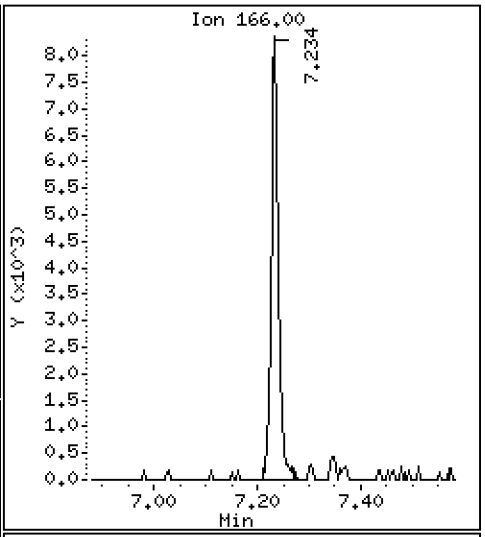
Column phase: Rxi-17sil

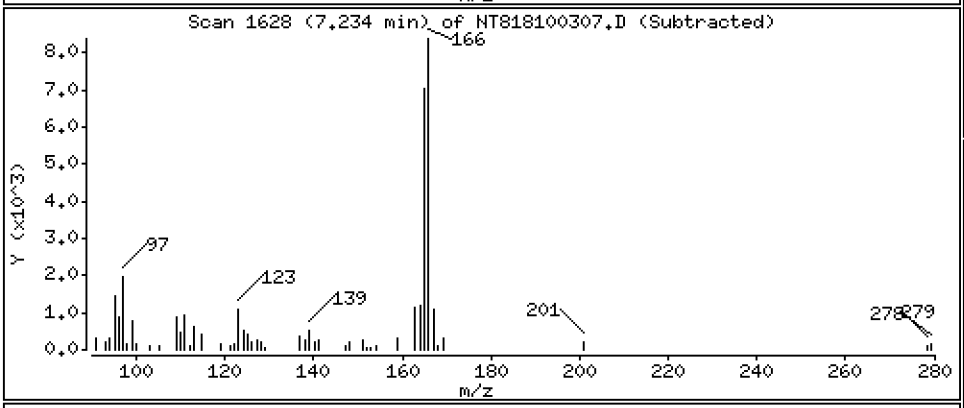
Column diameter: 0.25

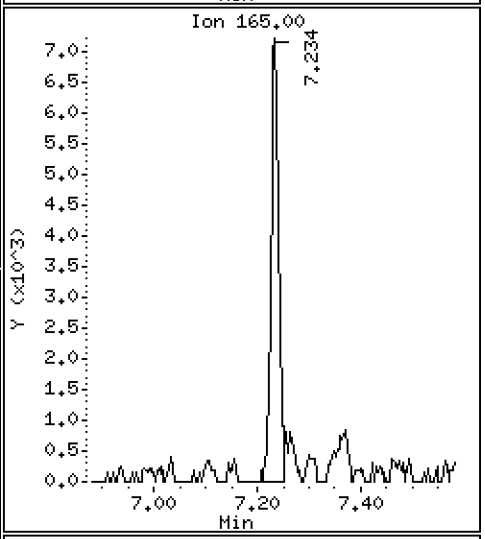
14 Fluorene

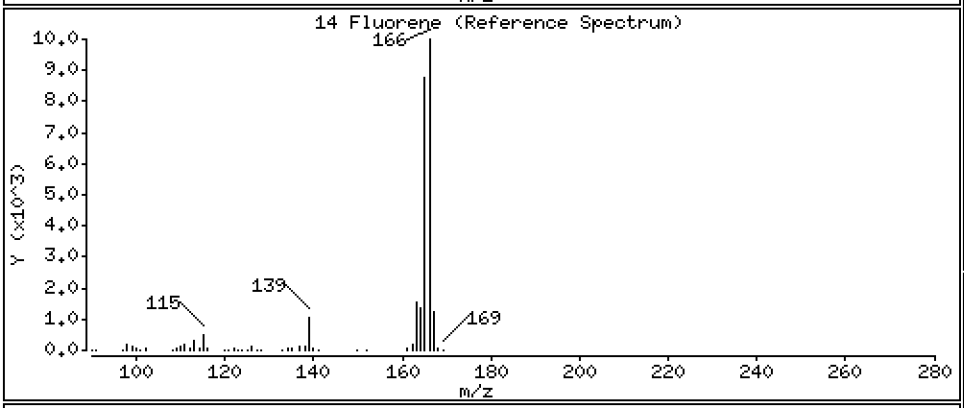
Concentration: 0.1298 ug/mL

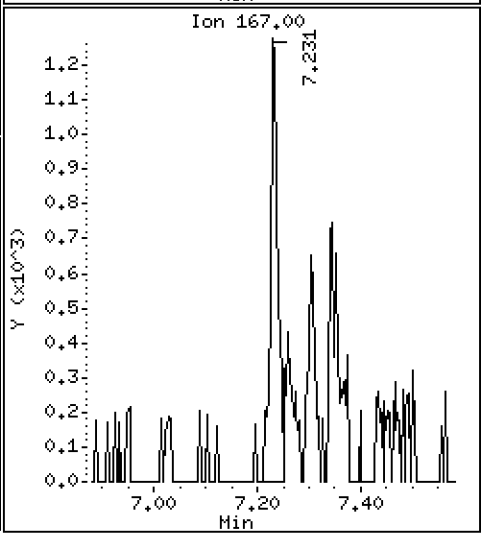


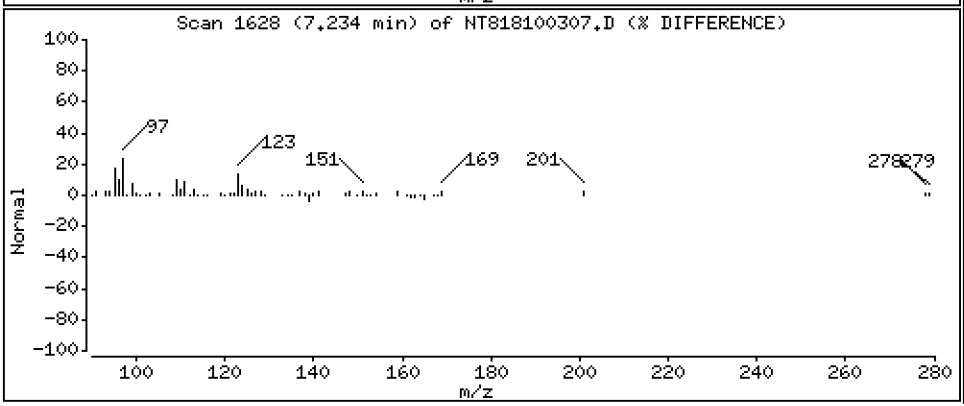












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

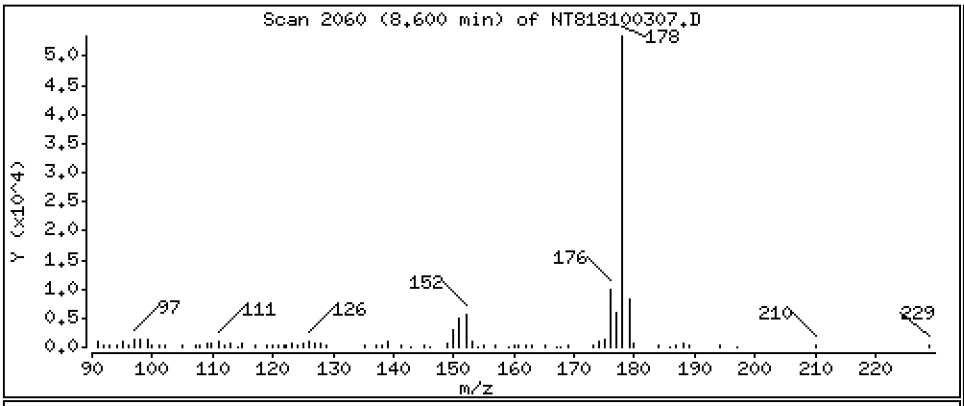
Operator: JZ

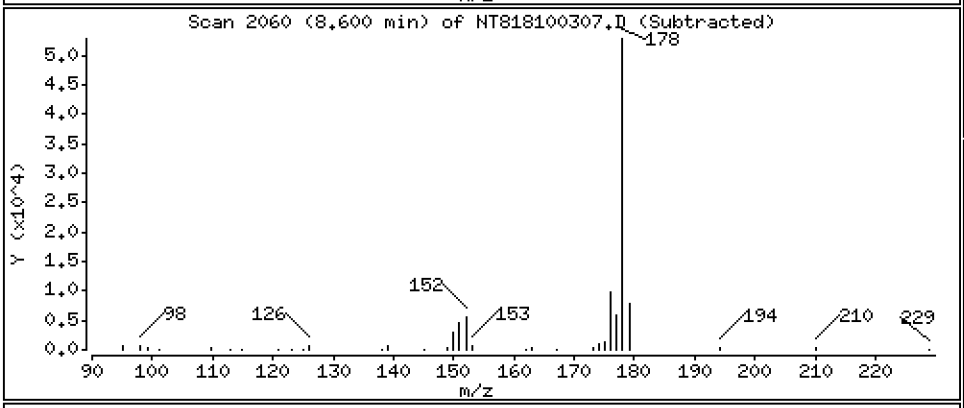
Column phase: Rxi-17sil

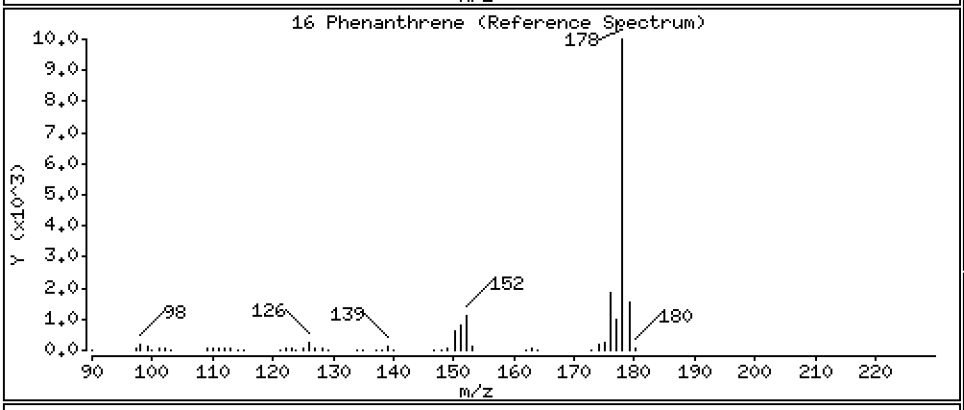
Column diameter: 0.25

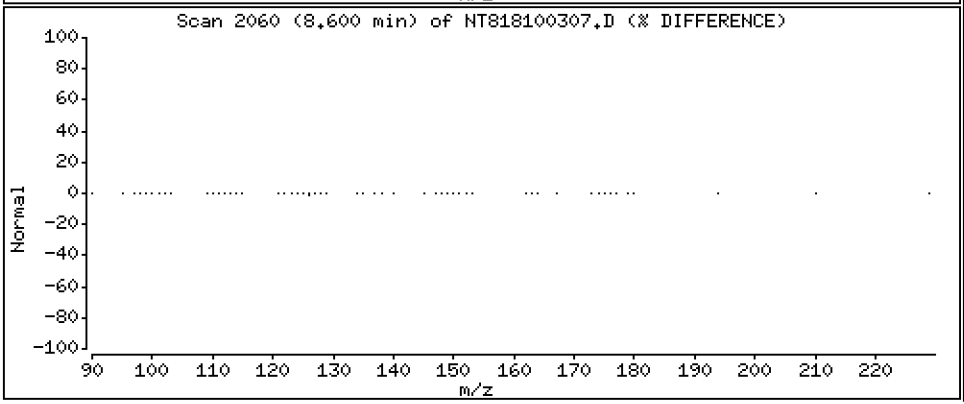
16 Phenanthrene

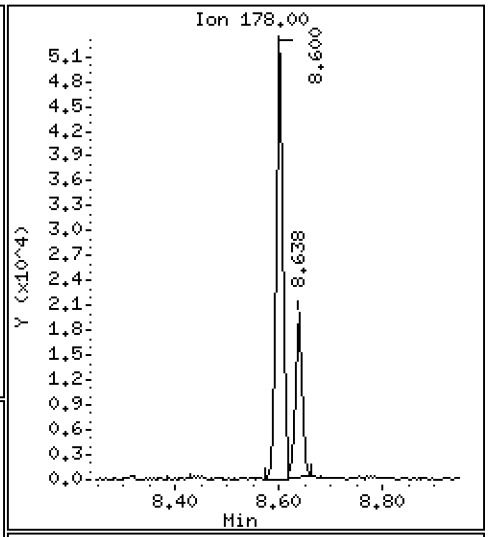
Concentration: 0.6288 ug/mL

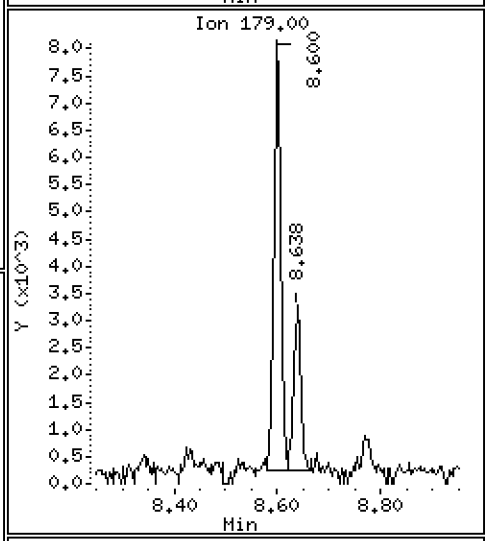


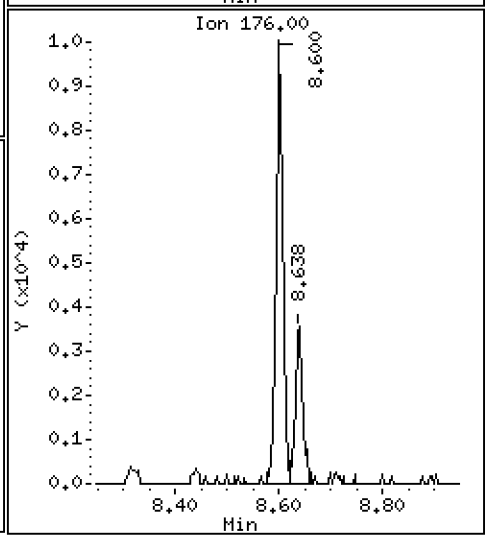












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

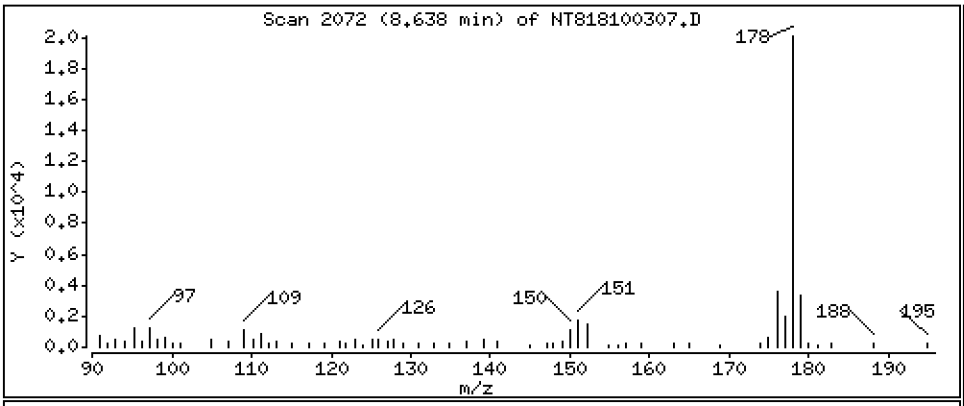
Operator: JZ

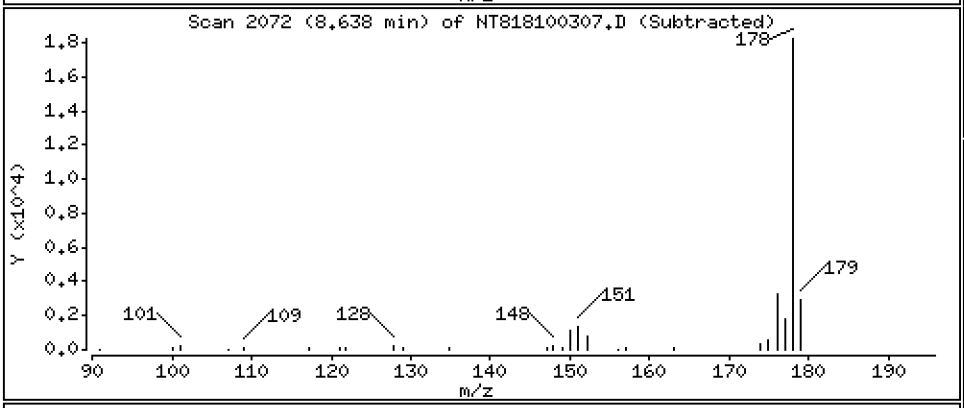
Column phase: Rxi-17sil

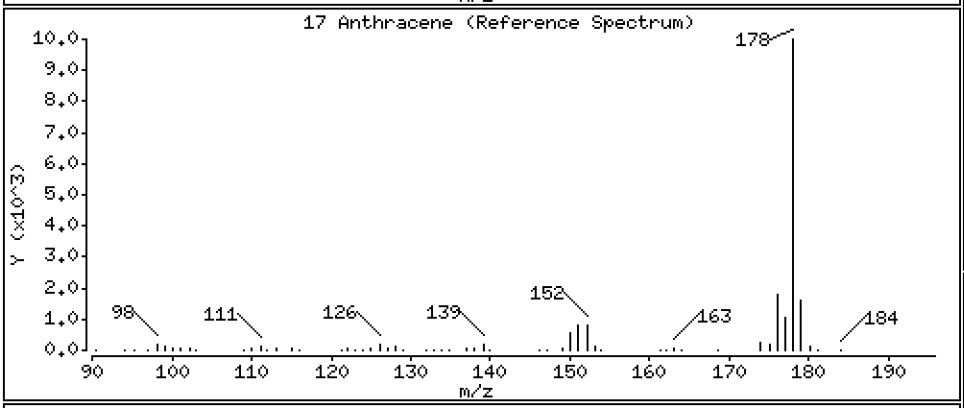
Column diameter: 0.25

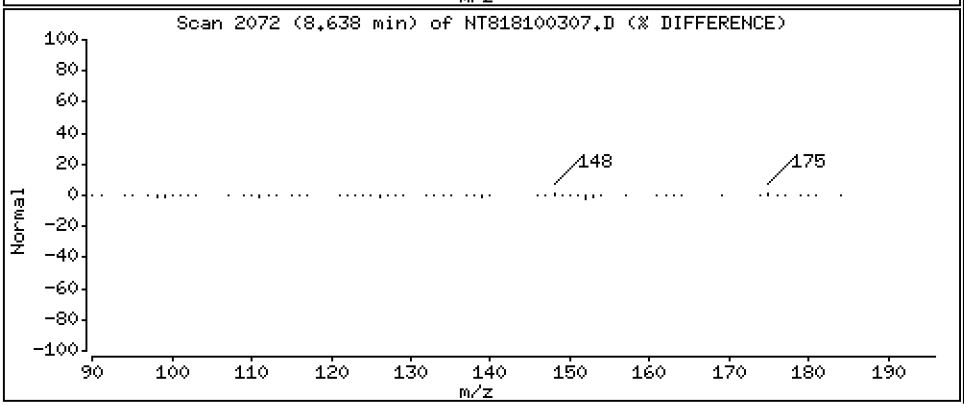
17 Anthracene

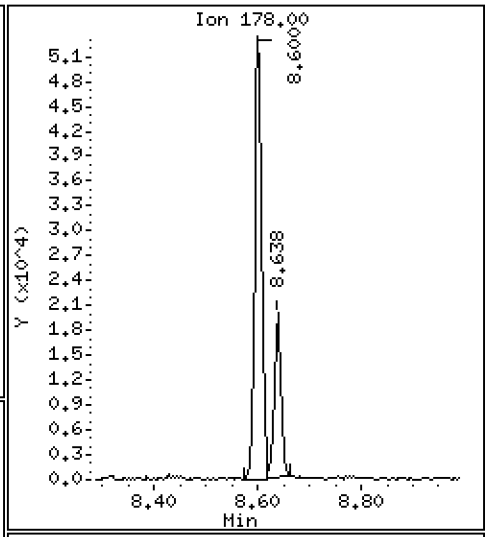
Concentration: 0.2427 ug/mL

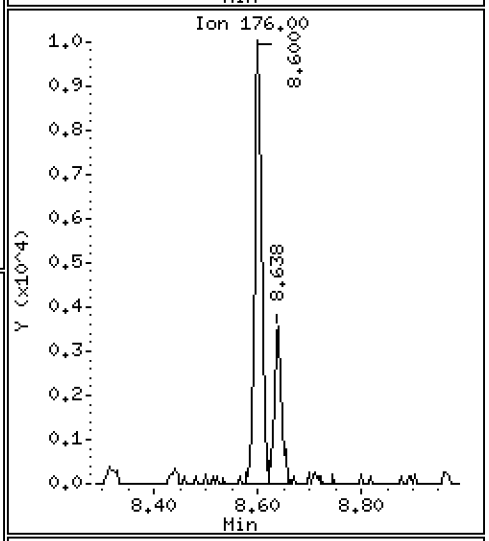


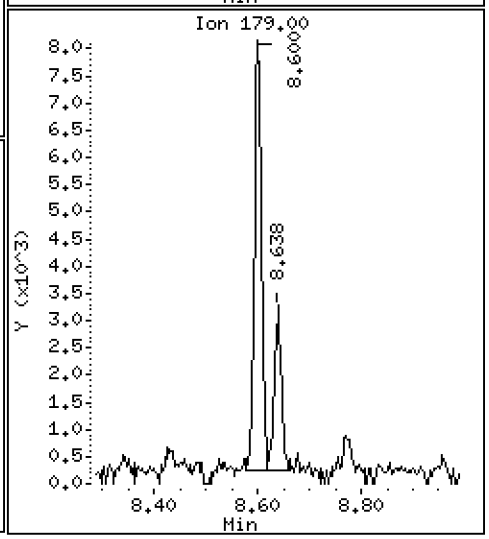












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

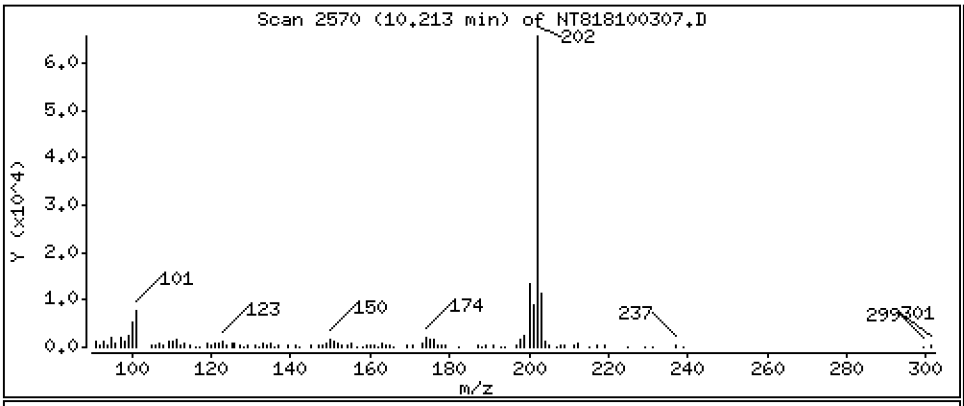
Operator: JZ

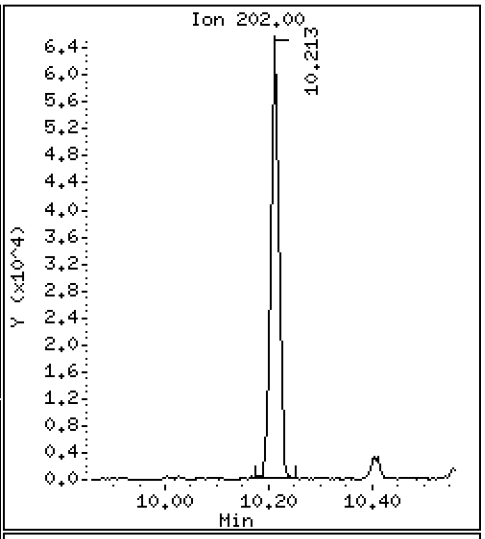
Column phase: Rxi-17sil

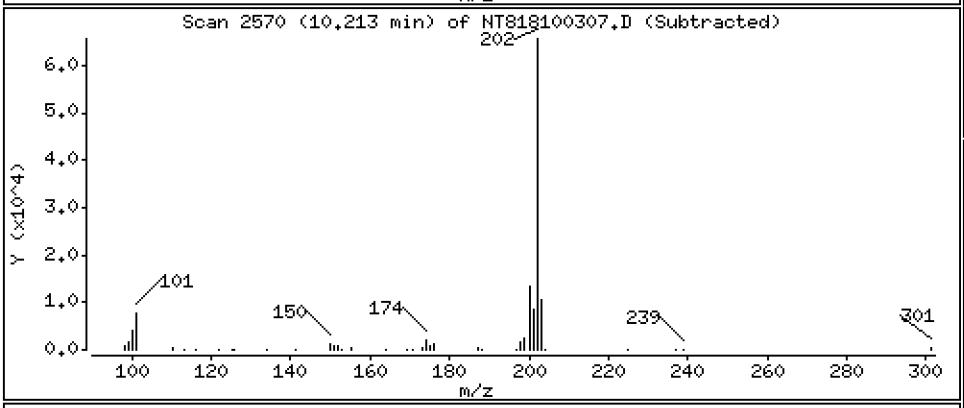
Column diameter: 0.25

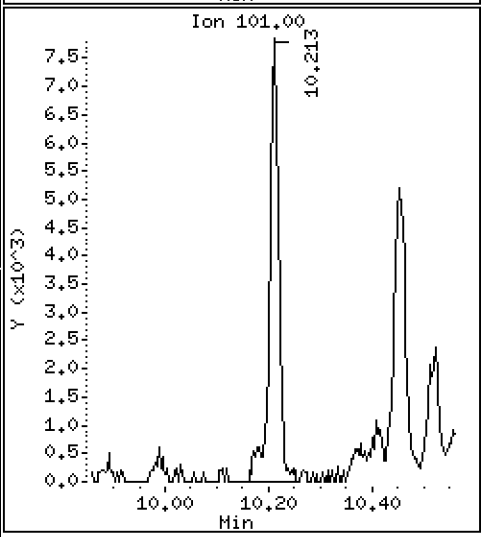
22 Fluoranthene

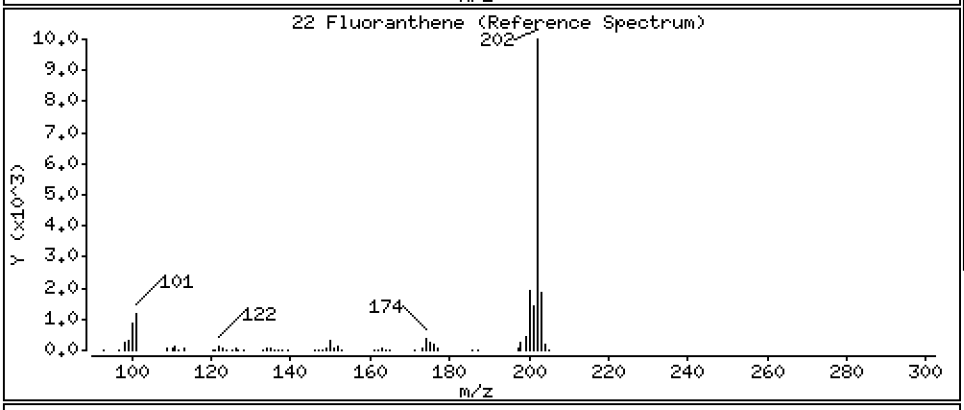
Concentration: 0.7928 ug/mL

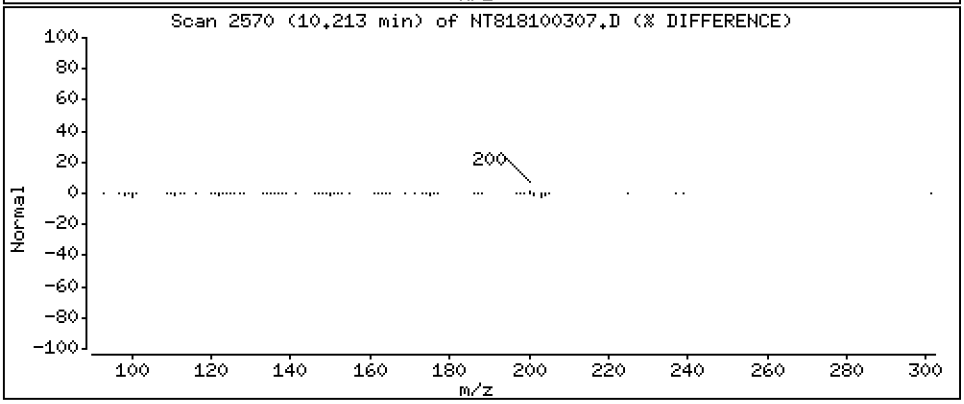












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

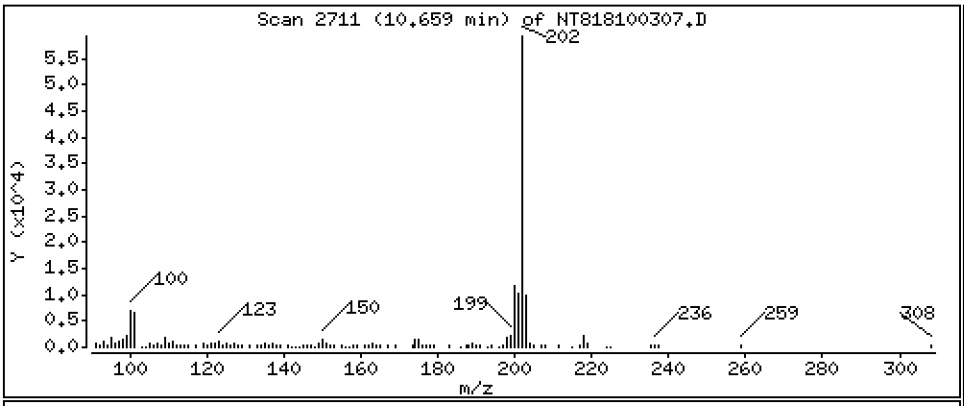
Operator: JZ

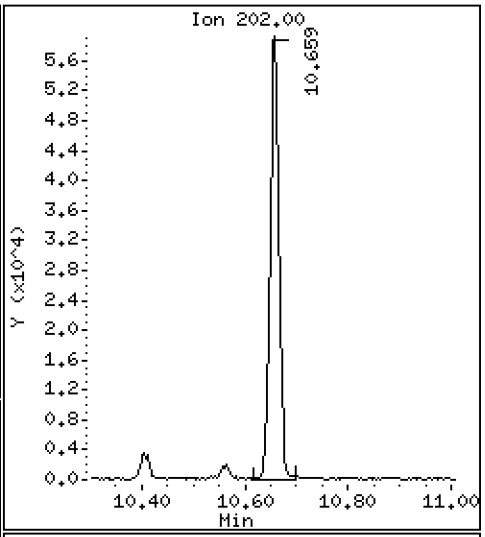
Column phase: Rxi-17sil

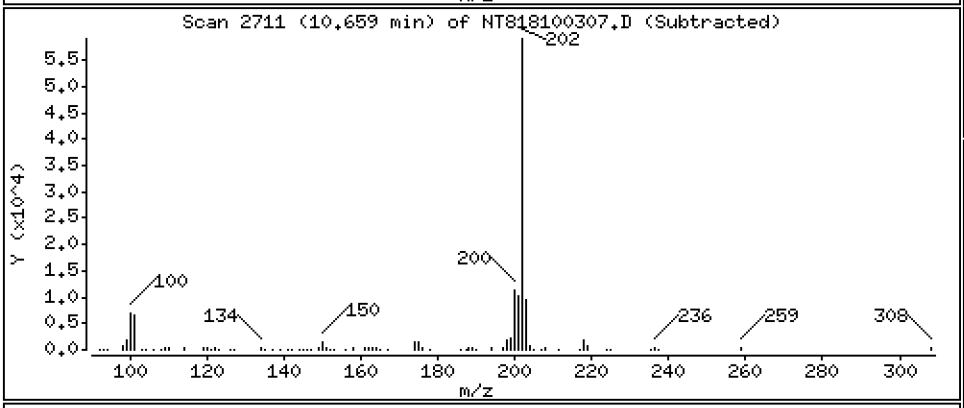
Column diameter: 0.25

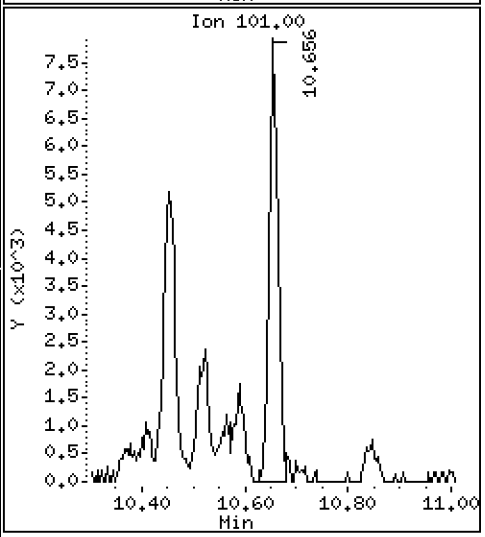
23 Pyrene

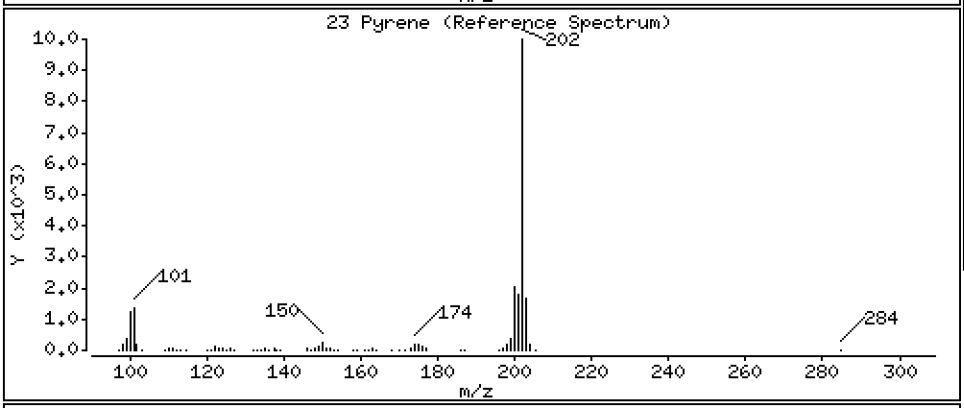
Concentration: 0.7554 ug/mL

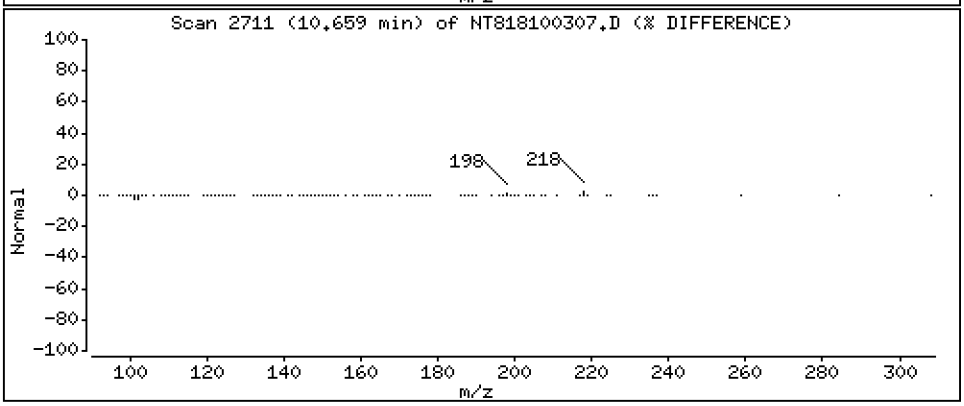












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

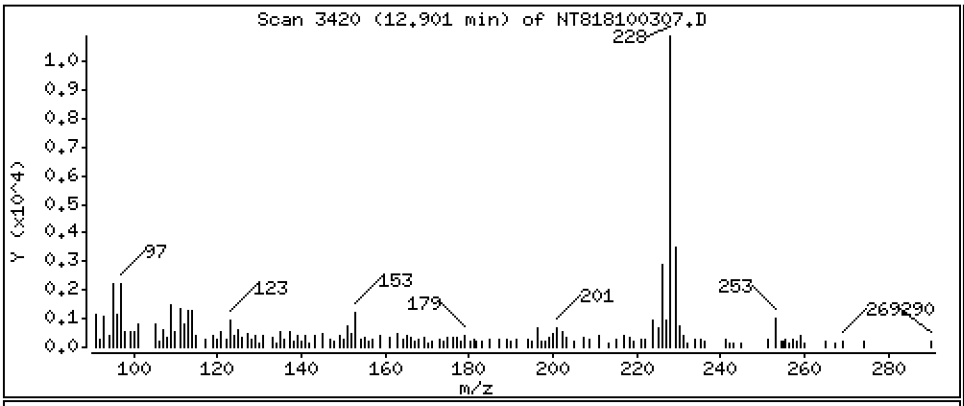
Operator: JZ

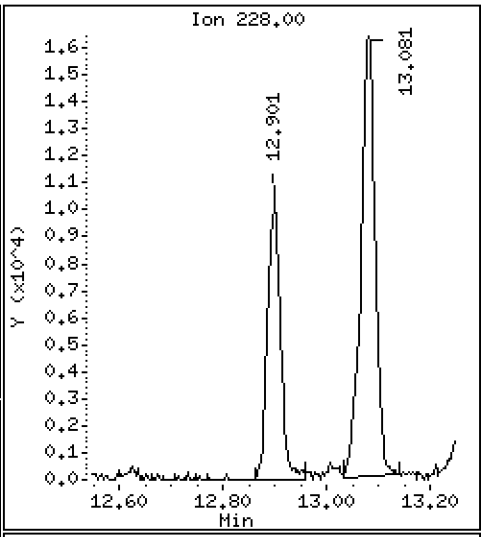
Column phase: Rxi-17sil

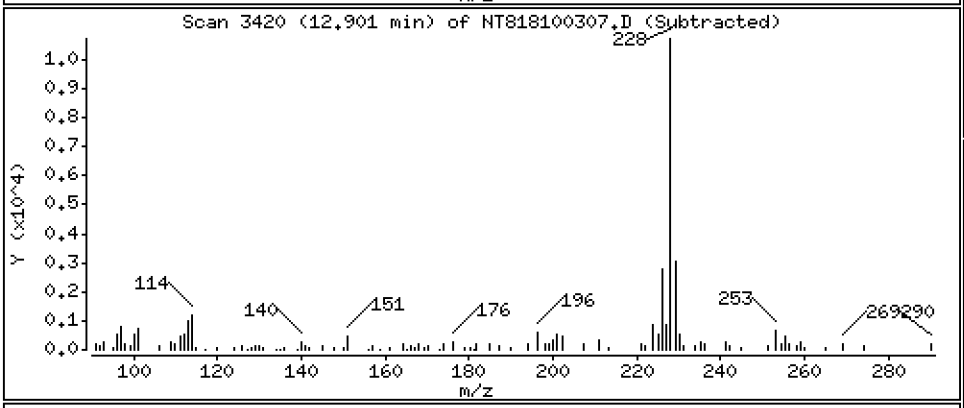
Column diameter: 0.25

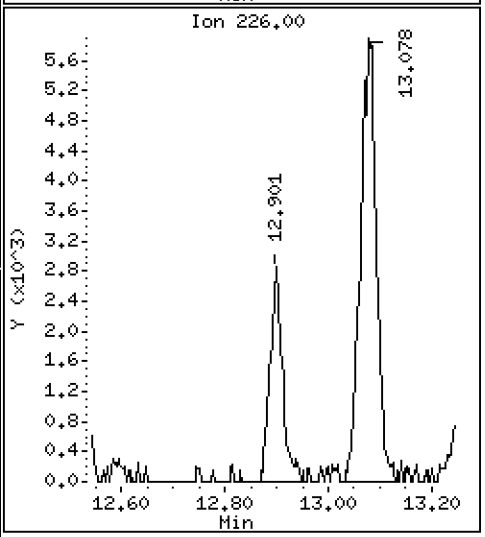
24 Benzo(a)anthracene

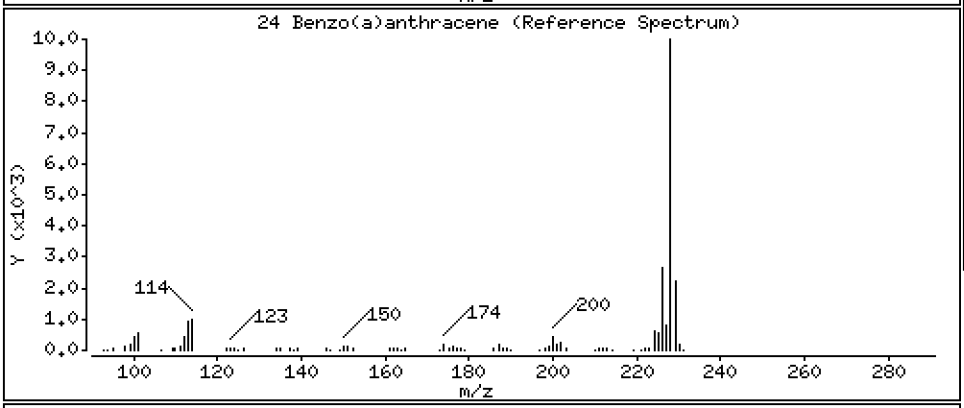
Concentration: 0.2021 ug/mL

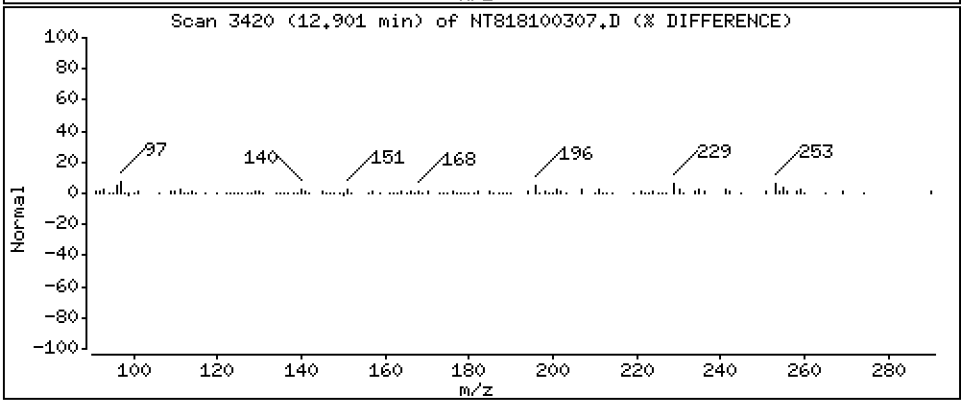












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

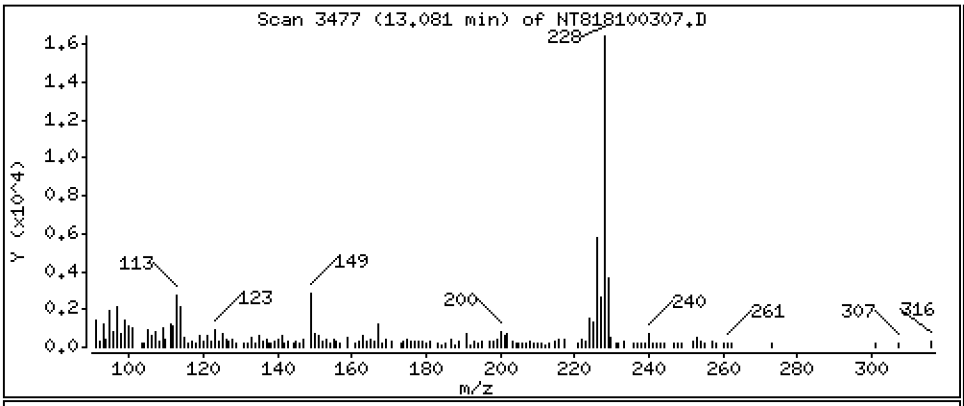
Operator: JZ

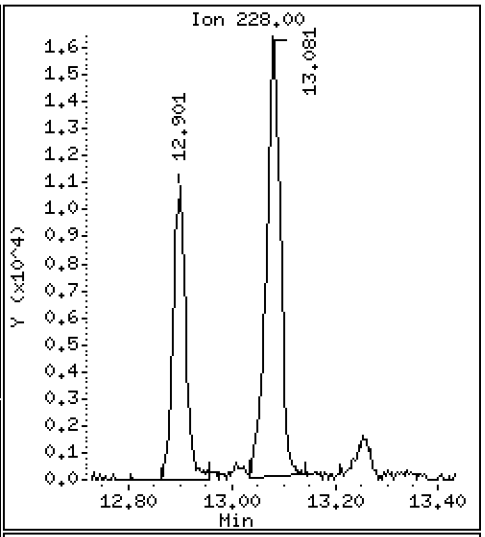
Column phase: Rxi-17sil

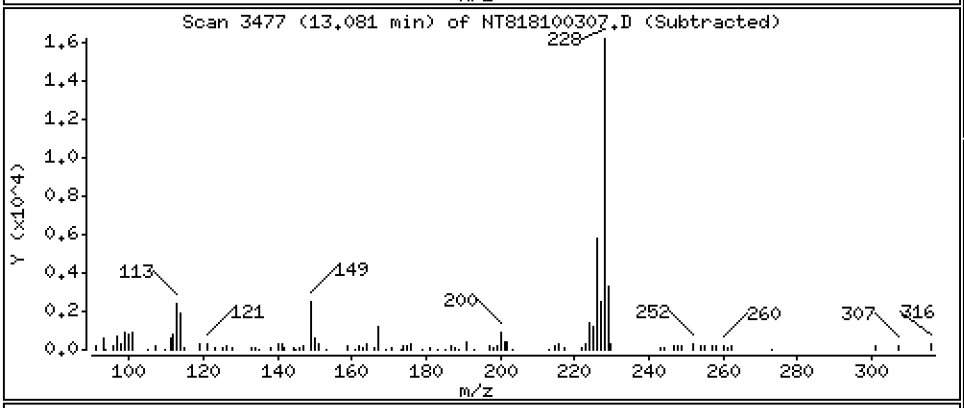
Column diameter: 0.25

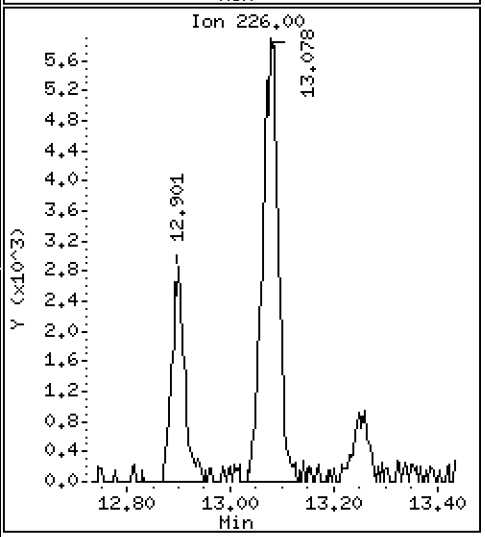
27 Chrysene

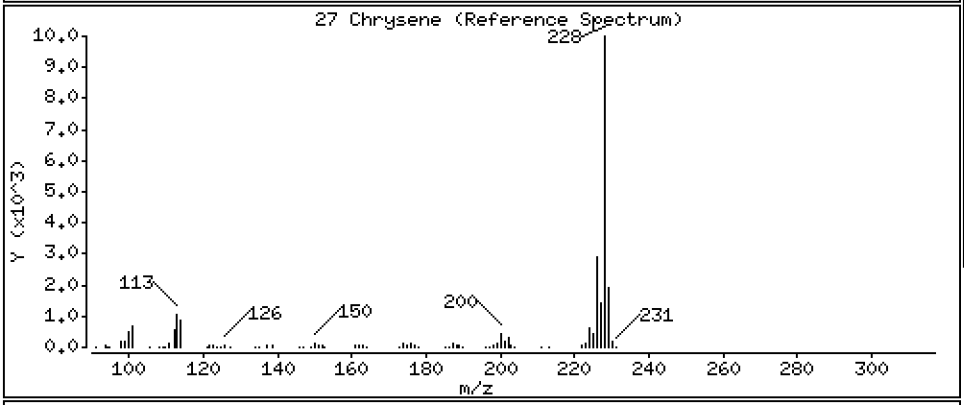
Concentration: 0.3605 ug/mL

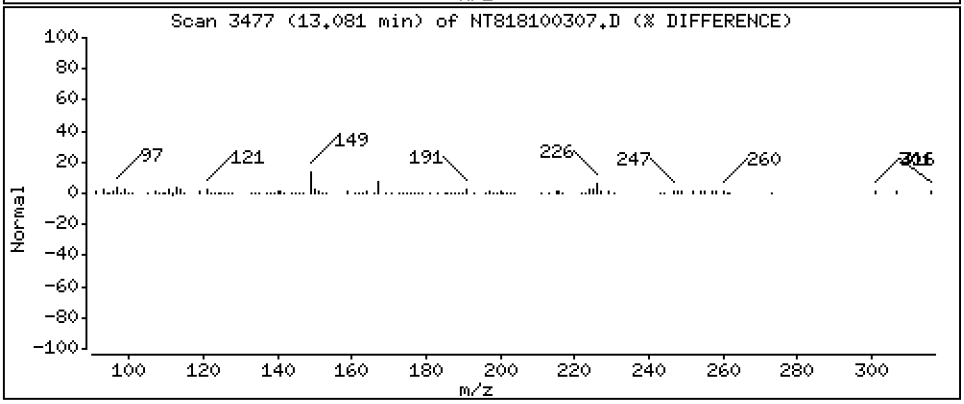












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

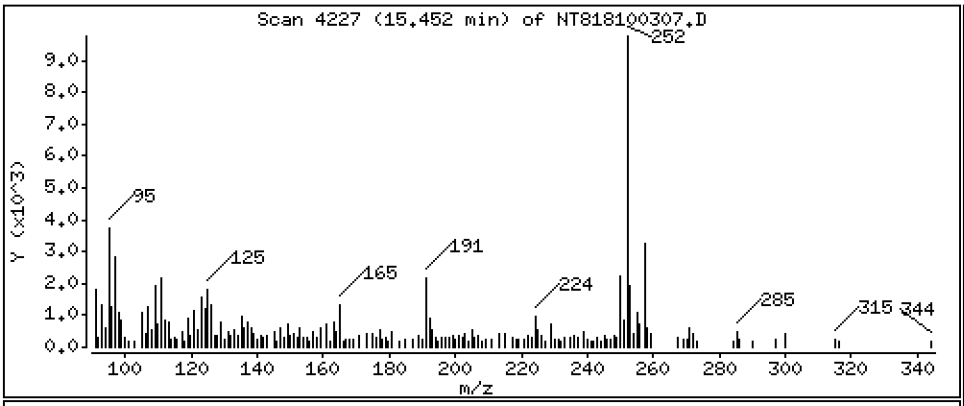
Operator: JZ

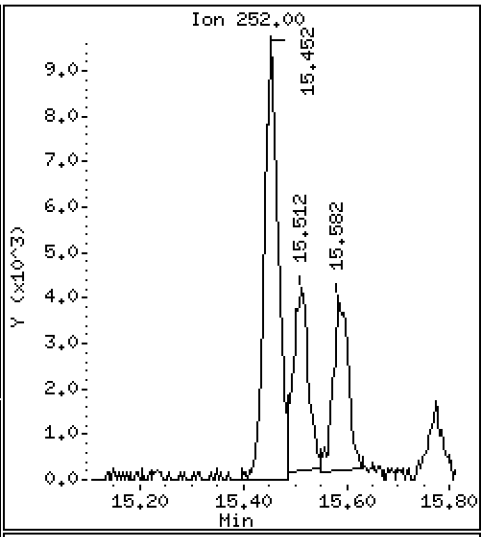
Column phase: Rxi-17sil

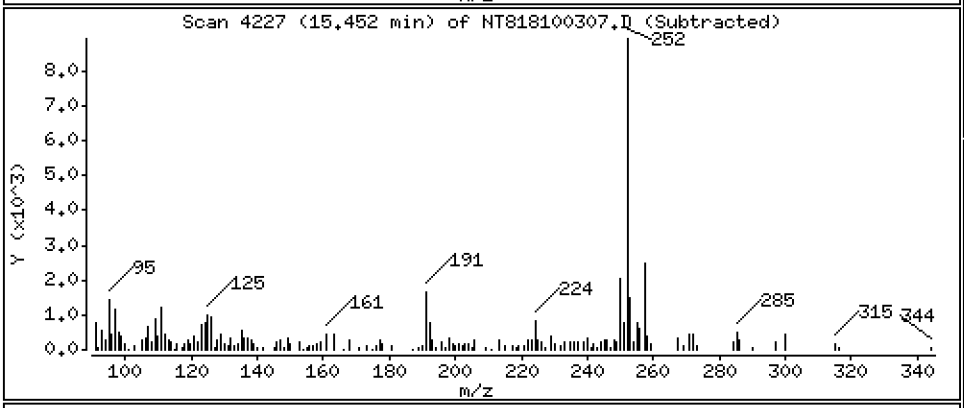
Column diameter: 0.25

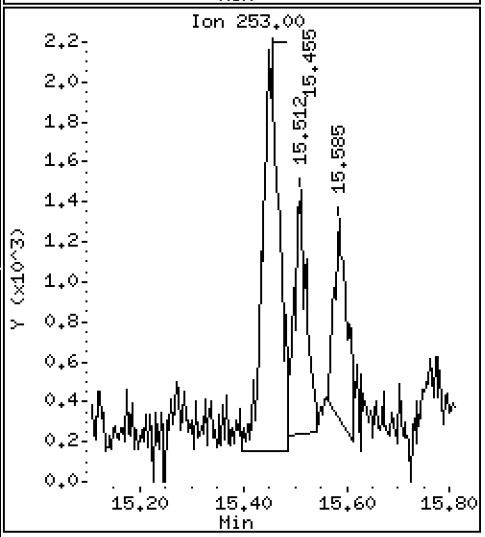
28 Benzo(b)fluoranthene

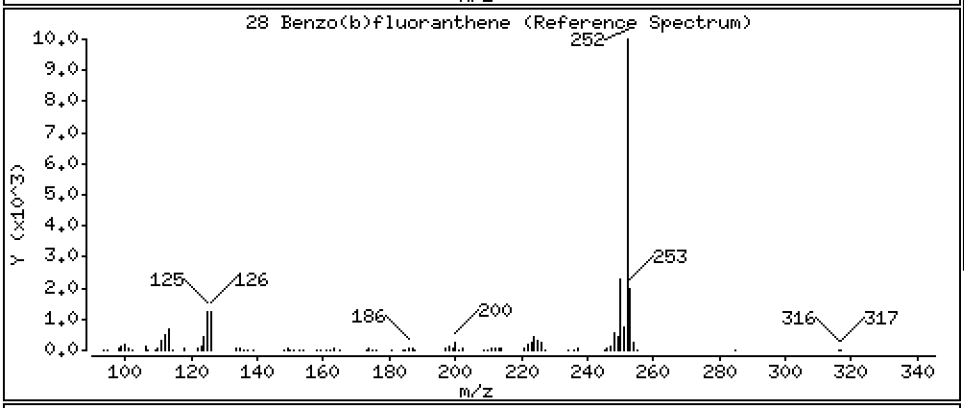
Concentration: 0.1921 ug/mL

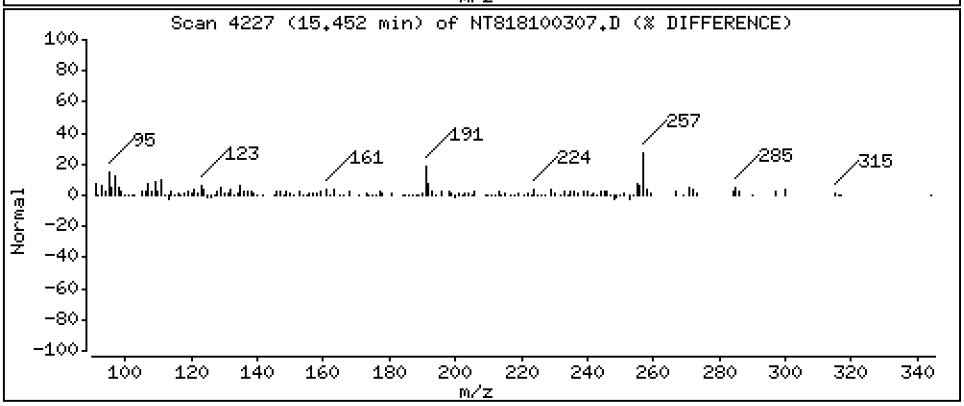












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

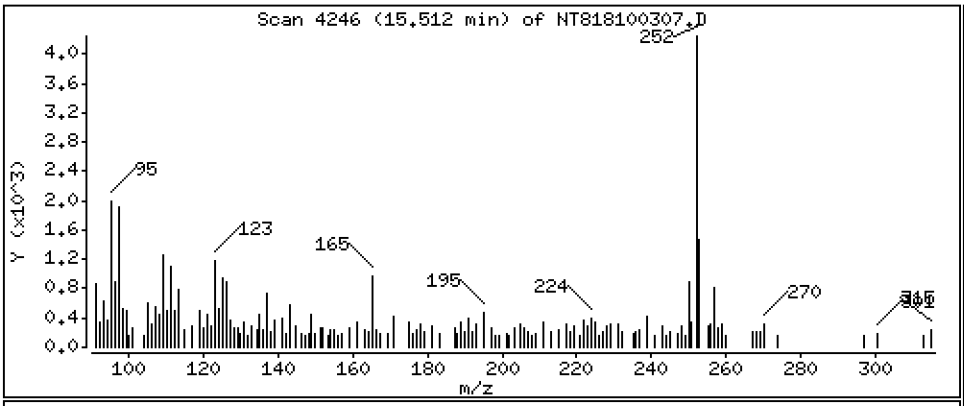
Operator: JZ

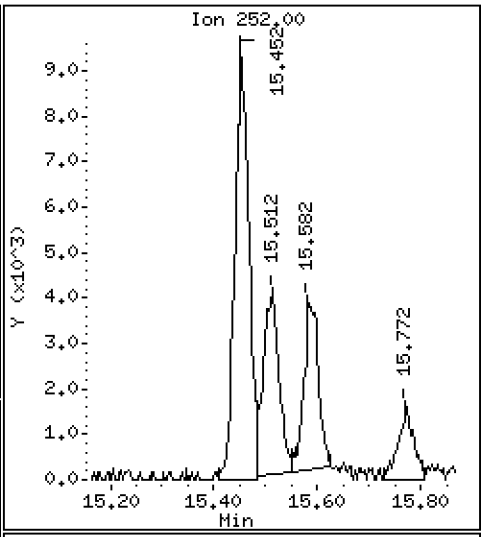
Column phase: Rxi-17sil

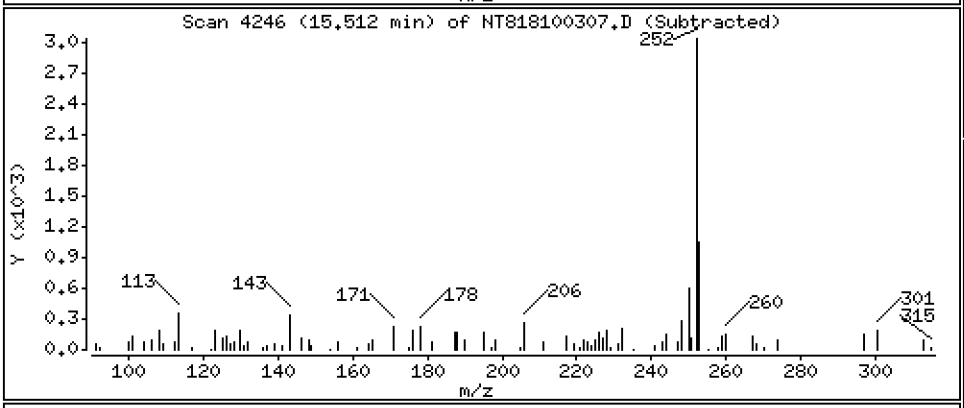
Column diameter: 0.25

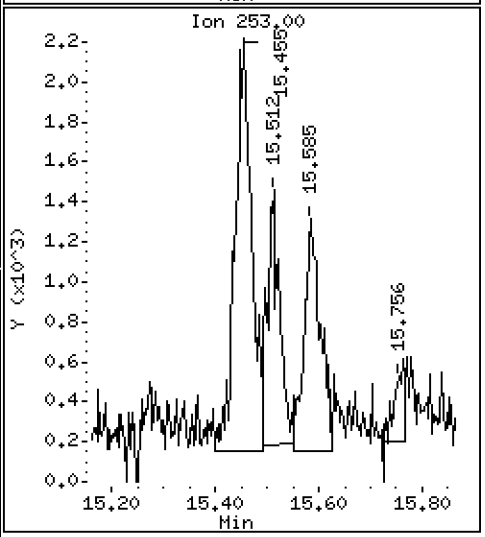
29 Benzo(k)fluoranthene

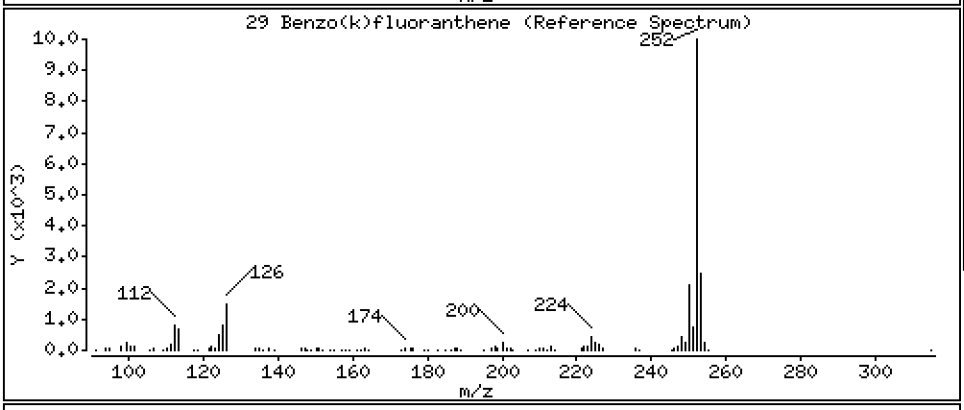
Concentration: 0.09182 ug/mL

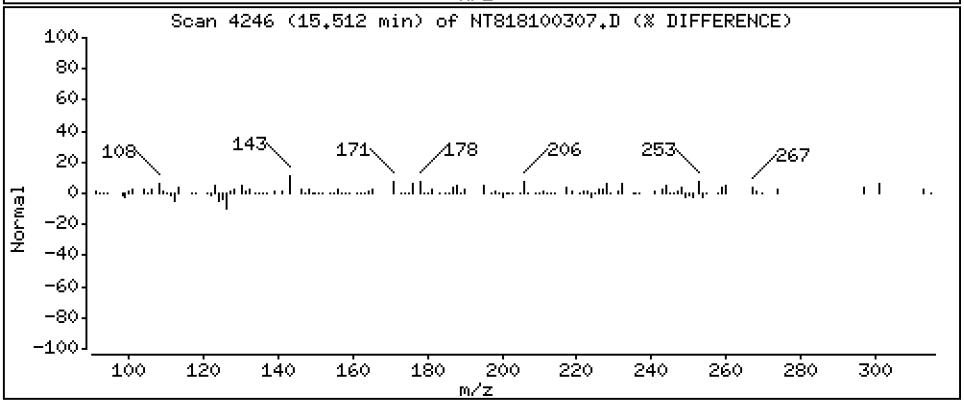












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

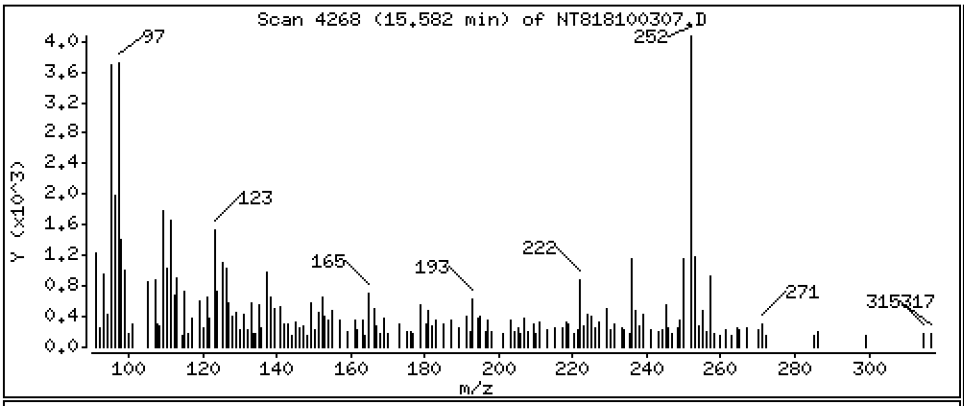
Operator: JZ

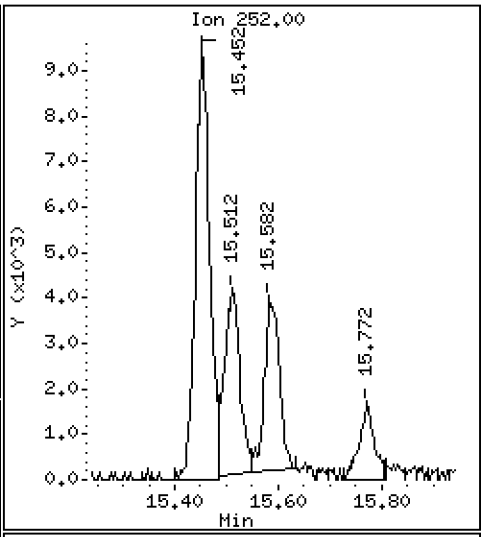
Column phase: Rxi-17sil

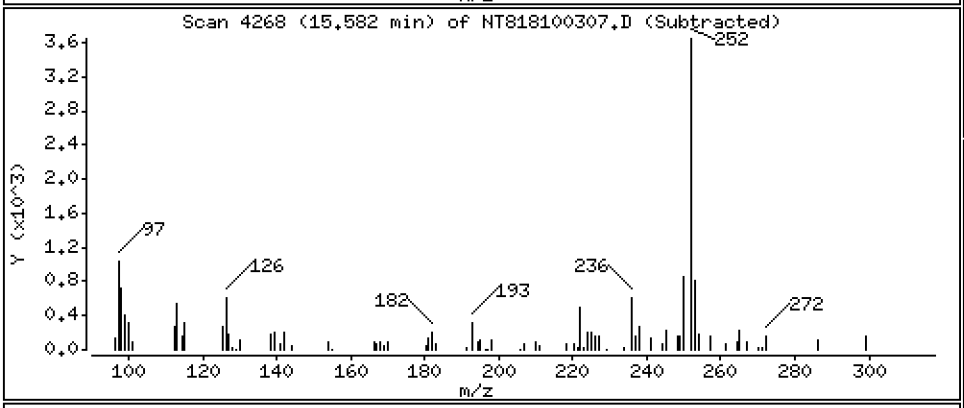
Column diameter: 0.25

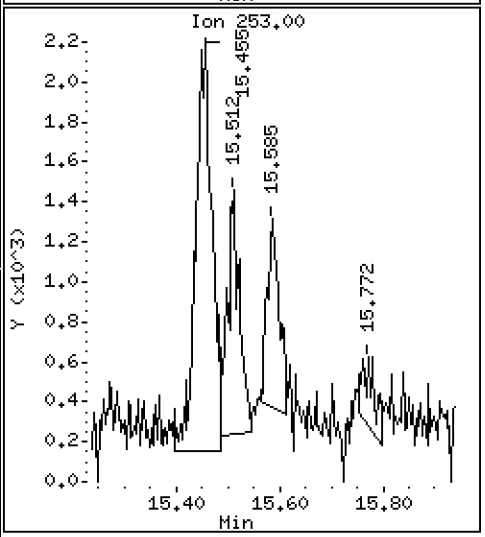
30 Benzo(j)fluoranthene

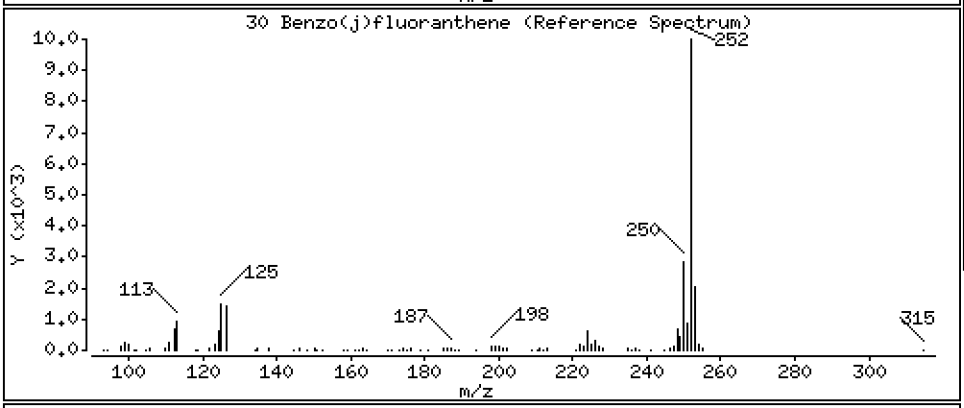
Concentration: 0.08439 ug/mL

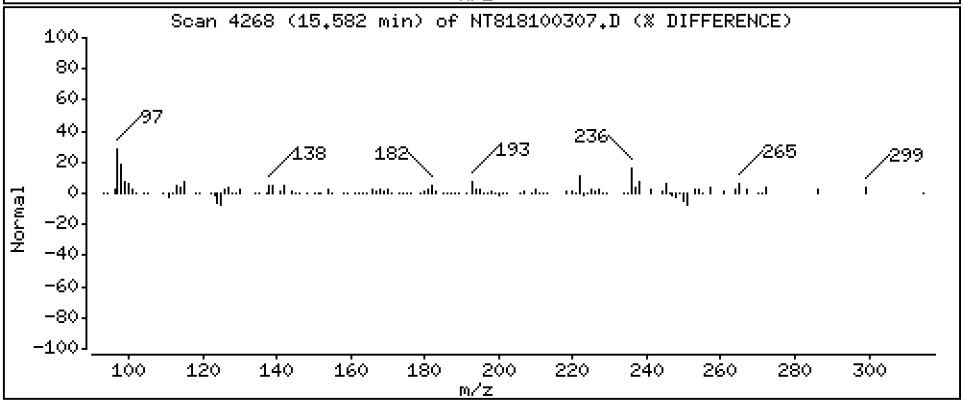












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

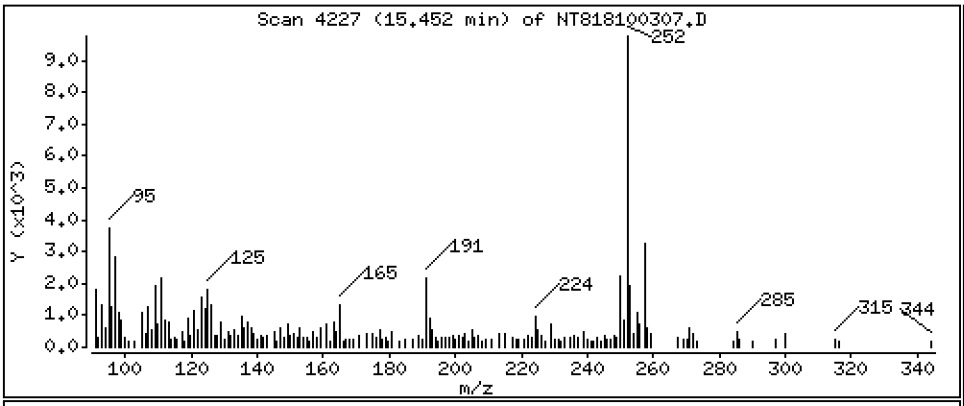
Operator: JZ

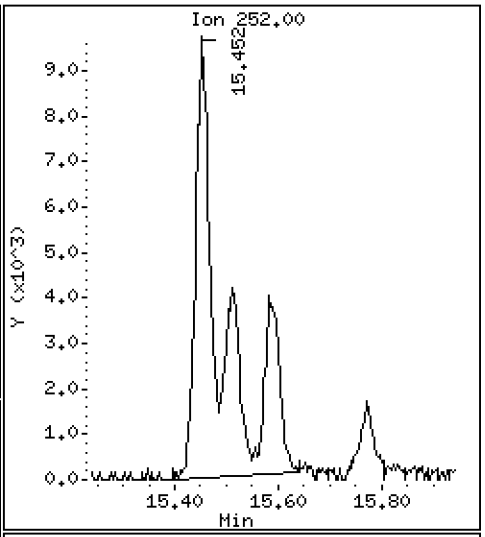
Column phase: Rxi-17sil

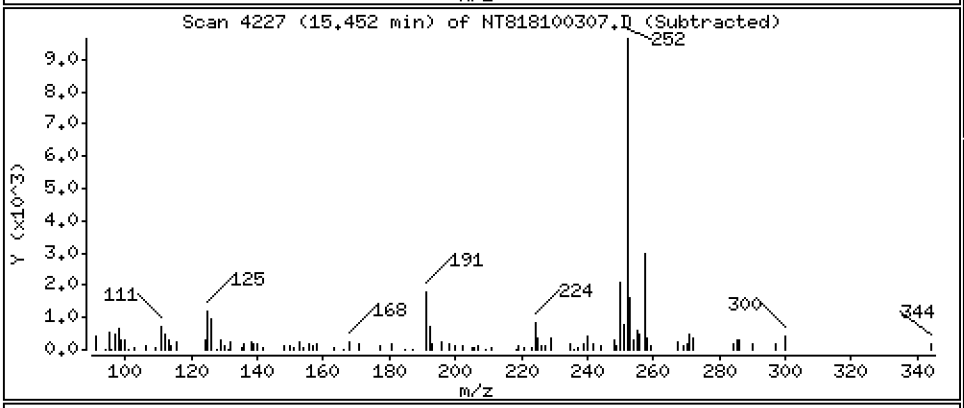
Column diameter: 0.25

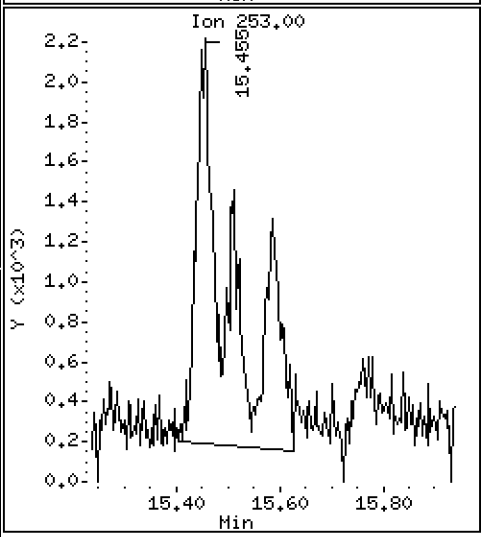
31 Total Benzofluoranthenes

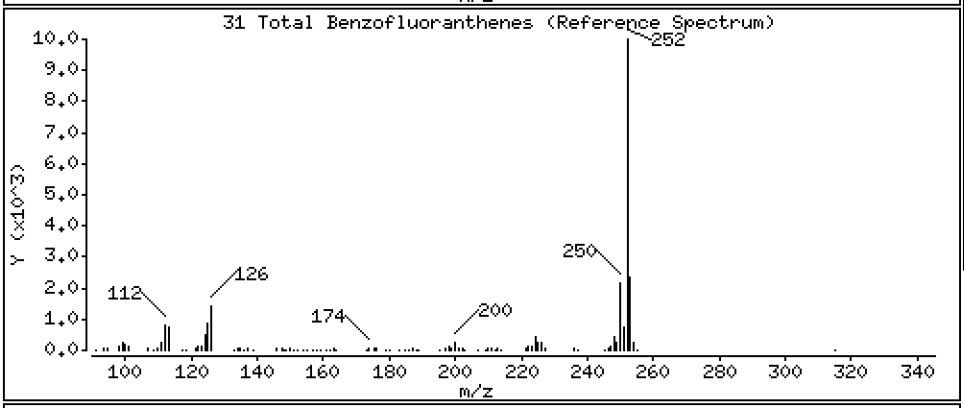
Concentration: 0.3737 ug/mL

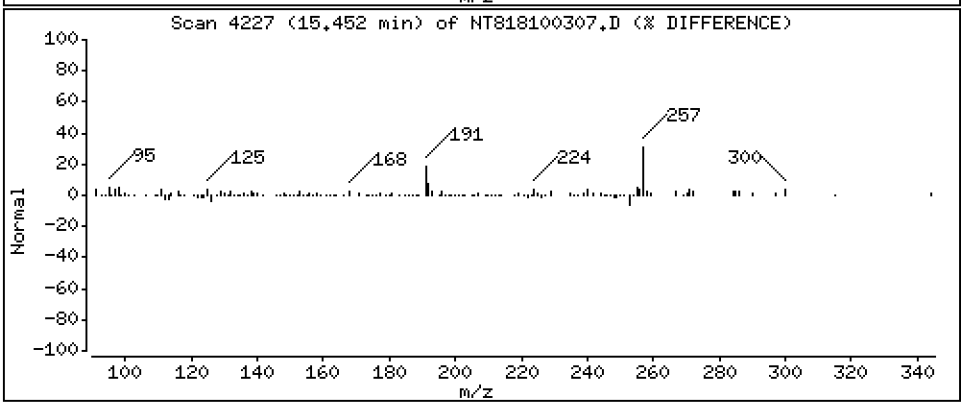












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

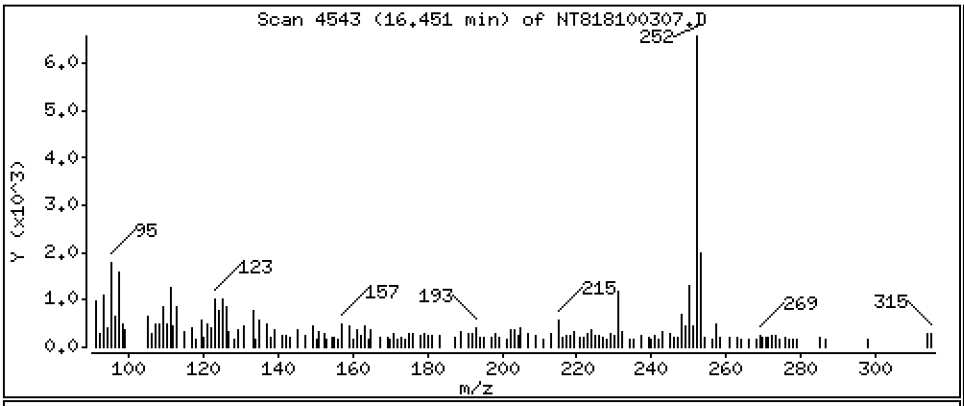
Operator: JZ

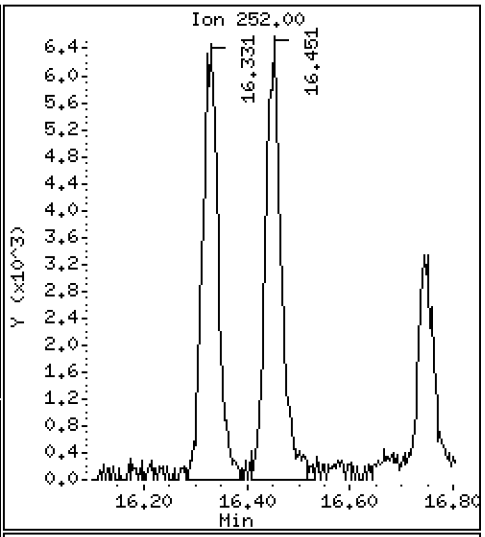
Column phase: Rxi-17sil

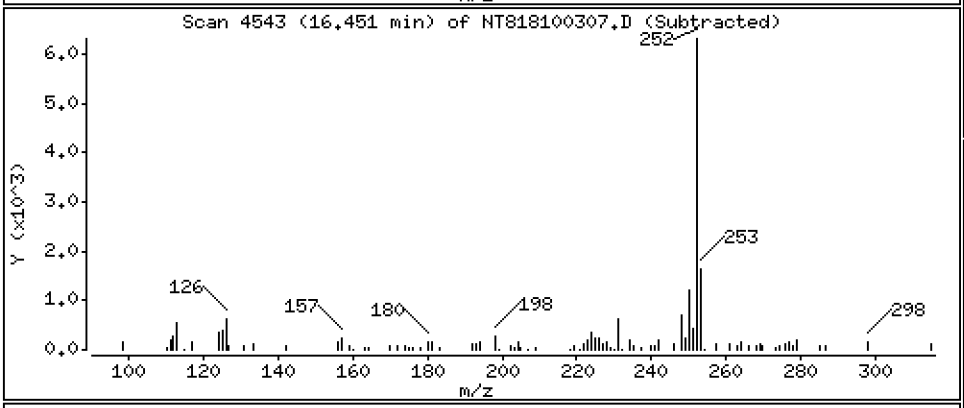
Column diameter: 0.25

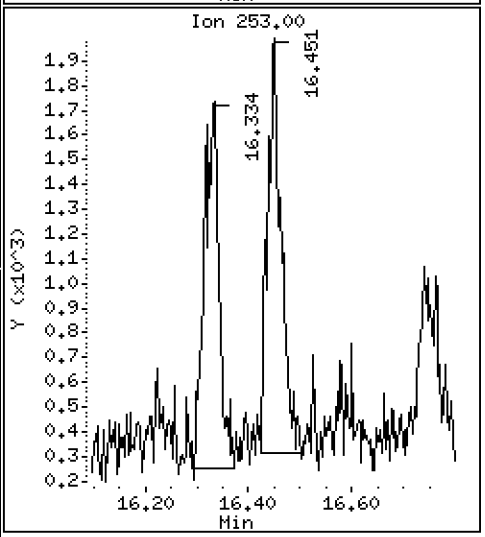
32 Benzo(a)pyrene

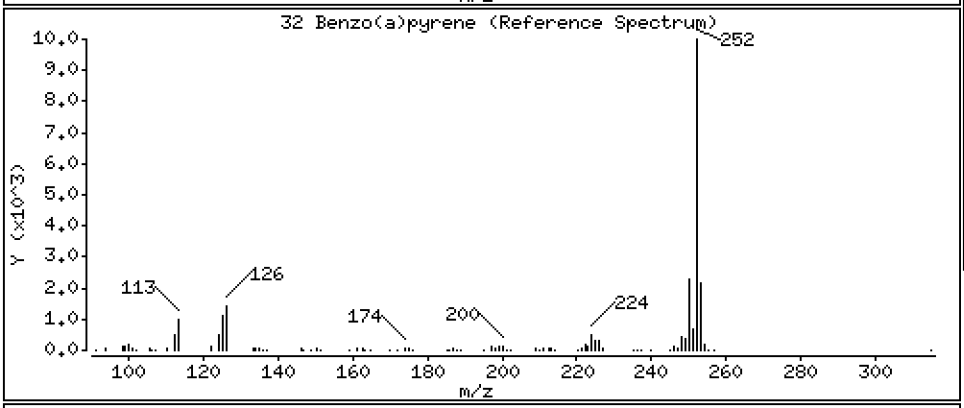
Concentration: 0.1645 ug/mL

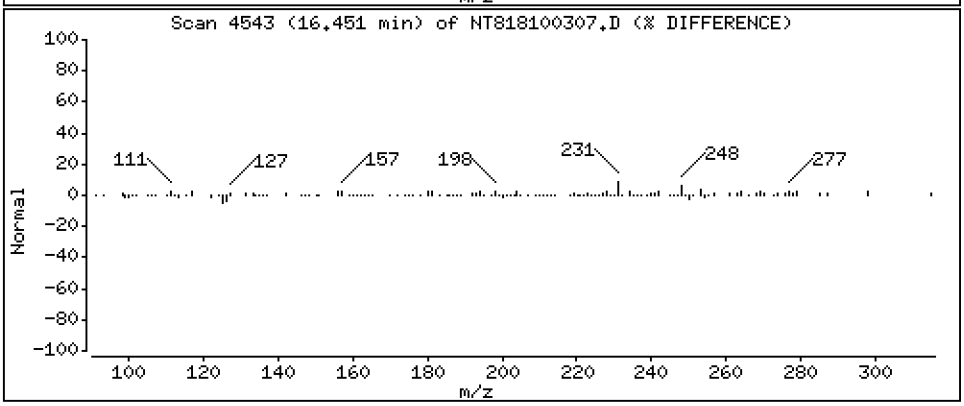












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

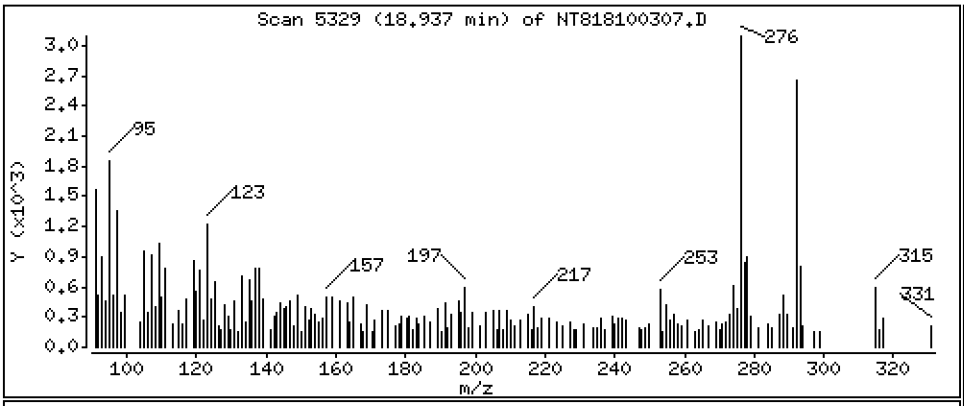
Operator: JZ

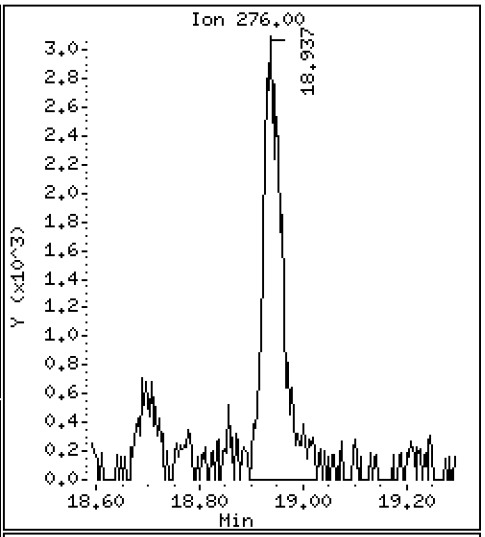
Column phase: Rxi-17sil

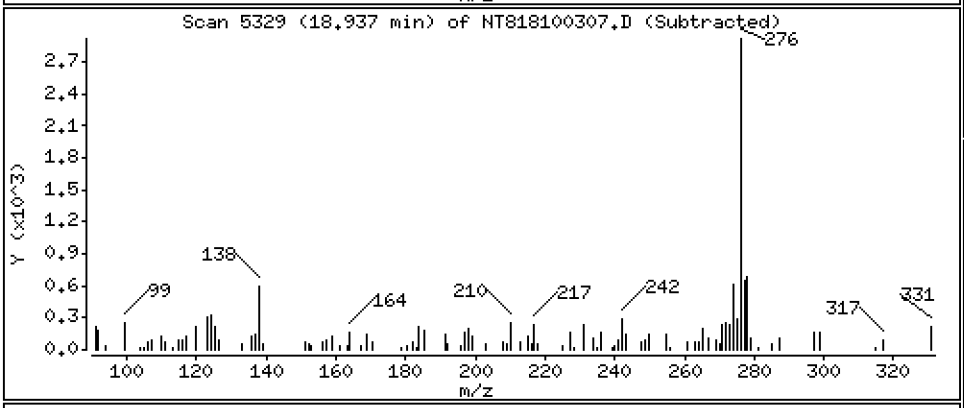
Column diameter: 0.25

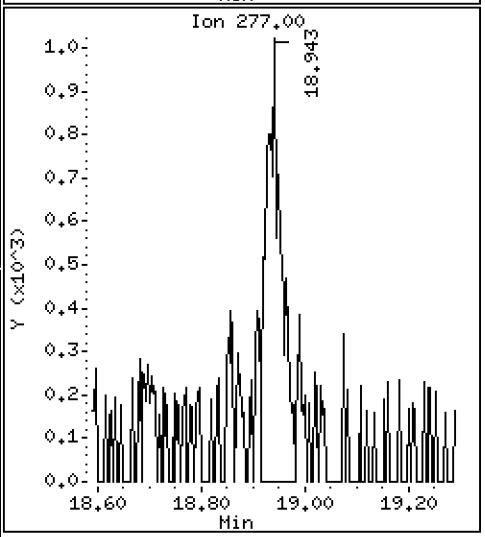
37 Indeno(1,2,3-cd)pyrene

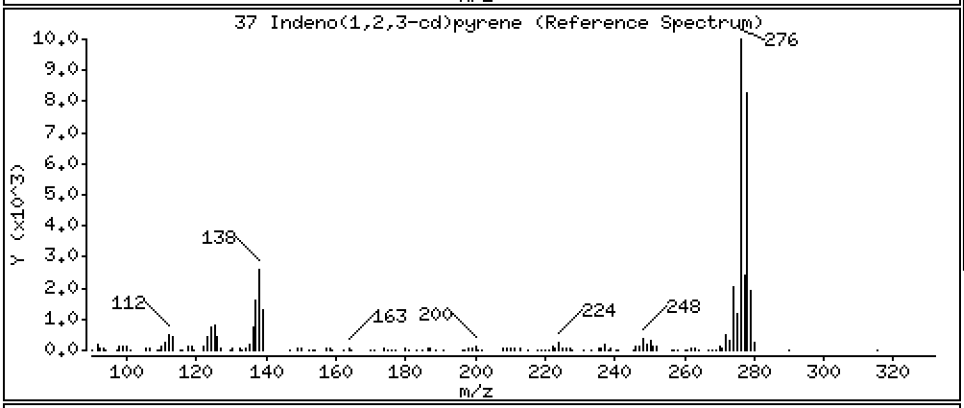
Concentration: 0.08725 ug/mL

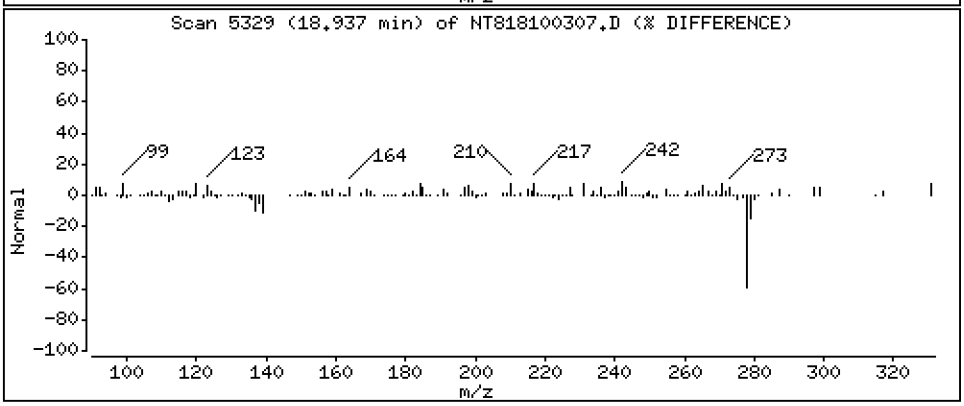












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

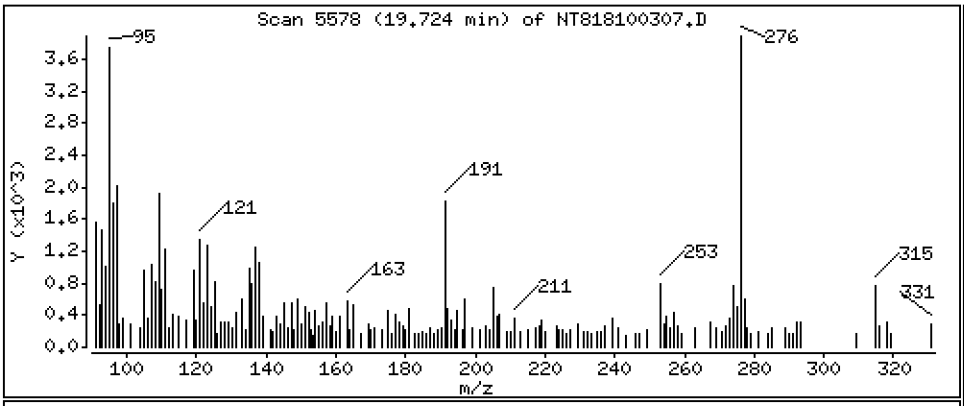
Operator: JZ

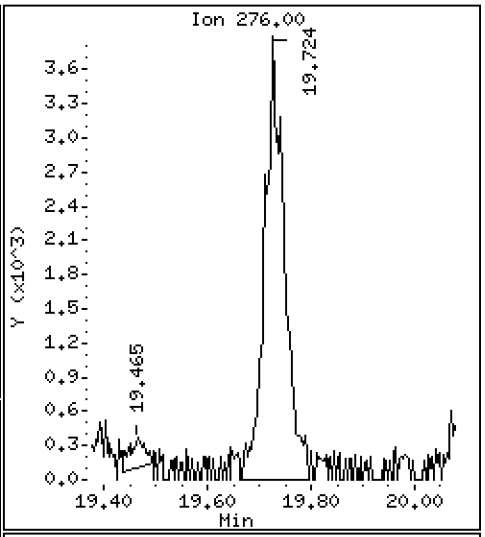
Column phase: Rxi-17sil

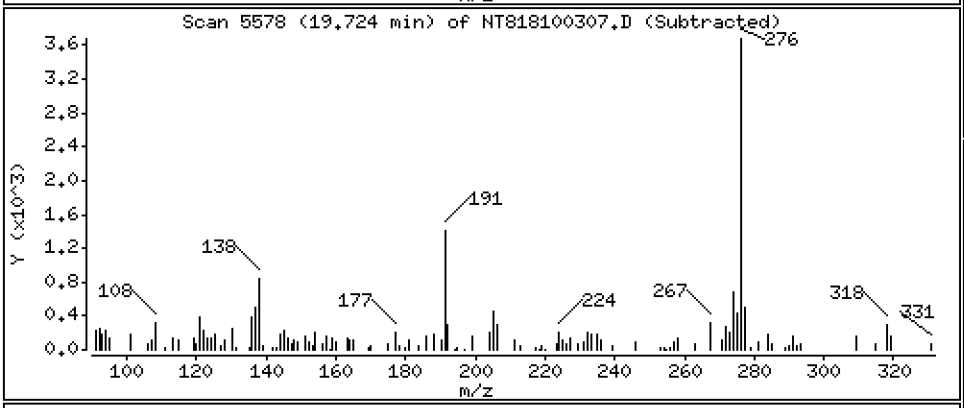
Column diameter: 0.25

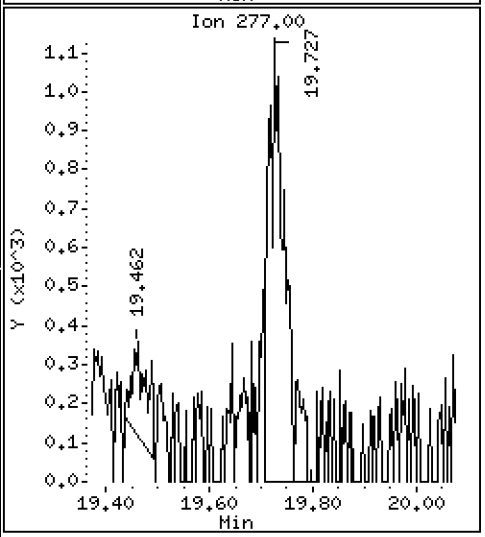
39 Benzo(g,h,i)perylene

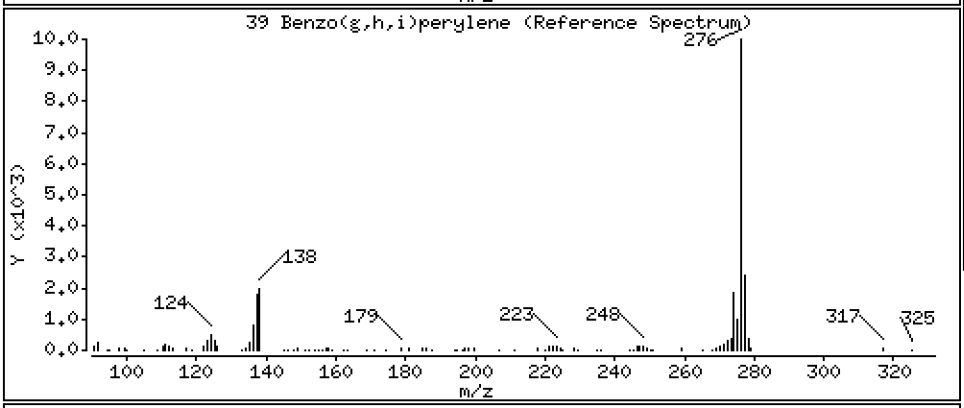
Concentration: 0.1863 ug/mL

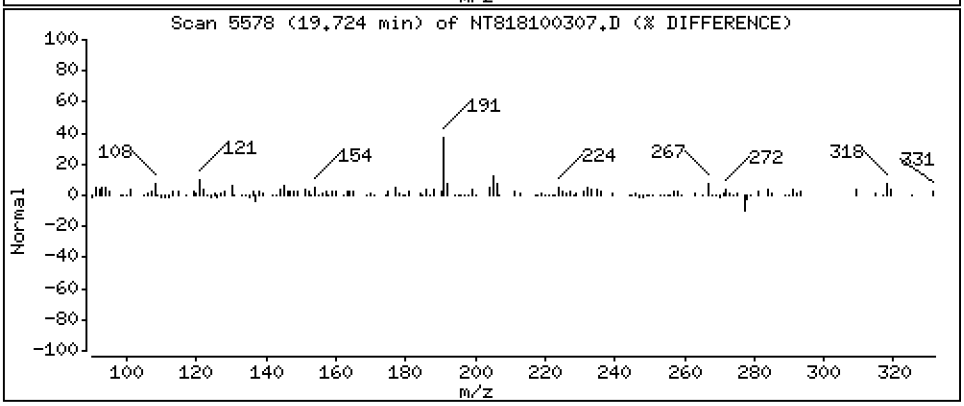












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100307.D

Date : 03-OCT-2018 13:48

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-01

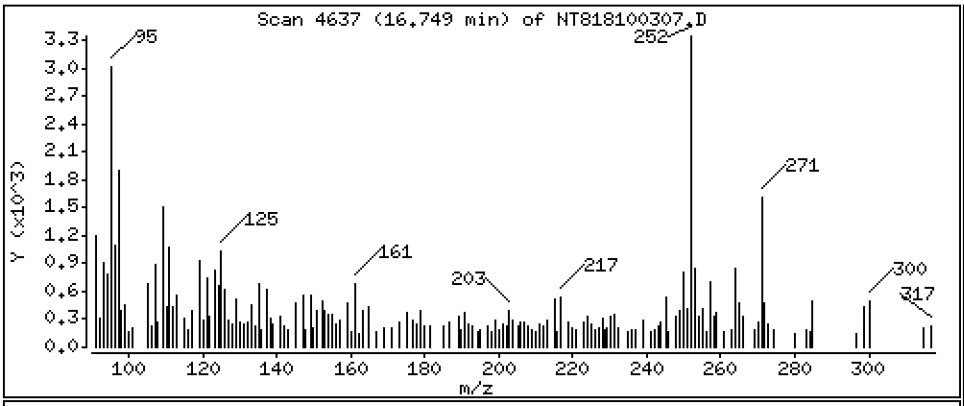
Operator: JZ

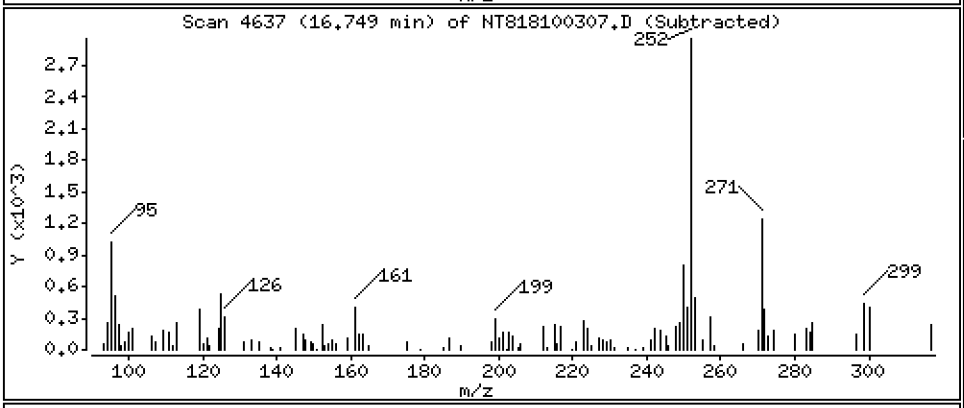
Column phase: Rxi-17sil

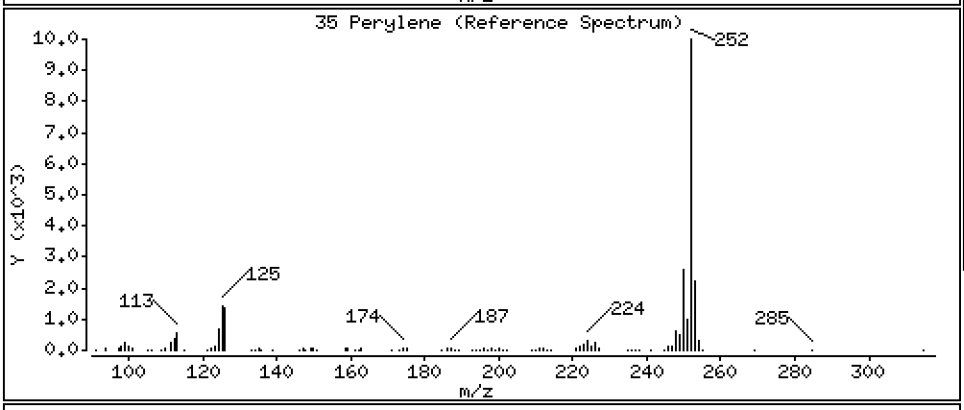
Column diameter: 0.25

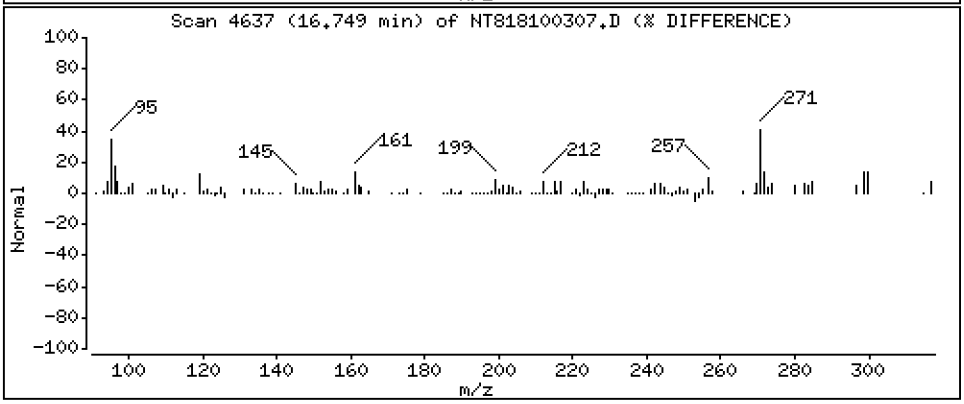
35 Perylene

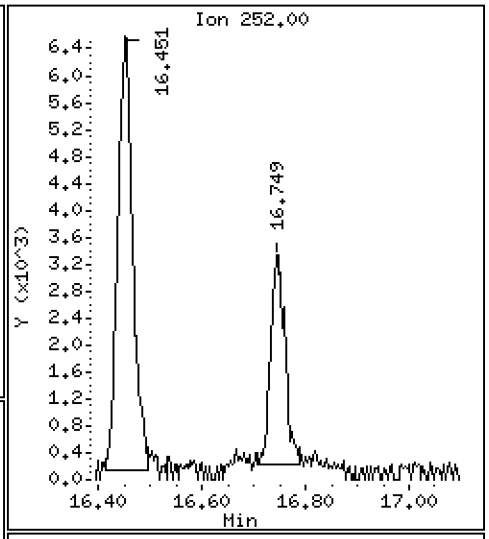
Concentration: 0.06707 ug/mL

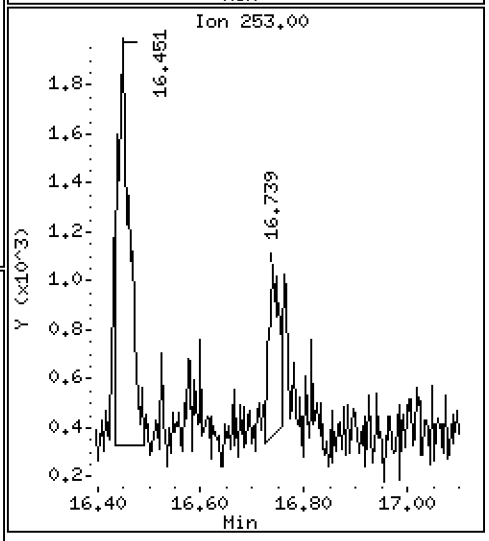












ARI Labs, Inc.

Semivolatile Report SW846 Method 8270D

Data file : \\target\share\chem3\nt8.i\20181003.b\NT818100307.D
Lab Smp Id: 18I0285-01
Inj Date : 03-OCT-2018 13:48
Operator : JZ Inst ID: nt8.i
Smp Info : 18I0285-01
Misc Info : 18-
Comment : 1ul Injection
Method : \\target\share\chem3\nt8.i\20181003.b\FSIMPNA180803.m
Meth Date : 03-Oct-2018 12:11 jianqing Quant Type: ISTD
Cal Date : 03-AUG-2018 10:49 Cal File: N818080302.D
Als bottle: 7
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: pnax.sub
Target Version: 4.14
Processing Host: ORGDATA22

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/mL)	FINAL (ug/mL)
*	1 Naphthalene-d8	136	4.312	4.319	(1.000)	142221	2.00000	
	2 Naphthalene	128	4.341	4.347	(1.007)	62975	0.81245	0.8124
$	3 2-Methylnaphthalene-d10	152	5.039	5.040	(1.169)	88423	1.75803	1.758
	4 2-Methylnaphthalene	141	5.084	5.087	(1.179)	5603	0.12891	0.1289
	5 1-methylnaphthalene	141	5.280	5.280	(1.224)	3360	0.07508	0.07508
	9 Acenaphthylene	152	6.456	6.453	(0.983)	10589	0.13094	0.1309
*	10 Acenaphthene-d10	164	6.567	6.564	(1.000)	76244	2.00000	
	11 Acenaphthene	153	6.617	6.614	(1.008)	7089	0.13004	0.1300
	12 Dibenzofuran	168	6.763	6.763	(1.030)	10974	0.14532	0.1453
	14 Fluorene	166	7.234	7.231	(1.102)	8116	0.12976	0.1298
*	15 Phenanthrene-d10	188	8.565	8.565	(1.000)	147766	2.00000	
	16 Phenanthrene	178	8.600	8.597	(1.004)	50111	0.62881	0.6288
	17 Anthracene	178	8.638	8.638	(1.008)	18933	0.24266	0.2427
	22 Fluoranthene	202	10.212	10.209	(1.192)	73460	0.79285	0.7928
$	21 Fluoranthene-d10	212	10.181	10.178	(1.189)	215529	2.30958	2.310
	23 Pyrene	202	10.658	10.655	(0.819)	71404	0.75539	0.7554
	24 Benzo(a)anthracene	228	12.900	12.897	(0.991)	18476	0.20214	0.2021
*	25 Chrysene-d12	240	13.014	13.014	(1.000)	158864	2.00000	
	27 Chrysene	228	13.080	13.080	(1.005)	31144	0.36051	0.3605
	28 Benzo(b)fluoranthene	252	15.452	15.458	(0.926)	18433	0.19212	0.1921
	29 Benzo(k)fluoranthene	252	15.512	15.515	(0.930)	8722	0.09182	0.09182
	30 Benzo(j)fluoranthene	252	15.581	15.591	(0.934)	7599	0.08439	0.08439
	31 Total Benzofluoranthenes	252	15.452	15.591	(0.926)	34800	0.37371	0.3737(M)
	32 Benzo(a)pyrene	252	16.451	16.451	(0.986)	14233	0.16445	0.1645
*	33 Perylene-d12	264	16.679	16.672	(1.000)	153854	2.00000	
	37 Indeno(1,2,3-cd)pyrene	276	18.936	18.943	(1.135)	7955	0.08725	0.08725
$	36 Dibenzo(a,h)anthracene-d14	292	18.857	18.861	(1.131)	199918	2.89655	2.897
	38 Dibenzo(a,h)anthracene	278	Compound Not Detected.					
	39 Benzo(g,h,i)perylene	276	19.724	19.727	(1.183)	10338	0.18631	0.1863
	35 Perylene	252	16.748	16.745	(1.004)	5988	0.06707	0.06707

QC Flag Legend

M - Compound response manually integrated.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt8.i
Lab File ID: NT818100307.D
Lab Smp Id: 18I0285-01
Analysis Type: SV
Quant Type: ISTD
Operator: JZ
Method File: \\target\share\chem3\nt8.i\20181003.b\FSIMPNA180803.m
Misc Info: 18-

Calibration Date: 03-OCT-2018
Calibration Time: 11:20
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
1 Naphthalene-d8	131877	65939	263754	142221	7.84
10 Acenaphthene-d10	72272	36136	144544	76244	5.50
15 Phenanthrene-d10	156058	78029	312116	147766	-5.31
25 Chrysene-d12	174389	87195	348778	158864	-8.90
33 Perylene-d12	150701	75351	301402	153854	2.09

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
1 Naphthalene-d8	4.32	3.82	4.82	4.31	-0.15
10 Acenaphthene-d10	6.56	6.06	7.06	6.57	0.05
15 Phenanthrene-d10	8.57	8.07	9.07	8.57	-0.00
25 Chrysene-d12	13.01	12.51	13.51	13.01	-0.00
33 Perylene-d12	16.67	16.17	17.17	16.68	0.04

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

ccal: //target/share/chem3/nt8.i/20181003.b/NT818100302.D
REVIEW SUMMARY FOR FILE - NT818100307.D

Lab ID: 18I0285-01
nt8.i, 20181003.b\FSIMPNA180803.m,   03-OCT-2018 13:48

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND
0.926	0.935	-0.0087	Total Benzofluoranthenes

RRT check based on Ccal File: NT818100302.D

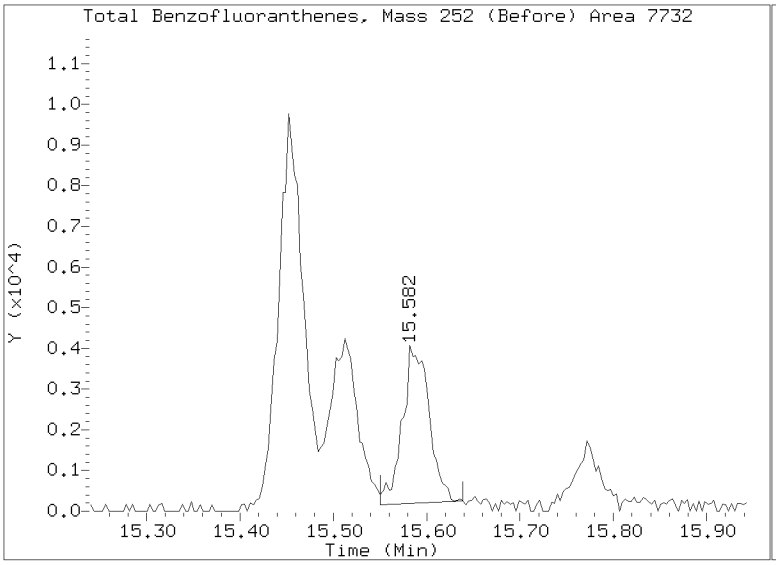
On Column LOD for nt8.i, 20181003.b\FSIMPNA180803.m, pnax.sub = 0.0500

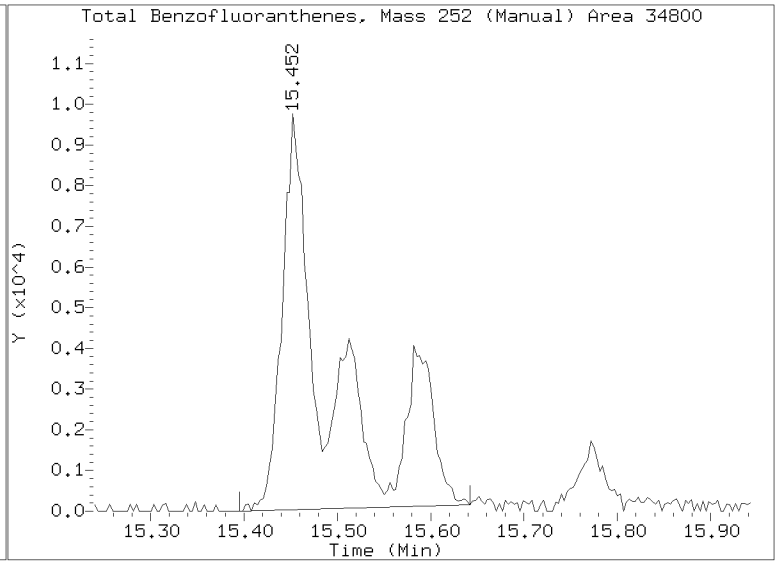
Exception: Benzo(b)fluoranthene 0.0300
Exception: Benzo(k)fluoranthene 0.0300
Exception: Benzo(j)fluoranthene 0.0300
Exception: Total Benzofluoranthenes 0.0300
Exception: Fluoranthene-d10 (Surr) 0.0000

* Only compounds listed in the work order have been verified by the analyst *

Quant Ion Manual Peak Adjustment Report

Datafile: //target/share/chem3/nt8.i/20181003.b/NT818100307.D
Injection Date: 03-OCT-2018 13:48
Lab ID:18I0285-01 Client ID:
Report Date: 10/03/2018 14:26





SMA1-ST-0-10-Comp-180917

Form I
ORGANIC ANALYSIS DATA SHEET
EPA 8270D-SIM
Polynuclear Aromatic Hydrocarbons

Laboratory:	Analytical Resources, Inc.				
Client:	Anchor QEA, LLC				
Project:	Port Gamble - OMMP LTM				
Matrix:	Sediment	Laboratory ID:	18I0285-02	SDG:	18I0285
Sampled:	09/17/18 12:05	Prepared:	09/26/18 15:45	File ID:	NT818100308.D
% Solids:	49.28	Preparation:	EPA 3546 (Microwave)	Analyzed:	10/03/18 14:14
Batch:	BGI0708	Sequence:	SGJ0048	Initial/Final:	20.34 g Wet / 0.5 mL
Instrument:	NT8	Column:	RXI-17Sil ms	Calibration:	BH00016
Cleanups:	Silica Gel, Sulfur				

CAS NO.	COMPOUND	DILUTION	CONC. (ug/kg dry)	Q	DL	RL
91-20-3	Naphthalene	1	706	E	1.27	4.99
91-57-6	2-Methylnaphthalene	1	125		1.10	4.99
90-12-0	1-Methylnaphthalene	1	87.3		0.40	4.99
208-96-8	Acenaphthylene	1	80.7		1.08	4.99
83-32-9	Acenaphthene	1	205		0.57	4.99
86-73-7	Fluorene	1	220		0.63	4.99
85-01-8	Phenanthrene	1	587	E	0.72	4.99
120-12-7	Anthracene	1	252		0.87	4.99
206-44-0	Fluoranthene	1	602	E	0.47	4.99
129-00-0	Pyrene	1	632	E	0.62	4.99
56-55-3	Benzo(a)anthracene	1	260		0.82	4.99
218-01-9	Chrysene	1	433		1.05	4.99
205-99-2	Benzo(b)fluoranthene	1	255		1.37	4.99
207-08-9	Benzo(k)fluoranthene	1	125		0.76	4.99
205-82-3	Benzo(j)fluoranthene	1	118		0.68	4.99
50-32-8	Benzo(a)pyrene	1	214		0.61	4.99
193-39-5	Indeno(1,2,3-cd)pyrene	1	90.7		1.05	4.99
53-70-3	Dibenzo(a,h)anthracene	1	28.4		0.89	4.99
191-24-2	Benzo(g,h,i)perylene	1	110		1.06	4.99
	Benzofluoranthenes, Total	1	497		3.00	9.98

SURROGATES	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC	QC LIMITS	Q
2-Methylnaphthalene-d10	149.65	88.5	59.1	32 - 120	
Dibenzo[a,h]anthracene-d14	149.65	120	80.0	21 - 133	
Fluoranthene-d10	149.65	102	67.9	36 - 134	

Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100308.D

Date : 03-OCT-2018 14:14

Client ID:

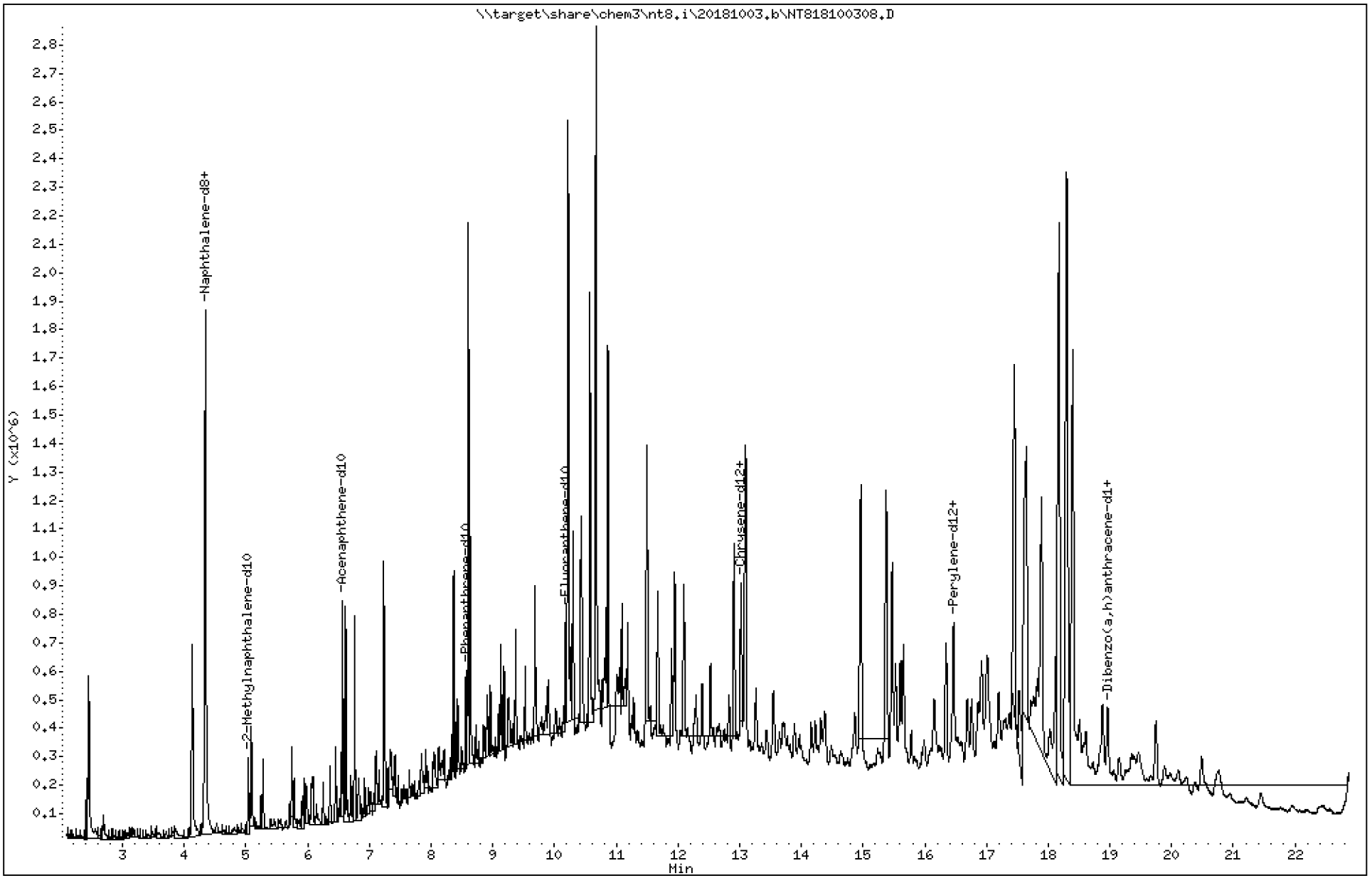
Sample Info: 18I0285-02

Instrument: nt8.i

Operator: JZ

Column phase: Rxi-17sil

Column diameter: 0.25



Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100308.D

Date : 03-OCT-2018 14:14

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-02

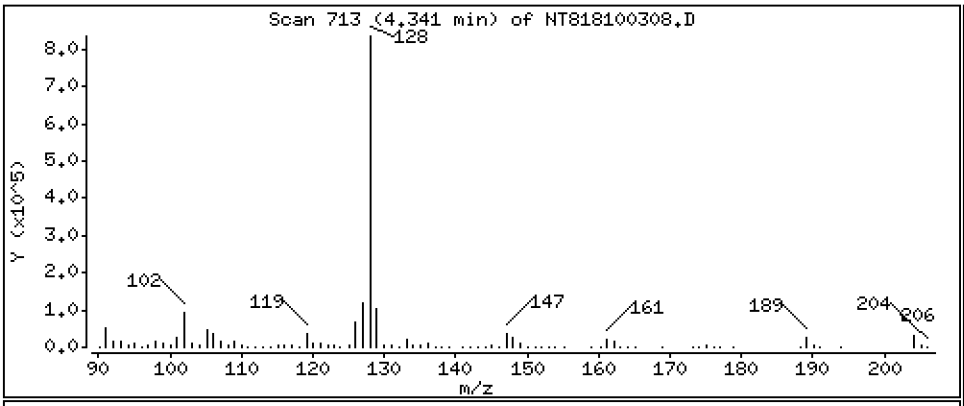
Operator: JZ

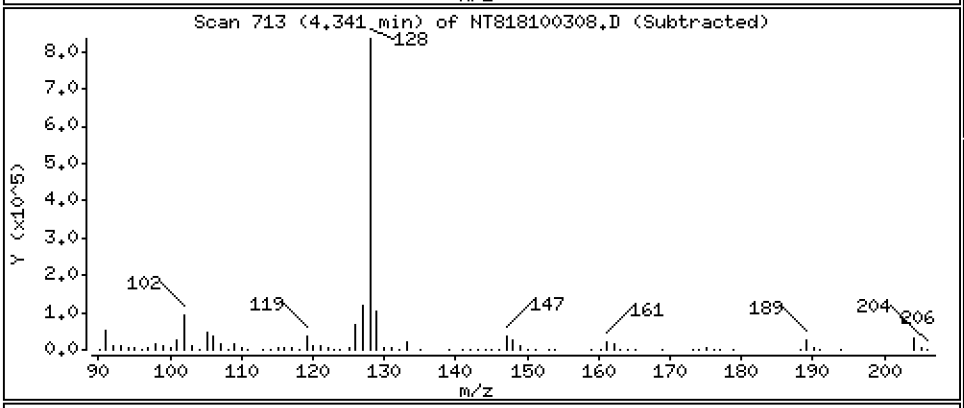
Column phase: Rxi-17sil

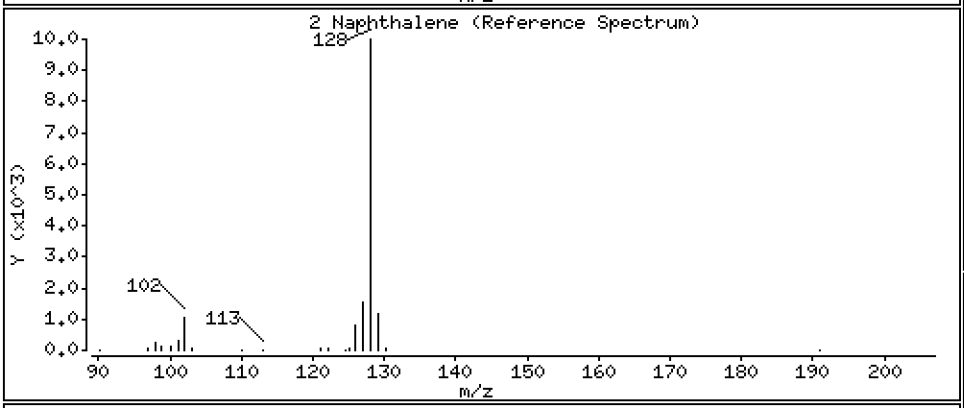
Column diameter: 0.25

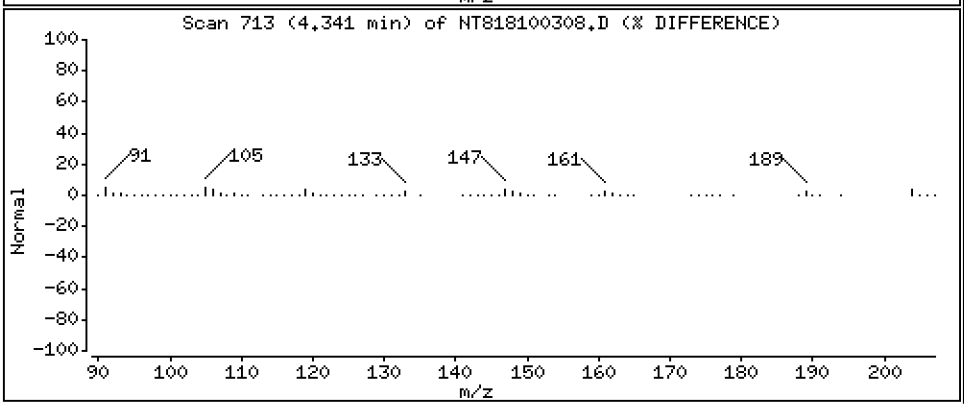
2 Naphthalene

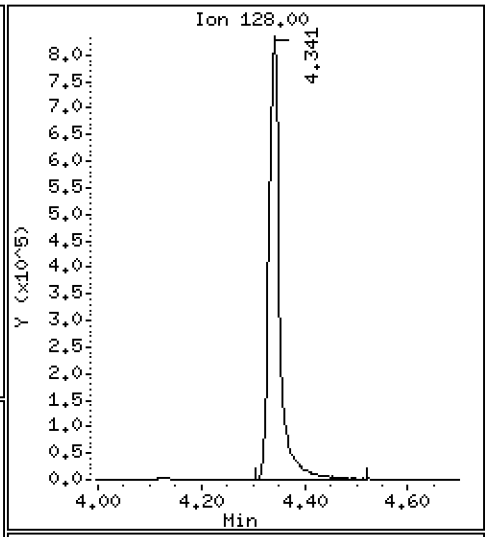
Concentration: 14.14 ug/mL

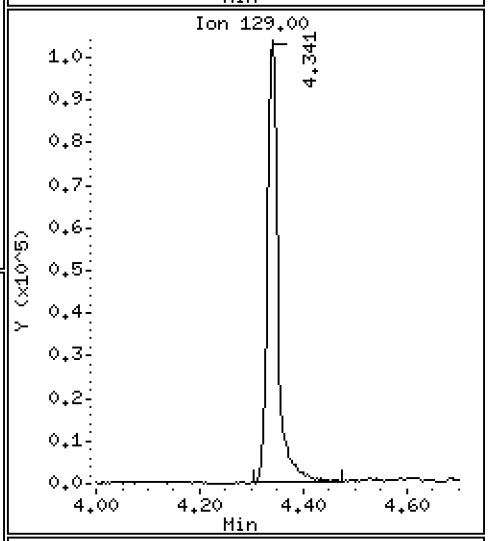


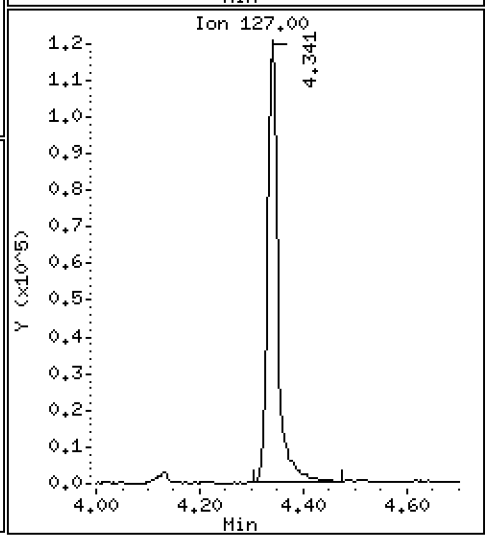












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100308.D

Date : 03-OCT-2018 14:14

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-02

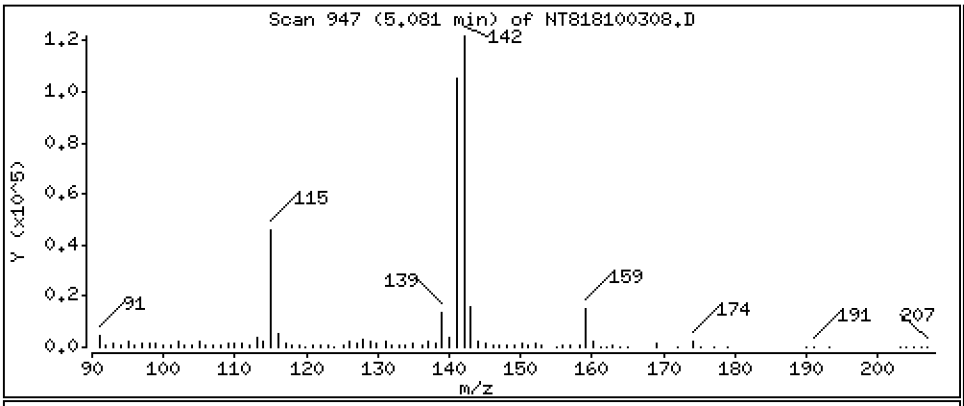
Operator: JZ

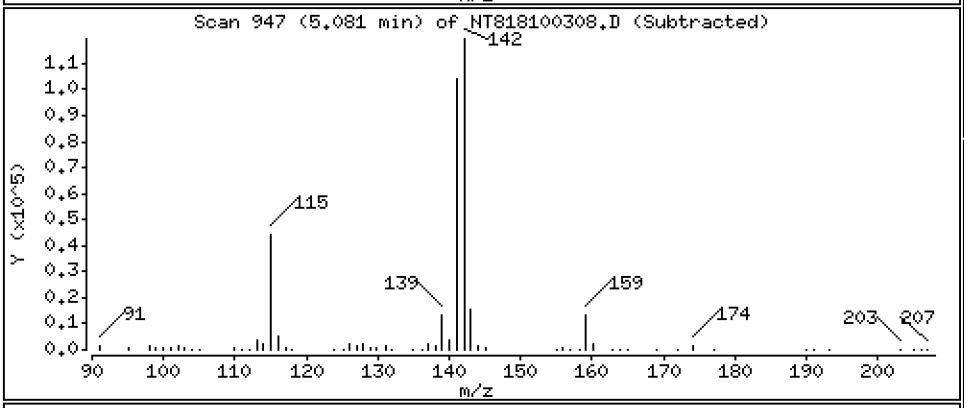
Column phase: Rxi-17sil

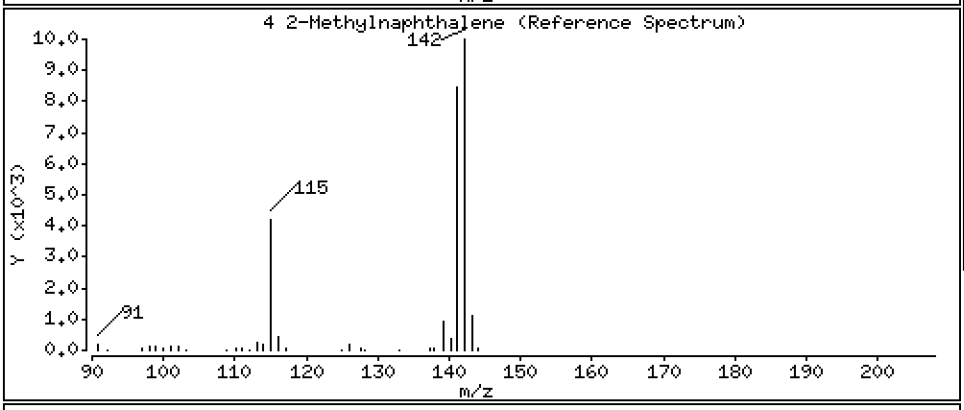
Column diameter: 0.25

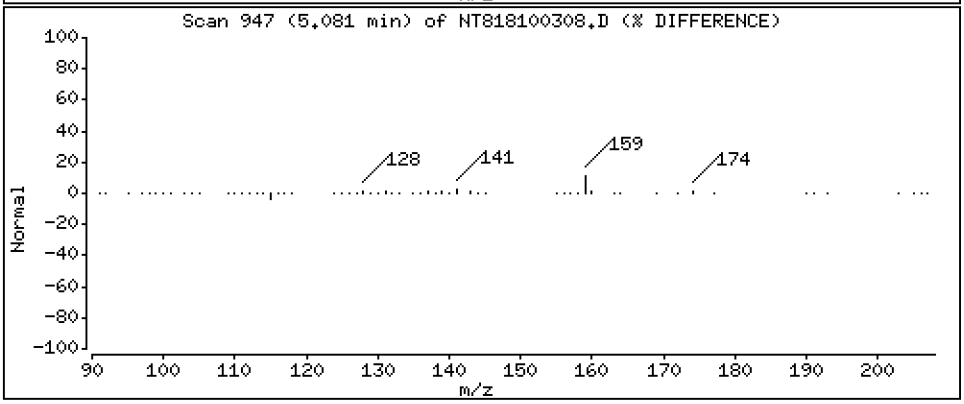
4 2-Methylnaphthalene

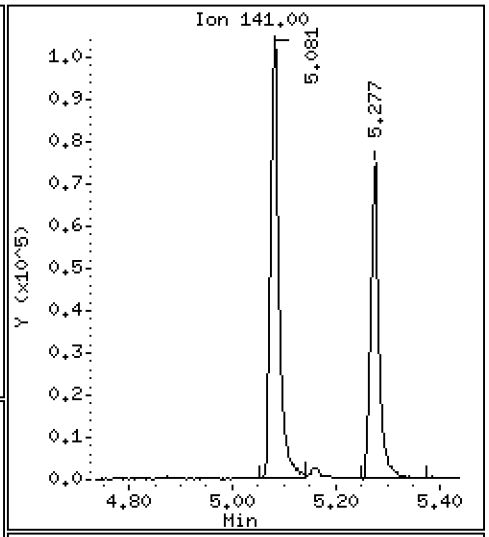
Concentration: 2.514 ug/mL

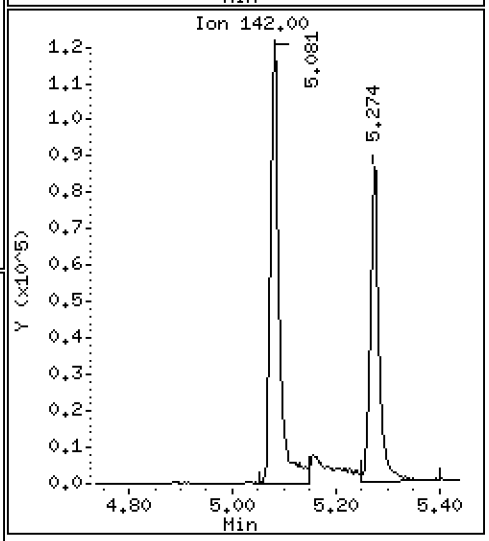












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100308.D

Date : 03-OCT-2018 14:14

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-02

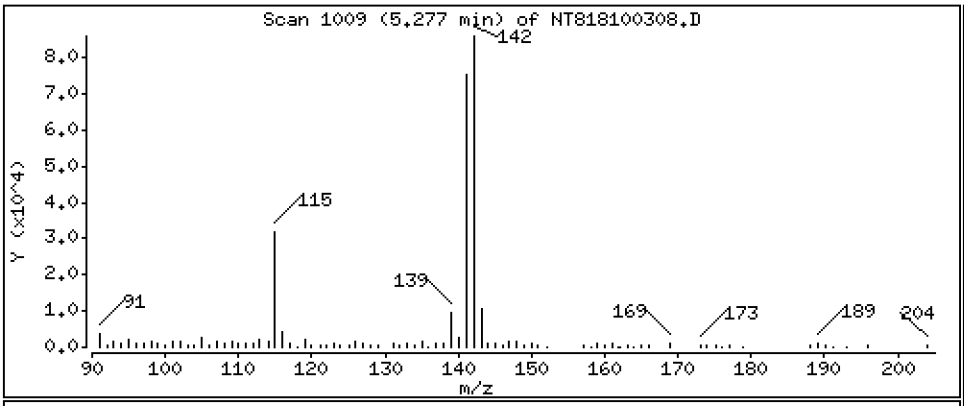
Operator: JZ

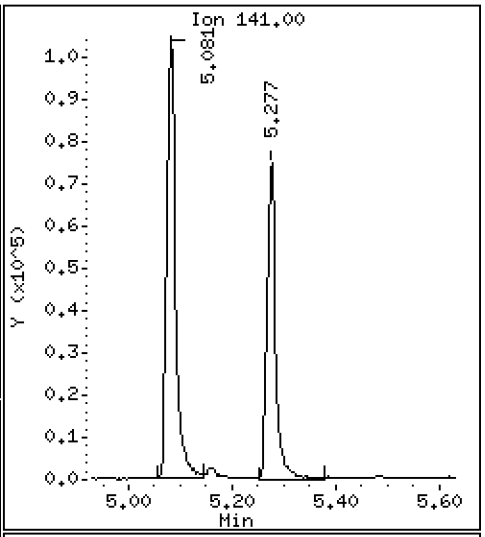
Column phase: Rxi-17sil

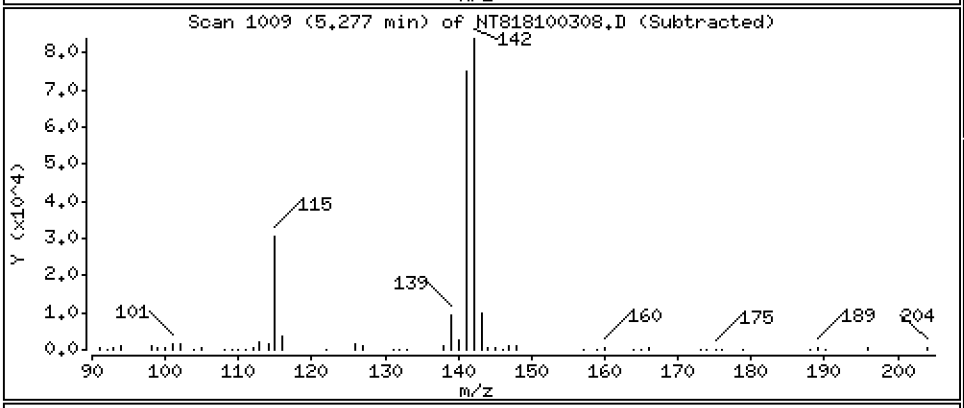
Column diameter: 0.25

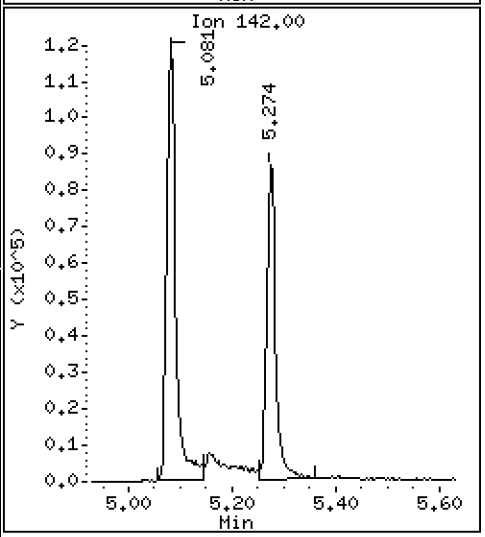
5 1-methylnaphthalene

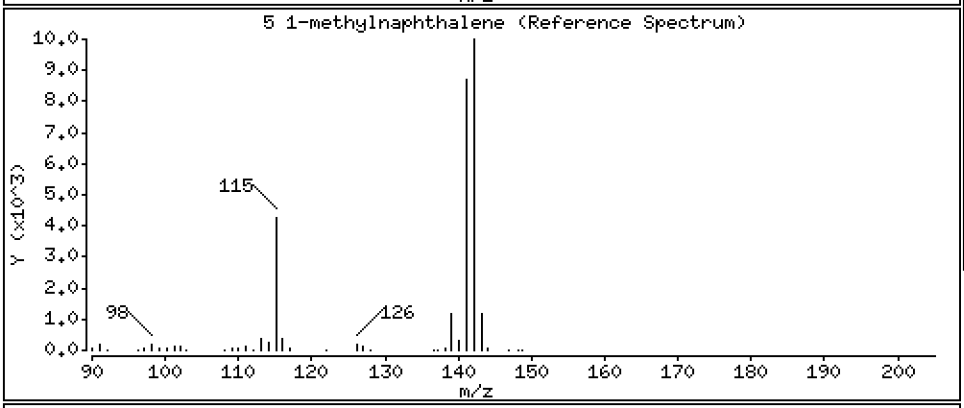
Concentration: 1.751 ug/mL

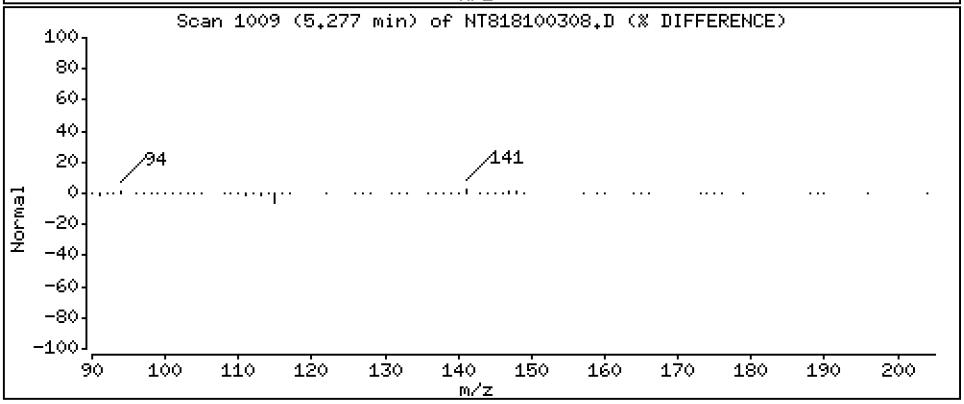












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100308.D

Date : 03-OCT-2018 14:14

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-02

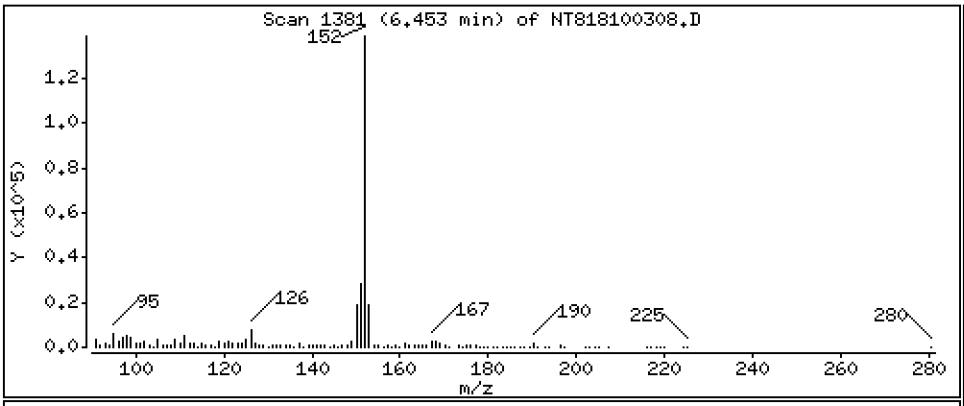
Operator: JZ

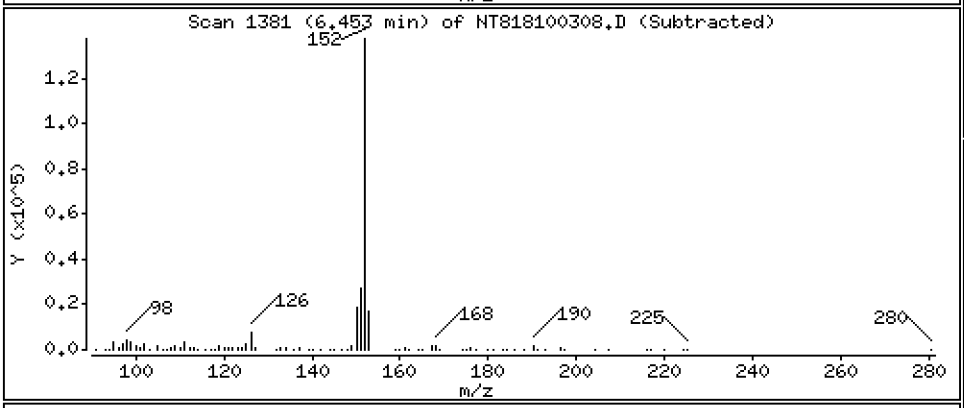
Column phase: Rxi-17sil

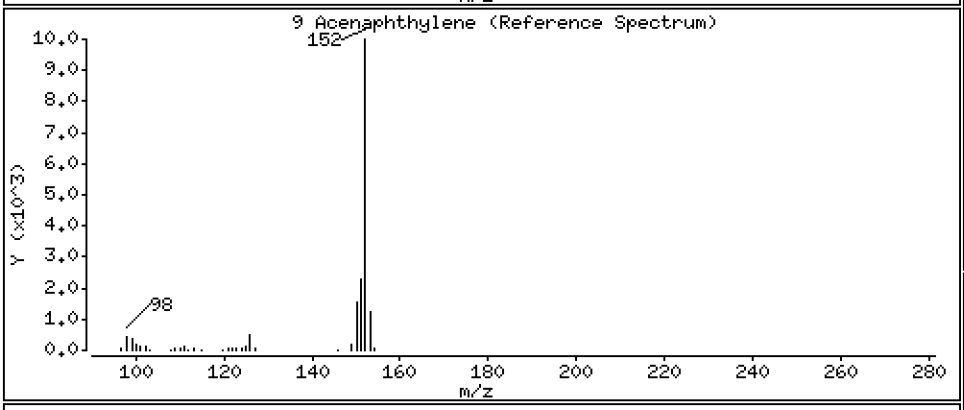
Column diameter: 0.25

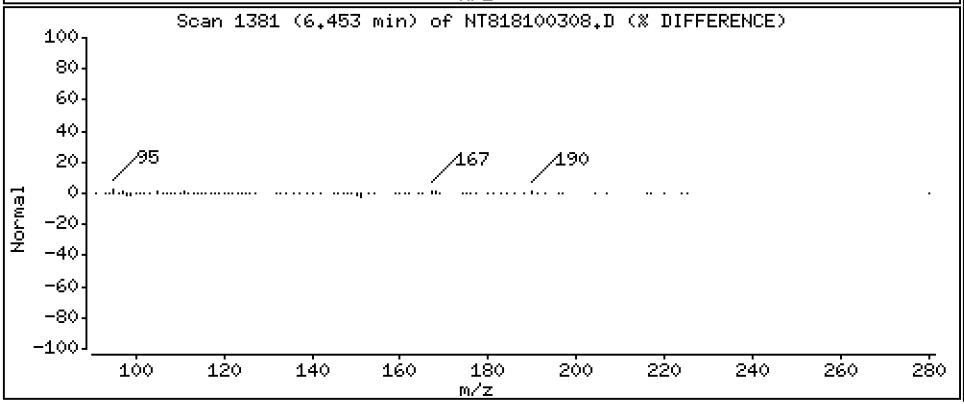
9 Acenaphthylene

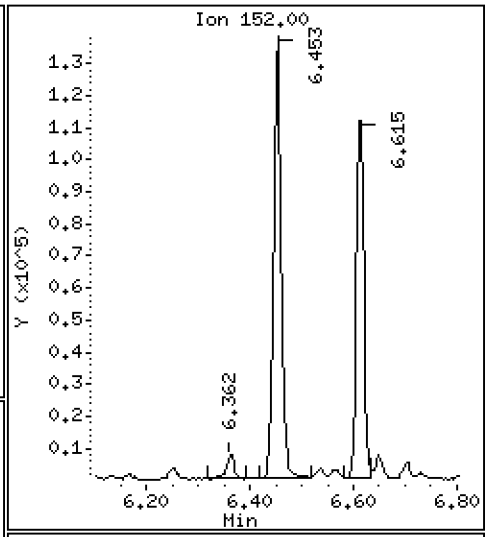
Concentration: 1.617 ug/mL

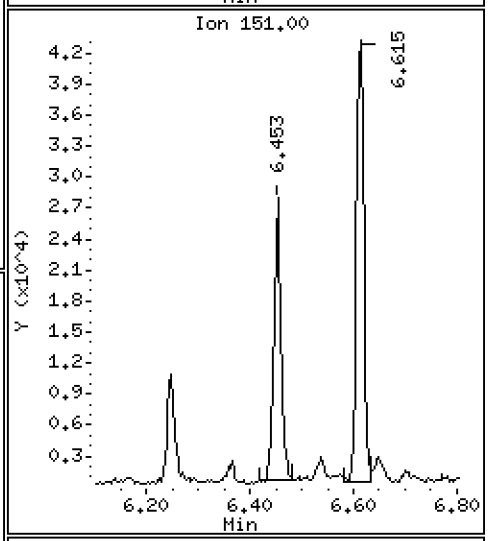


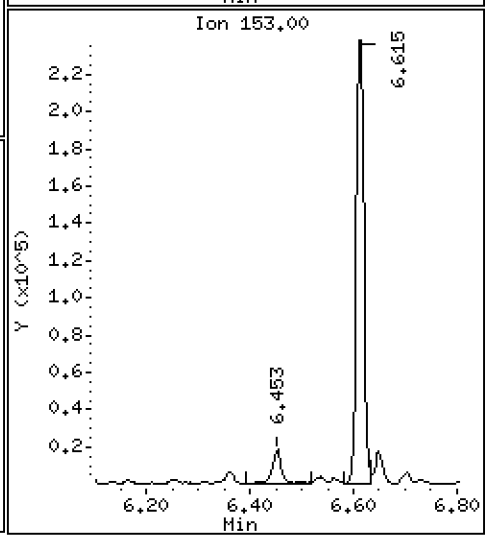












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100308.D

Date : 03-OCT-2018 14:14

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-02

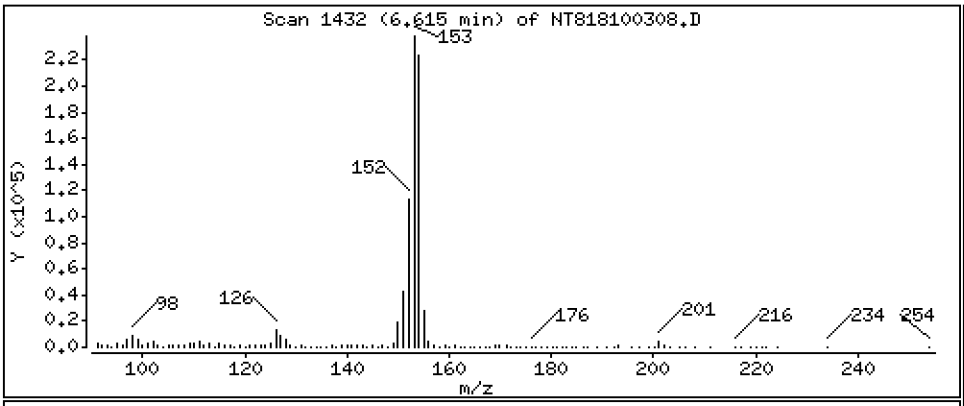
Operator: JZ

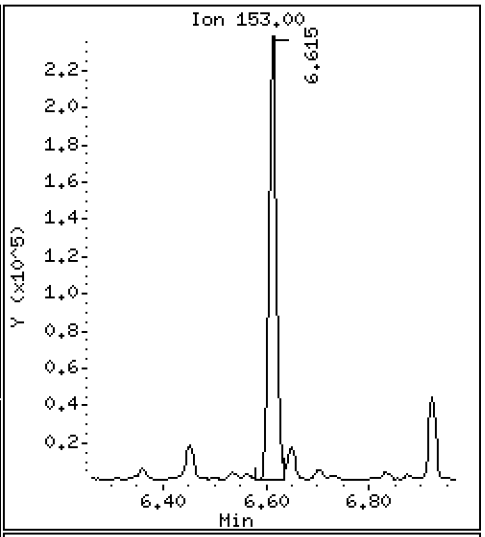
Column phase: Rxi-17sil

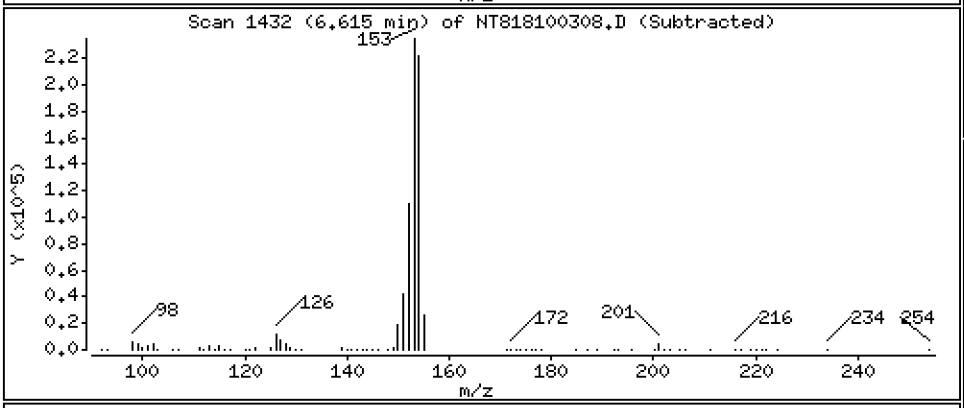
Column diameter: 0.25

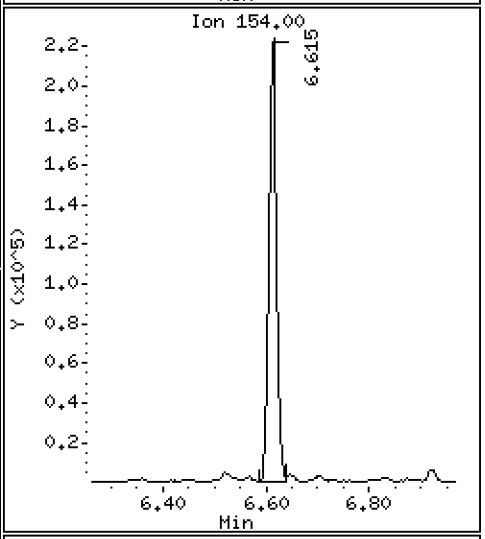
11 Acenaphthene

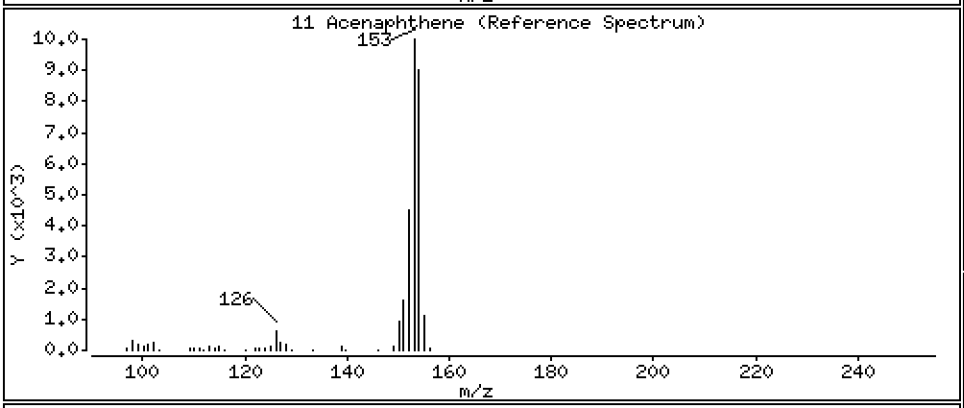
Concentration: 4.118 ug/mL

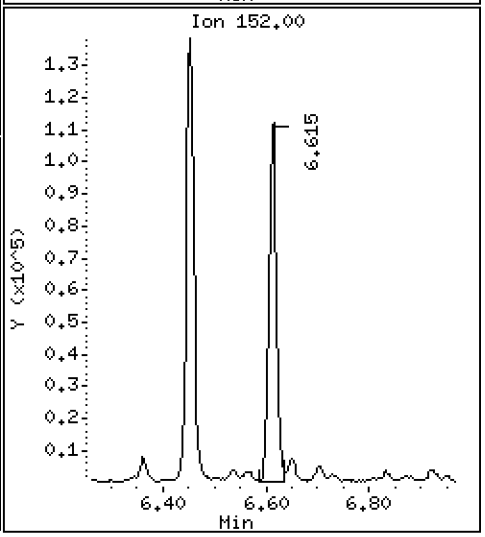


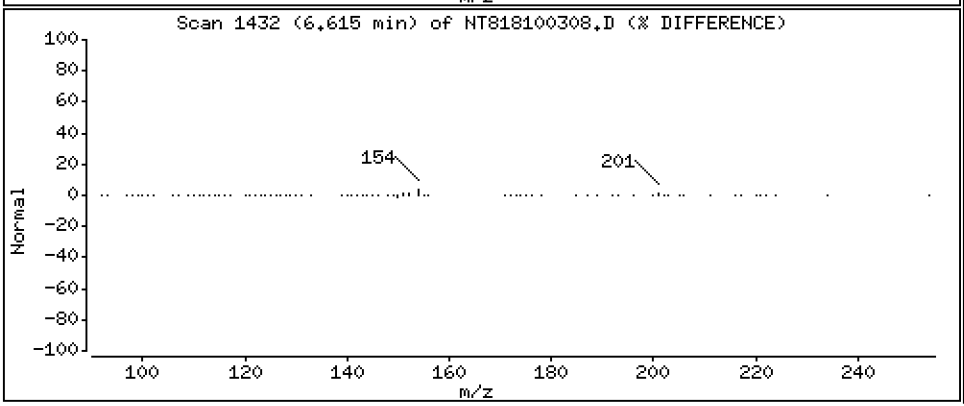












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100308.D

Date : 03-OCT-2018 14:14

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-02

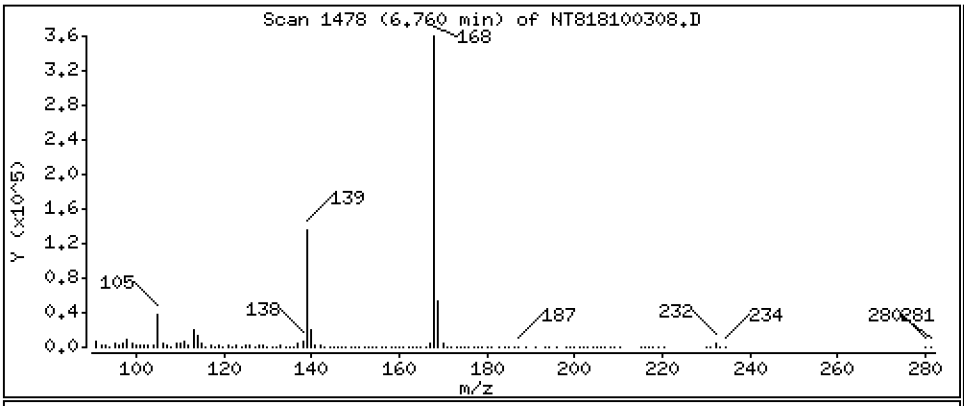
Operator: JZ

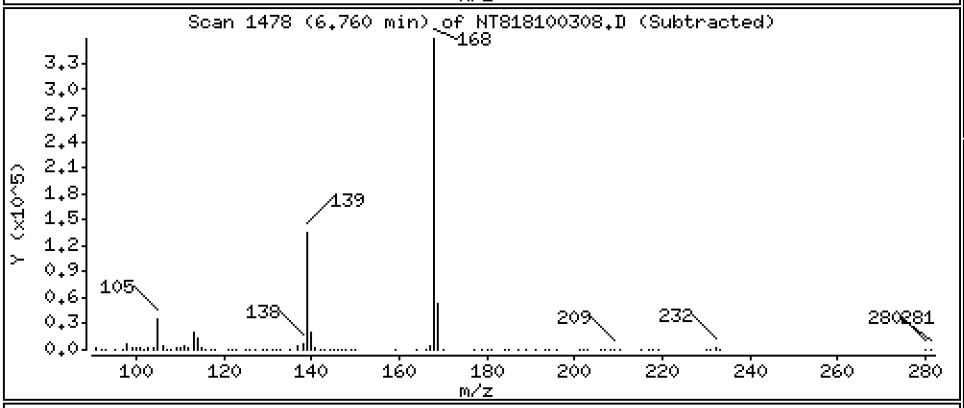
Column phase: Rxi-17sil

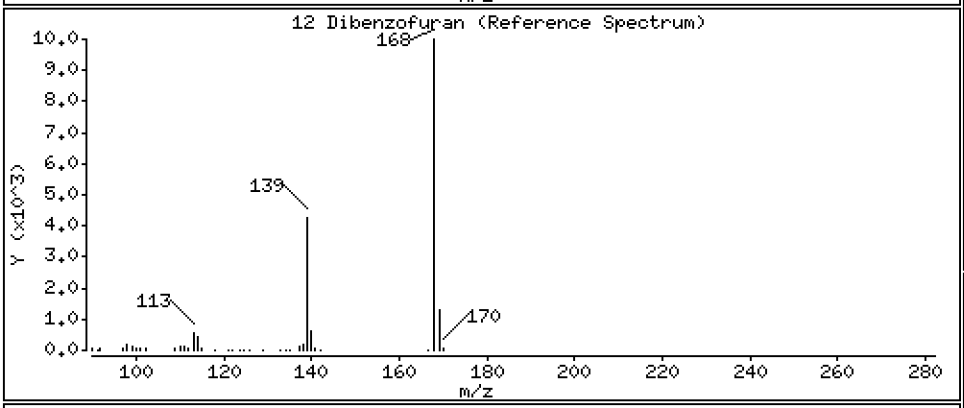
Column diameter: 0.25

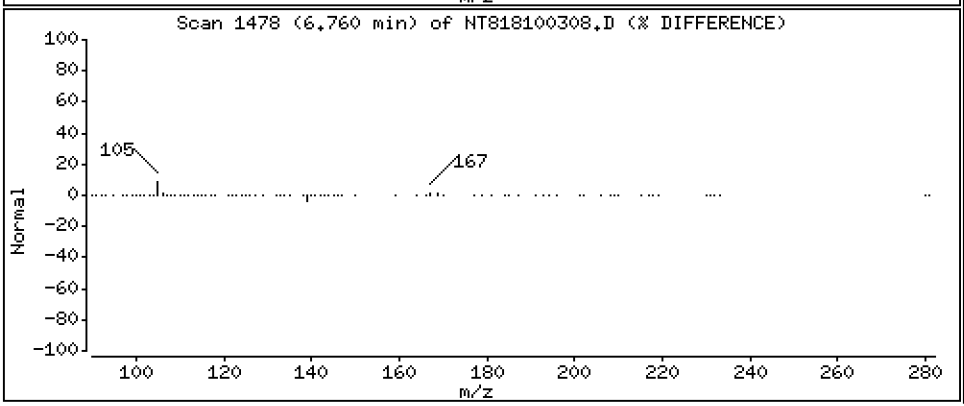
12 Dibenzofuran

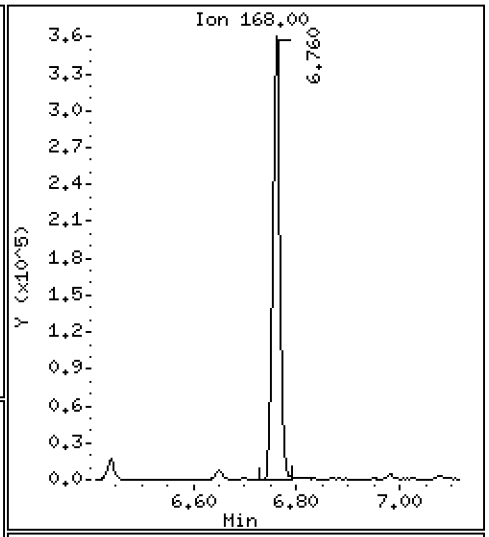
Concentration: 4.260 ug/mL

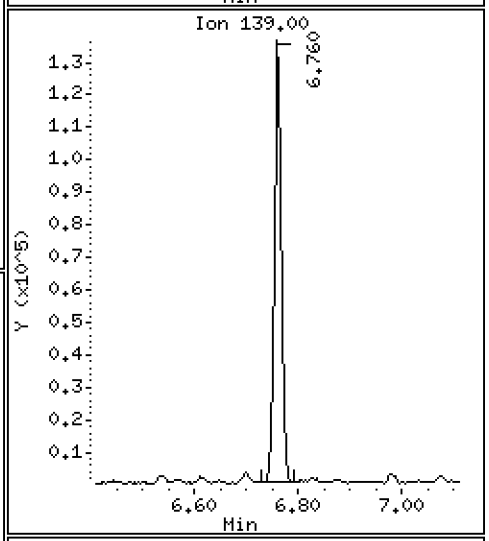


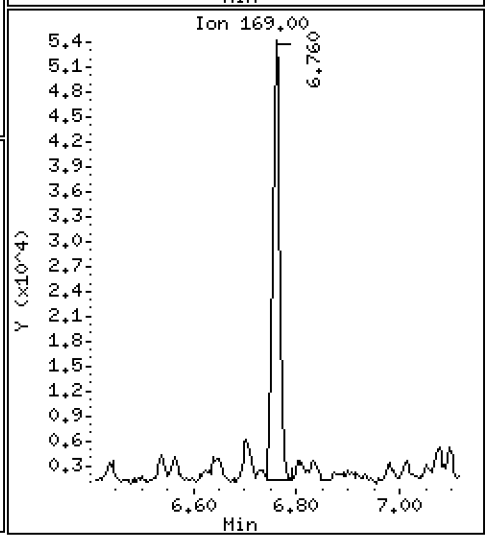












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100308.D

Date : 03-OCT-2018 14:14

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-02

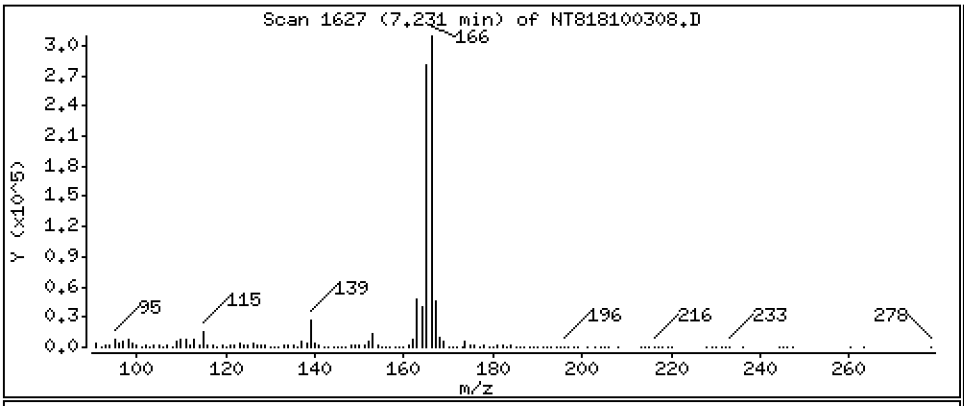
Operator: JZ

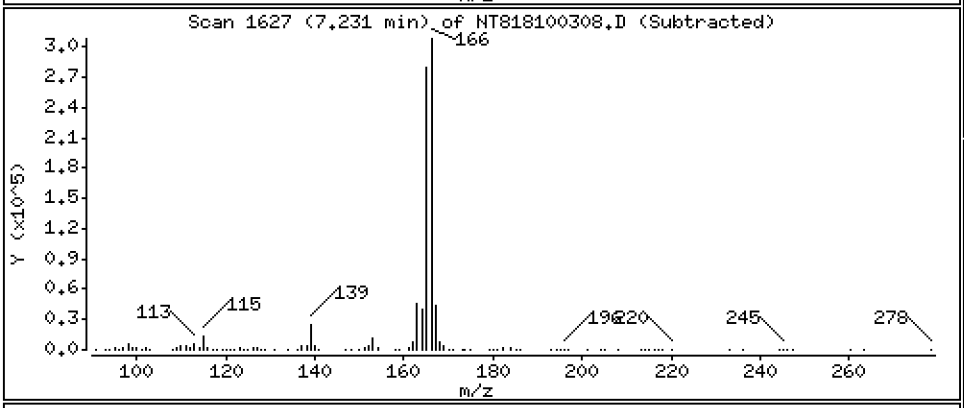
Column phase: Rxi-17sil

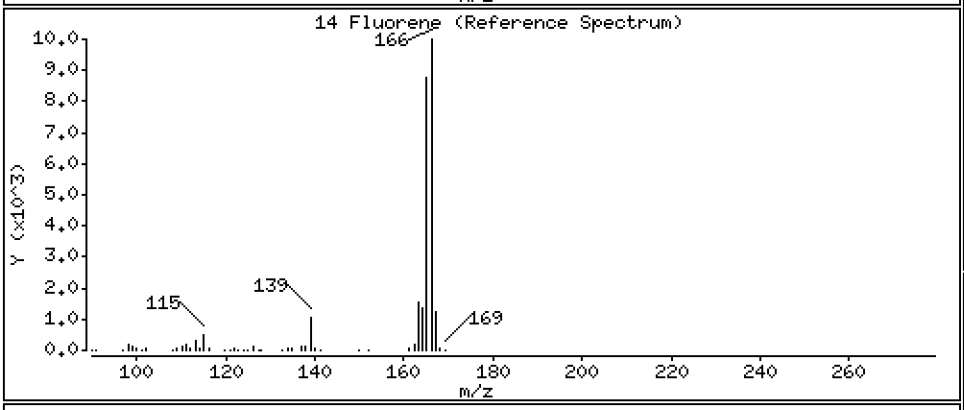
Column diameter: 0.25

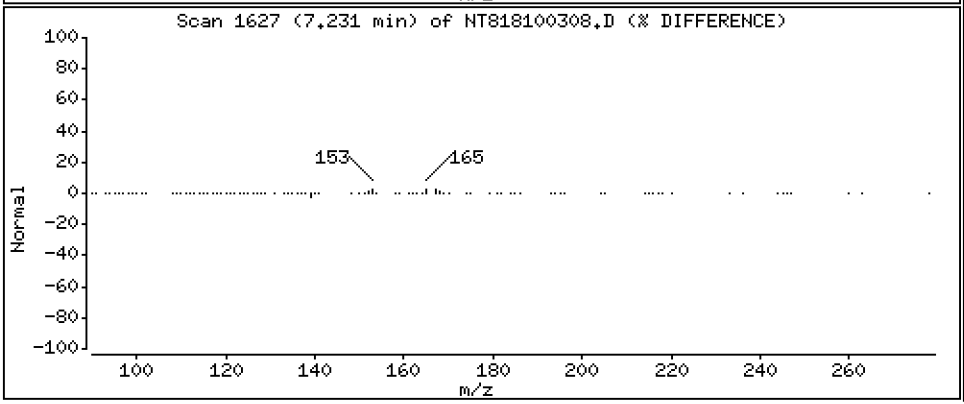
14 Fluorene

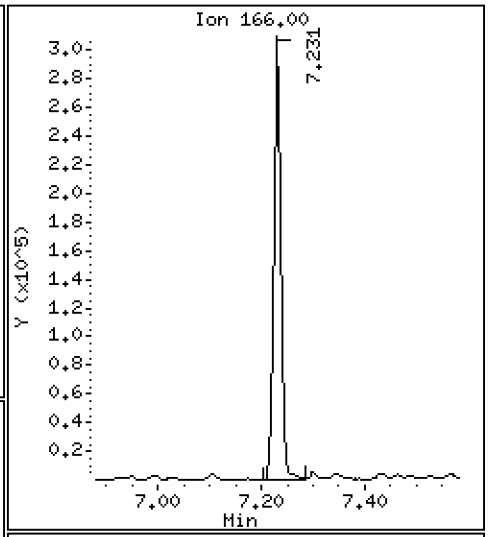
Concentration: 4.419 ug/mL

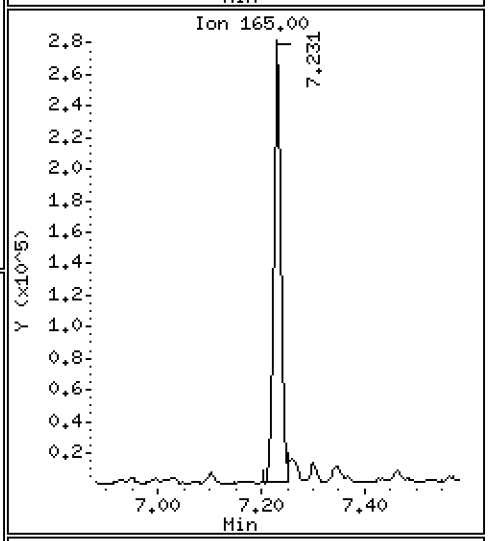


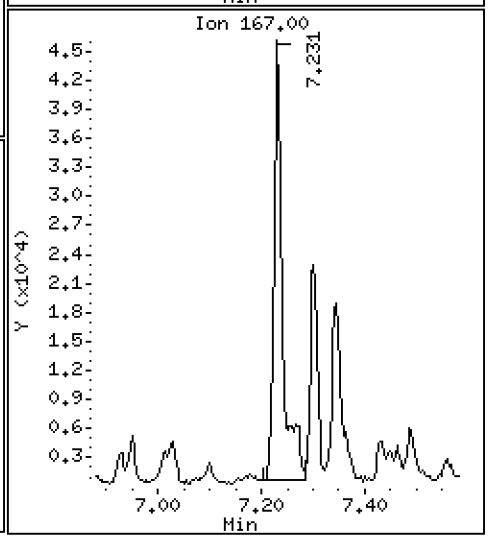












Data File: \\target\share\chem3\nt8.i\20181003.b\NT818100308.D

Date : 03-OCT-2018 14:14

Client ID:

Instrument: nt8.i

Sample Info: 18I0285-02

Operator: JZ

Column phase: Rxi-17sil

Column diameter: 0.25

16 Phenanthrene

Concentration: 11.76 ug/mL