Eastern Wharf and Alder Chip Mill (Pre-demolition)

SMA-1 Conveyor/Pier and Log Transfer Dock (Pre-demolition)

SMA-2 and Mill Site (Pre-construction)

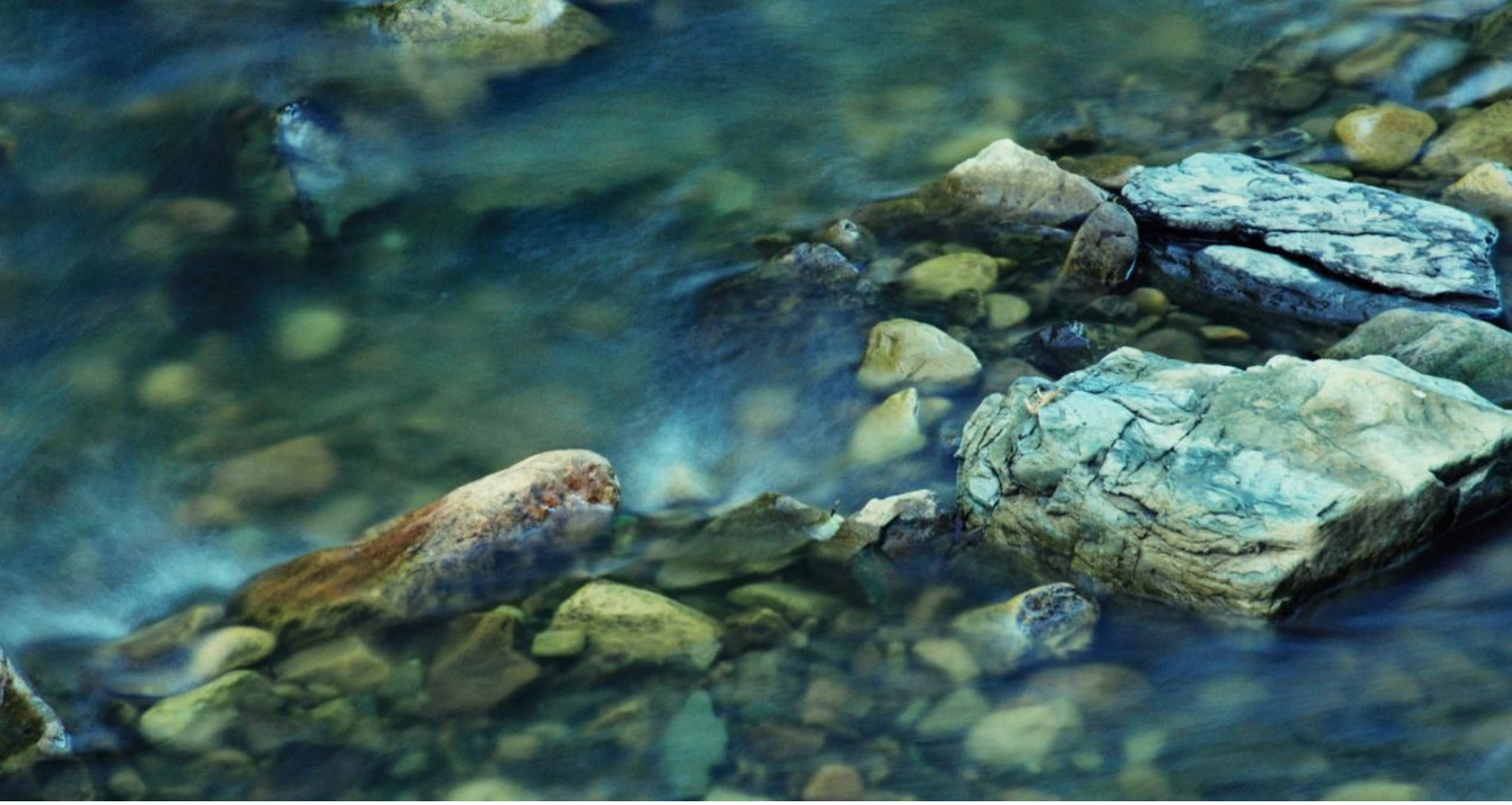
Eastern Wharf and Alder Chip Mill Area (Post-demolition)

SMA-1 Conveyor/Pier (Post-demolition), Log Transfer Dock (Pre-demolition)

SMA-2 and Mill Site (Post-construction)

Appendix A
Shellfish Monitoring – Season 2

Appendix A-1
Year 2 Shellfish Monitoring Data Report



February 2018
Port Gamble Bay Cleanup Project

ANCHOR QEA

Final Year 2 Shellfish Monitoring Data Report

Prepared for
Pope Resources, LP/OPG Properties, LLC
U.S. Army Corps of Engineers
Washington State Department of Ecology
Washington Department of Fish and Wildlife
Washington State Department of Health

In Association with
Port Gamble S'Klallam Tribe

February 2018
Port Gamble Bay Cleanup Project

Final Year 2 Shellfish Monitoring Data Report

Prepared for
Pope Resources, LP/OPG Properties, LLC
U.S. Army Corps of Engineers
Washington State Department of Ecology
Washington Department of Fish and Wildlife
Washington State Department of Health

Prepared by
Anchor QEA, LLC
Port Gamble S'Klallam Tribe

Project Number: 150388-01.01
\\FUJI\Anchor\Projects\Port Gamble\2015 CM Support\Season 2 Completion Report\Appendices\A_Shellfish Monitoring Rpt\A.1 - Season 2 Data Report\Final Year 2 Port Gamble Shellfish Monitoring Data Report.docx

TABLE OF CONTENTS

TABLES

FIGURES

ATTACHMENTS

ABBREVIATIONS

µg	micrograms
µg/kg	micrograms per kilogram
ARI	Analytical Resources, Inc.
cm	centimeter
CoC	chemical of concern
cPAH	carcinogenic polycyclic aromatic hydrocarbon
WDOH	Washington State Department of Health
DSP	diarrhetic shellfish poisoning
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
g	gram
mg/kg	milligrams per kilogram
ng/kg	nanograms per kilogram
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PEMD	polyethylene membrane device
Penn Cove	Penn Cove Shellfish, Inc.
PSP	paralytic shellfish poisoning
Site	Port Gamble Bay Cleanup Project Site
SMA	sediment management area
SMP	*Port Gamble Bay Cleanup Project Shellfish Monitoring Plan* (Anchor QEA and Port Gamble S'Klallam Tribe 2015; Attachment A)
TEQ	toxicity equivalent quotient
WDFW	Washington Department of Fish and Wildlife
Year 1 Data Report	*Year 1 Shellfish Monitoring Data Report* (Anchor QEA and Port Gamble S'Klallam Tribe 2016; Attachment B)

Executive Summary

From August 2016 to January 2017, the second and final season of in-water demolition and sediment cleanup actions were performed in Port Gamble Bay, including creosote-treated pile and debris removal, intertidal excavation, subtidal dredging, and capping/cover placement. Concurrent with these cleanup activities, shellfish monitoring of biotoxins and chemicals of concern was performed to evaluate potential short-term in-water construction-related effects of the cleanup, consistent with project permit requirements. Shellfish monitoring was performed as a collaborative effort between Pope Resources, LP/OPG Properties, LLC, and the Port Gamble S'Klallam Tribe.

The Year 2 shellfish monitoring data were combined with Year 1 data reported previously and compared to baseline data collected prior to cleanup, as well as to Puget Sound non-urban reference data. The results of the shellfish monitoring are summarized below:

- Biotoxin levels in shellfish tissue remained below health advisory criteria throughout in-water construction.
- While localized increases in polycyclic aromatic hydrocarbon concentrations in shellfish tissue and water column passive samplers were detected, levels in shellfish tissue remained below health advisory criteria throughout in-water construction.

1 Introduction

This data report summarizes shellfish biotoxin and chemical of concern (CoC) monitoring performed in accordance with the *Port Gamble Bay Cleanup Project Shellfish Monitoring Plan* (SMP; Anchor QEA and Port Gamble S'Klallam Tribe 2015; Attachment A), consistent with U.S. Army Corps of Engineers permit requirements for the Port Gamble Bay Cleanup Project Site (Site; NWS-2013-1270). The results from the first season of shellfish monitoring, along with appropriate minor modifications to the SMP, are presented in the *Year 1 Shellfish Monitoring Data Report* (Year 1 Data Report; Anchor QEA and Port Gamble S'Klallam Tribe 2016; Attachment B). The SMP was implemented concurrently with remedial actions performed in sediment management areas (SMAs) of the Site (Figure 1). Remedial actions included creosote-treated pile and debris removal throughout the Site, intertidal excavation and subtidal dredging in SMAs 1 and 2, and sediment capping/cover placement in SMAs 1, 2, and 3.

Year 2 shellfish monitoring data are summarized in this data report, including sample collection activities, deviations from the SMP, and biological and chemical results for the biotoxin and CoC monitoring, respectively, using both caged mussel and polyethylene membrane device (PEMD) sampling methods. The combined Year 1 and Year 2 shellfish monitoring results are summarized and compared with baseline Site monitoring data collected prior to cleanup by the Washington Department of Fish and Wildlife (WDFW), along with health advisory criteria developed by the Washington State Department of Health (WDOH) and Puget Sound non-urban reference data for additional context.

2 Year 2 Shellfish Sampling

Sample collection, processing, and analysis were conducted in accordance with the methods described in the SMP (Attachment A) as modified based on the recommendations included in Section 4 of the Year 1 Data Report (Attachment B). This section summarizes Year 2 sample collection methods and deviations from the SMP, where applicable.

2.1 Caged Mussel Biotoxin Sampling

Shellfish paralytic shellfish poisoning (PSP) and diarrhetic shellfish poisoning (DSP) monitoring was conducted in conjunction with the Port Gamble S'Klallam Tribe's and WDOH's ongoing comprehensive biotoxin monitoring in Port Gamble Bay. The shellfish monitoring followed methods and procedures described in the *Marine Biotoxin Contingency Plan* (WDOH 2015a). Adult Pacific blue mussels (*Mytilus trossulus*; obtained from Penn Cove Shellfish, Inc. [Penn Cove], in Whidbey Island, Washington) were deployed during the Year 2 in-water construction period. In addition to PSP, DSP was also monitored during Year 2 biotoxin sampling. The comprehensive WDOH and Port Gamble S'Klallam Tribe net tow and whole water biotoxin monitoring program results are not included in this report.

2.2 Caged Mussel CoC Sampling

The caged mussel CoC sampling generally followed the methods and procedures used during the baseline study in Port Gamble Bay (WDFW 2014), as described in the SMP. However, to reduce potential cage loss, alterations to the cage deployment strategy were made as outlined in the Year 1 Data Report.

Two sampling events took place during Year 2 CoC shellfish sampling. Event 1 coincided with pile removal and intertidal excavation activities, while Event 2 was conducted concurrently with the pile removal, dredging, and capping activities. Consistent with the SMP, a pre-deployment time-zero sample for each event, consisting of a representative sample of Penn Cove stock mussels, was shipped to the analytical laboratories to characterize baseline CoC concentrations.

Event 1 mussel cages were deployed on August 16, 2016, at three stations in SMA-1 as well as three harvestable beach areas in Port Gamble Bay. The cages deployed at the Point Julia harvestable beach area for this event were offset from the Year 1 location and placed at the target location for biotoxin sampling cages. To ensure adequate mussel sample mass was retrieved, two sets of cages (A- and B-series) were deployed during the first event. The A-series caged mussels were retrieved on October 11, 2016, corresponding to a deployment period of 56 days. The A-series cages yielded sufficient mass at all test locations and were used for chemical testing. The B-series mussel mass was not required for analysis, were retrieved in a later mobilization, and were discarded. The as-deployed Event 1 caged mussel locations are presented in Figure 2; deployment and retrieval field forms are included in Attachment C.

Event 2 mussel cages were deployed on November 10 and 11, 2016, at three stations in SMA-1, five stations in SMA-2, and the three harvestable beach areas. The caged mussels were retrieved on January 5 and 6, 2017, corresponding to a deployment period of approximately 55 days. Like Event 1, two sets of cages were deployed at all testing locations. However, during retrieval some of the cages were compromised, which resulted in inadequate living mussel tissue to accommodate all analyses for Event 2 at stations SMA-1-2 and SMA-1-3. Therefore, mussel tissue from stations SMA-1-2 and SMA-1-3 were composited into a single sample, PG-SMA1-2-3-MUS-170105. Similarly, because of limited sample volume, mussel tissue collected from the Gravel Plot harvestable beach was analyzed for all parameters except cadmium. The as-deployed Event 2 caged mussel locations are presented in Figure 2; deployment and retrieval field forms are included in Attachment C.

Upon retrieval, living mussels were submitted to the laboratory for processing. At the laboratory, the mussels were scrubbed free of debris and shucked. Composites were analyzed in accordance with the SMP, including total solids analysis to allow for dry weight correction.

2.3 Polyethylene Membrane Sampling

Like the Year 1 procedures, PEMDs and their deployment apparatus were prepared by Analytical Resources, Inc. (ARI). As discussed in the Year 1 Data Report, three performance reference compounds (anthracene-d10, benzo(e)pyrene-d12, and fluorene-d10) were spiked onto the PEMDs to verify that equilibrium conditions were achieved during deployment and to support surface water concentration calculations. The spiked PEMDs were then shipped to the field team for deployment. ARI measured the average dry weight of the PEMDs to reduce bias due to moisture in or on the PEMD strip and to reduce the contamination potential inherent in additional sample handling steps prior to extraction. Seven 20-centimeter (cm) strips of PEMD tubing were weighed; the average weight was 0.89 ±0.03 grams (g).

PEMDs were co-deployed at the caged mussel CoC sampling locations discussed in Section 2.2 (Figure 3). The PEMD sampling design followed methods and procedures used during the baseline study in Port Gamble Bay (West et al. 2015). The Event 1 PEMDs were deployed on August 30, 2016, and retrieved on September 9, 2016, corresponding to a deployment period of approximately 10 days. The Event 2 PEMDs were deployed on November 10 and 11, 2016, and retrieved on November 22, 2016, corresponding to a deployment period of approximately 11 days.

Following the retrieval of the PEMDs, the deployment apparatus was wrapped in foil and placed immediately into a sealed bag and shipped overnight, on ice, to ARI. Once the PEMDS were received at ARI, the PEMD strips were removed from the deployment apparatus, cut to 20 cm, and surface particulates were wiped off and discarded. Samples were prepared by solvent extraction and sonication, and analyzed for polycyclic aromatic hydrocarbons (PAHs) according to the U.S. Environmental Protection Agency (EPA) Method 8270D using selected ion monitoring. PEMD deployment and retrieval field forms and chain-of-custody documents are included in Attachment C.

3 Year 2 Biotoxin and Chemical Analyses

This section summarizes the results of the caged mussel biotoxin, caged mussel CoC, and PEMD analyses performed during the Year 2 shellfish monitoring. Caged mussel CoC and PEMD laboratory reports are presented in Attachment D.

3.1 Data Validation and Usability

Except for biotoxin analyses conducted by WDOH, all analytical chemistry data presented in this data report were validated by Laboratory Data Consultants, Inc., of Carlsbad, California. Data validation was performed following EPA guidelines, as described in the SMP and the *National Functional Guidelines for Data Review* (EPA 2004, 2008, 2011). Data validation verified the accuracy and precision of chemical determinations. Data qualifiers assigned from the data validation and their definitions are shown on each of the respective analytical results tables. Data validation reports are included in Attachment E.

As appropriate, results were qualified as biased or estimated based on method or technical criteria. Data qualified with a "J" indicates that the associated numerical value is the approximate concentration of the analyte. Data qualified with a "UJ" indicates the approximate reporting limit below which the analyte was not detected. Data qualifications did not impact the data quality objectives, and all data were determined to be useable as reported from the laboratory or as qualified in this data report.

3.2 Caged Mussel Biotoxin Analyses

Caged mussel tissue samples were analyzed for PSP at the WDOH laboratory, consistent with the SMP. In addition, DSP was analyzed during Year 2 monitoring. As discussed in the SMP, harvest closures are recommended by the Food and Drug Administration when any mussel sample equals or exceeds 80 micrograms [µg] of PSP toxin per 100 g of shellfish tissue. WDOH recommends more protective action levels for PSP and DSP of 38 µg per 100 g and 16 µg per 100 g, respectively. Throughout the Year 2 in-water construction period, all PSP and PSP biotoxin analyses were below WDOH action levels (Table 1).

3.3 Caged Mussel CoC Analyses

Mussel tissues were processed, extracted, and analyzed by ARI for total solids, lipids, cadmium, PAHs, and dioxins/furans, as described in the SMP, with the exceptions noted in Section 2.2 herein. A sample aliquot was also submitted to Maxxam Analytics in Burnaby, British Columbia, Canada, for polychlorinated biphenyl (PCB) congener analysis. Year 2 CoC analyses are summarized in Table 2 and in Attachment F (Tables F-1 through F-4).

As discussed in the SMP, in consideration of the overall objectives of the Port Gamble Bay cleanup project to reduce shellfish tissue CoC concentrations over time, WDOH (2015b) developed shellfish tissue screening levels for intermediate-duration shellfish consumption exposures. These screening levels use toxicological profile data for Site CoCs (as well as PCBs) available from the Agency for Toxic Substances and Disease Control for non-cancer endpoints, based on the most sensitive endpoint that, in their best judgment, represents the most sensitive human health effect for a given exposure route and duration. The WDOH screening levels assumed a high-level (subsistence) shellfish consumption rate of 499 g per day. Because the WDOH-calculated screening level for cadmium was below the natural background shellfish tissue concentration reported by Ecology (2012), the cadmium screening level for the SMP was revised upward to two times the natural background tissue level (0.52 milligrams per kilogram [mg/kg]). The background-adjusted WDOH intermediate-duration shellfish tissue screening criteria based on wet weight concentrations are summarized in Table 2.

To provide a further context for comparison, Port Gamble Bay shellfish tissue CoC concentrations were also compared to baseline levels measured in Penn Cove stock mussels, as well as regional shellfish tissue levels reported in other natural background and non-urban shellfish protection and harvest districts in the greater Puget Sound region. Data sources compiled for the regional non-urban comparison included the following:

- Natural background shellfish tissue concentrations reported in the Port Gamble Bay remedial investigation (Ecology 2012)
- Non-urban bivalve (clams, mussels, and oysters) as well as fish and crab tissue concentrations in relatively pristine areas of Puget Sound reported in the Lower Duwamish Waterway remedial investigation (Windward 2010), including tissue samples collected from Freshwater Bay (Straits of Juan de Fuca)
- Non-urban bivalve tissue concentrations in the Holmes Harbor shellfish protection and harvest district (DOH 2008)

Chemical-specific caged mussel CoC analyses are summarized in the following subsections.

3.3.1 Cadmium

Average cadmium concentrations in shellfish tissue measured during the SMP are summarized in Figure 4. Pre-cleanup (2014/2015 sampling; WDFW 2014) baseline mussel cadmium concentrations in Port Gamble Bay were similar to non-urban Puget Sound bivalve and Penn Cove stock levels, within the regional natural background range. Throughout the two in-water construction seasons, average cadmium concentrations declined from pre-cleanup baseline levels, remaining within the regional background range (less than 0.52 mg/kg).

3.3.2 Polychlorinated Biphenyls

Average total PCB concentrations in shellfish tissue measured during the SMP are summarized in Figure 5. Pre-cleanup (2014/2015 sampling; WDFW 2014) baseline mussel total PCB concentrations in Port Gamble Bay were similar to non-urban Puget Sound fish and crab levels, but were somewhat higher than non-urban Puget Sound bivalve and Penn Cove stock concentrations. Throughout the two in-water construction seasons, average total PCB concentrations declined from pre-cleanup baseline levels, remaining below the WDOH intermediate-duration shellfish tissue screening criterion (less than 4.7 µg/kg).

3.3.3 Dioxin/Furans

Average dioxin/furan toxicity equivalent quotient (TEQ) concentrations in shellfish tissue measured during the SMP are summarized in Figure 6. Pre-cleanup (2014/2015 sampling; WDFW 2014) baseline mussel dioxin/furan TEQ concentrations in Port Gamble Bay were in the low range of non-urban Puget Sound bivalve and fish/crab concentrations, similar to Penn Cove stock levels. Throughout the two in-water construction seasons, average dioxin/furan TEQ concentrations remained similar to pre-cleanup baseline levels and well below the WDOH intermediate-duration shellfish tissue screening criterion (less than 3.2 nanograms per kilogram [ng/kg]).

3.3.4 Polycyclic Aromatic Hydrocarbons

Average total PAH concentrations in shellfish tissue measured during the SMP are summarized in Figure 7. Pre-cleanup (2014/2015 sampling; WDFW 2014) baseline mussel total PAH concentrations in Port Gamble Bay were above non-urban Puget Sound bivalve and fish/crab levels, and were also higher than Penn Cove stock concentrations. Throughout the two in-water construction seasons, average total PAH concentrations declined slightly from pre-cleanup baseline levels, remaining well below the WDOH intermediate-duration shellfish tissue screening criterion (less than 63 mg/kg).

While the WDOH (2015b) intermediate-duration shellfish tissue screening criterion for PAHs was developed for total PAH concentrations, Ecology's (2012) sediment cleanup objectives for Port Gamble Bay were based on reducing concentrations of a subset of PAHs that are potentially carcinogenic (cPAHs). Average cPAH concentrations in shellfish tissue measured during the SMP are summarized in Figure 8. Pre-cleanup (2014/2015 sampling; WDFW 2014) baseline mussel cPAH concentrations in Port Gamble Bay were slightly above non-urban Puget Sound bivalve and fish/crab levels, and were also slightly higher than Penn Cove stock concentrations, though within the range of sample variability. Throughout the two in-water construction seasons, average cPAH concentrations remained similar to pre-cleanup baseline levels, particularly within Port Gamble Bay harvestable beach areas.

3.4 Polyethylene Membrane PAH Analyses

As discussed in the SMP, PEMDs were co-deployed at all caged mussel locations in Port Gamble Bay during the Year 2 monitoring to evaluate whether PEMD monitoring may be an effective surrogate for caged mussel monitoring, as PEMDs can provide a cost-effective method to characterize water column dissolved PAH concentrations. The PEMD sampling design followed methods and procedures used during the baseline study in Port Gamble Bay (West et al. 2015), and were also equivalent to those used during Year 1. Year 2 PEMD analyses are summarized in Attachment G.

To evaluate potential cross contamination of PEMDs due to atmospheric exposure during transport and sampling, one trip blank PEMD accompanied the field samples to the Site and back to the laboratory (ARI), without being deployed into Port Gamble Bay. Each trip blank PEMD was prepared in the same manner as the samples. PAHs detected in the trip blanks were subtracted from detections in the field samples to calculate blank-corrected sample concentrations (Attachment G).

Total PAH concentrations in PEMDs measured during the SMP are summarized in Figure 9. During Year 1 and the first Year 2 monitoring (Event 1; August/September 2016), total PAH levels in PEMDs deployed throughout Port Gamble Bay remained similar to pre-cleanup (2014/2015 sampling; West et al. 2015) baseline concentrations, within the range of sample variability. However, during the second monitoring event (Event 2; November 2016), total PAH levels in PEMDs increased at all Port Gamble Bay monitoring stations. The PEMD data reveal that water column dissolved PAH concentrations increased 2- to 5-fold during this last phase of in-water construction. The highest PEMD levels were detected near Mill Site construction activities, likely due to dissolved PAH releases from creosote pile removal or sediment dredging activities during this period. However, similar PAH concentration increases were not observed in caged mussels deployed at the same stations sampled over the same period (Table 2), suggesting that there is not a direct relationship between dissolved water column and shellfish PAH tissue concentrations, consistent with the literature (e.g., Timmermann and Andersen 2003). Thus, PEMDs were not identified as an effective surrogate for caged mussel monitoring.

4 Post-construction In situ Shellfish CoC Sampling

As discussed in the SMP, pre-construction baseline in situ shellfish tissue data were collected by Ecology and the Port Gamble S'Klallam Tribe between 2008 and 2013 within four primary shellfish harvesting areas of Port Gamble Bay (Point Julia, Gravel Plot, Western Shoreline, and SMA-3; see Figures 1 and 2). Sampled species included mussels, oysters, cockles, littleneck clams, horse clams, manila clams, geoduck, and Dungeness crab. Tissue samples were analyzed for CoCs including cadmium, PCBs, dioxins/furans, and PAHs, along with other parameters.

Approximately 3 months following completion of in-water construction, in late April 2017, Port Gamble S'Klallam Tribe members collected post-construction in situ shellfish tissue samples from Point Julia, Gravel Plot, and the Western Shoreline, targeting the same intertidal species included in the baseline sampling (mussels, oysters, cockles, littleneck clams, horse clams, and manila clams). In addition, geoduck and Dungeness crab (muscle and hepatopancreas tissue) sampling was performed in subtidal areas of SMA-3 using divers. Laboratory CoC analyses of the post-construction tissue samples are currently underway, and will be reported in a supplemental data memorandum comparing pre- and post-construction in situ tissue concentrations. The supplemental data memorandum will be prepared in summer 2017 by Anchor QEA and the Port Gamble S'Klallam Tribe, and will be distributed to Pope Resources LP/OPG Properties, LLC, U.S. Army Corps of Engineers, Ecology, WDFW, and WDOH.

5 References

Anchor QEA and Port Gamble S'Klallam Tribe, 2015. *Port Gamble Bay Cleanup Project Shellfish Monitoring Plan*. 2015.

Anchor QEA and Port Gamble S'Klallam Tribe, 2016. *Year 1 Shellfish Monitoring Data Report, Port Gamble Bay Cleanup Project*. May.

DOH (Washington State Department of Health), 2008. *Evaluation of Selected Metals in Holmes Harbor Shellfish, Freeland, Island County, Washington*. July.

DOH, 2015a. *Marine Biotoxin Contingency Plan*. Office of Shellfish & Water Protection. Updated February 20, 2015.

DOH, 2015b. *Port Gamble Bay Minimal Risk Levels and Screening Values*. Correspondence from Lenford O'Garro, Site Assessment & Toxicology Section, Office of Environmental Health, Safety & Toxicology, Division of Environmental Public Health. March.

Ecology (Washington State Department of Ecology), 2012. *Final Partial Remedial Investigation and Feasibility Study for Port Gamble Bay Property* (a portion of the Port Gamble Bay and Mill Site). Port Gamble, Washington. December.

Ecology, 2015. *Sediment Cleanup User Manual II. Toxics Cleanup Program.* Publication No. 12-09-057. March.

EPA (U.S. Environmental Protection Agency), 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI). EPA 540-R-04-004. October.

EPA, 2008. *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review*. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. USEPA 540-R-08-01. June.

EPA, 2011. *USEPA Contract Laboratory Program National Functional Guidelines for Dioxin/Furan Data Review*. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. USEPA 540-R-11-16. September.

Lauenstein, G.G. and A.Y. Cantillo, 1993. *Sampling and Analytical Methods of the National Status and Trends Program National Benthic Surveillance and Mussel Watch Projects, 1984-1992*. Silver Spring, Maryland, National Oceanic and Atmospheric Administration. Report No. NOS ORCA 71.

Timmermann, K. and O. Andersen, 2003. Bioavailability of pyrene to the deposit-feeding polychaete *Arenicola marina*: importance of sediment versus water uptake routes. *Mar Ecol Prog Ser: 246: 163–172*.

WDFW (Washington Department of Fish and Wildlife), 2014. *Toxic Contaminants in Bay Mussels (*Mytilus trossulus*) Transplanted to Port Gamble Bay, Washington Before and After Cleanup and Restoration (2015 – 2017), Quality Assurance Project Plan*. Prepared for Washington State Department of Ecology. November.

West, J.E., A.J. Carey, J.A. Lanksbury, L.A. Niewolny, and S.M. O'Neill, 2015. *Toxic contaminants in embryonic and adult Pacific Herring (*Clupea pallasii*) from Port Gamble Bay, Washington: extent and magnitude of contamination by polycyclic aromatic hydrocarbons (PAHs) and other toxic contaminants.* Washington Department of Fish and Wildlife. August.

Windward Environmental, 2010. *Remedial Investigation for Lower Duwamish Waterway*. Prepared for Lower Duwamish Waterway Group for submittal to U.S. Environmental Protection Agency, Seattle, Washington, and Washington State Department of Ecology, Bellevue, Washington. July.

Tables

Table 1

DOH Biotoxin Data Summary

WDOH PSP/DSP RESULTS-PORT GAMBLE 2016

PSP#	Collect Date	Waterbody	Site Name	Species	Tissue	Org	PSP Result	DSP Result
201600018	1/5/2016	Port Gamble	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	<1
201600756	5/4/2016	Port Gamble	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	NTD
201600915	5/17/2016	Port Gamble	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	2
201601081	5/31/2016	Port Gamble	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	1
201601265	6/14/2016	Port Gamble	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	8
201601340	6/20/2016	Port Gamble	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	6
201601334	6/20/2016	Port Gamble	Point Julia	Pacific Oyster	Whole	Port Gamble S'Klallam Tribe	NTD	
201601439	6/26/2016	Port Gamble	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	1
201601438	6/26/2016	Port Gamble	Port Gamble Bay	Pacific Oyster	Whole	Port Gamble S'Klallam Tribe	NTD	
201601541	7/5/2016	Port Gamble	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	1
201601622	7/11/2016	Port Gamble	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	1
201601822	7/20/2016	Port Gamble	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	1
201601885	7/25/2016	Port Gamble	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	<1
201602014	8/3/2016	Port Gamble	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	1
201602136	8/10/2016	Port Gamble	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	1

All result units are migrograms/100 grams of tissue

PSP action level >80 micrograms/100 grams

DSP action level ≥16 micrograms/100 grams

Table 1

DOH Biotoxin Data Summary

PSP#	Collect Date	Waterbody	Site Name	Species	Tissue	Org	PSP Result	DSP Result
201602130	8/10/2016	Port Gamble	Port Gamble Bay	Manila Clam	Whole	Port Gamble S'Klallam Tribe	NTD	
201602129	8/10/2016	Port Gamble	Port Gamble Bay	Pacific Oyster	Whole	Port Gamble S'Klallam Tribe	NTD	<1
201602167	8/15/2016	Port Gamble	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	6
201602262	8/18/2016	Port Gamble	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NoTest	1
201602325	8/23/2016	Port Gamble	Point Julia	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	7
201602378	8/29/2016	Port Gamble	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	10
201602463	9/6/2016	Port Gamble	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	13
201602550	9/12/2016	Port Gamble	Port Gamble Bay	Manila Clam	Whole	Port Gamble S'Klallam Tribe	NoTest	<1
201602549	9/12/2016	Port Gamble	Port Gamble Bay	Pacific Oyster	Whole	Port Gamble S'Klallam Tribe	NoTest	1
201602547	9/12/2016	Port Gamble	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NoTest	7
201602656	9/22/2016	Port Gamble	Port Gamble	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	3
201602687	9/26/2016	Port Gamble	Port Gamble	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	6
201602773	10/5/2016	Port Gamble	Port Gamble	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	4
201602834	10/13/2016	Port Gamble	Port Gamble	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	3
201602907	10/20/2016	Port Gamble	Port Gamble	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	2
201602941	10/26/2016	Port Gamble	Port Gamble	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	3

All result units are migrograms/100 grams of tissue

PSP action level >80 micrograms/100 grams

DSP action level ≥16 micrograms/100 grams

Table 1

DOH Biotoxin Data Summary

PSP#	Collect Date	Waterbody	Site Name	Species	Tissue	Org	PSP Result	DSP Result
201602984	11/1/2016	Port Gamble	Port Gamble	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	1
201603128	11/16/2016	Port Gamble	Port Gamble	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	NTD
201603252	12/1/2016	Port Gamble	Port Gamble	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	1
201603326	12/14/2016	Port Gamble	Point Julia	Blue Mussel	Whole	Port Gamble S'Klallam Tribe	NTD	<1

All result units are migrograms/100 grams of tissue

PSP action level >80 micrograms/100 grams

DSP action level ≥16 micrograms/100 grams

Table 2
Caged Mussel Results Summary

Parameter	Units	SMP Tissue Screening Criteria	Year 1			Year 2, Event 1			Year 2, Event 2			
			Time Zero Penn Cove Stock	SMA-2 Average	Harvestable Beach Average	Time Zero Penn Cove Stock	SMA-1 Average	Harvestable Beach Average	Time Zero Penn Cove Stock	SMA-1 Average	SMA-2 Average	Harvestable Beach Average
Total PAH (U=1/2)	mg/kg wet	63[a]	0.023	0.059	0.029	0.0044	0.0064	0.0083	0.0071	0.029	0.048	0.016
Total cPAH TEQ (U=1/2)	mg/kg wet	--	0.0005	0.0026	0.0010	0.0005	0.0005	0.0005	0.0004	0.0009	0.0017	0.0005
Dioxins/Furans TEQ (U=1/2)	ng/kg wet	3.2[a]	0.11	0.11	0.11	0.11	0.10	0.13	0.12	0.30	0.23	0.24
Cadmium	mg/kg wet	0.52[b]	0.31	0.32	0.36	0.99	0.60[c]	0.48	0.23	0.25	0.23	0.22
Polychlorinated Biphenyls (U=0)	µg/kg wet	4.7[a]	0.98	4.5	3.5	1.1	1.4	1.4	0.96	1.5	1.8	1.9

Notes:

a. Intermediate-duration shellfish consumption exposure criteria from WDOH (2015b), based on a high shellfish consumption rate (499 grams per day)

b. Two times the natural background tissue concentration from Ecology (2012)

c. The cadmium concentration was greater than the screening criteria but less than the Penn Cove Stock time zero result

µg/kg: micrograms per kilogram

mg/kg: milligrams per kilogram

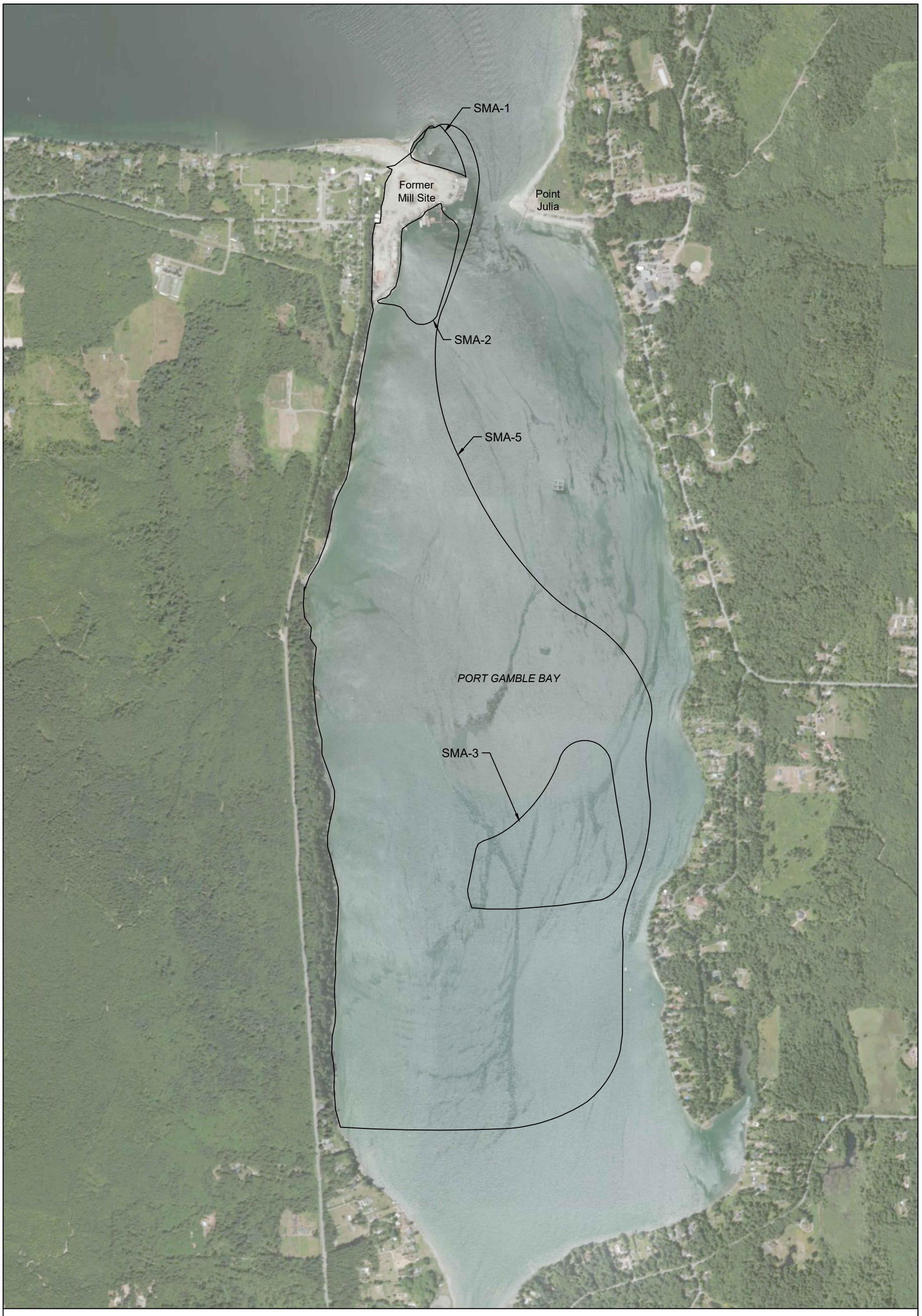
ng/kg: nomograms per kilogram

PAH: polycyclic aromatic hydrocarbons

SMP: Shellfish Monitoring Plan (Anchor QEA and Port Gamble S'Klallam Tribe, 2015)

TEQ: toxicity equivalence

Figures



HORIZONTAL DATUM: Washington State Plane North,
NAD83, U.S. Feet.

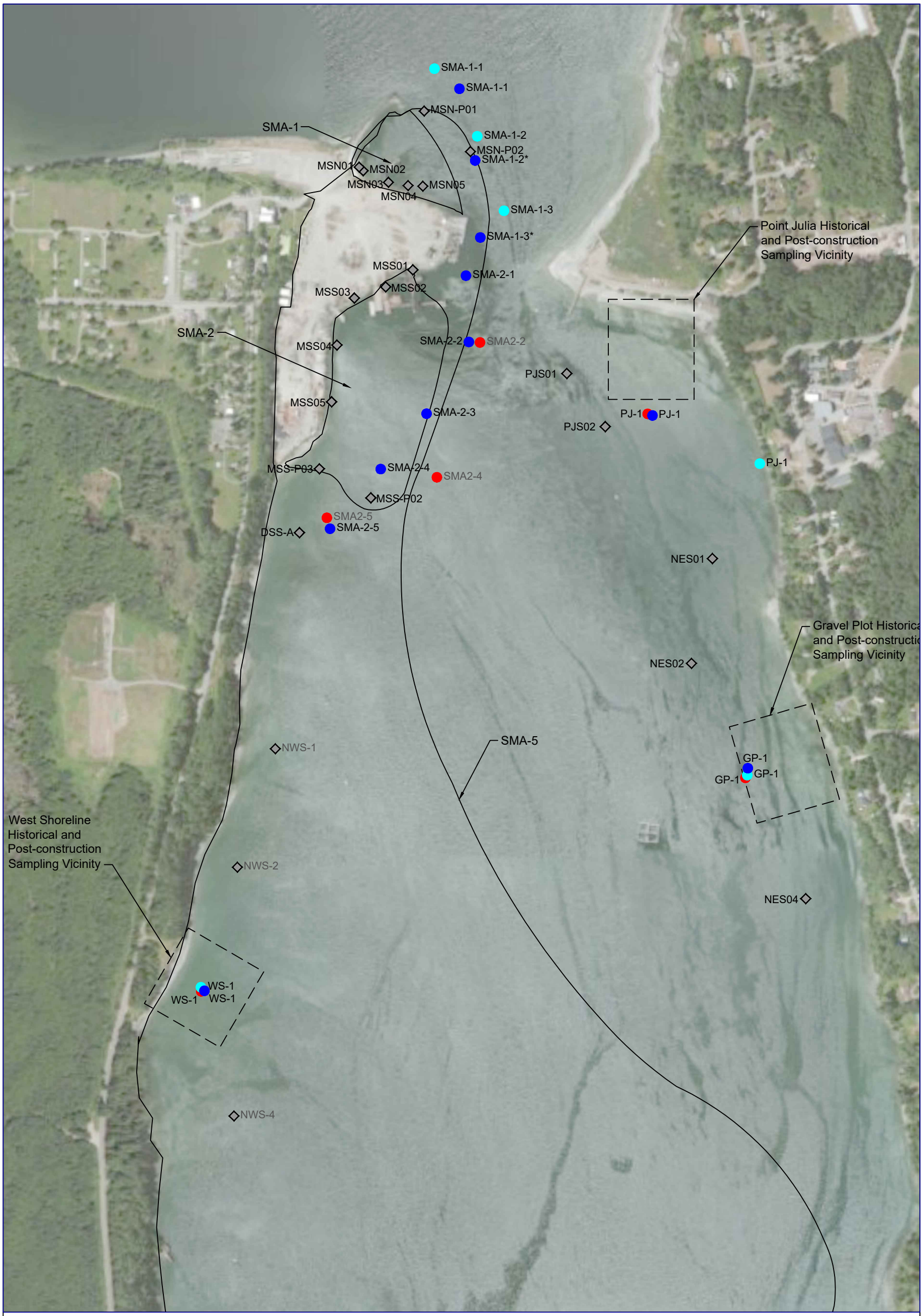
0 1200
Feet

Publish Date: 2017/04/27 3:15 PM | User: chewett
Filepath: K:\Projects\0388-Pope Resources\Port Gamble Sediment Cleanup RI-FS\Strategic Technical Support\0388-WK-001 (SMA Offsets).dwg F1

ANCHOR QEA

Figure 1
Vicinity Map

Final Year 2 Shellfish Monitoring Plan Data Report
Port Gamble Bay Cleanup Project



HORIZONTAL DATUM: Washington State Plane North, NAD83, U.S. Feet.
NOTES: Caged mussel mass for locations marked with an asterisk (*) was combined for analysis due to mass recovery limitations.

LEGEND:

- SMA Area
- WDFW Caged Mussel Sample Location (Approximate)

CAGED MUSSEL COC LOCATIONS:

- Year 1
- Year 2, Event 1
- Year 2, Event 2

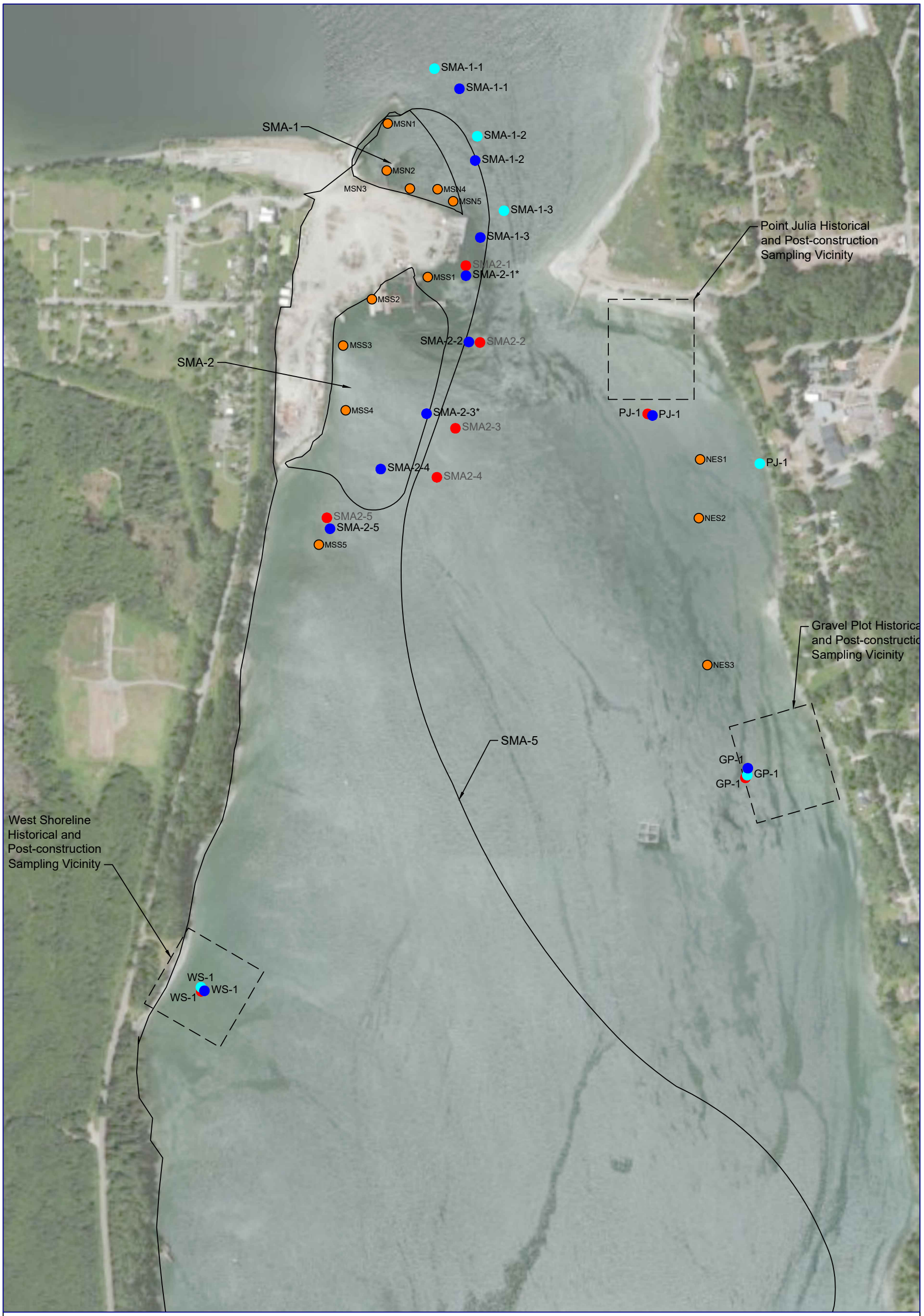
0 600
Feet

Publish Date: 2017/04/27 3:16 PM | User: chewett
Filepath: K:\Projects\0388-Pope Resources\Port Gamble Sediment Cleanup RI-FS\Strategic Technical Support\0388-WK-006 (Sitewide-Actual_Season 2).dwg F2

ANCHOR QEA

Figure 2
Caged Mussel Locations

Final Year 2 Shellfish Monitoring Plan Data Report
Port Gamble Bay Cleanup Project



HORIZONTAL DATUM: Washington State Plane North, NAD83, U.S. Feet.

LEGEND:

- SMA Area
- WDFW PEMD Baseline Sampling Locations
- Year 1 PEMD Locations
- Year 2, Event 1 PEMD Sample Locations
- Year 2, Event 2 PEMD Sample Locations

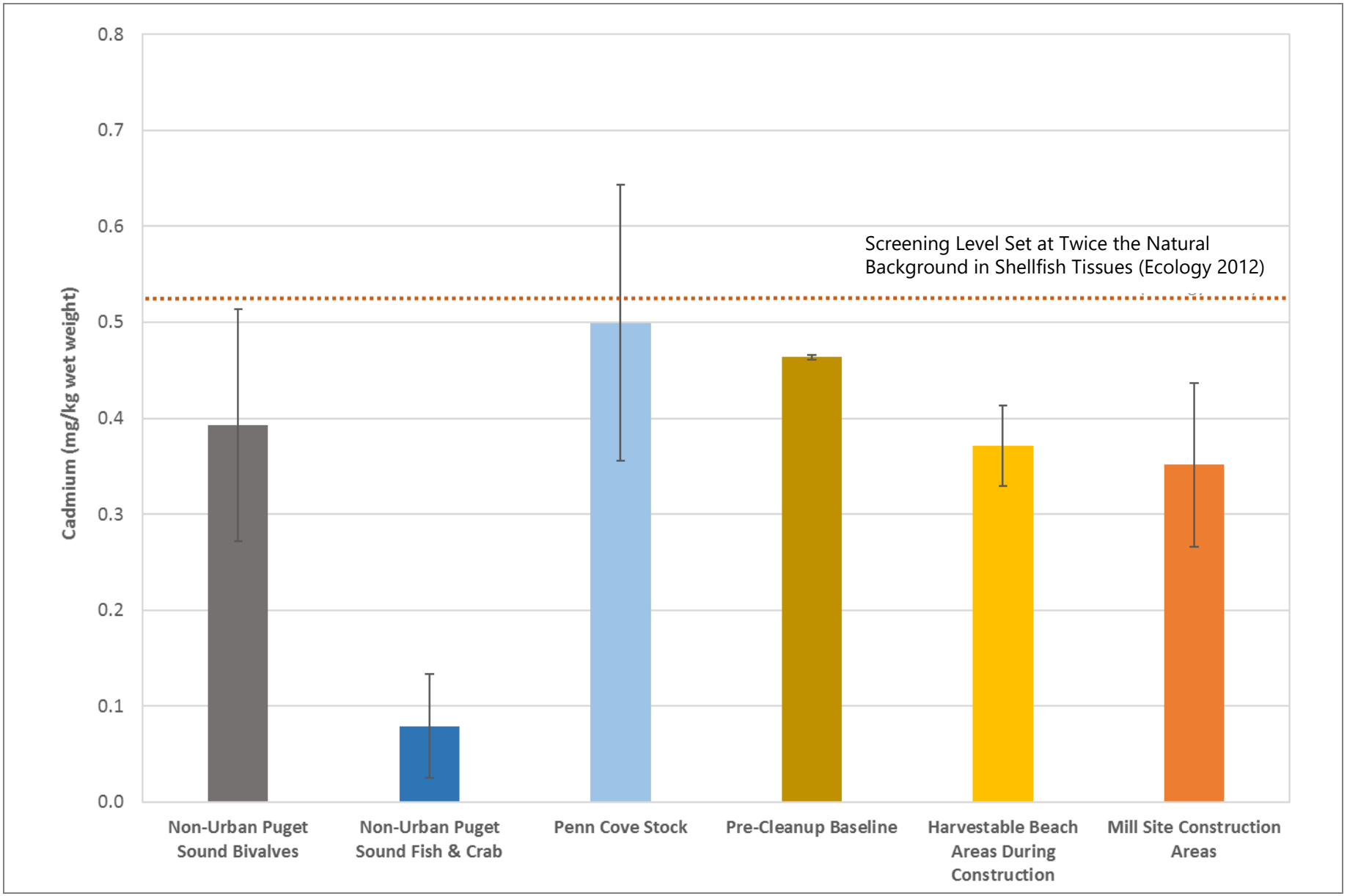
0 600
Feet

Publish Date: 2017/04/27 3:28 PM | User: chewett
Filepath: K:\Projects\0388-Pope Resources\Port Gamble Sediment Cleanup RI-FS\Strategic Technical Support\0388-WK-007 (Sitewide_WDFW-Actual).dwg F3

ANCHOR QEA

Figure 3
WDFW PEMD Sample Locations

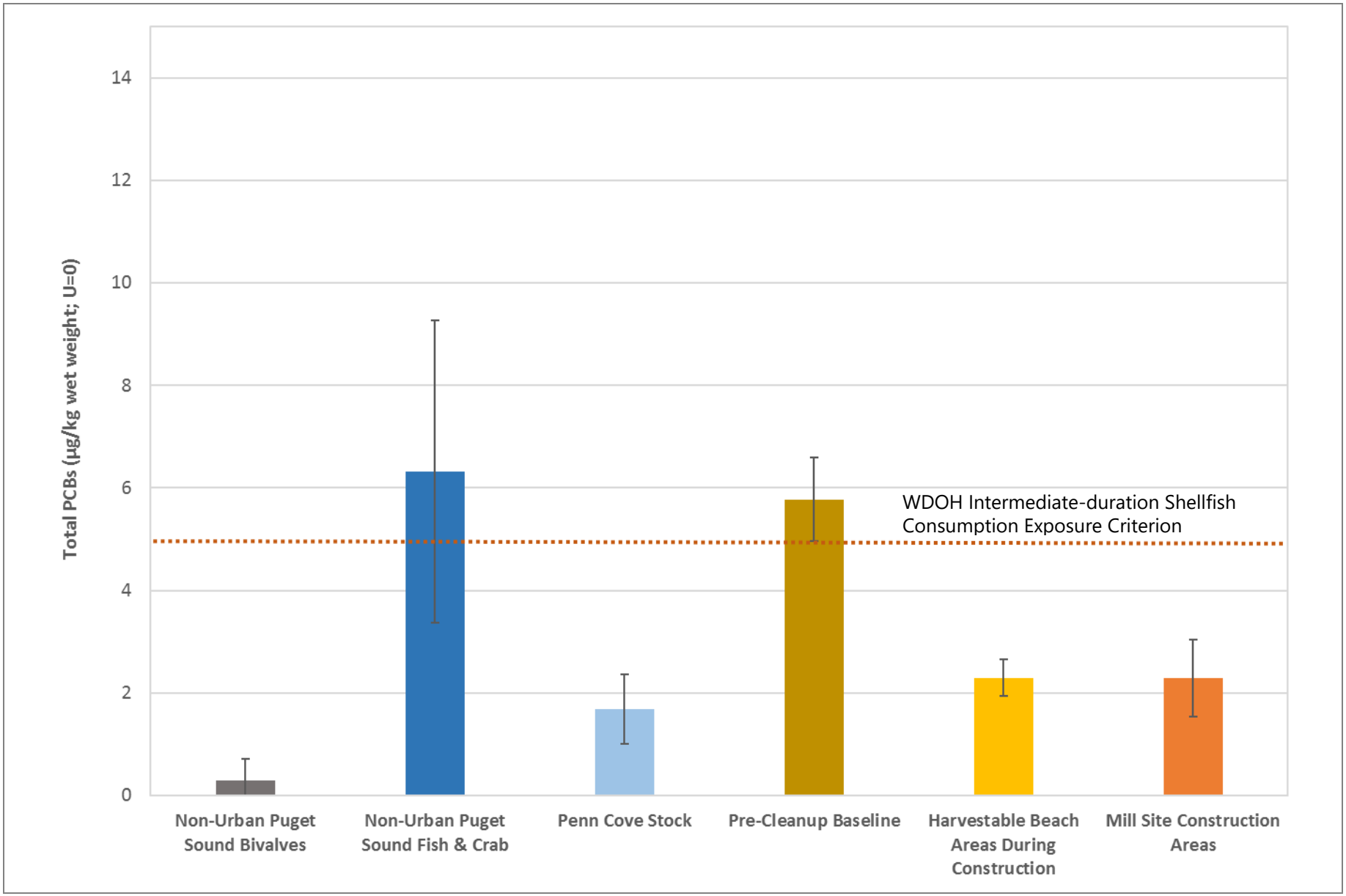
Final Year 2 Shellfish Monitoring Plan Data Report
Port Gamble Bay Cleanup Project



Filepath: \\fuji\anchor\Projects\Port Gamble\2016 Field Investigations\Shellfish\Data Reporting\Figures\Figure_4 170502 Cadmium.docx

ANCHOR QEA

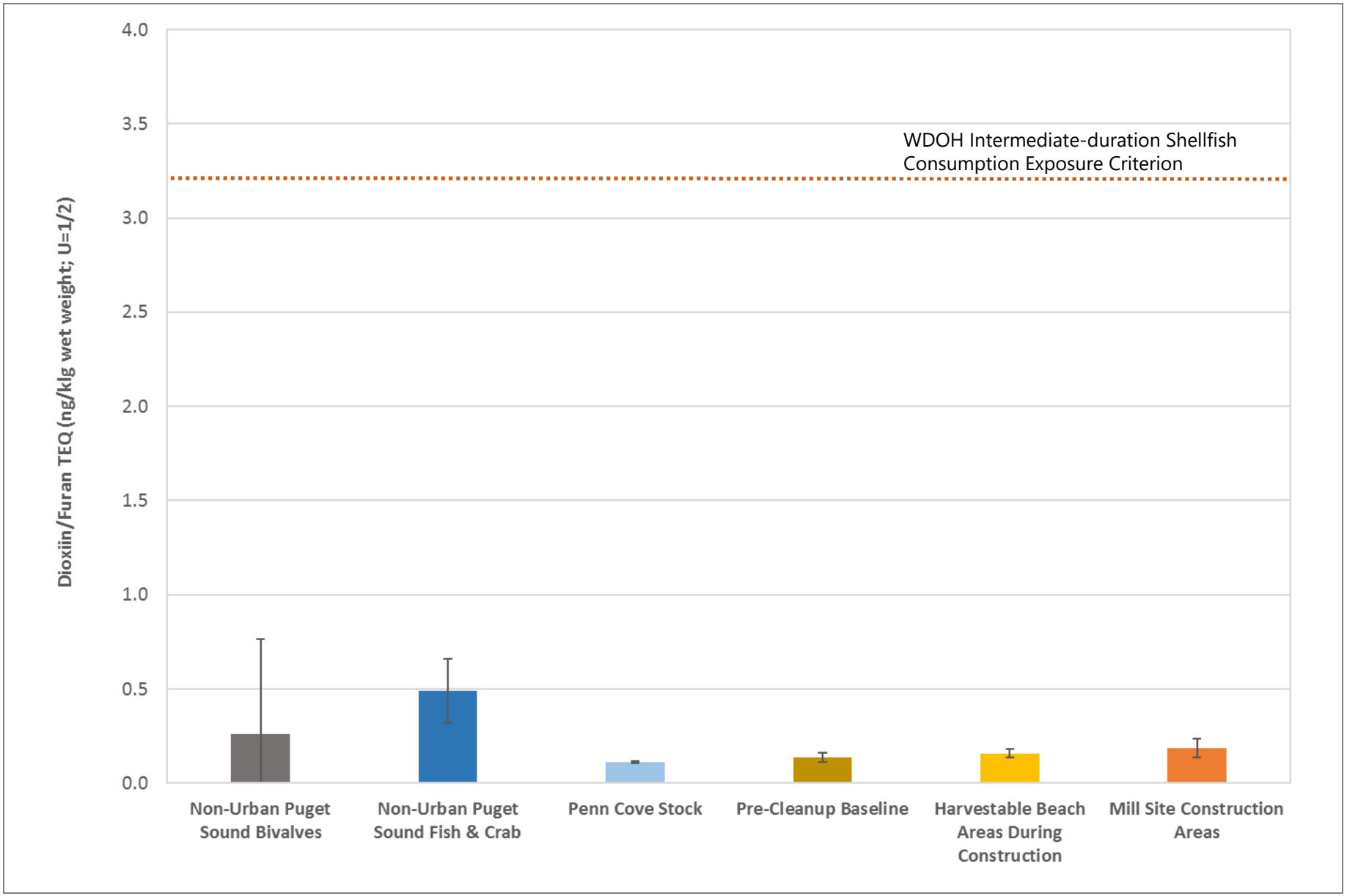
Figure 4
Caged Mussel Cadmium Levels
Final Year 2 Shellfish Monitoring Data Report
Port Gamble Bay Cleanup Project



Filepath: \\fuji\anchor\Projects\Port Gamble\2016 Field Investigations\Shellfish\Data Reporting\Figures\Figure_5 170502 PCB.docx

ANCHOR QEA

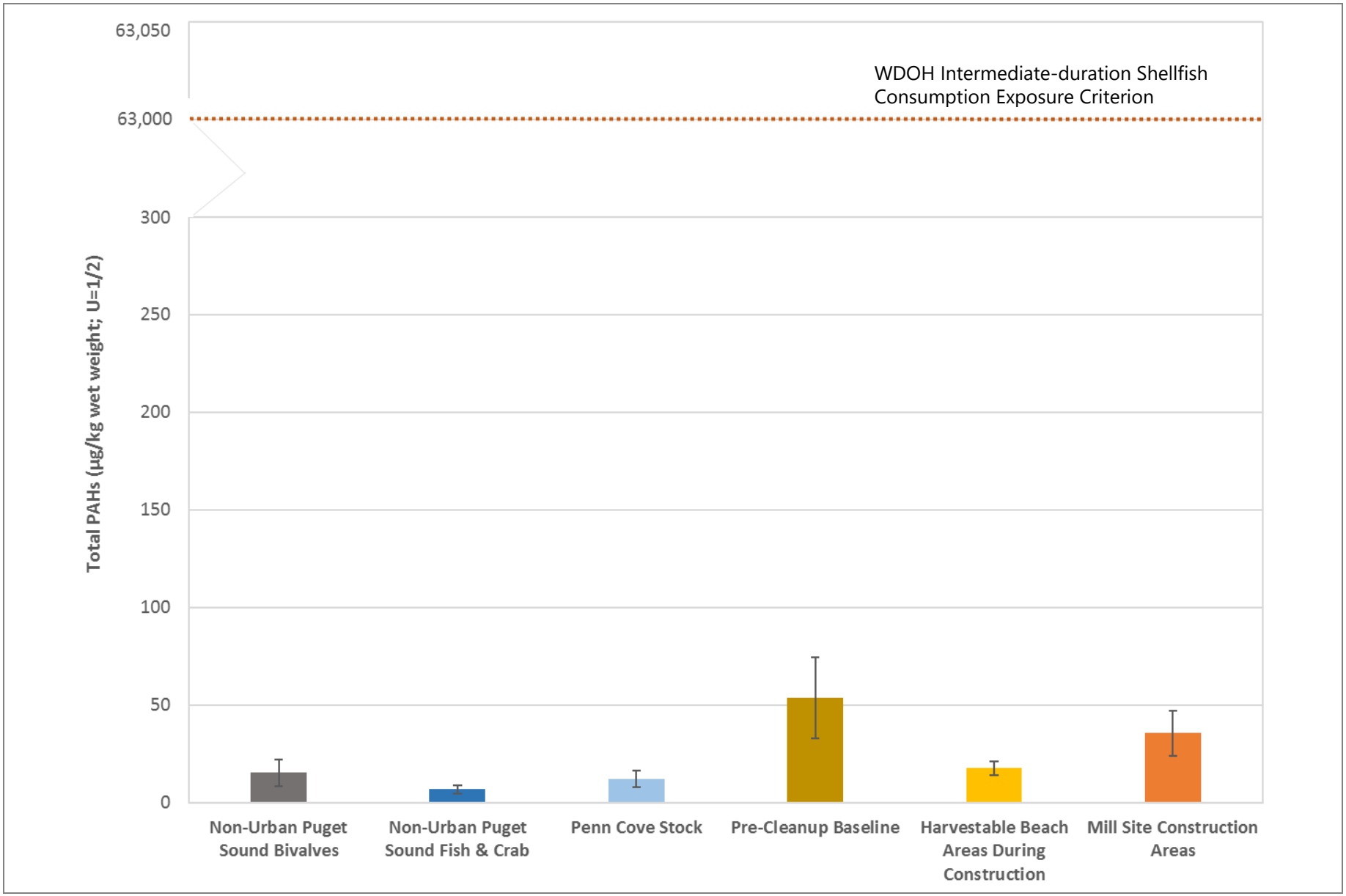
Figure 5
Caged Mussel Total PCB Levels
Final Year 2 Shellfish Monitoring Data Report
Port Gamble Bay Cleanup Project



Filepath: \\fuji\anchor\Projects\Port Gamble\2016 Field Investigations\Shellfish\Data Reporting\Figures\Figure_6 170502 DF TEQ.docx

ANCHOR QEA

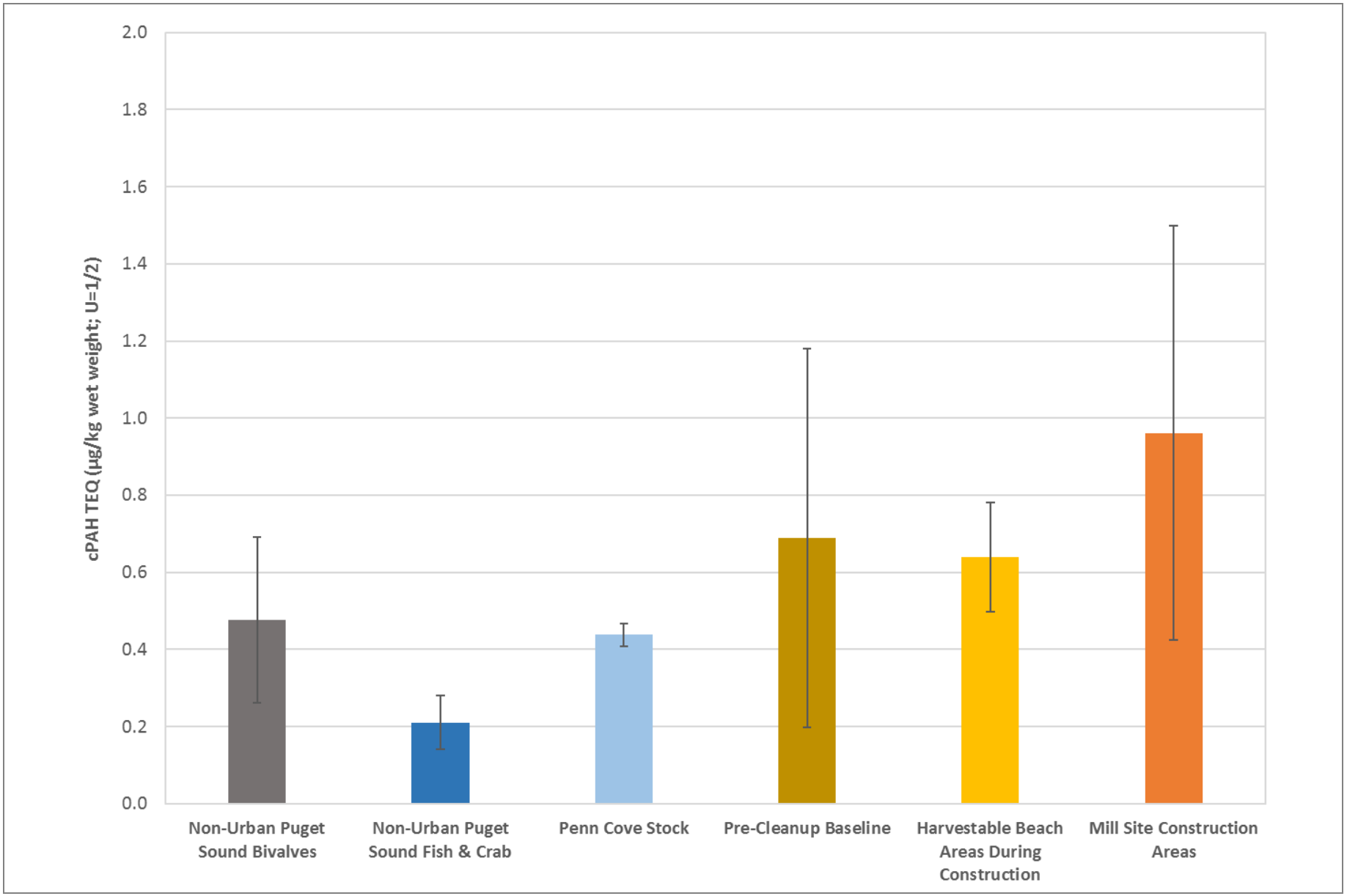
Figure 6
Caged Mussel Dioxins/Furans TEQ Levels
Final Year 2 Shellfish Monitoring Data Report
Port Gamble Bay Cleanup Project



Filepath: \\fuji\anchor\Projects\Port Gamble\2016 Field Investigations\Shellfish\Data Reporting\Figures\Figure_7 170502 PAH.docx

ANCHOR QEA

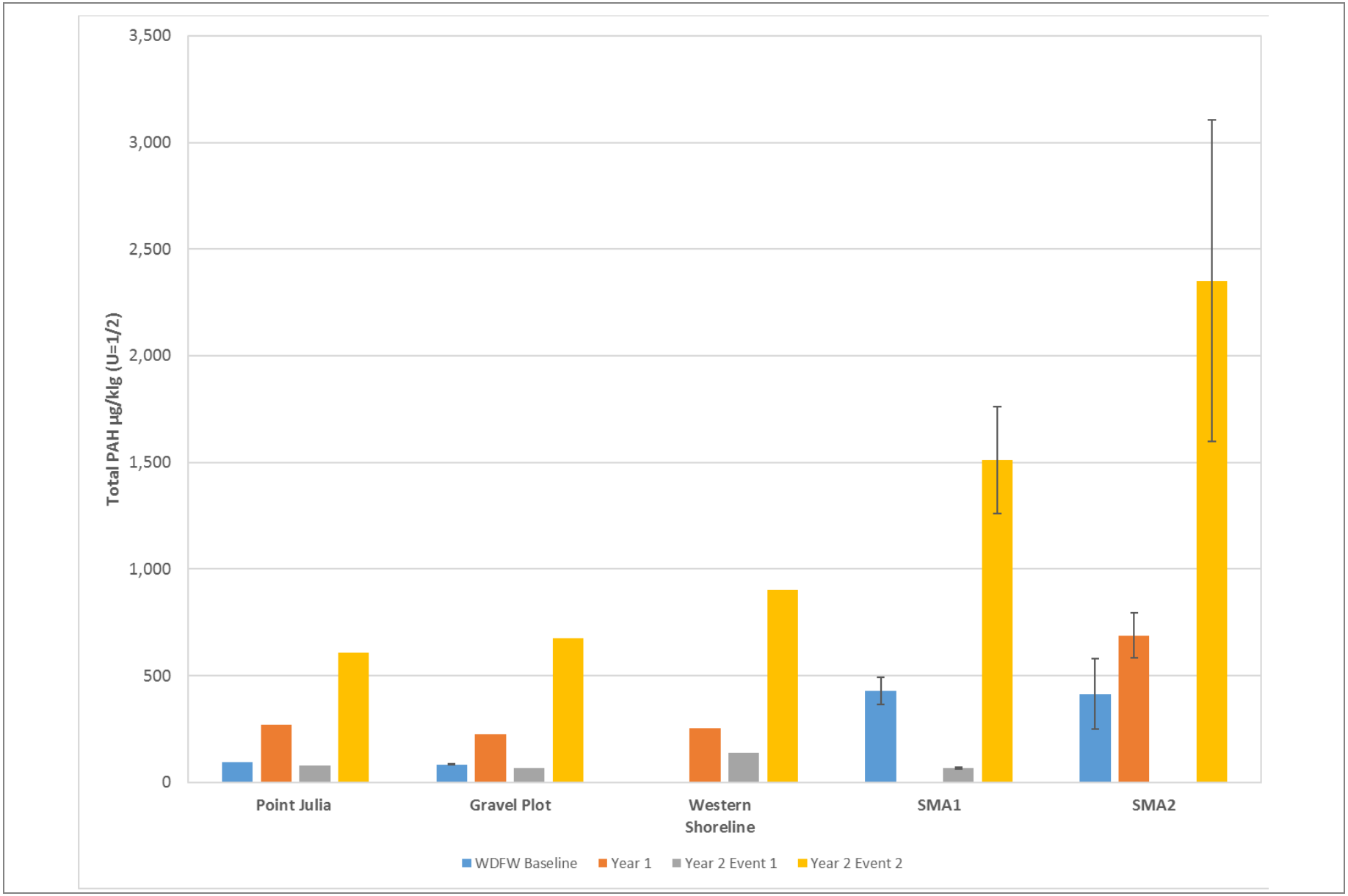
Figure 7
Caged Mussel Total PAH Levels
Final Year 2 Shellfish Monitoring Data Report
Port Gamble Bay Cleanup Project



Filepath: \\fuji\anchor\Projects\Port Gamble\2016 Field Investigations\Shellfish\Data Reporting\Figures\Figure_8 170502 cPAH.docx

ANCHOR QEA

Figure 8
Caged Mussel cPAH TEQ Levels
Final Year 2 Shellfish Monitoring Data Report
Port Gamble Bay Cleanup Project



Filepath: \\fuji\anchor\Projects\Port Gamble\2016 Field Investigations\Shellfish\Data Reporting\Figures\Figure_9 170502 PEMD PAH.docx

ANCHOR QEA

Figure 9
PEMD Total PAH Levels
Final Year 2 Shellfish Monitoring Data Report
Port Gamble Bay Cleanup Project

Attachment A
Port Gamble Bay Shellfish Monitoring Plan

SHELLFISH MONITORING PLAN
PORT GAMBLE BAY CLEANUP PROJECT

Prepared for

Washington State Department of Ecology

Washington Department of Health

Pope Resources, LP/OPG Properties, LLC

Prepared by

Anchor QEA, LLC

Port Gamble S'Klallam Tribe

May 2015

SHELLFISH MONITORING PLAN
PORT GAMBLE BAY CLEANUP PROJECT

Prepared for

Washington State Department of Ecology

Washington Department of Health

Pope Resources, LP/OPG Properties, LLC

Prepared by

Anchor QEA, LLC

Port Gamble S'Klallam Tribe

May 2015

TABLE OF CONTENTS

List of Tables

List of Figures

List of Appendices

LIST OF ACRONYMS AND ABBREVIATIONS

µg	micrograms
CAP	*Final Cleanup Action Plan*
CD	Consent Decree
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CLP	Contract Laboratory Program
CoC	contaminant of concern
cy	cubic yard
DGPS	Differential Global Positioning System
DQO	data quality objective
Ecology	Washington State Department of Ecology
EDL	estimated detection limit
EDR	*Engineering Design Report*
EMNR	enhanced monitored natural recovery
FDA	Food and Drug Administration
GPS	global positioning system
HAZWOPER	Hazardous Waste Operations and Emergency Response
HDPE	high-density polyethylene
MDL	method detection limit
mg/kg	milligrams per kilogram
MLLW	mean lower low water
mm	millimeters
MRL	method reporting limit
MTCA	Model Toxics Control Act
NELAC	National Environmental Laboratory Accreditation Conference
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PEMD	polyethylene membrane device

PGST	Port Gamble S'Klallam Tribe
PR/OPG	Pope Resources, LP/OPG Properties, LLC
PSP	paralytic shellfish poisoning
RCW	Revised Code of Washington
QA	quality assurance
QC	quality control
SOP	standard operating procedure
SMA	sediment management area
SMS	Sediment Management Standards
SMP	Shellfish Monitoring Plan
USACE	U.S. Army Corps of Engineers
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDOH	Washington Department of Health

1 INTRODUCTION

Port Gamble Bay ("Site") is one of seven bays in Puget Sound identified for sediment cleanup under Ecology's Toxics Cleanup Program Puget Sound Initiative. Site cleanup requirements are described in the *Final Cleanup Action Plan* (CAP; Ecology 2013), and will be implemented 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/ Olympic Property Group, LLC (PR/OPG), entered in December 2013. The *Engineering Design Report* (EDR; Anchor QEA 2014) presents detailed plans for the cleanup project, which will be performed by PR/OPG under Ecology oversight.

Cleanup of the Site is being performed consistent with the requirements of the Model Toxics Control Act (MTCA), Chapter 70.105D in the Revised Code of Washington (RCW), as administered by Ecology under the MTCA Cleanup Regulation, Chapter 173-340 of the Washington Administrative Code (WAC), and with the Sediment Management Standards (SMS) Chapter 173-204 WAC. Cleanup actions will also comply with the requirements of the U.S. Army Corps of Engineers (USACE) Nationwide 38 Permit for the Port Gamble Bay Cleanup Project (NWS-2013-1270).

This *Shellfish Monitoring Plan* (SMP) describes the sampling and analysis plan for shellfish monitoring to be conducted during pile removal, intertidal excavation, and dredging activities and immediately following completion of cleanup construction actions at the Site. While not a MTCA or SMS requirement, shellfish monitoring will be performed as requested by tribes, consistent with USACE permit requirements. This SMP describes data quality objectives (DQOs), sampling and analytical methods, quality assurance/quality control (QA/QC) procedures, and data management to monitor shellfish during pile removal, intertidal excavation, and dredging activities and immediately following completion of cleanup construction actions.

1.1 Project Overview

Cleanup construction activities within individual sediment management areas (SMAs) of the Site will include the following (Figure 1):

- Removal of approximately 5,800 creosote-treated wood piles as practicable (including piles supporting overwater structures), along with approximately 55,000 square feet of overwater structure
- Excavation (primarily during low tide conditions) of approximately 26,000 cubic yards (cy) of intertidal sediments in SMA-1 and SMA-2, and capping/backfilling the excavation areas with 24 inches of clean material
- Dredging of approximately 40,000 cy of subtidal wood waste in SMA-1 and SMA-2, and placement of a 6-inch-thick layer of clean sand/silt to manage dredging residuals
- Advanced mitigation of impacts to existing native eelgrass in some of the SMA-1 and SMA-2 dredging areas by constructing and planting 24,000 square feet of eelgrass habitat at a 1:1 ratio in a mitigation area located in the southern portion of SMA-2
- Placement of a 1-foot-thick layer of silty sand and/or gravel material over approximately 3 subtidal acres in SMA-1, and placement of a 4-foot-thick sand and/or silt cap over approximately 7 subtidal acres in SMA-2
- Placement of 6 inches of sand/silt enhanced monitored natural recovery (EMNR) material over approximately 68 subtidal acres in SMA-2 and SMA-3

The cleanup action is described in detail in the EDR (Anchor QEA 2014).

Sampling and analysis during construction will be performed using various methods to address overall project monitoring objectives, including:

- **Water Quality Monitoring**: described in the *Water Quality Monitoring Plan* included as a part of Appendix E to the EDR, and performed by PR/OPG's contractors with Ecology oversight (separate from this SMP)
- **Shellfish Biotoxin Monitoring**: described in this SMP using caged mussel sampling performed by the Port Gamble S'Klallam Tribe (PGST) and paralytic shellfish poisoning (PSP) analysis performed by Washington Department of Health (WDOH)
- **Shellfish Contaminant of Concern (CoC) Monitoring:** described in this SMP using three complementary monitoring approaches performed by PR/OPG's contractors:
  - Caged mussel sampling and analysis of CoCs
  - Monitoring of water column carcinogenic polycyclic aromatic hydrocarbon (cPAH) concentrations using passive ethylene membrane devices (PEMDs)

- In situ shellfish monitoring if caged mussel tissue concentrations exceed intermediate risk screening levels, and at the completion of in-water construction (currently anticipated in January 2017)

The shellfish biotoxin and CoC monitoring plans are described in detail in this SMP.

1.2 Study Area

Port Gamble Bay is located in Kitsap County and encompasses more than 2 square miles of intertidal and subtidal habitat. The bay and surrounding areas support diverse aquatic and upland habitats, as well as resources for fishing, shellfish harvesting, and many other aquatic uses. The area surrounding the bay remains largely rural in nature, though more than 100 acres of the basin are currently in commercial land use, largely in the Gamble Creek watershed. The PGST Reservation is located east of the bay.

The Site is divided into SMAs as shown on Figure 1. Shellfish monitoring will be conducted during cleanup construction activities within SMA-1, SMA-2, and SMA-3.

1.3 Construction Sequencing

The cleanup project is anticipated to be completed within two construction seasons, and will be sequenced to maximize overall protectiveness. Subject to final permitting approvals, full-scale construction is scheduled to begin in July/August 2015. Work will occur during approved in-water work windows, with demolition preceding excavation, and intertidal excavation above mean lower low water (MLLW) occurring in dry conditions prior to subtidal dredging. Dredging and excavation will be followed by placement of clean residuals cover, EMNR material, and in-water engineered caps. All construction actions within an individual SMA are targeted to be completed within a single construction season; placement of eelgrass habitat bench material in SMA-2 will occur in Year 1. This SMP assumes that 2015 construction will begin in SMA-2; however, the selected contractor will refine the construction sequence and schedule as appropriate, subject to Ecology approval.

1.4 Human Health Contaminants

The CAP (Ecology 2013) evaluated a series of human health CoCs: metals (arsenic, cadmium, copper, and mercury), cPAHs, polychlorinated biphenyls (PCBs), and dioxins/furans. Of this list, cadmium, cPAHs, and dioxins/furans were identified as Site-related human health CoCs. Ecology identified cPAHs as the primary human health CoC throughout the Site; dioxins/furans were identified as a human health CoC in limited areas of the Site, and cadmium was identified as a low-level human health CoC.

In addition to the Site-related CoCs, the affected tribes are also interested in expanding shellfish monitoring to include PCBs. Moreover, PGST and WDOH currently monitor biotoxins to inform tribal members and the public about potential PSP risks from consumption of shellfish harvested from Port Gamble Bay. These additional monitoring elements are included in this SMP.

1.5 Tissue Screening Levels

This section describes shellfish tissue screening levels and response actions if screening levels are exceeded for biotoxins and/or CoCs resulting from in-water construction activities. A summary of the screening levels are presented in Table 1; further details are provided in Sections 1.5.1 and 1.5.2.

1.5.1 Shellfish Biotoxin Monitoring

PSP is a serious illness, caused by eating shellfish that have consumed large amounts of toxin-producing microscopic phytoplankton. Throughout the Pacific Coast, *Alexandrium sp.* is the primary cause of PSP, and most species of shellfish in Washington have been found to contain PSP toxin at one time or another (WDOH 2015a). *Alexandrium* is a dinoflagellate that spends part of its life cycle as a cyst in the sediment before germinating to become a vegetative cell (Anderson 1998). Once vegetative cells enter the water following cyst germination, their growth and transport are affected by circulation, nutrients, stratification, and other chemical and physical factors including sunlight, water temperature, and salinity (Anderson 1998; USEPA 2013). Mussels have been shown to rapidly accumulate PSP toxin. As a result, the PSP toxin levels in mussels are a good index of the abundance of *Alexandrium sp*. present in the water column.

Mussels placed in cages at strategic sites are currently used as the primary element of the WDOH marine biotoxin monitoring and contingency plan (WDOH 2015a). Within Port Gamble Bay, a single sentinel caged mussel tissue location has been established at a primary PGST shellfish harvesting beach (Figure 2), and is currently monitored by PGST and WDOH every other week from May through October. Advisory closures are in effect when any mussel sample equals or exceeds Food and Drug Administration (FDA) regulatory levels (equal to or greater than 80 micrograms [µg] of PSP toxin per 100 g of shellfish tissue; Table 1). An area is reopened when two successive samples, collected at least 7 days apart, fall below 80 µg/100 g of PSP toxin.

In addition to the current monitoring by WDOH and PGST, PGST will perform additional weekly sampling of caged mussels during in-water construction (i.e., pile removal, intertidal excavation, and/or subtidal dredging) from July 15 to October 31. Between November 1 and January 14, PGST will sample caged mussels every other week. Additional sampling will be conducted by PGST using the same procedures currently used by WDOH for their ongoing PSP monitoring in Port Gamble Bay. PR/OPG will be responsible for payment of these additional samples that are above and beyond the current every other week sampling between May and October.

If PSP toxins are detected above FDA regulatory levels in caged mussels, WDOH performs in situ sampling and PSP analysis of subsistence species (oyster, manila, cockle, and butter clam), as this constitutes a public health necessity. WDOH will determine the appropriate frequency for in situ subsistence sampling based on results, and will continue sampling until all species are non-detect for PSP.

Because PSP outbreaks cannot generally be controlled once they are initiated, no contingency actions related to the cleanup will be required if a PSP outbreak occurs in Port Gamble Bay during the first in-water construction season. WDOH may decide to initiate closures of shellfish beds depending on the nature and extent of the PSP outbreak. If a PSP exceedance occurs during the first in-water construction season, adaptive management measures may be implemented during the second in-water construction season, depending on the cause of the PSP outbreak. In addition, if no potential cleanup-related PSP

exceedances occur during the first construction season, the PSP monitoring may be adjusted as appropriate during the second construction season.

1.5.2 Shellfish CoC Monitoring

As discussed in the CAP (Ecology 2013), in addition to reducing risks to benthic organisms from wood waste exposure, one of the other primary objectives of the Port Gamble Bay cleanup project is to:

> *Eliminate, reduce, or otherwise control to the extent practicable risks to humans from ingestion of seafood containing chemicals that exceed risk-based concentrations and/or natural background concentrations.*

The CAP (Ecology 2013) recognized the potential for short-term increases in risks from pile and sediment removal, and balanced such short-term risks with the long-term protection that will result from removing these materials. The EDR incorporates best management practices and other engineering controls to minimize cleanup-related CoC releases and exposures to the extent practicable. Nevertheless, increases in short-term shellfish tissue CoC concentrations, particularly at locations immediately adjacent to SMA-1 and SMA-2, are possible during construction of the Port Gamble Bay cleanup project, followed by accelerated long-term recovery.

In consideration of the overall objectives of the Port Gamble Bay cleanup project, WDOH (2015b) developed short-term shellfish tissue screening levels for intermediate-duration shellfish consumption exposures using toxicological profile data for Site CoCs (as well as PCBs) available from the Agency for Toxic Substances and Disease Control for non-cancer endpoints, based the most sensitive endpoint that, in their best judgment, represents the most sensitive human health effect for a given exposure route and duration. The WDOH screening levels, which assumed a high-level (subsistence) shellfish consumption rate of 499 g per day, are summarized in Table 1. Because the WDOH calculated screening level for cadmium (0.079 milligrams per kilogram [mg/kg]) is below the natural background tissue concentration reported by Ecology (2012), the cadmium screening level was revised upwards to two times the natural background tissue level (0.52 mg/kg; see Table 1). The screening levels will be refined and updated as necessary during implementation of this SMP.

The caged mussel PSP and CoC monitoring data will be compared with appropriate tissue screening levels. If tissue screening levels are exceeded in caged mussel tissue samples during in-water removal actions (i.e., pile removal, intertidal excavation, and subtidal dredging), supplemental in situ shellfish monitoring will be conducted as specified in Sections 2.1.1.3 and 2.1.1.4. In situ shellfish monitoring for CoCs will also be performed at the completion of in-water construction in Year 2 (currently anticipated January 2017) to document post-construction shellfish quality conditions.

There are no screening levels for in situ shellfish monitoring, though the values summarized in Table 1 may be used by tribal shellfish managers and WDOH to provide advisories to tribal members and the public. Similarly, there are no screening levels for passive sampling of water column PAH concentrations using PEMDs. However, PEMD results will be compared with caged mussel tissue PAH concentrations to evaluate the effectiveness of PEMDs as a proxy to more precisely monitor tissue PAH concentration trends.

1.6 Baseline Monitoring Data

Baseline data are available for all shellfish monitoring elements to allow comparison with data collected during the in-water construction period. As described in more detail in later sections of this document, all data collected under this SMP will be obtained using methods and procedures equivalent to those used during the baseline monitoring. Baseline monitoring stations to be reoccupied as part of this SMP are depicted in Figure 2. The available SMP baseline data are summarized as follows:

- Shellfish Biotoxin Monitoring: Biweekly PSP analyses of samples collected during the May to October period since 2008 from the PGST beach location (Figure 2) are summarized in Appendix A-1.
- Shellfish CoC Monitoring:
  - *Caged mussel sampling and analysis of CoCs:* Caged mussels were deployed at 28 locations in Port Gamble Bay in December 2014, and successfully retrieved in February 2015 (WDFW 2014a). Mussel tissue samples were analyzed for cPAHs, dioxins/furans, cadmium, PCBs, and other ancillary chemicals; the baseline data are summarized in Appendix A-2 (*pending until June/July 2015*).

- *Water column cPAH monitoring using PEMDs:* As part of the Ecology/ Washington Department of Fish and Wildlife (WDFW) herring embryo study (WDFW 2014b), PEMDs were deployed at 40 locations in Port Gamble Bay between February and April 2014, and equilibrated for 10 days before retrieval. PEMDs were analyzed for cPAHs and other ancillary chemicals; the baseline data are summarized in Appendix A-3 (*pending until June/July 2015*).
- *In situ shellfish monitoring:* In situ shellfish tissue sampling data have been collected by Ecology and PGST since 2008 within six primary shellfish harvesting areas of Port Gamble Bay (Point Julia, Gravel Plot, The Bars, Central Bay, Western Shoreline, and Mill Site). Sampled species have included mussels, oysters, cockles, littleneck clams, horse clams, manila clams, geoduck, and Dungeness crab. Tissue samples were analyzed for cPAHs, dioxins/furans, cadmium, PCBs, and other ancillary chemicals. The baseline data for harvesting areas targeted in this SMP (i.e., Point Julia, Gravel Plot, Western Shoreline, and SMA-3) are summarized in Appendix A-4.

1.7 Document Organization

The remainder of this document is organized as follows:

- **Section 2, Data Generation and Acquisition**: This section summarizes the sampling design, sampling and processing methods, sample handling and chain-of-custody procedures, laboratory analytical methods, QA/QC procedures, and data management.
- **Section 3, Project Management**: This section describes the project purpose, project organization and responsibilities, project task schedule, DQOs, and special training requirements.
- **Section 4, Assessments and Oversight:** This section includes compliance assessments, response and corrective actions, and reports to management.
- **Section 5, Data Validation and Usability**: This section describes data validation and verification methods and criteria for usability of data.
- **Section 6, References:** This section presents relevant citations or reference material.

2 DATA GENERATION AND ACQUISITION

This section summarizes the sampling design, sampling and processing methods, sample handling, laboratory methods, and QA/QC measures.

2.1 Sampling Design

The shellfish monitoring sampling design is summarized in Table 2 and described in detail in subsequent sections. Monitoring includes the collection and analysis of shellfish tissue for biotoxin and CoC analyses as well as passive sampling with PEMDs for PAH analysis.

2.1.1 Shellfish Tissue Sampling

Shellfish tissue sampling includes using caged mussels to monitor biotoxin and CoC concentrations during in-water construction (i.e., pile removal, intertidal excavation, and/or subtidal dredging) in SMA-1 and SMA-2. In addition, in situ shellfish sampling will be performed if caged mussel tissue concentrations exceed intermediate risk screening levels, and also at the completion of in-water construction actions in Year 2 (anticipated January 2017).

2.1.1.1 Caged Mussel Biotoxin Sampling Design

Shellfish biotoxin monitoring will be conducted in conjunction with PGST's and WDOH's ongoing PSP monitoring in Port Gamble Bay, and will follow methods and procedures described in the *Marine Biotoxin Contingency Plan* (WDOH 2015a). Adult Pacific blue mussels (*Mytilus trossulus;* obtained from Penn Cove Shellfish, Inc. in Whidbey Island, Washington) will be deployed during Years 1 and 2 in-water construction periods to assess effects during pile removal, intertidal excavation, and/or subtidal dredging. Sampling will occur weekly from July 15 to October 31 and every other week from November 1 to January 14.

Caged mussel deployment and sampling will be performed by PGST at the same sentinel station used historically within Port Gamble Bay, placed within the subtidal zone near a primary PGST shellfish harvesting beach (Figure 2). Composite mussel tissue will be

analyzed for PSP by the WDOH laboratory as described in the *Marine Biotoxin Contingency Plan* (WDOH 2015a).

2.1.1.2 Caged Mussel CoC Sampling Design

The caged mussel CoC sampling design follows methods and procedures used during the baseline study in Port Gamble Bay (WDFW 2014a). All cages will be placed immediately above the sediment surface. Adult Pacific blue mussels will be placed in cages and will remain in situ for 60 days prior to retrieval and tissue resection/analysis.

During Year 1 construction actions, and subject to refinement of project sequencing and scheduling (see Section 1.3), caged mussels will be deployed at five locations located 300 feet offshore of the SMA-2 subtidal dredging areas (Figure 3), as well as at three primary shellfish harvesting beaches in Port Gamble Bay (Point Julia, Gravel Plot, and Western Shoreline; see Figure 2). The 300-foot offset from subtidal dredging areas will help ensure that the cages remain intact during construction actions, and are also located close enough to the removal areas to reflect potential transport of CoCs. During Year 2 construction actions, and again subject to refinement of project sequencing and scheduling (see Section 1.3), caged mussels will be deployed at three locations located 300 feet offshore of SMA-1 dredging areas, two representative locations adjacent to SMA-2 (identified based on review of Year 1 sampling data), and at the three primary shellfish harvesting beaches in Port Gamble Bay (Point Julia, Gravel Plot, and Western Shoreline).

Deployment of caged mussels for CoC monitoring will occur during two periods in Year 1:

- September/October 2015 – after pile removal and/or intertidal excavation is underway, but prior to the initiation of subtidal dredging
- January/February 2016 – shortly following completion of Year 1 in-water construction actions

A similar deployment schedule is anticipated in Year 2, subject to refinement based on the results of the Year 1 monitoring.

Composite samples of caged mussel tissue collected from each of the sampling locations will be analyzed for PAHs, dioxins/furans, cadmium, PCBs, and lipids (Table 2).

2.1.1.3 In Situ Shellfish Biotoxin Sampling Design

As discussed in Section 1.5.2, contingent in situ shellfish PSP monitoring will be performed by WDOH if caged mussel tissue concentrations exceed the screening level provided in Table 1.

2.1.1.4 In Situ Shellfish CoC Sampling Design

In situ shellfish monitoring for CoCs will be performed if caged mussel tissue concentrations exceed intermediate risk screening levels listed in Table 1, and also at the completion of in-water construction actions in Year 2 (anticipated January 2017). In situ shellfish sampling will be performed at three primary intertidal shellfish harvesting beaches in Port Gamble Bay (Point Julia, Gravel Plot, and Western Shoreline; see Figure 2), and will target species included in the baseline sampling (mussels, oysters, cockles, littleneck clams, horse clams, and manila clams; see Appendix A-4). In addition, geoduck and Dungeness crab (muscle and hepatopancreas tissue) sampling will be performed in subtidal areas of SMA-3 using divers (Table 2).

At each of the four in situ shellfish sampling locations (Point Julia, Gravel Plot, Western Shoreline, and SMA-3), approximately 5 to 20 composite tissue samples of the predominant shellfish species will be collected, consistent with the baseline data set, and analyzed for PAHs, dioxins/furans, cadmium, PCBs, and lipids (Table 2).

2.1.2 Water Column PAH Monitoring Using PEMDs

Concurrent with the caged mussel CoC sampling discussed above, PEMDs will be co-deployed at the same caged mussel locations in Port Gamble Bay (Figures 2 and 3), and during four separate sampling events (mid-season and post season events in Years 1 and 2). The PEMD sampling design follows methods and procedures used during the baseline study in Port Gamble Bay (WDFW 2014b).

Consistent with the baseline study (WDFW 2014b), PEMDs will equilibrate in situ for 10 days (i.e., retrieved prior to completion of the caged mussel CoC deployments). PEMDs will be analyzed for PAHs. Because a 10-day deployment is far too short for dioxins/furans to reach near-equilibrium in the PEMDs, and also because no baseline dioxin/furan PEMD data were collected (WDFW 2014b), dioxin/furan analysis will not be performed on the PEMD samples. However, as discussed in Section 2.1.1.2, dioxins/furans will be analyzed as part of the caged mussel CoC monitoring (Table 2).

2.2 Sample Collection, Processing, and Handling Procedures

This section describes activities, methods, and procedures for sample collection, processing, and handling. A list of station identifications, sampling locations, sample type and method, and analytical testing is provided in Table 2.

2.2.1 Caged Mussels

Biotoxin and CoC concentrations in shellfish during construction will be determined using methods provided in *Standard Guide for Conducting In-situ Field Bioassays with Caged Bivalves* (ASTM E2122-02, 2007) and the WDFW Port Gamble Bay baseline study (2014a). Caged mussels will be deployed from a sampling vessel with adequate deck space for storing and assembling equipment.

2.2.1.1 Species

Blue mussels will be acquired from Penn Cove Shellfish, Inc., as discussed in Section 2.1.1.1. Adult mussels (45 millimeters [mm] ± 5 mm) will be selected for deployment in the cages. An adequate number of mussels will be placed in each cage to provide sufficient tissue for analyses and to account for potential survival issues during the exposure period. In addition, a 'time zero' sample from each batch of mussels will be shipped to the analytical laboratories to establish background concentrations in mussel tissue prior to deployment.

2.2.1.2 Equipment

Mussels will be placed in cages to prevent predation. Cages will consist of plastic-coated wire mesh with mesh openings of 1.25 cm by 2.5 cm to allow water to flow through the

cages. Mussels will placed in high-density polyethylene (HDPE) mesh bags, which will be secured inside the cages with zip-ties, or similar, so that mussels are suspended approximately 35 cm above the cage bottom.

The mussel cages will be anchored into the sediment surface using rebar or equivalent materials. In addition, extra wire mesh panels will be affixed to the bottom of the cages and rebar to prevent the cages from sinking into the sediment. Cages will be affixed with metal labels with the project and contact information. Subsurface buoys will also be labeled and attached to cages with rope to aid in recovery. Depths at the proposed sampling stations range from -8.7 to -38.2 feet MLLW. An adequate rope length will be used so that buoys remain underwater except at lower tides.

Once deployed, cages will remain in situ for 7 days (biotoxin monitoring) or 60 days (CoC monitoring). All materials will be either rinsed with high-pressure freshwater or soaked in seawater for 24 hours prior to deployment at sampling locations.

2.2.1.3 Deployment of Caged Mussels for Biotoxin Analyses

Mussels will be placed into one or more cages for deployment at the PGST/WDOH sentinel monitoring station (Figure 2). The minimum tissue volume needed for biotoxin analysis is 150 g per sample; an adequate number of mussels will be distributed evenly amongst the cage(s) to provide sufficient volume for analysis of composited replicates.

Cages will be lowered to target depth and the global positioning system (GPS) locations will be recorded on field forms. Cages will remain in situ for 7 days prior to retrieval.

2.2.1.4 Deployment of Caged Mussels for CoC Analyses

Mussels will be placed into three cages (replicates) for deployment at each of the sampling locations in the SMA that is undergoing active construction (Figure 3). The minimum tissue volume needed for COC analysis is 400 g per sample; an adequate number of mussels will be distributed evenly amongst the replicate cages at each station to provide sufficient volume for analysis of composited replicates.

Cages will also be affixed with PEMD samplers (see Section 2.1.2) and lowered to target depth. The GPS locations will be recorded on field forms. Cages will be retrieved and PEMDs recovered after 10 days. Cages will then be re-deployed and remain in situ for 50 more days.

2.2.2 In Situ Shellfish Sampling for CoCs

In situ shellfish sampling methods will follow guidance provided in the *Port Gamble S'Klallam Tribe Brownfields Supplemental Quality Assurance Project Plan Addendum: Standard Operating Procedure: Marine Tissue Sampling* (RIDOLFI Inc. 2011).

Only living, adult organisms will be collected, and Dungeness crab must meet legal take requirements; only males with a carapace length of at least 6.25 inches may be collected. Sampling of shallow-dwelling species (all species except geoduck and crab) will be conducted from harvestable beaches (see Figure 2) in the intertidal or shallow subtidal zone at low tide. Geoducks will be collected using divers; Dungeness crab will be collected using crab pots deployed from a vessel. Individuals will be separated by species and placed in buckets, or equivalent, with site water until processing occurs.

2.2.3 Passive Sampling with PEMDs

Passive sampling will be conducted with PEMDs consistent with methods used in a herring study within Port Gamble Bay (WDFW 2014b) and the methods detailed by Carls et al. (2004).

2.2.3.1 Equipment

PEMDs consist of low-density polyethylene strips that attract and absorb non-polar hydrocarbons. PEMDs will be prepared by the chemical laboratory and constructed from "lay-flat" tubing cut longitudinally to create strips approximately 20 cm by 5 cm. Strips will be placed in a sonicator with methylene chloride for 5 minutes and then rinsed with fresh methylene chloride, wrapped in solvent-rinsed aluminum foil, and placed in zip-top baggies. PEMDs will be shipped or couriered to the field staff.

2.2.3.2 Deployment of PEMDs

PEMDs will be deployed with caged mussels at the stations targeted for CoC analyses (see Figures 2 and 3). PEMDs are easily contaminated; therefore, they will remain sealed in baggies until deployment at each station. One PEMD will be deployed with each cage (for a total of three replicates per station).

Upon arrival at a station, the vessel engine will be turned off. The field staff handling PEMDs will wear clean gloves and be cautious to avoid touching any surface that has not been decontaminated. Each PEMD will be removed from the baggie, fastened to a mussel cage with a zip-tie, or similar, and deployed with the cage.

2.2.4 Sample Identification and Labels

Each composite sample will be assigned a unique alphanumeric identifier. The identifier will have the format of "Project Identifier-Station ID-Species or Media Code-Analytical Program-Date." Samples will be identified according to the following procedure:

- The project designator will be PG to denote Port Gamble
- The station ID will correspond to sample locations shown on Figures 2 and 3
- Species/media codes are as follows:
  - COC = cockles
  - MAN = manila clams
  - BUT = butter clams
  - OYS = oysters
  - GEO = geoducks
  - DUNH = Dungeness crab hepatopancreas
  - DUNM = Dungeness crab muscle
  - PEMD = polyethylene membrane device
- Analytical program will be coded as either BIO for biotoxins or CoC for contaminants of concern
- Date of collection, in the form of YYMMDD
- As an example, a Dungeness crab muscle tissue sample collected on August 24, 2015 from station SMA2-2 will have an ID of PG-SMA2-2-DUNM-COC-150824

Each sample will have an adhesive plastic or waterproof paper label affixed to the container or baggie and will be labeled at the time of collection. The following information will be recorded on the container label at the time of collection:

- Project name
- Sample identifier
- Date and time of sample collection
- Analysis to be performed

2.2.5 Station Positioning

A handheld or vessel-mounted Differential Global Positioning System (DGPS) will be used to navigate to the desired sampling location. GPS coordinates for each sampling station are provided in Table 2. Collection at the sampling location will be guided by the navigation system with an accuracy of ±10 feet. The coordinates will be recorded, when positioned at the sampling location, in latitude and longitude in decimal degrees (to 5 decimal places). Positions will be relative to the Washington State Plane Coordinates, North, North American Datum of 1983.

2.2.6 Shellfish Tissue Retrieval and Processing

2.2.6.1 Caged Mussels for Biotoxins

Mussels will be retrieved after a 7-day exposure period. GPS coordinates and/or cage buoys will be used to locate cages. Mussels from replicates at each station will be composited to create one sample per station. Approximately 150 g of tissue is needed per species composite for PSP analysis. The recommended number of individuals per composite for blue mussels is 75 to 100 individuals. Mussels will be submitted to the WDOH laboratory for PSP analysis under the following conditions:

- Shells will be rinsed free of sediment with either fresh or saltwater.
- Mussels will arrive fresh, alive, and in the shell.
- No cracked or crushed shells will be included in the sampling.
- Mussels will be packed on ice in waterproof plastic bags and maintained cold. If stored overnight, mussels will be refrigerated in a bowl covered by a wet towel.
- Mussels will be held dry; holding in fresh or saltwater will be prohibited.

New mussels will be obtained and placed in cages to ensure sufficient tissue volume is available for weekly monitoring (during July 15 to October 31) and every other week monitoring (during November 1 to January 14) during construction.

2.2.6.2 Caged Mussels for CoCs

Mussels will be retrieved after a 60-day exposure. GPS coordinates and/or cage buoys will be used to locate cages. Mussels from replicates at each station will be composited to create one sample per station. Mussels will be left in mesh bags, placed in zip-top baggies, labeled, and stored in coolers on ice until delivery to the analytical laboratory. Mussels will be composited and processed at the analytical laboratory.

2.2.6.3 In Situ Shellfish for CoCs

One composite sample per beach will be created for each species. Approximately 400 g of tissue is needed per species composite for CoC analysis. The recommended number of individuals per composite is as follows:

- Cockles and small clams: 30
- Oysters: 15 to 20
- Geoduck clams: 5
- Dungeness crab: 1

Samples will be stored in zip-top baggies in coolers on ice until delivery to the analytical laboratory.

2.2.7 PEMD Retrieval and Processing

PEMDs will be retrieved with caution to avoid contamination. Upon arrival at a station, the vessel engine will be shut off. Each cage/PEMD will be located by its float and/or GPS location and retrieved. The PEMD will be removed from its anchoring device, wrapped in aluminum foil, and placed in a zip-top baggie. Each baggie will be labeled consistent with methods described in Section 2.2.4 and stored in a cooler on ice until delivery to the analytical laboratory.

2.3 Sample Handling Requirements

Sample container requirements, holding times, and preservation requirements are outlined in Table 3. Sample containers, instruments, working surfaces, technician protective gear, and other items that may come into contact with sample material must meet high standards of cleanliness. All equipment and instruments that will be used and are in direct contact with various media collected for chemical analyses must be made of glass, stainless steel, HDPE, or polytetrafluoroethylene and will be cleaned prior to each day's use and between sampling or compositing events.

Extra caution will be taken when handling PEMD samples, because they are easily contaminated. PEMDs will only be handled with clean, gloved hands and never come into contact with dirty gloves or any other surface.

2.3.1 Decontamination Procedures

2.3.1.1 Field Sampling Equipment

The following general decontamination procedures will be followed for field sampling equipment:

1. Pre-wash rinse with tap or site water
2. Wash with solution of tap water or site water and phosphate-free soap (e.g., Alconox)
3. Rinse three times with distilled water
4. Cover (no contact) all decontaminated items with aluminum foil
5. Store in a clean, closed container for next use

Cages and associated equipment (mesh, ropes, anchors, etc.) will be pressure-washed with freshwater or soaked in saltwater for 24 hours prior to use and kept clean until deployment.

2.3.2 Investigation Derived Waste Management

All disposable sampling materials and personal protective equipment used in sample collection and processing (e.g., disposable gloves and paper towels) will be placed in heavy-duty garbage bags for disposal in the municipal waste. No hazardous materials will be used during fieldwork for this study.

2.3.3 Sample Custody and Shipping Requirements

Chain-of-custody procedures will be followed for all samples throughout the collection, handling, and analysis process. The principal document used to track possession and transfer of samples is the chain-of-custody form. Each sample will be represented on a chain-of-custody form the day it is collected. All manual data entries will be made using an indelible ink pen. Corrections will be made by drawing a single line through the error, writing in the correct information, and then dating and initialing the change. Blank lines and spaces on the chain-of-custody form will be lined out, dated, and initialed by the individual maintaining custody. Electronic chain-of-custody forms generated from a custom field application will be emailed directly to the laboratory and QA managers.

A chain-of-custody form will accompany each shipment of samples to the analytical laboratory. Each person in custody of samples will sign the chain-of-custody form and ensure the samples are not left unattended unless properly secured. Copies of all chain-of-custody forms will be retained in the project files.

All samples will be shipped or hand delivered to the analytical laboratory no later than 1 day after collection. Samples collected on Friday may be held until the following Monday for shipment, provided that this delay does not jeopardize any holding time requirements. Specific sample shipping procedures are as follows:

- Each cooler or container containing samples for analysis will be shipped via overnight delivery to the laboratory. In the event that Saturday delivery is required, the field coordinator will contact the analytical laboratory before 3 p.m. on Friday to ensure that the laboratory is aware of the number of containers shipped and the airbill tracking numbers for those containers. Following each shipment, the field coordinator will call the laboratory and verify that the shipment from the day before has been received and is in good condition.
- Coolant ice will be sealed in separate plastic bags and placed in the shipping containers.
- Individual sample containers will be placed in a sealable plastic bag, packed to prevent breakage, and transported in a sealed ice chest or other suitable container.

- Glass jars will be separated in the shipping container by shock-absorbent material (e.g., bubble wrap) to prevent breakage.
- The shipping containers will be clearly labeled with sufficient information (name of project, time and date container was sealed, person sealing the container, and consultant's office name and address) to enable positive identification.
- The shipping waybill number will be documented on all chain-of-custody forms accompanying samples.
- A sealed envelope containing chain-of-custody forms will be enclosed in a plastic bag and taped to the inside lid of the cooler.
- A minimum of two signed and dated custody seals will be placed on adjacent sides of each cooler prior to shipping.
- Each cooler will be wrapped securely with strapping tape, labeled "Glass – Fragile" and "This End Up," and will be clearly labeled with the laboratory's shipping address and the consultant's return address.

Upon transfer of sample possession to the analytical laboratory, the person(s) transferring custody of the sample container will sign the chain-of-custody form. Upon receipt of samples at the laboratory, the custody seals will be broken, and the receiver will record the condition of the samples on a sample receipt form. Chain-of-custody forms will be used internally in the laboratory to track sample handling and final disposition.

2.4 Laboratory Analytical Methods

Analytical parameters, methods, and target reporting limits for tissue and PEMD analyses are listed in Tables 4 and 5, respectively. These methods are consistent with methods used in prior studies within Port Gamble Bay.

2.4.1 Tissue for Biotoxins

Caged mussels will be scrubbed free of debris and shucked. One composited sample will be created for each station by combining tissue from the replicates. Organisms will be processed and composited at the WDOH laboratory and tissue will be analyzed for PSP.

2.4.2 Tissue for CoCs

2.4.2.1 Tissue Analyses

Mussel and in situ shellfish tissue collected for CoC analyses will be analyzed by a National Environmental Laboratory Accreditation Conference (NELAC)-accredited chemistry laboratory. CoC analytes will include PAHs (cPAH and total PAH [sum of 16]), dioxin/furan congeners, cadmium, PCB congeners, and lipids. The analyte list, analytical methods, and reporting limits are summarized in Table 4. All analyses will be conducted with a target 3-week turn-around-time.

2.4.2.2 Tissue Processing

Organisms will be processed at the analytical chemistry laboratory. Caged mussels will be scrubbed free of debris, shucked, and composited. Mussels from the replicate cages at each location will be used to create composites, and a single composited sample from each station will be analyzed for CoCs.

Organisms will be analyzed by major taxonomic group (i.e., clams and cockles, geoducks, oysters, and crabs) from each harvestable beach. Dungeness crabs will be dissected and hepatopancreas and muscle tissues will be composited and analyzed separately.

2.4.3 PEMDs

PEMDs will be analyzed for PAHs using methods consistent with those used by WDFW for the baseline study (WDFW 2014b). A complete list of PAH compounds and analytical methods is provided in Table 5.

2.5 Quality Assurance/Quality Control

QA/QC samples will be prepared in the laboratories to monitor the bias and precision of the analyses procedures.

The quality of laboratory data is assessed by precision, accuracy, representativeness, comparability, completeness, and sensitivity as defined in Section 3.1. Laboratory QA/QC samples include method blanks, laboratory control samples, matrix spike/matrix spike

duplicates, and matrix duplicates. Laboratory QA/QC analytical frequencies are provided in Table 6. Laboratory DQOs for precision, accuracy, and completeness are listed in Table 7.

2.6 Instrument/Equipment Testing, Inspection, and Maintenance Requirements

This section describes procedures for testing, inspection, and maintenance of field and laboratory equipment.

2.6.1 Field Instruments/Equipment

The field coordinator or designee will maintain inventories of field instruments and equipment and will be responsible for the preparation, documentation, and implementation of preventative maintenance. The frequency and types of maintenance will be based on the manufacturer's recommendations and/or previous experience with the equipment. The frequency of maintenance is dependent on the type and stability of the equipment, the methods used, the intended use of the equipment, and recommendations of the manufacturer. Detailed information regarding the calibration and frequency of equipment calibration is provided in specific manufacturers' instruction manuals.

The field coordinator or designee will also be responsible for navigation and will confirm proper operation of the navigation equipment daily. This verification may consist of internal diagnostics or visiting a location with known coordinates to confirm the coordinates indicated by the navigation system. Samplers will be inspected daily for any mechanical problems, and problems will be noted in the field logbook and corrected prior to continuing sampling operations.

2.6.2 Laboratory Instruments/Equipment

Analytical instrument testing, inspection, maintenance, setup, and calibration will be conducted by each laboratory in accordance with the requirements identified in the laboratory's standard operating procedures (SOPs) and manufacturer instructions. In addition, each of the specified analytical methods provides protocols for proper instrument setup, tuning, and critical operating parameters. Instrument maintenance and repair will be documented in the maintenance log or record book.

2.7 Inspection/Acceptance of Supplies and Consumables

The quality of supplies and consumables used during sample collection and laboratory analysis can affect the quality of the project data. All equipment that comes into contact with the samples and extracts must be sufficiently clean to prevent detectable contamination, and the analyte concentrations must be accurate in all standards used for calibration and QC purposes.

Reagents of appropriate purity and suitably cleaned laboratory equipment will be used for all stages of laboratory analyses. Details of acceptance requirements for supplies and consumables at the laboratories are provided in the laboratory SOPs. All supplies will be obtained from reputable suppliers with appropriate documentation or certification.

2.8 Non-Direct Measurements

Existing chemical data from previous baseline investigations will be used to guide this SMP.

2.9 Data Management

Field data sheets will be checked for completeness and accuracy by the field lead prior to delivery to the QA/QC manager. Data generated in the field will be documented on paper and provided to the QA/QC manager, who is responsible for the entering data into the database. Manually entered data will be checked by a second party. Field documentation will be filed in the main project file after data entry and checking are complete.

Laboratory data will be provided to the QA/QC manager in the EQuIS electronic format. Laboratory data that are electronically provided and loaded into the database will undergo a 10% check against the laboratory print copy data. Data will be validated or reviewed manually, and qualifiers, if assigned, will be entered manually. The accuracy of manually entered qualifiers will be verified by a second party. Data tables and reports will be exported from EQuIS to Microsoft Excel tables.

3 PROJECT MANAGEMENT

This section provides a description of DQOs, special training needed to perform the tasks, and documentation procedures.

3.1 Data Quality Objectives

The overall DQO for field sampling and laboratory analysis is to produce data of known and appropriate quality to support the project objectives. DQOs for the project are provided in Table 7. The quality of laboratory data is assessed by precision, accuracy, representativeness, comparability, completeness, and sensitivity. The definitions for the data quality indicators are as follows.

3.1.1 Precision

Precision is the ability of an analytical method or instrument to reproduce its own measurement. It is a measure of the variability, or random error, in sampling, sample handling, and laboratory analysis.

3.1.2 Accuracy

Accuracy is a measure of the closeness of an individual measurement (or an average of multiple measurements) to the true or expected value.

3.1.3 Representativeness

Representativeness expresses the degree to which data accurately and precisely represent an environmental condition.

3.1.4 Comparability

Comparability expresses the confidence with which one dataset can be evaluated in relation to another dataset. For this program, comparability of data will be established through the use of standard analytical methodologies and reporting formats and the use of common traceable calibration and reference materials.

3.1.5 Completeness

Completeness is a measure of the amount of data that is determined to be valid in proportion to the amount of data collected.

3.1.6 Sensitivity

Sensitivity is related to the instrument calibration low-level standard, method detection limits (MDLs) and/or estimated detection limits (EDLs). Analytical methods will be selected to achieve reporting limits that comply with, or are close to, target detection limits.

3.2 Special Training Requirements/Certifications

A technical team will be assembled with the requisite experience and technical skills to successfully complete the sampling for this monitoring program. Personnel involved in sample collection will have extensive environmental sampling experience. All sampling personal will be required to have 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training and the 8-hour refresher course, as necessary, to meet the 29 Code of Federal Regulations 1910.120 Occupational Safety and Health Administration regulations. The training provides employees with knowledge and skills that enable them to perform their jobs safely and with minimum risk to their personal health. Documentation of course completion will be maintained in personnel files.

3.3 Documentation and Records

Records will be maintained documenting all activities and data related to sample collection and laboratory analyses. Results of data verification and validation activities will also be documented. Procedures for documentation of these activities are described in this section.

3.3.1 Field Records

All collected field samples will be documented using a custom field application or field collection logs. Additionally, the field coordinator or designee will keep a daily record of significant events, observations, and measurements on a daily log. Entries for each day will begin on a new page. The person recording information must enter the date and time and initial each entry.

In general, sufficient information will be recorded during sampling to reconstruct the event without relying on the memory of the field personnel.

The daily log will contain the following information, at a minimum:

- Project name
- Field personnel on site
- Site visitors
- Weather conditions
- Field observations
- Maps and/or drawings
- Sample collection date and time
- Sample collection method and description of activities
- Deviations from this SMP
- Conferences associated with field sampling activities

3.3.2 Analytical Records

Analytical data records (bookmarked PDF and electronic data deliverable formats) will be generated by the laboratory and submitted to the QA manager upon completion. If files are too large to be emailed, a notification email with download instructions will be sent to the data management team at labdata@anchorqea.com. Level IV data reports will be provided by the laboratory.

The analytical laboratory will be required to report the following, where applicable:

- **Case narrative**: This summary will discuss problems encountered during any aspect of analysis, if any. It should discuss, but is not be limited to, QC issues, sample shipment, sample storage, and analytical difficulties. Any problems encountered, actual or perceived, and their resolutions will be documented in as much detail as appropriate. Analytical QC samples that exceed project performance criteria and/or laboratory performance criteria should also be discussed in the case narrative.
- **Chain-of-custody records:** Legible copies of chain-of-custody forms will be provided as part of the data package. This documentation will include the time of receipt and condition of each sample received by the laboratory. Additional internal tracking of

sample custody by the laboratory will also be documented on a sample receipt form. The form must include all sample shipping container temperatures measured at the time of sample receipt.

- **Sample results:** The data package will summarize results for each sample analyzed. The summary will include the following information when applicable:
  - Field sample identifier and corresponding laboratory identification code
  - Sample matrix
  - Date and time of sample extraction
  - Date and time of analysis
  - Final concentration volumes and dilution factors
  - Instrument and analyst identification
  - Method reporting limits (MRLs) and MDLs accounting for sample-specific factors (e.g., dilution and total solids)
  - Analytical results with reporting units identified
  - Data qualifiers and their definitions
  - Raw data including instrument printouts, chromatograms, and bench sheets (required for full data packages)
- **QA/QC summaries:** Contract Laboratory Program (CLP)-like form summaries should be generated for all required laboratory QC components and samples (i.e., method blanks, instrument daily tunes, surrogate spikes, internal standards, and laboratory control samples). These summaries should include spike volumes, parent sample concentrations, percent recoveries, relative percent differences, area counts, and laboratory control limits as applicable. For full data packages, associated raw data files should be included.
- **Instrument calibration data**: CLP-like form summaries of calibration data (i.e., initial calibration, initial calibration verification, and continuing calibration verification) should be included in all data packages. For full data packages, associated raw data files should be included.

All instrument data shall be fully restorable at the laboratory from electronic backup. The laboratory will be required to maintain all records relevant to project analyses for a minimum of 5 years.

3.3.3 Data Reduction

Data reduction is the conversion of raw data to final results. Methods or procedures for data reduction shall be documented. The following procedures will be implemented to verify the accuracy of data reduction:

- Technical staff will document, review, and QC their own work to ensure accuracy.
- Major calculations will be subject to an independent senior technical review to ensure that both the methods and the calculations are correct and consistent with the approved work plan.
- The project manager will be responsible for ensuring that data reduction is conducted in a manner that produces high quality data via review and approval of concepts, methods, assumptions, and calculations.

4 ASSESSMENTS AND OVERSIGHT

Once data are received from the laboratory, a number of QC procedures will be followed to provide an accurate evaluation of the data quality. Specific procedures will be followed to assess data precision, accuracy, and completeness.

4.1 Compliance Assessments

Laboratory and field performance audits consist of on-site reviews of QA systems and equipment for sampling, calibration, and measurement. Audits will not be conducted as part of this study. However, laboratory audit reports will be made available to the project QA manager upon request. The laboratory is required to have written procedures addressing internal QA/QC. When these procedures have been submitted, the project QA manager will review them to ensure compliance with this SMP. The laboratory must ensure that personnel engaged in sampling and analysis tasks have appropriate training. As part of the audit process, the laboratory will provide the consultant with written details of any method modifications planned.

4.2 Response and Corrective Actions

Sections 4.2.1 and 4.2.2 identify the responsibilities of key project team members and actions to be taken in the event of an error, problem, or nonconformance to protocols identified in this SMP.

4.2.1 Field Activities

The field coordinator will be responsible for correcting equipment malfunctions during the field sampling effort. The QA manager will be responsible for resolving situations identified by the field coordinator that may result in noncompliance with the SMP. All corrective measures will be immediately documented in the field logbook.

4.2.2 Laboratory

The laboratory is required to comply with its SOPs. The laboratory manager will be responsible for ensuring that appropriate corrective actions are initiated as required for

conformance with this SMP. All laboratory personnel will be responsible for reporting problems that may compromise quality data.

The laboratory manager will be notified if any QC sample grossly exceeds the laboratory in-house control limits. The analyst will identify and correct the anomaly before continuing with the sample analysis. If the anomaly cannot be corrected, the laboratory manager will notify the QA manager. A narrative describing the anomaly, steps taken to identify and correct the anomaly, and the treatment of the relevant sample batch (i.e., recalculation, reanalysis, and re-extraction) will be submitted with the data package.

4.3 Reports to Management

QA reports to project management will include verbal status reports, written reports on field sampling activities and laboratory processes, data validation reports, and final project reports. These reports shall be the responsibility of the project manager.

5 DATA VALIDATION AND USABILITY

Data generated in the field and at the laboratories will be verified and validated according to methods and procedures described in this section.

5.1 Data Review, Validation, and Verification

During the validation process, analytical data will be electronically and/or manually evaluated for method and laboratory QC compliance, and their validity and applicability for program purposes will be determined.

Based on findings of the validation process, data validation qualifiers may be assigned. Validated project data, including qualifiers, will be entered into the project database, thus enabling this information to be retained or retrieved as needed.

5.2 Validation and Verification Methods

Field and laboratory data for this task will undergo a formal verification and validation process. All entries into the database will be verified. All errors found during the verification of field data, laboratory data, and the database will be corrected prior to release of the final data.

Data verification includes a review for completeness and accuracy by the field coordinator and laboratory manager; review by the data manager for outliers and omissions; and the use of performance criteria to identify laboratory QC sample outliers. Data verification will be conducted manually by Anchor QEA staff or an external validator.

For this program, Stage 2B validation (USEPA 2009) will be conducted following National Functional Guidelines for data validation (USEPA 1999, 2004, 2005, 2008), this SMP, and by using professional judgment. Data will be reviewed with regard to the following, as appropriate to the particular analysis:

- Completeness
- Holding times
- MRLs, MDLs, and EDLs

- Laboratory control samples
- Matrix spike/matrix spike duplicates
- Standard reference materials
- Surrogate recoveries
- Method blanks
- Field QC samples
- Initial calibration data
- Continuing calibration data
- Instrument performance check

A data validation report will be generated to document any issues with data quality and any qualifications applied to data. All validated data will be entered into the database established for this program, and a final data file will be exported. Verification of the database export against the PDF data report will be performed by the QA manager or designee. Any errors found in the data file export will be corrected in the database and reviewed for systemic reporting errors. Once all discrepancies are resolved, the database will be established.

The QA manager will be responsible for the final review of all data validation reports.

5.3 Reconciliation with User Requirements

The QA manager will review data at the completion of the task to determine if DQOs have been met. If data do not meet the project's specifications, the QA manager will review the errors and determine if the problem is due to calibration/maintenance, sampling techniques, or other factors and will suggest corrective action, if appropriate. It is expected that the problem would be able to be corrected by retraining, revising techniques, or replacing supplies/equipment; if not, the DQOs will be reviewed for feasibility. If specific DQOs are not achievable, the QA manager will recommend appropriate modifications. If matrix interference is suspected to have attributed to the exceedance, adequate laboratory documentation must be presented to demonstrate that instrument performance and/or laboratory technique did not bias the result. In cases where the DQOs have been exceeded and corrective actions did not resolve the outlier, data will be qualified per USEPA National Functional Guidelines (1999, 2004, 2005, 2008). In these instances, the usability of data will

be determined by the extent of the exceedance. Rejected data will be assigned an "R" qualifier and will not be used for any purposes.

6 REFERENCES

Anchor QEA, 2014. *Engineering Design Report, Port Gamble Bay Cleanup Project*. Report prepared for Pope Resources, LP/OPG Properties, LLC, and Washington State Department of Ecology. November 2014.

Anderson, D.M., 1998. In: Anderson, D.M. Cembella, A.D., Hallegraeff, G.M. (Eds.), *Physiological Ecology of Harmful Algal Blooms*. NATO ASI Series, Series G, Ecological sciences no. 41. Springer-Verlag, Berlin, pp. 29-48.

Carls, M.G., L.G Holland, J.W. Short, R.A. Heintz, and S.D. Rice, 2004. Monitoring Polynuclear Aromatic Hydrocarbons in Aqueous Environments with Passive Low-Density Polyethylene Membrane Devices. *Environmental Toxicology and Chemistry* 23(6): 1416-1424.

Ecology (Washington State Department of Ecology), 2012. *Final Partial Remedial Investigation and Feasibility Study for Port Gamble Bay, Washington*. December 2012.

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

RIDOLFI Inc., 2011. *Port Gamble S'Klallam Tribe Brownfields Supplemental Quality Assurance Project Plan Addendum: Standard Operating Procedure: Marine Tissue Sampling*. May 2011.

USEPA (U.S. Environmental Agency), 1999. *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*. U.S. Environmental Protection Agency, Office of Emergency Response. EPA 540/R-99/008. October 1999.

USEPA, 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI). EPA 540-R-04-004. October 2004.

USEPA, 2005. *USEPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review*. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI). EPA 540-R-05-001. September 2005.

USEPA, 2008. *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review*. Office of Superfund Remediation and Technical Innovation. EPA 540-R-08-01. June 2008.

USEPA, 2009. *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*. EPA 540-R-08-005. January 2009.

USEPA, 2013. *Impacts of Climate Change on the Occurrence of Harmful Algal Blooms.* EPA 820-S-13-001. May 2013. Available from: http://www2.epa.gov/sites/production/files/documents/climatehabs.pdf.

WDFW (Washington Department of Fish and Wildlife), 2014a. *Toxic Contaminants in Bay Mussels (Mytilus trossulus) Transplanted to Port Gamble Bay, Washington Before and After Cleanup and Restoration (2015 – 2017), Quality Assurance Project Plan*. Prepared for Washington State Department of Ecology, December 2014.

WDFW, 2014b. *Toxic Contaminants in Embryos of Pacific Herring (Clupea pallasii) from Port Gamble Bay, Washington: Extent and Magnitude of Contamination by Polycyclic Aromatic Hydrocarbons*. Draft Quality Assurance Project Plan Addendum: Analysis of PAHs and Other Contaminants in Polyethylene Membrane Devices Deployed in Port Gamble Bay as a Proxy for Biological Tissues. Prepared for Washington State Department of Ecology, August 2014.

WDOH (Washington Department of Health), 2015a. *Marine Biotoxin Contingency Plan*. Office of Shellfish & Water Protection. Updated February 20, 2015.

WDOH, 2015b. Port Gamble Bay Minimal Risk Levels and Screening Values. Correspondence from Lenford O'Garro, Site Assessment & Toxicology Section, Office of Environmental Health, Safety & Toxicology, Division of Environmental Public Health. March 11, 2015.

TABLES

Table 1
Shellfish Screening Levels

Parameter	Units	Tissue Screening Criteria
Paralytic Shellfish Poisoning	µg/100gm wet	80[a]
Total Polycyclic Aromatic Hydrocarbons	mg/kg wet	63[b]
Dioxin/Furan Toxicity Equivalent Quotient	ng/kg wet	3.2[b]
Cadmium	mg/kg wet	0.52[c]
Polychlorinated Biphenyls	µg/kg wet	4.7[b]

Notes:
a Advisory criterion from WDOH (2015a)
b Intermediate-duration shellfish consumption exposure criteria from WDOH (2015b), based on a high shellfish consumption rate (499 grams per day)
c Two times the natural background tissue concentration from Ecology (2012)
µg/100gm = micrograms per 100 grams
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
ng/kg = nanograms per kilogram

Table 2
Sampling Design Summary

Sampling Area	Station ID	Proposed Coordinates[1]		Sample Media	Sampling Method	Composite Sample Analytical Testing Chemistry	Archive
		Northing	Easting				
SMA-1	SMA-1-1	317971.442	1211765.078	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
	SMA-1-2	317559.819	1212023.905	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
	SMA-1-3	317123.527	1212194.029	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
SMA-2	SMA-2-1	316739.530	1211968.535	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
	SMA-2-2	316303.466	1211795.518	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
	SMA-2-3	315844.882	1211706.056	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
	SMA-2-4	315474.392	1211446.785	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
	SMA-2-5	315172.444	1211104.658	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--

Table 2
Sampling Design Summary

Sampling Area	Station ID	Proposed Coordinates[1]		Sample Media	Sampling Method	Composite Sample Analytical Testing Chemistry	Archive
		Northing	Easting				
SMA-3	SMA-3-1[2]	308268.920	1212681.470	In Situ Geoduck and Dungeness Crab Muscle and Hepatopancreas Tissue	Diver collection (with crab pot)	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual shellfish tissue
Intertidal Sampling Locations							
Point Julia	PJ-1[2]	315818.330	1213098.710	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
				In Situ Shellfish Tissue	Hand collection on harvestable beaches	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual shellfish tissue
	PJ-2[3]	315532.680	1213791.050	Mussel Tissue	In situ caged mussels	Biotoxin	Individual mussel tissue
Gravel Plot	GP-1[2]	313556.130	1213706.450	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
				In Situ Shellfish Tissue	Hand collection on harvestable beaches	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual shellfish tissue
West Shoreline	WS-1[2]	312230.280	1210323.390	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
				In Situ Shellfish Tissue	Hand collection on harvestable beaches	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual shellfish tissue

Notes:
1 Horizontal datum: Washington State Plane North Zone, NAD83, US Feet
2 In situ shellfish will be collected from sampling areas shown on Figure 2. Coordinates are provided for reference; actual sampling area will be determined based on availability of target species. All species except geoducks and crabs will be collected at low tide from the beach. Geoducks will be collected using divers deployed from a vessel; crabs will be collected using crab pots.
3 Point Julia biotoxin sampling location is provisional and subject to PGST Refinement.
NAD 83 = North American Datum of 1983
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
PEMD = polyethylene membrane device

Table 3
Sample Size, Holding Time, and Preservation for Physical/Chemical Analyses

Parameter	Sample Size	Container Size and Type	Holding Time	Preservative
Mussel Tissue Samples				
Biotoxin	120 g	Zip-top baggie	5 days	Freeze -20°C
Lipids	400 g	Wrap in foil and place in Zip-top baggie	1 year	Freeze -20°C
Cadmium			1 year	Freeze -20°C
Dioxins/furans			1 year to extraction	Freeze -20°C
			1 year after extraction	
PCB congeners			1 year to extraction	Freeze -20°C
			1 year after extraction	
PAHs			1 year to extraction	Freeze -20°C
			1 year after extraction	
PEMD Samples				
PAHs	1 - 20 x 5 cm PEMD	Wrap in foil and plastic	14 days to extraction	Cool 4°C
			40 days to analysis	

Notes:
°C = degrees Celsius
cm = centimeter
g = grams
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
PEMD = polyethylene membrane device

Table 4
Tissue Parameters for Chemical Analyses and Analytical Methods

Parameter	Recommended Analytical Method	Reporting Limit[a]
Conventional Parameters (%)		
Lipids	Bligh & Dyer	0.1
Metals (mg/kg)		
Cadmium	6020A	0.1
Dioxin/Furans (ng/kg)		
Dioxins		
2,3,7,8-TCDD	EPA 1613B	0.5
1,2,3,7,8-PeCDD	EPA 1613B	2.5
1,2,3,4,7,8-HxCDD	EPA 1613B	2.5
1,2,3,6,7,8-HxCDD	EPA 1613B	2.5
1,2,3,7,8,9-HxCDD	EPA 1613B	2.5
1,2,3,4,6,7,8-HpCDD	EPA 1613B	2.5
OCDD	EPA 1613B	5
Furans		
2,3,7,8-TCDF	EPA 1613B	0.5
1,2,3,7,8-PeCDF	EPA 1613B	2.5
2,3,4,7,8,-PeCDF	EPA 1613B	2.5
1,2,3,4,7,8-HxCDF	EPA 1613B	2.5
1,2,3,6,7,8-HxCDF	EPA 1613B	2.5
1,2,3,7,8,9-HxCDF	EPA 1613B	2.5
2,3,4,6,7,8-HxCDF	EPA 1613B	2.5
1,2,3,4,6,7,8-HpCDF	EPA 1613B	2.5
1,2,3,4,7,8,9-HpCDF	EPA 1613B	2.5
OCDF	EPA 1613B	5
Polychlorinated Biphenyls (ng/kg)		
PCB Congeners 1-209	EPA 1668A	10
Polycyclic Aromatic Hydrocarbons (µg/kg)		
2-Methylnaphthalene	EPA 8270D SIM	0.5
Acenaphthene	EPA 8270D SIM	0.5
Acenaphthylene	EPA 8270D SIM	0.5
Anthracene	EPA 8270D SIM	0.5
Benzo(a)anthracene	EPA 8270D SIM	0.5
Benzo(a)pyrene	EPA 8270D SIM	0.5
Benzo(b)fluoranthene	EPA 8270D SIM	0.5
Benzo(e)pyrene	EPA 8270D SIM	0.5
Benzo(g,h,i)perylene	EPA 8270D SIM	0.5
Benzo(k)fluoranthene	EPA 8270D SIM	0.5
Chrysene	EPA 8270D SIM	0.5
Dibenzo(a,h)anthracene	EPA 8270D SIM	0.5
Fluoranthene	EPA 8270D SIM	0.5
Fluorene	EPA 8270D SIM	0.5
Indeno(1,2,3-c,d)pyrene	EPA 8270D SIM	0.5
Naphthalene	EPA 8270D SIM	0.5
Perylene	EPA 8270D SIM	0.5
Phenanthrene	EPA 8270D SIM	0.5
Pyrene	EPA 8270D SIM	0.5

Notes:

a Achievable reporting limits may be increased due to sample size and/or matrix interference.

µg/kg = micrograms per kilogram; mg/kg = milligrams per kilogram; ng/kg = nanograms per kilogram

Table 5

PEMD Parameters for Chemical Analyses and Analytical Methods

Parameter	Analytical Method	Reporting Limit
Polycyclic Aromatic Hydrocarbons (ng)		
2-Methylnaphthalene	8270D SIM	TBD
Acenaphthene	8270D SIM	TBD
Acenaphthylene	8270D SIM	TBD
Anthracene	8270D SIM	TBD
Benzo(a)anthracene	8270D SIM	TBD
Benzo(a)pyrene	8270D SIM	TBD
Benzo(b)fluoranthene	8270D SIM	TBD
Benzo(e)pyrene	8270D SIM	TBD
Benzo(g,h,i)perylene	8270D SIM	TBD
Benzo(k)fluoranthene	8270D SIM	TBD
Chrysene	8270D SIM	TBD
Dibenzo(a,h)anthracene	8270D SIM	TBD
Fluoranthene	8270D SIM	TBD
Fluorene	8270D SIM	TBD
Indeno(1,2,3-c,d)pyrene	8270D SIM	TBD
Naphthalene	8270D SIM	TBD
Perylene	8270D SIM	TBD
Phenanthrene	8270D SIM	TBD
Pyrene	8270D SIM	TBD

Notes:
ng = nanogram
PEMD = polyethylene membrane device
TBD = to be decided

Table 6
Laboratory Quality Control Sample Analysis Summary

Analysis Type	Initial Calibration	Ongoing Calibration	Standard Reference Material[a]	Replicates	Matrix Spikes	Matrix Spike Duplicates	Method Blanks	Surrogate Spikes	Laboratory Control Samples
Polycyclic Aromatic Hydrocarbons	As needed[b]	1 per 10 samples	1 per 20 samples	NA	1 per 20 samples	1 per 20 samples	Each batch	Every sample	1 per 20 samples
Dioxins/Furans	As needed[b]	Every 12 hours	1 per 20 samples	NA	NA[c]	NA[c]	1 per 20 samples	Every sample	1 per 20 samples
Cadmium	Daily or each batch	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	NA	Each batch	NA	1 per 20 samples
Polychlorinated biphenyls	As needed[d]	1 per 10 samples	1 per 20 samples	NA	NA[c]	NA[c]	Each batch	Every sample	1 per 20 samples
Lipids	Daily[e]	NA	NA	1 per 20 samples	NA	NA	NA	NA	NA

Notes:
Calibration and certification of drying ovens and weighing scales are conducted bi-annually.
a When a Standard Reference Material is available.
b Initial calibrations are considered valid until the ongoing continuing calibration no longer meets method specifications. At that point, a new initial calibration is performed.
c Isotope dilution required by method
d Initial calibration verification and calibration blank must be analyzed at the beginning of each batch.
e Scale should be calibrated with class 5 weights daily; weights must bracket the weight of sample and weighing vessel.
NA = Not applicable

Table 7
Data Quality Objectives

Parameter	Precision	Accuracy[a]	Method Blank	Completeness
Tissue Samples				
Lipids	± 20% RPD	NA	NA	95%
Cadmium	± 25% RPD	75-125% R	≤ PQL[b]	95%
Polycyclic aromatic hydrocarbons	±35 % RPD	50-150% R	≤ PQL[b]	95%
Dioxins/Furans	±35 % RPD	50-150% R	≤ PQL[b]	95%
Polychlorinated biphenyl Congeners	±35 % RPD	50-150% R	≤ PQL[b]	95%
PEMD Samples				
Polycyclic aromatic hydrocarbons	±35 % RPD	50-150% R	≤ PQL[b]	95%

Notes:

a Accuracy goals apply to laboratory control samples and matrix spike samples, as applicable to the analysis.

b When the sample concentration is < 5x the method blank concentration.

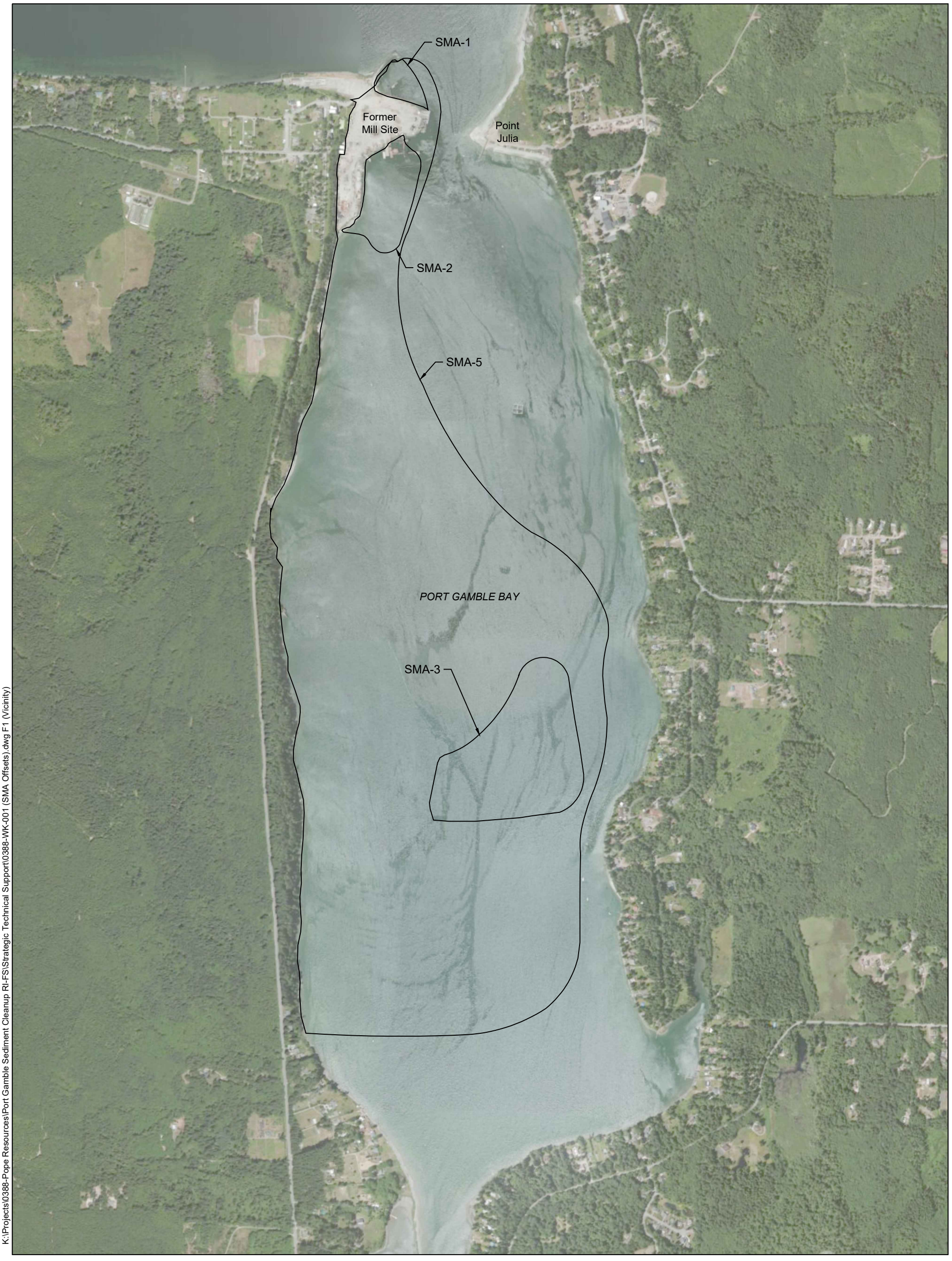
NA = not applicable

PQL = practical quantitation limit

RPD = relative percent difference

R = recovery

FIGURES



K:\Projects\0388-Pope Resources\Port Gamble Sediment Cleanup RI-FS\Strategic Technical Support\0388-WK-001 (SMA Offsets).dwg F1 (Vicinity)

Feb 13, 2018 3:52pm chewett

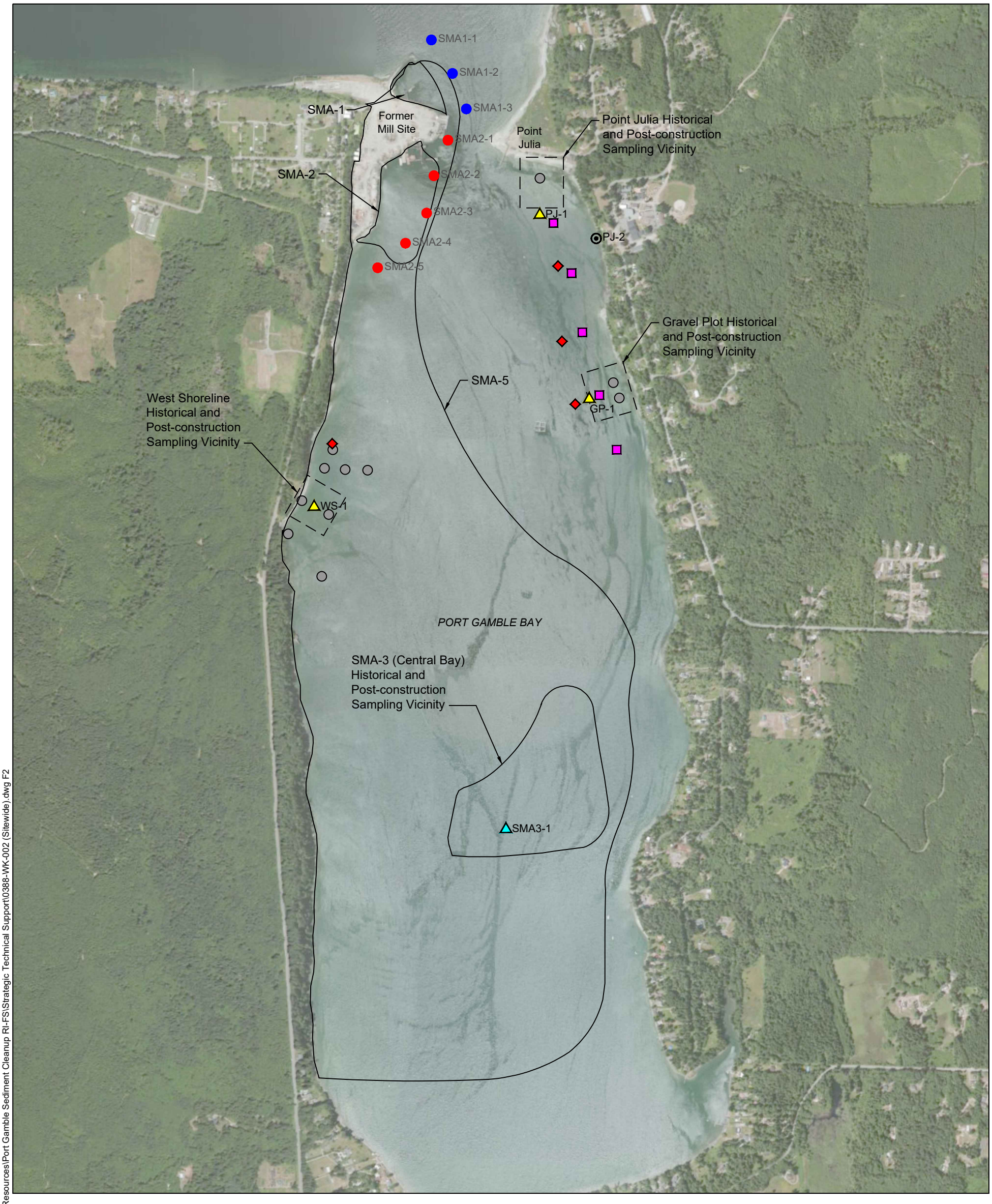
HORIZONTAL DATUM: Washington State Plane North, NAD83, U.S. Feet.

0 1200

Scale in Feet

ANCHOR QEA

Figure 1
Vicinity Map
Shellfish Monitoring Plan
Port Gamble, Washington



Feb 13, 2018 3:53pm chewett K:\Projects\0388-Pope Resources\Port Gamble Sediment Cleanup RI-FS\Strategic Technical Support\0388-WK-002 (Sitewide).dwg F2

HORIZONTAL DATUM: Washington State Plane North, NAD83, U.S. Feet.

NOTES:

1. For in-situ wild shellfish sampling, historical sampling areas will be reoccupied and target species to collected will consist of those previously sampled (see Tables 2-5).
2. Year 2 Caged Mussel Locations adjacent to SMA-2 will be identified based on Year 1 sampling data.
3. Provisional Sampling Location - subject to PGST refinement.

LEGEND:

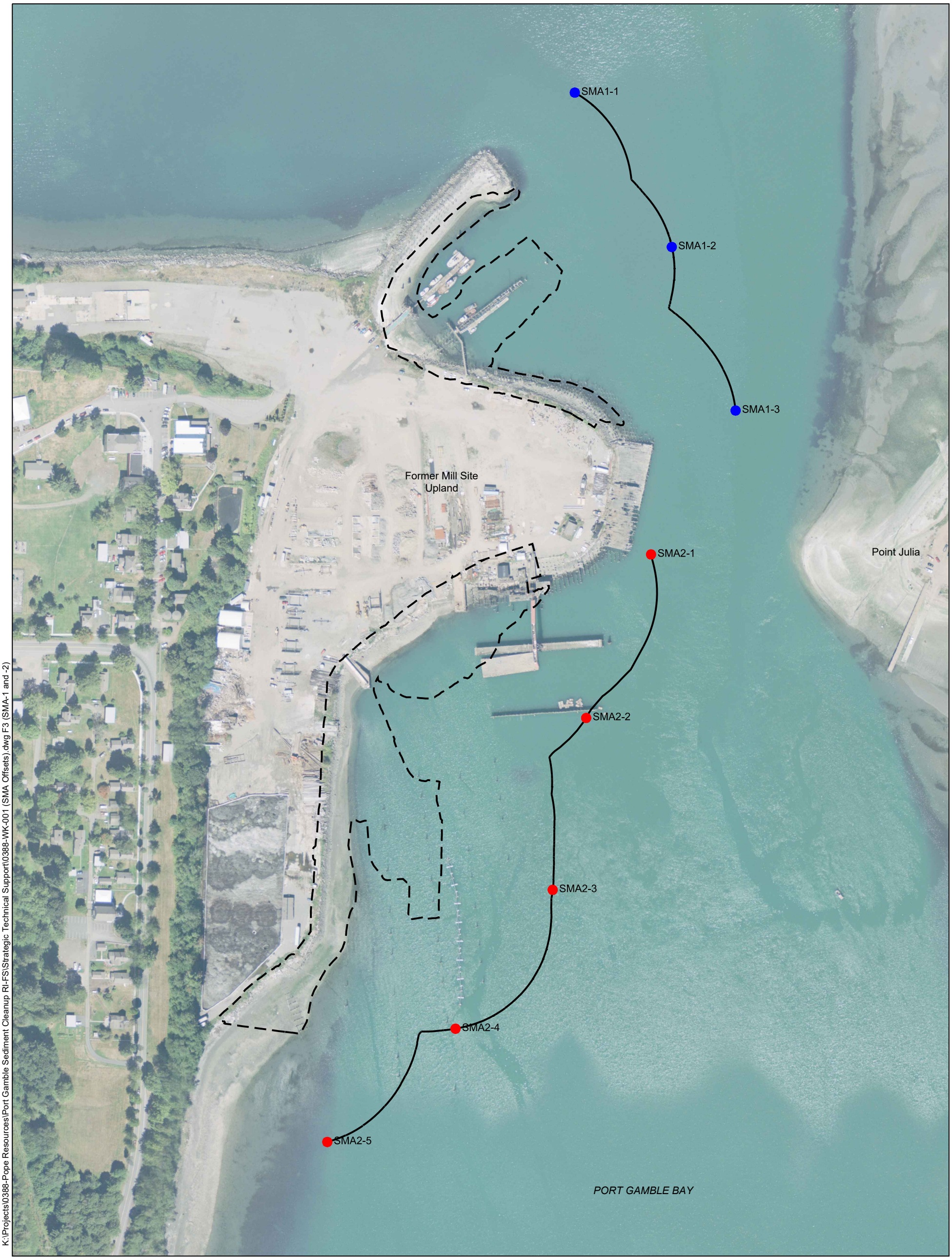
- Proposed CoC Caged Mussel, and PEMD Sampling Location, Year 1 and 2
- Proposed Biotoxin Sampling Location (See Note 3), Year 1 and 2
- SMA Area
- Historical Caged Mussel Sampling Location
- Historical PEMD Sampling Location
- Historical Sampling Location, Other
- Geoduck and Crab Tissue Sampling to be Conducted Within SMA-3
- Wild Shellfish Sampling Area
- Proposed CoC Caged Mussel and PEMD Sample Location, Year 1
- Proposed CoC Caged Mussel and PEMD Sample Location, Year 2 (See Note 2)

0 1200

Scale in Feet

ANCHOR QEA

Figure 2
Proposed and Historical Bay Sampling Locations
Shellfish Monitoring Plan
Port Gamble, Washington



ANCHOR QEA

Figure 3
SMA-1 and SMA-2 Caged Mussel and PEMD Sampling Locations
Shellfish Monitoring Plan
Port Gamble, Washington

APPENDIX A
PORT GAMBLE BAY BASELINE DATA

APPENDIX A-1
HISTORICAL MUSSEL BIOTOXIN DATA

Table A-1
Historical PSP Mussel Tissue Results

Date	Location	PSP Concentration (µg/100g wet weight)[1]
6/9/2008	Port Gamble Bay	ND
6/16/2008	Port Gamble Bay	ND
6/30/2008	Port Gamble Bay	ND
7/14/2008	Port Gamble Bay	ND
7/28/2008	Port Gamble Bay	ND
8/11/2008	Port Gamble Bay	ND
8/25/2008	Port Gamble Bay	ND
9/10/2008	Port Gamble Bay	ND
9/23/2008	Port Gamble Bay	ND
5/11/2009	Port Gamble Bay	ND
5/26/2009	Port Gamble Bay	ND
6/8/2009	Port Gamble Bay	ND
6/21/2009	Port Gamble Bay	ND
7/6/2009	Port Gamble Bay	ND
7/20/2009	Port Gamble Bay	ND
8/4/2009	Port Gamble Bay	ND
8/17/2009	Port Gamble Bay	ND
6/7/2010	Port Gamble Bay	ND
6/22/2010	Port Gamble Bay	ND
7/6/2010	Port Gamble Bay	ND
7/20/2010	Port Gamble Bay	<38
7/26/2010	Port Gamble Bay	ND
8/3/2010	Port Gamble Bay	ND
8/24/2010	Port Gamble Bay	ND
4/18/2011	Point Julia	ND
5/3/2011	Point Julia	ND
5/16/2011	Point Julia	ND
6/6/2011	Point Julia	ND
6/20/2011	Point Julia	ND
7/5/2011	Point Julia	ND
7/18/2011	Point Julia	ND
8/1/2011	Point Julia	ND
8/18/2011	Point Julia	ND
9/8/2011	Point Julia	ND
9/22/2011	Point Julia	ND
9/29/2011	Point Julia	ND
10/6/2011	Point Julia	ND
12/11/2011	Point Julia	ND
1/3/2012	Port Gamble Bay	ND
1/23/2012	Port Gamble Bay	ND
2/6/2012	Port Gamble Bay	ND
2/20/2012	Port Gamble Bay	ND

Table A-1
Historical PSP Mussel Tissue Results

Date	Location	PSP Concentration (µg/100g wet weight)[1]
3/12/2012	Port Gamble Bay	ND
4/17/2012	Port Gamble Bay	ND
5/1/2012	Port Gamble Bay	ND
5/15/2012	Port Gamble Bay	ND
5/29/2012	Port Gamble Bay	ND
6/7/2012	Point Julia	ND
7/11/2012	Point Julia	ND
7/23/2012	Point Julia	ND
8/5/2012	Port Gamble Bay	ND
8/14/2012	Port Gamble Bay	ND
8/19/2012	Port Gamble Bay	**150**
8/27/2012	Port Gamble Bay	43
9/4/2012	Port Gamble Bay	<38
9/10/2012	Port Gamble Bay	46
9/17/2012	Port Gamble Bay	<38
9/24/2012	Port Gamble Bay	ND
10/8/2012	Point Julia	<38
10/15/2012	Port Gamble Bay	ND
1/2/2013	Port Gamble Tract #20100	ND
1/14/2013	Port Gamble Tract #20100	ND
1/28/2013	Port Gamble Tract #20100	ND
2/11/2013	Port Gamble Tract #20100	ND
5/20/2013	Port Gamble Tract #20100	ND
6/17/2013	Port Gamble Bay	ND
6/17/2013	Port Gamble Bay	ND
6/25/2013	Port Gamble Tract #20100	ND
7/1/2013	Port Gamble Bay	ND
7/1/2013	Port Gamble Bay	ND
7/9/2013	Port Gamble Tract #20100	ND
7/11/2013	Port Gamble Tract #20100	ND
7/30/2013	Port Gamble Bay	ND
7/30/2013	Port Gamble Bay	ND
8/6/2013	Port Gamble Tract #20100	ND
8/19/2013	Port Gamble Tract #20100	ND
8/29/2013	Port Gamble Bay	ND
8/29/2013	Port Gamble Bay	ND
9/3/2013	Port Gamble Tract #20100	ND
9/19/2013	Port Gamble Bay	ND
9/19/2013	Port Gamble Bay	ND
9/24/2013	Port Gamble Tract #20100	<38
10/16/2013	Port Gamble Tract #20100	<38
6/24/2014	Point Julia	ND

Table A-1
Historical PSP Mussel Tissue Results

Date	Location	PSP Concentration (µg/100g wet weight)[1]
8/20/2014	Port Gamble Bay	ND
9/15/2014	Port Gamble Bay	ND
10/7/2014	Port Gamble Bay	ND
12/15/2014	Port Gamble Tract #20100	ND
1/8/2015	Port Gamble Tract #20100	ND

Notes:

from 2008 - 2014.

1 Analysis performed on whole-body tissue samples from blue mussels.

Bold text indicates detected result greater than advisory screening criterion (80 µg/100g wet weight; WDOH 2015).

µg/100g = micrograms per 100 grams

ND = not detected

PSP = paralytic shellfish poisoning

APPENDIX A-2
2014 CAGED MUSSEL COC DATA

Pending until June/July 2015

APPENDIX A-3
2014 WATER COLUMN CPAH DATA

Pending until June/July 2015

APPENDIX A-4
HISTORICAL IN SITU SHELLFISH DATA

Table A-4-1
Historical Tissue Data - Point Julia

Parameters	Species	Cockle			Horse Clam				Oyster						Manila Clam			Littleneck Clam				Mussel
	Sampling ID	SB CO-01	SB CO-02	SB CO-03	SB HC-01	SB HC-02	SB HC-03	SB HC-04	Oyster 1A	PJ_O_PGST_100429	SB OY-01	SB OY-02	SB OY-03	SB OY-04	SB MN-01	SB MN-02	SB MN-03	HART14_CLAM1A	SB LN-01	SB LN-02	SB LN-03	HC_PGPJ
	Sampling Date	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	12/15/2008	4/29/2010	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	12/15/2008	9/22/2011	9/22/2011	9/22/2011	1/8/2013
	TEF (as applicable)																				
Conventionals (%)																						
Percent Lipids		0.386	0.388	0.67	0.867	0.634	1.19	0.523	1.97	2.43	3.21	2.62	3.07	2.49	0.448	0.488	0.298	0.232	0.966	0.686	0.966	1.12
Metals (mg/kg)																						
Arsenic		NA	NA	NA	NA	NA	NA	NA	1 U	2	NA	NA	NA	NA	NA	NA	NA	2	NA	NA	NA	0.861
Cadmium		NA	NA	NA	NA	NA	NA	NA	0.99	1.13	NA	NA	NA	NA	NA	NA	NA	0.36	NA	NA	NA	0.365
Chromium		NA	NA	NA	NA	NA	NA	NA	0.1	0.1	NA	NA	NA	NA	NA	NA	NA	0.3	NA	NA	NA	NA
Copper		NA	NA	NA	NA	NA	NA	NA	3.98	6.9	NA	NA	NA	NA	NA	NA	NA	1.37	NA	NA	NA	0.864
Lead		NA	NA	NA	NA	NA	NA	NA	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	0.4 U	NA	NA	NA	0.0336
Mercury		NA	NA	NA	NA	NA	NA	NA	0.01	0.01	NA	NA	NA	NA	NA	NA	NA	0.01 U	NA	NA	NA	0.0073
Silver		NA	NA	NA	NA	NA	NA	NA	0.1	0.13 J	NA	NA	NA	NA	NA	NA	NA	0.12	NA	NA	NA	NA
Zinc		NA	NA	NA	NA	NA	NA	NA	101	139	NA	NA	NA	NA	NA	NA	NA	10.1	NA	NA	NA	13.1
Polycyclic Aromatic Hydrocarbons (PAHs) (µg/kg)																						
Napthalene		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.6 U	0.7 U	0.6 U	0.8 U	0.5 U	0.5 U	0.5 U	NA	0.6 U	0.5 U	0.5 U	1
2-Methylnaphthalene		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.9	0.8	0.9	0.7	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	NA
1-Methylnaphthalene		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	NA
Acenaphthylene		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.86 U
Acenaphthene		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.8	0.7	0.8	0.6	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.93 U
Fluorene		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	1	0.9	1.0	0.8	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.64 U
Phenanthrene		0.8	0.7	1.0	1.1	0.9	1.4	0.8	NA	NA	4.8	3.9	4.5	3.9	1.2	0.9	0.8	NA	2.3	2.2	2.1	4
Anthracene		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.68 U
Fluoranthene		1.4	0.9	1.6	1.2	1.0	1.6	0.9	NA	NA	12	11	12	9.3	1.2	1.1	0.9	NA	2.4	1.6	2.6	3.8
Pyrene		0.6	0.5 U	0.6	0.9	0.6	1.1	0.6	NA	NA	5.6	4.6	5.2	4.0	0.7	0.5	0.5 U	NA	1.1	0.8	1.1	1.9
Benzo(g,h,i)perylene		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.64 U
Dibenzofuran		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.6	0.6	0.6	0.7	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	NA
Carcinogenic Polycyclic Aromatic Hydrocarbons (µg/kg)																						
Total Benzofluoranthenes	0.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	2.2	2.5	2.7	1.7	1.1 J	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	2.6
Benzo(b)fluoranthene	0.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	1.1					0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	1.1
Benzo(k)fluoranthene	0.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	1.1					0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	1.5
Benz(a)anthracene	0.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.9	1.1	1.4	1.0	0.7	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	1.1
Chrysene	0.01	0.5	0.5	0.7	0.5 U	0.5 U	0.5 U	0.5 U	NA	2.9	3.5	3.3	3.1	2.2	0.5 U	0.5 U	0.5 U	NA	0.5	0.5	1.3	2.7
Benzo(a)pyrene	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	.64 U
Indeno(1,2,3-cd)pyrene	0.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	.63 U
Dibenz(a,h)anthracene	0.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	.53 U
cPAHs TEQ		0.355	0.355	0.357	0.353	0.353	0.353	0.353	NA	0.897	0.695	1.293	0.601	0.502	0.357	0.394	0.425	NA	0.355	0.355	0.438	0.8542
Polychlorinated Biphenyls (PCBs) Aroclors (µg/kg)																						
Aroclor-1016		3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	8.0 U	4.0 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	3.9 U	3.9 U	8 U	3.9 U	3.9 U	3.8 U	NA
Aroclor-1242		3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	8.0 U	4.0 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	3.9 U	3.9 U	8 U	3.9 U	3.9 U	3.8 U	NA
Aroclor-1248		3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	8.0 U	4.0 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	3.9 U	3.9 U	12 U	3.9 U	3.9 U	3.8 U	NA
Aroclor-1254		3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	8.0 U	4.0 U	2.5 J	4.0 U	2.1 J	4.0 U	3.9 U	3.9 U	3.9 U	8 U	3.9 U	3.9 U	3.8 U	NA
Aroclor-1260		3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	8.0 U	4.0 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	3.9 U	3.9 U	8 U	3.9 U	3.9 U	3.8 U	NA
Aroclor-1221		3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	8.0 U	4.0 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	3.9 U	3.9 U	8 U	3.9 U	3.9 U	3.8 U	NA
Aroclor-1232		3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	8.0 U	4.0 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	3.9 U	3.9 U	8 U	3.9 U	3.9 U	3.8 U	NA
Total Aroclors		3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	8.0 U	4.0 U	2.5 J	4.0 U	2.1 J	4.0 U	3.9 U	3.9 U	3.9 U	8 U	3.9 U	3.9 U	3.8 U	NA
PCB Congeners (ng/kg)																						
PCB-017		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-018		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-028		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.36
PCB-031		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.32

Table A-4-1
Historical Tissue Data - Point Julia

Parameters	Species	Cockle			Horse Clam				Oyster						Manila Clam			Littleneck Clam				Mussel
	Sampling ID	SB CO-01	SB CO-02	SB CO-03	SB HC-01	SB HC-02	SB HC-03	SB HC-04	Oyster 1A	PJ_O_PGST_100429	SB OY-01	SB OY-02	SB OY-03	SB OY-04	SB MN-01	SB MN-02	SB MN-03	HART14_CLAM1A	SB LN-01	SB LN-02	SB LN-03	HC_PGPJ
	Sampling Date	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	12/15/2008	4/29/2010	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	12/15/2008	9/22/2011	9/22/2011	9/22/2011	1/8/2013
	TEF (as applicable)																					
PCB-033		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-044		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-049		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-052		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-066		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-070		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-074		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-077	0.0001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-081	0.0003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-082		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-087		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-095		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-099		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-101		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-105	0.00003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-110		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-114	0.00003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-118	0.00003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-123	0.00003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-126	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-128		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-138		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-149		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-151		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-153		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-156/157	0.00003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-158		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-167	0.00003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-169	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-170		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-171		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-177		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-180		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-183		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-187		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-189	0.00003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-191		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-194		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-195		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-199		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-205		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-206		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-208		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-209		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB Congener TEQ		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	*
Dioxins / Furans (µg/kg)																						
2,3,7,8-TCDD	1	NA	NA	NA	NA	NA	NA	0.0495 U	0.117 U	NA	0.070 J	NA	NA	NA	NA	NA	NA	0.111 U	NA	NA	NA	NA
1,2,3,7,8-PECDD	1	NA	NA	NA	NA	NA	NA	0.0495 U	0.272 U	NA	0.0480 U	NA	NA	NA	NA	NA	NA	0.26 U	NA	NA	NA	NA

Table A-4-1
Historical Tissue Data - Point Julia

Parameters	Species	Cockle			Horse Clam				Oyster						Manila Clam			Littleneck Clam				Mussel
	Sampling ID	SB CO-01	SB CO-02	SB CO-03	SB HC-01	SB HC-02	SB HC-03	SB HC-04	Oyster 1A	PJ_O_PGST_100429	SB OY-01	SB OY-02	SB OY-03	SB OY-04	SB MN-01	SB MN-02	SB MN-03	HART14_CLAM1A	SB LN-01	SB LN-02	SB LN-03	HC_PGPJ
	Sampling Date	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	12/15/2008	4/29/2010	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	12/15/2008	9/22/2011	9/22/2011	9/22/2011	1/8/2013
	TEF (as applicable)																					
1,2,3,4,7,8-HXCDD	0.1	NA	NA	NA	NA	NA	NA	0.0495 U	0.399 U	NA	0.0480 U	NA	NA	NA	NA	NA	NA	0.381 U	NA	NA	NA	NA
1,2,3,6,7,8-HXCDD	0.1	NA	NA	NA	NA	NA	NA	0.0495 U	0.421 U	NA	0.104 J	NA	NA	NA	NA	NA	NA	0.402 U	NA	NA	NA	NA
1,2,3,7,8,9-HXCDD	0.1	NA	NA	NA	NA	NA	NA	0.0495 U	0.231 U	NA	0.081 J	NA	NA	NA	NA	NA	NA	0.221 U	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDD	0.01	NA	NA	NA	NA	NA	NA	0.176 J	0.421 U	NA	0.163 J	NA	NA	NA	NA	NA	NA	0.402 U	NA	NA	NA	NA
OCDD	0.0003	NA	NA	NA	NA	NA	NA	1.06 J	0.816 U	NA	0.872 J	NA	NA	NA	NA	NA	NA	0.779 U	NA	NA	NA	NA
2,3,7,8-TCDF	0.1	NA	NA	NA	NA	NA	NA	0.0495 U	0.111 U	NA	0.308 J	NA	NA	NA	NA	NA	NA	0.106 U	NA	NA	NA	NA
1,2,3,7,8-PECDF	0.03	NA	NA	NA	NA	NA	NA	0.0495 U	0.313 U	NA	0.0480 U	NA	NA	NA	NA	NA	NA	0.299 U	NA	NA	NA	NA
2,3,4,7,8-PECDF	0.3	NA	NA	NA	NA	NA	NA	0.050 J	0.256 U	NA	0.108 J	NA	NA	NA	NA	NA	NA	0.245 U	NA	NA	NA	NA
1,2,3,4,7,8-HXCDF	0.1	NA	NA	NA	NA	NA	NA	0.0495 U	0.563 U	NA	0.0480 U	NA	NA	NA	NA	NA	NA	0.537 U	NA	NA	NA	NA
1,2,3,6,7,8-HXCDF	0.1	NA	NA	NA	NA	NA	NA	0.0495 U	0.135 U	NA	0.0480 U	NA	NA	NA	NA	NA	NA	0.129 U	NA	NA	NA	NA
1,2,3,7,8,9-HXCDF	0.1	NA	NA	NA	NA	NA	NA	0.0495 U	0.26 U	NA	0.0480 U	NA	NA	NA	NA	NA	NA	0.248 U	NA	NA	NA	NA
2,3,4,6,7,8-HXCDF	0.1	NA	NA	NA	NA	NA	NA	0.0495 U	0.307 U	NA	0.0480 U	NA	NA	NA	NA	NA	NA	0.293 U	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDF	0.01	NA	NA	NA	NA	NA	NA	0.0495 U	0.562 U	NA	0.0480 U	NA	NA	NA	NA	NA	NA	0.537 U	NA	NA	NA	NA
1,2,3,4,7,8,9-HPCDF	0.01	NA	NA	NA	NA	NA	NA	0.0495 U	0.582 U	NA	0.0480 U	NA	NA	NA	NA	NA	NA	0.556 U	NA	NA	NA	NA
OCDF	0.0003	NA	NA	NA	NA	NA	NA	0.051 J	0.725 U	NA	0.064 J	NA	NA	NA	NA	NA	NA	0.692 U	NA	NA	NA	NA
Total TEQ		NA	NA	NA	NA	NA	NA	0.210	0.367	NA	0.191	NA	NA	NA	NA	NA	NA	0.35028	NA	NA	NA	NA

Notes:
For TEQ calculations, non-detects were assumed to be half the quantitation limit
* = Not enough congeners with assigned TEFs were analyzed to make a TEQ
µg/kg = micrograms per kilogram
J = estimated concentration
mg/kg = milligrams per kilogram
NA = Not analyzed
ng/kg = nanograms per kilogram
TEF = toxic equivalency factor
TEQ = toxicity equivalent quotient
U = Not detected at the method detection limit

Table A-4-2
Historical Tissue Data - Gravel Plot

	Species	Oyster						Cockle	Littleneck Clam
	Sampling ID	HART14_OYSTER2A	Port Gamble A1	Port Gamble A2	Port Gamble A3	S_O_PGST_100	12110604	RS_C_PGST_10042	HART14_CLAM2A
	Sampling Date	12/15/2008	9/22/2004	9/22/2004	9/22/2004	4/29/2010	11/28/2012	4/29/2010	12/15/2008
Parameters	**TEF (as applicable)**								
Conventionals (%)									
Percent Lipids		1.97				2.63	1.96	0.28	0.487
Metals (mg/kg)									
Arsenic		1	0.44	0.56	0.46	2	1	1 U	2
Cadmium		0.96	0.78	0.71	0.73	1.49	1	0.04	0.24
Chromium		0.2	NA	NA	NA	0.2	0.2	0.2	0.3
Copper		4.45	NA	NA	NA	9.5	3.64	1.5	1.02
Lead		0.4 U	NA	NA	NA	0.4 U	0.4 U	0.4 U	0.4 U
Mercury		0.01	NA	NA	NA	0.012	0.008	0.005 U	0.01 U
Silver		0.1	NA	NA	NA	0.16 J	0.06 U	--R	0.09
Zinc		124	78	72	78	174	75.2	9	10.5
Polycyclic Aromatic Hydrocarbons (PAHs) (µg/kg)									
Napthalene		NA	NA	NA	NA	NA	0.7	NA	NA
2-Methylnaphthalene		NA	NA	NA	NA	NA	0.6	NA	NA
1-Methylnaphthalene		NA	NA	NA	NA	NA	0.5 U	NA	NA
Acenaphthylene		NA	NA	NA	NA	NA	0.5 U	NA	NA
Acenaphthene		NA	NA	NA	NA	NA	0.5 U	NA	NA
Fluorene		NA	NA	NA	NA	NA	0.7	NA	NA
Phenanthrene		NA	NA	NA	NA	NA	3	NA	NA
Anthracene		NA	NA	NA	NA	NA	0.6	NA	NA
Fluoranthene		NA	NA	NA	NA	NA	12	NA	NA
Pyrene		NA	NA	NA	NA	NA	6.5	NA	NA
Benzo(g,h,i)perylene		NA	NA	NA	NA	NA	0.5 U	NA	NA
Dibenzofuran		NA	NA	NA	NA	NA	0.6	NA	NA
Carcinogenic Polycyclic Aromatic Hydrocarbons (µg/kg)									
Total Benzofluoranthenes	0.1	NA	NA	NA	NA	4.0	1.8	0.5 U	4.9 U
Benzo(b)fluoranthene	0.1	NA	NA	NA	NA	2.0	1.2	0.5 U	4.9 U
Benzo(k)fluoranthene	0.1	NA	NA	NA	NA	2.0	0.6	0.5 U	4.9 U
Benz(a)anthracene	0.1	NA	NA	NA	NA	1.3	1	0.5 U	4.9 U
Chrysene	0.01	NA	NA	NA	NA	3.8	3.1	0.5 U	4.9 U
Benzo(a)pyrene	1	NA	NA	NA	NA	0.5	0.5 U	0.5 U	4.9 U
Indeno(1,2,3-cd)pyrene	0.1	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	4.9 U
Dibenz(a,h)anthracene	0.1	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	4.9 U
cPAHs TEQ		NA	NA	NA	NA	1.14	0.5831	0.353	3.45
Polychlorinated Biphenyls (PCBs) Aroclors (µg/kg)									
Aroclor-1016		8 U	NA	NA	NA	4.0 U	4 U	4.0 U	8.0 U
Aroclor-1242		8 U	NA	NA	NA	4.0 U	4 U	4.0 U	8.0 U

Table A-4-2
Historical Tissue Data - Gravel Plot

	Species	Oyster						Cockle	Littleneck Clam
	Sampling ID	HART14_OYSTER2A	Port Gamble A1	Port Gamble A2	Port Gamble A3	S_O_PGST_100	12110604	RS_C_PGST_10042	HART14_CLAM2A
	Sampling Date	12/15/2008	9/22/2004	9/22/2004	9/22/2004	4/29/2010	11/28/2012	4/29/2010	12/15/2008
Parameters	**TEF (as applicable)**								
Aroclor-1248		8 U	NA	NA	NA	4.0 U	4 U	4.0 U	8.0 U
Aroclor-1254		8 U	NA	NA	NA	4.0 U	6.2	4.0 U	8.0 U
Aroclor-1260		8 U	NA	NA	NA	4.0 U	4 U	4.0 U	8.0 U
Aroclor-1221		8 U	NA	NA	NA	4.0 U	4 U	4.0 U	8.0 U
Aroclor-1232		8 U	NA	NA	NA	4.0 U	4 U	4.0 U	8.0 U
Total Aroclors		8 U	NA	NA	NA	4.0 U	6.2	4.0 U	8.0 U
Dioxins / Furans (µg/kg)									
2,3,7,8-TCDD	1	0.108 U	NA	NA	NA	NA	NA	NA	0.117 U
1,2,3,7,8-PECDD	1	0.252 U	NA	NA	NA	NA	NA	NA	0.273 U
1,2,3,4,7,8-HXCDD	0.1	0.37 U	NA	NA	NA	NA	NA	NA	0.4 U
1,2,3,6,7,8-HXCDD	0.1	0.391 U	NA	NA	NA	NA	NA	NA	0.423 U
1,2,3,7,8,9-HXCDD	0.1	0.214 U	NA	NA	NA	NA	NA	NA	0.232 U
1,2,3,4,6,7,8-HPCDD	0.01	0.391 U	NA	NA	NA	NA	NA	NA	0.422 U
OCDD	0.0003	1.78 T	NA	NA	NA	NA	NA	NA	0.818 U
2,3,7,8-TCDF	0.1	0.375 T	NA	NA	NA	NA	NA	NA	0.111 U
1,2,3,7,8-PECDF	0.03	0.29 U	NA	NA	NA	NA	NA	NA	0.314 U
2,3,4,7,8-PECDF	0.3	0.237 U	NA	NA	NA	NA	NA	NA	0.257 U
1,2,3,4,7,8-HXCDF	0.1	0.522 U	NA	NA	NA	NA	NA	NA	0.564 U
1,2,3,6,7,8-HXCDF	0.1	0.125 U	NA	NA	NA	NA	NA	NA	0.135 U
1,2,3,7,8,9-HXCDF	0.1	0.241 U	NA	NA	NA	NA	NA	NA	0.261 U
2,3,4,6,7,8-HXCDF	0.1	0.285 U	NA	NA	NA	NA	NA	NA	0.308 U
1,2,3,4,6,7,8-HPCDF	0.01	0.521 U	NA	NA	NA	NA	NA	NA	0.564 U
1,2,3,4,7,8,9-HPCDF	0.01	0.54 U	NA	NA	NA	NA	NA	NA	0.584 U
OCDF	0.0003	0.672 U	NA	NA	NA	NA	NA	NA	0.727 U
Total Dioxin TEQ		0.373	NA	NA	NA	NA	NA	NA	0.368

Notes:
For TEQ calculations, non-detects were assumed to be half the quantitation limit
µg/kg = micrograms per kilogram
J = estimated concentration
mg/kg = milligrams per kilogram
NA = not analyzed
ng/kg = nanograms per kilogram
TEF = toxic equivalency factor
TEQ = toxicity equivalent quotient
U = not detected at the method detection limit

Table A-4-3
Historical Tissue Data - SMA-3

	Species	Crab Hepatopancreas					Crab Muscle						
	Sampling ID	HART14_CRAB1A PAN	PG11-BW-04-DCH-R1	PG11-BW-04-DCH-R2	12112801	12112803	HART14_CRAB1A MEAT	PG11-BW-04-DCM-R1	PG11-BW-04-DCM-R2	12PTGB1-DCM01A (muscle)	12PTGB3-DCM01A (muscle)	12112802	12112804
	Sampling Date	12/23/2008	8/2/2011	8/2/2011	11/28/2012	11/28/2012	12/23/2008	8/2/2011	8/3/2011	8/13/2012	8/13/2012	11/28/2012	11/28/2012
Parameters	TEF (as applicable)												
Conventionals (%)													
Percent Lipids		3.01	6.9	6.36	5.11	2.27	0.208	0.22	0.24	0.22	0.17	0.487	0.512
Metals (mg/kg)													
Arsenic		4	8	8	8	7	7	5	5	6.89	7.54	8	8
Cadmium		0.34	0.83	1.44	0.51	0.24	0.04	0.04 U	0.04 U	0.0027	0.0033	0.04 U	0.04 U
Chromium		0.1	0.1 J	0.1 J	0.1	0.1 U	0.1	0.1 U	0.1 J	NA	NA	0.1	0.2
Copper		19.2	4.01	4.07	15.9	23.2	8.65	5.74	3.75	6.84	7.42	8.47	7.2
Lead		0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.0046	0.0041 U	0.4 U	0.4 U
Mercury		0.03	0.02	0.028	0.023	0.023	0.047	0.027	0.036	0.0295	0.0383	0.034	0.054
Silver		0.5	.11 J	0.1 J	0.28	0.47	0.19	0.12 J	0.1 J	NA	NA	0.13	0.13
Zinc		15.1	17.6	15.5	18.8	15.4	50.2	30.3	38.3	44.1	42.3	40.4	37.1
Polycyclic Aromatic Hydrocarbons (PAHs) (µg/kg)													
Napthalene		NA	1 B	1.3 B	0.8	0.5	NA	0.5 B	0.5 B	0.86 B	0.83 B	0.5 U	0.5 U
2-Methylnaphthalene		NA	0.5 U	0.6	0.7	0.5 U	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U
1-Methylnaphthalene		NA	NA	NA	0.5 U	0.5 U	NA	NA	NA	NA	NA	0.5 U	0.5 U
Acenaphthylene		NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.26 U	0.32 U	0.5 U	0.5 U
Acenaphthene		NA	0.6	0.8	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.28 U	0.34 U	0.5 U	0.5 U
Fluorene		NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.27 U	0.33 U	0.5 U	0.5 U
Phenanthrene		NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.3	0.33 U	0.5 U	0.5 U
Anthracene		NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.21 U	0.25 U	0.5 U	0.5 U
Fluoranthene		NA	0.5 U	0.6	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.27 U	0.33 U	0.5 U	0.5 U
Pyrene		NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.27 U	0.33 U	0.5 U	0.5 U
Benzo(g,h,i)perylene		NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.34 U	0.4 U	0.5 U	0.5 U
Dibenzofuran		NA	NA	NA	0.5 U	0.5 U	NA	NA	NA	NA	NA	0.5 U	0.5 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (µg/kg)													
Total Benzofluoranthenes	0.1	NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.38 U	0.45 U	0.5 U	0.5 U
Benzo(b)fluoranthene	0.1	NA	NA	NA	0.5 U	0.5 U	NA	NA	NA	0.38 U	0.45 U	0.5 U	0.5 U
Benzo(k)fluoranthene	0.1	NA	NA	NA	0.5 U	0.5 U	NA	NA	NA	0.38 U	0.45 U	0.5 U	0.5 U
Benz(a)anthracene	0.1	NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.33 U	0.39 U	0.5 U	0.5 U
Chrysene	0.01	NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.38 U	0.46 U	0.5 U	0.5 U
Benzo(a)pyrene	1	NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.34 U	0.41 U	0.5 U	0.5 U
Indeno(1,2,3-cd)pyrene	0.1	NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.34 U	0.4 U	0.5 U	0.5 U
Dibenz(a,h)anthracene	0.1	NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.29 U	0.34 U	0.5 U	0.5 U
cPAHs TEQ		NA	0.353	0.353	0.3775	0.3775	NA	0.353	0.353	0.3884	0.4618	0.3775	0.3775
Polychlorinated Biphenyls (PCBs) Aroclors (µg/kg)													
Aroclor-1016		8 U	NA	NA	4 U	3.9 U	8 U	NA	NA	NA	NA	4 U	4 U
Aroclor-1242		8 U	NA	NA	4 U	3.9 U	8 U	NA	NA	NA	NA	4 U	4 U
Aroclor-1248		8 U	NA	NA	4 U	3.9 U	8 U	NA	NA	NA	NA	4 U	4 U
Aroclor-1254		20 U	NA	NA	12	11	8 U	NA	NA	NA	NA	4 U	6.2
Aroclor-1260		15 P	NA	NA	6.7	4.4	8 U	NA	NA	NA	NA	4 U	4 U
Aroclor-1221		8 U	NA	NA	4 U	3.9 U	8 U	NA	NA	NA	NA	4 U	4 U
Aroclor-1232		8 U	NA	NA	4 U	3.9 U	8 U	NA	NA	NA	NA	4 U	4 U
Total Aroclors		8 U	NA	NA	18.7	15.4	8 U	NA	NA	NA	NA	4 U	6.2

Table A-4-3
Historical Tissue Data - SMA-3

	Species	Crab Hepatopancreas					Crab Muscle						
	Sampling ID	HART14_CRAB1A PAN	PG11-BW-04-DCH-R1	PG11-BW-04-DCH-R2	12112801	12112803	HART14_CRAB1A MEAT	PG11-BW-04-DCM-R1	PG11-BW-04-DCM-R2	12PTGB1-DCM01A (muscle)	12PTGB3-DCM01A (muscle)	12112802	12112804
	Sampling Date	12/23/2008	8/2/2011	8/2/2011	11/28/2012	11/28/2012	12/23/2008	8/2/2011	8/3/2011	8/13/2012	8/13/2012	11/28/2012	11/28/2012
Parameters	TEF (as applicable)												
PCB Congeners (ng/kg)													
PCB-017		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-018		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-028		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-031		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-033		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-044		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-049		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-052		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-066		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-070		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-074		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-077	0.0001	20.8	35.4	37.1	NA	NA	0.91 U	1.78	1.71	NA	NA	NA	NA
PCB-081	0.0003	0.923 U	1.42 U	1.69 U	NA	NA	0.91 U	0.156 U	0.227 U	NA	NA	NA	NA
PCB-082		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-087		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-095		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-099		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-101		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.34	NA	NA
PCB-105	0.00003	425	802	714	NA	NA	29.5	25.3	28.4	0.21 U	0.25 U	NA	NA
PCB-110		NA	NA	NA	NA	NA	NA	NA	NA	0.21	0.27	NA	NA
PCB-114	0.00003	24.6	44.2	39.4	NA	NA	0.91 U	1.24	1.45	NA	NA	NA	NA
PCB-118	0.00003	1210	2120	1990	NA	NA	79.2	66.4	74.4	0.22	0.32	NA	NA
PCB-123	0.00003	20.7	35.6	40.2	NA	NA	0.91 U	1.14	1.09	NA	NA	NA	NA
PCB-126	0.1	15.8	6.82 U	7.03	NA	NA	0.91 U	0.396 U	0.282 U	NA	NA	NA	NA
PCB-128		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-138		NA	NA	NA	NA	NA	NA	NA	NA	0.43	0.86	NA	NA
PCB-149		NA	NA	NA	NA	NA	NA	NA	NA	0.21	0.3	NA	NA
PCB-151		NA	NA	NA	NA	NA	NA	NA	NA	0.20 U	0.25 U	NA	NA
PCB-153		NA	NA	NA	NA	NA	NA	NA	NA	0.42	0.83	NA	NA
PCB-156/157	0.00003	192	429	315	NA	NA	11.3	11.9	11	0.2 U	0.25 U	NA	NA
PCB-158		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-167	0.00003	96.1	188	157	NA	NA	5.18	4.47	4.81	NA	NA	NA	NA
PCB-169	0.03	0.923 U	3.01 U	3.33 U	NA	NA	0.91 U	0.163 U	0.168 U	NA	NA	NA	NA
PCB-170		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-171		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-177		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-180		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-183		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-187		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.38	NA	NA
PCB-189	0.00003	16 J	46.9	31.6	NA	NA	0.91 U	1.01	0.857 U	NA	NA	NA	NA
PCB-191		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-194		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-195		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA

Table A-4-3
Historical Tissue Data - SMA-3

	Species	Crab Hepatopancreas					Crab Muscle						
	Sampling ID	HART14_CRAB1A PAN	PG11-BW-04-DCH-R1	PG11-BW-04-DCH-R2	12112801	12112803	HART14_CRAB1A MEAT	PG11-BW-04-DCM-R1	PG11-BW-04-DCM-R2	12PTGB1-DCM01A (muscle)	12PTGB3-DCM01A (muscle)	12112802	12112804
	Sampling Date	12/23/2008	8/2/2011	8/2/2011	11/28/2012	11/28/2012	12/23/2008	8/2/2011	8/3/2011	8/13/2012	8/13/2012	11/28/2012	11/28/2012
Parameters	TEF (as applicable)												
PCB-199		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-205		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-206		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-208		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-209		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB Congener TEQ		1.65	0.809	0.817	NA	NA	0.0631	0.0436	0.0325	*	*	NA	NA
Dioxins / Furans (ng/kg)													
2,3,7,8-TCDD	1	.106 U	0.275	0.212 U	NA	NA	0.112 U	0.056 U	0.05 U	NA	NA	NA	0.057 U
1,2,3,7,8-PECDD	1	.428 T	0.96 J	0.736 J	NA	NA	0.262 U	0.049 U	0.0491 U	NA	NA	NA	0.057 U
1,2,3,4,7,8-HXCDD	0.1	.364 U	0.573 J	0.357 J	NA	NA	0.384 U	0.049 U	0.0491 U	NA	NA	NA	0.057 U
1,2,3,6,7,8-HXCDD	0.1	1.05 T	2.45	1.86	NA	NA	0.406 U	0.081 U	0.099 U	NA	NA	NA	0.187
1,2,3,7,8,9-HXCDD	0.1	.211 U	0.954 J	0.665 J	NA	NA	0.223 U	0.049 U	0.057 U	NA	NA	NA	0.057 U
1,2,3,4,6,7,8-HPCDD	0.01	1.8 T	3.88	2.64	NA	NA	0.406 U	0.119 U	0.181 U	NA	NA	NA	0.443
OCDD	0.0003	2.3 T	4.13	3.32	NA	NA	0.786 U	0.231 U	0.224 U	NA	NA	NA	0.612
2,3,7,8-TCDF	0.1	1.03	1.85	1.58	NA	NA	0.223 T	0.065 J	0.071 U	NA	NA	NA	0.169
1,2,3,7,8-PECDF	0.03	.286 U	0.494 J	0.242 J	NA	NA	0.301 U	0.049 U	0.0491 U	NA	NA	NA	0.057 U
2,3,4,7,8-PECDF	0.3	.455 T	0.874 J	0.558 J	NA	NA	0.247 U	0.052 J	0.0491 U	NA	NA	NA	0.064
1,2,3,4,7,8-HXCDF	0.1	.513 U	0.438 J	0.303 U	NA	NA	0.542 U	0.049 U	0.0491 U	NA	NA	NA	0.057 U
1,2,3,6,7,8-HXCDF	0.1	.123 U	0.213 J	0.181 J	NA	NA	0.13 U	0.049 U	0.0491 U	NA	NA	NA	0.057 U
1,2,3,7,8,9-HXCDF	0.1	.237 U	0.0497 U	0.047 U	NA	NA	0.25 U	0.049 U	0.0491 U	NA	NA	NA	0.057 U
2,3,4,6,7,8-HXCDF	0.1	.28 U	0.237 U	0.168 J	NA	NA	0.296 U	0.049 U	0.0491 U	NA	NA	NA	0.057 U
1,2,3,4,6,7,8-HPCDF	0.01	.513 U	0.935	0.766	NA	NA	0.542 U	0.049 U	0.0491 U	NA	NA	NA	0.087
1,2,3,4,7,8,9-HPCDF	0.01	.531 U	0.0497 U	0.047 U	NA	NA	0.561 U	0.049 U	0.0491 U	NA	NA	NA	0.057 U
OCDF	0.0003	.661 U	0.28 U	0.227 U	NA	NA	0.698 U	0.049 U	0.0491 U	NA	NA	NA	0.057
Total Dioxin TEQ		0.940	2.220	1.480	NA	NA	0.370	0.0952	0.0827	NA	NA	NA	0.14

Table A-4-3
Historical Tissue Data - SMA-3

	Geoduck						
	HART14_GD1A	HART14_GD2A	HART14_GD3A	12111903	12111904	12111905	12111906
	12/16/2008	12/16/2008	12/16/2008	11/19/2012	11/19/2012	11/19/2012	11/19/2012
Parameters							
Conventionals (%)							
Percent Lipids	0.481	0.426	0.823	0.47	0.694	0.222	0.34
Metals (mg/kg)							
Arsenic	1	2	2	3	2	9	4
Cadmium	0.19	0.19	0.26	0.36	0.2	1.37	0.76
Chromium	0.1	0.1	0.2	0.5	0.3	0.9	0.4
Copper	3.25	2.85	6.29	6.32	6.44	7.37	4.04
Lead	0.4 U	0.4 U	0.4 U	0.8	0.4 U	1.8	0.4 U
Mercury	0.01	0.01	0.02	0.01	0.008	0.052	0.014
Silver	0.93	1.15	1.47	0.75	0.15	3.47	2.74
Zinc	16.5	14.5	30.8	28.1	14.9	14.8	24.7
Polycyclic Aromatic Hydrocarbo							
Napthalene	NA	NA	NA	0.5	0.5 U	0.5 U	0.5 U
2-Methylnaphthalene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
1-Methylnaphthalene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Acenaphthylene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Acenaphthene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Fluorene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Phenanthrene	NA	NA	NA	0.7	0.7	0.5 U	0.6
Anthracene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Fluoranthene	NA	NA	NA	1	1.7	0.9	0.8
Pyrene	NA	NA	NA	0.5 U	0.5	0.5	0.5 U
Benzo(g,h,i)perylene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Dibenzofuran	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Carcinogenic Polycyclic Aromati							
Total Benzofluoranthenes	NA	NA	NA	0.9	1.2	0.5 U	0.7
Benzo(b)fluoranthene	NA	NA	NA	0.5	0.6	0.5 U	0.5 U
Benzo(k)fluoranthene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Benz(a)anthracene	NA	NA	NA	0.5	0.5	0.5 U	0.5 U
Chrysene	NA	NA	NA	0.7	0.7	0.5 U	0.5
Benzo(a)pyrene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Indeno(1,2,3-cd)pyrene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Dibenz(a,h)anthracene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
cPAHs TEQ	NA	NA	NA	0.43	0.44	0.38	0.38
Polychlorinated Biphenyls (PCBs							
Aroclor-1016	4.0 U	4.0 U	4.0 U	4 U	4 U	4 U	4 U
Aroclor-1242	4.0 U	4.0 U	4.0 U	4 U	4 U	4 U	4 U
Aroclor-1248	4.0 U	4.0 U	4.0 U	4 U	4 U	4 U	4 U
Aroclor-1254	4.0 U	4.0 U	4.0 U	4 U	4 U	4 U	4 U
Aroclor-1260	4.0 U	4.0 U	4.0 U	4 U	4 U	4 U	4 U
Aroclor-1221	4.0 U	4.0 U	4.0 U	4 U	4 U	4 U	4 U
Aroclor-1232	4.0 U	4.0 U	4.0 U	4 U	4 U	4 U	4 U
Total Aroclors	4.0 U	4.0 U	4.0 U	4 U	4 U	4 U	4 U

Table A-4-3
Historical Tissue Data - SMA-3

	Geoduck						
	HART14_GD1A	HART14_GD2A	HART14_GD3A	12111903	12111904	12111905	12111906
	12/16/2008	12/16/2008	12/16/2008	11/19/2012	11/19/2012	11/19/2012	11/19/2012
Parameters							
PCB Congeners (ng/kg)							
PCB-017	NA	NA	NA	NA	NA	NA	NA
PCB-018	NA	NA	NA	NA	NA	NA	NA
PCB-028	NA	NA	NA	NA	NA	NA	NA
PCB-031	NA	NA	NA	NA	NA	NA	NA
PCB-033	NA	NA	NA	NA	NA	NA	NA
PCB-044	NA	NA	NA	NA	NA	NA	NA
PCB-049	NA	NA	NA	NA	NA	NA	NA
PCB-052	NA	NA	NA	NA	NA	NA	NA
PCB-066	NA	NA	NA	NA	NA	NA	NA
PCB-070	NA	NA	NA	NA	NA	NA	NA
PCB-074	NA	NA	NA	NA	NA	NA	NA
PCB-077	0.977 U	0.836 U	NA	NA	NA	NA	NA
PCB-081	0.977 U	0.836 U	NA	NA	NA	NA	NA
PCB-082	NA	NA	NA	NA	NA	NA	NA
PCB-087	NA	NA	NA	NA	NA	NA	NA
PCB-095	NA	NA	NA	NA	NA	NA	NA
PCB-099	NA	NA	NA	NA	NA	NA	NA
PCB-101	NA	NA	NA	NA	NA	NA	NA
PCB-105	20.2	18.1	NA	NA	NA	NA	NA
PCB-110	NA	NA	NA	NA	NA	NA	NA
PCB-114	0.977 U	0.836 U	NA	NA	NA	NA	NA
PCB-118	70.4	50.4	NA	NA	NA	NA	NA
PCB-123	0.977 U	0.836 U	NA	NA	NA	NA	NA
PCB-126	0.977 U	0.836 U	NA	NA	NA	NA	NA
PCB-128	NA	NA	NA	NA	NA	NA	NA
PCB-138	NA	NA	NA	NA	NA	NA	NA
PCB-149	NA	NA	NA	NA	NA	NA	NA
PCB-151	NA	NA	NA	NA	NA	NA	NA
PCB-153	NA	NA	NA	NA	NA	NA	NA
PCB-156/157	7.93	2.21 J	NA	NA	NA	NA	NA
PCB-158	NA	NA	NA	NA	NA	NA	NA
PCB-167	5.31 J	2.79 J	NA	NA	NA	NA	NA
PCB-169	0.977 U	0.836 U	NA	NA	NA	NA	NA
PCB-170	NA	NA	NA	NA	NA	NA	NA
PCB-171	NA	NA	NA	NA	NA	NA	NA
PCB-177	NA	NA	NA	NA	NA	NA	NA
PCB-180	NA	NA	NA	NA	NA	NA	NA
PCB-183	NA	NA	NA	NA	NA	NA	NA
PCB-187	NA	NA	NA	NA	NA	NA	NA
PCB-189	0.977 UJ	0.836 U	NA	NA	NA	NA	NA
PCB-191	NA	NA	NA	NA	NA	NA	NA
PCB-194	NA	NA	NA	NA	NA	NA	NA
PCB-195	NA	NA	NA	NA	NA	NA	NA

Table A-4-3
Historical Tissue Data - SMA-3

	Geoduck						
	HART14_GD1A	HART14_GD2A	HART14_GD3A	12111903	12111904	12111905	12111906
	12/16/2008	12/16/2008	12/16/2008	11/19/2012	11/19/2012	11/19/2012	11/19/2012
Parameters							
PCB-199	NA	NA	NA	NA	NA	NA	NA
PCB-205	NA	NA	NA	NA	NA	NA	NA
PCB-206	NA	NA	NA	NA	NA	NA	NA
PCB-208	NA	NA	NA	NA	NA	NA	NA
PCB-209	NA	NA	NA	NA	NA	NA	NA
PCB Congener TEQ	0.0669	0.0567	NA	NA	NA	NA	NA
Dioxins / Furans (ng/kg)							
2,3,7,8-TCDD	0.111 U	0.107 U	0.107 U	NA	NA	NA	NA
1,2,3,7,8-PECDD	0.258 U	0.25 U	0.25 U	NA	NA	NA	NA
1,2,3,4,7,8-HXCDD	0.378 U	0.367 U	0.367 U	NA	NA	NA	NA
1,2,3,6,7,8-HXCDD	0.399 U	0.387 U	0.387 U	NA	NA	NA	NA
1,2,3,7,8,9-HXCDD	0.219 U	0.212 U	0.212 U	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDD	0.399 U	0.387 U	0.387 U	NA	NA	NA	NA
OCDD	2.58 J	1.51 J	1.05 J	NA	NA	NA	NA
2,3,7,8-TCDF	0.105 U	0.102 U	0.102 U	NA	NA	NA	NA
1,2,3,7,8-PECDF	0.297 U	0.288 U	0.288 U	NA	NA	NA	NA
2,3,4,7,8-PECDF	0.243 U	0.235 U	0.235 U	NA	NA	NA	NA
1,2,3,4,7,8-HXCDF	0.533 U	0.517 U	0.517 U	NA	NA	NA	NA
1,2,3,6,7,8-HXCDF	0.128 U	0.124 U	0.124 U	NA	NA	NA	NA
1,2,3,7,8,9-HXCDF	0.246 U	0.239 U	0.239 U	NA	NA	NA	NA
2,3,4,6,7,8-HXCDF	0.291 U	0.282 U	0.282 U	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDF	0.533 U	0.517 U	0.517 U	NA	NA	NA	NA
1,2,3,4,7,8,9-HPCDF	0.552 U	0.535 U	0.535 U	NA	NA	NA	NA
OCDF	0.687 U	0.666 U	0.666 U	NA	NA	NA	NA
Total Dioxin TEQ	0.349	0.337	0.337	NA	NA	NA	NA

Notes:

For TEQ calculations, non-detects were assumed to be half the quantitation limit

* = not enough congeners with assigned TEFs were analyzed to make a TEQ

µg/kg = micrograms per kilogram

B = analyte was detected in the Method Blank. If the sample value is less than three times the blank value, the sample value is suspect.

J = estimated concentration

mg/kg = milligrams per kilogram

NA = not analyzed

ng/kg = nanograms per kilogram

TEF = toxic equivalency factor

TEQ = toxicity equivalent quotient

U = not detected at the method detection limit

Table A-4-4
Historical Tissue Data - Western Shoreline

	Species	Oyster	Cockle	Littleneck	Manila
	Sampling ID	LS_O_PGST_100429	LS_C_PGST_100429	LS_LN_PGST_100429	LS_M_PGST_100429
	Sampling Date	4/29/2010	4/29/2010	4/29/2010	4/29/2010
Parameters	TEF (as applicable)				
Conventionals (%)					
Percent Lipids		1.65	0.39	0.47	0.38
Metals (mg/kg)					
Arsenic		1	1 U	3	3
Cadmium		1.28	0.04	0.45	0.35
Chromium		0.2	0.20	0.20	0.2
Copper		9.9	1.1	3.3	6.68
Lead		0.4 U	0.4 U	0.4 U	0.4 U
Mercury		0.011	0.005 U	0.008	0.008
Silver		0.14 J	0.06 UJ	0.07 J	0.08 J
Zinc		130	10	13	11.5
Polycyclic Aromatic Hydrocarbons (PAHs) (µg/kg)					
Napthalene		NA	NA	NA	NA
2-Methylnaphthalene		NA	NA	NA	NA
1-Methylnaphthalene		NA	NA	NA	NA
Acenaphthylene		NA	NA	NA	NA
Acenaphthene		NA	NA	NA	NA
Fluorene		NA	NA	NA	NA
Phenanthrene		NA	NA	NA	NA
Anthracene		NA	NA	NA	NA
Fluoranthene		NA	NA	NA	NA
Pyrene		NA	NA	NA	NA
Benzo(g,h,i)perylene		NA	NA	NA	NA
Dibenzofuran		NA	NA	NA	NA
Carcinogenic Polycyclic Aromatic Hydrocarbons (µg/kg)					
Total Benzofluoranthenes	0.1	1.6	0.5 U	0.5 U	0.5 U

Table A-4-4
Historical Tissue Data - Western Shoreline

	Species	Oyster	Cockle	Littleneck	Manila
	Sampling ID	LS_O_PGST_100429	LS_C_PGST_100429	LS_LN_PGST_100429	LS_M_PGST_100429
	Sampling Date	4/29/2010	4/29/2010	4/29/2010	4/29/2010
Parameters	**TEF (as applicable)**				
Benzo(b)fluoranthene	0.1	0.8	0.5 U	0.5 U	0.5 U
Benzo(k)fluoranthene	0.1	0.8	0.5 U	0.5 U	0.5 U
Benz(a)anthracene	0.1	0.9	0.5 U	0.5 U	1.1
Chrysene	0.01	2.4	0.9	0.5 U	1.2
Benzo(a)pyrene	1	0.5 U	0.5 U	0.5 U	0.5 U
Indeno(1,2,3-cd)pyrene	0.1	0.5 U	0.5 U	0.5 U	0.5 U
Dibenz(a,h)anthracene	0.1	0.5 U	0.5 U	0.5 U	0.5 U
cPAHs TEQ		0.7054	0.5784	0.57775	0.6637
Polychlorinated Biphenyls (PCBs) Aroclors (µg/kg)					
Aroclor-1016		3.9 U	4.0 U	4 U	4 U
Aroclor-1242		3.9 U	4.0 U	4 U	4 U
Aroclor-1248		3.9 U	4.0 U	4 U	4 U
Aroclor-1254		3.9 U	4.0 U	4 U	4 U
Aroclor-1260		3.9 U	4.0 U	4 U	4 U
Aroclor-1221		3.9 U	4.0 U	4 U	4 U
Aroclor-1232		3.9 U	4.0 U	4 U	4 U
Total Aroclors					4 U
PCB Congeners (ng/kg)					
PCB-017		NA	NA	NA	NA
PCB-018		NA	NA	NA	NA
PCB-028		NA	NA	NA	NA
PCB-031		NA	NA	NA	NA
PCB-033		NA	NA	NA	NA
PCB-044		NA	NA	NA	NA
PCB-049		NA	NA	NA	NA
PCB-052		NA	NA	NA	NA

Table A-4-4
Historical Tissue Data - Western Shoreline

	Species	Oyster	Cockle	Littleneck	Manila
	Sampling ID	LS_O_PGST_100429	LS_C_PGST_100429	LS_LN_PGST_100429	LS_M_PGST_100429
	Sampling Date	4/29/2010	4/29/2010	4/29/2010	4/29/2010
Parameters	TEF (as applicable)				
PCB-066		NA	NA	NA	NA
PCB-070		NA	NA	NA	NA
PCB-074		NA	NA	NA	NA
PCB-077	0.0001	NA	NA	NA	NA
PCB-081	0.0003	NA	NA	NA	NA
PCB-082		NA	NA	NA	NA
PCB-087		NA	NA	NA	NA
PCB-095		NA	NA	NA	NA
PCB-099		NA	NA	NA	NA
PCB-101		NA	NA	NA	NA
PCB-105	0.00003	NA	NA	NA	NA
PCB-110		NA	NA	NA	NA
PCB-114	0.00003	NA	NA	NA	NA
PCB-118	0.00003	NA	NA	NA	NA
PCB-123	0.00003	NA	NA	NA	NA
PCB-126	0.1	NA	NA	NA	NA
PCB-128		NA	NA	NA	NA
PCB-138		NA	NA	NA	NA
PCB-149		NA	NA	NA	NA
PCB-151		NA	NA	NA	NA
PCB-153		NA	NA	NA	NA
PCB-156/157	0.00003	NA	NA	NA	NA
PCB-158		NA	NA	NA	NA
PCB-167	0.00003	NA	NA	NA	NA
PCB-169	0.03	NA	NA	NA	NA
PCB-170		NA	NA	NA	NA

Table A-4-4
Historical Tissue Data - Western Shoreline

	Species	Oyster	Cockle	Littleneck	Manila
	Sampling ID	LS_O_PGST_100429	LS_C_PGST_100429	LS_LN_PGST_100429	LS_M_PGST_100429
	Sampling Date	4/29/2010	4/29/2010	4/29/2010	4/29/2010
Parameters	TEF (as applicable)				
PCB-171		NA	NA	NA	NA
PCB-177		NA	NA	NA	NA
PCB-180		NA	NA	NA	NA
PCB-183		NA	NA	NA	NA
PCB-187		NA	NA	NA	NA
PCB-189	0.00003	NA	NA	NA	NA
PCB-191		NA	NA	NA	NA
PCB-194		NA	NA	NA	NA
PCB-195		NA	NA	NA	NA
PCB-199		NA	NA	NA	NA
PCB-205		NA	NA	NA	NA
PCB-206		NA	NA	NA	NA
PCB-208		NA	NA	NA	NA
PCB-209		NA	NA	NA	NA
PCB Congener TEQ		NA	NA	NA	NA
Dioxins / Furans (ng/kg)					
2,3,7,8-TCDD	1	NA	NA	NA	NA
1,2,3,7,8-PECDD	1	NA	NA	NA	NA
1,2,3,4,7,8-HXCDD	0.1	NA	NA	NA	NA
1,2,3,6,7,8-HXCDD	0.1	NA	NA	NA	NA
1,2,3,7,8,9-HXCDD	0.1	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDD	0.01	NA	NA	NA	NA
OCDD	0.0003	NA	NA	NA	NA
2,3,7,8-TCDF	0.1	NA	NA	NA	NA
1,2,3,7,8-PECDF	0.03	NA	NA	NA	NA
2,3,4,7,8-PECDF	0.3	NA	NA	NA	NA

Table A-4-4
Historical Tissue Data - Western Shoreline

	Species	Oyster	Cockle	Littleneck	Manila
	Sampling ID	LS_O_PGST_100429	LS_C_PGST_100429	LS_LN_PGST_100429	LS_M_PGST_100429
	Sampling Date	4/29/2010	4/29/2010	4/29/2010	4/29/2010
Parameters	TEF (as applicable)				
1,2,3,4,7,8-HXCDF	0.1	NA	NA	NA	NA
1,2,3,6,7,8-HXCDF	0.1	NA	NA	NA	NA
1,2,3,7,8,9-HXCDF	0.1	NA	NA	NA	NA
2,3,4,6,7,8-HXCDF	0.1	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDF	0.01	NA	NA	NA	NA
1,2,3,4,7,8,9-HPCDF	0.01	NA	NA	NA	NA
OCDF	0.0003	NA	NA	NA	NA
Total Dioxin TEQ		NA	NA	NA	NA

Notes:

For TEQ calculations, non-detects were assumed to be half the quantitation limit.

µg/kg = micrograms per kilogram

B = analyte was detected in the Method Blank. If the sample value is less than three times the blank value, the sample value is suspect.

J = estimated concentration

mg/kg = milligrams per kilogram

NA = not analyzed

ng/kg = nanograms per kilogram

TEF = toxic equivalency factor

TEQ = toxicity equivalent quotient

U = not detected at the method detection limit

Attachment B
Year 1 Shellfish Monitoring Data Report

YEAR 1 SHELLFISH MONITORING DATA REPORT
PORT GAMBLE BAY CLEANUP PROJECT

Prepared for

Washington State Department of Ecology

Washington State Department of Health

Washington State Department of Fish and Wildlife

U.S. Army Corps of Engineers

Pope Resources, LP/OPG Properties, LLC

Prepared by

Anchor QEA, LLC

Port Gamble S'Klallam Tribe

May 2016

YEAR 1 SHELLFISH MONITORING DATA REPORT

PORT GAMBLE BAY CLEANUP PROJECT

Prepared for

Washington State Department of Ecology

Washington State Department of Health

Washington State Department of Fish and Wildlife

U.S. Army Corps of Engineers

Pope Resources, LP/OPG Properties, LLC

Prepared by

Anchor QEA, LLC

Port Gamble S'Klallam Tribe

May 2016

TABLE OF CONTENTS

List of Tables

List of Figures

List of Appendices

LIST OF ACRONYMS AND ABBREVIATIONS

µg	micrograms
ARI	Analytical Resources, Inc.
cm	centimeter
CoC	contaminant of concern
DOH	Washington State Department of Health
Ecology	Washington State Department of Ecology
g	gram
LDC	Laboratory Data Consultants, Inc.
mg/kg	milligrams per kilogram
ng/kg	nanograms per kilogram
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PEMD	polyethylene membrane device
Penn Cove	Penn Cove Shellfish, Inc.
PSP	paralytic shellfish poisoning
RPD	relative percent difference
Site	Port Gamble Bay Cleanup Site
SMA	sediment management area
SMP	Shellfish Monitoring Plan
T0	time zero
USACE	U.S. Army Corps of Engineers
WDFW	Washington Department of Fish and Wildlife

EXECUTIVE SUMMARY

From September 2015 to January 2016, sediment cleanup actions were performed in Port Gamble Bay, including creosote-treated pile removal, intertidal excavation, subtidal dredging, and capping/cover placement. Concurrent with these cleanup activities, shellfish monitoring of biotoxins and chemicals of concern was performed to evaluate potential short-term construction-related effects of the cleanup, consistent with project permit requirements. Shellfish monitoring was performed as a collaborative effort between Pope Resources, LP/OPG Properties, LLC, the Port Gamble S'Klallam Tribe, and the Washington State Department of Health.

Shellfish monitoring data collected during Port Gamble Bay cleanup activities were compared with baseline data collected prior to cleanup, using equivalent methods and procedures. The results of the shellfish monitoring are summarized below:

- Biotoxin results during construction were below detection limits
- Polynuclear aromatic hydrocarbons concentrations in shellfish tissue and water column passive samplers during construction were similar to or slightly elevated (within a factor of roughly two-fold) compared to baseline levels, but were well below the intermediate-duration shellfish consumption screening criterion
- Cadmium concentrations in shellfish tissue during construction were similar to or lower than baseline concentrations, and were also below the natural background screening criterion
- Dioxin/furan concentrations in shellfish tissue during construction were similar to or lower than baseline concentrations, and were also below the intermediate-duration shellfish consumption screening criterion
- Polychlorinated biphenyl concentrations in shellfish tissue during construction were similar to or lower than baseline concentrations, and were also at or below the intermediate-duration shellfish consumption screening criterion

Building on these data, relatively minor modifications to the 2016/2017 shellfish monitoring program are recommended.

1 INTRODUCTION

This data report describes the results of the shellfish biotoxin and chemical of concern (CoC) monitoring performed during the first year (Year 1) of remedial actions at the Port Gamble Cleanup Site (Site), including creosote-treated pile removal, intertidal excavation, and subtidal dredging activities performed within sediment management area (SMA)-2 (Figure 1). Shellfish monitoring was performed as requested by the Port Gamble S'Klallam Tribe, and consistent with U.S. Army Corps of Engineers (USACE) permit requirements for the Site cleanup project (NWS-2013-1270). Shellfish monitoring activities during Year 1 remedial actions were performed in accordance with the *Port Gamble Cleanup Project Shellfish Monitoring Plan* (SMP; Appendix A) as approved by the Washington State Department of Ecology (Ecology).

This report summarizes sample collection activities, deviations from the SMP, as well as biological and chemical results for the biotoxin and CoC monitoring, including both caged mussel and polyethylene membrane devices (PEMDs) sampling. This report concludes with recommended modifications to the Year 2 SMP.

2 SAMPLE COLLECTION SUMMARY

Sample collection, processing, and analysis were conducted in accordance with the methods described in the SMP. This section describes details of the sample collection for each media and deviations from the SMP, where applicable.

2.1 Caged Mussel Biotoxin Sampling

Shellfish biotoxin monitoring was conducted in conjunction with the Port Gamble S'Klallam Tribe's and Washington State Department of Health's (DOH's) ongoing paralytic shellfish poisoning (PSP) monitoring in Port Gamble Bay, which followed methods and procedures described in the *Marine Biotoxin Contingency Plan* (DOH 2015a). Adult Pacific blue mussels (*Mytilus trossulus;* obtained from Penn Cove Shellfish, Inc. (Penn Cove), in Whidbey Island, Washington) were deployed during the Year 1 in-water construction period. No deviations to the SMP caged mussel biotoxin sampling or analysis plan occurred during Year 1.

2.2 Caged Mussel CoC Sampling

The caged mussel CoC sampling generally followed methods and procedures used during the baseline study in Port Gamble Bay (WDFW 2014a), as described in the SMP. However, both adult Pacific blue mussels (*Mytilus trossulus*) and hybrid Pacific blue/Mediterranean mussels (*M. trossulus* x *M. galloprovincialis*) were obtained from Penn Cove and deployed to the Site. Forty-eight mussels were placed in each cage.

Consistent with the SMP (Appendix A), a pre-deployment time zero (T0) sample comprised of a representative distribution of the Penn Cove mussels was shipped to the analytical laboratories to characterize baseline CoC concentrations in mussel tissue. On October 29 and 30, 2015, three mussel cages were deployed at each of eight stations, as described in the SMP (Appendix A). The caged mussels were retrieved on January 4 and 5, 2016, corresponding to a deployment period of approximately 67 days. The SMA-2 cages were located approximately 300 feet beyond the SMA-2 dredging area boundary, to help minimize cage loss due to vessel movement and construction activities. However, despite repeated efforts to locate the cages deployed at stations SMA2-1 and SMA2-3 (Figure 2 of Appendix A), they

were not recovered. Mussel cage deployment and retrieval field forms and chain-of-custody documents are included in Appendix B1 and B2, respectively.

Figure 2 depicts the six Port Gamble stations (three in SMA-2 and three in other areas of Port Gamble Bay) where mussel cages were retrieved (three cages per station, resulting in retrieval of 18 cages). Upon retrieval, mussel mortality was assessed (Appendix C), and living mussels were submitted to the lab for processing. At the laboratory, the mussels were scrubbed free of debris and shucked. Because, as discussed above, two types of Penn Cove mussels were deployed, a composite extraction aliquot composed of an equal mass of each sub-species was prepared for all stations except the Western Shoreline station, which was comprised of 75 individuals from each species. Composites were analyzed for in accordance with the SMP, including total solids analysis to allow for dry weight correction.

2.3 PEMD Sampling

PEMDs and their deployment apparatus were cleaned and prepared by Analytical Resources, Inc. (ARI). The PEMDs were then shipped to the SMP field staff for deployment. In an effort to eliminate bias due to moisture in or on the PEMD strip, and eliminate the contamination potential inherent in additional sample handling steps prior to extraction, the lab measured the average dry weight of the PEMDs. Seven 20 centimeter (cm) strips of PEMD tubing were weighed. The average weight was 0.89 ±0.03 grams (g). This mass was used to calculate final results in dry weight. The average weight of three 20 cm lengths of PEMDs after retrieval was 0.82 ±0.12 g.

Concurrent with the caged mussel CoC sampling discussed above, PEMDs were co-deployed at the same caged mussel locations in Port Gamble Bay (Figure 3). The PEMD sampling design followed methods and procedures used during the baseline study in Port Gamble Bay (WDFW 2014b). The PEMDs were deployed on October 29 and 30, 2015, and retrieved on November 9 and 10, 2015, corresponding to a deployment period of approximately 11 days (i.e., retrieved prior to completion of the caged mussel CoC deployments, consistent with the baseline sampling [WDFW 2014b]). PEMDs were analyzed for polynuclear aromatic hydrocarbons (PAHs). PEMD deployment and retrieval field forms and chain-of-custody documents are included in Appendix B1 and B3, respectively.

Following retrieval of PEMDs, the cages were placed immediately into a sealed bag and shipped overnight, on ice, to ARI. Once received at ARI, PEMD strips were removed from the cages, cut to 20 cm, and surface particulates were wiped off and discarded. Samples were prepared by solvent extraction and sonication prior to analysis by U.S. Environmental Protection Agency (EPA) Method 8270D using selected ion monitoring.

3 SMP DATA SUMMARY

This section summarizes the results of the SMP biotoxin, caged mussel CoC, and PEMD analytical data. Caged mussel CoC and PEMD laboratory reports are presented in Appendix E.

3.1 Data Validation and Usability

With the exception of DOH analyzed biotoxin data, all analytical data presented in this report were validated by Laboratory Data Consultants, Inc. (LDC), of Carlsbad, California. The data validation was performed under EPA guidelines, as described in the SMP and the National Functional Guidelines for Data Review (EPA 2004, 2008, 2011). Data validation verified the accuracy and precision of chemical determinations performed during this investigation. Data qualifiers assigned as a result of the data validation and their definitions are shown on each of the respective analytical results tables. Data validation reports are included in Appendix F. Data may have been qualified as biased or estimated for a particular analysis, based on method or technical criteria. Data qualified with a "J" indicates that the associated numerical value is the approximate concentration of the analyte. Data qualified with a "UJ" indicates the approximate reporting limit below which the analyte was not detected. Data qualifications are not expected to impact the data quality objectives, and all data were determined to be useable as reported from the laboratory or as qualified in this data report.

3.2 Caged Mussel Biotoxin Data

Caged mussel tissue samples were analyzed for the PSP biotoxin by DOH, consistent with the SMP. More than 3 months prior to the initiation the remedial construction, elevated PSP concentrations of up to 112 micrograms (µg)/100 g wet weight, which exceeded the 80 µg/100 g saxitoxin equivalents DOH advisory criterion (Table 1), were reported in a cockle just outside Port Gamble Bay at the Bars. However, all biotoxin results from samples collected during Year 1 construction activities were below detection limits (less than 38 µg/100 g; Table 2).

3.3 Caged Mussel CoC Data

As described in the SMP, mussel tissues were processed, extracted, and analyzed by ARI for total solids, lipids, PAHs, cadmium, and dioxins/furans. A sample aliquot was also submitted to Maxxam Analytics in Burnaby, British Columbia, Canada, for polychlorinated biphenyl (PCB) congener analysis. All sample results are reported in wet weight (Table 3) and dry weight (Table 4).

3.3.1 WDFW and ARI Laboratory Method Comparison

To provide a comparison of baseline tissue data collected and analyzed by the Washington State Department of Fish and Wildlife (WDFW) with Year 1 SMP samples analyzed by ARI, samples of archived mussel tissue previously analyzed by WDFW were also analyzed by ARI to compare methodologies and results. WDFW provided three samples that had been analyzed at the Northwest Fisheries Lab for PAHs, which spanned a range of PAH concentrations. Samples from each lab were reported on a wet weight basis. Only the PAH compounds listed in the SMP were used for comparison. The WDFW and ARI sample results are presented on a wet weight basis and dry weight basis in Tables 3 and 4, respectively.

Certified reference material (NIST 1974c) was also analyzed by both WDFW and ARI. For those compounds that had a certified value, WDFW's results were an average of 117% higher than ARI's. The WDFW method resulted in values that were closer to the certified values, and were consistently higher than the data reported by ARI. Based on these data, it is likely the ARI data have a low bias for PAHs, compared with the WDFW baseline data. However, as discussed above, the ARI tissue data were determined to be useable as reported from the laboratory or as qualified in this data report.

3.3.2 Mussel Tissue CoC Concentrations

Wet weight mussel tissue CoC concentrations are summarized as follows:

- Eleven PAH compounds were detected in the Penn Cove T0 mussel tissue sample with a total PAH concentration (non-detects are summed at one-half the detection limit [U=1/2]) of approximately 23 µg/kg (Table 3). The total PAH concentrations in Year 1 mussel samples ranged from approximately 23 µg/kg at Point Julia, to

approximately 112 µg/kg at SMA2-5. While average Year 1 mussel total PAH concentrations in SMA-2 and in harvestable beach areas appear similar to baseline concentrations (Figure 4), the low bias in the ARI PAH data compared with the WDFW baseline data discussed above, suggests that Year 1 PAH concentrations may have been slightly elevated relative to baseline. However, Year 1 total PAH concentrations were well below the DOH intermediate-duration shellfish consumption exposure criterion reported in the SMP (63,000 µg/kg; Table 1).

- Cadmium was detected in the T0 mussel tissue sample at a concentration of approximately 0.31 milligrams per kilogram wet weight (mg/kg; Table 3). Cadmium concentrations in the Year 1 mussel tissue samples ranged from approximately 0.27 mg/kg at SMA2-4 to approximately 0.38 mg/kg at SMA2-2. Average Year 1 mussel cadmium concentrations in SMA-2 and in harvestable beach areas were lower than baseline concentrations (Figure 5), and also below the SMP tissue screening criterion of 0.52 mg/kg (based on natural background levels; Table 1).
- The total dioxin/furan toxicity equivalence (TEQ; U=1/2) for the T0 sample was 0.11 nanograms per kilogram (ng/kg). Dioxins/furan TEQs in the Year 1 samples ranged from 0.096 ng/kg at PG-GP to 0.13 ng/kg at location SMA2-5. The average concentration for the SMA-2 and harvestable beach areas both 0.11 ng/kg wet weight, respectively.
- The total PCB concentration in the T0 mussel tissue sample was approximately 0.98 µg/kg (where non-detects are summed at zero for consistency with WDFW methodology). Total PCB concentrations in the Year 1 mussel tissue samples ranged from approximately 2.8 µg/kg at Point Julia to approximately 5.5 µg/kg at SMA2-2 (Table 3). Average Year 1 mussel tissue total PCB concentrations in SMA-2 and harvestable beach areas were similar. While the WDFW baseline PCB tissue data included only a subset of the 209 PCB congeners analyzed in Year 1, estimated total baseline PCB tissue concentrations based on regression relationships presented in Lauenstein and Cantillo (1993) ranged from approximately 3.9 µg/kg at the Gravel Plot to 10.7 µg/kg at SMA-2 (Figure 6), similar to or higher than the Year 1 data, indicating no increase over baseline conditions.

3.4 PEMD Data

Two PEMD blanks were analyzed along with the samples. A PEMD trip blank was prepared to evaluate the potential for contamination during sample transport. Each blank was prepared in the same manner as the samples. The trip blank accompanied the samples to the field and back to the lab without being exposed to site conditions while the field blank was conducted to evaluate potential contamination during transport and deployment. The field blank was exposed to site conditions during deployment at site SMA 2-2 on October 30, 2015.

All detected PEMD results for acenaphthene, fluoranthene, fluorene, phenanthrene and pyrene were significantly (greater than five times) higher than concentration detected in the trip blank. Detected concentrations of 2-methylnaphthalene and naphthalene in all PEMDs, as well as anthracene results in the three reference areas, were less than five times the trip blank detections, which indicates that these PEMD results could potentially be biased high.

Nine PAHs were detected in the field blank. All detected PEMD results for fluoranthene and pyrene were more than five times greater than the field blank concentrations. Results for 2-methylnaphthalene, acenaphthene, naphthalene and fluorene were less than five times the field blank results, indicating that these PEMD results could potentially be biased high.

To ensure that a PEMD would be recovered at each station, two were deployed at each station and designated as "A" and "B" samples. In most cases, the "A" sample was analyzed and the "B" sample archived. At location SMA2-3, both samples were analyzed, and the "B" sample was evaluated as a field duplicate. Relative percent differences (RPDs) were calculated for all samples as part of data validation. The RPD values for 2-methylnaphthalene, acenaphthylene, anthracene, fluoranthene, and naphthalene were below 35%, indicating a low level of variability between the sample and duplicate for these compounds. Acenaphthene, benzo(a)anthracene, chrysene, fluorine, phenanthrene, and pyrene RPD values indicated the highest amount of variability. Concentrations of the remaining compounds were too low to provide meaningful precision data.

Consistent with the SMP, PEMD samples were analyzed only for PAHs. Total PAH concentrations ranged in the PEMDs ranged from approximately 225 µg/kg at PG-GP to

approximately 1,020 µg/kg at station PG-SMA2-5 (Table 5). PEMD results are summarized in Table 5. Baseline and Year 1 PEMD data for total PAHs are summarized in Figure 7. While there is considerable variability in the PEMD data, Year 1 PEMD total PAH concentrations in SMA-2 and in harvestable beach areas were somewhat higher than baseline levels, generally consistent with the caged mussel data (Section 3.3.2).

4 RECOMMENDED YEAR 2 SMP MODIFICATIONS

As contemplated in the SMP, the Year 2 program will be modified based on the Year 1 results and the construction schedule. This section describes recommended updates to the Year 2 SMP approach, including the following:

- Shellfish biotoxin monitoring
- Shellfish CoC monitoring
- In situ shellfish monitoring

The SMP provides a detailed description of sampling and analytical methods; quality assurance/quality control; project management; assessments and oversight; and data validation and usability. Changes or additional requirements for the SMP program in Year 2 are discussed below.

4.1 Year 2 Construction Schedule

The cleanup project will be completed in Year 2, which ends in January 2017. Work will occur during approved in-water work windows, with pile removal preceding excavation and capping activities. Depending on the outcome of USACE permit modifications, Year 2 in-water work including intertidal excavation and pile removal activities is scheduled to commence in late June to early July 2016, and will largely be focused in SMA-1, though more limited activities will occur in SMA-2 and other more broadly distributed areas of Port Gamble Bay. Again, depending on the outcome of USACE permit modifications, Year 2 subtidal dredging will commence in mid-October to early November, and will include concurrent dredging activities in SMA-1 and SMA-2.

4.2 Shellfish Biotoxin Monitoring

Caged mussels will be analyzed for PSP and other marine biotoxins to provide supplemental data to ongoing monitoring conducted by DOH. Marine biotoxin monitoring will be conducted as outlined in the SMP, with no modifications to the Year 2 SMP program.

4.3 Shellfish and PEMD CoC Monitoring

Caged mussels will be analyzed for PAHs, dioxins/furans, cadmium, PCBs, and lipids; PEMDs will be analyzed for PAHs. Caged mussels will remain in situ for 60 days, and PEMDs will be retrieved after 10 days. Modifications to the SMP program for Year 2 include the following:

- Two caged mussel deployments will be necessary to cover the duration of Site construction activities.
  - Deployment 1 – July 15 to October 1: Caged mussels will be deployed at three stations within SMA-1 and in the three harvestable beach areas depicted in the SMP. This first deployed will be concurrent with pile removal and intertidal excavation activities.
  - Deployment 2 – November 1 to January 15: Caged mussels will be deployed at all stations described in the SMP, including the same 3 SMA-1 stations discussed above, as well as five SMA-2 stations and the three harvestable beach areas (i.e., 11 stations total). This second deployment will be concurrent with dredging activities.
- PEMDs will be co-located with the caged mussel deployments as in Year 1.
- Some cages were unable to be located and retrieved during Year 1. Vessel traffic in the area may have caused the buoy marker lines to be severed at these stations. Cages will be placed with an offset line along the sediment bed to improve the likelihood of cage recovery at all stations in Year 2.

4.4 In Situ Shellfish Monitoring

As described in the SMP, in situ shellfish monitoring will be performed following completion of Year 2 in-water activities, to document post-construction shellfish quality conditions. Shellfish will be collected from three harvestable beaches in Port Gamble Bay and will target mussels, oysters, cockles, and clams. In addition, geoduck and Dungeness crab will be collected near SMA-3. Details of the collection of in situ shellfish and station locations are provided in the SMP.

5 REFERENCES

EPA (U.S. Environmental Protection Agency), 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review.* U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI). EPA 540-R-04-004. October 2004.

EPA, 2008. *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review.* U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. USEPA 540-R-08-01. June 2008.

EPA, 2011. *USEPA Contract Laboratory Program National Functional Guidelines for Dioxin/Furan Data Review.* U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. USEPA 540-R-11-16. September 2011.

Ecology (Washington State Department of Ecology), 2015. *Sediment Cleanup User Manual II. Toxics Cleanup Program.* Publication No. 12-09-057. March 2015.

Lauenstein, G. G. and A. Y. Cantillo, 1993. Sampling and analytical methods of the National Status and Trends Program National Benthic Surveillance and Mussel Watch Projects. 1984-1992. Silver Spring, MD, National Oceanic and Atmospheric Administration. Report No. NOS ORCA 71.

West et al., 2015. *Toxic contaminants in embryonic and adult Pacific Herring (Clupea pallasii) from Port Gamble Bay, Washington: extent and magnitude of contamination by polycyclic aromatic hydrocarbons (PAHs) and other toxic contaminants.* Washington Department of Fish and Wildlife. 2015.

TABLES

WDOH PSP RESULTS - PORT GAMBLE
2015

PSP#	Collect Date	Waterbody	Site Name	Species	Tissue	Org	PSP Result
201503898	12/22/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201503829	12/7/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201503729	11/24/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201503634	11/12/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201503432	10/27/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201503356	10/21/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201503293	10/13/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201503233	10/7/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201503169	9/29/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201503086	9/23/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201503015	9/16/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201502885	9/8/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201502829	9/2/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201502722	8/25/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201502640	8/18/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201502515	8/11/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201502421	8/4/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201502306	7/29/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201502199	7/21/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201502100	7/15/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201501929	7/7/2015	Port	Reservation Tidelands (Bars)	Cockle	Whole	Port Gamble S'Klallam	<38
201501692	6/23/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD
201501514	6/16/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	<38
201501513	6/16/2015	Port	Reservation Tidelands (Bars)	Cockle	Whole	Port Gamble S'Klallam	59
201501463	6/15/2015	Port	Gravel Plot	Cockle	Whole	Port Gamble S'Klallam	<38
201501468	6/15/2015	Port	Gravel Plot	Manila Clam	Whole	Port Gamble S'Klallam	NTD
201501467	6/15/2015	Port	Point Julia	Pacific Oyster	Whole	Port Gamble S'Klallam	NTD
201501462	6/15/2015	Port	Gravel Plot	Pacific Oyster	Whole	Port Gamble S'Klallam	NTD
201501461	6/15/2015	Port	Reservation Tidelands (Bars)	Pacific Oyster	Whole	Port Gamble S'Klallam	NTD
201501423	6/9/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	<38
201501330	6/4/2015	Port	Gravel Plot	Cockle	Whole	Port Gamble S'Klallam	50

PSP action level ≥80 micrograms/100 grams

PSP#	Collect Date	Waterbody	Site Name	Species	Tissue	Org	PSP Result
201501342	6/4/2015	Port	Point Julia	Littleneck Clam	Whole	Port Gamble S'Klallam	NTD
201501332	6/4/2015	Port	Point Julia	Manila Clam	Whole	Port Gamble S'Klallam	NTD
201501331	6/4/2015	Port	Gravel Plot	Manila Clam	Whole	Port Gamble S'Klallam	NTD
201501329	6/4/2015	Port	Point Julia	Pacific Oyster	Whole	Port Gamble S'Klallam	<38
201501328	6/4/2015	Port	Gravel Plot	Pacific Oyster	Whole	Port Gamble S'Klallam	<38
201501327	6/4/2015	Port	Reservation Tidelands (Bars)	Pacific Oyster	Whole	Port Gamble S'Klallam	<38
201501308	6/3/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	78
201501250	6/2/2015	Port	Reservation Tidelands (Bars)	Cockle	Whole	Port Gamble S'Klallam	**112**
201501145	5/27/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	<38
201501078	5/20/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	<38
201500869	5/8/2015	Port	Port Gamble Bay	Blue Mussel	Whole	Port Gamble S'Klallam	NTD

PSP action level ≥80 micrograms/100 grams

Table 2
Caged Mussel Result Summary

Parameter	Units	Tissue Screening Criteria	Year 1 SMA-2 Average Results	Year 1 Harvestable Beach Average Results
Paralytic Shellfish Poisoning	µg/100 gm wet	80[a]	NA	ND
Total Polycyclic Aromatic Hydrocarbons	mg/kg wet	63[b]	0.059	0.029
Dioxin/Furan Toxic Equivalency	ng/kg wet	3.2[b]	0.11	0.11
Cadmium	mg/kg wet	0.52[c]	0.32	0.36
Polychlorinated Biphenyls	µg/kg wet	4.7[b]	4.5	3.5

Notes:
a = Advisory criterion from WDOH (2015a)
b = Intermediate-duration shellfish consumption exposure criteria from WDOH (2015b), based on a high shellfish consumption rate (499 grams per day)
c = Two times the natural background tissue concentration from Ecology (2012)
ND = not detected
µg/100 gm = micrograms per 100 grams
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
ng/kg = nanograms per kilogram

Table 3
Caged Mussel Results - Wet Weight

FINAL VALIDATED DATA

Location ID	Composite	PG-SMA2-2	PG-SMA2-4	PG-SMA2-5	PG-WS-1	PG-GP-1	PG-PJ-1	--	--	--
Sample ID	PG-T0-MUS-COC-151030	PG-SMA2-2-MUS-COC-160104	PG-SMA2-4-MUS-COC-160105	PG-SMA2-5-MUS-COC-160104	PG-WS-1-MUS-COC-160104	PG-GP-1-MUS-COC-160104	PG-PJ-1-MUS-COC-160104	13CPS_DB-MTW01Z	13EB_ME-MTW01Z	13NPS_CIAR2-MTW01Z
Sample Date	10/30/2016	1/4/2016	1/5/2016	1/4/2016	1/4/2016	1/4/2016	1/4/2016	1/10/2013	1/7/2013	1/14/2013
X	--	1212056.16326	1211788.46725	1211104.65844	1210323.39	1213706.45	1213098.71	--	--	--
Y	--	316262.151069	315424.288965	315172.44362	312230.28	313556.13	315818.33	--	--	--
Conventional Parameters (pct)										
Lipids	**1.28**	**1.11**	**0.926**	**1.07**	**1.21**	**1.1**	**0.979**	**1.39**	**1.32**	**1.29**
Total solids	**17.55**	**17.35**	**13.56**	**14.73**	**17.4**	**16.32**	**14.33**	**15.47**	**15.89**	**15.5**
Metals (mg/kg)										
Cadmium	**0.31**	**0.4**	**0.27**	**0.28**	**0.38**	**0.38**	**0.31**	--	--	--
Polycyclic Aromatic Hydrocarbons (µg/kg)										
2-Methylnaphthalene	**0.81 J**	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	**1.43**	0.5 U
Acenaphthene	**1.45**	0.5 U	0.5 U	**1.22**	**0.58**	0.5 U	0.5 UJ	0.5 U	**4.62**	0.5 U
Acenaphthylene	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	**0.86 J**	0.5 UJ
Anthracene	**1.03**	**1.23**	**1.75**	**4.69**	**1.7**	**0.95**	**0.99**	0.5 U	**8.54**	0.5 U
Benzo(a)anthracene	**0.86 J**	**1.64 J**	**2.96 J**	**7.53 J**	**2.83 J**	**1.42 J**	**1.51 J**	**0.51**	**15**	0.5 U
Benzo(a)pyrene	0.5 U	**0.59**	**1.13**	**2.76**	**0.97**	0.5 U	0.5 U	0.5 U	**5.81**	0.5 U
Benzo(b)fluoranthene	**0.5**	**1.52**	**2.45**	**5.99**	**2.45**	**1.18**	--	**0.6**	**12.1**	0.5 U
Benzo(e)pyrene	0.5 U	**1.11**	**1.58**	**5.24**	**1.67**	**0.82**	**0.87**	0.5 U	**8.9**	0.5 U
Benzo(g,h,i)perylene	0.5 U	0.5 U	**0.71**	**0.99**	0.5 U	0.5 U	0.5 U	0.5 U	**2.31**	0.5 U
Benzo(k)fluoranthene	0.5 UJ	**1.19 J**	**1.49 J**	**4.12 J**	**1.58 J**	**0.74 J**	**0.78 J**	0.5 UJ	**7.11 J**	0.5 UJ
Chrysene	**1.06 J**	**2.14 J**	**3.17 J**	**8.65 J**	**3.44 J**	**1.99 J**	**2.06 J**	**1.09**	**17**	0.5 U
Dibenzo(a,h)anthracene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.51**	0.5 U
Fluoranthene	**4.81 J**	**6.5 J**	**10.7 J**	**33.6 J**	**9.95 J**	**5.98 J**	**6.28 J**	**2.19**	**81.4**	**0.75**
Fluorene	**2.01 J**	**0.65 J**	**0.77 J**	**1.8 J**	**0.86 J**	**0.73 J**	**0.66 J**	0.5 U	**6.66**	0.5 U
Indeno(1,2,3-c,d)pyrene	0.5 U	0.5 U	0.5 U	**0.7**	0.5 U	0.5 U	0.5 U	0.5 U	**1.67**	0.5 U
Naphthalene	**1.1**	**0.6**	**0.56**	**0.84**	**0.55**	**0.59**	**0.56 J**	**0.56**	**1.09**	**0.66**
Perylene	0.5 UJ	0.5 UJ	**0.76 J**	**1.75 J**	**0.65 J**	0.5 UJ	0.5 UJ	0.5 U	**2.82**	0.5 U
Phenanthrene	**5.94**	**4.2**	**5.47**	**13.1**	**5.94**	**4.52**	**4.29 J**	**1.24**	**30.1**	**0.66**
Pyrene	**3.18**	**4.98**	**7.09**	**25.2**	**7.33**	**4.33**	**4.34**	**1.57**	**33.4**	**0.58**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)	**0.4716 J**	**1.0964 J**	**1.9017 J**	**4.7055 J**	**1.7404 J**	**0.6539 J**	**0.5496 J**	**0.4469 J**	**9.619 J**	0.5 UJ
Total HPAH (SMS) (U = 1/2)	**11.66 J**	**19.31 J**	**30.2 J**	**89.79 J**	**29.3 J**	**16.64 J**	**15.97 J**	**7.21 J**	**176.31 J**	**3.33 J**
Total LPAH (SMS) (U = 1/2)	**11.78 J**	**7.18 J**	**9.05 J**	**21.9 J**	**9.88 J**	**7.29 J**	**7 J**	**2.8 J**	**51.87 J**	**2.32 J**
Total PAH (SMS) (U = 1/2)	**23.44 J**	**26.49 J**	**39.25 J**	**111.69 J**	**39.18 J**	**23.93 J**	**22.97 J**	**10.01 J**	**228.18 J**	**5.65 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)	**0.1466 J**	**1.0464 J**	**1.8517 J**	**4.6805 J**	**1.6904 J**	**0.3539 J**	**0.2496 J**	**0.1219 J**	**9.619 J**	0.5 UJ
Total HPAH (SMS) (U = 0)	**10.41 J**	**18.56 J**	**29.7 J**	**89.54 J**	**28.55 J**	**15.64 J**	**14.97 J**	**5.96 J**	**176.31 J**	**1.33 J**
Total LPAH (SMS) (U = 0)	**11.53 J**	**6.68 J**	**8.55 J**	**21.65 J**	**9.63 J**	**6.79 J**	**6.5 J**	**1.8 J**	**51.87 J**	**1.32 J**
Total PAH (SMS) (U = 0)	**21.94 J**	**25.24 J**	**38.25 J**	**111.19 J**	**38.18 J**	**22.43 J**	**21.47 J**	**7.76 J**	**228.18 J**	**2.65 J**
Dioxin Furans (ng/kg)										
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.0398 U	0.038 U	0.0339 U	0.0479 U	0.0379 U	0.0379 U	0.0458 U	--	--	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	**0.0478 J**	0.052 U	0.0599 U	0.0639 U	0.0518 U	0.0419 U	0.0518 U	--	--	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.0618 U	0.048 U	0.0559 U	0.0579 U	0.0379 U	0.0578 U	0.0797 U	--	--	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.0618 U	**0.0808 J**	**0.0711 J**	**0.116 J**	**0.117 J**	**0.0658 J**	**0.102 J**	--	--	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	**0.0837 J**	0.05 U	**0.0513 J**	**0.0599 J**	**0.062 J**	0.0598 U	0.0817 U	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.775 U	1.01 U	0.866 U	1.61 U	1.2 U	0.821 U	1.36 U	--	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	7.46 U	13.6 U	11 U	19.6 U	16.1 U	9.47 U	14 U	--	--	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**0.0914 J**	**0.613 J**	**0.465 J**	**0.898 J**	**0.704 J**	**0.491 J**	**0.235**	--	--	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**0.0474 J**	0.052 U	**0.0667 J**	**0.307 J**	**0.247 J**	**0.133 J**	**0.173 J**	--	--	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**0.249 J**	**0.494 J**	**0.646 J**	**1.25 J**	**0.985 J**	**0.675 J**	**0.9 J**	--	--	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**3.03 J**	**11.7 J**	**5.86 J**	**14.5**	**12.4 J**	**4.89**	**11.2**	--	--	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	**0.0458 J**	**0.158 J**	**0.0699 J**	**0.15 J**	**0.162 J**	**0.148 J**	**0.13 J**	--	--	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.0518 U	0.046 U	0.0449 U	0.0639 U	0.0612 U	0.0658 U	0.0538 U	--	--	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.0378 U	**0.0464 J**	**0.0359 J**	0.0599 U	**0.0379 J**	0.0618 U	0.0518 U	--	--	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.0558 U	0.05 U	0.0299 U	0.0439 U	0.0399 U	**0.0393 J**	0.0518 U	--	--	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.0538 U	0.048 U	0.0279 U	0.0399 U	0.0379 U	0.0399 U	0.0478 U	--	--	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	**0.0657 J**	**0.0742 J**	**0.0659 J**	**0.078 J**	**0.0648 J**	**0.0439 J**	0.0518 U	--	--	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.0538 U	0.046 U	0.0279 U	0.0419 U	0.0379 U	0.0399 U	0.0478 U	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.189 U	0.127 U	0.152 U	0.252 U	0.173 U	0.127 U	0.175 U	--	--	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	**0.043 J**	0.038 U	0.024 U	**0.0419 J**	0.0279 U	0.0359 U	0.0319 U	--	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.502 U	0.376 U	0.313 U	0.768 U	0.443 U	0.32 U	0.437 U	--	--	--
Total Tetrachlorodibenzofuran (TCDF)	**0.169 J**	**1.14 J**	**0.71 J**	**1.34 J**	**0.927 J**	**0.8 J**	**0.599 J**	--	--	--
Total Pentachlorodibenzofuran (PeCDF)	**0.314 J**	**0.371 J**	**0.41 J**	**0.354 J**	**0.576 J**	**0.215 J**	**0.269 J**	--	--	--

Table 3
Caged Mussel Results - Wet Weight

Location ID	Composite	PG-SMA2-2	PG-SMA2-4	PG-SMA2-5	PG-WS-1	PG-GP-1	PG-PJ-1	--	--	--
Sample ID	PG-T0-MUS-COC-151030	PG-SMA2-2-MUS-COC-160104	PG-SMA2-4-MUS-COC-160105	PG-SMA2-5-MUS-COC-160104	PG-WS-1-MUS-COC-160104	PG-GP-1-MUS-COC-160104	PG-PJ-1-MUS-COC-160104	13CPS_DB-MTW01Z	13EB_ME-MTW01Z	13NPS_CIAR2-MTW01Z
Sample Date	10/30/2016	1/4/2016	1/5/2016	1/4/2016	1/4/2016	1/4/2016	1/4/2016	1/10/2013	1/7/2013	1/14/2013
X	--	1212056.16326	1211788.46725	1211104.65844	1210323.39	1213706.45	1213098.71	--	--	--
Y	--	316262.151069	315424.288965	315172.44362	312230.28	313556.13	315818.33	--	--	--
Total Hexachlorodibenzofuran (HxCDF)	**0.187 J**	**0.213 J**	**0.208 J**	**0.304**	**0.25 J**	**0.204 J**	**0.157 J**	--	--	--
Total Heptachlorodibenzofuran (HpCDF)	**0.446 J**	**0.296 J**	**0.373 J**	**0.663 J**	**0.393 J**	**0.306 J**	**0.496 J**	--	--	--
Total Dioxin/Furan (U = 1/2)	**4.9572 J**	**8.1239 J**	**6.6118 J**	**11.7704 J**	**9.5679 J**	**5.8864 J**	**8.5159 J**	--	--	--
Total Dioxin/Furan (U = 0)	**0.286 J**	**0.3594 J**	**0.2941 J**	**0.4458 J**	**0.4437 J**	**0.297 J**	**0.232 J**	--	--	--
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	**0.1144613 J**	**0.1109814 J**	**0.09815045 J**	**0.1281977 J**	**0.11488395 J**	**0.096115 J**	**0.10860705 J**	--	--	--
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	**0.06775 J**	**0.04522 J**	**0.03659 J**	**0.040809 J**	**0.05195 J**	**0.0297 J**	**0.0232 J**	--	--	--
PCB Congeners (ng/kg)										
PCB-001	0.74 U	0.7 U	0.66 U	0.5 U	0.62 U	0.73 U	0.63 U	--	--	--
PCB-002	0.64 U	0.63 U	0.57 U	0.44 U	0.56 U	0.66 U	0.57 U	--	--	--
PCB-003	0.74 U	0.7 U	0.66 U	**0.63 J**	0.62 U	0.73 U	0.63 U	--	--	--
PCB-004	**5.8 J**	3.2 U	**3.7 J**	**6.2 J**	2.6 U	2.4 U	2.5 U	--	--	--
PCB-005	**15.3**	3.9 U	1.1 U	1.2 U	4.4 U	3.8 U	3.9 U	--	--	--
PCB-006	**2.94 J**	2.9 U	**2.37 J**	**4 J**	3.3 U	2.9 U	2.9 U	--	--	--
PCB-007	1 U	3.3 U	1.1 U	1.2 U	3.7 U	3.2 U	3.3 U	--	--	--
PCB-008	0.9 U	**6.8 J**	**9.6 J**	**18.4**	**9.8 J**	**6.9 J**	**7 J**	--	--	--
PCB-009	0.87 U	2.9 U	0.92 U	**1.2 J**	3.3 U	2.9 U	2.9 U	--	--	--
PCB-010	0.92 U	2.5 U	0.83 U	0.81 U	2 U	1.8 U	1.9 U	--	--	--
PCB-011	9.12 U	6.9 U	7.85 U	7.8 U	9.9 U	6.9 U	7 U	--	--	--
PCB-012/013	**0.71 J**	3.2 U	**1.5 J**	**2 J**	3.5 U	3.1 U	3.1 U	--	--	--
PCB-014	0.87 U	2.9 U	0.93 U	1 U	3.2 U	2.8 U	2.9 U	--	--	--
PCB-015	**15.1**	**22.9**	**29.6**	**43.8**	**28.4**	**22.4**	**19.4**	--	--	--
PCB-016	**8.81 J**	**16.5**	**14.1**	**21.4**	**24.2**	**17.8**	**14.4**	--	--	--
PCB-017	**8.43 J**	**5.6 J**	**7.59 J**	**15.7**	**9.9 J**	**7.8 J**	**7.6 J**	--	--	--
PCB-018/030	**18.8 J**	**27.7**	**32.8**	**52.9**	**42.9**	**30.3**	**28.9**	--	--	--
PCB-019	**5.93 J**	**3.3 J**	**5.35 J**	**10.2**	**5.6 J**	**4.4 J**	**4.1 J**	--	--	--
PCB-020/028	**84.4**	**306**	**276**	**376**	**353**	**263**	**230**	--	--	--
PCB-021/033	**19 J**	**40.9**	**47.6**	**68.1**	**60.5**	**43.9**	**39.8**	--	--	--
PCB-022	**20.9**	**36.1**	**45.4**	**63.9**	**57.9**	**39.9**	**39.6**	--	--	--
PCB-023	0.7 U	1.3 U	0.78 U	0.69 U	1.1 U	0.93 U	1.5 U	--	--	--
PCB-024	0.76 U	2.6 U	0.71 U	**1.3 J**	2.3 U	1.7 U	1.2 U	--	--	--
PCB-025	**3.6 J**	**8.1 J**	**9.44 J**	**13.4**	**11**	**7.99 J**	**7.6 J**	--	--	--
PCB-026/029	**6.98 J**	**19.5 J**	**20.1**	**29.2**	**25**	**18.1 J**	**16.9 J**	--	--	--
PCB-027	**2.74 J**	**5.2 J**	**5.57 J**	**8.4 J**	**7.1 J**	**5 J**	**4.5 J**	--	--	--
PCB-031	**32.9**	**87.3**	**91.8**	**134**	**120**	**83.2**	**76.8**	--	--	--
PCB-032	**9.04 J**	**6.6 J**	**8.59 J**	**16.7**	**10.3**	**8.2 J**	**7 J**	--	--	--
PCB-034	0.68 U	1.1 U	0.76 U	**0.99 J**	0.89 U	0.78 U	1.2 U	--	--	--
PCB-035	**0.77 J**	0.86 U	**2.2 J**	**3.11 J**	**1.5 J**	0.6 U	0.94 U	--	--	--
PCB-036	0.54 U	0.87 U	0.61 U	0.54 U	0.7 U	0.61 U	0.96 U	--	--	--
PCB-037	**12.7**	**40.2**	**50.5**	**66.3**	**43.6**	**32.4**	**28.4**	--	--	--
PCB-038	0.64 U	0.95 U	0.72 U	0.64 U	0.77 U	0.67 U	1 U	--	--	--
PCB-039	0.67 U	**1.8 J**	**2.34 J**	**2.84 J**	**2.21 J**	**1.71 J**	**1.5 J**	--	--	--
PCB-040/041/071	**28 J**	**95.6**	**110**	**159**	**117**	**83.1**	**75.8**	--	--	--
PCB-042	**14.9**	**43.4**	**56.9**	**79**	**54.4**	**37.5**	**36**	--	--	--
PCB-043	**3.4 J**	**15.8**	**15**	**20.3**	**16**	**12.2**	**11.5**	--	--	--
PCB-044/047/065	**52.3**	**207**	**216**	**293**	**238**	**171**	**155**	--	--	--
PCB-045/051	**8 J**	**18.1 J**	**19.6 J**	**28.6**	**24.7**	**17.4 J**	**16 J**	--	--	--
PCB-046	**4 J**	**11.6**	**12.2**	**17.8**	**14.9**	**11.6**	**10.2**	--	--	--
PCB-048	**12.8**	**63.3**	**64.5**	**91**	**72.7**	**54.1**	**47.4**	--	--	--
PCB-049/069	**25**	**71.3**	**92.8**	**125**	**102**	**66.7**	**63.9**	--	--	--
PCB-050/053	**9.9 J**	**35.6**	**30.1**	**43.8**	**39.5**	**29.3**	**25.7**	--	--	--
PCB-052	**60.7**	**206**	**235**	**320**	**234**	**168**	**150**	--	--	--
PCB-054	0.63 U	1.6 U	0.6 U	1.2 U	1.2 U	1.1 U	0.89 U	--	--	--
PCB-055	1.1 U	1.2 U	0.83 U	0.89 U	1.5 U	1.7 U	1.4 U	--	--	--
PCB-056	**2.6 J**	**6.1 J**	**5.26 J**	**7.41 J**	**7.8 J**	**5.5 J**	**5.8 J**	--	--	--
PCB-057	0.93 U	**1.1 J**	**0.76 J**	**0.95 J**	**1.2 J**	1.4 U	1.2 U	--	--	--
PCB-058	1.1 U	1.2 U	0.81 U	0.85 U	1.4 U	1.7 U	1.4 U	--	--	--
PCB-059/062/075	**5.2 J**	**21.4 J**	**22.3 J**	**30.6**	**24.8 J**	**17.6 J**	**15.5 J**	--	--	--
PCB-060	**2.6 J**	**5.8 J**	**5.03 J**	**6.88 J**	**6.4 J**	**4.7 J**	**4.5 J**	--	--	--

Table 3
Caged Mussel Results - Wet Weight

Location ID	Composite	PG-SMA2-2	PG-SMA2-4	PG-SMA2-5	PG-WS-1	PG-GP-1	PG-PJ-1	--	--	--
Sample ID	PG-T0-MUS-COC-151030	PG-SMA2-2-MUS-COC-160104	PG-SMA2-4-MUS-COC-160105	PG-SMA2-5-MUS-COC-160104	PG-WS-1-MUS-COC-160104	PG-GP-1-MUS-COC-160104	PG-PJ-1-MUS-COC-160104	13CPS_DB-MTW01Z	13EB_ME-MTW01Z	13NPS_CIAR2-MTW01Z
Sample Date	10/30/2016	1/4/2016	1/5/2016	1/4/2016	1/4/2016	1/4/2016	1/4/2016	1/10/2013	1/7/2013	1/14/2013
X	--	1212056.16326	1211788.46725	1211104.65844	1210323.39	1213706.45	1213098.71	--	--	--
Y	--	316262.151069	315424.288965	315172.44362	312230.28	313556.13	315818.33	--	--	--
PCB-061/070/074/076	**30.1 J**	**112**	**91.2**	**122**	**117**	**88.6**	**77.7**	--	--	--
PCB-063	**1.05 J**	**4.21 J**	**3.42 J**	**4.71 J**	**4.4 J**	**3.2 J**	**2.5 J**	--	--	--
PCB-064	**15.8**	**39.3**	**56.6**	**76.1**	**57.3**	**37**	**35.5**	--	--	--
PCB-066	12.4 U	**43.7**	**33.4**	**44.4**	**43.8**	**33.9**	**29.9**	--	--	--
PCB-067	0.83 U	**3.87 J**	**3.73 J**	**4.68 J**	**4.2 J**	**3.1 J**	**2.6 J**	--	--	--
PCB-068	1.1 U	**1.7 J**	**1.58 J**	**1.78 J**	**1.5 J**	1.4 U	1.2 U	--	--	--
PCB-072	1.1 U	**2.04 J**	**2.09 J**	**2.66 J**	**1.9 J**	**1.7 J**	**1.3 J**	--	--	--
PCB-073	1.1 U	2.3 U	0.77 U	1.1 U	2.4 U	1.4 U	1.5 U	--	--	--
PCB-077	**1.6 J**	**3.7 J**	**2.05 J**	**2.8 J**	**2.3 J**	**1.6 J**	1.3 U	--	--	--
PCB-078	0.95 U	0.95 U	0.72 U	0.76 U	1.1 U	1.4 U	1.1 U	--	--	--
PCB-079	0.81 U	0.84 U	0.61 U	**0.82 J**	0.99 U	1.2 U	0.99 U	--	--	--
PCB-080	0.86 U	1 U	0.64 U	0.68 U	1.2 U	1.4 U	1.2 U	--	--	--
PCB-081	1.3 U	**2 J**	1 U	1.1 U	1.4 U	1.7 U	1.4 U	--	--	--
PCB-082	**1.9 J**	**4.7 J**	**4 J**	**5.3 J**	**5.2 J**	**3.9 J**	**3.8 J**	--	--	--
PCB-083/099	**40.2**	**72.7**	**64.1**	**83.7**	**88.1**	**59.7**	**53.3**	--	--	--
PCB-084	**4.3 J**	**9.9**	**9.8 J**	**12.9**	**11.7**	**8.7 J**	**8.3 J**	--	--	--
PCB-085/116/117	**5.71 J**	**13.6 J**	**9.9 J**	**13 J**	**12.4 J**	**11.5 J**	**9.9 J**	--	--	--
PCB-086/087/097/109/119/125	**14.2 J**	**37.6 J**	**32.8 J**	**45.1 J**	**41.7 J**	**31 J**	**29.4 J**	--	--	--
PCB-088/091	**2.5 J**	**6.6 J**	**7 J**	**11 J**	**8.5 J**	**5.59 J**	**5.3 J**	--	--	--
PCB-089	1.1 U	1.6 U	1.3 U	1.4 U	1.7 U	0.96 U	1.5 U	--	--	--
PCB-090/101/113	**43.9**	**144**	**119**	**165**	**147**	**105**	**97.1**	--	--	--
PCB-092	**9.2 J**	**23.9**	**18.2**	**24.5**	**24.1**	**17.9**	**16.5**	--	--	--
PCB-093/095/098/100/102	**3 J**	**8 J**	**8.8 J**	**12.5 J**	**10.1 J**	**7.76 J**	**6.8 J**	--	--	--
PCB-094	1.1 U	1.8 U	1.4 U	**1.8 J**	1.8 U	1 U	1.6 U	--	--	--
PCB-095	**26**	**86.6**	**81.1**	**115**	**87.3**	**64.7**	**61**	--	--	--
PCB-096	0.74 U	**1.3 J**	**1.66 J**	**2.4 J**	**1.88 J**	**1.1 J**	**1.1 J**	--	--	--
PCB-103	**1.07 J**	**2.5 J**	**2 J**	**3.1 J**	**2.4 J**	**1.59 J**	**1.7 J**	--	--	--
PCB-104	0.54 U	0.2 U	0.61 U	1 U	0.3 U	0.43 U	0.53 U	--	--	--
PCB-105	10 U	**28.2**	**24.4**	**34.1**	**31.8**	**23.5**	**20.8**	--	--	--
PCB-106	0.86 U	0.62 U	1 U	0.7 U	0.96 U	0.88 U	0.76 U	--	--	--
PCB-107	3.07 U	**7.76 J**	**5.7 J**	**7.61 J**	**8.1 J**	**6.7 J**	**6.2 J**	--	--	--
PCB-108/124	**1.19 J**	**2.42 J**	**2.5 J**	**3.19 J**	**2.9 J**	**2.42 J**	**1.91 J**	--	--	--
PCB-110/115	**27.8**	**81.3**	**78**	**107**	**93.7**	**64.8**	**61.2**	--	--	--
PCB-111	0.79 U	1.2 U	0.96 U	1 U	1.2 U	0.69 U	1.1 U	--	--	--
PCB-112	0.72 U	1.2 U	0.87 U	0.93 U	1.2 U	0.69 U	1 U	--	--	--
PCB-114	1.2 U	**1.91 J**	1.4 U	**2 J**	**1.5 J**	1.1 U	0.91 U	--	--	--
PCB-118	30.4 U	**90.5**	**78.7**	**108**	**95.3**	**70**	**63.6**	--	--	--
PCB-120	0.7 U	1 U	0.85 U	0.9 U	1 U	0.59 U	0.9 U	--	--	--
PCB-121	0.81 U	1.3 U	0.98 U	1 U	1.3 U	0.74 U	1.1 U	--	--	--
PCB-122	0.97 U	0.7 U	1.2 U	0.79 U	1.1 U	0.99 U	0.86 U	--	--	--
PCB-123	1.3 U	**1.62 J**	1.6 U	1.1 U	1.3 U	1.2 U	1 U	--	--	--
PCB-126	1.2 U	**2.52 J**	1.5 U	0.98 U	1.2 U	1.1 U	0.95 U	--	--	--
PCB-127	0.88 U	0.62 U	1.1 U	0.71 U	0.95 U	0.87 U	0.75 U	--	--	--
PCB-128/166	**6.9 J**	**30.4**	**25**	**33.5**	**32.8**	**22.8**	**21.1**	--	--	--
PCB-129/138/163	**58.6**	**356**	**306**	**423**	**368**	**245**	**221**	--	--	--
PCB-130	**3.1 J**	**12.1**	**11**	**13.5**	**14.5**	**9.6 J**	**8.6 J**	--	--	--
PCB-131	1.6 U	2.3 U	**2 J**	**2.1 J**	2.2 U	3.6 U	3.2 U	--	--	--
PCB-132	**5.3 J**	**35.5**	**37.9**	**52.5**	**39.3**	**23.8**	**24.9**	--	--	--
PCB-133	**1.3 J**	**5.3 J**	**3.9 J**	**5.2 J**	**6.1 J**	**4.4 J**	**3.6 J**	--	--	--
PCB-134/143	**2.3 J**	**10.2 J**	**9.7 J**	**13.7 J**	**6.8 J**	**5.1 J**	**5 J**	--	--	--
PCB-135/151	**17.2 J**	**97.7**	**95.8**	**138**	**85.1**	**61.1**	**58.8**	--	--	--
PCB-136	**4 J**	**23.8**	**23.4**	**34.9**	**21.8**	**15**	**13.9**	--	--	--
PCB-137	1.5 U	**2.9 J**	**12.9**	**3 J**	**3.1 J**	3.2 U	2.8 U	--	--	--
PCB-139/140	1.3 U	**2.6 J**	**2.3 J**	**2.9 J**	**3.1 J**	2.8 U	2.5 U	--	--	--
PCB-141	**1.7 J**	**8.6 J**	**10.3**	**14.8**	**10.6**	**6.9 J**	**6.6 J**	--	--	--
PCB-142	1.4 U	2 U	1.3 U	1.4 U	1.9 U	3.1 U	2.8 U	--	--	--
PCB-144	**1.6 J**	**12.3**	**12.7**	**19.3**	**10.9**	**6.7 J**	**7.5 J**	--	--	--
PCB-145	1.2 U	1.7 U	1.1 U	1.1 U	2.6 U	2 U	1.6 U	--	--	--

Table 3
Caged Mussel Results - Wet Weight

Location ID	Composite	PG-SMA2-2	PG-SMA2-4	PG-SMA2-5	PG-WS-1	PG-GP-1	PG-PJ-1	--	--	--
Sample ID	PG-T0-MUS-COC-151030	PG-SMA2-2-MUS-COC-160104	PG-SMA2-4-MUS-COC-160105	PG-SMA2-5-MUS-COC-160104	PG-WS-1-MUS-COC-160104	PG-GP-1-MUS-COC-160104	PG-PJ-1-MUS-COC-160104	13CPS_DB-MTW01Z	13EB_ME-MTW01Z	13NPS_CIAR2-MTW01Z
Sample Date	10/30/2016	1/4/2016	1/5/2016	1/4/2016	1/4/2016	1/4/2016	1/4/2016	1/10/2013	1/7/2013	1/14/2013
X	--	1212056.16326	1211788.46725	1211104.65844	1210323.39	1213706.45	1213098.71	--	--	--
Y	--	316262.151069	315424.288965	315172.44362	312230.28	313556.13	315818.33	--	--	--
PCB-146	13.2 U	**57.7**	**44.4**	**60.8**	**62.8**	**42.3**	**36.7**	--	--	--
PCB-147/149	**37.3**	**248**	**222**	**321**	**235**	**168**	**147**	--	--	--
PCB-148	1.4 U	2.1 U	1.3 U	1.4 U	3.1 U	2.4 U	2 U	--	--	--
PCB-150	1.1 U	1.8 U	0.98 U	1 U	2.6 U	2 U	1.7 U	--	--	--
PCB-152	1 U	1.4 U	0.93 U	0.98 U	2.1 U	1.6 U	1.3 U	--	--	--
PCB-153/168	**73.9**	**402**	**330**	**468**	**431**	**284**	**255**	--	--	--
PCB-154	**1.8 J**	**4.3 J**	**4.1 J**	**6 J**	**4.9 J**	**3.2 J**	**3.3 J**	--	--	--
PCB-155	0.69 U	1.1 U	0.63 U	0.66 U	1.7 U	1.3 U	1.1 U	--	--	--
PCB-156/157	2.9 U	**20.5**	**17.7 J**	**24.2**	**19 J**	**12.1 J**	**11.8 J**	--	--	--
PCB-158	**3.3 J**	**23.8**	**20.6**	**29.5**	**23**	**15.4**	**14.7**	--	--	--
PCB-159	0.6 U	0.74 U	0.56 U	1 U	1.3 U	0.86 U	0.98 U	--	--	--
PCB-160	1.1 U	1.5 U	1.1 U	1.2 U	1.5 U	2.3 U	2.1 U	--	--	--
PCB-161	0.93 U	1.3 U	0.87 U	0.94 U	1.2 U	2 U	1.8 U	--	--	--
PCB-162	0.66 U	0.79 U	0.62 U	**4.4 J**	1.4 U	0.92 U	1 U	--	--	--
PCB-164	**1.4 J**	**7 J**	0.94 U	**10**	**7.7 J**	**5.2 J**	**4.7 J**	--	--	--
PCB-165	1.2 U	1.6 U	1.1 U	1.2 U	1.6 U	2.5 U	2.3 U	--	--	--
PCB-167	**1.78 J**	**9.64 J**	**8.67 J**	**11.7**	**8.7 J**	**6.5 J**	**6.2 J**	--	--	--
PCB-169	0.87 U	0.91 U	0.81 U	1.5 U	1.6 U	1.1 U	1.2 U	--	--	--
PCB-170	**2.5 J**	**21.8**	**23.3**	**32.9**	**25.6**	**14.7**	**14.2**	--	--	--
PCB-171/173	**2.1 J**	**22.7**	**19.3 J**	**27.9**	**22.2**	**14.3 J**	**14.4 J**	--	--	--
PCB-172	1.8 U	2.4 U	**2 J**	1.4 U	3.1 U	2.2 U	1.7 U	--	--	--
PCB-174	1.7 U	2.4 U	1.2 U	1.3 U	3.1 U	2.2 U	1.7 U	--	--	--
PCB-175	2 U	**3.2 J**	**2.8 J**	**4.29 J**	2.5 U	1.6 U	1.6 U	--	--	--
PCB-176	1.4 U	**9 J**	**7.97 J**	**11.7**	**8 J**	**5 J**	**4.9 J**	--	--	--
PCB-177	**4.7 J**	**44.3**	**36.2**	**51.6**	**41.8**	**27.9**	**28.3**	--	--	--
PCB-178	**3.2 J**	**18**	**14.3**	**20.5**	**18.3**	**12.4**	**11.7**	--	--	--
PCB-179	**3.4 J**	**29.1**	**26.6**	**39.3**	**26.5**	**18.9**	**17.6**	--	--	--
PCB-180/193	9.1 U	**114**	**106**	**152**	**112**	**69.3**	**66.9**	--	--	--
PCB-181	1.9 U	2.6 U	1.3 U	1.4 U	3.3 U	2.4 U	1.8 U	--	--	--
PCB-182	2 U	1.4 U	1.2 U	0.96 U	2.5 U	1.6 U	1.7 U	--	--	--
PCB-183	**5.2 J**	**52**	**44.2**	**58.3**	**51.7**	**33.4**	**31.4**	--	--	--
PCB-184	1.5 U	1.1 U	0.87 U	0.69 U	2 U	1.2 U	1.3 U	--	--	--
PCB-185	2.1 U	2.7 U	1.4 U	1.6 U	3.5 U	2.5 U	1.9 U	--	--	--
PCB-186	1.6 U	1.2 U	0.95 U	0.75 U	2.1 U	1.3 U	1.4 U	--	--	--
PCB-187	18.7 U	**123**	**108**	**153**	**121**	**79.9**	**75.2**	--	--	--
PCB-188	1.4 U	1 U	0.81 U	0.64 U	1.9 U	1.2 U	1.2 U	--	--	--
PCB-189	0.52 U	**5.36 J**	**2.63 J**	**3.9 J**	**2.47 J**	**1.84 J**	**1.92 J**	--	--	--
PCB-190	1.3 U	**11.5**	**9.99**	**14.1**	**9.9 J**	**6.3 J**	**6.7 J**	--	--	--
PCB-191	1.3 U	**1.9 J**	**2.23 J**	**3.3 J**	2.2 U	1.6 U	1.2 U	--	--	--
PCB-192	1.6 U	2.1 U	1.1 U	1.2 U	2.8 U	1.9 U	1.5 U	--	--	--
PCB-194	**1.23 J**	**7.8 J**	**7.8 J**	**10.9**	**8.5 J**	**4.6 J**	**5.3 J**	--	--	--
PCB-195	1 U	1.7 U	0.93 U	**1.96 J**	1.5 U	0.8 U	1.3 U	--	--	--
PCB-196	1.6 U	1.8 U	1.1 U	**1.5 J**	2.7 U	1.7 U	3.1 U	--	--	--
PCB-197	1.2 U	**1.8 J**	**1.43 J**	**2.3 J**	2.1 U	1.3 U	2.4 U	--	--	--
PCB-198/199	1.7 U	1.8 U	1.2 U	**1.3 J**	2.8 U	1.7 U	3.2 U	--	--	--
PCB-200	1.1 U	1.2 U	0.77 U	0.81 U	1.8 U	1.1 U	2.1 U	--	--	--
PCB-201	1.1 U	**4.8 J**	**3.67 J**	**4.98 J**	**4.3 J**	**3.2 J**	**2.5 J**	--	--	--
PCB-202	**1.8 J**	**10.1**	**7.85 J**	**10**	**11.1**	**7.3 J**	**6 J**	--	--	--
PCB-203	1.7 U	**8.8 J**	**7.9 J**	**11.8**	**9.2 J**	**5.4 J**	**5.6 J**	--	--	--
PCB-204	1.1 U	1.2 U	0.78 U	0.81 U	1.9 U	1.2 U	2.1 U	--	--	--
PCB-205	0.96 U	1.5 U	**1.05 J**	**1.58 J**	1.4 U	0.74 U	1.2 U	--	--	--
PCB-206	0.84 U	1.2 U	0.84 U	0.8 U	2.2 U	1.5 U	2.7 U	--	--	--
PCB-207	0.66 U	0.97 U	0.66 U	0.63 U	1.7 U	1.2 U	2.1 U	--	--	--
PCB-208	0.84 U	1.3 U	0.84 U	0.8 U	2.2 U	1.5 U	2.7 U	--	--	--
PCB-209	0.91 U	1.4 U	0.81 U	0.97 U	2.9 U	2.5 U	2.1 U	--	--	--
Total PCB Congener (U = 1/2)	**1078.21 J**	**4191.725 J**	**3962.895 J**	**5541.795 J**	**4611.99 J**	**3232.935 J**	**2959.205 J**	--	--	--
Total PCB Congener (U = 0)	**979.38 J**	**4136.25 J**	**3928.92 J**	**5512.27 J**	**4539.16 J**	**3168.2 J**	**2891.23 J**	--	--	--
Total PCB Congener TEQ 2005 (Mammal) (U = 1/2)	**0.0741532 J**	**0.2713519 J**	**0.091513 J**	**0.0774785 J**	**0.0892226 J**	**0.0753677 J**	**0.06893325 J**	--	--	--

Table 3
Caged Mussel Results - Wet Weight

Location ID	Composite	PG-SMA2-2	PG-SMA2-4	PG-SMA2-5	PG-WS-1	PG-GP-1	PG-PJ-1	--	--	--
Sample ID	PG-T0-MUS-COC-151030	PG-SMA2-2-MUS-COC-160104	PG-SMA2-4-MUS-COC-160105	PG-SMA2-5-MUS-COC-160104	PG-WS-1-MUS-COC-160104	PG-GP-1-MUS-COC-160104	PG-PJ-1-MUS-COC-160104	13CPS_DB-MTW01Z	13EB_ME-MTW01Z	13NPS_CIAR2-MTW01Z
Sample Date	10/30/2016	1/4/2016	1/5/2016	1/4/2016	1/4/2016	1/4/2016	1/4/2016	1/10/2013	1/7/2013	1/14/2013
X	--	1212056.16326	1211788.46725	1211104.65844	1210323.39	1213706.45	1213098.71	--	--	--
Y	--	316262.151069	315424.288965	315172.44362	312230.28	313556.13	315818.33	--	--	--
Total PCB Congener TEQ 2005 (Mammal) (U = 0)	**0.0002134 J**	**0.2577019 J**	**0.004168 J**	**0.005797 J**	**0.0049931 J**	**0.0035782 J**	**0.0031296 J**	--	--	--
Dioxin Furans and PCB Congeners (ng/kg)										
Total Dioxin/Furan and PCB Congener TEQ 2005 (Mammal) (Calculated U = 1/2)	**0.1886145 J**	**0.3823333 J**	**0.18966345 J**	**0.2056762 J**	**0.20410655 J**	**0.1714827 J**	**0.1775403 J**	--	--	--
Total Dioxin/Furan and PCB Congener TEQ 2005 (Mammal) (Calculated U = 0)	**0.0679634 J**	**0.3029219 J**	**0.040758 J**	**0.046606 J**	**0.0569431 J**	**0.0332782 J**	**0.0263296 J**	--	--	--

Notes:
Bold = detected result
-- = results not reported or not applicable

µg/kg = micrograms per kilogram
cPAH = carcinogenic polycyclic aromatic hydrocarbon
HPAH = high molecular weight PAH
J = estimated value
LPAH = low molecular weight PAH
ng/kg = nanograms per kilogram
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyls
pct = percent
TEQ = toxic equivalency
U = compound analyzed, but not detected above detection limit
UJ = compound analyzed, but not detected above estimated detection limit

Horizontal coordinate datum is NAD 1983 State Plane Washington North FIPS 4601 (US Survey Feet).
Results presented in this table are reported in wet-weight (as-received) basis.
Totals are calculated as the sum of all detected results and half of the reporting limit of undetected results (U=1/2). If all results are not detected, the highest reporting limit value is reported as the sum.
Totals are calculated as the sum of all detected results (U=0). If all results are not detected, the highest method detection limit value is reported as the sum.
USEPA Stage 2B and/or Stage 4 data validation was completed by Laboratory Data Consultants (LDC).
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 HPAH are the total of benzo(a)anthracene, benzo(a)pyrene, benzo(x)fluoranthenes, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-c,d)pyrene, and pyrene.
Total LPAH are the total of acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene. 2-Methylnapthalene is not included in the sum of LPAHs.
Total PAH are the total of acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(x)fluoranthenes, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-c,d)pyrene, naphthalene, phenanthrene, and pyrene. 2-Methylnapthalene is not included.
Total PCB congeners is the sum of all PCB congeners listed in this table.
Dioxin/furan TEQ values were calculated with 2005 World Health Organization (WHO) TEF values for mammals.

FINAL VALIDATED DATA

Table 4
Caged Mussel Results - Dry Weight

FINAL VALIDATED DATA

Location ID	Composite	PG-SMA2-2	PG-SMA2-4	PG-SMA2-5	PG-WS-1	PG-GP-1	PG-PJ-1	--	--	--
Sample ID	PG-T0-MUS-COC-151030	PG-SMA2-2-MUS-COC-160104	PG-SMA2-4-MUS-COC-160105	PG-SMA2-5-MUS-COC-160104	PG-WS-1-MUS-COC-160104	PG-GP-1-MUS-COC-160104	PG-PJ-1-MUS-COC-160104	13CPS_DB-MTW01Z	13EB_ME-MTW01Z	13NPS_CIAR2-MTW01Z
Sample Date	10/30/2016	1/4/2016	1/5/2016	1/4/2016	1/4/2016	1/4/2016	1/4/2016	1/10/2013	1/7/2013	1/14/2013
X	--	1212056.16326	1211788.46725	1211104.65844	1210323.39	1213706.45	1213098.71	--	--	--
Y	--	316262.151069	315424.288965	315172.44362	312230.28	313556.13	315818.33	--	--	--
Metals (mg/kg)										
Cadmium	**1.77**	**2.31**	**1.99**	**1.9**	**2.18**	**2.33**	**2.16**	--	--	--
Polycyclic Aromatic Hydrocarbons (µg/kg)										
2-Methylnaphthalene	**4.62 J**	2.88 UJ	3.69 UJ	3.39 UJ	2.87 UJ	3.06 UJ	3.49 UJ	3.23 U	**9**	3.23 U
Acenaphthene	**8.26**	2.88 U	3.69 U	**8.28**	**3.33**	3.06 U	3.49 UJ	3.23 U	**29.1**	3.23 U
Acenaphthylene	2.85 UJ	2.88 UJ	3.69 UJ	3.39 UJ	2.87 UJ	3.06 UJ	3.49 UJ	3.23 UJ	**5.41 J**	3.23 UJ
Anthracene	**5.87**	**7.09**	**12.9**	**31.8**	**9.77**	**5.82**	**6.91**	3.23 U	**53.7**	3.23 U
Benzo(a)anthracene	**4.9 J**	**9.45 J**	**21.8 J**	**51.1 J**	**16.3 J**	**8.7 J**	**10.5 J**	**3.3**	**94.4**	3.23 U
Benzo(a)pyrene	2.85 U	**3.4**	**8.33**	**18.7**	**5.57**	3.06 U	3.49 U	3.23 U	**36.6**	3.23 U
Benzo(b)fluoranthene	**2.85**	**8.76**	**18.1**	**40.7**	**14.1**	**7.23**	--	**3.88**	**76.1**	3.23 U
Benzo(e)pyrene	2.85 U	**6.4**	**11.7**	**35.6**	**9.6**	**5.02**	**6.07**	3.23 U	**56**	3.23 U
Benzo(g,h,i)perylene	2.85 U	2.88 U	**5.24**	**6.72**	2.87 U	3.06 U	3.49 U	3.23 U	**14.5**	3.23 U
Benzo(k)fluoranthene	2.85 UJ	**6.86 J**	**11 J**	**28 J**	**9.08 J**	**4.53 J**	**5.44 J**	3.23 UJ	**44.7 J**	3.23 UJ
Chrysene	**6.04 J**	**12.3 J**	**23.4 J**	**58.7 J**	**19.8 J**	**12.2 J**	**14.4 J**	**7.05**	**107**	3.23 U
Dibenzo(a,h)anthracene	2.85 U	2.88 U	3.69 U	3.39 U	2.87 U	3.06 U	3.49 U	3.23 U	**3.21**	3.23 U
Fluoranthene	**27.4 J**	**37.5 J**	**78.9 J**	**228 J**	**57.2 J**	**36.6 J**	**43.8 J**	**14.2**	**512**	**4.84**
Fluorene	**11.5 J**	**3.75 J**	**5.68 J**	**12.2 J**	**4.94 J**	**4.47 J**	**4.61 J**	3.23 U	**41.9**	3.23 U
Indeno(1,2,3-c,d)pyrene	2.85 U	2.88 U	3.69 U	**4.75**	2.87 U	3.06 U	3.49 U	3.23 U	**10.5**	3.23 U
Naphthalene	**6.27**	**3.46**	**4.13**	**5.7**	**3.16**	**3.62**	**3.91 J**	**3.62**	**6.86**	**4.26**
Perylene	2.85 UJ	2.88 UJ	**5.6 J**	**11.9 J**	**3.74 J**	3.06 UJ	3.49 UJ	3.23 U	**17.7**	3.23 U
Phenanthrene	**33.8**	**24.2**	**40.3**	**88.9**	**34.1**	**27.7**	**29.9 J**	**8.02**	**189**	**4.26**
Pyrene	**18.1**	**28.7**	**52.3**	**171**	**42.1**	**26.5**	**30.3**	**10.1**	**210**	**3.74**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)	**2.6879 J**	**6.318 J**	**14.023 J**	**31.9115 J**	**10.003 J**	**4.004 J**	**3.832 J**	**2.888 J**	**60.561 J**	3.23 UJ
Total HPAH (SMS) (U = 1/2)	**66.42 J**	**111.29 J**	**222.76 J**	**609.37 J**	**168.46 J**	**101.88 J**	**111.42 J**	**46.61 J**	**1109.01 J**	**21.5 J**
Total LPAH (SMS) (U = 1/2)	**67.13 J**	**41.38 J**	**66.7 J**	**148.58 J**	**56.74 J**	**44.67 J**	**48.82 J**	**18.1 J**	**325.97 J**	**14.98 J**
Total PAH (SMS) (U = 1/2)	**133.54 J**	**152.67 J**	**289.46 J**	**757.94 J**	**225.19 J**	**146.55 J**	**160.24 J**	**64.71 J**	**1434.98 J**	**36.48 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)	**0.8354 J**	**6.03 J**	**13.654 J**	**31.742 J**	**9.716 J**	**2.168 J**	**1.738 J**	**0.7885 J**	**60.561 J**	3.23 UJ
Total HPAH (SMS) (U = 0)	**59.29 J**	**106.97 J**	**219.07 J**	**607.67 J**	**164.15 J**	**95.76 J**	**104.44 J**	**38.53 J**	**1109.01 J**	**8.58 J**
Total LPAH (SMS) (U = 0)	**65.7 J**	**38.5 J**	**63.01 J**	**146.88 J**	**55.3 J**	**41.61 J**	**45.33 J**	**11.64 J**	**325.97 J**	**8.52 J**
Total PAH (SMS) (U = 0)	**124.99 J**	**145.47 J**	**282.08 J**	**754.55 J**	**219.45 J**	**137.37 J**	**149.77 J**	**50.17 J**	**1434.98 J**	**17.1 J**
Dioxin Furans (ng/kg)										
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.227 U	0.219 U	0.25 U	0.325 U	0.218 U	0.232 U	0.32 U	--	--	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	**0.272 J**	0.3 U	0.442 U	0.434 U	0.298 U	0.257 U	0.361 U	--	--	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.352 U	0.277 U	0.412 U	0.393 U	0.218 U	0.354 U	0.556 U	--	--	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.352 U	**0.466 J**	**0.524 J**	**0.788 J**	**0.672 J**	**0.403 J**	**0.712 J**	--	--	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	**0.477 J**	0.288 U	**0.378 J**	**0.407 J**	**0.356 J**	0.366 U	0.57 U	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	5.68 U	5.76 U	7.36 U	6.78 U	5.73 U	6.11 U	6.95 U	--	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	53.4 U	54.3 U	69.3 U	63.8 U	54 U	57.5 U	65.5 U	--	--	--
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**0.521 J**	**3.53 J**	**3.43 J**	**6.1 J**	**4.05 J**	**3.01 J**	**1.64**	--	--	--
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**0.27 J**	0.3 U	**0.492 J**	**2.08 J**	**1.42 J**	**0.815 J**	**1.21 J**	--	--	--
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**1.42 J**	**2.85 J**	**4.76 J**	**8.49 J**	**5.66 J**	**4.14 J**	**6.28 J**	--	--	--
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**17.3 J**	**67.4 J**	**43.2 J**	**98.4**	**71.3 J**	**30**	**78.2**	--	--	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	**0.261 J**	**0.911 J**	**0.515 J**	**1.02 J**	**0.931 J**	**0.907 J**	**0.907 J**	--	--	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	2.68 U	2.72 U	3.47 U	0.434 U	2.71 U	0.403 U	0.375 U	--	--	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.215 U	**0.267 J**	**0.265 J**	0.407 U	**0.218 J**	0.379 U	0.361 U	--	--	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.318 U	0.288 U	0.221 U	0.298 U	0.229 U	**0.241 J**	0.361 U	--	--	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.307 U	0.277 U	0.206 U	0.271 U	0.218 U	0.244 U	0.334 U	--	--	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	**0.374 J**	**0.428 J**	**0.486 J**	**0.53 J**	**0.372 J**	**0.269 J**	0.361 U	--	--	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.307 U	0.265 U	0.206 U	0.284 U	0.218 U	0.244 U	0.334 U	--	--	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	5 U	5.08 U	6.48 U	5.97 U	5.05 U	5.38 U	6.12 U	--	--	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	**0.245 J**	0.219 U	0.177 U	**0.284 J**	0.16 U	0.22 U	0.223 U	--	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	10 U	10.2 U	13.1 U	12 U	10.1 U	10.8 U	12.3 U	--	--	--
Total Tetrachlorodibenzofuran (TCDF)	**0.963 J**	**6.57 J**	**5.24 J**	**9.1 J**	**5.33 J**	**4.9 J**	**4.18 J**	--	--	--
Total Pentachlorodibenzofuran (PeCDF)	**1.79 J**	**2.14 J**	**3.02 J**	**2.4 J**	**3.31 J**	**1.32 J**	**1.88 J**	--	--	--

Table 4
Caged Mussel Results - Dry Weight

Location ID	Composite	PG-SMA2-2	PG-SMA2-4	PG-SMA2-5	PG-WS-1	PG-GP-1	PG-PJ-1	--	--	--
Sample ID	PG-T0-MUS-COC-151030	PG-SMA2-2-MUS-COC-160104	PG-SMA2-4-MUS-COC-160105	PG-SMA2-5-MUS-COC-160104	PG-WS-1-MUS-COC-160104	PG-GP-1-MUS-COC-160104	PG-PJ-1-MUS-COC-160104	13CPS_DB-MTW01Z	13EB_ME-MTW01Z	13NPS_CIAR2-MTW01Z
Sample Date	10/30/2016	1/4/2016	1/5/2016	1/4/2016	1/4/2016	1/4/2016	1/4/2016	1/10/2013	1/7/2013	1/14/2013
X	--	1212056.16326	1211788.46725	1211104.65844	1210323.39	1213706.45	1213098.71	--	--	--
Y	--	316262.151069	315424.288965	315172.44362	312230.28	313556.13	315818.33	--	--	--
Total Hexachlorodibenzofuran (HxCDF)	**1.07 J**	**1.23 J**	**1.53 J**	**2.06**	**1.44 J**	**1.25 J**	**1.1 J**	--	--	--
Total Heptachlorodibenzofuran (HpCDF)	**2.54 J**	**1.71 J**	**2.75 J**	**4.5 J**	**2.26 J**	**1.88 J**	**3.46 J**	--	--	--
Total Dioxin/Furan (U = 1/2)	**41.048 J**	**42.169 J**	**52.98 J**	**48.727 J**	**42.124 J**	**43.065 J**	**49.132 J**	--	--	--
Total Dioxin/Furan (U = 0)	**1.629 J**	**2.072 J**	**2.168 J**	**3.029 J**	**2.549 J**	**1.82 J**	**1.619 J**	--	--	--
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	**0.71631 J**	**0.69562 J**	**0.802545 J**	**0.86182 J**	**0.705615 J**	**0.61859 J**	**0.76611 J**	--	--	--
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	**0.38565 J**	**0.2606 J**	**0.2698 J**	**0.27734 J**	**0.2985 J**	**0.182 J**	**0.1619 J**	--	--	--
PCB Congeners (ng/kg)										
PCB-001	4.22 U	4.03 U	4.87 U	3.39 U	3.56 U	4.47 U	4.4 U	--	--	--
PCB-002	3.65 U	3.63 U	4.2 U	2.99 U	3.22 U	4.04 U	3.98 U	--	--	--
PCB-003	4.22 U	4.03 U	4.87 U	**4.28 J**	3.56 U	4.47 U	4.4 U	--	--	--
PCB-004	**33 J**	18.4 U	**27.3 J**	**42.1 J**	14.9 U	14.7 U	17.4 U	--	--	--
PCB-005	**87.2**	22.5 U	8.11 U	8.15 U	25.3 U	23.3 U	27.2 U	--	--	--
PCB-006	**16.8 J**	16.7 U	**17.5 J**	**27.2 J**	19 U	17.8 U	20.2 U	--	--	--
PCB-007	5.7 U	19 U	8.11 U	8.15 U	21.3 U	19.6 U	23 U	--	--	--
PCB-008	5.13 U	**39.2 J**	**70.8 J**	**125**	**56.3 J**	**42.3 J**	**48.8 J**	--	--	--
PCB-009	4.96 U	16.7 U	6.78 U	**8.15 J**	19 U	17.8 U	20.2 U	--	--	--
PCB-010	5.24 U	14.4 U	6.12 U	5.5 U	11.5 U	11 U	13.3 U	--	--	--
PCB-011	5.07 U	17.3 U	6.93 U	6.79 U	19 U	17.8 U	20.9 U	--	--	--
PCB-012/013	**4.05 J**	18.4 U	**11.1 J**	**13.6 J**	20.1 U	19 U	21.6 U	--	--	--
PCB-014	4.96 U	16.7 U	6.86 U	6.79 U	18.4 U	17.2 U	20.2 U	--	--	--
PCB-015	**86**	**132**	**218**	**297**	**163**	**137**	**135**	--	--	--
PCB-016	**50.2 J**	**95.1**	**104**	**145**	**139**	**109**	**100**	--	--	--
PCB-017	**48 J**	**32.3 J**	**56 J**	**107**	**56.9 J**	**47.8 J**	**53 J**	--	--	--
PCB-018/030	**107 J**	**160**	**242**	**359**	**247**	**186**	**202**	--	--	--
PCB-019	**33.8 J**	**19 J**	**39.5 J**	**69.2**	**32.2 J**	**27 J**	**28.6 J**	--	--	--
PCB-020/028	**481**	**1760**	**2040**	**2550**	**2030**	**1610**	**1610**	--	--	--
PCB-021/033	**108 J**	**236**	**351**	**462**	**348**	**269**	**278**	--	--	--
PCB-022	**119**	**208**	**335**	**434**	**333**	**244**	**276**	--	--	--
PCB-023	3.99 U	7.49 U	5.75 U	4.68 U	6.32 U	5.7 U	10.5 U	--	--	--
PCB-024	4.33 U	15 U	5.24 U	**8.83 J**	13.2 U	10.4 U	8.37 U	--	--	--
PCB-025	**20.5 J**	**46.7 J**	**69.6 J**	**91**	**63.2**	**49 J**	**53 J**	--	--	--
PCB-026/029	**39.8 J**	**112 J**	**148**	**198**	**144**	**111 J**	**118 J**	--	--	--
PCB-027	**15.6 J**	**30 J**	**41.1 J**	**57 J**	**40.8 J**	**30.6 J**	**31.4 J**	--	--	--
PCB-031	**187**	**503**	**677**	**910**	**690**	**510**	**536**	--	--	--
PCB-032	**51.5 J**	**38 J**	**63.3 J**	**113**	**59.2**	**50.2 J**	**48.8 J**	--	--	--
PCB-034	3.87 U	6.34 U	5.6 U	**6.72 J**	5.11 U	4.78 U	8.37 U	--	--	--
PCB-035	**4.39 J**	4.96 U	**16.2 J**	**21.1 J**	**8.62 J**	3.68 U	6.56 U	--	--	--
PCB-036	3.08 U	5.01 U	4.5 U	3.67 U	4.02 U	3.74 U	6.7 U	--	--	--
PCB-037	**72.4**	**232**	**372**	**450**	**251**	**199**	**198**	--	--	--
PCB-038	3.65 U	5.48 U	5.31 U	4.34 U	4.43 U	4.11 U	6.98 U	--	--	--
PCB-039	3.82 U	**10.4 J**	**17.3 J**	**19.3 J**	**12.7 J**	**10.5 J**	**10.5 J**	--	--	--
PCB-040/041/071	**160 J**	**551**	**811**	**1080**	**672**	**509**	**529**	--	--	--
PCB-042	**84.9**	**250**	**420**	**536**	**313**	**230**	**251**	--	--	--
PCB-043	**19.4 J**	**91.1**	**111**	**138**	**92**	**74.8**	**80.3**	--	--	--
PCB-044/047/065	**298**	**1190**	**1590**	**1990**	**1370**	**1050**	**1080**	--	--	--
PCB-045/051	**45.6 J**	**104 J**	**145 J**	**194**	**142**	**107 J**	**112 J**	--	--	--
PCB-046	**22.8 J**	**66.9**	**90**	**121**	**85.6**	**71.1**	**71.2**	--	--	--
PCB-048	**72.9**	**365**	**476**	**618**	**418**	**331**	**331**	--	--	--
PCB-049/069	**142**	**411**	**684**	**849**	**586**	**409**	**446**	--	--	--
PCB-050/053	**56.4 J**	**205**	**222**	**297**	**227**	**180**	**179**	--	--	--
PCB-052	**346**	**1190**	**1730**	**2170**	**1340**	**1030**	**1050**	--	--	--
PCB-054	3.59 U	9.22 U	4.42 U	8.15 U	6.9 U	6.74 U	6.21 U	--	--	--
PCB-055	6.27 U	6.92 U	6.12 U	6.04 U	8.62 U	10.4 U	9.77 U	--	--	--
PCB-056	**14.8 J**	**35.2 J**	**38.8 J**	**50.3 J**	**44.8 J**	**33.7 J**	**40.5 J**	--	--	--
PCB-057	5.3 U	**6.34 J**	**5.6 J**	**6.45 J**	**6.9 J**	8.58 U	8.37 U	--	--	--

Table 4
Caged Mussel Results - Dry Weight

Location ID	Composite	PG-SMA2-2	PG-SMA2-4	PG-SMA2-5	PG-WS-1	PG-GP-1	PG-PJ-1	--	--	--
Sample ID	PG-T0-MUS-COC-151030	PG-SMA2-2-MUS-COC-160104	PG-SMA2-4-MUS-COC-160105	PG-SMA2-5-MUS-COC-160104	PG-WS-1-MUS-COC-160104	PG-GP-1-MUS-COC-160104	PG-PJ-1-MUS-COC-160104	13CPS_DB-MTW01Z	13EB_ME-MTW01Z	13NPS_CIAR2-MTW01Z
Sample Date	10/30/2016	1/4/2016	1/5/2016	1/4/2016	1/4/2016	1/4/2016	1/4/2016	1/10/2013	1/7/2013	1/14/2013
X	--	1212056.16326	1211788.46725	1211104.65844	1210323.39	1213706.45	1213098.71	--	--	--
Y	--	316262.151069	315424.288965	315172.44362	312230.28	313556.13	315818.33	--	--	--
PCB-058	6.27 U	6.92 U	5.97 U	5.77 U	8.05 U	10.4 U	9.77 U	--	--	--
PCB-059/062/075	**29.6 J**	**123 J**	**164 J**	**208**	**143 J**	**108 J**	**108 J**	--	--	--
PCB-060	**14.8 J**	**33.4 J**	**37.1 J**	**46.7 J**	**36.8 J**	**28.8 J**	**31.4 J**	--	--	--
PCB-061/070/074/076	**172 J**	**646**	**673**	**828**	**672**	**543**	**542**	--	--	--
PCB-063	**5.98 J**	**24.3 J**	**25.2 J**	**32 J**	**25.3 J**	**19.6 J**	**17.4 J**	--	--	--
PCB-064	**90**	**227**	**417**	**517**	**329**	**227**	**248**	--	--	--
PCB-066	4.9 U	**252**	**246**	**301**	**252**	**208**	**209**	--	--	--
PCB-067	4.73 U	**22.3 J**	**27.5 J**	**31.8 J**	**24.1 J**	**19 J**	**18.1 J**	--	--	--
PCB-068	6.27 U	**9.8 J**	**11.7 J**	**12.1 J**	**8.62 J**	8.58 U	8.37 U	--	--	--
PCB-072	6.27 U	**11.8 J**	**15.4 J**	**18.1 J**	**10.9 J**	**10.4 J**	**9.07 J**	--	--	--
PCB-073	6.27 U	13.3 U	5.68 U	7.47 U	13.8 U	8.58 U	10.5 U	--	--	--
PCB-077	**9.12 J**	**21.3 J**	**15.1 J**	**19 J**	**13.2 J**	**9.8 J**	9.07 U	--	--	--
PCB-078	5.41 U	5.48 U	5.31 U	5.16 U	6.32 U	8.58 U	7.68 U	--	--	--
PCB-079	4.62 U	4.84 U	4.5 U	**5.57 J**	5.69 U	7.35 U	6.91 U	--	--	--
PCB-080	4.9 U	5.76 U	4.72 U	4.62 U	6.9 U	8.58 U	8.37 U	--	--	--
PCB-081	7.41 U	**11.5 J**	7.37 U	7.47 U	8.05 U	10.4 U	9.77 U	--	--	--
PCB-082	**10.8 J**	**27.1 J**	**29.5 J**	**36 J**	**29.9 J**	**23.9 J**	**26.5 J**	--	--	--
PCB-083/099	**229**	**419**	**473**	**568**	**506**	**366**	**372**	--	--	--
PCB-084	**24.5 J**	**57.1**	**72.3 J**	**87.6**	**67.2**	**53.3 J**	**57.9 J**	--	--	--
PCB-085/116/117	**32.5 J**	**78.4 J**	**73 J**	**88.3 J**	**71.3 J**	**70.5 J**	**69.1 J**	--	--	--
PCB-086/087/097/109/119/125	**80.9 J**	**217 J**	**242 J**	**306 J**	**240 J**	**190 J**	**205 J**	--	--	--
PCB-088/091	**14.2 J**	**38 J**	**51.6 J**	**74.7 J**	**48.9 J**	**34.3 J**	**37 J**	--	--	--
PCB-089	6.27 U	9.22 U	9.59 U	9.5 U	9.77 U	5.88 U	10.5 U	--	--	--
PCB-090/101/113	**250**	**830**	**878**	**1120**	**845**	**643**	**678**	--	--	--
PCB-092	**52.4 J**	**138**	**134**	**166**	**139**	**110**	**115**	--	--	--
PCB-093/095/098/100/102	**17.1 J**	**46.1 J**	**64.9 J**	**84.9 J**	**58 J**	**47.5 J**	**47.5 J**	--	--	--
PCB-094	6.27 U	10.4 U	10.3 U	**12.2 J**	10.3 U	6.13 U	11.2 U	--	--	--
PCB-095	**148**	**499**	**598**	**781**	**502**	**396**	**426**	--	--	--
PCB-096	4.22 U	**7.49 J**	**12.2 J**	**16.3 J**	**10.8 J**	**6.74 J**	**7.68 J**	--	--	--
PCB-103	**6.1 J**	**14.4 J**	**14.7 J**	**21 J**	**13.8 J**	**9.74 J**	**11.9 J**	--	--	--
PCB-104	3.08 U	1.15 U	4.5 U	6.79 U	1.72 U	2.63 U	3.7 U	--	--	--
PCB-105	6.84 U	**163**	**180**	**232**	**183**	**144**	**145**	--	--	--
PCB-106	4.9 U	3.57 U	7.37 U	4.75 U	5.52 U	5.39 U	5.3 U	--	--	--
PCB-107	5.13 U	**44.7 J**	**42 J**	**51.7 J**	**46.6 J**	**41.1 J**	**43.3 J**	--	--	--
PCB-108/124	**6.78 J**	**13.9 J**	**18.4 J**	**21.7 J**	**16.7 J**	**14.8 J**	**13.3 J**	--	--	--
PCB-110/115	**158**	**469**	**575**	**726**	**539**	**397**	**427**	--	--	--
PCB-111	4.5 U	6.92 U	7.08 U	6.79 U	6.9 U	4.23 U	7.68 U	--	--	--
PCB-112	4.1 U	6.92 U	6.42 U	6.31 U	6.9 U	4.23 U	6.98 U	--	--	--
PCB-114	6.84 U	**11 J**	10.3 U	**13.6 J**	**8.62 J**	6.74 U	6.35 U	--	--	--
PCB-118	6.84 U	**522**	**580**	**733**	**548**	**429**	**444**	--	--	--
PCB-120	3.99 U	5.76 U	6.27 U	6.11 U	5.75 U	3.62 U	6.28 U	--	--	--
PCB-121	4.62 U	7.49 U	7.23 U	6.79 U	7.47 U	4.53 U	7.68 U	--	--	--
PCB-122	5.53 U	4.03 U	8.85 U	5.36 U	6.32 U	6.07 U	6 U	--	--	--
PCB-123	7.41 U	**9.34 J**	11.8 U	7.47 U	7.47 U	7.35 U	6.98 U	--	--	--
PCB-126	6.84 U	**14.5 J**	11.1 U	6.65 U	6.9 U	6.74 U	6.63 U	--	--	--
PCB-127	5.01 U	3.57 U	8.11 U	4.82 U	5.46 U	5.33 U	5.23 U	--	--	--
PCB-128/166	**39.3 J**	**175**	**184**	**227**	**189**	**140**	**147**	--	--	--
PCB-129/138/163	**334**	**2050**	**2260**	**2870**	**2110**	**1500**	**1540**	--	--	--
PCB-130	**17.7 J**	**69.7**	**81.1**	**91.6**	**83.3**	**58.8 J**	**60 J**	--	--	--
PCB-131	9.12 U	13.3 U	**14.7 J**	**14.3 J**	12.6 U	22.1 U	22.3 U	--	--	--
PCB-132	**30.2 J**	**205**	**279**	**356**	**226**	**146**	**174**	--	--	--
PCB-133	**7.41 J**	**30.5 J**	**28.8 J**	**35.3 J**	**35.1 J**	**27 J**	**25.1 J**	--	--	--
PCB-134/143	**13.1 J**	**58.8 J**	**71.5 J**	**93 J**	**39.1 J**	**31.3 J**	**34.9 J**	--	--	--
PCB-135/151	**98 J**	**563**	**706**	**937**	**489**	**374**	**410**	--	--	--
PCB-136	**22.8 J**	**137**	**173**	**237**	**125**	**91.9**	**97**	--	--	--

Table 4
Caged Mussel Results - Dry Weight

Location ID	Composite	PG-SMA2-2	PG-SMA2-4	PG-SMA2-5	PG-WS-1	PG-GP-1	PG-PJ-1	--	--	--
Sample ID	PG-T0-MUS-COC-151030	PG-SMA2-2-MUS-COC-160104	PG-SMA2-4-MUS-COC-160105	PG-SMA2-5-MUS-COC-160104	PG-WS-1-MUS-COC-160104	PG-GP-1-MUS-COC-160104	PG-PJ-1-MUS-COC-160104	13CPS_DB-MTW01Z	13EB_ME-MTW01Z	13NPS_CIAR2-MTW01Z
Sample Date	10/30/2016	1/4/2016	1/5/2016	1/4/2016	1/4/2016	1/4/2016	1/4/2016	1/10/2013	1/7/2013	1/14/2013
X	--	1212056.16326	1211788.46725	1211104.65844	1210323.39	1213706.45	1213098.71	--	--	--
Y	--	316262.151069	315424.288965	315172.44362	312230.28	313556.13	315818.33	--	--	--
PCB-137	8.55 U	**16.7 J**	**95.1**	**20.4 J**	**17.8 J**	19.6 U	19.5 U	--	--	--
PCB-139/140	7.41 U	**15 J**	**17 J**	**19.7 J**	**17.8 J**	17.2 U	17.4 U	--	--	--
PCB-141	**9.69 J**	**49.6 J**	**76**	**100**	**60.9**	**42.3 J**	**46.1 J**	--	--	--
PCB-142	7.98 U	11.5 U	9.59 U	9.5 U	10.9 U	19 U	19.5 U	--	--	--
PCB-144	**9.12 J**	**70.9**	**93.7**	**131**	**62.6**	**41.1 J**	**52.3 J**	--	--	--
PCB-145	6.84 U	9.8 U	8.11 U	7.47 U	14.9 U	12.3 U	11.2 U	--	--	--
PCB-146	7.41 U	**333**	**327**	**413**	**361**	**259**	**256**	--	--	--
PCB-147/149	**213**	**1430**	**1640**	**2180**	**1350**	**1030**	**1030**	--	--	--
PCB-148	7.98 U	12.1 U	9.59 U	9.5 U	17.8 U	14.7 U	14 U	--	--	--
PCB-150	6.27 U	10.4 U	7.23 U	6.79 U	14.9 U	12.3 U	11.9 U	--	--	--
PCB-152	5.7 U	8.07 U	6.86 U	6.65 U	12.1 U	9.8 U	9.07 U	--	--	--
PCB-153/168	**421**	**2320**	**2430**	**3180**	**2480**	**1740**	**1780**	--	--	--
PCB-154	**10.3 J**	**24.8 J**	**30.2 J**	**40.7 J**	**28.2 J**	**19.6 J**	**23 J**	--	--	--
PCB-155	3.93 U	6.34 U	4.65 U	4.48 U	9.77 U	7.97 U	7.68 U	--	--	--
PCB-156/157	4.67 U	**118**	**131 J**	**164**	**109 J**	**74.1 J**	**82.3 J**	--	--	--
PCB-158	**18.8 J**	**137**	**152**	**200**	**132**	**94.4**	**103**	--	--	--
PCB-159	3.42 U	4.27 U	4.13 U	6.79 U	7.47 U	5.27 U	6.84 U	--	--	--
PCB-160	6.27 U	8.65 U	8.11 U	8.15 U	8.62 U	14.1 U	14.7 U	--	--	--
PCB-161	5.3 U	7.49 U	6.42 U	6.38 U	6.9 U	12.3 U	12.6 U	--	--	--
PCB-162	3.76 U	4.55 U	4.57 U	**29.9 J**	8.05 U	5.64 U	6.98 U	--	--	--
PCB-164	**7.98 J**	**40.3 J**	6.93 U	**67.9**	**44.3 J**	**31.9 J**	**32.8 J**	--	--	--
PCB-165	6.84 U	9.22 U	8.11 U	8.15 U	9.2 U	15.3 U	16.1 U	--	--	--
PCB-167	**10.1 J**	**55.6 J**	**63.9 J**	**79.4**	**50 J**	**39.8 J**	**43.3 J**	--	--	--
PCB-169	4.96 U	5.24 U	5.97 U	10.2 U	9.2 U	6.74 U	8.37 U	--	--	--
PCB-170	**14.2 J**	**126**	**172**	**223**	**147**	**90.1**	**99.1**	--	--	--
PCB-171/173	**12 J**	**131**	**142 J**	**189**	**128**	**87.6 J**	**100 J**	--	--	--
PCB-172	10.3 U	13.8 U	**14.7 J**	9.5 U	17.8 U	13.5 U	11.9 U	--	--	--
PCB-174	9.69 U	13.8 U	8.85 U	8.83 U	17.8 U	13.5 U	11.9 U	--	--	--
PCB-175	11.4 U	**18.4 J**	**20.6 J**	**29.1 J**	14.4 U	9.8 U	11.2 U	--	--	--
PCB-176	7.98 U	**51.9 J**	**58.8 J**	**79.4**	**46 J**	**30.6 J**	**34.2 J**	--	--	--
PCB-177	**26.8 J**	**255**	**267**	**350**	**240**	**171**	**197**	--	--	--
PCB-178	**18.2 J**	**104**	**105**	**139**	**105**	**76**	**81.6**	--	--	--
PCB-179	**19.4 J**	**168**	**196**	**267**	**152**	**116**	**123**	--	--	--
PCB-180/193	6.84 U	**657**	**782**	**1030**	**644**	**425**	**467**	--	--	--
PCB-181	10.8 U	15 U	9.59 U	9.5 U	19 U	14.7 U	12.6 U	--	--	--
PCB-182	11.4 U	8.07 U	8.85 U	6.52 U	14.4 U	9.8 U	11.9 U	--	--	--
PCB-183	**29.6 J**	**300**	**326**	**396**	**297**	**205**	**219**	--	--	--
PCB-184	8.55 U	6.34 U	6.42 U	4.68 U	11.5 U	7.35 U	9.07 U	--	--	--
PCB-185	12 U	15.6 U	10.3 U	10.9 U	20.1 U	15.3 U	13.3 U	--	--	--
PCB-186	9.12 U	6.92 U	7.01 U	5.09 U	12.1 U	7.97 U	9.77 U	--	--	--
PCB-187	11.4 U	**709**	**796**	**1040**	**695**	**490**	**525**	--	--	--
PCB-188	7.98 U	5.76 U	5.97 U	4.34 U	10.9 U	7.35 U	8.37 U	--	--	--
PCB-189	2.96 U	**30.9 J**	**19.4 J**	**26.5 J**	**14.2 J**	**11.3 J**	**13.4 J**	--	--	--
PCB-190	7.41 U	**66.3**	**73.7**	**95.7**	**56.9 J**	**38.6 J**	**46.8 J**	--	--	--
PCB-191	7.41 U	**11 J**	**16.4 J**	**22.4 J**	12.6 U	9.8 U	8.37 U	--	--	--
PCB-192	9.12 U	12.1 U	8.11 U	8.15 U	16.1 U	11.6 U	10.5 U	--	--	--
PCB-194	**7.01 J**	**45 J**	**57.5 J**	**74**	**48.9 J**	**28.2 J**	**37 J**	--	--	--
PCB-195	5.7 U	9.8 U	6.86 U	**13.3 J**	8.62 U	4.9 U	9.07 U	--	--	--
PCB-196	9.12 U	10.4 U	8.11 U	**10.2 J**	15.5 U	10.4 U	21.6 U	--	--	--
PCB-197	6.84 U	**10.4 J**	**10.5 J**	**15.6 J**	12.1 U	7.97 U	16.7 U	--	--	--
PCB-198/199	9.69 U	10.4 U	8.85 U	**8.83 J**	16.1 U	10.4 U	22.3 U	--	--	--
PCB-200	6.27 U	6.92 U	5.68 U	5.5 U	10.3 U	6.74 U	14.7 U	--	--	--
PCB-201	6.27 U	**27.7 J**	**27.1 J**	**33.8 J**	**24.7 J**	**19.6 J**	**17.4 J**	--	--	--
PCB-202	**10.3 J**	**58.2**	**57.9 J**	**67.9**	**63.8**	**44.7 J**	**41.9 J**	--	--	--
PCB-203	9.69 U	**50.7 J**	**58.3 J**	**80.1**	**52.9 J**	**33.1 J**	**39.1 J**	--	--	--

Table 4
Caged Mussel Results - Dry Weight

Location ID	Composite	PG-SMA2-2	PG-SMA2-4	PG-SMA2-5	PG-WS-1	PG-GP-1	PG-PJ-1	--	--	--
Sample ID	PG-T0-MUS-COC-151030	PG-SMA2-2-MUS-COC-160104	PG-SMA2-4-MUS-COC-160105	PG-SMA2-5-MUS-COC-160104	PG-WS-1-MUS-COC-160104	PG-GP-1-MUS-COC-160104	PG-PJ-1-MUS-COC-160104	13CPS_DB-MTW01Z	13EB_ME-MTW01Z	13NPS_CIAR2-MTW01Z
Sample Date	10/30/2016	1/4/2016	1/5/2016	1/4/2016	1/4/2016	1/4/2016	1/4/2016	1/10/2013	1/7/2013	1/14/2013
X	--	1212056.16326	1211788.46725	1211104.65844	1210323.39	1213706.45	1213098.71	--	--	--
Y	--	316262.151069	315424.288965	315172.44362	312230.28	313556.13	315818.33	--	--	--
PCB-204	6.27 U	6.92 U	5.75 U	5.5 U	10.9 U	7.35 U	14.7 U	--	--	--
PCB-205	5.47 U	8.65 U	**7.74 J**	**10.7 J**	8.05 U	4.53 U	8.37 U	--	--	--
PCB-206	4.79 U	6.92 U	6.19 U	5.43 U	12.6 U	9.19 U	18.8 U	--	--	--
PCB-207	3.76 U	5.59 U	4.87 U	4.28 U	9.77 U	7.35 U	14.7 U	--	--	--
PCB-208	4.79 U	7.49 U	6.19 U	5.43 U	12.6 U	9.19 U	18.8 U	--	--	--
PCB-209	5.19 U	8.07 U	5.97 U	6.59 U	16.7 U	15.3 U	14.7 U	--	--	--
Total PCB Congener (U = 1/2)	**5862.385 J**	**24149.58 J**	**29198.39 J**	**37593.615 J**	**26486 J**	**19800.96 J**	**20645.06 J**	--	--	--
Total PCB Congener (U = 0)	**5579.83 J**	**23841.07 J**	**28973.34 J**	**37416.23 J**	**26086.46 J**	**19416.48 J**	**20184.55 J**	--	--	--
Total PCB Congener TEQ 2005 (Mammal) (U = 1/2)	**0.4192599 J**	**1.5614752 J**	**0.676726 J**	**0.52608755 J**	**0.51302415 J**	**0.46179735 J**	**0.48100895 J**	--	--	--
Total PCB Congener TEQ 2005 (Mammal) (U = 0)	**0.001215 J**	**1.4828752 J**	**0.030739 J**	**0.039355 J**	**0.0287046 J**	**0.021926 J**	**0.02184 J**	--	--	--
Dioxin Furans and PCB Congeners (ng/kg)										
Total Dioxin/Furan and PCB Congener TEQ 2005 (Mammal) (Calculated U = 1/2)	**1.1355699 J**	**2.2570952 J**	**1.479271 J**	**1.38790755 J**	**1.21863915 J**	**1.08038735 J**	**1.24711895 J**	--	--	--
Total Dioxin/Furan and PCB Congener TEQ 2005 (Mammal) (Calculated U = 0)	**0.386865 J**	**1.7434752 J**	**0.300539 J**	**0.316695 J**	**0.3272046 J**	**0.203926 J**	**0.18374 J**	--	--	--

Notes:
Bold = detected result
-- = results not reported or not applicable

µg/kg = micrograms per kilogram
cPAH = carcinogenic polycyclic aromatic hydrocarbon
HPAH = high molecular weight PAH
J = estimated value
LPAH = low molecular weight PAH
ng/kg = nanograms per kilogram
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyls
pct = percent
TEQ = toxic equivalency
U = compound analyzed, but not detected above detection limit
UJ = compound analyzed, but not detected above estimated detection limit

Horizontal coordinate datum is NAD 1983 State Plane Washington North FIPS 4601 (US Survey Feet).
Results presented in this table are reported in dry weight basis.
Totals are calculated as the sum of all detected results (U=0). If all results are not detected, the highest method detection limit value is reported as the sum.
Totals are calculated as the sum of all detected results and half of the reporting limit of undetected results (U=1/2). If all results are not detected, the highest reporting limit value is reported as the sum.
USEPA Stage 2B and/or Stage 4 data validation was completed by Laboratory Data Consultants (LDC).
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 HPAH are the total of benzo(a)anthracene, benzo(a)pyrene, benzo(x)fluoranthenes, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-c,d)pyrene, and pyrene.
Total LPAH are the total of acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene. 2-Methylnapthalene is not included in the sum of LPAHs.
Total PAH are the total of acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(x)fluoranthenes, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-c,d)pyrene, naphthalene, phenanthrene, and pyrene. 2-Methylnapthalene is not included.
Total PCB congeners is the sum of all PCB congeners listed in this table.
Dioxin/furan TEQ values were calculated with 2005 World Health Organization (WHO) TEF values for mammals.

FINAL VALIDATED DATA

Table 5
PEMD Data Summary

FINAL VALIDATED DATA

Location ID	FieldQC	FieldQC	PG-GP-1	PG-PJ-1	PG-SMA2-1	PG-SMA2-2	PG-SMA2-3	PG-SMA2-3	PG-SMA2-4	PG-SMA2-5	PG-WS-1
Sample ID	PG-FB-PEMD-151110	PG-TB-PEMD-151110	PG-GP-1-PEMD-151109-A	PG-PJ-1-PEMD-151109-A	PG-SMA2-1-PEMD-151110-	PG-SMA2-2-PEMD-151110-	PG-SMA2-3-PEMD-151110-	PG-SMA2-3-PEMD-151110-	PG-SMA2-4-PEMD-151109-	PG-SMA2-5-PEMD-151109-A	PG-WS-1-PEMD-151109-A
Sample Date	11/10/2015	11/10/2015	11/9/2015	11/9/2015	11/10/2015	11/10/2015	11/10/2015	11/10/2015	11/9/2015	11/9/2015	11/9/2015
Sample Type	FB	TB	N	N	N	N	N	N	N	N	N
Matrix	PEMD	PEMD	PEMD	PEMD	PEMD	PEMD	PEMD	PEMD	PEMD	PEMD	PEMD
X	--	--	1213706.45	1213098.71	1211968.535	1212056.163	1211903.837	1211903.837	1211788.467	1211104.658	1210323.39
Y	--	--	313556.13	315818.33	316739.5296	316262.1511	315728.9093	315728.9093	315424.289	315172.4436	312230.28
Polycyclic Aromatic Hydrocarbons (µg/kg)											
2-Methylnaphthalene	**58.7 J**	**7.28 J**	**8.97 J**	**8.56 J**	**7.17 J**	**5.38 J**	**5.79 J**	**7.41 J**	**13.5 J**	**5.04 J**	**10.8 J**
Acenaphthene	**48.4 J**	**1.24 J**	**11.7 J**	**13.3 J**	**10.3 J**	**16.3 J**	**13.2 J**	**67.5 J**	**54.3 J**	**13.9 J**	**14.5 J**
Acenaphthylene	**1.61 J**	1.12 UJ	1.12 UJ	1.12 UJ	1.12 UJ	**1.26 J**	**1.29 J**	**1.75 J**	**1.51 J**	1.4 UJ	1.12 UJ
Anthracene	**1.71 J**	**2.4 J**	**7.53 J**	**8.87 J**	**13.5 J**	**19.1 J**	**24.3 J**	**34.2 J**	**22.2 J**	**12.7 J**	**7.33 J**
Benzo(a)anthracene	1.12 UJ	1.12 UJ	**5.69 J**	**6.71 J**	**18.9 J**	**11.7 J**	**32.4 J**	**15.8 J**	**14.2 J**	**8.82 J**	**4.94 J**
Benzo(a)pyrene	1.12 UJ	1.12 UJ	1.12 UJ	1.12 UJ	**2.21 J**	**1.84 J**	**7.07 J**	**1.86 J**	**1.4 J**	1.4 UJ	1.12 UJ
Benzo(b)fluoranthene	1.12 UJ	1.12 UJ	**2.2 J**	**2.29 J**	**4.49 J**	**3.13 J**	**9.23 J**	**3.87 J**	**3.24 J**	**2.3 J**	**1.87 J**
Benzo(e)pyrene	1.12 UJ	1.12 UJ	**1.33 J**	**1.44 J**	**2.72 J**	**1.97 J**	**5.71 J**	**2.43 J**	**2.02 J**	1.4 UJ	**1.19 J**
Benzo(g,h,i)perylene	1.12 UJ	1.12 UJ	1.12 UJ	1.12 UJ	1.12 UJ	1.12 UJ	**1.48 J**	1.12 UJ	1.12 UJ	1.4 UJ	1.12 UJ
Benzo(k)fluoranthene	1.12 UJ	1.12 UJ	1.12 UJ	1.12 UJ	**1.81 J**	**1.3 J**	**4.1 J**	**1.52 J**	**1.24 J**	1.4 UJ	1.12 UJ
Chrysene	1.12 UJ	1.12 UJ	**5.93 J**	**7.48 J**	**17.3 J**	**11 J**	**28.6 J**	**14.1 J**	**13.2 J**	**8.11 J**	**5.66 J**
Dibenzo(a,h)anthracene	1.12 UJ	1.12 UJ	1.12 UJ	1.12 UJ	1.12 UJ	1.12 UJ	1.12 UJ	1.12 UJ	1.12 UJ	1.4 UJ	1.12 UJ
Fluoranthene	**12.6 J**	**4.17 J**	**63.5 J**	**75.9 J**	**280 J**	**186 J**	**353 J**	**332 J**	**231 J**	**88.9 J**	**68.2 J**
Fluorene	**23.6 J**	**1.48 J**	**12.5 J**	**16.1 J**	**12 J**	**22.7 J**	**19.1 J**	**63.2 J**	**44.6 J**	**18.4 J**	**16.8 J**
Indeno(1,2,3-c,d)pyrene	1.12 UJ	1.12 UJ	1.12 UJ	1.12 UJ	1.12 UJ	1.12 UJ	**1.35 J**	1.12 UJ	1.12 UJ	1.4 UJ	1.12 UJ
Naphthalene	**41.9 J**	**19.9 J**	**15.6 J**	**15.3 J**	**14.6 J**	5.47 UJ	**10.8 J**	**9.72 J**	**19.6 J**	**9.1 J**	**19.1 J**
Perylene	1.12 UJ	1.12 UJ	1.12 UJ	1.12 UJ	1.12 UJ	1.12 UJ	**1.75 J**	1.12 UJ	1.12 UJ	1.4 UJ	1.12 UJ
Phenanthrene	**32.1 J**	**3.44 J**	**59.5 J**	**72.3 J**	**80.5 J**	**186 J**	**204 J**	**364 J**	**216 J**	**75.2 J**	**70.9 J**
Pyrene	**7.47**	**5.21**	**37.6**	**50.2**	**179**	**77.6**	**198**	**110**	**102**	**56.9**	**40.6**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 1/2)	1.12 UJ	1.12 UJ	**1.5763 J**	**1.7028 J**	**5.015 J**	**3.675 J**	**12.12 J**	**4.232 J**	**3.512 J**	**2.1031 J**	**1.4656 J**
Total HPAH (SMS) (U = 1/2)	**24.55 J**	**13.86 J**	**117.72 J**	**145.38 J**	**505.39 J**	**294.25 J**	**635.79 J**	**480.83 J**	**367.96 J**	**168.53 J**	**124.07 J**
Total LPAH (SMS) (U = 1/2)	**149.32 J**	**29.02 J**	**107.39 J**	**126.43 J**	**131.46 J**	**248.1 J**	**272.69 J**	**540.37 J**	**358.21 J**	**130 J**	**129.19 J**
Total PAH (SMS) (U = 1/2)	**173.87 J**	**42.88 J**	**225.11 J**	**271.81 J**	**636.85 J**	**542.35 J**	**908.48 J**	**1021.2 J**	**726.17 J**	**298.53 J**	**253.26 J**
Total cPAH TEQ (7 minimum CAEPA 2005) (U = 0)	1.12 UJ	1.12 UJ	**0.8483 J**	**0.9748 J**	**4.903 J**	**3.563 J**	**12.064 J**	**4.12 J**	**3.4 J**	**1.1931 J**	**0.7376 J**
Total HPAH (SMS) (U = 0)	**20.07 J**	**9.38 J**	**114.92 J**	**142.58 J**	**503.71 J**	**292.57 J**	**635.23 J**	**479.15 J**	**366.28 J**	**165.03 J**	**121.27 J**
Total LPAH (SMS) (U = 0)	**149.32 J**	**28.46 J**	**106.83 J**	**125.87 J**	**130.9 J**	**245.36 J**	**272.69 J**	**540.37 J**	**358.21 J**	**129.3 J**	**128.63 J**
Total PAH (SMS) (U = 0)	**169.39 J**	**37.84 J**	**221.75 J**	**268.45 J**	**634.61 J**	**537.93 J**	**907.92 J**	**1019.52 J**	**724.49 J**	**294.33 J**	**249.9 J**

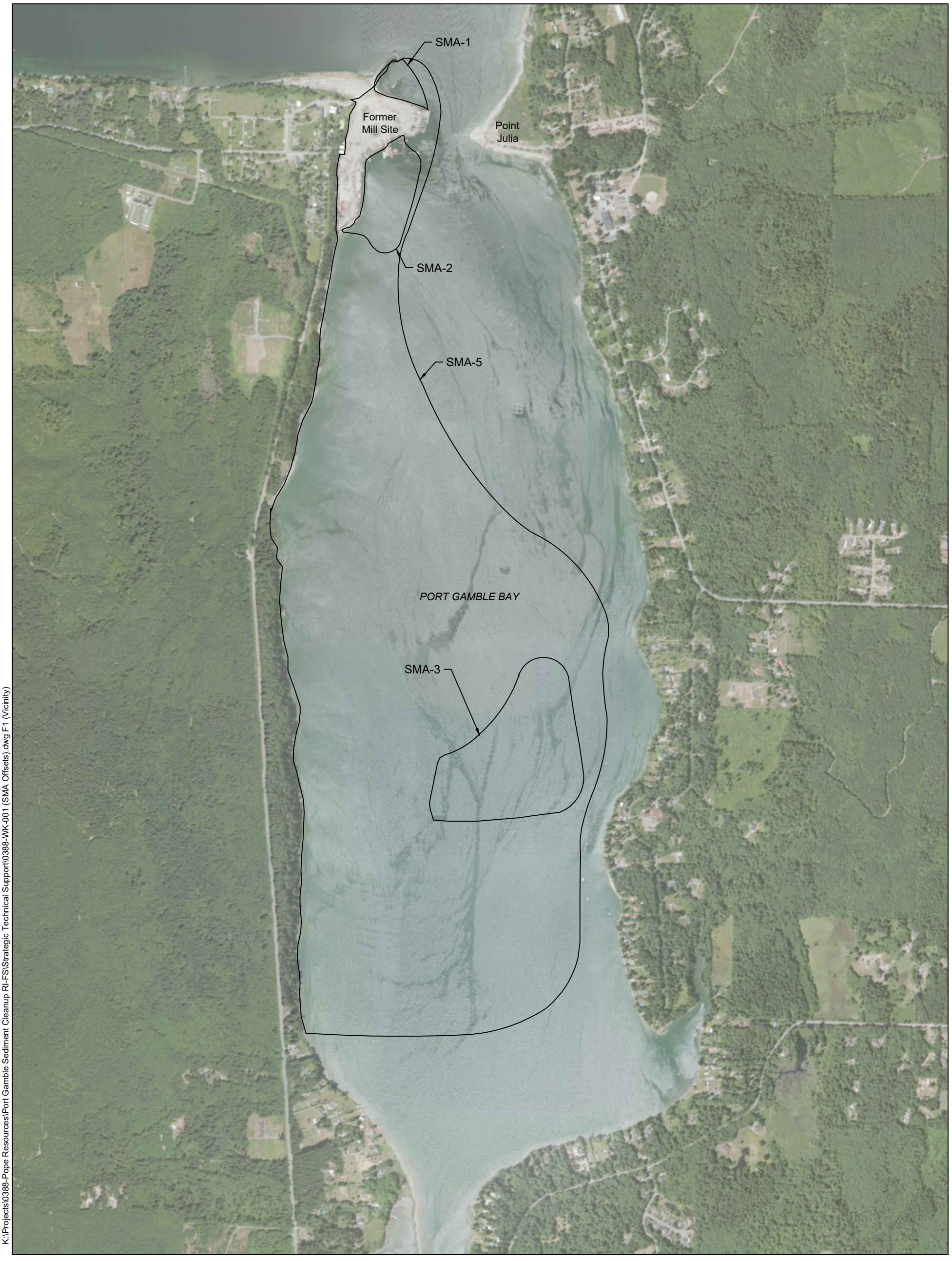
Notes:
Bold = Detected result
-- = results not reported or not applicable

cPAH = carcinogenic polycyclic aromatic hydrocarbon
FB = field blank sample
HPAH = high molecular weight PAH
J = estimated value
LPAH = low molecular weight PAH
N = normal field sample
PAH = polycyclic aromatic hydrocarbons
TEQ = toxic equivalency
U = compound analyzed, but not detected above detection limit
µg/kg = micrograms per kilogram
UJ = Compound analyzed, but not detected above estimated detection limit

Horizontal coordinate datum is NAD 1983 State Plane Washington North FIPS 4601 (US Survey Feet).
All undetect results are reported at the reporting limit.
USEPA Stage 2B data validation was completed by Laboratory Data Consultants (LDC).

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 HPAH are the total of benzo(a)anthracene, benzo(a)pyrene, benzo(x)fluoranthenes, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-c,d)pyrene, and pyrene.
Total LPAH are the total of acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene. 2-Methylnapthalene is not included in the sum of LPAHs.
Total PAH are the total of acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(x)fluoranthenes, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-c,d)pyrene, naphthalene, phenanthrene, and pyrene. 2-Methylnapthalene is not included.
FINAL VALIDATED DATA

FIGURES



K:\Projects\0388-Pope Resources\Port Gamble Sediment Cleanup RI-FS\Strategic Technical Support\0388-WK-001 (SMA Offsets).dwg F1 (Vicinity)

Feb 13, 2018 3:52pm chewett

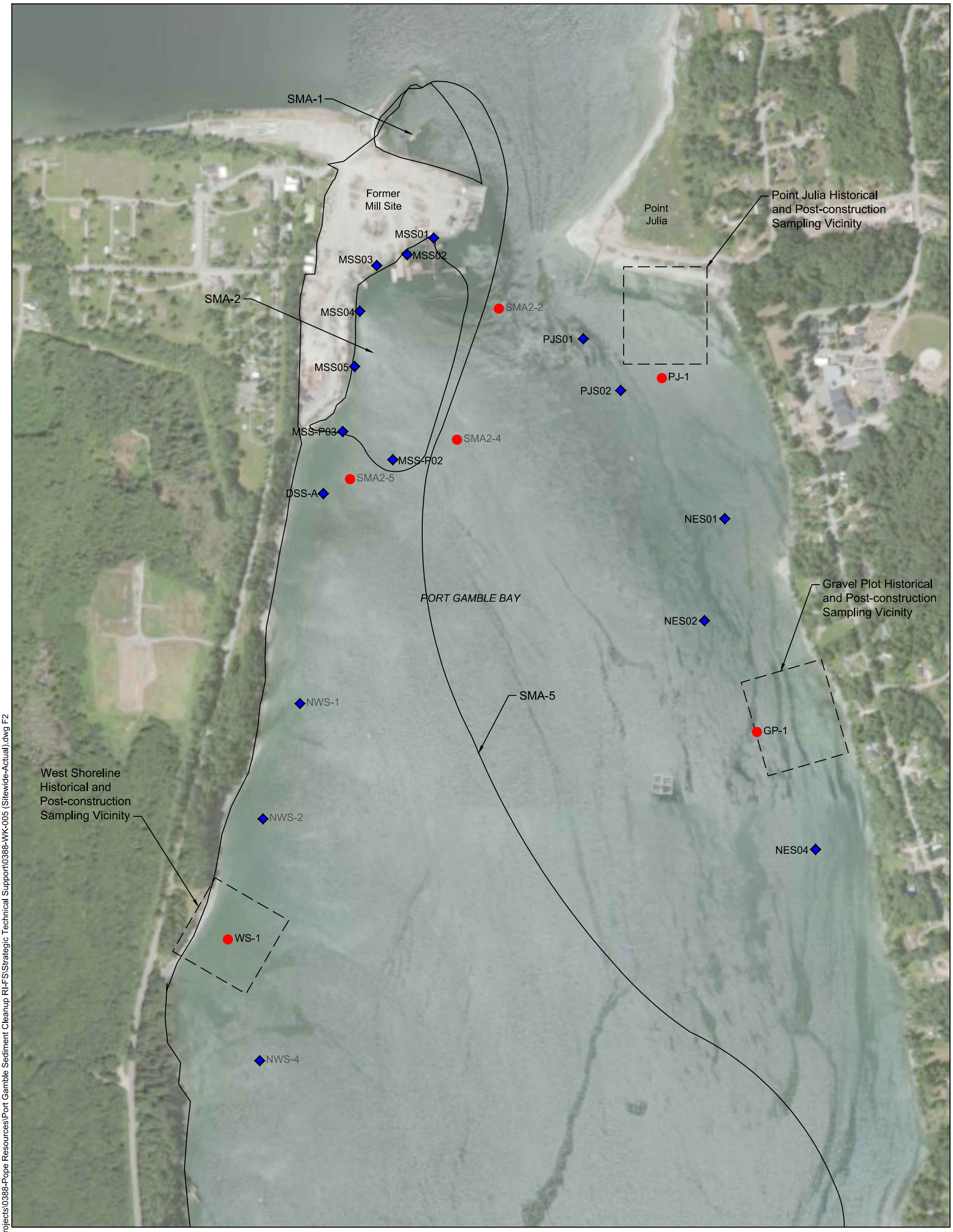
HORIZONTAL DATUM: Washington State Plane North, NAD83, U.S. Feet.

0 1200

Scale in Feet

ANCHOR QEA

Figure 1
Vicinity Map
Shellfish Monitoring Plan
Port Gamble, Washington



K:\Projects\0388-Pope Resources\Port Gamble Sediment Cleanup RI-FS\Strategic Technical Support\0388-WK-005 (Sitewide-Actual).dwg F2

Apr 26, 2016 3:50pm chewett

HORIZONTAL DATUM: Washington State Plane North, NAD83, U.S. Feet.

NOTES:

1. For in-situ wild shellfish sampling, historical sampling areas will be reoccupied and target species to collected will consist of those previously sampled (see Tables 2-5).

LEGEND:

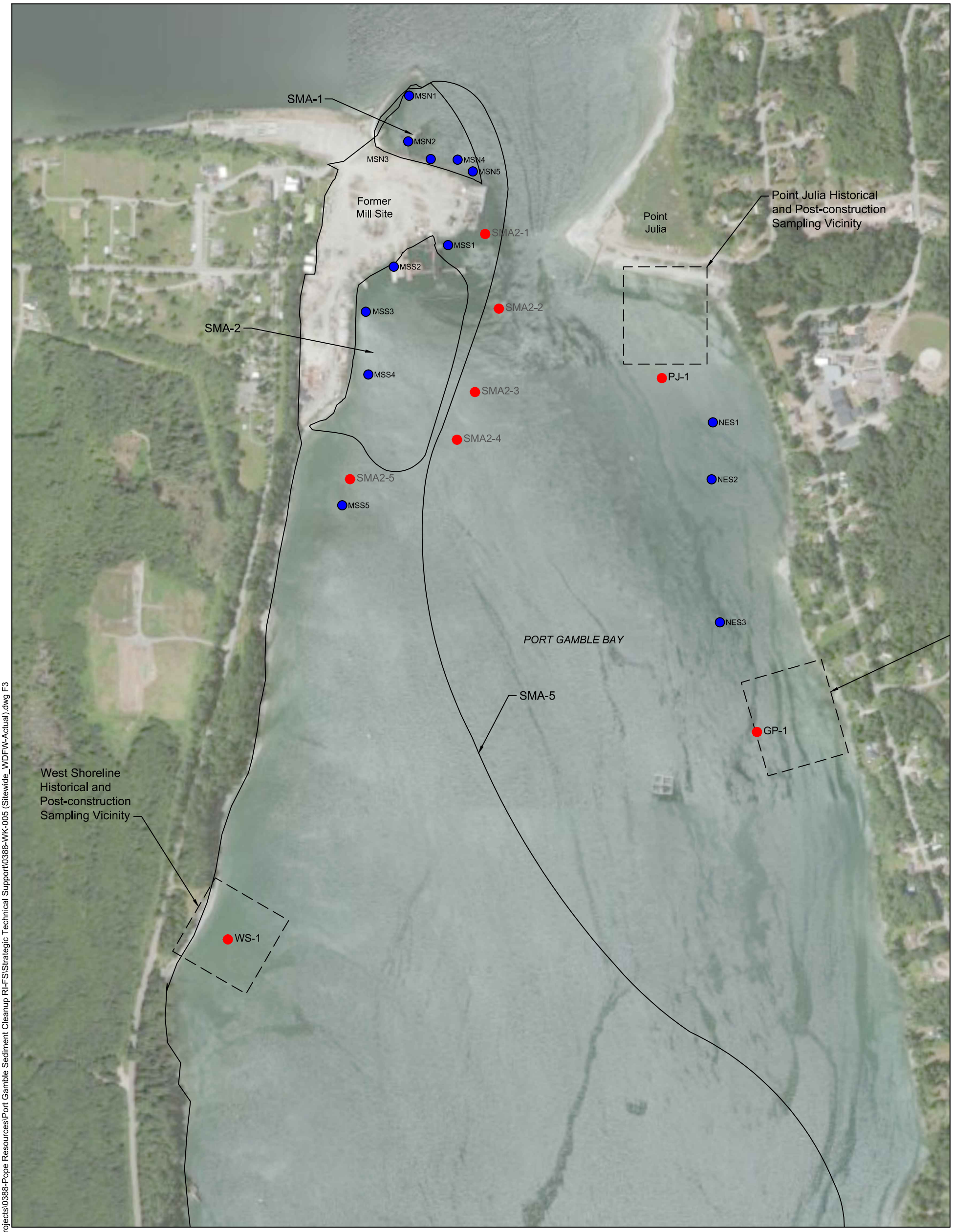
- SMA Area
- WDFW PEMD Sample Location
- Actual CoC Caged Mussel Sample Locations, Year 1

0 600

Scale in Feet

ANCHOR QEA

Figure 2
Caged Mussel Locations
Shellfish Monitoring Plan
Port Gamble, Washington



K:\Projects\0388-Pope Resources\Port Gamble Sediment Cleanup RI-FS\Strategic Technical Support\0388-WK-005 (Sitewide_WDFW-Actual).dwg F3

Apr 26, 2016 3:51pm chewett

HORIZONTAL DATUM: Washington State Plane North, NAD83, U.S. Feet.

NOTES:

1. For in-situ wild shellfish sampling, historical sampling areas will be reoccupied and target species to collected will consist of those previously sampled (see Tables 2-5).

LEGEND:

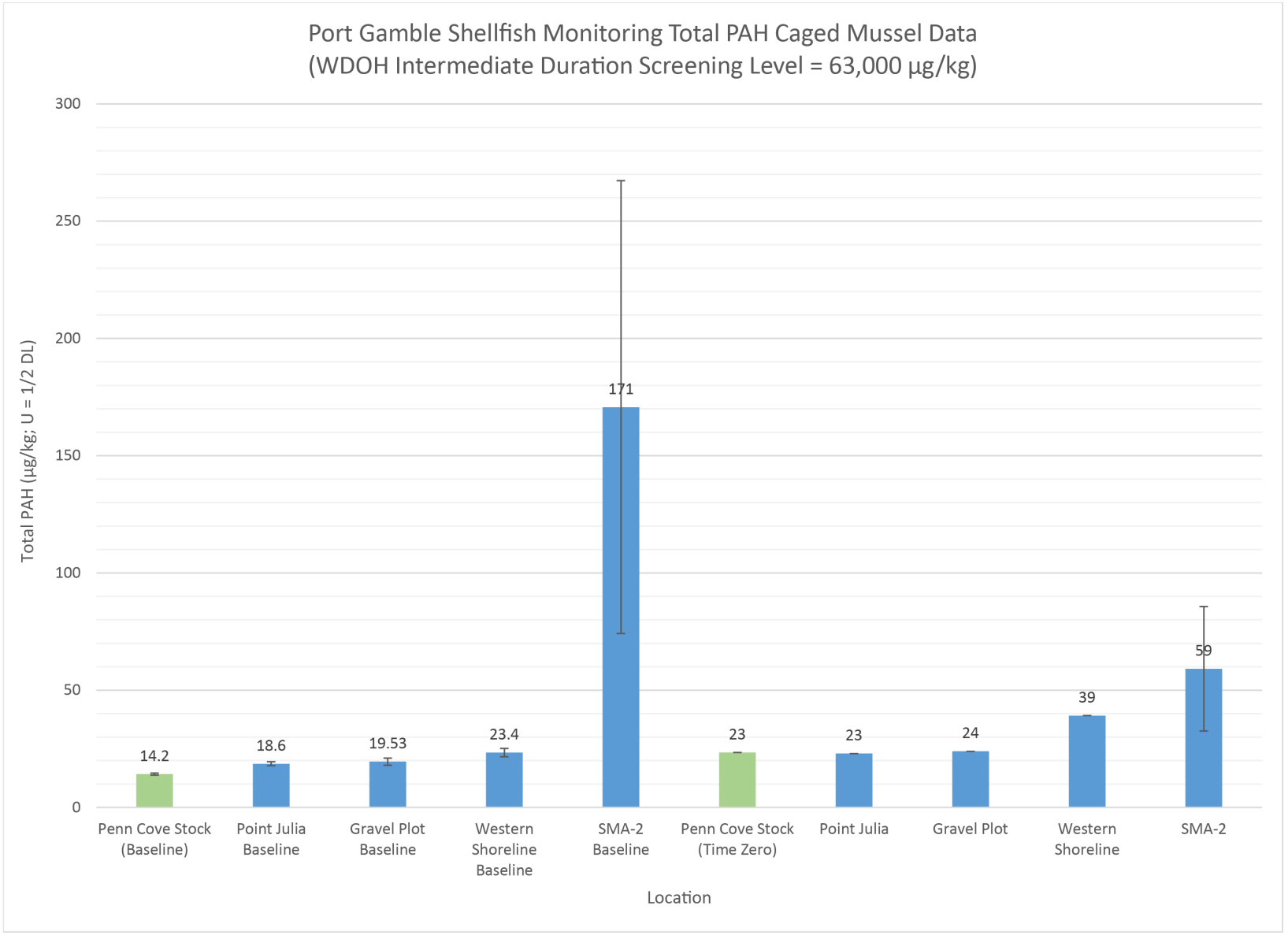
- SMA Area
- WDFW Caged Mussel Sampling Location (2014/2015)
- Actual CoC PEMD Sample Locations, Year 1

0 600

Scale in Feet

ANCHOR QEA

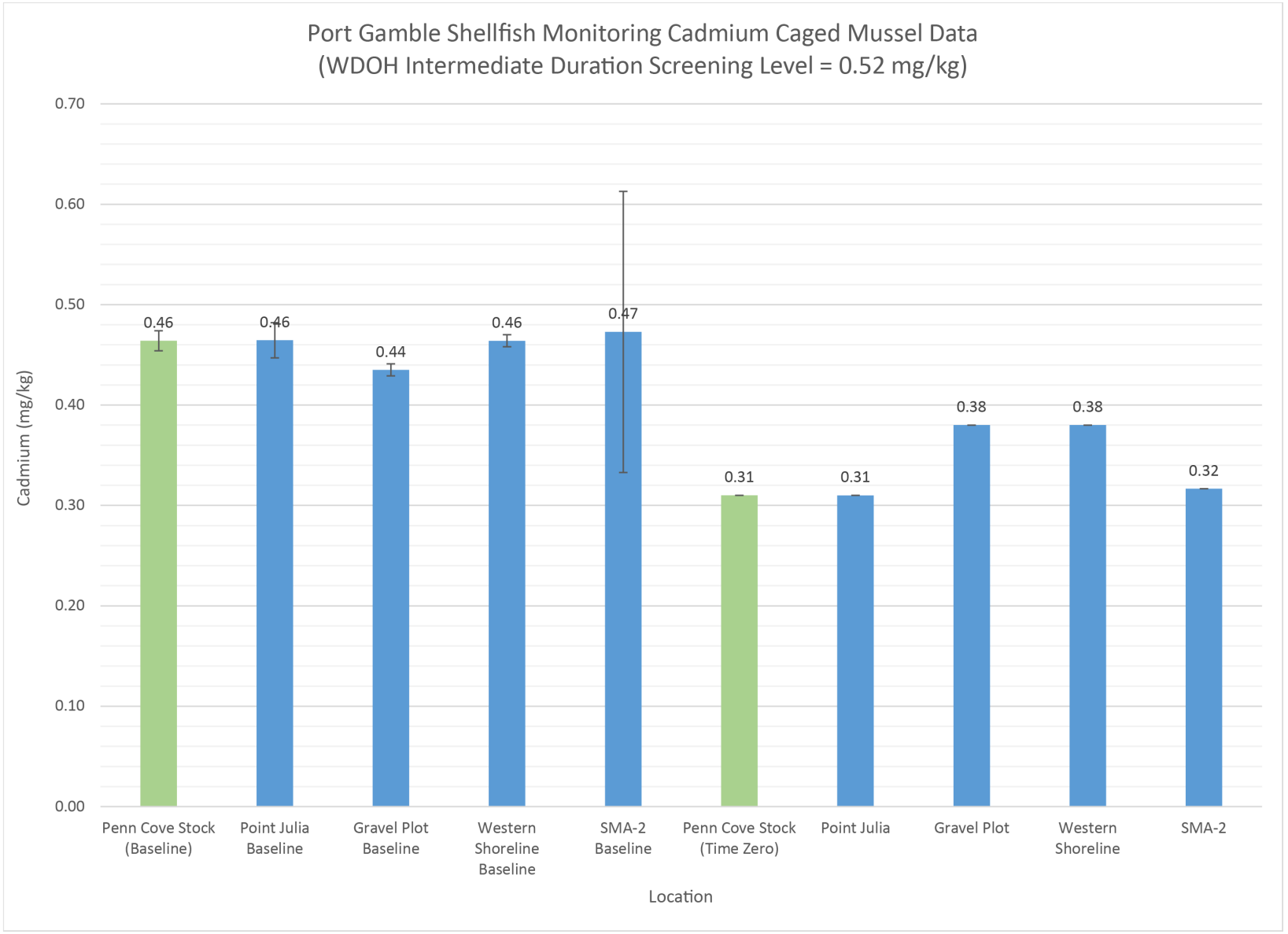
Figure 3
PEMD Locations
Shellfish Monitoring Plan
Port Gamble, Washington



\\FUJI\Anchor\Projects\Port Gamble\2015 Field Investigations\Shellfish Monitoring\Data Reporting\Figures\Fig 4 to 8 Files\Fig 4 to 8.docx

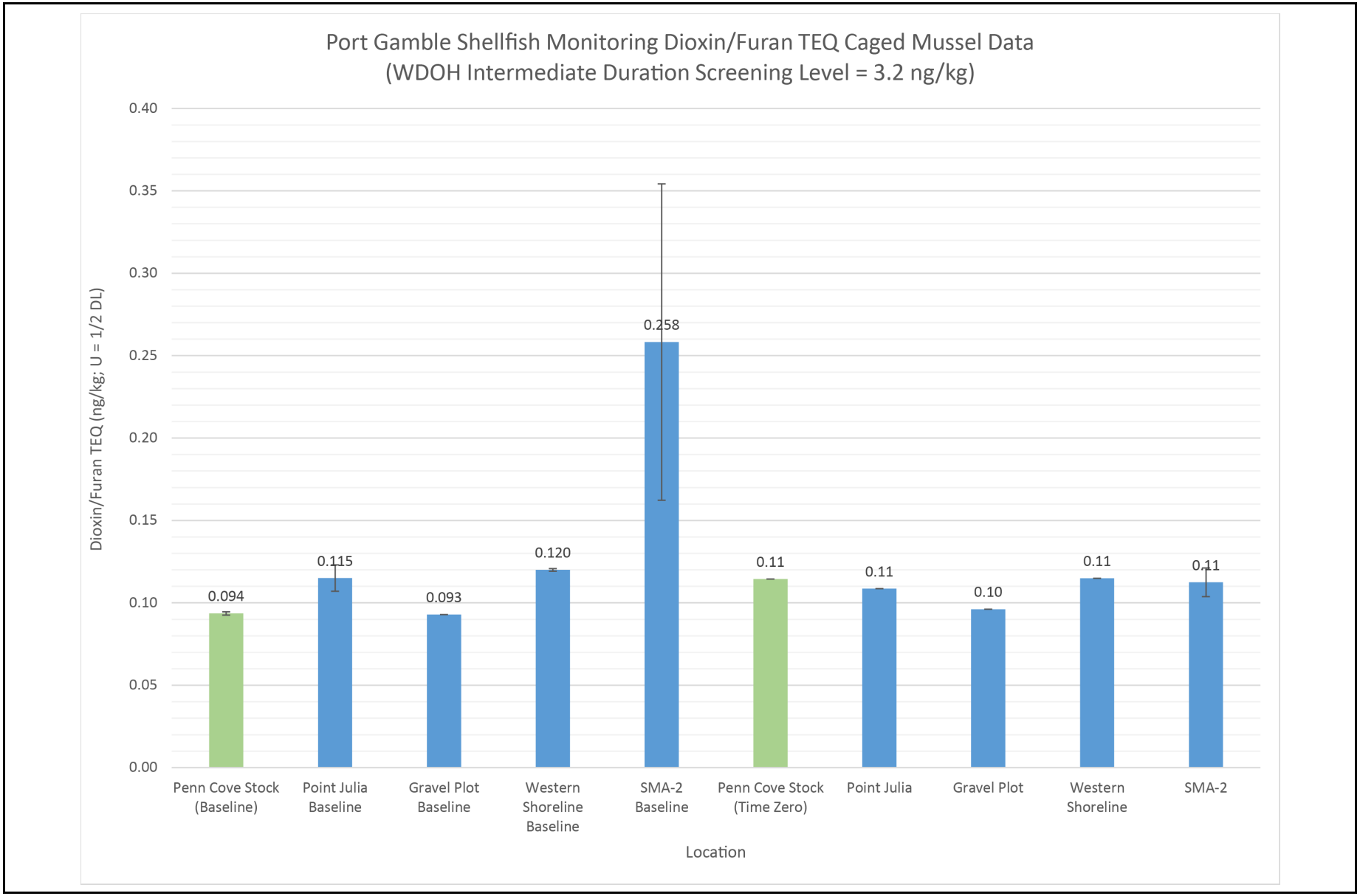
ANCHOR QEA

Figure 4
Caged Mussel Total PAH Chart
Year 1 Shellfish Monitoring Data Report
Port Gamble Bay Cleanup Project



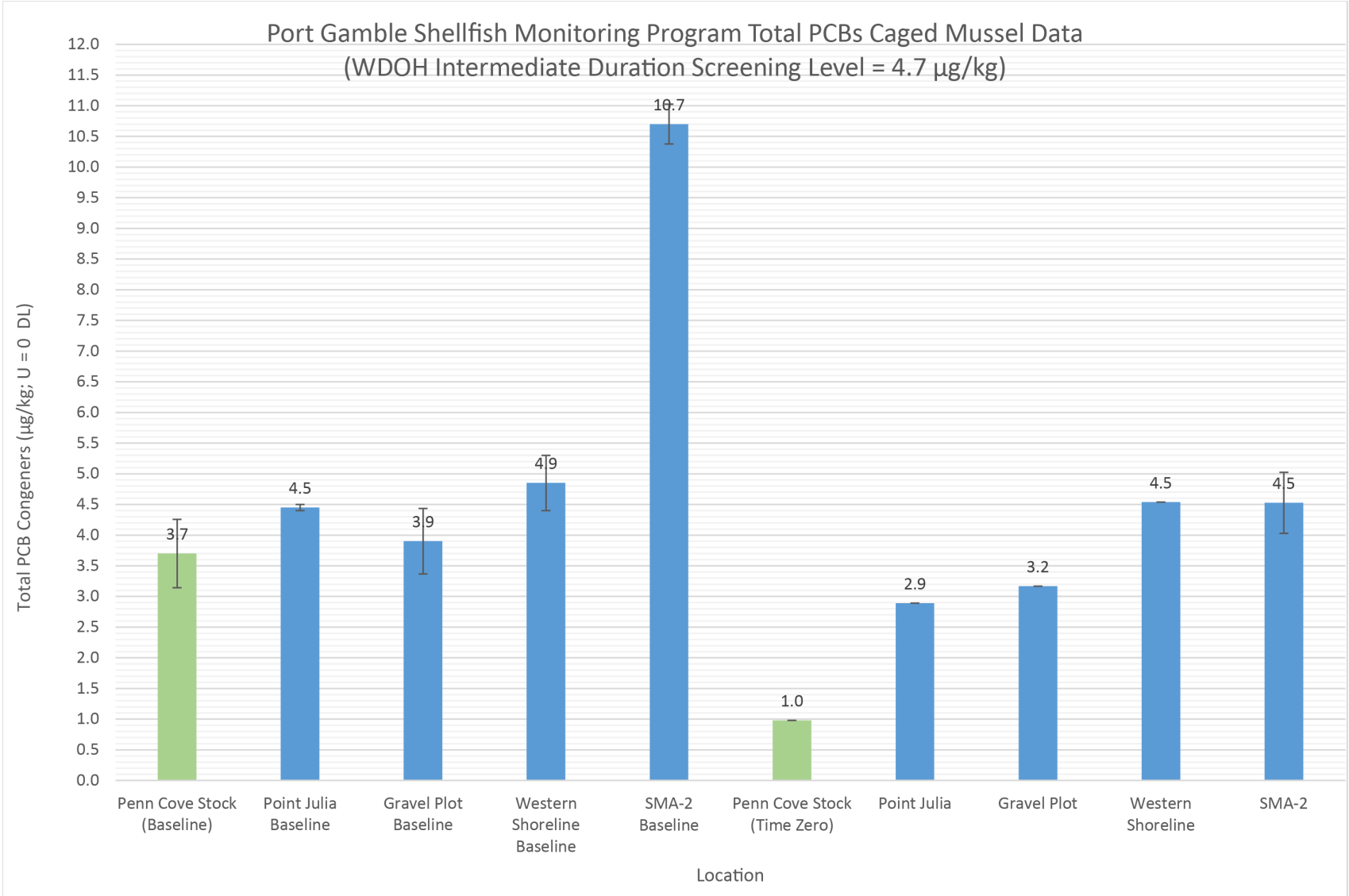
ANCHOR QEA

Figure 5
Caged Mussel Cadmium Chart
Year 1 Shellfish Monitoring Data Report
Port Gamble Bay Cleanup Project



ANCHOR QEA

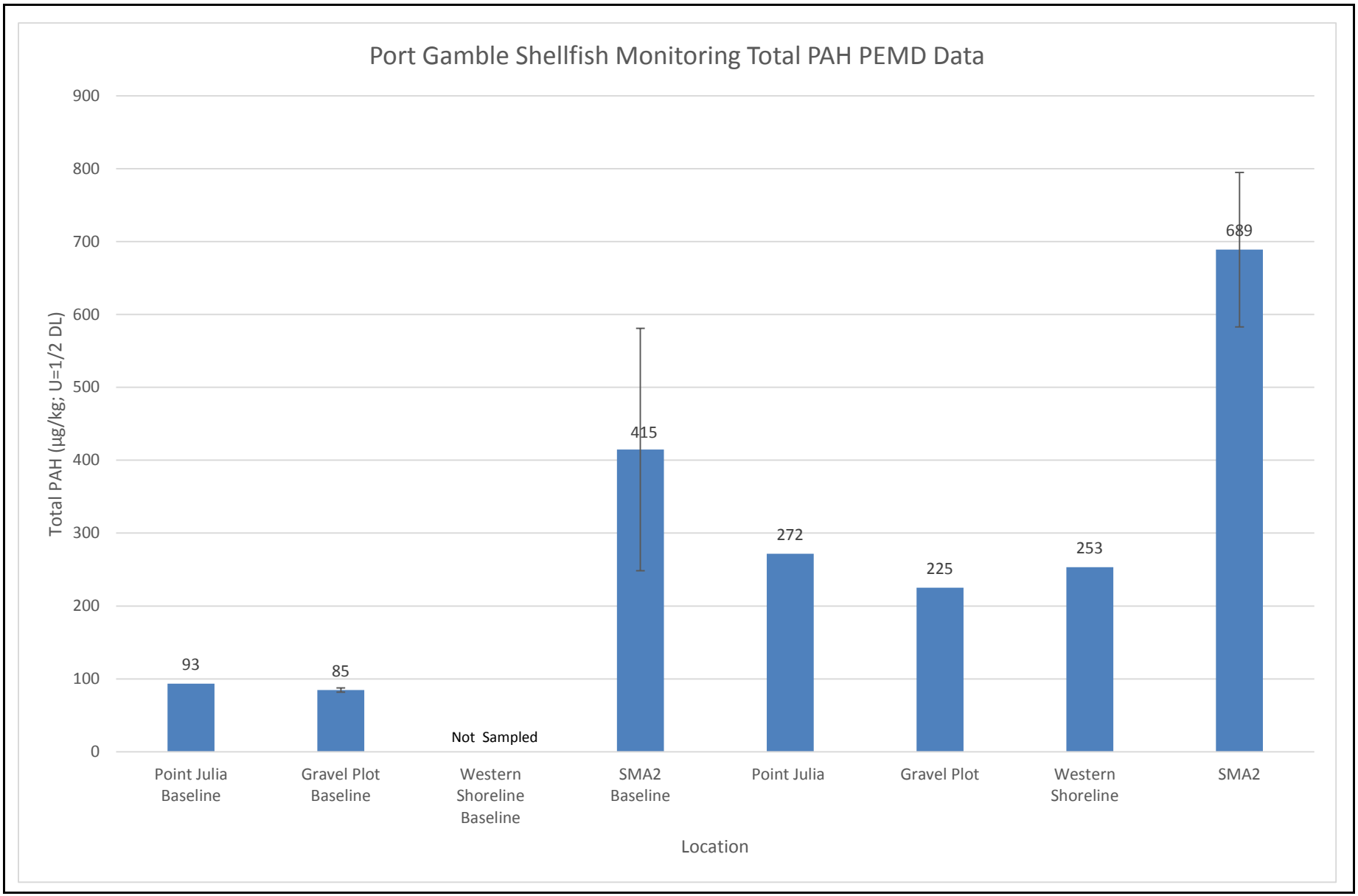
Figure 6
Caged Mussel Dioxins/Furans TEQ Chart
Year 1 Shellfish Monitoring Data Report
Port Gamble Bay Cleanup Project



\\FUJI\Anchor\Projects\Port Gamble\2015 Field Investigations\Shellfish Monitoring\Data Reporting\Figures\Fig 4 to 8 Files\Fig 4 to 8.docx

ANCHOR QEA

Figure 7
Caged Mussel Total PCB Chart
Year 1 Shellfish Monitoring Data Report
Port Gamble Bay Cleanup Project



\\FUJI\Anchor\Projects\Port Gamble\2015 Field Investigations\Shellfish Monitoring\Data Reporting\Figures\Fig 4 to 8 Files\Fig 4 to 8.docx

ANCHOR QEA

Figure 8
PEMD Total PAH Levels
Year 1 Shellfish Monitoring Data Report
Port Gamble Bay Cleanup Project

APPENDIX A
PORT GAMBLE BAY SHELLFISH MONITORING PLAN

SHELLFISH MONITORING PLAN
PORT GAMBLE BAY CLEANUP PROJECT

Prepared for

Washington State Department of Ecology

Washington Department of Health

Pope Resources, LP/OPG Properties, LLC

Prepared by

Anchor QEA, LLC

Port Gamble S'Klallam Tribe

May 2015

SHELLFISH MONITORING PLAN
PORT GAMBLE BAY CLEANUP PROJECT

Prepared for

Washington State Department of Ecology

Washington Department of Health

Pope Resources, LP/OPG Properties, LLC

Prepared by

Anchor QEA, LLC

Port Gamble S'Klallam Tribe

May 2015

TABLE OF CONTENTS

List of Tables

List of Figures

List of Appendices

LIST OF ACRONYMS AND ABBREVIATIONS

µg	micrograms
CAP	*Final Cleanup Action Plan*
CD	Consent Decree
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CLP	Contract Laboratory Program
CoC	contaminant of concern
cy	cubic yard
DGPS	Differential Global Positioning System
DQO	data quality objective
Ecology	Washington State Department of Ecology
EDL	estimated detection limit
EDR	*Engineering Design Report*
EMNR	enhanced monitored natural recovery
FDA	Food and Drug Administration
GPS	global positioning system
HAZWOPER	Hazardous Waste Operations and Emergency Response
HDPE	high-density polyethylene
MDL	method detection limit
mg/kg	milligrams per kilogram
MLLW	mean lower low water
mm	millimeters
MRL	method reporting limit
MTCA	Model Toxics Control Act
NELAC	National Environmental Laboratory Accreditation Conference
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PEMD	polyethylene membrane device

PGST	Port Gamble S'Klallam Tribe
PR/OPG	Pope Resources, LP/OPG Properties, LLC
PSP	paralytic shellfish poisoning
RCW	Revised Code of Washington
QA	quality assurance
QC	quality control
SOP	standard operating procedure
SMA	sediment management area
SMS	Sediment Management Standards
SMP	Shellfish Monitoring Plan
USACE	U.S. Army Corps of Engineers
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDOH	Washington Department of Health

1 INTRODUCTION

Port Gamble Bay ("Site") is one of seven bays in Puget Sound identified for sediment cleanup under Ecology's Toxics Cleanup Program Puget Sound Initiative. Site cleanup requirements are described in the *Final Cleanup Action Plan* (CAP; Ecology 2013), and will be implemented 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/ Olympic Property Group, LLC (PR/OPG), entered in December 2013. The *Engineering Design Report* (EDR; Anchor QEA 2014) presents detailed plans for the cleanup project, which will be performed by PR/OPG under Ecology oversight.

Cleanup of the Site is being performed consistent with the requirements of the Model Toxics Control Act (MTCA), Chapter 70.105D in the Revised Code of Washington (RCW), as administered by Ecology under the MTCA Cleanup Regulation, Chapter 173-340 of the Washington Administrative Code (WAC), and with the Sediment Management Standards (SMS) Chapter 173-204 WAC. Cleanup actions will also comply with the requirements of the U.S. Army Corps of Engineers (USACE) Nationwide 38 Permit for the Port Gamble Bay Cleanup Project (NWS-2013-1270).

This *Shellfish Monitoring Plan* (SMP) describes the sampling and analysis plan for shellfish monitoring to be conducted during pile removal, intertidal excavation, and dredging activities and immediately following completion of cleanup construction actions at the Site. While not a MTCA or SMS requirement, shellfish monitoring will be performed as requested by tribes, consistent with USACE permit requirements. This SMP describes data quality objectives (DQOs), sampling and analytical methods, quality assurance/quality control (QA/QC) procedures, and data management to monitor shellfish during pile removal, intertidal excavation, and dredging activities and immediately following completion of cleanup construction actions.

1.1 Project Overview

Cleanup construction activities within individual sediment management areas (SMAs) of the Site will include the following (Figure 1):

- Removal of approximately 5,800 creosote-treated wood piles as practicable (including piles supporting overwater structures), along with approximately 55,000 square feet of overwater structure
- Excavation (primarily during low tide conditions) of approximately 26,000 cubic yards (cy) of intertidal sediments in SMA-1 and SMA-2, and capping/backfilling the excavation areas with 24 inches of clean material
- Dredging of approximately 40,000 cy of subtidal wood waste in SMA-1 and SMA-2, and placement of a 6-inch-thick layer of clean sand/silt to manage dredging residuals
- Advanced mitigation of impacts to existing native eelgrass in some of the SMA-1 and SMA-2 dredging areas by constructing and planting 24,000 square feet of eelgrass habitat at a 1:1 ratio in a mitigation area located in the southern portion of SMA-2
- Placement of a 1-foot-thick layer of silty sand and/or gravel material over approximately 3 subtidal acres in SMA-1, and placement of a 4-foot-thick sand and/or silt cap over approximately 7 subtidal acres in SMA-2
- Placement of 6 inches of sand/silt enhanced monitored natural recovery (EMNR) material over approximately 68 subtidal acres in SMA-2 and SMA-3

The cleanup action is described in detail in the EDR (Anchor QEA 2014).

Sampling and analysis during construction will be performed using various methods to address overall project monitoring objectives, including:

- **Water Quality Monitoring**: described in the *Water Quality Monitoring Plan* included as a part of Appendix E to the EDR, and performed by PR/OPG's contractors with Ecology oversight (separate from this SMP)
- **Shellfish Biotoxin Monitoring**: described in this SMP using caged mussel sampling performed by the Port Gamble S'Klallam Tribe (PGST) and paralytic shellfish poisoning (PSP) analysis performed by Washington Department of Health (WDOH)
- **Shellfish Contaminant of Concern (CoC) Monitoring:** described in this SMP using three complementary monitoring approaches performed by PR/OPG's contractors:
  - Caged mussel sampling and analysis of CoCs
  - Monitoring of water column carcinogenic polycyclic aromatic hydrocarbon (cPAH) concentrations using passive ethylene membrane devices (PEMDs)

- In situ shellfish monitoring if caged mussel tissue concentrations exceed intermediate risk screening levels, and at the completion of in-water construction (currently anticipated in January 2017)

The shellfish biotoxin and CoC monitoring plans are described in detail in this SMP.

1.2 Study Area

Port Gamble Bay is located in Kitsap County and encompasses more than 2 square miles of intertidal and subtidal habitat. The bay and surrounding areas support diverse aquatic and upland habitats, as well as resources for fishing, shellfish harvesting, and many other aquatic uses. The area surrounding the bay remains largely rural in nature, though more than 100 acres of the basin are currently in commercial land use, largely in the Gamble Creek watershed. The PGST Reservation is located east of the bay.

The Site is divided into SMAs as shown on Figure 1. Shellfish monitoring will be conducted during cleanup construction activities within SMA-1, SMA-2, and SMA-3.

1.3 Construction Sequencing

The cleanup project is anticipated to be completed within two construction seasons, and will be sequenced to maximize overall protectiveness. Subject to final permitting approvals, full-scale construction is scheduled to begin in July/August 2015. Work will occur during approved in-water work windows, with demolition preceding excavation, and intertidal excavation above mean lower low water (MLLW) occurring in dry conditions prior to subtidal dredging. Dredging and excavation will be followed by placement of clean residuals cover, EMNR material, and in-water engineered caps. All construction actions within an individual SMA are targeted to be completed within a single construction season; placement of eelgrass habitat bench material in SMA-2 will occur in Year 1. This SMP assumes that 2015 construction will begin in SMA-2; however, the selected contractor will refine the construction sequence and schedule as appropriate, subject to Ecology approval.

1.4 Human Health Contaminants

The CAP (Ecology 2013) evaluated a series of human health CoCs: metals (arsenic, cadmium, copper, and mercury), cPAHs, polychlorinated biphenyls (PCBs), and dioxins/furans. Of this list, cadmium, cPAHs, and dioxins/furans were identified as Site-related human health CoCs. Ecology identified cPAHs as the primary human health CoC throughout the Site; dioxins/furans were identified as a human health CoC in limited areas of the Site, and cadmium was identified as a low-level human health CoC.

In addition to the Site-related CoCs, the affected tribes are also interested in expanding shellfish monitoring to include PCBs. Moreover, PGST and WDOH currently monitor biotoxins to inform tribal members and the public about potential PSP risks from consumption of shellfish harvested from Port Gamble Bay. These additional monitoring elements are included in this SMP.

1.5 Tissue Screening Levels

This section describes shellfish tissue screening levels and response actions if screening levels are exceeded for biotoxins and/or CoCs resulting from in-water construction activities. A summary of the screening levels are presented in Table 1; further details are provided in Sections 1.5.1 and 1.5.2.

1.5.1 Shellfish Biotoxin Monitoring

PSP is a serious illness, caused by eating shellfish that have consumed large amounts of toxin-producing microscopic phytoplankton. Throughout the Pacific Coast, *Alexandrium sp.* is the primary cause of PSP, and most species of shellfish in Washington have been found to contain PSP toxin at one time or another (WDOH 2015a). *Alexandrium* is a dinoflagellate that spends part of its life cycle as a cyst in the sediment before germinating to become a vegetative cell (Anderson 1998). Once vegetative cells enter the water following cyst germination, their growth and transport are affected by circulation, nutrients, stratification, and other chemical and physical factors including sunlight, water temperature, and salinity (Anderson 1998; USEPA 2013). Mussels have been shown to rapidly accumulate PSP toxin. As a result, the PSP toxin levels in mussels are a good index of the abundance of *Alexandrium sp*. present in the water column.

Mussels placed in cages at strategic sites are currently used as the primary element of the WDOH marine biotoxin monitoring and contingency plan (WDOH 2015a). Within Port Gamble Bay, a single sentinel caged mussel tissue location has been established at a primary PGST shellfish harvesting beach (Figure 2), and is currently monitored by PGST and WDOH every other week from May through October. Advisory closures are in effect when any mussel sample equals or exceeds Food and Drug Administration (FDA) regulatory levels (equal to or greater than 80 micrograms [µg] of PSP toxin per 100 g of shellfish tissue; Table 1). An area is reopened when two successive samples, collected at least 7 days apart, fall below 80 µg/100 g of PSP toxin.

In addition to the current monitoring by WDOH and PGST, PGST will perform additional weekly sampling of caged mussels during in-water construction (i.e., pile removal, intertidal excavation, and/or subtidal dredging) from July 15 to October 31. Between November 1 and January 14, PGST will sample caged mussels every other week. Additional sampling will be conducted by PGST using the same procedures currently used by WDOH for their ongoing PSP monitoring in Port Gamble Bay. PR/OPG will be responsible for payment of these additional samples that are above and beyond the current every other week sampling between May and October.

If PSP toxins are detected above FDA regulatory levels in caged mussels, WDOH performs in situ sampling and PSP analysis of subsistence species (oyster, manila, cockle, and butter clam), as this constitutes a public health necessity. WDOH will determine the appropriate frequency for in situ subsistence sampling based on results, and will continue sampling until all species are non-detect for PSP.

Because PSP outbreaks cannot generally be controlled once they are initiated, no contingency actions related to the cleanup will be required if a PSP outbreak occurs in Port Gamble Bay during the first in-water construction season. WDOH may decide to initiate closures of shellfish beds depending on the nature and extent of the PSP outbreak. If a PSP exceedance occurs during the first in-water construction season, adaptive management measures may be implemented during the second in-water construction season, depending on the cause of the PSP outbreak. In addition, if no potential cleanup-related PSP

exceedances occur during the first construction season, the PSP monitoring may be adjusted as appropriate during the second construction season.

1.5.2 Shellfish CoC Monitoring

As discussed in the CAP (Ecology 2013), in addition to reducing risks to benthic organisms from wood waste exposure, one of the other primary objectives of the Port Gamble Bay cleanup project is to:

> *Eliminate, reduce, or otherwise control to the extent practicable risks to humans from ingestion of seafood containing chemicals that exceed risk-based concentrations and/or natural background concentrations.*

The CAP (Ecology 2013) recognized the potential for short-term increases in risks from pile and sediment removal, and balanced such short-term risks with the long-term protection that will result from removing these materials. The EDR incorporates best management practices and other engineering controls to minimize cleanup-related CoC releases and exposures to the extent practicable. Nevertheless, increases in short-term shellfish tissue CoC concentrations, particularly at locations immediately adjacent to SMA-1 and SMA-2, are possible during construction of the Port Gamble Bay cleanup project, followed by accelerated long-term recovery.

In consideration of the overall objectives of the Port Gamble Bay cleanup project, WDOH (2015b) developed short-term shellfish tissue screening levels for intermediate-duration shellfish consumption exposures using toxicological profile data for Site CoCs (as well as PCBs) available from the Agency for Toxic Substances and Disease Control for non-cancer endpoints, based the most sensitive endpoint that, in their best judgment, represents the most sensitive human health effect for a given exposure route and duration. The WDOH screening levels, which assumed a high-level (subsistence) shellfish consumption rate of 499 g per day, are summarized in Table 1. Because the WDOH calculated screening level for cadmium (0.079 milligrams per kilogram [mg/kg]) is below the natural background tissue concentration reported by Ecology (2012), the cadmium screening level was revised upwards to two times the natural background tissue level (0.52 mg/kg; see Table 1). The screening levels will be refined and updated as necessary during implementation of this SMP.

The caged mussel PSP and CoC monitoring data will be compared with appropriate tissue screening levels. If tissue screening levels are exceeded in caged mussel tissue samples during in-water removal actions (i.e., pile removal, intertidal excavation, and subtidal dredging), supplemental in situ shellfish monitoring will be conducted as specified in Sections 2.1.1.3 and 2.1.1.4. In situ shellfish monitoring for CoCs will also be performed at the completion of in-water construction in Year 2 (currently anticipated January 2017) to document post-construction shellfish quality conditions.

There are no screening levels for in situ shellfish monitoring, though the values summarized in Table 1 may be used by tribal shellfish managers and WDOH to provide advisories to tribal members and the public. Similarly, there are no screening levels for passive sampling of water column PAH concentrations using PEMDs. However, PEMD results will be compared with caged mussel tissue PAH concentrations to evaluate the effectiveness of PEMDs as a proxy to more precisely monitor tissue PAH concentration trends.

1.6 Baseline Monitoring Data

Baseline data are available for all shellfish monitoring elements to allow comparison with data collected during the in-water construction period. As described in more detail in later sections of this document, all data collected under this SMP will be obtained using methods and procedures equivalent to those used during the baseline monitoring. Baseline monitoring stations to be reoccupied as part of this SMP are depicted in Figure 2. The available SMP baseline data are summarized as follows:

- Shellfish Biotoxin Monitoring: Biweekly PSP analyses of samples collected during the May to October period since 2008 from the PGST beach location (Figure 2) are summarized in Appendix A-1.
- Shellfish CoC Monitoring:
  - *Caged mussel sampling and analysis of CoCs:* Caged mussels were deployed at 28 locations in Port Gamble Bay in December 2014, and successfully retrieved in February 2015 (WDFW 2014a). Mussel tissue samples were analyzed for cPAHs, dioxins/furans, cadmium, PCBs, and other ancillary chemicals; the baseline data are summarized in Appendix A-2 (*pending until June/July 2015*).

- *Water column cPAH monitoring using PEMDs:* As part of the Ecology/ Washington Department of Fish and Wildlife (WDFW) herring embryo study (WDFW 2014b), PEMDs were deployed at 40 locations in Port Gamble Bay between February and April 2014, and equilibrated for 10 days before retrieval. PEMDs were analyzed for cPAHs and other ancillary chemicals; the baseline data are summarized in Appendix A-3 (*pending until June/July 2015*).
- *In situ shellfish monitoring:* In situ shellfish tissue sampling data have been collected by Ecology and PGST since 2008 within six primary shellfish harvesting areas of Port Gamble Bay (Point Julia, Gravel Plot, The Bars, Central Bay, Western Shoreline, and Mill Site). Sampled species have included mussels, oysters, cockles, littleneck clams, horse clams, manila clams, geoduck, and Dungeness crab. Tissue samples were analyzed for cPAHs, dioxins/furans, cadmium, PCBs, and other ancillary chemicals. The baseline data for harvesting areas targeted in this SMP (i.e., Point Julia, Gravel Plot, Western Shoreline, and SMA-3) are summarized in Appendix A-4.

1.7 Document Organization

The remainder of this document is organized as follows:

- **Section 2, Data Generation and Acquisition**: This section summarizes the sampling design, sampling and processing methods, sample handling and chain-of-custody procedures, laboratory analytical methods, QA/QC procedures, and data management.
- **Section 3, Project Management**: This section describes the project purpose, project organization and responsibilities, project task schedule, DQOs, and special training requirements.
- **Section 4, Assessments and Oversight:** This section includes compliance assessments, response and corrective actions, and reports to management.
- **Section 5, Data Validation and Usability**: This section describes data validation and verification methods and criteria for usability of data.
- **Section 6, References:** This section presents relevant citations or reference material.

2 DATA GENERATION AND ACQUISITION

This section summarizes the sampling design, sampling and processing methods, sample handling, laboratory methods, and QA/QC measures.

2.1 Sampling Design

The shellfish monitoring sampling design is summarized in Table 2 and described in detail in subsequent sections. Monitoring includes the collection and analysis of shellfish tissue for biotoxin and CoC analyses as well as passive sampling with PEMDs for PAH analysis.

2.1.1 Shellfish Tissue Sampling

Shellfish tissue sampling includes using caged mussels to monitor biotoxin and CoC concentrations during in-water construction (i.e., pile removal, intertidal excavation, and/or subtidal dredging) in SMA-1 and SMA-2. In addition, in situ shellfish sampling will be performed if caged mussel tissue concentrations exceed intermediate risk screening levels, and also at the completion of in-water construction actions in Year 2 (anticipated January 2017).

2.1.1.1 Caged Mussel Biotoxin Sampling Design

Shellfish biotoxin monitoring will be conducted in conjunction with PGST's and WDOH's ongoing PSP monitoring in Port Gamble Bay, and will follow methods and procedures described in the *Marine Biotoxin Contingency Plan* (WDOH 2015a). Adult Pacific blue mussels (*Mytilus trossulus;* obtained from Penn Cove Shellfish, Inc. in Whidbey Island, Washington) will be deployed during Years 1 and 2 in-water construction periods to assess effects during pile removal, intertidal excavation, and/or subtidal dredging. Sampling will occur weekly from July 15 to October 31 and every other week from November 1 to January 14.

Caged mussel deployment and sampling will be performed by PGST at the same sentinel station used historically within Port Gamble Bay, placed within the subtidal zone near a primary PGST shellfish harvesting beach (Figure 2). Composite mussel tissue will be

analyzed for PSP by the WDOH laboratory as described in the *Marine Biotoxin Contingency Plan* (WDOH 2015a).

2.1.1.2 Caged Mussel CoC Sampling Design

The caged mussel CoC sampling design follows methods and procedures used during the baseline study in Port Gamble Bay (WDFW 2014a). All cages will be placed immediately above the sediment surface. Adult Pacific blue mussels will be placed in cages and will remain in situ for 60 days prior to retrieval and tissue resection/analysis.

During Year 1 construction actions, and subject to refinement of project sequencing and scheduling (see Section 1.3), caged mussels will be deployed at five locations located 300 feet offshore of the SMA-2 subtidal dredging areas (Figure 3), as well as at three primary shellfish harvesting beaches in Port Gamble Bay (Point Julia, Gravel Plot, and Western Shoreline; see Figure 2). The 300-foot offset from subtidal dredging areas will help ensure that the cages remain intact during construction actions, and are also located close enough to the removal areas to reflect potential transport of CoCs. During Year 2 construction actions, and again subject to refinement of project sequencing and scheduling (see Section 1.3), caged mussels will be deployed at three locations located 300 feet offshore of SMA-1 dredging areas, two representative locations adjacent to SMA-2 (identified based on review of Year 1 sampling data), and at the three primary shellfish harvesting beaches in Port Gamble Bay (Point Julia, Gravel Plot, and Western Shoreline).

Deployment of caged mussels for CoC monitoring will occur during two periods in Year 1:

- September/October 2015 – after pile removal and/or intertidal excavation is underway, but prior to the initiation of subtidal dredging
- January/February 2016 – shortly following completion of Year 1 in-water construction actions

A similar deployment schedule is anticipated in Year 2, subject to refinement based on the results of the Year 1 monitoring.

Composite samples of caged mussel tissue collected from each of the sampling locations will be analyzed for PAHs, dioxins/furans, cadmium, PCBs, and lipids (Table 2).

2.1.1.3 In Situ Shellfish Biotoxin Sampling Design

As discussed in Section 1.5.2, contingent in situ shellfish PSP monitoring will be performed by WDOH if caged mussel tissue concentrations exceed the screening level provided in Table 1.

2.1.1.4 In Situ Shellfish CoC Sampling Design

In situ shellfish monitoring for CoCs will be performed if caged mussel tissue concentrations exceed intermediate risk screening levels listed in Table 1, and also at the completion of in-water construction actions in Year 2 (anticipated January 2017). In situ shellfish sampling will be performed at three primary intertidal shellfish harvesting beaches in Port Gamble Bay (Point Julia, Gravel Plot, and Western Shoreline; see Figure 2), and will target species included in the baseline sampling (mussels, oysters, cockles, littleneck clams, horse clams, and manila clams; see Appendix A-4). In addition, geoduck and Dungeness crab (muscle and hepatopancreas tissue) sampling will be performed in subtidal areas of SMA-3 using divers (Table 2).

At each of the four in situ shellfish sampling locations (Point Julia, Gravel Plot, Western Shoreline, and SMA-3), approximately 5 to 20 composite tissue samples of the predominant shellfish species will be collected, consistent with the baseline data set, and analyzed for PAHs, dioxins/furans, cadmium, PCBs, and lipids (Table 2).

2.1.2 Water Column PAH Monitoring Using PEMDs

Concurrent with the caged mussel CoC sampling discussed above, PEMDs will be co-deployed at the same caged mussel locations in Port Gamble Bay (Figures 2 and 3), and during four separate sampling events (mid-season and post season events in Years 1 and 2). The PEMD sampling design follows methods and procedures used during the baseline study in Port Gamble Bay (WDFW 2014b).

Consistent with the baseline study (WDFW 2014b), PEMDs will equilibrate in situ for 10 days (i.e., retrieved prior to completion of the caged mussel CoC deployments). PEMDs will be analyzed for PAHs. Because a 10-day deployment is far too short for dioxins/furans to reach near-equilibrium in the PEMDs, and also because no baseline dioxin/furan PEMD data were collected (WDFW 2014b), dioxin/furan analysis will not be performed on the PEMD samples. However, as discussed in Section 2.1.1.2, dioxins/furans will be analyzed as part of the caged mussel CoC monitoring (Table 2).

2.2 Sample Collection, Processing, and Handling Procedures

This section describes activities, methods, and procedures for sample collection, processing, and handling. A list of station identifications, sampling locations, sample type and method, and analytical testing is provided in Table 2.

2.2.1 Caged Mussels

Biotoxin and CoC concentrations in shellfish during construction will be determined using methods provided in *Standard Guide for Conducting In-situ Field Bioassays with Caged Bivalves* (ASTM E2122-02, 2007) and the WDFW Port Gamble Bay baseline study (2014a). Caged mussels will be deployed from a sampling vessel with adequate deck space for storing and assembling equipment.

2.2.1.1 Species

Blue mussels will be acquired from Penn Cove Shellfish, Inc., as discussed in Section 2.1.1.1. Adult mussels (45 millimeters [mm] ± 5 mm) will be selected for deployment in the cages. An adequate number of mussels will be placed in each cage to provide sufficient tissue for analyses and to account for potential survival issues during the exposure period. In addition, a 'time zero' sample from each batch of mussels will be shipped to the analytical laboratories to establish background concentrations in mussel tissue prior to deployment.

2.2.1.2 Equipment

Mussels will be placed in cages to prevent predation. Cages will consist of plastic-coated wire mesh with mesh openings of 1.25 cm by 2.5 cm to allow water to flow through the

cages. Mussels will placed in high-density polyethylene (HDPE) mesh bags, which will be secured inside the cages with zip-ties, or similar, so that mussels are suspended approximately 35 cm above the cage bottom.

The mussel cages will be anchored into the sediment surface using rebar or equivalent materials. In addition, extra wire mesh panels will be affixed to the bottom of the cages and rebar to prevent the cages from sinking into the sediment. Cages will be affixed with metal labels with the project and contact information. Subsurface buoys will also be labeled and attached to cages with rope to aid in recovery. Depths at the proposed sampling stations range from -8.7 to -38.2 feet MLLW. An adequate rope length will be used so that buoys remain underwater except at lower tides.

Once deployed, cages will remain in situ for 7 days (biotoxin monitoring) or 60 days (CoC monitoring). All materials will be either rinsed with high-pressure freshwater or soaked in seawater for 24 hours prior to deployment at sampling locations.

2.2.1.3 Deployment of Caged Mussels for Biotoxin Analyses

Mussels will be placed into one or more cages for deployment at the PGST/WDOH sentinel monitoring station (Figure 2). The minimum tissue volume needed for biotoxin analysis is 150 g per sample; an adequate number of mussels will be distributed evenly amongst the cage(s) to provide sufficient volume for analysis of composited replicates.

Cages will be lowered to target depth and the global positioning system (GPS) locations will be recorded on field forms. Cages will remain in situ for 7 days prior to retrieval.

2.2.1.4 Deployment of Caged Mussels for CoC Analyses

Mussels will be placed into three cages (replicates) for deployment at each of the sampling locations in the SMA that is undergoing active construction (Figure 3). The minimum tissue volume needed for COC analysis is 400 g per sample; an adequate number of mussels will be distributed evenly amongst the replicate cages at each station to provide sufficient volume for analysis of composited replicates.

Cages will also be affixed with PEMD samplers (see Section 2.1.2) and lowered to target depth. The GPS locations will be recorded on field forms. Cages will be retrieved and PEMDs recovered after 10 days. Cages will then be re-deployed and remain in situ for 50 more days.

2.2.2 In Situ Shellfish Sampling for CoCs

In situ shellfish sampling methods will follow guidance provided in the *Port Gamble S'Klallam Tribe Brownfields Supplemental Quality Assurance Project Plan Addendum: Standard Operating Procedure: Marine Tissue Sampling* (RIDOLFI Inc. 2011).

Only living, adult organisms will be collected, and Dungeness crab must meet legal take requirements; only males with a carapace length of at least 6.25 inches may be collected. Sampling of shallow-dwelling species (all species except geoduck and crab) will be conducted from harvestable beaches (see Figure 2) in the intertidal or shallow subtidal zone at low tide. Geoducks will be collected using divers; Dungeness crab will be collected using crab pots deployed from a vessel. Individuals will be separated by species and placed in buckets, or equivalent, with site water until processing occurs.

2.2.3 Passive Sampling with PEMDs

Passive sampling will be conducted with PEMDs consistent with methods used in a herring study within Port Gamble Bay (WDFW 2014b) and the methods detailed by Carls et al. (2004).

2.2.3.1 Equipment

PEMDs consist of low-density polyethylene strips that attract and absorb non-polar hydrocarbons. PEMDs will be prepared by the chemical laboratory and constructed from "lay-flat" tubing cut longitudinally to create strips approximately 20 cm by 5 cm. Strips will be placed in a sonicator with methylene chloride for 5 minutes and then rinsed with fresh methylene chloride, wrapped in solvent-rinsed aluminum foil, and placed in zip-top baggies. PEMDs will be shipped or couriered to the field staff.

2.2.3.2 Deployment of PEMDs

PEMDs will be deployed with caged mussels at the stations targeted for CoC analyses (see Figures 2 and 3). PEMDs are easily contaminated; therefore, they will remain sealed in baggies until deployment at each station. One PEMD will be deployed with each cage (for a total of three replicates per station).

Upon arrival at a station, the vessel engine will be turned off. The field staff handling PEMDs will wear clean gloves and be cautious to avoid touching any surface that has not been decontaminated. Each PEMD will be removed from the baggie, fastened to a mussel cage with a zip-tie, or similar, and deployed with the cage.

2.2.4 Sample Identification and Labels

Each composite sample will be assigned a unique alphanumeric identifier. The identifier will have the format of "Project Identifier-Station ID-Species or Media Code-Analytical Program-Date." Samples will be identified according to the following procedure:

- The project designator will be PG to denote Port Gamble
- The station ID will correspond to sample locations shown on Figures 2 and 3
- Species/media codes are as follows:
  - COC = cockles
  - MAN = manila clams
  - BUT = butter clams
  - OYS = oysters
  - GEO = geoducks
  - DUNH = Dungeness crab hepatopancreas
  - DUNM = Dungeness crab muscle
  - PEMD = polyethylene membrane device
- Analytical program will be coded as either BIO for biotoxins or CoC for contaminants of concern
- Date of collection, in the form of YYMMDD
- As an example, a Dungeness crab muscle tissue sample collected on August 24, 2015 from station SMA2-2 will have an ID of PG-SMA2-2-DUNM-COC-150824

Each sample will have an adhesive plastic or waterproof paper label affixed to the container or baggie and will be labeled at the time of collection. The following information will be recorded on the container label at the time of collection:

- Project name
- Sample identifier
- Date and time of sample collection
- Analysis to be performed

2.2.5 Station Positioning

A handheld or vessel-mounted Differential Global Positioning System (DGPS) will be used to navigate to the desired sampling location. GPS coordinates for each sampling station are provided in Table 2. Collection at the sampling location will be guided by the navigation system with an accuracy of ±10 feet. The coordinates will be recorded, when positioned at the sampling location, in latitude and longitude in decimal degrees (to 5 decimal places). Positions will be relative to the Washington State Plane Coordinates, North, North American Datum of 1983.

2.2.6 Shellfish Tissue Retrieval and Processing

2.2.6.1 Caged Mussels for Biotoxins

Mussels will be retrieved after a 7-day exposure period. GPS coordinates and/or cage buoys will be used to locate cages. Mussels from replicates at each station will be composited to create one sample per station. Approximately 150 g of tissue is needed per species composite for PSP analysis. The recommended number of individuals per composite for blue mussels is 75 to 100 individuals. Mussels will be submitted to the WDOH laboratory for PSP analysis under the following conditions:

- Shells will be rinsed free of sediment with either fresh or saltwater.
- Mussels will arrive fresh, alive, and in the shell.
- No cracked or crushed shells will be included in the sampling.
- Mussels will be packed on ice in waterproof plastic bags and maintained cold. If stored overnight, mussels will be refrigerated in a bowl covered by a wet towel.
- Mussels will be held dry; holding in fresh or saltwater will be prohibited.

New mussels will be obtained and placed in cages to ensure sufficient tissue volume is available for weekly monitoring (during July 15 to October 31) and every other week monitoring (during November 1 to January 14) during construction.

2.2.6.2 Caged Mussels for CoCs

Mussels will be retrieved after a 60-day exposure. GPS coordinates and/or cage buoys will be used to locate cages. Mussels from replicates at each station will be composited to create one sample per station. Mussels will be left in mesh bags, placed in zip-top baggies, labeled, and stored in coolers on ice until delivery to the analytical laboratory. Mussels will be composited and processed at the analytical laboratory.

2.2.6.3 In Situ Shellfish for CoCs

One composite sample per beach will be created for each species. Approximately 400 g of tissue is needed per species composite for CoC analysis. The recommended number of individuals per composite is as follows:

- Cockles and small clams: 30
- Oysters: 15 to 20
- Geoduck clams: 5
- Dungeness crab: 1

Samples will be stored in zip-top baggies in coolers on ice until delivery to the analytical laboratory.

2.2.7 PEMD Retrieval and Processing

PEMDs will be retrieved with caution to avoid contamination. Upon arrival at a station, the vessel engine will be shut off. Each cage/PEMD will be located by its float and/or GPS location and retrieved. The PEMD will be removed from its anchoring device, wrapped in aluminum foil, and placed in a zip-top baggie. Each baggie will be labeled consistent with methods described in Section 2.2.4 and stored in a cooler on ice until delivery to the analytical laboratory.

2.3 Sample Handling Requirements

Sample container requirements, holding times, and preservation requirements are outlined in Table 3. Sample containers, instruments, working surfaces, technician protective gear, and other items that may come into contact with sample material must meet high standards of cleanliness. All equipment and instruments that will be used and are in direct contact with various media collected for chemical analyses must be made of glass, stainless steel, HDPE, or polytetrafluoroethylene and will be cleaned prior to each day's use and between sampling or compositing events.

Extra caution will be taken when handling PEMD samples, because they are easily contaminated. PEMDs will only be handled with clean, gloved hands and never come into contact with dirty gloves or any other surface.

2.3.1 Decontamination Procedures

2.3.1.1 Field Sampling Equipment

The following general decontamination procedures will be followed for field sampling equipment:

1. Pre-wash rinse with tap or site water
2. Wash with solution of tap water or site water and phosphate-free soap (e.g., Alconox)
3. Rinse three times with distilled water
4. Cover (no contact) all decontaminated items with aluminum foil
5. Store in a clean, closed container for next use

Cages and associated equipment (mesh, ropes, anchors, etc.) will be pressure-washed with freshwater or soaked in saltwater for 24 hours prior to use and kept clean until deployment.

2.3.2 Investigation Derived Waste Management

All disposable sampling materials and personal protective equipment used in sample collection and processing (e.g., disposable gloves and paper towels) will be placed in heavy-duty garbage bags for disposal in the municipal waste. No hazardous materials will be used during fieldwork for this study.

2.3.3 Sample Custody and Shipping Requirements

Chain-of-custody procedures will be followed for all samples throughout the collection, handling, and analysis process. The principal document used to track possession and transfer of samples is the chain-of-custody form. Each sample will be represented on a chain-of-custody form the day it is collected. All manual data entries will be made using an indelible ink pen. Corrections will be made by drawing a single line through the error, writing in the correct information, and then dating and initialing the change. Blank lines and spaces on the chain-of-custody form will be lined out, dated, and initialed by the individual maintaining custody. Electronic chain-of-custody forms generated from a custom field application will be emailed directly to the laboratory and QA managers.

A chain-of-custody form will accompany each shipment of samples to the analytical laboratory. Each person in custody of samples will sign the chain-of-custody form and ensure the samples are not left unattended unless properly secured. Copies of all chain-of-custody forms will be retained in the project files.

All samples will be shipped or hand delivered to the analytical laboratory no later than 1 day after collection. Samples collected on Friday may be held until the following Monday for shipment, provided that this delay does not jeopardize any holding time requirements. Specific sample shipping procedures are as follows:

- Each cooler or container containing samples for analysis will be shipped via overnight delivery to the laboratory. In the event that Saturday delivery is required, the field coordinator will contact the analytical laboratory before 3 p.m. on Friday to ensure that the laboratory is aware of the number of containers shipped and the airbill tracking numbers for those containers. Following each shipment, the field coordinator will call the laboratory and verify that the shipment from the day before has been received and is in good condition.
- Coolant ice will be sealed in separate plastic bags and placed in the shipping containers.
- Individual sample containers will be placed in a sealable plastic bag, packed to prevent breakage, and transported in a sealed ice chest or other suitable container.

- Glass jars will be separated in the shipping container by shock-absorbent material (e.g., bubble wrap) to prevent breakage.
- The shipping containers will be clearly labeled with sufficient information (name of project, time and date container was sealed, person sealing the container, and consultant's office name and address) to enable positive identification.
- The shipping waybill number will be documented on all chain-of-custody forms accompanying samples.
- A sealed envelope containing chain-of-custody forms will be enclosed in a plastic bag and taped to the inside lid of the cooler.
- A minimum of two signed and dated custody seals will be placed on adjacent sides of each cooler prior to shipping.
- Each cooler will be wrapped securely with strapping tape, labeled "Glass – Fragile" and "This End Up," and will be clearly labeled with the laboratory's shipping address and the consultant's return address.

Upon transfer of sample possession to the analytical laboratory, the person(s) transferring custody of the sample container will sign the chain-of-custody form. Upon receipt of samples at the laboratory, the custody seals will be broken, and the receiver will record the condition of the samples on a sample receipt form. Chain-of-custody forms will be used internally in the laboratory to track sample handling and final disposition.

2.4 Laboratory Analytical Methods

Analytical parameters, methods, and target reporting limits for tissue and PEMD analyses are listed in Tables 4 and 5, respectively. These methods are consistent with methods used in prior studies within Port Gamble Bay.

2.4.1 Tissue for Biotoxins

Caged mussels will be scrubbed free of debris and shucked. One composited sample will be created for each station by combining tissue from the replicates. Organisms will be processed and composited at the WDOH laboratory and tissue will be analyzed for PSP.

2.4.2 Tissue for CoCs

2.4.2.1 Tissue Analyses

Mussel and in situ shellfish tissue collected for CoC analyses will be analyzed by a National Environmental Laboratory Accreditation Conference (NELAC)-accredited chemistry laboratory. CoC analytes will include PAHs (cPAH and total PAH [sum of 16]), dioxin/furan congeners, cadmium, PCB congeners, and lipids. The analyte list, analytical methods, and reporting limits are summarized in Table 4. All analyses will be conducted with a target 3-week turn-around-time.

2.4.2.2 Tissue Processing

Organisms will be processed at the analytical chemistry laboratory. Caged mussels will be scrubbed free of debris, shucked, and composited. Mussels from the replicate cages at each location will be used to create composites, and a single composited sample from each station will be analyzed for CoCs.

Organisms will be analyzed by major taxonomic group (i.e., clams and cockles, geoducks, oysters, and crabs) from each harvestable beach. Dungeness crabs will be dissected and hepatopancreas and muscle tissues will be composited and analyzed separately.

2.4.3 PEMDs

PEMDs will be analyzed for PAHs using methods consistent with those used by WDFW for the baseline study (WDFW 2014b). A complete list of PAH compounds and analytical methods is provided in Table 5.

2.5 Quality Assurance/Quality Control

QA/QC samples will be prepared in the laboratories to monitor the bias and precision of the analyses procedures.

The quality of laboratory data is assessed by precision, accuracy, representativeness, comparability, completeness, and sensitivity as defined in Section 3.1. Laboratory QA/QC samples include method blanks, laboratory control samples, matrix spike/matrix spike

duplicates, and matrix duplicates. Laboratory QA/QC analytical frequencies are provided in Table 6. Laboratory DQOs for precision, accuracy, and completeness are listed in Table 7.

2.6 Instrument/Equipment Testing, Inspection, and Maintenance Requirements

This section describes procedures for testing, inspection, and maintenance of field and laboratory equipment.

2.6.1 Field Instruments/Equipment

The field coordinator or designee will maintain inventories of field instruments and equipment and will be responsible for the preparation, documentation, and implementation of preventative maintenance. The frequency and types of maintenance will be based on the manufacturer's recommendations and/or previous experience with the equipment. The frequency of maintenance is dependent on the type and stability of the equipment, the methods used, the intended use of the equipment, and recommendations of the manufacturer. Detailed information regarding the calibration and frequency of equipment calibration is provided in specific manufacturers' instruction manuals.

The field coordinator or designee will also be responsible for navigation and will confirm proper operation of the navigation equipment daily. This verification may consist of internal diagnostics or visiting a location with known coordinates to confirm the coordinates indicated by the navigation system. Samplers will be inspected daily for any mechanical problems, and problems will be noted in the field logbook and corrected prior to continuing sampling operations.

2.6.2 Laboratory Instruments/Equipment

Analytical instrument testing, inspection, maintenance, setup, and calibration will be conducted by each laboratory in accordance with the requirements identified in the laboratory's standard operating procedures (SOPs) and manufacturer instructions. In addition, each of the specified analytical methods provides protocols for proper instrument setup, tuning, and critical operating parameters. Instrument maintenance and repair will be documented in the maintenance log or record book.

2.7 Inspection/Acceptance of Supplies and Consumables

The quality of supplies and consumables used during sample collection and laboratory analysis can affect the quality of the project data. All equipment that comes into contact with the samples and extracts must be sufficiently clean to prevent detectable contamination, and the analyte concentrations must be accurate in all standards used for calibration and QC purposes.

Reagents of appropriate purity and suitably cleaned laboratory equipment will be used for all stages of laboratory analyses. Details of acceptance requirements for supplies and consumables at the laboratories are provided in the laboratory SOPs. All supplies will be obtained from reputable suppliers with appropriate documentation or certification.

2.8 Non-Direct Measurements

Existing chemical data from previous baseline investigations will be used to guide this SMP.

2.9 Data Management

Field data sheets will be checked for completeness and accuracy by the field lead prior to delivery to the QA/QC manager. Data generated in the field will be documented on paper and provided to the QA/QC manager, who is responsible for the entering data into the database. Manually entered data will be checked by a second party. Field documentation will be filed in the main project file after data entry and checking are complete.

Laboratory data will be provided to the QA/QC manager in the EQuIS electronic format. Laboratory data that are electronically provided and loaded into the database will undergo a 10% check against the laboratory print copy data. Data will be validated or reviewed manually, and qualifiers, if assigned, will be entered manually. The accuracy of manually entered qualifiers will be verified by a second party. Data tables and reports will be exported from EQuIS to Microsoft Excel tables.

3 PROJECT MANAGEMENT

This section provides a description of DQOs, special training needed to perform the tasks, and documentation procedures.

3.1 Data Quality Objectives

The overall DQO for field sampling and laboratory analysis is to produce data of known and appropriate quality to support the project objectives. DQOs for the project are provided in Table 7. The quality of laboratory data is assessed by precision, accuracy, representativeness, comparability, completeness, and sensitivity. The definitions for the data quality indicators are as follows.

3.1.1 Precision

Precision is the ability of an analytical method or instrument to reproduce its own measurement. It is a measure of the variability, or random error, in sampling, sample handling, and laboratory analysis.

3.1.2 Accuracy

Accuracy is a measure of the closeness of an individual measurement (or an average of multiple measurements) to the true or expected value.

3.1.3 Representativeness

Representativeness expresses the degree to which data accurately and precisely represent an environmental condition.

3.1.4 Comparability

Comparability expresses the confidence with which one dataset can be evaluated in relation to another dataset. For this program, comparability of data will be established through the use of standard analytical methodologies and reporting formats and the use of common traceable calibration and reference materials.

3.1.5 Completeness

Completeness is a measure of the amount of data that is determined to be valid in proportion to the amount of data collected.

3.1.6 Sensitivity

Sensitivity is related to the instrument calibration low-level standard, method detection limits (MDLs) and/or estimated detection limits (EDLs). Analytical methods will be selected to achieve reporting limits that comply with, or are close to, target detection limits.

3.2 Special Training Requirements/Certifications

A technical team will be assembled with the requisite experience and technical skills to successfully complete the sampling for this monitoring program. Personnel involved in sample collection will have extensive environmental sampling experience. All sampling personal will be required to have 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training and the 8-hour refresher course, as necessary, to meet the 29 Code of Federal Regulations 1910.120 Occupational Safety and Health Administration regulations. The training provides employees with knowledge and skills that enable them to perform their jobs safely and with minimum risk to their personal health. Documentation of course completion will be maintained in personnel files.

3.3 Documentation and Records

Records will be maintained documenting all activities and data related to sample collection and laboratory analyses. Results of data verification and validation activities will also be documented. Procedures for documentation of these activities are described in this section.

3.3.1 Field Records

All collected field samples will be documented using a custom field application or field collection logs. Additionally, the field coordinator or designee will keep a daily record of significant events, observations, and measurements on a daily log. Entries for each day will begin on a new page. The person recording information must enter the date and time and initial each entry.

In general, sufficient information will be recorded during sampling to reconstruct the event without relying on the memory of the field personnel.

The daily log will contain the following information, at a minimum:

- Project name
- Field personnel on site
- Site visitors
- Weather conditions
- Field observations
- Maps and/or drawings
- Sample collection date and time
- Sample collection method and description of activities
- Deviations from this SMP
- Conferences associated with field sampling activities

3.3.2 Analytical Records

Analytical data records (bookmarked PDF and electronic data deliverable formats) will be generated by the laboratory and submitted to the QA manager upon completion. If files are too large to be emailed, a notification email with download instructions will be sent to the data management team at labdata@anchorqea.com. Level IV data reports will be provided by the laboratory.

The analytical laboratory will be required to report the following, where applicable:

- **Case narrative**: This summary will discuss problems encountered during any aspect of analysis, if any. It should discuss, but is not be limited to, QC issues, sample shipment, sample storage, and analytical difficulties. Any problems encountered, actual or perceived, and their resolutions will be documented in as much detail as appropriate. Analytical QC samples that exceed project performance criteria and/or laboratory performance criteria should also be discussed in the case narrative.
- **Chain-of-custody records:** Legible copies of chain-of-custody forms will be provided as part of the data package. This documentation will include the time of receipt and condition of each sample received by the laboratory. Additional internal tracking of

sample custody by the laboratory will also be documented on a sample receipt form. The form must include all sample shipping container temperatures measured at the time of sample receipt.

- **Sample results:** The data package will summarize results for each sample analyzed. The summary will include the following information when applicable:
  - Field sample identifier and corresponding laboratory identification code
  - Sample matrix
  - Date and time of sample extraction
  - Date and time of analysis
  - Final concentration volumes and dilution factors
  - Instrument and analyst identification
  - Method reporting limits (MRLs) and MDLs accounting for sample-specific factors (e.g., dilution and total solids)
  - Analytical results with reporting units identified
  - Data qualifiers and their definitions
  - Raw data including instrument printouts, chromatograms, and bench sheets (required for full data packages)
- **QA/QC summaries:** Contract Laboratory Program (CLP)-like form summaries should be generated for all required laboratory QC components and samples (i.e., method blanks, instrument daily tunes, surrogate spikes, internal standards, and laboratory control samples). These summaries should include spike volumes, parent sample concentrations, percent recoveries, relative percent differences, area counts, and laboratory control limits as applicable. For full data packages, associated raw data files should be included.
- **Instrument calibration data**: CLP-like form summaries of calibration data (i.e., initial calibration, initial calibration verification, and continuing calibration verification) should be included in all data packages. For full data packages, associated raw data files should be included.

All instrument data shall be fully restorable at the laboratory from electronic backup. The laboratory will be required to maintain all records relevant to project analyses for a minimum of 5 years.

3.3.3 Data Reduction

Data reduction is the conversion of raw data to final results. Methods or procedures for data reduction shall be documented. The following procedures will be implemented to verify the accuracy of data reduction:

- Technical staff will document, review, and QC their own work to ensure accuracy.
- Major calculations will be subject to an independent senior technical review to ensure that both the methods and the calculations are correct and consistent with the approved work plan.
- The project manager will be responsible for ensuring that data reduction is conducted in a manner that produces high quality data via review and approval of concepts, methods, assumptions, and calculations.

4 ASSESSMENTS AND OVERSIGHT

Once data are received from the laboratory, a number of QC procedures will be followed to provide an accurate evaluation of the data quality. Specific procedures will be followed to assess data precision, accuracy, and completeness.

4.1 Compliance Assessments

Laboratory and field performance audits consist of on-site reviews of QA systems and equipment for sampling, calibration, and measurement. Audits will not be conducted as part of this study. However, laboratory audit reports will be made available to the project QA manager upon request. The laboratory is required to have written procedures addressing internal QA/QC. When these procedures have been submitted, the project QA manager will review them to ensure compliance with this SMP. The laboratory must ensure that personnel engaged in sampling and analysis tasks have appropriate training. As part of the audit process, the laboratory will provide the consultant with written details of any method modifications planned.

4.2 Response and Corrective Actions

Sections 4.2.1 and 4.2.2 identify the responsibilities of key project team members and actions to be taken in the event of an error, problem, or nonconformance to protocols identified in this SMP.

4.2.1 Field Activities

The field coordinator will be responsible for correcting equipment malfunctions during the field sampling effort. The QA manager will be responsible for resolving situations identified by the field coordinator that may result in noncompliance with the SMP. All corrective measures will be immediately documented in the field logbook.

4.2.2 Laboratory

The laboratory is required to comply with its SOPs. The laboratory manager will be responsible for ensuring that appropriate corrective actions are initiated as required for

conformance with this SMP. All laboratory personnel will be responsible for reporting problems that may compromise quality data.

The laboratory manager will be notified if any QC sample grossly exceeds the laboratory in-house control limits. The analyst will identify and correct the anomaly before continuing with the sample analysis. If the anomaly cannot be corrected, the laboratory manager will notify the QA manager. A narrative describing the anomaly, steps taken to identify and correct the anomaly, and the treatment of the relevant sample batch (i.e., recalculation, reanalysis, and re-extraction) will be submitted with the data package.

4.3 Reports to Management

QA reports to project management will include verbal status reports, written reports on field sampling activities and laboratory processes, data validation reports, and final project reports. These reports shall be the responsibility of the project manager.

5 DATA VALIDATION AND USABILITY

Data generated in the field and at the laboratories will be verified and validated according to methods and procedures described in this section.

5.1 Data Review, Validation, and Verification

During the validation process, analytical data will be electronically and/or manually evaluated for method and laboratory QC compliance, and their validity and applicability for program purposes will be determined.

Based on findings of the validation process, data validation qualifiers may be assigned. Validated project data, including qualifiers, will be entered into the project database, thus enabling this information to be retained or retrieved as needed.

5.2 Validation and Verification Methods

Field and laboratory data for this task will undergo a formal verification and validation process. All entries into the database will be verified. All errors found during the verification of field data, laboratory data, and the database will be corrected prior to release of the final data.

Data verification includes a review for completeness and accuracy by the field coordinator and laboratory manager; review by the data manager for outliers and omissions; and the use of performance criteria to identify laboratory QC sample outliers. Data verification will be conducted manually by Anchor QEA staff or an external validator.

For this program, Stage 2B validation (USEPA 2009) will be conducted following National Functional Guidelines for data validation (USEPA 1999, 2004, 2005, 2008), this SMP, and by using professional judgment. Data will be reviewed with regard to the following, as appropriate to the particular analysis:

- Completeness
- Holding times
- MRLs, MDLs, and EDLs

- Laboratory control samples
- Matrix spike/matrix spike duplicates
- Standard reference materials
- Surrogate recoveries
- Method blanks
- Field QC samples
- Initial calibration data
- Continuing calibration data
- Instrument performance check

A data validation report will be generated to document any issues with data quality and any qualifications applied to data. All validated data will be entered into the database established for this program, and a final data file will be exported. Verification of the database export against the PDF data report will be performed by the QA manager or designee. Any errors found in the data file export will be corrected in the database and reviewed for systemic reporting errors. Once all discrepancies are resolved, the database will be established.

The QA manager will be responsible for the final review of all data validation reports.

5.3 Reconciliation with User Requirements

The QA manager will review data at the completion of the task to determine if DQOs have been met. If data do not meet the project's specifications, the QA manager will review the errors and determine if the problem is due to calibration/maintenance, sampling techniques, or other factors and will suggest corrective action, if appropriate. It is expected that the problem would be able to be corrected by retraining, revising techniques, or replacing supplies/equipment; if not, the DQOs will be reviewed for feasibility. If specific DQOs are not achievable, the QA manager will recommend appropriate modifications. If matrix interference is suspected to have attributed to the exceedance, adequate laboratory documentation must be presented to demonstrate that instrument performance and/or laboratory technique did not bias the result. In cases where the DQOs have been exceeded and corrective actions did not resolve the outlier, data will be qualified per USEPA National Functional Guidelines (1999, 2004, 2005, 2008). In these instances, the usability of data will

be determined by the extent of the exceedance. Rejected data will be assigned an "R" qualifier and will not be used for any purposes.

6 REFERENCES

Anchor QEA, 2014. *Engineering Design Report, Port Gamble Bay Cleanup Project*. Report prepared for Pope Resources, LP/OPG Properties, LLC, and Washington State Department of Ecology. November 2014.

Anderson, D.M., 1998. In: Anderson, D.M. Cembella, A.D., Hallegraeff, G.M. (Eds.), *Physiological Ecology of Harmful Algal Blooms*. NATO ASI Series, Series G, Ecological sciences no. 41. Springer-Verlag, Berlin, pp. 29-48.

Carls, M.G., L.G Holland, J.W. Short, R.A. Heintz, and S.D. Rice, 2004. Monitoring Polynuclear Aromatic Hydrocarbons in Aqueous Environments with Passive Low-Density Polyethylene Membrane Devices. *Environmental Toxicology and Chemistry* 23(6): 1416-1424.

Ecology (Washington State Department of Ecology), 2012. *Final Partial Remedial Investigation and Feasibility Study for Port Gamble Bay, Washington*. December 2012.

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

RIDOLFI Inc., 2011. *Port Gamble S'Klallam Tribe Brownfields Supplemental Quality Assurance Project Plan Addendum: Standard Operating Procedure: Marine Tissue Sampling*. May 2011.

USEPA (U.S. Environmental Agency), 1999. *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*. U.S. Environmental Protection Agency, Office of Emergency Response. EPA 540/R-99/008. October 1999.

USEPA, 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI). EPA 540-R-04-004. October 2004.

USEPA, 2005. *USEPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review*. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI). EPA 540-R-05-001. September 2005.

USEPA, 2008. *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review*. Office of Superfund Remediation and Technical Innovation. EPA 540-R-08-01. June 2008.

USEPA, 2009. *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*. EPA 540-R-08-005. January 2009.

USEPA, 2013. *Impacts of Climate Change on the Occurrence of Harmful Algal Blooms.* EPA 820-S-13-001. May 2013. Available from: http://www2.epa.gov/sites/production/files/documents/climatehabs.pdf.

WDFW (Washington Department of Fish and Wildlife), 2014a. *Toxic Contaminants in Bay Mussels (Mytilus trossulus) Transplanted to Port Gamble Bay, Washington Before and After Cleanup and Restoration (2015 – 2017), Quality Assurance Project Plan*. Prepared for Washington State Department of Ecology, December 2014.

WDFW, 2014b. *Toxic Contaminants in Embryos of Pacific Herring (Clupea pallasii) from Port Gamble Bay, Washington: Extent and Magnitude of Contamination by Polycyclic Aromatic Hydrocarbons*. Draft Quality Assurance Project Plan Addendum: Analysis of PAHs and Other Contaminants in Polyethylene Membrane Devices Deployed in Port Gamble Bay as a Proxy for Biological Tissues. Prepared for Washington State Department of Ecology, August 2014.

WDOH (Washington Department of Health), 2015a. *Marine Biotoxin Contingency Plan*. Office of Shellfish & Water Protection. Updated February 20, 2015.

WDOH, 2015b. Port Gamble Bay Minimal Risk Levels and Screening Values. Correspondence from Lenford O'Garro, Site Assessment & Toxicology Section, Office of Environmental Health, Safety & Toxicology, Division of Environmental Public Health. March 11, 2015.

TABLES

Table 1
Shellfish Screening Levels

Parameter	Units	Tissue Screening Criteria
Paralytic Shellfish Poisoning	µg/100gm wet	80[a]
Total Polycyclic Aromatic Hydrocarbons	mg/kg wet	63[b]
Dioxin/Furan Toxicity Equivalent Quotient	ng/kg wet	3.2[b]
Cadmium	mg/kg wet	0.52[c]
Polychlorinated Biphenyls	µg/kg wet	4.7[b]

Notes:
a Advisory criterion from WDOH (2015a)
b Intermediate-duration shellfish consumption exposure criteria from WDOH (2015b), based on a high shellfish consumption rate (499 grams per day)
c Two times the natural background tissue concentration from Ecology (2012)
µg/100gm = micrograms per 100 grams
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
ng/kg = nanograms per kilogram

Table 2
Sampling Design Summary

Sampling Area	Station ID	Proposed Coordinates[1]		Sample Media	Sampling Method	Composite Sample Analytical Testing Chemistry	Archive
		Northing	Easting				
SMA-1	SMA-1-1	317971.442	1211765.078	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
	SMA-1-2	317559.819	1212023.905	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
	SMA-1-3	317123.527	1212194.029	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
SMA-2	SMA-2-1	316739.530	1211968.535	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
	SMA-2-2	316303.466	1211795.518	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
	SMA-2-3	315844.882	1211706.056	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
	SMA-2-4	315474.392	1211446.785	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
	SMA-2-5	315172.444	1211104.658	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--

Table 2
Sampling Design Summary

Sampling Area	Station ID	Proposed Coordinates[1]		Sample Media	Sampling Method	Composite Sample Analytical Testing Chemistry	Archive
		Northing	Easting				
SMA-3	SMA-3-1[2]	308268.920	1212681.470	In Situ Geoduck and Dungeness Crab Muscle and Hepatopancreas Tissue	Diver collection (with crab pot)	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual shellfish tissue
Intertidal Sampling Locations							
Point Julia	PJ-1[2]	315818.330	1213098.710	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
				In Situ Shellfish Tissue	Hand collection on harvestable beaches	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual shellfish tissue
	PJ-2[3]	315532.680	1213791.050	Mussel Tissue	In situ caged mussels	Biotoxin	Individual mussel tissue
Gravel Plot	GP-1[2]	313556.130	1213706.450	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
				In Situ Shellfish Tissue	Hand collection on harvestable beaches	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual shellfish tissue
West Shoreline	WS-1[2]	312230.280	1210323.390	Mussel Tissue	In situ caged mussels	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual mussel tissue
				Water	PEMD	PAHs	--
				In Situ Shellfish Tissue	Hand collection on harvestable beaches	PAHs, dioxins/furans, cadmium, PCBs, and lipids	Individual shellfish tissue

Notes:
1 Horizontal datum: Washington State Plane North Zone, NAD83, US Feet
2 In situ shellfish will be collected from sampling areas shown on Figure 2. Coordinates are provided for reference; actual sampling area will be determined based on availability of target species. All species except geoducks and crabs will be collected at low tide from the beach. Geoducks will be collected using divers deployed from a vessel; crabs will be collected using crab pots.
3 Point Julia biotoxin sampling location is provisional and subject to PGST Refinement.
NAD 83 = North American Datum of 1983
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
PEMD = polyethylene membrane device

Table 3
Sample Size, Holding Time, and Preservation for Physical/Chemical Analyses

Parameter	Sample Size	Container Size and Type	Holding Time	Preservative
Mussel Tissue Samples				
Biotoxin	120 g	Zip-top baggie	5 days	Freeze -20°C
Lipids	400 g	Wrap in foil and place in Zip-top baggie	1 year	Freeze -20°C
Cadmium			1 year	Freeze -20°C
Dioxins/furans			1 year to extraction	Freeze -20°C
			1 year after extraction	
PCB congeners			1 year to extraction	Freeze -20°C
			1 year after extraction	
PAHs			1 year to extraction	Freeze -20°C
			1 year after extraction	
PEMD Samples				
PAHs	1 - 20 x 5 cm PEMD	Wrap in foil and plastic	14 days to extraction	Cool 4°C
			40 days to analysis	

Notes:
°C = degrees Celsius
cm = centimeter
g = grams
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
PEMD = polyethylene membrane device

Table 4
Tissue Parameters for Chemical Analyses and Analytical Methods

Parameter	Recommended Analytical Method	Reporting Limit[a]
Conventional Parameters (%)		
Lipids	Bligh & Dyer	0.1
Metals (mg/kg)		
Cadmium	6020A	0.1
Dioxin/Furans (ng/kg)		
Dioxins		
2,3,7,8-TCDD	EPA 1613B	0.5
1,2,3,7,8-PeCDD	EPA 1613B	2.5
1,2,3,4,7,8-HxCDD	EPA 1613B	2.5
1,2,3,6,7,8-HxCDD	EPA 1613B	2.5
1,2,3,7,8,9-HxCDD	EPA 1613B	2.5
1,2,3,4,6,7,8-HpCDD	EPA 1613B	2.5
OCDD	EPA 1613B	5
Furans		
2,3,7,8-TCDF	EPA 1613B	0.5
1,2,3,7,8-PeCDF	EPA 1613B	2.5
2,3,4,7,8,-PeCDF	EPA 1613B	2.5
1,2,3,4,7,8-HxCDF	EPA 1613B	2.5
1,2,3,6,7,8-HxCDF	EPA 1613B	2.5
1,2,3,7,8,9-HxCDF	EPA 1613B	2.5
2,3,4,6,7,8-HxCDF	EPA 1613B	2.5
1,2,3,4,6,7,8-HpCDF	EPA 1613B	2.5
1,2,3,4,7,8,9-HpCDF	EPA 1613B	2.5
OCDF	EPA 1613B	5
Polychlorinated Biphenyls (ng/kg)		
PCB Congeners 1-209	EPA 1668A	10
Polycyclic Aromatic Hydrocarbons (µg/kg)		
2-Methylnaphthalene	EPA 8270D SIM	0.5
Acenaphthene	EPA 8270D SIM	0.5
Acenaphthylene	EPA 8270D SIM	0.5
Anthracene	EPA 8270D SIM	0.5
Benzo(a)anthracene	EPA 8270D SIM	0.5
Benzo(a)pyrene	EPA 8270D SIM	0.5
Benzo(b)fluoranthene	EPA 8270D SIM	0.5
Benzo(e)pyrene	EPA 8270D SIM	0.5
Benzo(g,h,i)perylene	EPA 8270D SIM	0.5
Benzo(k)fluoranthene	EPA 8270D SIM	0.5
Chrysene	EPA 8270D SIM	0.5
Dibenzo(a,h)anthracene	EPA 8270D SIM	0.5
Fluoranthene	EPA 8270D SIM	0.5
Fluorene	EPA 8270D SIM	0.5
Indeno(1,2,3-c,d)pyrene	EPA 8270D SIM	0.5
Naphthalene	EPA 8270D SIM	0.5
Perylene	EPA 8270D SIM	0.5
Phenanthrene	EPA 8270D SIM	0.5
Pyrene	EPA 8270D SIM	0.5

Notes:

a Achievable reporting limits may be increased due to sample size and/or matrix interference.

µg/kg = micrograms per kilogram; mg/kg = milligrams per kilogram; ng/kg = nanograms per kilogram

Table 5

PEMD Parameters for Chemical Analyses and Analytical Methods

Parameter	Analytical Method	Reporting Limit
Polycyclic Aromatic Hydrocarbons (ng)		
2-Methylnaphthalene	8270D SIM	TBD
Acenaphthene	8270D SIM	TBD
Acenaphthylene	8270D SIM	TBD
Anthracene	8270D SIM	TBD
Benzo(a)anthracene	8270D SIM	TBD
Benzo(a)pyrene	8270D SIM	TBD
Benzo(b)fluoranthene	8270D SIM	TBD
Benzo(e)pyrene	8270D SIM	TBD
Benzo(g,h,i)perylene	8270D SIM	TBD
Benzo(k)fluoranthene	8270D SIM	TBD
Chrysene	8270D SIM	TBD
Dibenzo(a,h)anthracene	8270D SIM	TBD
Fluoranthene	8270D SIM	TBD
Fluorene	8270D SIM	TBD
Indeno(1,2,3-c,d)pyrene	8270D SIM	TBD
Naphthalene	8270D SIM	TBD
Perylene	8270D SIM	TBD
Phenanthrene	8270D SIM	TBD
Pyrene	8270D SIM	TBD

Notes:
ng = nanogram
PEMD = polyethylene membrane device
TBD = to be decided

Table 6
Laboratory Quality Control Sample Analysis Summary

Analysis Type	Initial Calibration	Ongoing Calibration	Standard Reference Material[a]	Replicates	Matrix Spikes	Matrix Spike Duplicates	Method Blanks	Surrogate Spikes	Laboratory Control Samples
Polycyclic Aromatic Hydrocarbons	As needed[b]	1 per 10 samples	1 per 20 samples	NA	1 per 20 samples	1 per 20 samples	Each batch	Every sample	1 per 20 samples
Dioxins/Furans	As needed[b]	Every 12 hours	1 per 20 samples	NA	NA[c]	NA[c]	1 per 20 samples	Every sample	1 per 20 samples
Cadmium	Daily or each batch	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	NA	Each batch	NA	1 per 20 samples
Polychlorinated biphenyls	As needed[d]	1 per 10 samples	1 per 20 samples	NA	NA[c]	NA[c]	Each batch	Every sample	1 per 20 samples
Lipids	Daily[e]	NA	NA	1 per 20 samples	NA	NA	NA	NA	NA

Notes:
Calibration and certification of drying ovens and weighing scales are conducted bi-annually.
a When a Standard Reference Material is available.
b Initial calibrations are considered valid until the ongoing continuing calibration no longer meets method specifications. At that point, a new initial calibration is performed.
c Isotope dilution required by method
d Initial calibration verification and calibration blank must be analyzed at the beginning of each batch.
e Scale should be calibrated with class 5 weights daily; weights must bracket the weight of sample and weighing vessel.
NA = Not applicable

Table 7
Data Quality Objectives

Parameter	Precision	Accuracy[a]	Method Blank	Completeness
Tissue Samples				
Lipids	± 20% RPD	NA	NA	95%
Cadmium	± 25% RPD	75-125% R	≤ PQL[b]	95%
Polycyclic aromatic hydrocarbons	±35 % RPD	50-150% R	≤ PQL[b]	95%
Dioxins/Furans	±35 % RPD	50-150% R	≤ PQL[b]	95%
Polychlorinated biphenyl Congeners	±35 % RPD	50-150% R	≤ PQL[b]	95%
PEMD Samples				
Polycyclic aromatic hydrocarbons	±35 % RPD	50-150% R	≤ PQL[b]	95%

Notes:

a Accuracy goals apply to laboratory control samples and matrix spike samples, as applicable to the analysis.

b When the sample concentration is < 5x the method blank concentration.

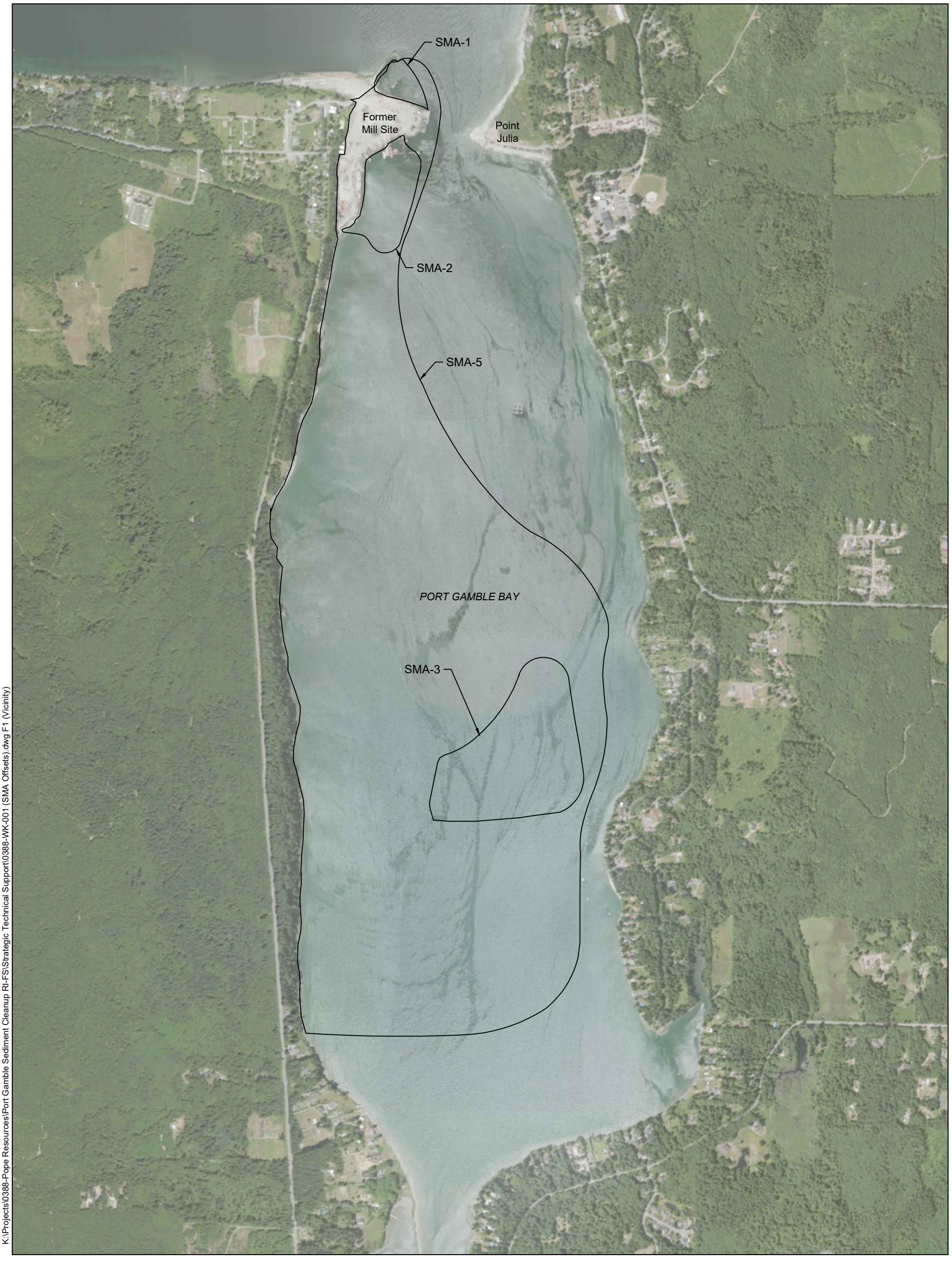
NA = not applicable

PQL = practical quantitation limit

RPD = relative percent difference

R = recovery

FIGURES



K:\Projects\0388-Pope Resources\Port Gamble Sediment Cleanup RI-FS\Strategic Technical Support\0388-WK-001 (SMA Offsets).dwg F1 (Vicinity)

Feb 13, 2018 3:52pm chewett

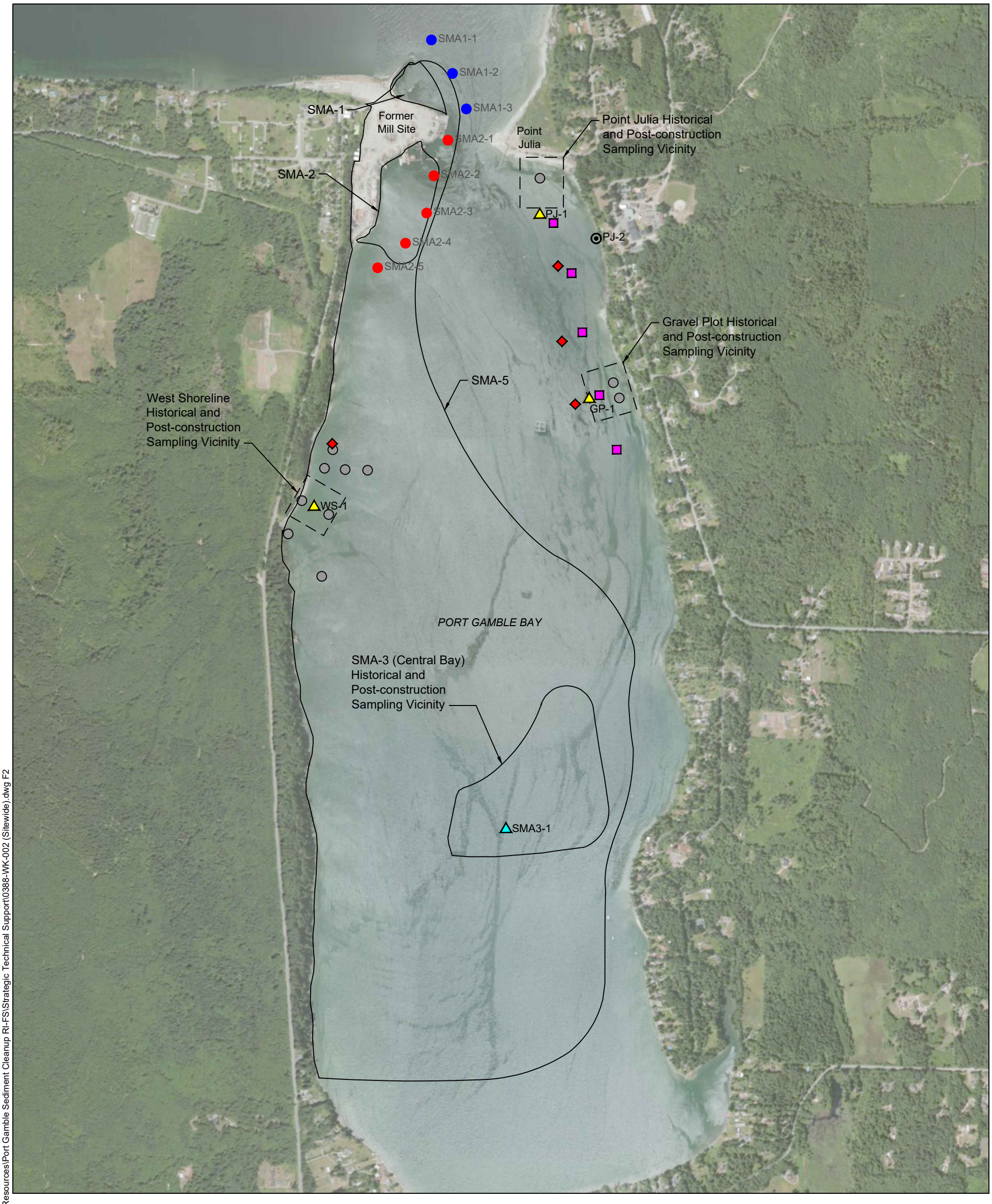
HORIZONTAL DATUM: Washington State Plane North, NAD83, U.S. Feet.

0 1200

Scale in Feet

ANCHOR QEA

Figure 1
Vicinity Map
Shellfish Monitoring Plan
Port Gamble, Washington



Feb 13, 2018 3:53pm chewett K:\Projects\0388-Pope Resources\Port Gamble Sediment Cleanup RI-FS\Strategic Technical Support\0388-WK-002 (Sitewide).dwg F2

HORIZONTAL DATUM: Washington State Plane North, NAD83, U.S. Feet.

NOTES:

1. For in-situ wild shellfish sampling, historical sampling areas will be reoccupied and target species to collected will consist of those previously sampled (see Tables 2-5).
2. Year 2 Caged Mussel Locations adjacent to SMA-2 will be identified based on Year 1 sampling data.
3. Provisional Sampling Location - subject to PGST refinement.

LEGEND:

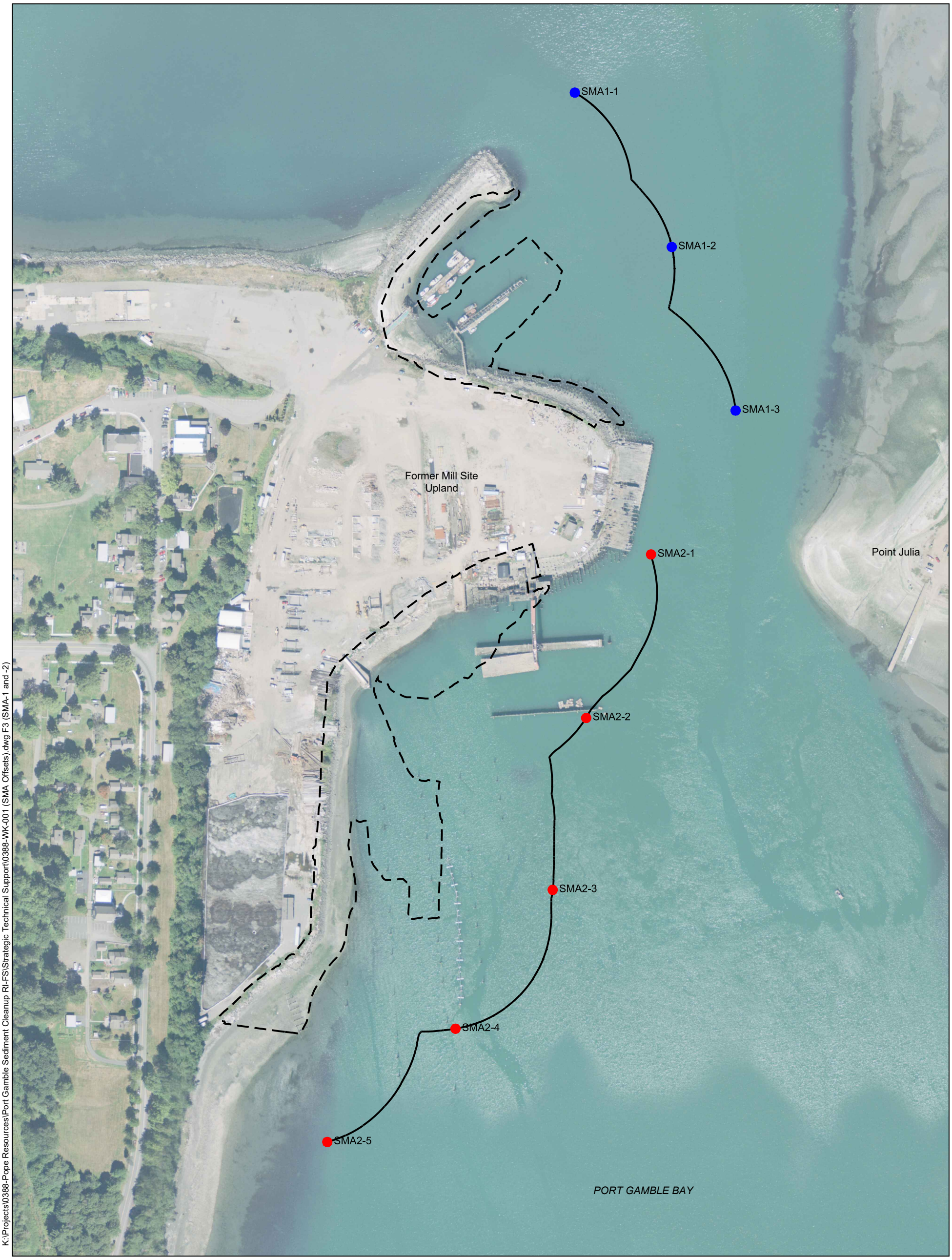
- Proposed CoC Caged Mussel, and PEMD Sampling Location, Year 1 and 2
- Proposed Biotoxin Sampling Location (See Note 3), Year 1 and 2
- SMA Area
- Historical Caged Mussel Sampling Location
- Historical PEMD Sampling Location
- Historical Sampling Location, Other
- Geoduck and Crab Tissue Sampling to be Conducted Within SMA-3
- Wild Shellfish Sampling Area
- Proposed CoC Caged Mussel and PEMD Sample Location, Year 1
- Proposed CoC Caged Mussel and PEMD Sample Location, Year 2 (See Note 2)

0 1200

Scale in Feet

ANCHOR QEA

Figure 2
Proposed and Historical Bay Sampling Locations
Shellfish Monitoring Plan
Port Gamble, Washington



ANCHOR QEA

Figure 3
SMA-1 and SMA-2 Caged Mussel and PEMD Sampling Locations
Shellfish Monitoring Plan
Port Gamble, Washington

APPENDIX A
PORT GAMBLE BAY BASELINE DATA

APPENDIX A-1
HISTORICAL MUSSEL BIOTOXIN DATA

Table A-1
Historical PSP Mussel Tissue Results

Date	Location	PSP Concentration (µg/100g wet weight)[1]
6/9/2008	Port Gamble Bay	ND
6/16/2008	Port Gamble Bay	ND
6/30/2008	Port Gamble Bay	ND
7/14/2008	Port Gamble Bay	ND
7/28/2008	Port Gamble Bay	ND
8/11/2008	Port Gamble Bay	ND
8/25/2008	Port Gamble Bay	ND
9/10/2008	Port Gamble Bay	ND
9/23/2008	Port Gamble Bay	ND
5/11/2009	Port Gamble Bay	ND
5/26/2009	Port Gamble Bay	ND
6/8/2009	Port Gamble Bay	ND
6/21/2009	Port Gamble Bay	ND
7/6/2009	Port Gamble Bay	ND
7/20/2009	Port Gamble Bay	ND
8/4/2009	Port Gamble Bay	ND
8/17/2009	Port Gamble Bay	ND
6/7/2010	Port Gamble Bay	ND
6/22/2010	Port Gamble Bay	ND
7/6/2010	Port Gamble Bay	ND
7/20/2010	Port Gamble Bay	<38
7/26/2010	Port Gamble Bay	ND
8/3/2010	Port Gamble Bay	ND
8/24/2010	Port Gamble Bay	ND
4/18/2011	Point Julia	ND
5/3/2011	Point Julia	ND
5/16/2011	Point Julia	ND
6/6/2011	Point Julia	ND
6/20/2011	Point Julia	ND
7/5/2011	Point Julia	ND
7/18/2011	Point Julia	ND
8/1/2011	Point Julia	ND
8/18/2011	Point Julia	ND
9/8/2011	Point Julia	ND
9/22/2011	Point Julia	ND
9/29/2011	Point Julia	ND
10/6/2011	Point Julia	ND
12/11/2011	Point Julia	ND
1/3/2012	Port Gamble Bay	ND
1/23/2012	Port Gamble Bay	ND
2/6/2012	Port Gamble Bay	ND
2/20/2012	Port Gamble Bay	ND

Table A-1
Historical PSP Mussel Tissue Results

Date	Location	PSP Concentration (µg/100g wet weight)[1]
3/12/2012	Port Gamble Bay	ND
4/17/2012	Port Gamble Bay	ND
5/1/2012	Port Gamble Bay	ND
5/15/2012	Port Gamble Bay	ND
5/29/2012	Port Gamble Bay	ND
6/7/2012	Point Julia	ND
7/11/2012	Point Julia	ND
7/23/2012	Point Julia	ND
8/5/2012	Port Gamble Bay	ND
8/14/2012	Port Gamble Bay	ND
8/19/2012	Port Gamble Bay	**150**
8/27/2012	Port Gamble Bay	43
9/4/2012	Port Gamble Bay	<38
9/10/2012	Port Gamble Bay	46
9/17/2012	Port Gamble Bay	<38
9/24/2012	Port Gamble Bay	ND
10/8/2012	Point Julia	<38
10/15/2012	Port Gamble Bay	ND
1/2/2013	Port Gamble Tract #20100	ND
1/14/2013	Port Gamble Tract #20100	ND
1/28/2013	Port Gamble Tract #20100	ND
2/11/2013	Port Gamble Tract #20100	ND
5/20/2013	Port Gamble Tract #20100	ND
6/17/2013	Port Gamble Bay	ND
6/17/2013	Port Gamble Bay	ND
6/25/2013	Port Gamble Tract #20100	ND
7/1/2013	Port Gamble Bay	ND
7/1/2013	Port Gamble Bay	ND
7/9/2013	Port Gamble Tract #20100	ND
7/11/2013	Port Gamble Tract #20100	ND
7/30/2013	Port Gamble Bay	ND
7/30/2013	Port Gamble Bay	ND
8/6/2013	Port Gamble Tract #20100	ND
8/19/2013	Port Gamble Tract #20100	ND
8/29/2013	Port Gamble Bay	ND
8/29/2013	Port Gamble Bay	ND
9/3/2013	Port Gamble Tract #20100	ND
9/19/2013	Port Gamble Bay	ND
9/19/2013	Port Gamble Bay	ND
9/24/2013	Port Gamble Tract #20100	<38
10/16/2013	Port Gamble Tract #20100	<38
6/24/2014	Point Julia	ND

Table A-1
Historical PSP Mussel Tissue Results

Date	Location	PSP Concentration (µg/100g wet weight)[1]
8/20/2014	Port Gamble Bay	ND
9/15/2014	Port Gamble Bay	ND
10/7/2014	Port Gamble Bay	ND
12/15/2014	Port Gamble Tract #20100	ND
1/8/2015	Port Gamble Tract #20100	ND

Notes:

from 2008 - 2014.

1 Analysis performed on whole-body tissue samples from blue mussels.

Bold text indicates detected result greater than advisory screening criterion (80 µg/100g wet weight; WDOH 2015).

µg/100g = micrograms per 100 grams

ND = not detected

PSP = paralytic shellfish poisoning

APPENDIX A-2
2014 CAGED MUSSEL COC DATA

Pending until June/July 2015

APPENDIX A-3
2014 WATER COLUMN CPAH DATA

Pending until June/July 2015

APPENDIX A-4
HISTORICAL IN SITU SHELLFISH DATA

Table A-4-1
Historical Tissue Data - Point Julia

Parameters	Species	Cockle			Horse Clam				Oyster						Manila Clam			Littleneck Clam				Mussel
	Sampling ID	SB CO-01	SB CO-02	SB CO-03	SB HC-01	SB HC-02	SB HC-03	SB HC-04	Oyster 1A	PJ_O_PGST_100429	SB OY-01	SB OY-02	SB OY-03	SB OY-04	SB MN-01	SB MN-02	SB MN-03	HART14_CLAM1A	SB LN-01	SB LN-02	SB LN-03	HC_PGPJ
	Sampling Date	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	12/15/2008	4/29/2010	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	12/15/2008	9/22/2011	9/22/2011	9/22/2011	1/8/2013
	TEF (as applicable)																				
Conventionals (%)																						
Percent Lipids		0.386	0.388	0.67	0.867	0.634	1.19	0.523	1.97	2.43	3.21	2.62	3.07	2.49	0.448	0.488	0.298	0.232	0.966	0.686	0.966	1.12
Metals (mg/kg)																						
Arsenic		NA	NA	NA	NA	NA	NA	NA	1 U	2	NA	NA	NA	NA	NA	NA	NA	2	NA	NA	NA	0.861
Cadmium		NA	NA	NA	NA	NA	NA	NA	0.99	1.13	NA	NA	NA	NA	NA	NA	NA	0.36	NA	NA	NA	0.365
Chromium		NA	NA	NA	NA	NA	NA	NA	0.1	0.1	NA	NA	NA	NA	NA	NA	NA	0.3	NA	NA	NA	NA
Copper		NA	NA	NA	NA	NA	NA	NA	3.98	6.9	NA	NA	NA	NA	NA	NA	NA	1.37	NA	NA	NA	0.864
Lead		NA	NA	NA	NA	NA	NA	NA	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	0.4 U	NA	NA	NA	0.0336
Mercury		NA	NA	NA	NA	NA	NA	NA	0.01	0.01	NA	NA	NA	NA	NA	NA	NA	0.01 U	NA	NA	NA	0.0073
Silver		NA	NA	NA	NA	NA	NA	NA	0.1	0.13 J	NA	NA	NA	NA	NA	NA	NA	0.12	NA	NA	NA	NA
Zinc		NA	NA	NA	NA	NA	NA	NA	101	139	NA	NA	NA	NA	NA	NA	NA	10.1	NA	NA	NA	13.1
Polycyclic Aromatic Hydrocarbons (PAHs) (µg/kg)																						
Napthalene		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.6 U	0.7 U	0.6 U	0.8 U	0.5 U	0.5 U	0.5 U	NA	0.6 U	0.5 U	0.5 U	1
2-Methylnaphthalene		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.9	0.8	0.9	0.7	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	NA
1-Methylnaphthalene		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	NA
Acenaphthylene		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.86 U
Acenaphthene		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.8	0.7	0.8	0.6	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.93 U
Fluorene		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	1	0.9	1.0	0.8	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.64 U
Phenanthrene		0.8	0.7	1.0	1.1	0.9	1.4	0.8	NA	NA	4.8	3.9	4.5	3.9	1.2	0.9	0.8	NA	2.3	2.2	2.1	4
Anthracene		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.68 U
Fluoranthene		1.4	0.9	1.6	1.2	1.0	1.6	0.9	NA	NA	12	11	12	9.3	1.2	1.1	0.9	NA	2.4	1.6	2.6	3.8
Pyrene		0.6	0.5 U	0.6	0.9	0.6	1.1	0.6	NA	NA	5.6	4.6	5.2	4.0	0.7	0.5	0.5 U	NA	1.1	0.8	1.1	1.9
Benzo(g,h,i)perylene		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.64 U
Dibenzofuran		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.6	0.6	0.6	0.7	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	NA
Carcinogenic Polycyclic Aromatic Hydrocarbons (µg/kg)																						
Total Benzofluoranthenes	0.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	2.2	2.5	2.7	1.7	1.1 J	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	2.6
Benzo(b)fluoranthene	0.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	1.1					0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	1.1
Benzo(k)fluoranthene	0.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	1.1					0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	1.5
Benz(a)anthracene	0.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.9	1.1	1.4	1.0	0.7	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	1.1
Chrysene	0.01	0.5	0.5	0.7	0.5 U	0.5 U	0.5 U	0.5 U	NA	2.9	3.5	3.3	3.1	2.2	0.5 U	0.5 U	0.5 U	NA	0.5	0.5	1.3	2.7
Benzo(a)pyrene	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	.64 U
Indeno(1,2,3-cd)pyrene	0.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	.63 U
Dibenz(a,h)anthracene	0.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	.53 U
cPAHs TEQ		0.355	0.355	0.357	0.353	0.353	0.353	0.353	NA	0.897	0.695	1.293	0.601	0.502	0.357	0.394	0.425	NA	0.355	0.355	0.438	0.8542
Polychlorinated Biphenyls (PCBs) Aroclors (µg/kg)																						
Aroclor-1016		3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	8.0 U	4.0 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	3.9 U	3.9 U	8 U	3.9 U	3.9 U	3.8 U	NA
Aroclor-1242		3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	8.0 U	4.0 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	3.9 U	3.9 U	8 U	3.9 U	3.9 U	3.8 U	NA
Aroclor-1248		3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	8.0 U	4.0 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	3.9 U	3.9 U	12 U	3.9 U	3.9 U	3.8 U	NA
Aroclor-1254		3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	8.0 U	4.0 U	2.5 J	4.0 U	2.1 J	4.0 U	3.9 U	3.9 U	3.9 U	8 U	3.9 U	3.9 U	3.8 U	NA
Aroclor-1260		3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	8.0 U	4.0 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	3.9 U	3.9 U	8 U	3.9 U	3.9 U	3.8 U	NA
Aroclor-1221		3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	8.0 U	4.0 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	3.9 U	3.9 U	8 U	3.9 U	3.9 U	3.8 U	NA
Aroclor-1232		3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	8.0 U	4.0 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	3.9 U	3.9 U	8 U	3.9 U	3.9 U	3.8 U	NA
Total Aroclors		3.9 U	3.9 U	3.9 U	4.0 U	3.9 U	4.0 U	3.9 U	8.0 U	4.0 U	2.5 J	4.0 U	2.1 J	4.0 U	3.9 U	3.9 U	3.9 U	8 U	3.9 U	3.9 U	3.8 U	NA
PCB Congeners (ng/kg)																						
PCB-017		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-018		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-028		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.36
PCB-031		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.32

Table A-4-1
Historical Tissue Data - Point Julia

Parameters	Species	Cockle			Horse Clam				Oyster						Manila Clam			Littleneck Clam				Mussel
	Sampling ID	SB CO-01	SB CO-02	SB CO-03	SB HC-01	SB HC-02	SB HC-03	SB HC-04	Oyster 1A	PJ_O_PGST_100429	SB OY-01	SB OY-02	SB OY-03	SB OY-04	SB MN-01	SB MN-02	SB MN-03	HART14_CLAM1A	SB LN-01	SB LN-02	SB LN-03	HC_PGPJ
	Sampling Date	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	12/15/2008	4/29/2010	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	12/15/2008	9/22/2011	9/22/2011	9/22/2011	1/8/2013
	TEF (as applicable)																					
PCB-033		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-044		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-049		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-052		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-066		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-070		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-074		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-077	0.0001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-081	0.0003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-082		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-087		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-095		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-099		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-101		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-105	0.00003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-110		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-114	0.00003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-118	0.00003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-123	0.00003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-126	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-128		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-138		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-149		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-151		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-153		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-156/157	0.00003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-158		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-167	0.00003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-169	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-170		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-171		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-177		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-180		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-183		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-187		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-189	0.00003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-191		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-194		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-195		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-199		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-205		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-206		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-208		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB-209		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 U
PCB Congener TEQ		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	*
Dioxins / Furans (µg/kg)																						
2,3,7,8-TCDD	1	NA	NA	NA	NA	NA	NA	0.0495 U	0.117 U	NA	0.070 J	NA	NA	NA	NA	NA	NA	0.111 U	NA	NA	NA	NA
1,2,3,7,8-PECDD	1	NA	NA	NA	NA	NA	NA	0.0495 U	0.272 U	NA	0.0480 U	NA	NA	NA	NA	NA	NA	0.26 U	NA	NA	NA	NA

Table A-4-1
Historical Tissue Data - Point Julia

Parameters	Species	Cockle			Horse Clam				Oyster						Manila Clam			Littleneck Clam				Mussel
	Sampling ID	SB CO-01	SB CO-02	SB CO-03	SB HC-01	SB HC-02	SB HC-03	SB HC-04	Oyster 1A	PJ_O_PGST_100429	SB OY-01	SB OY-02	SB OY-03	SB OY-04	SB MN-01	SB MN-02	SB MN-03	HART14_CLAM1A	SB LN-01	SB LN-02	SB LN-03	HC_PGPJ
	Sampling Date	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	12/15/2008	4/29/2010	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	9/22/2011	12/15/2008	9/22/2011	9/22/2011	9/22/2011	1/8/2013
	TEF (as applicable)																					
1,2,3,4,7,8-HXCDD	0.1	NA	NA	NA	NA	NA	NA	0.0495 U	0.399 U	NA	0.0480 U	NA	NA	NA	NA	NA	NA	0.381 U	NA	NA	NA	NA
1,2,3,6,7,8-HXCDD	0.1	NA	NA	NA	NA	NA	NA	0.0495 U	0.421 U	NA	0.104 J	NA	NA	NA	NA	NA	NA	0.402 U	NA	NA	NA	NA
1,2,3,7,8,9-HXCDD	0.1	NA	NA	NA	NA	NA	NA	0.0495 U	0.231 U	NA	0.081 J	NA	NA	NA	NA	NA	NA	0.221 U	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDD	0.01	NA	NA	NA	NA	NA	NA	0.176 J	0.421 U	NA	0.163 J	NA	NA	NA	NA	NA	NA	0.402 U	NA	NA	NA	NA
OCDD	0.0003	NA	NA	NA	NA	NA	NA	1.06 J	0.816 U	NA	0.872 J	NA	NA	NA	NA	NA	NA	0.779 U	NA	NA	NA	NA
2,3,7,8-TCDF	0.1	NA	NA	NA	NA	NA	NA	0.0495 U	0.111 U	NA	0.308 J	NA	NA	NA	NA	NA	NA	0.106 U	NA	NA	NA	NA
1,2,3,7,8-PECDF	0.03	NA	NA	NA	NA	NA	NA	0.0495 U	0.313 U	NA	0.0480 U	NA	NA	NA	NA	NA	NA	0.299 U	NA	NA	NA	NA
2,3,4,7,8-PECDF	0.3	NA	NA	NA	NA	NA	NA	0.050 J	0.256 U	NA	0.108 J	NA	NA	NA	NA	NA	NA	0.245 U	NA	NA	NA	NA
1,2,3,4,7,8-HXCDF	0.1	NA	NA	NA	NA	NA	NA	0.0495 U	0.563 U	NA	0.0480 U	NA	NA	NA	NA	NA	NA	0.537 U	NA	NA	NA	NA
1,2,3,6,7,8-HXCDF	0.1	NA	NA	NA	NA	NA	NA	0.0495 U	0.135 U	NA	0.0480 U	NA	NA	NA	NA	NA	NA	0.129 U	NA	NA	NA	NA
1,2,3,7,8,9-HXCDF	0.1	NA	NA	NA	NA	NA	NA	0.0495 U	0.26 U	NA	0.0480 U	NA	NA	NA	NA	NA	NA	0.248 U	NA	NA	NA	NA
2,3,4,6,7,8-HXCDF	0.1	NA	NA	NA	NA	NA	NA	0.0495 U	0.307 U	NA	0.0480 U	NA	NA	NA	NA	NA	NA	0.293 U	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDF	0.01	NA	NA	NA	NA	NA	NA	0.0495 U	0.562 U	NA	0.0480 U	NA	NA	NA	NA	NA	NA	0.537 U	NA	NA	NA	NA
1,2,3,4,7,8,9-HPCDF	0.01	NA	NA	NA	NA	NA	NA	0.0495 U	0.582 U	NA	0.0480 U	NA	NA	NA	NA	NA	NA	0.556 U	NA	NA	NA	NA
OCDF	0.0003	NA	NA	NA	NA	NA	NA	0.051 J	0.725 U	NA	0.064 J	NA	NA	NA	NA	NA	NA	0.692 U	NA	NA	NA	NA
Total TEQ		NA	NA	NA	NA	NA	NA	0.210	0.367	NA	0.191	NA	NA	NA	NA	NA	NA	0.35028	NA	NA	NA	NA

Notes:
For TEQ calculations, non-detects were assumed to be half the quantitation limit
* = Not enough congeners with assigned TEFs were analyzed to make a TEQ
µg/kg = micrograms per kilogram
J = estimated concentration
mg/kg = milligrams per kilogram
NA = Not analyzed
ng/kg = nanograms per kilogram
TEF = toxic equivalency factor
TEQ = toxicity equivalent quotient
U = Not detected at the method detection limit

Table A-4-2
Historical Tissue Data - Gravel Plot

	Species	Oyster						Cockle	Littleneck Clam
	Sampling ID	HART14_OYSTER2A	Port Gamble A1	Port Gamble A2	Port Gamble A3	S_O_PGST_100	12110604	RS_C_PGST_10042	HART14_CLAM2A
	Sampling Date	12/15/2008	9/22/2004	9/22/2004	9/22/2004	4/29/2010	11/28/2012	4/29/2010	12/15/2008
Parameters	**TEF (as applicable)**								
Conventionals (%)									
Percent Lipids		1.97				2.63	1.96	0.28	0.487
Metals (mg/kg)									
Arsenic		1	0.44	0.56	0.46	2	1	1 U	2
Cadmium		0.96	0.78	0.71	0.73	1.49	1	0.04	0.24
Chromium		0.2	NA	NA	NA	0.2	0.2	0.2	0.3
Copper		4.45	NA	NA	NA	9.5	3.64	1.5	1.02
Lead		0.4 U	NA	NA	NA	0.4 U	0.4 U	0.4 U	0.4 U
Mercury		0.01	NA	NA	NA	0.012	0.008	0.005 U	0.01 U
Silver		0.1	NA	NA	NA	0.16 J	0.06 U	--R	0.09
Zinc		124	78	72	78	174	75.2	9	10.5
Polycyclic Aromatic Hydrocarbons (PAHs) (µg/kg)									
Napthalene		NA	NA	NA	NA	NA	0.7	NA	NA
2-Methylnaphthalene		NA	NA	NA	NA	NA	0.6	NA	NA
1-Methylnaphthalene		NA	NA	NA	NA	NA	0.5 U	NA	NA
Acenaphthylene		NA	NA	NA	NA	NA	0.5 U	NA	NA
Acenaphthene		NA	NA	NA	NA	NA	0.5 U	NA	NA
Fluorene		NA	NA	NA	NA	NA	0.7	NA	NA
Phenanthrene		NA	NA	NA	NA	NA	3	NA	NA
Anthracene		NA	NA	NA	NA	NA	0.6	NA	NA
Fluoranthene		NA	NA	NA	NA	NA	12	NA	NA
Pyrene		NA	NA	NA	NA	NA	6.5	NA	NA
Benzo(g,h,i)perylene		NA	NA	NA	NA	NA	0.5 U	NA	NA
Dibenzofuran		NA	NA	NA	NA	NA	0.6	NA	NA
Carcinogenic Polycyclic Aromatic Hydrocarbons (µg/kg)									
Total Benzofluoranthenes	0.1	NA	NA	NA	NA	4.0	1.8	0.5 U	4.9 U
Benzo(b)fluoranthene	0.1	NA	NA	NA	NA	2.0	1.2	0.5 U	4.9 U
Benzo(k)fluoranthene	0.1	NA	NA	NA	NA	2.0	0.6	0.5 U	4.9 U
Benz(a)anthracene	0.1	NA	NA	NA	NA	1.3	1	0.5 U	4.9 U
Chrysene	0.01	NA	NA	NA	NA	3.8	3.1	0.5 U	4.9 U
Benzo(a)pyrene	1	NA	NA	NA	NA	0.5	0.5 U	0.5 U	4.9 U
Indeno(1,2,3-cd)pyrene	0.1	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	4.9 U
Dibenz(a,h)anthracene	0.1	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	4.9 U
cPAHs TEQ		NA	NA	NA	NA	1.14	0.5831	0.353	3.45
Polychlorinated Biphenyls (PCBs) Aroclors (µg/kg)									
Aroclor-1016		8 U	NA	NA	NA	4.0 U	4 U	4.0 U	8.0 U
Aroclor-1242		8 U	NA	NA	NA	4.0 U	4 U	4.0 U	8.0 U

Table A-4-2
Historical Tissue Data - Gravel Plot

	Species	Oyster						Cockle	Littleneck Clam
	Sampling ID	HART14_OYSTER2A	Port Gamble A1	Port Gamble A2	Port Gamble A3	S_O_PGST_100	12110604	RS_C_PGST_10042	HART14_CLAM2A
	Sampling Date	12/15/2008	9/22/2004	9/22/2004	9/22/2004	4/29/2010	11/28/2012	4/29/2010	12/15/2008
Parameters	**TEF (as applicable)**								
Aroclor-1248		8 U	NA	NA	NA	4.0 U	4 U	4.0 U	8.0 U
Aroclor-1254		8 U	NA	NA	NA	4.0 U	6.2	4.0 U	8.0 U
Aroclor-1260		8 U	NA	NA	NA	4.0 U	4 U	4.0 U	8.0 U
Aroclor-1221		8 U	NA	NA	NA	4.0 U	4 U	4.0 U	8.0 U
Aroclor-1232		8 U	NA	NA	NA	4.0 U	4 U	4.0 U	8.0 U
Total Aroclors		8 U	NA	NA	NA	4.0 U	6.2	4.0 U	8.0 U
Dioxins / Furans (µg/kg)									
2,3,7,8-TCDD	1	0.108 U	NA	NA	NA	NA	NA	NA	0.117 U
1,2,3,7,8-PECDD	1	0.252 U	NA	NA	NA	NA	NA	NA	0.273 U
1,2,3,4,7,8-HXCDD	0.1	0.37 U	NA	NA	NA	NA	NA	NA	0.4 U
1,2,3,6,7,8-HXCDD	0.1	0.391 U	NA	NA	NA	NA	NA	NA	0.423 U
1,2,3,7,8,9-HXCDD	0.1	0.214 U	NA	NA	NA	NA	NA	NA	0.232 U
1,2,3,4,6,7,8-HPCDD	0.01	0.391 U	NA	NA	NA	NA	NA	NA	0.422 U
OCDD	0.0003	1.78 T	NA	NA	NA	NA	NA	NA	0.818 U
2,3,7,8-TCDF	0.1	0.375 T	NA	NA	NA	NA	NA	NA	0.111 U
1,2,3,7,8-PECDF	0.03	0.29 U	NA	NA	NA	NA	NA	NA	0.314 U
2,3,4,7,8-PECDF	0.3	0.237 U	NA	NA	NA	NA	NA	NA	0.257 U
1,2,3,4,7,8-HXCDF	0.1	0.522 U	NA	NA	NA	NA	NA	NA	0.564 U
1,2,3,6,7,8-HXCDF	0.1	0.125 U	NA	NA	NA	NA	NA	NA	0.135 U
1,2,3,7,8,9-HXCDF	0.1	0.241 U	NA	NA	NA	NA	NA	NA	0.261 U
2,3,4,6,7,8-HXCDF	0.1	0.285 U	NA	NA	NA	NA	NA	NA	0.308 U
1,2,3,4,6,7,8-HPCDF	0.01	0.521 U	NA	NA	NA	NA	NA	NA	0.564 U
1,2,3,4,7,8,9-HPCDF	0.01	0.54 U	NA	NA	NA	NA	NA	NA	0.584 U
OCDF	0.0003	0.672 U	NA	NA	NA	NA	NA	NA	0.727 U
Total Dioxin TEQ		0.373	NA	NA	NA	NA	NA	NA	0.368

Notes:
For TEQ calculations, non-detects were assumed to be half the quantitation limit
µg/kg = micrograms per kilogram
J = estimated concentration
mg/kg = milligrams per kilogram
NA = not analyzed
ng/kg = nanograms per kilogram
TEF = toxic equivalency factor
TEQ = toxicity equivalent quotient
U = not detected at the method detection limit

Table A-4-3
Historical Tissue Data - SMA-3

	Species	Crab Hepatopancreas					Crab Muscle						
	Sampling ID	HART14_CRAB1A PAN	PG11-BW-04-DCH-R1	PG11-BW-04-DCH-R2	12112801	12112803	HART14_CRAB1A MEAT	PG11-BW-04-DCM-R1	PG11-BW-04-DCM-R2	12PTGB1-DCM01A (muscle)	12PTGB3-DCM01A (muscle)	12112802	12112804
	Sampling Date	12/23/2008	8/2/2011	8/2/2011	11/28/2012	11/28/2012	12/23/2008	8/2/2011	8/3/2011	8/13/2012	8/13/2012	11/28/2012	11/28/2012
Parameters	TEF (as applicable)												
Conventionals (%)													
Percent Lipids		3.01	6.9	6.36	5.11	2.27	0.208	0.22	0.24	0.22	0.17	0.487	0.512
Metals (mg/kg)													
Arsenic		4	8	8	8	7	7	5	5	6.89	7.54	8	8
Cadmium		0.34	0.83	1.44	0.51	0.24	0.04	0.04 U	0.04 U	0.0027	0.0033	0.04 U	0.04 U
Chromium		0.1	0.1 J	0.1 J	0.1	0.1 U	0.1	0.1 U	0.1 J	NA	NA	0.1	0.2
Copper		19.2	4.01	4.07	15.9	23.2	8.65	5.74	3.75	6.84	7.42	8.47	7.2
Lead		0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.0046	0.0041 U	0.4 U	0.4 U
Mercury		0.03	0.02	0.028	0.023	0.023	0.047	0.027	0.036	0.0295	0.0383	0.034	0.054
Silver		0.5	.11 J	0.1 J	0.28	0.47	0.19	0.12 J	0.1 J	NA	NA	0.13	0.13
Zinc		15.1	17.6	15.5	18.8	15.4	50.2	30.3	38.3	44.1	42.3	40.4	37.1
Polycyclic Aromatic Hydrocarbons (PAHs) (µg/kg)													
Napthalene		NA	1 B	1.3 B	0.8	0.5	NA	0.5 B	0.5 B	0.86 B	0.83 B	0.5 U	0.5 U
2-Methylnaphthalene		NA	0.5 U	0.6	0.7	0.5 U	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U
1-Methylnaphthalene		NA	NA	NA	0.5 U	0.5 U	NA	NA	NA	NA	NA	0.5 U	0.5 U
Acenaphthylene		NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.26 U	0.32 U	0.5 U	0.5 U
Acenaphthene		NA	0.6	0.8	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.28 U	0.34 U	0.5 U	0.5 U
Fluorene		NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.27 U	0.33 U	0.5 U	0.5 U
Phenanthrene		NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.3	0.33 U	0.5 U	0.5 U
Anthracene		NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.21 U	0.25 U	0.5 U	0.5 U
Fluoranthene		NA	0.5 U	0.6	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.27 U	0.33 U	0.5 U	0.5 U
Pyrene		NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.27 U	0.33 U	0.5 U	0.5 U
Benzo(g,h,i)perylene		NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.34 U	0.4 U	0.5 U	0.5 U
Dibenzofuran		NA	NA	NA	0.5 U	0.5 U	NA	NA	NA	NA	NA	0.5 U	0.5 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (µg/kg)													
Total Benzofluoranthenes	0.1	NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.38 U	0.45 U	0.5 U	0.5 U
Benzo(b)fluoranthene	0.1	NA	NA	NA	0.5 U	0.5 U	NA	NA	NA	0.38 U	0.45 U	0.5 U	0.5 U
Benzo(k)fluoranthene	0.1	NA	NA	NA	0.5 U	0.5 U	NA	NA	NA	0.38 U	0.45 U	0.5 U	0.5 U
Benz(a)anthracene	0.1	NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.33 U	0.39 U	0.5 U	0.5 U
Chrysene	0.01	NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.38 U	0.46 U	0.5 U	0.5 U
Benzo(a)pyrene	1	NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.34 U	0.41 U	0.5 U	0.5 U
Indeno(1,2,3-cd)pyrene	0.1	NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.34 U	0.4 U	0.5 U	0.5 U
Dibenz(a,h)anthracene	0.1	NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.29 U	0.34 U	0.5 U	0.5 U
cPAHs TEQ		NA	0.353	0.353	0.3775	0.3775	NA	0.353	0.353	0.3884	0.4618	0.3775	0.3775
Polychlorinated Biphenyls (PCBs) Aroclors (µg/kg)													
Aroclor-1016		8 U	NA	NA	4 U	3.9 U	8 U	NA	NA	NA	NA	4 U	4 U
Aroclor-1242		8 U	NA	NA	4 U	3.9 U	8 U	NA	NA	NA	NA	4 U	4 U
Aroclor-1248		8 U	NA	NA	4 U	3.9 U	8 U	NA	NA	NA	NA	4 U	4 U
Aroclor-1254		20 U	NA	NA	12	11	8 U	NA	NA	NA	NA	4 U	6.2
Aroclor-1260		15 P	NA	NA	6.7	4.4	8 U	NA	NA	NA	NA	4 U	4 U
Aroclor-1221		8 U	NA	NA	4 U	3.9 U	8 U	NA	NA	NA	NA	4 U	4 U
Aroclor-1232		8 U	NA	NA	4 U	3.9 U	8 U	NA	NA	NA	NA	4 U	4 U
Total Aroclors		8 U	NA	NA	18.7	15.4	8 U	NA	NA	NA	NA	4 U	6.2

Table A-4-3
Historical Tissue Data - SMA-3

	Species	Crab Hepatopancreas					Crab Muscle						
	Sampling ID	HART14_CRAB1A PAN	PG11-BW-04-DCH-R1	PG11-BW-04-DCH-R2	12112801	12112803	HART14_CRAB1A MEAT	PG11-BW-04-DCM-R1	PG11-BW-04-DCM-R2	12PTGB1-DCM01A (muscle)	12PTGB3-DCM01A (muscle)	12112802	12112804
	Sampling Date	12/23/2008	8/2/2011	8/2/2011	11/28/2012	11/28/2012	12/23/2008	8/2/2011	8/3/2011	8/13/2012	8/13/2012	11/28/2012	11/28/2012
Parameters	TEF (as applicable)												
PCB Congeners (ng/kg)													
PCB-017		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-018		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-028		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-031		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-033		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-044		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-049		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-052		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-066		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-070		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-074		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-077	0.0001	20.8	35.4	37.1	NA	NA	0.91 U	1.78	1.71	NA	NA	NA	NA
PCB-081	0.0003	0.923 U	1.42 U	1.69 U	NA	NA	0.91 U	0.156 U	0.227 U	NA	NA	NA	NA
PCB-082		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-087		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-095		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-099		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-101		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.34	NA	NA
PCB-105	0.00003	425	802	714	NA	NA	29.5	25.3	28.4	0.21 U	0.25 U	NA	NA
PCB-110		NA	NA	NA	NA	NA	NA	NA	NA	0.21	0.27	NA	NA
PCB-114	0.00003	24.6	44.2	39.4	NA	NA	0.91 U	1.24	1.45	NA	NA	NA	NA
PCB-118	0.00003	1210	2120	1990	NA	NA	79.2	66.4	74.4	0.22	0.32	NA	NA
PCB-123	0.00003	20.7	35.6	40.2	NA	NA	0.91 U	1.14	1.09	NA	NA	NA	NA
PCB-126	0.1	15.8	6.82 U	7.03	NA	NA	0.91 U	0.396 U	0.282 U	NA	NA	NA	NA
PCB-128		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-138		NA	NA	NA	NA	NA	NA	NA	NA	0.43	0.86	NA	NA
PCB-149		NA	NA	NA	NA	NA	NA	NA	NA	0.21	0.3	NA	NA
PCB-151		NA	NA	NA	NA	NA	NA	NA	NA	0.20 U	0.25 U	NA	NA
PCB-153		NA	NA	NA	NA	NA	NA	NA	NA	0.42	0.83	NA	NA
PCB-156/157	0.00003	192	429	315	NA	NA	11.3	11.9	11	0.2 U	0.25 U	NA	NA
PCB-158		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-167	0.00003	96.1	188	157	NA	NA	5.18	4.47	4.81	NA	NA	NA	NA
PCB-169	0.03	0.923 U	3.01 U	3.33 U	NA	NA	0.91 U	0.163 U	0.168 U	NA	NA	NA	NA
PCB-170		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-171		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-177		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-180		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-183		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-187		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.38	NA	NA
PCB-189	0.00003	16 J	46.9	31.6	NA	NA	0.91 U	1.01	0.857 U	NA	NA	NA	NA
PCB-191		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-194		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-195		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA

Table A-4-3
Historical Tissue Data - SMA-3

	Species	Crab Hepatopancreas					Crab Muscle						
	Sampling ID	HART14_CRAB1A PAN	PG11-BW-04-DCH-R1	PG11-BW-04-DCH-R2	12112801	12112803	HART14_CRAB1A MEAT	PG11-BW-04-DCM-R1	PG11-BW-04-DCM-R2	12PTGB1-DCM01A (muscle)	12PTGB3-DCM01A (muscle)	12112802	12112804
	Sampling Date	12/23/2008	8/2/2011	8/2/2011	11/28/2012	11/28/2012	12/23/2008	8/2/2011	8/3/2011	8/13/2012	8/13/2012	11/28/2012	11/28/2012
Parameters	TEF (as applicable)												
PCB-199		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-205		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-206		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB-208		NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.25 U	NA	NA
PCB-209		NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	NA	NA
PCB Congener TEQ		1.65	0.809	0.817	NA	NA	0.0631	0.0436	0.0325	*	*	NA	NA
Dioxins / Furans (ng/kg)													
2,3,7,8-TCDD	1	.106 U	0.275	0.212 U	NA	NA	0.112 U	0.056 U	0.05 U	NA	NA	NA	0.057 U
1,2,3,7,8-PECDD	1	.428 T	0.96 J	0.736 J	NA	NA	0.262 U	0.049 U	0.0491 U	NA	NA	NA	0.057 U
1,2,3,4,7,8-HXCDD	0.1	.364 U	0.573 J	0.357 J	NA	NA	0.384 U	0.049 U	0.0491 U	NA	NA	NA	0.057 U
1,2,3,6,7,8-HXCDD	0.1	1.05 T	2.45	1.86	NA	NA	0.406 U	0.081 U	0.099 U	NA	NA	NA	0.187
1,2,3,7,8,9-HXCDD	0.1	.211 U	0.954 J	0.665 J	NA	NA	0.223 U	0.049 U	0.057 U	NA	NA	NA	0.057 U
1,2,3,4,6,7,8-HPCDD	0.01	1.8 T	3.88	2.64	NA	NA	0.406 U	0.119 U	0.181 U	NA	NA	NA	0.443
OCDD	0.0003	2.3 T	4.13	3.32	NA	NA	0.786 U	0.231 U	0.224 U	NA	NA	NA	0.612
2,3,7,8-TCDF	0.1	1.03	1.85	1.58	NA	NA	0.223 T	0.065 J	0.071 U	NA	NA	NA	0.169
1,2,3,7,8-PECDF	0.03	.286 U	0.494 J	0.242 J	NA	NA	0.301 U	0.049 U	0.0491 U	NA	NA	NA	0.057 U
2,3,4,7,8-PECDF	0.3	.455 T	0.874 J	0.558 J	NA	NA	0.247 U	0.052 J	0.0491 U	NA	NA	NA	0.064
1,2,3,4,7,8-HXCDF	0.1	.513 U	0.438 J	0.303 U	NA	NA	0.542 U	0.049 U	0.0491 U	NA	NA	NA	0.057 U
1,2,3,6,7,8-HXCDF	0.1	.123 U	0.213 J	0.181 J	NA	NA	0.13 U	0.049 U	0.0491 U	NA	NA	NA	0.057 U
1,2,3,7,8,9-HXCDF	0.1	.237 U	0.0497 U	0.047 U	NA	NA	0.25 U	0.049 U	0.0491 U	NA	NA	NA	0.057 U
2,3,4,6,7,8-HXCDF	0.1	.28 U	0.237 U	0.168 J	NA	NA	0.296 U	0.049 U	0.0491 U	NA	NA	NA	0.057 U
1,2,3,4,6,7,8-HPCDF	0.01	.513 U	0.935	0.766	NA	NA	0.542 U	0.049 U	0.0491 U	NA	NA	NA	0.087
1,2,3,4,7,8,9-HPCDF	0.01	.531 U	0.0497 U	0.047 U	NA	NA	0.561 U	0.049 U	0.0491 U	NA	NA	NA	0.057 U
OCDF	0.0003	.661 U	0.28 U	0.227 U	NA	NA	0.698 U	0.049 U	0.0491 U	NA	NA	NA	0.057
Total Dioxin TEQ		0.940	2.220	1.480	NA	NA	0.370	0.0952	0.0827	NA	NA	NA	0.14

Table A-4-3
Historical Tissue Data - SMA-3

	Geoduck						
	HART14_GD1A	HART14_GD2A	HART14_GD3A	12111903	12111904	12111905	12111906
	12/16/2008	12/16/2008	12/16/2008	11/19/2012	11/19/2012	11/19/2012	11/19/2012
Parameters							
Conventionals (%)							
Percent Lipids	0.481	0.426	0.823	0.47	0.694	0.222	0.34
Metals (mg/kg)							
Arsenic	1	2	2	3	2	9	4
Cadmium	0.19	0.19	0.26	0.36	0.2	1.37	0.76
Chromium	0.1	0.1	0.2	0.5	0.3	0.9	0.4
Copper	3.25	2.85	6.29	6.32	6.44	7.37	4.04
Lead	0.4 U	0.4 U	0.4 U	0.8	0.4 U	1.8	0.4 U
Mercury	0.01	0.01	0.02	0.01	0.008	0.052	0.014
Silver	0.93	1.15	1.47	0.75	0.15	3.47	2.74
Zinc	16.5	14.5	30.8	28.1	14.9	14.8	24.7
Polycyclic Aromatic Hydrocarbo							
Napthalene	NA	NA	NA	0.5	0.5 U	0.5 U	0.5 U
2-Methylnaphthalene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
1-Methylnaphthalene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Acenaphthylene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Acenaphthene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Fluorene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Phenanthrene	NA	NA	NA	0.7	0.7	0.5 U	0.6
Anthracene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Fluoranthene	NA	NA	NA	1	1.7	0.9	0.8
Pyrene	NA	NA	NA	0.5 U	0.5	0.5	0.5 U
Benzo(g,h,i)perylene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Dibenzofuran	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Carcinogenic Polycyclic Aromati							
Total Benzofluoranthenes	NA	NA	NA	0.9	1.2	0.5 U	0.7
Benzo(b)fluoranthene	NA	NA	NA	0.5	0.6	0.5 U	0.5 U
Benzo(k)fluoranthene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Benz(a)anthracene	NA	NA	NA	0.5	0.5	0.5 U	0.5 U
Chrysene	NA	NA	NA	0.7	0.7	0.5 U	0.5
Benzo(a)pyrene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Indeno(1,2,3-cd)pyrene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
Dibenz(a,h)anthracene	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U
cPAHs TEQ	NA	NA	NA	0.43	0.44	0.38	0.38
Polychlorinated Biphenyls (PCBs							
Aroclor-1016	4.0 U	4.0 U	4.0 U	4 U	4 U	4 U	4 U
Aroclor-1242	4.0 U	4.0 U	4.0 U	4 U	4 U	4 U	4 U
Aroclor-1248	4.0 U	4.0 U	4.0 U	4 U	4 U	4 U	4 U
Aroclor-1254	4.0 U	4.0 U	4.0 U	4 U	4 U	4 U	4 U
Aroclor-1260	4.0 U	4.0 U	4.0 U	4 U	4 U	4 U	4 U
Aroclor-1221	4.0 U	4.0 U	4.0 U	4 U	4 U	4 U	4 U
Aroclor-1232	4.0 U	4.0 U	4.0 U	4 U	4 U	4 U	4 U
Total Aroclors	4.0 U	4.0 U	4.0 U	4 U	4 U	4 U	4 U

Table A-4-3
Historical Tissue Data - SMA-3

	Geoduck						
	HART14_GD1A	HART14_GD2A	HART14_GD3A	12111903	12111904	12111905	12111906
	12/16/2008	12/16/2008	12/16/2008	11/19/2012	11/19/2012	11/19/2012	11/19/2012
Parameters							
PCB Congeners (ng/kg)							
PCB-017	NA	NA	NA	NA	NA	NA	NA
PCB-018	NA	NA	NA	NA	NA	NA	NA
PCB-028	NA	NA	NA	NA	NA	NA	NA
PCB-031	NA	NA	NA	NA	NA	NA	NA
PCB-033	NA	NA	NA	NA	NA	NA	NA
PCB-044	NA	NA	NA	NA	NA	NA	NA
PCB-049	NA	NA	NA	NA	NA	NA	NA
PCB-052	NA	NA	NA	NA	NA	NA	NA
PCB-066	NA	NA	NA	NA	NA	NA	NA
PCB-070	NA	NA	NA	NA	NA	NA	NA
PCB-074	NA	NA	NA	NA	NA	NA	NA
PCB-077	0.977 U	0.836 U	NA	NA	NA	NA	NA
PCB-081	0.977 U	0.836 U	NA	NA	NA	NA	NA
PCB-082	NA	NA	NA	NA	NA	NA	NA
PCB-087	NA	NA	NA	NA	NA	NA	NA
PCB-095	NA	NA	NA	NA	NA	NA	NA
PCB-099	NA	NA	NA	NA	NA	NA	NA
PCB-101	NA	NA	NA	NA	NA	NA	NA
PCB-105	20.2	18.1	NA	NA	NA	NA	NA
PCB-110	NA	NA	NA	NA	NA	NA	NA
PCB-114	0.977 U	0.836 U	NA	NA	NA	NA	NA
PCB-118	70.4	50.4	NA	NA	NA	NA	NA
PCB-123	0.977 U	0.836 U	NA	NA	NA	NA	NA
PCB-126	0.977 U	0.836 U	NA	NA	NA	NA	NA
PCB-128	NA	NA	NA	NA	NA	NA	NA
PCB-138	NA	NA	NA	NA	NA	NA	NA
PCB-149	NA	NA	NA	NA	NA	NA	NA
PCB-151	NA	NA	NA	NA	NA	NA	NA
PCB-153	NA	NA	NA	NA	NA	NA	NA
PCB-156/157	7.93	2.21 J	NA	NA	NA	NA	NA
PCB-158	NA	NA	NA	NA	NA	NA	NA
PCB-167	5.31 J	2.79 J	NA	NA	NA	NA	NA
PCB-169	0.977 U	0.836 U	NA	NA	NA	NA	NA
PCB-170	NA	NA	NA	NA	NA	NA	NA
PCB-171	NA	NA	NA	NA	NA	NA	NA
PCB-177	NA	NA	NA	NA	NA	NA	NA
PCB-180	NA	NA	NA	NA	NA	NA	NA
PCB-183	NA	NA	NA	NA	NA	NA	NA
PCB-187	NA	NA	NA	NA	NA	NA	NA
PCB-189	0.977 UJ	0.836 U	NA	NA	NA	NA	NA
PCB-191	NA	NA	NA	NA	NA	NA	NA
PCB-194	NA	NA	NA	NA	NA	NA	NA
PCB-195	NA	NA	NA	NA	NA	NA	NA

Table A-4-3
Historical Tissue Data - SMA-3

	Geoduck						
	HART14_GD1A	HART14_GD2A	HART14_GD3A	12111903	12111904	12111905	12111906
	12/16/2008	12/16/2008	12/16/2008	11/19/2012	11/19/2012	11/19/2012	11/19/2012
Parameters							
PCB-199	NA	NA	NA	NA	NA	NA	NA
PCB-205	NA	NA	NA	NA	NA	NA	NA
PCB-206	NA	NA	NA	NA	NA	NA	NA
PCB-208	NA	NA	NA	NA	NA	NA	NA
PCB-209	NA	NA	NA	NA	NA	NA	NA
PCB Congener TEQ	0.0669	0.0567	NA	NA	NA	NA	NA
Dioxins / Furans (ng/kg)							
2,3,7,8-TCDD	0.111 U	0.107 U	0.107 U	NA	NA	NA	NA
1,2,3,7,8-PECDD	0.258 U	0.25 U	0.25 U	NA	NA	NA	NA
1,2,3,4,7,8-HXCDD	0.378 U	0.367 U	0.367 U	NA	NA	NA	NA
1,2,3,6,7,8-HXCDD	0.399 U	0.387 U	0.387 U	NA	NA	NA	NA
1,2,3,7,8,9-HXCDD	0.219 U	0.212 U	0.212 U	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDD	0.399 U	0.387 U	0.387 U	NA	NA	NA	NA
OCDD	2.58 J	1.51 J	1.05 J	NA	NA	NA	NA
2,3,7,8-TCDF	0.105 U	0.102 U	0.102 U	NA	NA	NA	NA
1,2,3,7,8-PECDF	0.297 U	0.288 U	0.288 U	NA	NA	NA	NA
2,3,4,7,8-PECDF	0.243 U	0.235 U	0.235 U	NA	NA	NA	NA
1,2,3,4,7,8-HXCDF	0.533 U	0.517 U	0.517 U	NA	NA	NA	NA
1,2,3,6,7,8-HXCDF	0.128 U	0.124 U	0.124 U	NA	NA	NA	NA
1,2,3,7,8,9-HXCDF	0.246 U	0.239 U	0.239 U	NA	NA	NA	NA
2,3,4,6,7,8-HXCDF	0.291 U	0.282 U	0.282 U	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDF	0.533 U	0.517 U	0.517 U	NA	NA	NA	NA
1,2,3,4,7,8,9-HPCDF	0.552 U	0.535 U	0.535 U	NA	NA	NA	NA
OCDF	0.687 U	0.666 U	0.666 U	NA	NA	NA	NA
Total Dioxin TEQ	0.349	0.337	0.337	NA	NA	NA	NA

Notes:

For TEQ calculations, non-detects were assumed to be half the quantitation limit

* = not enough congeners with assigned TEFs were analyzed to make a TEQ

µg/kg = micrograms per kilogram

B = analyte was detected in the Method Blank. If the sample value is less than three times the blank value, the sample value is suspect.

J = estimated concentration

mg/kg = milligrams per kilogram

NA = not analyzed

ng/kg = nanograms per kilogram

TEF = toxic equivalency factor

TEQ = toxicity equivalent quotient

U = not detected at the method detection limit

Table A-4-4
Historical Tissue Data - Western Shoreline

	Species	Oyster	Cockle	Littleneck	Manila
	Sampling ID	LS_O_PGST_100429	LS_C_PGST_100429	LS_LN_PGST_100429	LS_M_PGST_100429
	Sampling Date	4/29/2010	4/29/2010	4/29/2010	4/29/2010
Parameters	TEF (as applicable)				
Conventionals (%)					
Percent Lipids		1.65	0.39	0.47	0.38
Metals (mg/kg)					
Arsenic		1	1 U	3	3
Cadmium		1.28	0.04	0.45	0.35
Chromium		0.2	0.20	0.20	0.2
Copper		9.9	1.1	3.3	6.68
Lead		0.4 U	0.4 U	0.4 U	0.4 U
Mercury		0.011	0.005 U	0.008	0.008
Silver		0.14 J	0.06 UJ	0.07 J	0.08 J
Zinc		130	10	13	11.5
Polycyclic Aromatic Hydrocarbons (PAHs) (µg/kg)					
Napthalene		NA	NA	NA	NA
2-Methylnaphthalene		NA	NA	NA	NA
1-Methylnaphthalene		NA	NA	NA	NA
Acenaphthylene		NA	NA	NA	NA
Acenaphthene		NA	NA	NA	NA
Fluorene		NA	NA	NA	NA
Phenanthrene		NA	NA	NA	NA
Anthracene		NA	NA	NA	NA
Fluoranthene		NA	NA	NA	NA
Pyrene		NA	NA	NA	NA
Benzo(g,h,i)perylene		NA	NA	NA	NA
Dibenzofuran		NA	NA	NA	NA
Carcinogenic Polycyclic Aromatic Hydrocarbons (µg/kg)					
Total Benzofluoranthenes	0.1	1.6	0.5 U	0.5 U	0.5 U

Table A-4-4
Historical Tissue Data - Western Shoreline

	Species	Oyster	Cockle	Littleneck	Manila
	Sampling ID	LS_O_PGST_100429	LS_C_PGST_100429	LS_LN_PGST_100429	LS_M_PGST_100429
	Sampling Date	4/29/2010	4/29/2010	4/29/2010	4/29/2010
Parameters	**TEF (as applicable)**				
Benzo(b)fluoranthene	0.1	0.8	0.5 U	0.5 U	0.5 U
Benzo(k)fluoranthene	0.1	0.8	0.5 U	0.5 U	0.5 U
Benz(a)anthracene	0.1	0.9	0.5 U	0.5 U	1.1
Chrysene	0.01	2.4	0.9	0.5 U	1.2
Benzo(a)pyrene	1	0.5 U	0.5 U	0.5 U	0.5 U
Indeno(1,2,3-cd)pyrene	0.1	0.5 U	0.5 U	0.5 U	0.5 U
Dibenz(a,h)anthracene	0.1	0.5 U	0.5 U	0.5 U	0.5 U
cPAHs TEQ		0.7054	0.5784	0.57775	0.6637
Polychlorinated Biphenyls (PCBs) Aroclors (µg/kg)					
Aroclor-1016		3.9 U	4.0 U	4 U	4 U
Aroclor-1242		3.9 U	4.0 U	4 U	4 U
Aroclor-1248		3.9 U	4.0 U	4 U	4 U
Aroclor-1254		3.9 U	4.0 U	4 U	4 U
Aroclor-1260		3.9 U	4.0 U	4 U	4 U
Aroclor-1221		3.9 U	4.0 U	4 U	4 U
Aroclor-1232		3.9 U	4.0 U	4 U	4 U
Total Aroclors					4 U
PCB Congeners (ng/kg)					
PCB-017		NA	NA	NA	NA
PCB-018		NA	NA	NA	NA
PCB-028		NA	NA	NA	NA
PCB-031		NA	NA	NA	NA
PCB-033		NA	NA	NA	NA
PCB-044		NA	NA	NA	NA
PCB-049		NA	NA	NA	NA
PCB-052		NA	NA	NA	NA

Table A-4-4
Historical Tissue Data - Western Shoreline

	Species	Oyster	Cockle	Littleneck	Manila
	Sampling ID	LS_O_PGST_100429	LS_C_PGST_100429	LS_LN_PGST_100429	LS_M_PGST_100429
	Sampling Date	4/29/2010	4/29/2010	4/29/2010	4/29/2010
Parameters	TEF (as applicable)				
PCB-066		NA	NA	NA	NA
PCB-070		NA	NA	NA	NA
PCB-074		NA	NA	NA	NA
PCB-077	0.0001	NA	NA	NA	NA
PCB-081	0.0003	NA	NA	NA	NA
PCB-082		NA	NA	NA	NA
PCB-087		NA	NA	NA	NA
PCB-095		NA	NA	NA	NA
PCB-099		NA	NA	NA	NA
PCB-101		NA	NA	NA	NA
PCB-105	0.00003	NA	NA	NA	NA
PCB-110		NA	NA	NA	NA
PCB-114	0.00003	NA	NA	NA	NA
PCB-118	0.00003	NA	NA	NA	NA
PCB-123	0.00003	NA	NA	NA	NA
PCB-126	0.1	NA	NA	NA	NA
PCB-128		NA	NA	NA	NA
PCB-138		NA	NA	NA	NA
PCB-149		NA	NA	NA	NA
PCB-151		NA	NA	NA	NA
PCB-153		NA	NA	NA	NA
PCB-156/157	0.00003	NA	NA	NA	NA
PCB-158		NA	NA	NA	NA
PCB-167	0.00003	NA	NA	NA	NA
PCB-169	0.03	NA	NA	NA	NA
PCB-170		NA	NA	NA	NA

Table A-4-4
Historical Tissue Data - Western Shoreline

	Species	Oyster	Cockle	Littleneck	Manila
	Sampling ID	LS_O_PGST_100429	LS_C_PGST_100429	LS_LN_PGST_100429	LS_M_PGST_100429
	Sampling Date	4/29/2010	4/29/2010	4/29/2010	4/29/2010
Parameters	TEF (as applicable)				
PCB-171		NA	NA	NA	NA
PCB-177		NA	NA	NA	NA
PCB-180		NA	NA	NA	NA
PCB-183		NA	NA	NA	NA
PCB-187		NA	NA	NA	NA
PCB-189	0.00003	NA	NA	NA	NA
PCB-191		NA	NA	NA	NA
PCB-194		NA	NA	NA	NA
PCB-195		NA	NA	NA	NA
PCB-199		NA	NA	NA	NA
PCB-205		NA	NA	NA	NA
PCB-206		NA	NA	NA	NA
PCB-208		NA	NA	NA	NA
PCB-209		NA	NA	NA	NA
PCB Congener TEQ		NA	NA	NA	NA
Dioxins / Furans (ng/kg)					
2,3,7,8-TCDD	1	NA	NA	NA	NA
1,2,3,7,8-PECDD	1	NA	NA	NA	NA
1,2,3,4,7,8-HXCDD	0.1	NA	NA	NA	NA
1,2,3,6,7,8-HXCDD	0.1	NA	NA	NA	NA
1,2,3,7,8,9-HXCDD	0.1	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDD	0.01	NA	NA	NA	NA
OCDD	0.0003	NA	NA	NA	NA
2,3,7,8-TCDF	0.1	NA	NA	NA	NA
1,2,3,7,8-PECDF	0.03	NA	NA	NA	NA
2,3,4,7,8-PECDF	0.3	NA	NA	NA	NA

Table A-4-4
Historical Tissue Data - Western Shoreline

	Species	Oyster	Cockle	Littleneck	Manila
	Sampling ID	LS_O_PGST_100429	LS_C_PGST_100429	LS_LN_PGST_100429	LS_M_PGST_100429
	Sampling Date	4/29/2010	4/29/2010	4/29/2010	4/29/2010
Parameters	TEF (as applicable)				
1,2,3,4,7,8-HXCDF	0.1	NA	NA	NA	NA
1,2,3,6,7,8-HXCDF	0.1	NA	NA	NA	NA
1,2,3,7,8,9-HXCDF	0.1	NA	NA	NA	NA
2,3,4,6,7,8-HXCDF	0.1	NA	NA	NA	NA
1,2,3,4,6,7,8-HPCDF	0.01	NA	NA	NA	NA
1,2,3,4,7,8,9-HPCDF	0.01	NA	NA	NA	NA
OCDF	0.0003	NA	NA	NA	NA
Total Dioxin TEQ		NA	NA	NA	NA

Notes:

For TEQ calculations, non-detects were assumed to be half the quantitation limit.

µg/kg = micrograms per kilogram

B = analyte was detected in the Method Blank. If the sample value is less than three times the blank value, the sample value is suspect.

J = estimated concentration

mg/kg = milligrams per kilogram

NA = not analyzed

ng/kg = nanograms per kilogram

TEF = toxic equivalency factor

TEQ = toxicity equivalent quotient

U = not detected at the method detection limit

APPENDIX B
FIELD FORMS

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: Anchor QEA	Phone: 206-287-9130	Date: 11/02/15	Ice Present?
Client Contact: Cindy Fields		No. of Coolers:	Cooler Temps:
Client Project Name: Port Gamble Clean-up			
Client Project #: 150388 0101	Samplers: J. Florer		

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested *								Notes/Comments
					Lipids	Dioxins/ Furans	cPAHs	PCB Congeners					
PG-TP-MUS-COC-151030	10/30/15	1500	tissue	1	X	X	X	X					Shuckt + homogenize send out tissue for PCB congener analysis

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
* Archive frozen until additional mussel samples are submitted late Dec 2015	Printed Name: Joanna Florer	Printed Name: Emily Litwin	Printed Name:	Printed Name:
	Company: Anchor QEA	Company: ARI	Company:	Company:
	Date & Time: 11/02/15 1128	Date & Time: 11/02/15 1128	Date & Time:	Date & Time:

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

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 Clean-up DATE: 10/29/15
SITE ADDRESS: PERSONNEL: J. Flores, Mike Rory (trn bed)

WEATHER: overcast + calm WIND FROM: N NE E SE S SW W NW LOW LIGHT MEDIUM HEAVY
SUNNY CLOUDY RAIN ? TEMPERATURE: °F °C [Circle appropriate units]

TIME	COMMENTS
0700	Arrive Salisbury Pt. park boat ramp
0800	Arrive SMA-1 dock + loaded cages & conducted
	H+S + daily plan.
0830	departed SMA-1 dock, headed to mussel pen
0845	collected mussels for 2 locations - headed to GP-1
0900	Arrive GP-1 + deployed 3 cages w/ mussels (PEMDs in 2 cages)
1000	left GP-1 + headed to PJ-1
1030	Arrive PJ-1 + deployed 3 cages w/ mussels (PEMDs in 2 cages)
1130	left PJ-1 headed to SMA-1 dock to p/u more cages
1145	arrived SMA-1 dock p/u cages + David + went to mussel pen to
	get more mussels
1200	headed to WS-1
1210	Arrive WS-1 + deployed 3 cages w/ mussels (PEMDs in 2 cages)
1251	Departed WS-1 + headed to net pen to p/u more mussels + then to SMA dock
1315	Arrive SMA dock to p/u another cage set.
1340	Arrive SMA-2-5 + deployed 3 cages w/ mussels (PEMDs in 2 cages)
	offset anchor rigged location south of construction (SMA)
1430	finished SMA-2-5 + headed to SMA-2-4
~~1500~~ 1445	arrive SMA-2-4 + deployed 3 cages w/ mussels (PEMDs 2 cages)
~~1520~~ 1520	finished at SMA-2-4 + headed to net pen to p/u more mussels
1600	back to SMA dock + set-up cages for SMA-2-3
1620	arrive SMA-2-3 + deployed 3 cages w/ mussels (PEMDs 2 cages)
1645	finished deploying at SMA-2-3 + returned to SMA dock
1700	left SMA dock - returned to Salisbury Pt Park

End of day
JF 10/29/15

Signature: J. Flores

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 Clean-up

DATE: 10/30/15

SITE ADDRESS:

PERSONNEL: J. Fluver, Mike + Chris James

WEATHER: Overcast

WIND FROM: N | NE | E | SE | S | SW | W | (NW)

SUNNY | CLOUDY | RAIN | ?

(LIGHT) | MEDIUM | HEAVY

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

TIME	COMMENTS
1230	began mussel deployment by picking up mussels from net pen + loading 1st set of cages
1245	departed SMA dock + headed to location SMA-2-2 deployed 3 mussel cages & PEMDs 2 cages)
1315	~~COB~~ opened trip blank PEMD for 5 min while deploying cages.
1320	headed back to SMA dock + set up cages for SMA-2-1
1410	Deployed 3 mussel cages at SMA-2-1
1440	Returned to SMA dock
1445	Arrive SMA dock + unloaded
1500	created Type O mussel sample (#101, 58, 19, 142)
1530	Mussel deployment demobilization - End of day
	note: T-0 mussels to be submitted to ~~ARI~~ on Monday

JM7 10/30/15

Signature: J. Fluver

Caged Bivalve Deployment

ANCHOR QEA

Project: Shellfish Monitoring Plan Port Gamble Bay Cleanup | Project Number: 130388-01.02

Station ID:	GP-1	Weather:	cloudy
Date:	10/29/15	Water Depth (ft) (A):	12.8 ft (lead line) ~~or fathometer~~
Time:	0900	Tide height (ft MLLW) (B):	+9.6 flood or (ebb)
Latitude/Easting:	on target	Water Depth (ft MLLW) (A-B):	3.2
Longitude/Northing:	on target		
Field Staff:	JMF, MJ, RD		

DESCRIPTION OF CAGE DEPLOYMENT

e.g., deployment design (offset, anchor/rigging system), how to identify the cages with PEMDs, type of mussels placed in the cages

yellow buoys have PEMDs, red/white ~~or white~~ = non PEMD
GP-1 cage 1 bag #'s - 77, 117, 75, 118 cage 2 bag #'s - 115, 116, 7, 79
cage 3 bag # - 119, 76, 120, 1

JJ 10/29/15

LOCATION DESCRIPTION

e.g., nearby landmarks/feature/facility and approximate distance, hydrologic observations such as flow, currents and direction, wave action, vessel activity

due west of Mike's house + east of net pen
halfway between the shoreline + net pens

JJ 10/29/15

Caged Bivalve Deployment

ANCHOR QEA

Project: Shellfish Monitoring Plan Port Gamble Bay Cleanup Project Number: 130388-01.02

Station ID: PJ-1
Date: 10/29/15
Time: 10:30
Latitude/Easting: 315796.32
Longitude/Northing: 1212999.14
Field Staff: J. Flower, Rory + Mike

Weather: Cloudy
Water Depth (ft) (A): 9.5 lead line or (fathometer)
Tide height (ft MLLW) (B): +7.2 flood or (ebb)
Water Depth (ft MLLW) (A-B): 2.3

DESCRIPTION OF CAGE DEPLOYMENT

e.g., deployment design (offset, anchor/rigging system), how to identify the cages with PEMDs, type of mussels placed in the cages

non-PEMD = Red/white buoy ; yellow or white buoy = PEMD
Cage 1 (non PEMD) bag #'s - 155, 4, 80, 157
Cage 2 (PEMD) bag #'s - 158, 3, 156, 78
Cage 3 (PEMD) bag #'s - 2, 160, 159, 74

JF 10/29/15

LOCATION DESCRIPTION

e.g., nearby landmarks/feature/facility and approximate distance, hydrologic observations such as flow, currents and direction, wave action, vessel activity

due west of church (PG) & NE of turquoise house, due south of Point Julia light post. Moved location 60 ft SW to deeper location.

JF 10/29/15

Caged Bivalve Deployment

ANCHOR QEA

Project: Shellfish Monitoring Plan Port Gamble Bay Cleanup Project Number: 130388-01.02

Station ID: WS-1
Date: 10/29/15
Time: 1210
Latitude/Easting: 312185.73
Longitude/Northing: 1210499.80
Field Staff: J. Flaherty, Rory, Mike

Weather: partially cloudy
Water Depth (ft) (A): 7.0 lead line or fathometer
Tide height (ft MLLW) (B): 5.0 flood or ebb
Water Depth (ft MLLW) (A-B): 2ft

DESCRIPTION OF CAGE DEPLOYMENT

e.g., deployment design (offset, anchor/rigging system), how to identify the cages with PEMDs, type of mussels placed in the cages

cage1 - bag#s 8,153,152,5

cage2 - bag#'s 113,73,71,112

cage3 - bag#'s 114,10,72,154

PEMDs in cages w/ white or yellow buoys
Red/white buoy - no PEMD

DT 10/29/15

LOCATION DESCRIPTION

e.g., nearby landmarks/feature/facility and approximate distance, hydrologic observations such as flow, currents and direction, wave action, vessel activity

WS-1 moved east from original location to deeper water ~ 200ft.

due south of construction, east of cable crossing sign 150ft east of pilings

DT 10/29/15

Caged Bivalve Deployment

ANCHOR QEA

Project: Shellfish Monitoring Plan Port Gamble Bay Cleanup Project Number: 130388-01.02

Station ID:	SMA-2-5	Weather:	overcast
Date:	10/29/15	Water Depth (ft) (A):	16.0 lead line or fathometer
Time:	1340	Tide height (ft MLLW) (B):	5.2 flood or ebb
Latitude/Easting:	on target	Water Depth (ft MLLW) (A-B):	10.8
Longitude/Northing:	on target		
Field Staff:	J. Flower, Rory, Mikie D. Gillingham		

DESCRIPTION OF CAGE DEPLOYMENT

e.g., deployment design (offset, anchor/rigging system), how to identify the cages with PEMDs, type of mussels placed in the cages

Offset location with one white buoy marker. PEMD cage lines marked w/ zipties.

Cage1 bag#-106, 107, 65, 17

Cage2 bag#- 66, 108, 147, 12

Cage3 bag#- 110, 14, 67, 148

LOCATION DESCRIPTION

e.g., nearby landmarks/feature/facility and approximate distance, hydrologic observations such as flow, currents and direction, wave action, vessel activity

Due west of shoreline w/ 4 evergreen trees, SW of shore line

Caged Bivalve Deployment

ANCHOR QEA

Project: Shellfish Monitoring Plan Port Gamble Bay Cleanup Project Number: 130388-01.02

Station ID: SMA-2-4
Date: 10/29/15
Time: 1515
Latitude/Easting: 1211825.49
Longitude/Northing: 315378.62
Field Staff: J. Flower, Mike, Rory D. Gillingham

Weather: Overcast
Water Depth (ft) (A): ~~37.7~~ lead line or (fathometer)
Tide height (ft MLLW) (B): +7.1 (flood) or ebb
Water Depth (ft MLLW) (A-B): ~~37.7~~ 30.6 87

DESCRIPTION OF CAGE DEPLOYMENT

e.g., deployment design (offset, anchor/rigging system), how to identify the cages with PEMDs, type of mussels placed in the cages

Cage 1 - 69, 70, 109, 151
Cage 2 - 146, 13, 111, 11
Cage 3 - 150, 68, 6, 149

offset location w/ ziptes on lines for cages w/ PEMDs. one buoy 94

LOCATION DESCRIPTION

e.g., nearby landmarks/feature/facility and approximate distance, hydrologic observations such as flow, currents and direction, wave action, vessel activity

due east of beige house + due west of turquoise house

Caged Bivalve Deployment

ANCHOR QEA

Project: Shellfish Monitoring Plan Port Gamble Bay Cleanup Project Number: 130388-01.02

Station ID: SMA-2-3
Date: 10/29/15
Time: 1620
Latitude/Easting: 1211898.18
Longitude/Northing: 315698.12
Field Staff: J. Florer, Rory, Mike D. Gillingham

Weather: overcast
Water Depth (ft) (A): 45.5 lead line or (rathometer)
Tide height (ft MLLW) (B): 8.7 (flood) or ebb
Water Depth (ft MLLW) (A-B): 36.8

DESCRIPTION OF CAGE DEPLOYMENT

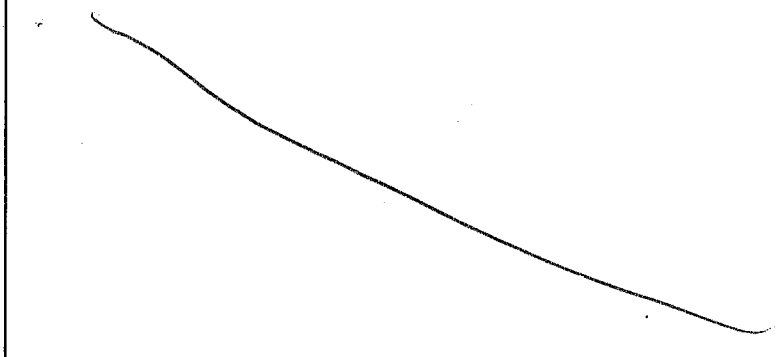
e.g., deployment design (offset, anchor/rigging system), how to identify the cages with PEMDs, type of mussels placed in the cages

Cage1 - 16, 15, 144, 105
Cage2 - 103, 62, 184, 63
Cage3 - 64, 143, 145, 18

offset anchor rigging set-up w/ 1 white buoy due to strong wind from the north engine was left on + boated into wind to stay on location. PEMD was upwind of engine.

LOCATION DESCRIPTION

e.g., nearby landmarks/feature/facility and approximate distance, hydrologic observations such as flow, currents and direction, wave action, vessel activity



Caged Bivalve Deployment

ANCHOR QEA

Project: Shellfish Monitoring Plan Port Gamble Bay Cleanup Project Number: 130388-01.02

Station ID:	SMA-2-2	Weather:	overcast
Date:	10/30/15	Water Depth (ft) (A):	49.5 lead line or fathometer
Time:	1320	Tide height (ft MLLW) (B):	+5.4 flood or ebb
Latitude/Easting:	~~See op's~~ 1212655.76	Water Depth (ft MLLW) (A-B):	44.1
Longitude/Northing:	316263.11		
Field Staff:	J. Flaer, Mike Chris Jones		

DESCRIPTION OF CAGE DEPLOYMENT

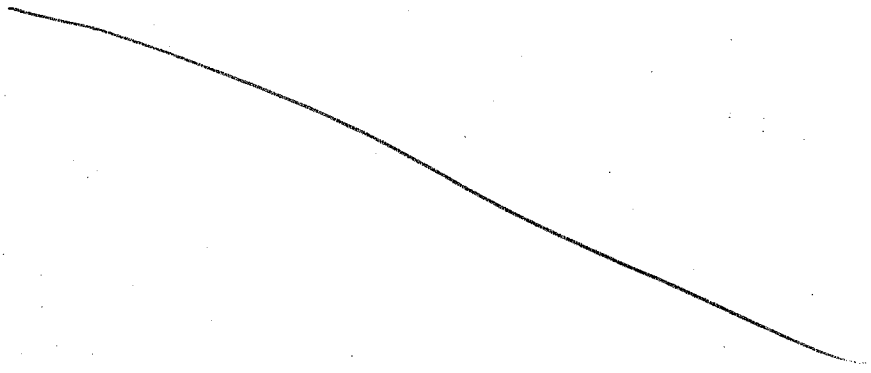
e.g., deployment design (offset, anchor/rigging system), how to identify the cages with PEMDs, type of mussels placed in the cages

Cage 1 - 137, 59, 97, 24
Cage 2 - 25, 139, 56, 96
Cage 3 - 98, 140, 23, 60

offset system w/ one buoy (white)

LOCATION DESCRIPTION

e.g., nearby landmarks/feature/facility and approximate distance, hydrologic observations such as flow, currents and direction, wave action, vessel activity



Caged Bivalve Deployment

ANCHOR QEA

Project: Shellfish Monitoring Plan Port Gamble Bay Cleanup Project Number: 130388-01.02

Station ID:	SMA-2-1	Weather:	Overcast
Date:	10/30/15	Water Depth (ft) (A):	49 lead line or fathometer
Time:	1410	Tide height (ft MLLW) (B):	+5.4 flood or ebb
Latitude/Easting:	Ontarget	Water Depth (ft MLLW) (A-B):	39
Longitude/Northing:	"		
Field Staff:	J. Plover, Mike, Chris Jones		

DESCRIPTION OF CAGE DEPLOYMENT

e.g., deployment design (offset, anchor/rigging system), how to identify the cages with PEMDs, type of mussels placed in the cages

Cage 1 - 61, 21, 136, 99
Cage 2 - 141, 22, 55, 100
Cage 3 102, 20, 57, 138

yellow marker buoy offset system

LOCATION DESCRIPTION

e.g., nearby landmarks/feature/facility and approximate distance, hydrologic observations such as flow, currents and direction, wave action, vessel activity

East of green water tower, west of light pole at Point Julia boat launch

ANCHOR QEA

DAILY SAFETY BRIEFING

Date: 10/29/15

Project Name: PG Cleanup

Project No: 150388 0101 task 5

Person Conducting Meeting: J. Flaver

Health and Safety Officer: C. Farrell

Project Manager: N. Sollitt

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:

Over cast, no wind

Daily work scope:

deployment of SMP

Site-specific hazards:

water, ropes

Safety comments:

be careful when tangling

Attendees	
Printed Name	**Signature**
Joanna Flaver	J. Flaver
David Gillingham	David Gillingham

ANCHOR QEA

DAILY SAFETY BRIEFING

Date: 10/29/15

Project Name: PG Clean-up

Project No: 150388001 tasks

Person Conducting Meeting: J. Florer

Health and Safety Officer: C. Torrell

Project Manager: N. Soccorsy

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:

overcast

Daily work scope:

mussel cage deployment

Site-specific hazards:

falling over board + entanglement in ropes

Safety comments:

keep an eye out for vessel traffic + wake

Attendees	
Printed Name	**Signature**
J Florer	J. Florer

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Standard
ARI Client Company: Anchor QEA	Phone: 206-287-9130.
Client Contact: Cindy Fields	
Client Project Name: Port Gamble Clean-up	
Client Project #: 150388-01.01	Samplers: J. Florer, RO'Rourke

Page: 1 of 1	
Date: 01/16/16	Ice Present? Yes
No. of Coolers: 2	Cooler Temps: 0.6, 0.9°C

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Lipids	PCBs congeners	Dioxin/furans	Cadmium	PAHs (SIM)				Notes/Comments
PG-SMA2-2-MUS-COC-160104	01/04/16	1400	Tissue	(69) 1	X	X	X	X	X				Composite the 2 bags per sample
PG-PJ-1-MUS-COC-160104	"	0900	"	1	X	X	X	X	X				"
PG-WS-1-MUS-COC-160104	"	1145	"	1	X	X	X	X	X				"
PG-GP-1-MUS-COC-160104	"	1010	"	1	X	X	X	X	X				"
(69) PG-SMA2-5 ~~MUS COC~~-COC-160104	01/04/16	1600	"	1	X	X	X	X	X				"
PG-SMA2-4-MUS-COC-160105	01/05/16	0940	Tissue	1	X	X	X	X	X				"

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
rinse, shuck, composite, homogenize all mussels for each sample.	J. Florer	Tyler Rankin		
	Printed Name: Joanna Florer	Printed Name: Tyler Rankin	Printed Name:	Printed Name:
	Company: Anchor QEA	Company: ARI	Company:	Company:
	Date & Time: 1/6/15 1033	Date & Time: 1/6/15 1033	Date & Time:	Date & Time:

Daily Log

ANCHOR QEA

Shellfish Monitoring WQ Retrieval

Anchor QEA, LLC
720 Olive Way, Suite 1900
Seattle, WA 98101
Phone 206.287.9130 Fax 206.287.9131

PROJECT NAME: Port Gamble Clean-up

DATE: 01/4/16

SITE ADDRESS:

PERSONNEL: J. Flaver + R O'Rourke (PGST)

WEATHER: WIND FROM: N | NE | E | SE | S | SW | W | NW (E, S circled)

SUNNY | CLOUDY | RAIN | ? (CLOUDY, RAIN circled)

LIGHT | MEDIUM | HEAVY (LIGHT circled)

TEMPERATURE: °F 38 . °C [Circle appropriate units]

TIME	COMMENTS
0800	Arrive Point Julia, met Rory O'Rourke + Mike Jones (PGST) + setup
0830	conducted daily Slope + H+S mtgs
0900	Arrive PJ-1 · GPS coords collected from 2nd cage (central location)
	Bag # Trossulus: 3, 4, 78, 80, 74, 2 Mortalities: 14
	Hybrid: 155, 156, 157, 158, 159, 160 " 17
0955	Returned to Pt. Julia to drop off empty cages
1010	Arrive GP-1
	Bag # Trossulus: 1, 76, 75, 77, 7, 9, 79 (1 extra) Mortalities: 25
	Hybrid: 115, 116, 117, 118, 119, 120 " : 20
1050	Returned to Pt. Julia to drop off cages + take lunch break
1145	Arrive WS-1. Buoys were submerged, a seal was ensnared in the lines + died.
	Bag # Trossulus: 5, 8, 10, 71, 72, 73 mortalities: 21
	Hybrid: 112, 113, 114, 152, 153, 154 " : 3
1250	Returned to Pt. Julia to drop off cages + wait for WQ boat to collect SMA2 locations
1400	Retrieved SMA2-2 from WQ boat
	Bag # Trossulus: 23, 24, 25, 56, 59, 60 mortalities: ~~35~~ 44
	Hybrid: 96, 97, 98, 137, 139, 140 " : 38
1500	Completed processing SMA2-2 mussels + waited for WQ team to complete monitoring
	+ bring another SMA2 set of cages
1600	Retrieved SMA2-5 from WQ boat
	bag # Trossulus: 12, 14, 17, 65, 66, 67 mortalities: 24
	Hybrid: 106, 107, 108, 110, 147, 148 " 12
1640	finished processing SMA2-5 + daily demobe
1700	left Pt. Julia
1715	Daily debrief call w/ Nathan + prep for next day
1800	End of day

Signature: J. Flaver

Daily Log

ANCHOR QEA

Anchor QEA, LLC
720 Olive Way, Suite 1900
Seattle, WA 98101
Phone 206.287.9130 Fax 206.287.9131

PROJECT NAME: Port Gamble Clean-up DATE:

SITE ADDRESS: PERSONNEL: J. Florer

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
0940	Retrieval of SMA2-4. coordinates: N 47 50.973 silt observed
	W 122° 34.741 on mussels
	bag # Trossulus: 11, 13, 4, 69, 70, 68 mortalities: 33
	hybrid: 111, 146, 150, 149, 151, 109 " 35
1110	completed processing of SMA2-4
1030-1200	WQ boat searched for SMA2-1 + SMA-3 g buoys are not visible
1230-1330	PGST boat searched for lost cages
1400	Returned to Millsite dock + demobed

Signature: J. Florer

Daily Log

ANCHOR QEA

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

PROJECT NAME: Port Gamble Clean-up and Restoration **DATE:** 11/9/15

SITE ADDRESS: Port Gamble Bay, WA **PERSONNEL:** J. Flaherty, R. O'Rourke, T. Schuman

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
0715	Arrive at the Millsite.
0730	Conducted H+S + set-up
0800	Headed to boat conducted H+S (vessel specific) + discussed daily scope
0825	Departed Millsite dock to begin PEMD retrieval
0835	Retrieved PEMDs from ~~PG-1~~ GP-1. A buoy was lost from one cage, so the yellow buoy is tied to 2 cages.
0855	Departed ~~PG-1~~ GP-1 + headed to ~~PJ-1~~ Mill dock because WQ needed to commence.
0915	Returned to AQ trailer on Mill site + prepped samples for submittal + prepped for next locations
1015	Returned to Mill site dock to retrieve additional PEMDs; departed dock
1020	Arrive WS-1 + retrieved PEMDs
1045	Departed WS-1 + headed to PJ-1
1055	Arrive PJ-1 retrieved PEMDs
1115	Returned to Millsite dock to set-up for SMA location retrieval
1145	departed ~~PJ-1~~ dock + headed to SMA2-5
1200	Arrived SMA2-5
1220	retrieved PEMDs from SMA2-5 + re-deployed cages
1300	returned to Mill site dock, so WQ Monitoring could commence
1430	departed Millsite dock to retrieve PEMDs from SMA2-4
1440	Arrive SMA2-4 + began pulling in cages
1450	retrieved PEMDs
1500-1505	Opened field blank while motor off
1540	Departed SMA2-4 + headed back to Millsite dock
1600	End of Day

JM7 11/9/15

Signature: J. Flaherty

Daily Log

ANCHOR QEA

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

PROJECT NAME: Port Gamble Clean-up and Restoration
DATE: 11/10/15
SITE ADDRESS: Port Gamble Bay, WA
PERSONNEL: T. Schuh, D. Gillingham, R.O'Rourke, J. Flora

WEATHER: Foggy
WIND FROM: None (N | NE | E | SE | S | SW | W | NW)
SUNNY | CLOUDY | RAIN | Foggy?
LIGHT | MEDIUM | HEAVY
TEMPERATURE: °F (40).4 °C [Circle-appropriate units]

TIME	COMMENTS
0915	Departed Mill site dock to retrieve PEMDs
0930	Arrive SMAZ-3
0945	Retrieved PEMDs from SMAZ-3
1005	Arrive SMAZ-2
1020	Retrieved SMAZ-2 PEMDs
1040	Redeployed cages at SMAZ-2
1050	Arrive SMAZ-1
1110	Retrieved ~~SMZA~~ SMAZ-1 PEMDs
1130	Redeployed SMAZ-1 cages + collected buoy coordinates for SMAZ-1 from SMAZ-5
1145	returned to mill site dock
1200	demobilized field effort + lunch break
1300	left mill site to drop samples to the lab
1600	dropped samples off at ART - End of Day

11/10/15

Signature: J. Flora

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Standard	Page: 1 of 2	
ARI Client Company: Anchor QEA	Phone: 206-287-9130	Date: 11/10/15	Ice Present?
Client Contact: Cindy Fields | Nathan Soccorsy		No. of Coolers:	Cooler Temps:
Client Project Name: Port Gamble Clean-up			
Client Project #:	Samplers: J. Flores, R. D'Rourke		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: *								Notes/Comments
PG-GP-1-PEMD-151109-A	11/9/15	0835	PEMD	1	X								
PG-GP-1-PEMD-151109-B		0835		1	X								Extract + archive
PG-PJ-1-PEMD-151109-A		1055		1	X								
PG-PJ-1-PEMD-151109-B		1055		1	X								Extract + archive
PG-WS-1-PEMD-151109-A		1020		1	X								
PG-WS-1-PEMD-151109-B		1020		1	X								Extract + archive
PG-SMA2-5-PEMD-151109-A		1220		1	X								
PG-SMA2-5-PEMD-151109-B		1220		1	X								Extract + archive
PG-SMA2-4-PEMD-151109-A		1450		1	X								
PG-SMA2-4-PEMD-151109-B	11/9/15	1450	PEMD	1	X								Extract + archive

* PEH

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
* All "B" samples to be extracted & then archived	Printed Name: Joanna Flores	Printed Name: Emily Litwin	Printed Name:	Printed Name:
	Company: Anchor QEA	Company: ARI	Company:	Company:
	Date & Time: 11/10/15 1557	Date & Time: 11/10/15 1557	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Standard	Page: 2 of 2	
ARI Client Company: Anchor QEA	Phone:	Date: 11/10/15	Ice Present?
Client Contact: Cindy Fields / Nathan Soccorsy		No. of Coolers:	Cooler Temps:
Client Project Name: Port Gamble clean-up			
Client Project #:	Samplers: J. Florer, R. O'Rourke		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: * PAHs								Notes/Comments
PG-SMA2-3-~~PEMD-151110-A~~ PEMD-151110-A	11/10/15	0945	PEMD	1	X								
PG-SMA2-3-PEMD-151110-B		0945		1	X								extract + archive
PG-SMA2-2-PEMD-151110-A		1020		1	X								
PG-SMA2-2-PEMD-151110-B		1020		1	X								extract + archive
PG-SMA2-1-PEMD-151110-A		1110		1	X								
PG-SMA2-1-PEMD-151110-B		1110		1	X								extract + archive
PG-FB-PEMD-151110		1200		1	X								Field blank
PG-TB-PEMD-151110	11/10/15	1530	PEMD	1	X								Trip blank

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
* All "B" samples to be extracted + then archived	Printed Name: Joanna Florer	Printed Name: Emily Litwin	Printed Name:	Printed Name:
	Company: Anchor QEA	Company: ARI	Company:	Company:
	Date & Time: 11/10/15 1557	Date & Time: 11/10/15 1557	Date & Time:	Date & Time:

APPENDIX C
MUSSEL MORTALITY LOG

Appendix C
Mortality Log

Location ID	Trossulus			Hybrid		
	Count Begin	Mortalities	Count End	Count Begin	Mortalities	Count End
PJ-1	96	14	82	96	17	79
GP-1[a]	112	25	87	96	20	76
WS-1	96	21	75	96	3	93
SMA-2-2	96	44	52	96	38	58
SMA-2-5	96	24	72	96	12	84
SMA-2-4	96	33	63	96	35	61

Notes:

a = Extra bag inadvertantly included when deployed.

APPENDIX D
LABORATORY REPORTS

Table of Contents: ARI Job AQJ9

Client: Anchor QEA, LLC

Project: Port Gamble Clean-Up

AV
Signature

December-17-2015
Date

Analytical Resources, Incorporated
Analytical Chemists and Consultants

December 17, 2015

Cindy Fields
Anchor QEA
720 Olive Way, Suite 1900
Seattle, WA 98101

RE: Project: Port Gamble Bay Clean-up
ARI Job No.: AQJ9

Dear Ms. Fields:

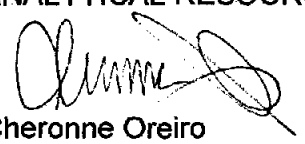
Please find enclosed the Chain of Custody records (COCs), sample receipt documentation, and the final data package for samples from the project referenced above.

Sample receipt and details regarding requested analyses are discussed in the Case Narrative.

An electronic copy of this package will remain on file with ARI. Should you have any questions or problems, please feel free to contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.



Cheronne Oreiro
Project Manager
(206) 695-6214
cheronneo@arilabs.com
www.arilabs.com

cc: eFile: AQJ9

Enclosures

Chain of Custody Documentation

ARI Job ID: AQJ9

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: AQ19	Turn-around Requested: Standard	Page: 1 of 2	
ARI Client Company: Anchor QEA	Phone: 206-287-9130	Date: 11/10/15	Ice Present?
Client Contact: Cindy Fields | Nathan Soccorsy		No. of Coolers:	Cooler Temps:
Client Project Name: Port Gamble Clean-up			
Client Project #:	Samplers: J. Florer, R. O'Rourke		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: * PAHs	Notes/Comments
PG-GP-1-PEMD-151109-A	11/9/15	0835	PEMD	1	X	
PG-GP-1-PEMD-151109-B		0835		1	X	Extract + archive
PG-PJ-1-PEMD-151109-A		1055		1	X	
PG-PJ-1-PEMD-151109-B		1055		1	X	Extract + archive
PG-WS-1-PEMD-151109-A		1020		1	X	
PG-WS-1-PEMD-151109-B		1020		1	X	Extract + archive
PG-SMA2-5-PEMD-151109-A		1220		1	X	
PG-SMA2-5-PEMD-151109-B		1220		1	X	Extract + archive
PG-SMA2-4-PEMD-151109-A		1450		1	X	
PG-SMA2-4-PEMD-151109-B	11/9/15	1450	PEMD	1	X	Extract + archive

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
* All "B" samples to be extracted + then archived	Printed Name: Joanna Florer	Printed Name: Emily Litwin	Printed Name:	Printed Name:
	Company: Anchor QEA	Company: ARI	Company:	Company:
	Date & Time: 11/10/15 1557	Date & Time: 11/10/15 1557	Date & Time:	Date & Time:

AQ19: 00003

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: AQ19	Turn-around Requested: Standard	Page: 2 of 2	
ARI Client Company: Anchor QEA	Phone:	Date: 11/10/15	Ice Present?
Client Contact: Cindy Fields / Nathan Soccersy		No. of Coolers:	Cooler Temps:
Client Project Name: Port Gamble clean-up			
Client Project #:	Samplers: J. Florer, R. O'Rourke		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: * PAHs	Notes/Comments
PG-SMA2-3-~~PEMD-151110~~-151110-A	11/10/15	0945	PEMD	1	X	
PG-SMA2-3-PEMD-151110-B		0945		1	X	extract + archive
PG-SMA2-2-PEMD-151110-A		1020		1	X	
PG-SMA2-2-PEMD-151110-B		1020		1	X	extract + archive
PG-SMA2-5-PEMD-151110-A		1110		1	X	
PG-SMA2-5-PEMD-151110-B		1110		1	X	extract + archive
PG-FB-PEMD-151110		1200		1	X	Field blank
PG-TB-PEMD-151110	11/10/15	1530	PEMD	1	X	Trip blank

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
* All "B" samples to be extracted + then archived	Printed Name: Joanna Florer	Printed Name: Emily Litton	Printed Name:	Printed Name:
	Company: Anchor QEA	Company: ARI	Company:	Company:
	Date & Time: 11/10/15 1557	Date & Time: 11/10/15 1557	Date & Time:	Date & Time:

AQ19 : 00001

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Anchor

COC No(s): ______ (NA circled)

Assigned ARI Job No: AQJ9

Project Name: Port Gamble Cleanup

Delivered by: Fed-Ex UPS Courier Hand Delivered (circled) Other: ______

Tracking No: ______ (NA circled)

Preliminary Examination Phase:

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

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 4.6 5.8 3.1
Time: ______

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D002565

Cooler Accepted by: [initials] Date: 11/10/15 Time: 1557

Complete custody forms and attach all shipping documents

Log-In Phase:

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

Was Sample Split by ARI : NA (circled) YES Date/Time: ______ Equipment: ______ Split by: ______

Samples Logged by: [initials] Date: 11/11/15 Time: 1556

***** 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 Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm	
			Small → "sm" (< 2 mm)
			Peabubbles → "pb" (2 to < 4 mm)
			Large → "lg" (4 to < 6 mm)
			Headspace → "hs" (> 6 mm)

Subject: Port Gamble PEMDs
From: Cindy Fields <cfields@anchorqea.com>
Date: 11/11/2015 11:29 AM
To: "Cheronne Oreiro (cheronneo@arilabs.com)" <cheronneo@arilabs.com>
CC: Nathan Soccorsy <nsoccorsy@anchorqea.com>

Hi Cheronne,
I discussed with Nathan and here's what we would like for the PEMDs:

- Please extract all "A" and "B" samples and archive the "B" extracts
- The "B" extract for the sample at location SMA2-3 should be analyzed. We will treat this as a field duplicate to assess precision (even though it's really a separate sample).
    - Is it possible to run a lab replicate (ie: two analyses from one extract?)
- Please extract and analyze 1 rep of the tissue SRM with the PEMDs (and later, one with the mussel tissue).

Please let me know if any of things sound problematic.

Thank you!

Cindy Fields
Scientist

ANCHOR QEA, LLC
cfields@anchorqea.com
720 Olive Way, Suite 1900
Seattle, WA 98101

T 206.287.9130

D 206.903.3394

C 206.326.8170

F 206.287.9131

ANCHOR QEA, LLC
www.anchorqea.com

Case Narrative, Data Qualifiers, Control Limits

ARI Job ID: AQJ9

ANALYTICAL
RESOURCES
INCORPORATED

Case Narrative

Client: Anchor QEA
Project: Port Gamble Bay Clean-up
ARI Job No.: AQJ9

Sample Receipt

Eighteen polyethylene membrane devices (PEMDs) were received on November 10, 2015 under ARI job AQJ9. Select samples were extracted and archived, as requested. The cooler temperatures measured by IR thermometer following ARI SOP were 3.1, 4.6, and 5.8°C. For further details regarding sample receipt, please refer to the Cooler Receipt Form.

PAHs by SW8270D-SIM

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

Several PEMDs were weighed prior to deployment and an average dry weight of 0.89g was used to calculate results.

All control limits should be considered advisory, 30-160%.

Initial calibrations were within method requirements.

The initial calibration verification (ICV) on 12/14/15 fell outside the 20% control limit low for Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, and Benzo(g,h,i)perylene. Sample results associated with this ICV were undetected for these compounds. No corrective action was taken.

Due to laboratory error, **LCS-111815** was double spiked with internal standard spike therefore all areas were outside control limits high. All other internal standard areas were within control limits. No corrective action was taken.

The surrogate percent recovery of d10-2-Methylnaphthalene fell outside advisory control limits low for sample **PG-SMA2-5-PEMD-151109-A** due to loss during extraction. All other surrogate percent recoveries were within advisory control limits. No corrective action was taken.

Naphthalene was present in **MB-111815** at a level that was greater than the reporting limit. All detected results for this compound have been flagged with a "B" qualifier. No further corrective action was taken.

The LCS and LCSD percent recoveries of Perylene fell advisory control limits low for **LCS-111815**. All other percent recoveries were within advisory control limits. No corrective action was taken.

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: AQJ9
Client: Anchor QEA, LLC
Project Event: N/A
Project Name: Port Gamble Clean-Up

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	PG-GP-1-PEMD-151109-A	AQJ9A	15-21388	Tissue	11/09/15 08:35	11/10/15 15:57
2.	PG-GP-1-PEMD-151109-B	AQJ9B	15-21389	Tissue	11/09/15 08:35	11/10/15 15:57
3.	PG-PJ-1-PEMD-151109-A	AQJ9C	15-21390	Tissue	11/09/15 10:55	11/10/15 15:57
4.	PG-PJ-1-PEMD-151109-B	AQJ9D	15-21391	Tissue	11/09/15 10:55	11/10/15 15:57
5.	PG-WS-1-PEMD-151109-A	AQJ9E	15-21392	Tissue	11/09/15 10:20	11/10/15 15:57
6.	PG-WS-1-PEMD-151109-B	AQJ9F	15-21393	Tissue	11/09/15 10:20	11/10/15 15:57
7.	PG-SMA2-5-PEMD-151109-A	AQJ9G	15-21394	Tissue	11/09/15 12:20	11/10/15 15:57
8.	PG-SMA2-5-PEMD-151109-B	AQJ9H	15-21395	Tissue	11/09/15 12:20	11/10/15 15:57
9.	PG-SMA2-4-PEMD-151109-A	AQJ9I	15-21396	Tissue	11/09/15 14:50	11/10/15 15:57
10.	PG-SMA2-4-PEMD-151109-B	AQJ9J	15-21397	Tissue	11/09/15 14:50	11/10/15 15:57
11.	PG-SMA2-3-PEMD-151110-A	AQJ9K	15-21398	Tissue	11/10/15 09:45	11/10/15 15:57
12.	PG-SMA2-3-PEMD-151110-B	AQJ9L	15-21399	Tissue	11/10/15 09:45	11/10/15 15:57
13.	PG-SMA2-2-PEMD-151110-A	AQJ9M	15-21400	Tissue	11/10/15 10:20	11/10/15 15:57
14.	PG-SMA2-2-PEMD-151110-B	AQJ9N	15-21401	Tissue	11/10/15 10:20	11/10/15 15:57
15.	PG-SMA2-1-PEMD-151110-A	AQJ9O	15-21402	Tissue	11/10/15 11:10	11/10/15 15:57
16.	PG-SMA2-1-PEMD-151110-B	AQJ9P	15-21403	Tissue	11/10/15 11:10	11/10/15 15:57
17.	PG-FB-PEMD-151110	AQJ9Q	15-21404	Tissue	11/10/15 12:00	11/10/15 15:57
18.	PG-TB-PEMD-151110	AQJ9R	15-21405	Tissue	11/10/15 15:30	11/10/15 15:57

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 2/14/2011

Inorganic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Duplicate RPD is not within established control limits

B — Reported value is less than the CRDL but ≥ the Reporting Limit

N — Matrix Spike recovery not within established control limits

NA — Not Applicable, analyte not spiked

H — The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible

L — Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Flagged value is not within established control limits

B — Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.

J — Estimated concentration when the value is less than ARI's established reporting limits

D — The spiked compound was not detected due to sample extract dilution

E — Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

Q — Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NR Spiked compound recovery is not reported due to chromatographic interference

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**

Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

SIM PAH Analysis
Report and Summary QC Forms

ARI Job ID: AQJ9

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Low Level SW8270D-SIM GC/MS **Sample ID: PG-GP-1-PEMD-151109-A**
Extraction Method: SW3550C **SAMPLE**

Lab Sample ID: AQJ9A
LIMS ID: 15-21388
Matrix: Tissue
Data Release Authorized:
Reported: 12/16/15

QC Report No: AQJ9-Anchor QEA, LLC
Project: Port Gamble Clean-Up
Event: NA
Date Sampled: 11/09/15
Date Received: 11/10/15

Date Extracted: 11/18/15
Date Analyzed: 12/05/15 13:15
Instrument/Analyst: NT11/JLW
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 0.89 g-as-rec
Final Extract Volume: 0.1 mL
Dilution Factor: 1.00
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
91-20-3	**Naphthalene**	**1.12**	**15.6 B**
91-57-6	**2-Methylnaphthalene**	**1.12**	**8.97**
208-96-8	Acenaphthylene	1.12	< 1.12 U
83-32-9	**Acenaphthene**	**1.12**	**11.7**
86-73-7	**Fluorene**	**1.12**	**12.5**
85-01-8	**Phenanthrene**	**1.12**	**59.5**
120-12-7	**Anthracene**	**1.12**	**7.53**
206-44-0	**Fluoranthene**	**1.12**	**63.5**
129-00-0	**Pyrene**	**1.12**	**37.6**
56-55-3	**Benzo(a)anthracene**	**1.12**	**5.69**
218-01-9	**Chrysene**	**1.12**	**5.93**
205-99-2	**Benzo(b)fluoranthene**	**1.12**	**2.20**
207-08-9	Benzo(k)fluoranthene	1.12	< 1.12 U
50-32-8	Benzo(a)pyrene	1.12	< 1.12 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.12	< 1.12 U
53-70-3	Dibenz(a,h)anthracene	1.12	< 1.12 U
191-24-2	Benzo(g,h,i)perylene	1.12	< 1.12 U
198-55-0	Perylene	1.12	< 1.12 U
192-97-2	**Benzo(e)pyrene**	**1.12**	**1.33**
TOTBFA	**Total Benzofluoranthenes**	**1.12**	**2.20**

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	61.0%
d10-2-Methylnaphthalene	46.3%
d14-Dibenzo(a,h)anthracene	59.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Low Level SW8270D-SIM GC/MS **Sample ID: PG-PJ-1-PEMD-151109-A**
Extraction Method: SW3550C **SAMPLE**

Lab Sample ID: AQJ9C
LIMS ID: 15-21390
Matrix: Tissue
Data Release Authorized:
Reported: 12/16/15

QC Report No: AQJ9-Anchor QEA, LLC
Project: Port Gamble Clean-Up
Event: NA
Date Sampled: 11/09/15
Date Received: 11/10/15

Date Extracted: 11/18/15
Date Analyzed: 12/05/15 13:45
Instrument/Analyst: NT11/JLW
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 0.89 g-as-rec
Final Extract Volume: 0.1 mL
Dilution Factor: 1.00
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
91-20-3	**Naphthalene**	**1.12**	**15.3 B**
91-57-6	**2-Methylnaphthalene**	**1.12**	**8.56**
208-96-8	Acenaphthylene	1.12	< 1.12 U
83-32-9	**Acenaphthene**	**1.12**	**13.3**
86-73-7	**Fluorene**	**1.12**	**16.1**
85-01-8	**Phenanthrene**	**1.12**	**72.3**
120-12-7	**Anthracene**	**1.12**	**8.87**
206-44-0	**Fluoranthene**	**1.12**	**75.9**
129-00-0	**Pyrene**	**1.12**	**50.2**
56-55-3	**Benzo(a)anthracene**	**1.12**	**6.71**
218-01-9	**Chrysene**	**1.12**	**7.48**
205-99-2	**Benzo(b)fluoranthene**	**1.12**	**2.29**
207-08-9	Benzo(k)fluoranthene	1.12	< 1.12 U
50-32-8	Benzo(a)pyrene	1.12	< 1.12 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.12	< 1.12 U
53-70-3	Dibenz(a,h)anthracene	1.12	< 1.12 U
191-24-2	Benzo(g,h,i)perylene	1.12	< 1.12 U
198-55-0	Perylene	1.12	< 1.12 U
192-97-2	**Benzo(e)pyrene**	**1.12**	**1.44**
TOTBFA	**Total Benzofluoranthenes**	**1.12**	**2.29**

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	63.7%
d10-2-Methylnaphthalene	47.7%
d14-Dibenzo(a,h)anthracene	68.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Low Level SW8270D-SIM GC/MS **Sample ID: PG-WS-1-PEMD-151109-A**
Extraction Method: SW3550C **SAMPLE**

Lab Sample ID: AQJ9E
LIMS ID: 15-21392
Matrix: Tissue
Data Release Authorized:
Reported: 12/16/15

QC Report No: AQJ9-Anchor QEA, LLC
Project: Port Gamble Clean-Up
Event: NA
Date Sampled: 11/09/15
Date Received: 11/10/15

Date Extracted: 11/18/15
Date Analyzed: 12/05/15 14:15
Instrument/Analyst: NT11/JLW
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 0.89 g-as-rec
Final Extract Volume: 0.1 mL
Dilution Factor: 1.00
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
91-20-3	**Naphthalene**	**1.12**	**19.1 B**
91-57-6	**2-Methylnaphthalene**	**1.12**	**10.8**
208-96-8	Acenaphthylene	1.12	< 1.12 U
83-32-9	**Acenaphthene**	**1.12**	**14.5**
86-73-7	**Fluorene**	**1.12**	**16.8**
85-01-8	**Phenanthrene**	**1.12**	**70.9**
120-12-7	**Anthracene**	**1.12**	**7.33**
206-44-0	**Fluoranthene**	**1.12**	**68.2**
129-00-0	**Pyrene**	**1.12**	**40.6**
56-55-3	**Benzo(a)anthracene**	**1.12**	**4.94**
218-01-9	**Chrysene**	**1.12**	**5.66**
205-99-2	**Benzo(b)fluoranthene**	**1.12**	**1.87**
207-08-9	Benzo(k)fluoranthene	1.12	< 1.12 U
50-32-8	Benzo(a)pyrene	1.12	< 1.12 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.12	< 1.12 U
53-70-3	Dibenz(a,h)anthracene	1.12	< 1.12 U
191-24-2	Benzo(g,h,i)perylene	1.12	< 1.12 U
198-55-0	Perylene	1.12	< 1.12 U
192-97-2	**Benzo(e)pyrene**	**1.12**	**1.19**
TOTBFA	**Total Benzofluoranthenes**	**1.12**	**1.87**

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	61.0%
d10-2-Methylnaphthalene	49.3%
d14-Dibenzo(a,h)anthracene	50.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Low Level SW8270D-SIM GC/MS
Extraction Method: SW3550C
Page 1 of 1

Sample ID: PG-SMA2-5-PEMD-151109-A
SAMPLE

Lab Sample ID: AQJ9G
LIMS ID: 15-21394
Matrix: Tissue
Data Release Authorized:
Reported: 12/16/15

QC Report No: AQJ9-Anchor QEA, LLC
Project: Port Gamble Clean-Up
Event: NA
Date Sampled: 11/09/15
Date Received: 11/10/15

Date Extracted: 11/18/15
Date Analyzed: 12/05/15 14:45
Instrument/Analyst: NT11/JLW
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 0.89 g-as-rec
Final Extract Volume: 0.0 mL
Dilution Factor: 2.50
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
91-20-3	**Naphthalene**	**1.40**	**9.10 B**
91-57-6	**2-Methylnaphthalene**	**1.40**	**5.04**
208-96-8	Acenaphthylene	1.40	< 1.40 U
83-32-9	**Acenaphthene**	**1.40**	**13.9**
86-73-7	**Fluorene**	**1.40**	**18.4**
85-01-8	**Phenanthrene**	**1.40**	**75.2**
120-12-7	**Anthracene**	**1.40**	**12.7**
206-44-0	**Fluoranthene**	**1.40**	**88.9**
129-00-0	**Pyrene**	**1.40**	**56.9**
56-55-3	**Benzo(a)anthracene**	**1.40**	**8.82**
218-01-9	**Chrysene**	**1.40**	**8.11**
205-99-2	**Benzo(b)fluoranthene**	**1.40**	**2.30**
207-08-9	Benzo(k)fluoranthene	1.40	< 1.40 U
50-32-8	Benzo(a)pyrene	1.40	< 1.40 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.40	< 1.40 U
53-70-3	Dibenz(a,h)anthracene	1.40	< 1.40 U
191-24-2	Benzo(g,h,i)perylene	1.40	< 1.40 U
198-55-0	Perylene	1.40	< 1.40 U
192-97-2	Benzo(e)pyrene	1.40	< 1.40 U
TOTBFA	**Total Benzofluoranthenes**	**1.40**	**2.30**

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	34.9%
d10-2-Methylnaphthalene	25.0%
d14-Dibenzo(a,h)anthracene	32.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Low Level SW8270D-SIM GC/MS
Extraction Method: SW3550C
Page 1 of 1

Sample ID: PG-SMA2-4-PEMD-151109-A SAMPLE

Lab Sample ID: AQJ9I
LIMS ID: 15-21396
Matrix: Tissue
Data Release Authorized:
Reported: 12/16/15

QC Report No: AQJ9-Anchor QEA, LLC
Project: Port Gamble Clean-Up
Event: NA
Date Sampled: 11/09/15
Date Received: 11/10/15

Date Extracted: 11/18/15
Date Analyzed: 12/05/15 15:16
Instrument/Analyst: NT11/JLW
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 0.89 g-as-rec
Final Extract Volume: 0.1 mL
Dilution Factor: 1.00
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
91-20-3	**Naphthalene**	**1.12**	**19.6 B**
91-57-6	**2-Methylnaphthalene**	**1.12**	**13.5**
208-96-8	**Acenaphthylene**	**1.12**	**1.51**
83-32-9	**Acenaphthene**	**1.12**	**54.3**
86-73-7	**Fluorene**	**1.12**	**44.6**
85-01-8	**Phenanthrene**	**1.12**	**152 E**
120-12-7	**Anthracene**	**1.12**	**22.2**
206-44-0	**Fluoranthene**	**1.12**	**155 E**
129-00-0	**Pyrene**	**1.12**	**102**
56-55-3	**Benzo(a)anthracene**	**1.12**	**14.2**
218-01-9	**Chrysene**	**1.12**	**13.2**
205-99-2	**Benzo(b)fluoranthene**	**1.12**	**3.24**
207-08-9	**Benzo(k)fluoranthene**	**1.12**	**1.24**
50-32-8	**Benzo(a)pyrene**	**1.12**	**1.40**
193-39-5	Indeno(1,2,3-cd)pyrene	1.12	< 1.12 U
53-70-3	Dibenz(a,h)anthracene	1.12	< 1.12 U
191-24-2	Benzo(g,h,i)perylene	1.12	< 1.12 U
198-55-0	Perylene	1.12	< 1.12 U
192-97-2	**Benzo(e)pyrene**	**1.12**	**2.02**
TOTBFA	**Total Benzofluoranthenes**	**1.12**	**5.94**

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	70.7%
d10-2-Methylnaphthalene	53.7%
d14-Dibenzo(a,h)anthracene	60.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Low Level SW8270D-SIM GC/MS **Sample ID: PG-SMA2-4-PEMD-151109-A**
Extraction Method: SW3550C **DILUTION**
Page 1 of 1

Lab Sample ID: AQJ9I
LIMS ID: 15-21396
Matrix: Tissue
Data Release Authorized:
Reported: 12/16/15

QC Report No: AQJ9-Anchor QEA, LLC
Project: Port Gamble Clean-Up
Event: NA
Date Sampled: 11/09/15
Date Received: 11/10/15

Date Extracted: 11/18/15
Date Analyzed: 12/14/15 10:42
Instrument/Analyst: NT11/JLW
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 0.89 g-as-rec
Final Extract Volume: 0.1 mL
Dilution Factor: 10.0
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
91-20-3	**Naphthalene**	**11.2**	**22.6 B**
91-57-6	**2-Methylnaphthalene**	**11.2**	**14.0**
208-96-8	Acenaphthylene	11.2	< 11.2 U
83-32-9	**Acenaphthene**	**11.2**	**62.5**
86-73-7	**Fluorene**	**11.2**	**53.8**
85-01-8	**Phenanthrene**	**11.2**	**216**
120-12-7	**Anthracene**	**11.2**	**28.3**
206-44-0	**Fluoranthene**	**11.2**	**231**
129-00-0	**Pyrene**	**11.2**	**140**
56-55-3	**Benzo(a)anthracene**	**11.2**	**16.4**
218-01-9	**Chrysene**	**11.2**	**16.2**
205-99-2	Benzo(b)fluoranthene	11.2	< 11.2 U
207-08-9	Benzo(k)fluoranthene	11.2	< 11.2 U
50-32-8	Benzo(a)pyrene	11.2	< 11.2 U
193-39-5	Indeno(1,2,3-cd)pyrene	11.2	< 11.2 U
53-70-3	Dibenz(a,h)anthracene	11.2	< 11.2 U
191-24-2	Benzo(g,h,i)perylene	11.2	< 11.2 U
198-55-0	Perylene	11.2	< 11.2 U
192-97-2	Benzo(e)pyrene	11.2	< 11.2 U
TOTBFA	Total Benzofluoranthenes	11.2	< 11.2 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	85.0%
d10-2-Methylnaphthalene	57.0%
d14-Dibenzo(a,h)anthracene	60.3% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Low Level SW8270D-SIM GC/MS
Extraction Method: SW3550C
Page 1 of 1

Sample ID: PG-SMA2-3-PEMD-151110-A
SAMPLE

Lab Sample ID: AQJ9K
LIMS ID: 15-21398
Matrix: Tissue
Data Release Authorized:
Reported: 12/16/15

QC Report No: AQJ9-Anchor QEA, LLC
Project: Port Gamble Clean-Up
Event: NA
Date Sampled: 11/10/15
Date Received: 11/10/15

Date Extracted: 11/18/15
Date Analyzed: 12/05/15 15:46
Instrument/Analyst: NT11/JLW
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 0.89 g-as-rec
Final Extract Volume: 0.1 mL
Dilution Factor: 1.00
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result	
91-20-3	**Naphthalene**	**1.12**	**10.8**	**B**
91-57-6	**2-Methylnaphthalene**	**1.12**	**5.79**	
208-96-8	**Acenaphthylene**	**1.12**	**1.29**	
83-32-9	**Acenaphthene**	**1.12**	**13.2**	
86-73-7	**Fluorene**	**1.12**	**19.1**	
85-01-8	**Phenanthrene**	**1.12**	**126**	**E**
120-12-7	**Anthracene**	**1.12**	**24.3**	
206-44-0	**Fluoranthene**	**1.12**	**185**	**E**
129-00-0	**Pyrene**	**1.12**	**119**	**E**
56-55-3	**Benzo(a)anthracene**	**1.12**	**32.4**	
218-01-9	**Chrysene**	**1.12**	**28.6**	
205-99-2	**Benzo(b)fluoranthene**	**1.12**	**9.23**	
207-08-9	**Benzo(k)fluoranthene**	**1.12**	**4.10**	
50-32-8	**Benzo(a)pyrene**	**1.12**	**7.07**	
193-39-5	**Indeno(1,2,3-cd)pyrene**	**1.12**	**1.35**	
53-70-3	Dibenz(a,h)anthracene	1.12	< 1.12	U
191-24-2	**Benzo(g,h,i)perylene**	**1.12**	**1.48**	
198-55-0	**Perylene**	**1.12**	**1.75**	
192-97-2	**Benzo(e)pyrene**	**1.12**	**5.71**	
TOTBFA	**Total Benzofluoranthenes**	**1.12**	**17.8**	

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	65.0%
d10-2-Methylnaphthalene	48.7%
d14-Dibenzo(a,h)anthracene	58.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Low Level SW8270D-SIM GC/MS **Sample ID: PG-SMA2-3-PEMD-151110-A**
Extraction Method: SW3550C **DILUTION**

Lab Sample ID: AQJ9K
LIMS ID: 15-21398
Matrix: Tissue
Data Release Authorized:
Reported: 12/16/15

QC Report No: AQJ9-Anchor QEA, LLC
Project: Port Gamble Clean-Up
Event: NA
Date Sampled: 11/10/15
Date Received: 11/10/15

Date Extracted: 11/18/15
Date Analyzed: 12/14/15 11:12
Instrument/Analyst: NT11/JLW
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 0.89 g-as-rec
Final Extract Volume: 0.1 mL
Dilution Factor: 10.0
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
91-20-3	**Naphthalene**	**11.2**	**14.3 B**
91-57-6	2-Methylnaphthalene	11.2	< 11.2 U
208-96-8	Acenaphthylene	11.2	< 11.2 U
83-32-9	**Acenaphthene**	**11.2**	**16.7**
86-73-7	**Fluorene**	**11.2**	**25.2**
85-01-8	**Phenanthrene**	**11.2**	**204**
120-12-7	**Anthracene**	**11.2**	**39.3**
206-44-0	**Fluoranthene**	**11.2**	**353**
129-00-0	**Pyrene**	**11.2**	**198**
56-55-3	**Benzo(a)anthracene**	**11.2**	**45.6**
218-01-9	**Chrysene**	**11.2**	**42.8**
205-99-2	**Benzo(b)fluoranthene**	**11.2**	**13.2**
207-08-9	Benzo(k)fluoranthene	11.2	< 11.2 U
50-32-8	Benzo(a)pyrene	11.2	< 11.2 U
193-39-5	Indeno(1,2,3-cd)pyrene	11.2	< 11.2 U
53-70-3	Dibenz(a,h)anthracene	11.2	< 11.2 U
191-24-2	Benzo(g,h,i)perylene	11.2	< 11.2 U
198-55-0	Perylene	11.2	< 11.2 U
192-97-2	Benzo(e)pyrene	11.2	< 11.2 U
TOTBFA	**Total Benzofluoranthenes**	**11.2**	**13.2**

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	89.7%
d10-2-Methylnaphthalene	61.3%
d14-Dibenzo(a,h)anthracene	65.0% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Low Level SW8270D-SIM GC/MS **Sample ID: PG-SMA2-3-PEMD-151110-B**
Extraction Method: SW3550C **SAMPLE**

Lab Sample ID: AQJ9L
LIMS ID: 15-21399
Matrix: Tissue
Data Release Authorized:
Reported: 12/16/15

QC Report No: AQJ9-Anchor QEA, LLC
Project: Port Gamble Clean-Up
Event: NA
Date Sampled: 11/10/15
Date Received: 11/10/15

Date Extracted: 11/18/15
Date Analyzed: 12/05/15 16:16
Instrument/Analyst: NT11/JLW
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 0.89 g-as-rec
Final Extract Volume: 0.1 mL
Dilution Factor: 1.00
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result	
91-20-3	**Naphthalene**	**1.12**	**9.72**	**B**
91-57-6	**2-Methylnaphthalene**	**1.12**	**7.41**	
208-96-8	**Acenaphthylene**	**1.12**	**1.75**	
83-32-9	**Acenaphthene**	**1.12**	**67.5**	
86-73-7	**Fluorene**	**1.12**	**63.2**	
85-01-8	**Phenanthrene**	**1.12**	**189**	**E**
120-12-7	**Anthracene**	**1.12**	**34.2**	
206-44-0	**Fluoranthene**	**1.12**	**164**	**E**
129-00-0	**Pyrene**	**1.12**	**110**	
56-55-3	**Benzo(a)anthracene**	**1.12**	**15.8**	
218-01-9	**Chrysene**	**1.12**	**14.1**	
205-99-2	**Benzo(b)fluoranthene**	**1.12**	**3.87**	
207-08-9	**Benzo(k)fluoranthene**	**1.12**	**1.52**	
50-32-8	**Benzo(a)pyrene**	**1.12**	**1.86**	
193-39-5	Indeno(1,2,3-cd)pyrene	1.12	< 1.12	U
53-70-3	Dibenz(a,h)anthracene	1.12	< 1.12	U
191-24-2	Benzo(g,h,i)perylene	1.12	< 1.12	U
198-55-0	Perylene	1.12	< 1.12	U
192-97-2	**Benzo(e)pyrene**	**1.12**	**2.43**	
TOTBFA	**Total Benzofluoranthenes**	**1.12**	**7.15**	

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	56.7%
d10-2-Methylnaphthalene	43.7%
d14-Dibenzo(a,h)anthracene	46.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Low Level SW8270D-SIM GC/MS **Sample ID: PG-SMA2-3-PEMD-151110-B**
Extraction Method: SW3550C **DILUTION**

Lab Sample ID: AQJ9L
LIMS ID: 15-21399
Matrix: Tissue
Data Release Authorized:
Reported: 12/16/15

QC Report No: AQJ9-Anchor QEA, LLC
Project: Port Gamble Clean-Up
Event: NA
Date Sampled: 11/10/15
Date Received: 11/10/15

Date Extracted: 11/18/15
Date Analyzed: 12/14/15 11:42
Instrument/Analyst: NT11/JLW
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 0.89 g-as-rec
Final Extract Volume: 0.1 mL
Dilution Factor: 10.0
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
91-20-3	**Naphthalene**	**11.2**	**13.3 B**
91-57-6	2-Methylnaphthalene	11.2	< 11.2 U
208-96-8	Acenaphthylene	11.2	< 11.2 U
83-32-9	**Acenaphthene**	**11.2**	**99.9**
86-73-7	**Fluorene**	**11.2**	**93.5**
85-01-8	**Phenanthrene**	**11.2**	**364**
120-12-7	**Anthracene**	**11.2**	**64.3**
206-44-0	**Fluoranthene**	**11.2**	**332**
129-00-0	**Pyrene**	**11.2**	**196**
56-55-3	**Benzo(a)anthracene**	**11.2**	**23.6**
218-01-9	**Chrysene**	**11.2**	**22.2**
205-99-2	Benzo(b)fluoranthene	11.2	< 11.2 U
207-08-9	Benzo(k)fluoranthene	11.2	< 11.2 U
50-32-8	Benzo(a)pyrene	11.2	< 11.2 U
193-39-5	Indeno(1,2,3-cd)pyrene	11.2	< 11.2 U
53-70-3	Dibenz(a,h)anthracene	11.2	< 11.2 U
191-24-2	Benzo(g,h,i)perylene	11.2	< 11.2 U
198-55-0	Perylene	11.2	< 11.2 U
192-97-2	Benzo(e)pyrene	11.2	< 11.2 U
TOTBFA	Total Benzofluoranthenes	11.2	< 11.2 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	87.0%
d10-2-Methylnaphthalene	57.3%
d14-Dibenzo(a,h)anthracene	56.3% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Low Level SW8270D-SIM GC/MS **Sample ID: PG-SMA2-2-PEMD-151110-A**
Extraction Method: SW3550C **SAMPLE**
Page 1 of 1

Lab Sample ID: AQJ9M
LIMS ID: 15-21400
Matrix: Tissue
Data Release Authorized:
Reported: 12/16/15

QC Report No: AQJ9-Anchor QEA, LLC
Project: Port Gamble Clean-Up
Event: NA
Date Sampled: 11/10/15
Date Received: 11/10/15

Date Extracted: 11/18/15
Date Analyzed: 12/05/15 16:46
Instrument/Analyst: NT11/JLW
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 0.89 g-as-rec
Final Extract Volume: 0.1 mL
Dilution Factor: 1.00
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result	
91-20-3	**Naphthalene**	**1.12**	**5.47**	**B**
91-57-6	**2-Methylnaphthalene**	**1.12**	**5.38**	
208-96-8	**Acenaphthylene**	**1.12**	**1.26**	
83-32-9	**Acenaphthene**	**1.12**	**16.3**	
86-73-7	**Fluorene**	**1.12**	**22.7**	
85-01-8	**Phenanthrene**	**1.12**	**119**	**E**
120-12-7	**Anthracene**	**1.12**	**19.1**	
206-44-0	**Fluoranthene**	**1.12**	**114**	**E**
129-00-0	**Pyrene**	**1.12**	**77.6**	
56-55-3	**Benzo(a)anthracene**	**1.12**	**11.7**	
218-01-9	**Chrysene**	**1.12**	**11.0**	
205-99-2	**Benzo(b)fluoranthene**	**1.12**	**3.13**	
207-08-9	**Benzo(k)fluoranthene**	**1.12**	**1.30**	
50-32-8	**Benzo(a)pyrene**	**1.12**	**1.84**	
193-39-5	Indeno(1,2,3-cd)pyrene	1.12	< 1.12	U
53-70-3	Dibenz(a,h)anthracene	1.12	< 1.12	U
191-24-2	Benzo(g,h,i)perylene	1.12	< 1.12	U
198-55-0	Perylene	1.12	< 1.12	U
192-97-2	**Benzo(e)pyrene**	**1.12**	**1.97**	
TOTBFA	**Total Benzofluoranthenes**	**1.12**	**5.89**	

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	61.3%
d10-2-Methylnaphthalene	39.7%
d14-Dibenzo(a,h)anthracene	51.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Low Level SW8270D-SIM GC/MS **Sample ID: PG-SMA2-2-PEMD-151110-A**
Extraction Method: SW3550C **DILUTION**

Lab Sample ID: AQJ9M
LIMS ID: 15-21400
Matrix: Tissue
Data Release Authorized:
Reported: 12/16/15

QC Report No: AQJ9-Anchor QEA, LLC
Project: Port Gamble Clean-Up
Event: NA
Date Sampled: 11/10/15
Date Received: 11/10/15

Date Extracted: 11/18/15
Date Analyzed: 12/14/15 12:12
Instrument/Analyst: NT11/JLW
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 0.89 g-as-rec
Final Extract Volume: 0.1 mL
Dilution Factor: 10.0
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
91-20-3	Naphthalene	11.2	< 11.2 U
91-57-6	2-Methylnaphthalene	11.2	< 11.2 U
208-96-8	Acenaphthylene	11.2	< 11.2 U
83-32-9	**Acenaphthene**	**11.2**	**20.1**
86-73-7	**Fluorene**	**11.2**	**29.4**
85-01-8	**Phenanthrene**	**11.2**	**186**
120-12-7	**Anthracene**	**11.2**	**32.0**
206-44-0	**Fluoranthene**	**11.2**	**186**
129-00-0	**Pyrene**	**11.2**	**116**
56-55-3	**Benzo(a)anthracene**	**11.2**	**15.9**
218-01-9	**Chrysene**	**11.2**	**15.8**
205-99-2	Benzo(b)fluoranthene	11.2	< 11.2 U
207-08-9	Benzo(k)fluoranthene	11.2	< 11.2 U
50-32-8	Benzo(a)pyrene	11.2	< 11.2 U
193-39-5	Indeno(1,2,3-cd)pyrene	11.2	< 11.2 U
53-70-3	Dibenz(a,h)anthracene	11.2	< 11.2 U
191-24-2	Benzo(g,h,i)perylene	11.2	< 11.2 U
198-55-0	Perylene	11.2	< 11.2 U
192-97-2	Benzo(e)pyrene	11.2	< 11.2 U
TOTBFA	Total Benzofluoranthenes	11.2	< 11.2 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	87.0%
d10-2-Methylnaphthalene	49.3%
d14-Dibenzo(a,h)anthracene	61.3% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Low Level SW8270D-SIM GC/MS
Extraction Method: SW3550C
Page 1 of 1

Sample ID: PG-SMA2-1-PEMD-151110-A SAMPLE

Lab Sample ID: AQJ9O
LIMS ID: 15-21402
Matrix: Tissue
Data Release Authorized:
Reported: 12/16/15

QC Report No: AQJ9-Anchor QEA, LLC
Project: Port Gamble Clean-Up
Event: NA
Date Sampled: 11/10/15
Date Received: 11/10/15

Date Extracted: 11/18/15
Date Analyzed: 12/05/15 17:16
Instrument/Analyst: NT11/JLW
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 0.89 g-as-rec
Final Extract Volume: 0.1 mL
Dilution Factor: 1.00
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
91-20-3	**Naphthalene**	**1.12**	**14.6 B**
91-57-6	**2-Methylnaphthalene**	**1.12**	**7.17**
208-96-8	Acenaphthylene	1.12	< 1.12 U
83-32-9	**Acenaphthene**	**1.12**	**10.3**
86-73-7	**Fluorene**	**1.12**	**12.0**
85-01-8	**Phenanthrene**	**1.12**	**80.5**
120-12-7	**Anthracene**	**1.12**	**13.5**
206-44-0	**Fluoranthene**	**1.12**	**160 E**
129-00-0	**Pyrene**	**1.12**	**118 E**
56-55-3	**Benzo(a)anthracene**	**1.12**	**18.9**
218-01-9	**Chrysene**	**1.12**	**17.3**
205-99-2	**Benzo(b)fluoranthene**	**1.12**	**4.49**
207-08-9	**Benzo(k)fluoranthene**	**1.12**	**1.81**
50-32-8	**Benzo(a)pyrene**	**1.12**	**2.21**
193-39-5	Indeno(1,2,3-cd)pyrene	1.12	< 1.12 U
53-70-3	Dibenz(a,h)anthracene	1.12	< 1.12 U
191-24-2	Benzo(g,h,i)perylene	1.12	< 1.12 U
198-55-0	Perylene	1.12	< 1.12 U
192-97-2	**Benzo(e)pyrene**	**1.12**	**2.72**
TOTBFA	**Total Benzofluoranthenes**	**1.12**	**8.44**

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	72.0%
d10-2-Methylnaphthalene	52.7%
d14-Dibenzo(a,h)anthracene	60.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Low Level SW8270D-SIM GC/MS **Sample ID: PG-SMA2-1-PEMD-151110-A**
Extraction Method: SW3550C **DILUTION**

Lab Sample ID: AQJ9O
LIMS ID: 15-21402
Matrix: Tissue
Data Release Authorized:
Reported: 12/16/15

QC Report No: AQJ9-Anchor QEA, LLC
Project: Port Gamble Clean-Up
Event: NA
Date Sampled: 11/10/15
Date Received: 11/10/15

Date Extracted: 11/18/15
Date Analyzed: 12/14/15 12:42
Instrument/Analyst: NT11/JLW
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 0.89 g-as-rec
Final Extract Volume: 0.1 mL
Dilution Factor: 10.0
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
91-20-3	**Naphthalene**	**11.2**	**18.5 B**
91-57-6	2-Methylnaphthalene	11.2	< 11.2 U
208-96-8	Acenaphthylene	11.2	< 11.2 U
83-32-9	**Acenaphthene**	**11.2**	**12.0**
86-73-7	**Fluorene**	**11.2**	**14.5**
85-01-8	**Phenanthrene**	**11.2**	**119**
120-12-7	**Anthracene**	**11.2**	**19.7**
206-44-0	**Fluoranthene**	**11.2**	**280**
129-00-0	**Pyrene**	**11.2**	**179**
56-55-3	**Benzo(a)anthracene**	**11.2**	**24.5**
218-01-9	**Chrysene**	**11.2**	**23.6**
205-99-2	Benzo(b)fluoranthene	11.2	< 11.2 U
207-08-9	Benzo(k)fluoranthene	11.2	< 11.2 U
50-32-8	Benzo(a)pyrene	11.2	< 11.2 U
193-39-5	Indeno(1,2,3-cd)pyrene	11.2	< 11.2 U
53-70-3	Dibenz(a,h)anthracene	11.2	< 11.2 U
191-24-2	Benzo(g,h,i)perylene	11.2	< 11.2 U
198-55-0	Perylene	11.2	< 11.2 U
192-97-2	Benzo(e)pyrene	11.2	< 11.2 U
TOTBFA	Total Benzofluoranthenes	11.2	< 11.2 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	101%
d10-2-Methylnaphthalene	62.3%
d14-Dibenzo(a,h)anthracene	70.7% Q

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Low Level SW8270D-SIM GC/MS **Sample ID: PG-FB-PEMD-151110**
Extraction Method: SW3550C **SAMPLE**

Lab Sample ID: AQJ9Q
LIMS ID: 15-21404
Matrix: Tissue
Data Release Authorized:
Reported: 12/16/15

QC Report No: AQJ9-Anchor QEA, LLC
Project: Port Gamble Clean-Up
Event: NA
Date Sampled: 11/10/15
Date Received: 11/10/15

Date Extracted: 11/18/15
Date Analyzed: 12/05/15 17:46
Instrument/Analyst: NT11/JLW
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 0.89 g-as-rec
Final Extract Volume: 0.1 mL
Dilution Factor: 1.00
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
91-20-3	**Naphthalene**	**1.12**	**41.9 B**
91-57-6	**2-Methylnaphthalene**	**1.12**	**58.7**
208-96-8	**Acenaphthylene**	**1.12**	**1.61**
83-32-9	**Acenaphthene**	**1.12**	**48.4**
86-73-7	**Fluorene**	**1.12**	**23.6**
85-01-8	**Phenanthrene**	**1.12**	**32.1**
120-12-7	**Anthracene**	**1.12**	**1.71**
206-44-0	**Fluoranthene**	**1.12**	**12.6**
129-00-0	**Pyrene**	**1.12**	**7.47**
56-55-3	Benzo(a)anthracene	1.12	< 1.12 U
218-01-9	Chrysene	1.12	< 1.12 U
205-99-2	Benzo(b)fluoranthene	1.12	< 1.12 U
207-08-9	Benzo(k)fluoranthene	1.12	< 1.12 U
50-32-8	Benzo(a)pyrene	1.12	< 1.12 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.12	< 1.12 U
53-70-3	Dibenz(a,h)anthracene	1.12	< 1.12 U
191-24-2	Benzo(g,h,i)perylene	1.12	< 1.12 U
198-55-0	Perylene	1.12	< 1.12 U
192-97-2	Benzo(e)pyrene	1.12	< 1.12 U
TOTBFA	Total Benzofluoranthenes	1.12	< 1.12 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	63.0%
d10-2-Methylnaphthalene	48.0%
d14-Dibenzo(a,h)anthracene	42.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Low Level SW8270D-SIM GC/MS **Sample ID: PG-TB-PEMD-151110**
Extraction Method: SW3550C **SAMPLE**

Lab Sample ID: AQJ9R
LIMS ID: 15-21405
Matrix: Tissue
Data Release Authorized:
Reported: 12/16/15

QC Report No: AQJ9-Anchor QEA, LLC
Project: Port Gamble Clean-Up
Event: NA
Date Sampled: 11/10/15
Date Received: 11/10/15

Date Extracted: 11/18/15
Date Analyzed: 12/05/15 18:16
Instrument/Analyst: NT11/JLW
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 0.89 g-as-rec
Final Extract Volume: 0.1 mL
Dilution Factor: 1.00
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
91-20-3	**Naphthalene**	**1.12**	**19.9 B**
91-57-6	**2-Methylnaphthalene**	**1.12**	**7.28**
208-96-8	Acenaphthylene	1.12	< 1.12 U
83-32-9	**Acenaphthene**	**1.12**	**1.24**
86-73-7	**Fluorene**	**1.12**	**1.48**
85-01-8	**Phenanthrene**	**1.12**	**3.44**
120-12-7	**Anthracene**	**1.12**	**2.40**
206-44-0	**Fluoranthene**	**1.12**	**4.17**
129-00-0	**Pyrene**	**1.12**	**5.21**
56-55-3	Benzo(a)anthracene	1.12	< 1.12 U
218-01-9	Chrysene	1.12	< 1.12 U
205-99-2	Benzo(b)fluoranthene	1.12	< 1.12 U
207-08-9	Benzo(k)fluoranthene	1.12	< 1.12 U
50-32-8	Benzo(a)pyrene	1.12	< 1.12 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.12	< 1.12 U
53-70-3	Dibenz(a,h)anthracene	1.12	< 1.12 U
191-24-2	Benzo(g,h,i)perylene	1.12	< 1.12 U
198-55-0	Perylene	1.12	< 1.12 U
192-97-2	Benzo(e)pyrene	1.12	< 1.12 U
TOTBFA	Total Benzofluoranthenes	1.12	< 1.12 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	59.7%
d10-2-Methylnaphthalene	43.7%
d14-Dibenzo(a,h)anthracene	46.0%

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Tissue

QC Report No: AQJ9-Anchor QEA, LLC
Project: Port Gamble Clean-Up

Client ID	FLN	MNP	DBA	TOT OUT
MB-111815	41.7%	31.5%	41.3%	0
LCS-111815	60.0%	43.0%	61.7%	0
LCSD-111815	49.7%	35.3%	53.0%	0
PG-GP-1-PEMD-151109-A	61.0%	46.3%	59.3%	0
PG-PJ-1-PEMD-151109-A	63.7%	47.7%	68.7%	0
PG-WS-1-PEMD-151109-A	61.0%	49.3%	50.3%	0
PG-SMA2-5-PEMD-151109-	34.9%	25.0%*	32.7%	1
PG-SMA2-4-PEMD-151109-	70.7%	53.7%	60.0%	0
PG-SMA2-4-PEMD-151109-	DL85.0%	57.0%	60.3%	0
PG-SMA2-3-PEMD-151110-	65.0%	48.7%	58.3%	0
PG-SMA2-3-PEMD-151110-	DL89.7%	61.3%	65.0%	0
PG-SMA2-3-PEMD-151110-	56.7%	43.7%	46.0%	0
PG-SMA2-3-PEMD-151110-	DL87.0%	57.3%	56.3%	0
PG-SMA2-2-PEMD-151110-	61.3%	39.7%	51.0%	0
PG-SMA2-2-PEMD-151110-	DL87.0%	49.3%	61.3%	0
PG-SMA2-1-PEMD-151110-	72.0%	52.7%	60.3%	0
PG-SMA2-1-PEMD-151110-	DL 101%	62.3%	70.7%	0
PG-FB-PEMD-151110	63.0%	48.0%	42.3%	0
PG-TB-PEMD-151110	59.7%	43.7%	46.0%	0

	LCS/MB LIMITS (Advisory)	QC LIMITS (Advisory)
(FLN) = d10-Fluoranthene	(30-160)	(30-160)
(MNP) = d10-2-Methylnaphthalene	(30-160)	(30-160)
(DBA) = d14-Dibenzo(a,h)anthracene	(30-160)	(30-160)

Prep Method: SW3550C
Log Number Range: 15-21388 to 15-21405

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Low Level SW8270D-SIM GC/MS
Page 1 of 1

Sample ID: LCS-111815
LAB CONTROL SAMPLE

Lab Sample ID: LCS-111815
LIMS ID: 15-21388
Matrix: Tissue
Data Release Authorized:
Reported: 12/17/15

QC Report No: AQJ9-Anchor QEA, LLC
Project: Port Gamble Clean-Up
Event: NA
Date Sampled: NA
Date Received: NA

Date Extracted: 11/18/15

Date Analyzed LCS: 12/05/15 11:45
LCSD: 12/05/15 12:45
Instrument/Analyst LCS: NT11/JLW
LCSD: NT11/JLW

Sample Amount LCS: 0.89 g-as-rec
LCSD: 0.89 g-as-rec
Final Extract Volume LCS: 0.10 mL
LCSD: 0.10 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Naphthalene	16.1 B	33.7	47.8%	12.2 B	33.7	36.2%	27.6%
2-Methylnaphthalene	15.0	33.7	44.5%	12.5	33.7	37.1%	18.2%
Acenaphthylene	15.2	33.7	45.1%	11.8	33.7	35.0%	25.2%
Acenaphthene	15.0	33.7	44.5%	11.4	33.7	33.8%	27.3%
Fluorene	17.1	33.7	50.7%	13.6	33.7	40.4%	22.8%
Phenanthrene	21.7	33.7	64.4%	16.7	33.7	49.6%	26.0%
Anthracene	17.1	33.7	50.7%	13.9	33.7	41.2%	20.6%
Fluoranthene	19.4	33.7	57.6%	16.7	33.7	49.6%	15.0%
Pyrene	20.8	33.7	61.7%	17.8	33.7	52.8%	15.5%
Benzo(a)anthracene	19.7	33.7	58.5%	16.4	33.7	48.7%	18.3%
Chrysene	18.7	33.7	55.5%	15.0	33.7	44.5%	22.0%
Benzo(b)fluoranthene	18.9	33.7	56.1%	15.9	33.7	47.2%	17.2%
Benzo(k)fluoranthene	17.6	33.7	52.2%	14.8	33.7	43.9%	17.3%
Benzo(a)pyrene	16.0	33.7	47.5%	13.4	33.7	39.8%	17.7%
Indeno(1,2,3-cd)pyrene	18.5	33.7	54.9%	15.5	33.7	46.0%	17.6%
Dibenz(a,h)anthracene	19.0	33.7	56.4%	15.9	33.7	47.2%	17.8%
Benzo(g,h,i)perylene	18.0	33.7	53.4%	15.1	33.7	44.8%	17.5%
Perylene	8.11	33.7	24.1%	7.91	33.7	23.5%	2.5%
Benzo(e)pyrene	16.2	33.7	48.1%	13.8	33.7	40.9%	16.0%
Total Benzofluoranthenes	52.6	101	52.1%	44.3	101	43.9%	17.1%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

SIM Semivolatile Surrogate Recovery

	LCS	LCSD
d10-Fluoranthene	60.0%	49.7%
d10-2-Methylnaphthalene	43.0%	35.3%
d14-Dibenzo(a,h)anthracene	61.7%	53.0%

4B

SEMIVOLATILE METHOD BLANK SUMMARY

BLANK NO.

AQJ9MBS1

Lab Name: ANALYTICAL RESOURCES INC. Client: ANCHOR QEA, LLC

ARI Job No: AQJ9 Project: PORT GAMBLE CLEAN-UP

Lab File ID: 15120505 Date Extracted: 11/18/15

Instrument ID: NT11 Date Analyzed: 12/05/15

Matrix: SOLID Time Analyzed: 1215

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	AQJ9LCSS1	AQJ9LCSS1	15120504	12/05/15
02	AQJ9LCSDS1	AQJ9LCSDS1	15120506	12/05/15
03	PG-GP-1-PEMD-151	AQJ9A	15120507	12/05/15
04	PG-PJ-1-PEMD-151	AQJ9C	15120508	12/05/15
05	PG-WS-1-PEMD-151	AQJ9E	15120509	12/05/15
06	PG-SMA2-5-PEMD-1	AQJ9G	15120510	12/05/15
07	PG-SMA2-4-PEMD-1	AQJ9I	15120511	12/05/15
08	PG-SMA2-3-PEMD-1	AQJ9K	15120512	12/05/15
09	PG-SMA2-3-PEMD-1	AQJ9L	15120513	12/05/15
10	PG-SMA2-2-PEMD-1	AQJ9M	15120514	12/05/15
11	PG-SMA2-1-PEMD-1	AQJ9O	15120515	12/05/15
12	PG-FB-PEMD-15111	AQJ9Q	15120516	12/05/15
13	PG-TB-PEMD-15111	AQJ9R	15120517	12/05/15
14	PG-SMA2-4-PEMD-1	AQJ9I	15121404	12/14/15
15	PG-SMA2-3-PEMD-1	AQJ9K	15121405	12/14/15
16	PG-SMA2-3-PEMD-1	AQJ9L	15121406	12/14/15
17	PG-SMA2-2-PEMD-1	AQJ9M	15121407	12/14/15
18	PG-SMA2-1-PEMD-1	AQJ9O	15121408	12/14/15
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

FORM IV SV

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by Low Level SW8270D-SIM GC/MS **Sample ID: MB-111815**
Extraction Method: SW3550C **METHOD BLANK**

Lab Sample ID: MB-111815
LIMS ID: 15-21388
Matrix: Tissue
Data Release Authorized:
Reported: 12/16/15

QC Report No: AQJ9-Anchor QEA, LLC
Project: Port Gamble Clean-Up
Event: NA
Date Sampled: NA
Date Received: NA

Date Extracted: 11/18/15
Date Analyzed: 12/05/15 12:15
Instrument/Analyst: NT11/JLW
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 0.89 g-as-rec
Final Extract Volume: 0.1 mL
Dilution Factor: 1.00
Percent Moisture: NA
Sulfur Cleanup: No

CAS Number	Analyte	LOQ	Result
91-20-3	**Naphthalene**	**1.12**	**1.33**
91-57-6	2-Methylnaphthalene	1.12	< 1.12 U
208-96-8	Acenaphthylene	1.12	< 1.12 U
83-32-9	Acenaphthene	1.12	< 1.12 U
86-73-7	Fluorene	1.12	< 1.12 U
85-01-8	Phenanthrene	1.12	< 1.12 U
120-12-7	Anthracene	1.12	< 1.12 U
206-44-0	Fluoranthene	1.12	< 1.12 U
129-00-0	Pyrene	1.12	< 1.12 U
56-55-3	Benzo(a)anthracene	1.12	< 1.12 U
218-01-9	Chrysene	1.12	< 1.12 U
205-99-2	Benzo(b)fluoranthene	1.12	< 1.12 U
207-08-9	Benzo(k)fluoranthene	1.12	< 1.12 U
50-32-8	Benzo(a)pyrene	1.12	< 1.12 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.12	< 1.12 U
53-70-3	Dibenz(a,h)anthracene	1.12	< 1.12 U
191-24-2	Benzo(g,h,i)perylene	1.12	< 1.12 U
198-55-0	Perylene	1.12	< 1.12 U
192-97-2	Benzo(e)pyrene	1.12	< 1.12 U
TOTBFA	Total Benzofluoranthenes	1.12	< 1.12 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	41.7%
d10-2-Methylnaphthalene	31.5%
d14-Dibenzo(a,h)anthracene	41.3%

5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: ANALYTICAL RESOURCES INC. Client: ANCHOR QEA, LLC

Instrument ID: NT11 Project: PORT GAMBLE CLEAN-UP

DFTPP Injection Date: 12/04/15 DFTPP Injection Time: 0845

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	10.0 - 80.0% of mass 198	36.7
68	Less than 2.0% of mass 69	0.0 (0.0)1
69	Mass 69 relative abundance	46.7
70	Less than 2.0% of mass 69	0.2 (0.5)1
127	10.0 - 80.0% of mass 198	50.3
197	Less than 2.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	8.8
275	10.0 - 60.0% of mass 198	29.8
365	Greater than 1.0% of mass 198	3.54
441	0.0 - 24.0% of mass 442	13.4 (16.4)2
442	50.0 - 200.0% of mass 198	81.9
443	15.0 - 24.0% of mass 442	18.6 (22.7)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		LLSIM 250	15120402	12/04/15	0903
02		LLSIM 100	15120403	12/04/15	0933
03		LLSIM 10	15120404	12/04/15	1003
04		LLSIM 50	15120405	12/04/15	1033
05		LLSIM 500	15120406	12/04/15	1103
06		LLSIM 1000	15120407	12/04/15	1133
07		LLSIM SCV 25	15120408	12/04/15	1204
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: ANALYTICAL RESOURCES INC. Client: ANCHOR QEA, LLC

Instrument ID: NT11 Project: PORT GAMBLE CLEAN-UP

DFTPP Injection Date: 12/05/15 DFTPP Injection Time: 1012

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	10.0 - 80.0% of mass 198	39.8
68	Less than 2.0% of mass 69	0.0 (0.0)1
69	Mass 69 relative abundance	50.8
70	Less than 2.0% of mass 69	0.3 (0.6)1
127	10.0 - 80.0% of mass 198	52.3
197	Less than 2.0% of mass 198	0.2
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	8.6
275	10.0 - 60.0% of mass 198	27.1
365	Greater than 1.0% of mass 198	3.17
441	0.0 - 24.0% of mass 442	11.2 (16.3)2
442	50.0 - 200.0% of mass 198	68.7
443	15.0 - 24.0% of mass 442	15.6 (22.6)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		LLSIM 250	15120502	12/05/15	1030
02	AQJ9LCSS1	AQJ9LCSS1	15120504	12/05/15	1145
03	AQJ9MBS1	AQJ9MBS1	15120505	12/05/15	1215
04	AQJ9LCSDS1	AQJ9LCSDS1	15120506	12/05/15	1245
05	PG-GP-1-PEMD-151	AQJ9A	15120507	12/05/15	1315
06	PG-PJ-1-PEMD-151	AQJ9C	15120508	12/05/15	1345
07	PG-WS-1-PEMD-151	AQJ9E	15120509	12/05/15	1415
08	PG-SMA2-5-PEMD-1	AQJ9G	15120510	12/05/15	1445
09	PG-SMA2-4-PEMD-1	AQJ9I	15120511	12/05/15	1516
10	PG-SMA2-3-PEMD-1	AQJ9K	15120512	12/05/15	1546
11	PG-SMA2-3-PEMD-1	AQJ9L	15120513	12/05/15	1616
12	PG-SMA2-2-PEMD-1	AQJ9M	15120514	12/05/15	1646
13	PG-SMA2-1-PEMD-1	AQJ9O	15120515	12/05/15	1716
14	PG-FB-PEMD-15111	AQJ9Q	15120516	12/05/15	1746
15	PG-TB-PEMD-15111	AQJ9R	15120517	12/05/15	1816
16		LLSIM CCV 25	15120518	12/05/15	1846
17					
18					
19					
20					

5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: ANALYTICAL RESOURCES INC. Client: ANCHOR QEA, LLC

Instrument ID: NT11 Project: PORT GAMBLE CLEAN-UP

DFTPP Injection Date: 12/14/15 DFTPP Injection Time: 0852

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	10.0 - 80.0% of mass 198	36.2
68	Less than 2.0% of mass 69	0.0 (0.0)1
69	Mass 69 relative abundance	42.7
70	Less than 2.0% of mass 69	0.4 (0.9)1
127	10.0 - 80.0% of mass 198	47.3
197	Less than 2.0% of mass 198	0.2
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	7.7
275	10.0 - 60.0% of mass 198	27.5
365	Greater than 1.0% of mass 198	3.39
441	0.0 - 24.0% of mass 442	12.8 (15.3)2
442	50.0 - 200.0% of mass 198	83.5
443	15.0 - 24.0% of mass 442	17.2 (20.6)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		LLPAH 250	15121402	12/14/15	0909
02		LLPAH MRL	15121403	12/14/15	0959
03	PG-SMA2-4-PEMD-1	AQJ9I	15121404	12/14/15	1042
04	PG-SMA2-3-PEMD-1	AQJ9K	15121405	12/14/15	1112
05	PG-SMA2-3-PEMD-1	AQJ9L	15121406	12/14/15	1142
06	PG-SMA2-2-PEMD-1	AQJ9M	15121407	12/14/15	1212
07	PG-SMA2-1-PEMD-1	AQJ9O	15121408	12/14/15	1242
08		LLPAH CCV	15121409	12/14/15	1313
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

6B

SEMIVOLATILE 8270-D INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES INC. Client: ANCHOR QEA, LLC

ARI Job No: AQJ9 Project: PORT GAMBLE CLEAN-UP

Instrument ID: NT11 Calibration Date: 12/04/15

LAB FILE ID: RRF10 =15120404 RRF50 =15120405 RRF100=15120403
RRF250=15120402 RRF500=15120406 RRF1000=15120407

COMPOUND	RRF 10	RRF 50	RRF 100	RRF 250	RRF 500	RRF 1000	___ RRF	%RSD /R^2
Naphthalene	1.199	1.257	1.208	1.138	1.095	1.034	1.155	7.1
2-Methylnaphthalene	0.757	0.822	0.818	0.825	0.787	0.754	0.794	4.1
Acenaphthylene	1.587	1.688	1.646	1.628	1.602	1.535	1.614	3.3
Acenaphthene	1.084	1.136	1.097	1.066	1.041	1.005	1.072	4.3
Dibenzofuran	1.637	1.742	1.685	1.623	1.559	1.437	1.614	6.6
Fluorene	1.159	1.259	1.248	1.231	1.209	1.156	1.210	3.7
Phenanthrene	1.201	1.339	1.261	1.223	1.143	1.063	1.205	7.9
Anthracene	1.014	1.089	1.089	1.118	1.122	1.039	1.078	4.0
Fluoranthene	1.095	1.291	1.250	1.266	1.227	1.130	1.210	6.5
Pyrene	1.570	1.718	1.639	1.574	1.557	1.445	1.584	5.8
Benzo(a)anthracene	1.264	1.424	1.349	1.340	1.338	1.285	1.333	4.2
Chrysene	1.461	1.649	1.511	1.434	1.412	1.314	1.464	7.6
Benzo(b)fluoranthene	1.236	1.449	1.335	1.309	1.428	1.373	1.355	5.8
Benzo(k)fluoranthene	1.404	1.665	1.575	1.601	1.638	1.592	1.579	5.8
Benzo(j)fluoranthene	1.324	1.581	1.430	1.419	1.477	1.400	1.438	6.0
Benzo(a)pyrene	1.122	1.390	1.285	1.305	1.392	1.352	1.308	7.7
Indeno(1,2,3-cd)pyrene	1.070	1.396	1.342	1.372	1.529	1.530	1.373	12.3
Dibenzo(a,h)anthracene	0.794	1.057	1.071	1.111	1.233	1.249	1.086	15.1
Benzo(g,h,i)perylene	1.030	1.235	1.174	1.174	1.272	1.268	1.192	7.6
1-Methylnaphthalene	0.672	0.743	0.744	0.740	0.711	0.681	0.715	4.6
Perylene	1.258	1.475	1.355	1.306	1.390	1.351	1.356	5.5
Benzo(e)pyrene	1.300	1.485	1.371	1.324	1.391	1.346	1.370	4.8
2-Methylnaphthalene-d10	0.706	0.768	0.761	0.766	0.738	0.714	0.742	3.7
Dibenzo(a,h)anthracene-d14	0.593	0.781	0.799	0.816	0.911	0.944	0.807	15.3
Fluoranthene-d10	1.015	1.152	1.114	1.133	1.122	1.062	1.100	4.7

<- Outside QC limits: %RSD <20% or R^2 > 0.990

FORM VI SV-1

7B

SEMIVOLATILE 8270-D CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES INC. Client: ANCHOR QEA, LLC

ARI Job No: AQJ9 Project: PORT GAMBLE CLEAN-UP

Instrument ID: NT11 Cont. Calib. Date: 12/05/15

Init. Calib. Date: 12/04/15 Cont. Calib. Time: 1030

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
Naphthalene	1.155	1.109	0.700	AVRG	-4.0
2-Methylnaphthalene	0.794	0.792	0.400	AVRG	-0.2
Acenaphthylene	1.614	1.545	0.900	AVRG	-4.3
Acenaphthene	1.072	1.041	0.900	AVRG	-2.9
Dibenzofuran	1.614	1.559	0.800	AVRG	-3.4
Fluorene	1.210	1.186	0.900	AVRG	-2.0
Phenanthrene	1.205	1.177	0.700	AVRG	-2.3
Anthracene	1.078	1.055	0.700	AVRG	-2.1
Fluoranthene	1.210	1.210	0.600	AVRG	0.0
Pyrene	1.584	1.545	0.600	AVRG	-2.5
Benzo(a)anthracene	1.333	1.292	0.800	AVRG	-3.1
Chrysene	1.464	1.428	0.700	AVRG	-2.4
Benzo(b)fluoranthene	1.355	1.325	0.700	AVRG	-2.2
Benzo(k)fluoranthene	1.579	1.579	0.700	AVRG	0.0
Benzo(j)fluoranthene	1.438	1.453	0.010	AVRG	1.0
Benzo(a)pyrene	1.308	1.298	0.700	AVRG	-0.8
Indeno(1,2,3-cd)pyrene	1.373	1.391	0.500	AVRG	1.3
Dibenzo(a,h)anthracene	1.086	1.115	0.400	AVRG	2.7
Benzo(g,h,i)perylene	1.192	1.177	0.500	AVRG	-1.2
1-Methylnaphthalene	0.715	0.718	0.010	AVRG	0.4
Perylene	1.356	1.321	0.010	AVRG	-2.6
Benzo(e)pyrene	1.370	1.342	0.010	AVRG	-2.0
2-Methylnaphthalene-d10	0.742	0.737	0.010	AVRG	-0.7
Dibenzo(a,h)anthracene-d14	0.807	0.818	0.010	AVRG	1.4
Fluoranthene-d10	1.100	1.061	0.010	AVRG	-3.5

<- Exceeds QC limit of 20% D

* RF less than minimum RF

FORM VII SV-1

7B

SEMIVOLATILE 8270-D CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES INC. Client: ANCHOR QEA, LLC

ARI Job No: AQJ9 Project: PORT GAMBLE CLEAN-UP

Instrument ID: NT11 Cont. Calib. Date: 12/14/15

Init. Calib. Date: 12/04/15 Cont. Calib. Time: 0909

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift	
Naphthalene	1.155	1.104	0.700	AVRG	-4.4	
2-Methylnaphthalene	0.794	0.788	0.400	AVRG	-0.8	
Acenaphthylene	1.614	1.622	0.900	AVRG	0.5	
Acenaphthene	1.072	1.028	0.900	AVRG	-4.1	
Dibenzofuran	1.614	1.534	0.800	AVRG	-5.0	
Fluorene	1.210	1.191	0.900	AVRG	-1.6	
Phenanthrene	1.205	1.129	0.700	AVRG	-6.3	
Anthracene	1.078	1.104	0.700	AVRG	2.4	
Fluoranthene	1.210	1.197	0.600	AVRG	-1.1	
Pyrene	1.584	1.555	0.600	AVRG	-1.8	
Benzo(a)anthracene	1.333	1.310	0.800	AVRG	-1.7	
Chrysene	1.464	1.358	0.700	AVRG	-7.2	
Benzo(b)fluoranthene	1.355	1.301	0.700	AVRG	-4.0	
Benzo(k)fluoranthene	1.579	1.564	0.700	AVRG	-0.9	
Benzo(j)fluoranthene	1.438	1.319	0.010	AVRG	-8.3	
Benzo(a)pyrene	1.308	1.246	0.700	AVRG	-4.7	
Indeno(1,2,3-cd)pyrene	1.373	1.016	0.500	AVRG	-26.0	<-
Dibenzo(a,h)anthracene	1.086	0.818	0.400	AVRG	-24.7	<-
Benzo(g,h,i)perylene	1.192	0.750	0.500	AVRG	-37.1	<-
1-Methylnaphthalene	0.715	0.708	0.010	AVRG	-1.0	
Perylene	1.356	1.255	0.010	AVRG	-7.4	
Benzo(e)pyrene	1.370	1.278	0.010	AVRG	-6.7	
2-Methylnaphthalene-d10	0.742	0.724	0.010	AVRG	-2.4	
Dibenzo(a,h)anthracene-d14	0.807	0.626	0.010	AVRG	-22.4	<-
Fluoranthene-d10	1.100	1.087	0.010	AVRG	-1.2	

<- Exceeds QC limit of 20% D

* RF less than minimum RF

FORM VII SV-1

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC. Client: ANCHOR QEA, LLC

ARI Job No: AQJ9 Project: PORT GAMBLE CLEAN-UP

Ical Midpoint ID: 15120402 Ical Date: 12/04/15

Instrument ID: NT11 Cont. Cal Date: 12/04/15

		IS1(NPT) AREA #	RT #	IS2(ANT) AREA #	RT #	IS3(PHN) AREA #	RT #
	ICAL MIDPT	327896	6.60	239179	9.60	372253	12.27
	UPPER LIMIT	655792		478358		744506	
	LOWER LIMIT	163948		119590		186127	
	CCAL	337457	6.60	238950	9.60	380348	12.27
	UPPER LIMIT		7.10		10.10		12.77
	LOWER LIMIT		6.10		9.10		11.77
01		330144	6.60	236381	9.60	360337	12.27
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

IS1 = Naphthalene-d8
IS2 = Acenaphthene-d10
IS3 = Phenanthrene-d10

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC. Client: ANCHOR QEA, LLC

ARI Job No: AQJ9 Project: PORT GAMBLE CLEAN-UP

Ical Midpoint ID: 15120402 Ical Date: 12/04/15

Instrument ID: NT11 Cont. Cal Date: 12/04/15

		IS4(CRY) AREA #	RT #	IS5(PRY) AREA #	RT #	AREA #	RT #
	ICAL MIDPT	294711	17.02	260595	19.84		
	UPPER LIMIT	589422		521190			
	LOWER LIMIT	147356		130298			
	CCAL	298514	17.01	256244	19.84		
	UPPER LIMIT		17.51		20.34		
	LOWER LIMIT		16.51		19.34		
01		291007	17.01	242244	19.83		
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

IS4 = Chrysene-d12
IS5 = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

8B
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC. Client: ANCHOR QEA, LLC

ARI Job No: AQJ9 Project: PORT GAMBLE CLEAN-UP

Ical Midpoint ID: 15120402 Ical Date: 12/04/15

Instrument ID: NT11 Cont. Cal Date: 12/05/15

		IS1(NPT) AREA #	RT #	IS2(ANT) AREA #	RT #	IS3(PHN) AREA #	RT #
	ICAL MIDPT	327896	6.60	239179	9.60	372253	12.27
	UPPER LIMIT	655792		478358		744506	
	LOWER LIMIT	163948		119590		186127	
	CCAL	259155	6.60	222472	9.60	373365	12.28
	UPPER LIMIT		7.10		10.10		12.78
	LOWER LIMIT		6.10		9.10		11.78
01	AQJ9LCSS1	975072*	6.58	685451*	9.59	1077117*	12.27
02	AQJ9MBS1	438288	6.59	366527	9.59	602619	12.27
03	AQJ9LCSDS1	377538	6.58	322593	9.59	523037	12.27
04	PG-GP-1-PEMD	329948	6.59	276926	9.59	455160	12.27
05	PG-PJ-1-PEMD	347293	6.58	286981	9.59	493459	12.27
06	PG-WS-1-PEMD	324170	6.59	268869	9.59	444544	12.27
07	PG-SMA2-5-PE	297768	6.58	252418	9.59	432491	12.27
08	PG-SMA2-4-PE	291014	6.59	238819	9.59	387727	12.27
09	PG-SMA2-3-PE	329170	6.59	272591	9.59	446217	12.27
10	PG-SMA2-3-PE	345794	6.59	286502	9.59	478323	12.27
11	PG-SMA2-2-PE	307876	6.59	255620	9.59	411968	12.27
12	PG-SMA2-1-PE	308997	6.59	253688	9.59	419421	12.27
13	PG-FB-PEMD-1	348938	6.59	285660	9.59	466630	12.27
14	PG-TB-PEMD-1	335866	6.59	274447	9.60	451003	12.27
15							
16							
17							
18							
19							
20							

IS1 = Naphthalene-d8
IS2 = Acenaphthene-d10
IS3 = Phenanthrene-d10

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC. Client: ANCHOR QEA, LLC

ARI Job No: AQJ9 Project: PORT GAMBLE CLEAN-UP

Ical Midpoint ID: 15120402 Ical Date: 12/04/15

Instrument ID: NT11 Cont. Cal Date: 12/05/15

		IS4(CRY) AREA #	RT #	IS5(PRY) AREA #	RT #	AREA #	RT #
	ICAL MIDPT	294711	17.02	260595	19.84		
	UPPER LIMIT	589422		521190			
	LOWER LIMIT	147356		130298			
	CCAL	284920	17.02	217601	19.84		
	UPPER LIMIT		17.52		20.34		
	LOWER LIMIT		16.52		19.34		
01	AQJ9LCSS1	790706*	17.01	732910*	19.84		
02	AQJ9MBS1	445515	17.02	407440	19.84		
03	AQJ9LCSDS1	383735	17.01	343460	19.84		
04	PG-GP-1-PEMD	342230	17.02	315896	19.84		
05	PG-PJ-1-PEMD	330591	17.02	298465	19.84		
06	PG-WS-1-PEMD	330321	17.02	300363	19.84		
07	PG-SMA2-5-PE	311806	17.02	281081	19.84		
08	PG-SMA2-4-PE	283013	17.02	256301	19.84		
09	PG-SMA2-3-PE	330667	17.02	292938	19.84		
10	PG-SMA2-3-PE	347514	17.02	308933	19.84		
11	PG-SMA2-2-PE	294435	17.02	257227	19.84		
12	PG-SMA2-1-PE	292332	17.02	252868	19.84		
13	PG-FB-PEMD-1	323985	17.02	278293	19.84		
14	PG-TB-PEMD-1	314713	17.02	267996	19.84		
15							
16							
17							
18							
19							
20							

IS4 = Chrysene-d12
IS5 = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC. Client: ANCHOR QEA, LLC

ARI Job No: AQJ9 Project: PORT GAMBLE CLEAN-UP

Ical Midpoint ID: 15120402 Ical Date: 12/04/15

Instrument ID: NT11 Cont. Cal Date: 12/14/15

		IS1(NPT) AREA #	RT #	IS2(ANT) AREA #	RT #	IS3(PHN) AREA #	RT #
	ICAL MIDPT	327896	6.60	239179	9.60	372253	12.27
	UPPER LIMIT	655792		478358		744506	
	LOWER LIMIT	163948		119590		186127	
	CCAL	270472	6.61	216392	9.61	358358	12.28
	UPPER LIMIT		7.11		10.11		12.78
	LOWER LIMIT		6.11		9.11		11.78
01		273233	6.61	204199	9.61	340081	12.29
02	PG-SMA2-4-PE	296401	6.61	215875	9.61	345178	12.28
03	PG-SMA2-3-PE	301887	6.61	222712	9.61	358654	12.28
04	PG-SMA2-3-PE	298203	6.61	216970	9.60	347616	12.28
05	PG-SMA2-2-PE	291558	6.60	217109	9.60	342997	12.28
06	PG-SMA2-1-PE	295716	6.61	218344	9.60	344692	12.28
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

IS1 = Naphthalene-d8
IS2 = Acenaphthene-d10
IS3 = Phenanthrene-d10

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

8B
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES INC. Client: ANCHOR QEA, LLC

ARI Job No: AQJ9 Project: PORT GAMBLE CLEAN-UP

Ical Midpoint ID: 15120402 Ical Date: 12/04/15

Instrument ID: NT11 Cont. Cal Date: 12/14/15

		IS4(CRY) AREA #	RT #	IS5(PRY) AREA #	RT #	AREA #	RT #
	ICAL MIDPT	294711	17.02	260595	19.84		
	UPPER LIMIT	589422		521190			
	LOWER LIMIT	147356		130298			
	CCAL	283003	17.02	242204	19.85		
	UPPER LIMIT		17.52		20.35		
	LOWER LIMIT		16.52		19.35		
01		256902	17.03	220992	19.86		
02	PG-SMA2-4-PE	254462	17.03	225753	19.86		
03	PG-SMA2-3-PE	272267	17.02	239176	19.85		
04	PG-SMA2-3-PE	262654	17.02	233657	19.85		
05	PG-SMA2-2-PE	253845	17.02	229648	19.85		
06	PG-SMA2-1-PE	257252	17.02	231462	19.85		
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

IS4 = Chrysene-d12
IS5 = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

SIM PAH Raw Data
Extraction Bench Sheets and Notes

ARI Job ID: AQJ9

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Organic Extractions Benchsheet

Miscellaneous
Water/Soil/Sed/Tissue/Other
Separatory Funnel (3510C)/Liq-Liq (3520C)
Sonication (3550C)/Microwave (3546)
TissueMize (Modified 3550C)

Analysis SIM PNA Low Level

Preparation Test Misc # 1

ARI Job No(s) AQJ9

Batch # _____

Batch set up by: ~~SB~~

EPH Aromatic

Bottle #	ARI Sample I.D.	~~Weight~~ Or ~~Volume Extracted~~	Sonic Horn ID + Chk	(REQ/ ~~Opt~~) ~~GPC~~ Y/(N)	(REQ/ ~~Opt~~) ~~Acid~~ Clean Y/(N)	(REQ/ ~~Opt~~) Sulfur Clean Y/(N)	(REQ) Opt) ~~SPE~~ Clean (Y)/N Silica Gel	Final Effective Volume	Vol to Lab	Comments	Verify Client ID
	AQJ9 BLK	(1) each	1					Φ.1 mL	Φ.1 mL		TH 11/18/15 Analyst/Date
	BS	(1) each	3					Φ.1 mL	Φ.1 mL		Pre-GPC KD 1 2 3 4 5 6 ___°C Exchange to Hex? Analyst/Date
	BS Dup	(1) each	4					Φ.1 mL	Φ.1 mL		
1	~~MRL Check~~ A	1 each	5					Φ.1 mL	Φ.1 mL		TurboVap Pre-GPC 1 2 3 4 5 Analyst/Date
1	B	1 each	6					Φ.1 mL	Φ.1 mL		
1	C	1 each	7					Φ.1 mL	Φ.1 mL		
1	D	1 each	9					Φ.1 mL	Φ.1 mL		
1	E	1 each	10					Φ.1 mL	Φ.1 mL		~~Post-GPC~~ KD 1 2 3 4 5 6 ___°C Exchange to Hex? Analyst/Date 11/23/15
1	F	1 each	1					Φ.1 mL	Φ.1 mL		
1	G	1 each	3				Φ 11/18/15	~~Φ.1 mL~~	0.650 Φ.1 mL	See NOTES	
1	H	1 each	4				12/1/15	Φ.1 mL	Φ.1 mL		TurboVap Post-GPC 1 2 3 4 5 Analyst/Date
1	I	1 each	5					Φ.1 mL	Φ.1 mL		
1	J	1 each	6					Φ.1 mL	Φ.1 mL		
1	K	1 each	7					Φ.1 mL	Φ.1 mL		
1	L	1 each	9					Φ.1 mL	Φ.1 mL		TurboVap Pre-Cleanups 1 2 3 4 5 SR 11/23/15 Analyst/Date
1	M	1 each	10					Φ.1 mL	Φ.1 mL	See notes	
1	N	1 each	1					Φ.1 mL	Φ.1 mL		
1	O	1 each	3					Φ.1 mL	Φ.1 mL		
1	P	1 each	4					Φ.1 mL	Φ.1 mL		TurboVap Post-Cleanups (1) 2 3 4 5 SR 12/1/15 Analyst/Date
1	Q	1 each	5					Φ.1 mL	Φ.1 mL		
1	R	1 each	6					Φ.1 mL	Φ.1 mL	12/1/15	
Analyst/Date		TH 11/18/15	TH 11/18/15				SR 11/23/15	SR 12/1/15	SR 11/18/15	Reviewed by/Date	

	Standard	Standard ID	Concentration	Volume	Expiration Date	Analyst	Witness
Low Lvl SIM PNA	Surrogate	I (D###442)	1.5/7.5 ng/mL	2Φ µL	12/12/15	TH	YC
	Spike	( )		µL			
Low Lvl SIM PNA	Spike	18 (D##4411)	1.5/7.5 ng/mL	2Φ µL	11/11/16	TA	YC
	Spike	( )		µL			
	~~MRL Spike~~	( )		µL			
Extraction Time: 16:50		Liq/Liq Start:	Liq/Liq Stop:		Balance ID:		

SPECIAL INSTRUCTIONS: (2x) 1:1 Low Lvl DCM/Pentane
KD: LLDCM @ 80°C (Hex x 2 x 20mL 100°C) → Hex to T. Tube
EPH AROMATIC = LL DCM
Vial @ 0.5mL in LL DCM (Dioxin vial at 0.1mL in ISO-OCTANE)

3057F

Revision 07
06/23/15

AQJ9 : 00047

Organic Extractions
Reagent and Solutions Identification

Analysis: SIM PNA Low Level
Method: Sonication (3550C)

ARI Job No(s) AQJ9

Soil/Sediment/Solid/Tissue/Other:	Analyst/Date
Sonication/~~Microwave~~/Tissuemize Station:	Sonication/~~Microwave~~/~~Tissuemize~~
Neutral Sodium Sulfate: ( )	
~~Pre-deactivated Sodium Sulfate:~~ ( )	
~~Neutral Glasswool:~~ ( )	
~~Pre-deactivated Glasswool:~~ ( )	TH 11/18/15
~~1:1 Hexane/Acetone:~~ ( )	
~~80:20 Hexane/Acetone:~~ ( )	
~~1:1 DCM/Acetone:~~ ( )	
~~80:20 DCM/Acetone:~~ ( )	
~~Hexane:~~ ( )	
~~DCM:~~ ( )	
Other: 1:1 Low Lvl DCM/Pentane (DDD4539)	
Other: Low Lvl DCM (DDD2862)	
Pre-GPC KD Station:	Pre-GPC KD
Hexane: ( )	RH
DCM: ( )	11/23/15
Neutral Sodium Sulfate: ( )	
Pre-deactivated Sodium Sulfate: ( )	
Neutral Glasswool: ( )	
Pre-deactivated Glasswool: ( )	
Other: ( )	
Other: ( )	
GPC Filter Prep:	GPC Filter Prep
DCM: ( )	
Other: ( )	
Other: ( )	
GPC Station:	GPC
~~Acetone:~~ ( )	
~~DCM:~~ ( )	
~~1:1 DCM/Acetone:~~ ( )	
Other: ( )	
Other: ( )	
Post GPC KD Station:	Post GPC KD
DCM: (DDD2862)	RH
Hexane: (DDD4494)	11/23/15
~~Other:~~ ( )	
~~Other:~~ ( )	
Vialing Station:	Vialing SE 11/27/15
Hexane: (DDD4494) LL DCM DDD2862	
~~DCM:~~ ( )	BAS 100µL 12/3/15
~~Concentrated Sulfuric Acid:~~ ( ) Na2SO4 DDD4535	
~~Ethyl Acetate:~~ ( )	
~~Tetrabutylammonium hydrogensulfate (TBAS):~~ ( ) 60/40 Pent/DCM DDD4463	
~~Sodium Sulfite:~~ ( )	
~~Copper:~~ ( ) Glass wool DDD1829	
~~Silica Gel (SPE) Darts:~~ ( )	
0% Silica Gel: ( )	
~~Alumina:~~ ( )	
~~HexMgBr:~~ ( ) ISO-Octane DDD8647	
Other: ( )	
Other: ( )	

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Organic Extractions Laboratory Analyst Notes

ARI Job No.: AQJ9 Client ID: Anchor QEA, LLC

Batch ID:

Parameter: SIM PNA Low Level Client Project: Port Gamble Clean-up

Screens: Soil/Sediment/Solid/Other:	Analyst/Date
☐ No Anomalies (standard soil/wet sediment/sand/gravel)=	
☐ Standing Water Decanted (Not shared)=	
☐ Standing Water Homogenized (Shared samples)=	
☐ Clay/Clumps (Difficult to homogenize)=	
☐ Rocks (%+size)?	
☐ Organics (Leaves/sticks/grass)=	
☐ Oily, obvious fuel/sulfur odors=	
☐ Received in 32oz jar(s)=Homogenized in Pyrex dish=	
☐ Other (Details)=	
Aqueous:	
☐ No Anomalies	
☐ Turbid/Color=	
☐ Particulates(%)=(Note: >5%=Notify Supervisor/Lead)	
☐ Emulsions (%)=	
☐ Oily, obvious fuel/sulfur odors=	
☐ Other (Details)=	
☐ Received in 1.0L Bottle(s)=No Bottle Rinse=	
☒ Other Notes/Comments= (Note problems, concerns, corrective actions).	12/1/15
M- went to 250µl prior to vialing at 500µl.	SC ~~12/1/15~~ SC 12/1/15
Sample C spilled 300µl of 500ml / 200µl taken to .050ml	
50ul BB	12/3/15
☐ Share Samples Y / N	
☐ Multiple Jars Y / N	
☐ Sample Pre-Screens indicate analyte activity=	
☐ Sample weights/volumes reduced based on Pre-Screen=	

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Organic Extractions
Prep Sheet Notes

ARI Job No.: AQJ9 Client ID: Anchor QEA, LLC

Parameter: SIM PNA Low Level Client Project: Port Gamble clean-up

Matrix: Filter bag/tissue/other

USING CLEAN (LLOM RINSED) RAZOR BLADE & FORCEPS & CLEAN GLOVES BETWEEN SAMPLES: PEMO CAGES WERE OPENED & DISASSEMBLED. 20CM WAS CUT FROM THE CENTER OF EACH STRIP. EACH STRIP WAS WIPED OF PARTICULATES USING A KIMWIPE. (3) RANDOM STRIPS WERE WEIGHED ON AN ANALYTICAL BALANCE A= 0.860, I= 0.9240, M= 0.6883 AFTER DISASSEMBLING CAGE & RETRIEVING STRIP: FRESH GLOVES WERE WORN TO CUT THE STRIP TO 20CM & GROSS PARTICULATES REMOVED WITH A KIMWIPE. STRIPS WERE PLACED INTO INDIVIDUAL LABELED BEAKERS FOR SONICATION. SURROGATE & SPIKE WERE ADDED AND 125MLS 1:1 LOW LEVEL DCM/PENTANE. ALL SAMPLES WERE SONICATED 2 X 5MIN EACH

Pre-Dry Prep Time: 5hrs	Analyst/Date: TH 11/8/13	Post-Dry Prep Time:	Analyst/Date:	Balance ID: ANALYTICAL B041108

Special Instructions:

(8270) PNA Filter Bag:
1. Follow prep and extraction instructions on bench sheet.

Small PCB Filter Bag:
1. Weigh wet filter bag and record weight on blue prep sheet. 2. Any solids splits taken at this time. (Record weights on blue prep sheet). 3. Filter bags are dried overnight by attaching them to the drying apparatus (wrapped in aluminum foil in a tube shape). 4. Re-weigh dried samples and record weight on blue prep sheet. 5. Cut off plastic rings and record weights on blue prep sheet. 6. Record sample dry weights without plastic rings on blue prep sheet and bench sheet. 7. Roll up filter bag and place in labeled 32oz jars. 8. Add Hexane until jar is half full. 9. Add 20g sodium sulfate to filter bag in jar. 10. Blanks=Weigh 10g Sodium Sulfate into labeled 32oz jars. Add Hexane until jar is ¼ full. 11. Add surr/spike. 12. Tighten lids and place in large ziplock bags. 13. Tumble for 12 hours (min 6 hours). 14. Record "prep time" on blue prep sheet. 15. KD (normal drying columns) on 100°C water bath. 16. Turbovap to approx. 4mL. 17. Vial with Hexane at 5mL in scintillation vials for required cleanups. (Acid/Sulfur/SPE). 18. Pre-SPE Screen 1mL. (Note: Determination of Required SPE cleanup is based on Pre-SPE Screen. 19. After cleanups: TurboVap and vial 1mL in Hexane.

Large PCB Filter Bag instructions on the back of this prep sheet. (Turn over)

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Organic Extractions Prep Sheet Notes

Avg 0.89

ARI Job No.: PEMD R&D Client ID: ANCHOR

Parameter: LLSIMPNA Client Project:

Matrix: Filter bag/tissue/other

PEMD STRIPS WERE CUT 20CM LONG. USING A pre-cleaned RAZOR BLADE the TUBING WAS SLIT OPEN. (7) STRIPS WERE PLACED IN A 1000ML BEAKER WITH LOW LEVEL DCM AND SONICATED FOR 5min. USING PRE-CLEANED FORCEPTS : 1 STRIP EACH WAS PLACED IN A NEW 40Z JAR. SAMPLES 1-4 100ML DI H2O Rinsed w/LLDCM AND WAS ADDED TO THE JAR, AND 5-7 100ML SEA H2O WAS ADDED TO THE JAR. SURROGATES/SPIKES WERE ADDED APPROPRIATELY TO JARS - 2-7. JAR #1 IS A LAB BLANK (NO SURR/SPK)
ALL JARS WERE CAPPED TIGHTLY AND SHOOK FOR 1min.
ALL (7) JARS WERE PLACED IN REF 05. SHAKE EACH JAR FOR 1 min UNTIL THE EXTRACTION DATE OF OCT. 13 (= 13 DAYS). 9/32/15 T.H.
Prepared Aluminum foil Strips (RINSED 2X LL DCM) FOR ANALYTICAL BALANCE. Rinsed Forcepts between each strip.
#1= 0.904, #2= 0.892 #3= 0.891 #4= 0.938 #5= 0.854 #6= 0.886 #7= 0.886
Rinsed Aluminum foil off & placed each strip into pre-rinsed 400ML Beaker w/ 100ML 1:1 LLDCM/PEM
SONICATED 2X FOR 5min EACH. AFTER SONICATION:
(Placed EA. STRIP IN LABELED 40Z JAR W/ 75mL LLDCM. FOR ARCHIVE)
#3B, 4B, 6B, 7B = DI H2O/SEA H2O (THAT THE STRIPS SAT IN FOR 13 days) WERE EXTRACTED 3X W/LL DCM
ALL EXTRACTS WERE KD'd @ 80°C W/ 2X 20mL Hexane Exchanged. 10/14/15 TH
ALL EXTRACTS WERE FRACTIONATED FOR EPH AROMATIC BY MANUEL COLUMN. 10/15/16 WW
ALL EXTRACTS WERE VIALED AT ~ 0.5ML IN DCM AND FURTHER CONCENTRATED & Exchanged TO ISO-OCTANE IN DIOXIN LAB BY RB 10/16/15
10/16/15 TH

Pre-Dry Prep Time:	Analyst/Date:	Post-Dry Prep Time:	Analyst/Date:	Balance ID:

Special Instructions:

(8270) PNA Filter Bag:
1. Follow prep and extraction instructions on bench sheet.

Small PCB Filter Bag:
1. Weigh wet filter bag and record weight on blue prep sheet. 2. Any solids splits taken at this time. (Record weights on blue prep sheet). 3. Filter bags are dried overnight by attaching them to the drying apparatus (wrapped in aluminum foil in a tube shape). 4. Re-weigh dried samples and record weight on blue prep sheet. 5. Cut off plastic rings and record weights on blue prep sheet. 6. Record sample dry weights without plastic rings on blue prep sheet and bench sheet. 7. Roll up filter bag and place in labeled 32oz jars. 8. Add Hexane until jar is half full. 9. Add 20g sodium sulfate to filter bag in jar. 10. Blanks=Weigh 10g Sodium Sulfate into labeled 32oz jars. Add Hexane until jar is ¼ full. 11. Add surr/spike. 12. Tighten lids and place in large ziplock bags. 13. Tumble for 12 hours (min 6 hours). 14. Record "prep time" on blue prep sheet. 15. KD (normal drying columns) on 100°C water bath. 16. Turbovap to approx. 4mL. 17. Vial with Hexane at 5mL in scintillation vials for required cleanups. (Acid/Sulfur/SPE). 18. Pre-SPE Screen 1mL. (Note: Determination of Required SPE cleanup is based on Pre-SPE Screen. 19. After cleanups: TurboVap and vial 1mL in Hexane.

Large PCB Filter Bag instructions on the back of this prep sheet. (Turn over)

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Extract Dilution Bench Sheet

ARI Job#: AQJ9 Client ID: _____
Analyst: EJ Date: 12/4/15

ARI Sample ID	Primary Dilution				Secondary Dilution			
	Extract Volume (uL)	Diluent/Diluent ID	Diluent Volume (uL)	Dilution Factor	Primary Dilution (uL)	Diluent/Diluent ID	Diluent Volume (uL)	Final Dilution Factor
AQJ9I	30	DCM/Dec4059	270	10x				
K	"	"	"	"				
L								
M								
O								

AQJ9:00052

SIM PAH Raw Data
Initial Calibration

ARI Job ID: AQJ9

Analysis	Matrix	Method
8270D-SIM PAH (0.5 ug/kg)	Solid	EPA 8270D-SIM

Checklist: Initial Calibration Checklist-SVOA

#	Checklist Item	Response	Analyst Initials	Date
1	Element Calibration Code	YES	JLW	12/05/2015
	Comments: *YL00008*			
2	DFTPP Tune met criteria	YES	JLW	12/05/2015
3	DDT breakdown <20%	YES	JLW	12/05/2015
4	Peak Tailing factor <= 2%	NO	JLW	12/05/2015
	Comments: *Benzidine TD @ 2.11*			
5	ICal meets 20% RSD, LR COD, and QR COD limits	YES	JLW	12/05/2015
6	NO ICAL Q Flag applied	YES	JLW	12/05/2015
7	Manual integrations include before/after pictures	NA	JLW	12/05/2015
8	Spectral Library matches updated	YES	JLW	12/05/2015
9	Internal Standard areas within 50-200% from reference	YES	JLW	12/05/2015
10	Minimum response factors met			12/30/1899
11	All SCV within +/- 20% (DOD)	YES	JLW	12/05/2015
12	All SCV within +/- 30%	YES	JLW	12/05/2015
13	NO Linear or Quadratic fits used	YES	JLW	12/05/2015
14	NO Calibration points dropped	YES	JLW	12/05/2015
15	Additional notes	NA	JLW	12/05/2015
16	Reviewer approval (Reviewer)	YES	BB	12/07/2015

* = Indicates Automated Response from Element DataSyst

ARI Labs, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-DEC-2015 09:03
End Cal Date : 04-DEC-2015 11:33
Quant Method : ISTD
Origin : Disabled
Target Version : 4.14
Integrator : HP RTE
Method file : \\target\share\chem3\nt11.i\20151204.b\lowsim.m
Last Edit : 05-Dec-2015 09:24 jonathonw
Curve Type : Average

Calibration File Names:
Level 1: \\target\share\chem3\nt11.i\20151204.b\15120404.D
Level 2: \\target\share\chem3\nt11.i\20151204.b\15120405.D
Level 3: \\target\share\chem3\nt11.i\20151204.b\15120403.D
Level 4: \\target\share\chem3\nt11.i\20151204.b\15120402.D
Level 5: \\target\share\chem3\nt11.i\20151204.b\15120406.D
Level 6: \\target\share\chem3\nt11.i\20151204.b\15120407.D

	Compound	10.000 Level 1	50.000 Level 2	100.000 Level 3	250.000 Level 4	500.000 Level 5	1000.000 Level 6	RRF	% RSD
	5 Naphthalene	1.19875	1.25660	1.20859	1.13779	1.09546	1.03421	1.15523	7.090
	7 2-Methylnaphthalene	0.75696	0.82162	0.81758	0.82518	0.78721	0.75401	0.79376	4.105
	8 1-Methylnaphthalene	0.67221	0.74285	0.74457	0.74059	0.71073	0.68104	0.71533	4.554
	10 Acenaphthylene	1.58688	1.68774	1.64577	1.62759	1.60202	1.53483	1.61414	3.252
	12 Acenaphthene	1.08363	1.13588	1.09716	1.06578	1.04086	1.00481	1.07135	4.251
	14 Dibenzofuran	1.63702	1.74172	1.68518	1.62325	1.55902	1.43742	1.61394	6.569
	15 Fluorene	1.15912	1.25912	1.24842	1.23125	1.20885	1.15567	1.21040	3.673
	17 Pentachlorophenol	+++++	+++++	+++++	+++++	+++++	+++++	+++++	+++++
	19 Phenanthrene	1.20070	1.33868	1.26117	1.22278	1.14299	1.06348	1.20497	7.894
	20 Anthracene	1.01417	1.08937	1.08864	1.11858	1.12165	1.03900	1.07857	4.018
	22 Carbazole	+++++	+++++	+++++	+++++	+++++	+++++	+++++	+++++
	24 Fluoranthene	1.09490	1.29137	1.25014	1.26562	1.22706	1.12956	1.20977	6.544
	25 Pyrene	1.56990	1.71816	1.63928	1.57402	1.55717	1.44465	1.58387	5.751
	28 Benzo(a)anthracene	1.26389	1.42412	1.34869	1.34036	1.33833	1.28529	1.33345	4.200
	30 Chrysene	1.46075	1.64931	1.51090	1.43415	1.41191	1.31399	1.46350	7.649
	44 Benzo(b)fluoranthene	1.23590	1.44922	1.33506	1.30908	1.42782	1.37318	1.35504	5.830
	45 Benzo(k)fluoranthene	1.40405	1.66492	1.57480	1.60115	1.63773	1.59156	1.57904	5.812
	46 Benzo(j)fluoranthene	1.32355	1.58148	1.42960	1.41908	1.47673	1.39992	1.43839	5.986
	34 Benzo(a)pyrene	1.12243	1.39016	1.28482	1.30477	1.39200	1.35226	1.30774	7.704
	37 Indeno(1,2,3-cd)pyrene	1.07019	1.39573	1.34204	1.37226	1.52877	1.52953	1.37309	12.270
	38 Dibenzo(a,h)anthracene	0.79381	1.05747	1.07068	1.11092	1.23311	1.24877	1.08579	15.143
	39 Benzo(g,h,i)perylene	1.03016	1.23486	1.17375	1.17405	1.27154	1.26755	1.19199	7.571
	47 Perylene	1.25753	1.47517	1.35486	1.30583	1.39016	1.35136	1.35582	5.480
	48 Benzo(e)pyrene	1.29965	1.48474	1.37096	1.32360	1.39138	1.34634	1.36945	4.764
$	6 2-Methylnaphthalene-d10	0.70562	0.76809	0.76144	0.76607	0.73856	0.71434	0.74235	3.683
$	16 2,4,6-Tribromophenol	+++++	+++++	+++++	+++++	+++++	+++++	+++++	+++++
$	23 Fluoranthene-d10	1.01495	1.15239	1.11432	1.13346	1.12157	1.06256	1.09988	4.666

ARI Labs, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-DEC-2015 09:03
End Cal Date : 04-DEC-2015 11:33
Quant Method : ISTD
Origin : Disabled
Target Version : 4.14
Integrator : HP RTE
Method file : \\target\share\chem3\nt11.i\20151204.b\lowsim.m
Last Edit : 05-Dec-2015 09:24 jonathonw
Curve Type : Average

Compound	10.000 Level 1	50.000 Level 2	100.000 Level 3	250.000 Level 4	500.000 Level 5	1000.000 Level 6	___ RRF	% RSD
$ 36 Dibenzo(a,h)anthracene-d14	0.59288	0.78076	0.79874	0.81630	0.91118	0.94354	0.80723	15.292

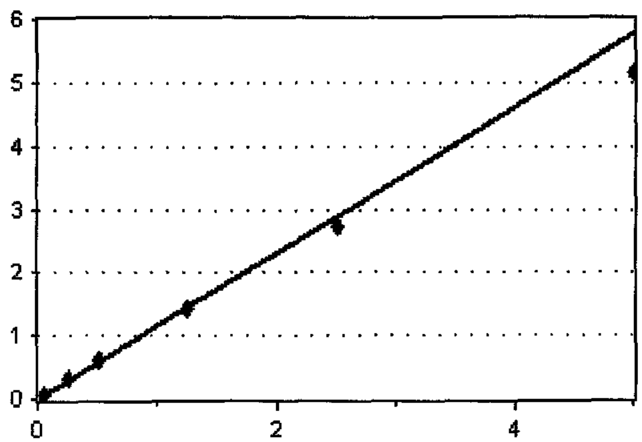
Analytical Resources, Incorporated
Analytical Chemists and Consultants

Calibration Report

Instrument:	**NT11**	**Calibration Date:**	**04-Dec-2015 08:45 By JLW**
Calibration ID:	**YL00008**	**Last Edit Date:**	**05-Dec-2015 10:30 By JLW**

8270D-SIM PAH (0.5 ug/k

Naphthalene

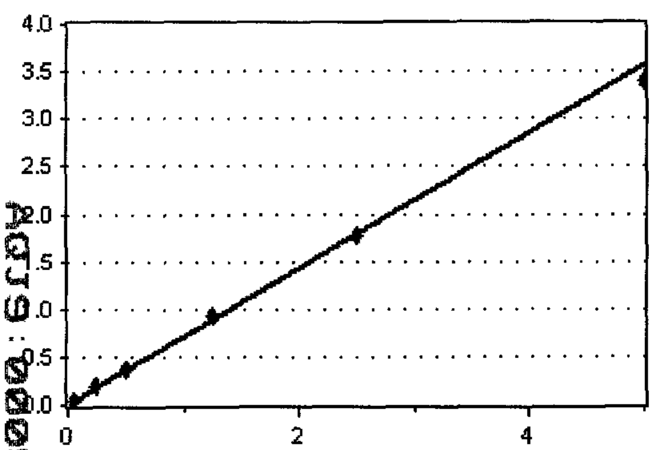


Average RF

RF RSD: 7.089665

[Conc] = 1.155235 * [Response]

1-Methylnaphthalene



Average RF

RF RSD: 4.554497

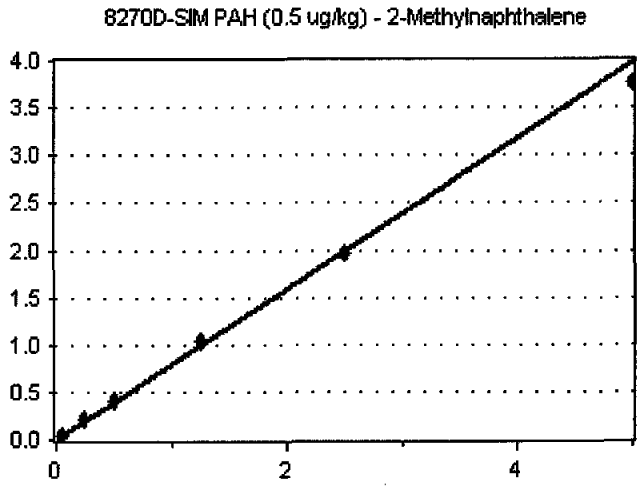
[Conc] = 0.7153312 * [Response]

Calibration Report

Instrument: NT11
Calibration ID: YL00008
Calibration Date: 04-Dec-2015 08:45 By JLW
Last Edit Date: 05-Dec-2015 10:30 By JLW

8270D-SIM PAH (0.5 ug/k

2-Methylnaphthalene

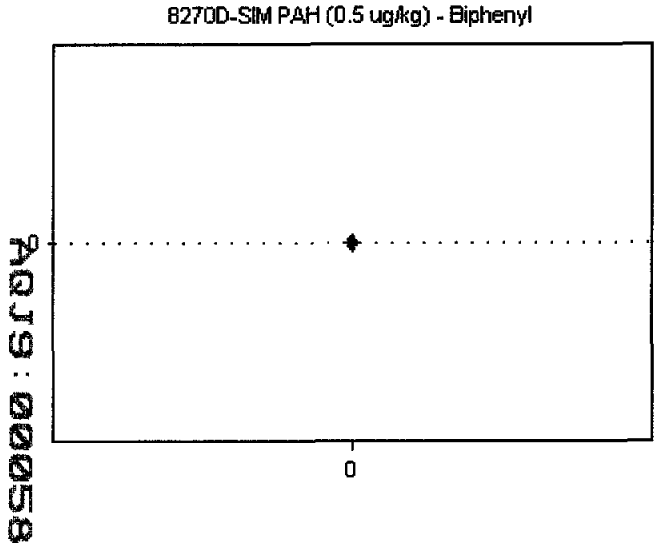


Average RF

RF RSD: 4.104786

[Conc] = 0.7937607 * [Response]

Biphenyl



Average RF

RF RSD:

[Conc] = * [Response]

AQJS:00058

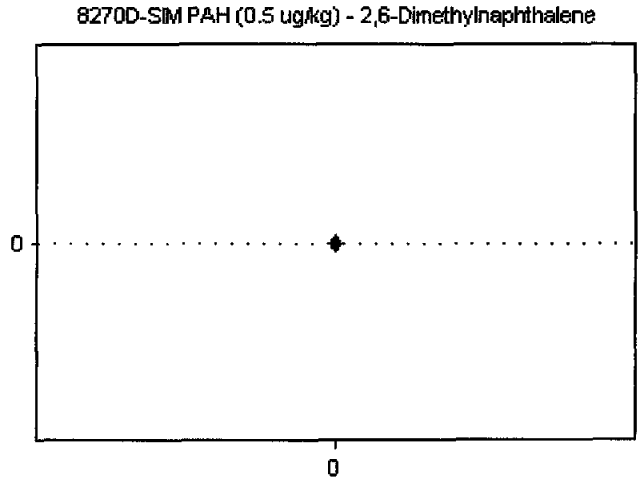
Analytical Resources, Incorporated
Analytical Chemists and Consultants

Calibration Report

Instrument:	**NT11**	**Calibration Date:**	**04-Dec-2015 08:45 By JLW**
Calibration ID:	**YL00008**	**Last Edit Date:**	**05-Dec-2015 10:30 By JLW**

8270D-SIM PAH (0.5 ug/k

2,6-Dimethylnaphthalene

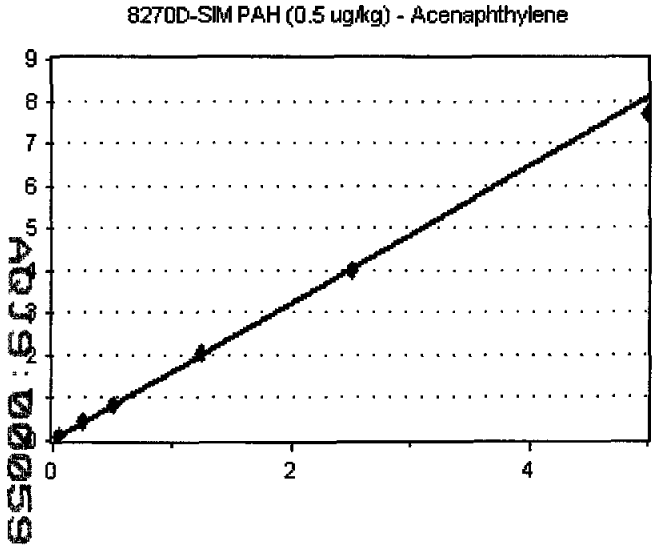


Average RF

RF RSD:

[Conc] = * [Response]

Acenaphthylene



Average RF

RF RSD: 3.252344

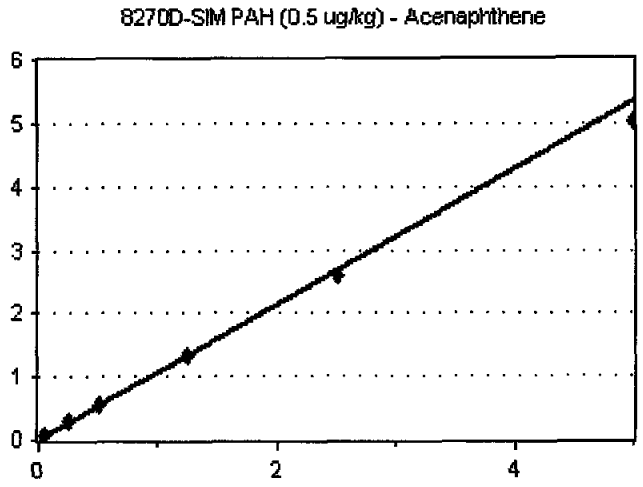
[Conc] = 1.614139 * [Response]

Calibration Report

Instrument: NT11
Calibration ID: YL00008
Calibration Date: 04-Dec-2015 08:45 By JLW
Last Edit Date: 05-Dec-2015 10:30 By JLW

8270D-SIM PAH (0.5 ug/k

Acenaphthene

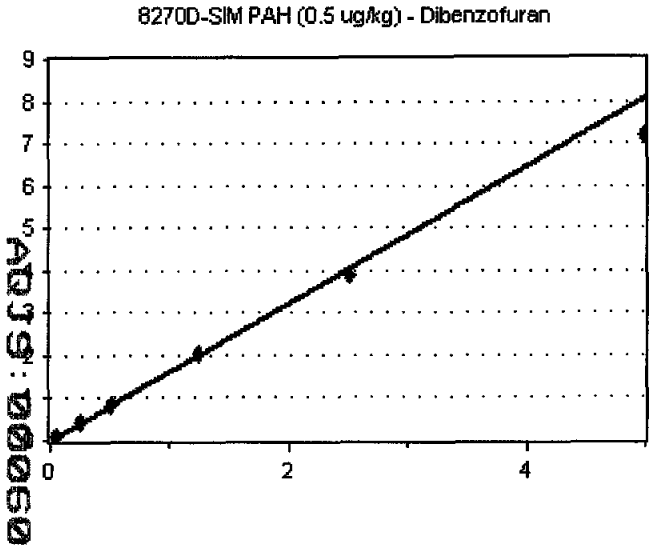


Average RF

RF RSD: 4.250741

[Conc] = 1.071353 * [Response]

Dibenzofuran



Average RF

RF RSD: 6.568803

[Conc] = 1.613935 * [Response]

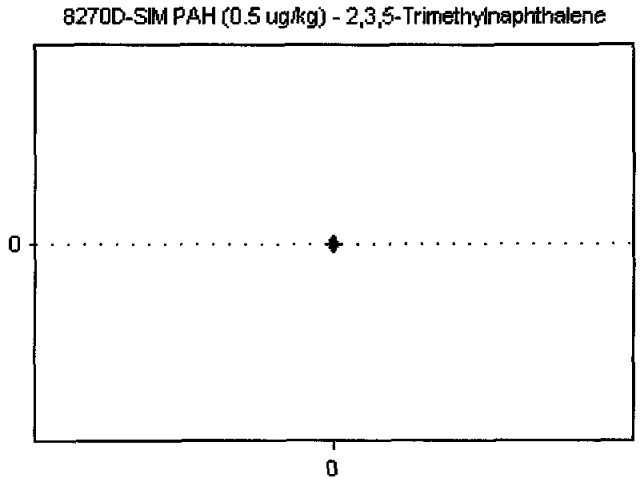
Analytical Resources, Incorporated
Analytical Chemists and Consultants

Calibration Report

Instrument:	**NT11**	**Calibration Date:**	**04-Dec-2015 08:45 By JLW**
Calibration ID:	**YL00008**	**Last Edit Date:**	**05-Dec-2015 10:30 By JLW**

8270D-SIM PAH (0.5 ug/k

2,3,5-Trimethylnaphthalene

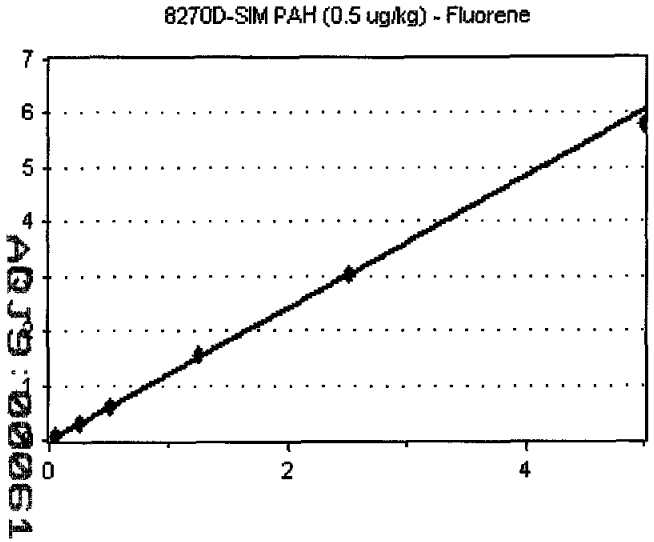


Average RF

RF RSD:

[Conc] = * [Response]

Fluorene



Average RF

RF RSD: 3.672642

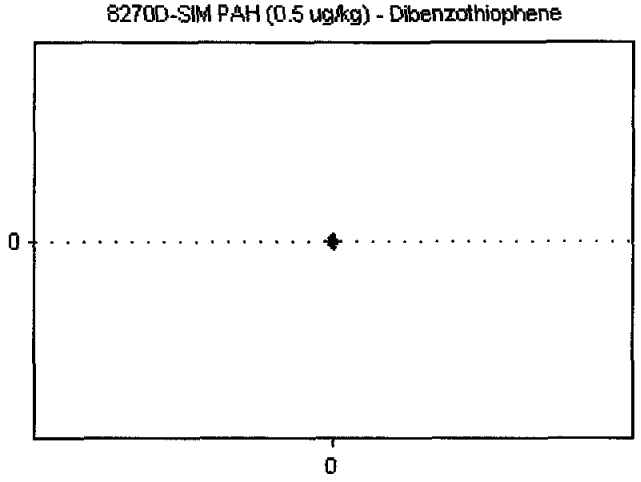
[Conc] = 1.210404 * [Response]

Calibration Report

Instrument:	**NT11**	**Calibration Date:**	**04-Dec-2015 08:45 By JLW**
Calibration ID:	**YL00008**	**Last Edit Date:**	**05-Dec-2015 10:30 By JLW**

8270D-SIM PAH (0.5 ug/k

Dibenzothiophene

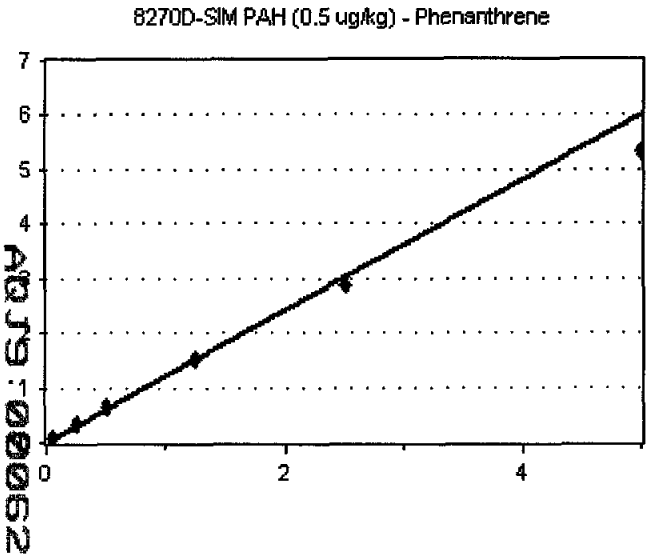


Average RF

RF RSD:

[Conc] = * [Response]

Phenanthrene



Average RF

RF RSD: 7.893657

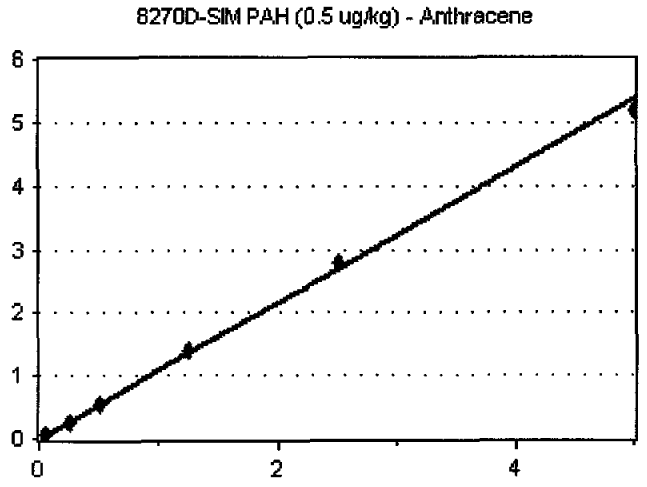
[Conc] = 1.204967 * [Response]

Calibration Report

Instrument:	**NT11**	**Calibration Date:**	**04-Dec-2015 08:45 By JLW**
Calibration ID:	**YL00008**	**Last Edit Date:**	**05-Dec-2015 10:30 By JLW**

8270D-SIM PAH (0.5 ug/k

Anthracene

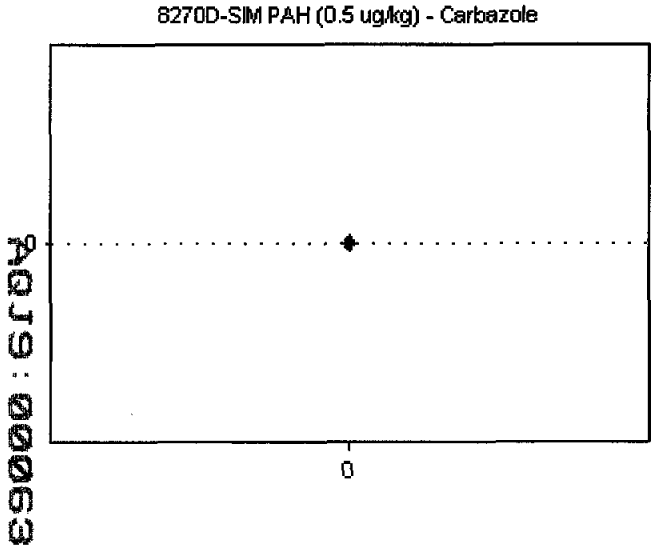


Average RF

RF RSD: 4.017562

[Conc] = 1.078569 * [Response]

Carbazole



Average RF

RF RSD:

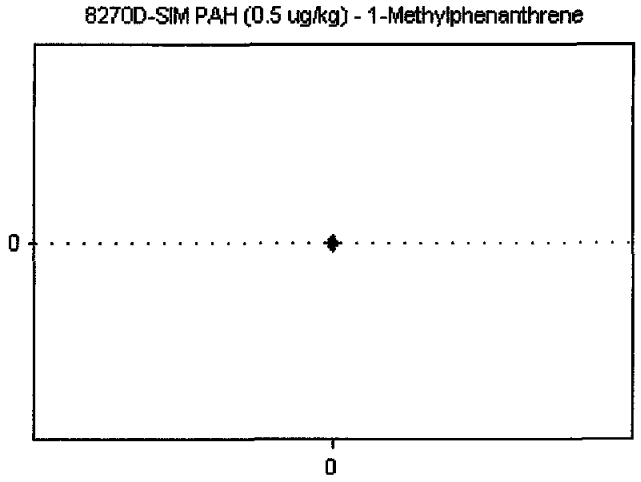
[Conc] = * [Response]

Calibration Report

Instrument:	**NT11**	**Calibration Date:**	**04-Dec-2015 08:45 By JLW**
Calibration ID:	**YL00008**	**Last Edit Date:**	**05-Dec-2015 10:30 By JLW**

8270D-SIM PAH (0.5 ug/k;

1-Methylphenanthrene

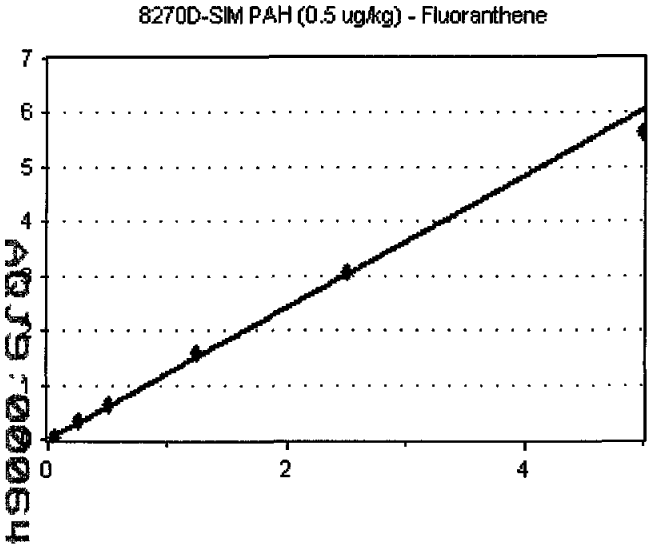


Average RF

RF RSD:

[Conc] = * [Response]

Fluoranthene



Average RF

RF RSD: 6.543763

[Conc] = 1.209772 * [Response]

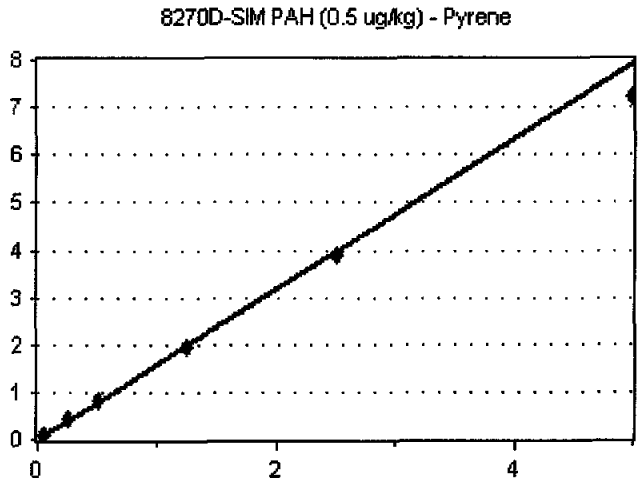
Analytical Resources, Incorporated
Analytical Chemists and Consultants

Calibration Report

Instrument:	**NT11**	**Calibration Date:**	**04-Dec-2015 08:45 By JLW**
Calibration ID:	**YL00008**	**Last Edit Date:**	**05-Dec-2015 10:30 By JLW**

8270D-SIM PAH (0.5 ug/k

Pyrene

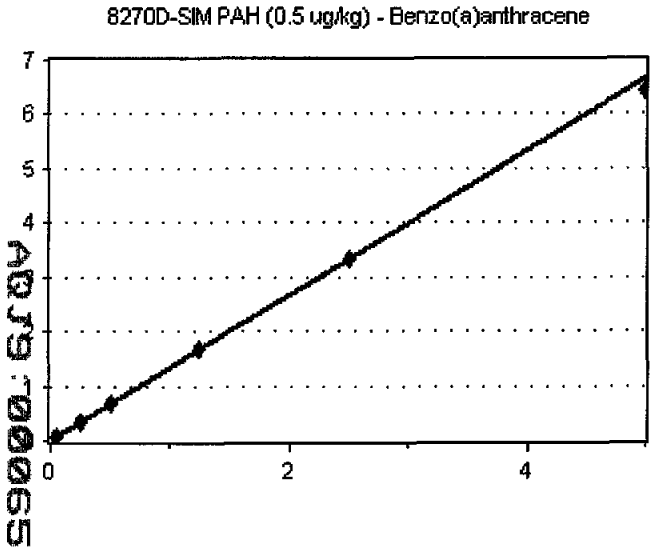


Average RF

RF RSD: 5.75149

[Conc] = 1.583866 * [Response]

Benzo(a)anthracene



Average RF

RF RSD: 4.200089

[Conc] = 1.333447 * [Response]

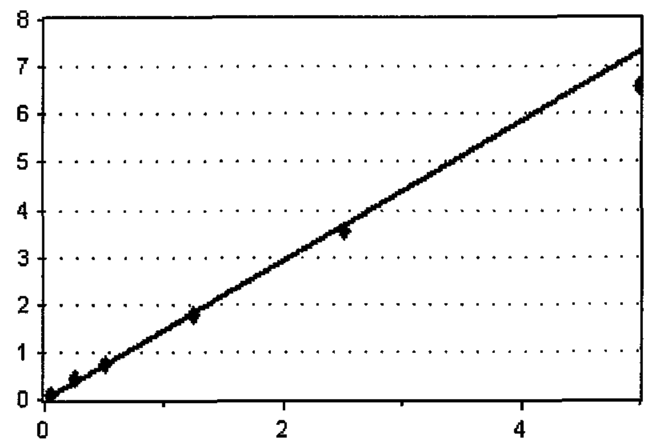
Analytical Resources, Incorporated
Analytical Chemists and Consultants

Calibration Report

Instrument: **NT11**
Calibration ID: **YL00008**
Calibration Date: **04-Dec-2015 08:45 By JLW**
Last Edit Date: **05-Dec-2015 10:30 By JLW**

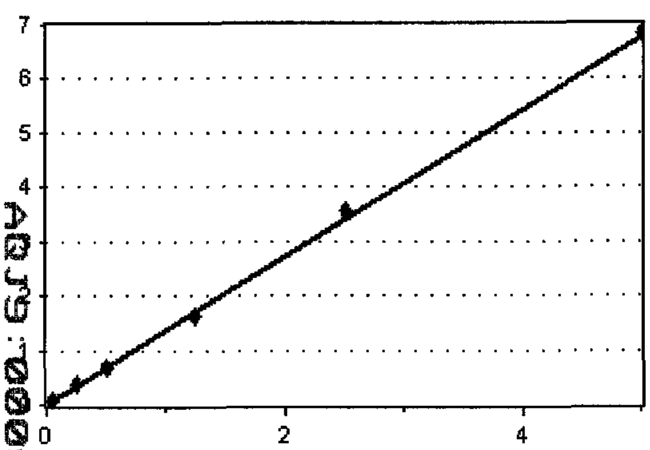
8270D-SIM PAH (0.5 ug/k

Chrysene



Average RF
RF RSD: 7.648974
[Conc] = 1.463504 * [Response]

Benzo(b)fluoranthene



Average RF
RF RSD: 5.829888
[Conc] = 1.355043 * [Response]

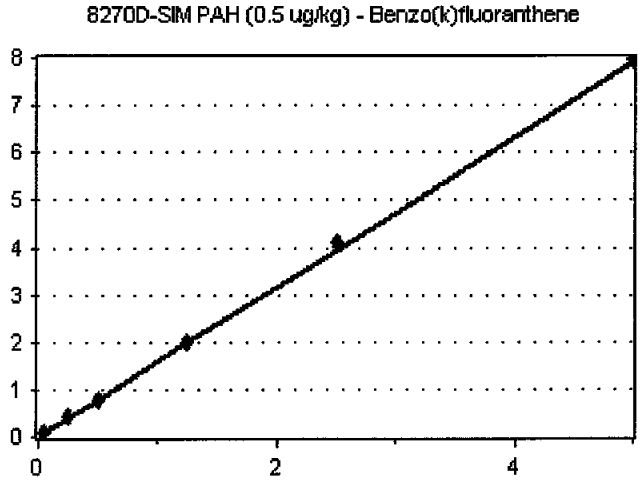
AQJ9:00066

Calibration Report

Instrument:	**NT11**	**Calibration Date:**	**04-Dec-2015 08:45 By JLW**
Calibration ID:	**YL00008**	**Last Edit Date:**	**05-Dec-2015 10:30 By JLW**

8270D-SIM PAH (0.5 ug/k

Benzo(k)fluoranthene

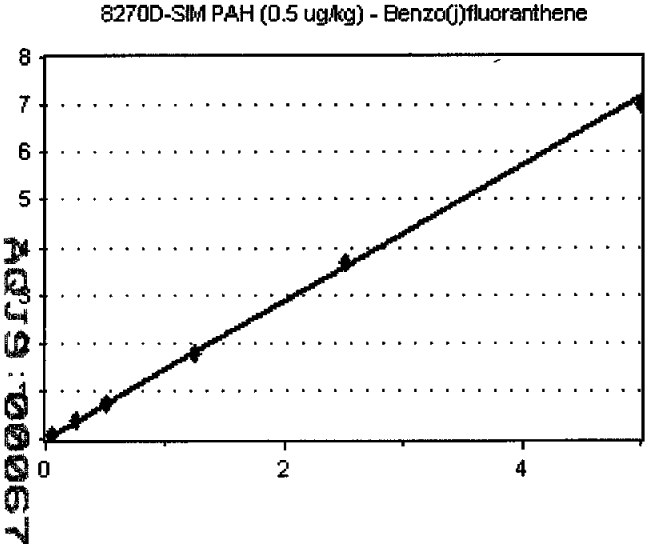


Average RF

RF RSD: 5.811618

[Conc] = 1.579036 * [Response]

Benzo(j)fluoranthene



Average RF

RF RSD: 5.985693

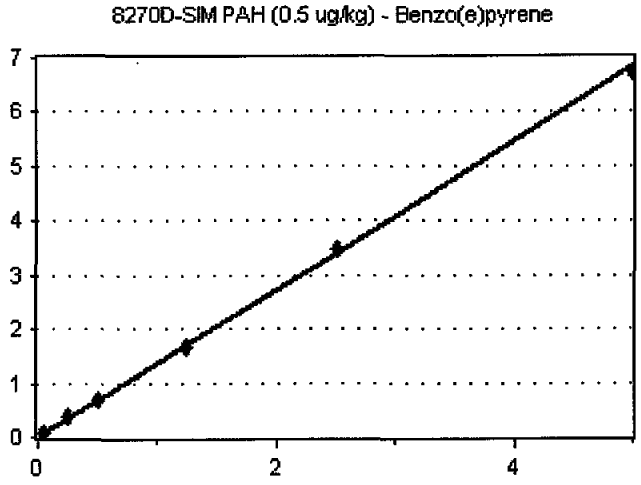
[Conc] = 1.438395 * [Response]

Calibration Report

Instrument:	**NT11**	**Calibration Date:**	**04-Dec-2015 08:45 By JLW**
Calibration ID:	**YL00008**	**Last Edit Date:**	**05-Dec-2015 10:30 By JLW**

8270D-SIM PAH (0.5 ug/k

Benzo(e)pyrene

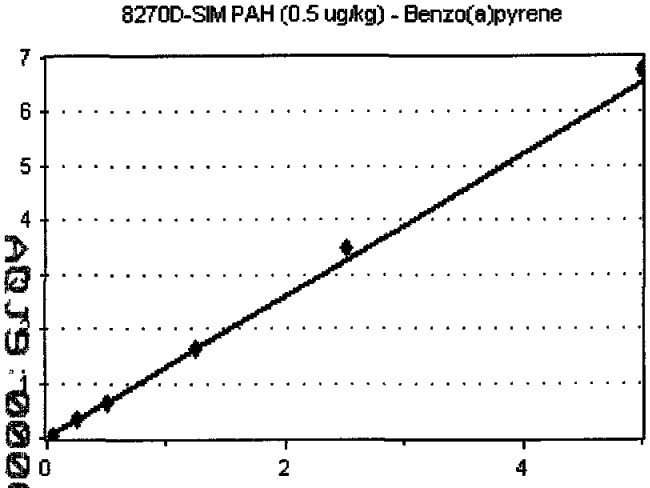


Average RF

RF RSD: 4.764213

[Conc] = 1.369446 * [Response]

Benzo(a)pyrene



Average RF

RF RSD: 7.703707

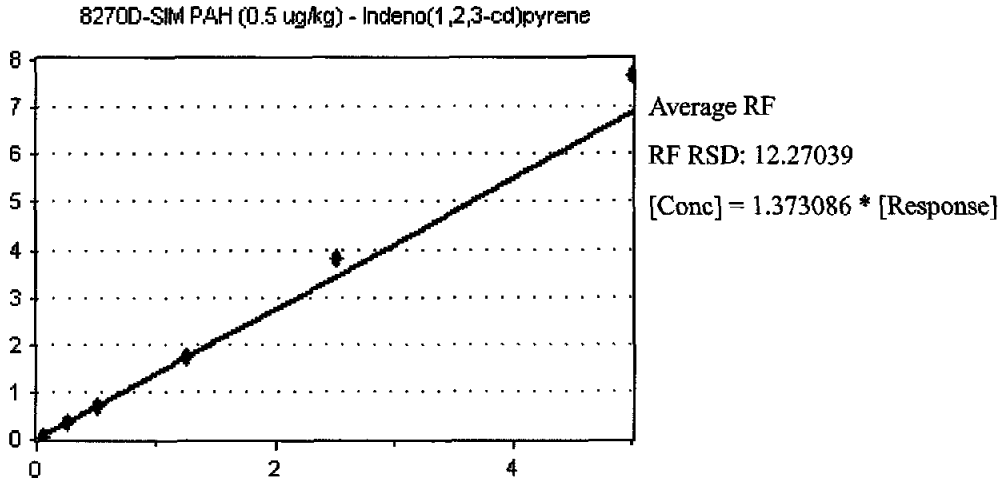
[Conc] = 1.307741 * [Response]

Calibration Report

Instrument:	**NT11**	**Calibration Date:**	**04-Dec-2015 08:45 By JLW**
Calibration ID:	**YL00008**	**Last Edit Date:**	**05-Dec-2015 10:30 By JLW**

8270D-SIM PAH (0.5 ug/k

Indeno(1,2,3-cd)pyrene

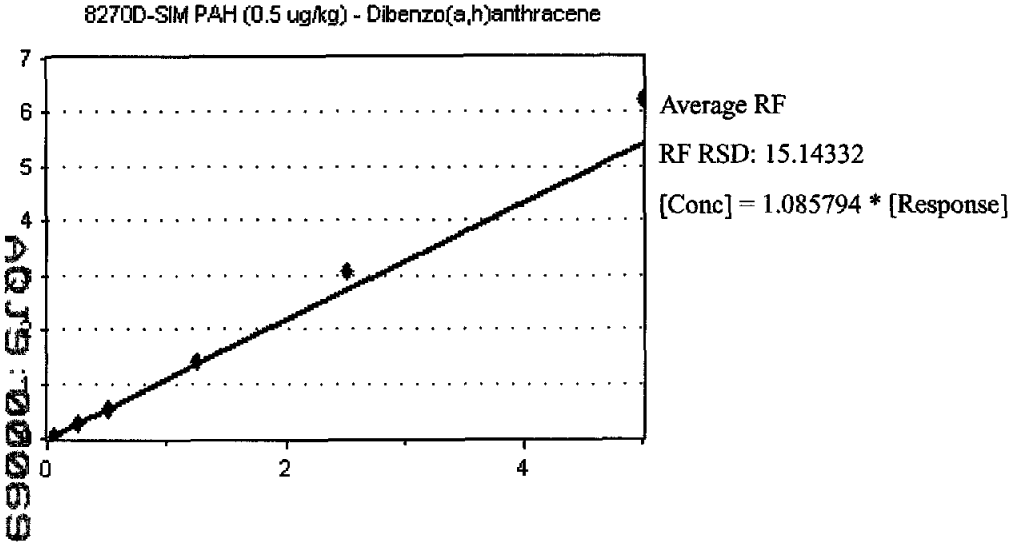


Average RF

RF RSD: 12.27039

[Conc] = 1.373086 * [Response]

Dibenzo(a,h)anthracene



Average RF

RF RSD: 15.14332

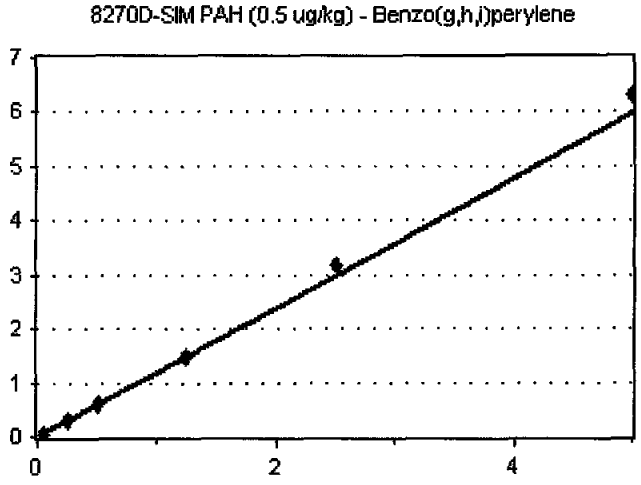
[Conc] = 1.085794 * [Response]

Calibration Report

Instrument:	**NT11**	**Calibration Date:**	**04-Dec-2015 08:45 By JLW**
Calibration ID:	**YL00008**	**Last Edit Date:**	**05-Dec-2015 10:30 By JLW**

8270D-SIM PAH (0.5 ug/k

Benzo(g,h,i)perylene

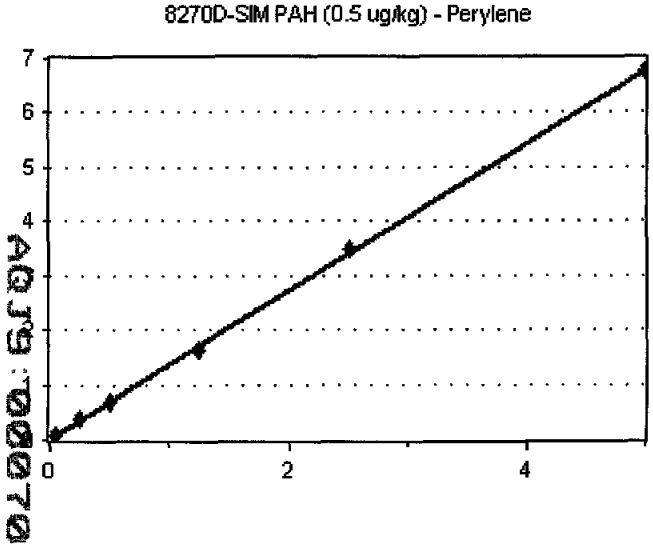


Average RF

RF RSD: 7.570849

[Conc] = 1.191986 * [Response]

Perylene



Average RF

RF RSD: 5.480223

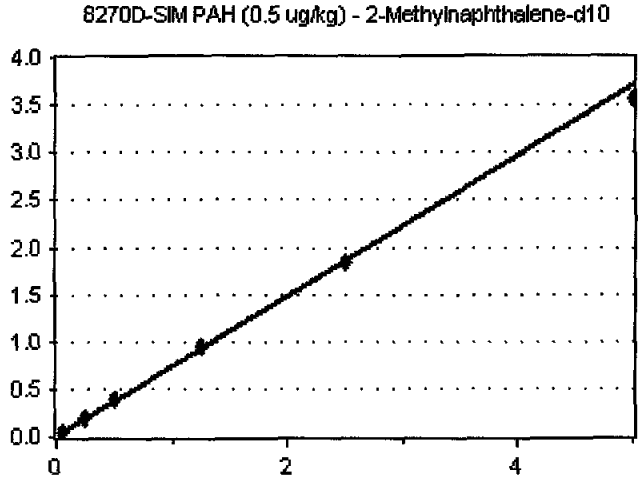
[Conc] = 1.355818 * [Response]

Calibration Report

Instrument:	**NT11**	**Calibration Date:**	**04-Dec-2015 08:45 By JLW**
Calibration ID:	**YL00008**	**Last Edit Date:**	**05-Dec-2015 10:30 By JLW**

8270D-SIM PAH (0.5 ug/k

2-Methylnaphthalene-d10

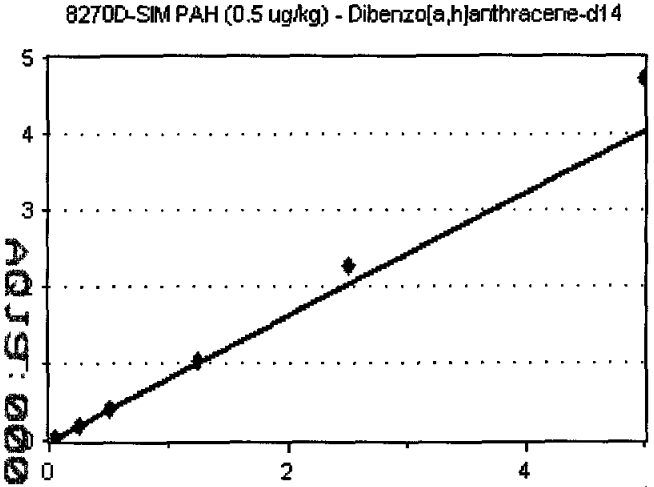


Average RF

RF RSD: 3.68313

[Conc] = 0.7423531 * [Response]

Dibenzo[a,h]anthracene-d14



Average RF

RF RSD: 15.29202

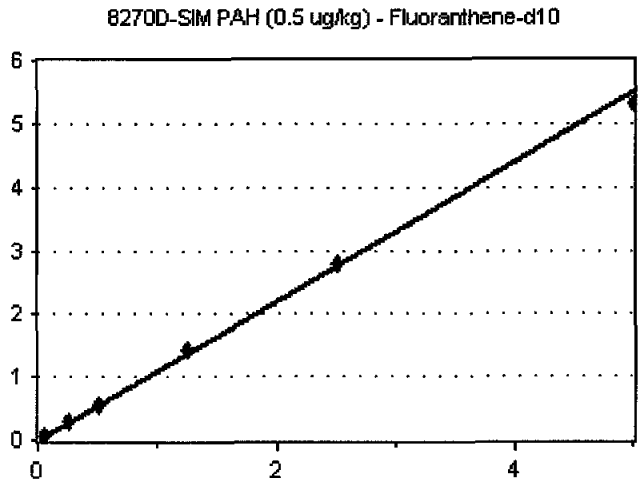
[Conc] = 0.8072325 * [Response]

Calibration Report

Instrument:	**NT11**	**Calibration Date:**	**04-Dec-2015 08:45 By JLW**
Calibration ID:	**YL00008**	**Last Edit Date:**	**05-Dec-2015 10:30 By JLW**

8270D-SIM PAH (0.5 ug/k

Fluoranthene-d10



Average RF

RF RSD: 4.666284

[Conc] = 1.099877 * [Response]

Naphthalene-d8

Average RF

RF RSD:

[Conc] = * [Response]

MANUAL INTEGRATION SUMMARY FOR DATABATCH - \\target\share\chem3\nt11.i\20151204.b

ARI Job No.: TUNE Method: DFTPP.m Instrument: nt11.i Date: 04-DEC-2015

Time	Filename	LabID	ClientId	DF	Manually Integrated Compounds
0845	15120401.D	TUNE	10	1	NO MANUAL INTEGRATION
0903	15120402.D	LLSIM	250	1	NO MANUAL INTEGRATION
0933	15120403.D	LLSIM	100	1	NO MANUAL INTEGRATION
1003	15120404.D	LLSIM	10	1	NO MANUAL INTEGRATION
1033	15120405.D	LLSIM	50	1	NO MANUAL INTEGRATION
1103	15120406.D	LLSIM	500	1	NO MANUAL INTEGRATION
1133	15120407.D	LLSIM	1000	1	NO MANUAL INTEGRATION
1204	15120408.D	LLSIM	SCV 250	1	NO MANUAL INTEGRATION

INTERNAL STANDARD SUMMARY FOR DATABATCH - \\target\share\chem3\nt11.i\20151204.b

	Time	Filename	LabID	ClientId	DF									
1	0845	15120401.D	TUNE 10		1	NO ISTDS FOUND								
2	0903	15120402.D	LLSIM 250		1	6.60	327896	9.60	239179	12.27	372253	17.02	294711	19.84	260595
3	0933	15120403.D	LLSIM 100		1	6.60	322094	9.60	228988	12.27	364343	17.02	276576	19.84	245162
4	1003	15120404.D	LLSIM 10		1	6.60	325673	9.60	218580	12.27	358974	17.01	262207	19.84	229323
5	1033	15120405.D	LLSIM 50		1	6.60	322810	9.60	219192	12.27	354307	17.01	262604	19.84	229726
6	1103	15120406.D	LLSIM 500		1	6.60	340768	9.60	241553	12.27	382017	17.01	296788	19.84	253397
7	1133	15120407.D	LLSIM 1000		1	6.60	337457	9.60	238950	12.27	380348	17.01	298514	19.84	256244
8	1204	15120408.D	LLSIM SCV 250		1	6.60	330144	9.60	236381	12.27	360337	17.01	291007	19.83	242244

ARI Labs, Inc.
RETENTION TIME SUMMARY REPORT

Method File: \\target\share\chem3\nt11.i\20151204.b\lowsim.m
Batch File: \\target\share\chem3\nt11.i\20151204.b
Inst ID: nt11.i

ID:	RT01	RT02	RT03	RT04	RT05	RT06
FILENAME:	15120402	15120403	15120404	15120405	15120406	15120407
INJ.DATE:	04-DEC-2015	04-DEC-2015	04-DEC-2015	04-DEC-2015	04-DEC-2015	04-DEC-2015
INJ.TIME:	09:03	09:33	10:03	10:33	11:03	11:33

	Compound	RT01	RT02	RT03	RT04	RT05	RT06	EXPEC RT	RT WINDOW	AVG RT	STD DEV
*	4 Naphthalene-d8	6.598	6.597	6.598	6.598	6.598	6.598	6.598	6.348-6.848	6.598	0.000
	5 Naphthalene	6.640	6.629	6.629	6.629	6.629	6.629	6.629	6.379-6.879	6.631	0.004
$	6 2-Methylnaphthalene-d1	7.575	7.575	7.575	7.575	7.575	7.575	7.575	7.325-7.825	7.575	0.000
	7 2-Methylnaphthalene	7.638	7.638	7.638	7.627	7.627	7.627	7.627	7.377-7.877	7.632	0.006
	8 1-Methylnaphthalene	7.890	7.890	7.890	7.890	7.890	7.890	7.890	7.640-8.140	7.890	0.000
	10 Acenaphthylene	9.446	9.446	9.446	9.446	9.446	9.446	9.446	9.196-9.696	9.446	0.000
*	11 Acenaphthene-d10	9.601	9.601	9.601	9.601	9.601	9.601	9.601	9.351-9.851	9.601	0.000
	12 Acenaphthene	9.656	9.656	9.656	9.656	9.656	9.656	9.656	9.406-9.906	9.656	0.000
	14 Dibenzofuran	9.867	9.867	9.867	9.867	9.867	9.867	9.867	9.617-10.117	9.867	0.000
	15 Fluorene	10.487	10.487	10.487	10.487	10.487	10.487	10.487	10.237-10.737	10.487	0.000
$	16 2,4,6-Tribromophenol	+++++	+++++	+++++	+++++	+++++	+++++	12.499	12.249-12.749	+++++	+++++
	17 Pentachlorophenol	+++++	+++++	+++++	+++++	+++++	+++++	4.785	4.535-5.035	+++++	+++++
*	18 Phenanthrene-d10	12.269	12.269	12.269	12.269	12.269	12.269	12.269	12.019-12.519	12.269	0.000
	19 Phenanthrene	12.314	12.313	12.314	12.314	12.313	12.313	12.313	12.063-12.563	12.313	0.000
	20 Anthracene	12.369	12.369	12.369	12.369	12.369	12.369	12.369	12.119-12.619	12.369	0.000
	22 Carbazole	+++++	+++++	+++++	+++++	+++++	+++++	14.533	14.283-14.783	+++++	+++++
$	23 Fluoranthene-d10	14.375	14.375	14.375	14.365	14.375	14.375	14.375	14.125-14.625	14.373	0.004

Reviewer 1 ______ Date: 12/5/15
Reviewer 2 ______ Date: 12/7/15

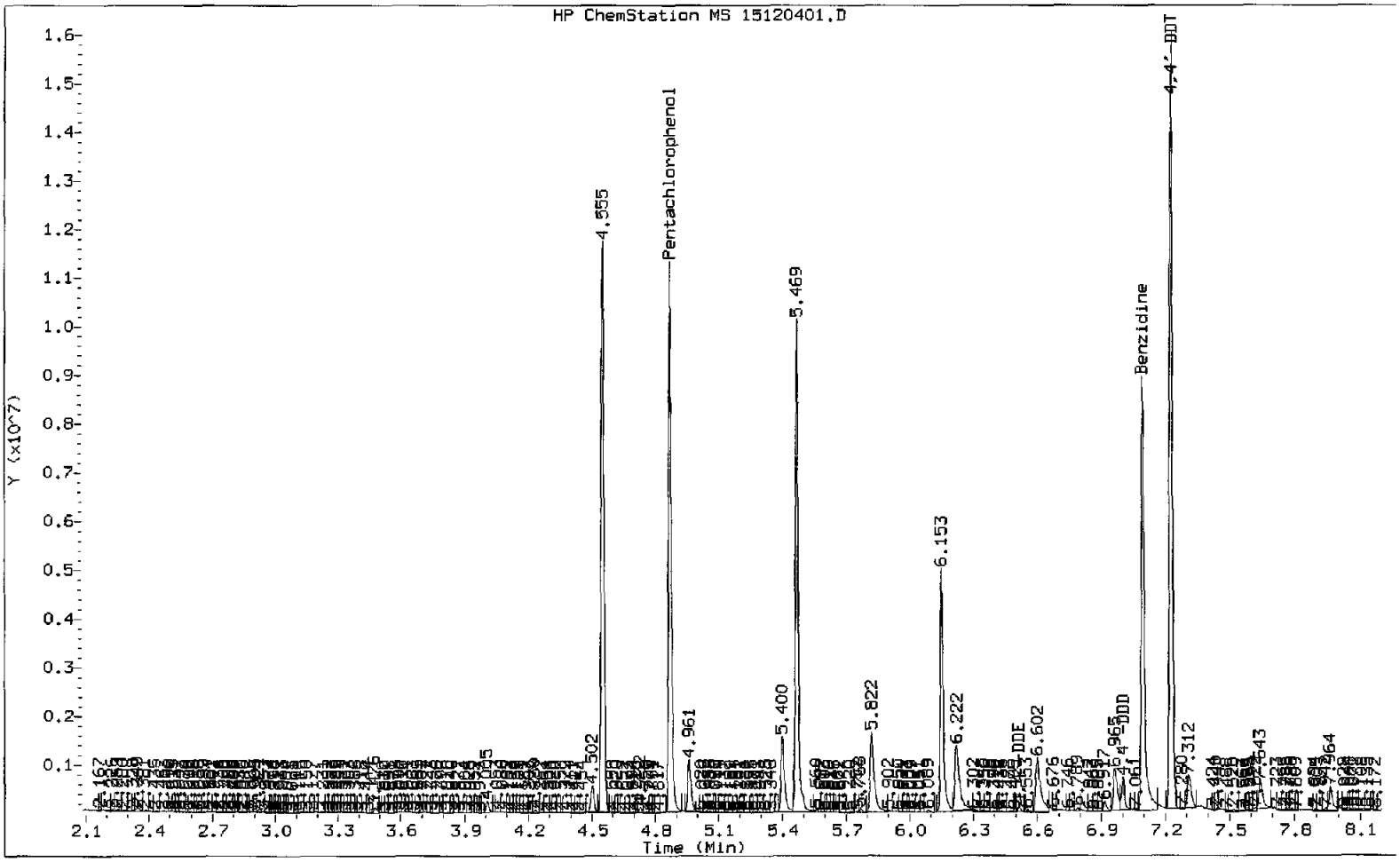
ARI Labs, Inc.
RETENTION TIME SUMMARY REPORT

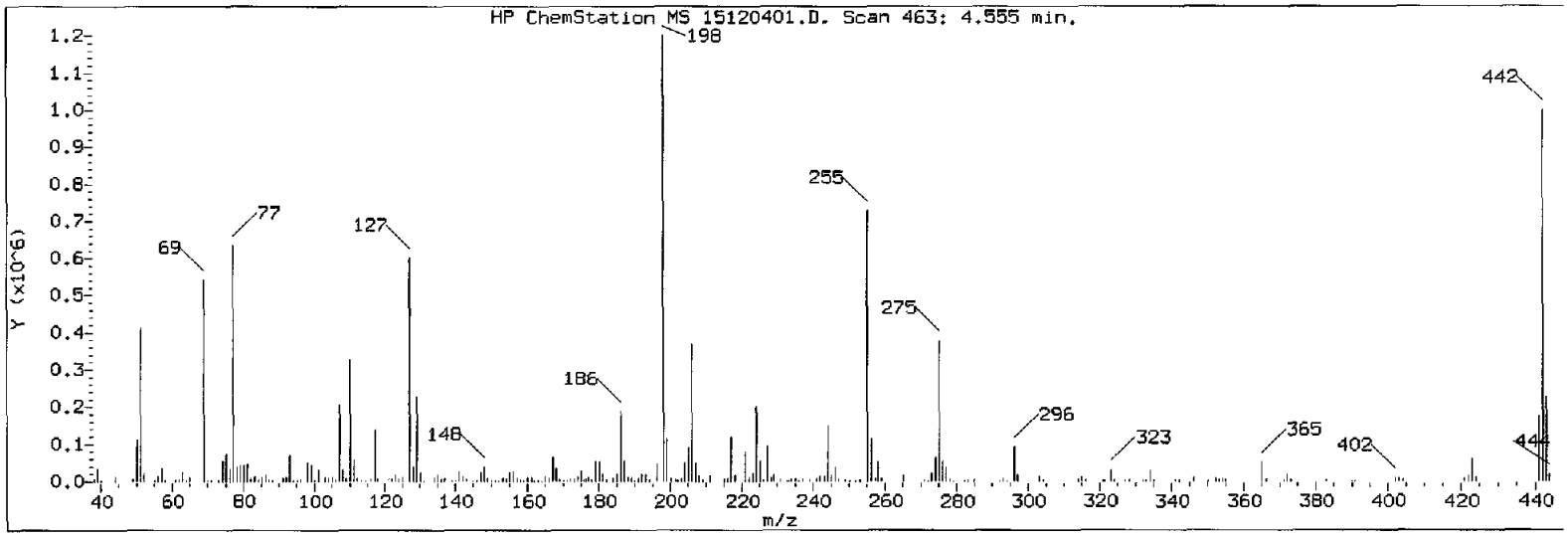
Method File: \\target\share\chem3\nt11.i\20151204.b\lowsim.m
Batch File: \\target\share\chem3\nt11.i\20151204.b
Inst ID: nt11.i

	Compound	RT01	RT02	RT03	RT04	RT05	RT06	EXPEC RT	RT WINDOW	AVG RT	STD DEV
	24 Fluoranthene	14.404	14.404	14.404	14.404	14.404	14.404	14.404	14.154-14.654	14.404	0.000
	25 Pyrene	14.903	14.903	14.903	14.903	14.903	14.903	14.903	14.653-15.153	14.903	0.000
	28 Benzo(a)anthracene	16.918	16.918	16.918	16.918	16.918	16.918	16.918	16.668-17.168	16.918	0.000
*	29 Chrysene-d12	17.018	17.018	17.010	17.010	17.010	17.010	17.010	16.760-17.260	17.012	0.004
	30 Chrysene	17.068	17.059	17.060	17.060	17.059	17.059	17.059	16.809-17.309	17.061	0.003
	44 Benzo(b)fluoranthene	18.785	18.785	18.785	18.785	18.785	18.785	18.785	18.535-19.035	18.785	0.000
	45 Benzo(k)fluoranthene	18.833	18.833	18.824	18.824	18.823	18.833	18.833	18.583-19.083	18.828	0.005
	46 Benzo(j)fluoranthene	18.891	18.891	18.891	18.891	18.891	18.891	18.891	18.641-19.141	18.891	0.000
	34 Benzo(a)pyrene	19.640	19.630	19.631	19.631	19.631	19.631	19.631	19.381-19.881	19.632	0.004
*	35 Perylene-d12	19.842	19.842	19.842	19.842	19.842	19.842	19.842	19.592-20.092	19.842	0.000
$	36 Dibenzo(a,h)anthracene	22.208	22.197	22.197	22.197	22.197	22.197	22.197	21.947-22.447	22.199	0.005
	37 Indeno(1,2,3-cd)pyrene	22.330	22.330	22.330	22.330	22.330	22.330	22.330	22.080-22.580	22.330	0.000
	38 Dibenzo(a,h)anthracene	22.319	22.319	22.319	22.308	22.308	22.308	22.308	22.058-22.558	22.313	0.006
	39 Benzo(g,h,i)perylene	23.427	23.426	23.427	23.427	23.426	23.426	23.426	23.176-23.676	23.426	0.000
	47 Perylene	19.900	19.900	19.900	19.900	19.900	19.900	19.900	19.650-20.150	19.900	0.000
	48 Benzo(e)pyrene	19.525	19.525	19.525	19.525	19.525	19.525	19.525	19.275-19.775	19.525	0.000

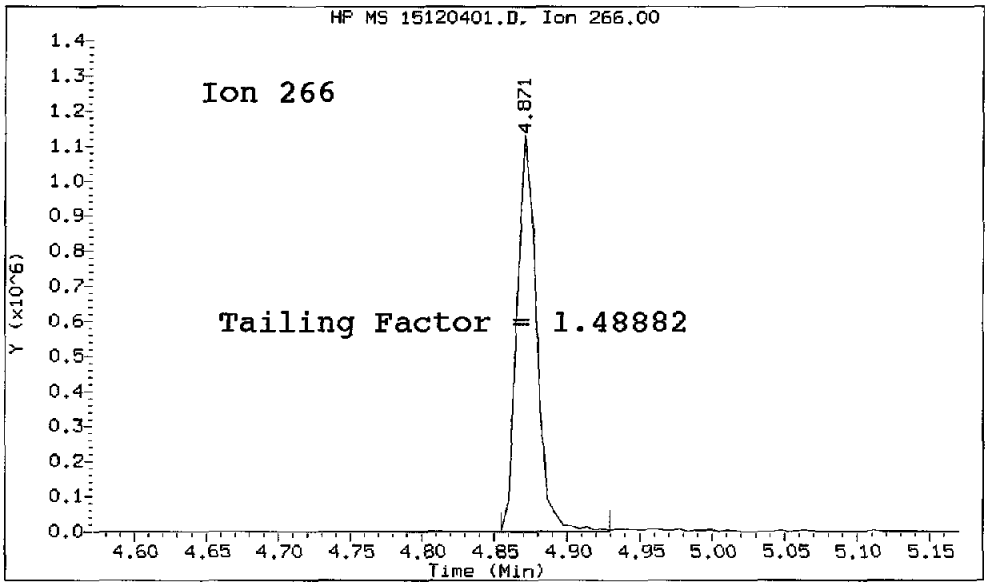
DFTPP TAILING FACTOR AND BREAKDOWN GRAPHIC REPORT

Datafile Analyzed: /20151204.b/15120401.D/15120401.D
Method Used: \20151204.b\DFTPP.m Inst: nt11
Injection Date: 04-DEC-2015 08:45 Operator: JW
Sample Info: TUNE 10 TUNE 10
Report Date: 12/04/2015 09:41



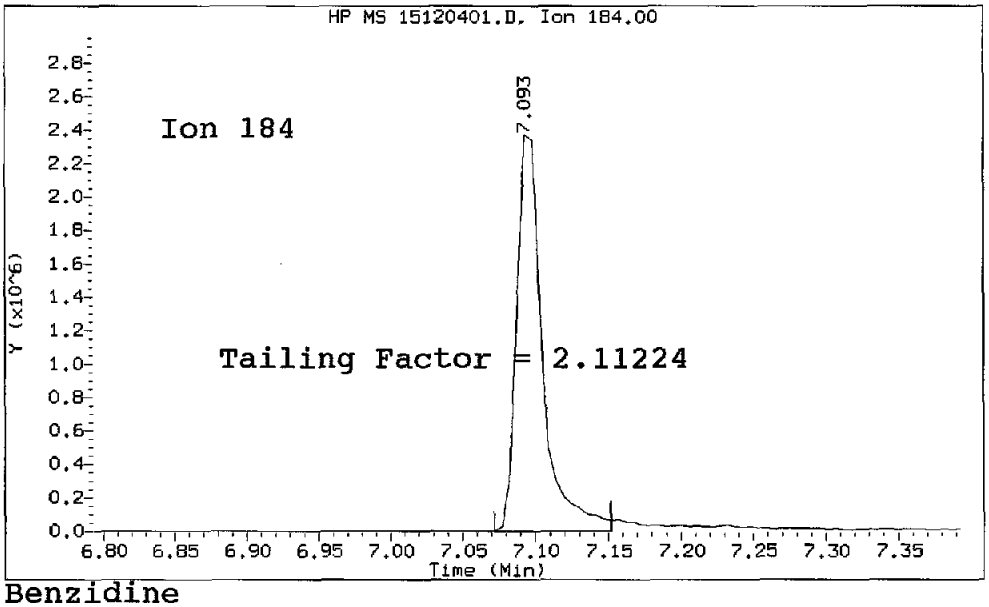


Datafile Analyzed: /20151204.b/15120401.D/15120401.D
Method Used: \20151204.b\DFTPP.m\sw846ddt.m Inst: nt11
Injection Date: 04-DEC-2015 08:45 Operator: JR
Sample Info: TUNE 10
Report Date: 12/04/2015 09:41



Pentachlorophenol
==========
Exp. RT = 4.914
Found RT = 4.871

Tail Factor = 1.489 Maximum Allowed = 2.0



Benzidine
==========
Exp. RT = 7.141
Found RT = 7.093

The tailing factor for Benzidine EXCEEDED

Tail Factor = 2.112 Maximum Allowed = 2.0

8270 TAILING FACTOR/BREAKDOWN SUMMARY RESULTS

TAILING ANALYSIS SUMMARY

Compound	Tail Factor	Max Allowed	Test	
Pentachlorophenol	1.4888179	2.000	PASS	
Benzidine	2.1122449	2.000	FAIL	[Failure]

12/7/16

DDT DEGRADATION BREAKDOWN ANALYSIS SUMMARY

Compound	Response	%Breakdown	Max Allowed	Test
4,4-DDT	2078544			N/A
4,4-DDE	12541	0.6	20.0	PASS
4,4-DDD	100432	4.6	20.0	PASS
4,4-DDD + DDE	112973	5.2	20.0	PASS

Tuning Sample, nt11.i/20151204.b/15120401.D, *** FAILED ***

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
198	Base Peak, 100% relative abundance	100.00
51	10.00 - 80.00% of mass 198	36.71
68	Less than 2.00% of mass 69	0.00 (0.00)
69	Mass 69 relative abundance	46.72
70	Less than 2.00% of mass 69	0.25 (0.53)
127	10.00 - 80.00% of mass 198	50.34
197	Less than 2.00% of mass 198	0.00
199	5.00 - 9.00% of mass 198	8.78
275	10.00 - 60.00% of mass 198	29.75
365	Greater than 1.00% of mass 198	3.54
441	0.01 - 24.00% of mass 442	13.40 (16.36)
442	50.00 - 200.00% of mass 198	81.93
443	15.00 - 24.00% of mass 442	18.59 (22.69)

Data File: 15120401.D
Spectrum: Avg. Scans 462-464 (4.56), Background Scan 456
Location of Maximum: 198.00
Number of points: 252

m/z	Y	m/z	Y	m/z	Y	m/z	Y
38.00	5903	123.00	15321	191.00	4529	276.00	37792
39.00	32472	124.00	6008	192.00	15383	277.00	25616
40.00	2234	125.00	8697	193.00	14981	278.00	5143
44.00	1291	127.00	487424	194.00	2969	279.00	797
49.00	2336	128.00	36048	195.00	935	282.00	1077
50.00	99976	129.00	198784	196.00	36952	283.00	4344
51.00	355456	130.00	17864	198.00	968192	285.00	4257
52.00	19288	131.00	3029	199.00	85016	290.00	736
53.00	699	132.00	770	200.00	7648	292.00	695
55.00	817	134.00	4444	201.00	4181	293.00	3995
56.00	12284	135.00	17328	202.00	2800	294.00	1601
57.00	28160	136.00	7249	203.00	7062	296.00	79296
58.00	882	137.00	7197	204.00	45768	297.00	10726
61.00	4027	139.00	686	205.00	78432	301.00	1083
62.00	4478	140.00	3181	206.00	296256	303.00	9535
63.00	21296	141.00	26728	207.00	40064	304.00	2760
64.00	2870	142.00	9703	208.00	13008	310.00	1258
65.00	7567	143.00	5423	209.00	4174	314.00	5255
69.00	452352	144.00	1270	210.00	2826	315.00	11430
70.00	2404	145.00	2146	211.00	10991	316.00	4496
71.00	1729	146.00	3758	212.00	1343	317.00	1730
74.00	51136	147.00	11875	213.00	1135	321.00	2836
75.00	72784	148.00	28688	215.00	5759	322.00	766
76.00	27064	149.00	7601	216.00	5158	323.00	27808
77.00	512768	150.00	1111	217.00	87992	324.00	3710
78.00	35304	151.00	3226	218.00	10624	327.00	3445
79.00	35128	152.00	2009	221.00	58632	328.00	2747
80.00	28640	153.00	8844	222.00	12655	332.00	2890
81.00	40048	154.00	6510	223.00	18704	333.00	2909
82.00	10036	155.00	17848	224.00	170624	334.00	18896
83.00	13510	156.00	20976	225.00	44928	335.00	3574
84.00	155	157.00	5537	226.00	4319	341.00	3496
85.00	9792	158.00	5165	227.00	75184	342.00	946
86.00	11647	159.00	2604	228.00	10251	346.00	5555
87.00	6242	160.00	7198	229.00	15494	350.00	704
88.00	2104	161.00	9881	231.00	4886	352.00	9894
91.00	8456	162.00	2652	233.00	1517	353.00	6975
92.00	8959	163.00	959	234.00	3642	354.00	7491
93.00	59144	164.00	701	235.00	4833	355.00	2236
94.00	4278	165.00	10199	236.00	1621	365.00	34240
95.00	1022	166.00	9417	237.00	5726	366.00	4979
96.00	2824	167.00	49792	239.00	1926	371.00	2016
98.00	40528	168.00	25208	241.00	6592	372.00	17560
99.00	34656	169.00	4359	242.00	9932	373.00	3339
100.00	3425	170.00	2037	243.00	9154	383.00	2922
101.00	24160	171.00	2039	244.00	122792	390.00	1755
102.00	687	172.00	5959	245.00	17280	391.00	814
103.00	7164	173.00	5076	246.00	28232	402.00	5209
104.00	12935	174.00	11539	247.00	4557	403.00	6386

105.00	10605	175.00	20720	249.00	3982	404.00	2710
106.00	7128	176.00	7696	250.00	1046	421.00	6452
107.00	162176	177.00	11926	252.00	969	422.00	10014
108.00	27064	178.00	3414	253.00	5072	423.00	50464
109.00	2954	179.00	42472	255.00	572352	424.00	9853
110.00	279360	180.00	32368	256.00	86752	425.00	909
111.00	42360	181.00	14321	257.00	6074	441.00	129768
112.00	6933	182.00	2960	258.00	40416	442.00	793216
113.00	1332	184.00	4180	259.00	6964	443.00	179968
114.00	829	185.00	19872	265.00	16576	444.00	15867
116.00	8676	186.00	147328	271.00	1077	445.00	897
117.00	106856	187.00	42160	272.00	2517		
118.00	7215	188.00	5898	273.00	20392		
120.00	674	189.00	10119	274.00	55504		
122.00	7466	190.00	1772	275.00	288064		

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151204.b\15120402.D
Lab Smp Id: LLSIM 250
Inj Date : 04-DEC-2015 09:03 MS Autotune Date: 23-APR-2014 12:54
Operator : JW Inst ID: nt11.i
Smp Info : LLSIM 250
Misc Info :
Comment :
Method : \\target\share\chem3\nt11.i\20151204.b\lowsim.m
Meth Date : 05-Dec-2015 09:24 jonathonw Quant Type: ISTD
Cal Date : 04-DEC-2015 09:03 Cal File: 15120402.D
Als bottle: 5 Calibration Sample, Level: 4
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14

JW 12/5/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ng/mL)	AMOUNTS ON-COL (ng/mL)
*	4 Naphthalene-d8	136	6.597	6.597	(1.000)	327896	200.000	
	5 Naphthalene	128	6.639	6.629	(1.006)	466348	250.000	246
$	6 2-Methylnaphthalene-d10	152	7.574	7.574	(1.148)	313990	250.000	258
	7 2-Methylnaphthalene	142	7.637	7.627	(1.158)	338215	250.000	260
	8 1-Methylnaphthalene	142	7.889	7.889	(1.196)	303545	250.000	259
	10 Acenaphthylene	152	9.446	9.445	(0.984)	486608	250.000	252
*	11 Acenaphthene-d10	164	9.601	9.600	(1.000)	239179	200.000	
	12 Acenaphthene	153	9.656	9.656	(1.006)	318640	250.000	249
	14 Dibenzofuran	168	9.866	9.866	(1.028)	485308	250.000	251
	15 Fluorene	166	10.486	10.486	(1.092)	368110	250.000	254
*	18 Phenanthrene-d10	188	12.269	12.269	(1.000)	372253	200.000	
	19 Phenanthrene	178	12.313	12.313	(1.004)	568980	250.000	254
	20 Anthracene	178	12.368	12.368	(1.008)	520493	250.000	259
$	23 Fluoranthene-d10	212	14.375	14.374	(1.172)	527419	250.000	258
	24 Fluoranthene	202	14.403	14.403	(1.174)	588912	250.000	262
	25 Pyrene	202	14.903	14.903	(0.876)	579853	250.000	248
	28 Benzo(a)anthracene	228	16.918	16.918	(0.994)	493775	250.000	251
*	29 Chrysene-d12	240	17.018	17.009	(1.000)	294711	200.000	
	30 Chrysene	228	17.067	17.059	(1.003)	528325	250.000	245
	44 Benzo(b)fluoranthene	252	18.785	18.785	(0.947)	426424	250.000	242
	45 Benzo(k)fluoranthene	252	18.833	18.833	(0.949)	521565	250.000	254
	46 Benzo(j)fluoranthene	252	18.890	18.890	(0.952)	462257	250.000	247
	34 Benzo(a)pyrene	252	19.640	19.630	(0.990)	425021	250.000	249
*	35 Perylene-d12	264	19.842	19.842	(1.000)	260595	200.000	
$	36 Dibenzo(a,h)anthracene-d14	292	22.208	22.197	(1.119)	265906	250.000	253
	37 Indeno(1,2,3-cd)pyrene	276	22.330	22.329	(1.125)	447004	250.000	250
	38 Dibenzo(a,h)anthracene	278	22.318	22.307	(1.125)	361875	250.000	256
	39 Benzo(g,h,i)perylene	276	23.426	23.426	(1.181)	382439	250.000	246
	47 Perylene	252	19.899	19.899	(1.003)	425367	250.000	241
	48 Benzo(e)pyrene	252	19.524	19.524	(0.984)	431155	250.000	242

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120402.D
Lab Smp Id: LLSIM 250
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151204.b\lowsim.m
Misc Info:

Calibration Date: 04-DEC-2015
Calibration Time: 09:03
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	327896	0.00
11 Acenaphthene-d10	239179	119590	478358	239179	0.00
18 Phenanthrene-d10	372253	186127	744506	372253	0.00
29 Chrysene-d12	294711	147356	589422	294711	0.00
35 Perylene-d12	260595	130298	521190	260595	0.00

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.60	0.00
11 Acenaphthene-d10	9.60	9.10	10.10	9.60	0.00
18 Phenanthrene-d10	12.27	11.77	12.77	12.27	0.00
29 Chrysene-d12	17.02	16.52	17.52	17.02	0.00
35 Perylene-d12	19.84	19.34	20.34	19.84	0.00

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.

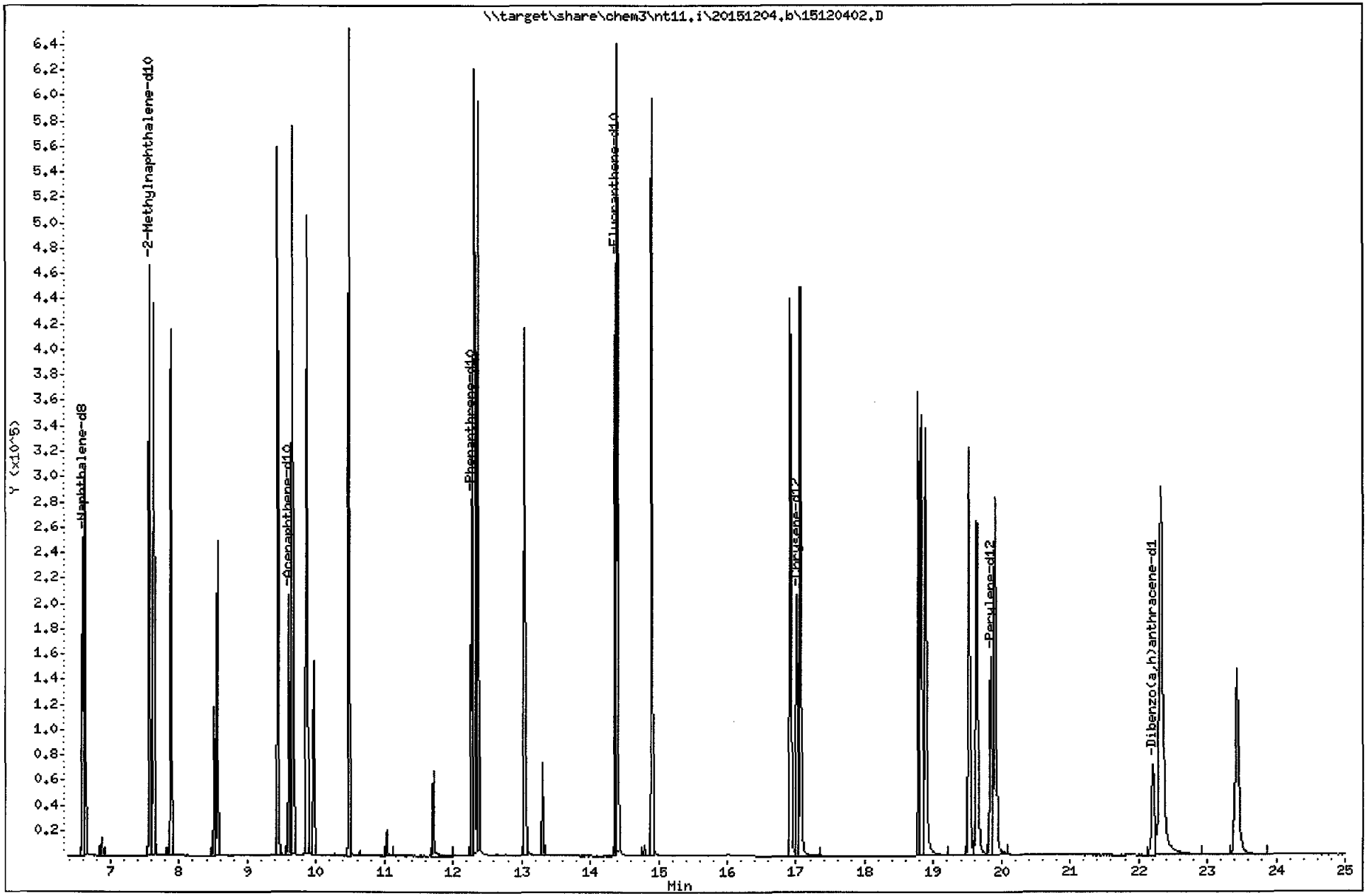
Data File: \\target\share\chem3\nt11.i\20151204.b\15120402.D
Date : 04-DEC-2015 09:03
Client ID:
Sample Info: LLSIM 250

Instrument: nt11.i

Operator: JW

Column phase: Rxi-17Sil MS
Column diameter: 0.25

AQ19:00085



REVIEW SUMMARY FOR FILE - 15120402.D

Lab ID: LLSIM 250
nt11.i, 20151204.b\lowsim.m, 04-DEC-2015 09:03

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151204.b\lowsim.m,Sublist: PEMD.sub = 0.0000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151204.b\15120403.D
Lab Smp Id: LLSIM 100
Inj Date : 04-DEC-2015 09:33 MS Autotune Date: 23-APR-2014 12:5
Operator : JW Inst ID: nt11.i
Smp Info : LLSIM 100
Misc Info :
Comment :
Method : \\target\share\chem3\nt11.i\20151204.b\lowsim.m
Meth Date : 05-Dec-2015 09:24 jonathonw Quant Type: ISTD
Cal Date : 04-DEC-2015 09:33 Cal File: 15120403.D
Als bottle: 4 Calibration Sample, Level: 3
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14

JD 12/5/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ng/mL)	ON-COL (ng/mL)
*	4 Naphthalene-d8	136	6.597	6.597	(1.000)	322094	200.000	
	5 Naphthalene	128	6.628	6.629	(1.005)	194640	100.000	105
$	6 2-Methylnaphthalene-d10	152	7.574	7.574	(1.148)	122627	100.000	103
	7 2-Methylnaphthalene	142	7.637	7.627	(1.158)	131669	100.000	103
	8 1-Methylnaphthalene	142	7.889	7.889	(1.196)	119911	100.000	104
	10 Acenaphthylene	152	9.445	9.445	(0.984)	188431	100.000	102
*	11 Acenaphthene-d10	164	9.600	9.600	(1.000)	228988	200.000	
	12 Acenaphthene	153	9.656	9.656	(1.006)	125618	100.000	102
	14 Dibenzofuran	168	9.866	9.866	(1.028)	192943	100.000	104
	15 Fluorene	166	10.486	10.486	(1.092)	142937	100.000	103
*	18 Phenanthrene-d10	188	12.269	12.269	(1.000)	364343	200.000	
	19 Phenanthrene	178	12.313	12.313	(1.004)	229750	100.000	105
	20 Anthracene	178	12.368	12.368	(1.008)	198320	100.000	101
$	23 Fluoranthene-d10	212	14.374	14.374	(1.172)	202998	100.000	101
	24 Fluoranthene	202	14.403	14.403	(1.174)	227740	100.000	103
	25 Pyrene	202	14.903	14.903	(0.876)	226693	100.000	103
	28 Benzo(a)anthracene	228	16.918	16.918	(0.994)	186507	100.000	101
*	29 Chrysene-d12	240	17.017	17.009	(1.000)	276576	200.000	
	30 Chrysene	228	17.059	17.059	(1.002)	208940	100.000	103
	44 Benzo(b)fluoranthene	252	18.784	18.785	(0.947)	163653	100.000	98.5
	45 Benzo(k)fluoranthene	252	18.832	18.833	(0.949)	193041	100.000	99.7
	46 Benzo(j)fluoranthene	252	18.890	18.890	(0.952)	175242	100.000	99.4
	34 Benzo(a)pyrene	252	19.630	19.630	(0.989)	157495	100.000	98.2
*	35 Perylene-d12	264	19.841	19.842	(1.000)	245162	200.000	
$	36 Dibenzo(a,h)anthracene-d14	292	22.196	22.197	(1.119)	97910	100.000	98.9
	37 Indeno(1,2,3-cd)pyrene	276	22.329	22.329	(1.125)	164508	100.000	97.7
	38 Dibenzo(a,h)anthracene	278	22.318	22.307	(1.125)	131245	100.000	98.6
	39 Benzo(g,h,i)perylene	276	23.426	23.426	(1.181)	143879	100.000	98.5
	47 Perylene	252	19.899	19.899	(1.003)	166080	100.000	99.9
	48 Benzo(e)pyrene	252	19.524	19.524	(0.984)	168054	100.000	100

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120403.D
Lab Smp Id: LLSIM 100
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151204.b\lowsim.m
Misc Info:

Calibration Date: 04-DEC-2015
Calibration Time: 09:03
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	322094	-1.77
11 Acenaphthene-d10	239179	119590	478358	228988	-4.26
18 Phenanthrene-d10	372253	186127	744506	364343	-2.12
29 Chrysene-d12	294711	147356	589422	276576	-6.15
35 Perylene-d12	260595	130298	521190	245162	-5.92

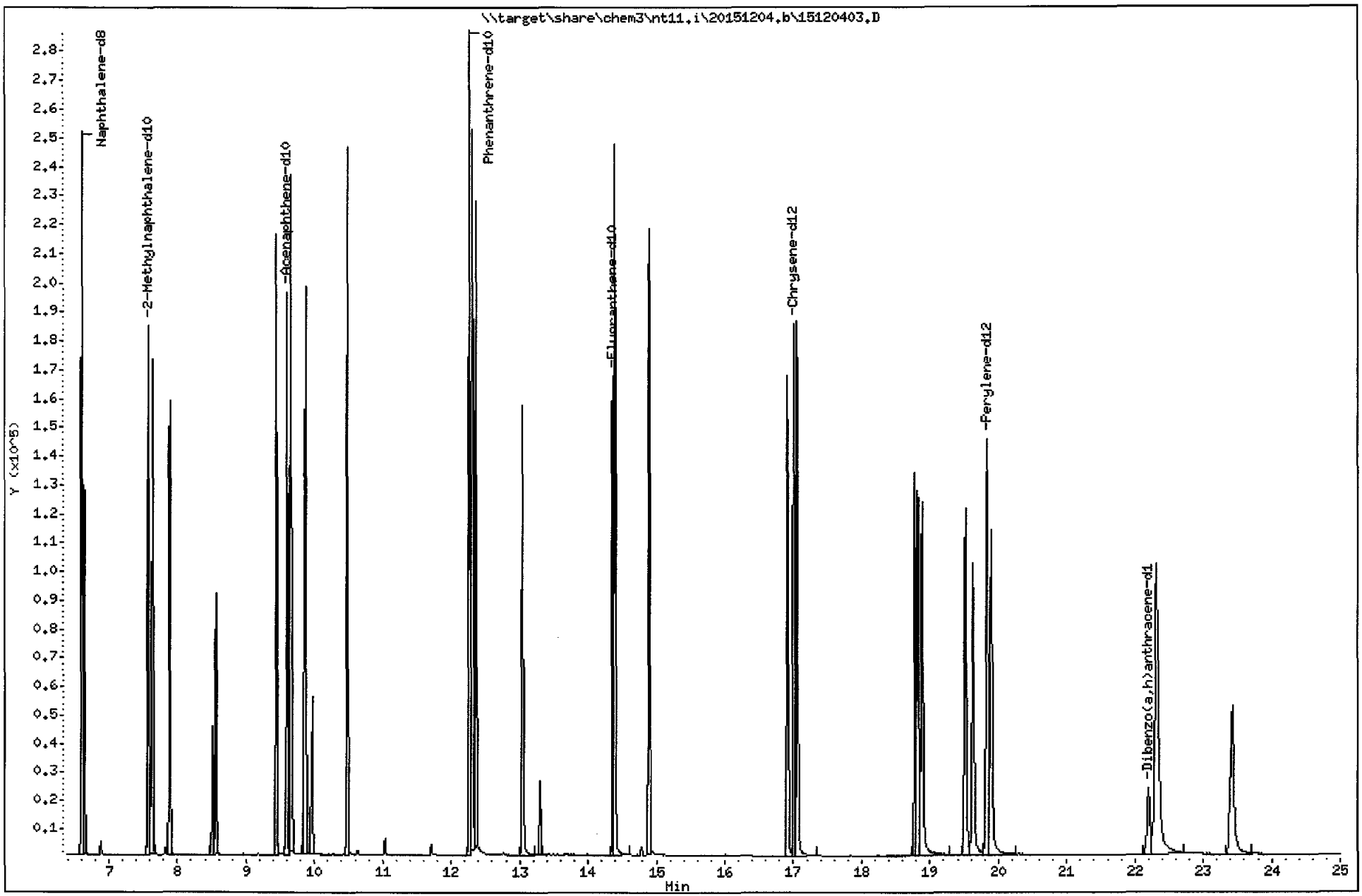
COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.60	-0.00
11 Acenaphthene-d10	9.60	9.10	10.10	9.60	-0.00
18 Phenanthrene-d10	12.27	11.77	12.77	12.27	-0.00
29 Chrysene-d12	17.02	16.52	17.52	17.02	-0.00
35 Perylene-d12	19.84	19.34	20.34	19.84	-0.00

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.

Data File: \\target\share\chem3\nt11.i\20151204.b\15120403.D
Date : 04-DEC-2015 09:33
Client ID:
Sample Info: LLSIM 100

Instrument: nt11.i
Operator: JW
Column phase: Rxi-17Sil MS
Column diameter: 0.25

AQJ9:00089



REVIEW SUMMARY FOR FILE - 15120403.D

Lab ID: LLSIM 100
nt11.i, 20151204.b\lowsim.m, 04-DEC-2015 09:33

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151204.b\lowsim.m,Sublist: PEMD.sub = 0.0000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151204.b\15120404.D
Lab Smp Id: LLSIM 10
Inj Date : 04-DEC-2015 10:03 MS Autotune Date: 23-APR-2014 12:5
Operator : JW Inst ID: nt11.i
Smp Info : LLSIM 10
Misc Info :
Comment :
Method : \\target\share\chem3\nt11.i\20151204.b\lowsim.m
Meth Date : 05-Dec-2015 09:24 jonathonw Quant Type: ISTD
Cal Date : 04-DEC-2015 10:03 Cal File: 15120404.D
Als bottle: 2 Calibration Sample, Level: 1
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14

SW 12/5/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ng/mL)	AMOUNTS ON-COL (ng/mL)
*	4 Naphthalene-d8	136	6.597	6.597	(1.000)	325673	200.000	
	5 Naphthalene	128	6.629	6.629	(1.005)	19520	10.0000	10.4
$	6 2-Methylnaphthalene-d10	152	7.574	7.574	(1.148)	11490	10.0000	9.51
	7 2-Methylnaphthalene	142	7.637	7.627	(1.158)	12326	10.0000	9.54
	8 1-Methylnaphthalene	142	7.889	7.889	(1.196)	10946	10.0000	9.40
	10 Acenaphthylene	152	9.446	9.445	(0.984)	17343	10.0000	9.83
*	11 Acenaphthene-d10	164	9.601	9.600	(1.000)	218580	200.000	
	12 Acenaphthene	153	9.656	9.656	(1.006)	11843	10.0000	10.1
	14 Dibenzofuran	168	9.866	9.866	(1.028)	17891	10.0000	10.1
	15 Fluorene	166	10.486	10.486	(1.092)	12668	10.0000	9.58
*	18 Phenanthrene-d10	188	12.269	12.269	(1.000)	358974	200.000	
	19 Phenanthrene	178	12.313	12.313	(1.004)	21551	10.0000	9.96
	20 Anthracene	178	12.368	12.368	(1.008)	18203	10.0000	9.40
$	23 Fluoranthene-d10	212	14.375	14.374	(1.172)	18217	10.0000	9.23
	24 Fluoranthene	202	14.403	14.403	(1.174)	19652	10.0000	9.05
	25 Pyrene	202	14.903	14.903	(0.876)	20582	10.0000	9.91
	28 Benzo(a)anthracene	228	16.918	16.918	(0.995)	16570	10.0000	9.48
*	29 Chrysene-d12	240	17.009	17.009	(1.000)	262207	200.000	
	30 Chrysene	228	17.059	17.059	(1.003)	19151	10.0000	9.98
	44 Benzo(b)fluoranthene	252	18.785	18.785	(0.947)	14171	10.0000	9.12
	45 Benzo(k)fluoranthene	252	18.823	18.833	(0.949)	16099	10.0000	8.89
	46 Benzo(j)fluoranthene	252	18.890	18.890	(0.952)	15176	10.0000	9.20
	34 Benzo(a)pyrene	252	19.630	19.630	(0.989)	12870	10.0000	8.58
*	35 Perylene-d12	264	19.842	19.842	(1.000)	229323	200.000	
$	36 Dibenzo(a,h)anthracene-d14	292	22.197	22.197	(1.119)	6798	10.0000	7.34
	37 Indeno(1,2,3-cd)pyrene	276	22.329	22.329	(1.125)	12271	10.0000	7.79
	38 Dibenzo(a,h)anthracene	278	22.318	22.307	(1.125)	9102	10.0000	7.31
	39 Benzo(g,h,i)perylene	276	23.426	23.426	(1.181)	11812	10.0000	8.64
	47 Perylene	252	19.899	19.899	(1.003)	14419	10.0000	9.28
	48 Benzo(e)pyrene	252	19.524	19.524	(0.984)	14902	10.0000	9.49

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120404.D
Lab Smp Id: LLSIM 10
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151204.b\lowsim.m
Misc Info:

Calibration Date: 04-DEC-2015
Calibration Time: 09:03
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	325673	-0.68
11 Acenaphthene-d10	239179	119590	478358	218580	-8.61
18 Phenanthrene-d10	372253	186127	744506	358974	-3.57
29 Chrysene-d12	294711	147356	589422	262207	-11.03
35 Perylene-d12	260595	130298	521190	229323	-12.00

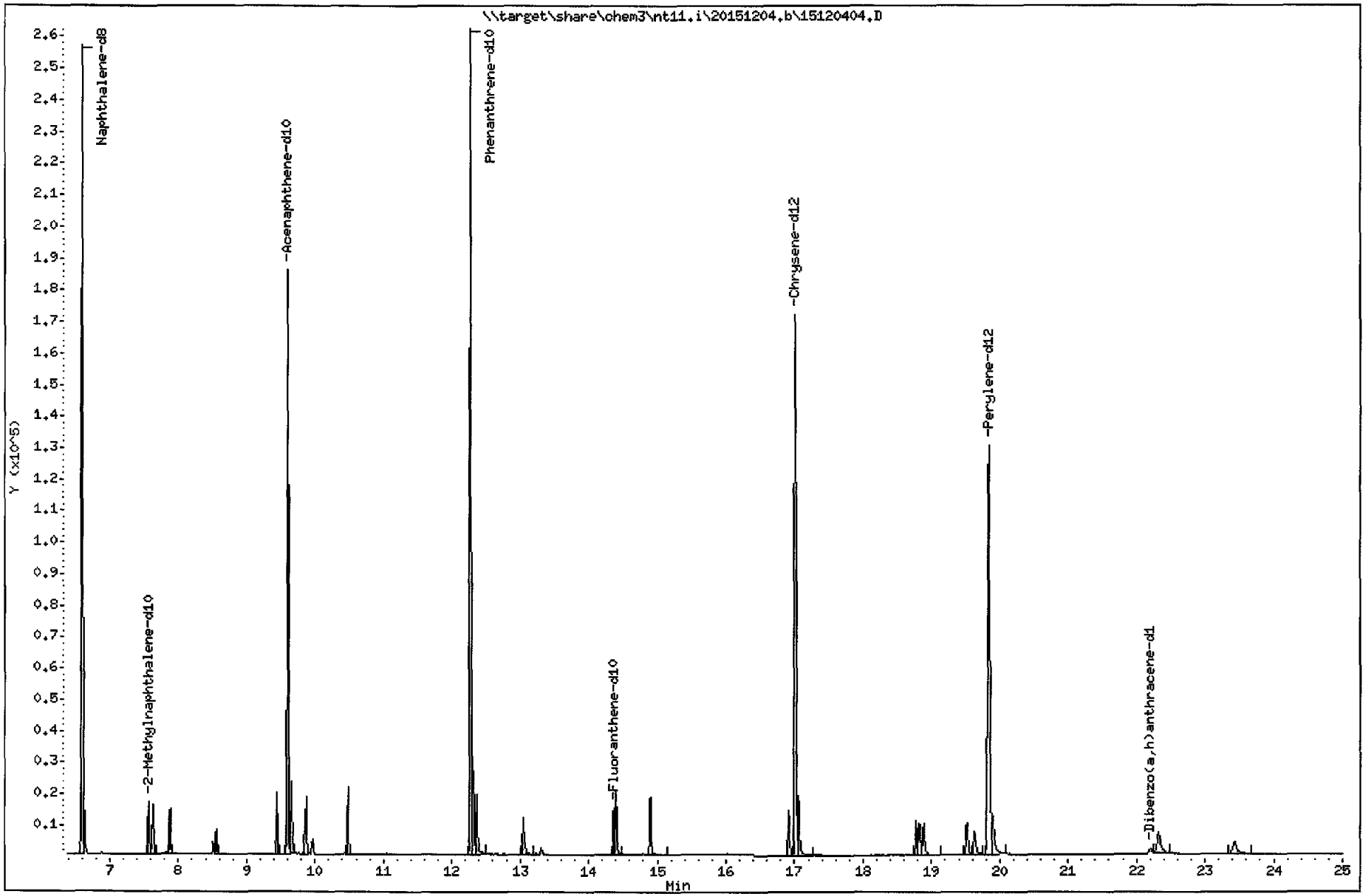
COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.60	-0.00
11 Acenaphthene-d10	9.60	9.10	10.10	9.60	-0.00
18 Phenanthrene-d10	12.27	11.77	12.77	12.27	-0.00
29 Chrysene-d12	17.02	16.52	17.52	17.01	-0.05
35 Perylene-d12	19.84	19.34	20.34	19.84	-0.00

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.

Data File: \\target\share\chem3\nt11.i\20151204.b\15120404.D
Date : 04-DEC-2015 10:03
Client ID:
Sample Info: LLSIM 10

Instrument: nt11.i
Operator: JW
Column diameter: 0.25

Column phase: Rxi-17Sil MS



REVIEW SUMMARY FOR FILE - 15120404.D

Lab ID: LLSIM 10
nt11.i, 20151204.b\lowsim.m, 04-DEC-2015 10:03

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151204.b\lowsim.m,Sublist: PEMD.sub = 0.0000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151204.b\15120405.D
Lab Smp Id: LLSIM 50
Inj Date : 04-DEC-2015 10:33 MS Autotune Date: 23-APR-2014 12:5
Operator : JW Inst ID: nt11.i
Smp Info : LLSIM 50
Misc Info :
Comment :
Method : \\target\share\chem3\nt11.i\20151204.b\lowsim.m
Meth Date : 05-Dec-2015 09:24 jonathonw Quant Type: ISTD
Cal Date : 04-DEC-2015 10:33 Cal File: 15120405.D
Als bottle: 3 Calibration Sample, Level: 2
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14

BD 12/5/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ng/mL)	AMOUNTS ON-COL (ng/mL)
*	4 Naphthalene-d8	136	6.597	6.597	(1.000)	322810	200.000	
	5 Naphthalene	128	6.629	6.629	(1.005)	101411	50.0000	54.4
$	6 2-Methylnaphthalene-d10	152	7.574	7.574	(1.148)	61987	50.0000	51.7
	7 2-Methylnaphthalene	142	7.627	7.627	(1.156)	66307	50.0000	51.8
	8 1-Methylnaphthalene	142	7.889	7.889	(1.196)	59950	50.0000	51.9
	10 Acenaphthylene	152	9.446	9.445	(0.984)	92485	50.0000	52.3
*	11 Acenaphthene-d10	164	9.601	9.600	(1.000)	219192	200.000	
	12 Acenaphthene	153	9.656	9.656	(1.006)	62244	50.0000	53.0
	14 Dibenzofuran	168	9.866	9.866	(1.028)	95443	50.0000	54.0
	15 Fluorene	166	10.486	10.486	(1.092)	68997	50.0000	52.0
*	18 Phenanthrene-d10	188	12.269	12.269	(1.000)	354307	200.000	
	19 Phenanthrene	178	12.313	12.313	(1.004)	118576	50.0000	55.5
	20 Anthracene	178	12.368	12.368	(1.008)	96493	50.0000	50.5
$	23 Fluoranthene-d10	212	14.365	14.374	(1.171)	102075	50.0000	52.4
	24 Fluoranthene	202	14.403	14.403	(1.174)	114385	50.0000	53.4
	25 Pyrene	202	14.903	14.903	(0.876)	112799	50.0000	54.2
	28 Benzo(a)anthracene	228	16.918	16.918	(0.995)	93495	50.0000	53.4
*	29 Chrysene-d12	240	17.009	17.009	(1.000)	262604	200.000	
	30 Chrysene	228	17.059	17.059	(1.003)	108279	50.0000	56.3
	44 Benzo(b)fluoranthene	252	18.785	18.785	(0.947)	83231	50.0000	53.5
	45 Benzo(k)fluoranthene	252	18.823	18.833	(0.949)	95619	50.0000	52.7
	46 Benzo(j)fluoranthene	252	18.890	18.890	(0.952)	90827	50.0000	55.0
	34 Benzo(a)pyrene	252	19.630	19.630	(0.989)	79839	50.0000	53.2
*	35 Perylene-d12	264	19.842	19.842	(1.000)	229726	200.000	
$	36 Dibenzo(a,h)anthracene-d14	292	22.197	22.197	(1.119)	44840	50.0000	48.4
	37 Indeno(1,2,3-cd)pyrene	276	22.330	22.329	(1.125)	80159	50.0000	50.8
	38 Dibenzo(a,h)anthracene	278	22.307	22.307	(1.124)	60732	50.0000	48.7
	39 Benzo(g,h,i)perylene	276	23.426	23.426	(1.181)	70920	50.0000	51.8
	47 Perylene	252	19.899	19.899	(1.003)	84721	50.0000	54.4
	48 Benzo(e)pyrene	252	19.525	19.524	(0.984)	85271	50.0000	54.2

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120405.D
Lab Smp Id: LLSIM 50
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151204.b\lowsim.m
Misc Info:

Calibration Date: 04-DEC-2015
Calibration Time: 09:03
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

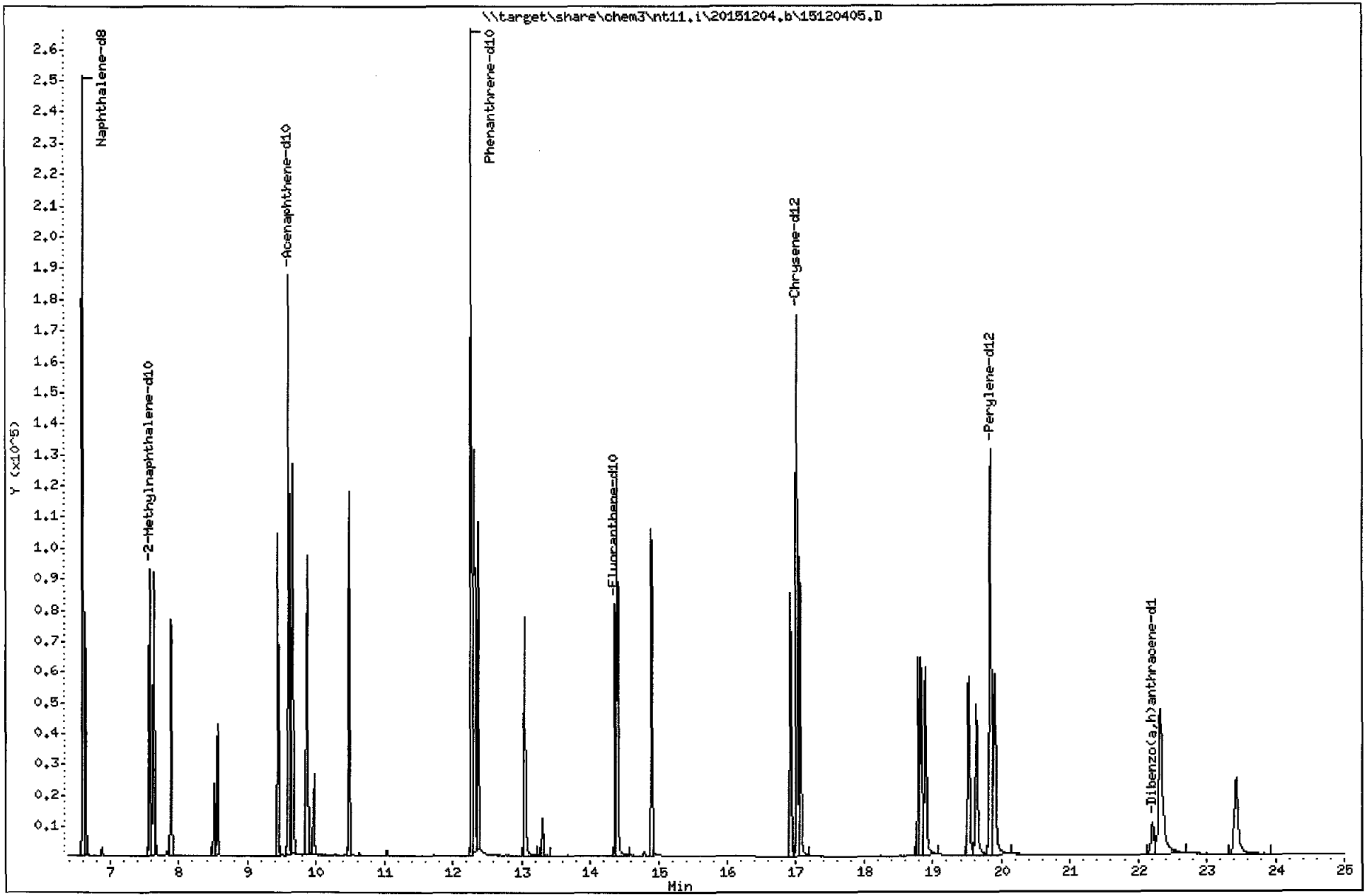
COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	322810	-1.55
11 Acenaphthene-d10	239179	119590	478358	219192	-8.36
18 Phenanthrene-d10	372253	186127	744506	354307	-4.82
29 Chrysene-d12	294711	147356	589422	262604	-10.89
35 Perylene-d12	260595	130298	521190	229726	-11.85

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.60	0.00
11 Acenaphthene-d10	9.60	9.10	10.10	9.60	0.00
18 Phenanthrene-d10	12.27	11.77	12.77	12.27	0.00
29 Chrysene-d12	17.02	16.52	17.52	17.01	-0.05
35 Perylene-d12	19.84	19.34	20.34	19.84	0.00

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.

Data File: \\target\share\chem3\nt11.i\20151204.b\15120405.D
Date : 04-DEC-2015 10:33
Client ID:
Sample Info: LLSIM 50

Instrument: nt11.i
Operator: JW
Column phase: Rxi-17Sil MS
Column diameter: 0.25



REVIEW SUMMARY FOR FILE - 15120405.D

Lab ID: LLSIM 50
nt11.i, 20151204.b\lowsim.m, 04-DEC-2015 10:33

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151204.b\lowsim.m,Sublist: PEMD.sub = 0.0000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151204.b\15120406.D
Lab Smp Id: LLSIM 500
Inj Date : 04-DEC-2015 11:03 MS Autotune Date: 23-APR-2014 12:5
Operator : JW Inst ID: nt11.i
Smp Info : LLSIM 500
Misc Info :
Comment :
Method : \\target\share\chem3\nt11.i\20151204.b\lowsim.m
Meth Date : 05-Dec-2015 09:24 jonathonw Quant Type: ISTD
Cal Date : 04-DEC-2015 11:03 Cal File: 15120406.D
Als bottle: 6 Calibration Sample, Level: 5
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14

JW 2/5/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ng/mL)	AMOUNTS ON-COL (ng/mL)
*	4 Naphthalene-d8	136	6.597	6.597	(1.000)	340768	200.000	
	5 Naphthalene	128	6.629	6.629	(1.005)	933248	500.000	474
$	6 2-Methylnaphthalene-d10	152	7.574	7.574	(1.148)	629193	500.000	497
	7 2-Methylnaphthalene	142	7.627	7.627	(1.156)	670644	500.000	496
	8 1-Methylnaphthalene	142	7.889	7.889	(1.196)	605485	500.000	497
	10 Acenaphthylene	152	9.445	9.445	(0.984)	967430	500.000	496
*	11 Acenaphthene-d10	164	9.600	9.600	(1.000)	241553	200.000	
	12 Acenaphthene	153	9.656	9.656	(1.006)	628559	500.000	486
	14 Dibenzofuran	168	9.866	9.866	(1.028)	941463	500.000	483
	15 Fluorene	166	10.486	10.486	(1.092)	730006	500.000	499
*	18 Phenanthrene-d10	188	12.269	12.269	(1.000)	382017	200.000	
	19 Phenanthrene	178	12.313	12.313	(1.004)	1091600	500.000	474
	20 Anthracene	178	12.368	12.368	(1.008)	1071225	500.000	520
$	23 Fluoranthene-d10	212	14.374	14.374	(1.172)	1071150	500.000	510
	24 Fluoranthene	202	14.403	14.403	(1.174)	1171890	500.000	507
	25 Pyrene	202	14.903	14.903	(0.876)	1155377	500.000	492
	28 Benzo(a)anthracene	228	16.918	16.918	(0.995)	993004	500.000	502
*	29 Chrysene-d12	240	17.009	17.009	(1.000)	296788	200.000	
	30 Chrysene	228	17.059	17.059	(1.003)	1047594	500.000	482
	44 Benzo(b)fluoranthene	252	18.785	18.785	(0.947)	904516	500.000	527
	45 Benzo(k)fluoranthene	252	18.823	18.833	(0.949)	1037488	500.000	519
	46 Benzo(j)fluoranthene	252	18.890	18.890	(0.952)	935496	500.000	513
	34 Benzo(a)pyrene	252	19.630	19.630	(0.989)	881824	500.000	532
*	35 Perylene-d12	264	19.841	19.842	(1.000)	253397	200.000	
$	36 Dibenzo(a,h)anthracene-d14	292	22.196	22.197	(1.119)	577224	500.000	564
	37 Indeno(1,2,3-cd)pyrene	276	22.329	22.329	(1.125)	968463	500.000	557
	38 Dibenzo(a,h)anthracene	278	22.307	22.307	(1.124)	781168	500.000	568
	39 Benzo(g,h,i)perylene	276	23.426	23.426	(1.181)	805513	500.000	533
	47 Perylene	252	19.899	19.899	(1.003)	880659	500.000	513
	48 Benzo(e)pyrene	252	19.524	19.524	(0.984)	881426	500.000	508

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120406.D
Lab Smp Id: LLSIM 500
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151204.b\lowsim.m
Misc Info:

Calibration Date: 04-DEC-2015
Calibration Time: 09:03
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	340768	3.93
11 Acenaphthene-d10	239179	119590	478358	241553	0.99
18 Phenanthrene-d10	372253	186127	744506	382017	2.62
29 Chrysene-d12	294711	147356	589422	296788	0.70
35 Perylene-d12	260595	130298	521190	253397	-2.76

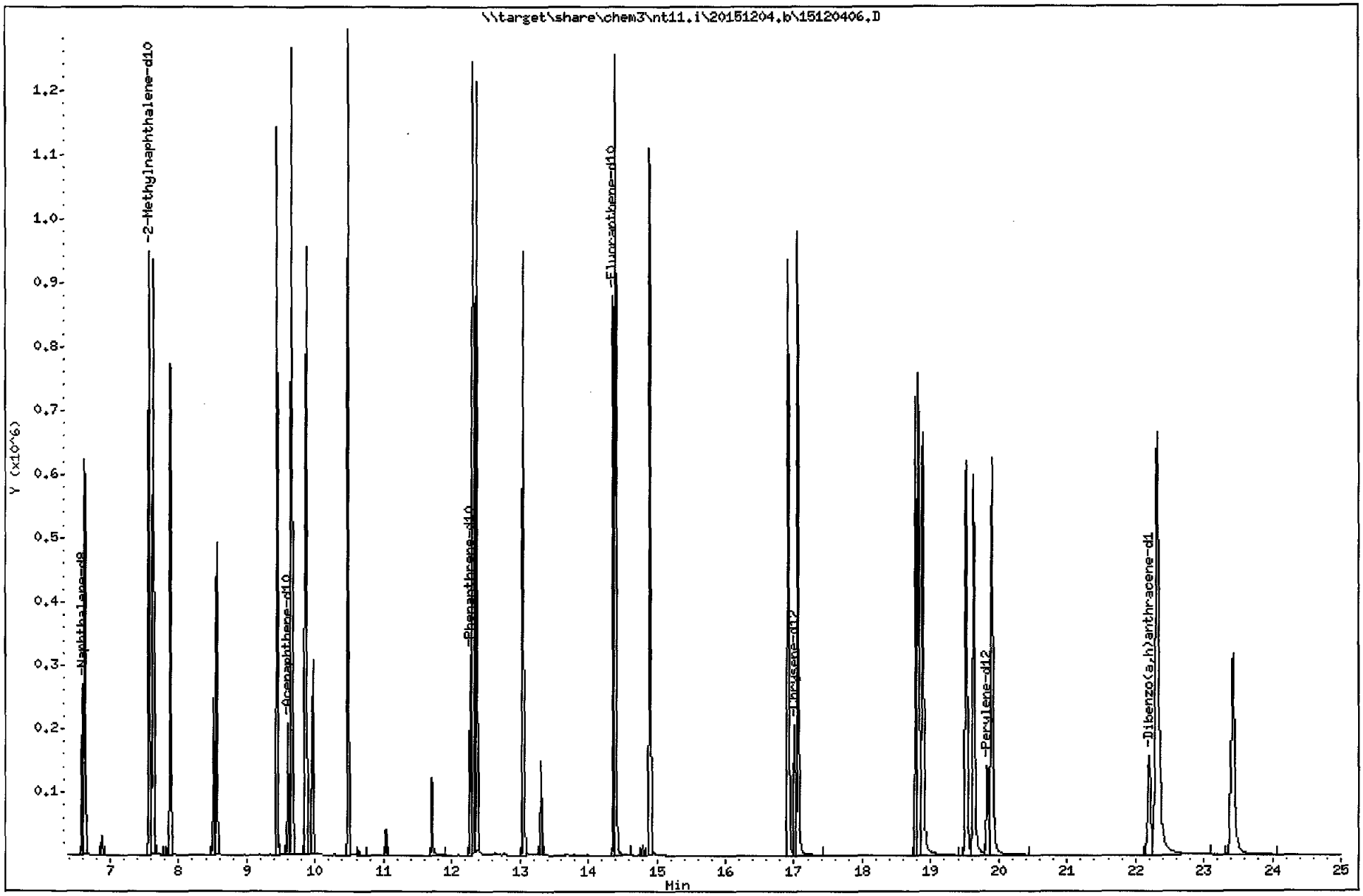
COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.60	-0.00
11 Acenaphthene-d10	9.60	9.10	10.10	9.60	-0.00
18 Phenanthrene-d10	12.27	11.77	12.77	12.27	-0.00
29 Chrysene-d12	17.02	16.52	17.52	17.01	-0.05
35 Perylene-d12	19.84	19.34	20.34	19.84	-0.00

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.

Data File: \\target\share\chem3\nt11.i\20151204.b\15120406.D
Date : 04-DEC-2015 11:03
Client ID:
Sample Info: LLSIM 500

Instrument: nt11.i
Operator: JW
Column phase: Rxi-17Sil MS
Column diameter: 0.25

AQJ9:001101



REVIEW SUMMARY FOR FILE - 15120406.D

Lab ID: LLSIM 500
nt11.i, 20151204.b\lowsim.m, 04-DEC-2015 11:03

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151204.b\lowsim.m,Sublist: PEMD.sub = 0.0000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151204.b\15120407.D
Lab Smp Id: LLSIM 1000
Inj Date : 04-DEC-2015 11:33 MS Autotune Date: 23-APR-2014 12:54
Operator : JW Inst ID: nt11.i
Smp Info : LLSIM 1000
Misc Info :
Comment :
Method : \\target\share\chem3\nt11.i\20151204.b\lowsim.m
Meth Date : 05-Dec-2015 09:24 jonathonw Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 7 Calibration Sample, Level: 6
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14

12/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ng/mL)	AMOUNTS ON-COL (ng/mL)
*	4 Naphthalene-d8	136	6.597	6.597	(1.000)	337457	200.000	
	5 Naphthalene	128	6.629	6.629	(1.005)	1745003	1000.00	895
$	6 2-Methylnaphthalene-d10	152	7.574	7.574	(1.148)	1205300	1000.00	962
	7 2-Methylnaphthalene	142	7.627	7.627	(1.156)	1272236	1000.00	950
	8 1-Methylnaphthalene	142	7.889	7.889	(1.196)	1149104	1000.00	952
	10 Acenaphthylene	152	9.445	9.445	(0.984)	1833736	1000.00	951
*	11 Acenaphthene-d10	164	9.600	9.600	(1.000)	238950	200.000	
	12 Acenaphthene	153	9.656	9.656	(1.006)	1200492	1000.00	938
	14 Dibenzofuran	168	9.866	9.866	(1.028)	1717363	1000.00	891
	15 Fluorene	166	10.486	10.486	(1.092)	1380739	1000.00	955
*	18 Phenanthrene-d10	188	12.269	12.269	(1.000)	380348	200.000	
	19 Phenanthrene	178	12.313	12.313	(1.004)	2022457	1000.00	883
	20 Anthracene	178	12.368	12.368	(1.008)	1975909	1000.00	963
$	23 Fluoranthene-d10	212	14.374	14.374	(1.172)	2020716	1000.00	966
	24 Fluoranthene	202	14.403	14.403	(1.174)	2148123	1000.00	934
	25 Pyrene	202	14.903	14.903	(0.876)	2156236	1000.00	912
	28 Benzo(a)anthracene	228	16.918	16.918	(0.995)	1918385	1000.00	964
*	29 Chrysene-d12	240	17.009	17.009	(1.000)	298514	200.000	
	30 Chrysene	228	17.059	17.059	(1.003)	1961226	1000.00	898
	44 Benzo(b)fluoranthene	252	18.785	18.785	(0.947)	1759341	1000.00	1010
	45 Benzo(k)fluoranthene	252	18.833	18.833	(0.949)	2039144	1000.00	1010
	46 Benzo(j)fluoranthene	252	18.890	18.890	(0.952)	1793610	1000.00	973
	34 Benzo(a)pyrene	252	19.630	19.630	(0.989)	1732537	1000.00	1030
*	35 Perylene-d12	264	19.842	19.842	(1.000)	256244	200.000	
$	36 Dibenzo(a,h)anthracene-d14	292	22.197	22.197	(1.119)	1208888	1000.00	1170
	37 Indeno(1,2,3-cd)pyrene	276	22.329	22.329	(1.125)	1959663	1000.00	1110
	38 Dibenzo(a,h)anthracene	278	22.307	22.307	(1.124)	1599951	1000.00	1150
	39 Benzo(g,h,i)perylene	276	23.426	23.426	(1.181)	1624015	1000.00	1060
	47 Perylene	252	19.899	19.899	(1.003)	1731385	1000.00	997
	48 Benzo(e)pyrene	252	19.524	19.524	(0.984)	1724956	1000.00	983

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120407.D
Lab Smp Id: LLSIM 1000
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151204.b\lowsim.m
Misc Info:

Calibration Date: 04-DEC-2015
Calibration Time: 09:03
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	337457	2.92
11 Acenaphthene-d10	239179	119590	478358	238950	-0.10
18 Phenanthrene-d10	372253	186127	744506	380348	2.17
29 Chrysene-d12	294711	147356	589422	298514	1.29
35 Perylene-d12	260595	130298	521190	256244	-1.67

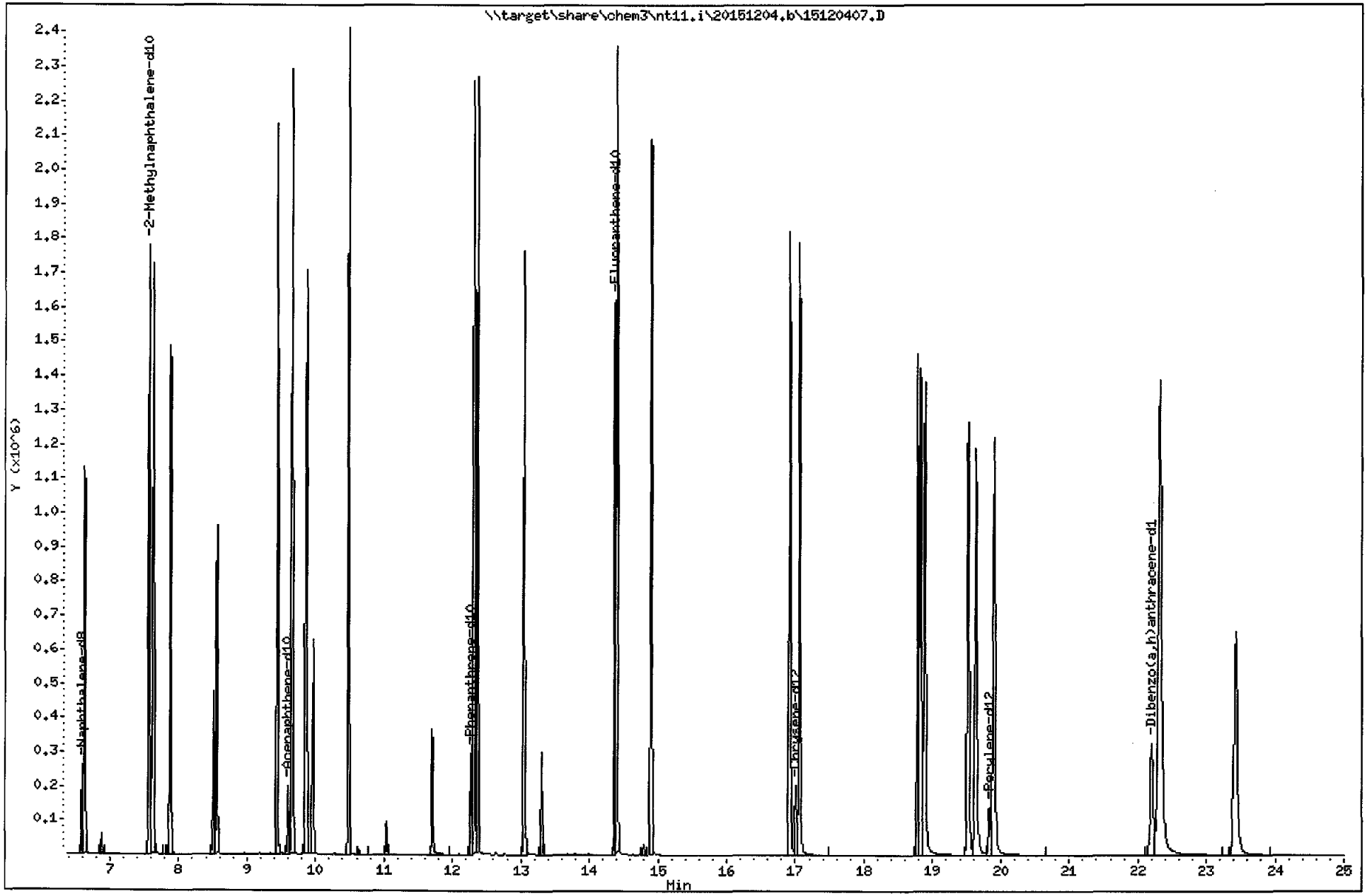
COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.60	-0.00
11 Acenaphthene-d10	9.60	9.10	10.10	9.60	-0.00
18 Phenanthrene-d10	12.27	11.77	12.77	12.27	-0.00
29 Chrysene-d12	17.02	16.52	17.52	17.01	-0.05
35 Perylene-d12	19.84	19.34	20.34	19.84	-0.00

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.

Data File: \\target\share\chem3\nt11.i\20151204.b\15120407.D
Date : 04-DEC-2015 11:33
Client ID:
Sample Info: LLSIM 1000

Instrument: nt11.i
Operator: JW
Column phase: Rxi-17Sil MS
Column diameter: 0.25

AQJ9:00105



REVIEW SUMMARY FOR FILE - 15120407.D

Lab ID: LLSIM 1000
nt11.i, 20151204.b\lowsim.m, 04-DEC-2015 11:33

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151204.b\lowsim.m,Sublist: PEMD.sub = 0.0000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151204.b\15120408.D
Lab Smp Id: LLSIM SCV 250
Inj Date : 04-DEC-2015 12:04 MS Autotune Date: 23-APR-2014 12:5
Operator : JW Inst ID: nt11.i
Smp Info : LLSIM SCV 250
Misc Info :
Comment :
Method : \\target\share\chem3\nt11.i\20151204.b\lowsim.m
Meth Date : 05-Dec-2015 09:24 jonathonw Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 8
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt / Vo * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	500.000	Final Extract Volume (uL)
Vo	500.000	Sample Volume extracted (mL)
Cpnd Variable		Local Compound Variable

JW 12/5/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	FINAL (ng/L)
*	4 Naphthalene-d8	136	6.597	6.597	(1.000)	330144	200.000	
	5 Naphthalene	128	6.629	6.629	(1.005)	446422	234.100	234
$	6 2-Methylnaphthalene-d10	152	Compound Not Detected.					
	7 2-Methylnaphthalene	142	7.627	7.627	(1.156)	286909	218.968	219
	8 1-Methylnaphthalene	142	7.889	7.889	(1.196)	286856	242.931	243
	10 Acenaphthylene	152	9.445	9.445	(0.984)	450083	235.922	236
*	11 Acenaphthene-d10	164	9.600	9.600	(1.000)	236381	200.000	
	12 Acenaphthene	153	9.656	9.656	(1.006)	307274	242.667	243
	14 Dibenzofuran	168	Compound Not Detected.					
	15 Fluorene	166	10.486	10.486	(1.092)	337933	236.220	236
*	18 Phenanthrene-d10	188	12.269	12.269	(1.000)	360337	200.000	
	19 Phenanthrene	178	12.313	12.313	(1.004)	535994	246.891	247
	20 Anthracene	178	12.368	12.368	(1.008)	485229	249.701	250
$	23 Fluoranthene-d10	212	Compound Not Detected.					
	24 Fluoranthene	202	14.403	14.403	(1.174)	518632	237.945	238
	25 Pyrene	202	14.903	14.903	(0.876)	586418	254.458	254
	28 Benzo(a)anthracene	228	16.918	16.918	(0.995)	456787	235.431	235
*	29 Chrysene-d12	240	17.009	17.009	(1.000)	291007	200.000	
	30 Chrysene	228	17.059	17.059	(1.003)	500271	234.930	235
	44 Benzo(b)fluoranthene	252	18.784	18.785	(0.947)	394832	240.567	241
	45 Benzo(k)fluoranthene	252	18.823	18.833	(0.949)	474361	248.024	248
	46 Benzo(j)fluoranthene	252	Compound Not Detected.					

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ng/L)
	34 Benzo(a)pyrene.	252	19.630	19.630	(0.990)	391410	247.108	247
*	35 Perylene-d12	264	19.832	19.842	(1.000)	242244	200.000	
$	36 Dibenzo(a,h)anthracene-d14	292	Compound Not Detected.					
	37 Indeno(1,2,3-cd)pyrene	276	22.329	22.329	(1.126)	412835	248.231	248
	38 Dibenzo(a,h)anthracene	278	22.307	22.307	(1.125)	328597	249.858	250
	39 Benzo(g,h,i)perylene	276	23.426	23.426	(1.181)	360543	249.725	250
	47 Perylene	252	Compound Not Detected.					
	48 Benzo(e)pyrene	252	Compound Not Detected.					

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120408.D
Lab Smp Id: LLSIM SCV 250
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151204.b\lowsim.m
Misc Info:

Calibration Date: 04-DEC-2015
Calibration Time: 09:03

Level: LOW
Sample Type: WATER

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	330144	0.69
11 Acenaphthene-d10	239179	119590	478358	236381	-1.17
18 Phenanthrene-d10	372253	186127	744506	360337	-3.20
29 Chrysene-d12	294711	147356	589422	291007	-1.26
35 Perylene-d12	260595	130298	521190	242244	-7.04

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.60	-0.00
11 Acenaphthene-d10	9.60	9.10	10.10	9.60	-0.00
18 Phenanthrene-d10	12.27	11.77	12.77	12.27	-0.00
29 Chrysene-d12	17.02	16.52	17.52	17.01	-0.05
35 Perylene-d12	19.84	19.34	20.34	19.83	-0.05

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.

ARI Labs, Inc.

RECOVERY REPORT

Client Name: Client SDG: SDGa03180
Sample Matrix: LIQUID Fraction: SV
Lab Smp Id: LLSIM SCV 250
Level: LOW Operator: JW
Data Type: MS DATA SampleType: SAMPLE
SpikeList File: waterlcs.spk Quant Type: ISTD
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151204.b\lowsim.m
Misc Info:

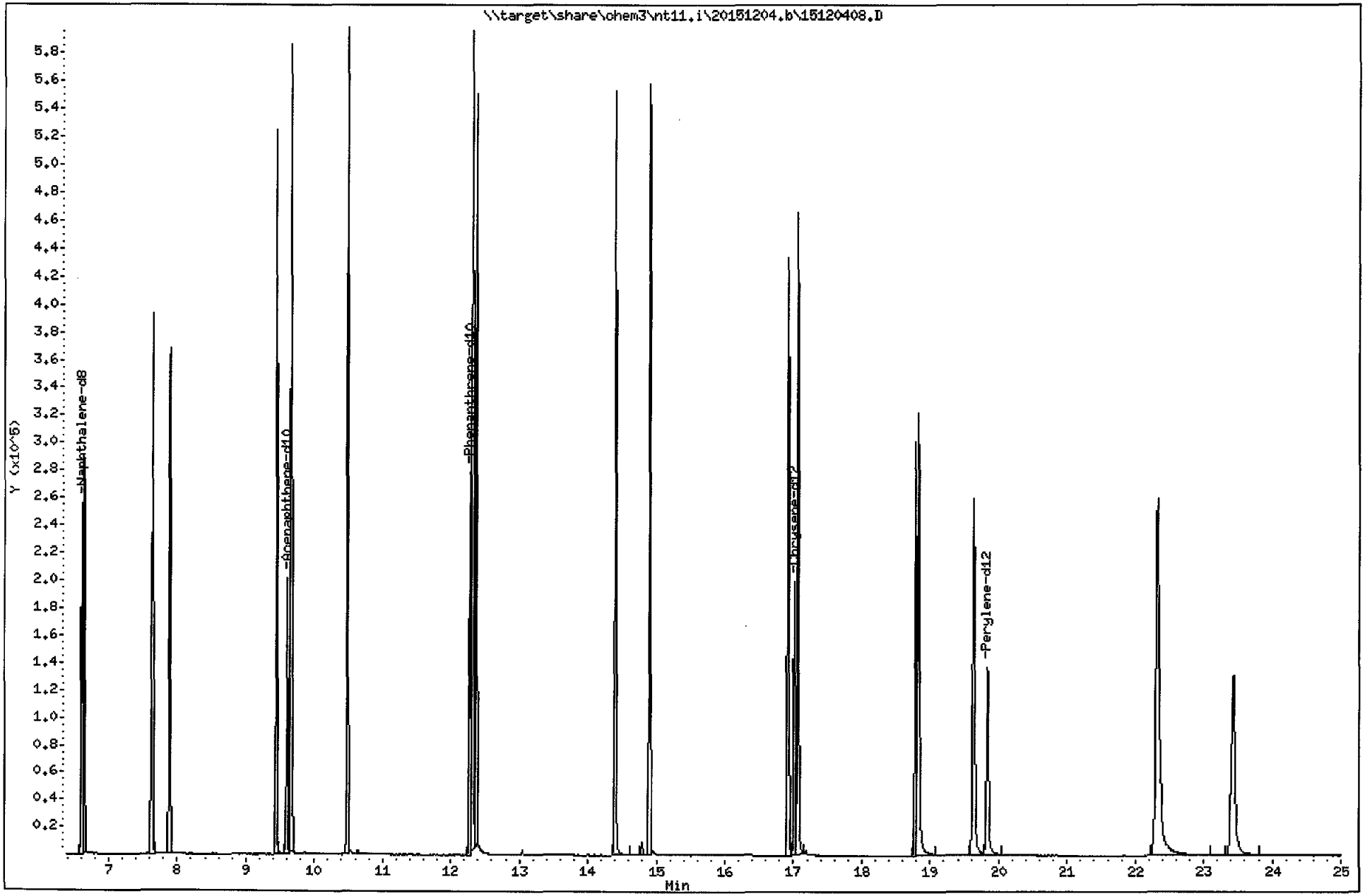
SURROGATE COMPOUND	CONC ADDED ng/L	CONC RECOVERED ng/L	% RECOVERED	LIMITS
$ 6 2-Methylnaphthale	6000	0.000	*	42-120
$ 23 Fluoranthene-d10	6000	0.000	*	57-120
$ 36 Dibenzo(a,h)anthr	6000	0.000	*	29-120

no surr

Data File: \\target\share\ohem3\nt11.i\20151204.b\15120408.D
Date : 04-DEC-2015 12:04
Client ID:
Sample Info: LLSIM SCV 250
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: JW
Column diameter: 0.25

AQJ9:00111



Data File: \\target\share\chem3\nt11.i\20151204.b\15120408.D

Date : 04-DEC-2015 12:04

Client ID:

Instrument: nt11.i

Sample Info: LLSIM SCV 250

Volume Injected (uL): 2.0

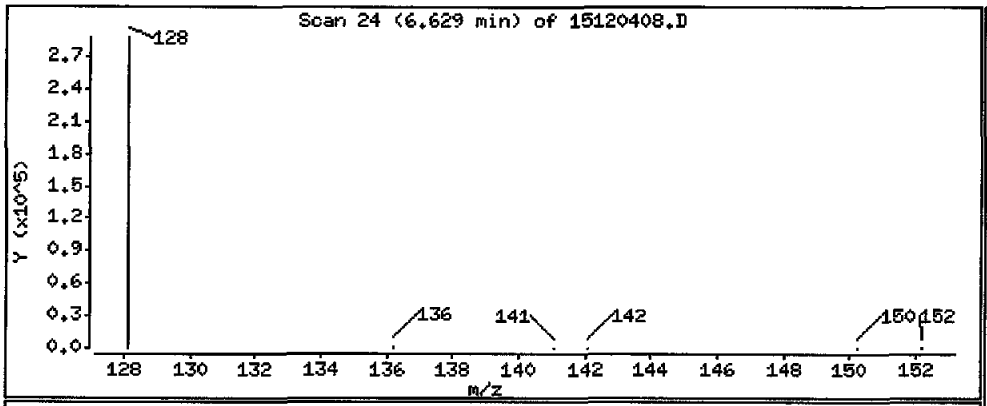
Operator: JW

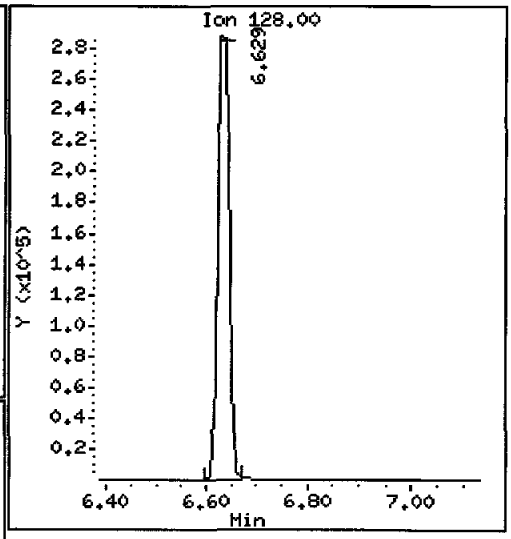
Column phase: Rxi-17Sil MS

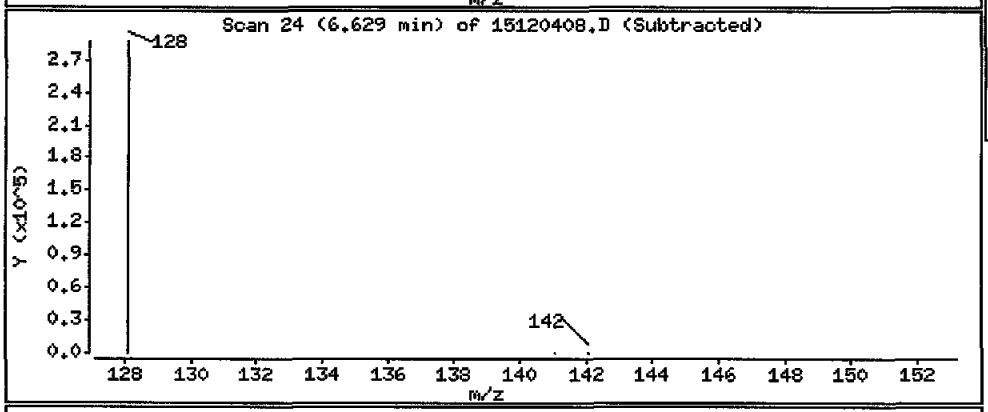
Column diameter: 0.25

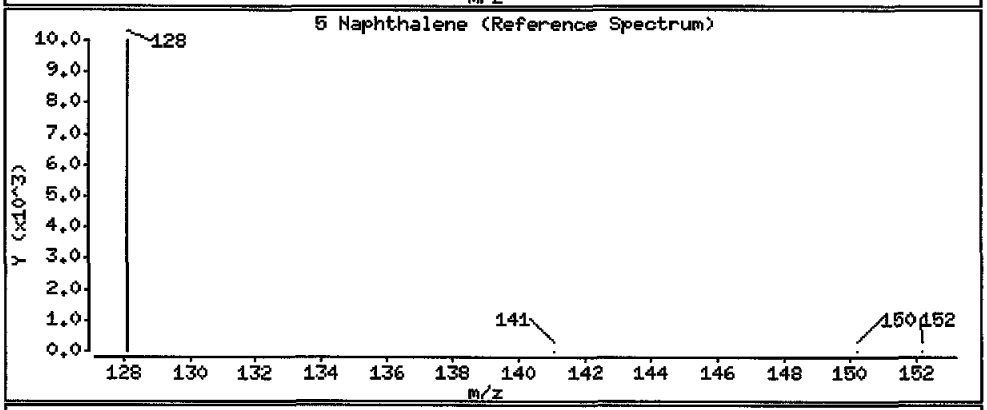
5 Naphthalene

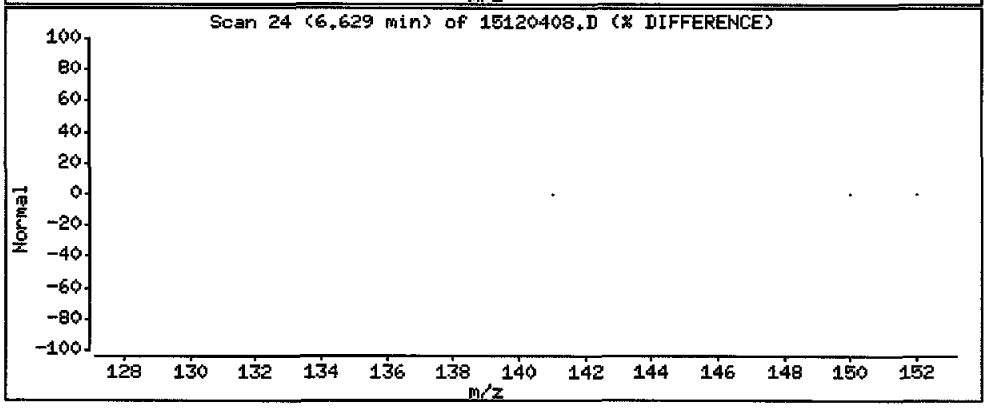
Concentration: 234 ng/L











Data File: \\target\share\chem3\nt11.i\20151204.b\15120408.D

Date : 04-DEC-2015 12:04

Client ID:

Instrument: nt11.i

Sample Info: LLSIM SCV 250

Volume Injected (uL): 2.0

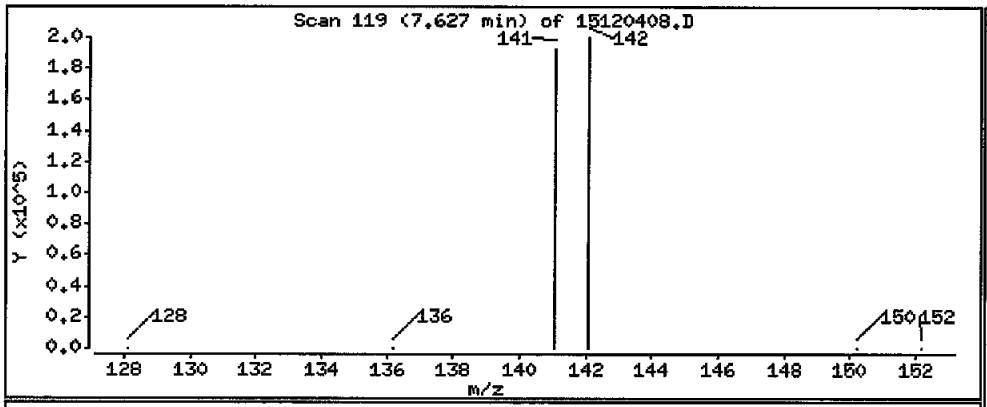
Operator: JW

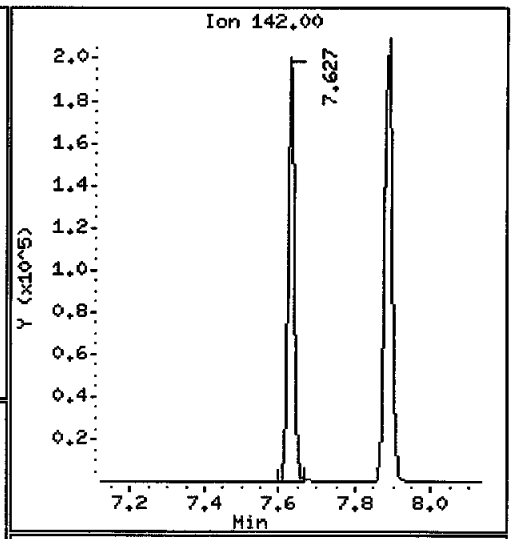
Column phase: Rxi-17Sil MS

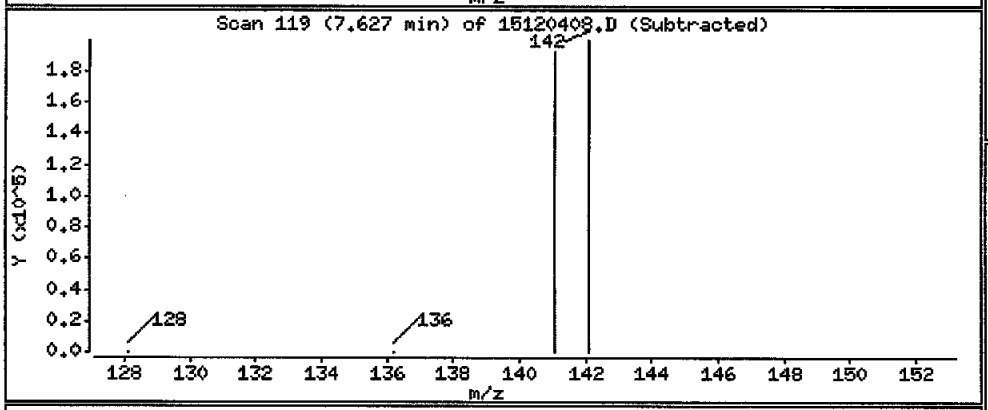
Column diameter: 0.25

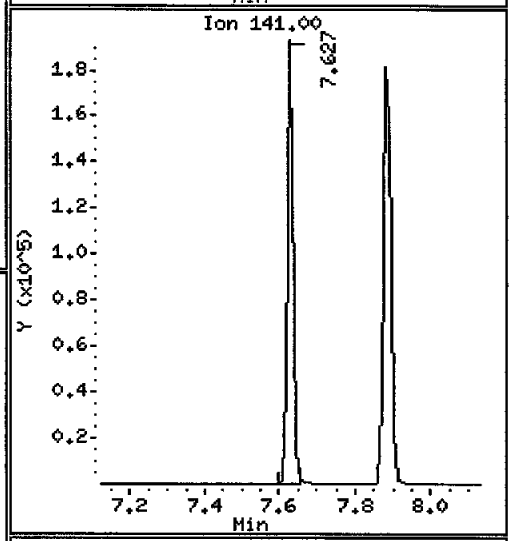
7 2-Methylnaphthalene

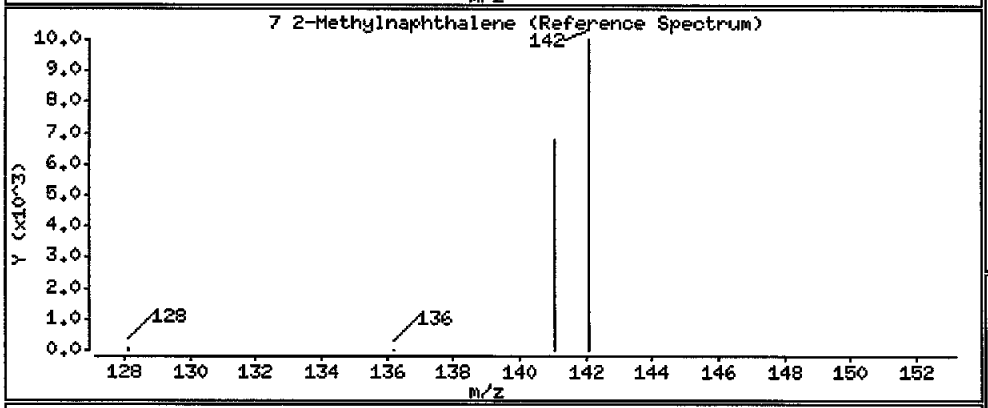
Concentration: 219 ng/L

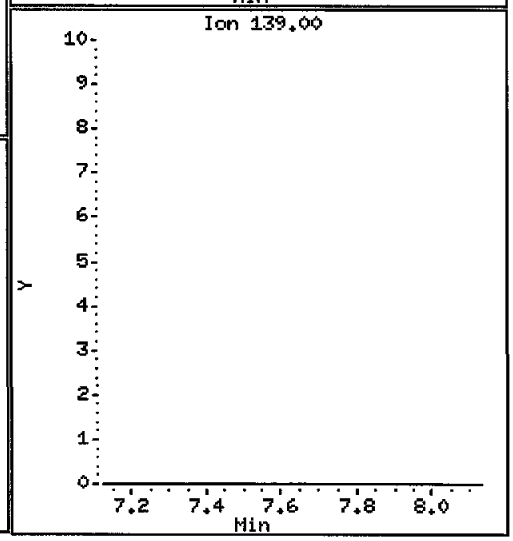


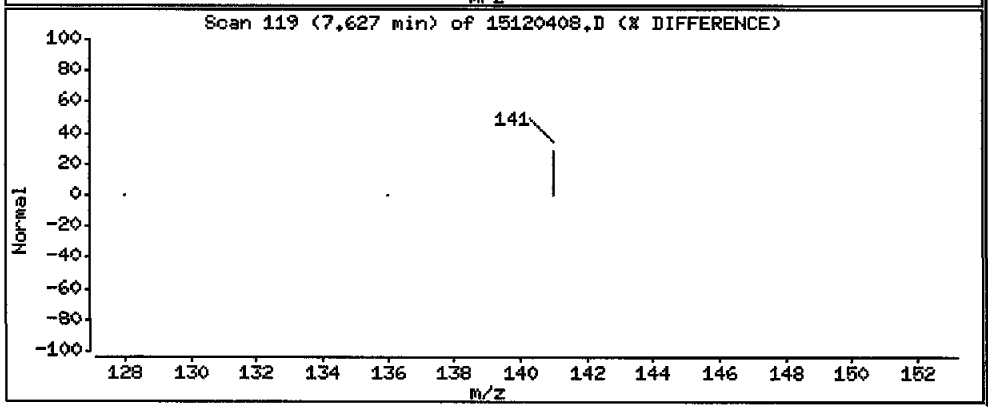












Data File: \\target\share\chem3\nt11.i\20151204.b\15120408.D

Date : 04-DEC-2015 12:04

Client ID:

Instrument: nt11.i

Sample Info: LLSIM SCV 250

Volume Injected (uL): 2.0

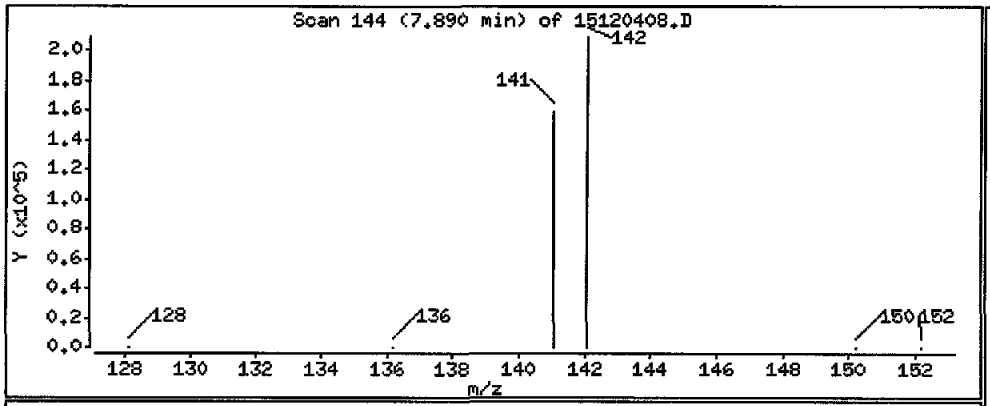
Operator: JW

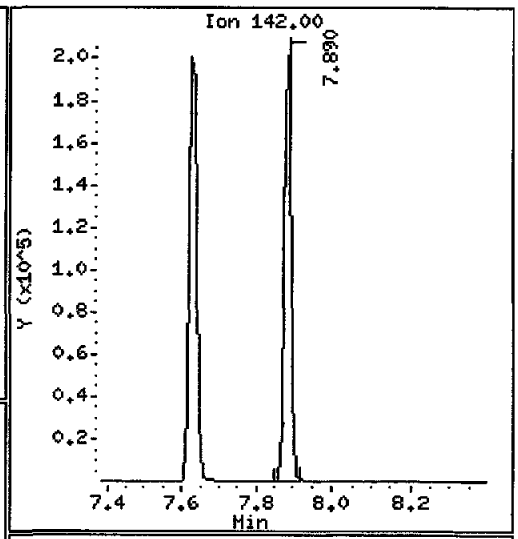
Column phase: Rxi-17Sil MS

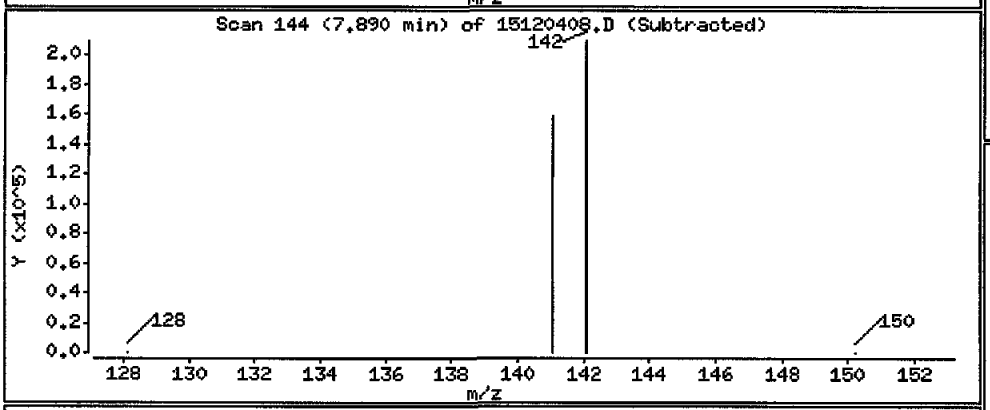
Column diameter: 0.25

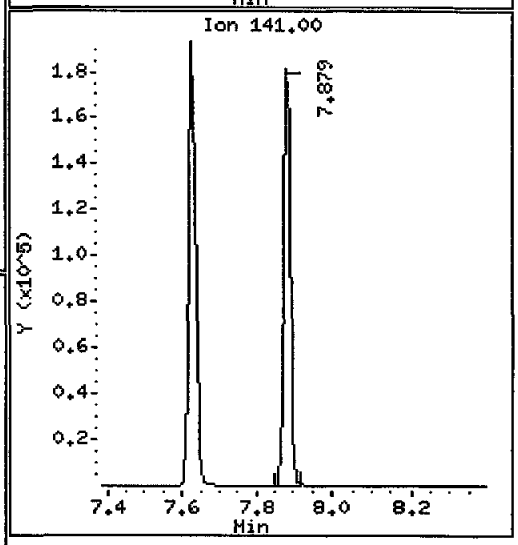
8 1-Methylnaphthalene

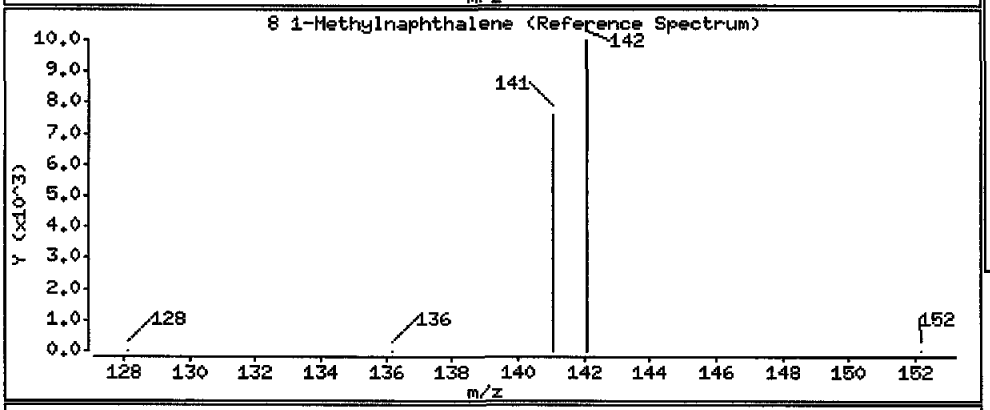
Concentration: 243 ng/L

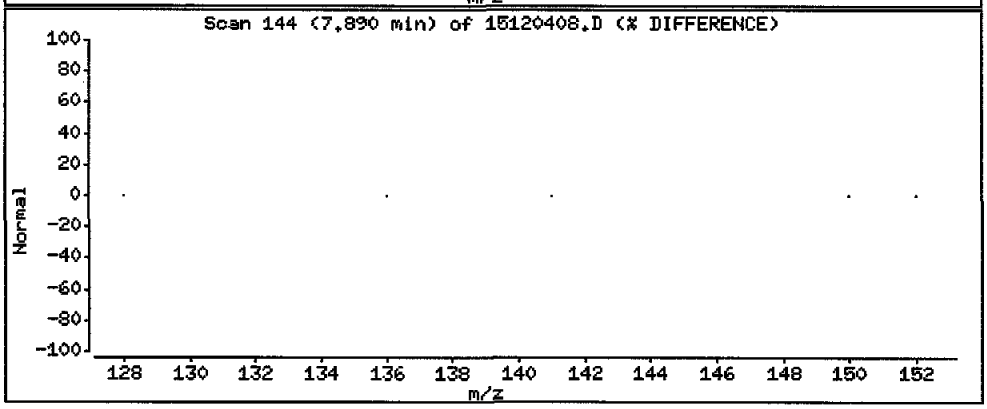












Data File: \\target\share\chem3\nt11.i\20151204.b\15120408.D

Date : 04-DEC-2015 12:04

Client ID:

Instrument: nt11.i

Sample Info: LLSIM SCV 250

Volume Injected (uL): 2.0

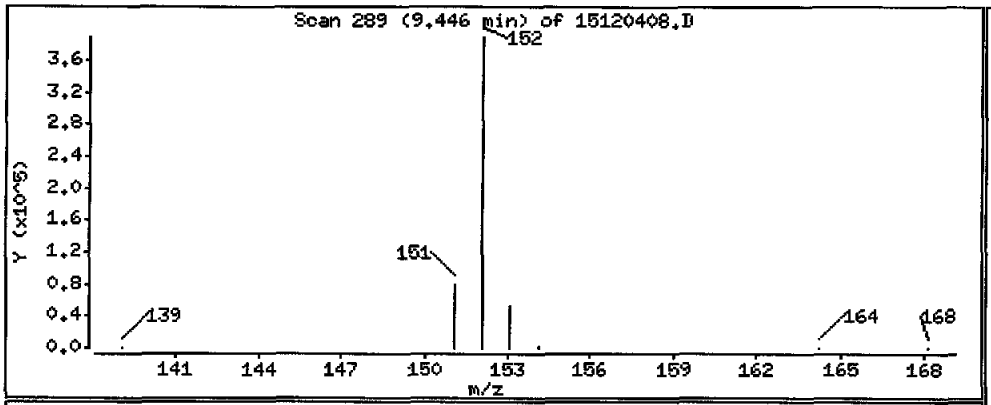
Operator: JW

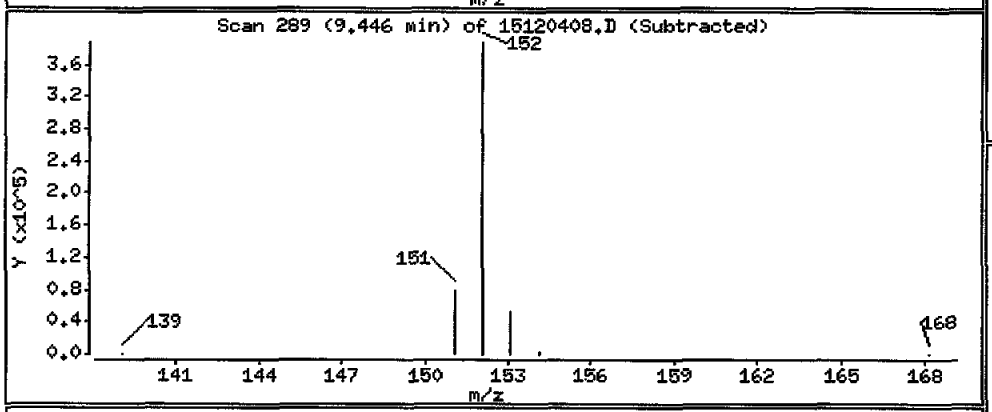
Column phase: Rxi-17Sil MS

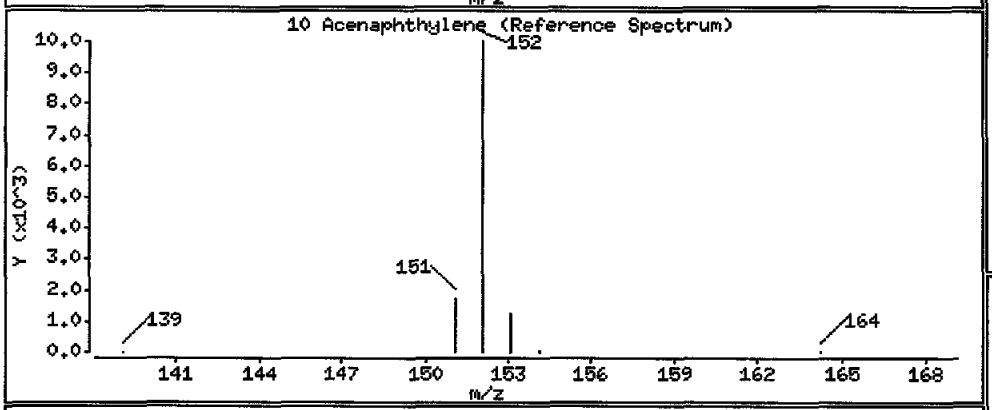
Column diameter: 0.25

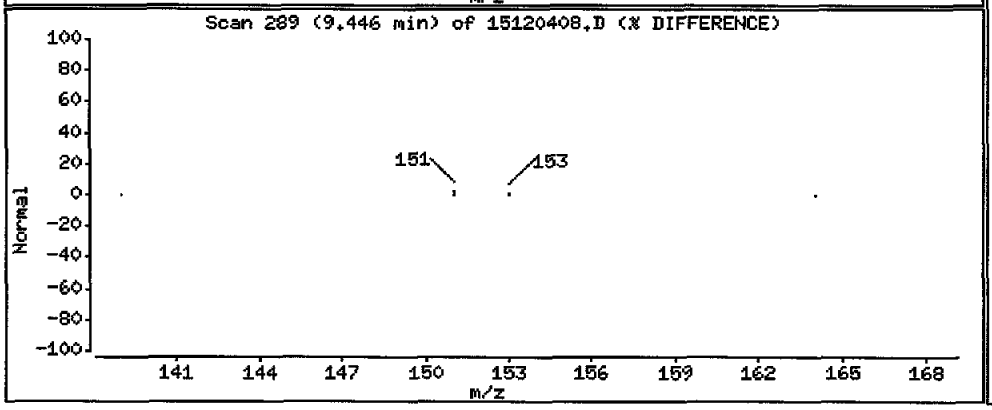
10 Acenaphthylene

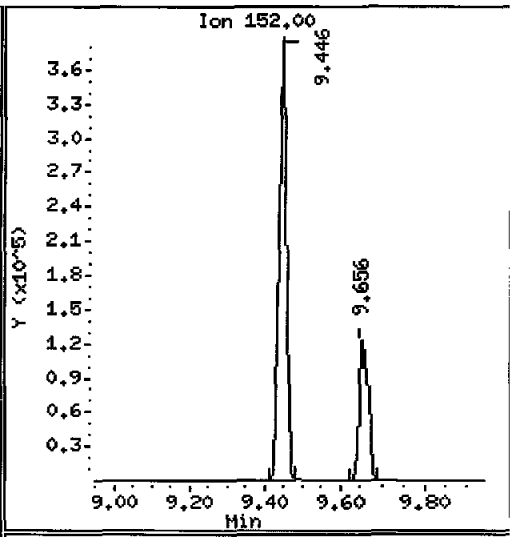
Concentration: 236 ng/L

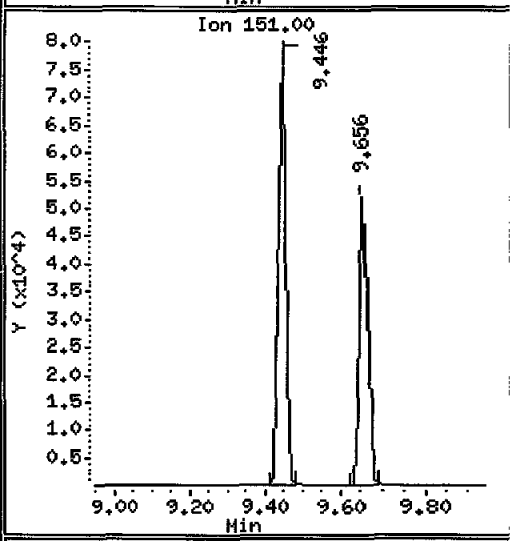


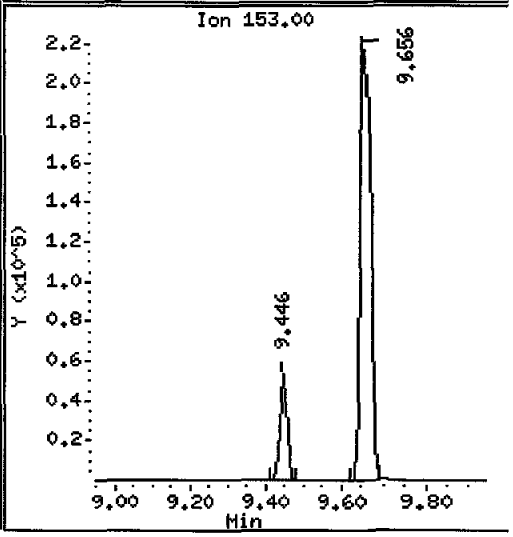












Data File: \\target\share\chem3\nt11.i\20151204.b\15120408.D

Date : 04-DEC-2015 12:04

Client ID:

Instrument: nt11.i

Sample Info: LLSIM SCV 250

Volume Injected (uL): 2.0

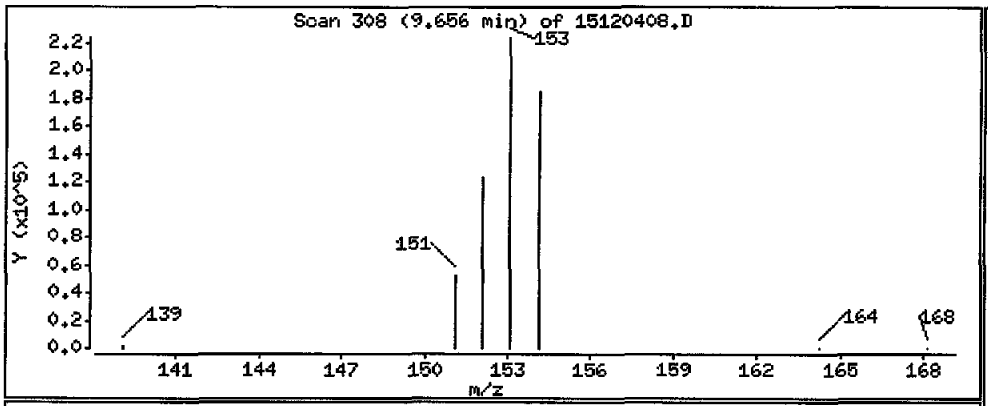
Operator: JW

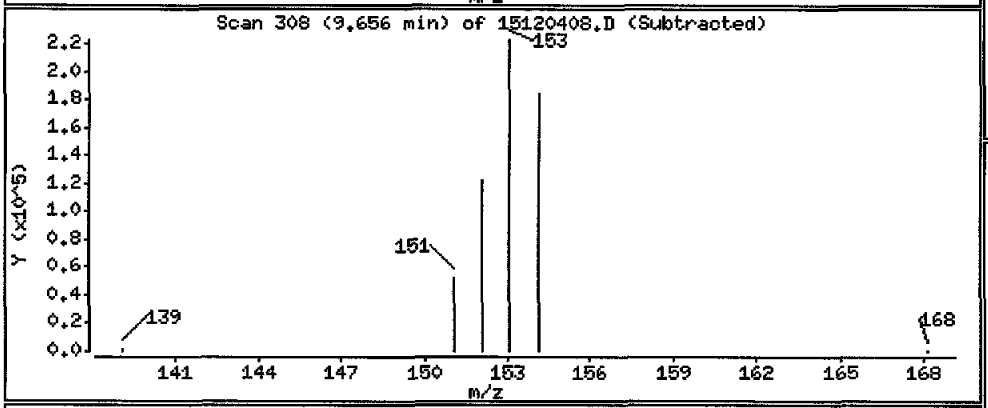
Column phase: Rxi-17Sil MS

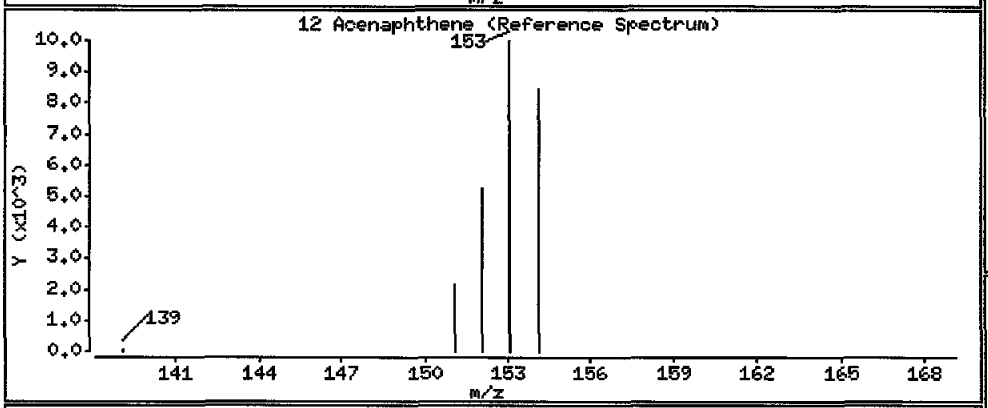
Column diameter: 0.25

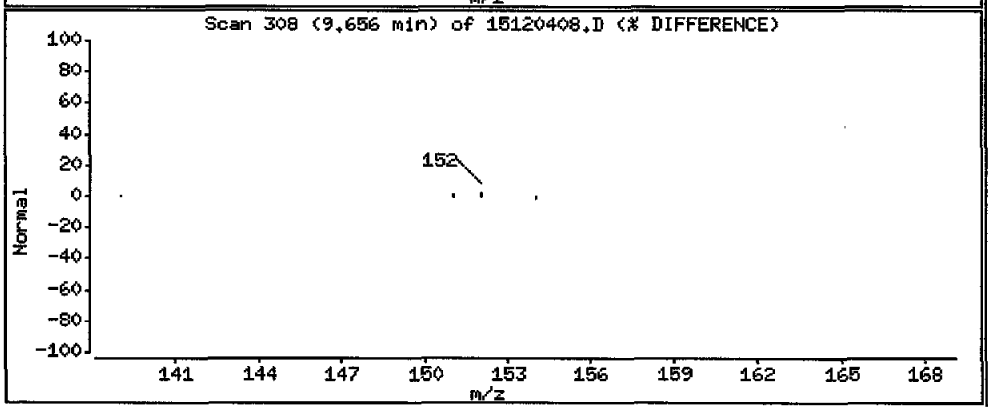
12 Acenaphthene

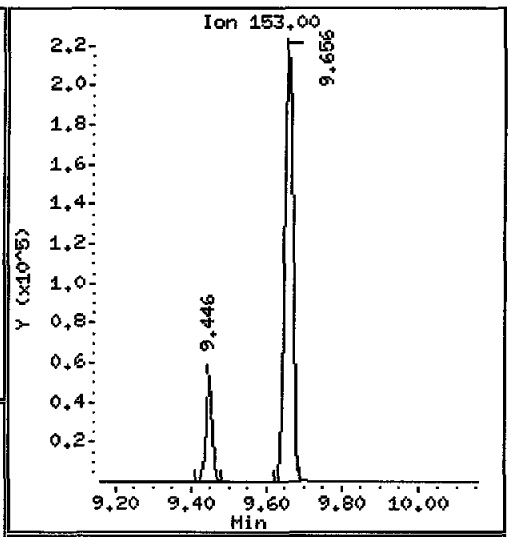
Concentration: 243 ng/L

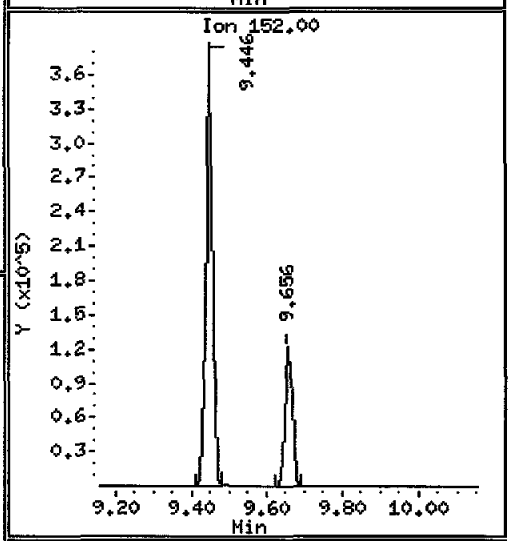


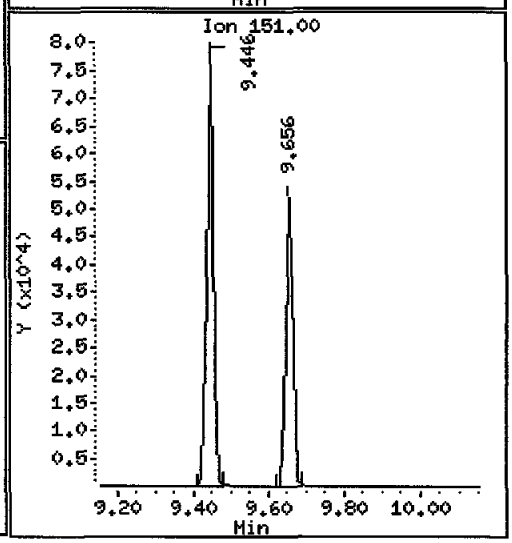












Data File: \\target\share\chem3\nt11.i\20151204.b\15120408.D

Date : 04-DEC-2015 12:04

Client ID:

Instrument: nt11.i

Sample Info: LLSIM SCV 250

Volume Injected (uL): 2.0

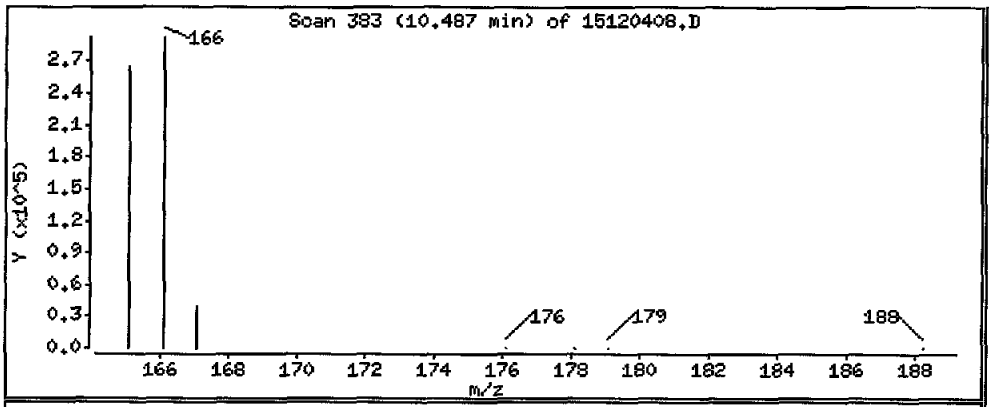
Operator: JW

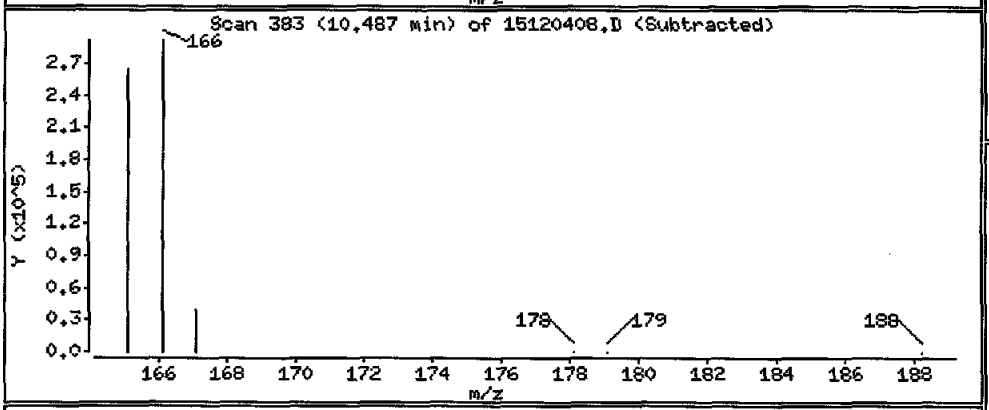
Column phase: Rxi-17Sil MS

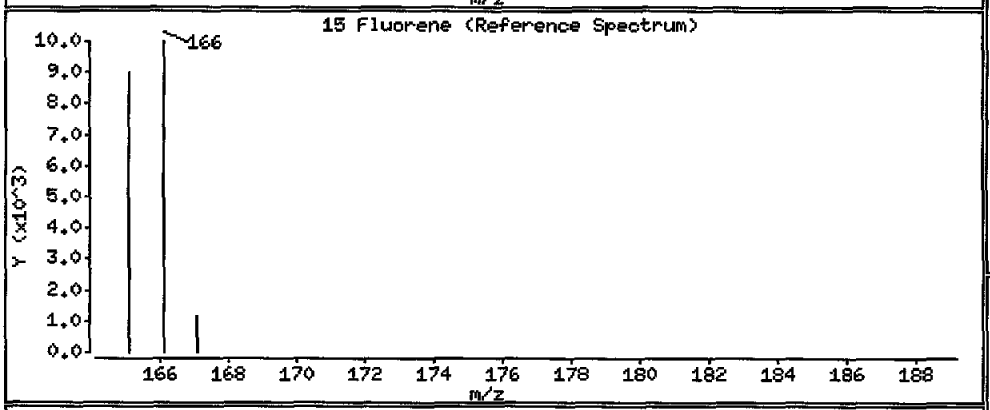
Column diameter: 0.25

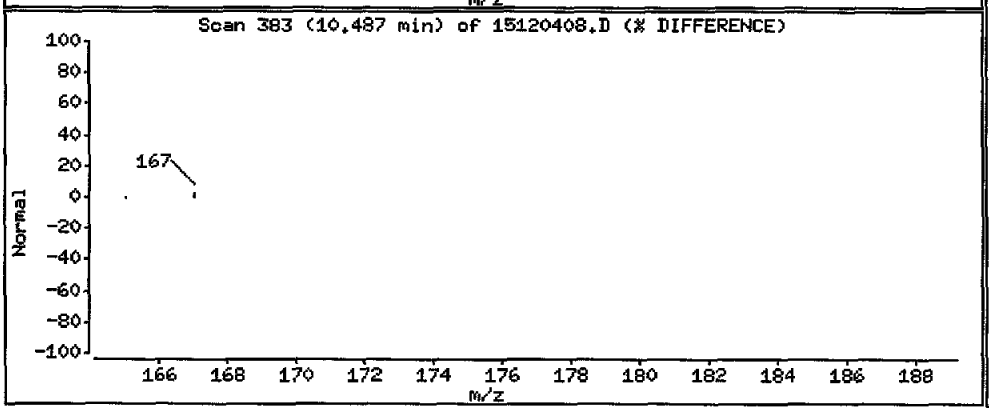
15 Fluorene

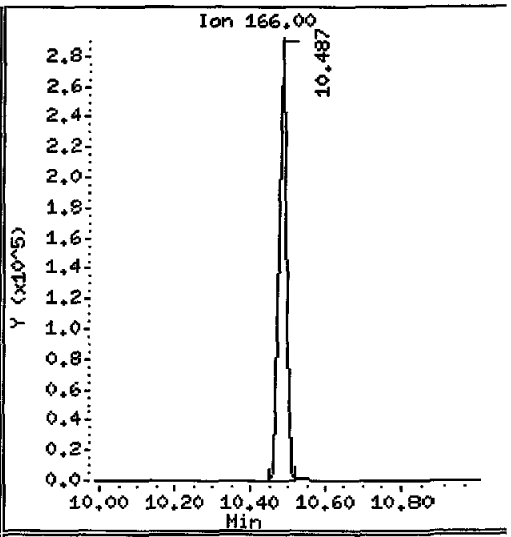
Concentration: 236 ng/L

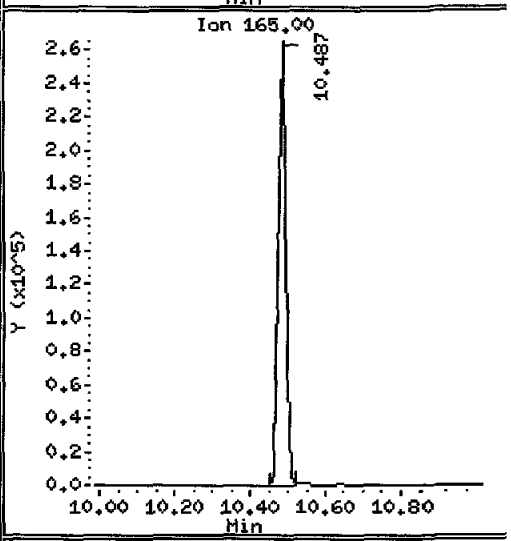


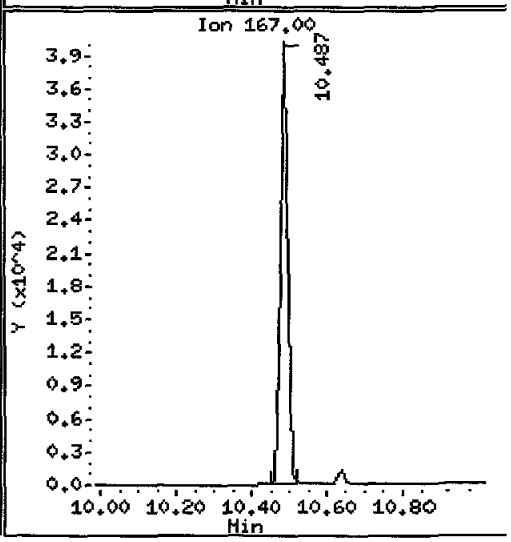












Data File: \\target\share\chem3\nt11.i\20151204.b\15120408.D

Date : 04-DEC-2015 12:04

Client ID:

Instrument: nt11.i

Sample Info: LLSIM SCV 250

Volume Injected (uL): 2.0

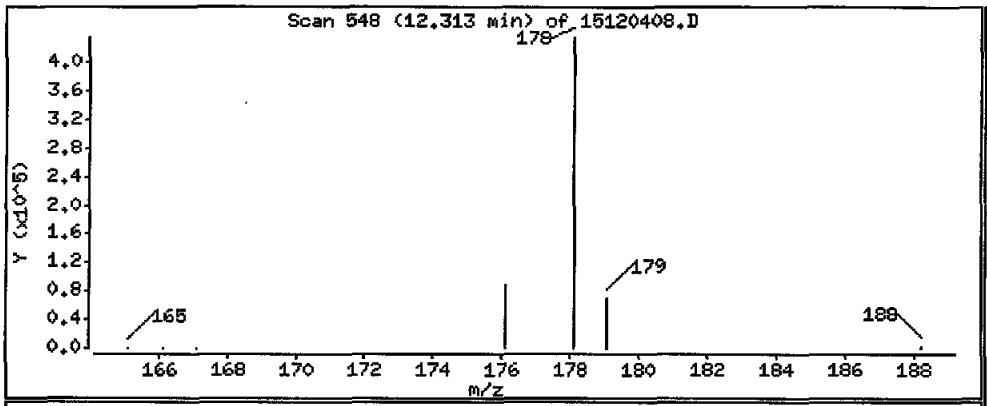
Operator: JW

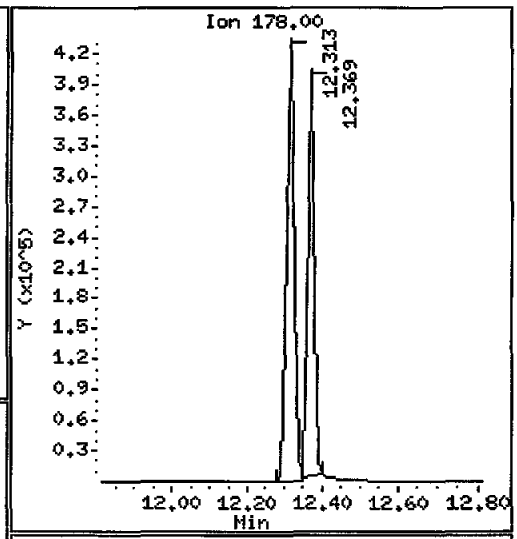
Column phase: Rxi-17Sil MS

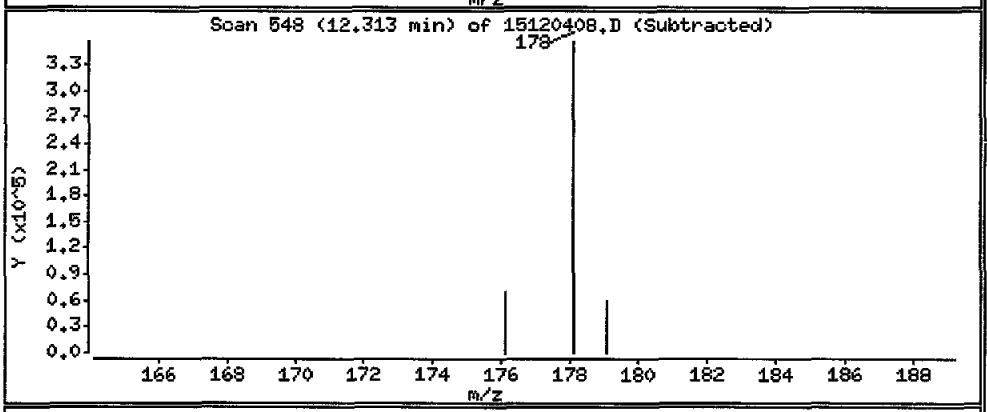
Column diameter: 0.25

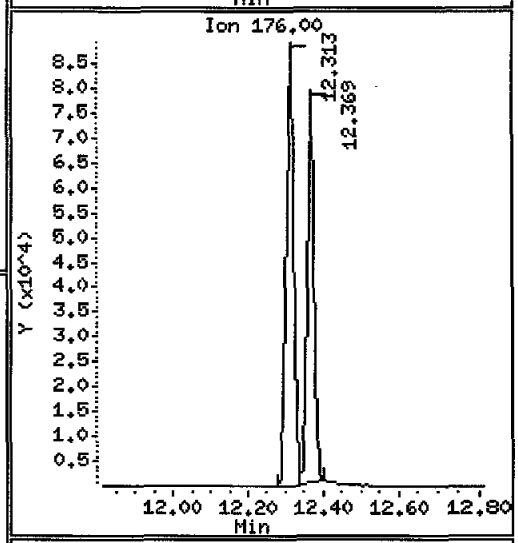
19 Phenanthrene

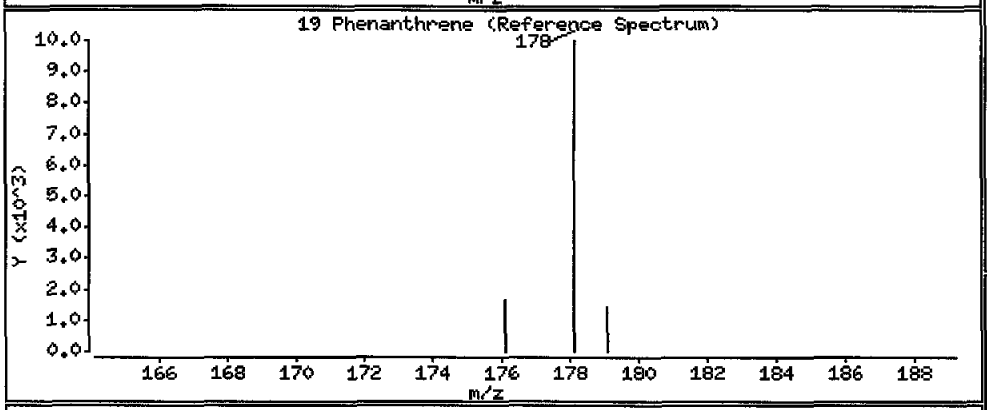
Concentration: 247 ng/L

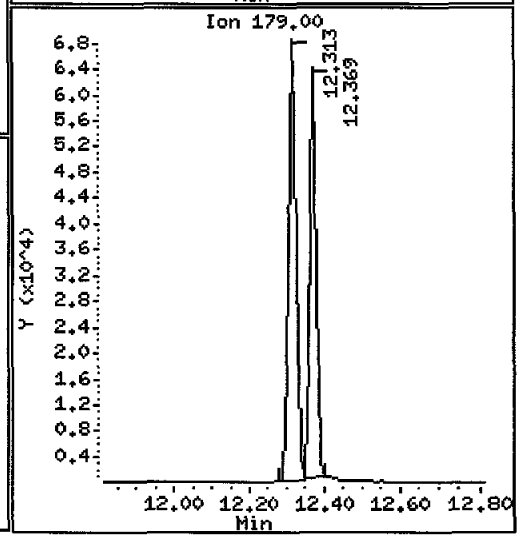


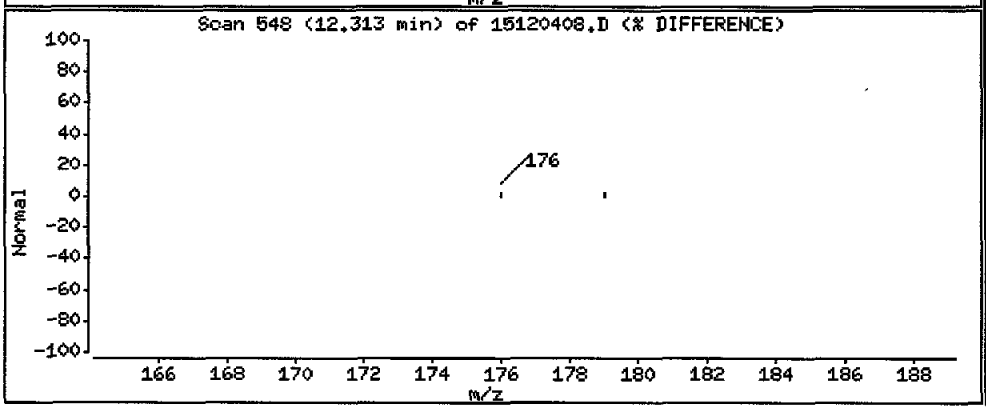












Data File: \\target\share\chem3\nt11.i\20151204.b\15120408.D

Date : 04-DEC-2015 12:04

Client ID:

Instrument: nt11.i

Sample Info: LLSIM SCV 250

Volume Injected (uL): 2.0

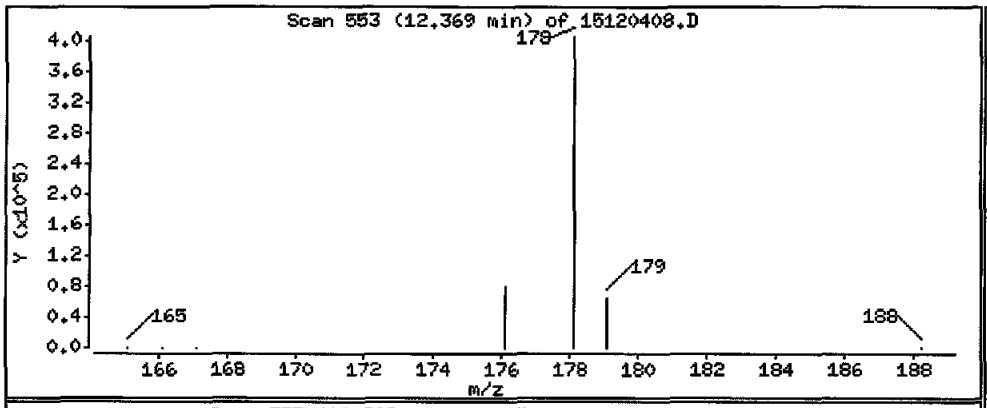
Operator: JW

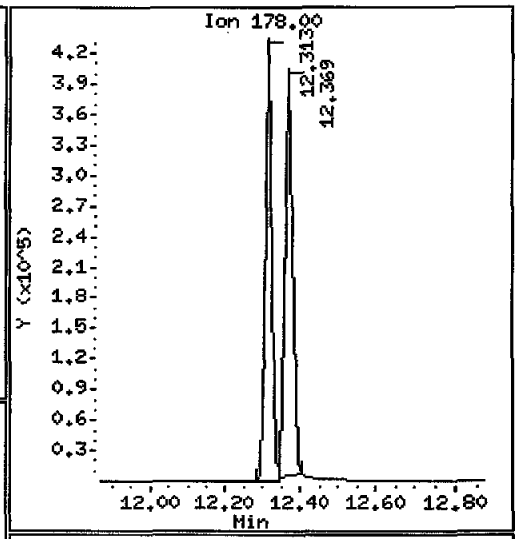
Column phase: Rxi-17Sil MS

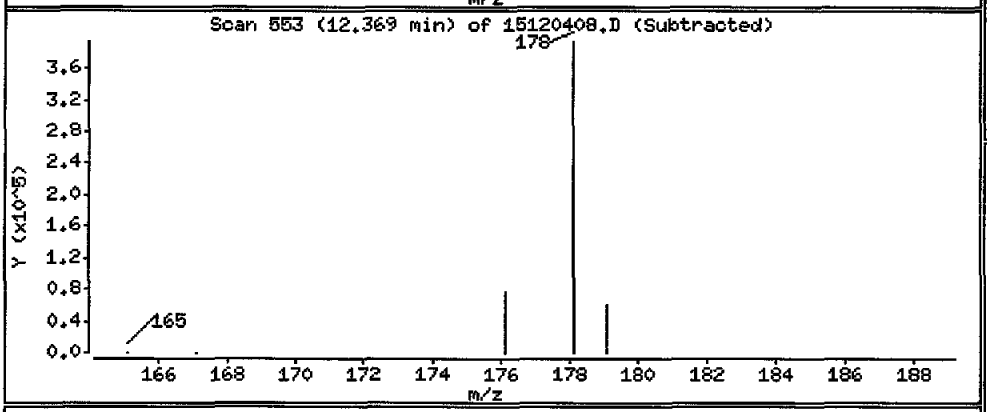
Column diameter: 0.25

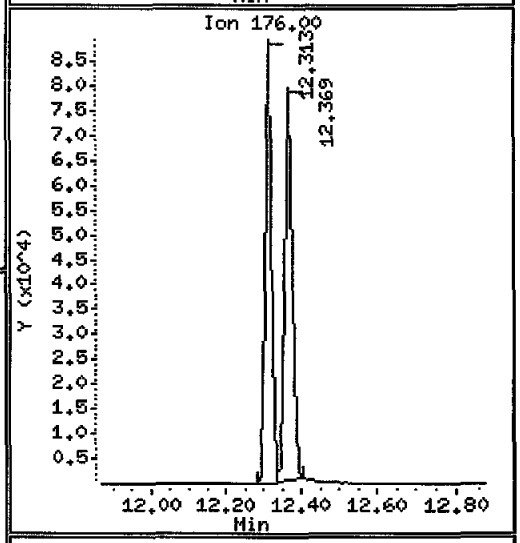
20 Anthracene

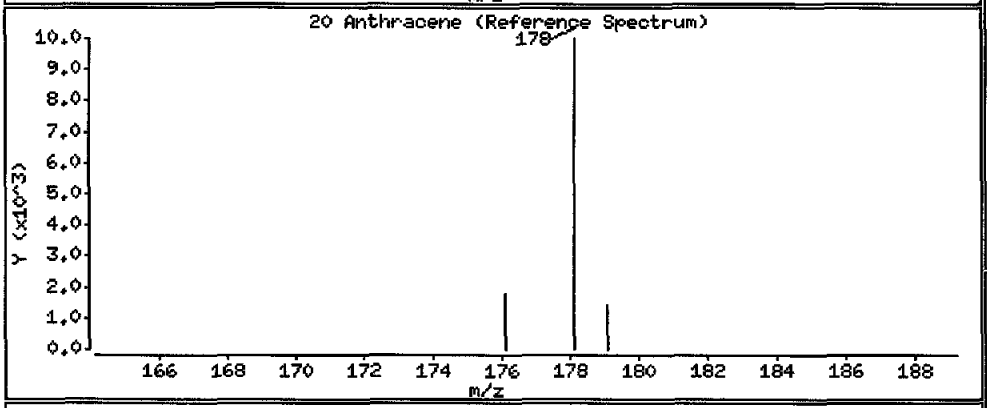
Concentration: 250 ng/L

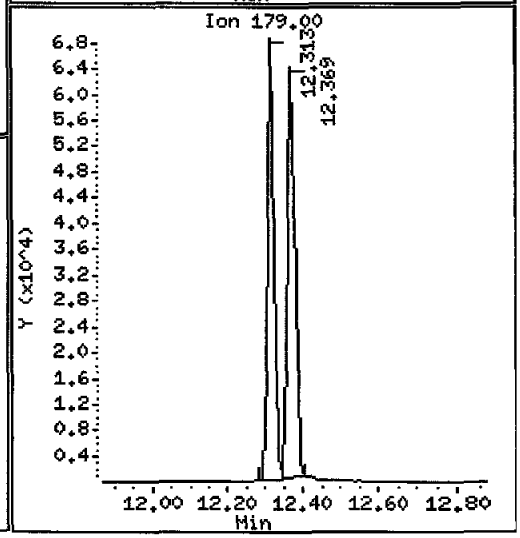


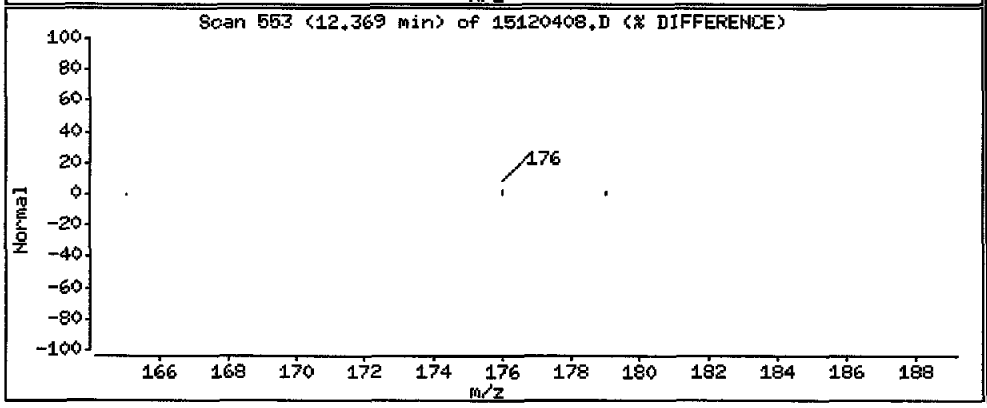












Data File: \\target\share\chem3\nt11.i\20151204.b\15120408.D

Date : 04-DEC-2015 12:04

Client ID:

Instrument: nt11.i

Sample Info: LLSIM SCV 250

Volume Injected (uL): 2.0

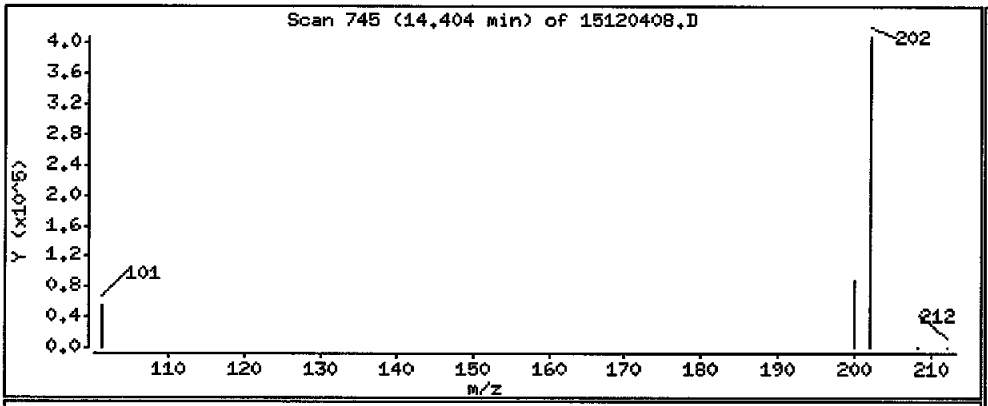
Operator: JW

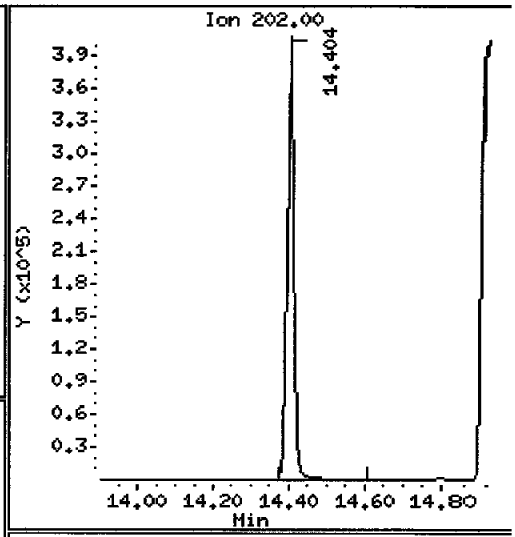
Column phase: Rxi-17Sil MS

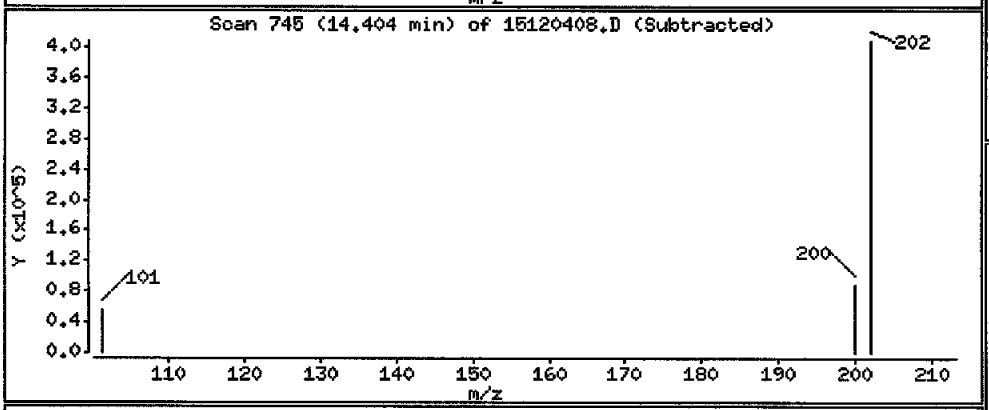
Column diameter: 0.25

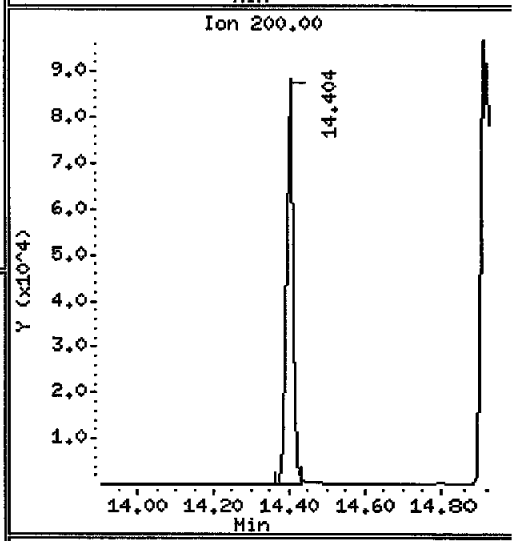
24 Fluoranthene

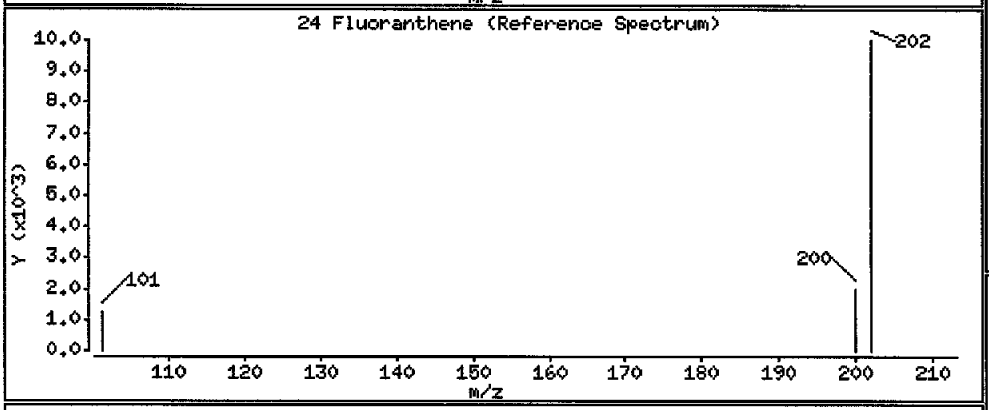
Concentration: 238 ng/L

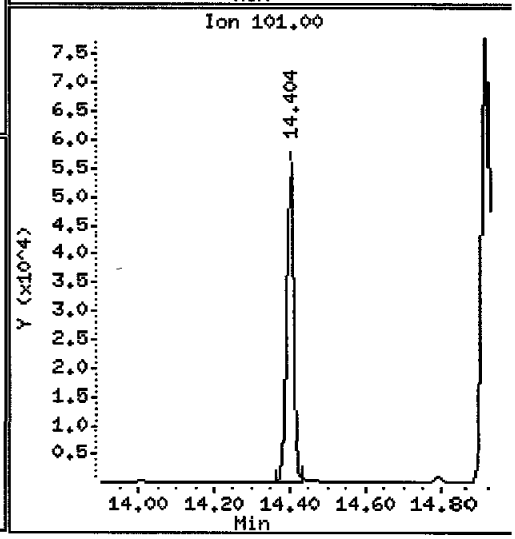


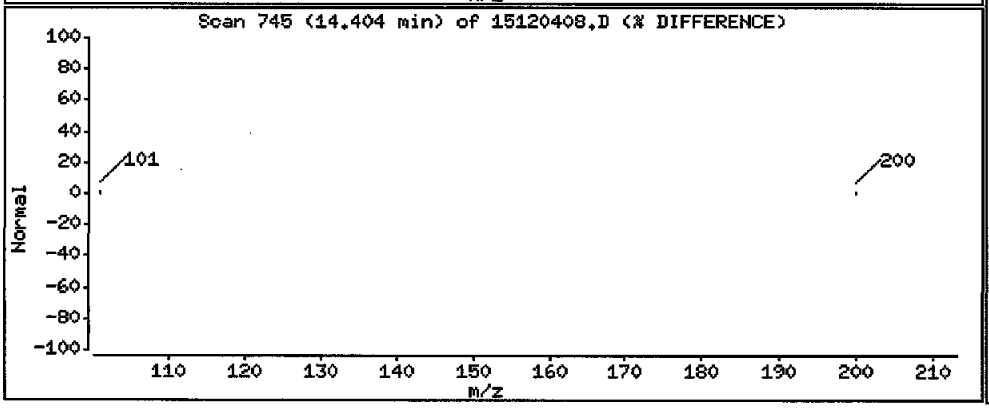












Data File: \\target\share\chem3\nt11.i\20151204.b\15120408.D

Date : 04-DEC-2015 12:04

Client ID:

Instrument: nt11.i

Sample Info: LLSIM SCV 250

Volume Injected (uL): 2.0

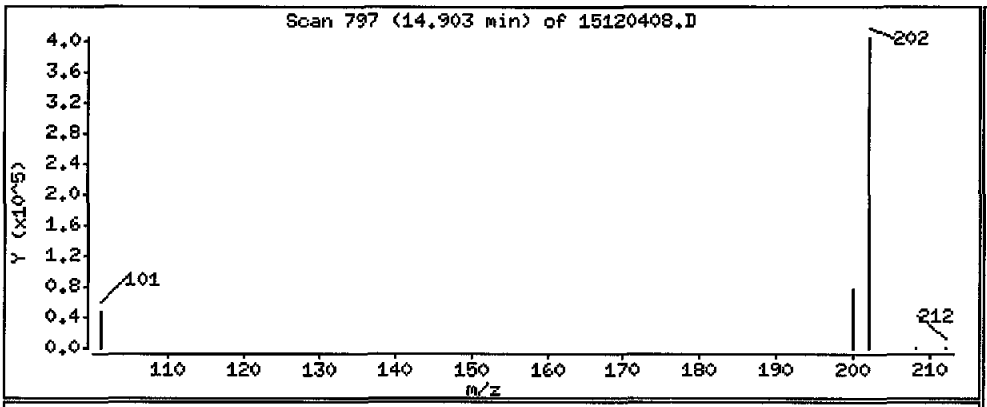
Operator: JW

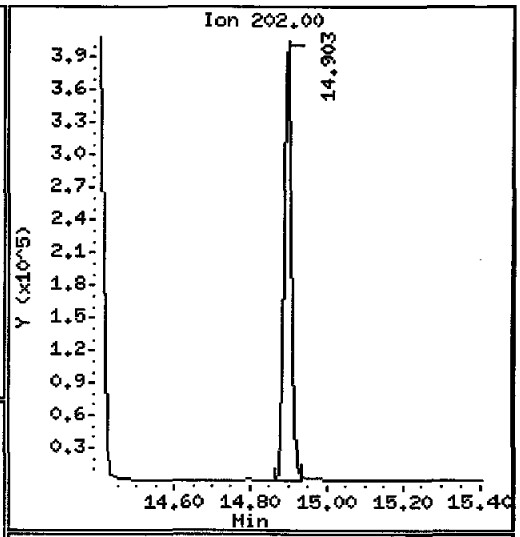
Column phase: Rxi-17Sil MS

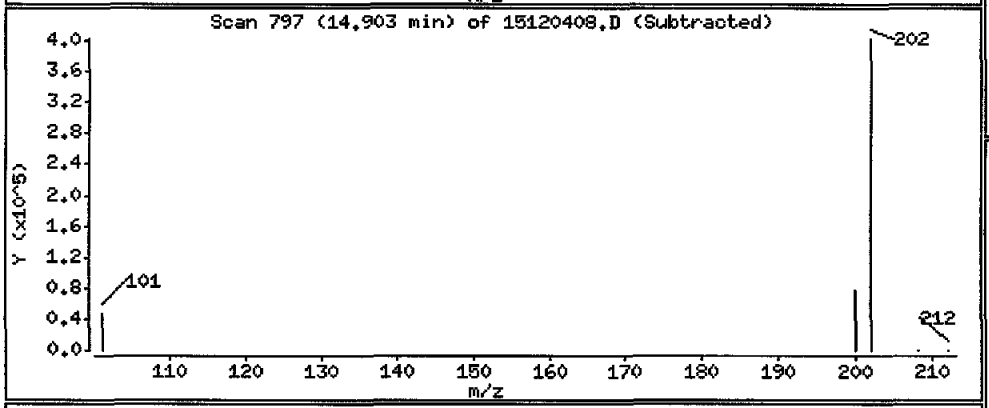
Column diameter: 0.25

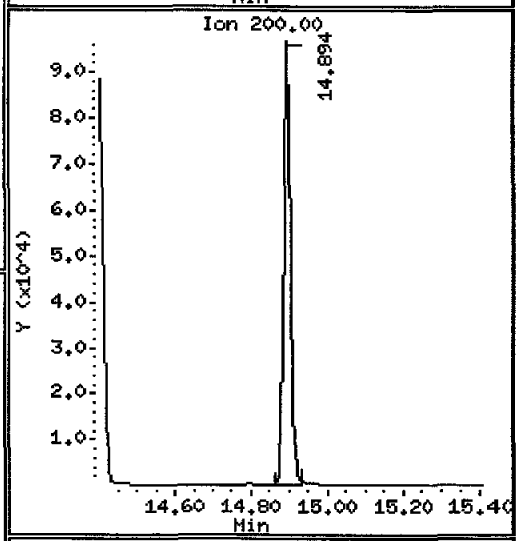
25 Pyrene

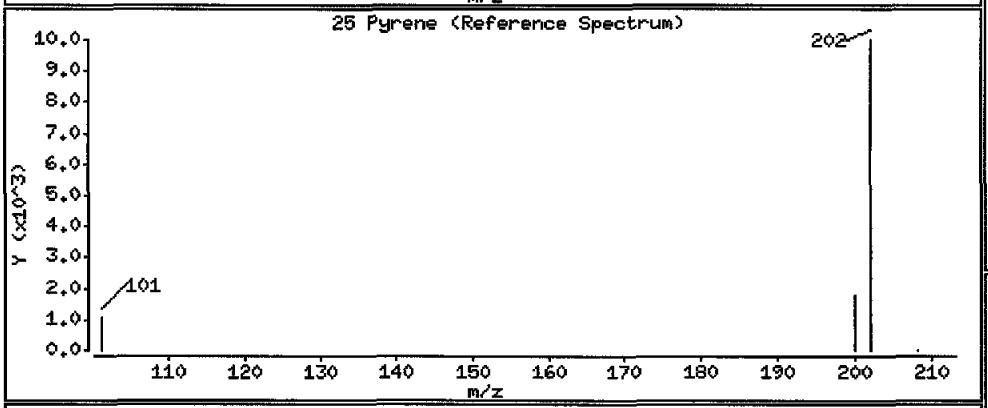
Concentration: 254 ng/L

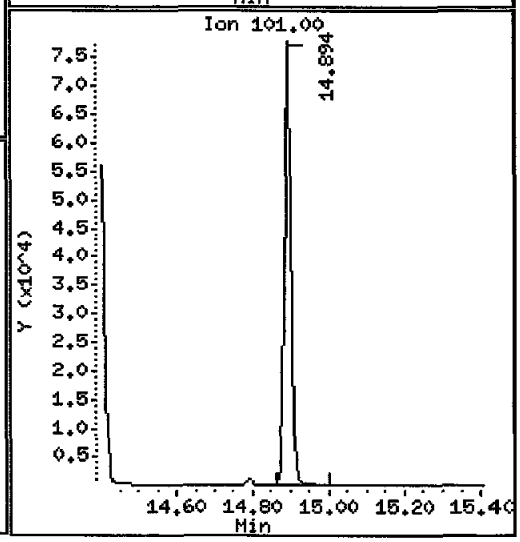


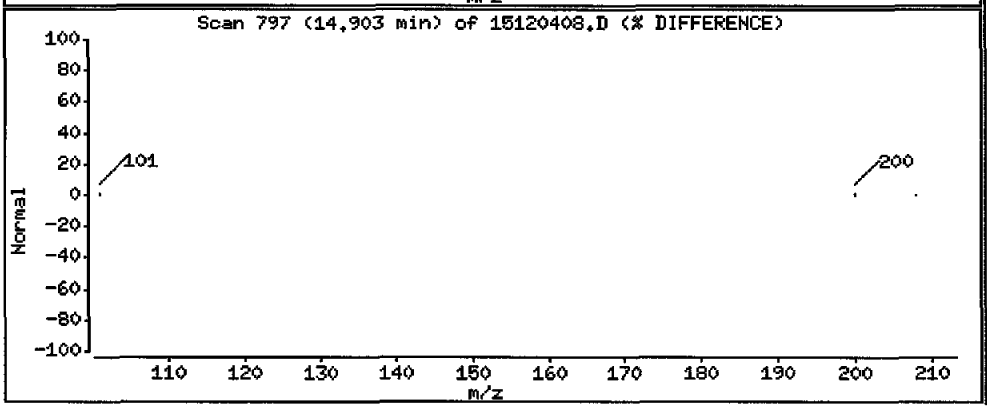












Data File: \\target\share\chem3\nt11.i\20151204.b\15120408.D

Date : 04-DEC-2015 12:04

Client ID:

Instrument: nt11.i

Sample Info: LLSIM SCV 250

Volume Injected (uL): 2.0

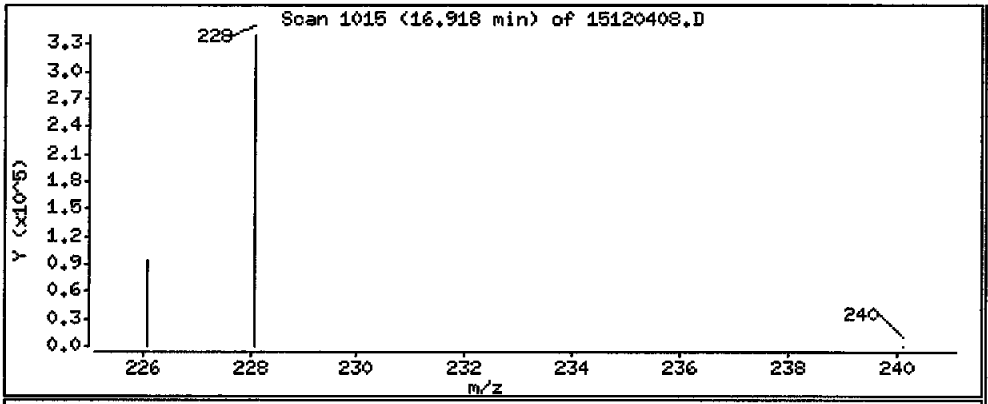
Operator: JW

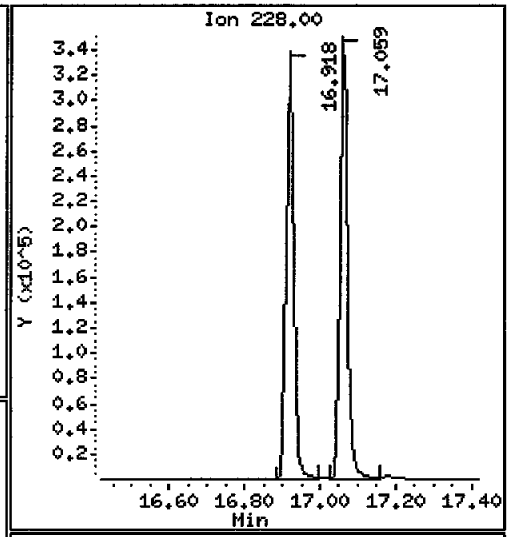
Column phase: Rxi-17Sil MS

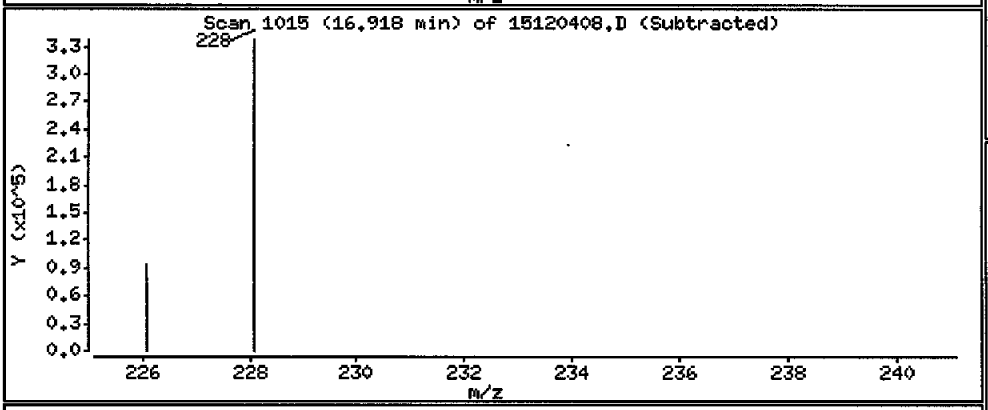
Column diameter: 0.25

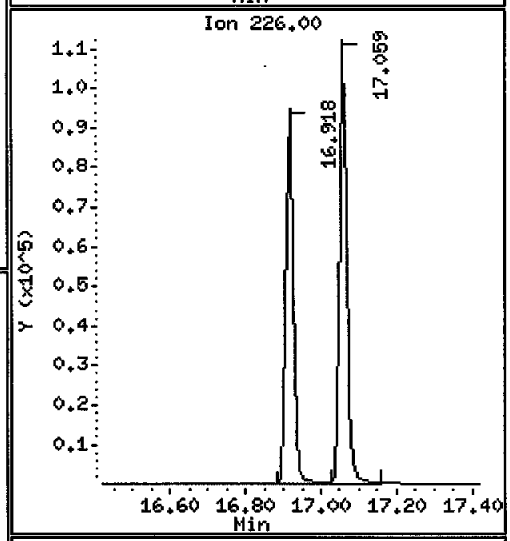
28 Benzo(a)anthracene

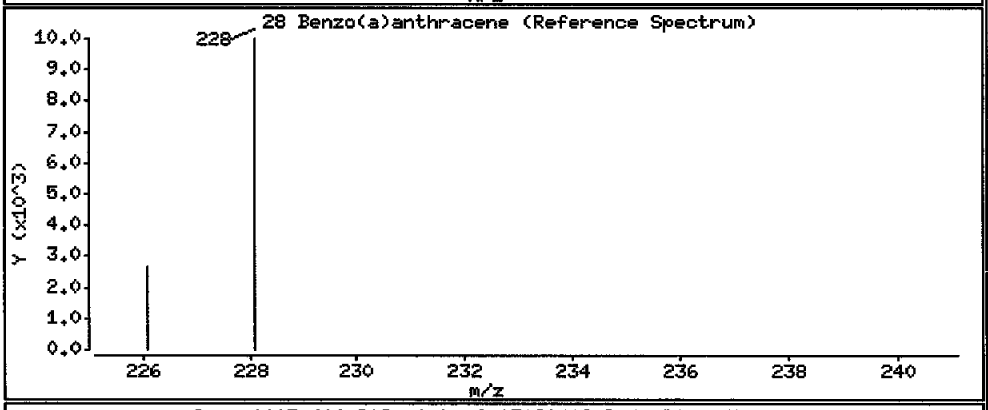
Concentration: 235 ng/L

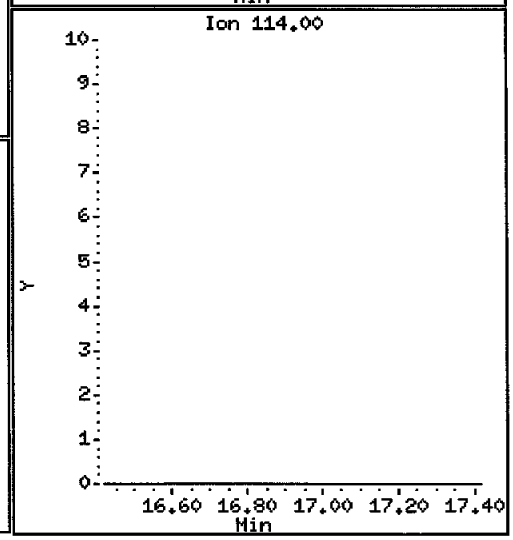


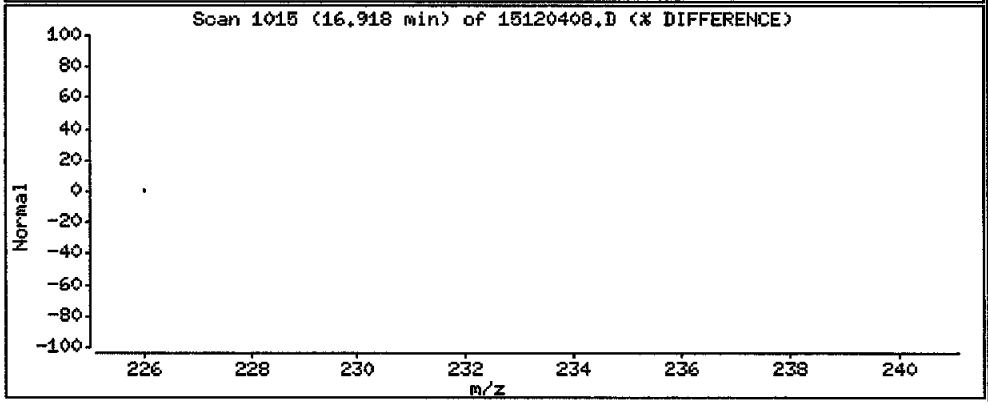












Data File: \\target\share\chem3\nt11.i\20151204.b\15120408.D

Date : 04-DEC-2015 12:04

Client ID:

Instrument: nt11.i

Sample Info: LLSIM SCV 250

Volume Injected (uL): 2.0

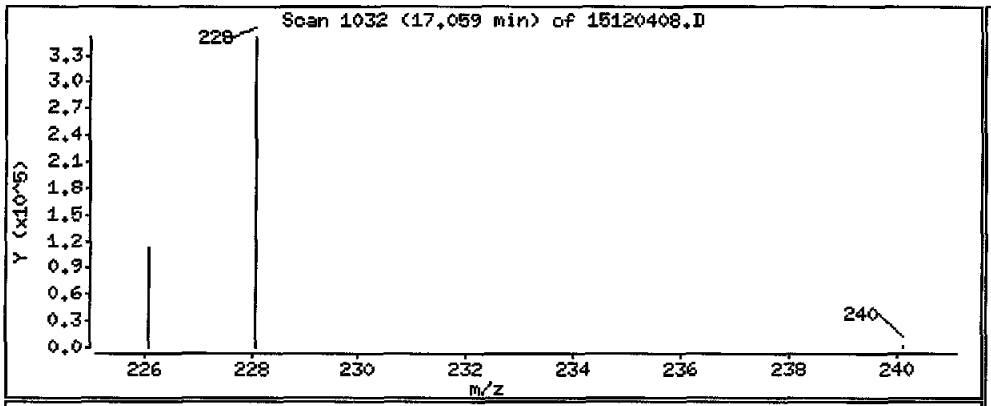
Operator: JW

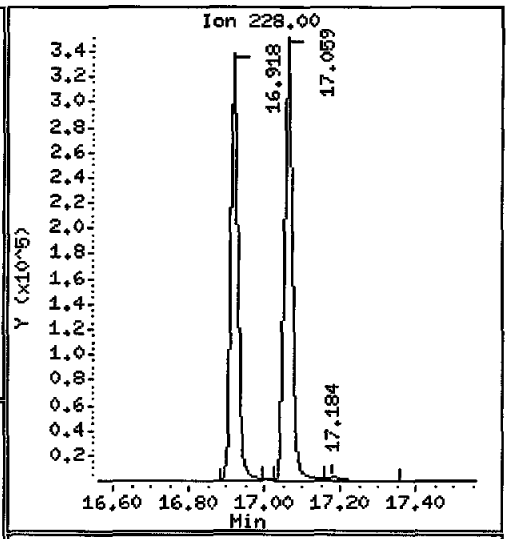
Column phase: Rxi-17Sil MS

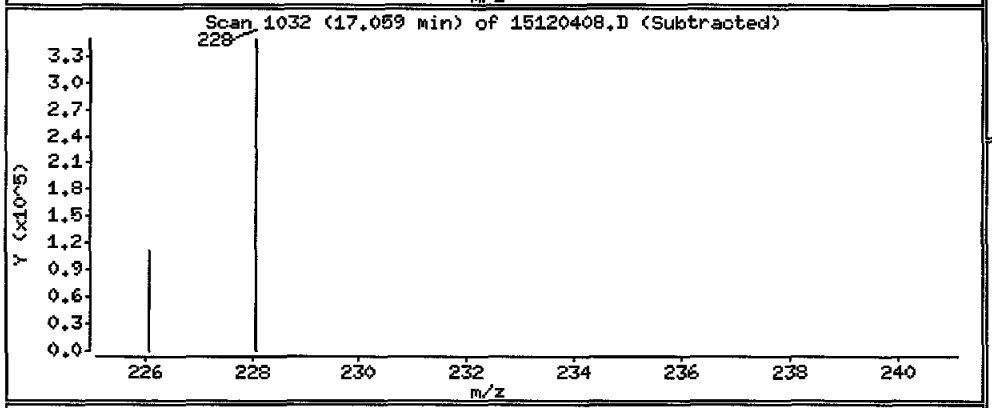
Column diameter: 0.25

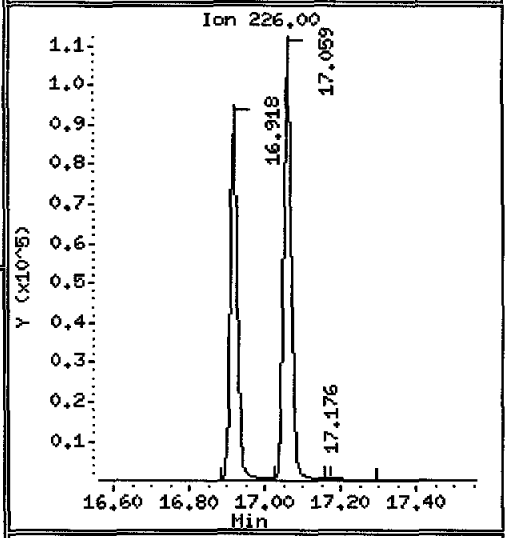
30 Chrysene

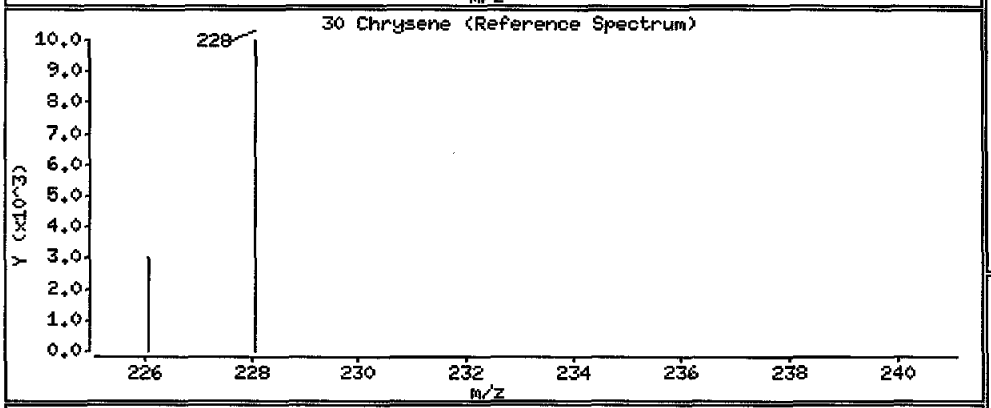
Concentration: 235 ng/L

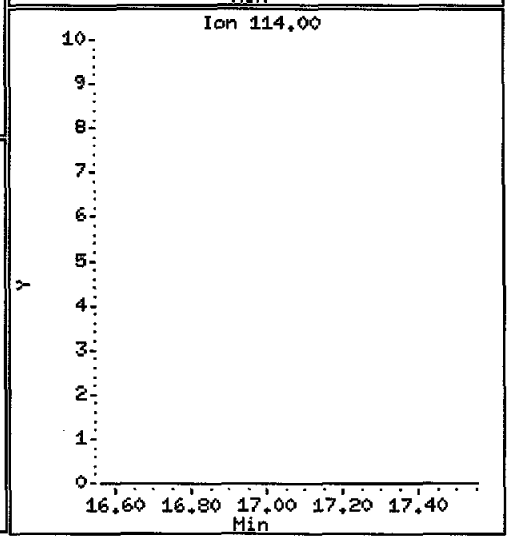


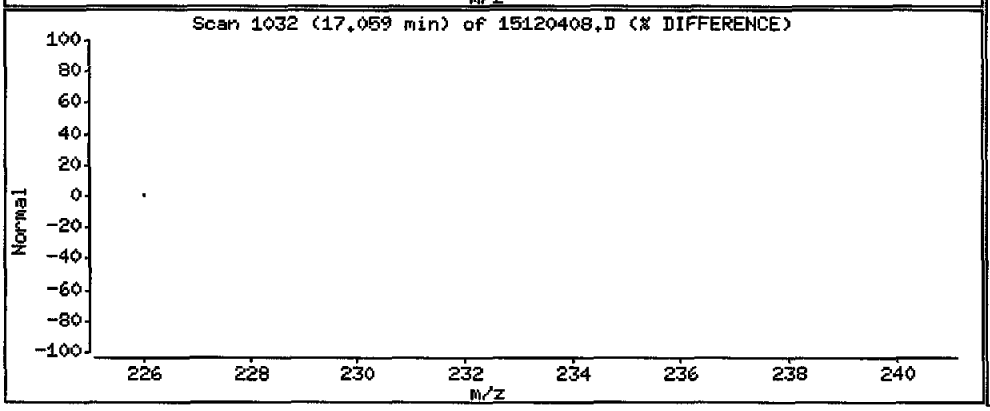












Data File: \\target\share\chem3\nt11.i\20151204.b\15120408.D

Date : 04-DEC-2015 12:04

Client ID:

Instrument: nt11.i

Sample Info: LLSIM SCV 250

Volume Injected (uL): 2.0

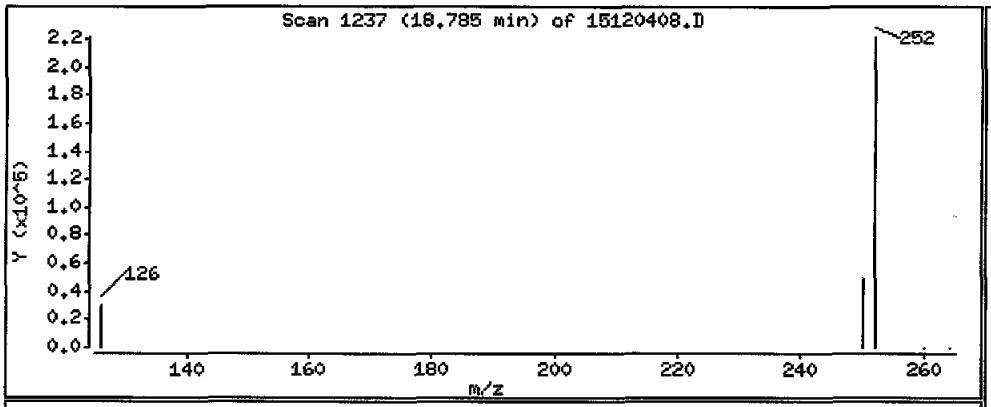
Operator: JW

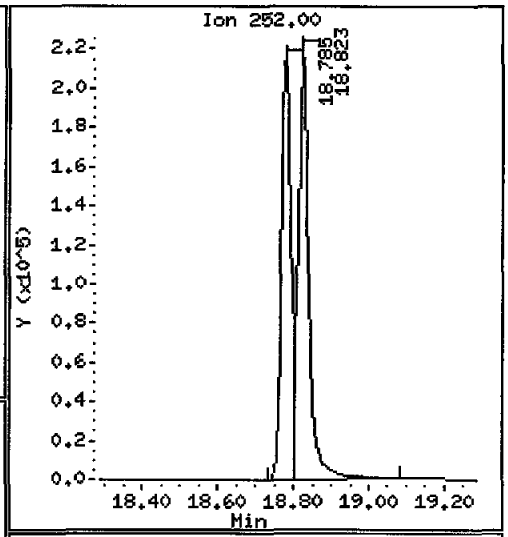
Column phase: Rxi-17Sil MS

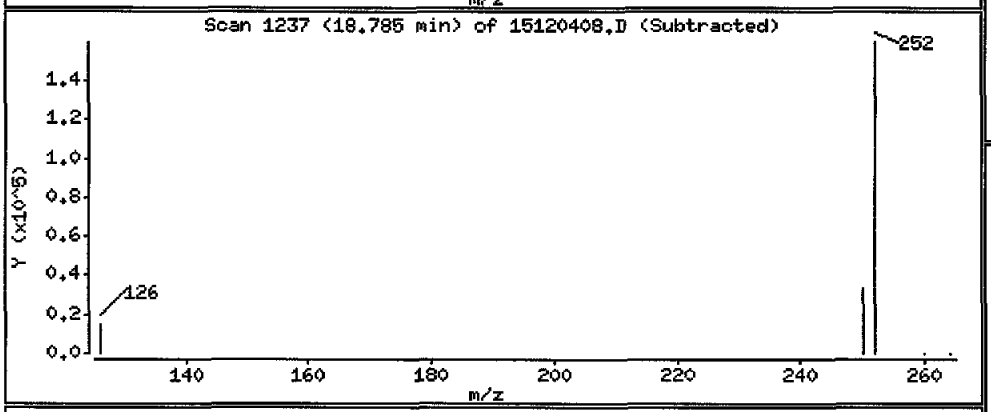
Column diameter: 0.25

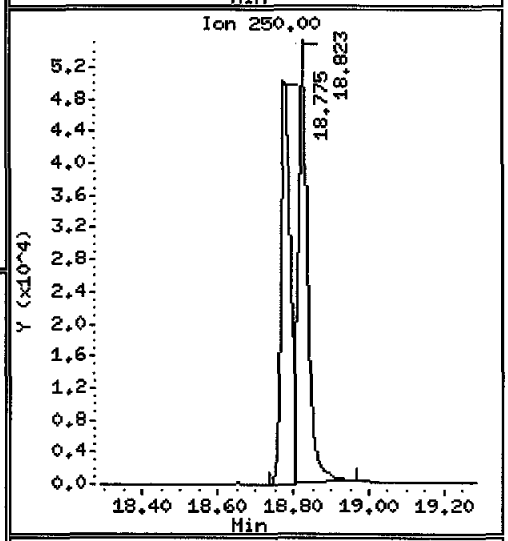
44 Benzo(b)fluoranthene

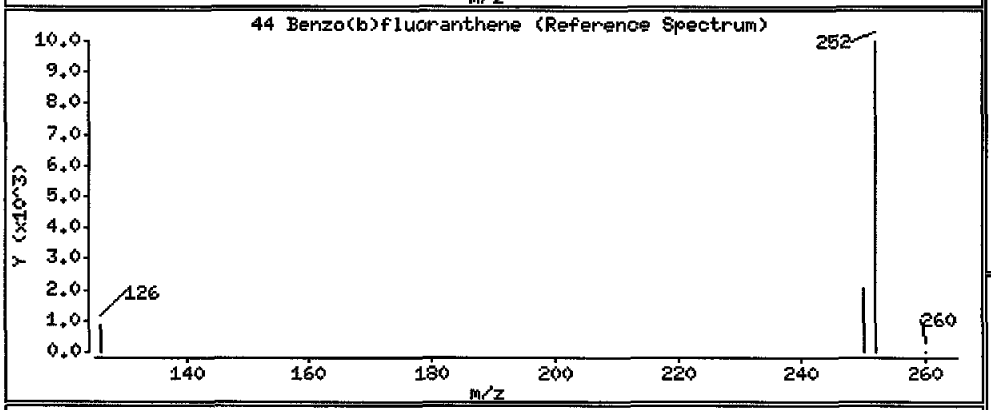
Concentration: 241 ng/L

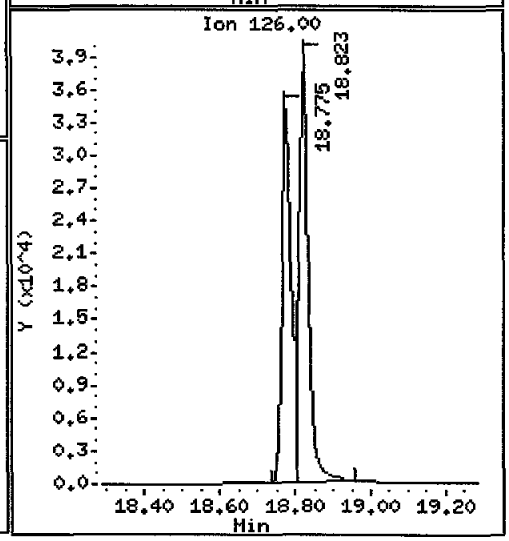


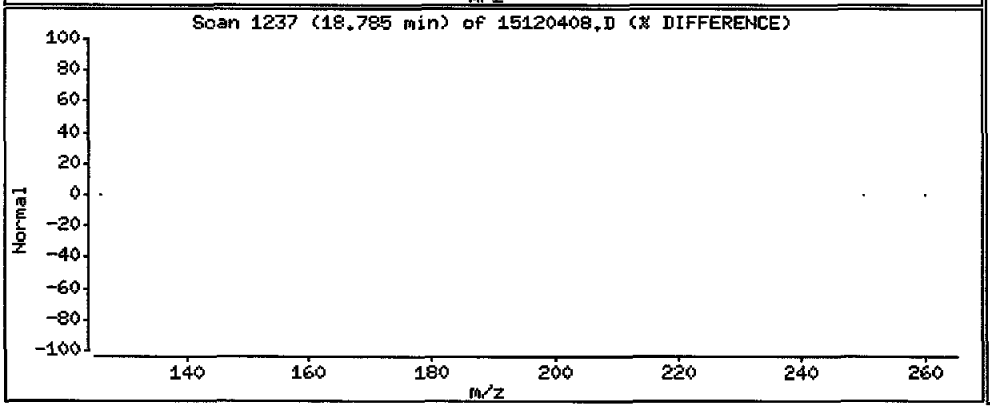












Data File: \\target\share\chem3\nt11.i\20151204.b\15120408.D

Date : 04-DEC-2015 12:04

Client ID:

Instrument: nt11.i

Sample Info: LLSIM SCV 250

Volume Injected (uL): 2.0

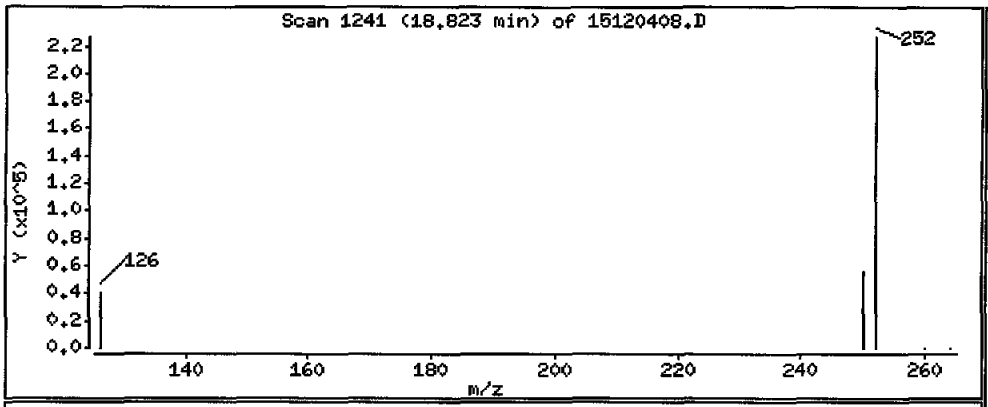
Operator: JW

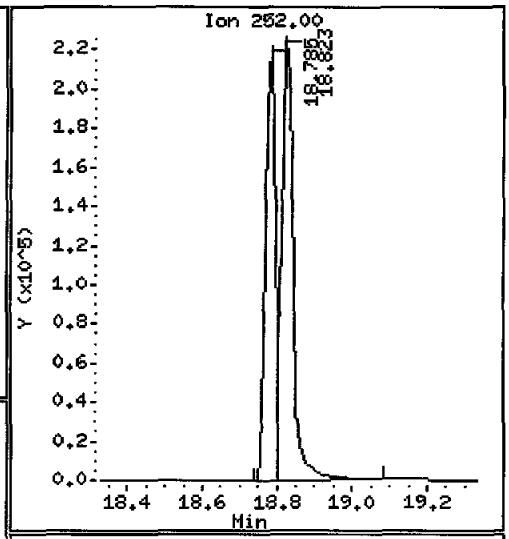
Column phase: Rxi-17Sil MS

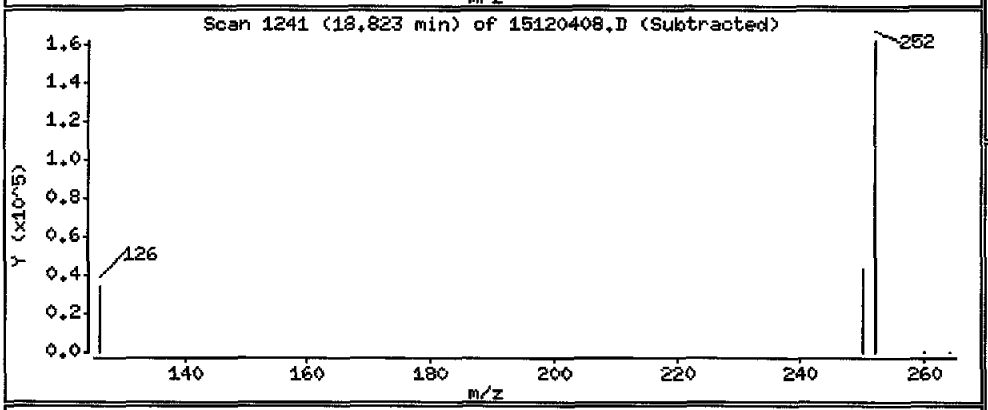
Column diameter: 0.25

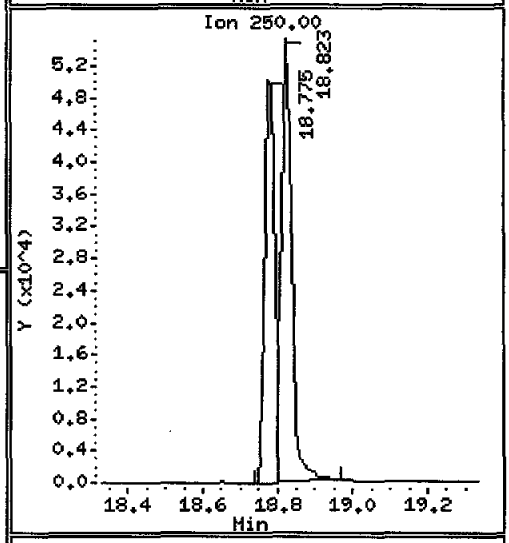
45 Benzo(k)fluoranthene

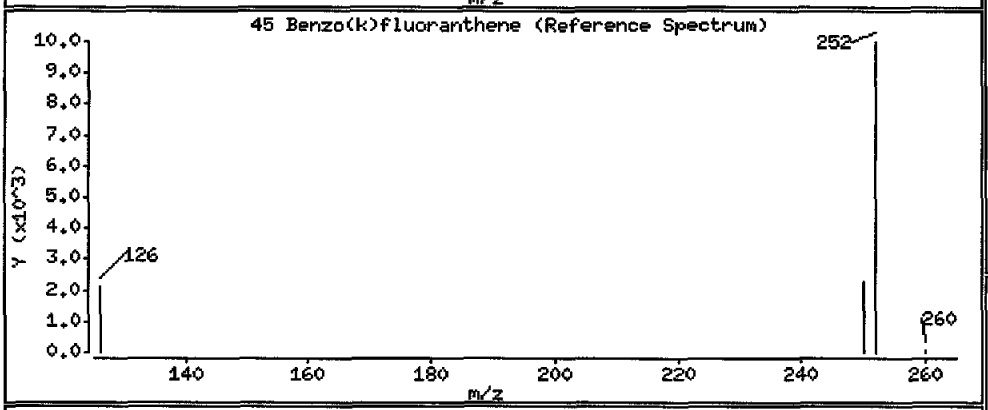
Concentration: 248 ng/L

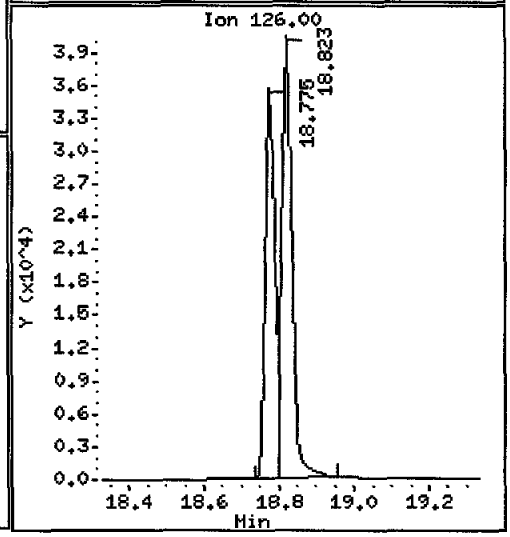


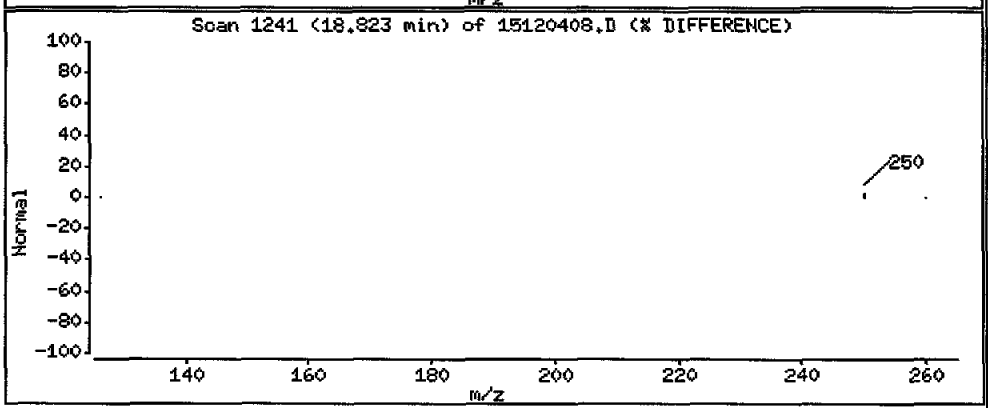












Data File: \\target\share\chem3\nt11.i\20151204.b\15120408.D

Date : 04-DEC-2015 12:04

Client ID:

Instrument: nt11.i

Sample Info: LLSIM SCV 250

Volume Injected (uL): 2.0

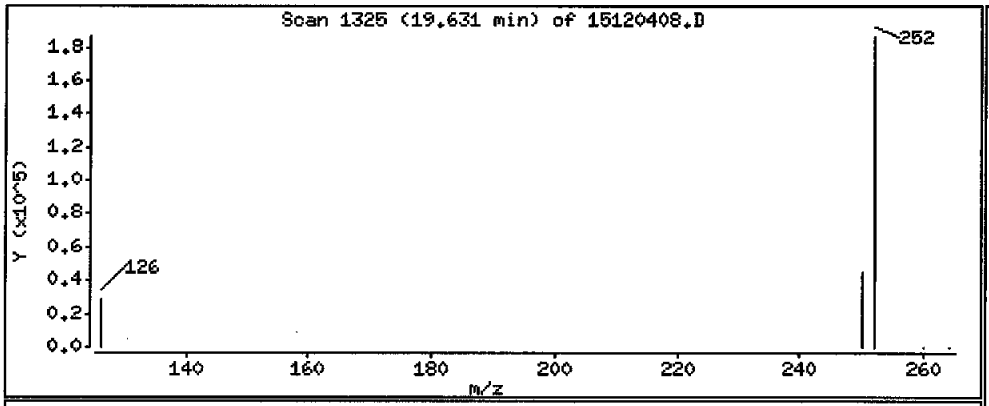
Operator: JW

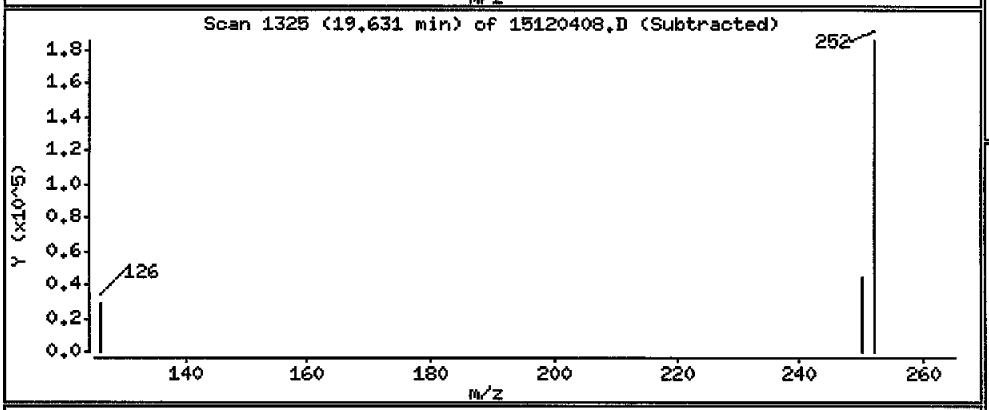
Column phase: Rxi-17Sil MS

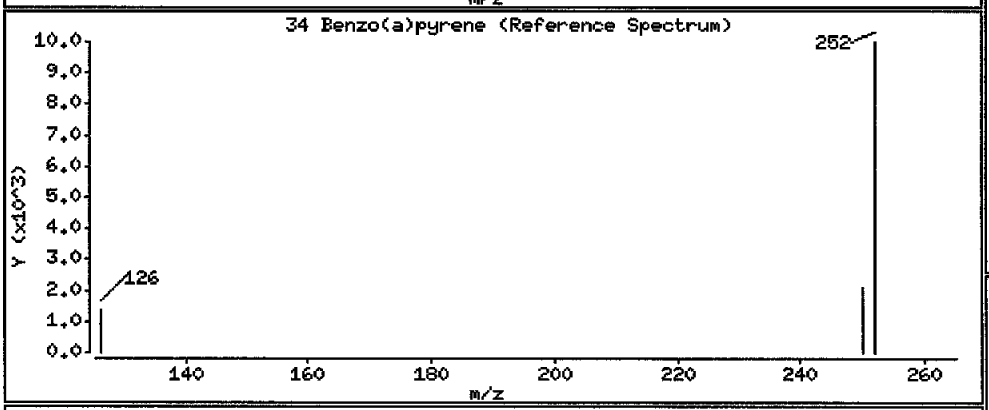
Column diameter: 0.25

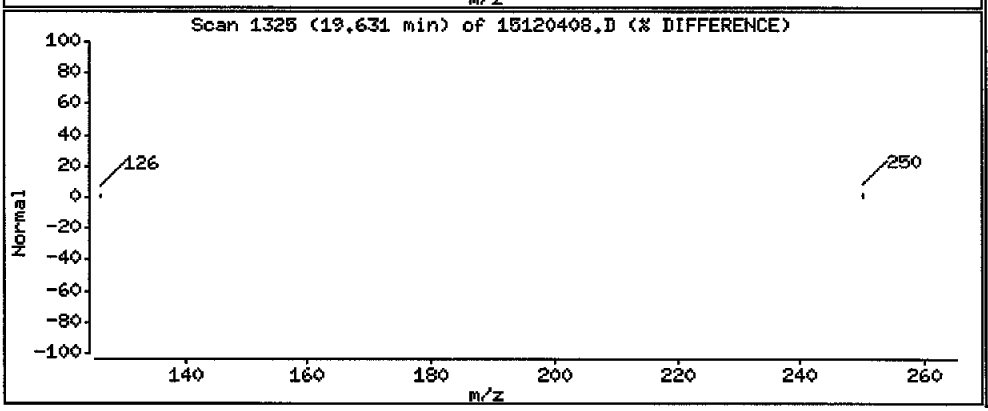
34 Benzo(a)pyrene

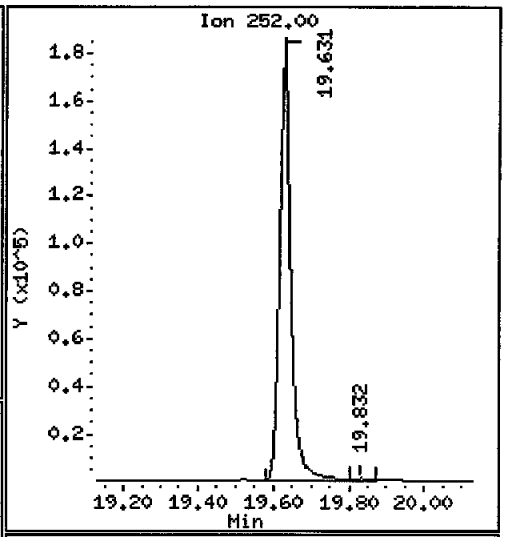
Concentration: 247 ng/L

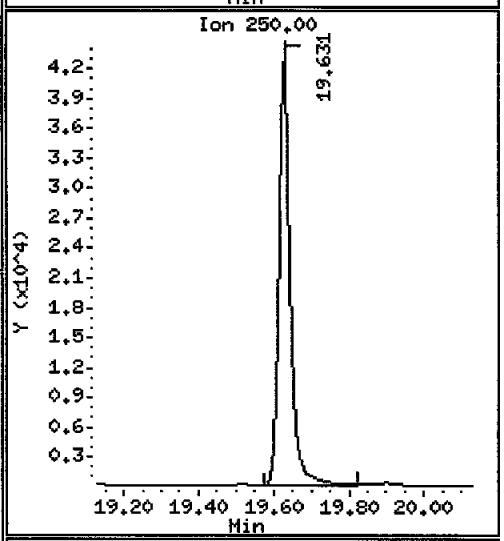


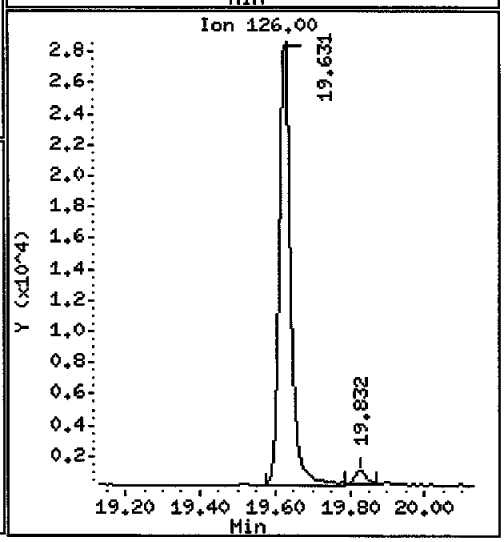












Data File: \\target\share\chem3\nt11.i\20151204.b\15120408.D

Date : 04-DEC-2015 12:04

Client ID:

Instrument: nt11.i

Sample Info: LLSIM SCV 250

Volume Injected (uL): 2.0

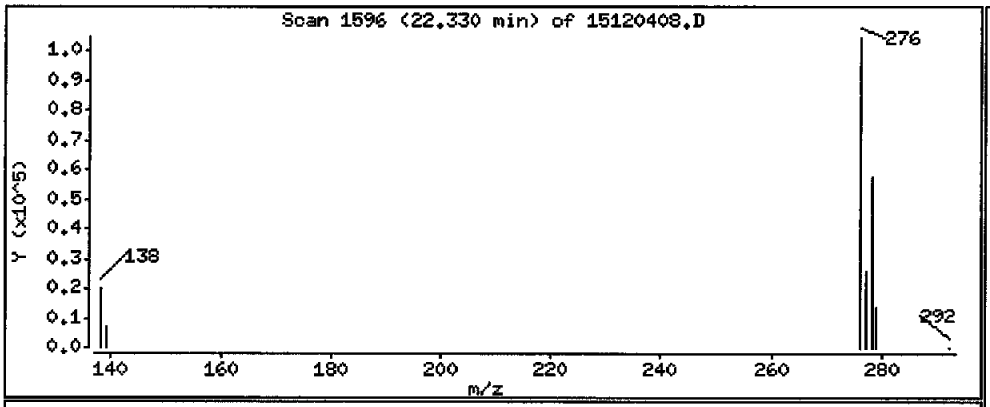
Operator: JW

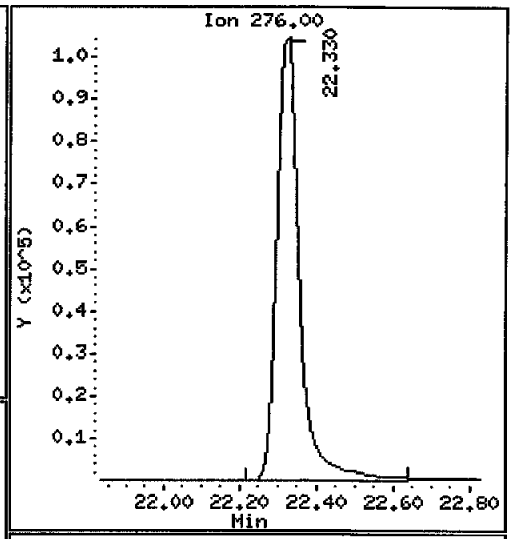
Column phase: Rxi-17Sil MS

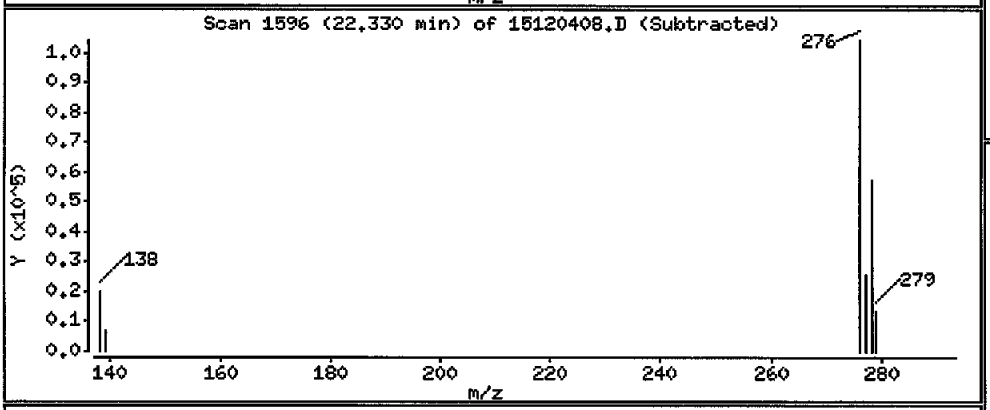
Column diameter: 0.25

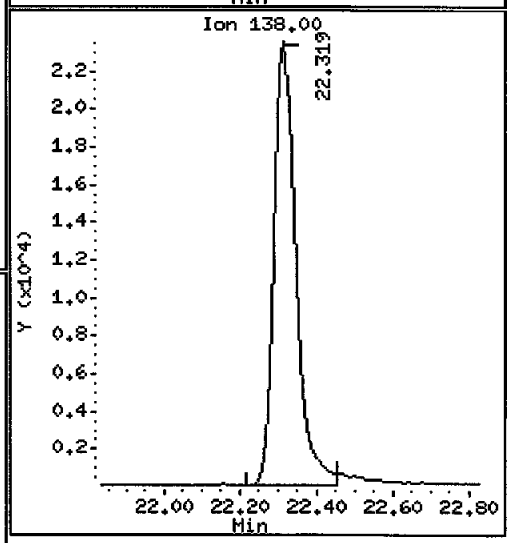
37 Indeno(1,2,3-cd)pyrene

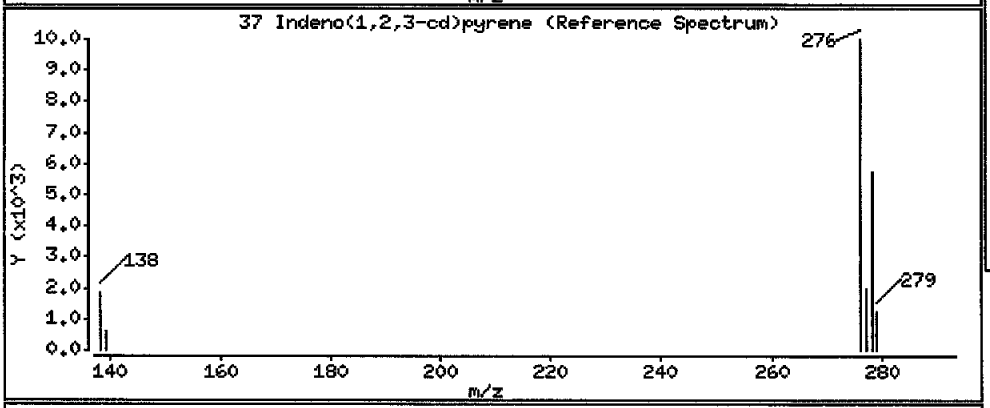
Concentration: 248 ng/L

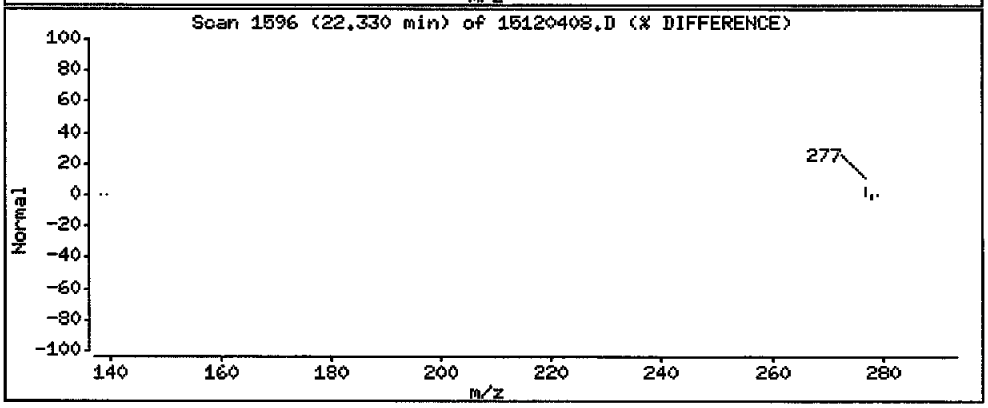












Data File: \\target\share\chem3\nt11.i\20151204.b\15120408.D

Date : 04-DEC-2015 12:04

Client ID:

Instrument: nt11.i

Sample Info: LLSIM SCV 250

Volume Injected (uL): 2.0

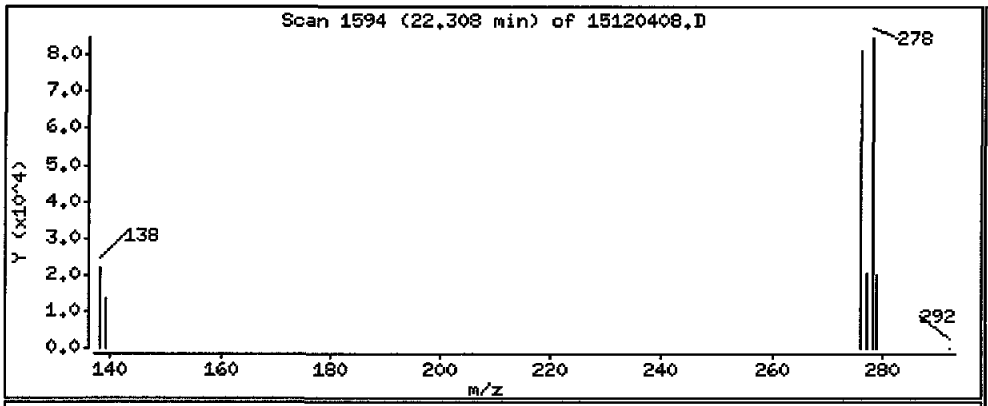
Operator: JW

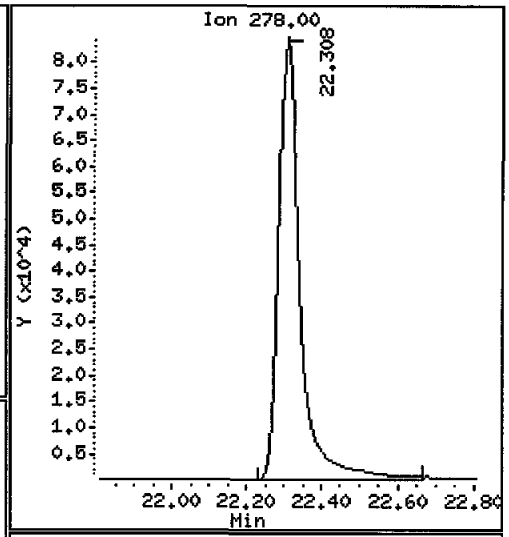
Column phase: Rxi-17Sil MS

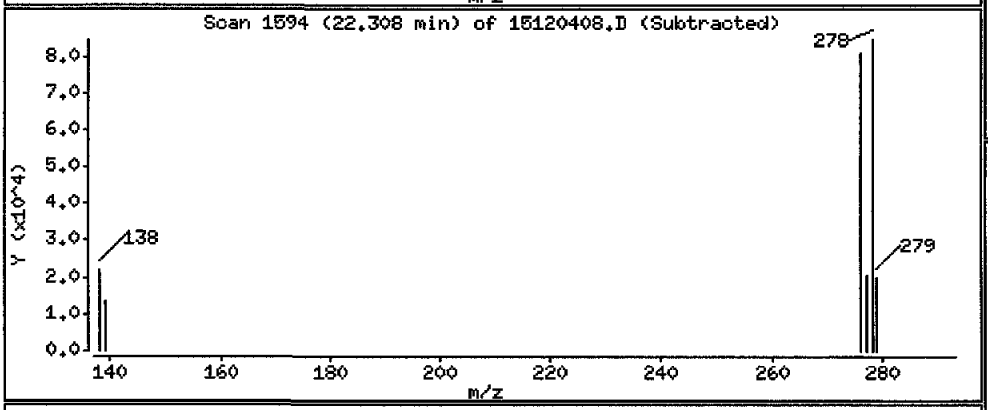
Column diameter: 0.25

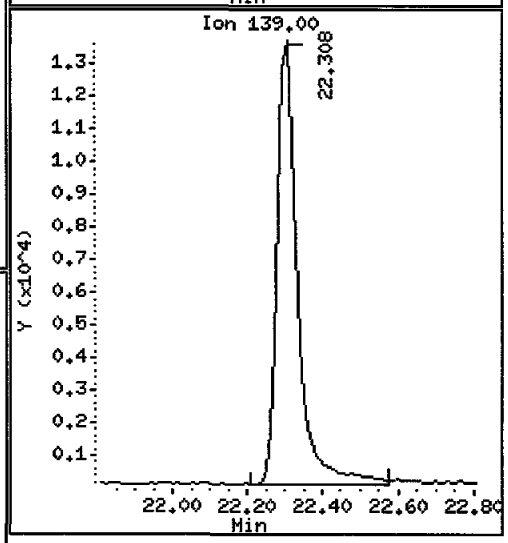
38 Dibenzo(a,h)anthracene

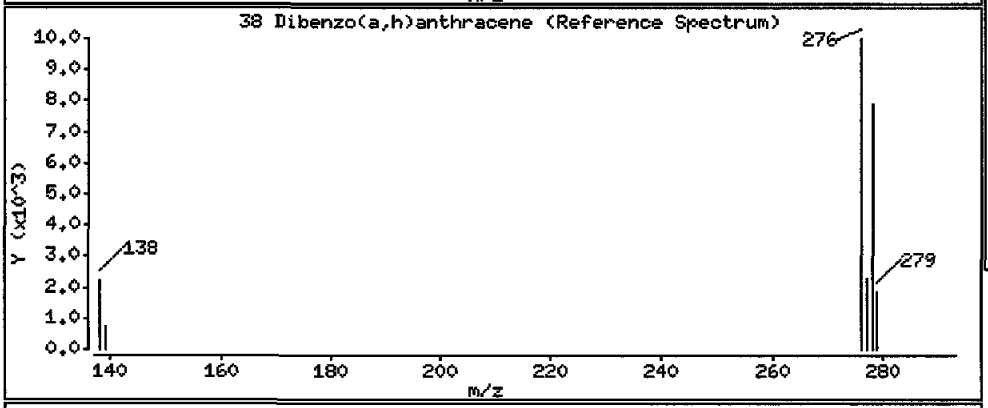
Concentration: 250 ng/L

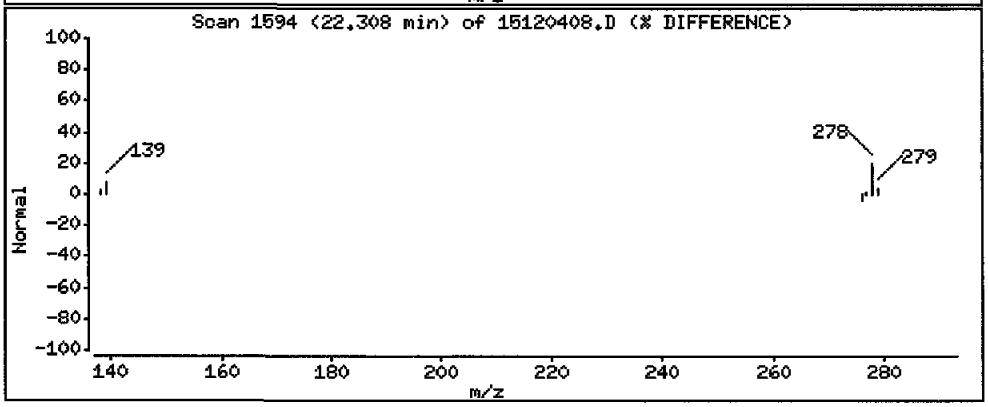












Data File: \\target\share\chem3\nt11.i\20151204.b\15120408.D

Date : 04-DEC-2015 12:04

Client ID:

Instrument: nt11.i

Sample Info: LLSIM SCV 250

Volume Injected (uL): 2.0

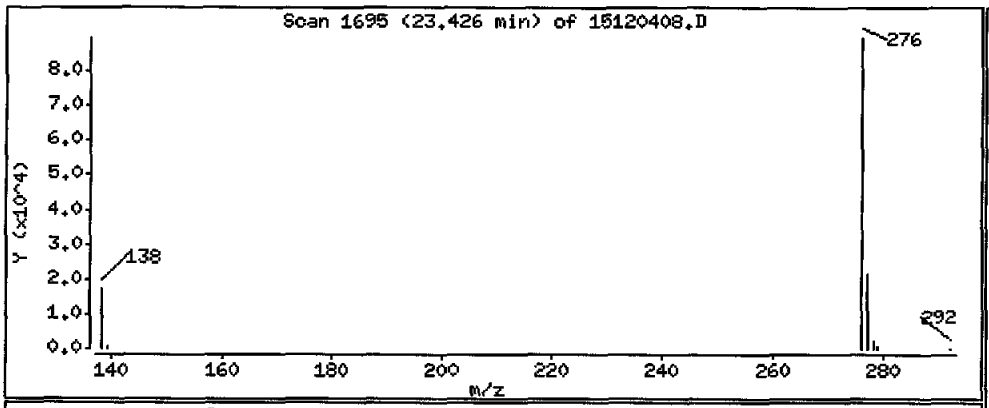
Operator: JW

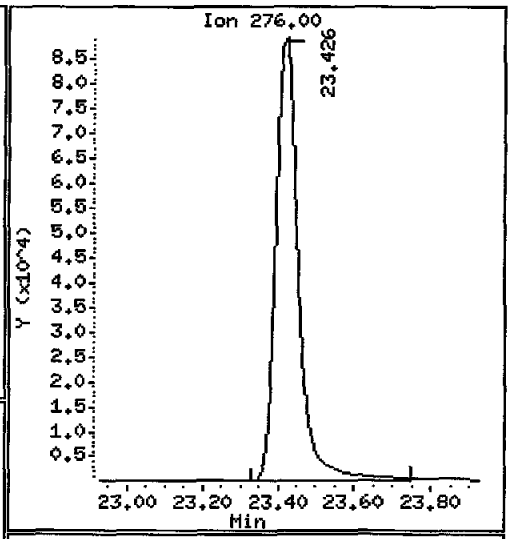
Column phase: Rxi-17Sil MS

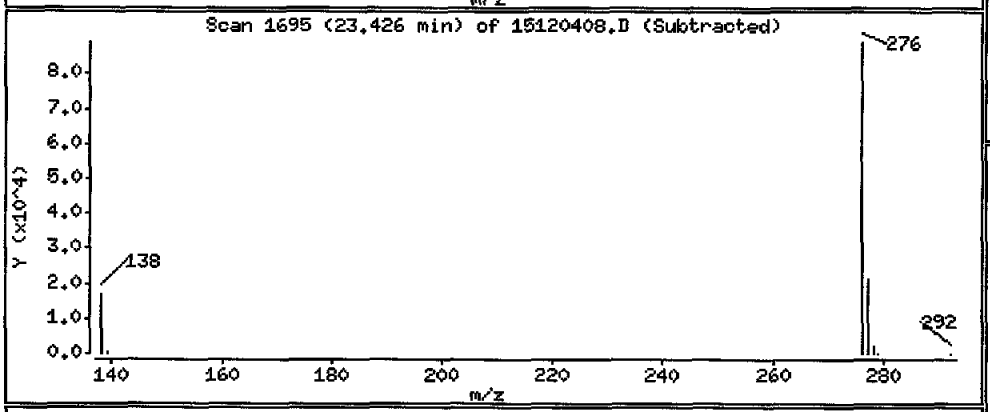
Column diameter: 0.25

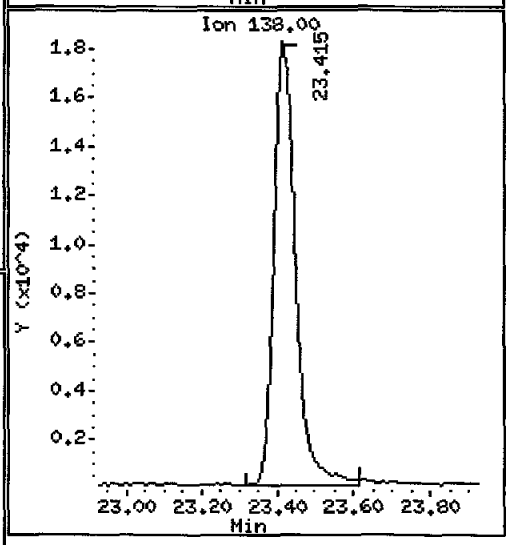
39 Benzo(g,h,i)perylene

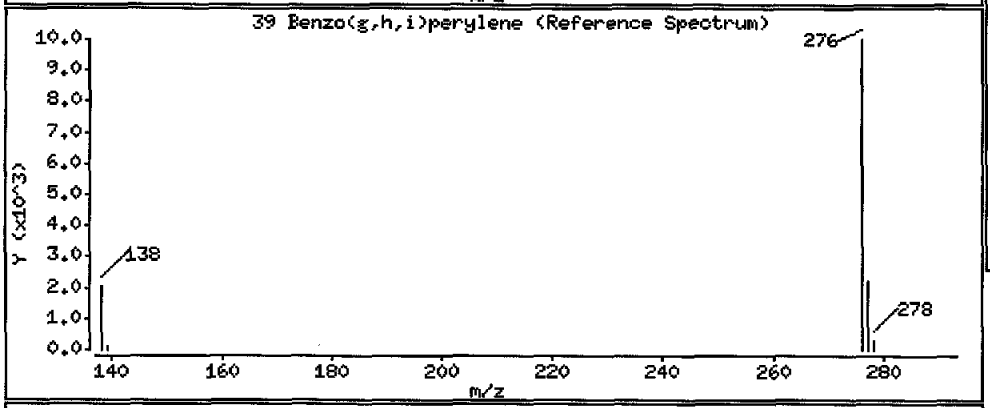
Concentration: 250 ng/L

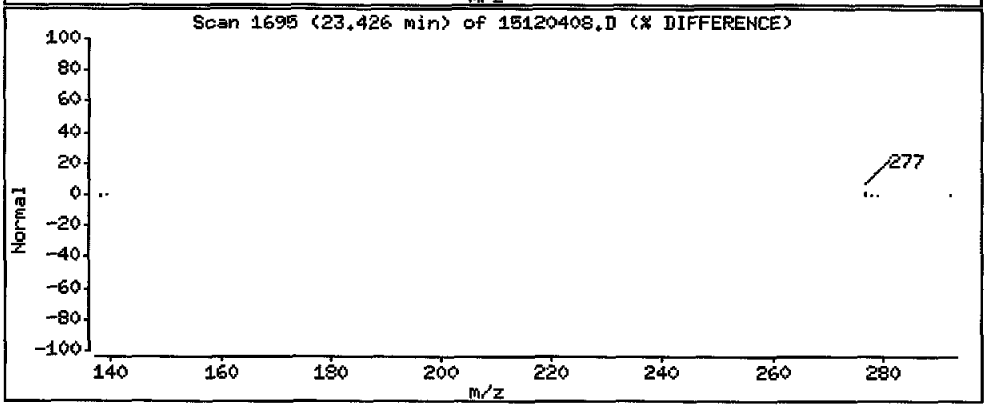












REVIEW SUMMARY FOR FILE - 15120408.D

Lab ID: LLSIM SCV 250
nt11.i, 20151204.b\lowsim.m, 04-DEC-2015 12:04

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

** FIRST SURROGATE NOT FOUND. ICAL Check not performed **

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151204.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

SIM PAH Raw Data
Run Logs, Continuing Calibrations, and Raw Data

ARI Job ID: AQJ9

Analytical Resources, Incorporated
Analytical Chemists and
Consultants

GC/MS SVOA Analyst Notes / Data Review Checklist

ELEMENT/NWA #.: AQ59 Client: Anchor QEA, LLC

METHOD: **8270D** (SIM-SVOA) **KRONE** (Butyl Tins) **8270D** (SVOA) **8270D** (OP-Pest)

Instrument: NT-6 NT-8 NT-10 (NT-11) NT-12 NT-14

Calibration Code: YL00008 Analysis Start Date: 12/5/15

	REVIEW 1/REVIEW 2		REVIEW 1/REVIEW 2
DFTPP Tune met Criteria?	(Y) / N / ___	Internal Standard within 50-200%? (3)	(Y) / N / ___
DDT Breakdown <20%?	(Y) / N / ___	Retention Times within Windows?	(Y) / N / ___
Peak Tailing Factor ≤2?	(Y) / N / ___	Method Blank in Control? (4)	(Y) / N / ___
ICV/CCV Meets %D? (1)	(Y) / N / ___	BS/BSD Recovery in Control? (5)	(Y) / N / ___
ICAL Q Flag applied?	Y / (N) / ___	~~MS / MSD Recovery in Control?~~	~~Y / N / ___~~
ICV/CCV Q flag applied? (1)	(Y) / N / ___	Samples Diluted?	(Y) / N / ___
Surrogate Recovery met? (2)	(Y) / N / ___	Special Analysis Request? Benzo(e) Pyrene	(Y) / N / ___
Manual Integrations?	(Y) / N / ___	VDP Completed?	NA / (Y) / N / ___
Integration Summary?	(Y) / N / ___	Technical Review? ✓	___ / ___

Detail problems, corrective actions and/or other pertinent information below.

(1) Dibenzo(ah)anthracene on 12/15 @ 25% low Q flag applied to dilution

(2) G surr 2-Meth @ 25.04 (30-160) sample adjusted w/ dilution factor to account for only 40% of extract conc., see ext notes

(3) Double IS in LCS, used same curve but w/ low sim IS Fix.m to correct values

(4) Naphth. above RL in MB, thus B flags

(5) LCS Perylene @ 24.05% & LCSD @ 23.46% — poor continuous (Active gel strips?)

Rec ~~recon~~ running back-up of G for better results as of now its approx.

(Review 1) Analyst: TW **Date:** 12/15/15

(Review 2) Peer: _____ **Date:** _____

(Final Review) Reviewer: [signature] **Date:** 12/16/15

Analytical Resources Inc.: Organics Instrument Log

NT-11 Serial No.:GC=US10140004, MS=US10481502

Date: 12.5.15 Analysis: LOW PAH Analyst: JW

GC Program: lowsim Column No: D001724 Column Type: Rxi-17Sil MS

Instrument Tune (.U or .CT.): 150115.U EM Voltage: 1847

Calibration File: 151205a.D Cali Code: YL00008 Injection Vol.: 2uL

IS/SS D0028835

Ical/Ccal D004412 D000252

LCS/ICV

	Time	Filename	LabID	ClientId	DF								
1	1012	15120501.D	TUNE 10		1	NO ISTDS FOUND							
2	1030	15120502.D	LLSIM 250		1	6.60	327903	9.60	235603	12.27	369128	17.02	278802	19.84	239693
3	1115	15120503.D	Miss Inj		1	6.60	382012	9.60	271262	12.28	431333	17.02	335834	19.84	284135
4	1145	15120504.D	AQJ9LCSS1	AQJ9LCSS1	1	6.58	975072	9.59	685451	12.27	1077117	17.01	790706	19.84	732910
5	1215	15120505.D	AQJ9MBS1	AQJ9MBS1	1	6.59	438288	9.59	366527	12.27	602619	17.02	445515	19.84	407448
6	1245	15120506.D	AQJ9LCSDS1	AQJ9LCSDS1	1	6.58	377538	9.59	322593	12.27	523037	17.01	383735	19.84	343460
7	1315	15120507.D	AQJ9A	PG-GP-1-PEMD	1	6.59	329948	9.59	276926	12.27	455160	17.02	342230	19.84	315896
8	1345	15120508.D	AQJ9C	PG-PJ-1-PEMD	1	6.58	347293	9.59	286981	12.27	493459	17.02	330591	19.84	298665
9	1415	15120509.D	AQJ9E	PG-WS-1-PEMD	1	6.59	324170	9.59	268869	12.27	444544	17.02	330321	19.84	300363
10	1445	15120510.D	AQJ9G	PG-SMA2-5-PE	1	6.58	297768	9.59	252418	12.27	432491	17.02	311806	19.84	281081
11	1516	15120511.D	AQJ9I	PG-SMA2-4-PE	1	6.59	291014	9.59	238819	12.27	387727	17.02	283013	19.84	256301
12	1546	15120512.D	AQJ9K	PG-SMA2-3-PE	1	6.59	329170	9.59	272591	12.27	446217	17.02	330667	19.84	292938
13	1616	15120513.D	AQJ9L	PG-SMA2-3-PE	1	6.59	345794	9.59	286502	12.27	478323	17.02	347514	19.84	308933
14	1646	15120514.D	AQJ9N	PG-SMA2-2-PE	1	6.59	307876	9.59	255620	12.27	411968	17.02	294435	19.84	257327
15	1716	15120515.D	AQJ9O	PG-SMA2-1-PE	1	6.59	308997	9.59	253688	12.27	419421	17.02	292332	19.84	252868
16	1746	15120516.D	AQJ9Q	PG-TB-PEMD-1	1	6.59	348938	9.59	285660	12.27	466630	17.02	323985	19.84	278293
17	1816	15120517.D	AQJ9R	PG-TB-PEMD-1	1	6.59	335866	9.60	274447	12.27	451003	17.02	314713	19.84	267996
18	1846	15120518.D	LLSIM CCV 250		1	6.60	259155	9.60	222472	12.28	373365	17.02	284920	19.84	217601
19	1916	15120519.D	D004689		1	6.60	251075	9.60	206797	12.28	346328	17.02	268384	19.84	206963
20	1946	15120520.D	D004497		1	6.60	258875	9.60	208077	12.28	351126	17.02	273966	19.85	216333
21	2016	15120521.D	D004686		1	6.60	265420	9.60	212567	12.28	357038	17.02	278541	19.85	224573

JW 12/15/15

Every line must contain information or be lined out. Make all entries legible.
Start a new page for each QC period. Document All Maintenance Tasks In Element

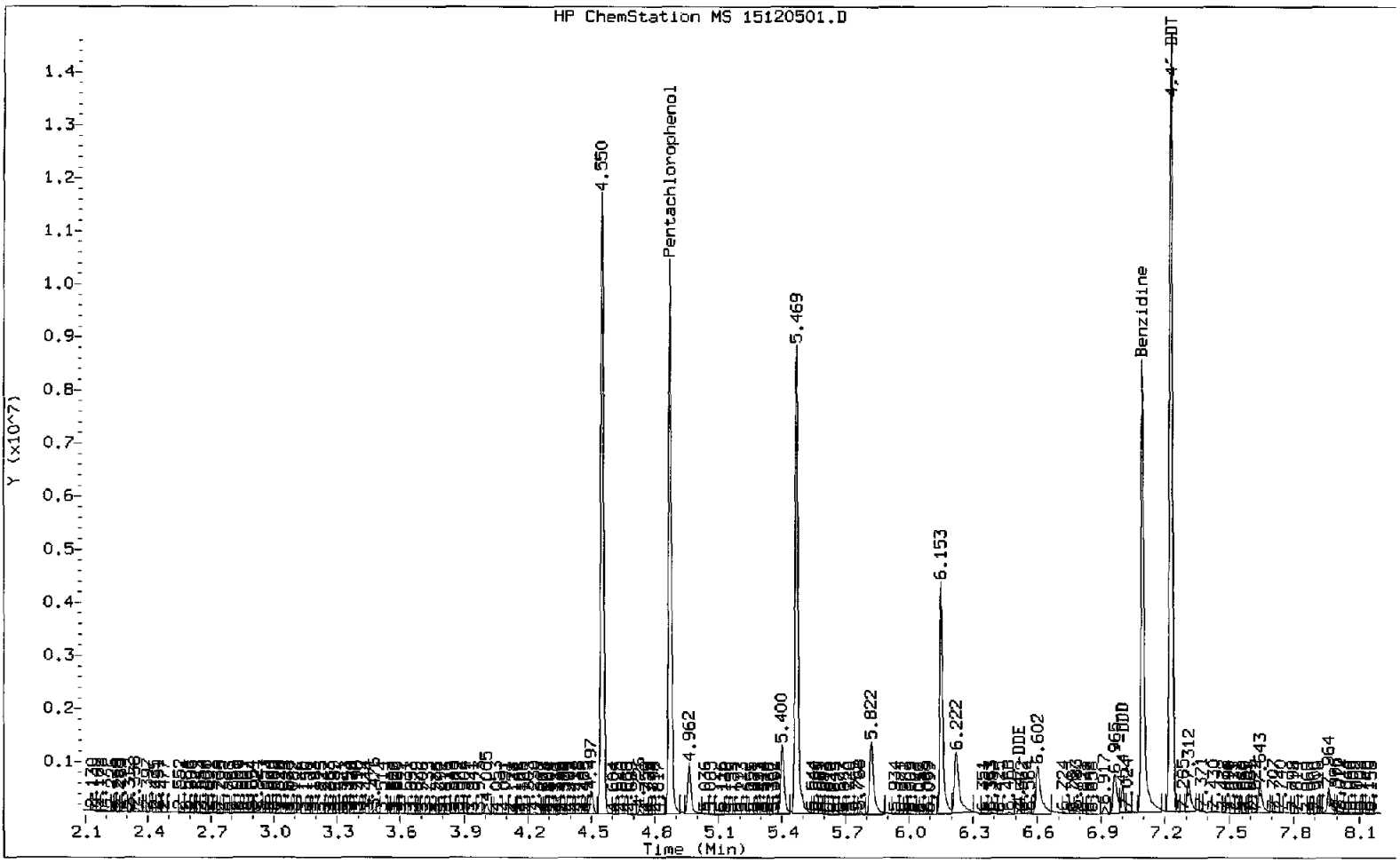
MANUAL INTEGRATION SUMMARY FOR DATABATCH - \\target\share\chem3\nt11.i\20151205.b

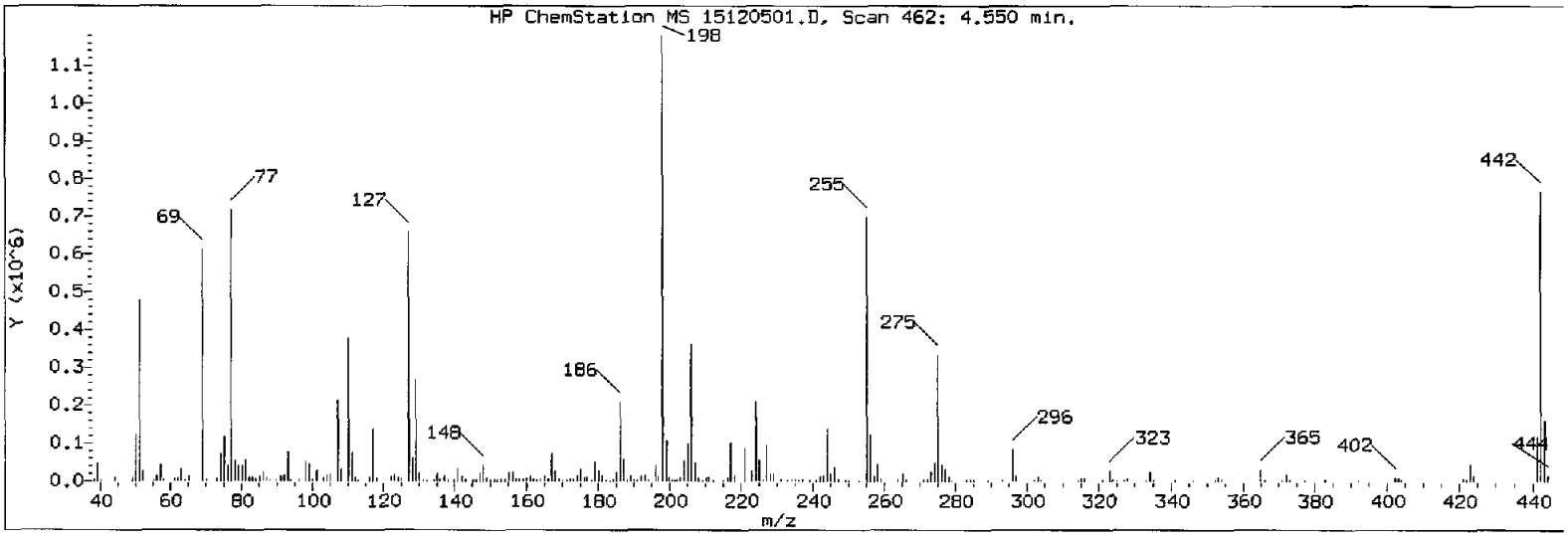
ARI Job No.: TUNE Method: DFTPP.m Instrument: nt11.i Date: 05-DEC-2015

Time	Filename	LabID	ClientId	DF	Manually Integrated Compounds
1012	15120501.D	TUNE 10		1	NO MANUAL INTEGRATION
1030	15120502.D	LLSIM 250		1	NO MANUAL INTEGRATION
1145	15120504.D	AQJ9LCSS1	AQJ9LCSS1	1	NO MANUAL INTEGRATION
1215	15120505.D	AQJ9MBS1	AQJ9MBS1	1	NO MANUAL INTEGRATION
1245	15120506.D	AQJ9LCSDS1	AQJ9LCSDS1	1	NO MANUAL INTEGRATION
1315	15120507.D	AQJ9A	PG-GP-1-PE	1	NO MANUAL INTEGRATION
1345	15120508.D	AQJ9C	PG-PJ-1-PE	1	NO MANUAL INTEGRATION
1415	15120509.D	AQJ9E	PG-WS-1-PE	1	NO MANUAL INTEGRATION
1445	15120510.D	AQJ9G	PG-SMA2-5-	1	NO MANUAL INTEGRATION
1516	15120511.D	AQJ9I	PG-SMA2-4-	1	NO MANUAL INTEGRATION
1546	15120512.D	AQJ9K	PG-SMA2-3-	1	NO MANUAL INTEGRATION
1616	15120513.D	AQJ9L	PG-SMA2-3-	1	NO MANUAL INTEGRATION
1646	15120514.D	AQJ9M	PG-SMA2-2-	1	NO MANUAL INTEGRATION
1716	15120515.D	AQJ9O	PG-SMA2-1-	1	NO MANUAL INTEGRATION
1746	15120516.D	AQJ9Q	PG-FB-PEMD	1	NO MANUAL INTEGRATION
1816	15120517.D	AQJ9R	PG-TB-PEMD	1	NO MANUAL INTEGRATION
1846	15120518.D	LLSIM CCV 250		1	NO MANUAL INTEGRATION

DFTPP TAILING FACTOR AND BREAKDOWN GRAPHIC REPORT

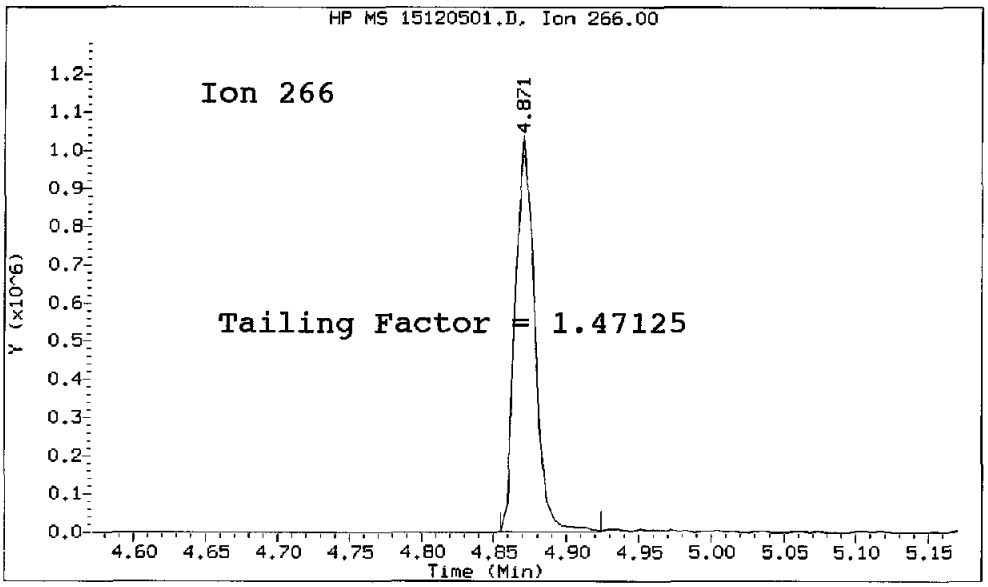
Datafile Analyzed: /20151205.b/15120501.D/15120501.D
Method Used: \20151205.b\DFTPP.m Inst: nt11
Injection Date: 05-DEC-2015 10:12 Operator: JW
Sample Info: TUNE 10 TUNE 10
Report Date: 12/05/2015 10:33





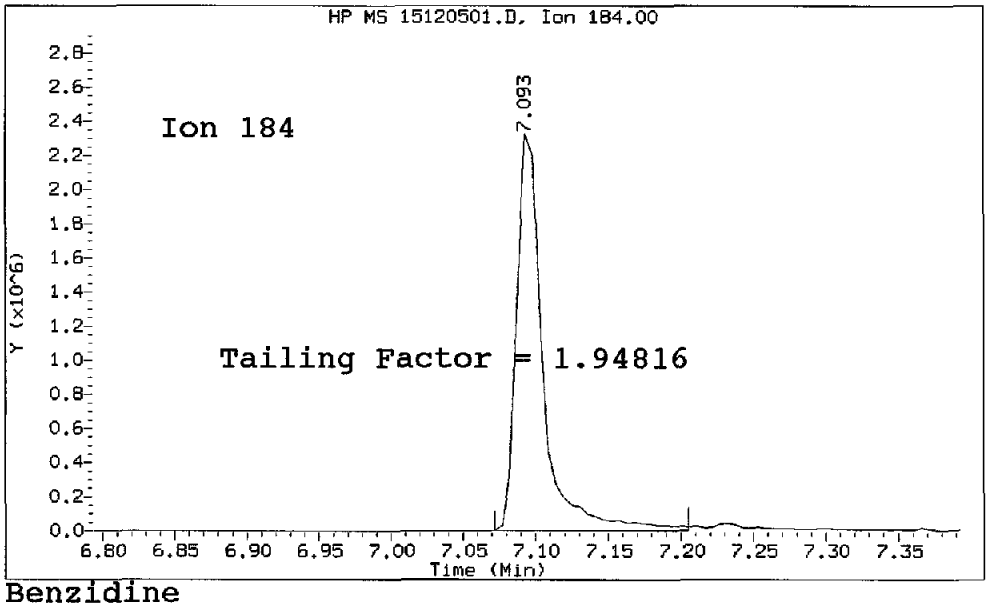
AQJ9:00135

Datafile Analyzed: /20151205.b/15120501.D/15120501.D
Method Used: \20151205.b\DFTPP.m\sw846ddt.m Inst: nt11
Injection Date: 05-DEC-2015 10:12 Operator: JR
Sample Info: TUNE 10
Report Date: 12/05/2015 10:33



Pentachlorophenol
==========
Exp. RT = 4.914
Found RT = 4.871

Tail Factor = 1.471 Maximum Allowed = 2.0



Benzidine
==========
Exp. RT = 7.141
Found RT = 7.093

Tail Factor = 1.948 Maximum Allowed = 2.0

8270 TAILING FACTOR/BREAKDOWN SUMMARY RESULTS

TAILING ANALYSIS SUMMARY

Compound	Tail Factor	Max Allowed	Test
Pentachlorophenol	1.4712460	2.000	PASS
Benzidine	1.9481583	2.000	PASS

DDT DEGRADATION BREAKDOWN ANALYSIS SUMMARY

Compound	Response	%Breakdown	Max Allowed	Test
4,4-DDT	2031855			N/A
4,4-DDE	11546	0.6	20.0	PASS
4,4-DDD	74265	3.5	20.0	PASS
4,4-DDD + DDE	85811	4.1	20.0	PASS

Tuning Sample, nt11.i/20151205.b/15120501.D, *** PASSED ***

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
198	Base Peak, 100% relative abundance	100.00
51	10.00 - 80.00% of mass 198	39.81
68	Less than 2.00% of mass 69	0.00 (0.00)
69	Mass 69 relative abundance	50.80
70	Less than 2.00% of mass 69	0.31 (0.60)
127	10.00 - 80.00% of mass 198	52.35
197	Less than 2.00% of mass 198	0.22
199	5.00 - 9.00% of mass 198	8.57
275	10.00 - 60.00% of mass 198	27.08
365	Greater than 1.00% of mass 198	3.17
441	0.01 - 24.00% of mass 442	11.20 (16.29)
442	50.00 - 200.00% of mass 198	68.74
443	15.00 - 24.00% of mass 442	15.55 (22.63)

Data File: 15120501.D
Spectrum: Avg. Scans 461-463 (4.55), Background Scan 456
Location of Maximum: 198.00
Number of points: 247

m/z	Y	m/z	Y	m/z	Y	m/z	Y
37.00	796	127.00	501248	192.00	13274	272.00	3625
38.00	5144	128.00	43680	193.00	14408	273.00	18768
39.00	35552	129.00	200960	194.00	2035	274.00	45816
44.00	1425	130.00	16960	196.00	33200	275.00	259264
49.00	361	131.00	2741	197.00	2080	276.00	33840
50.00	100568	132.00	1490	198.00	957568	277.00	26368
51.00	381184	134.00	4770	199.00	82088	278.00	5277
52.00	23280	135.00	16123	200.00	7074	279.00	1401
55.00	816	136.00	5838	201.00	6432	282.00	697
56.00	9987	137.00	9798	202.00	1312	283.00	1016
57.00	28664	138.00	849	203.00	7024	284.00	1435
58.00	1407	140.00	2606	204.00	45584	285.00	3292
61.00	4808	141.00	25944	205.00	71168	289.00	754
62.00	7999	142.00	11518	206.00	288064	293.00	4321
63.00	21864	143.00	6099	207.00	38760	294.00	1189
64.00	923	145.00	989	208.00	9260	296.00	71312
65.00	9278	146.00	2919	209.00	1293	297.00	10554
69.00	486400	147.00	10303	210.00	8090	301.00	1069
70.00	2938	148.00	27368	211.00	10991	302.00	1023
74.00	54048	149.00	6831	212.00	1056	303.00	9746
75.00	83680	150.00	1851	215.00	975	304.00	3651
76.00	30616	151.00	5045	216.00	6117	314.00	4463
77.00	552960	152.00	1961	217.00	76720	315.00	8704
78.00	40144	153.00	7538	218.00	11435	316.00	3742
79.00	36160	154.00	5080	221.00	57040	321.00	2867
80.00	29512	155.00	16728	222.00	4043	322.00	978
81.00	43008	156.00	20288	223.00	18136	323.00	24848
82.00	10154	157.00	5918	224.00	163648	324.00	4070
83.00	8762	158.00	6163	225.00	39520	325.00	711
84.00	624	159.00	3734	226.00	3450	327.00	2995
85.00	8726	160.00	6422	227.00	70488	328.00	2890
86.00	12436	161.00	11331	228.00	10702	332.00	989
87.00	5944	162.00	4706	229.00	13894	333.00	1602
88.00	3214	163.00	1117	230.00	986	334.00	14854
90.00	889	164.00	2594	231.00	4112	335.00	2636
91.00	10302	165.00	10268	233.00	712	341.00	2623
92.00	9586	166.00	6533	234.00	3354	346.00	2813
93.00	61336	167.00	50808	235.00	4416	352.00	7676
94.00	2599	168.00	25056	236.00	2699	353.00	5339
95.00	743	169.00	4268	237.00	3565	354.00	7348
96.00	2275	170.00	2742	239.00	2405	365.00	30352
98.00	43016	171.00	1323	240.00	1264	366.00	4519
99.00	37288	172.00	3669	241.00	3770	371.00	2220
100.00	4435	173.00	3041	242.00	8426	372.00	13581
101.00	21864	174.00	9512	243.00	10488	373.00	2484
103.00	5770	175.00	25224	244.00	115096	377.00	694
104.00	12738	176.00	6823	245.00	14387	383.00	3383
105.00	13886	177.00	10559	246.00	25112	390.00	2644
106.00	1701	178.00	4111	247.00	5999	391.00	897

107.00	162688	179.00	42448	249.00	2766	392.00	683
108.00	23536	180.00	24720	250.00	2126	402.00	5449
110.00	288768	181.00	13449	253.00	2882	403.00	6114
111.00	48928	182.00	2699	254.00	1658	404.00	2398
112.00	6558	183.00	837	255.00	563712	421.00	6125
113.00	1079	184.00	3745	256.00	93960	422.00	3809
116.00	8181	185.00	21768	257.00	7815	423.00	46944
117.00	108592	186.00	161088	258.00	35752	424.00	10124
118.00	6971	187.00	45336	259.00	5218	441.00	107216
122.00	10497	188.00	4923	264.00	912	442.00	658240
123.00	13586	189.00	9086	265.00	14748	443.00	148928
124.00	7987	190.00	2373	266.00	1863	444.00	15561
125.00	4756	191.00	3589	271.00	2472		

ARI Labs, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt11.i Injection Date: 05-DEC-2015 10:30
Lab File ID: 15120502.D Init. Cal. Date(s): 04-DEC-2015 04-DEC-2015
Analysis Type: Init. Cal. Times: 09:03 11:33
Lab Sample ID: LLSIM 250 Quant Type: ISTD
Method: \\target\share\chem3\nt11.i\20151205.b\lowsim.m

COMPOUND	RRF / AMOUNT	RF250	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE
5 Naphthalene	1.15523	1.10894	0.010	-4.00739	20.00000	Averaged
$ 6 2-Methylnaphthalene-d10	0.74235	0.73710	0.010	-0.70717	20.00000	Averaged
7 2-Methylnaphthalene	0.79376	0.79183	0.010	-0.24302	20.00000	Averaged
8 1-Methylnaphthalene	0.71533	0.71855	0.010	0.44985	20.00000	Averaged
10 Acenaphthylene	1.61414	1.54517	0.010	-4.27288	20.00000	Averaged
12 Acenaphthene	1.07135	1.04113	0.010	-2.82091	20.00000	Averaged
14 Dibenzofuran	1.61394	1.55931	0.010	-3.38475	20.00000	Averaged
15 Fluorene	1.21040	1.18604	0.010	-2.01300	20.00000	Averaged
19 Phenanthrene	1.20497	1.17708	0.010	-2.31456	20.00000	Averaged
20 Anthracene	1.07857	1.05537	0.010	-2.15058	20.00000	Averaged
$ 23 Fluoranthene-d10	1.09988	1.06102	0.200	-3.53327	20.00000	Averaged
24 Fluoranthene	1.20977	1.21007	0.010	0.02436	20.00000	Averaged
25 Pyrene	1.58387	1.54514	0.010	-2.44503	20.00000	Averaged
28 Benzo(a)anthracene	1.33345	1.29159	0.010	-3.13930	20.00000	Averaged
30 Chrysene	1.46350	1.42858	0.010	-2.38626	20.00000	Averaged
44 Benzo(b)fluoranthene	1.35504	1.32521	0.200	-2.20200	20.00000	Averaged
45 Benzo(k)fluoranthene	1.57904	1.57933	0.200	0.01865	20.00000	Averaged
46 Benzo(j)fluoranthene	1.43839	1.45324	0.200	1.03179	20.00000	Averaged
34 Benzo(a)pyrene	1.30774	1.29832	0.010	-0.72064	20.00000	Averaged
$ 36 Dibenzo(a,h)anthracene-d14	0.80723	0.81780	0.010	1.30903	20.00000	Averaged
37 Indeno(1,2,3-cd)pyrene	1.37309	1.39143	0.010	1.33574	20.00000	Averaged
38 Dibenzo(a,h)anthracene	1.08579	1.11469	0.010	2.66116	20.00000	Averaged
39 Benzo(g,h,i)perylene	1.19199	1.17695	0.010	-1.26125	20.00000	Averaged
47 Perylene	1.35582	1.32137	0.200	-2.54073	20.00000	Averaged
48 Benzo(e)pyrene	1.36945	1.34177	0.200	-2.02071	20.00000	Averaged

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151205.b\15120502.D
Lab Smp Id: LLSIM 250
Inj Date : 05-DEC-2015 10:30 MS Autotune Date: 23-APR-2014 12:54
Operator : JW Inst ID: nt11.i
Smp Info : LLSIM 250
Misc Info :
Comment :
Method : \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Meth Date : 14-Dec-2015 10:43 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 2 Continuing Calibration Sample
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ng/mL)	AMOUNTS ON-COL (ng/mL)
*	4 Naphthalene-d8	136	6.597	6.597	(1.000)	327903	200.000	
	5 Naphthalene	128	6.629	6.629	(1.005)	454531	250.000	240
$	6 2-Methylnaphthalene-d10	152	7.574	7.574	(1.148)	302123	250.000	248
	7 2-Methylnaphthalene	142	7.627	7.627	(1.156)	324555	250.000	249
	8 1-Methylnaphthalene	142	7.889	7.889	(1.196)	294518	250.000	251
	10 Acenaphthylene	152	9.445	9.445	(0.984)	455058	250.000	239
*	11 Acenaphthene-d10	164	9.600	9.600	(1.000)	235603	200.000	
	12 Acenaphthene	153	9.656	9.656	(1.006)	306617	250.000	243
	14 Dibenzofuran	168	9.866	9.866	(1.028)	459222	250.000	242
	15 Fluorene	166	10.486	10.486	(1.092)	349293	250.000	245
*	18 Phenanthrene-d10	188	12.269	12.269	(1.000)	369128	200.000	
	19 Phenanthrene	178	12.313	12.313	(1.004)	543115	250.000	244
	20 Anthracene	178	12.368	12.368	(1.008)	486960	250.000	245
$	23 Fluoranthene-d10	212	14.374	14.374	(1.172)	489563	250.000	241
	24 Fluoranthene	202	14.403	14.403	(1.174)	558337	250.000	250
	25 Pyrene	202	14.903	14.903	(0.876)	538485	250.000	244
	28 Benzo(a)anthracene	228	16.918	16.918	(0.994)	450121	250.000	242
*	29 Chrysene-d12	240	17.017	17.017	(1.000)	278802	200.000	
	30 Chrysene	228	17.059	17.059	(1.002)	497864	250.000	244
	44 Benzo(b)fluoranthene	252	18.784	18.784	(0.947)	397053	250.000	244
	45 Benzo(k)fluoranthene	252	18.833	18.833	(0.949)	473193	250.000	250
	46 Benzo(j)fluoranthene	252	18.890	18.890	(0.952)	435413	250.000	253
	34 Benzo(a)pyrene	252	19.630	19.630	(0.989)	388997	250.000	248
*	35 Perylene-d12	264	19.841	19.841	(1.000)	239693	200.000	
$	36 Dibenzo(a,h)anthracene-d14	292	22.208	22.208	(1.119)	245026	250.000	253
	37 Indeno(1,2,3-cd)pyrene	276	22.329	22.329	(1.125)	416894	250.000	253
	38 Dibenzo(a,h)anthracene	278	22.318	22.318	(1.125)	333979	250.000	257
	39 Benzo(g,h,i)perylene	276	23.426	23.426	(1.181)	352634	250.000	247
	47 Perylene	252	19.899	19.899	(1.003)	395904	250.000	244
	48 Benzo(e)pyrene	252	19.524	19.524	(0.984)	402017	250.000	245

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120502.D
Lab Smp Id: LLSIM 250
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info:

Calibration Date: 05-DEC-2015
Calibration Time: 18:46
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

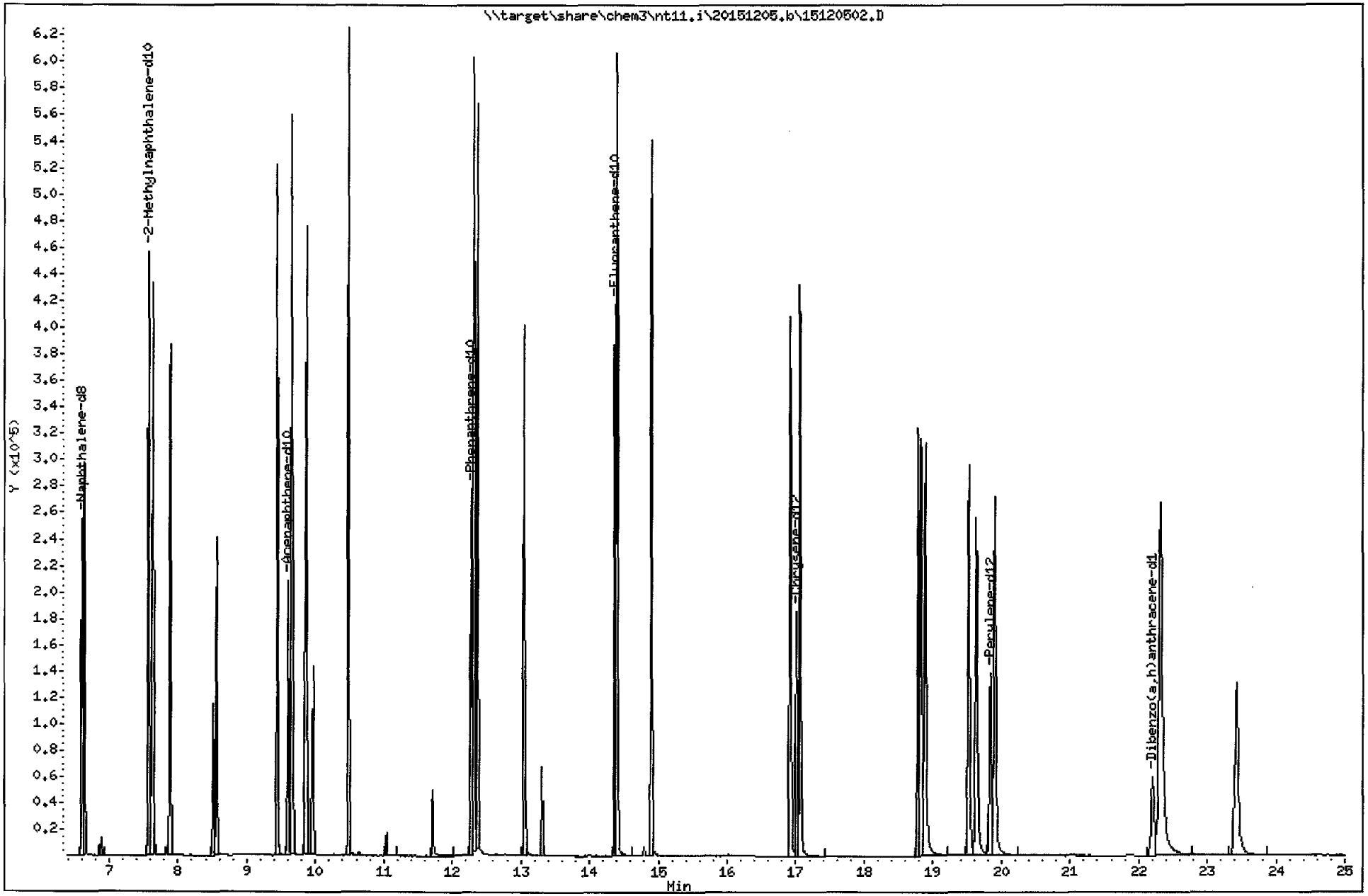
COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	327903	0.00
11 Acenaphthene-d10	239179	119590	478358	235603	-1.50
18 Phenanthrene-d10	372253	186127	744506	369128	-0.84
29 Chrysene-d12	294711	147356	589422	278802	-5.40
35 Perylene-d12	260595	130298	521190	239693	-8.02

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.60	0.00
11 Acenaphthene-d10	9.60	9.10	10.10	9.60	0.00
18 Phenanthrene-d10	12.27	11.77	12.77	12.27	0.00
29 Chrysene-d12	17.02	16.52	17.52	17.02	0.00
35 Perylene-d12	19.84	19.34	20.34	19.84	0.00

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.

Data File: \\target\share\chem3\nt11.i\20151205.b\15120502.D
Date : 05-DEC-2015 10:30
Client ID:
Sample Info: LLSIM 250

Instrument: nt11.i
Operator: JW
Column phase: Rxi-17Sil MS
Column diameter: 0.25



REVIEW SUMMARY FOR FILE - 15120502.D

Lab ID: LLSIM 250
nt11.i, 20151205.b\lowsim.m, 05-DEC-2015 10:30

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

On Column LOD for nt11.i,20151205.b\lowsim.m,Sublist: PEMD.sub = 0.0000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151205.b\15120504.D
Lab Smp Id: AQJ9LCSS1 Client Smp ID: AQJ9LCSS1
Inj Date : 05-DEC-2015 11:45 MS Autotune Date: 23-APR-2014 12:5
Operator : JW Inst ID: nt11.i
Smp Info : AQJ9LCSS1
Misc Info : 15-21388
Comment :
Method : \\target\share\chem3\nt11.i\20151205.b\lowsimISFix.m
Meth Date : 15-Dec-2015 08:24 jonathonw Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 5 QC Sample: LCS
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	100.000	Volume of final extract (uL)
Ws	0.89000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

SW 12/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	FINAL (ug/kg)	
*	4 Naphthalene-d8	136	6.576	6.597	(1.000)	975072	400.000		
	5 Naphthalene	128	6.618	6.639	(1.006)	402429	142.903	16100	B
$	6 2-Methylnaphthalene-d10	152	7.563	7.574	(1.150)	233908	129.258	14500	
	7 2-Methylnaphthalene	142	7.616	7.637	(1.158)	257985	133.330	15000	
	8 1-Methylnaphthalene	142	7.868	7.889	(1.196)	227568	130.505	14700	
	10 Acenaphthylene	152	9.434	9.445	(0.984)	374966	135.561	15200	
*	11 Acenaphthene-d10	164	9.589	9.600	(1.000)	685451	400.000		
	12 Acenaphthene	153	9.645	9.667	(1.006)	244475	133.164	15000	
	14 Dibenzofuran	168	9.855	9.866	(1.028)	374641	135.461	15200	
	15 Fluorene	166	10.475	10.486	(1.092)	315168	151.948	17100	
*	18 Phenanthrene-d10	188	12.269	12.280	(1.000)	1077117	400.000		
	19 Phenanthrene	178	12.302	12.313	(1.003)	625118	192.657	21600	
	20 Anthracene	178	12.357	12.368	(1.007)	443265	152.620	17100	
$	23 Fluoranthene-d10	212	14.365	14.374	(1.171)	532654	179.845	20200	
	24 Fluoranthene	202	14.403	14.413	(1.174)	563076	172.846	19400	
	25 Pyrene	202	14.893	14.903	(0.876)	578518	184.775	20800	
	28 Benzo(a)anthracene	228	16.918	16.926	(0.995)	462181	175.340	19700	
*	29 Chrysene-d12	240	17.009	17.017	(1.000)	790706	400.000		
	30 Chrysene	228	17.059	17.067	(1.003)	480150	165.969	18600	
	44 Benzo(b)fluoranthene	252	18.784	18.785	(0.947)	418489	168.554	18900	
	45 Benzo(k)fluoranthene	252	18.832	18.833	(0.949)	451781	156.151	17500	

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	FINAL (ug/kg)
	46 Benzo(j)fluoranthene	252	18.890	18.890	(0.952)	378845	143.745	16200
	34 Benzo(a)pyrene	252	19.630	19.640	(0.989)	341240	142.412	16000
*	35 Perylene-d12	264	19.841	19.842	(1.000)	732910	400.000	
$	36 Dibenzo(a,h)anthracene-d14	292	22.207	22.208	(1.119)	273937	185.209	20800
	37 Indeno(1,2,3-cd)pyrene	276	22.329	22.341	(1.125)	415230	165.044	18500
	38 Dibenzo(a,h)anthracene	278	22.318	22.318	(1.125)	336258	169.019	19000
	39 Benzo(g,h,i)perylene	276	23.426	23.437	(1.181)	348966	159.780	18000
	47 Perylene	252	19.899	19.909	(1.003)	179236	72.1495	8110(R)
	48 Benzo(e)pyrene	252	19.524	19.534	(0.984)	361944	144.247	16200

QC Flag Legend

R - Spike/Surrogate failed recovery limits.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120504.D
Lab Smp Id: AQJ9LCSS1
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsimISFix.m
Misc Info: 15-21388

Calibration Date: 05-DEC-2015
Calibration Time: 18:46
Client Smp ID: AQJ9LCSS1
Level: LOW
Sample Type: Solid

Test Mode:
Use Initial Calibration Level 4.

Double IS ok

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF	
4 Naphthalene-d8	327896	163948	655792	975072	197.37	<
11 Acenaphthene-d10	239179	119590	478358	685451	186.58	<
18 Phenanthrene-d10	372253	186127	744506	1077117	189.35	<
29 Chrysene-d12	294711	147356	589422	790706	168.30	<
35 Perylene-d12	260595	130298	521190	732910	181.24	<

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.58	-0.32
11 Acenaphthene-d10	9.60	9.10	10.10	9.59	-0.12
18 Phenanthrene-d10	12.28	11.78	12.78	12.27	-0.09
29 Chrysene-d12	17.02	16.52	17.52	17.01	-0.05
35 Perylene-d12	19.84	19.34	20.34	19.84	-0.00

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.

ARI Labs, Inc.

RECOVERY REPORT

Client Name: Anchor QEA, LLC
Sample Matrix: SOLID
Lab Smp Id: AQJ9LCSS1
Level: LOW
Data Type: MS DATA
SpikeList File: PEMD.spk
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsimISFix.m
Misc Info: 15-21388

Client SDG: AQJ9
Fraction: SV
Client Smp ID: AQJ9LCSS1
Operator: JW
SampleType: LCS
Quant Type: ISTD

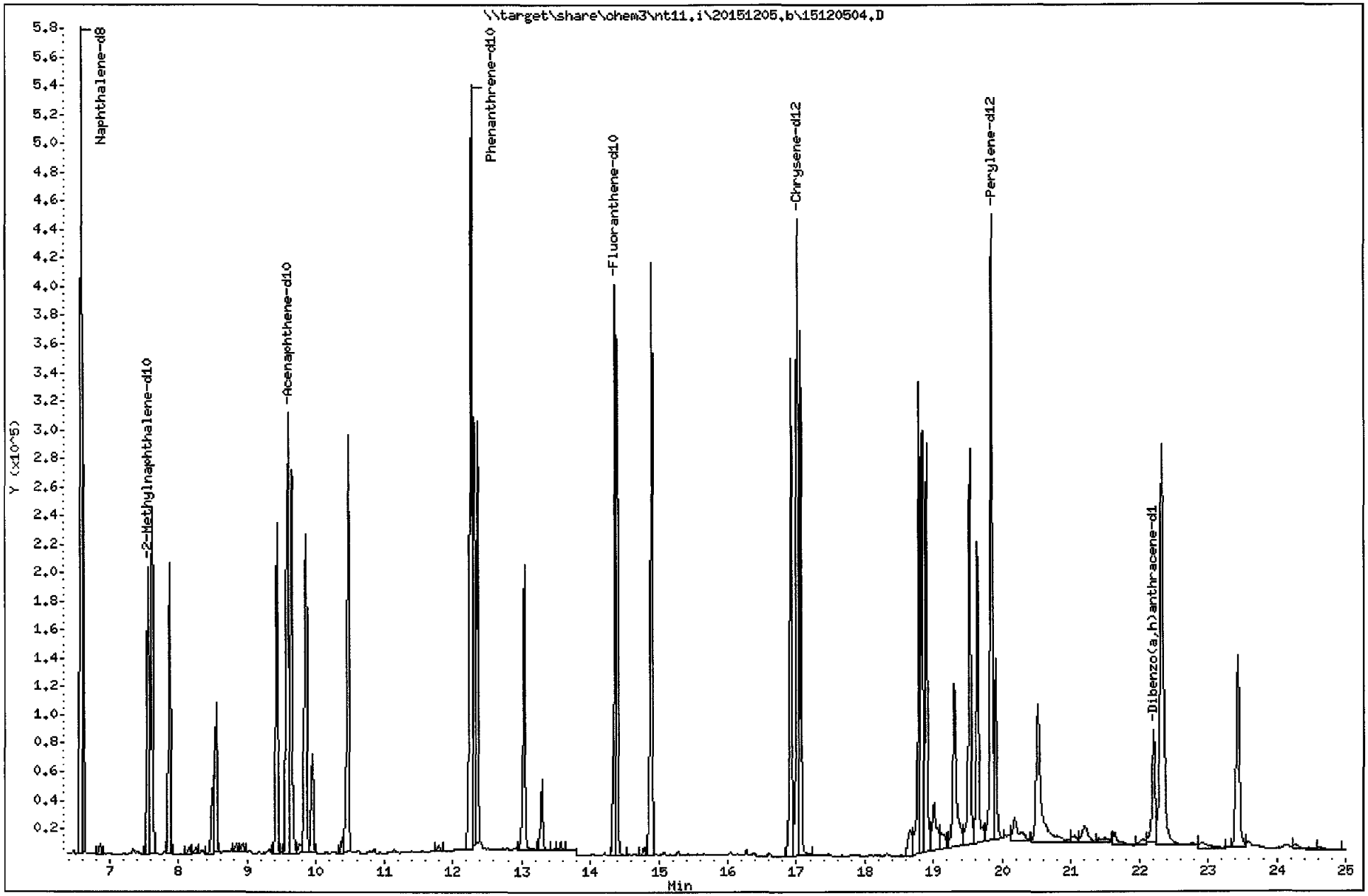
SPIKE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
5 Naphthalene	33700	16100	47.63	30-160
7 2-Methylnaphthalen	33700	15000	44.44	30-160
10 Acenaphthylene	33700	15200	45.19	30-160
12 Acenaphthene	33700	15000	44.39	30-160
15 Fluorene	33700	17100	50.65	30-160
19 Phenanthrene	33700	21600	64.22	30-160
20 Anthracene	33700	17100	50.87	30-160
24 Fluoranthene	33700	19400	57.62	30-160
25 Pyrene	33700	20800	61.59	30-160
28 Benzo(a)anthracene	33700	19700	58.45	30-160
30 Chrysene	33700	18600	55.32	30-160
44 Benzo(b)fluoranthe	33700	18900	56.18	30-160
45 Benzo(k)fluoranthe	33700	17500	52.05	30-160
34 Benzo(a)pyrene	33700	16000	47.47	30-160
37 Indeno(1,2,3-cd)py	33700	18500	55.01	30-160
38 Dibenzo(a,h)anthra	33700	19000	56.34	30-160
39 Benzo(g,h,i)peryle	33700	18000	53.26	30-160
47 Perylene	33700	8110	24.05*	30-160
48 Benzo(e)pyrene	33700	16200	48.08	30-160

SURROGATE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
$ 6 2-Methylnaphthalen	33700	14500	43.09	30-160
$ 23 Fluoranthene-d10	33700	20200	59.95	30-160
$ 36 Dibenzo(a,h)anthra	33700	20800	61.74	30-160

Data File: \\target\share\chem3\nt11.i\20151205.b\15120504.D
Date : 05-DEC-2015 11:45
Client ID: AQJ9LCSS1
Sample Info: AQJ9LCSS1
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: JW
Column diameter: 0.25

AQJ9:001150



REVIEW SUMMARY FOR FILE - 15120504.D

Lab ID: AQJ9LCSS1
nt11.i, 20151205.b\lowsimISFix.m, 05-DEC-2015 11:45

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151205.b\lowsimISFix.m,Sublist: PEMD.sub = 3.00

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151205.b\15120505.D
Lab Smp Id: AQJ9MBS1 Client Smp ID: AQJ9MBS1
Inj Date : 05-DEC-2015 12:15 MS Autotune Date: 23-APR-2014 12:5
Operator : JW Inst ID: nt11.i
Smp Info : AQJ9MBS1
Misc Info : 15-21388
Comment :
Method : \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Meth Date : 14-Dec-2015 10:48 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 4 QC Sample: BLANK
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	100.000	Volume of final extract (uL)
Ws	0.89000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

FJ 12/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)
*	4 Naphthalene-d8	136	6.587	6.597	(1.000)	438288	200.000	
	5 Naphthalene	128	6.618	6.639	(1.005)	29996	11.8485	1330
$	6 2-Methylnaphthalene-d10	152	7.564	7.574	(1.148)	153831	94.5592	10600
	7 2-Methylnaphthalene	142	7.616	7.637	(1.156)	11564	6.64797	747(H)
	8 1-Methylnaphthalene	142	7.879	7.889	(1.196)	6749	4.30529	484(H)
	10 Acenaphthylene	152	Compound Not Detected.					
*	11 Acenaphthene-d10	164	9.589	9.600	(1.000)	366527	200.000	
	12 Acenaphthene	153	Compound Not Detected.					
	14 Dibenzofuran	168	Compound Not Detected.					
	15 Fluorene	166	Compound Not Detected.					
*	18 Phenanthrene-d10	188	12.269	12.280	(1.000)	602619	200.000	
	19 Phenanthrene	178	12.313	12.313	(1.004)	13839	3.81168	428(H)
	20 Anthracene	178	Compound Not Detected.					
$	23 Fluoranthene-d10	212	14.365	14.374	(1.171)	414921	125.201	14100
	24 Fluoranthene	202	14.403	14.413	(1.174)	12655	3.47173	390(H)
	25 Pyrene	202	14.893	14.903	(0.875)	15028	4.25942	479(H)
	28 Benzo(a)anthracene	228	Compound Not Detected.					
*	29 Chrysene-d12	240	17.017	17.017	(1.000)	445515	200.000	
	30 Chrysene	228	Compound Not Detected.					
	44 Benzo(b)fluoranthene	252	Compound Not Detected.					
	45 Benzo(k)fluoranthene	252	Compound Not Detected.					

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)
46	Benzo(j)fluoranthene	252	Compound Not Detected.					
34	Benzo(a)pyrene	252	Compound Not Detected.					
* 35	Perylene-d12	264	19.841	19.842	(1.000)	407440	200.000	
$ 36	Dibenzo(a,h)anthracene-d14	292	22.208	22.208	(1.119)	204191	124.166	14000
37	Indeno(1,2,3-cd)pyrene	276	Compound Not Detected.					
38	Dibenzo(a,h)anthracene	278	Compound Not Detected.					
39	Benzo(g,h,i)perylene	276	Compound Not Detected.					
47	Perylene	252	Compound Not Detected.					
48	Benzo(e)pyrene	252	Compound Not Detected.					

QC Flag Legend

H - Operator selected an alternate compound hit.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120505.D
Lab Smp Id: AQJ9MBS1
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21388

Calibration Date: 05-DEC-2015
Calibration Time: 18:46
Client Smp ID: AQJ9MBS1
Level: LOW
Sample Type: Solid

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	438288	33.67
11 Acenaphthene-d10	239179	119590	478358	366527	53.24
18 Phenanthrene-d10	372253	186127	744506	602619	61.88
29 Chrysene-d12	294711	147356	589422	445515	51.17
35 Perylene-d12	260595	130298	521190	407440	56.35

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.59	-0.16
11 Acenaphthene-d10	9.60	9.10	10.10	9.59	-0.12
18 Phenanthrene-d10	12.28	11.78	12.78	12.27	-0.09
29 Chrysene-d12	17.02	16.52	17.52	17.02	-0.00
35 Perylene-d12	19.84	19.34	20.34	19.84	-0.00

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.

ARI Labs, Inc.

RECOVERY REPORT

Client Name: Anchor QEA, LLC
Sample Matrix: SOLID
Lab Smp Id: AQJ9MBS1
Level: LOW
Data Type: MS DATA
SpikeList File: waterlcs.spk
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21388

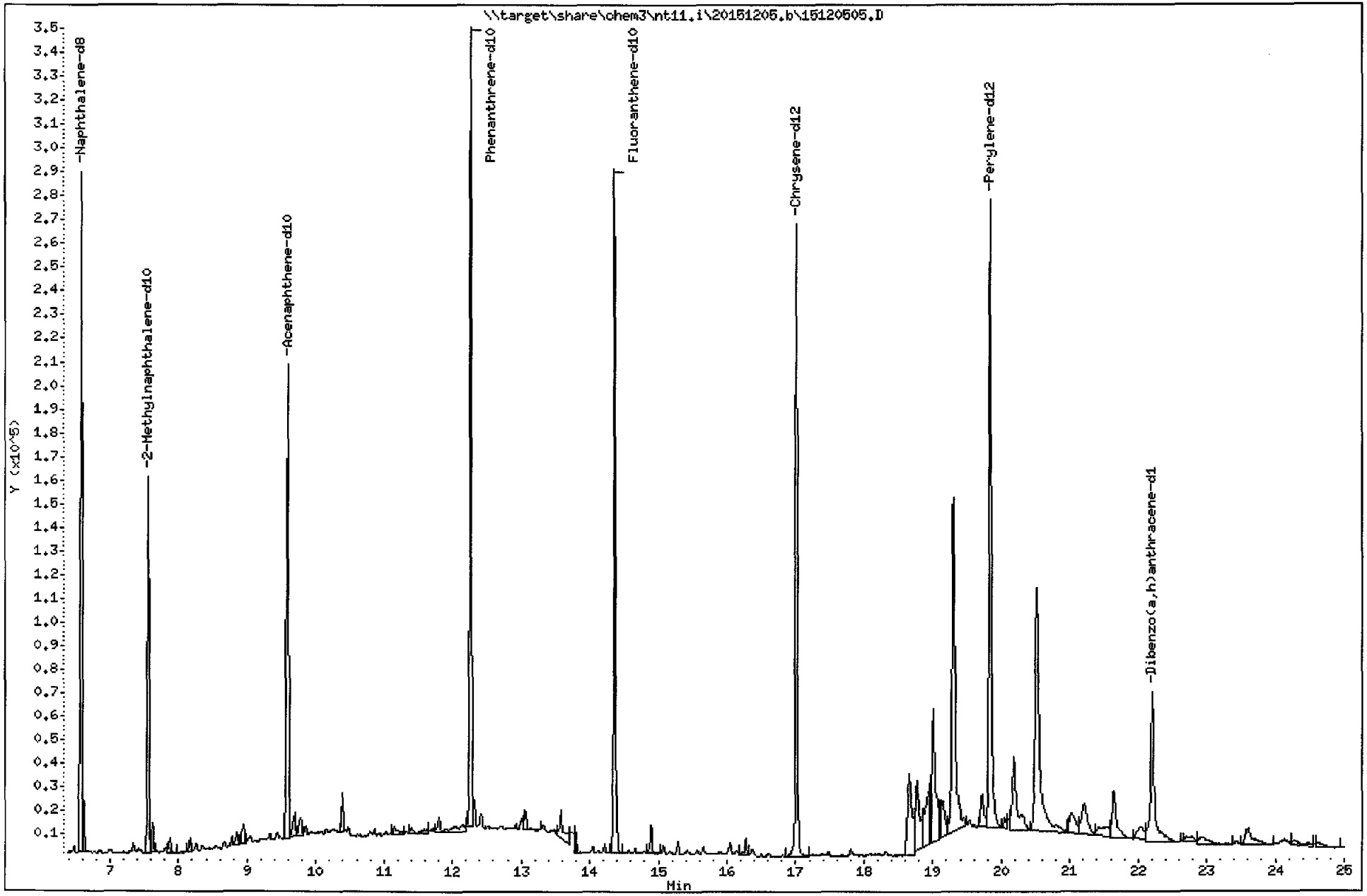
Client SDG: AQJ9
Fraction: SV
Client Smp ID: AQJ9MBS1
Operator: JW
SampleType: BLANK
Quant Type: ISTD

SURROGATE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
$ 6 2-Methylnaphthalen	33700	10600	31.52	30-160
$ 23 Fluoranthene-d10	33700	14100	41.73	30-160
$ 36 Dibenzo(a,h)anthra	33700	14000	41.39	30-160

Data File: \\target\share\chem3\nt11.i\20151205.b\15120505.D
Date : 05-DEC-2015 12:15
Client ID: AQJ9MBS1
Sample Info: AQJ9MBS1
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: JW
Column diameter: 0.25

AQJ9:001156



Data File: \\target\share\chem3\nt11.i\20151205.b\15120505.D

Date : 05-DEC-2015 12:15

Client ID: AQJ9MBS1

Instrument: nt11.i

Sample Info: AQJ9MBS1

Volume Injected (uL): 2.0

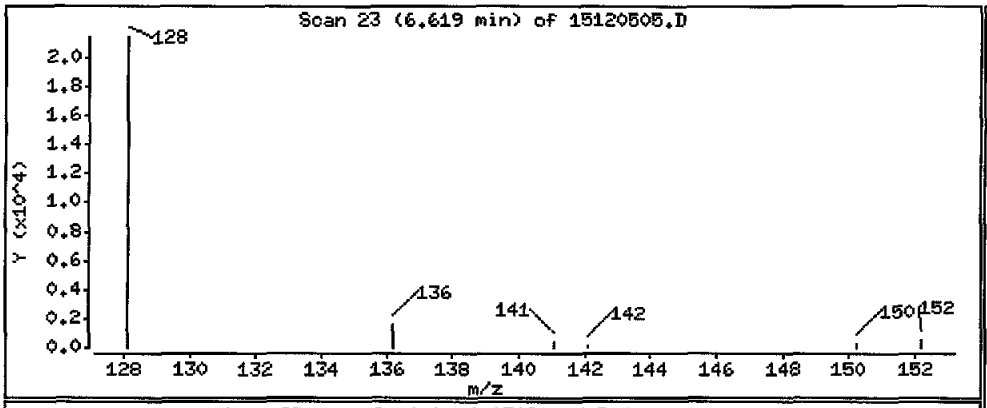
Operator: JW

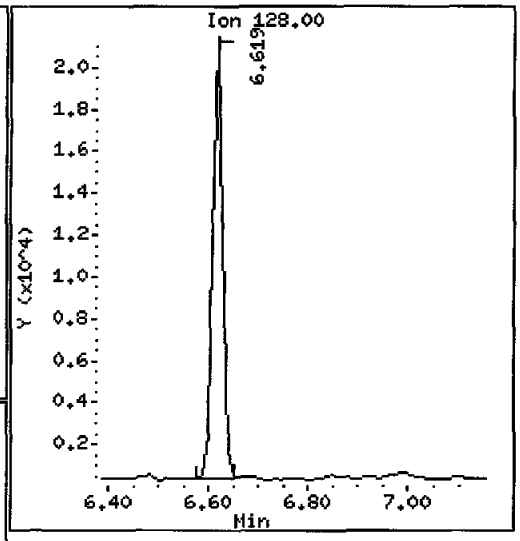
Column phase: Rxi-17Sil MS

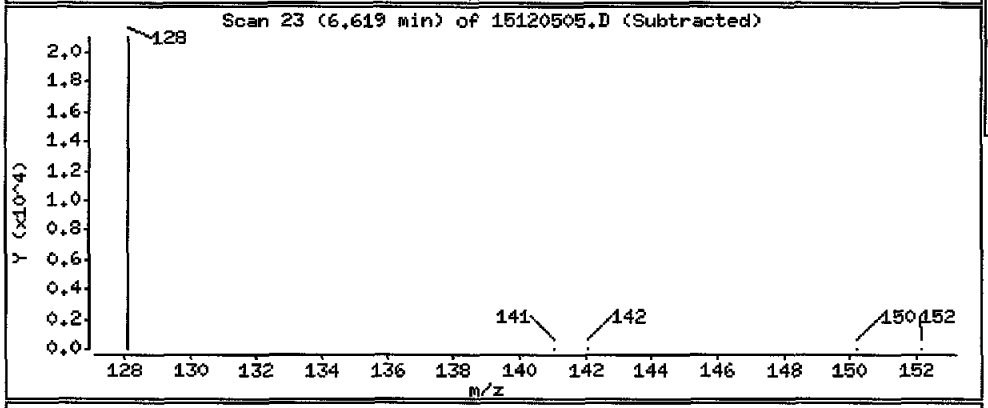
Column diameter: 0.25

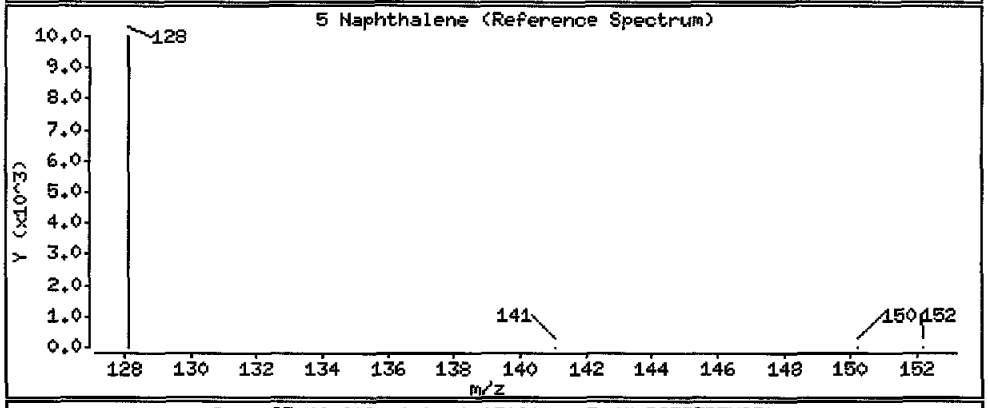
5 Naphthalene

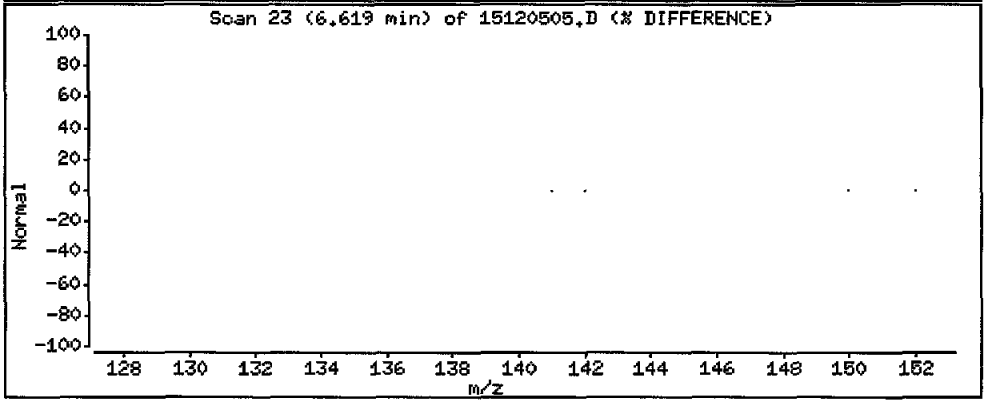
Concentration: 1330 ug/kg











Data File: \\target\share\chem3\nt11.i\20151205.b\15120505.D

Date : 05-DEC-2015 12:15

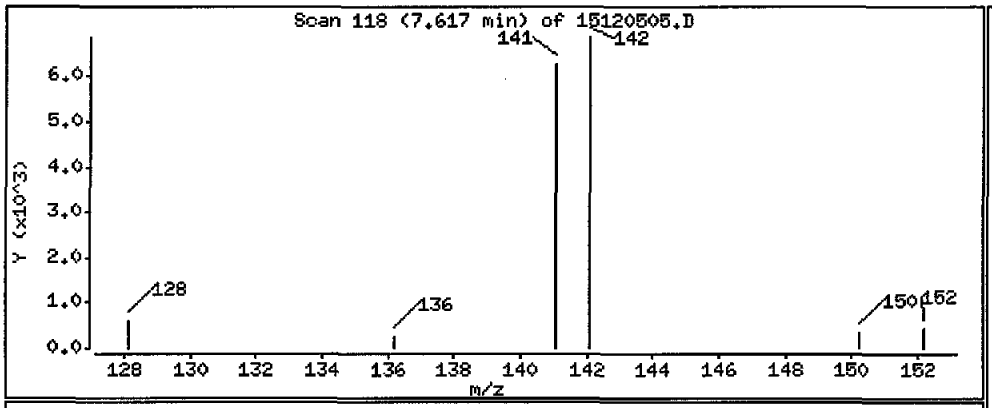
Client ID: AQJ9MBS1 Instrument: nt11.i

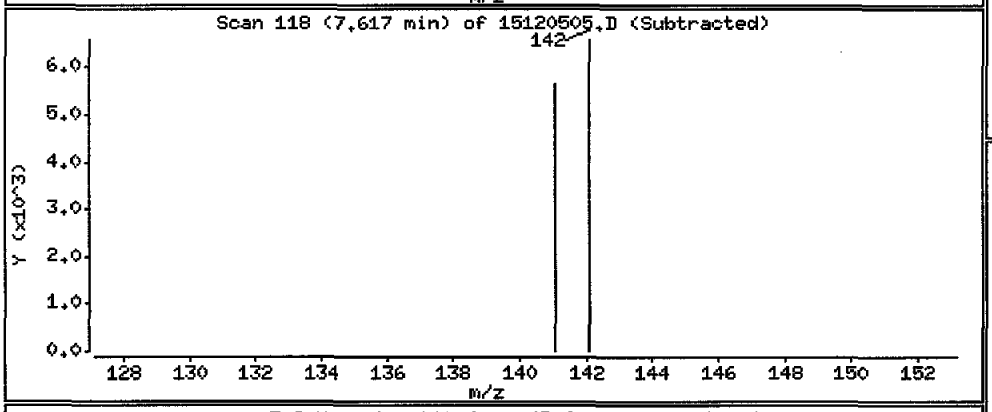
Sample Info: AQJ9MBS1

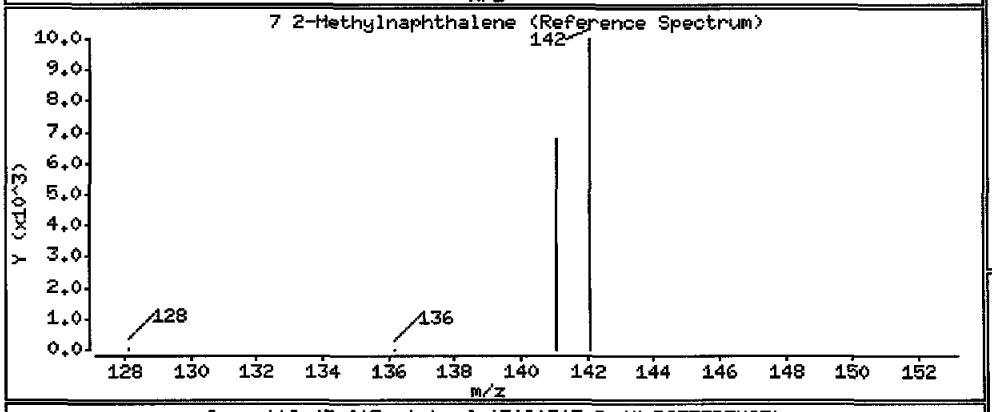
Volume Injected (uL): 2.0 Operator: JW

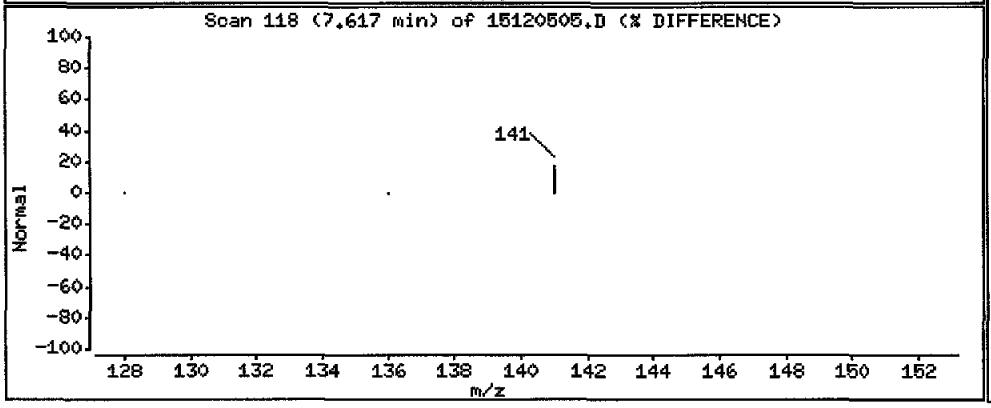
Column phase: Rxi-17Sil MS Column diameter: 0.25

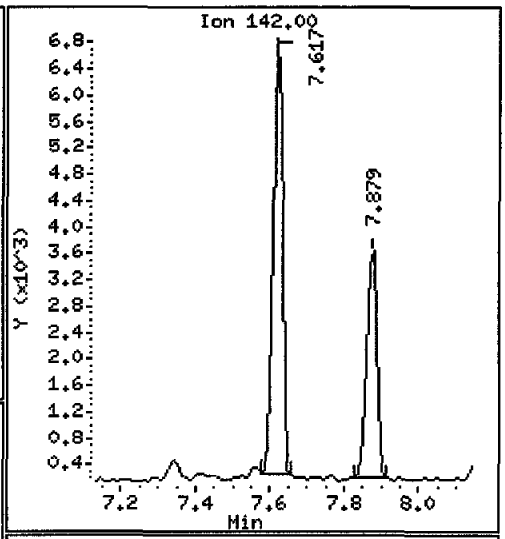
7 2-Methylnaphthalene Concentration: 747 ug/kg

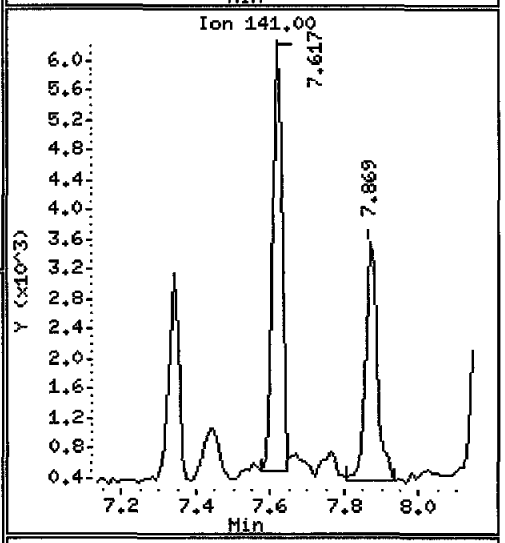


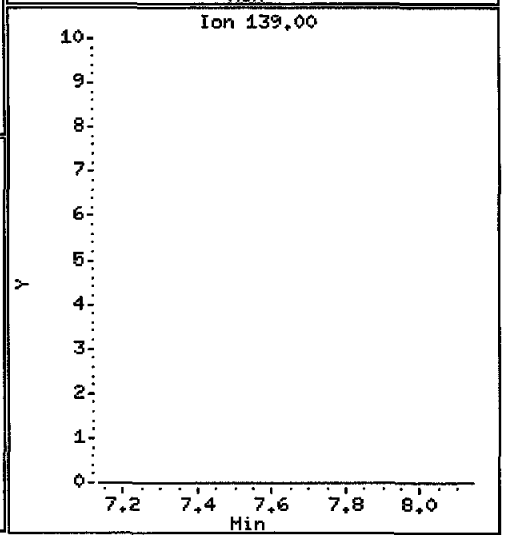












Data File: \\target\share\chem3\nt11.i\20151205.b\15120505.D

Date : 05-DEC-2015 12:15

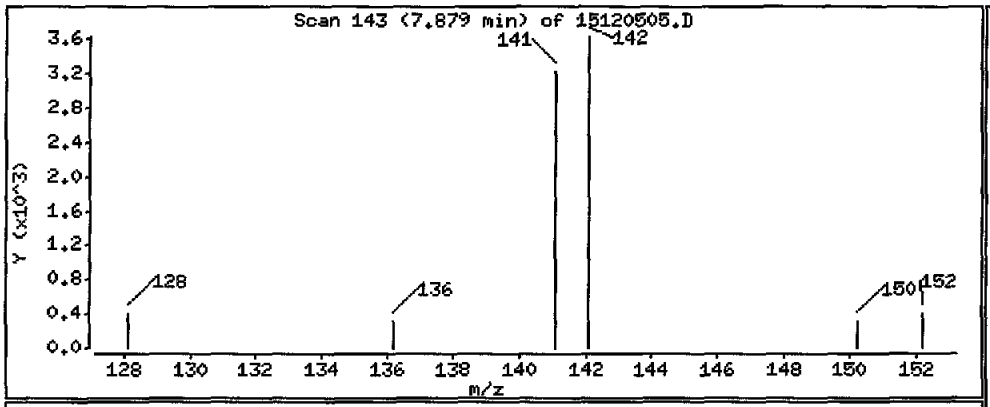
Client ID: AQJ9MBS1 Instrument: nt11.i

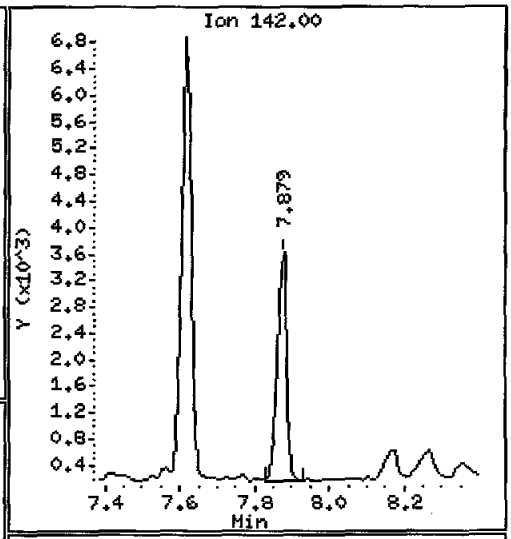
Sample Info: AQJ9MBS1

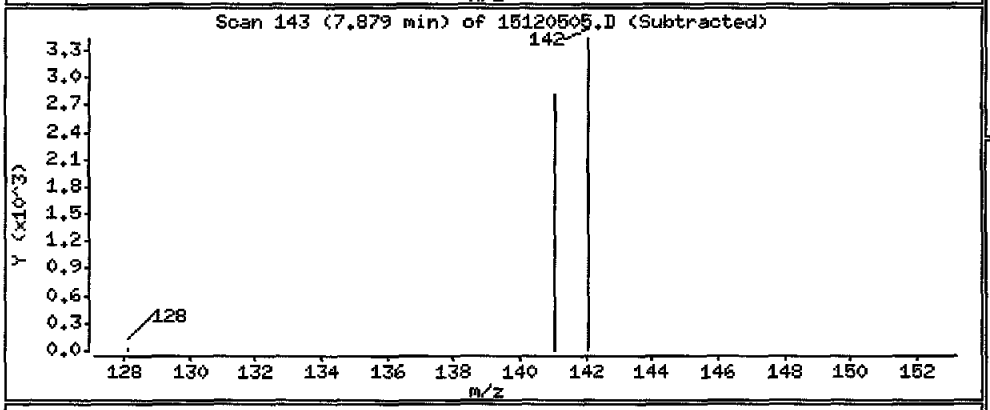
Volume Injected (uL): 2.0 Operator: JW

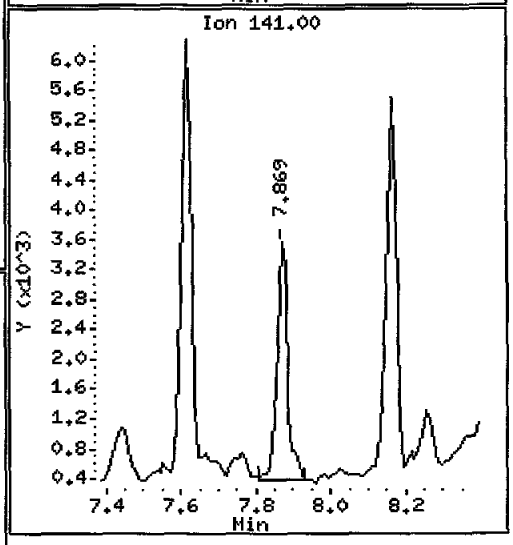
Column phase: Rxi-17Sil MS Column diameter: 0.25

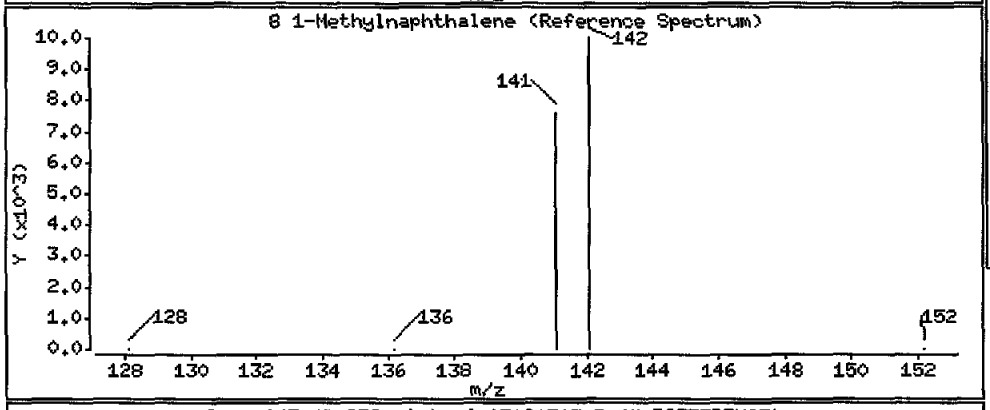
8 1-Methylnaphthalene Concentration: 484 ug/kg

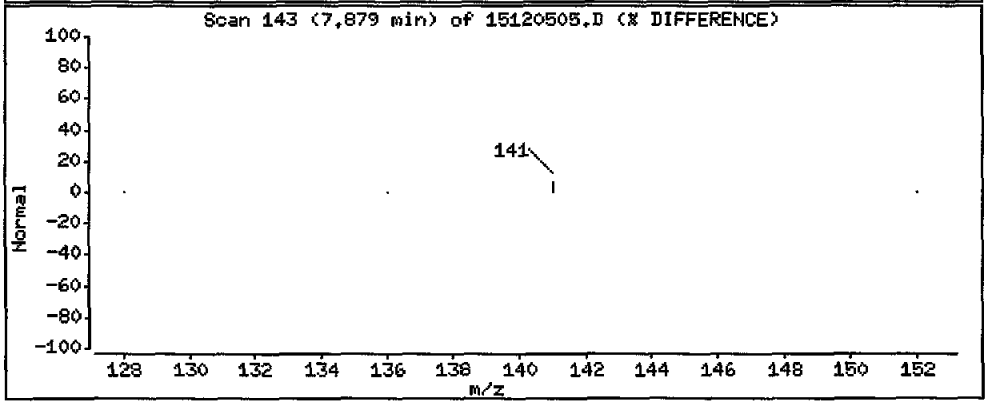












Data File: \\target\share\chem3\nt11.i\20151205.b\15120505.D

Date : 05-DEC-2015 12:15

Client ID: AQJ9MBS1

Instrument: nt11.i

Sample Info: AQJ9MBS1

Volume Injected (uL): 2.0

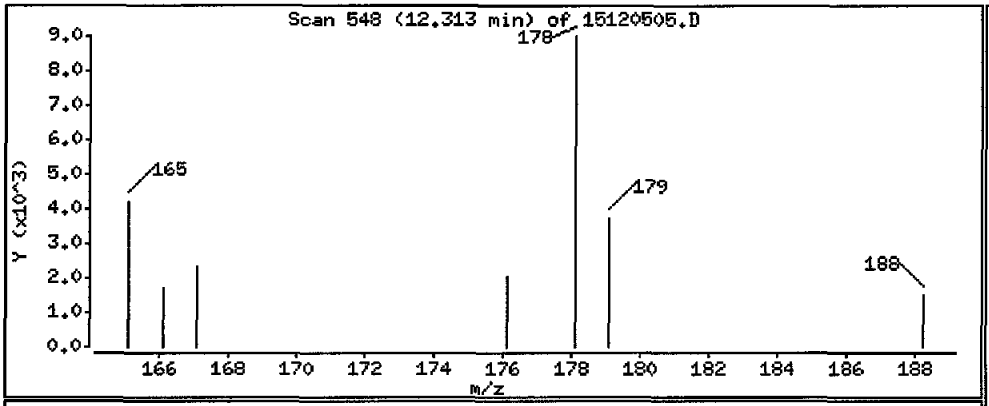
Operator: JW

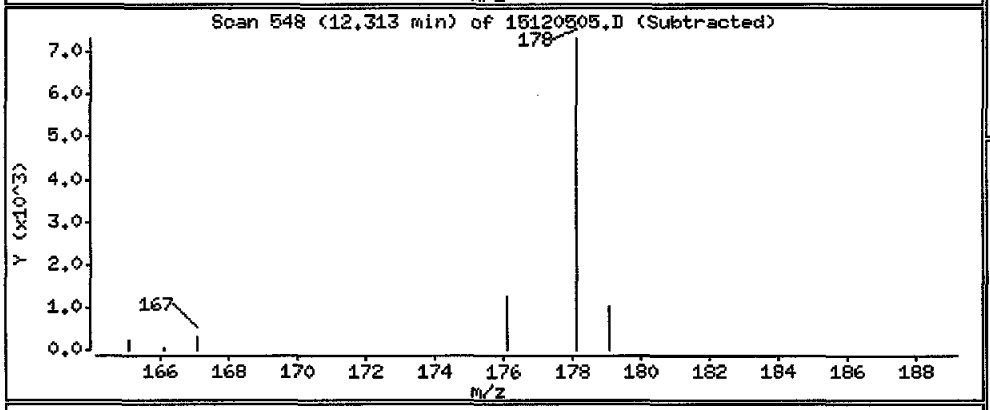
Column phase: Rxi-17Sil MS

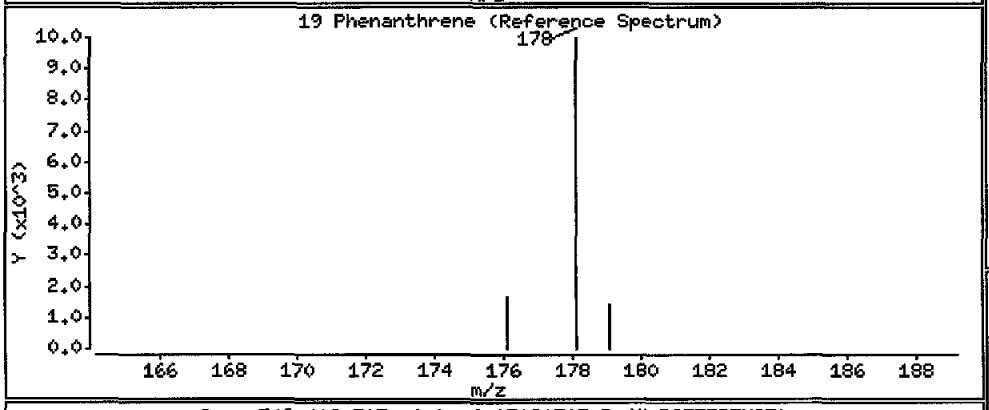
Column diameter: 0.25

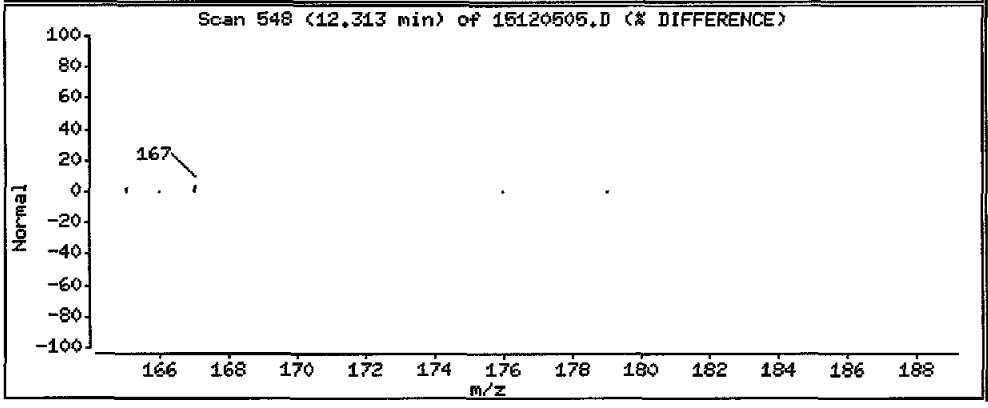
19 Phenanthrene

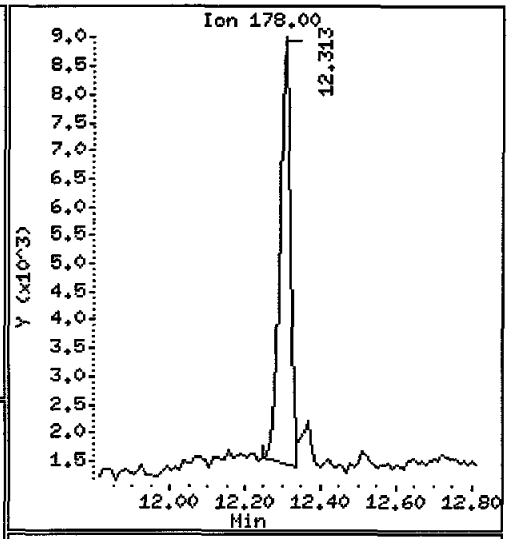
Concentration: 428 ug/kg

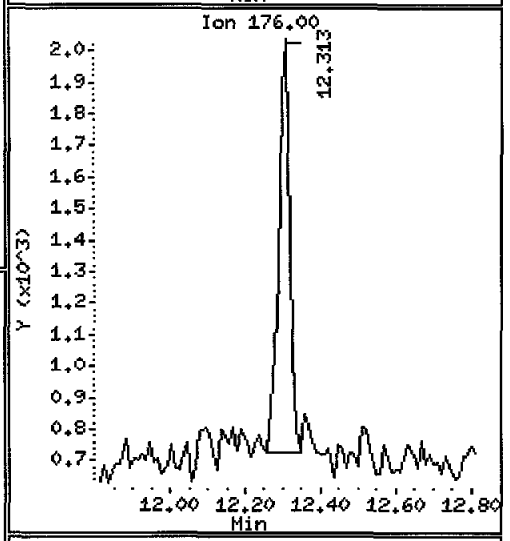


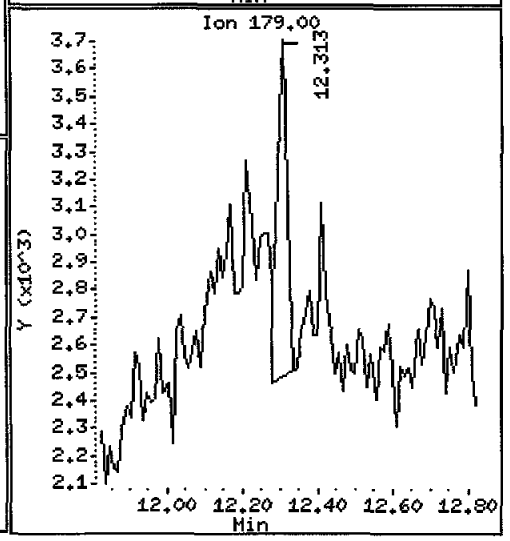












Data File: \\target\share\chem3\nt11.i\20151205.b\15120505.D

Date : 05-DEC-2015 12:15

Client ID: AQJ9MBS1

Instrument: nt11.i

Sample Info: AQJ9MBS1

Volume Injected (uL): 2.0

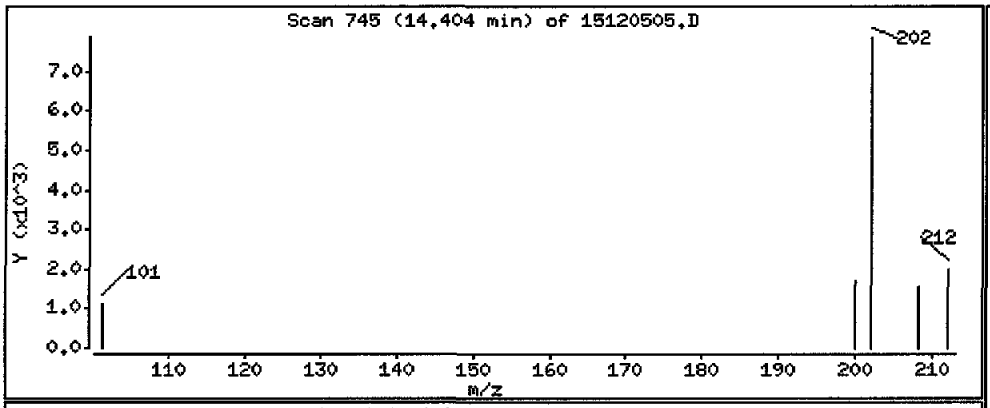
Operator: JW

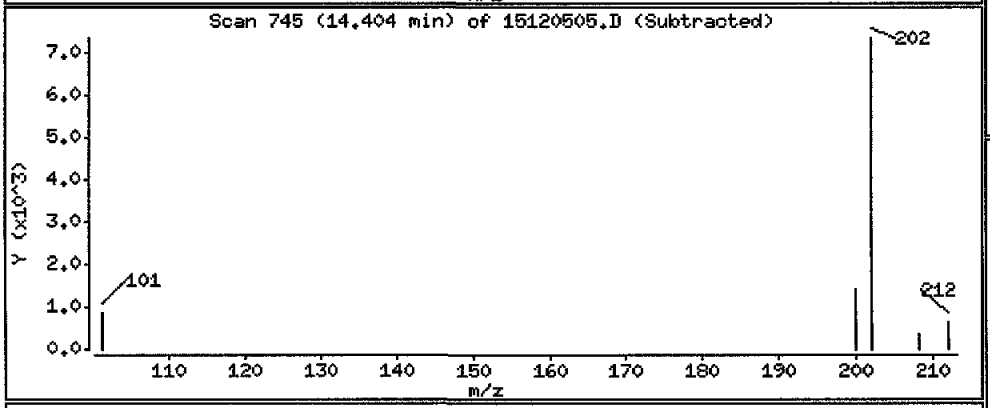
Column phase: Rxi-17Sil MS

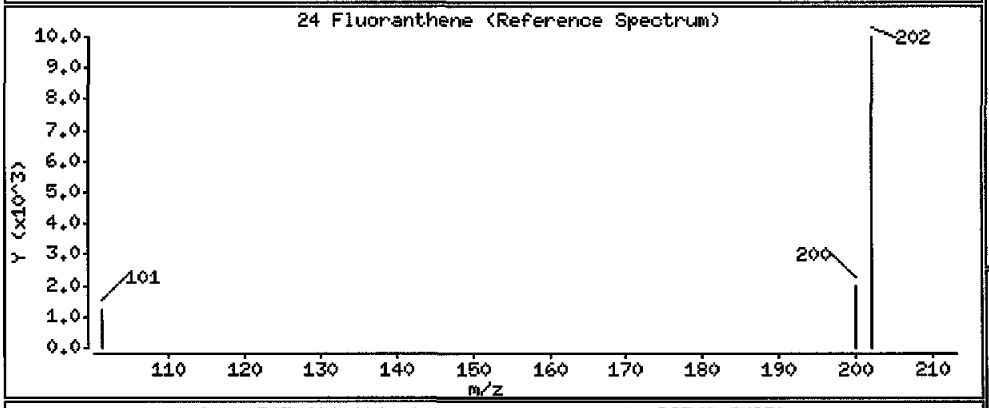
Column diameter: 0.25

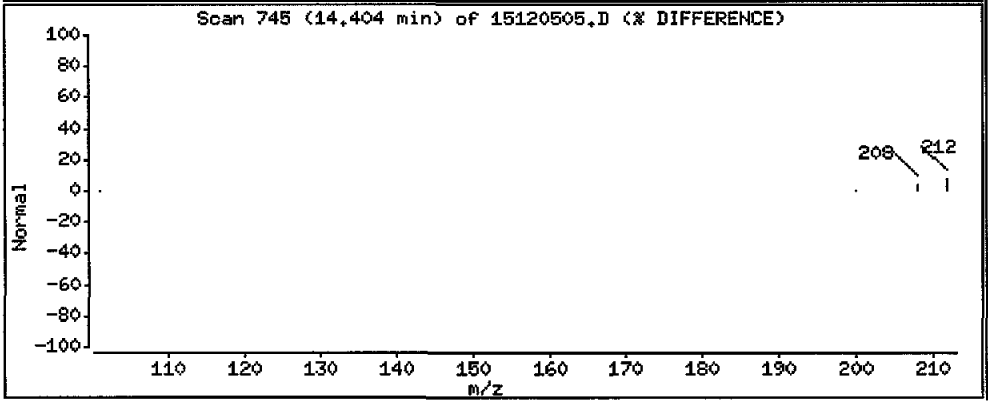
24 Fluoranthene

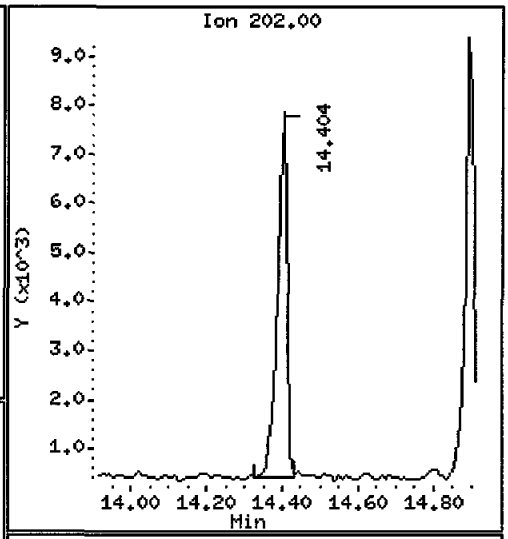
Concentration: 390 ug/kg

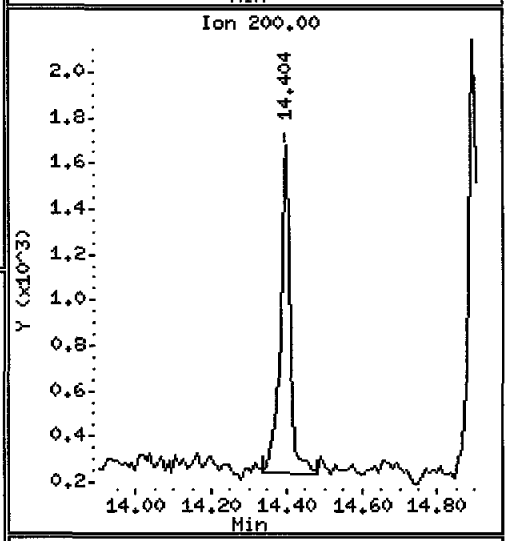


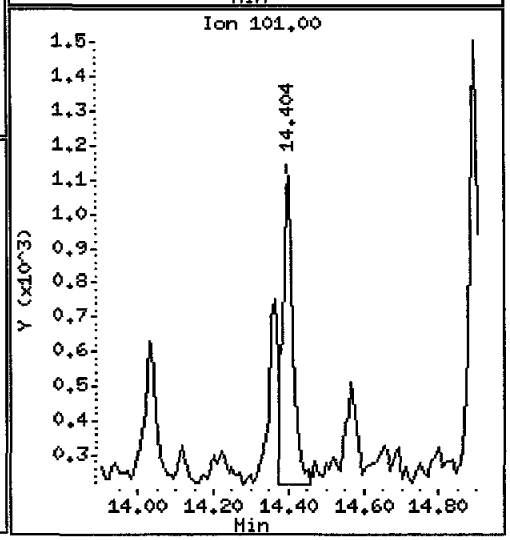












Data File: \\target\share\chem3\nt11.i\20151205.b\15120505.D

Date : 05-DEC-2015 12:15

Client ID: AQJ9MBS1

Instrument: nt11.i

Sample Info: AQJ9MBS1

Volume Injected (uL): 2.0

Operator: JW

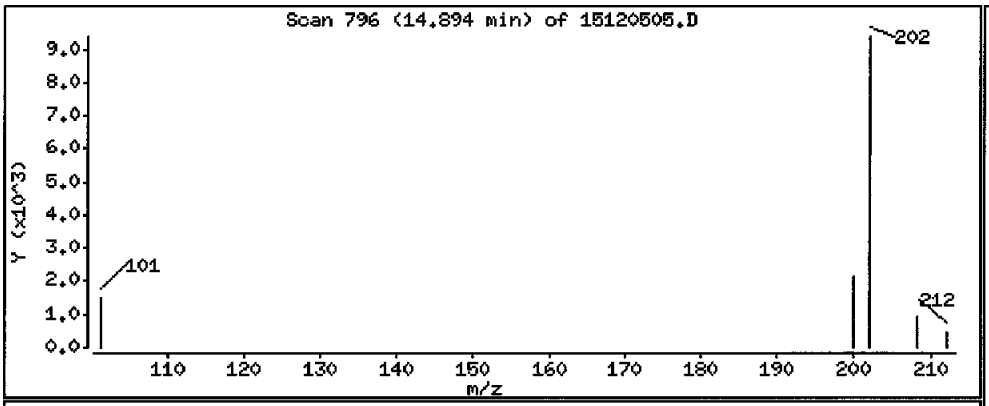
Column phase: Rxi-17Sil MS

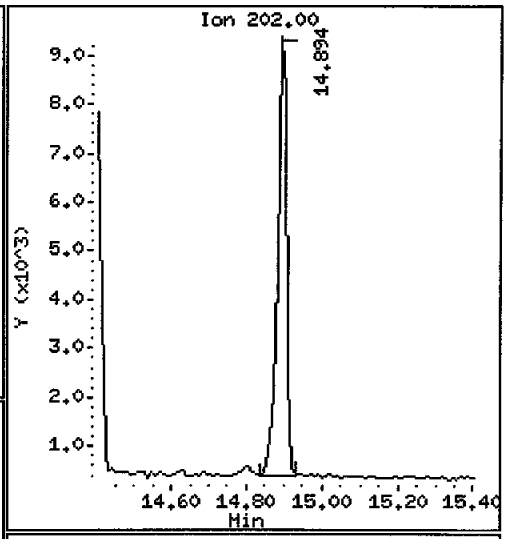
Column diameter: 0.25

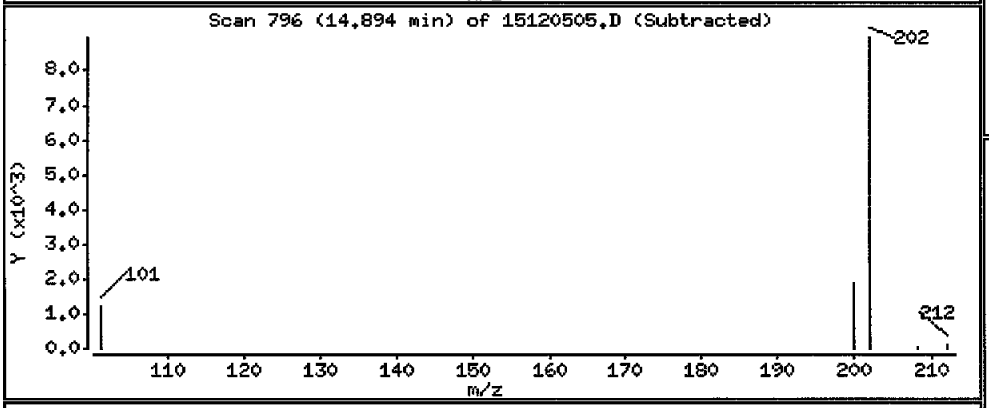
25 Pyrene

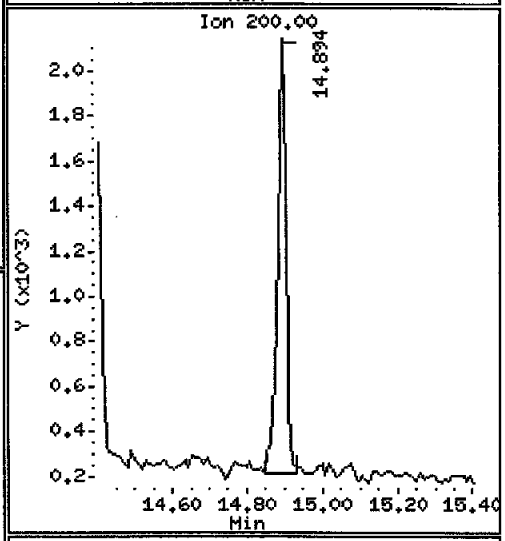
Concentration: 479 ug/kg

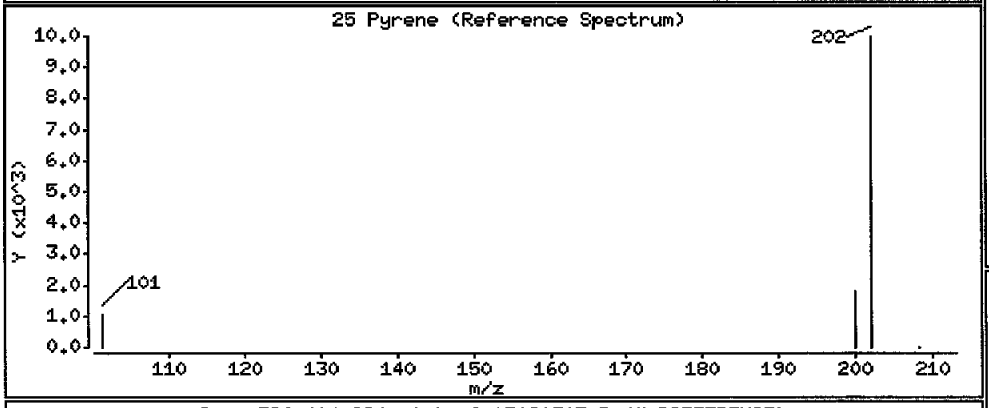
LMD

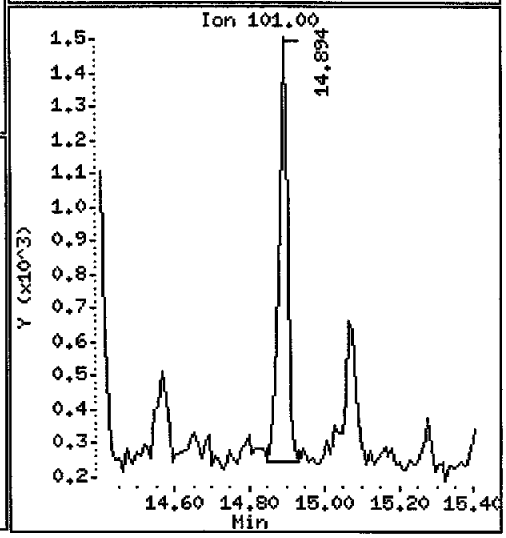


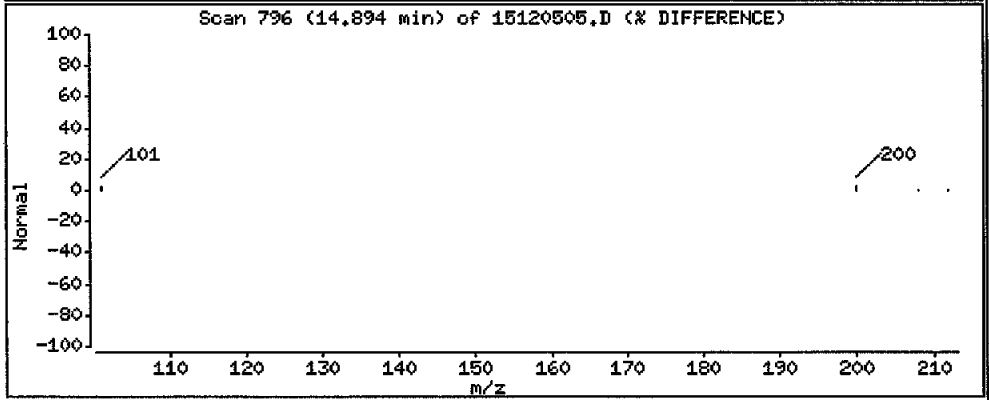












REVIEW SUMMARY FOR FILE - 15120505.D

Lab ID: AQJ9MBS1
nt11.i, 20151205.b\lowsim.m, 05-DEC-2015 12:15

RT CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151205.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151205.b\15120506.D
Lab Smp Id: AQJ9LCSDS1 Client Smp ID: AQJ9LCSDS1
Inj Date : 05-DEC-2015 12:45 MS Autotune Date: 23-APR-2014 12:54
Operator : JW Inst ID: nt11.i
Smp Info : AQJ9LCSDS1
Misc Info : 15-21388
Comment :
Method : \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Meth Date : 14-Dec-2015 10:43 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 6 QC Sample: LCSD
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	100.000	Volume of final extract (uL)
Ws	0.89000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

JW 12/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)
*	4 Naphthalene-d8	136	6.576	6.597	(1.000)	377538	200.000	
	5 Naphthalene	128	6.618	6.629	(1.006)	236245	108.333	12200
$	6 2-Methylnaphthalene-d10	152	7.564	7.574	(1.150)	148567	106.018	11900
	7 2-Methylnaphthalene	142	7.616	7.627	(1.158)	166919	111.400	12500
	8 1-Methylnaphthalene	142	7.868	7.889	(1.196)	150592	111.523	12500
	10 Acenaphthylene	152	9.434	9.445	(0.984)	274359	105.379	11800
*	11 Acenaphthene-d10	164	9.589	9.600	(1.000)	322593	200.000	
	12 Acenaphthene	153	9.656	9.656	(1.007)	175614	101.625	11400
	14 Dibenzofuran	168	9.855	9.866	(1.028)	269904	103.681	11600
	15 Fluorene	166	10.475	10.486	(1.092)	235804	120.780	13600
*	18 Phenanthrene-d10	188	12.269	12.269	(1.000)	523037	200.000	
	19 Phenanthrene	178	12.313	12.313	(1.004)	466901	148.166	16600
	20 Anthracene	178	12.357	12.368	(1.007)	349269	123.825	13900
$	23 Fluoranthene-d10	212	14.365	14.374	(1.171)	429604	149.356	16800
	24 Fluoranthene	202	14.403	14.403	(1.174)	469298	148.335	16700
	25 Pyrene	202	14.893	14.903	(0.876)	480438	158.095	17800
	28 Benzo(a)anthracene	228	16.918	16.918	(0.995)	373003	145.792	16400
*	29 Chrysene-d12	240	17.009	17.017	(1.000)	383735	200.000	
	30 Chrysene	228	17.059	17.059	(1.003)	374544	133.385	15000
	44 Benzo(b)fluoranthene	252	18.785	18.784	(0.947)	328827	141.308	15900
	45 Benzo(k)fluoranthene	252	18.833	18.833	(0.949)	356321	131.402	14800

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	FINAL (ug/kg)
	46 Benzo(j)fluoranthene	252	18.890	18.890	(0.952)	299760	121.353	13600
	34 Benzo(a)pyrene	252	19.630	19.630	(0.989)	267677	119.191	13400
*	35 Perylene-d12	264	19.842	19.841	(1.000)	343460	200.000	
$	36 Dibenzo(a,h)anthracene-d14	292	22.208	22.208	(1.119)	220286	158.907	17900
	37 Indeno(1,2,3-cd)pyrene	276	22.329	22.329	(1.125)	324939	137.803	15500
	38 Dibenzo(a,h)anthracene	278	22.318	22.318	(1.125)	263633	141.386	15900
	39 Benzo(g,h,i)perylene	276	23.426	23.426	(1.181)	274328	134.015	15100
	47 Perylene	252	19.899	19.899	(1.003)	163883	70.3860	7910(R)
	48 Benzo(e)pyrene	252	19.524	19.524	(0.984)	287952	122.442	13800

QC Flag Legend

R - Spike/Surrogate failed recovery limits.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120506.D
Lab Smp Id: AQJ9LCSDS1
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21388

Calibration Date: 05-DEC-2015
Calibration Time: 10:30
Client Smp ID: AQJ9LCSDS1
Level: LOW
Sample Type: Solid

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	377538	15.14
11 Acenaphthene-d10	239179	119590	478358	322593	34.88
18 Phenanthrene-d10	372253	186127	744506	523037	40.51
29 Chrysene-d12	294711	147356	589422	383735	30.21
35 Perylene-d12	260595	130298	521190	343460	31.80

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.58	-0.32
11 Acenaphthene-d10	9.60	9.10	10.10	9.59	-0.11
18 Phenanthrene-d10	12.27	11.77	12.77	12.27	0.00
29 Chrysene-d12	17.02	16.52	17.52	17.01	-0.05
35 Perylene-d12	19.84	19.34	20.34	19.84	0.00

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.

ARI Labs, Inc.

RECOVERY REPORT

Client Name: Anchor QEA, LLC
Sample Matrix: SOLID
Lab Smp Id: AQJ9LCSDS1
Level: LOW
Data Type: MS DATA
SpikeList File: PEMD.spk
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21388

Client SDG: AQJ9
Fraction: SV
Client Smp ID: AQJ9LCSDS1
Operator: JW
SampleType: LCSD
Quant Type: ISTD

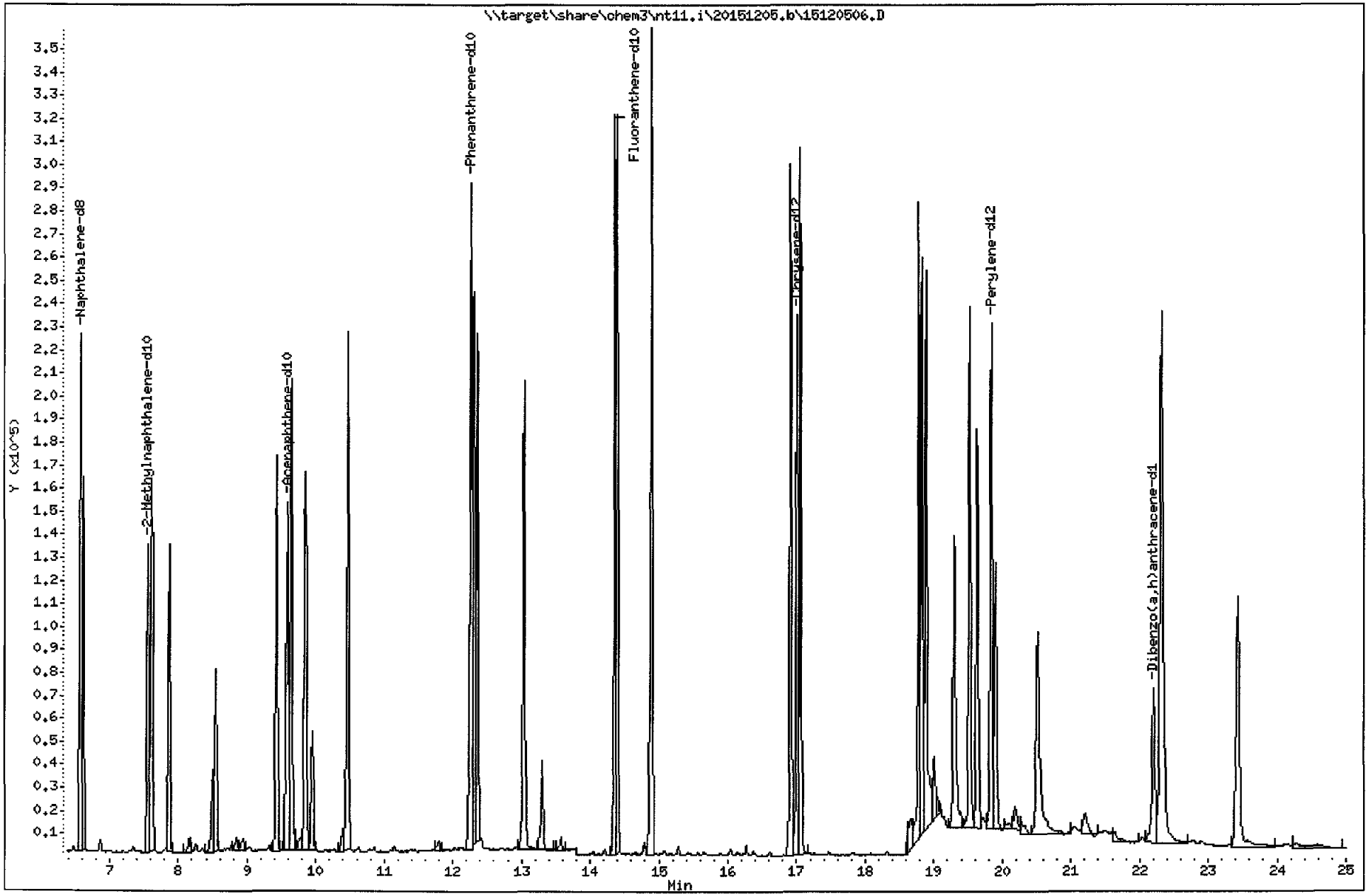
	SPIKE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
5	Naphthalene	33700	12200	36.11	30-160
7	2-Methylnaphthalen	33700	12500	37.13	30-160
10	Acenaphthylene	33700	11800	35.13	30-160
12	Acenaphthene	33700	11400	33.88	30-160
15	Fluorene	33700	13600	40.26	30-160
19	Phenanthrene	33700	16600	49.39	30-160
20	Anthracene	33700	13900	41.28	30-160
24	Fluoranthene	33700	16700	49.44	30-160
25	Pyrene	33700	17800	52.70	30-160
28	Benzo(a)anthracene	33700	16400	48.60	30-160
30	Chrysene	33700	15000	44.46	30-160
44	Benzo(b)fluoranthe	33700	15900	47.10	30-160
45	Benzo(k)fluoranthe	33700	14800	43.80	30-160
34	Benzo(a)pyrene	33700	13400	39.73	30-160
37	Indeno(1,2,3-cd)py	33700	15500	45.93	30-160
38	Dibenzo(a,h)anthra	33700	15900	47.13	30-160
39	Benzo(g,h,i)peryle	33700	15100	44.67	30-160
47	Perylene	33700	7910	23.46*	30-160
48	Benzo(e)pyrene	33700	13800	40.81	30-160

	SURROGATE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
$ 6	2-Methylnaphthalen	33700	11900	35.34	30-160
$ 23	Fluoranthene-d10	33700	16800	49.79	30-160
$ 36	Dibenzo(a,h)anthra	33700	17900	52.97	30-160

Data File: \\target\share\chem3\nt11.i\20151205.b\15120506.D
Date : 05-DEC-2015 12:45
Client ID: AQJ9LCSDS1
Sample Info: AQJ9LCSDS1
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: JW
Column diameter: 0.25

AQJ9:00168



REVIEW SUMMARY FOR FILE - 15120506.D

Lab ID: AQJ9LCSDS1
nt11.i, 20151205.b\lowsim.m, 05-DEC-2015 12:45

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151205.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151205.b\15120507.D
Lab Smp Id: AQJ9A Client Smp ID: PG-GP-1-PEMD-151109
Inj Date : 05-DEC-2015 13:15 MS Autotune Date: 23-APR-2014 12:5
Operator : JW Inst ID: nt11.i
Smp Info : AQJ9A
Misc Info : 15-21388
Comment :
Method : \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Meth Date : 14-Dec-2015 10:43 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 7
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	100.000	Volume of final extract (uL)
Ws	0.89000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

JW 12/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)	
*	4 Naphthalene-d8	136	6.587	6.597	(1.000)	329948	200.000		
	5 Naphthalene	128	6.618	6.629	(1.005)	265038	139.066	15600	B
$	6 2-Methylnaphthalene-d10	152	7.564	7.574	(1.148)	170807	139.470	15700	
	7 2-Methylnaphthalene	142	7.616	7.627	(1.156)	104495	79.7977	8970	
	8 1-Methylnaphthalene	142	7.879	7.889	(1.196)	60596	51.3477	5770	
	10 Acenaphthylene	152	Compound Not Detected.						
*	11 Acenaphthene-d10	164	9.589	9.600	(1.000)	276926	200.000		
	12 Acenaphthene	153	9.656	9.656	(1.007)	155009	104.494	11700	
	14 Dibenzofuran	168	9.855	9.866	(1.028)	126127	56.4402	6340	
	15 Fluorene	166	10.475	10.486	(1.092)	185942	110.946	12500	
*	18 Phenanthrene-d10	188	12.269	12.269	(1.000)	455160	200.000		
	19 Phenanthrene	178	12.313	12.313	(1.004)	1452263	529.586	59500	
	20 Anthracene	178	12.368	12.368	(1.008)	164500	67.0168	7530	
$	23 Fluoranthene-d10	212	14.365	14.374	(1.171)	457748	182.872	20500	
	24 Fluoranthene	202	14.403	14.403	(1.174)	1555776	565.079	63500	
	25 Pyrene	202	14.903	14.903	(0.876)	906267	334.387	37600	
	28 Benzo(a)anthracene	228	16.918	16.918	(0.994)	115512	50.6248	5690	
*	29 Chrysene-d12	240	17.017	17.017	(1.000)	342230	200.000		
	30 Chrysene	228	17.059	17.059	(1.002)	132139	52.7654	5930	
	44 Benzo(b)fluoranthene	252	18.785	18.784	(0.947)	41996	19.6219	2200	
	45 Benzo(k)fluoranthene	252	Compound Not Detected.						

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)
	46 Benzo(j)fluoranthene	252	Compound Not Detected.					
	34 Benzo(a)pyrene	252	Compound Not Detected.					
*	35 Perylene-d12	264	19.841	19.841	(1.000)	315896	200.000	
$	36 Dibenzo(a,h)anthracene-d14	292	22.208	22.208	(1.119)	226531	177.670	20000
	37 Indeno(1,2,3-cd)pyrene	276	Compound Not Detected.					
	38 Dibenzo(a,h)anthracene	278	Compound Not Detected.					
	39 Benzo(g,h,i)perylene	276	Compound Not Detected.					
	47 Perylene	252	Compound Not Detected.					
	48 Benzo(e)pyrene	252	19.524	19.524	(0.984)	25694	11.8788	1330

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120507.D
Lab Smp Id: AQJ9A
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21388

Calibration Date: 05-DEC-2015
Calibration Time: 10:30
Client Smp ID: PG-GP-1-PEMD-1!
Level: LOW
Sample Type: Tissue

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	329948	0.63
11 Acenaphthene-d10	239179	119590	478358	276926	15.78
18 Phenanthrene-d10	372253	186127	744506	455160	22.27
29 Chrysene-d12	294711	147356	589422	342230	16.12
35 Perylene-d12	260595	130298	521190	315896	21.22

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.59	-0.16
11 Acenaphthene-d10	9.60	9.10	10.10	9.59	-0.12
18 Phenanthrene-d10	12.27	11.77	12.77	12.27	0.00
29 Chrysene-d12	17.02	16.52	17.52	17.02	0.00
35 Perylene-d12	19.84	19.34	20.34	19.84	0.00

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.

ARI Labs, Inc.

RECOVERY REPORT

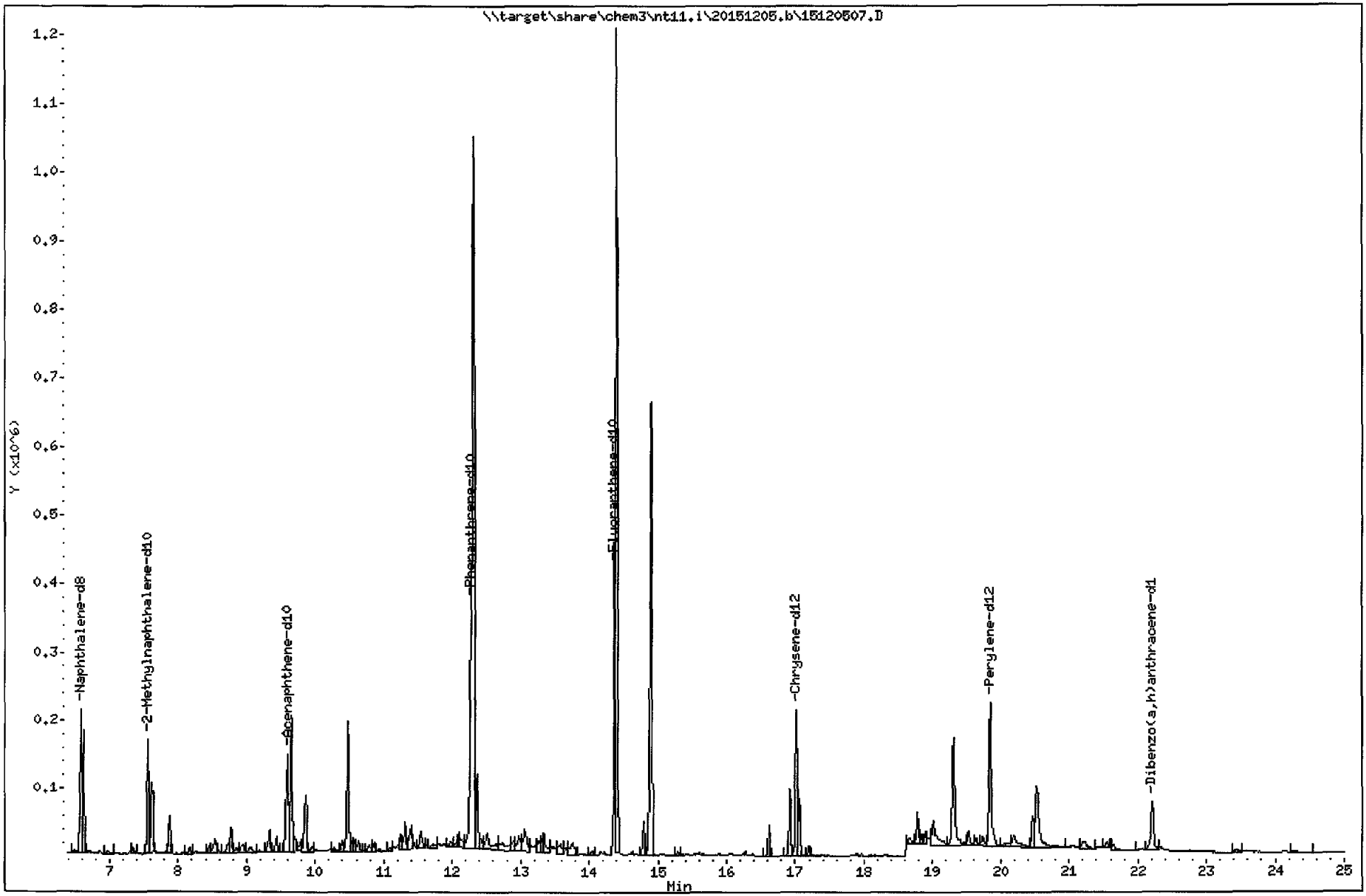
Client Name: Anchor QEA, LLC
Client SDG: AQJ9
Sample Matrix: SOLID
Fraction: SV
Lab Smp Id: AQJ9A
Client Smp ID: PG-GP-1-PEMD-151109
Level: LOW
Operator: JW
Data Type: MS DATA
SampleType: SAMPLE
SpikeList File: waterlcs.spk
Quant Type: ISTD
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21388

SURROGATE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
$ 6 2-Methylnaphthalen	33700	15700	46.49	30-160
$ 23 Fluoranthene-d10	33700	20500	60.96	30-160
$ 36 Dibenzo(a,h)anthra	33700	20000	59.22	30-160

Data File: \\target\share\chem3\nt11.i\20151205.b\15120507.D
Date : 05-DEC-2015 13:15
Client ID: PG-GP-1-PEND-151109
Sample Info: AQJ9A
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: JW
Column diameter: 0.25

AQJ9:001714



Data File: \\target\share\chem3\nt11.i\20151205.b\15120507.D

Date : 05-DEC-2015 13:15

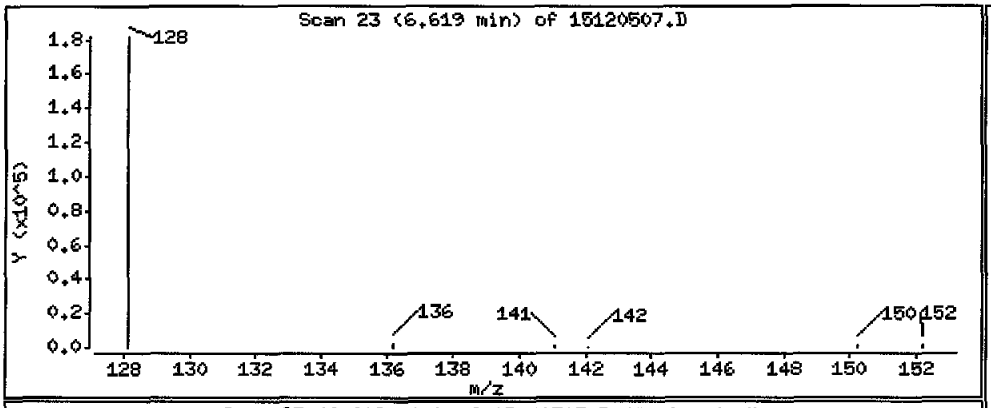
Client ID: PG-GP-1-PEMD-151109 Instrument: nt11.i

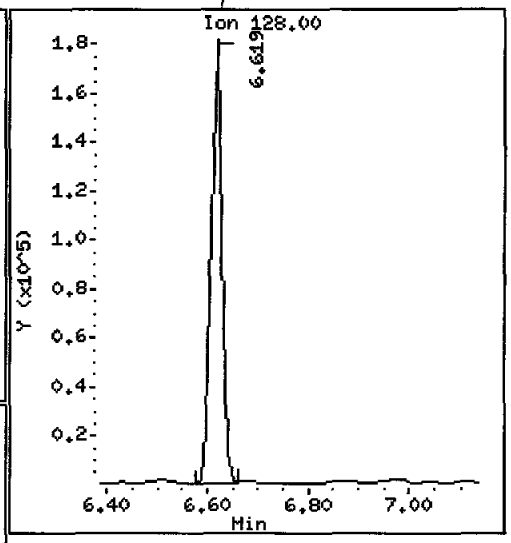
Sample Info: AQJ9A

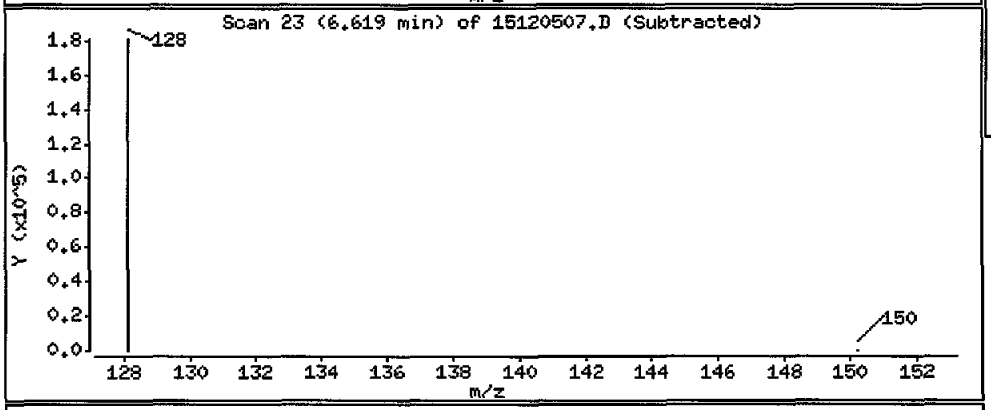
Volume Injected (uL): 2.0 Operator: JW

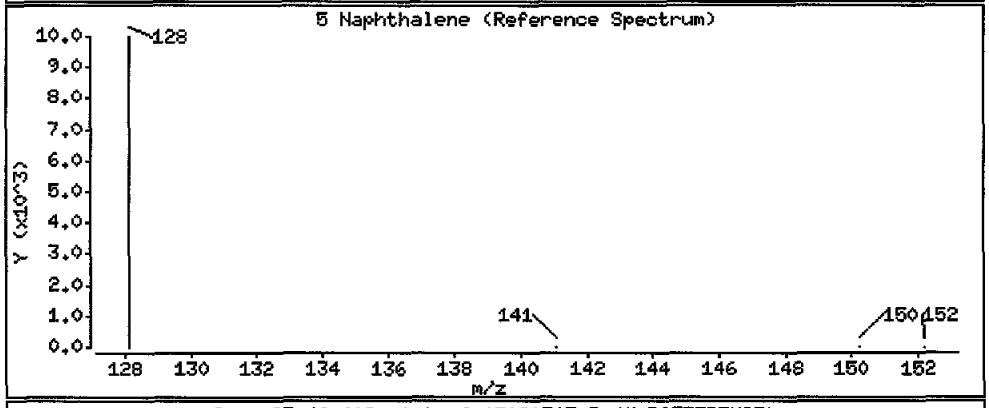
Column phase: Rxi-17Sil MS Column diameter: 0.25

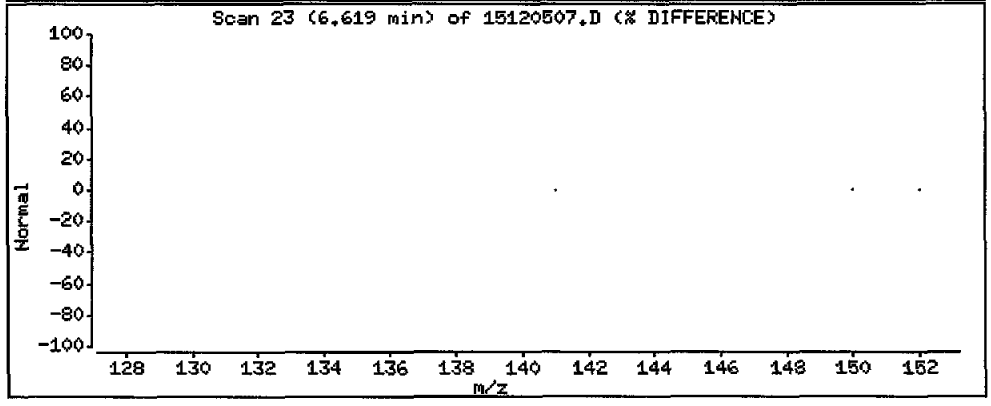
5 Naphthalene Concentration: 15600 ug/kg











Data File: \\target\share\chem3\nt11.i\20151205.b\15120507.D

Date : 05-DEC-2015 13:15

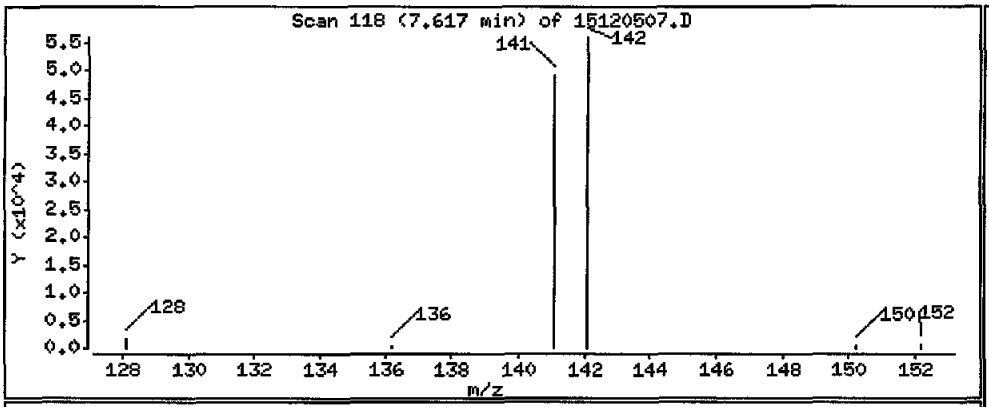
Client ID: PG-GP-1-PEMD-151109 Instrument: nt11.i

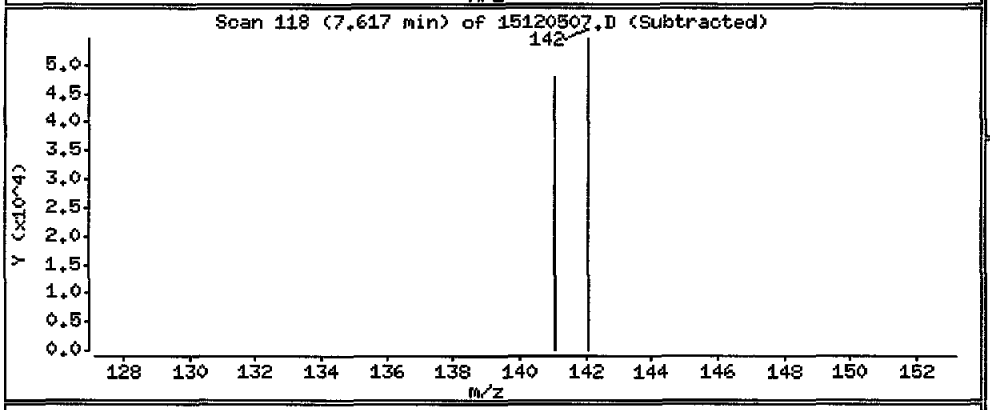
Sample Info: AQJ9A

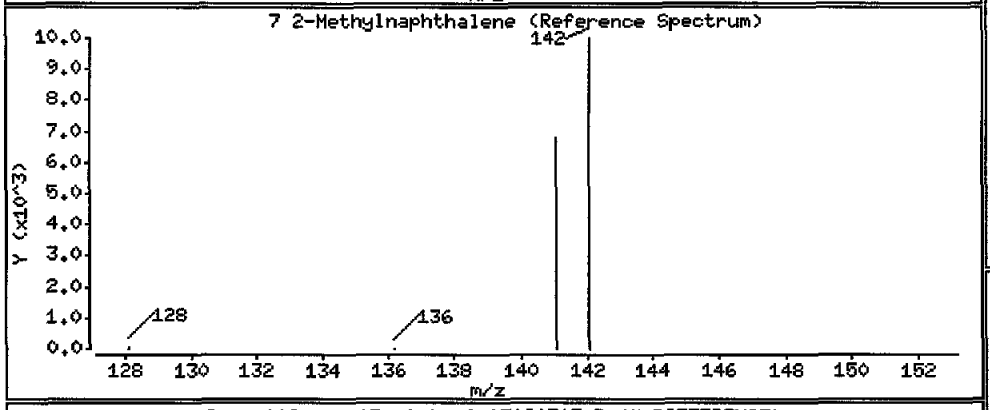
Volume Injected (uL): 2.0 Operator: JW

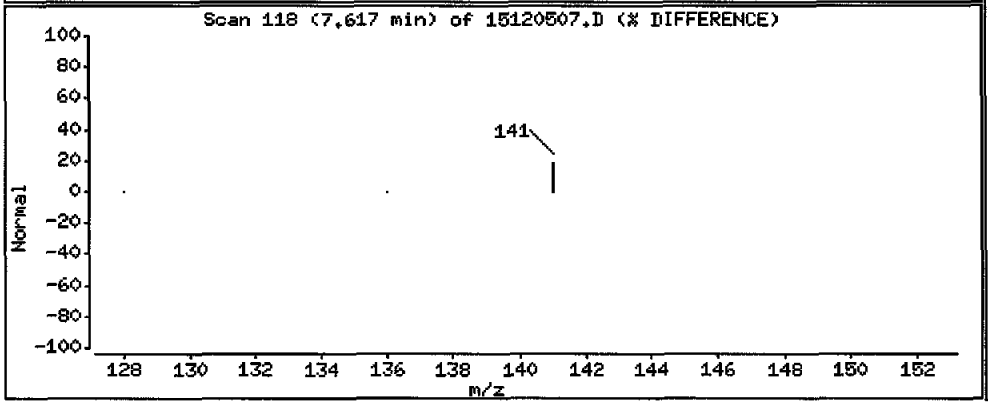
Column phase: Rxi-17Sil MS Column diameter: 0.25

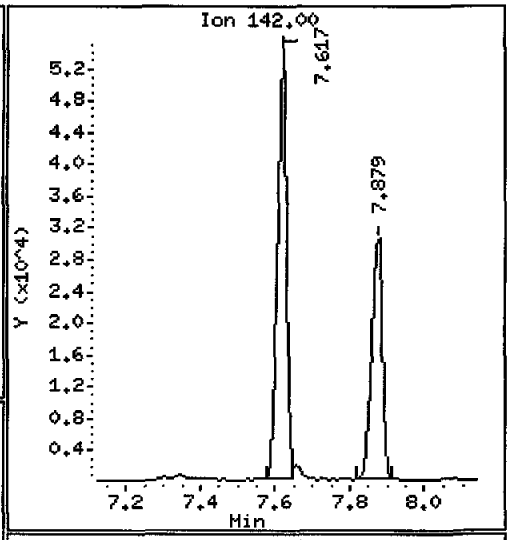
7 2-Methylnaphthalene Concentration: 8970 ug/kg

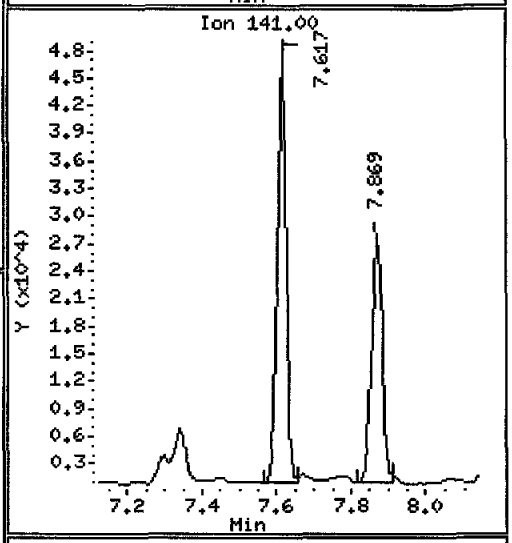


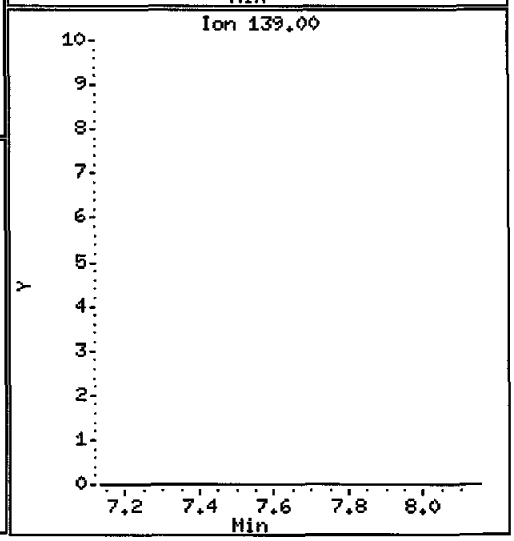












Data File: \\target\share\chem3\nt11.i\20151205.b\15120507.D

Date : 05-DEC-2015 13:15

Client ID: PG-GP-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9A

Volume Injected (uL): 2.0

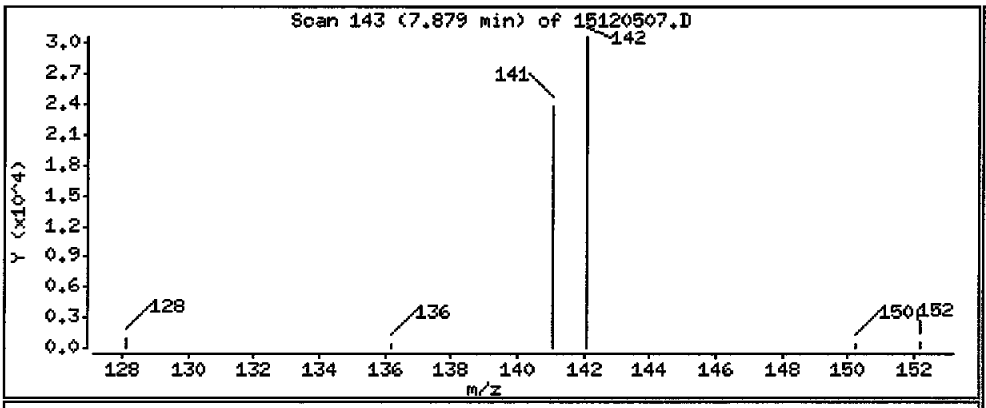
Operator: JW

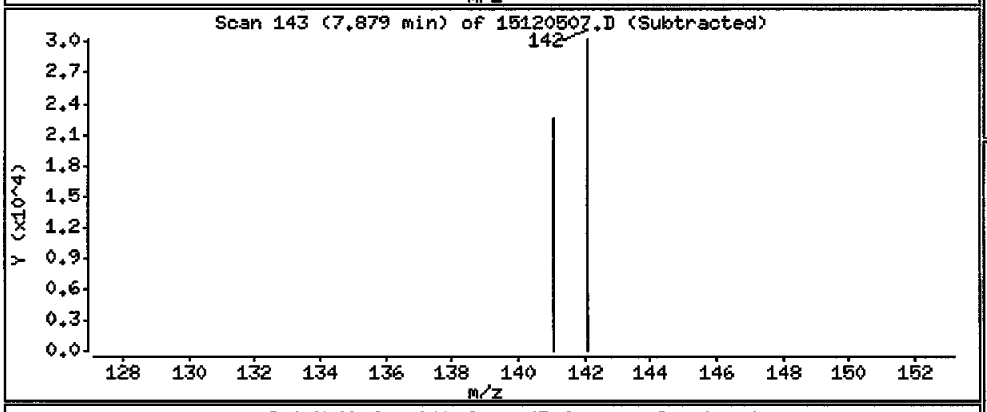
Column phase: Rxi-17Sil MS

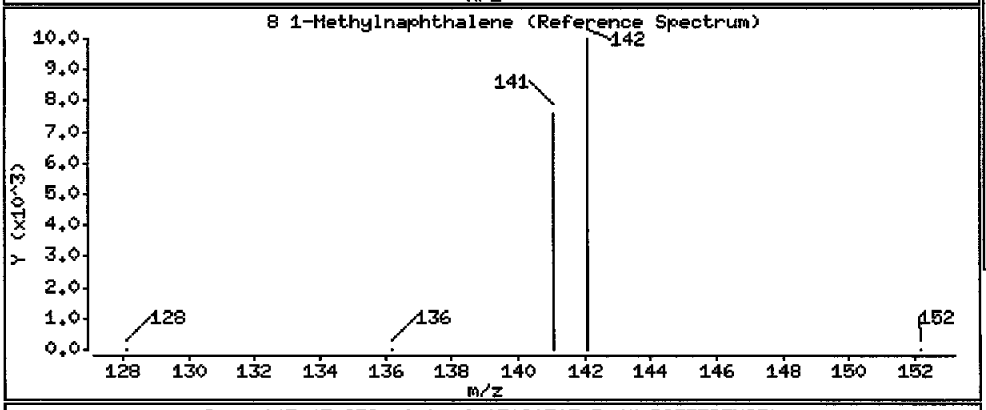
Column diameter: 0.25

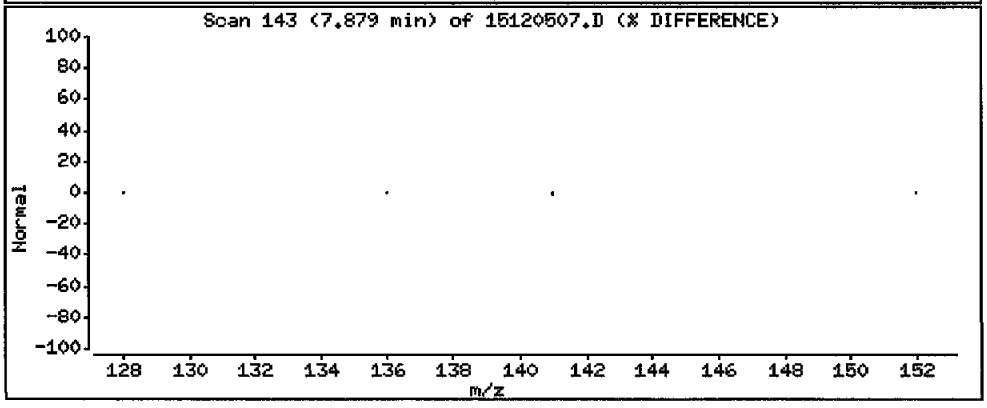
8 1-Methylnaphthalene

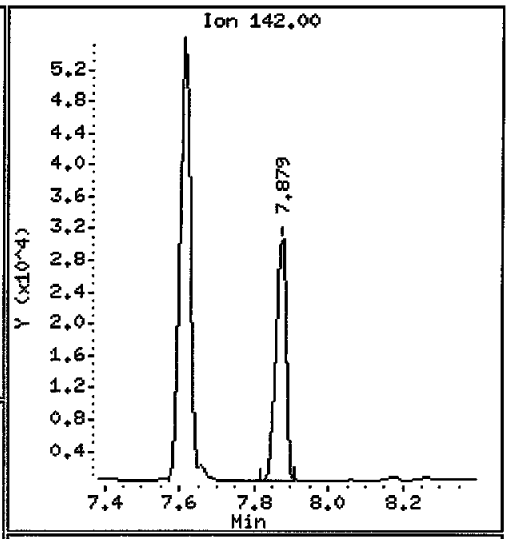
Concentration: 5770 ug/kg

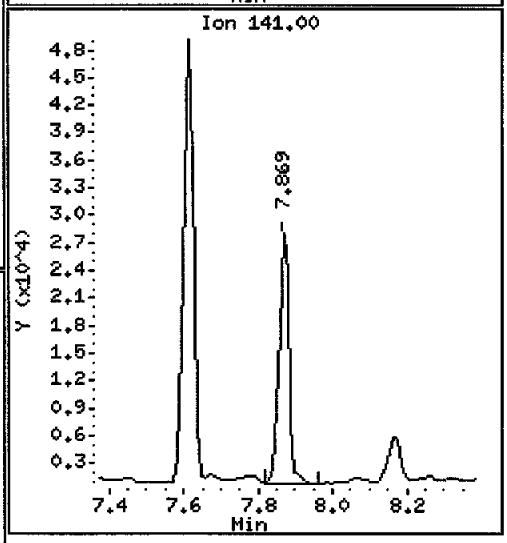












Data File: \\target\share\chem3\nt11.i\20151205.b\15120507.D

Date : 05-DEC-2015 13:15

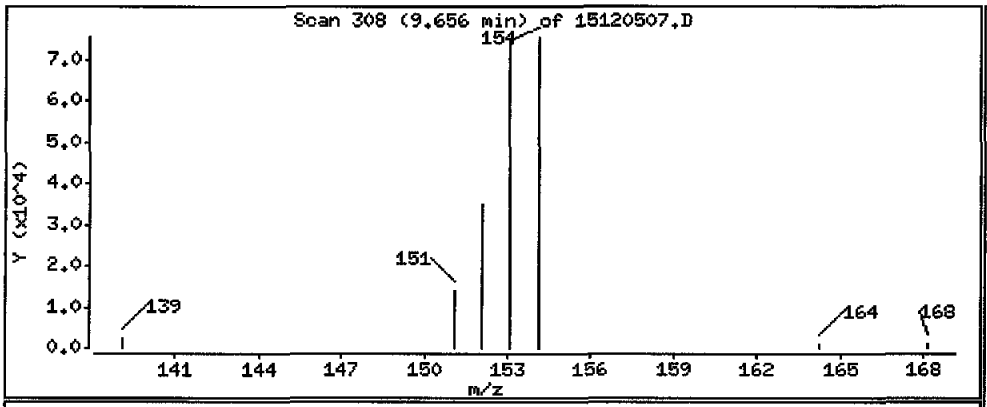
Client ID: PG-GP-1-PEMD-151109 Instrument: nt11.i

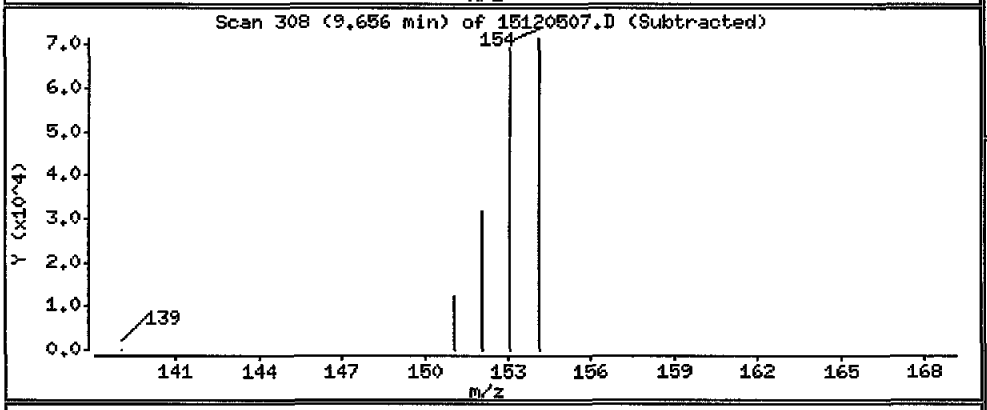
Sample Info: AQJ9A

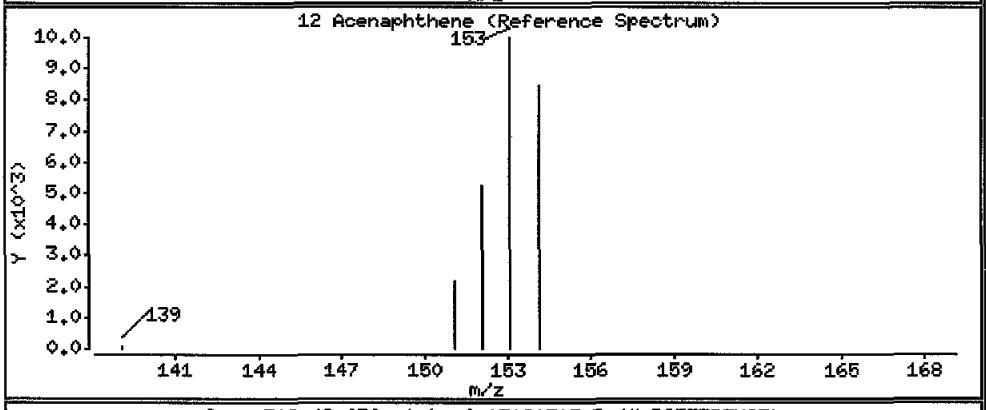
Volume Injected (uL): 2.0 Operator: JW

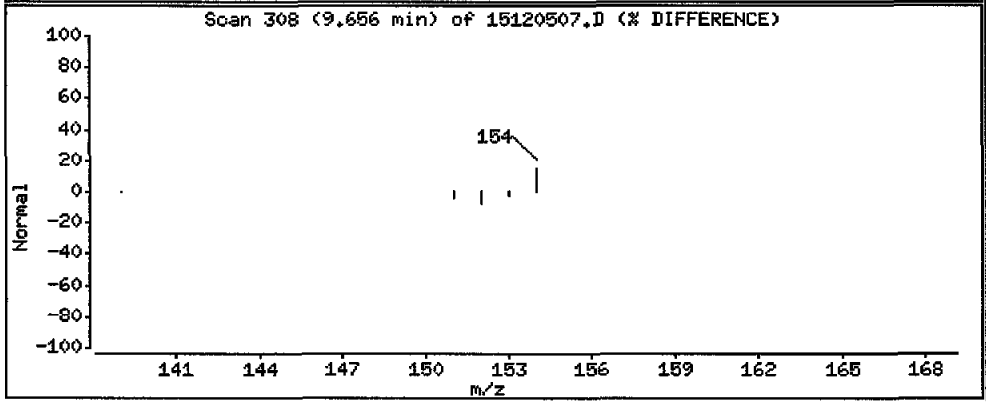
Column phase: Rxi-17Sil MS Column diameter: 0.25

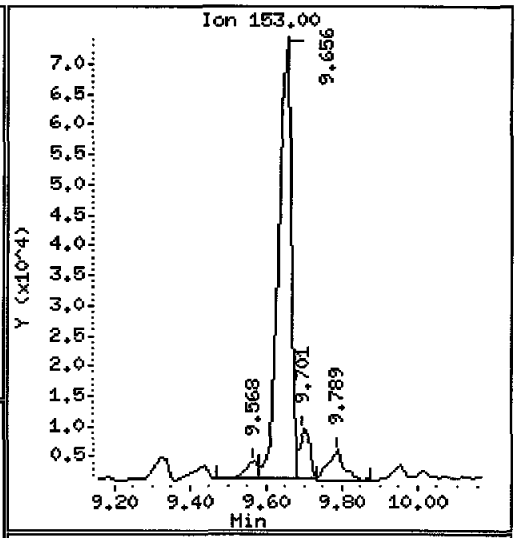
12 Acenaphthene Concentration: 11700 ug/kg

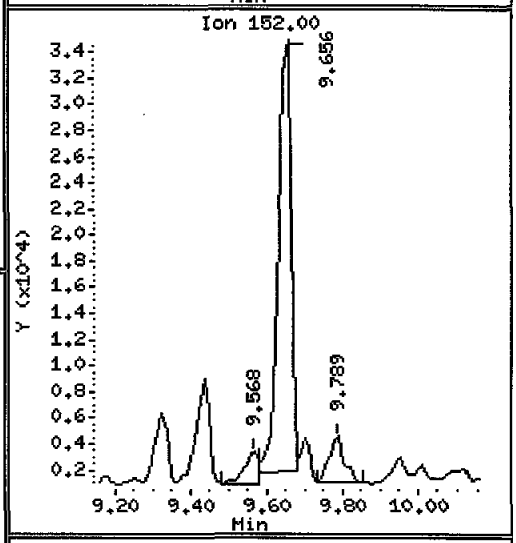


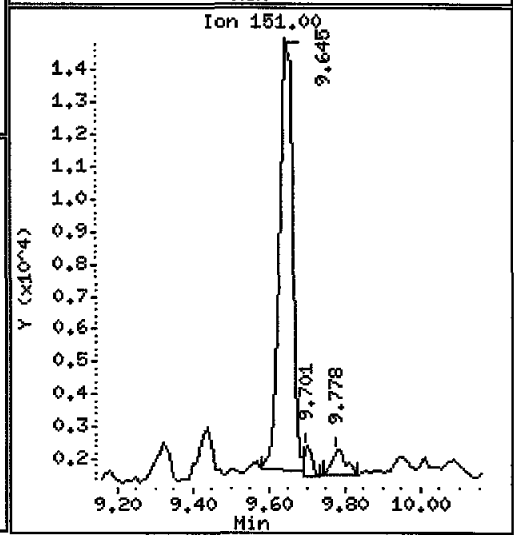












Data File: \\target\share\chem3\nt11.i\20151205.b\15120507.D

Date : 05-DEC-2015 13:15

Client ID: PG-GP-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9A

Volume Injected (uL): 2.0

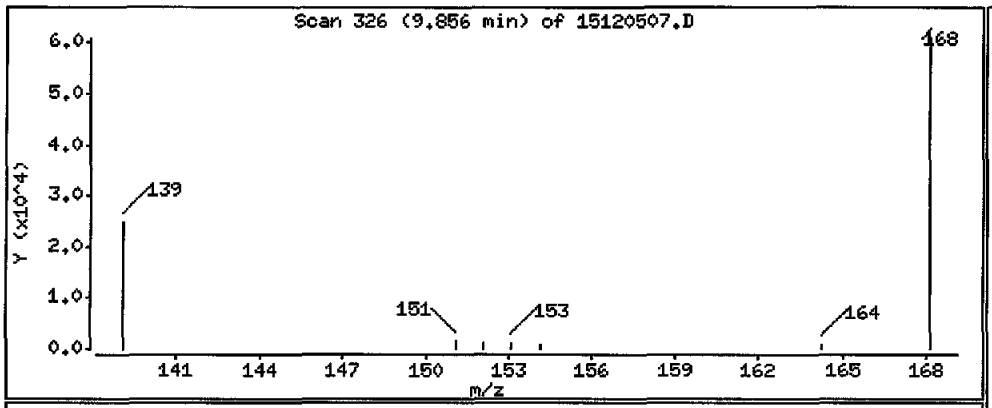
Operator: JW

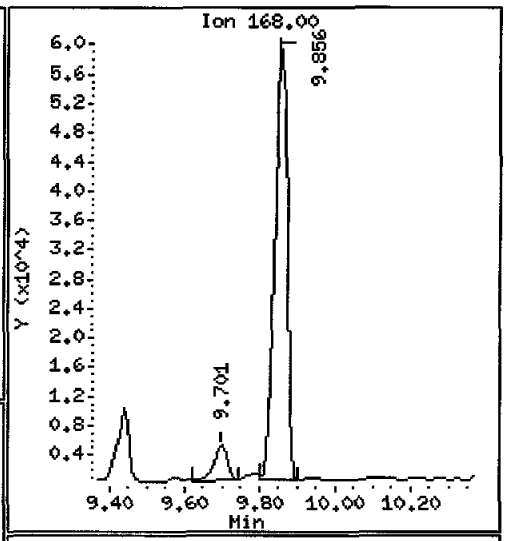
Column phase: Rxi-17Sil MS

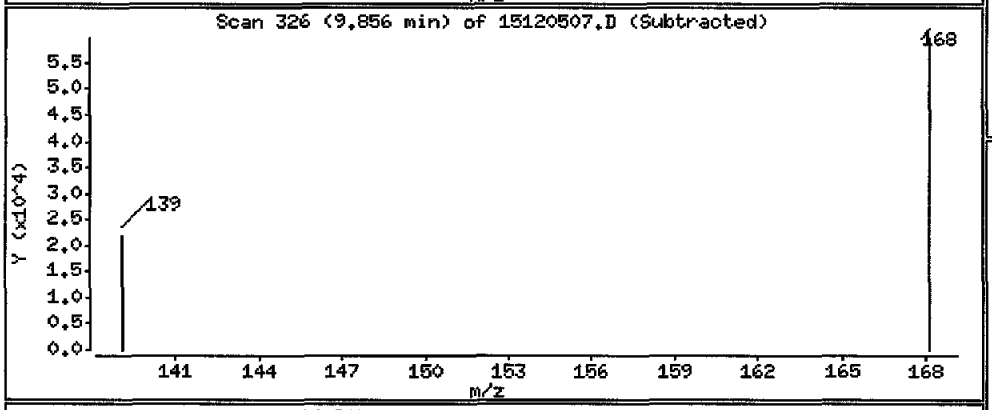
Column diameter: 0.25

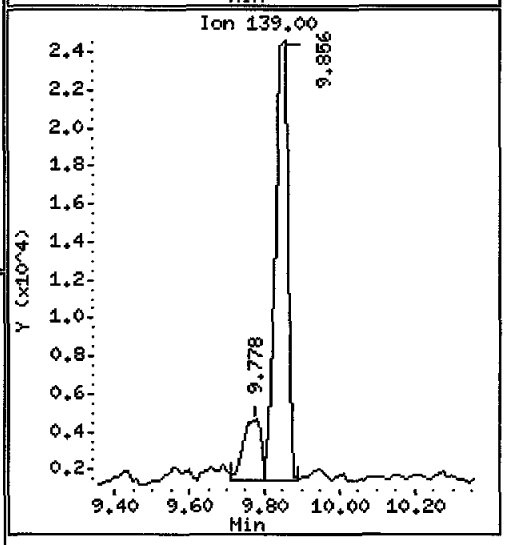
14 Dibenzofuran

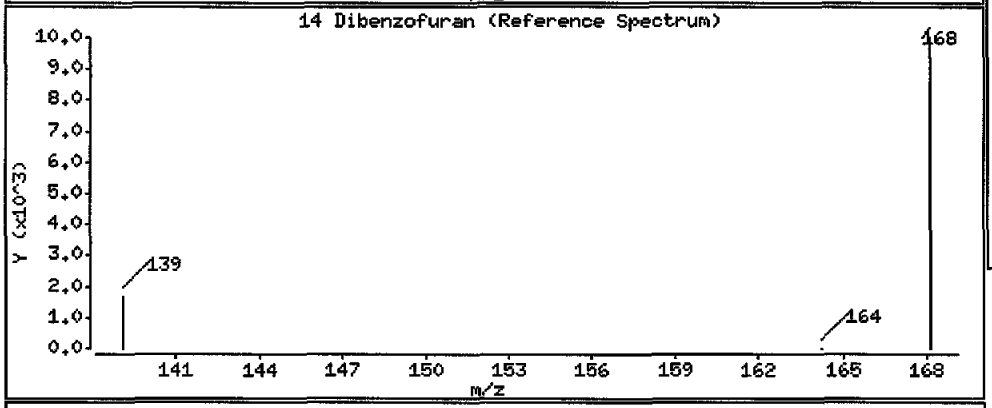
Concentration: 6340 ug/kg

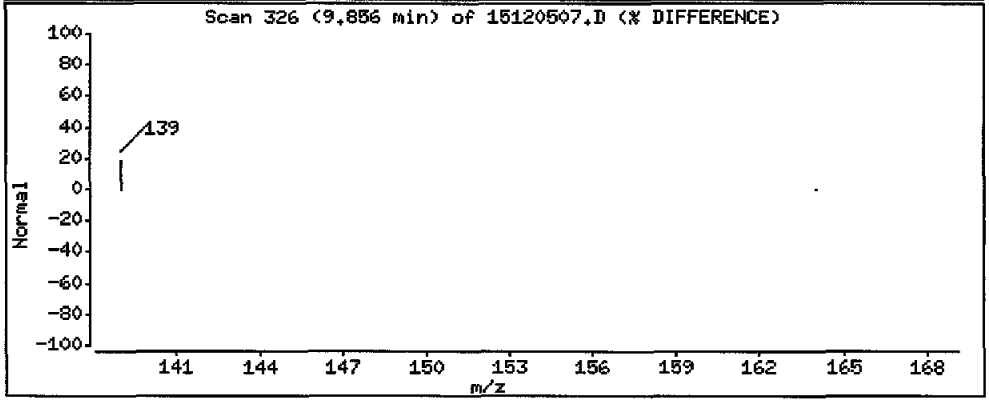












Data File: \\target\share\chem3\nt11.i\20151205.b\15120507.D

Date : 05-DEC-2015 13:15

Client ID: PG-CP-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9A

Volume Injected (uL): 2.0

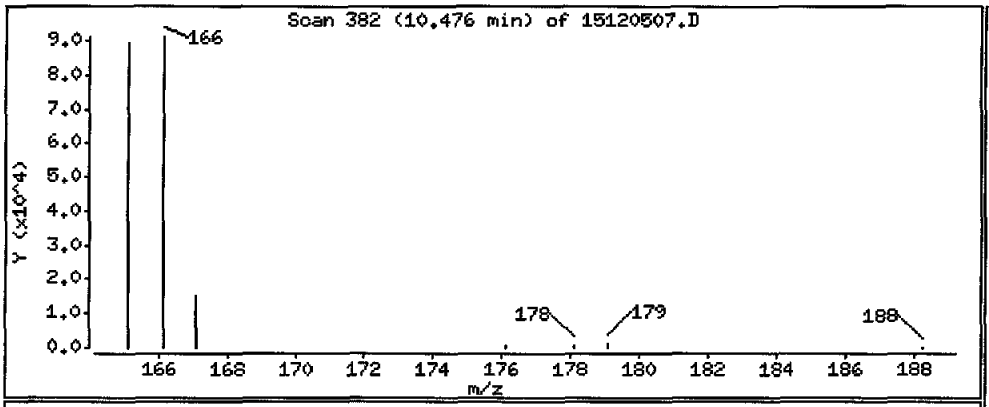
Operator: JW

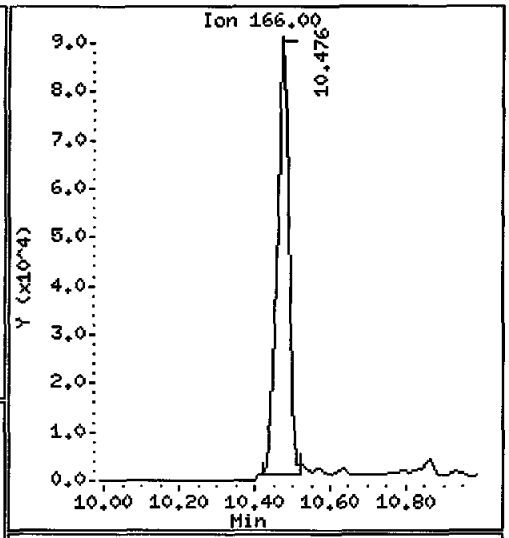
Column phase: Rxi-17Sil MS

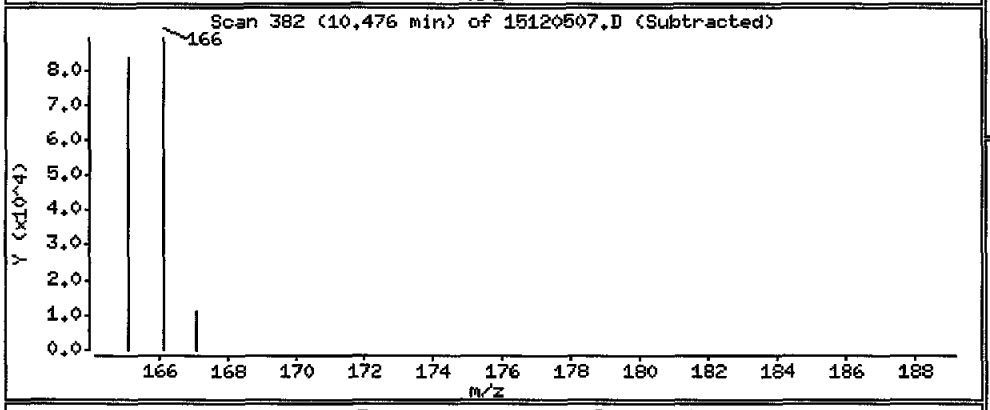
Column diameter: 0.25

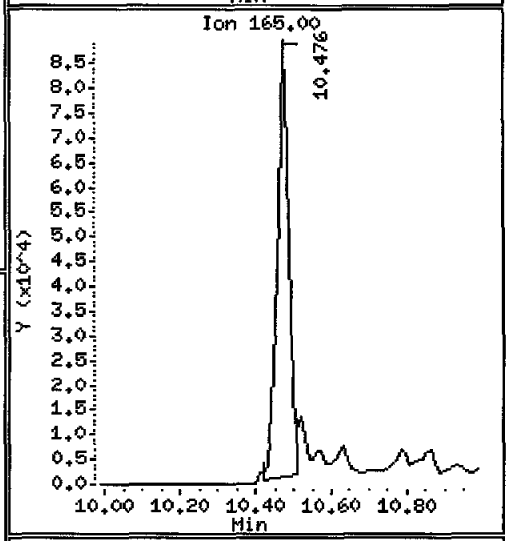
15 Fluorene

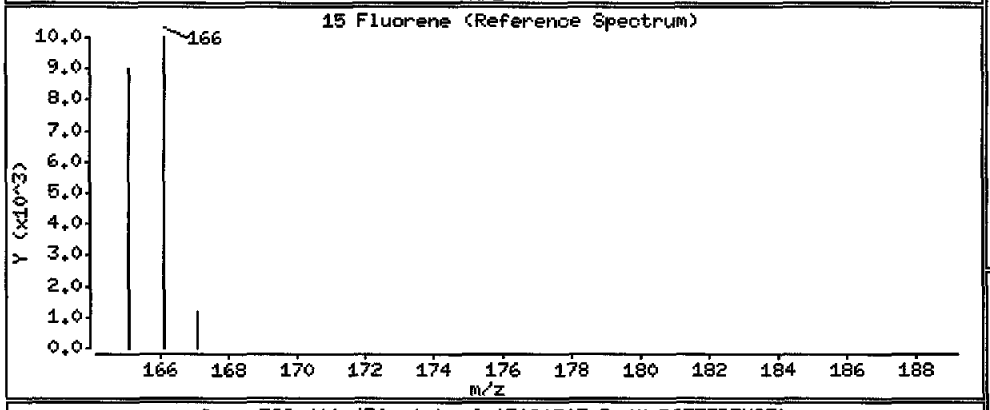
Concentration: 12500 ug/kg

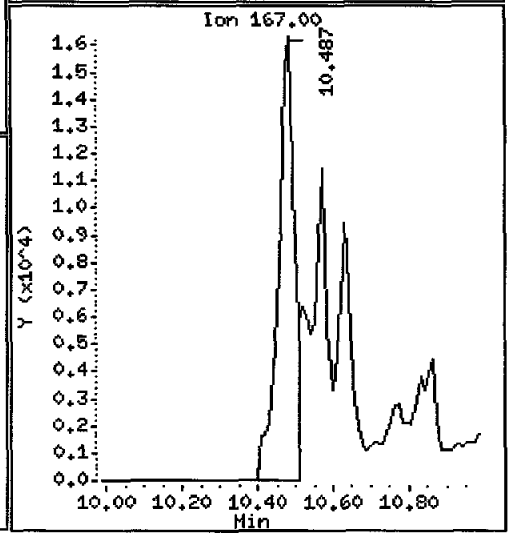


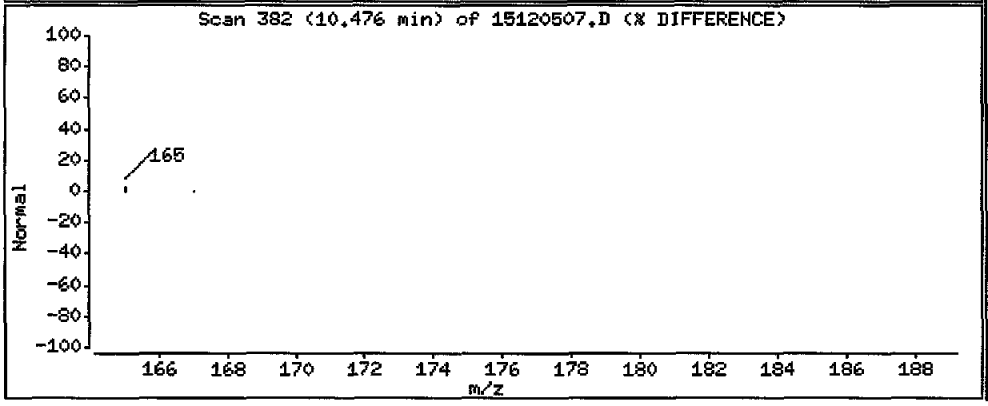












Data File: \\target\share\chem3\nt11.i\20151205.b\15120507.D

Date : 05-DEC-2015 13:15

Client ID: PG-GP-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9A

Volume Injected (uL): 2.0

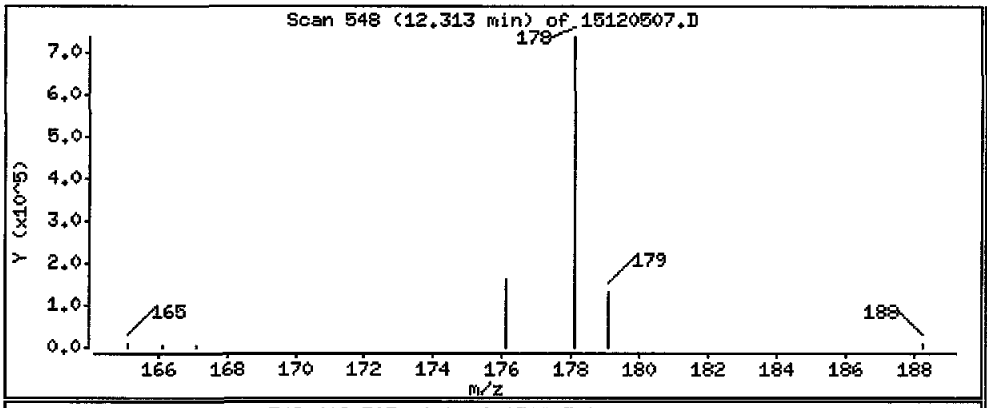
Operator: JW

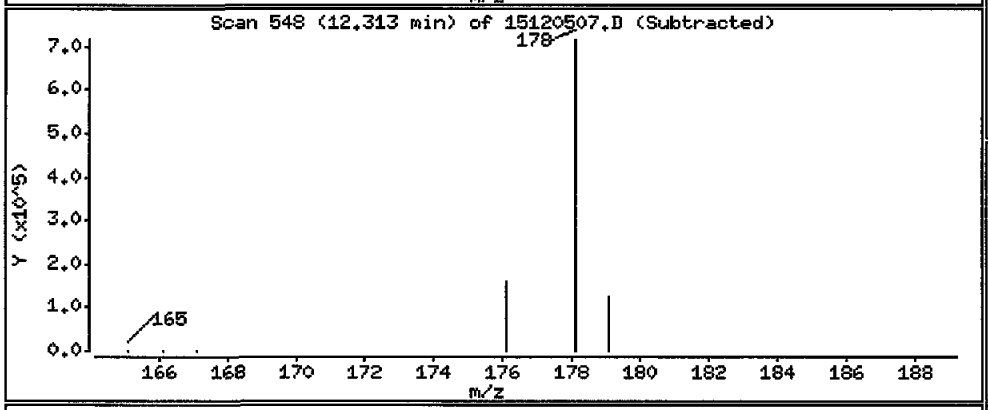
Column phase: Rxi-17Sil MS

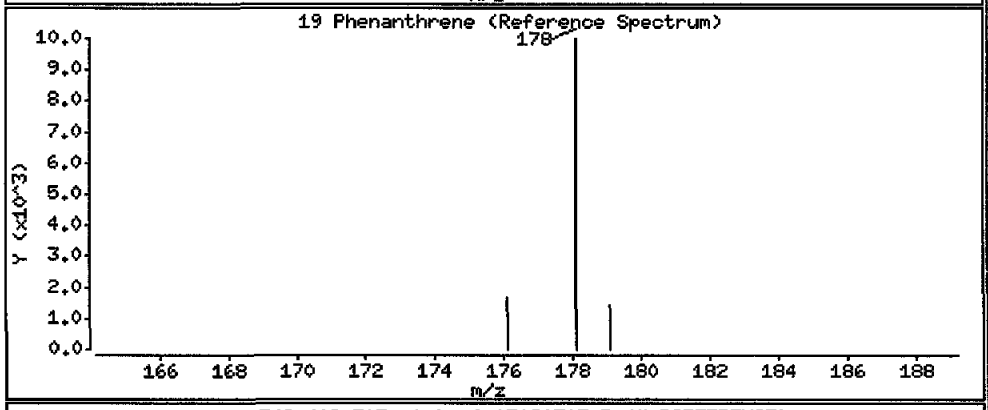
Column diameter: 0.25

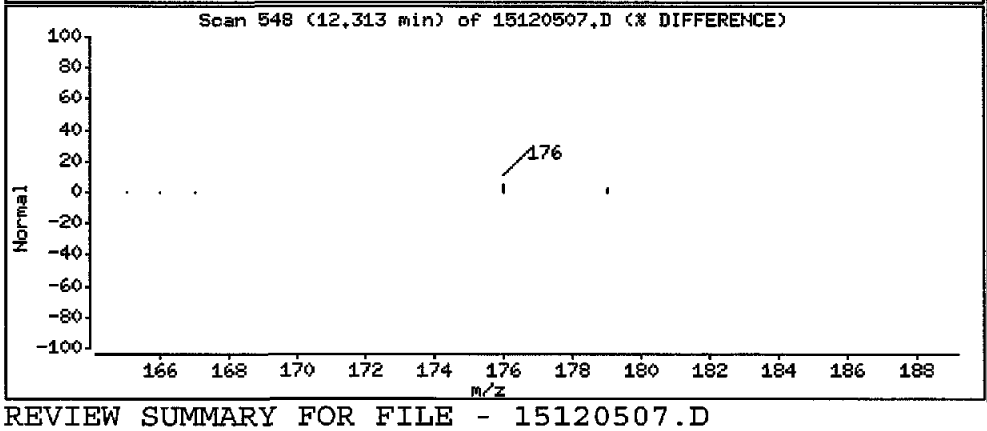
19 Phenanthrene

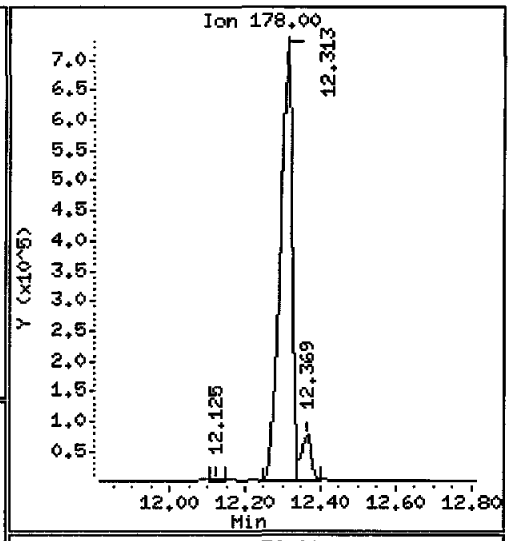
Concentration: 59500 ug/kg

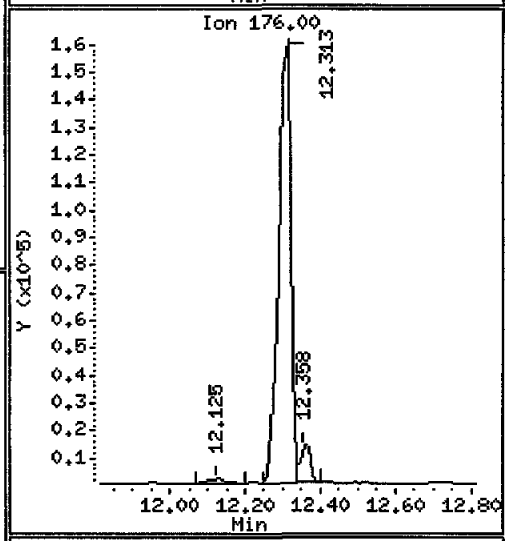


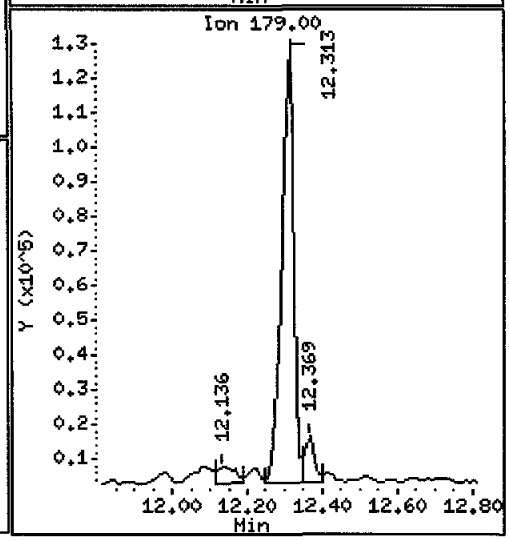








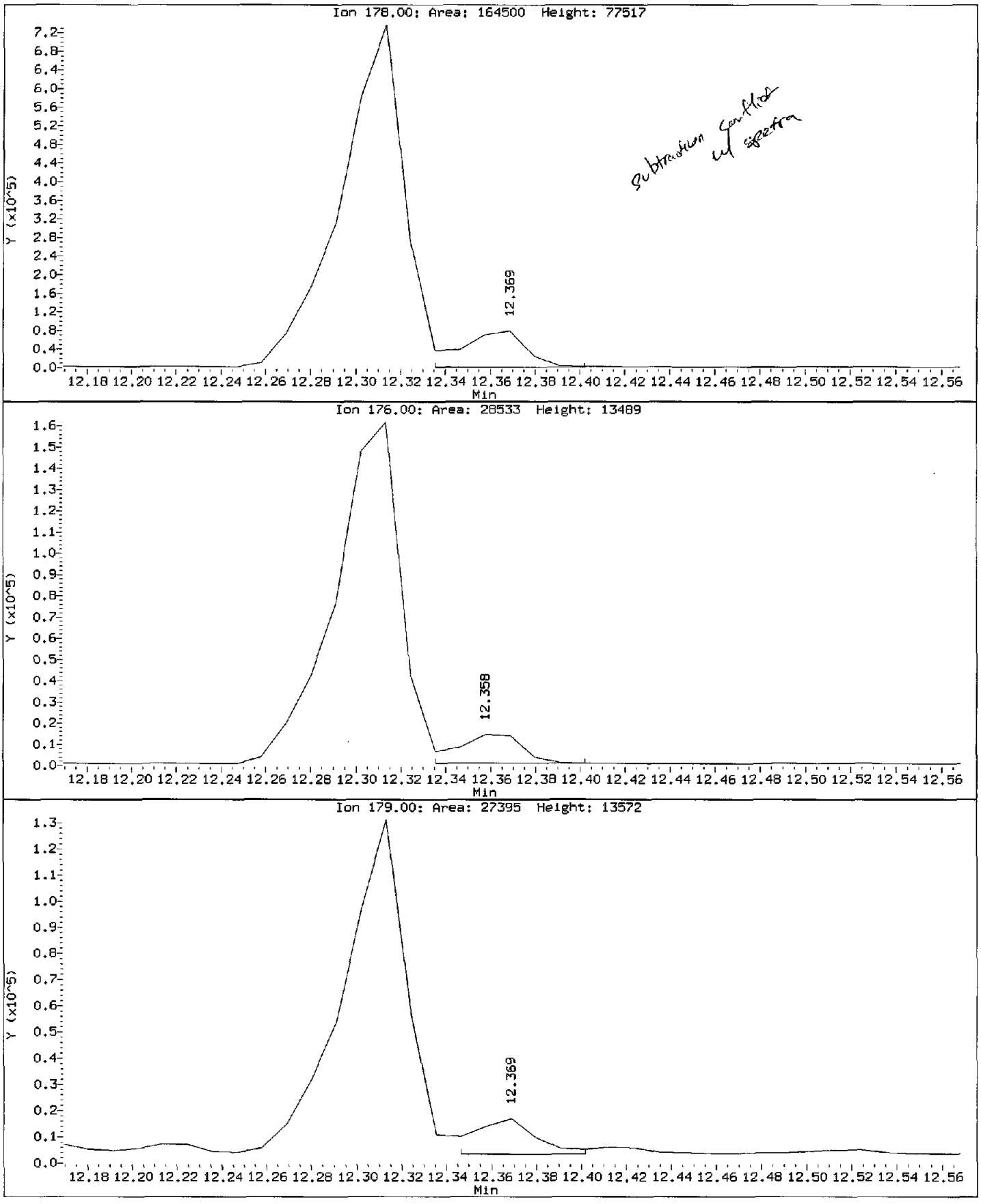




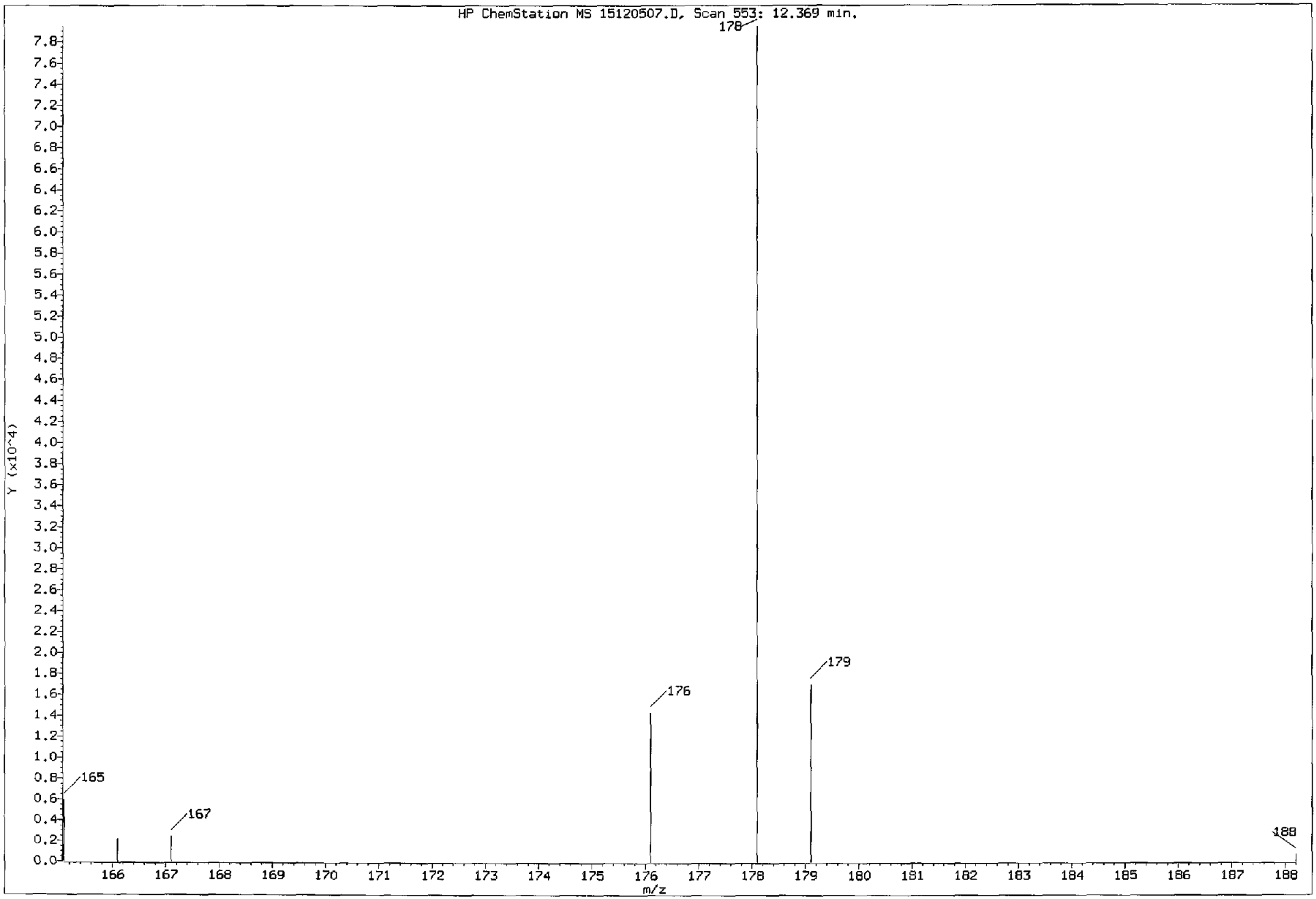
REVIEW SUMMARY FOR FILE - 15120507.D

Data File: \\target\share\chem3\nt11.i\20151205.b\15120507.D
Injection Date: 05-DEC-2015 13:15
Instrument: nt11.i
Client Sample ID: PG-GP-1-PEMD-151109

Compound: Anthracene
CAS Number:



Data File: \\target\share\chem3\nt11.i\20151205.b\15120507.D
Injection Date: 05-DEC-2015 13:15
Instrument: nt11.i
Client Sample ID: PG-GP-1-PEMD-151109



Data File: \\target\share\chem3\nt11.i\20151205.b\15120507.D

Date : 05-DEC-2015 13:15

Client ID: PG-GP-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9A

Volume Injected (uL): 2.0

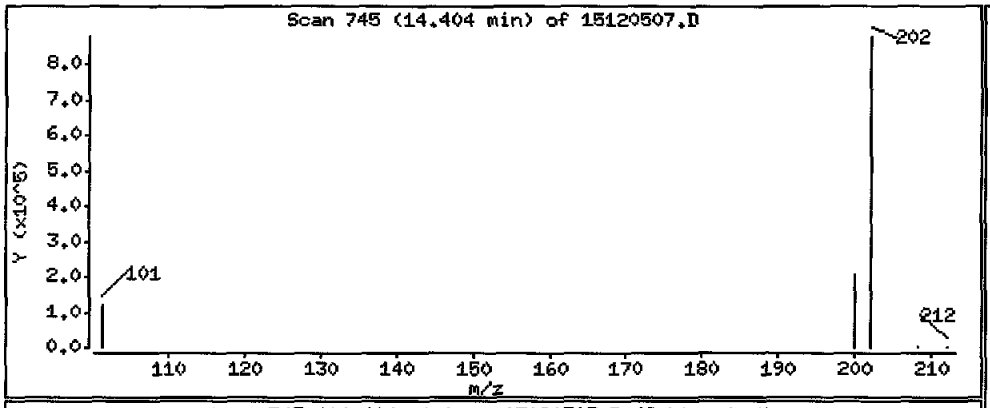
Operator: JW

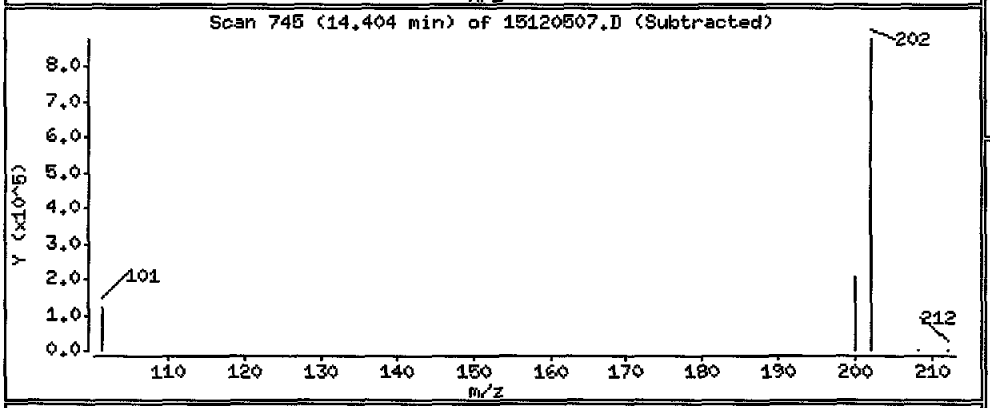
Column phase: Rxi-17Sil MS

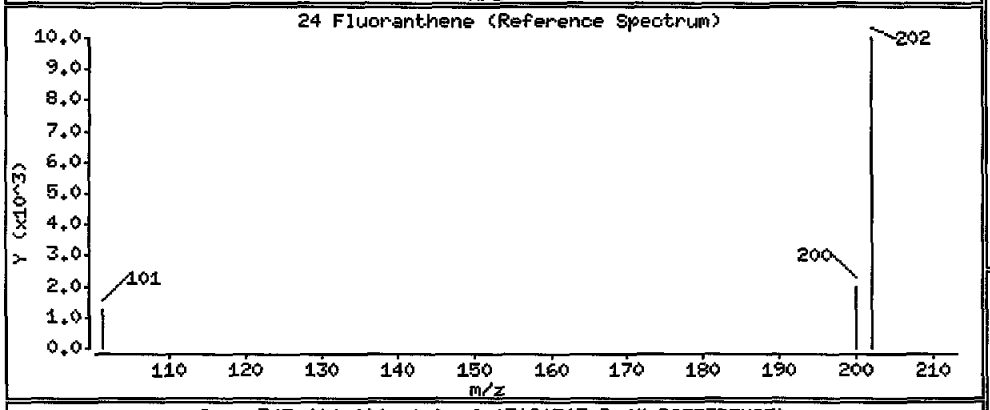
Column diameter: 0.25

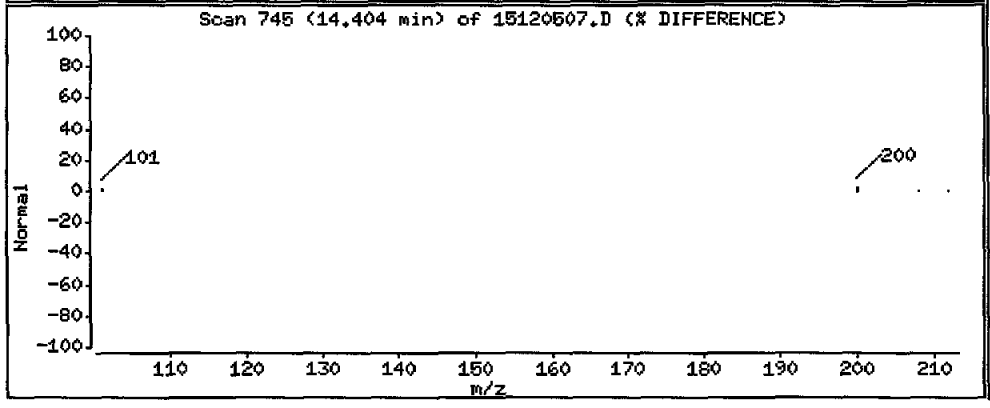
24 Fluoranthene

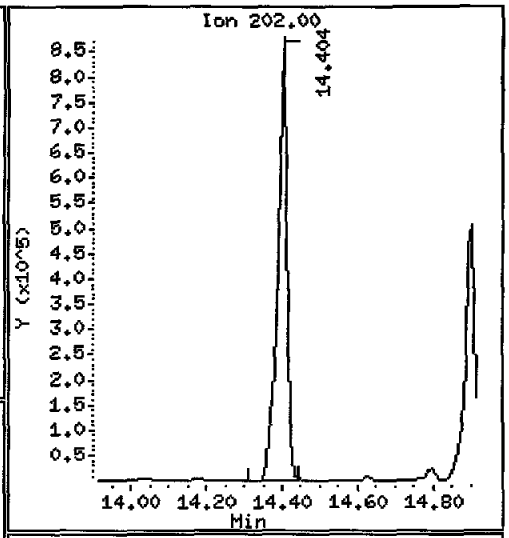
Concentration: 63500 ug/kg

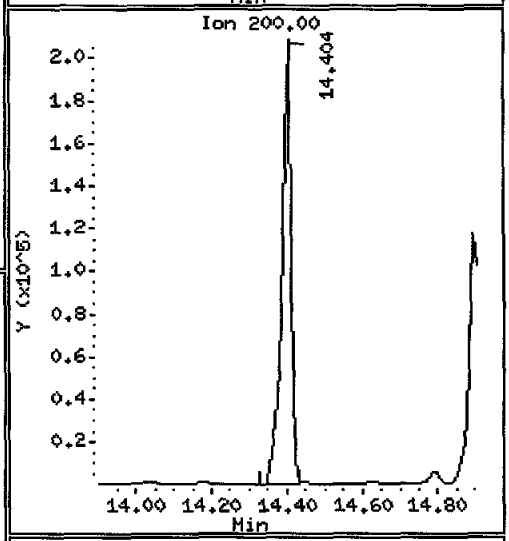


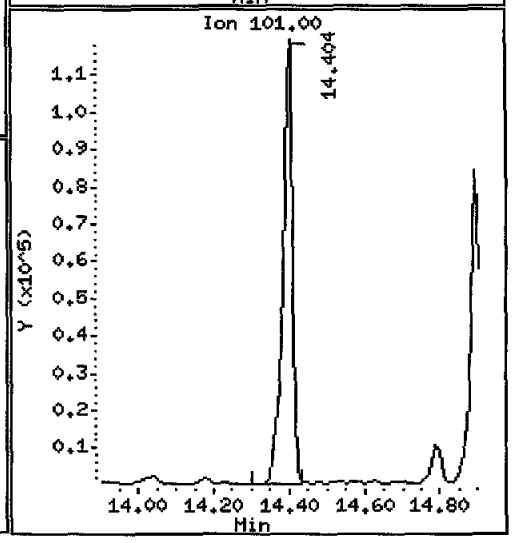












Data File: \\target\share\chem3\nt11.i\20151205.b\15120507.D

Date : 05-DEC-2015 13:15

Client ID: PG-GP-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9A

Volume Injected (uL): 2.0

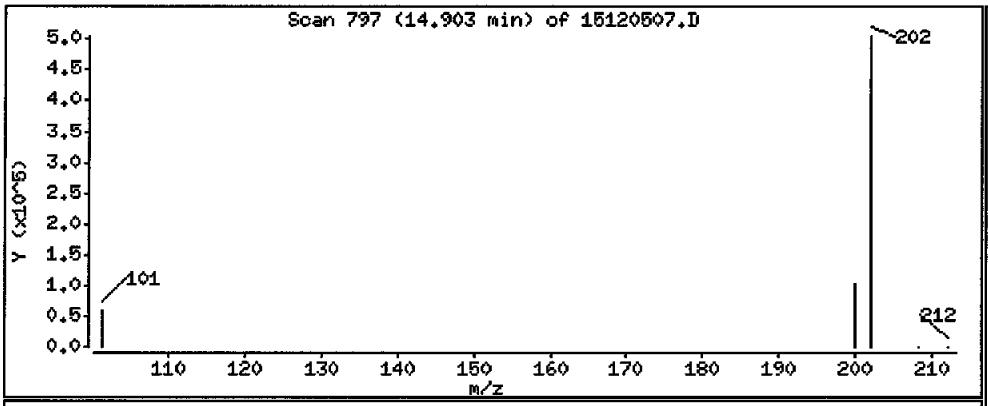
Operator: JW

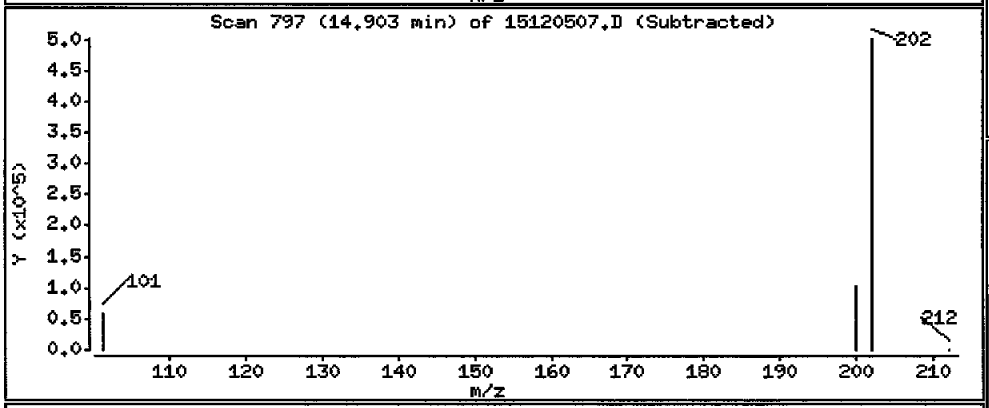
Column phase: Rxi-17Sil MS

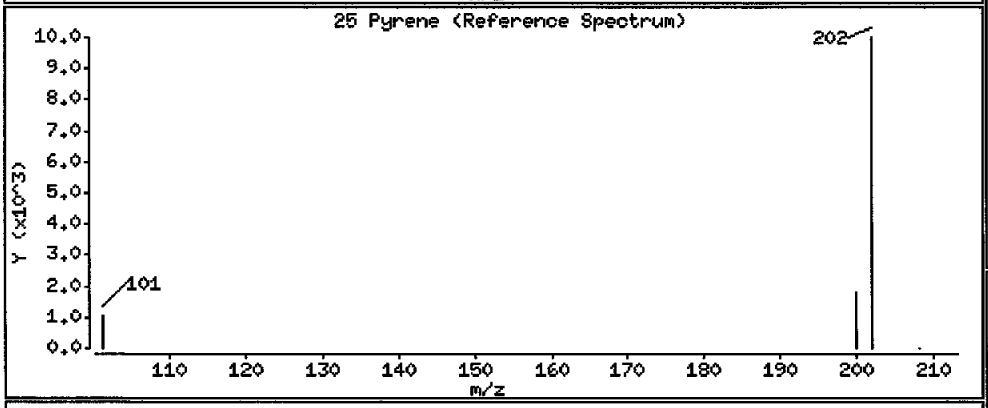
Column diameter: 0.25

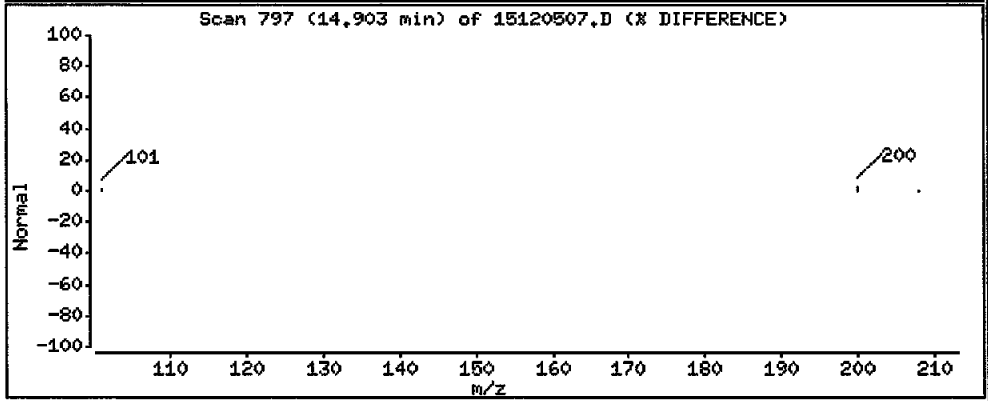
25 Pyrene

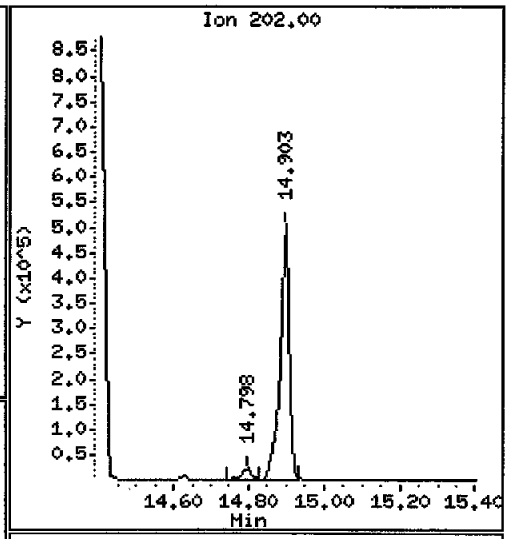
Concentration: 37600 ug/kg

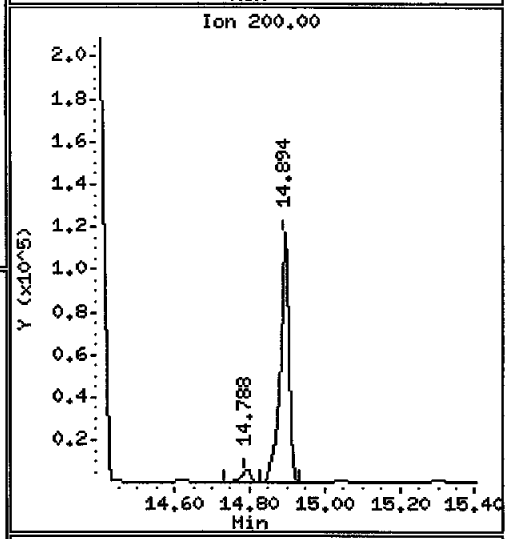


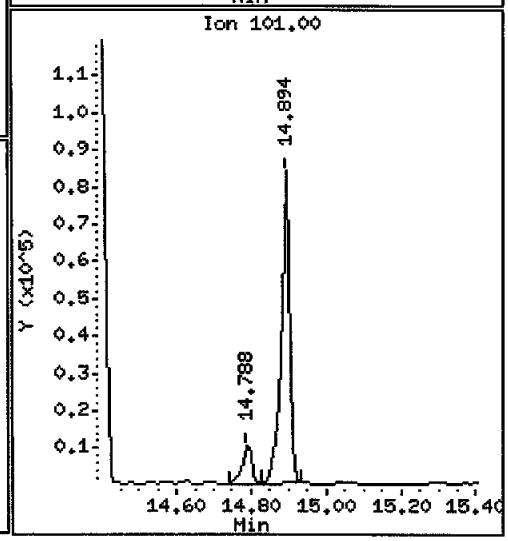












Data File: \\target\share\chem3\nt11.i\20151205.b\15120507.D

Date : 05-DEC-2015 13:15

Client ID: PG-GP-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9A

Volume Injected (uL): 2.0

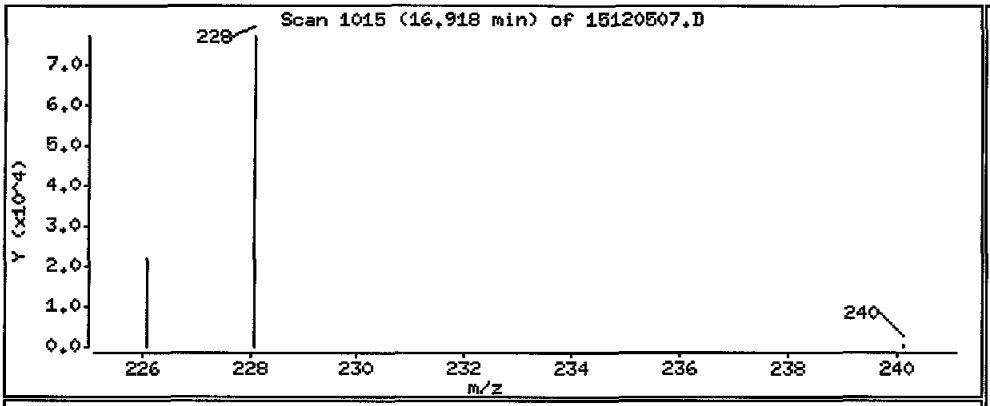
Operator: JW

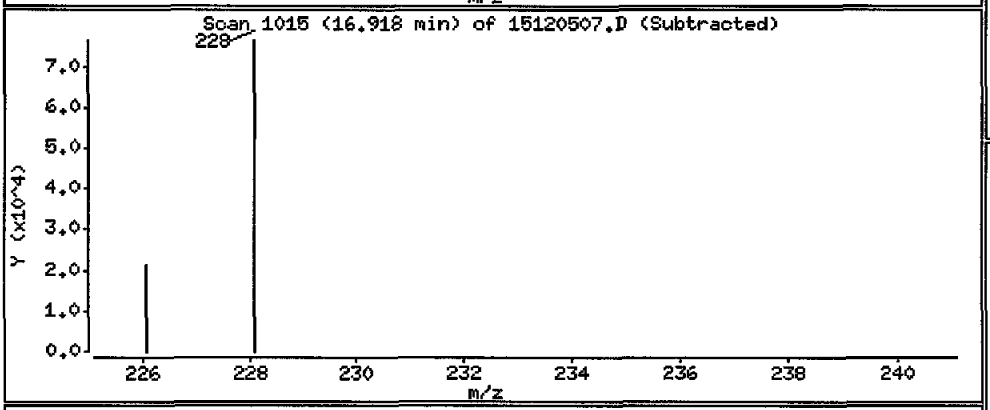
Column phase: Rxi-17Sil MS

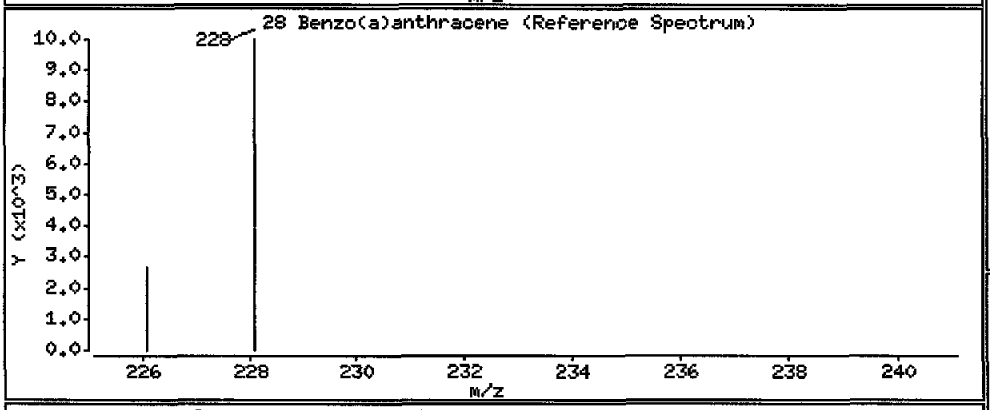
Column diameter: 0.25

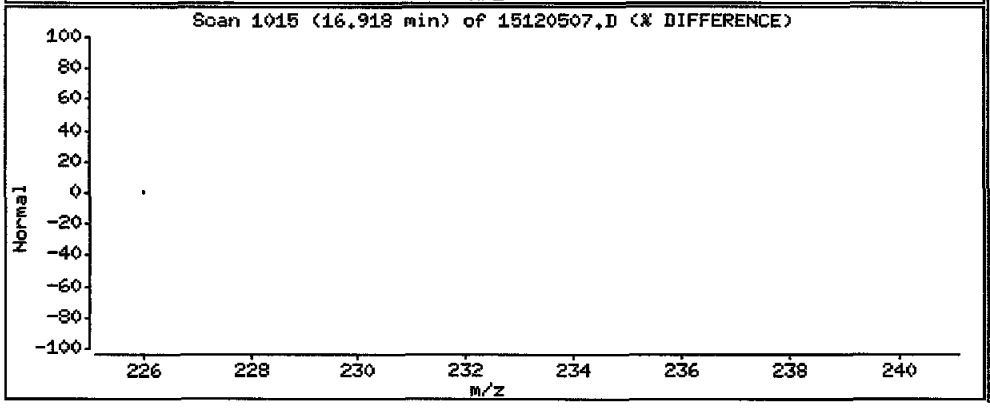
28 Benzo(a)anthracene

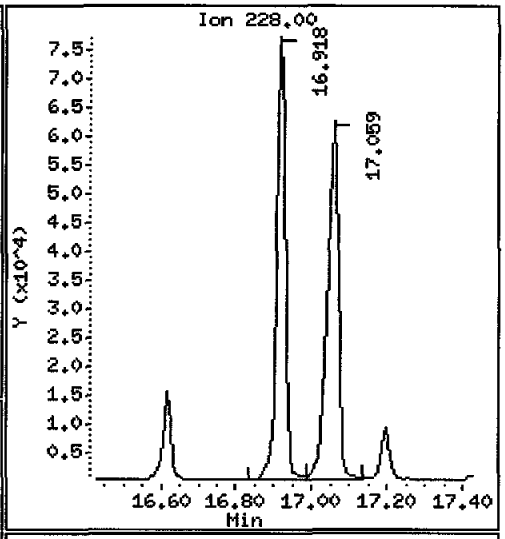
Concentration: 5690 ug/kg

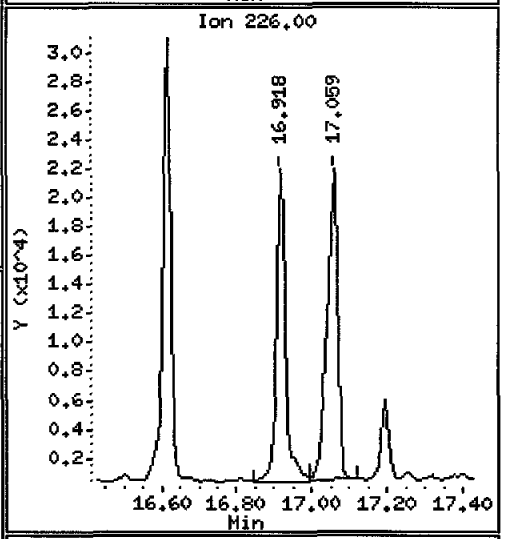


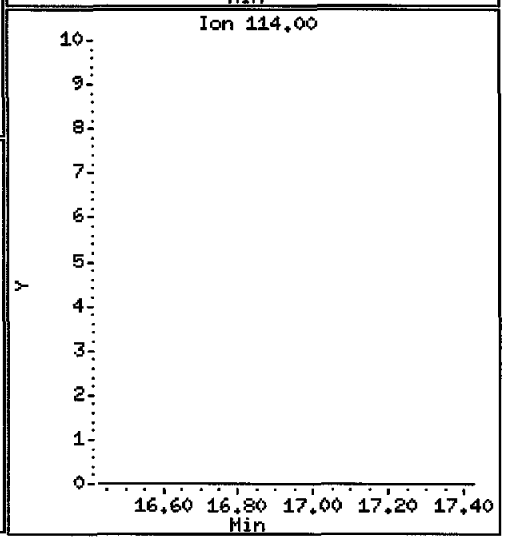












Data File: \\target\share\chem3\nt11.i\20151205.b\15120507.D

Date : 05-DEC-2015 13:15

Client ID: PG-GP-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9A

Volume Injected (uL): 2.0

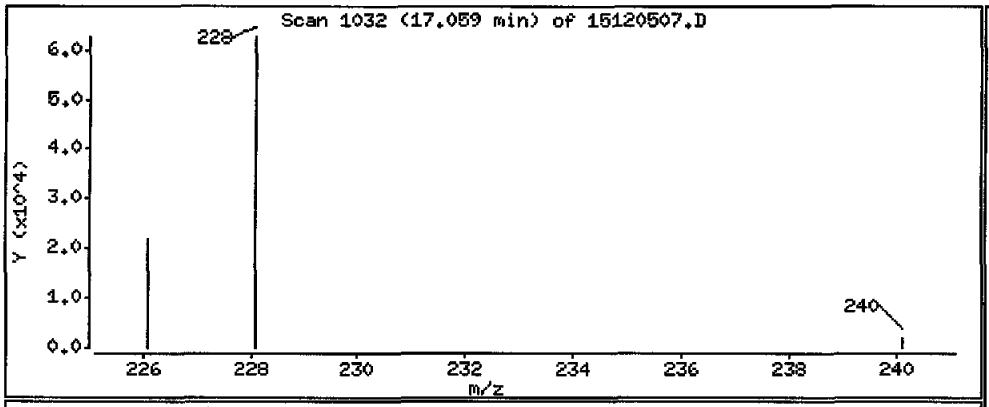
Operator: JW

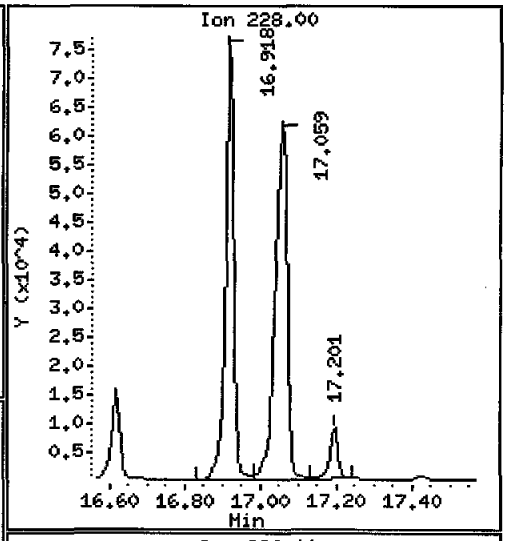
Column phase: Rxi-17Sil MS

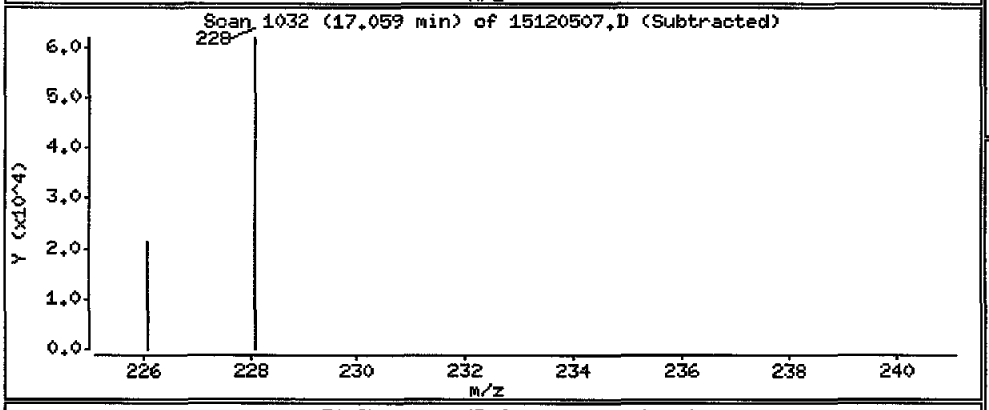
Column diameter: 0.25

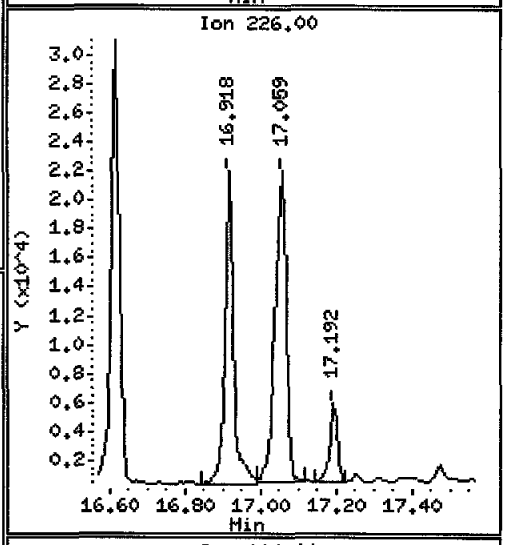
30 Chrysene

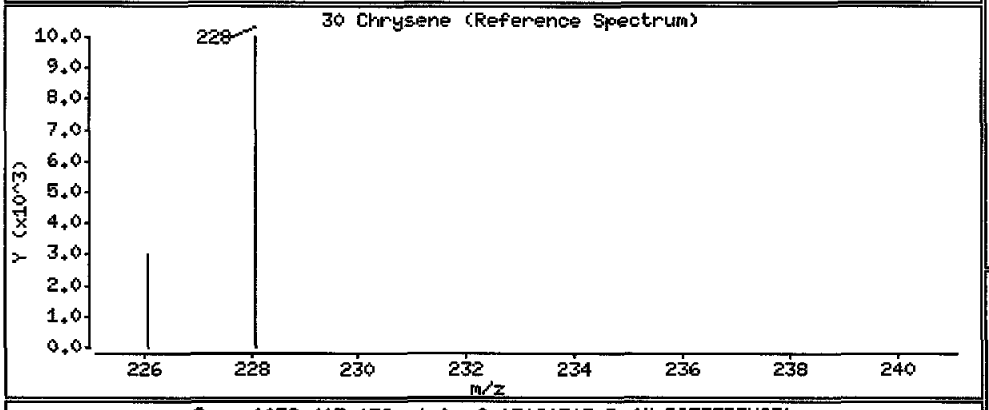
Concentration: 5930 ug/kg

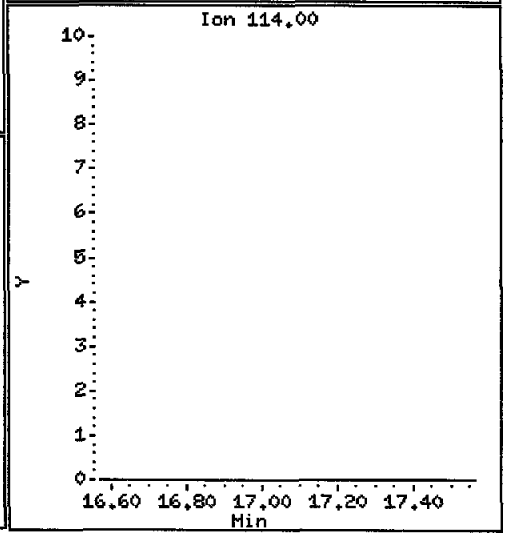


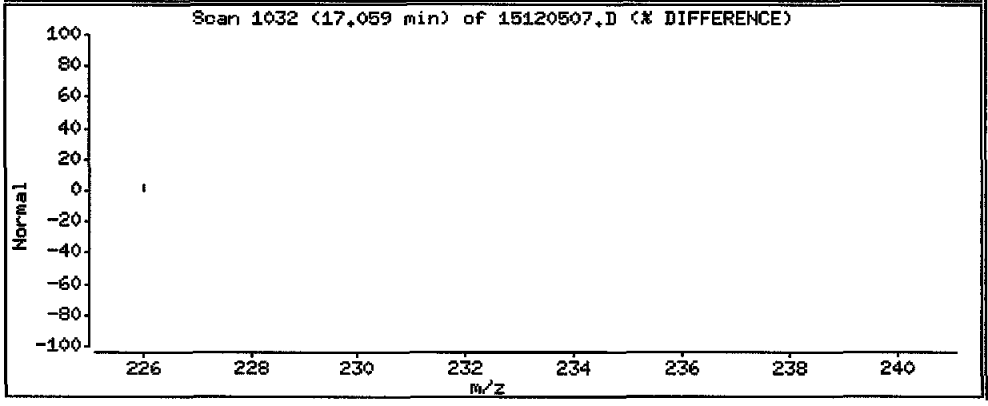












Data File: \\target\share\chem3\nt11.i\20151205.b\15120507.D

Date : 05-DEC-2015 13:15

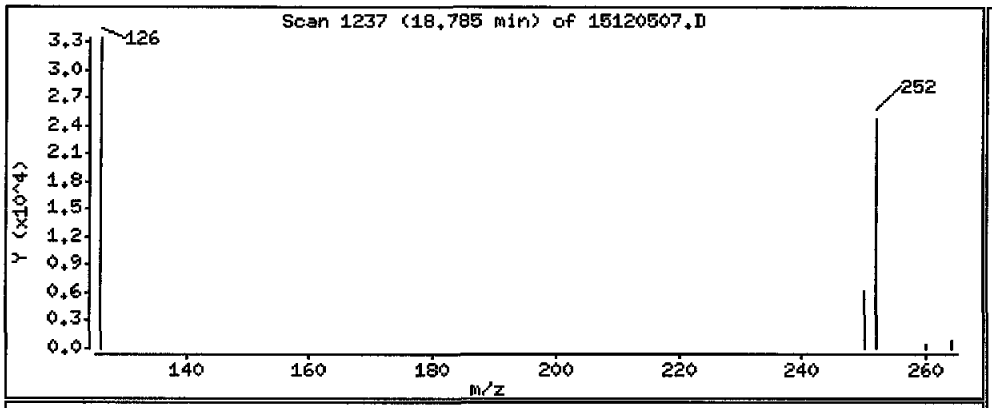
Client ID: PC-GP-1-PEMD-151109 Instrument: nt11.i

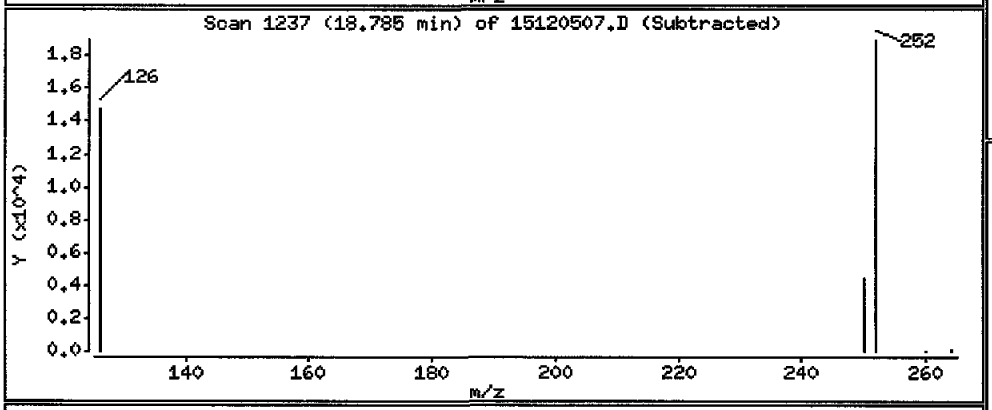
Sample Info: AQJ9A

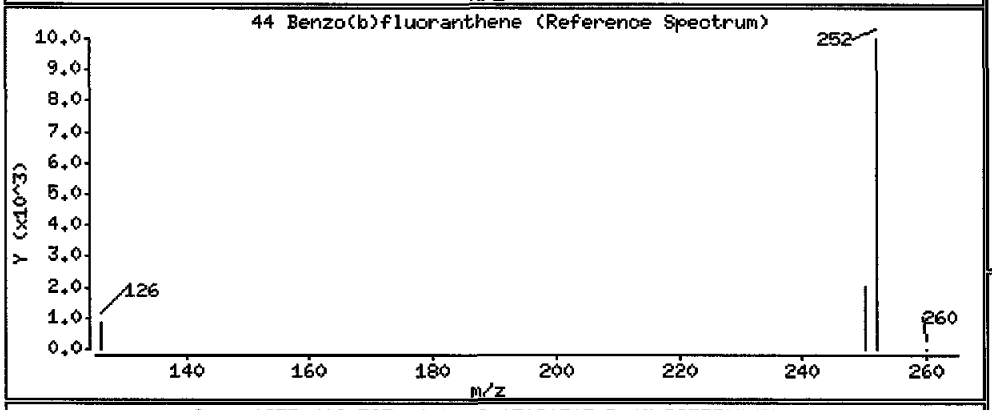
Volume Injected (uL): 2.0 Operator: JW

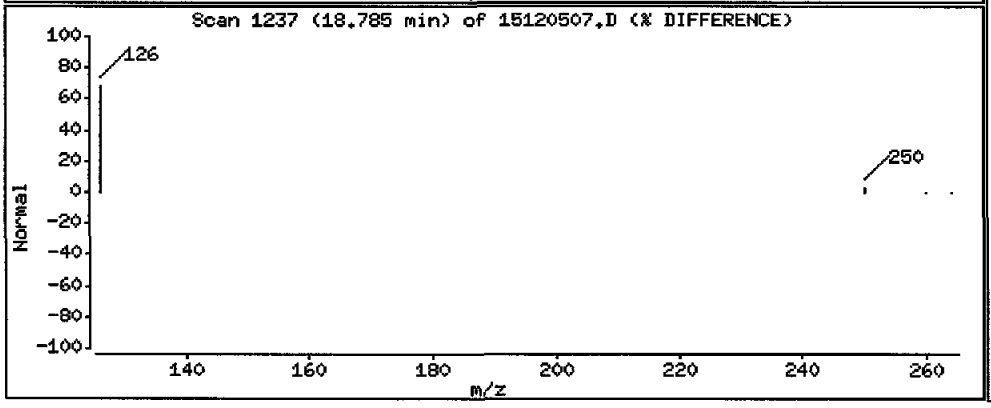
Column phase: Rxi-17Sil MS Column diameter: 0.25

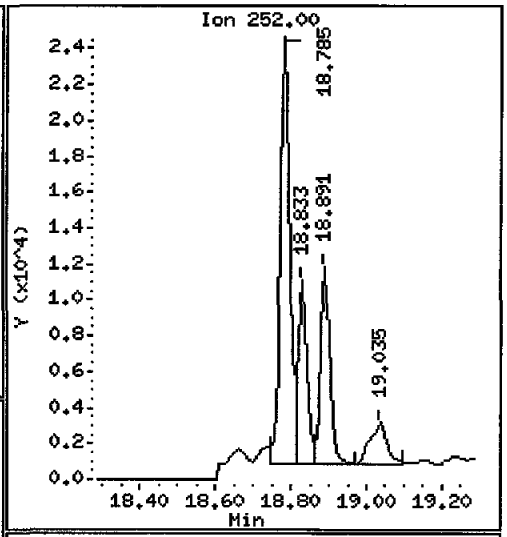
44 Benzo(b)fluoranthene Concentration: 2200 ug/kg

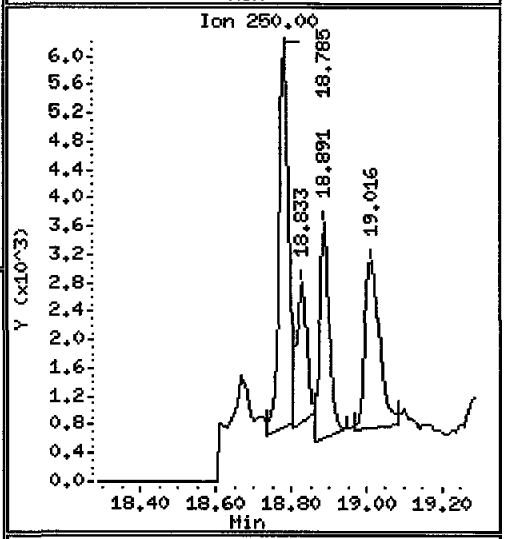


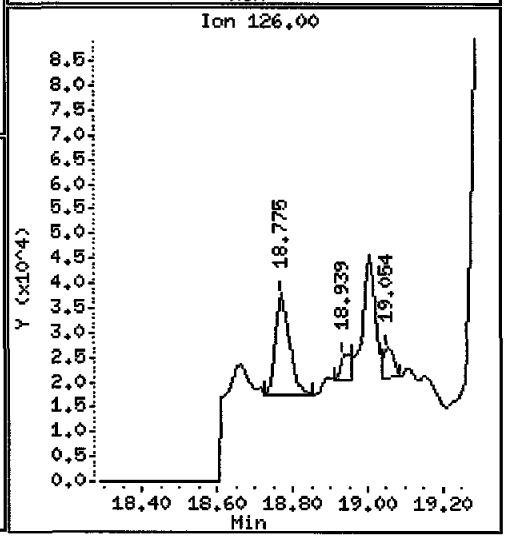












Data File: \\target\share\chem3\nt11.i\20151205.b\15120507.D

Date : 05-DEC-2015 13:15

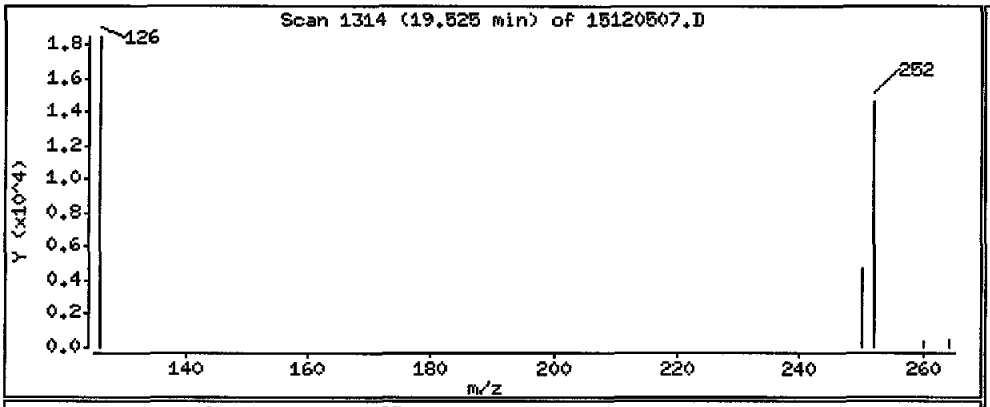
Client ID: PC-CP-1-PEMD-151109 Instrument: nt11.i

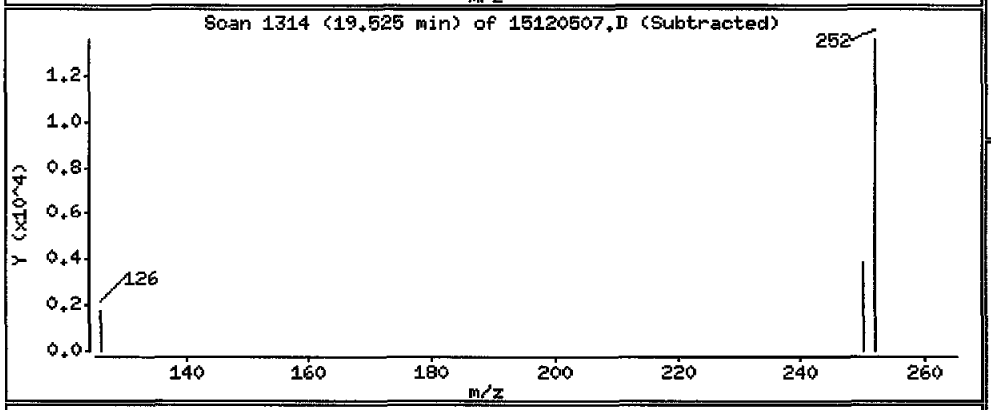
Sample Info: AQJ9A

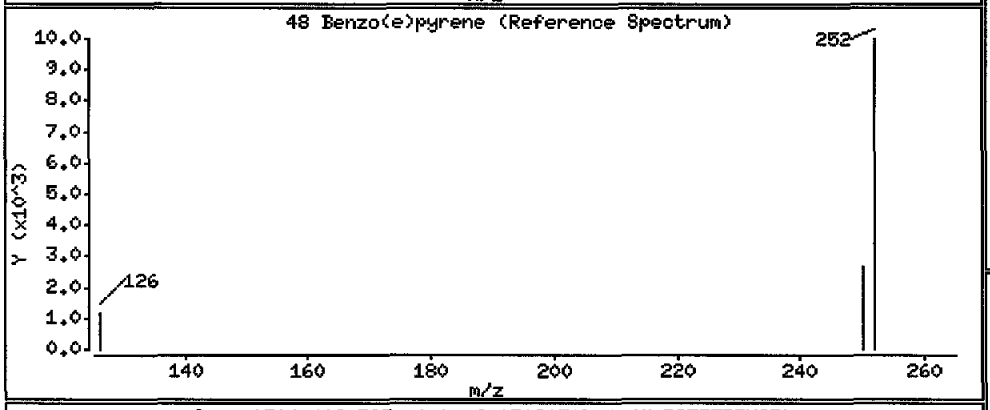
Volume Injected (uL): 2.0 Operator: JW

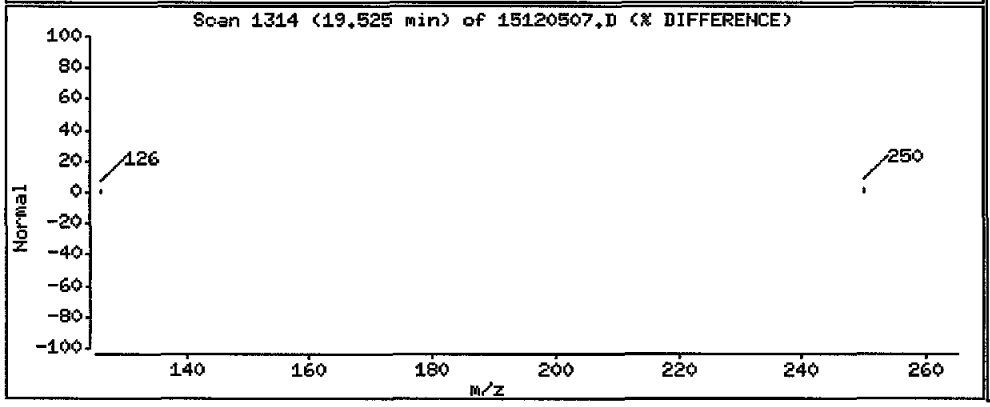
Column phase: Rxi-17Sil MS Column diameter: 0.25

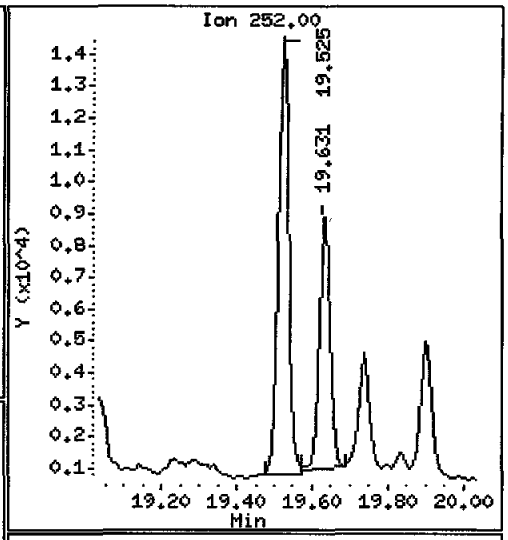
48 Benzo(e)pyrene Concentration: 1330 ug/kg

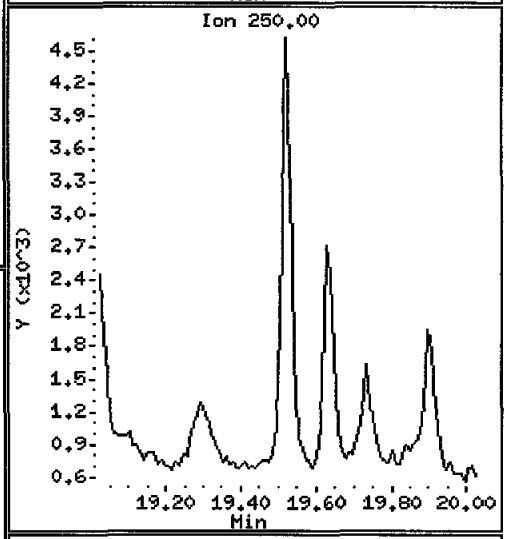


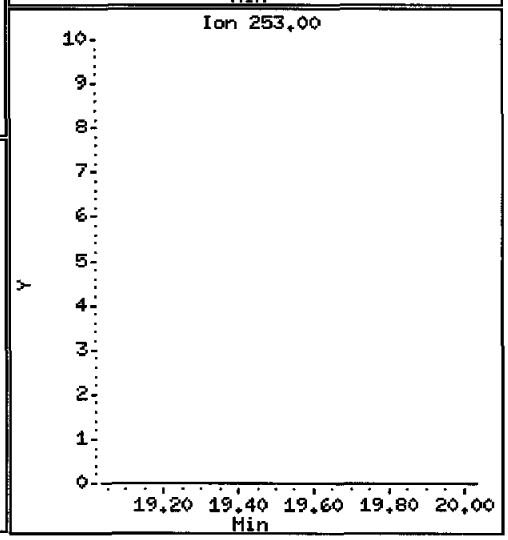












Lab ID: AQJ9A
nt11.i, 20151205.b\lowsim.m, 05-DEC-2015 13:15

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151205.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151205.b\15120508.D
Lab Smp Id: AQJ9C Client Smp ID: PG-PJ-1-PEMD-151109
Inj Date : 05-DEC-2015 13:45 MS Autotune Date: 23-APR-2014 12:54
Operator : JW Inst ID: nt11.i
Smp Info : AQJ9C
Misc Info : 15-21390
Comment :
Method : \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Meth Date : 14-Dec-2015 10:43 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 8
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	100.000	Volume of final extract (uL)
Ws	0.89000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

BO 12/15/15

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	FINAL (ug/kg)	
* 4 Naphthalene-d8	136	6.576	6.597	(1.000)	347293	200.000		
5 Naphthalene	128	6.618	6.629	(1.006)	272534	135.858	15300	B
$ 6 2-Methylnaphthalene-d10	152	7.564	7.574	(1.150)	184868	143.412	16100	
7 2-Methylnaphthalene	142	7.616	7.627	(1.158)	105005	76.1823	8560	
8 1-Methylnaphthalene	142	7.868	7.889	(1.196)	61321	49.3669	5550	
10 Acenaphthylene	152	Compound Not Detected.						
* 11 Acenaphthene-d10	164	9.589	9.600	(1.000)	286981	200.000		
12 Acenaphthene	153	9.656	9.656	(1.007)	181398	117.999	13300	
14 Dibenzofuran	168	9.855	9.866	(1.028)	164300	70.9461	7970	
15 Fluorene	166	10.475	10.486	(1.092)	249054	143.397	16100	
* 18 Phenanthrene-d10	188	12.269	12.269	(1.000)	493459	200.000		
19 Phenanthrene	178	12.313	12.313	(1.004)	1914142	643.840	72300	
20 Anthracene	178	12.368	12.368	(1.008)	209966	78.9005	8870	
$ 23 Fluoranthene-d10	212	14.365	14.374	(1.171)	518865	191.201	21500	
24 Fluoranthene	202	14.403	14.403	(1.174)	2015377	675.199	75900	
25 Pyrene	202	14.893	14.903	(0.875)	1169728	446.792	50200	
28 Benzo(a)anthracene	228	16.918	16.918	(0.994)	131711	59.7565	6710	
* 29 Chrysene-d12	240	17.017	17.017	(1.000)	330591	200.000		
30 Chrysene	228	17.059	17.059	(1.002)	160999	66.5531	7480	
44 Benzo(b)fluoranthene	252	18.784	18.784	(0.947)	41274	20.4108	2290	
45 Benzo(k)fluoranthene	252	Compound Not Detected.						

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)
46	Benzo(j)fluoranthene	252	Compound Not Detected.					
34	Benzo(a)pyrene	252	Compound Not Detected.					
* 35	Perylene-d12	264	19.841	19.841	(1.000)	298465	200.000	
$ 36	Dibenzo(a,h)anthracene-d14	292	22.208	22.208	(1.119)	247785	205.690	23100
37	Indeno(1,2,3-cd)pyrene	276	Compound Not Detected.					
38	Dibenzo(a,h)anthracene	278	Compound Not Detected.					
39	Benzo(g,h,i)perylene	276	Compound Not Detected.					
47	Perylene	252	Compound Not Detected.					
48	Benzo(e)pyrene	252	19.524	19.524	(0.984)	26215	12.8275	1440

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120508.D
Lab Smp Id: AQJ9C
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21390

Calibration Date: 05-DEC-2015
Calibration Time: 10:30
Client Smp ID: PG-PJ-1-PEMD-1
Level: LOW
Sample Type: Tissue

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	347293	5.92
11 Acenaphthene-d10	239179	119590	478358	286981	19.99
18 Phenanthrene-d10	372253	186127	744506	493459	32.56
29 Chrysene-d12	294711	147356	589422	330591	12.17
35 Perylene-d12	260595	130298	521190	298465	14.53

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.58	-0.32
11 Acenaphthene-d10	9.60	9.10	10.10	9.59	-0.12
18 Phenanthrene-d10	12.27	11.77	12.77	12.27	0.00
29 Chrysene-d12	17.02	16.52	17.52	17.02	0.00
35 Perylene-d12	19.84	19.34	20.34	19.84	0.00

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.

ARI Labs, Inc.

RECOVERY REPORT

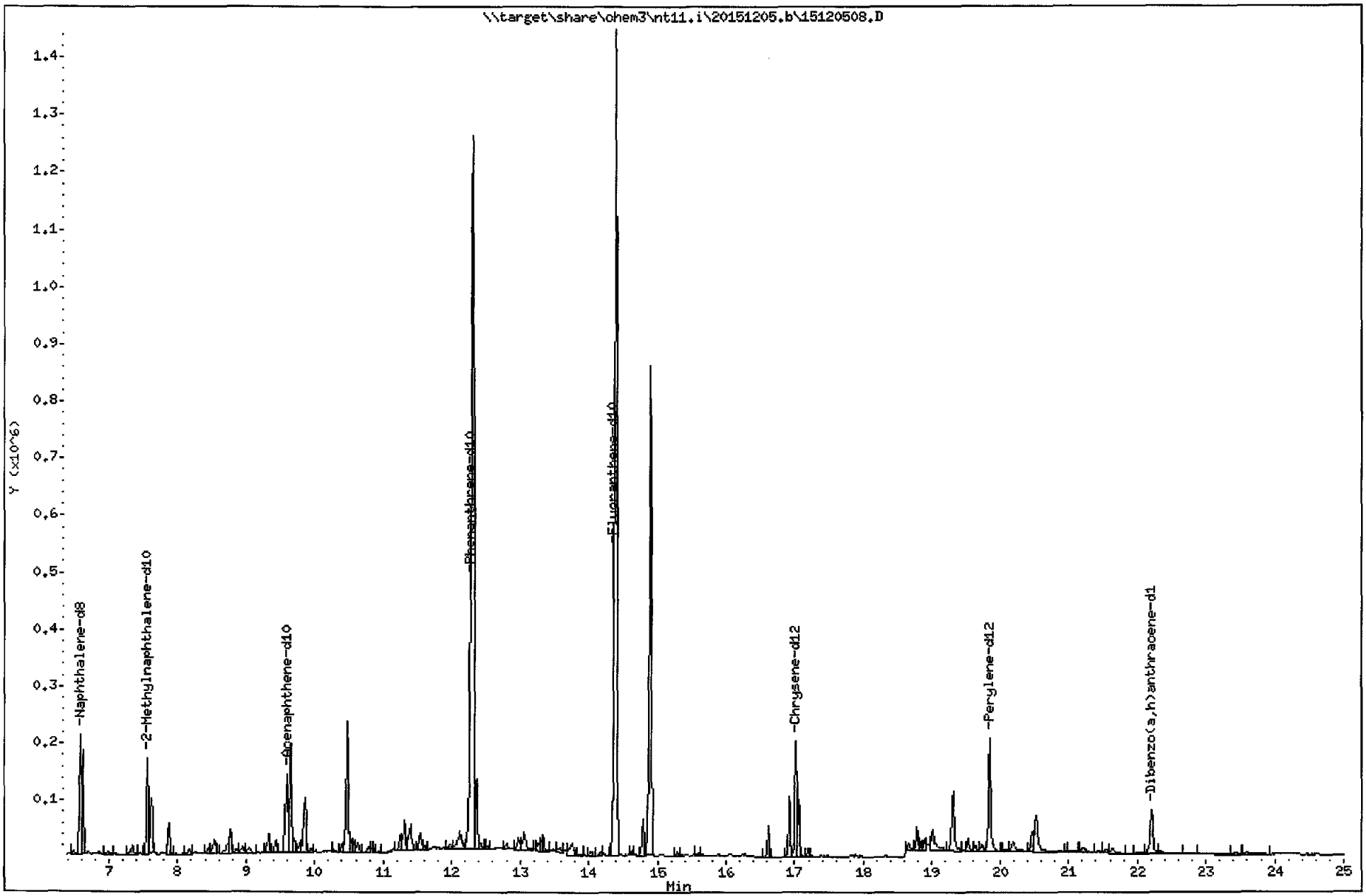
Client Name: Anchor QEA, LLC
Client SDG: AQJ9
Sample Matrix: SOLID
Fraction: SV
Lab Smp Id: AQJ9C
Client Smp ID: PG-PJ-1-PEMD-151109
Level: LOW
Operator: JW
Data Type: MS DATA
SampleType: SAMPLE
SpikeList File: waterlcs.spk
Quant Type: ISTD
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21390

SURROGATE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
$ 6 2-Methylnaphthalen	33700	16100	47.80	30-160
$ 23 Fluoranthene-d10	33700	21500	63.73	30-160
$ 36 Dibenzo(a,h)anthra	33700	23100	68.56	30-160

Data File: \\target\share\chem3\nt11.i\20151205.b\15120508.D
Date : 05-DEC-2015 13:45
Client ID: PC-PJ-1-PEMD-151109
Sample Info: AQJ9C
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: JW
Column diameter: 0.25

AQJ9:00195



Data File: \\target\share\chem3\nt11.i\20151205.b\15120508.D

Date : 05-DEC-2015 13:45

Client ID: PG-PJ-1-PEMD-151109 Instrument: nt11.i

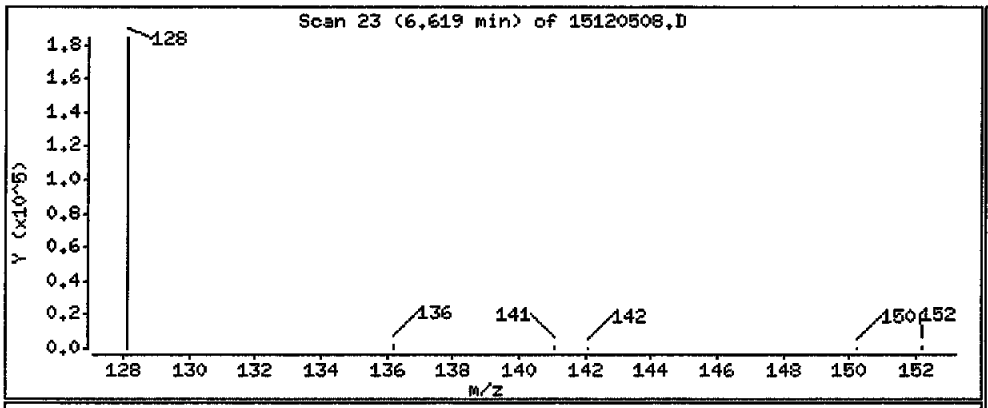
Sample Info: AQJ9C

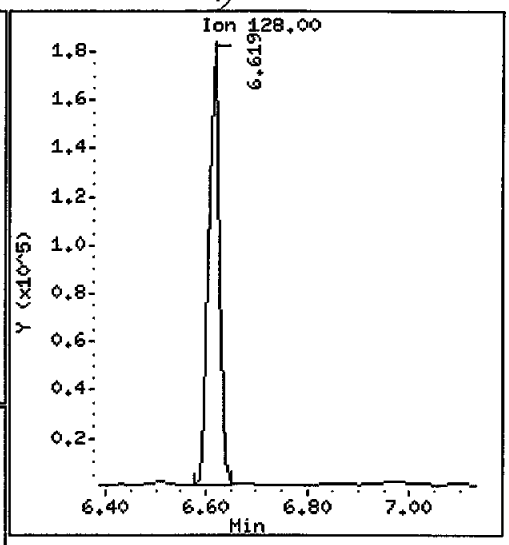
Volume Injected (uL): 2.0 Operator: JW

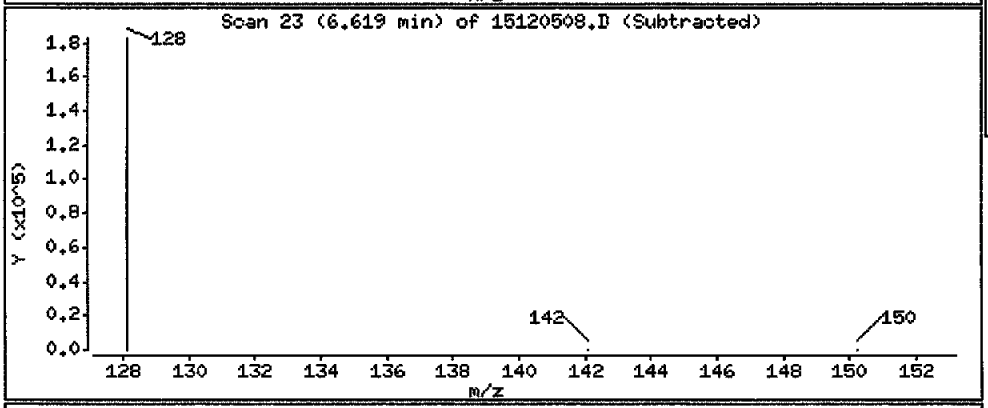
Column phase: Rxi-17Sil MS Column diameter: 0.25

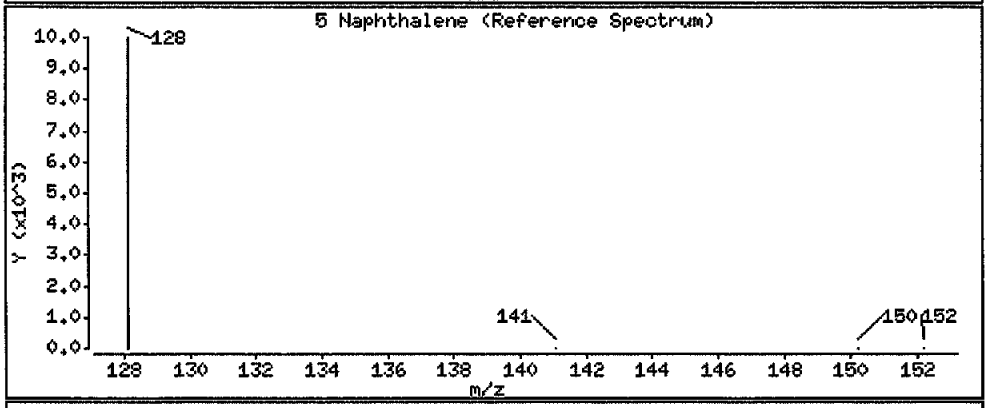
5 Naphthalene Concentration: 15300 ug/kg

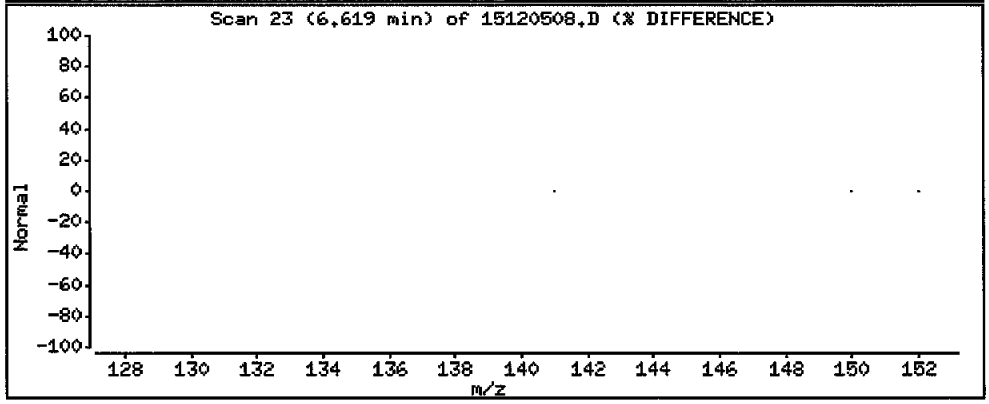
B











Data File: \\target\share\chem3\nt11.i\20151205.b\15120508.D

Date : 05-DEC-2015 13:45

Client ID: PG-PJ-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9C

Volume Injected (uL): 2.0

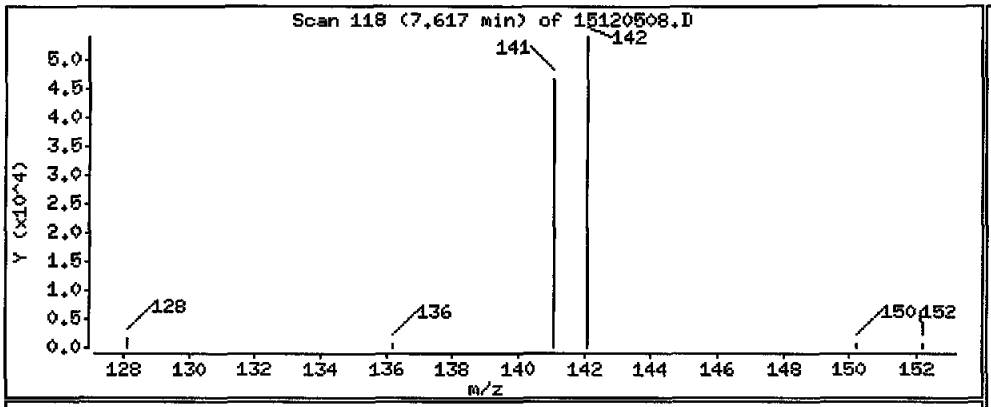
Operator: JW

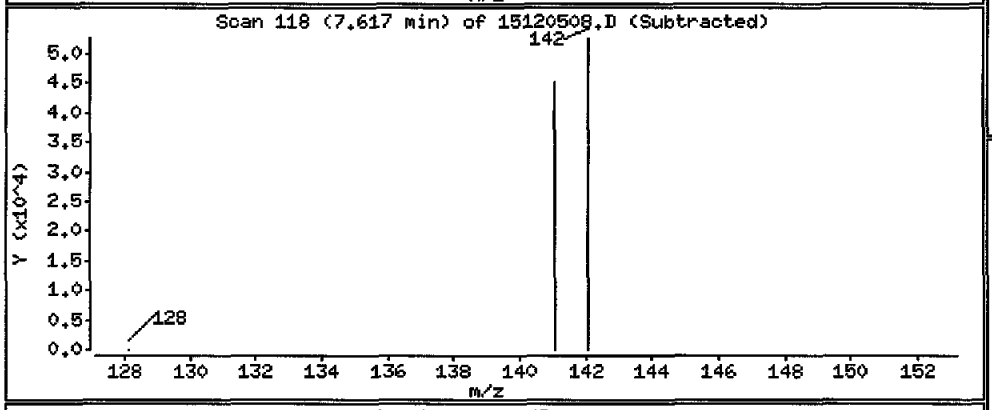
Column phase: Rxi-17Sil MS

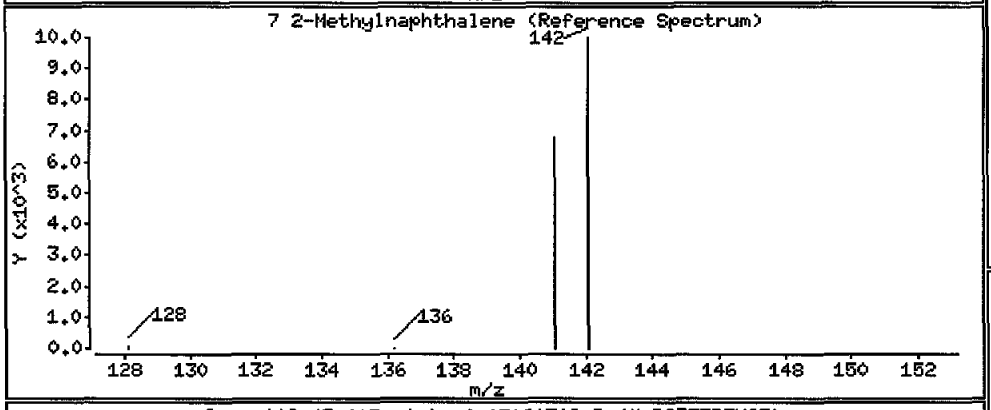
Column diameter: 0.25

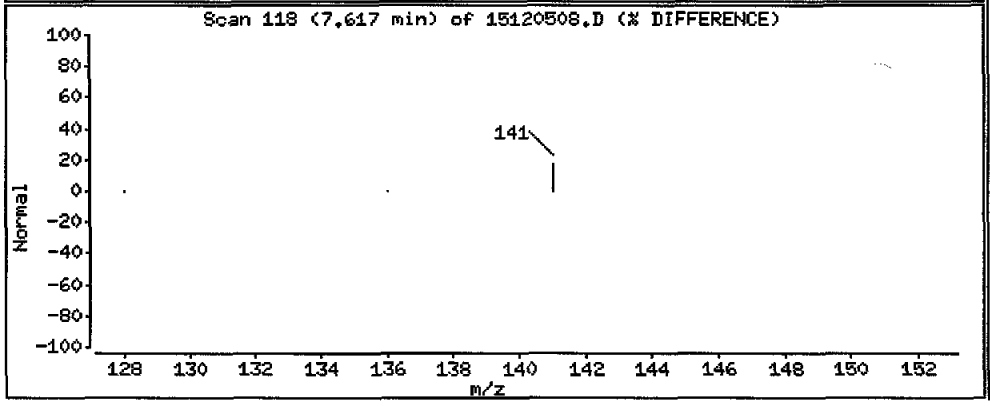
7 2-Methylnaphthalene

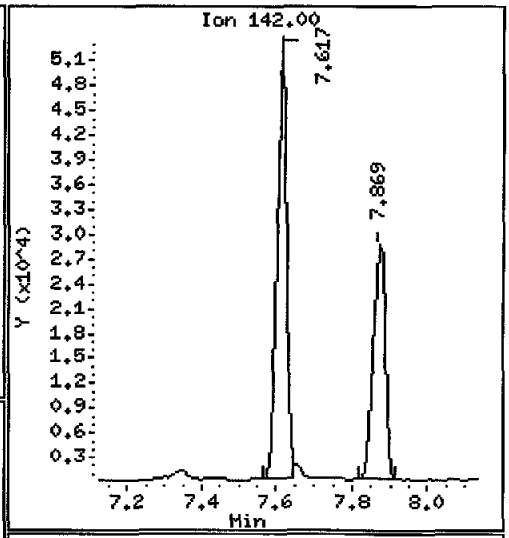
Concentration: 8560 ug/kg

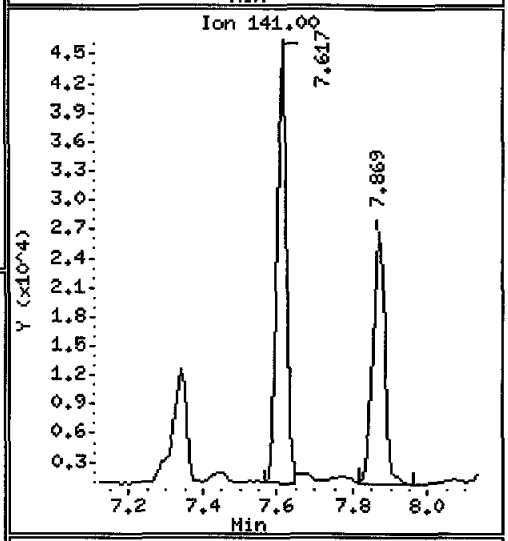


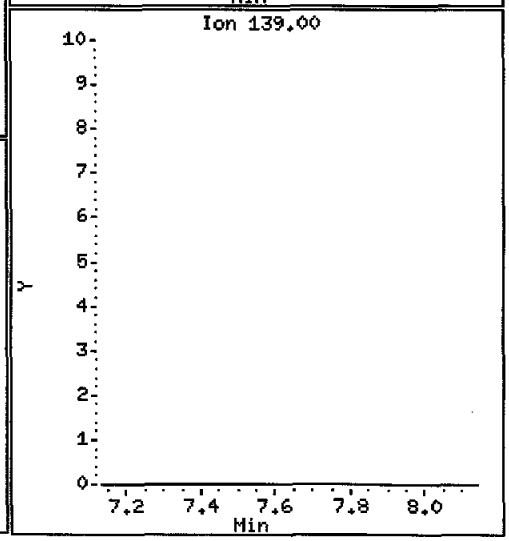












Data File: \\target\share\chem3\nt11.i\20151205.b\15120508.D

Date : 05-DEC-2015 13:45

Client ID: PG-PJ-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9C

Volume Injected (uL): 2.0

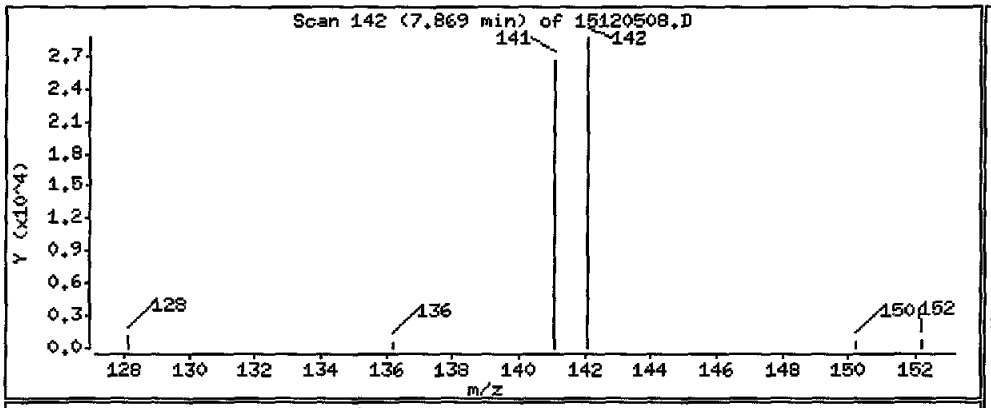
Operator: JW

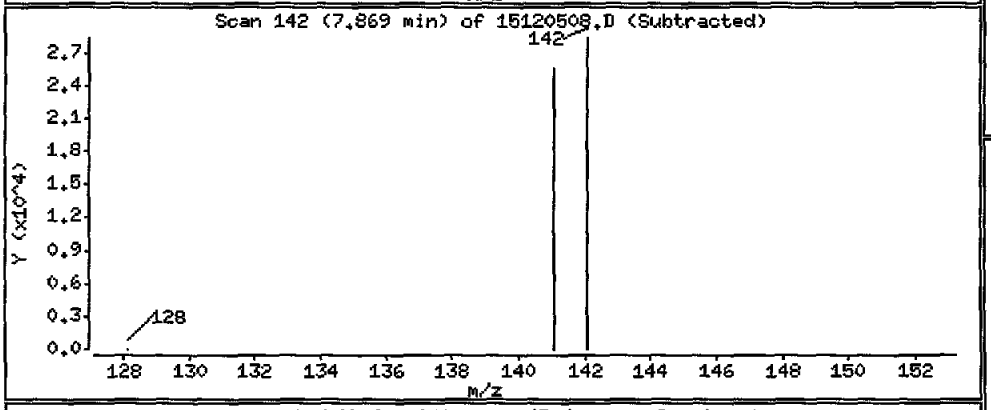
Column phase: Rxi-17Sil MS

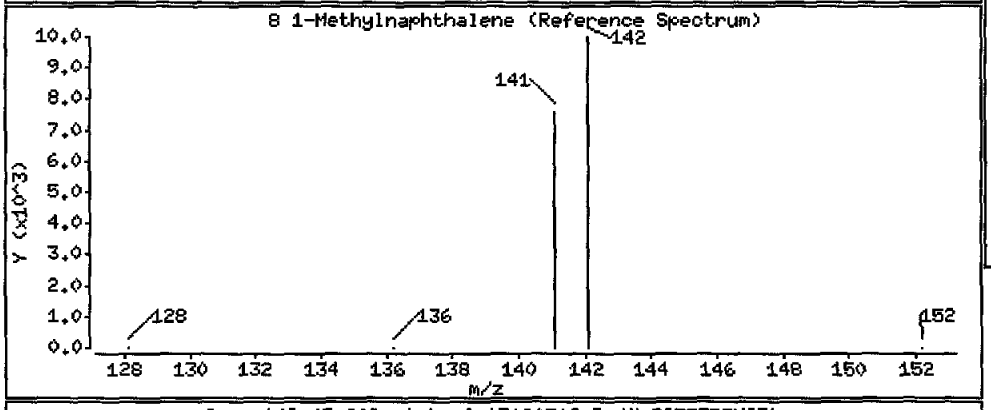
Column diameter: 0.25

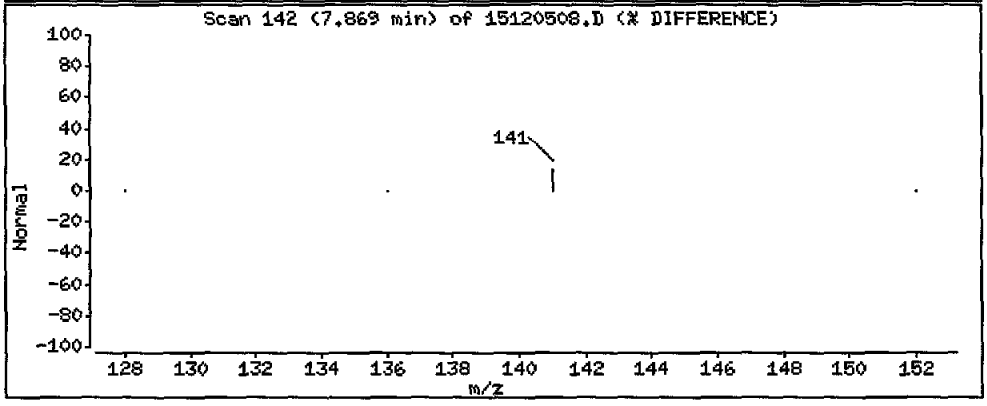
8 1-Methylnaphthalene

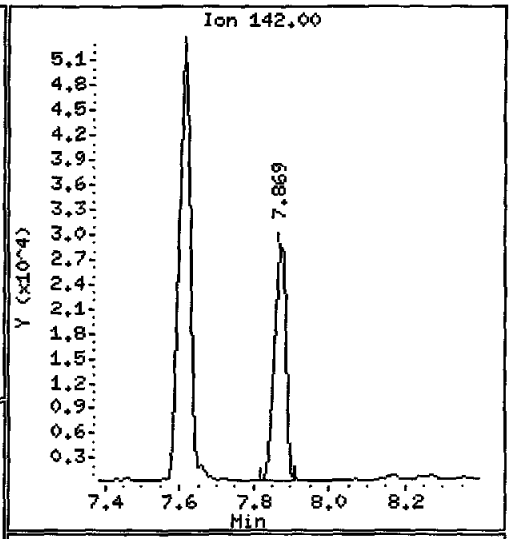
Concentration: 5550 ug/kg

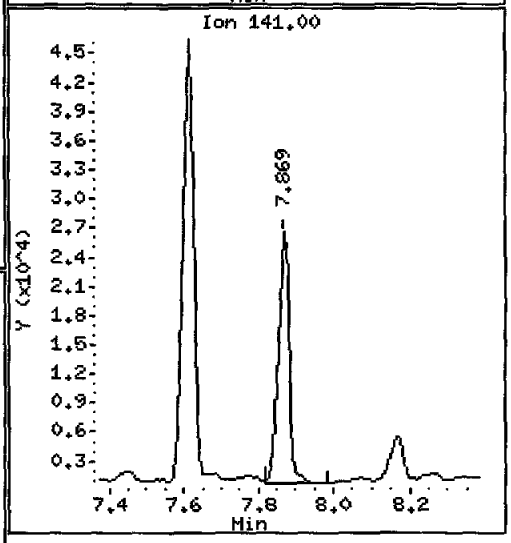












Data File: \\target\share\chem3\nt11.i\20151205.b\15120508.D

Date : 05-DEC-2015 13:45

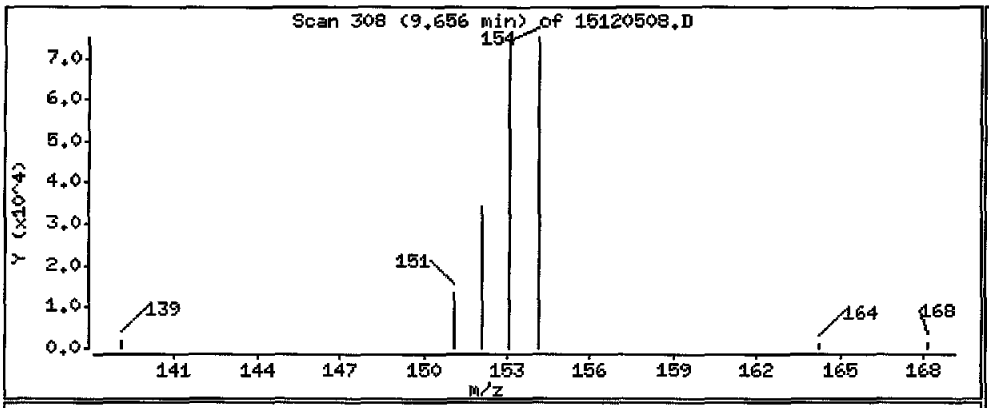
Client ID: PG-PJ-1-PEMD-151109 Instrument: nt11.i

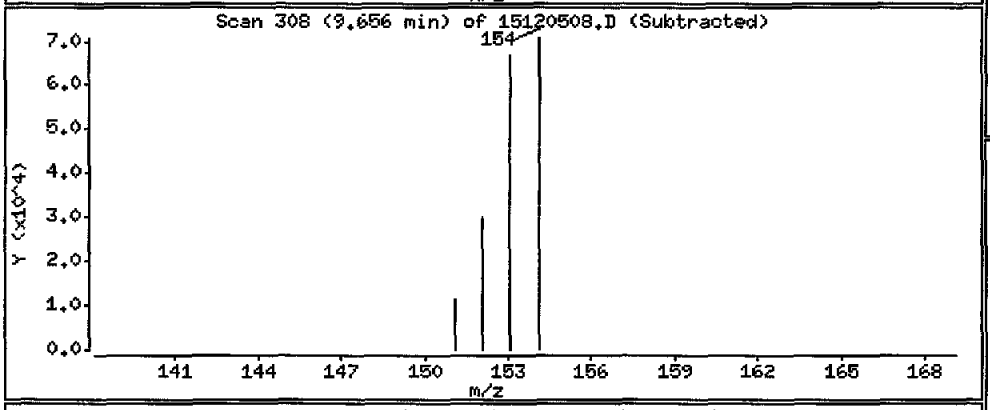
Sample Info: AQJ9C

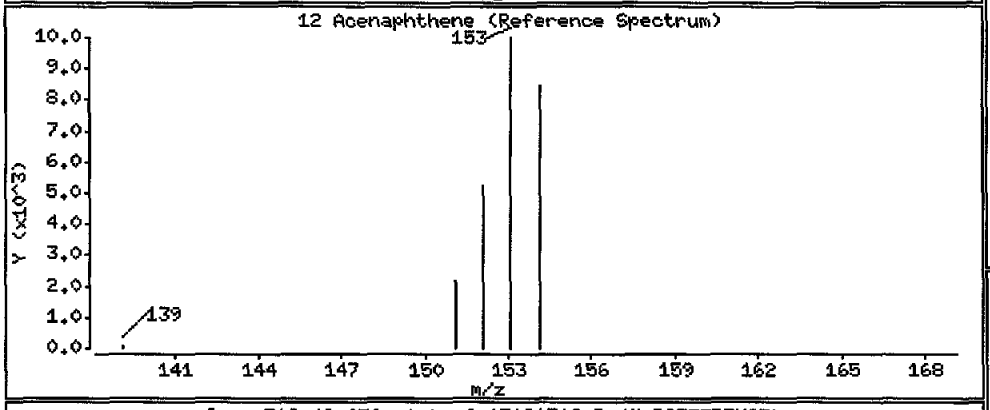
Volume Injected (uL): 2.0 Operator: JW

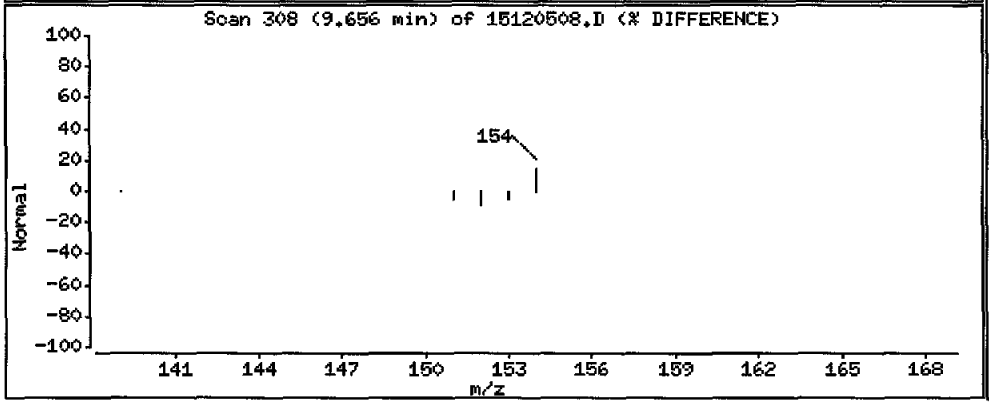
Column phase: Rxi-17Sil MS Column diameter: 0.25

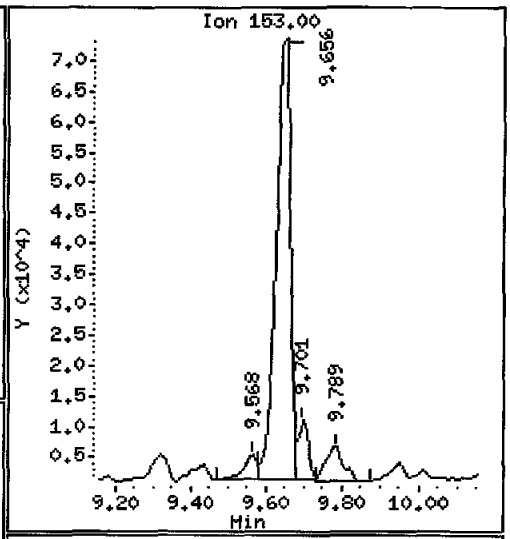
12 Acenaphthene Concentration: 13300 ug/kg

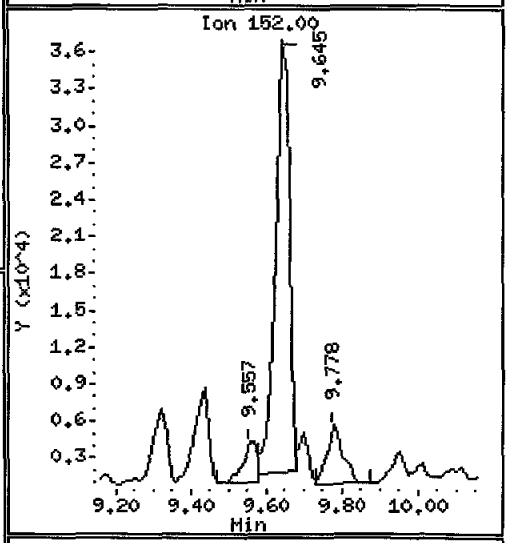


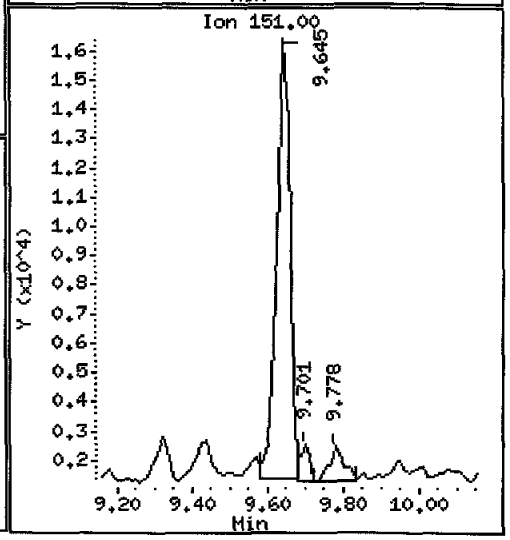












Data File: \\target\share\chem3\nt11.i\20151205.b\15120508.D

Date : 05-DEC-2015 13:45

Client ID: PG-PJ-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9C

Volume Injected (uL): 2.0

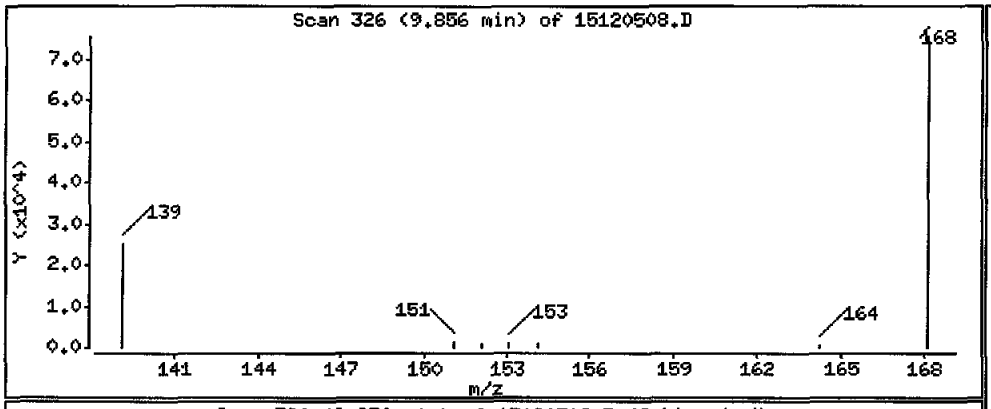
Operator: JW

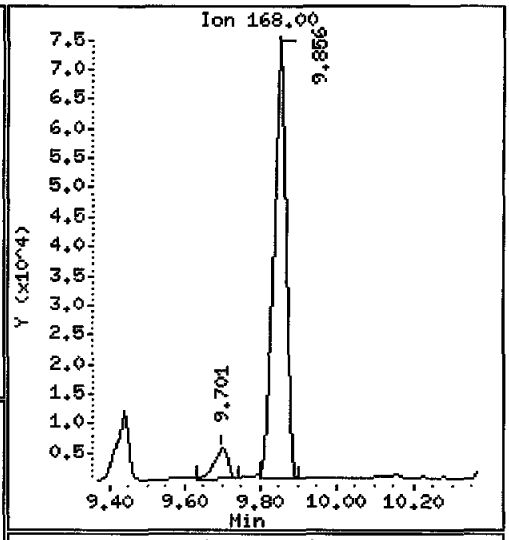
Column phase: Rxi-17Sil MS

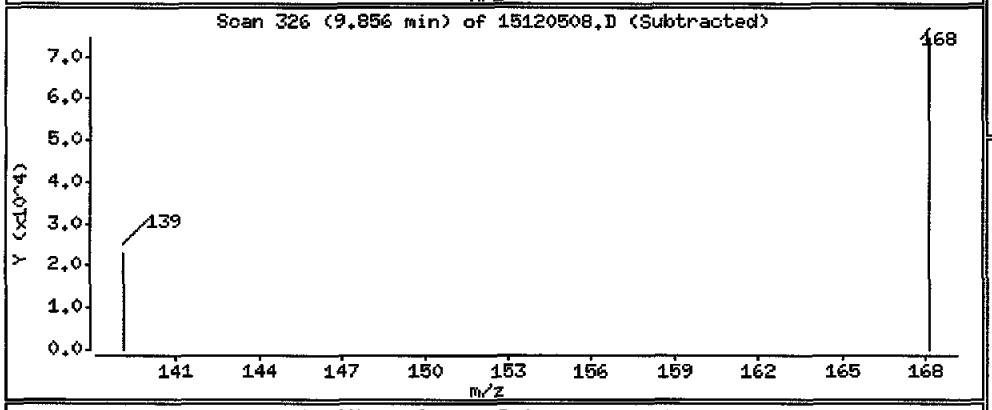
Column diameter: 0.25

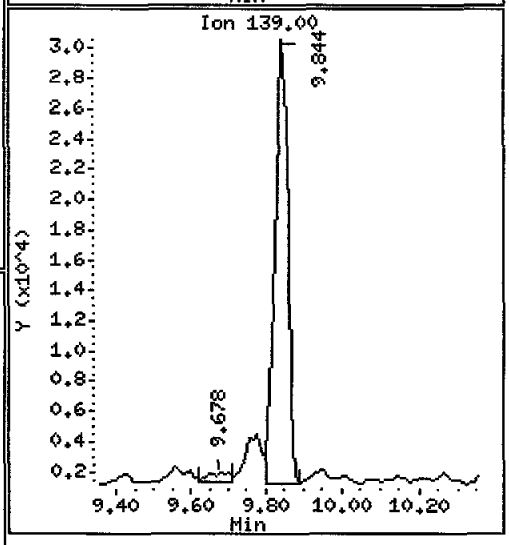
14 Dibenzofuran

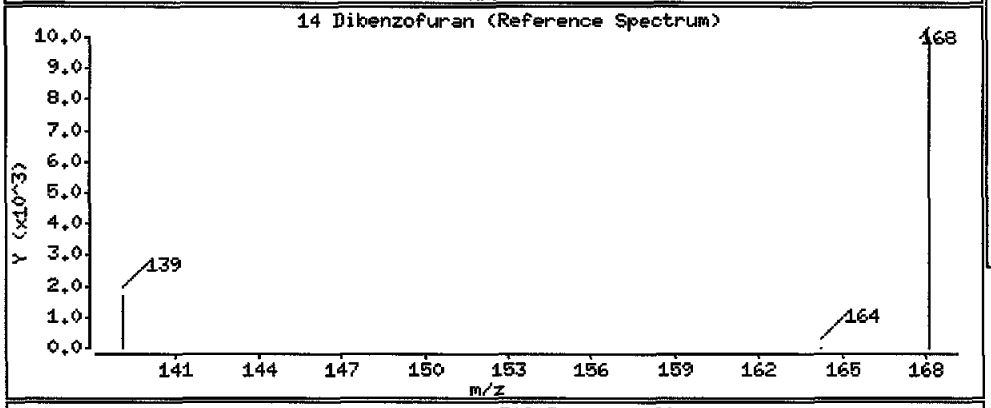
Concentration: 7970 ug/kg

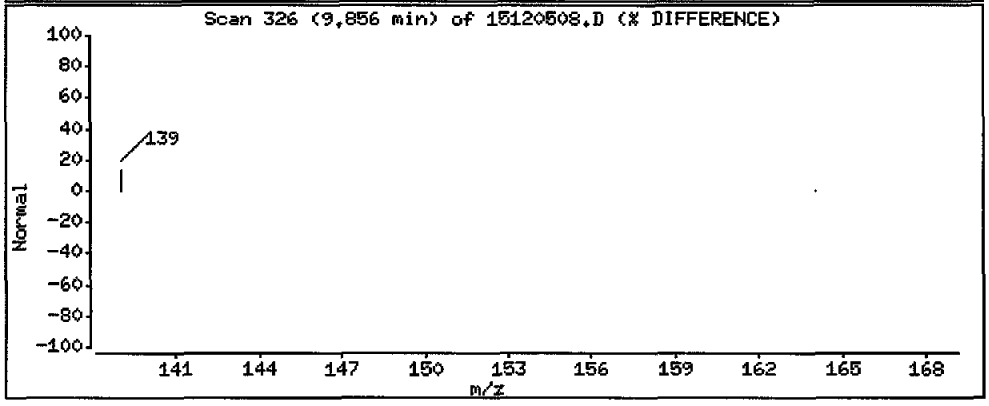












Data File: \\target\share\chem3\nt11.i\20151205.b\15120508.D

Date : 05-DEC-2015 13:45

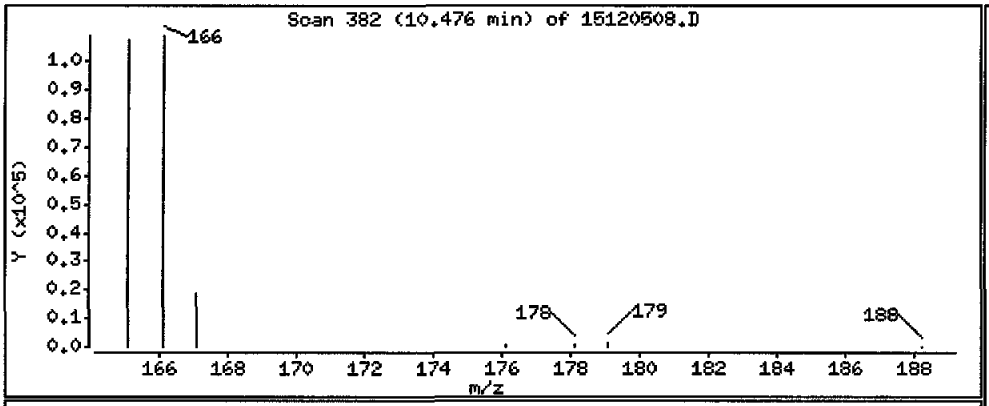
Client ID: PG-PJ-1-PEMD-151109 Instrument: nt11.i

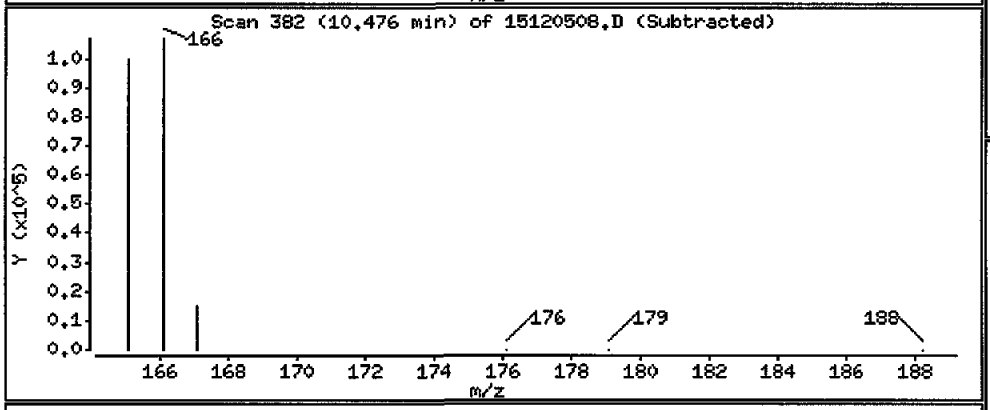
Sample Info: AQJ9C

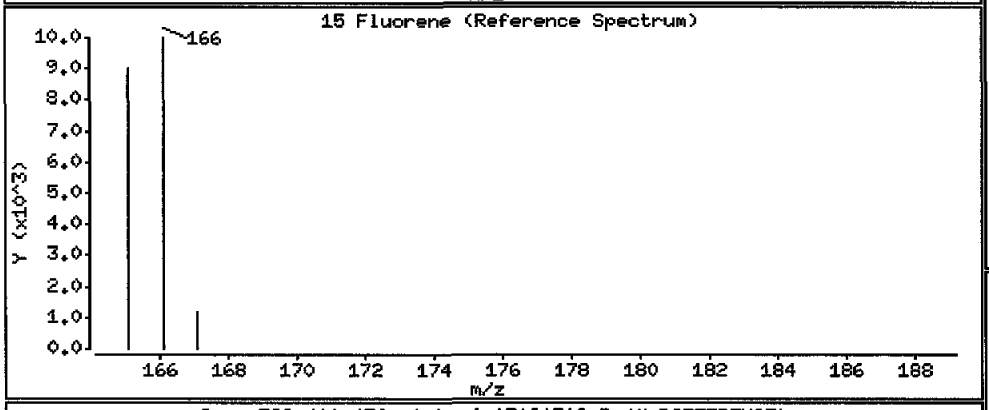
Volume Injected (uL): 2.0 Operator: JW

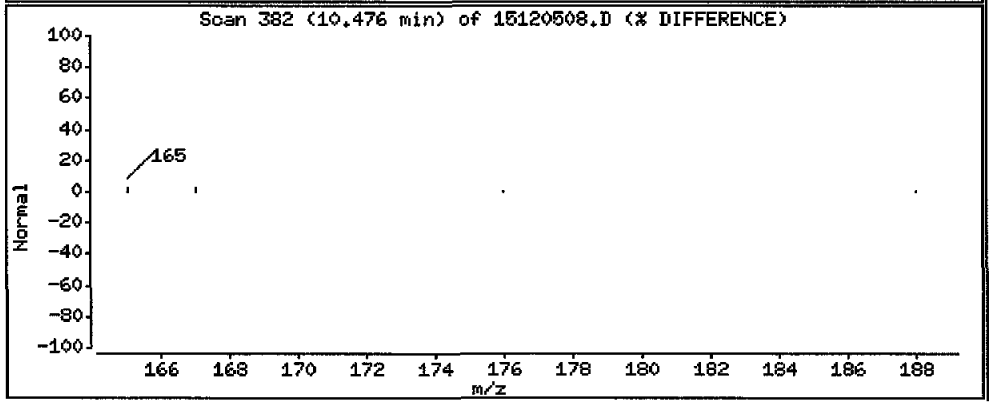
Column phase: Rxi-17Sil MS Column diameter: 0.25

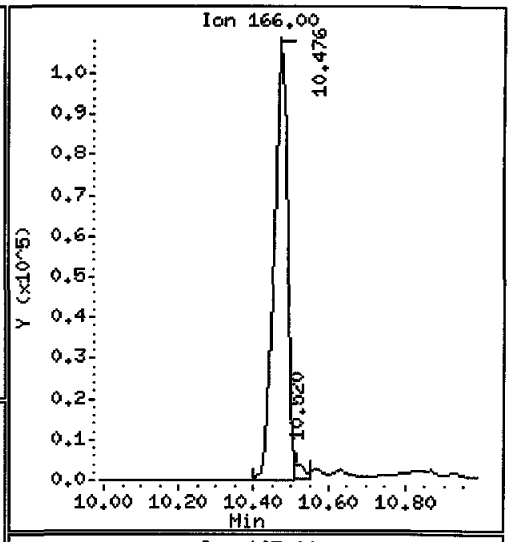
15 Fluorene Concentration: 16100 ug/kg

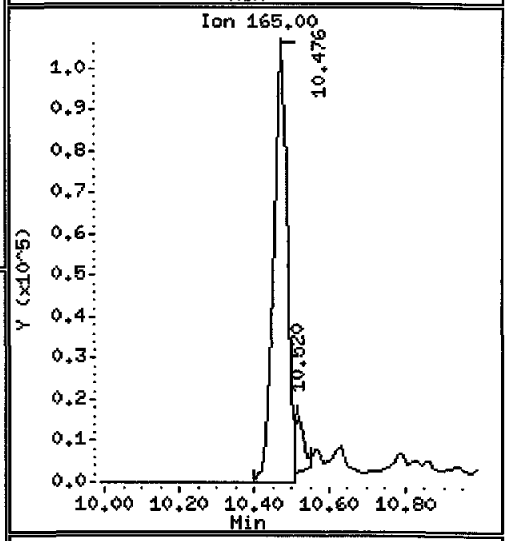


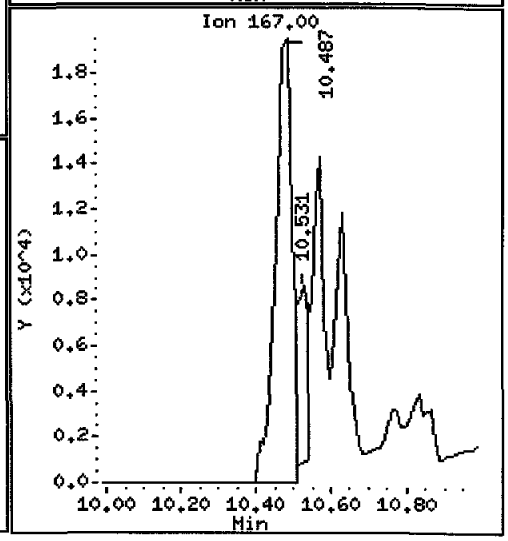












Data File: \\target\share\chem3\nt11.i\20151205.b\15120508.D

Date : 05-DEC-2015 13:45

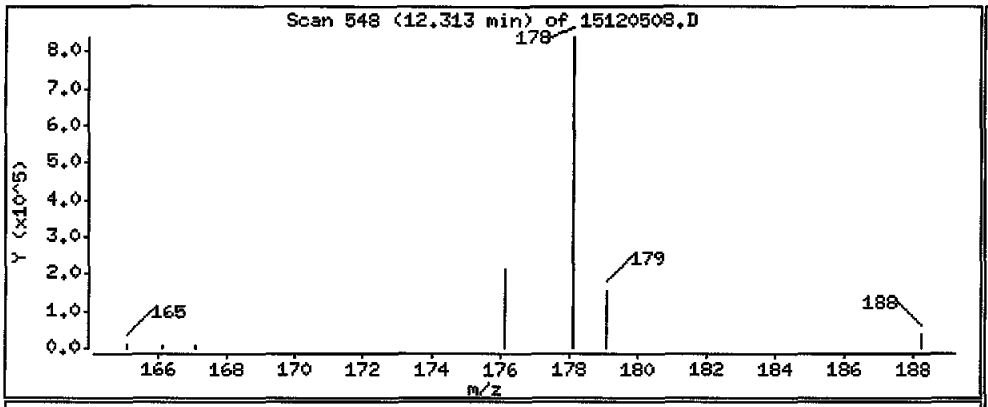
Client ID: PG-PJ-1-PEMD-151109 Instrument: nt11.i

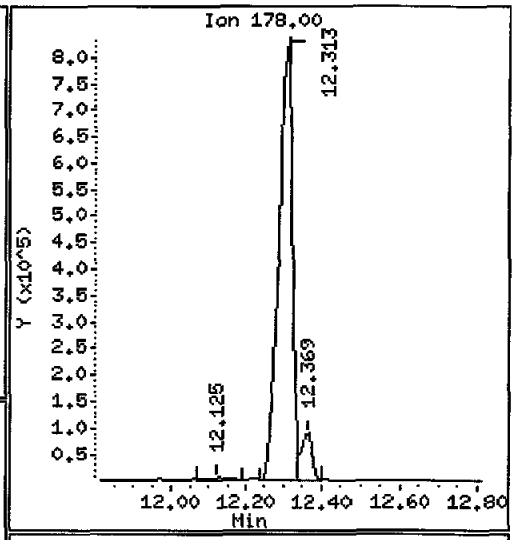
Sample Info: AQJ9C

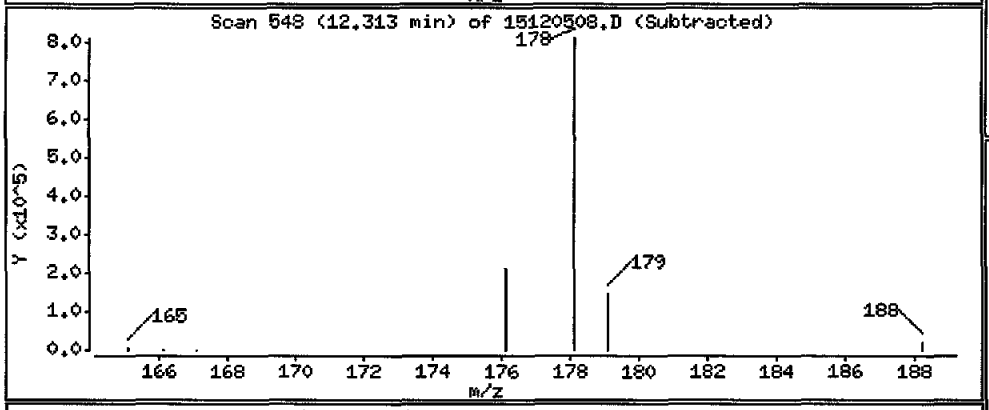
Volume Injected (uL): 2.0 Operator: JW

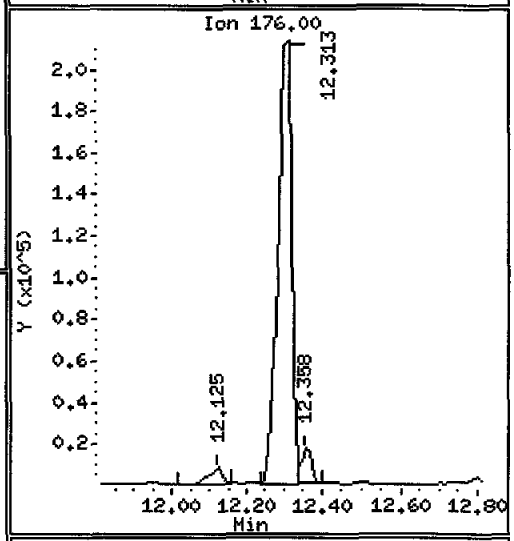
Column phase: Rxi-17Sil MS Column diameter: 0.25

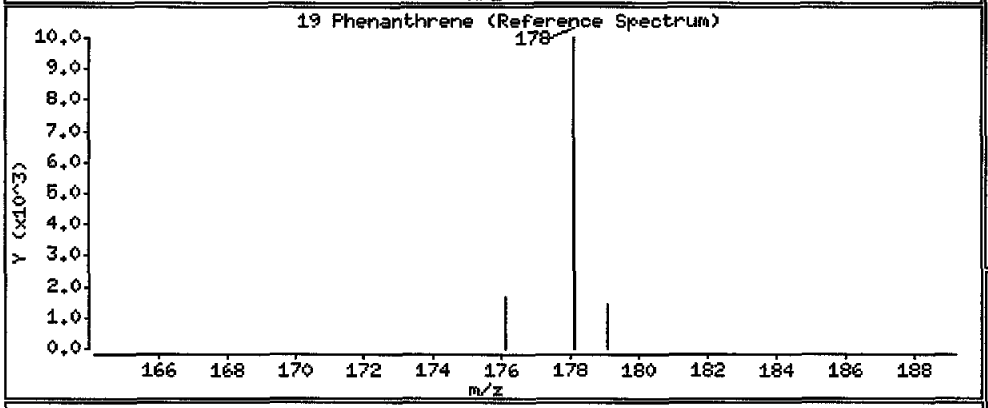
19 Phenanthrene Concentration: 72300 ug/kg

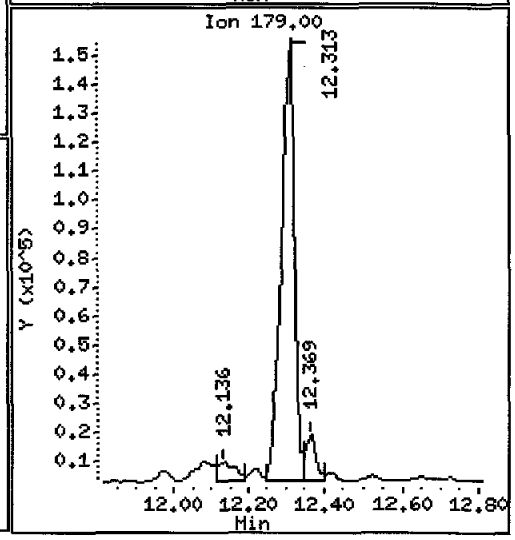


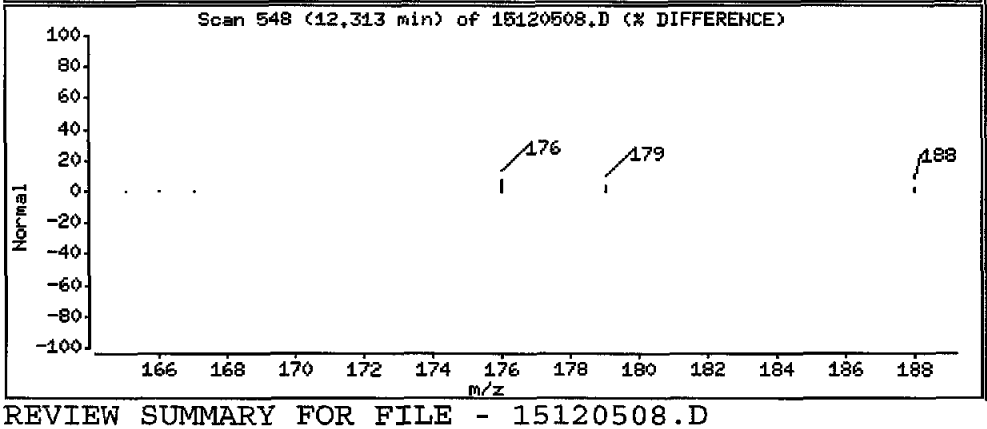








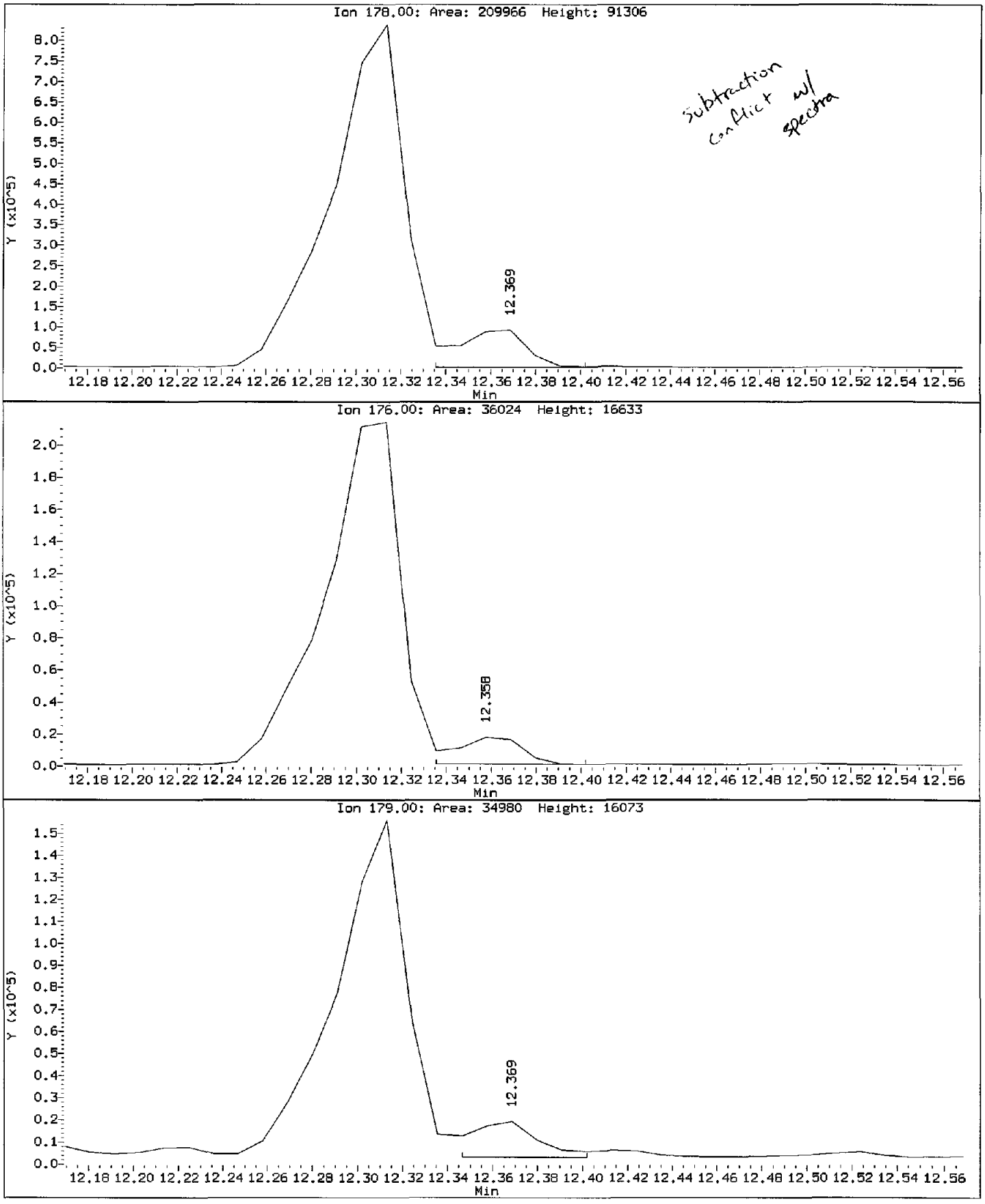




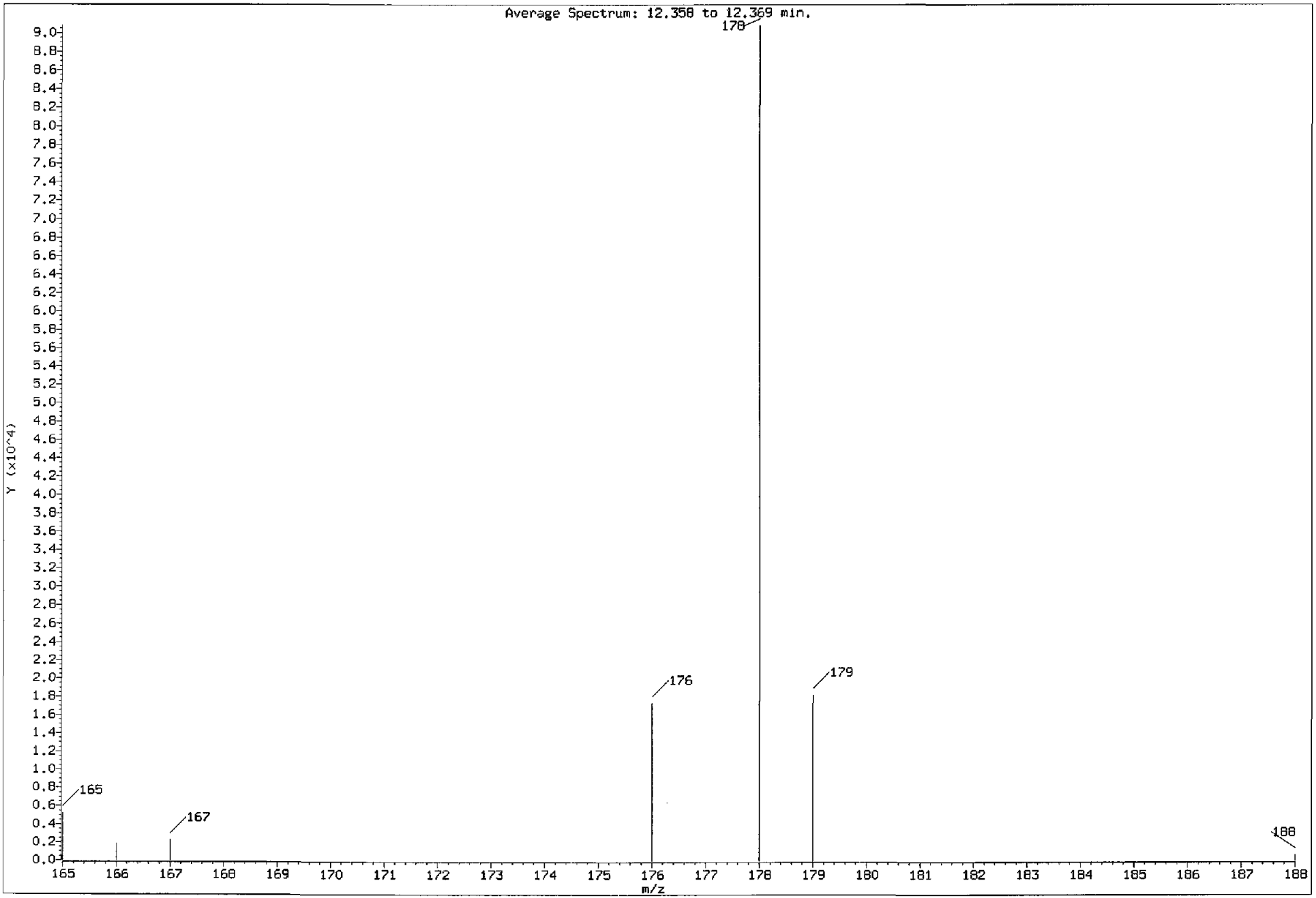
REVIEW SUMMARY FOR FILE - 15120508.D

Data File: \\target\share\chem3\nt11.i\20151205.b\15120508.D
Injection Date: 05-DEC-2015 13:45
Instrument: nt11.i
Client Sample ID: PG-PJ-1-PEMD-151109

Compound: Anthracene
CAS Number:



Data File: \\target\share\chem3\nt11.i\20151205.b\15120508.D
Injection Date: 05-DEC-2015 13:45
Instrument: nt11.i
Client Sample ID: PG-PJ-1-PEMD-151109



Data File: \\target\share\chem3\nt11.i\20151205.b\15120508.D

Date : 05-DEC-2015 13:45

Client ID: PG-PJ-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9C

Volume Injected (uL): 2.0

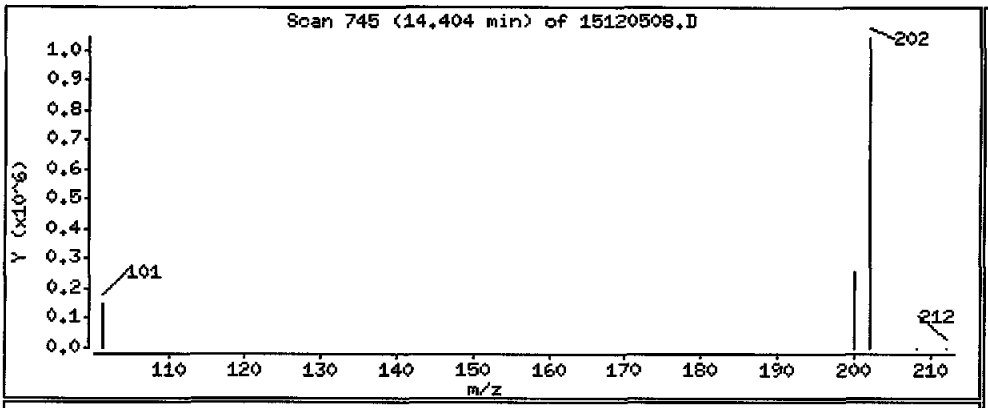
Operator: JW

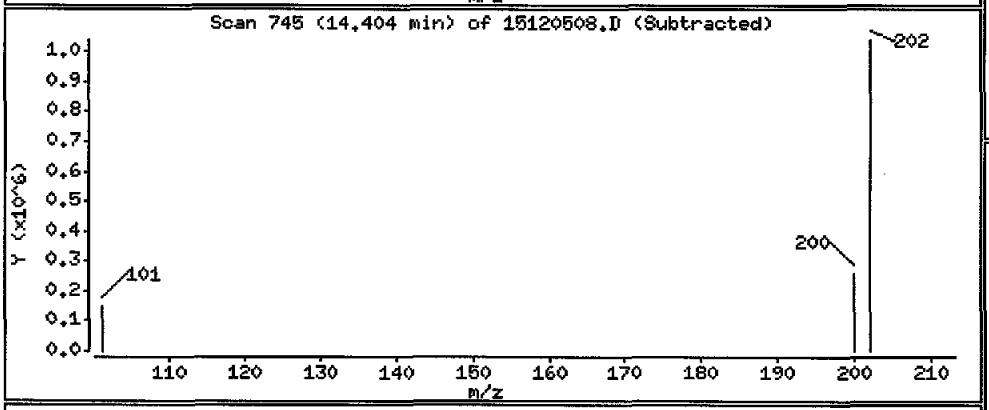
Column phase: Rxi-17Sil MS

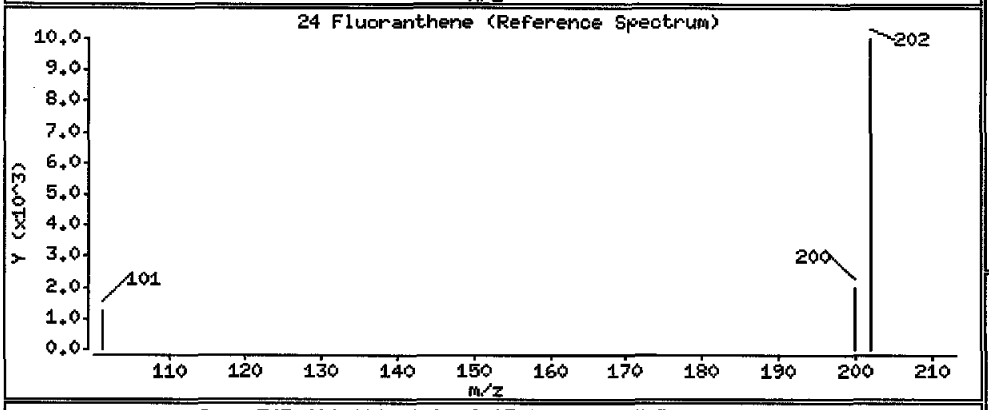
Column diameter: 0.25

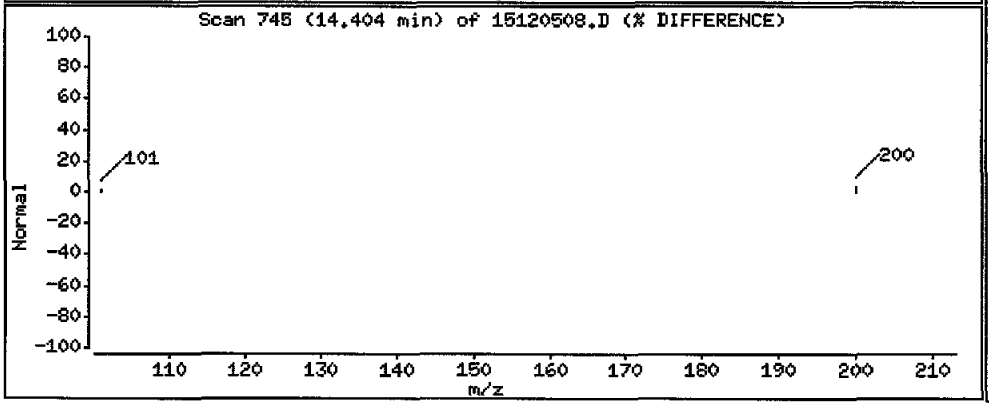
24 Fluoranthene

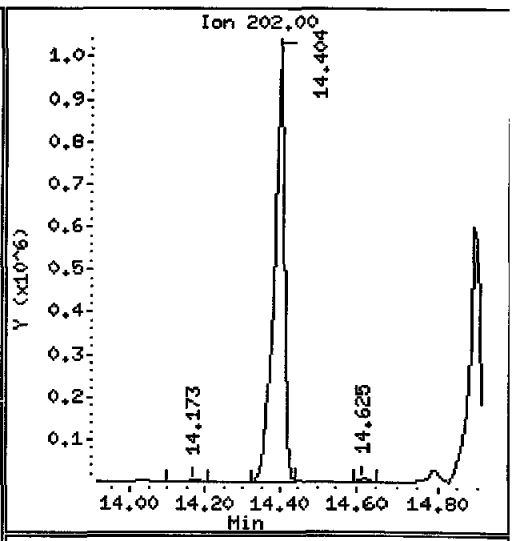
Concentration: 75900 ug/kg

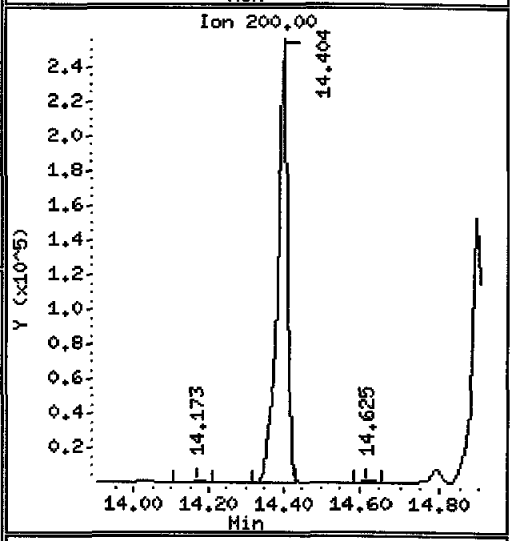


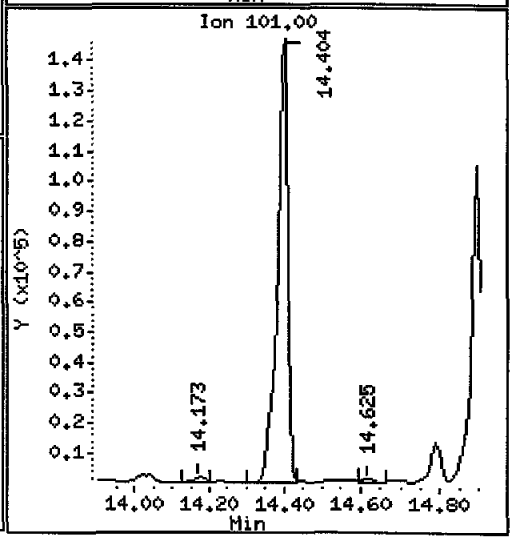












Data File: \\target\share\chem3\nt11.i\20151205.b\15120508.D

Date : 05-DEC-2015 13:45

Client ID: PG-PJ-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9C

Volume Injected (uL): 2.0

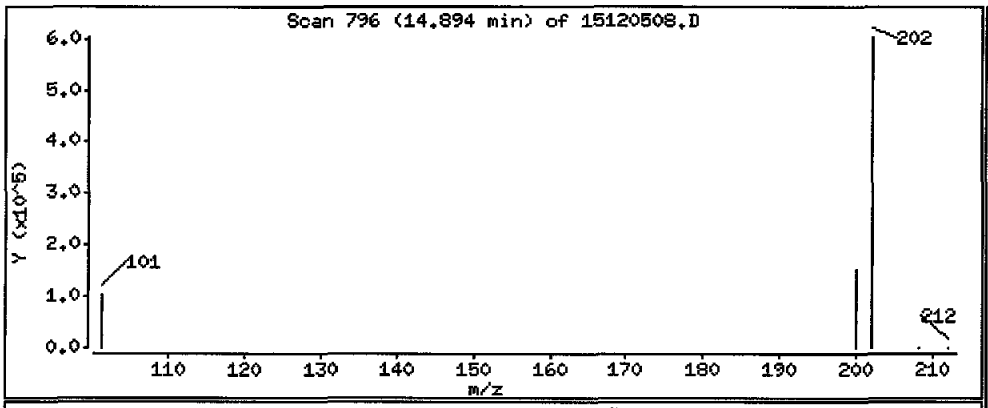
Operator: JW

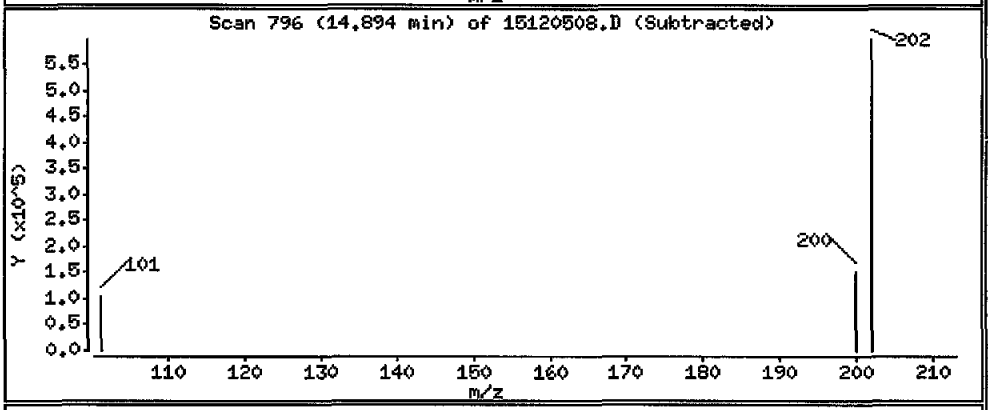
Column phase: Rxi-17Sil MS

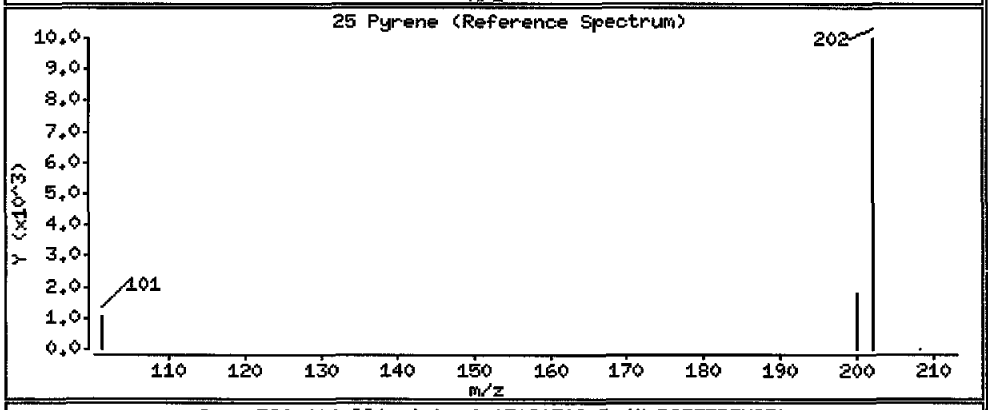
Column diameter: 0.25

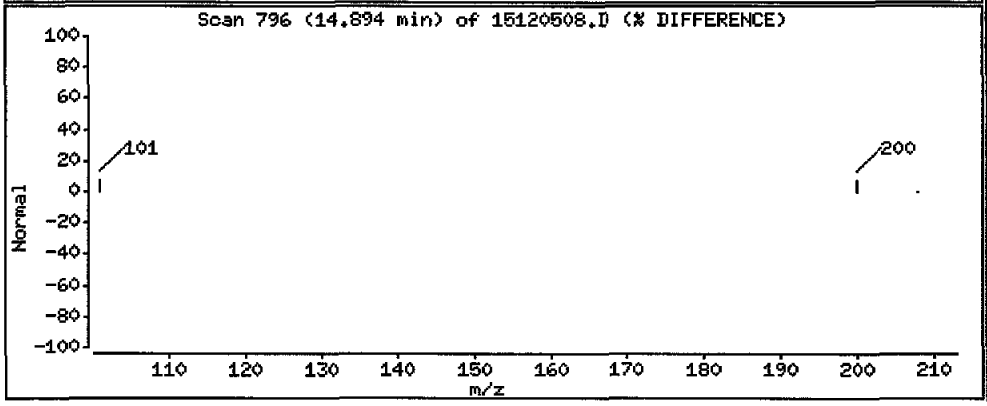
25 Pyrene

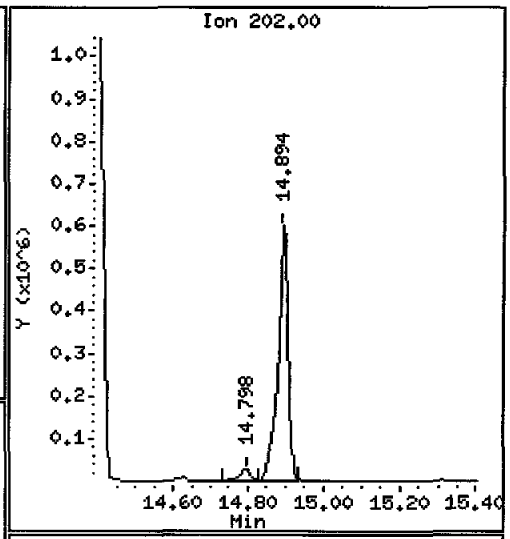
Concentration: 50200 ug/kg

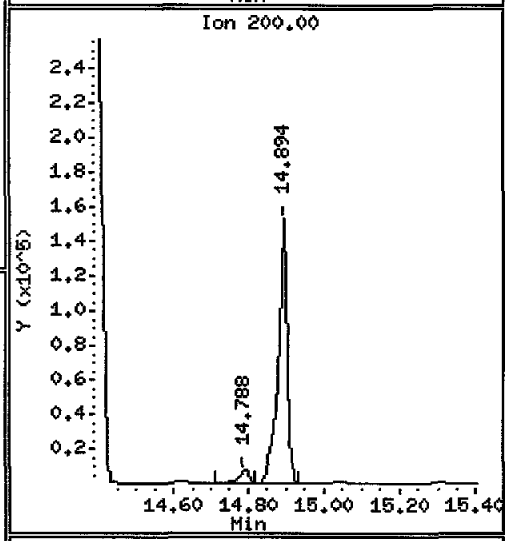


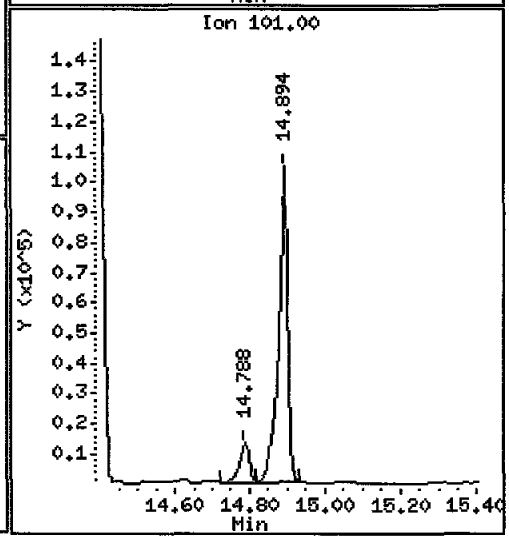












Data File: \\target\share\chem3\nt11.i\20151205.b\15120508.D

Date : 05-DEC-2015 13:45

Client ID: PG-PJ-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9C

Volume Injected (uL): 2.0

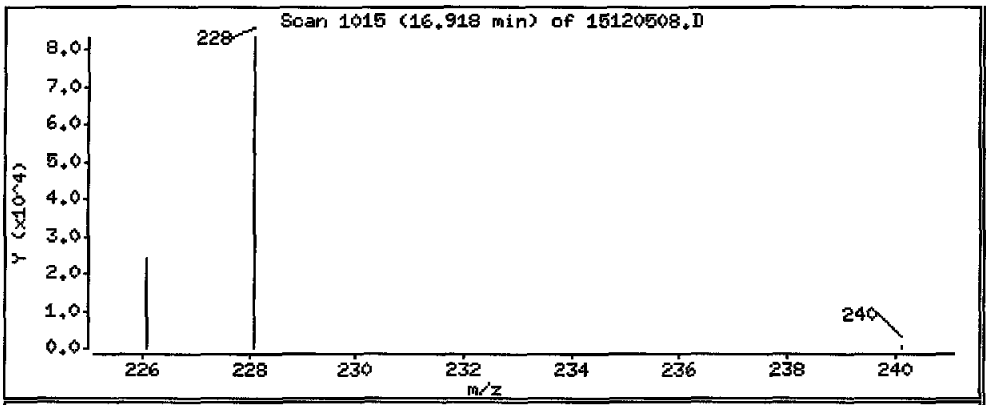
Operator: JW

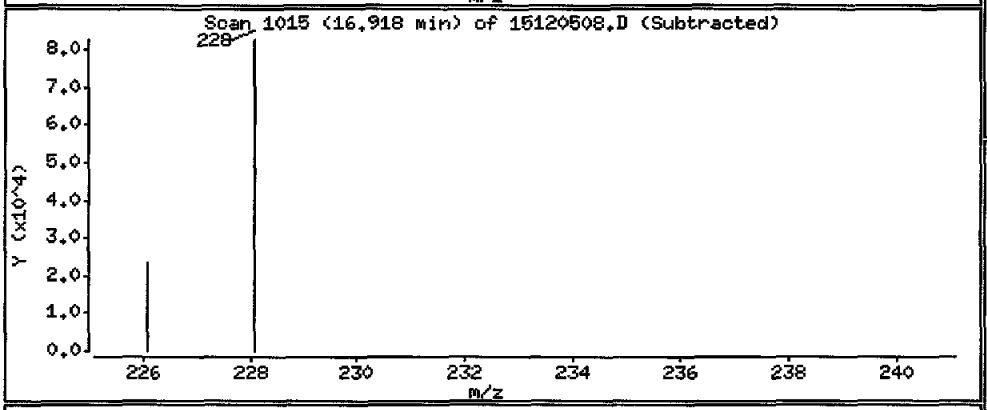
Column phase: Rxi-17Sil MS

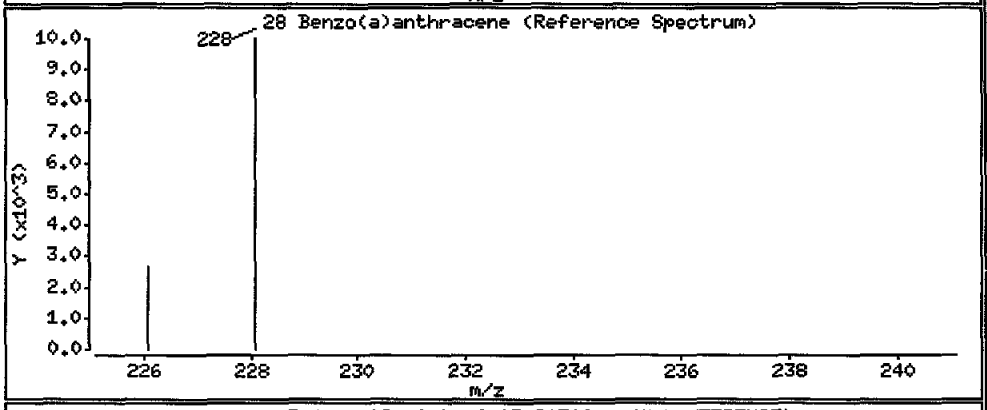
Column diameter: 0.25

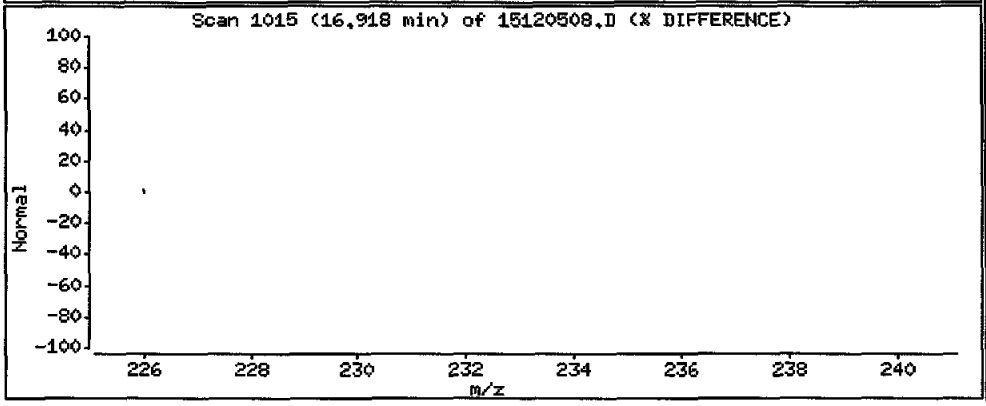
28 Benzo(a)anthracene

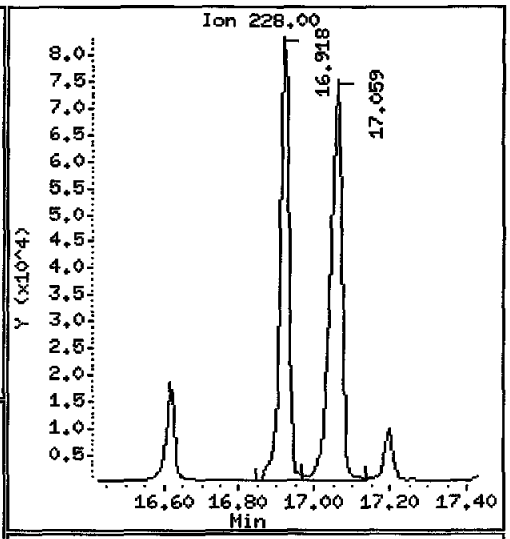
Concentration: 6710 ug/kg

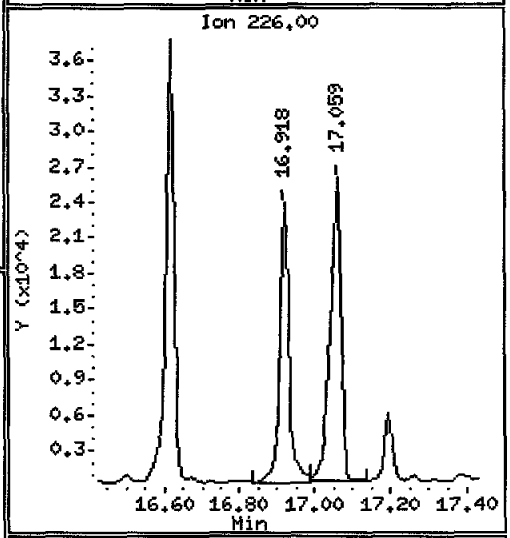


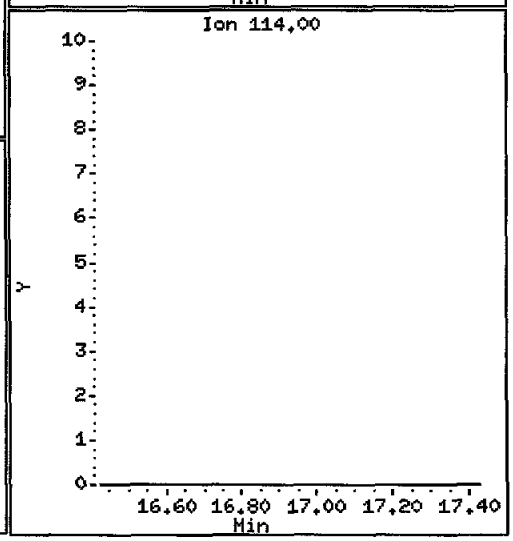












Data File: \\target\share\chem3\nt11.i\20151205.b\15120508.D

Date : 05-DEC-2015 13:45

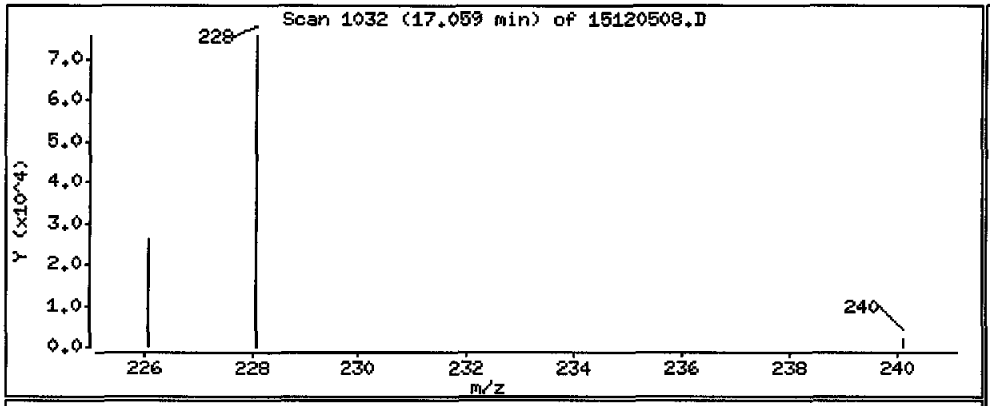
Client ID: PG-PJ-1-PEMD-151109 Instrument: nt11.i

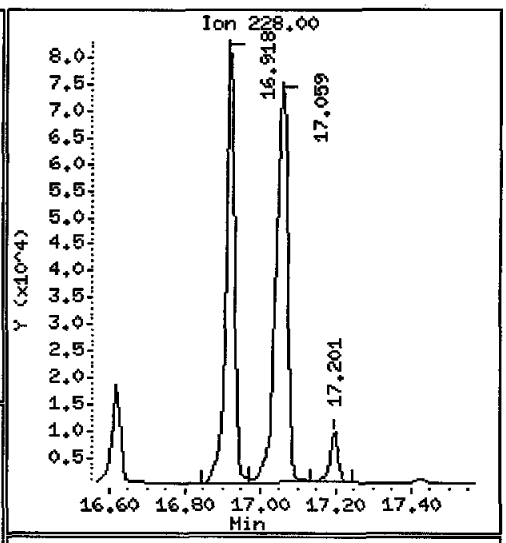
Sample Info: AQJ9C

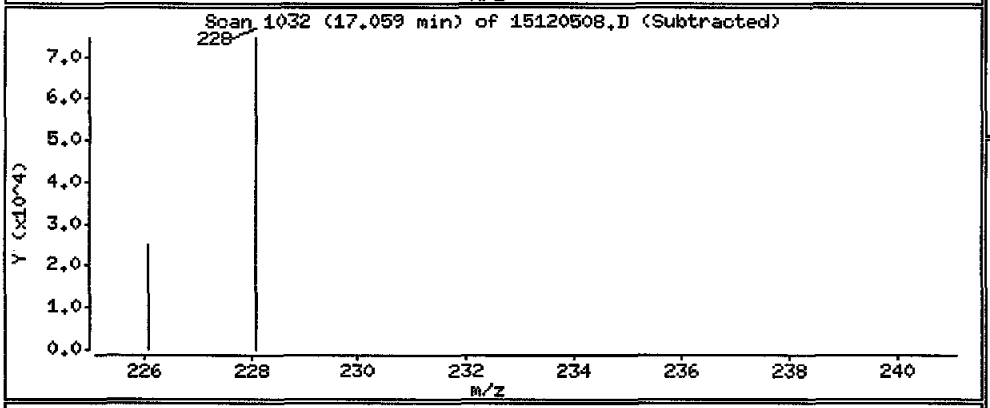
Volume Injected (uL): 2.0 Operator: JW

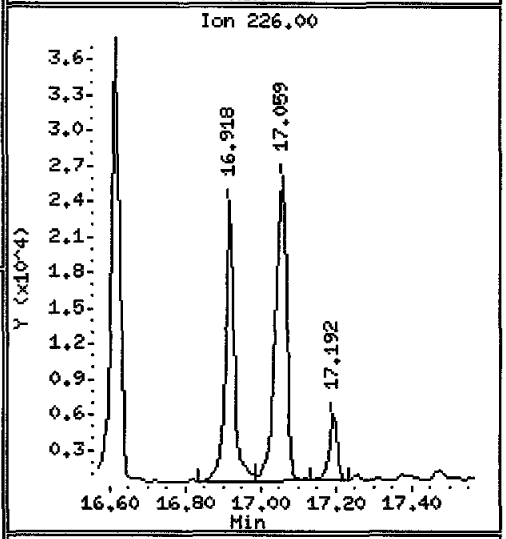
Column phase: Rxi-17Sil MS Column diameter: 0.25

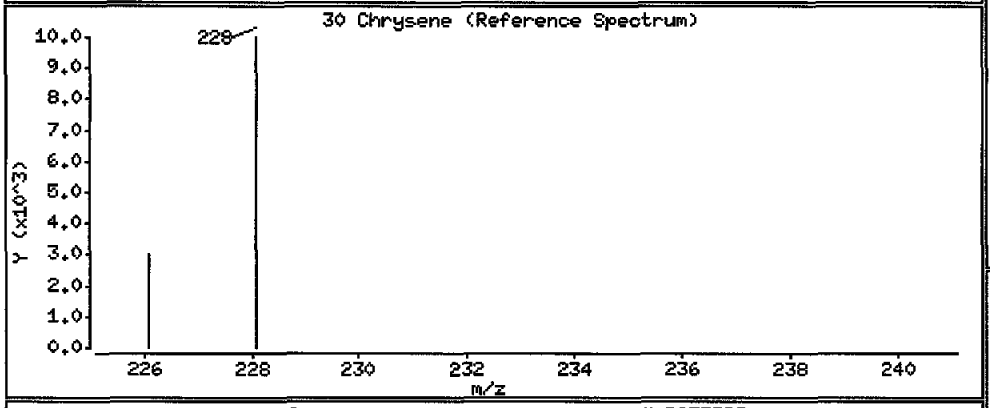
30 Chrysene Concentration: 7480 ug/kg

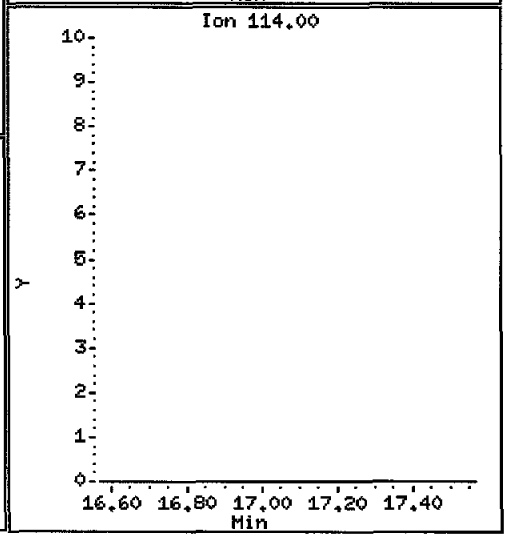


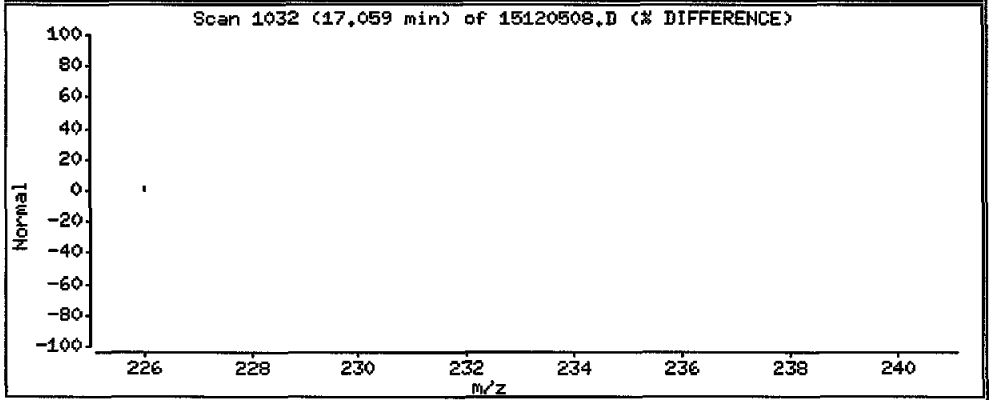












Data File: \\target\share\chem3\nt11.i\20151205.b\15120508.D

Date : 05-DEC-2015 13:45

Client ID: PG-PJ-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9C

Volume Injected (uL): 2.0

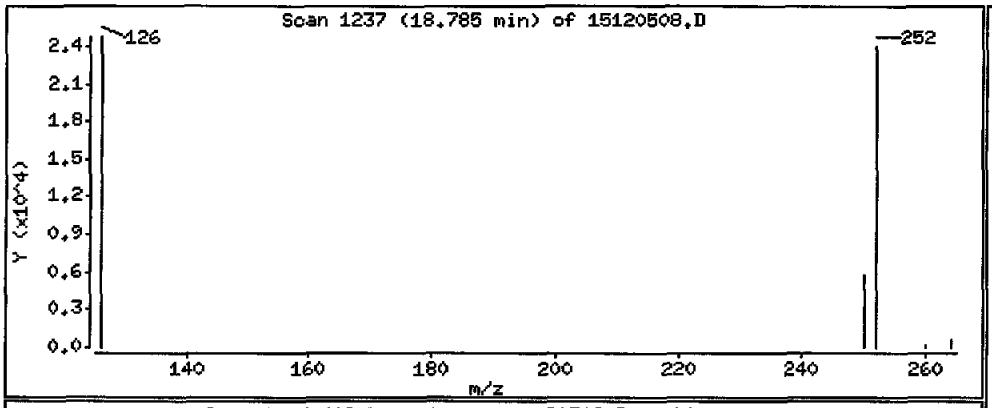
Operator: JW

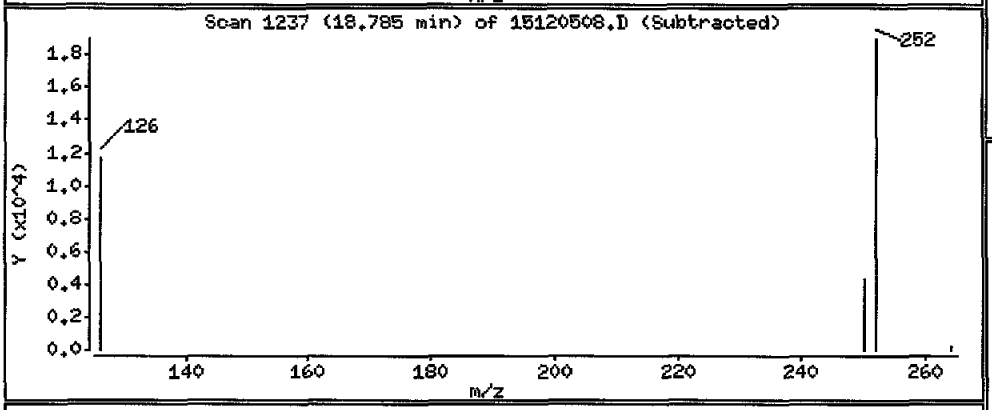
Column phase: Rxi-17Sil MS

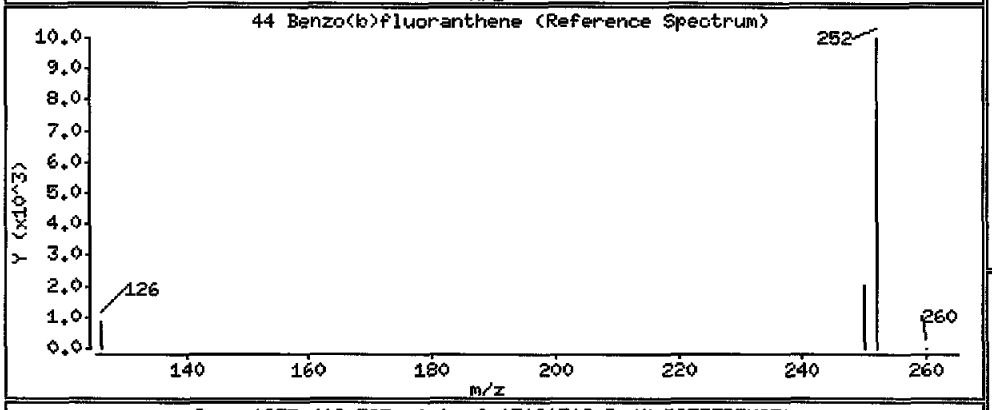
Column diameter: 0.25

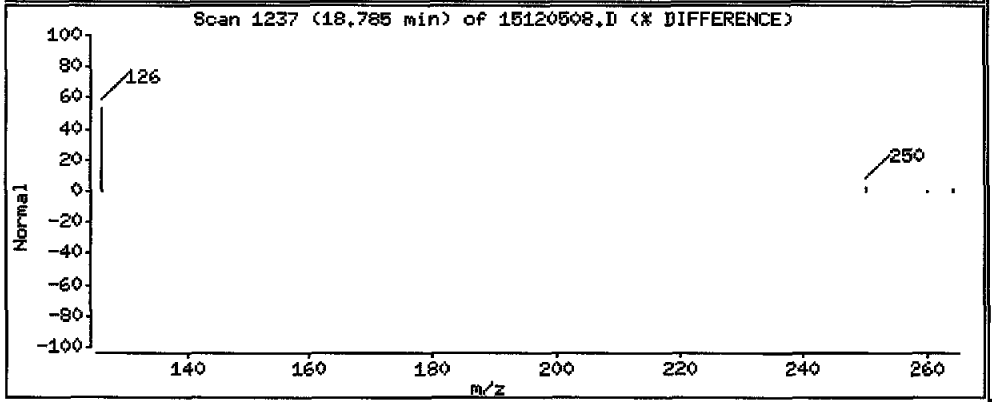
44 Benzo(b)fluoranthene

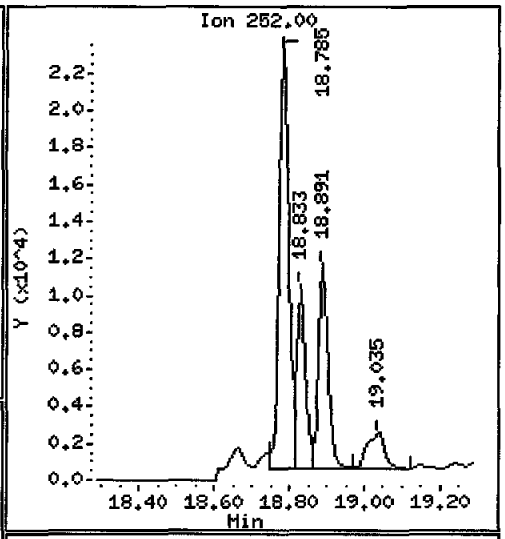
Concentration: 2290 ug/kg

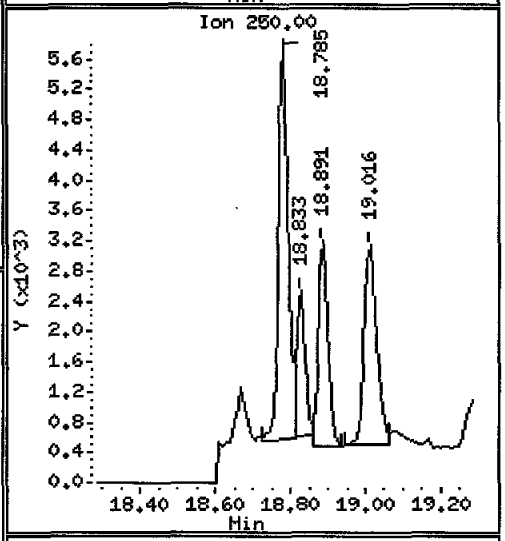


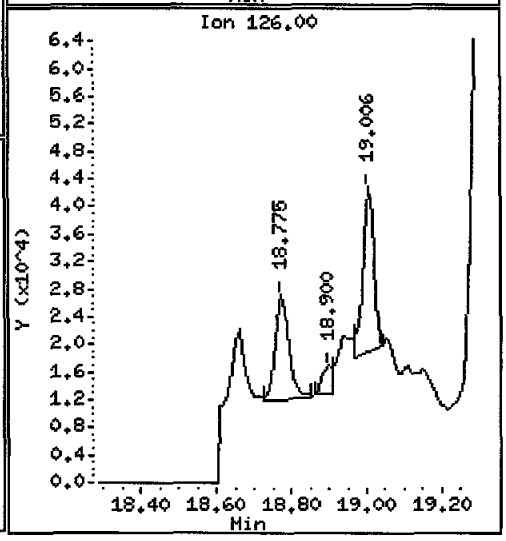












Data File: \\target\share\chem3\nt11.i\20151205.b\15120508.D

Date : 05-DEC-2015 13:45

Client ID: PG-PJ-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9C

Volume Injected (uL): 2.0

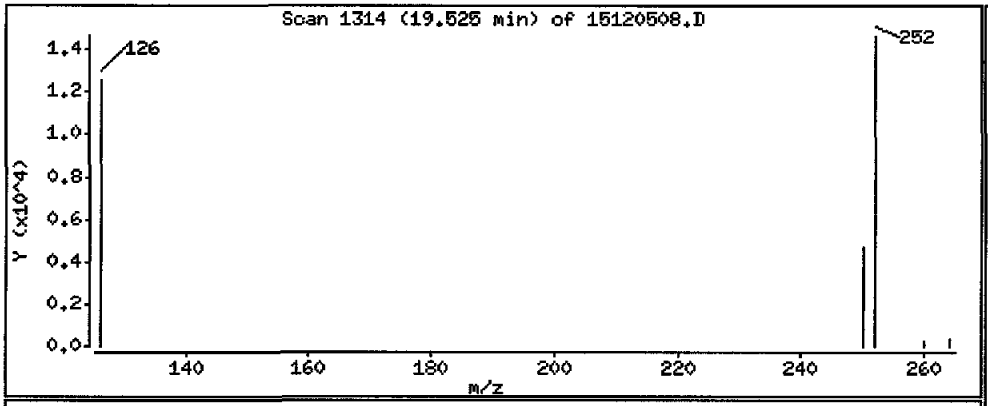
Operator: JW

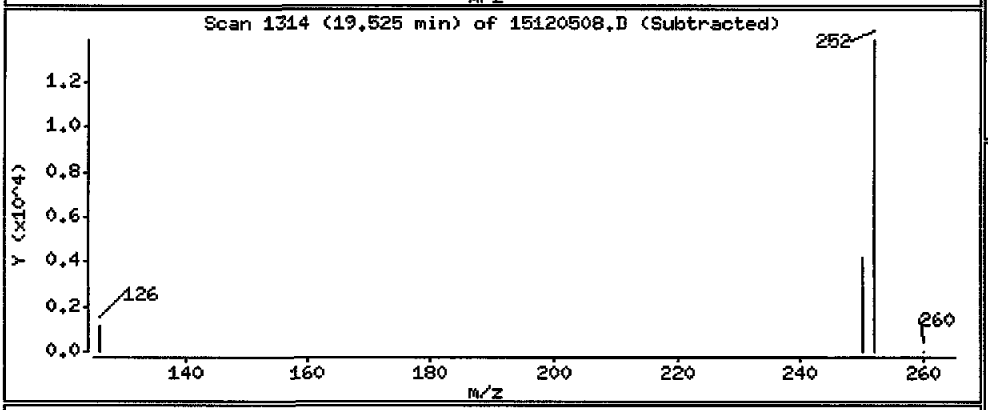
Column phase: Rxi-17Sil MS

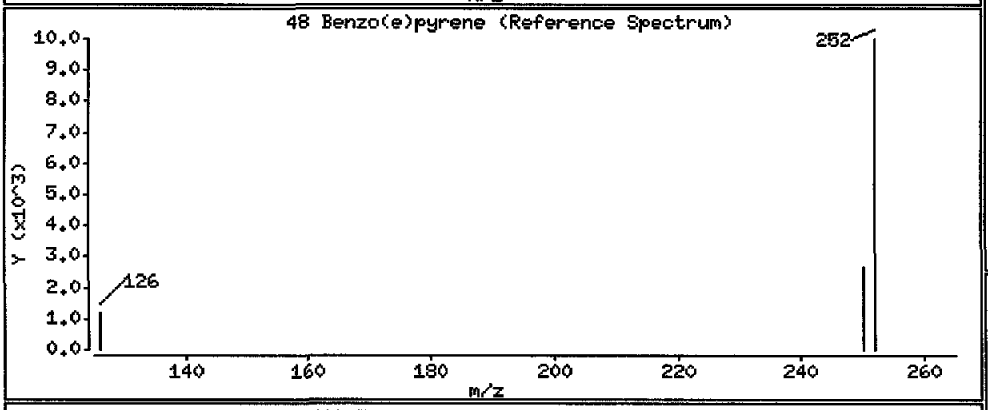
Column diameter: 0.25

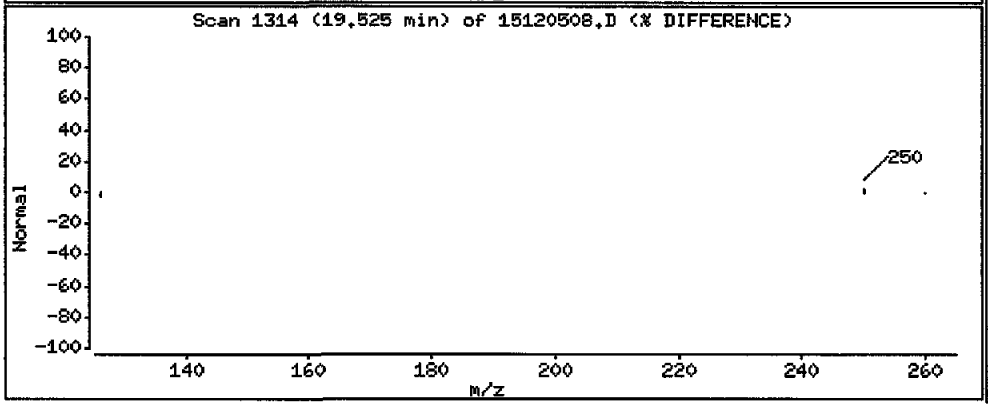
48 Benzo(e)pyrene

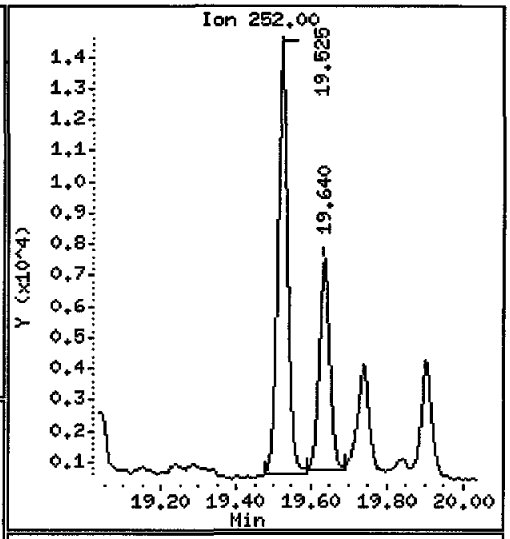
Concentration: 1440 ug/kg

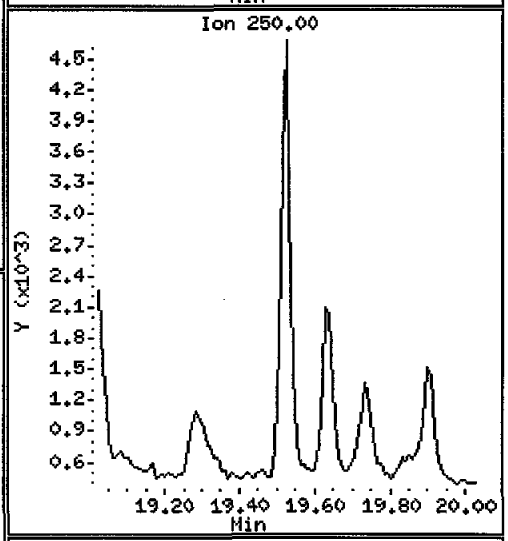


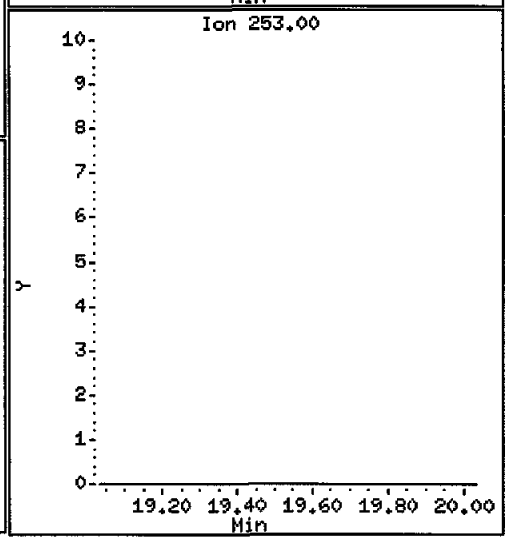












Lab ID: AQJ9C
nt11.i, 20151205.b\lowsim.m, 05-DEC-2015 13:45

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151205.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151205.b\15120509.D
Lab Smp Id: AQJ9E Client Smp ID: PG-WS-1-PEMD-151109
Inj Date : 05-DEC-2015 14:15 MS Autotune Date: 23-APR-2014 12:54
Operator : JW Inst ID: nt11.i
Smp Info : AQJ9E
Misc Info : 15-21392
Comment :
Method : \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Meth Date : 14-Dec-2015 10:43 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 9
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	100.000	Volume of final extract (uL)
Ws	0.89000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

JW 12/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)
*	4 Naphthalene-d8	136	6.587	6.597	(1.000)	324170	200.000	
	5 Naphthalene	128	6.618	6.629	(1.005)	317961	169.809	19100 B
$	6 2-Methylnaphthalene-d10	152	7.564	7.574	(1.148)	178156	148.063	16600
	7 2-Methylnaphthalene	142	7.616	7.627	(1.156)	124036	96.4085	10800
	8 1-Methylnaphthalene	142	7.879	7.889	(1.196)	72574	62.5938	7030
	10 Acenaphthylene	152	Compound Not Detected.					
*	11 Acenaphthene-d10	164	9.589	9.600	(1.000)	268869	200.000	
	12 Acenaphthene	153	9.656	9.656	(1.007)	185368	128.704	14500
	14 Dibenzofuran	168	9.855	9.866	(1.028)	173697	80.0563	9000
	15 Fluorene	166	10.475	10.486	(1.092)	243173	149.442	16800
*	18 Phenanthrene-d10	188	12.269	12.269	(1.000)	444544	200.000	
	19 Phenanthrene	178	12.313	12.313	(1.004)	1690671	631.247	70900
	20 Anthracene	178	12.368	12.368	(1.008)	156332	65.2101	7330
$	23 Fluoranthene-d10	212	14.374	14.374	(1.172)	448561	183.482	20600
	24 Fluoranthene	202	14.403	14.403	(1.174)	1631259	606.645	68200
	25 Pyrene	202	14.903	14.903	(0.876)	946112	361.675	40600
	28 Benzo(a)anthracene	228	16.926	16.918	(0.995)	96765	43.9376	4940
*	29 Chrysene-d12	240	17.017	17.017	(1.000)	330321	200.000	
	30 Chrysene	228	17.067	17.059	(1.003)	121677	50.3394	5660
	44 Benzo(b)fluoranthene	252	18.784	18.784	(0.947)	33773	16.5959	1860
	45 Benzo(k)fluoranthene	252	Compound Not Detected.					

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	FINAL (ug/kg)
46	Benzo(j)fluoranthene	252	Compound Not Detected.					
34	Benzo(a)pyrene	252	Compound Not Detected.					
* 35	Perylene-d12	264	19.841	19.841	(1.000)	300363	200.000	
$ 36	Dibenzo(a,h)anthracene-d14	292	22.207	22.208	(1.119)	183649	151.486	17000
37	Indeno(1,2,3-cd)pyrene	276	Compound Not Detected.					
38	Dibenzo(a,h)anthracene	278	Compound Not Detected.					
39	Benzo(g,h,i)perylene	276	Compound Not Detected.					
47	Perylene	252	Compound Not Detected.					
48	Benzo(e)pyrene	252	19.524	19.524	(0.984)	21802	10.6007	1190

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120509.D
Lab Smp Id: AQJ9E
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21392

Calibration Date: 05-DEC-2015
Calibration Time: 10:30
Client Smp ID: PG-WS-1-PEMD-1!
Level: LOW
Sample Type: Tissue

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	324170	-1.14
11 Acenaphthene-d10	239179	119590	478358	268869	12.41
18 Phenanthrene-d10	372253	186127	744506	444544	19.42
29 Chrysene-d12	294711	147356	589422	330321	12.08
35 Perylene-d12	260595	130298	521190	300363	15.26

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.59	-0.16
11 Acenaphthene-d10	9.60	9.10	10.10	9.59	-0.12
18 Phenanthrene-d10	12.27	11.77	12.77	12.27	-0.00
29 Chrysene-d12	17.02	16.52	17.52	17.02	-0.00
35 Perylene-d12	19.84	19.34	20.34	19.84	-0.00

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.

ARI Labs, Inc.

RECOVERY REPORT

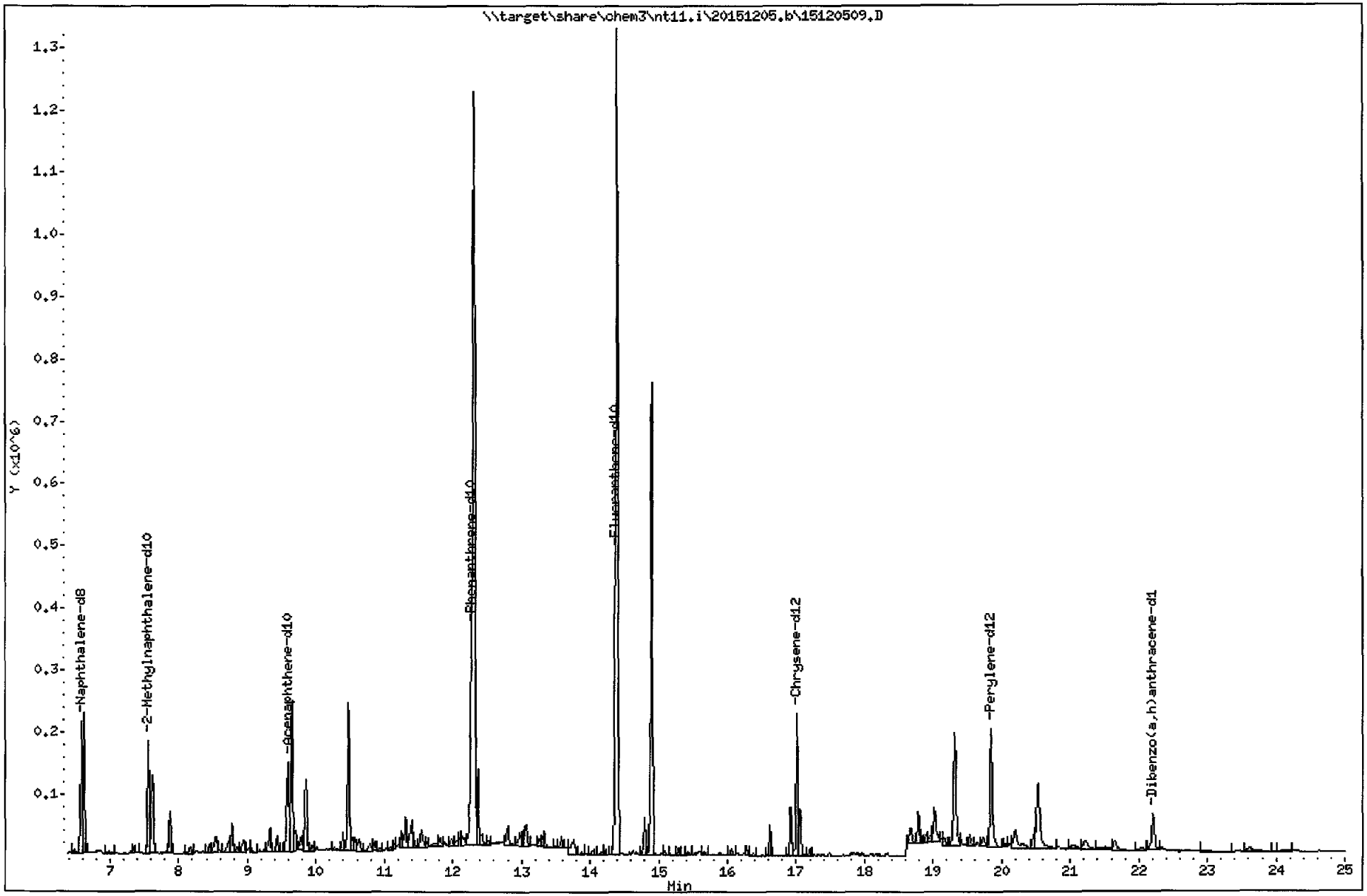
Client Name: Anchor QEA, LLC
Client SDG: AQJ9
Sample Matrix: SOLID
Fraction: SV
Lab Smp Id: AQJ9E
Client Smp ID: PG-WS-1-PEMD-151109
Level: LOW
Operator: JW
Data Type: MS DATA
SampleType: SAMPLE
SpikeList File: waterlcs.spk
Quant Type: ISTD
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21392

SURROGATE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
$ 6 2-Methylnaphthalen	33700	16600	49.35	30-160
$ 23 Fluoranthene-d10	33700	20600	61.16	30-160
$ 36 Dibenzo(a,h)anthra	33700	17000	50.50	30-160

Data File: \\target\share\chem3\nt11.i\20151205.b\15120509.D
Date : 05-DEC-2015 14:15
Client ID: PG-WS-1-PEMD-151109
Sample Info: AQJ9E
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: JW
Column diameter: 0.25

AQJ9:00216



Data File: \\target\share\chem3\nt11.i\20151205.b\15120509.D

Date : 05-DEC-2015 14:15

Client ID: PG-WS-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9E

Volume Injected (uL): 2.0

Operator: JW

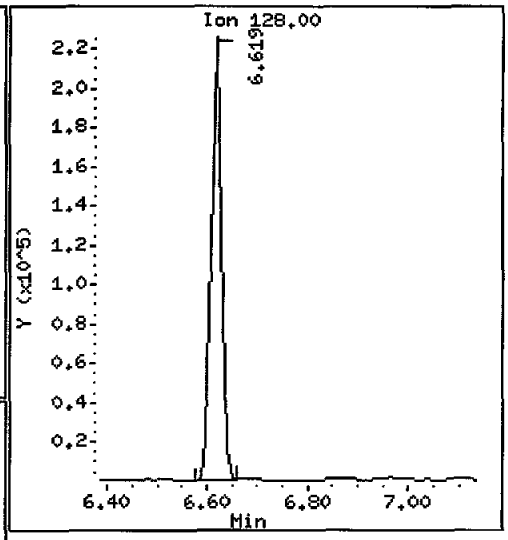
Column phase: Rxi-17Sil MS

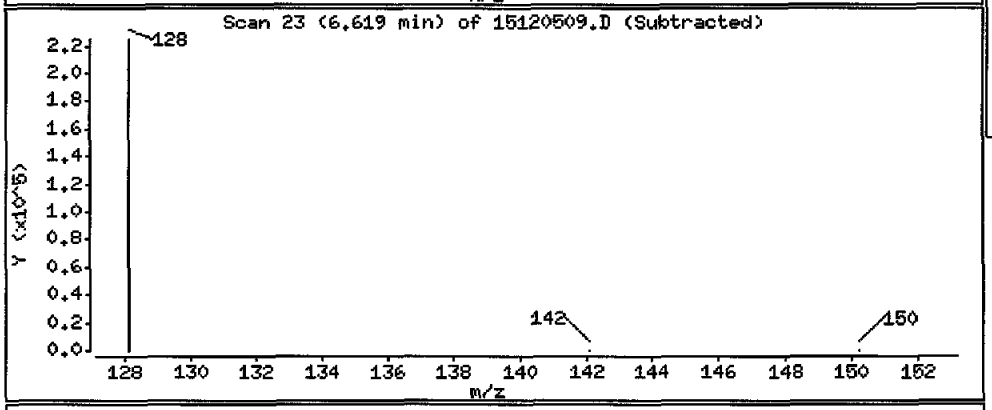
Column diameter: 0.25

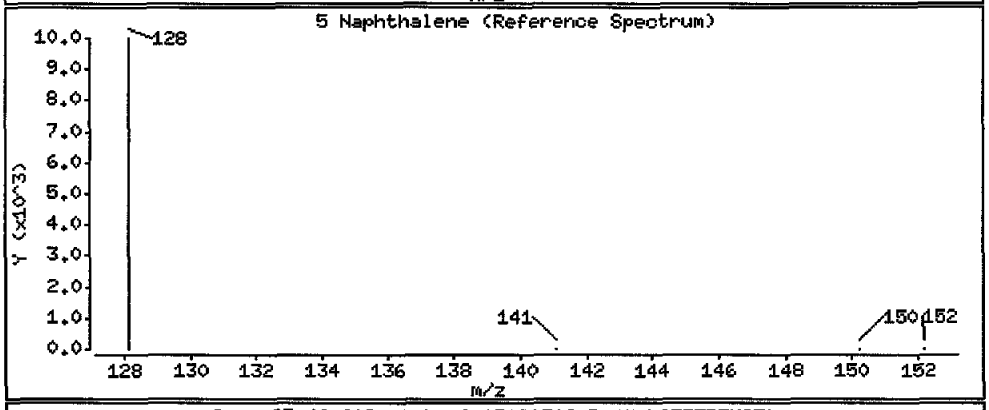
5 Naphthalene

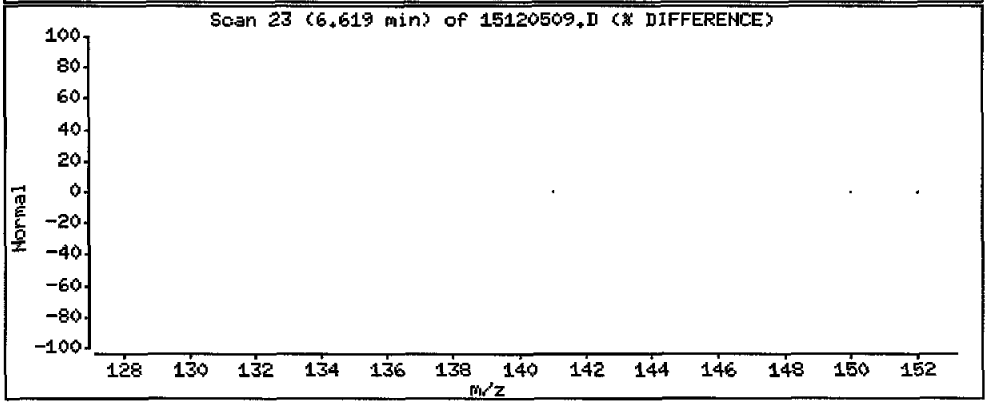
Concentration: 19100 ug/kg

B









Data File: \\target\share\chem3\nt11.i\20151205.b\15120509.D

Date : 05-DEC-2015 14:15

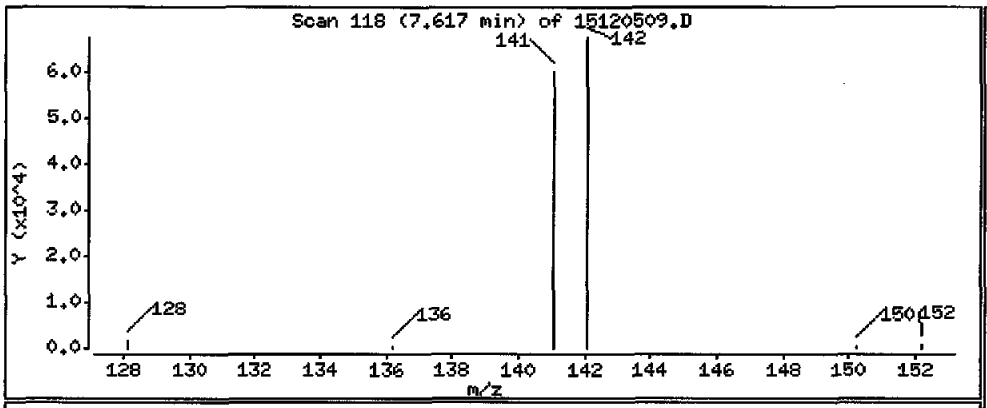
Client ID: PG-WS-1-PEMD-151109 Instrument: nt11.i

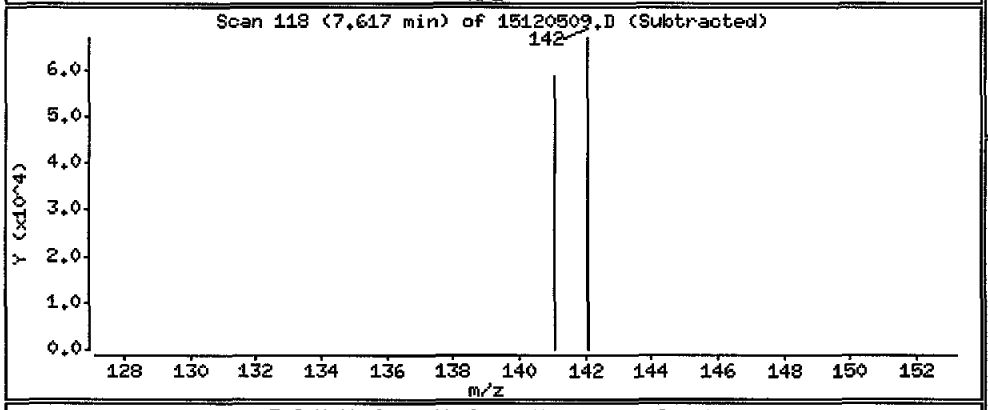
Sample Info: AQJ9E

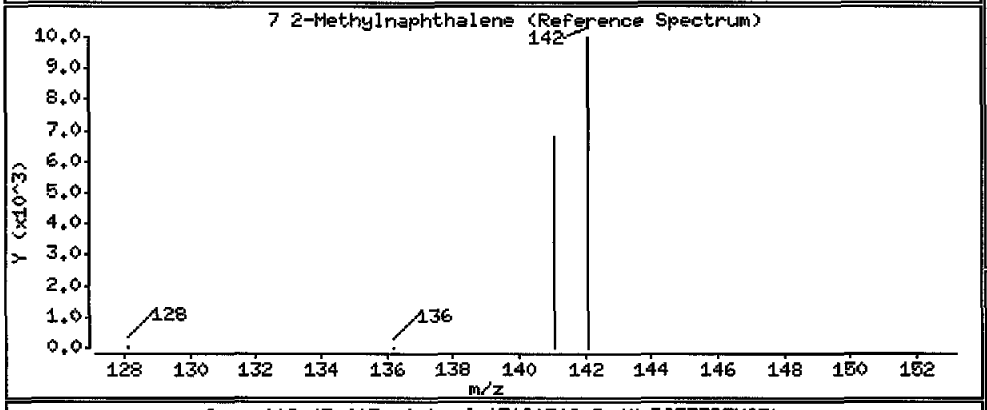
Volume Injected (uL): 2.0 Operator: JW

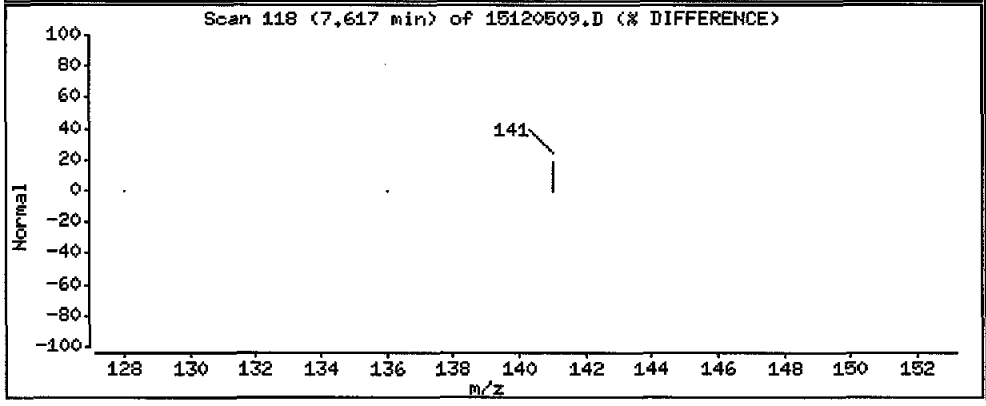
Column phase: Rxi-17Sil MS Column diameter: 0.25

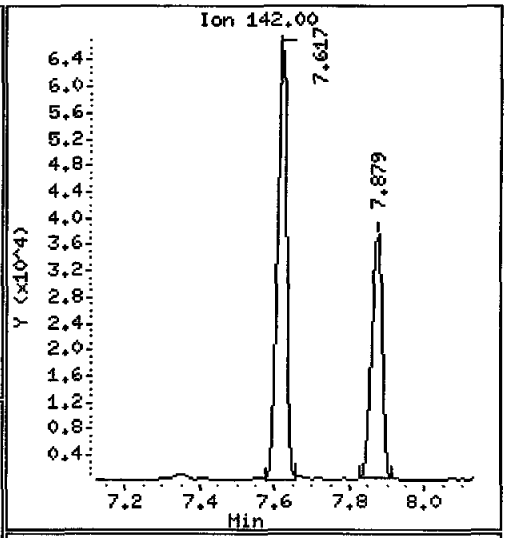
7 2-Methylnaphthalene Concentration: 10800 ug/kg

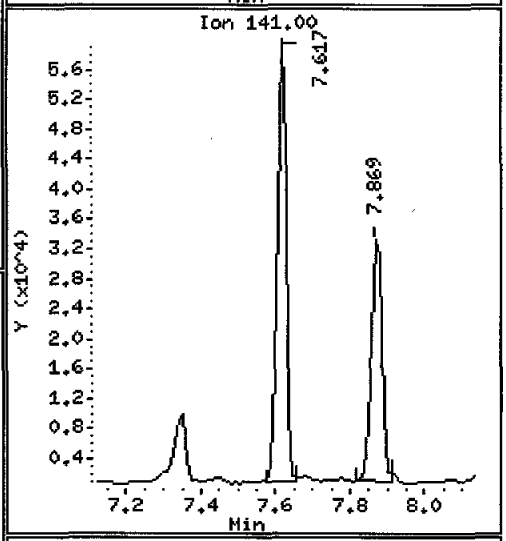


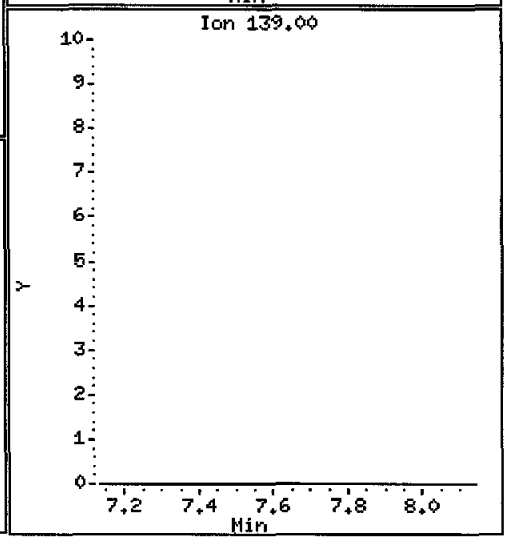












Data File: \\target\share\chem3\nt11.i\20151205.b\15120509.D

Date : 05-DEC-2015 14:15

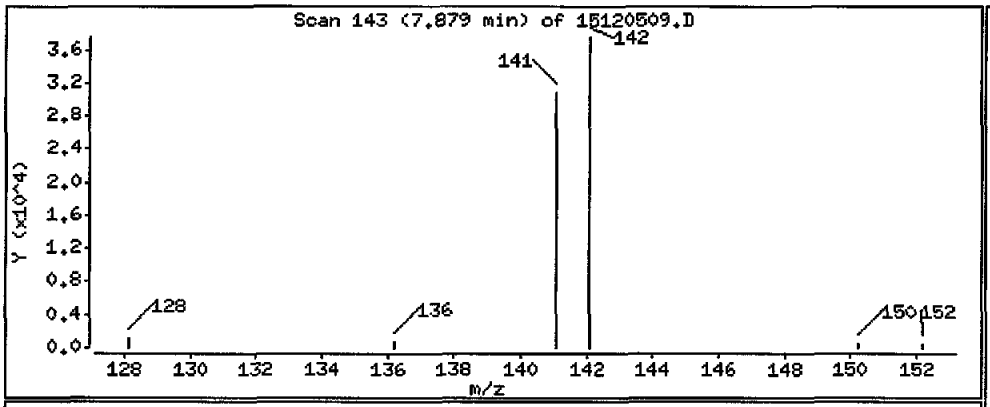
Client ID: PG-WS-1-PEMD-151109 Instrument: nt11.i

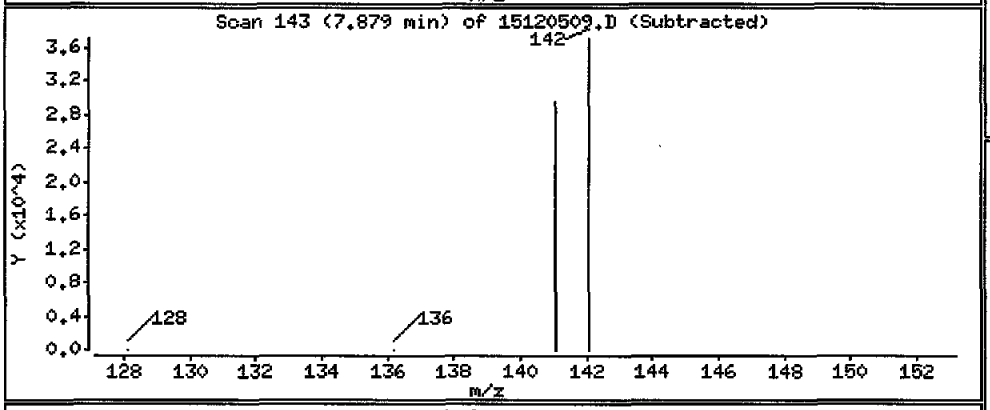
Sample Info: AQJ9E

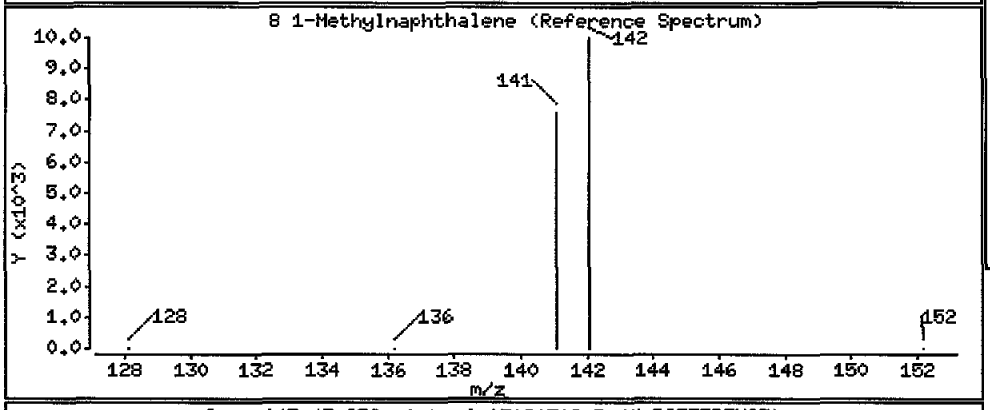
Volume Injected (uL): 2.0 Operator: JW

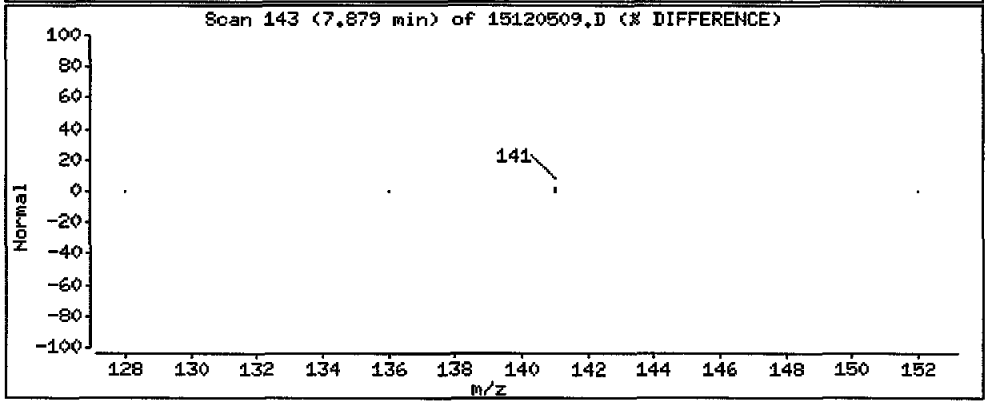
Column phase: Rxi-17Sil MS Column diameter: 0.25

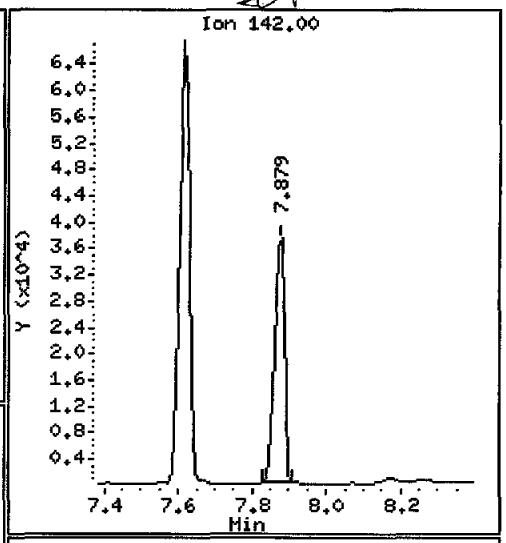
8 1-Methylnaphthalene Concentration: 7030 ug/kg

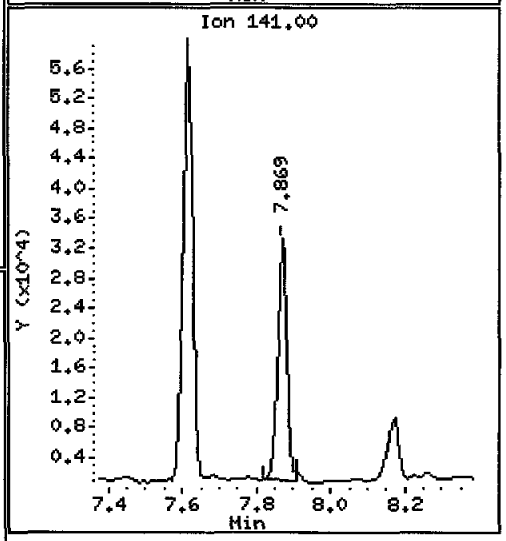












Data File: \\target\share\chem3\nt11.i\20151205.b\15120509.D

Date : 05-DEC-2015 14:15

Client ID: PC-WS-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9E

Volume Injected (uL): 2.0

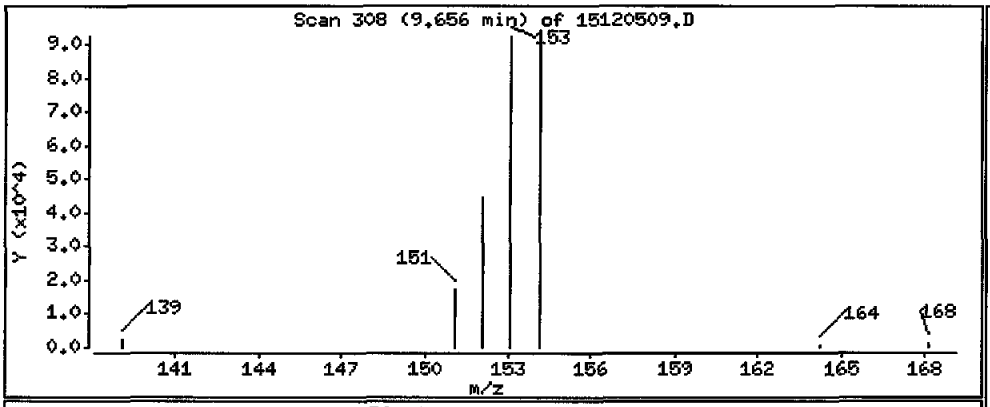
Operator: JW

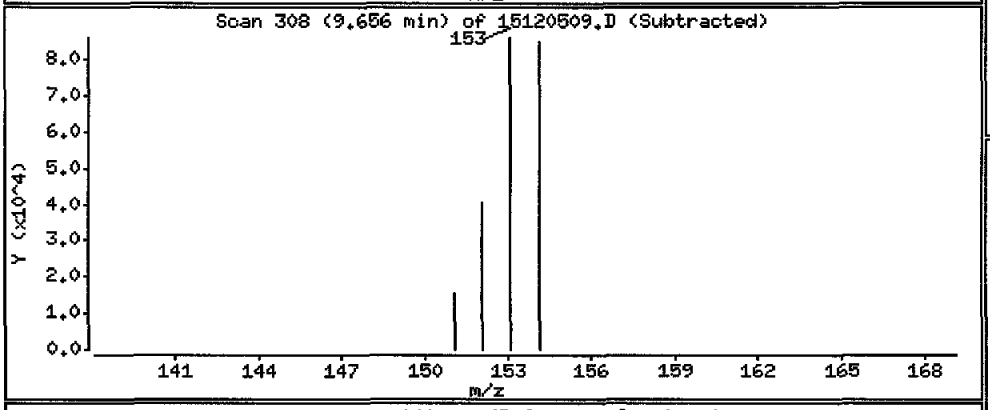
Column phase: Rxi-17Sil MS

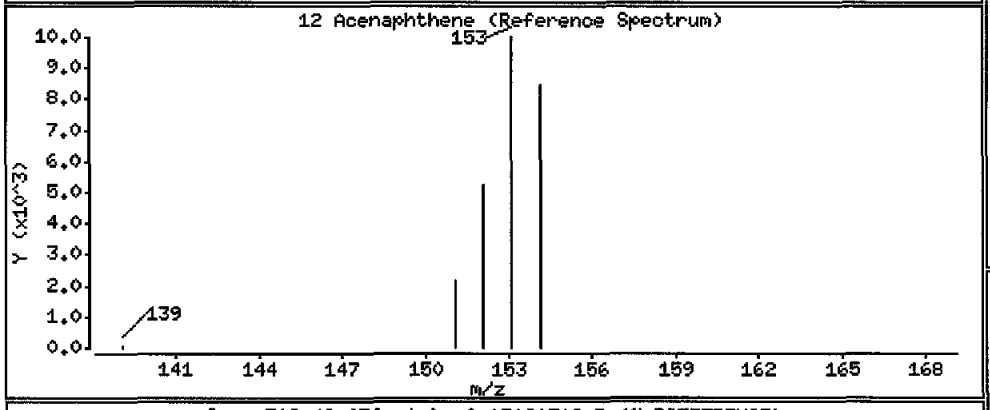
Column diameter: 0.25

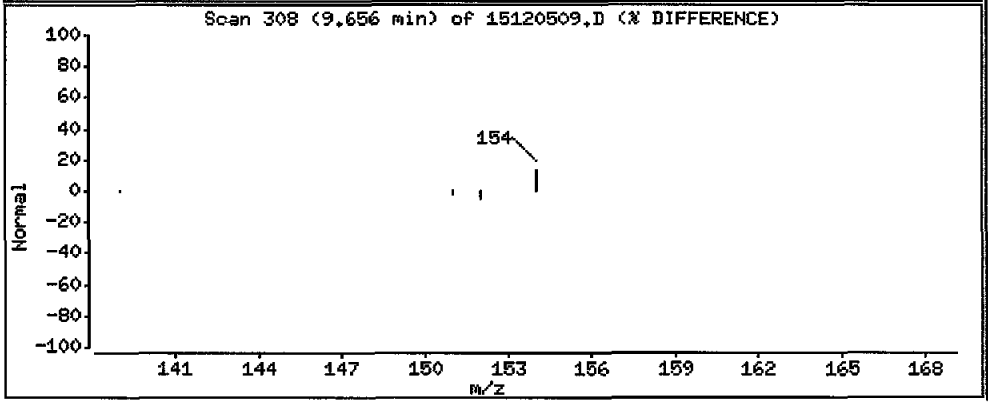
12 Acenaphthene

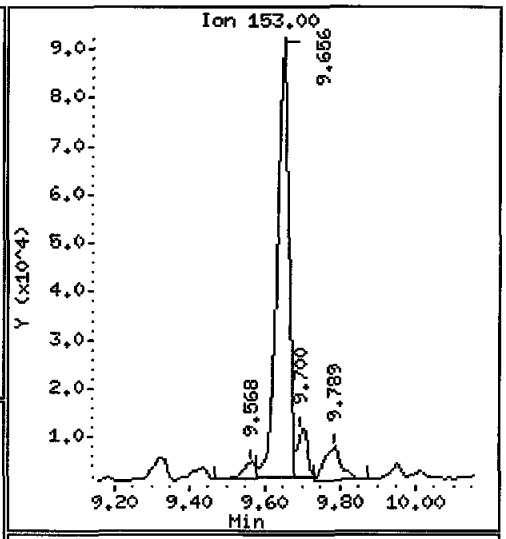
Concentration: 14500 ug/kg

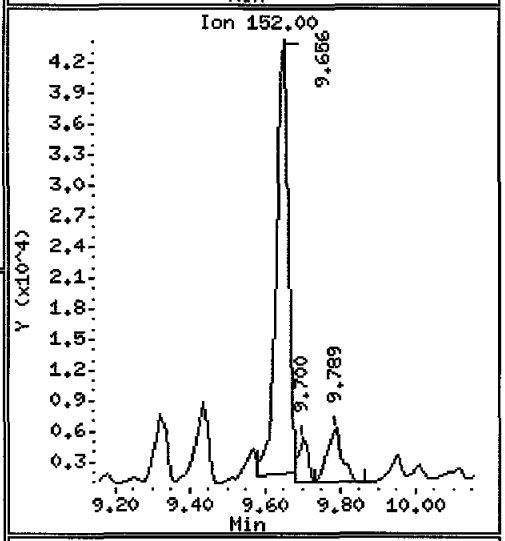


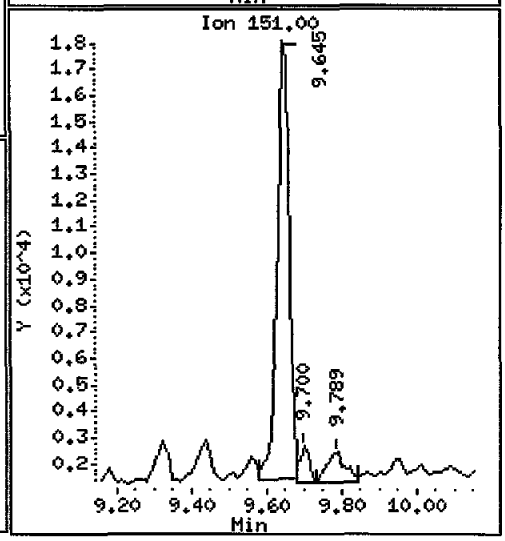












Data File: \\target\share\chem3\nt11.i\20151205.b\15120509.D

Date : 05-DEC-2015 14:15

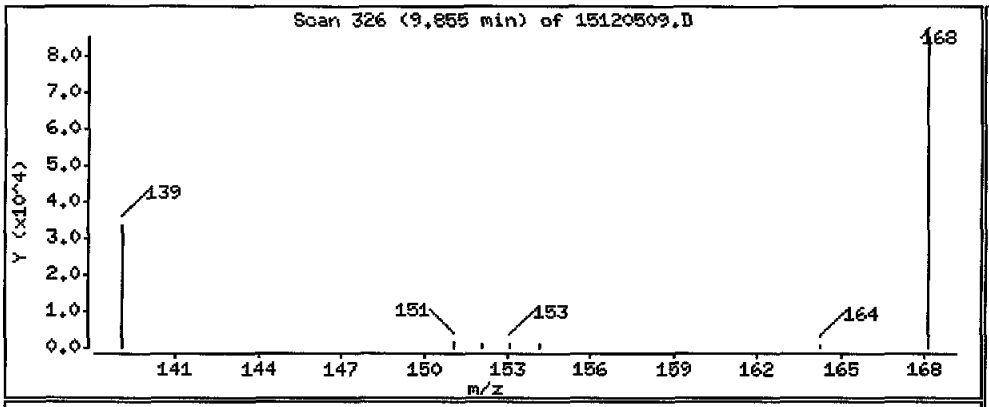
Client ID: PG-WS-1-PEMD-151109 Instrument: nt11.i

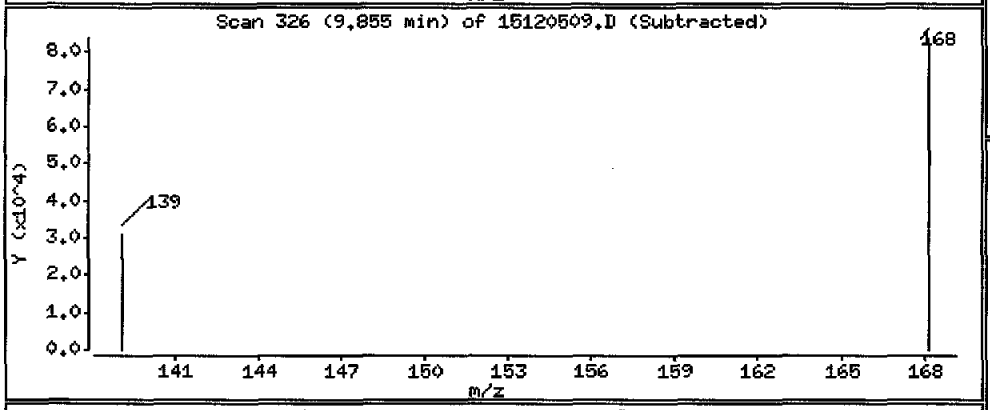
Sample Info: AQJ9E

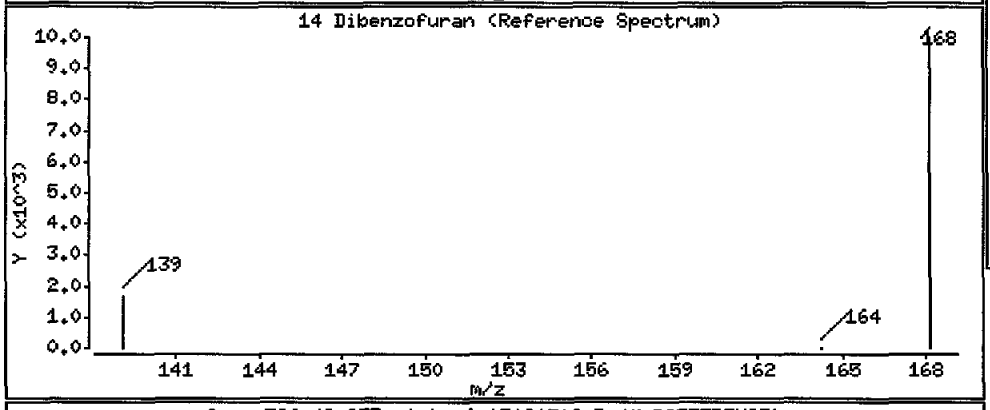
Volume Injected (uL): 2.0 Operator: JW

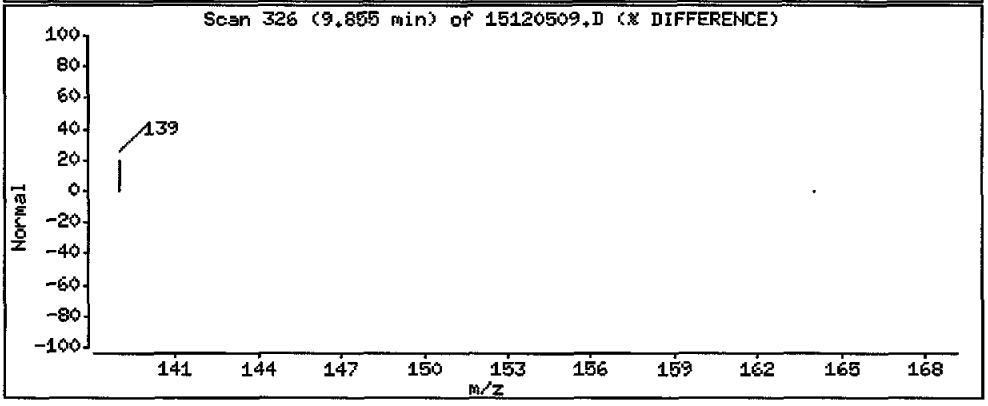
Column phase: Rxi-17Sil MS Column diameter: 0.25

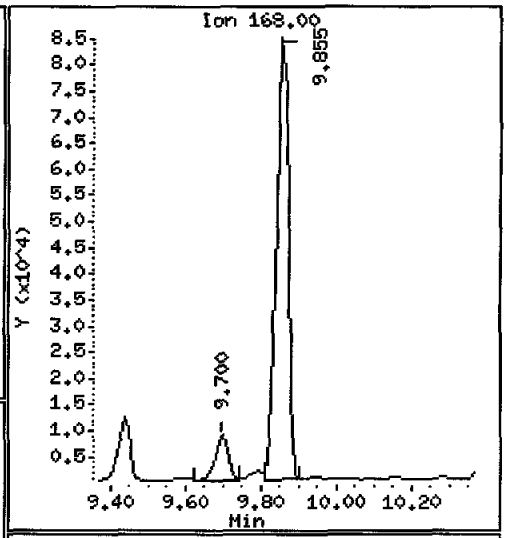
14 Dibenzofuran Concentration: 9000 ug/kg

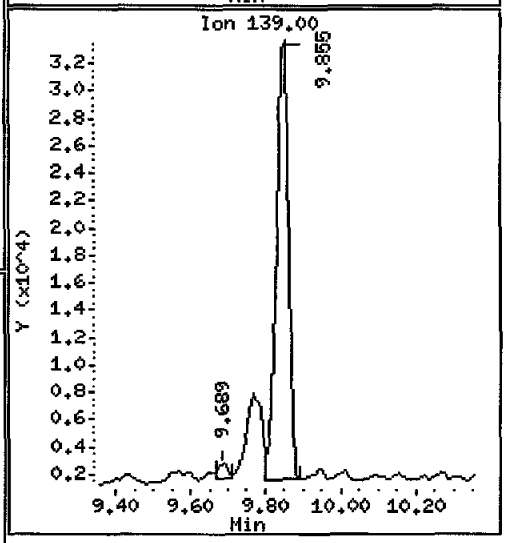












Data File: \\target\share\chem3\nt11.i\20151205.b\15120509.D

Date : 05-DEC-2015 14:15

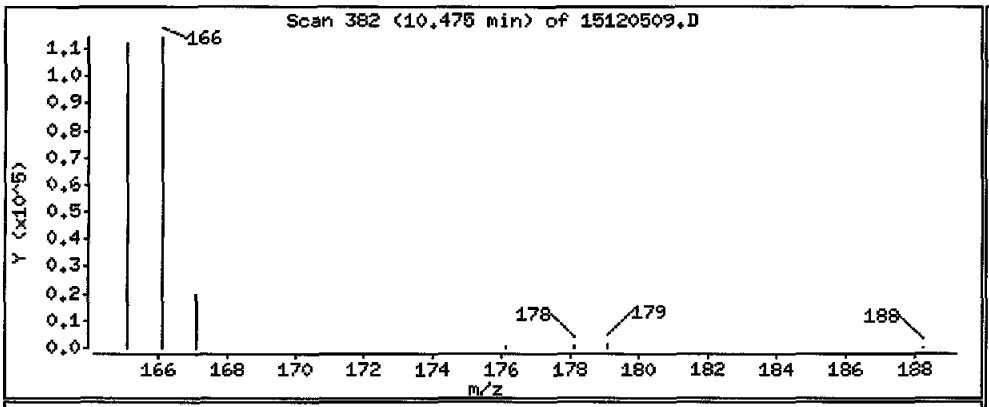
Client ID: PG-WS-1-PEMD-151109 Instrument: nt11.i

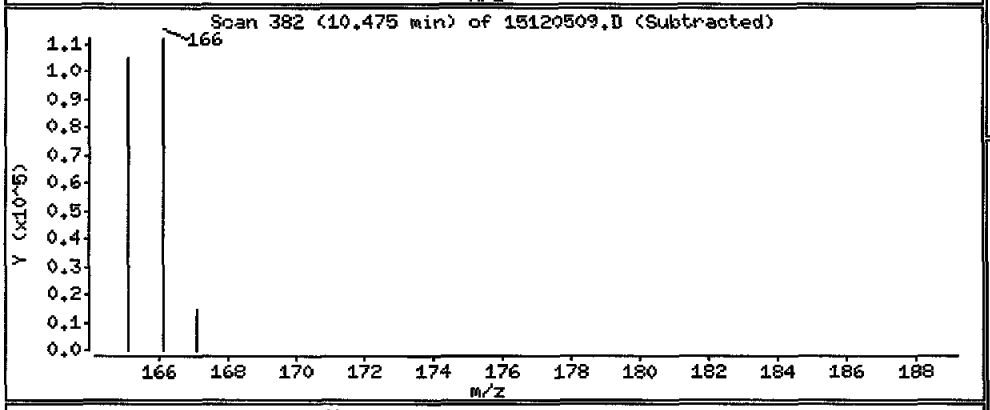
Sample Info: AQJ9E

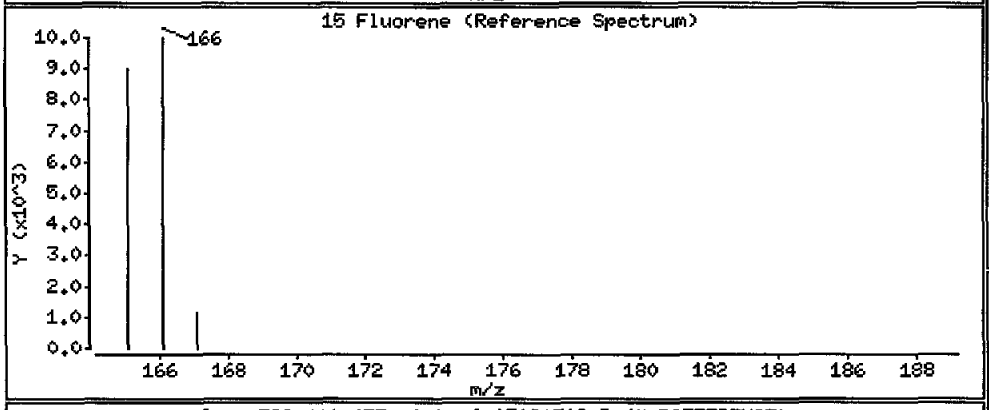
Volume Injected (uL): 2.0 Operator: JW

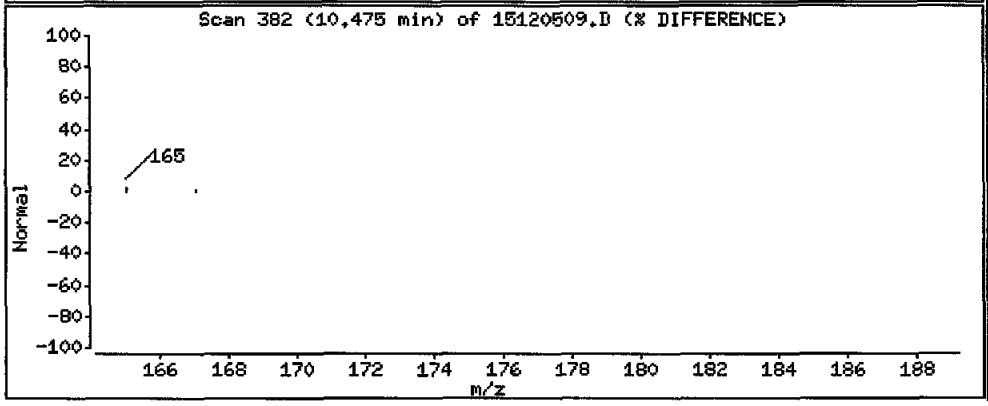
Column phase: Rxi-17Sil MS Column diameter: 0.25

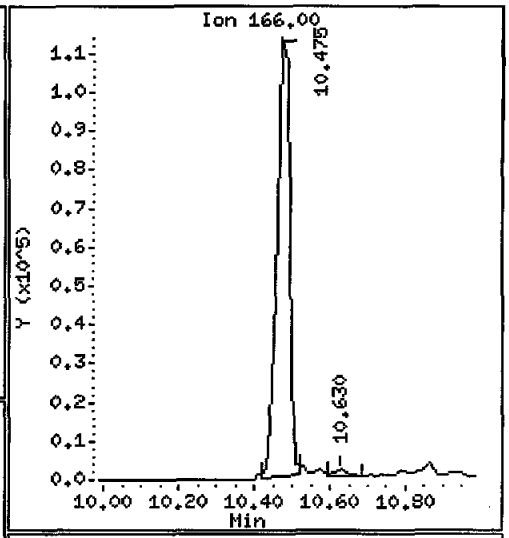
15 Fluorene Concentration: 16800 ug/kg

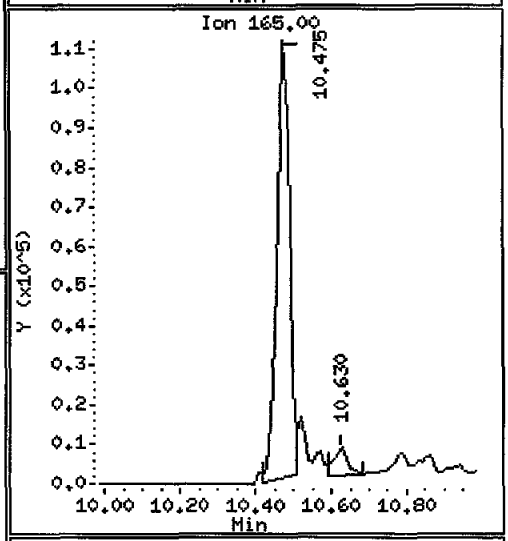


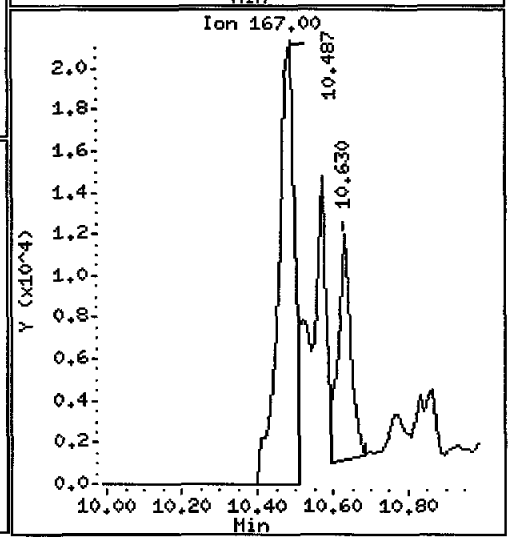












Data File: \\target\share\chem3\nt11.i\20151205.b\15120509.D

Date : 05-DEC-2015 14:15

Client ID: PG-WS-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9E

Volume Injected (uL): 2.0

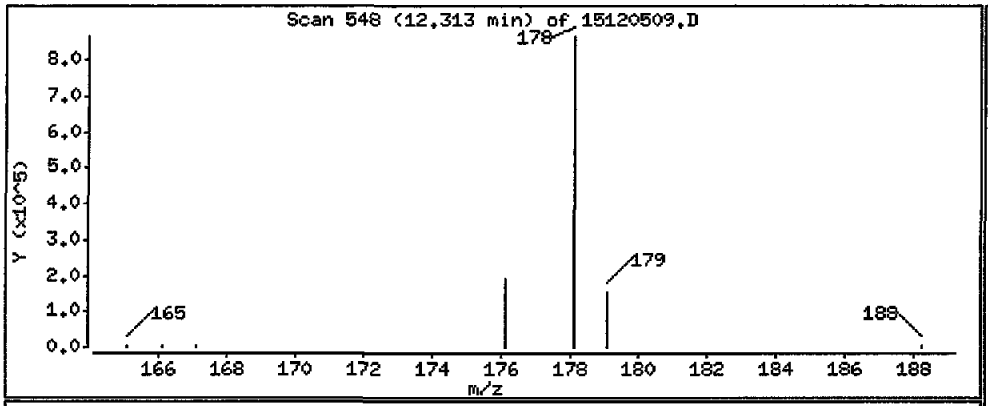
Operator: JW

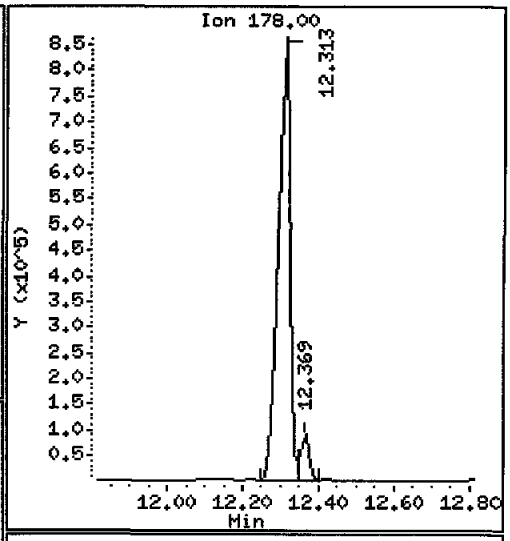
Column phase: Rxi-17Sil MS

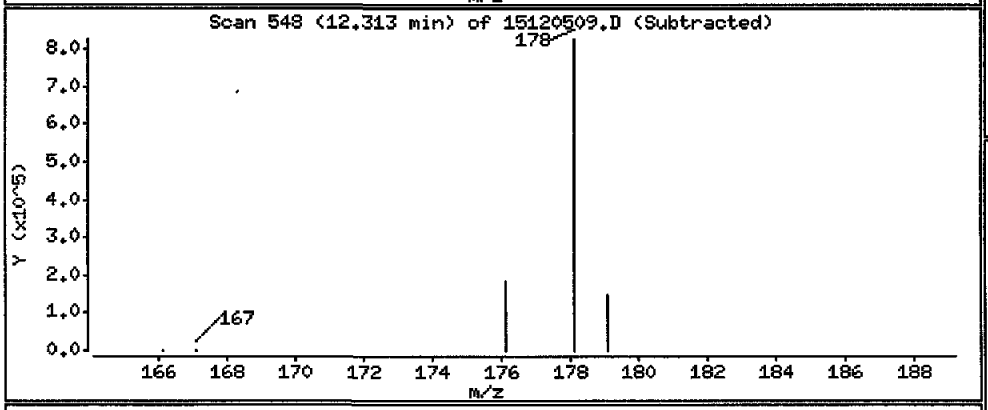
Column diameter: 0.25

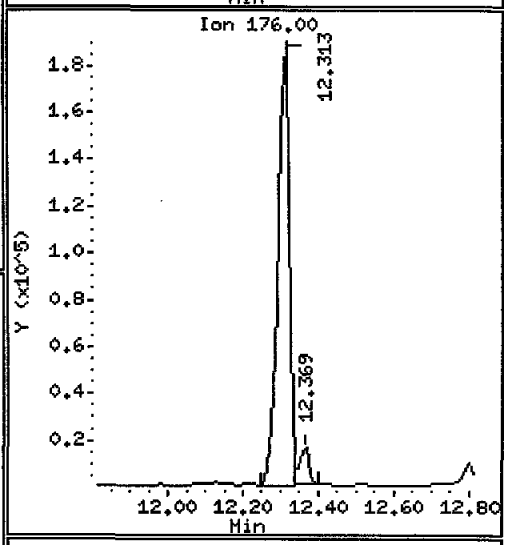
19 Phenanthrene

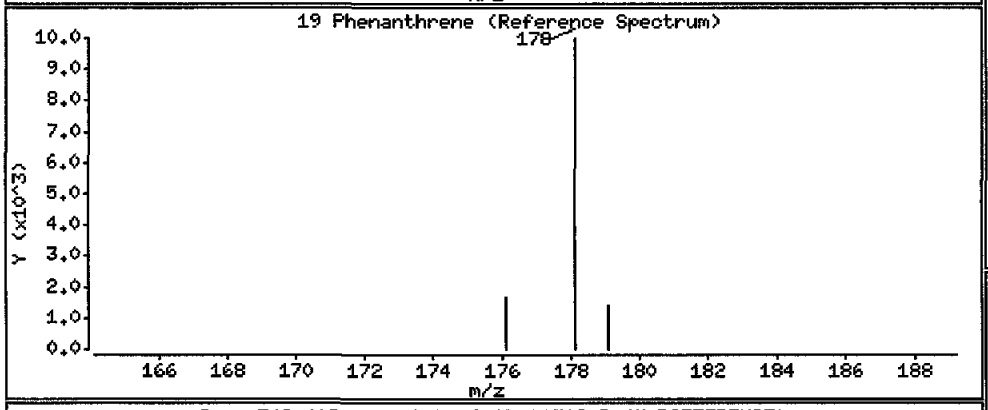
Concentration: 70900 ug/kg

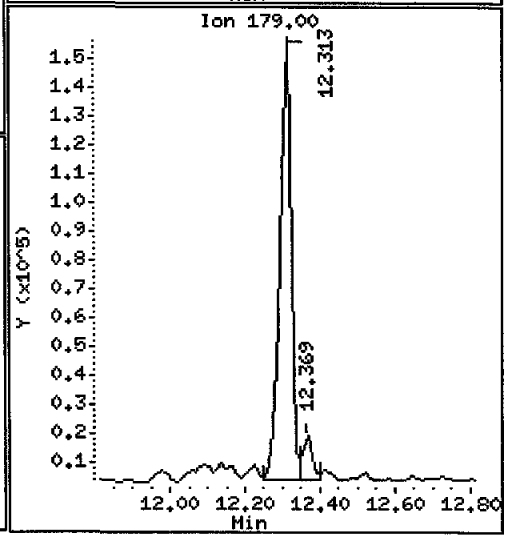


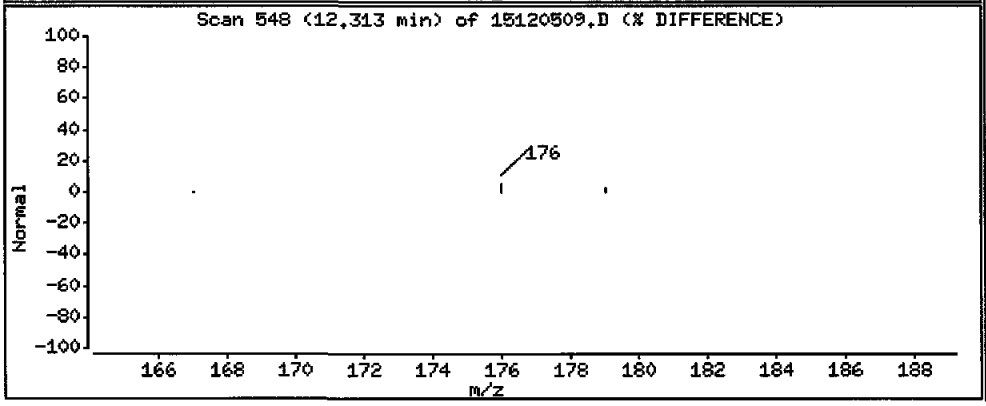












Data File: \\target\share\chem3\nt11.i\20151205.b\15120509.D

Date : 05-DEC-2015 14:15

Client ID: PG-WS-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9E

Volume Injected (uL): 2.0

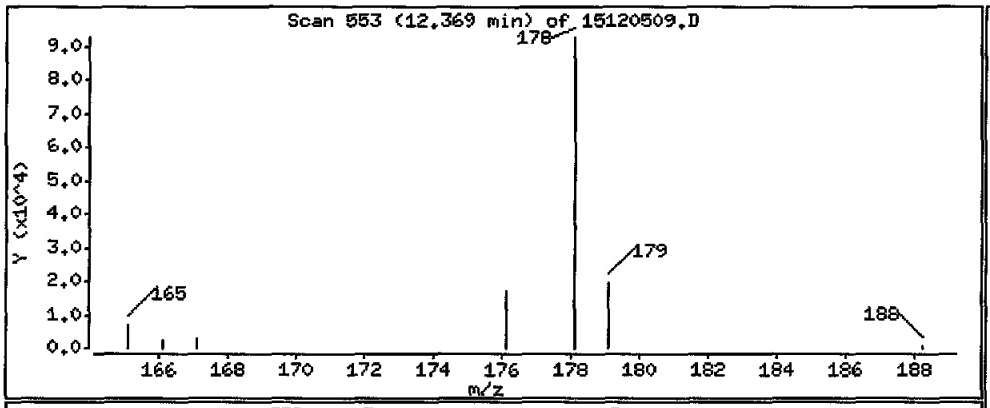
Operator: JW

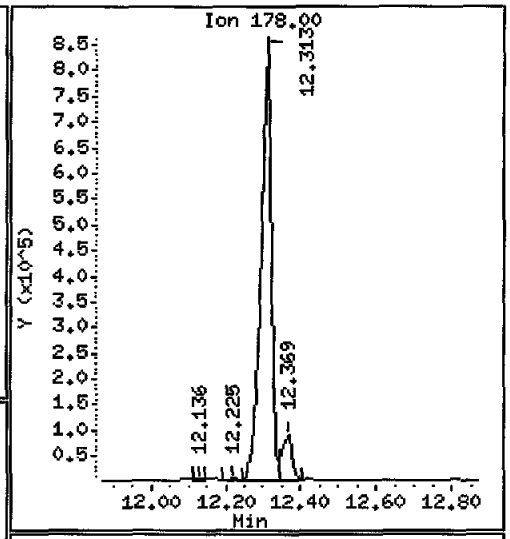
Column phase: Rxi-17Sil MS

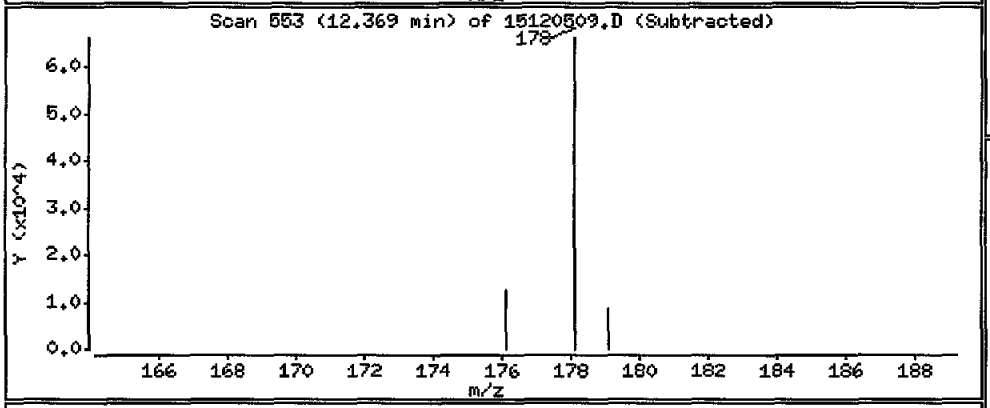
Column diameter: 0.25

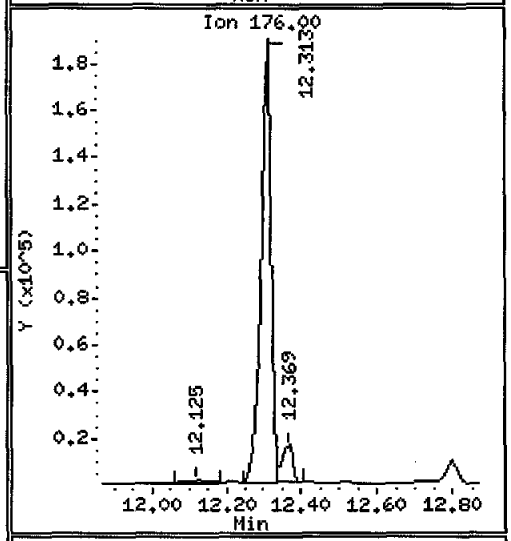
20 Anthracene

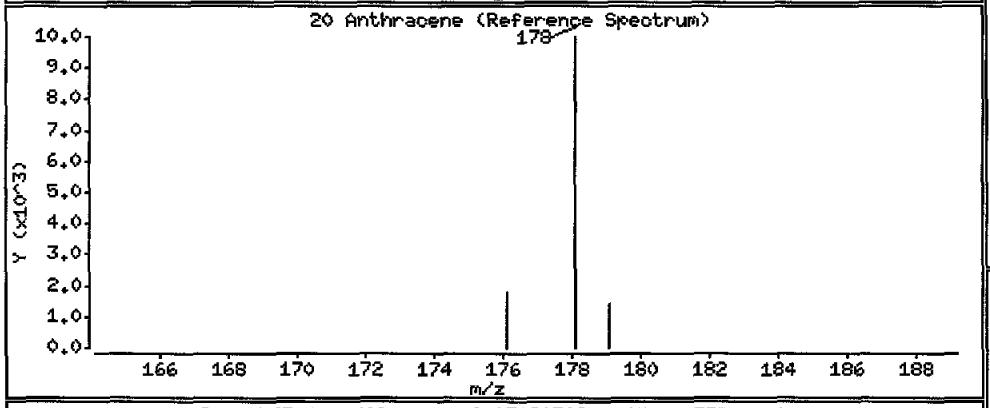
Concentration: 7330 ug/kg

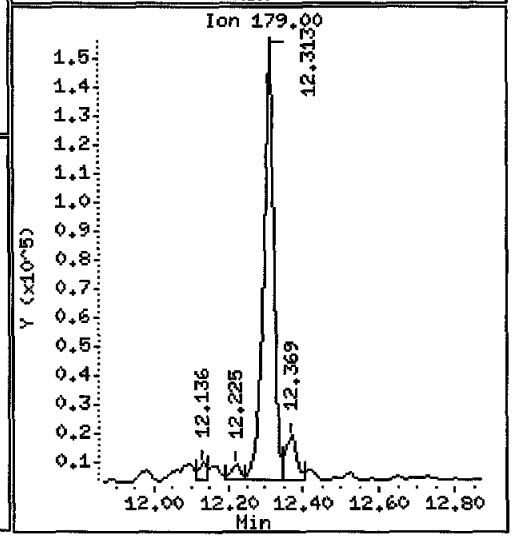


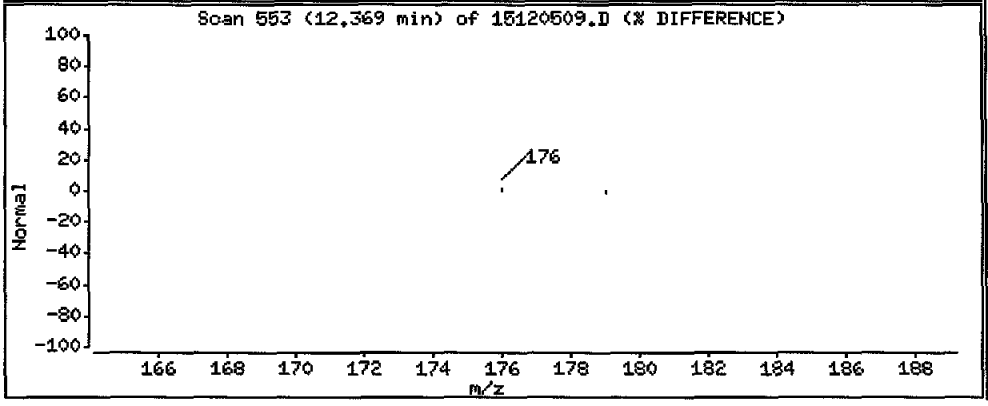












Data File: \\target\share\chem3\nt11.i\20151205.b\15120509.D

Date : 05-DEC-2015 14:15

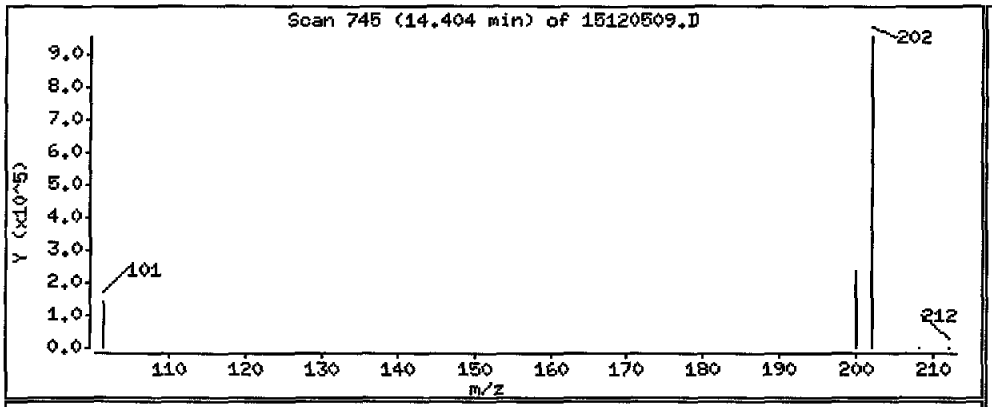
Client ID: PG-WS-1-PEMD-151109 Instrument: nt11.i

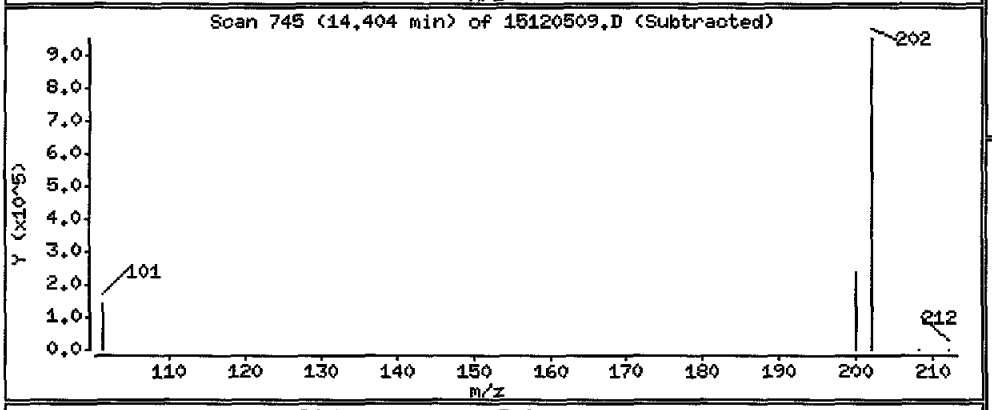
Sample Info: AQJ9E

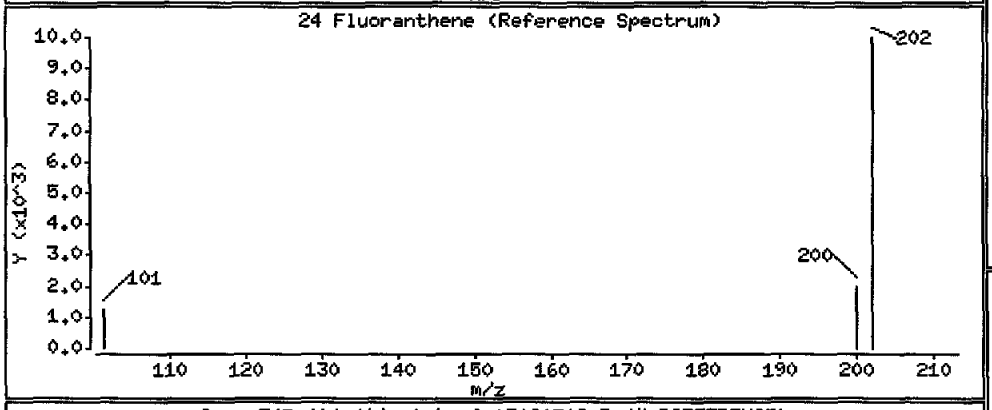
Volume Injected (uL): 2.0 Operator: JW

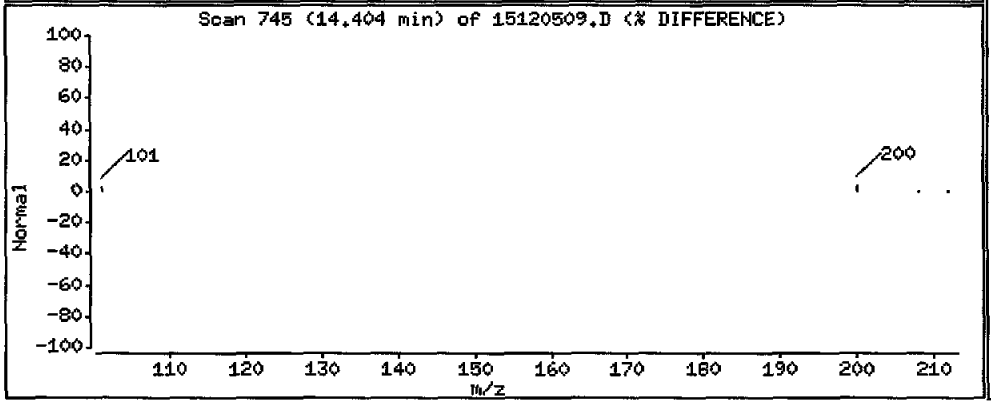
Column phase: Rxi-17Sil MS Column diameter: 0.25

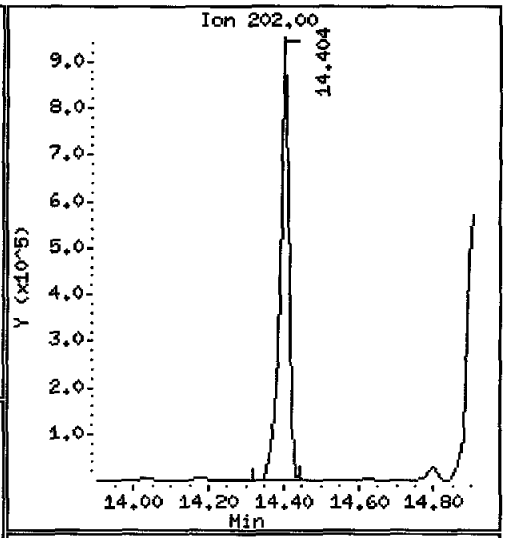
24 Fluoranthene Concentration: 68200 ug/kg

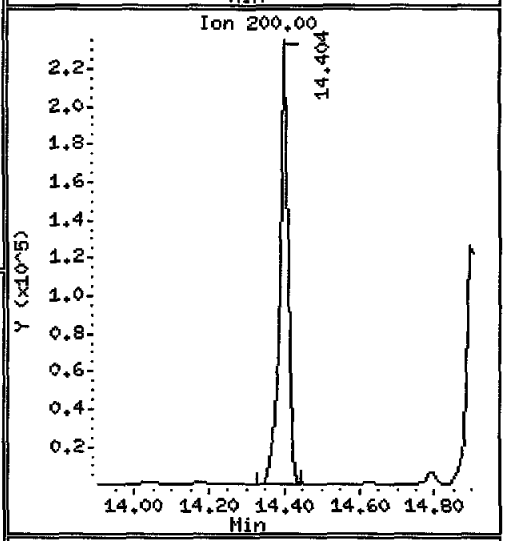


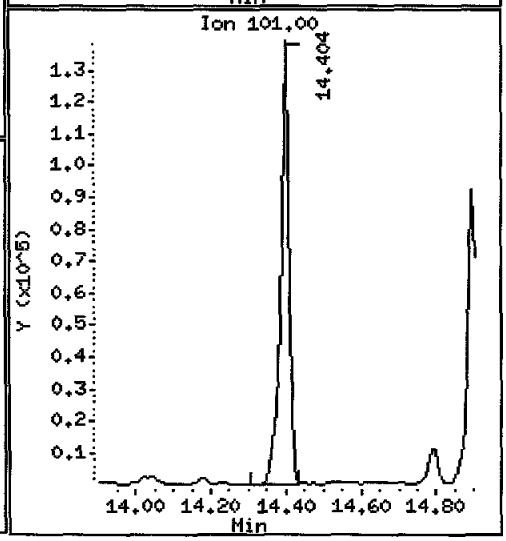












Data File: \\target\share\chem3\nt11.i\20151205.b\15120509.D

Date : 05-DEC-2015 14:15

Client ID: PG-WS-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9E

Volume Injected (uL): 2.0

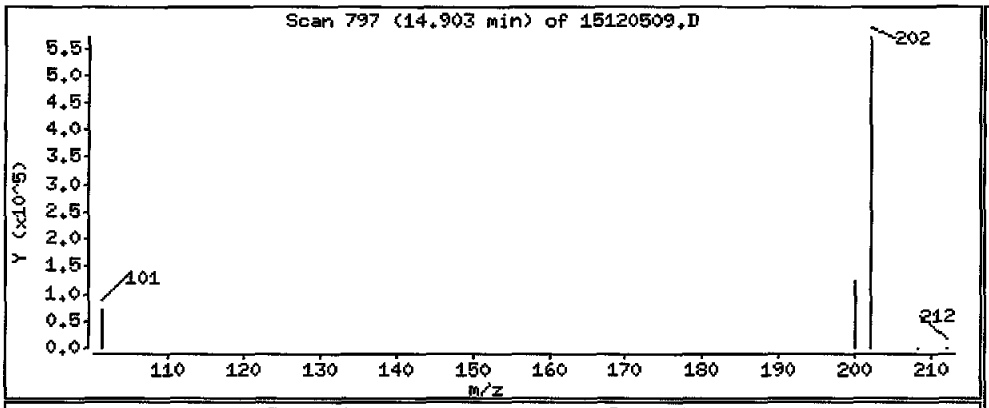
Operator: JW

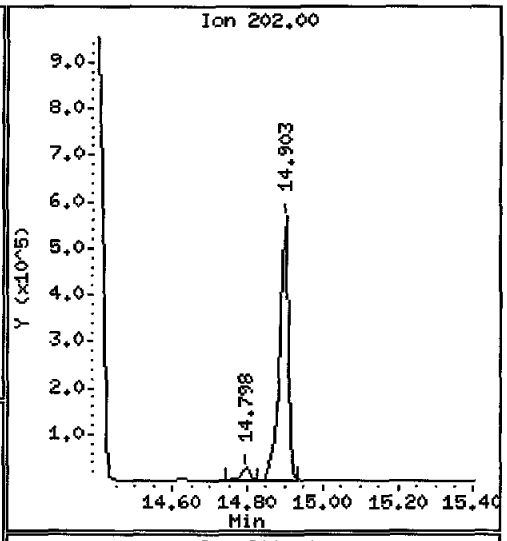
Column phase: Rxi-17Sil MS

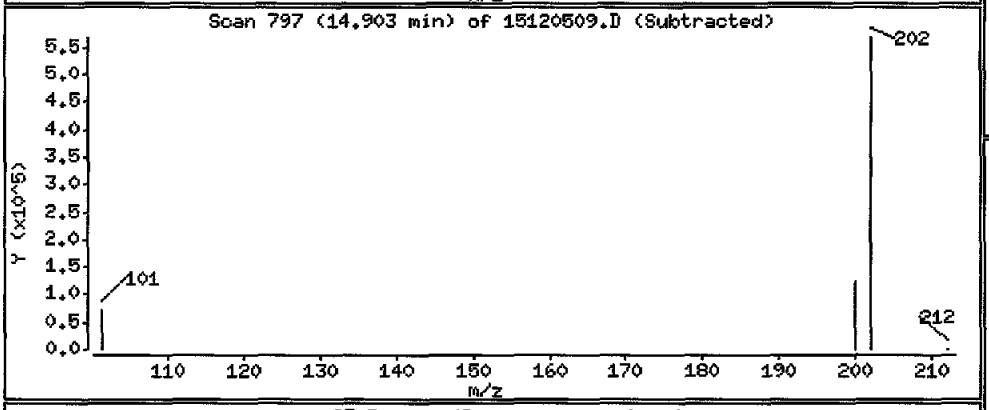
Column diameter: 0.25

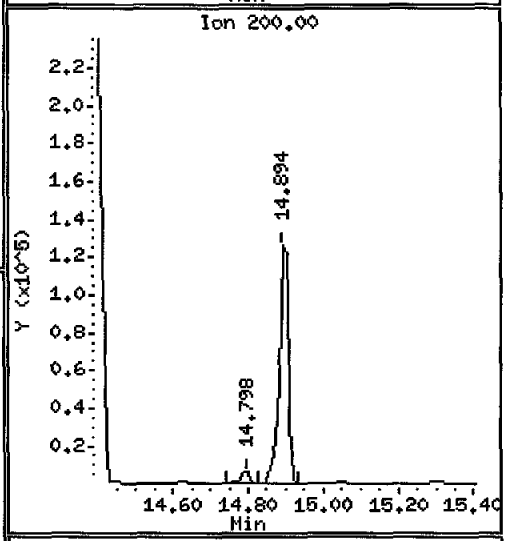
25 Pyrene

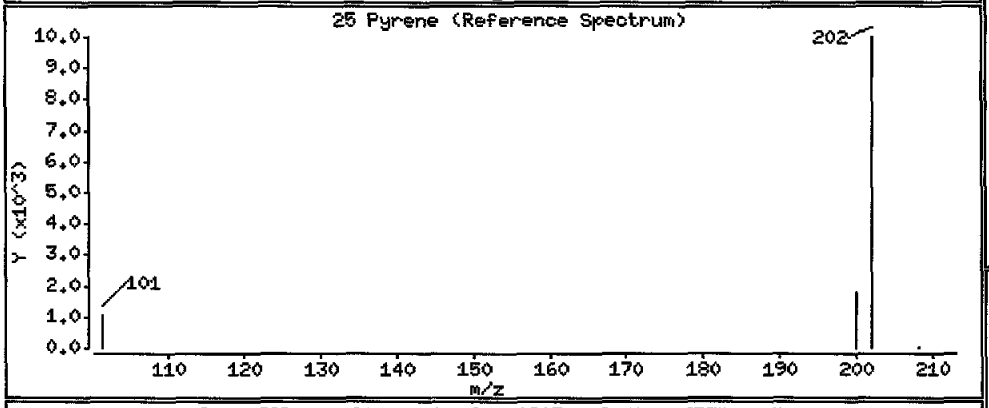
Concentration: 40600 ug/kg

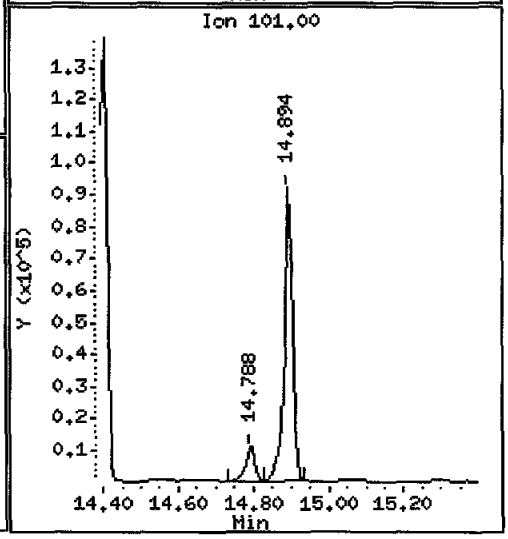


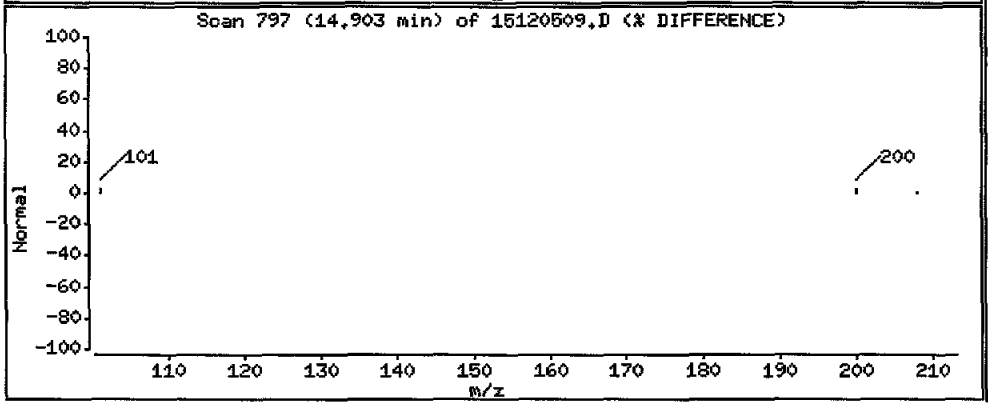












Data File: \\target\share\chem3\nt11.i\20151205.b\15120509.D

Date : 05-DEC-2015 14:15

Client ID: PG-WS-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9E

Volume Injected (uL): 2.0

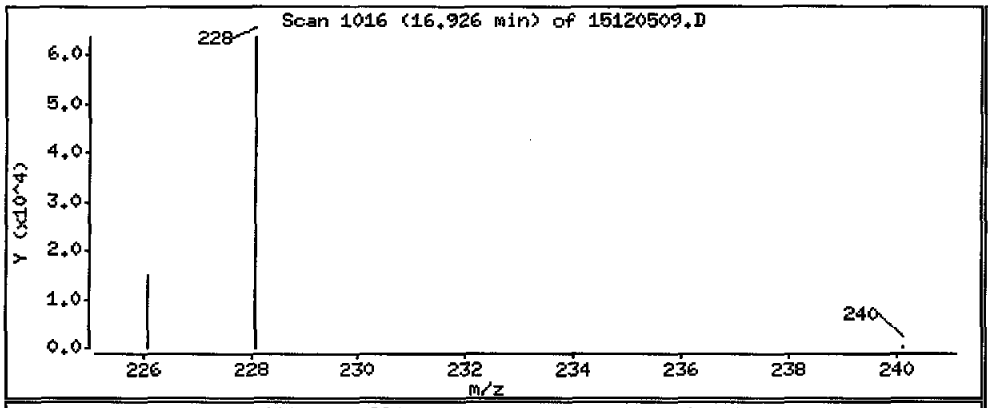
Operator: JW

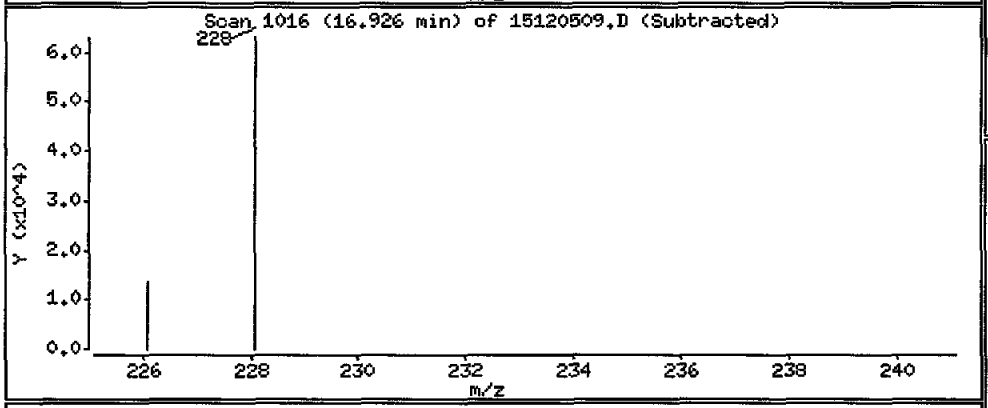
Column phase: Rxi-17Sil MS

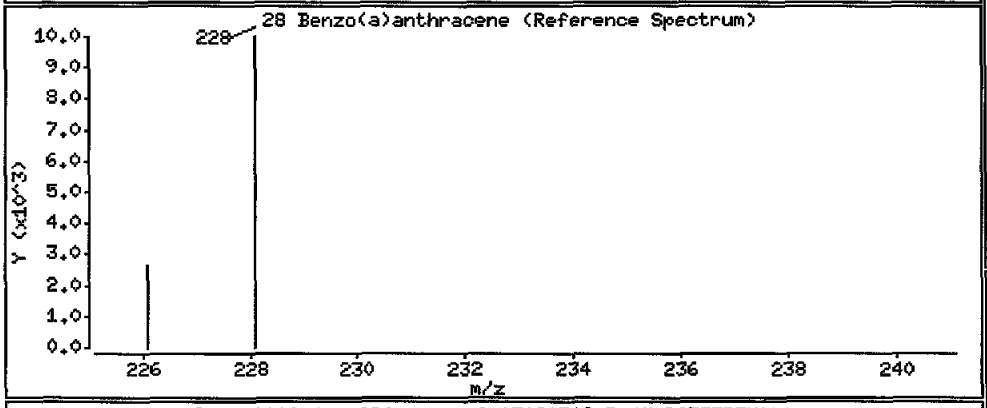
Column diameter: 0.25

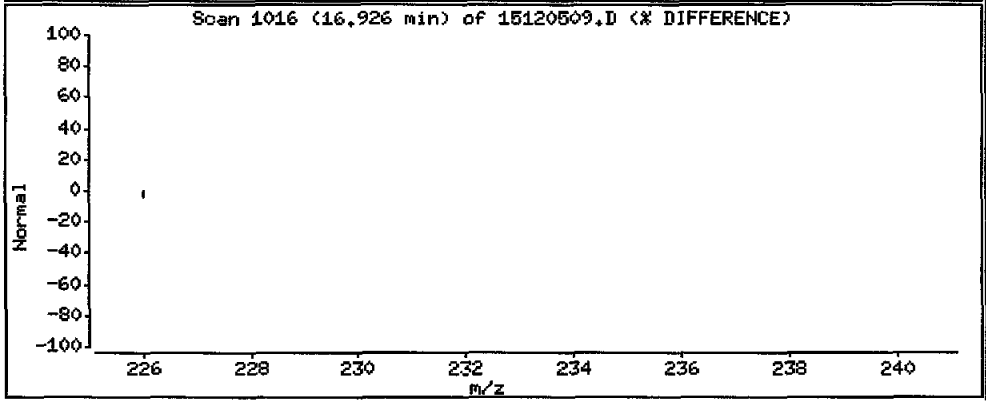
28 Benzo(a)anthracene

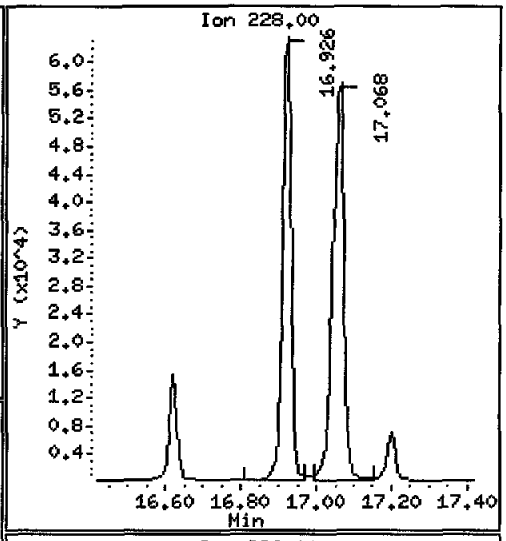
Concentration: 4940 ug/kg

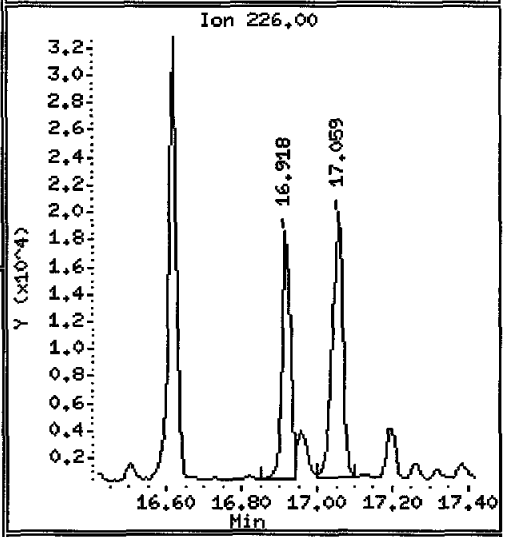


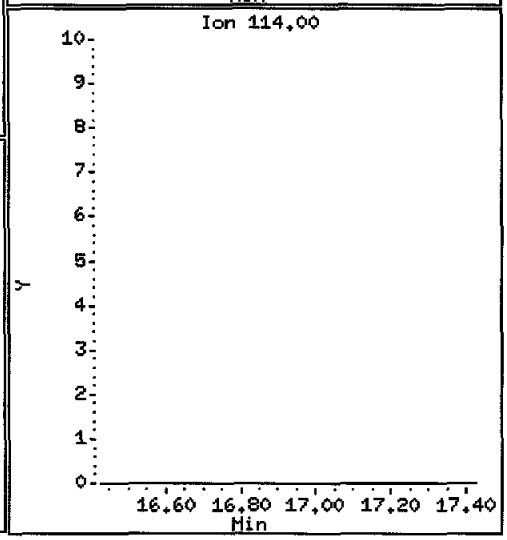












Data File: \\target\share\chem3\nt11.i\20151205.b\15120509.D

Date : 05-DEC-2015 14:15

Client ID: PG-WS-1-PEMD-151109

Instrument: nt11.i

Sample Info: AQJ9E

Volume Injected (uL): 2.0

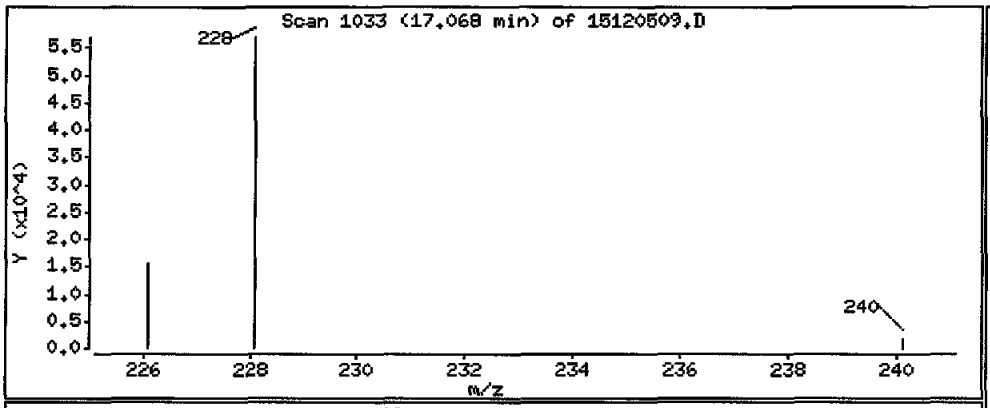
Operator: JW

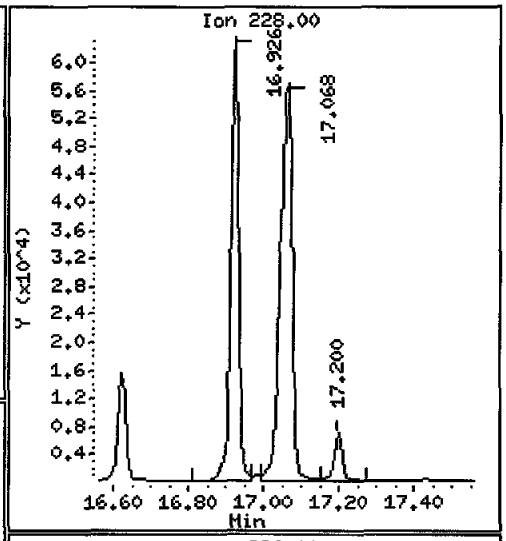
Column phase: Rxi-17Sil MS

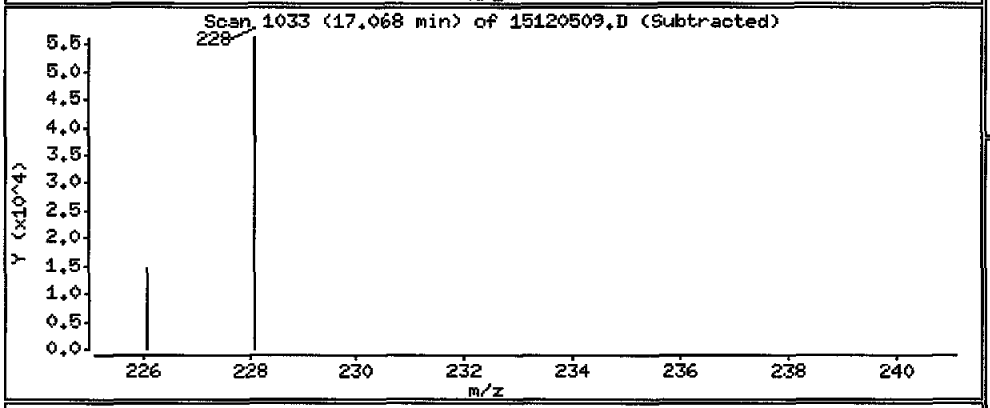
Column diameter: 0.25

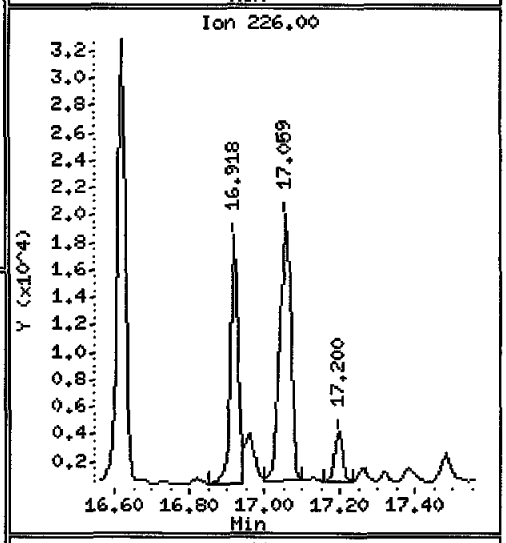
30 Chrysene

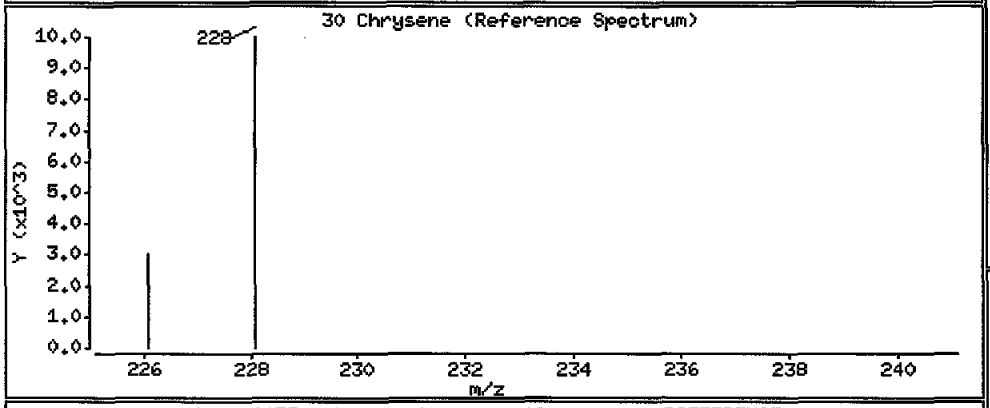
Concentration: 5660 ug/kg

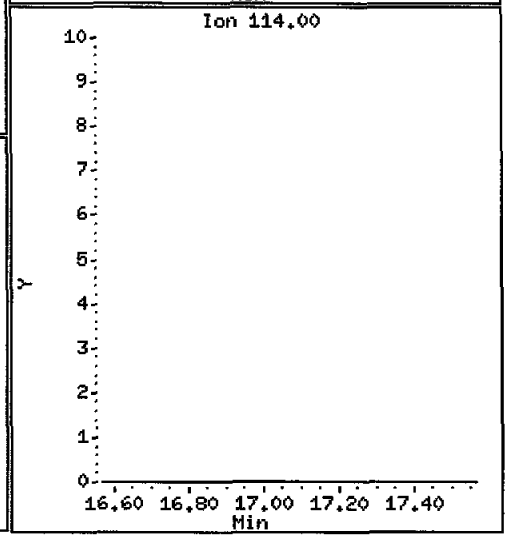


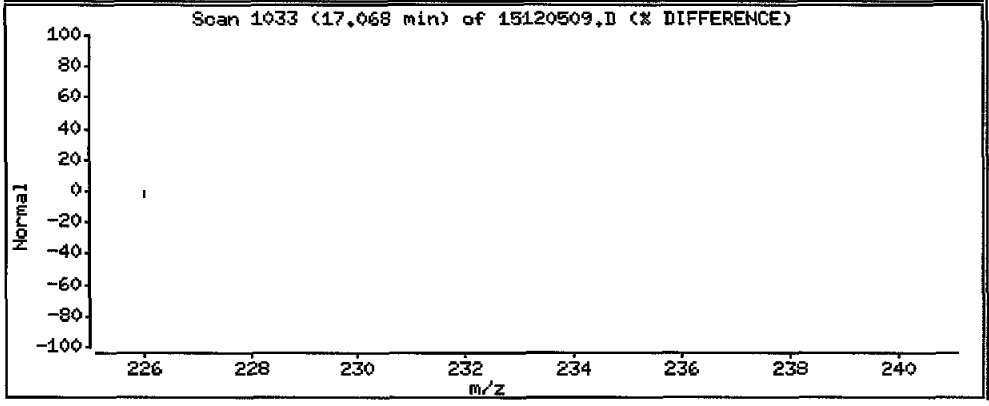












Data File: \\target\share\chem3\nt11.i\20151205.b\15120509.D

Date : 05-DEC-2015 14:15

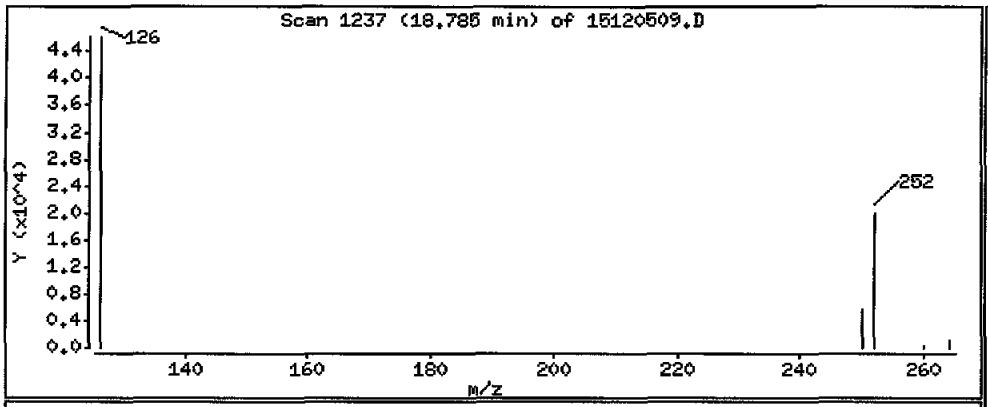
Client ID: PG-WS-1-PEMD-151109 Instrument: nt11.i

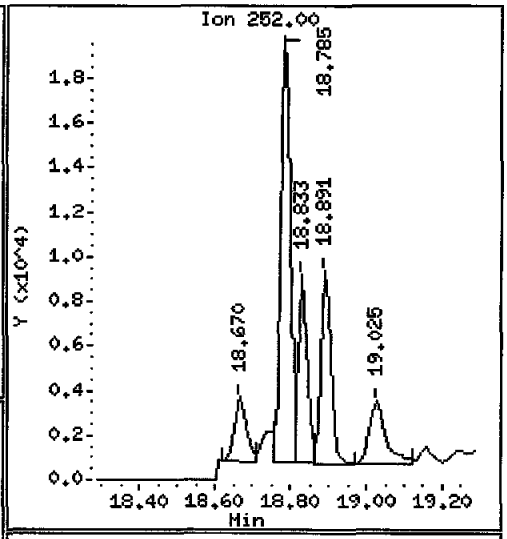
Sample Info: AQJ9E

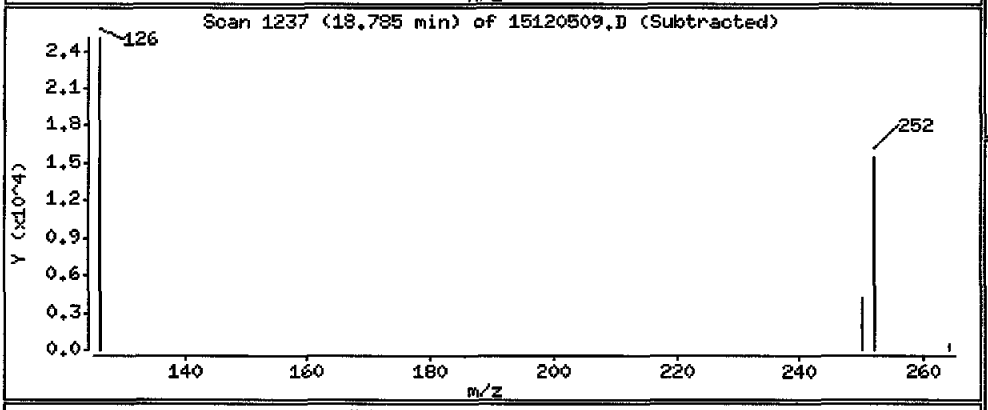
Volume Injected (uL): 2.0 Operator: JW

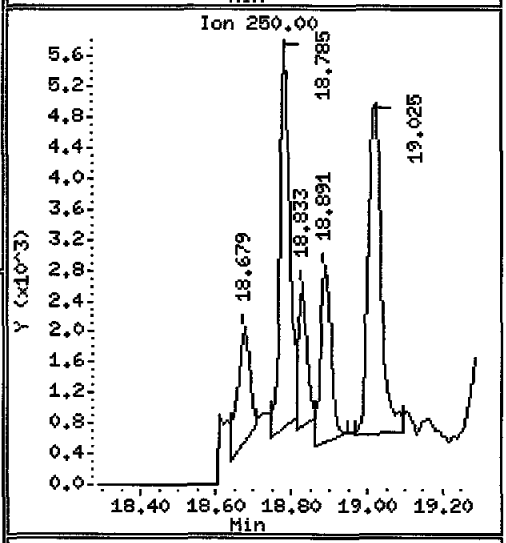
Column phase: Rxi-17Sil MS Column diameter: 0.25

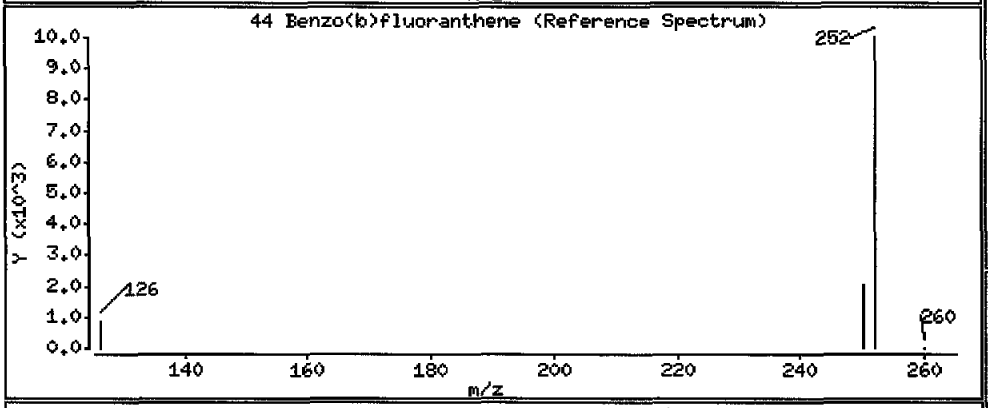
44 Benzo(b)fluoranthene Concentration: 1860 ug/kg

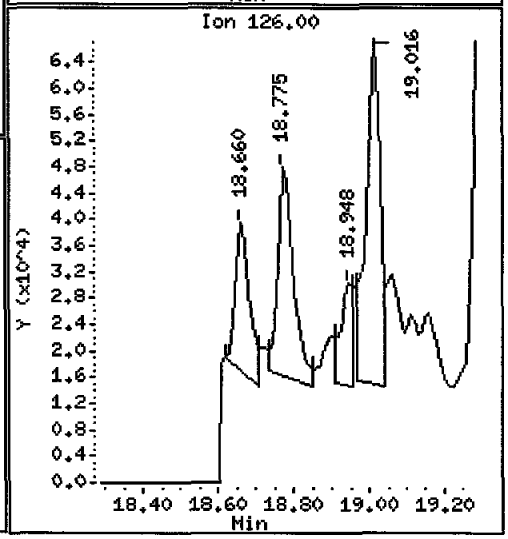


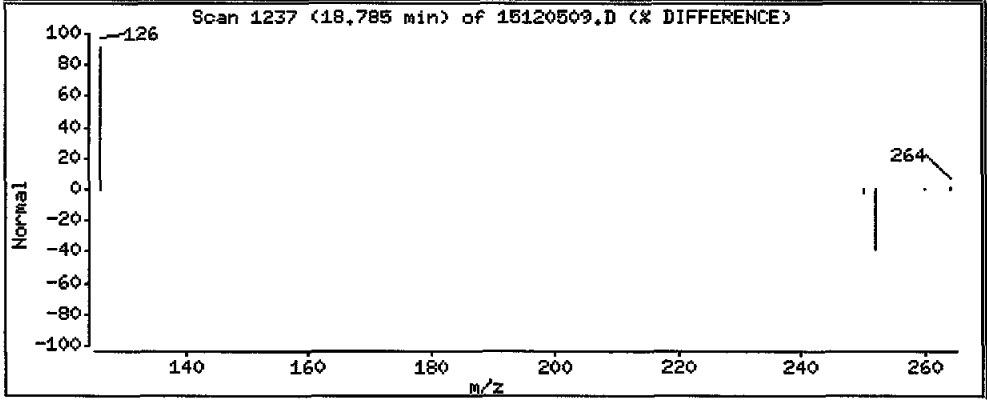












Data File: \\target\share\chem3\nt11.i\20151205.b\15120509.D

Date : 05-DEC-2015 14:15

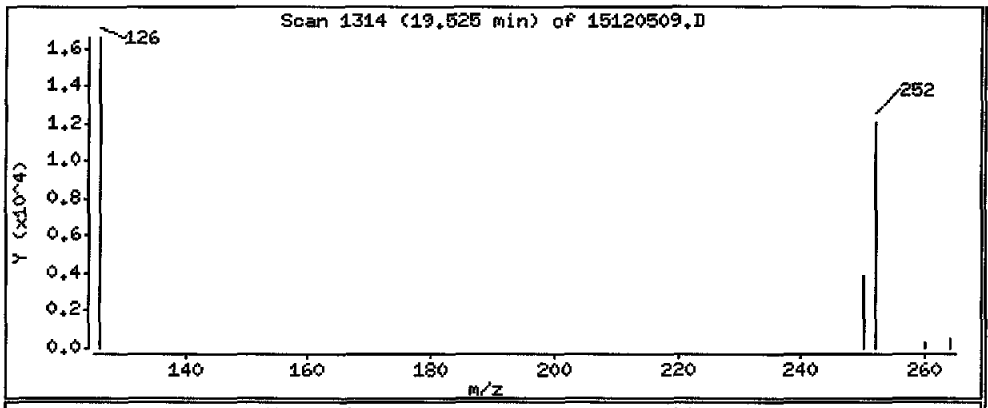
Client ID: PG-WS-1-PEMD-151109 Instrument: nt11.i

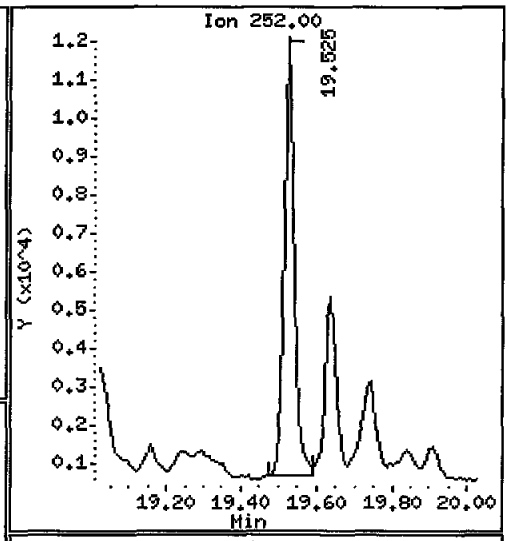
Sample Info: AQJ9E

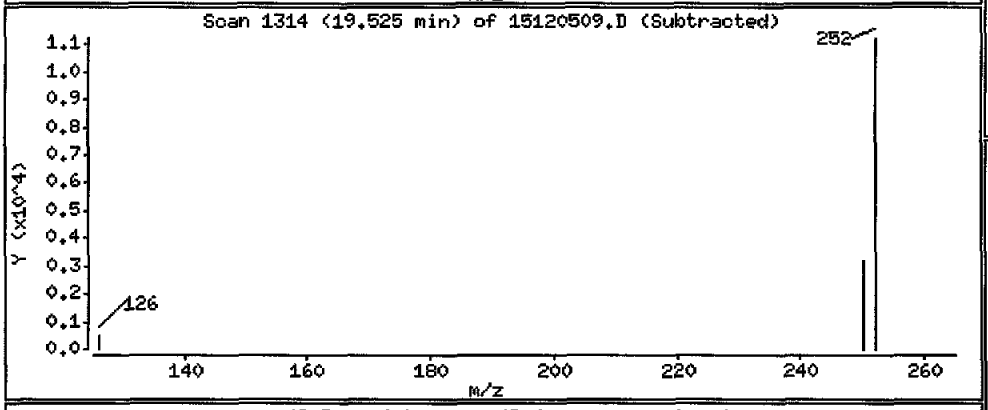
Volume Injected (uL): 2.0 Operator: JW

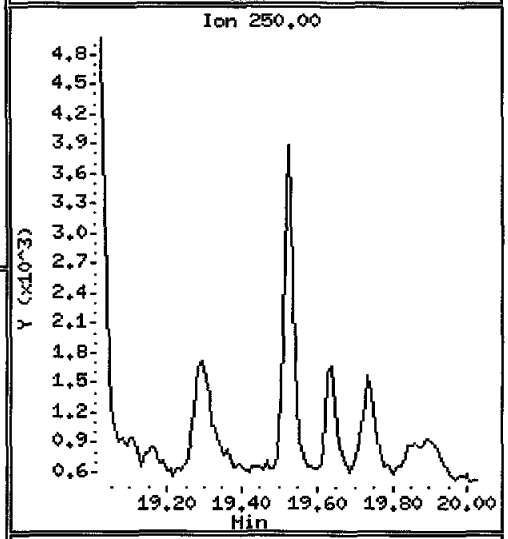
Column phase: Rxi-17Sil MS Column diameter: 0.25

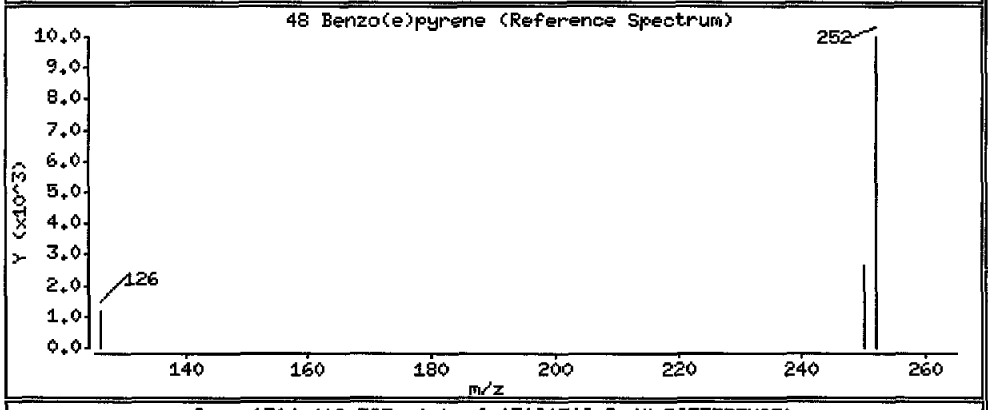
48 Benzo(e)pyrene Concentration: 1190 ug/kg

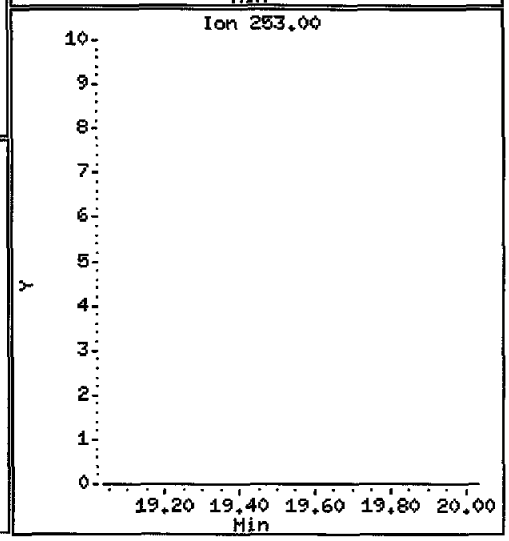


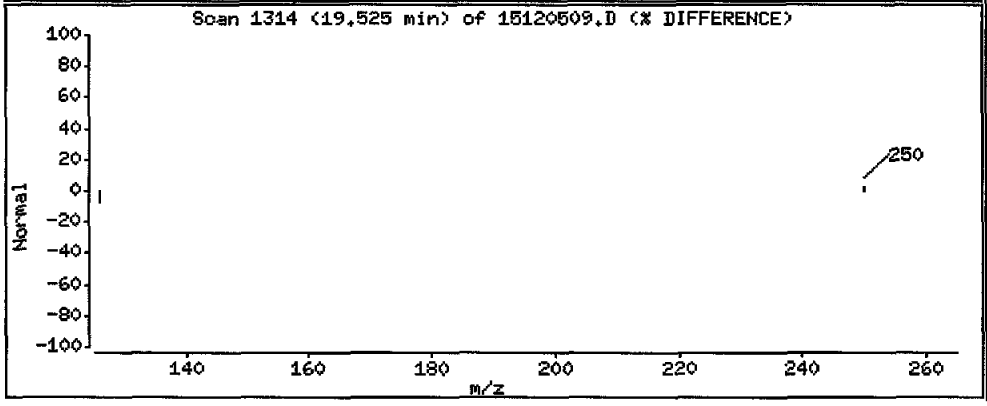












REVIEW SUMMARY FOR FILE - 15120509.D

Lab ID: AQJ9E
nt11.i, 20151205.b\lowsim.m, 05-DEC-2015 14:15

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151205.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151205.b\15120510.D
Lab Smp Id: AQJ9G Client Smp ID: PG-SMA2-5-PEMD-1511
Inj Date : 05-DEC-2015 14:45 MS Autotune Date: 23-APR-2014 12:5
Operator : JW Inst ID: nt11.i
Smp Info : AQJ9G
Misc Info : 15-21394
Comment :
Method : \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Meth Date : 14-Dec-2015 10:48 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 10
Dil Factor: 2.50000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	2.500	Dilution Factor
Vt	50.000	Volume of final extract (uL)
Ws	0.89000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

12/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	FINAL (ug/kg)
*	4 Naphthalene-d8	136	6.576	6.597	(1.000)	297768	200.000	
	5 Naphthalene	128	6.618	6.639	(1.006)	111437	64.7905	9100
$	6 2-Methylnaphthalene-d10	152	7.564	7.574	(1.150)	66422	60.0971	8440(R)
	7 2-Methylnaphthalene	142	7.616	7.637	(1.158)	42428	35.9017	5040
	8 1-Methylnaphthalene	142	7.868	7.889	(1.196)	25384	23.8344	3350
	10 Acenaphthylene	152	Compound Not Detected.					
*	11 Acenaphthene-d10	164	9.589	9.600	(1.000)	252418	200.000	
	12 Acenaphthene	153	9.656	9.667	(1.007)	133802	98.9554	13900
	14 Dibenzofuran	168	9.855	9.866	(1.028)	118110	57.9843	8140
	15 Fluorene	166	10.475	10.486	(1.092)	199762	130.765	18400
*	18 Phenanthrene-d10	188	12.269	12.280	(1.000)	432491	200.000	
	19 Phenanthrene	178	12.313	12.313	(1.004)	1394966	535.355	75200
	20 Anthracene	178	12.368	12.368	(1.008)	211686	90.7605	12700
$	23 Fluoranthene-d10	212	14.365	14.374	(1.171)	198994	83.6660	11800
	24 Fluoranthene	202	14.403	14.413	(1.174)	1655596	632.854	88900
	25 Pyrene	202	14.903	14.903	(0.876)	999630	404.824	56900
	28 Benzo(a)anthracene	228	16.918	16.926	(0.994)	130557	62.8015	8820
*	29 Chrysene-d12	240	17.017	17.017	(1.000)	311806	200.000	
	30 Chrysene	228	17.059	17.067	(1.002)	131788	57.7600	8110
	44 Benzo(b)fluoranthene	252	18.785	18.785	(0.947)	31146	16.3549	2300
	45 Benzo(k)fluoranthene	252	Compound Not Detected.					

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	FINAL (ug/kg)
	46 Benzo(j)fluoranthene	252	Compound Not Detected.					
	34 Benzo(a)pyrene	252	Compound Not Detected.					
*	35 Perylene-d12	264	19.842	19.842	(1.000)	281081	200.000	
$	36 Dibenzo(a,h)anthracene-d14	292	22.208	22.208	(1.119)	88893	78.3551	11000
	37 Indeno(1,2,3-cd)pyrene	276	Compound Not Detected.					
	38 Dibenzo(a,h)anthracene	278	Compound Not Detected.					
	39 Benzo(g,h,i)perylene	276	Compound Not Detected.					
	47 Perylene	252	Compound Not Detected.					
	48 Benzo(e)pyrene	252	Compound Not Detected.					

QC Flag Legend

R - Spike/Surrogate failed recovery limits.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120510.D
Lab Smp Id: AQJ9G
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21394

Calibration Date: 05-DEC-2015
Calibration Time: 18:46
Client Smp ID: PG-SMA2-5-PEMD-
Level: LOW
Sample Type: Tissue

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	297768	-9.19
11 Acenaphthene-d10	239179	119590	478358	252418	5.54
18 Phenanthrene-d10	372253	186127	744506	432491	16.18
29 Chrysene-d12	294711	147356	589422	311806	5.80
35 Perylene-d12	260595	130298	521190	281081	7.86

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.58	-0.32
11 Acenaphthene-d10	9.60	9.10	10.10	9.59	-0.12
18 Phenanthrene-d10	12.28	11.78	12.78	12.27	-0.09
29 Chrysene-d12	17.02	16.52	17.52	17.02	0.00
35 Perylene-d12	19.84	19.34	20.34	19.84	0.00

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.

ARI Labs, Inc.

RECOVERY REPORT

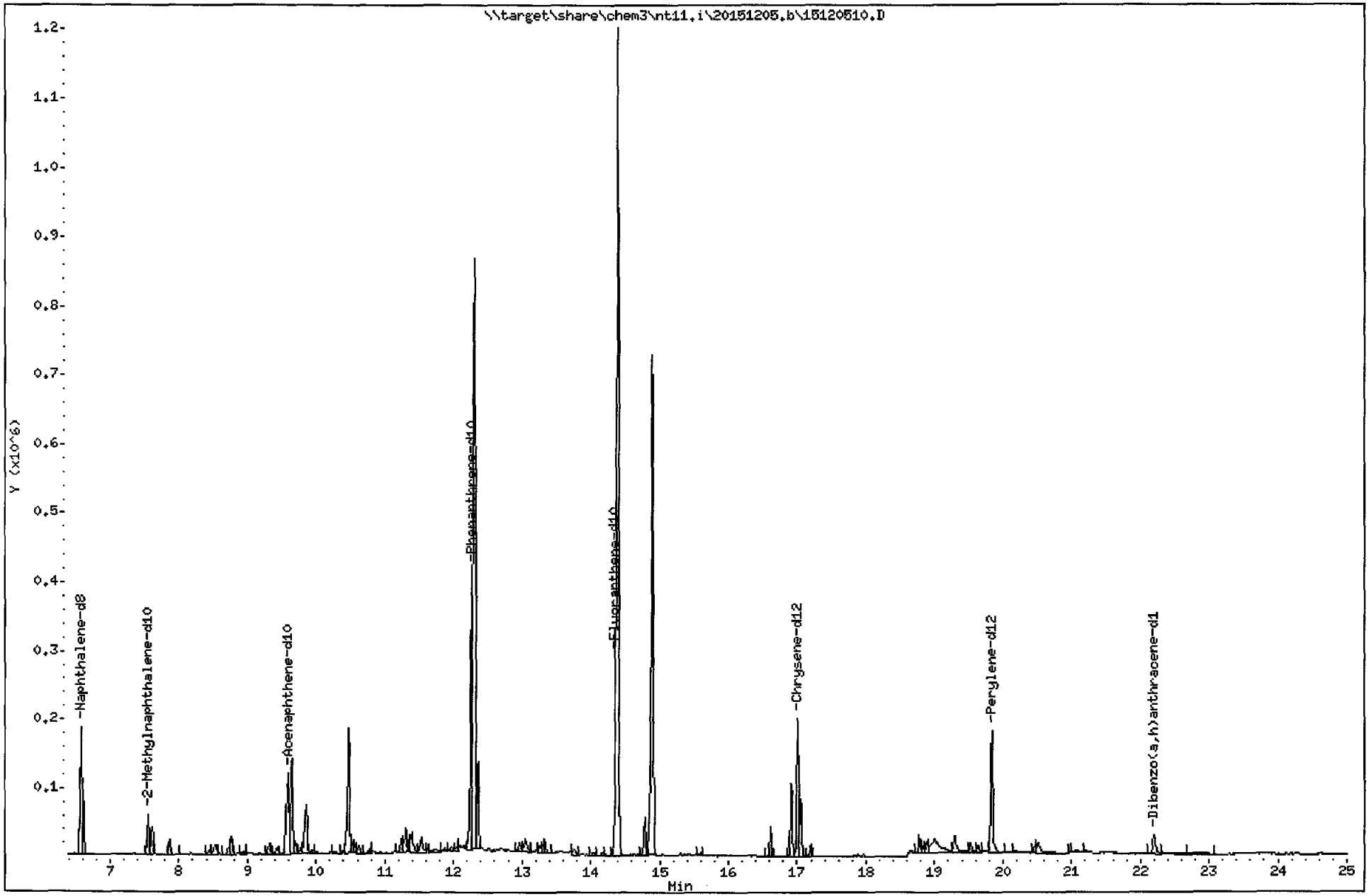
Client Name: Anchor QEA, LLC
Client SDG: AQJ9
Sample Matrix: SOLID
Fraction: SV
Lab Smp Id: AQJ9G
Client Smp ID: PG-SMA2-5-PEMD-1511
Level: LOW
Operator: JW
Data Type: MS DATA
SampleType: SAMPLE
SpikeList File: waterlcs.spk
Quant Type: ISTD
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21394

SURROGATE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
$ 6 2-Methylnaphthalen	33700	8440	25.04*	30-160
$ 23 Fluoranthene-d10	33700	11800	34.86	30-160
$ 36 Dibenzo(a,h)anthra	33700	11000	32.65	30-160

Data File: \\target\share\chem3\nt11.i\20151205.b\15120510.D
Date : 05-DEC-2015 14:45
Client ID: PG-SMA2-5-PEMD-1511
Sample Info: AQJ9G
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: JW
Column diameter: 0.25

AQJ9G:00236



Data File: \\target\share\chem3\nt11.i\20151205.b\15120510.D

Date : 05-DEC-2015 14:45

Client ID: PG-SMA2-5-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9G

Volume Injected (uL): 2.0

Operator: JW

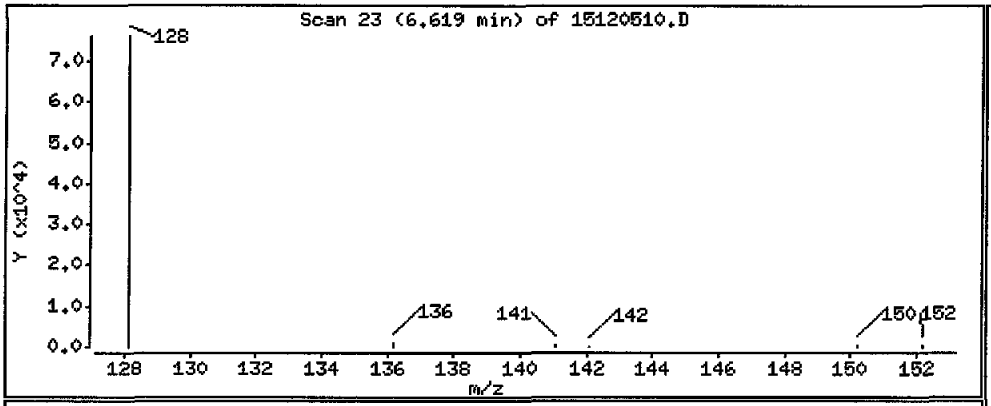
Column phase: Rxi-17Sil MS

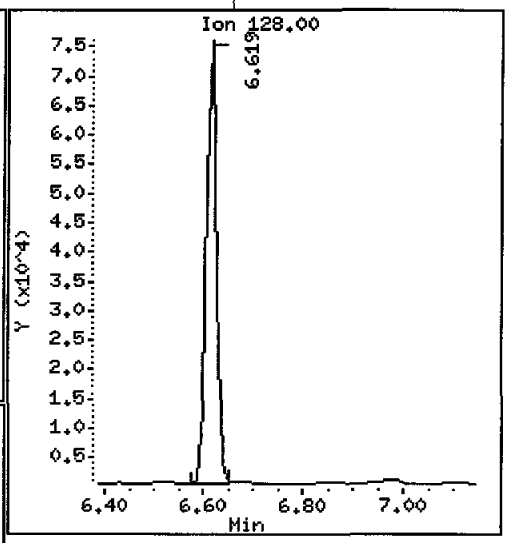
Column diameter: 0.25

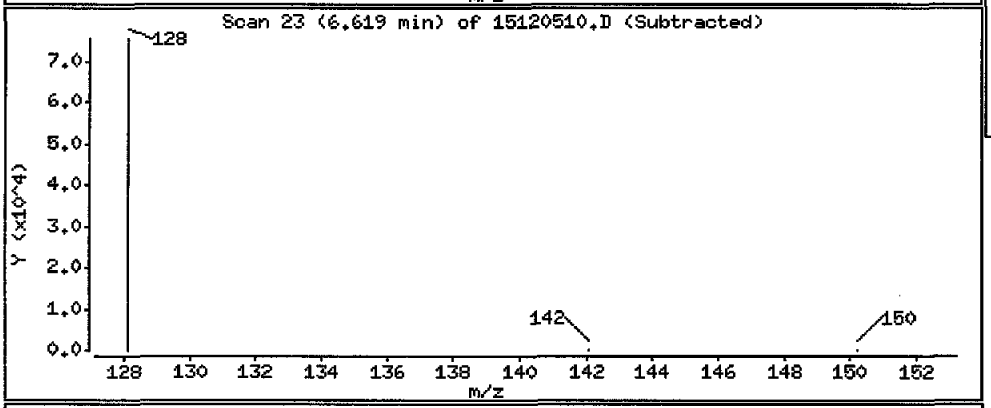
5 Naphthalene

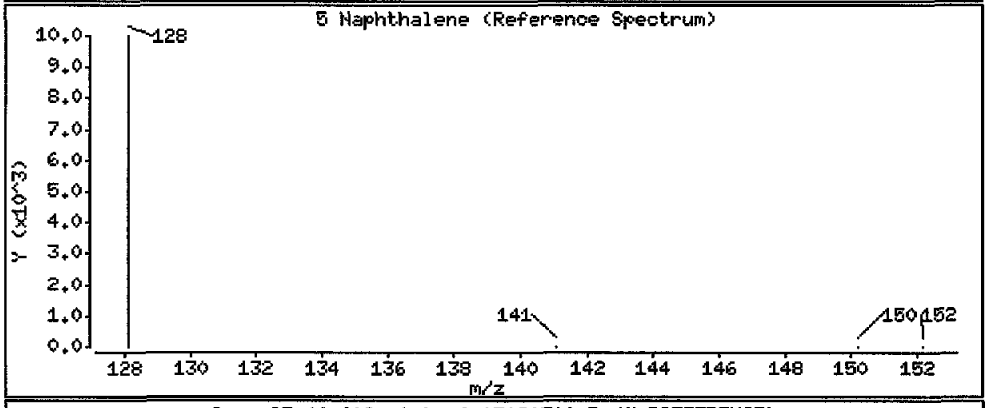
Concentration: 9100 ug/kg

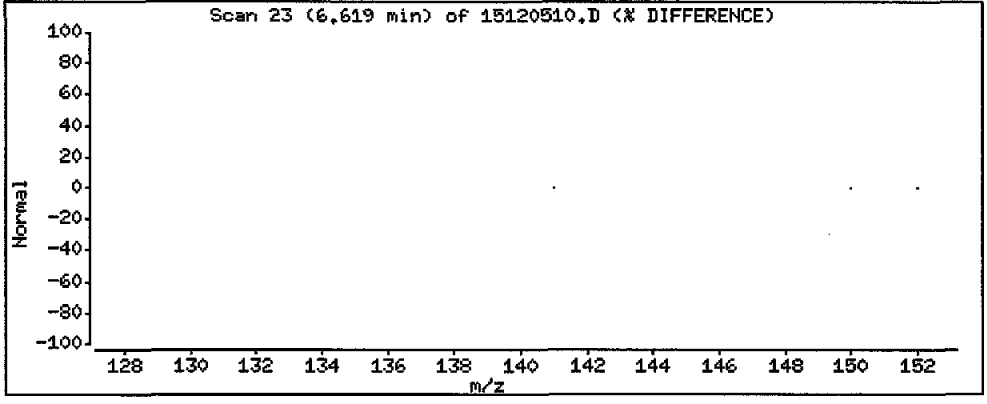
B











Data File: \\target\share\chem3\nt11.i\20151205.b\15120510.D

Date : 05-DEC-2015 14:45

Client ID: PG-SMA2-5-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9G

Volume Injected (uL): 2.0

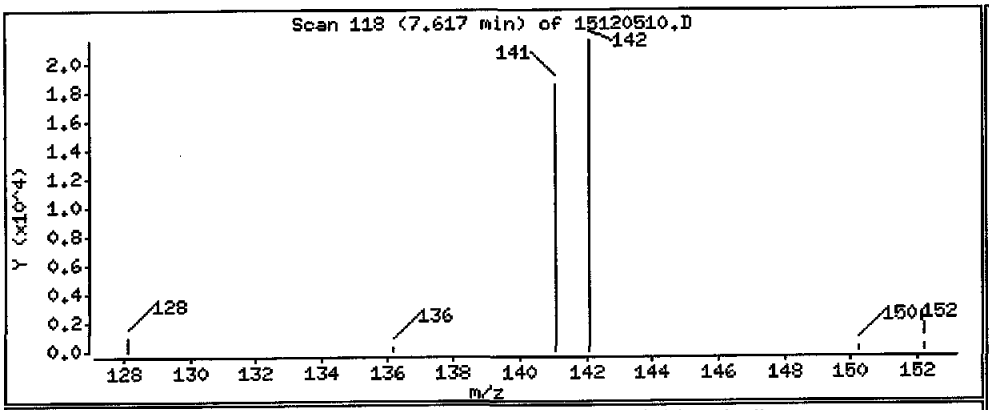
Operator: JW

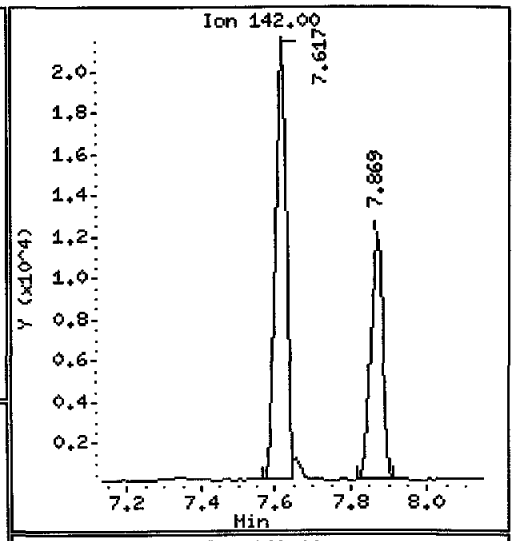
Column phase: Rxi-17Sil MS

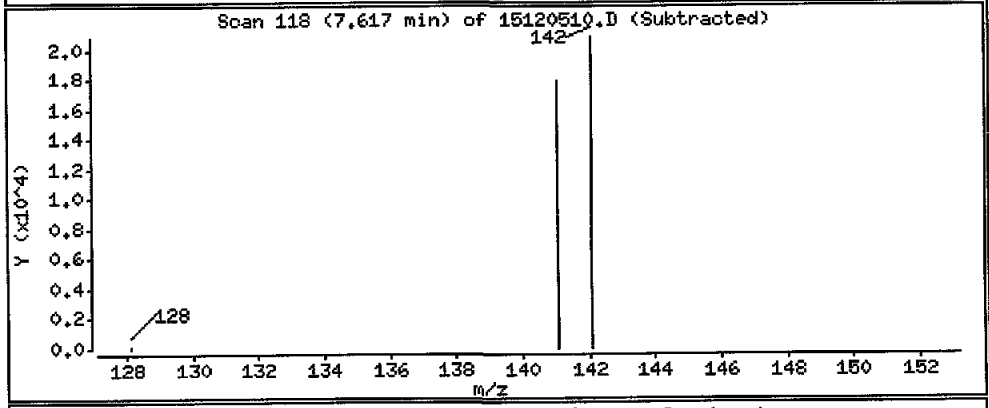
Column diameter: 0.25

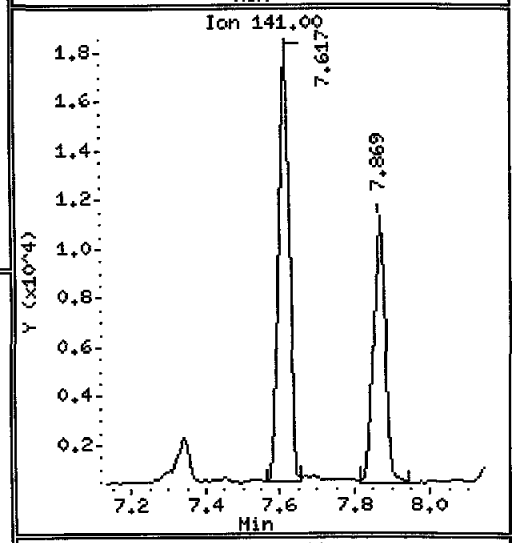
7 2-Methylnaphthalene

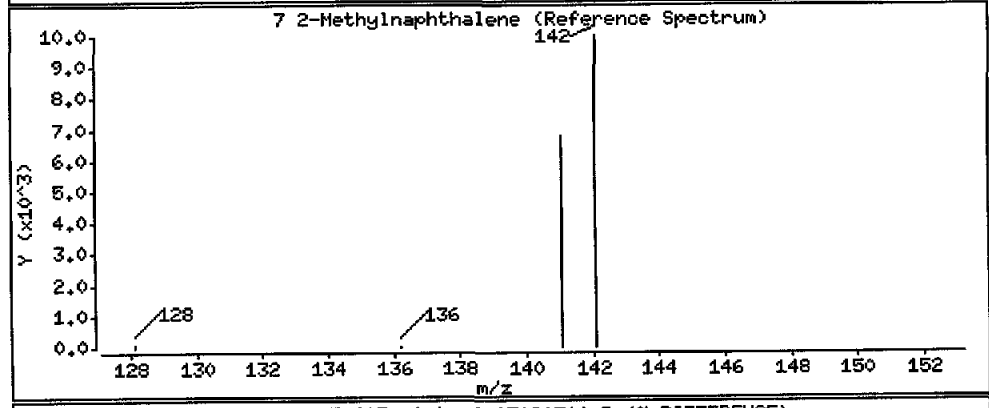
Concentration: 5040 ug/kg

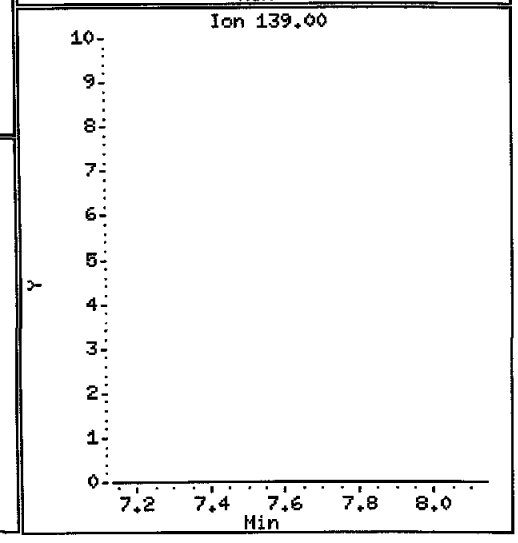


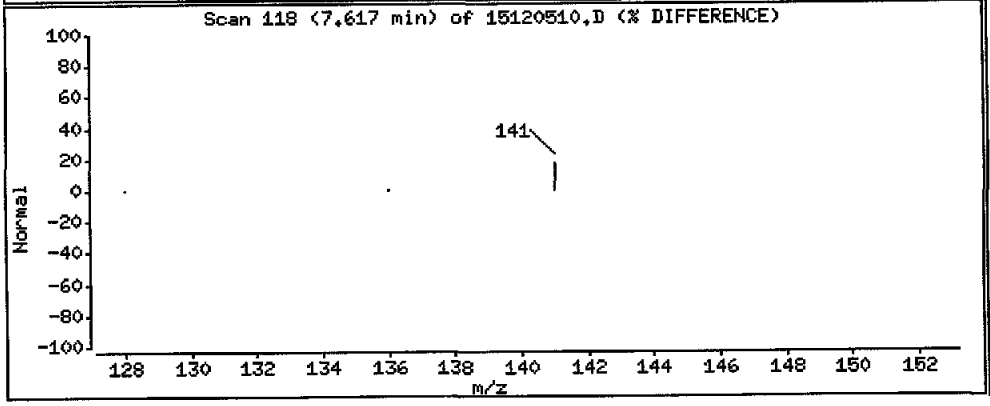












Data File: \\target\share\chem3\nt11.i\20151205.b\15120510.D

Date : 05-DEC-2015 14:45

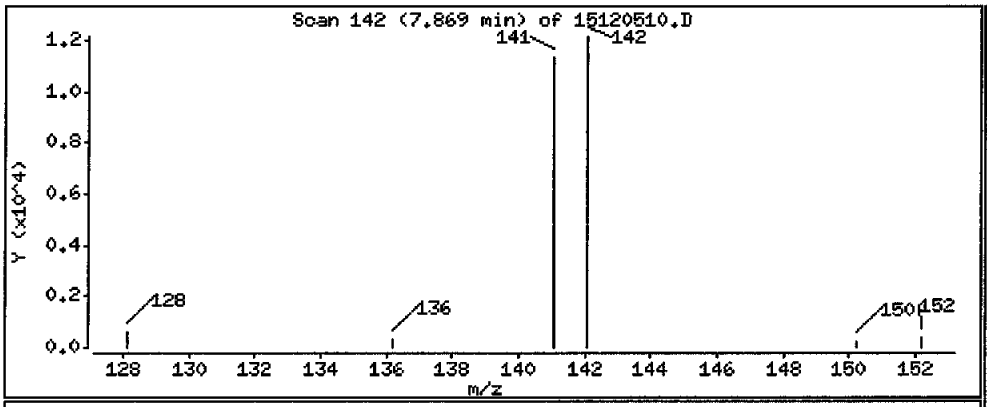
Client ID: PG-SMA2-5-PEMD-1511 Instrument: nt11.i

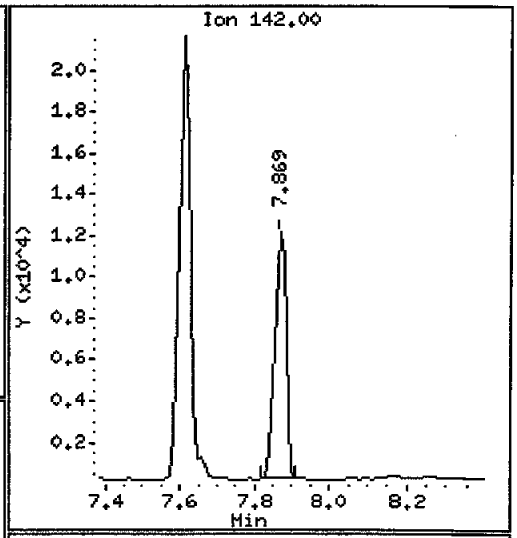
Sample Info: AQJ9G

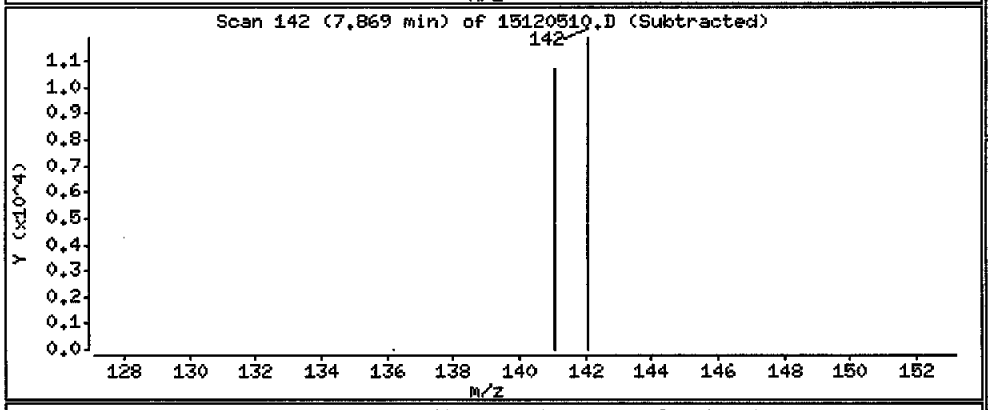
Volume Injected (uL): 2.0 Operator: JW

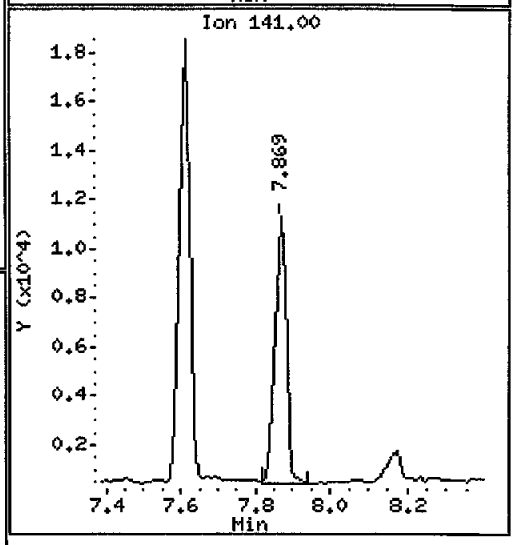
Column phase: Rxi-17Sil MS Column diameter: 0.25

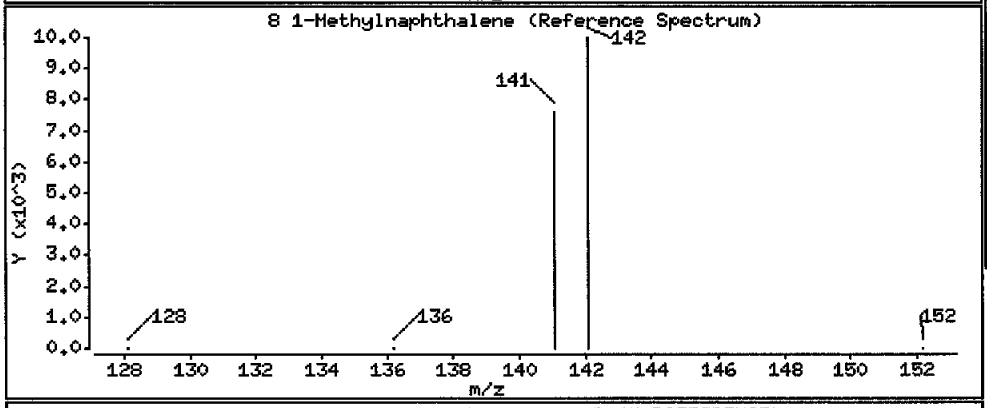
8 1-Methylnaphthalene Concentration: 3350 ug/kg

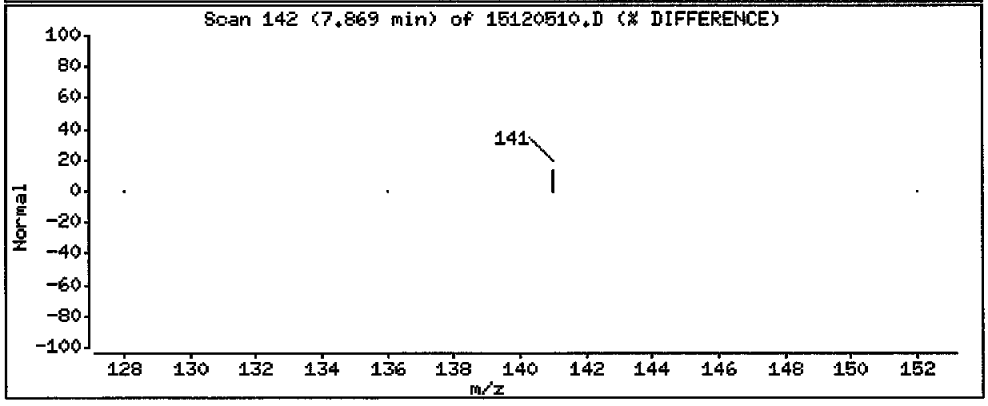












Data File: \\target\share\chem3\nt11.i\20151205.b\15120510.D

Date : 05-DEC-2015 14:45

Client ID: PG-SMA2-5-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9C

Volume Injected (uL): 2.0

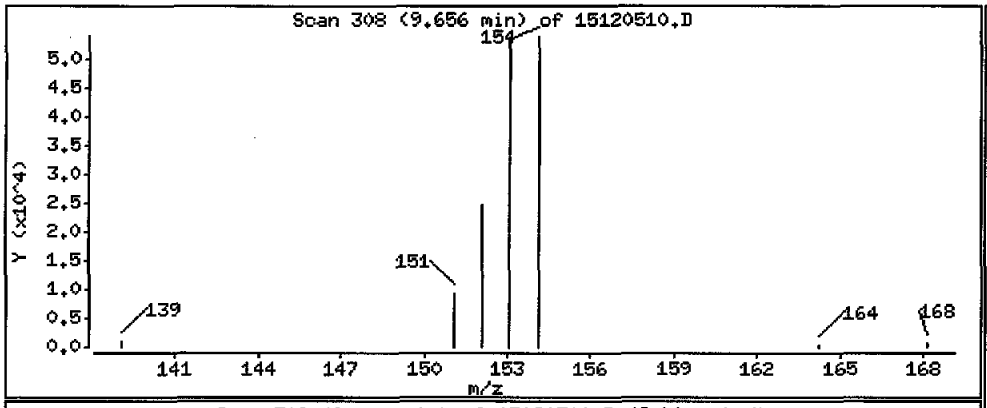
Operator: JW

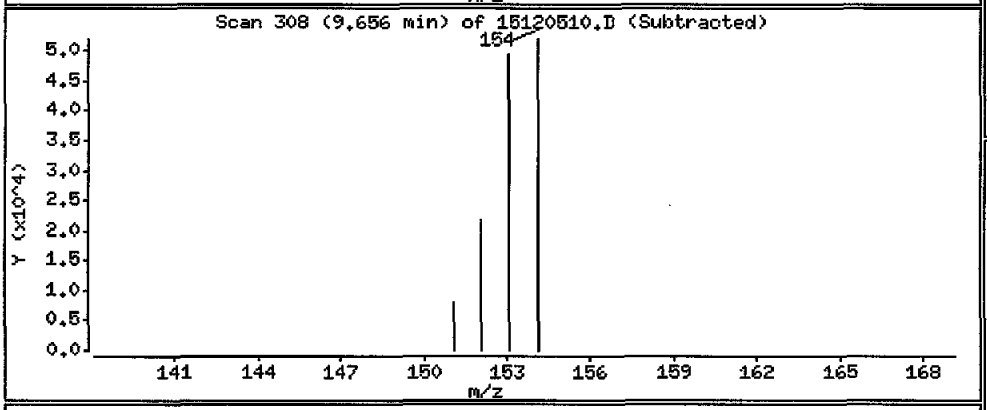
Column phase: Rxi-17Sil MS

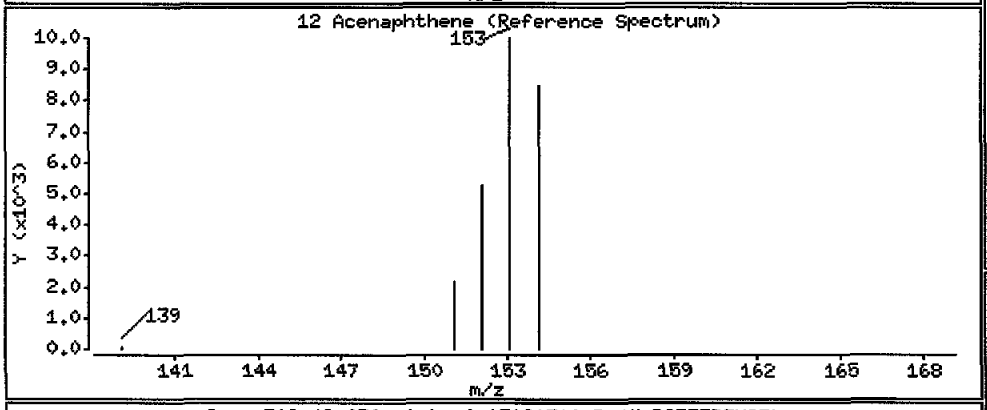
Column diameter: 0.25

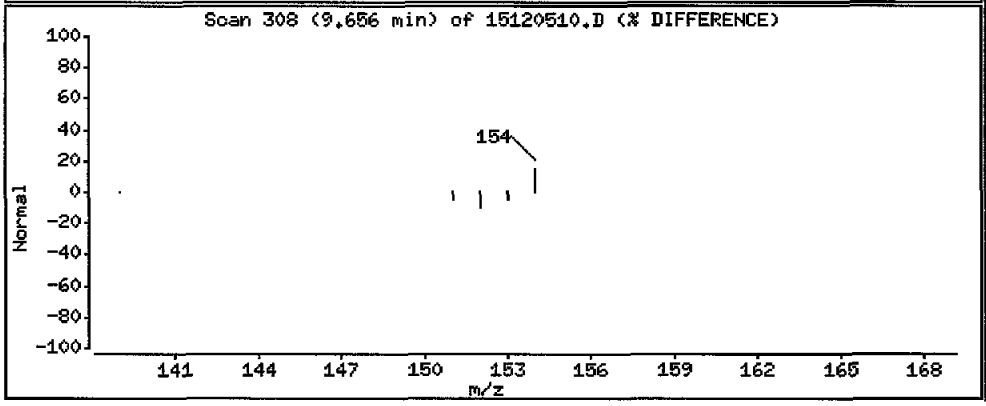
12 Acenaphthene

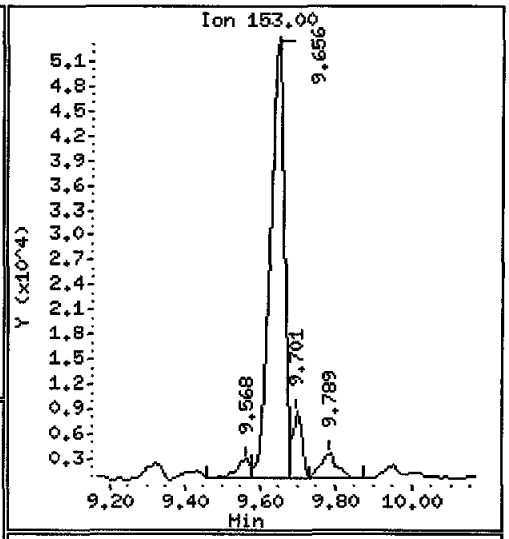
Concentration: 13900 ug/kg

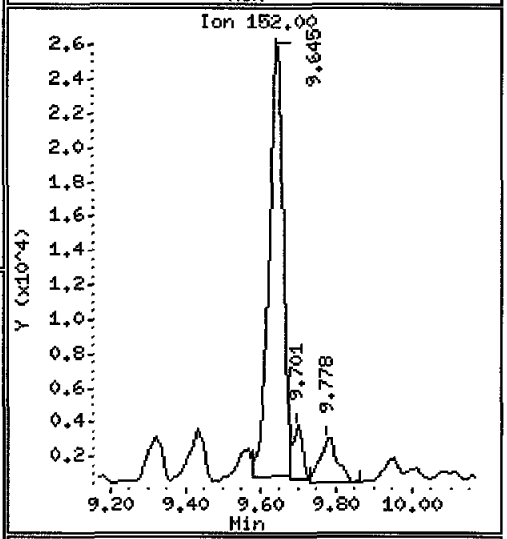


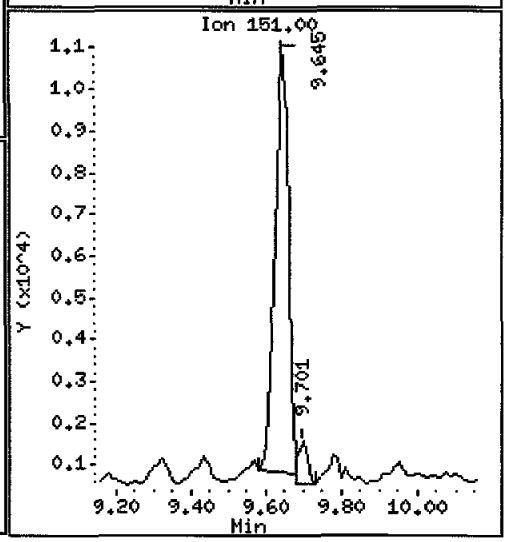












Data File: \\target\share\chem3\nt11.i\20151205.b\15120510.D

Date : 05-DEC-2015 14:45

Client ID: PG-SMA2-5-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9G

Volume Injected (uL): 2.0

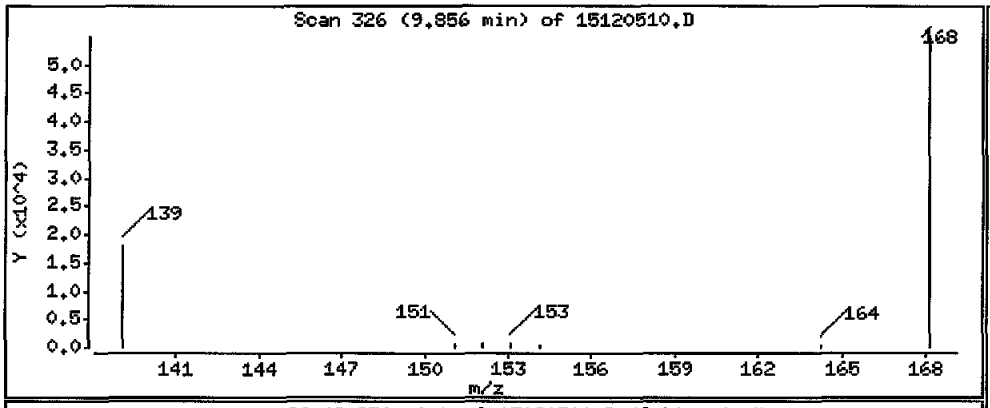
Operator: JW

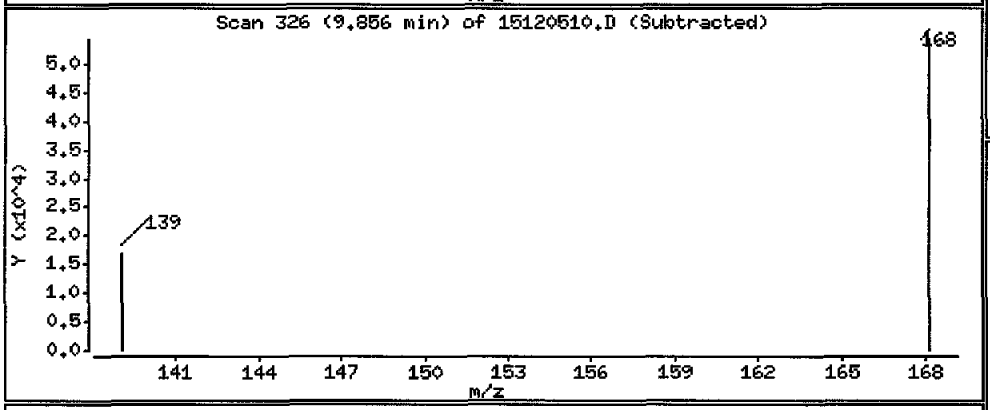
Column phase: Rxi-17Sil MS

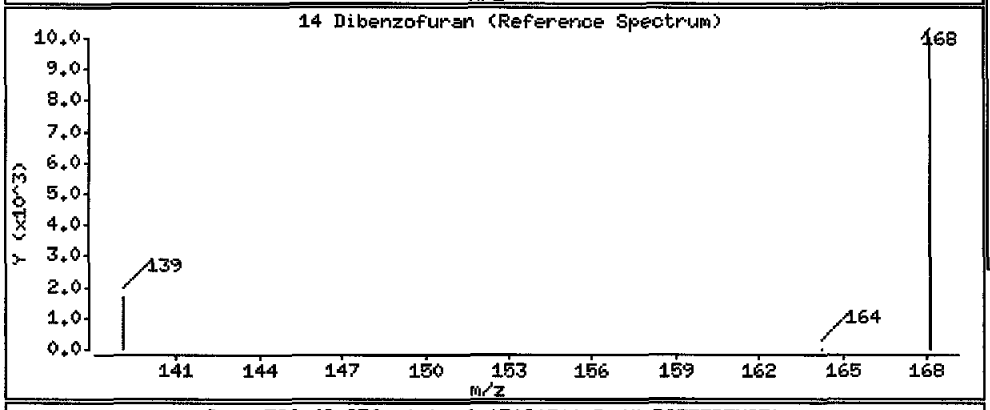
Column diameter: 0.25

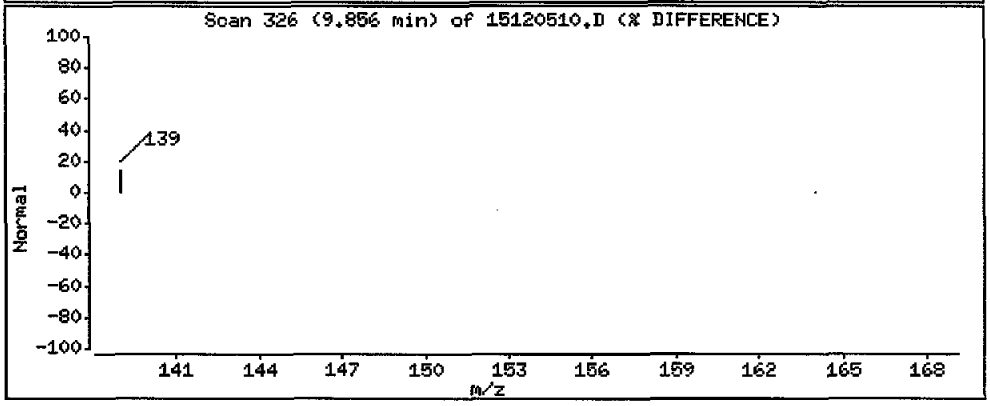
14 Dibenzofuran

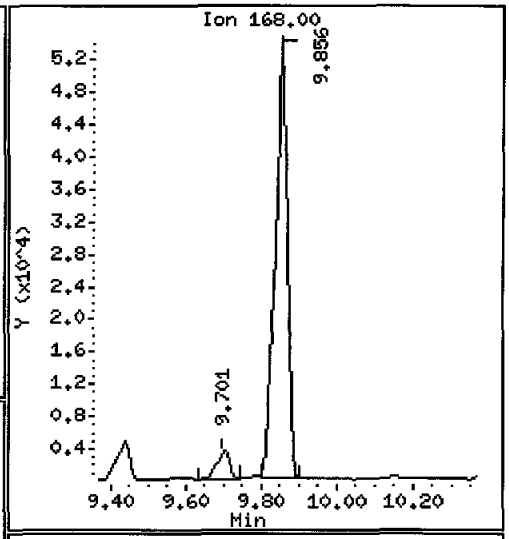
Concentration: 8140 ug/kg

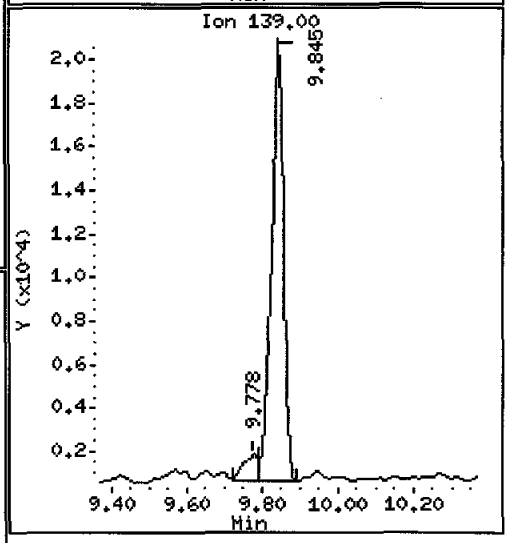












Data File: \\target\share\chem3\nt11.i\20151205.b\15120510.D

Date : 05-DEC-2015 14:45

Client ID: PG-SMA2-5-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9G

Volume Injected (uL): 2.0

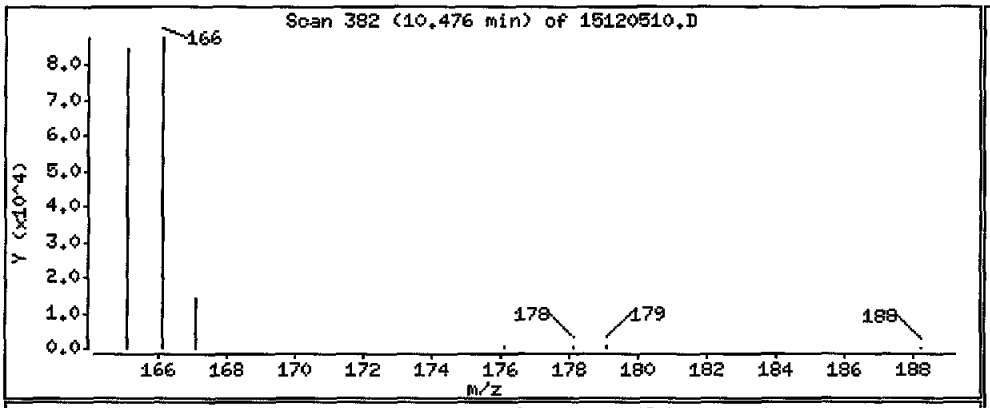
Operator: JW

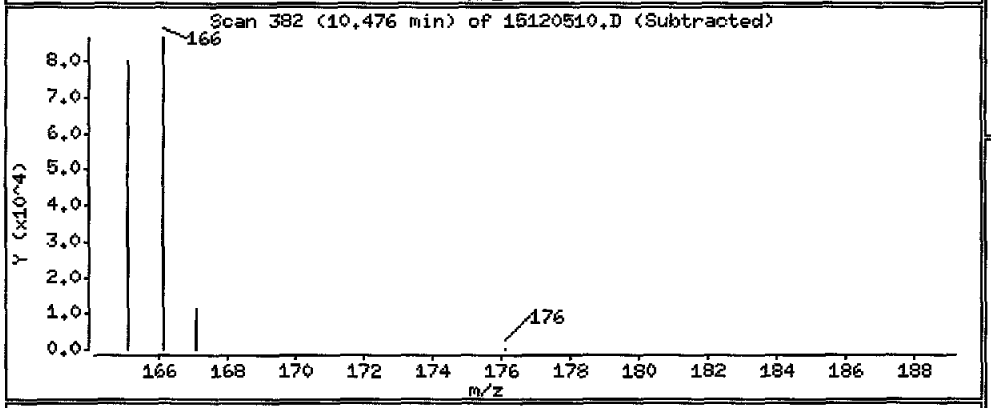
Column phase: Rxi-17Sil MS

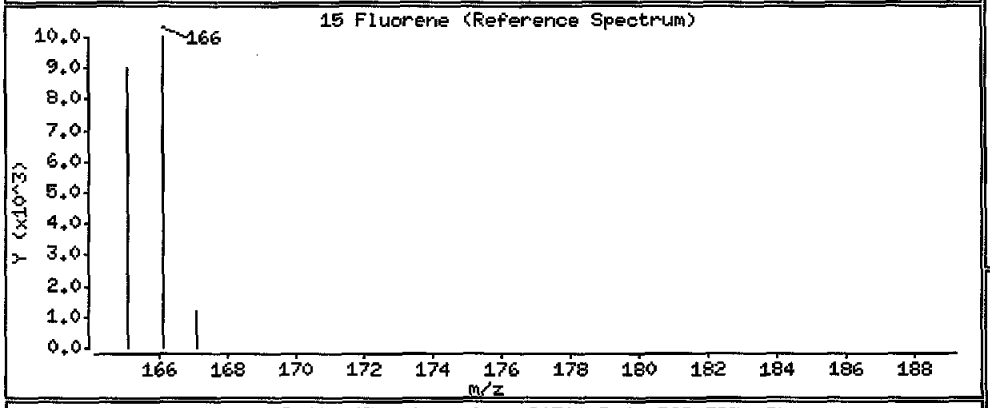
Column diameter: 0.25

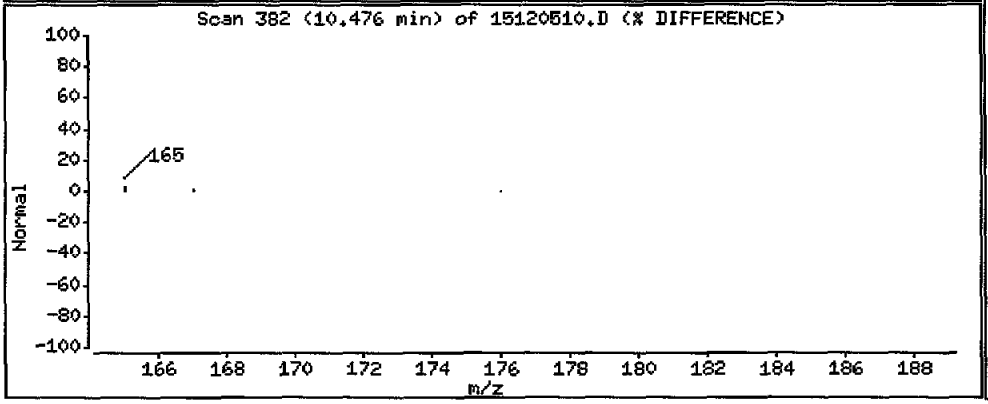
15 Fluorene

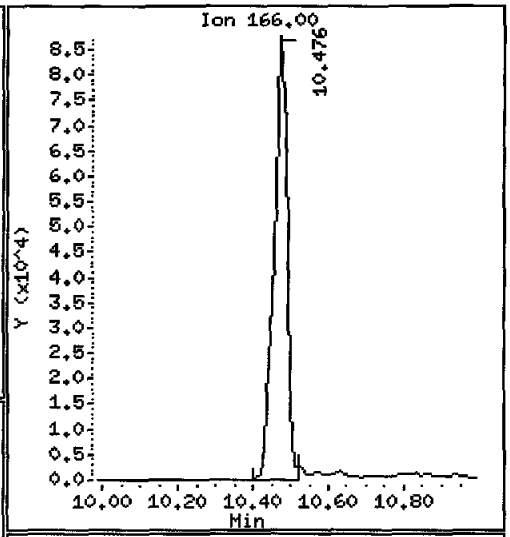
Concentration: 18400 ug/kg

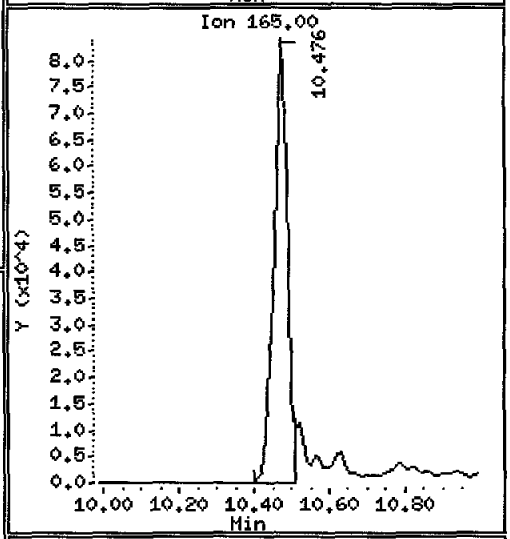


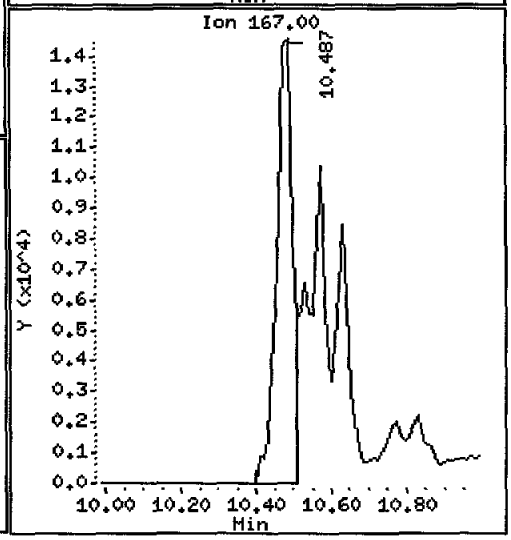












Data File: \\target\share\chem3\nt11.i\20151205.b\15120510.D

Date : 05-DEC-2015 14:45

Client ID: PG-SMA2-5-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9G

Volume Injected (uL): 2.0

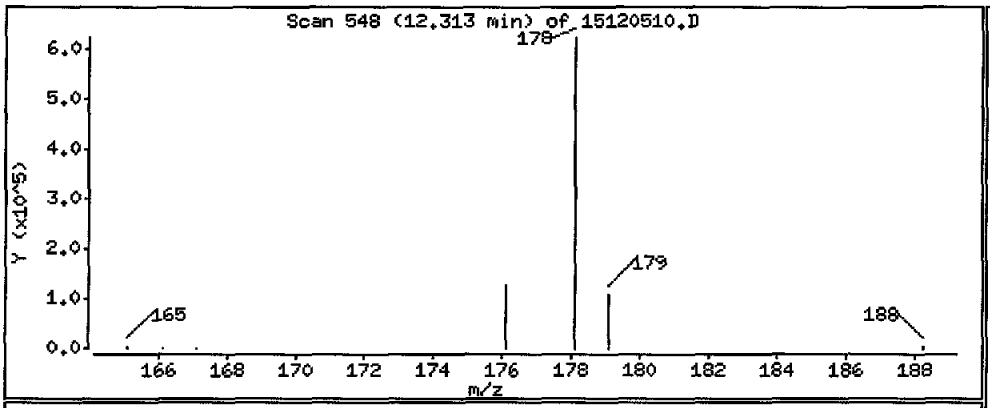
Operator: JW

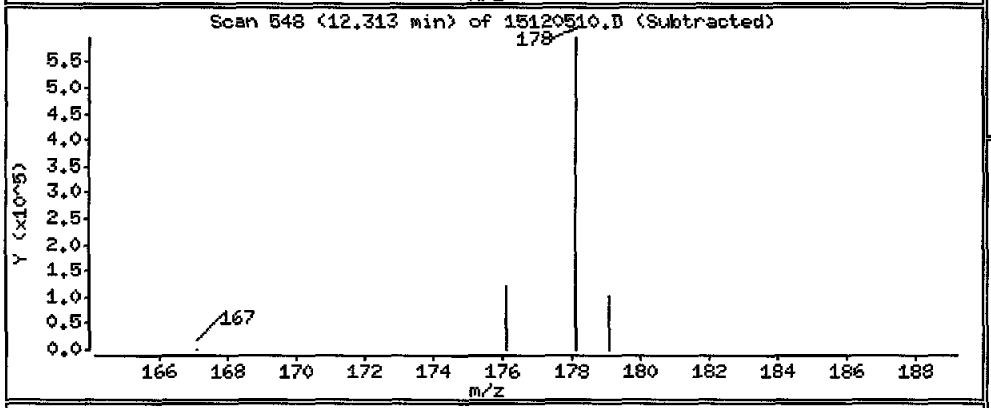
Column phase: Rxi-17Sil MS

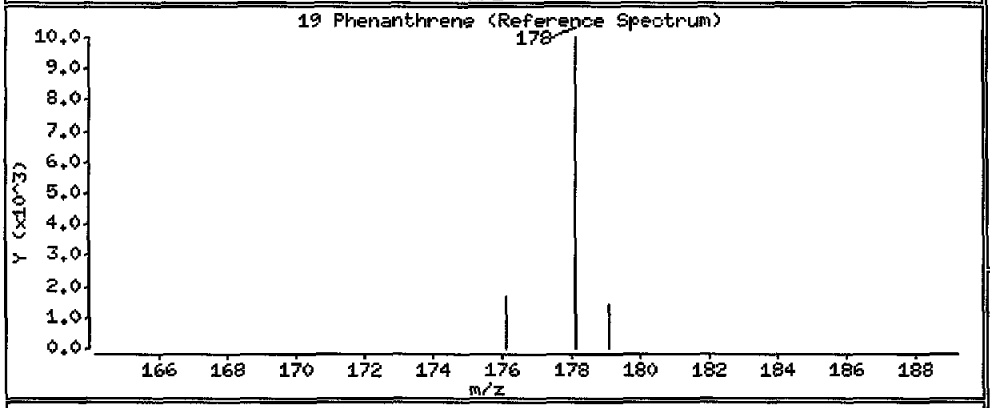
Column diameter: 0.25

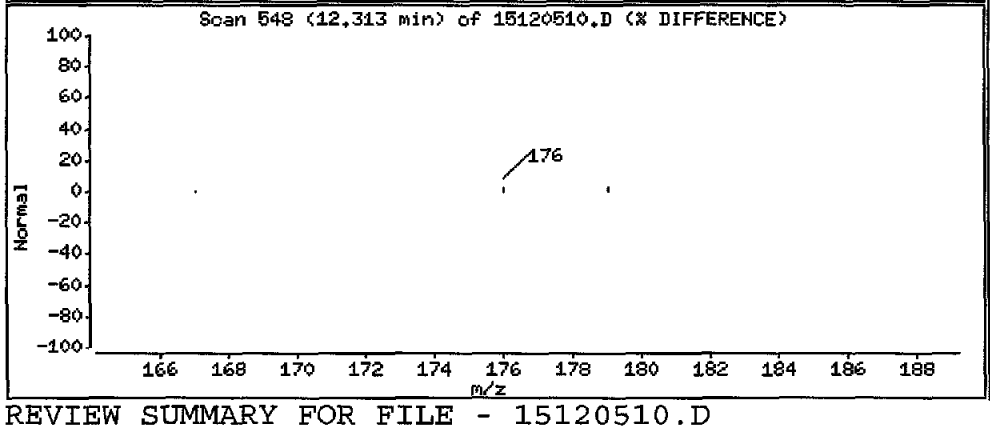
19 Phenanthrene

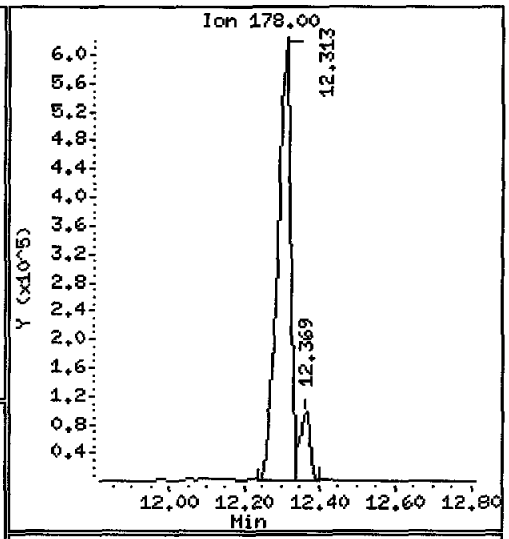
Concentration: 75200 ug/kg

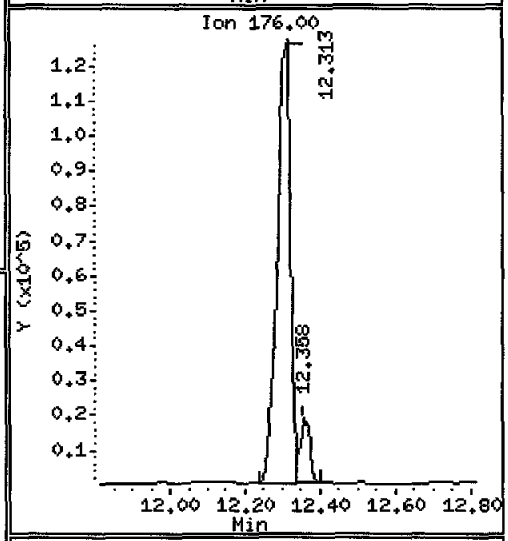


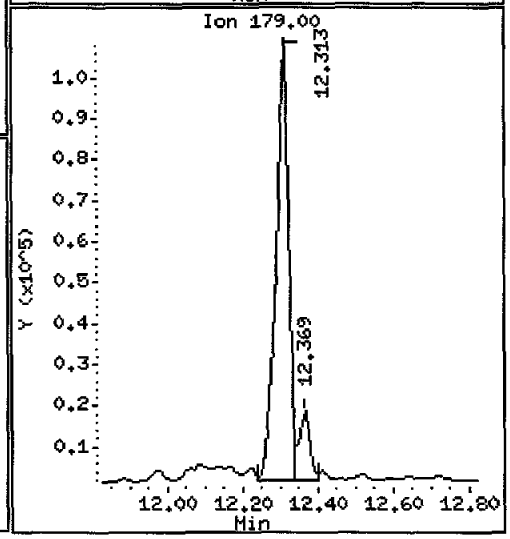








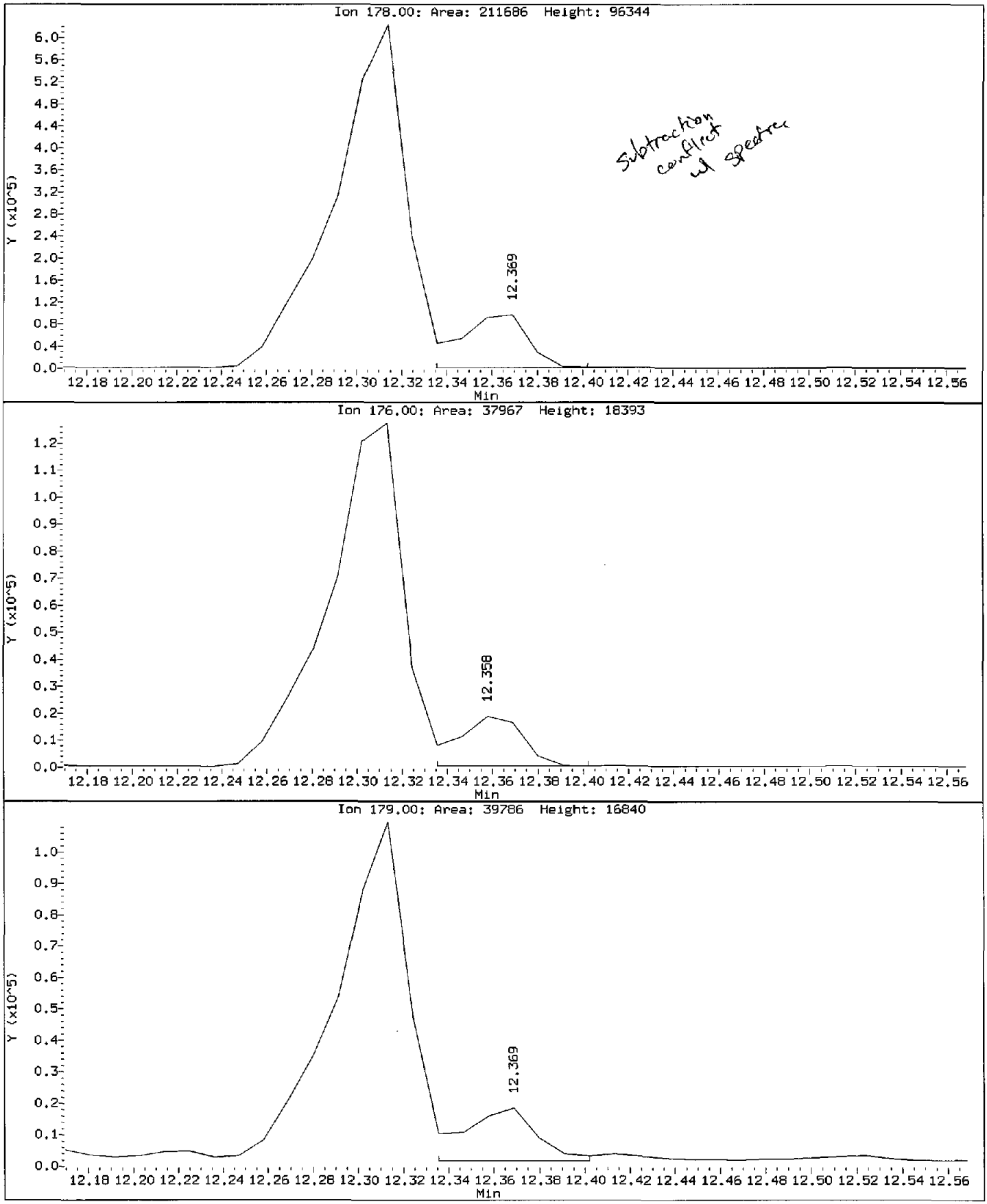




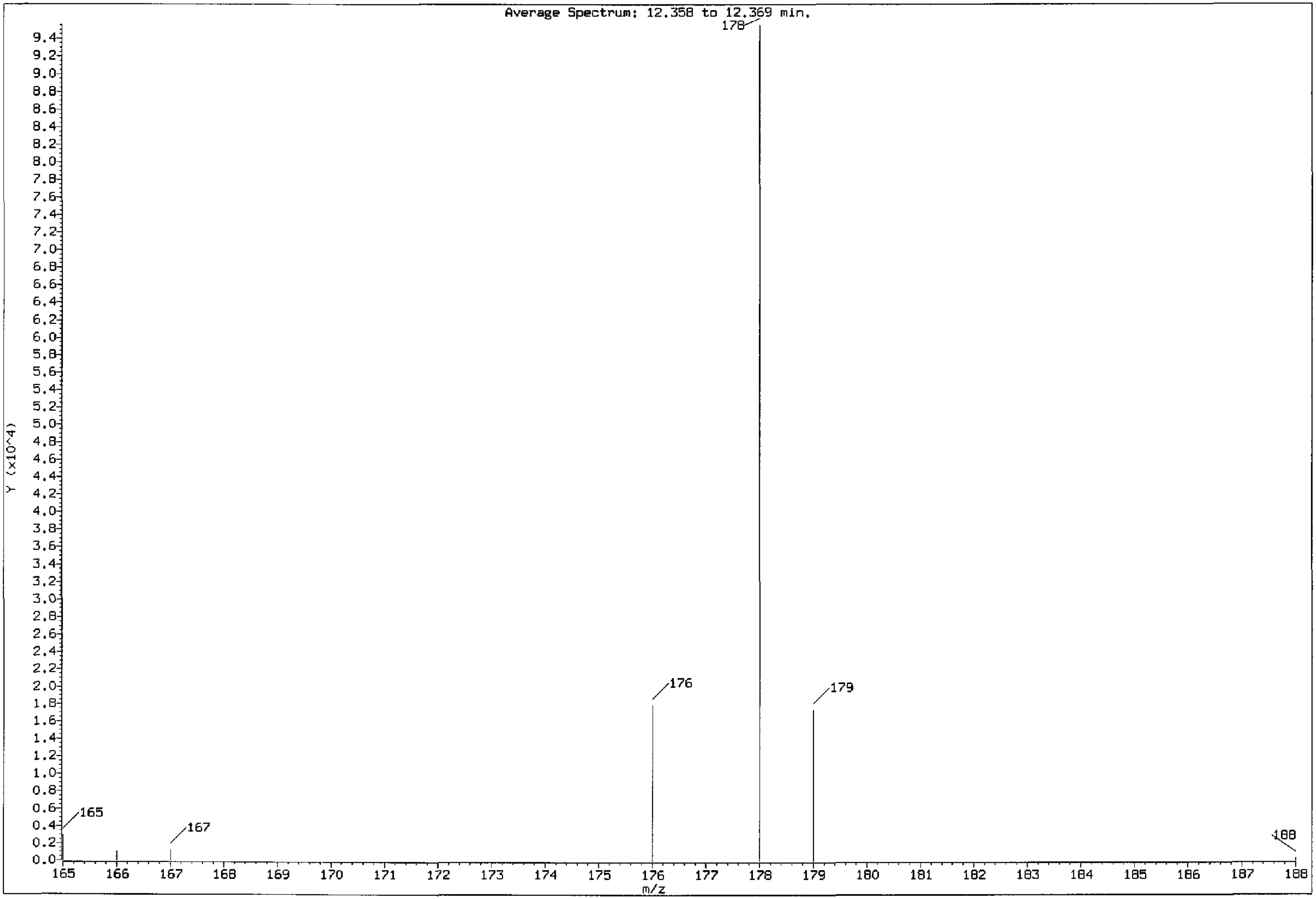
REVIEW SUMMARY FOR FILE - 15120510.D

Data File: \\target\share\chem3\nt11.i\20151205.b\15120510.D
Injection Date: 05-DEC-2015 14:45
Instrument: nt11.i
Client Sample ID: PG-SMA2-5-PEMD-1511

Compound: Anthracene
CAS Number:



Data File: \\target\share\chem3\nt11.i\20151205.b\15120510.D
Injection Date: 05-DEC-2015 14:45
Instrument: nt11.i
Client Sample ID: PG-SMA2-5-PEMD-1511



AQJ9:00245

Data File: \\target\share\chem3\nt11.i\20151205.b\15120510.D

Date : 05-DEC-2015 14:45

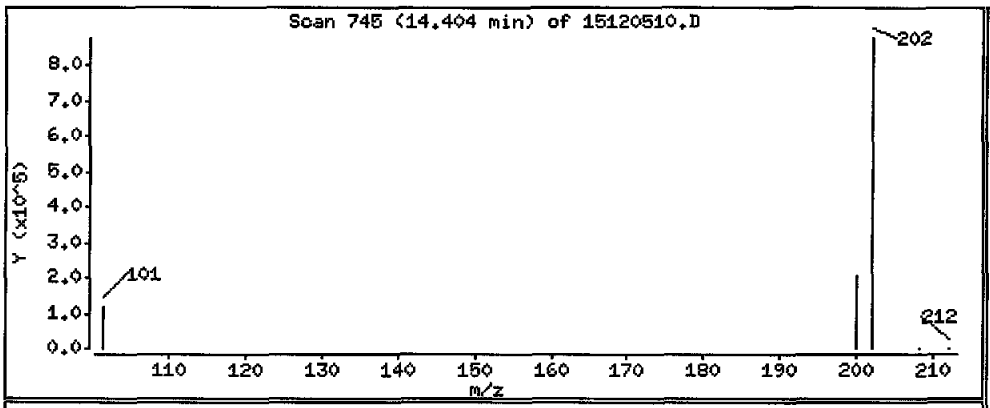
Client ID: PG-SMA2-5-PEMD-1511 Instrument: nt11.i

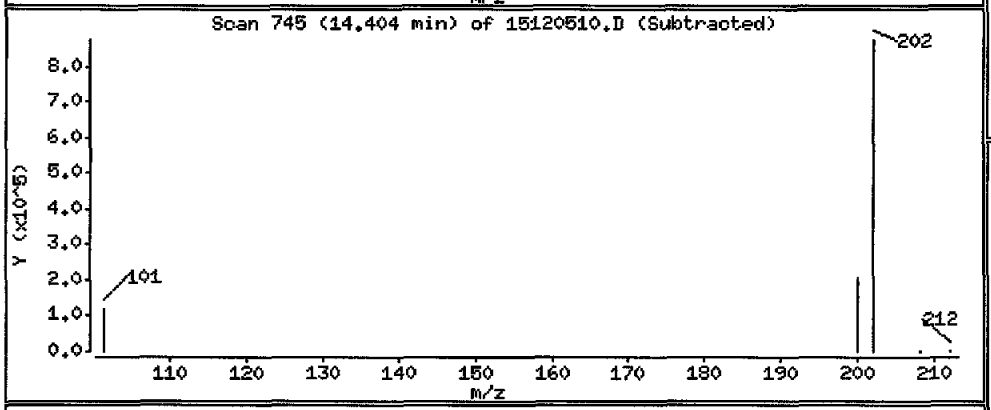
Sample Info: AQJ9G

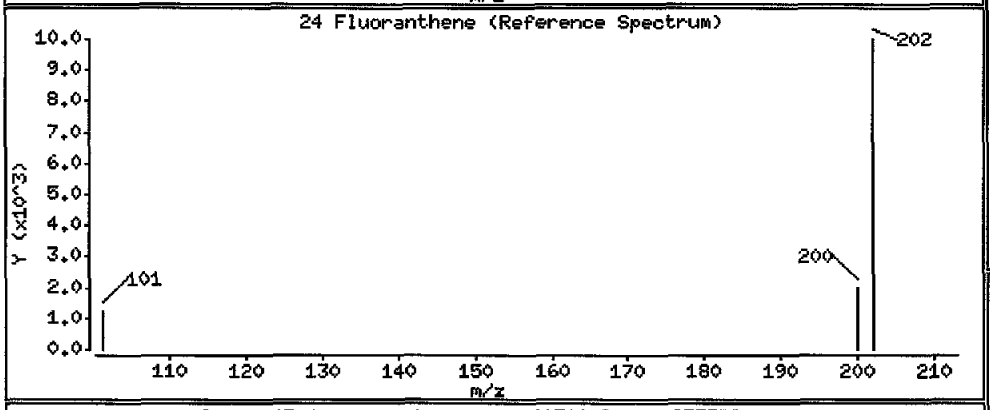
Volume Injected (uL): 2.0 Operator: JW

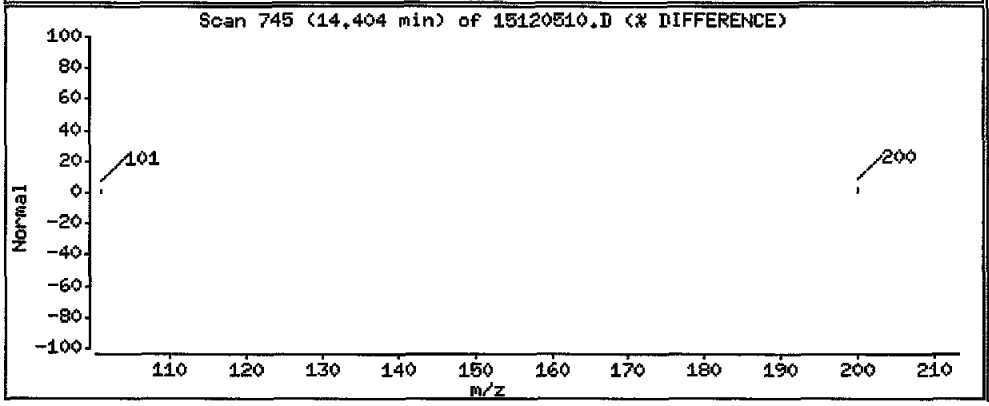
Column phase: Rxi-17Sil MS Column diameter: 0.25

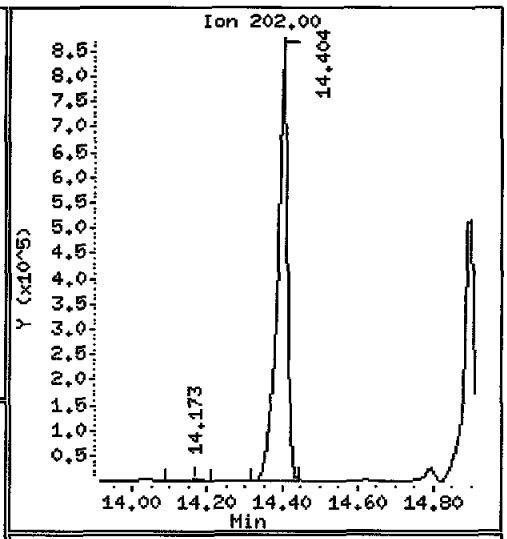
24 Fluoranthene Concentration: 88900 ug/kg

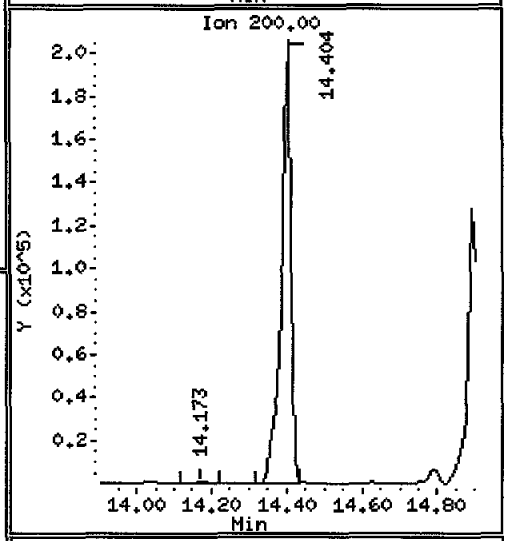


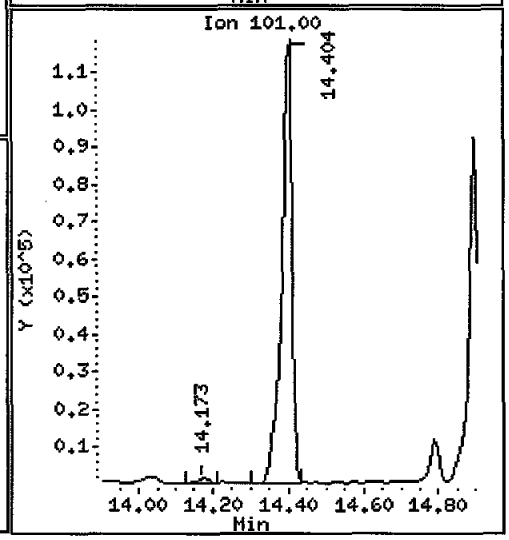












Data File: \\target\share\chem3\nt11.i\20151205.b\15120510.D

Date : 05-DEC-2015 14:45

Client ID: PG-SMA2-5-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9C

Volume Injected (uL): 2.0

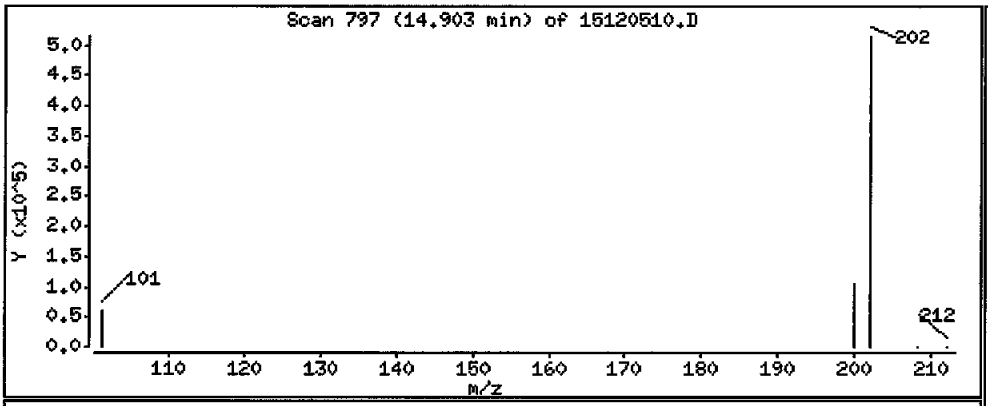
Operator: JW

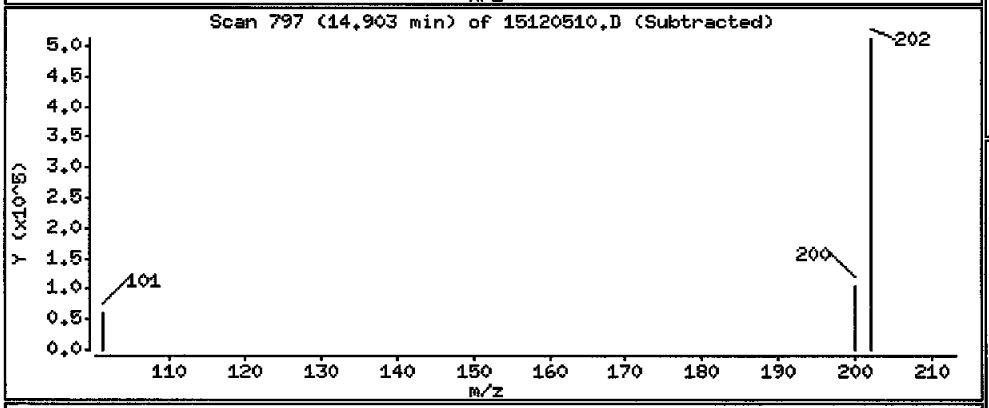
Column phase: Rxi-17Sil MS

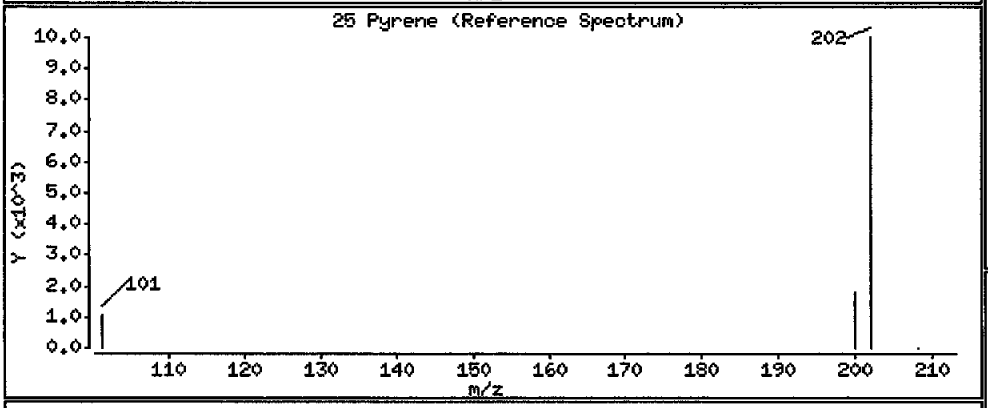
Column diameter: 0.25

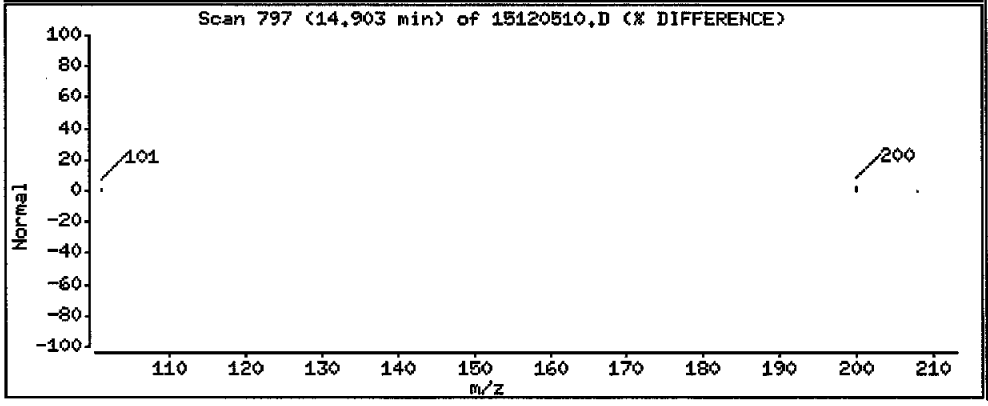
25 Pyrene

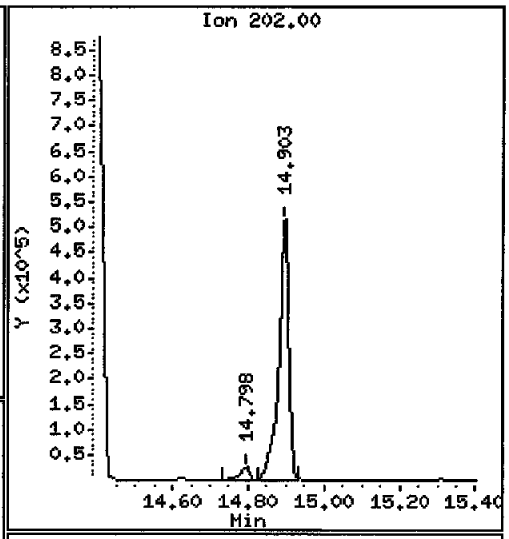
Concentration: 56900 ug/kg

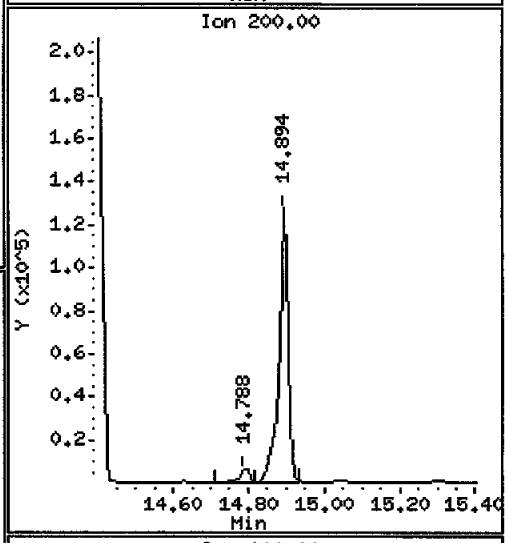


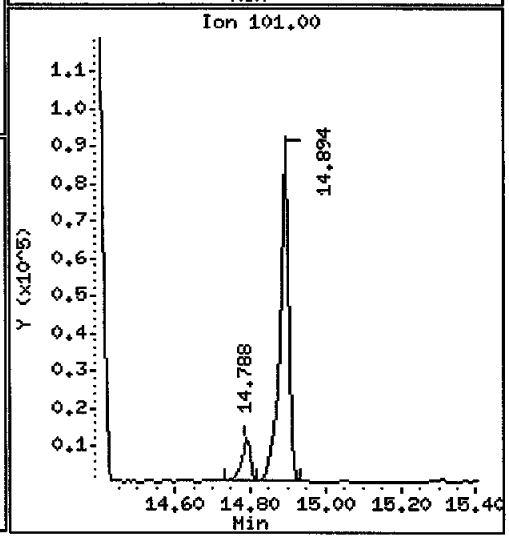












Data File: \\target\share\chem3\nt11.i\20151205.b\15120510.D

Date : 05-DEC-2015 14:45

Client ID: PG-SMA2-5-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9G

Volume Injected (uL): 2.0

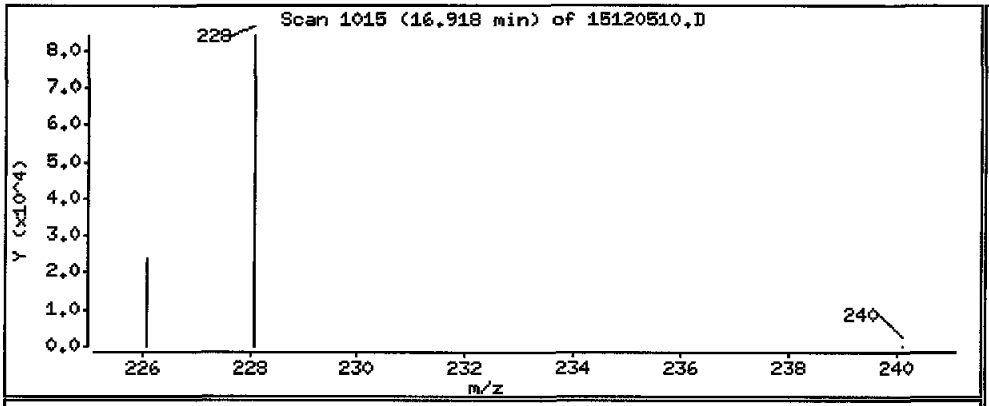
Operator: JW

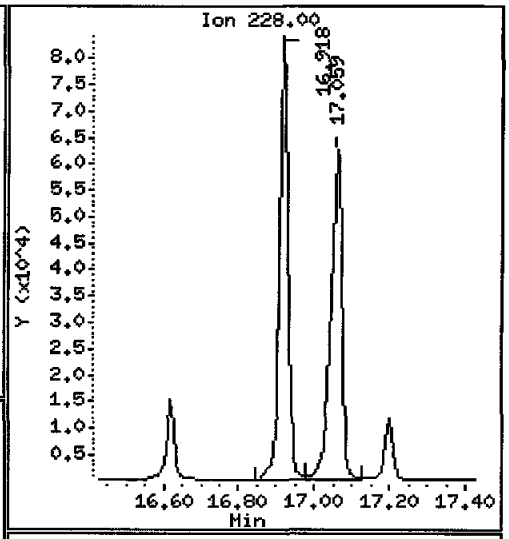
Column phase: Rxi-17Sil MS

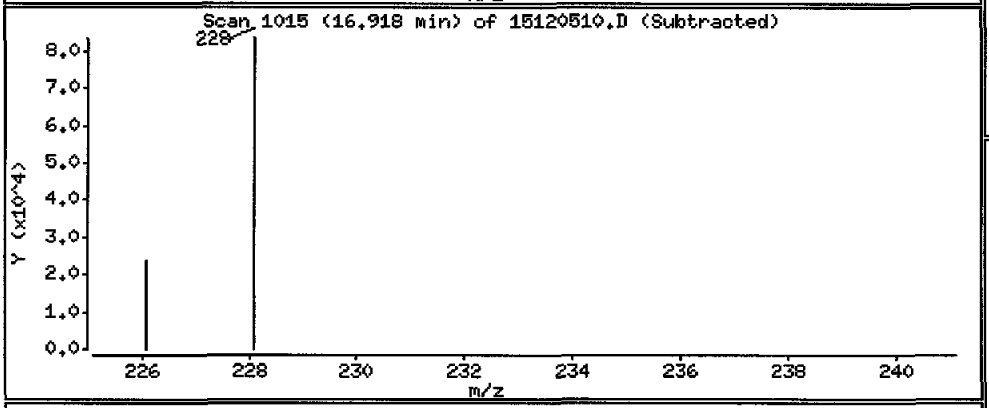
Column diameter: 0.25

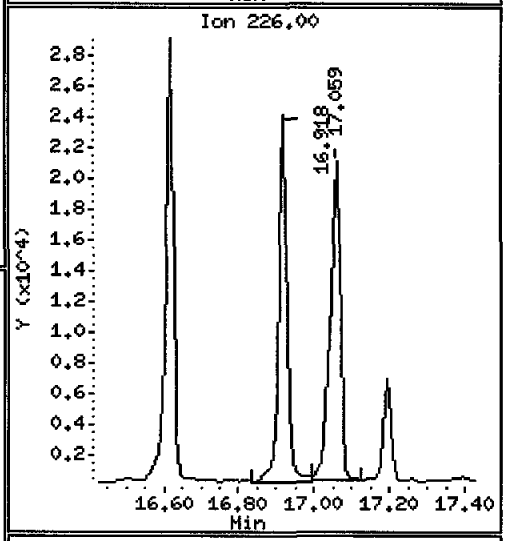
28 Benzo(a)anthracene

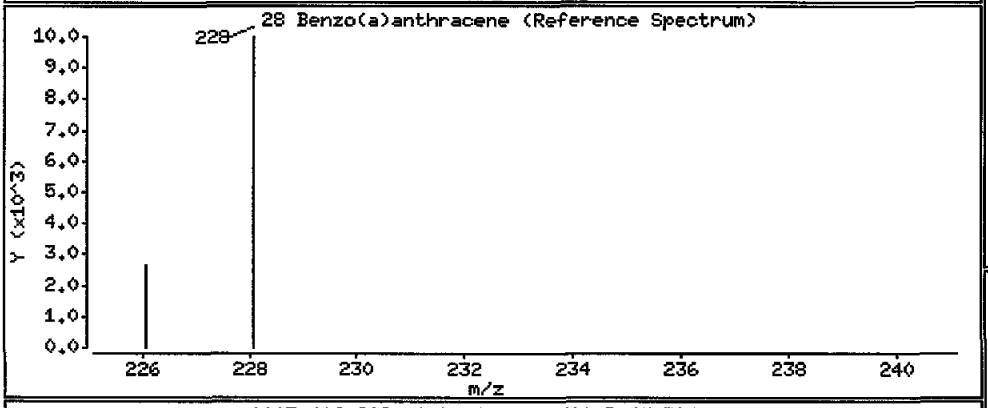
Concentration: 8820 ug/kg

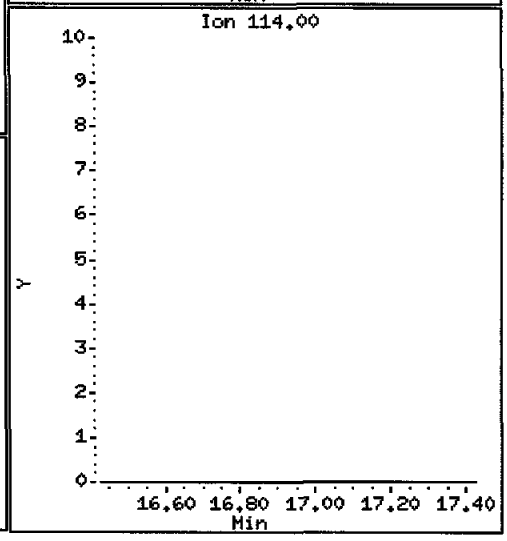


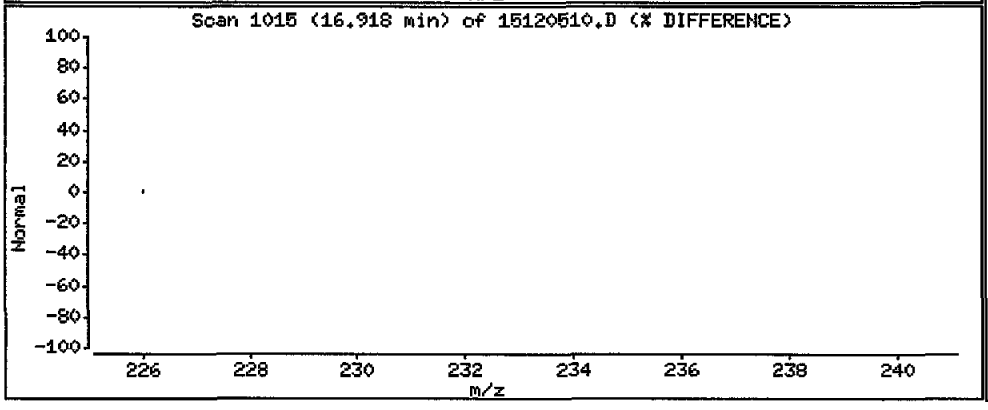












Data File: \\target\share\chem3\nt11.i\20151205.b\15120510.D

Date : 05-DEC-2015 14:45

Client ID: PG-SMA2-5-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9G

Volume Injected (uL): 2.0

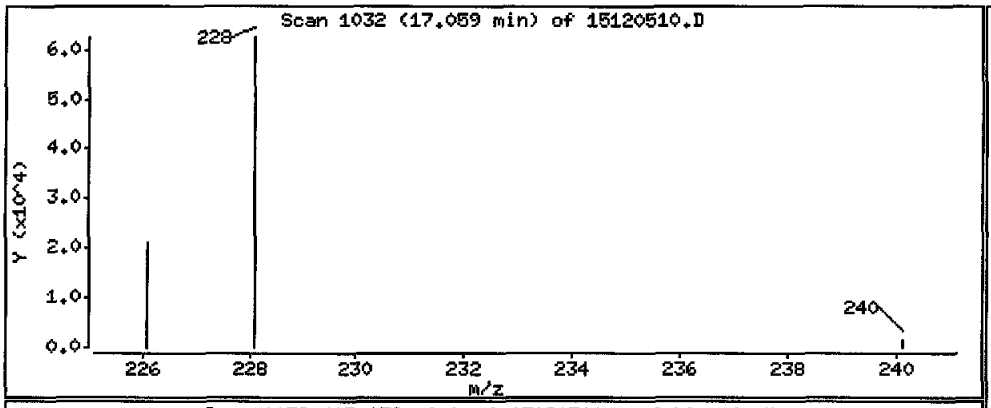
Operator: JW

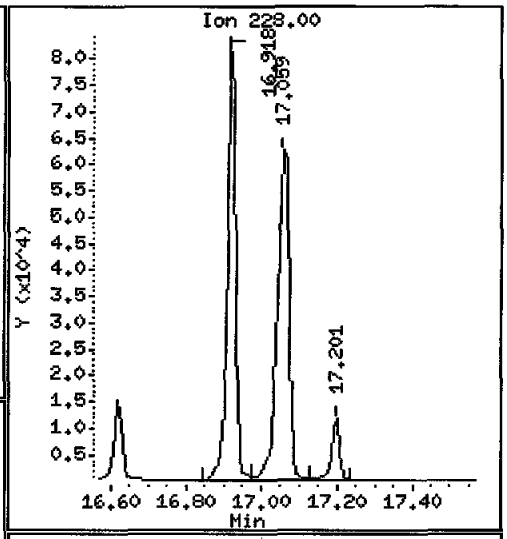
Column phase: Rxi-17Sil MS

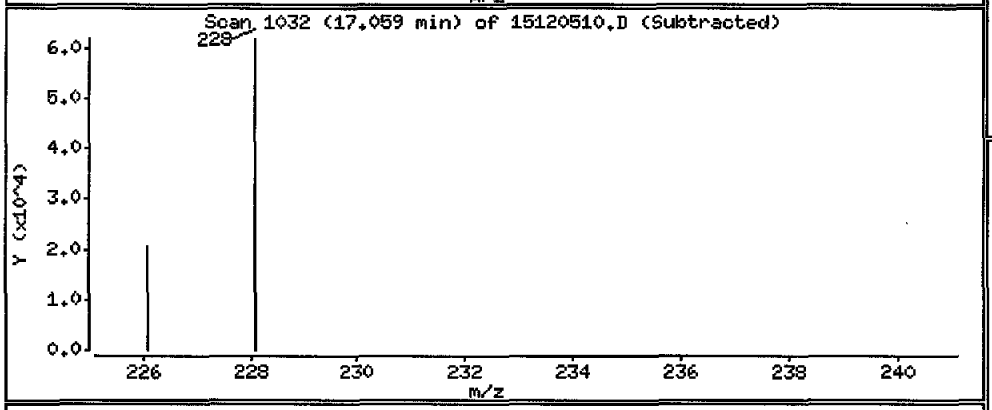
Column diameter: 0.25

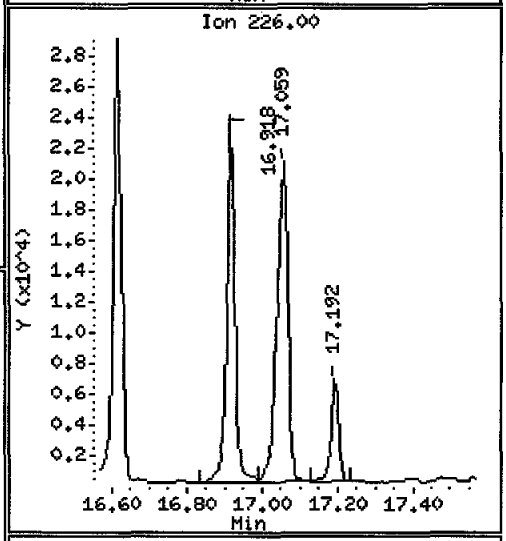
30 Chrysene

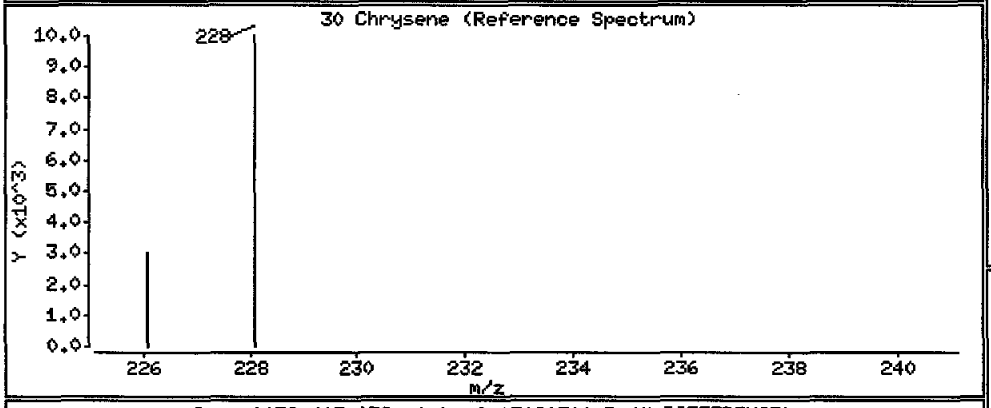
Concentration: 8110 ug/kg

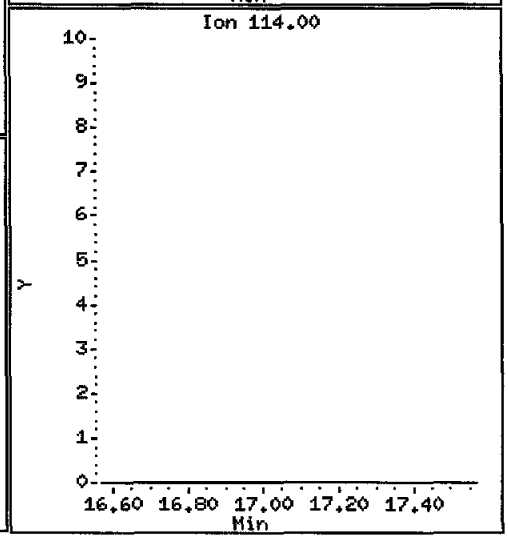


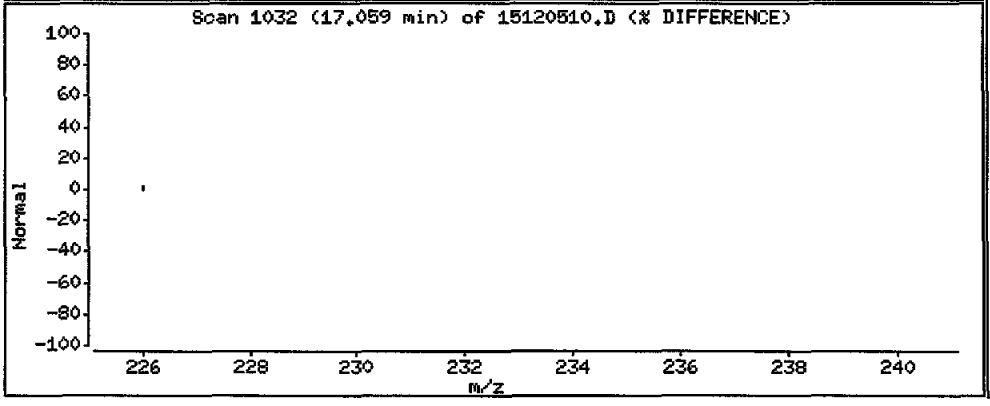












Data File: \\target\share\chem3\nt11.i\20151205.b\15120510.D

Date : 05-DEC-2015 14:45

Client ID: PG-SMA2-5-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9G

Volume Injected (uL): 2.0

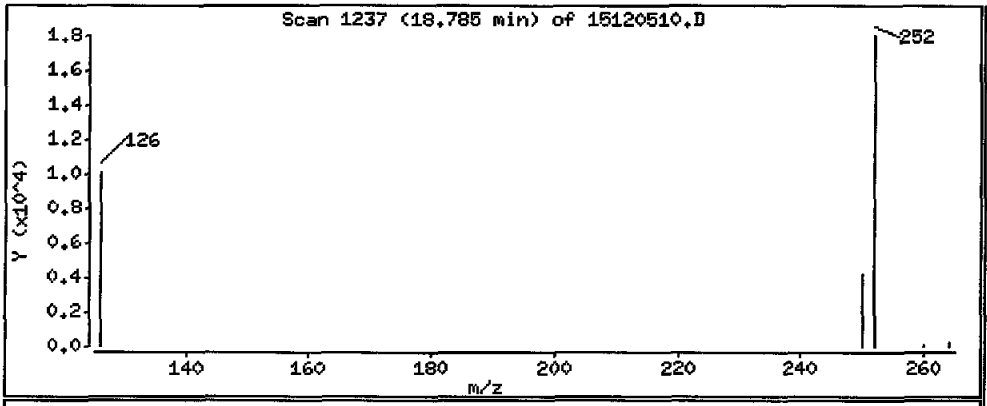
Operator: JW

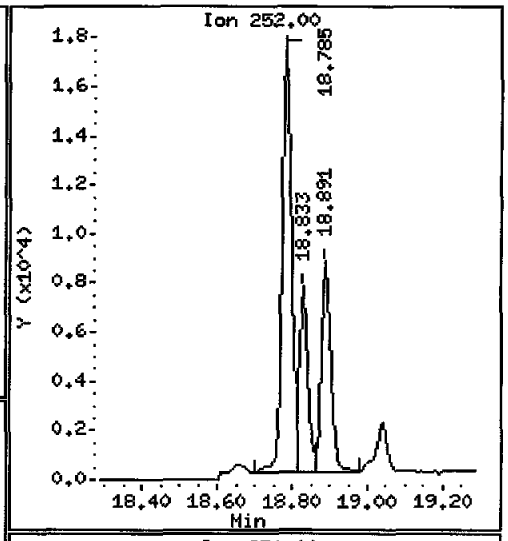
Column phase: Rxi-17Sil MS

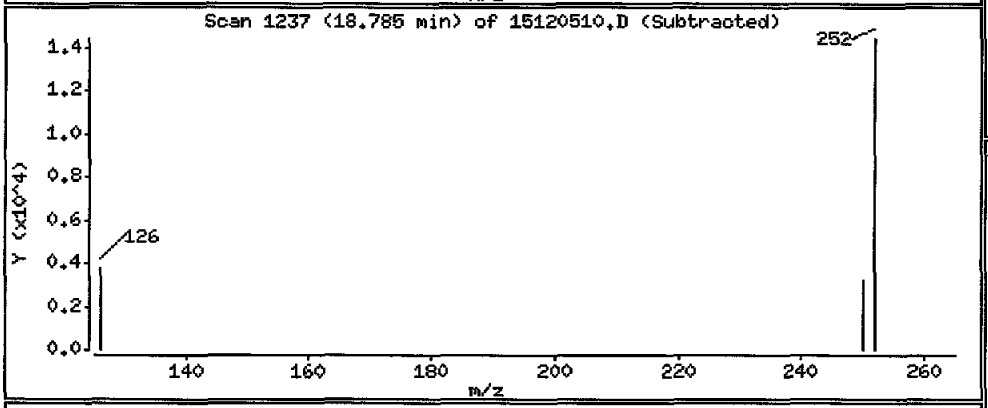
Column diameter: 0.25

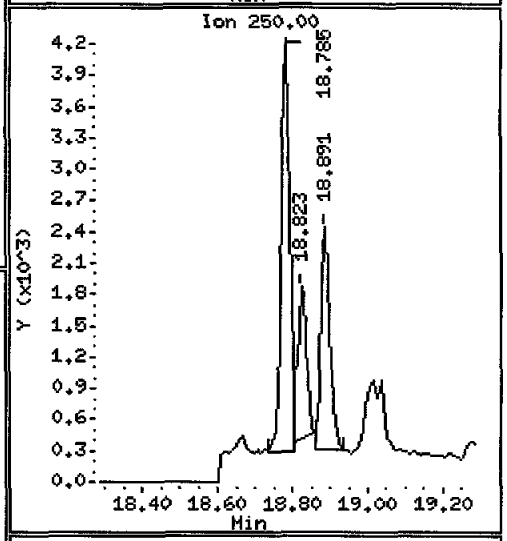
44 Benzo(b)fluoranthene

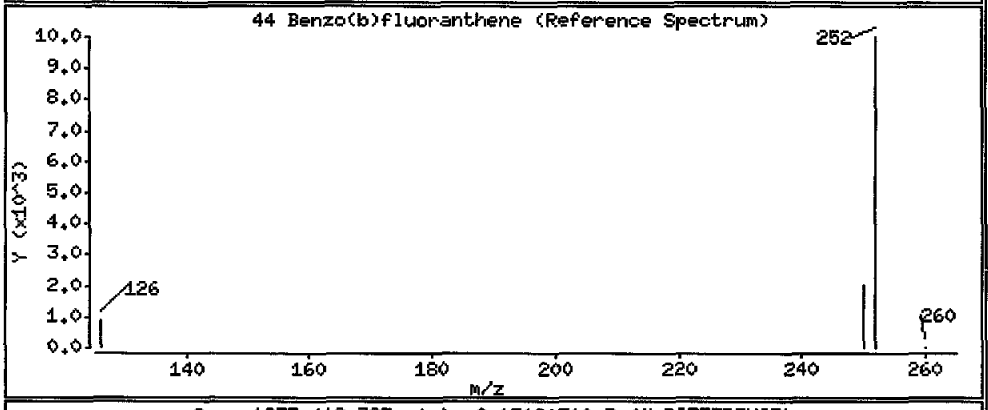
Concentration: 2300 ug/kg

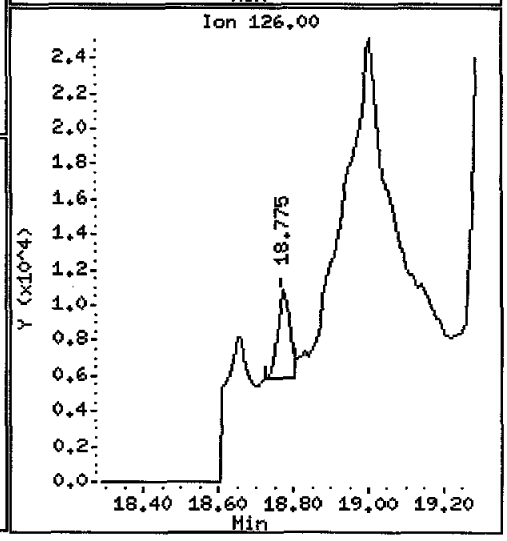


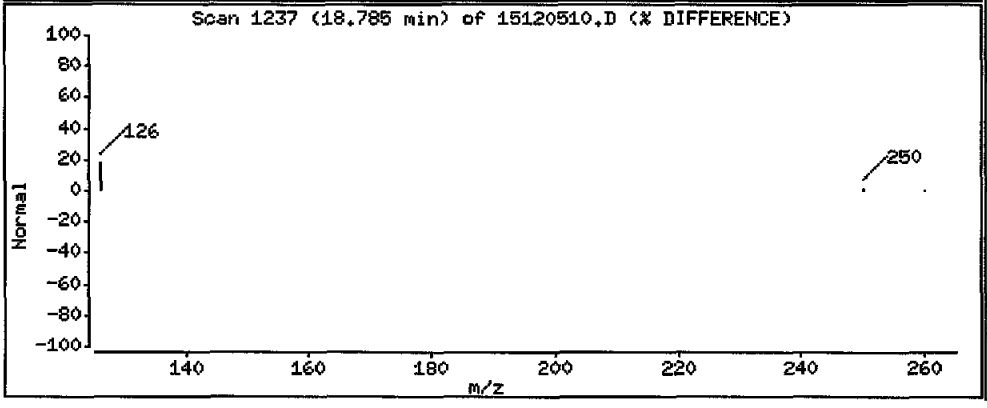












Lab ID: AQJ9G
nt11.i, 20151205.b\lowsim.m, 05-DEC-2015 14:45

RT CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151205.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151205.b\15120511.D
Lab Smp Id: AQJ9I Client Smp ID: PG-SMA2-4-PEMD-1511
Inj Date : 05-DEC-2015 15:16 MS Autotune Date: 23-APR-2014 12:54
Operator : JW Inst ID: nt11.i
Smp Info : AQJ9I
Misc Info : 15-21396
Comment :
Method : \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Meth Date : 14-Dec-2015 10:43 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 11
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	100.000	Volume of final extract (uL)
Ws	0.89000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

JW 12/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	FINAL (ug/kg)	
*	4 Naphthalene-d8	136	6.587	6.597	(1.000)	291014	200.000		
	5 Naphthalene	128	6.618	6.629	(1.005)	293769	174.764	19600	B
$	6 2-Methylnaphthalene-d10	152	7.564	7.574	(1.148)	174381	161.438	18100	
	7 2-Methylnaphthalene	142	7.627	7.627	(1.158)	138943	120.299	13500	
	8 1-Methylnaphthalene	142	7.879	7.889	(1.196)	88305	84.8388	9530	
	10 Acenaphthylene	152	9.434	9.445	(0.984)	25942	13.4593	1510	
*	11 Acenaphthene-d10	164	9.589	9.600	(1.000)	238819	200.000		
	12 Acenaphthene	153	9.656	9.656	(1.007)	618712	483.634	54300	
	14 Dibenzofuran	168	9.866	9.866	(1.029)	443710	230.237	25900	
	15 Fluorene	166	10.486	10.486	(1.094)	573542	396.822	44600	
*	18 Phenanthrene-d10	188	12.269	12.269	(1.000)	387727	200.000		
	19 Phenanthrene	178	12.313	12.313	(1.004)	3154508	1350.39	152000	E
	20 Anthracene	178	12.368	12.368	(1.008)	413820	197.910	22200	
$	23 Fluoranthene-d10	212	14.375	14.374	(1.172)	453067	212.482	23900	
	24 Fluoranthene	202	14.403	14.403	(1.174)	3239827	1381.41	155000	E
	25 Pyrene	202	14.903	14.903	(0.876)	2039177	909.830	102000	
	28 Benzo(a)anthracene	228	16.926	16.918	(0.995)	239240	126.789	14200	
*	29 Chrysene-d12	240	17.018	17.017	(1.000)	283013	200.000		
	30 Chrysene	228	17.067	17.059	(1.003)	243059	117.366	13200	
	44 Benzo(b)fluoranthene	252	18.785	18.784	(0.947)	50035	28.8138	3240	
	45 Benzo(k)fluoranthene	252	18.833	18.833	(0.949)	22253	10.9971	1240	

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)
46	Benzo(j)fluoranthene	252	18.890	18.890	(0.952)	24010	13.0255	1460
34	Benzo(a)pyrene	252	19.640	19.630	(0.990)	20857	12.4454	1400
* 35	Perylene-d12	264	19.842	19.841	(1.000)	256301	200.000	
$ 36	Dibenzo(a,h)anthracene-d14	292	22.208	22.208	(1.119)	185826	179.634	20200
37	Indeno(1,2,3-cd)pyrene	276	Compound Not Detected.					
38	Dibenzo(a,h)anthracene	278	Compound Not Detected.					
39	Benzo(g,h,i)perylene	276	Compound Not Detected.					
47	Perylene	252	Compound Not Detected.					
48	Benzo(e)pyrene	252	19.524	19.524	(0.984)	31540	17.9720	2020

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120511.D
Lab Smp Id: AQJ9I
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21396

Calibration Date: 05-DEC-2015
Calibration Time: 10:30
Client Smp ID: PG-SMA2-4-PEMD-
Level: LOW
Sample Type: Tissue

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	291014	-11.25
11 Acenaphthene-d10	239179	119590	478358	238819	-0.15
18 Phenanthrene-d10	372253	186127	744506	387727	4.16
29 Chrysene-d12	294711	147356	589422	283013	-3.97
35 Perylene-d12	260595	130298	521190	256301	-1.65

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.59	-0.16
11 Acenaphthene-d10	9.60	9.10	10.10	9.59	-0.11
18 Phenanthrene-d10	12.27	11.77	12.77	12.27	0.00
29 Chrysene-d12	17.02	16.52	17.52	17.02	0.00
35 Perylene-d12	19.84	19.34	20.34	19.84	0.00

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.

ARI Labs, Inc.

RECOVERY REPORT

Client Name: Anchor QEA, LLC
Sample Matrix: SOLID
Lab Smp Id: AQJ9I
Level: LOW
Data Type: MS DATA
SpikeList File: waterlcs.spk
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21396

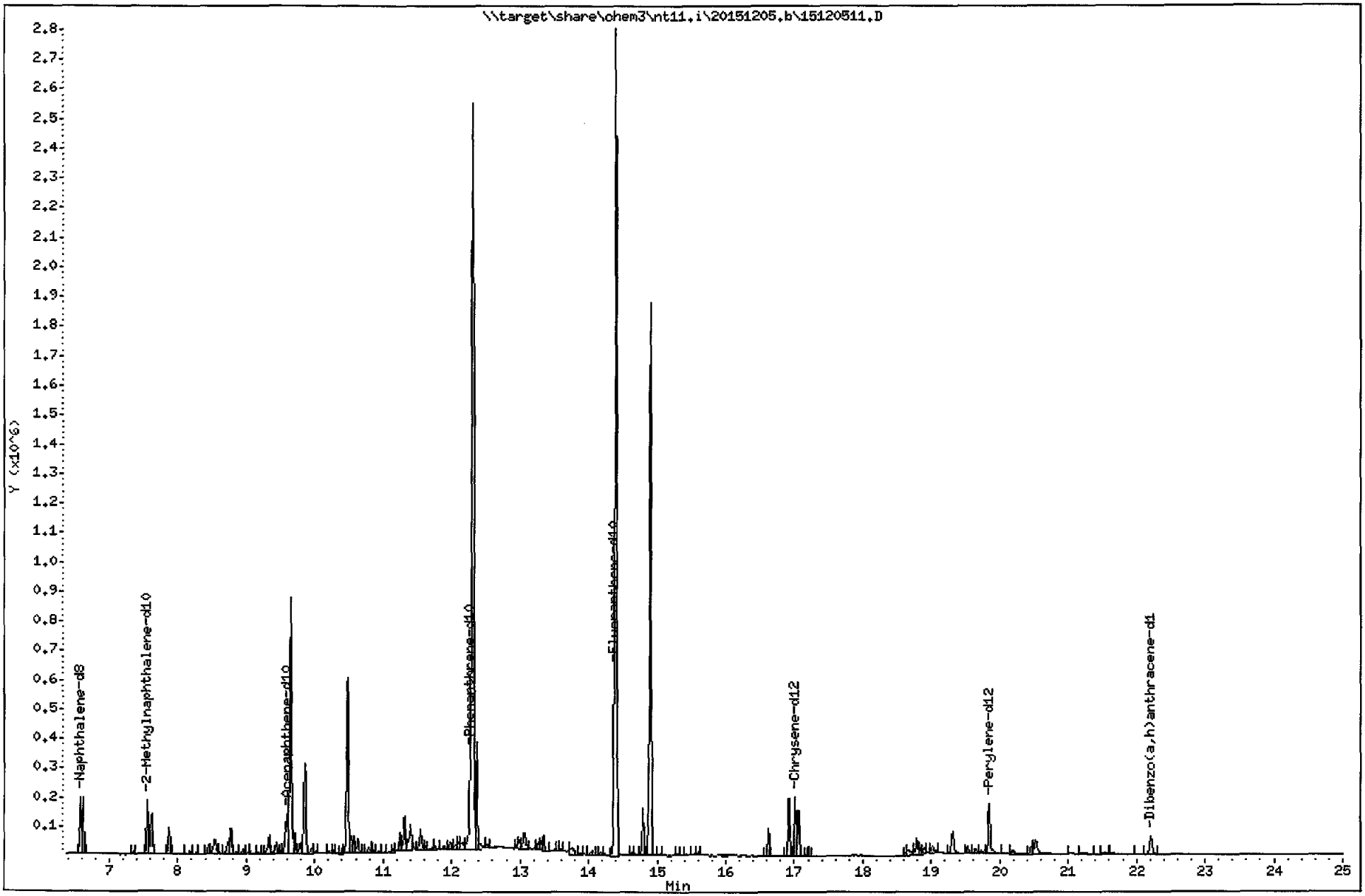
Client SDG: AQJ9
Fraction: SV
Client Smp ID: PG-SMA2-4-PEMD-1511
Operator: JW
SampleType: SAMPLE
Quant Type: ISTD

SURROGATE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
$ 6 2-Methylnaphthalen	33700	18100	53.81	30-160
$ 23 Fluoranthene-d10	33700	23900	70.83	30-160
$ 36 Dibenzo(a,h)anthra	33700	20200	59.88	30-160

Data File: \\target\share\chem3\nt11.i\20151205.b\15120511.D
Date : 05-DEC-2015 15:16
Client ID: PG-SMA2-4-PEMD-1511
Sample Info: AQJ9I
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: JW
Column diameter: 0.25

AQJ9:00256



Data File: \\target\share\chem3\nt11.i\20151205.b\15120511.D

Date : 05-DEC-2015 15:16

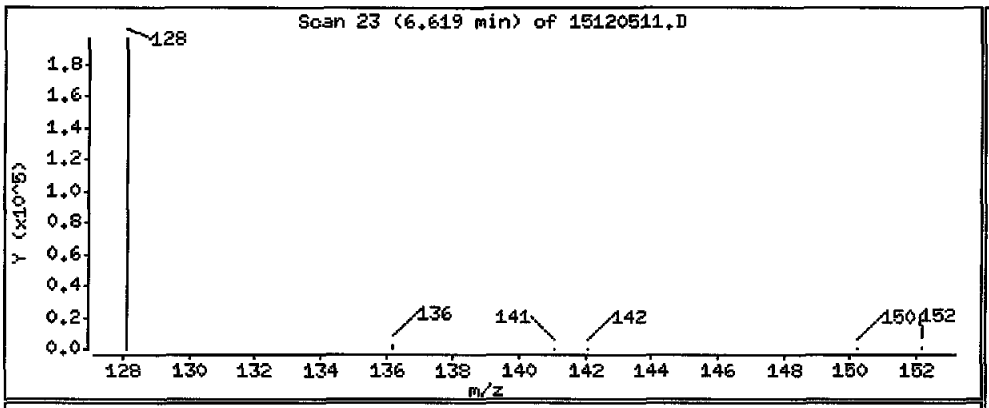
Client ID: PG-SMA2-4-PEMD-1511 Instrument: nt11.i

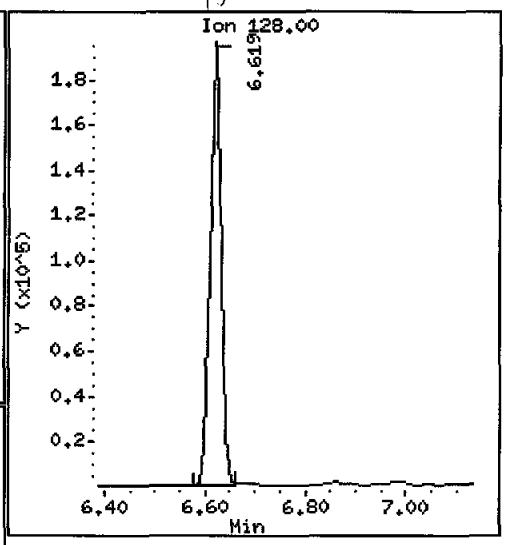
Sample Info: AQJ9I

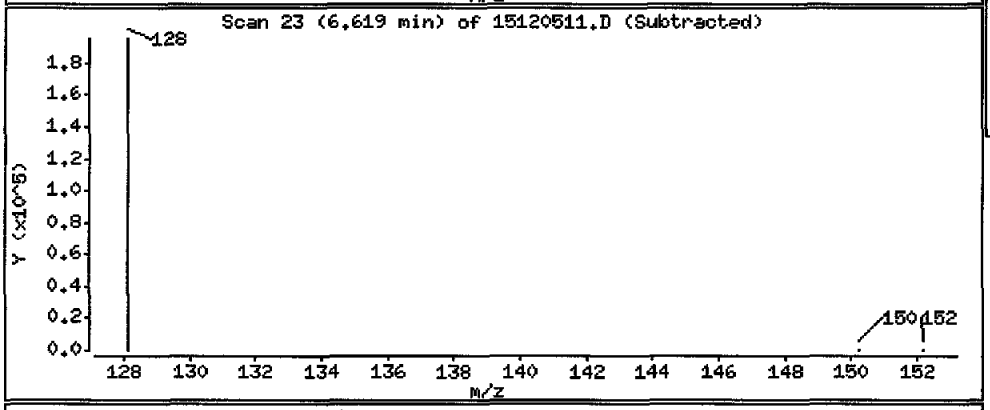
Volume Injected (uL): 2.0 Operator: JW

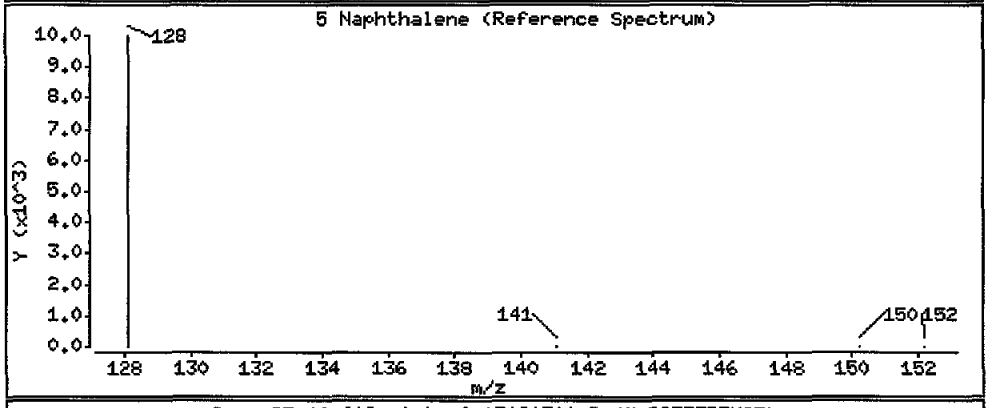
Column phase: Rxi-17Sil MS Column diameter: 0.25

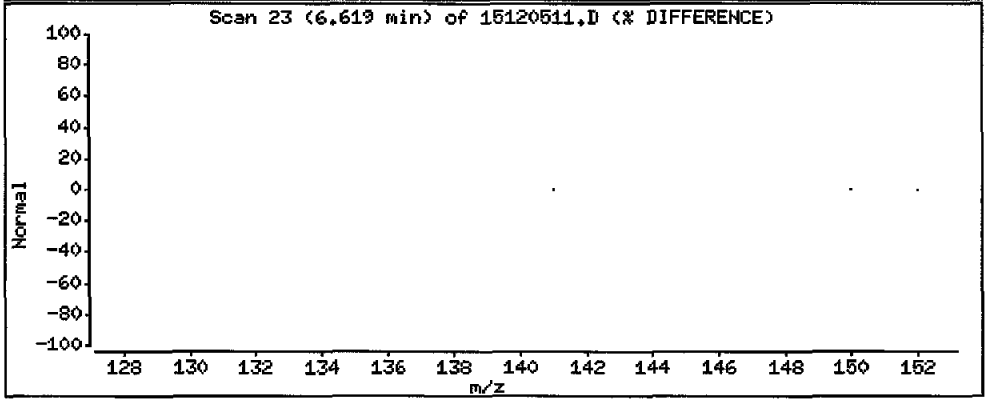
5 Naphthalene Concentration: 19600 ug/kg











Data File: \\target\share\chem3\nt11.i\20151205.b\15120511.D

Date : 05-DEC-2015 15:16

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I

Volume Injected (uL): 2.0

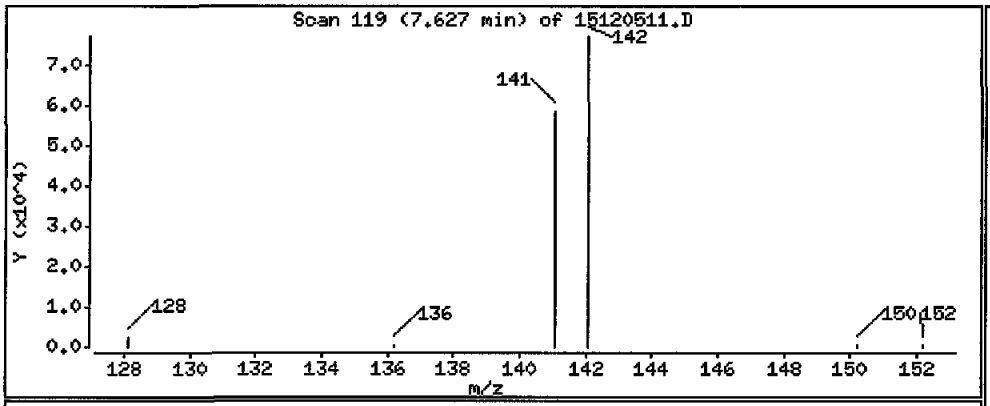
Operator: JW

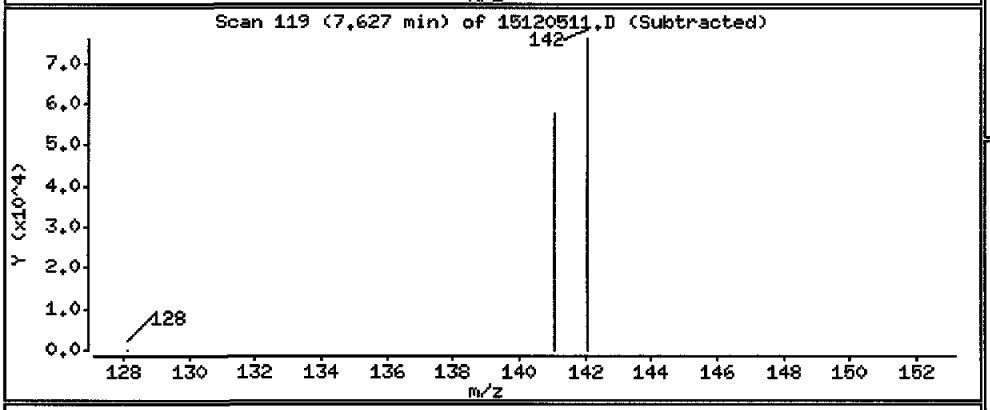
Column phase: Rxi-17Sil MS

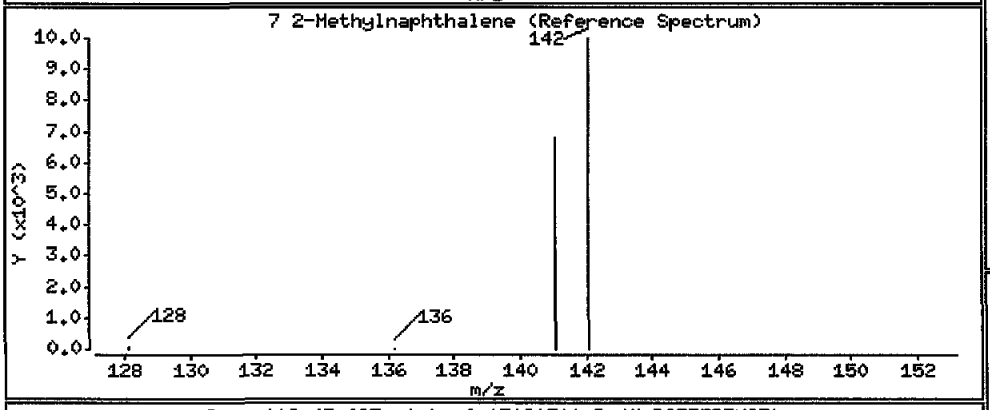
Column diameter: 0.25

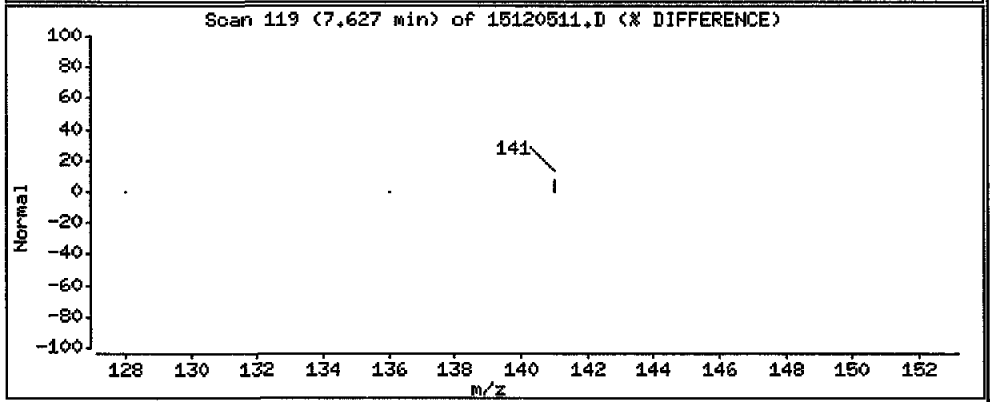
7 2-Methylnaphthalene

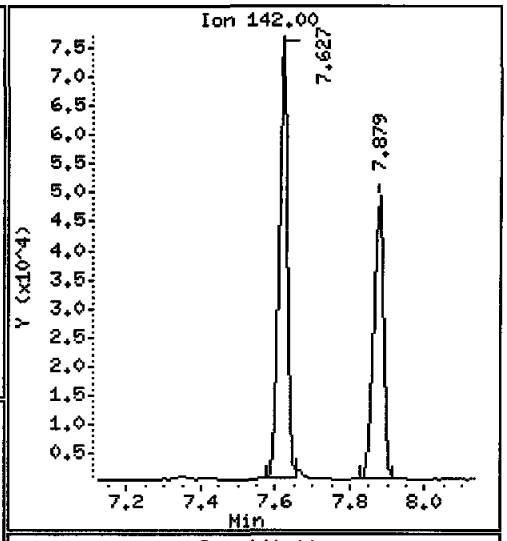
Concentration: 13500 ug/kg

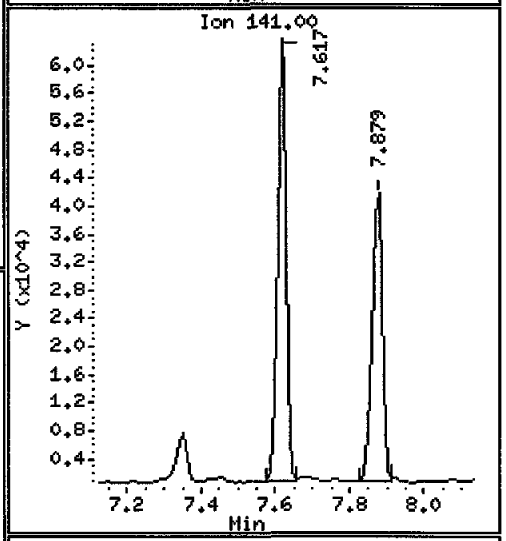


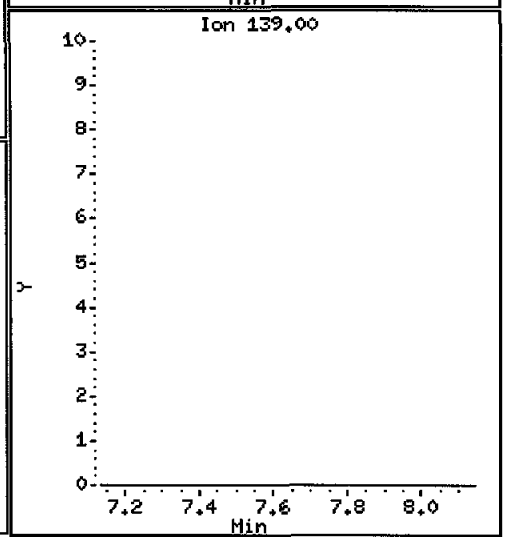












Data File: \\target\share\chem3\nt11.i\20151205.b\15120511.D

Date : 05-DEC-2015 15:16

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I

Volume Injected (uL): 2.0

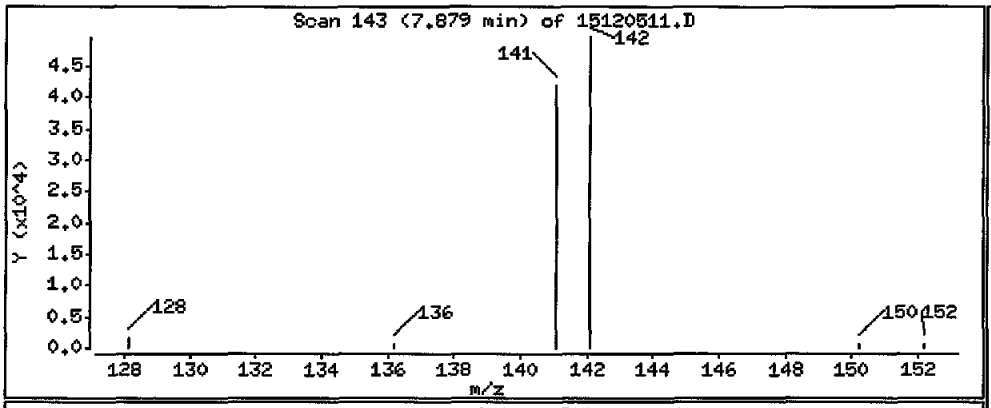
Operator: JW

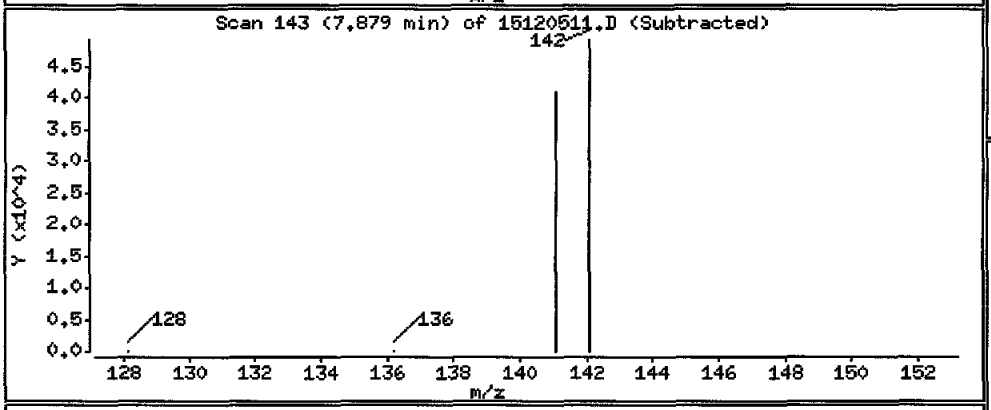
Column phase: Rxi-17Sil MS

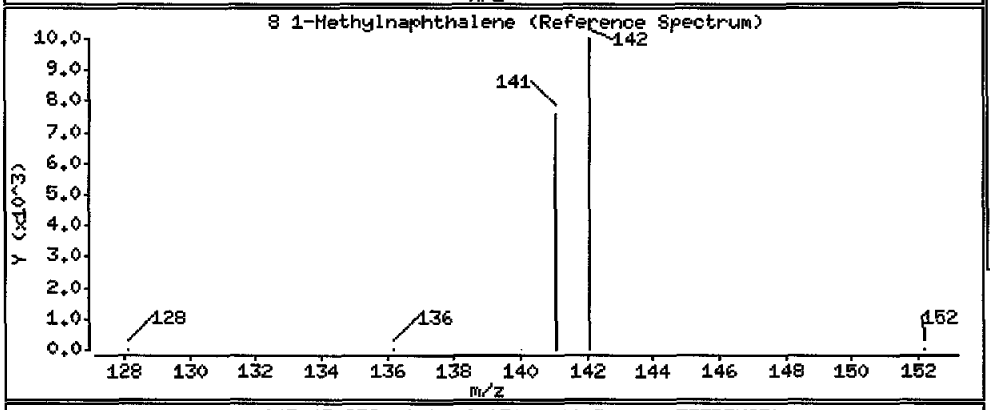
Column diameter: 0.25

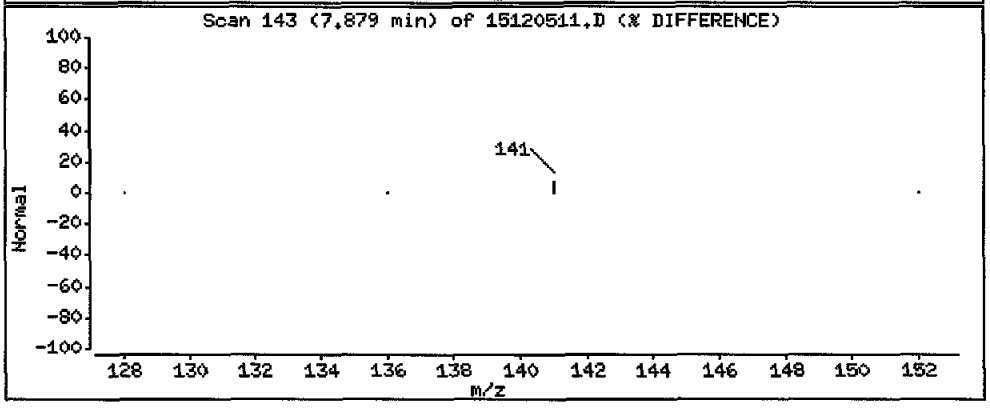
8 1-Methylnaphthalene

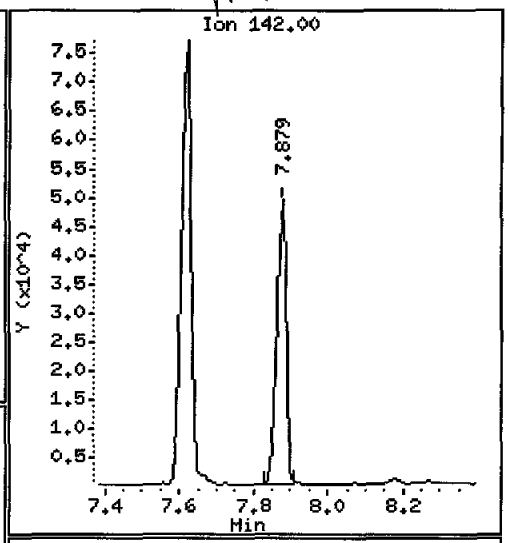
Concentration: 9530 ug/kg

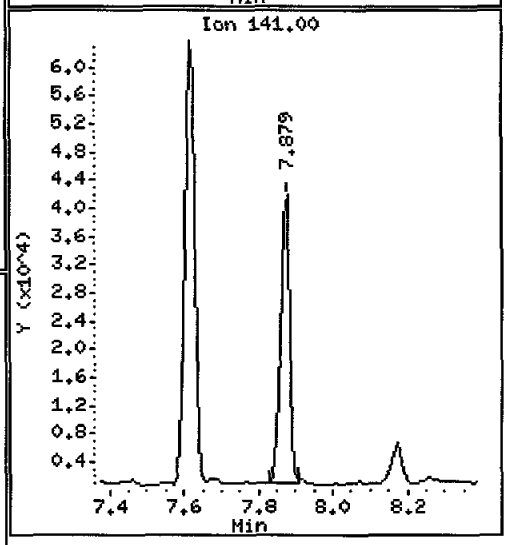












Data File: \\target\share\chem3\nt11.i\20151205.b\15120511.D

Date : 05-DEC-2015 15:16

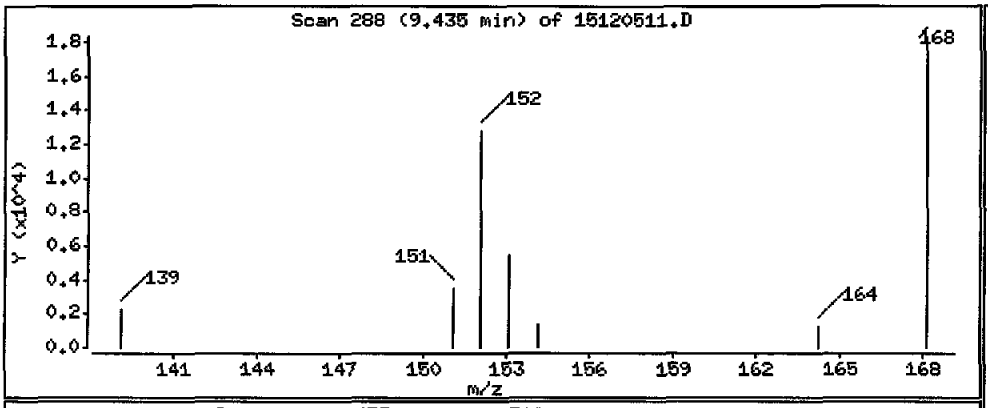
Client ID: PC-SMA2-4-PEMD-1511 Instrument: nt11.i

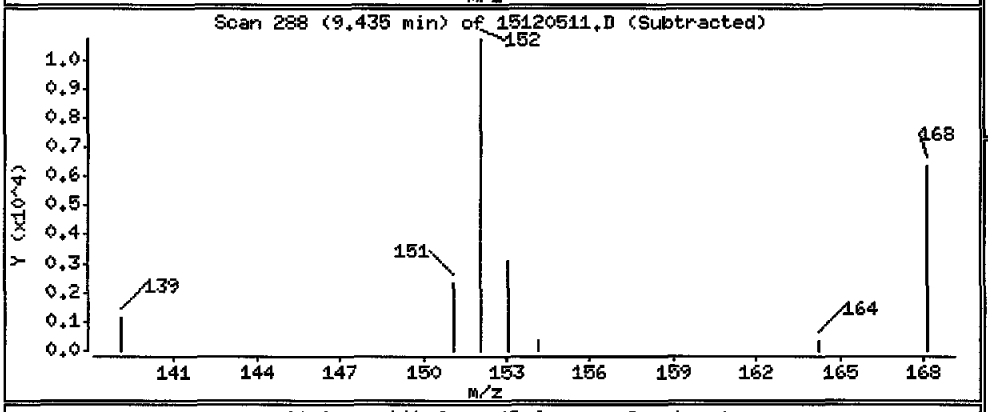
Sample Info: AQJ9I

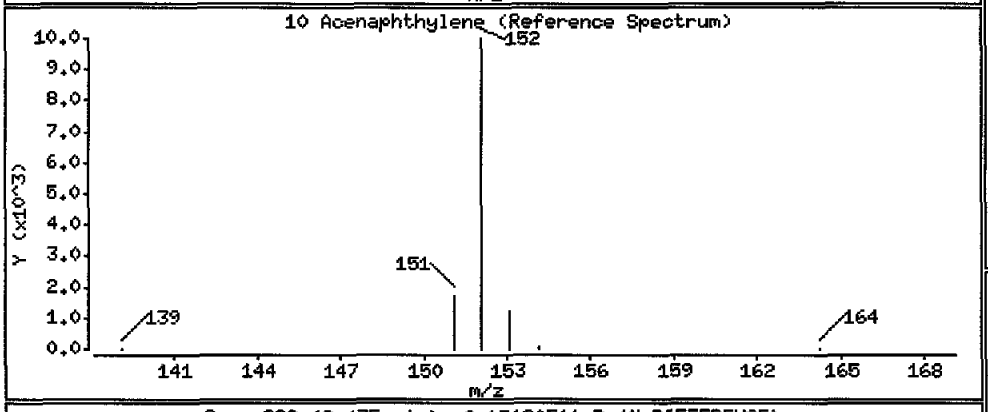
Volume Injected (uL): 2.0 Operator: JW

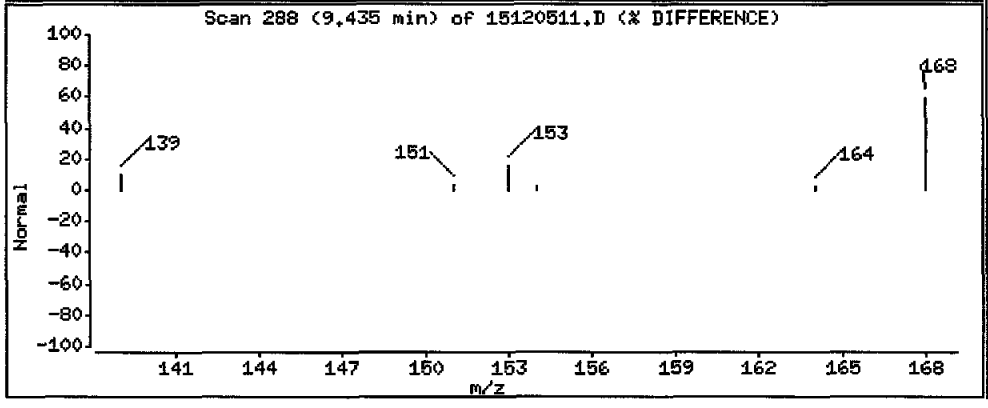
Column phase: Rxi-17Sil MS Column diameter: 0.25

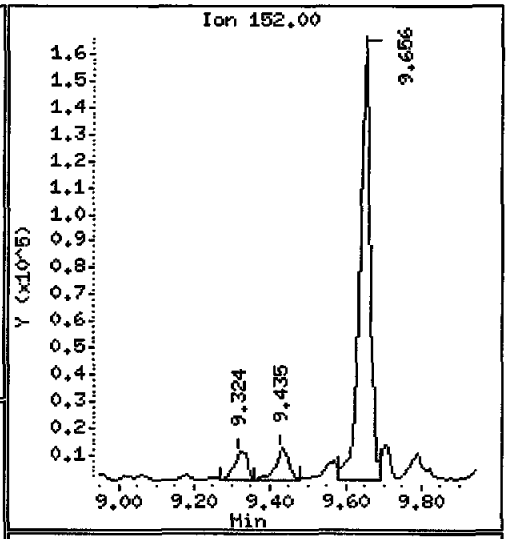
10 Acenaphthylene Concentration: 1510 ug/kg

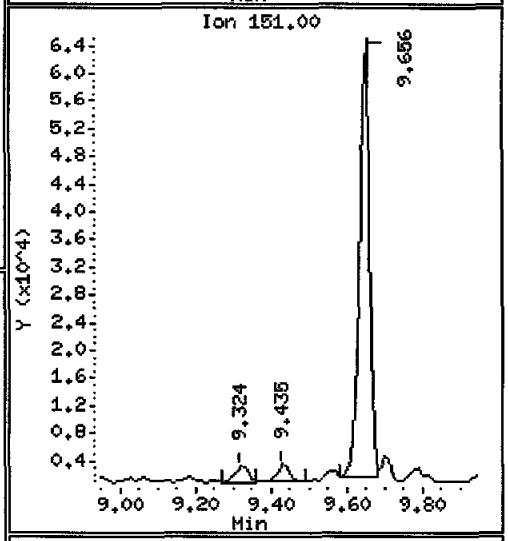


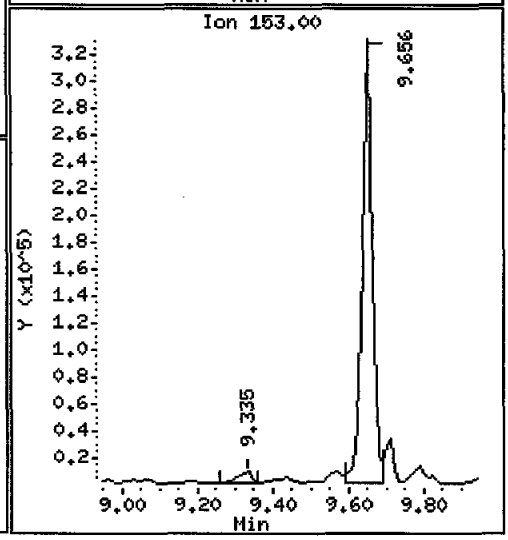












Data File: \\target\share\chem3\nt11.i\20151205.b\15120511.D

Date : 05-DEC-2015 15:16

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I

Volume Injected (uL): 2.0

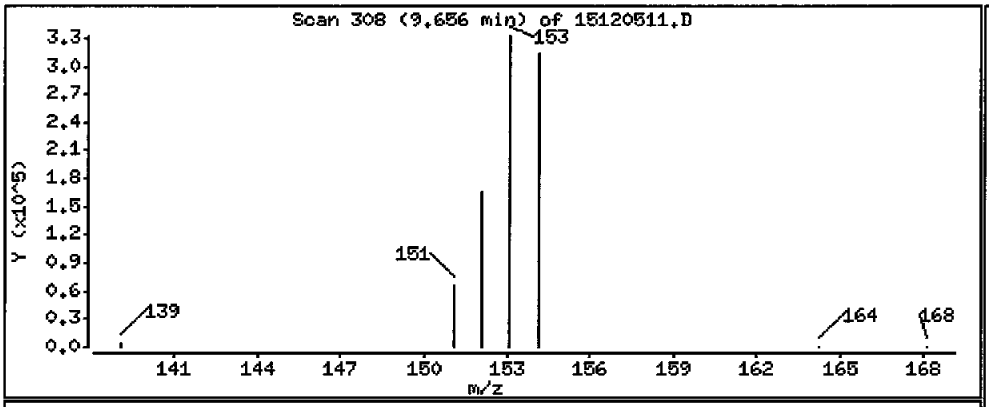
Operator: JW

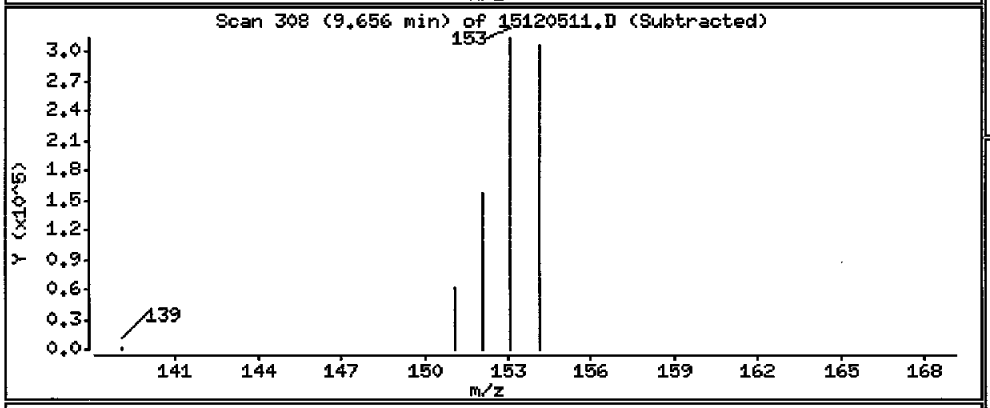
Column phase: Rxi-17Sil MS

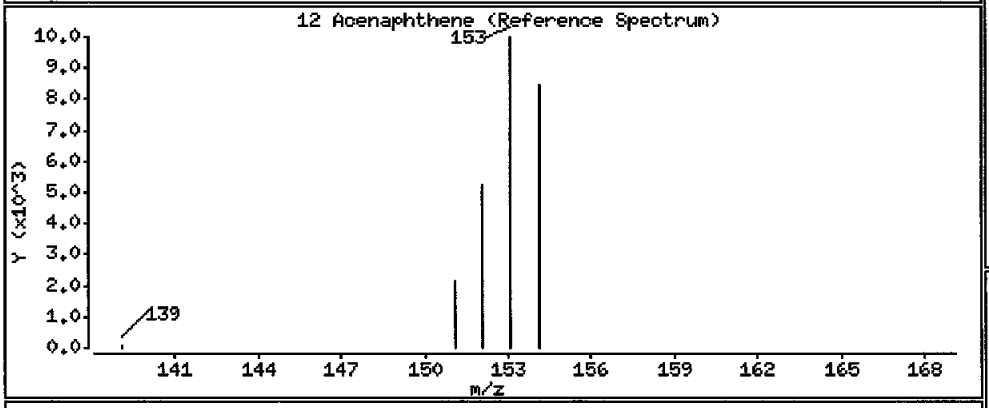
Column diameter: 0.25

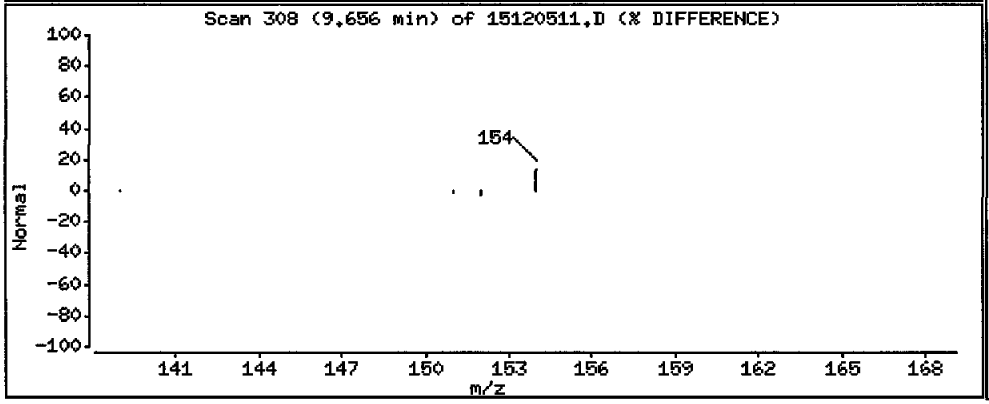
12 Acenaphthene

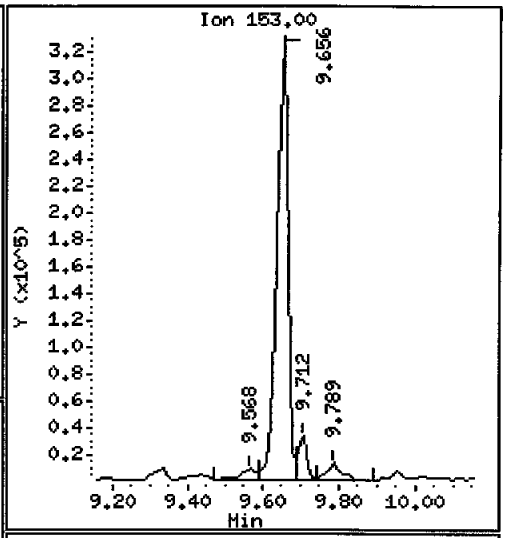
Concentration: 54300 ug/kg

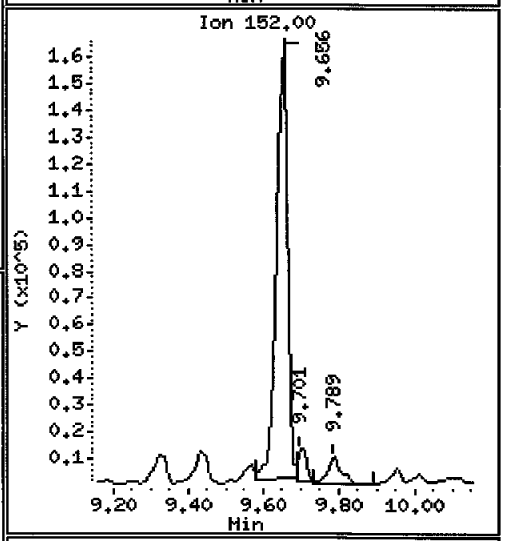


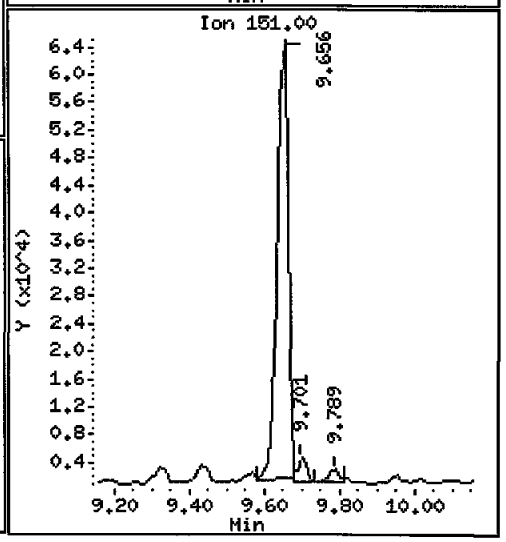












Data File: \\target\share\chem3\nt11.i\20151205.b\15120511.D

Date : 05-DEC-2015 15:16

Client ID: PC-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I

Volume Injected (uL): 2.0

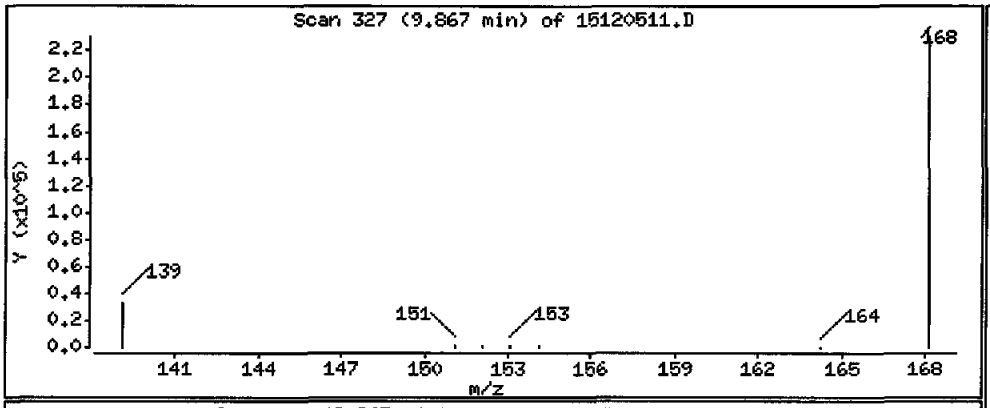
Operator: JW

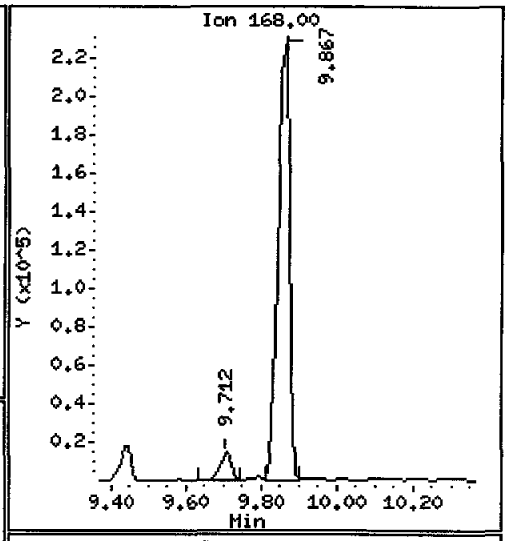
Column phase: Rxi-17Sil MS

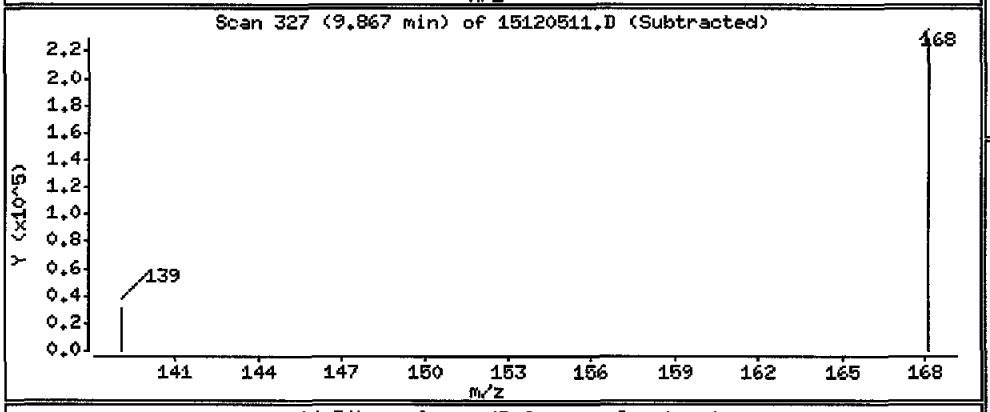
Column diameter: 0.25

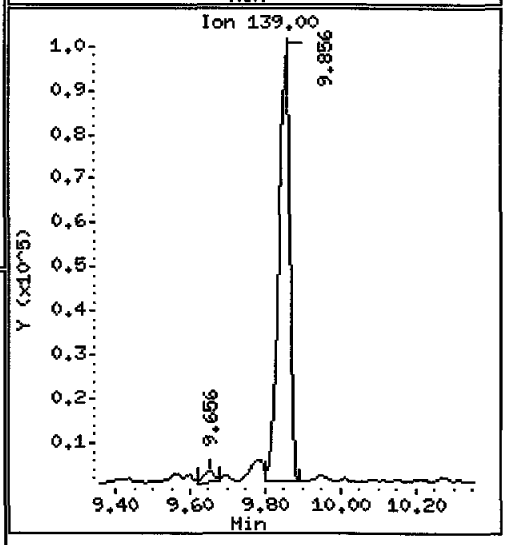
14 Dibenzofuran

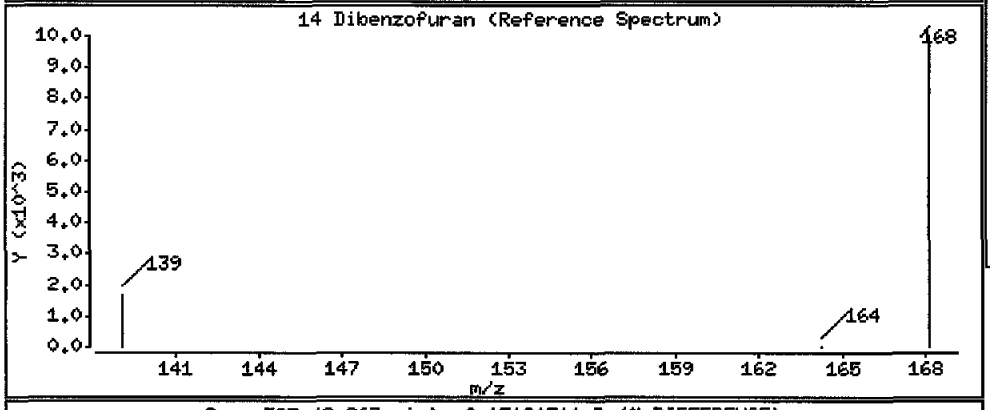
Concentration: 25900 ug/kg

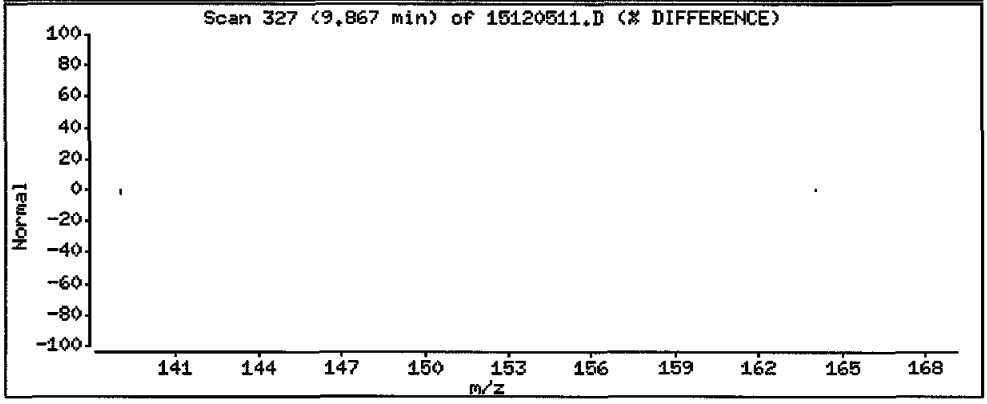












Data File: \\target\share\chem3\nt11.i\20151205.b\15120511.D

Date : 05-DEC-2015 15:16

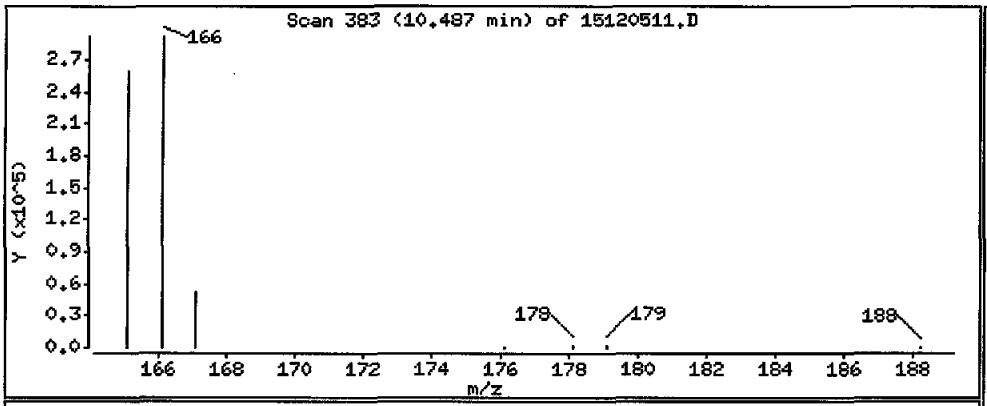
Client ID: PG-SMA2-4-PEMD-1511 Instrument: nt11.i

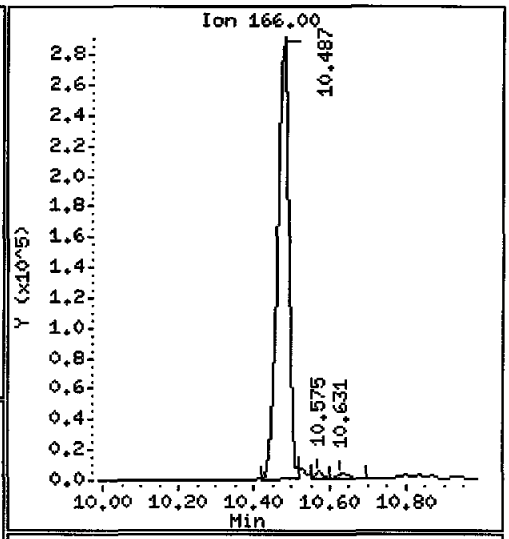
Sample Info: AQJ9I

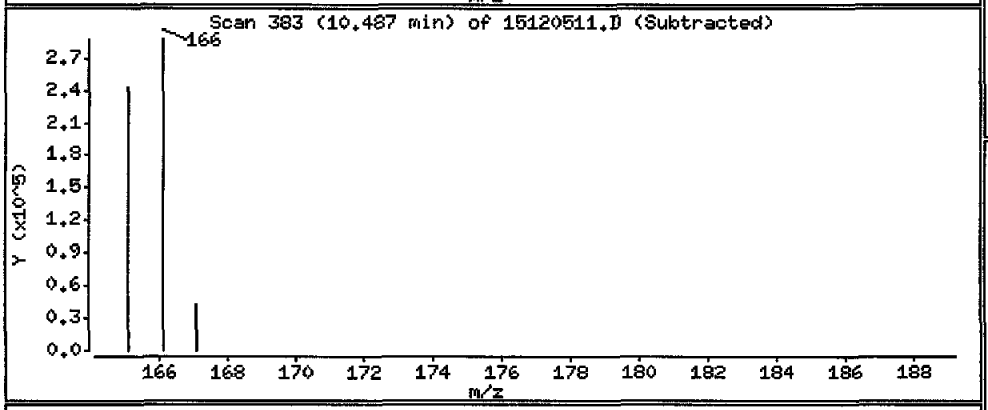
Volume Injected (uL): 2.0 Operator: JW

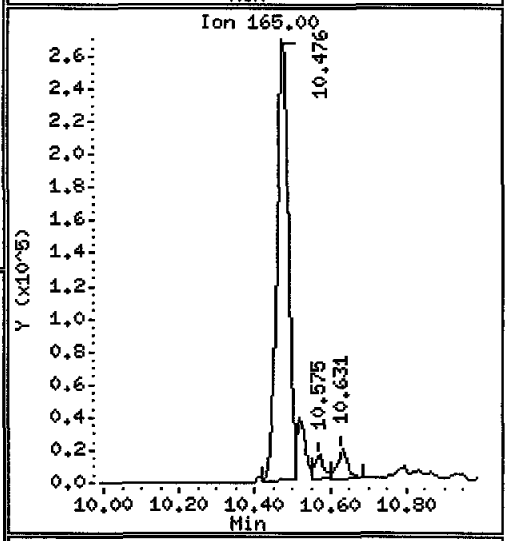
Column phase: Rxi-17Sil MS Column diameter: 0.25

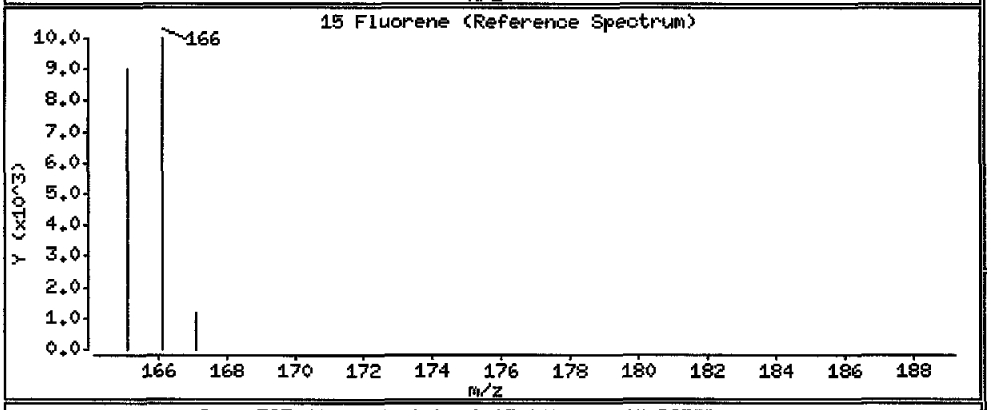
15 Fluorene Concentration: 44600 ug/kg

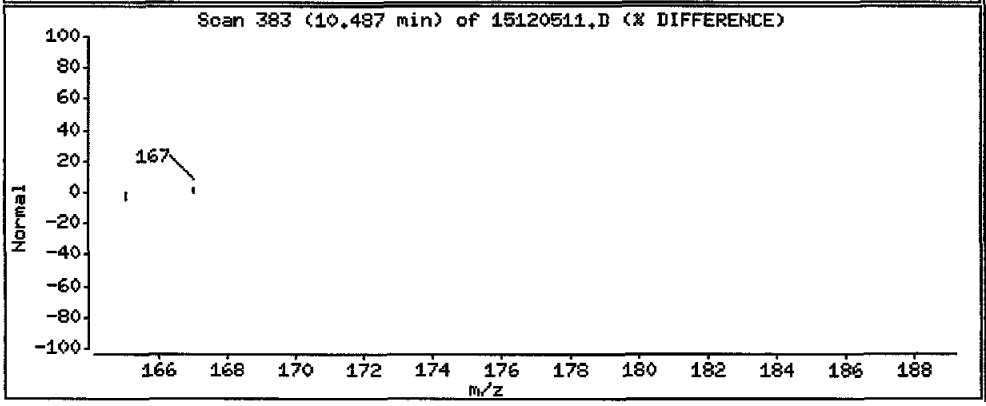


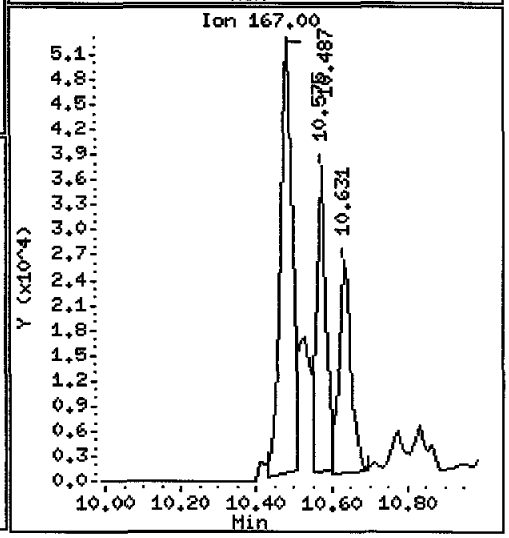












Data File: \\target\share\chem3\nt11.i\20151205.b\15120511.D

Date : 05-DEC-2015 15:16

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I

Volume Injected (uL): 2.0

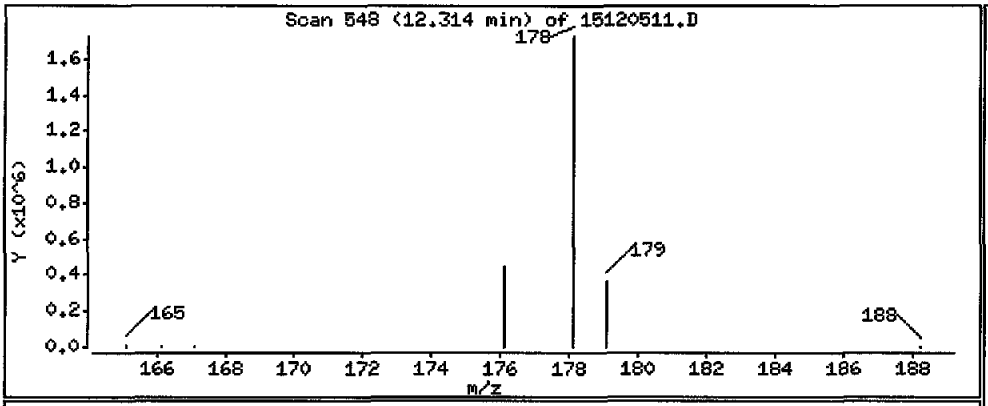
Operator: JW

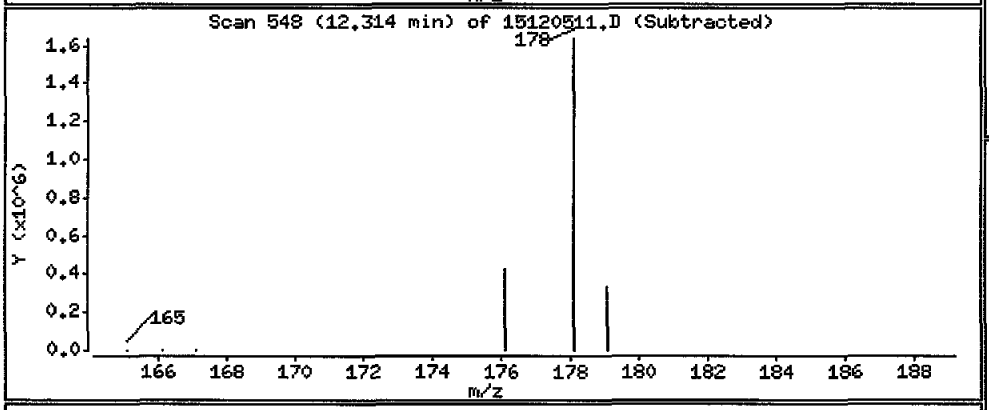
Column phase: Rxi-17Sil MS

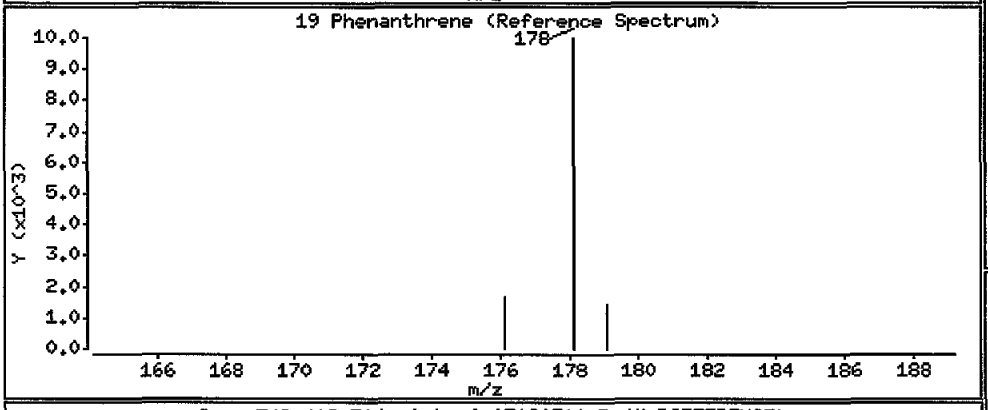
Column diameter: 0.25

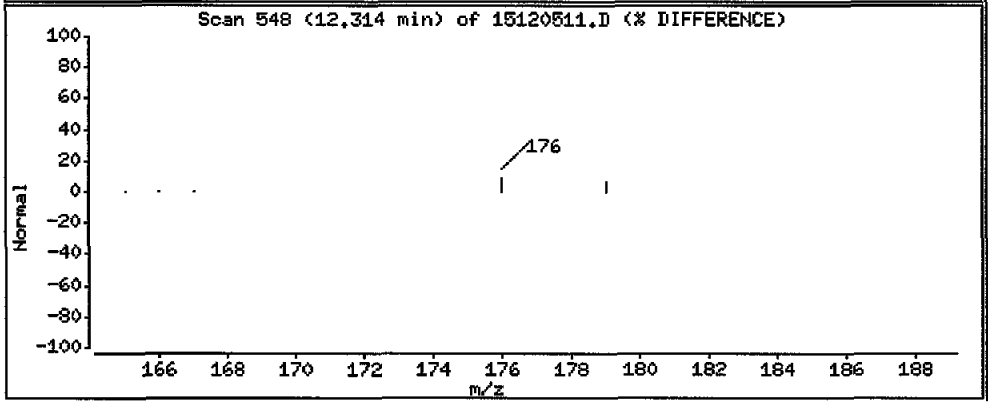
19 Phenanthrene

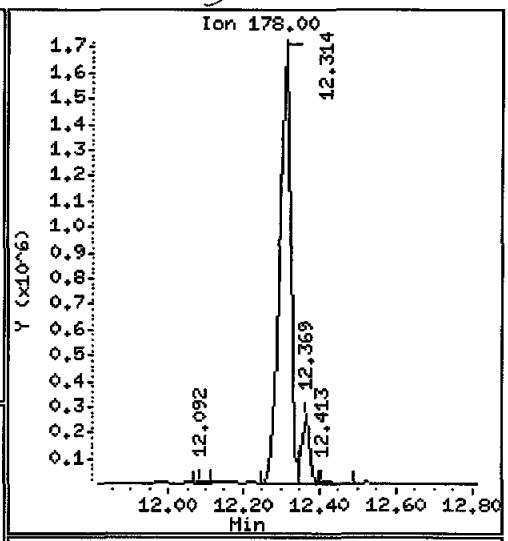
Concentration: 152000 ug/kg

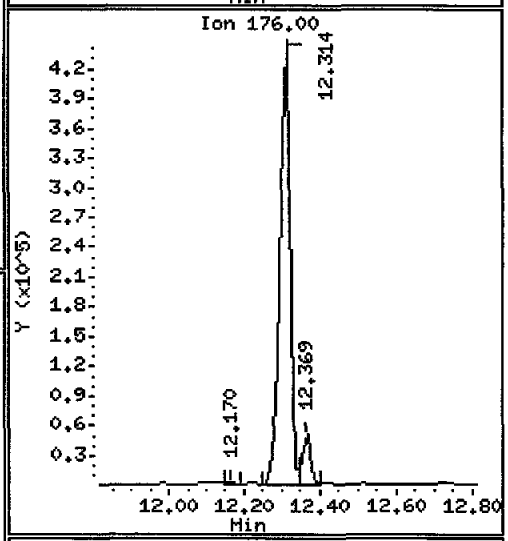


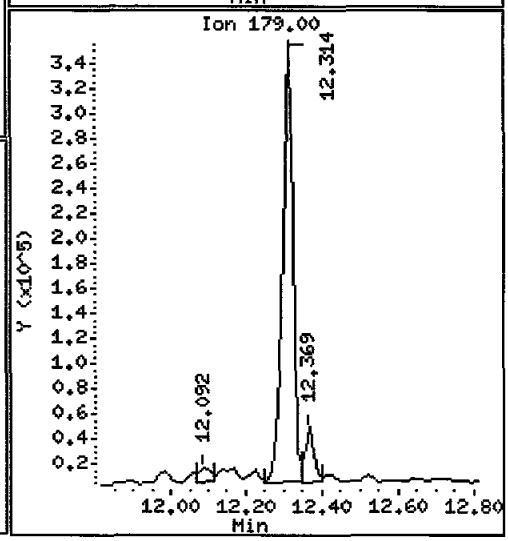












Data File: \\target\share\chem3\nt11.i\20151205.b\15120511.D

Date : 05-DEC-2015 15:16

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I

Volume Injected (uL): 2.0

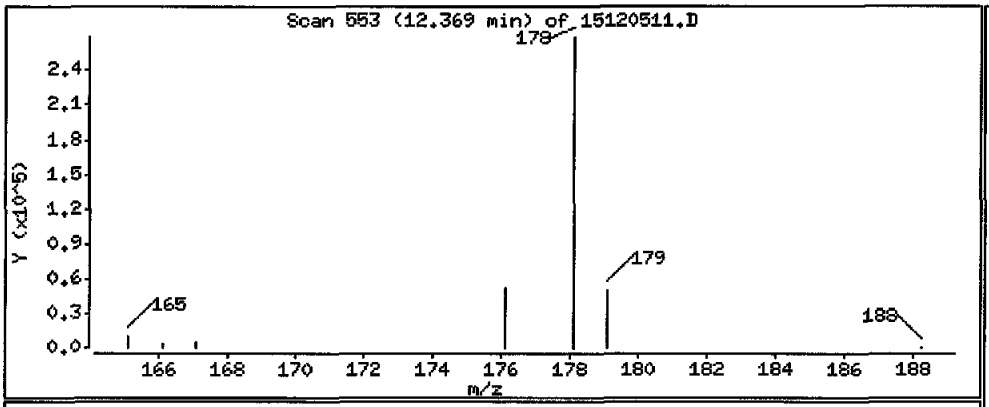
Operator: JW

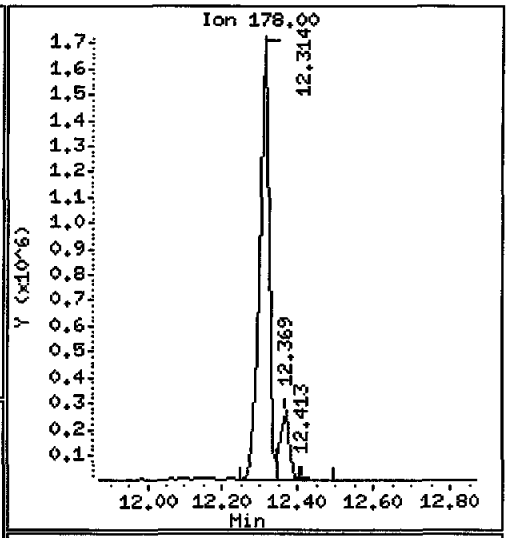
Column phase: Rxi-17Sil MS

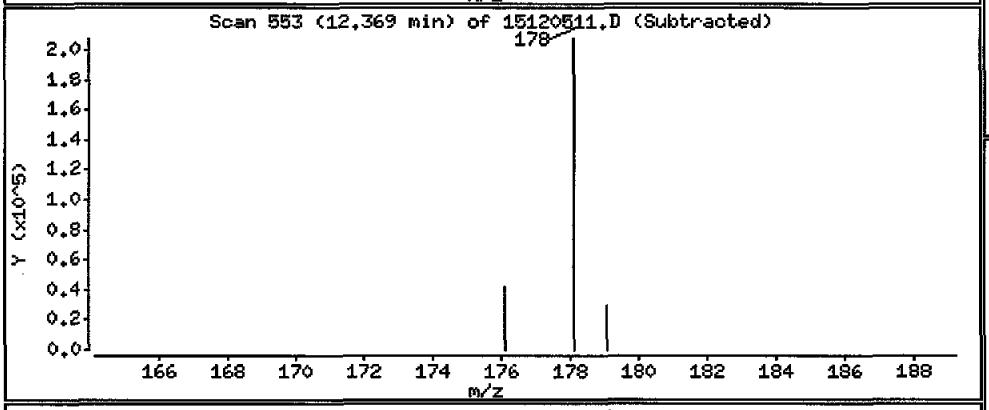
Column diameter: 0.25

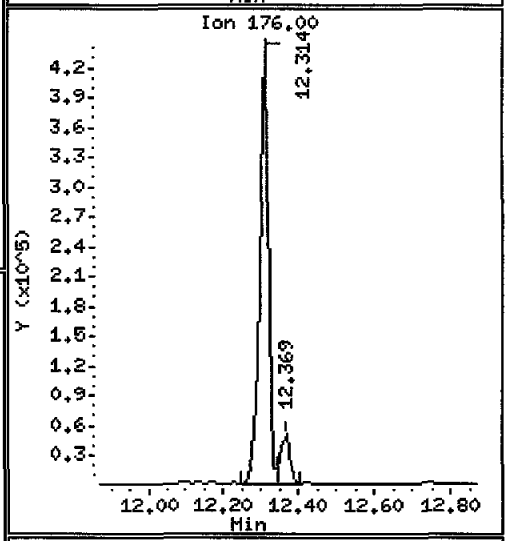
20 Anthracene

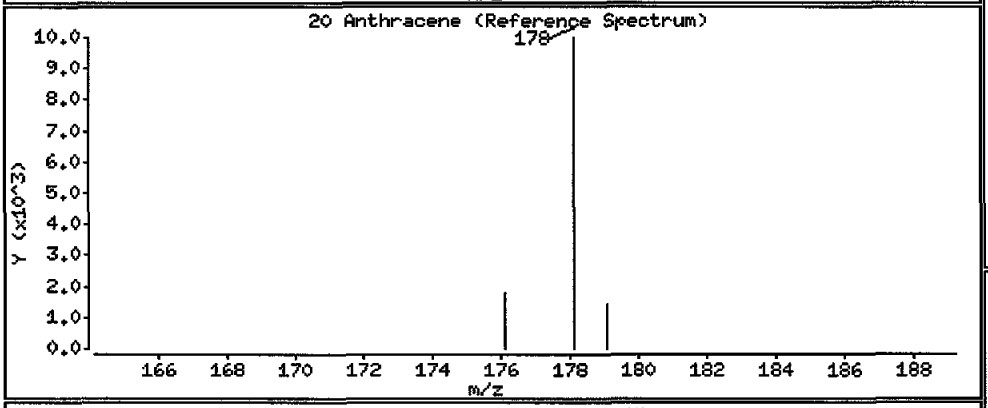
Concentration: 22200 ug/kg

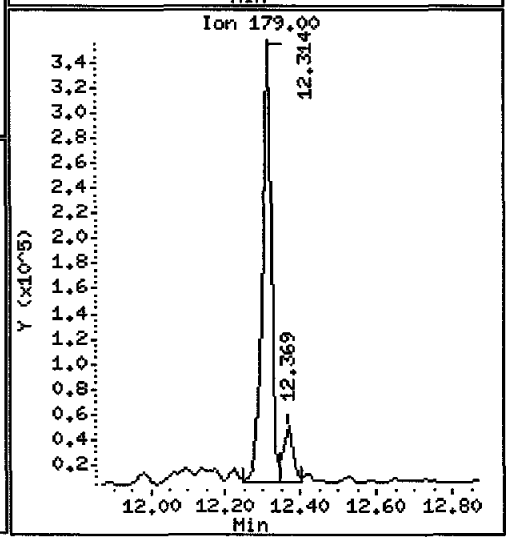


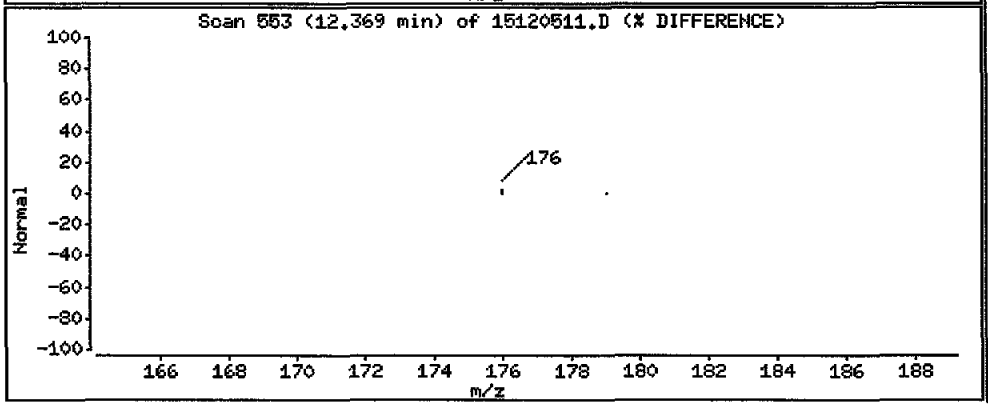












Data File: \\target\share\chem3\nt11.i\20151205.b\15120511.D

Date : 05-DEC-2015 15:16

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I

Volume Injected (uL): 2.0

Operator: JW

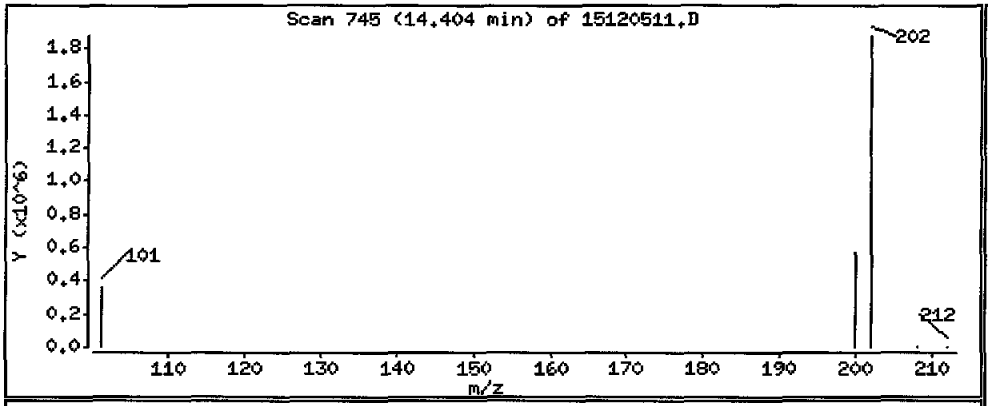
Column phase: Rxi-17Sil MS

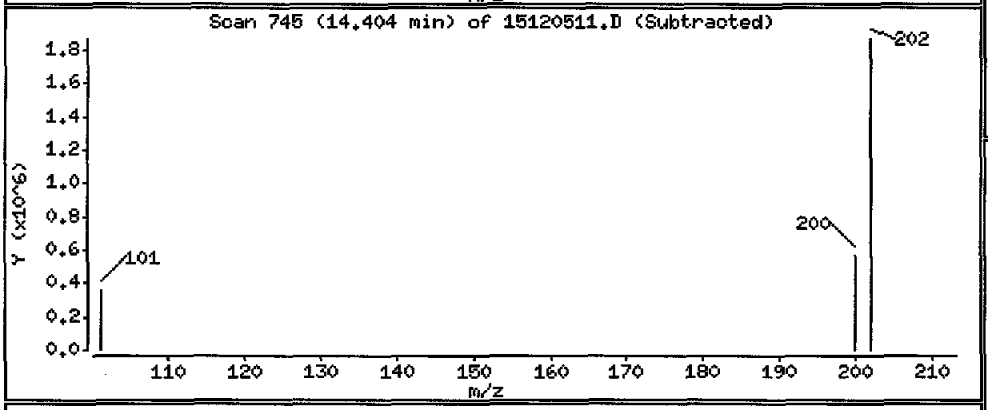
Column diameter: 0.25

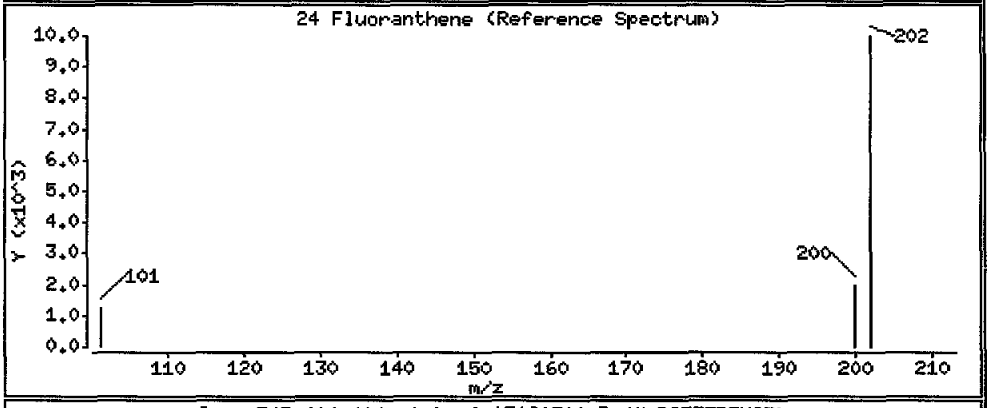
24 Fluoranthene

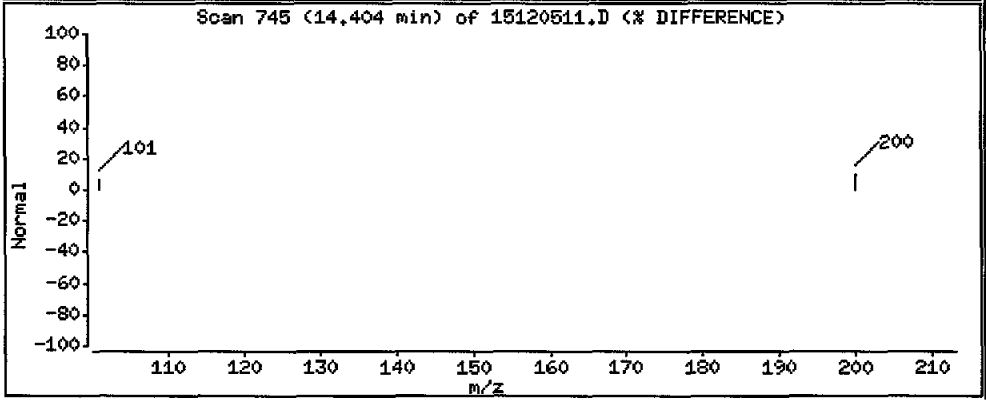
Concentration: 155000 ug/kg

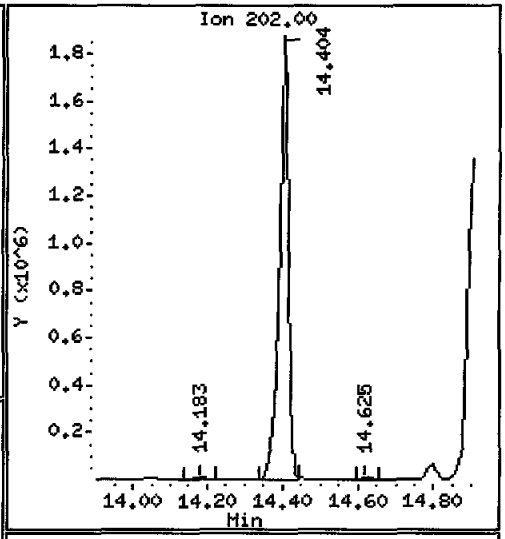
E

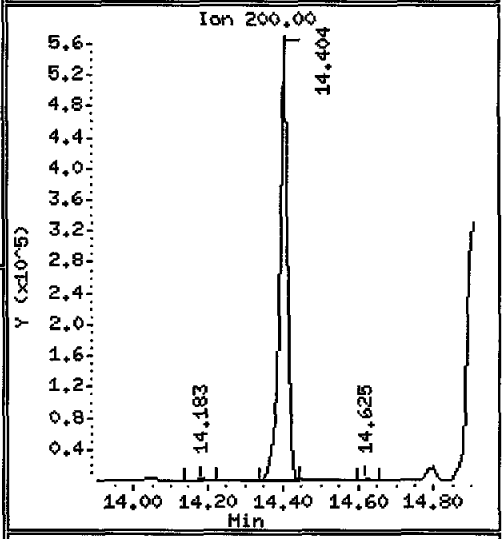


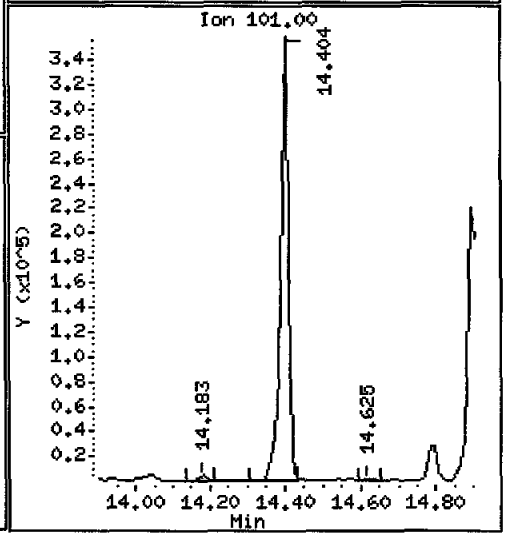












Data File: \\target\share\chem3\nt11.i\20151205.b\15120511.D

Date : 05-DEC-2015 15:16

Client ID: PC-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I

Volume Injected (uL): 2.0

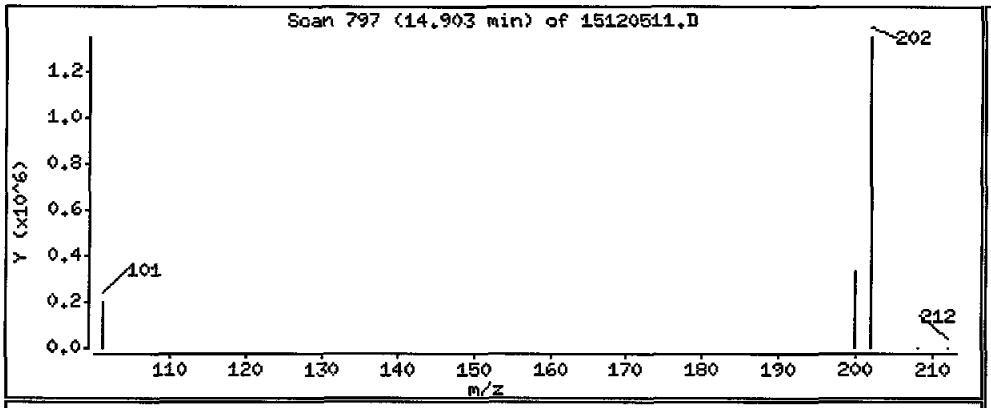
Operator: JW

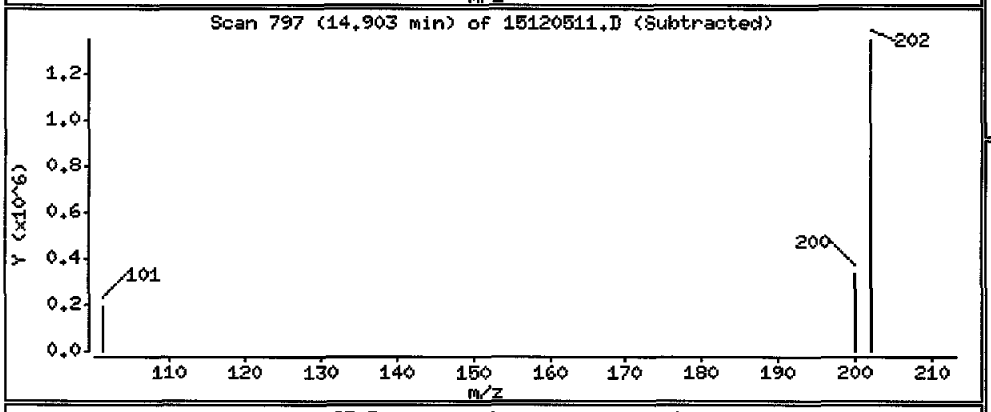
Column phase: Rxi-17Sil MS

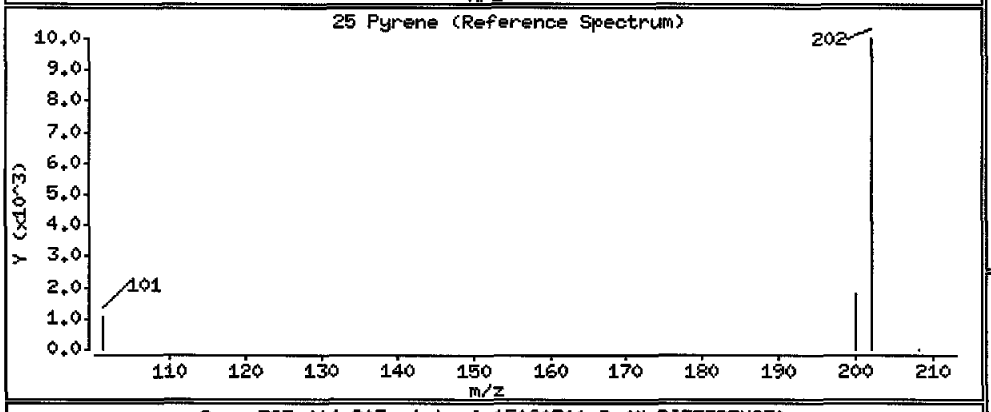
Column diameter: 0.25

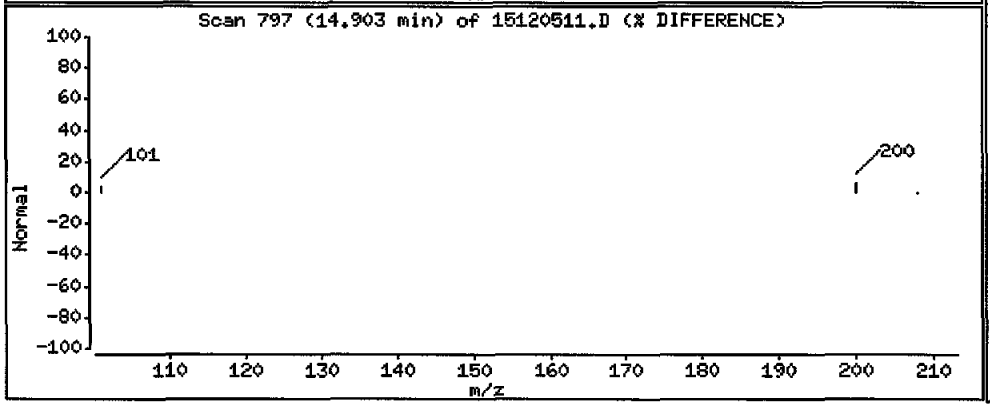
25 Pyrene

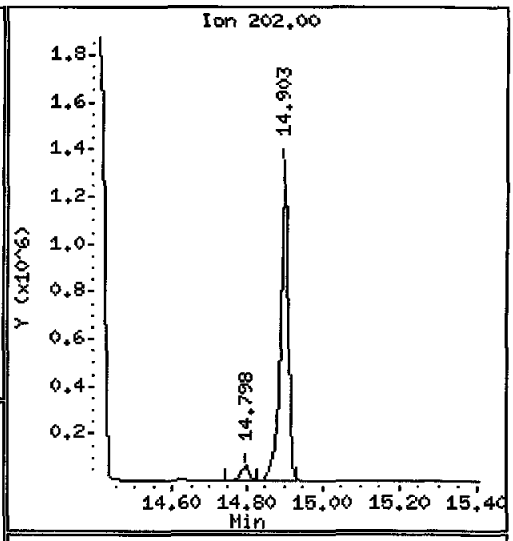
Concentration: 102000 ug/kg

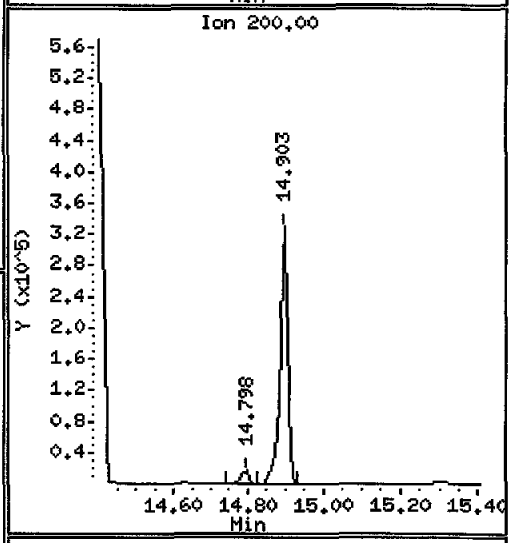


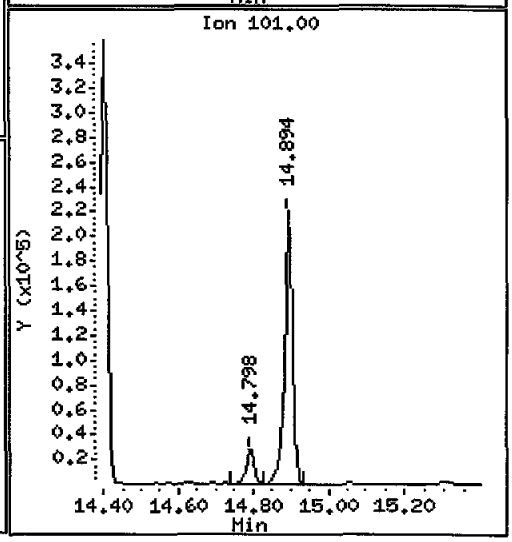












Data File: \\target\share\chem3\nt11.i\20151205.b\15120511.D

Date : 05-DEC-2015 15:16

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I

Volume Injected (uL): 2.0

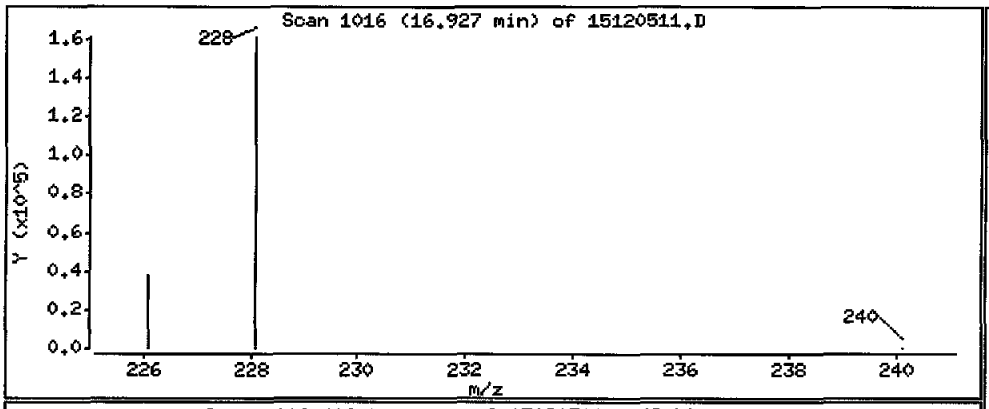
Operator: JW

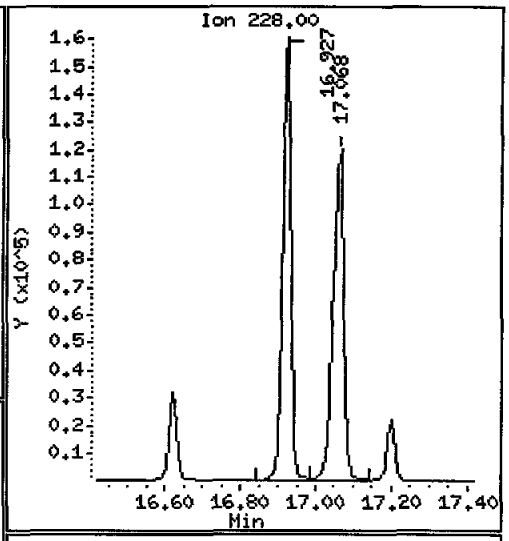
Column phase: Rxi-17Sil MS

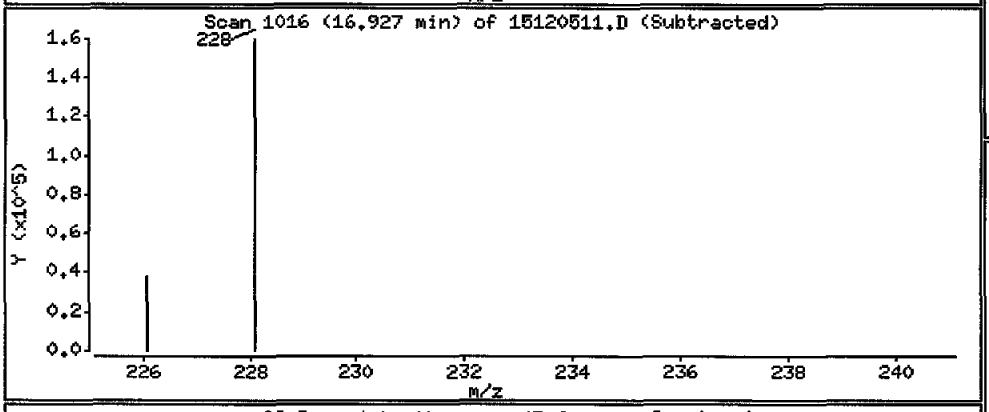
Column diameter: 0.25

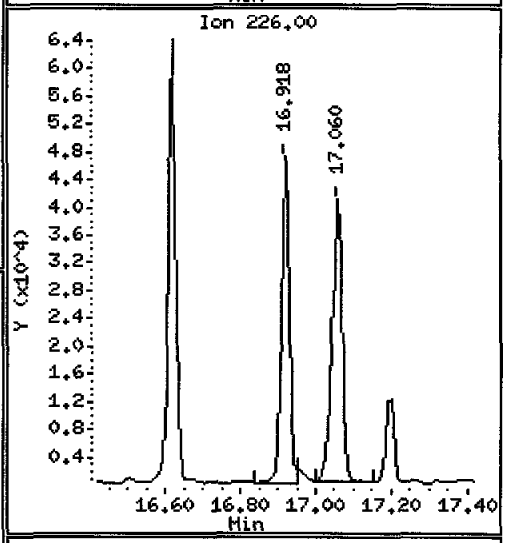
28 Benzo(a)anthracene

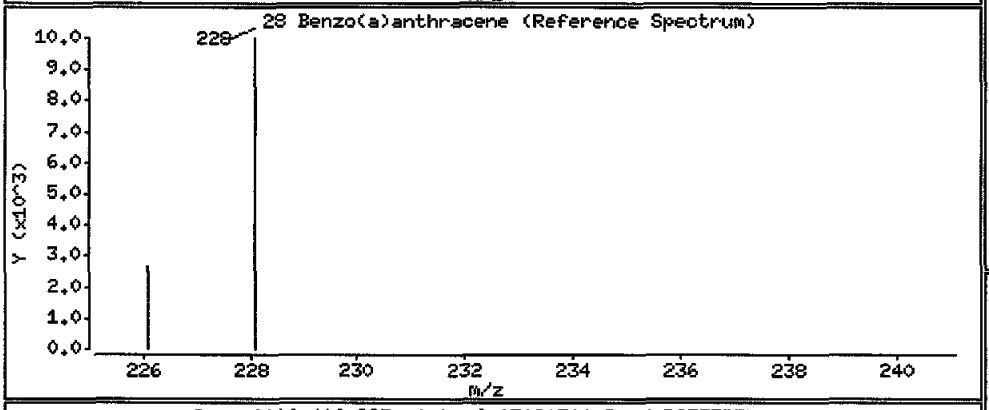
Concentration: 14200 ug/kg

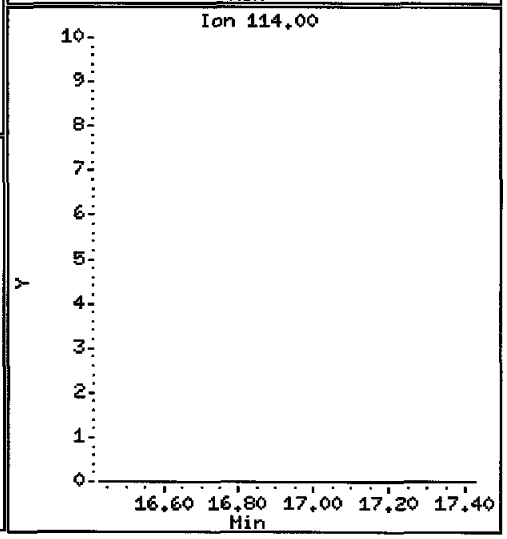


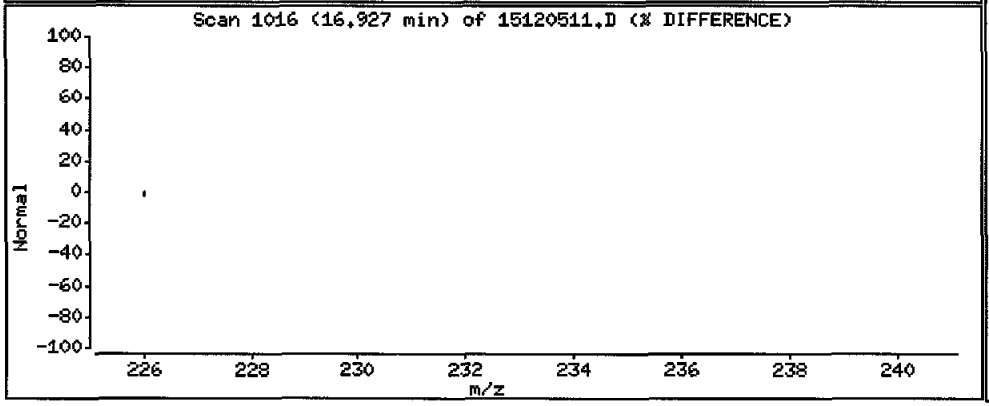












Data File: \\target\share\chem3\nt11.i\20151205.b\15120511.D

Date : 05-DEC-2015 15:16

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I

Volume Injected (uL): 2.0

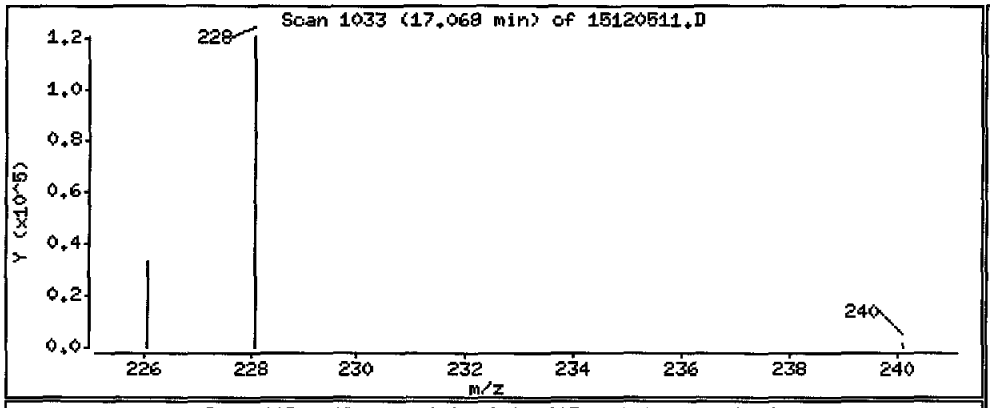
Operator: JW

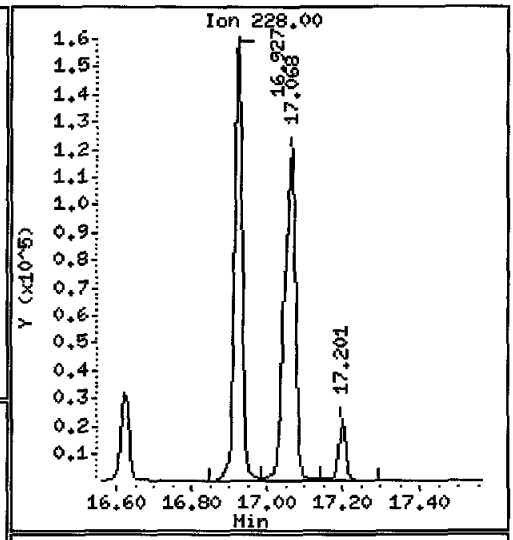
Column phase: Rxi-17Sil MS

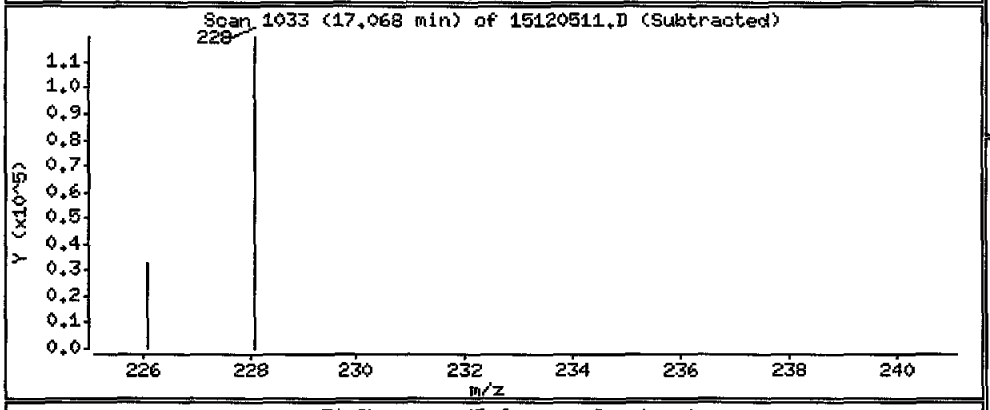
Column diameter: 0.25

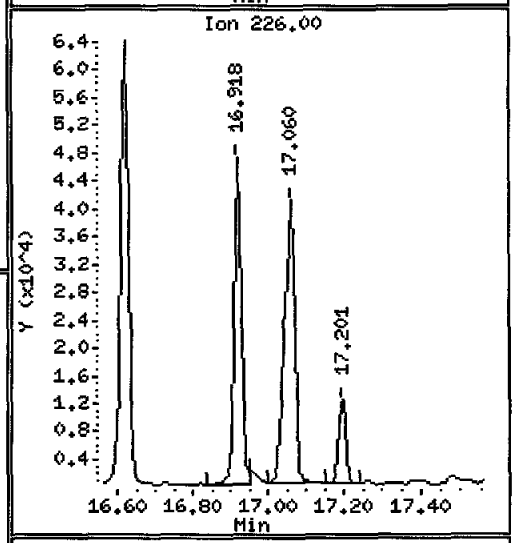
30 Chrysene

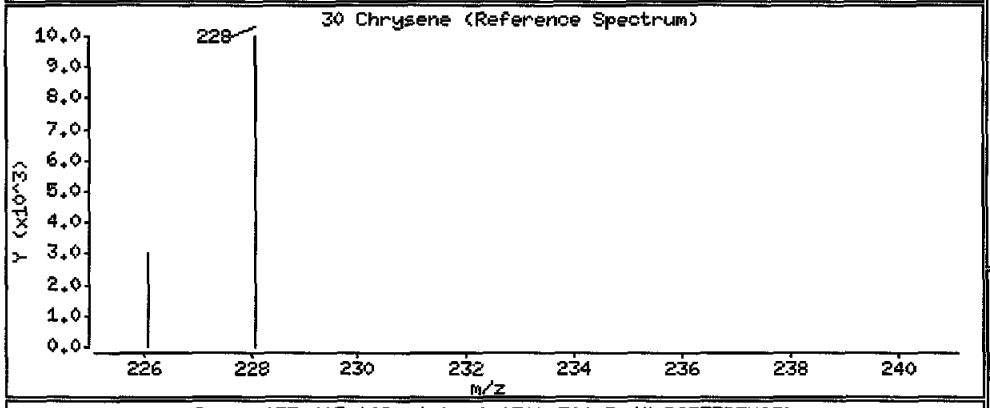
Concentration: 13200 ug/kg

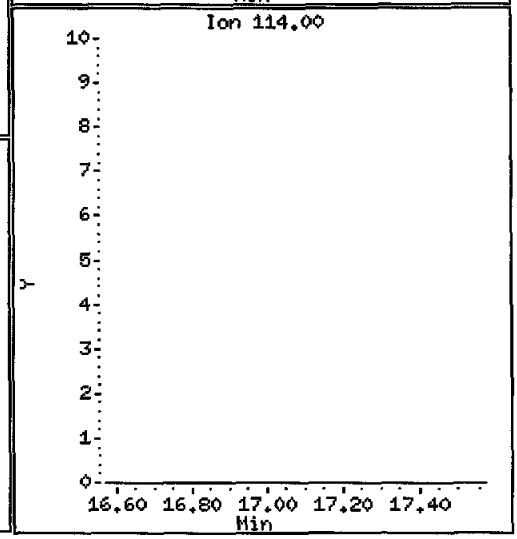


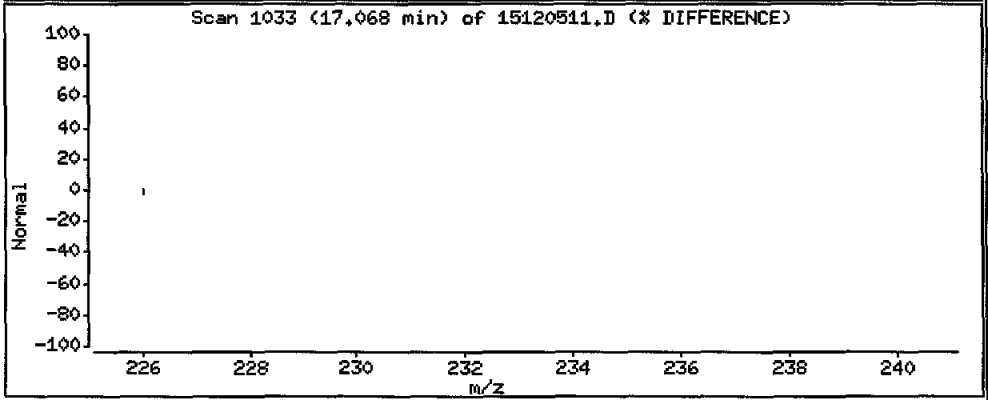












Data File: \\target\share\chem3\nt11.i\20151205.b\15120511.D

Date : 05-DEC-2015 15:16

Client ID: PC-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I

Volume Injected (uL): 2.0

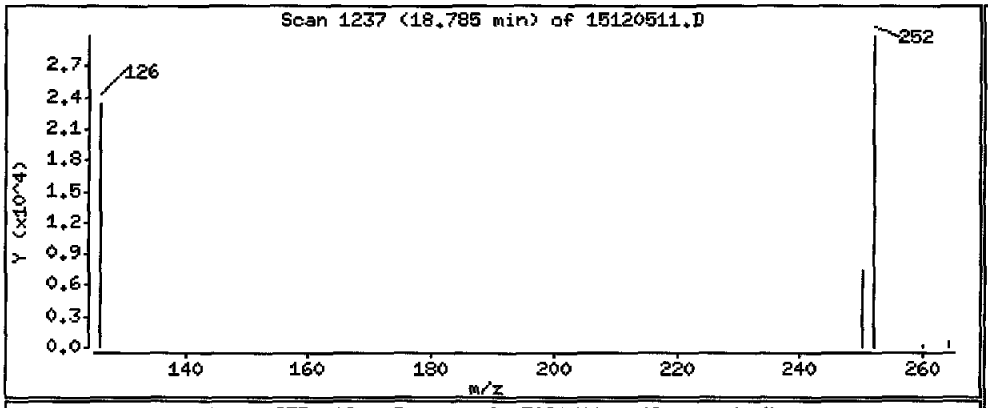
Operator: JW

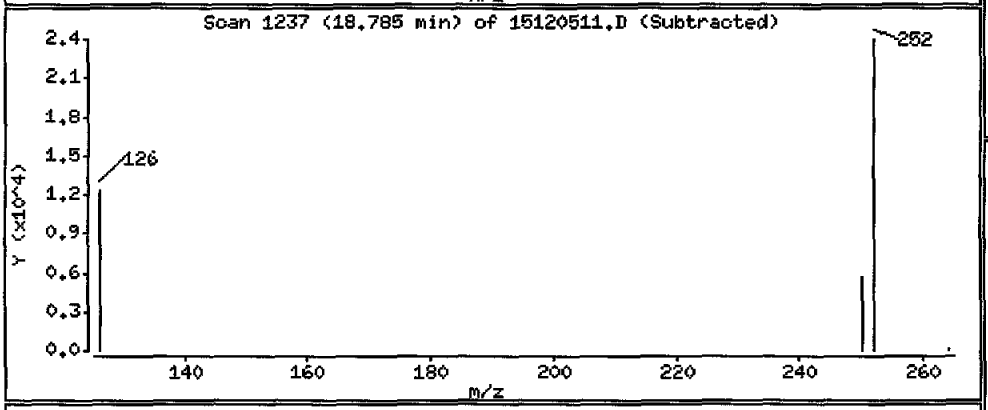
Column phase: Rxi-17Sil MS

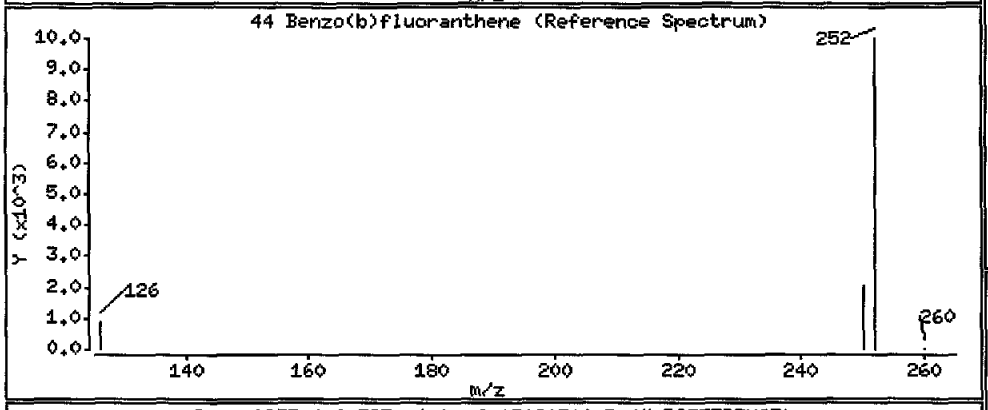
Column diameter: 0.25

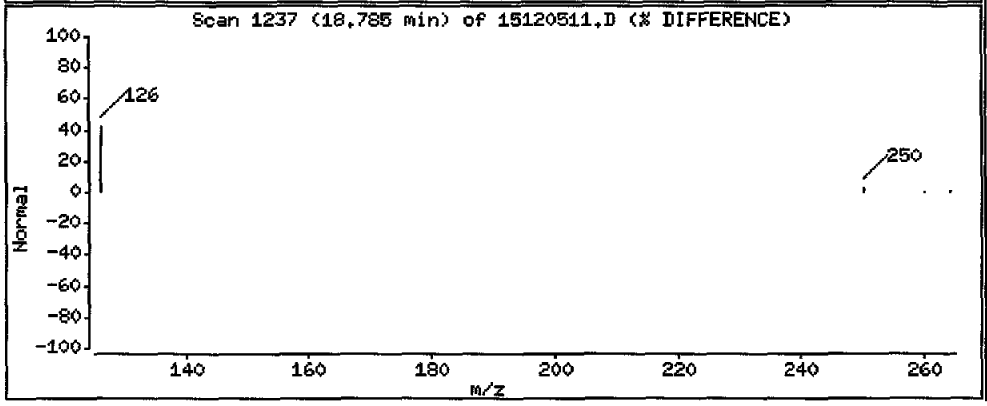
44 Benzo(b)fluoranthene

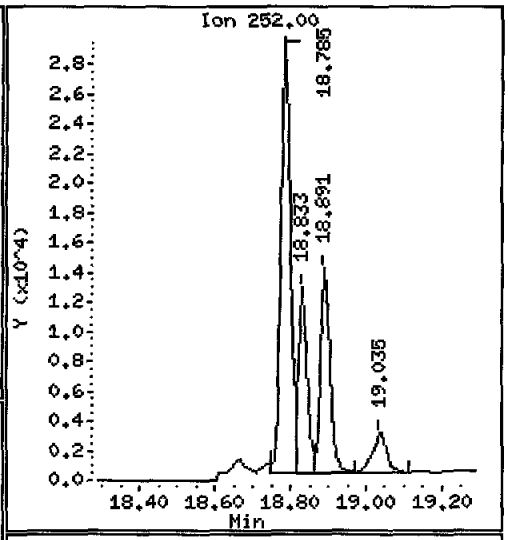
Concentration: 3240 ug/kg

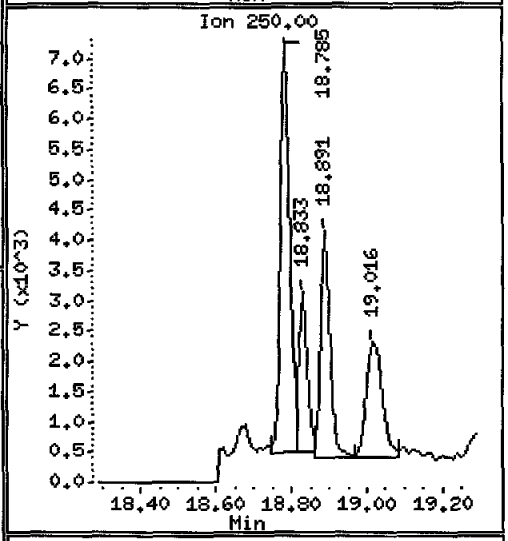


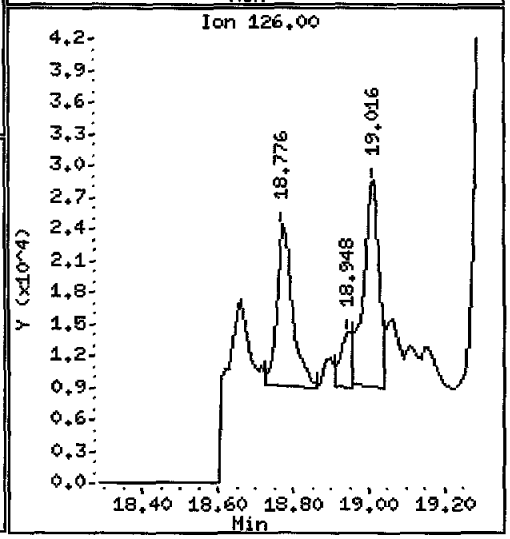












Data File: \\target\share\chem3\nt11.i\20151205.b\15120511.D

Date : 05-DEC-2015 15:16

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I

Volume Injected (uL): 2.0

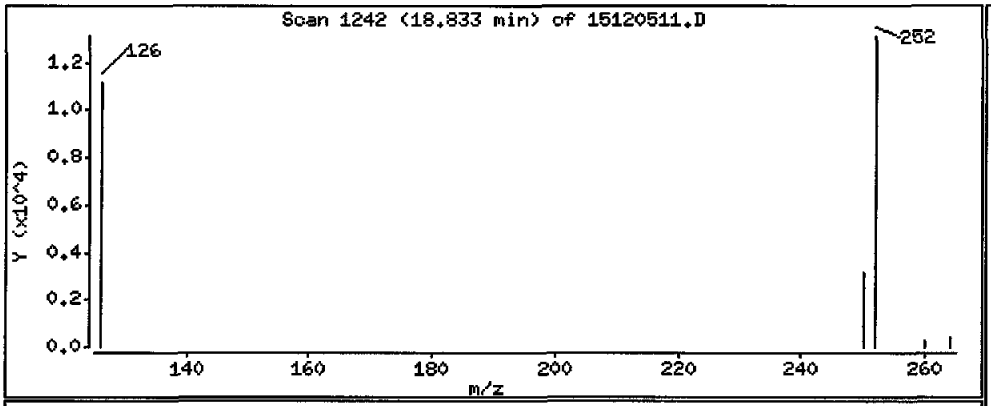
Operator: JW

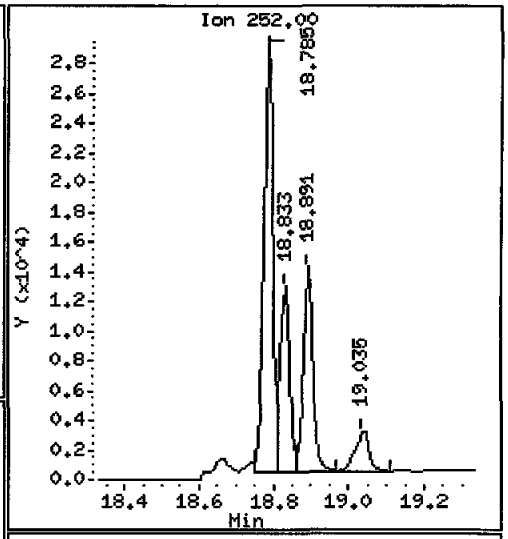
Column phase: Rxi-17Sil MS

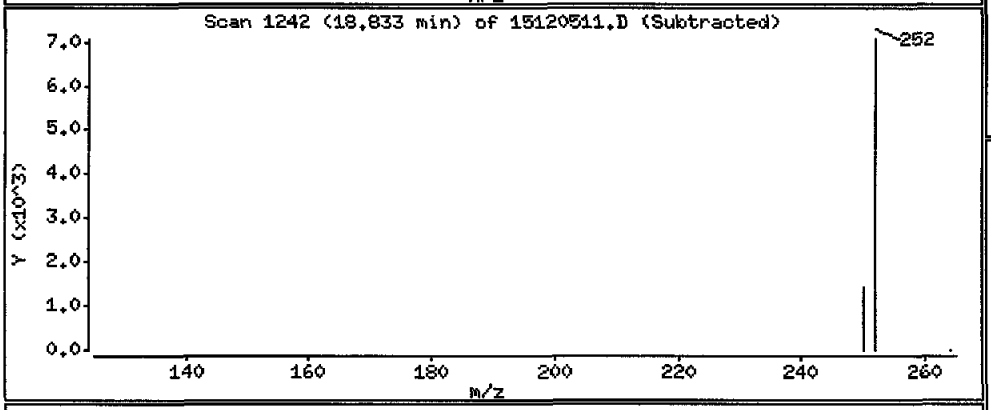
Column diameter: 0.25

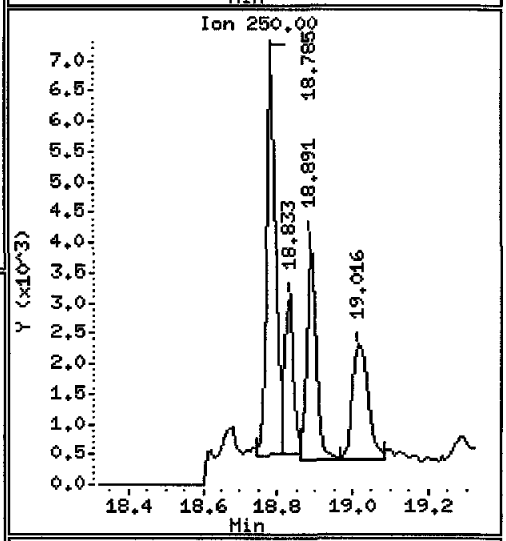
45 Benzo(k)fluoranthene

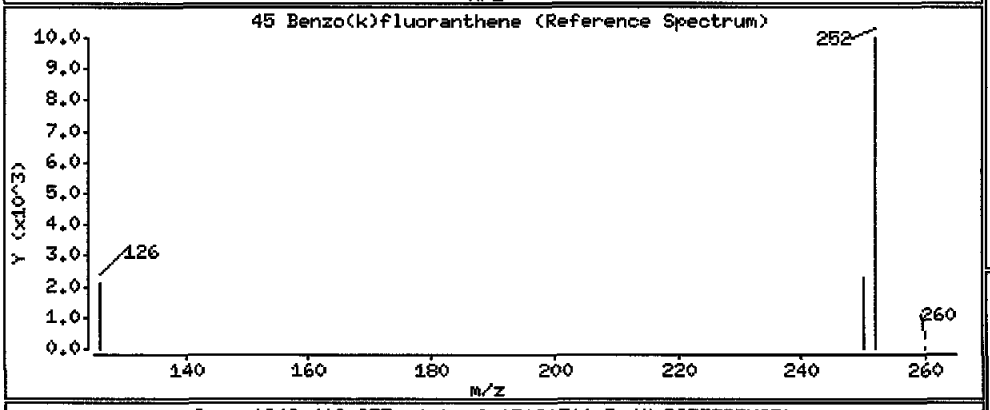
Concentration: 1240 ug/kg

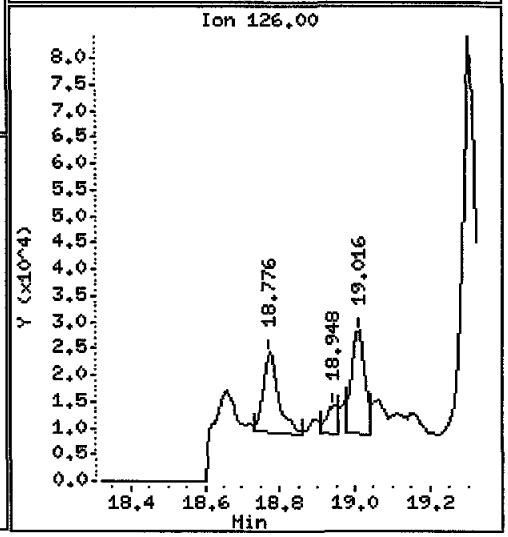


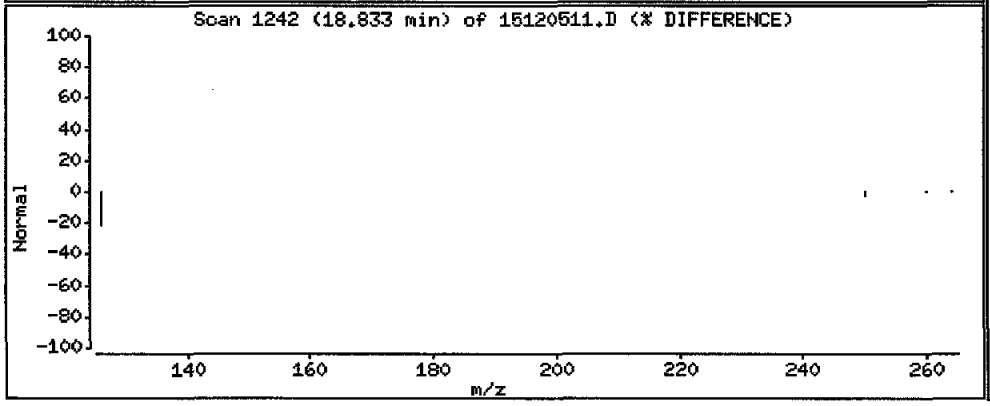












Data File: \\target\share\chem3\nt11.i\20151205.b\15120511.D

Date : 05-DEC-2015 15:16

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I

Volume Injected (uL): 2.0

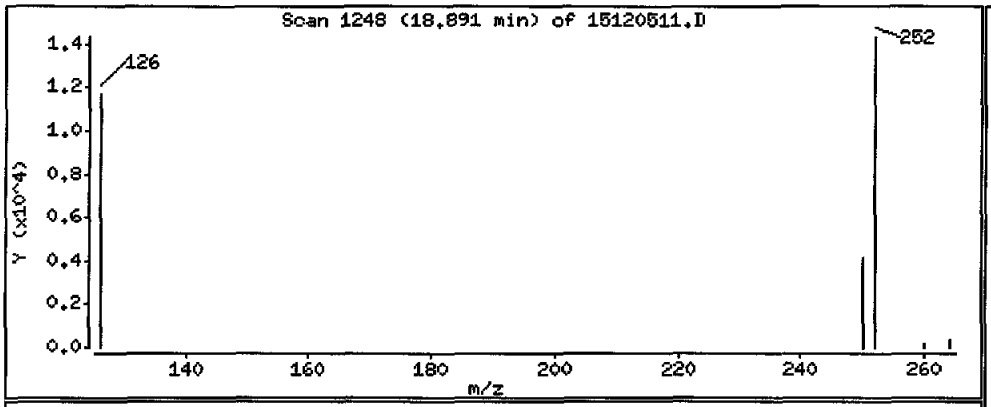
Operator: JW

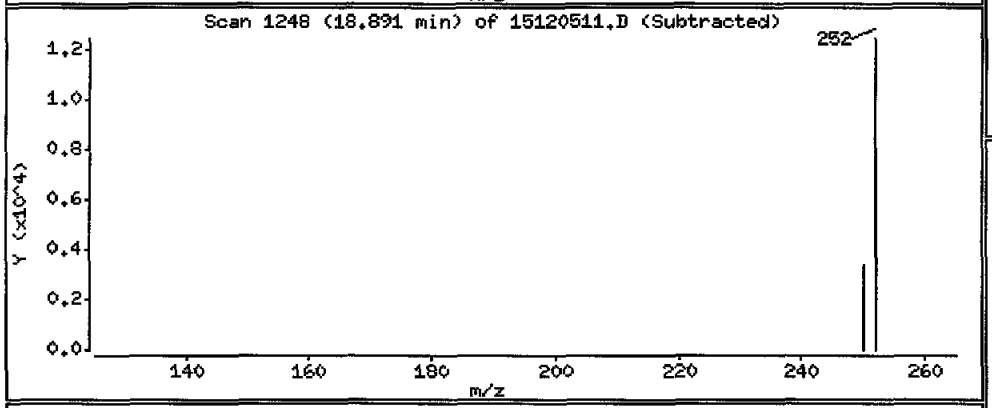
Column phase: Rxi-17Sil MS

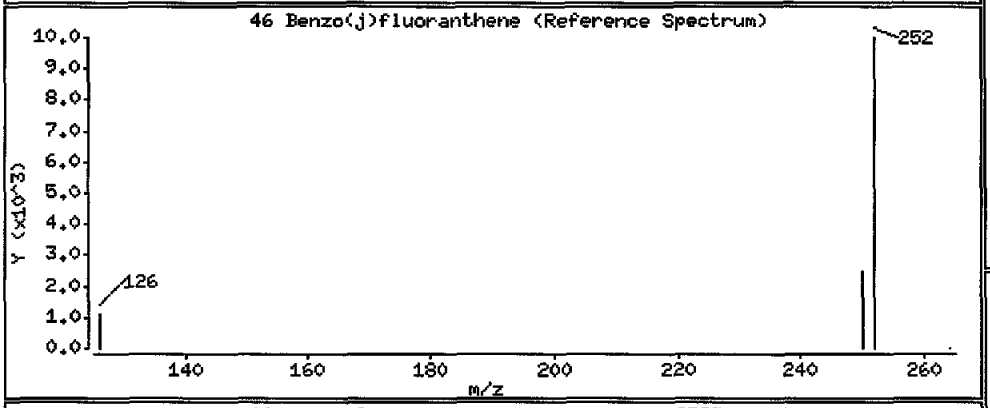
Column diameter: 0.25

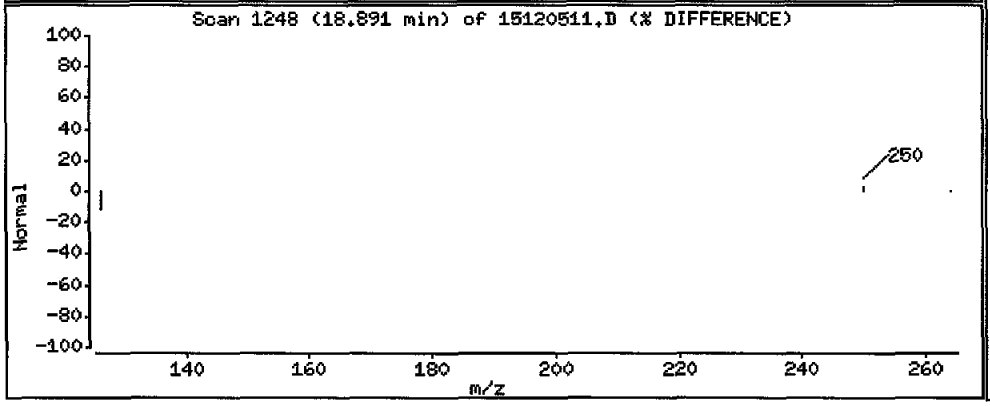
46 Benzo(j)fluoranthene

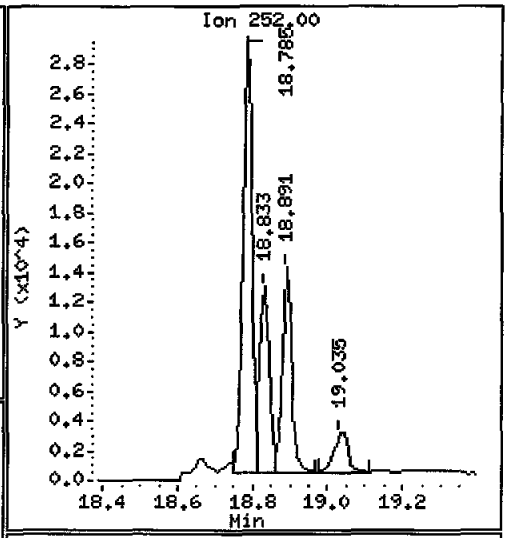
Concentration: 1460 ug/kg

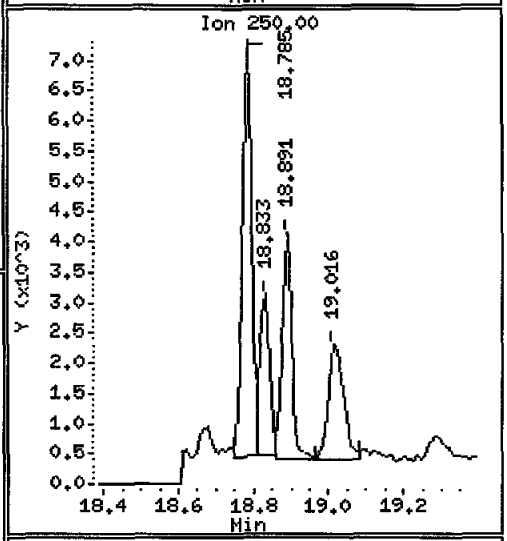


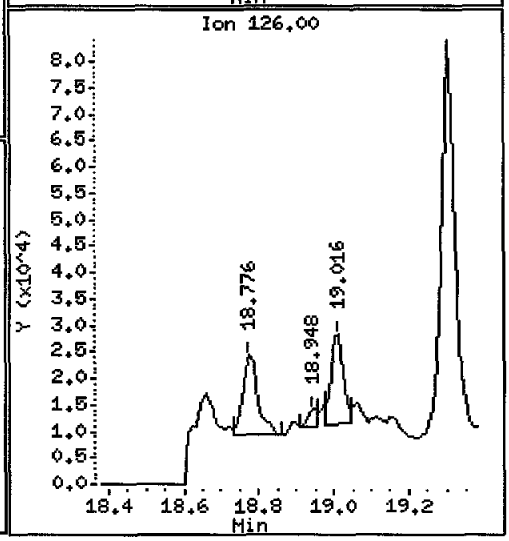












Data File: \\target\share\chem3\nt11.i\20151205.b\15120511.D

Date : 05-DEC-2015 15:16

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I

Volume Injected (uL): 2.0

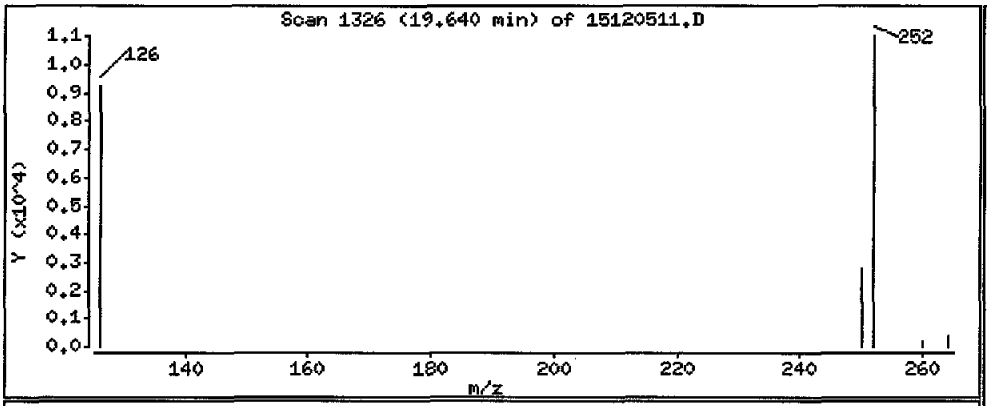
Operator: JW

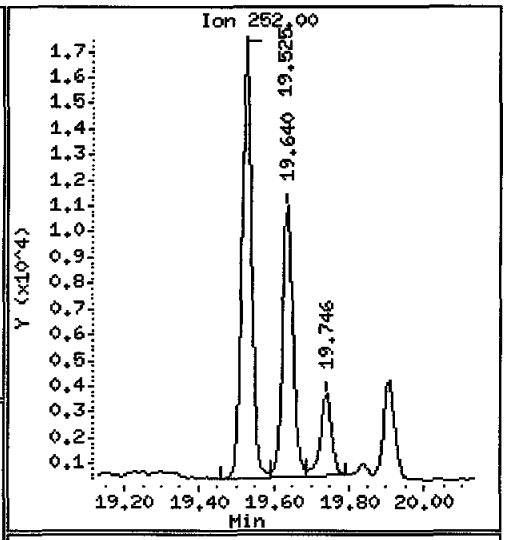
Column phase: Rxi-17Sil MS

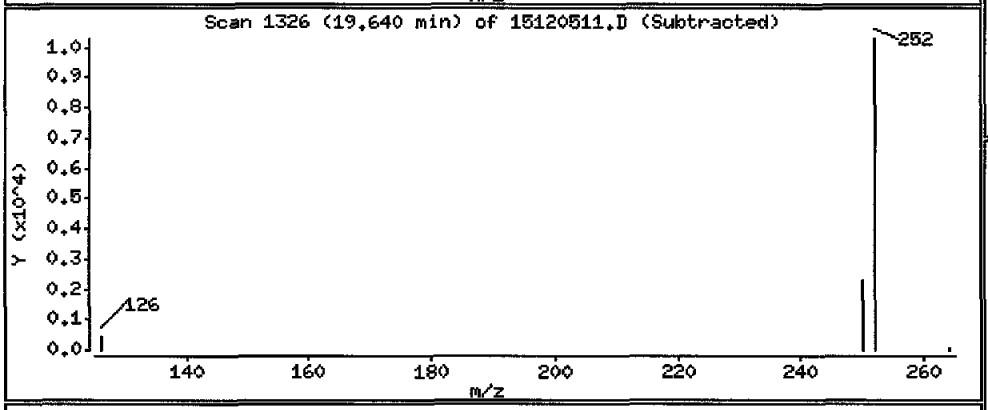
Column diameter: 0.25

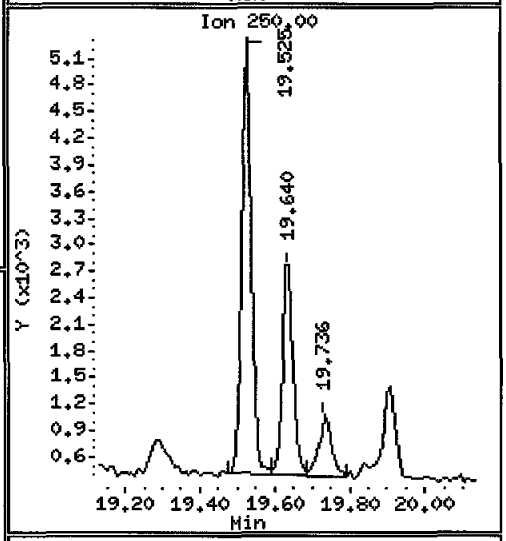
34 Benzo(a)pyrene

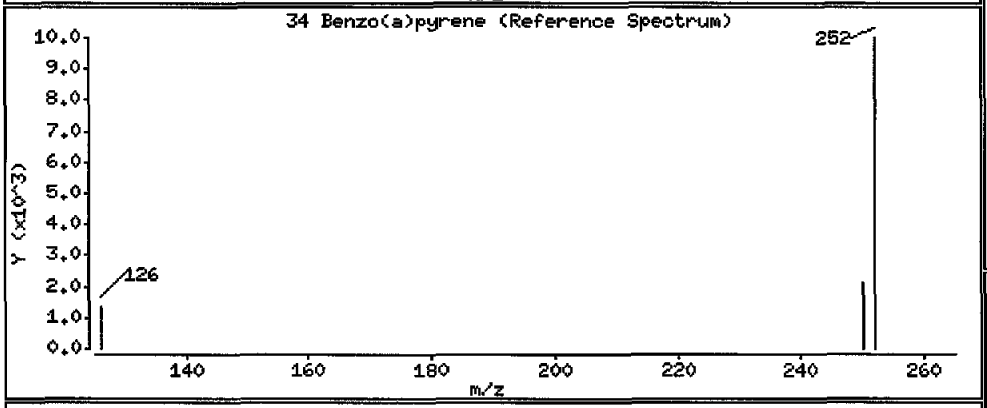
Concentration: 1400 ug/kg

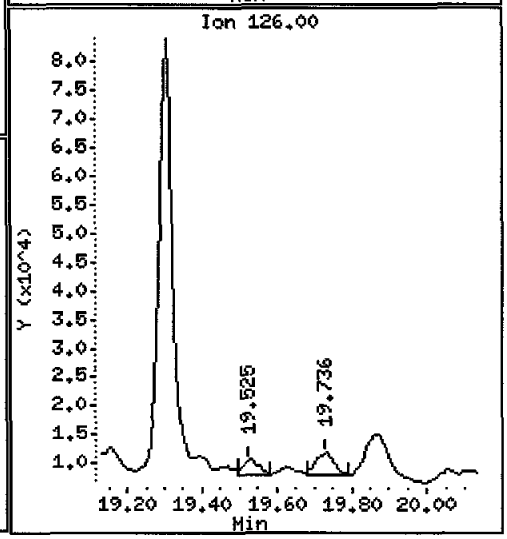


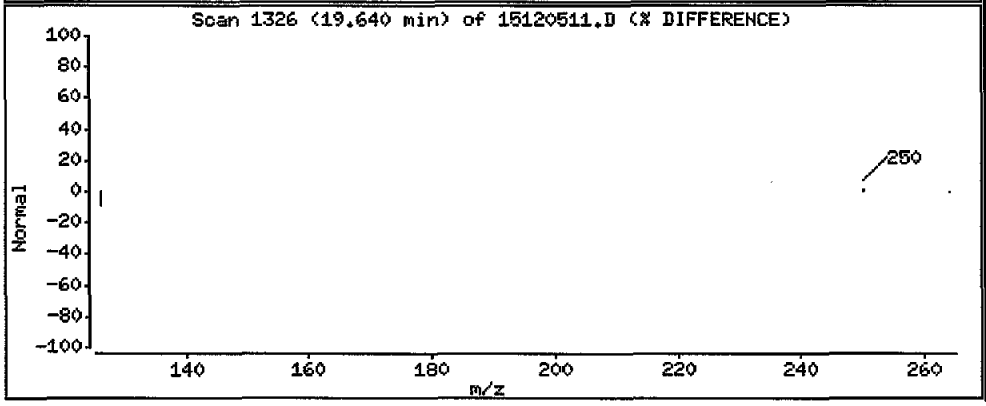












Data File: \\target\share\chem3\nt11.i\20151205.b\15120511.D

Date : 05-DEC-2015 15:16

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I

Volume Injected (uL): 2.0

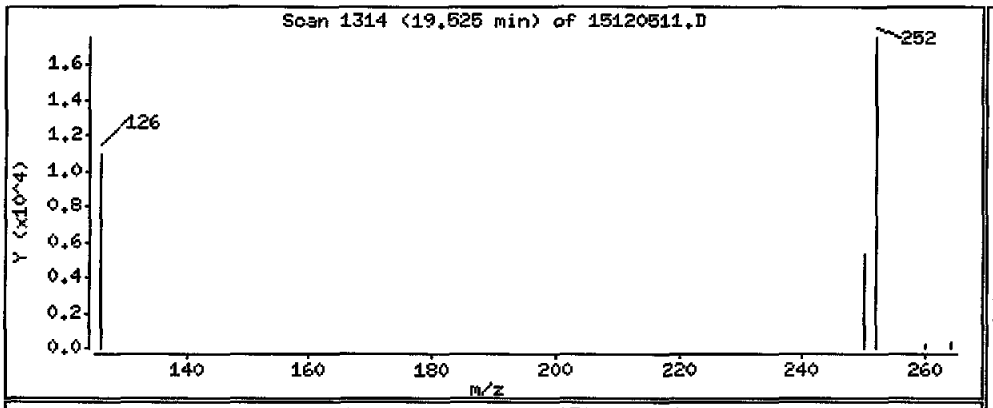
Operator: JW

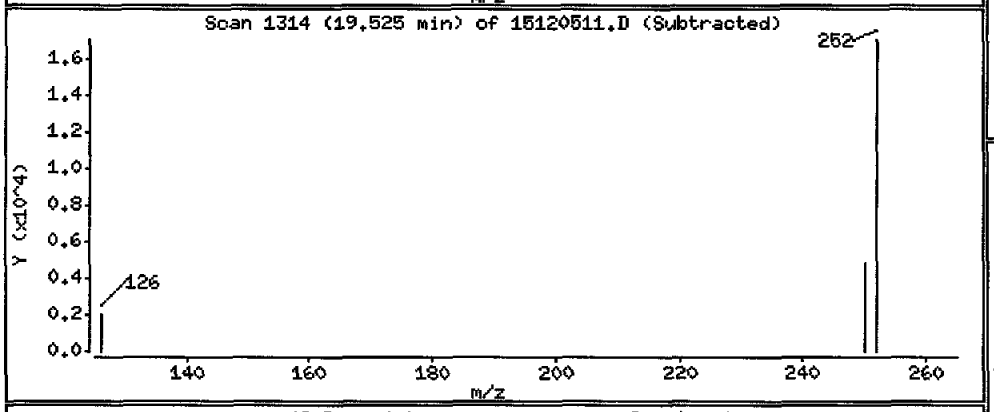
Column phase: Rxi-17Sil MS

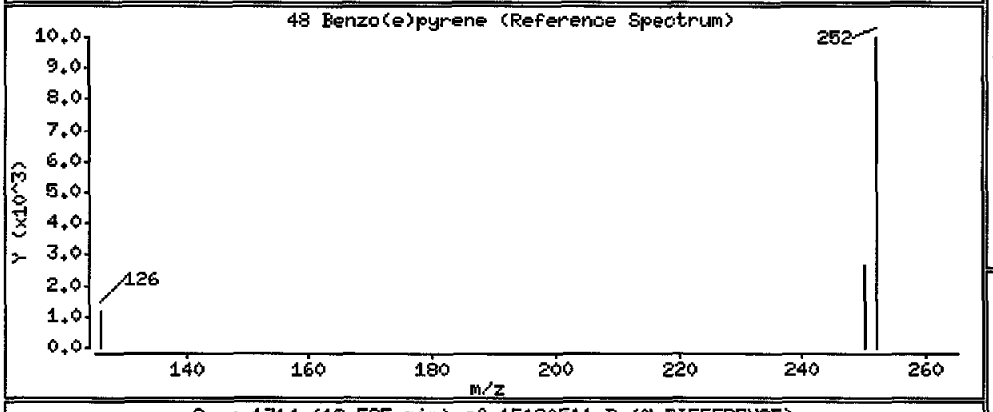
Column diameter: 0.25

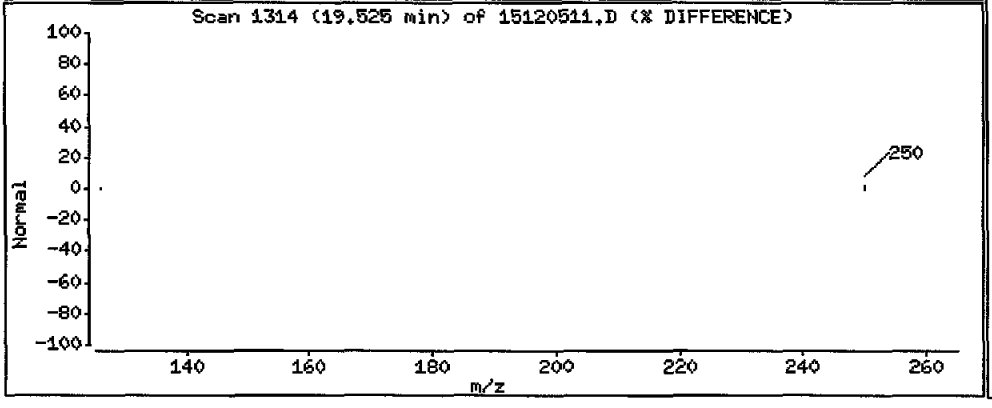
48 Benzo(e)pyrene

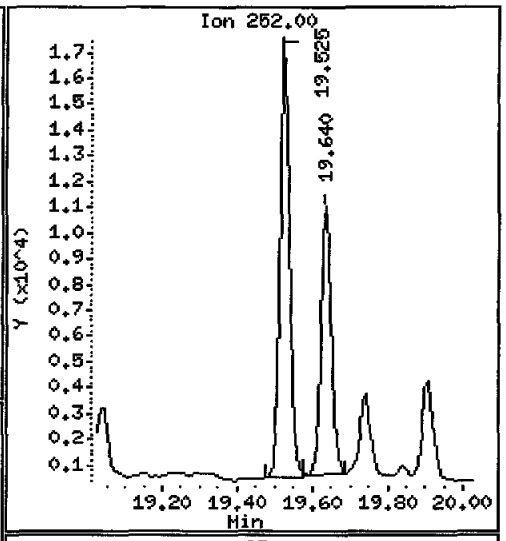
Concentration: 2020 ug/kg

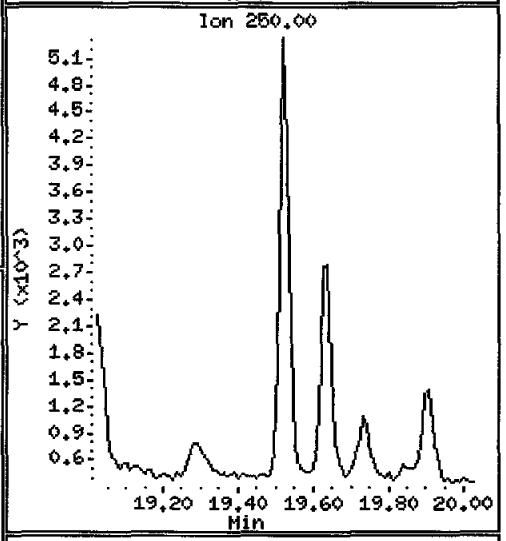


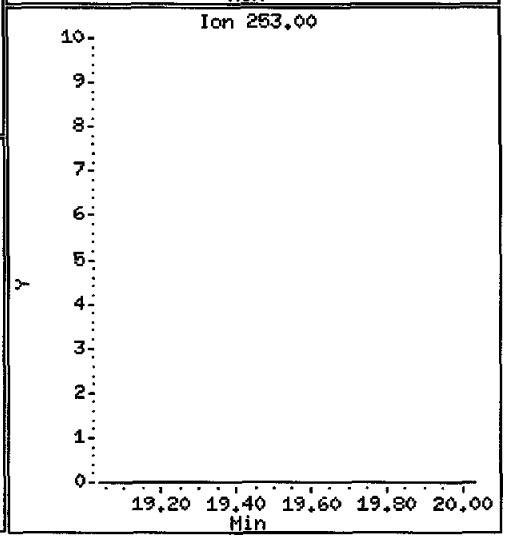












REVIEW SUMMARY FOR FILE - 15120511.D

Lab ID: AQJ9I
nt11.i, 20151205.b\lowsim.m, 05-DEC-2015 15:16

RT CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND
NONE			

On Column LOD for nt11.i,20151205.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151205.b\15120512.D
Lab Smp Id: AQJ9K Client Smp ID: PG-SMA2-3-PEMD-1511
Inj Date : 05-DEC-2015 15:46 MS Autotune Date: 23-APR-2014 12:5
Operator : JW Inst ID: nt11.i
Smp Info : AQJ9K
Misc Info : 15-21398
Comment :
Method : \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Meth Date : 14-Dec-2015 10:43 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 12
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	100.000	Volume of final extract (uL)
Ws	0.89000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

JW 12/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	FINAL (ug/kg)	
*	4 Naphthalene-d8	136	6.587	6.597	(1.000)	329170	200.000		
	5 Naphthalene	128	6.618	6.629	(1.005)	182997	96.2462	10800	B
$	6 2-Methylnaphthalene-d10	152	7.564	7.574	(1.148)	178331	145.957	16400	
	7 2-Methylnaphthalene	142	7.627	7.627	(1.158)	67315	51.5267	5790	
	8 1-Methylnaphthalene	142	7.879	7.889	(1.196)	38568	32.7589	3680	
	10 Acenaphthylene	152	9.434	9.445	(0.984)	25169	11.4405	1290	
*	11 Acenaphthene-d10	164	9.589	9.600	(1.000)	272591	200.000		
	12 Acenaphthene	153	9.656	9.656	(1.007)	171449	117.414	13200	
	14 Dibenzofuran	168	9.855	9.866	(1.028)	142783	64.9096	7290	
	15 Fluorene	166	10.486	10.486	(1.094)	280972	170.314	19100	
*	18 Phenanthrene-d10	188	12.269	12.269	(1.000)	446217	200.000		
	19 Phenanthrene	178	12.313	12.313	(1.004)	3006310	1118.26	126000	E
	20 Anthracene	178	12.368	12.368	(1.008)	520276	216.207	24300	
$	23 Fluoranthene-d10	212	14.374	14.374	(1.172)	478777	195.107	21900	
	24 Fluoranthene	202	14.403	14.403	(1.174)	4436718	1643.77	185000	E
	25 Pyrene	202	14.903	14.903	(0.876)	2764840	1055.82	119000	E
	28 Benzo(a)anthracene	228	16.926	16.918	(0.995)	636180	288.565	32400	
*	29 Chrysene-d12	240	17.017	17.017	(1.000)	330667	200.000		
	30 Chrysene	228	17.067	17.059	(1.003)	616786	254.906	28600	
	44 Benzo(b)fluoranthene	252	18.784	18.784	(0.947)	163113	82.1845	9230	
	45 Benzo(k)fluoranthene	252	18.833	18.833	(0.949)	84343	36.4679	4100	

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	FINAL (ug/kg)
46	Benzo(j)fluoranthene	252	18.890	18.890	(0.952)	83928	39.8367	4480
34	Benzo(a)pyrene	252	19.640	19.630	(0.990)	120581	62.9522	7070
* 35	Perylene-d12	264	19.841	19.841	(1.000)	292938	200.000	
$ 36	Dibenzo(a,h)anthracene-d14	292	22.207	22.208	(1.119)	206429	174.593	19600
37	Indeno(1,2,3-cd)pyrene	276	22.329	22.329	(1.125)	24109	11.9877	1350
38	Dibenzo(a,h)anthracene	278	Compound Not Detected.					
39	Benzo(g,h,i)perylene	276	23.426	23.426	(1.181)	22994	13.1704	1480
47	Perylene	252	19.909	19.899	(1.003)	30906	15.5631	1750
48	Benzo(e)pyrene	252	19.524	19.524	(0.984)	101994	50.8492	5710

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120512.D
Lab Smp Id: AQJ9K
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21398

Calibration Date: 05-DEC-2015
Calibration Time: 10:30
Client Smp ID: PG-SMA2-3-PEMD
Level: LOW
Sample Type: Tissue

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	329170	0.39
11 Acenaphthene-d10	239179	119590	478358	272591	13.97
18 Phenanthrene-d10	372253	186127	744506	446217	19.87
29 Chrysene-d12	294711	147356	589422	330667	12.20
35 Perylene-d12	260595	130298	521190	292938	12.41

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.59	-0.16
11 Acenaphthene-d10	9.60	9.10	10.10	9.59	-0.12
18 Phenanthrene-d10	12.27	11.77	12.77	12.27	-0.00
29 Chrysene-d12	17.02	16.52	17.52	17.02	-0.00
35 Perylene-d12	19.84	19.34	20.34	19.84	-0.00

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.

ARI Labs, Inc.

RECOVERY REPORT

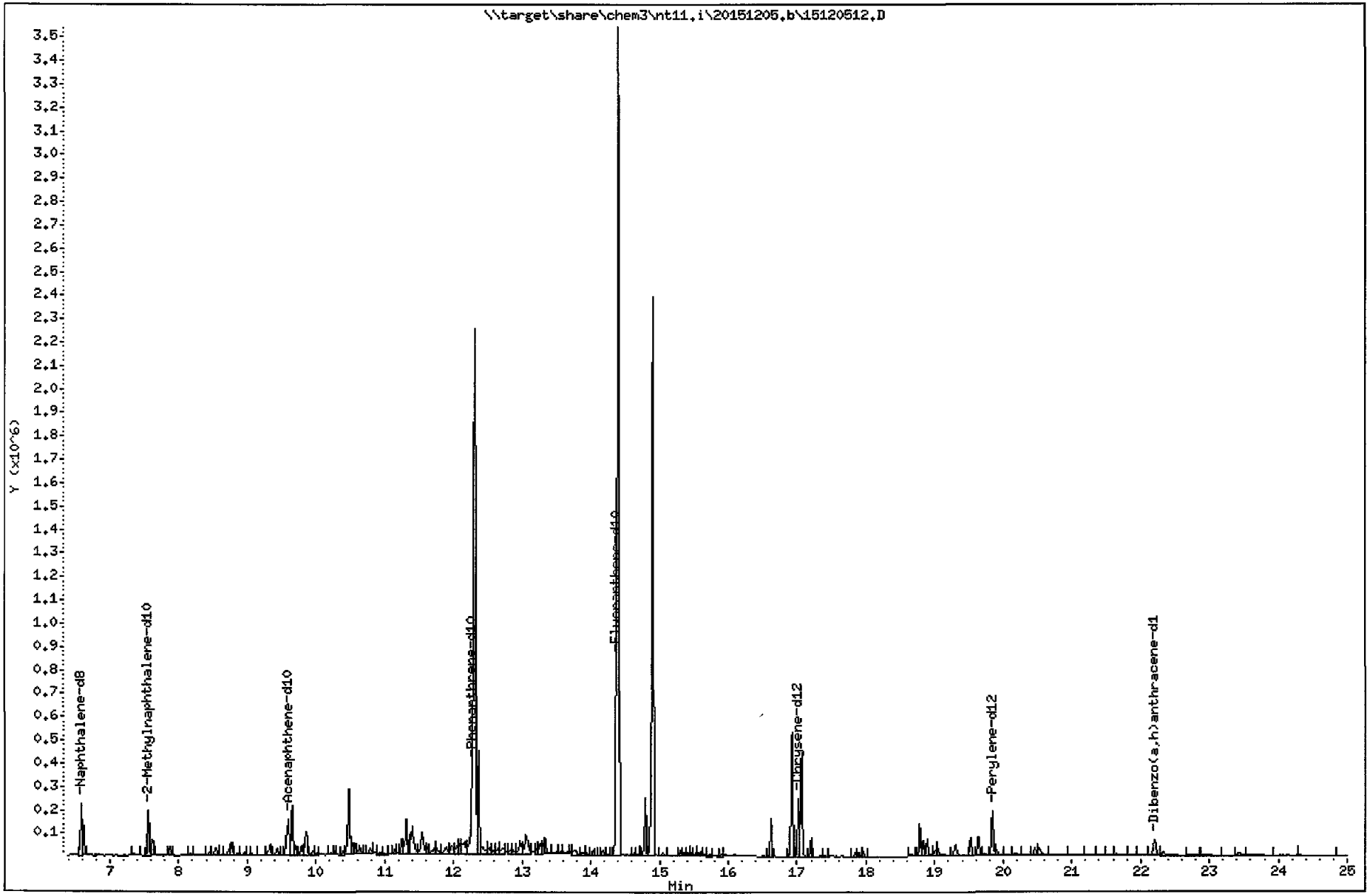
Client Name: Anchor QEA, LLC
Client SDG: AQJ9
Sample Matrix: SOLID
Fraction: SV
Lab Smp Id: AQJ9K
Client Smp ID: PG-SMA2-3-PEMD-1511
Level: LOW
Operator: JW
Data Type: MS DATA
SampleType: SAMPLE
SpikeList File: waterlcs.spk
Quant Type: ISTD
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21398

SURROGATE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
$ 6 2-Methylnaphthalen	33700	16400	48.65	30-160
$ 23 Fluoranthene-d10	33700	21900	65.04	30-160
$ 36 Dibenzo(a,h)anthra	33700	19600	58.20	30-160

Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D
Date : 05-DEC-2015 15:46
Client ID: PG-SMA2-3-PEMD-1511
Sample Info: AQJ9K
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: JW
Column diameter: 0.25

AQJ9:00280



Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K

Volume Injected (uL): 2.0

Operator: JW

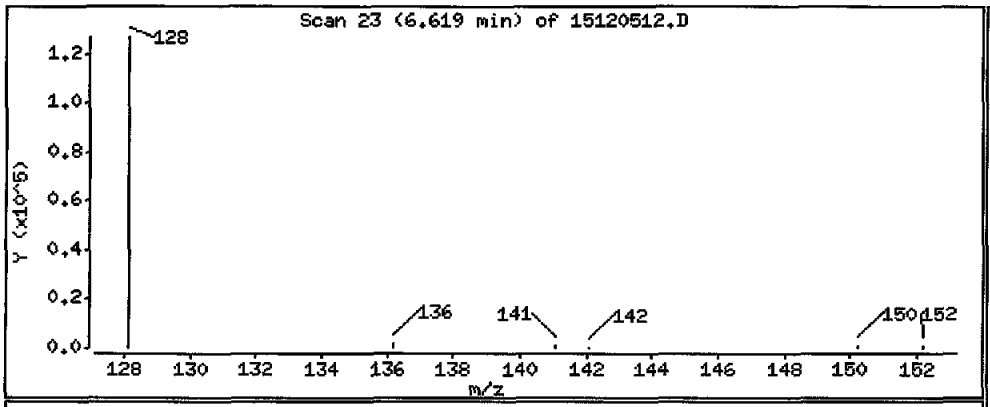
Column phase: Rxi-17Sil MS

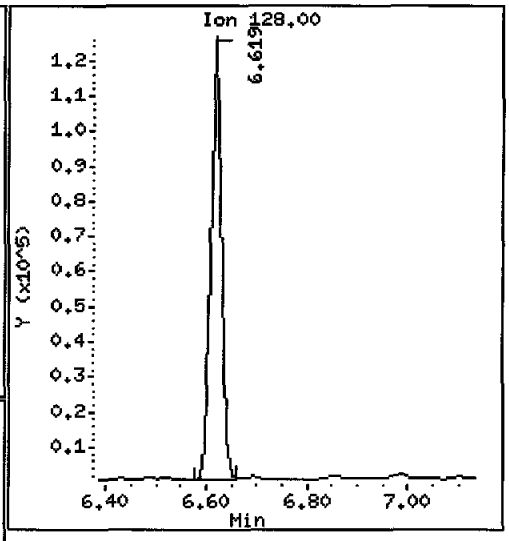
Column diameter: 0.25

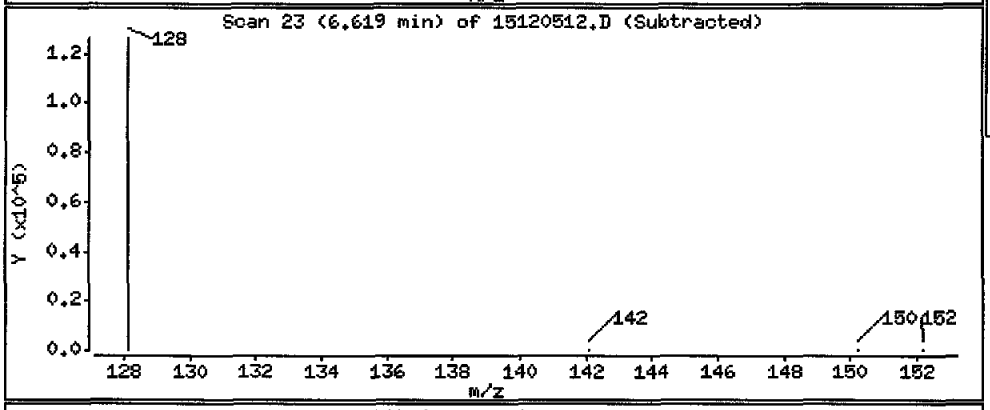
5 Naphthalene

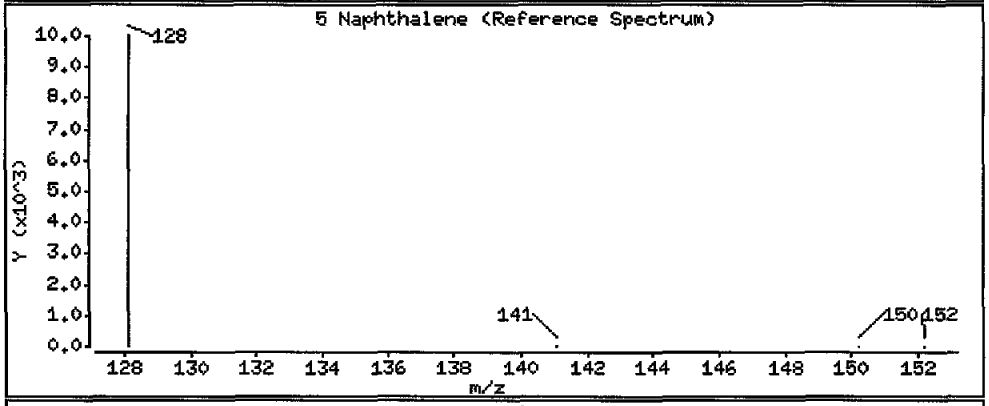
Concentration: 10800 ug/kg

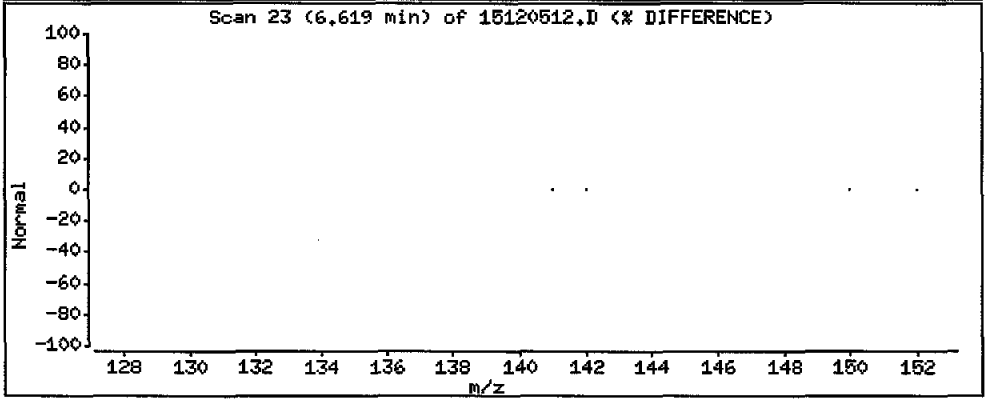
B











Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K

Volume Injected (uL): 2.0

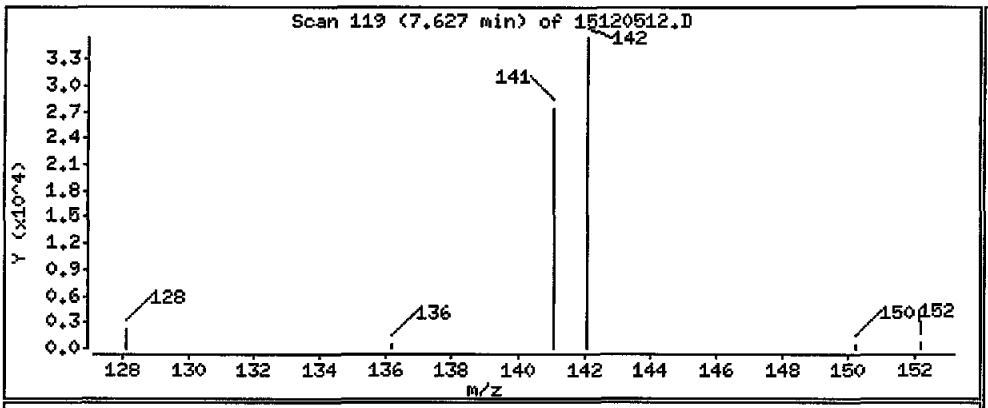
Operator: JW

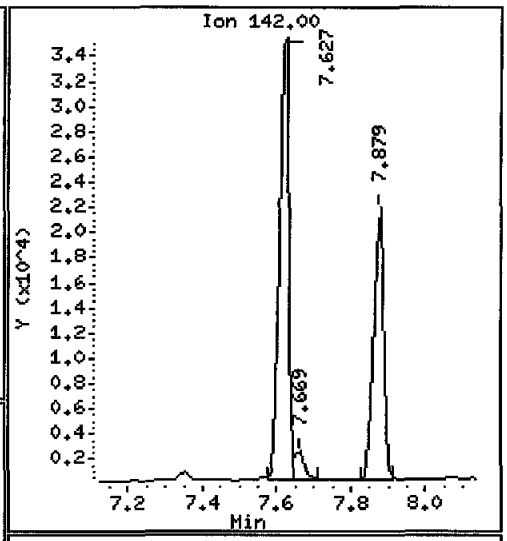
Column phase: Rxi-17Sil MS

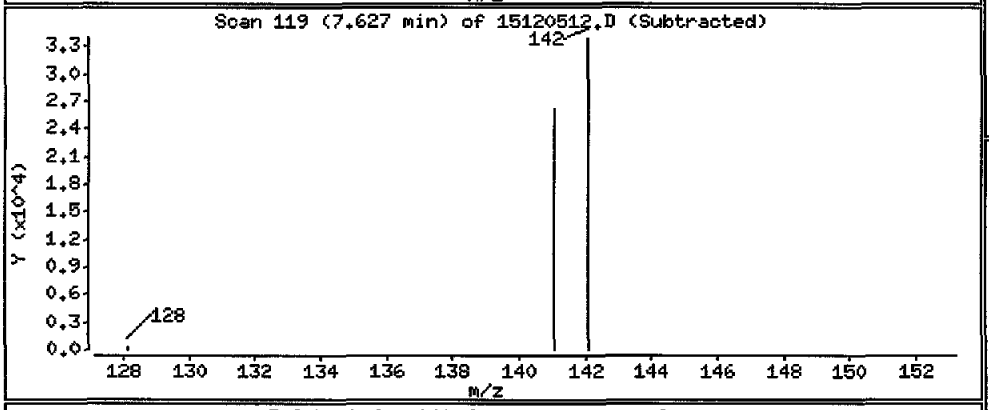
Column diameter: 0.25

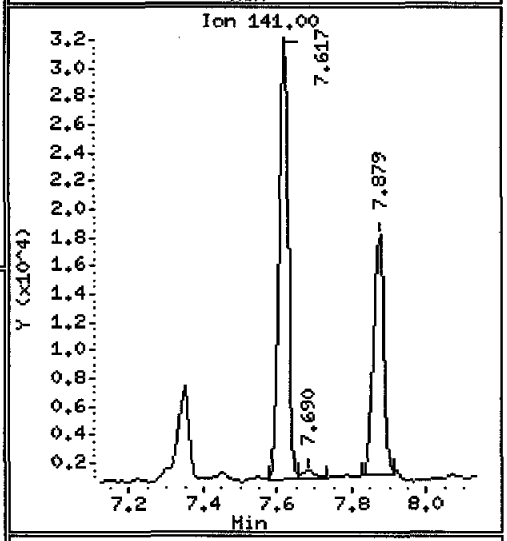
7 2-Methylnaphthalene

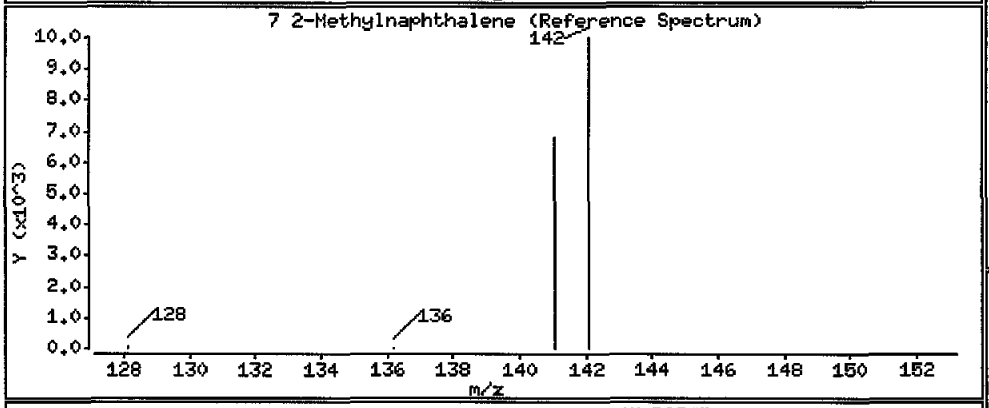
Concentration: 5790 ug/kg

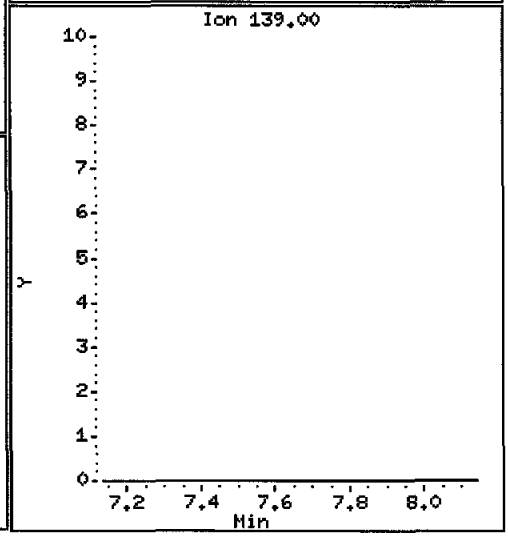


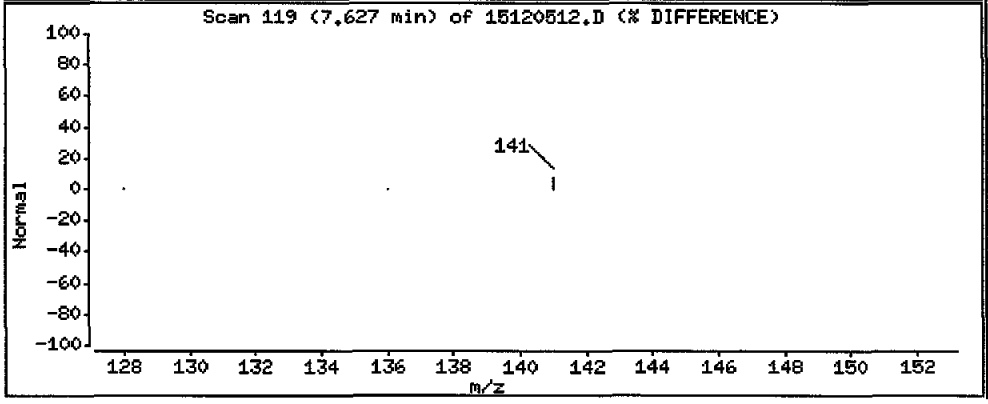












Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

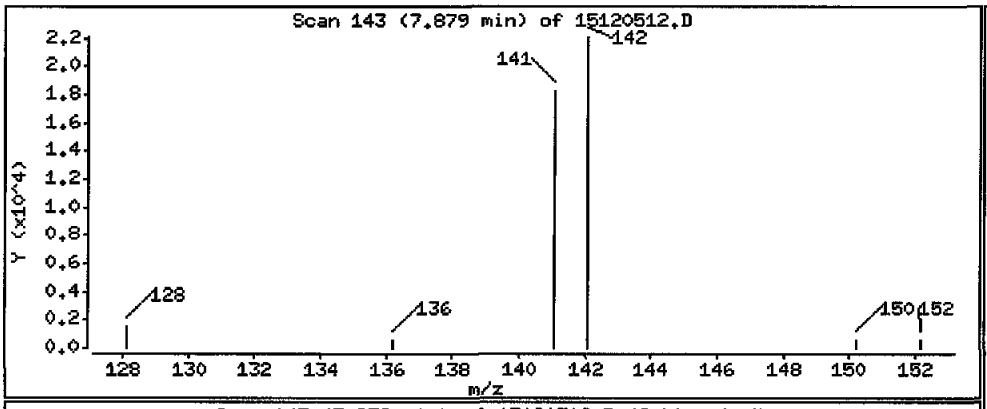
Client ID: PG-SMA2-3-PEMD-1511 Instrument: nt11.i

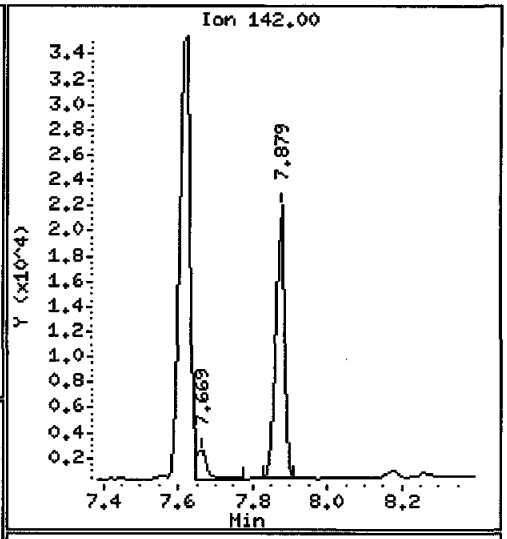
Sample Info: AQJ9K

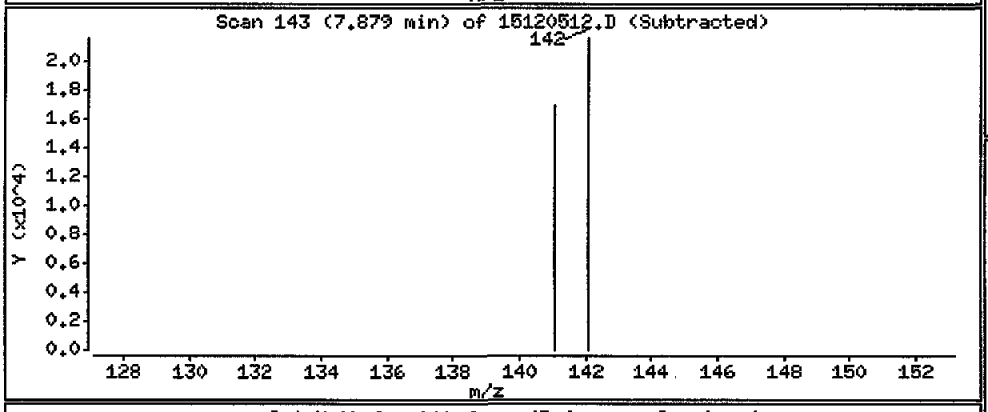
Volume Injected (uL): 2.0 Operator: JW

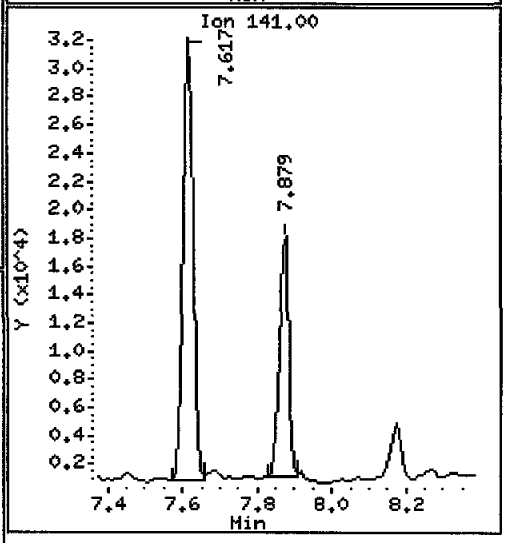
Column phase: Rxi-17Sil MS Column diameter: 0.25

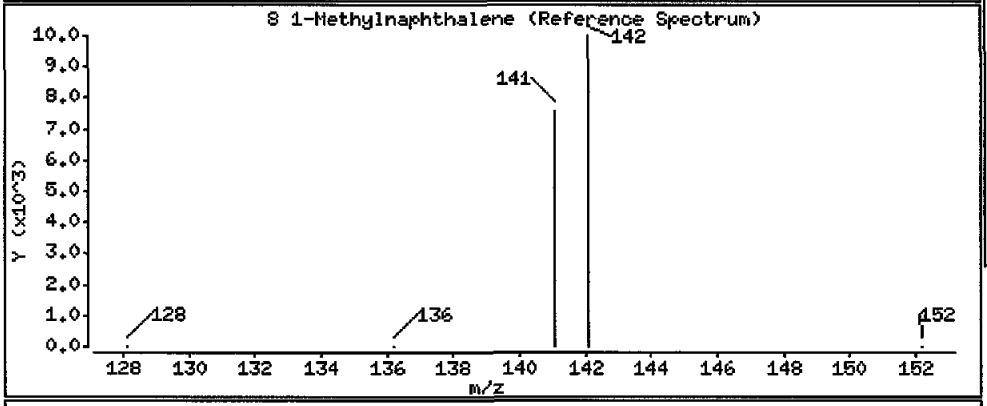
8 1-Methylnaphthalene Concentration: 3680 ug/kg

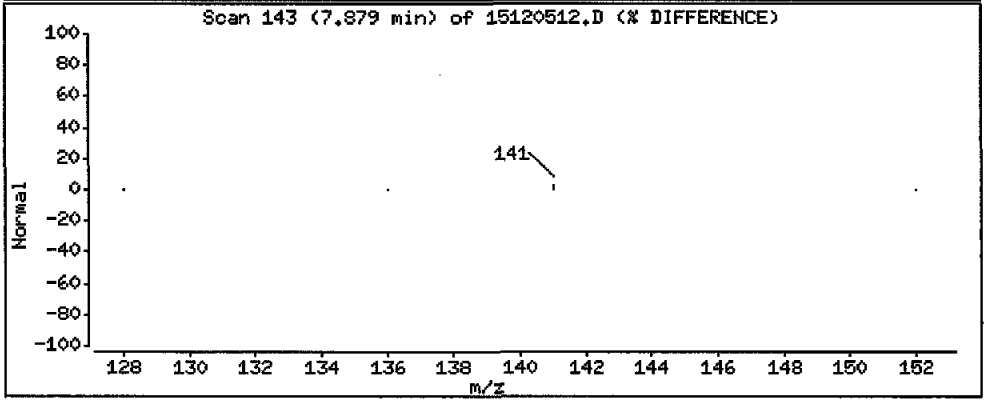












Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K

Volume Injected (uL): 2.0

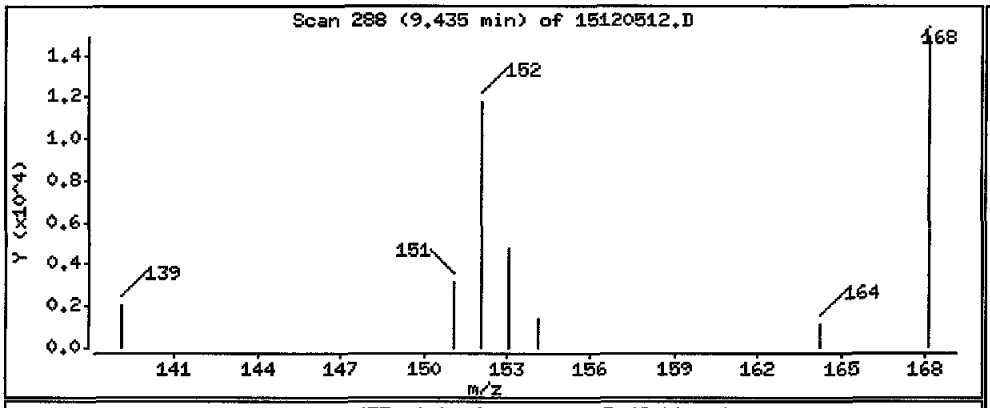
Operator: JW

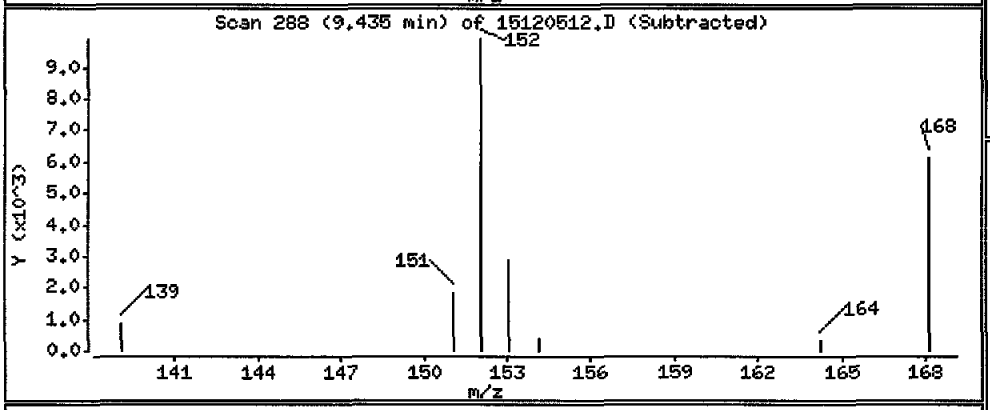
Column phase: Rxi-17Sil MS

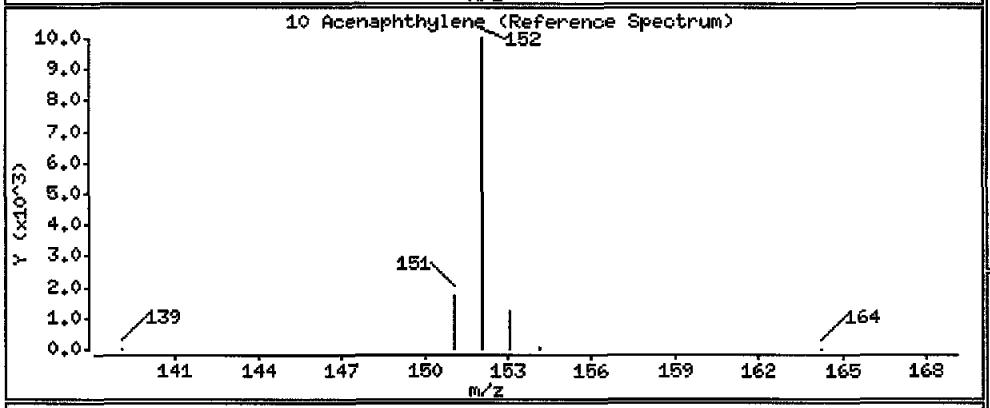
Column diameter: 0.25

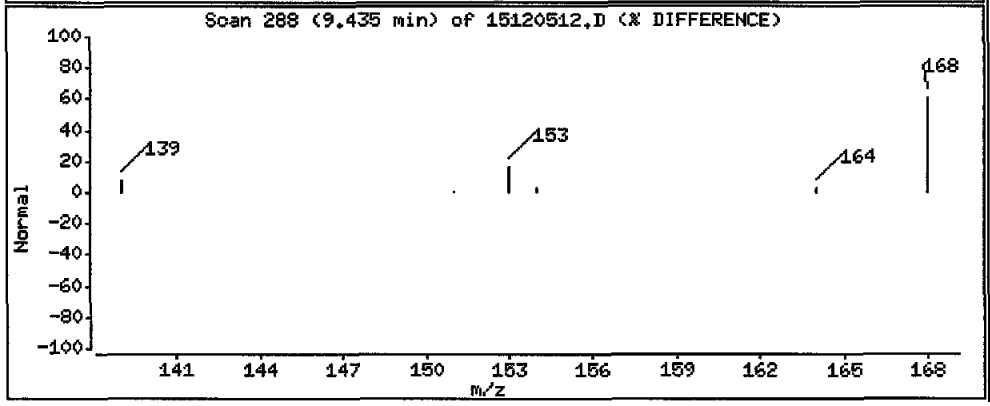
10 Acenaphthylene

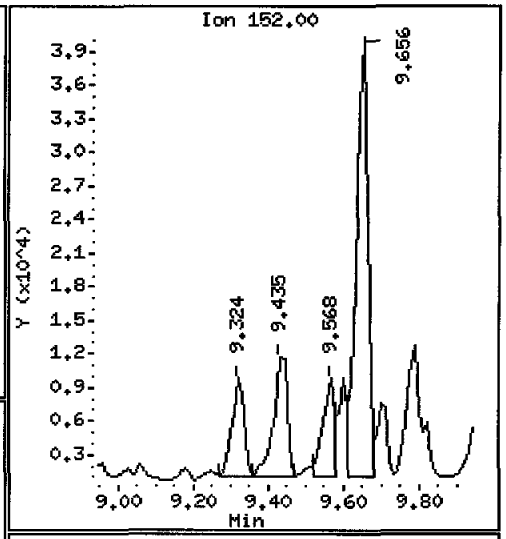
Concentration: 1290 ug/kg

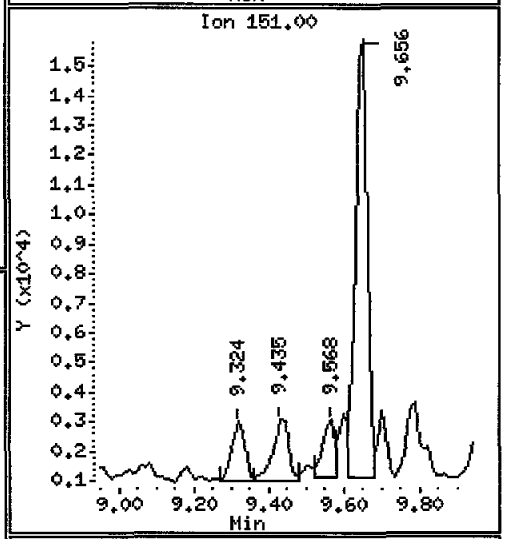


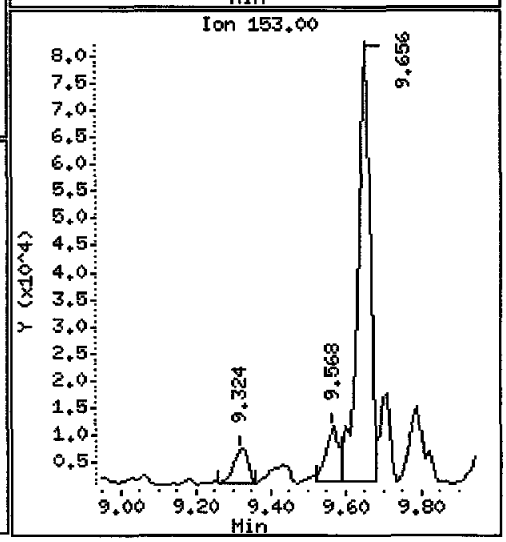












Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K

Volume Injected (uL): 2.0

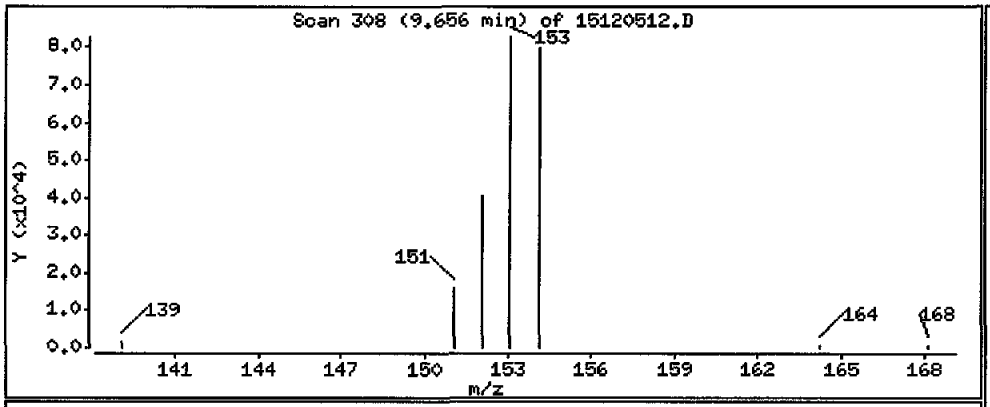
Operator: JW

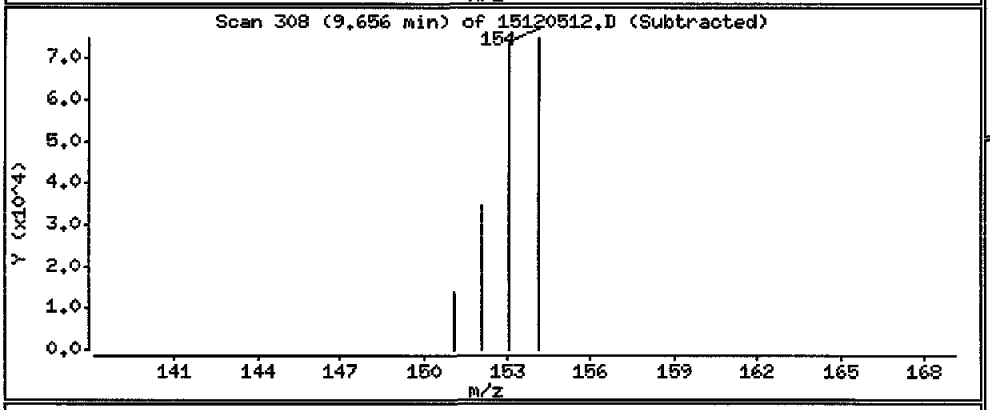
Column phase: Rxi-17Sil MS

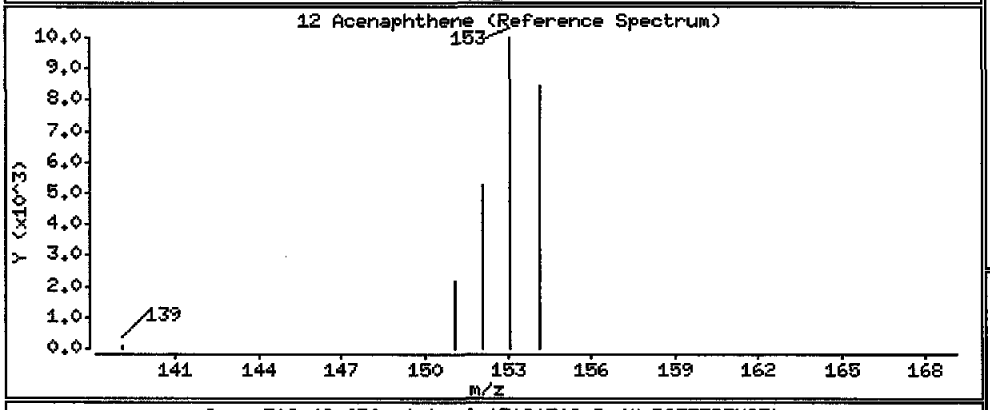
Column diameter: 0.25

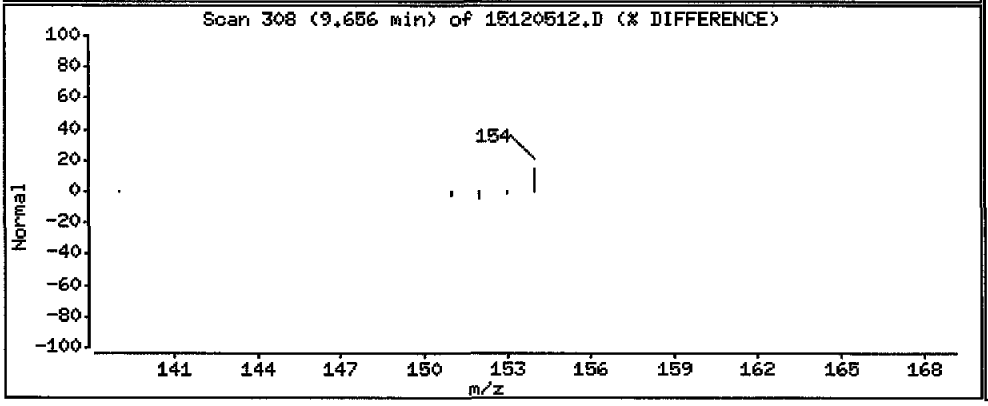
12 Acenaphthene

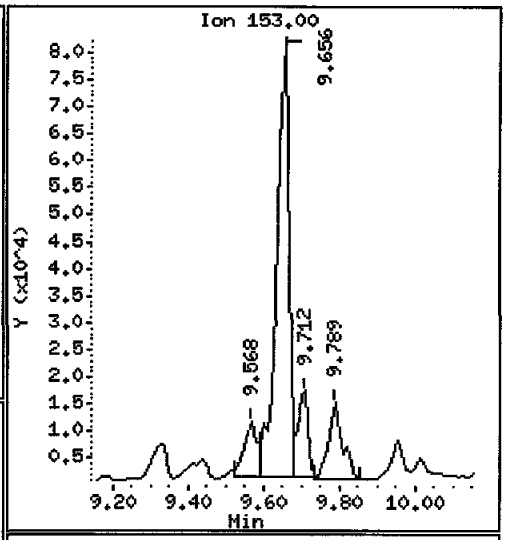
Concentration: 13200 ug/kg

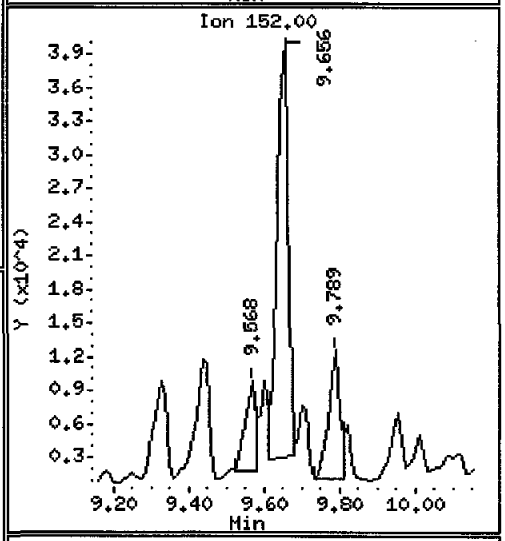


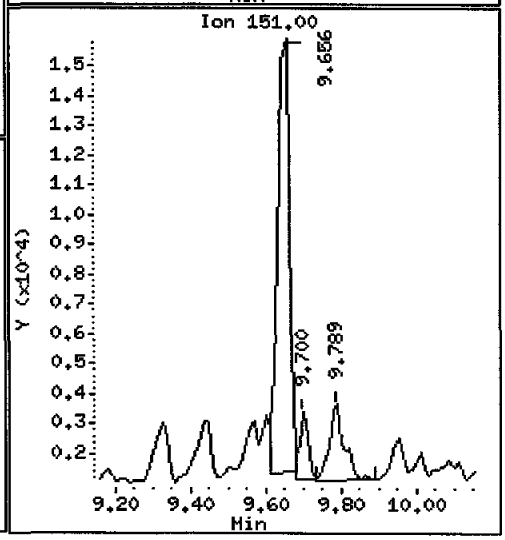












Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K

Volume Injected (uL): 2.0

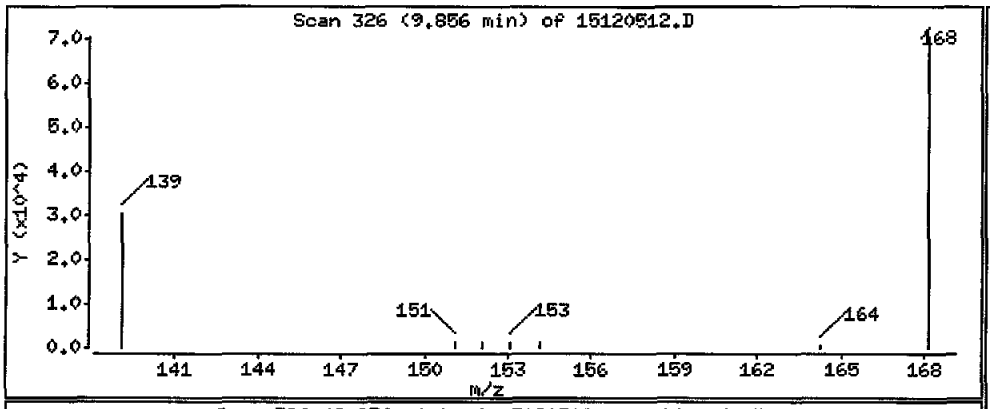
Operator: JW

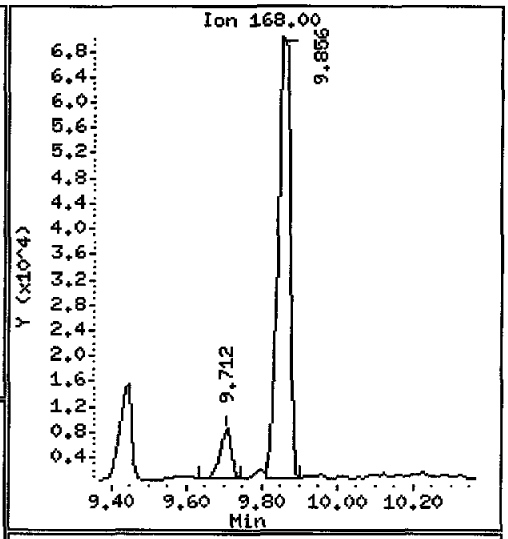
Column phase: Rxi-17Sil MS

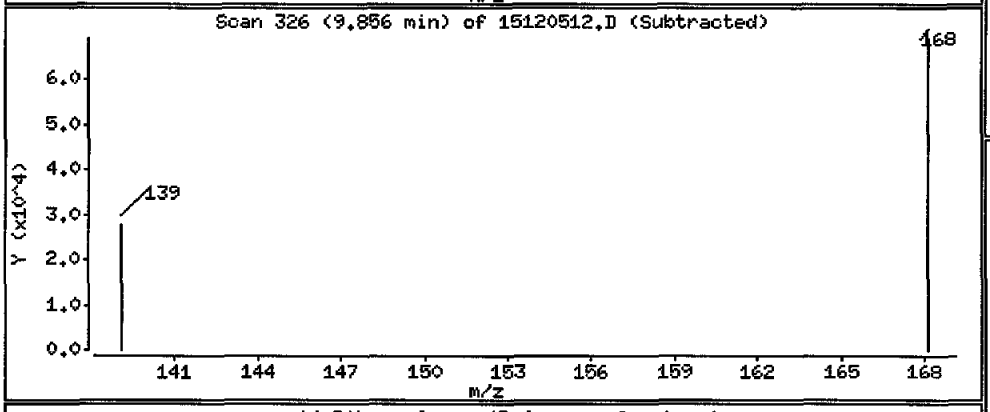
Column diameter: 0.25

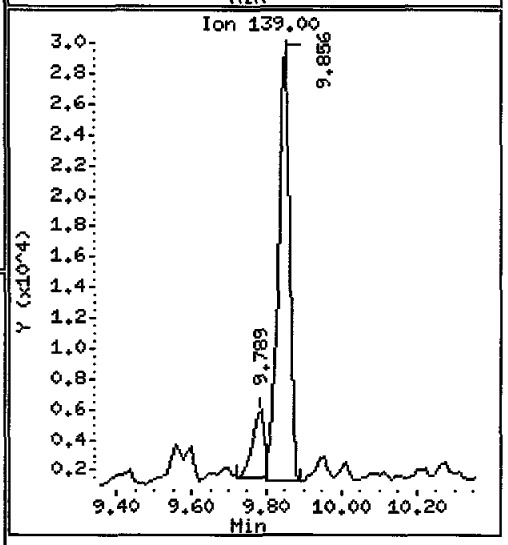
14 Dibenzofuran

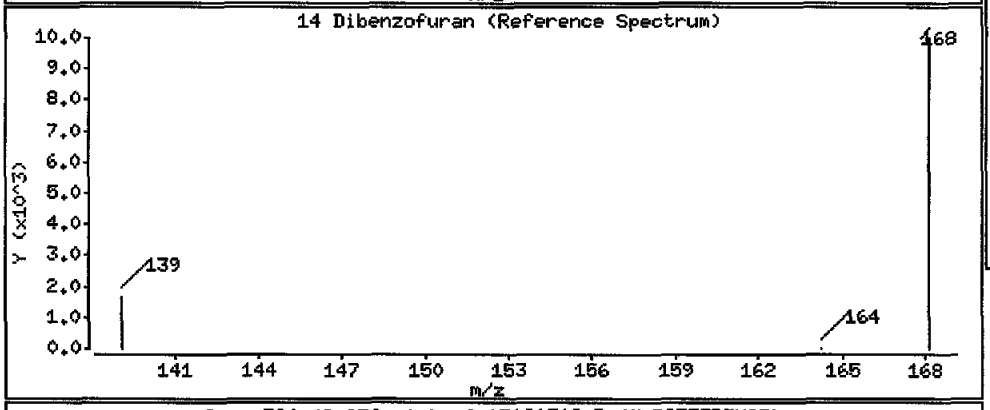
Concentration: 7290 ug/kg

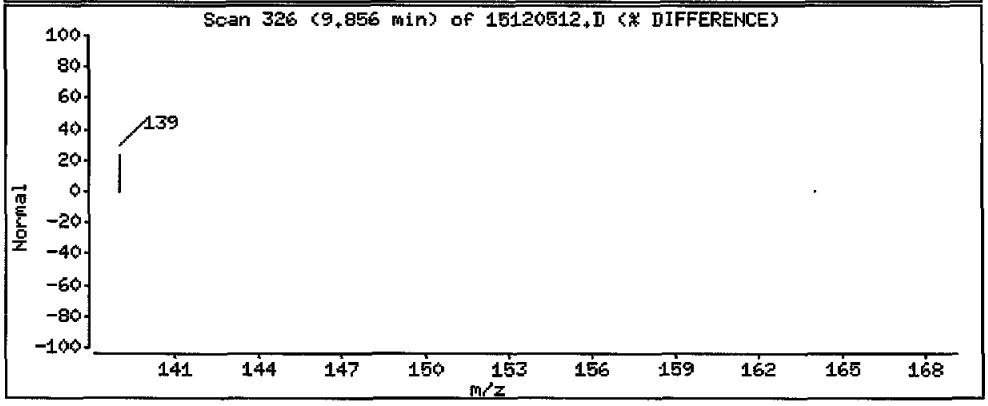












Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K

Volume Injected (uL): 2.0

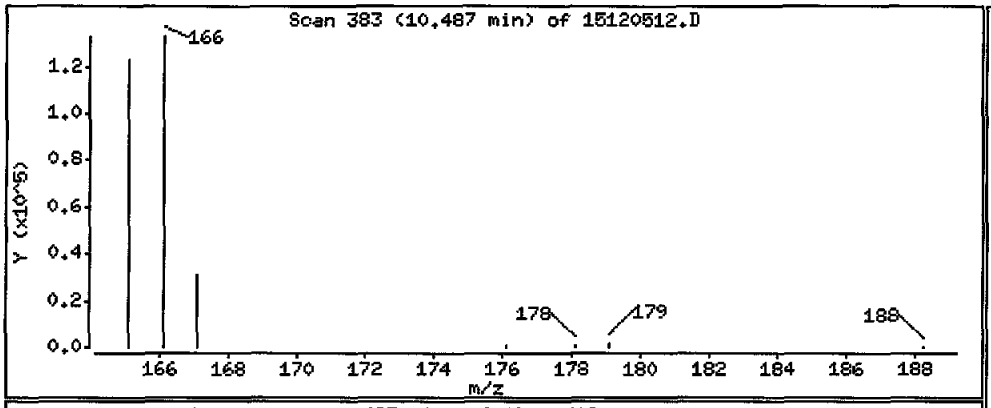
Operator: JW

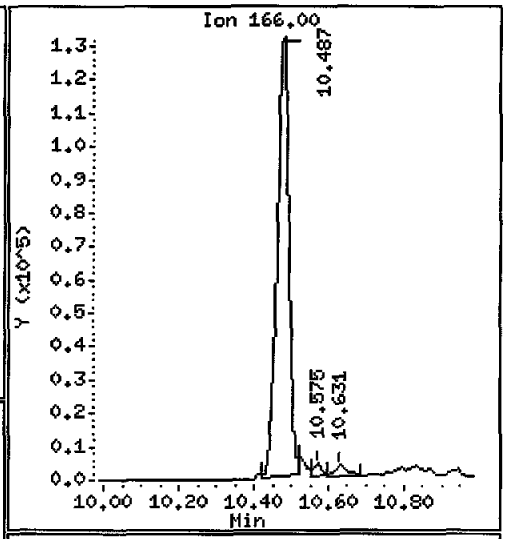
Column phase: Rxi-17Sil MS

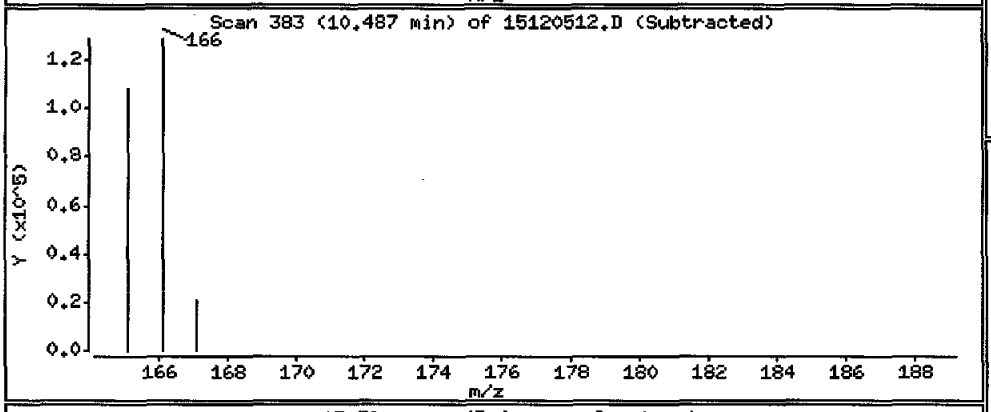
Column diameter: 0.25

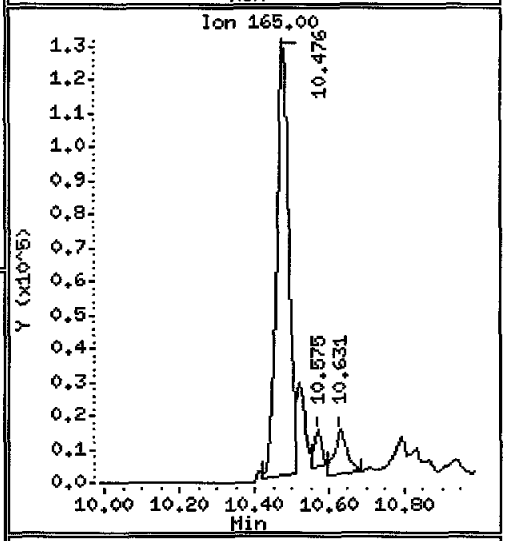
15 Fluorene

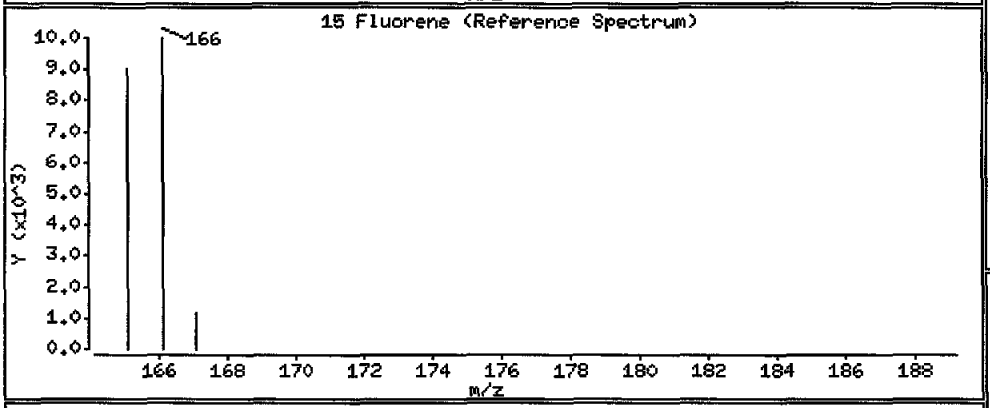
Concentration: 19100 ug/kg

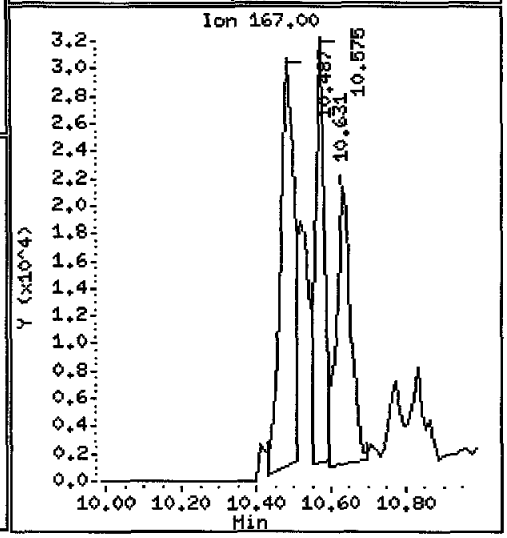


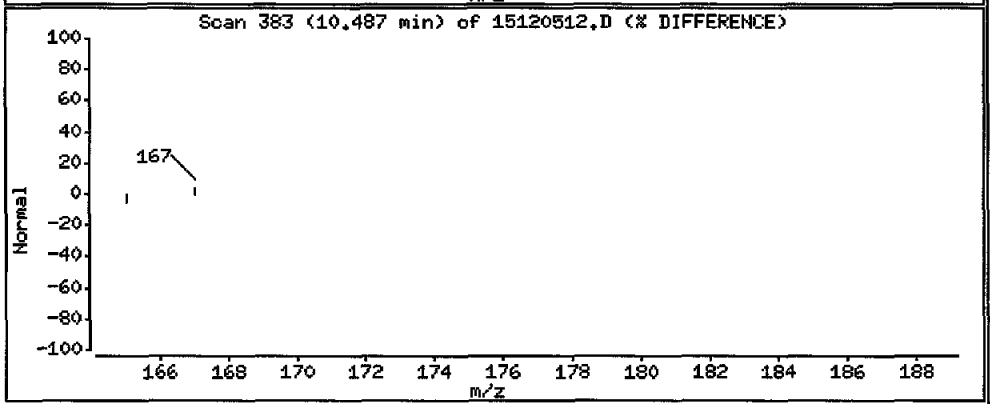












Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K

Volume Injected (uL): 2.0

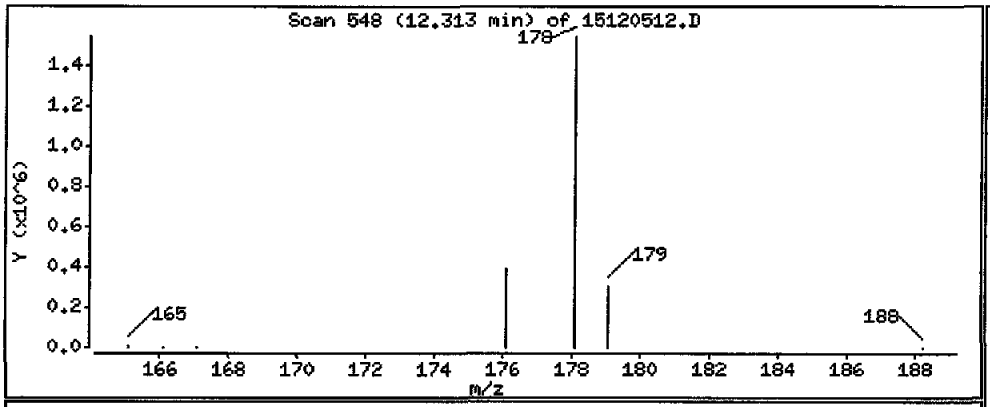
Operator: JW

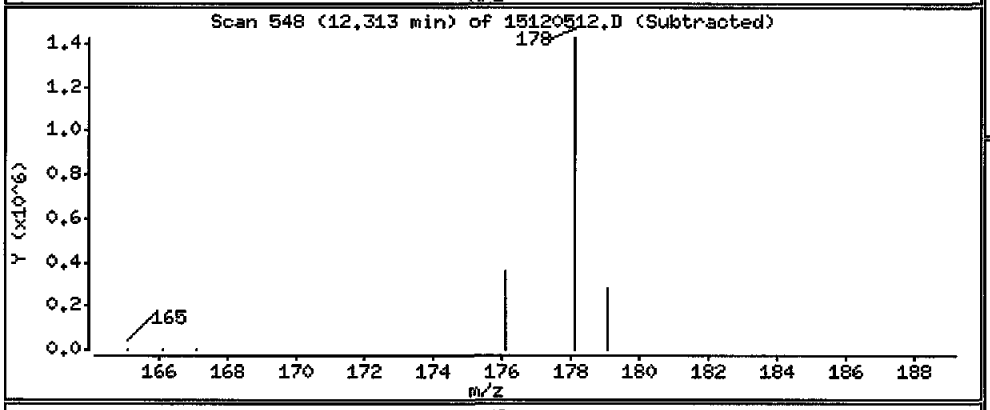
Column phase: Rxi-17Sil MS

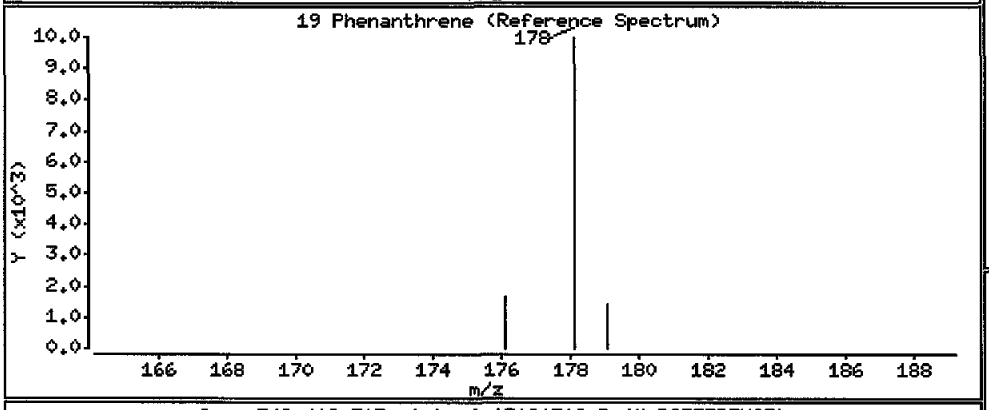
Column diameter: 0.25

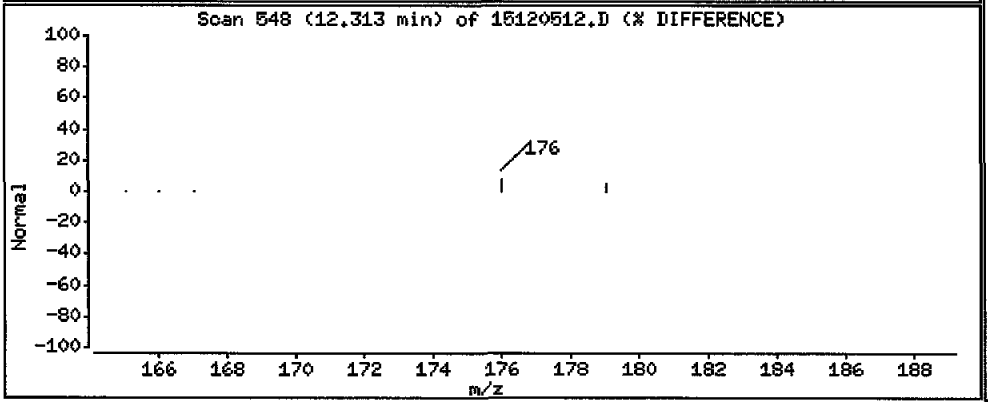
19 Phenanthrene

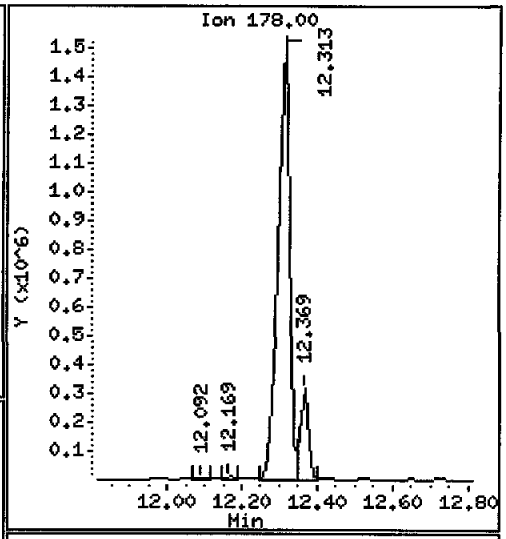
Concentration: 126000 ug/kg

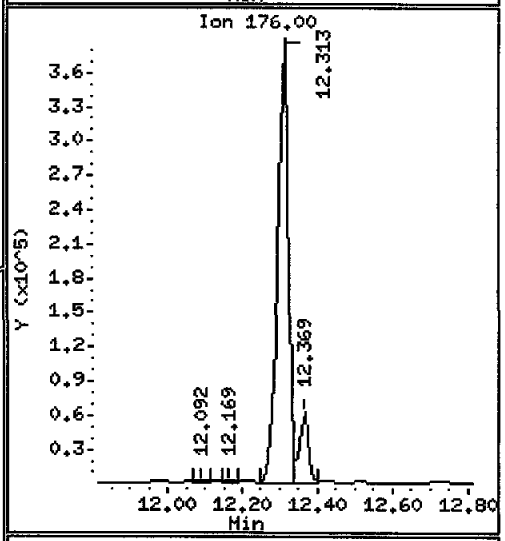


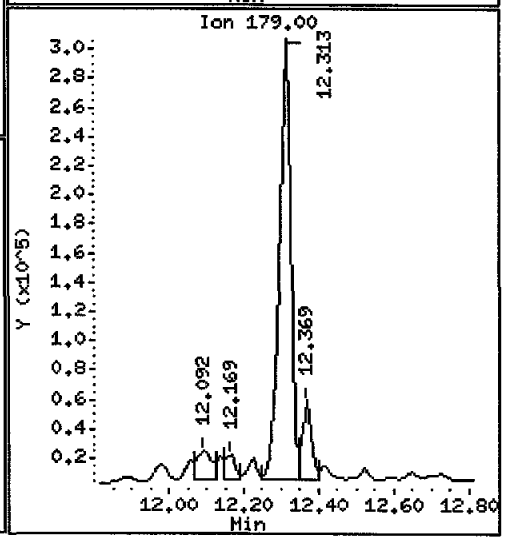












Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K

Volume Injected (uL): 2.0

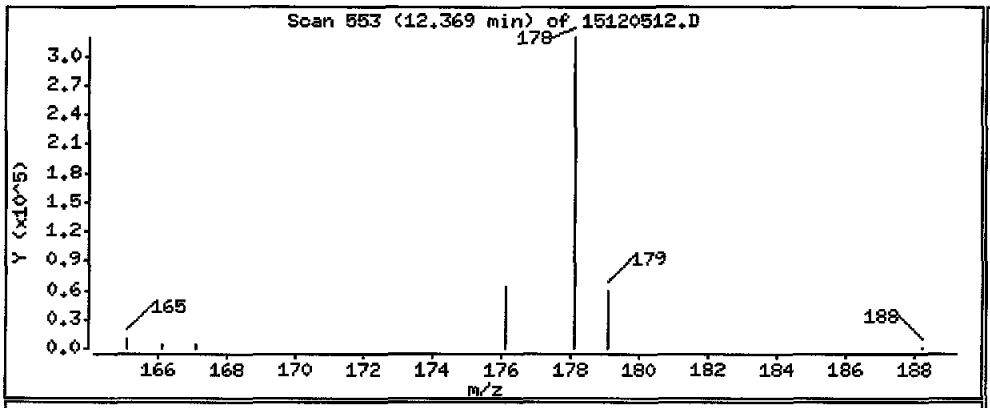
Operator: JW

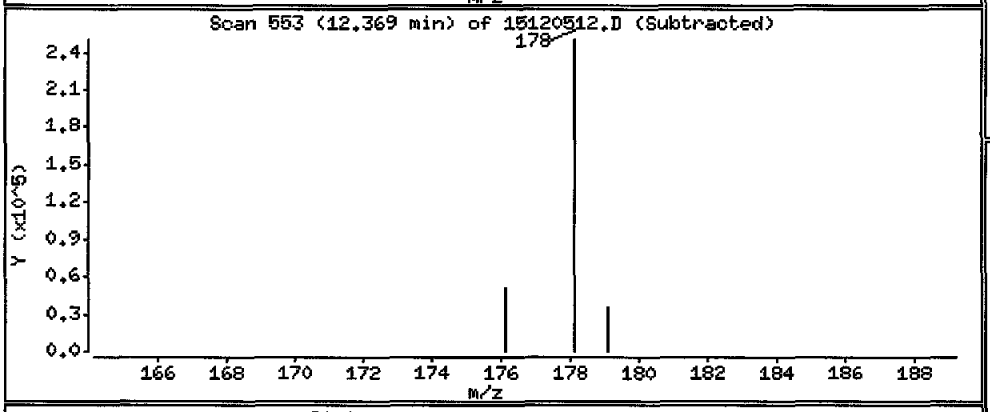
Column phase: Rxi-17Sil MS

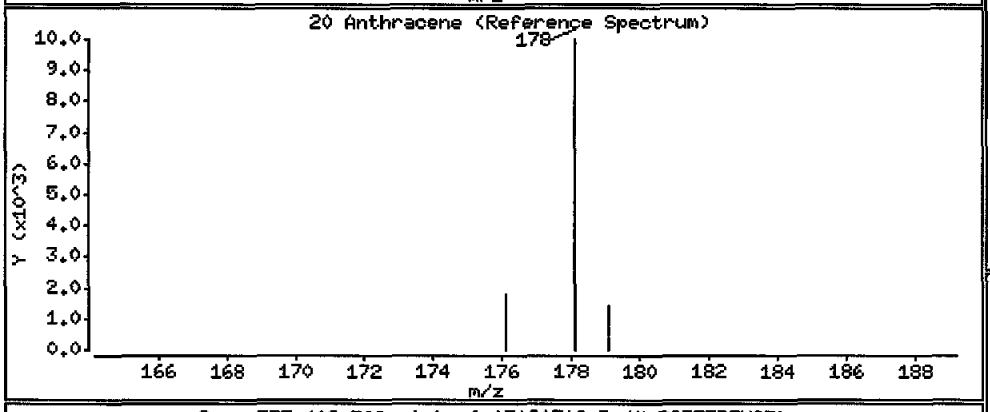
Column diameter: 0.25

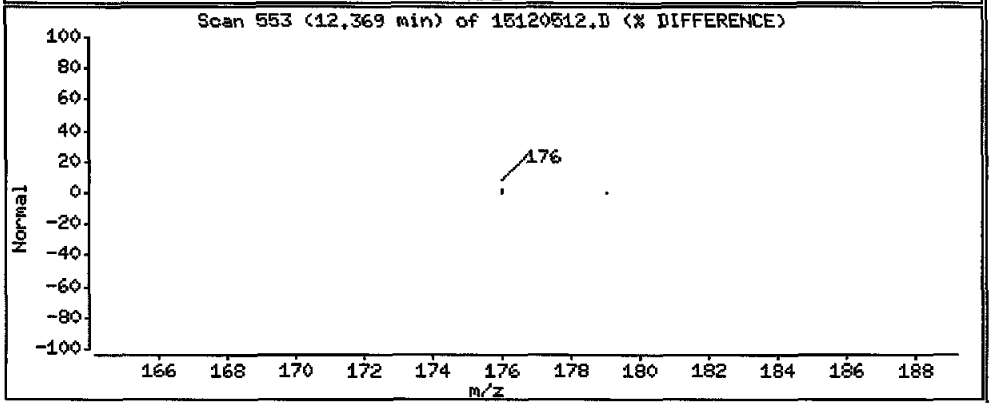
20 Anthracene

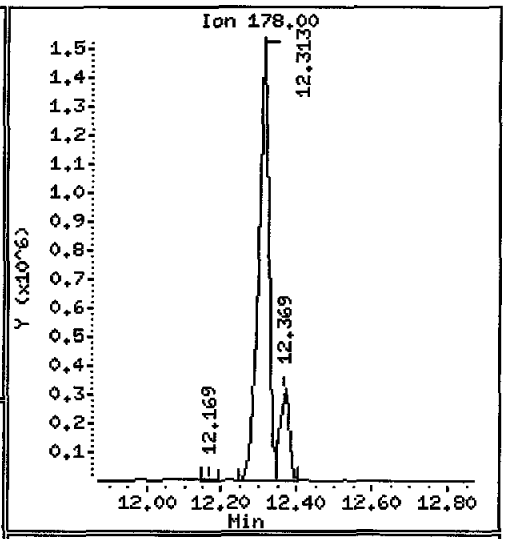
Concentration: 24300 ug/kg

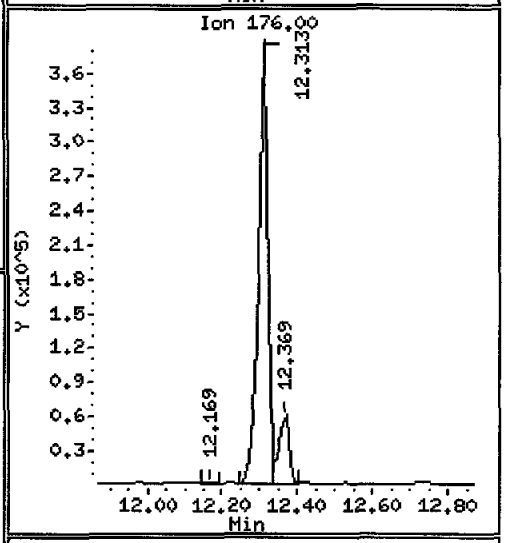


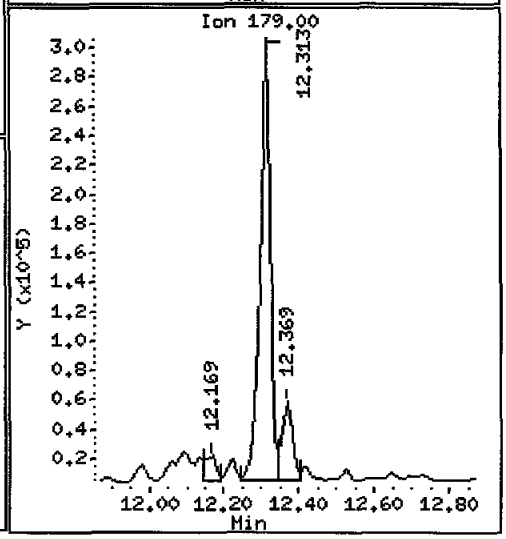












Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K

Volume Injected (uL): 2.0

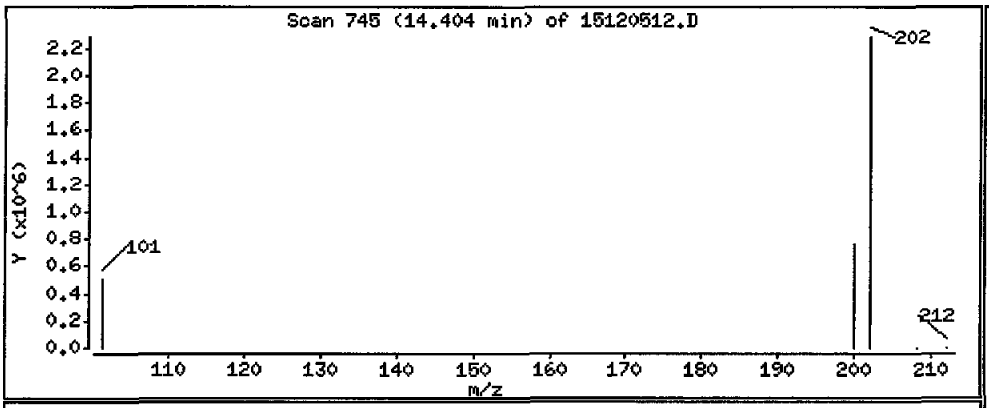
Operator: JW

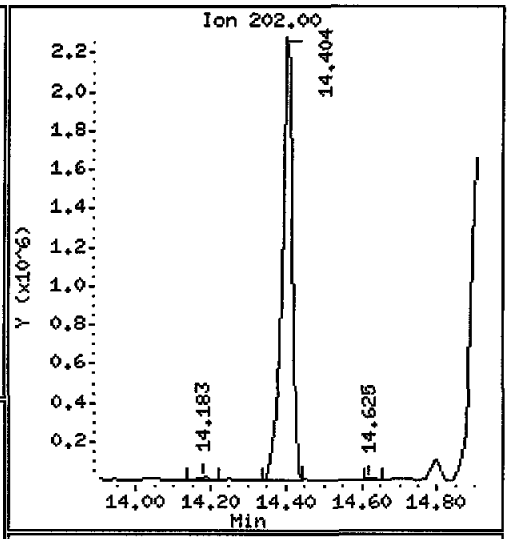
Column phase: Rxi-17Sil MS

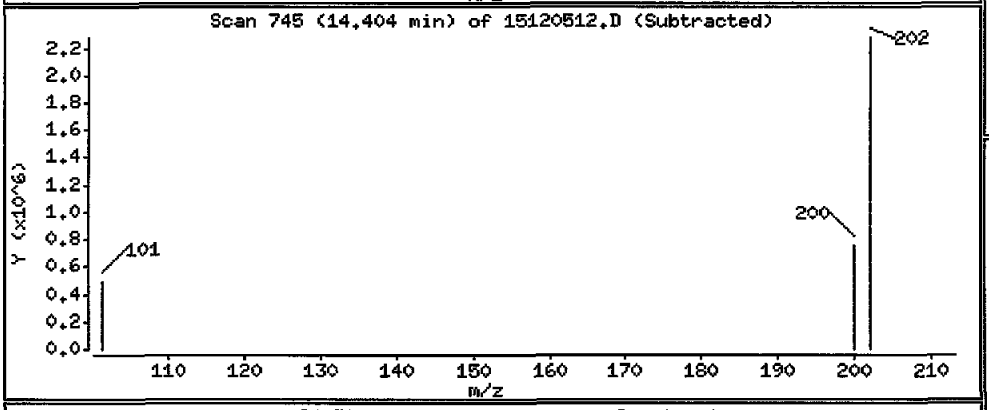
Column diameter: 0.25

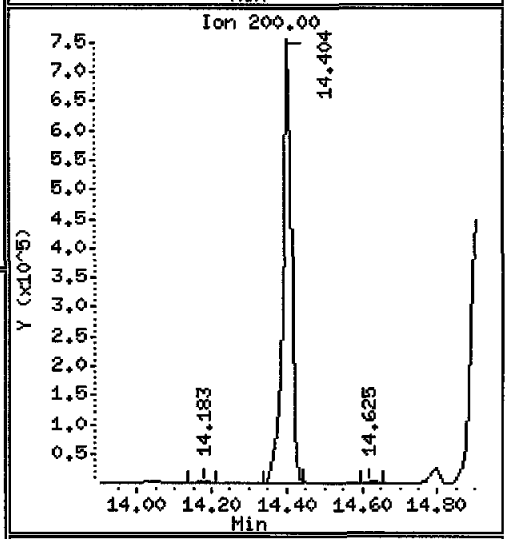
24 Fluoranthene

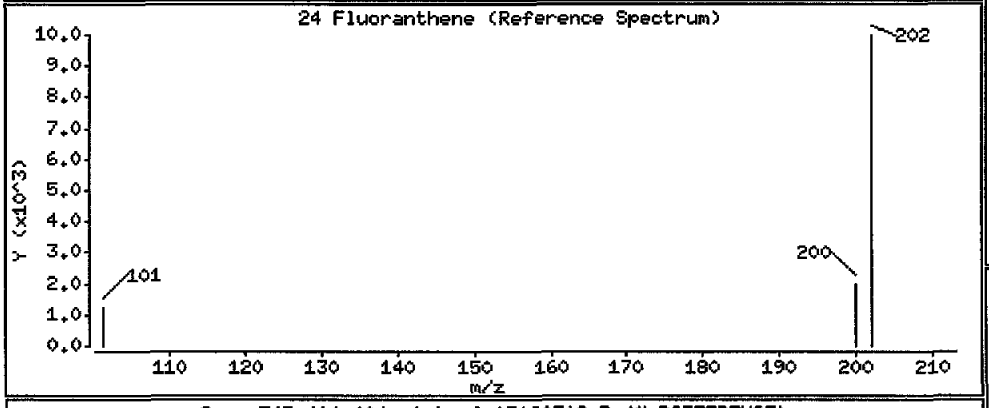
Concentration: 185000 ug/kg

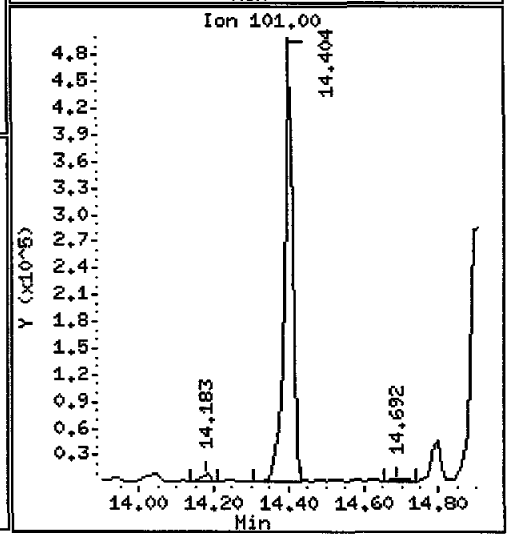


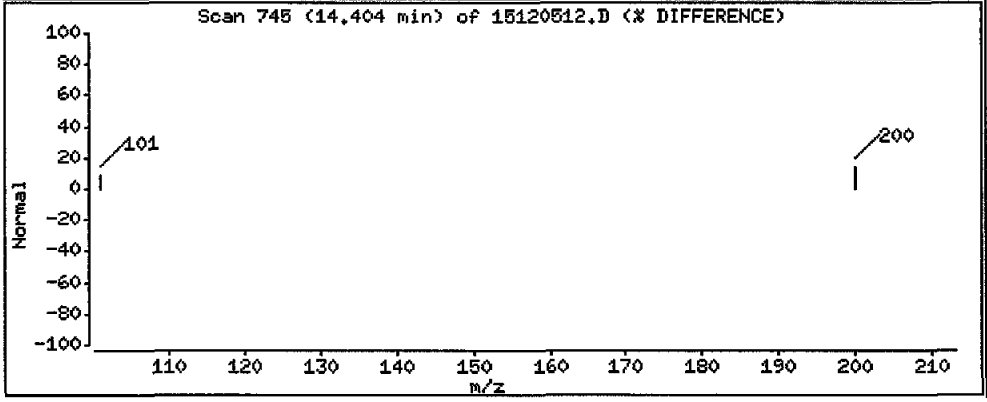












Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K

Volume Injected (uL): 2.0

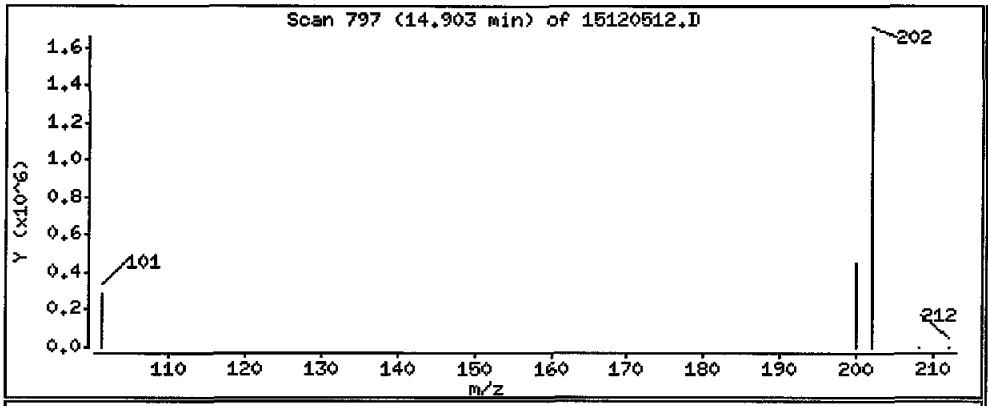
Operator: JW

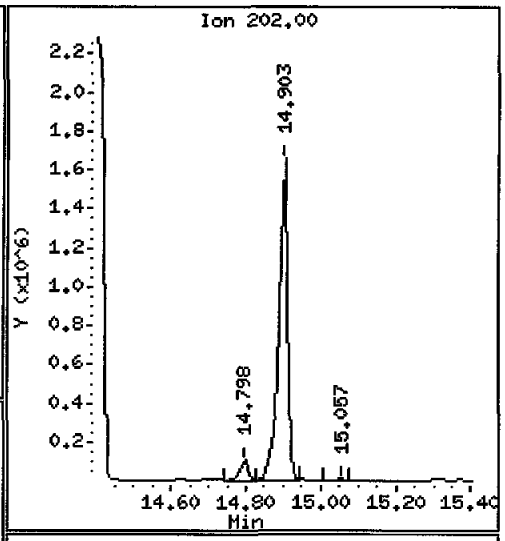
Column phase: Rxi-17Sil MS

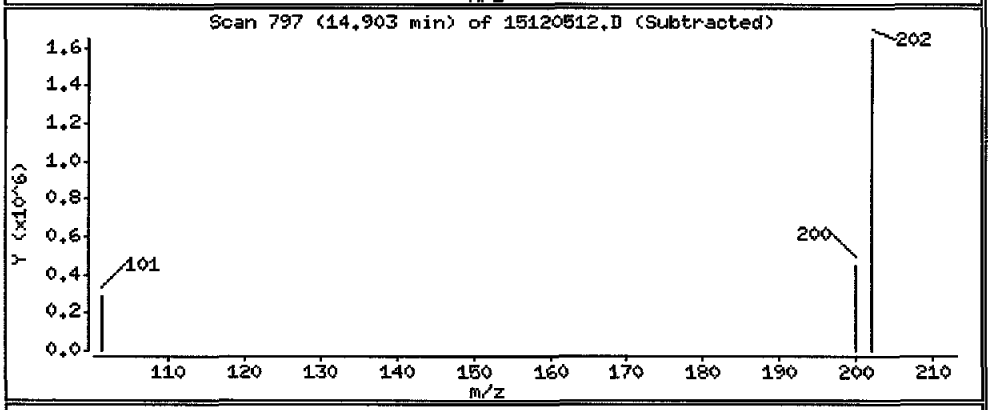
Column diameter: 0.25

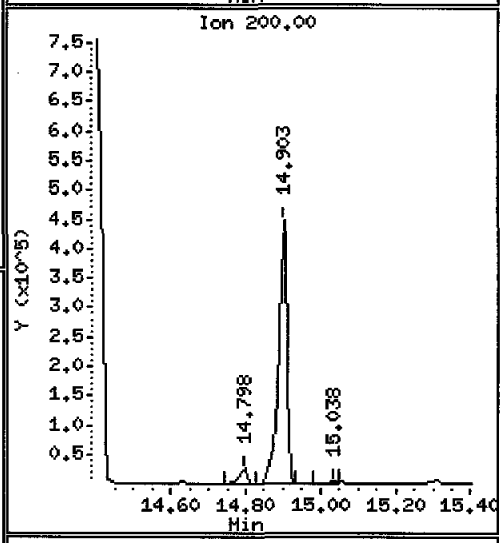
25 Pyrene

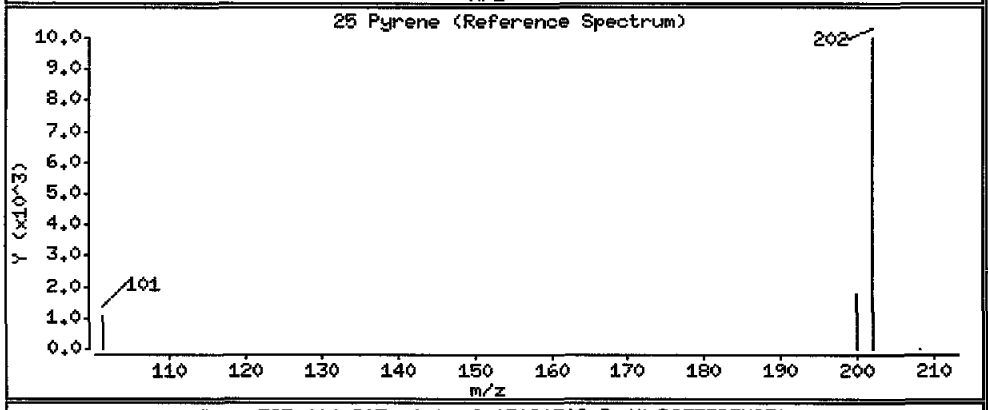
Concentration: 119000 ug/kg

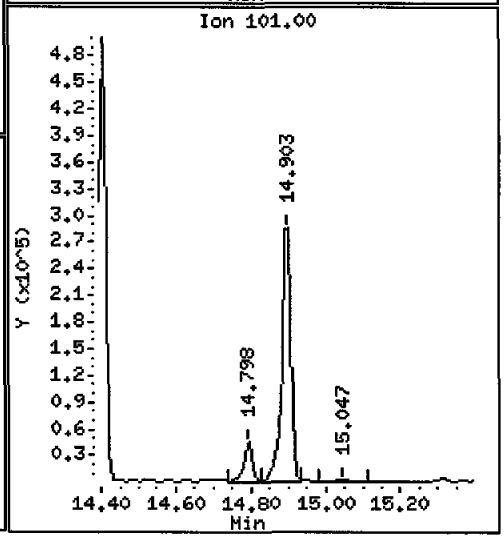


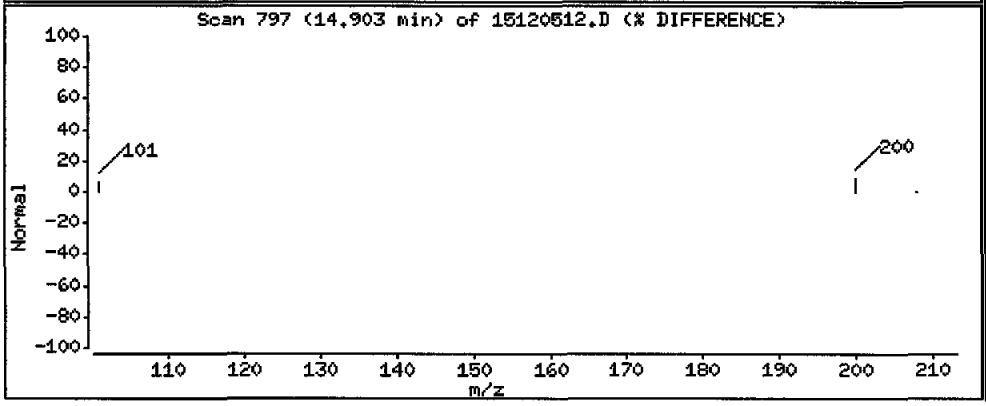












Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

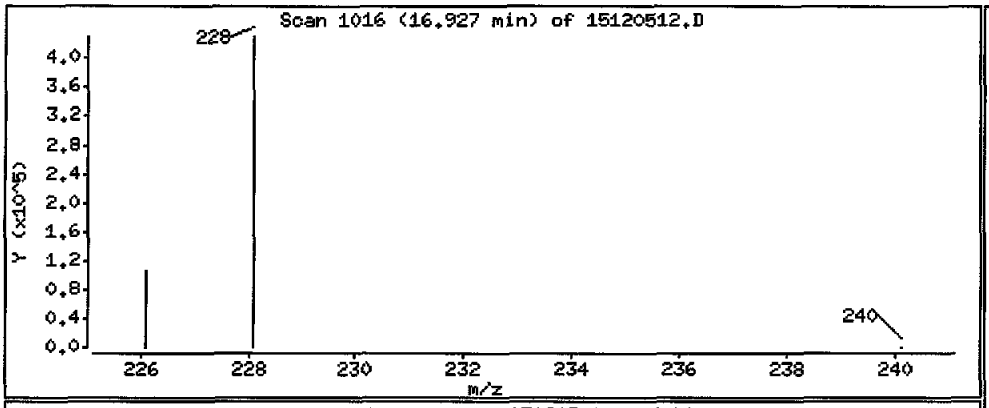
Client ID: PG-SMA2-3-PEMD-1511 Instrument: nt11.i

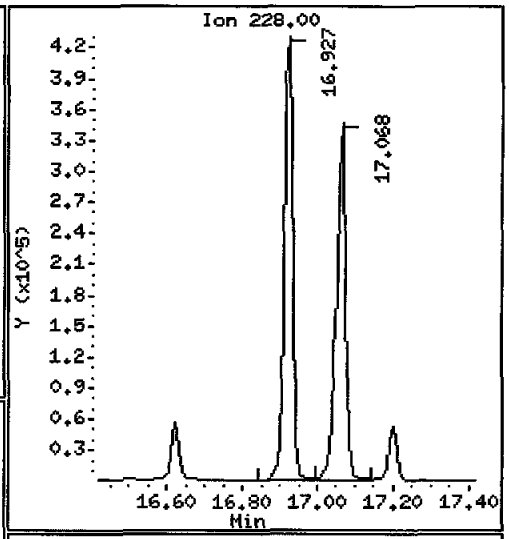
Sample Info: AQJ9K

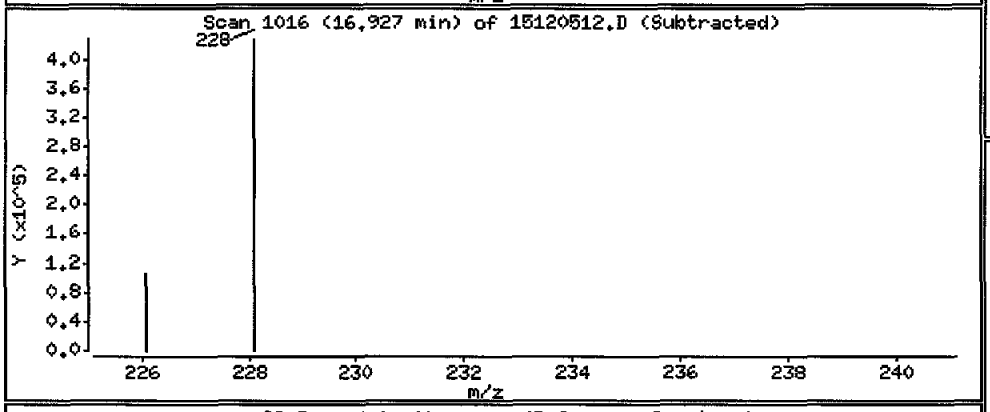
Volume Injected (uL): 2.0 Operator: JW

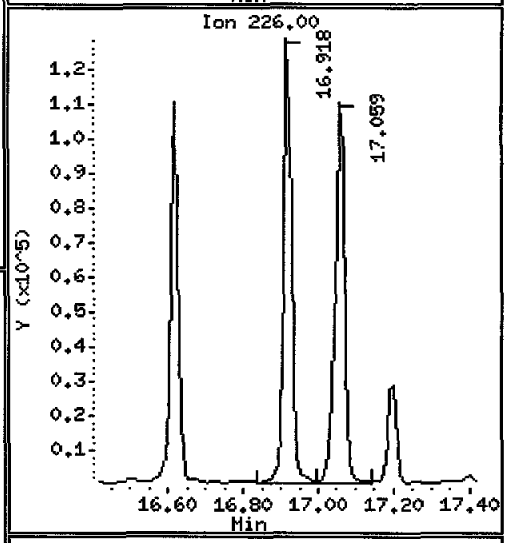
Column phase: Rxi-17Sil MS Column diameter: 0.25

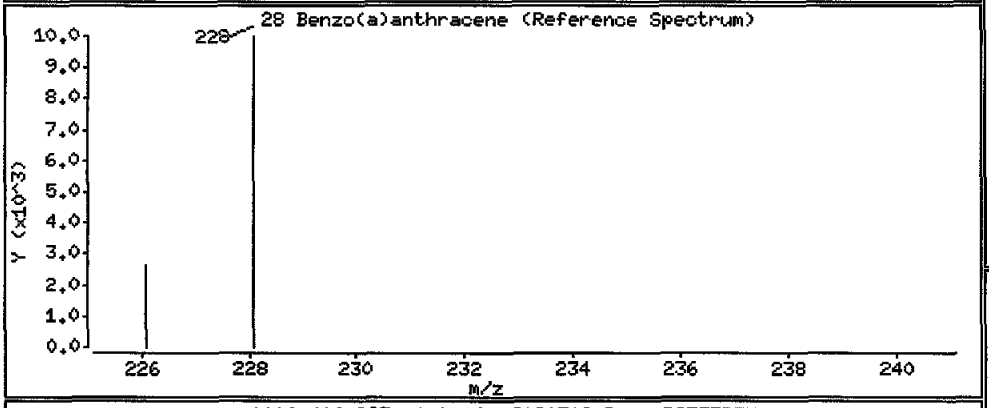
28 Benzo(a)anthracene Concentration: 32400 ug/kg

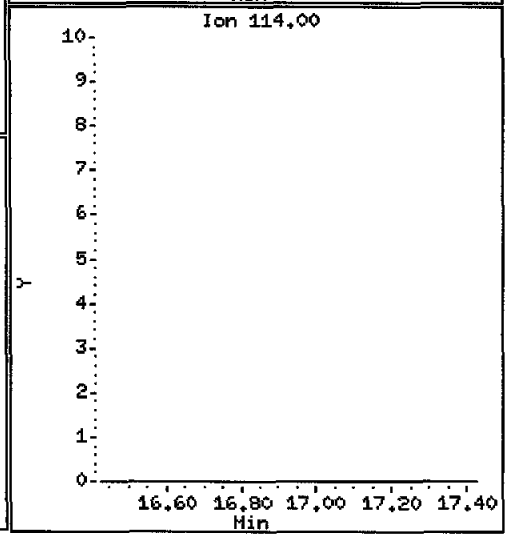


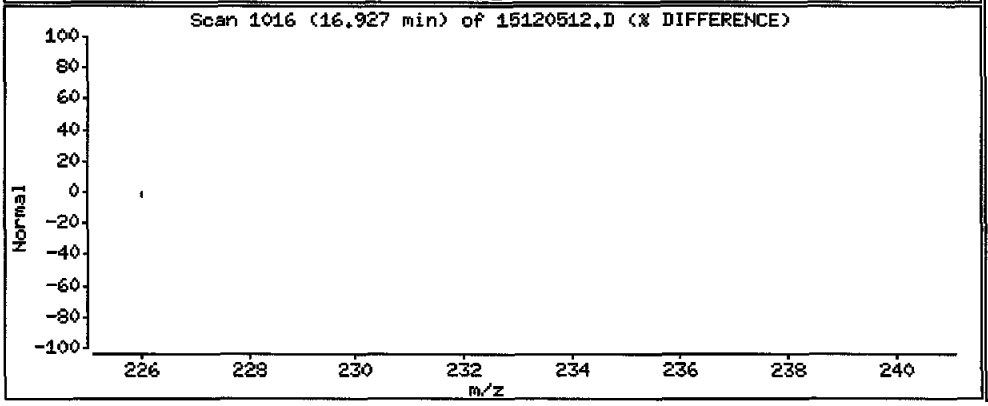












Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K

Volume Injected (uL): 2.0

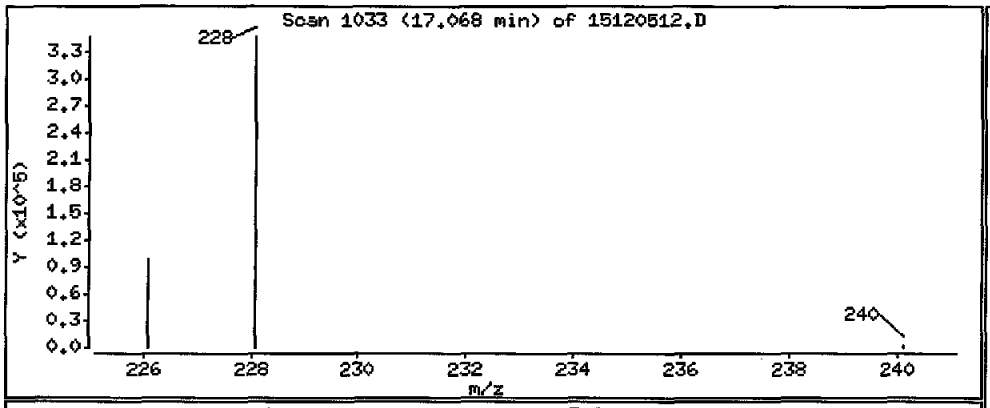
Operator: JW

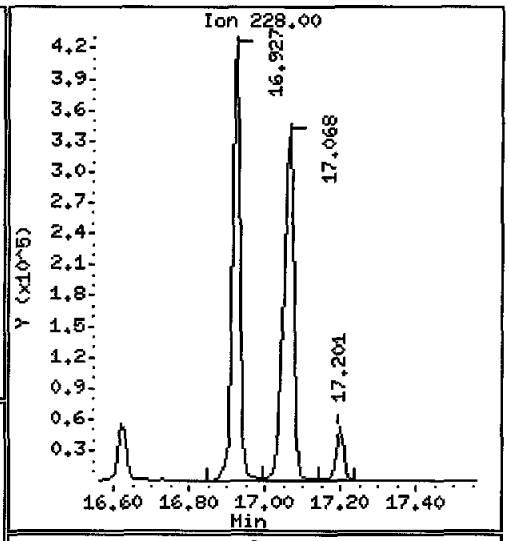
Column phase: Rxi-17Sil MS

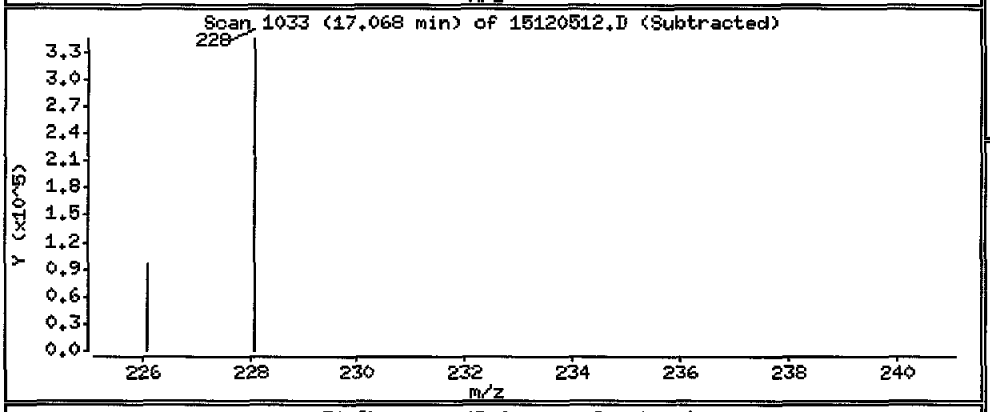
Column diameter: 0.25

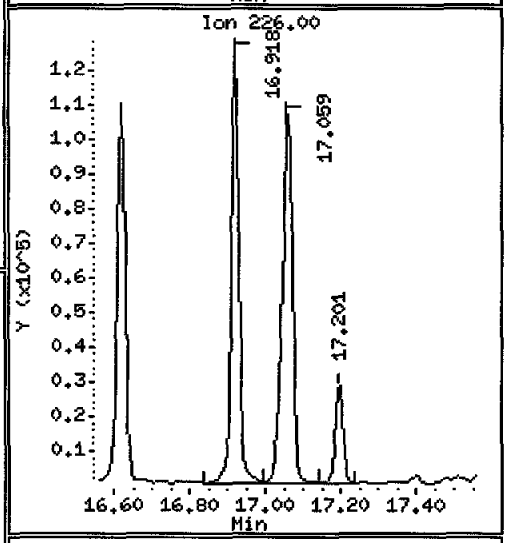
30 Chrysene

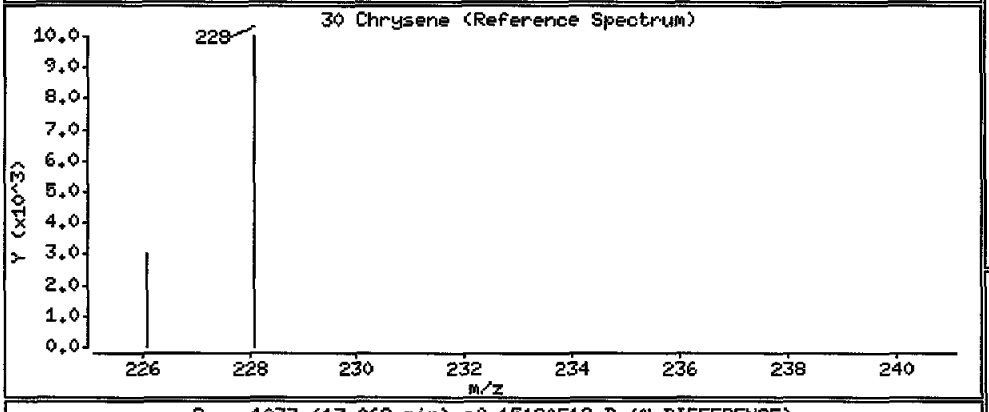
Concentration: 28600 ug/kg

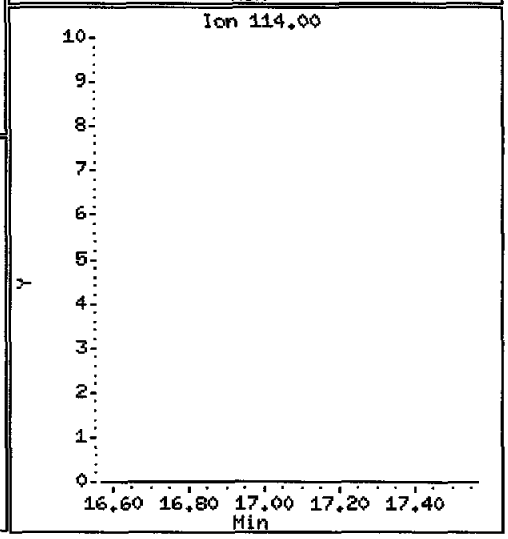


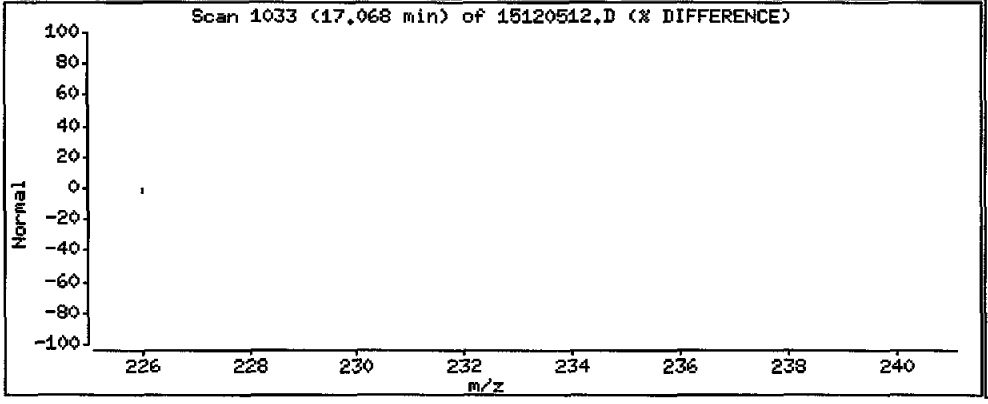












Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K

Volume Injected (uL): 2.0

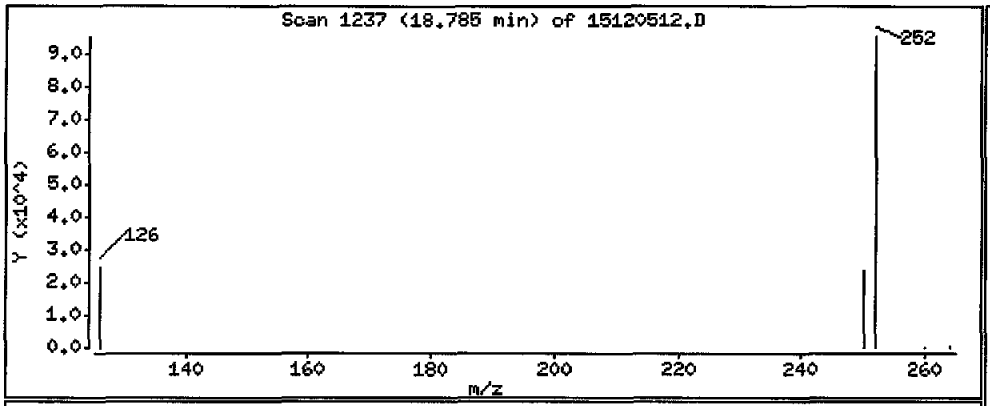
Operator: JW

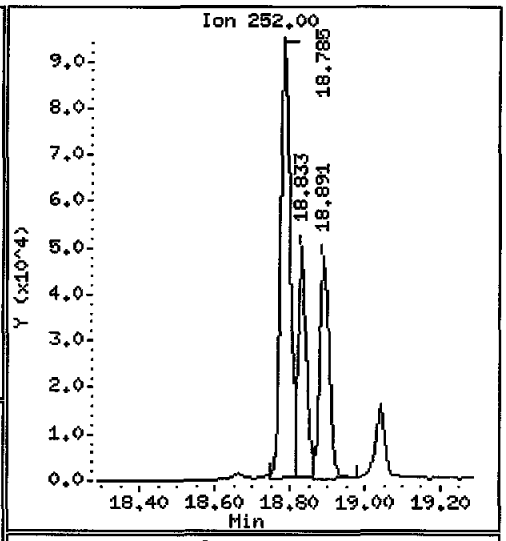
Column phase: Rxi-17Sil MS

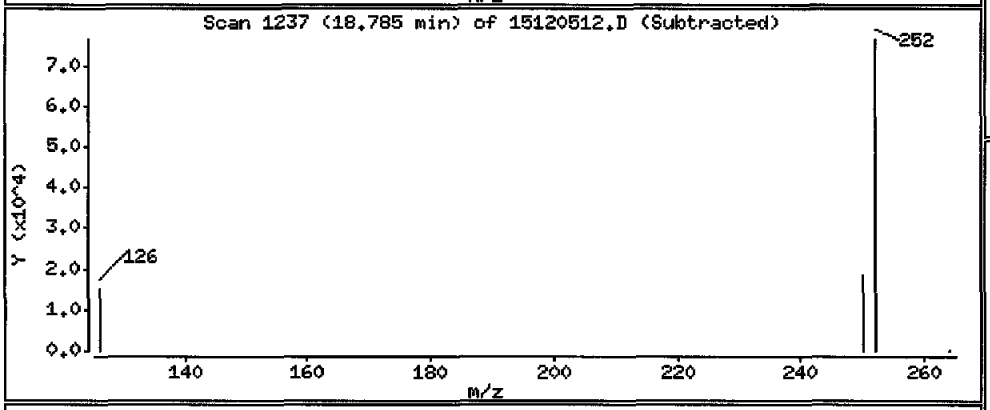
Column diameter: 0.25

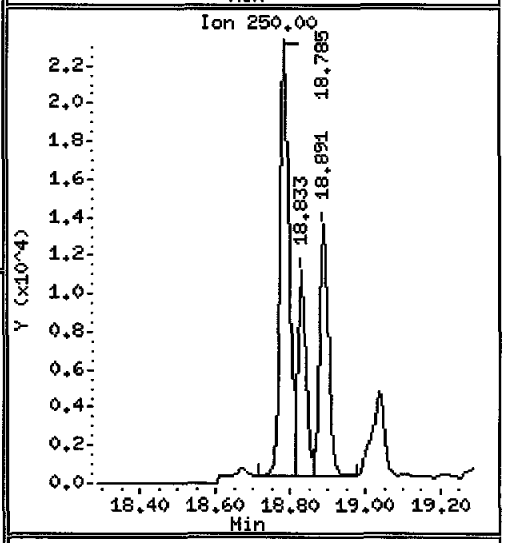
44 Benzo(b)fluoranthene

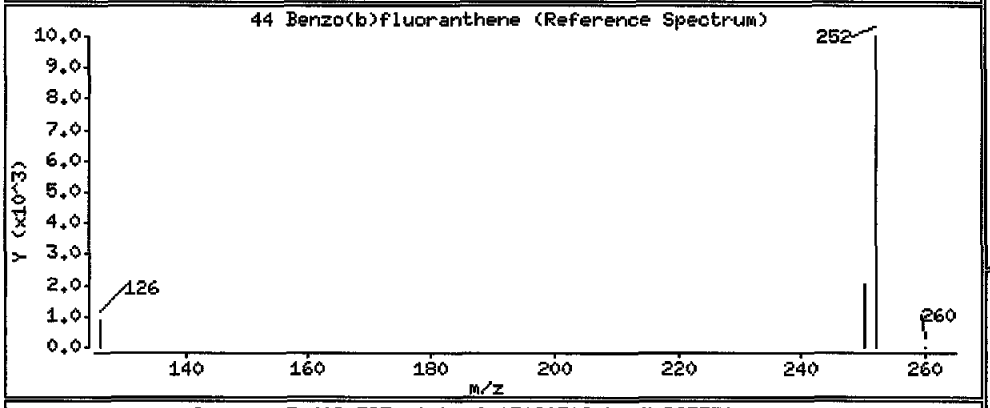
Concentration: 9230 ug/kg

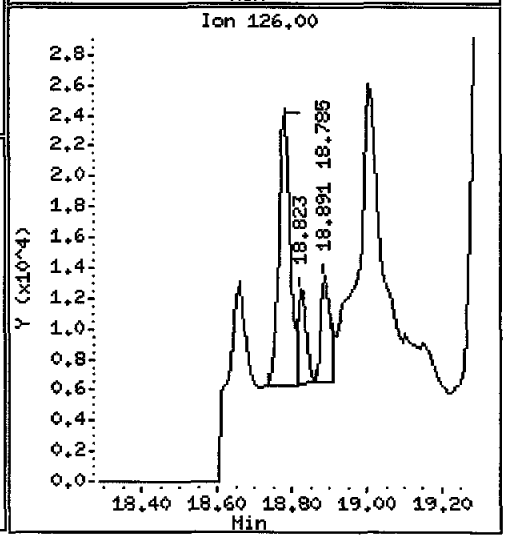


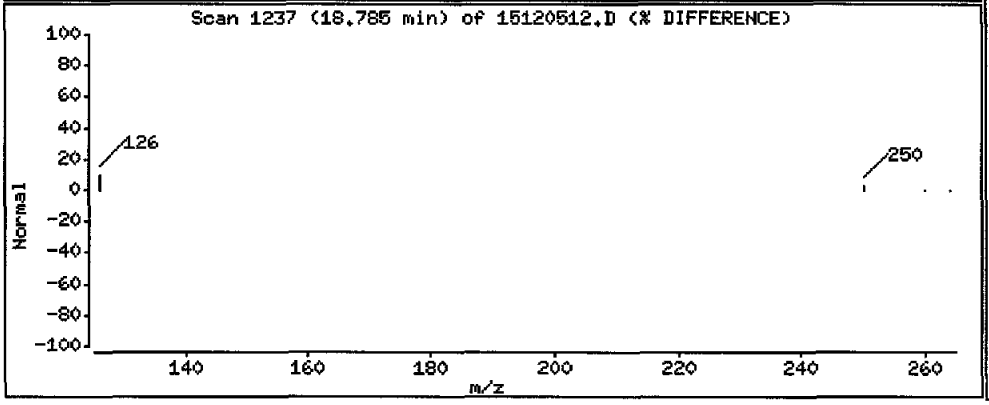












Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

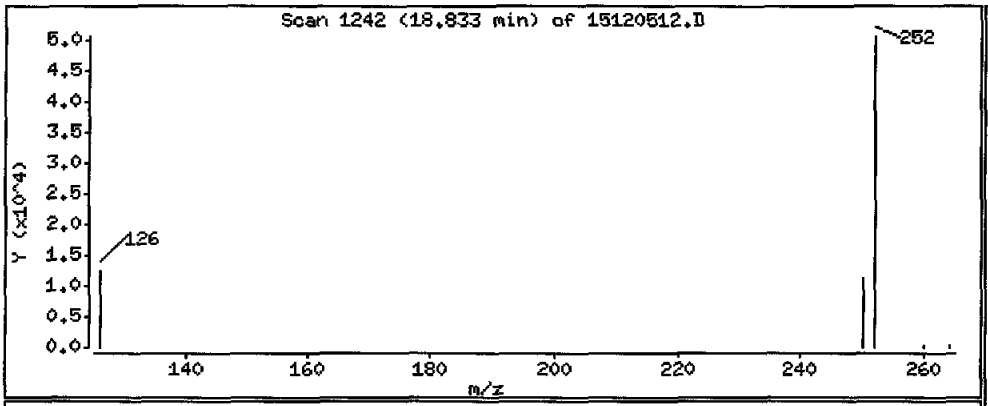
Client ID: PG-SMA2-3-PEMD-1511 Instrument: nt11.i

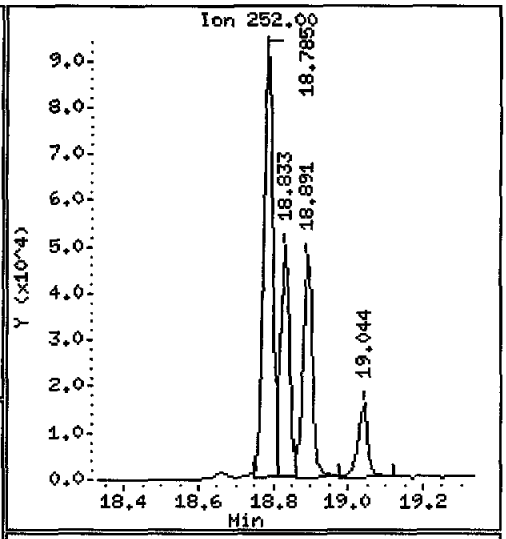
Sample Info: AQJ9K

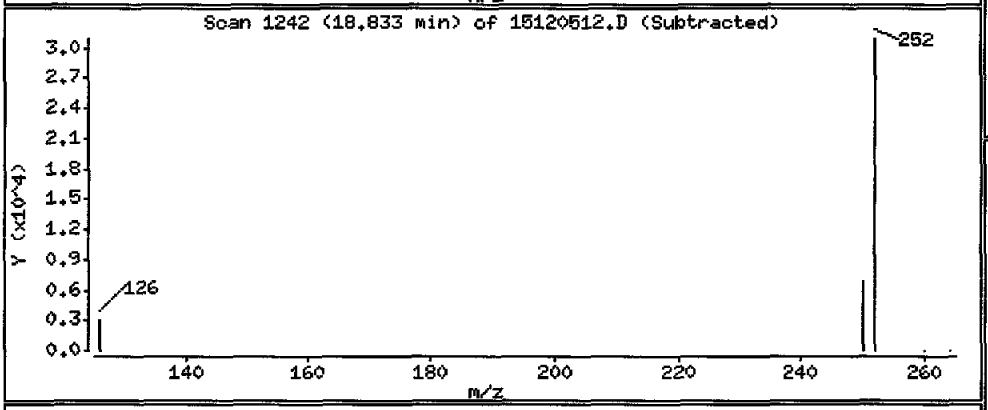
Volume Injected (uL): 2.0 Operator: JW

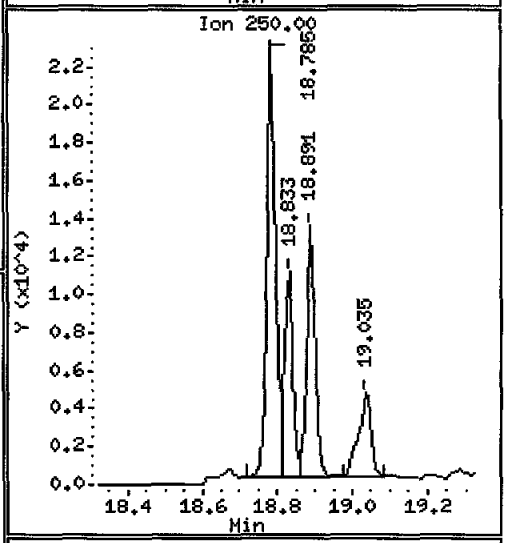
Column phase: Rxi-17Sil MS Column diameter: 0.25

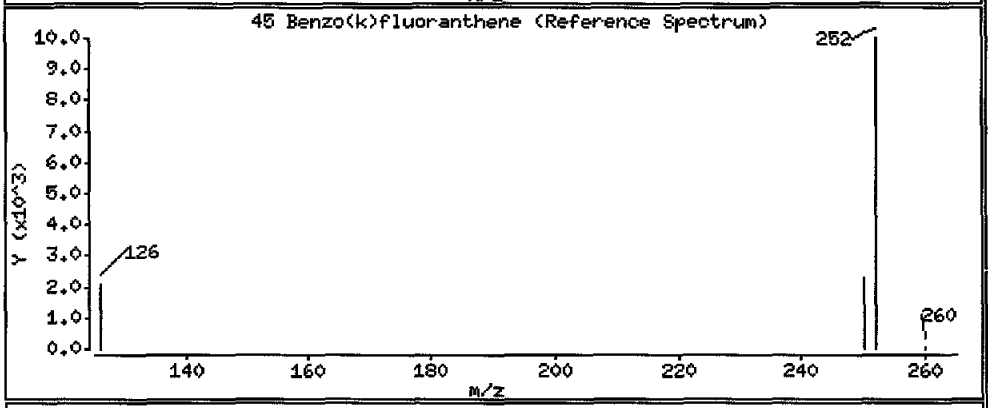
45 Benzo(k)fluoranthene Concentration: 4100 ug/kg

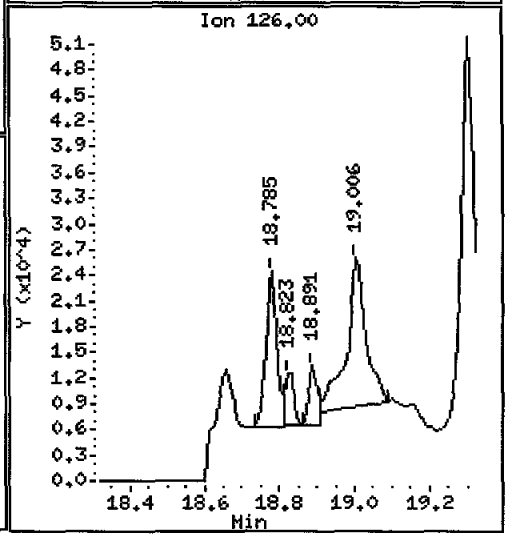


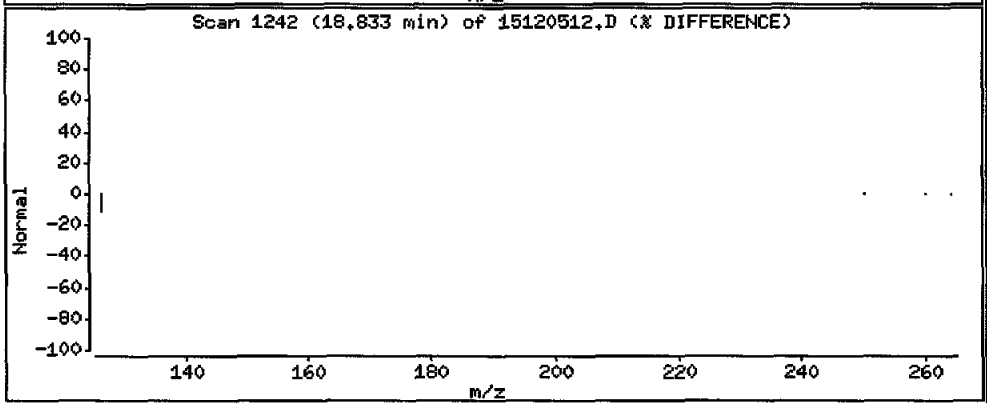












Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K

Volume Injected (uL): 2.0

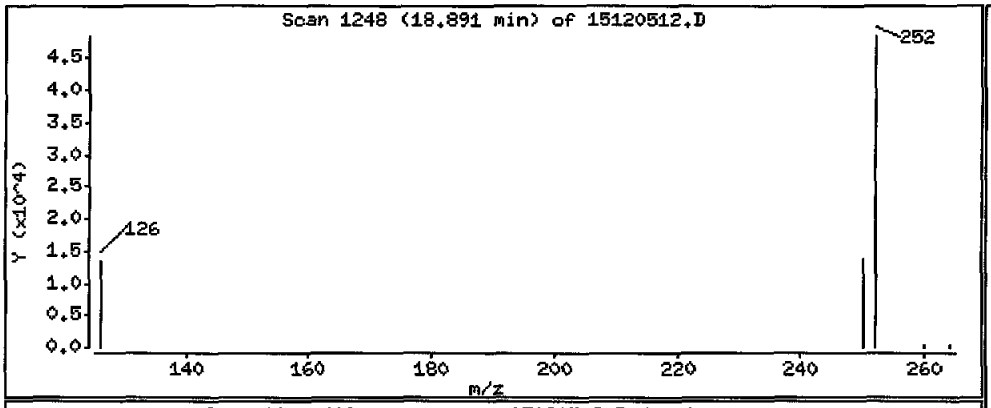
Operator: JW

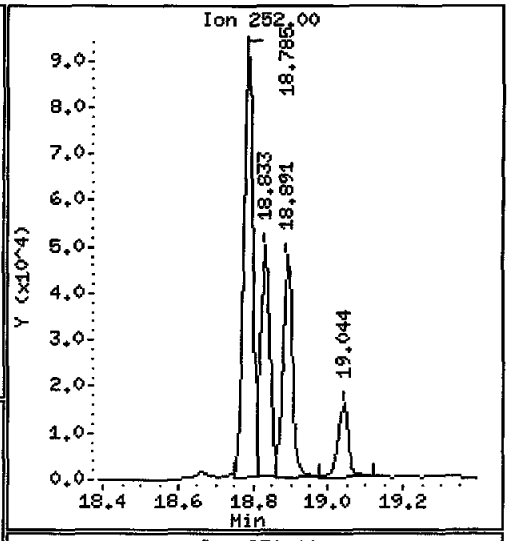
Column phase: Rxi-17Sil MS

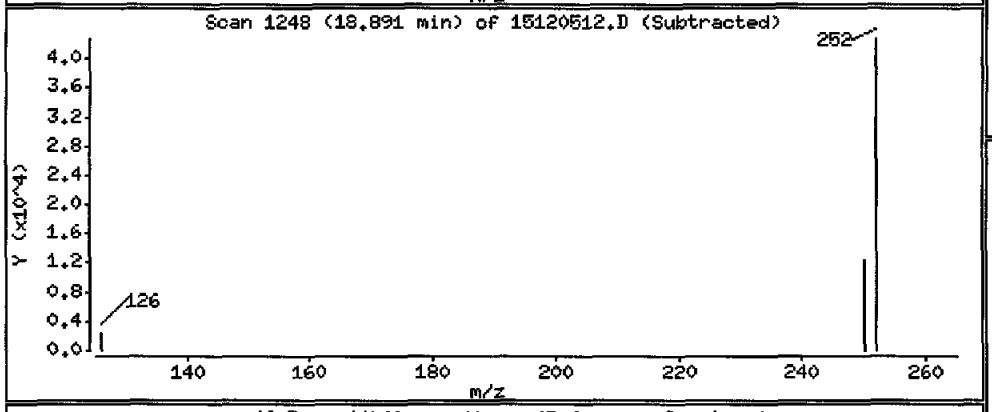
Column diameter: 0.25

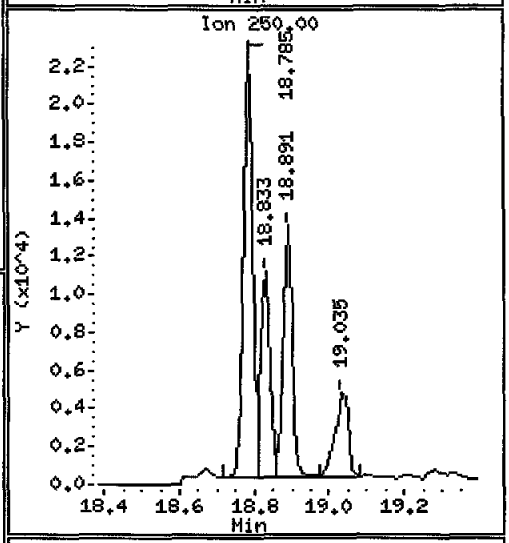
46 Benzo(j)fluoranthene

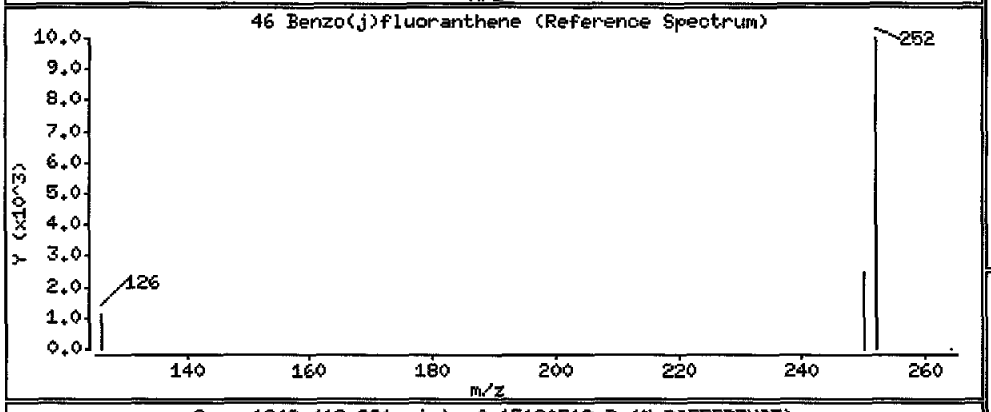
Concentration: 4480 ug/kg

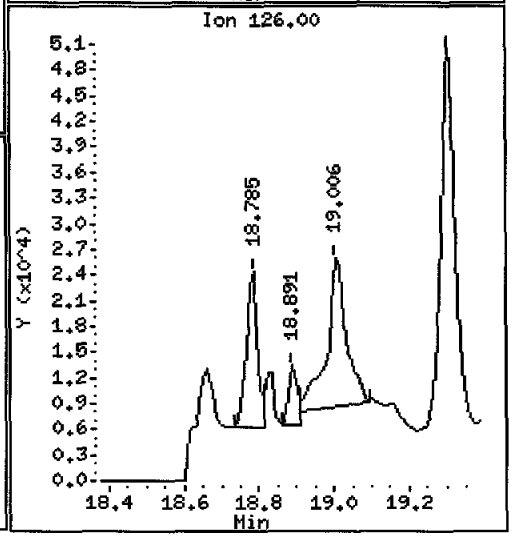


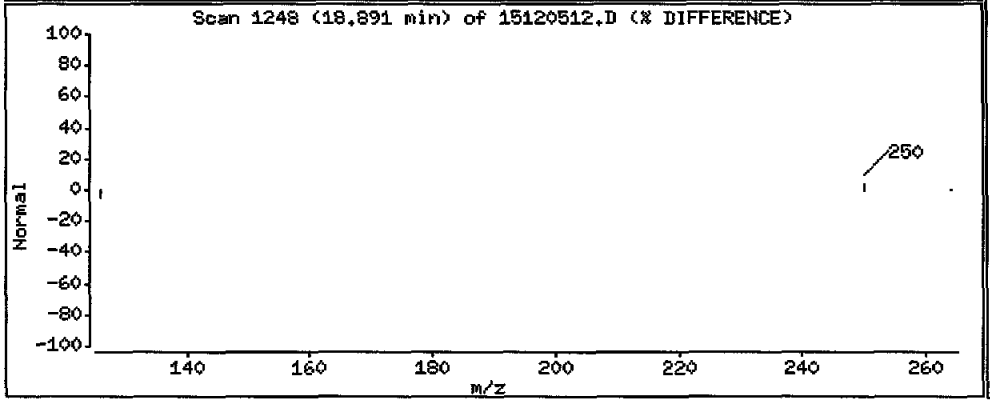












Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K

Volume Injected (uL): 2.0

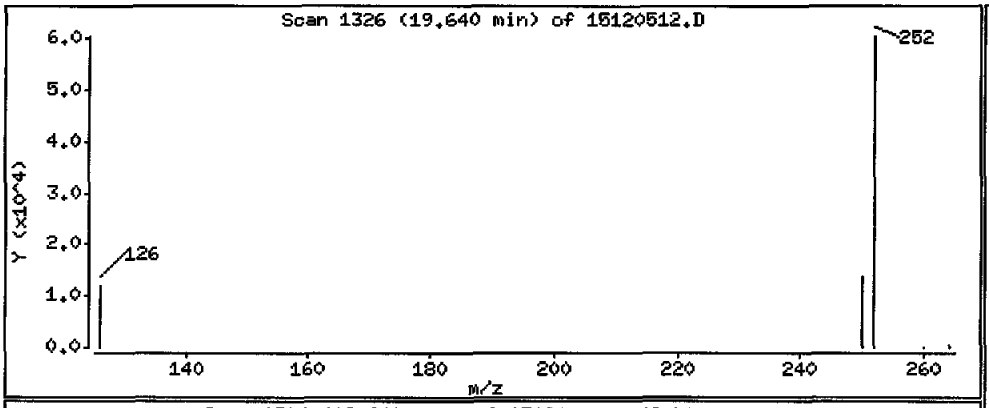
Operator: JW

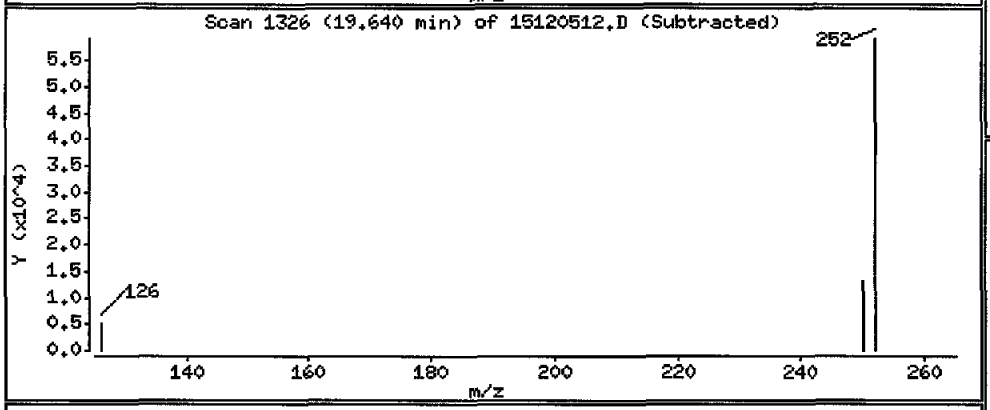
Column phase: Rxi-17Sil MS

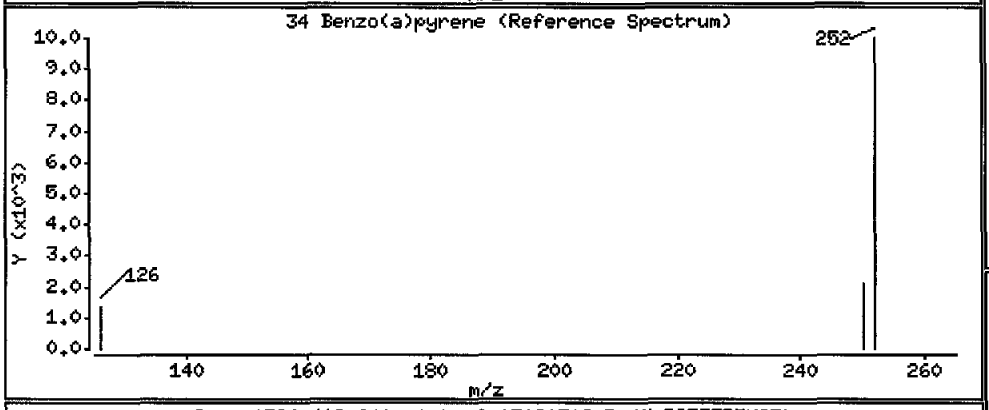
Column diameter: 0.25

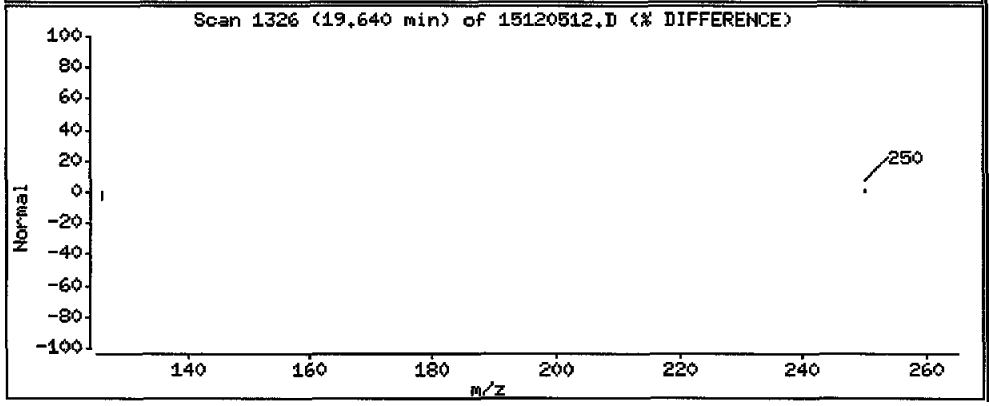
34 Benzo(a)pyrene

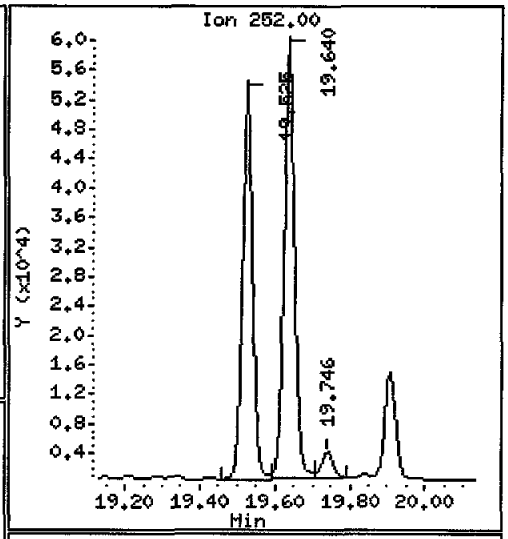
Concentration: 7070 ug/kg

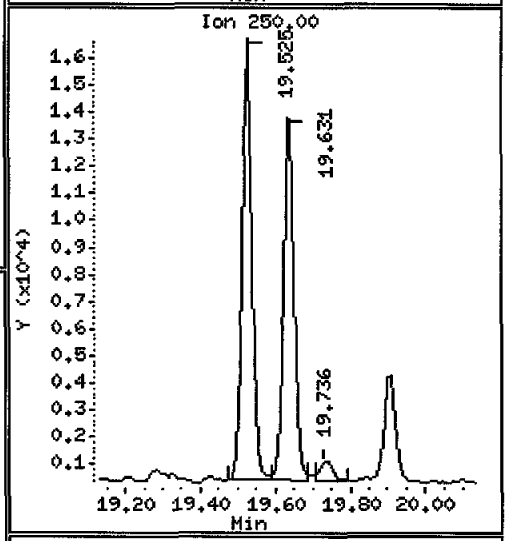


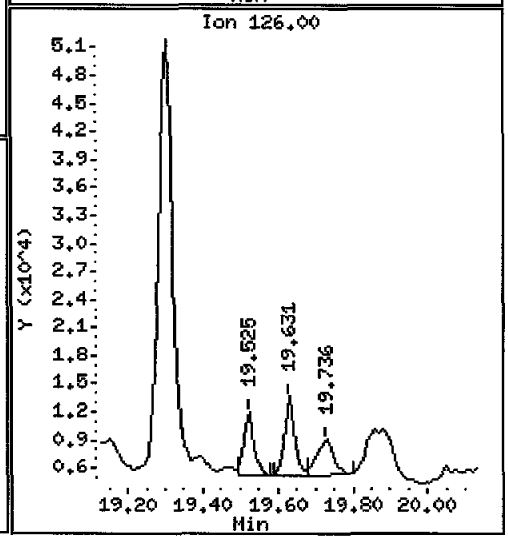












Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K

Volume Injected (uL): 2.0

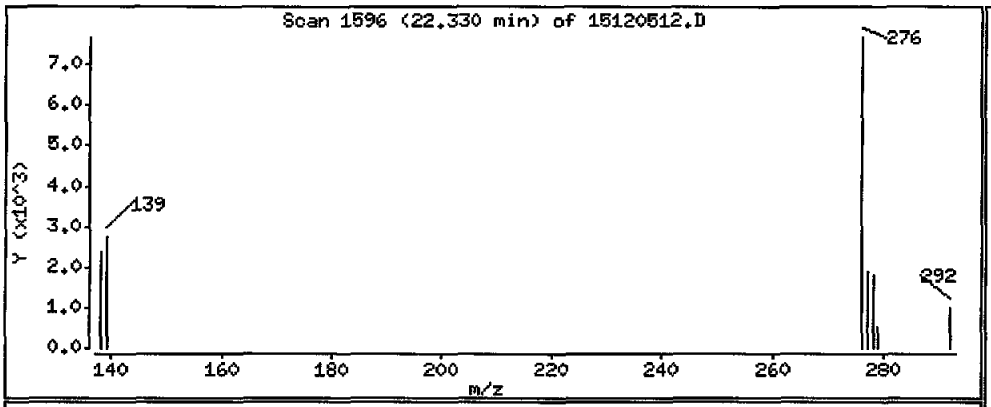
Operator: JW

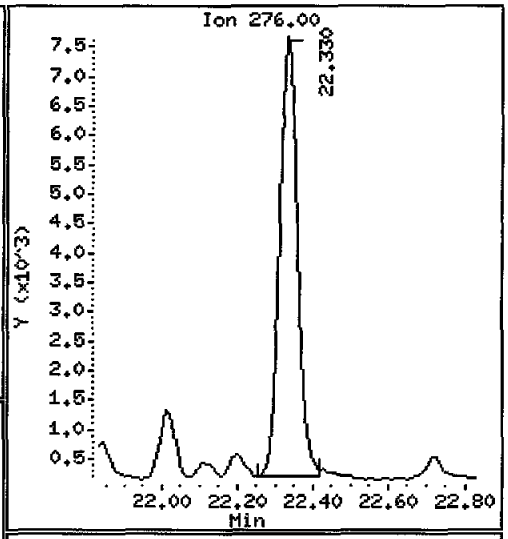
Column phase: Rxi-17Sil MS

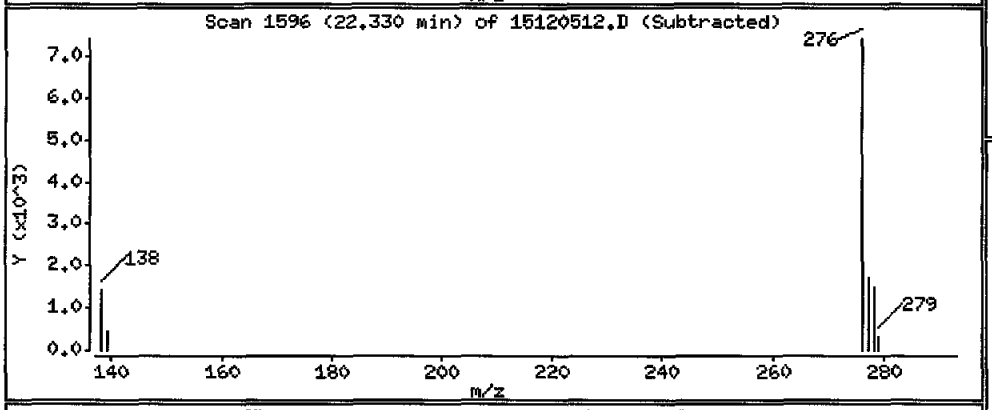
Column diameter: 0.25

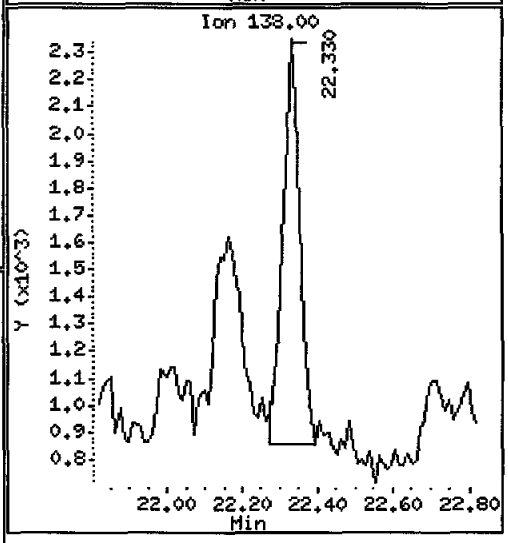
37 Indeno(1,2,3-cd)pyrene

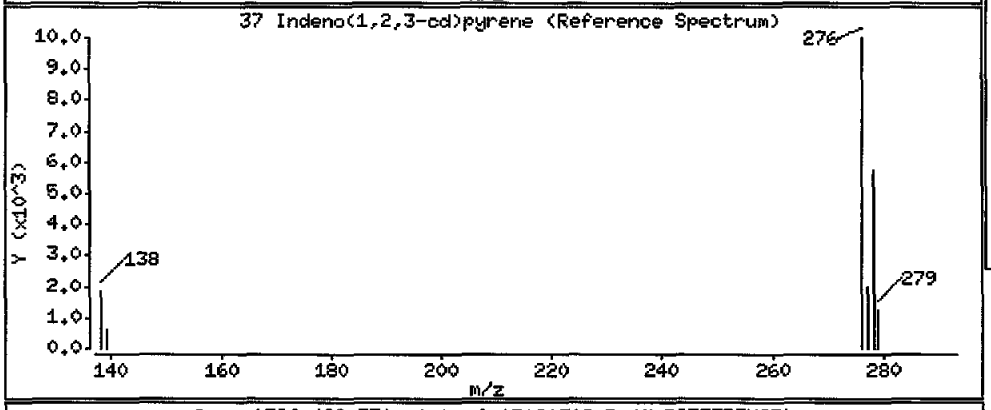
Concentration: 1350 ug/kg

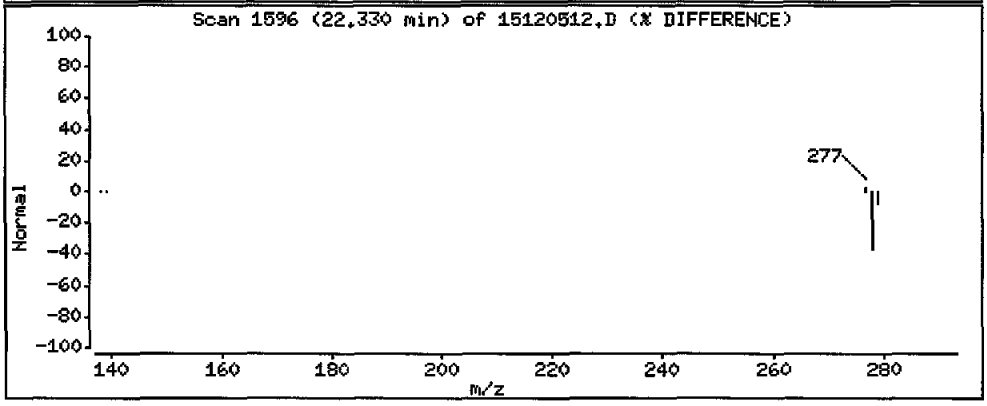












Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K

Volume Injected (uL): 2.0

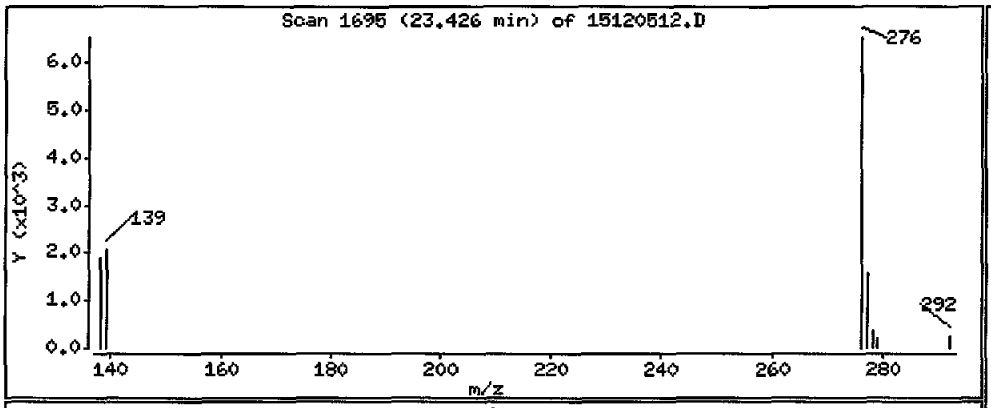
Operator: JW

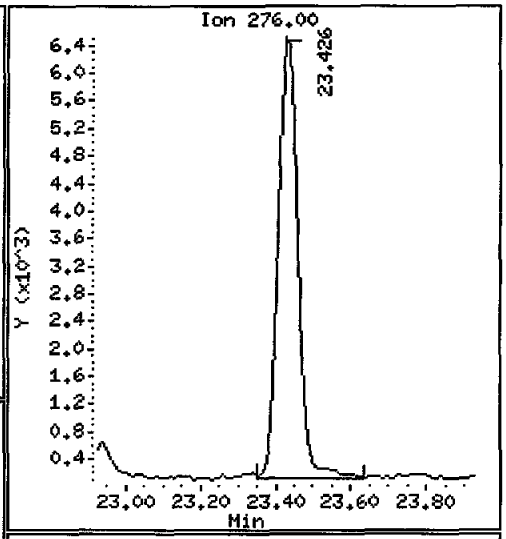
Column phase: Rxi-17Sil MS

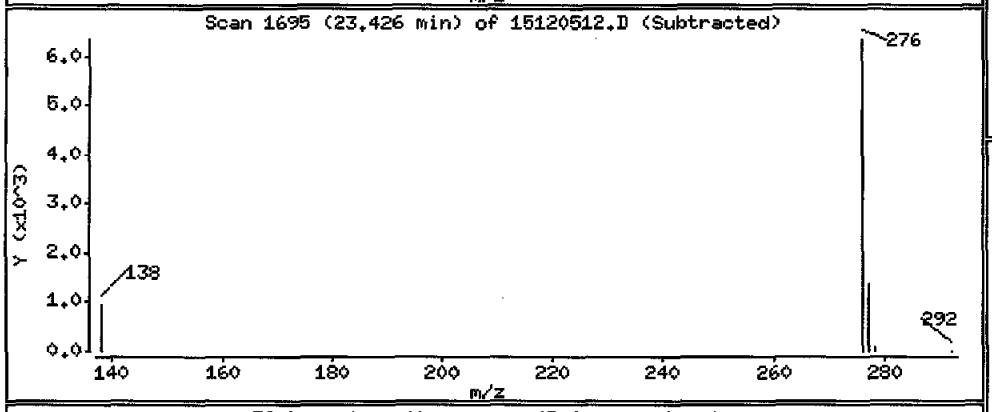
Column diameter: 0.25

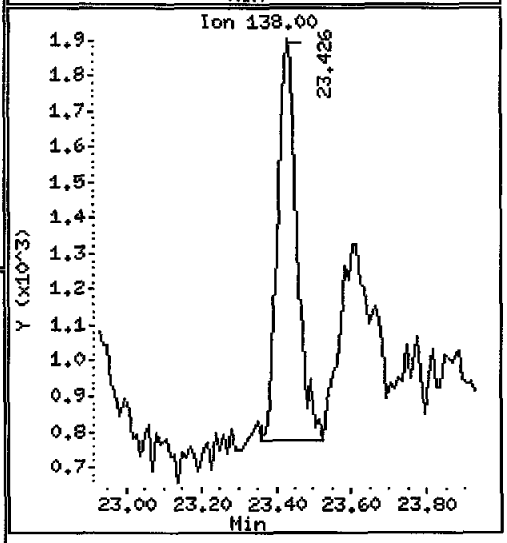
39 Benzo(g,h,i)perylene

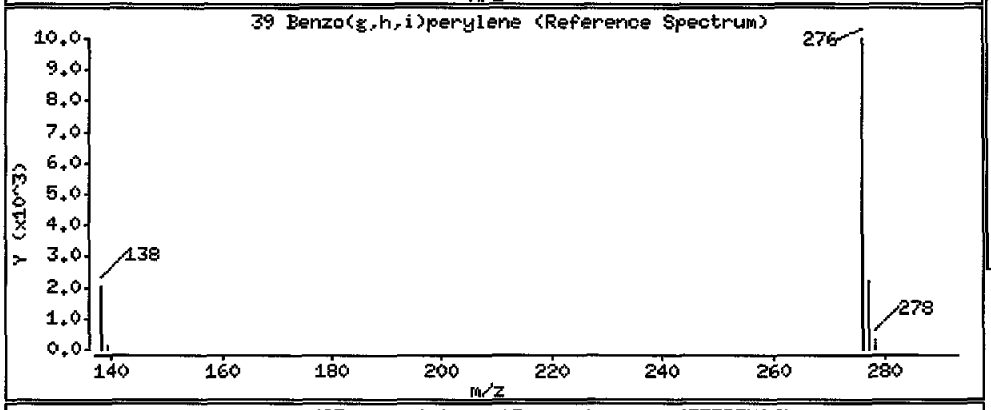
Concentration: 1480 ug/kg

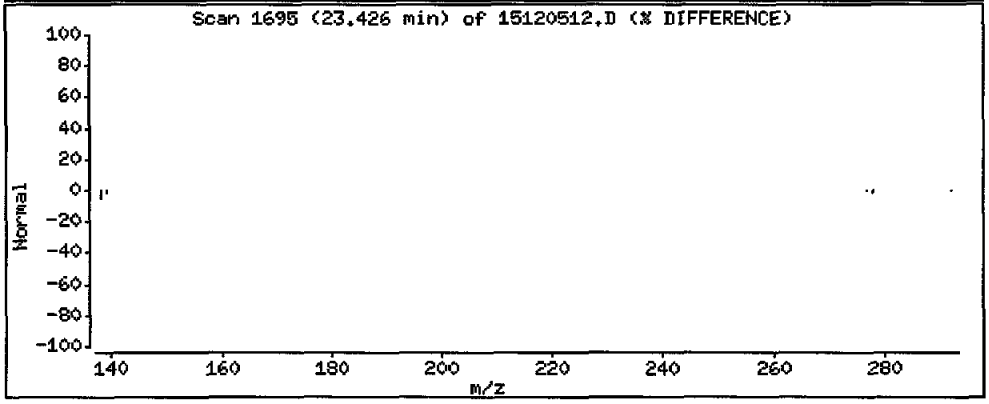












Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K

Volume Injected (uL): 2.0

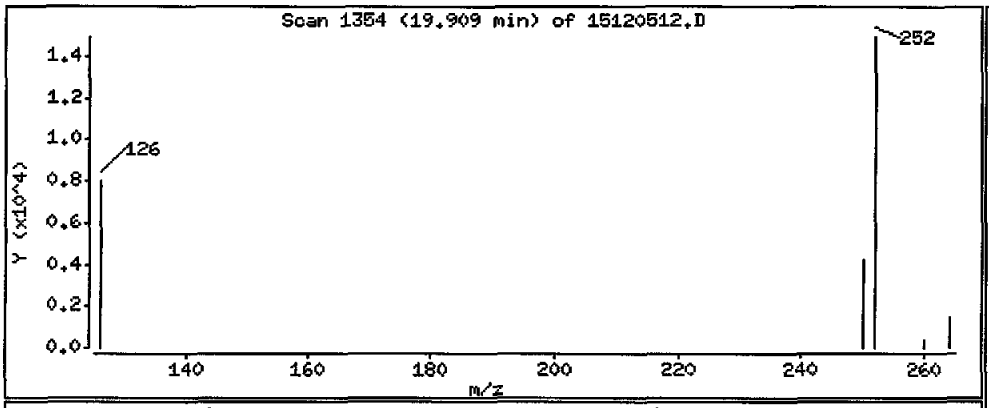
Operator: JW

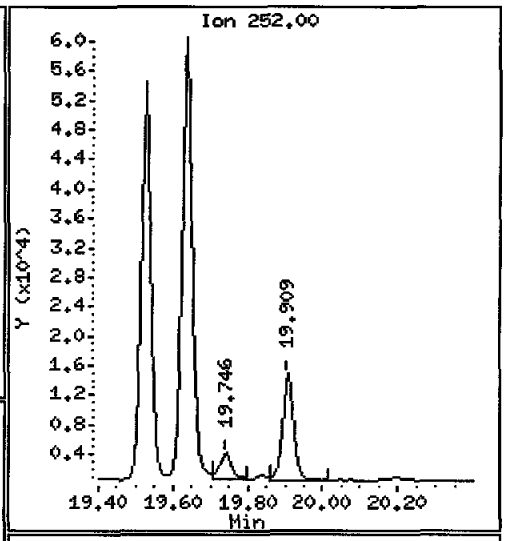
Column phase: Rxi-17Sil MS

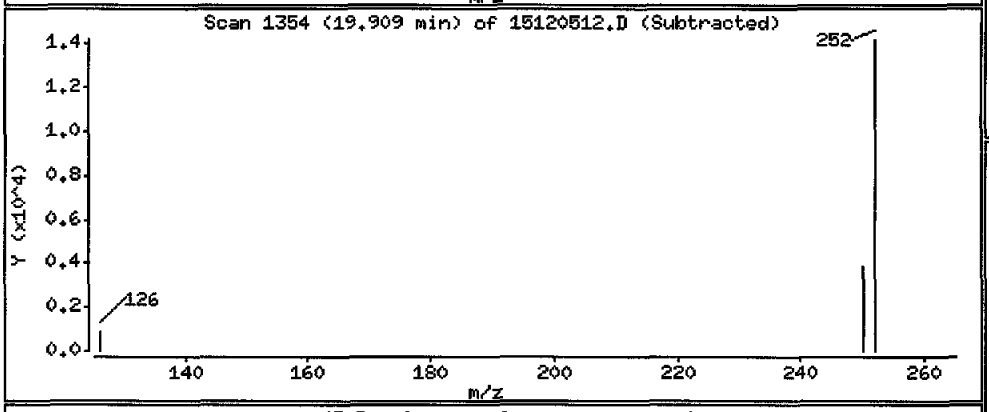
Column diameter: 0.25

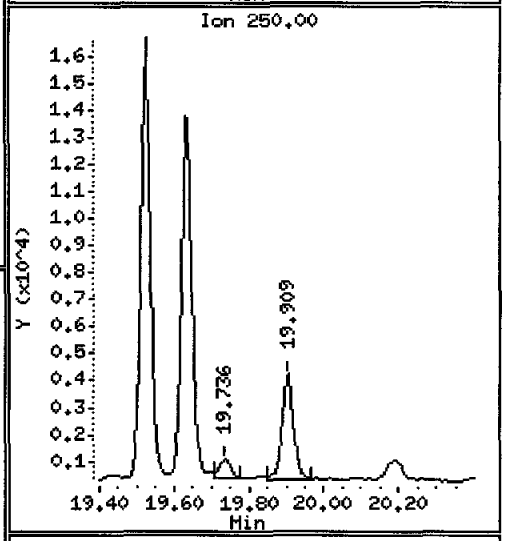
47 Perylene

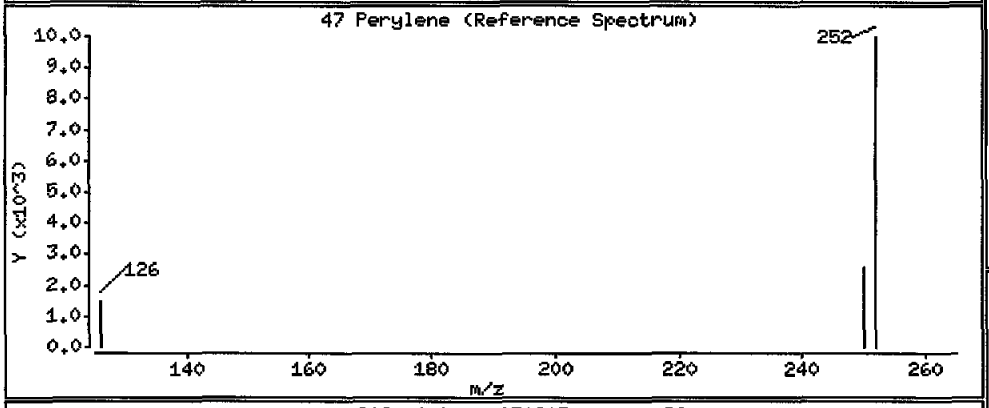
Concentration: 1750 ug/kg

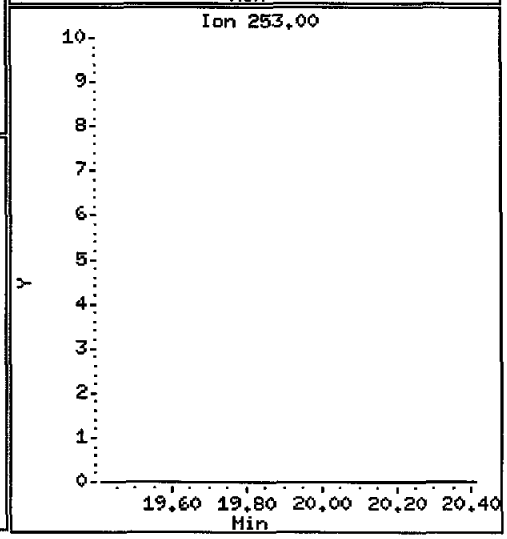


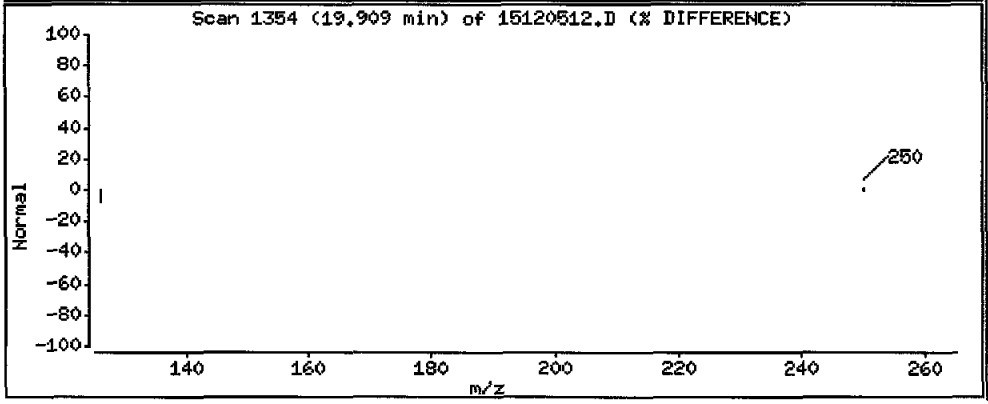












Data File: \\target\share\chem3\nt11.i\20151205.b\15120512.D

Date : 05-DEC-2015 15:46

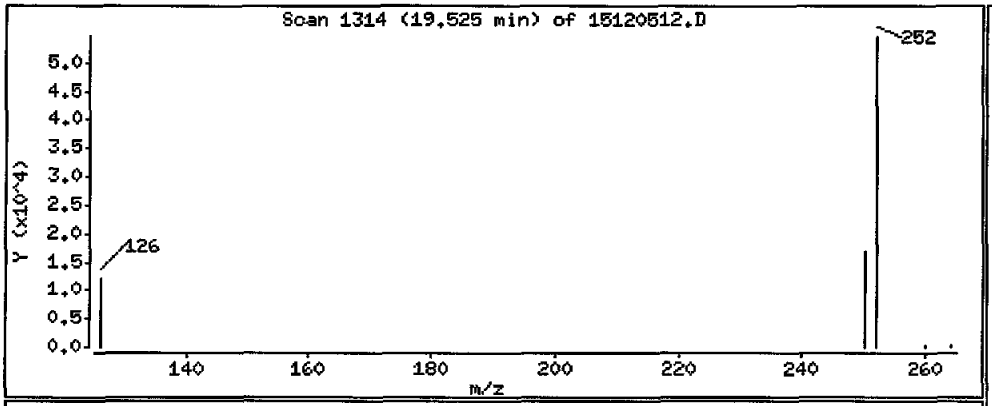
Client ID: PG-SMA2-3-PEMD-1511 Instrument: nt11.i

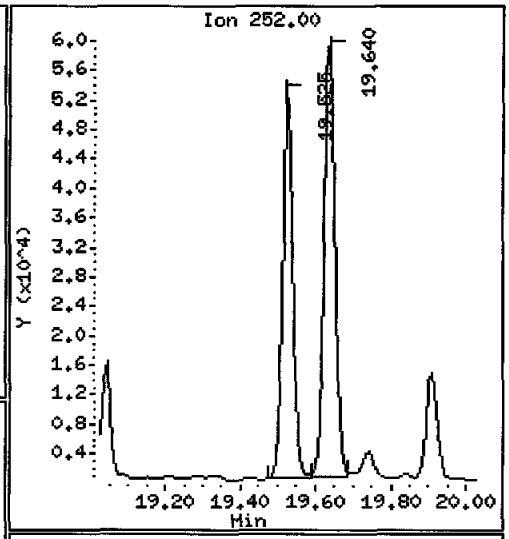
Sample Info: AQJ9K

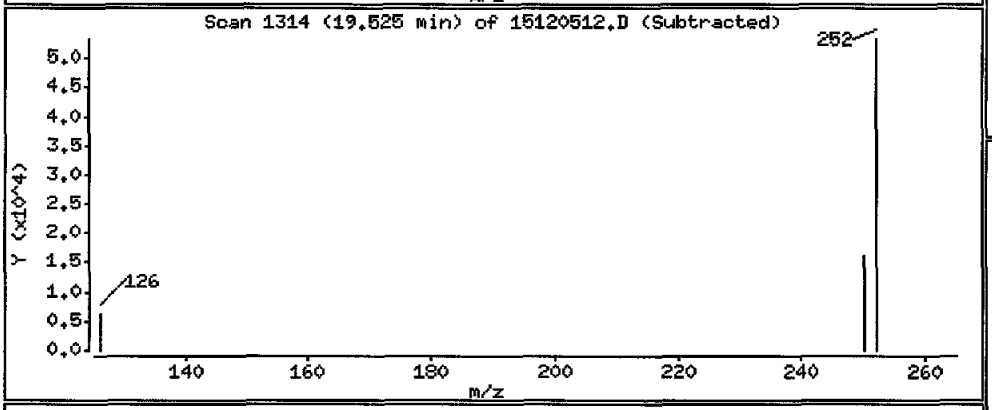
Volume Injected (uL): 2.0 Operator: JW

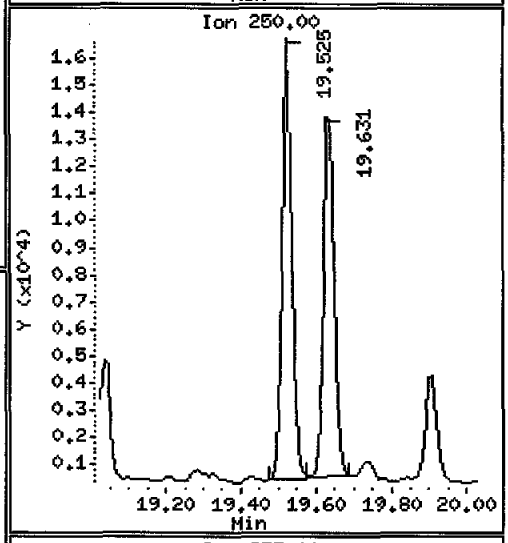
Column phase: Rxi-17Sil MS Column diameter: 0.25

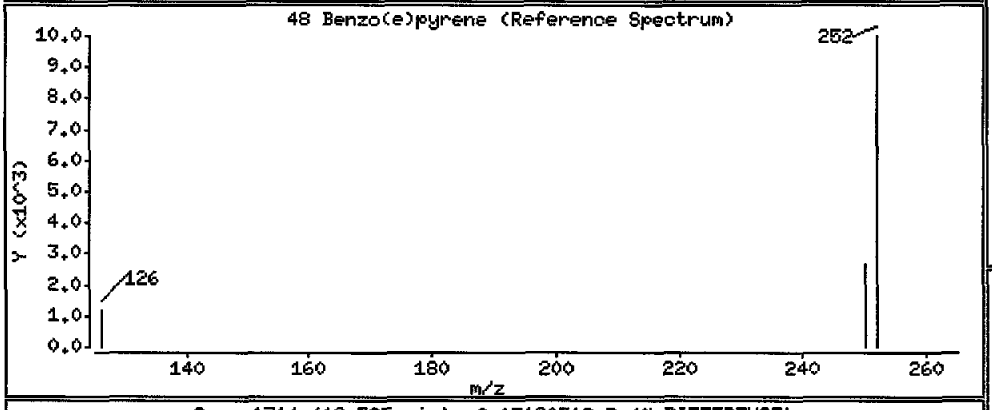
48 Benzo(e)pyrene Concentration: 5710 ug/kg

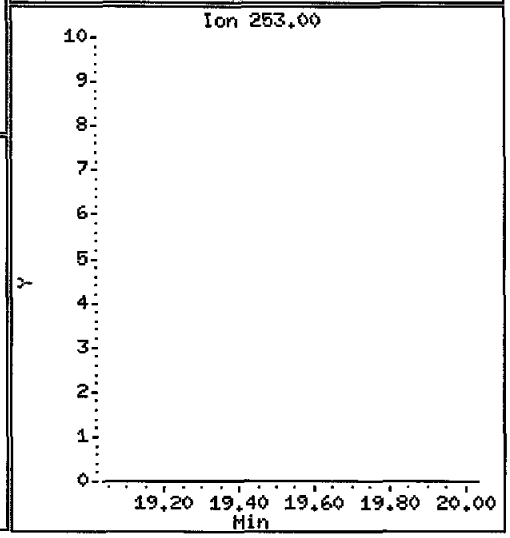


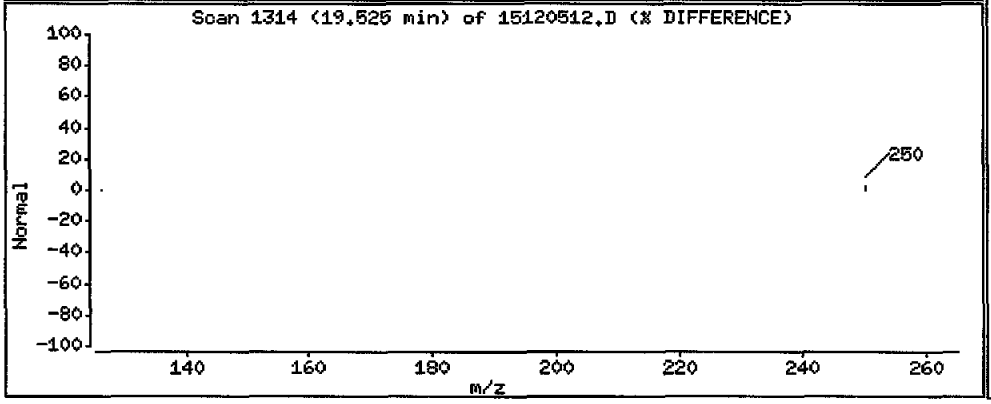












REVIEW SUMMARY FOR FILE - 15120512.D

Lab ID: AQJ9K
nt11.i, 20151205.b\lowsim.m, 05-DEC-2015 15:46

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151205.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151205.b\15120513.D
Lab Smp Id: AQJ9L Client Smp ID: PG-SMA2-3-PEMD-1511
Inj Date : 05-DEC-2015 16:16 MS Autotune Date: 23-APR-2014 12:54
Operator : JW Inst ID: nt11.i
Smp Info : AQJ9L
Misc Info : 15-21399
Comment :
Method : \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Meth Date : 14-Dec-2015 10:43 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 13
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	100.000	Volume of final extract (uL)
Ws	0.89000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

JW 12/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	FINAL (ug/kg)	
*	4 Naphthalene-d8	136	6.587	6.597	(1.000)	345794	200.000		
	5 Naphthalene	128	6.618	6.629	(1.005)	172736	86.4819	9720	B
$	6 2-Methylnaphthalene-d10	152	7.564	7.574	(1.148)	167889	130.805	14700	
	7 2-Methylnaphthalene	142	7.616	7.627	(1.156)	90563	65.9893	7410	
	8 1-Methylnaphthalene	142	7.879	7.889	(1.196)	60568	48.9721	5500	
	10 Acenaphthylene	152	9.434	9.445	(0.984)	35959	15.5514	1750	
*	11 Acenaphthene-d10	164	9.589	9.600	(1.000)	286502	200.000		
	12 Acenaphthene	153	9.656	9.656	(1.007)	922119	600.837	67500	
	14 Dibenzofuran	168	9.855	9.866	(1.028)	590342	255.341	28700	
	15 Fluorene	166	10.486	10.486	(1.094)	976074	562.930	63300	
*	18 Phenanthrene-d10	188	12.269	12.269	(1.000)	478323	200.000		
	19 Phenanthrene	178	12.313	12.313	(1.004)	4843873	1680.84	189000	E
	20 Anthracene	178	12.368	12.368	(1.008)	786359	304.847	34300	
$	23 Fluoranthene-d10	212	14.375	14.374	(1.172)	446287	169.660	19100	
	24 Fluoranthene	202	14.403	14.403	(1.174)	4218029	1457.86	164000	E
	25 Pyrene	202	14.903	14.903	(0.876)	2695239	979.347	110000	
	28 Benzo(a)anthracene	228	16.926	16.918	(0.995)	325631	140.543	15800	
*	29 Chrysene-d12	240	17.018	17.017	(1.000)	347514	200.000		
	30 Chrysene	228	17.067	17.059	(1.003)	318730	125.339	14100	
	44 Benzo(b)fluoranthene	252	18.785	18.784	(0.947)	72087	34.4405	3870	
	45 Benzo(k)fluoranthene	252	18.833	18.833	(0.949)	33079	13.5621	1520	

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)
	46 Benzo(j)fluoranthene	252	18.890	18.890	(0.952)	34719	15.6263	1760
	34 Benzo(a)pyrene	252	19.640	19.630	(0.990)	33371	16.5201	1860
*	35 Perylene-d12	264	19.842	19.841	(1.000)	308933	200.000	
$	36 Dibenzo(a,h)anthracene-d14	292	22.208	22.208	(1.119)	171626	137.642	15500
	37 Indeno(1,2,3-cd)pyrene	276	Compound Not Detected.					
	38 Dibenzo(a,h)anthracene	278	Compound Not Detected.					
	39 Benzo(g,h,i)perylene	276	Compound Not Detected.					
	47 Perylene	252	Compound Not Detected.					
	48 Benzo(e)pyrene	252	19.524	19.524	(0.984)	45692	21.6004	2430

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120513.D
Lab Smp Id: AQJ9L
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21399

Calibration Date: 05-DEC-2015
Calibration Time: 10:30
Client Smp ID: PG-SMA2-3-PEMD-
Level: LOW
Sample Type: Tissue

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	345794	5.46
11 Acenaphthene-d10	239179	119590	478358	286502	19.79
18 Phenanthrene-d10	372253	186127	744506	478323	28.49
29 Chrysene-d12	294711	147356	589422	347514	17.92
35 Perylene-d12	260595	130298	521190	308933	18.55

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.59	-0.16
11 Acenaphthene-d10	9.60	9.10	10.10	9.59	-0.11
18 Phenanthrene-d10	12.27	11.77	12.77	12.27	0.00
29 Chrysene-d12	17.02	16.52	17.52	17.02	0.00
35 Perylene-d12	19.84	19.34	20.34	19.84	0.00

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.

ARI Labs, Inc.

RECOVERY REPORT

Client Name: Anchor QEA, LLC
Sample Matrix: SOLID
Lab Smp Id: AQJ9L
Level: LOW
Data Type: MS DATA
SpikeList File: waterlcs.spk
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21399

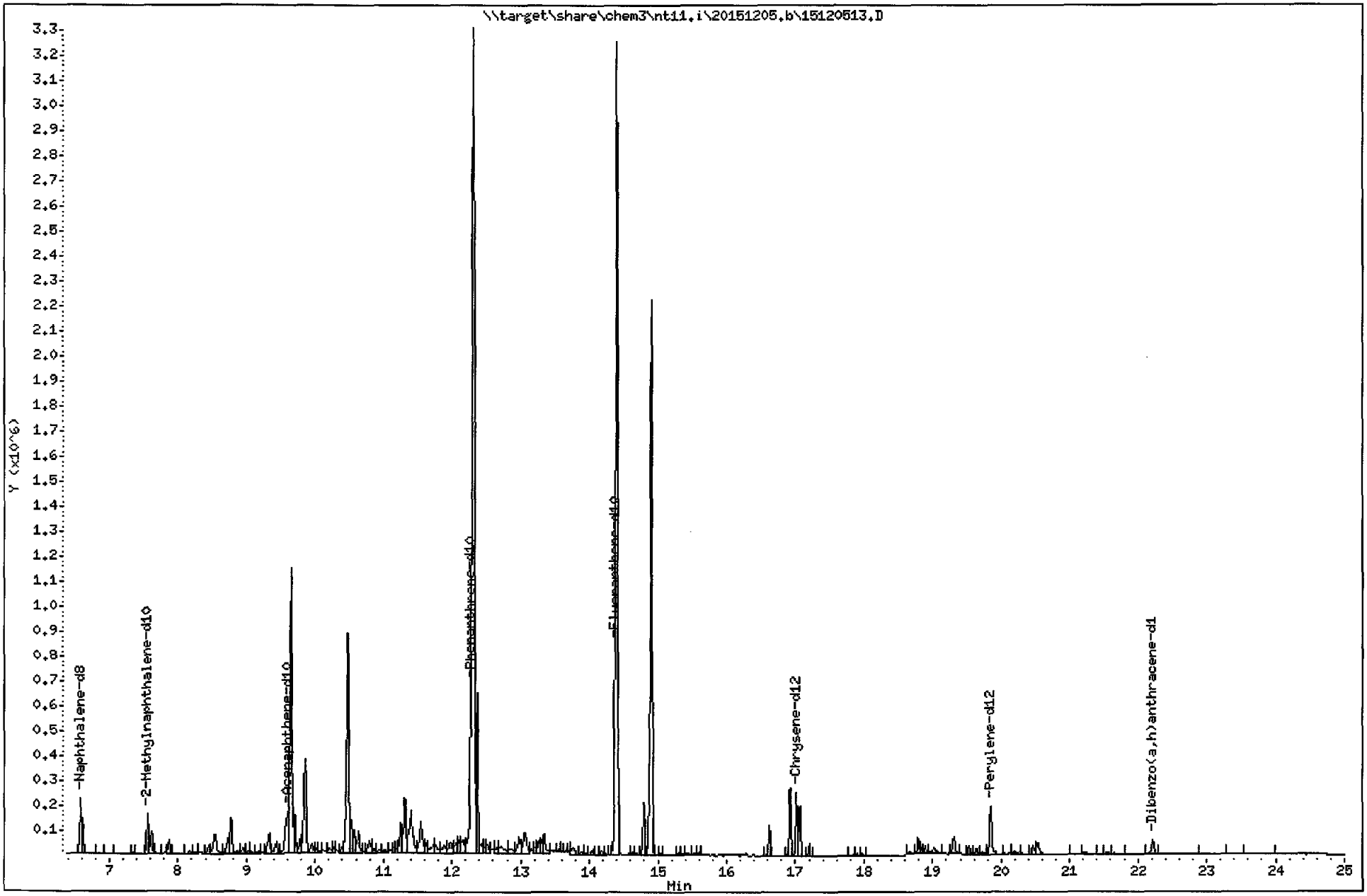
Client SDG: AQJ9
Fraction: SV
Client Smp ID: PG-SMA2-3-PEMD-1511
Operator: JW
SampleType: SAMPLE
Quant Type: ISTD

SURROGATE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
$ 6 2-Methylnaphthalen	33700	14700	43.60	30-160
$ 23 Fluoranthene-d10	33700	19100	56.55	30-160
$ 36 Dibenzo(a,h)anthra	33700	15500	45.88	30-160

Data File: \\target\share\chem3\nt11.i\20151205.b\15120513.D
Date : 05-DEC-2015 16:16
Client ID: PG-SMA2-3-PEMD-1511
Sample Info: AQJ9L
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: JW
Column diameter: 0.25

AQJ9:00307



Data File: \\target\share\chem3\nt11.i\20151205.b\15120513.D

Date : 05-DEC-2015 16:16

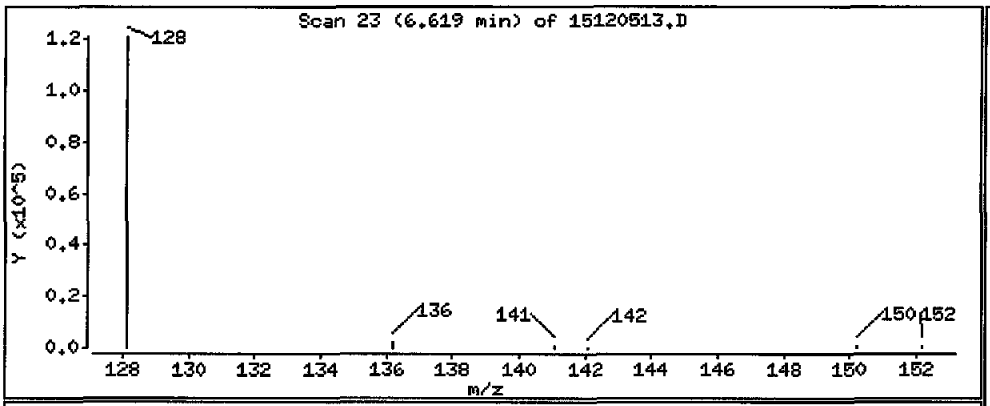
Client ID: PG-SMA2-3-PEMD-1511 Instrument: nt11.i

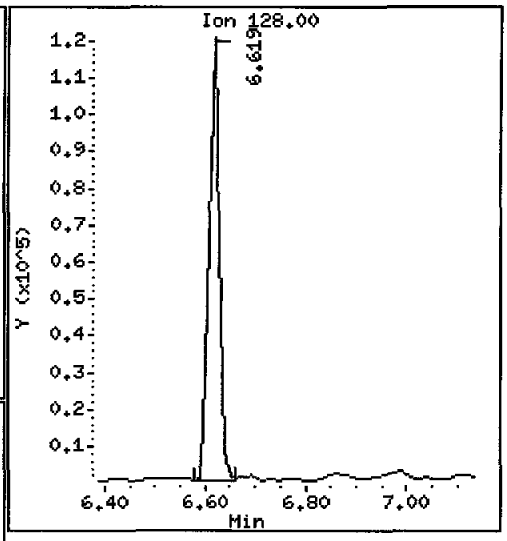
Sample Info: AQJ9L

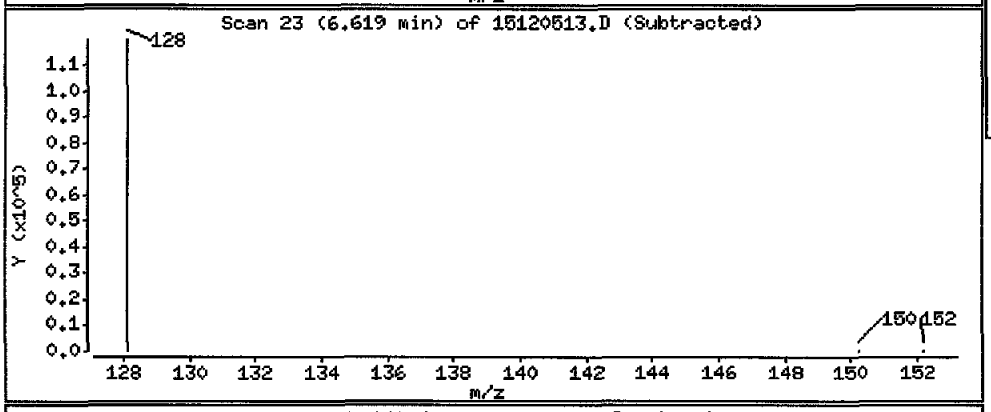
Volume Injected (uL): 2.0 Operator: JW

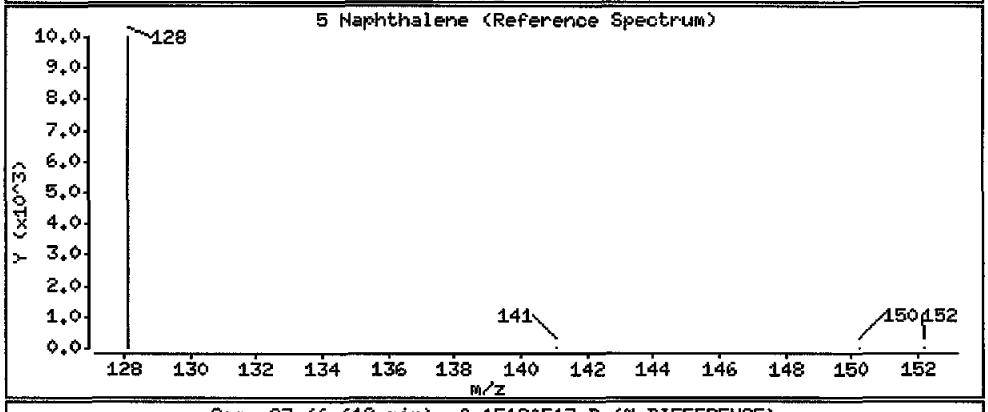
Column phase: Rxi-17Sil MS Column diameter: 0.25

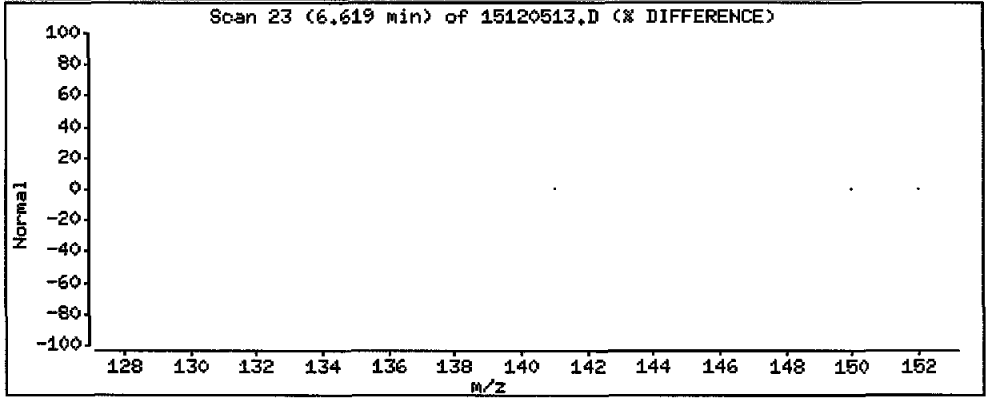
5 Naphthalene Concentration: 9720 ug/kg











Data File: \\target\share\chem3\nt11.i\20151205.b\15120513.D

Date : 05-DEC-2015 16:16

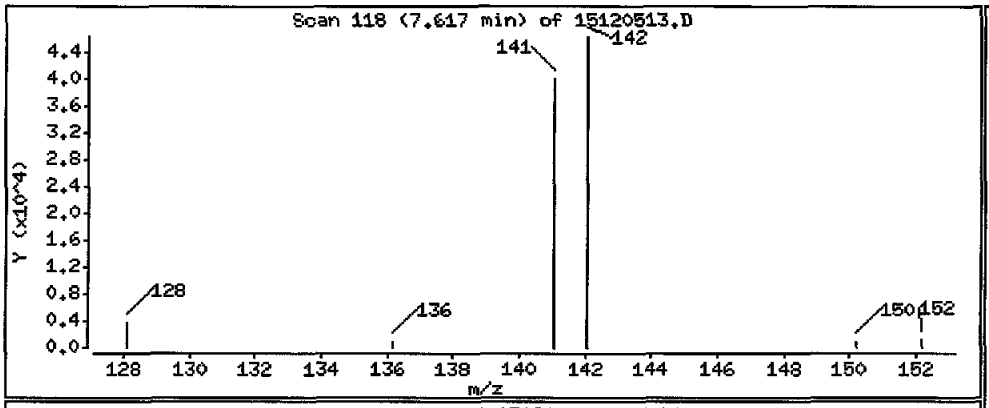
Client ID: PG-SMA2-3-PEMD-1511 Instrument: nt11.i

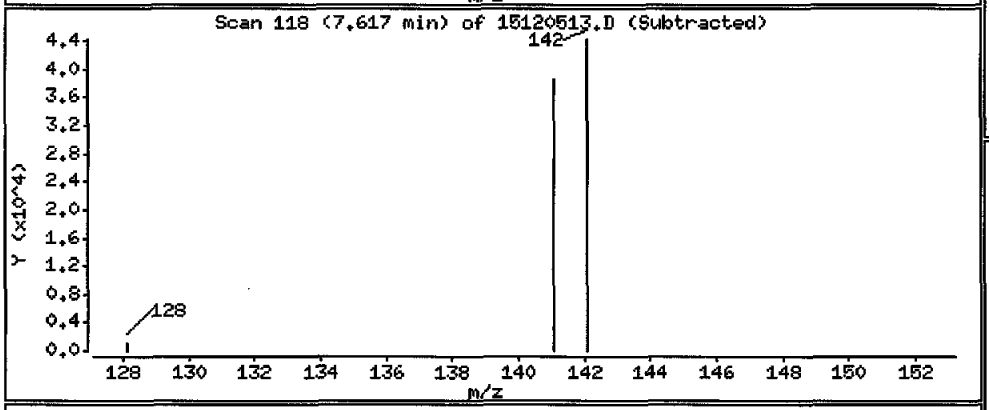
Sample Info: AQJ9L

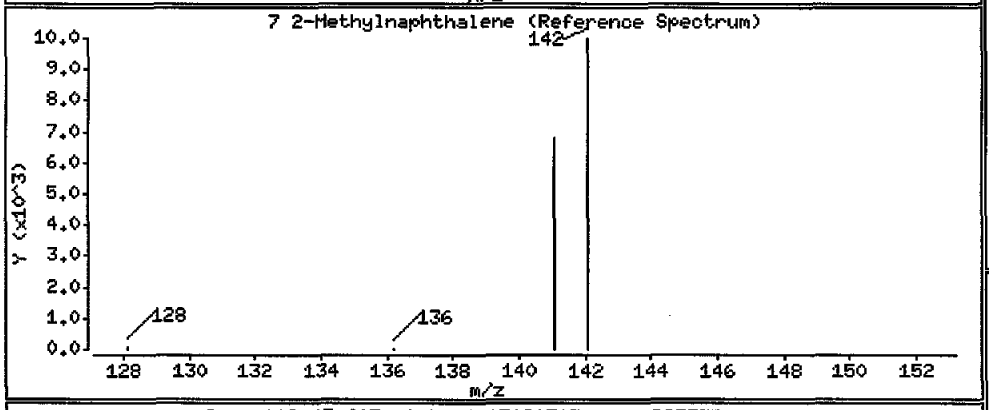
Volume Injected (uL): 2.0 Operator: JW

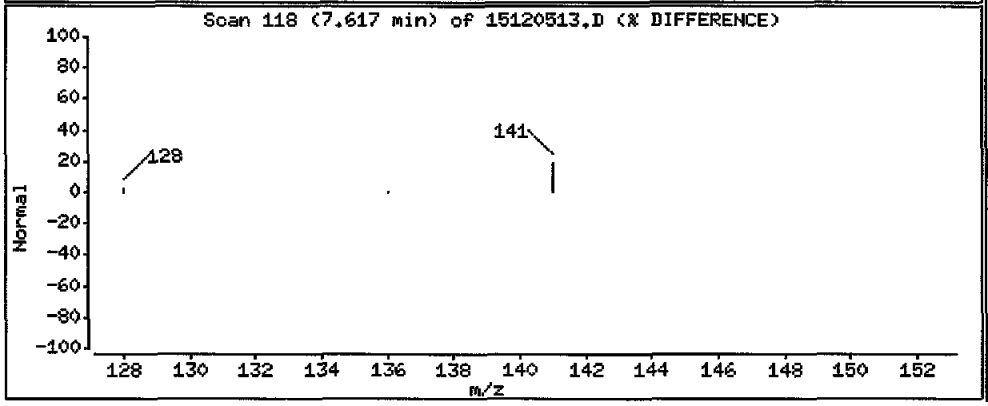
Column phase: Rxi-17Sil MS Column diameter: 0.25

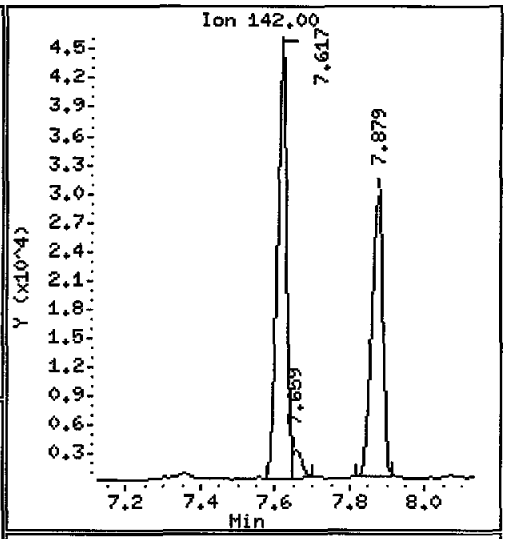
7 2-Methylnaphthalene Concentration: 7410 ug/kg

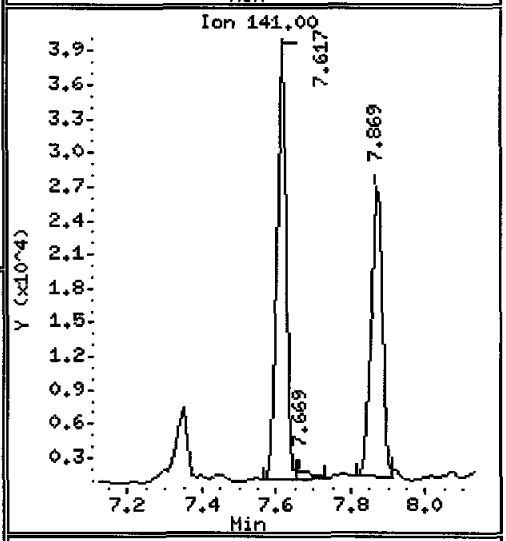


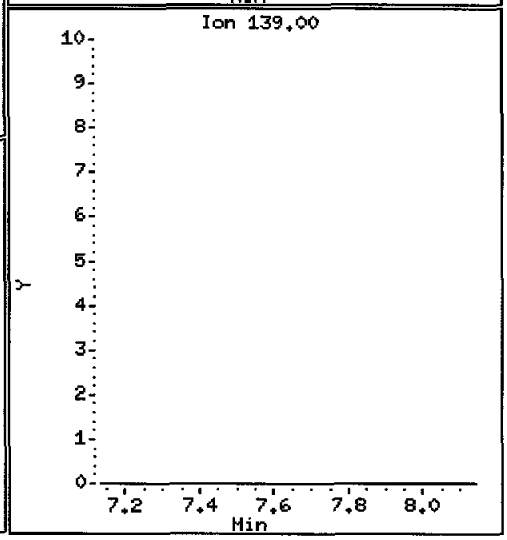












Data File: \\target\share\chem3\nt11.i\20151205.b\15120513.D

Date : 05-DEC-2015 16:16

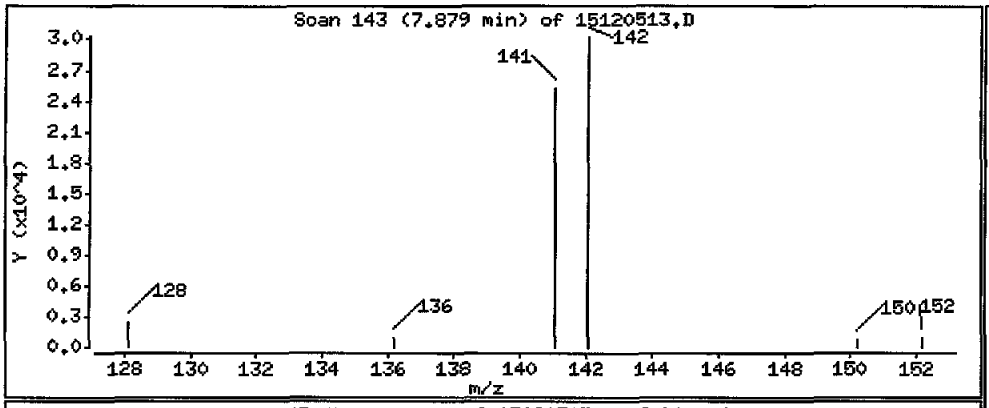
Client ID: PG-SMA2-3-PEMD-1511 Instrument: nt11.i

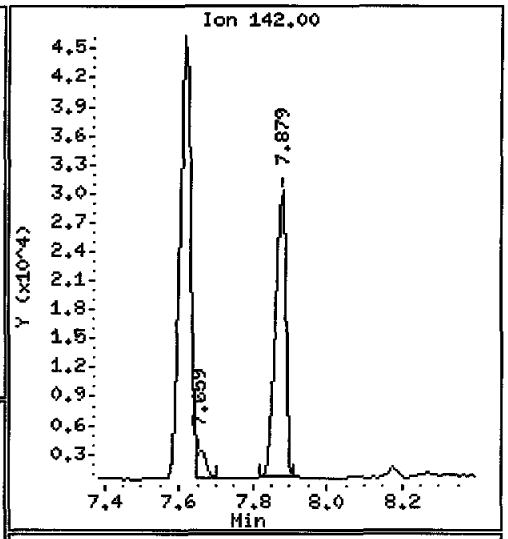
Sample Info: AQJ9L

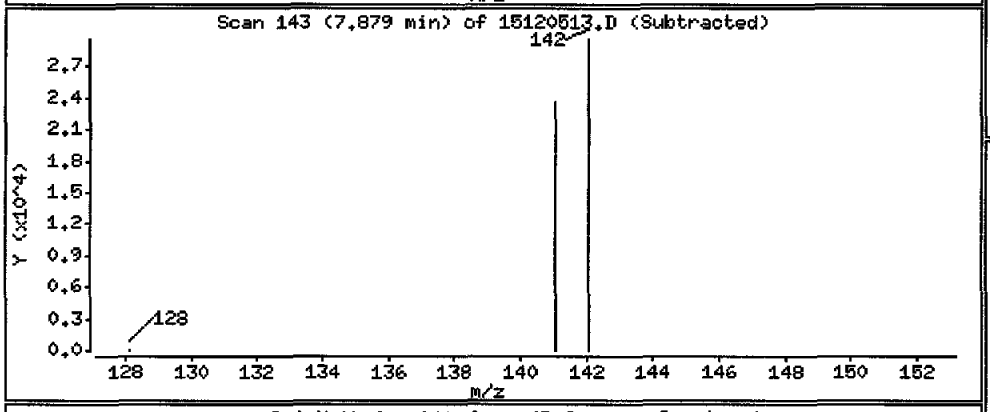
Volume Injected (uL): 2.0 Operator: JW

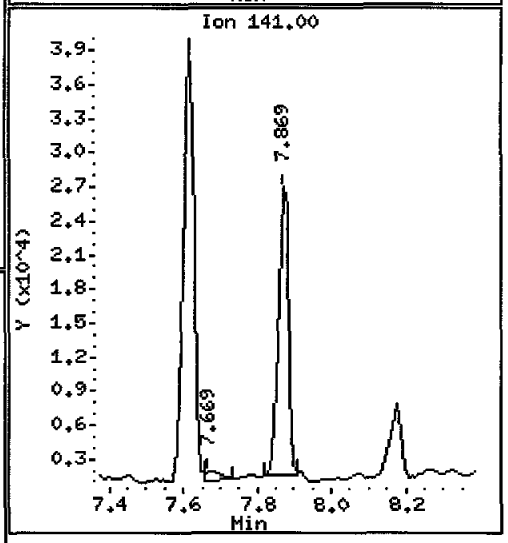
Column phase: Rxi-17Sil MS Column diameter: 0.25

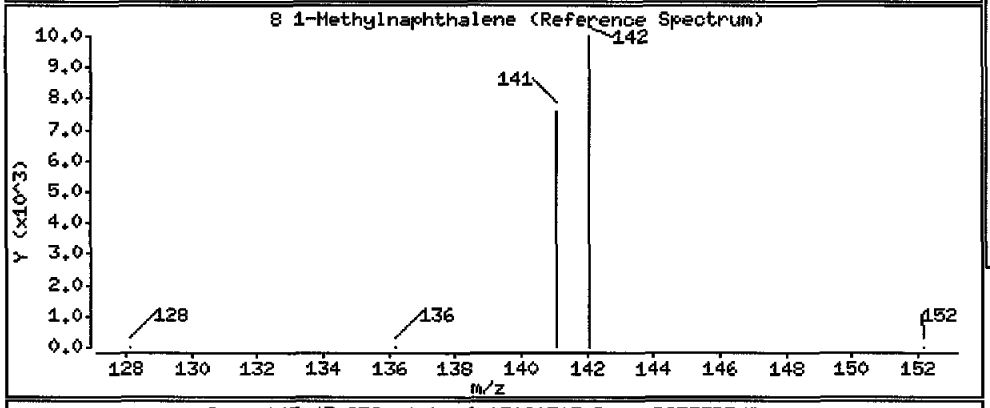
8 1-Methylnaphthalene Concentration: 5500 ug/kg

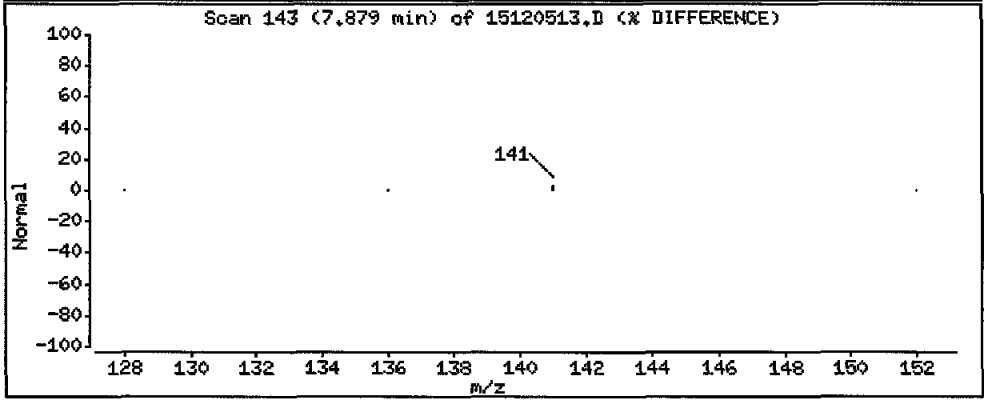












Data File: \\target\share\chem3\nt11.i\20151205.b\15120513.D

Date : 05-DEC-2015 16:16

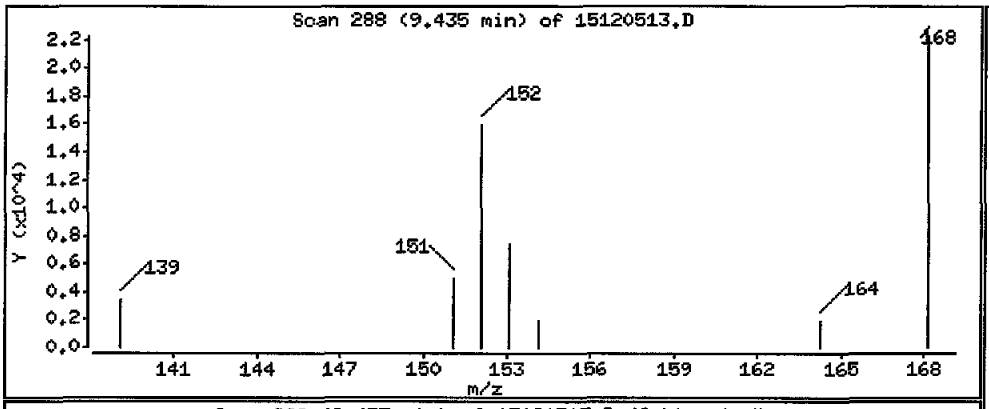
Client ID: PG-SMA2-3-PEMD-1511 Instrument: nt11.i

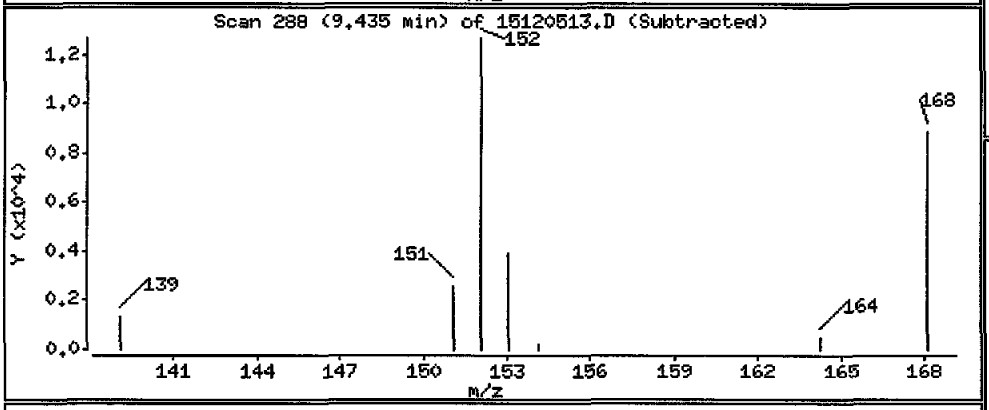
Sample Info: AQJ9L

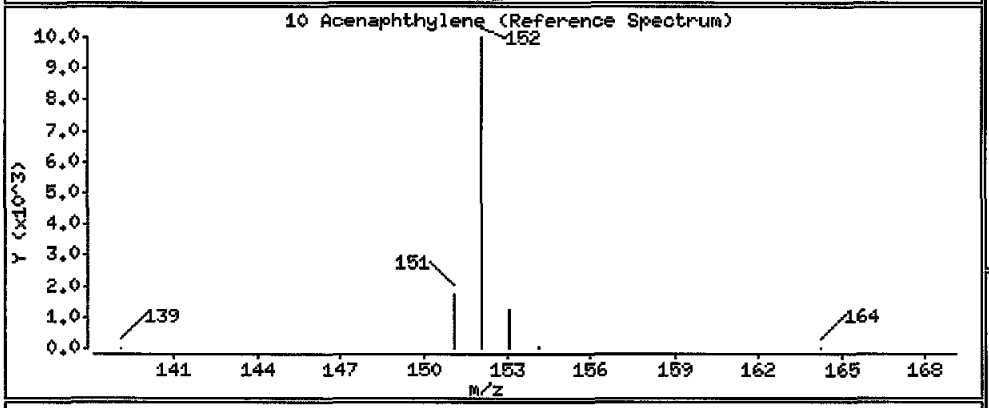
Volume Injected (uL): 2.0 Operator: JW

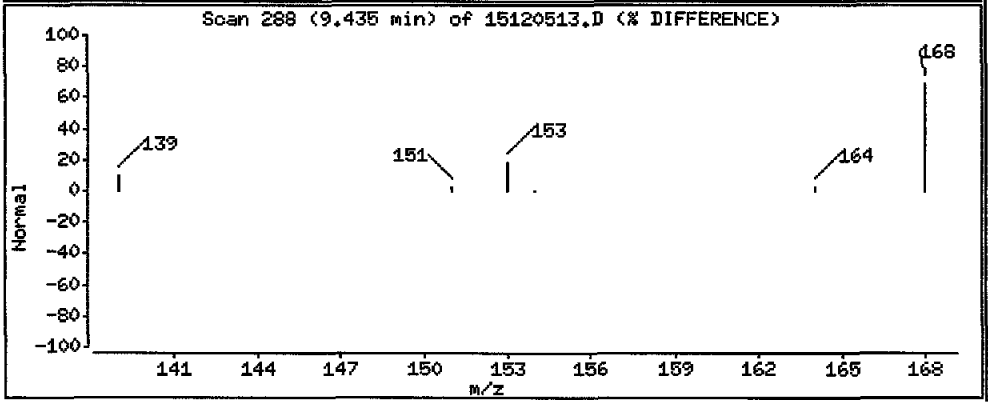
Column phase: Rxi-17Sil MS Column diameter: 0.25

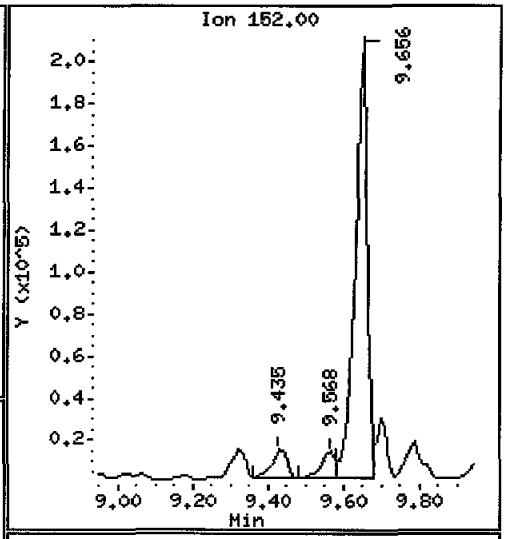
10 Acenaphthylene Concentration: 1750 ug/kg

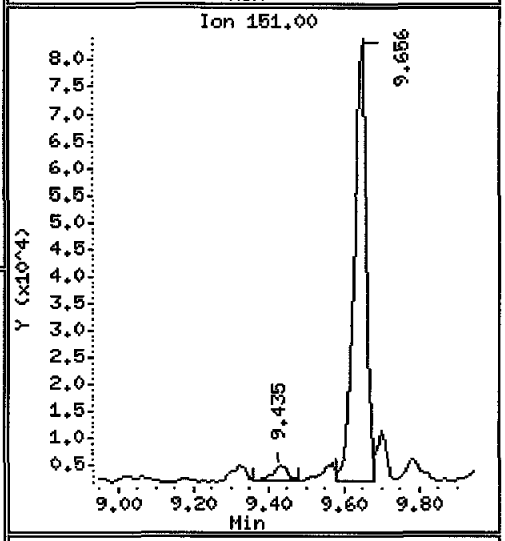


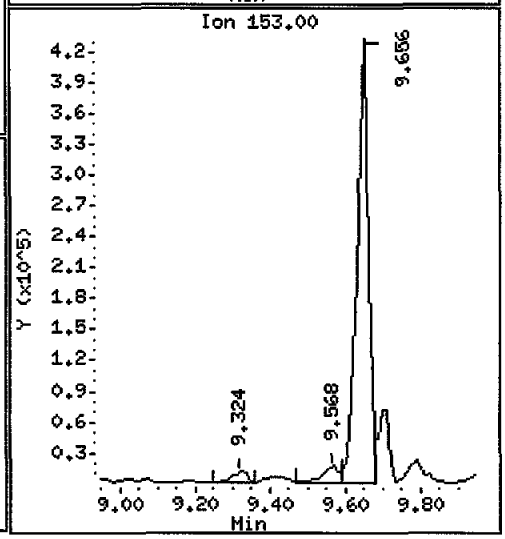












Data File: \\target\share\chem3\nt11.i\20151205.b\15120513.D

Date : 05-DEC-2015 16:16

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9L

Volume Injected (uL): 2.0

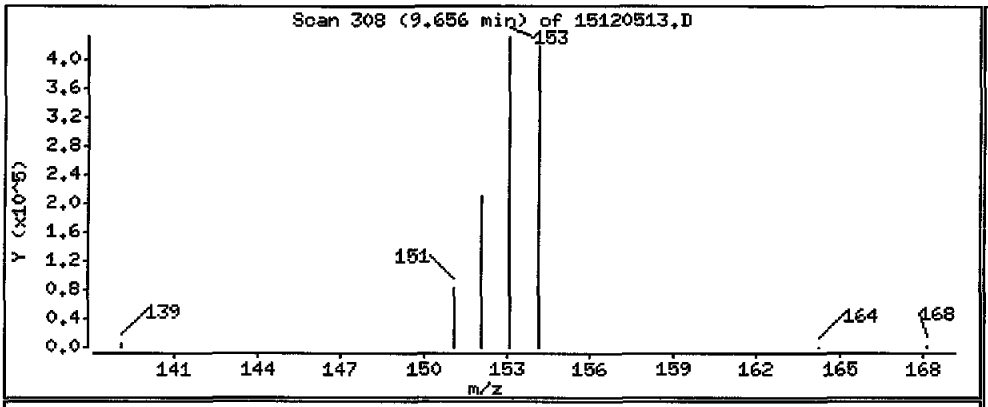
Operator: JW

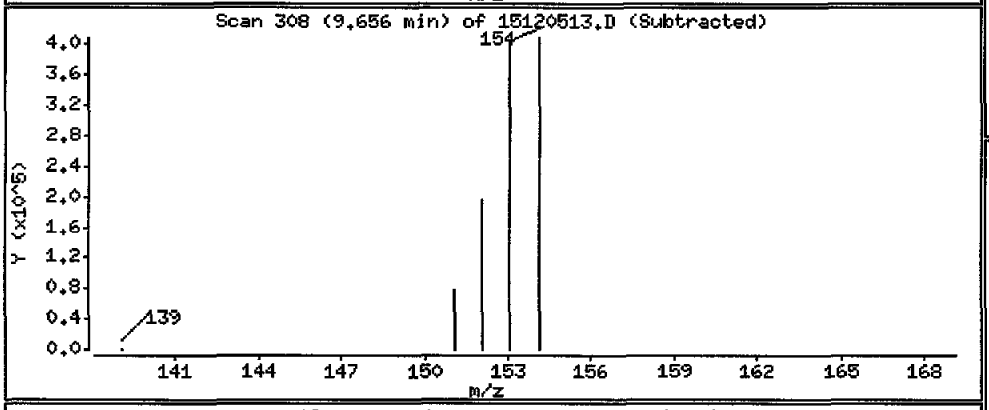
Column phase: Rxi-17Sil MS

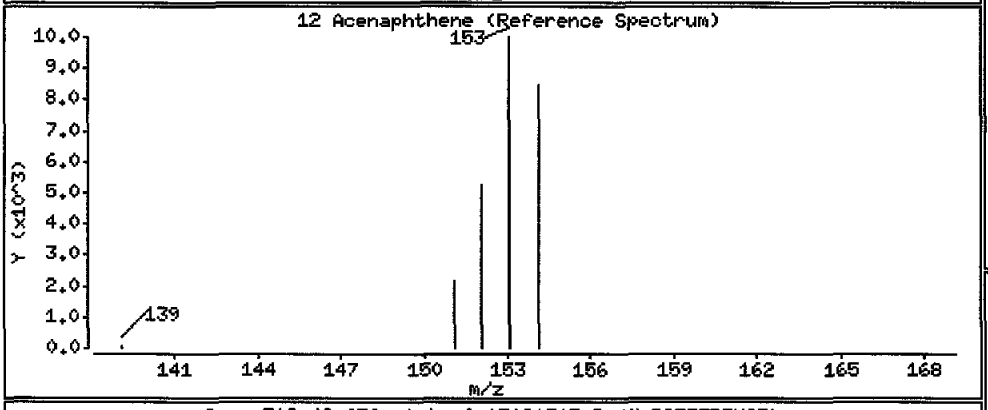
Column diameter: 0.25

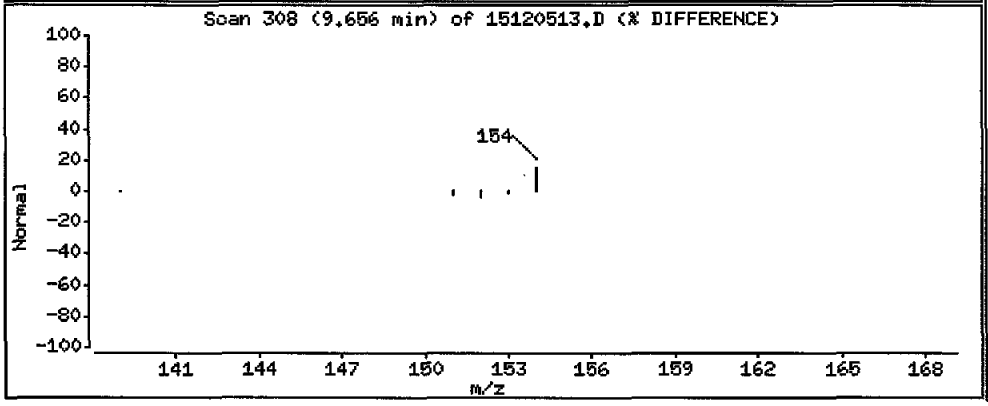
12 Acenaphthene

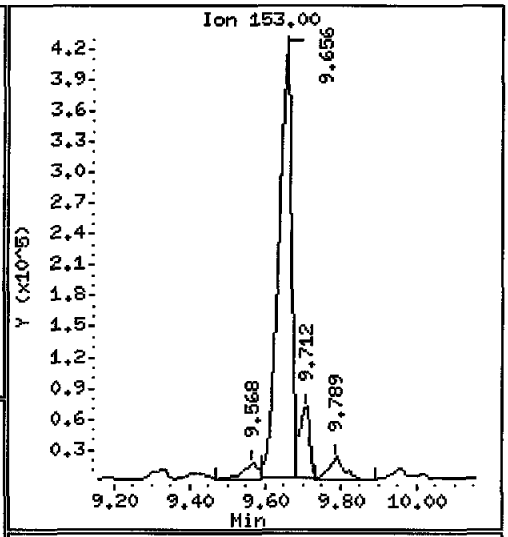
Concentration: 67500 ug/kg

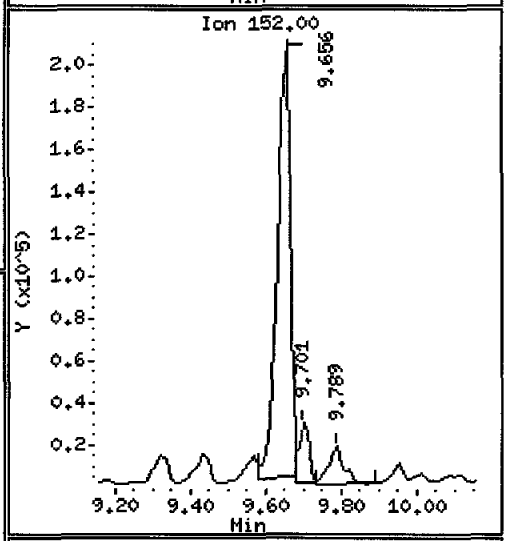


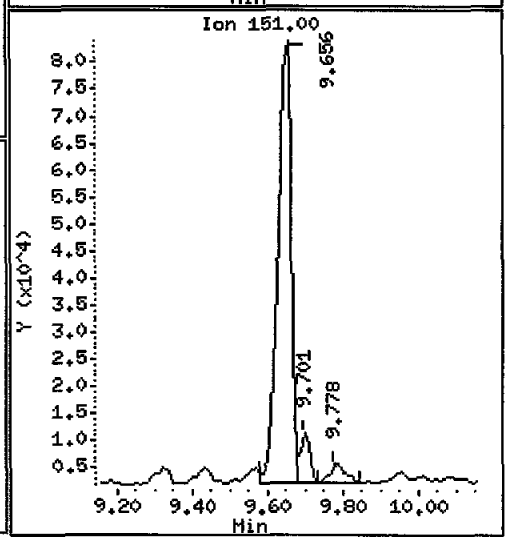












Data File: \\target\share\chem3\nt11.i\20151205.b\15120513.D

Date : 05-DEC-2015 16:16

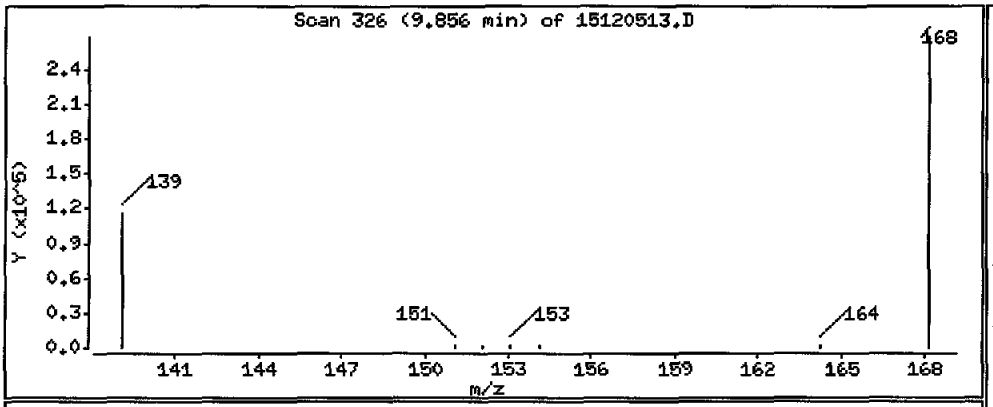
Client ID: PC-SMA2-3-PEMD-1511 Instrument: nt11.i

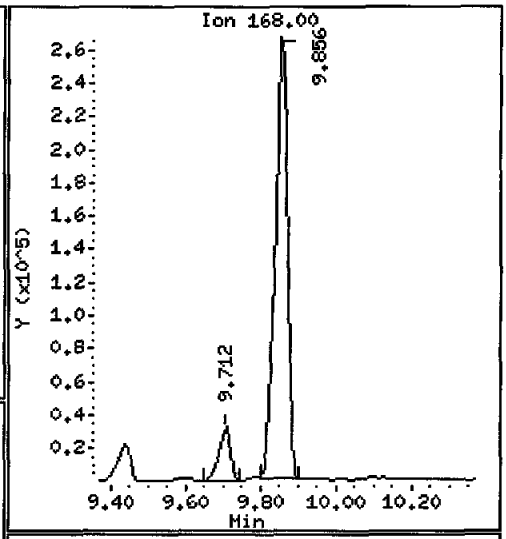
Sample Info: AQJ9L

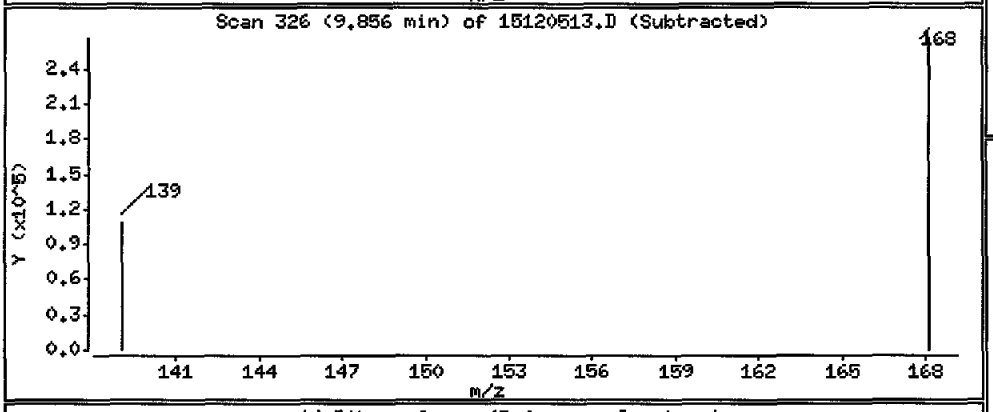
Volume Injected (uL): 2.0 Operator: JW

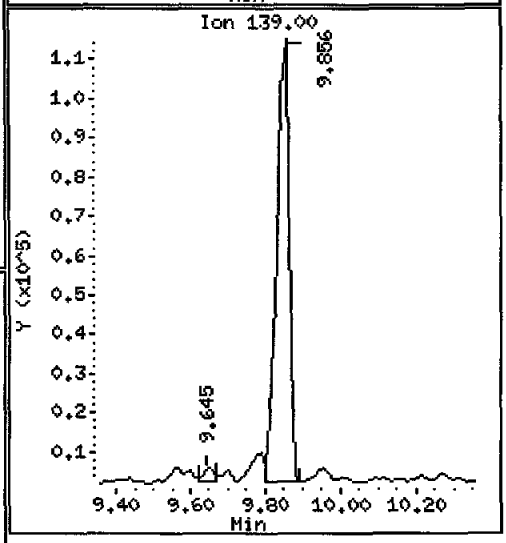
Column phase: Rxi-17Sil MS Column diameter: 0.25

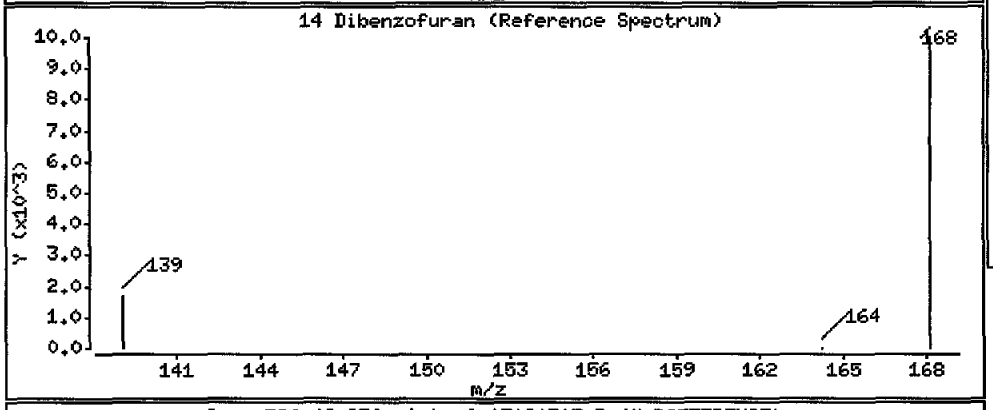
14 Dibenzofuran Concentration: 28700 ug/kg

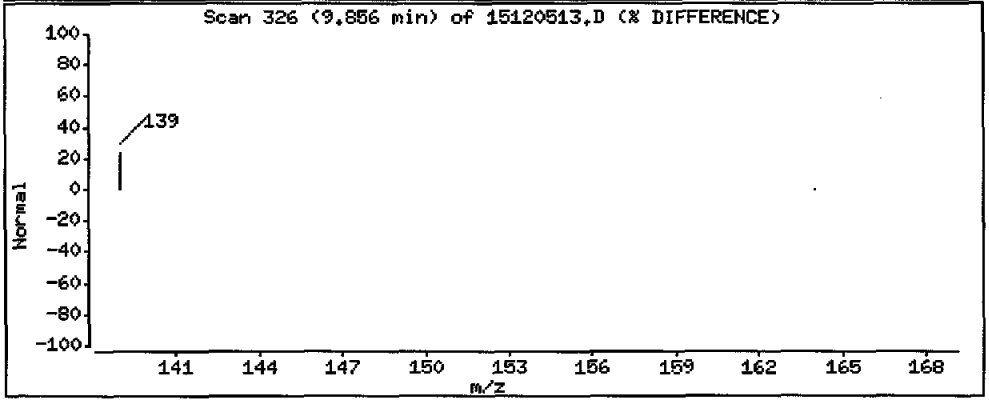












Data File: \\target\share\chem3\nt11.i\20151205.b\15120513.D

Date : 05-DEC-2015 16:16

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9L

Volume Injected (uL): 2.0

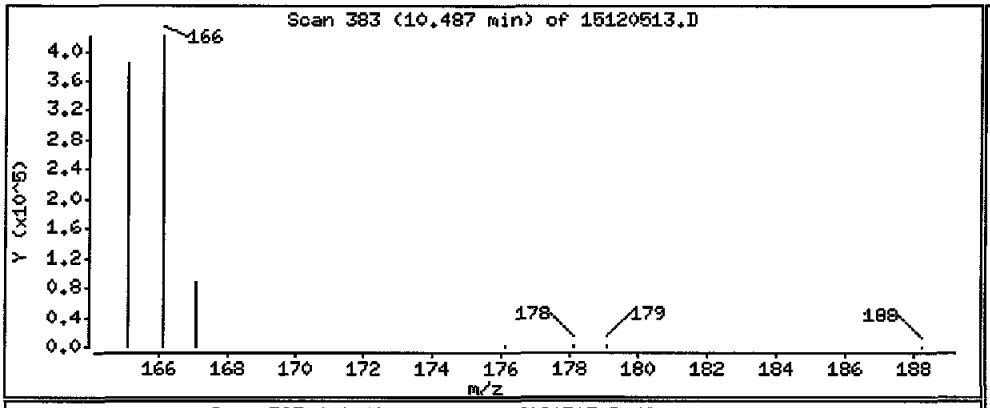
Operator: JW

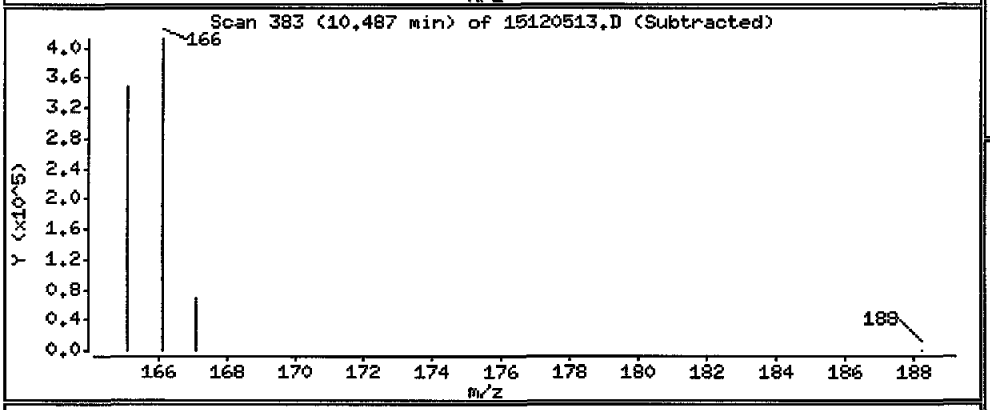
Column phase: Rxi-17Sil MS

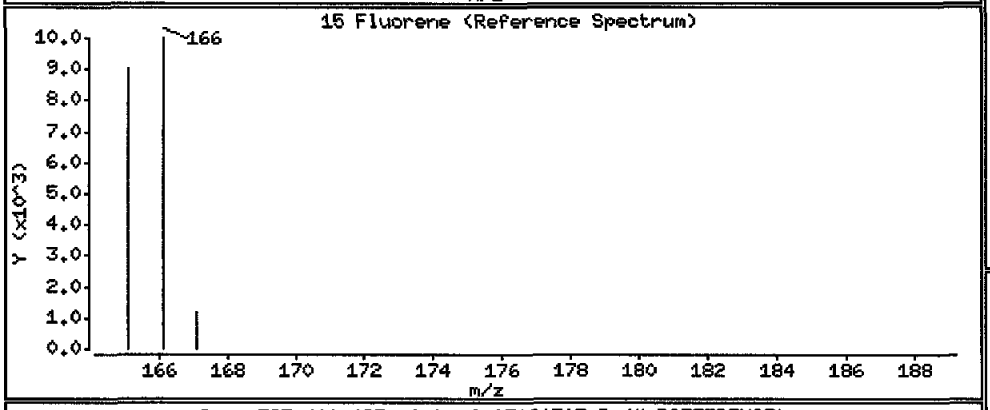
Column diameter: 0.25

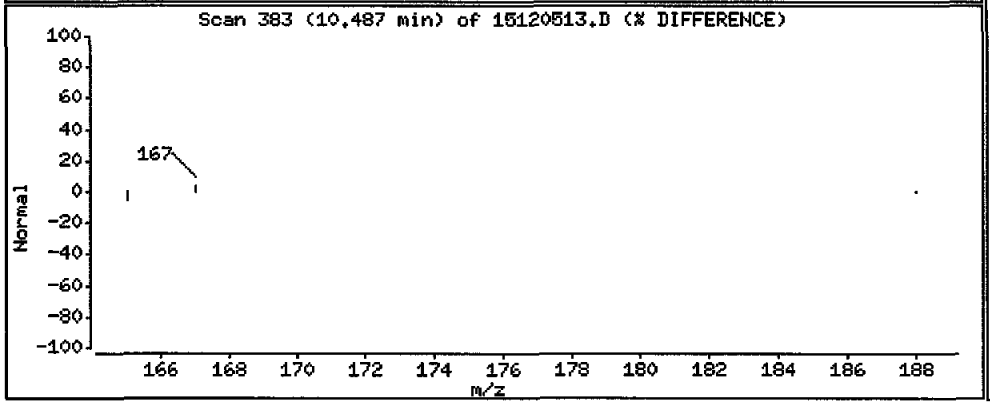
15 Fluorene

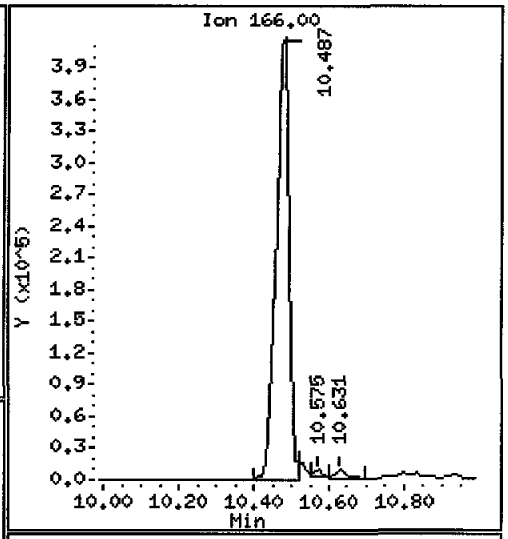
Concentration: 63300 ug/kg

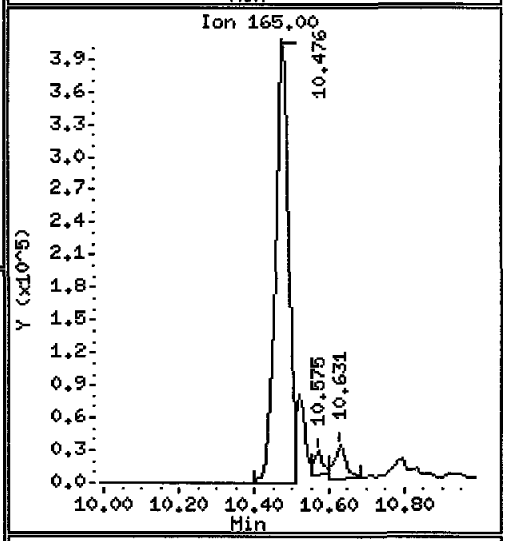


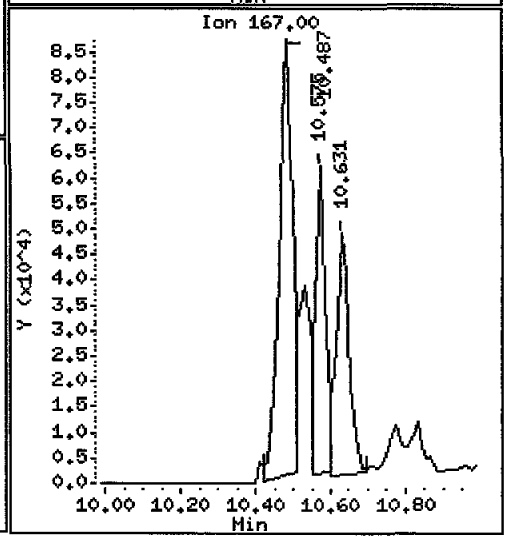












Data File: \\target\share\chem3\nt11.i\20151205.b\15120513.D

Date : 05-DEC-2015 16:16

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9L

Volume Injected (uL): 2.0

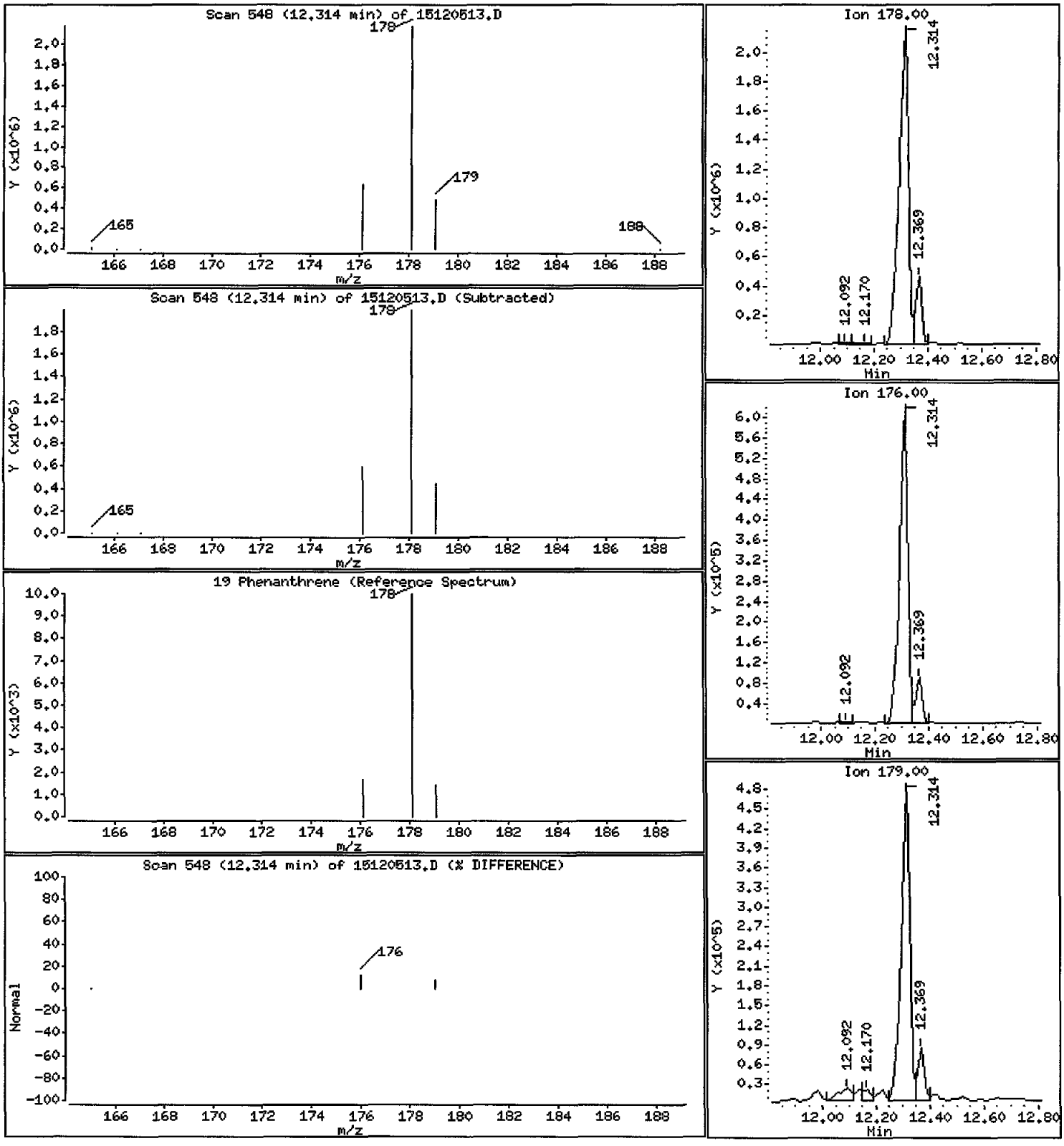
Operator: JW

Column phase: Rxi-17Sil MS

Column diameter: 0.25

19 Phenanthrene

Concentration: 189000 ug/kg



Data File: \\target\share\chem3\nt11.i\20151205.b\15120513.D

Date : 05-DEC-2015 16:16

Client ID: PC-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9L

Volume Injected (uL): 2.0

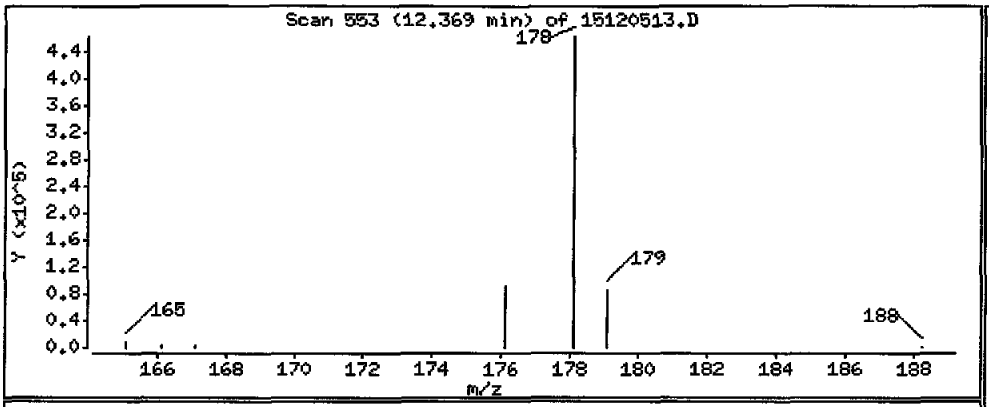
Operator: JW

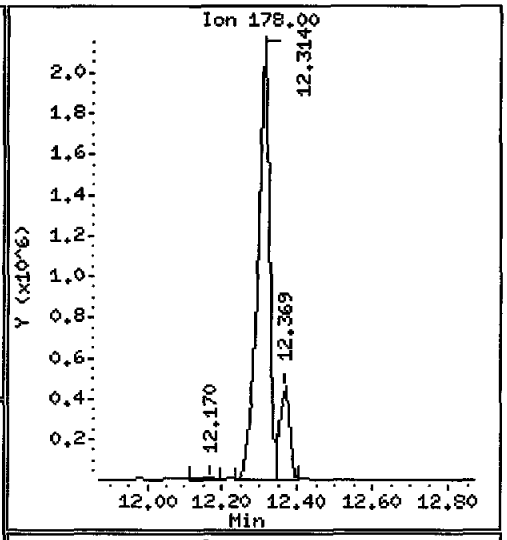
Column phase: Rxi-17Sil MS

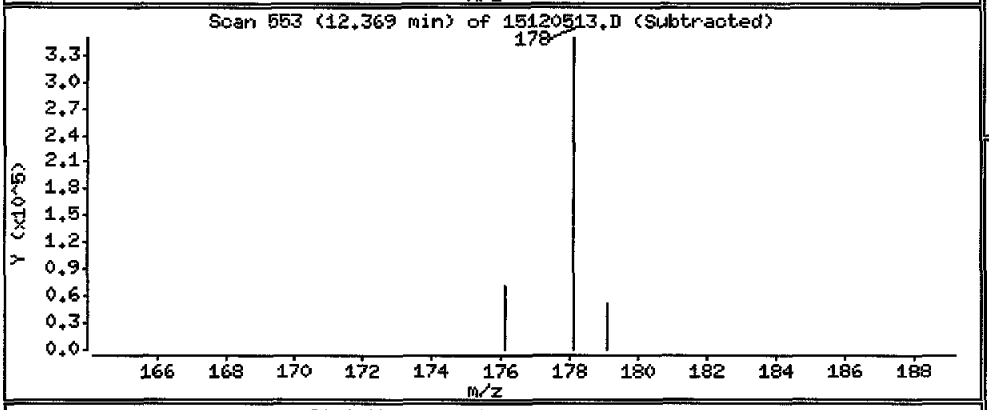
Column diameter: 0.25

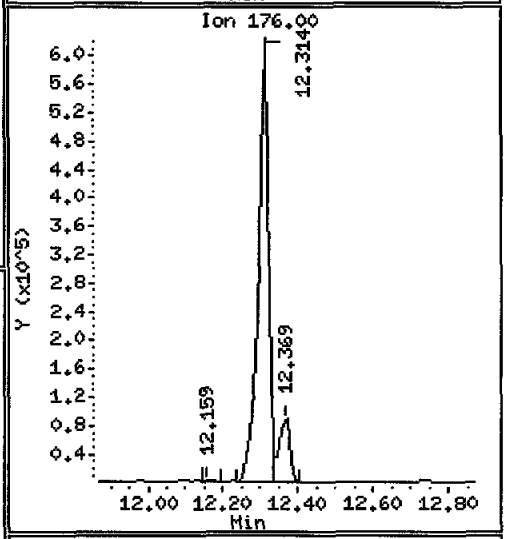
20 Anthracene

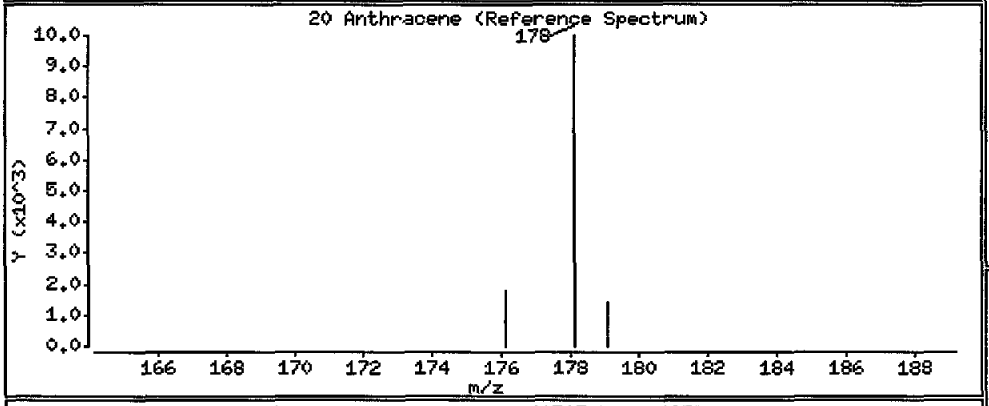
Concentration: 34300 ug/kg

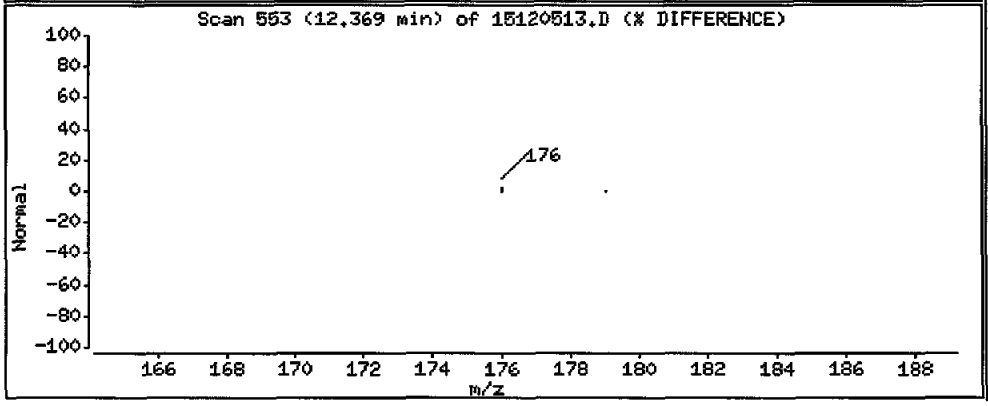


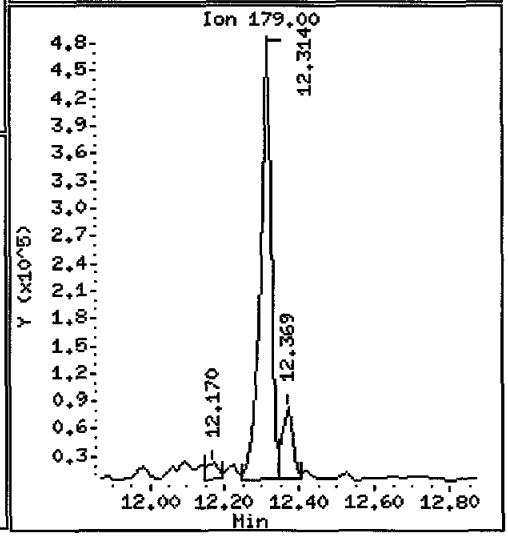












Data File: \\target\share\chem3\nt11.i\20151205.b\15120513.D

Date : 05-DEC-2015 16:16

Client ID: PG-SMA2-3-PEMD-1511 Instrument: nt11.i

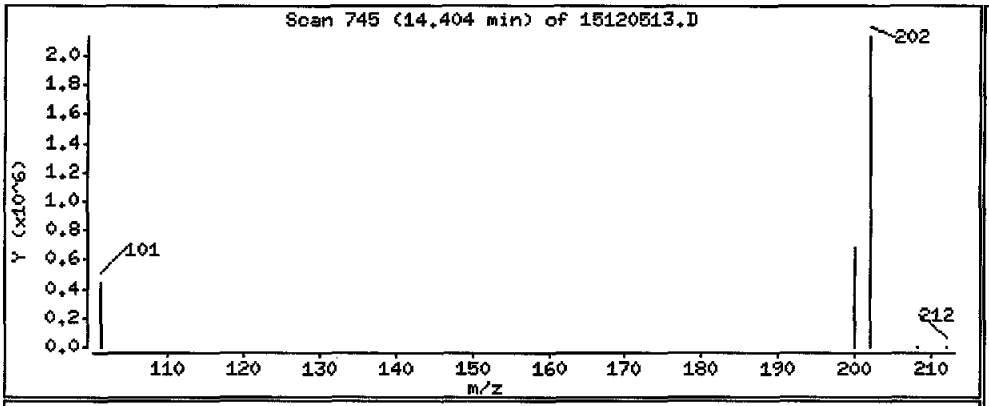
Sample Info: AQJ9L

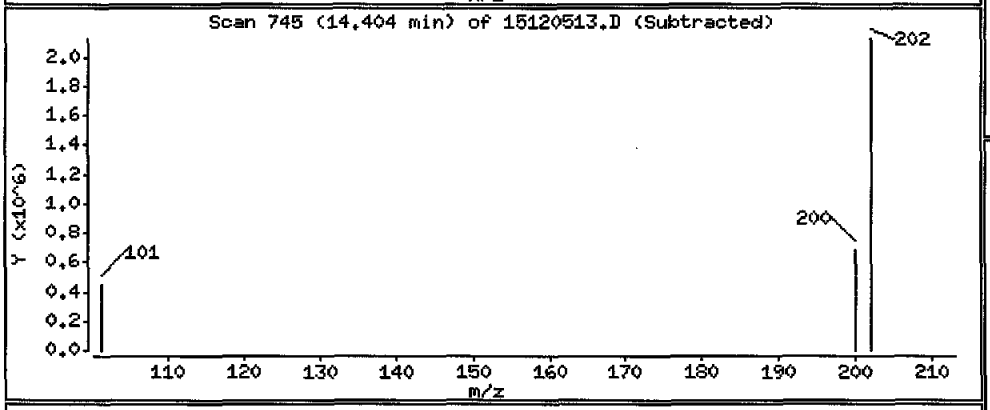
Volume Injected (uL): 2.0 Operator: JW

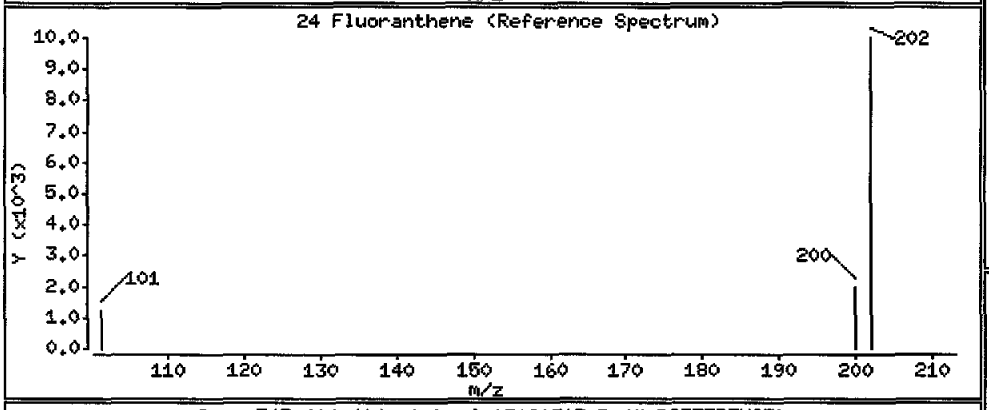
Column phase: Rxi-17Sil MS Column diameter: 0.25

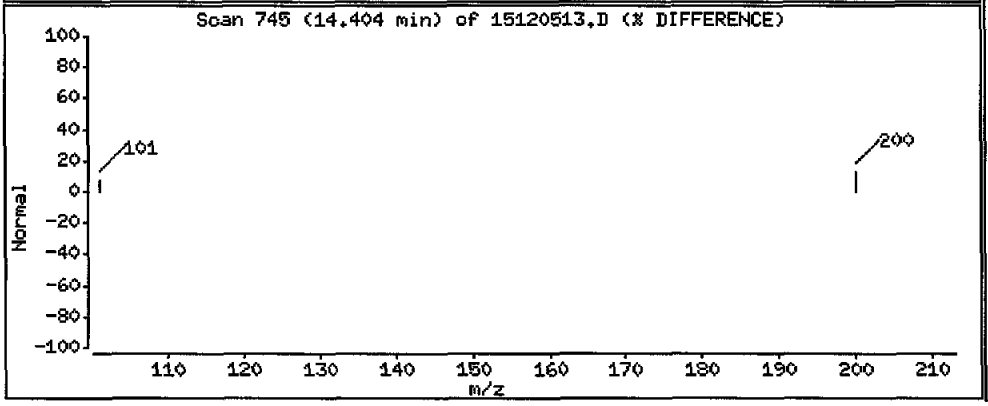
24 Fluoranthene Concentration: 164000 ug/kg

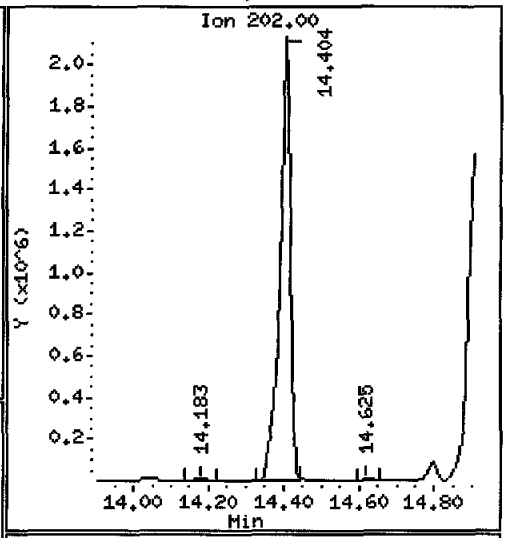
F

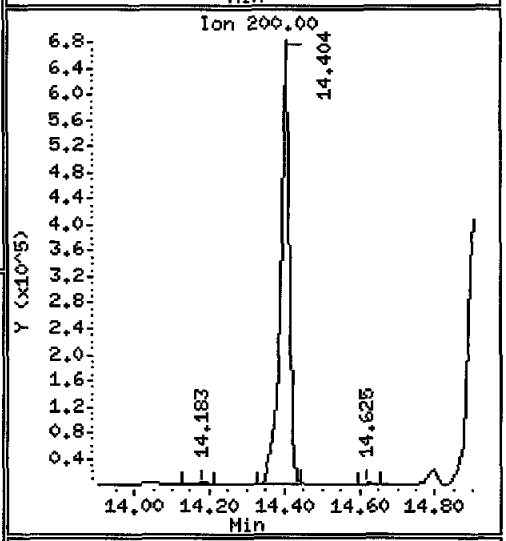


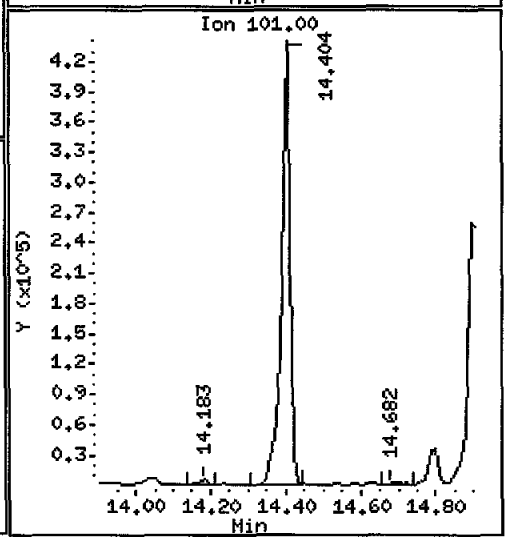












Data File: \\target\share\chem3\nt11.i\20151205.b\15120513.D

Date : 05-DEC-2015 16:16

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9L

Volume Injected (uL): 2.0

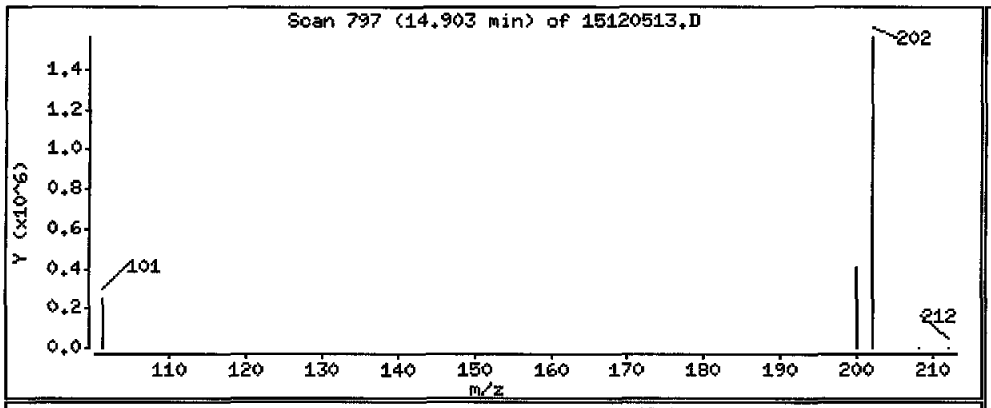
Operator: JW

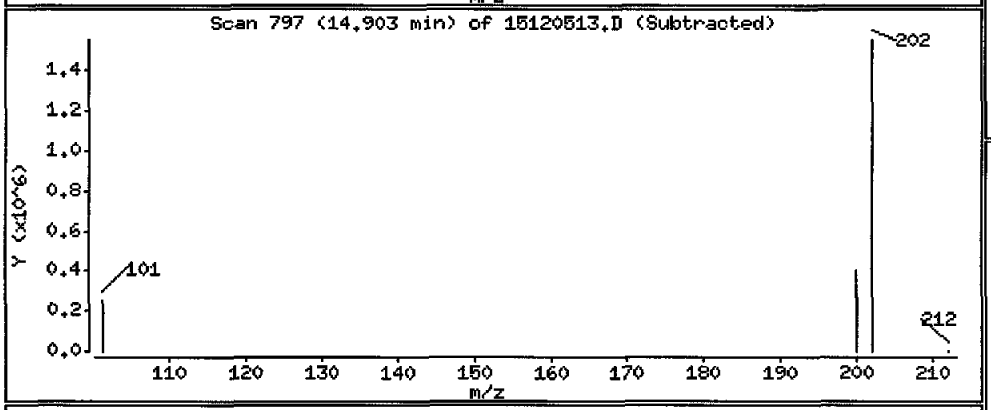
Column phase: Rxi-17Sil MS

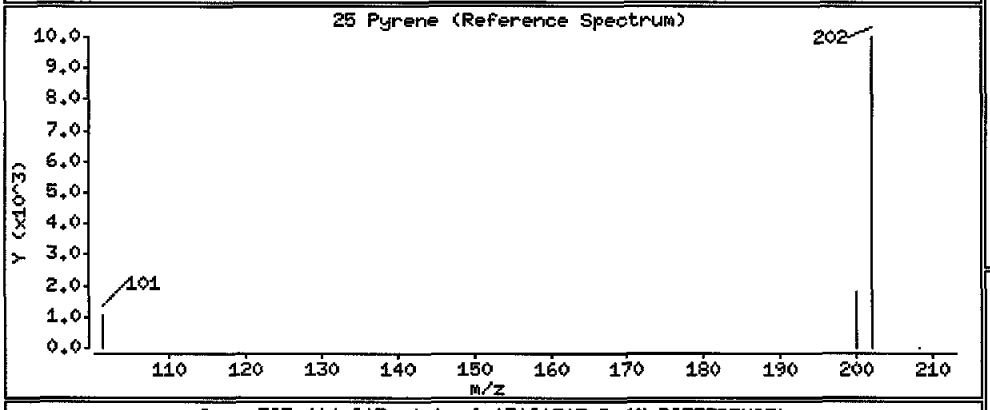
Column diameter: 0.25

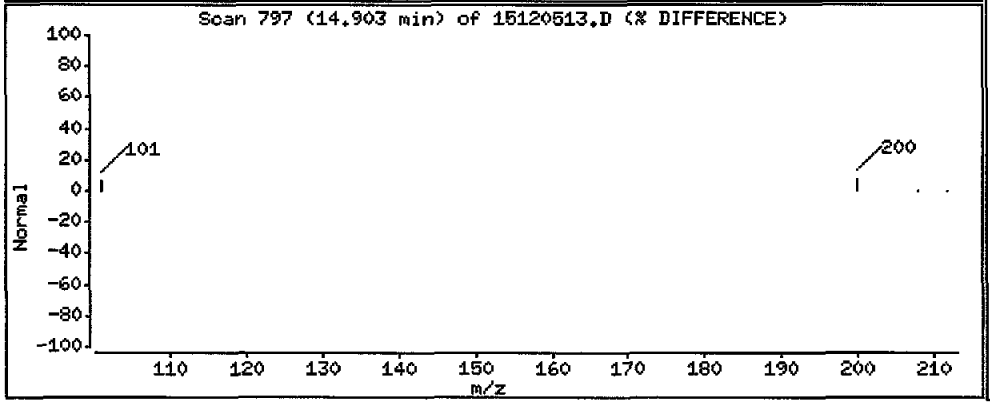
25 Pyrene

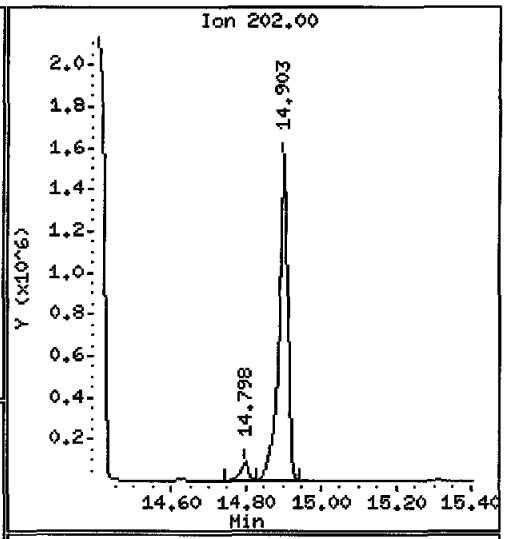
Concentration: 110000 ug/kg

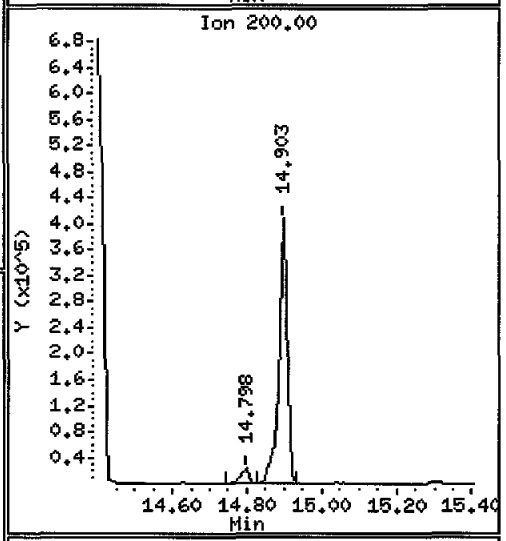


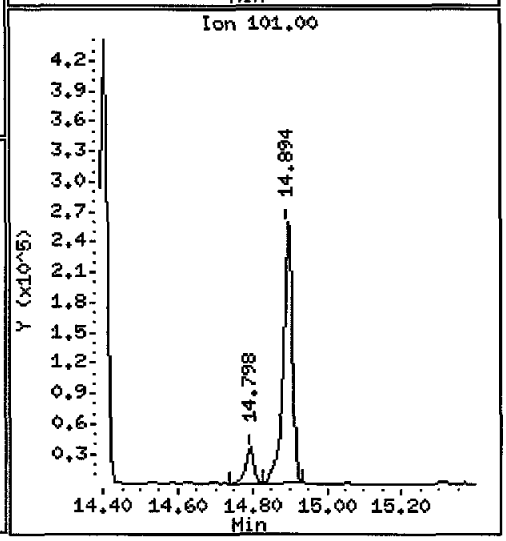












Data File: \\target\share\chem3\nt11.i\20151205.b\15120513.D

Date : 05-DEC-2015 16:16

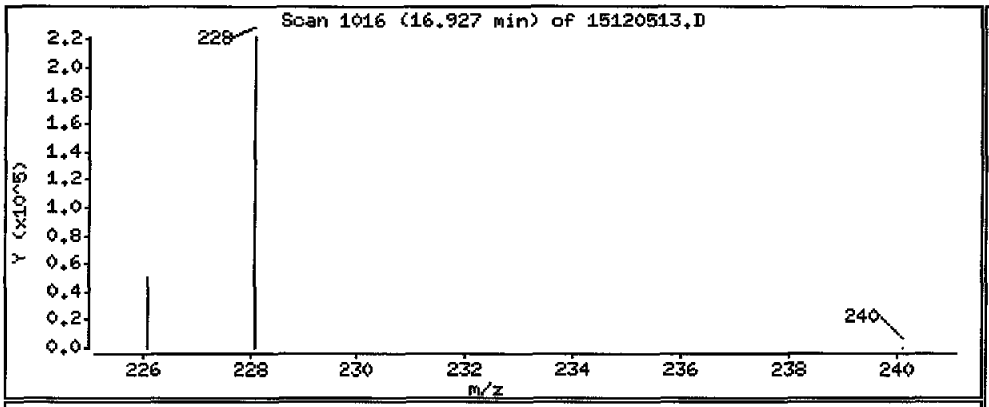
Client ID: PG-SMA2-3-PEMD-1511 Instrument: nt11.i

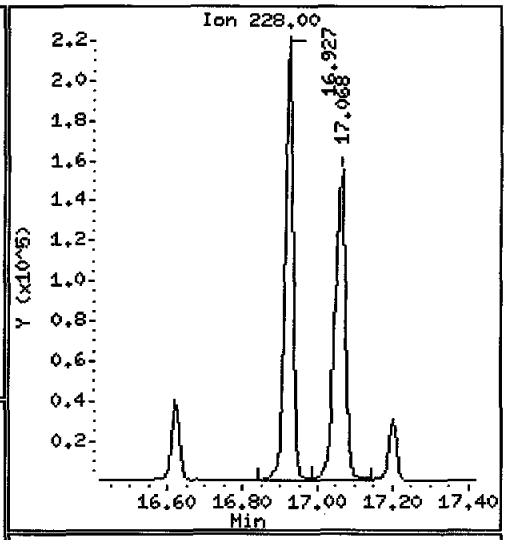
Sample Info: AQJ9L

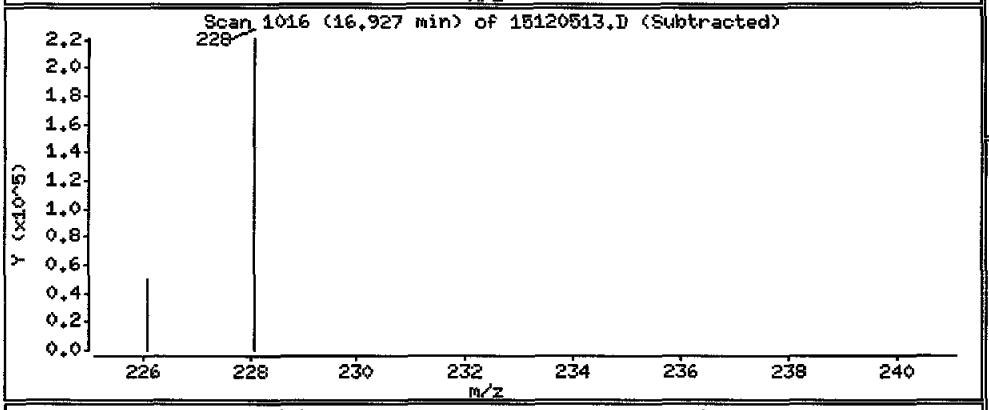
Volume Injected (uL): 2.0 Operator: JW

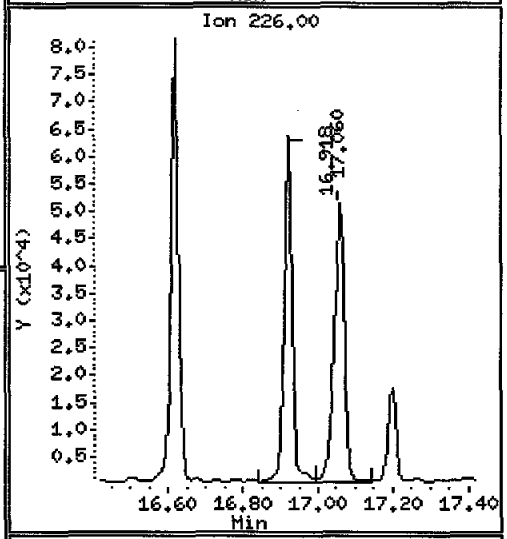
Column phase: Rxi-17Sil MS Column diameter: 0.25

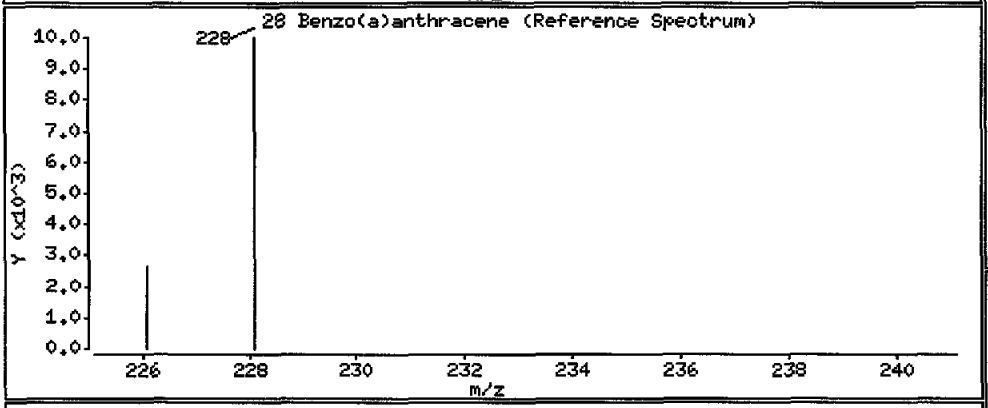
28 Benzo(a)anthracene Concentration: 15800 ug/kg

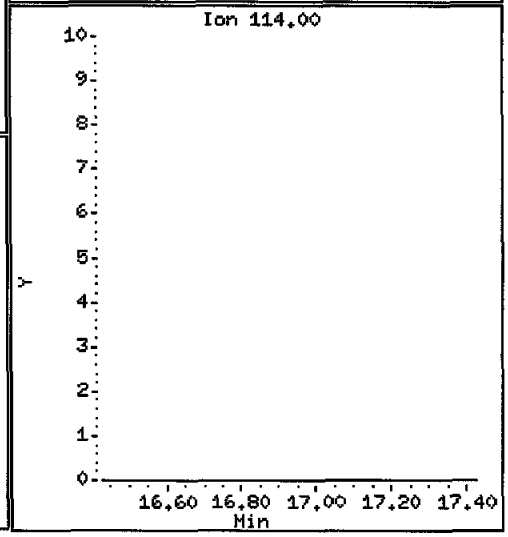


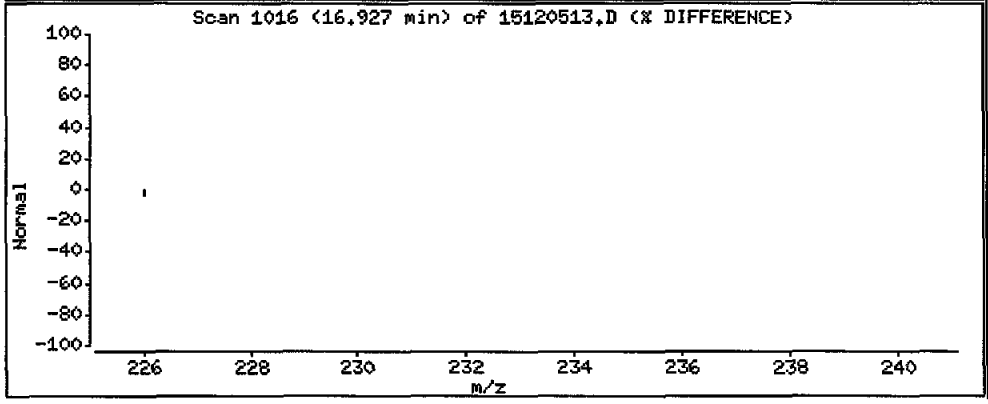












Data File: \\target\share\chem3\nt11.i\20151205.b\15120513.D

Date : 05-DEC-2015 16:16

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9L

Volume Injected (uL): 2.0

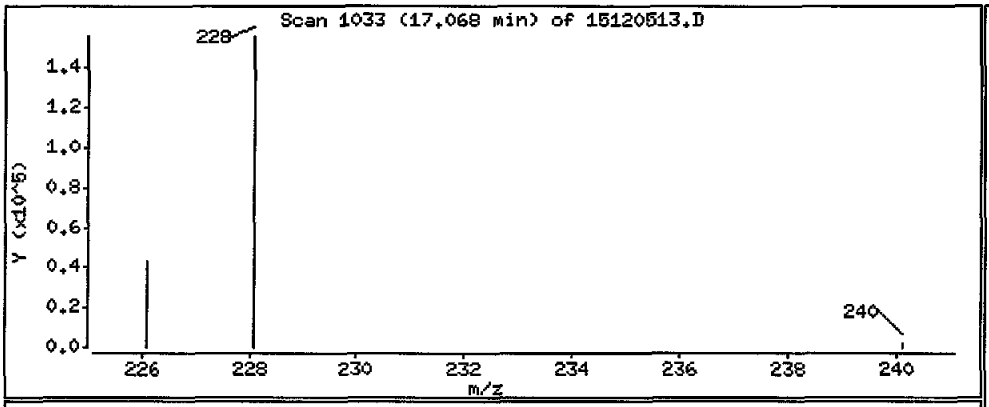
Operator: JW

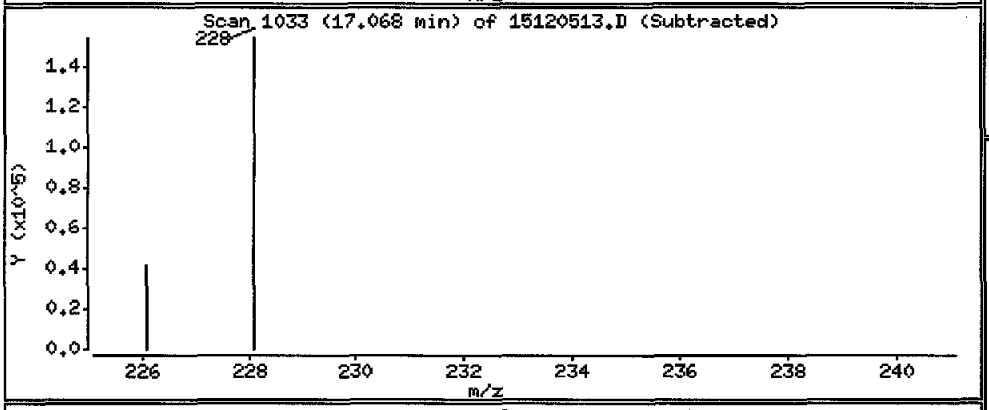
Column phase: Rxi-17Sil MS

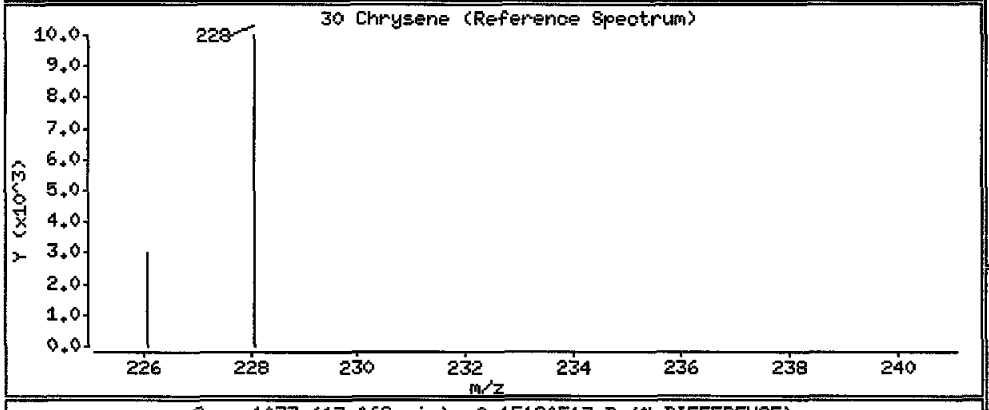
Column diameter: 0.25

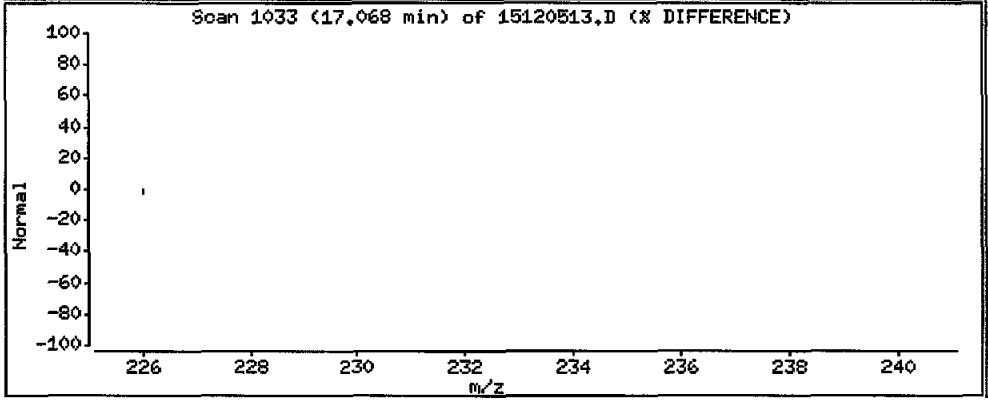
30 Chrysene

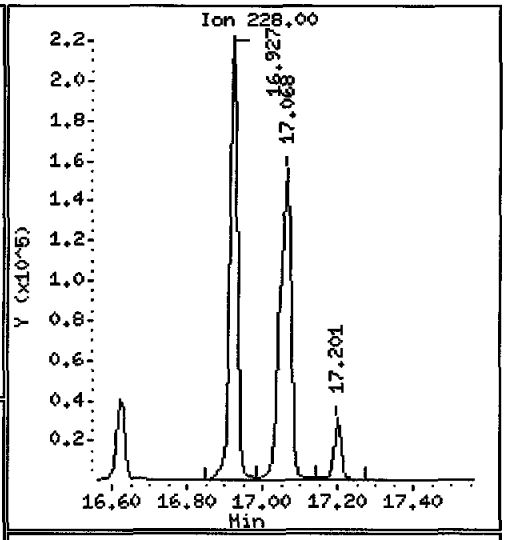
Concentration: 14100 ug/kg

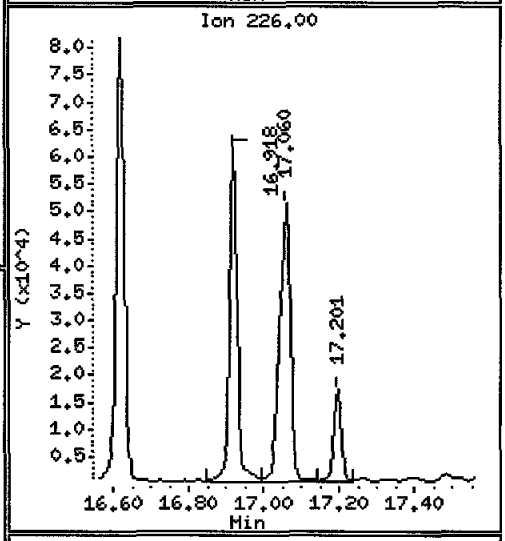


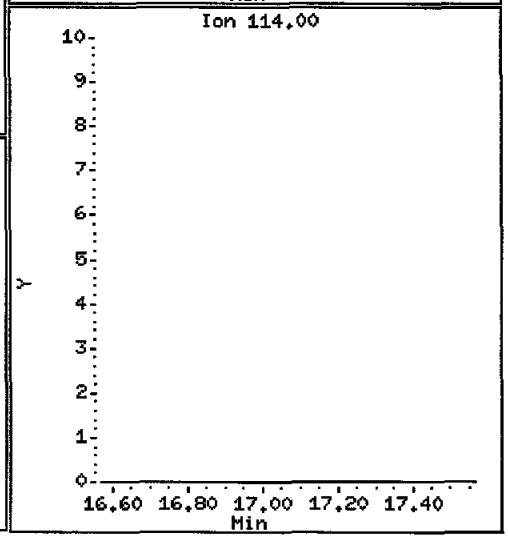












Data File: \\target\share\chem3\nt11.i\20151205.b\15120513.D

Date : 05-DEC-2015 16:16

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9L

Volume Injected (uL): 2.0

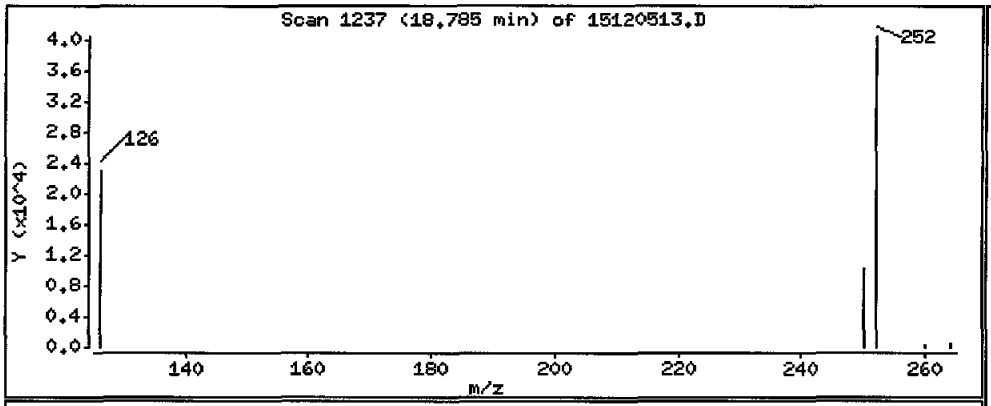
Operator: JW

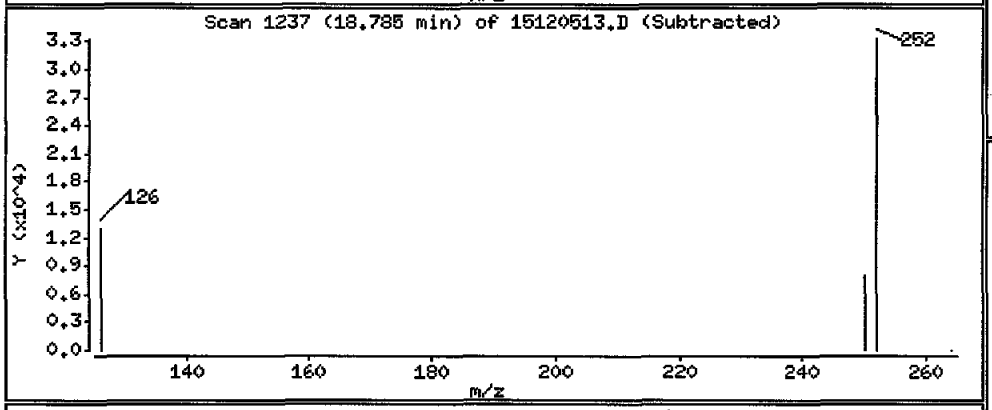
Column phase: Rxi-17Sil MS

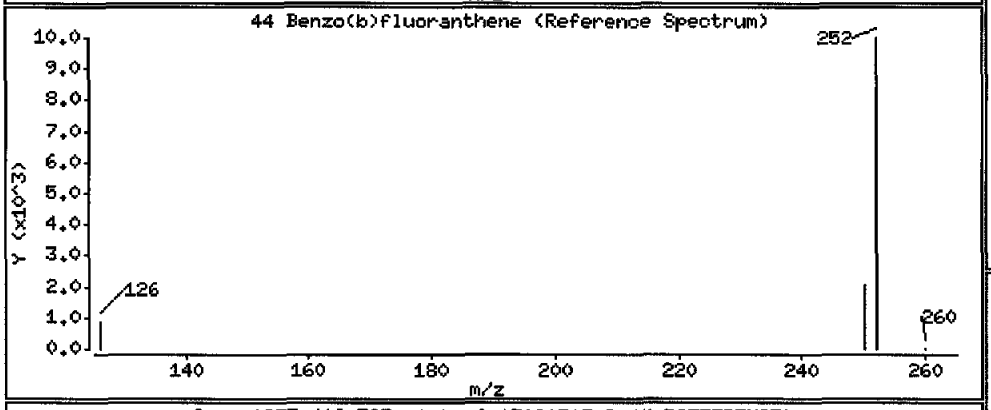
Column diameter: 0.25

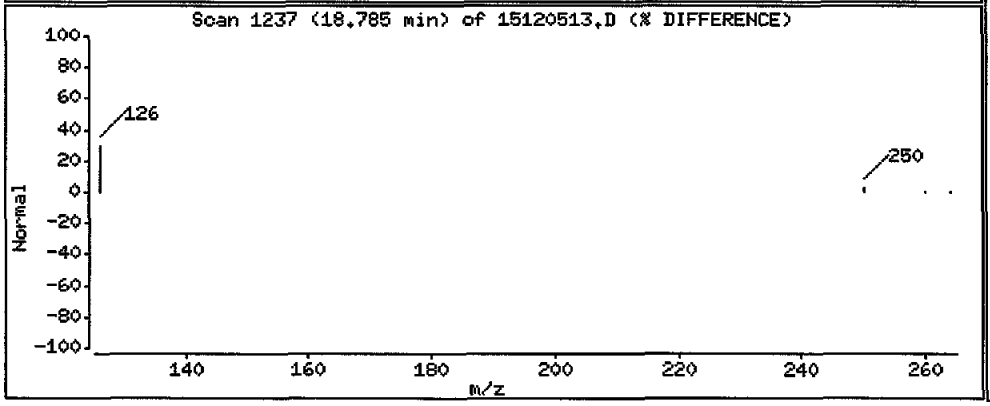
44 Benzo(b)fluoranthene

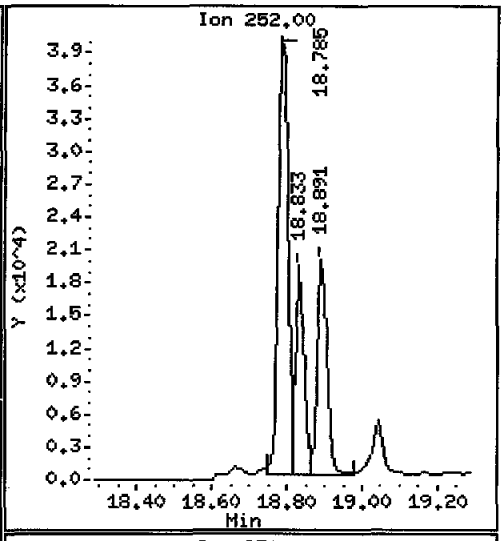
Concentration: 3870 ug/kg

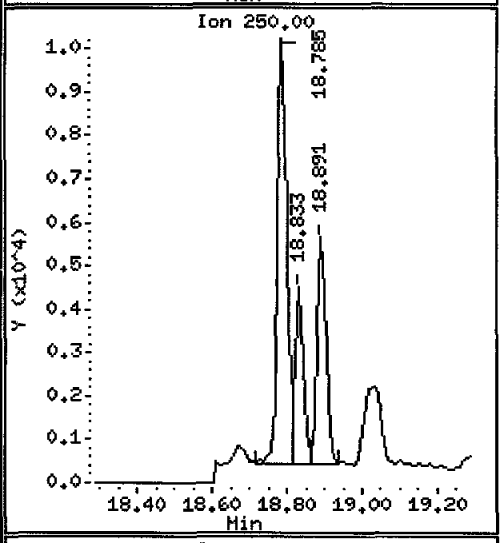


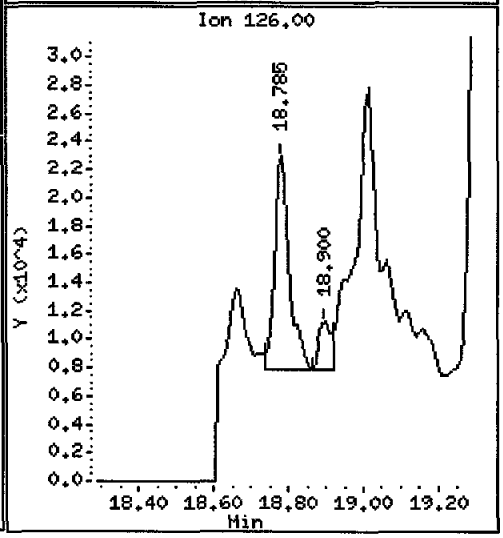












Data File: \\target\share\chem3\nt11.i\20151205.b\15120513.D

Date : 05-DEC-2015 16:16

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9L

Volume Injected (uL): 2.0

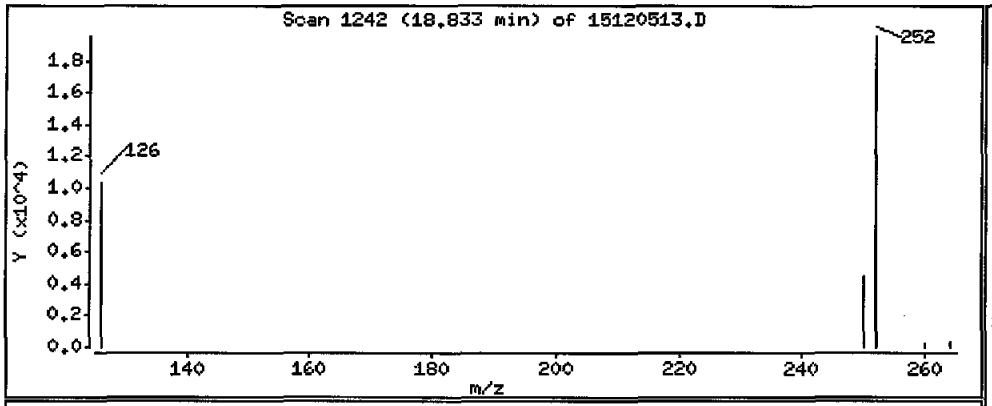
Operator: JW

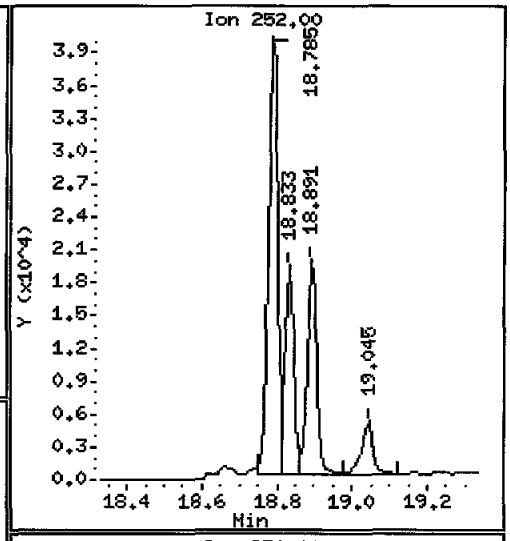
Column phase: Rxi-17Sil MS

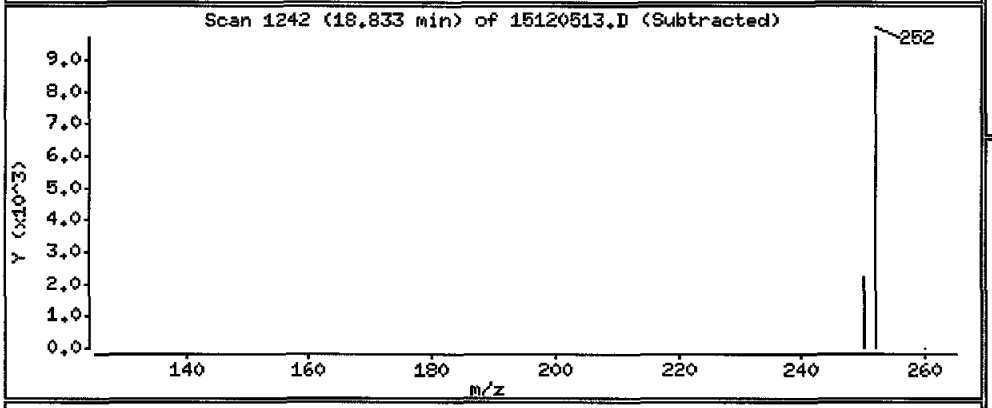
Column diameter: 0.25

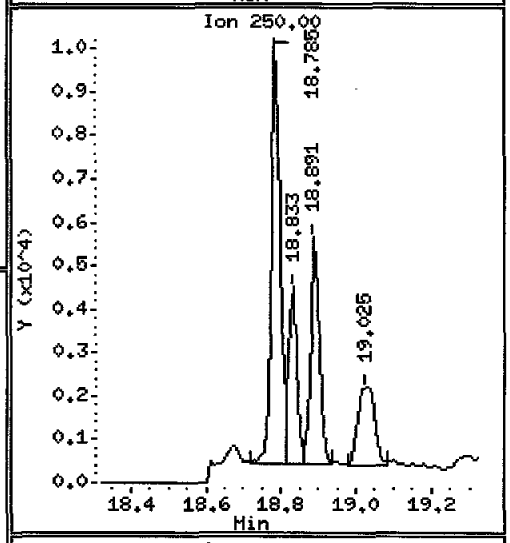
45 Benzo(k)fluoranthene

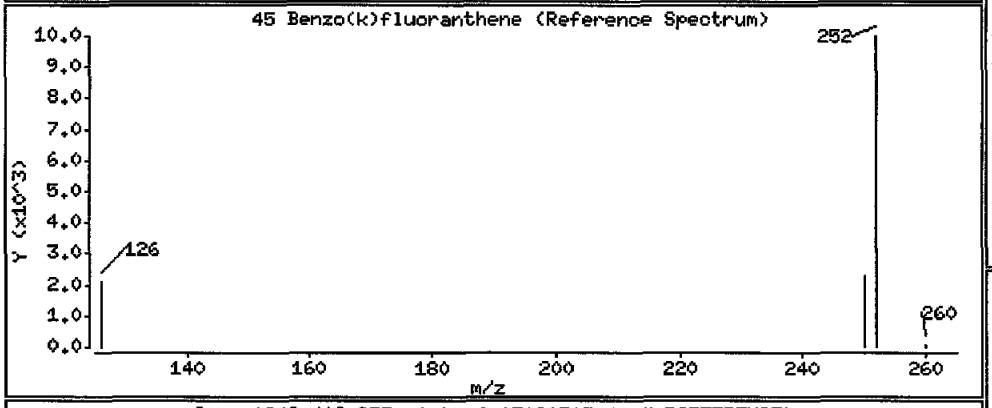
Concentration: 1520 ug/kg

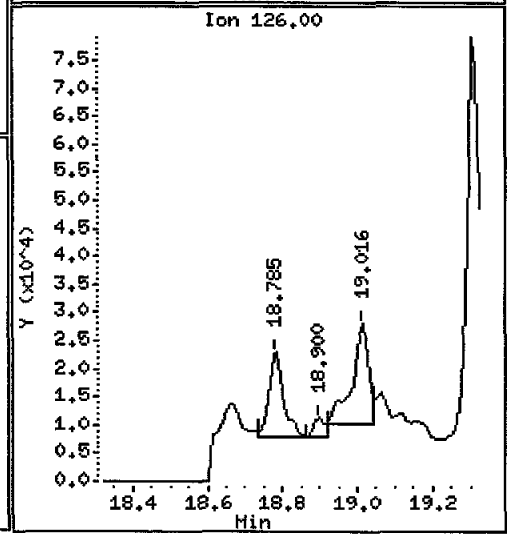


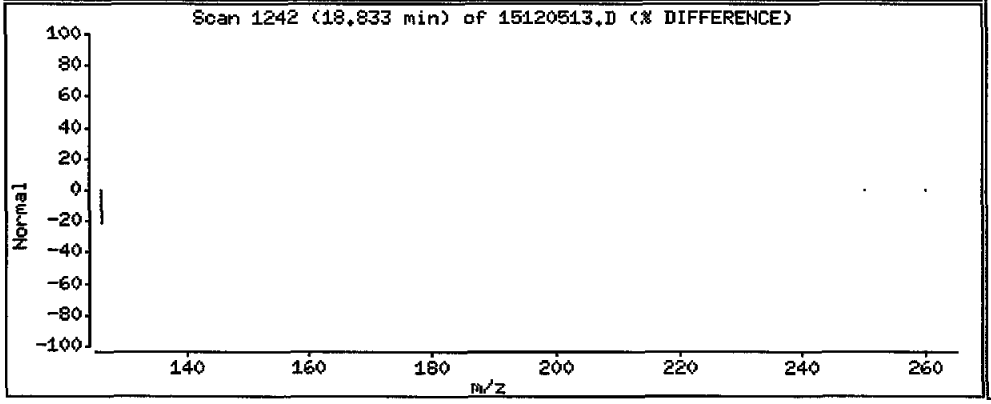












Data File: \\target\share\chem3\nt11.i\20151205.b\15120513.D

Date : 05-DEC-2015 16:16

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9L

Volume Injected (uL): 2.0

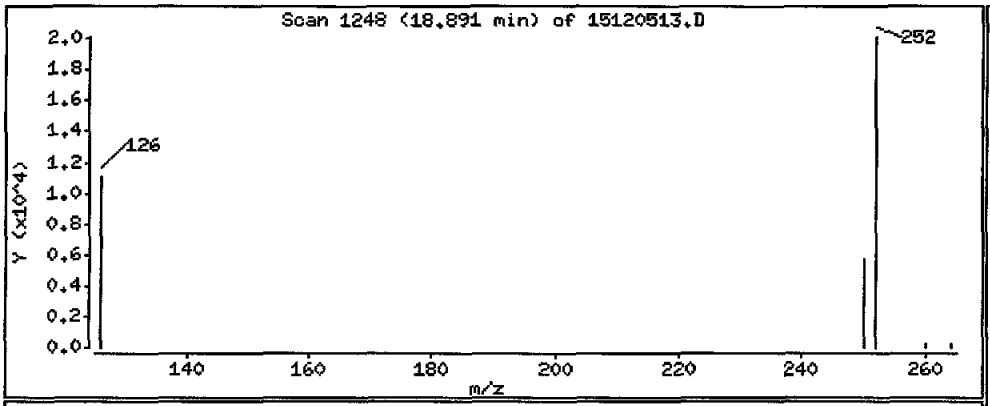
Operator: JW

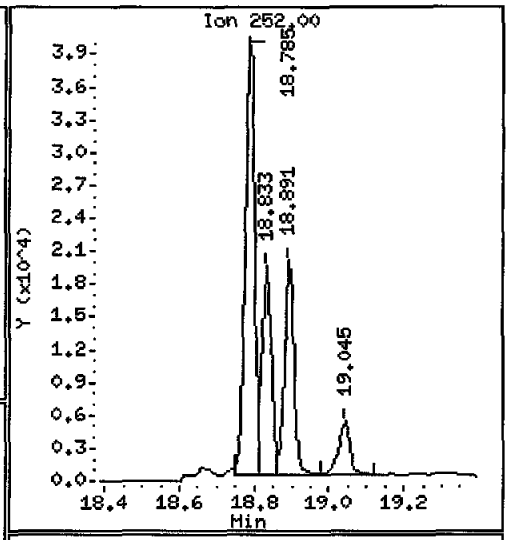
Column phase: Rxi-17Sil MS

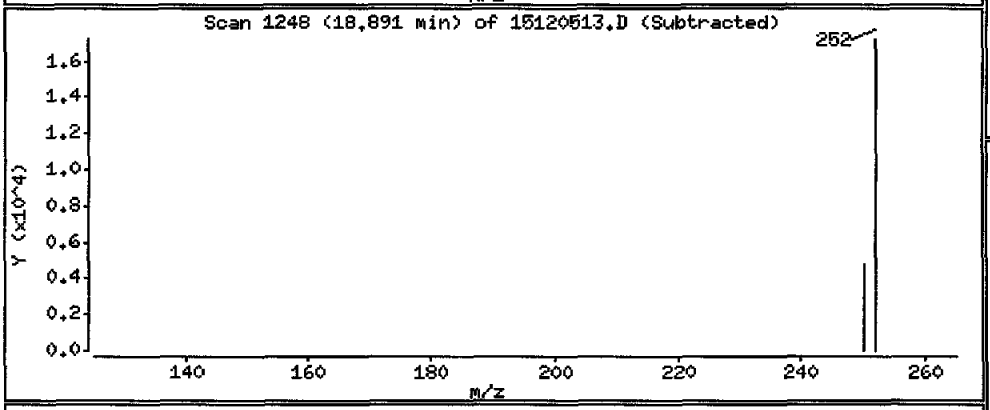
Column diameter: 0.25

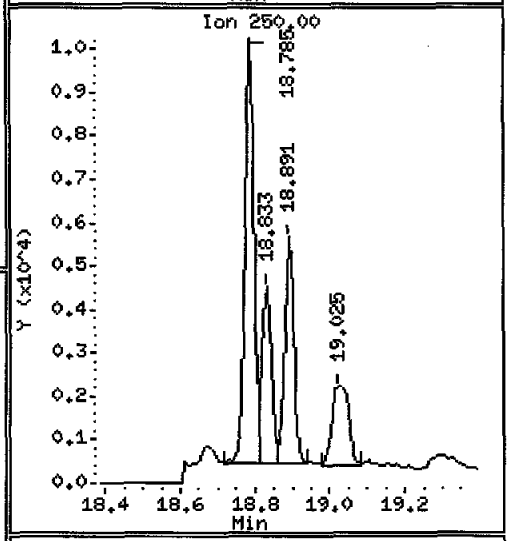
46 Benzo(j)fluoranthene

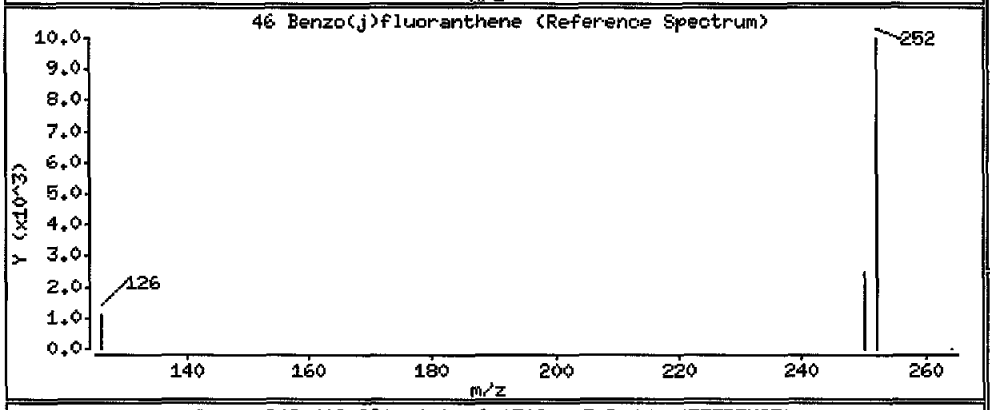
Concentration: 1760 ug/kg

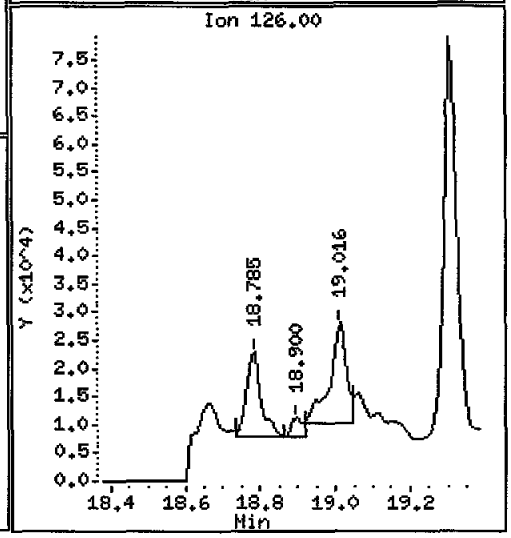


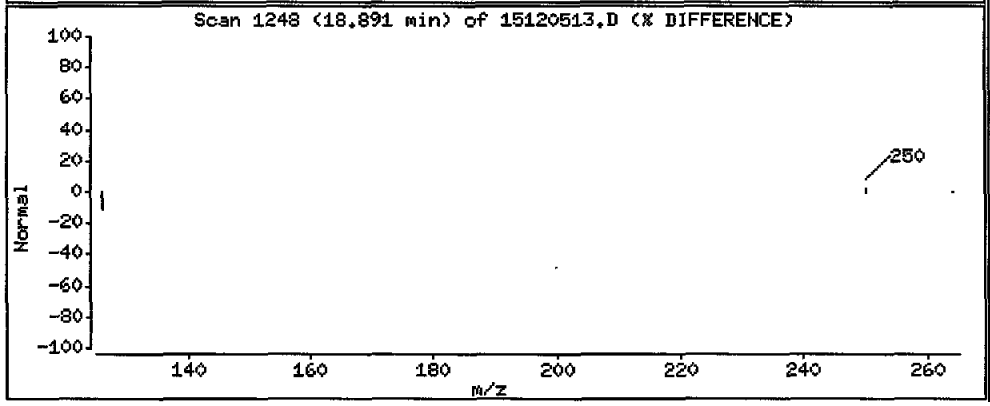












Data File: \\target\share\chem3\nt11.i\20151205.b\15120513.D

Date : 05-DEC-2015 16:16

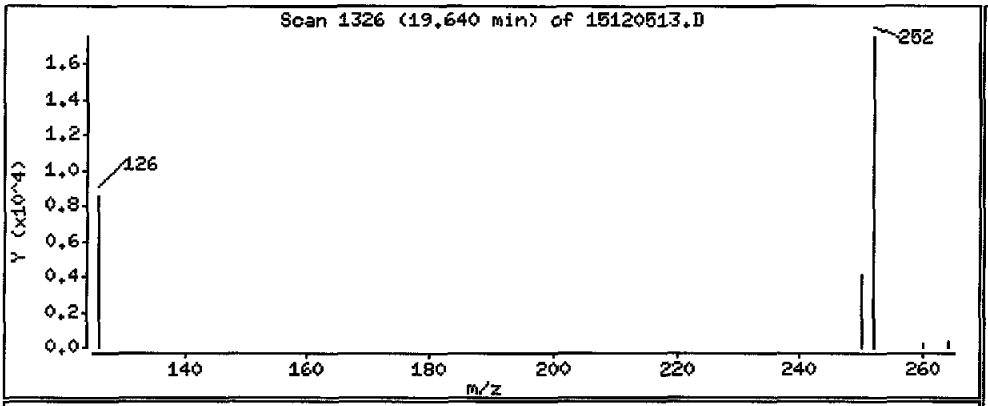
Client ID: PG-SMA2-3-PEMD-1511 Instrument: nt11.i

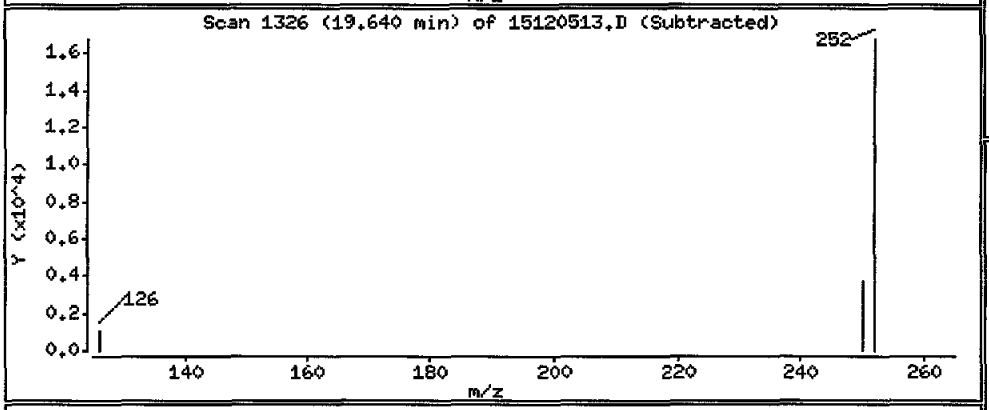
Sample Info: AQJ9L

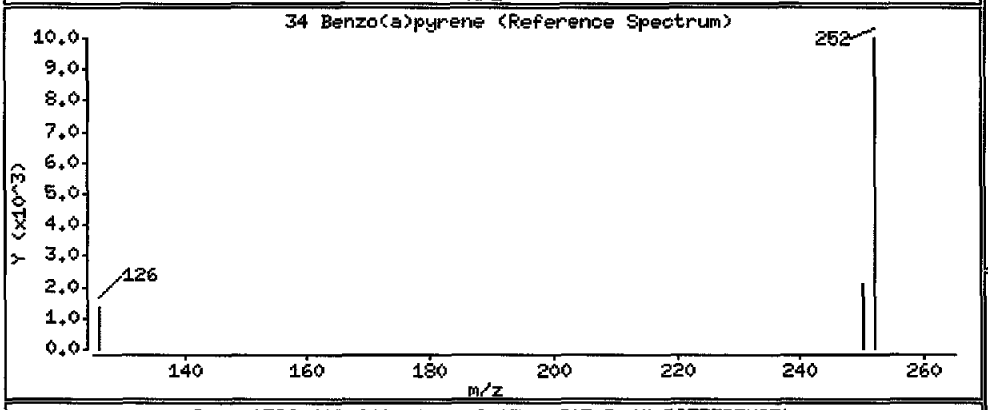
Volume Injected (uL): 2.0 Operator: JW

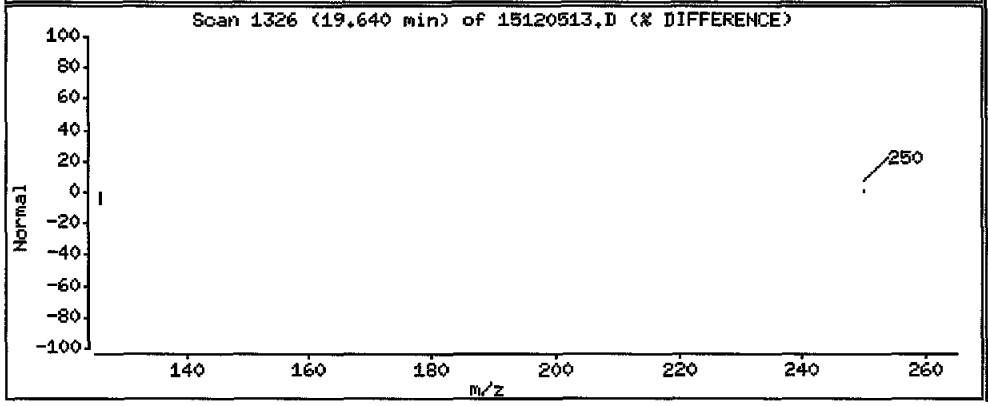
Column phase: Rxi-17Sil MS Column diameter: 0.25

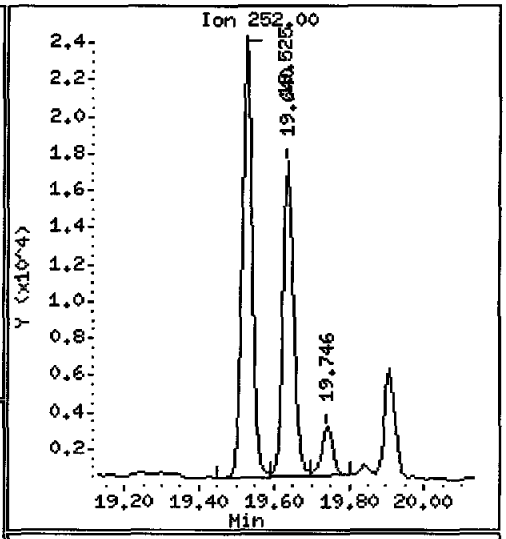
34 Benzo(a)pyrene Concentration: 1860 ug/kg

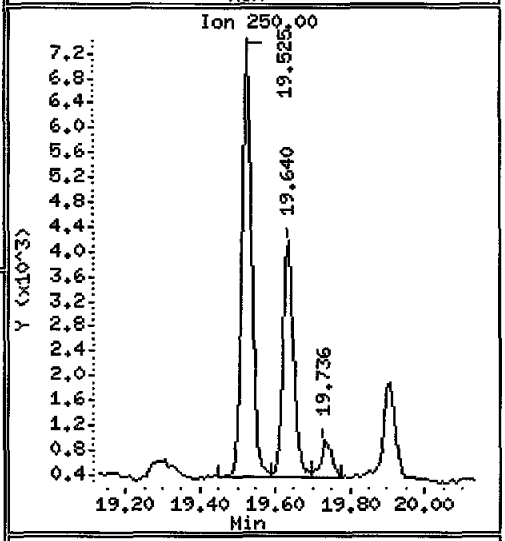


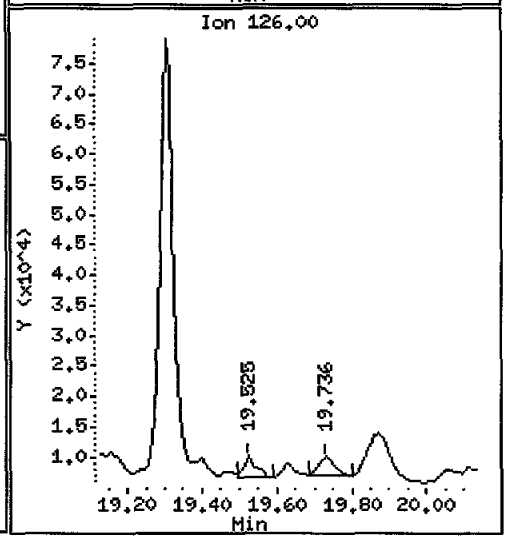












Data File: \\target\share\chem3\nt11.i\20151205.b\15120513.D

Date : 05-DEC-2015 16:16

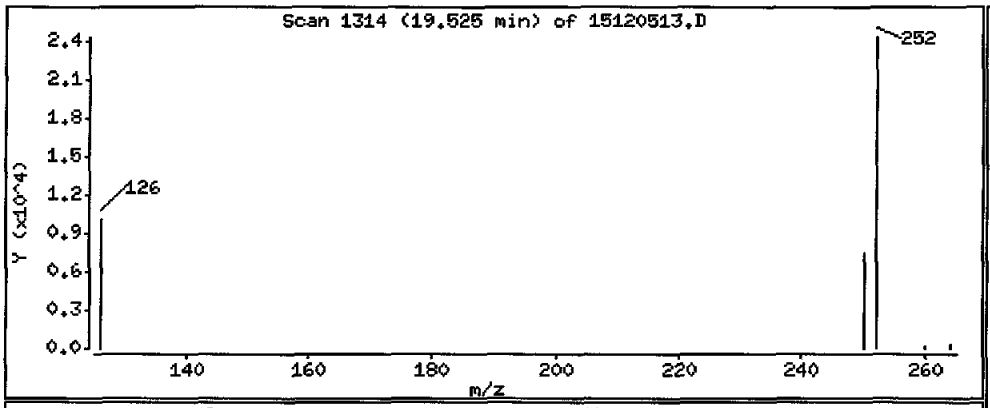
Client ID: PG-SMA2-3-PEMD-1511 Instrument: nt11.i

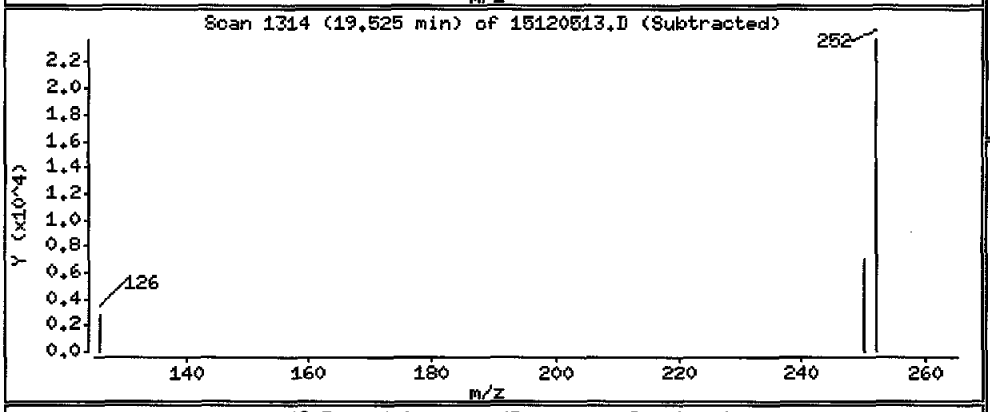
Sample Info: AQJ9L

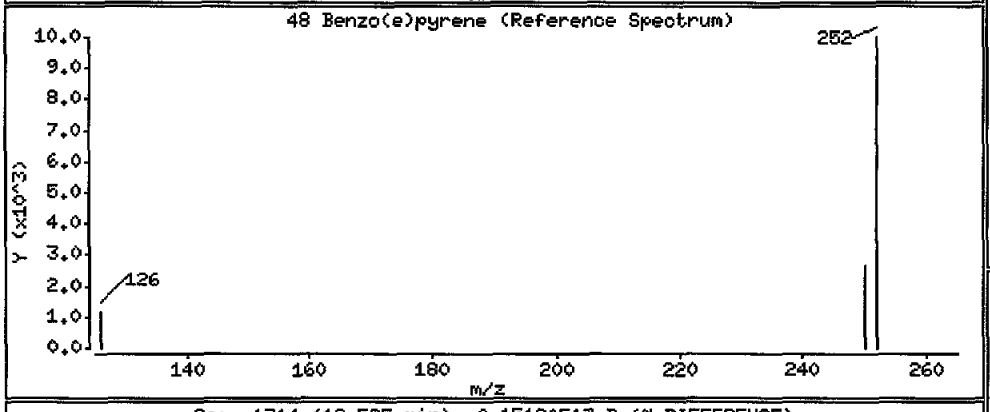
Volume Injected (uL): 2.0 Operator: JW

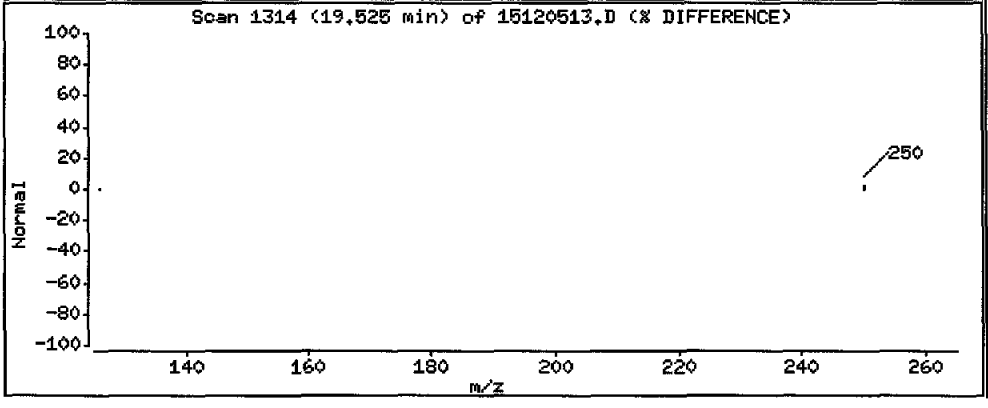
Column phase: Rxi-17Sil MS Column diameter: 0.25

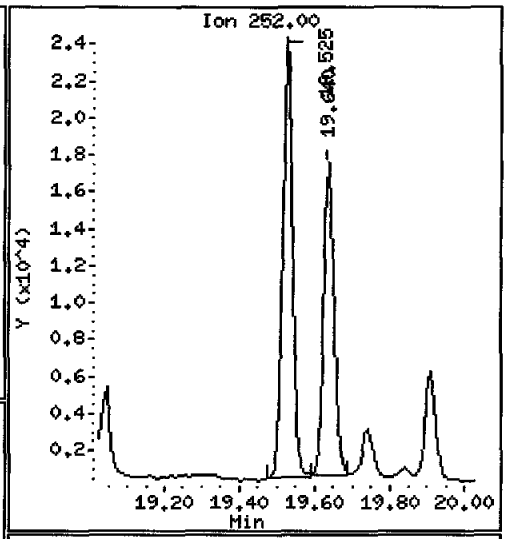
48 Benzo(e)pyrene Concentration: 2430 ug/kg

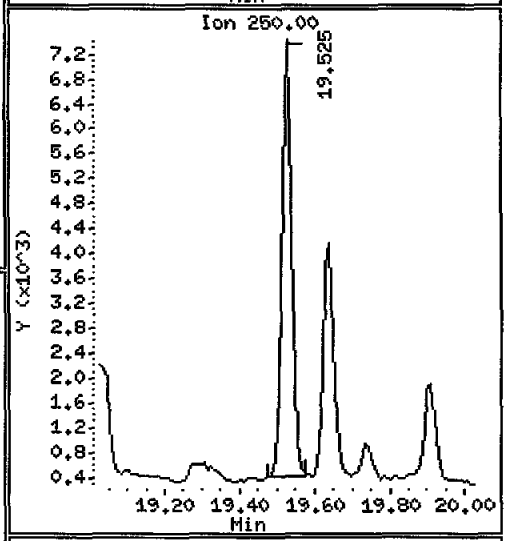


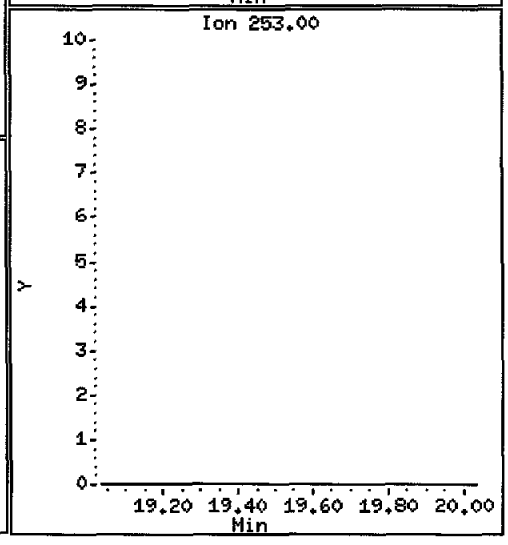












REVIEW SUMMARY FOR FILE - 15120513.D

Lab ID: AQJ9L
nt11.i, 20151205.b\lowsim.m, 05-DEC-2015 16:16

RT CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151205.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151205.b\15120514.D
Lab Smp Id: AQJ9M Client Smp ID: PG-SMA2-2-PEMD-1511
Inj Date : 05-DEC-2015 16:46 MS Autotune Date: 23-APR-2014 12:54
Operator : JW Inst ID: nt11.i
Smp Info : AQJ9M
Misc Info : 15-21400
Comment :
Method : \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Meth Date : 14-Dec-2015 10:43 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 14
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	100.000	Volume of final extract (uL)
Ws	0.89000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

SO 12/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)	
*	4 Naphthalene-d8	136	6.587	6.597	(1.000)	307876	200.000		
	5 Naphthalene	128	6.618	6.629	(1.005)	86533	48.6593	5470	B
$	6 2-Methylnaphthalene-d10	152	7.564	7.574	(1.148)	136541	119.483	13400	
	7 2-Methylnaphthalene	142	7.627	7.627	(1.158)	58503	47.8787	5380	
	8 1-Methylnaphthalene	142	7.879	7.889	(1.196)	35414	32.1604	3610	
	10 Acenaphthylene	152	9.434	9.445	(0.984)	23149	11.2209	1260	
*	11 Acenaphthene-d10	164	9.589	9.600	(1.000)	255620	200.000		
	12 Acenaphthene	153	9.656	9.656	(1.007)	198741	145.141	16300	
	14 Dibenzofuran	168	9.866	9.866	(1.029)	178089	86.3348	9700	
	15 Fluorene	166	10.486	10.486	(1.094)	312002	201.680	22700	
*	18 Phenanthrene-d10	188	12.269	12.269	(1.000)	411968	200.000		
	19 Phenanthrene	178	12.313	12.313	(1.004)	2633370	1060.97	119000	E
	20 Anthracene	178	12.368	12.368	(1.008)	377978	170.132	19100	
$	23 Fluoranthene-d10	212	14.375	14.374	(1.172)	417025	184.071	20700	
	24 Fluoranthene	202	14.403	14.403	(1.174)	2523155	1012.53	114000	E
	25 Pyrene	202	14.903	14.903	(0.876)	1610415	690.653	77600	
	28 Benzo(a)anthracene	228	16.926	16.918	(0.995)	204081	103.960	11700	
*	29 Chrysene-d12	240	17.017	17.017	(1.000)	294435	200.000		
	30 Chrysene	228	17.067	17.059	(1.003)	211370	98.1047	11000	
	44 Benzo(b)fluoranthene	252	18.794	18.784	(0.947)	48551	27.8585	3130	
	45 Benzo(k)fluoranthene	252	18.833	18.833	(0.949)	23456	11.5498	1300	

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)
46	Benzo(j)fluoranthene	252	18.890	18.890	(0.952)	24109	13.0321	1460
34	Benzo(a)pyrene	252	19.640	19.630	(0.990)	27518	16.3609	1840
* 35	Perylene-d12	264	19.842	19.841	(1.000)	257227	200.000	
$ 36	Dibenzo(a,h)anthracene-d14	292	22.208	22.208	(1.119)	158599	152.762	17200
37	Indeno(1,2,3-cd)pyrene	276	Compound Not Detected.					
38	Dibenzo(a,h)anthracene	278	Compound Not Detected.					
39	Benzo(g,h,i)perylene	276	Compound Not Detected.					
47	Perylene	252	Compound Not Detected.					
48	Benzo(e)pyrene	252	19.524	19.524	(0.984)	30933	17.5627	1970

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120514.D
Lab Smp Id: AQJ9M
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21400

Calibration Date: 05-DEC-2015
Calibration Time: 10:30
Client Smp ID: PG-SMA2-2-PEMD
Level: LOW
Sample Type: Tissue

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	307876	-6.11
11 Acenaphthene-d10	239179	119590	478358	255620	6.87
18 Phenanthrene-d10	372253	186127	744506	411968	10.67
29 Chrysene-d12	294711	147356	589422	294435	-0.09
35 Perylene-d12	260595	130298	521190	257227	-1.29

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.59	-0.16
11 Acenaphthene-d10	9.60	9.10	10.10	9.59	-0.11
18 Phenanthrene-d10	12.27	11.77	12.77	12.27	0.00
29 Chrysene-d12	17.02	16.52	17.52	17.02	0.00
35 Perylene-d12	19.84	19.34	20.34	19.84	0.00

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.

ARI Labs, Inc.

RECOVERY REPORT

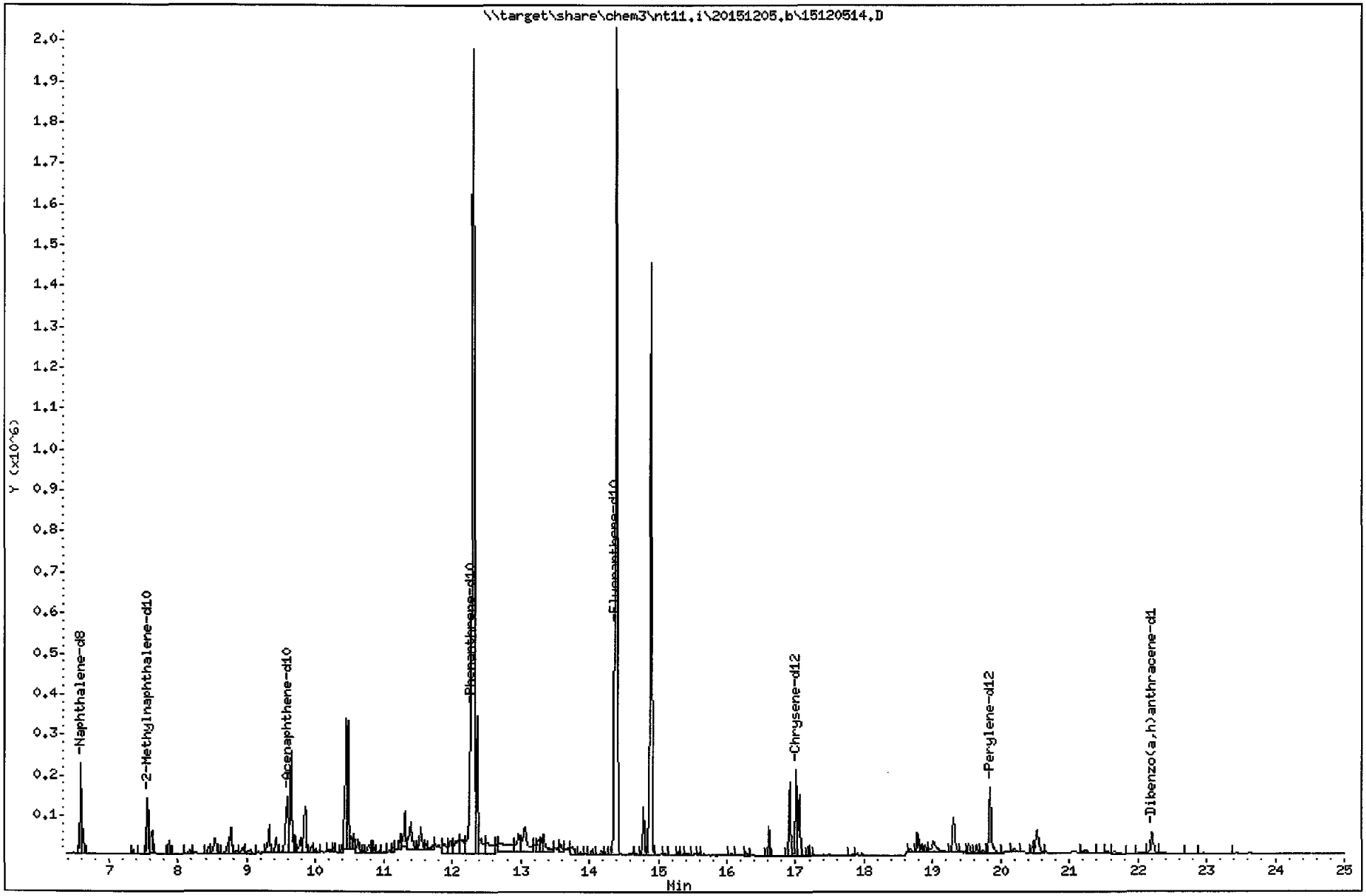
Client Name: Anchor QEA, LLC
Client SDG: AQJ9
Sample Matrix: SOLID
Fraction: SV
Lab Smp Id: AQJ9M
Client Smp ID: PG-SMA2-2-PEMD-1511
Level: LOW
Operator: JW
Data Type: MS DATA
SampleType: SAMPLE
SpikeList File: waterlcs.spk
Quant Type: ISTD
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21400

SURROGATE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
$ 6 2-Methylnaphthalen	33700	13400	39.83	30-160
$ 23 Fluoranthene-d10	33700	20700	61.36	30-160
$ 36 Dibenzo(a,h)anthra	33700	17200	50.92	30-160

Data File: \\target\share\chem3\nt11.i\20151205.b\15120514.D
Date : 05-DEC-2015 16:46
Client ID: PC-SMA2-2-PEMD-1511
Sample Info: AQJ9M
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: JW
Column diameter: 0.25

AQJ9:00031



Data File: \\target\share\chem3\nt11.i\20151205.b\15120514.D

Date : 05-DEC-2015 16:46

Client ID: PC-SMA2-2-PEMD-1511 Instrument: nt11.i

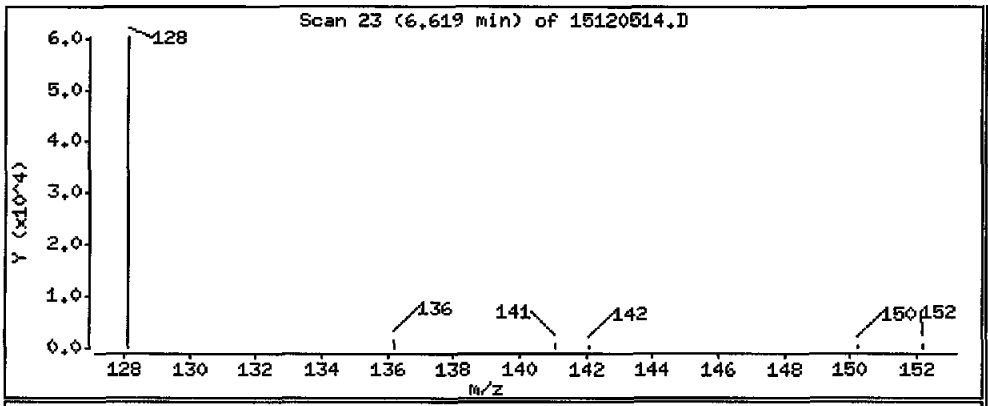
Sample Info: AQJ9M

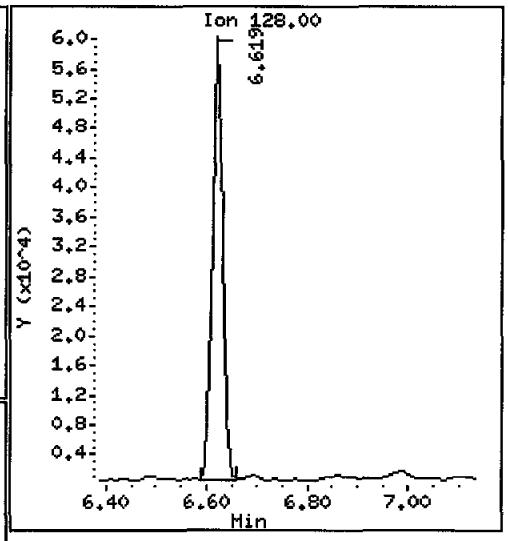
Volume Injected (uL): 2.0 Operator: JW

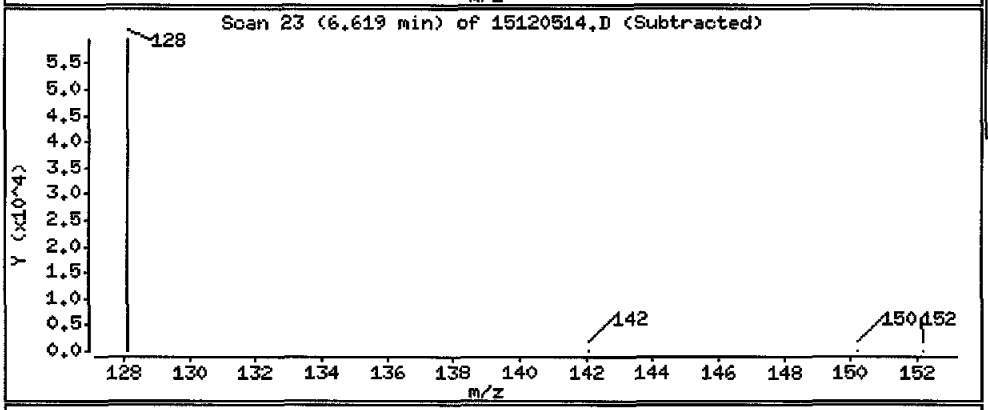
Column phase: Rxi-17Sil MS Column diameter: 0.25

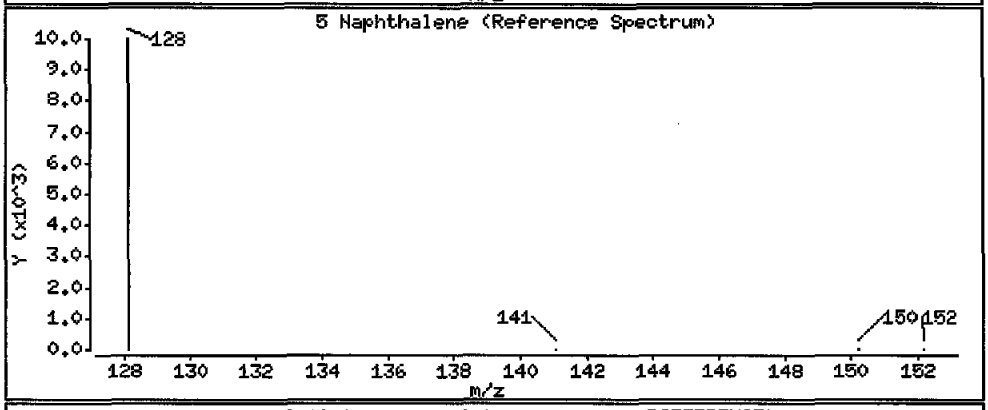
5 Naphthalene Concentration: 5470 ug/kg

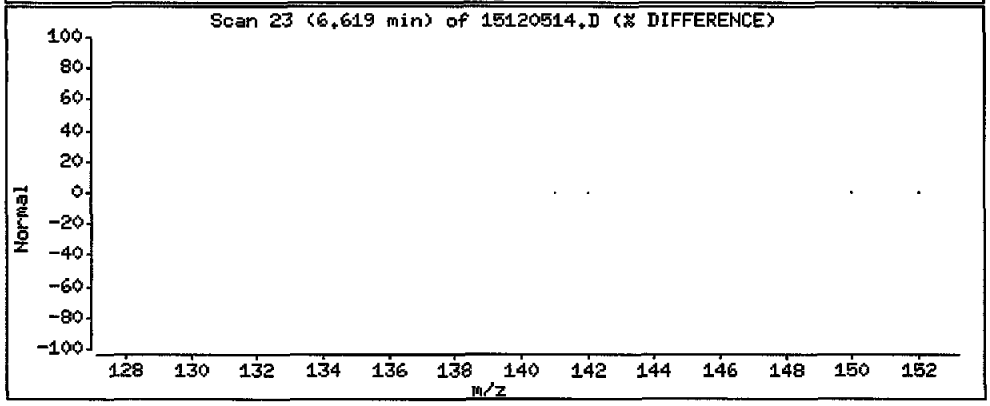
B











Data File: \\target\share\chem3\nt11.i\20151205.b\15120514.D

Date : 05-DEC-2015 16:46

Client ID: PC-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M

Volume Injected (uL): 2.0

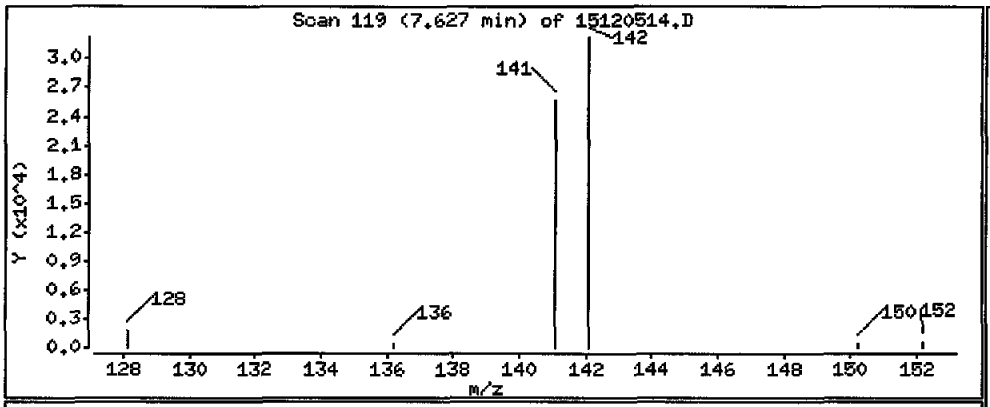
Operator: JW

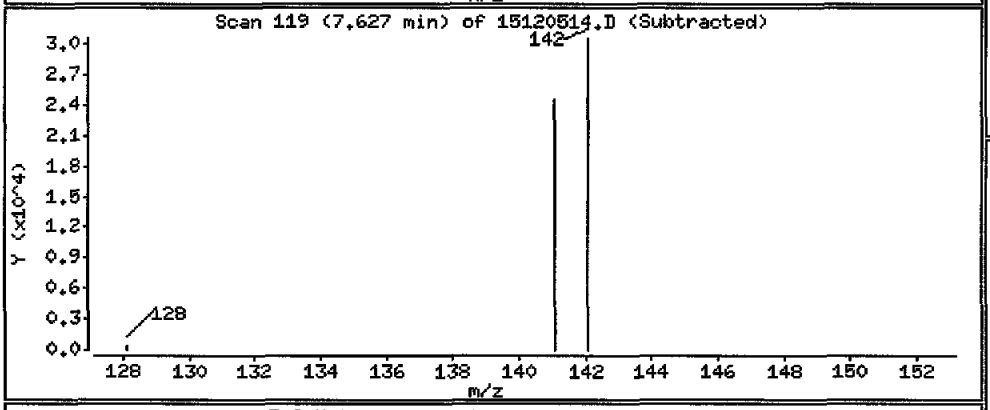
Column phase: Rxi-17Sil MS

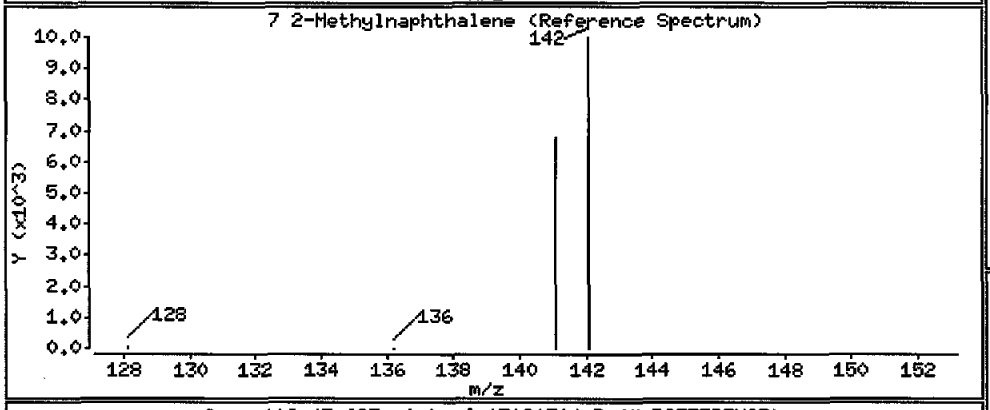
Column diameter: 0.25

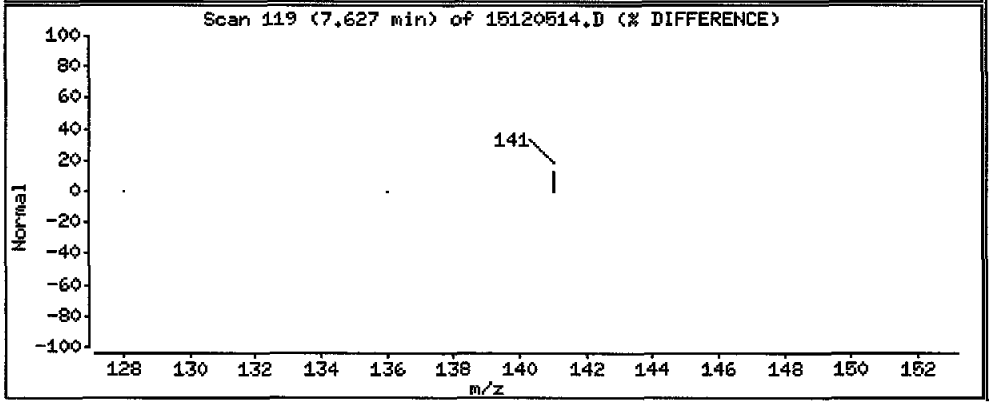
7 2-Methylnaphthalene

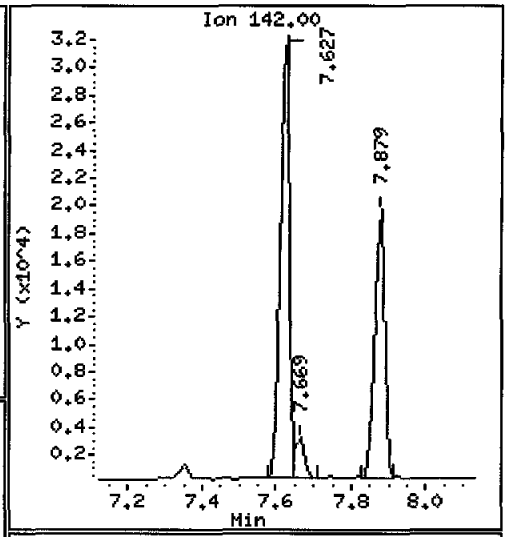
Concentration: 5380 ug/kg

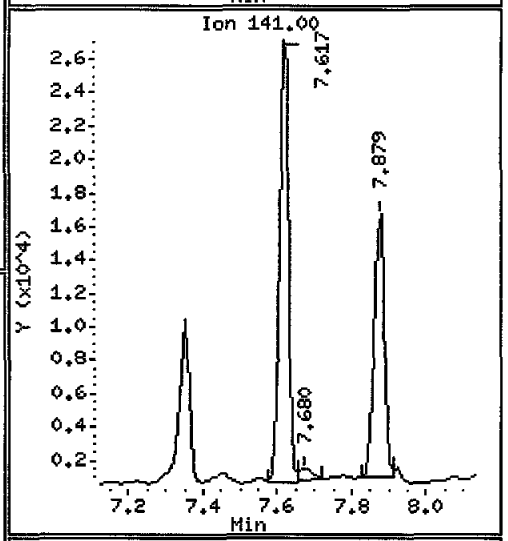


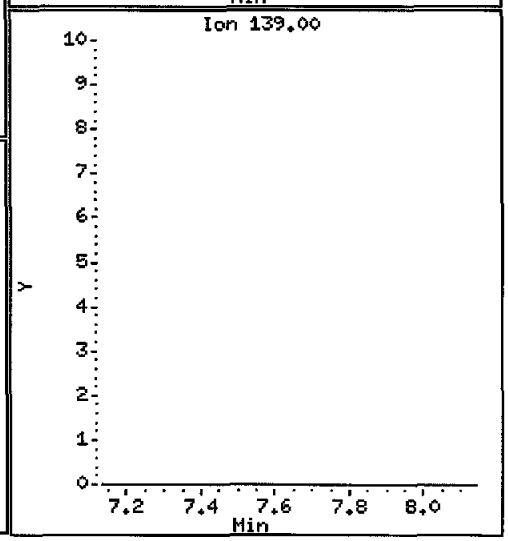












Data File: \\target\share\chem3\nt11.i\20151205.b\15120514.D

Date : 05-DEC-2015 16:46

Client ID: PG-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M

Volume Injected (uL): 2.0

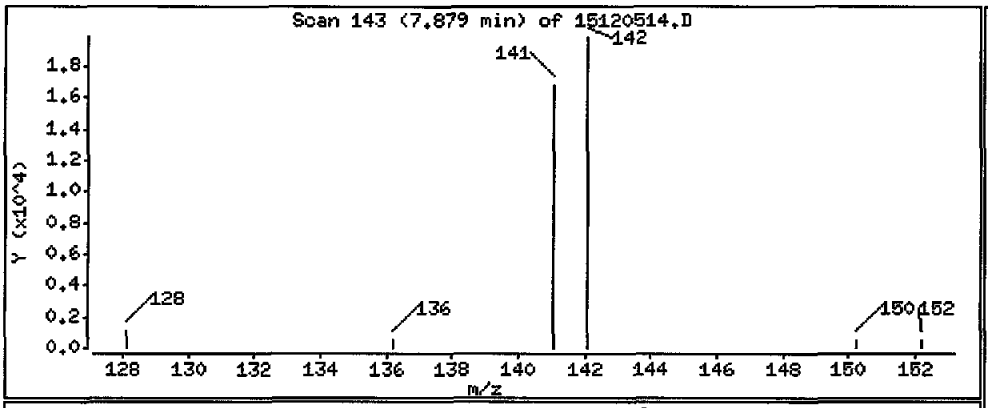
Operator: JW

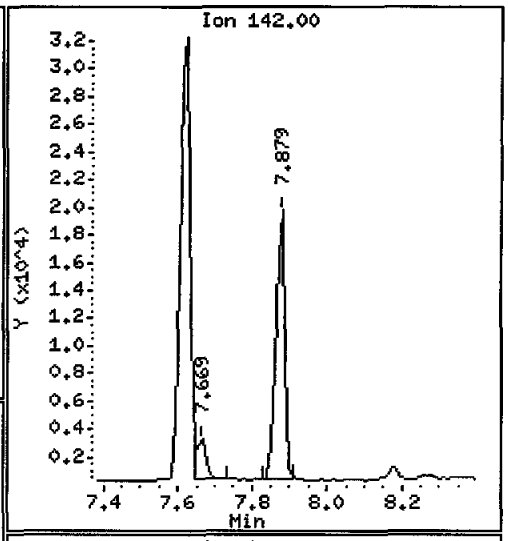
Column phase: Rxi-17Sil MS

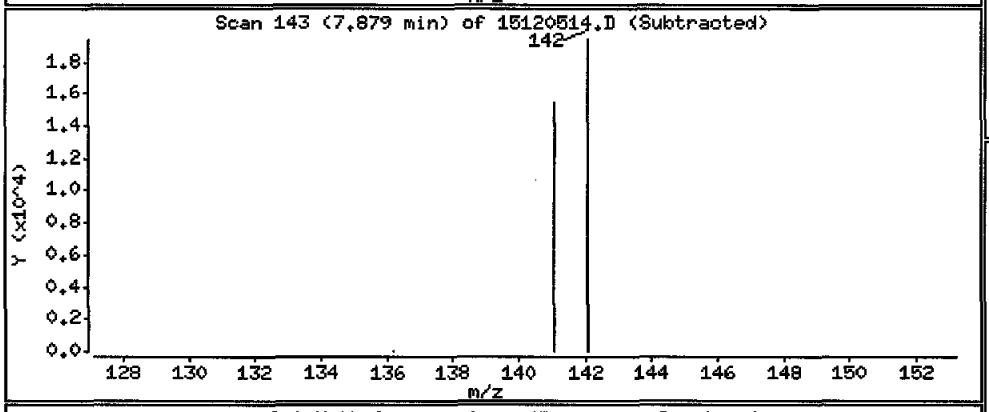
Column diameter: 0.25

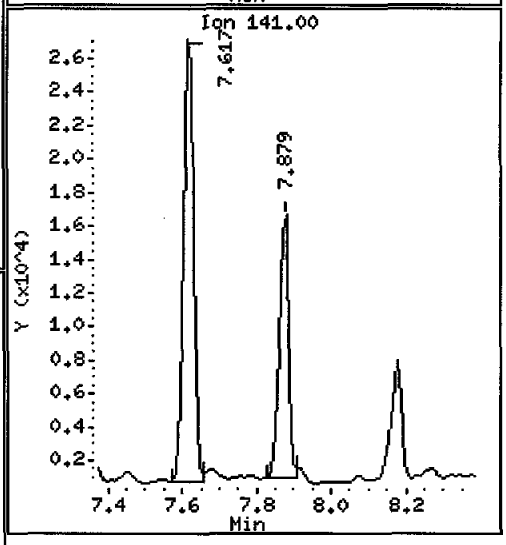
8 1-Methylnaphthalene

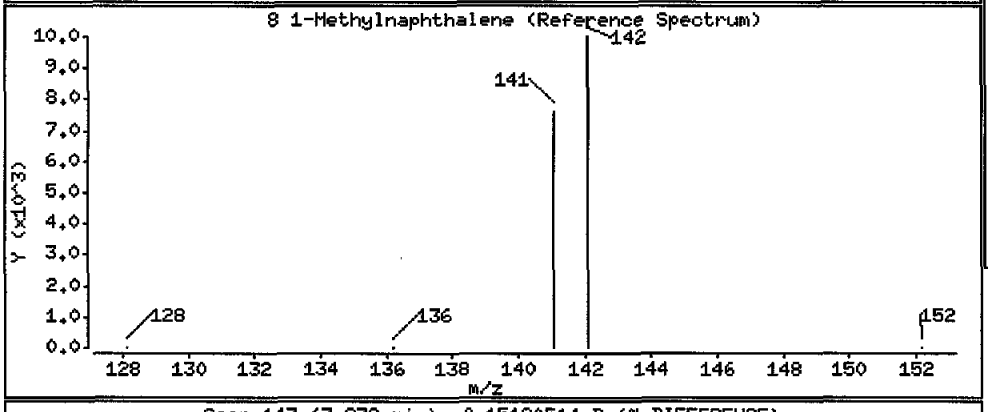
Concentration: 3610 ug/kg

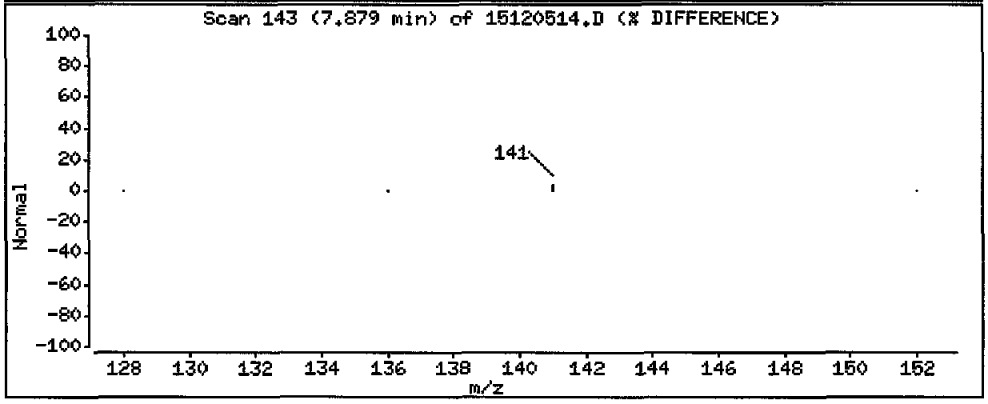












Data File: \\target\share\chem3\nt11.i\20151205.b\15120514.D

Date : 05-DEC-2015 16:46

Client ID: PG-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M

Volume Injected (uL): 2.0

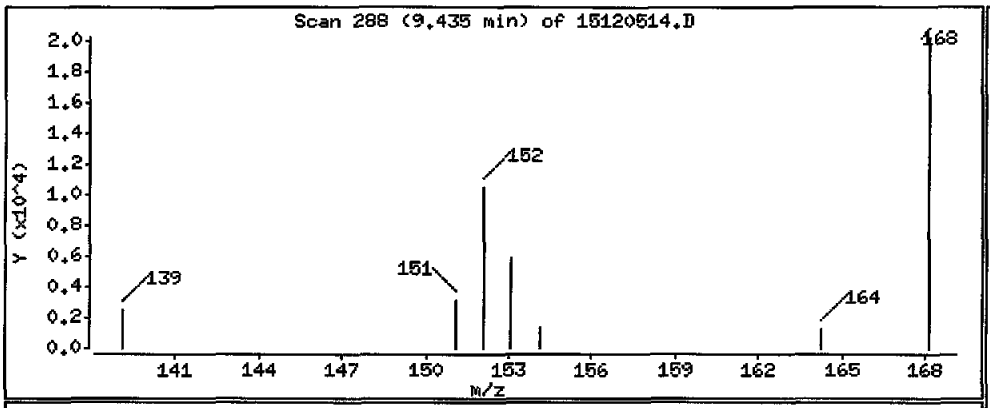
Operator: JW

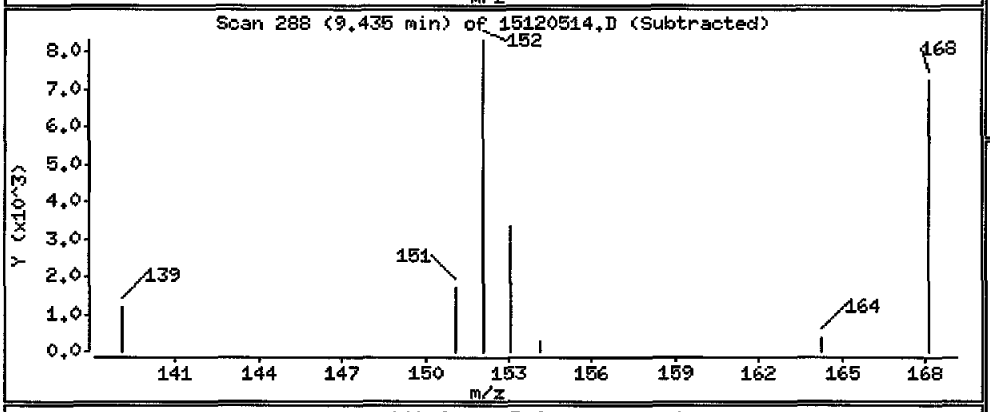
Column phase: Rxi-17Sil MS

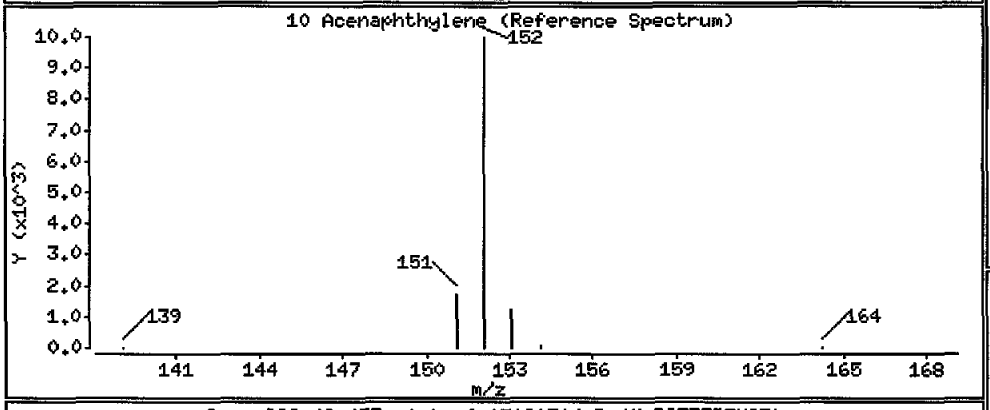
Column diameter: 0.25

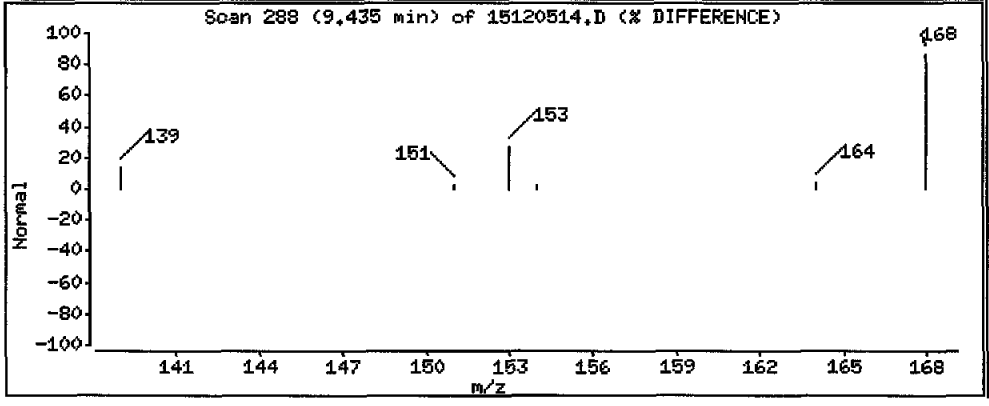
10 Acenaphthylene

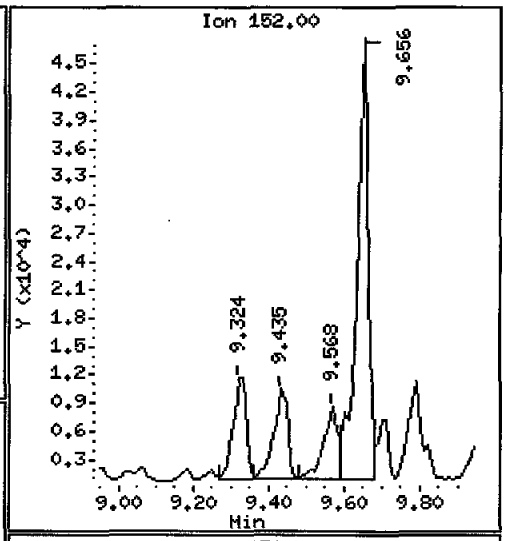
Concentration: 1260 ug/kg

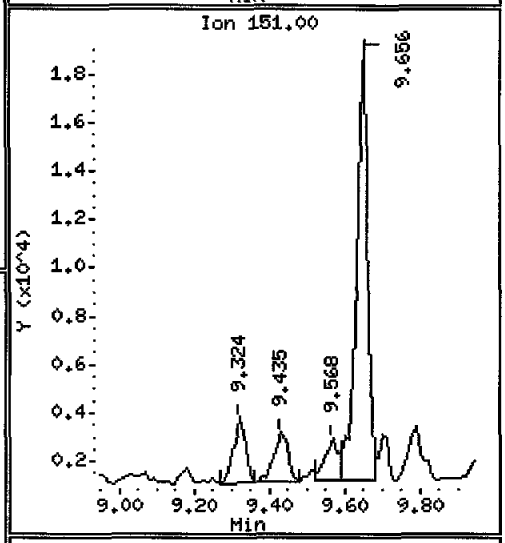


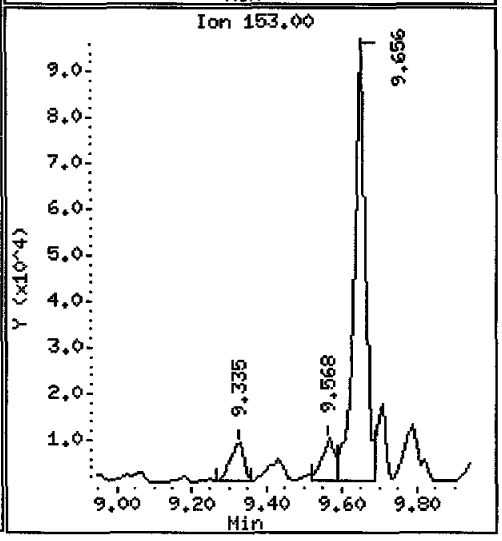












Data File: \\target\share\chem3\nt11.i\20151205.b\15120514.D

Date : 05-DEC-2015 16:46

Client ID: PG-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M

Volume Injected (uL): 2.0

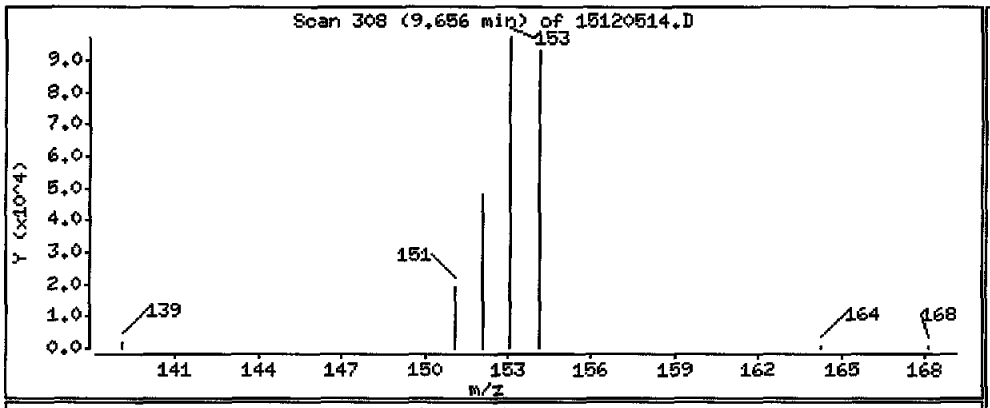
Operator: JW

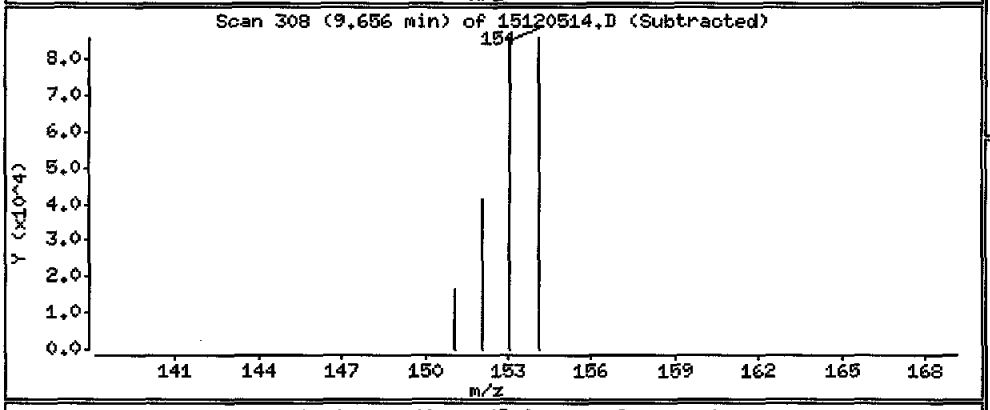
Column phase: Rxi-17Sil MS

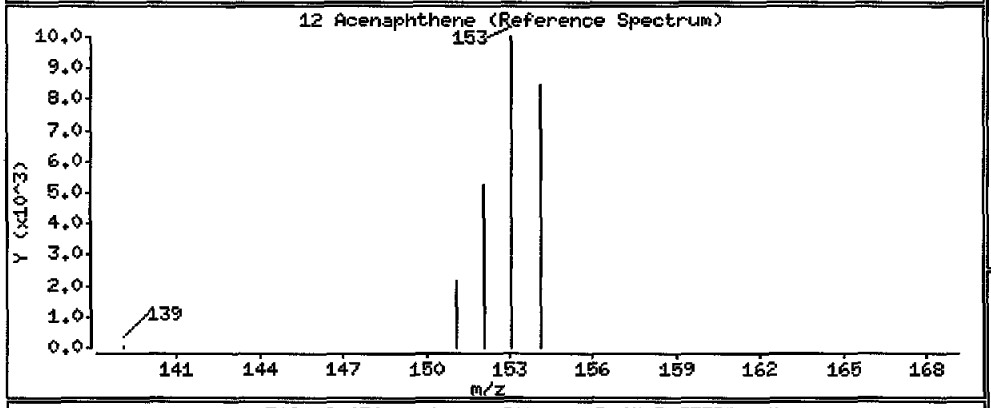
Column diameter: 0.25

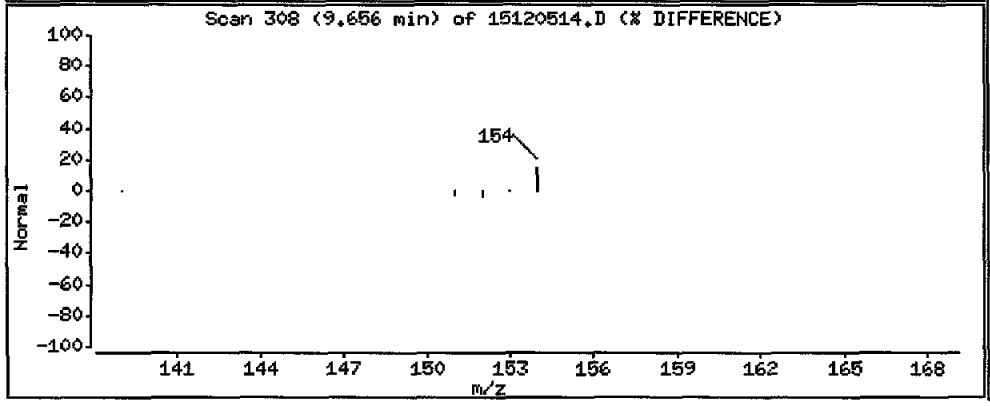
12 Acenaphthene

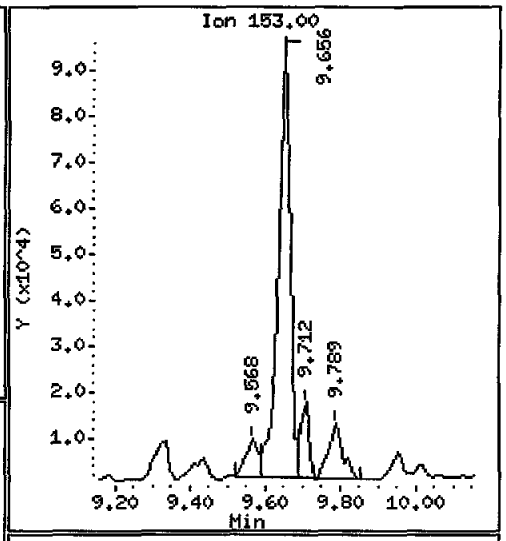
Concentration: 16300 ug/kg

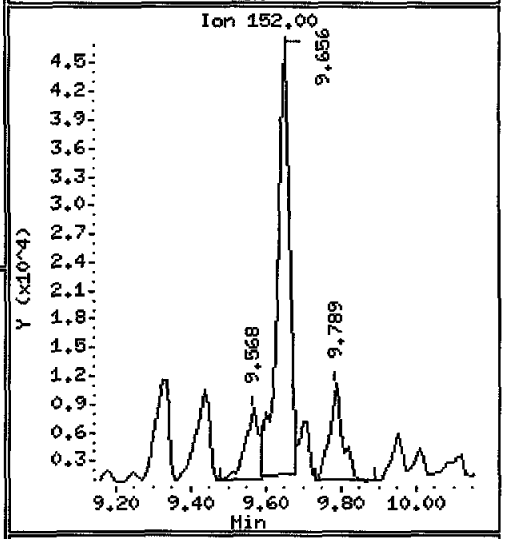


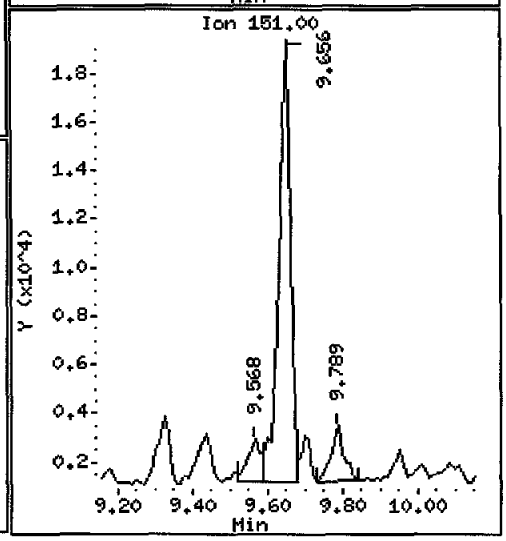












Data File: \\target\share\chem3\nt11.i\20151205.b\15120514.D

Date : 05-DEC-2015 16:46

Client ID: PG-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M

Volume Injected (uL): 2.0

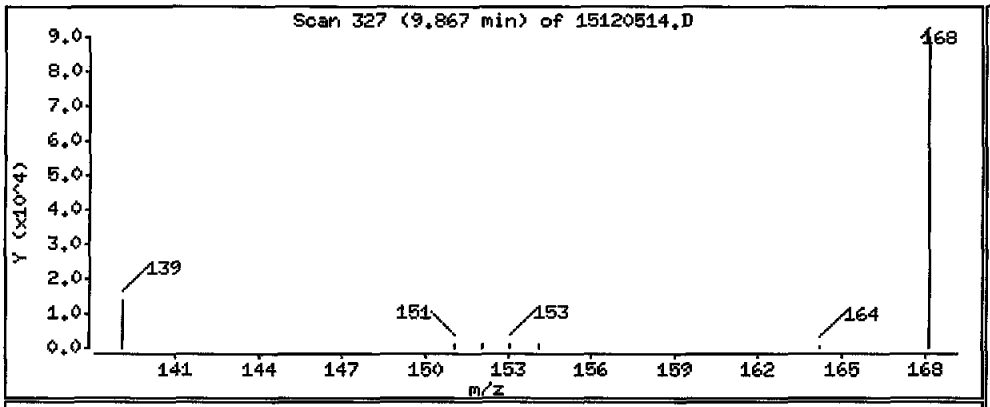
Operator: JW

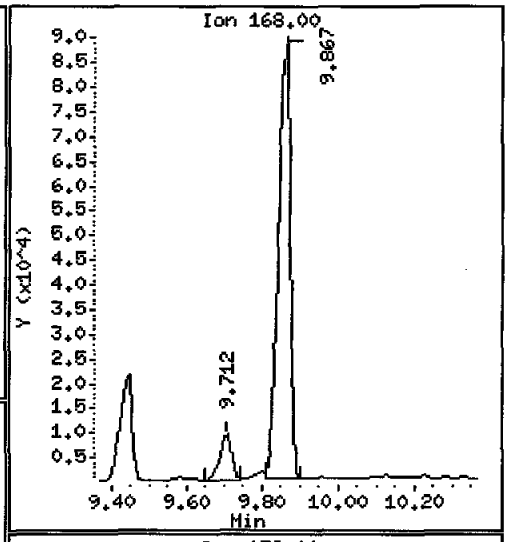
Column phase: Rxi-17Sil MS

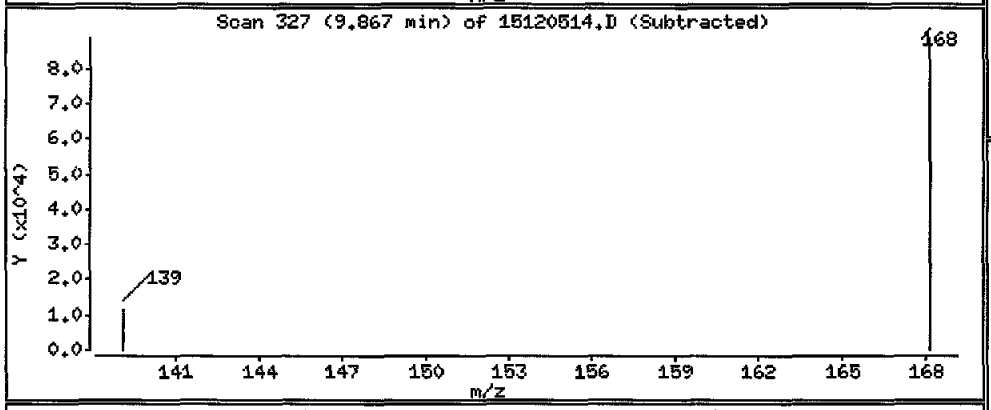
Column diameter: 0.25

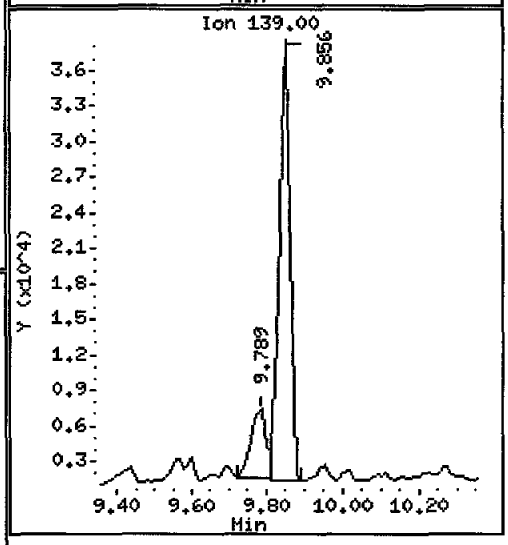
14 Dibenzofuran

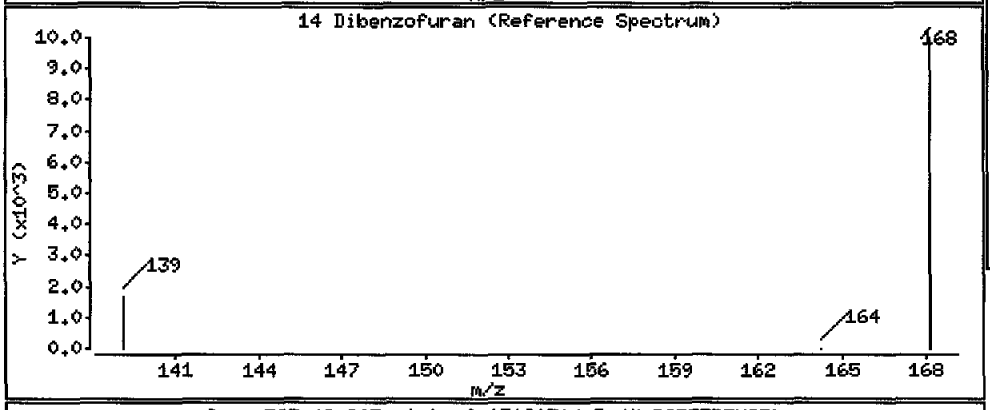
Concentration: 9700 ug/kg

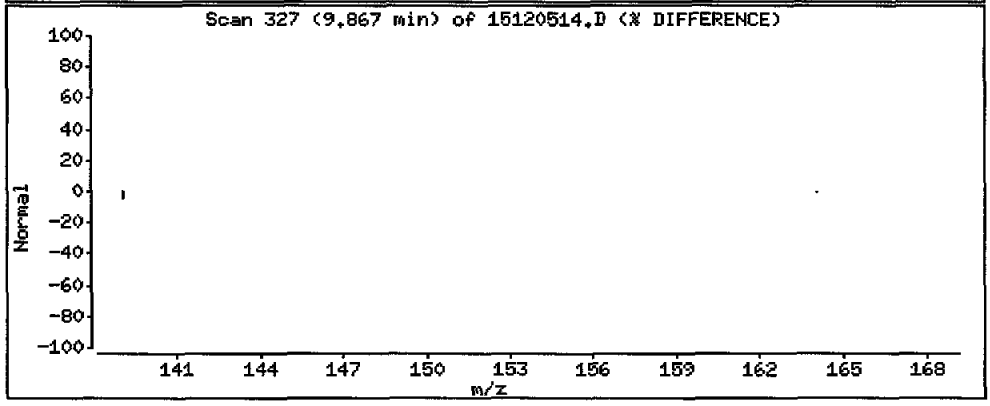












Data File: \\target\share\chem3\nt11.i\20151205.b\15120514.D

Date : 05-DEC-2015 16:46

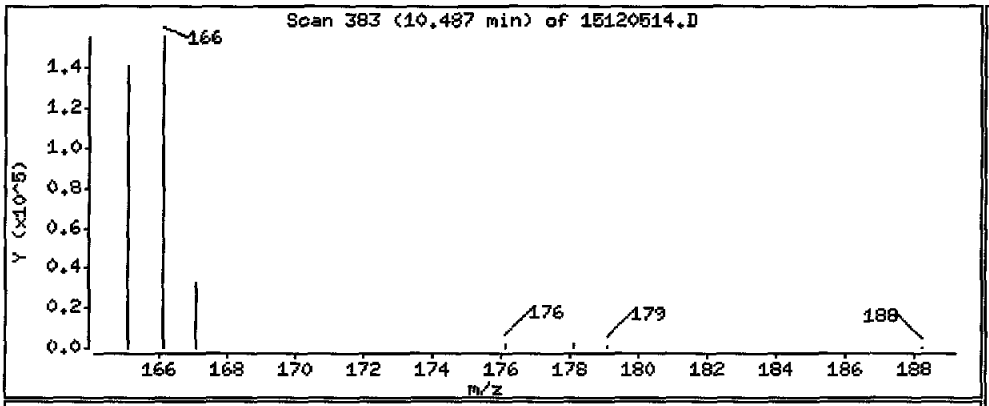
Client ID: PG-SMA2-2-PEMD-1511 Instrument: nt11.i

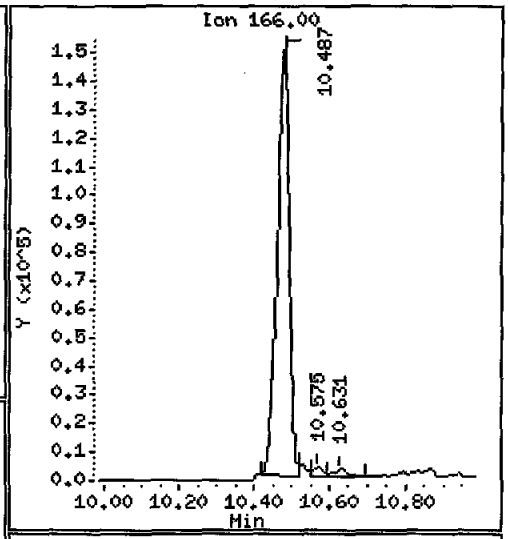
Sample Info: AQJ9M

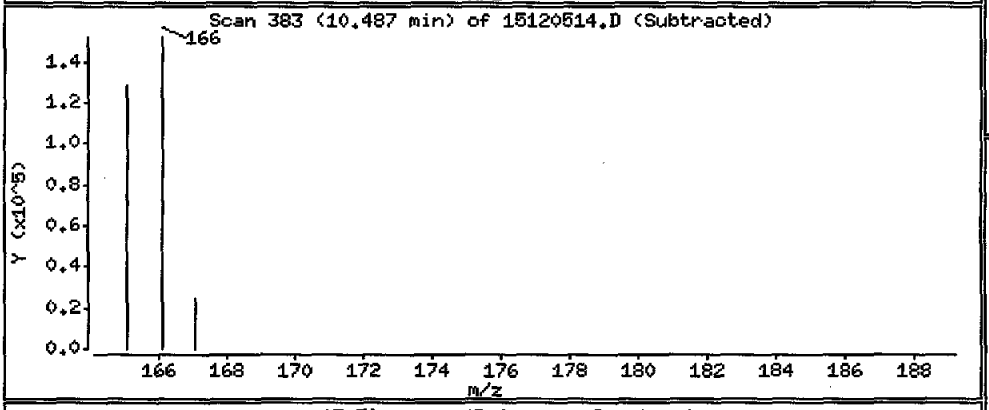
Volume Injected (uL): 2.0 Operator: JW

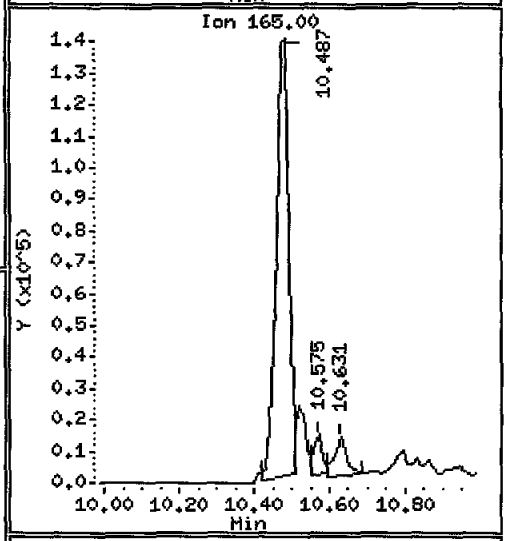
Column phase: Rxi-17Sil MS Column diameter: 0.25

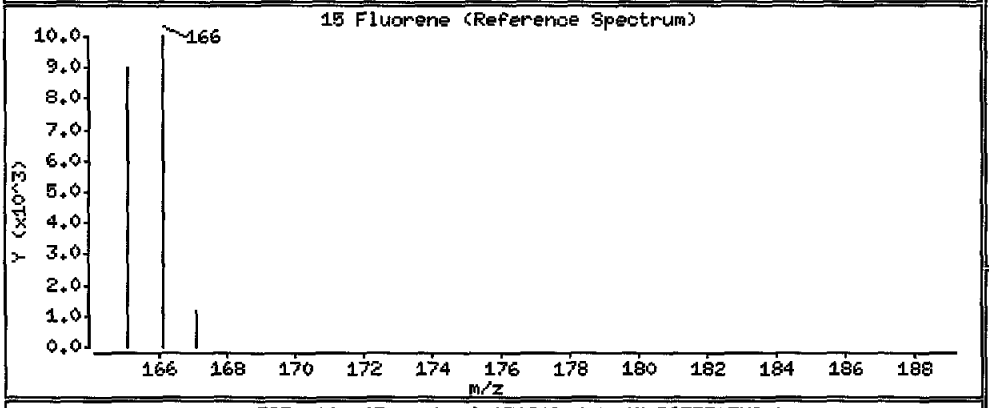
15 Fluorene Concentration: 22700 ug/kg

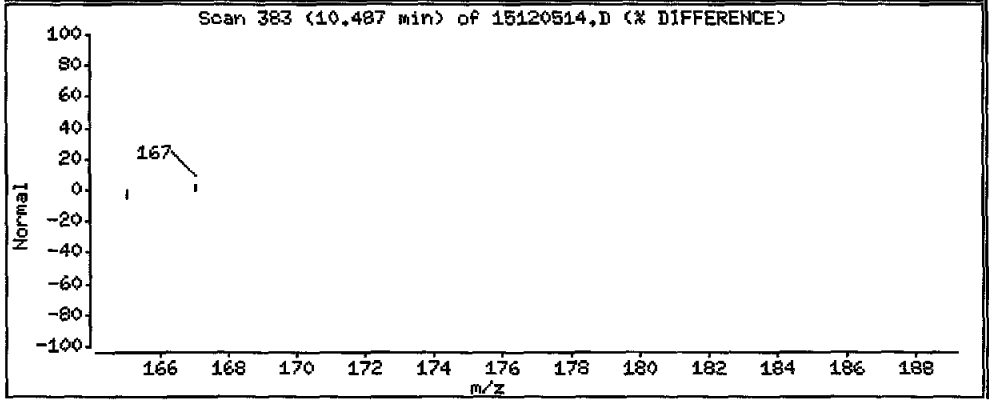


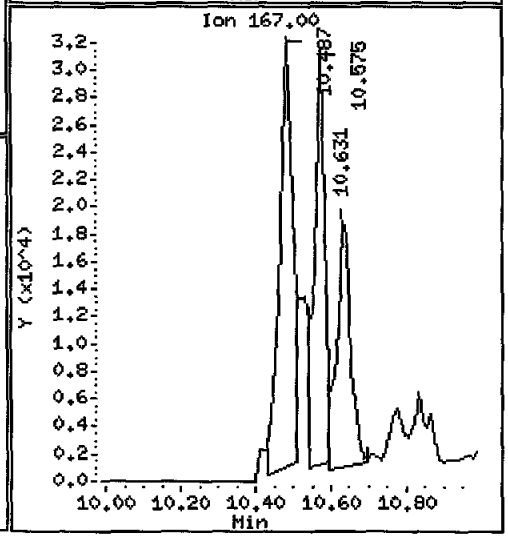












Data File: \\target\share\chem3\nt11.i\20151205.b\15120514.D

Date : 05-DEC-2015 16:46

Client ID: PG-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M

Volume Injected (uL): 2.0

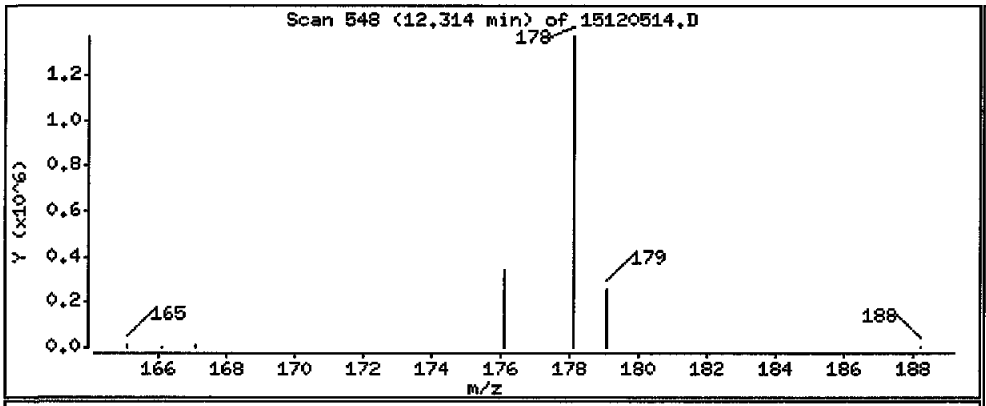
Operator: JW

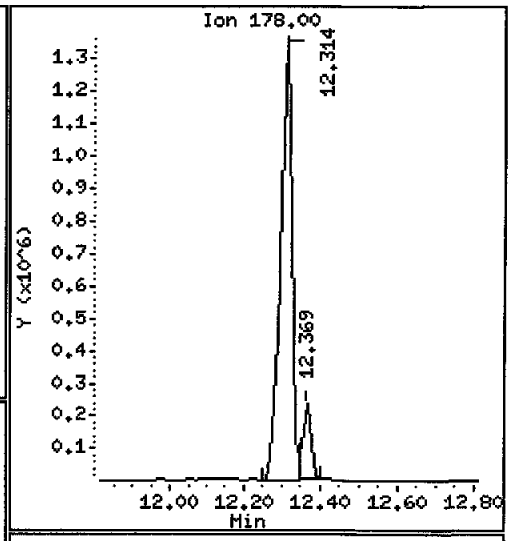
Column phase: Rxi-17Sil MS

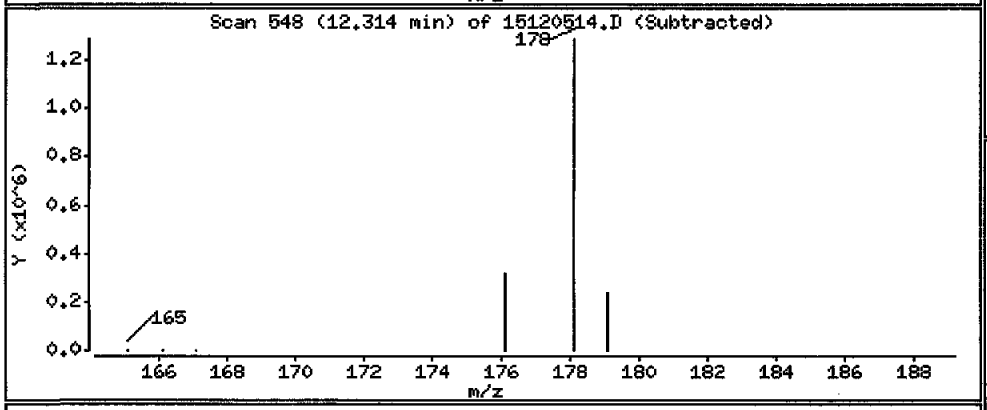
Column diameter: 0.25

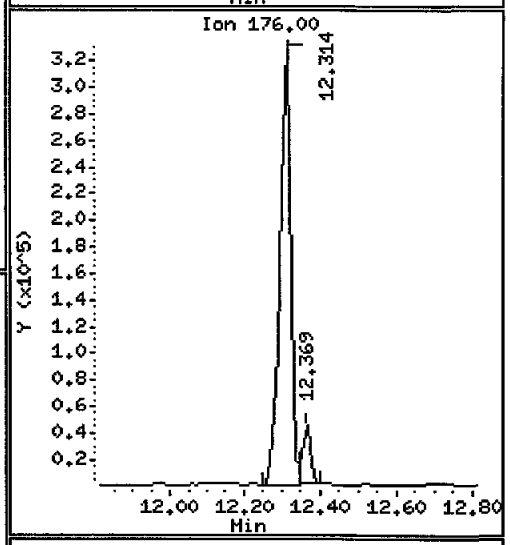
19 Phenanthrene

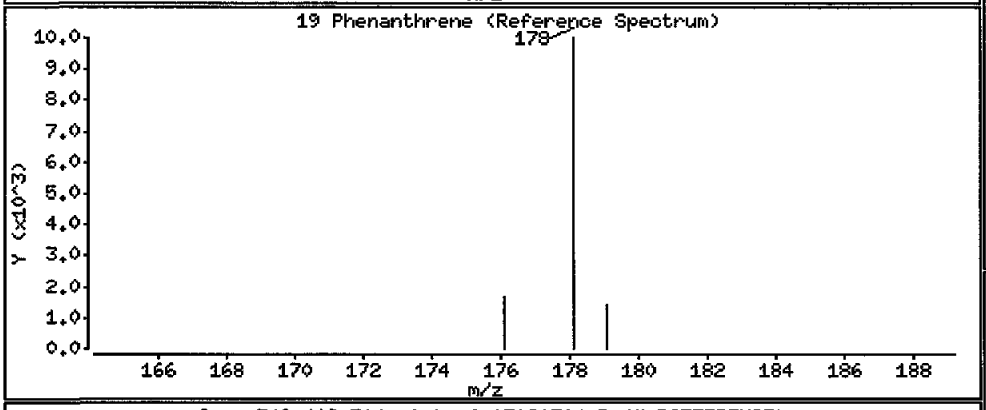
Concentration: 119000 ug/kg

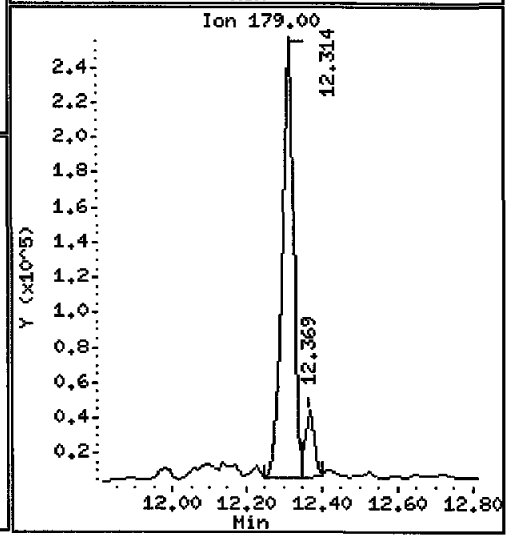


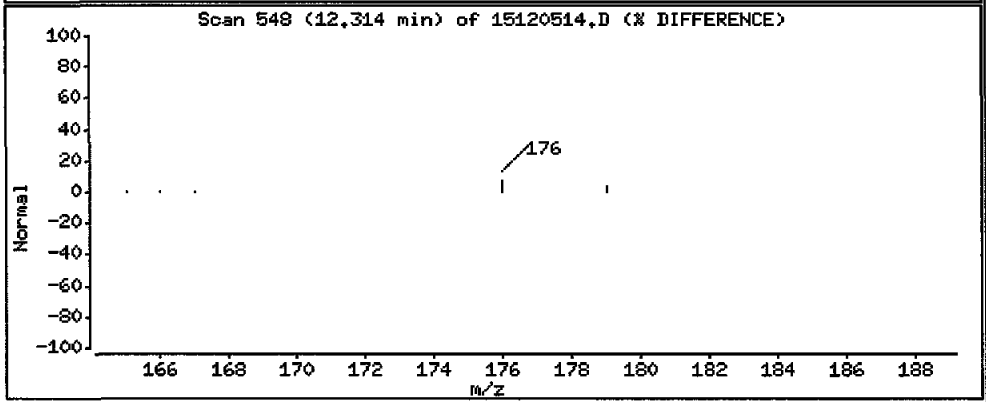












Data File: \\target\share\chem3\nt11.i\20151205.b\15120514.D

Date : 05-DEC-2015 16:46

Client ID: PG-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M

Volume Injected (uL): 2.0

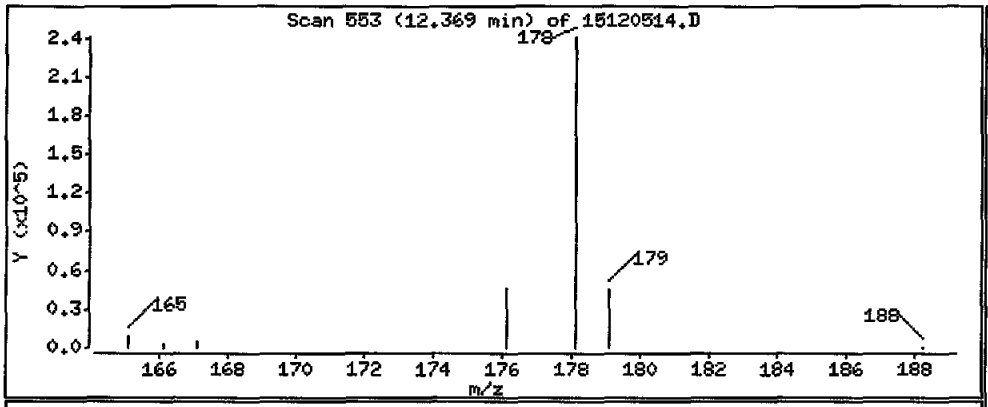
Operator: JW

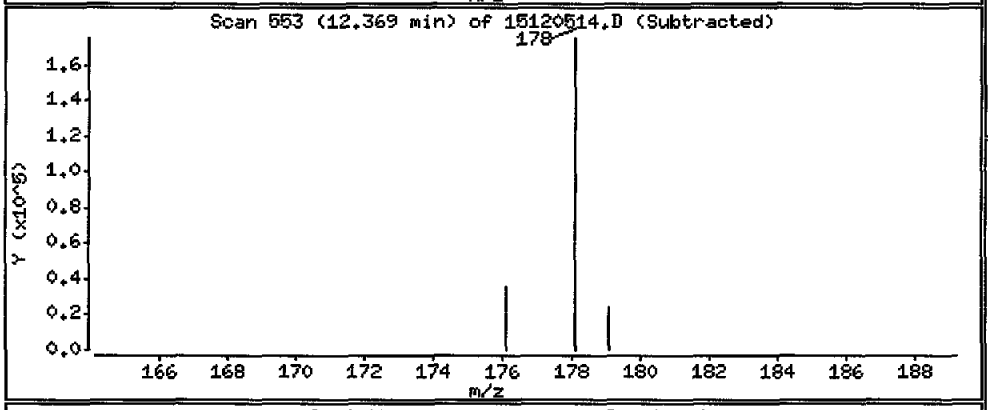
Column phase: Rxi-17Sil MS

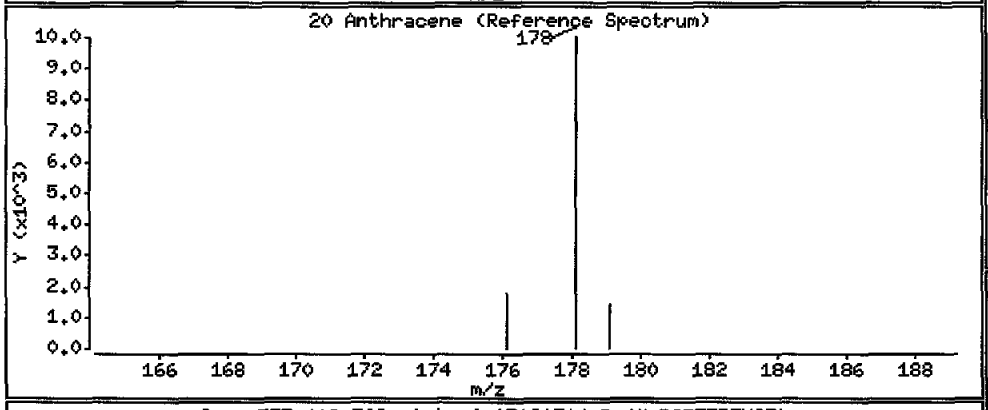
Column diameter: 0.25

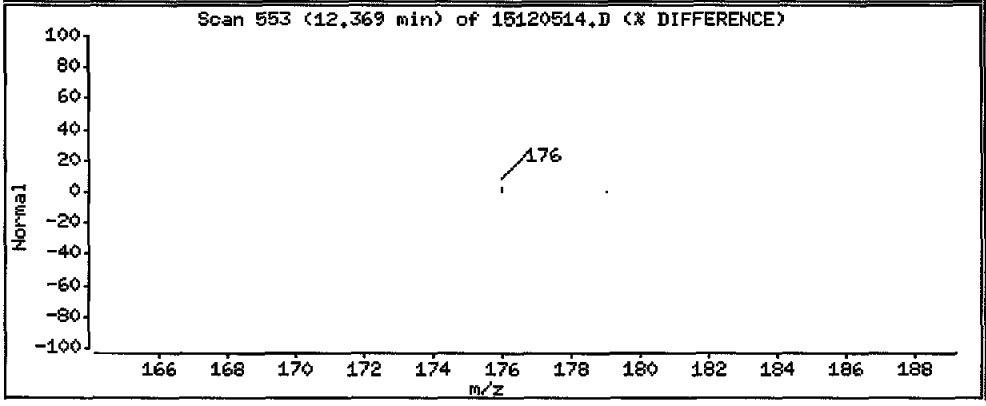
20 Anthracene

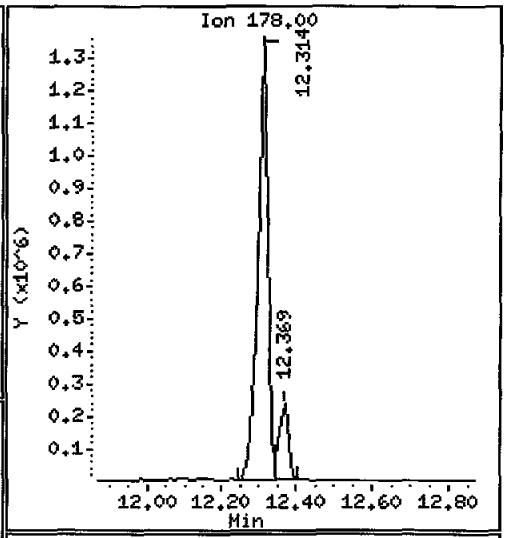
Concentration: 19100 ug/kg

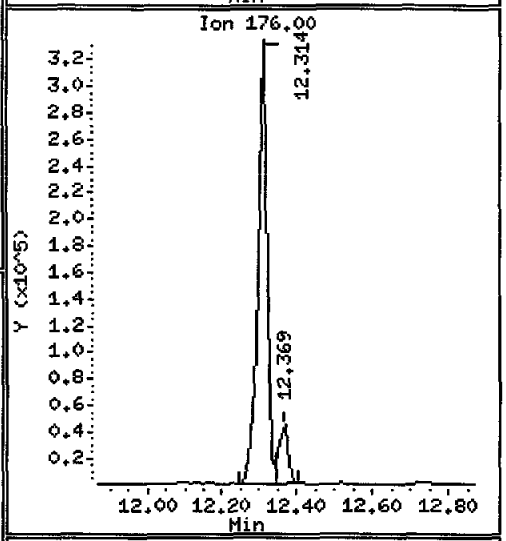


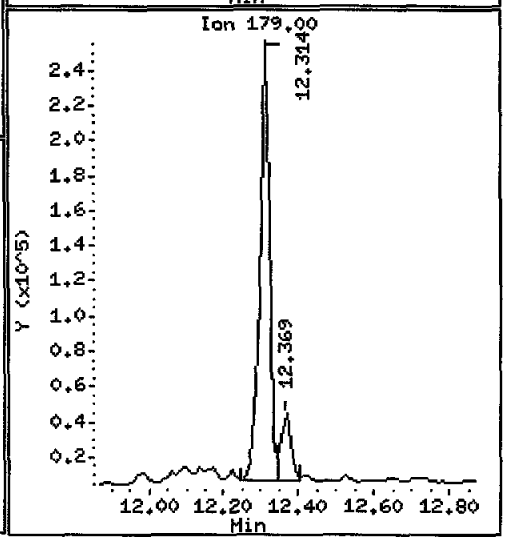












Data File: \\target\share\chem3\nt11.i\20151205.b\15120514.D

Date : 05-DEC-2015 16:46

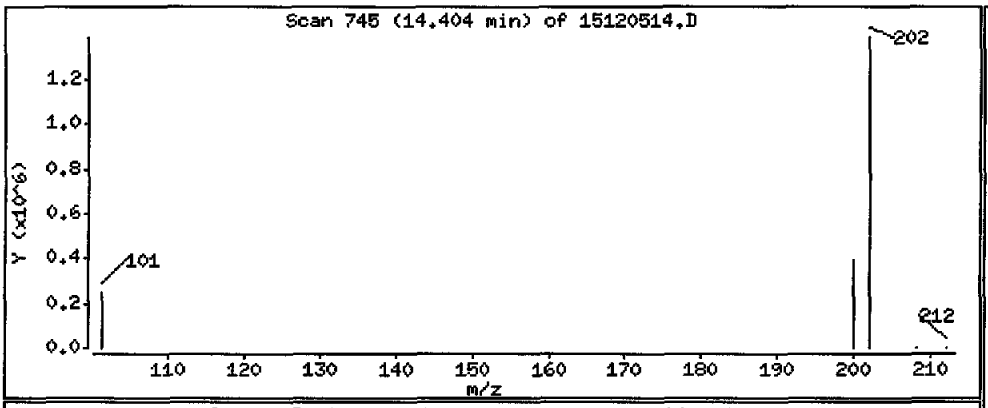
Client ID: PG-SMA2-2-PEMD-1511 Instrument: nt11.i

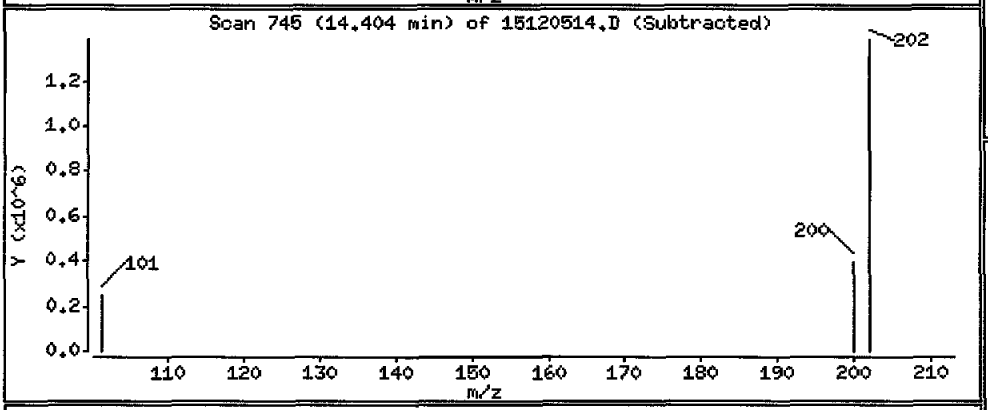
Sample Info: AQJ9M

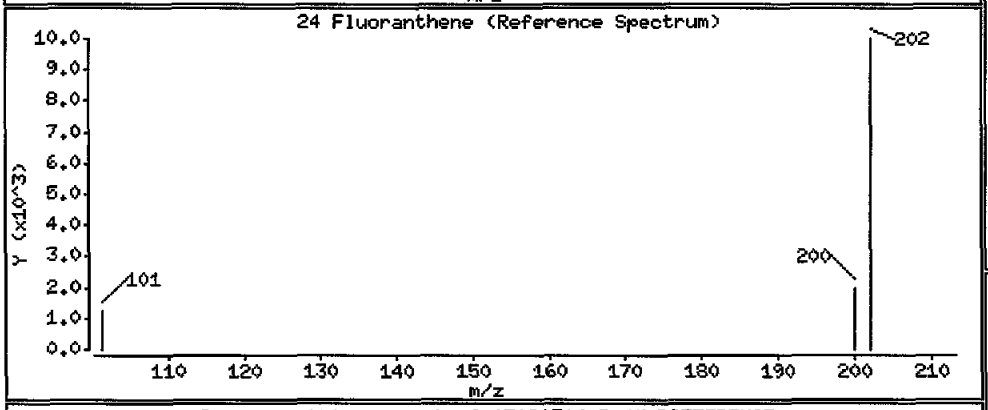
Volume Injected (uL): 2.0 Operator: JW

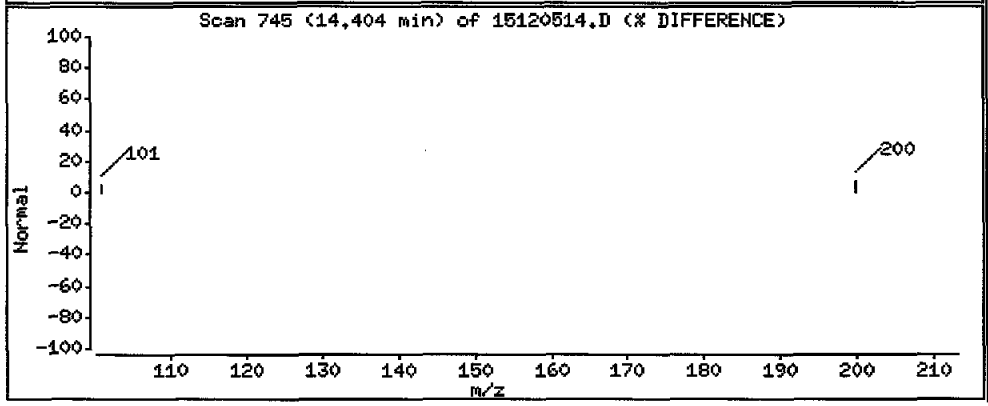
Column phase: Rxi-17Sil MS Column diameter: 0.25

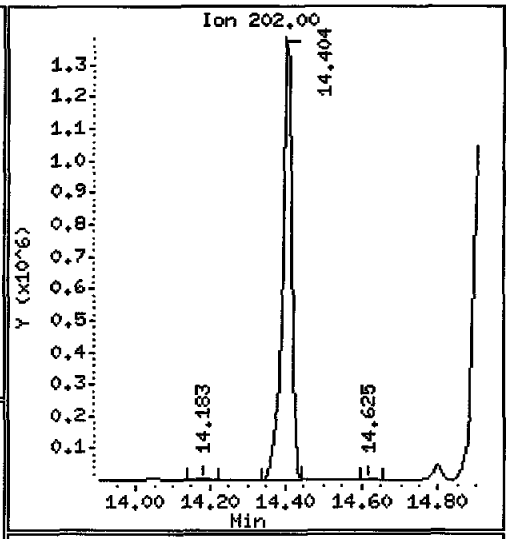
24 Fluoranthene Concentration: 114000 ug/kg

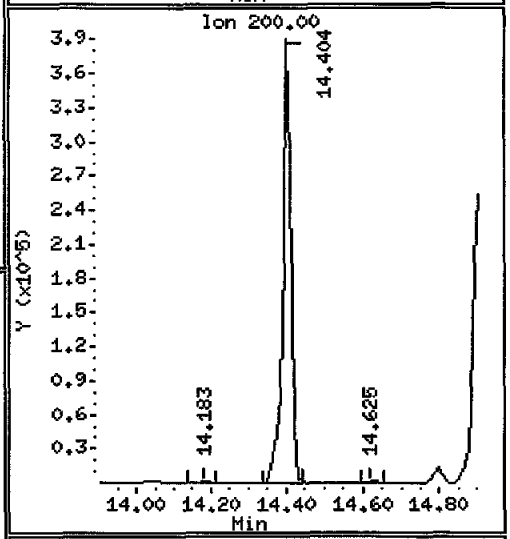


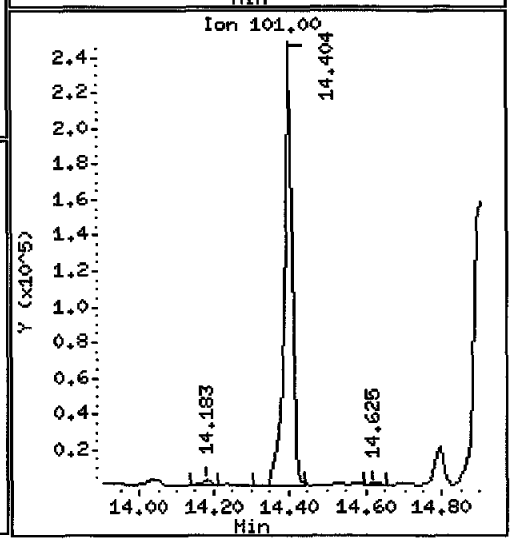












Data File: \\target\share\chem3\nt11.i\20151205.b\15120514.D

Date : 05-DEC-2015 16:46

Client ID: PG-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M

Volume Injected (uL): 2.0

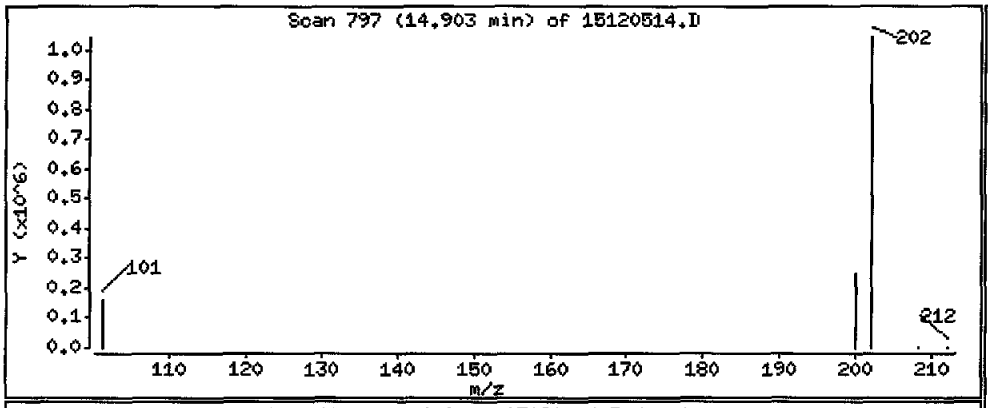
Operator: JW

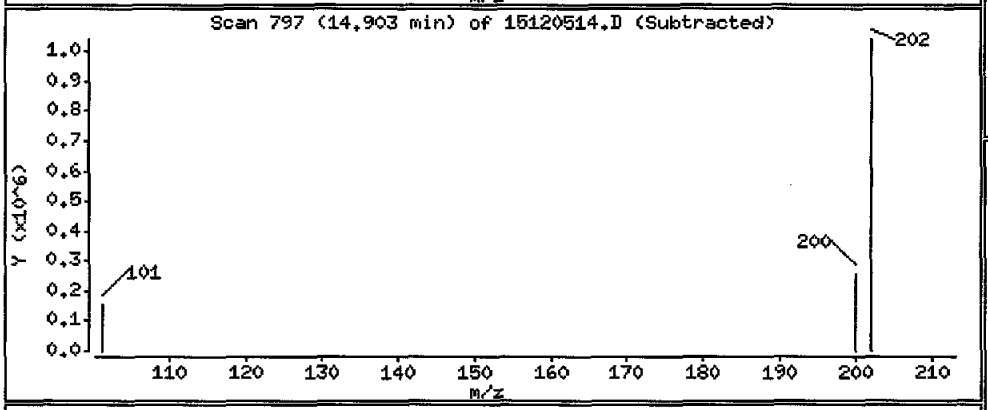
Column phase: Rxi-17Sil MS

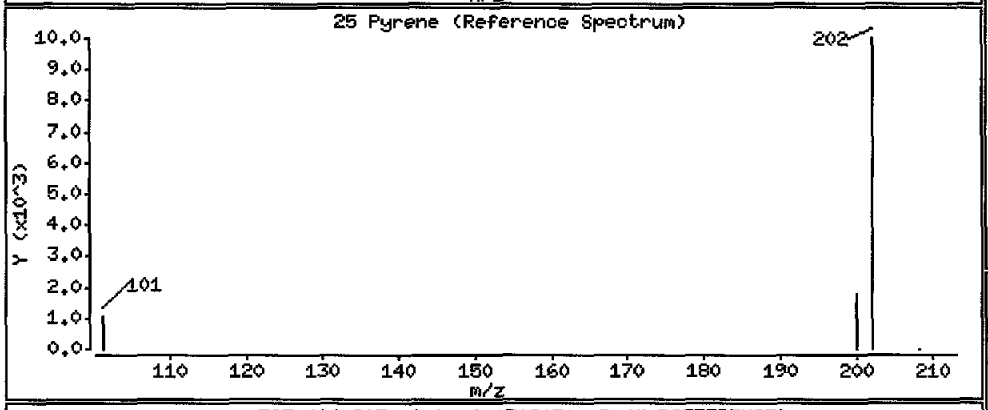
Column diameter: 0.25

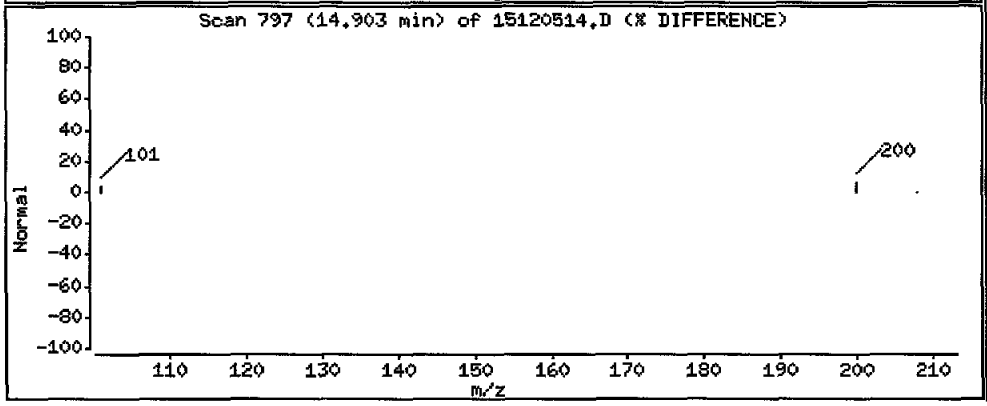
25 Pyrene

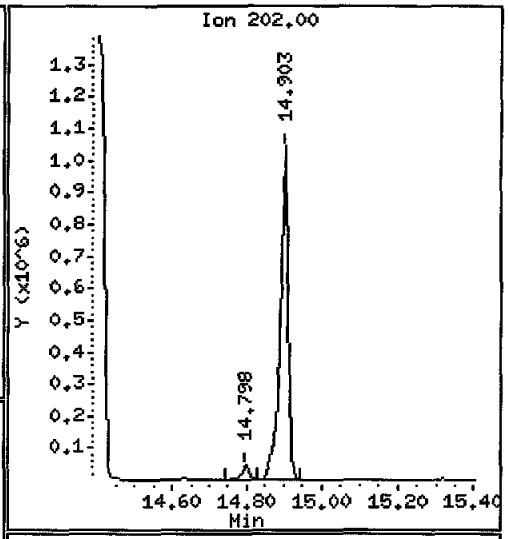
Concentration: 77600 ug/kg

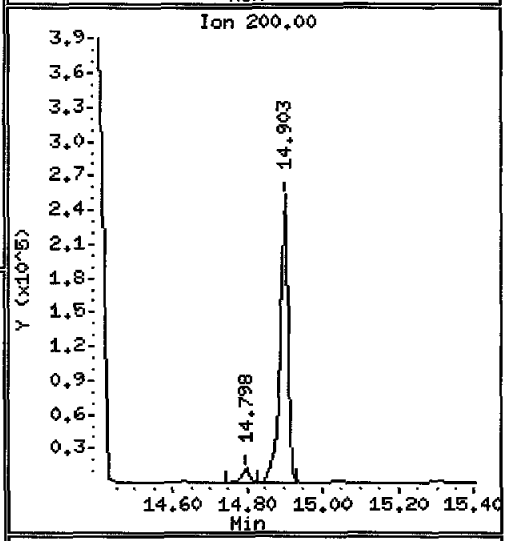


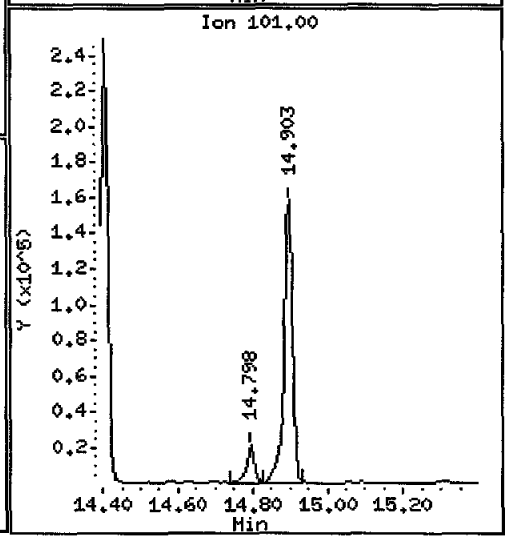












Data File: \\target\share\chem3\nt11.i\20151205.b\15120514.D

Date : 05-DEC-2015 16:46

Client ID: PG-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M

Volume Injected (uL): 2.0

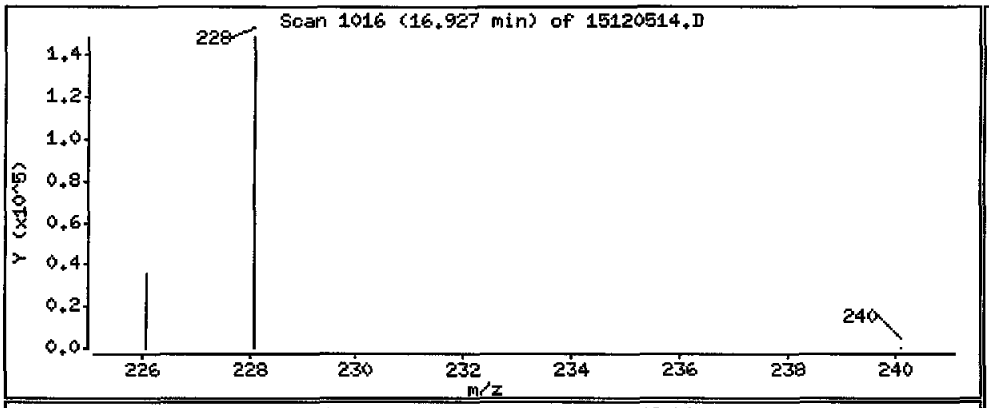
Operator: JW

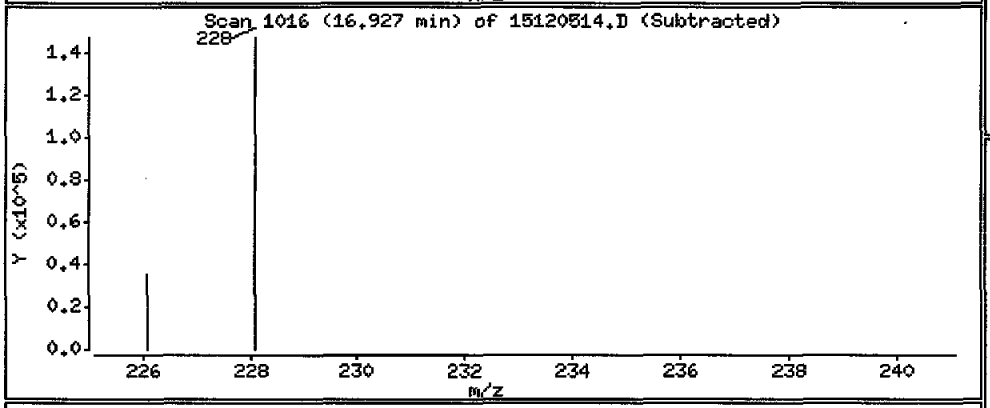
Column phase: Rxi-17Sil MS

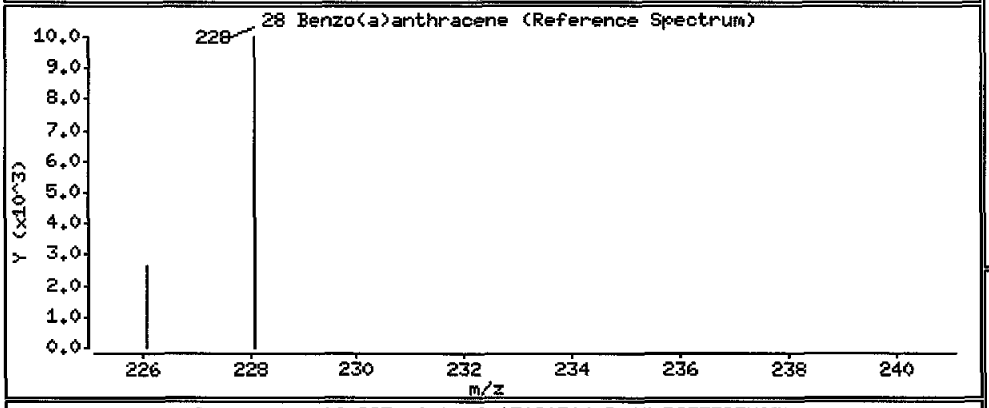
Column diameter: 0.25

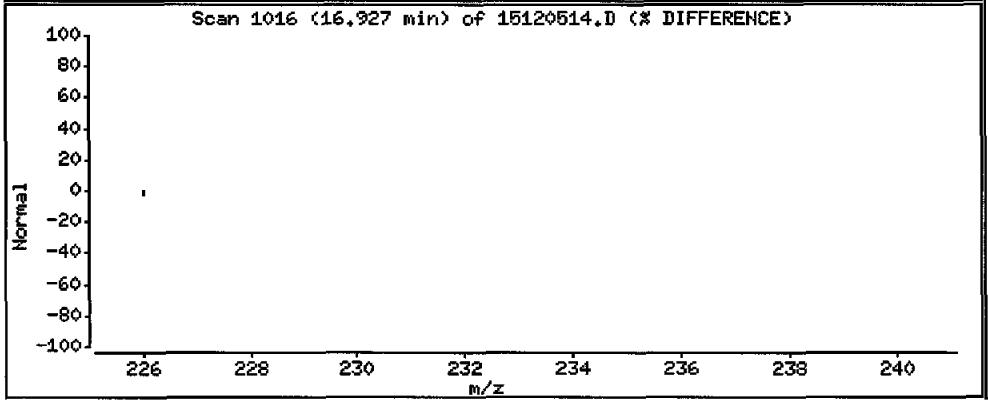
28 Benzo(a)anthracene

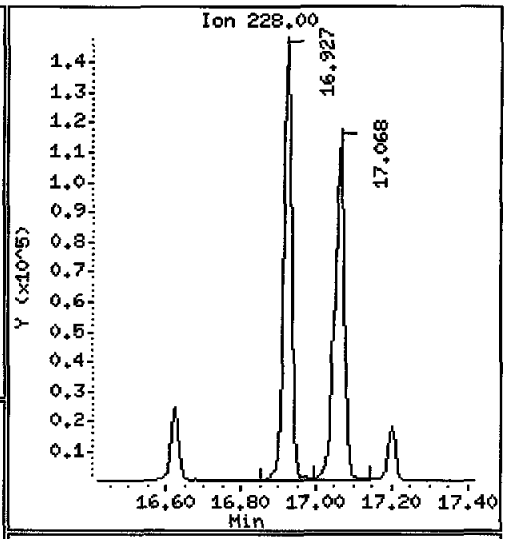
Concentration: 11700 ug/kg

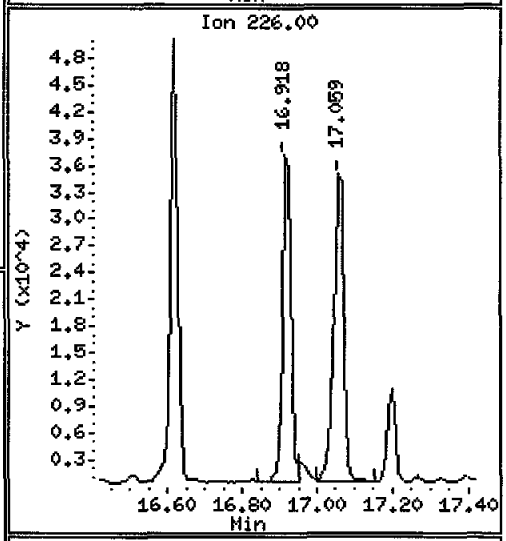


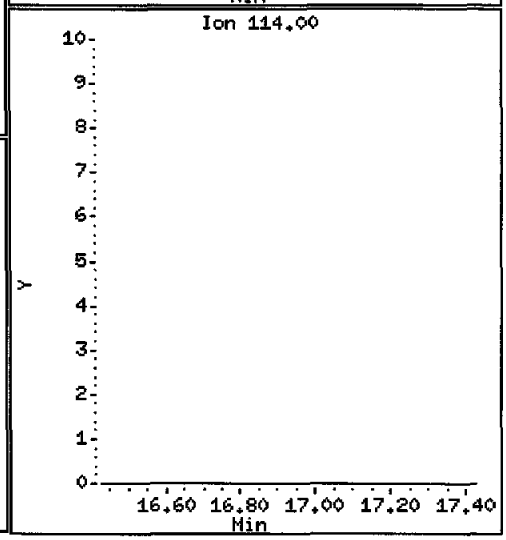












Data File: \\target\share\chem3\nt11.i\20151205.b\15120514.D

Date : 05-DEC-2015 16:46

Client ID: PC-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M

Volume Injected (uL): 2.0

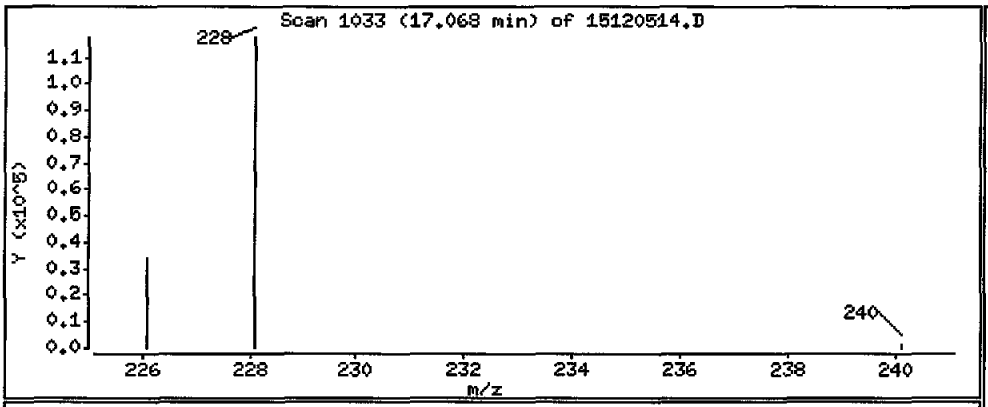
Operator: JW

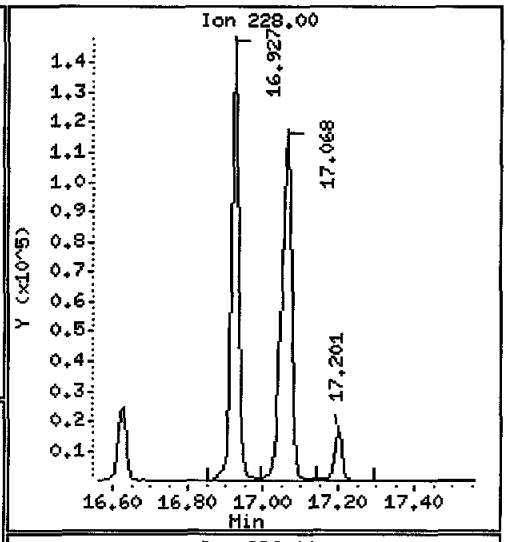
Column phase: Rxi-17Sil MS

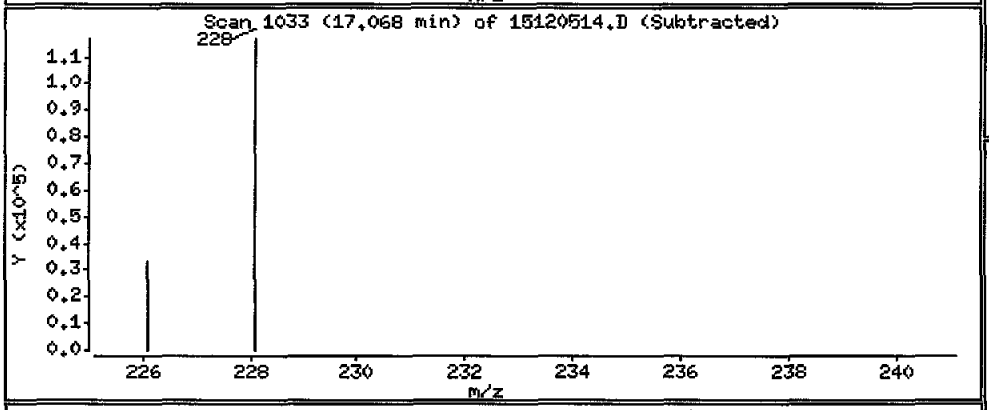
Column diameter: 0.25

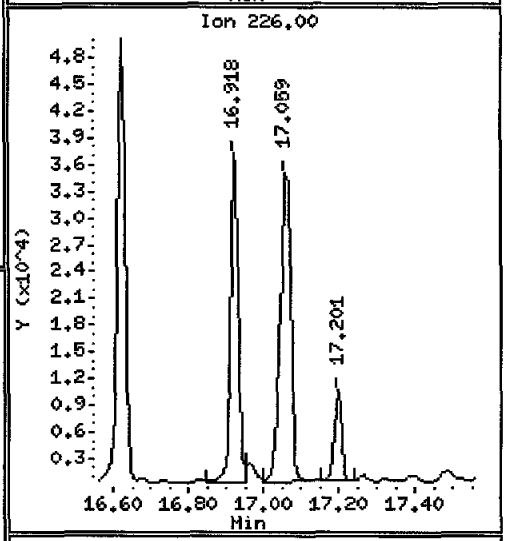
30 Chrysene

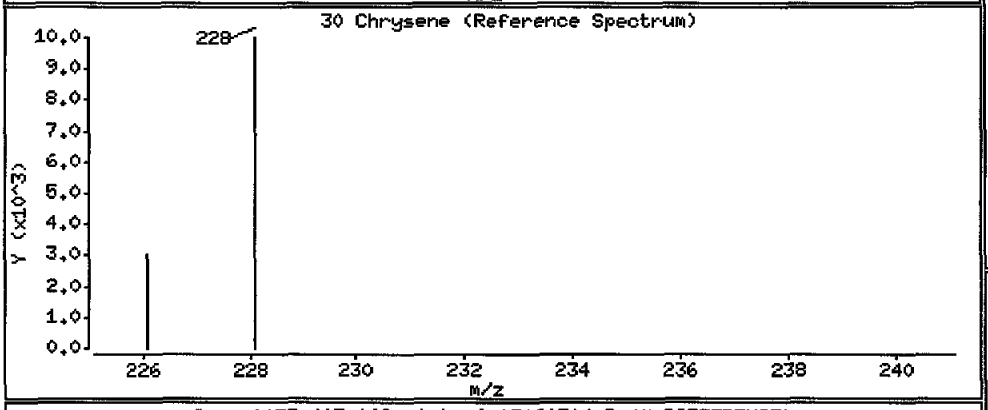
Concentration: 11000 ug/kg

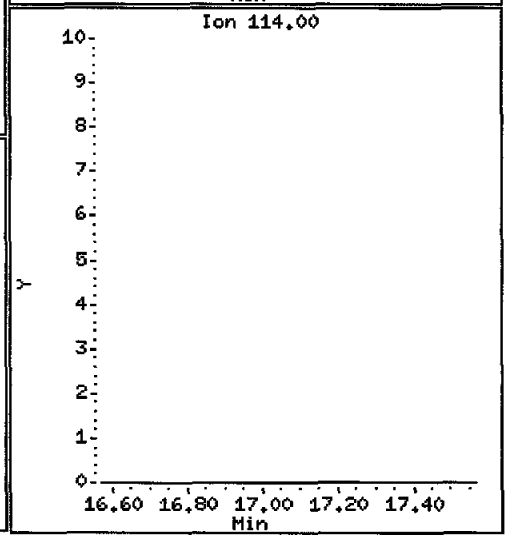


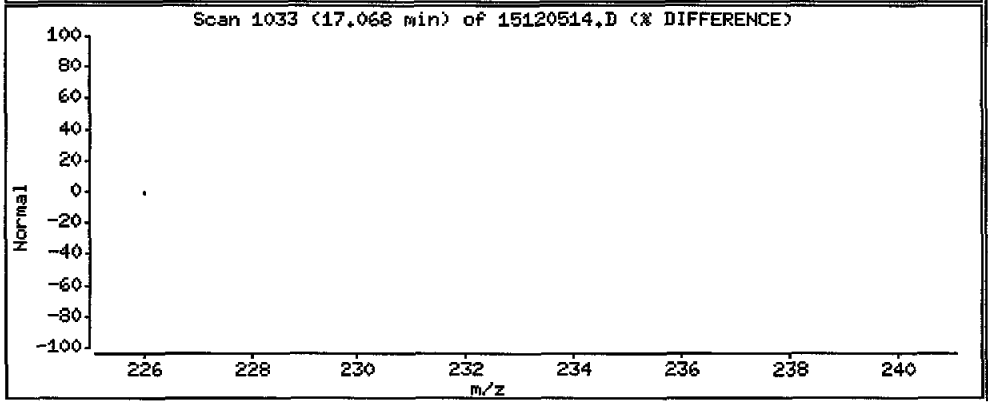












Data File: \\target\share\chem3\nt11.i\20151205.b\15120514.D

Date : 05-DEC-2015 16:46

Client ID: PG-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M

Volume Injected (uL): 2.0

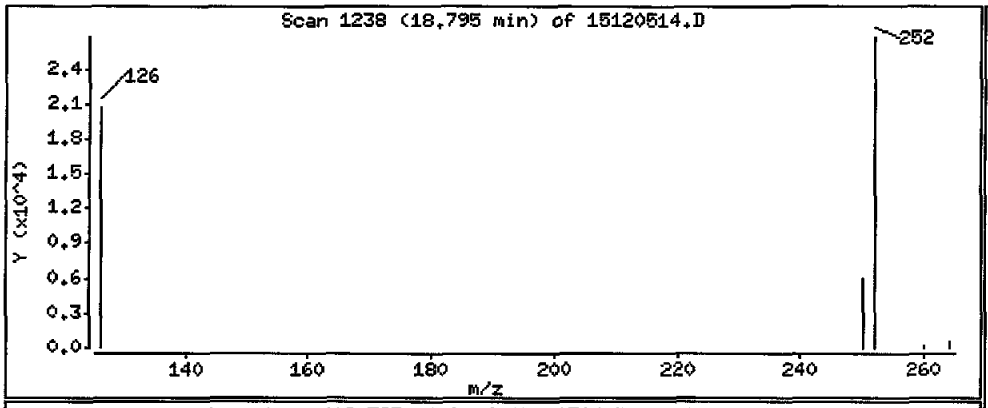
Operator: JW

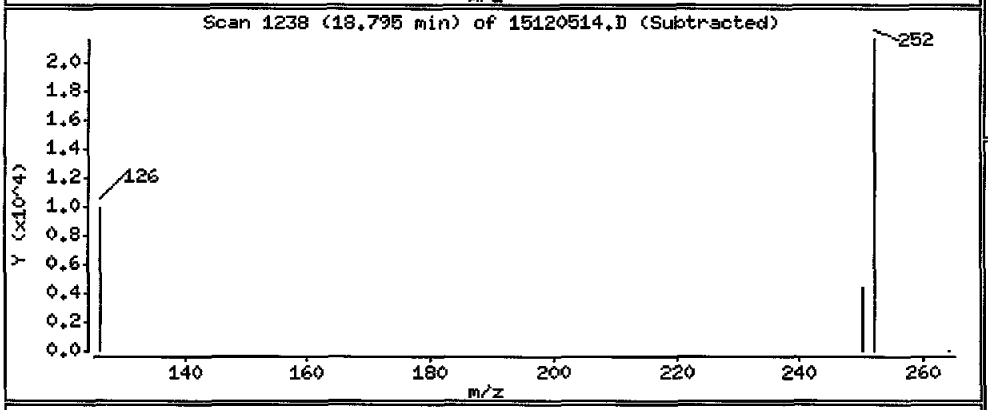
Column phase: Rxi-17Sil MS

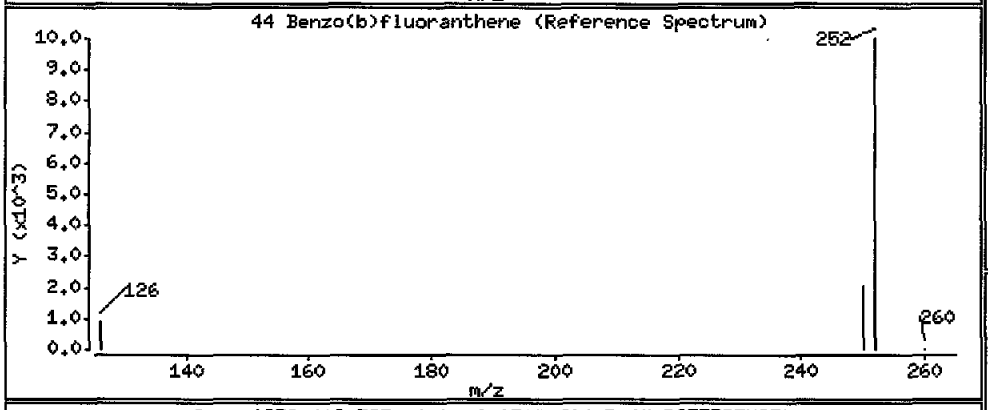
Column diameter: 0.25

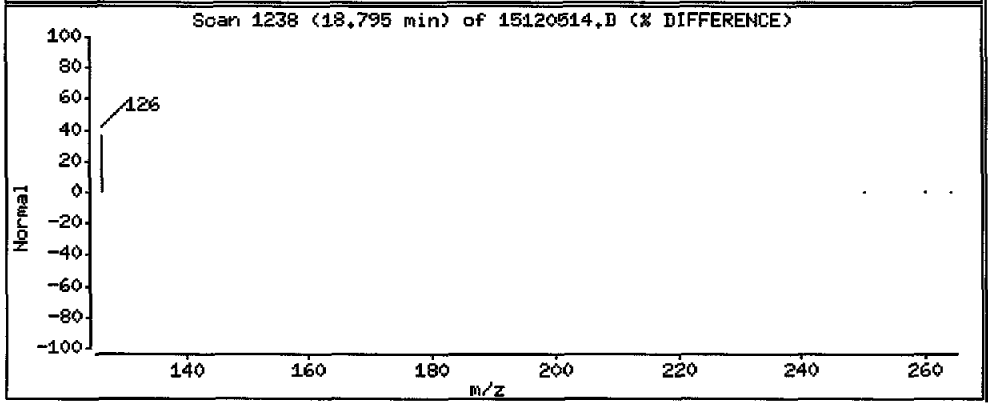
44 Benzo(b)fluoranthene

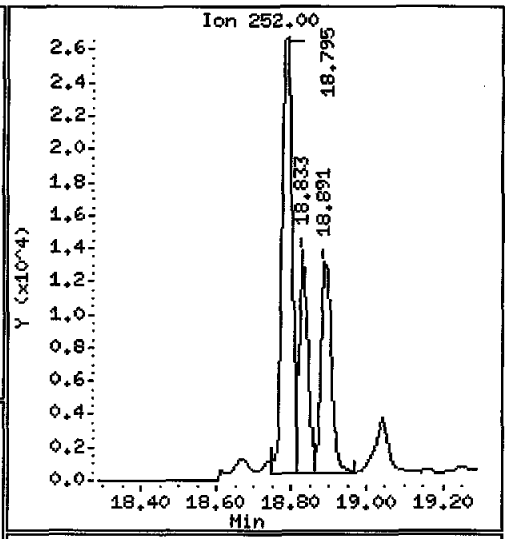
Concentration: 3130 ug/kg

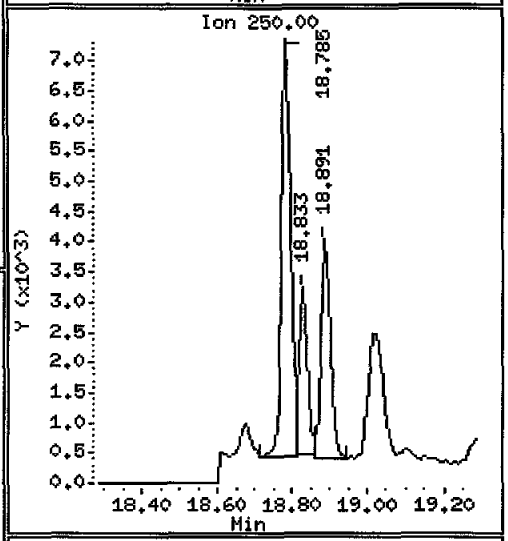


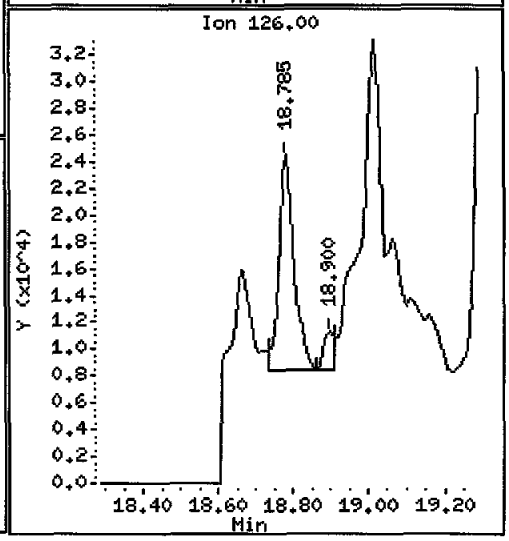












Data File: \\target\share\chem3\nt11.i\20151205.b\15120514.D

Date : 05-DEC-2015 16:46

Client ID: PG-SHA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M

Volume Injected (uL): 2.0

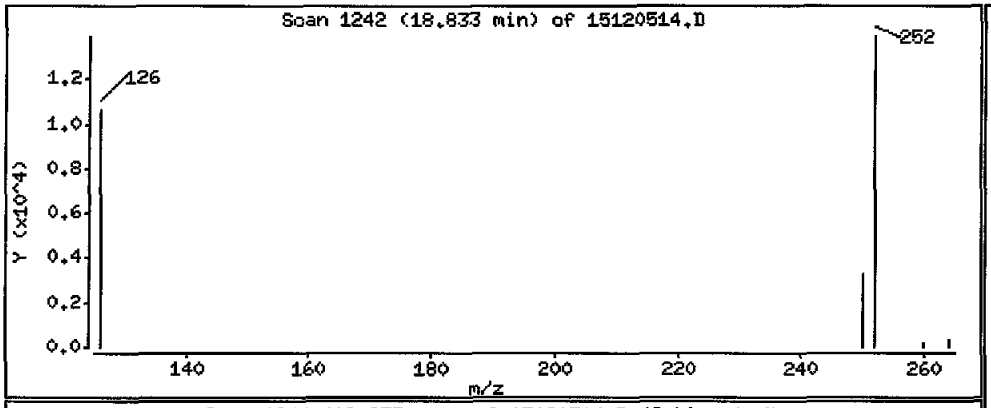
Operator: JW

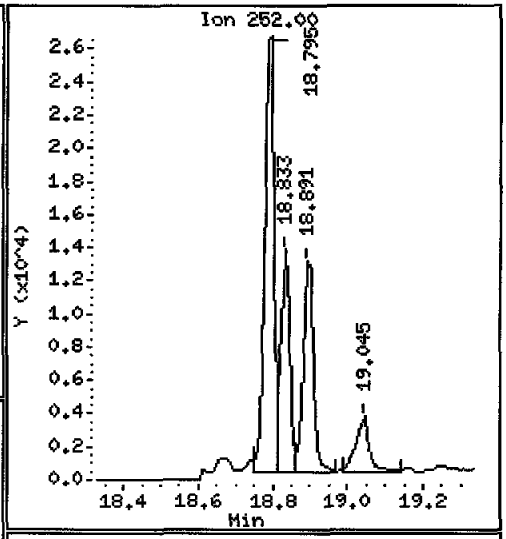
Column phase: Rxi-17Sil MS

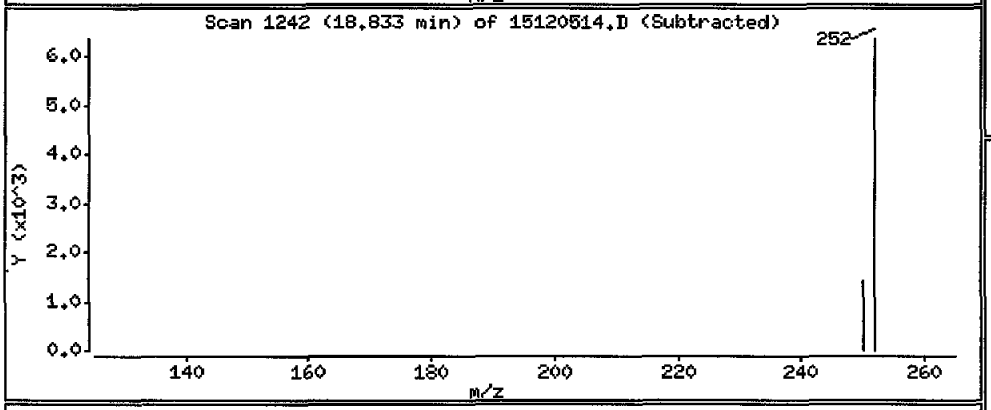
Column diameter: 0.25

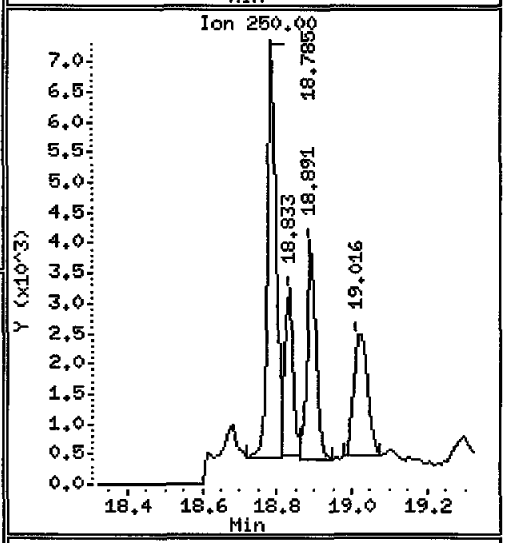
45 Benzo(k)fluoranthene

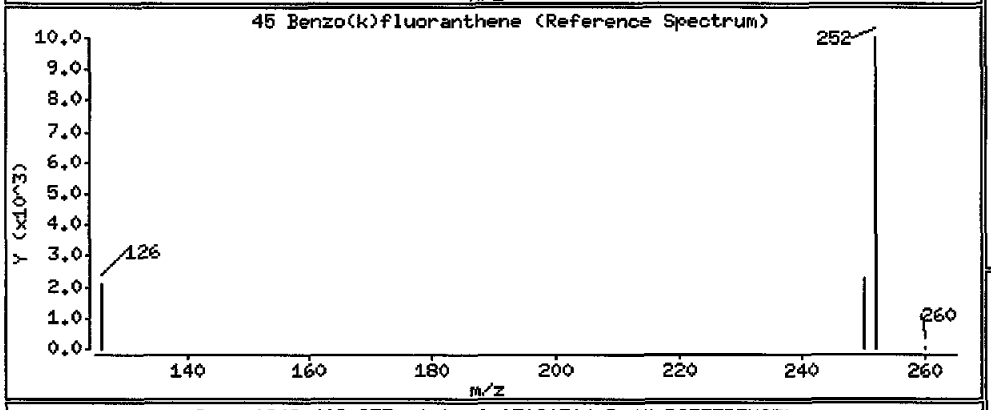
Concentration: 1300 ug/kg

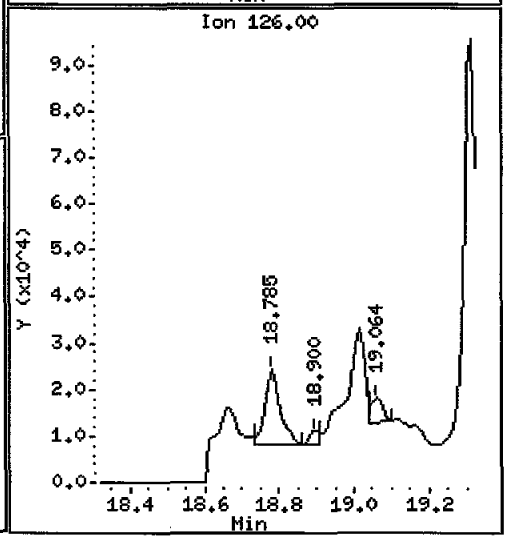


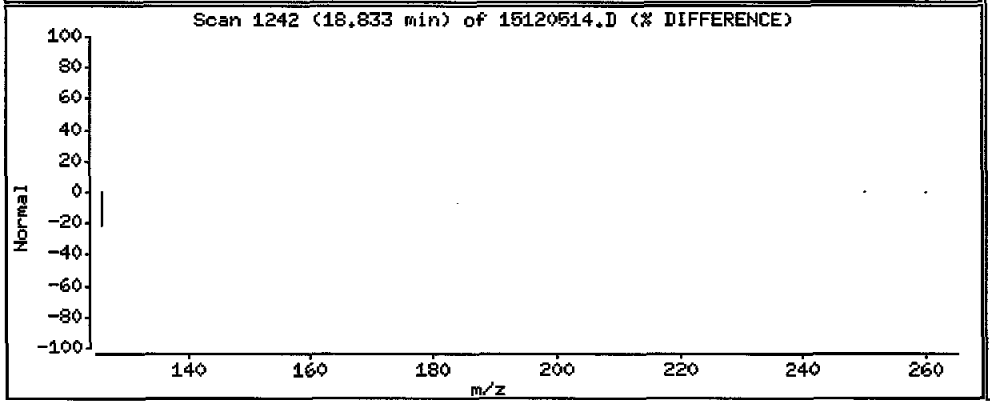












Data File: \\target\share\chem3\nt11.i\20151205.b\15120514.D

Date : 05-DEC-2015 16:46

Client ID: PC-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M

Volume Injected (uL): 2.0

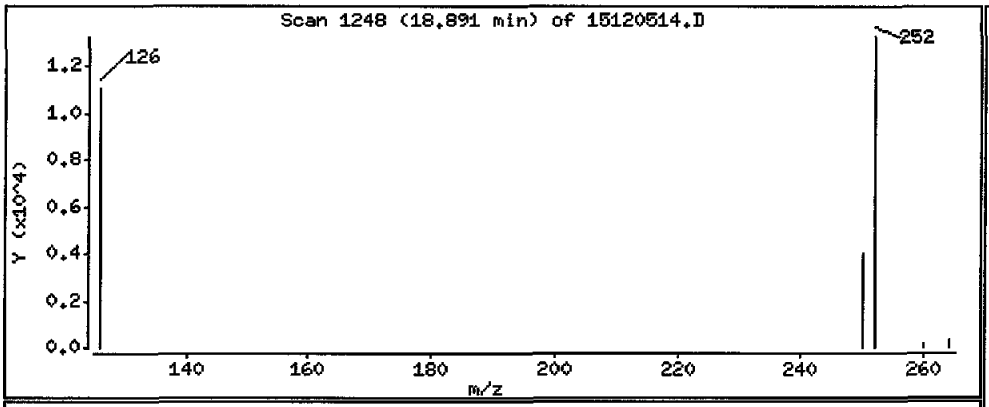
Operator: JW

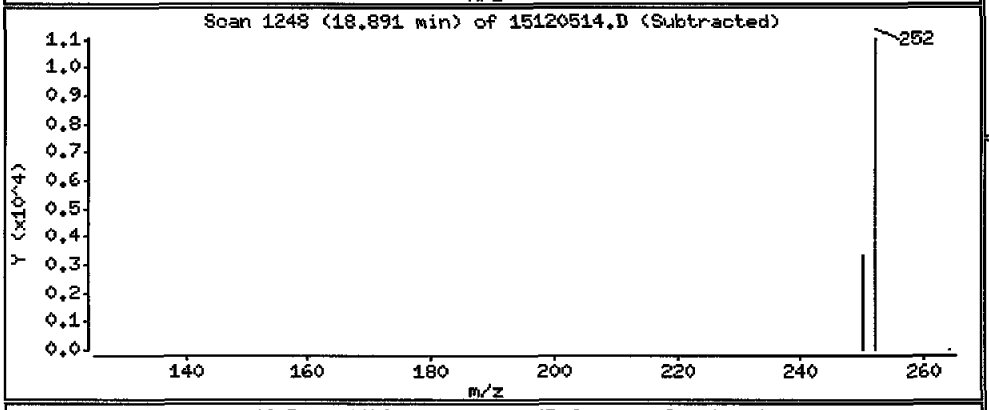
Column phase: Rxi-17Sil MS

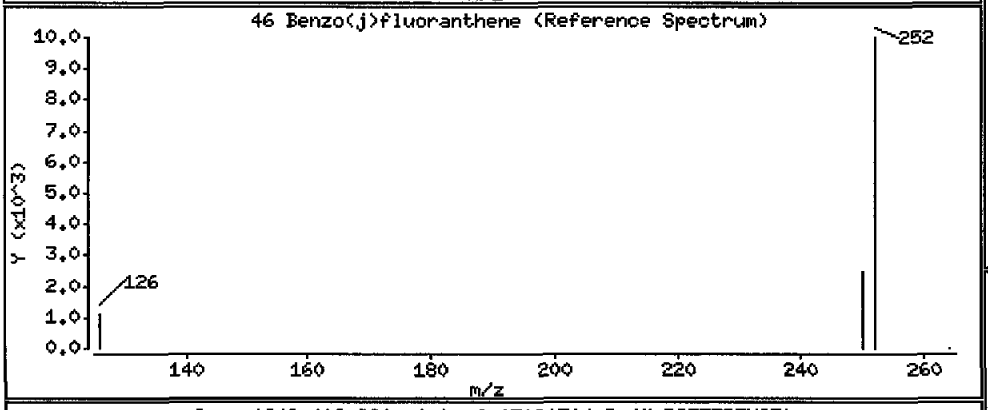
Column diameter: 0.25

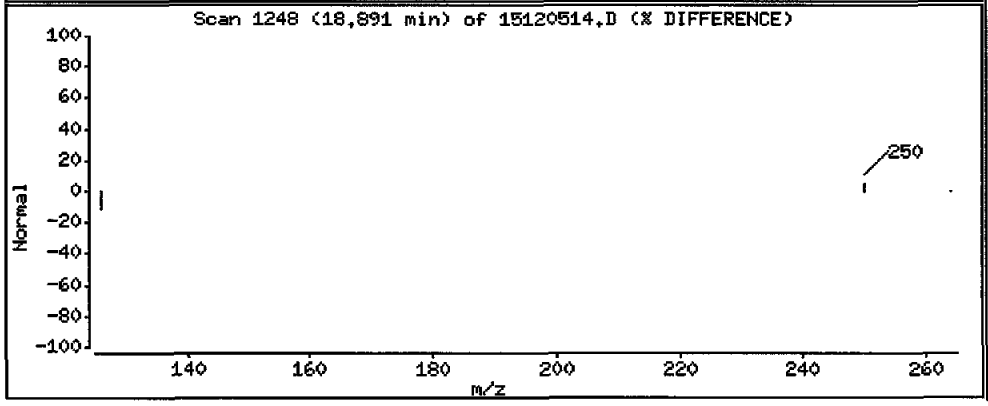
46 Benzo(j)fluoranthene

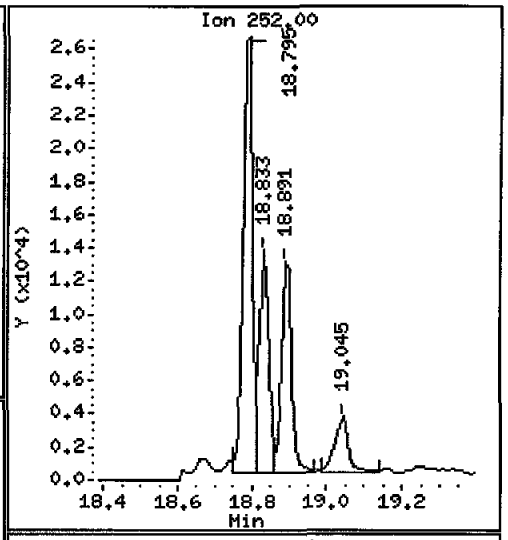
Concentration: 1460 ug/kg

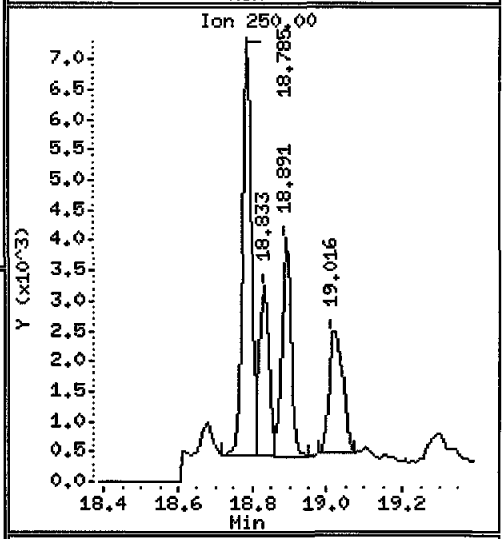


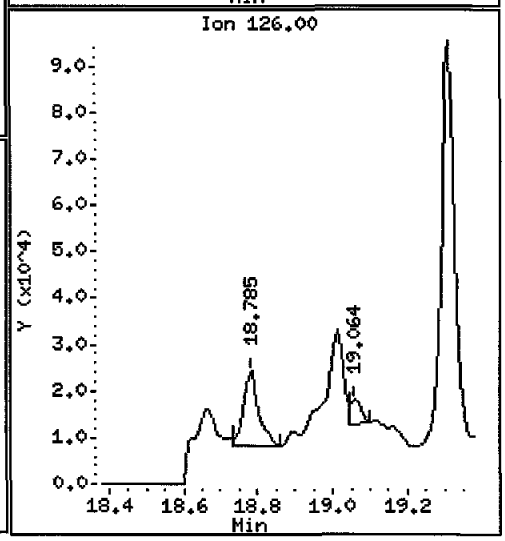












Data File: \\target\share\chem3\nt11.i\20151205.b\15120514.D

Date : 05-DEC-2015 16:46

Client ID: PG-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M

Volume Injected (uL): 2.0

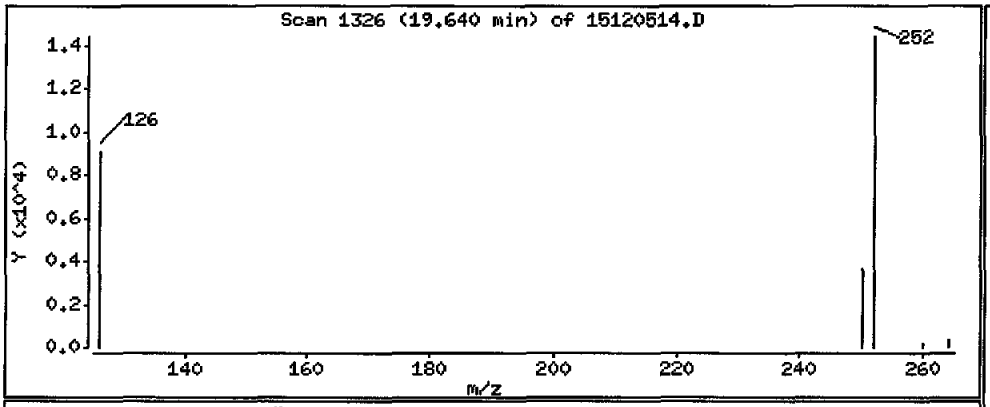
Operator: JW

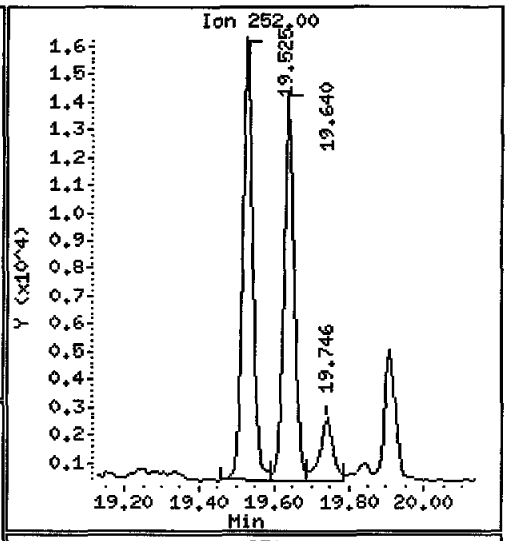
Column phase: Rxi-17Sil MS

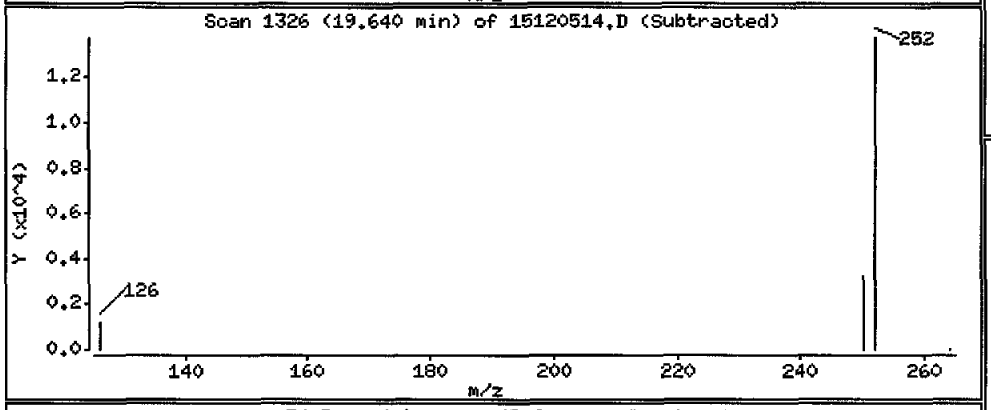
Column diameter: 0.25

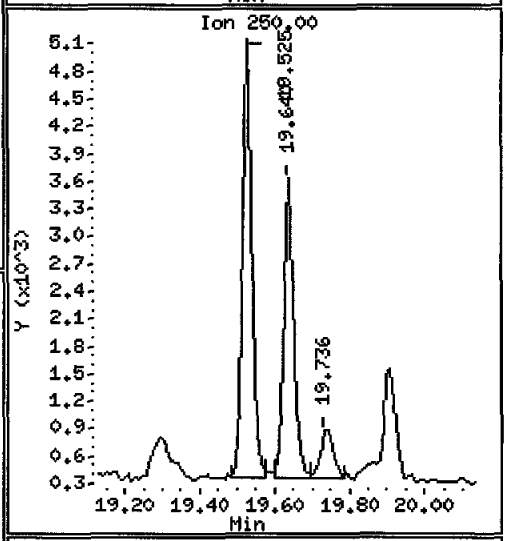
34 Benzo(a)pyrene

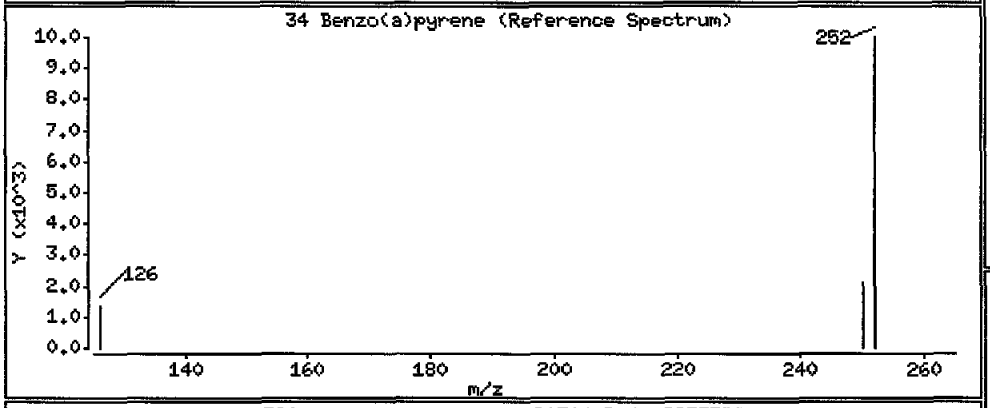
Concentration: 1840 ug/kg

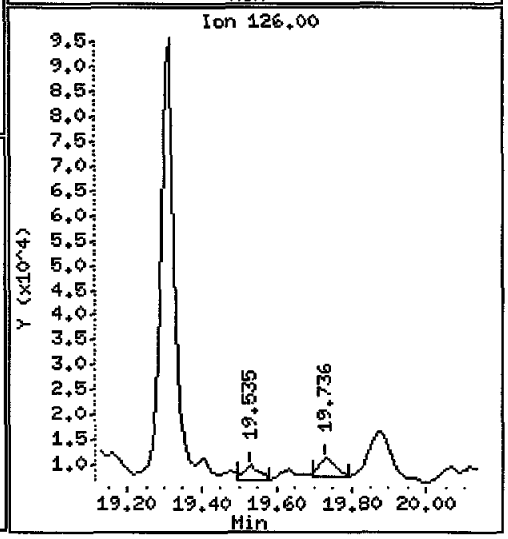


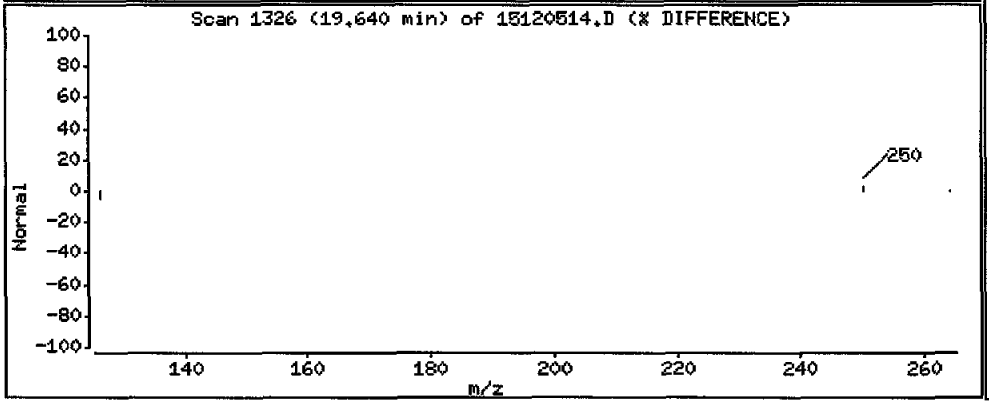












Data File: \\target\share\chem3\nt11.i\20151205.b\15120514.D

Date : 05-DEC-2015 16:46

Client ID: PG-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M

Volume Injected (uL): 2.0

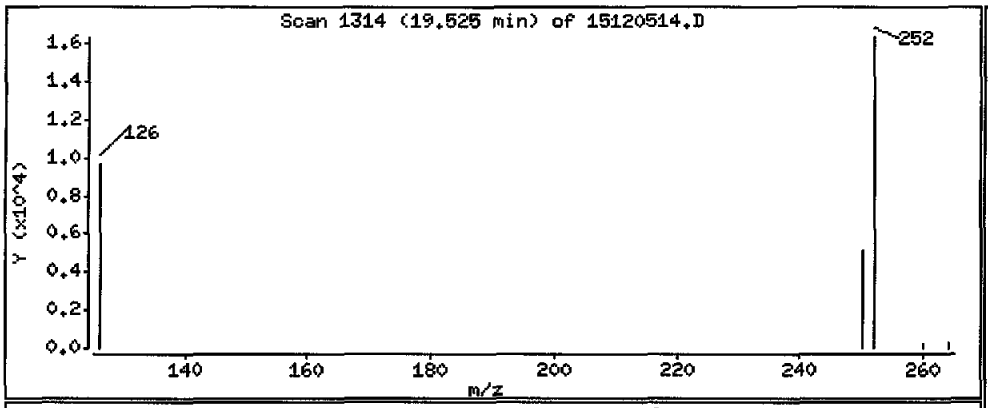
Operator: JW

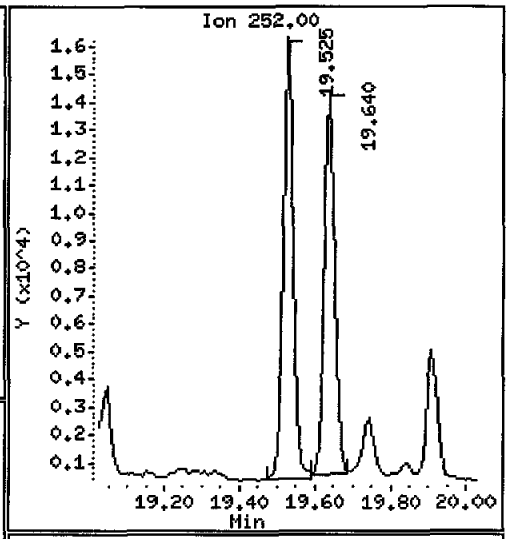
Column phase: Rxi-17Sil MS

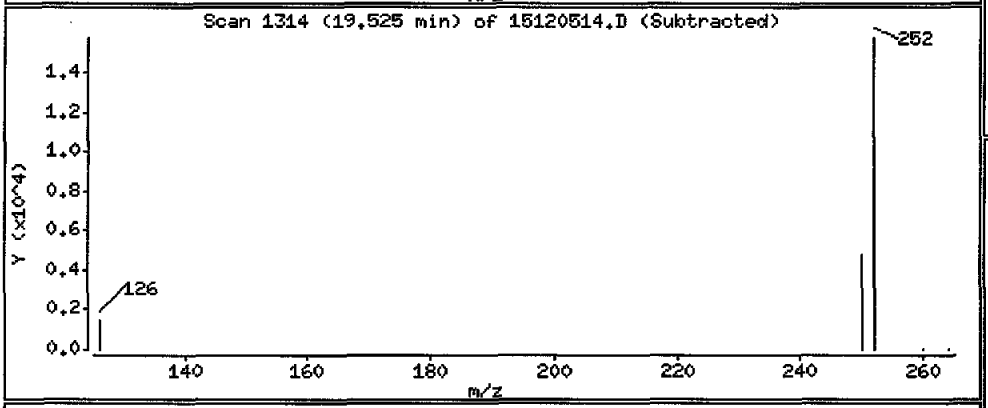
Column diameter: 0.25

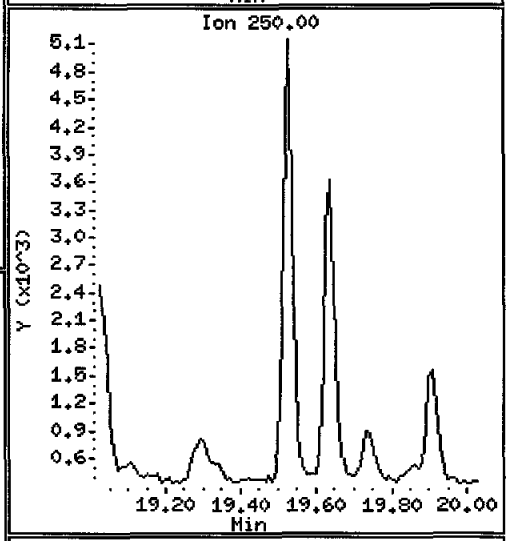
48 Benzo(e)pyrene

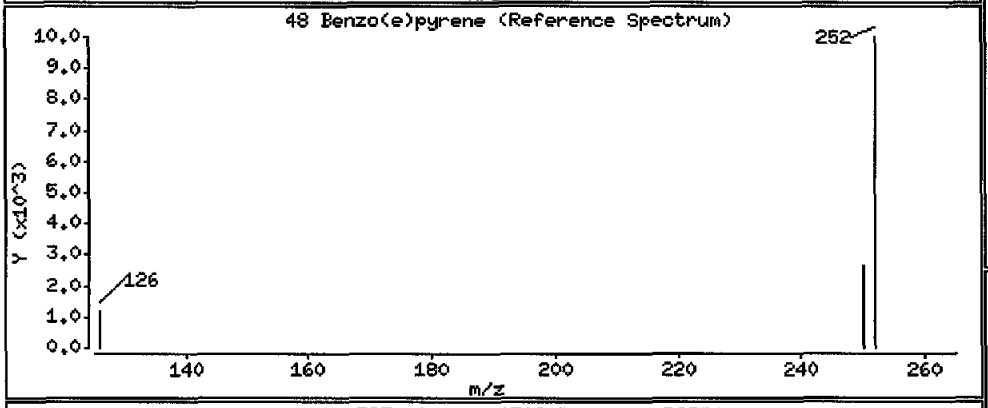
Concentration: 1970 ug/kg

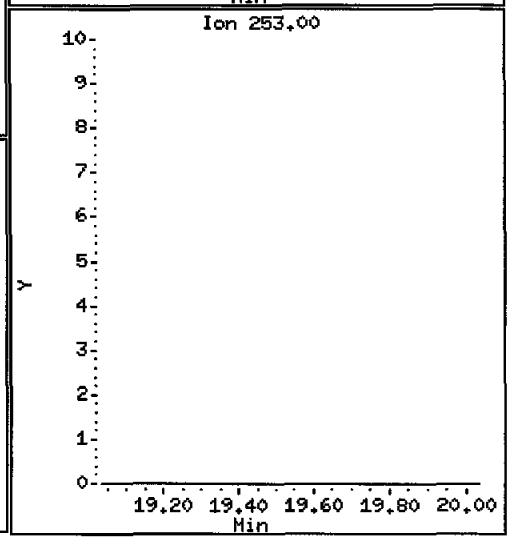


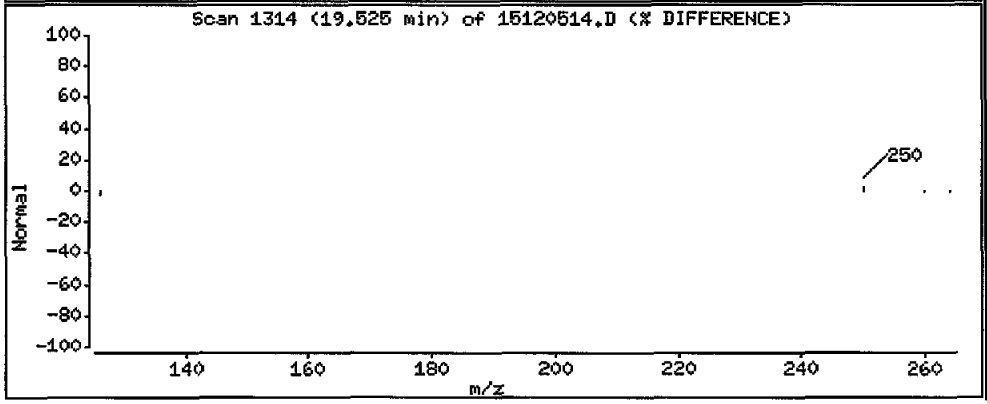












REVIEW SUMMARY FOR FILE - 15120514.D

Lab ID: AQJ9M
nt11.i, 20151205.b\lowsim.m, 05-DEC-2015 16:46

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151205.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151205.b\15120515.D
Lab Smp Id: AQJ9O Client Smp ID: PG-SMA2-1-PEMD-1511
Inj Date : 05-DEC-2015 17:16 MS Autotune Date: 23-APR-2014 12:5
Operator : JW Inst ID: nt11.i
Smp Info : AQJ9O
Misc Info : 15-21402
Comment :
Method : \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Meth Date : 14-Dec-2015 10:43 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 15
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	100.000	Volume of final extract (uL)
Ws	0.89000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

JW 12/15/15

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	FINAL (ug/kg)	
* 4 Naphthalene-d8	136	6.587	6.597	(1.000)	308997	200.000		
5 Naphthalene	128	6.618	6.629	(1.005)	232085	130.033	14600	B
$ 6 2-Methylnaphthalene-d10	152	7.564	7.574	(1.148)	180995	157.809	17700	
7 2-Methylnaphthalene	142	7.627	7.627	(1.158)	78241	63.8000	7170	
8 1-Methylnaphthalene	142	7.879	7.889	(1.196)	45123	40.8288	4590	
10 Acenaphthylene	152	Compound Not Detected.						
* 11 Acenaphthene-d10	164	9.589	9.600	(1.000)	253688	200.000		
12 Acenaphthene	153	9.656	9.656	(1.007)	124876	91.8917	10300	
14 Dibenzofuran	168	9.866	9.866	(1.029)	109401	53.4398	6000	
15 Fluorene	166	10.486	10.486	(1.094)	164251	106.981	12000	
* 18 Phenanthrene-d10	188	12.269	12.269	(1.000)	419421	200.000		
19 Phenanthrene	178	12.313	12.313	(1.004)	1810541	716.495	80500	
20 Anthracene	178	12.368	12.368	(1.008)	271667	120.107	13500	
$ 23 Fluoranthene-d10	212	14.374	14.374	(1.172)	498776	216.243	24300	
24 Fluoranthene	202	14.413	14.403	(1.175)	3602352	1419.92	160000	E
25 Pyrene	202	14.903	14.903	(0.876)	2420545	1045.56	117000	E
28 Benzo(a)anthracene	228	16.926	16.918	(0.995)	328208	168.394	18900	
* 29 Chrysene-d12	240	17.017	17.017	(1.000)	292332	200.000		
30 Chrysene	228	17.067	17.059	(1.003)	329356	153.966	17300	
44 Benzo(b)fluoranthene	252	18.794	18.784	(0.947)	68482	39.9723	4490	
45 Benzo(k)fluoranthene	252	18.833	18.833	(0.949)	32208	16.1327	1810	

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)
46	Benzo(j)fluoranthene	252	18.890	18.890	(0.952)	34550	18.9979	2130
34	Benzo(a)pyrene	252	19.640	19.630	(0.990)	32537	19.6785	2210
* 35	Perylene-d12	264	19.841	19.841	(1.000)	252868	200.000	
$ 36	Dibenzo(a,h)anthracene-d14	292	22.208	22.208	(1.119)	184932	181.196	20400
37	Indeno(1,2,3-cd)pyrene	276	Compound Not Detected.					
38	Dibenzo(a,h)anthracene	278	Compound Not Detected.					
39	Benzo(g,h,i)perylene	276	Compound Not Detected.					
47	Perylene	252	Compound Not Detected.					
48	Benzo(e)pyrene	252	19.534	19.524	(0.985)	41984	24.2480	2720

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120515.D
Lab Smp Id: AQJ9O
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21402

Calibration Date: 05-DEC-2015
Calibration Time: 10:30
Client Smp ID: PG-SMA2-1-PEMD-
Level: LOW
Sample Type: Tissue

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	308997	-5.76
11 Acenaphthene-d10	239179	119590	478358	253688	6.07
18 Phenanthrene-d10	372253	186127	744506	419421	12.67
29 Chrysene-d12	294711	147356	589422	292332	-0.81
35 Perylene-d12	260595	130298	521190	252868	-2.97

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.59	-0.16
11 Acenaphthene-d10	9.60	9.10	10.10	9.59	-0.12
18 Phenanthrene-d10	12.27	11.77	12.77	12.27	0.00
29 Chrysene-d12	17.02	16.52	17.52	17.02	0.00
35 Perylene-d12	19.84	19.34	20.34	19.84	0.00

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.

ARI Labs, Inc.

RECOVERY REPORT

Client Name: Anchor QEA, LLC
Sample Matrix: SOLID
Lab Smp Id: AQJ9O
Level: LOW
Data Type: MS DATA
SpikeList File: waterlcs.spk
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21402

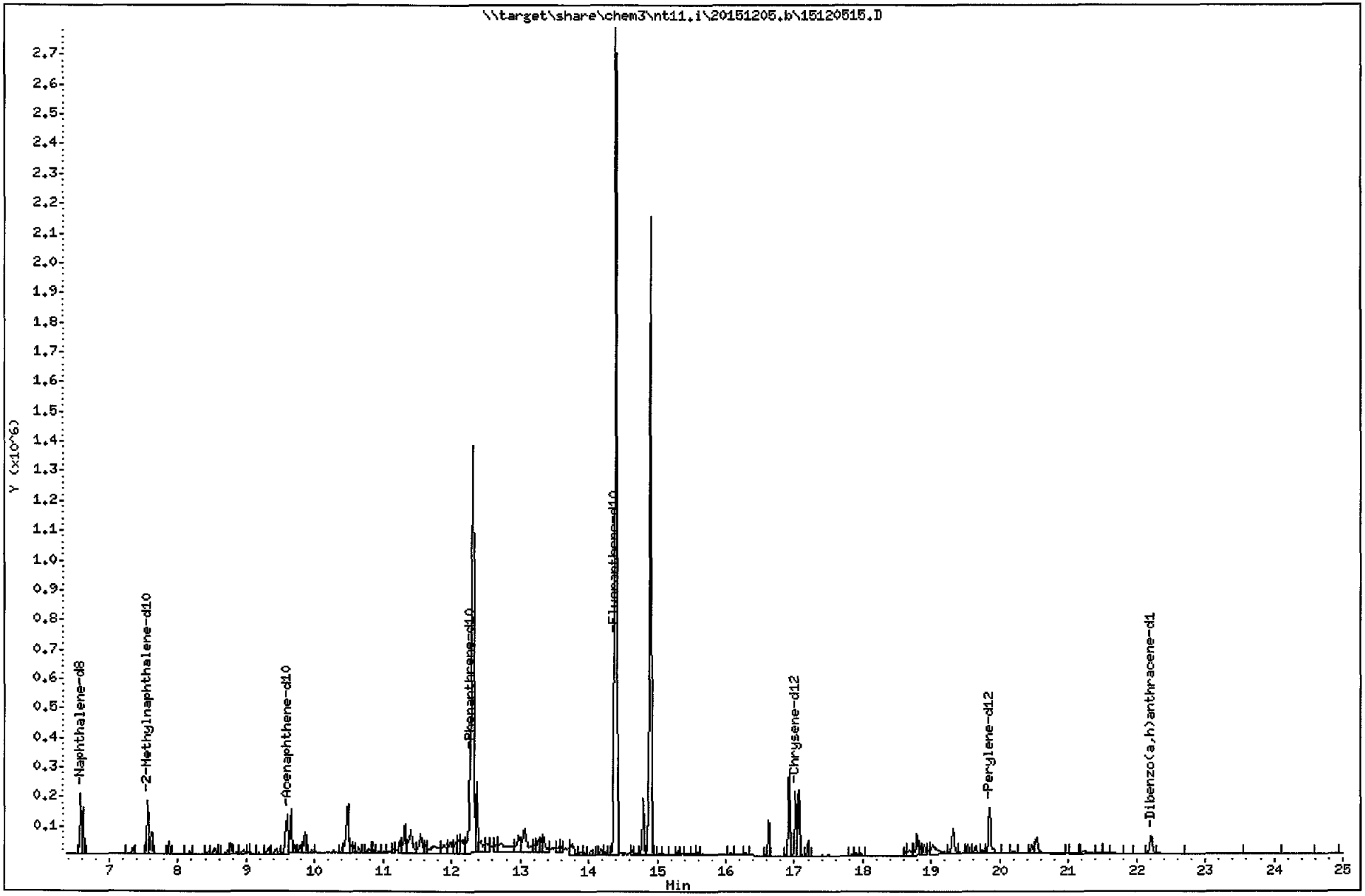
Client SDG: AQJ9
Fraction: SV
Client Smp ID: PG-SMA2-1-PEMD-1511
Operator: JW
SampleType: SAMPLE
Quant Type: ISTD

SURROGATE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
$ 6 2-Methylnaphthalen	33700	17700	52.60	30-160
$ 23 Fluoranthene-d10	33700	24300	72.08	30-160
$ 36 Dibenzo(a,h)anthra	33700	20400	60.40	30-160

Data File: \\target\share\chem3\nt11.i\20151205.b\15120515.D
Date : 05-DEC-2015 17:16
Client ID: PG-SMA2-1-PEMD-1511
Sample Info: AQJ90
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: JW
Column diameter: 0.25

AQJ9:00355



Data File: \\target\share\chem3\nt11.i\20151205.b\15120515.D

Date : 05-DEC-2015 17:16

Client ID: PG-SMA2-1-PEND-1511

Instrument: nt11.i

Sample Info: AQJ90

Volume Injected (uL): 2.0

Operator: JW

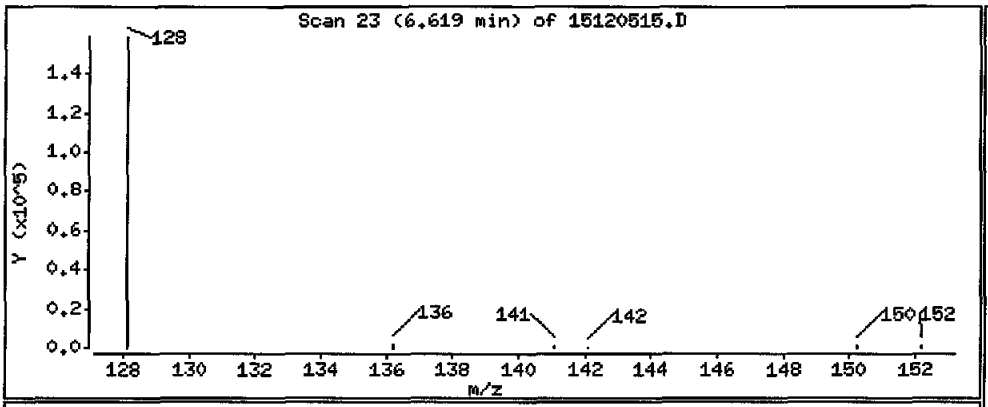
Column phase: Rxi-17Sil MS

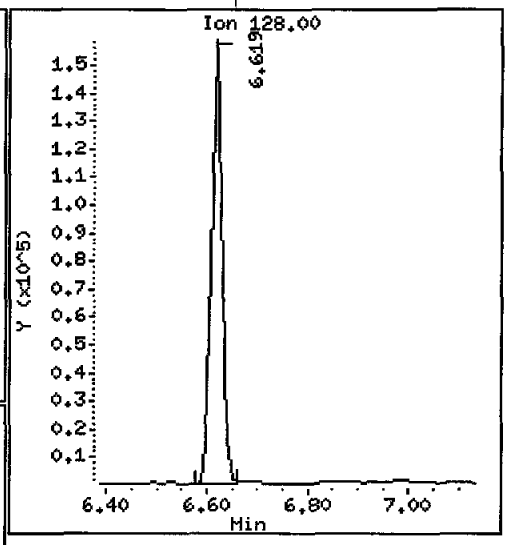
Column diameter: 0.25

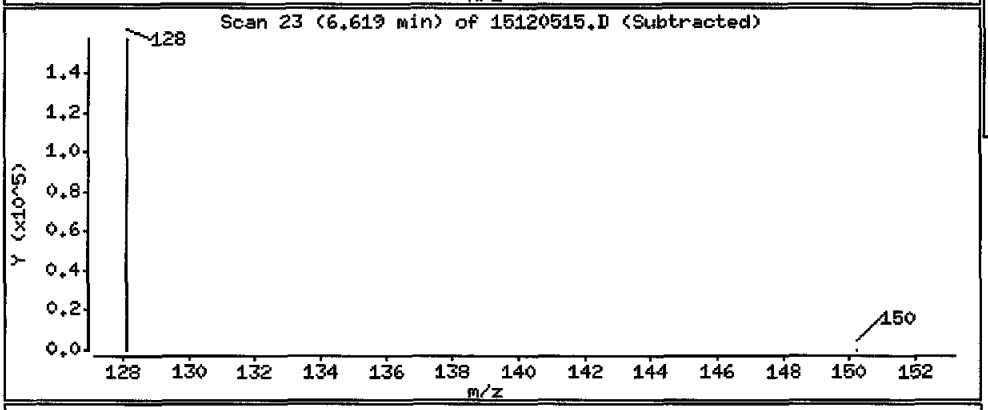
5 Naphthalene

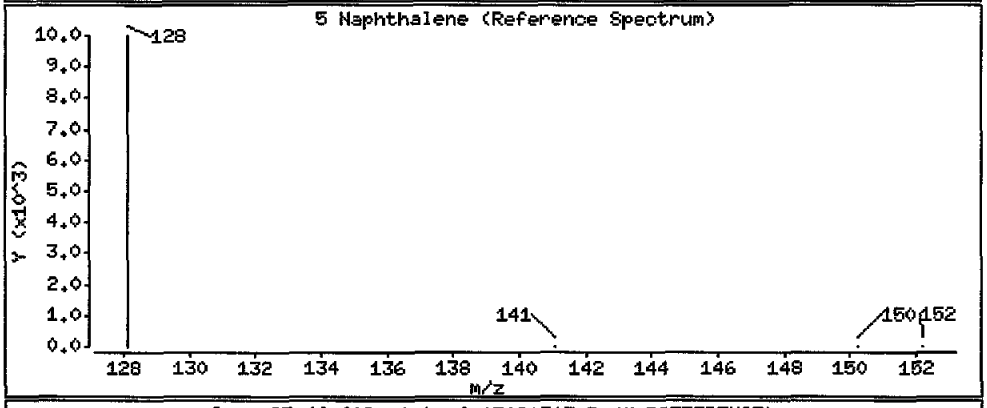
Concentration: 14600 ug/kg

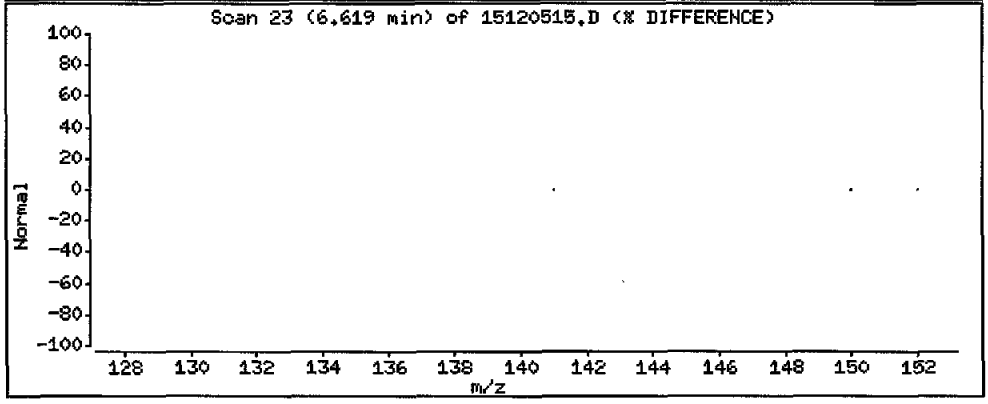
B











Data File: \\target\share\chem3\nt11.i\20151205.b\15120515.D

Date : 05-DEC-2015 17:16

Client ID: PG-SMA2-1-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ90

Volume Injected (uL): 2.0

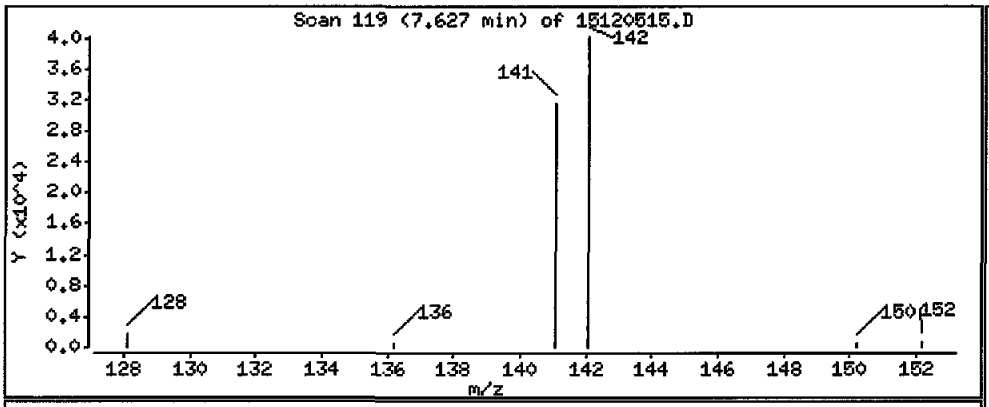
Operator: JW

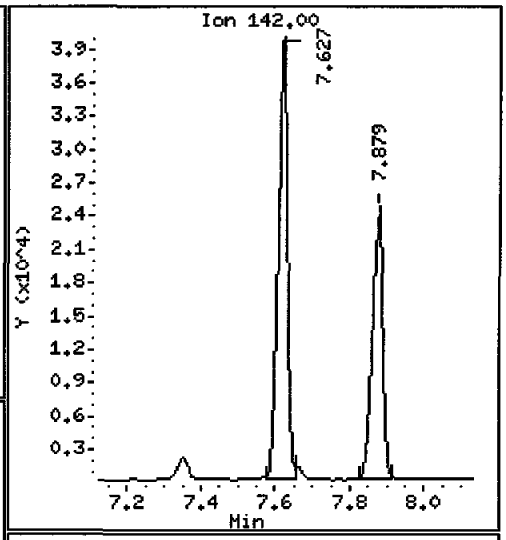
Column phase: Rxi-17Sil MS

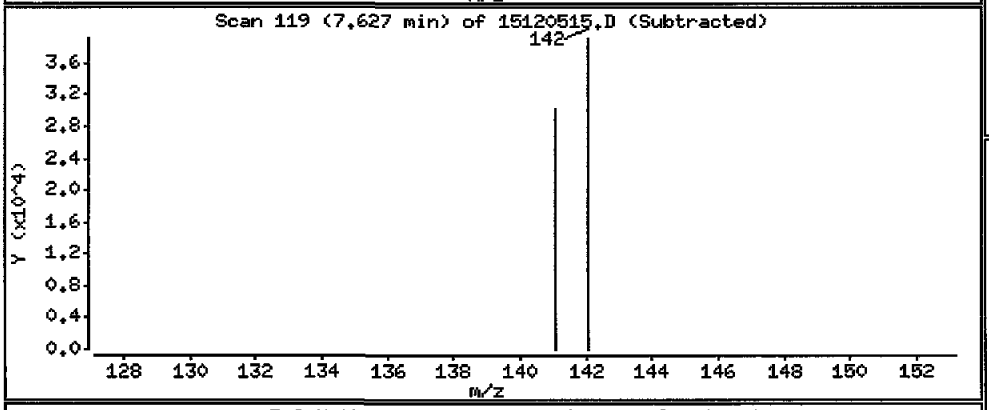
Column diameter: 0.25

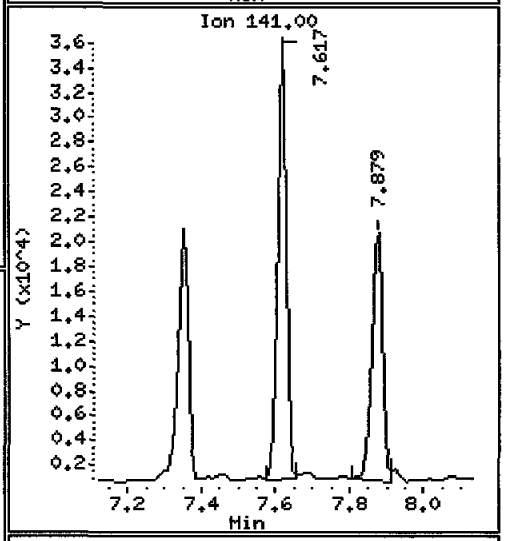
7 2-Methylnaphthalene

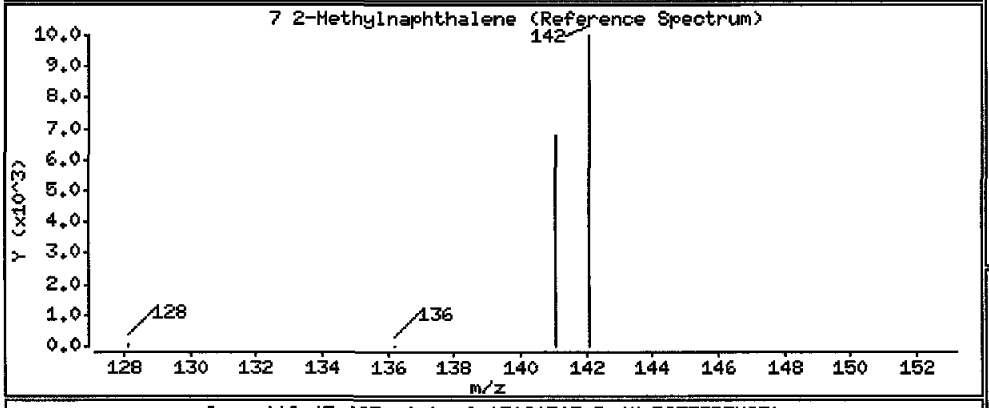
Concentration: 7170 ug/kg

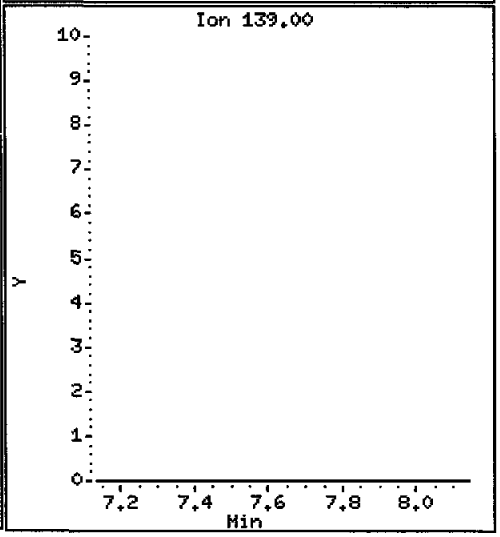


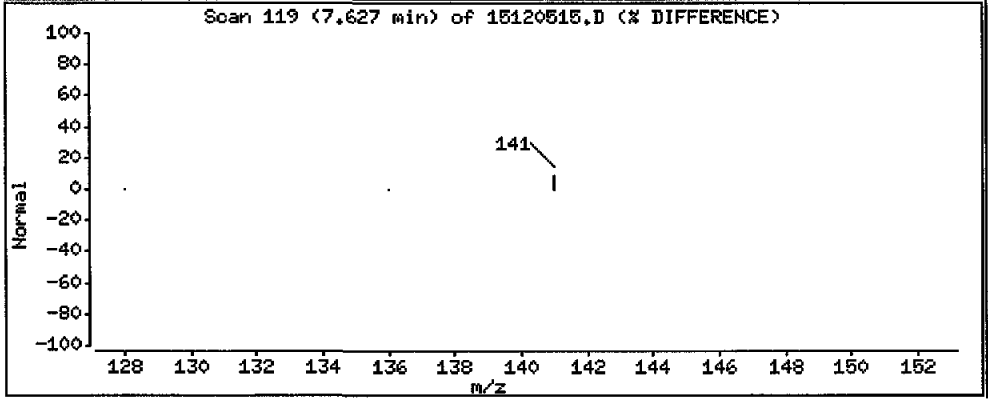












Data File: \\target\share\chem3\nt11.i\20151205.b\15120515.D

Date : 05-DEC-2015 17:16

Client ID: PG-SMA2-1-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ90

Volume Injected (uL): 2.0

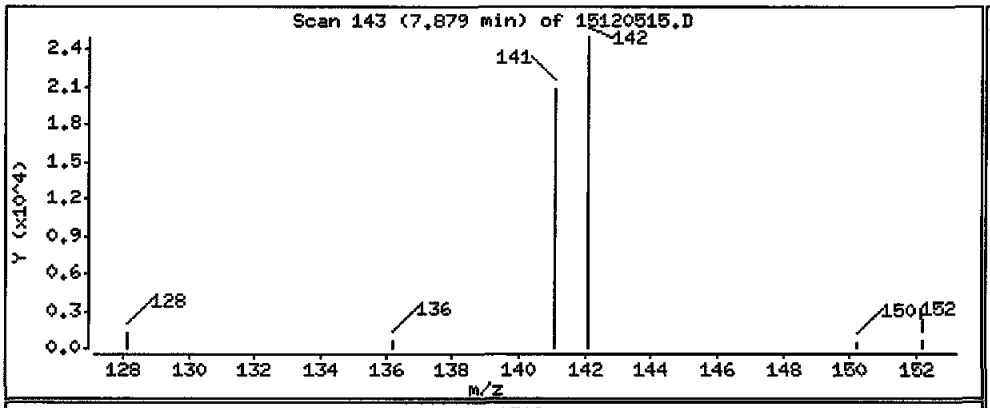
Operator: JW

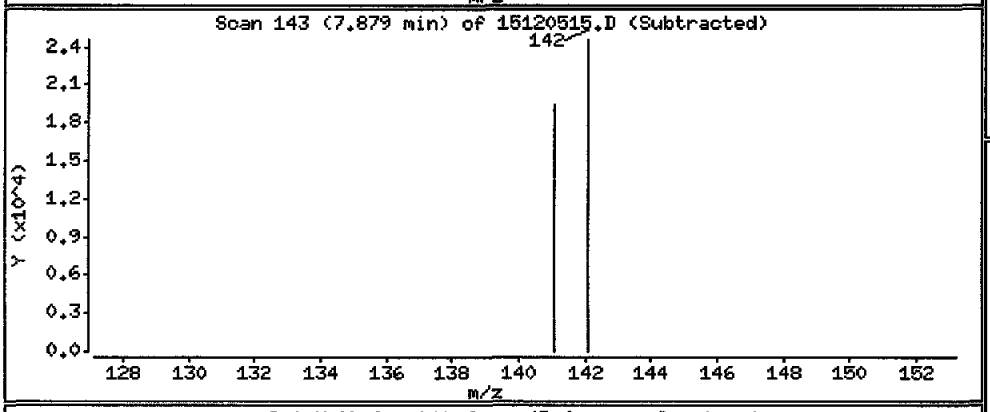
Column phase: Rxi-17Sil MS

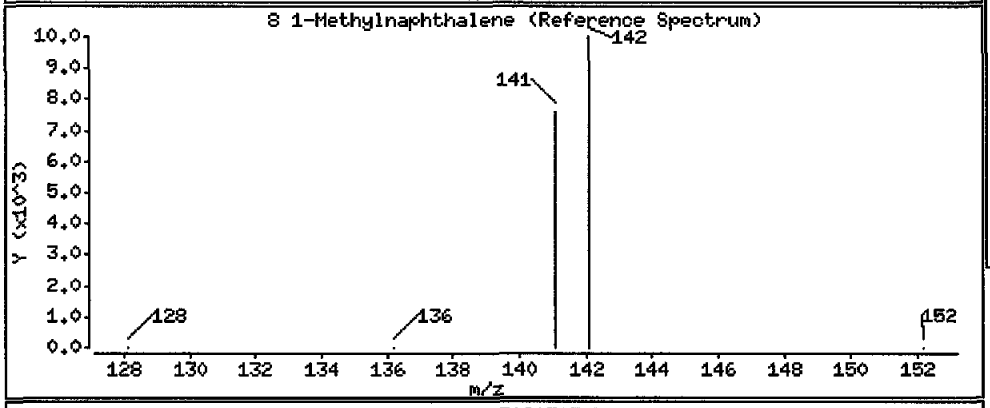
Column diameter: 0.25

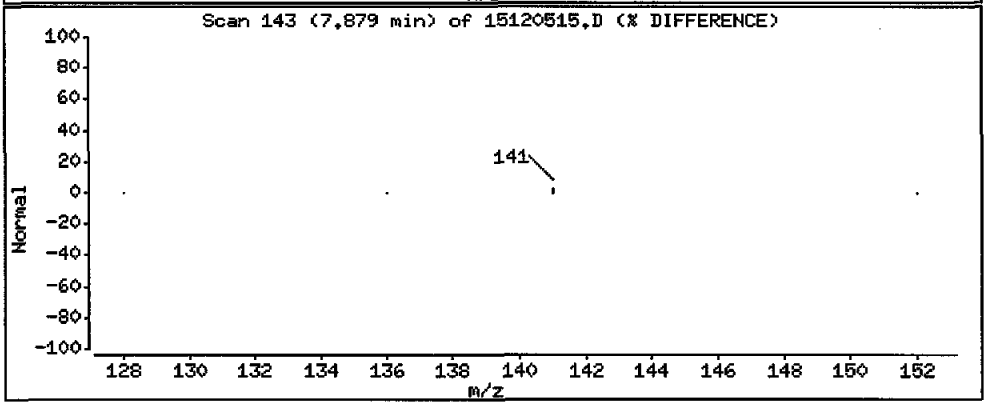
8 1-Methylnaphthalene

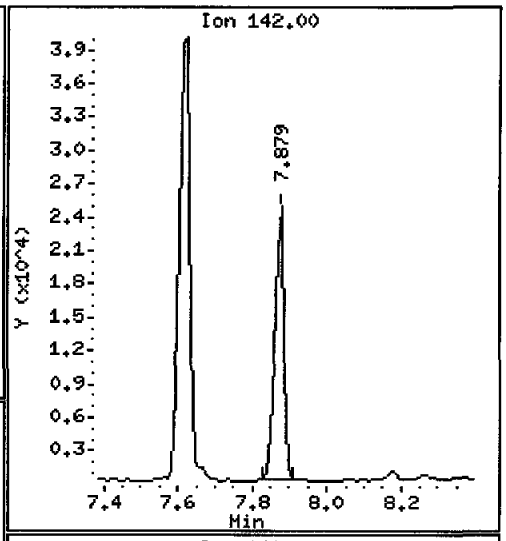
Concentration: 4590 ug/kg

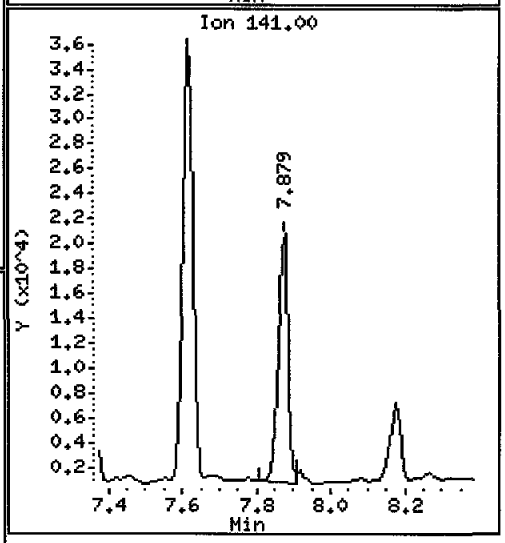












Data File: \\target\share\chem3\nt11.i\20151205.b\15120515.D

Date : 05-DEC-2015 17:16

Client ID: PG-SMA2-1-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ90

Volume Injected (uL): 2.0

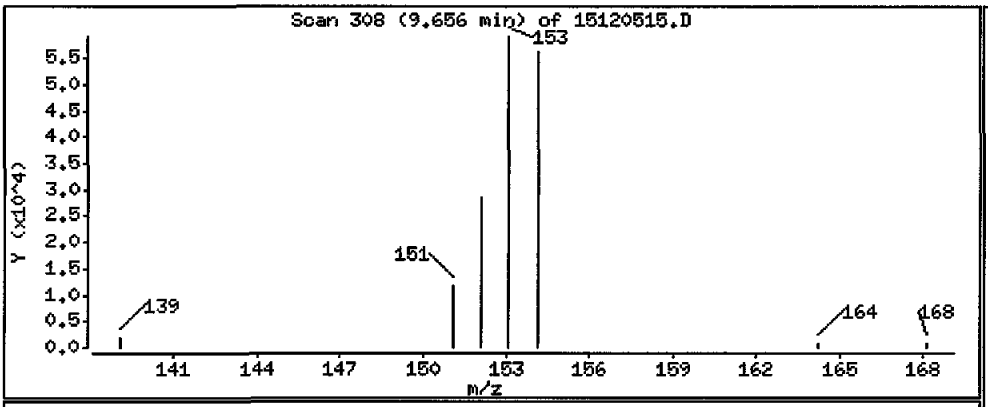
Operator: JW

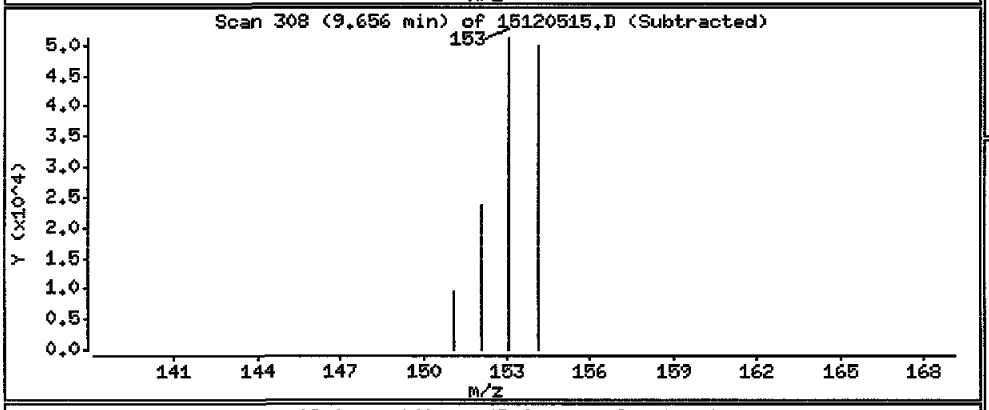
Column phase: Rxi-17Sil MS

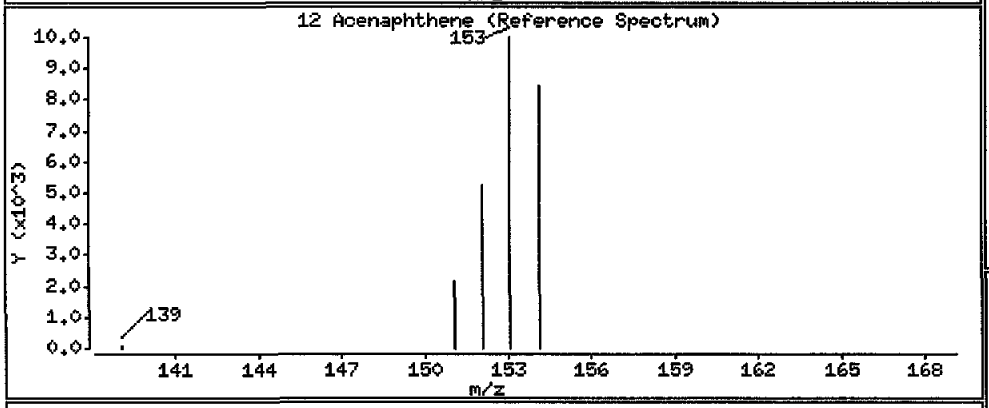
Column diameter: 0.25

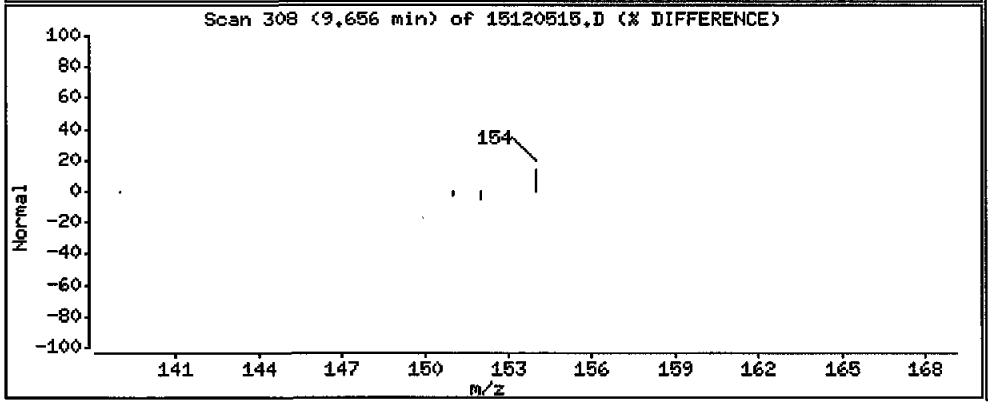
12 Acenaphthene

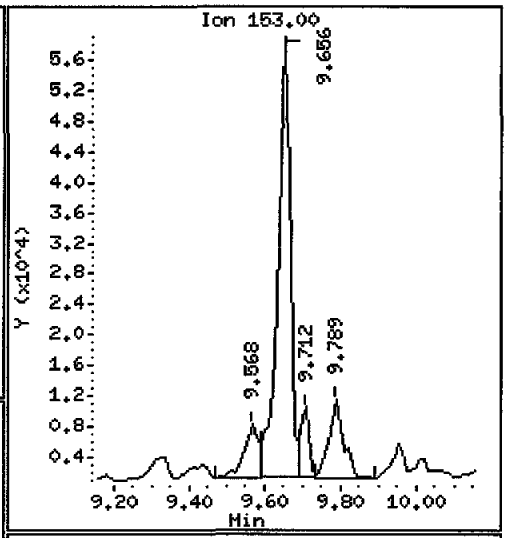
Concentration: 10300 ug/kg

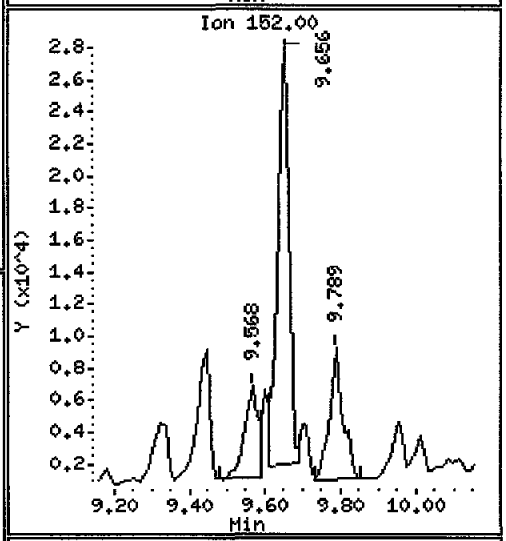


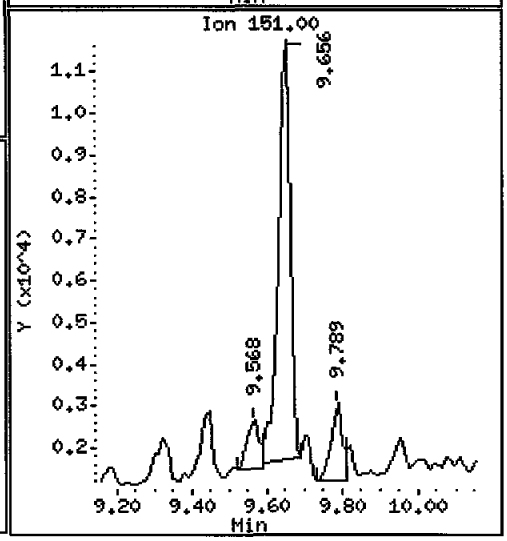












Data File: \\target\share\chem3\nt11.i\20151205.b\15120515.D

Date : 05-DEC-2015 17:16

Client ID: PG-SMA2-1-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ90

Volume Injected (uL): 2.0

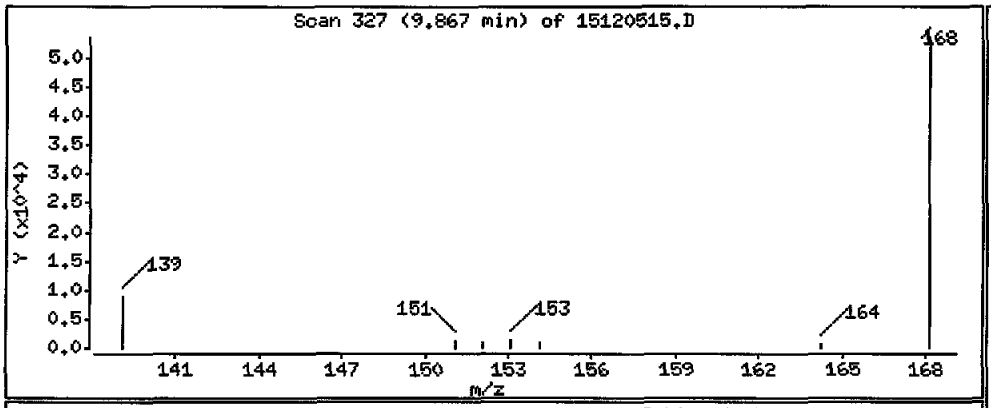
Operator: JW

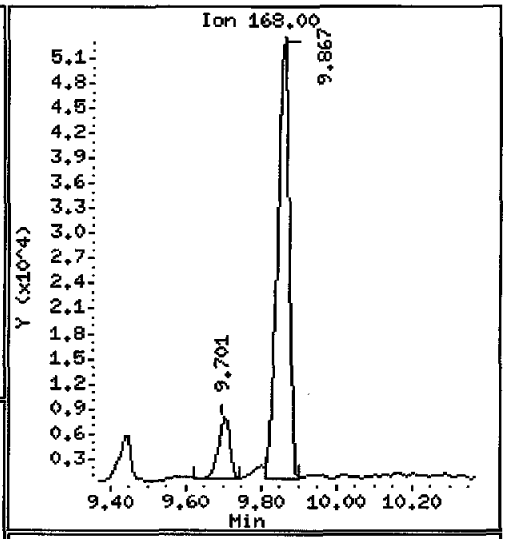
Column phase: Rxi-17Sil MS

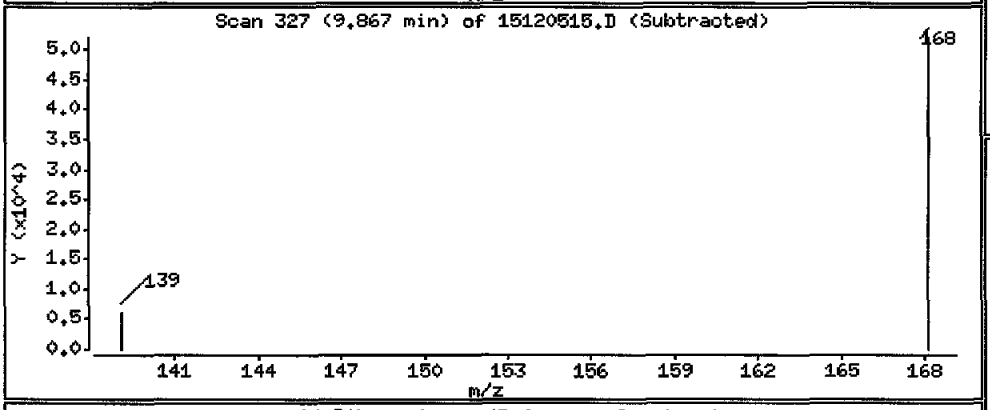
Column diameter: 0.25

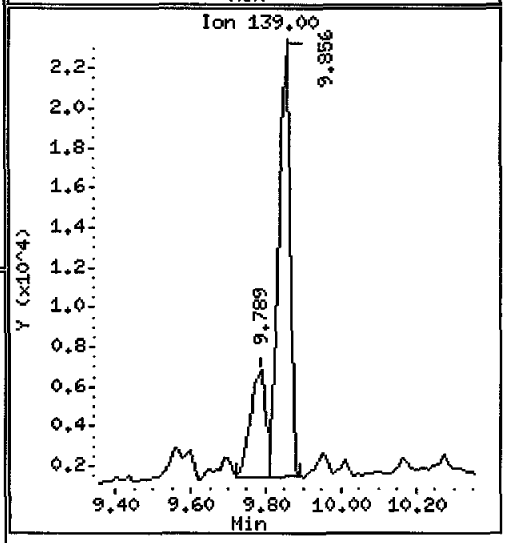
14 Dibenzofuran

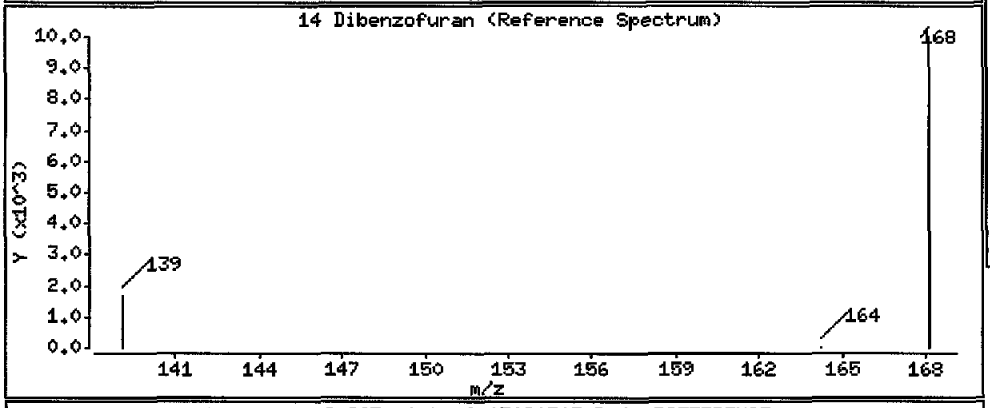
Concentration: 6000 ug/kg

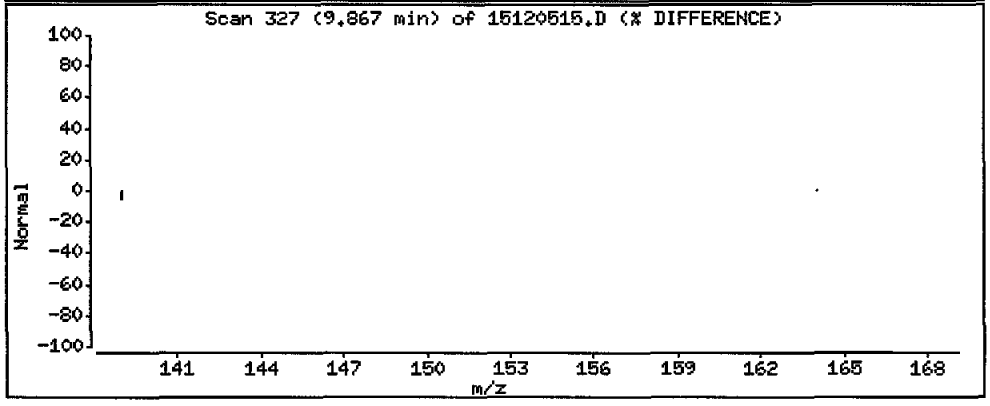












Data File: \\target\share\chem3\nt11.i\20151205.b\15120515.D

Date : 05-DEC-2015 17:16

Client ID: PG-SMA2-1-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ90

Volume Injected (uL): 2.0

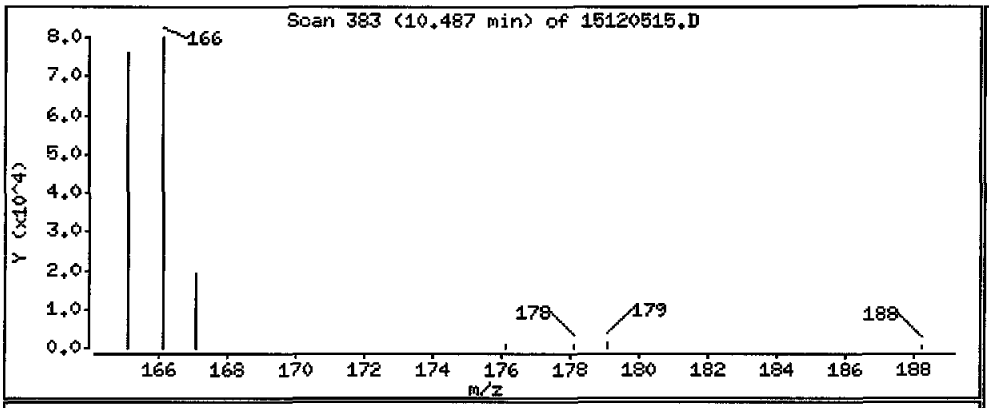
Operator: JW

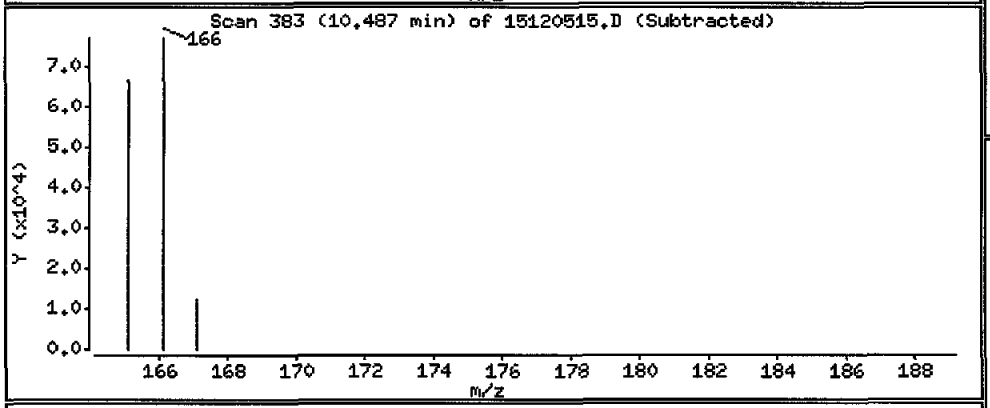
Column phase: Rxi-17Sil MS

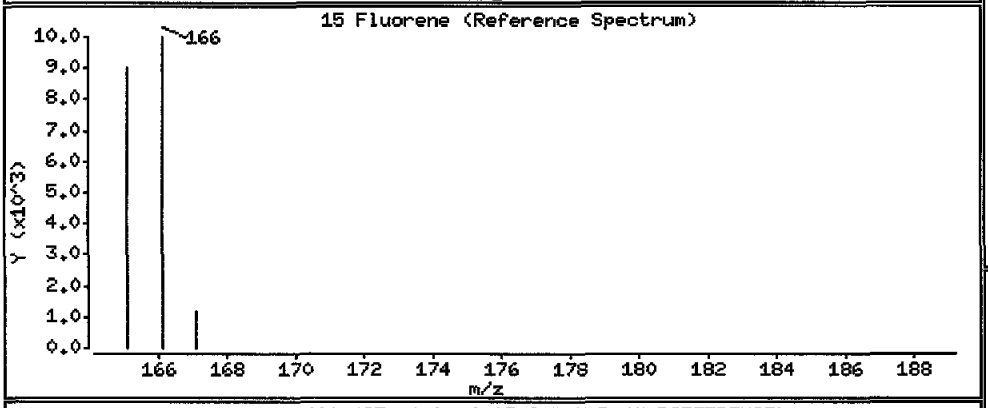
Column diameter: 0.25

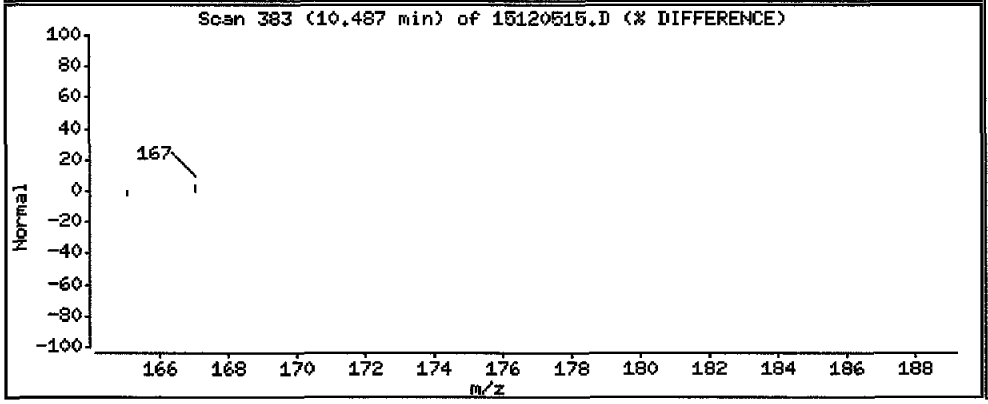
15 Fluorene

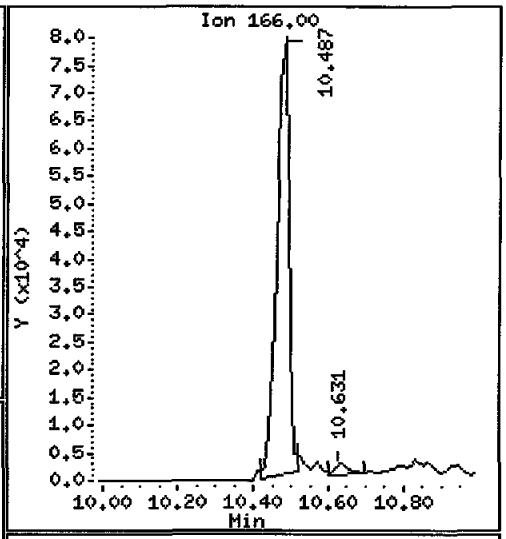
Concentration: 12000 ug/kg

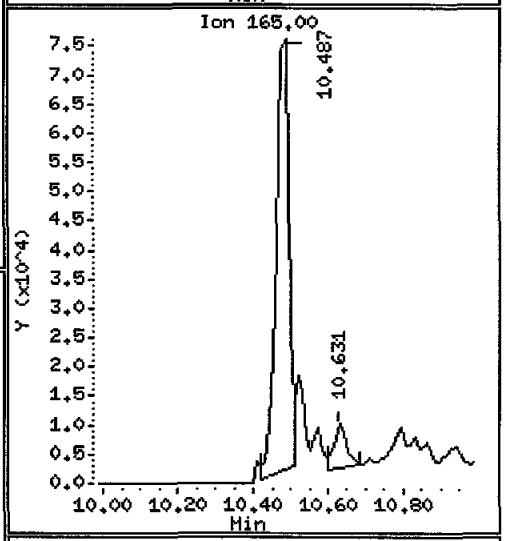


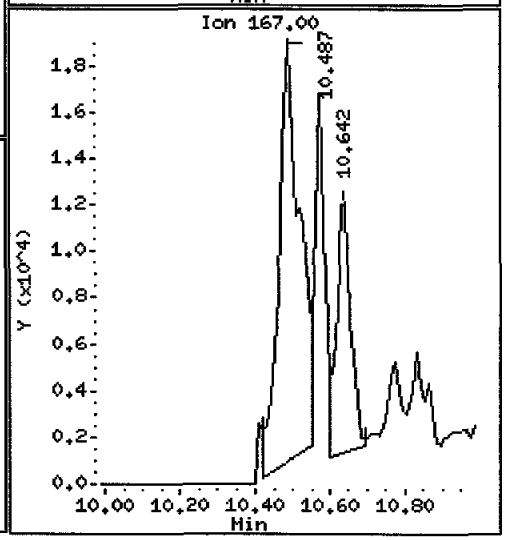












Data File: \\target\share\chem3\nt11.i\20151205.b\15120515.D

Date : 05-DEC-2015 17:16

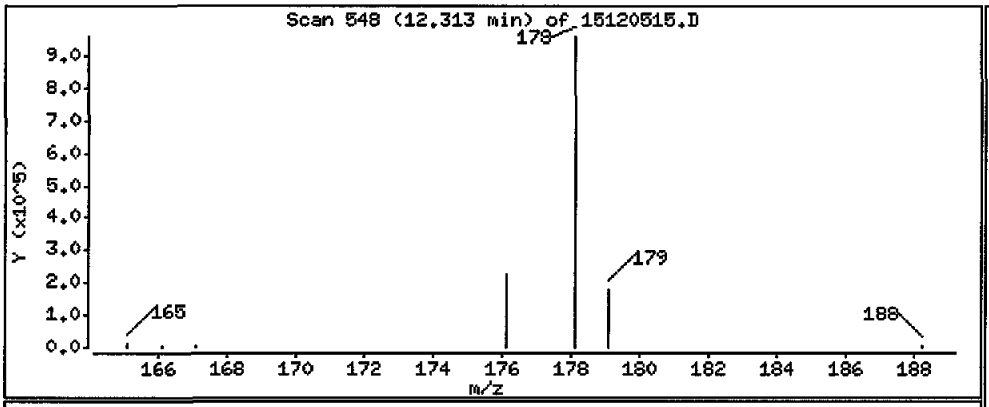
Client ID: PG-SMA2-1-PEMD-1511 Instrument: nt11.i

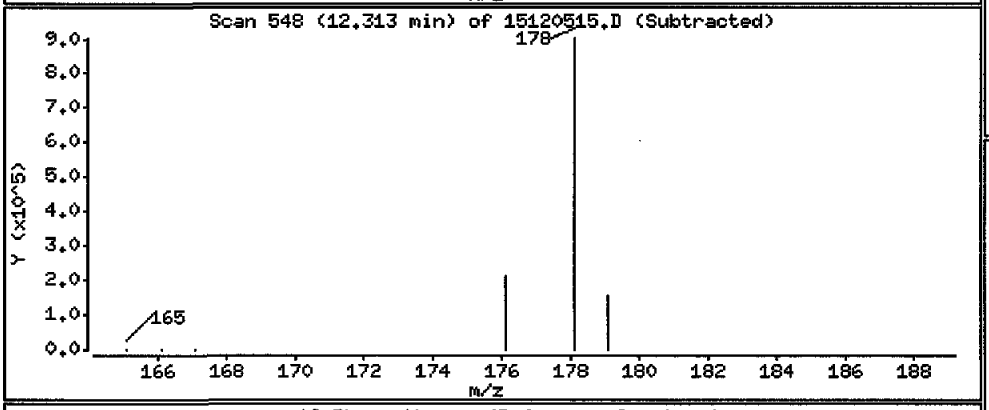
Sample Info: AQJ90

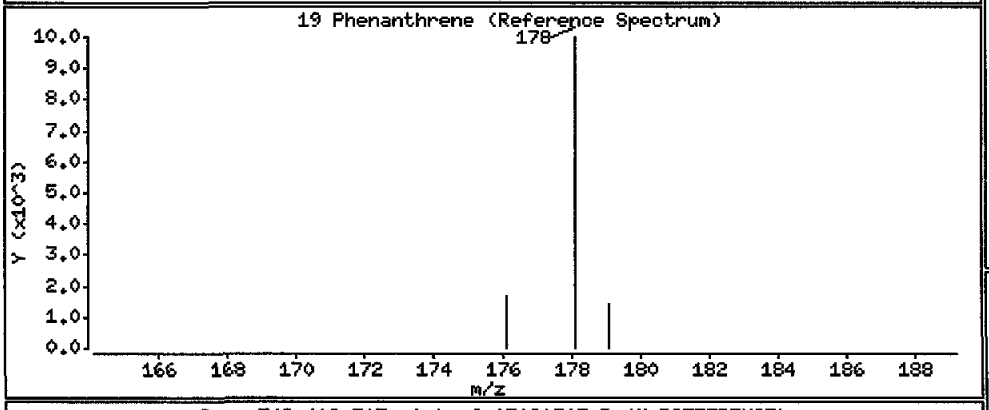
Volume Injected (uL): 2.0 Operator: JW

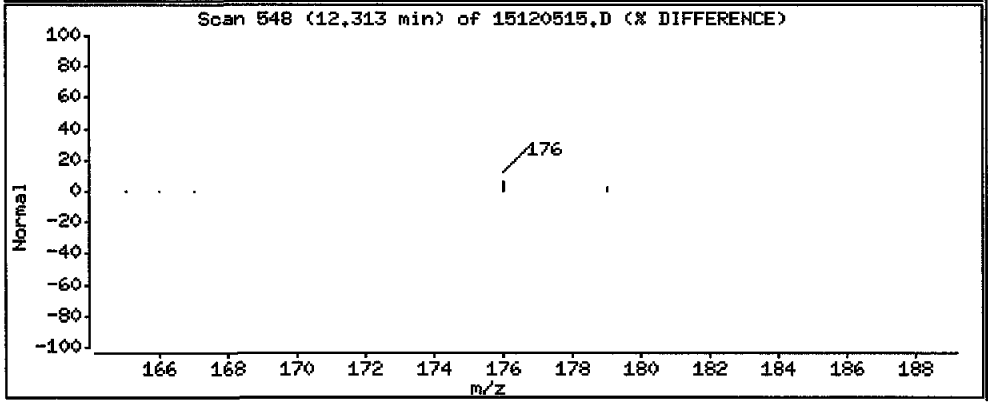
Column phase: Rxi-17Sil MS Column diameter: 0.25

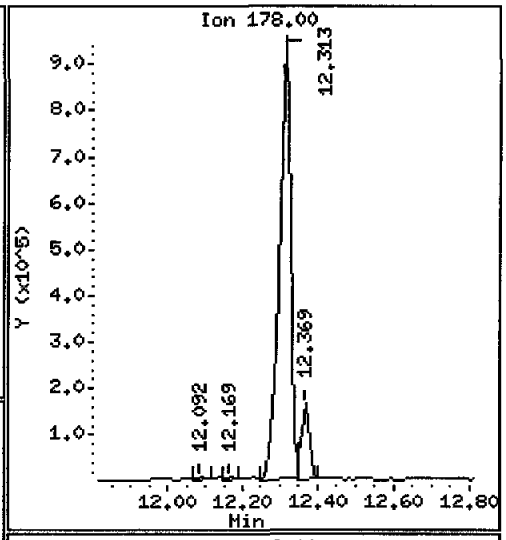
19 Phenanthrene Concentration: 80500 ug/kg

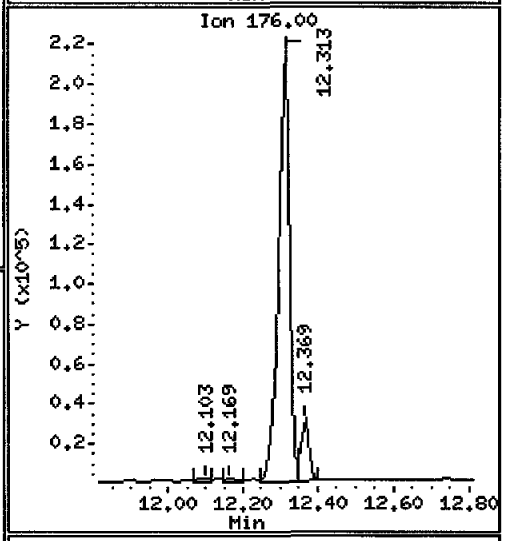


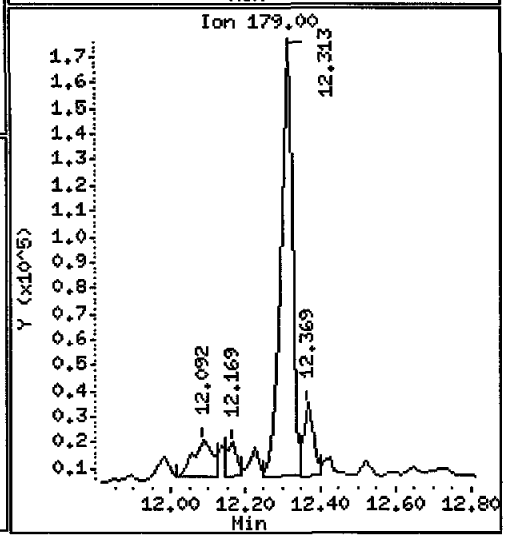












Data File: \\target\share\chem3\nt11.i\20151205.b\15120515.D

Date : 05-DEC-2015 17:16

Client ID: PC-SMA2-1-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ90

Volume Injected (uL): 2.0

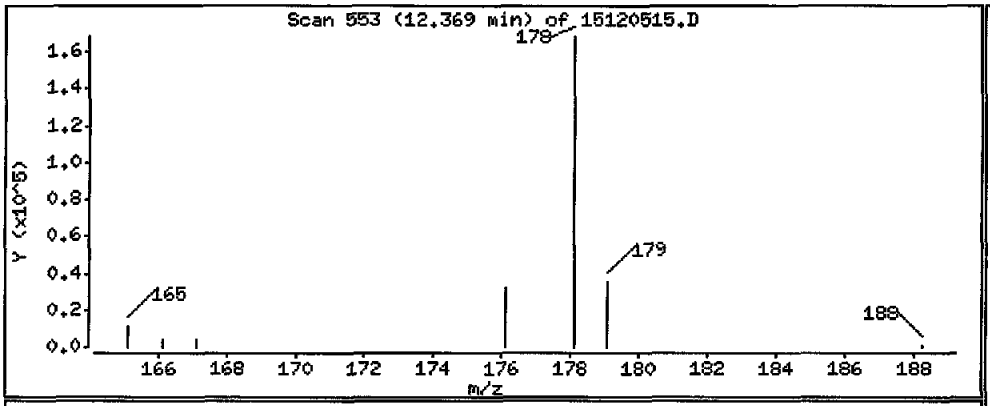
Operator: JW

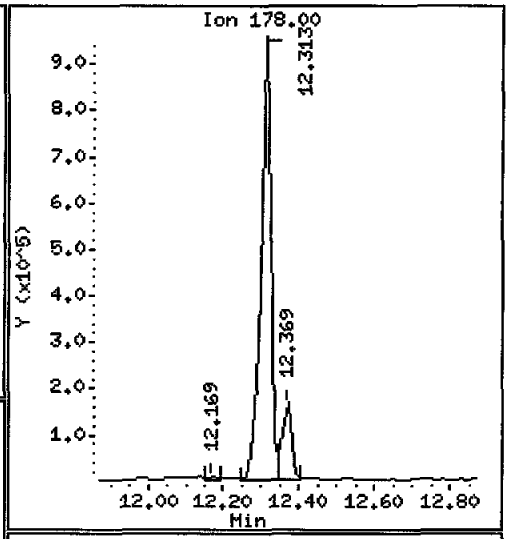
Column phase: Rxi-17Sil MS

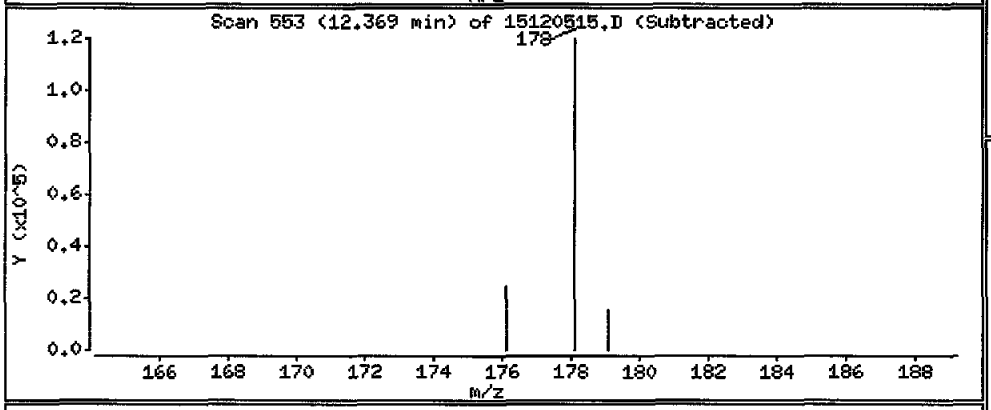
Column diameter: 0.25

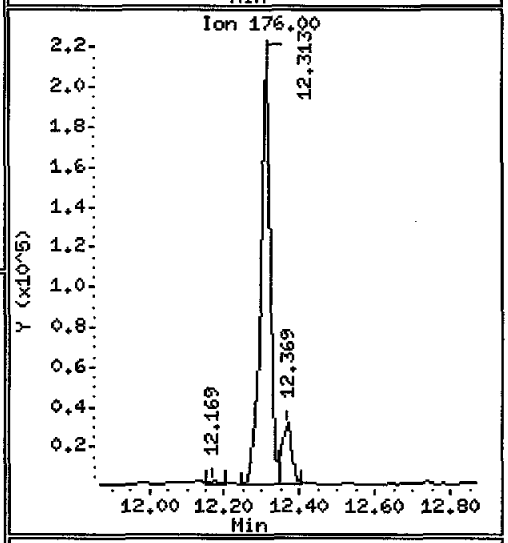
20 Anthracene

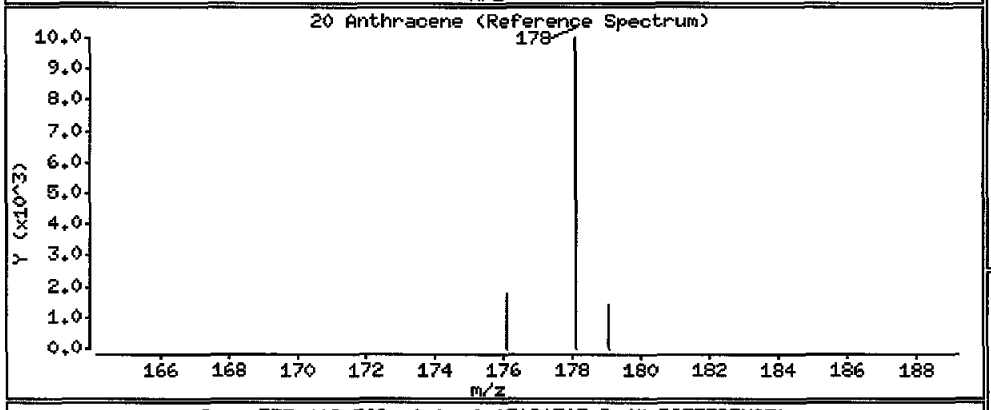
Concentration: 13500 ug/kg

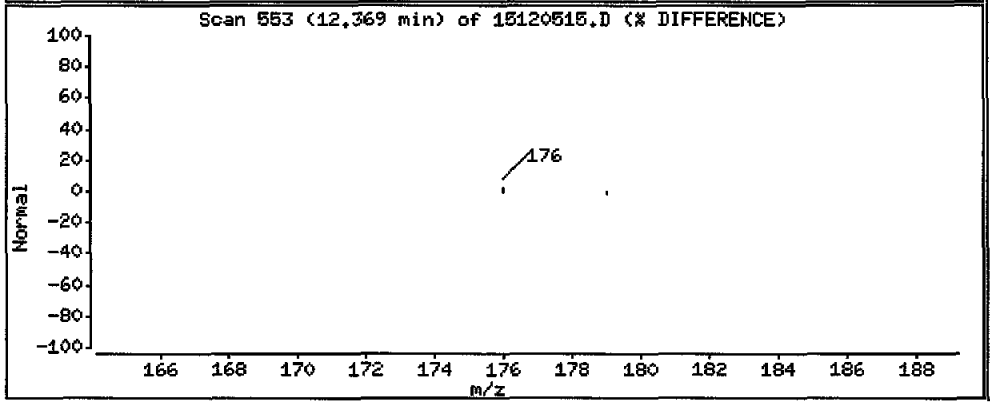


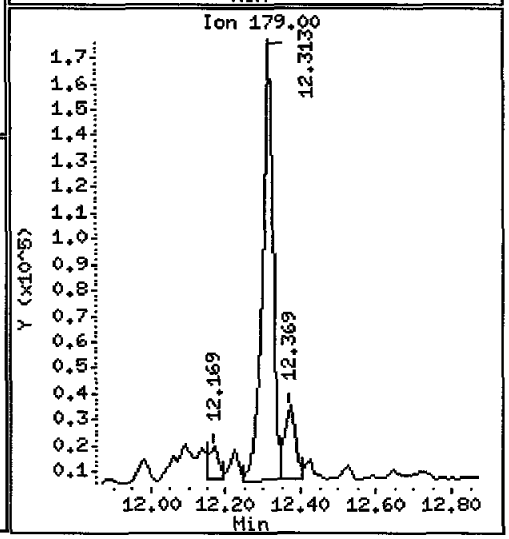












Data File: \\target\share\chem3\nt11.i\20151205.b\15120515.D

Date : 05-DEC-2015 17:16

Client ID: PG-SMA2-1-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ90

Volume Injected (uL): 2.0

Operator: JW

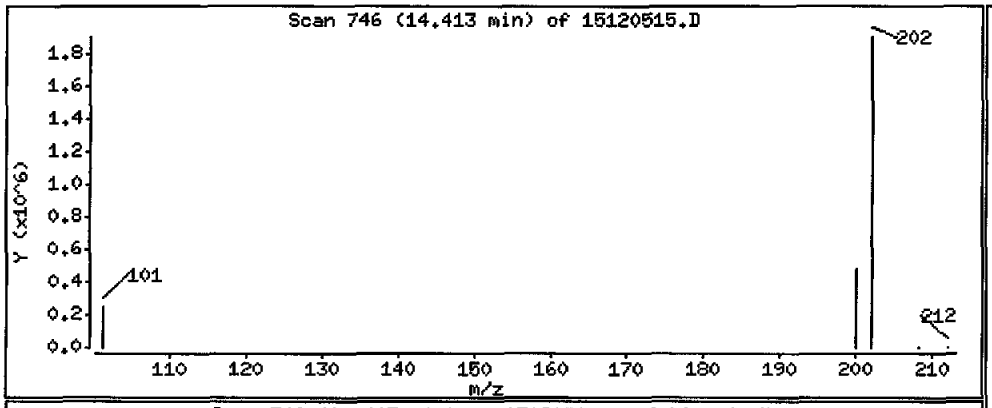
Column phase: Rxi-17Sil MS

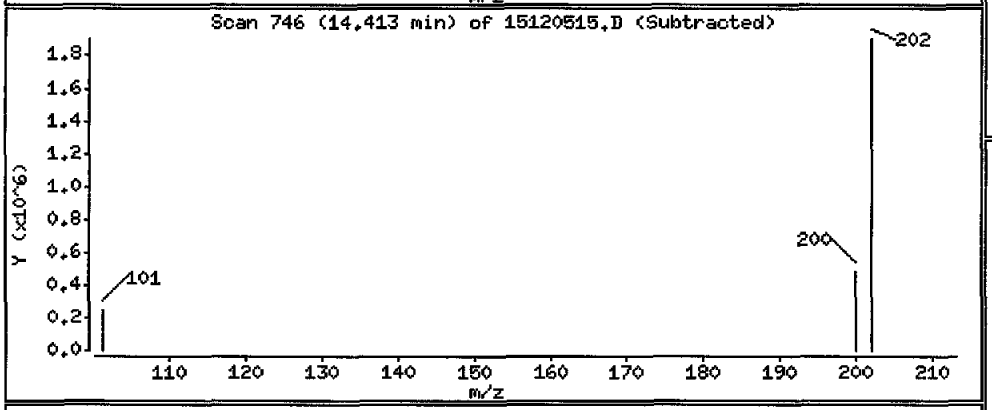
Column diameter: 0.25

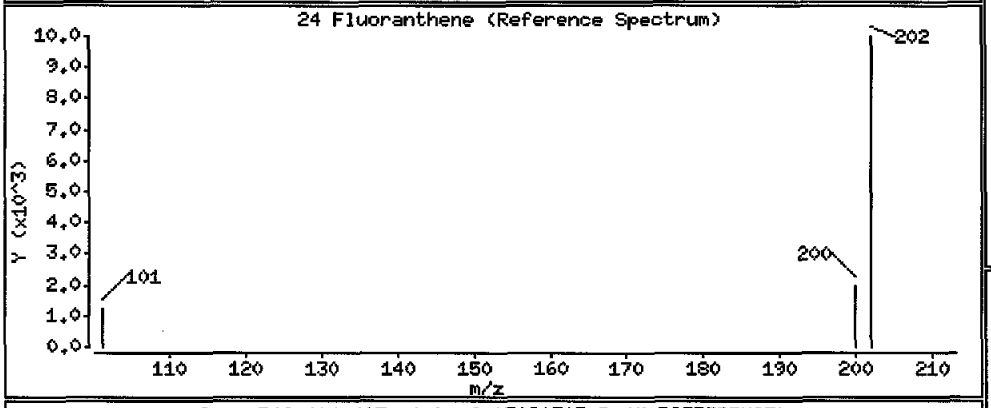
24 Fluoranthene

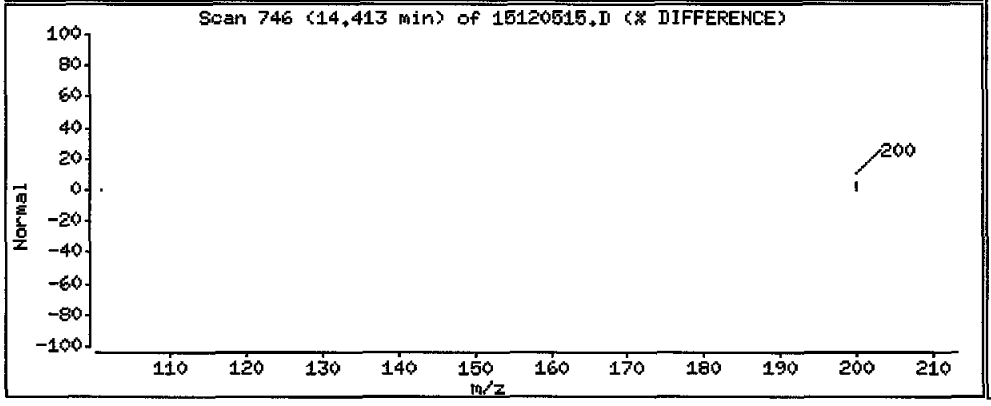
Concentration: 160000 ug/kg

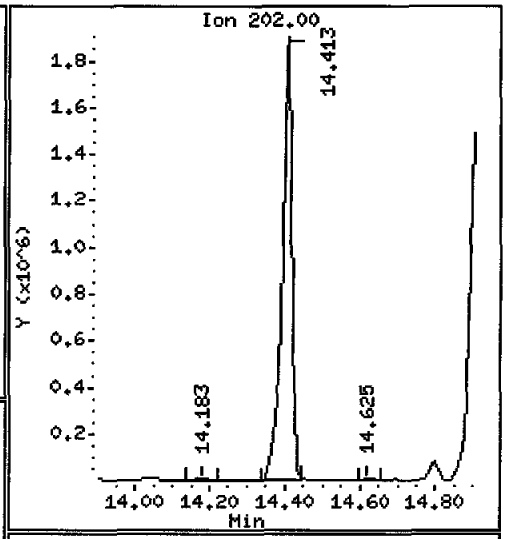
F

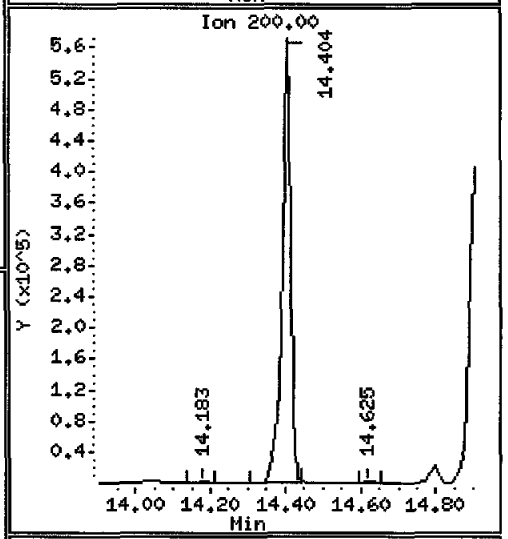


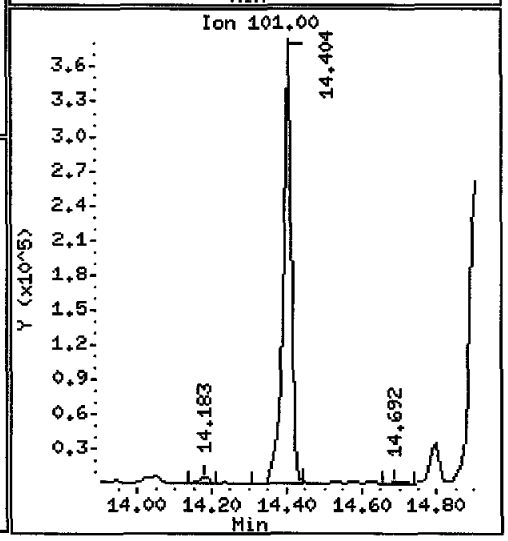












Data File: \\target\share\chem3\nt11.i\20151205.b\15120515.D

Date : 05-DEC-2015 17:16

Client ID: PG-SMA2-1-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9O

Volume Injected (uL): 2.0

Operator: JW

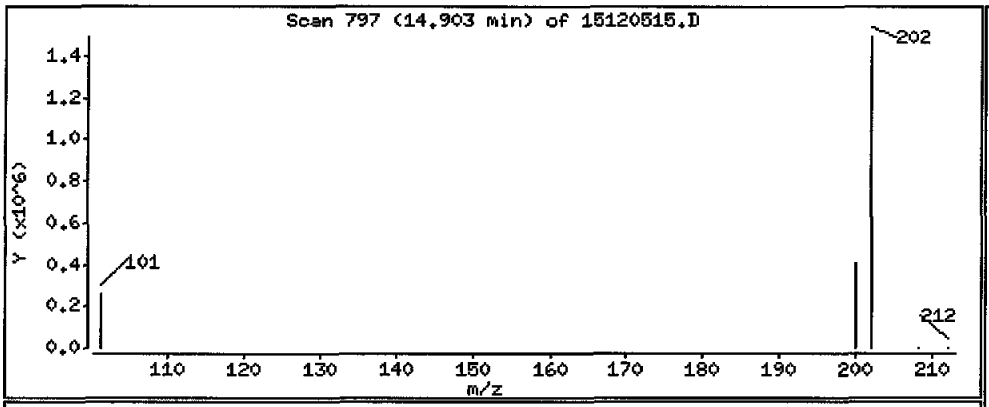
Column phase: Rxi-17Sil MS

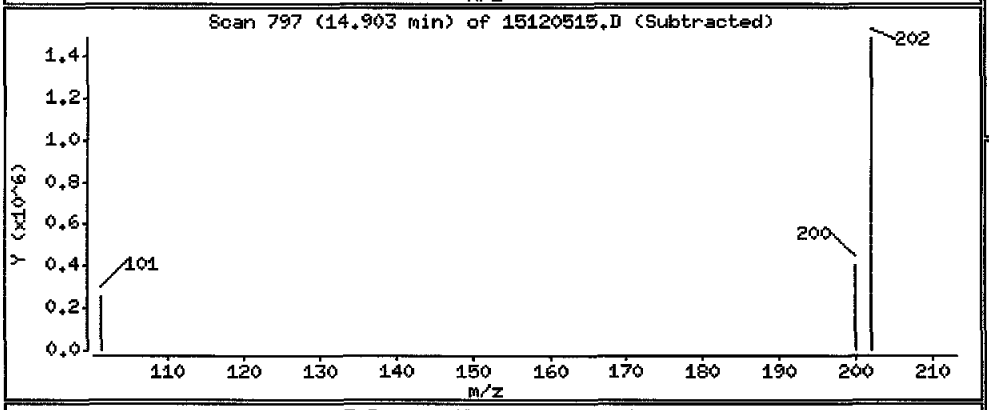
Column diameter: 0.25

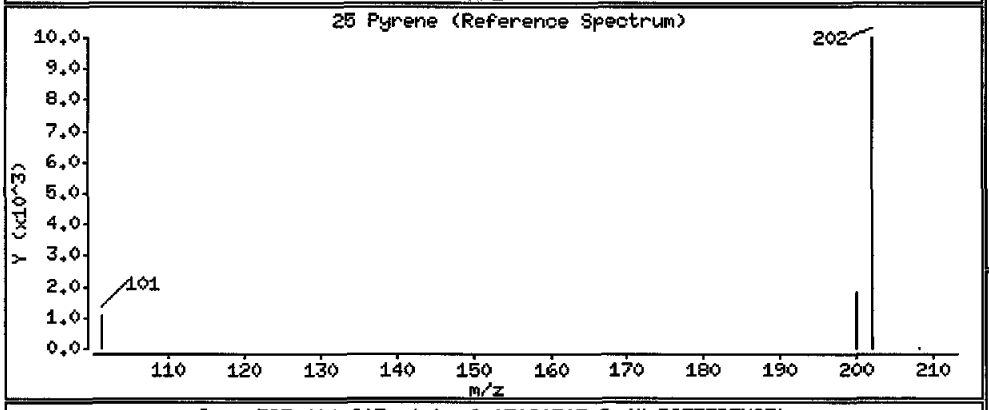
E

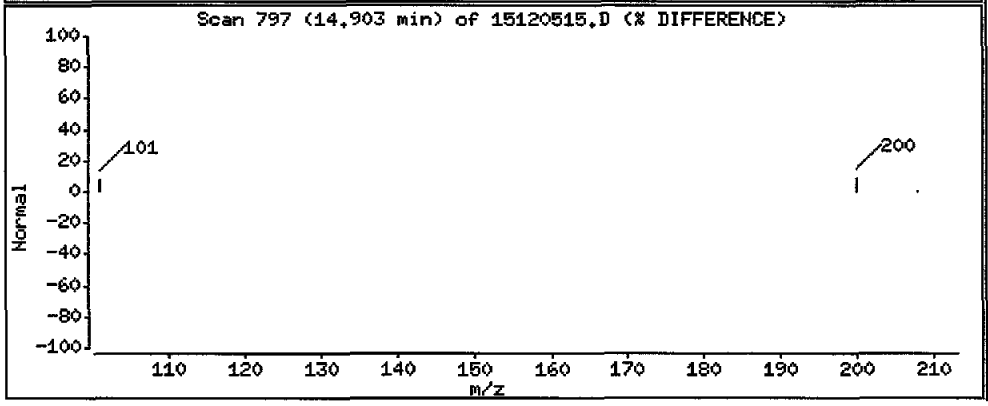
25 Pyrene

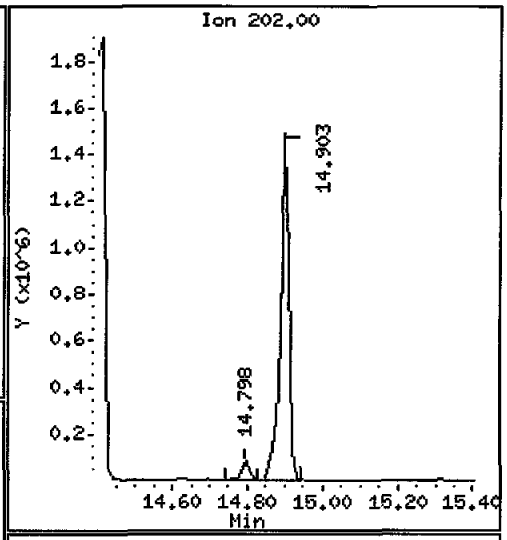
Concentration: 117000 ug/kg

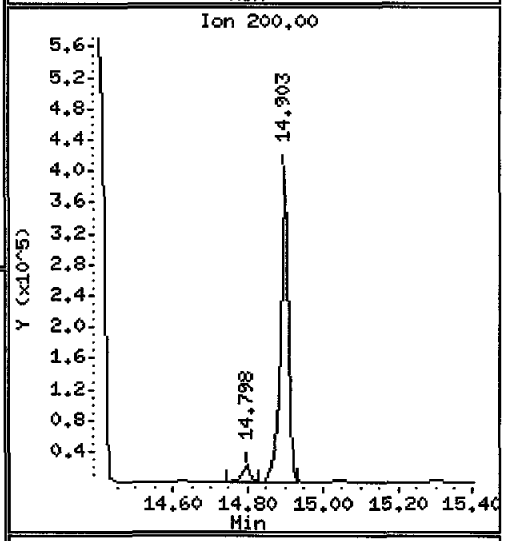


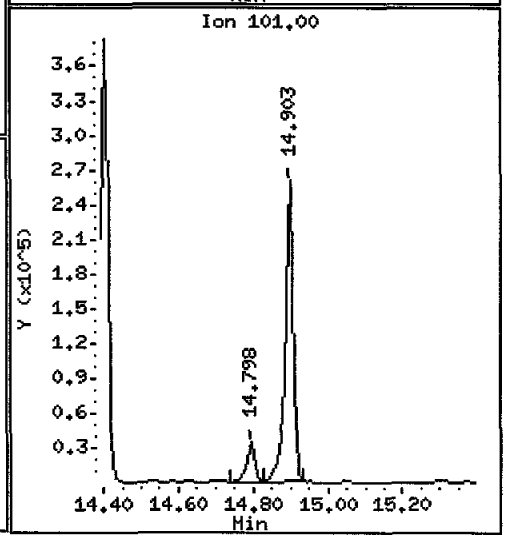












Data File: \\target\share\chem3\nt11.i\20151205.b\15120515.D

Date : 05-DEC-2015 17:16

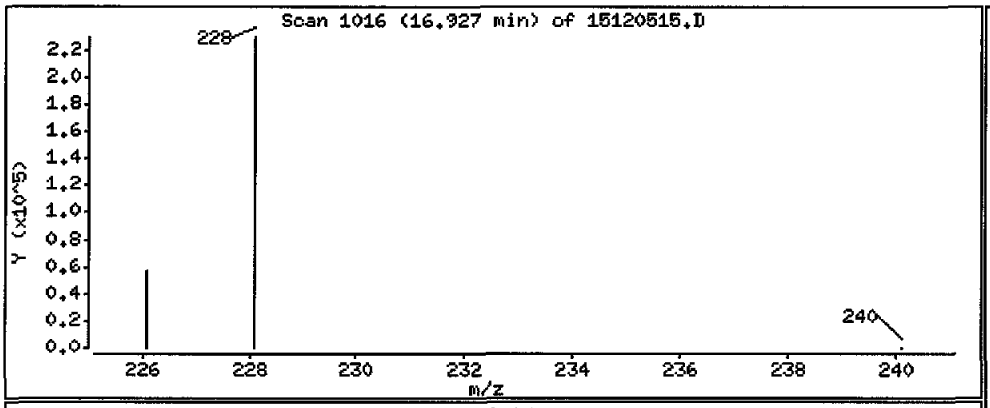
Client ID: PG-SMA2-1-PEMD-1511 Instrument: nt11.i

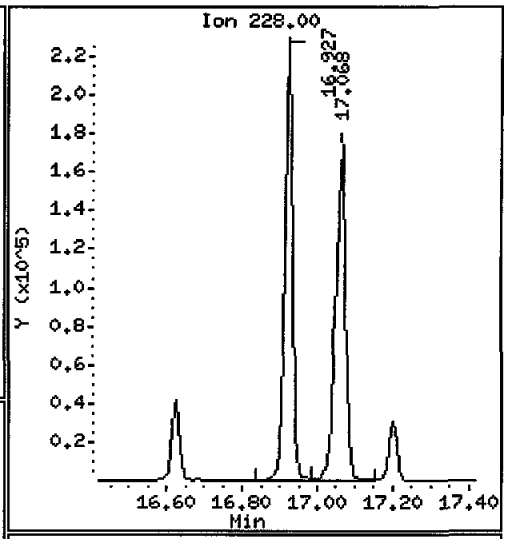
Sample Info: AQJ90

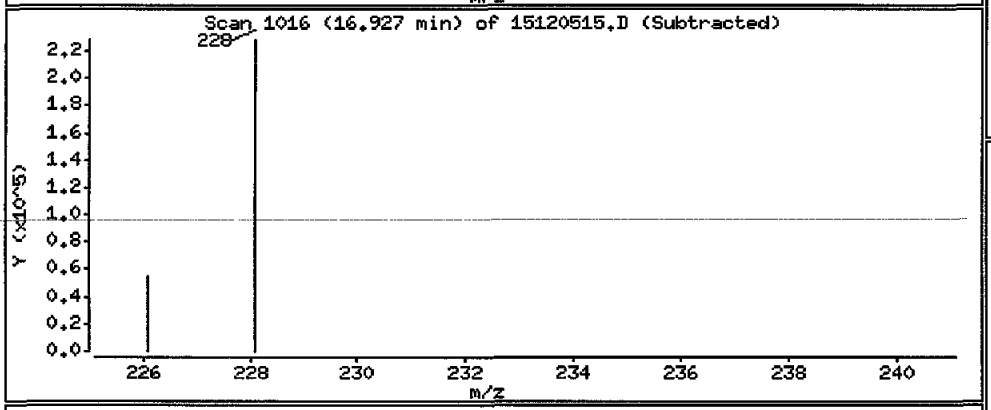
Volume Injected (uL): 2.0 Operator: JW

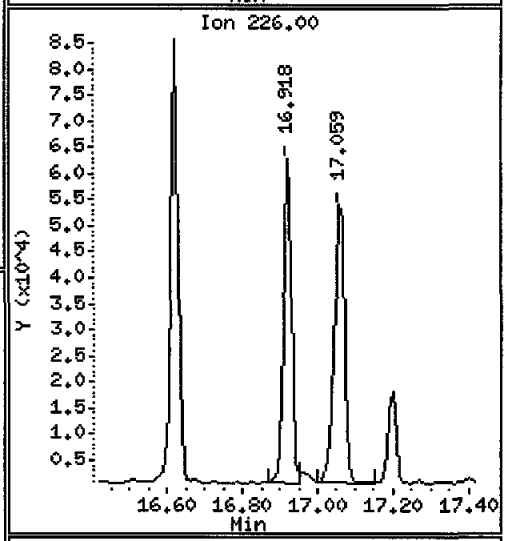
Column phase: Rxi-17Sil MS Column diameter: 0.25

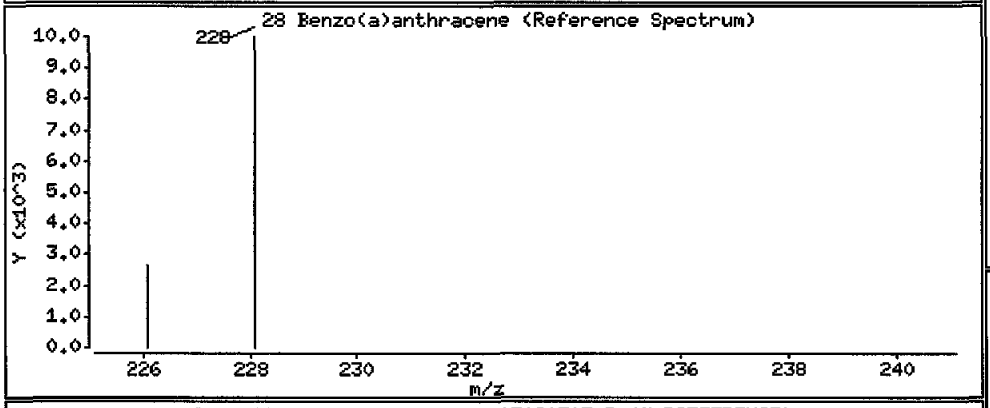
28 Benzo(a)anthracene Concentration: 18900 ug/kg

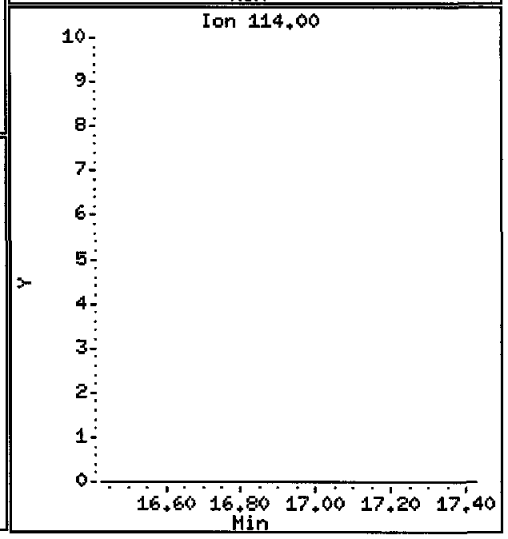


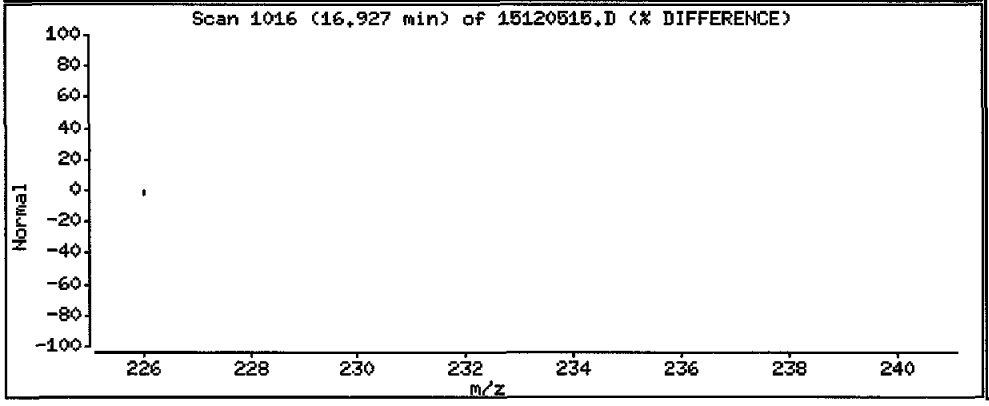












Data File: \\target\share\chem3\nt11.i\20151205.b\15120515.D

Date : 05-DEC-2015 17:16

Client ID: PG-SMA2-1-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9O

Volume Injected (uL): 2.0

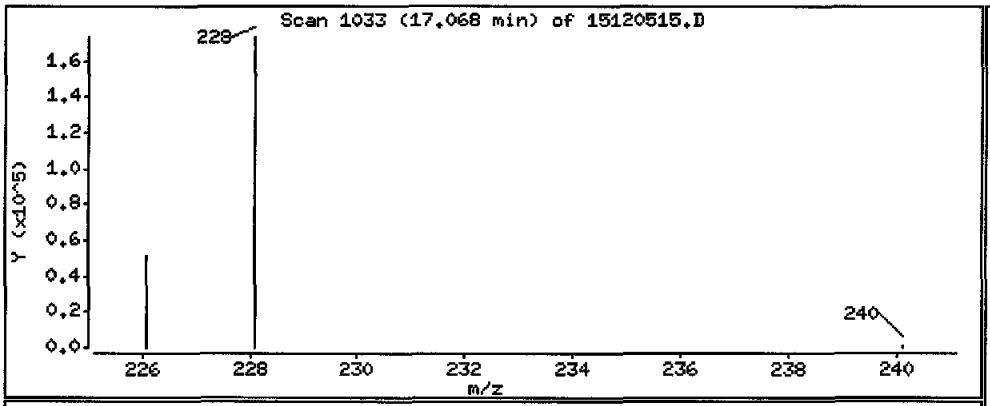
Operator: JW

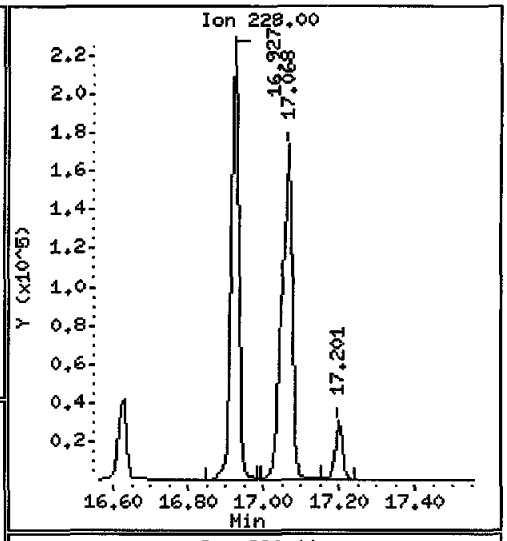
Column phase: Rxi-17Sil MS

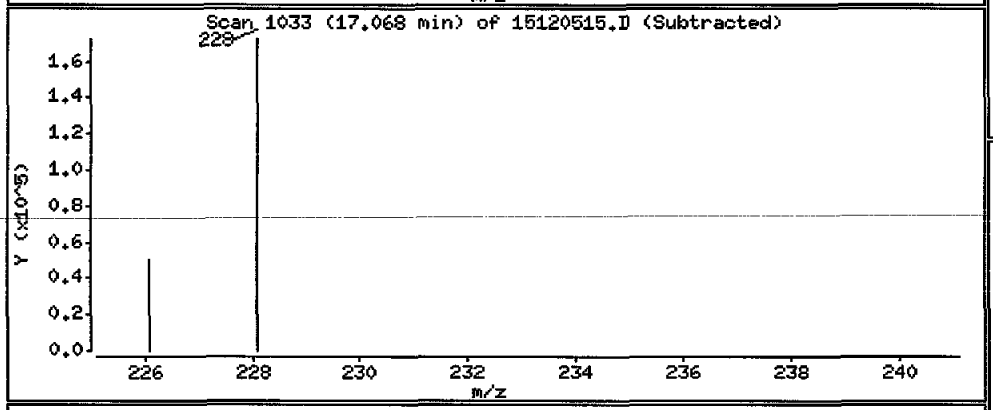
Column diameter: 0.25

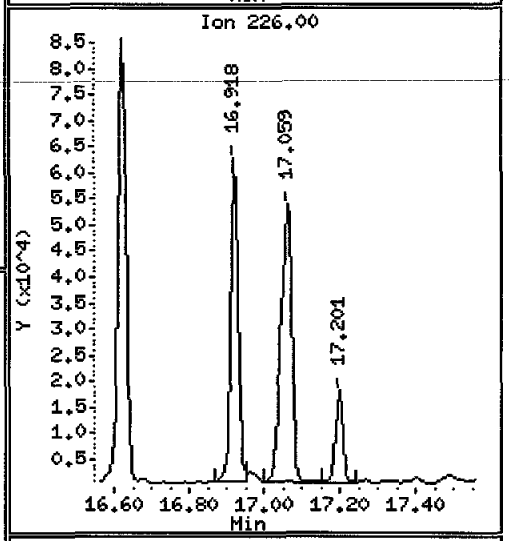
30 Chrysene

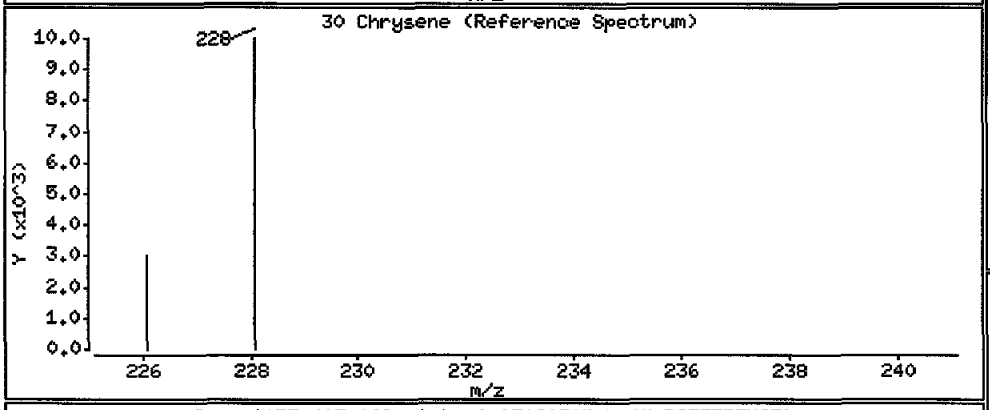
Concentration: 17300 ug/kg

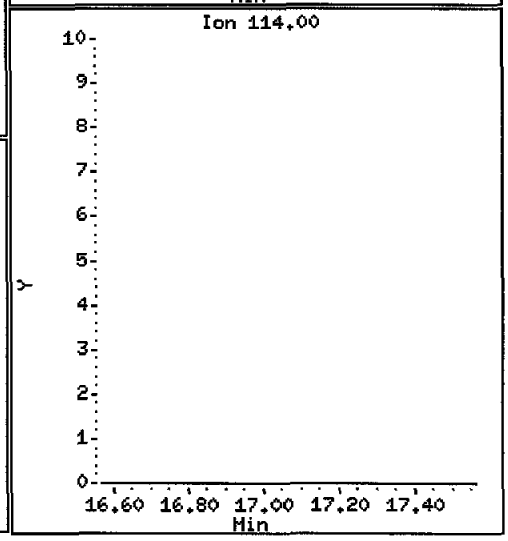


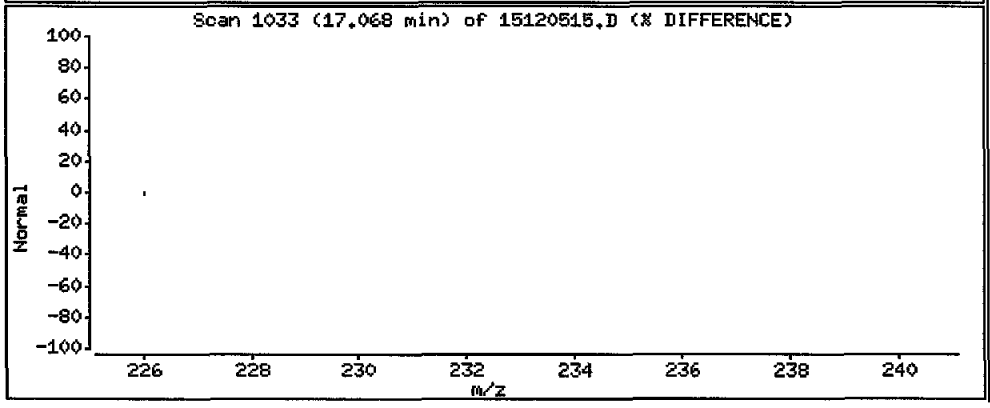












Data File: \\target\share\chem3\nt11.i\20151205.b\15120515.D

Date : 05-DEC-2015 17:16

Client ID: PG-SMA2-1-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9O

Volume Injected (uL): 2.0

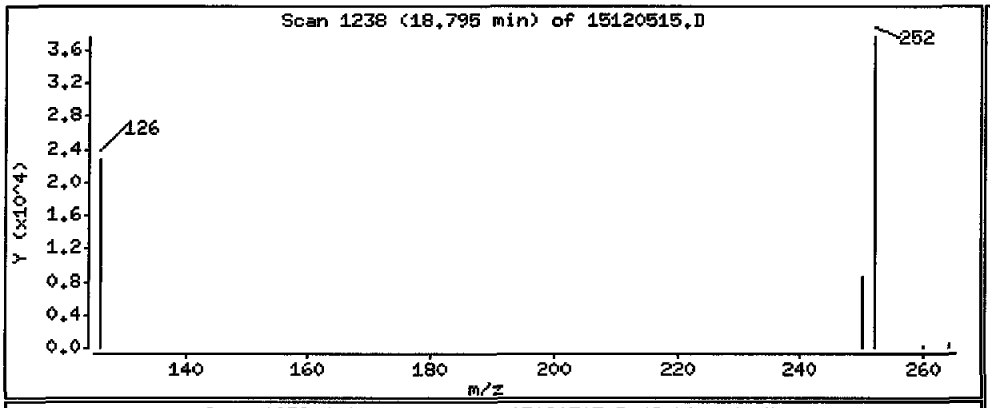
Operator: JW

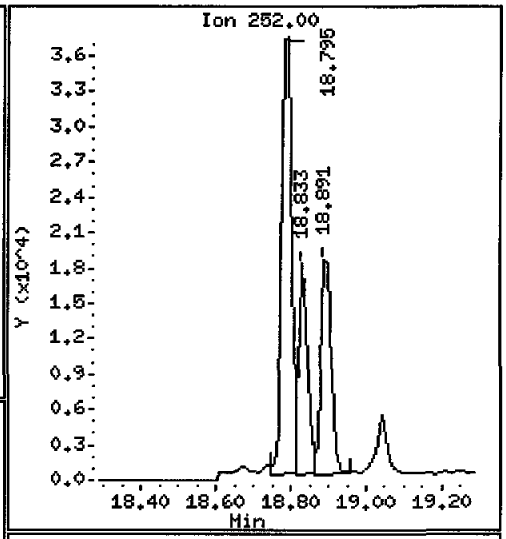
Column phase: Rxi-17Sil MS

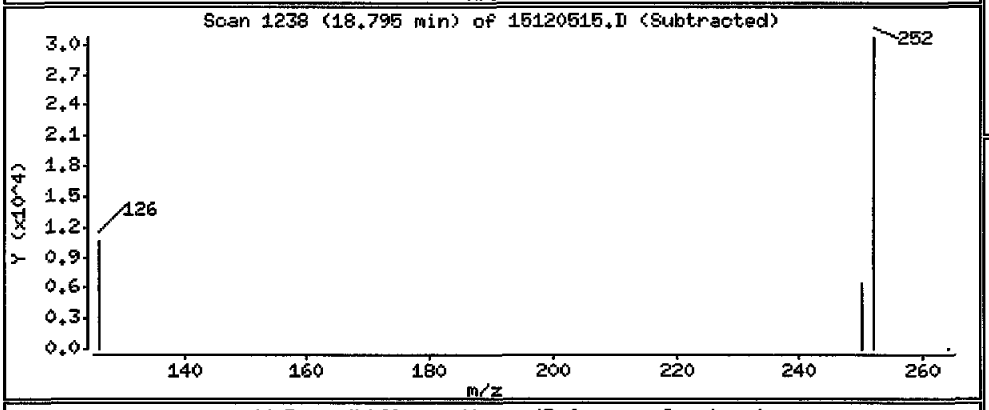
Column diameter: 0.25

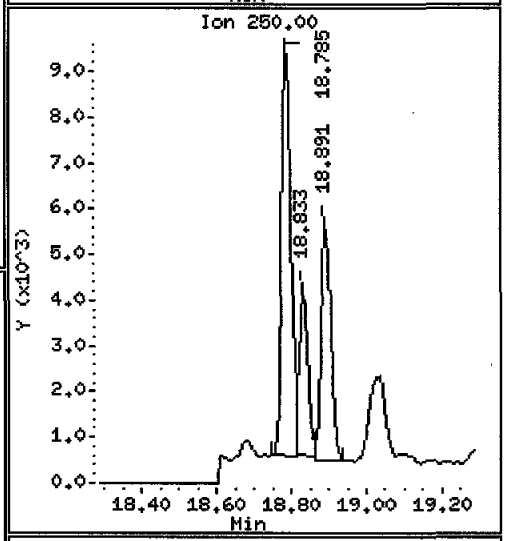
44 Benzo(b)fluoranthene

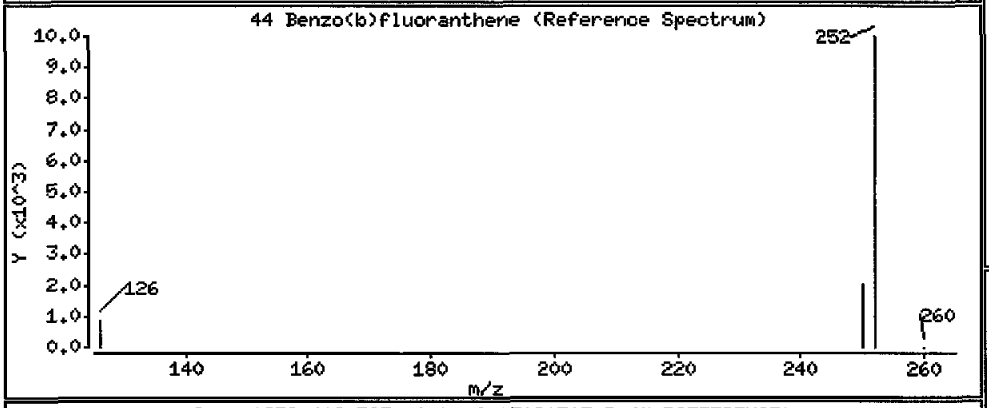
Concentration: 4490 ug/kg

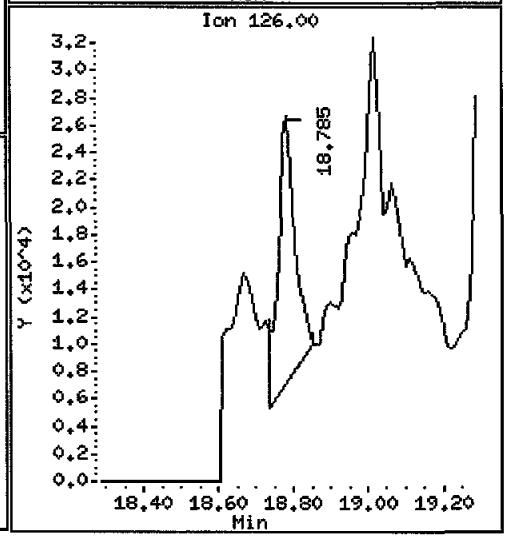


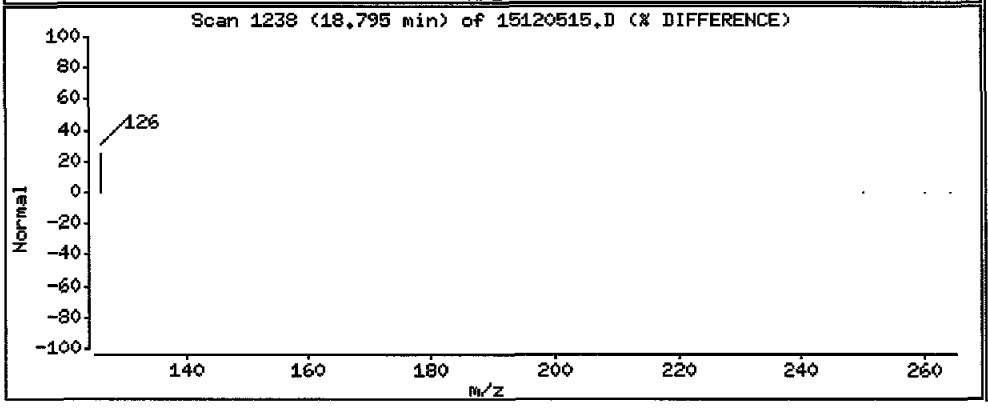












Data File: \\target\share\chem3\nt11.i\20151205.b\15120515.D

Date : 05-DEC-2015 17:16

Client ID: PG-SMA2-1-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ90

Volume Injected (uL): 2.0

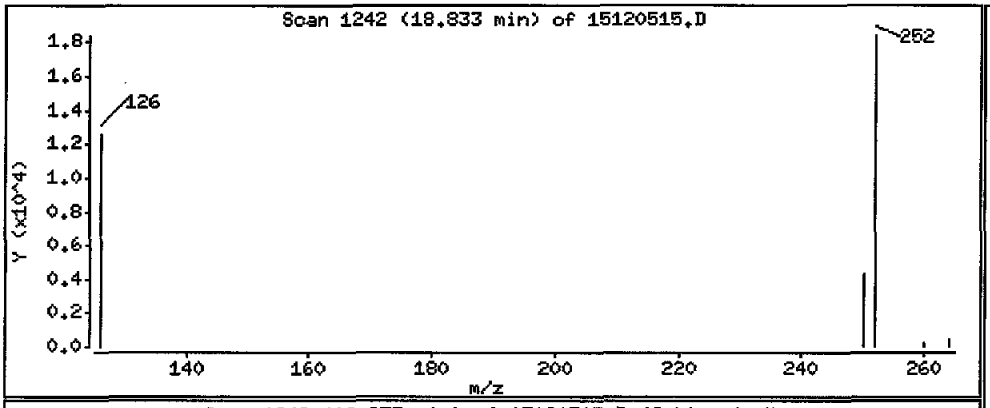
Operator: JW

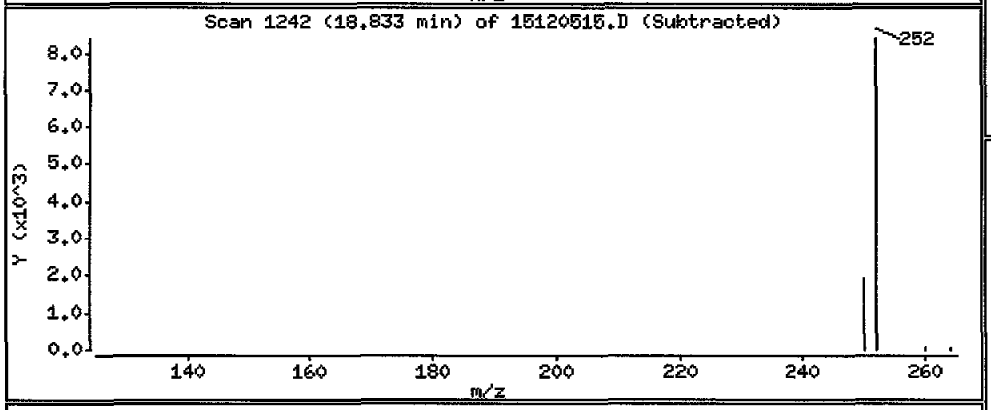
Column phase: Rxi-17Sil MS

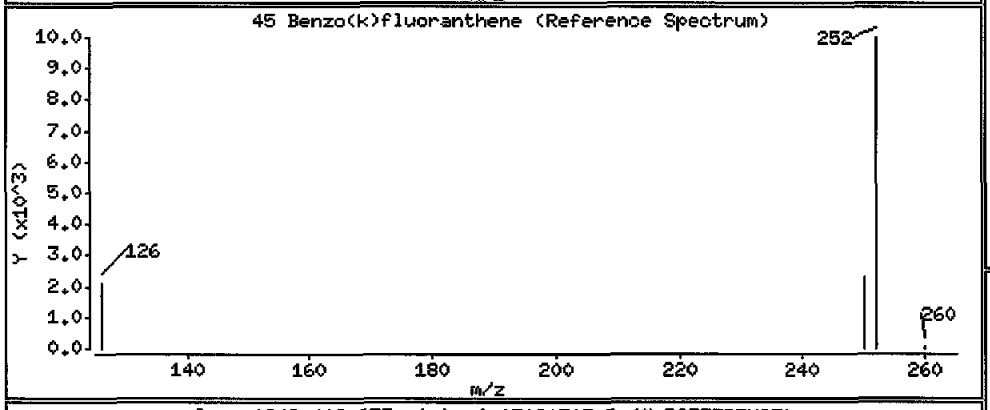
Column diameter: 0.25

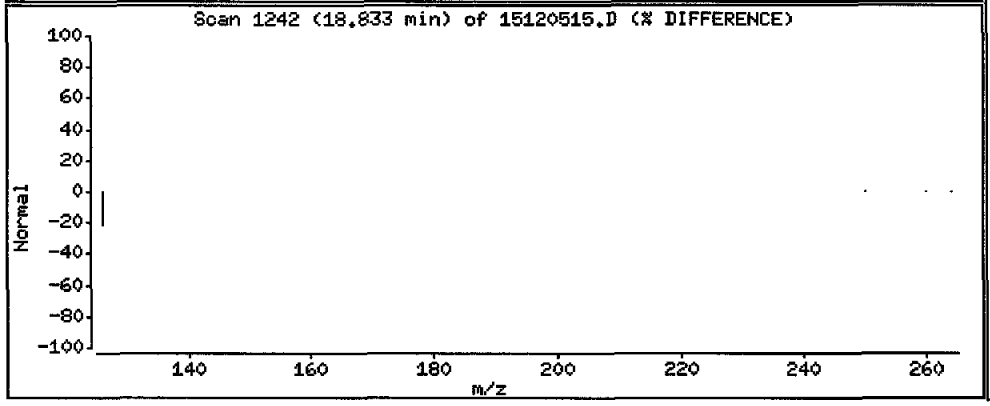
45 Benzo(k)fluoranthene

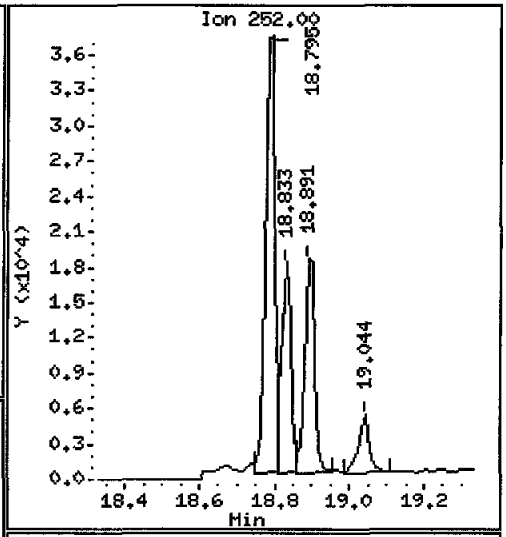
Concentration: 1810 ug/kg

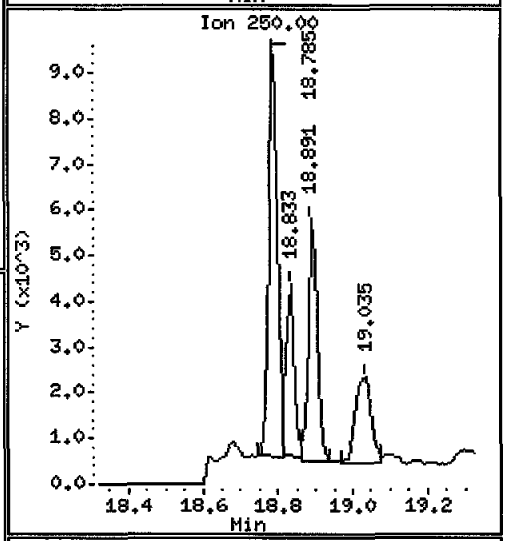


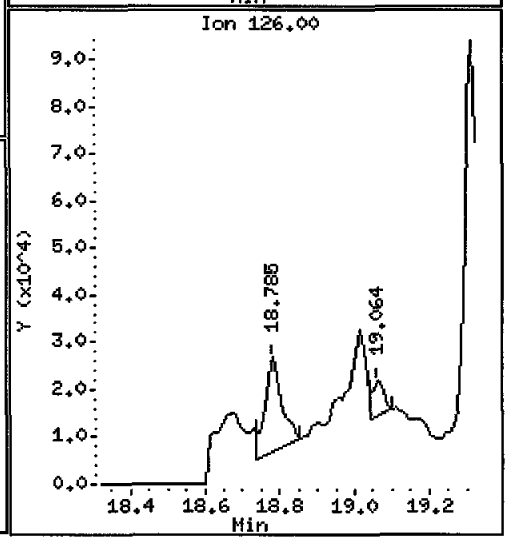












Data File: \\target\share\chem3\nt11.i\20151205.b\15120515.D

Date : 05-DEC-2015 17:16

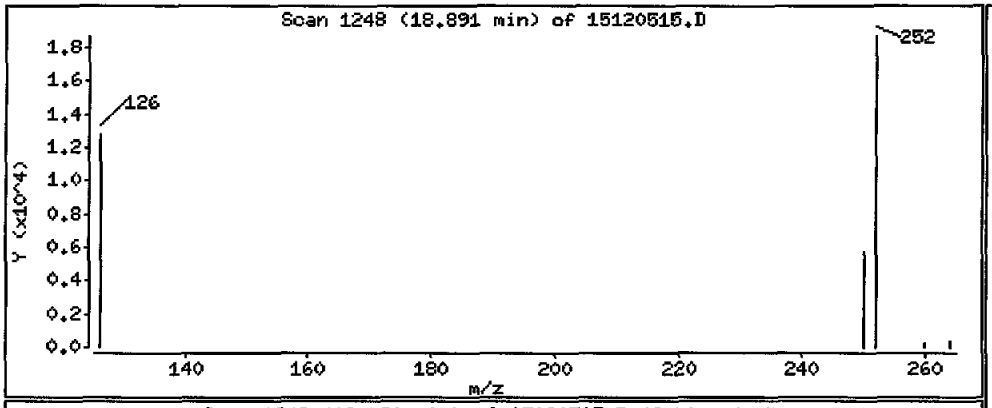
Client ID: PG-SMA2-1-PEMD-1511 Instrument: nt11.i

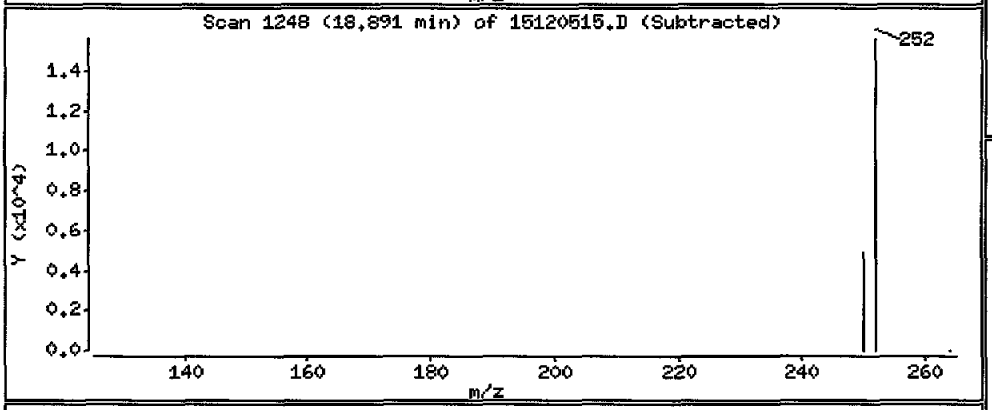
Sample Info: AQJ90

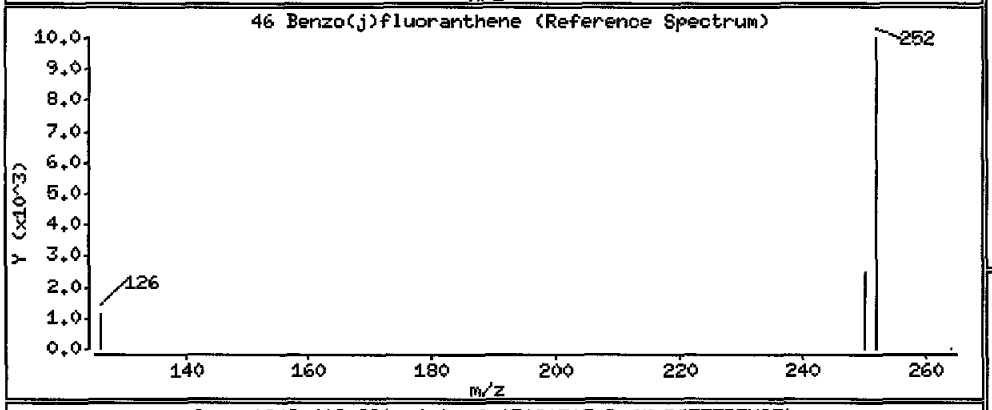
Volume Injected (uL): 2.0 Operator: JW

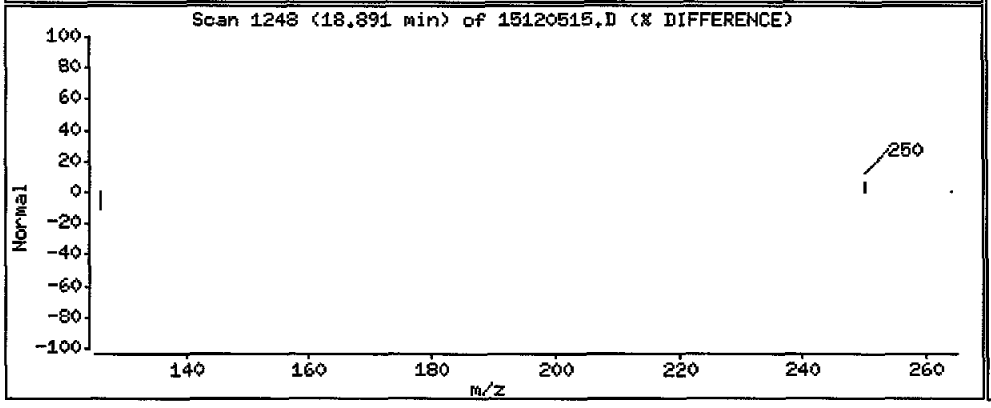
Column phase: Rxi-17Sil MS Column diameter: 0.25

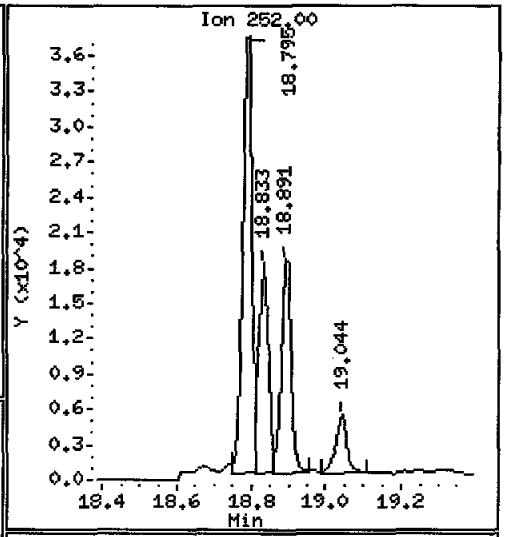
46 Benzo(j)fluoranthene Concentration: 2130 ug/kg

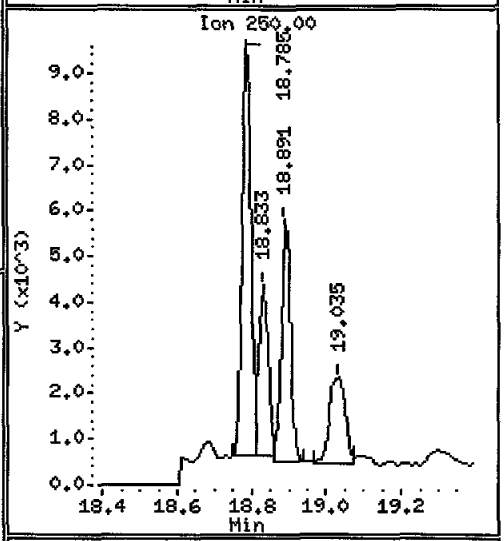


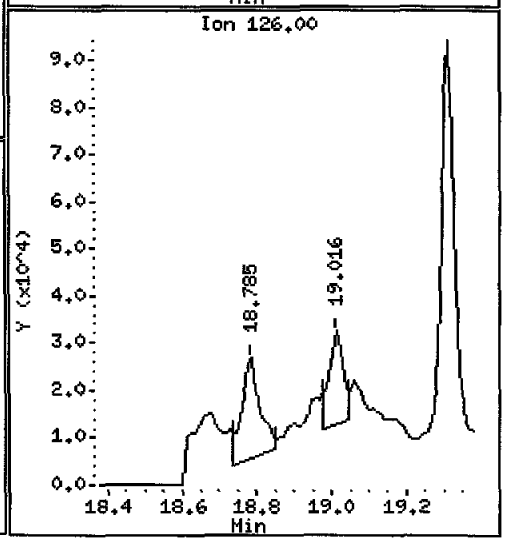












Data File: \\target\share\chem3\nt11.i\20151205.b\15120515.D

Date : 05-DEC-2015 17:16

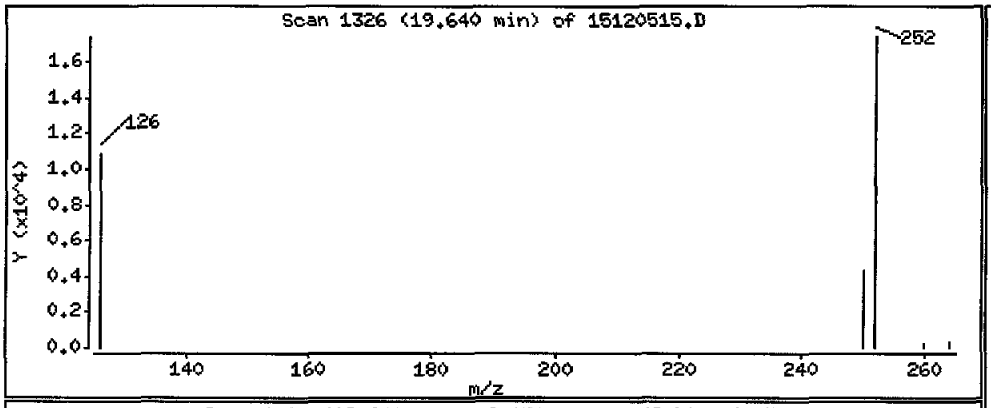
Client ID: PG-SMA2-1-PEMD-1511 Instrument: nt11.i

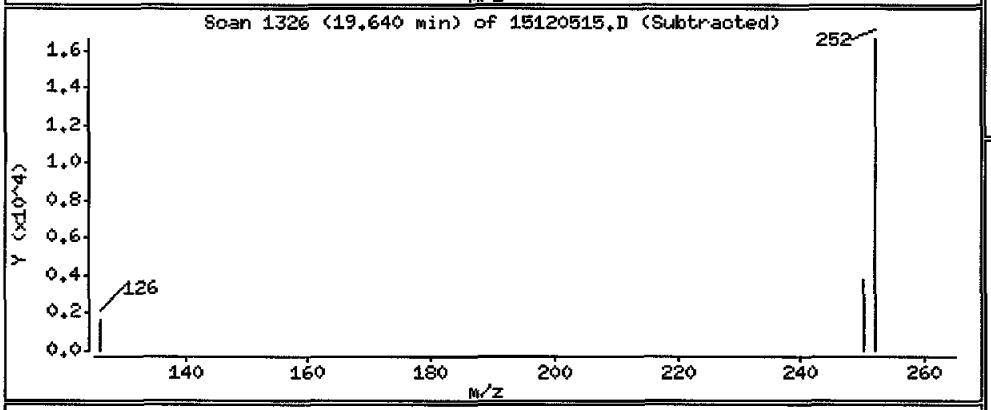
Sample Info: AQJ9O

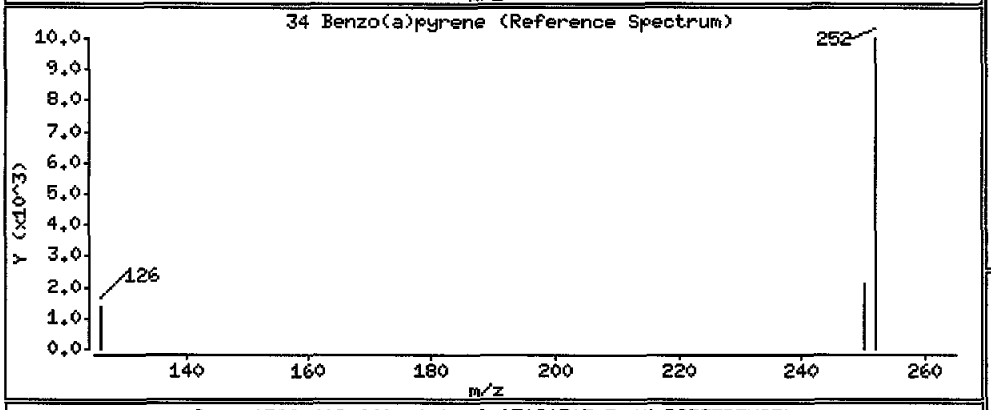
Volume Injected (uL): 2.0 Operator: JW

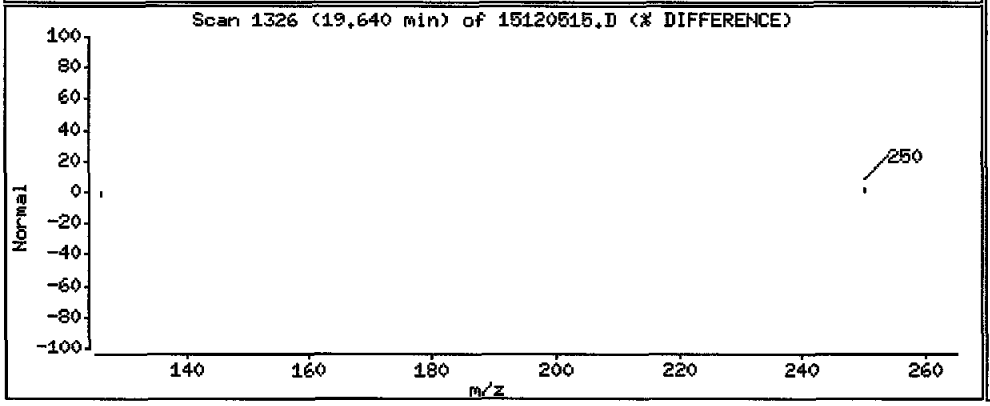
Column phase: Rxi-17Sil MS Column diameter: 0.25

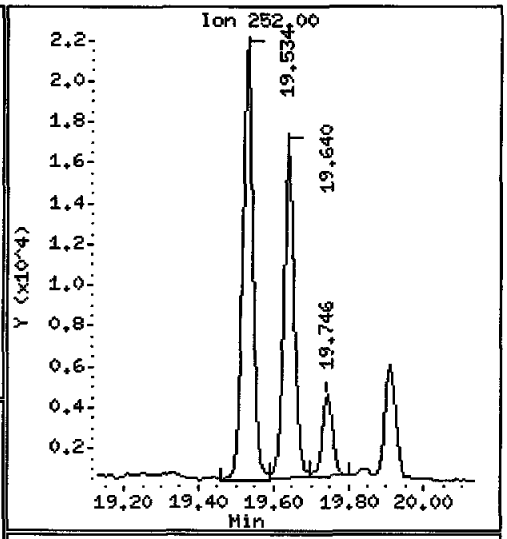
34 Benzo(a)pyrene Concentration: 2210 ug/kg

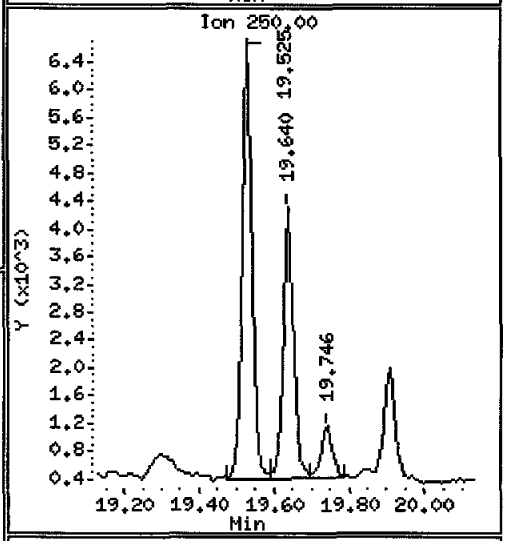


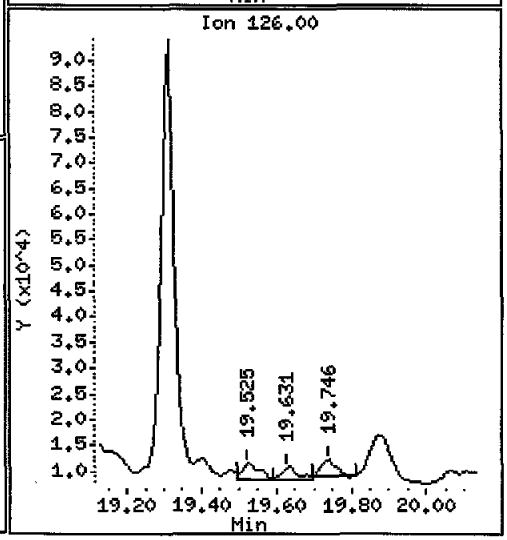












Data File: \\target\share\chem3\nt11.i\20151205.b\15120515.D

Date : 05-DEC-2015 17:16

Client ID: PG-SMA2-1-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9O

Volume Injected (uL): 2.0

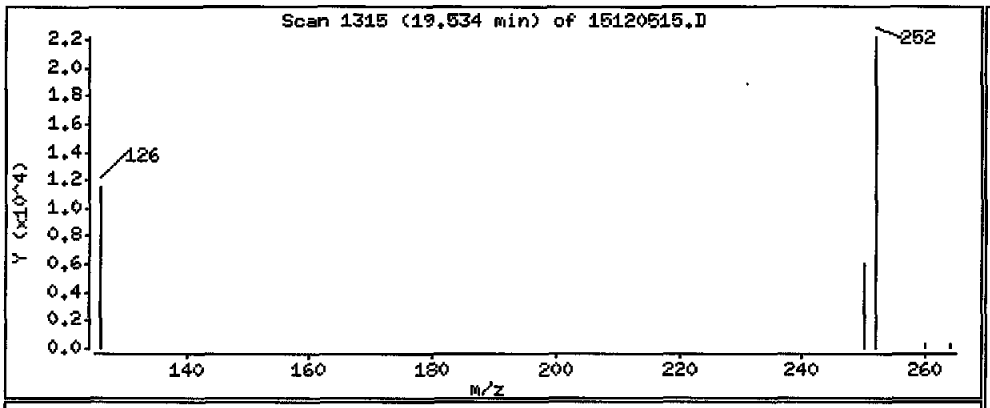
Operator: JW

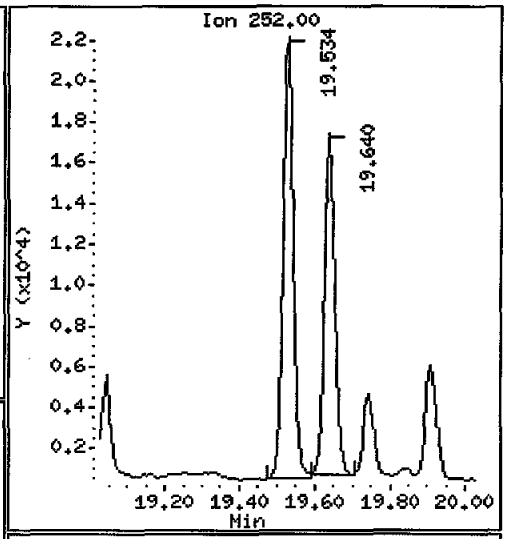
Column phase: Rxi-17Sil MS

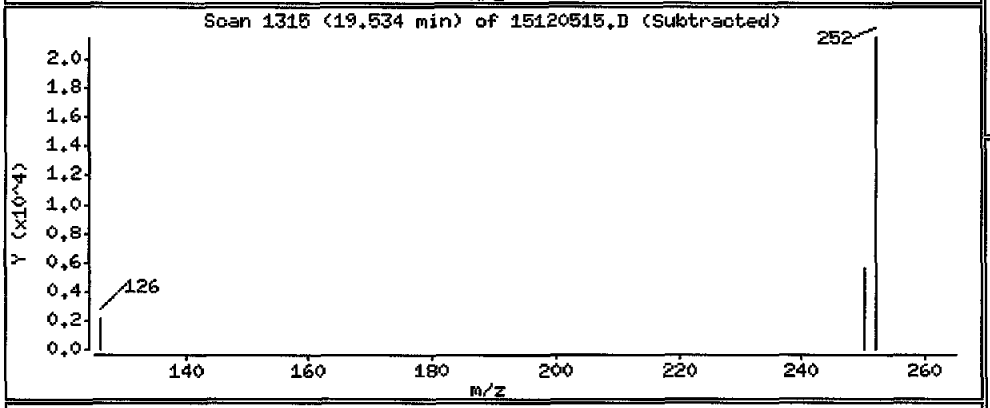
Column diameter: 0.25

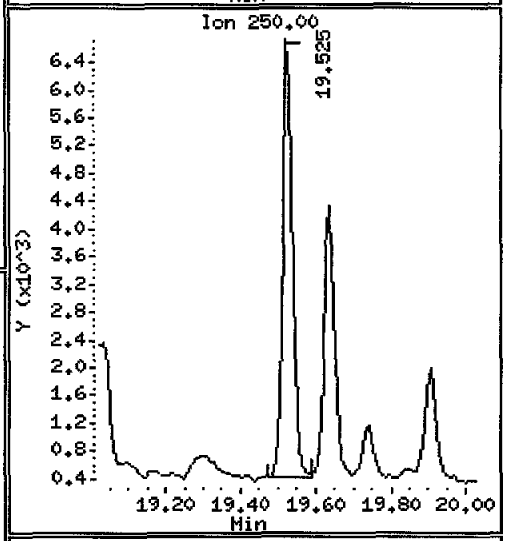
48 Benzo(e)pyrene

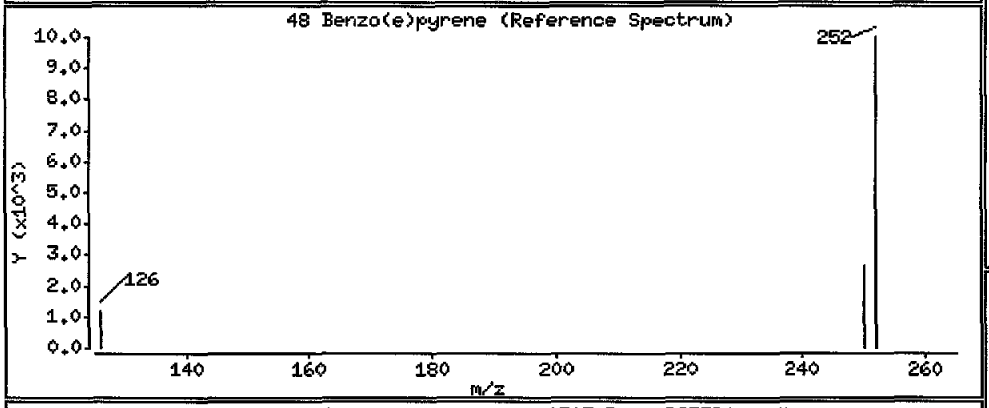
Concentration: 2720 ug/kg

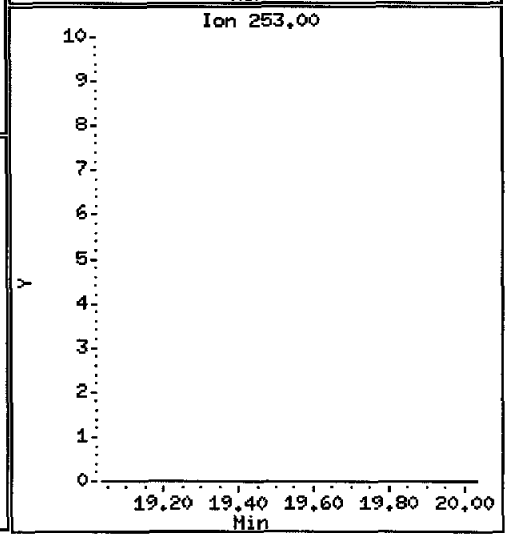


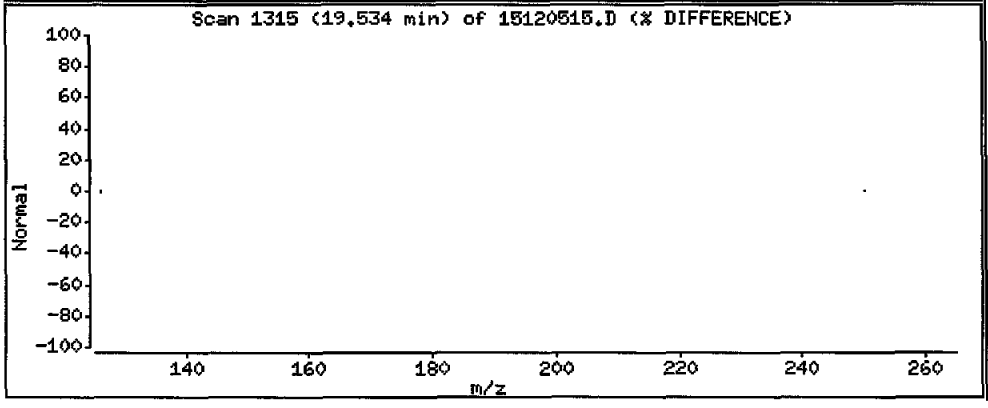












REVIEW SUMMARY FOR FILE - 15120515.D

Lab ID: AQJ9O
nt11.i, 20151205.b\lowsim.m, 05-DEC-2015 17:16

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151205.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151205.b\15120516.D
Lab Smp Id: AQJ9Q Client Smp ID: PG-FB-PEMD-151110
Inj Date : 05-DEC-2015 17:46 MS Autotune Date: 23-APR-2014 12:5
Operator : JW Inst ID: nt11.i
Smp Info : AQJ9Q
Misc Info : 15-21404
Comment :
Method : \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Meth Date : 14-Dec-2015 10:43 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 16
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	100.000	Volume of final extract (uL)
Ws	0.89000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

12/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)	
*	4 Naphthalene-d8	136	6.586	6.597	(1.000)	348938	200.000		
	5 Naphthalene	128	6.618	6.629	(1.005)	751114	372.664	41900	B
$	6 2-Methylnaphthalene-d10	152	7.564	7.574	(1.148)	186445	143.953	16200	
	7 2-Methylnaphthalene	142	7.627	7.627	(1.158)	722976	522.055	58700	
	8 1-Methylnaphthalene	142	7.879	7.889	(1.196)	436114	349.442	39300	
	10 Acenaphthylene	152	9.434	9.445	(0.984)	33027	14.3255	1610	
*	11 Acenaphthene-d10	164	9.589	9.600	(1.000)	285660	200.000		
	12 Acenaphthene	153	9.656	9.656	(1.007)	659079	430.711	48400	
	14 Dibenzofuran	168	9.866	9.866	(1.029)	518428	224.897	25300	
	15 Fluorene	166	10.486	10.486	(1.094)	362319	209.576	23500	
*	18 Phenanthrene-d10	188	12.269	12.269	(1.000)	466630	200.000		
	19 Phenanthrene	178	12.313	12.313	(1.004)	804293	286.086	32100	
	20 Anthracene	178	12.368	12.368	(1.008)	38193	15.1772	1710	
$	23 Fluoranthene-d10	212	14.374	14.374	(1.172)	484609	188.845	21200	
	24 Fluoranthene	202	14.403	14.403	(1.174)	316231	112.036	12600	
	25 Pyrene	202	14.903	14.903	(0.876)	170632	66.5039	7470	
	28 Benzo(a)anthracene	228	Compound Not Detected.						
*	29 Chrysene-d12	240	17.017	17.017	(1.000)	323985	200.000		
	30 Chrysene	228	Compound Not Detected.						
	44 Benzo(b)fluoranthene	252	Compound Not Detected.						
	45 Benzo(k)fluoranthene	252	Compound Not Detected.						

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)
46	Benzo(j)fluoranthene	252	Compound Not Detected.					
34	Benzo(a)pyrene	252	Compound Not Detected.					
* 35	Perylene-d12	264	19.841	19.841	(1.000)	278293	200.000	
$ 36	Dibenzo(a,h)anthracene-d14	292	22.207	22.208	(1.119)	143120	127.418	14300
37	Indeno(1,2,3-cd)pyrene	276	Compound Not Detected.					
38	Dibenzo(a,h)anthracene	278	Compound Not Detected.					
39	Benzo(g,h,i)perylene	276	Compound Not Detected.					
47	Perylene	252	Compound Not Detected.					
48	Benzo(e)pyrene	252	Compound Not Detected.					

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120516.D
Lab Smp Id: AQJ9Q
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21404

Calibration Date: 05-DEC-2015
Calibration Time: 10:30
Client Smp ID: PG-FB-PEMD-1511
Level: LOW
Sample Type: Tissue

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	348938	6.42
11 Acenaphthene-d10	239179	119590	478358	285660	19.43
18 Phenanthrene-d10	372253	186127	744506	466630	25.35
29 Chrysene-d12	294711	147356	589422	323985	9.93
35 Perylene-d12	260595	130298	521190	278293	6.79

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.59	-0.16
11 Acenaphthene-d10	9.60	9.10	10.10	9.59	-0.12
18 Phenanthrene-d10	12.27	11.77	12.77	12.27	-0.00
29 Chrysene-d12	17.02	16.52	17.52	17.02	-0.00
35 Perylene-d12	19.84	19.34	20.34	19.84	-0.00

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.

ARI Labs, Inc.

RECOVERY REPORT

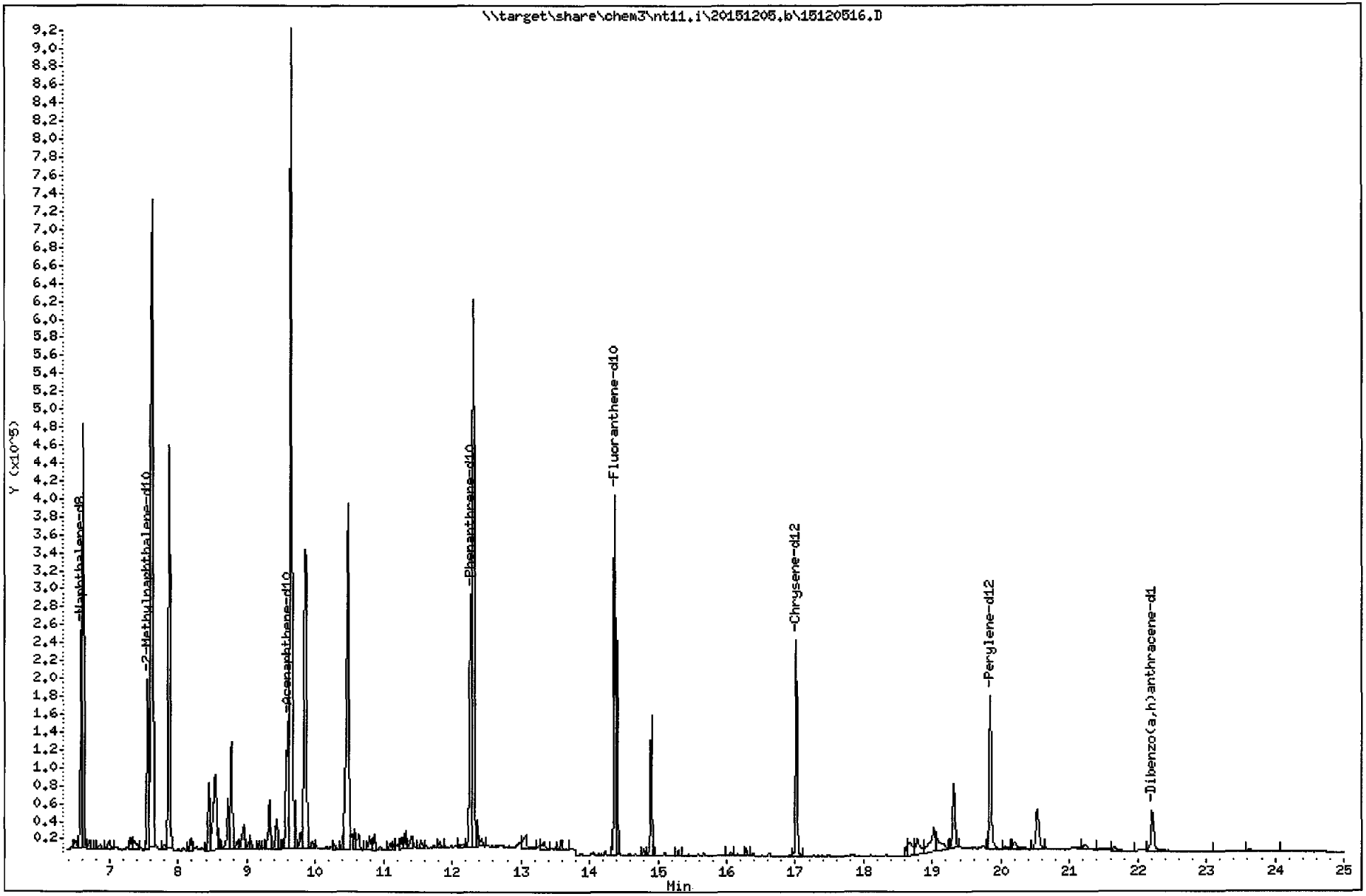
Client Name: Anchor QEA, LLC
Client SDG: AQJ9
Sample Matrix: SOLID
Fraction: SV
Lab Smp Id: AQJ9Q
Client Smp ID: PG-FB-PEMD-151110
Level: LOW
Operator: JW
Data Type: MS DATA
SampleType: SAMPLE
SpikeList File: waterlcs.spk
Quant Type: ISTD
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21404

SURROGATE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
$ 6 2-Methylnaphthalen	33700	16200	47.98	30-160
$ 23 Fluoranthene-d10	33700	21200	62.95	30-160
$ 36 Dibenzo(a,h)anthra	33700	14300	42.47	30-160

Data File: \\target\share\chem3\nt11.i\20151205.b\15120516.D
Date : 05-DEC-2015 17:46
Client ID: PG-FB-PEMD-151110
Sample Info: AQJ9Q
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: JW
Column diameter: 0.25

AQJ9:00378



Data File: \\target\share\chem3\nt11.i\20151205.b\15120516.D

Date : 05-DEC-2015 17:46

Client ID: PG-FB-PEMD-151110 Instrument: nt11.i

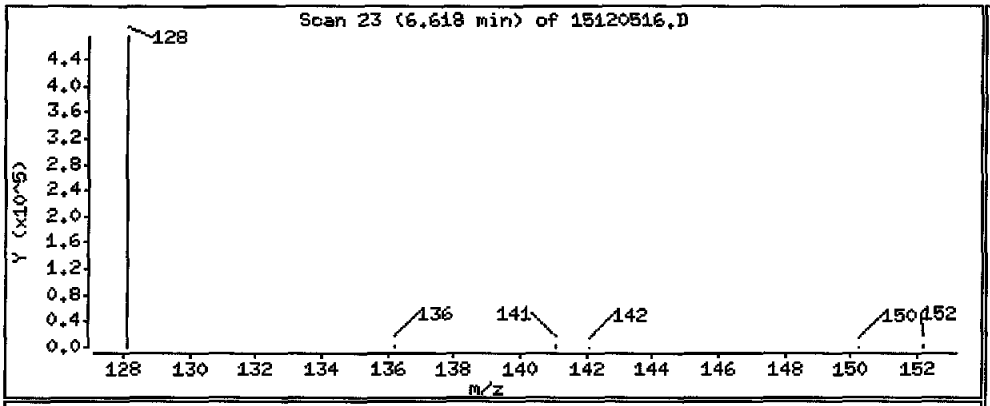
Sample Info: AQJ9Q

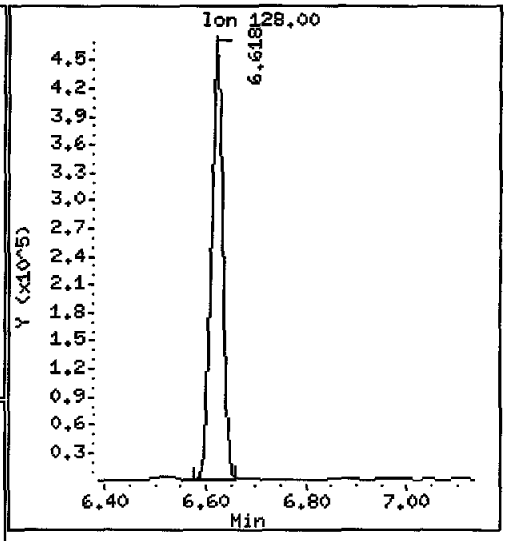
Volume Injected (uL): 2.0 Operator: JW

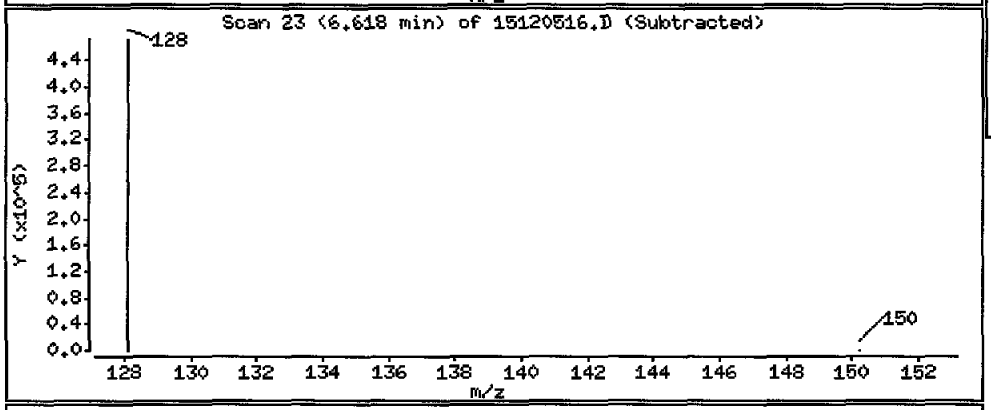
Column phase: Rxi-17Sil MS Column diameter: 0.25

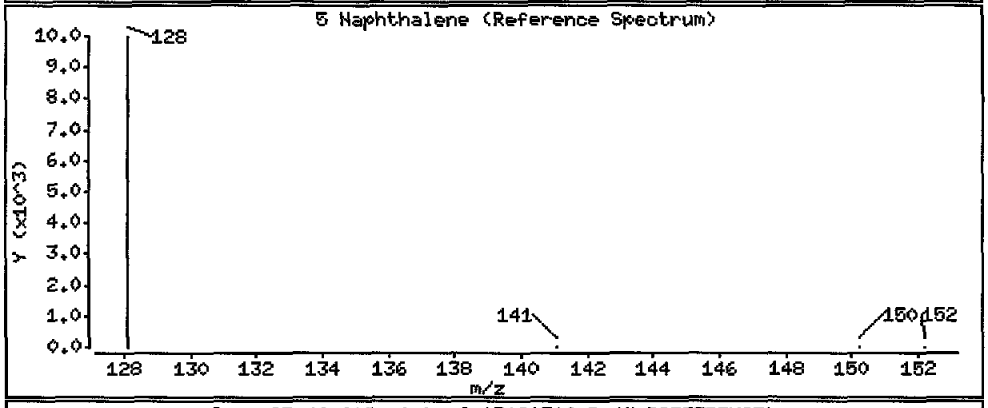
5 Naphthalene Concentration: 41900 ug/kg

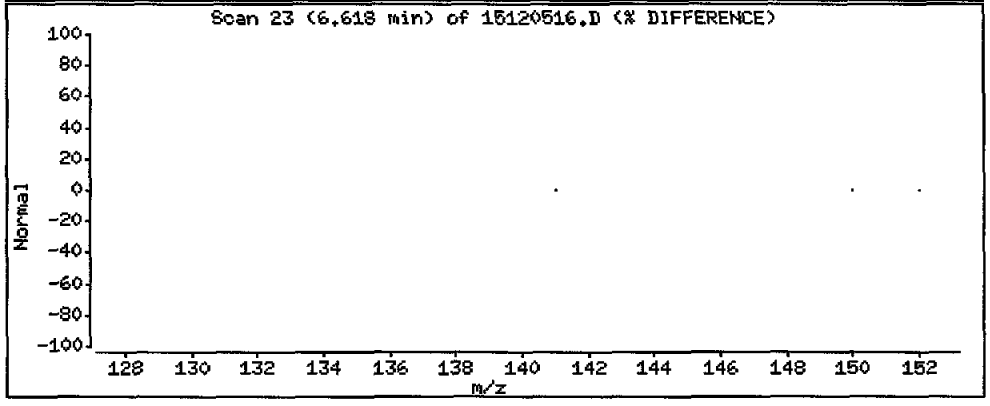
B











Data File: \\target\share\chem3\nt11.i\20151205.b\15120516.D

Date : 05-DEC-2015 17:46

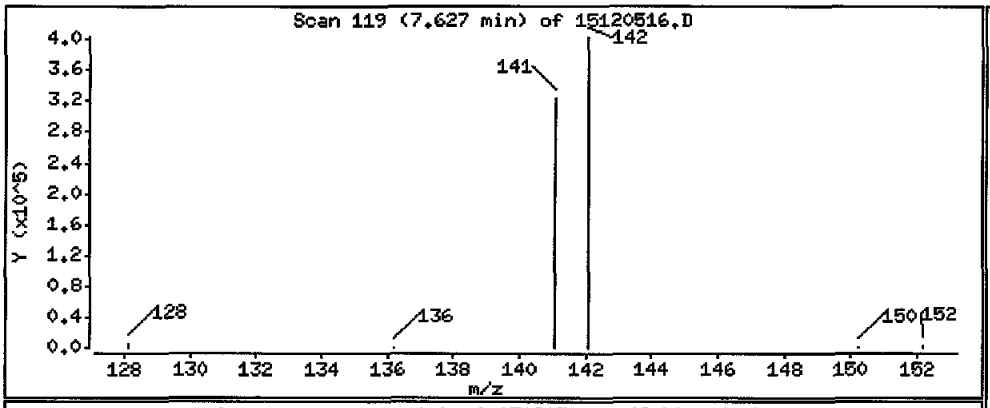
Client ID: PG-FB-PEMD-151110 Instrument: nt11.i

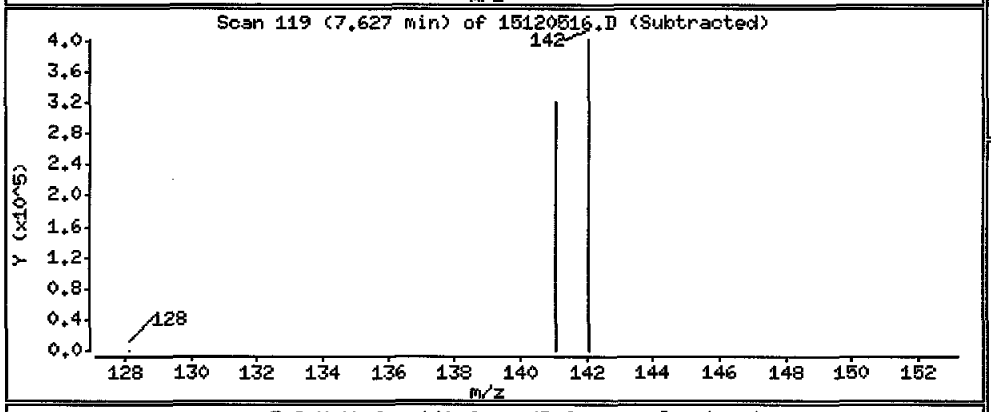
Sample Info: AQJ9Q

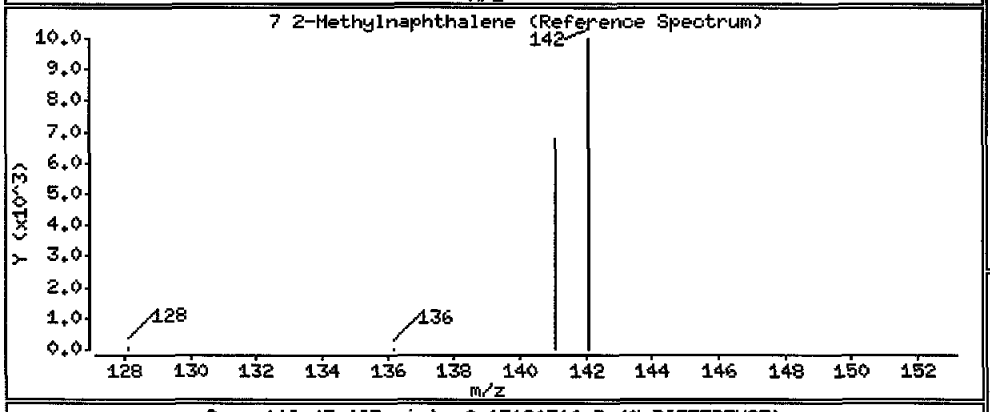
Volume Injected (uL): 2.0 Operator: JW

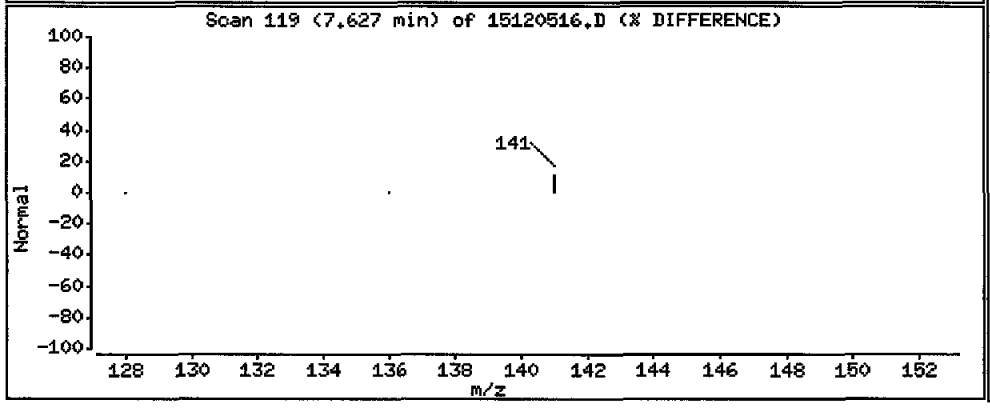
Column phase: Rxi-17Sil MS Column diameter: 0.25

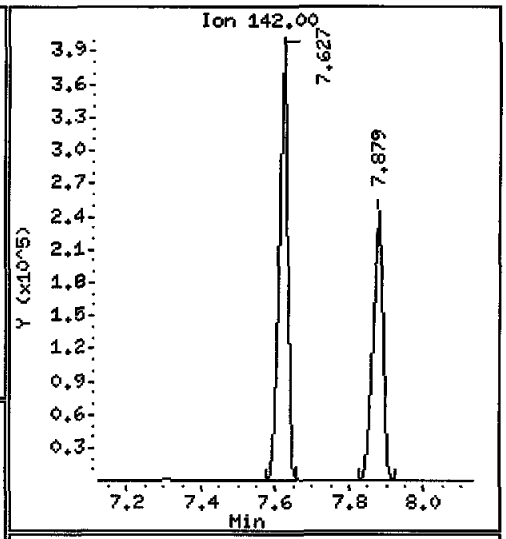
7 2-Methylnaphthalene Concentration: 58700 ug/kg

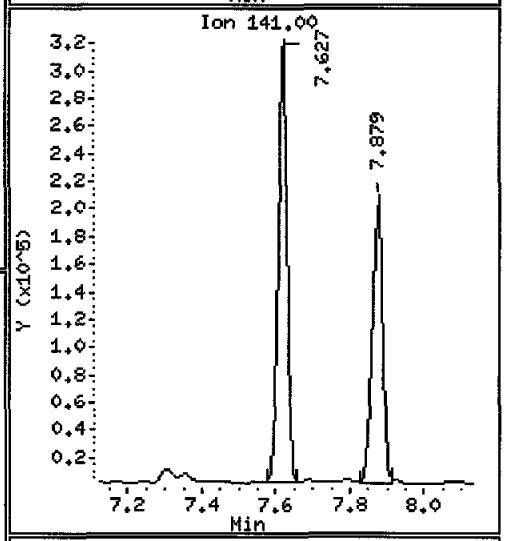


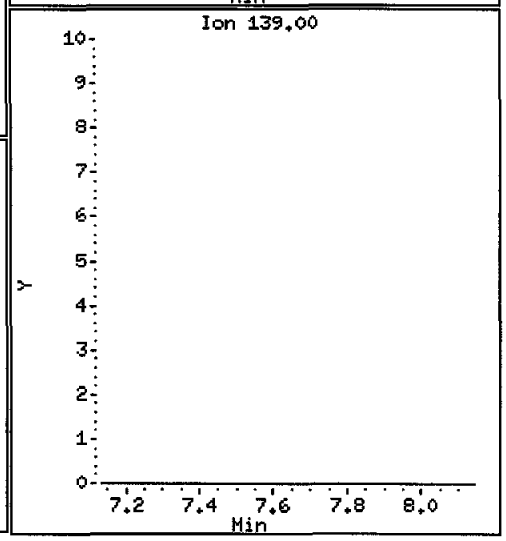












Data File: \\target\share\chem3\nt11.i\20151205.b\15120516.D

Date : 05-DEC-2015 17:46

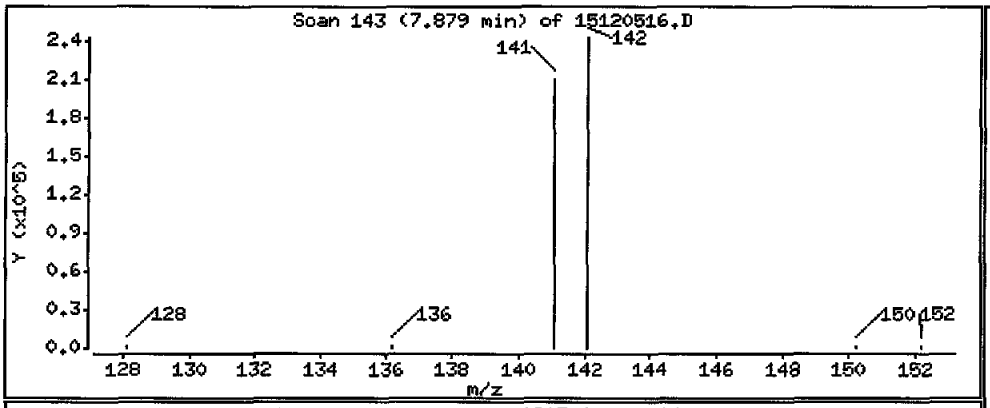
Client ID: PC-FB-PEMD-151110 Instrument: nt11.i

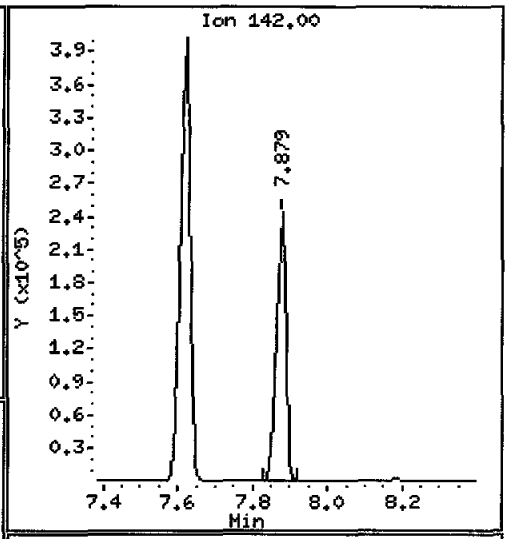
Sample Info: AQJ9Q

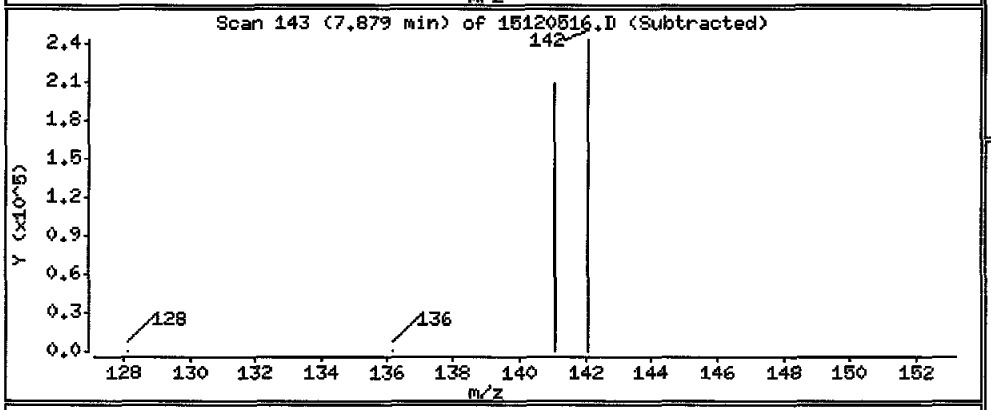
Volume Injected (uL): 2.0 Operator: JW

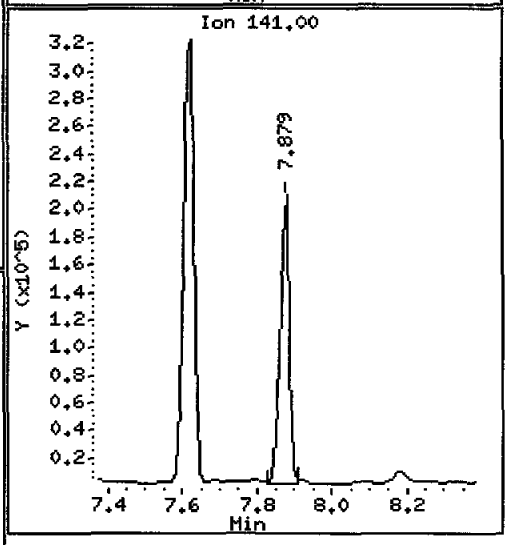
Column phase: Rxi-17Sil MS Column diameter: 0.25

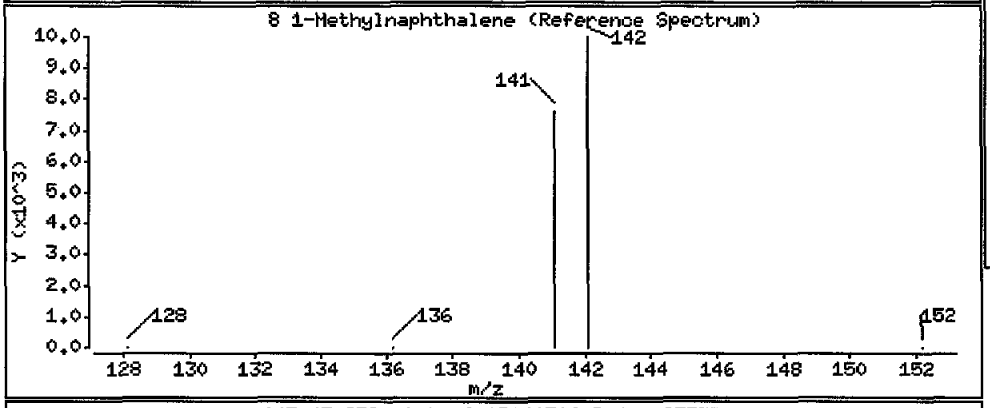
8 1-Methylnaphthalene Concentration: 39300 ug/kg

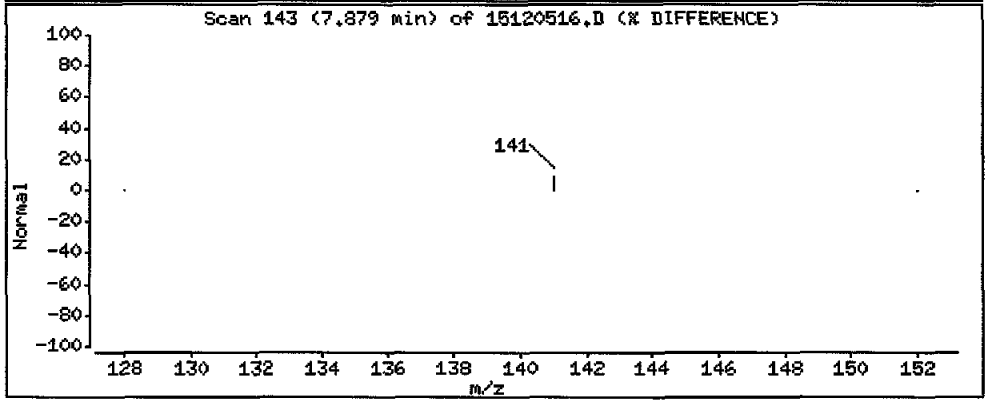












Data File: \\target\share\chem3\nt11.i\20151205.b\15120516.D

Date : 05-DEC-2015 17:46

Client ID: PG-FB-PEMD-151110

Instrument: nt11.i

Sample Info: AQJ9Q

Volume Injected (uL): 2.0

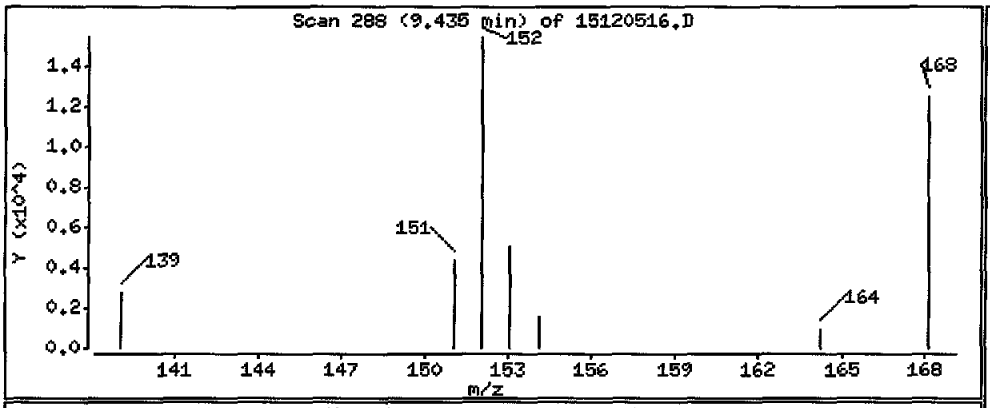
Operator: JW

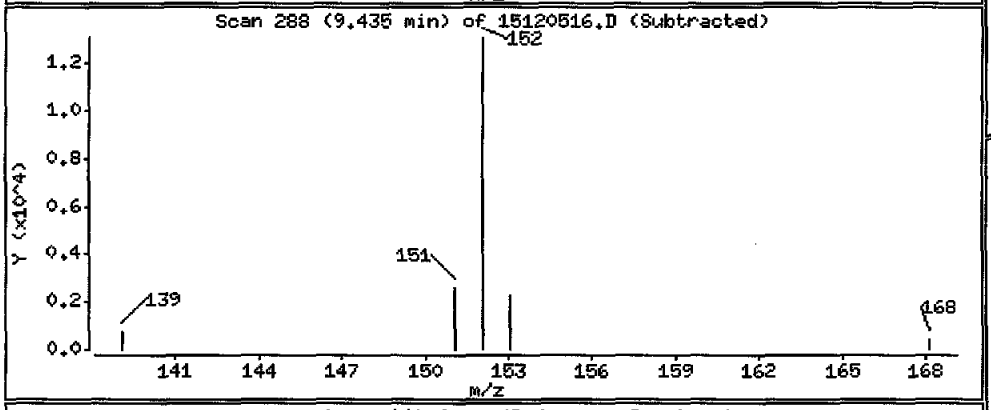
Column phase: Rxi-17Sil MS

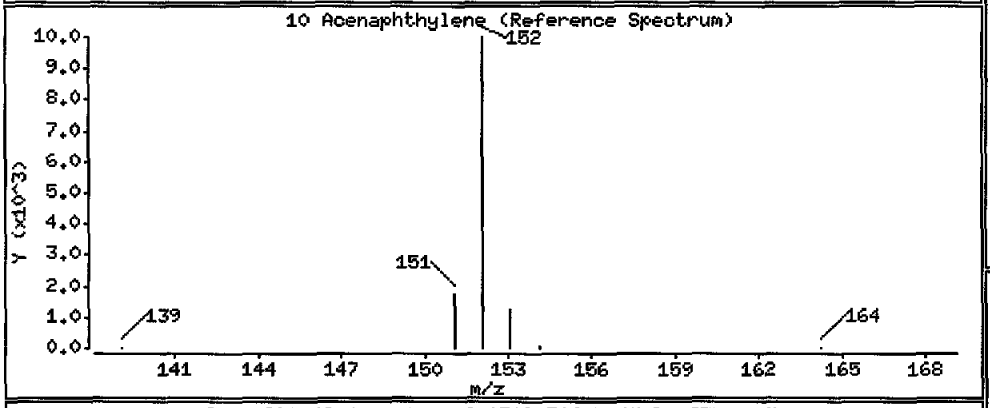
Column diameter: 0.25

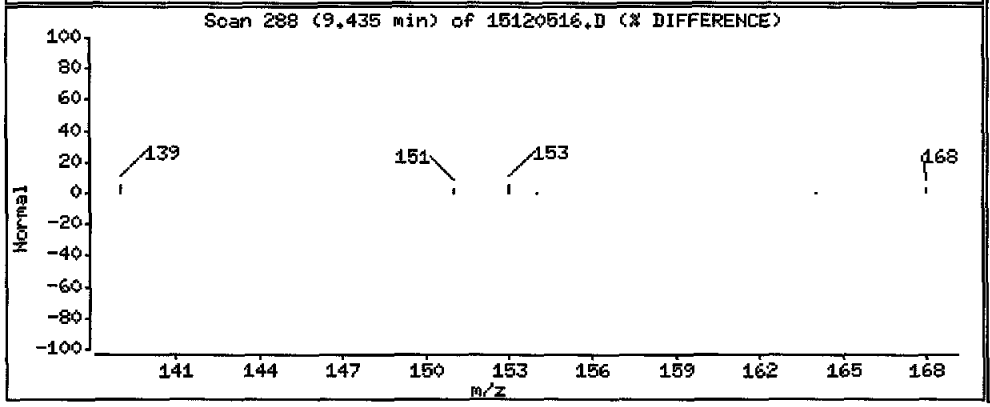
10 Acenaphthylene

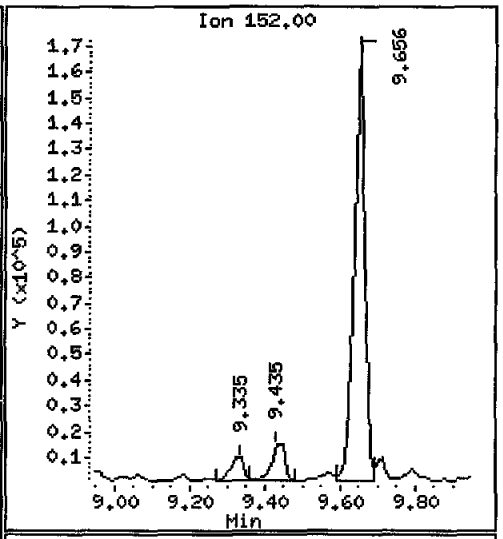
Concentration: 1610 ug/kg

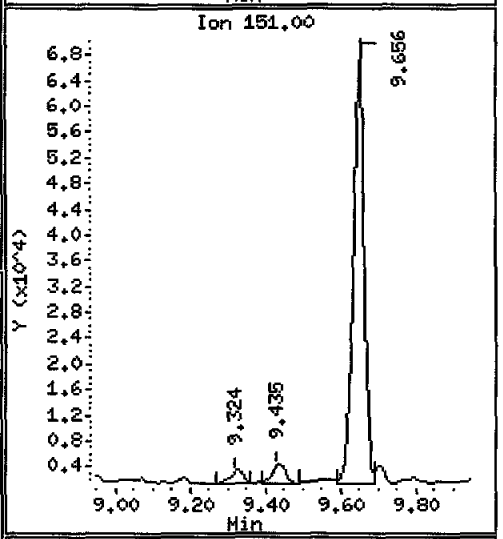


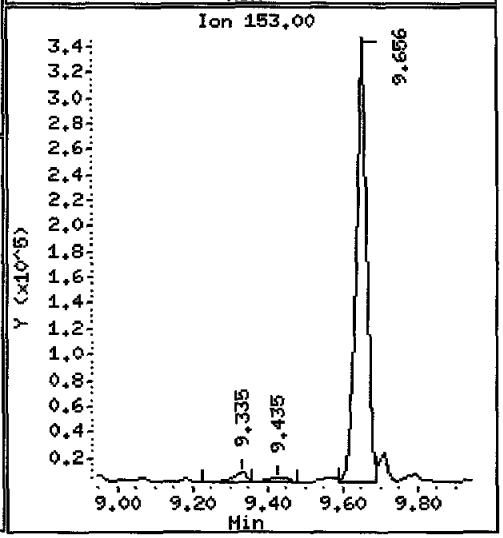












Data File: \\target\share\chem3\nt11.i\20151205.b\15120516.D

Date : 05-DEC-2015 17:46

Client ID: PG-FB-PEMD-151110

Instrument: nt11.i

Sample Info: AQJ9Q

Volume Injected (uL): 2.0

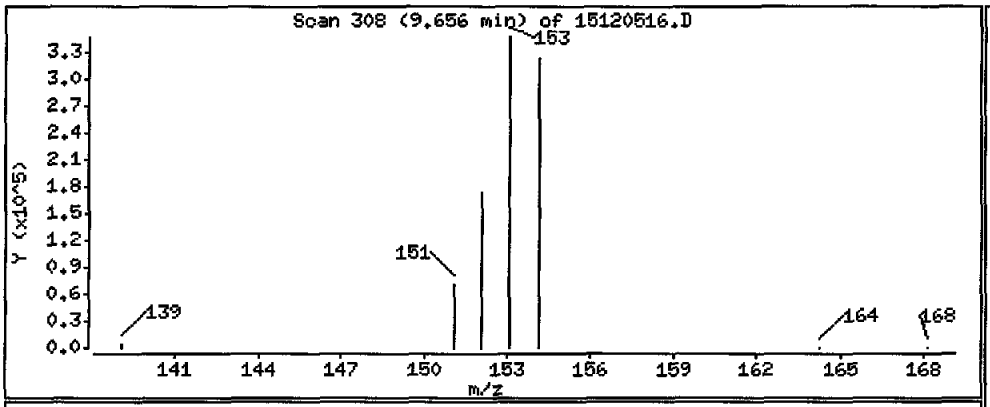
Operator: JW

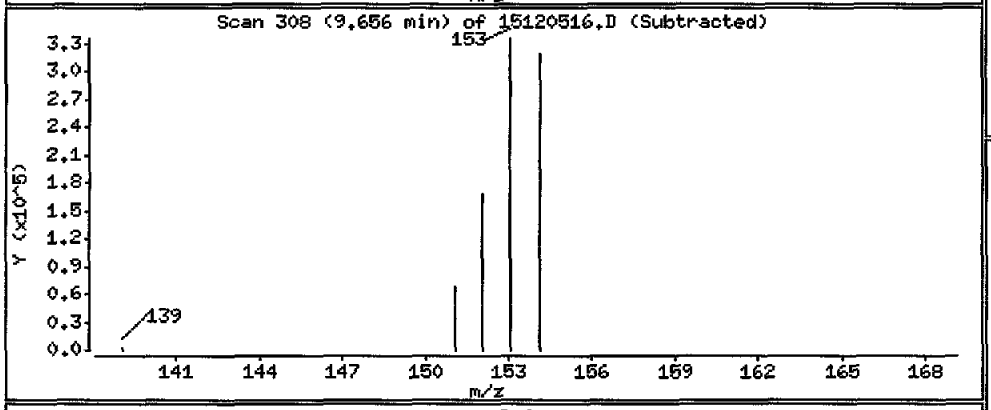
Column phase: Rxi-17Sil MS

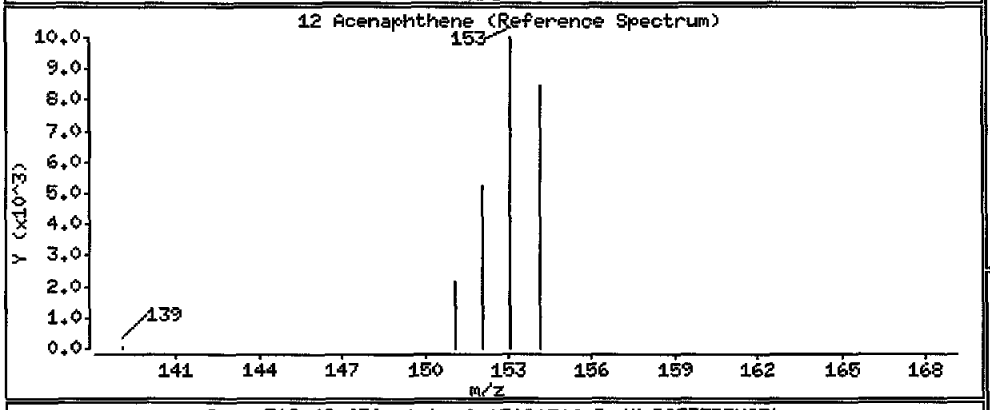
Column diameter: 0.25

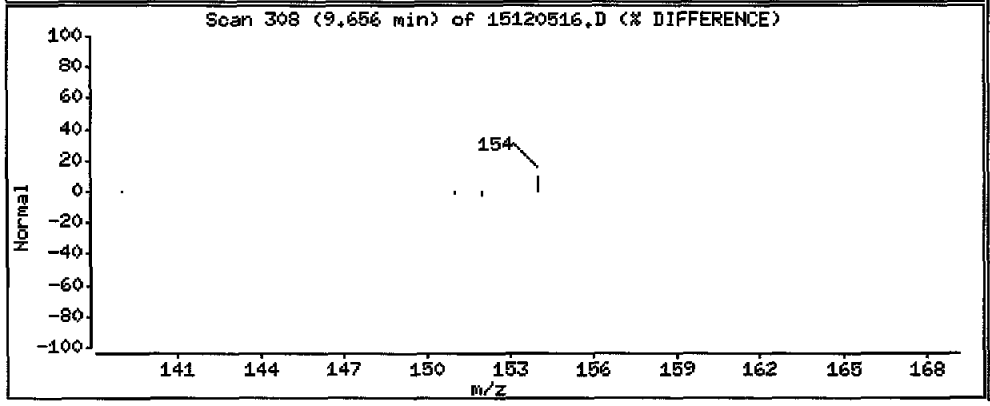
12 Acenaphthene

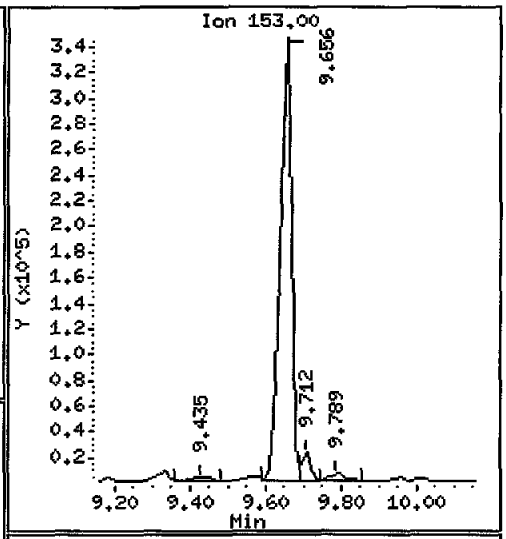
Concentration: 48400 ug/kg

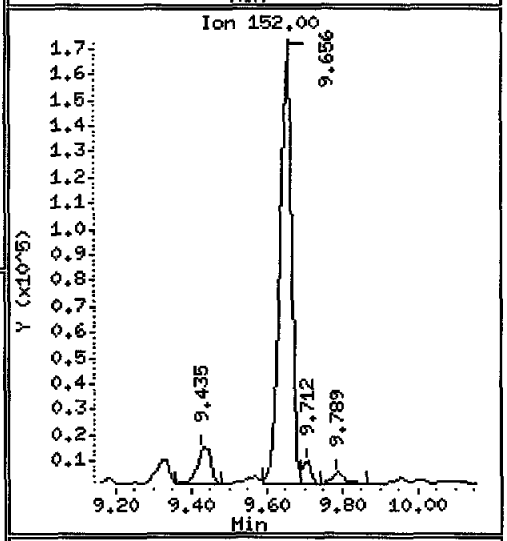


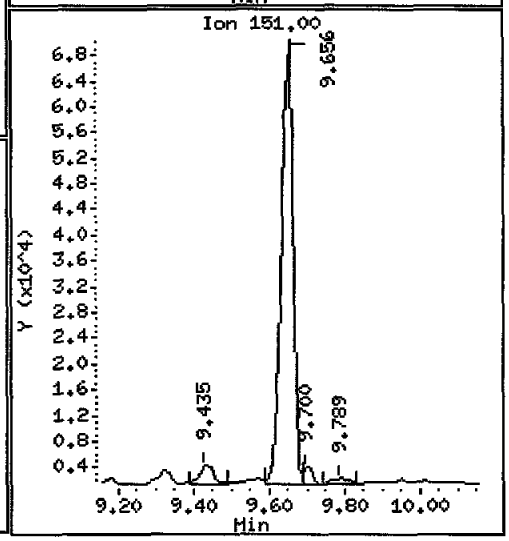












Data File: \\target\share\chem3\nt11.i\20151205.b\15120516.D

Date : 05-DEC-2015 17:46

Client ID: PG-FB-PEMD-151110

Instrument: nt11.i

Sample Info: AQJ9Q

Volume Injected (uL): 2.0

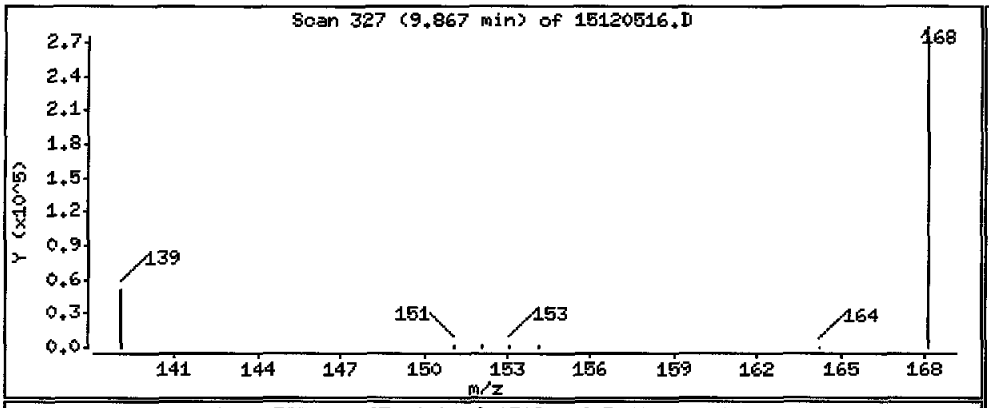
Operator: JW

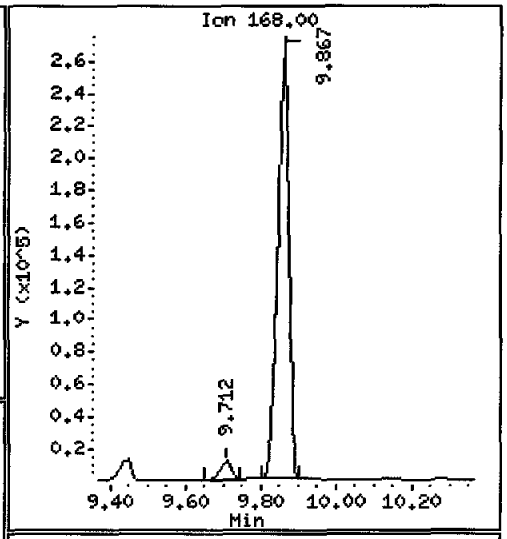
Column phase: Rxi-17Sil MS

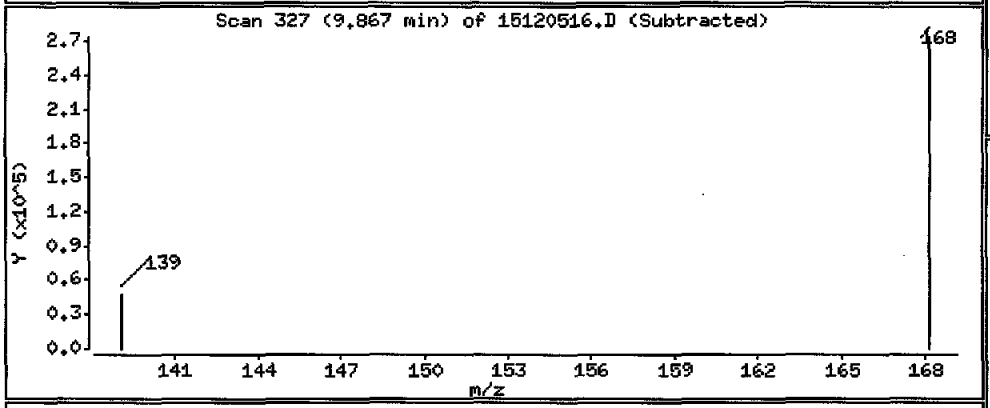
Column diameter: 0.25

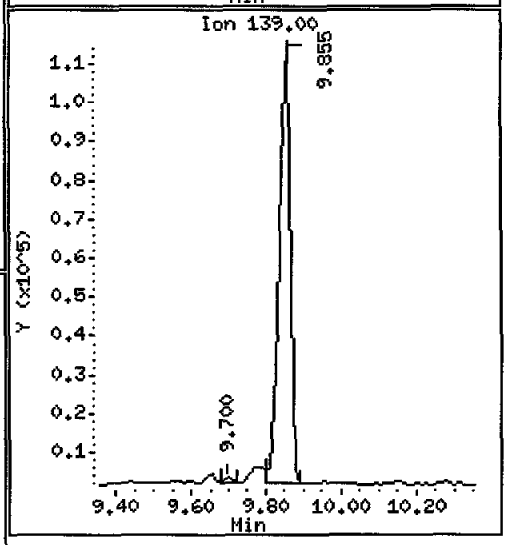
14 Dibenzofuran

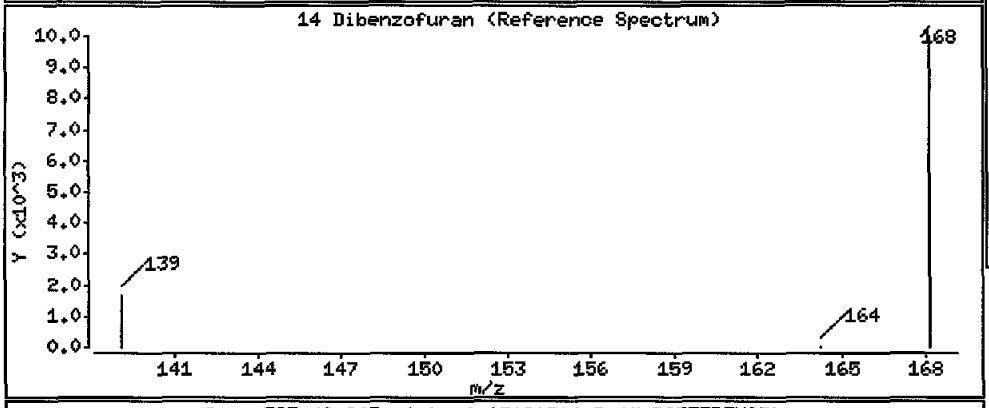
Concentration: 25300 ug/kg

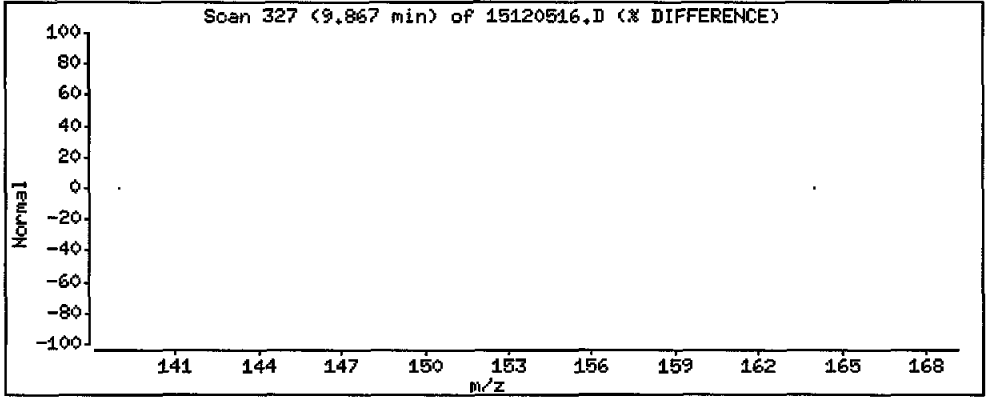












Data File: \\target\share\chem3\nt11.i\20151205.b\15120516.D

Date : 05-DEC-2015 17:46

Client ID: PG-FB-PEMD-151110

Instrument: nt11.i

Sample Info: AQJ9Q

Volume Injected (uL): 2.0

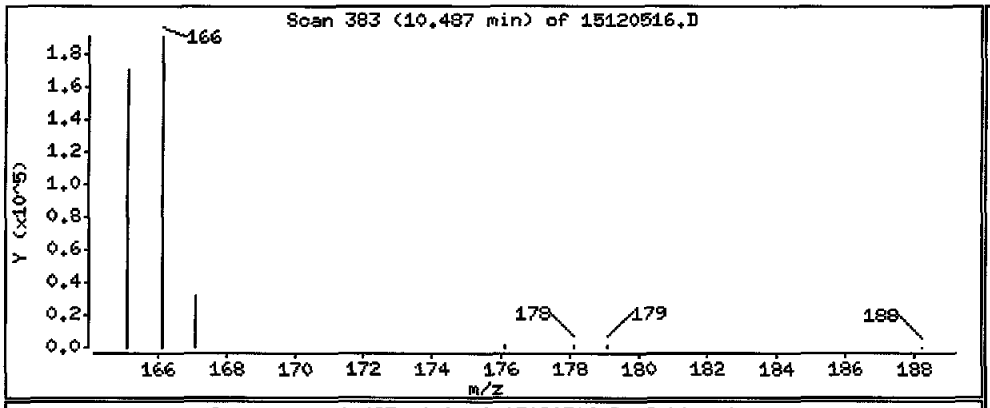
Operator: JW

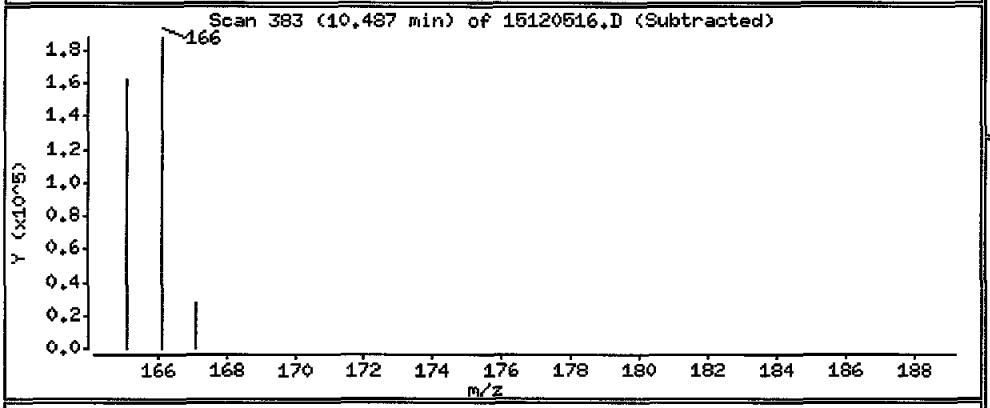
Column phase: Rxi-17Sil MS

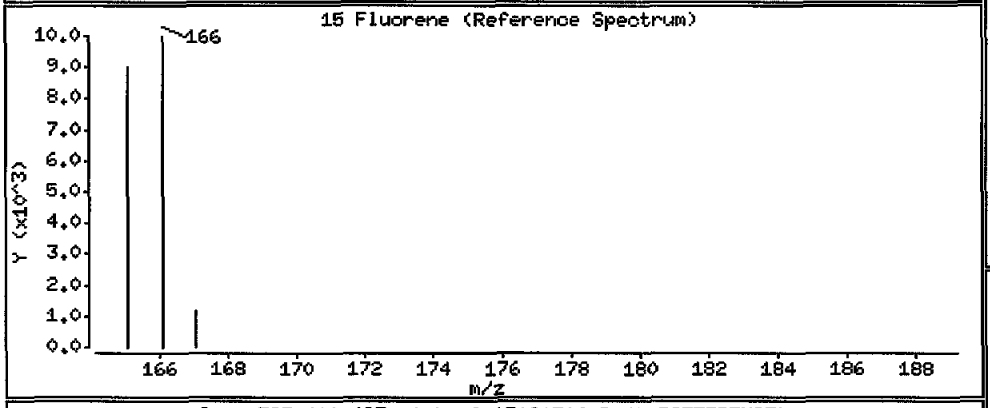
Column diameter: 0.25

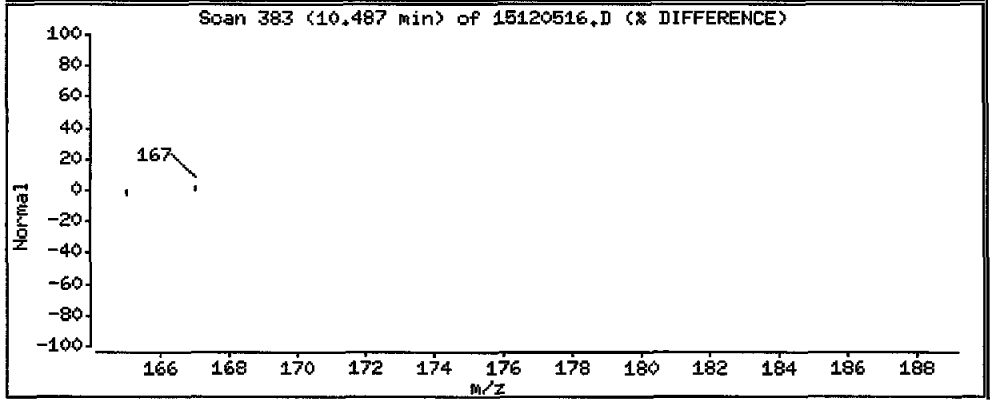
15 Fluorene

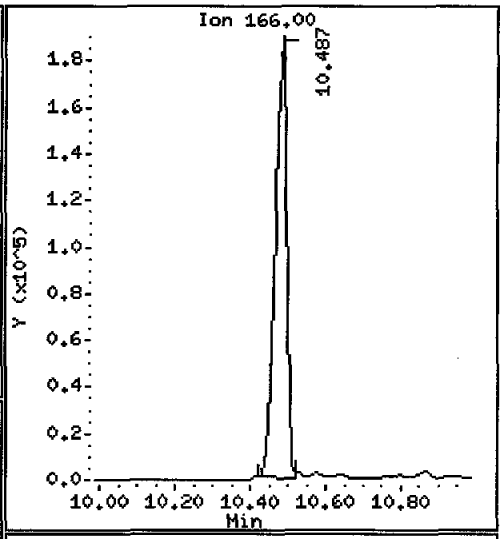
Concentration: 23500 ug/kg

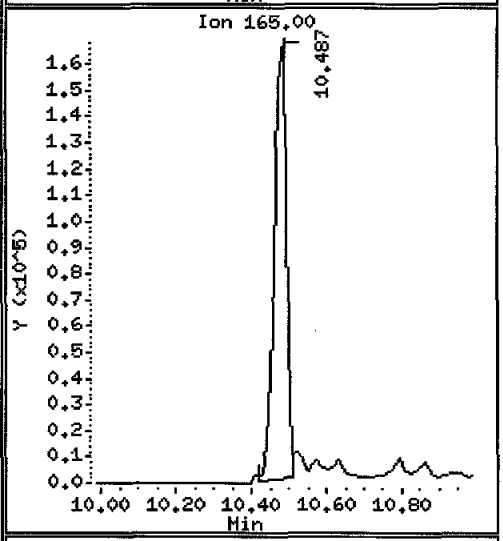


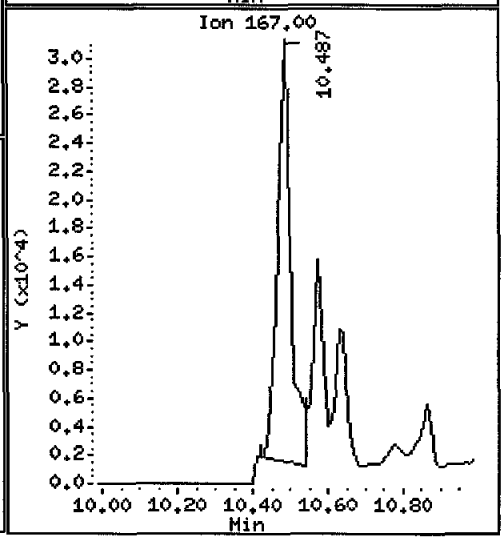












Data File: \\target\share\chem3\nt11.i\20151205.b\15120516.D

Date : 05-DEC-2015 17:46

Client ID: PG-FB-PEMD-151110

Instrument: nt11.i

Sample Info: AQJ9Q

Volume Injected (uL): 2.0

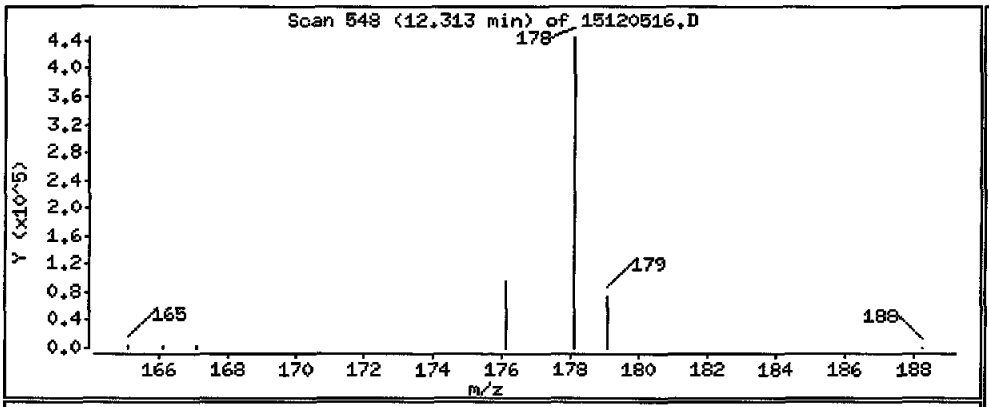
Operator: JW

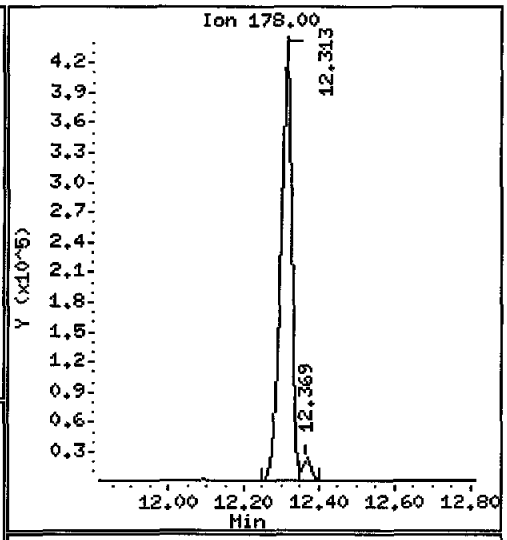
Column phase: Rxi-17Sil MS

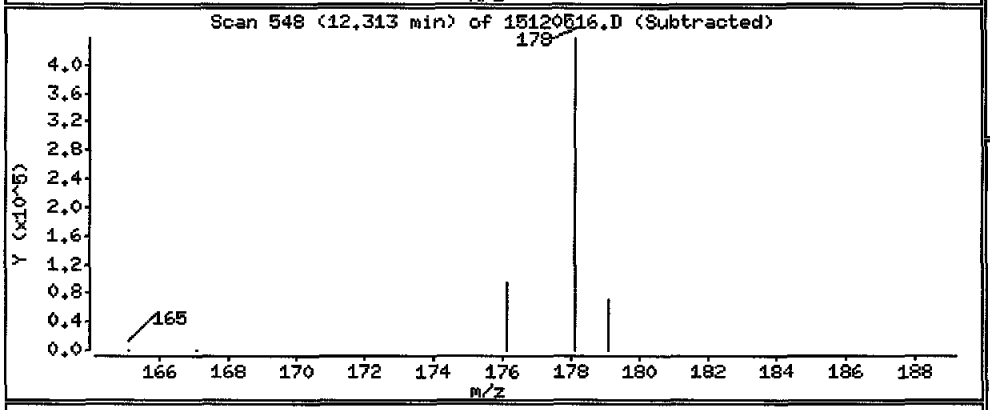
Column diameter: 0.25

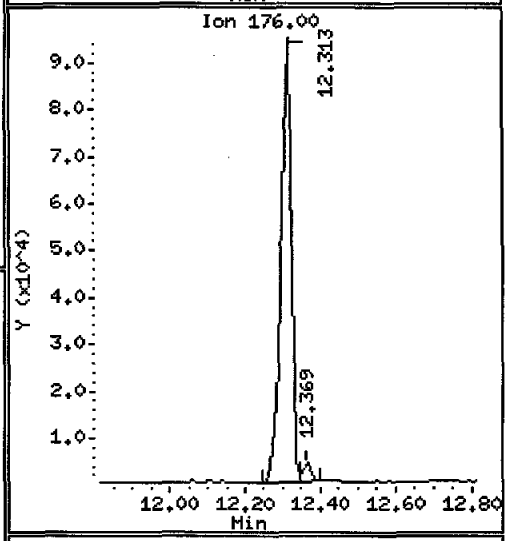
19 Phenanthrene

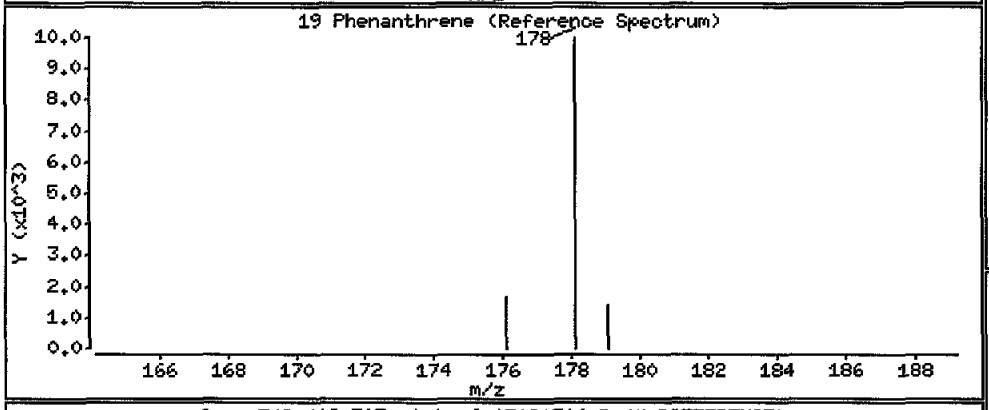
Concentration: 32100 ug/kg

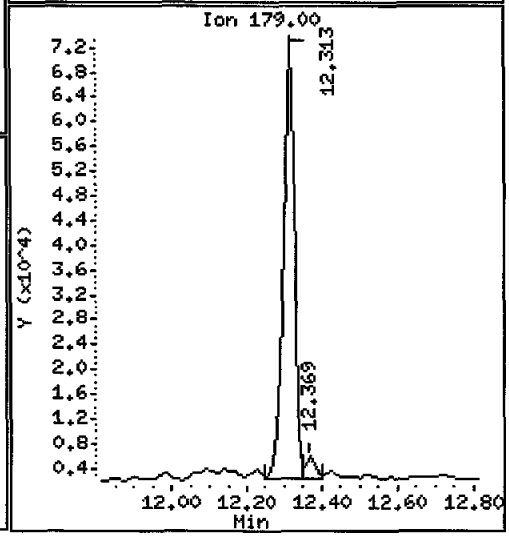


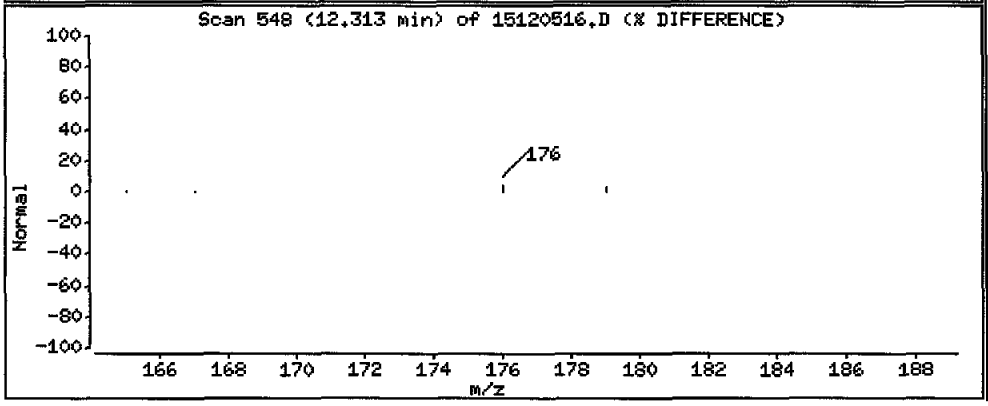












Data File: \\target\share\chem3\nt11.i\20151205.b\15120516.D

Date : 05-DEC-2015 17:46

Client ID: PG-FB-PEMD-151110

Instrument: nt11.i

Sample Info: AQJ9Q

Volume Injected (uL): 2.0

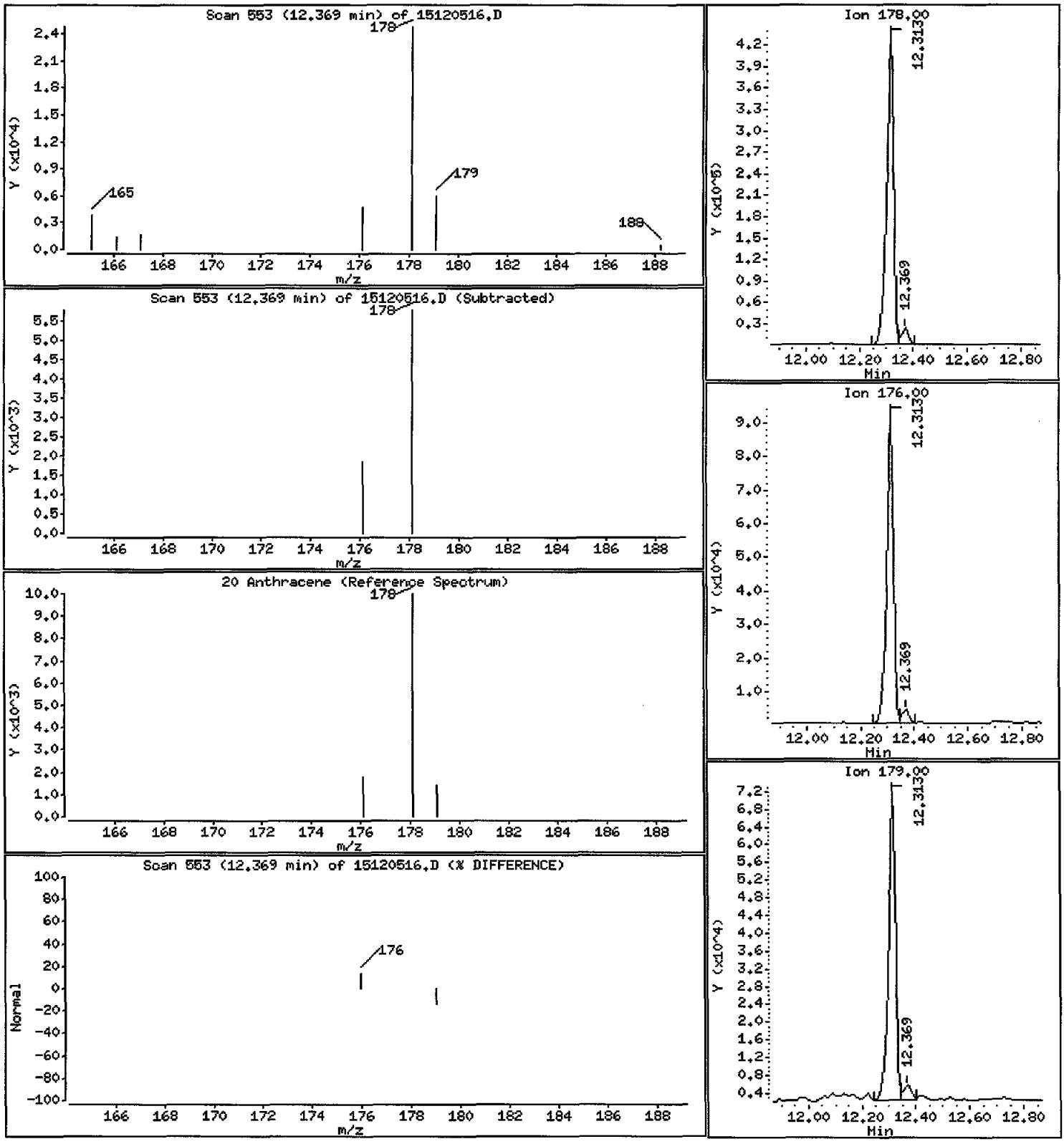
Operator: JW

Column phase: Rxi-17Sil MS

Column diameter: 0.25

20 Anthracene

Concentration: 1710 ug/kg



Data File: \\target\share\chem3\nt11.i\20151205.b\15120516.D

Date : 05-DEC-2015 17:46

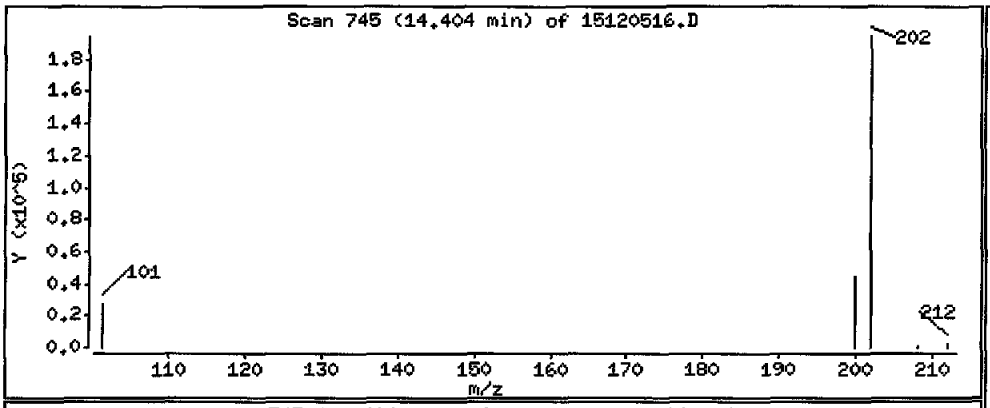
Client ID: PG-FB-PEMD-151110 Instrument: nt11.i

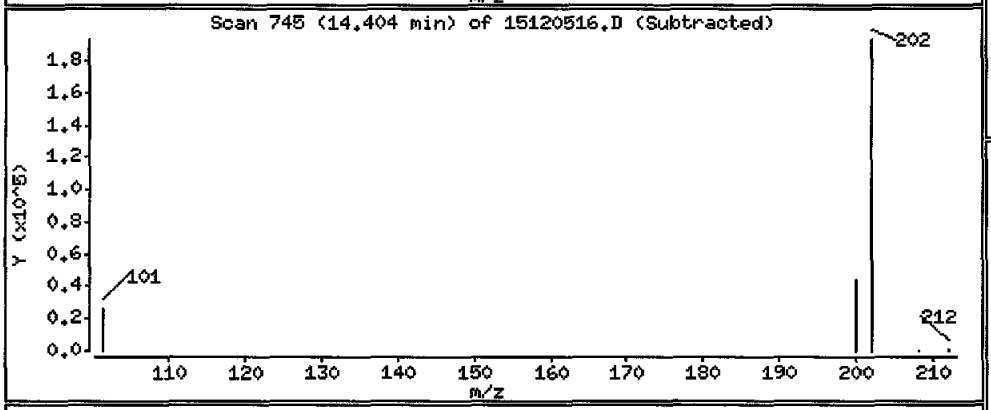
Sample Info: AQJ9Q

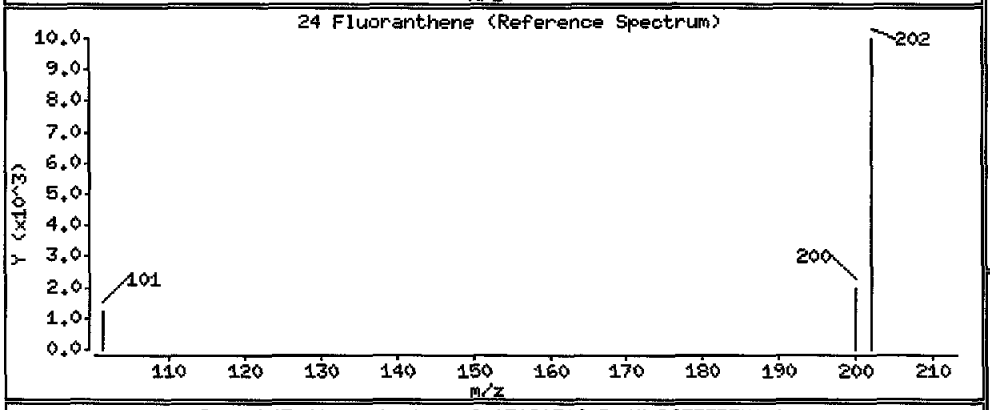
Volume Injected (uL): 2.0 Operator: JW

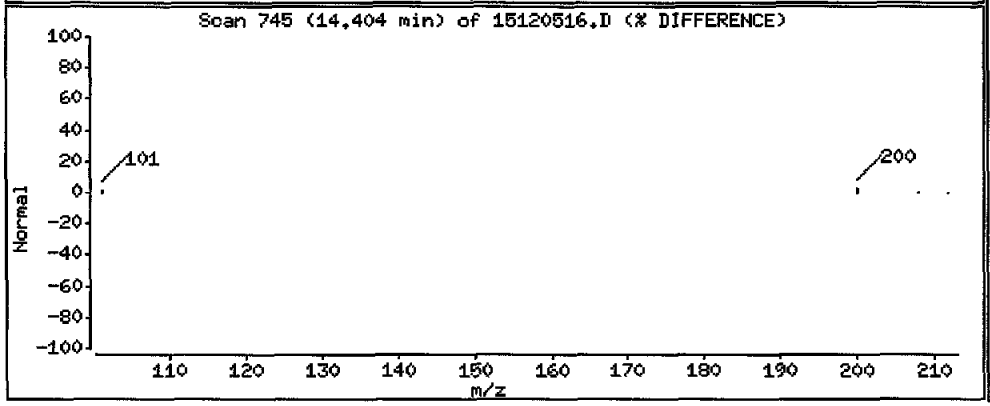
Column phase: Rxi-17Sil MS Column diameter: 0.25

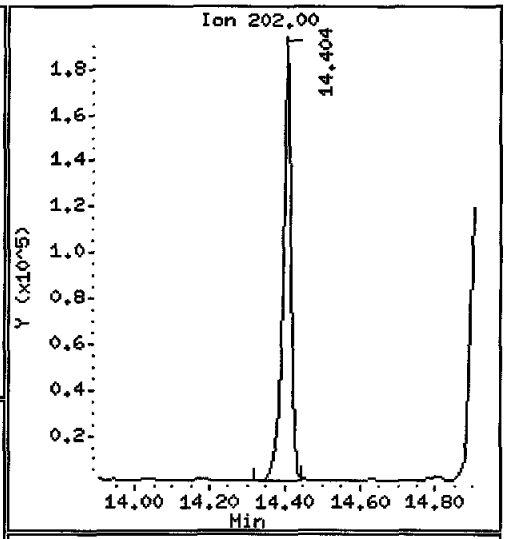
24 Fluoranthene Concentration: 12600 ug/kg

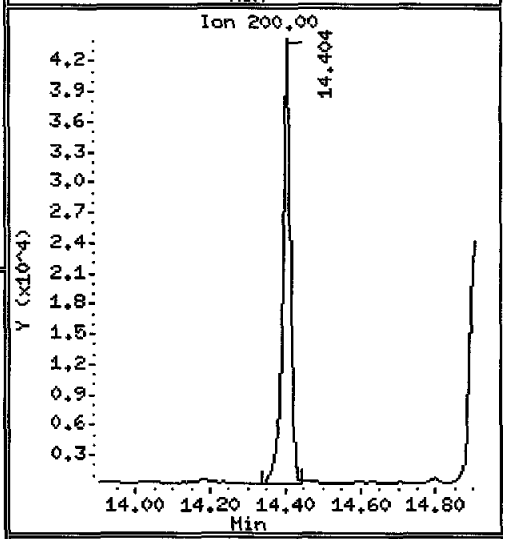


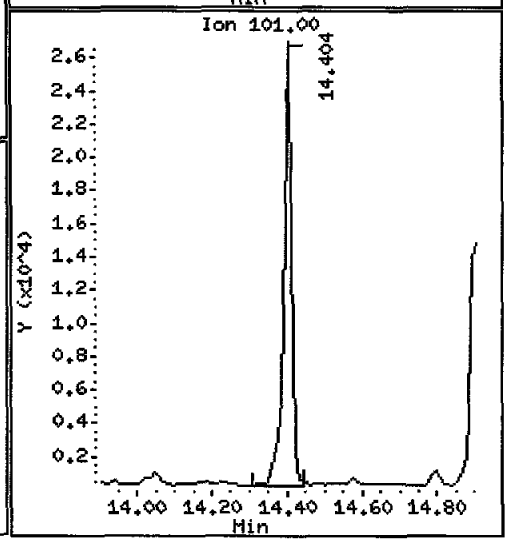












Data File: \\target\share\chem3\nt11.i\20151205.b\15120516.D

Date : 05-DEC-2015 17:46

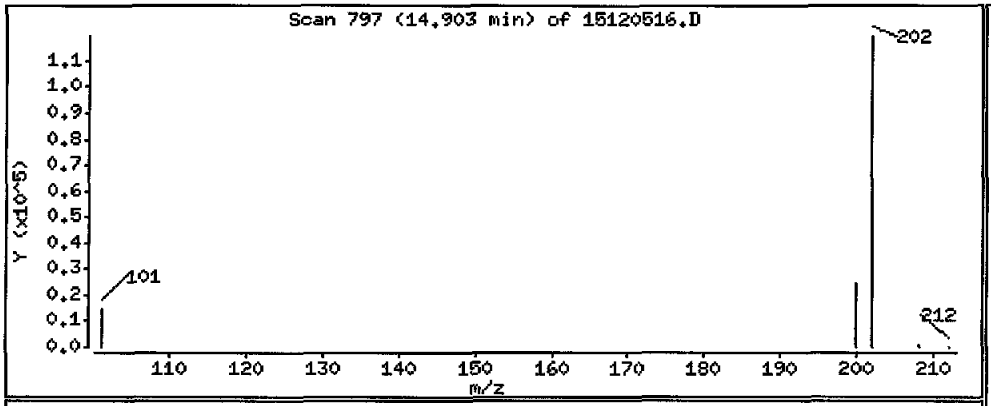
Client ID: PG-FB-PEMD-151110 Instrument: nt11.i

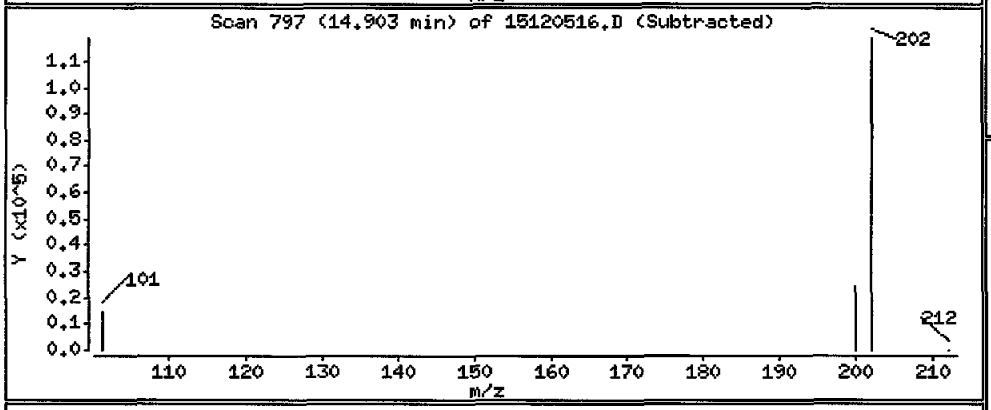
Sample Info: AQJ9Q

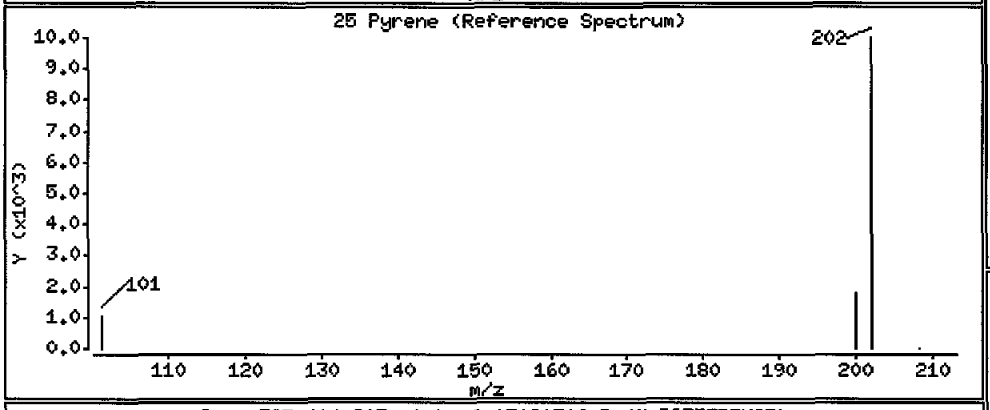
Volume Injected (uL): 2.0 Operator: JW

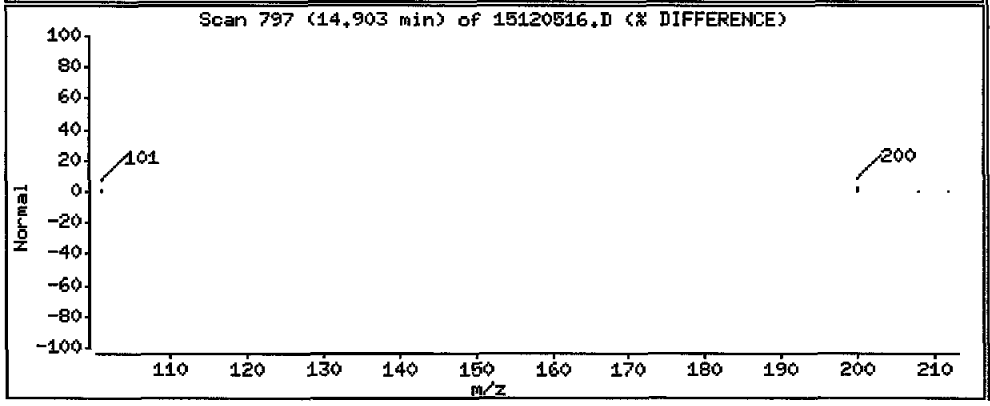
Column phase: Rxi-17Sil MS Column diameter: 0.25

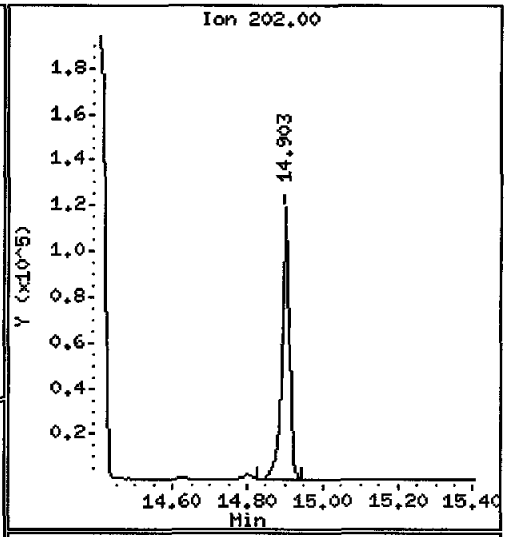
25 Pyrene Concentration: 7470 ug/kg

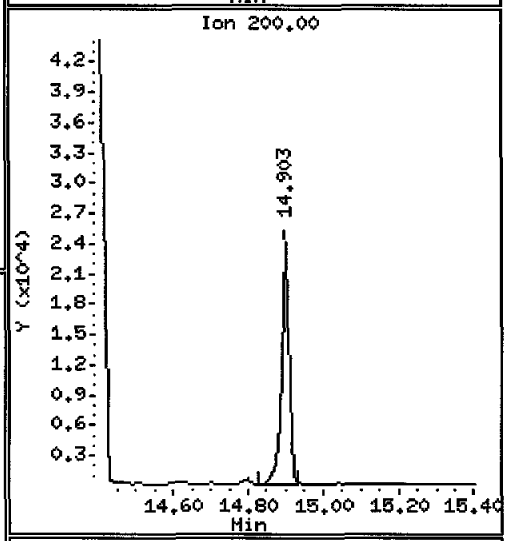


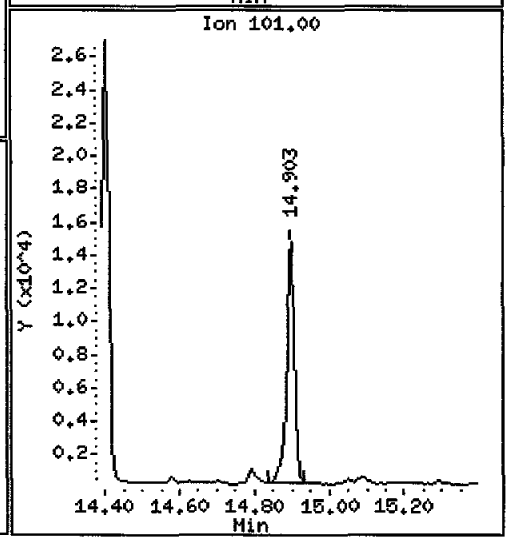












REVIEW SUMMARY FOR FILE - 15120516.D

Lab ID: AQJ9Q
nt11.i, 20151205.b\lowsim.m, 05-DEC-2015 17:46

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151205.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151205.b\15120517.D
Lab Smp Id: AQJ9R Client Smp ID: PG-TB-PEMD-151110
Inj Date : 05-DEC-2015 18:16 MS Autotune Date: 23-APR-2014 12:5
Operator : JW Inst ID: nt11.i
Smp Info : AQJ9R
Misc Info : 15-21405
Comment :
Method : \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Meth Date : 14-Dec-2015 10:43 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 17
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	100.000	Volume of final extract (uL)
Ws	0.89000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

JC 2/5/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	FINAL (ug/kg)
*	4 Naphthalene-d8	136	6.587	6.597	(1.000)	335866	200.000	
	5 Naphthalene	128	6.618	6.629	(1.005)	343155	176.882	19900 B
$	6 2-Methylnaphthalene-d10	152	7.564	7.574	(1.148)	163829	131.415	14800
	7 2-Methylnaphthalene	142	7.627	7.627	(1.158)	86393	64.8116	7280
	8 1-Methylnaphthalene	142	7.879	7.889	(1.196)	44451	37.0031	4160
	10 Acenaphthylene	152	Compound Not Detected.					
*	11 Acenaphthene-d10	164	9.601	9.600	(1.000)	274447	200.000	
	12 Acenaphthene	153	9.656	9.656	(1.006)	16244	11.0492	1240
	14 Dibenzofuran	168	9.866	9.866	(1.028)	22413	10.1201	1140
	15 Fluorene	166	10.486	10.486	(1.092)	21819	13.1364	1480
*	18 Phenanthrene-d10	188	12.269	12.269	(1.000)	451003	200.000	
	19 Phenanthrene	178	12.313	12.313	(1.004)	83098	30.5820	3440
	20 Anthracene	178	12.368	12.368	(1.008)	51871	21.3269	2400
$	23 Fluoranthene-d10	212	14.375	14.374	(1.172)	444699	179.297	20100
	24 Fluoranthene	202	14.403	14.403	(1.174)	101275	37.1235	4170
	25 Pyrene	202	14.903	14.903	(0.876)	115584	46.3762	5210
	28 Benzo(a)anthracene	228	Compound Not Detected.					
*	29 Chrysene-d12	240	17.018	17.017	(1.000)	314713	200.000	
	30 Chrysene	228	Compound Not Detected.					
	44 Benzo(b)fluoranthene	252	Compound Not Detected.					
	45 Benzo(k)fluoranthene	252	Compound Not Detected.					

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)
46	Benzo(j)fluoranthene	252	Compound Not Detected.					
34	Benzo(a)pyrene	252	Compound Not Detected.					
* 35	Perylene-d12	264	19.842	19.841	(1.000)	267996	200.000	
$ 36	Dibenzo(a,h)anthracene-d14	292	22.208	22.208	(1.119)	149040	137.786	15500
37	Indeno(1,2,3-cd)pyrene	276	Compound Not Detected.					
38	Dibenzo(a,h)anthracene	278	Compound Not Detected.					
39	Benzo(g,h,i)perylene	276	Compound Not Detected.					
47	Perylene	252	Compound Not Detected.					
48	Benzo(e)pyrene	252	Compound Not Detected.					

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120517.D
Lab Smp Id: AQJ9R
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21405

Calibration Date: 05-DEC-2015
Calibration Time: 10:30
Client Smp ID: PG-TB-PEMD-1511
Level: LOW
Sample Type: Tissue

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	335866	2.43
11 Acenaphthene-d10	239179	119590	478358	274447	14.75
18 Phenanthrene-d10	372253	186127	744506	451003	21.15
29 Chrysene-d12	294711	147356	589422	314713	6.79
35 Perylene-d12	260595	130298	521190	267996	2.84

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.59	-0.16
11 Acenaphthene-d10	9.60	9.10	10.10	9.60	0.00
18 Phenanthrene-d10	12.27	11.77	12.77	12.27	0.00
29 Chrysene-d12	17.02	16.52	17.52	17.02	0.00
35 Perylene-d12	19.84	19.34	20.34	19.84	0.00

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.

ARI Labs, Inc.

RECOVERY REPORT

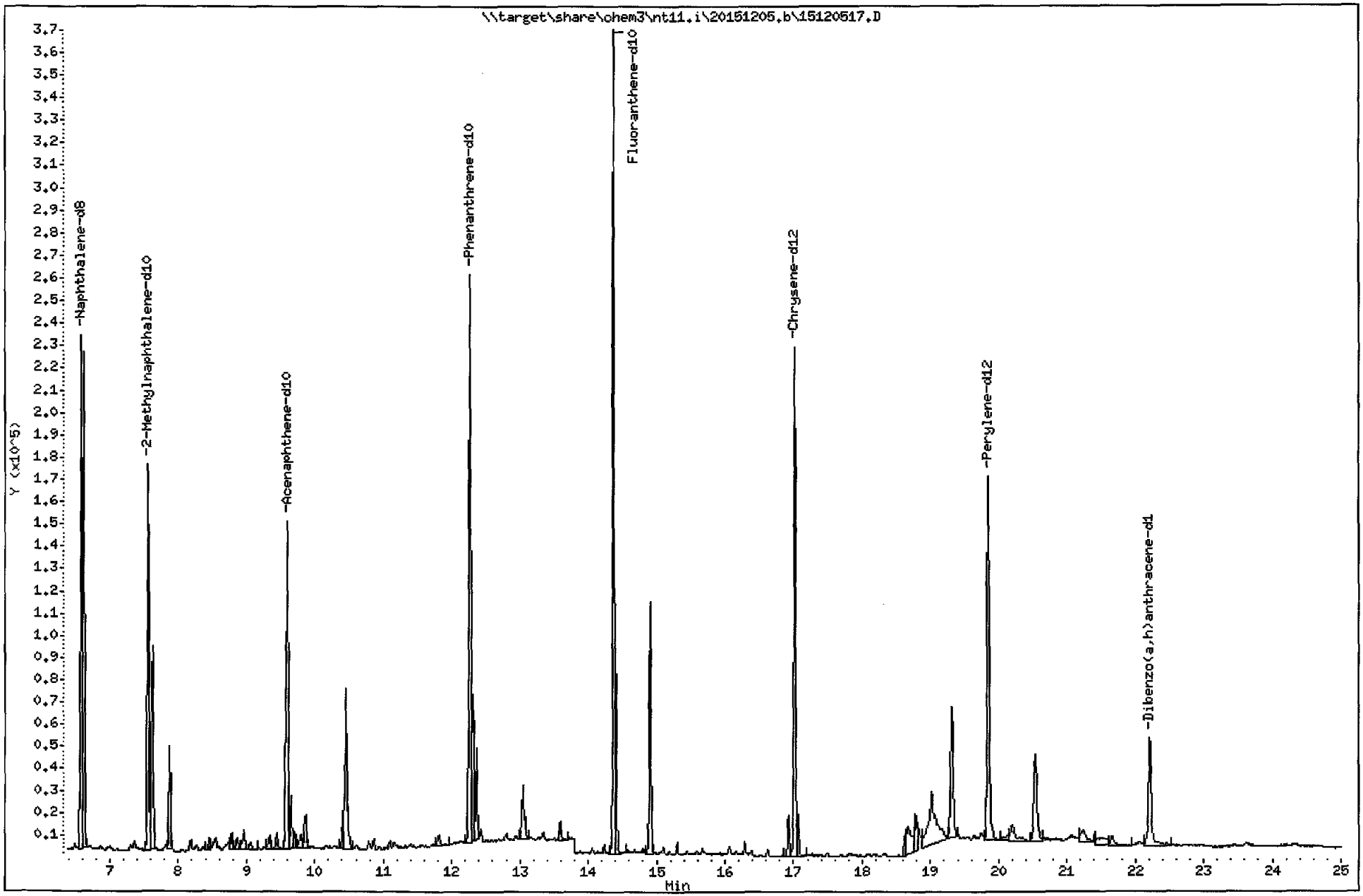
Client Name: Anchor QEA, LLC
Client SDG: AQJ9
Sample Matrix: SOLID
Fraction: SV
Lab Smp Id: AQJ9R
Client Smp ID: PG-TB-PEMD-151110
Level: LOW
Operator: JW
Data Type: MS DATA
SampleType: SAMPLE
SpikeList File: waterlcs.spk
Quant Type: ISTD
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info: 15-21405

SURROGATE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
$ 6 2-Methylnaphthalen	33700	14800	43.80	30-160
$ 23 Fluoranthene-d10	33700	20100	59.77	30-160
$ 36 Dibenzo(a,h)anthra	33700	15500	45.93	30-160

Data File: \\target\share\chem3\nt11.i\20151205.b\15120517.D
Date : 05-DEC-2015 18:16
Client ID: PG-TB-PEMD-151110
Sample Info: AQJ9R
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: JW
Column diameter: 0.25

AQJ9:00395



Data File: \\target\share\chem3\nt11.i\20151205.b\15120517.D

Date : 05-DEC-2015 18:16

Client ID: PG-TB-PEMD-151110

Instrument: nt11.i

Sample Info: AQJ9R

Volume Injected (uL): 2.0

Operator: JW

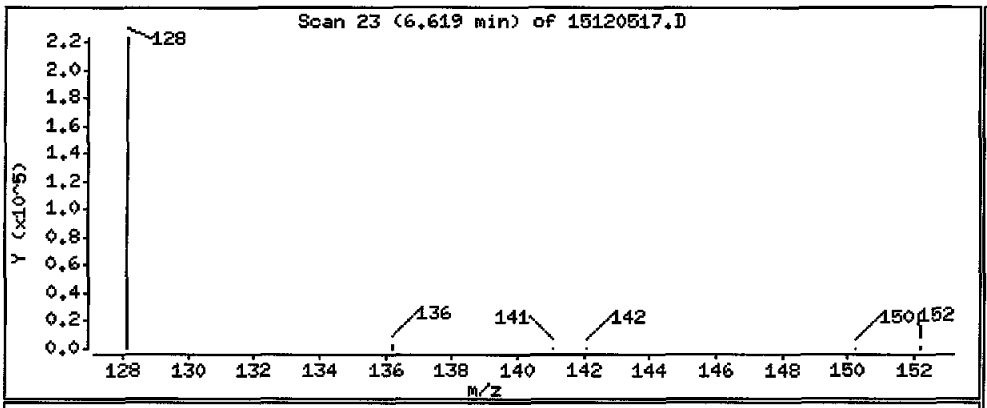
Column phase: Rxi-17Sil MS

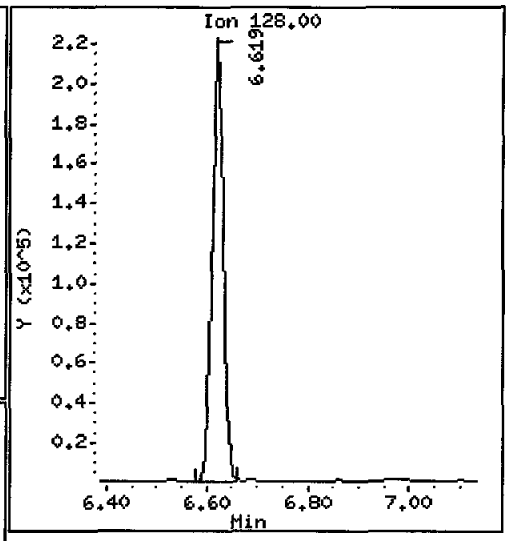
Column diameter: 0.25

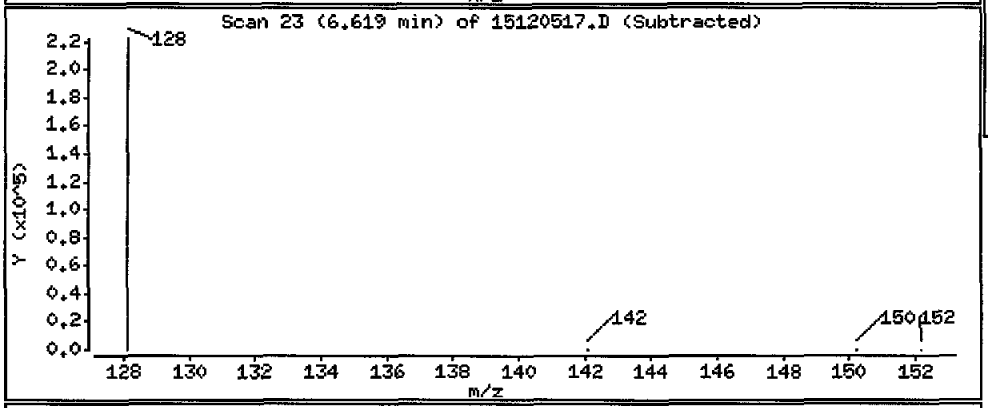
5 Naphthalene

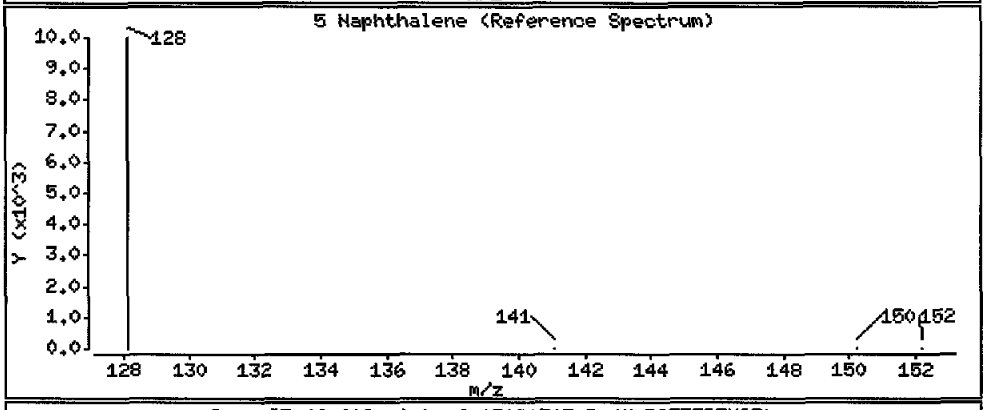
Concentration: 19900 ug/kg

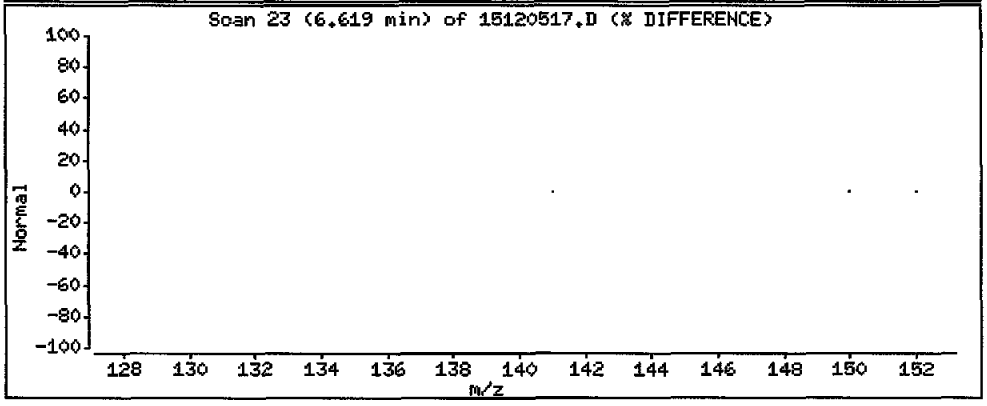
B











Data File: \\target\share\chem3\nt11.i\20151205.b\15120517.D

Date : 05-DEC-2015 18:16

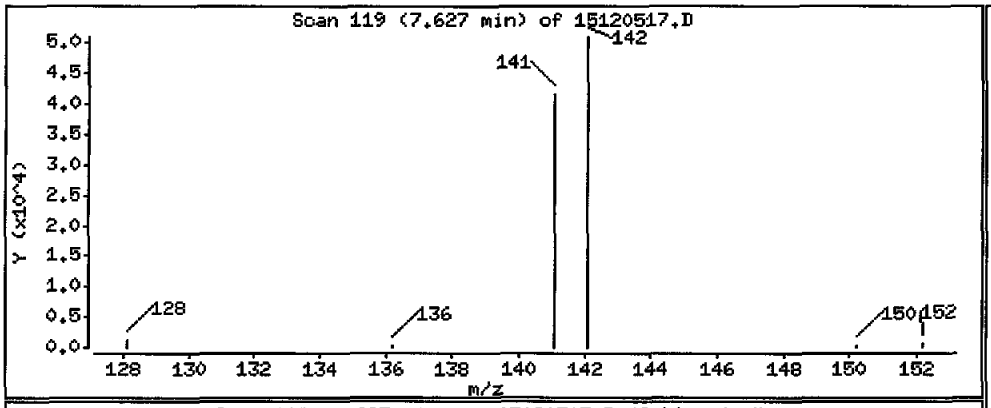
Client ID: PG-TB-PEMD-151110 Instrument: nt11.i

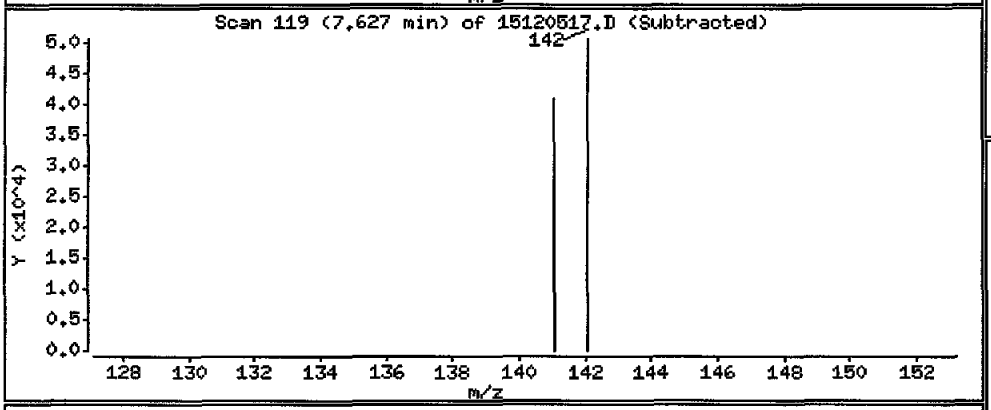
Sample Info: AQJ9R

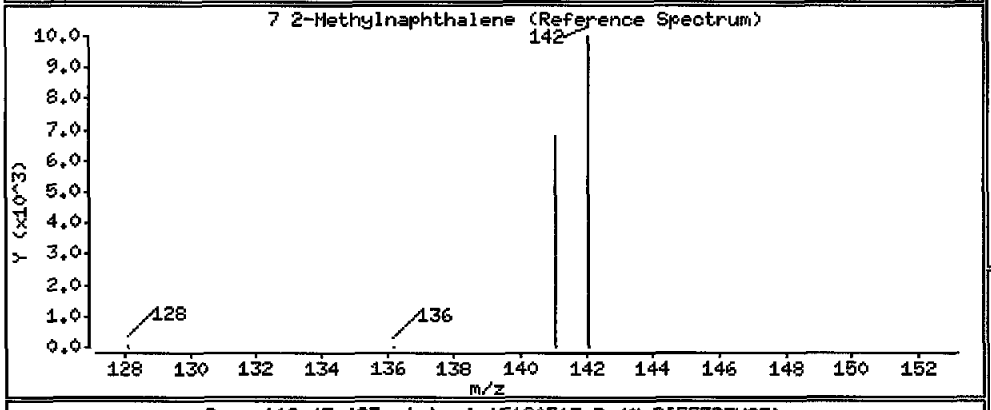
Volume Injected (uL): 2.0 Operator: JW

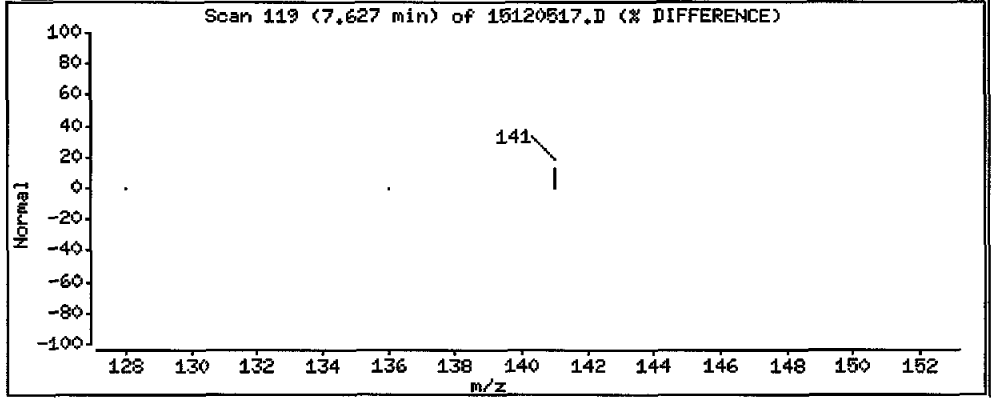
Column phase: Rxi-17Sil MS Column diameter: 0.25

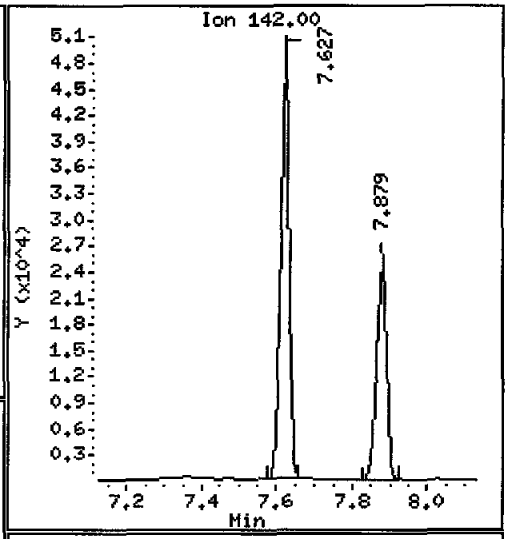
7 2-Methylnaphthalene Concentration: 7280 ug/kg

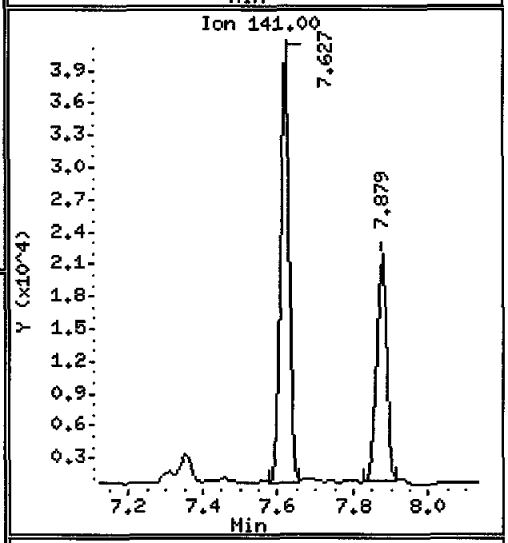


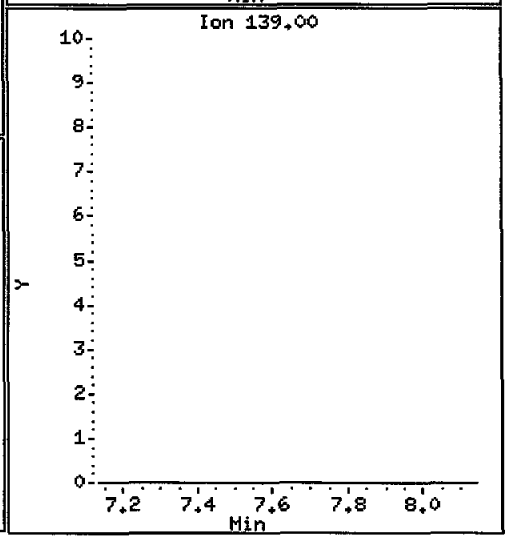












Data File: \\target\share\chem3\nt11.i\20151205.b\15120517.D

Date : 05-DEC-2015 18:16

Client ID: PG-TB-PEMD-151110

Instrument: nt11.i

Sample Info: AQJ9R

Volume Injected (uL): 2.0

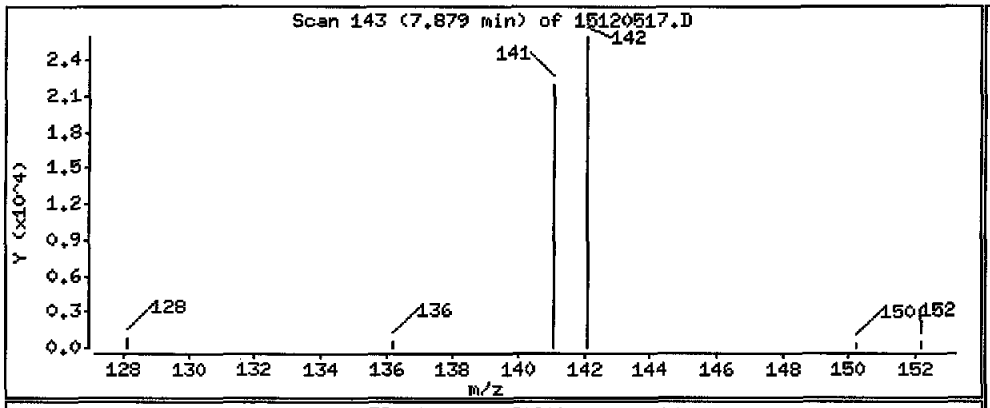
Operator: JW

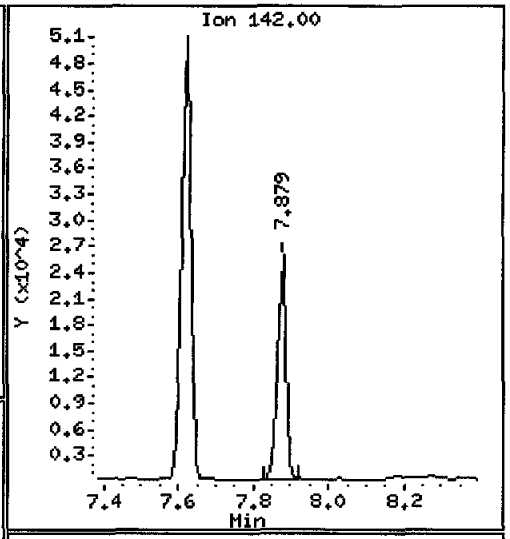
Column phase: Rxi-17Sil MS

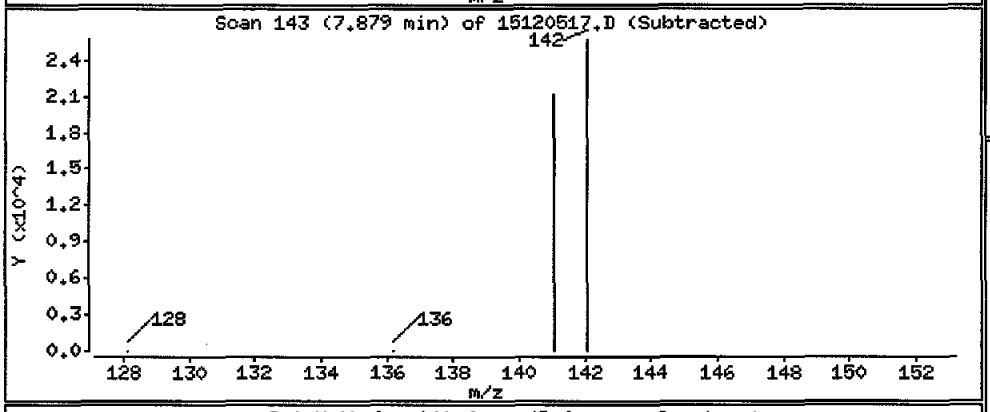
Column diameter: 0.25

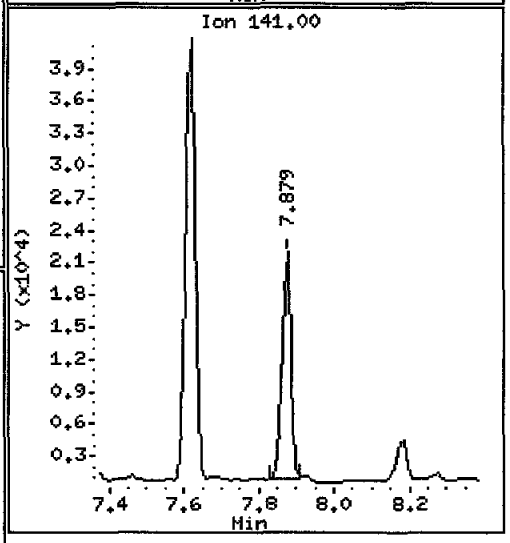
8 1-Methylnaphthalene

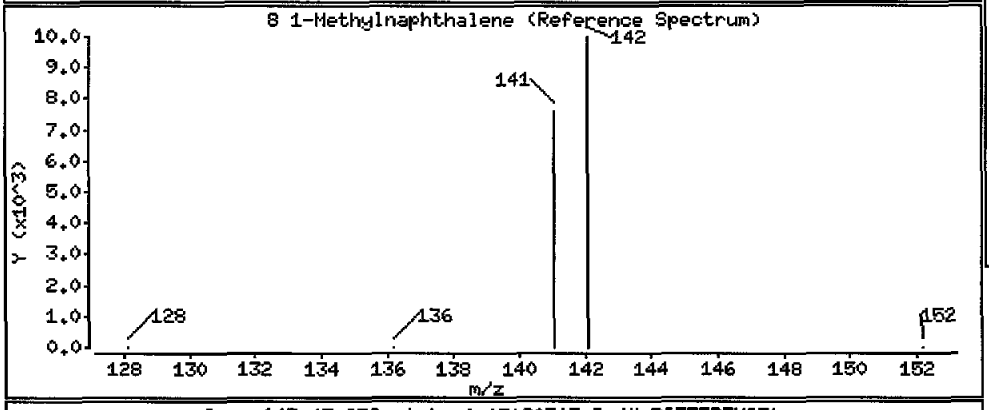
Concentration: 4160 ug/kg

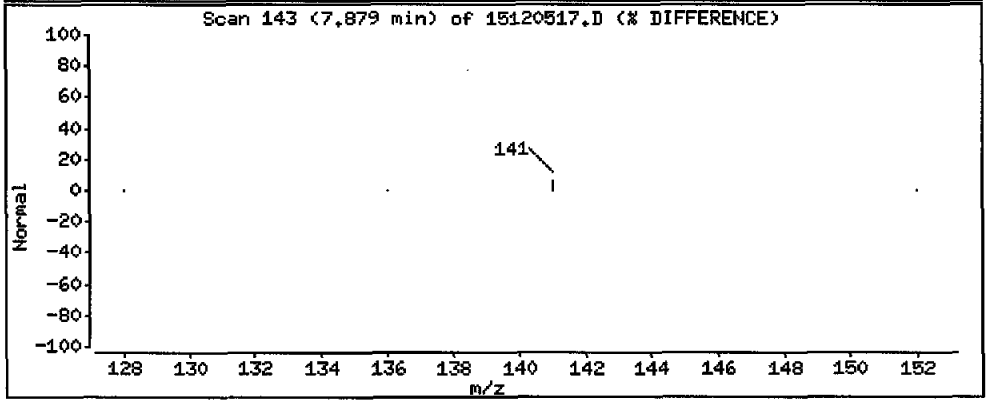












Data File: \\target\share\chem3\nt11.i\20151205.b\15120517.D

Date : 05-DEC-2015 18:16

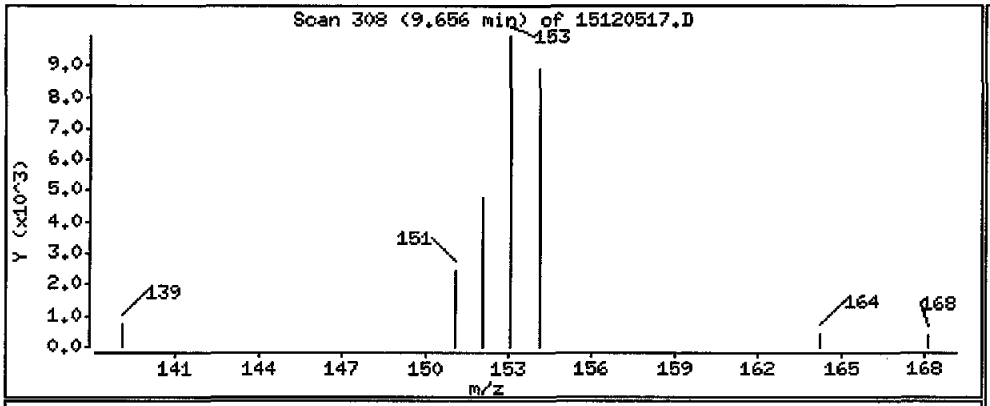
Client ID: PG-TB-PEMD-151110 Instrument: nt11.i

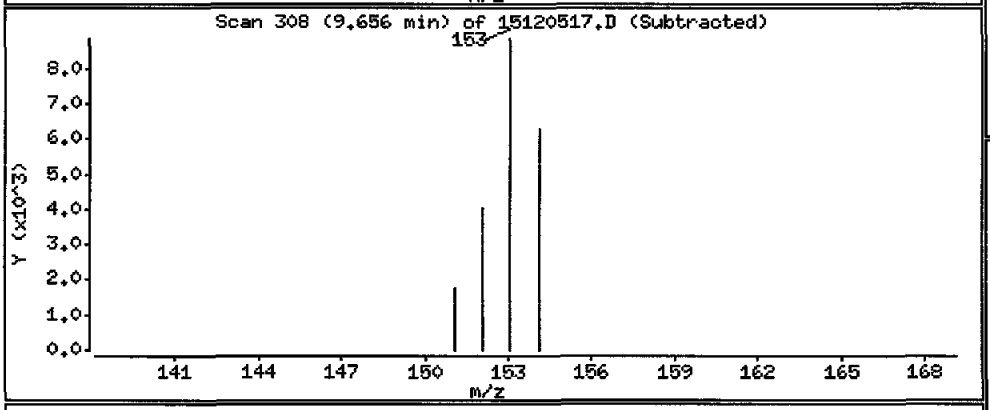
Sample Info: AQJ9R

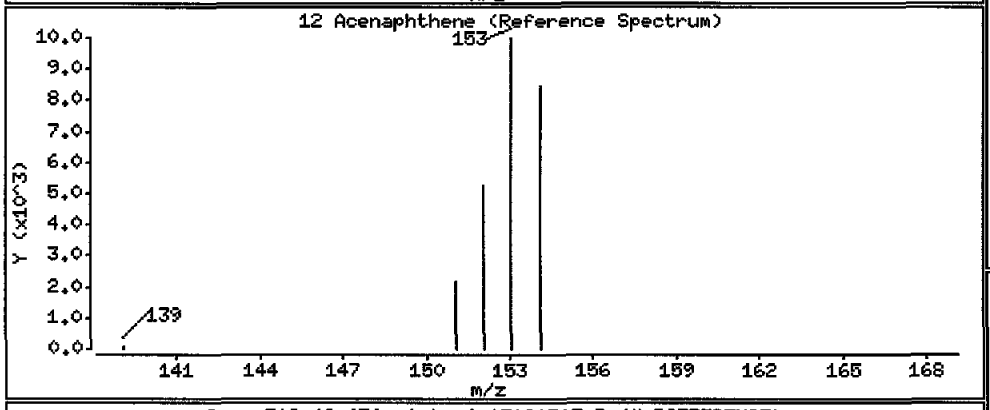
Volume Injected (uL): 2.0 Operator: JW

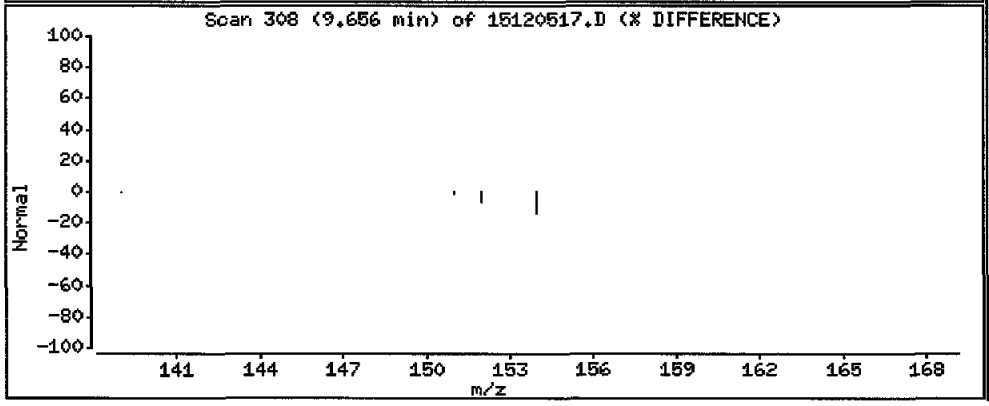
Column phase: Rxi-17Sil MS Column diameter: 0.25

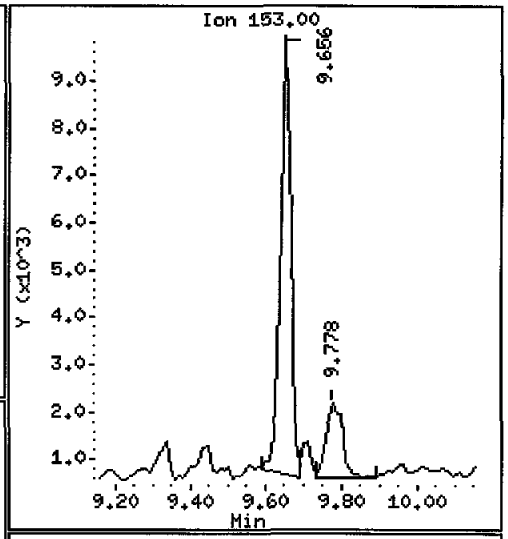
12 Acenaphthene Concentration: 1240 ug/kg

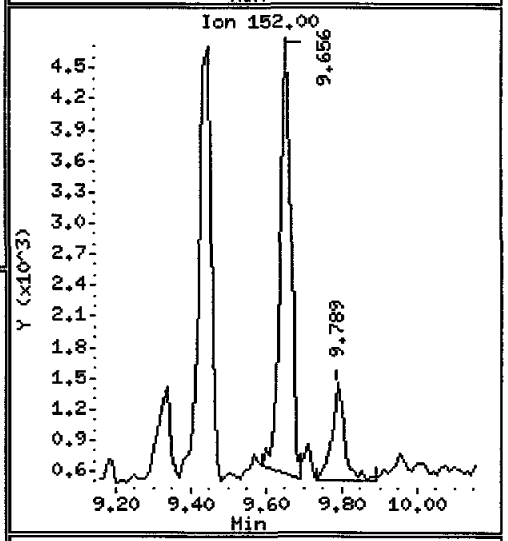


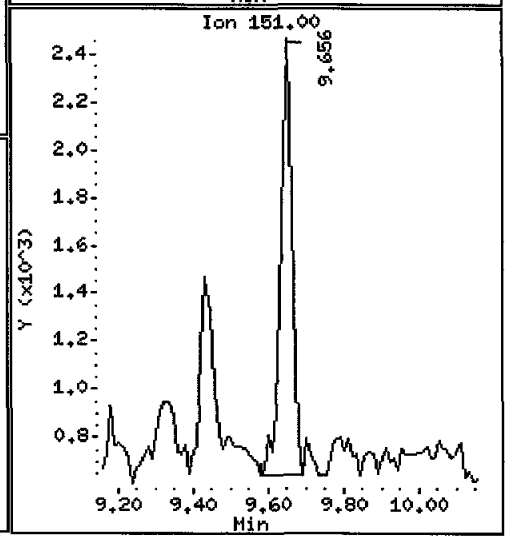












Data File: \\target\share\chem3\nt11.i\20151205.b\15120517.D

Date : 05-DEC-2015 18:16

Client ID: PG-TB-PEMD-151110

Instrument: nt11.i

Sample Info: AQJ9R

Volume Injected (uL): 2.0

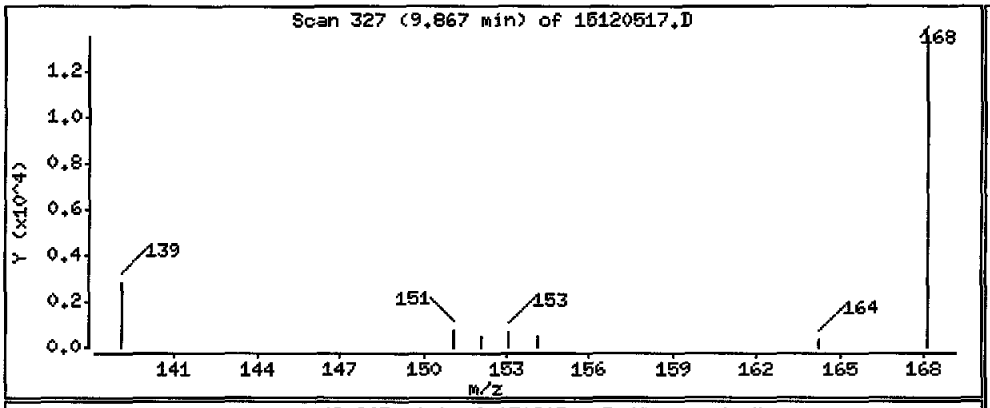
Operator: JW

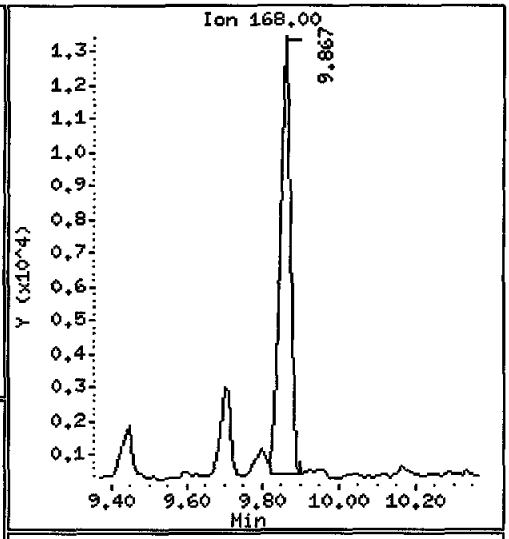
Column phase: Rxi-17Sil MS

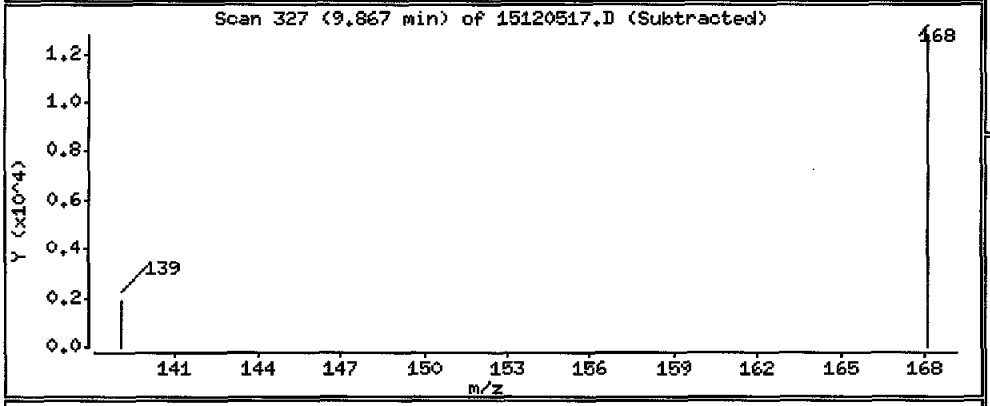
Column diameter: 0.25

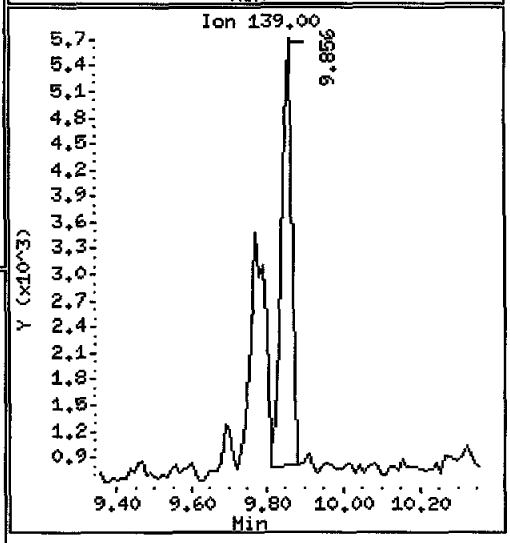
14 Dibenzofuran

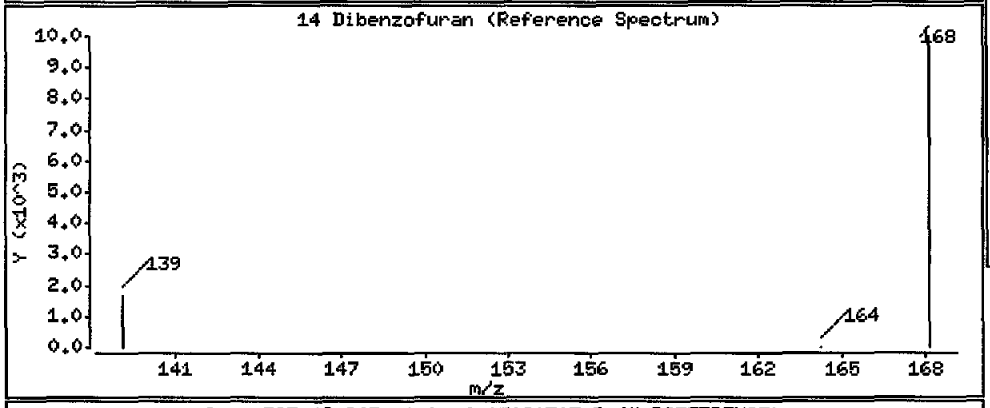
Concentration: 1140 ug/kg

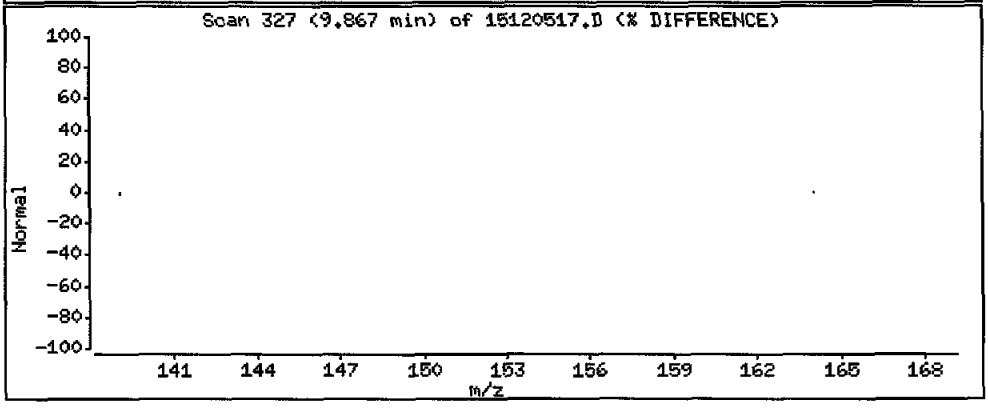












Data File: \\target\share\chem3\nt11.i\20151205.b\15120517.D

Date : 05-DEC-2015 18:16

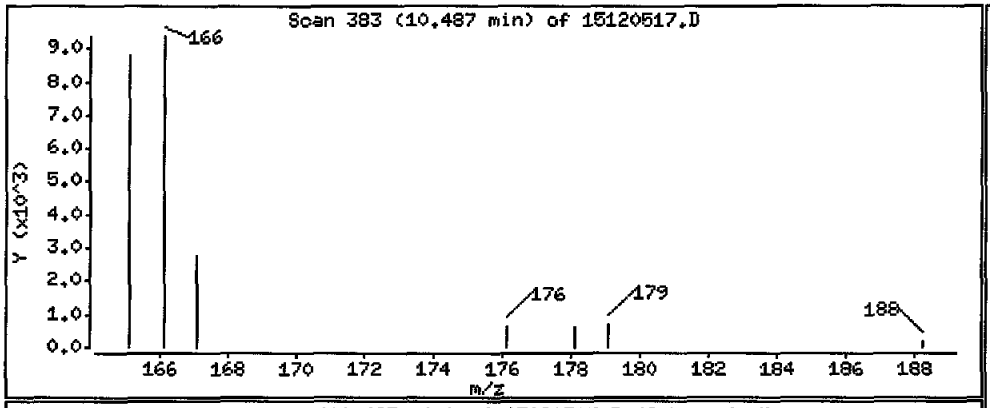
Client ID: PG-TB-PEMD-151110 Instrument: nt11.i

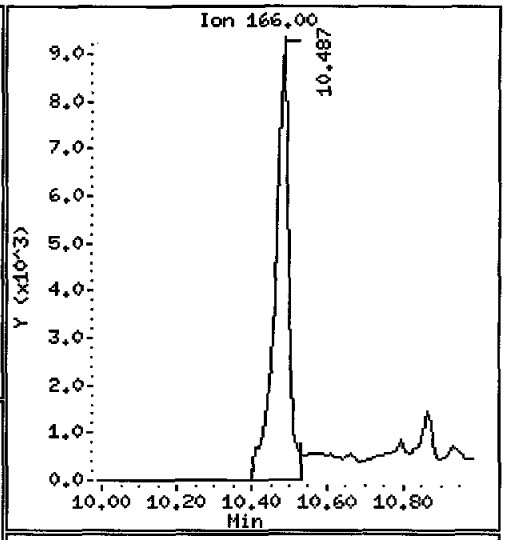
Sample Info: AQJ9R

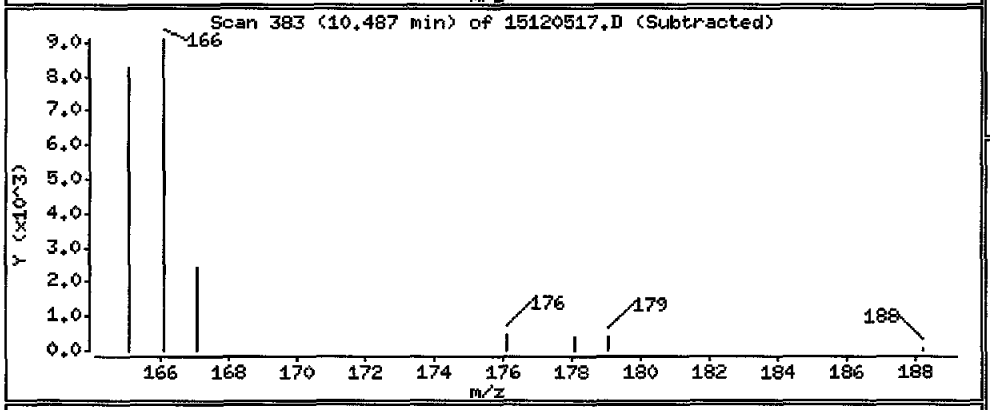
Volume Injected (uL): 2.0 Operator: JW

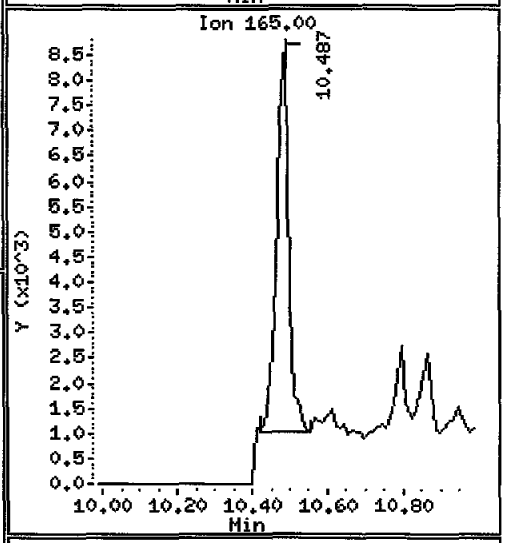
Column phase: Rxi-17Sil MS Column diameter: 0.25

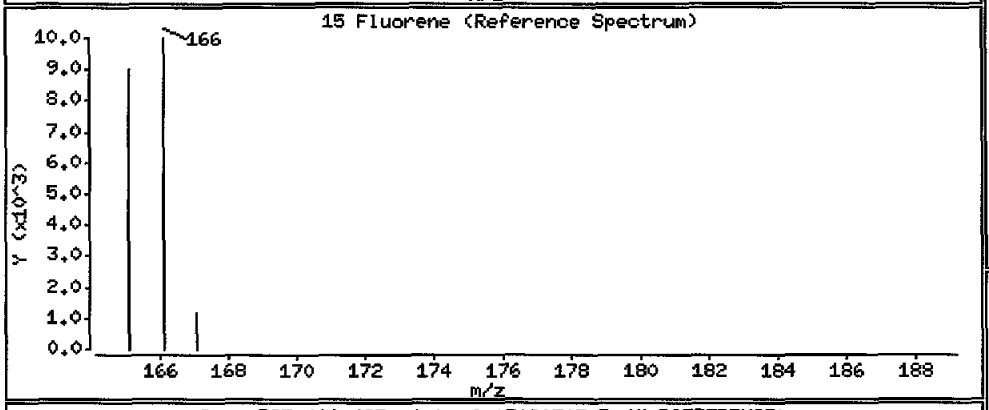
15 Fluorene Concentration: 1480 ug/kg

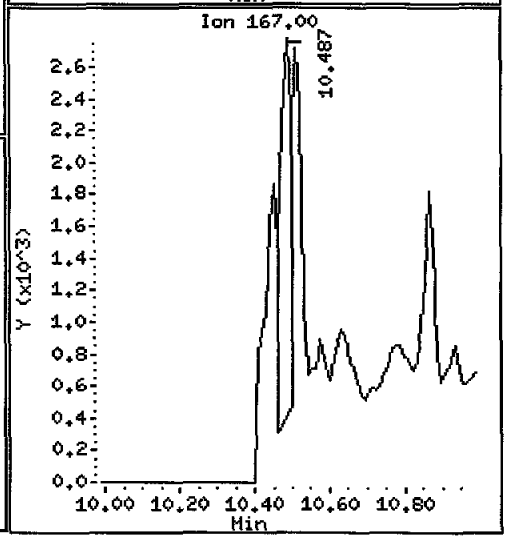


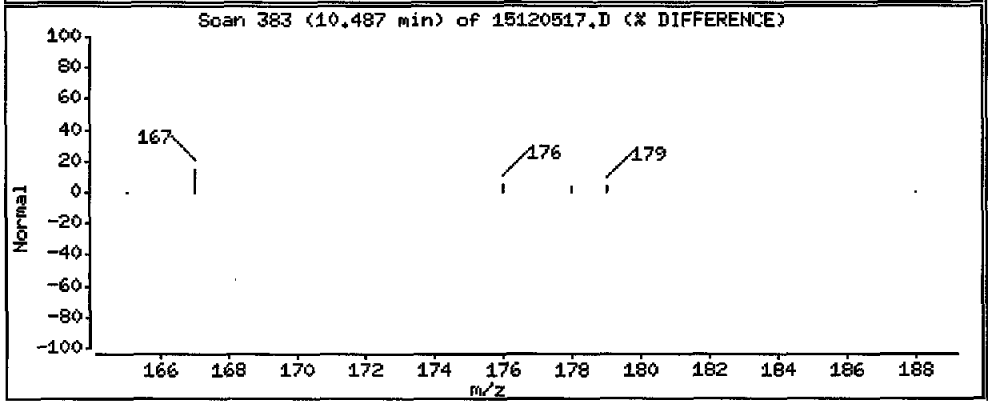












Data File: \\target\share\chem3\nt11.i\20151205.b\15120517.D

Date : 05-DEC-2015 18:16

Client ID: PG-TB-PEMD-151110

Instrument: nt11.i

Sample Info: AQJ9R

Volume Injected (uL): 2.0

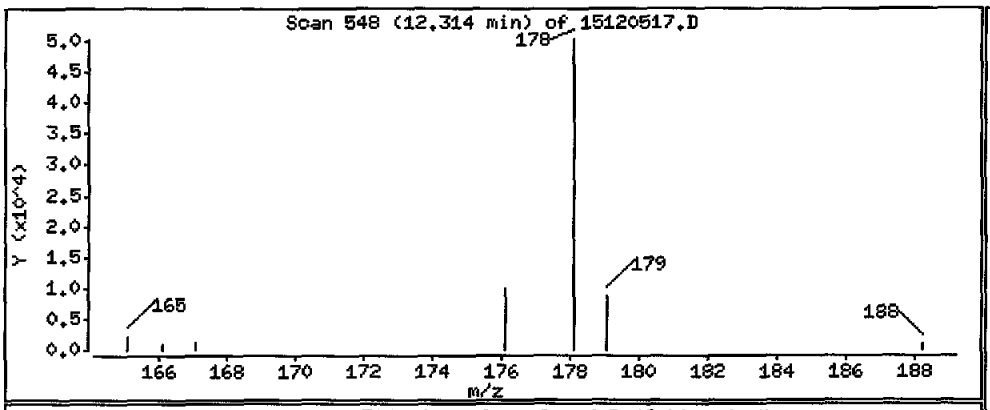
Operator: JW

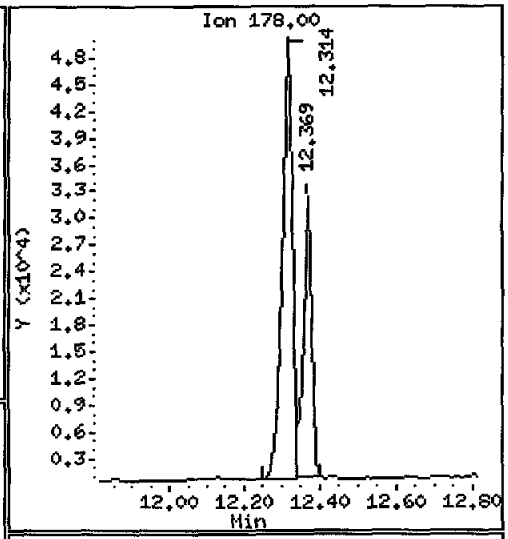
Column phase: Rxi-17Sil MS

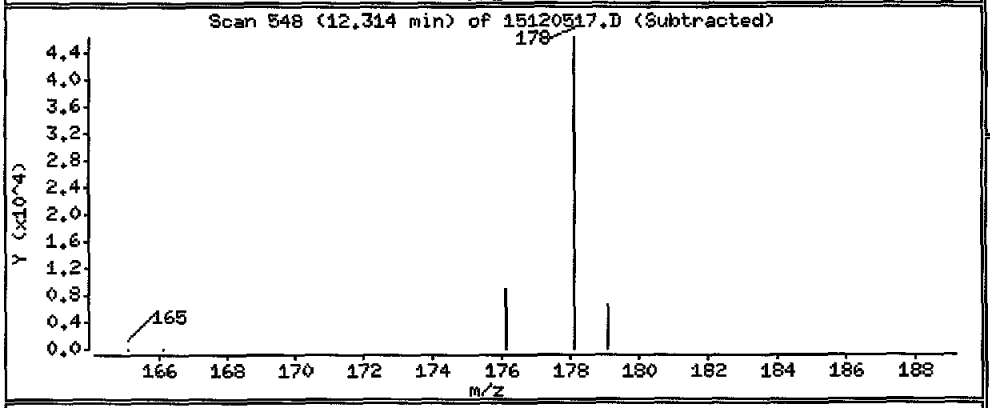
Column diameter: 0.25

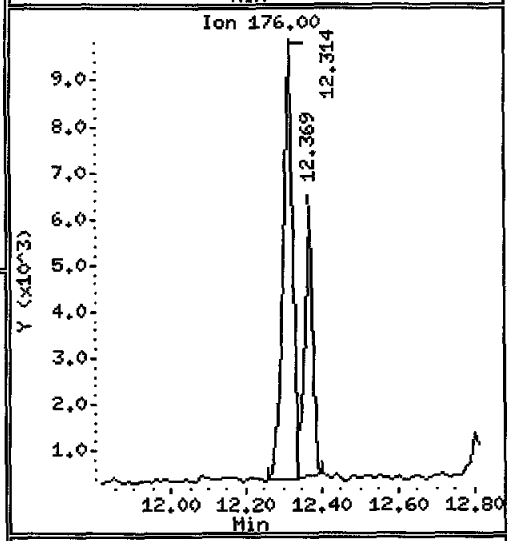
19 Phenanthrene

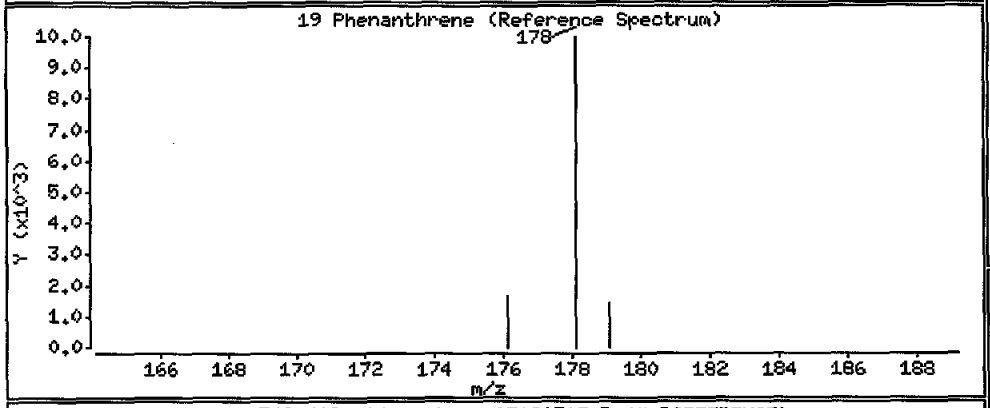
Concentration: 3440 ug/kg

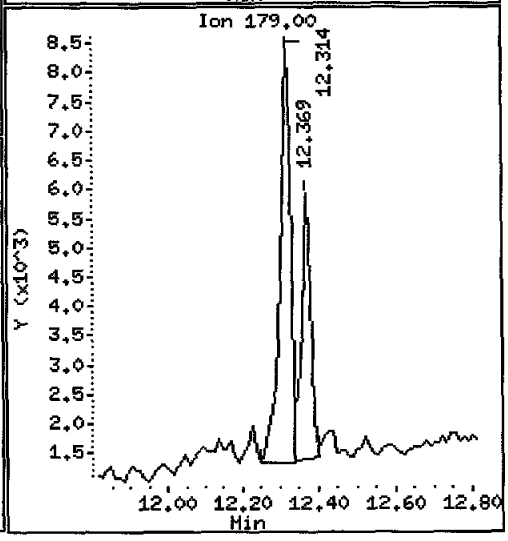


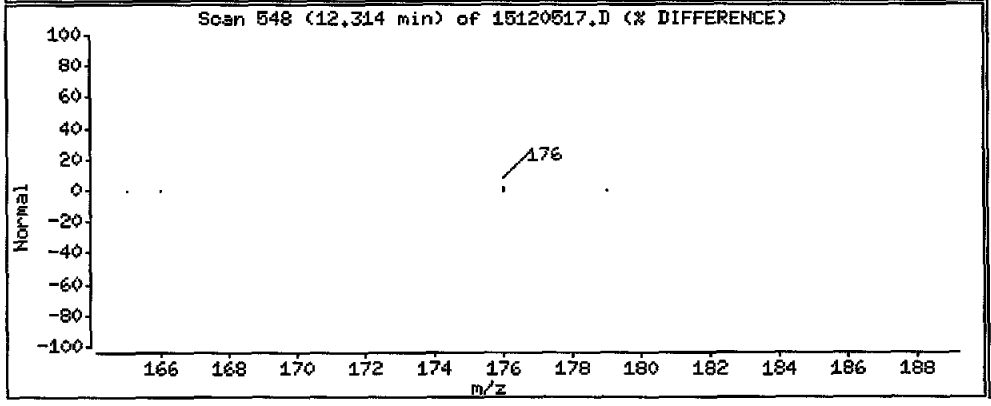












Data File: \\target\share\chem3\nt11.i\20151205.b\15120517.D

Date : 05-DEC-2015 18:16

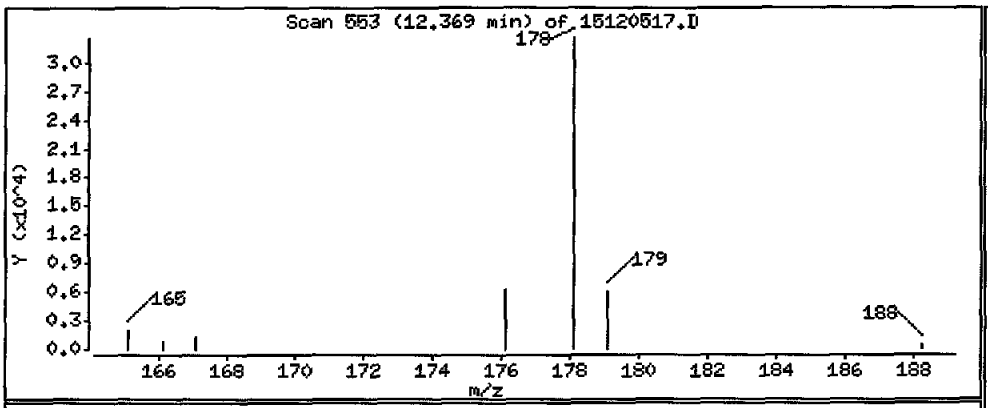
Client ID: PG-TB-PEMD-151110 Instrument: nt11.i

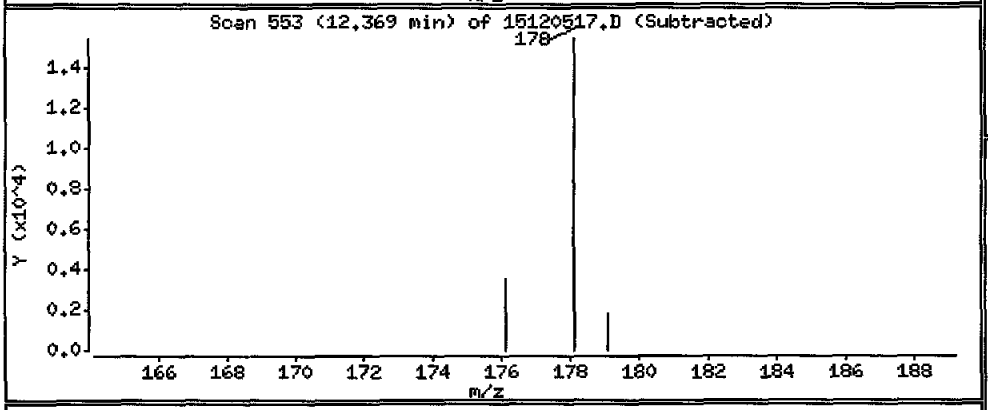
Sample Info: AQJ9R

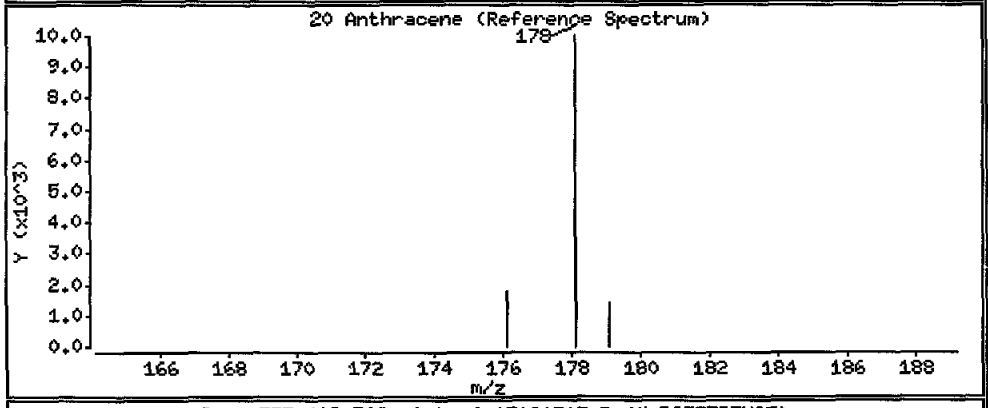
Volume Injected (uL): 2.0 Operator: JW

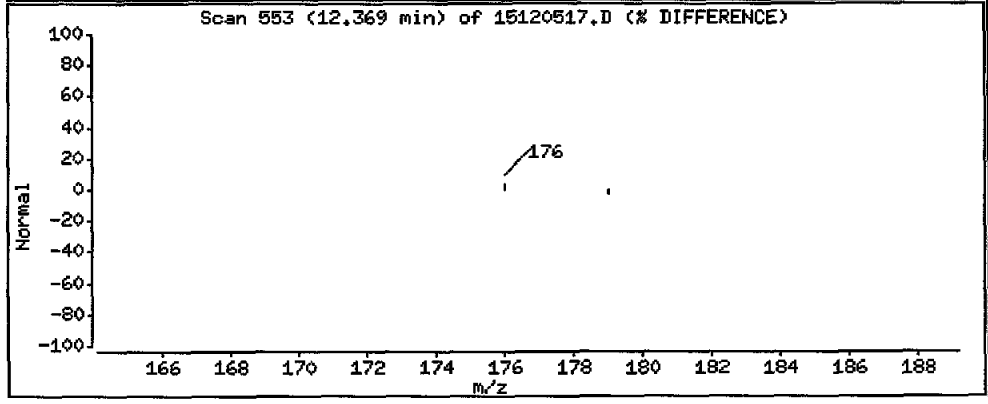
Column phase: Rxi-17Sil MS Column diameter: 0.25

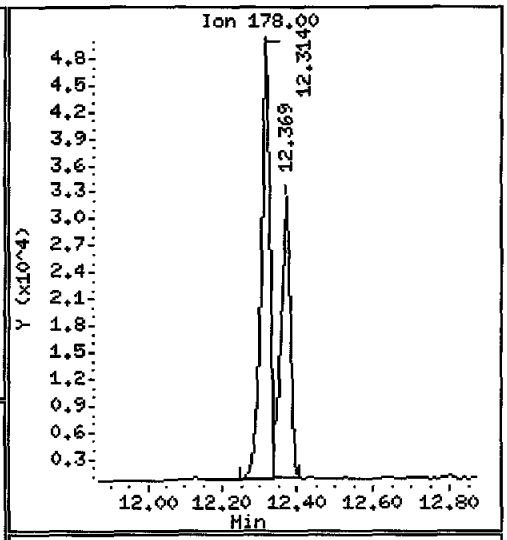
20 Anthracene Concentration: 2400 ug/kg

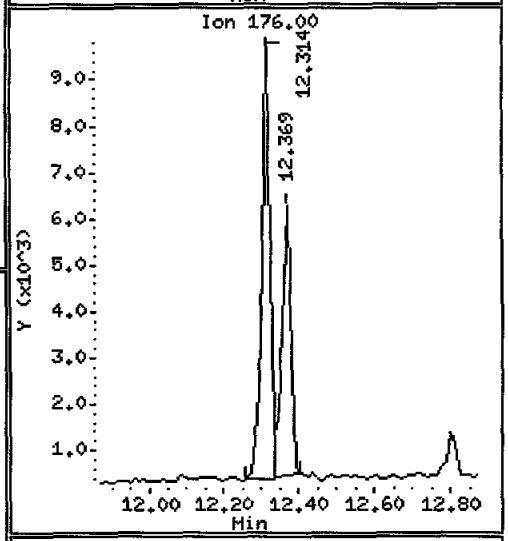


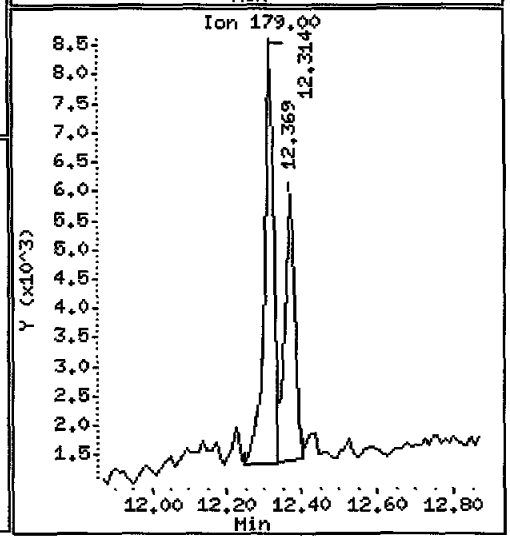












Data File: \\target\share\chem3\nt11.i\20151205.b\15120517.D

Date : 05-DEC-2015 18:16

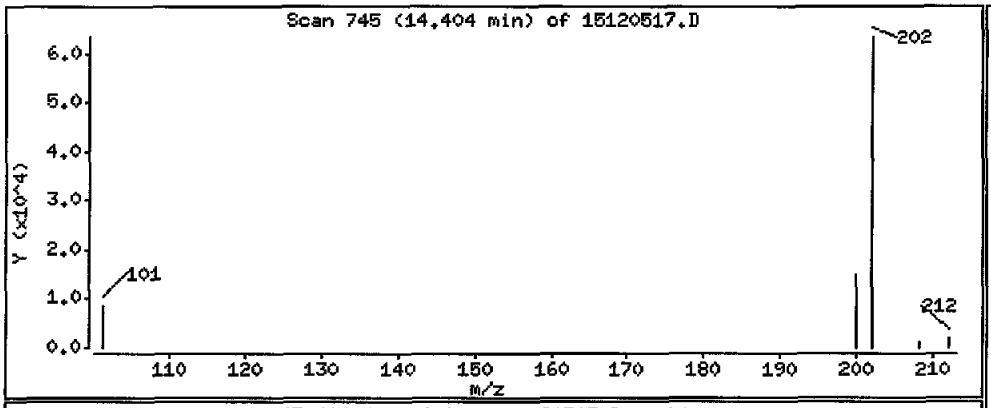
Client ID: PG-TB-PEMD-151110 Instrument: nt11.i

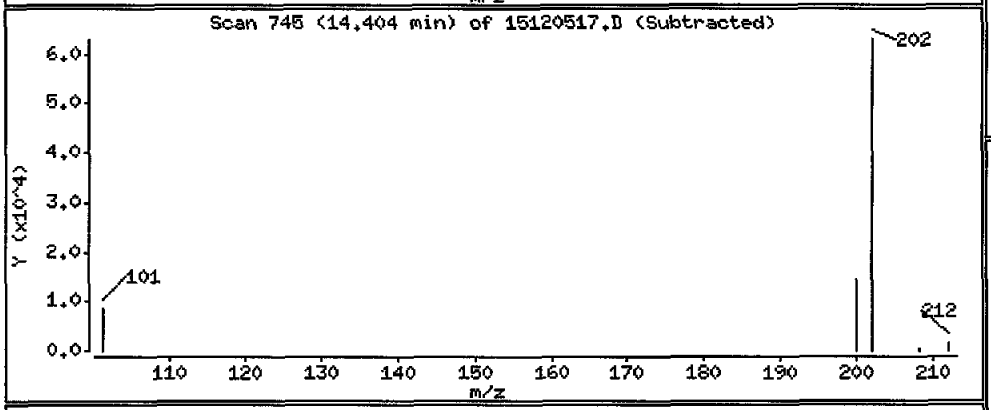
Sample Info: AQJ9R

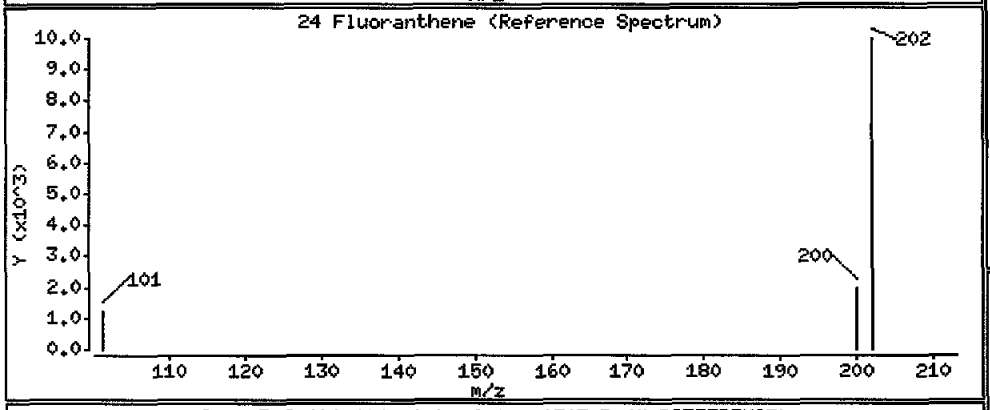
Volume Injected (uL): 2.0 Operator: JW

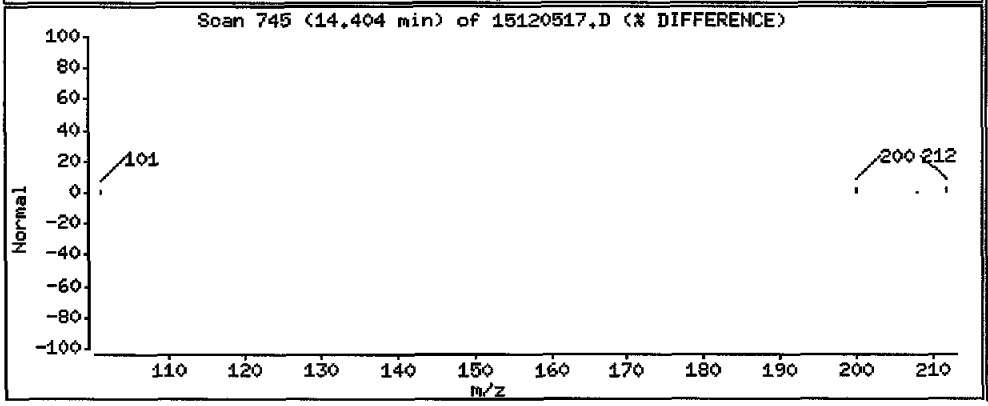
Column phase: Rxi-17Sil MS Column diameter: 0.25

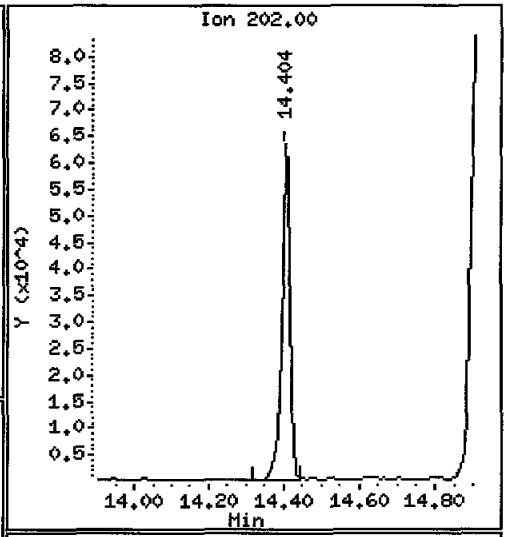
24 Fluoranthene Concentration: 4170 ug/kg

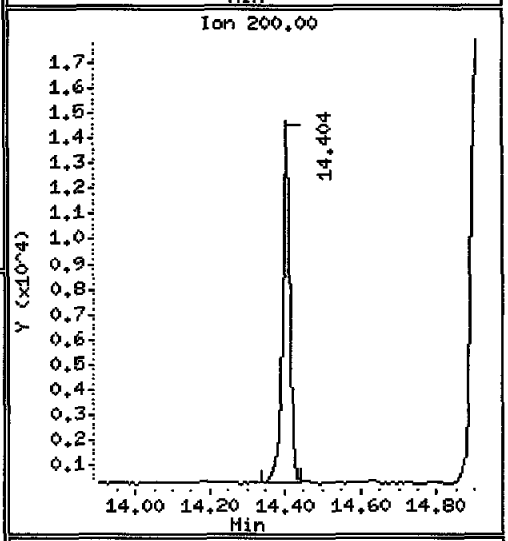


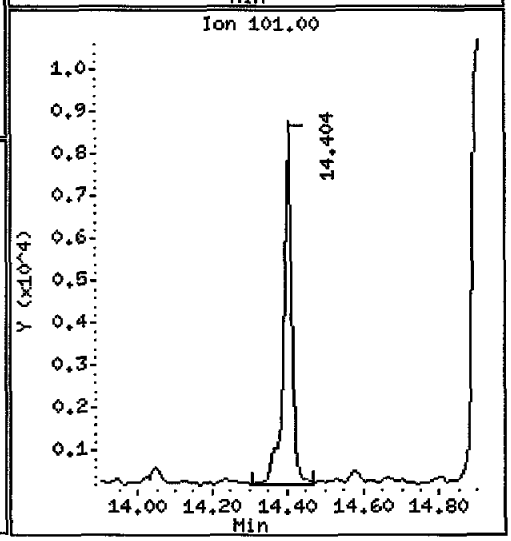












Data File: \\target\share\chem3\nt11.i\20151205.b\15120517.D

Date : 05-DEC-2015 18:16

Client ID: PG-TB-PEMD-151110

Instrument: nt11.i

Sample Info: AQJ9R

Volume Injected (uL): 2.0

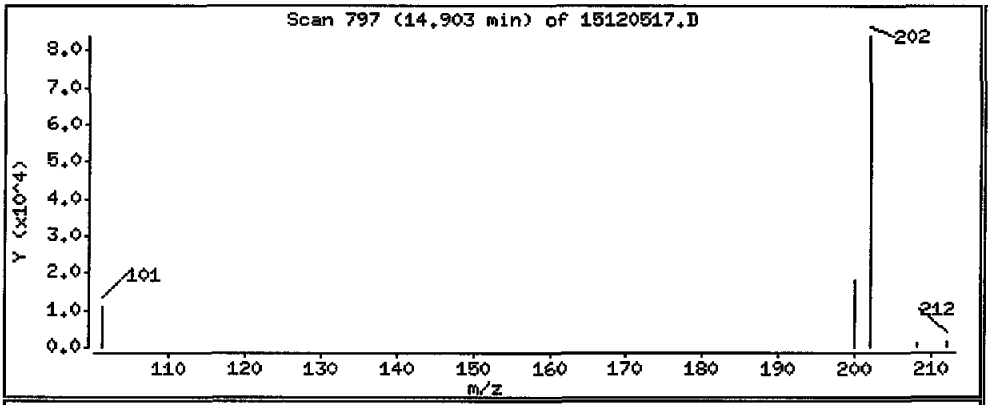
Operator: JW

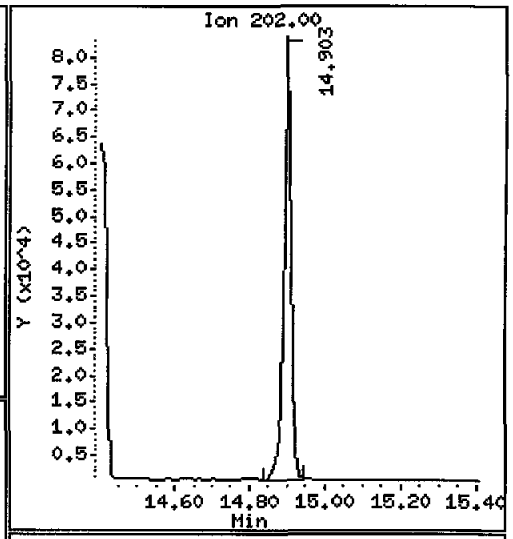
Column phase: Rxi-17Sil MS

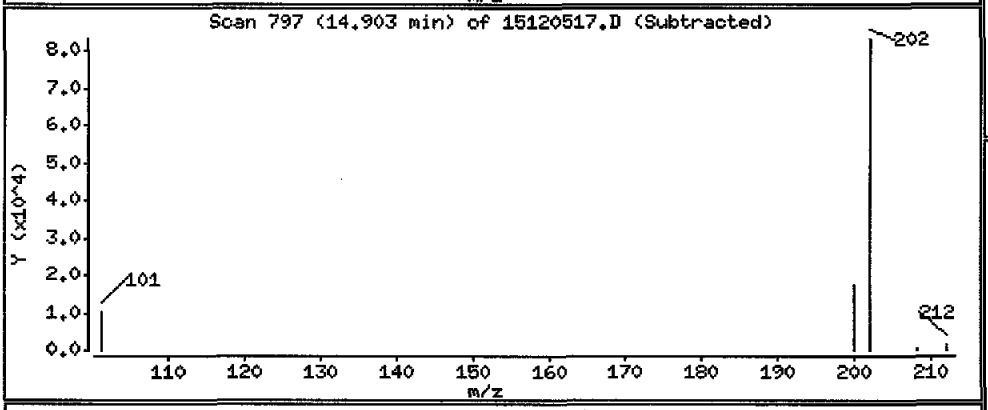
Column diameter: 0.25

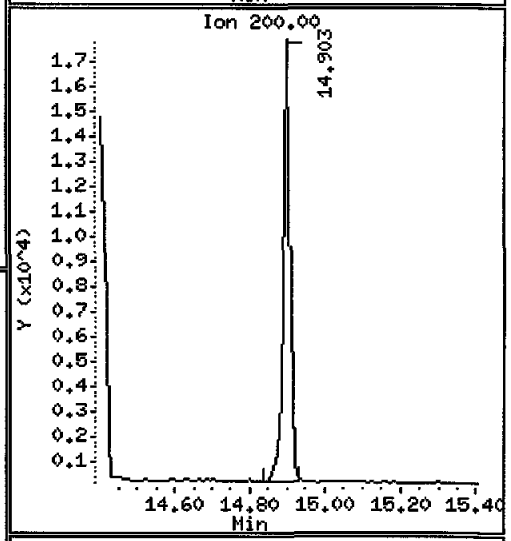
25 Pyrene

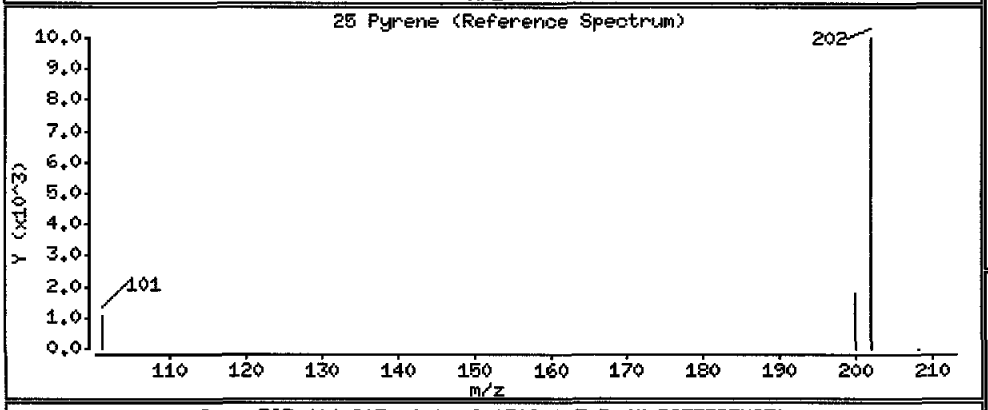
Concentration: 5210 ug/kg

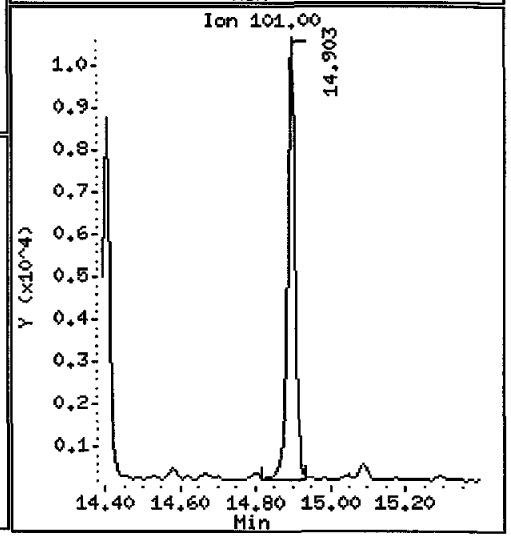


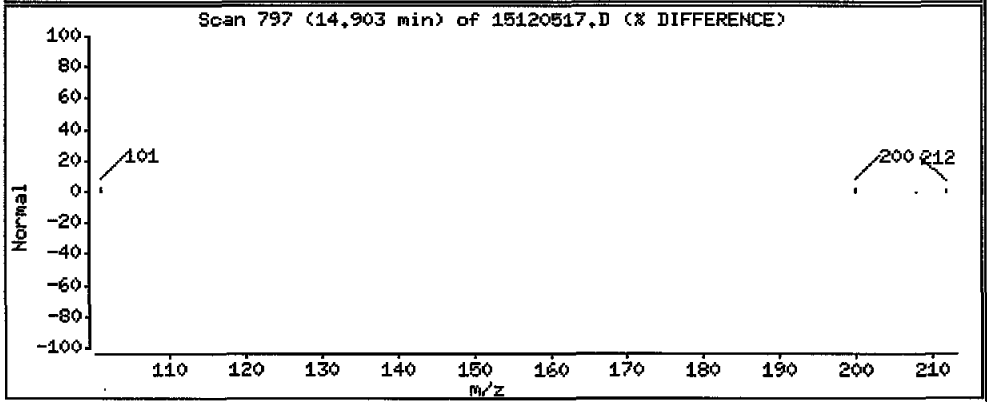












REVIEW SUMMARY FOR FILE - 15120517.D

Lab ID: AQJ9R
nt11.i, 20151205.b\lowsim.m, 05-DEC-2015 18:16

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151205.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

ARI Labs, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt11.i Injection Date: 05-DEC-2015 18:46
Lab File ID: 15120518.D Init. Cal. Date(s): 04-DEC-2015 04-DEC-2015
Analysis Type: SOIL Init. Cal. Times: 09:03 11:33
Lab Sample ID: LLSIM CCV 250 Quant Type: ISTD
Method: \\target\share\chem3\nt11.i\20151205.b\lowsim.m

COMPOUND	RRF / AMOUNT	RF250	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
5 Naphthalene	1.15523	1.09128	0.010	-5.53592	20.00000	Averaged	
$ 6 2-Methylnaphthalene-d10	0.74235	0.79876	0.010	7.59827	20.00000	Averaged	
7 2-Methylnaphthalene	0.79376	0.85162	0.010	7.28927	20.00000	Averaged	
8 1-Methylnaphthalene	0.71533	0.78379	0.010	9.56985	20.00000	Averaged	
10 Acenaphthylene	1.61414	1.69011	0.010	4.70666	20.00000	Averaged	
12 Acenaphthene	1.07135	1.03513	0.010	-3.38081	20.00000	Averaged	
14 Dibenzofuran	1.61394	1.54425	0.010	-4.31762	20.00000	Averaged	
15 Fluorene	1.21040	1.24800	0.010	3.10562	20.00000	Averaged	
19 Phenanthrene	1.20497	1.14248	0.010	-5.18602	20.00000	Averaged	
20 Anthracene	1.07857	1.14104	0.010	5.79210	20.00000	Averaged	
$ 23 Fluoranthene-d10	1.09988	1.16265	0.200	5.70749	20.00000	Averaged	
24 Fluoranthene	1.20977	1.24484	0.010	2.89842	20.00000	Averaged	
25 Pyrene	1.58387	1.66686	0.010	5.24013	20.00000	Averaged	
28 Benzo(a)anthracene	1.33345	1.38038	0.010	3.52003	20.00000	Averaged	
30 Chrysene	1.46350	1.36878	0.010	-6.47241	20.00000	Averaged	
44 Benzo(b)fluoranthene	1.35504	1.48949	0.200	9.92191	20.00000	Averaged	
45 Benzo(k)fluoranthene	1.57904	1.50346	0.200	-4.78620	20.00000	Averaged	
46 Benzo(j)fluoranthene	1.43839	1.38630	0.200	-3.62179	20.00000	Averaged	
34 Benzo(a)pyrene	1.30774	1.27626	0.010	-2.40713	20.00000	Averaged	
$ 36 Dibenzo(a,h)anthracene-d14	0.80723	0.57053	0.010	-29.32311	20.00000	Averaged	<-
37 Indeno(1,2,3-cd)pyrene	1.37309	0.90518	0.010	-34.07697	20.00000	Averaged	<-
38 Dibenzo(a,h)anthracene	1.08579	0.72204	0.010	-33.50149	20.00000	Averaged	<-
39 Benzo(g,h,i)perylene	1.19199	0.67272	0.010	-43.56300	20.00000	Averaged	<-
47 Perylene	1.35582	1.26297	0.200	-6.84822	20.00000	Averaged	
48 Benzo(e)pyrene	1.36945	1.27933	0.200	-6.58027	20.00000	Averaged	

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151205.b\15120518.D
Lab Smp Id: LLSIM CCV 250
Inj Date : 05-DEC-2015 18:46 MS Autotune Date: 23-APR-2014 12:5
Operator : JW Inst ID: nt11.i
Smp Info : LLSIM CCV 250
Misc Info :
Comment :
Method : \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Meth Date : 14-Dec-2015 10:48 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 2 Continuing Calibration Sample
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	500.000	Volume of final extract (uL)
Ws	10.000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

JW 12/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ng/mL)	AMOUNTS ON-COL (ng/mL)
*	4 Naphthalene-d8	136	6.597	6.597	(1.000)	259155	200.000	
	5 Naphthalene	128	6.639	6.639	(1.006)	353514	250.000	236
$	6 2-Methylnaphthalene-d10	152	7.574	7.574	(1.148)	258753	250.000	269
	7 2-Methylnaphthalene	142	7.637	7.637	(1.158)	275877	250.000	268
	8 1-Methylnaphthalene	142	7.889	7.889	(1.196)	253903	250.000	274
	10 Acenaphthylene	152	9.445	9.445	(0.984)	470003	250.000	262
*	11 Acenaphthene-d10	164	9.600	9.600	(1.000)	222472	200.000	
	12 Acenaphthene	153	9.667	9.667	(1.007)	287860	250.000	242
	14 Dibenzofuran	168	9.866	9.866	(1.028)	429441	250.000	239
	15 Fluorene	166	10.486	10.486	(1.092)	347055	250.000	258
*	18 Phenanthrene-d10	188	12.280	12.280	(1.000)	373365	200.000	
	19 Phenanthrene	178	12.313	12.313	(1.003)	533201	250.000	237
	20 Anthracene	178	12.368	12.368	(1.007)	532531	250.000	264
$	23 Fluoranthene-d10	212	14.374	14.374	(1.171)	542617	250.000	264
	24 Fluoranthene	202	14.413	14.413	(1.174)	580973	250.000	257
	25 Pyrene	202	14.903	14.903	(0.876)	593653	250.000	263
	28 Benzo(a)anthracene	228	16.926	16.926	(0.995)	491624	250.000	259
*	29 Chrysene-d12	240	17.017	17.017	(1.000)	284920	200.000	
	30 Chrysene	228	17.067	17.067	(1.003)	487491	250.000	234
	44 Benzo(b)fluoranthene	252	18.785	18.785	(0.947)	405143	250.000	275
	45 Benzo(k)fluoranthene	252	18.833	18.833	(0.949)	408943	250.000	238

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ng/mL)	AMOUNTS ON-COL (ng/mL)
	46 Benzo(j)fluoranthene	252	18.890	18.890	(0.952)	377075	250.000	241
	34 Benzo(a)pyrene	252	19.640	19.640	(0.990)	347145	250.000	244
*	35 Perylene-d12	264	19.842	19.842	(1.000)	217601	200.000	
$	36 Dibenzo(a,h)anthracene-d14	292	22.208	22.208	(1.119)	155184	250.000	177
	37 Indeno(1,2,3-cd)pyrene	276	22.341	22.341	(1.126)	246210	250.000	165
	38 Dibenzo(a,h)anthracene	278	22.318	22.318	(1.125)	196395	250.000	166
	39 Benzo(g,h,i)perylene	276	23.437	23.437	(1.181)	182981	250.000	141
	47 Perylene	252	19.909	19.909	(1.003)	343529	250.000	233
	48 Benzo(e)pyrene	252	19.534	19.534	(0.985)	347980	250.000	234

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15120518.D
Lab Smp Id: LLSIM CCV 250
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt11.i\20151205.b\lowsim.m
Misc Info:

Calibration Date: 05-DEC-2015
Calibration Time: 10:30
Level: LOW
Sample Type: SOIL

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	259155	-20.96
11 Acenaphthene-d10	239179	119590	478358	222472	-6.99
18 Phenanthrene-d10	372253	186127	744506	373365	0.30
29 Chrysene-d12	294711	147356	589422	284920	-3.32
35 Perylene-d12	260595	130298	521190	217601	-16.50

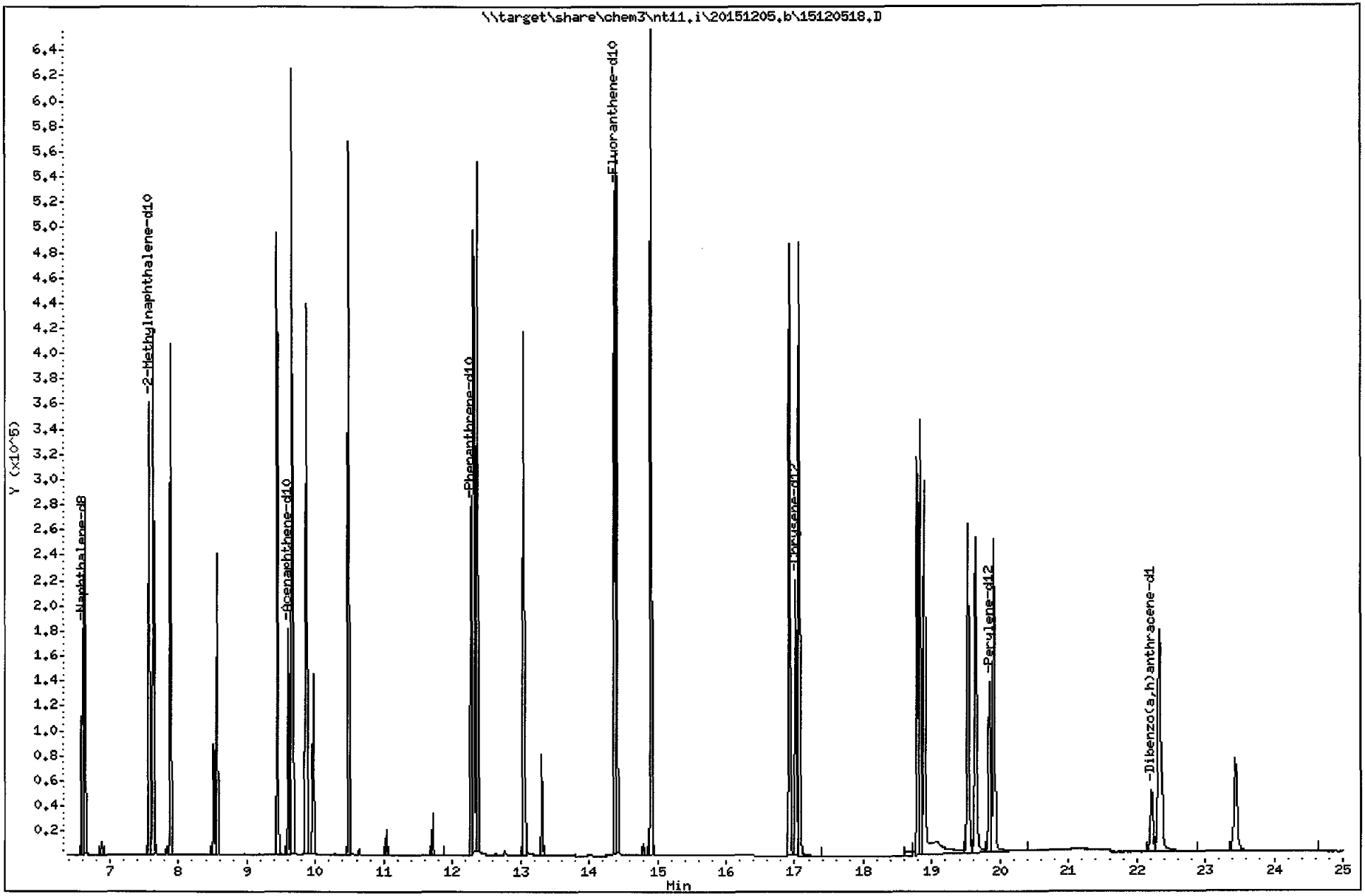
COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.60	6.10	7.10	6.60	0.00
11 Acenaphthene-d10	9.60	9.10	10.10	9.60	0.00
18 Phenanthrene-d10	12.28	11.78	12.78	12.28	0.00
29 Chrysene-d12	17.02	16.52	17.52	17.02	0.00
35 Perylene-d12	19.84	19.34	20.34	19.84	0.00

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.

Data File: \\target\share\chem3\nt11.i\20151205.b\15120518.D
Date : 05-DEC-2015 18:46
Client ID:
Sample Info: LLSIM CCV 250
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i

Operator: JW
Column diameter: 0.25



REVIEW SUMMARY FOR FILE - 15120518.D

Lab ID: LLSIM CCV 250
nt11.i, 20151205.b\lowsim.m, 05-DEC-2015 18:46

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

On Column LOD for nt11.i,20151205.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

Analytical Resources Inc.: Organics Instrument Log

NT-11 Serial No.:GC=US10140004, MS=US10481502

Date: 12/14/15 Analysis: LowPAH Analyst: JW

GC Program: LowSim Column No: D001724 Column Type: Rxi-MS;ht

Instrument Tune (.U or .CT.): 150115.U EM Voltage: 1817

Calibration File: 151401.D Cali Code: 4L0008 Injection Vol.: 2uL

IS/SS

D002835

Ical/Ccal

D004417

D004452

LCS/ICV

Document All Maintenance Tasks In Element

	Time	Filename	LabID	ClientId	DF								
1	0852	15121401.D	TUNE 10		1	NO ISTDS FOUND							
2	0909	15121402.D	LLPAH 250		1	6.61	308705	9.61	225310	12.28	368978	17.03	282985	19.85	241047
3	0959	15121403.D	LLPAH MRL		1	6.61	273233	9.61	204199	12.29	340081	17.03	256902	19.86	220992
4	1042	15121404.D	AQJ9I	PG-SMA2-4-PE	10	6.61	296401	9.61	215875	12.28	345178	17.03	254462	19.86	225753
5	1112	15121405.D	AQJ9K	PG-SMA2-3-PE	10	6.61	301887	9.61	222712	12.28	358654	17.02	272267	19.85	239176
6	1142	15121406.D	AQJ9L	PG-SMA2-3-PE	10	6.61	298203	9.60	216970	12.28	347616	17.02	262654	19.85	233657
7	1212	15121407.D	AQJ9M	PG-SMA2-2-PE	10	6.60	291558	9.60	217109	12.28	342997	17.02	253845	19.85	229648
8	1242	15121408.D	AQJ9O	PG-SMA2-1-PE	10	6.61	295716	9.60	218344	12.28	344692	17.02	257252	19.85	231462
9	1313	15121409.D	LLPAH CCV		1	6.61	270472	9.61	216392	12.28	358358	17.02	283003	19.85	242204
10	1343	15121410.D	D005238		1	6.61	285014	9.60	212740	12.28	355040	17.03	265033	19.85	230015

JW 12/15/15

Every line must contain information or be lined out. Make all entries legible.
Start a new page for each QC period. Document All Maintenance Tasks In Element

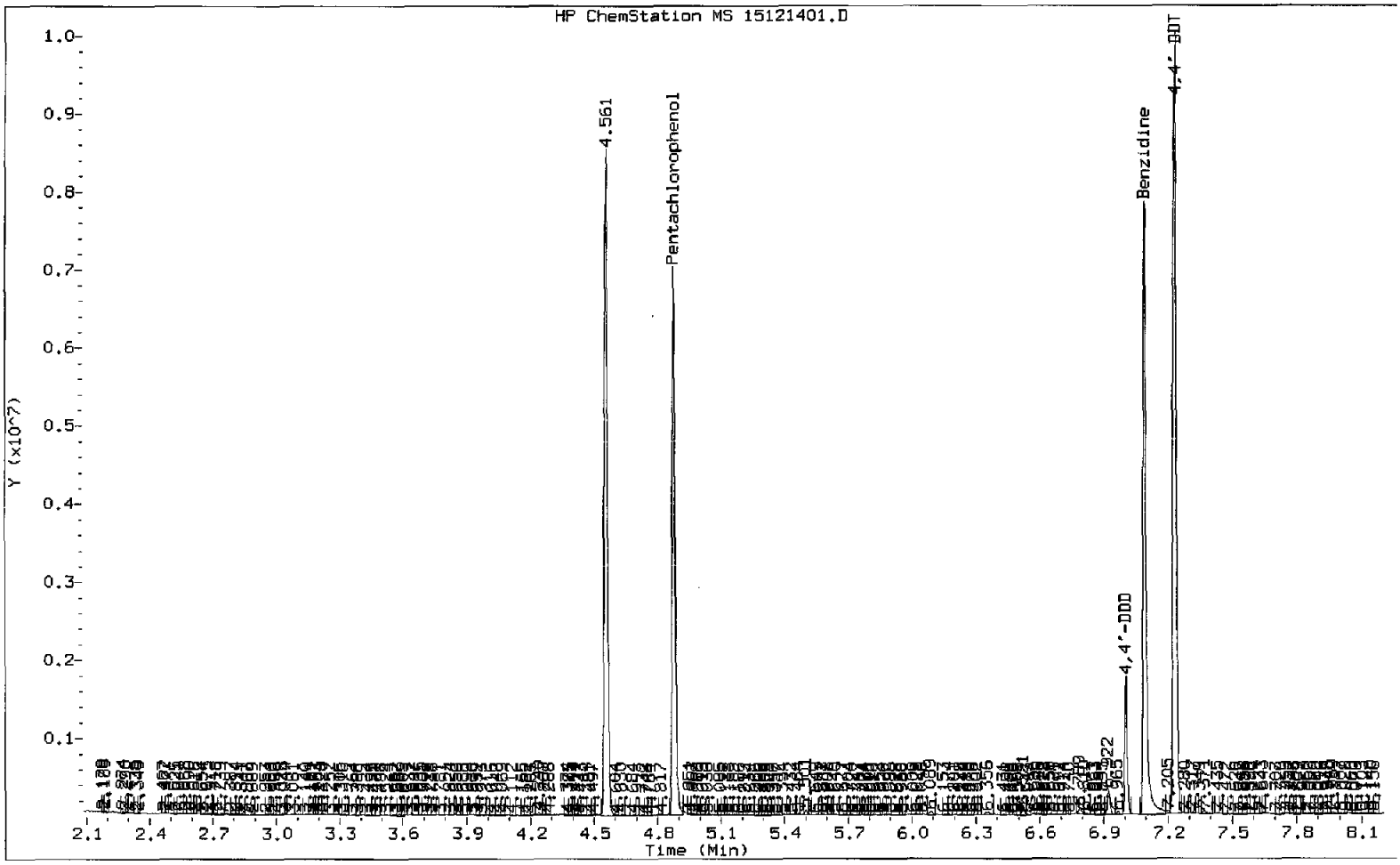
MANUAL INTEGRATION SUMMARY FOR DATABATCH - \\target\share\chem3\nt11.i\20151214.b

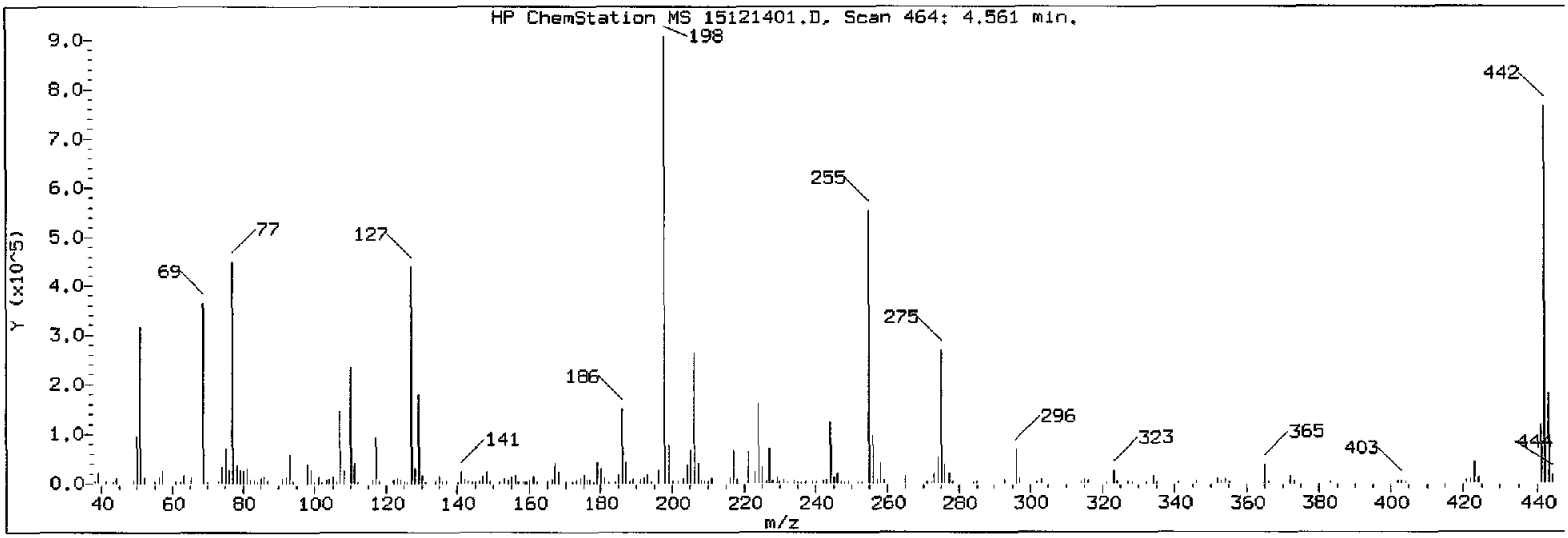
ARI Job No.: TUNE Method: DFTPP.m Instrument: nt11.i Date: 14-DEC-2015

Time	Filename	LabID	ClientId	DF	Manually Integrated Compounds
0852	15121401.D	TUNE 10		1	NO MANUAL INTEGRATION
0909	15121402.D	LLPAH 250		1	NO MANUAL INTEGRATION
0959	15121403.D	LLPAH MRL		1	Benzo(e)pyrene,
1042	15121404.D	AQJ9I	PG-SMA2-4-	10	NO MANUAL INTEGRATION
1112	15121405.D	AQJ9K	PG-SMA2-3-	10	NO MANUAL INTEGRATION
1142	15121406.D	AQJ9L	PG-SMA2-3-	10	NO MANUAL INTEGRATION
1212	15121407.D	AQJ9M	PG-SMA2-2-	10	NO MANUAL INTEGRATION
1242	15121408.D	AQJ9O	PG-SMA2-1-	10	NO MANUAL INTEGRATION
1313	15121409.D	LLPAH CCV		1	NO MANUAL INTEGRATION

DFTPP TAILING FACTOR AND BREAKDOWN GRAPHIC REPORT

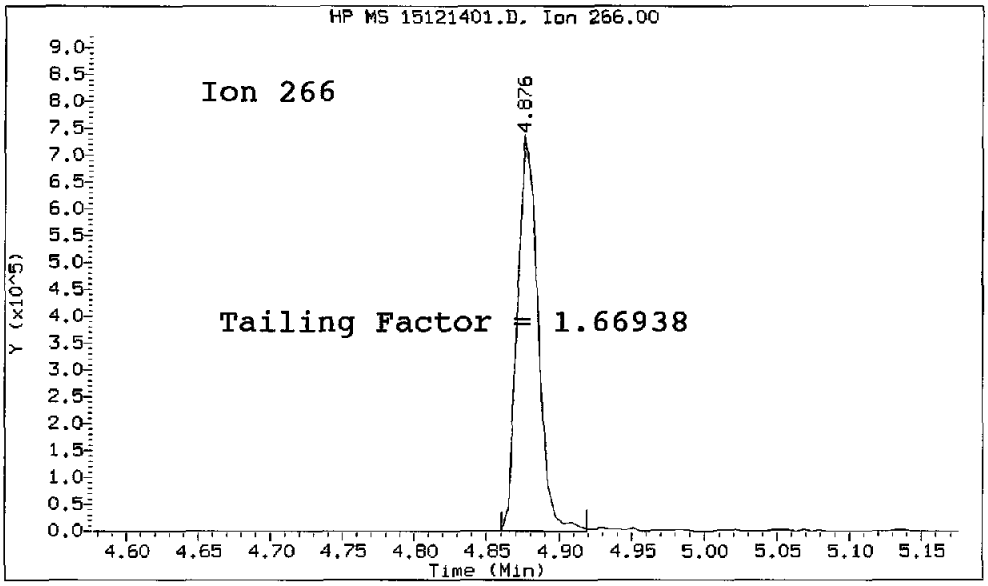
Datafile Analyzed: /20151214.b/15121401.D/15121401.D
Method Used: \20151214.b\DFTPP.m Inst: nt11
Injection Date: 14-DEC-2015 08:52 Operator: VTS
Sample Info: TUNE 10 TUNE 10
Report Date: 12/14/2015 09:38





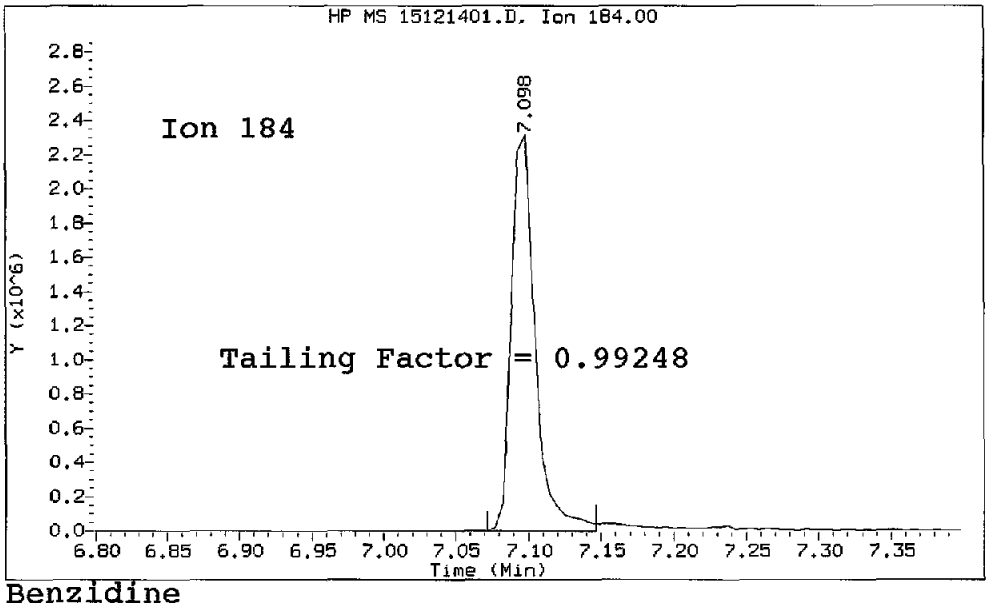
AQJ9:00415

Datafile Analyzed: /20151214.b/15121401.D/15121401.D
Method Used: \20151214.b\DFTPP.m\sw846ddt.m Inst: nt11
Injection Date: 14-DEC-2015 08:52 Operator: JR
Sample Info: TUNE 10
Report Date: 12/14/2015 09:38



Pentachlorophenol
==========
Exp. RT = 4.914
Found RT = 4.876

Tail Factor = 1.669 Maximum Allowed = 2.0



Benzidine
==========
Exp. RT = 7.141
Found RT = 7.098

Tail Factor = 0.992 Maximum Allowed = 2.0

8270 TAILING FACTOR/BREAKDOWN SUMMARY RESULTS

TAILING ANALYSIS SUMMARY

Compound	Tail Factor	Max Allowed	Test
Pentachlorophenol	1.6693811	2.000	PASS
Benzidine	0.9924812	2.000	PASS

DDT DEGRADATION BREAKDOWN ANALYSIS SUMMARY

Compound	Response	%Breakdown	Max Allowed	Test
4,4-DDT	1615387			N/A
4,4-DDE	0	0.0	20.0	PASS
4,4-DDD	305430	15.9	20.0	PASS
4,4-DDD + DDE	305430	15.9	20.0	PASS

Tuning Sample, nt11.i/20151214.b/15121401.D, *** PASSED ***

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
198	Base Peak, 100% relative abundance	100.00
51	10.00 - 80.00% of mass 198	36.23
68	Less than 2.00% of mass 69	0.00 (0.00)
69	Mass 69 relative abundance	42.67
70	Less than 2.00% of mass 69	0.37 (0.87)
127	10.00 - 80.00% of mass 198	47.31
197	Less than 2.00% of mass 198	0.23
199	5.00 - 9.00% of mass 198	7.69
275	10.00 - 60.00% of mass 198	27.51
365	Greater than 1.00% of mass 198	3.39
441	0.01 - 24.00% of mass 442	12.81 (15.34)
442	50.00 - 200.00% of mass 198	83.47
443	15.00 - 24.00% of mass 442	17.21 (20.61)

Data File: 15121401.D
Spectrum: Avg. Scans 463-465 (4.56), Background Scan 458
Location of Maximum: 198.00
Number of points: 227

m/z	Y	m/z	Y	m/z	Y	m/z	Y
38.00	4608	117.00	74232	187.00	34248	256.00	76280
39.00	19296	118.00	4225	188.00	3139	257.00	7153
40.00	909	122.00	6601	189.00	7245	258.00	29512
41.00	1885	123.00	9394	190.00	1474	259.00	4831
43.00	699	124.00	6478	191.00	5380	265.00	12688
44.00	4233	125.00	3411	192.00	9610	271.00	1381
49.00	1998	126.00	1126	193.00	13965	272.00	760
50.00	70488	127.00	357952	194.00	1866	273.00	16776
51.00	274176	128.00	27544	196.00	25960	274.00	41880
52.00	13907	129.00	151808	197.00	1735	275.00	208192
53.00	693	130.00	13207	198.00	756672	276.00	31688
55.00	2009	131.00	1991	199.00	58192	277.00	19032
56.00	8684	134.00	3545	200.00	4708	278.00	1368
57.00	21840	135.00	12477	201.00	4897	283.00	707
61.00	4129	136.00	5693	203.00	7897	284.00	1511
62.00	4389	137.00	5156	204.00	31672	285.00	3742
63.00	12948	140.00	1959	205.00	53368	293.00	4575
64.00	1013	141.00	18288	206.00	218304	296.00	57696
65.00	8270	142.00	5722	207.00	31704	297.00	7757
69.00	322880	143.00	2752	208.00	6032	302.00	941
70.00	2803	144.00	677	209.00	3628	303.00	7352
73.00	2616	145.00	670	210.00	3722	314.00	1875
74.00	30832	146.00	2776	211.00	9995	315.00	6374
75.00	55312	147.00	11307	215.00	2103	316.00	5022
76.00	20464	148.00	20904	216.00	5440	321.00	2328
77.00	386176	149.00	4519	217.00	55584	323.00	18440
78.00	28768	151.00	1837	218.00	7764	324.00	3675
79.00	23416	152.00	1521	221.00	46040	327.00	2295
80.00	18920	153.00	6896	222.00	4718	328.00	1737
81.00	27504	154.00	3335	223.00	14926	332.00	693
82.00	8323	155.00	10669	224.00	125232	334.00	10673
83.00	5083	156.00	16520	225.00	27664	335.00	2437
85.00	6279	157.00	3607	226.00	3824	341.00	1490
86.00	10970	158.00	2632	227.00	54704	346.00	4149
87.00	2453	159.00	3226	228.00	6250	352.00	6170
88.00	880	160.00	4862	229.00	10261	353.00	5120
91.00	7549	161.00	12884	230.00	1092	354.00	6737
92.00	8363	162.00	1712	231.00	3734	355.00	699
93.00	46176	165.00	6199	232.00	672	365.00	25672
94.00	4368	166.00	6102	234.00	2572	366.00	2064
96.00	1396	167.00	35408	235.00	3501	372.00	12527
98.00	33672	168.00	17824	236.00	1946	373.00	1750
99.00	21120	170.00	936	237.00	3359	383.00	3100
100.00	2104	172.00	2728	239.00	1261	390.00	1107
101.00	13488	173.00	4411	240.00	1135	402.00	4866
102.00	1866	174.00	9388	241.00	1891	403.00	4672
103.00	5151	175.00	17112	242.00	6945	404.00	1007
104.00	10531	176.00	4103	243.00	6397	421.00	4642
105.00	10479	177.00	6295	244.00	96680	422.00	4372

106.00	2427	178.00	888	245.00	11779	423.00	36232
107.00	115896	179.00	30800	246.00	18112	424.00	7916
108.00	18960	180.00	21704	247.00	3924	441.00	96912
109.00	1037	181.00	10736	248.00	864	442.00	631616
110.00	208576	182.00	2622	249.00	1920	443.00	130200
111.00	33344	184.00	1689	252.00	722	444.00	11693
112.00	3267	185.00	14698	253.00	2754	445.00	1093
116.00	5954	186.00	124872	255.00	442560		

ARI Labs, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt11.i Injection Date: 14-DEC-2015 09:09
Lab File ID: 15121402.D Init. Cal. Date(s): 04-DEC-2015 04-DEC-2015
Analysis Type: SOIL Init. Cal. Times: 09:03 11:33
Lab Sample ID: LLPAH 250 Quant Type: ISTD
Method: \\target\share\chem3\nt11.i\20151214.b\lowsim.m

COMPOUND	RRF / AMOUNT	RF250	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
5 Naphthalene	1.15523	1.10446	0.010	-4.39552	20.00000	Averaged	
$ 6 2-Methylnaphthalene-d10	0.74235	0.72428	0.010	-2.43389	20.00000	Averaged	
7 2-Methylnaphthalene	0.79376	0.78791	0.010	-0.73731	20.00000	Averaged	
8 1-Methylnaphthalene	0.71533	0.70795	0.010	-1.03208	20.00000	Averaged	
10 Acenaphthylene	1.61414	1.62245	0.010	0.51516	20.00000	Averaged	
12 Acenaphthene	1.07135	1.02849	0.010	-4.00127	20.00000	Averaged	
14 Dibenzofuran	1.61394	1.53426	0.010	-4.93653	20.00000	Averaged	
15 Fluorene	1.21040	1.19089	0.010	-1.61233	20.00000	Averaged	
19 Phenanthrene	1.20497	1.12906	0.010	-6.29981	20.00000	Averaged	
20 Anthracene	1.07857	1.10448	0.010	2.40232	20.00000	Averaged	
$ 23 Fluoranthene-d10	1.09988	1.08711	0.200	-1.16106	20.00000	Averaged	
24 Fluoranthene	1.20977	1.19735	0.010	-1.02714	20.00000	Averaged	
25 Pyrene	1.58387	1.55519	0.010	-1.81054	20.00000	Averaged	
28 Benzo(a)anthracene	1.33345	1.30962	0.010	-1.78719	20.00000	Averaged	
30 Chrysene	1.46350	1.35821	0.010	-7.19432	20.00000	Averaged	
44 Benzo(b)fluoranthene	1.35504	1.30088	0.200	-3.99729	20.00000	Averaged	
45 Benzo(k)fluoranthene	1.57904	1.56424	0.200	-0.93706	20.00000	Averaged	
46 Benzo(j)fluoranthene	1.43839	1.31929	0.200	-8.28029	20.00000	Averaged	
34 Benzo(a)pyrene	1.30774	1.24654	0.010	-4.68004	20.00000	Averaged	
$ 36 Dibenzo(a,h)anthracene-d14	0.80723	0.62553	0.010	-22.50958	20.00000	Averaged	<-
37 Indeno(1,2,3-cd)pyrene	1.37309	1.01586	0.010	-26.01591	20.00000	Averaged	<-
38 Dibenzo(a,h)anthracene	1.08579	0.81836	0.010	-24.63031	20.00000	Averaged	<-
39 Benzo(g,h,i)perylene	1.19199	0.74995	0.010	-37.08358	20.00000	Averaged	<-
47 Perylene	1.35582	1.25529	0.200	-7.41428	20.00000	Averaged	
48 Benzo(e)pyrene	1.36945	1.27781	0.200	-6.69127	20.00000	Averaged	

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151214.b\15121402.D
Lab Smp Id: LLPAH 250
Inj Date : 14-DEC-2015 09:09 MS Autotune Date: 23-APR-2014 12:5
Operator : VTS Inst ID: nt11.i
Smp Info : LLPAH 250
Misc Info :
Comment :
Method : \\target\share\chem3\nt11.i\20151214.b\lowsim.m
Meth Date : 15-Dec-2015 08:23 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 2 Continuing Calibration Sample
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	500.000	Volume of final extract (uL)
Ws	10.000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

JW 12/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ng/mL)	AMOUNTS ON-COL (ng/mL)
*	4 Naphthalene-d8	136	6.608	6.608	(1.000)	308705	200.000	
	5 Naphthalene	128	6.639	6.639	(1.005)	426189	250.000	239
$	6 2-Methylnaphthalene-d10	152	7.585	7.585	(1.148)	279488	250.000	244
	7 2-Methylnaphthalene	142	7.637	7.637	(1.156)	304039	250.000	248
	8 1-Methylnaphthalene	142	7.889	7.889	(1.194)	273184	250.000	247
	10 Acenaphthylene	152	9.456	9.456	(0.984)	456944	250.000	251
*	11 Acenaphthene-d10	164	9.611	9.611	(1.000)	225310	200.000	
	12 Acenaphthene	153	9.667	9.667	(1.006)	289660	250.000	240
	14 Dibenzofuran	168	9.877	9.877	(1.028)	432106	250.000	238
	15 Fluorene	166	10.497	10.497	(1.092)	335399	250.000	246
*	18 Phenanthrene-d10	188	12.280	12.280	(1.000)	368978	200.000	
	19 Phenanthrene	178	12.324	12.324	(1.004)	520746	250.000	234
	20 Anthracene	178	12.379	12.379	(1.008)	509411	250.000	256
$	23 Fluoranthene-d10	212	14.384	14.384	(1.171)	501398	250.000	247
	24 Fluoranthene	202	14.413	14.413	(1.174)	552243	250.000	247
	25 Pyrene	202	14.912	14.912	(0.876)	550119	250.000	245
	28 Benzo(a)anthracene	228	16.926	16.926	(0.994)	463252	250.000	246
*	29 Chrysene-d12	240	17.026	17.026	(1.000)	282985	200.000	
	30 Chrysene	228	17.075	17.075	(1.003)	480443	250.000	232
	44 Benzo(b)fluoranthene	252	18.794	18.794	(0.947)	391966	250.000	240
	45 Benzo(k)fluoranthene	252	18.842	18.842	(0.949)	471319	250.000	248

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ng/mL)	AMOUNTS ON-COL (ng/mL)
	46 Benzo(j)fluoranthene	252	18.900	18.900	(0.952)	397514	250.000	229
	34 Benzo(a)pyrene	252	19.649	19.649	(0.990)	375593	250.000	238
*	35 Perylene-d12	264	19.851	19.851	(1.000)	241047	200.000	
$	36 Dibenzo(a,h)anthracene-d14	292	22.219	22.219	(1.119)	188477	250.000	194
	37 Indeno(1,2,3-cd)pyrene	276	22.351	22.351	(1.126)	306089	250.000	185
	38 Dibenzo(a,h)anthracene	278	22.329	22.329	(1.125)	246579	250.000	188
	39 Benzo(g,h,i)perylene	276	23.448	23.448	(1.181)	225968	250.000	157
	47 Perylene	252	19.918	19.918	(1.003)	378231	250.000	231
	48 Benzo(e)pyrene	252	19.534	19.534	(0.984)	385016	250.000	233

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15121402.D
Lab Smp Id: LLPAH 250
Analysis Type: SV
Quant Type: ISTD
Operator: VTS
Method File: \\target\share\chem3\nt11.i\20151214.b\lowsim.m
Misc Info:

Calibration Date: 14-DEC-2015
Calibration Time: 13:13
Level: LOW
Sample Type: SOIL

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	308705	-5.85
11 Acenaphthene-d10	239179	119590	478358	225310	-5.80
18 Phenanthrene-d10	372253	186127	744506	368978	-0.88
29 Chrysene-d12	294711	147356	589422	282985	-3.98
35 Perylene-d12	260595	130298	521190	241047	-7.50

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.61	6.11	7.11	6.61	0.00
11 Acenaphthene-d10	9.61	9.11	10.11	9.61	0.00
18 Phenanthrene-d10	12.28	11.78	12.78	12.28	0.00
29 Chrysene-d12	17.03	16.53	17.53	17.03	0.00
35 Perylene-d12	19.85	19.35	20.35	19.85	0.00

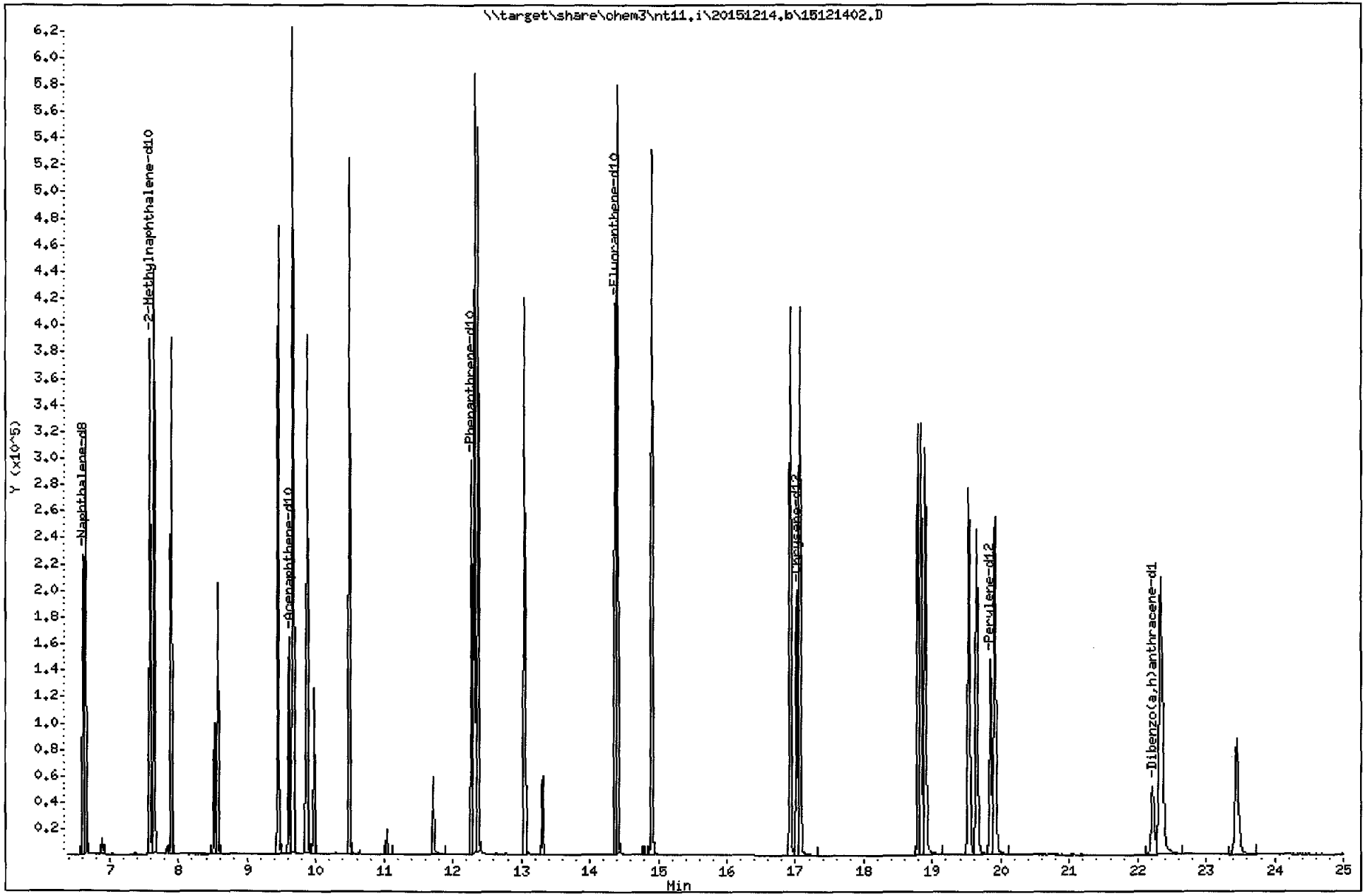
AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Data File: \\target\share\chem3\nt11.i\20151214.b\15121402.D
Date : 14-DEC-2015 09:09
Client ID:
Sample Info: LLPAH 250
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i

Operator: VTS
Column diameter: 0.25

AQ19:00425



REVIEW SUMMARY FOR FILE - 15121402.D

Lab ID: LLPAH 250
nt11.i, 20151214.b\lowsim.m, 14-DEC-2015 09:09

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

On Column LOD for nt11.i,20151214.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151214.b\15121403.D
Lab Smp Id: LLPAH MRL
Inj Date : 14-DEC-2015 09:59 MS Autotune Date: 23-APR-2014 12:54
Operator : VTS Inst ID: nt11.i
Smp Info : LLPAH MRL
Misc Info :
Comment :
Method : \\target\share\chem3\nt11.i\20151214.b\lowsim.m
Meth Date : 15-Dec-2015 08:23 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 3
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	500.000	Volume of final extract (uL)
Ws	10.000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

12/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ng/Kg)
*	4 Naphthalene-d8	136	6.608	6.608	(1.000)	273233	200.000	
	5 Naphthalene	128	6.639	6.639	(1.005)	17941	11.3677	568
$	6 2-Methylnaphthalene-d10	152	7.585	7.585	(1.148)	11886	11.7199	586(R)
	7 2-Methylnaphthalene	142	7.648	7.637	(1.157)	12282	11.3260	566
	8 1-Methylnaphthalene	142	7.900	7.889	(1.196)	11237	11.4985	575
	10 Acenaphthylene	152	9.457	9.456	(0.984)	19861	12.0514	603
*	11 Acenaphthene-d10	164	9.612	9.611	(1.000)	204199	200.000	
	12 Acenaphthene	153	9.667	9.667	(1.006)	12513	11.4395	572
	14 Dibenzofuran	168	9.877	9.877	(1.028)	18756	11.3823	569
	15 Fluorene	166	10.497	10.497	(1.092)	14330	11.5956	580
*	18 Phenanthrene-d10	188	12.291	12.280	(1.000)	340081	200.000	
	19 Phenanthrene	178	12.324	12.324	(1.003)	23630	11.5328	577
	20 Anthracene	178	12.379	12.379	(1.007)	22801	12.4324	622
$	23 Fluoranthene-d10	212	14.384	14.384	(1.170)	21651	11.5766	579(R)
	24 Fluoranthene	202	14.423	14.413	(1.173)	23535	11.4408	572
	25 Pyrene	202	14.913	14.912	(0.876)	24101	11.8462	592
	28 Benzo(a)anthracene	228	16.935	16.926	(0.995)	19610	11.4489	572
*	29 Chrysene-d12	240	17.026	17.026	(1.000)	256902	200.000	
	30 Chrysene	228	17.076	17.075	(1.003)	21268	11.3135	566
	44 Benzo(b)fluoranthene	252	18.804	18.794	(0.947)	16815	11.2304	562
	45 Benzo(k)fluoranthene	252	18.842	18.842	(0.949)	18332	10.5068	525

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ng/Kg)
	46 Benzo(j)fluoranthene	252	18.910	18.900	(0.952)	15807	9.94546	497
	34 Benzo(a)pyrene	252	19.649	19.649	(0.989)	14962	10.3543	518
*	35 Perylene-d12	264	19.861	19.851	(1.000)	220992	200.000	
$	36 Dibenzo(a,h)anthracene-d14	292	22.241	22.219	(1.120)	6557	7.35123	368(R)
	37 Indeno(1,2,3-cd)pyrene	276	22.363	22.351	(1.126)	10658	7.02476	351
	38 Dibenzo(a,h)anthracene	278	22.352	22.329	(1.125)	8476	7.06475	353
	39 Benzo(g,h,i)perylene	276	23.470	23.448	(1.182)	9212	6.99417	350
	47 Perylene	252	19.928	19.918	(1.003)	15601	10.4137	521
	48 Benzo(e)pyrene	252	19.544	19.534	(0.984)	16077	10.6246	531(M)

QC Flag Legend

R - Spike/Surrogate failed recovery limits.
M - Compound response manually integrated.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15121403.D
Lab Smp Id: LLPAH MRL
Analysis Type: SV
Quant Type: ISTD
Operator: VTS
Method File: \\target\share\chem3\nt11.i\20151214.b\lowsim.m
Misc Info:

Calibration Date: 14-DEC-2015
Calibration Time: 09:09

Level: LOW
Sample Type: SOIL

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	273233	-16.67
11 Acenaphthene-d10	239179	119590	478358	204199	-14.63
18 Phenanthrene-d10	372253	186127	744506	340081	-8.64
29 Chrysene-d12	294711	147356	589422	256902	-12.83
35 Perylene-d12	260595	130298	521190	220992	-15.20

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.61	6.11	7.11	6.61	0.00
11 Acenaphthene-d10	9.61	9.11	10.11	9.61	0.00
18 Phenanthrene-d10	12.28	11.78	12.78	12.29	0.09
29 Chrysene-d12	17.03	16.53	17.53	17.03	0.00
35 Perylene-d12	19.85	19.35	20.35	19.86	0.05

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.

ARI Labs, Inc.

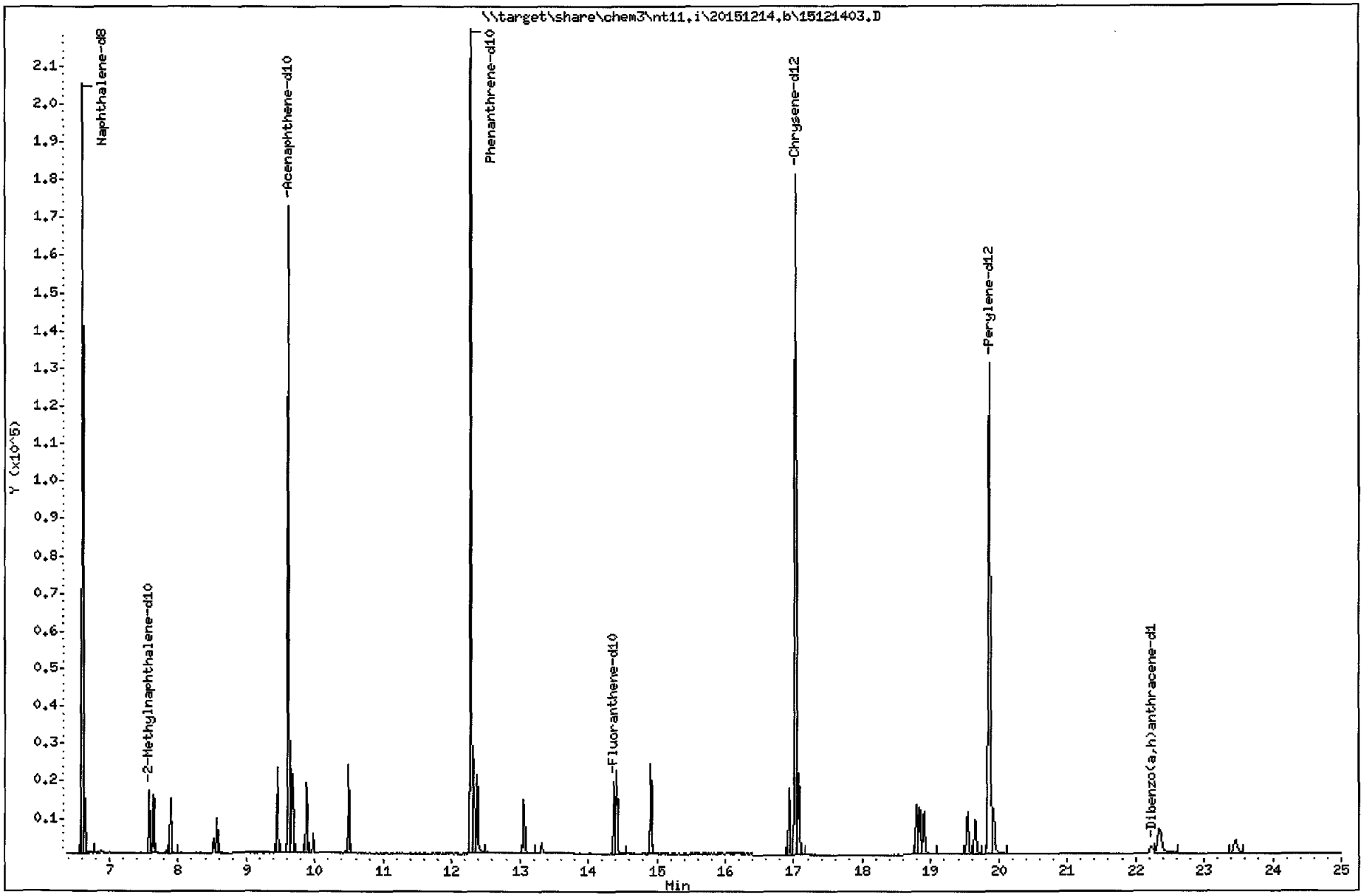
RECOVERY REPORT

Client Name: Client SDG: SDGa04420
Sample Matrix: SOLID Fraction: SV
Lab Smp Id: LLPAH MRL
Level: LOW Operator: VTS
Data Type: MS DATA SampleType: SAMPLE
SpikeList File: waterlcs.spk Quant Type: ISTD
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151214.b\lowsim.m
Misc Info:

SURROGATE COMPOUND	CONC ADDED ng/Kg	CONC RECOVERED ng/Kg	% RECOVERED	LIMITS
$ 6 2-Methylnaphthalen	15000	586	3.91*	30-160
$ 23 Fluoranthene-d10	15000	579	3.86*	30-160
$ 36 Dibenzo(a,h)anthra	15000	368	2.45*	30-160

Data File: \\target\share\chem3\nt11.i\20151214.b\15121403.D
Date : 14-DEC-2015 09:59
Client ID:
Sample Info: LLPAH MRL
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: VTS
Column diameter: 0.25



REVIEW SUMMARY FOR FILE - 15121403.D

Lab ID: LLPAH MRL
nt11.i, 20151214.b\lowsim.m, 14-DEC-2015 09:59

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

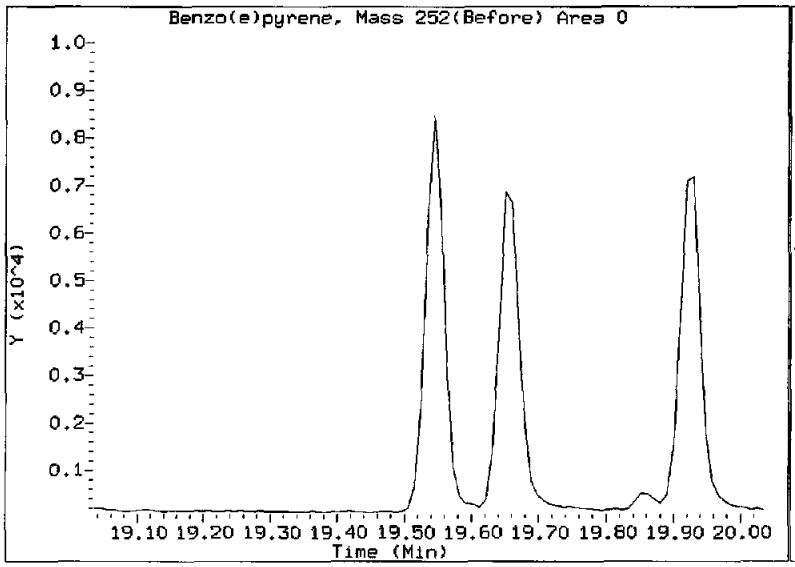
NONE

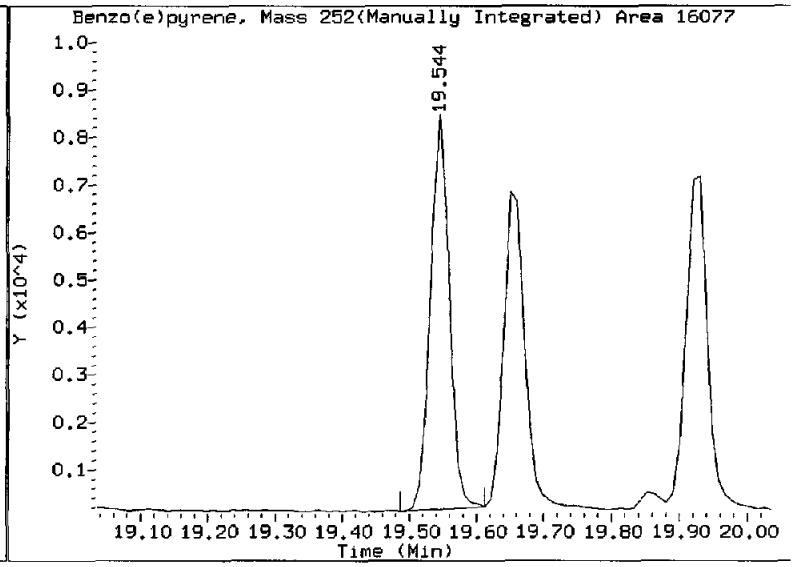
On Column LOD for nt11.i,20151214.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

Quant Ion Manual Integrations Report

Datafile: //target/share/chem3/nt11.i/20151214.b/15121403.D
Injection Date: 14-DEC-2015 09:59
Lab ID:LLPAH MRL Client ID:
Report Date: 12/15/2015 08:23





ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151214.b\15121404.D
Lab Smp Id: AQJ9I Client Smp ID: PG-SMA2-4-PEMD-1511
Inj Date : 14-DEC-2015 10:42 MS Autotune Date: 23-APR-2014 12:5
Operator : VTS Inst ID: nt11.i
Smp Info : AQJ9I,10
Misc Info : 15-21396
Comment :
Method : \\target\share\chem3\nt11.i\20151214.b\lowsim.m
Meth Date : 15-Dec-2015 08:23 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 4
Dil Factor: 10.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	10.000	Dilution Factor
Vt	100.000	Volume of final extract (uL)
Ws	0.89000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

JW 12/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)
*	4 Naphthalene-d8	136	6.608	6.608	(1.000)	296401	200.000	
	5 Naphthalene	128	6.639	6.639	(1.005)	34422	20.1056	22600 B
$	6 2-Methylnaphthalene-d10	152	7.585	7.585	(1.148)	18775	17.0655	19200
	7 2-Methylnaphthalene	142	7.637	7.637	(1.156)	14665	12.4665	14000
	8 1-Methylnaphthalene	142	Compound Not Detected.					
	10 Acenaphthylene	152	Compound Not Detected.					
*	11 Acenaphthene-d10	164	9.611	9.611	(1.000)	215875	200.000	
	12 Acenaphthene	153	9.667	9.667	(1.006)	64286	55.5919	62500
	14 Dibenzofuran	168	9.877	9.877	(1.028)	47921	27.5085	30900
	15 Fluorene	166	10.497	10.497	(1.092)	62539	47.8683	53800
*	18 Phenanthrene-d10	188	12.280	12.280	(1.000)	345178	200.000	
	19 Phenanthrene	178	12.324	12.324	(1.004)	398817	191.772	215000
	20 Anthracene	178	12.379	12.379	(1.008)	46883	25.1857	28300
$	23 Fluoranthene-d10	212	14.384	14.384	(1.171)	48363	25.4775	28600
	24 Fluoranthene	202	14.422	14.413	(1.174)	429785	205.842	231000
	25 Pyrene	202	14.912	14.912	(0.876)	250282	124.199	140000
	28 Benzo(a)anthracene	228	16.934	16.926	(0.995)	24764	14.5966	16400
*	29 Chrysene-d12	240	17.026	17.026	(1.000)	254462	200.000	
	30 Chrysene	228	17.075	17.075	(1.003)	26792	14.3886	16200
	44 Benzo(b)fluoranthene	252	Compound Not Detected.					
	45 Benzo(k)fluoranthene	252	Compound Not Detected.					

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	FINAL (ug/kg)	
	46 Benzo(j)fluoranthene	252	Compound Not Detected.						
	34 Benzo(a)pyrene	252	Compound Not Detected.						
*	35 Perylene-d12	264	19.861	19.851	(1.000)	225753	200.000		
$	36 Dibenzo(a,h)anthracene-d14	292	22.230	22.219	(1.119)	16513	18.1227	20400	Q
	37 Indeno(1,2,3-cd)pyrene	276	Compound Not Detected.						
	38 Dibenzo(a,h)anthracene	278	Compound Not Detected.						
	39 Benzo(g,h,i)perylene	276	Compound Not Detected.						
	47 Perylene	252	Compound Not Detected.						
	48 Benzo(e)pyrene	252	Compound Not Detected.						

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15121404.D
Lab Smp Id: AQJ9I
Analysis Type: SV
Quant Type: ISTD
Operator: VTS
Method File: \\target\share\chem3\nt11.i\20151214.b\lowsim.m
Misc Info: 15-21396

Calibration Date: 14-DEC-2015
Calibration Time: 09:09
Client Smp ID: PG-SMA2-4-PEMD-
Level: LOW
Sample Type: Tissue

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	296401	-9.61
11 Acenaphthene-d10	239179	119590	478358	215875	-9.74
18 Phenanthrene-d10	372253	186127	744506	345178	-7.27
29 Chrysene-d12	294711	147356	589422	254462	-13.66
35 Perylene-d12	260595	130298	521190	225753	-13.37

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.61	6.11	7.11	6.61	0.00
11 Acenaphthene-d10	9.61	9.11	10.11	9.61	0.00
18 Phenanthrene-d10	12.28	11.78	12.78	12.28	0.00
29 Chrysene-d12	17.03	16.53	17.53	17.03	0.00
35 Perylene-d12	19.85	19.35	20.35	19.86	0.05

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.

ARI Labs, Inc.

RECOVERY REPORT

Client Name: Anchor QEA, LLC
Sample Matrix: SOLID
Lab Smp Id: AQJ9I
Level: LOW
Data Type: MS DATA
SpikeList File: waterlcs.spk
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151214.b\lowsim.m
Misc Info: 15-21396

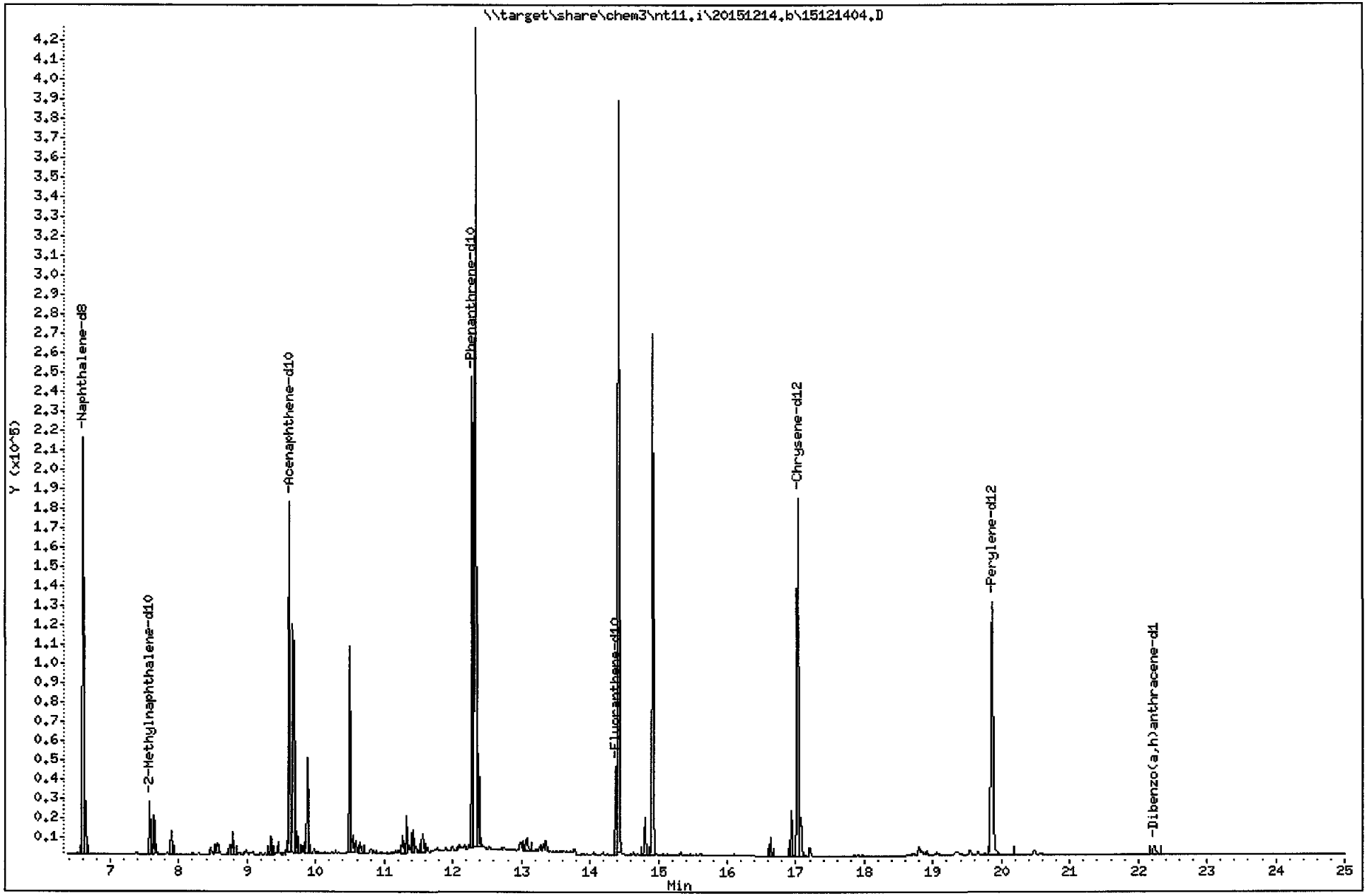
Client SDG: AQJ9
Fraction: SV
Client Smp ID: PG-SMA2-4-PEMD-1511
Operator: VTS
SampleType: SAMPLE
Quant Type: ISTD

SURROGATE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
$ 6 2-Methylnaphthalen	33700	19200	56.89	30-160
$ 23 Fluoranthene-d10	33700	28600	84.92	30-160
$ 36 Dibenzo(a,h)anthra	33700	20400	60.41	30-160

Data File: \\target\share\chem3\nt11.i\20151214.b\15121404.D
Date : 14-DEC-2015 10:42
Client ID: PG-SMA2-4-PEMD-1511
Sample Info: AQJ9I,10
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: VTS
Column diameter: 0.25

AQJ9:90137



Data File: \\target\share\chem3\nt11.i\20151214.b\15121404.D

Date : 14-DEC-2015 10:42

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I,10

Volume Injected (uL): 2.0

Operator: VTS

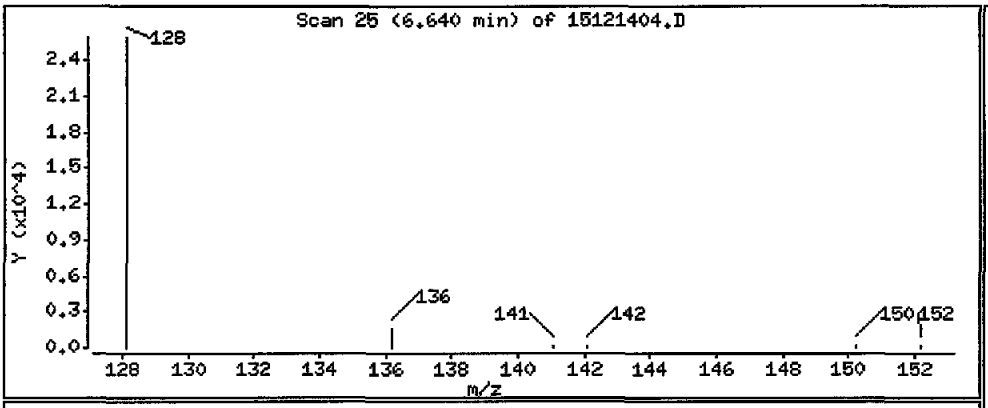
Column phase: Rxi-17Sil MS

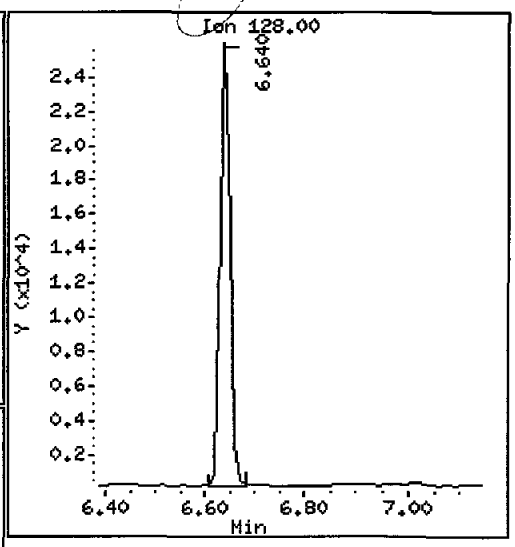
Column diameter: 0.25

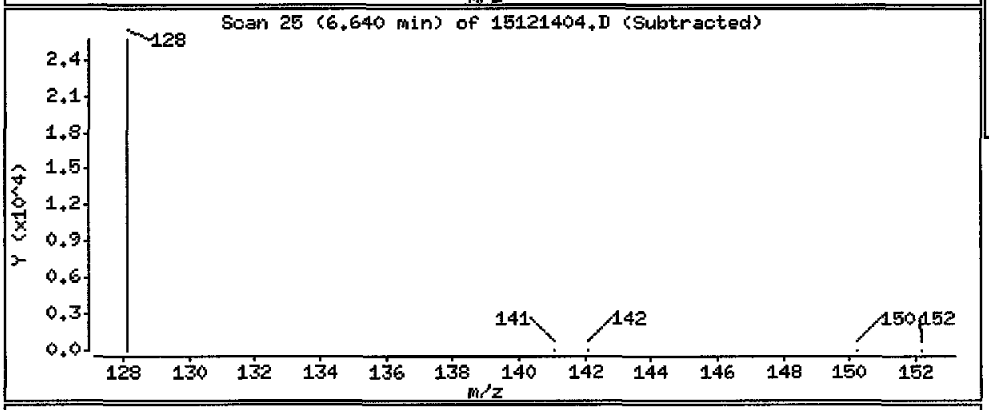
5 Naphthalene

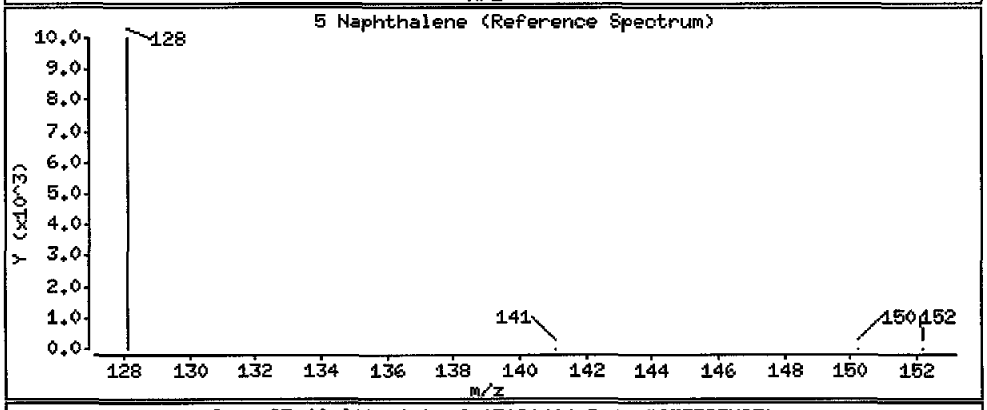
Concentration: 22600 ug/kg

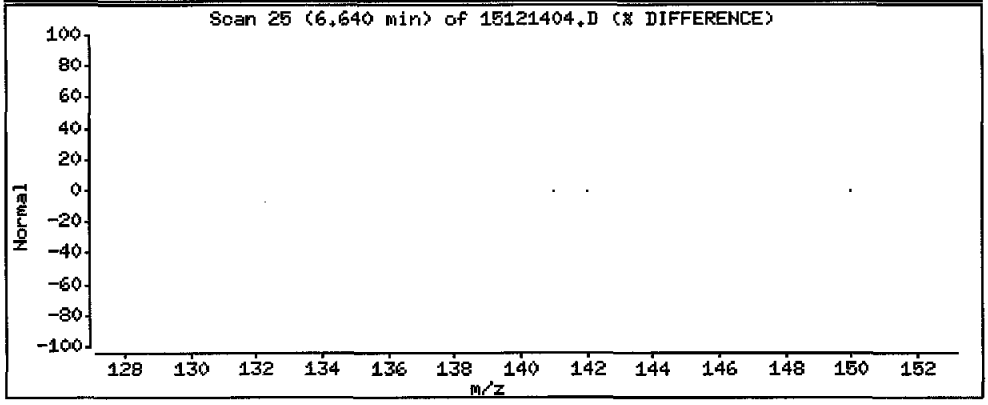
B











Data File: \\target\share\chem3\nt11.i\20151214.b\15121404.D

Date : 14-DEC-2015 10:42

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I,10

Volume Injected (uL): 2.0

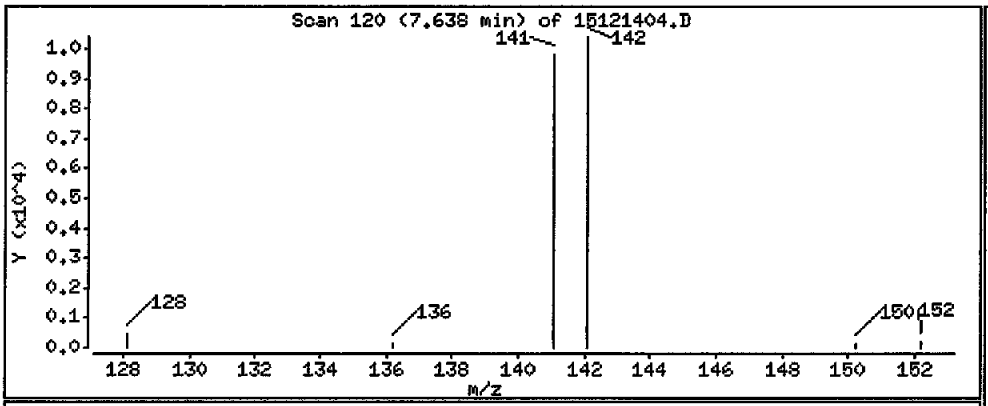
Operator: VTS

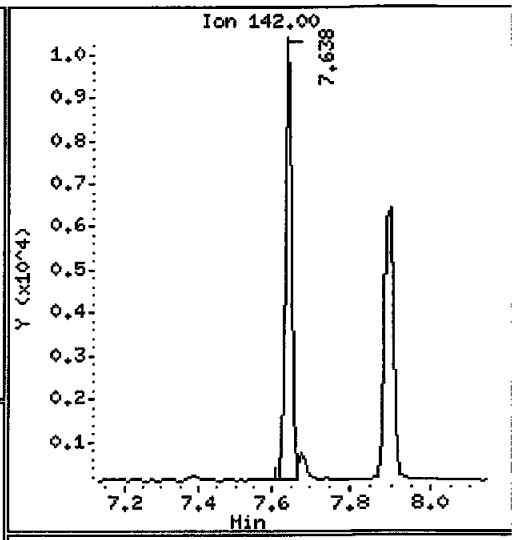
Column phase: Rxi-17Sil MS

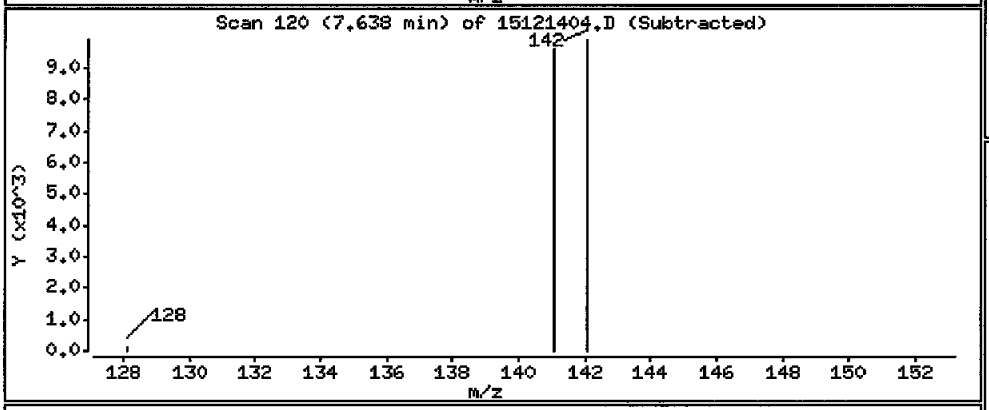
Column diameter: 0.25

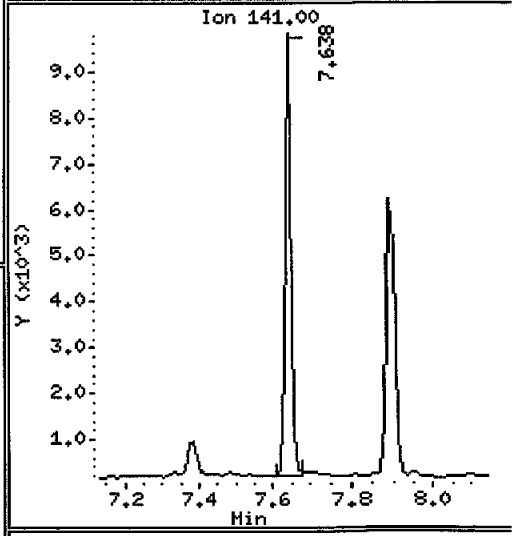
7 2-Methylnaphthalene

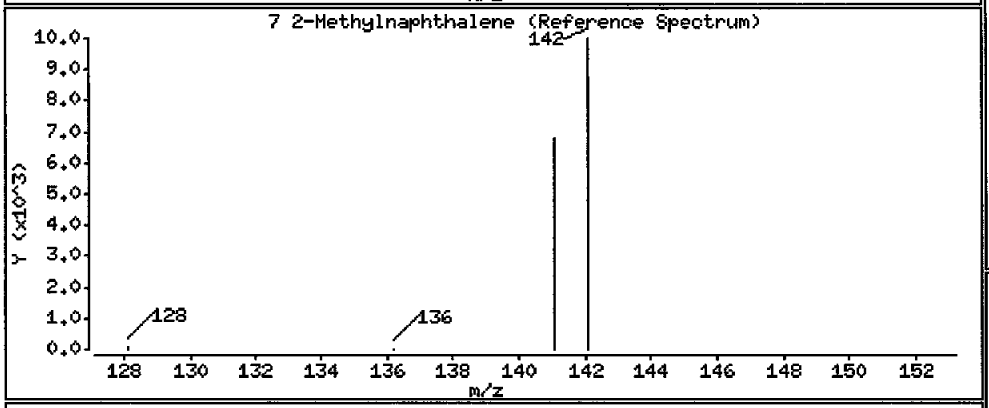
Concentration: 14000 ug/kg

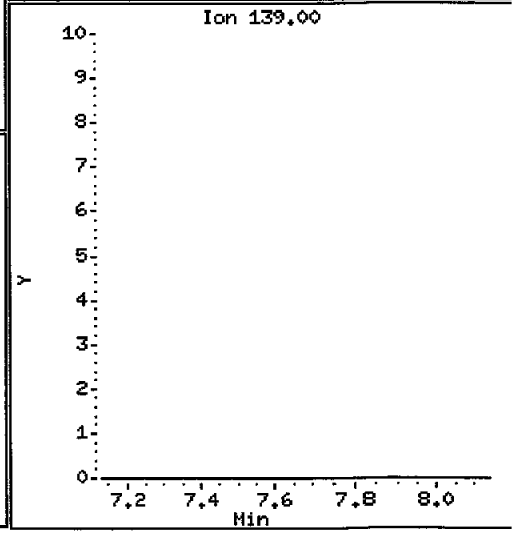


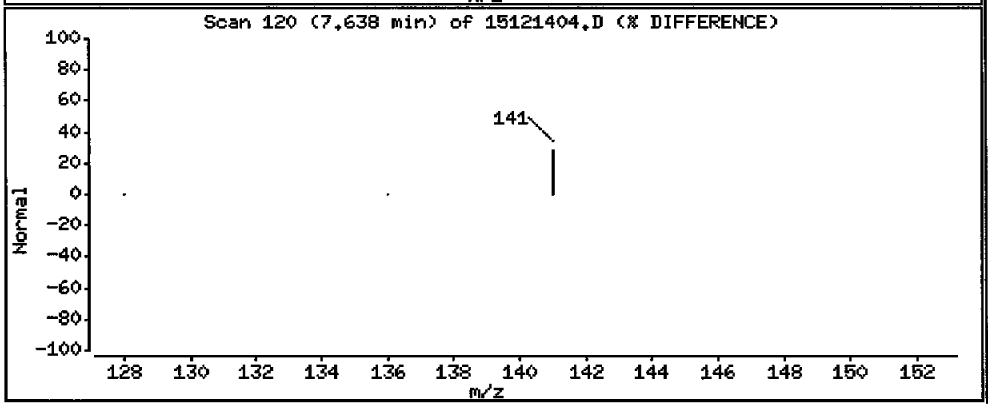












Data File: \\target\share\chem3\nt11.i\20151214.b\15121404.D

Date : 14-DEC-2015 10:42

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I,10

Volume Injected (uL): 2.0

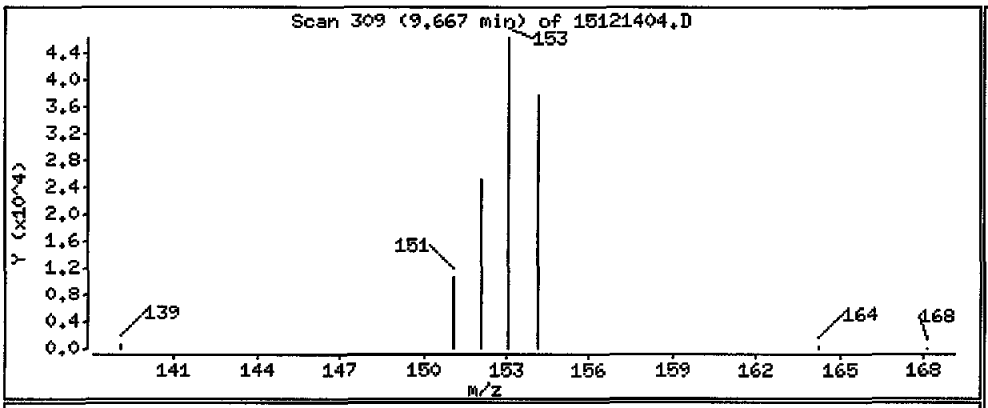
Operator: VTS

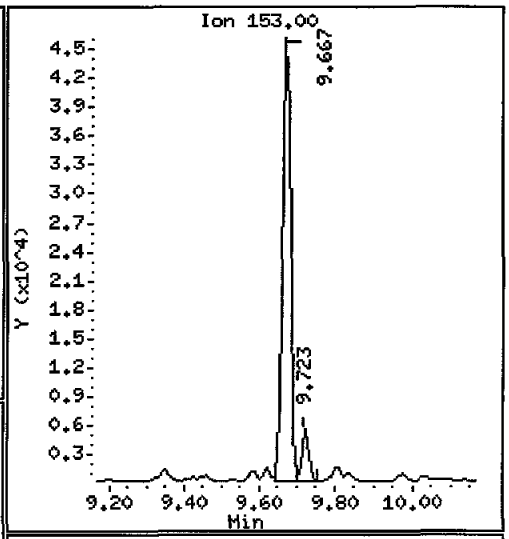
Column phase: Rxi-17Sil MS

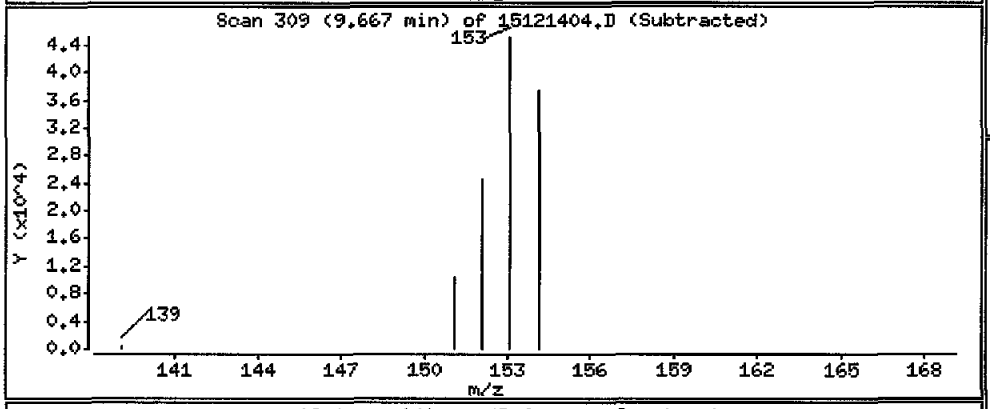
Column diameter: 0.25

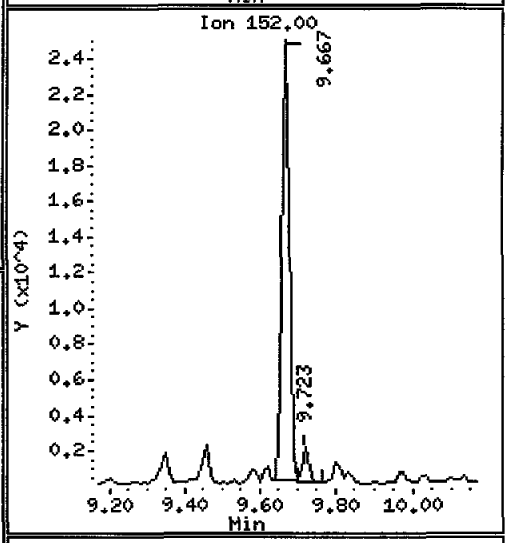
12 Acenaphthene

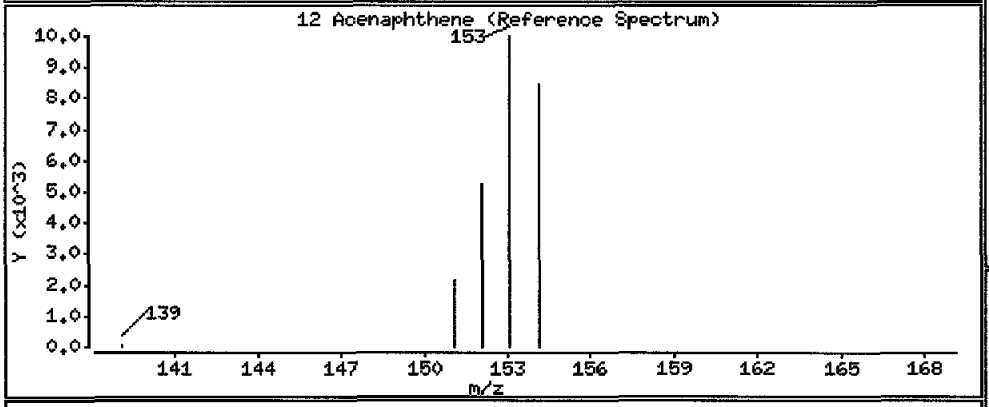
Concentration: 62500 ug/kg

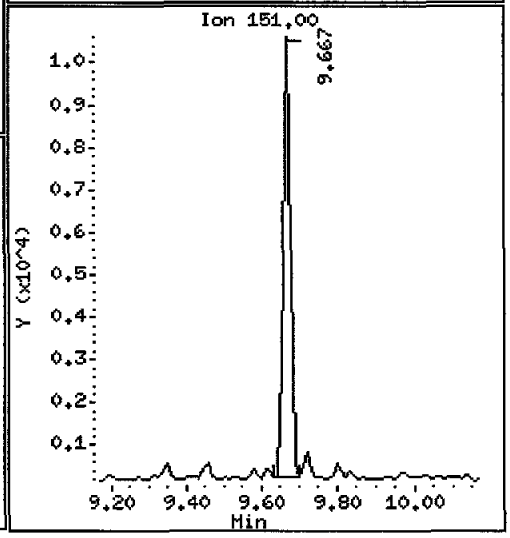


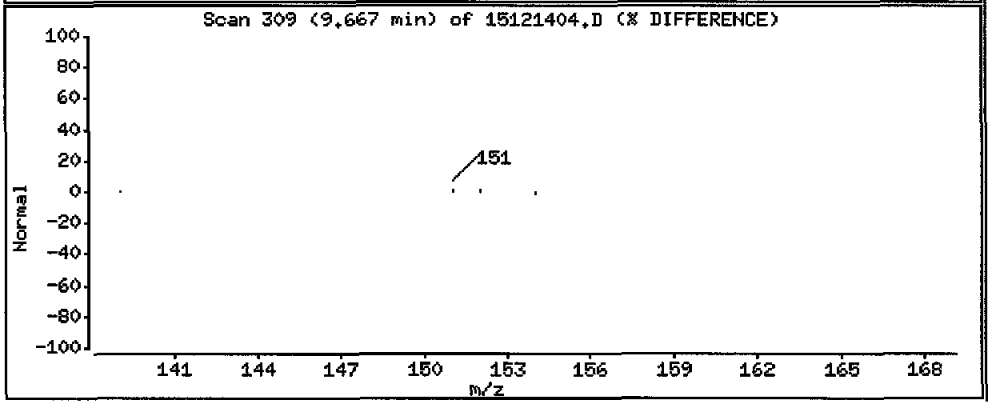












Data File: \\target\share\chem3\nt11.i\20151214.b\15121404.D

Date : 14-DEC-2015 10:42

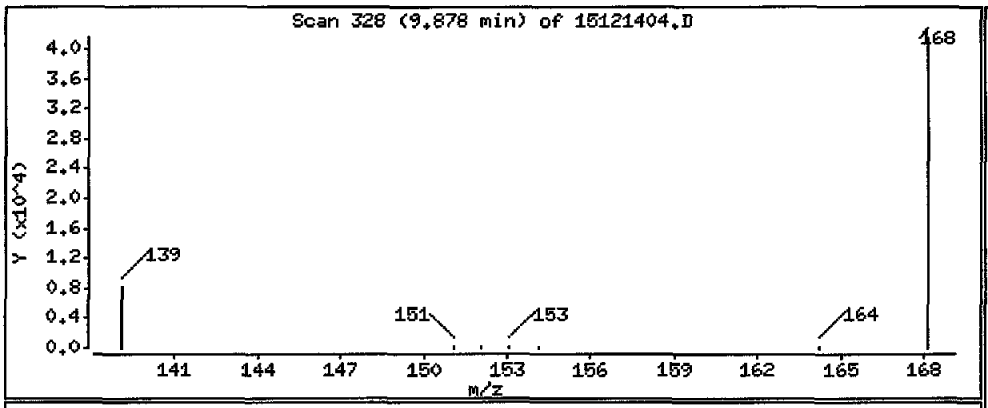
Client ID: PC-SMA2-4-PEMD-1511 Instrument: nt11.i

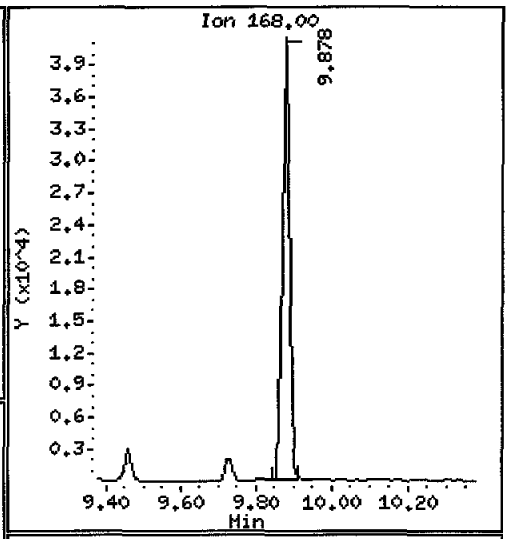
Sample Info: AQJ9I,10

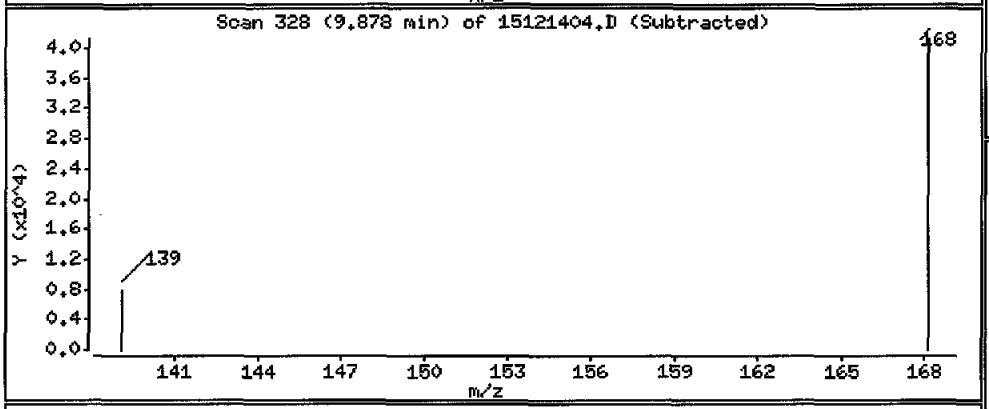
Volume Injected (uL): 2.0 Operator: VTS

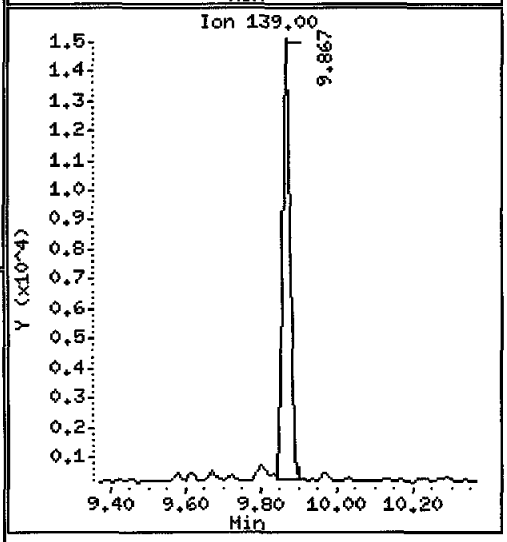
Column phase: Rxi-17Sil MS Column diameter: 0.25

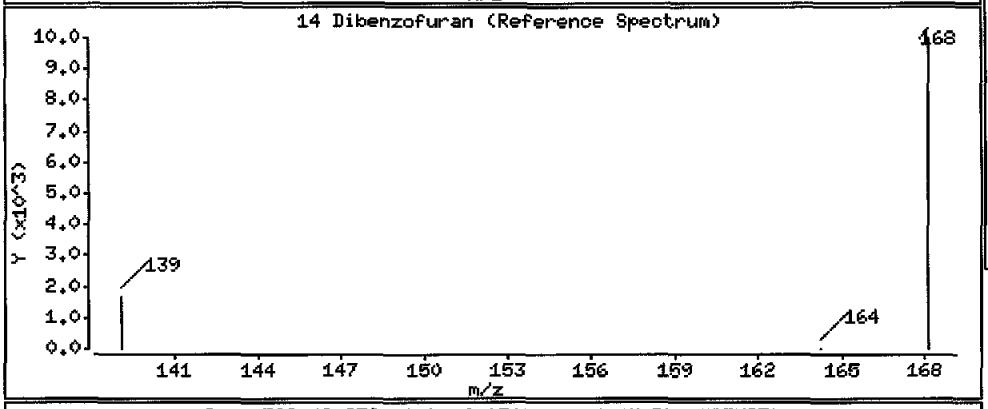
14 Dibenzofuran Concentration: 30900 ug/kg

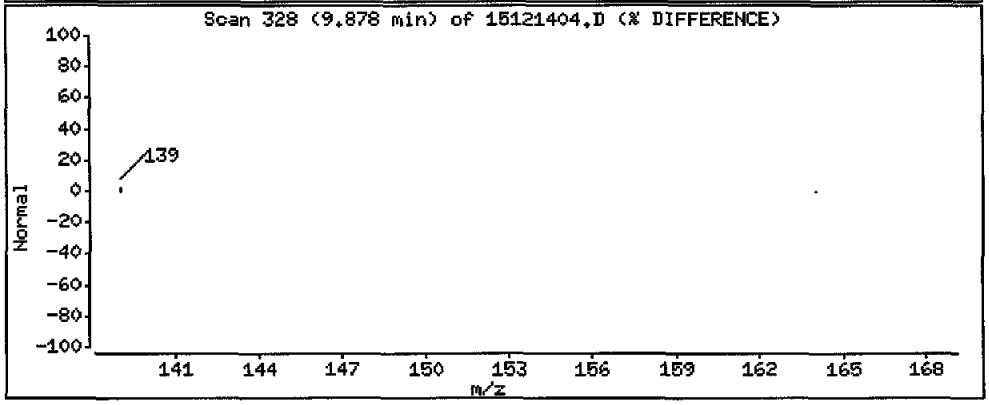












Data File: \\target\share\chem3\nt11.i\20151214.b\15121404.D

Date : 14-DEC-2015 10:42

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I,10

Volume Injected (uL): 2.0

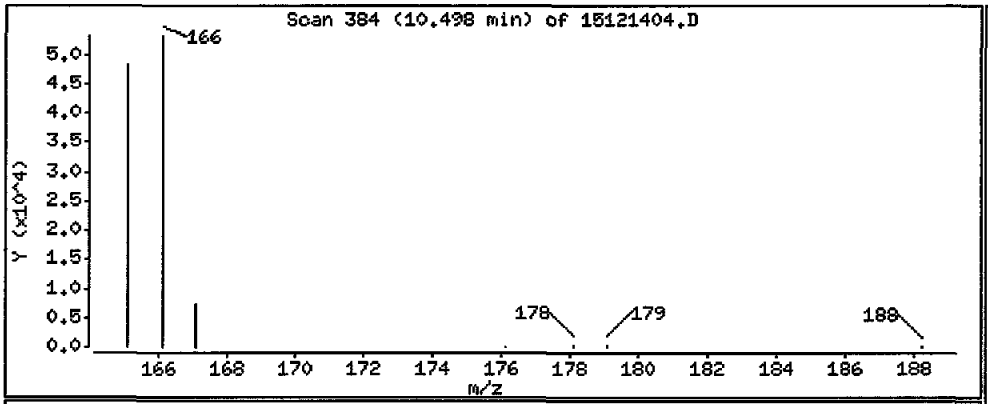
Operator: VTS

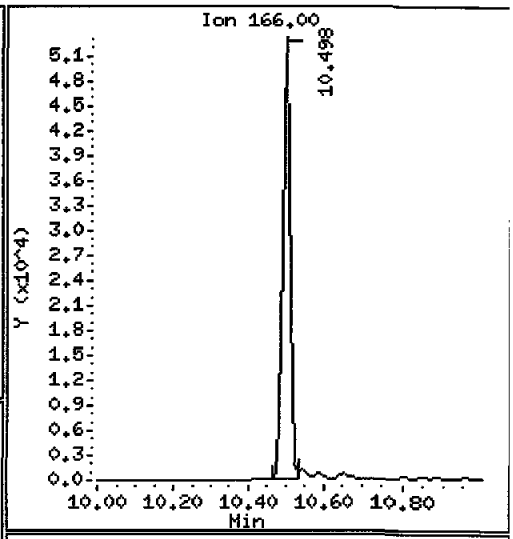
Column phase: Rxi-17Sil MS

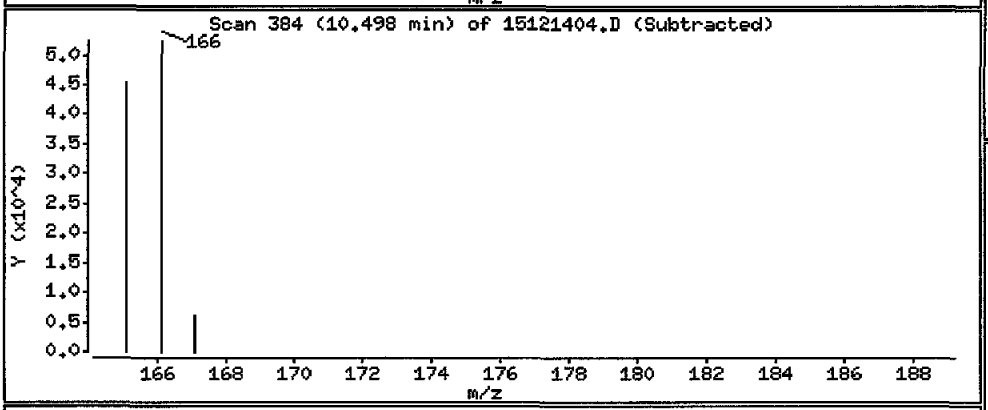
Column diameter: 0.25

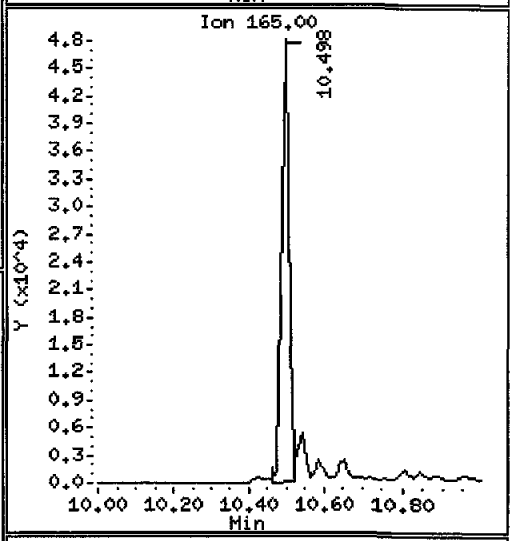
15 Fluorene

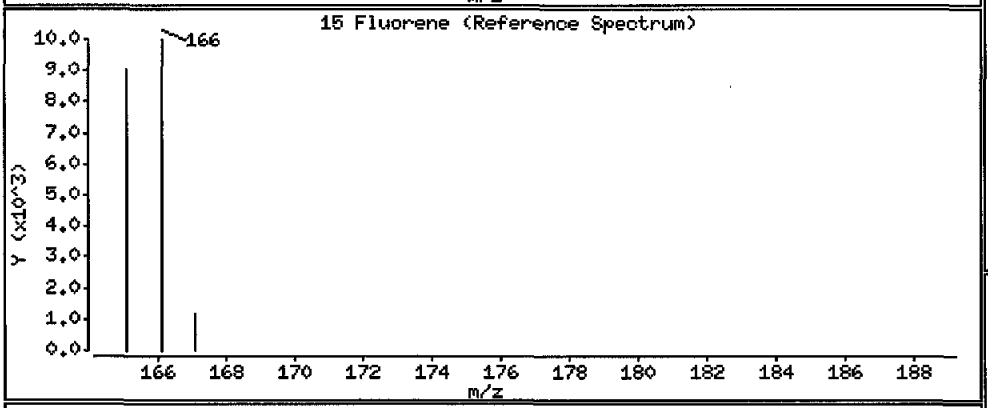
Concentration: 53800 ug/kg

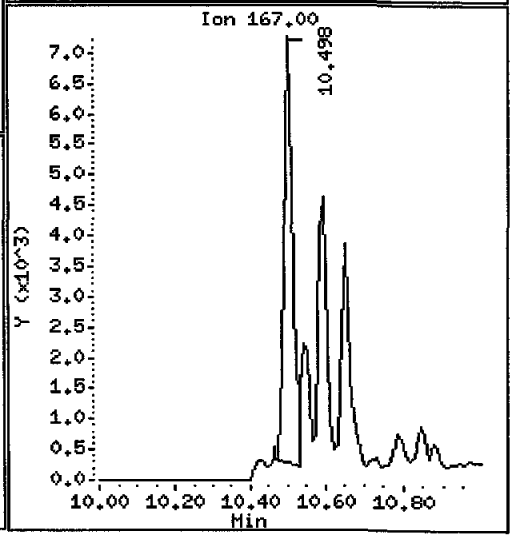


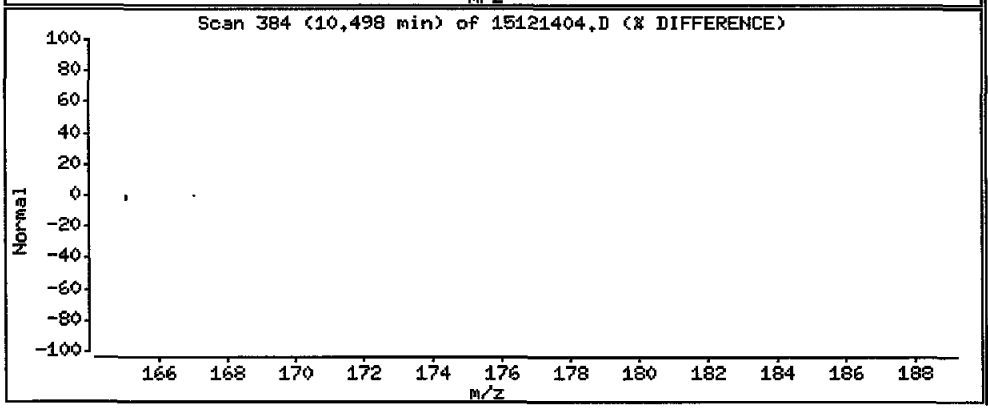












Data File: \\target\share\chem3\nt11.i\20151214.b\15121404.D

Date : 14-DEC-2015 10:42

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I,10

Volume Injected (uL): 2.0

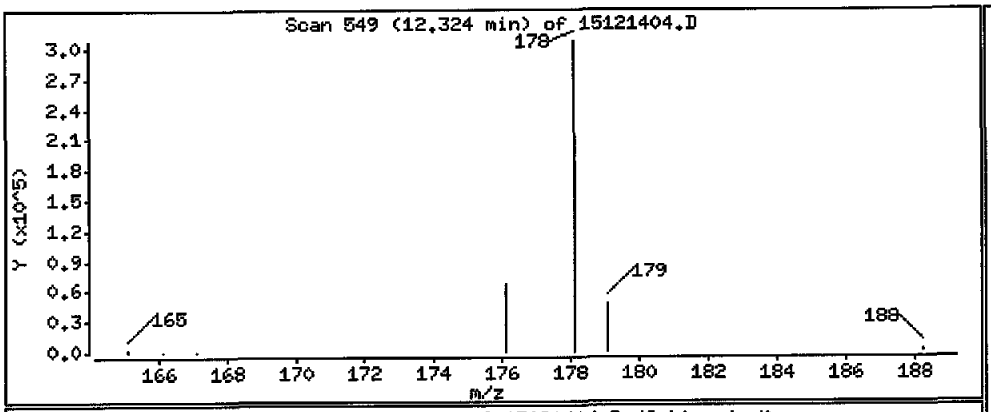
Operator: VTS

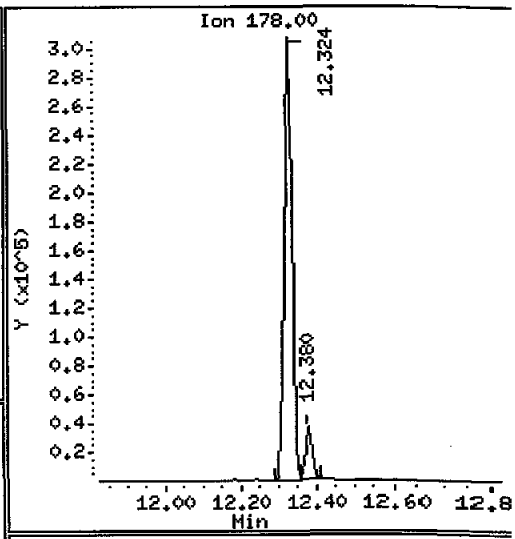
Column phase: Rxi-17Sil MS

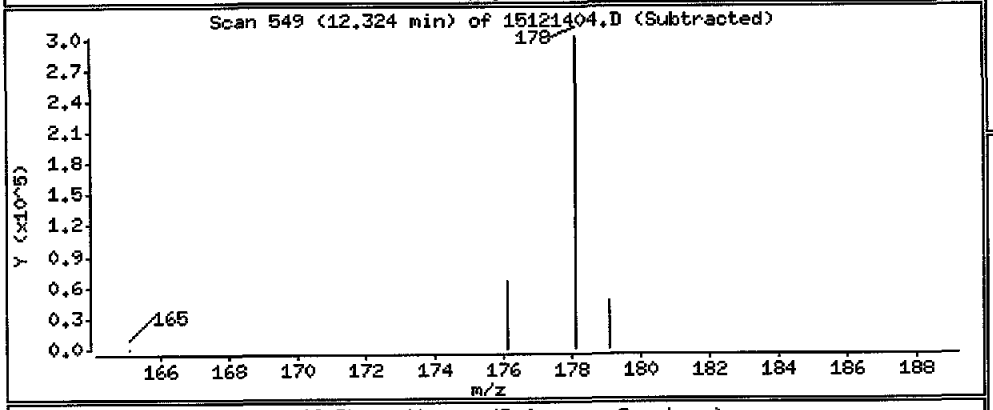
Column diameter: 0.25

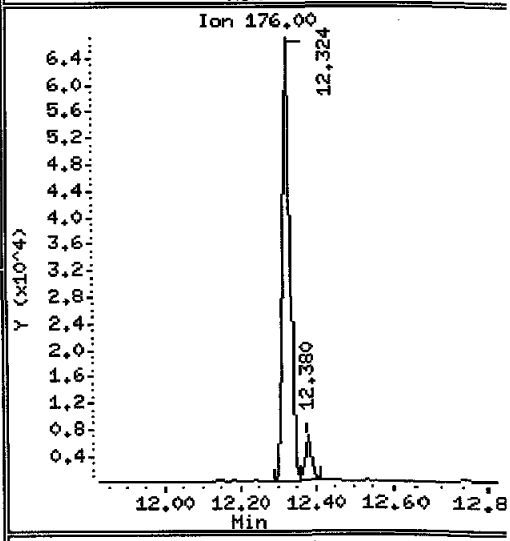
19 Phenanthrene

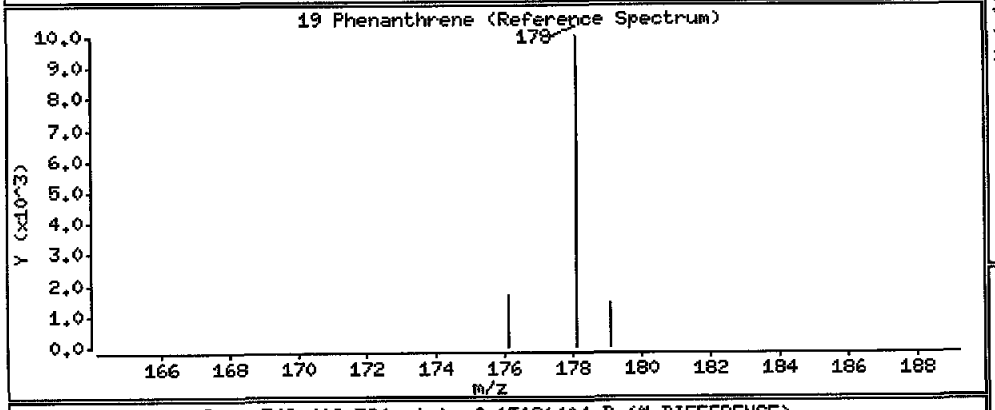
Concentration: 215000 ug/kg

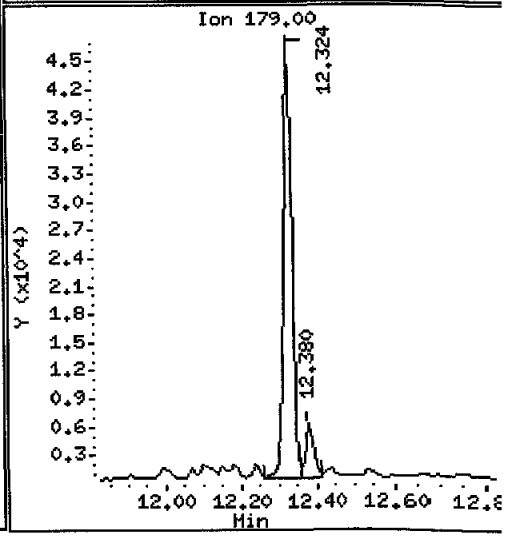


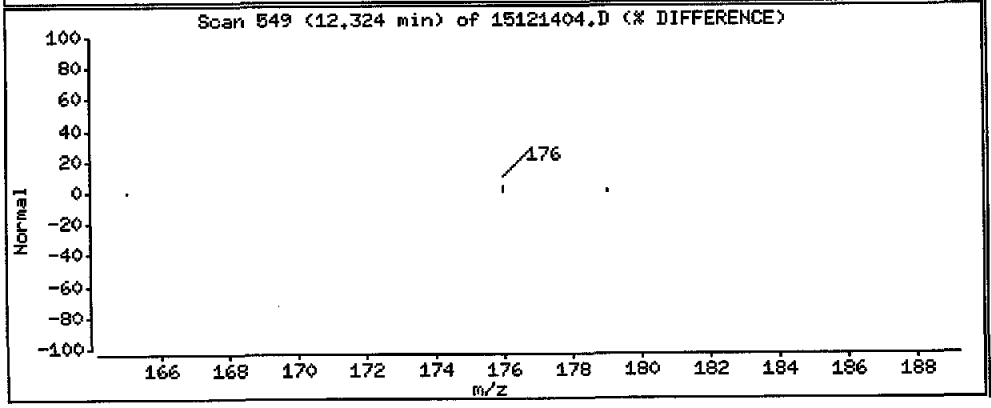












Data File: \\target\share\chem3\nt11.i\20151214.b\15121404.D

Date : 14-DEC-2015 10:42

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I,10

Volume Injected (uL): 2.0

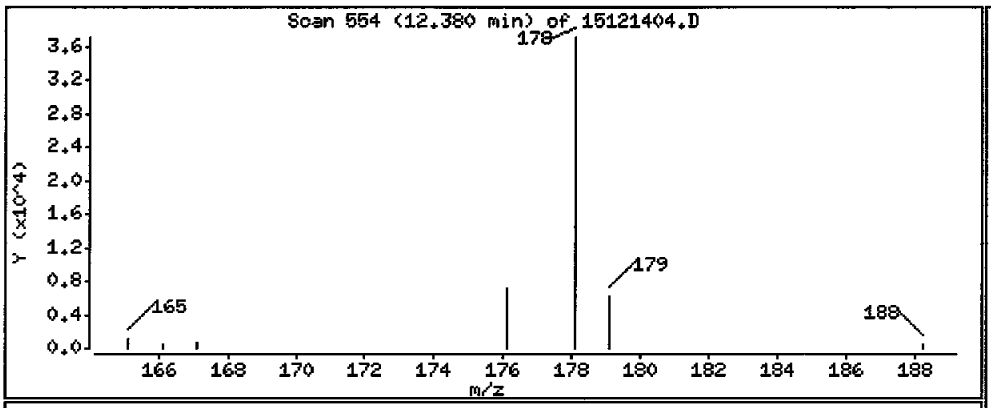
Operator: VTS

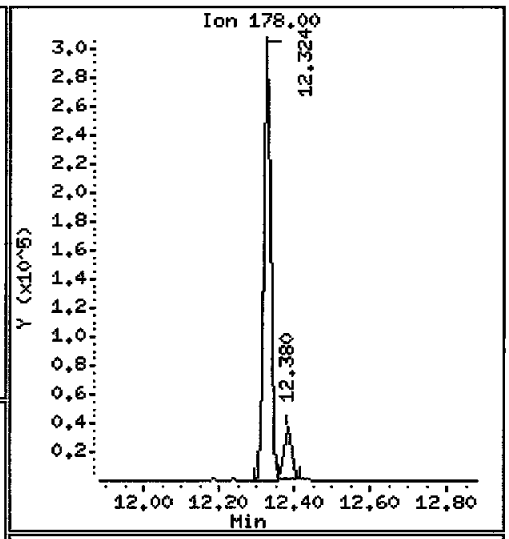
Column phase: Rxi-17Sil MS

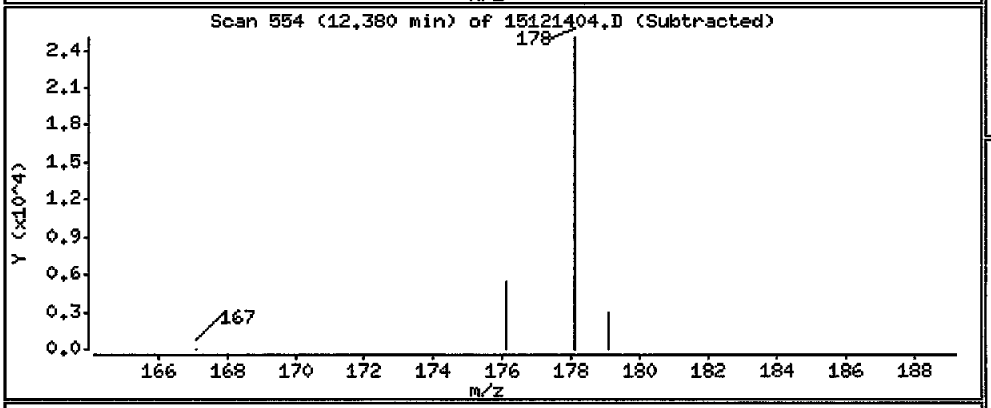
Column diameter: 0.25

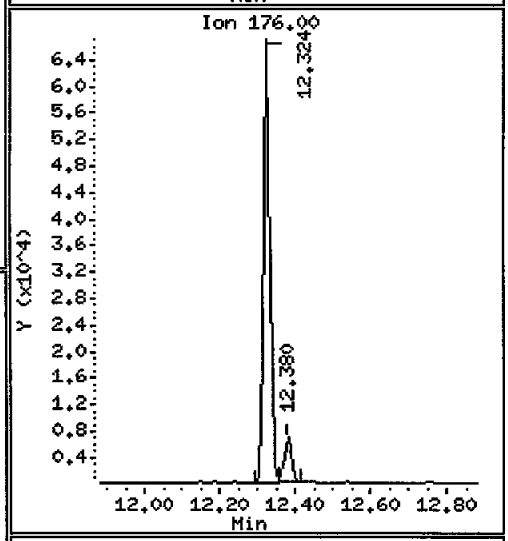
20 Anthracene

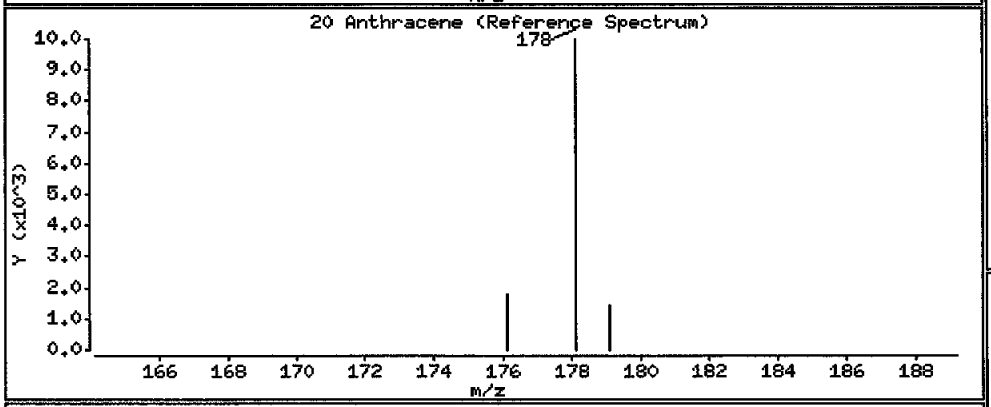
Concentration: 28300 ug/kg

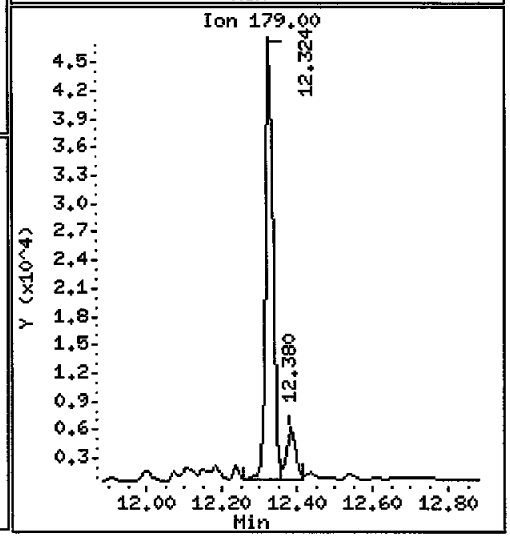


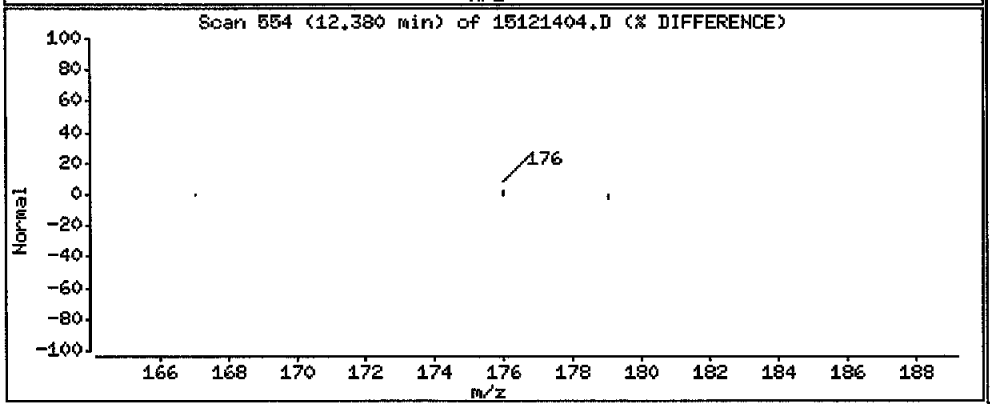












Data File: \\target\share\chem3\nt11.i\20151214.b\15121404.D

Date : 14-DEC-2015 10:42

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I,10

Volume Injected (uL): 2.0

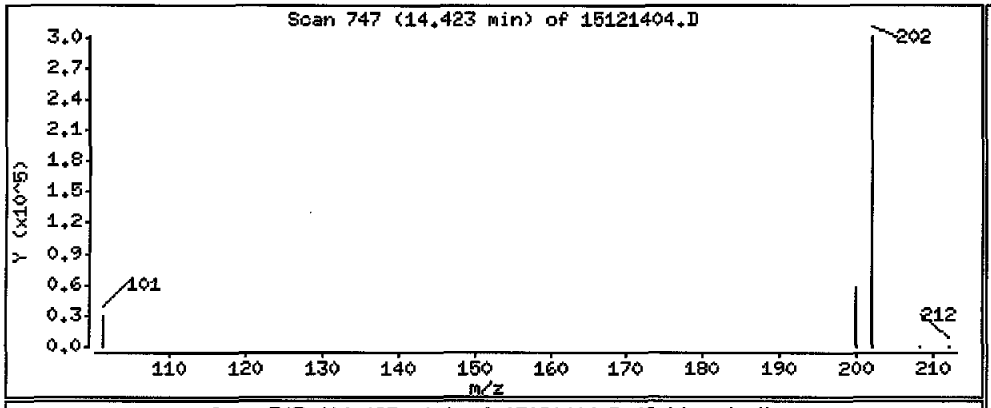
Operator: VTS

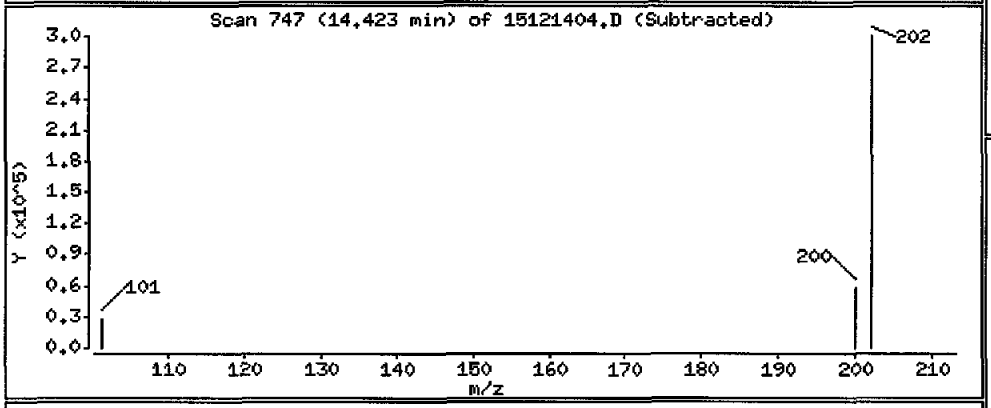
Column phase: Rxi-17Sil MS

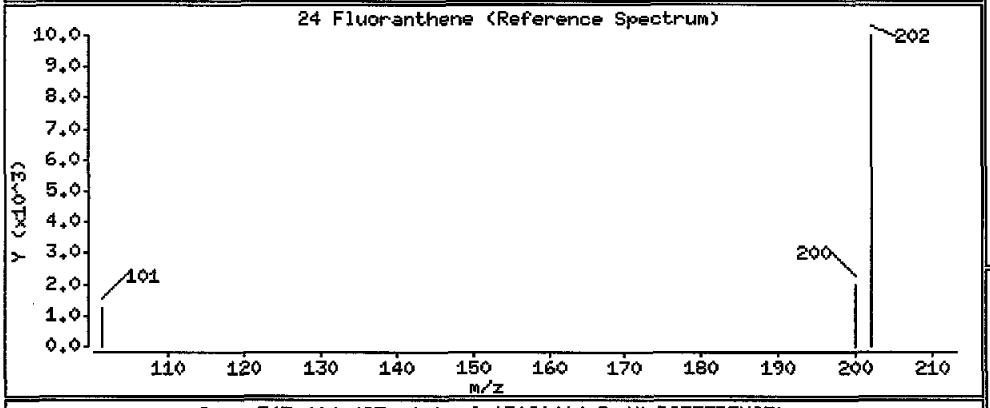
Column diameter: 0.25

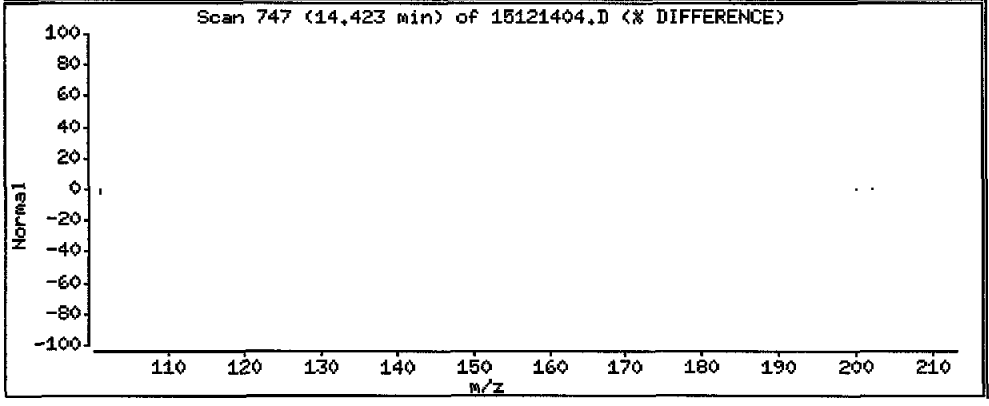
24 Fluoranthene

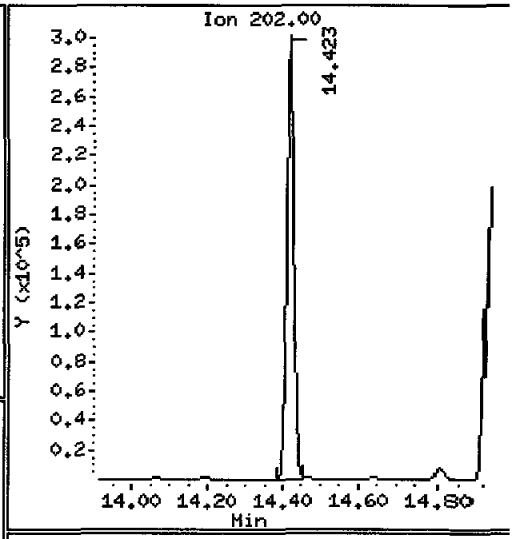
Concentration: 231000 ug/kg

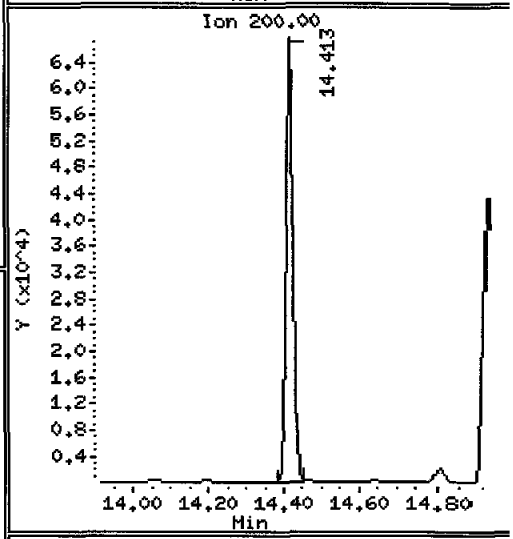


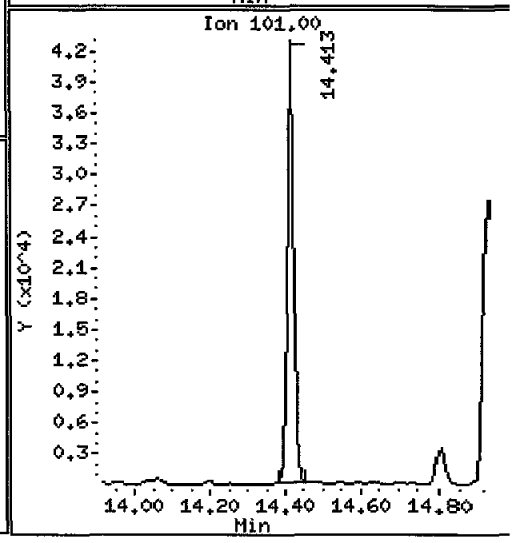












Data File: \\target\share\chem3\nt11.i\20151214.b\15121404.D

Date : 14-DEC-2015 10:42

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I,10

Volume Injected (uL): 2.0

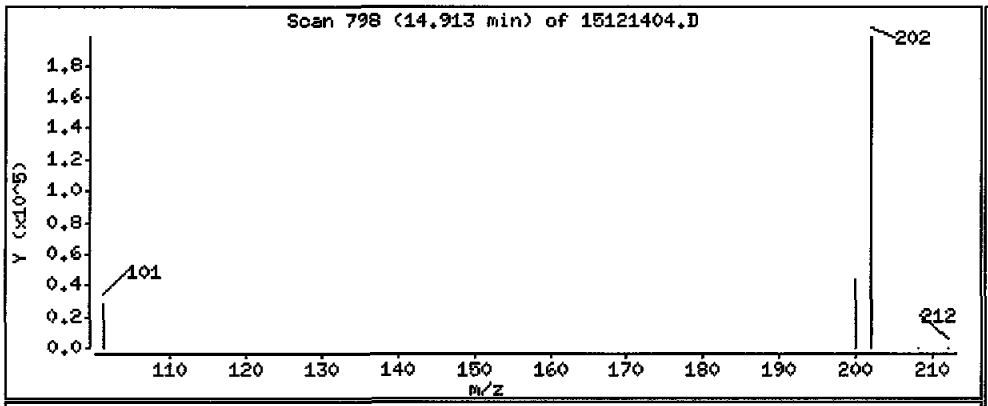
Operator: VTS

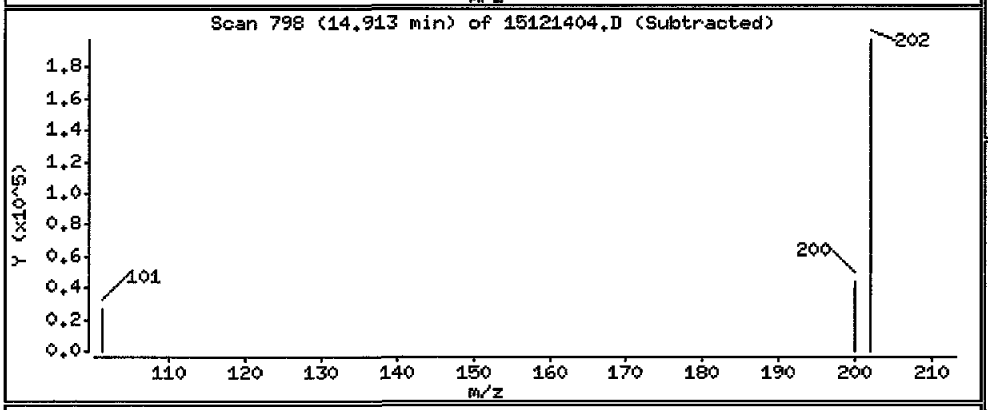
Column phase: Rxi-17Sil MS

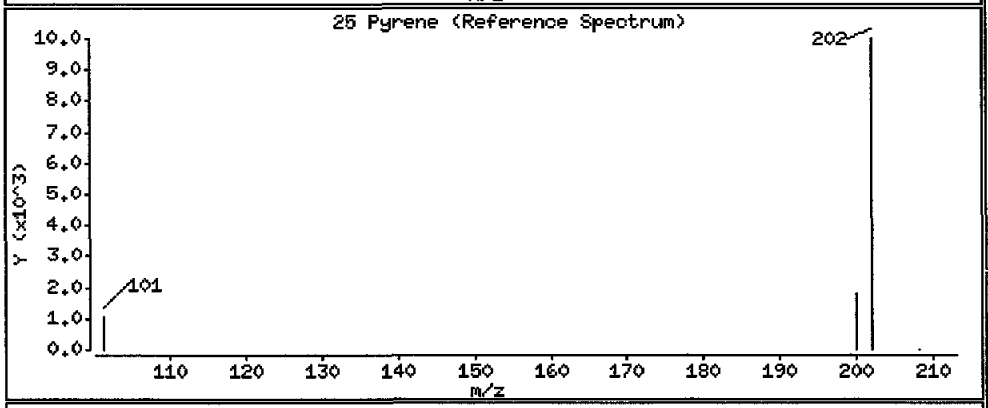
Column diameter: 0.25

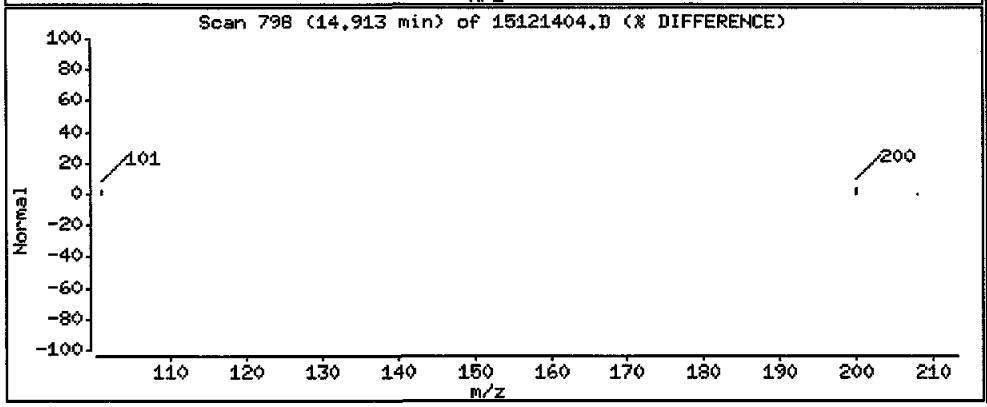
25 Pyrene

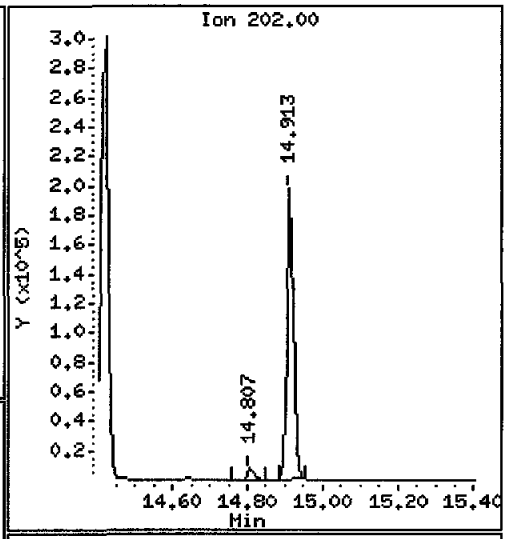
Concentration: 140000 ug/kg

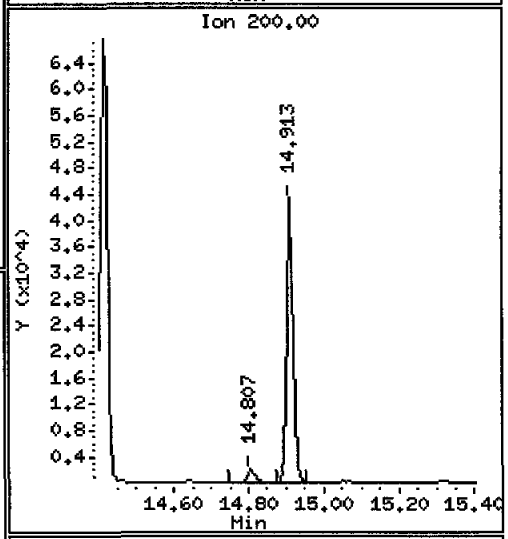


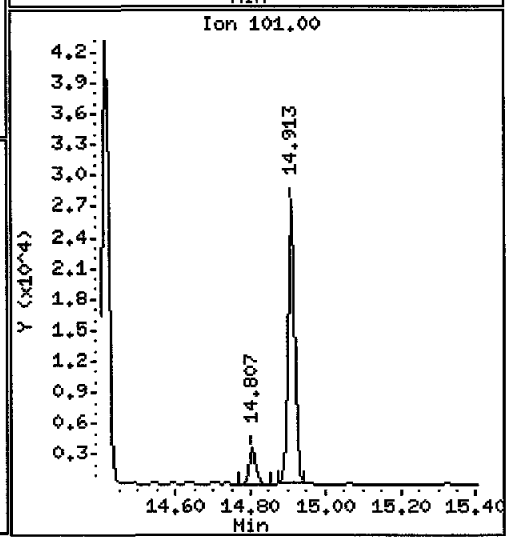












Data File: \\target\share\chem3\nt11.i\20151214.b\15121404.D

Date : 14-DEC-2015 10:42

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I,10

Volume Injected (uL): 2.0

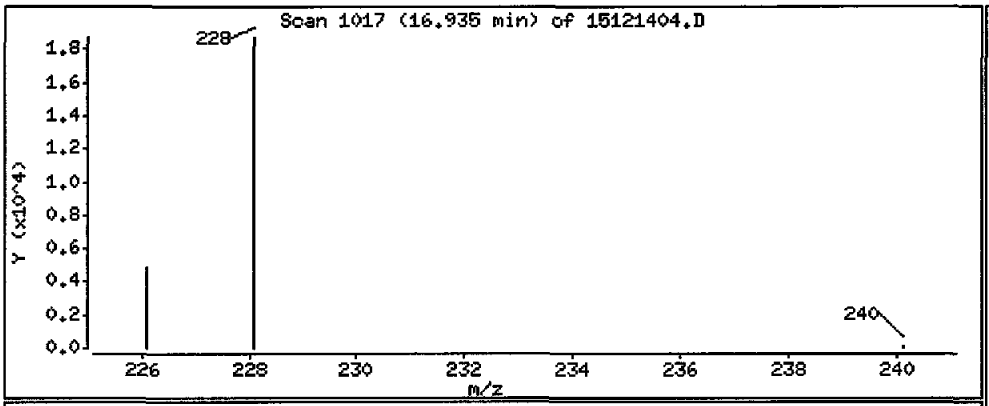
Operator: VTS

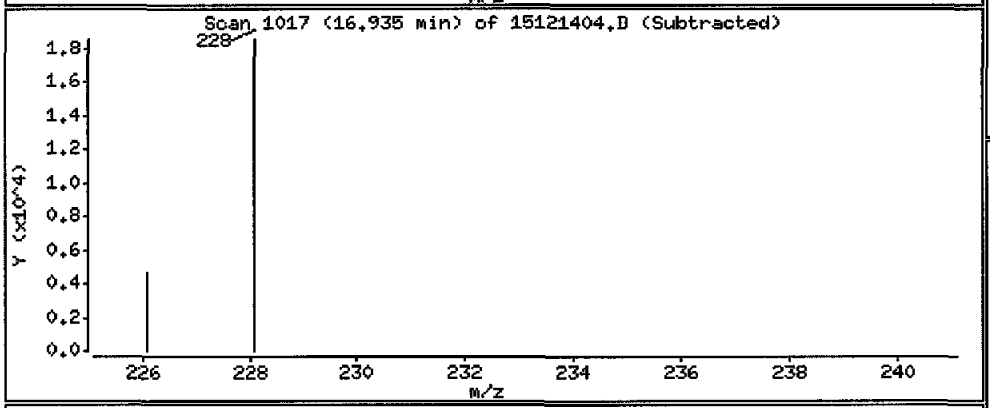
Column phase: Rxi-17Sil MS

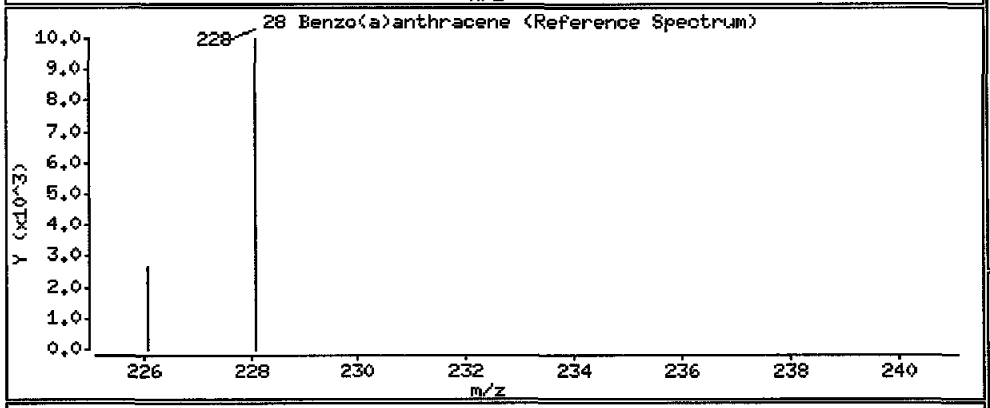
Column diameter: 0.25

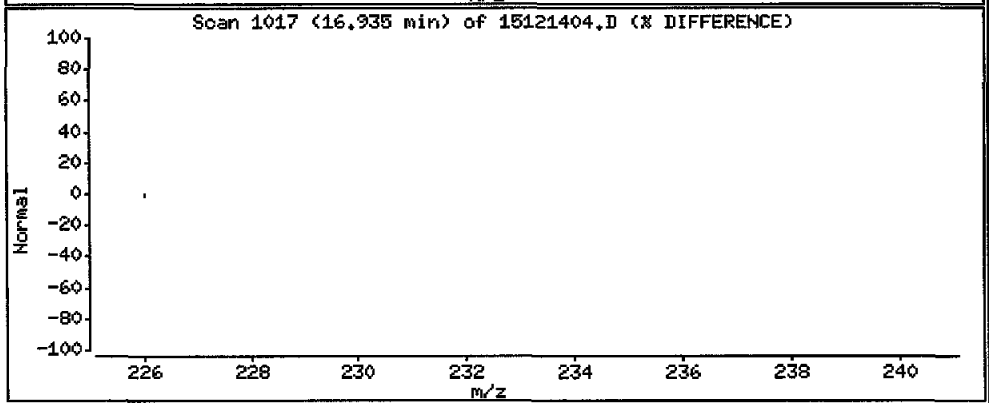
28 Benzo(a)anthracene

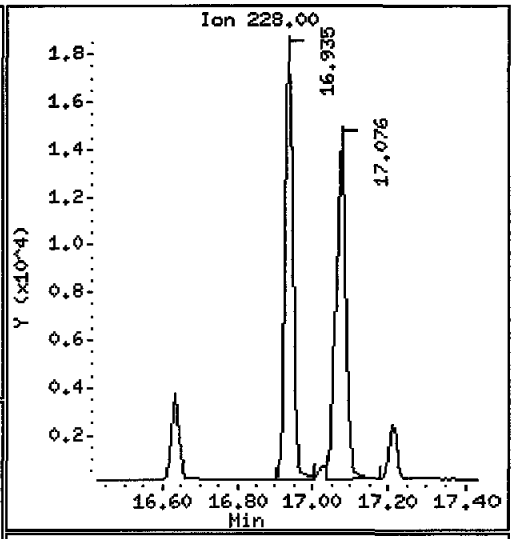
Concentration: 16400 ug/kg

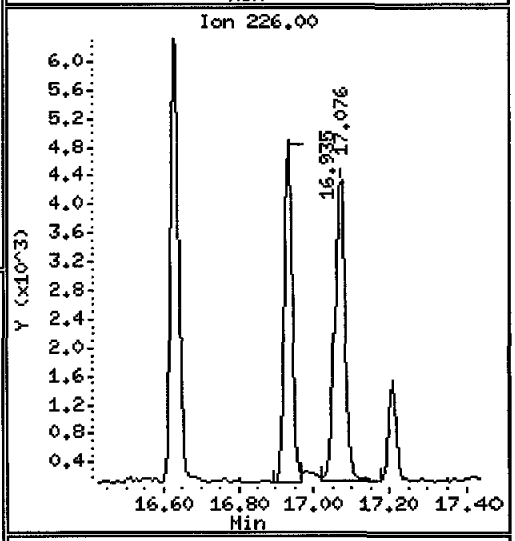


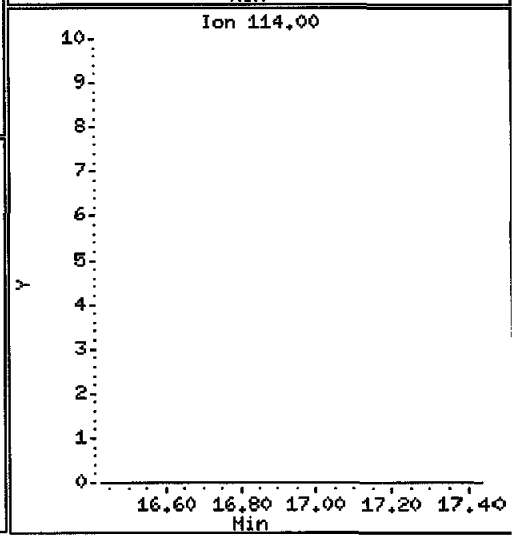












Data File: \\target\share\chem3\nt11.i\20151214.b\15121404.D

Date : 14-DEC-2015 10:42

Client ID: PG-SMA2-4-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9I,10

Volume Injected (uL): 2.0

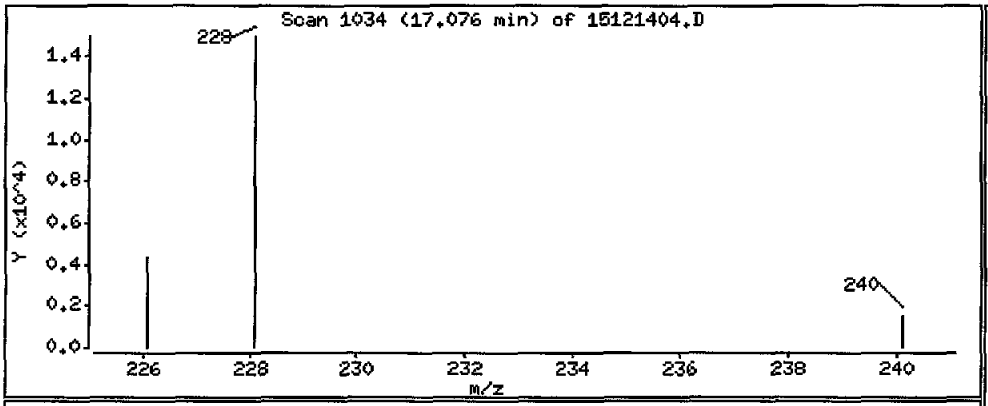
Operator: VTS

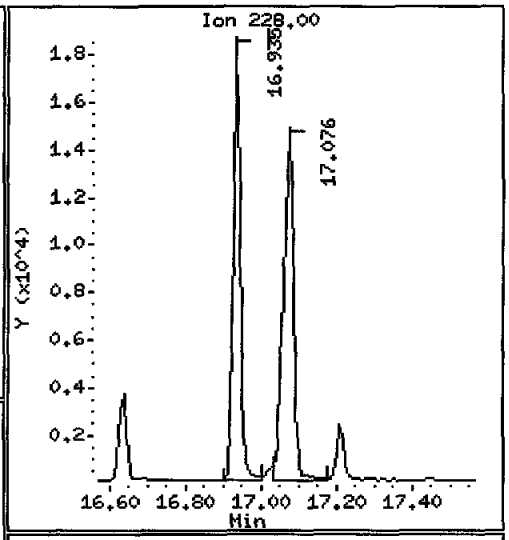
Column phase: Rxi-17Sil MS

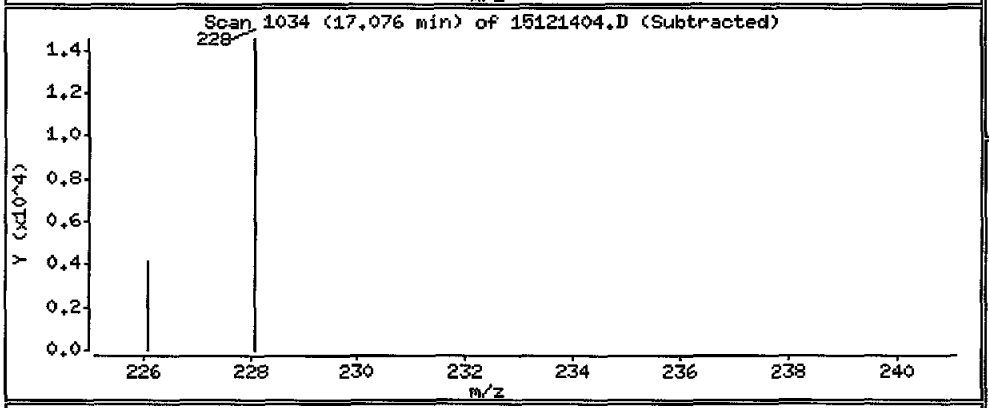
Column diameter: 0.25

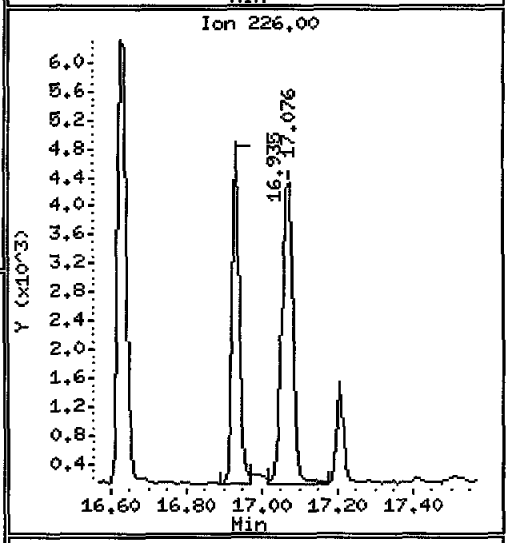
30 Chrysene

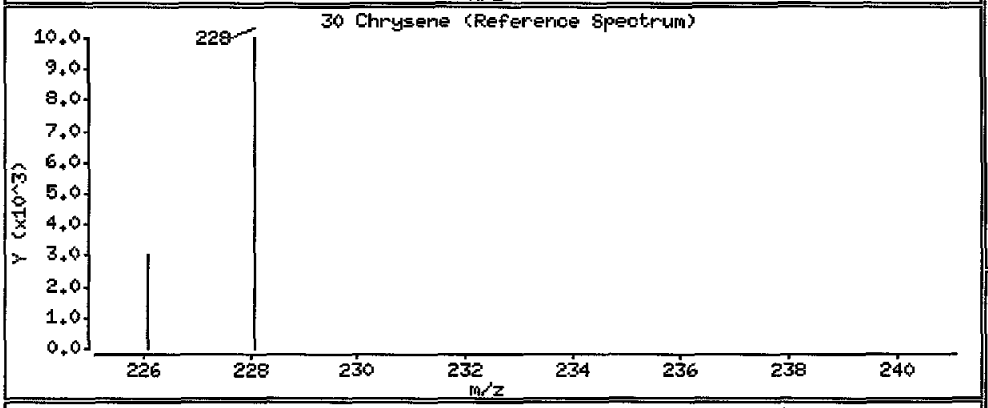
Concentration: 16200 ug/kg

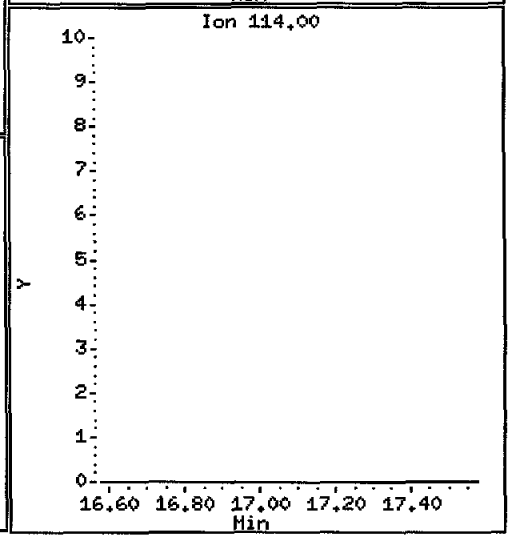


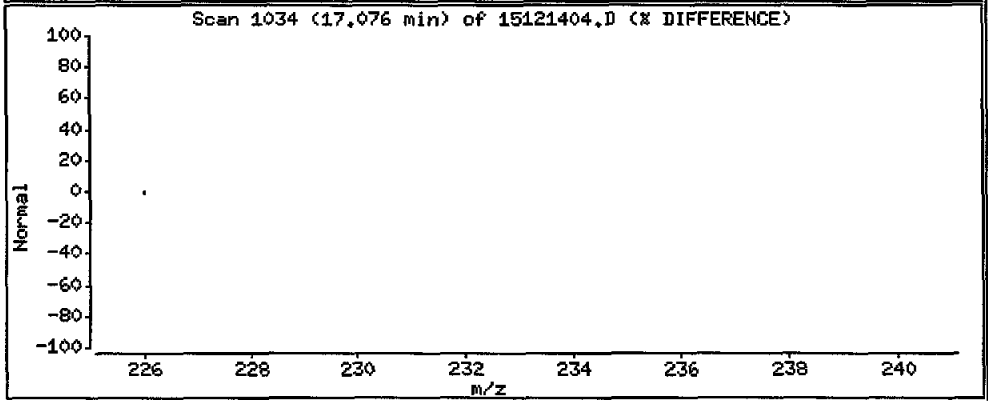












REVIEW SUMMARY FOR FILE - 15121404.D

Lab ID: AQJ9I
nt11.i, 20151214.b\lowsim.m, 14-DEC-2015 10:42

RT CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151214.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151214.b\15121405.D
Lab Smp Id: AQJ9K Client Smp ID: PG-SMA2-3-PEMD-1511
Inj Date : 14-DEC-2015 11:12 MS Autotune Date: 23-APR-2014 12:5
Operator : VTS Inst ID: nt11.i
Smp Info : AQJ9K,10
Misc Info : 15-21398
Comment :
Method : \\target\share\chem3\nt11.i\20151214.b\lowsim.m
Meth Date : 15-Dec-2015 08:23 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 5
Dil Factor: 10.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	10.000	Dilution Factor
Vt	100.000	Volume of final extract (uL)
Ws	0.89000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

dw 12/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)
*	4 Naphthalene-d8	136	6.608	6.608	(1.000)	301887	200.000	
	5 Naphthalene	128	6.639	6.639	(1.005)	22221	12.7432	14300 B
$	6 2-Methylnaphthalene-d10	152	7.585	7.585	(1.148)	20605	18.3886	20700
	7 2-Methylnaphthalene	142	Compound Not Detected.					
	8 1-Methylnaphthalene	142	Compound Not Detected.					
	10 Acenaphthylene	152	Compound Not Detected.					
*	11 Acenaphthene-d10	164	9.611	9.611	(1.000)	222712	200.000	
	12 Acenaphthene	153	9.667	9.667	(1.006)	17679	14.8187	16700
	14 Dibenzofuran	168	Compound Not Detected.					
	15 Fluorene	166	10.497	10.497	(1.092)	30292	22.4742	25300
*	18 Phenanthrene-d10	188	12.280	12.280	(1.000)	358654	200.000	
	19 Phenanthrene	178	12.324	12.324	(1.004)	392754	181.761	204000
	20 Anthracene	178	12.379	12.379	(1.008)	67741	35.0234	39400
$	23 Fluoranthene-d10	212	14.374	14.384	(1.171)	53107	26.9254	30300
	24 Fluoranthene	202	14.413	14.413	(1.174)	682411	314.555	353000
	25 Pyrene	202	14.912	14.912	(0.876)	379924	176.203	198000
	28 Benzo(a)anthracene	228	16.926	16.926	(0.995)	73623	40.5576	45600
*	29 Chrysene-d12	240	17.017	17.026	(1.000)	272267	200.000	
	30 Chrysene	228	17.067	17.075	(1.003)	75914	38.1033	42800
	44 Benzo(b)fluoranthene	252	18.794	18.794	(0.947)	18974	11.7090	13200
	45 Benzo(k)fluoranthene	252	Compound Not Detected.					

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)	
	46 Benzo(j)fluoranthene	252	Compound Not Detected.						
	34 Benzo(a)pyrene	252	Compound Not Detected.						
*	35 Perylene-d12	264	19.851	19.851	(1.000)	239176	200.000		
$	36 Dibenzo(a,h)anthracene-d14	292	22.219	22.219	(1.119)	18828	19.5037	21900	Q
	37 Indeno(1,2,3-cd)pyrene	276	Compound Not Detected.						
	38 Dibenzo(a,h)anthracene	278	Compound Not Detected.						
	39 Benzo(g,h,i)perylene	276	Compound Not Detected.						
	47 Perylene	252	Compound Not Detected.						
	48 Benzo(e)pyrene	252	Compound Not Detected.						

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15121405.D
Lab Smp Id: AQJ9K
Analysis Type: SV
Quant Type: ISTD
Operator: VTS
Method File: \\target\share\chem3\nt11.i\20151214.b\lowsim.m
Misc Info: 15-21398

Calibration Date: 14-DEC-2015
Calibration Time: 09:09
Client Smp ID: PG-SMA2-3-PEMD-
Level: LOW
Sample Type: Tissue

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	301887	-7.93
11 Acenaphthene-d10	239179	119590	478358	222712	-6.88
18 Phenanthrene-d10	372253	186127	744506	358654	-3.65
29 Chrysene-d12	294711	147356	589422	272267	-7.62
35 Perylene-d12	260595	130298	521190	239176	-8.22

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.61	6.11	7.11	6.61	0.00
11 Acenaphthene-d10	9.61	9.11	10.11	9.61	0.00
18 Phenanthrene-d10	12.28	11.78	12.78	12.28	0.00
29 Chrysene-d12	17.03	16.53	17.53	17.02	-0.05
35 Perylene-d12	19.85	19.35	20.35	19.85	0.00

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.

ARI Labs, Inc.

RECOVERY REPORT

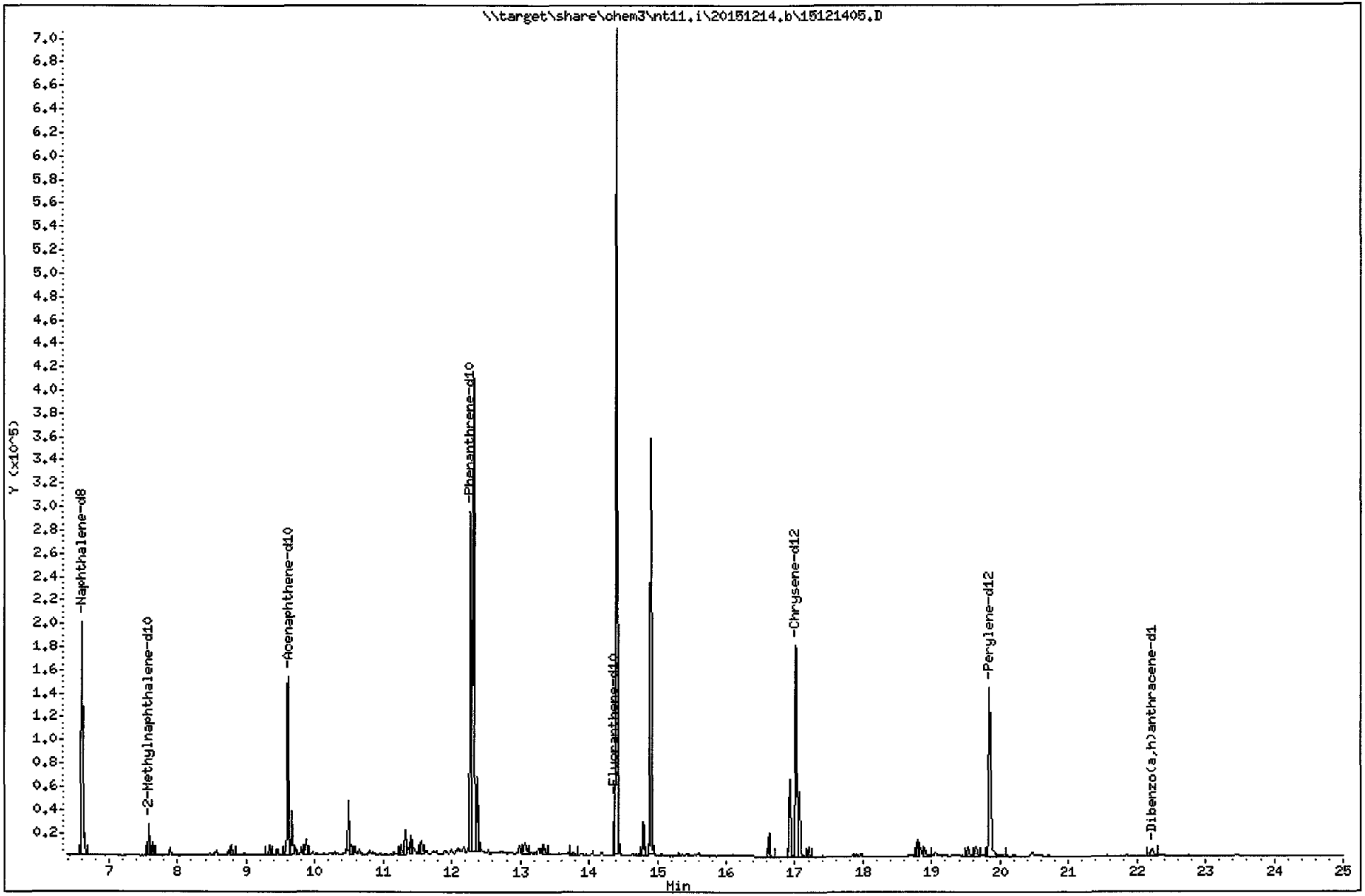
Client Name: Anchor QEA, LLC
Client SDG: AQJ9
Sample Matrix: SOLID
Fraction: SV
Lab Smp Id: AQJ9K
Client Smp ID: PG-SMA2-3-PEMD-1511
Level: LOW
Operator: VTS
Data Type: MS DATA
SampleType: SAMPLE
SpikeList File: waterlcs.spk
Quant Type: ISTD
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151214.b\lowsim.m
Misc Info: 15-21398

SURROGATE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
$ 6 2-Methylnaphthalen	33700	20700	61.30	30-160
$ 23 Fluoranthene-d10	33700	30300	89.75	30-160
$ 36 Dibenzo(a,h)anthra	33700	21900	65.01	30-160

Data File: \\target\share\chem3\nt11.i\20151214.b\15121405.D
Date : 14-DEC-2015 11:12
Client ID: PG-SMA2-3-PEMD-1511
Sample Info: AQJ9K,10
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: VTS
Column diameter: 0.25

AQJ9:00454



Data File: \\target\share\chem3\nt11.i\20151214.b\15121405.D

Date : 14-DEC-2015 11:12

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K,10

Volume Injected (uL): 2.0

Operator: VTS

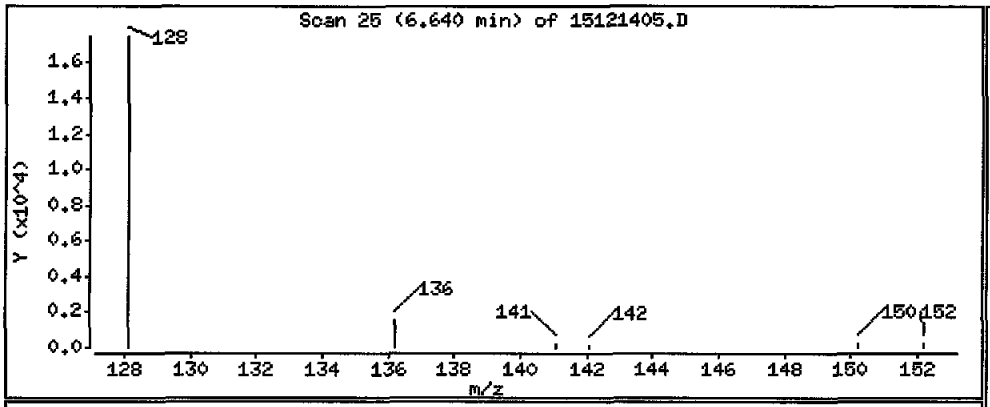
Column phase: Rxi-17Sil MS

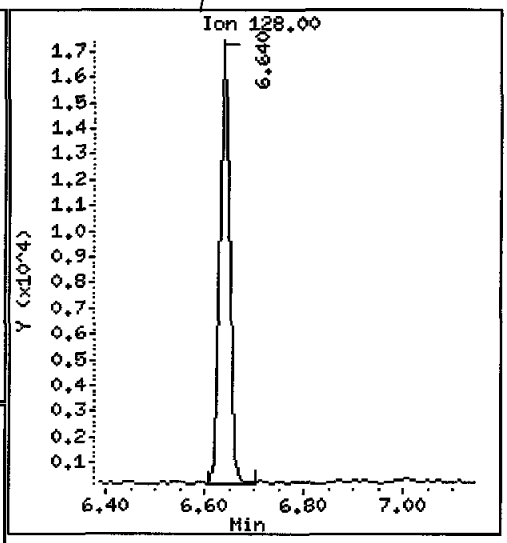
Column diameter: 0.25

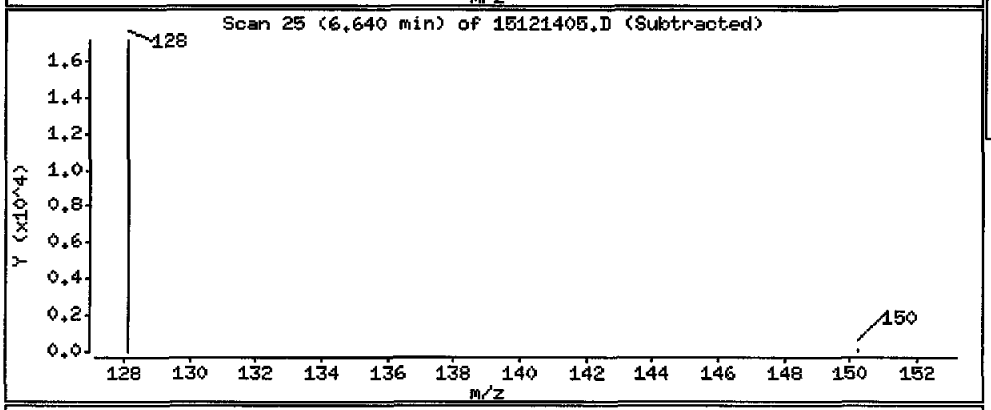
5 Naphthalene

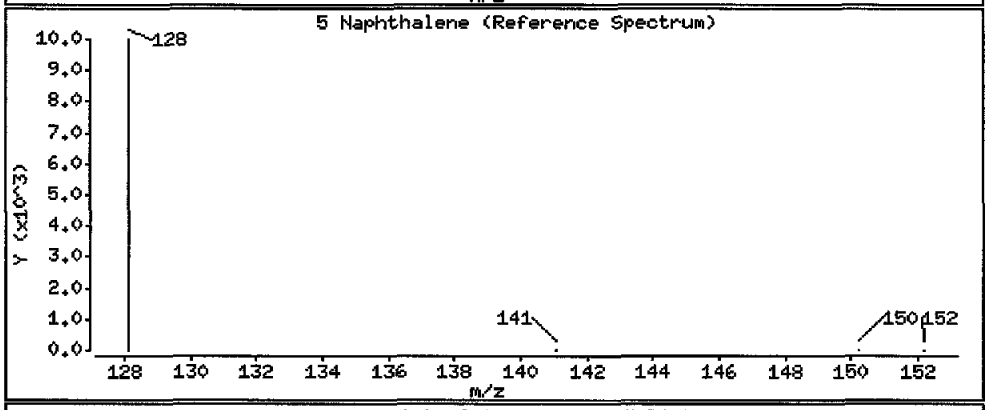
Concentration: 14300 ug/kg

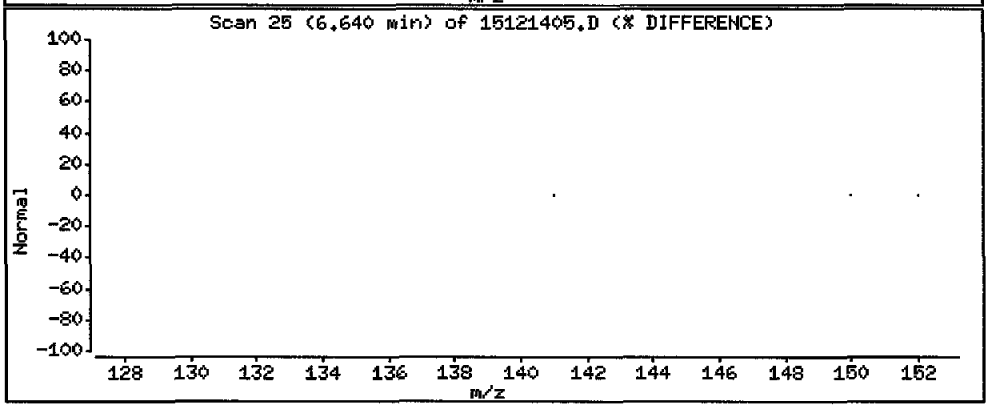
B











Data File: \\target\share\chem3\nt11.i\20151214.b\15121405.D

Date : 14-DEC-2015 11:12

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K,10

Volume Injected (uL): 2.0

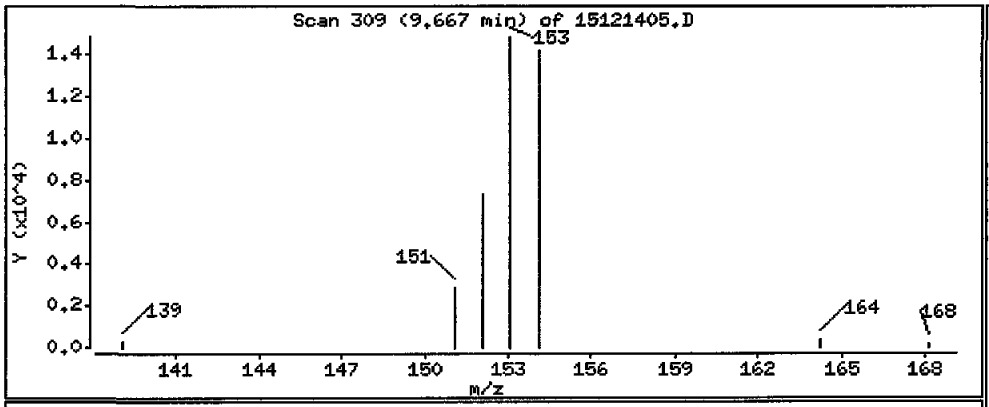
Operator: VTS

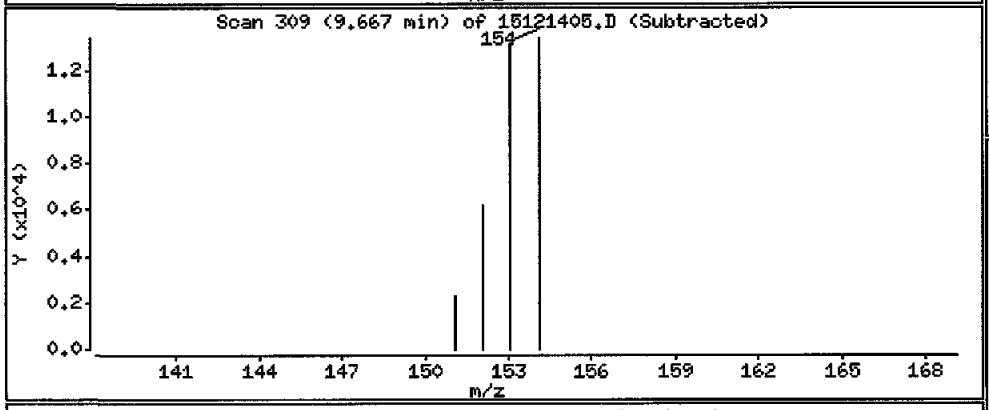
Column phase: Rxi-17Sil MS

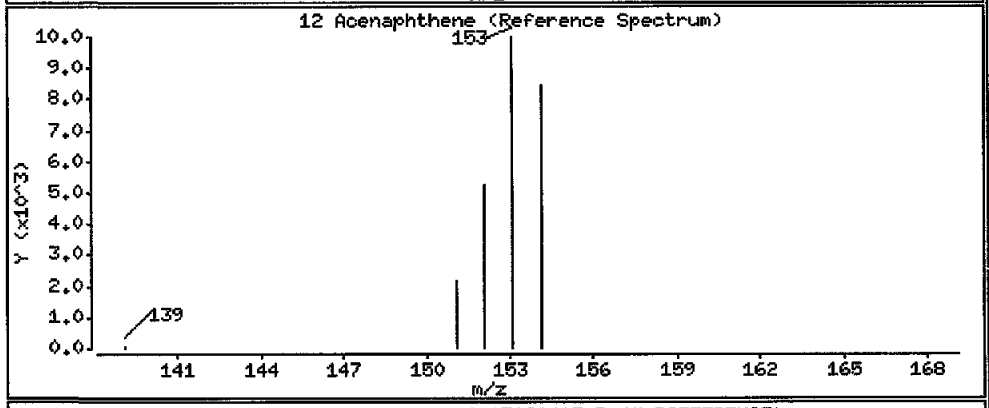
Column diameter: 0.25

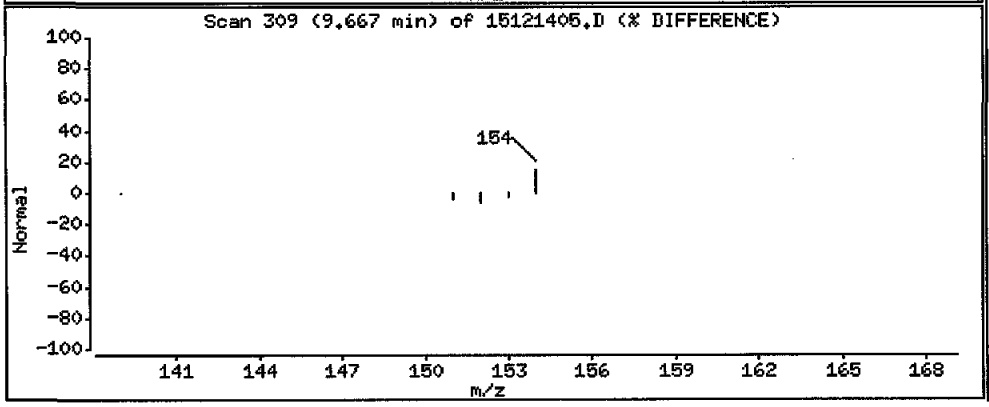
12 Acenaphthene

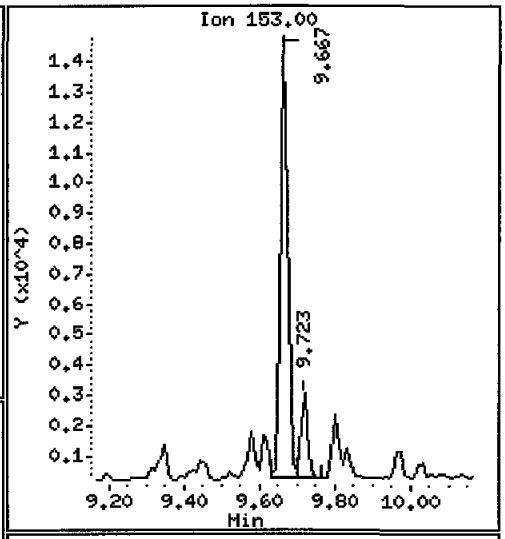
Concentration: 16700 ug/kg

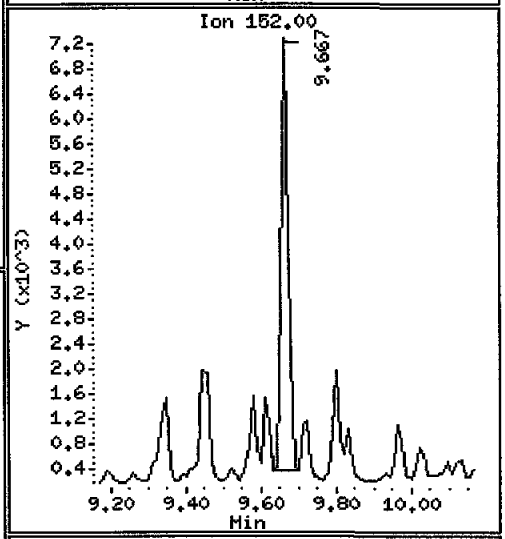


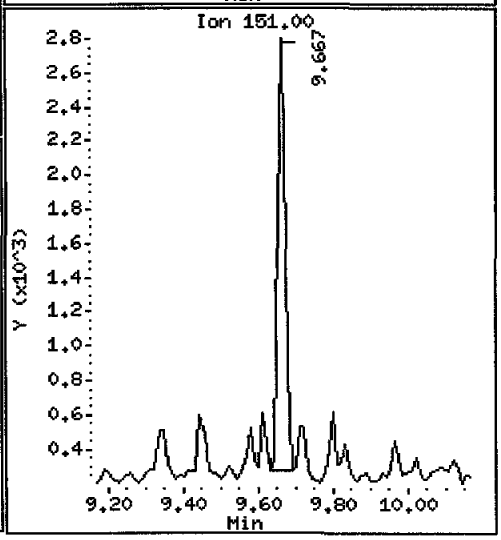












Data File: \\target\share\chem3\nt11.i\20151214.b\15121405.D

Date : 14-DEC-2015 11:12

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K,10

Volume Injected (uL): 2.0

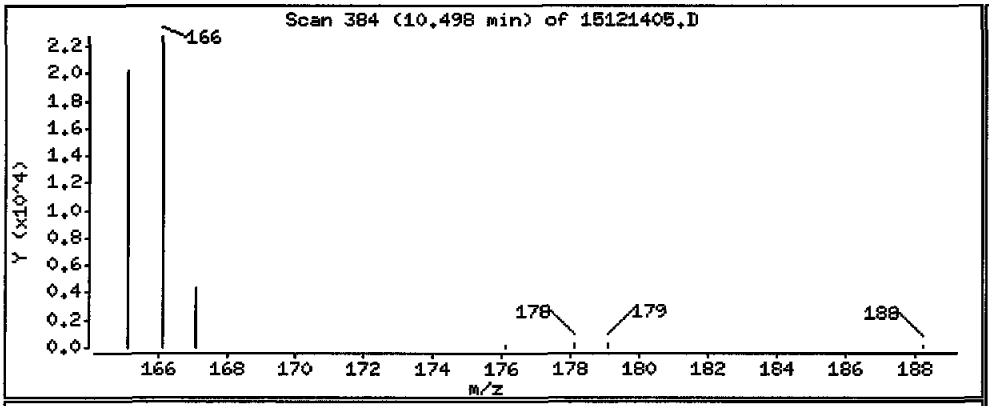
Operator: VTS

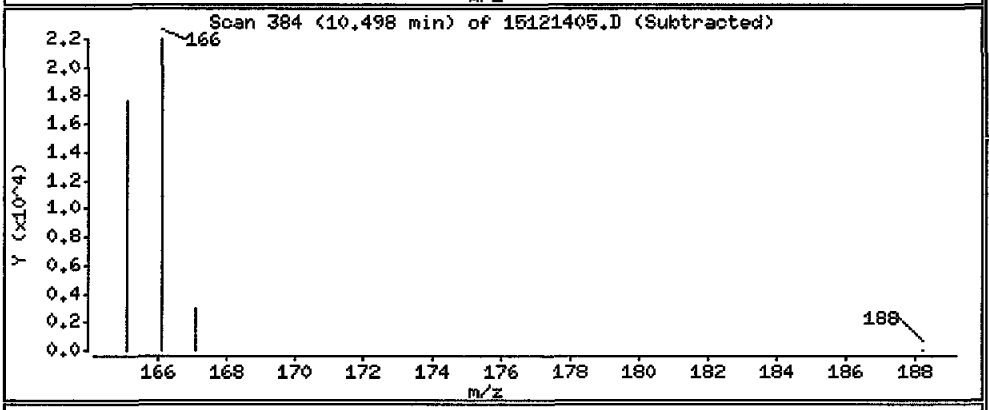
Column phase: Rxi-17Sil MS

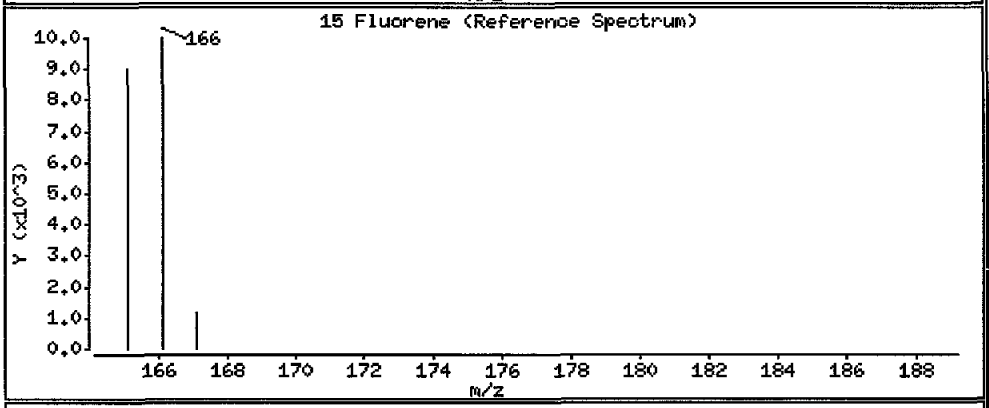
Column diameter: 0.25

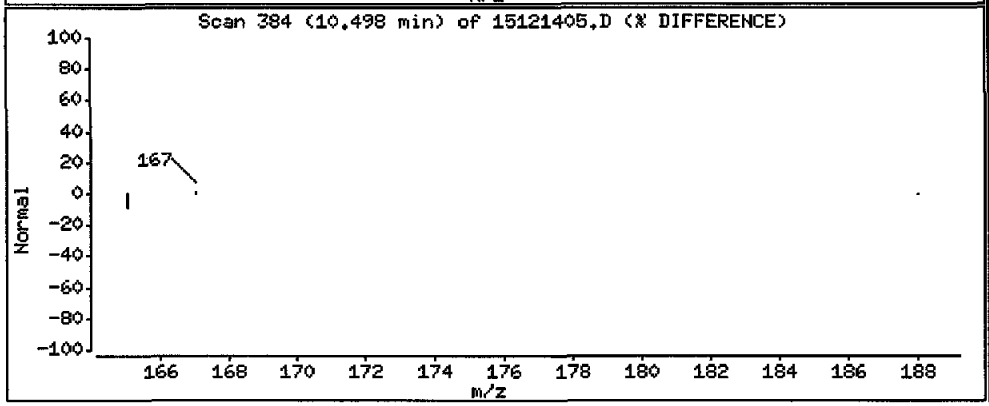
15 Fluorene

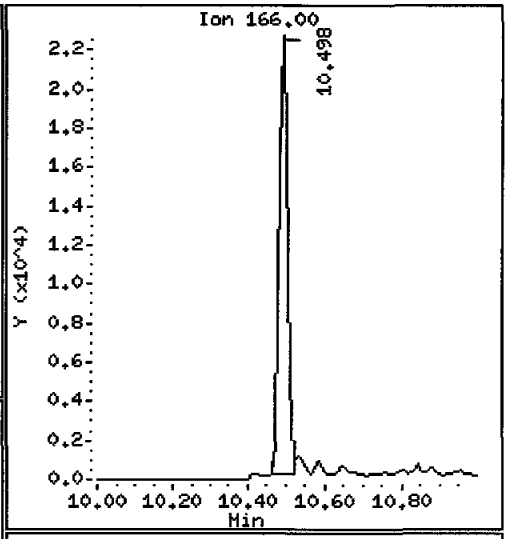
Concentration: 25300 ug/kg

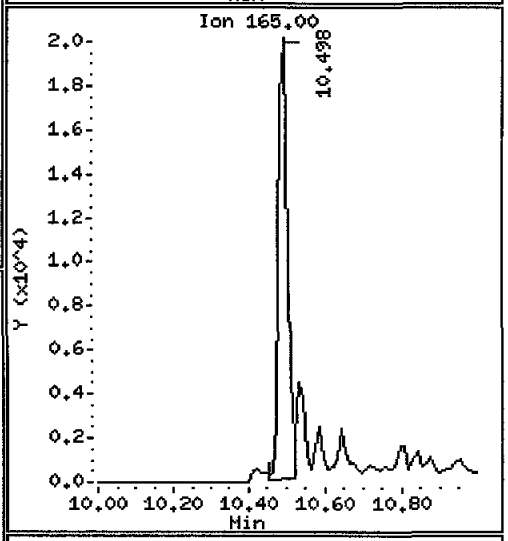


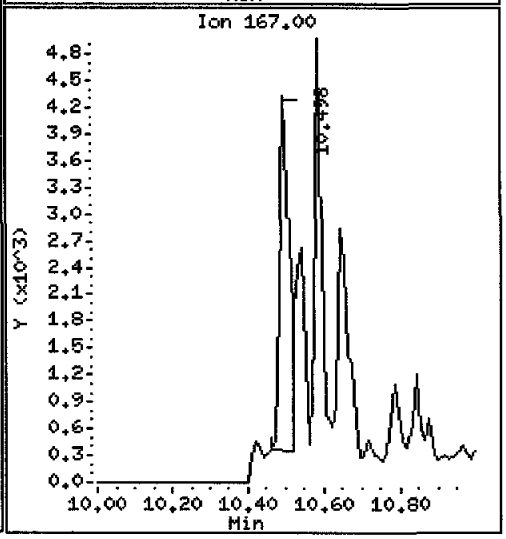












Data File: \\target\share\chem3\nt11.i\20151214.b\15121405.D

Date : 14-DEC-2015 11:12

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K,10

Volume Injected (uL): 2.0

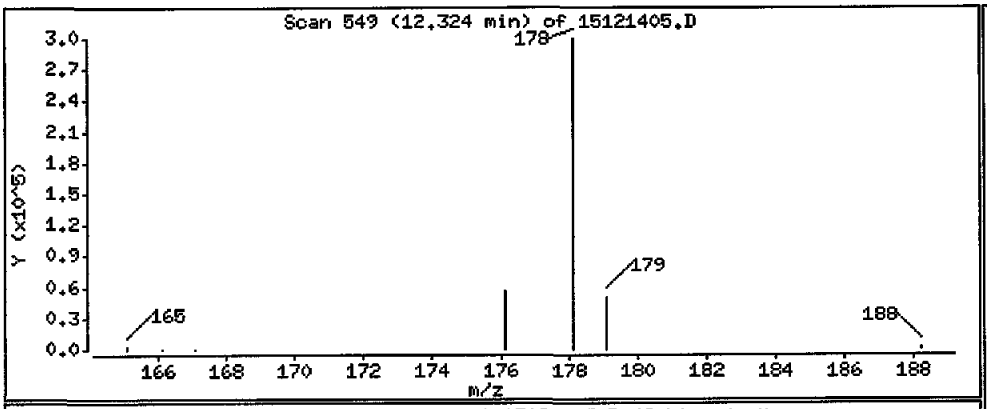
Operator: VTS

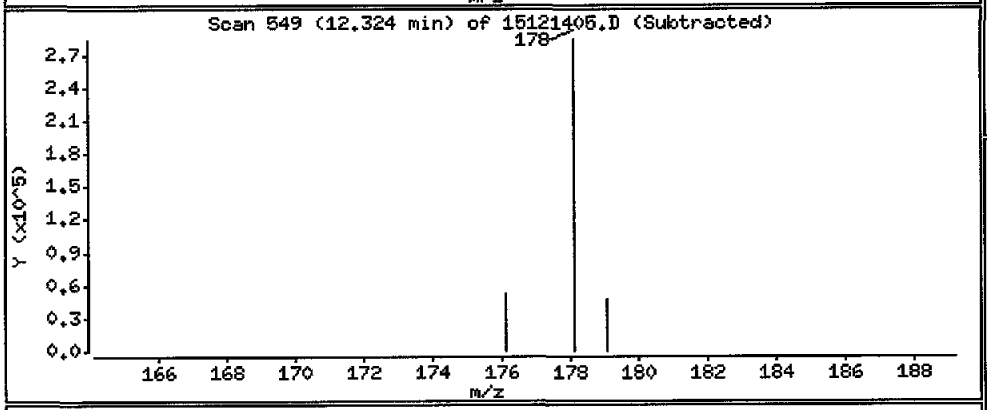
Column phase: Rxi-17Sil MS

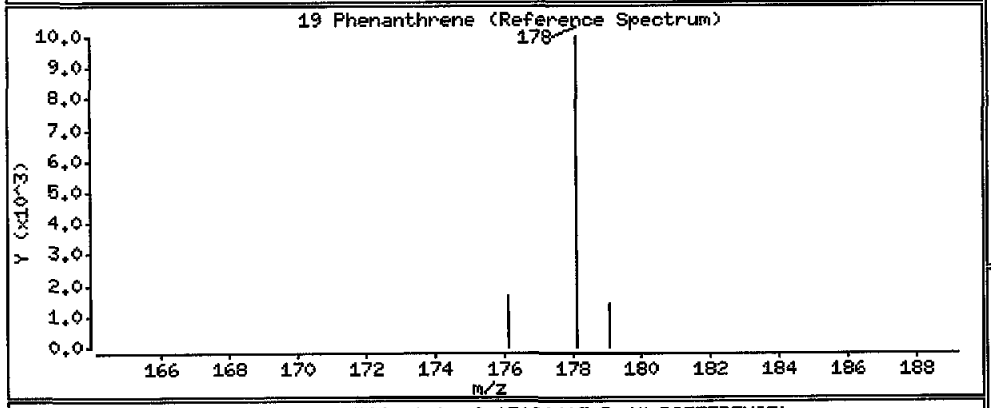
Column diameter: 0.25

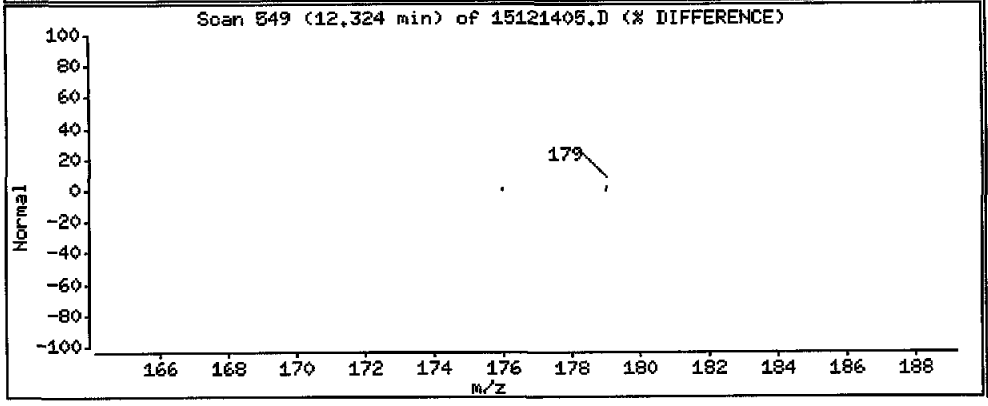
19 Phenanthrene

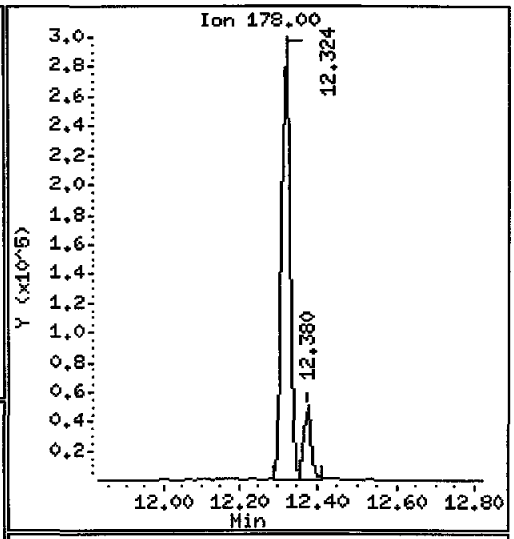
Concentration: 204000 ug/kg

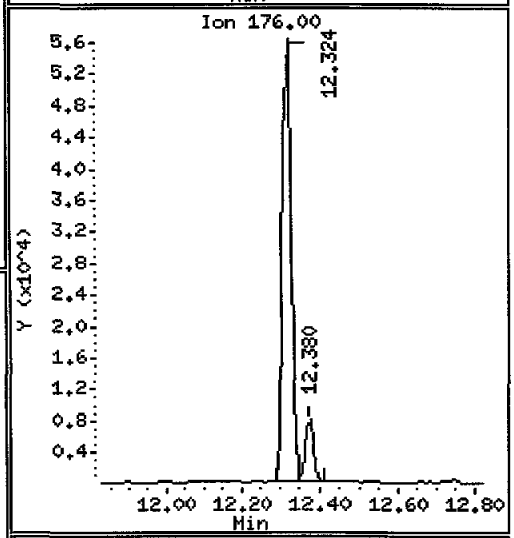


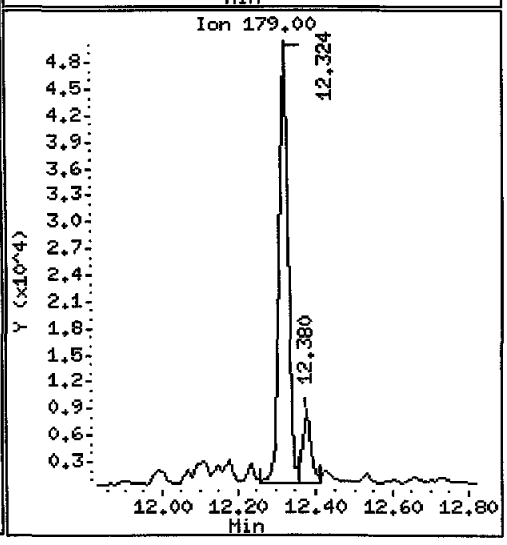












Data File: \\target\share\chem3\nt11.i\20151214.b\15121405.D

Date : 14-DEC-2015 11:12

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K,10

Volume Injected (uL): 2.0

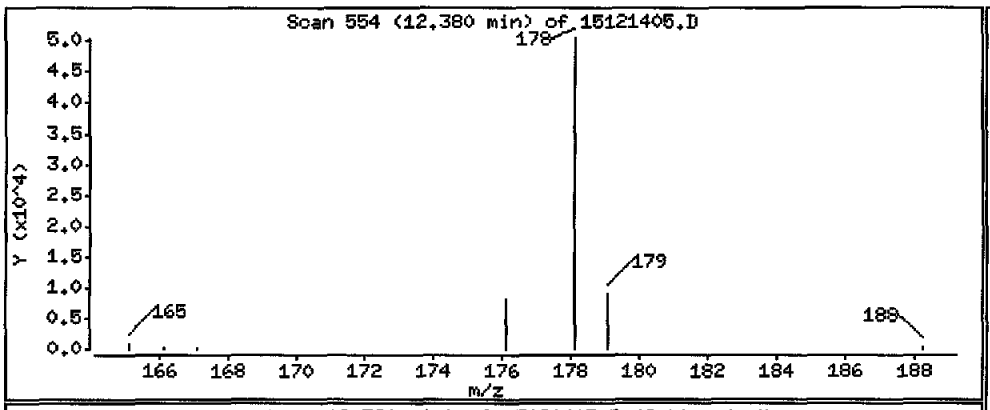
Operator: VTS

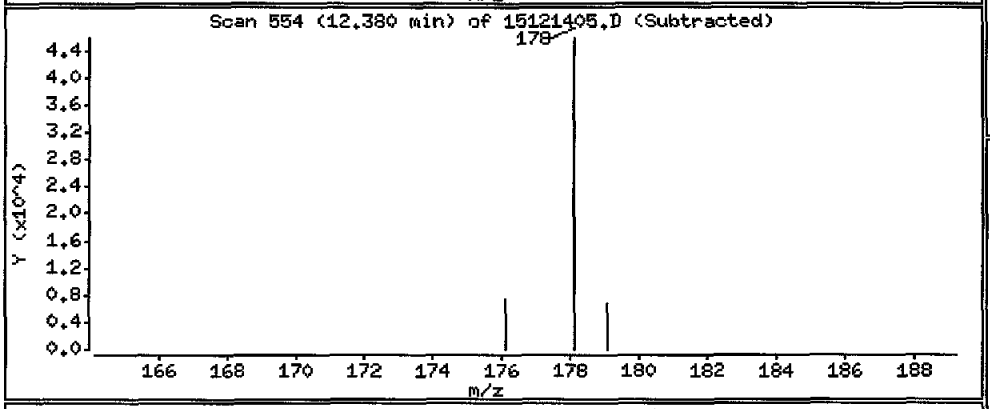
Column phase: Rxi-17Sil MS

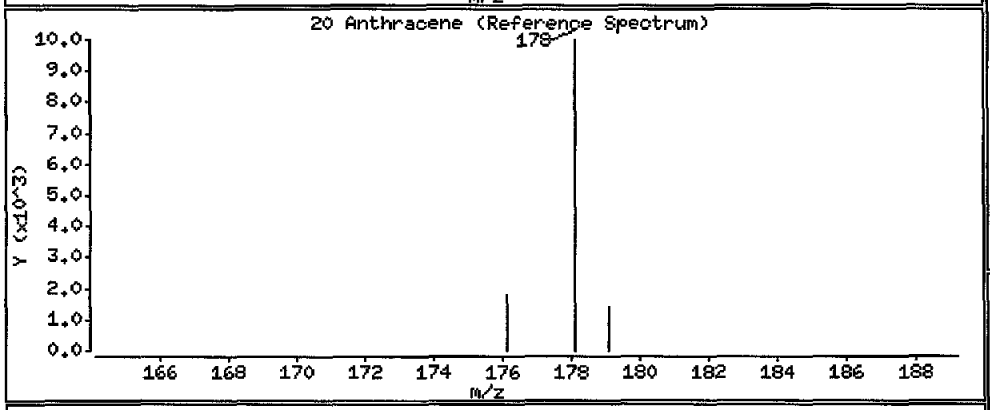
Column diameter: 0.25

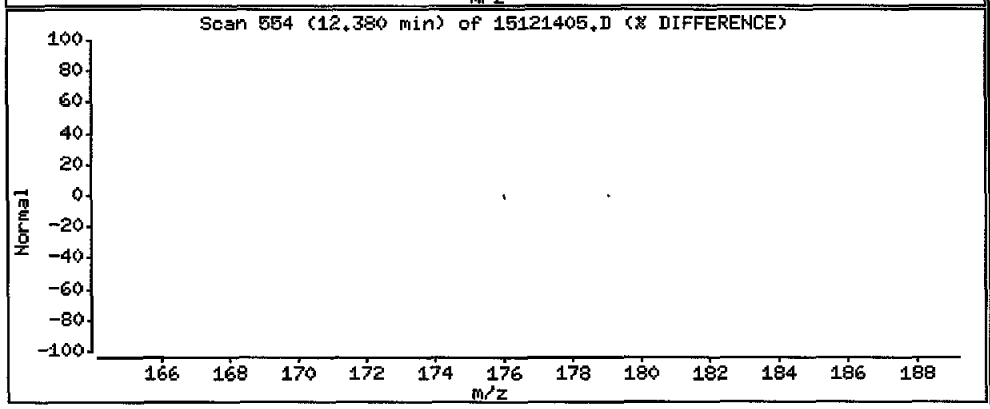
20 Anthracene

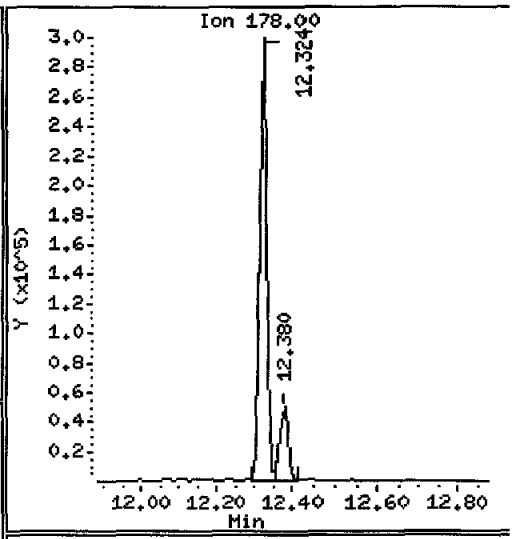
Concentration: 39400 ug/kg

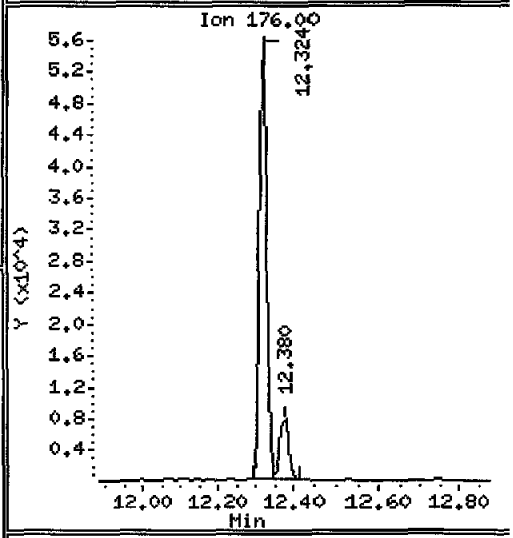


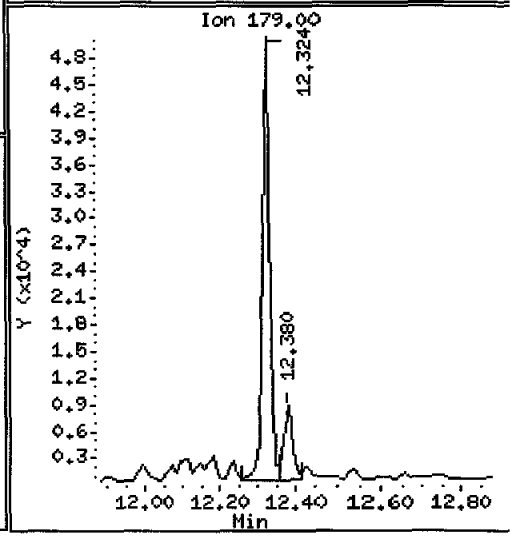












Data File: \\target\share\chem3\nt11.i\20151214.b\15121405.D

Date : 14-DEC-2015 11:12

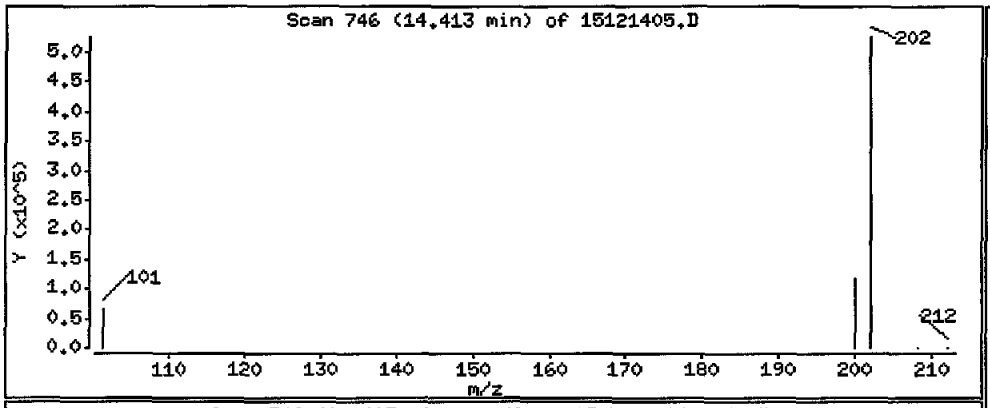
Client ID: PG-SMA2-3-PEMD-1511 Instrument: nt11.i

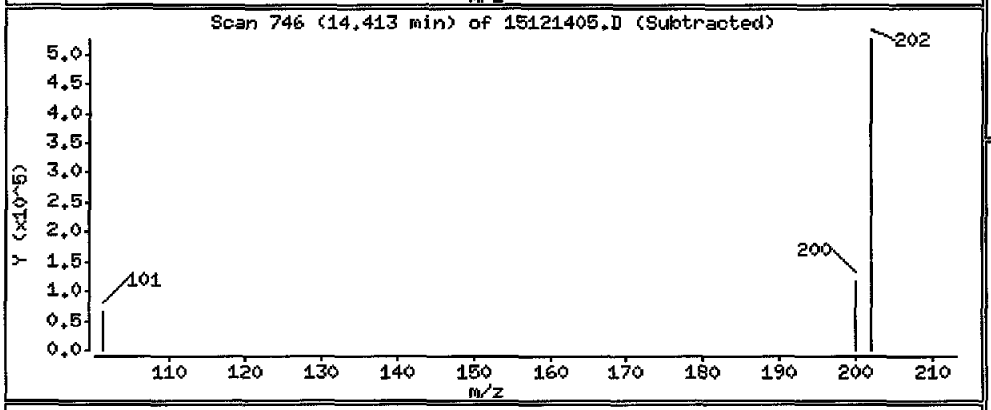
Sample Info: AQJ9K,10

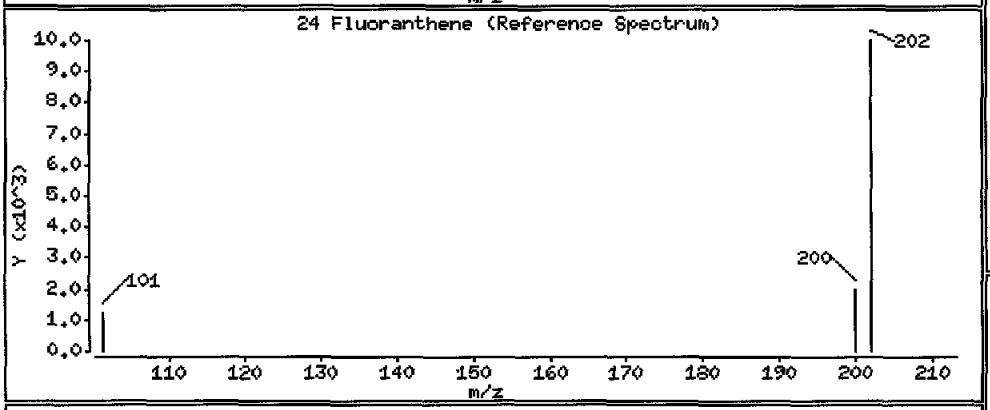
Volume Injected (uL): 2.0 Operator: VTS

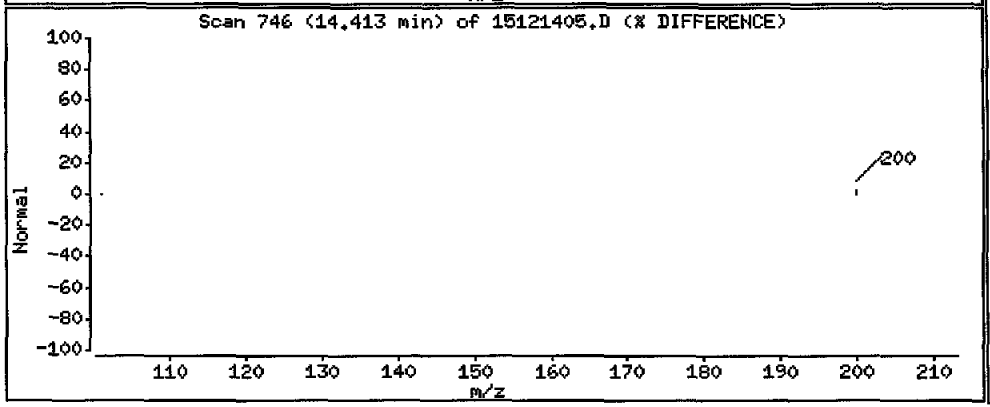
Column phase: Rxi-17Sil MS Column diameter: 0.25

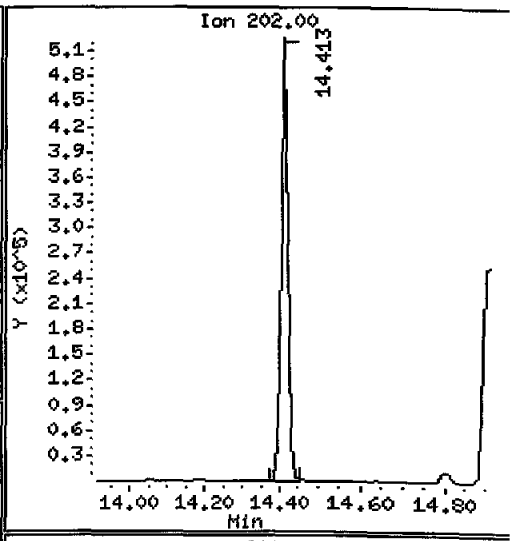
24 Fluoranthene Concentration: 353000 ug/kg

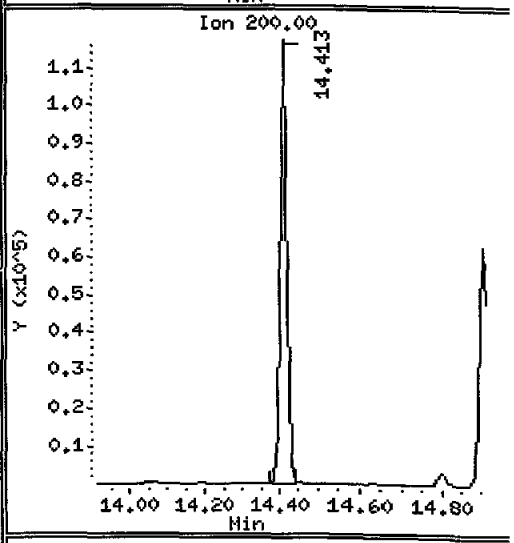


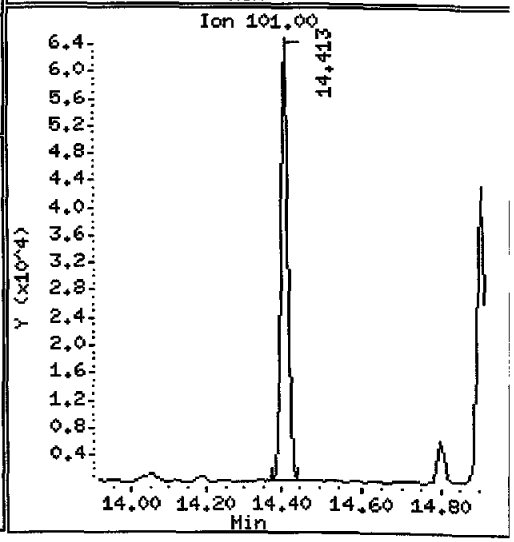












Data File: \\target\share\chem3\nt11.i\20151214.b\15121405.D

Date : 14-DEC-2015 11:12

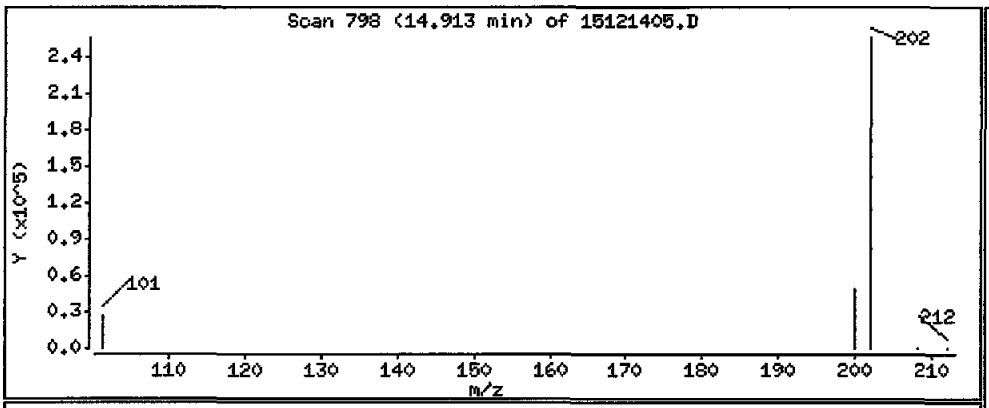
Client ID: PG-SMA2-3-PEMD-1511 Instrument: nt11.i

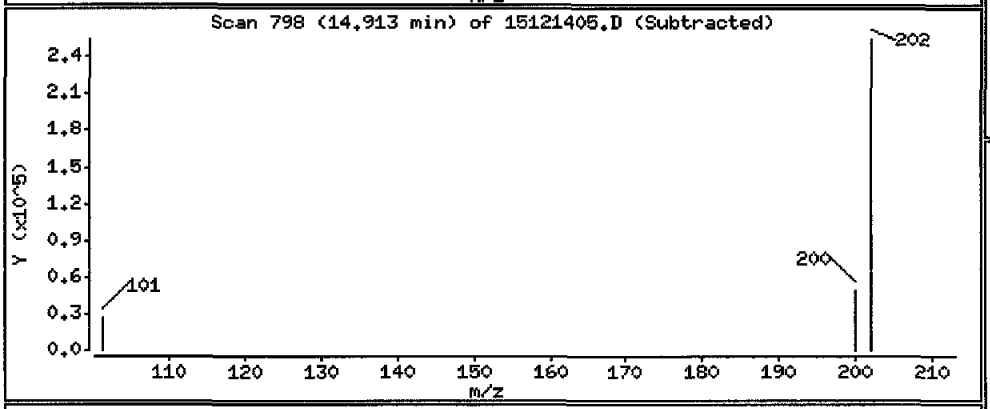
Sample Info: AQJ9K,10

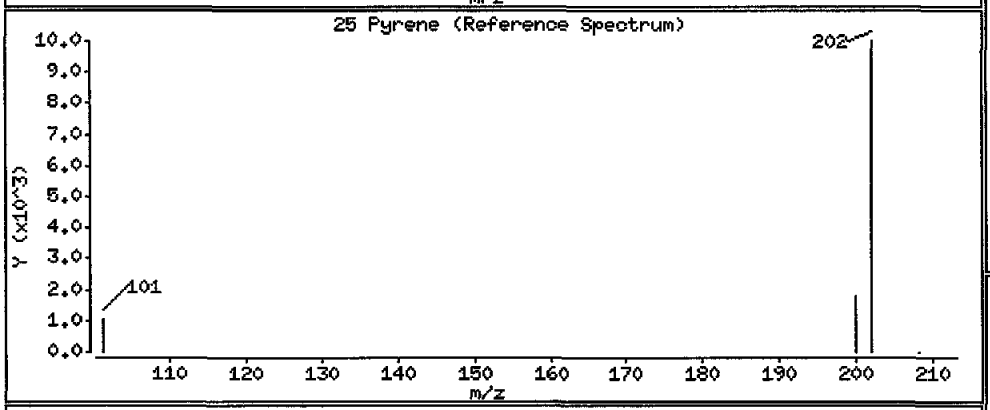
Volume Injected (uL): 2.0 Operator: VTS

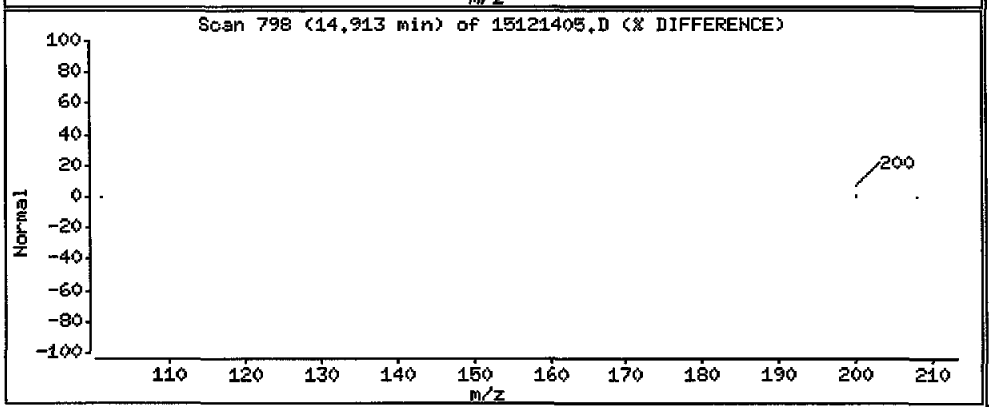
Column phase: Rxi-17Sil MS Column diameter: 0.25

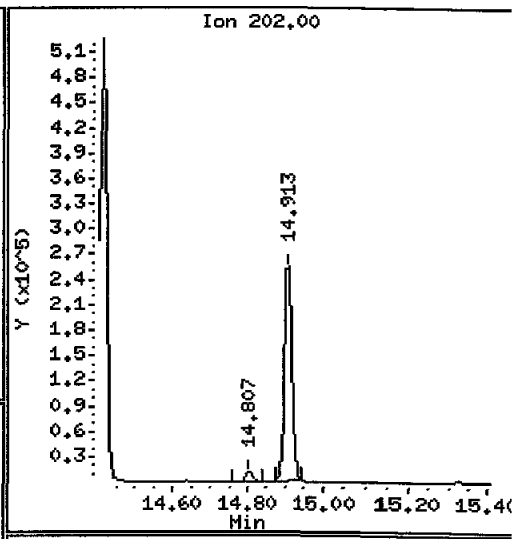
25 Pyrene Concentration: 198000 ug/kg

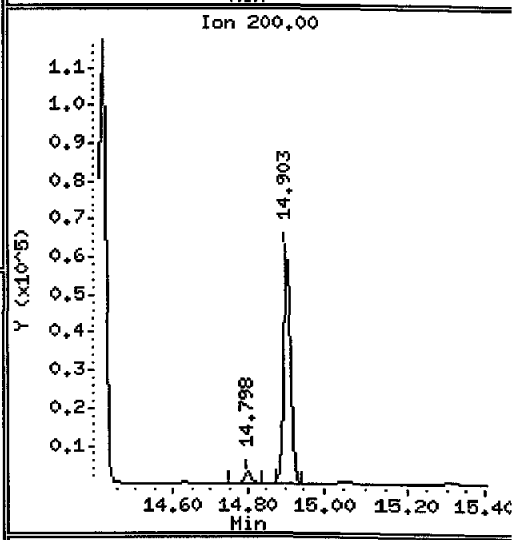


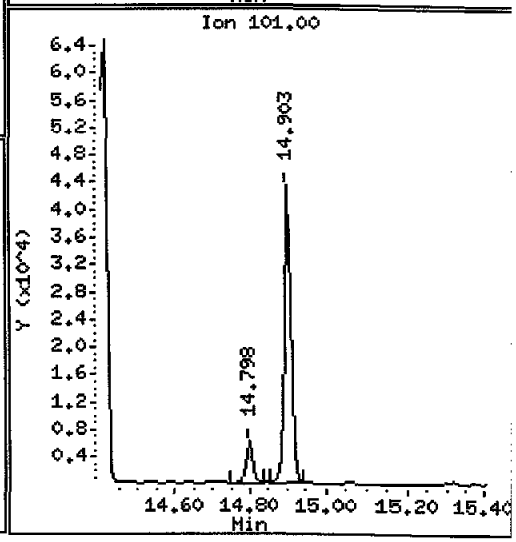












Data File: \\target\share\chem3\nt11.i\20151214.b\15121405.D

Date : 14-DEC-2015 11:12

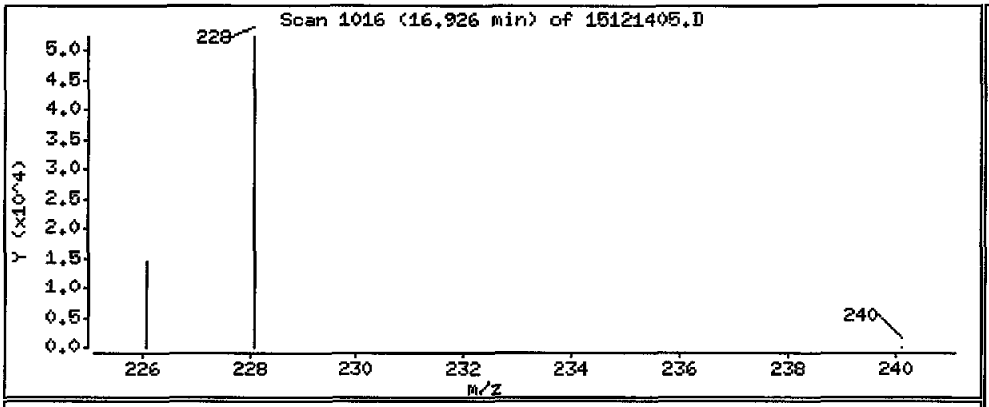
Client ID: PG-SMA2-3-PEMD-1511 Instrument: nt11.i

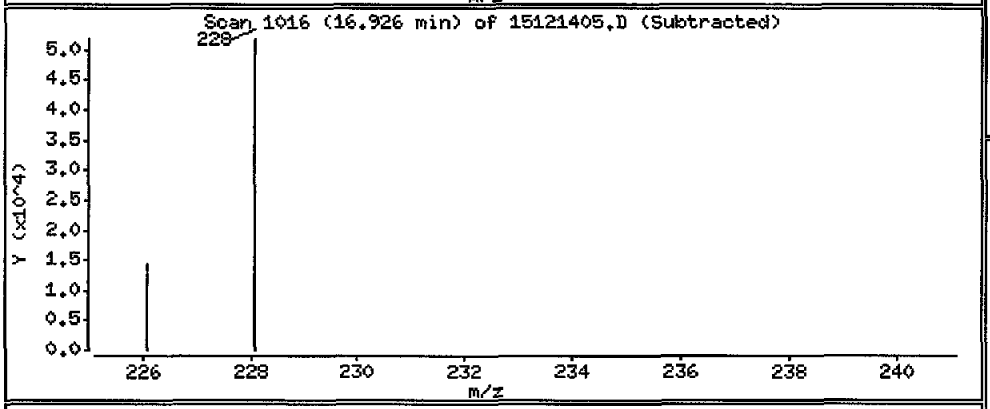
Sample Info: AQJ9K,10

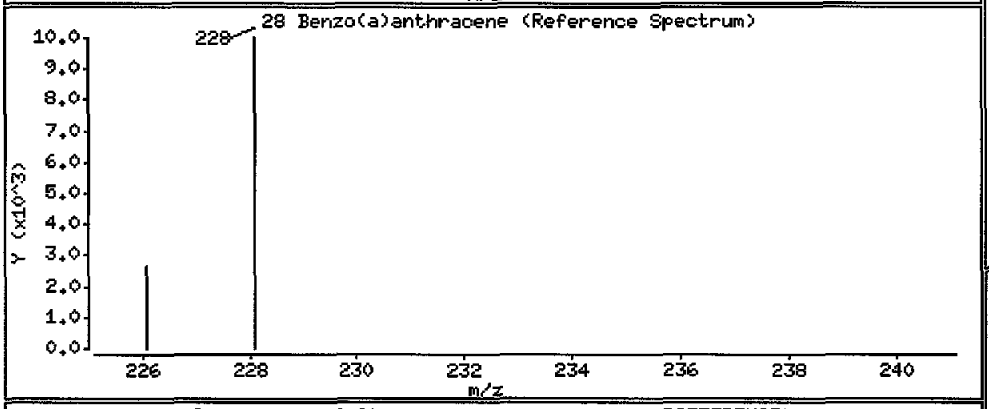
Volume Injected (uL): 2.0 Operator: VTS

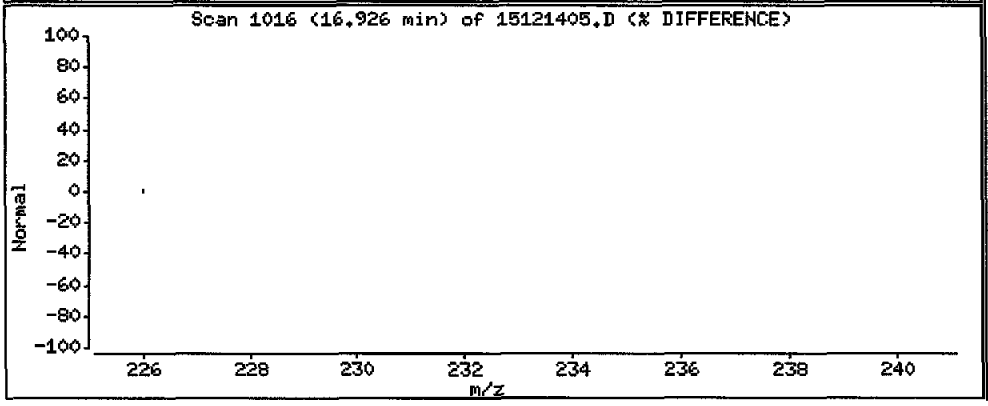
Column phase: Rxi-17Sil MS Column diameter: 0.25

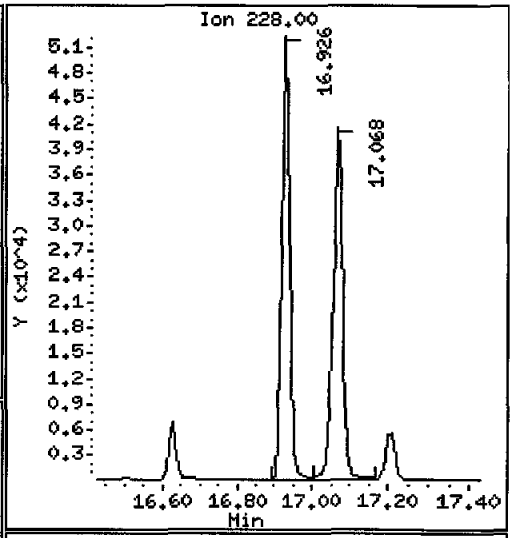
28 Benzo(a)anthracene Concentration: 45600 ug/kg

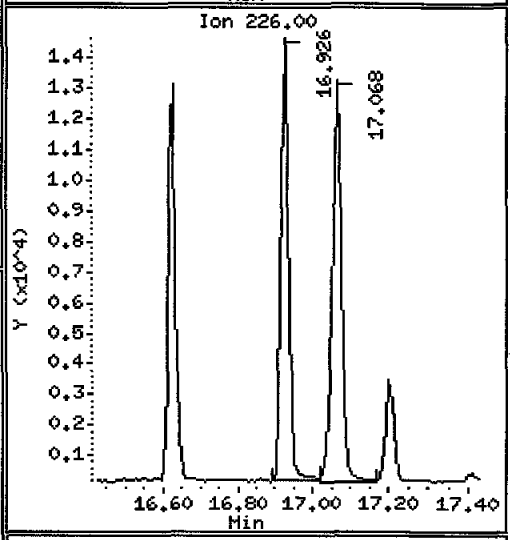


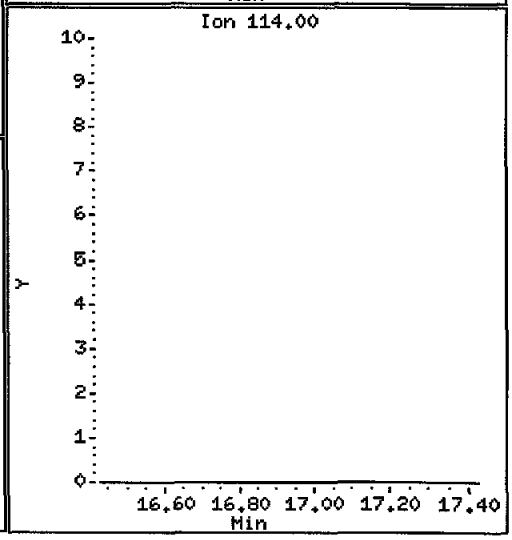












Data File: \\target\share\chem3\nt11.i\20151214.b\15121405.D

Date : 14-DEC-2015 11:12

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K,10

Volume Injected (uL): 2.0

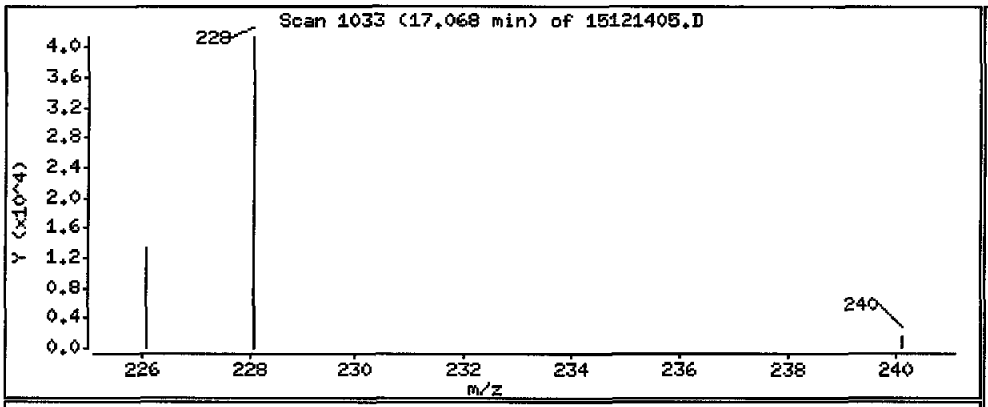
Operator: VTS

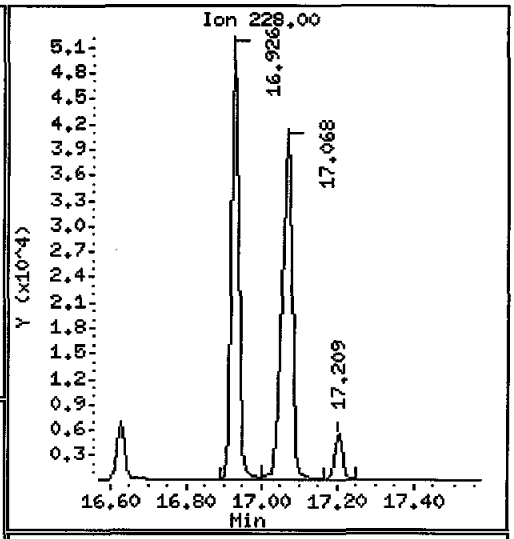
Column phase: Rxi-17Sil MS

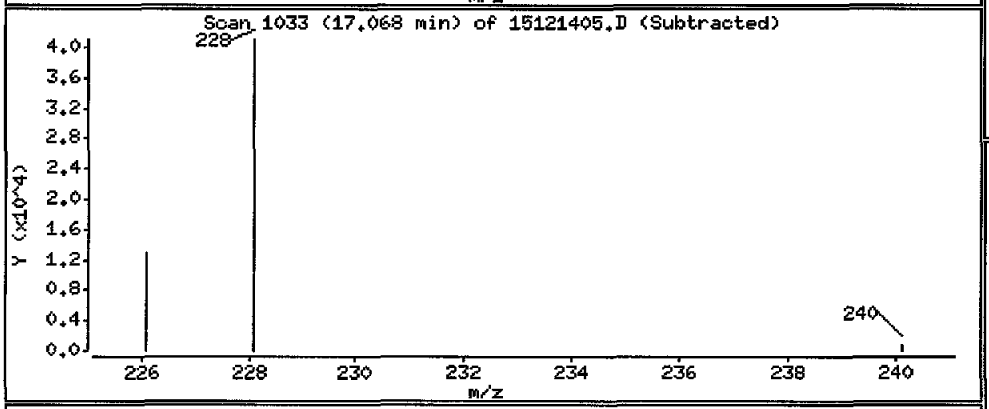
Column diameter: 0.25

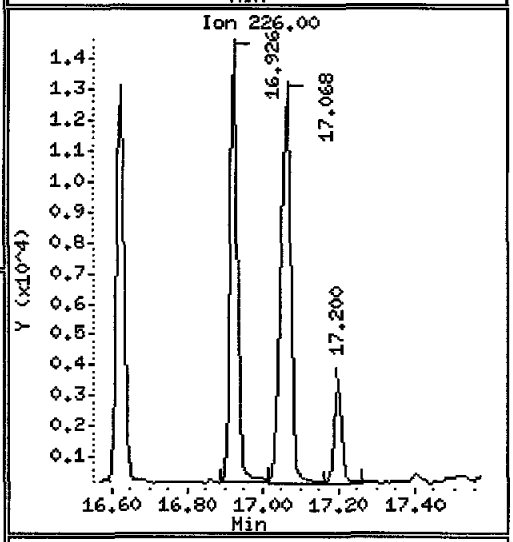
30 Chrysene

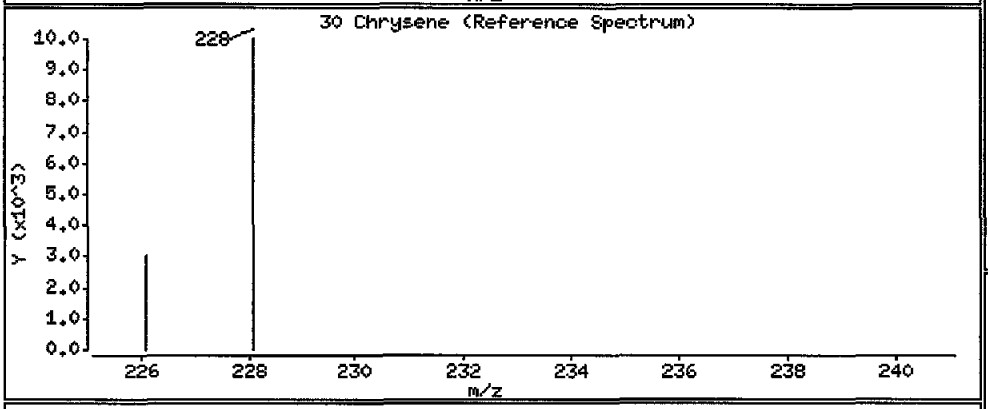
Concentration: 42800 ug/kg

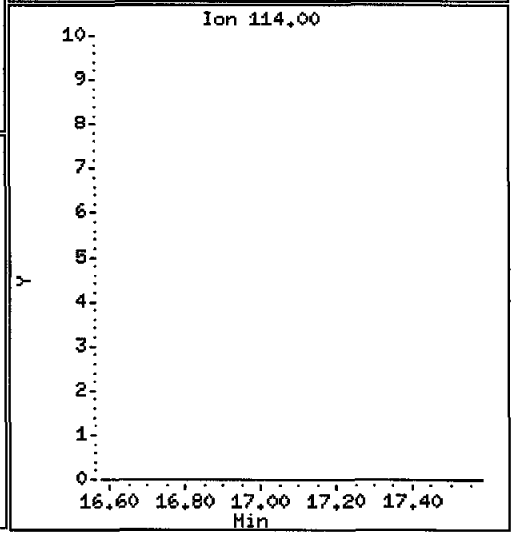


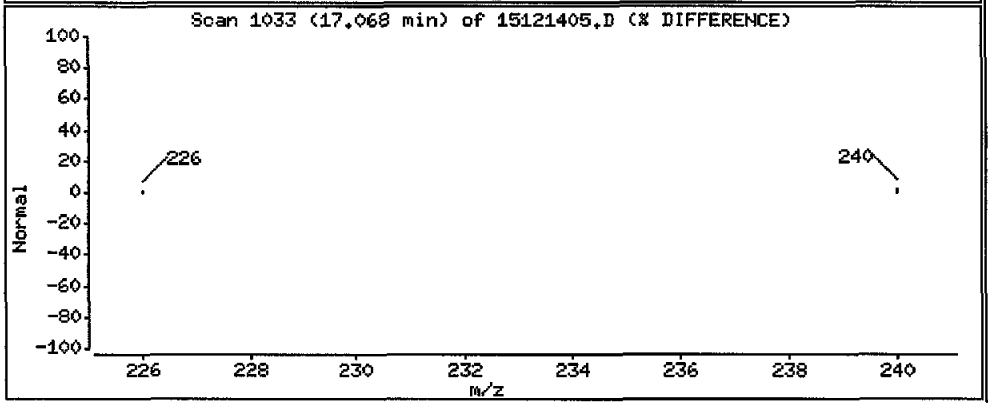












Data File: \\target\share\chem3\nt11.i\20151214.b\15121405.D

Date : 14-DEC-2015 11:12

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9K,10

Volume Injected (uL): 2.0

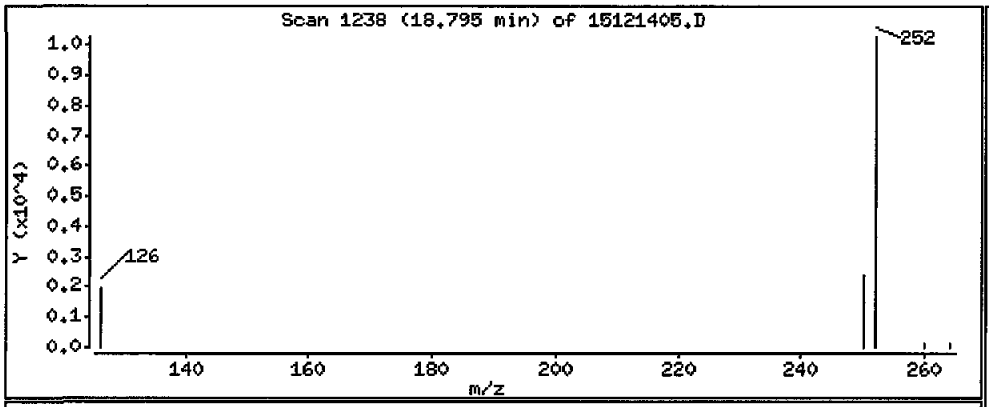
Operator: VTS

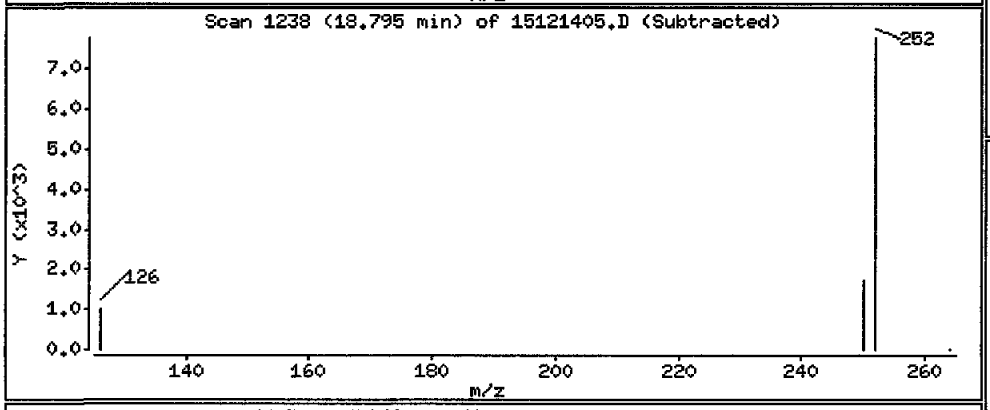
Column phase: Rxi-17Sil MS

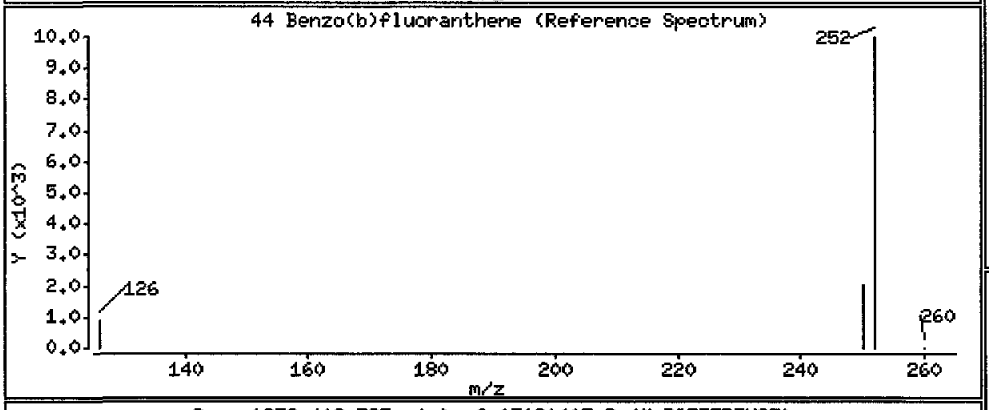
Column diameter: 0.25

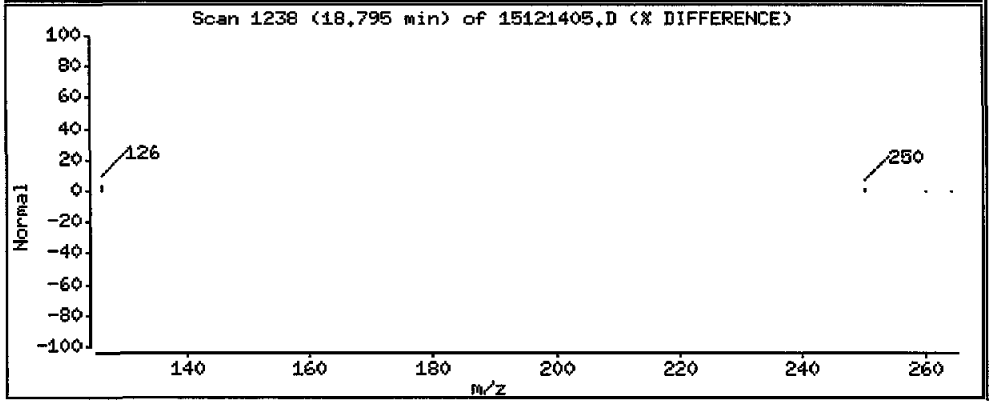
44 Benzo(b)fluoranthene

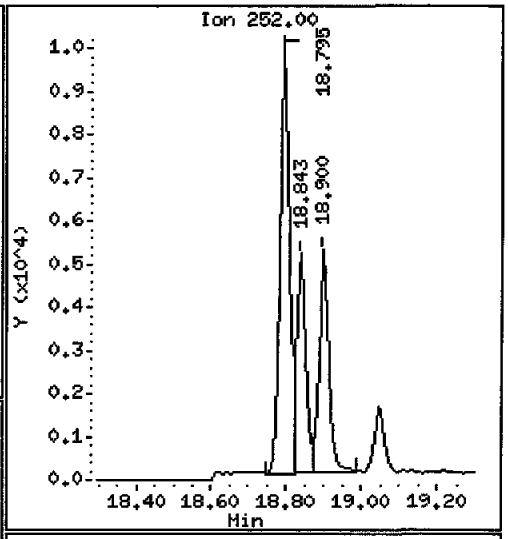
Concentration: 13200 ug/kg

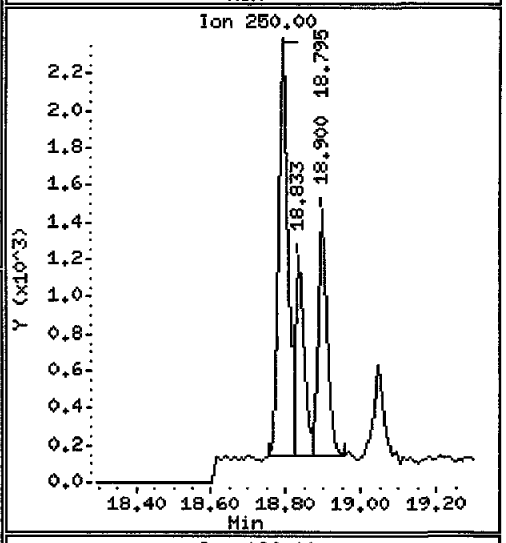


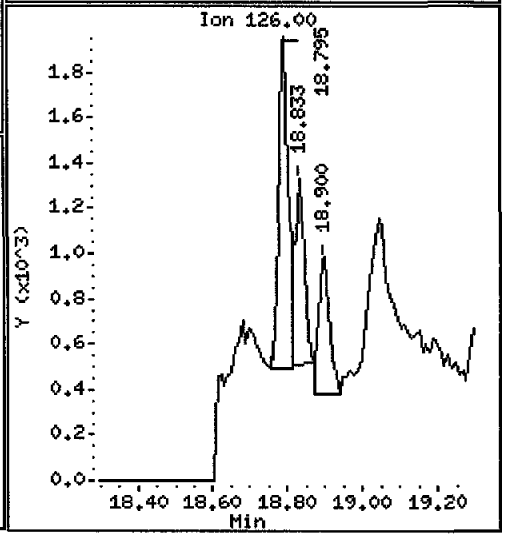












REVIEW SUMMARY FOR FILE - 15121405.D

Lab ID: AQJ9K
nt11.i, 20151214.b\lowsim.m, 14-DEC-2015 11:12

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151214.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151214.b\15121406.D
Lab Smp Id: AQJ9L Client Smp ID: PG-SMA2-3-PEMD-1511
Inj Date : 14-DEC-2015 11:42 MS Autotune Date: 23-APR-2014 12:5
Operator : VTS Inst ID: nt11.i
Smp Info : AQJ9L,10
Misc Info : 15-21399
Comment :
Method : \\target\share\chem3\nt11.i\20151214.b\lowsim.m
Meth Date : 15-Dec-2015 08:23 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 6
Dil Factor: 10.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	10.000	Dilution Factor
Vt	100.000	Volume of final extract (uL)
Ws	0.89000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

JW 12/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)
*	4 Naphthalene-d8	136	6.608	6.608	(1.000)	298203	200.000	
	5 Naphthalene	128	6.639	6.639	(1.005)	20393	11.8394	13300 B
$	6 2-Methylnaphthalene-d10	152	7.585	7.585	(1.148)	19054	17.2145	19300
	7 2-Methylnaphthalene	142	Compound Not Detected.					
	8 1-Methylnaphthalene	142	Compound Not Detected.					
	10 Acenaphthylene	152	Compound Not Detected.					
*	11 Acenaphthene-d10	164	9.601	9.611	(1.000)	216970	200.000	
	12 Acenaphthene	153	9.667	9.667	(1.007)	103329	88.9037	99900
	14 Dibenzofuran	168	9.877	9.877	(1.029)	67605	38.6121	43400
	15 Fluorene	166	10.497	10.497	(1.093)	109321	83.2537	93500
*	18 Phenanthrene-d10	188	12.280	12.280	(1.000)	347616	200.000	
	19 Phenanthrene	178	12.324	12.324	(1.004)	679383	324.392	364000
	20 Anthracene	178	12.379	12.379	(1.008)	107316	57.2462	64300
$	23 Fluoranthene-d10	212	14.375	14.384	(1.171)	49825	26.0635	29300
	24 Fluoranthene	202	14.413	14.413	(1.174)	621293	295.477	332000
	25 Pyrene	202	14.903	14.912	(0.876)	362915	174.475	196000
	28 Benzo(a)anthracene	228	16.926	16.926	(0.995)	36723	20.9705	23600
*	29 Chrysene-d12	240	17.018	17.026	(1.000)	262654	200.000	
	30 Chrysene	228	17.067	17.075	(1.003)	37953	19.7469	22200
	44 Benzo(b)fluoranthene	252	Compound Not Detected.					
	45 Benzo(k)fluoranthene	252	Compound Not Detected.					

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)	
	46 Benzo(j)fluoranthene	252	Compound Not Detected.						
	34 Benzo(a)pyrene	252	Compound Not Detected.						
*	35 Perylene-d12	264	19.851	19.851	(1.000)	233657	200.000		
$	36 Dibenzo(a,h)anthracene-d14	292	22.219	22.219	(1.119)	15918	16.8788	19000	Q
	37 Indeno(1,2,3-cd)pyrene	276	Compound Not Detected.						
	38 Dibenzo(a,h)anthracene	278	Compound Not Detected.						
	39 Benzo(g,h,i)perylene	276	Compound Not Detected.						
	47 Perylene	252	Compound Not Detected.						
	48 Benzo(e)pyrene	252	Compound Not Detected.						

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15121406.D
Lab Smp Id: AQJ9L
Analysis Type: SV
Quant Type: ISTD
Operator: VTS
Method File: \\target\share\chem3\nt11.i\20151214.b\lowsim.m
Misc Info: 15-21399

Calibration Date: 14-DEC-2015
Calibration Time: 09:09
Client Smp ID: PG-SMA2-3-PEMD
Level: LOW
Sample Type: Tissue

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	298203	-9.06
11 Acenaphthene-d10	239179	119590	478358	216970	-9.29
18 Phenanthrene-d10	372253	186127	744506	347616	-6.62
29 Chrysene-d12	294711	147356	589422	262654	-10.88
35 Perylene-d12	260595	130298	521190	233657	-10.34

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.61	6.11	7.11	6.61	0.00
11 Acenaphthene-d10	9.61	9.11	10.11	9.60	-0.11
18 Phenanthrene-d10	12.28	11.78	12.78	12.28	0.00
29 Chrysene-d12	17.03	16.53	17.53	17.02	-0.05
35 Perylene-d12	19.85	19.35	20.35	19.85	0.00

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.

ARI Labs, Inc.

RECOVERY REPORT

Client Name: Anchor QEA, LLC
Sample Matrix: SOLID
Lab Smp Id: AQJ9L
Level: LOW
Data Type: MS DATA
SpikeList File: waterlcs.spk
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151214.b\lowsim.m
Misc Info: 15-21399

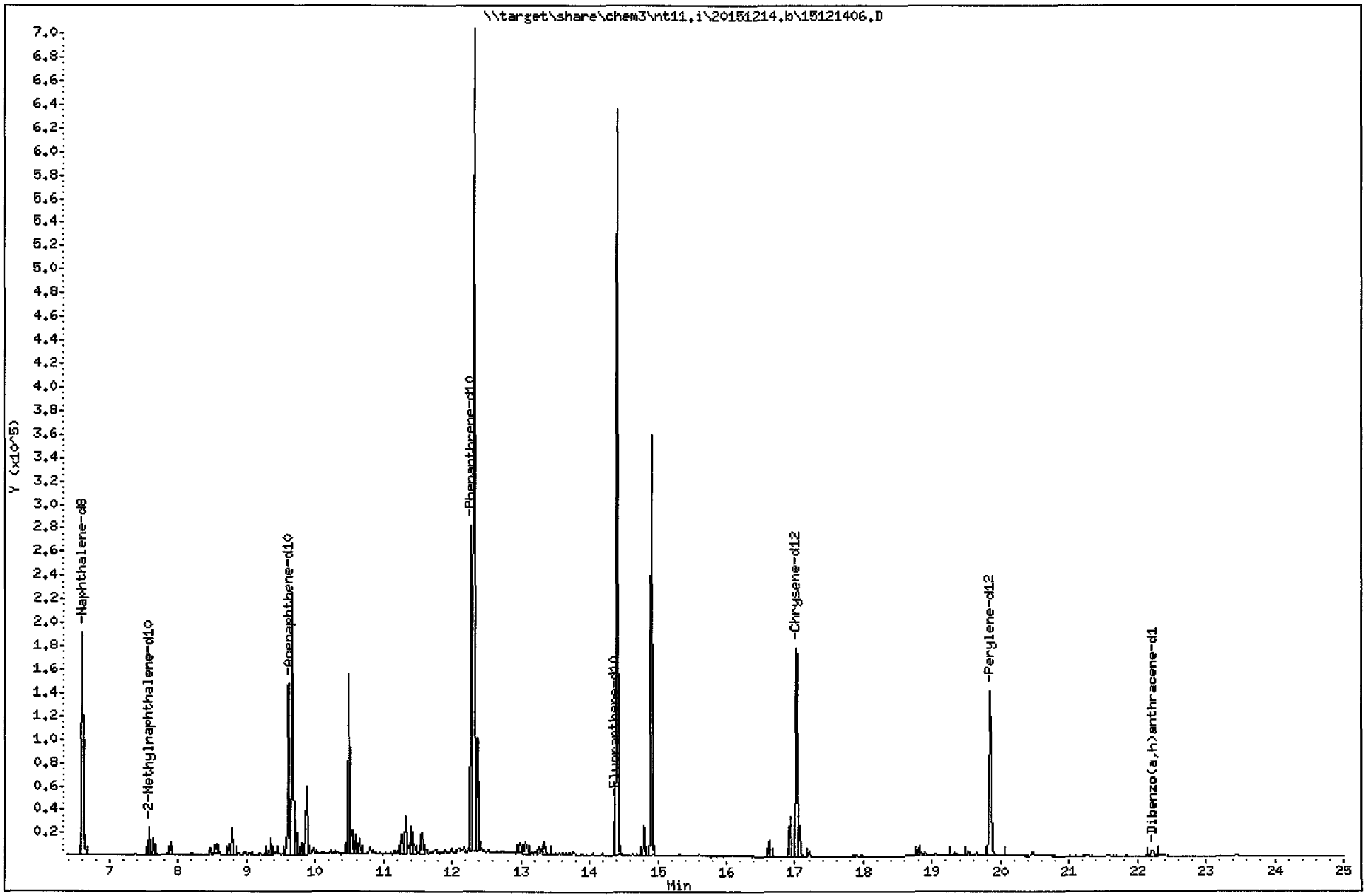
Client SDG: AQJ9
Fraction: SV
Client Smp ID: PG-SMA2-3-PEMD-1511
Operator: VTS
SampleType: SAMPLE
Quant Type: ISTD

SURROGATE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
$ 6 2-Methylnaphthalen	33700	19300	57.38	30-160
$ 23 Fluoranthene-d10	33700	29300	86.88	30-160
$ 36 Dibenzo(a,h)anthra	33700	19000	56.26	30-160

Data File: \\target\share\chem3\nt11.i\20151214.b\15121406.D
Date : 14-DEC-2015 11:42
Client ID: PG-SMA2-3-PEMD-1511
Sample Info: AQJ9L,10
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: VTS
Column diameter: 0.25

AQJ9:00179



Data File: \\target\share\chem3\nt11.i\20151214.b\15121406.D

Date : 14-DEC-2015 11:42

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9L,10

Volume Injected (uL): 2.0

Operator: VTS

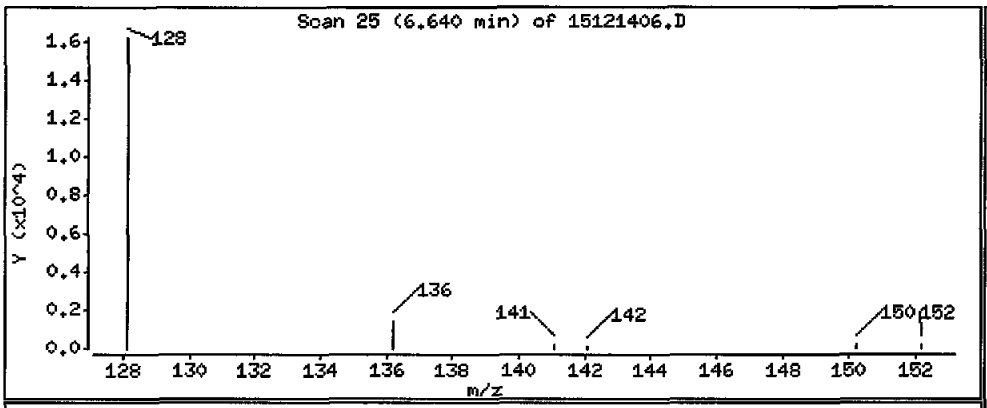
Column phase: Rxi-17Sil MS

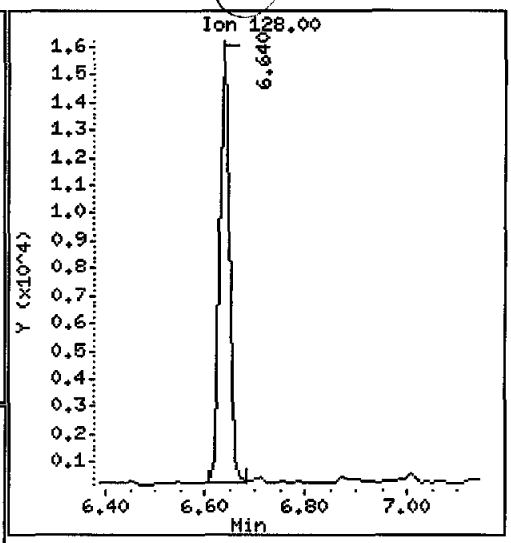
Column diameter: 0.25

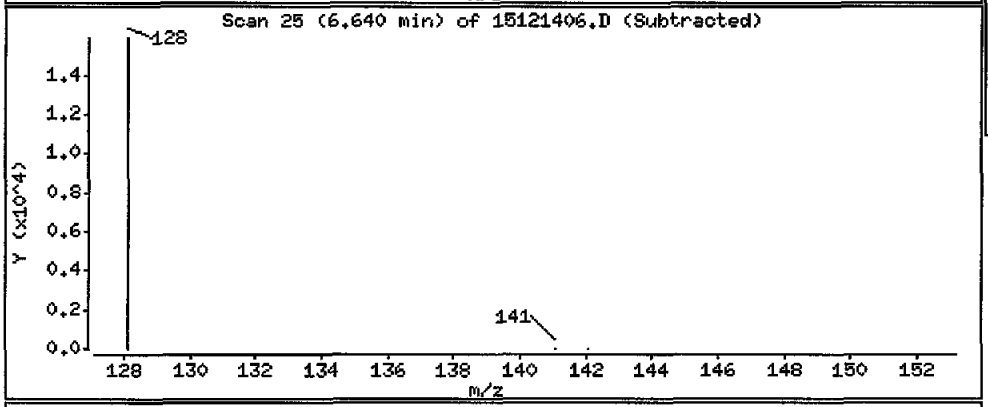
5 Naphthalene

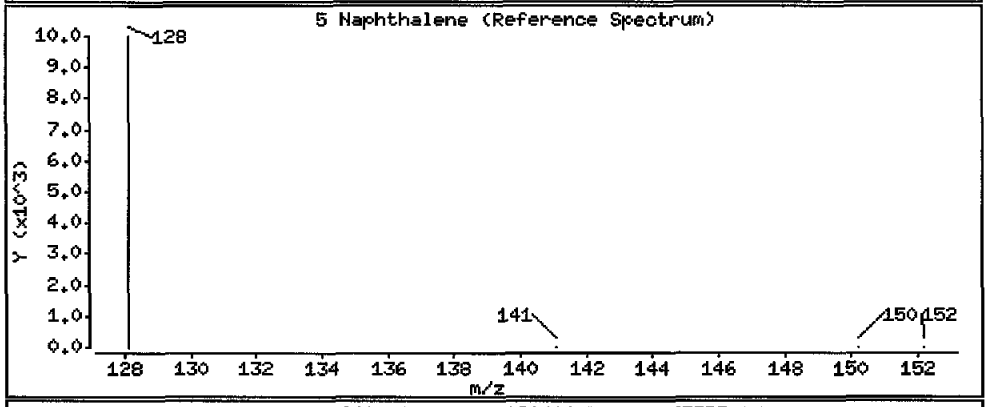
Concentration: 13300 ug/kg

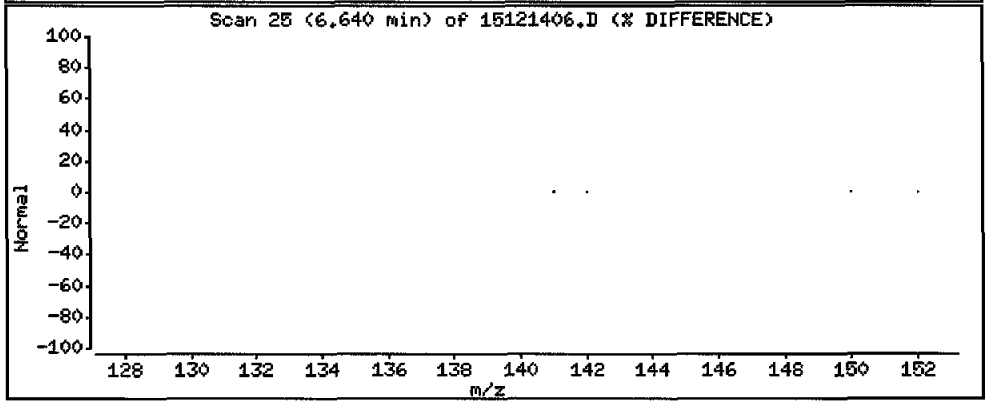
B











Data File: \\target\share\chem3\nt11.i\20151214.b\15121406.D

Date : 14-DEC-2015 11:42

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9L,10

Volume Injected (uL): 2.0

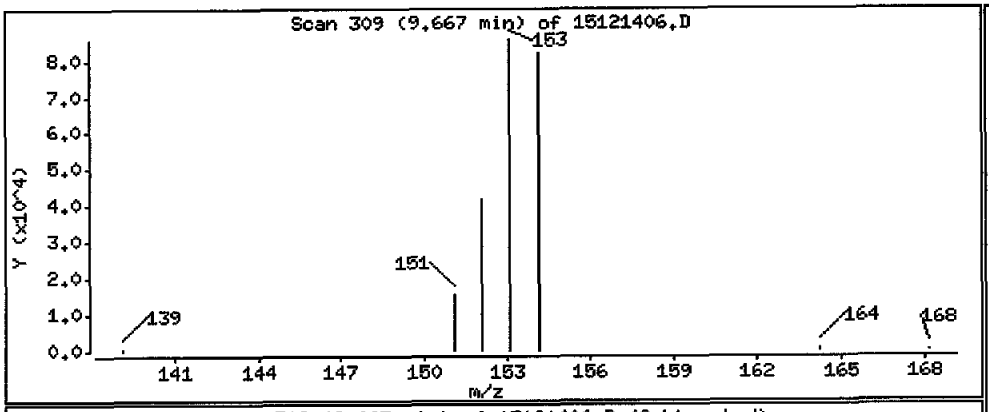
Operator: VTS

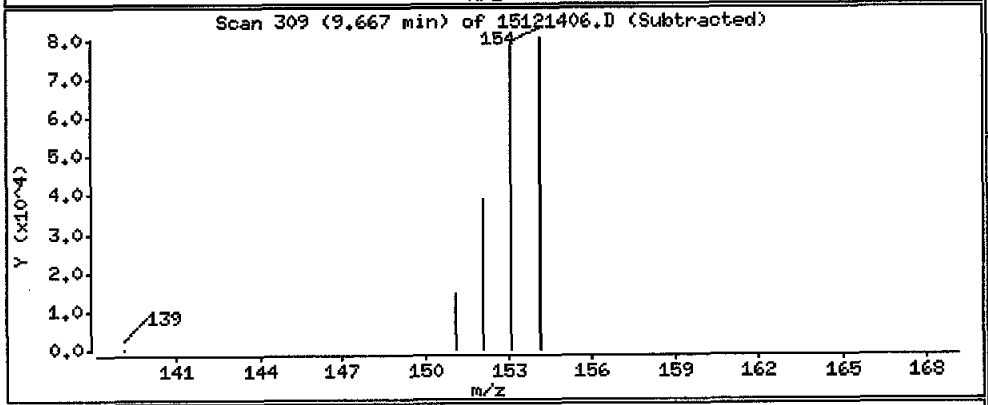
Column phase: Rxi-17Sil MS

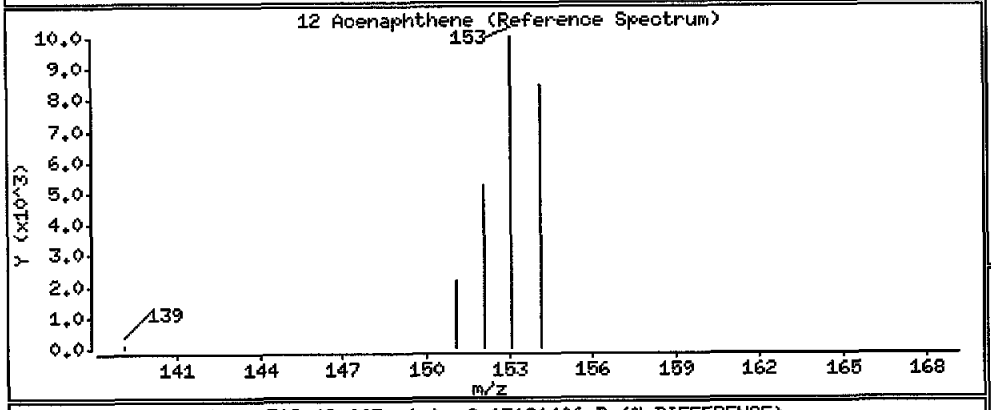
Column diameter: 0.25

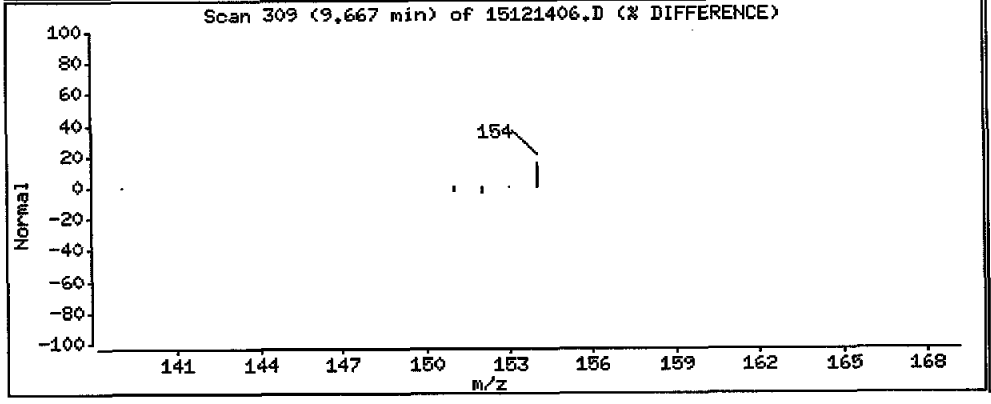
12 Acenaphthene

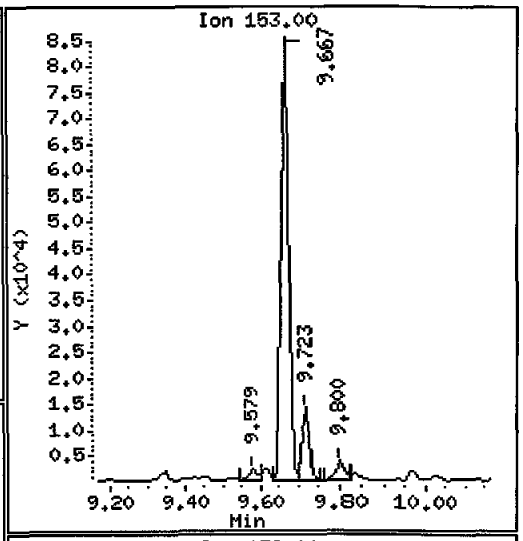
Concentration: 99900 ug/kg

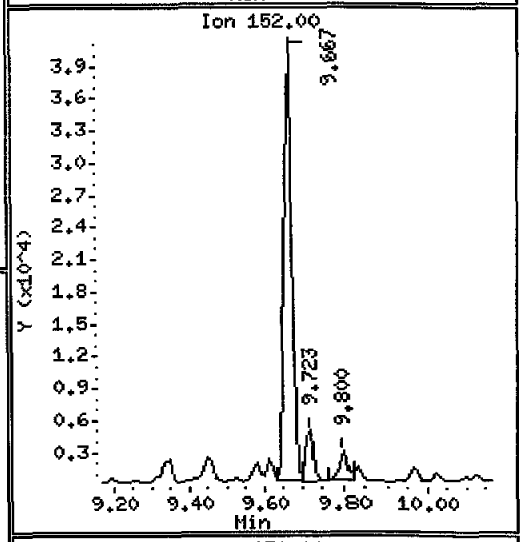


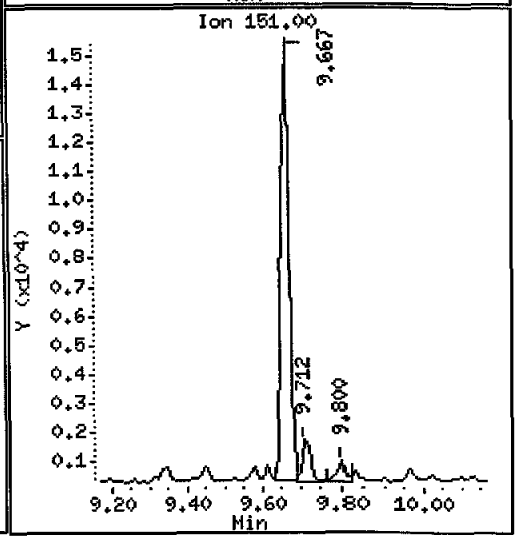












Data File: \\target\share\chem3\nt11.i\20151214.b\15121406.D

Date : 14-DEC-2015 11:42

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9L,10

Volume Injected (uL): 2.0

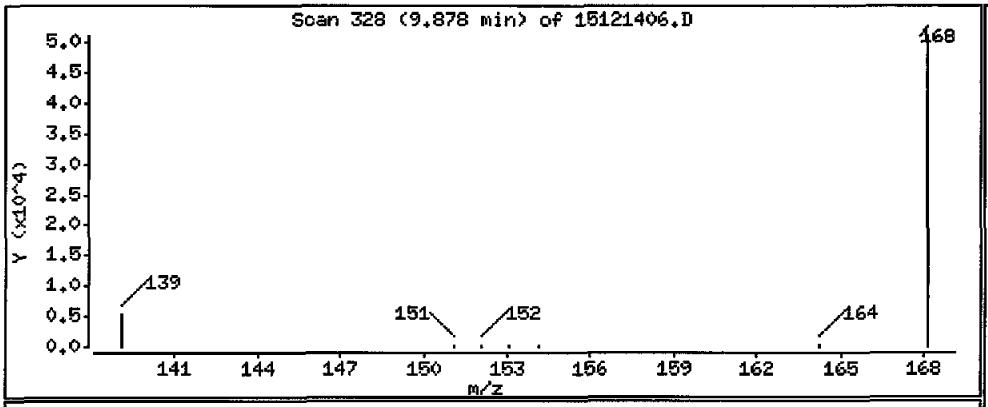
Operator: VTS

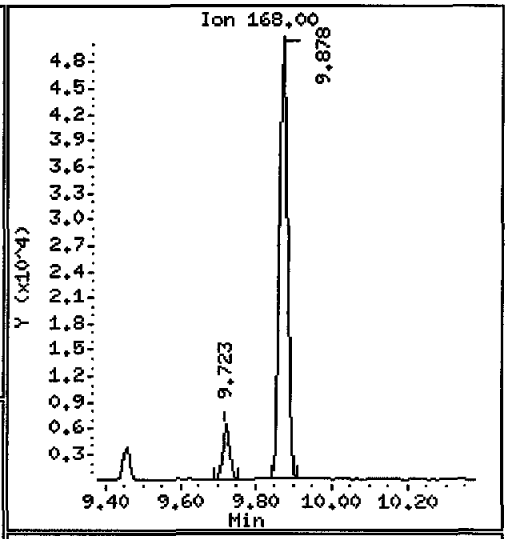
Column phase: Rxi-17Sil MS

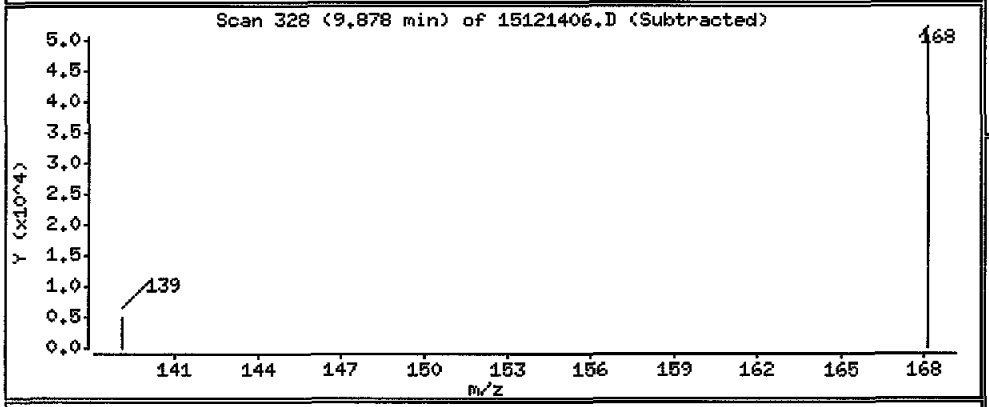
Column diameter: 0.25

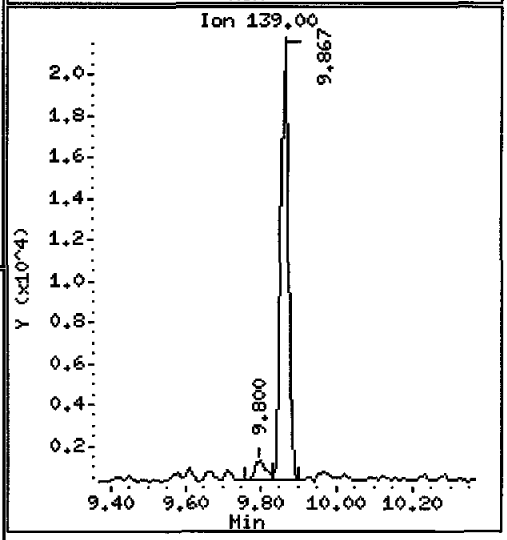
14 Dibenzofuran

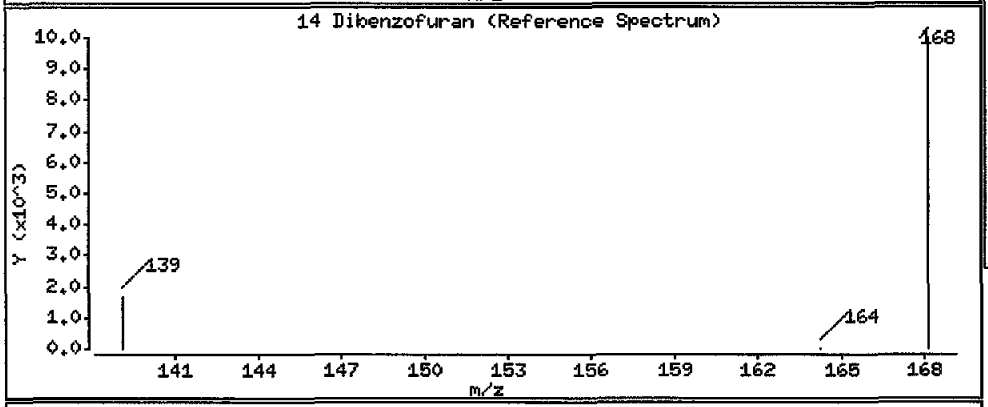
Concentration: 43400 ug/kg

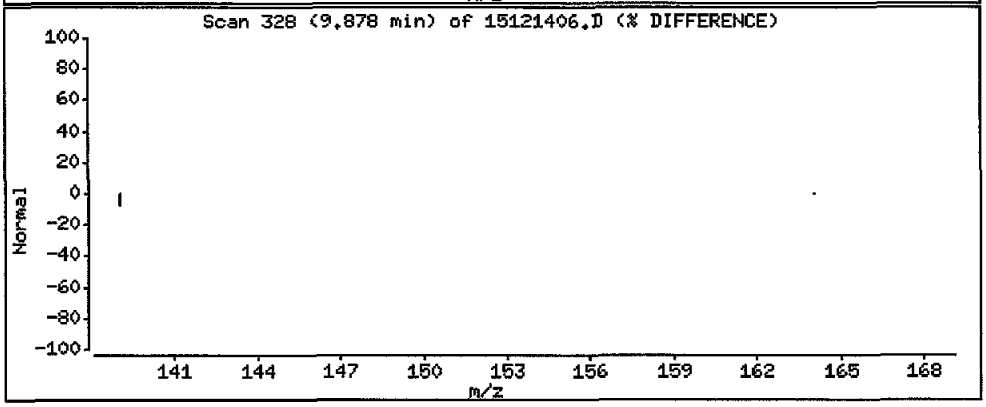












Data File: \\target\share\chem3\nt11.i\20151214.b\15121406.D

Date : 14-DEC-2015 11:42

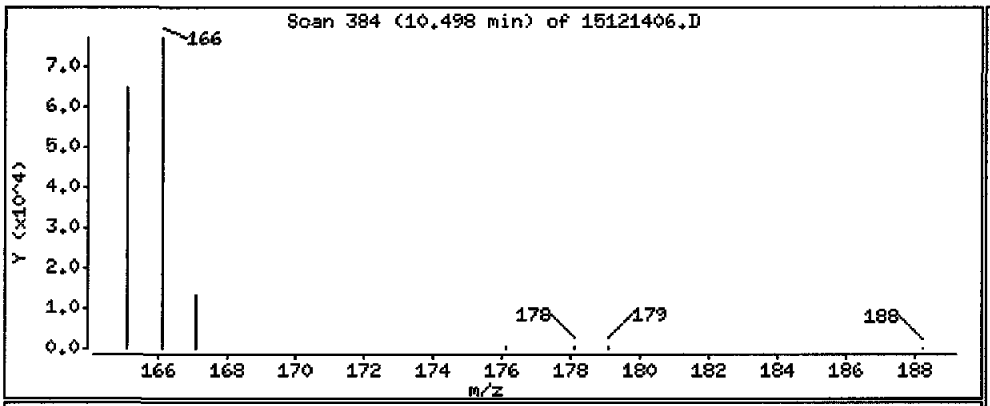
Client ID: PG-SMA2-3-PEMD-1511 Instrument: nt11.i

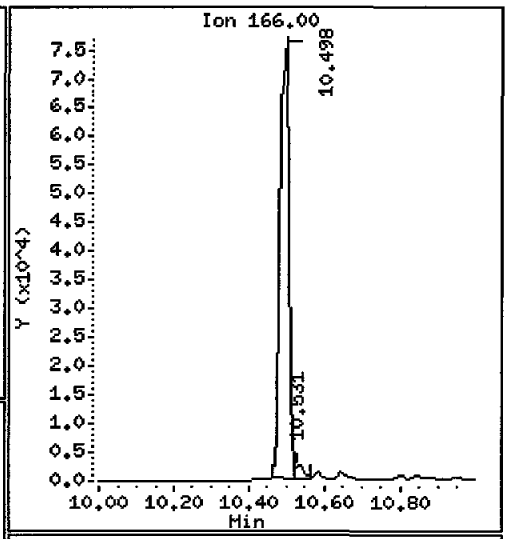
Sample Info: AQJ9L,10

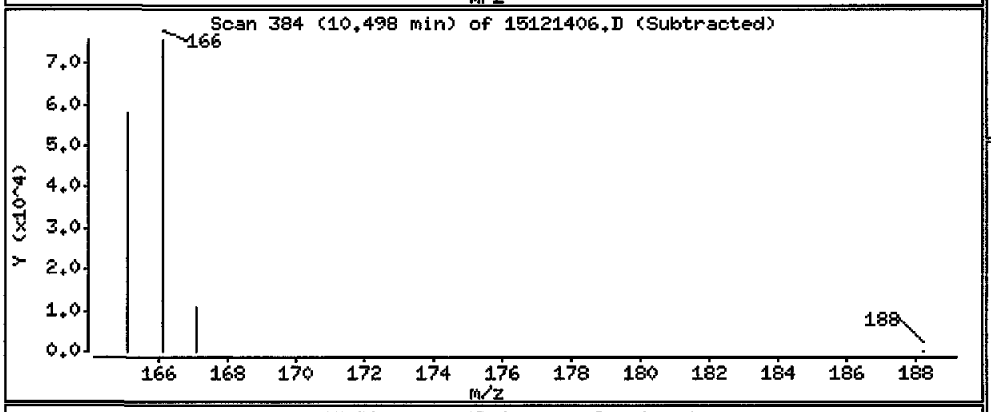
Volume Injected (uL): 2.0 Operator: VTS

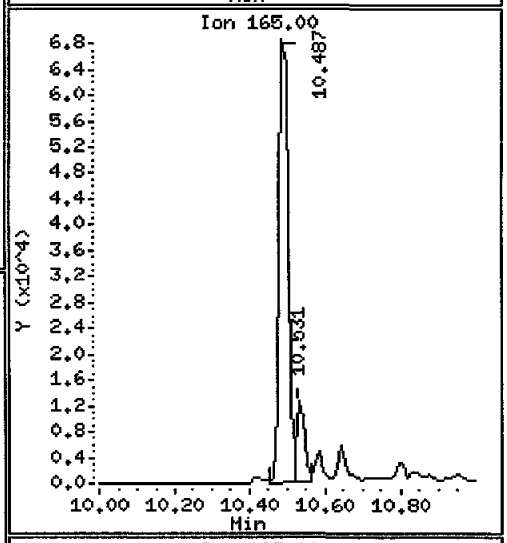
Column phase: Rxi-17Sil MS Column diameter: 0.25

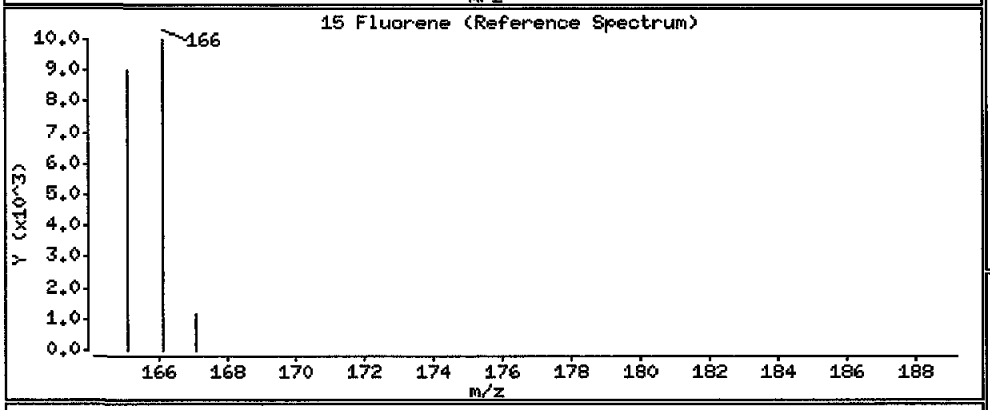
15 Fluorene Concentration: 93500 ug/kg

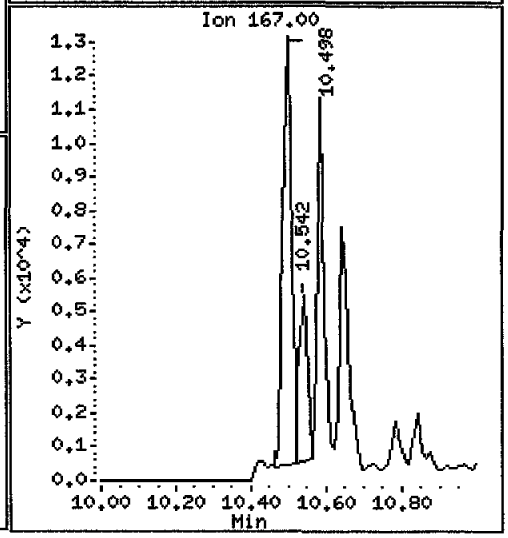


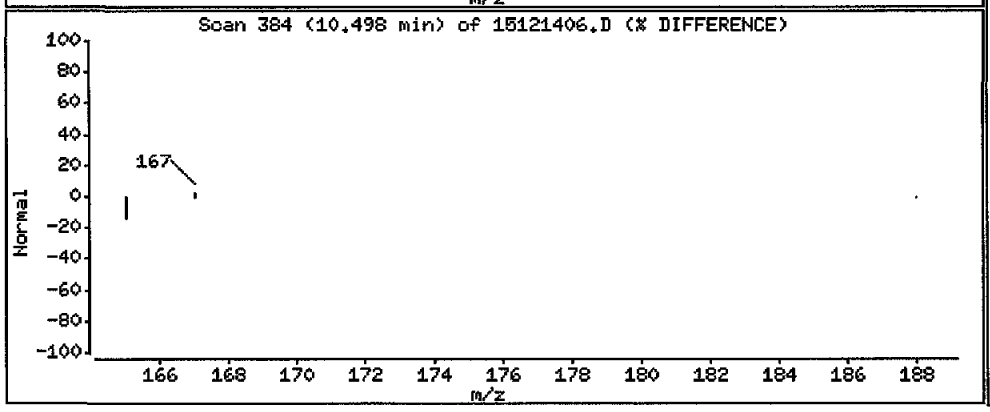












Data File: \\target\share\chem3\nt11.i\20151214.b\15121406.D

Date : 14-DEC-2015 11:42

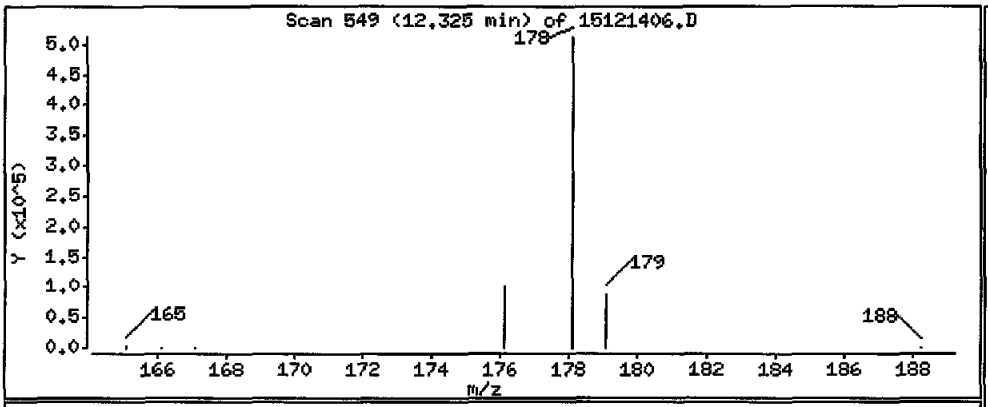
Client ID: PG-SMA2-3-PEMD-1511 Instrument: nt11.i

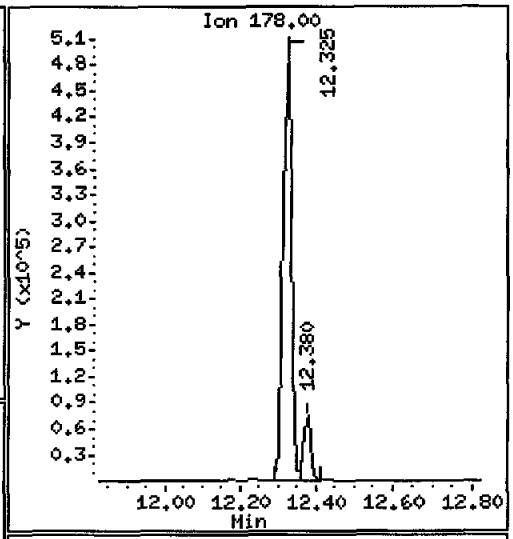
Sample Info: AQJ9L,10

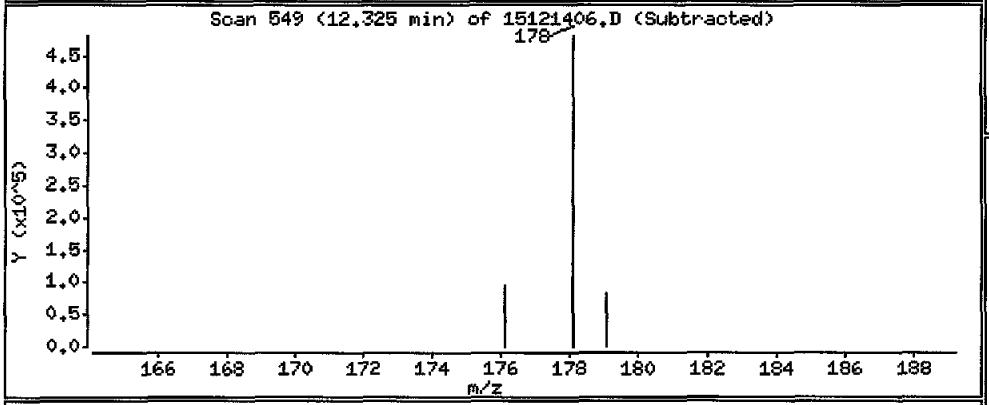
Volume Injected (uL): 2.0 Operator: VTS

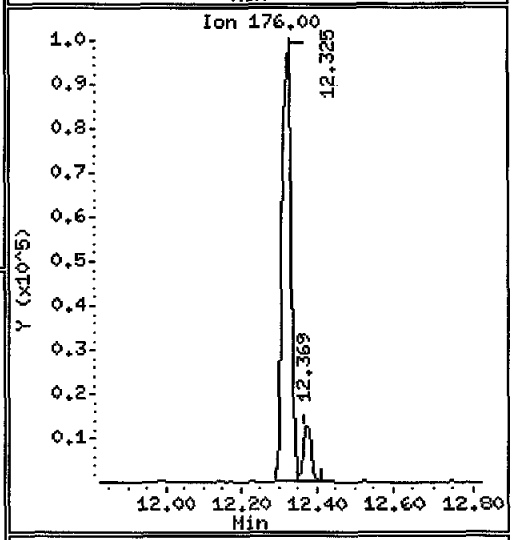
Column phase: Rxi-17Sil MS Column diameter: 0.25

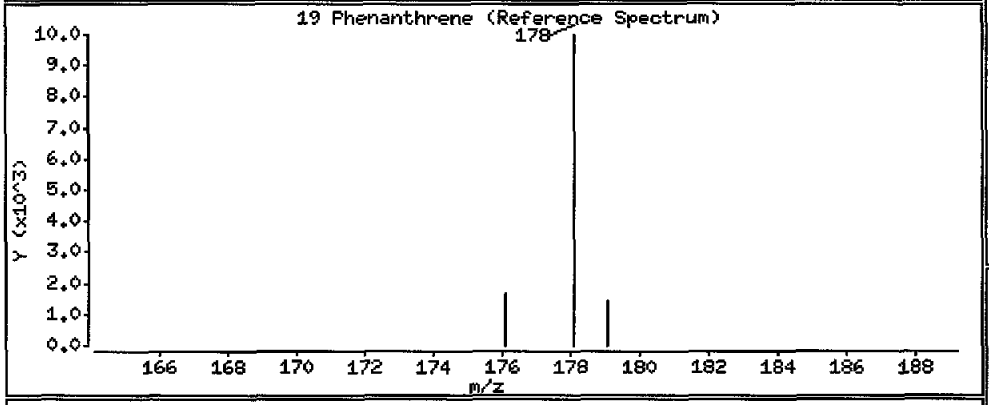
19 Phenanthrene Concentration: 364000 ug/kg

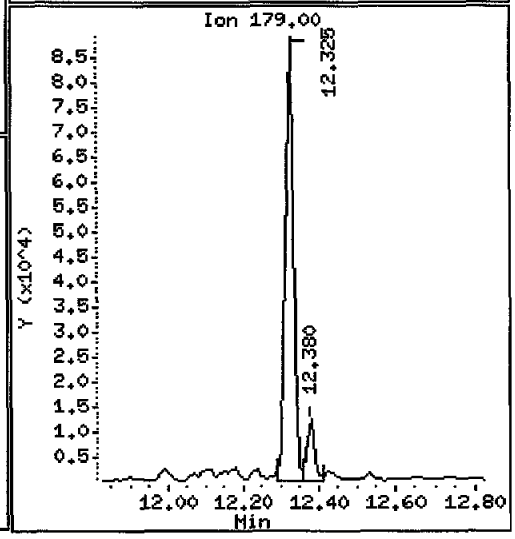


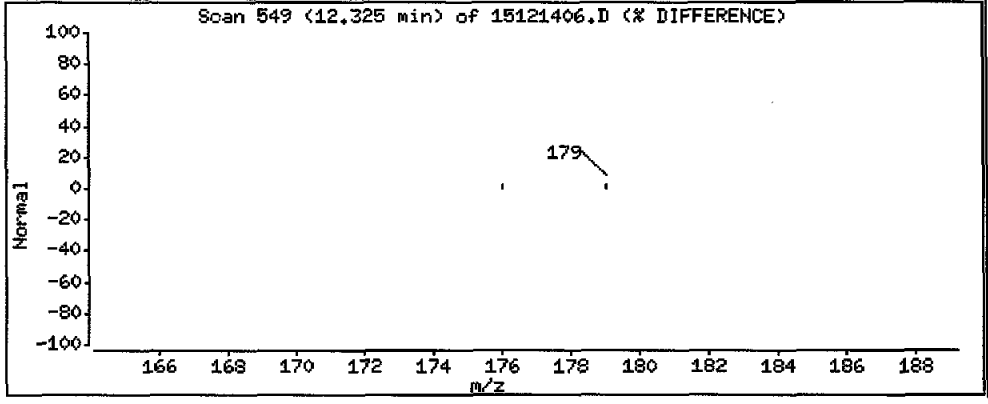












Data File: \\target\share\chem3\nt11.i\20151214.b\15121406.D

Date : 14-DEC-2015 11:42

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9L,10

Volume Injected (uL): 2.0

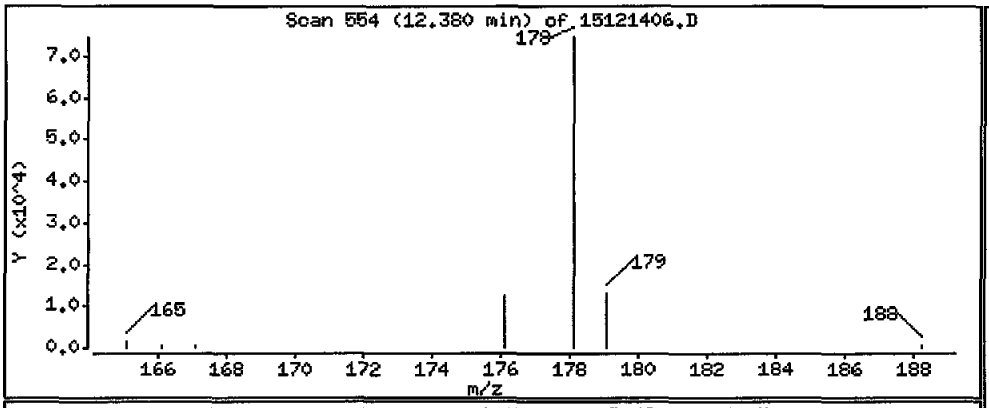
Operator: VTS

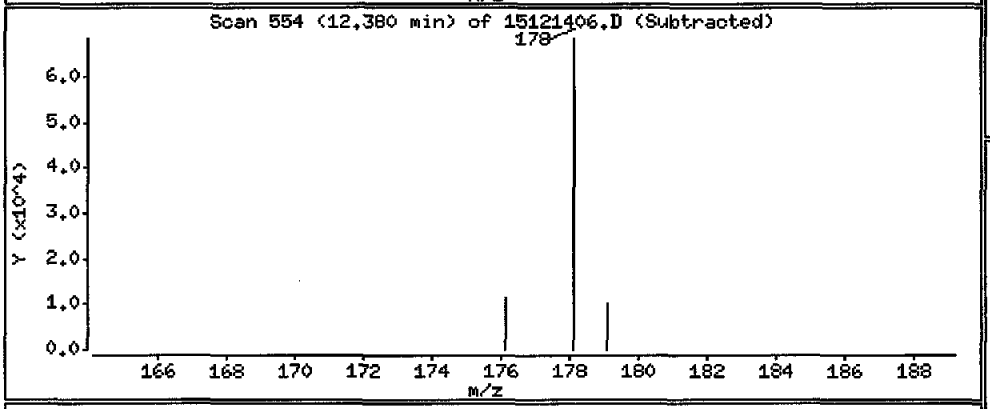
Column phase: Rxi-17Sil MS

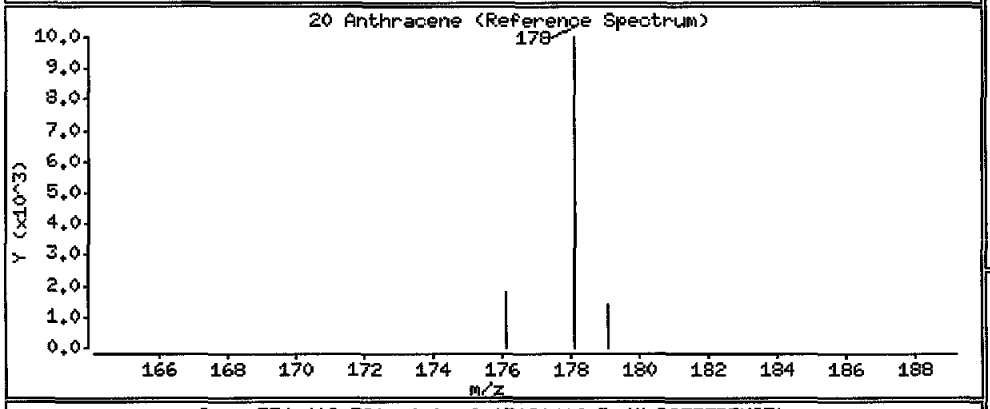
Column diameter: 0.25

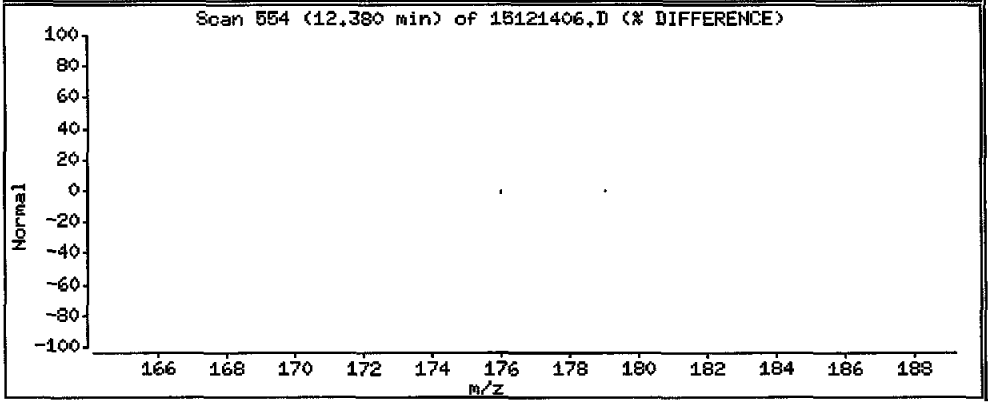
20 Anthracene

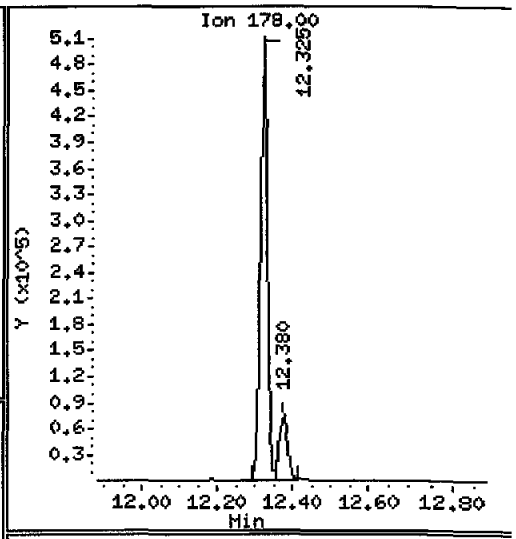
Concentration: 64300 ug/kg

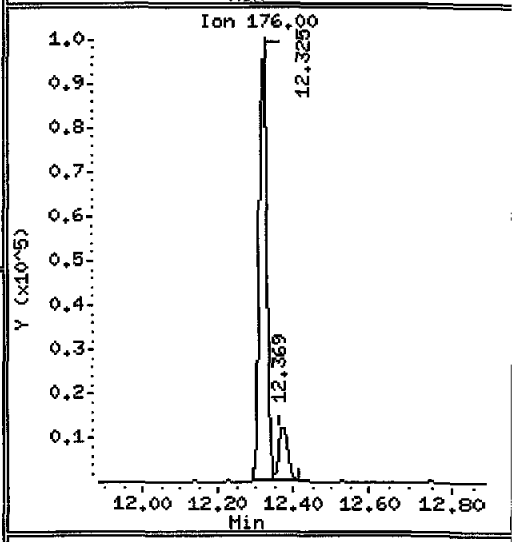


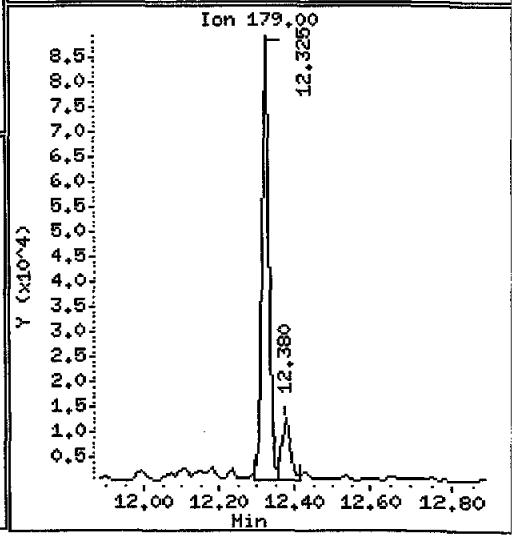












Data File: \\target\share\chem3\nt11.i\20151214.b\15121406.D

Date : 14-DEC-2015 11:42

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9L,10

Volume Injected (uL): 2.0

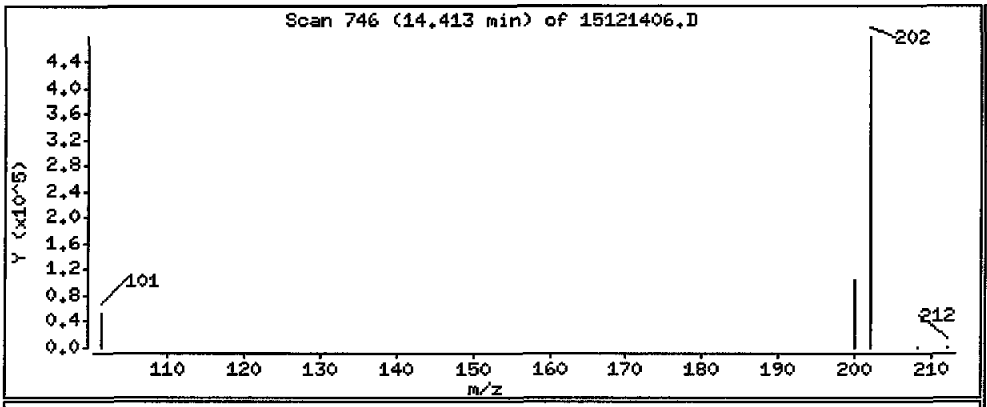
Operator: VTS

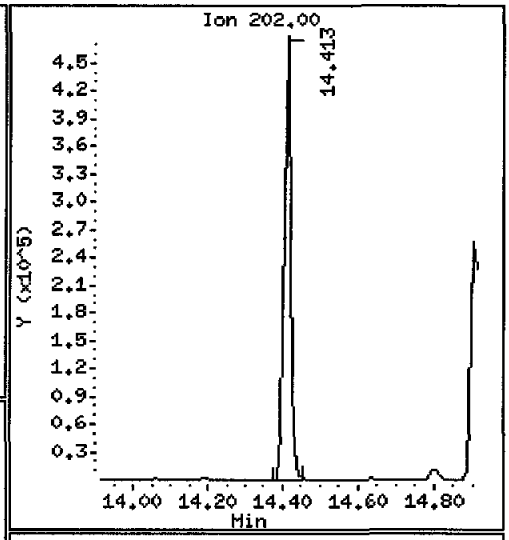
Column phase: Rxi-17Sil MS

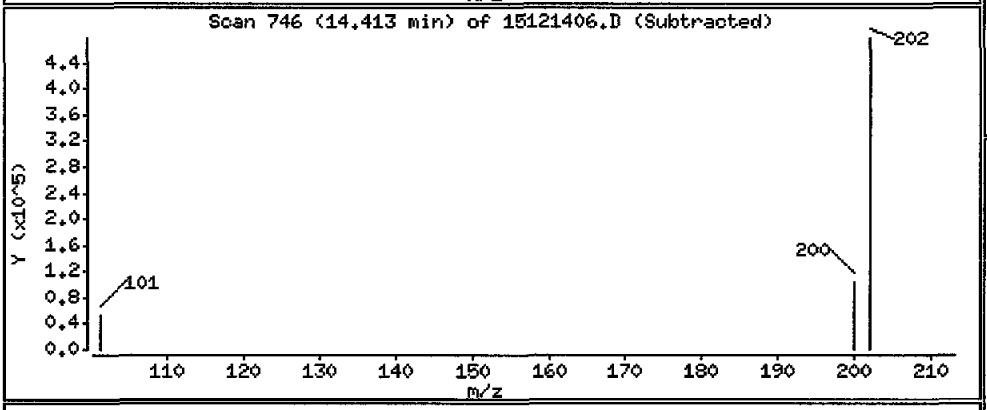
Column diameter: 0.25

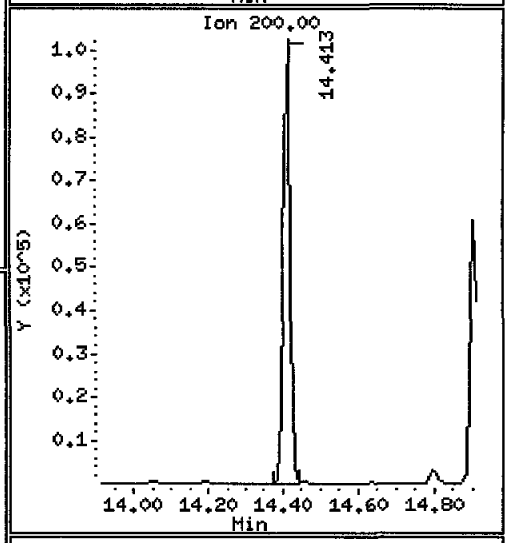
24 Fluoranthene

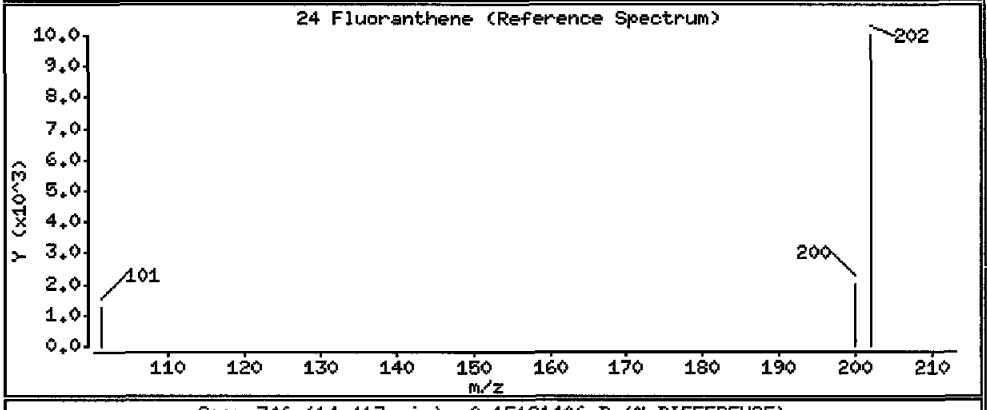
Concentration: 332000 ug/kg

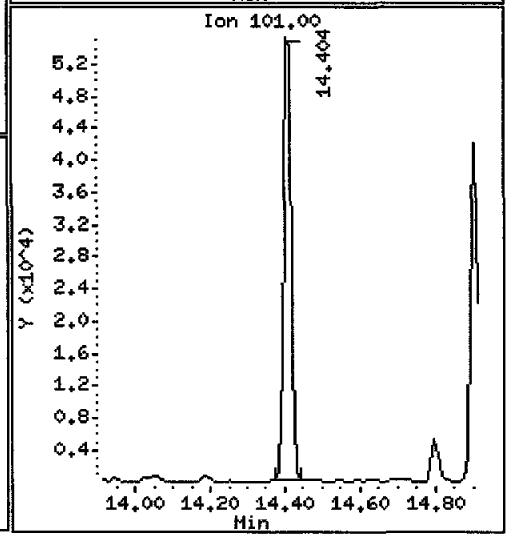


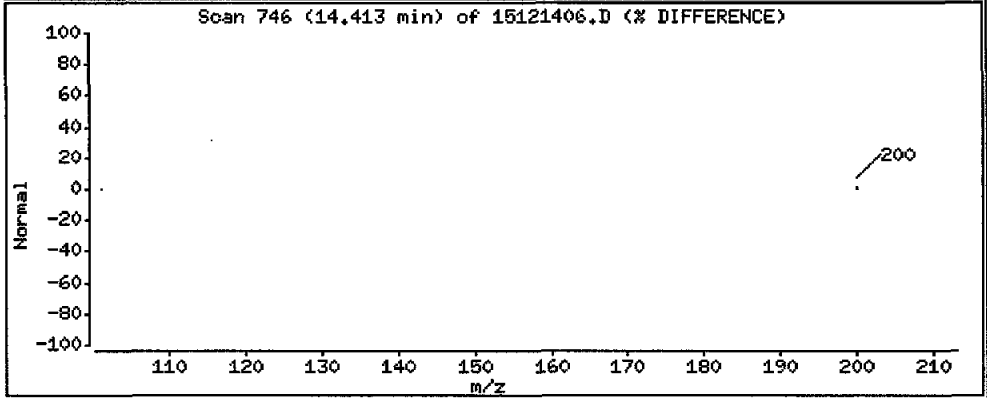












Data File: \\target\share\chem3\nt11.i\20151214.b\15121406.D

Date : 14-DEC-2015 11:42

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9L,10

Volume Injected (uL): 2.0

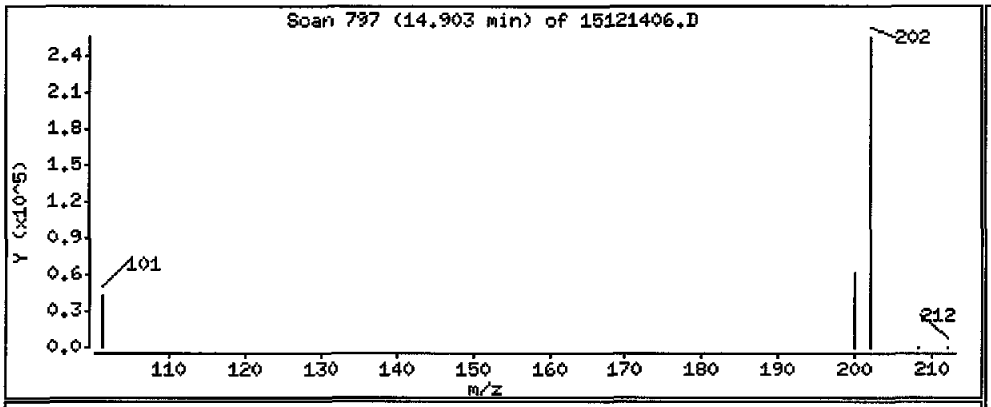
Operator: VTS

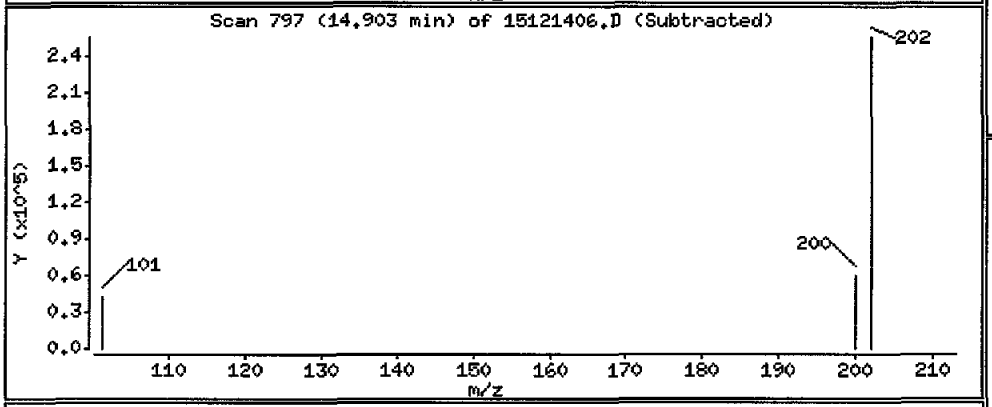
Column phase: Rxi-17Sil MS

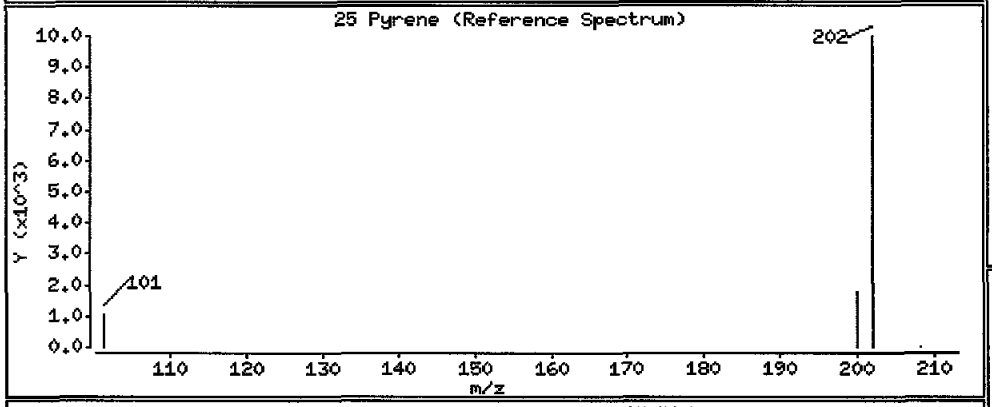
Column diameter: 0.25

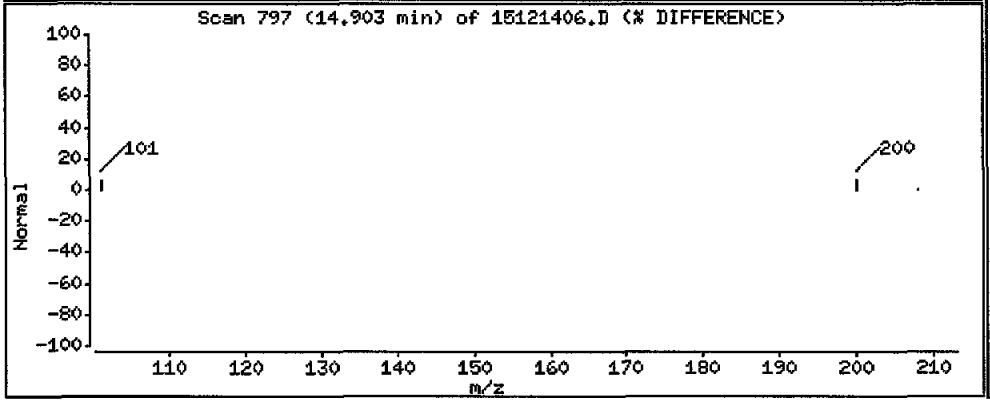
25 Pyrene

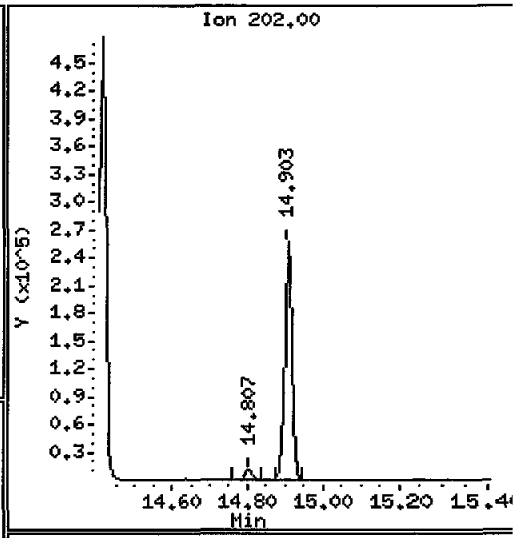
Concentration: 196000 ug/kg

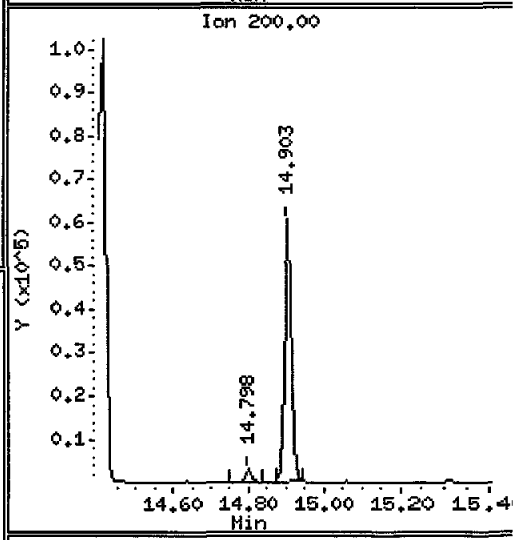


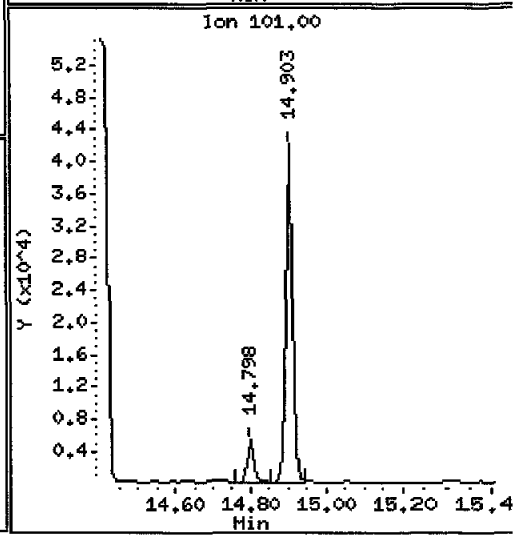












Data File: \\target\share\chem3\nt11.i\20151214.b\15121406.D

Date : 14-DEC-2015 11:42

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9L,10

Volume Injected (uL): 2.0

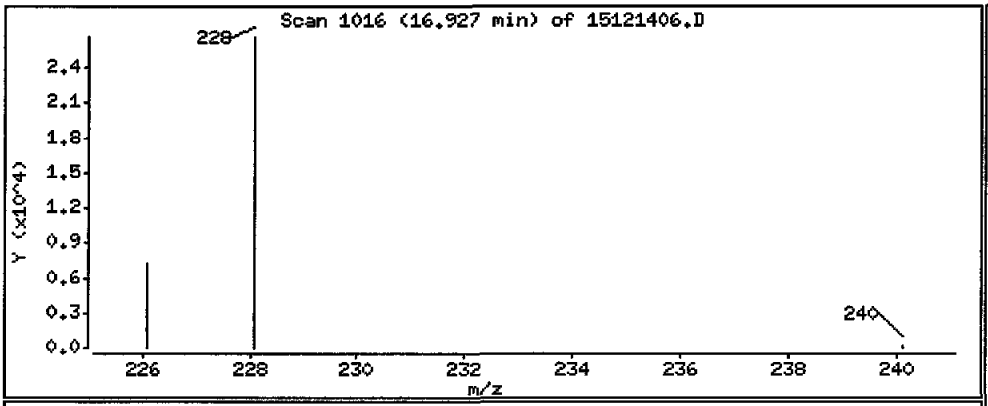
Operator: VTS

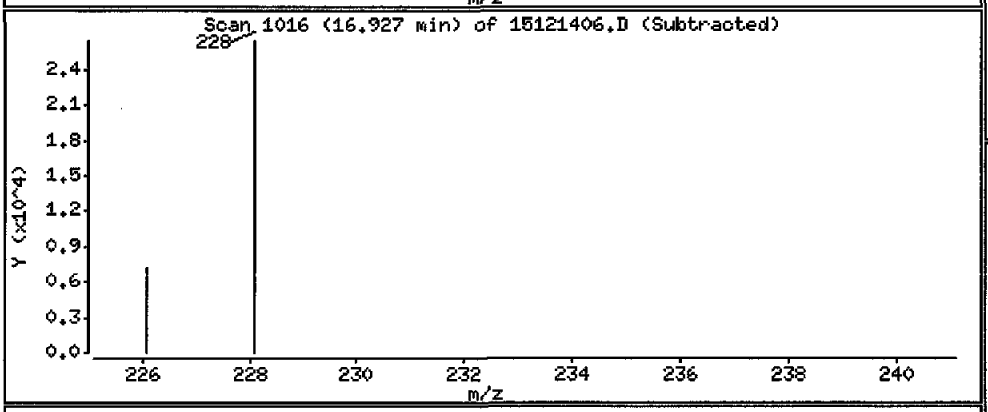
Column phase: Rxi-17Sil MS

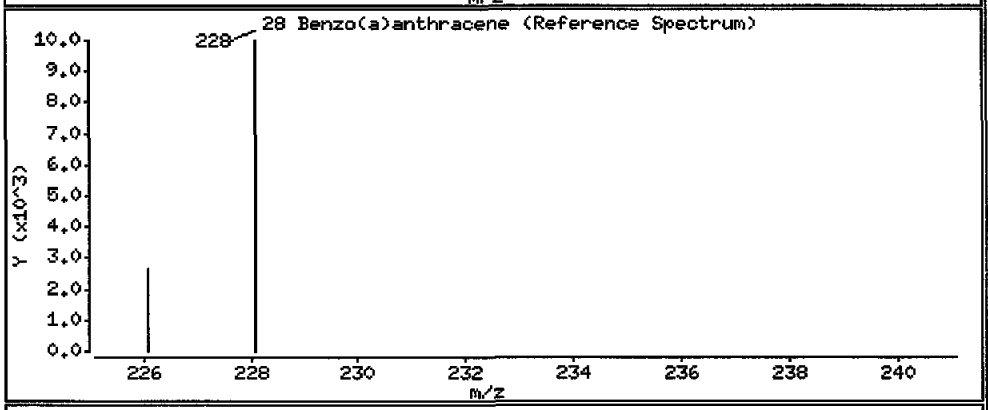
Column diameter: 0.25

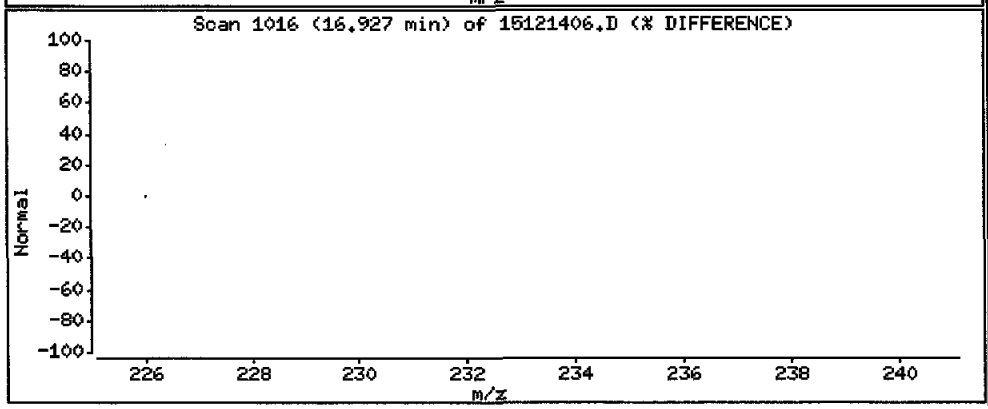
28 Benzo(a)anthracene

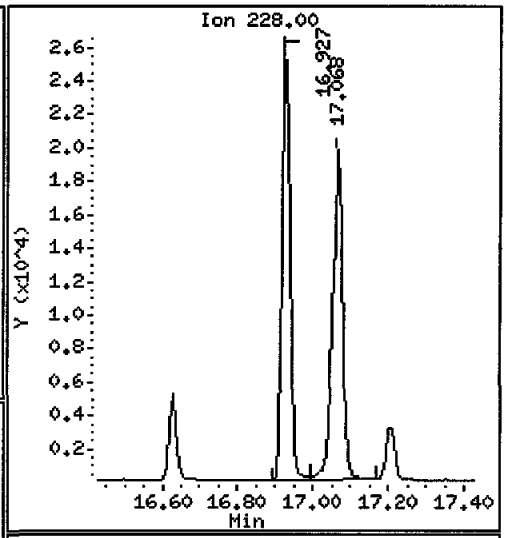
Concentration: 23600 ug/kg

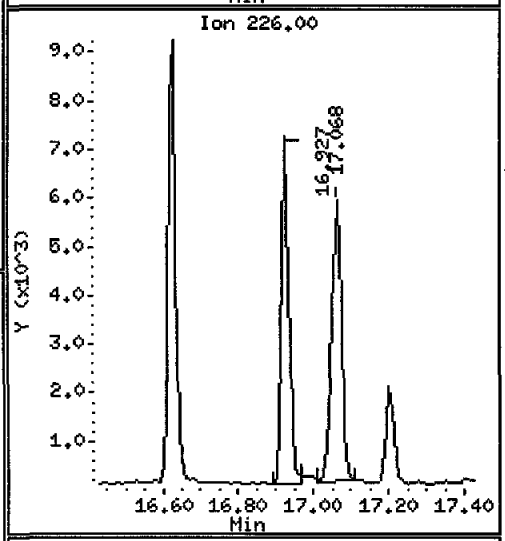


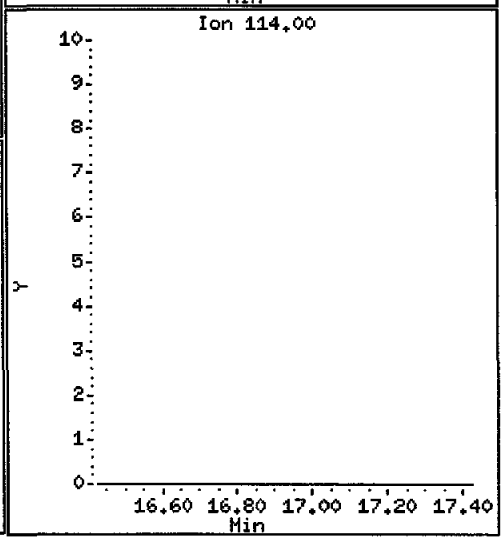












Data File: \\target\share\chem3\nt11.i\20151214.b\15121406.D

Date : 14-DEC-2015 11:42

Client ID: PG-SMA2-3-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9L,10

Volume Injected (uL): 2.0

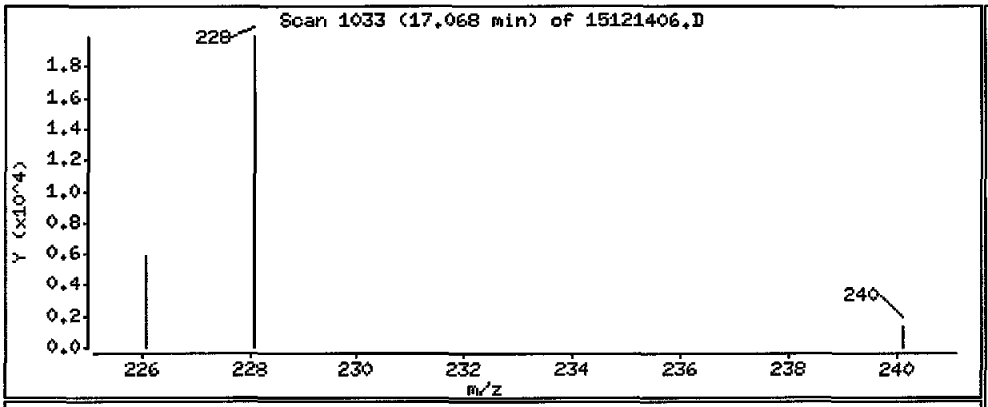
Operator: VTS

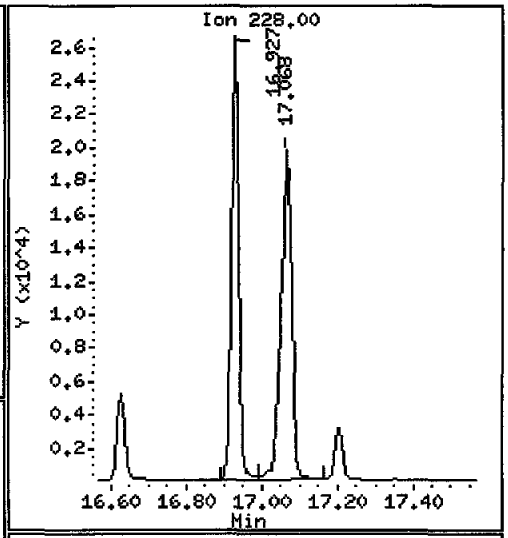
Column phase: Rxi-17Sil MS

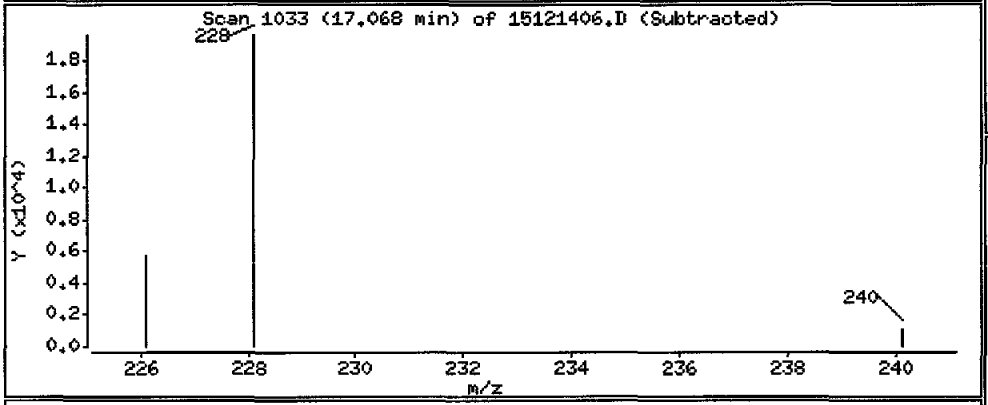
Column diameter: 0.25

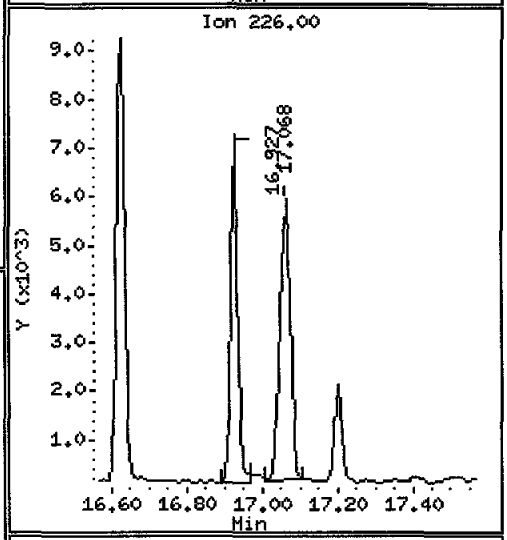
30 Chrysene

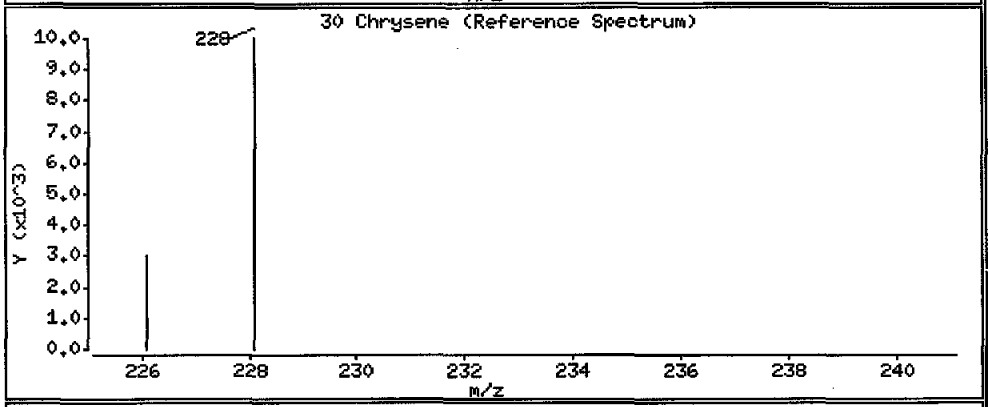
Concentration: 22200 ug/kg

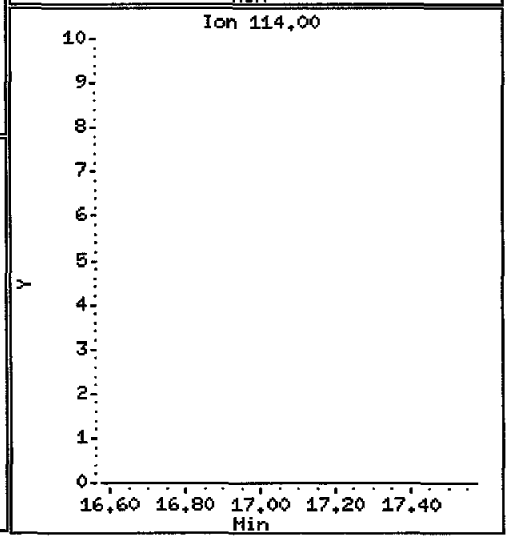


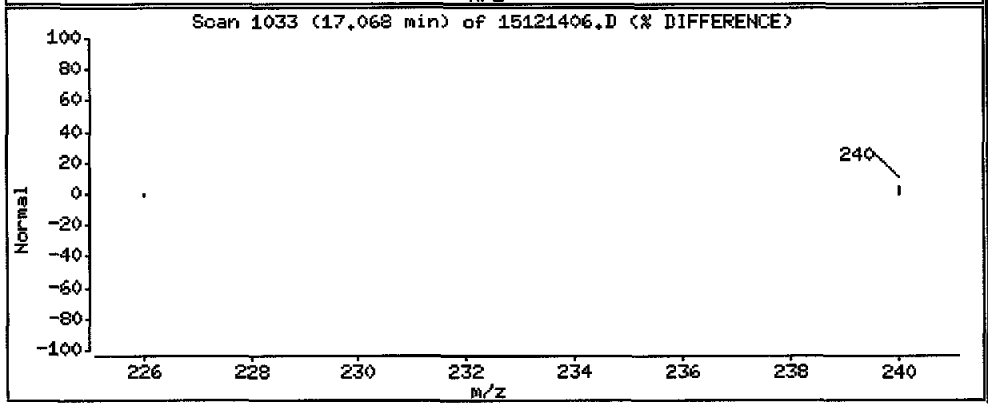












REVIEW SUMMARY FOR FILE - 15121406.D

Lab ID: AQJ9L
nt11.i, 20151214.b\lowsim.m, 14-DEC-2015 11:42

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151214.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151214.b\15121407.D
Lab Smp Id: AQJ9M Client Smp ID: PG-SMA2-2-PEMD-1511
Inj Date : 14-DEC-2015 12:12 MS Autotune Date: 23-APR-2014 12:5
Operator : VTS Inst ID: nt11.i
Smp Info : AQJ9M,10
Misc Info : 15-21400
Comment :
Method : \\target\share\chem3\nt11.i\20151214.b\lowsim.m
Meth Date : 15-Dec-2015 08:23 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 7
Dil Factor: 10.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	10.000	Dilution Factor
Vt	100.000	Volume of final extract (uL)
Ws	0.89000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

DW 2/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)
*	4 Naphthalene-d8	136	6.597	6.608	(1.000)	291558	200.000	
	5 Naphthalene	128	Compound Not Detected.					
$	6 2-Methylnaphthalene-d10	152	7.585	7.585	(1.150)	15981	14.7672	16600
	7 2-Methylnaphthalene	142	Compound Not Detected.					
	8 1-Methylnaphthalene	142	Compound Not Detected.					
	10 Acenaphthylene	152	Compound Not Detected.					
*	11 Acenaphthene-d10	164	9.600	9.611	(1.000)	217109	200.000	
	12 Acenaphthene	153	9.667	9.667	(1.007)	20814	17.8968	20100
	14 Dibenzofuran	168	9.877	9.877	(1.029)	20489	11.6946	13100
	15 Fluorene	166	10.497	10.497	(1.093)	34349	26.1418	29400
*	18 Phenanthrene-d10	188	12.280	12.280	(1.000)	342997	200.000	
	19 Phenanthrene	178	12.324	12.324	(1.004)	341631	165.319	186000
	20 Anthracene	178	12.379	12.379	(1.008)	52709	28.4955	32000
$	23 Fluoranthene-d10	212	14.374	14.384	(1.171)	49293	26.1325	29400
	24 Fluoranthene	202	14.413	14.413	(1.174)	343693	165.656	186000
	25 Pyrene	202	14.903	14.912	(0.876)	208087	103.511	116000
	28 Benzo(a)anthracene	228	16.926	16.926	(0.995)	23963	14.1588	15900
*	29 Chrysene-d12	240	17.017	17.026	(1.000)	253845	200.000	
	30 Chrysene	228	17.067	17.075	(1.003)	26142	14.0736	15800
	44 Benzo(b)fluoranthene	252	Compound Not Detected.					
	45 Benzo(k)fluoranthene	252	Compound Not Detected.					

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	FINAL (ug/kg)	
46	Benzo(j)fluoranthene	252	Compound Not Detected.						
34	Benzo(a)pyrene	252	Compound Not Detected.						
* 35	Perylene-d12	264	19.851	19.851	(1.000)	229648	200.000		
$ 36	Dibenzo(a,h)anthracene-d14	292	22.219	22.219	(1.119)	17090	18.4379	20700	
37	Indeno(1,2,3-cd)pyrene	276	Compound Not Detected.						
38	Dibenzo(a,h)anthracene	278	Compound Not Detected.						
39	Benzo(g,h,i)perylene	276	Compound Not Detected.						
47	Perylene	252	Compound Not Detected.						
48	Benzo(e)pyrene	252	Compound Not Detected.						

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt11.i
Lab File ID: 15121407.D
Lab Smp Id: AQJ9M
Analysis Type: SV
Quant Type: ISTD
Operator: VTS
Method File: \\target\share\chem3\nt11.i\20151214.b\lowsim.m
Misc Info: 15-21400

Calibration Date: 14-DEC-2015
Calibration Time: 09:09
Client Smp ID: PG-SMA2-2-PEMD-
Level: LOW
Sample Type: Tissue

Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	327896	163948	655792	291558	-11.08
11 Acenaphthene-d10	239179	119590	478358	217109	-9.23
18 Phenanthrene-d10	372253	186127	744506	342997	-7.86
29 Chrysene-d12	294711	147356	589422	253845	-13.87
35 Perylene-d12	260595	130298	521190	229648	-11.88

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Naphthalene-d8	6.61	6.11	7.11	6.60	-0.16
11 Acenaphthene-d10	9.61	9.11	10.11	9.60	-0.11
18 Phenanthrene-d10	12.28	11.78	12.78	12.28	0.00
29 Chrysene-d12	17.03	16.53	17.53	17.02	-0.05
35 Perylene-d12	19.85	19.35	20.35	19.85	0.00

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.

ARI Labs, Inc.

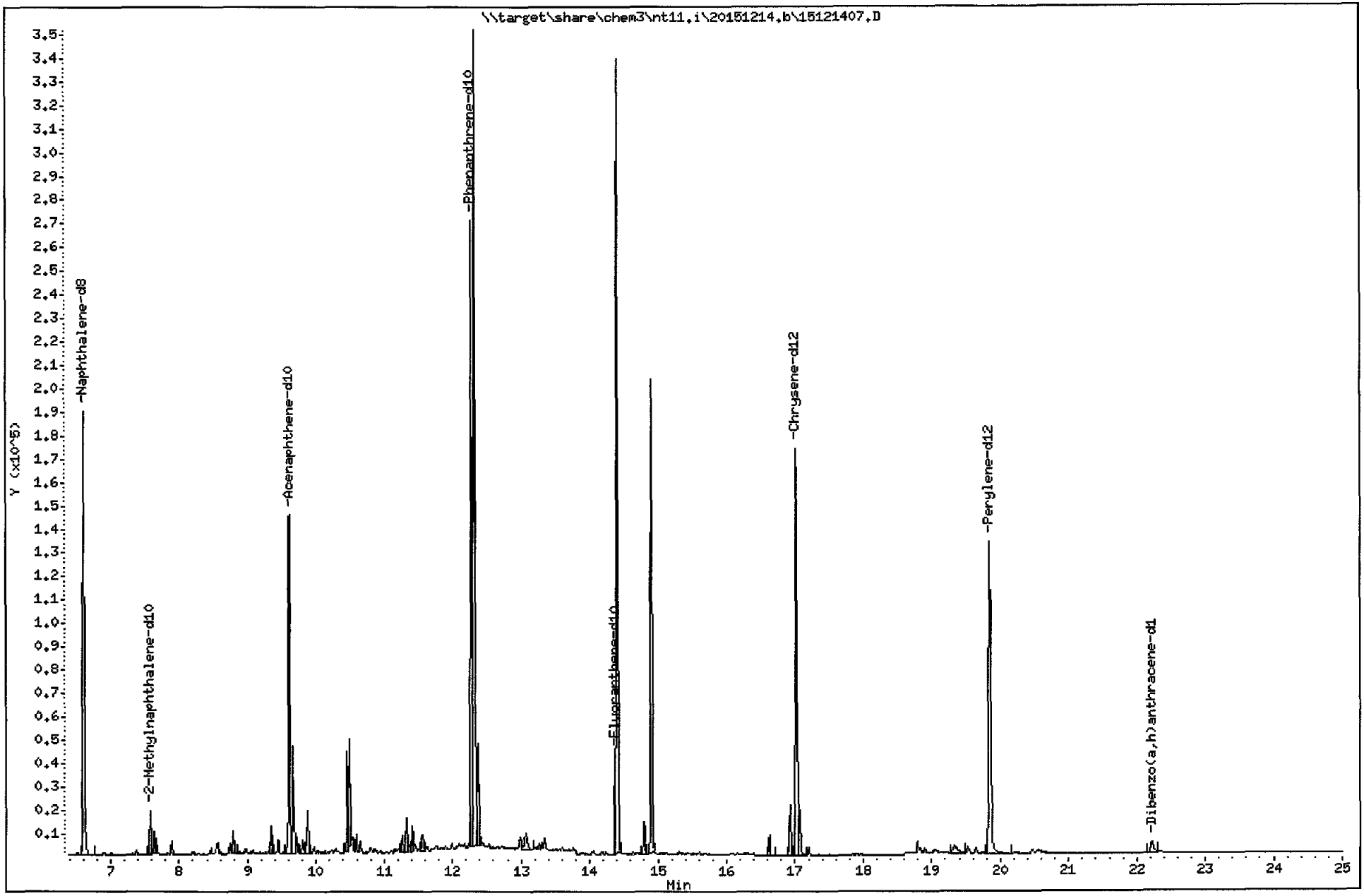
RECOVERY REPORT

Client Name: Anchor QEA, LLC
Client SDG: AQJ9
Sample Matrix: SOLID
Fraction: SV
Lab Smp Id: AQJ9M
Client Smp ID: PG-SMA2-2-PEMD-1511
Level: LOW
Operator: VTS
Data Type: MS DATA
SampleType: SAMPLE
SpikeList File: waterlcs.spk
Quant Type: ISTD
Sublist File: PEMD.sub
Method File: \\target\share\chem3\nt11.i\20151214.b\lowsim.m
Misc Info: 15-21400

SURROGATE COMPOUND	CONC ADDED ug/kg	CONC RECOVERED ug/kg	% RECOVERED	LIMITS
$ 6 2-Methylnaphthalen	33700	16600	49.22	30-160
$ 23 Fluoranthene-d10	33700	29400	87.11	30-160
$ 36 Dibenzo(a,h)anthra	33700	20700	61.46	30-160

Data File: \\target\share\chem3\nt11.i\20151214.b\15121407.D
Date : 14-DEC-2015 12:12
Client ID: PG-SMA2-2-PEMD-1511
Sample Info: AQJ9M,10
Volume Injected (uL): 2.0
Column phase: Rxi-17Sil MS

Instrument: nt11.i
Operator: VTS
Column diameter: 0.25



Data File: \\target\share\chem3\nt11.i\20151214.b\15121407.D

Date : 14-DEC-2015 12:12

Client ID: PG-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M,10

Volume Injected (uL): 2.0

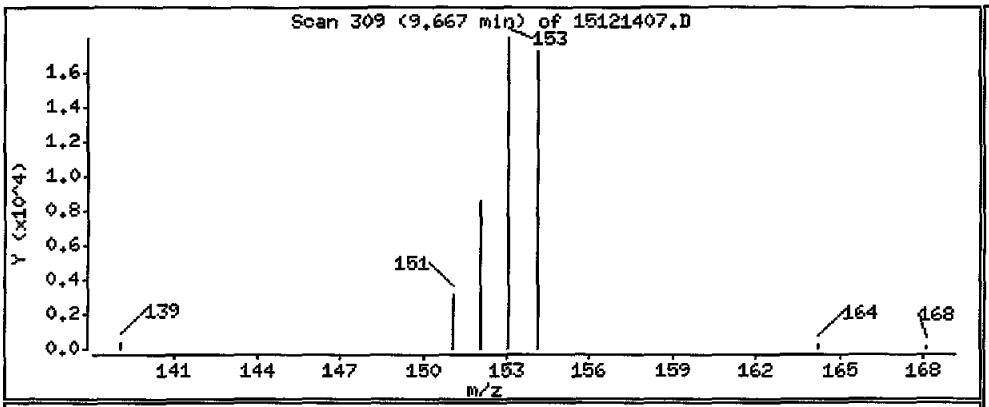
Operator: VTS

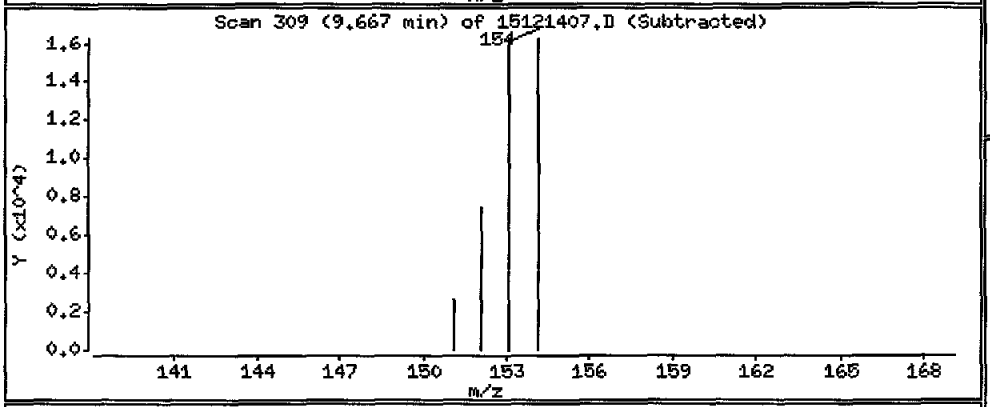
Column phase: Rxi-17Sil MS

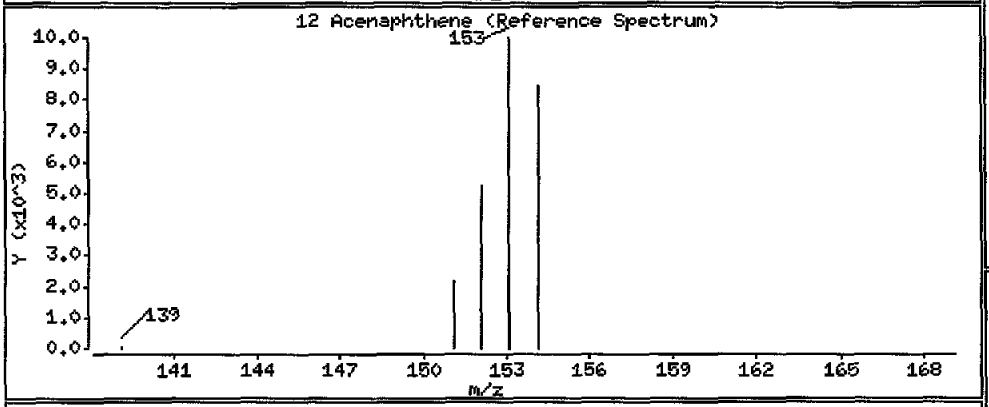
Column diameter: 0.25

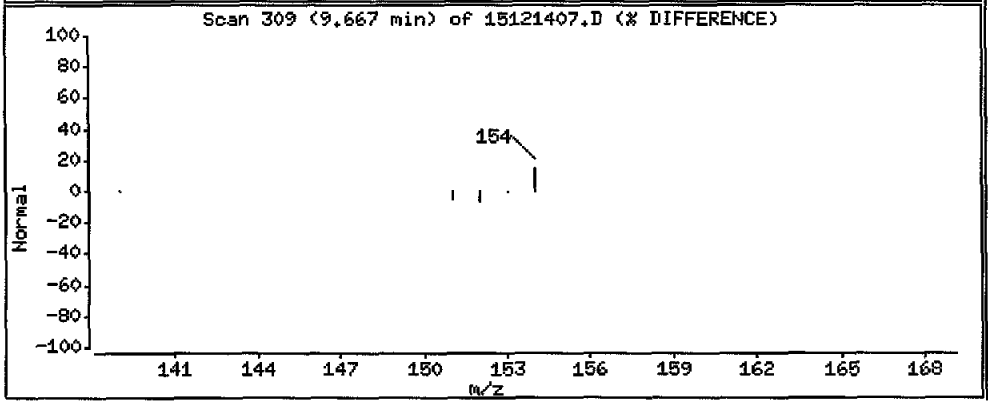
12 Acenaphthene

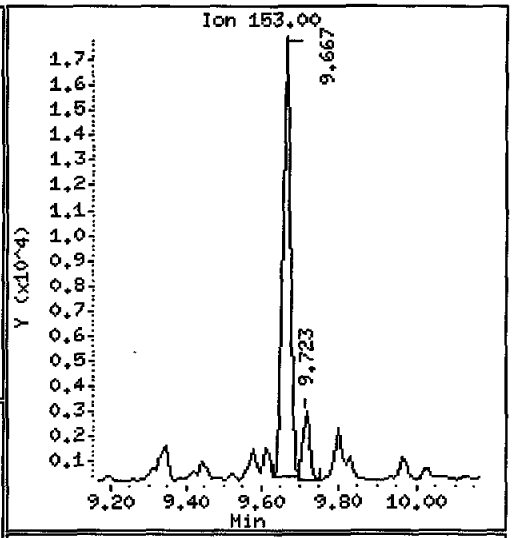
Concentration: 20100 ug/kg

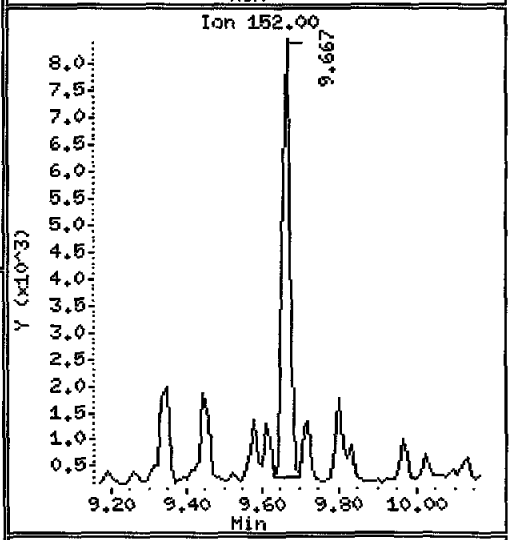


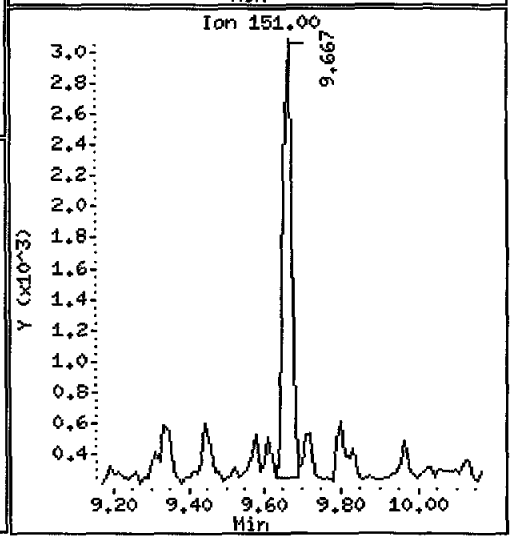












Data File: \\target\share\ohem3\nt11.i\20151214.b\15121407.D

Date : 14-DEC-2015 12:12

Client ID: PG-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M,10

Volume Injected (uL): 2.0

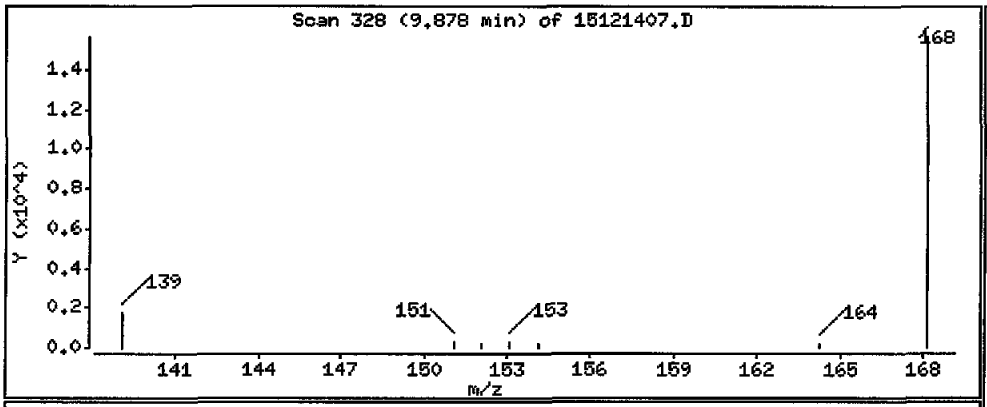
Operator: VTS

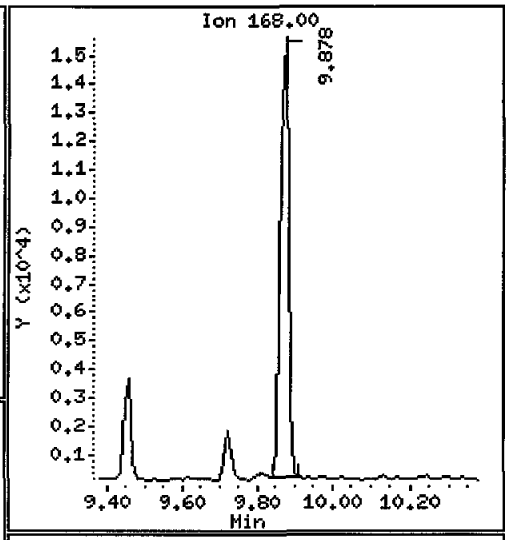
Column phase: Rxi-17Sil MS

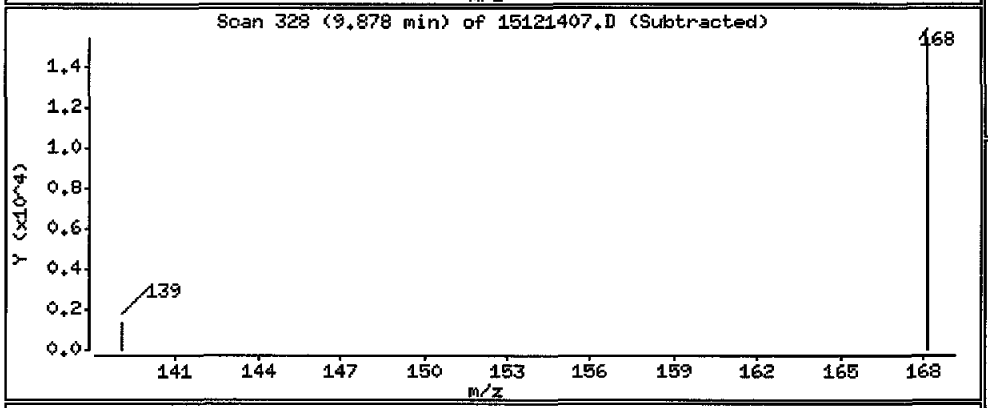
Column diameter: 0.25

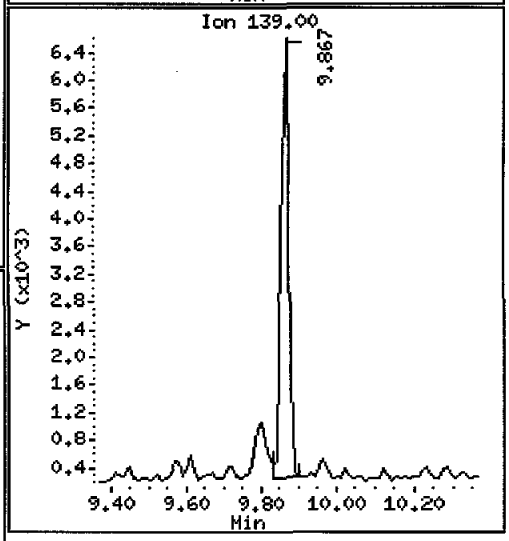
14 Dibenzofuran

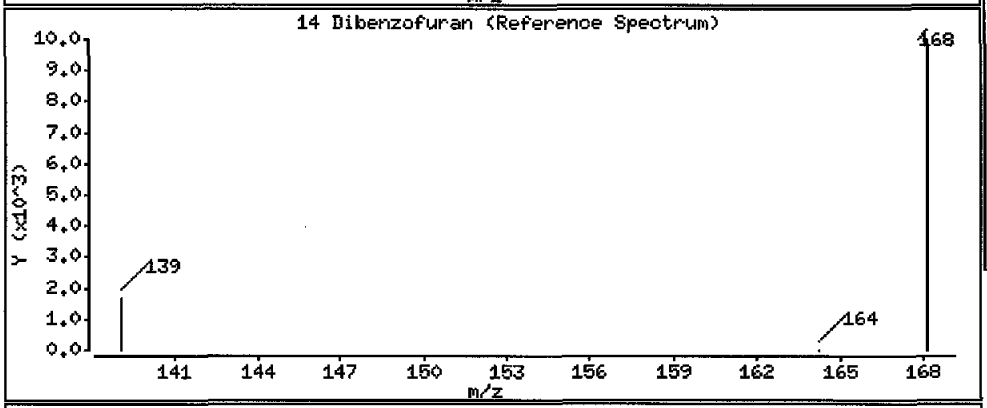
Concentration: 13100 ug/kg

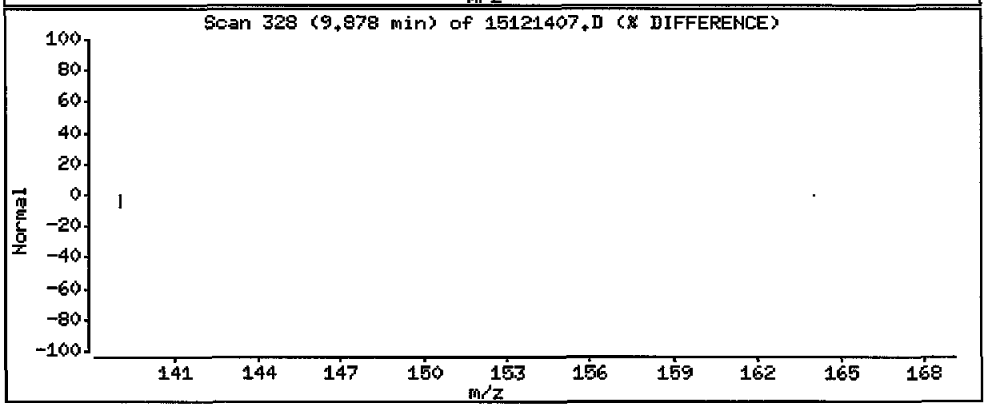












Data File: \\target\share\chem3\nt11.i\20151214.b\15121407.D

Date : 14-DEC-2015 12:12

Client ID: PG-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M,10

Volume Injected (uL): 2.0

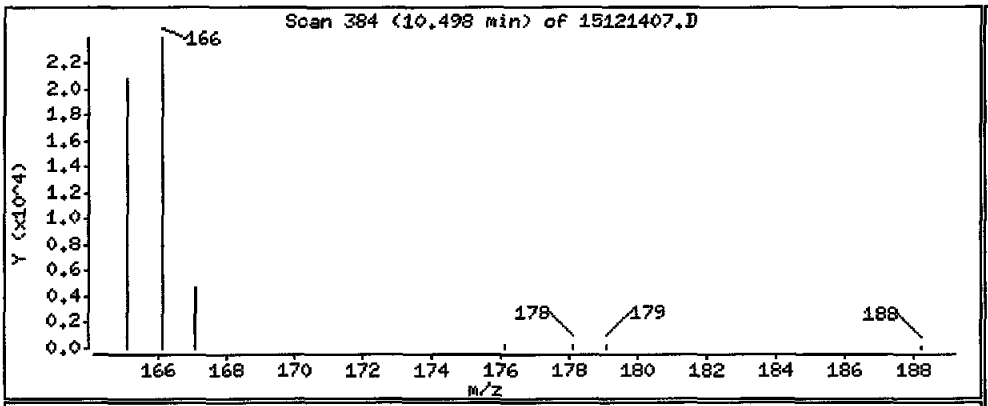
Operator: VTS

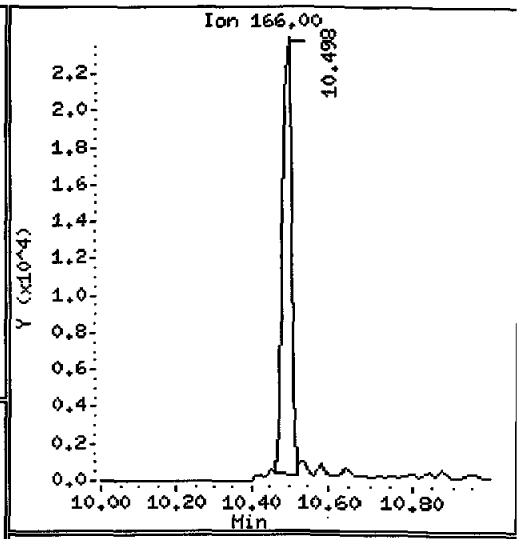
Column phase: Rxi-17Sil MS

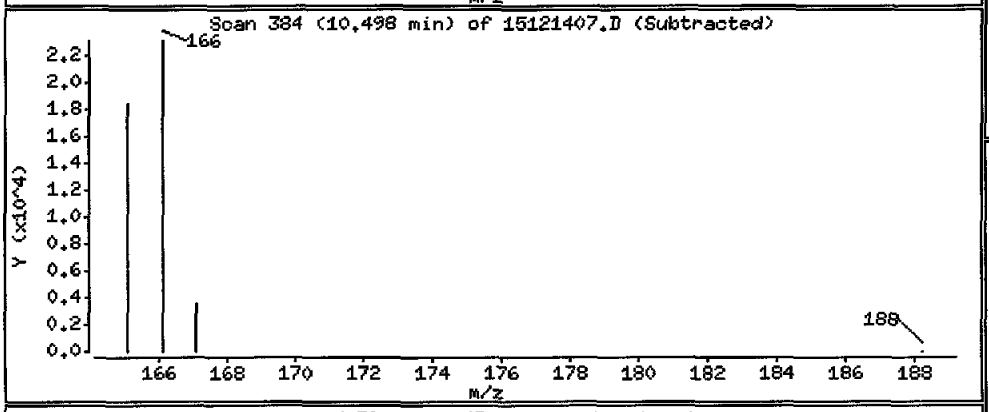
Column diameter: 0.25

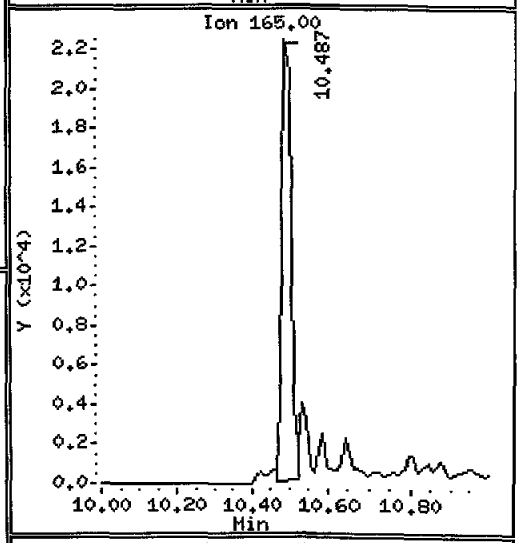
15 Fluorene

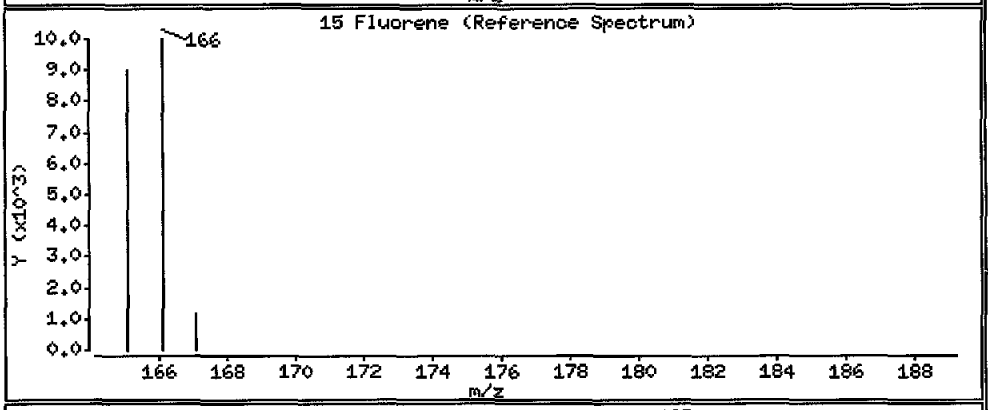
Concentration: 29400 ug/kg

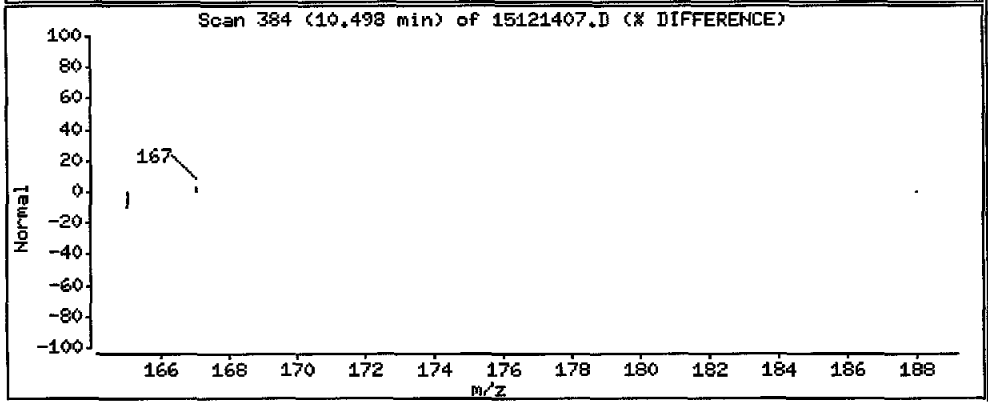


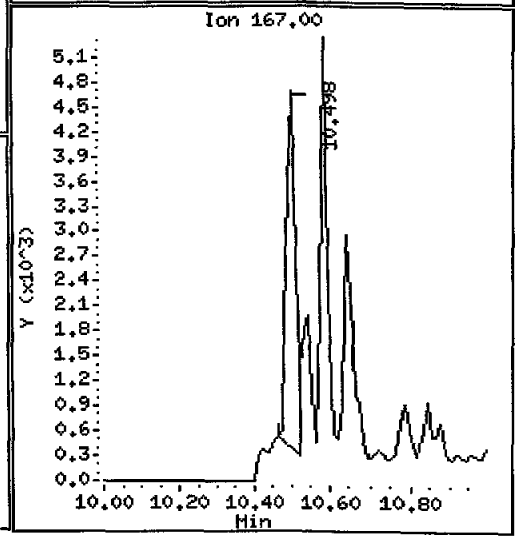












Data File: \\target\share\chem3\nt11.i\20151214.b\15121407.D

Date : 14-DEC-2015 12:12

Client ID: PG-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M,10

Volume Injected (uL): 2.0

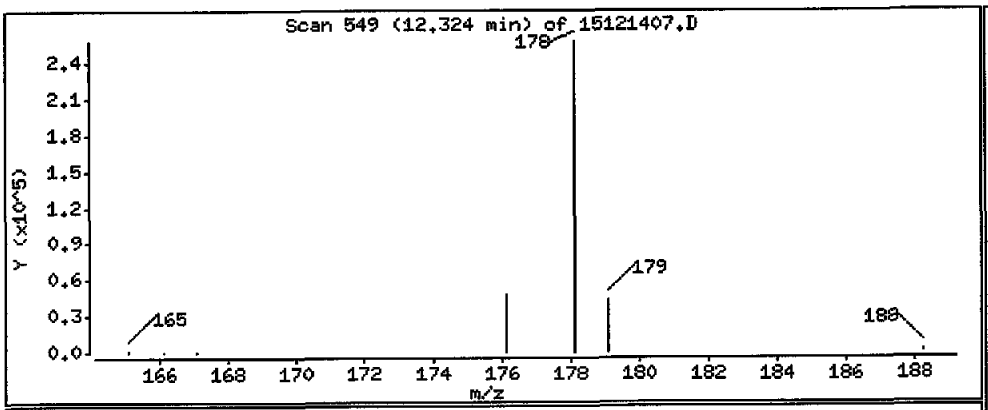
Operator: VTS

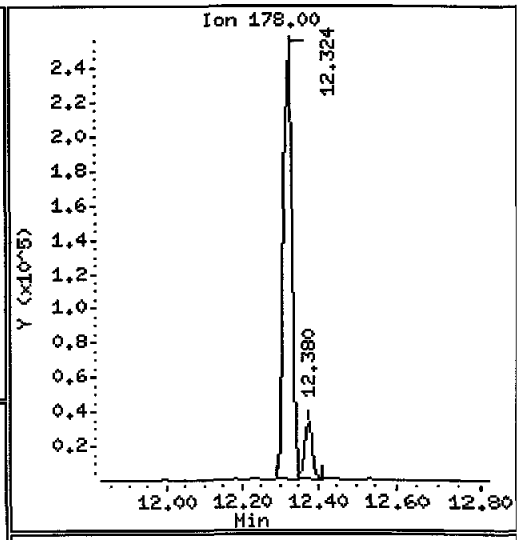
Column phase: Rxi-17Sil MS

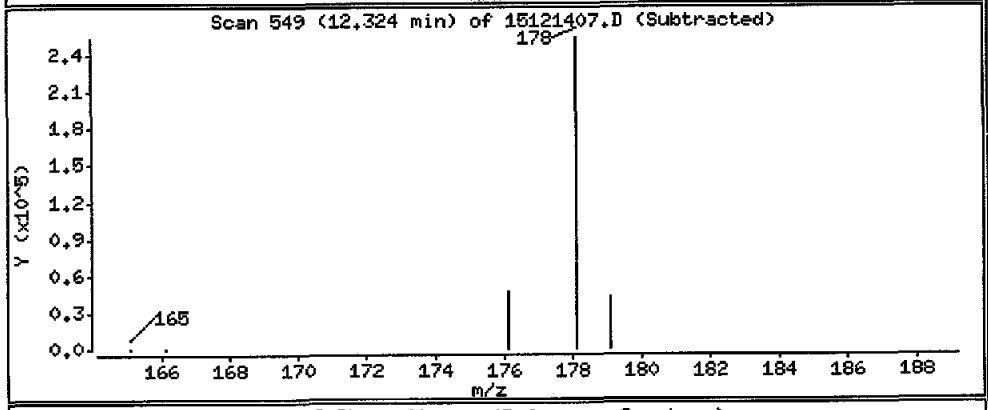
Column diameter: 0.25

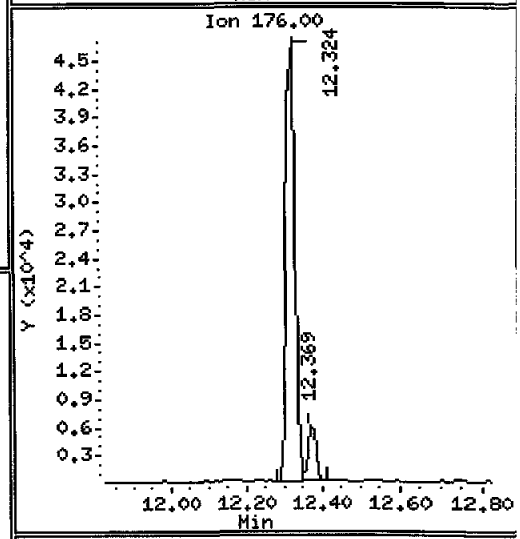
19 Phenanthrene

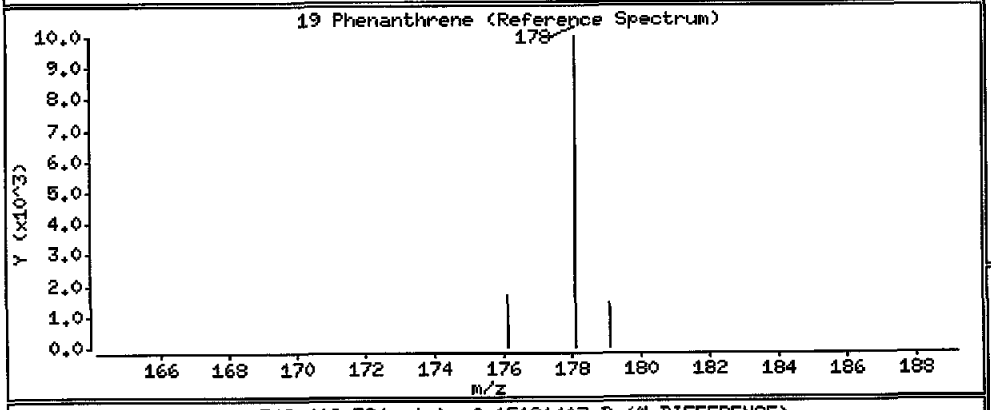
Concentration: 186000 ug/kg

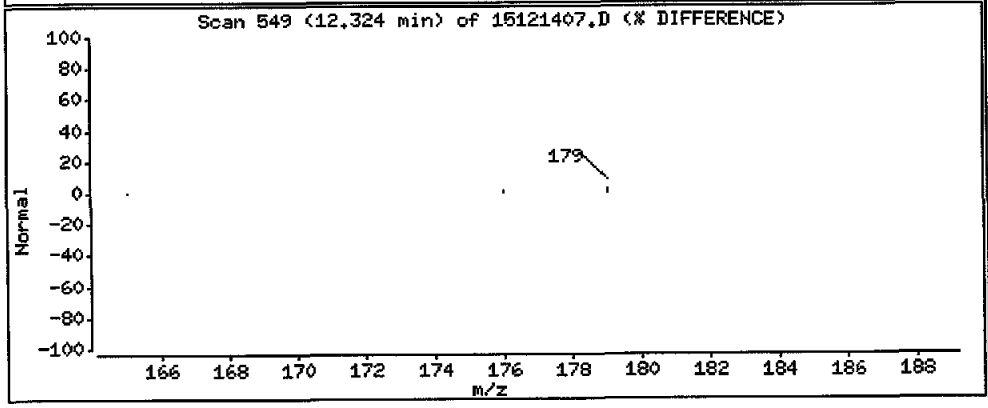


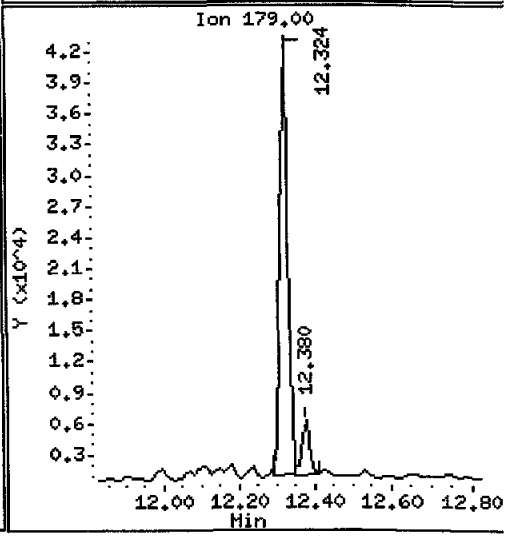












Data File: \\target\share\chem3\nt11.i\20151214.b\15121407.D

Date : 14-DEC-2015 12:12

Client ID: PC-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M,10

Volume Injected (uL): 2.0

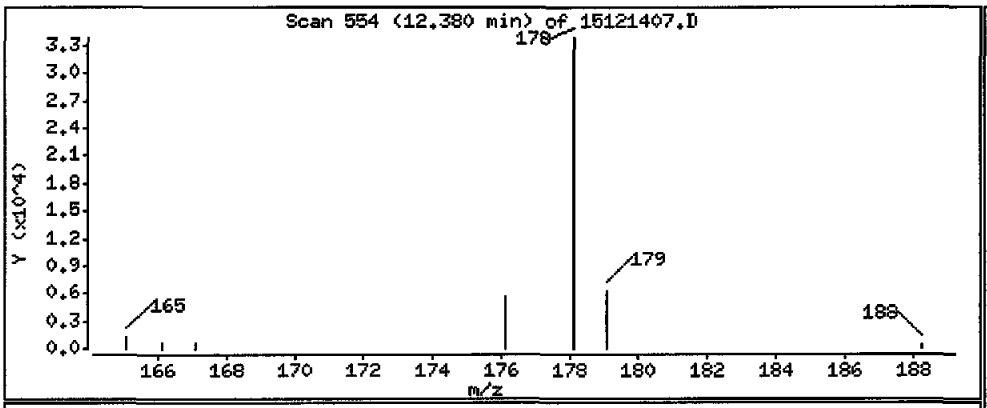
Operator: VTS

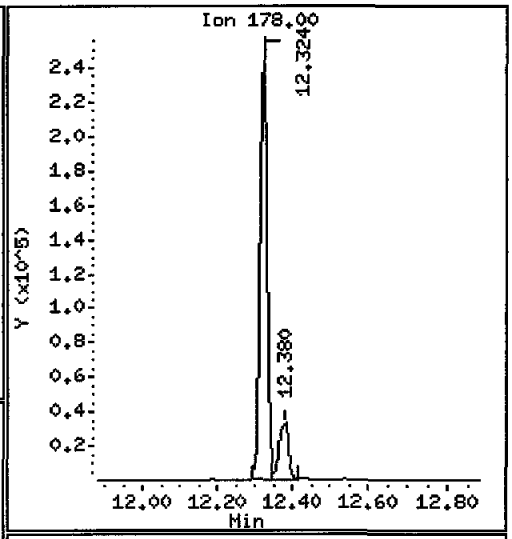
Column phase: Rxi-17Sil MS

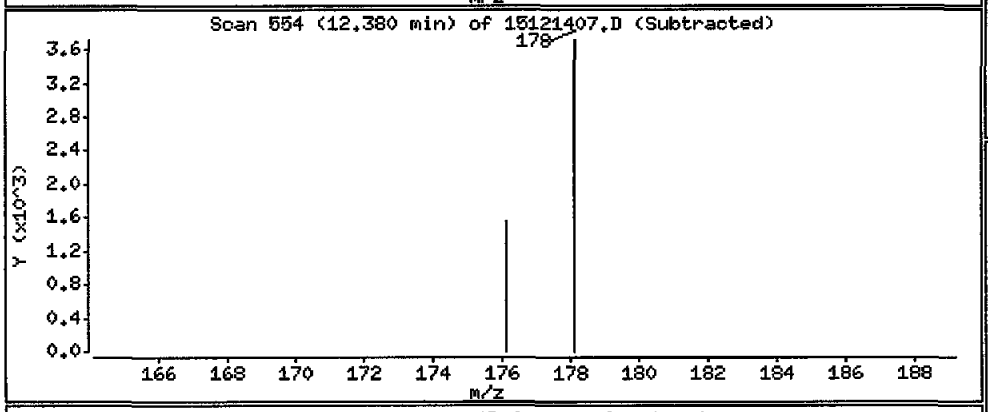
Column diameter: 0.25

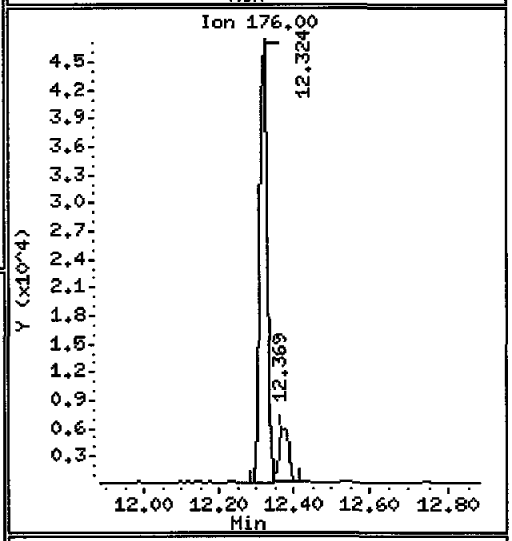
20 Anthracene

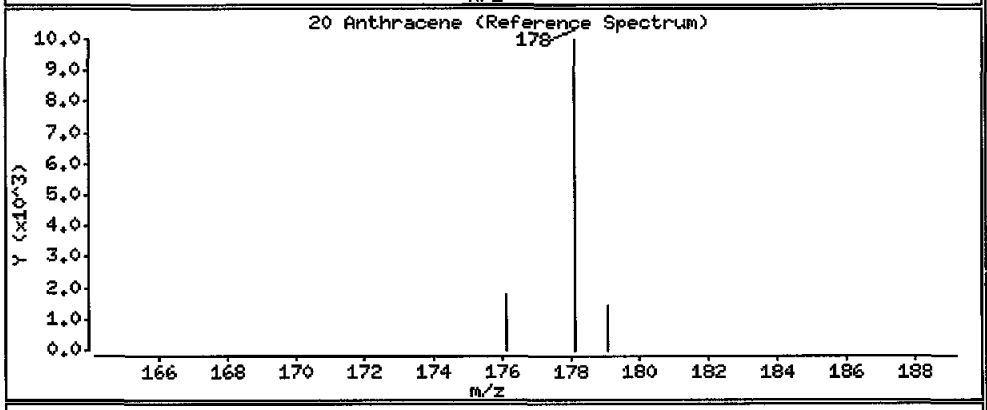
Concentration: 32000 ug/kg

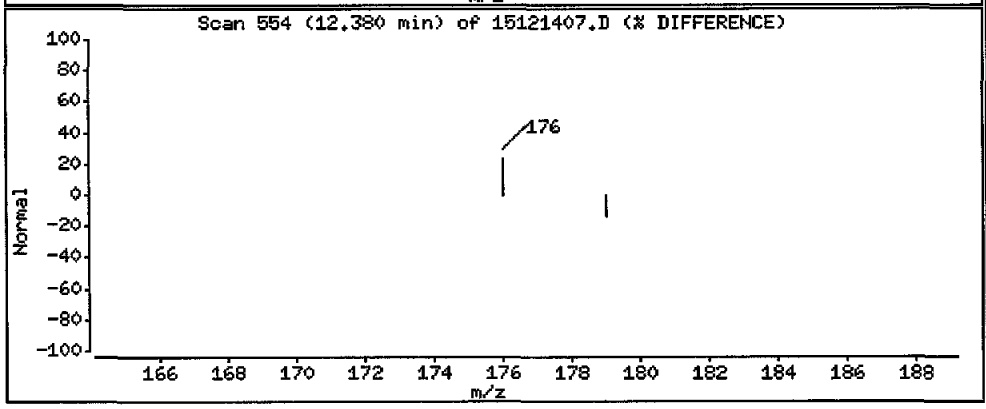


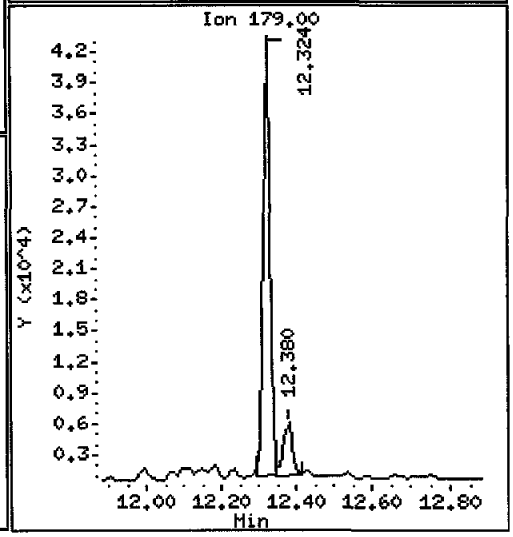












Data File: \\target\share\chem3\nt11.i\20151214.b\15121407.D

Date : 14-DEC-2015 12:12

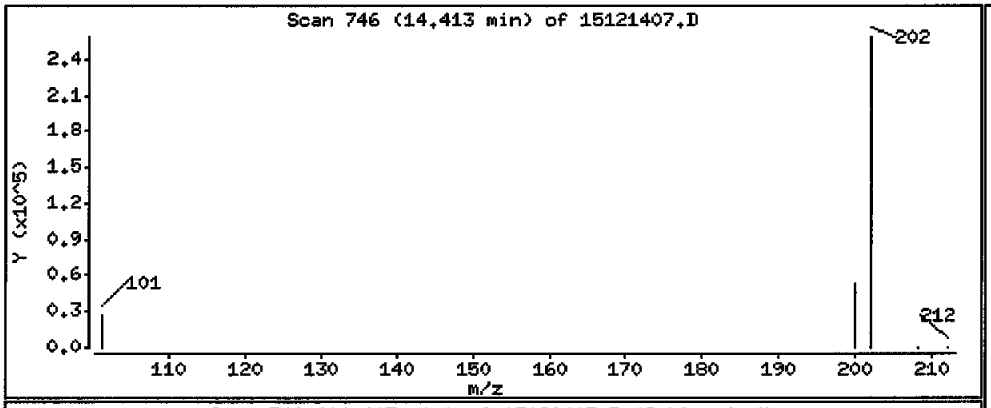
Client ID: PG-SMA2-2-PEMD-1511 Instrument: nt11.i

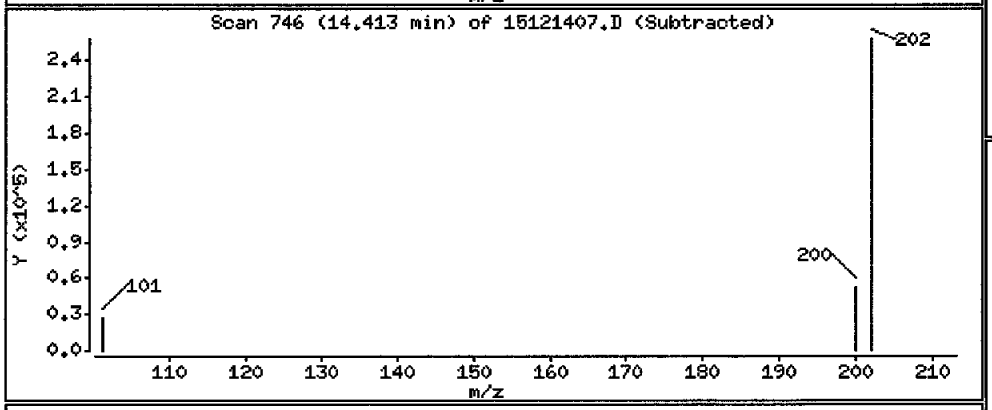
Sample Info: AQJ9M,10

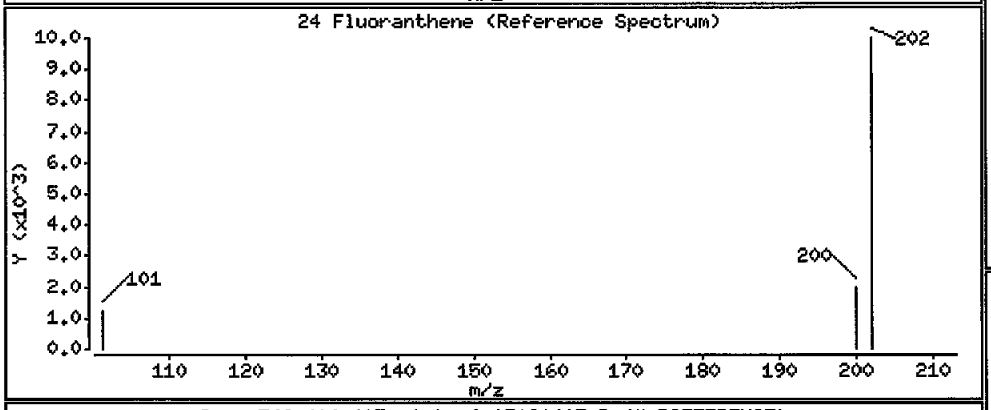
Volume Injected (uL): 2.0 Operator: VTS

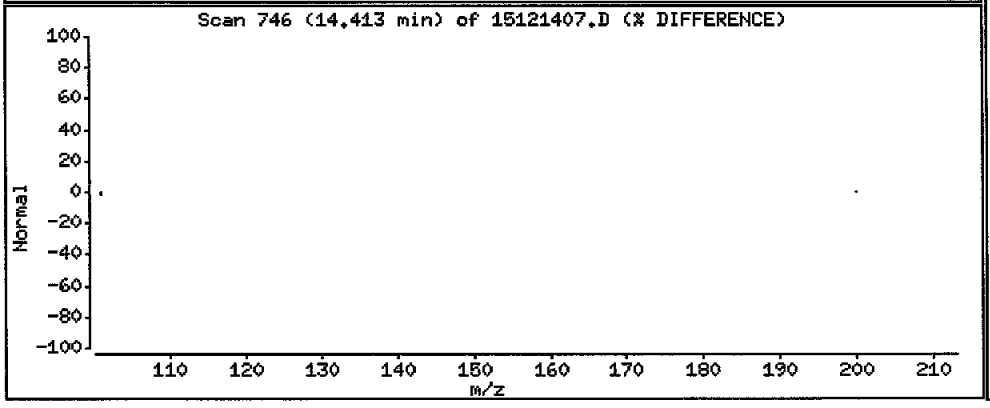
Column phase: Rxi-17Sil MS Column diameter: 0.25

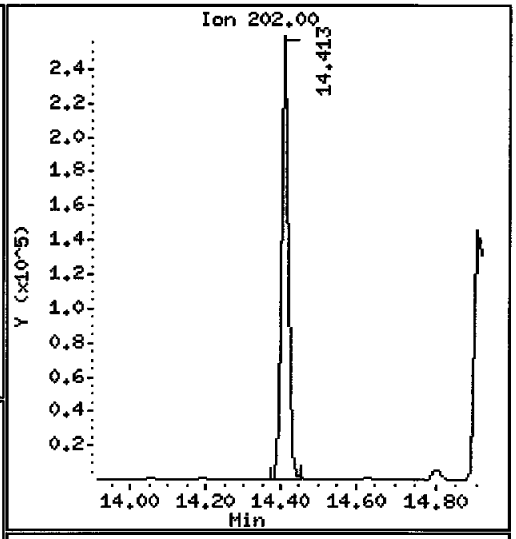
24 Fluoranthene Concentration: 186000 ug/kg

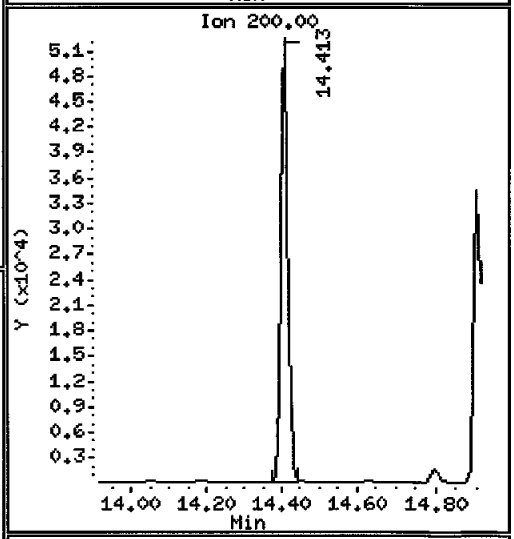


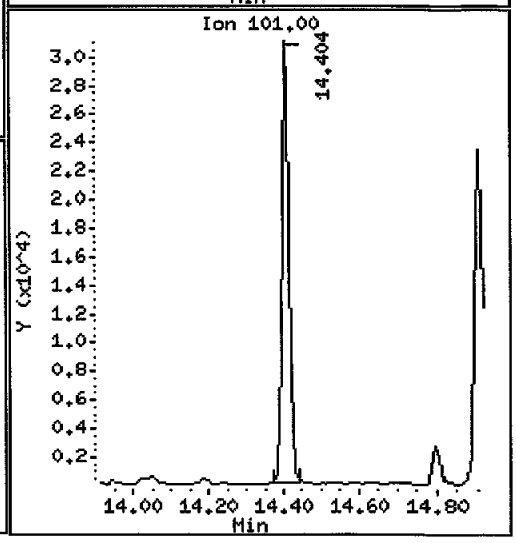












Data File: \\target\share\chem3\nt11.i\20151214.b\15121407.D

Date : 14-DEC-2015 12:12

Client ID: PG-SMA2-2-PEMD-1511

Instrument: nt11.i

Sample Info: AQJ9M,10

Volume Injected (uL): 2.0

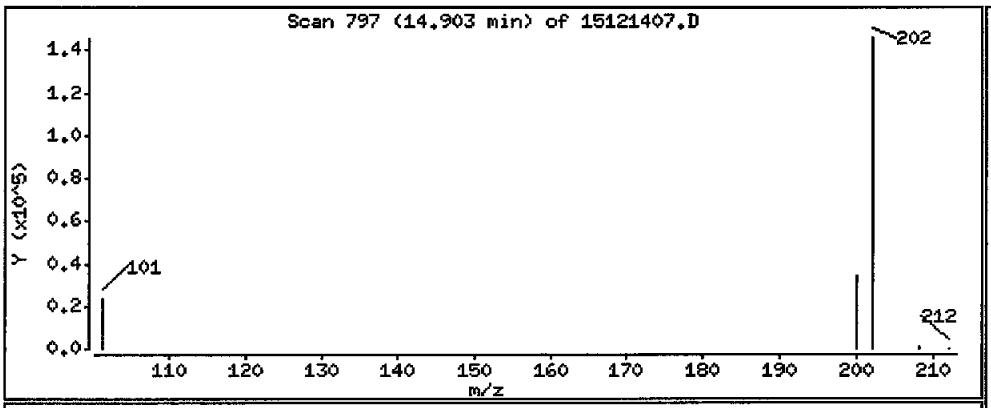
Operator: VTS

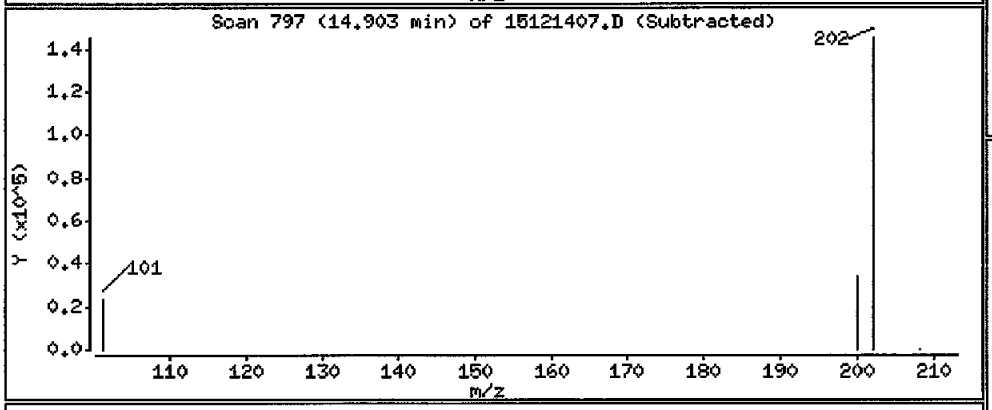
Column phase: Rxi-17Sil MS

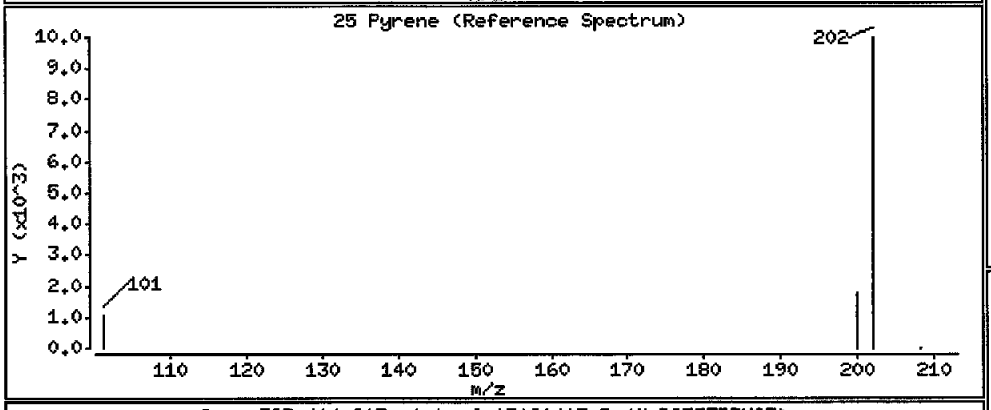
Column diameter: 0.25

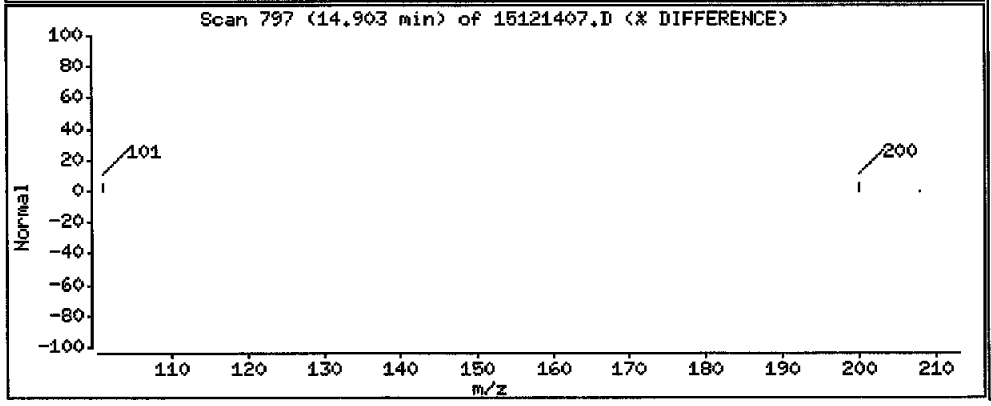
25 Pyrene

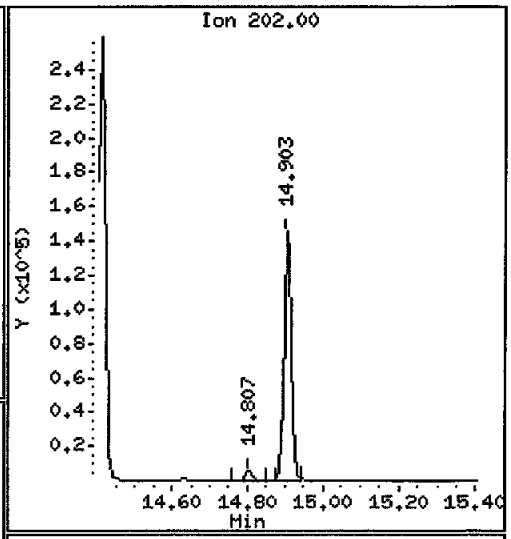
Concentration: 116000 ug/kg

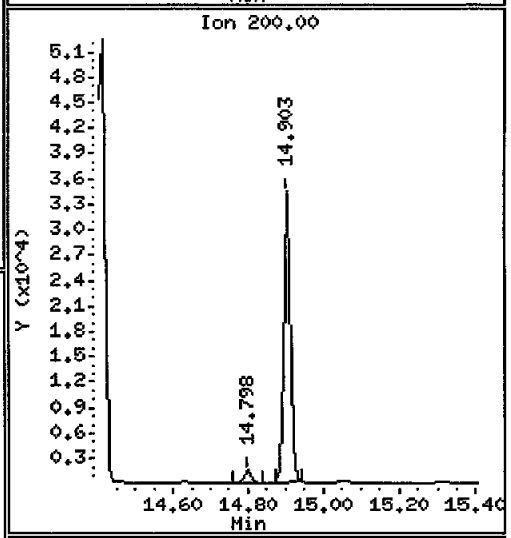


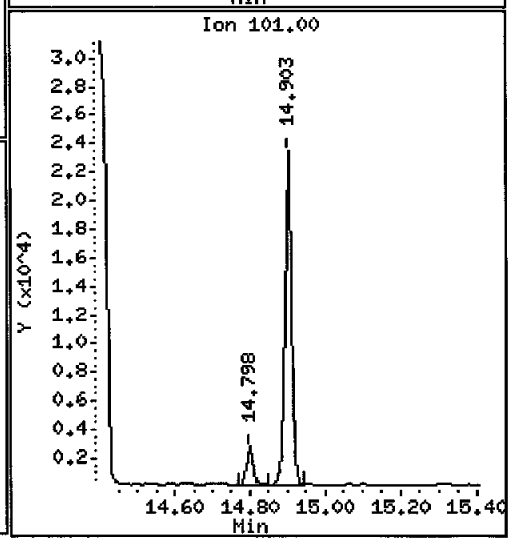












Data File: \\target\share\chem3\nt11.i\20151214.b\15121407.D

Date : 14-DEC-2015 12:12

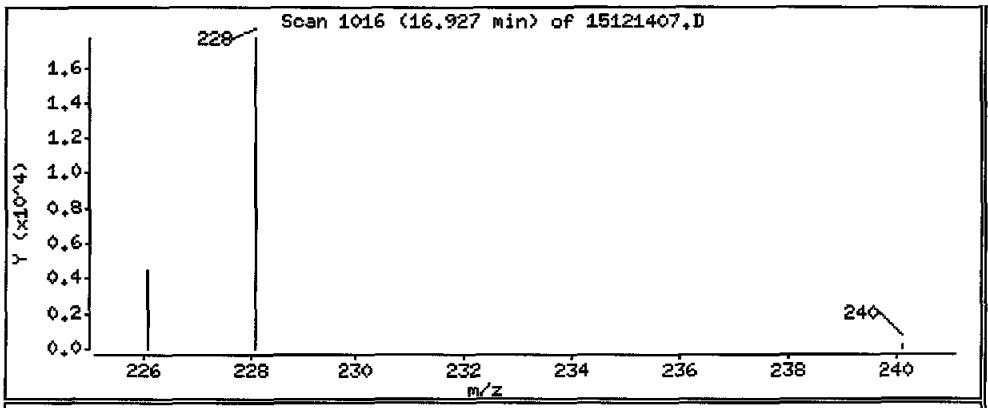
Client ID: PG-SMA2-2-PEMD-1511 Instrument: nt11.i

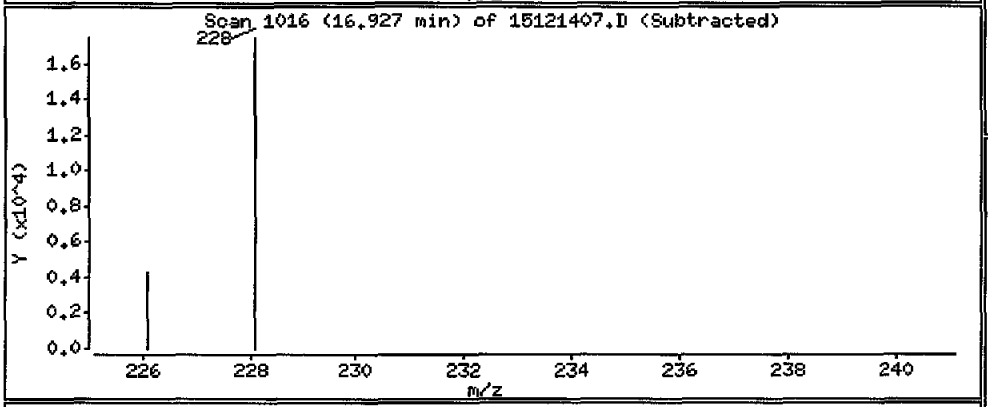
Sample Info: AQJ9M,10

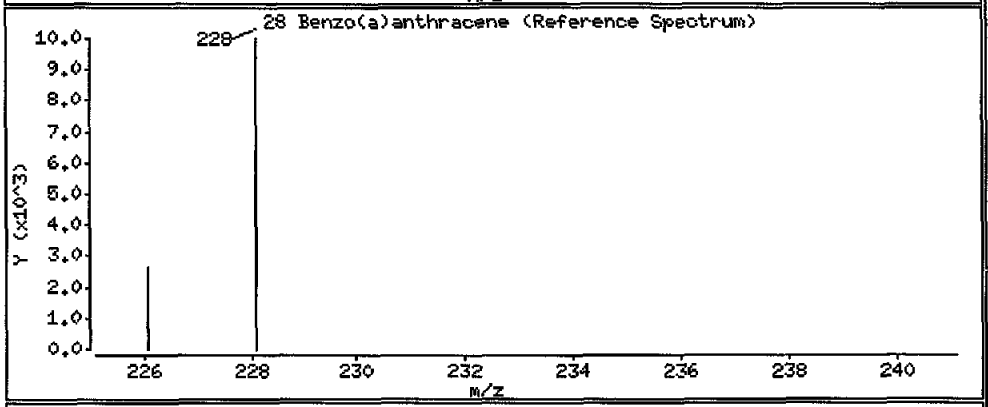
Volume Injected (uL): 2.0 Operator: VTS

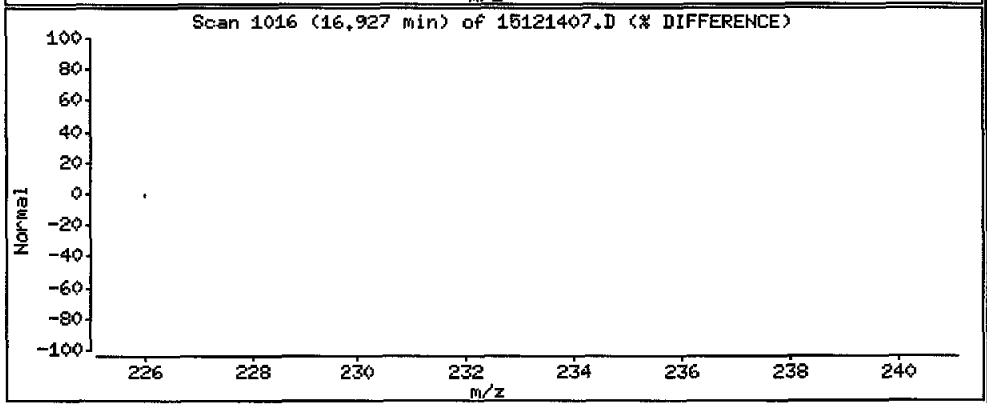
Column phase: Rxi-17Sil MS Column diameter: 0.25

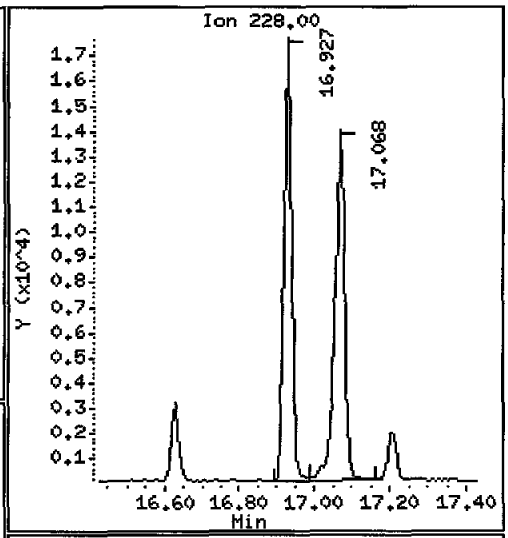
28 Benzo(a)anthracene Concentration: 15900 ug/kg

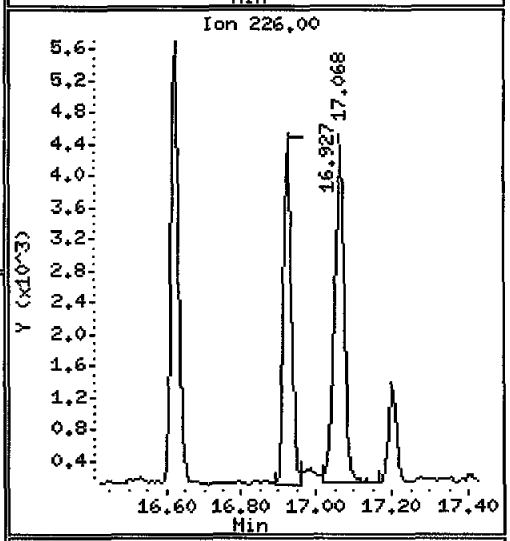


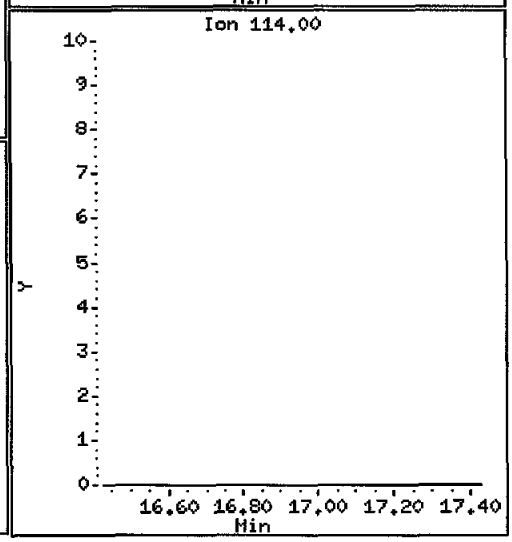












Data File: \\target\share\chem3\nt11.i\20151214.b\15121407.D

Date : 14-DEC-2015 12:12

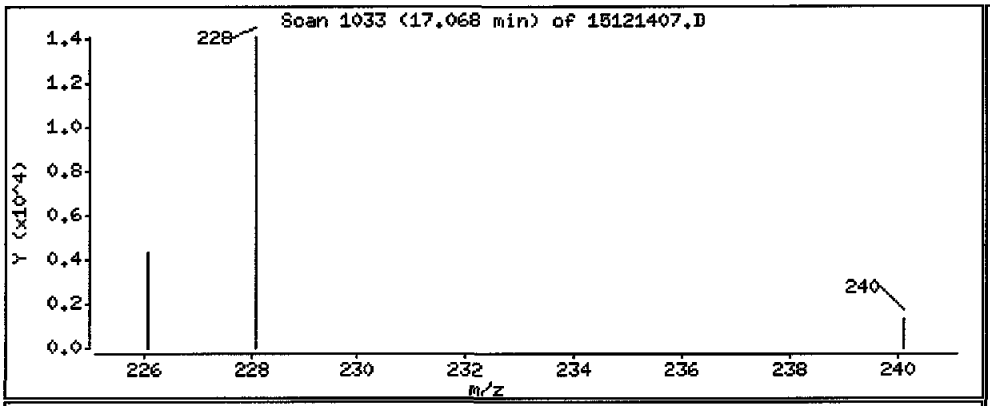
Client ID: PG-SMA2-2-PEMD-1511 Instrument: nt11.i

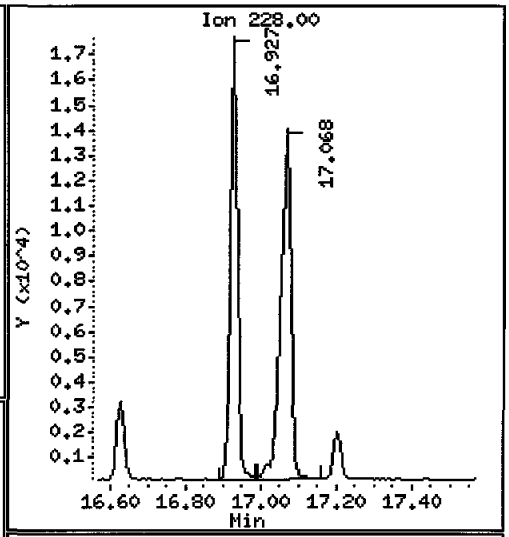
Sample Info: AQJ9M,10

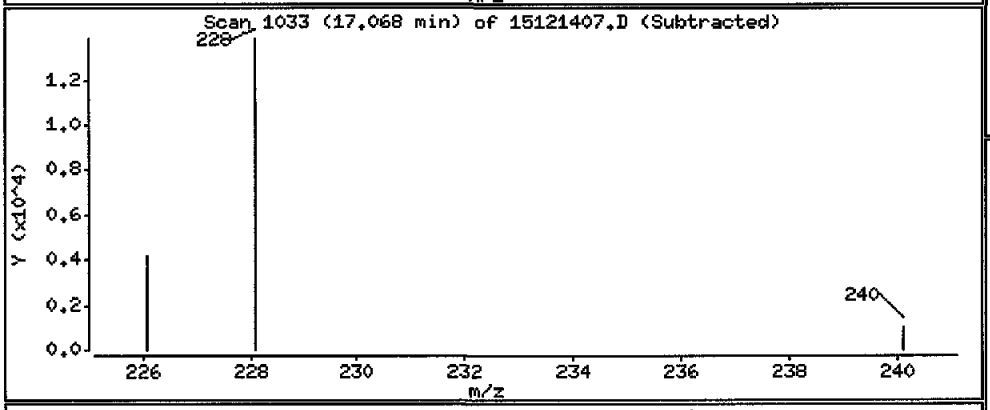
Volume Injected (uL): 2.0 Operator: VTS

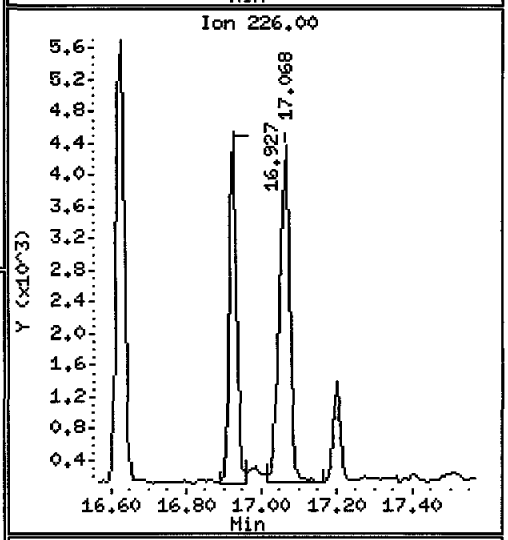
Column phase: Rxi-17Sil MS Column diameter: 0.25

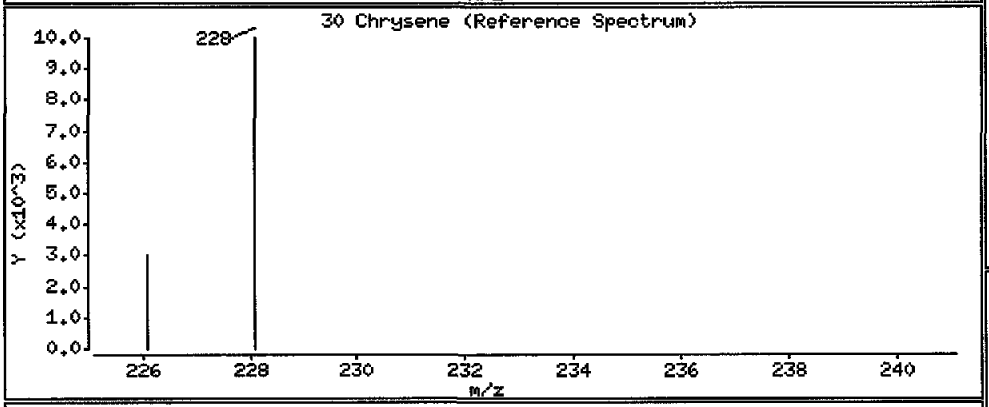
30 Chrysene Concentration: 15800 ug/kg

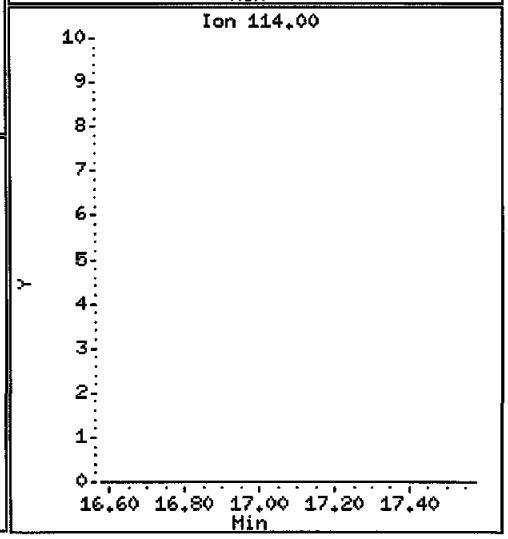


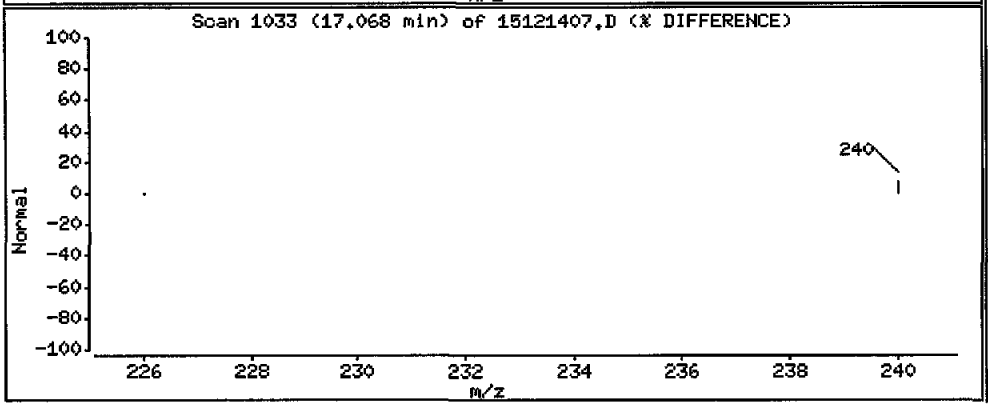












REVIEW SUMMARY FOR FILE - 15121407.D

Lab ID: AQJ9M
nt11.i, 20151214.b\lowsim.m, 14-DEC-2015 12:12

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt11.i,20151214.b\lowsim.m,Sublist: PEMD.sub = 3.0000

Exception: Naphthalene 7.0000
Exception: Phenanthrene 2.5000
Exception: Anthracene 2.0000
Exception: Pyrene 4.0000
Exception: Benzo(j)fluoranthene 2.5000
Exception: Benzo(a)pyrene 2.0000
Exception: Perylene 3.5000
Exception: Benzo(e)pyrene 2.0000
Exception: 2-Methylnaphthalene-d10 (Surr) 0.1000
Exception: Dibenzo(a,h)anthracene-d14 (Surr) 0.1000
Exception: Fluoranthene-d10 (Surr) 0.1000

ARI Labs, Inc.

LOW LEVEL PNAs BY SW8270D-SIM

Data file : \\target\share\chem3\nt11.i\20151214.b\15121408.D
Lab Smp Id: AQJ90 Client Smp ID: PG-SMA2-1-PEMD-1511
Inj Date : 14-DEC-2015 12:42 MS Autotune Date: 23-APR-2014 12:54
Operator : VTS Inst ID: nt11.i
Smp Info : AQJ90,10
Misc Info : 15-21402
Comment :
Method : \\target\share\chem3\nt11.i\20151214.b\lowsim.m
Meth Date : 15-Dec-2015 08:23 nt11.i Quant Type: ISTD
Cal Date : 04-DEC-2015 11:33 Cal File: 15120407.D
Als bottle: 8
Dil Factor: 10.00000
Integrator: HP RTE Compound Sublist: PEMD.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * Vt/(Ws * (100-M)/100) * CpndVariable

Name	Value	Description
DF	10.000	Dilution Factor
Vt	100.000	Volume of final extract (uL)
Ws	0.89000	Weight of sample extracted (g)
M	0.00000	% Moisture (not decanted)
Cpnd Variable		Local Compound Variable

12/15/15

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/mL)	CONCENTRATIONS FINAL (ug/kg)	
*	4 Naphthalene-d8	136	6.608	6.608	(1.000)	295716	200.000		
	5 Naphthalene	128	6.639	6.639	(1.005)	28084	16.4416	18500	B
$	6 2-Methylnaphthalene-d10	152	7.585	7.585	(1.148)	20575	18.7450	21100	
	7 2-Methylnaphthalene	142	Compound Not Detected.						
	8 1-Methylnaphthalene	142	Compound Not Detected.						
	10 Acenaphthylene	152	Compound Not Detected.						
*	11 Acenaphthene-d10	164	9.600	9.611	(1.000)	218344	200.000		
	12 Acenaphthene	153	9.667	9.667	(1.007)	12533	10.7155	12000	
	14 Dibenzofuran	168	Compound Not Detected.						
	15 Fluorene	166	10.497	10.497	(1.093)	17083	12.9277	14500	
*	18 Phenanthrene-d10	188	12.280	12.280	(1.000)	344692	200.000		
	19 Phenanthrene	178	12.324	12.324	(1.004)	220575	106.214	119000	
	20 Anthracene	178	12.379	12.379	(1.008)	32657	17.5682	19700	
$	23 Fluoranthene-d10	212	14.374	14.384	(1.171)	57265	30.2095	33900	
	24 Fluoranthene	202	14.413	14.413	(1.174)	518729	248.792	280000	
	25 Pyrene	202	14.903	14.912	(0.876)	324845	159.452	179000	
	28 Benzo(a)anthracene	228	16.926	16.926	(0.995)	37447	21.8330	24500	
*	29 Chrysene-d12	240	17.017	17.026	(1.000)	257252	200.000		
	30 Chrysene	228	17.067	17.075	(1.003)	39613	21.0434	23600	
	44 Benzo(b)fluoranthene	252	Compound Not Detected.						
	45 Benzo(k)fluoranthene	252	Compound Not Detected.						