# RECORD OF DECISION

**Operable Unit 4**
**Newtown Creek Superfund Site**
**Brooklyn, Queens, New York**

United States Environmental Protection Agency

Region 2

New York, New York

January 2025

747011

## DECLARATION FOR THE RECORD OF DECISION

## SITE NAME AND LOCATION

Newtown Creek Superfund Site
Kings County and Queens County, New York

EPA Superfund Site Identification Number: NYN000206282
Operable Unit: 04

## STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the U.S. Environmental Protection Agency's (EPA's) selection of an interim, early action remedy for Operable Unit 4 (OU4) of the Newtown Creek Superfund Site (Site), in Kings County and Queens County, New York, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §§ 9601 - 9675, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. This decision document explains the factual and legal basis for selecting the OU4 remedy. The attached index (see Appendix III) identifies the items that comprise the Administrative Record for this action, upon which the selected remedy is based.

The New York State Department of Environmental Conservation (NYSDEC) was consulted on the selected remedy in accordance with CERCLA §121(f), 42 U.S.C. §9621(f), and concurs with the selected remedy (see Appendix IV).

## ASSESSMENT OF THE SITES

Actual or threatened releases of hazardous substances at or from the Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

## DESCRIPTION OF THE SELECTED REMEDY

The remedial action described in this document addresses the East Branch portion of OU1 of the Newtown Creek Superfund Site (Figure 1). The East Branch is one of the five tributaries to Newtown Creek (Figure 2). The comprehensive remedial investigation/feasibility study (RI/FS) for all of OU1 of the Site is currently ongoing. EPA has determined that there is enough information available for the East Branch portion of OU1 to select an interim, early action while the full OU1 RI/FS continues. For administrative purposes, this interim, early action is referred to as OU4. For clarity throughout the rest of this ROD, OU4 will be referred to as the "East Branch portion of OU1."

The major components of the selected remedy include the following:

- Dredge to allow placement of a cap to maintain existing water depth with localized deeper dredging. The selected remedy includes the following primary components:
    - A pre-design investigation (PDI) to help fill data gaps and further refine our understanding of the East Branch Conceptual Site Model (CSM). The PDI will be developed with clear data quality objectives and assessment methods and will include, at a minimum, the following activities:
        - Collect additional sediment contaminant of concern (COC) data to refine the remedial footprints and depths of the various remedy components and to delineate potential principal threat waste (PTW) and Toxic Substances Control Act materials;
        - Collect additional porewater and/or groundwater COC data to refine cap designs;
        - Collect data to further delineate non-aqueous phase liquid (NAPL), investigate NAPL mobility, and determine the constituents present in NAPL;
        - Collect geotechnical data to support dredge design, cap design and shoreline stability evaluations;
        - Conduct investigations (*e.g.*, systematic as well as opportunistic seep sampling) and surveys to inform decisions on the need for upland source controls [*e.g.*, sealed bulkheads]).
    - Dredging to a minimum depth to accommodate capping without decreasing water depths. FFS dredge depth estimates range from 36 inches (in deeper water areas) to 53 inches (in shallower water areas) below the current mud line.
    - Dredging deeper in certain areas, to be determined during the design of the remedy, based on the following considerations:
        - potential for NAPL migration from the deeper soft and/or native material;
        - potential for human and/or ecological exposure to PTW;
        - depth to uncontaminated material;
        - and comparatively higher COC concentrations in remaining sediment.
    - In-situ stabilization (ISS) where needed to reduce migration of and/or for treating NAPL or PTW.
    - Capping of dredged areas where contaminated sediment is left in place or where the flux of COCs from groundwater is relatively high and could result in exceedance of remediation goals over time. Capping may also be determined to be necessary in areas where ISS is used to reduce migration of and/or for treating

NAPL and/or PTW. The design of the cap will be determined after completion of the PDI based on consideration of areas of relatively high groundwater dissolved phase COCs, NAPL presence, and erosion potential (particularly near combined sewer overflow discharges). The FFS assumes the placement of a multilayer engineered cap including the following layers: erosion protection, geotechnical filter (where appropriate), dissolved phase chemical isolation, and NAPL sorption. In addition, a habitat layer will need to be placed on top of the cap, where appropriate. Design of the cap may vary throughout the East Branch depending on location-specific conditions and/or constructability considerations and the thickness of the cap will be commensurate with the depth of dredging at any particular location.

- Backfilling (*e.g.,* placement of a clean sand layer), as needed, to maintain existing water depths.
- Shoreline stabilization, including ISS, slot dredging, or bulkhead replacement, stabilization and/or installation, as needed.
- Installing sealed bulkheads to address shoreline seeps, as needed based on the results of the PDI and as a preliminary measure while the related upland source is addressed through either state or federal enforcement authorities.
- Dewatering and off-site disposition of all dredged sediment and debris.
- Restoration of all impacted areas, taking into account the reasonably anticipated future uses of the East Branch and the adjacent shorelines.
- Institutional controls, as needed, to maintain the integrity of the implemented remedy (fish consumption advisories through NYSDEC will remain in place).
- A robust post-remedy implementation monitoring program to ensure the remedy is performing as designed and remains protective over time. The monitoring program would be structured so that any ongoing sources negatively impacting the protectiveness of the remedy can be identified and then it will be determined if those sources require additional controls, either through state and/or federal enforcement authorities, to be determined on a case-by-case basis.

The total net-present value cost is estimated to be $243.5 million.

Any upland source control measures that are determined to be needed to support the long-term protectiveness of the remedy will be implemented under state and/or federal enforcement authorities, as to be determined on a case-by-case basis.

Remediation and monitoring in the East Branch would be a key element of and integrated with the OU1 adaptive site management strategy that is being developed.

The design of the remedial action will consider resiliency measures related to anticipated climate change-related hazards and will specifically consider the intensity, frequency, or duration of extreme weather events; sea level rise; seasonal changes in precipitation and/or temperatures; and increasing risk of floods.

The environmental benefits of the selected remedy may be improved by consideration, during remedy design or implementation, of technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green Energy Policy.

## DECLARATION OF STATUTORY DETERMINATIONS

### Part 1: Statutory Requirements

The selected remedy meets the requirements for remedial actions set forth in CERCLA Section 121, 42 U.S.C. § 9621, because it meets the following requirements: 1) it is protective of human health and the environment; 2) it meets a level or standard of control of the hazardous substances, pollutants, and contaminants that at least attains the legally applicable or relevant and appropriate requirements (ARARs) under federal and state laws 3) it is cost-effective; and 4) it utilizes permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable. In addition, CERCLA Section 121 includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances as a principal element. Although this is an interim, early action, EPA fully anticipates that the remedy for the East Branch portion of OU1 will be consistent with the eventual final remedy selected for OU1. EPA further anticipates that the East Branch portion of the OU1 remedy, and the associated operation and maintenance activities, will be subsumed by the eventual final OU1 remedy.

### Part 2: Statutory Preference for Treatment

CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances as a principal element (or justify not satisfying the preference). In keeping with the statutory preference for treatment as a principal element of the remedy, if principal threat waste is encountered during additional sampling to be conducted to support the design of the selected remedy, it will be either dredged or treated through ISS. Dredged material will need to be treated prior to disposal. Mobility will effectively be eliminated not necessarily through treatment, but by shipping the dredged sediments to disposal facilities. There would be no reduction in toxicity, mobility, or volume of the COCs specifically through treatment for dredged sediments. However, an amendment will be added (as needed) to stabilize the removed material and meet transportation and disposal requirements. The addition of an amendment will reduce the mobility of contaminants contained within the sediments compared to unamended sediments. In addition, the NAPL and dissolved phase caps will effectively isolate the remaining contaminated sediments that are not removed, and a carbon-based amendment and/or NAPL adsorption media will be incorporated into the cap to prevent the migration of contamination through the cap. While the remedy may not meet the statutory preference for utilizing treatment to the maximum extent practicable, treatment will be utilized to address principal threat waste. Additionally, a degree of treatment is a secondary benefit of amendment addition during sediment processing (for transportation and disposal requirements).

**Part 3: Five-Year Review Requirements**

A review of the remedial action pursuant to CERCLA Section121(c), 42 U.S.C. §9621(c), will be conducted five years after the commencement of the remedial action to ensure that the remedy continues to provide adequate protection to human health and the environment because this remedy will result in hazardous substances remaining on-Site above health-based levels that allow for unlimited use and unrestricted exposure.

## ROD DATA CERTIFICATION CHECKLIST

The ROD contains the remedy selection information noted below. More details may be found in the Administrative Record file for this Site.

- Contaminants of concern and their respective concentrations may be found in the "Summary of Site Characteristics" section;
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD are discussed in the "Current and Potential Future Land and Resource Uses" section;
- Baseline risk represented by the contaminants of concern may be found in the "Summary of Site Risks" section;
- Cleanup levels established for contaminants of concern and the basis for these levels maybe be found in the "Remedial Action Objectives" section;
- Estimated capital, annual operation and maintenance (O&M), and total present-worth costs are discussed in the "Description of Remedial Alternatives" section;
- A discussion of principal threat waste may be found in the "Principal Threat Waste" section;
- Key factors used in selecting the remedy (*i.e.*, how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) may be found in the "Comparative Analysis of Alternatives" and "Statutory Determinations" sections.

**AUTHORIZING SIGNATURE**

BARRY BREEN

Digitally signed by BARRY BREEN
Date: 2025.01.16 10:53:42 -05'00'

Barry Breen, Principal Deputy Assistant Administrator
Office of Land and Emergency Managment

Date

# RECORD OF DECISION
# DECISION SUMMARY

Newtown Creek Superfund Site
Kings County and Queens County, New York

United States Environmental Protection Agency
Region 2
New York, New York
January 2025

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## SITE NAME, LOCATION, AND DESCRIPTION

The Newtown Creek Superfund Site (Site) is located in Kings County and Queens County, New York City, New York. The Site includes Newtown Creek (the Creek) and its five tributaries, including Whale Creek, Dutch Kills, East Branch, English Kills, and Maspeth Creek. The Site is located within the Newtown Creek Significant Maritime and Industrial Area (SMIA), one of six designated SMIAs in New York City. The Newtown Creek SMIA, at over 780 acres, is the largest SMIA in New York City, and includes portions of the Greenpoint, Williamsburg, Long Island City, and Maspeth industrial areas.

Newtown Creek and its tributaries comprise an estuarine water body that is generally oriented in an east-west direction, although the easternmost section of Newtown Creek and several of the tributaries are oriented north-south. The water in Newtown Creek is currently classified by NYSDEC as Class SD, saline surface water with a protected use of fishing, though it does not presently meet parameters for that protected use.

Newtown Creek itself is used for both commercial/industrial and recreational purposes and it is surrounded by a mix of residential, commercial, and industrial uses. These uses are expected to continue in the future. The total human population within a one-mile radius of the Site is estimated to be approximately 380,000. Figure 1 shows the Site and the current Study Area boundary.

## SITE HISTORY AND ENFORCEMENT ACTIVITIES

Historically, Newtown Creek drained the uplands of western Long Island and flowed through wetlands and marshes. In the mid-1800s, the area next to the 3.8-mile-long Creek was one of the busiest industrial areas in New York City. Industrial facilities were located along its banks, including more than 50 oil refineries, petrochemical plants, fertilizer and glue factories, sawmills, and lumber and coal yards. Newtown Creek was crowded with commercial vessels, including large ships bringing in raw materials and fuel and taking out finished products including petroleum products, chemicals, and metals. In addition to the industrial pollution that resulted from all of this activity, New York City began dumping raw sewage directly into the water in 1856. During World War II, the Creek was one of the busiest ports in the nation. Currently, factories, warehouses, public utilities, and municipal facilities operate along the Creek. Various contaminated facilities upland of the Creek have been, and some continue to be, sources of the contamination at Newtown Creek.

This industrial development resulted in a major reworking of the Creek banks and channel for drainage and navigation purposes. The channelizing and deepening of Newtown Creek and its tributaries were largely completed by the 1930s, defining its current configuration. This historical development has resulted in changes in the nature of Newtown Creek and its tributaries' natural drainage condition from one with tributary flow, to one that is governed largely by engineered and institutional systems.

The East Branch was created in 1884 by cutting into the previously marshy edges of the waterway to increase distribution of building materials to supply the residential population near this area of the Creek. Similar to other portions of the Creek, the East Branch is a highly engineered water body that was almost completely bulkheaded by the early 1900s.

In the early 1990s, New York State declared that Newtown Creek was not meeting water quality standards under the Clean Water Act. Since then, several state- and city-sponsored cleanups of properties in the Newtown Creek area have taken place, and many such cleanups are ongoing. A major upgrade of the Newtown Creek Wastewater Treatment Plant was completed in 2012.

In 2010, the Site was added to EPA's National Priorities List pursuant to CERCLA.

At complex sites, EPA often divides cleanup activities into different areas or OUs so that cleanup of an environmental media or areas that have been characterized can occur while the nature and extent of contamination at the remainder of the site is still being investigated. Such a phased approach provides for site contamination to be addressed in a more expeditious manner, generally prioritizing response actions to accelerate risk reduction and to provide additional site information on which to base long-term risk management decisions.

**Newtown Creek Study Area**

In 2011, an administrative order on consent (AOC) was signed between EPA and six Respondents, including the City of New York (NYC) and a group of five private parties known as the Newtown Creek Group (NCG) (CERCLA Docket No. CERCLA-02-2011-2011). The NCG includes Phelps Dodge Refining Corporation, Texaco, Inc., BP Products North America Inc., the Brooklyn Union Gas Company D/B/A National Grid NY, and ExxonMobil Oil Corporation. The 2011 AOC requires the Respondents to perform a remedial investigation (RI) and Feasibility Study for OU1 under EPA oversight. The OU1 Study Area is defined, generally, as the water and sediment of Newtown Creek and its tributaries up to and including the landward edge of the shoreline and is defined fully in the AOC. The full definition of the Study Area is as follows:

> "Study Area" shall mean the portion of the Newtown Creek Superfund Site that encompasses the body of water known as Newtown Creek, situated at the border of the boroughs of Brooklyn (Kings County) and Queens (Queens County) in the City of New York and the State of New York, roughly centered at the geographic coordinates of 40° 42' 54.69" north latitude (40.715192°) and 73° 55' 50.74" west longitude (-73.930762°), having an approximate 3.8-mile reach, including Newtown Creek proper and its five

> branches (or tributaries) known respectively as Dutch Kills, Maspeth Creek, Whale Creek, East Branch and English Kills, as well as the sediments below the water, and the water column above the sediments, up to and including the landward edge of the shoreline, and including also any bulkheads or riprap containing the water body, except where no bulkhead or riprap exists, then the Study Area shall extend to the ordinary high water mark, as defined in 33 C.F.R. §328.3(e), of Newtown Creek, and the areal extent of the contamination from such area, but not including upland areas beyond the landward edge of the shoreline (notwithstanding that such upland areas may subsequently be identified as sources of contamination to the water body and its sediments or that such upland areas may be included within the scope of the Newtown Creek Superfund Site as listed pursuant to Section 105(a)(8) of CERCLA)."

The RI/FS for OU1 of the Site is ongoing.

**Combined Sewer Overflow Discharges**

OU2 of the Site was initiated in 2018. Under the regulatory authority of the Clean Water Act (CWA), the New York City Department of Environmental Protection (NYCDEP) is under order by NYSDEC to implement a Long-Term Control Plan (LTCP) to reduce combined sewer overflow (CSO) discharges to the Creek. While the focus of the Newtown Creek LTCP, which was approved by NYSDEC in 2018, is on CWA objectives related to bacteria levels and dissolved oxygen concentrations in water bodies, the volume reductions required by the LTCP will also decrease the mass of CERCLA hazardous substances that are discharged to the Creek. As such, in 2018, EPA and NYC signed an AOC (CERCLA Docket No. CERCLA-02-2018-2020) for NYCDEP to conduct a Focused Feasibility Study (FFS), under EPA oversight, for OU2 of the Site, the primary goal of which was to determine if the volume controls laid out in the LTCP to meet the requirements of the CWA program are also sufficient to meet CERCLA requirements regarding current and reasonably anticipated future CSO discharges to the OU1 Study Area.

Based on the results of the OU2 FFS, EPA signed a Record of Decision (ROD) in April 2021, which selected a remedy of no further action at this time under the Superfund program to address the volume of CSO discharges to Newtown Creek, where no further action in this case assumes that the Newtown Creek CSO LTCP that NYCDEP is under order by NYSDEC to implement is, in fact, implemented as required by the schedule developed pursuant to the NYSDEC order. The ROD requires a post-ROD monitoring program to ensure the assumptions made in reaching this conclusion remain appropriate. This monitoring is being conducted pursuant to a 2022 AOC between EPA and NYC (CERCLA Docket No. CERCLA-02-2022-2003).

### Lower Two Miles of the Creek

OU3 of the Site refers to the evaluation of a potential interim, early action for the lower two miles of the Creek in the Study Area, as described in a 2019 AOC between EPA and the NCG (CERCLA Docket No. CERCLA-02-2019-2011). The NCG conducted an FFS under the 2019 AOC to evaluate if an interim, early action remedy for OU3 was scientifically and technically appropriate, and to develop and evaluate a focused range of cleanup action alternatives for OU3. After EPA's technical review and consultation with stakeholders, EPA determined that the selection of a remedy for this portion of the Creek should be deferred pending completion of the OU1 studies.

### East Branch

OU4, the subject of this decision document, refers to the East Branch portion of the OU1 Study Area. The East Branch is one of the five tributaries to Newtown Creek (Figure 2). It is a dead-end tributary to Newtown Creek with a surface area of approximately 11 acres, and it is approximately 0.5 miles in length. The East Branch is a tributary to the upper main stem of the Creek, and it is located between the creek head at the intersection of Metropolitan and Onderdonk Avenues and approximately Creek Mile 2.8 where it converges with English Kills. The downstream extent of the East Branch begins just upstream of the Turning Basin and continues upstream for approximately 0.16 miles before branching off into two lobes. The western lobe extends up to the CSO outfall located near Metropolitan Avenue, and the eastern lobe is referred to as the Western Beef Slip.

Approximately 80 percent of the shoreline within the East Branch currently contains bulkheads, with nearly all of the remaining shorelines containing riprap or other armoring (Figure 3). The bulkheads vary in their condition, and some require significant maintenance. Based on the 2022 bathymetric survey, the average bathymetric elevation in East Branch is -11 feet North American Vertical Datum of 1988 (NAVD88), with a minimum elevation of approximately -24 feet NAVD88 (Figure 4). Water depths extend to a maximum of approximately 21 feet below mean lower low water (MLLW); MLLW is +0.261feet above NAVD88. Tidal ranges are approximately up to 5 feet, and there are portions of the East Branch sediment that are exposed during low tide. The average width of the East Branch is approximately 214 feet in the downstream portion and western lobe and 111 feet in the narrower Western Beef slip.

A federally authorized navigation channel had been present in a majority of the East Branch. However, a recent study by the U.S. Army Corps of Engineers did not identify any commercial users of the East Branch that would require a navigation channel and, therefore, deauthorization of the East Branch navigation channel was included in the Water Resources Development Act of 2024 (WRDA 2024) bill. The WRDA 2024 bill was signed into law on January 4, 2025 and, as such, the East Branch navigation channel is no longer authorized.

Important infrastructure located in the East Branch includes the Grand Street swing bridge, an aeration system operated and maintained by NYC to improve dissolved oxygen levels, submerged electrical cable crossings below the Grand Street bridge, stormwater outfalls including two CSO outfalls, two municipal separate storm sewer system (MS4) outfalls, and approximately 35 stormwater outfalls. A project to replace the Grand Street bridge is currently being developed by NYC; EPA is actively coordinating with NYC on this activity and both the design and implementation of the remedy for the East Branch portion of the Site may be impacted by the bridge work.

### Ongoing Enforcement Activities

Twenty-four potentially responsible parties (PRPs) have been notified of their potential liability since the original 2011 OU1 AOC was entered into by EPA and six PRPs. In total, thirty PRPs have been notified thus far, and efforts to identify additional PRPs continue. It is anticipated that all notified PRPs will be asked to take part in the remedial design and/or remedial action activities associated with the Site, including the East Branch portion of OU1.

### Uplands

The area surrounding Newtown Creek is densely populated with a mixture of residential, commercial and industrial properties. Several properties adjacent to the Creek are currently being addressed under a NYSDEC regulatory program. These, and others, may be acting as ongoing sources of contamination to the OU1 Study Area, including the East Branch portion. At this time, NYSDEC is generally taking the lead regulatory role in addressing upland sources of contamination that may be acting as ongoing sources of contamination to the Creek. EPA and NYSDEC are working closely together to coordinate activities in an efficient and productive manner and, in consultation with NYSDEC, EPA may assume the lead role on particular upland properties where it is determined to be necessary and appropriate.

For upland properties that remain under NYSDEC jurisdiction, EPA anticipates that impacts, or potential impacts, to the OU1 Study Area will be taken into account by NYSDEC and incorporated into remedy decisions using its enforcement authorities. For example, it is EPA's strong preference that groundwater sampling at upland properties adjacent to the East Branch include the analysis of water samples for the presence of the East Branch contaminants of concern in the dissolved phase.

## HIGHLIGHTS OF COMMUNITY PARTICIPATION

EPA released the FFS report and the Proposed Plan for the East Branch portion of OU1 to the public for comment on August 28, 2024. EPA made these documents available to the public in the Administrative Record file at the EPA Superfund Records Room in Region 2, New York, and online at: https://www.epa.gov/superfund/newtown-creek. The initial 30-day public comment period on these documents was scheduled from August 28, 2024, to September 27, 2024, and was extended to October 28, 2024, then November 12, 2024, at the request of various community groups. The notice of availability for these documents and the notice of the start of the initial 30-day comment period was published in the Brooklyn Daily Eagle on August 28, 2024; in El Diaro on September 6, 2024; and in Nowy Dziennik on September 14, 2024. The first notice of extension was published on Friday, September 13, 2024, in El Diario and on Monday, September 16, 2024, in the Brooklyn Daily Eagle. The second notice of extension was published on Monday, October 21, 2024, in the Brooklyn Daily Eagle.

On September 18, 2024, EPA conducted a hybrid public meeting, which was held in-person at a venue called the Chatroom at Elsewhere, located at 599 Johnson Avenue, Brooklyn, New York, and virtually on Zoom, to inform local officials and members of the public about the Superfund process, present the findings of the RI/FS thus far and EPA's Proposed Plan for the East Branch portion of OU1 to the community, review current and planned remedial activities at the Site, and to respond to questions from area residents and other attendees. EPA's responses to the comments received at the public meeting and in writing during the public comment period are included in the Responsiveness Summary (see Appendix V).

## SCOPE AND ROLE OF RESPONSE ACTION

Section 300.5 of the NCP, 40 CFR Section 300.5, defines an OU as a discrete action that comprises an incremental step toward comprehensively addressing a site's contamination. A discrete portion of a remedial response eliminates or mitigates a release, a threat of release, or pathway of exposure. The cleanup of a site can be divided into a number of OUs, depending on the complexity of the problems associated with the site.

As described in the Site History and Enforcement Activities section above, EPA has divided the Newtown Creek Superfund Site, which includes the Creek itself, into four OUs. The current status of each OU is as follows:

- **Operable Unit 1**: A comprehensive RI/FS for OU1 was initiated in 2011 and is ongoing. EPA approved the RI report for the entire OU1 Study Area in April 2023. Prior to this, EPA approved the Baseline Human Health Risk Assessment (BHHRA) for OU1 in June 2017 and the Baseline Ecological Risk Assessment (BERA) for OU1 in October 2018. These documents are all available in the Administrative Record supporting this ROD. The FS Report for OU1 is currently being developed.

- **Operable Unit 2**: EPA approved the post-ROD monitoring plan for OU2 in April 2024. The goal of the monitoring program is to collect samples of the four major CSO outfall discharges quarterly and from additional point source discharges at least once during the first two years of monitoring. EPA will determine if adjustments to the monitoring program are appropriate based on the results.

- **Operable Unit 3**: Based on the analysis conducted as per the 2019 AOC related to OU4, it was determined that remedial decisions for the lower two miles of the Creek should be deferred pending completion of the OU1 studies. No further work related directly to OU3 is being conducted at this time.

- **Operable Unit 4**: OU4 refers to the East Branch portion of OU1, which is one of the five tributaries to Newtown Creek and the subject of this ROD. Based on an FFS conducted by the NCG under EPA oversight for the East Branch portion of OU1 and data collected through the OU1 RI, EPA has determined that there is enough information to select an interim, early action for the East Branch portion of OU1 while the full OU1 RI/FS continues. The draft final FFS for OU4 was released in August 2024, and its conclusions were based primarily on the OU1 RI, BHHRA, BERA and ongoing FS.

**Basis for an Interim Remedy for the East Branch**

This ROD identifies an interim, early action for OU4, which is to address the East Branch portion of OU1. EPA is using an adaptive management approach for the entire Site consistent with EPA's Adaptive Management Framework, which is described as "a formalized process to manage risks from contaminated sediment sites where iterations of remediation, monitoring, and progress evaluations are guided by a formalized adaptive management plan that establishes the goals of the project, sets expectations, uses monitoring data to evaluate progress towards those expectations, and adapts the remedy as necessary based on those evaluations" (OLEM Directive No. 9200.1-166). EPA has developed a Site-specific memorandum titled, "Framework for the Operable Unit One Remedial Action Objective and Preliminary Remediation Goal Approach" that is included in the Administrative Record for this ROD (EPA, November 2023, referred to herein as the "Framework"). This Framework is an initial step towards describing the adaptive management approach that will be utilized at this Site, and the East Branch interim, early action is consistent with this Framework. A formal Adaptive Site Management plan, which will incorporate the Framework, is currently under development for the entire Site.

EPA has determined that conducting an interim, early action in the East Branch portion of OU1 while the full OU1 RI/FS is being completed would be beneficial for the following primary reasons:

- It will expedite the overall Site response by implementing remedial measures in one of the most upstream portions of the OU1 Study Area.

- It will result in immediate risk reduction and contaminant mass removal in this portion of the OU1 Study Area (and, to a lesser extent, within the OU1 Study Area as a whole).
- It will provide an opportunity to gain direct remedial experience working in the Creek, which would help all parties involved gain experience with the logistics of conducting remedial work in the remainder of the Site and help inform future efforts.
- Lessons learned from conducting the action (and associated pre-design investigation (PDI), remedial construction, and post-remedy implementation monitoring) will help inform the conduct of potential future early actions on other portions of the Creek, as well as the overall OU1 FS alternatives development, evaluation, and remedy selection as well as the eventual implementation of the OU1 remedy.
- It will provide an opportunity to validate and update the broader conceptual site model (CSM) that is being refined for the full OU1 Study Area. The interim, early action will include a robust post-remedy implementation monitoring program, and if the monitoring shows that the assumptions used to develop the East Branch CSM are not accurate, the CSM will then be updated accordingly.

It is EPA's expectation at this time that the post-remedy implementation monitoring conducted as part of this interim, early action would continue until such a time as this selected remedy is subsumed into a final remedy for the Site. Since the RI/FS for the entire OU1 Study Area is still ongoing, the remedy selected for the East Branch portion of OU1 is considered interim at this time while EPA's overall CSM of the Site is being further refined.

## SUMMARY OF SITE CHARACTERISTICS (OU1 STUDY AREA)

### Geology and Hydrogeology

Newtown Creek is a tributary of the East River. The Creek experiences twice-daily tidal exchange with the East River, a tidal estuarine water body, causing fluctuation in water elevation and salinity. Tidal ranges in Newtown Creek are approximately 5 to 6 feet. Stratified flow conditions can develop within portions of Newtown Creek during flood tide as a result of less-dense, fresher water flowing toward the East River in a surface layer and more saline water flowing inland in a bottom layer. Current freshwater inputs to the Study Area include groundwater, point and non-point source discharges, and overland flow. Upland groundwater aquifers are hydrologically connected to the Newtown Creek sediment bed. Within the Study Area, groundwater occurs in various stratigraphic units, including artificial fill, fluvial creek and marsh deposits, and mixed glacial deposits that make up the Upper Glacial Aquifer. Point source discharges to the Creek include more than 300 private and municipal outfalls along the Creek and its tributaries. These point sources primarily supply freshwater to Newtown Creek during wet-weather conditions and include individually permitted stormwater and wastewater discharges, CSO discharges, unpermitted discharges, and treated wastewater discharges from the

Newtown Creek Wastewater Treatment Plant (WWTP). Stormwater runoff from roadways and overland flow are also discharged to the creek. While Newtown Creek is an industrial urban waterway, various fauna are found within the Study Area.

The Creek bed is described using three separate layers: surface sediment, subsurface sediment, and native material. Surface sediment at the Site is defined as sediment within the top 6 inches of the sediment column, subsurface sediment at the Site is defined as sediment below the top 6 inches of the sediment column to the native material interface, and native material at the Site is defined as the glacial and post-glacial deposits present below the sediment. The thickness and content of these sediment layers vary throughout the Study Area based on natural variation of the elevation of native material as well as anthropogenic modifications to the Creek over time. Sediment inputs to Newtown Creek include sediment loads from the East River during each flood tide and point source discharges and overland flow from the urban watershed. Sediment bed resuspension is typically associated with high energy episodic events (e.g., storms) and anthropogenic influences (e.g., propwash). The underlying native materials contain varying percentages of coarse-grained and fine-grained materials.

Groundwater inputs to the Creek system are variable throughout the Study Area, the stratigraphic layers below the Creek waterways have varied physical (e.g., grain size, porosity) and chemical partitioning (e.g., total organic carbon content) properties, which contribute to spatial variability in contaminant fate and transport. The CSM assumes that the primary lateral groundwater flow path from upland locations to the Creek is through the underlying native materials, given the significant percentages of higher permeability medium- to coarse-grained materials within this layer. However, the groundwater flow through the native materials may be altered by shoreline structures (e.g., sheet piles) and the operation of groundwater extraction systems by upland property owners.

**Results of the Remedial Investigation**

The Site has been extensively studied through the OU1 RI/FS process. RI field work began in February 2012 and was completed in 2015. FS field work began in spring of 2017 and was completed in 2019. To further support the RI/FS process, EPA recently completed a study to characterize lateral groundwater discharge along the shoreline of the Creek, and the data is currently being evaluated. In addition, the NCG completed a sitewide bathymetric study in 2022 and recently completed a supplemental data collection effort in the Creek to support FS evaluations within the OU1 Study Area. Overall, the RI/FS field work has included sampling of surface water, surface sediment, subsurface sediment, groundwater, air, non-aqueous phase liquids (NAPL), ebullition, seeps, shoreline soil, point and non-point discharges, and biota, as well as physical and ecological surveys, multiple bathymetry surveys, and toxicity testing. The final RI Report was completed and approved by EPA in April 2023, and as previously mentioned, the draft FS for the OU1 Study Area is currently being prepared.

There are many ongoing, external sources of contamination to the Study Area (Figure 5). These include MS4 outfalls, the Newtown Creek WWTP treated effluent outfall, permitted industrial discharges, other permitted/non-permitted discharges, overland flow/direct drainage, other non-point sources, the tidal effects of the East River, atmospheric deposition, shoreline seeps/groundwater discharge from upland properties, and shoreline bank erosion, as well as CSO discharges.

Some of these sources may be considered both internal and external to the Study Area. For example, contamination may be entering the Creek below the mean high-water line through seeps, but the source of the contamination may be from the surrounding upland area. Other ongoing sources that fall into this category include lateral groundwater and shoreline bank erosion. These types of sources are referred to as "internal/external interface sources" herein. As is explained later in this ROD, this distinction is important to the development of the remedy for the East Branch portion of OU1. Representative samples from all of the ongoing sources were collected as part of the OU1 RI/FS process.

As part of the OU1 RI/FS, a complex set of interrelated models has also been developed. Hydrodynamic and sediment transport models (which include linked groundwater and point source models) were submitted with the final RI Report and have been reviewed (both internally and through the peer review process), refined, and finalized. EPA has also developed a long-term equilibrium (LTE) model to assess the impact of ongoing sources of contamination on the OU1 Study Area (including the East Branch). The LTE model is currently under review by technical experts outside of the project team. This model and its use in the remedial process is described more fully in later sections of this document. A contaminant fate and transport model had also been under development. However, EPA determined that the hydrodynamic and sediment transport models provide a detailed understanding of site characteristics and potential physical transport mechanisms impacting the Site, and those models, in conjunction with the LTE model, can be used in the evaluation of remedial alternatives for OU1. As such, completion of the contaminant fate and transport model was discontinued but inputs developed as part of the contaminant fate and transport model are being incorporated into the LTE model. Based on data collected as part of the OU1 RI/FS field program and current modeling, development of the CSM for the OU1 Study Area is well advanced. Additionally, the lateral groundwater discharge study data, data obtained as part of the OU2 post-ROD monitoring program, and additional sediment and surface water data will help further refine the OU1 CSM, as will the design and implementation of a remedy for the East Branch portion of OU1.

Elevated concentrations of contamination were found throughout the OU1 Study Area during the RI. Much of this contamination is due to historical inputs of contamination to the Creek, and contamination is found in the surface and subsurface sediment of the Creek and in the underlying native material. In-Creek processes may lead to the spread of this contamination within the Study Area. These processes include gas ebullition (bubbling)-facilitated contaminant/NAPL transport, sediment resuspension, NAPL dissolution and migration, and vertical groundwater discharge. In addition, ongoing sources of contamination will continue to add contamination to the Study Area. While EPA anticipates the amount of contamination entering the Creek from ongoing sources will decrease over time due to various factors, including cleanup of upland properties, greater regulatory control, and improved practices for managing waste and stormwater, all ongoing external sources of contamination cannot be completely eliminated.

Additional data from ongoing point sources and the East River will also be obtained as part of the OU2 post-ROD monitoring program. These data will be considered, as appropriate, in the design for the East Branch portion of OU1 remedy. Additionally, the lateral groundwater discharge study data and additional sediment and surface water data will help further refine the OU1 CSM, as will the design and implementation of a remedy for the East Branch portion of OU1.

As part of the RI/FS process, EPA also approved the Baseline Human Health Risk Assessment (BHHRA) for the Site in June 2017, and the Baseline Ecological Risk Assessment (BERA) for the Site in November 2018. The findings of the BHHRA and BERA are further discussed in the Summary of Site Risks section below.

## SUMMARY OF SITE CHARACTERISTICS (EAST BRANCH)

### Geology and Hydrogeology

The sediment bed throughout the East Branch is a cohesive (muddy) bed, with varying amounts of fine (clay or silt-sized) particles and coarse (sand-sized) material, with an average sediment thickness of 13 feet, and with significantly greater sediment thicknesses in the western lobe of between 16 and 26 feet (see Figure 6 ). The sediment bed is underlain by native materials, which consist of glacial (Upper Glacial Aquifer) and post-glacial (historical marsh, lacustrine, and fluvial creek) deposits.

The hydrodynamics of the East Branch (similar to other areas of Newtown Creek) are dominated by twice-daily tidal flows from the East River and by storm-driven freshwater inputs from over 35 individual point source discharges (direct discharges from individual sites, highway drains, MS4 outfalls, CSO outfalls, and overland flow) creating a dynamic local environment that exhibits a unique combination of solids loads and depositional characteristics. Freshwater also enters the East Branch from groundwater discharge, which occurs vertically at the base of the East Branch through the sediment bed and laterally through vertical permeable shorelines to the surface water (*i.e.*, lateral discharge). EPA's lateral groundwater study mentioned previously included investigations of the groundwater entering the East Branch laterally from upland properties. The data from the lateral groundwater study will be incorporated into the design of the remedy for the East Branch.

During dry weather, salinity in the East Branch ranges from approximately 12 to 24 practical salinity units and are slightly lower than those of the main stem and the East River. However, during wet weather, salinity is more variable and is generally less than salinity during dry weather. Salinity is a proxy for the saltwater versus freshwater inputs in the East Branch and their temporal variability.

**Results of Remedial Investigation**

The following discussion of the nature and extent of contamination in the East Branch is focused on the list of COCs that has been developed for the overall OU1 Study Area. Based on the results of the HHRA and BERA that were conducted for the entire OU1 Study Area, the COCs include total polycyclic aromatic hydrocarbons (TPAH(34)[1]), C19-C36 aliphatic hydrocarbons,[2] total polychlorinated biphenyls (TPCBs),[3] total dioxins/furans (measured as toxicity equivalence quotients, or TEQs, and represented below by Dioxins/Furans TEQ),[4] copper, and lead. More information about the development of the list of COCs and risk-based preliminary remediation goals (PRGs) is presented in the Summary of Site Risks and Remedial Action Objectives sections below. Appendix A of the FFS report, which is included in the administrative record for this remedial decision, includes several figures showing the nature and extent of contamination in the East Branch portion of the OU1 Study Area.

In surface sediment, there is no clear spatial distribution pattern associated with measurements of TPAH(34), C19-C36 aliphatic hydrocarbons, and lead concentrations in the East Branch. However, concentrations of TPCBs, Dioxins/Furans TEQ, and copper in surface sediment decline from the East Branch's confluence with the main stem of the Creek moving upstream to the head of the tributary (western lobe). Generally, COC concentrations in surface sediment in the East Branch are similar to or lower than COC concentrations in other areas of Newtown Creek. All COCs were detected in surface sediment at concentrations greater than their respective risk-based PRG (Table 1).

In subsurface sediment, COC concentrations are higher than surface sediment concentrations in nearly all cases. There is no clear spatial distribution pattern associated with measurements of TPCBs and lead concentrations in subsurface sediment in the East Branch. Generally, TPAH(34) and copper concentrations are elevated at the confluence with the main stem and in Western Beef Slip and decrease upstream toward the head of the tributary (western lobe). On the other hand, concentrations of C19–C36 aliphatic hydrocarbons and Dioxins/Furans TEQ are higher at the

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1 TPAH 34 includes both the 17 compounds included in the TPAH (17) method, as well as 17 other C1- to C4-alkylated homologs of 2- to 6-ring PAHs. TPAH(17) includes the 16 priority pollutant polycyclic aromatic hydrocarbons (PAHs) listed in the CERCLA list of hazardous substances, as well as 2-methylnaphthalene.
2 C19-C36 aliphatic hydrocarbons are a group of hydrocarbons that contain a specific number of carbon atoms.
3 Total PCBs refers to a group of 209 congeners. Some of the congeners are referred to as dioxin-like PCBs because they have chemical structures, physicochemical properties, and toxic responses similar to 2,3,7,8-TCDD. Some commercial PCB mixtures are known in the United States by an industrial trade name, Aroclor. In the environment, PCBs occur as mixtures whose compositions differ from the commercial Aroclor mixtures.
4 Twelve PCB congeners and seventeen dioxin/furan congeners have been assigned Dioxins/Furans TEQ toxic equivalence factors (TEF) according to the World Health Organization (WHO) toxic equivalence (TEQ) weighting scheme for mammals and the Van der Berg et al. weighting schemes for fish and birds.

head of tributary (western lobe). Generally, COC concentrations in subsurface sediment in the East Branch are similar to or lower than COC concentrations in other areas of Newtown Creek. All COCs were detected in subsurface sediment at concentrations greater than their respective risk-based PRG (Table 2)

In native material TPAH(34), C19-C36 aliphatic hydrocarbons, and lead concentrations are generally two to three orders of magnitude less than those in subsurface sediment. TPCBs and copper concentrations are generally one to two orders of magnitude less than those in subsurface sediment. Dioxins/Furans TEQ was detected in one sample in the native material. Other than one sample with a C19-C36 aliphatic hydrocarbons concentration greater than the risk-based PRG, all other COC concentrations detected in native material were less than their respective risk-based PRG.

Shallow porewater samples (0 to 12 inches below sediment surface) were analyzed for all Site COCs except for C19–C36 aliphatic hydrocarbons and Dioxins/Furans TEQ, because these were not initially identified as potential COCs for the Site. There is no clear spatial distribution pattern associated with measurements of TPAH(34) and lead concentrations in shallow porewater in the East Branch. Concentrations of TPCBs and copper in shallow porewater are higher near the East Branch's confluence with the main stem of the Creek than at the locations closer to its head (western lobe). TPCB concentrations in porewater from 1 to 2 feet below sediment surface (collected during the FS) in the eastern lobe are higher than in shallow porewater at the confluence with the main stem.

Only one mid-depth porewater sample was collected in the East Branch, from a depth interval of 1.5 to 3.5 feet. Mid-depth porewater samples are porewater samples collected from mid-depth within the subsurface sediment, at the approximate midpoint between the mudline and underlying native material. Since only one sample was collected, no spatial pattern could be determined. However, in the mid-depth porewater sample, TPCBs and copper concentrations were greater than, TPAH(34) concentrations were similar to, and lead concentrations were less than, concentrations detected in shallow porewater samples collected at this one location.

Groundwater samples collected from monitoring wells within the Creek were analyzed for all Site COCs except for Dioxins/Furans TEQ. Dissolved lead was only detected in one groundwater sample; as such, no spatial pattern could be determined. There is no clear spatial distribution pattern associated with measurements of TPAH(34), C19–C36 aliphatic hydrocarbons, and dissolved copper in groundwater below the East Branch. The lowest concentrations of TPCBs in groundwater were observed at the head of the tributary (western lobe). The lateral groundwater study described above will provide additional information on groundwater impacts to the East Branch.

Observations of NAPL blebs in sediment were located sporadically throughout the East Branch area and are not clustered at a particular location. Similarly, visual observations of surface and subsurface sediment samples identified sheen intermittently throughout the East Branch, and visual observations of sediment samples collected in the eastern lobe (also referred to as the Western Beef slip) identified sheen in the majority of samples collected (note that sheen is the appearance of iridescence on the surface of sediment or water and can be due to biological degradation of organic material or other processes; it is not necessarily indicative of the presence of Site COCs). NAPL blebs were also observed in the shake tests of two subsurface sediment cores collected in the eastern lobe. Mobile NAPL, defined as non-residual NAPL that can move through advection and as measured through laboratory testing, was not identified in the East Branch. However, the mobility of NAPL in untested areas of the East Branch is unknown, and changes to in-situ conditions and/or anthropogenic disturbances could potentially mobilize NAPL (both in tested and untested areas). Limited laboratory analysis of NAPL from the OU1 Study Area shows that it generally consists of TPAH(34) and TPCBs, though additional data is needed to more fully understand the composition of NAPL throughout the OU1 Study Area.

Gas ebullition originates primarily in surface and shallow subsurface sediment when water/sediment temperatures are generally higher and water depths are shallower (near the hours of low tides) and organic content in sediments is high enough to support the biogenic production of gases (mostly methane). When gas ebullition occurs in the presence of sheen-bearing material (NAPL or other organic materials), or below these materials, those constituents may be transported with gas bubbles to the water column, creating sheens that develop and/or expand. Gas ebullition-facilitated sheens were observed during surveys within the East Branch, indicating that gas ebullition-facilitated transport of NAPL is an on-going process. Gas ebullition can also transport contaminants from the sediment bed to the water column.

In the Study Area overall, spatial patterns in particulate phase TPAH(34), TPCB, copper, and lead concentrations in surface water show similar patterns to those in whole water (particulate, plus dissolved phase) samples, specifically that concentrations tend to increase with increasing distance upstream in the main stem of the Creek. Particulate phase TPAH(34) and TPCB concentrations in surface water also tend to be higher in the more upstream tributaries, like the East Branch. These patterns tend to be more prevalent during wet weather conditions.

In summary, COC concentrations in the sediment generally increase with depth, whereas COC concentrations in native material are generally one or two orders of magnitude lower than COC concentrations in the surface and subsurface sediment. Areas of sediment where COC concentrations do not increase with depth (*e.g.*, near CSO discharge locations at the head of the western lobe) have likely been affected by resuspension, redeposition, and mixing. COCs are detected and elevated in media other than sediments, including surface water, porewater and groundwater. Sheens have been observed intermittently throughout surface and subsurface sediment; NAPL blebs have been occasionally observed in subsurface sediment. Sheens have been observed in surface water due to ebullition. NAPL has been observed to be immobile (under conservative laboratory test conditions) at two locations tested in the East Branch, but existing immobile NAPL may be mobilized during implementation of the remedy, and mobile

NAPL may be identified during the PDI that will be conducted as part of this interim, early action.

## Ongoing Sources of Contamination to the East Branch

There are many ongoing sources of contamination to the East Branch portion of OU1, both internal to the OU1 Study Area and external to the Creek. Internal ongoing sources of contamination to the East Branch include, but are not necessarily limited to, sediment resuspension from within the OU1 Study Area, movement of sediment and surface water through tidal flow, ebullition-facilitated transport, NAPL dissolution to porewater, porewater migrations, and dissolved-phase exchange processes.

As is described in the Summary of Site Characteristics (OU1 Study Area) portion of this ROD, there are also many external sources of contamination to the East Branch portion of the OU1 Study Area, some of which may be considered internal/external interface sources. These sources include, but are not necessarily limited to, CSO discharges, MS4 discharges, permitted and non-permitted discharges, overland flow, groundwater flow, seeps (including groundwater and NAPL), bank erosion, and atmospheric deposition.

Overall, the East Branch is net depositional, though there are locally erosional areas. The relative impact of the ongoing sources varies throughout the East Branch. Depositing solids and COC loads originate primarily from point sources (*i.e.*, CSO and stormwater outfalls). East River solids comprise approximately 30 percent of the deposited sediment and less than 10 percent of the COC load in the East Branch. Findings of the OU1 RI/FS show that the contribution to COC loads from the other ongoing sources is less significant in the East Branch portion of OU1 than in other portions of OU1, though this finding will continue to be evaluated on an ongoing basis during and after implementation of a remedy for the East Branch.

EPA has developed the LTE model mentioned previously to assess the impact of ongoing sources of contamination on the OU1 Study Area (including the East Branch). The LTE model estimates the concentration of COCs in surface sediment that would occur from the ongoing sources of contamination assuming that the concentration of COCs in sediment were zero to start. In other words, it measures the amount of recontamination that would be expected to occur from ongoing external sources after a remedy is implemented. The output of EPA's LTE model is a cumulative distribution function (CDF) for each COC which shows the percentage of likelihood that a concentration is equal to or below the concentration indicated. The LTE model was developed using data from the OU1 RI/FS and will be updated over time using data obtained through the ongoing OU1 RI/FS, OU2 post-ROD monitoring program, the PDI, baseline monitoring conducted prior to remedy implementation, and post-remedy implementation monitoring conducted as part of the selected remedy for the East Branch portion of OU1.

### Conceptual Site Model

The CSM for the East Branch is presented in Figure 7, which has been developed based on the data collected as part of the OU1 RI/FS process as well as the current and reasonably anticipated future uses outlined in this section.

Information gained through the OU1 RI/FS was used to conduct an FFS for the East Branch portion of OU1 Study Area, which developed and evaluated remedial alternatives for the East Branch. A draft FFS was submitted to EPA in July 2023, and a draft final version was submitted in August 2024 shortly before the release of the East Branch Early Action Proposed Plan. The final FFS was submitted to EPA shortly before the release of this ROD and is available for review as part of the Administrative Record for this action.

## CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

As mentioned previously, the Site is located within the Newtown Creek SMIA, one of six designated SMIAs in New York City. The Newtown Creek SMIA, at over 780 acres, is the largest in New York City, and it includes portions of the Greenpoint, Williamsburg, Long Island City, and Maspeth industrial areas. The predominant land use in the Newtown Creek area remains industrial with smaller areas of commercial and residential development. The water in Newtown Creek is currently classified by NYSDEC as Class SD, saline surface water with a protected use of fishing. The Creek does not presently meet parameters for that protected use (primarily because of low dissolved oxygen). While the above-mentioned maritime industrial activities are expected to continue into the future, the Creek is also used for recreational uses, including kayaking and canoeing, and there are a limited number of existing and planned waterfront access points. Despite a New York State Department of Health fish advisory to limit fishing in Newtown Creek, posted warnings, and public outreach efforts, fishing and crabbing has been observed on the Creek.

Each of these current and reasonably anticipated future Site uses are described in more detail below. These uses are generally applicable to the entire Creek; specific details of relevance to the East Branch are highlighted.

### Navigation

Newtown Creek is currently an active navigable waterway with a federally authorized channel and is expected to continue to be an industrial waterway in the future. Based upon recent analysis from the U.S Army Corps of Engineers, the currently authorized navigational depths for portions of the Creek can be reduced in extent and depth and still meet the expected future industrial uses, and other portions can be deauthorized for navigation purposes.

As mentioned previously, a federally authorized navigation channel had been present in a majority of the East Branch. However, a recent study by the U.S. Army Corps of Engineers did not identify any commercial users of the East Branch that would require a navigation channel and, therefore, deauthorization of the East Branch navigation channel was included in the WRDA 2024 bill. The WRDA 2024 bill was signed into law on January 4, 2025, and, as such the East Branch navigation channel is no longer authorized.

### Recreation, Fishing, and Crabbing

Newtown Creek is currently used for recreational purposes such as boating. Recreational uses are expected to continue and likely expand as cleanup of the waterway enhances the opportunities for use. The Creek is also currently used by some people for fishing and crabbing. The New York State Department of Health has developed fish consumption advisories identifying consumption limits for fish and crabs in Newtown Creek (and other waterways within New York City), and, in consultation with the community, EPA has placed signs at known fishing/crabbing locations along the Creek advising anglers of the Superfund site designation and the State fish consumption advisories. However, the Creek is still used for fishing and crabbing, and some people continue to consume what they catch. This is expected to continue.

### Upland Uses

Uses of the areas surrounding the Creek are highly varied, and they include industrial properties, commercial properties, residential properties, recreational access areas, and abandoned properties. In addition, many upland properties adjacent to the Creek are contaminated from past industrial uses and are being addressed through State and non-Superfund federal cleanup actions.

EPA expects that when development/reuse of land adjacent to the Creek occurs, it will result in a broader range of land use, generally leading to increased human presence at the Creek. While the mix of industrial, commercial, and residential properties may remain similar over time, the exact use of particular lots may change, and there is a strong desire from the community to create more recreational options and soft shorelines.

Regarding the East Branch in particular, current upland uses surrounding the East Branch primarily consist of a wide variety of industrial and commercial operations, including building materials suppliers, corporate offices, retail businesses, storage facilities, and construction materials wholesalers, with limited residential use. However, future redevelopment of land adjacent to the East Branch may result in a broader range of land use, including potentially more residential use.

### Ecological Uses

Newtown Creek includes urban ecosystems that provide ecological benefits to environmental flora and fauna. EPA expects that general trends already underway in the Creek toward healthier and more diverse ecosystems will continue and will be supported by actions taken by EPA to address the Site, along with other actions (*e.g.*, improved watershed management practices and greater regulatory control). EPA also expects that several locations along the waterway may be changed from bulkheads to soft shorelines that would enhance ecosystem diversity.

### Groundwater and Surface Water Use

As mentioned above, the water in Newtown Creek is currently classified by NYSDEC as Class SD, saline surface water with a protected use of fishing. Therefore, industrial activities are expected to continue into the future, and as mentioned above, Newtown Creek is also used for recreational uses, including kayaking and canoeing, which is expected to continue. There are no current or anticipated future uses of groundwater on or near the Site.

### Environmental Justice

EPA's environmental justice (EJ) screening tool, EJScreen, is a mapping and screening tool that provides EPA with a nationally consistent dataset and approach for combining environmental and socioeconomic indicators. An EJ Screen analysis was conducted of the area within a 1-mile radius of the East Branch. The EJ analysis looked at thirteen EJ indexes and supplemental indexes in EJScreen reflecting the 13 environmental indicators: particulate matter, ozone, diesel particulate matter, air toxics cancer risk, air toxics respiratory hazard index, toxic releases to air, traffic proximity, lead paint, hazardous waste proximity, underground storage tanks, wastewater discharge, risk management program (RMP) facility proximity, and Superfund proximity. These EJ and supplemental indexes are a combination of environmental and socioeconomic information. The report generated from EJScreen found that people of color make up more than half of the community and approximately 47 percent of the population consists of non-English speakers. Hazardous waste and Superfund sites near the Site include the Greenpoint Petroleum Remediation Project and the Meeker Avenue Plume Superfund site. The EJ screen analysis indicates that the community within a 1-mile radius of this portion of the site falls close to or above the 80$^{th}$ percentile in 12 of the 13 environmental justice and supplemental indices. Based on these results it is likely that this area is a community with EJ concerns.

The findings of the report confirm that the outreach efforts EPA has been making are reasonable and appropriate. Regular community engagement at the Site has been ongoing for more than 10 years. Outreach has been conducted through social media, public meetings, and by attending Community Advisory Group meetings, and Site-related information has been provided in multiple languages including English, Polish, Spanish, and Chinese. This ensures the factors above are taken into account for effective and appropriate outreach.

### Climate Change

Potential climate change impacts to the East Branch include high vulnerability to sea level rise, flooding, and extreme heat. Annual days with maximum temperatures >90°F are expected to increase by approximately 18 days between 2035 and 2064 and by approximately 56 days between 2070 and 2099. Annual counts of intense rainstorms – those that drop two or more inches in one day – are projected to increase to approximately 3 rainstorms per year by 2099. Historically, Kings County and Queens County averaged 1 to 2 intense rainstorms per year. The design of the remedial action will consider resiliency measures related to these anticipated hazards and will specifically consider the intensity, frequency, and duration of extreme weather events; sea level rise; seasonal changes in precipitation and/or temperatures; and increasing risk of floods.[5]

## SUMMARY OF SITE RISKS

The human health risk assessment (HHRA) for Newtown Creek evaluated potential current and future risks to recreational users, including sailboat users, recreational boaters, swimmers and bathers, shoreline recreators, Plank Road recreational users, recreational anglers and crabbers as well as residents, industrial workers, including landside workers, dockside workers, general construction workers, and Hunter's Point construction workers. Trespassers or homeless individuals, in and near the canal were also evaluated. The HHRA evaluated the potential human risks from exposure to surface water, sediment, ambient air and ingestion of fish and shellfish (crabs). The potential ecological receptors using the creek includes aquatic plants, invertebrates, fish, crabs, aquatic birds and mammals. The potential ecological risk to these receptors from exposure to surface water and sediment in Newtown Creek was evaluated in the baseline ecological risk assessment (BERA). The risk assessments developed for Newtown Creek evaluated creek-wide exposure, however the results of the Creek-wide exposure is relevant for individual sections or portions of Newtown Creek because the COCs are found throughout all sections of the creek. The risk assessments are summarized below.

### *Human Health Risk Assessment*

A four-step human health risk assessment process was used for assessing site-related cancer risks and noncancer health hazards. The four-step process is comprised of:

- *Hazard Identification* – uses the analytical data collected to identify the contaminants of

5 Refer to the Administrative Record for this action for the East Branch Interim, Early Action Climate Assessment.

potential concern at the site for each medium, with consideration of a number of factors explained below;

- *Exposure Assessment* - estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed;
- *Toxicity Assessment* - determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response); and
- *Risk Characterization* - summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks.

The risk characterization also identifies contamination with concentrations which exceed acceptable levels, defined by the National Contingency Plan (NCP) as an excess lifetime cancer risk greater than 1 x $10^{-6}$ – 1 x $10^{-4}$ or a Hazard Index greater than 1.0; contaminants at these concentrations are considered chemicals of concern (COCs) and are typically those that will require remediation at a site. Also included in this section is a discussion of the uncertainties associated with these risks.

*Hazard Identification:* In this step, the chemicals of potential concern (COPCs) at the site in various media, which included sediment, surface water, ambient air and fish and crab tissue from Newtown Creek, are identified based on such factors as toxicity, concentration and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence and bioaccumulation. The contaminated media, concentrations detected, and concentrations utilized to estimate potential risk and hazards for the chemicals of concern (COCs) at the Site are presented in Table 3.

*Exposure Assessment:* Consistent with Superfund policy and guidance, the BHHRA is a baseline human health risk assessment and therefore assumes no remediation or institutional controls to mitigate or remove hazardous substance releases. Cancer risks and noncancer hazard indices were calculated based on an estimate of the reasonable maximum exposure (RME) expected to occur under current and future conditions at the site. The RME is defined as the highest exposure that is reasonably expected to occur at a site.

The area surrounding the East Branch portion of Newtown Creek is currently zoned for industrial and commercial use. There is also recreational use of the Creek. It is anticipated that the future land use for this area will remain generally consistent with current use, though residential uses may become more common. The BHHRA evaluated potential risks to populations associated with both current and potential future land uses.

In this step, the different exposure pathways through which people might be exposed to the COPCs in the various media identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated surface water and sediment. The exposure pathways that were evaluated are presented in Table 4. Factors relating to the exposure assessment include, but are not limited to, the concentrations in specific media that people might be exposed to and the frequency and duration of that exposure. Using these factors, a "reasonable maximum exposure" scenario is calculated.

*Toxicity Assessment:* In this step, the types of adverse health effects associated with chemical exposures and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other noncancer health hazards, such as changes in the normal functions of organs within the body (e.g., changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and noncancer health hazards. The toxicity values that were used to evaluate noncancer health hazards are presented in Table 5 and the toxicity values that were used to evaluate cancer risk are presented in Table 6.

Under current EPA guidelines, the likelihood of carcinogenic risks and noncancer hazards due to exposure to site chemicals are considered separately. Consistent with current EPA policy, it was assumed that the toxic effects of the site-related chemicals would be additive. Thus, cancer and noncancer risks associated with exposures to individual COPCs were summed to indicate the potential risks and hazards associated with mixtures of potential carcinogens and noncarcinogens, respectively. Toxicity data for the HHRA were provided by the Integrated Risk Information System (IRIS) database, the Provisional Peer Reviewed Toxicity Database (PPRTV), or another source that was identified as an appropriate reference for toxicity values.

*Risk Characterization:* This step summarized and combined outputs of the exposure and toxicity assessments to provide a quantitative assessment of Site risks. Exposures were evaluated based on the potential risk of developing cancer and the potential for noncancer health hazards.

Noncancer risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intakes and benchmark comparison levels of intake (reference doses, reference concentrations). Reference doses (RfDs) and reference concentrations (RfCs) are estimates of daily exposure levels for humans (including sensitive individuals) which are thought to be safe over a lifetime of exposure. The estimated intake of chemicals identified in environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) is compared to the RfD or the RfC to derive the hazard quotient (HQ) for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds within a particular medium that impacts a particular receptor population.

The HQ for oral and dermal exposures is calculated as below. The HQ for inhalation exposures is calculated using a similar model that incorporates the RfC, rather than the RfD.

HQ = Intake/RfD

Where: HQ = hazard quotient
Intake = estimated intake for a chemical (mg/kg-day)
RfD = reference dose (mg/kg-day)

The intake and the RfD will represent the same exposure period (i.e., chronic, subchronic, or acute).

The HI is calculated by summing the HQs for all chemicals for likely exposure scenarios for a specific population. The noncancer HI is a "threshold level," set at an HI of less than 1, below which noncancer health effects are not expected to occur. An HI greater than 1 indicates that the potential exists for noncarcinogenic health effects to occur due to site-related exposures, with the potential for health effects increasing as the HI increases. When the HI calculated for all chemicals for a specific population exceeds 1, separate HI values are then calculated for those chemicals which are known to act on the same target organ. These discrete HI values are then compared to the acceptable limit of 1 to evaluate the potential for noncancer health effects on a specific target organ. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. A summary of the noncarcinogenic risks associated with these chemicals for each exposure pathway is contained in Table 7.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a carcinogen, using the cancer slope factor (SF) for oral and dermal exposures and the inhalation unit risk (IUR) for inhalation exposures. Excess lifetime cancer risk for oral and dermal exposures is calculated from the following equation, while the equation for inhalation exposures uses the IUR, rather than the SF:

Risk = LADD x SF

Where: Risk = a unitless probability ($1 \times 10^{-6}$) of an individual developing cancer
LADD = lifetime average daily dose averaged over 70 years (mg/kg-day)
SF = cancer slope factor, expressed as [1/(mg/kg-day)]

These risks are probabilities that are usually expressed in scientific notation (such as $1 \times 10^{-4}$). An excess lifetime cancer risk of $1 \times 10^{-4}$ indicates that one additional incidence of cancer may occur in a population of 10,000 people who are exposed under the conditions identified in the assessment. Again, as stated in the National Contingency Plan, the acceptable risk range for site-related exposure is $10^{-6}$ to $10^{-4}$. A summary of the carcinogenic risks is presented in Table 8. Unacceptable risks were associated with exposure to total non-dioxin-like PCB congeners, total

PCB congeners, and total dioxins/furans[6] through ingestion of fish and crab in the Creek. Specifically, fish and crab consumption risks and HIs for the RME scenarios exceed CERCLA-acceptable risk levels of an excess cancer risk of $10^{-6}$ to $10^{-4}$ and a noncancer goal of protection of an HI of 1 for adult, adolescent and child anglers and crabbers. For all other receptors and pathways, the cancer risks from exposure to CERCLA hazardous substances were found to be below or within EPA's acceptable risk range. The only other receptor found to have unacceptable risks was the general construction worker. While cancer risks for this receptor were found to be within the acceptable risk range, noncancer hazards exceeded the hazard threshold of an HI of 1. The summary of unacceptable noncancer hazards can be found in Table 5 and the summary of unacceptable cancer risks can be found in Table 6. The complete human health risk assessment can be found in the Administrative Record.

***Uncertainties***

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties.

There were four categories of uncertainty discussed in the human health risk assessment: data evaluation, exposure assessment, toxicity assessment and risk characterization. Uncertainty associated with data evaluation was primarily associated with spatial representation based on the sampling data and variability in sampling results. Exposure assessment uncertainty was focused on limited site-specific information for exposure assumptions such as contact with sediment and surface water and fish and crab ingestion rates. The toxicity assessment uncertainty included discussions on margins of safety included in the toxicity values to address species extrapolation and upper-bound estimates of risk. Uncertainty related to risk characterization focused on fish and crab ingestion, especially in regard to the mobility of the fish and crabs in and out of Newtown Creek and the potential impact of current fish advisories to restrict fish consumption. These uncertainties could result in over- or under-estimation of risk and hazards.

***Summary of Human Health Risks and Hazards***

The HHRA indicated completed human risk exposure pathways associated with unacceptable risk levels for fish and crab consumption due primarily to dioxin/furans and PCBs.

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6 The "dioxins and furans" referred to in this ROD describe 75 individual polychlorinated dibenzo-p-dioxins and 135 polychlorinated dibenzofurans that are considered related compounds, or "congeners." TCDD refers to a group of dioxin congeners with four chlorine atoms, and 2,3,7,8-TCDD is a congener with a specific arrangement of those chlorine atoms in its molecular structure. Toxic equivalence factors (TEFs) for mammals were used to calculate total dioxin/furan and PCB TEQs (Van den Berg et al. 2006). Concentrations of relevant congeners were multiplied by their TEFs to estimate toxicity of the congeners relative to 2,3,7,8-tetrachlorodibenzo-pdioxin (2,3,7,8-TCDD). Total TEQ values were then estimated from the resulting 2,3,7,8-TCDD equivalent concentrations using the KM method. If a TEQ value could not be calculated using the KM method, the individual 2,3,7,8-TCDD equivalent concentrations (congener concentration multiplied by the TEF) were summed. Total dioxin/furan TEQs include 17 dioxin/furan congeners. Total PCB congener TEQs include 12 dioxin-like PCBs.

**Ecological Risk Assessment**

A four-step process is utilized for assessing site related ecological risks for a reasonable maximum exposure scenario: *Problem Formulation* - a qualitative evaluation of contaminant release, migration, and fate; identification of contaminants of concern, receptors, exposure pathways, and known ecological effects of the contaminants; and selection of endpoints for further study. *Exposure Assessment*--a quantitative evaluation of contaminant release, migration, and fate; characterization of exposure pathways and receptors; and measurement or estimation of exposure point concentrations. *Ecological Effects Assessment*--literature reviews, field studies, and toxicity tests, linking contaminant concentrations to effects on ecological receptors. *Risk Characterization*--measurement or estimation of both current and future adverse effects.

Surface water, sediment, porewater, and aquatic biota tissue (fish, crabs, and bivalves) were collected as part of the BERA. Sediment toxicity testing was also conducted with Site sediment. The receptors, exposure media, and exposure pathways that make up the lines of evidence (LOEs) that are evaluated quantitatively in the BERA consisted of the following:

- Aquatic plants – phytoplankton (surface water)
- Invertebrates – zooplankton, benthic macroinvertebrates (sediment dwelling organisms), epibenthic invertebrates (e.g., ribbed mussels [*Geukensia demissa*]), blue crab [*Callinectes sapidus*]) (surface water and surface sediment)
- Fish – striped bass (*Morone saxatilis*) and mummichog (*Fundulus heteroclitus*) (surface water, surface sediment, and diet)
- Aquatic birds – spotted sandpiper (*Actitis macularius*), as representative of invertivorous birds, green heron (*Butorides virescens*) and black-crowned night heron (*Nycticorax nycticorax*), as representative of invertivorous/piscivorous birds, and double-crested cormorant (*Phalacrocorax auritus*) and belted kingfisher (*Ceryle alcyon*), as representative of piscivorous birds (surface water, surface sediment, and diet)
- Mammals – raccoon (*Procyon lotor*) (surface water, surface sediment, and diet)

Other LOEs evaluated qualitatively consist of the following:

- Observations of fish and crab presence/absence, richness, and diversity
- Observations of bird and raccoon presence/absence, and for birds, richness and abundance
- Observations of aquatic macrophytes presence/absence
- Observations of amphibians and reptiles presence/absence

The BERA, with further evaluation in the Feasibility Study, identified the greatest risks from site contaminants under current and future site conditions to the receptors listed above and concluded that the primary contaminants leading to unacceptable risk in Newtown Creek are PCBs, copper, lead, dioxins/furans, and PAHs. Risk to benthic invertebrates resulted from sediment and porewater exposures to hydrocarbons (mainly C9-C40 total petroleum hydrocarbons, C10-C28 diesel range organic compounds, C19-C36 aliphatic hydrocarbons, TPAH(34), TPAH(17), and alkylated PAHs in sediments), the primary risk drivers were C19-C36 aliphatic hydrocarbons and TPAH(34). Risk to blue crab was associated with copper and total PCB congeners detected in tissue residue, and risk to bivalves was associated with TPAH(34) and total PCB congener detected in tissue reside. Risk to striped bass was associated with 2,3,7,8-TCDD, total dioxin/furan TEQ, and total PCB congeners in tissue residue, while risk to mummichog was associated with total PCB congener in tissue residue and copper in both tissue reside and through dietary intake. Exposure to porewater was also associated with risk in fish from both total PCB congener and TPAH(34). Risk to spotted sandpiper through dietary exposure was associated with exposure to copper, lead, and total PCB congeners. Risk to green heron, black-crowned night heron, and belted kingfisher through dietary exposure were associated solely with total PCB congeners. While cyanide was identified as a risk factor associated with exposure to surface water in phytoplankton, zooplankton, bivalves, benthic macroinvertebrates, blue crab, and fish, its spatial distribution was uneven and removal of two outliers removed the potential for risk.

Although risk is associated with exposure across the entirety of Newtown Creek, priority locations contributing to exceedances are listed in Table 9. This table provides a summary of the BERA results and includes, for each LOE, the contaminants of potential ecological concern that contribute to risk, the HQs or toxic units (TUs) calculated for each LOE, and a summary of the locations within the Study Area where exposure is highest and, therefore, contribute the most to risk where HQs and/or TUs are greater than 1.0. These priority areas indicate where exposure is highest but do not eliminate the potential for risk to these receptors elsewhere in Newtown Creek.

**Uncertainties**

The BERA identified a number of areas where uncertainty could result in over- or underestimation of risk. Selection of some of the screening levels were representative of freshwater environments and not the saline environment of Newtown Creek, which could over- or underestimate risk. Additionally, a number of chemicals did not have robust screening levels, or reporting limits for non-detects exceeded the screening levels, resulting in uncertainty in risk from exposure. Furthermore, there is uncertainty in the exposure assessment of fish tissue residue due to the natural movement of fish. Fish inhabiting the creek for shorter durations of time would have less contaminant burden from Newtown Creek, which could under-estimate the risk. For receptors where food chain models were used, risk can be over- or underestimated based on the exact dietary preferences and availability of prey as well as the actual amount of time Newtown Creek is used for foraging, breeding, etc.

**Basis for Taking Action**

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. The excess cancer risk and noncancer health hazards associated with human ingestion of fish and crab, as well as the ecological risks associated with ecological exposures, are above acceptable levels under baseline conditions. The Early Action will address areas of the East Branch with elevated contaminant concentrations that act as ongoing sources to the water column, the sediment bed, and biota. Remediating these sources will immediately reduce concentrations and reduce biota exposure to contaminants. Actual or threatened releases of hazardous substances from OU4 of the Site, if not addressed by implementing the response action selected in the ROD, may present an imminent and substantial endangerment to the public health, welfare, or the environment.

## REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are media-specific goals to protect human health and the environment; they specify the contaminant(s) of concern, the exposure route(s), receptor(s), and acceptable contaminant level(s) for each exposure route. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs), to-be-considered (TBC) advisories, criteria and guidance, and site-specific risk-based levels and background (i.e., reference area) concentrations.

The following interim remedial action objectives were established to address the East Branch portion of the OU1 Study Area:

**Exposure-based RAOs**

- Reduce potential current and future human exposure to COCs from ingestion of fish and crab by preventing biota exposure to sediments in the East Branch with COC concentrations above protective Remediation Goals (RGs).
- Reduce ecological exposure to Site COCs in sediment by reducing the concentrations of COCs in contaminated sediment in the East Branch to protective RGs.

**Source Control RAO**

- Reduce migration of COCs, related to NAPL and its constituents and other sources of COCs within the East Branch, to surface sediment and surface water to levels that are protective for human health and ecological exposure.

The exposure-based RAOs would be achieved by reducing concentrations of COCs in surface sediment to concentrations below the RGs that are defined below. For Newtown Creek, it was estimated that the top 6 inches of the sediment is the biologically active zone. This depth is the current definition for surface sediment associated with the source control RAO.

It is EPA's expectation that the selected remedy, once constructed, will successfully address these RAOs for sources located within the East Branch portion of the OU1 Study Area and that the post-remedy implementation monitoring program will ensure that the RAOs are met and that the remedy remains protective over time. After remedy implementation, the RAOs may be impacted broadly in two ways:

- Achievement of the RAOs may be compromised by impacts from within or adjacent to the East Branch portion of the OU1 Study Area. For example, it may be discovered during post-remedy implementation monitoring that the cap is not adequately preventing remaining contamination underneath it from rising towards the surface or that ebullition-assisted transport of contamination from portions of the Creek outside of the East Branch portion of the Study Area is settling on the surface of the cap. These types of impacts, and others related directly to the constructed remedy, would need to be addressed through federal Superfund authority.

- Achievement of the RAOs may be compromised by ongoing sources of contamination outside of the constructed portions of the OU4 remedy and outside of the OU1 Study Area. For example, post-remedy implementation monitoring may show that contamination entering the East Branch portion of the OU1 Study Area through seeps from a surrounding upland property is impacting the exposure-based RAOs over time. The constructed remedy would not have necessarily been designed to protect against such a source, though such as source could still impact the long-term protectiveness of the remedy and thus would need to be addressed. The appropriate entity to control sources originating outside of the OU1 Study Area will be determined on a situation-specific basis.

To further clarify the source control RAO, note that certain actions, such as the installation of bulkheads to provide stability to shorelines and prevent bank erosion which could adversely impact the long-term effectiveness of the action, may be implemented as part of the constructed remedy even if cleanup of the adjacent property is not part of the remedy. Decisions on how to address potential sources of contamination will be made initially during the design of the remedy (for those that are known) and an ongoing basis for those that are discovered through the post-remedy implementation monitoring program.

It is expected that these interim RAOs will be consistent with the final RAOs selected for the OU1 Study Area. The selected remedy for the East Branch includes a robust baseline and post-remedy implementation monitoring program to ensure that both the exposure-based and source control RAOs are being met on an ongoing basis over time, and until such a time as the long-term monitoring of this action is subsumed into a final OU1 Study Area remedy monitoring program. The post-remedy implementation monitoring approach for the East Branch is described more fully below in the Overview of Remedy Approach section of this ROD. In particular, the Monitoring and Evaluation Approach subsection of the Overview of Remedy Approach section, below, explains how the exposure based RAOs will be met over time.

**Remediation Goals**

Achieving the RAOs relies on the remedial alternatives' ability to meet remediation goals/cleanup levels. The remediation goals of an interim remedy are not necessarily the same as the final, protective remediation goals of a final remedy, but in this case the final remediation goals are anticipated to be met by interim action in the East Branch. Final remediation goals are generally chemical-specific concentration goals for each medium and/or exposure route that are established to protect human health and the environment. They can be based on such factors as ARARs, risk, and from comparison to background levels of contaminants in the environment that occur naturally or are from other industrial sources.

Based on the findings of the BHHRA and the BERA for the full OU1 Study Area, six COCs have been identified for OU1 of the Site and risk-based PRGs have been developed for each of the COCs. They were developed in consultation with EPA's Office of Research and Development and were selected based on the most sensitive exposure pathway, whether it was due to human health or ecological risk.

EPA has selected the long-term cleanup goals for the East Branch Early Action based on the risk-based PRGs. EPA can select PRGs consistent with background conditions if risk-based remediation goals are lower than background concentrations. However, since the Creek is a dead-end water body without a natural up-river source of water and there are many ongoing sources of contamination to the Creek, the determination of background at this Site is not clear cut. Furthermore, many identified sources of contamination are expected to decrease over time because of improved best management practices, planned, ongoing, and future cleanup actions (such as at upland sites), and additional regulatory control (including the LTCP both for Newtown Creek and for the East River overall). As such, a current estimate will likely not be appropriate in the future, particularly when sitewide final remediation goals are established in the site's final ROD. Since EPA anticipates that the risk-based PRGs are attainable and maintainable in the long-term, background-based interim PRGs or action levels are not necessary for this interim action. EPA recognizes the significance of this issue to its partners and stakeholders and, consistent with its long-term post-remedy implementation monitoring plans and its obligations under the five-year review guidance, EPA will frequently revisit whether cleanup levels (here, remediation goals) used at the time of the remedy selection are still valid.

PRGs become final RGs when EPA selects a remedy after taking into consideration all public comments. To achieve the RAOs for the East Branch portion of OU1, EPA has identified the following RGs for the COCs for this action:

| Contaminant of Concern | Remediation Goal | Most Sensitive Receptor and Exposure Pathway |
|---|---|---|
| TPCBs[1] | 0.30 mg/kg | Humans via crab consumption |
| Dioxins/Furans TEQ[1] | 18 ng/kg | Humans via crab consumption |
| Copper[2] | 490 mg/kg | Mummichog via dietary intake |
| Lead[3] | 340 mg/kg | Spotted sandpiper via dietary intake[3] |
| TPAH(34)[2] | 100 mg/kg | Benthic macroinvertebrates via sediment toxicity |
| C19-C36 Aliphatic Hydrocarbons[2] | 200 mg/kg | Benthic macroinvertebrates via sediment toxicity |

**Notes:**
TPCBs – total polychlorinated biphenyls, as described in the Summary of Site Characteristics Section
TEQ – toxic equivalence quotient
TPAH(34) – total polycyclic aromatic hydrocarbons, as described in the Summary of Site Characteristics Section
mg/kg – milligrams per kilogram
ng/kg – nanograms per kilogram

1. For this action, these will be evaluated on Surface Weighted Average Concentration basis over the East Branch portion of the OU1 Study Area. This will be re-evaluated as more portions of the Creek are remediated.
2. Evaluated on point-by-point basis (not to exceed)
3. To be evaluated on a SWAC basis along intertidal mud flats only. Note that the Proposed Plan mistakenly stated that lead would be evaluated on a SWAC basis for the full East Branch portion of the OU1 Study Area.

**Detailed Rationale for Selection of RGs for this Action**

The remediation goals for the long-term cleanup of the East Branch portion of OU1 are set to risk-based rather than background-based concentrations. EPA thinks this is achievable based on a review of the existing data for the East Branch portion of OU1 combined with the additional regulatory controls and best management practices that are expected over time. While EPA's expectation is that the remedy can be designed to substantially prevent internal recontamination from occurring (i.e., the expectation is that the remedy will perform as designed), additional measures to address ongoing, external sources of contamination, as described previously, may be needed to maintain the long-term protectiveness of the implemented remedy. Through the conduct of a robust post-remedy implementation monitoring plan, these impacts from ongoing, external sources can be understood and then addressed and/or mitigated, through state and/or federal enforcement authority, to be determined on a case-by-case basis, before they negatively impact the long-term protectiveness of the constructed remedy.

To support these statements, Figure 8 was developed through the use of EPA's probabilistic LTE model using existing data collected as part of the OU1 RI/FS process. It shows the expected range of long-term equilibrium concentrations for all of the COCs except lead based on existing data (lead is only a concern in the intertidal areas and is not included in the LTE model). The ongoing inputs included in the LTE model are the East River, CSO discharges, MS4 discharges, storm water/direct discharge, wastewater treatment plant effluent overflow, atmospheric deposition, groundwater/seeps,[7] bank erosion, treated groundwater effluent, and porewater advection. As described above, the output of the model will be updated on an ongoing basis as additional data is obtained, but based on the existing data only, it seems that:

- for copper (RG 490 mg/kg) and TPAH(34) (RG 100 mg/kg), ongoing source control measures may not be needed to maintain risk-based RGs over time;
- for TPCBs (RG 0.30 mg/kg), limited ongoing source control measures may be needed to maintain the risk-based RG over time; and
- for dioxins/furans TEQ (RG 18 ng/kg) and C19-C36 aliphatic hydrocarbons (RG 200 mg/kg), ongoing source control measures will likely be needed to maintain risk-based RGs over time.

Once again, these findings will be revisited once the PDI is complete and again on an ongoing basis as additional data is obtained, and any needed source control work to maintain the RGs over time after initial implementation of the remedy will be conducted under state and/or federal enforcement authorities, to be determined on a case-by-case basis.

Figure 8 also shows that CSO discharges currently provide a significant contribution to the long-term equilibrium concentration for most of the COCs. However, the volume of CSO discharges to the Creek will decrease by approximately 65% once the LTCP NYCDEP is under order by NYSDEC to implement by 2042 is fully implemented. As such, it is known that significant source control will happen in the not-too-distant future. In addition, increased regulatory controls and improved best management practices should reduce other ongoing sources of contamination (such as inputs from MS4 discharges, storm water/direct discharge, wastewater treatment plant effluent overflow) over time and, as is described more fully below, the selected remedy will help reduce other contributors to the long-term equilibrium concentrations, including lateral groundwater/seeps and bank erosion, at least on a preliminary basis, until appropriate source control measures can be taken understate and/or federal enforcement authorities.

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[7] Regarding the groundwater/seep data included in the initial version of the LTE model:

- The annual COC load from lateral groundwater/seeps were estimated based on the OU1 RI/FS opportunistic seep data samples and reach-specific estimated lateral groundwater discharge rates
- The opportunistic seep samples were analyzed for TPAH (34), TPCB, Cu, and D/F TEQ.
- The annual lateral groundwater/seeps loads used were calculated
- The model does not include shallow lateral groundwater discharge inputs to Newtown Creek since these data were not yet available.
- COC loads associated with shoreline NAPL seeps were assumed to be zero to reflect future controls of such sources (as necessary), Note that the LTE model can be used to evaluate the potential effects of COC loadings from this source through sensitivity analysis.

This analysis illustrates that, based on EPA's current understanding, the RAOs that have been established for the East Branch portion of OU1 are achievable and can be maintained in the long-term.

## OVERVIEW OF REMEDY APPROACH

The East Branch Early Action is an interim remedy, intended to be consistent with and not preclude the site's final remedy. The general intent of the remedial action for the East Branch portion of OU1 is to remove contaminated sediment to a depth that will result in immediate risk reduction and contaminant mass removal in this portion of the Creek (and, to a lesser extent, within the Study Area as a whole) and to ensure the risk reductions are maintained in the long-term.

The contaminated sediments targeted for remediation are the primary source of COC exposure, risk, and contamination in the East Branch. However, as previously discussed, there are other ongoing sources of contamination that could impact the protectiveness of the remedy. Extensive work has been conducted by EPA and participating parties to understand and quantify the nature and extent of those ongoing sources and to estimate their post-remediation impacts. Consistent with the NCP's preference for action and site management principle that early actions achieve significant risk reduction quickly, EPA is selecting an early action to address the primary source and repository of contaminants in the East Branch while the lesser COC sources are further characterized and remediated.

The CSM for the East Branch portion of OU1 is well developed at this point. While there is uncertainty around the impact of ongoing sources of contamination to the protectiveness of any remedy selected, those impacts are anticipated to be substantially less than the risks posed by the unremediated COC deposits currently in the East Branch. It would take considerable additional time (on the order of years) to significantly reduce the uncertainty surrounding the potential impact of ongoing sources following an early action. Also, given the Creek's location in a densely populated urban environment, there will always be a relatively large degree of uncertainty associated with the potential impact of ongoing sources of contamination on any implemented remedy. The NCP instructs that "[r]emedial actions are to be implemented as soon as site data and information make it possible to do so." As such, rather than delay taking any in Creek remedial action until the uncertainty is reduced, EPA developed the Site-specific Framework, mentioned previously, for OU1 to allow remedial work to proceed sooner rather than later. The Framework provides both an approach for evaluating the long-term effectiveness of remedies implemented for the Site, as well as a roadmap for addressing any impacts to the protectiveness that are discovered. It includes an iterative approach to post-remedy implementation monitoring and evaluation to ensure that risk-based remediation goals are achieved in the long term. This iterative approach, is applied specifically to the East Branch portion of OU1, is described as follows:

- Set long-term RGs for the East Branch portion of OU1 equal to the risk-based human health and ecological concentrations.

- Determine interim evaluation measures (IEMs) using empirical data, as well as the predictive LTE model developed for the Site. It is important to note that the IEMs are not the remediation goals described in the preceding section and they are not intended to establish whether the cleanup is "successful." The IEMs are a site-specific tool that will be used during post-remedy implementation monitoring to ensure remediation goals are maintained and to identify sources that may be impacting goal maintenance. The IEMs will be used for post-remedy implementation monitoring and will be adjusted periodically using empirical data to account for current conditions. The IEMs will be initially developed using data from the OU1 RI/FS as well as data obtained during PDI. The IEMs will continue to be refined on an ongoing basis using additional data such as baseline monitoring data collected shortly before remedial activities begin, ongoing data collected as part of post-ROD monitoring for OU2, and data collected as part of the post-remedy implementation monitoring program described in the next bullet.

- Develop a long-term post-remedy implementation monitoring program that includes sampling of at least surface sediment, subsurface sediment, porewater, both suspended sediment and dissolved phase concentrations in surface water, and ongoing external sources of contamination (including, at a minimum, CSO discharges, MS4 discharges, stormwater and overland flow, as needed if not being monitored under OU2). The monitoring program will also include regular visual and/or fluorescence technology inspections for NAPL, with chemical analysis to confirm the composition of NAPL identified, regular bank inspections for erosion, with sampling as needed, and regular inspections for the presence of seeps, with opportunistic sampling as possible. The purpose of this long-term monitoring program is twofold:

    - to assess the performance of the remedy itself within the East Branch portion of the OU1 Study Area.
    - to assess the impact on the protectiveness of the remedy from ongoing sources over time.

- If surface sediment concentrations do not meet the IEMs and do not continue trending towards the long-term remediation goals, determine if this is due to the performance of the in-Creek remedy itself or if additional external or internal/external interface source control measures are needed, either through federal and/or State of New York enforcement authorities, as appropriate.

The appropriate source control measures and entity to control the source would be determined on a situation-specific basis. For example, if the need for source control is determined to be related to an issue with the in-Creek remedy, then the additional source control measures would be taken through federal Superfund enforcement authority. However, if the need for source control is related to a seep from a contaminated upland property, then the source control action would be taken through state and/or federal (Superfund and/or non-Superfund) enforcement authority, to be determined on a case-by-case basis.

It is EPA's expectation that this selected remedy will successfully address internal sources of contamination in the East Branch. The approach described above provides a means to confirm this is true and to ensure the RAOs for the action are met in the long-term by ensuring impacts from all potential sources are understood and addressed, as needed and under the appropriate enforcement authority.

**Monitoring and Evaluation Approach**

Immediately after implementation of the remedy selected for the East Branch portion of OU1, COC concentrations in the surface sediment will be non-detect or well below levels of concern. Over time, however, the surface sediment concentrations of COCs are anticipated to increase due to the presence of ongoing sources of contamination. The LTE model was developed to estimate what the new equilibrium concentrations in the surface sediment will be based on data collected from the ongoing sources. Based on the current outputs of the LTE model, copper and TPAH from ongoing sources have less potential to cause RG exceedances post-remedy than dioxins/furans TEQs and C19-C36 aliphatic hydrocarbons. TPCBs fall somewhere in the middle. Limitations of the existing data sets (i.e., there are only a limited number of C19-C36 aliphatic hydrocarbon samples) are well documented in the RI and any such data gaps will be filled during PDI and subsequent sampling events.

As mentioned previously, the output of the LTE model will be cumulative distribution function, (CDF) curves for each COC within the East Branch. These curves indicate the overall likelihood of the risk-based RGs being exceeded once surface sediment, post-remedy implementation, has reached a new contaminant concentration equilibrium in the long term (i.e., accounting for ongoing contaminant sources not addressed by the remedy). From a risk management perspective, the projections fall into two categories for different COCs, as follows:

- **Group 1**: 50$^{th}$ percentile of the LTE CDF projection for a given COC <u>is not near</u>, equal to, or exceeding the RG.
- **Group 2**: 50$^{th}$ percentile of the LTE CDF projection for a given COC <u>is near</u>, equal to, or exceeds the RG.

Those COCs that fall within Group 1 would generally be viewed as having less potential to cause RG exceedances post-remedy implementation than those in Group 2. While the 50$^{th}$ percentile has been selected by EPA for this initial evaluation as a reasonable baseline, the chosen percentile for risk management evaluations may be revised in the future as additional data is collected and/or as the CSM is revised.

Given the above, a 2-tier post-remedy implementation monitoring program will be developed and refined over time.

- **Tier 1**: The initial tier will include a regular, post-remedy implementation monitoring plan that will be developed during the remedial design and refined over time. The tentative components of this monitoring plan are as described above and generally include all potential ongoing sources of contamination to the East Branch. This monitoring program will occur on a regular, scheduled basis and adjustments will be made, as needed.
- **Tier 2**: The second tier will require increased monitoring of appropriate potential sources of contamination if the surface sediment concentration of the remedy footprint reaches the IEM criteria indicated in the sub-bullets below. Acknowledging that Group 1 COCs will generally have less potential to cause RG exceedances post-remedy implementation than Group 2 COCs, the IEMs will be developed as follows:

    - IEMs for Group 1 COCs will be defined by when the surface sediment concentration of a COC reaches 90 percent of its RG either on a point-by-point basis or a SWAC basis (depending on how the RG was developed for the COC)
    - IEMs for Group 2 COCs will be defined by when the surface sediment concentration of a COC reaches 75 percent of its RG either on a point-by-point basis or a SWAC basis (again depending on how the RG was developed for the COC)

  For either Group 1 or Group 2 COCs, if the IEM concentration is being approached then increased monitoring of ongoing sources that may be responsible for the increases will be required. The exact monitoring to be conducted will be determined on a case-by-case basis, in consultation with EPA. Also note that the percentages included in the Tier 2 monitoring program may be revised over time, as additional data is collected and/or as the CSM is revised, and they could end up being set to the actual RG, if appropriate.

This monitoring program will allow EPA to identify the specific, ongoing sources that may cause RG exceedances before RG exceedances actually occur and will enable EPA to develop an appropriate course of action to ideally prevent RG exceedances from ever occurring. The IEMs will be refined over time as new empirical data is obtained, and over time, as additional external and internal/external interface source control measures are taken, the expectation is that all IEMs will be consistent with the risk-based RGs for all COCs, at which point the ongoing monitoring would be conducted to ensure the remedy remains protective.

Regarding NAPL, and sheens specifically: if NAPL from ongoing sources, including upland seeps, is found to be impacting the protectiveness of the implemented remedy, it will need to be addressed through either state and/or federal enforcement authorities (to be determined on a case-by-case basis). In addition, sheens could potentially be indicative of Site-related contamination at elevated concentrations that would impact the effectiveness of the implemented remedy. As such, sheens observed after implementation of the remedy would need to be further investigated, including through sampling and analysis. Depending on the results, additional remedial efforts could be required, again through either state and/or federal enforcement authorities (to be determined on a case-by-case basis).

## SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA Section 121(b)(1), 42 U.S.C. §9621(b)(1), requires that a remedial action be protective of human health and the environment, cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA Section 121(d), 42 U.S.C. §9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to Section 121(d)(4) of CERCLA, 42 U.S.C. §9621(d)(4).

Potential technologies applicable to sediment remediation were identified and screened using the effectiveness, implementability, and cost criteria, with emphasis on effectiveness. Those technologies that passed the initial screening were assembled into alternatives.

This ROD evaluates in detail six remedial alternatives for addressing the contamination associated with the East Branch portion of OU1, including a No Action alternative. The time to implement a remedial alternative reflects only the time required to construct or implement the remedy and does not include the time required to negotiate with the responsible parties, design the remedy, procure contracts for design and construction, or conduct operation and maintenance at the Site. Detailed information regarding the alternatives can be found in the East Branch Early Action FFS Report. Five-year reviews would be conducted as a component of all alternatives since each would leave contamination in place above levels that allow unlimited use and unrestricted exposure.

### Description of Remedial Alternatives

The remedial alternatives evaluated for the East Branch portion of OU1 (except for the No Action alternative) focus on the removal of contaminated sediments (dredging) and capping and include a number of common elements. The six remedial alternatives evaluated for this action and the common elements for each active remedial alternative are presented in detail below.

Common elements of each of the active alternatives will include the following:

- Pre-design investigation (PDI): A robust PDI will be conducted. The PDI will include, at a minimum, data collection to refine the footprints and depths of various remedy components and fill data gaps and would include: additional delineation of NAPL, potential principal threat waste (PTW) and potential Toxic Substances Control Act (TSCA) regulated material (e.g., high concentrations of TPCBs); further delineation of the COCs; additional surveys, including for the presence of NAPL and seeps; and additional geotechnical investigations to support design of the remedy. If needed, treatability studies will be conducted to obtain any additional required information to inform the design of the early action remedy. Data from the PDI will also be used to inform decisions on the need for ongoing source control measures and to refine the outputs of the LTE model that will be used to develop the initial IEMs that will be refined over time.

- Dredging: Each of the active remedial alternatives includes various amounts of dredging that will reduce the volume of contaminated sediment remaining in the East Branch. Because of the presence of debris in the East Branch, it is assumed that mechanical rather than hydraulic dredging will be used.

- Capping: Each active alternative includes placement of armored and amended caps in areas that vary by alternative. An amended cap consists of the addition of specialized or manufactured materials intermixed with typical cap aggregate materials at specified amounts. The objectives of the cap in each area are to provide (i) physical isolation of COCs in the sediment from the benthic environment; (ii) erosion protection to maintain cap stability against forces resulting from open water flows, propwash, vessel wakes, and other forces; and/or (iii) chemical isolation to sequester COCs that could be transported from the contaminated sediment below the cap via dissolved phase advection, diffusion, and/or gas-ebullition facilitated transport and, where containment is possible, NAPL and/or its constituents that could be transported via gas-ebullition facilitated transport and/or advection.

- In situ stabilization and solidification (ISS): Where needed to reduce contaminant migration and/or for treating NAPL or PTW. While existing data does not indicate this option will be necessary, Alternatives EB-B through EB-E (described below) assume that

ISS to treat NAPL and/or PTW will be needed to address 0.4 acres of the East Branch, which equates to 4 percent of the total surface area of the East Branch[8].

- Sealed bulkheads: If and where needed to reduce migration, sealed bulkheads may be used as a preliminary measure to address seeps while cleanup of the related upland source is evaluated and implemented[9]. Again, while the need for sealed bulkheads is not currently indicated by the existing data, for cost estimating purposes the FFS assumes that 20 percent of the length of bulkheads required for each alternative will need to be sealed, and it is further noted in the FFS that sealed bulkheads may be required in areas that do not otherwise require bulkheads for stabilization purposes.

- Stabilization measures: Each active remedial alternative includes stabilization measures that may be applicable depending on the location-specific conditions. These stabilization measures may include the use of ISS for bank stabilization or adjacent to sensitive structures, placing limits on the means and methods of dredging (e.g., prescribing slot dredging in some areas), and temporary or permanent structural support (i.e., repair or replacement of a bulkhead).

- Dredged Material Management and Disposition: Each active alternative assumes dredged material will be barged to an offsite processing facility where it would be treated through stabilization/solidification with amendment as necessary to reduce the moisture content of the material and meet transport and disposal requirements. Dredged material would then be transported by truck and disposed of in an offsite permitted Subtitle C, Subtitle D, and/or TSCA waste landfill, depending on the waste profile for a given dredged material management area. The potential for offsite beneficial reuse of some portion of the dredged material will also be considered, as appropriate. Debris would also need to be disposed of and/or beneficially reused, as appropriate.

- Restoration: Restoration of all impacted areas, taking into account the reasonably anticipated future uses of the East Branch and the adjacent shorelines.

- Institutional controls: institutional controls may be required to protect the constructed components of the alternative, as needed. Fish consumption advisories currently in place through the State are assumed to remain in place.

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[8] Note that the FFS assumes overlapping areas for shoreline stabilization and NAPL treatment using ISS. However, these are separate aspects of the alternatives and during the design of the selected remedy these aspects will be evaluated separately.

[9] Note that in the Proposed Plan sealed bulkheads were referred to as “temporary” measures. However, preliminary is the more appropriate term.

- Post-remedy implementation monitoring: As described in the Overview of Remedy Approach section of this ROD, a robust post-remedy implementation monitoring program will be conducted to assess both the performance of the remedy itself and the impact on the protectiveness of the remedy from ongoing sources post-remedy implementation. The data will also be used to evaluate the achievement of RAOs.

Given the industrial nature of the East Branch, each of the active remedial alternatives would also need to address infrastructure in and around the East Branch, including the Grand Street Bridge and the aeration system. Debris removal will also be a required component of each alternative prior to any dredging occurring.

**Description of Remedial Alternatives**

Please note that additional data must be obtained prior to designing any of the active alternatives described below. As such, the quantitative estimates provided for each alternative will be refined during the design of the remedy, after completion of the PDI.

**Alternative EB-A - No Action**

Alternative EB-A, the "No Action" alternative, is required by the NCP to provide an environmental baseline against which impacts of the other remedial alternatives can be compared. No action would be initiated to remediate contaminated media or otherwise mitigate the migration of contamination that poses unacceptable risks to human health and the environment. This alternative also does not include monitoring or institutional controls.

| | |
|---|---|
| Total Capital Cost: | $0 |
| Total O&M: | $0 |
| Total Cost: | $0 |
| Total Present Net Worth: | $0 |
| Implementation/Construction Time: | 0 years |

**Alternative EB-B – Dredge to Allow Placement of Cap at or Below 0 foot MLLW**

Under this alternative, sediment would be dredged where necessary to allow for placement of an armored and amended cap to be installed entirely at (or below) an elevation of 0 foot MLLW.

For this alternative, there would be more cap material placed than sediment removed via dredging; therefore, this alternative would result in a mudline elevation in East Branch that is shallower on average than the current mudline and would reduce water depths in the East Branch following remedy implementation.

Based on the assumptions used in the FFS, Alternative EB-B is expected to take 13 months to construct (over two construction seasons) and includes the following:

- Removal of approximately 34,000 cubic yards (cy) of debris and sediment (32,300 cy of sediment and 1,700 cy of debris; 24 scow trips for sediment and debris) over 3.5 acres;
- Capping with 79,400 cy of material (40 scow trips), over 11.2 acres (including post-ISS cap);
- ISS of 26,000 cy of sediment identified for NAPL treatment;
- Sealed bulkheads along 60 linear feet (LF) of shoreline; and
- Shoreline stabilization along 1,850 LF, or 36 percent, of the shoreline through the use of ISS, bulkheads and/or slot dredging.

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| Capital Cost: | $ 141.4 million |
| Total O&M Cost: | $ 33.4 million |
| Total Cost: | $ 174.8 million |
| Present Worth Cost: | $ 152.0 million |
| Construction Time Frame: | 2 years |

**Alternative EB-C – Dredge to Allow Placement of a Cap to Maintain Existing Water Depth**

Under this alternative, sediment would be dredged to a minimum depth (assumed to be at least 3 feet across the entire footprint of the East Branch to allow for placement of an armored and amended cap to maintain the existing water depth.

Based on the assumptions used in the FFS, Alternative EB-C is expected to take 22 months to construct (over three construction seasons) and includes the following:

- Removal of approximately 97,200 cy of debris and sediment (92,300 cy of sediment and 4,900 cy of debris; 63 scow trips for sediment and debris) over 11.2 acres;
- ISS of 9,900 cy of sediment (over 0.4 acres) identified for NAPL treatment;
- Capping with 77,000 cy of material (39 scow trips), over 11.2 acres (including post-ISS cap);
- Sealed bulkheads along 180 LF of shoreline; and
- Shoreline stabilization along 3,850 LF, or 76 percent, of the shoreline through the use of ISS, bulkheads and slot dredging.

| | |
|---|---|
| Capital Cost: | $ 236.8 million |
| Total O&M Cost: | $ 33.3 million |
| Total Cost: | $ 270.1 million |
| Present Worth Cost: | $ 235.2 million |
| Construction Time Frame: | 3 years |

**Alternative EB-D – Dredge to Allow Placement of a Cap to Maintain Existing Water Depth with Localized Deeper Dredging**

Under this alternative, sediments would be dredged to a minimum depth (assumed to be at least 3 feet) across the entire footprint of the East Branch to allow for placement of an armored and amended cap to maintain existing water depth.

In addition, this alternative includes the option for deeper dredging of sediments in select areas based on the following four considerations:

- Potential for NAPL migration from the deeper soft and/or native material
- Potential for human and/or ecological exposure to principal threat waste
- Depth to uncontaminated material[10]
- Comparatively higher COC concentrations in remaining sediment

Based on the assumptions used in the FFS, Alternative EB-D is expected to take 22 months to construct (over three construction seasons) and includes the following:

- Removal of approximately 106,300 cy of debris and sediment (101,000 cy of sediment and 5,300 cy of debris; 69 scow trips for sediment and debris) over 11.2 acres;
- ISS of 9,900 cy of sediment (over 0.4 acres) identified for NAPL treatment;
- Capping with 69,600 cy of material (35 scow trips), over 10.0 acres (including post-ISS cap);
- Backfilling with 14,400 cy of sand (8 scow trips), over 1.2 acres, as needed to maintain existing water depth where deeper dredging is conducted and to manage dredge residuals;
- Sealed bulkheads along 180 LF of shoreline; and
- Shoreline stabilization along 3,850 LF, or 76 percent, of the shoreline through the use of ISS, bulkheads and slot dredging.

Note that these estimates that were included in the FFS assumed deeper dredging only considering the depth to native material (i.e., deeper dredging would be conducted if the remaining depth to native material is minimal, on the order of less than five feet). The need for deeper dredging as related to the other three considerations, specifically the potential for NAPL migration from the deeper soft and/or native material, the potential for exposure to principal threat waste, and comparatively higher COC concentrations in remaining sediment, and the depth to uncontaminated material, would be determined during the design of the remedy. If it is

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[10] Note that the Proposed Plan referred to the depth to native material but this ROD refers to the depth to uncontaminated material for this condition, where uncontaminated material is defined as material with COC concentrations below RGs. Regardless, the idea is that if only a thin lens of contamination remains, on the order of approximately 5 feet or less, then additional dredging may be conducted to remove it.

determined that additional areas require deeper dredging in consideration of these other factors, the estimates listed above will change.

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| Capital Cost: | $ 245.9 million |
| Total O&M Cost: | $ 33.3 million |
| Total Cost: | $ 279.2 million |
| Present Worth Cost: | $ 243.5 million |
| Construction Time Frame: | 3 years |

**Alternative EB-E – Dredge All Within Navigation Channel, and Cap Outside Channel**

Under this alternative, sediment would be dredged in the federally authorized navigation channel to a depth necessary to accommodate a cap below the current authorized depth plus a buffer (the depth of which is to be determined in consultation with the U.S. Army Corps of Engineers), or to uncontaminated material, whichever is shallower. Areas dredged to native material would include backfill, if necessary. The remedy also includes dredging and/or capping with an armored and amended cap outside of the navigation channel, including in the Western Beef Slip, which is outside of the navigation channel, or in areas determined to have a relatively high flux of COCs from groundwater. The alternative also includes backfill, as needed, and would result in deeper water depths on average.

Note that this alternative was evaluated in the FFS and Proposed Plan because, at the time of preparation, deauthorization of the federally authorized navigation channel in the East Branch was uncertain. The WRDA 2024 bill includes a plan to deauthorize the East Branch navigation channel and was signed into law on January 4, 2025 and, as such the East Branch navigation channel is no longer authorized.

Based on the assumptions used in the FFS, Alternative EB-E is expected to take 37 months to construct (over five construction seasons) and includes the following:

- Removal of approximately 246,100 cy of debris and sediment (233,800 cy of sediment and 12,300 cy of debris; 157 scow trips for sediment and debris) over 10.6 acres;
- Capping with 42,700 cy of material (22 scow trips), over 8.1 acres (including post-ISS cap);
- Backfilling with 7,200 cy of sand (4 scow trips);
- ISS of 17,300 cy of sediment identified for NAPL treatment;
- Sealed bulkheads along 490 LF of shoreline; and
- Shoreline stabilization along 4,250 LF, or 84 percent, of the shoreline through the use of ISS, bulkheads and slot dredging.

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| Capital Cost: | $ 467.4 million |
| Total O&M Cost: | $ 32.4 million |
| Total Cost: | $ 499.8 million |
| Present Worth Cost: | $ 418.7 million |
| Construction Time Frame: | 5 years |

**Alternative EB-F – Dredge All**

Under this alternative, sediment would be dredged down to uncontaminated material across the entire footprint of the East Branch and backfill and would result in deeper water depths on average. Even though this alternative includes dredging of all contaminated sediment, armored/amended caps would be placed over areas determined to have a relatively high flux of COCs from groundwater.

Based on the assumptions used in the FFS, Alternative EB-F is expected to take 46 months to construct (over seven construction seasons) and includes the following:

- Removal of approximately 268,100 cy of debris and sediment (254,700 cy of sediment and 13,400 cy of debris; 171 scow trips for sediment and debris) over 11.2 acres;
- Capping with 31,500 cy of material (16 scow trips), over 6.8 acres (including post-ISS cap);
- Backfilling with 10,100 cy of sand (6 scow trips);
- ISS would not be needed for NAPL treatment since this alternative would dredge all contaminated sediments;
- Sealed bulkheads along 850 LF of shoreline; and
- Shoreline stabilization along 4,500 LF, or 88 percent, of the shoreline through the use of ISS or bulkheads.

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| Capital Cost: | $ 578.0 million |
| Total O&M Cost: | $ 32.1 million |
| Total Cost: | $ 610.1 million |
| Present Worth Cost: | $ 492.7 million |
| Construction Time Frame: | 7 years |

**SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES**

In selecting a remedy, EPA considered the factors set out in CERCLA Section 121, 42 U.S.C. §9621, conducting a detailed analysis of the viable remedial alternatives pursuant to the NCP, 40 CFR §300.430(e)(9), EPA's Guidance for Conducting Remedial Investigations and Feasibility

Studies under CERCLA (OSWER Directive 9355.3-01) and EPA's A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents, OSWER 9200.1-23.P. The detailed analysis consisted of an assessment of the individual alternatives against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

A comparative analysis of these alternatives based upon the nine evaluation criteria noted below follows.

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***Threshold Criteria*** *- The first two criteria are known as "threshold criteria" because they are the minimum requirements that each response measure must meet in order to be eligible for selection as a remedy.*

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**1. Overall Protection of Human Health and the Environment**

*Overall protection of human health and the environment determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.*

Alternative EB-A (No Action) would not be protective of human health and the environment because it would not reduce the potential exposure of human and ecological receptors to COCs in sediment. As it would not meet this threshold criterion, Alternative EB-A was not evaluated against the other NCP criteria.

The remaining alternatives would meet the threshold criteria of overall protection of human health and the environment. Exposure to contaminated sediment and migration of contaminants through sediment would be addressed through an appropriately designed combination of dredging, capping, ISS, sealed bulkheads, and treatment. Each alternative also assumes bank-to-bank remediation will be conducted, so that a clean surface would be present immediately after dredging and capping were completed.

Note that deauthorization of the federally authorized navigation channel in the East Branch of Newtown Creek was included in the WRDA 2024 bill, which was signed into law on January 4, 2025. As such, Alternative EB-E is not considered further in the nine criteria evaluation. The evaluation of Alternative EB-E would be very similar to that for Alternative EB-F.

**2. Compliance with applicable or relevant and appropriate requirements (ARARs)**
*CERCLA Section 121 (d), 42 U.S.C. § 9621(d), and Section 300.430(f)(1)(ii)(B) of the NCP, 40 CFR §300.430(f)(1)(ii)(B), require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA Section 121(d)(4).*

*Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides a basis for invoking a waiver.*

Under CERCLA, remedial actions must comply with all federal and state environmental requirements, standards, criteria, and limitations, unless such ARARs are waived under certain specific conditions. Because the remedy for the East Branch portion of OU1 is considered an interim early action, identification of ARARs is not necessary at this time. It is nonetheless expected that each of the active alternatives could be designed in such a way that it attains location- and action-specific ARARs and to-be-considered (TBC) advisories, criteria, and guidance (see Tables 10, 11, and 12). Chemical-specific ARARs would be addressed by the eventual, final remedy selected for OU1 and thus have not been identified for this interim early action.

Alternatives EB-B, EB-C, EB-D, and EB-F would satisfy location-specific ARARs (key potential location-specific ARARs include the Endangered Species Act, the Migratory Bird Treaty Act, the Coastal Zone Management Act, Protection of Wetlands regulations, and Floodplain Management regulations) and action-specific ARARs (key potential action-specific ARARs include the requirements of the Clean Water Act that would apply to dredging and capping, the RCRA requirements that would apply to management of dredged materials, and the Clean Air Act).

Alternatives EB-B, EB-C, EB-D, and EB-F would be anticipated to comply with location- and action-specific ARARs through appropriate engineering design and agency review processes. Confirmation of ARAR compliance is typically demonstrated during remedial design and through the remedial action work plan (e.g., environmental protection plan, construction quality control plan, waste management plan, transportation and disposal plan, stormwater pollution and spill prevention plan, and best management practices [BMPs]) as well as monitoring during the construction period.

***Primary Balancing Criteria** – the next five criteria, criteria 3 through 7, are known as "primary balancing criteria". These criteria are factors by which tradeoffs between response measures are assessed so that the best options will be chosen, given site-specific data and conditions.*

### 3. Long-Term Effectiveness and Permanence

*Long-term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.*

Each of the remaining alternatives would be effective in the long term through the use of appropriate remedial technologies, including dredging, ISS, and the installation of amended caps and/or backfill layers, as well as the use of sealed bulkheads, where needed, as a preliminary measure until a long-term solution can be implemented. Long-term effectiveness would be maintained through the ongoing conduct of a robust post-remedy implementation monitoring plan designed to detect both bottom-up concerns with the remedy (for example, from underlying NAPL or groundwater facilitated transport) as well as top-down concerns (for example, from the effects of climate change and scouring, and from the effects of ongoing sources of contamination from upland properties). If an impact to the effectiveness or protectiveness of the remedy is found, then the appropriate entity to address that impact will be determined on a case-by-case basis.

Alternative EB-B would raise the average elevation of the sediment bed thus potentially making it less resilient than the other active alternatives to the effects of climate change such as erosional impacts resulting from more frequent and higher intensity rainfall and higher intensity outfall and overland flows both currently and in the future. As such, the long-term effectiveness and permanence of Alternative EB-B is less than the other alternatives. Alternatives EB-C and EB-D would maintain existing water depths and therefore maintain the current hydraulics of the system. Alternatives EB-F would increase the average water depths in the East Branch, thus potentially making it more resilient to climate change though also altering the hydrodynamics of the system. Alternative EB-D would remove more contaminated sediment (as compared to Alternative EB-C) based on the four considerations for deeper dredging outlined in the alternative, thus likely making it more effective in the long-term at preventing exposure to or migration of contamination from below the capped area to the surface than Alternative EB-C. It would also require less O&M than Alternative EB-C since it would be less reliant on capping in the long term to maintain long-term effectiveness and permanence as less contamination would remain in-place. Alternative EB-F would be effective in the long term since all contaminated material would be dredged to uncontaminated material.

The robust post-remedy implementation monitoring plan, plus maintenance of the cap in perpetuity, would be an integral part of each potential alternative to ensure it remains effective and protective in the long term, considering both potential internal and external impacts to the remedy.

**4. Reduction of Toxicity, Mobility, or Volume through Treatment**
*Reduction of toxicity, mobility, or volume via treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.*

Each remaining alternative includes a combination of in-situ treatment (through ISS) and ex-situ treatment (of dredged sediment). Alternative EB-F would result in the greatest volume of ex-situ treatment, followed by EB-D, EB-C and EB-B. The volume of sediment requiring in-situ treatment would be refined using information collected during the PDI and during development design of the remedy. Since ISS is performed on sediment that remains in place and Alternative EB-B would leave the most contaminated sediment left in place, Alternative EB-B has the potential to result in the greatest volume of in situ treatment.

Both ISS and amended armored capping would be used in all alternatives to address the toxicity and mobility of contamination. While amended capping does not by itself satisfy the NCP criterion of reduction of toxicity, mobility or volume through treatment, as treatment caps do not directly address the source material beneath them, it does provide a means of sequestering the contamination in place so it is not available for exposure to human or ecological receptors, thus reducing the toxic effects. ISS and amended armored capping would also reduce the mobility of contamination remaining in the East Branch after dredging occurs. Reduction of toxicity and mobility (in the sense they were just described) increase from Alternative EB-B to EB-F.

**5. Short-Term Effectiveness**
*Short-term effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.*

Impacts to the community for each alternative increase from Alternative EB-B to EB-F. The length of time to implement each alternative increases from 13 months for Alternative EB-B, to 22 months for Alternatives EB-C or EB-D, and to 46 months for Alternative EB-F. The longer the timeframe and the greater the quantity of sediment to be addressed, the more significant the short-term impacts to the community would be. These short-term impacts include aesthetic impacts to the waterway, potential for odors and dust, increased noise and decreased access to the Creek. Handling larger quantities of sediment and backfill/capping materials would also have a greater short-term impact on the environment and more opportunities for impacts to worker safety. Short-term impacts would be controlled through the use of construction BMPs, personal protective equipment (PPE), engineering controls, and health and safety plans. On balance, Alternative EB-B would be the most effective in the short term. Alternatives EB-C and EB-D would be more effective in the short term than Alternative EB-F.

**6. Implementability**

*Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.*

It is expected that each of the alternatives would be implementable from a technical standpoint as each alternative employs well-established technologies and approaches. Additionally, services and materials needed to complete each of the active alternatives are readily available. From an administrative standpoint, NYSDEC may have concerns with Alternative EB-B because it would decrease the depth of water and, therefore, could impact water quality and may not comply with their water quality regulations. Specifically, it may affect the ability of the LTCP NYCDEP is currently under order by NYSDEC to implement to reach its goals. Alternatives EB-C and EB-D are more readily implementable than Alternative EB-F since the dredge volume would be lower than for Alternative EB-F, and Alternatives EB-C and EB-D would require less structural/engineering support to safely conduct.

There may be location-specific implementability issues associated with the use of ISS where needed to reduce migration of contamination and/or for treating NAPL or PTW. Specifically, successful implementation of ISS near CSO or other large discharges could be problematic if a large storm event were to occur while the stabilizing agent is curing. Mitigation measures to address this concern will be developed during the design of the remedy and implemented if needed. There may also be location-specific implementability issues associated with implementing shoreline stabilization measures including bulkhead installation, repair, or replacement or ISS.

**7. Cost**

*Cost includes estimated capital and annual operation and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent (this is a standard assumption in accordance with EPA guidance)*

Total present worth costs for Alternatives EB-B, EB-C, EB-D, and EB-F are summarized below. Present worth is calculated using a discount rate of seven percent. Long term monitoring (LTM) is assumed to be 10 years for each alternative since monitoring would continue until subsumed by the eventual final OU1 remedy.

Alternative EB-B:

- Total Present-Worth Cost $152.0 million
- Implemented within 2 years
- LTM for 0-10 Years at a total cost of $33.4 million

Alternative EB-C:

- Total Present-Worth Cost $235.2 million
- Implemented within 3 years
- LTM for 0-10 Years at a total cost of $33.3 million

Alternative EB-D:

- Total Present-Worth Cost $243.5 million
- Implemented within 3 Years
- LTM for 0-10 Years at a total cost of $33.3 million

Alternative EB-F:

- Total Present-Worth Cost $492.7 million
- Implemented within 7 Years
- LTM for 0-10 Years at a total cost of $32.1 million

Note that these costs are based on estimates using the OU1 RI/FS dataset and the assumptions made in the FFS. A robust PDI must be conducted as part of the design of the remedy for the East Branch action. It is anticipated that some of the estimates used to develop these costs may be low and some estimates may be high, but on balance EPA expects that the final remedy will be within +50 and -30 percent of the ROD estimates.

***Modifying Criteria** – The final two evaluation criteria, criteria 8 and 9, are called "modifying criteria" because new information or comments from the state or the community on the Proposed Plan may modify the preferred response measure or cause another response measure to be considered.*

**8. State Acceptance**

*State Agency acceptance considers whether the State and/or Support Agency agrees with EPA's analyses and recommendations.*

NYSDEC concurs with the selected remedy. A letter of concurrence, dated December 20, 2024, is attached in Appendix IV.

**9. Community Acceptance**

*"Community Acceptance" considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.*

On September 18, 2024, EPA held a formal public meeting on the proposed plan for OU4. All written and oral comments received, both during that meeting and throughout the comment period, which ended on November 12, 2024, after two requests for extension were granted, are addressed in detail in Appendix V, which is the Responsiveness Summary for this ROD.

The majority of comments received by EPA indicated support for the Preferred Alternative in the Proposed Plan. Several of the comments asked for additional detail related to the design of the remedy, such as how sediment will be dredged, staged, and transported and how the cap will be designed. There was also interest in learning how the cleanup work will be coordinated with New York City Department of Transportation plans to replace the Grand Street Bridge, which crosses the East Branch, and several questions about bulkhead and shoreline restoration and impacts of the cleanup work on the community. Several parties requested more detail about how coordination between Superfund and NYSDEC will occur and expressed concern with the pace of NYSDEC-led cleanups in the past.

Some members of the CAG did express their preference that EPA select Alternative EB-F (dredging of all contaminated sediment) rather than EB-D and questioned whether the nine criteria were evaluated properly. Overall, they voiced concern with the long-term effectiveness of capping. There were also several comments noting that there are data gaps in the East Branch, especially for NAPL and seeps, and asking that additional data be collected to make better informed decisions.

## PRINCIPAL THREAT WASTE

The NCP establishes an expectation that the EPA will use treatment to address the principal threats posed by a site whenever practicable (NCP Section 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or act as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment in the event that exposure should occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of alternatives, using the remedy selection criteria described above. The manner in which principal threat wastes are addressed provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

For this action, two types of principal threat waste are potentially present. These include:

- Contaminated sediment with PCB concentrations above 500 parts per million (ppm).
- NAPL in subsurface sediment or upland soil that has the potential to migrate to surface sediment and surface water.

Based on the findings of the RI/FS, there is no known PTW in the East Branch. However, additional sampling will be conducted to support the design of the remedy that is selected for the East Branch portion of the OU1 Study Area.

## SELECTED REMEDY

Based upon considerations of the results of the RI/FS, the requirements of CERCLA, the detailed analyses of the response measures and public comments, EPA has determined that Alternative EB-D (Figure 9) is the appropriate remedy for the East Branch portion of OU1, because it best satisfies the requirements of CERCLA Section 121, 42 U.S.C. §9621, and the NCP's nine evaluation criteria for remedial alternatives, 40 CFR §300.430(e)(9).

### Description of the Selected Remedy

The major components of the selected remedy include the following:

- Dredge to allow placement of a cap to maintain existing water depth with localized deeper dredging. The selected remedy includes the following primary components:
    - A PDI to help fill data gaps and further refine our understanding of the East Branch CSM. The PDI will be developed with clear data quality objectives and assessment methods and will include, at a minimum, the following activities:
        - Collect additional sediment COC data to refine the remedial footprints and depths of the various remedy components and to delineate potential PTW and TSCA materials;
        - Collect additional porewater and/or groundwater COC data to refine cap designs;
        - Collect data to further delineate NAPL, investigate NAPL mobility, and determine the constituents present in NAPL;
        - Collect geotechnical data to support dredge design, cap design and shoreline stability evaluations;
        - Conduct investigations (*e.g.*, systematic as well as opportunistic seep sampling) and surveys to inform decisions on the need for upland source controls [*e.g.*, sealed bulkheads]).
    - Dredging to a minimum depth to accommodate capping without decreasing water depths. FFS dredge depth estimates range from 36 inches (in deeper water areas) to 53 inches (in shallower water areas) below the current mud line.
    - Dredging deeper in certain areas, to be determined during the design of the remedy, based on the following considerations:
        - potential for NAPL migration from the deeper soft and/or native material;

        - potential for human and/or ecological exposure to PTW;
        - depth to uncontaminated material;
        - and comparatively higher COC concentrations in remaining sediment.
    - ISS where needed to reduce migration of and/or for treating NAPL or PTW.
    - Capping of dredged areas where contaminated sediment is left in place or where the flux of COCs from groundwater is relatively high and could result in exceedance of RGs over time. Capping may also be determined to be necessary in areas where ISS is used to reduce migration of and/or for treating NAPL and/or PTW. The design of the cap will be determined after completion of the PDI based on consideration of areas of relatively high groundwater dissolved phase COCs, NAPL presence, and erosion potential (particularly near CSO discharges). The FFS assumes the placement of a multilayer engineered cap including the following layers: erosion protection, geotechnical filter (where appropriate), dissolved phase chemical isolation, and NAPL sorption. In addition, a habitat layer will need to be placed on top of the cap, where appropriate. Design of the cap may vary throughout the East Branch depending on location-specific condition and/or constructability considerations and the thickness of the cap will be commensurate with the depth of dredging at any particular location.
    - Backfilling (*e.g.,* placement of a clean sand layer), as needed, to maintain existing water depths.
    - Shoreline stabilization, including ISS, slot dredging, or bulkhead replacement, stabilization and/or installation, as needed.
    - Installing sealed bulkheads to address shoreline seeps, as needed based on the results of the PDI and as a preliminary measure while the related upland source is addressed through either state or federal enforcement authorities.
    - Dewatering and offsite disposition of all dredged sediment and debris.
    - Restoration of all impacted areas, taking into account the reasonably anticipated future uses of the East Branch and the adjacent shorelines.
    - Institutional controls, as needed, to maintain the integrity of the implemented remedy (fish consumption advisories through NYSDEC will remain in place).
    - A robust post-remedy implementation monitoring program to ensure the remedy is performing as designed and remains protective over time. The monitoring program would be structured so that any ongoing sources negatively impacting the protectiveness of the remedy can be identified and then it will be determined if those sources require additional controls, either through state and/or federal enforcement authorities, to be determined on a case-by-case basis.

The total net-present value cost is estimated to be $243.5 million.

Any upland source control measures that are determined to be needed to support the long-term protectiveness of the remedy will be implemented under state and/or federal enforcement authorities, as to be determined on a case-by-case basis.

Remediation and monitoring in the East Branch would be a key element of and integrated with the OU1 adaptive site management strategy that is being developed.

Preliminary estimates of the selected remedy are as follows. All of these estimates will be refined during the PDI, and several are based on available data:

- 101,000 cy of sediment will be dredged through this action, over an area of 11.2 acres, and 5,300 cy of debris will be removed off-site.
- ISS will be used to address 9,900 cy of sediment in-place over an area of 0.4 acres.
- Deeper dredging to uncontaminated material will occur over 1.2 acres.
- An armored and amended cap will be placed over a total of 10.0 acres resulting in the need for 69,600 cy of capping.
- 14,400 cy of backfill material will be needed over 1.2 acres to manage dredge residuals and maintain existing water depth where deeper dredging is conducted.
- Shoreline stabilization will be required along 3,850 LF, which equates to approximately 76 percent of the shoreline, through the use of ISS, bulkheads or other methods.
- Sealed bulkheads will be needed over an estimated length of 180 LF.
- It is estimated that the entire action may take 22 months (over 3 construction seasons) to implement.

The design of the remedial action will consider resiliency measures related to these anticipated hazards and will specifically consider the intensity, frequency, or duration of extreme weather events; sea level rise; seasonal changes in precipitation and/or temperatures; and increasing risk of floods.

**Summary of the Rationale for the Selected Remedy**

EPA has selected Alternative EB-D as the remedy for the East Branch portion of OU1 because it meets the threshold criteria of protecting human health and the environment and complying with ARARs and it provides the best balance of the remaining criteria. It would be more effective in the long-term and provide more reduction in toxicity, mobility or volume through treatment than Alternatives EB-B or EB-C since it would remove more contaminated sediment and would be less reliant on capping to maintain effectiveness. Alternative EB-D would also be more effective in the short-term, more easily implementable, and more cost-effective than Alternatives EB-E or EB-F since it will remove less contaminated sediment, thus reducing the opportunities for short term impacts to the community, to workers and to the environment.

Based on information currently available, EPA believes the selected remedy meets the threshold criteria and provides the best balance of tradeoffs among the alternatives with respect to the balancing and modifying criteria. EPA expects the preferred alternative to satisfy the following statutory requirements of CERCLA Section 121(b) because (1) it will be protective of human health and the environment, either through this action or through additional actions to be determined as part of the OU1 ROD; (2) it will comply with location and action-specific ARARs; (3) it is cost-effective; and (4) it utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. In addition, CERCLA Section 121 includes a preference for remedies that permanently and significantly reduce the volume, toxicity or mobility of hazardous substances as a principal element.

With respect to the two modifying criteria of the comparative analysis, which are state acceptance and community acceptance, NYSDEC concurs with the selected remedy and, while some members of the community would have preferred the selection of Alternative EB-F, the community expressed overall support for the selected remedy.

**Expected Outcomes of the Selected Remedy**

The selected remedy is expected to meet the RAOs for the East Branch portion of OU1 because it will result in immediate risk reduction and contaminant mass removal in this portion of the OU1 Study Area (and, to a lesser extent, within the Study Area as a whole). This action would reduce the risks to humans via crab consumption and ecological receptors via dietary intake and sediment toxicity because immediately after implementation of this action, COC concentrations in the surface sediment should be clean (meaning non-detect or well below any regulatory standards for non-metals and at or below concentrations consistent with naturally occurring levels for metals). In addition, EPA will ensure risk reductions are maintained and RAOs are met in the long-term through the monitoring and evaluation approach developed for the East Branch portion of OU1, which is described above. The monitoring and evaluation approach will ensure impacts from all potential sources are understood and addressed, as needed and under the appropriate enforcement authority.

**Green Remediation**

EPA Region 2 Clean and Green Policy (Policy)[11] provides guidance for the implementation of green remediation for response actions in the region. The goal of the Policy is to enhance the environmental benefits of federal cleanup programs by promoting technologies and practices that are sustainable, while complying with all applicable laws and regulations. The objectives of green remediation are to: protect human health and the environment by achieving remedial action goals; support human and ecological use and reuse of remediated land; minimize impacts to water quality and water resources; reduce air emissions and greenhouse gas production; minimize material use and waste production; and conserve natural resources and energy.

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11 https://www.epa.gov/greenercleanups/epa-region-2-clean-and-green-policy

This Policy establishes touchstone practices that are both quantifiable and reportable. The region uses reporting requirements in enforcement instruments, grants, and contracts to collect and report metrics annually. Examples of touchstone practices that may be used during the implementation of the selected remedy are:

- Use of renewable energy, and energy conservation and efficiency approaches including EnergyStar equipment
- Cleaner fuels and clean diesel technologies and strategies
- Water conservation and efficiency approaches including WaterSense products
- Sustainable site design
- Industrial material reuse or recycling within regulatory requirements
- Recycling applications for materials generated at or removed from the site
- Environmentally Preferable Purchasing
- Greenhouse gas emission reduction technologies

Green remediation techniques, as detailed in NYSDEC's Green Remediation Program Policy-DER-31,[12] will also be considered during the implementation of the selected remedy to reduce short-term environmental impacts.

## STATUTORY DETERMINATIONS

As previously noted, CERCLA Section 121(b)(1), 42 U.S.C. § 9621(b)(1), mandates that a remedial action must be protective of human health and the environment, cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site. CERCLA Section 121(d), 42 U.S.C. § 9621(d), further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA Section 121(d)(4), 42 U.S.C. § 9621(d)(4).

For the reasons discussed below, EPA has determined that the interim, early action remedy meets the requirements of CERCLA Section 121, 42 U.S.C. §9621.

### Protection of Human Health and the Environment

It is expected that the selected remedy would meet the threshold criteria of overall protection of human health and the environment. Exposure to contaminated sediment and migration of

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12 https://extapps.dec.ny.gov/docs/remediation_hudson_pdf/der31.pfd

contaminants through sediment would be addressed through a combination of dredging, capping, ISS, sealed bulkheads, treatment, and institutional controls. As part of the selected remedy, bank-to-bank remediation would be conducted, so that a clean surface would be present immediately after dredging and capping.

Construction activities associated with this remedy may have significant impacts on the community and workers during the implementation of the remedy. Measures to minimize and mitigate the impacts associated with these activities will be addressed in community and worker health and safety plans, by the use of best management practices and by following approved health and safety procedures.

**Compliance with ARARs**

Because the remedy for the East Branch portion of OU1 is considered an interim, early action, identification of ARARs is not necessary at this time. It is nonetheless expected that the selected remedy could be designed in such a way that it attains location- and action-specific ARARs. Chemical-specific ARARs would be addressed by the eventual, final remedy selected for OU1 and thus have not been identified for this interim early action.

The selected remedy would satisfy location-specific ARARs (key potential location-specific ARARs include the Endangered Species Act, the Migratory Bird Treaty Act, the Coastal Zone Management Act, Protection of Wetlands regulations, and Floodplain Management regulations) and action-specific ARARs (key potential action-specific ARARs include the requirements of the Clean Water Act that would apply to dredging and capping, the RCRA requirements that would apply to management of dredged materials, and the Clean Air Act).

The selected remedy would be anticipated to comply with location- and action-specific ARARs through appropriate engineering design and agency review processes. Confirmation of ARAR compliance is typically demonstrated during remedial design and through the remedial action work plan (*e.g.*, environmental protection plan, construction quality control plan, waste management plan, transportation and disposal plan, stormwater pollution and spill prevention plan, and best management practices [BMPs]) as well as monitoring during the construction period.

**Cost-Effectiveness**

A cost-effective remedy is one in which costs are proportional to its overall effectiveness (40 C.F.R. § 300.430(f)(1)(ii)(D)). Overall effectiveness is based on the evaluations of long-term effectiveness and permanence, reduction in toxicity, mobility, and volume through treatment, and short-term effectiveness. Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness.

The selected remedy underwent a detailed cost analysis. In that analysis, capital and operation and maintenance costs were estimated and used to develop present-worth costs. In the present-worth cost analysis, operation and maintenance costs were calculated for the estimated life of each alternative. Present worth cost is the total cost of a remedial alternative over time in terms of today's dollar value. Present worth is calculated using a discount rate of seven percent. Cost estimates are expected to be accurate within a range of +50 to -30 percent. This is a standard assumption in accordance with EPA guidance.

Long term monitoring (LTM) is assumed to be 10 years for the selected remedy since monitoring would continue until subsumed by the eventual final OU1 remedy. The total estimated present worth cost for implementing the selected remedy is $243.5 million.

Based on the comparison of overall effectiveness to cost, the selected remedy meets the statutory requirement that Superfund remedies be cost effective (40 C.F.R. § 300.430(f)(1)(ii)(D)) in that it represents reasonable value for the money to be spent. A 10-year timeframe was used for planning and estimating purposes to construct the remedy, perform O&M of the cap, and perform long-term monitoring, although remediation timeframes could exceed this estimate.

**Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable**

The selected remedy utilizes permanent solutions and treatment technologies to the maximum extent practicable. The selected remedy provides the best balance of trade-offs among the alternatives with respect to the evaluation criteria with respect to the balancing criteria set forth in Section 300.430(f)(1)(i)(B) of the NCP and represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner in the East Branch portion of OU1. The selected remedy satisfies the criteria for long-term effectiveness and permanence by addressing contaminated sediment and ensuring risk reductions are maintained and RAOs are met in the long-term through the monitoring and evaluation approach developed for the East Branch portion of OU1, thereby reducing the toxicity, mobility, and volume of contamination.

**Preference for Treatment as a Principal Element**

CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances as a principal element (or justify not satisfying the preference). In keeping with the statutory preference for treatment as a principal element of the remedy, if principal threat waste is encountered during additional sampling to be conducted to support the design of the selected remedy, it will be either dredged or treated through in-situ stabilization (ISS). Dredged material will need to be treated prior to disposal. Mobility will effectively be eliminated not necessarily through treatment, but by shipping the dredged sediments to disposal facilities. There would be no reduction in toxicity, mobility, or volume of the contaminants of concern (COCs) specifically through treatment for dredged sediments. However, an amendment will be added (as needed) to stabilize the removed material and meet transportation and disposal requirements. The addition of an amendment will reduce the mobility of contaminants contained within the sediments compared to unamended sediments. In addition, the NAPL and dissolved phase caps will effectively isolate the remaining contaminated sediments that are not removed, and a carbon-based amendment and/or NAPL adsorption media will be incorporated into the cap to prevent the migration of contamination through the cap. While the remedy may not meet the statutory preference for utilizing treatment to the maximum extent practicable, treatment will be utilized to address principal threat waste. Additionally, a degree of treatment is a secondary benefit of amendment addition during sediment processing (for transportation and disposal requirements).

### Five-Year Review Requirements

A review of the remedial action pursuant to CERCLA Section121(c), 42 U.S.C. §9621(c), will be conducted five years after the commencement of the remedial action to ensure that the remedy continues to provide adequate protection to human health and the environment because this remedy will result in hazardous substances remaining on-Site above health-based levels that allow for unlimited use and unrestricted exposure.

## DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for OU4 of the Site was released on August 28, 2024. The Proposed Plan identified Alternative EB-D as the preferred alternative for addressing the East Branch portion of OU1 of the Site and solicited public comment. EPA reviewed all written (including electronic formats such as e-mail) and verbal comments received during the public comment period and has determined that no significant changes to the remedy, as originally proposed in the Proposed Plan, are necessary or appropriate.

The following issues/concerns have been clarified in this Record of Decision from what was presented in the Proposed Plan:

- Development and use of Interim Evaluation Measures in the post-remedy implementation monitoring program was clarified and slightly adjusted to clearly indicate that adjustments to the numerical criteria for developing IEMs may be made as additional data are obtained.

- Greater clarity around the distinction between the two reasons for the development of a highly robust post-remedy implementation monitoring plan, namely (i) to evaluate remedy performance and (ii) to evaluate the achievement of RAOs.

- Clearer definition of how upland properties are being considered as part of the Newtown Creek Site.

- Clarification that the quantitative development of volumes, areas, lengths and other measures associated with each alternative are based on existing data and must be refined during the design of the remedy, after conduct of the PDI. The quantities included in this Record of Decision should only be considered estimates developed for costing purposes.

- Restoration of all impacted areas of the East Branch was not specifically discussed in the Proposed Plan but is a part of the selected remedy. That point is clarified in this Record of Decision.

- At the time of release of the Proposed Plan, the WRDA 2024 bill, which includes deauthorization of the East Branch navigation channel, had not yet been signed into law. The Proposed Plan stated that it was EPA's expectation that the bill would be signed into law prior to implementation of the selected remedy. However, the WRDA 2024 bill was signed into law on January 4, 2025, and, as such the East Branch navigation channel is no longer authorized.

# APPENDIX I

## FIGURES

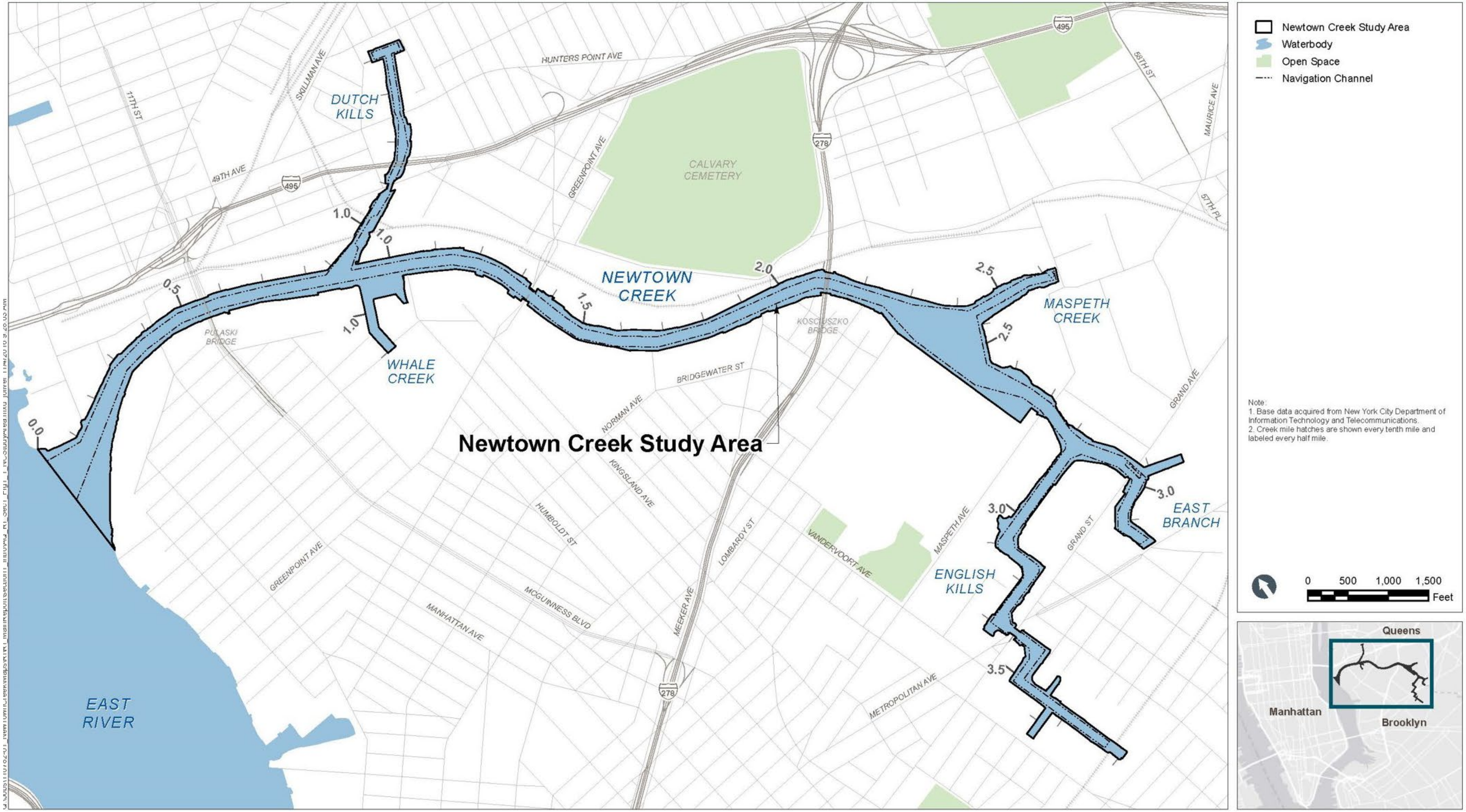



**Figure 1 - Newtown Creek Superfund Site Study Area (OU1)**

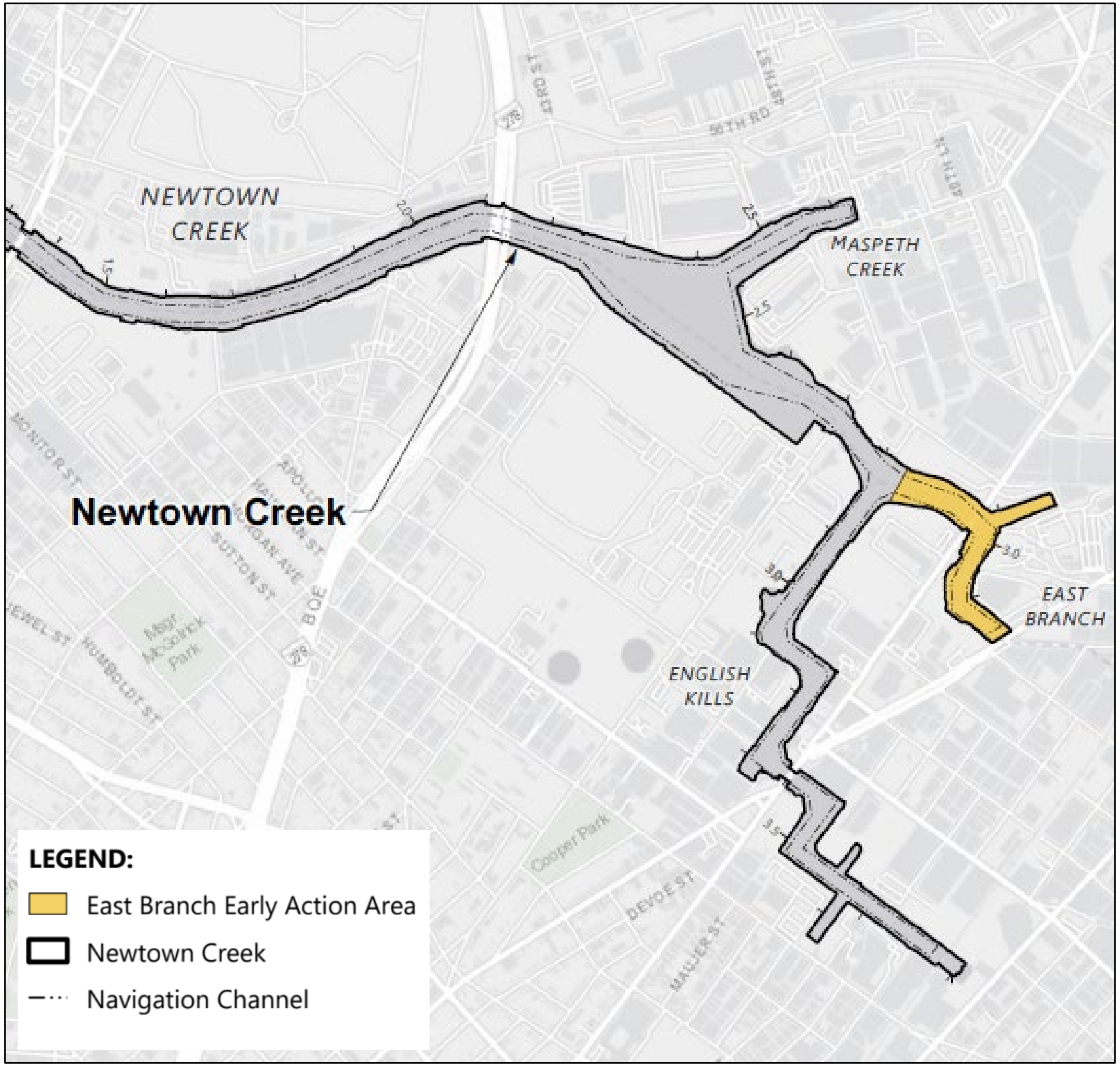



**Figure 2 - East Branch Early Action Area**


**Figure 3 - East Branch Existing Shoreline Conditions**

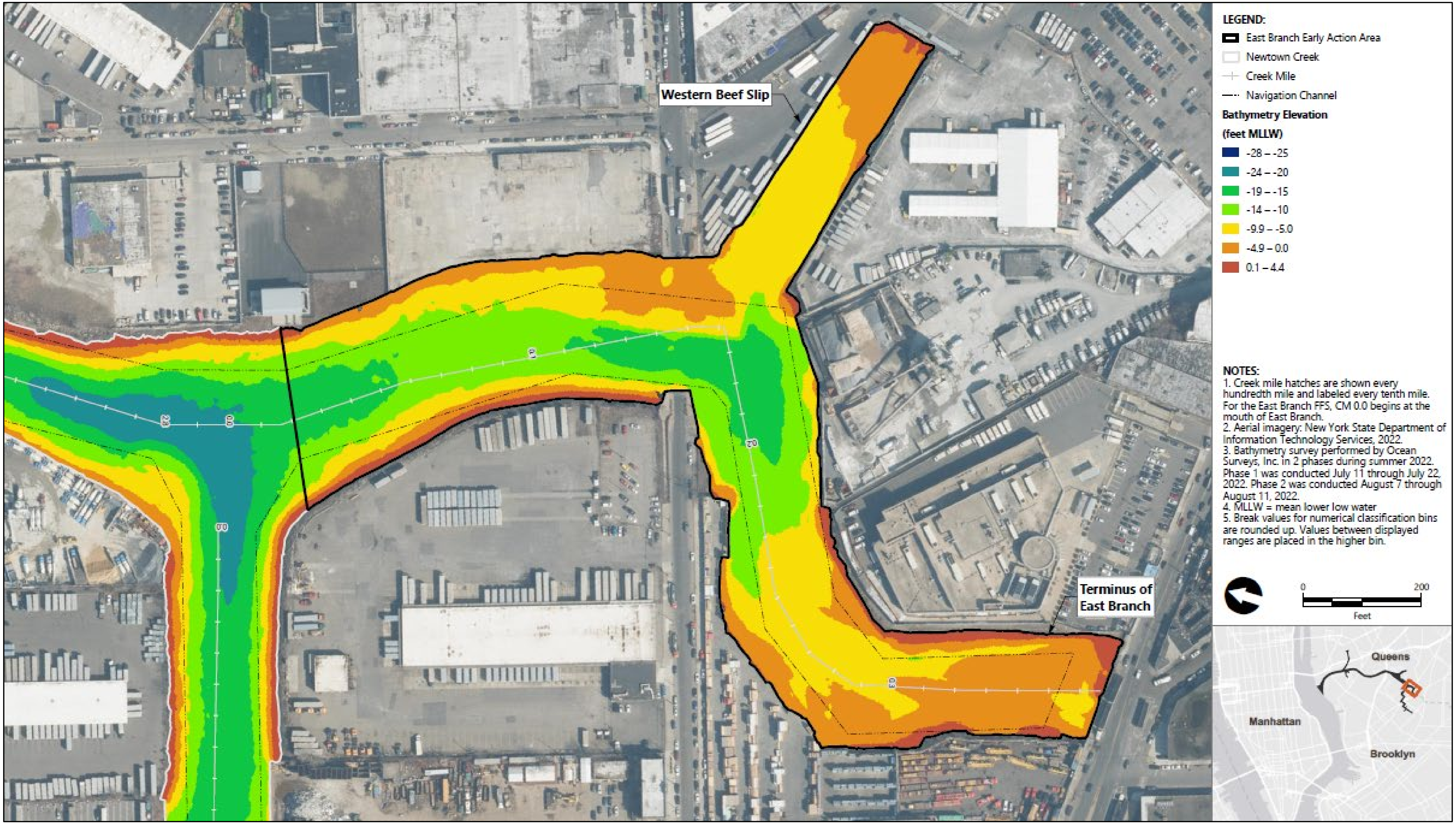



**Figure 4 - East Branch Bathymetry Elevation**


# Figure 5 - East Branch Point Source Discharge Locations

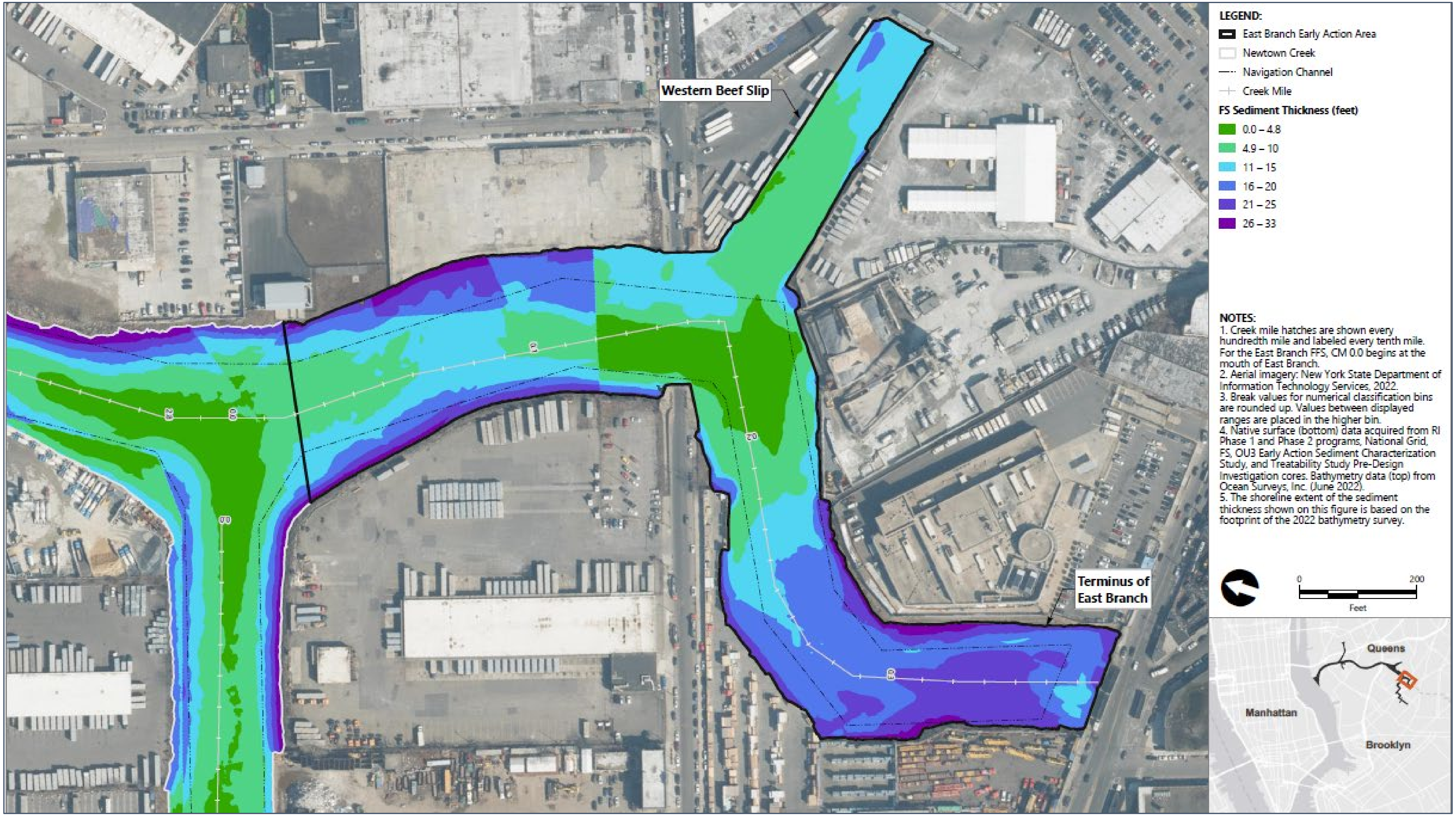



**Figure 6 - Sediment Thickness in the East Branch**

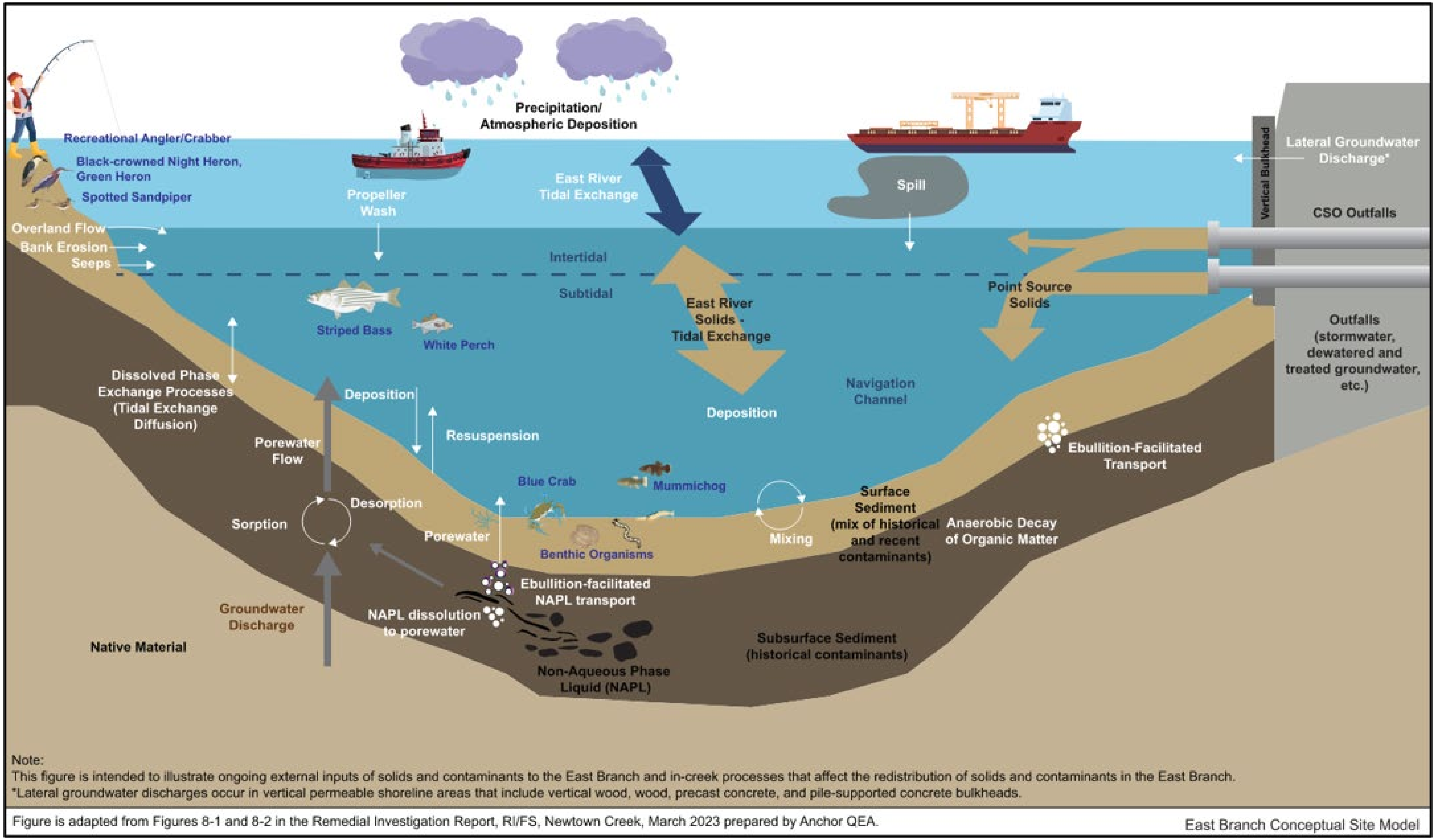
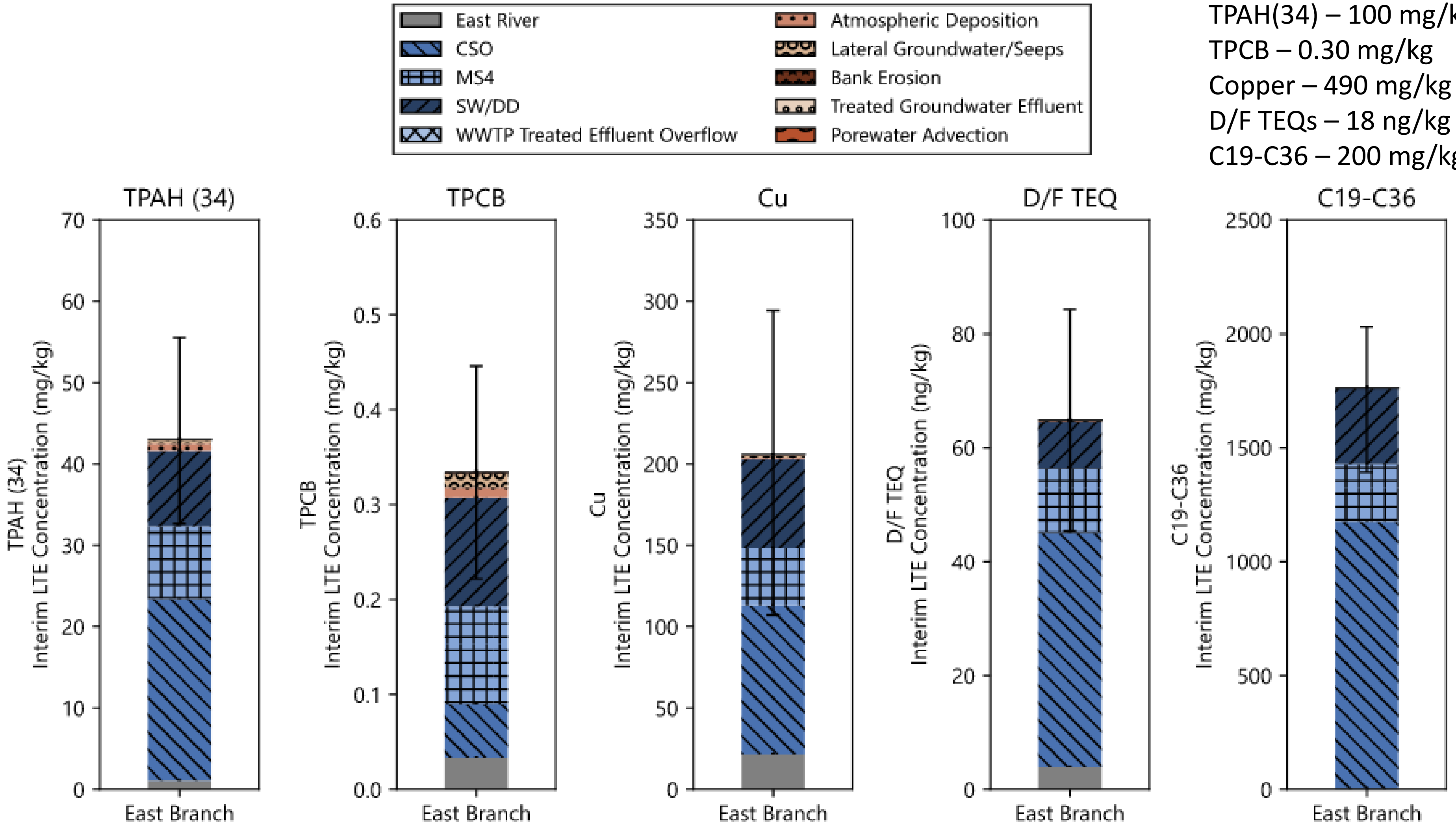



**Figure 7 - Conceptual Site Model for East Branch Portion of OU1**

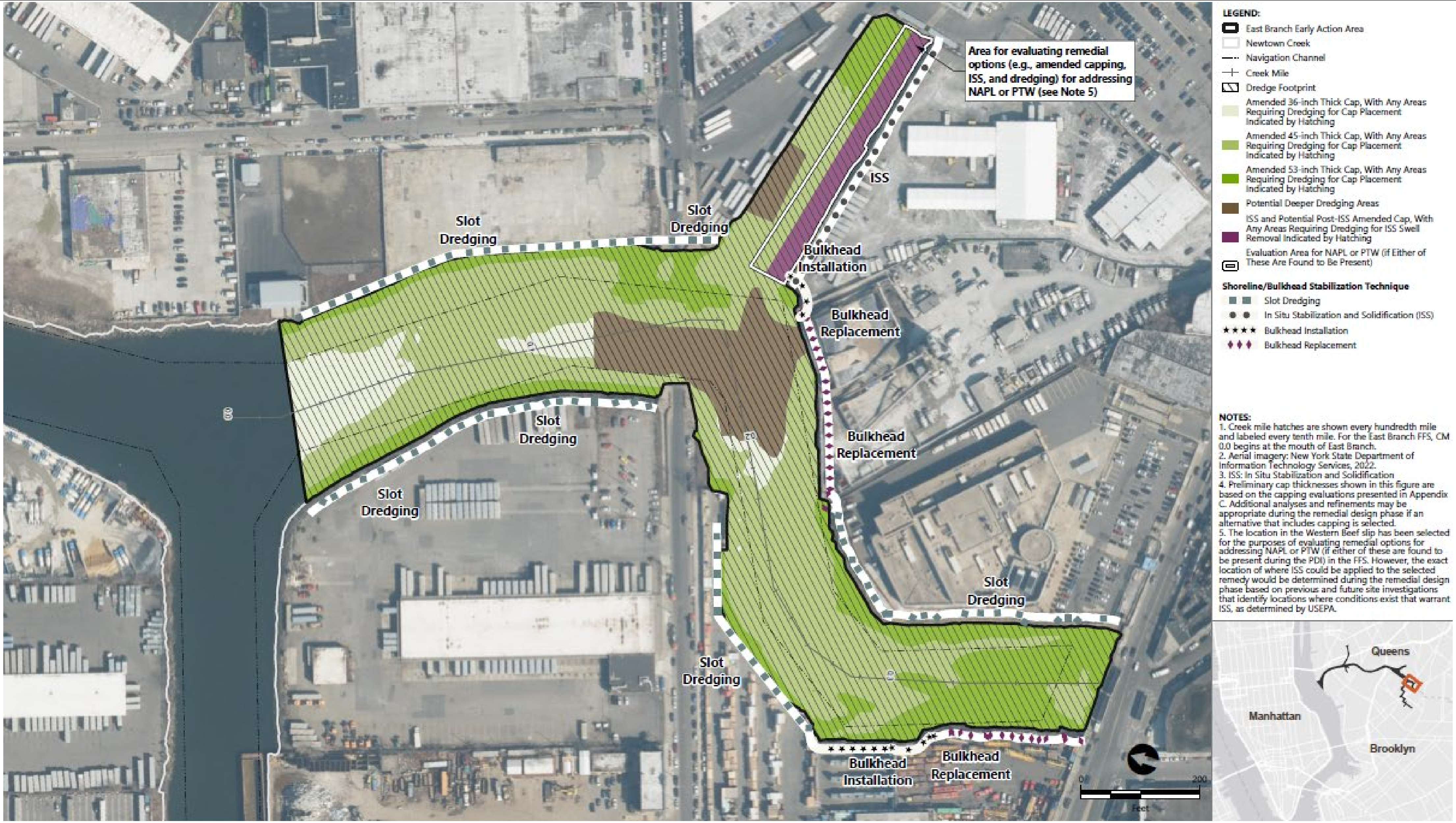
<u>Risk-Based PRGs</u>
TPAH(34) – 100 mg/kg
TPCB – 0.30 mg/kg
Copper – 490 mg/kg
D/F TEQs – 18 ng/kg
C19-C36 – 200 mg/kg




Notes: The range on each bar indicates the calculated long-term equilibrium concentrations with upper- and lower-bound ranges, while the bar itself shows the base case scenario.
WWTP treated effluent overflow and treated groundwater effluent are sources that originate outside of East Branch. Their contribution to long-term equilibrium in East Branch is a result of tidal transport.
CSO: combined sewer overflow; MS4: municipal separate storm sewer system; SW/DD: stormwater and direct drainage; WWTP: wastewater treatment plant
TPAH (34): total polycyclic aromatic hydrocarbon (34); TPCB: total polychlorinated biphenyl; Cu: copper; D/F TEQ: total dioxin/furan toxic equivalence quotient (mammal); C19-C36: C19-C36 aliphatics

**Figure 8 – Preliminary Estimates of Contribution of External Inputs for East Branch***

*Note: this figure will be updated based on data collected during the Preliminary Design Investigation




## Figure 9 - Selected Remedy for the East Branch Portion of OU1

***Note: Details to be updated during design of remedy**

# APPENDIX II

## TABLES

# Table 1

## Surface Sediment in East Branch – Summary Statistics

| Chemical | Count | Count Detect | Percent Detect | Minimum | Median | Arithmetic Average | Maximum | Standard Deviation |
|---|---|---|---|---|---|---|---|---|
| Total PAH (34) (mg/kg) | 42 | 42 | 100 | 3.4 | 88 | 130 | 690 | 130 |
| C19-C36 Aliphatics (mg/kg) | 27 | 27 | 100 | 35 | 1,800 | 2,000 | 7,300 | 1,600 |
| Total PCBs (mg/kg) | 42 | 42 | 100 | 0.024 | 1.3 | 2.5 | 16 | 3.3 |
| Total Dioxin/Furan TEQ 2005 (Mammal) (ng/kg) | 34 | 34 | 100 | 4.1 | 85 | 95 | 290 | 64 |
| Copper (mg/kg) | 42 | 42 | 100 | 32 | 360 | 590 | 6,300 | 980 |
| Lead (mg/kg) | 42 | 42 | 100 | 39 | 390 | 420 | 1,100 | 230 |

Notes:

All statistics are calculated using detect and non-detect samples. Non-detect samples, if present, are set to the MDL.

Statistics show two significant figures, except where data were reported as one significant figure.

Depth range for surface sediment is 0 to 15 cm.

Totals reported using Kaplan-Meier, if applicable.

Abbreviations:

cm: centimeter

MDL: method detection limit

mg/kg: milligrams per kilogram

ng/kg: nanograms per kilogram

PAH: polycyclic aromatic hydrocarbon

PCB: polychlorinated biphenyl

TEQ: toxic equivalence quotient

## Table 2

### Subsurface Sediment in East Branch – Summary Statistics

| Chemical | Depth | Count | Count Detect | Percent Detect | Minimum | Median | Arithmetic Average | Maximum | Standard Deviation |
|---|---|---|---|---|---|---|---|---|---|
| Total PAH (34) (mg/kg) | 15–60 cm | 17 | 17 | 100 | 21 | 270 | 420 | 1,700 | 420 |
| | 60–100 cm | 12 | 12 | 100 | 110 | 530 | 920 | 4,100 | 1,100 |
| | 100–200 cm | 24 | 24 | 100 | 54 | 760 | 970 | 6,100 | 1,200 |
| | 200–300 cm | 18 | 18 | 100 | 63 | 880 | 1,000 | 2,200 | 770 |
| | 300–400 cm | 11 | 11 | 100 | 43 | 820 | 1,000 | 2,400 | 760 |
| | 400–500 cm | 7 | 7 | 100 | 200 | 800 | 830 | 1,600 | 550 |
| | 500–600 cm | 1 | 1 | 100 | 300 | -- | -- | 300 | -- |
| C19-C36 Aliphatics (mg/kg) | 15–60 cm | 3 | 3 | 100 | 640 | 700 | 910 | 1,400 | 410 |
| | 60–100 cm | 2 | 2 | 100 | 370 | 700 | 700 | 1,000 | 480 |
| | 100–200 cm | 4 | 4 | 100 | 600 | 1,400 | 1,500 | 2,500 | 800 |
| | 200–300 cm | 5 | 5 | 100 | 1,000 | 3,300 | 3,200 | 5,100 | 1,600 |
| | 300–400 cm | 3 | 3 | 100 | 3,400 | 3,700 | 4,100 | 5,200 | 970 |
| | 400–500 cm | 3 | 3 | 100 | 3,100 | 4,200 | 4,900 | 7,600 | 2,400 |
| | 500–600 cm | 0 | 0 | -- | -- | -- | -- | -- | -- |
| Total PCBs (mg/kg) | 15–60 cm | 17 | 17 | 100 | 0.22 | 9.0 | 11 | 34 | 9.6 |
| | 60–100 cm | 12 | 12 | 100 | 0.45 | 9.1 | 13 | 42 | 14 |
| | 100–200 cm | 24 | 24 | 100 | 0.11 | 20 | 24 | 83 | 23 |
| | 200–300 cm | 18 | 18 | 100 | 0.056 | 7.2 | 13 | 45 | 14 |
| | 300–400 cm | 11 | 11 | 100 | 0.49 | 8.3 | 9.1 | 23 | 7.0 |
| | 400–500 cm | 7 | 7 | 100 | 3.2 | 9.8 | 12 | 35 | 11 |
| | 500–600 cm | 1 | 1 | 100 | 7.5 | -- | -- | 7.5 | -- |
| Total Dioxin/Furan TEQ 2005 (Mammal) (ng/kg) | 15–60 cm | 9 | 9 | 100 | 7.5 | 230 | 240 | 490 | 160 |
| | 60–100 cm | 4 | 4 | 100 | 22 | 110 | 220 | 620 | 280 |
| | 100–200 cm | 17 | 17 | 100 | 18 | 480 | 380 | 740 | 250 |
| | 200–300 cm | 12 | 12 | 100 | 22 | 95 | 250 | 650 | 230 |
| | 300–400 cm | 7 | 7 | 100 | 89 | 220 | 260 | 500 | 150 |
| | 400–500 cm | 5 | 5 | 100 | 150 | 190 | 240 | 480 | 140 |
| | 500–600 cm | 0 | 0 | -- | -- | -- | -- | -- | -- |
| Copper (mg/kg) | 15–60 cm | 17 | 17 | 100 | 230 | 1,300 | 1,600 | 4,900 | 1,200 |
| | 60–100 cm | 12 | 12 | 100 | 180 | 2,300 | 2,300 | 4,700 | 1,600 |
| | 100–200 cm | 24 | 24 | 100 | 320 | 2,600 | 2,700 | 6,000 | 1,500 |
| | 200–300 cm | 18 | 18 | 100 | 380 | 2,400 | 2,300 | 5,200 | 1,600 |
| | 300–400 cm | 11 | 11 | 100 | 190 | 2,000 | 2,600 | 5,400 | 1,600 |
| | 400–500 cm | 7 | 7 | 100 | 980 | 1,700 | 2,100 | 4,000 | 1,200 |
| | 500–600 cm | 1 | 1 | 100 | 1,200 | -- | -- | 1,200 | -- |
| Lead (mg/kg) | 15–60 cm | 17 | 17 | 100 | 280 | 760 | 920 | 2,300 | 530 |
| | 60–100 cm | 12 | 12 | 100 | 79 | 1,200 | 1,200 | 2,400 | 650 |
| | 100–200 cm | 24 | 24 | 100 | 290 | 1,500 | 1,500 | 2,400 | 510 |
| | 200–300 cm | 18 | 18 | 100 | 330 | 1,300 | 1,200 | 1,900 | 520 |
| | 300–400 cm | 11 | 11 | 100 | 220 | 1,300 | 1,200 | 1,900 | 490 |
| | 400–500 cm | 7 | 7 | 100 | 860 | 1,200 | 1,300 | 2,200 | 460 |
| | 500–600 cm | 1 | 1 | 100 | 1,100 | -- | -- | 1,100 | -- |

Notes:
Depth is depth below mudline. Totals reported using Kaplan-Meier, if applicable.
All statistics are calculated using detect and non-detect samples. Non-detect samples, if present, are set to the MDL.
Statistics show two significant figures, except where data were reported as one significant figure.
Table includes only subsurface sediment samples from cores that were sampled continuously.
--: indicates no information that is appropriate or available

Abbreviations:
cm: centimeter
MDL: method detection limit
mg/kg: milligrams per kilogram
ng/kg: nanograms per kilogram
PAH: polycyclic aromatic hydrocarbon
PCB: polychlorinated biphenyl
TEQ: toxic equivalence quotient

# Table 3
## Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

**Scenario Timeframe:** Current/Future
**Medium:** Surface Sediment
**Exposure Medium:** Surface Sediment – General Construction Worker

| Exposure Point | Chemical of Concern | Concentration Detected | | Concentration Units | Frequency of Detection | Exposure Point Concentration (EPC) | EPC Units | Statistical Measure |
|---|---|---|---|---|---|---|---|---|
| | | Min | Max | | | | | |
| Study Area[1] | Total PCB Congener TEQ 2005 (Mammal) | 47.3 | 145 | ng/kg | 8/8 | 72.8 | ng/kg | 95% Chebyshev (Mead, Sd) UCL) |

**Scenario Timeframe:** Current/Future
**Medium:** Tissue
**Exposure Medium:** Striped Bass Fillet

| Exposure Point | Chemical of Concern | Concentration Detected | | Concentration Units | Frequency of Detection | Exposure Point Concentration (EPC) | EPC Units | Statistical Measure |
|---|---|---|---|---|---|---|---|---|
| | | Min | Max | | | | | |
| Study Area | Total Dioxin/Furan TEQ 2005 (Mammal)[2] | 0.27 | 2.14 | ng/kg | 10/10 | 1.11 | ng/kg | 95% Student's-t UCL |
| | Total Nondioxin-like PCB Congener | 150,777 | 1,018,801 | ng/kg | 10/10 | 531,268 | ng/kg | 95% Student's-t UCL |
| | Total PCB Congener TEQ 2005 (Mammal) | 1.26 | 8.33 | ng/kg | 10/10 | 5.07 | ng/kg | 95% Student's-t UCL |

**Scenario Timeframe:** Current/Future
**Medium:** Tissue
**Exposure Medium:** White Perch Overflow Surface Sediment

| Exposure Point | Chemical of Concern | Concentration Detected | | Concentration Units | Frequency of Detection | Exposure Point Concentration (EPC) | EPC Units | Statistical Measure |
|---|---|---|---|---|---|---|---|---|
| | | Min | Max | | | | | |
| Study Area | Total Dioxin/Furan TEQ 2005 (Mammal) | 1.01 | 1.61 | ng/kg | 5/27 | 1.33 | ng/kg | 95% KM (t) UCL |
| | Total Nondioxin-like PCB Congener[3] | 89,392 | 522,658 | ng/kg | 7/7 | 420,036 | ng/kg | 95% Student's-t UCL |
| | Total PCB Congener TEQ 2005 (Mammal)[4] | 0.96 | 8.21 | ng/kg | 7/7 | 6.32 | ng/kg | 95% Student's-t UCL |

[1] The risk assessments developed for Newtown Creek evaluated creek-wide exposure in the Study Area, however the results of the creek-wide exposure is relevant for individual sections or portions of Newtown Creek because the COCs are found throughout all sections of the creek.
[2] Total Dioxin/Furan TEQ 2005 (Mammal) concentrations represent the total dioxin/furan concentration based upon the toxic equivalence quotient (TEQs) for mammals identified in Van den Berg et al. 2006. This equates to total dioxin/furans.
[3] Total Nondioxin-like PCB Congener concentrations represent the summed concentration of nondioxin like PCB congeners. This equates to total nondioxin-like PCBs. These compounds are evaluated using the toxicity values for total PCBs and Aroclor 1254 (for cancer and non-cancer, respectively).
[4] Total PCB Congener TEQ 2005 (Mammal) concentrations represent the total PCB congener concentration based upon the toxic equivalence quotient (TEQs) for mammals identified in Van den Berg et al. 2006. This equates to total PCB.

**Scenario Timeframe:** Current/Future
**Medium:** Tissue
**Exposure Medium:** Blue Crab Muscle and Hepatopancreas

| Exposure Point | Chemical of Concern | Concentration Detected | | Concentration Units | Frequency of Detection | Exposure Point Concentration (EPC) | EPC Units | Statistical Measure |
|---|---|---|---|---|---|---|---|---|
| | | Min | Max | | | | | |
| Study Area | Total Dioxin/Furan TEQ 2005 (Mammal) | 9.2 | 11.6 | ng/kg | 3/10 | 11.6 | ng/kg | Max Conc |
| | Total Nondioxin-like PCB Congener | 372,679 | 590,526 | ng/kg | 10/10 | 519,282 | ng/kg | 95% Student's-t UCL |
| | Total PCB Congener TEQ 2005 (Mammal) | 19.0 | 27.6 | ng/kg | 10/10 | 24.2 | ng/kg | 95% Student's-t UCL |

**Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations**

This table presents the chemicals of concern (COCs) and exposure point concentrations (EPCs) for each of the COCs in surface sediment, fish and blue crab tissue. The table includes the range of concentrations detected for each COC, as well as the frequency of detection (i.e., the number of times the chemical was detected in the samples collected at the site), the EPC and how it was derived.

Table 4
Exposure Pathways

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Current/ Future | Surface Water | Surface Water | Surface Water | Recreational Anglers/Crabbers | Adult (>18 years old) | Incidental ingestion | Qualitative | Recreational anglers and crabbers may come into direct contact with surface water while engaged in fishing and crabbing activities, which are limited to bulkheads. Dermal contact is expected to be limited to arms and hands as the anglers reach into the water to retrieve gear or fish/crabs from the creek. Ingestion of surface water during fishing and crabbing activities is expected to be infrequent and limited in duration. Children (0 to 6 years old) are assumed to not typically accompany adolescent and adult anglers and crabbers due to safety concerns. Inhalation of vapors from surface water (via transfer to air) by recreational anglers and crabbers may occur if volatiles are present. |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | | Adolescent (7 to 18 years old) | Incidental ingestion | Qualitative | |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | Recreational Boaters | Adult (>18 years old) | Incidental ingestion | Quantitative | Boaters may incidentally ingest or come into direct contact with surface water while engaged in recreational boating, canoeing, and kayaking activities. Dermal contact is expected to occur to the head, arms, hands, legs, and feet of boaters. Exposures to surface water by boaters are associated with splash and spray created while paddling and water draining down the shaft of paddles while boating. Older children and adolescents (7 to 18 years old) may also participate in recreational boating activities. Children (0 to 6 years old) are assumed to not typically accompany adolescent and adult boaters due to safety concerns. Inhalation of vapors from surface water (via transfer to air) by recreational boaters may occur if volatiles are present. |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | | Adolescent (7 to 18 years old) | Incidental ingestion | Quantitative | |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | Swimmers/Bathers | Adult (>18 years old) | Incidental ingestion | Quantitative | Swimming and bathing activities are considered full immersion (primary contact) activities that are infrequent and of short duration within the Study Area. USEPA has stated that swimming occurs at night and has been observed at the Manhattan Avenue Park and a boat with transients moored in English Kills. USEPA has observed adult transients bathing at Manhattan Avenue Park. Dermal contact is expected to occur to the entire body. Inhalation of vapors from surface water (via transfer to air) by swimmers/bathers may occur if volatiles are present. |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | | Adolescent (7 to 18 years old) | Incidental ingestion | Quantitative | |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | Shoreline Recreational Users | Adult (>18 years old) | Incidental ingestion | Excluded | Shoreline recreational users are not expected to come into direct contact or incidentally ingest surface water while visiting access areas during recreational activities other than boating, angling/crabbing, or swimming. Shoreline recreational activities include walking, jogging, and bicycling along shoreline paths and walkways, sitting at benches along the shoreline, and other passive recreational activities. There is very limited access to the waterfront of Newtown Creek, and there are physical and regulatory restrictions that limit exposures to surface waters of the creek. Inhalation of vapors from surface water (via transfer to air) by shoreline recreational users may occur if volatiles are present. |
| | | | | | | Dermal contact | Excluded | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | | Adolescent (7 to 18 years old) | Incidental ingestion | Excluded | |
| | | | | | | Dermal contact | Excluded | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | | Child (0 to 6 years old) | Incidental ingestion | Excluded | |
| | | | | | | Dermal contact | Excluded | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | Landside Workers | Adult (>18 years old) | Incidental ingestion | Excluded | Landside workers are workers at upland facilities located adjacent to Newtown Creek. These workers do not come in contact with Newtown Creek surface water but may inhale surface water vapors if such vapors are found to be transported to upland areas where such exposures may occur. |
| | | | | | | Dermal contact | Excluded | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | Dockside Workers | Adult (>18 years old) | Incidental ingestion | Quantitative | Dockside workers (workers engaged in routine maintenance and repair activities along bulkheads and other shoreline structures) may incidentally ingest or come into direct contact with surface water while engaged in occupational activities. Dermal contact is expected to occur to the head, forearms, and hands of dockside workers. Inhalation of vapors from surface water (via transfer to air) by dockside workers may occur if volatiles are present. It is assumed that on-water workers' (workers on barges, tug boats, and other commercial vessels) exposures will be less than that for dockside workers. |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | General Construction Worker | Adult (>18 years old) | Incidental ingestion | Quantitative | General construction workers are engaged in short-term, one-time construction type of activities. These workers may incidentally ingest or come into direct contact with surface water while engaged in occupational activities. Dermal contact is expected to occur to the head, forearms, and hands of general construction workers. Inhalation of vapors from surface water (via transfer to air) by general construction workers may occur if volatiles are present. It is assumed that on-water workers' (workers on barges, tug boats, and other commercial vessels) exposures will be less than that for general construction workers. |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Quantitative | |

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Current/ Future | Surface Water | Surface Water | Surface Water | Sailboat Users | Adult (>18 years old) | Incidental ingestion | Qualitative | Sailboat users are transient visitors to sailboats moored to bulkheads by the Anchor QEA field facility and are only present part-time. Sailboat users may have dermal contact with surface water from waves splashing into the boats. Incidental ingestion of surface water is expected to be infrequent and limited in duration while entering, exiting, or being present on their boats. Dermal contact is expected to include head, arms, hands, legs and feet. Inhalation of vapors from surface water (via transfer to air) by sailboat users may occur if volatiles are present. |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | Trespassers/ Homeless | Multiple ages | Incidental ingestion | Qualitative | Exposure to surface waters of Newtown Creek by trespassers/homeless is expected to be infrequent and of very limited duration. There is very limited access to Newtown Creek for trespassers/homeless because of existing security controls at facilities adjacent to Newtown Creek. |
| | | | | | | Dermal contact | Qualitative | |
| | | | | | | Inhalation of vapors | Qualitative | |
| | | Overflow Water | Overflow Water | Residents | Adult (>18 years old) | Incidental ingestion | Quantitative | Residents may incidentally ingest or come into direct contact with overflow surface water during flooding events or during cleanup activities following flooding events. Dermal contact is expected to occur to the head, arms, hands, and lower legs of residents. Overflow flooding events are expected to be infrequent and of limited duration. Inhalation of vapors from floodwaters (via transfer to air) is expected to be infrequent and limited in duration. |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Qualitative | |
| | | | | | Adolescent (7 to 18 years old) | Incidental ingestion | Quantitative | |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Qualitative | |
| | | | | | Child (0 to 6 years old) | Incidental ingestion | Quantitative | |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Qualitative | |
| | | | | Occupational Worker | Adult (>18 years old) | Incidental ingestion | Quantitative | Occupational workers engaged in upland occupational/industrial activities may incidentally ingest or come into direct contact with overflow surface water during flooding events or during cleanup activities following flooding events. Dermal contact is expected to occur to the head, forearms, lower legs, and hands. Overflow flooding events are expected to be infrequent and of limited duration. Inhalation of vapors from floodwaters (via transfer to air) is expected to be infrequent and limited in duration. |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Qualitative | |
| | Sediment | Nearshore Sediment | Nearshore Sediment | Recreational Anglers/Crabbers | Adult (>18 years old) | Incidental ingestion | Qualitative | Recreational anglers and crabbers are not expected to contact sediments as they fish/crab from bulkheads or boats, and the ingestion of sediment is assumed to be infrequent and of limited duration. There are no exposed sediments or beaches where recreational angling or crabbing can occur. Children (0 to 6 years old) are assumed to not typically accompany adolescent and adult anglers and crabbers due to safety concerns. Inhalation of vapors from sediments (via transfer to surface water and then to air) by recreational anglers and crabbers may occur if volatiles are present. |
| | | | | | | Dermal contact | Excluded | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | | Adolescent (7 to 18 years old) | Incidental ingestion | Qualitative | |
| | | | | | | Dermal contact | Excluded | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | Recreational Boaters | Adult (>18 years old) | Incidental ingestion | Qualitative | Boaters are expected to infrequently come into direct contact with or incidentally ingest sediments while engaged in recreational boating, canoeing, and kayaking activities. All public canoe/kayak launches in Newtown Creek only allow access to the creek via ladders or floating docks that lead directly to the water, and exposures to sediment while boarding or disembarking their boats is limited. Older children and adolescents (7 to 18 years old) may also participate in recreational boating activities. Inhalation of vapors from sediments (via transfer to surface water and then to air) by recreational boaters may occur if volatiles are present. |
| | | | | | | Dermal contact | Qualitative | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | | Adolescent (7 to 18 years old) | Incidental ingestion | Qualitative | |
| | | | | | | Dermal contact | Qualitative | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | Swimmers/Bathers | Adult (>18 years old) | Incidental ingestion | Excluded | Swimmers and bathers are not expected to contact or ingest sediments as they enter or exit from the water or while they swim. There are no exposed sediments or beaches at the locations where swimming and bathing activities have been observed. Inhalation of vapors from sediments (via transfer to surface water and then to air) by swimmers/bathers may occur if volatiles are present. |
| | | | | | | Dermal contact | Excluded | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | | Adolescent (7 to 18 years old) | Incidental ingestion | Excluded | |
| | | | | | | Dermal contact | Excluded | |
| | | | | | | Inhalation of vapors | Quantitative | |

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Current/ Future | Sediment | Nearshore Sediment | Nearshore Sediment | Shoreline Recreational Users | Adult (>18 years old) | Incidental ingestion | Excluded | Shoreline recreational users are not expected to incidentally ingest or come into direct contact with sediment while visiting public access areas during recreational activities other than boating and angling/crabbing. Shoreline recreational activities include walking, jogging, and bicycling along shoreline paths and walkways, sitting at benches along the shoreline, and other passive recreational activities. There is very limited access to the waterfront of Newtown Creek, and there are physical and regulatory restrictions that limit exposures to sediments of the creek. Inhalation of vapors from sediments (via transfer to surface water and then to air) by shoreline recreational users may occur if volatiles are present. |
| | | | | | | Dermal contact | Excluded | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | | Adolescent (7 to 18 years old) | Incidental ingestion | Excluded | |
| | | | | | | Dermal contact | Excluded | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | | Child (0 to 6 years old) | Incidental ingestion | Excluded | |
| | | | | | | Dermal contact | Excluded | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | Landside Workers | Adult (>18 years old) | Incidental ingestion | Excluded | Landside workers are workers at upland facilities located adjacent to Newtown Creek. These workers do not come in contact with Newtown Creek sediments but may inhale vapors from sediment (via transfer to surface water and then to air) if such vapors are found to be transported to upland areas where such exposures may occur. |
| | | | | | | Dermal contact | Excluded | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | Dockside Workers | Adult (>18 years old) | Incidental ingestion | Quantitative | Dockside workers (workers engaged in routine maintenance and repair activities along bulkheads and other shoreline structures) may incidentally ingest or come into direct contact with intertidal, nearshore sediments while engaged in occupational activities. Dermal contact is expected to occur to the head, forearms, and hands of dockside workers. Inhalation of vapors from sediments (via transfer to surface water and then to air) by dockside workers may occur if volatiles are present. It is assumed that on-water workers' (workers on barges, tug boats, and other commercial vessels) exposures will be less than that for dockside workers. |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | General Construction Workers | Adult (>18 years old) | Incidental ingestion | Quantitative | General construction workers are engaged in short-term, one-time construction type of activities. These workers may incidentally ingest or come into direct contact with intertidal, nearshore sediments while engaged in occupational activities. Dermal contact is expected to occur to the head, forearms, and hands of general construction workers. Inhalation of vapors from sediments (via transfer to surface water and then to air) by general construction workers may occur if volatiles are present. It is assumed that on-water workers' (workers on barges, tug boats, and other commercial vessels) exposures will be less than that for general construction workers. |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | Sailboat Users | Adult (>18 years old) | Incidental ingestion | Quantitative | Sailboat users are transient visitors to sailboats moored to bulkheads by the Anchor QEA field facility and are only present part-time. Sailboat users may come into dermal contact with the soil/fill material while entering or exiting their boats. Dermal contact is expected to be limited to the head, forearms, and hands. Sailboat users may incidentally ingest soil/fill material behind the bulkhead while entering, exiting, or being present on their boats. Inhalation of vapors from sediments (via transfer to surface water and then to air) by |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | Trespassers/ Homeless | Multiple ages | Incidental ingestion | Qualitative | Exposure to sediments of Newtown Creek by trespassers/homeless is expected to be infrequent and of very limited duration. There is very limited access to Newtown Creek because of existing security controls at facilities adjacent to Newtown Creek. |
| | | | | | | Dermal contact | Qualitative | |
| | | | | | | Inhalation of vapors | Qualitative | |
| | | Overflow Sediment | Overflow Sediment | Residents | Adult (>18 years old) | Incidental ingestion | Quantitative | Residents may incidentally ingest or come into direct contact with overflow surface sediment during flooding events or during cleanup activities following flooding events. Dermal contact is expected to occur to the head, arms, hands, and lower legs of residents. Overflow flooding events are expected to be infrequent and of limited duration. Inhalation of vapors from floodwaters (via transfer to air) is expected to be infrequent and limited in duration. |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Qualitative | |
| | | | | | Adolescent (7 to 18 years old) | Incidental ingestion | Quantitative | |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Qualitative | |
| | | | | | Child (0 to 6 years old) | Incidental ingestion | Quantitative | |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Qualitative | |

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Current/ Future | Sediment | Overflow Sediment | Overflow Sediment | Occupational Worker | Adult (>18 years old) | Incidental ingestion | Quantitative | Occupational workers engaged in upland occupational/industrial activities may incidentally ingest or come into direct contact with overflow sediment during flooding events or during cleanup activities following flooding events. Dermal contact is expected to occur to the head, forearms, lower legs, and hands. Overflow flooding events are expected to be infrequent and of limited duration. Inhalation of vapors from floodwaters (via transfer to air) is expected to be infrequent and limited in duration. |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Qualitative | |
| | Surface Water and Sediment | Resident Fish Tissue | Fish Fillets | Recreational Angler | Adult (>18 years old) | Ingestion | Quantitative | Recreational anglers may ingest resident fish tissue that have accumulated chemicals from site sediment and water. Recreational angling opportunities within the Study Area are severely restricted by the limited public access available. All age classes are included because fish caught by adults and adolescents may be shared with younger children within a household. |
| | | | | | Adolescent (7 to 18 years old) | Ingestion | Quantitative | |
| | | | | | Child (0 to 6 years old) | Ingestion | Quantitative | |
| | | | | Trespassers/ Homeless | Multiple ages | Ingestion | Qualitative | Angling by trespassers/homeless is expected to be infrequent and of very limited duration. There is very limited access to Newtown Creek because of existing security controls at facilities adjacent to Newtown Creek. |
| | | Resident Shellfish Tissue | Shellfish Tissue | Recreational Crabber | Adult (>18 years old) | Ingestion | Quantitative | Recreational crabbers may ingest resident crab tissue that has accumulated chemicals from site sediment and water. Recreational crabbing opportunities within the Study Area are severely restricted by the limited public access available. All age classes are included because crabs caught by adults and adolescents may be shared with younger children within a household. |
| | | | | | Adolescent (7 to 18 years old) | Ingestion | Quantitative | |
| | | | | | Child (0 to 6 years old) | Ingestion | Quantitative | |
| | | | | Trespassers/ Homeless | Multiple ages | Ingestion | Qualitative | Crabbing by trespassers/homeless is expected to be infrequent and of very limited duration. There is very limited access to Newtown Creek because of existing security controls at facilities adjacent to Newtown Creek. |

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Future | Surface Water | Surface Water | Surface Water | Plank Road Area Recreational User | Adult (>18 years old) | Incidental ingestion | Qualitative | Recreational users may come into direct contact with surface water while visiting the Plank Road access area. Incidental ingestion of surface water while visiting the Plank Road access area during recreational activities is expected to be infrequent and limited in duration. Dermal contact is expected to be limited to the head, forearms, hands, lower legs, and feet. Inhalation of vapors from surface water (via transfer to air) by shoreline recreational users may occur if volatiles are present. |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | | Adolescent (7 to 18 years old) | Incidental ingestion | Qualitative | |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | Hunter's Point Construction | Adult (>18 years old) | Incidental ingestion | Quantitative | Construction workers may incidentally ingest or come into direct contact with surface water while constructing the Hunter's Point South residential area canoe/kayak launch. Dermal contact is expected to occur to the head, forearms, and hands of construction workers. Inhalation of vapors from surface water (via transfer to surface water and then to air) by construction workers may occur if volatiles are present. |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | Sediment | Nearshore Sediment | Nearshore Sediment | Plank Road Area Recreational User | Adult (>18 years old) | Incidental ingestion | Quantitative | Recreational users may come into direct contact with and incidentally ingest sediment while visiting the Plank Road access area. Dermal contact is expected to be limited to the head, forearms, hands, lower legs, and feet. Inhalation of vapors from surface water (via transfer to air) by shoreline recreational users may occur if volatiles are present. |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | | Adolescent (7 to 18 years old) | Incidental ingestion | Quantitative | |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Quantitative | |
| | | | | Hunter's Point Construction | Adult (>18 years old) | Incidental ingestion | Quantitative | Construction workers may incidentally ingest or come into direct contact with intertidal, nearshore sediments while constructing the Hunter's Point South residential area canoe/kayak launch. Dermal contact is expected to occur to the head, forearms, and hands of construction workers. Inhalation of vapors from sediments (via transfer to surface water and then to air) by construction workers may occur if volatiles are present. |
| | | | | | | Dermal contact | Quantitative | |
| | | | | | | Inhalation of vapors | Quantitative | |

Note:
USEPA = U.S. Environmental Protection Agency

Quant = Quantitative risk analysis performed; Qual=Qualitative risk analysis performed; None=Not considered to be a significant exposure pathway, and therefore not evaluated.

**Summary of Selection of Exposure Pathways**

The table describes the exposure pathways that were evaluated for the risk assessment, and the rationale for the inclusion of each pathway. Exposure media, exposure points, and characteristics of receptor populations are included.

## Table 5

## Non-Cancer Toxicity Data Summary

**Pathway:** Oral/Dermal

| Chemical of Concern | Chronic/ Subchronic | Oral RfD Value | Oral RfD Units | Absorp. Efficiency (Dermal) | Adjusted RfD ( Dermal) | Adj. Dermal RfD Units | Primary Target Organ | Combined Uncertainty /Modifying Factors | Sources of RfD: Target Organ | Dates of RfD: |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Dioxin/Furan TEQ 2005 (Mammal) | Chronic | 7.0E-10 | mg/kg-day | 100% | 7.0E-10 | mg/kg-day | Reproduction | 30 | IRIS | January 2015 |
| Total Dioxin/Furan TEQ 2005 (Mammal) | Subchronic[5] | 2.0E-08 | mg/kg-day | 100% | 2.0E-08 | mg/kg-day | Immune system | 30 | A | March 2016 |
| Total Non-dioxin-like PCB Congener (Aroclor 1254) | Chronic | 2.0E-05 | mg/kg-day | 100% | 2.0E-05 | mg/kg-day | Immune system, dermal | 300 | IRIS | January 2015 |
| Total Non-dioxin-like PCB Congener (Aroclor 1254) | Subchronic | 3.0E-05 | mg/kg-day | 100% | 3.0E-05 | mg/kg-day | Central nervous system | 300 | A | March 2016 |
| Total PCB Congener TEQ 2005 (Mammal) | Chronic | 7.0E-10 | mg/kg-day | 100% | 7.0E-10 | mg/kg-day | Reproduction | 30 | IRIS | January 2015 |
| Total PCB Congener TEQ 2005 (Mammal) | Subchronic | 2.0E-08 | mg/kg-day | 100% | 2.0E-08 | mg/kg-day | Immune system | 30 | A | March 2016 |

**Key**

IRIS: Integrated Risk Information System, U.S. EPA
A: Agency for Toxic Substances and Disease Registry, as referenced in RSL table for chronic RfD or the ATSDR MRL (March 2016) for subchronic RfD

### Summary of Toxicity Assessment

This table provides non-carcinogenic risk information which is relevant to the contaminants of concern in surface sediment, fish and blue crab tissue. When available, the chronic toxicity data have been used to develop oral reference doses (RfDs).

[5] Subchronic toxicity values are included for COCs with non-cancer effects that were evaluated in a subchronic scenario (General Construction Worker and Hunter's Point Construction Worker).

# Table 6

## Cancer Toxicity Data Summary

**Pathway:** Oral/Dermal

| Chemical of Concern | Oral Cancer Slope Factor | Units | Adjusted Cancer Slope Factor (for Dermal) | Slope Factor Units | Weight of Evidence/ Cancer Guideline Description | Source | Date |
|---|---|---|---|---|---|---|---|
| Total Dioxin/Furan TEQ 2005 (Mammal) | 1.5E+05 | $(mg/kg/day)^{-1}$ | 1.5E+05 | $(mg/kg/day)^{-1}$ | Assessment underway | H | July 1997 |
| Total Non-dioxin-like PCB Congener (Total PCBs) | 2.0E+00 | $(mg/kg/day)^{-1}$ | 2.0E+00 | $(mg/kg/day)^{-1}$ | B2 | IRIS | January 2015 |
| Total PCB Congener TEQ 2005 (Mammal) | 1.5E+05 | $(mg/kg/day)^{-1}$ | 1.5E+05 | $(mg/kg/day)^{-1}$ | Assessment underway | H | July 1997 |

**Key:**

IRIS: Integrated Risk Information System. U.S. EPA
H: Health Effects Assessment Summary Tables FY1997 Update

**EPA Weight of Evidence:**

B2 – Probable human carcinogen-indicates limited evidence in humans

**Summary of Toxicity Assessment**

This table provides carcinogenic risk information which is relevant to the contaminants of concern in surface sediment, fish and blue crab tissue.

## Table 7

## Risk Characterization Summary - Noncarcinogenic

**Scenario Timeframe:** Current/Future
**Receptor Population:** General Construction Worker
**Receptor Age:** Adult

| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Primary Target Organ | Non-Carcinogenic Risk | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Ingestion | Dermal | Inhalation | Exposure Routes Total |
| Surface Sediment | Surface Sediment | General Construction Worker | Total Non-dioxin-like PCB Congener | Immune System | **1E+00** | ----- | ----- | **1E+00** |
| | | | | | | | **Hazard Index Total=** | **2E+00** |

**Scenario Timeframe:** Current/Future
**Receptor Population:** Recreational Angler
**Receptor Age:** Child

| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Primary Target Organ | Non-Carcinogenic Risk | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Ingestion | Dermal | Inhalation | Exposure Routes Total |
| Tissue | Striped Bass Fillet | Ingestion | Total Dioxin/Furan TEQ 2005 (Mammal) | Reproduction | **1E+00** | ----- | ----- | **1E+00** |
| | | | Total Non-dioxin-like PCB Congener | Immune System | **2E+01** | ----- | ----- | **2E+01** |
| | | | Total PCB Congener TEQ 2005 (Mammal) | Reproduction | **4E+00** | ----- | ----- | **4E+00** |
| | | | | | | | **Hazard Index Total=** | **2.0E+01** |

**Scenario Timeframe:** Current/Future
**Receptor Population:** Recreational Angler
**Receptor Age:** Adult

| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Primary Target Organ | Non-Carcinogenic Risk | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Ingestion | Dermal | Inhalation | Exposure Routes Total |
| Tissue | Striped Bass Fillet | Ingestion | Total Dioxin/Furan TEQ 2005 (Mammal) | Reproduction | 5E-01 | ----- | ----- | 5E-01 |
| | | | Total Non-dioxin-like PCB Congener | Immune System | **9E+00** | ----- | ----- | **9E+00** |
| | | | Total PCB Congener TEQ 2005 (Mammal) | Reproduction | **2E+00** | ----- | ----- | **2E+00** |
| | | | | | | | **Hazard Index Total=** | **1.0E+01** |

| Scenario Timeframe: | Current/Future | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Receptor Population:** | Recreational Angler | | | | | | | |
| **Receptor Age:** | Adolescent | | | | | | | |
| **Medium** | **Exposure Medium** | **Exposure Point** | **Chemical of Concern** | **Primary Target Organ** | **Non-Carcinogenic Risk** | | | |
| | | | | | **Ingestion** | **Dermal** | **Inhalation** | **Exposure Routes Total** |
| Tissue | Striped Bass Fillet | Ingestion | Total Dioxin/Furan TEQ 2005 (Mammal) | Reproduction | 5E-01 | ----- | ----- | 5E-01 |
| | | | Total Non-dioxin-like PCB Congener | Immune System | **9E+00** | ----- | ----- | **9E+00** |
| | | | Total PCB Congener TEQ 2005 (Mammal) | Reproduction | **2E+00** | ----- | ----- | **2E+00** |
| | | | | | | | **Hazard Index Total=** | **1E+01** |

| Scenario Timeframe: | Current/Future | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Receptor Population:** | Recreational Angler | | | | | | | |
| **Receptor Age:** | Adult | | | | | | | |
| **Medium** | **Exposure Medium** | **Exposure Point** | **Chemical of Concern** | **Primary Target Organ** | **Non-Carcinogenic Risk** | | | |
| | | | | | **Ingestion** | **Dermal** | **Inhalation** | **Exposure Routes Total** |
| Tissue | White Perch Fillet | Ingestion | Total Dioxin/Furan TEQ 2005 (Mammal) | Reproduction | 6E-01 | ----- | ----- | 6E-01 |
| | | | Total Non-dioxin-like PCB Congener | Immune System | **7E+00** | ----- | ----- | **7E+00** |
| | | | Total PCB Congener TEQ 2005 (Mammal) | Reproduction | **3E+00** | ----- | ----- | **3E+00** |
| | | | | | | | **Hazard Index Total=** | **1E+01** |

| Scenario Timeframe: | Current/Future | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Receptor Population:** | Recreational Angler | | | | | | | |
| **Receptor Age:** | Adolescent | | | | | | | |
| **Medium** | **Exposure Medium** | **Exposure Point** | **Chemical of Concern** | **Primary Target Organ** | **Non-Carcinogenic Risk** | | | |
| | | | | | **Ingestion** | **Dermal** | **Inhalation** | **Exposure Routes Total** |
| Tissue | White Perch Fillet | Ingestion | Total Dioxin/Furan TEQ 2005 (Mammal) | Reproduction | 6E-01 | ----- | ----- | 6E-01 |
| | | | Total Non-dioxin-like PCB Congener | Immune System | **7E+00** | ----- | ----- | **7E+00** |
| | | | Total PCB Congener TEQ 2005 (Mammal) | Reproduction | **3E+00** | ----- | ----- | **3E+00** |
| | | | | | | | **Hazard Index Total=** | **1E+01** |

| Scenario Timeframe: | Current/Future | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Receptor Population:** | Recreational Angler | | | | | | | |
| **Receptor Age:** | Child | | | | | | | |
| **Medium** | **Exposure Medium** | **Exposure Point** | **Chemical of Concern** | **Primary Target Organ** | **Non-Carcinogenic Risk** | | | |
| | | | | | **Ingestion** | **Dermal** | **Inhalation** | **Exposure Routes Total** |
| Tissue | White Perch Fillet | Ingestion | Total Dioxin/Furan TEQ 2005 (Mammal) | Reproduction | **6.1E+00** | ----- | ----- | **6.1E+00** |
| | | | Total Non-dioxin-like PCB Congener | Immune System | 6.4E-02 | ----- | ----- | 6.4E-02 |
| | | | Total PCB Congener TEQ 2005 (Mammal) | Reproduction | 5.6E-01 | ----- | ----- | 5.6E-01 |
| | | | | | | | **Hazard Index Total=** | **6.8E+00** |

| Scenario Timeframe: | Current/Future | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Receptor Population:** | Recreational Crabber | | | | | | | |
| **Receptor Age:** | Adult | | | | | | | |
| **Medium** | **Exposure Medium** | **Exposure Point** | **Chemical of Concern** | **Primary Target Organ** | **Non-Carcinogenic Risk** | | | |
| | | | | | **Ingestion** | **Dermal** | **Inhalation** | **Exposure Routes Total** |
| Tissue | Blue Crab Muscle and Hepatopancreas | Ingestion | Total Dioxin/Furan TEQ 2005 (Mammal) | Reproduction | **4E+00** | ----- | ----- | **4E+00** |
| | | | Total Non-dioxin-like PCB Congener | Immune System | **7E+00** | | | **7E+00** |
| | | | Total PCB Congener TEQ 2005 (Mammal) | Reproduction | **9E+00** | ----- | ----- | **9E+00** |
| | | | | | | | **Hazard Index Total=** | **2E+01** |

| Scenario Timeframe: | Current/Future | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Receptor Population:** | Recreational Crabber | | | | | | | |
| **Receptor Age:** | Adolescent | | | | | | | |
| **Medium** | **Exposure Medium** | **Exposure Point** | **Chemical of Concern** | **Primary Target Organ** | **Non-Carcinogenic Risk** | | | |
| | | | | | **Ingestion** | **Dermal** | **Inhalation** | **Exposure Routes Total** |
| Tissue | Blue Crab Muscle and Hepatopancreas | Ingestion | Total Dioxin/Furan TEQ 2005 (Mammal) | Reproduction | **4E+00** | ----- | ----- | **4E+00** |
| | | | Total Non-dioxin-like PCB Congener | Immune System | **7E+00** | | | **7E+00** |
| | | | Total PCB Congener TEQ 2005 (Mammal) | Reproduction | **9E+00** | ----- | ----- | **9E+00** |
| | | | | | | | **Hazard Index Total=** | **2E+01** |

| **Scenario Timeframe:** | Current/Future | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Receptor Population:** | Recreational Crabber | | | | | | | |
| **Receptor Age:** | Child | | | | | | | |
| **Medium** | **Exposure Medium** | **Exposure Point** | **Chemical of Concern** | **Primary Target Organ** | **Non-Carcinogenic Risk** | | | |
| | | | | | **Ingestion** | **Dermal** | **Inhalation** | **Exposure Routes Total** |
| Tissue | Blue Crab Muscle and Hepatopancreas | Ingestion | Total Dioxin/Furan TEQ 2005 (Mammal) | Reproduction | **8E+00** | ----- | ----- | **8E+00** |
| | | | Total Non-dioxin-like PCB Congener | Immune System | **1E+01** | ----- | ----- | **1E+01** |
| | | | Total PCB Congener TEQ 2005 (Mammal) | Reproduction | **2E+01** | ----- | ----- | **2E+01** |
| | | | | | | | **Hazard Index Total=** | **4E+01** |

----- – not available

### Summary of Risk Characterization - Non-Carcinogens

The table presents hazard quotients (HQs) for each route of exposure and the hazard index (sum of hazard quotients) for exposure to surface sediment, fish and blue crab tissue. The Risk Assessment Guidance for Superfund states that, generally, a hazard index (HI) greater than 1 indicates the potential for adverse non-cancer effects.

## Table 8
## Risk Characterization Summary - Carcinogens

**Scenario Timeframe:** Current/Future
**Receptor Population:** Recreational Angler
**Receptor Age:** Child

| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Carcinogenic Risk | | | |
|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Dermal | Inhalation | Exposure Routes Total |
| Tissue | Striped Bass Fillet | Ingestion | Total Dioxin/Furan TEQ 2005 (Mammal) | 9E-06 | ----- | ----- | 9E-06 |
| | | | Total Non-dioxin-like PCB Congener | 5E-05 | ----- | ----- | 5E-05 |
| | | | Total PCB Congener TEQ 2005 (Mammal) | 4E-05 | ----- | ----- | 4E-05 |
| | | | | | | **Total Risk =** | **1E-04** |

**Scenario Timeframe:** Current/Future
**Receptor Population:** Recreational Angler
**Receptor Age:** Adult

| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Carcinogenic Risk | | | |
|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Dermal | Inhalation | Exposure Routes Total |
| Tissue | Striped Bass Fillet | Ingestion | Total Dioxin/Furan TEQ 2005 (Mammal) | 2E-05 | ----- | ----- | 2E-05 |
| | | | Total Non-dioxin-like PCB Congener | **1E-04** | ----- | ----- | **1E-04** |
| | | | Total PCB Congener TEQ 2005 (Mammal) | 7E-05 | ----- | ----- | 7E-05 |
| | | | | | | **Total Risk =** | **2E-04** |

**Scenario Timeframe:** Current/Future
**Receptor Population:** Recreational Angler
**Receptor Age:** Adolescent

| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Carcinogenic Risk | | | |
|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Dermal | Inhalation | Exposure Routes Total |
| Tissue | Striped Bass Fillet | Ingestion | Total Dioxin/Furan TEQ 2005 (Mammal) | 9E-06 | ----- | ----- | 9E-06 |
| | | | Total Non-dioxin-like PCB Congener | 6E-05 | ----- | ----- | 6E-05 |
| | | | Total PCB Congener TEQ 2005 (Mammal) | 4E-05 | ----- | ----- | 4E-05 |
| | | | | | | **Total Risk =** | **1E-04** |
| | | | | | | **Sum of Adult/Child Risk =** | **3E-04** |

**Scenario Timeframe:** Current/Future
**Receptor Population:** Recreational Angler
**Receptor Age:** Adult

| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Carcinogenic Risk | | | |
|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Dermal | Inhalation | Exposure Routes Total |
| Tissue | White Perch Fillet | Ingestion | Total Dioxin/Furan TEQ 2005 (Mammal) | 2E-05 | ----- | ----- | 2E-05 |
| | | | Total Non-dioxin-like PCB Congener | 8E-05 | ----- | ----- | 8E-05 |
| | | | Total PCB Congener TEQ 2005 (Mammal) | 9E-05 | ----- | ----- | 9E-05 |
| | | | | | | **Total Risk =** | **2E-04** |

**Scenario Timeframe:** Current/Future
**Receptor Population:** Recreational Angler
**Receptor Age:** Adolescent

| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Carcinogenic Risk | | | |
|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Dermal | Inhalation | Exposure Routes Total |
| Tissue | White Perch Fillet | Ingestion | Total Dioxin/Furan TEQ 2005 (Mammal) | 1E-05 | ----- | ----- | 1E-05 |
| | | | Total Non-dioxin-like PCB Congener | 5E-05 | ----- | ----- | 5E-05 |
| | | | Total PCB Congener TEQ 2005 (Mammal) | 5E-05 | ----- | ----- | 5E-05 |
| | | | | | | **Total Risk =** | **1E-04** |

**Scenario Timeframe:** Current/Future
**Receptor Population:** Recreational Angler
**Receptor Age:** Child

| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Carcinogenic Risk | | | |
|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Dermal | Inhalation | Exposure Routes Total |
| Tissue | White Perch Fillet | Ingestion | Total Dioxin/Furan TEQ 2005 (Mammal) | 1E-05 | ----- | ----- | 1E-05 |
| | | | Total Non-dioxin-like PCB Congener | 4E-05 | ----- | ----- | 4E-05 |
| | | | Total PCB Congener TEQ 2005 (Mammal) | 5E-05 | ----- | ----- | 5E-05 |
| | | | | | | **Total Risk =** | **1E-04** |
| | | | | | | **Sum of Adult/Child Risk =** | **3E-04** |

**Scenario Timeframe:** Current/Future
**Receptor Population:** Recreational Crabber
**Receptor Age:** Adult

| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Carcinogenic Risk | | | |
|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Dermal | Inhalation | Exposure Routes Total |
| Tissue | Blue Crab Muscle and Hepatopancreas | Ingestion | Total Dioxin/Furan TEQ 2005 (Mammal) | **1E-04** | ----- | ----- | **1E-04** |
| | | | Total Non-dioxin-like PCB Congener | 8E-05 | ----- | ----- | 8E-05 |
| | | | Total PCB Congener TEQ 2005 (Mammal) | **3E-04** | ----- | ----- | **3E-04** |
| | | | | | | **Total Risk =** | **5E-04** |

**Scenario Timeframe:** Current/Future
**Receptor Population:** Recreational Crabber
**Receptor Age:** Adolescent

| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Carcinogenic Risk | | | |
|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Dermal | Inhalation | Exposure Routes Total |
| Tissue | Blue Crab Muscle and Hepatopancreas | Ingestion | Total Dioxin/Furan TEQ 2005 (Mammal) | 8E-05 | ----- | ----- | 8E-05 |
| | | | Total Non-dioxin-like PCB Congener | 5E-05 | ----- | ----- | 5E-05 |
| | | | Total PCB Congener TEQ 2005 (Mammal) | **2E-04** | ----- | ----- | **2E-04** |
| | | | | | | **Total Risk =** | **3E-04** |

**Scenario Timeframe:** Current/Future
**Receptor Population:** Recreational Crabber
**Receptor Age:** Child

| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Carcinogenic Risk | | | |
|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Dermal | Inhalation | Exposure Routes Total |
| Tissue | Blue Crab Muscle and Hepatopancreas | Ingestion | Total Dioxin/Furan TEQ 2005 (Mammal) | 7E-05 | ----- | ----- | 7E-05 |
| | | | Total Non-dioxin-like PCB Congener | 4E-05 | ----- | ----- | 4E-05 |
| | | | Total PCB Congener TEQ 2005 (Mammal) | **1E-04** | ----- | ----- | **1E-04** |
| | | | | | | **Total Risk =** | **3E-04** |
| | | | | | | **Sum of Adult/Child Risk =** | **8E-04** |

**Summary of Risk Characterization – Carcinogens**

The table presents cancer risks for fish and blue crab tissue exposure. As stated in the National Contingency Plan, the point of departure is $10^{-6}$ and the acceptable risk range for site-related exposure is $10^{-6}$ to $10^{-4}$.

## Table 9
## Baseline Ecological Risk Assessment Summary − Study Area

| Receptor Group | Receptor | Line of Evidence | Contaminant | HQ or TU[a,b] | Priority Locations Contributing to Exceedances |
|---|---|---|---|---|---|
| Aquatic Plants | Macrophytes | Qualitative Evaluation | Qualitative Evaluation | Qualitative Evaluation | Qualitative Evaluation |
| | Phytoplankton | Surface Water | Cyanide | HQ = 0.8, 1.1 | Dutch Kills, English Kills (one data point in each location) |
| Invertebrates | Zooplankton | Surface Water | Cyanide | HQ = 0.8, 1.1 | Dutch Kills, English Kills (one data point in each location) |
| | Epibenthic Invertebrates (Bivalves) | Surface Water | Cyanide | HQ = 0.8, 1.1 | Dutch Kills, English Kills (one data point in each location) |
| | | Tissue Residue | HPAH | HQ < 1, 1.7 | Maspeth Creek, English Kills |
| | | Tissue Residue | TPAH | HQ < 1, 1.9 | Maspeth Creek, English Kills |
| | | Tissue Residue | Total PCB Congener | HQ < 1, 3.9 | Maspeth Creek, Turning Basin, English Kills |
| | Benthic Macroinvertebrates[c] | Surface Water | Cyanide | HQ = 0.8, 1.1 | Dutch Kills, English Kills (one data point in each location) |
| | | Sediment Toxicity | See Porewater and Bulk Sediment | See Porewater and Bulk Sediment | Dutch Kills, Whale Creek, Maspeth Creek, **East Branch**, English Kills, Turning Basin |
| | | Porewater | TPAH (34)[d] | TU = 0.46 to 270 | Dutch Kills, Whale Creek, Maspeth Creek, **East Branch**, English Kills, Turning Basin |
| | | | Porewater Total SEM[e] | TU = 0.15 to 7.2 | Whale Creek, Maspeth Creek, **East Branch**, English Kills, Turning Basin |
| | | Bulk Sediment AVS, SEM | None | ∑SEM − AVS < 0 | N/A |
| | | Tissue Residue | HPAH | HQ < 1, 1.0 | Turning Basin, English Kills |
| | | Tissue Residue | TPAH | HQ < 1, 1.2 | Turning Basin, English Kills |

| | | | | | |
|---|---|---|---|---|---|
| | | Tissue Residue | Total PCB Congener | HQ < 1, 15 | Turning Basin, English Kills |
| | Epibenthic Decapods (Blue Crab) | Surface Water | Cyanide | HQ = 0.8, 1.1 | Dutch Kills, English Kills (one data point in each location) |
| | | Tissue Residue | Copper | HQ < 1, 1.6 | **All Zones** |
| | | Tissue Residue | Total PCB Congener | HQ < 1, 8.8 | All Zones (Dutch Kills, Turning Basin, English Kills) |
| Fish | Fish | Surface Water | Cyanide | HQ = 0.8, 1.1 | Dutch Kills, English Kills (one data point in each location) |
| | | Porewater | TPAH (34)[d] | TU = 0.46 to 270 | Dutch Kills, Whale Creek, Maspeth Creek, **East Branch**, English Kills, Turning Basin |
| | | | Porewater Total SEM[e] | TU = 0.15 to 7.2 | Whale Creek, Maspeth Creek, **East Branch**, English Kills, Turning Basin |
| | | | Total PCB Congener | TU = 0.05 to 9.4 | English Kills, Turning Basin |
| | | Tissue Residue | 2,3,7,8-TCDD (Striped Bass) | HQ < 1, 1.7 | Fish Sampling Zone 3, English Kills |
| | | Tissue Residue | Total D/F TEQ (Striped Bass) | HQ < 1, 2.8 | Dutch Kills, Fish Sampling Zone 3, English Kills |
| | | Tissue Residue | Total PCB Congener (Striped Bass) | HQ < 1, 4.0 | **All Zones** |
| | | Tissue Residue | Copper (Mummichog) | HQ < 1, 2.1 | **All Zones** |
| | | Tissue Residue | Total PCB Congener (Mummichog) | HQ < 1, 9.2 | Dutch Kills |
| | | Dietary Intake | Copper (Mummichog) | HQ = 1.2 | Maspeth Creek, **East Branch**, English Kills, Turning Basin |
| | Spotted Sandpiper | Dietary Intake | Copper | HQ = 1.04 | Maspeth Creek |
| | | | Lead | HQ = 1.6 | Dutch Kills, Maspeth Creek, English Kills |
| | | | Total PCB Congener | HQ = 1.7 | Dutch Kills |

| | | | | | |
|---|---|---|---|---|---|
| Wildlife (Aquatic Birds) | Green Heron | Dietary Intake | Total PCB Congener | HQ = 2.3 | Dutch Kills |
| | Black-crowned Night Heron | Dietary Intake | Total PCB Congener | HQ = 1.7 | Dutch Kills |
| | Belted Kingfisher | Dietary Intake | Total PCB Congener | HQ = 1.8 | Dutch Kills |
| | Double-crested Cormorant | Dietary Intake | None | HQ < 1 | N/A |
| Wildlife (Mammals) | Raccoon | Dietary Intake | None | HQ < 1 | N/A |
| Amphibians and Reptiles | Amphibians and Reptiles | Qualitative Evaluation | Qualitative Evaluation | Qualitative Evaluation | Qualitative Evaluation |

Notes:
a = A single HQ is calculated based on an overall 95% upper confidence limit on the mean concentration or dose for a particular receptor and exposure areas combination. TUs are calculated on a sample-by-sample basis and are, therefore, shown as a range.
b = For the tissue residue line of evidence, the first HQ is based on Newtown Creek Group CBRs, and the second HQ is based on USEPA Region 2 CBRs.
c = The benthic macroinvertebrate risk assessment also includes an evaluation of benthic community structure as another line of evidence; however, because this line of evidence does not involve calculation of HQs or TUs, it is not included in this summary table.
d = For the baseline risk analyses, porewater individual PAHs were analyzed according to Hawthorne et al. (2005, 2006). For the Phase 2 Screening Level Ecological Risk Assessment, bulk sediment individual PAHs were analyzed according to USEPA Method 8270.
e = Porewater total SEM refers to the summation of dissolved concentrations of cadmium, copper, lead, nickel, and zinc measured in porewater.

Acronyms:
∑SEM − AVS = sum of simultaneously extracted metals minus acid volatile sulfide 2,3,7,8-TCDD = 2,3,7,8-tetrachlorodibenzo-p-dioxin
AVS = acid volatile sulfide CBR = critical body residue D/F = dioxin/furans
HPAH = high-molecular-weight polycyclic aromatic hydrocarbon HQ = hazard quotient
N/A = not applicable
PAH = polycyclic aromatic hydrocarbon PCB = polychlorinated biphenyl
SEM = simultaneously extracted metals TEQ = toxic equivalence quotient
TPAH = total polycyclic aromatic hydrocarbons TU = toxic unit
USEPA = U.S. Environmental Protection Agency

References:
Hawthorne et al. (Hawthorne, S.B., C.B. Grabanski, D.J. Miller, and J.P. Kreitinger), 2005. Solid-Phase Microextraction of Parent and Alkyl Polycyclic Aromatic Hydrocarbons in Milliliter Sediment Pore Water Samples and Determination of KDOC Values. Environmental Science and Technology 39(8):2795-2803.
Hawthorne et al. (Hawthorne, S.B., D.J. Miller, and J.P. Kreitinger), 2006. Measurement of Total PAH Concentrations and Toxic Units Used for Sediment Risk Assessment at Manufactured Gas Plant Sites. Environmental Toxicology and Chemistry 25(1):287-296.

**Table 10**
**Location-Specific Applicable or Relevant and Appropriate Requirements**

| Media/Location/Action | Requirements | Prerequisite | Statute/Regulation Citation(s) |
|---|---|---|---|
| **Federal Location Specific ARARs** | | | |
| Presence of floodplains within remediation work areas | This regulation requires that federal agencies take measures to incorporate floodplain management goals into planning, regulatory, and decision-making processes. It also requires that the agency promote the preservation and restoration of floodplains so that their natural and beneficial values can be realized.<br>Long- and short-term impacts associated with the occupancy and modification of floodplains shall be avoided wherever possible. The agency shall avoid direct and indirect support of floodplain development wherever there is a practicable alternative. | Actions that could potentially adversely impact floodplains – **applicable**.<br>Federal Emergency Management Agency (FEMA) flood hazard zones delineating floodplains are indicated to be within the site. | Floodplain Management Regulations<br>Federal Emergency Management Agency regulations at 44 CFR 9; 40 CFR Part 6 Appendix A |
| Presence of floodplain within remediation work areas | This regulation prohibits encroachments such as capping or placement of material in the river or on riverbanks that would result in any increase in flood levels during occurrence of base flood discharge | Actions that may adversely affect flood rise – **relevant and appropriate**.<br>Remedial actions that involve capping or other placement of material in the river or on adjacent riverbanks in the study area may increase flood levels. | Flood plain management criteria for flood-prone areas 44 CFR 60.3(d)(2)(3) |
| Presence of wetlands within remediation work areas | This regulation requires that federal agencies take measures to incorporate wetlands protection considerations into planning, regulatory, and decision-making processes.<br>It also requires that the agency minimize the destruction, loss, or degradation of wetlands and preserve and enhance the natural and beneficial values of wetlands. The agency shall avoid direct and indirect support of wetlands development wherever there is a practicable alternative. | Actions made on jurisdictional wetlands – **applicable**.<br>Newtown Creek is listed as Estuarine and Marine Deepwater in the National Wetlands Inventory. | Protection of Wetlands Regulations 40 CFR Part 6 Appendix A |
| Presence of cultural resources within remediation work areas | This statute and implementing regulation requires federal agencies to take into account the effect of this response action upon any district, site, building, structure, or object that is included in or eligible for the National Register of Historic Places (generally, 50 years old or older).<br>Federal agencies are required to take into account their undertakings on historic properties and must determine if there will be an adverse effect and if so how the effect may be minimized or mitigated in consultation with the appropriate State Historic Preservation Office. | Identification of cultural resources on or eligible for the National Register by surveys – **potentially applicable**.<br>Cultural resource surveys that would indicate this is not an ARAR have not been conducted at the site. Potential actions could impact cultural resource features both in-water and within upland areas used for staging or transload.<br>Because of the location and area covered by the site, there is potential for cultural resources eligible for the National Register of Historic Places to be found within the remedial action area. There are currently no property or resources along the river that are included on the National Register; however, the confluence of Newtown Creek with the East River is indicated as historic on the National Register of Historic Places. | National Historic Preservation Act 16 U.S.C. §470 and Implementing Regulations 36 CFR 60, 63, 6.301(b), 800 |
| Presence of archaeological or historical artifacts within remediation work areas | This statute and implementing regulations establish requirements for the evaluation and preservation of historical and archaeological data that may be destroyed through alteration of terrain as a result of a federal construction project or a federally licensed activity or program.<br>The unauthorized removal of archaeological resources from a federal project or federally managed lands is prohibited without a permit and any archaeological investigations at a site must be conducted by a professional archaeologist. Note that under CERCLA 121(e), a permit is not required for on-site CERCLA response actions. | Identification of archaeological resources by an archaeological investigation – **potentially applicable**.<br>Cultural resource surveys that would indicate this is not an ARAR have not been conducted at the site. Potential actions could impact cultural resource features, both in-water and within upland areas used for staging or transload. | Preservation of Historical and Archeological Data 54<br>U.S.C. §§ 312501-312504, 312506-312508, and Implementing Regulations 43 CFR 7, Protection of Archaeological Resources |

| Media/Location/Action | Requirements | Prerequisite | Statute/Regulation Citation(s) |
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| Presence of habitat for Bald and/or Golden Eagles within remediation work areas | This statute makes it unlawful for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any Bald or Golden Eagle, or the parts, nests, or eggs of such a bird. In addition to immediate impacts, this requirement also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death, or nest abandonment.<br>If Bald or Golden Eagles are identified during remedial design and remedial action, activities must be modified and conducted to conserve the species and their habitat. | Identification of Bald or Golden Eagles and actions that could impair the species and their habitat – **potentially applicable**.<br>Surveys for Bald or Golden Eagles and their habitat, which would indicate this is not an ARAR, have not been conducted within the site. Although unlikely, there is the potential for eagle nests to exist on top of shoreline structures that could be affected by a remedial action. | Bald and Golden Eagle Protection Act 16 U.S.C. §§ 668(a) and 50 C.F.R. § 22.6 |
| Presence of habitat for federally endangered or threatened species within remediation work areas | This statute and implementing regulations provide that federal activities do not jeopardize the continued existence of any threatened or endangered species. 16 U.S.C. 1536(a) of the Endangered Species Act requires consultation with the U.S. Fish and Wildlife Service to identify the possible presence of protected species and mitigate potential impacts on such species. Substantive compliance with the ESA means that the lead agency must identify whether a threatened or endangered species, or its critical habitat, will be affected by a proposed response action. If so, the agency must avoid the action or take appropriate mitigation measures so that the action does not affect the species or its critical habitat. If, at any point, the conclusion is reached that endangered species are not present or will not be affected, no further action is required.<br>If threatened or endangered species are identified during remedial design and remedial action, activities must be modified and conducted to conserve the species and their habitat.<br>A survey to identify the presence of any endangered or threatened species must be conducted. | Identification of threatened and endangered (T&E) species that could impair the species and their habitat – **potentially applicable**.<br>Remedial actions may impact threatened and endangered species, both in water and in upland areas used for staging or transload. If threatened and endangered species are identified within the study area, actions that may negatively impact the species and their habitat must be modified and conducted to conserve the species and their habitat. | Endangered Species Act, 16 U.S.C. §1536(a)(2) and listing of endangered and threatened species per 50 CFR §§ 17.11 & 17.12, or designation of critical habitat per 50 CFR § 17.95 |
| Presence of habitat for migratory birds in remediation work areas | This statute and implementing regulations make it unlawful for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird.<br>If migratory birds are identified during remedial design and remedial action, activities must be modified and conducted to conserve the species and their habitat. | Actions that may negatively impact the migratory birds and their habitat – **potentially applicable**.<br>Remedial actions may impact migratory birds because they are conducted in water bodies. Migratory bird surveys that would indicate this is not an ARAR have not been conducted at the site. However, water bodies and wetlands have been identified within the site that could provide potential habitat for migratory birds. | Migratory Bird Treaty Act 16 U.S.C. §703 and Implementing Regulations, 50 CFR 10.13 (List of Migratory Birds) |
| Presence of waterbodies and streams within remediation work areas | This statute and implementing regulations require coordination with federal and state agencies for federally funded projects to ensure that any modification of any stream or other waterbody affected by any action authorized or funded by the federal agency provides for adequate protection of fish and wildlife resources.<br>Federal agencies must comply with substantive requirements identified by the U.S. Fish and Wildlife Service and the relevant state agency with jurisdiction over wildlife resources. | Modification of any stream or waterbodies that affect non-game fish and wildlife resources – **applicable**.<br>Remedial actions will involve federally funded modification of waterbodies that were identified from the National Wetlands Inventory. Consultation with the federal agencies will be conducted to identify substantive requirements for adequate protection of fish and wildlife resources. | Fish and Wildlife Coordination Act 16 U.S.C. §662 and 663 and Implementing Regulations 50 CFR 83 |
| Presence of essential fish habitat within remediation work areas | Requires federal agencies consult with National Marine Fisheries Service (NMFS) on actions that may adversely affect Essential Fish Habitat (EFH), defined as "those waters the substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." | Actions that may adversely affect EFH – **applicable**.<br>Remedial actions may involve EFH because the Newtown Creek watershed falls within an area designated as EFH by the NMFS. Potential effects to EFH from the proposed remedial actions have not been evaluated. | Magnuson-Stevens Fishery Conservation and Management Act 16 U.S.C. §1801 et seq. and Implementing Regulations 50 CFR Part 600.920 |

| Media/Location/Action | Requirements | Prerequisite | Statute/Regulation Citation(s) |
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| Presence of marine mammal habitat within remediation work areas | This statute and implementing regulations imposes restrictions on the taking, possession, transportation, selling, offering for sale, and importing of marine mammals or marine mammal products. It also establishes that best management practices (BMPs) be used for observing and avoiding contact with such species. | Actions that may adversely affect marine mammals – **potentially applicable**.<br>Remedial actions may impact marine mammals because they are conducted in water bodies. Surveys that would indicate this is not an ARAR have not been conducted at the site. However, water bodies and wetlands have been identified within the site that could provide potential habitat for marine mammals. | Marine Mammal Protection Act 16 U.S.C. § 1372 et seq. and Implementing Regulations 50 CFR 216.11 and 216.105 |
| Presence of coastal zone management area within remediation work areas | Requires activities affecting land or water uses in a coastal zone to certify noninterference with coastal zone management.<br>It establishes that federal agencies that conduct or support activities that directly affect a coastal use or resource must undertake those activities in a manner that is consistent, to the maximum extent practicable, with State coastal zone management programs that have been approved by the NOAA. | Actions that may adversely affect flood rise – **applicable**.<br>Remedial actions may impact coastal zones. The Newtown Creek watershed is entirely within the coastal zone management act boundary designated by NOAA for the State of New York. | Coastal Zone Management Act 16 U.S.C. § 1455b and 1456 and Implementing Regulations 15 CFR 930.32 through 930.34 |
| **State Location Specific ARARs** | | | |
| Presence of tidal wetlands within remediation work areas | This statute and implementing regulation establishes requirements for undertaking activities in or adjacent to tidal wetlands in order to preserve, protect, and enhance present and potential values of tidal wetlands within New York State including development restrictions. Remedial actions shall comply with substantive requirements of the permits.<br>Alternatives should be evaluated to minimize the destruction, loss, or degradation of tidal wetlands, to the extent practicable. | Presence of tidal wetlands within Newtown Creek or its tributaries – **applicable**.<br>The study area is within a New York State tidal wetland. The remedial action may include activities such as dredging and/or placement of fill, which is regulated under the Tidal Wetlands Act. | Tidal Wetlands New York State ECL Article 25, Title 4 and implementing regulation 6 NYCRR Part 661.6 |
| Presence of State-Owned Tidal Wetlands | This statute and implementing regulation prohibits the following activities within state owned tidal wetlands:<br>46.7(a)(1) any use of a motor vehicle, including parking, more than one hour before sunrise or more than one hour after sunset except for specifically permitted nature appreciation, educational or research activities;<br>46.7(a)(5) removal of naturally occurring or introduced flora, whether living or dead, except for specifically permitted research or educational activities;<br>46.7(a)(6) operation of motorized, wheeled or tracked vehicles and air boats except as specifically permitted activities;<br>46.7(a)(7) construction, erection or maintenance of any structure, except temporary blinds or temporary structures associated with specifically permitted research or educational activities which are permissible under section 51-0713 of the Environmental Conservation Law; or<br>46.7(a)(8) disposal of any solid, liquid or toxic waste material. | Use of state-owned tidal wetlands within Newtown Creek or its tributaries – **applicable**.<br>The study area is within a tidal wetland that is owned and/or under the jurisdiction of New York State | New York State ECL Article 3, Title 3 and implementing regulation 6 NYCRR F 46 |
| Presence of hazardous waste facilities in floodplain | This statute and implementing regulation establishes construction requirements for hazardous waste facilities in the 100-year floodplain. The remedial action may require disposal of material at a hazardous waste facility in the floodplain, which must comply with the provisions set forth under 6 NYCRR Part 373. | Presence of 100 year floodplain within Newtown Creek or its tributaries – **applicable**. | New York State ECL Department of Environmental Conservation; General Functions, Powers, Duties and Jurisdiction Article 3, Title 3; and Collection, Treatment and Disposal of Refuse and Other Solid Waste Article 27 Titles 7 and 9, and implementing regulation 6 NYCRR Part 373 |

| Media/Location/Action | Requirements | Prerequisite | Statute/Regulation Citation(s) |
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| Presence of endangered or threatened species or species of special concern and their habitats within remediation work areas | This statute and implementing regulation provide protection for endangered or threatened species and species of special concern within New York State. The taking of any endangered or threatened species is prohibited, except under a permit or license issued by NYSDEC. In accordance with CERCLA Section 121(e), a permit is not required for on-site CERCLA response actions. If it is determined that response actions may destroy or degrade the habitat of a New York State-listed endangered or threatened species or cause "a "taking" of any endangered or threatened species, such response actions will comply with substantive provisions of these regulations. | Presence of endangered or threatened species or their habitat within Newtown Creek or its tributaries – **potentially applicable**.<br>The study area may contain endangered, threatened, or species of special concern. Any protected species present within the study area should be identified. | New York Endangered Species Act New York State ECL Article 11, Title 5 and implementing regulation 6 NYCRR Part 182 |
| Presence of protected native plants within remediation work areas | This statute and implementing regulation provide protection for endangered, threatened, rare, and exploitable vulnerable native plants within New York State. All listed species are "protected plants" and may not be removed or damaged without consent. If it is determined that response actions may destroy or degrade New York State-listed protected native plants or cause a "taking" of any protected native plants, NYSDEC should be consulted with respect to substantive requirements. The removal of any protected plant species is prohibited and requires consultation with NYSDEC. Protection of these species should be considered when developing the remedial action. | Presence of endangered or threatened species or their habitat within Newtown Creek or its tributaries – **potentially applicable**.<br>The study area may contain New York State protected native plant species. Any listed protected plant species present within the study area should be identified. | New York State ECL Lands and Forests Article 9, Removal of Trees and Protected Plants Title 15 and implementing regulation Protected native plants 6 NYCRR Part 193.3 |
| Presence of coastal areas and inland waterways within remediation areas | This statute and implementing regulation establish policies for the designation of use of coastal and inland waterway resources while preventing the loss of living marine resources and wildlife, diminution of open space area or public access to the waterfront, shoreline erosion, and impairment of scenic beauty or permanent adverse changes to ecological systems. Waterfront redevelopment, including removal and/or replacement of deteriorated structures, design/construction of new structures, should involve NYSDEC consultation for applicable regulatory requirements.<br>The remedial action may require the construction/replacement of bulkheads, shoreline stabilization, or placement of rip rap which are considered alterations to shoreline and require NYSDEC consultation.<br>In addition, the protection of ecological receptors, wildlife habitats, and coastal land features should be considered when developing and implementing the remedy. | Presence of coastal areas or inland waterways within Newtown Creek or its tributaries – **applicable**.<br>The study area is within a New York State coastal waterway. | New York State Waterfront Revitalization of Coastal Areas and Inland Waterways New York State ECL Article 42; Sections 910-923 and implementing regulation 19 NYCRR Parts 600-603 |
| Presence of coastal erosion hazard areas | This statute and implementing regulation establish guidelines for coastal erosion management for natural and structural protection of erosion hazard areas. Regulated activities include replacement of bulkheads, dredging and/or placing of capping material. The remedial action must be designed in accordance with substantive requirements to address coastal erosion hazard areas which include restrictions on regulated activities and standards for erosion protection structures. | Presence of coastal erosion hazard areas within Newtown Creek or its tributaries – **applicable**.<br>The study area is within a designated coastal erosion hazard area. | New York State ECL Article 34 and implementing regulation Coastal Erosion Management 6 NYCRR Part 505 |
| Presence of fish and wildlife within remediation work areas | This statute establishes Fish and Wildlife management practices to preserve and develop fish and wildlife resources and improve access to them for recreational purposes. During dredging, or placement of fill or structures (i.e., Bulkheads, shoreline stabilization (rip rap)) no deleterious or poisonous substances shall be thrown or allowed to run into any public or private waters in quantities injurious to fish life, protected wildlife or waterfowl inhabiting those waters, or injurious to the propagation of fish, protected wildlife or waterfowl therein. | Presence of fish and wildlife within Newtown Creek or its tributaries – **applicable**.<br>The study area contains fish and wildlife. | Fish and Wildlife New York State ECL Article 11 Fish and Wildlife Management Practices Cooperative Program; Prohibitions; Taking of Fish, Wildlife, Shellfish and Crustacea For Scientific or Propagation Purposes; Destructive Wildlife; Rabies Control; Guides; Endangered Species Title 5 |

**Table 11**
**Action-Specific Applicable or Relevant and Appropriate Requirements**

| Media/Location/Action | Requirements | Prerequisite | Statute/Regulation Citation(s) |
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| **Federal Action Specific ARARs** | | | |
| Point source discharges including discharge of stormwater and/or water generated during sediment dewatering to the creek, its tributaries, or other waters of the U.S. during implementation, construction, or operation of the remedy | Section 402 of the Clean Water Act regulates discharges of pollutants from point sources to waters of the U.S., and requires compliance with the standards, limitations, and regulations promulgated per Sections 301, 304, 306, 307, 308 of the CWA.<br>Part 122.44 establishes permit conditions, which include effluent limitations and standards for discharges. | Discharge of pollutants from any point source into waters of the U.S., including the Newtown Creek or its tributaries – **applicable**.<br>CWA authorizes the issuance of permits for the discharge of any pollutant, including stormwater and/or sediment dewater discharges associated with industrial/remedial activity.<br>The National Pollutant Discharge Elimination System authorizes permits for the discharge of treatment system effluents by establishing water quality standards to be met using the best available technology (BATs) and best management practices (BMPs).<br>CERCLA requires that only substantive aspects of permits be complied with. Administrative components will not be addressed. | Clean Water Act 33 U.S.C. §§ 1342, et seq., and Implementing Regulation 40 CFR 122 (National Pollutant Discharge Elimination System) Subpart C (Permit Conditions) |
| Actions that discharge dredged or fill material into waters of the U.S. | CWA §404 regulates the discharge of dredged or fill material into waters of the U.S., including return flows from such activity. This program is implemented through regulations set forth in the 404(b)(1) guidelines, 40 CFR Part 230. The guidelines specify the restrictions on discharge (40 CFR 230.10); the factual determinations that need to be made on short-term and long-term effects of a proposed discharge of dredged or fill material on the physical, chemical, and biological components of the aquatic environment (40 CFR 230.11) in light of Subparts C through F of the guidelines; and the findings of compliance on the restrictions (40 CFR 230.12). Subpart J of the guidelines provide the standards and criteria for the use of all types of compensatory mitigation when the response action will result in unavoidable impacts to the aquatic environment. | Discharge of dredged or fill material into waters of the U.S., including return flows from such activity – **applicable**.<br>Used for evaluating impacts to the aquatic environment from dredging contaminated sediment, placement of capping material and enhanced monitored natural recovery material, and in situ treatment of sediments that will occur in implementing the remedy. | Clean Water Act, 33 U.S.C. 1344 Section 404(b)(1) Guidelines, and Implementing Regulations 40 CFR Part 230 (Guidelines for Specification of Disposal Sites for Dredged or Fill Material) |
| Actions that discharge pollutants to waters of the U.S. | Any federally authorized activity that may result in any discharge into navigable waters requires reasonable assurances that the activity will be conducted in a manner that will not violate applicable water quality standards by the imposition of any effluent limitations, other limitations, and monitoring requirements necessary to assure the discharge will comply with applicable provisions of the Clean Water Act. | Activity that may result in any discharge into navigable waters potentially – **relevant and appropriate**.<br>CWA 401 requirement, if more stringent than state implementation regulations, that in-water response actions that result in a discharge of pollutants comply with water quality standards through the placement of water quality-based conditions and other requirements on the discharge deemed necessary. Actions to implement the remedial action that may result in discharges to waters of the U.S. include, but may not be limited to, dredging, capping, placement of material for enhanced natural recovery, riverbank remediation, return flows, or dewatering sediments. Conditions and other requirements deemed necessary so that water quality standards are not violated will be placed on any such discharge.<br>CERCLA requires that only substantive aspects of certifications be complied with. Administrative components will not be addressed. | Clean Water Act, 33 USC 1341 (Section 401), and Implementing Regulations 40 CFR 121 |

| Media/Location/Action | Requirements | Prerequisite | Statute/Regulation Citation(s) |
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| Actions that discharge pollutants to the contiguous coastal zone | Establishes criteria for issuance of National Pollutant Discharge Elimination System (NPDES) permits for the discharge of pollutants from a point source into the territorial seas, the contiguous zone, and the oceans.<br>Prohibits discharges causing unreasonable degradation of the marine environment. | Discharge of pollutants from a point source into the territorial seas, the contiguous zone, and the ocean – **applicable**.<br>The Newtown Creek watershed is entirely within the contiguous coastal zone designated by NOAA for the State of New York.<br>CWA Section 403 requires that NPDES permit be issued for discharges into marine waters, including territorial seas, the contiguous zone, and the oceans, as defined in 40 CFR 122.2.<br>A permit is not required if point of discharge is on-site; however, substantive requirements would be complied with as described in 40 CFR 125.123(b) and (d)(1). | Clean Water Act 33 U.S.C. 1343 Ocean Discharge Criteria and Implementing Regulations 40 CFR 125.122, 125.123(b) and 125.123(d)(1) |
| Actions that transport material for dumping into the territorial sea or a contiguous coastal zone affecting the territorial sea | Establishes criteria for issuance of ocean dumping permits for the discharge of material into the territorial seas, or the contiguous zone adjacent to the territorial sea. | Discharge of dredged material into the territorial seas or the contiguous zone adjacent to the territorial sea – **applicable**.<br>The Newtown Creek watershed is entirely within the contiguous coastal zone designated by NOAA for the State of New York.<br>40 CFR 220 requires that NPDES permit be issued for discharges into marine waters, including territorial seas or the contiguous zone adjacent to the territorial sea. A permit is not required if point of discharge is on-site; however, substantive requirements would be complied with. | Marine Protection, Research, and Sanctuaries Act 33 U.S.C. 1412 and 1418, and Implementing Regulations 40 CFR 220-223, 40 CFR 225-228, and 40 CFR 230-233 |
| Discharge of CERCLA contaminants to publicly owned treatment works (POTW) | Establishes prohibitions on discharge of pollutants that pass through the POTW without treatment, interfere with POTW operation, contaminate POTW sludge, or endanger health/safety of POTW workers and establishes national pretreatment standards specifying quantities of pollutants or pollutant properties which may be discharged to a POTW. | Indirect discharge of treated water from dredged material dewatering to a POTW, including discharge to sewers leading to the POTW – **applicable**. | Clean Water Act 33 U.S.C. 1251 et seq. and Implementing Regulations 40 CFR 403.5-403.20 |
| Actions that discharge emissions during implementation, operation, or maintenance of a response action | Parts 64.3 and 64.7 provide substantive requirements for compliance assurance monitoring of pollutant-specific emissions units at a major source.<br>Part 64.3 provides general criteria for the design of compliance assurance monitoring programs.<br>Part 64.7 provides requirements for operation of the monitoring program. | Discharge of pollutants to air – **relevant and appropriate**. | Clean Air Act, 42 U.S.C. §7409 et seq. and Implementing Regulations: 40 CFR 64 (Compliance Assurance Monitoring) |
| Actions handling PCB remediation wastes and PCB-containing material | TSCA Subpart D regulates storage and disposal of PCB wastes and establishes requirements for handling, storage, and disposal of PCB-containing materials, including PCB remediation wastes, and sets performance standards for disposal technologies for materials/wastes with concentrations in excess of 50 milligrams per kilogram (mg/kg). Establishes decontamination standards for PCB-contaminated debris. | Disposal of contaminated dredged material, debris, or surface water with PCB contamination – **applicable**. | Toxic Substances Control Act, 15 U.S.C. §2601 et seq., and implementing regulations 40 CFR 761.50-761.79 |

| Media/Location/Action | Requirements | Prerequisite | Statute/Regulation Citation(s) |
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| Actions generating solid wastes that could contain hazardous wastes for management and disposal | Wastes generated during construction, monitoring, or remediation must be characterized and managed in accordance with substantive RCRA requirements prior to off-site disposal. This regulation requires determination if solid waste is a hazardous waste by using the following method:<br>First, determine if waste is excluded from regulation under 40 CFR 261.4, then determine if waste is listed as a hazardous waste under Subpart D 40 CFR Part 261 or whether the waste is (characteristic waste) identified in Subpart C of 40 CFR Part 261 by either:<br>1) Testing the waste according to the methods set forth in Subpart C of 40 CFR Part 261, or according to an equivalent method approved by the Administrator under 40 CFR §260.21; or<br>2) Applying knowledge of the hazard characteristic of the waste considering the materials or the processes used.<br>Dredged material that is subject to the requirements of Section 404 of the CWA is not a hazardous waste for purposes of regulation under RCRA.<br>Similarly, industrial wastewater discharges that are point source discharges subject to regulation under Section 402 of the CWA, as amended, are not solid wastes for the purpose of hazardous waste management. This exclusion applies only to the actual point source discharge. It does not exclude industrial wastewaters while they are being collected, stored, or treated before discharge, nor does it exclude sludges that are generated by industrial wastewater treatment. | Hazardous waste characterization and determination for management and disposal – **applicable**. | RCRA 42 U.S.C § 6901 et seq. and Implementing Regulations 40 CFR 261.1 through 261.24 |
| Actions generating RCRA hazardous waste | This regulation requires that generators of hazardous waste determine if the hazardous waste has to be treated before land disposal. This is done by determining if the waste meets the treatment standards in 40 CFR 268.40, 268.45, or 268.49 by testing in accordance with prescribed methods or use of generator knowledge of the waste. This determination can be made concurrently with the hazardous waste determination required in 40 CFR 261.11.<br>The generator must comply with the special requirements of 40 CFR § 268.9 in addition to any applicable requirements in 40 CFR § 268.7.<br>The initial generator of solid waste must determine each USEPA Hazardous Waste Number (waste code) applicable to the waste in order to determine the applicable treatment standards under 40 CFR 268 et seq. This determination may be made concurrently with the hazardous waste determination required in Sec. 261.11 of this chapter. The generator must determine the underlying hazardous constituents (as defined in 40 CFR 268.2(i)) in the characteristic waste. | Characterizing and treating dredged materials slated for disposal – **applicable**. | RCRA 42 U.S.C. § 6901 et seq. and Implementing Regulations 40 CFR 268.7(a)(1) and 40 CFR 268.9(a) |

| Media/Location/Action | Requirements | Prerequisite | Statute/Regulation Citation(s) |
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| Actions requiring temporary storage of hazardous waste | A generator may accumulate hazardous waste at the facility provided that (accumulation of RCRA hazardous waste on-site as defined in 40 CFR §260.10) the following criteria are met:<br>• Waste is placed in containers that comply with 40 CFR 265.171–173<br>• Date upon which accumulation begins is clearly marked and visible for inspection on each container<br>• Container is marked with the words "hazardous waste" or the container may be marked with other words that identify the contents; if accumulation of 55 gal or less of RCRA hazardous waste or 1 quart of acutely hazardous waste listed in §261.33(e) at or near any point of generation of hazardous waste regulations further require the following:<br>– In addition to the requirements of 40 CFR 262.34, a generator may accumulate hazardous waste on-site for 90 days or less without a permit provided that, if storing in excess of 100 containers, the waste is placed in a storage unit that meets the Accumulation requirements of 40 CFR 264.175<br>A generator shall comply with provisions found in 40 CFR, Part 262 and each applicable requirement of 40 CFR 262.34(a), (b), (c), (d), (e), and (f). | Temporary storage of hazardous waste – **applicable**.<br>CERCLA requires that only substantive aspects of permits be complied with. Administrative components will not be addressed. | RCRA 42 U.S.C. § 6901 et seq. and Implementing Regulations 40 CFR § 262.34(a); 40 CFR §262.34(a)(1)(i); 40 CFR § 262.34(a)(2) and (3); 40 CFR § 262.34(c)(1) |
| Actions that involve storage and treatment of hazardous waste | These regulations provide standards for location, design, operation, and closure of units in which treatment of hazardous waste may occur. These regulations also provide requirements for use and management of containers, tank systems, surface impoundments, waste piles, and land treatment units one or more of which may be used for the storage and treatment of hazardous waste. Subparts AA, BB, and CC provide air emission standards for process vents, equipment leaks, and tanks, surface impoundments, and containers that may be used. | Siting, design, operation, and closure of any containers, tank systems, surface impoundments, waste piles, or land treatment areas used for the storage (more than 90 days) and/or treatment of hazardous waste on-site prior to disposal offsite – **applicable**. | RCRA 42 U.S.C. § 6901 et seq. and Implementing Regulations 40 CFR Part 264, Subparts B, C, F, G, I, J, K, L, M, AA, BB, CC, and DD |
| Actions that discharge pollutants to waters of New York State | This statute and implementing regulations require permits to modify, change or disturb any protected stream, its bed or banks, or remove from its bed or banks sand or gravel or any other material; or to excavate or place fill in any of the navigable waters of the state.<br>Any applicant for a federal license or permit to conduct any activity which may result in any discharge into navigable waters must obtain a State Water Quality Certification under Section 401 of the Federal Water Pollution Control Act, 33 U.S.C. §1341. In accordance with CERCLA Sections 121(d)(2) and 121(e), neither a permit nor a water quality certification is required for on-site CERCLA response actions, although such actions must comply with substantive requirements of these regulations. Preventative measures should be established to minimize suspension of sediment during dredging and/or cap placement. Additional monitoring may be required to ensure remedial activities do not exceed water quality standards. | Activities that result in any discharge into Newtown Creek or its tributaries that are waters of New York State – **applicable**.<br>The remedial action may include dredging and/or capping which would disturb and remove material from the creek bed and/or banks, with the placement of material on top. | New York State ECL Water Resources Article 15, Protection of Water Title 5; Water Pollution Control Article 17, Jurisdiction of the Department; Authority; Powers and Duties Title 3 and implementing regulations 6 NYCRR Use and Protection of Waters Part 608 and Part 701 Classifications--Surface Waters and Groundwaters |
| Actions that discharge pollutants to waters of the State of New York | This statute and implementing regulations prohibit any person, directly or indirectly, to throw, drain, run or otherwise discharge into such waters organic or inorganic matter that shall cause or contribute to a condition in contravention of applicable standards adopted by NYSDEC pursuant to ECL 17-0301. | Activities that result in any discharge into Newtown Creek or its tributaries that are waters of New York State – **applicable**. | New York State ECL Article 17 Water Pollution Control, Title 5 Prohibitions and implementing regulation 6 NYCRR Parts 701 and 703 |

| Media/Location/Action | Requirements | Prerequisite | Statute/Regulation Citation(s) |
|---|---|---|---|
| Actions that involve point source discharge pollutants to surface water or groundwater in New York State | This statute and implementing regulations establish standards for point source discharges of wastewater and storm water to surface water and groundwater. In general, no person shall discharge or cause a discharge to New York State waters of any pollutant without a permit under the New York State Pollutant Discharge Elimination System (SPDES) program.<br>In accordance with CERCLA Section 121(e), a permit is not required for on-site CERCLA response actions, although the selected remedy will comply with substantive requirements of 6 NYCRR Part 750 which include prohibited discharges and effluent limitations. | Activities that result in discharges into Newtown Creek or its tributaries or to groundwater – **applicable**.<br>The remedial action may result in discharge to surface water subject to SPDES requirements. | New York State ECL Article 17 Water Pollution Control, Title 8 State Pollutant Discharge Elimination System (SPDES) and implementing regulation 6 NYCRR Part 750 |
| Actions that involve discharge of contaminants to air in New York State | This statute and implementing regulations establish that the emission of air contaminants to the outside atmosphere that jeopardize human, plant, or animal life, or are ruinous to property, or which unreasonably interfere with the comfortable enjoyment of life or property, is prohibited (6 NYCRR 211.2), New York State Air Quality Standards are promulgated at 6 NYCRR Part 257. | Activities that result in discharges to air – **applicable**. | New York State ECL Article 19 Air Pollution Control Title 3 Powers and Duties implementing regulation 6 NYCRR Parts 200-257–Air Resources |
| Actions that involve the generation of solid waste for management and disposal in New York State | This statute and implementing regulation establishes requirements for the management and disposal of solid waste and the design, construction, operation, and closure of solid waste management facilities within New York State. | Activities that result in generation of solid waste that requires management and disposal at a solid waste management facility – **applicable**.<br>The remedial action may include dredging and removal of material that requires disposal as solid waste. | New York State ECL Article 27, Title 7 Solid Waste Management and Resource Recovery Facilities and implementing regulation 6 NYCRR Part 360 Solid Waste Management Facilities General Requirements |
| Actions that involve the generation of hazardous waste for management in New York State | This statute and implementing regulations establish New York State requirements for the identification, listing, and handling of hazardous wastes. | Activities that result in generation of hazardous waste that requires management and disposal – **applicable**.<br>The remedial action may require dredging or generation of material which must be identified as a hazardous waste. | New York State ECL Article 27, Title 9 Industrial Hazardous Waste Management and implementing regulation 6 NYCRR Parts 370 Hazardous Waste Management System and 371 Identification and Listing of Hazardous Wastes |
| Actions that involve the generation of hazardous waste for management and disposal in New York State | This statute and implementing regulation establish requirements for treatment, storage, and disposal of hazardous waste. Including permit requirements (from which on-site response actions are exempt, although substantive requirements would be met) and standards for construction and operation of hazardous waste management facilities within New York State. | Activities that result in generation of hazardous waste that require management and disposal – **applicable**.<br>The remedial action may include the removal of material that is a classified hazardous waste and requires disposal at a hazardous waste facility. | New York State ECL Article 3, Title 3; Article 27, Title 7 Solid Waste Management and Resource Recovery Facilities and 9 Industrial Hazardous Waste Management and implementing regulation 6 NYCRR Part 373 Hazardous Waste Management Facilities |
| Actions that involve the generation of hazardous waste for disposal in New York State | This statute and implementing regulation restrict specified hazardous wastes from land disposal and defines circumstances under which an otherwise prohibited hazardous waste may be land disposed. | Activities that result in generation of hazardous waste that require disposal – **applicable**.<br>The remedial action may require dredging or generation of material that is a listed hazardous waste and subject to these requirements | New York State ECL Article 27, Title 9 Industrial Hazardous Waste Management and implementing regulation 6 NYCRR Part 376 Land Disposal Restrictions |
| Actions that involve the transportation of hazardous waste originating or terminating in New York State | This statute and implementing regulation establish requirements for the transportation of regulated waste originating or terminating in New York State. | Activities that result in generation of hazardous waste that require collection, transportation, and disposal at a solid waste facility – **applicable**.<br>The remedial action may require dredging or generation of material that is a listed hazardous waste and subject to these requirements. | New York State ECL Article 27, Title 9 Industrial Hazardous Waste Management and implementing regulation 6 NYCRR Part 364 Waste Transporter Requirements |

Abbreviations:
ARAR: Applicable or Relevant and Appropriate Requirement
BAT: best available technology
BMP: best management practice
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
CFR: Code of Federal Regulations
CWA: Clean Water Act
ECL: Environmental Conservation Law
EFH: Essential Fish Habitat
FEMA: Federal Emergency Management Agency
mg/kg: milligram per kilogram
NMFS: National Marine Fisheries Service
NOAA: National Oceanic and Atmospheric Administration
NPDES: National Pollutant Discharge Elimination System
NYCRR: New York Codes, Rules and Regulations
OU1: Operable Unit 1
PCB: polychlorinated biphenyl
POTW: publicly owned treatment works
RCRA: Resource Conservation and Recovery Act
SD: Saline Class D
SPDES: State Pollutant Discharge Elimination System
T&E: threatened and endangered
TSCA: Toxic Substances Control Act
U.S.C.: United States Code
USEPA: U.S. Environmental Protection Agency

# Table 12
# To be Considered

| Media/Action | Requirement | Prerequisite | Citation(s) |
|---|---|---|---|
| Contaminants from Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) releases found in streambank soil or sediment | The criteria for the protection of groundwater SSLs can be considered in the development of preliminary remediation goals (PRGs) for protection of groundwater from leaching of contaminants from soil. | Presence of contaminants of concern in streambank soil or sediment from CERCLA releases and/or as a result of a CERCLA action that could adversely affect groundwater through leaching – **TBC** | EPA Regional Screening Level (RSL), Summary Table, Protection of Groundwater Soil Screening Levels (SSLs) for Various Contaminants, May 2023 |
| Contaminants from CERCLA releases found in/discharged to air from streambank soil, sediment, surface water, or groundwater | The criteria for the industrial air SSLs can be considered in the development of preliminary remediation goals (PRGs) for protection of industrial workers. | Presence of contaminants of concern in air from CERCLA releases and/or as a result of a CERCLA action that results in airborne emissions that could adversely impact human receptors – **TBC** | EPA RSL. Summary Table, Industrial Air Screening Levels for Various Contaminants, May 2023 |
| Contaminants from CERCLA releases found in soil or sediment | The criteria for the development of ecological SSLs can be considered in the development of preliminary remediation goals (PRGs) for protection of plants and animals. | Presence of contaminants of concern in streambank soil or sediment from CERCLA releases and/or as a result of a CERCLA action that could adversely impact plant or animal ecological receptors – **TBC** | EPA Interim Ecological SSLs for Metals and Organic Contaminants, OSWER Directives 9285.7-56 et seq., various dates from 2003 to 2008. |
| PCB contamination from CERCLA releases found in/discharged to sediment or groundwater | Provides guidance on development of cleanups levels, for PCB contamination in sediment or groundwater that could adversely impact human or ecological receptors. Table 3-4 provides chemical and physical properties of PCBs that can be considered in determining cleanup levels for groundwater. Table 3-5 provides sediment quality criteria that can be considered in the development of cleanup levels for PCBs in sediment. | Presence of PCBs in sediment or groundwater from CERCLA releases and/or as a result of a CERCLA action that could adversely impact human or ecological receptors – **TBC** | Tables 3-4 and 3-5 within *Guidance on Remedial Actions for Superfund Sites with PCB Contamination*, EPA/540/G-90/007, August 1990 |
| Presence of wetlands | Requires federal agencies minimize the destruction, loss, or degradation of wetlands and to preserve and enhance beneficial values of wetlands and to avoid direct or indirect support of new construction in wetlands when there are practicable alternatives. | Federal actions that involve potential impacts to, or take place within, wetlands of Newtown Creek or its tributaries – **TBC**<br><br>Note: Federal agencies required to comply with Executive Order 11990 requirements. | Executive Order 11990 Section 1(a) *Protection of Wetlands* |
| | Agencies shall avoid undertaking construction located in wetlands unless:<br>(1) There is no practicable alternative to such construction, and<br>(2) That the proposed action includes all practicable measure to minimize harm to wetlands which may result from such use. | | Section 2(a) *Protection of Wetlands* |
| Presence of floodplains | Agencies shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains. | Federal actions that involve potential impacts to, or take place within, floodplains of Newtown Creek or its tributaries designated as such on a map – **TBC**<br><br>As provided in 44 CFR § 9.7 Determination of proposed action's location, Paragraph (c), Floodplain determination, one generally should consult the FEMA Flood Insurance Rate Map (FIRM), the Flood Boundary Floodway Map (FBFM) and the Flood Insurance Study (FIS) to determine if the Agency proposed action is within the base floodplain.<br><br>Note: Federal agencies required to comply with Executive Order 11988 requirements. | Executive Order 11988 Section 1. *Floodplain Management* |
| | Agencies shall consider alternatives to avoid, to the extent possible, adverse effects and incompatible development in the floodplain. Each agency shall design or modify its action in order to minimize potential harm to or within the floodplain. | | Executive Order 11988 Section 2(a)(2) *Floodplain Management* |
| | Where possible, an agency shall use natural systems, ecosystem processes, and nature-based approaches when developing alternatives for consideration. | Federal actions that involve potential impacts to, or take place within, floodplains of Newtown Creek or its tributaries – **TBC**<br><br>As provided in 44 CFR § 9.7 Determination of proposed action's location, Paragraph (c), Floodplain determination, one generally should consult the FEMA Flood Insurance Rate Map (FIRM), the Flood Boundary Floodway Map (FBFM) and the Flood Insurance Study (FIS) to determine if the Agency proposed action is within the base floodplain.<br><br>Note: Federal agencies required to comply with Executive Order 13690 requirements | Executive Order 13690 Section 2(c) |

| Media/Action | Requirement | Prerequisite | Citation(s) |
|---|---|---|---|
| Presence of Lower Hudson-Long Island Bays Basin designated wildlife habitat | The New York Comprehensive Wildlife Conservation Strategy is implemented through a State Wildlife Action Plan (SWAP) which provides guidance for managing and conserving New York State Species of Greatest Conservation Need (SGCN), a list of species that are experiencing a population decline or have identified threats that may put them in jeopardy. Alternatives should be evaluated to minimize the destruction, loss, or degradation of SGCN and their habitat. Modifications to activities that may have negative impacts should be evaluated, to the extent practicable.<br>SWAP requirements for the Lower Hudson-Long Island include:<br>• Monitor population and assess spawning habitat of banded sunfish.<br>• Continue programs to restore and monitor populations of American shad.<br>• Manage submerged aquatic vegetation to maintain communities dominated by natural vegetation.<br>• Monitor Atlantic sturgeon population, spawning, recruitment, and habitat use.<br>• Monitor shortnose sturgeon population.<br>• Survey for presence of tidewater mucket mussel.<br>• Remove barriers to the migration of alewife and American eel. | Actions that take place in Newtown Creek and its tributaries within habitat designated in the Lower Hudson-Long Island Bays Basin – **TBC** | New York State Comprehensive Wildlife Conservation Strategy, Final Submission Draft (2005) – Lower Hudson-Long Island Bays Basin, pages 281—320 |
| Presence of New York State designated estuaries | Provides guidance to prevent habitat loss and degradation; toxic contamination through dredge materials management; pathogen contamination; floatable debris; and nutrient and organic enrichment. | Actions that take place in Newtown Creek and its tributaries designated as a New York State estuary – **TBC** | Comprehensive Conservation and Management Plan (CCMP), New York-New Jersey Harbor Estuary Program Including the Bight Restoration Plan, Final (1996) |
| Presence of New York State designated estuaries or embayments connected with the Atlantic Ocean | Provides guidance for restoring, strengthening, and maintaining the ecological integrity of the ocean ecosystem; promote sustainable coastal development; and increase resiliency of ocean resources to climate change related impacts. | Actions that take place in Newtown Creek and its tributaries designated as a New York State connecting estuary or embayment – **TBC** | New York Ocean Action Plan 2017-2027 (2017) |
| Actions that remediate contaminated sediment | Provides criteria and considerations for use of monitored natural recovery for remediation of contaminated sediments including data collection as part of evaluation and contingency measures. | Actions that perform remediation of contaminated sediment using monitored natural recovery – **TBC** | Chapter 4 (Monitored Natural Recovery) within *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites*, EPA-540-R-05-012, OSWER 9355.0-85, December 2005 |
| | Provides criteria and considerations for use of in situ capping for remediation of contaminated sediments including criteria for use and function of caps. | Actions that perform remediation of contaminated sediment using in situ capping – **TBC** | Chapter 5 (In Situ Capping) within *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites*, EPA-540-R-05-012, OSWER 9355.0-85, December 2005 |
| | Provides criteria and considerations for of dredging alternative for remediation of contaminated sediments including an evaluation of all phases of the project, including removal, staging, dewatering, water treatment, sediment transport, and sediment treatment, reuse, or disposal. | Actions that perform remediation of contaminated sediment using dredging – **TBC** | Chapter 6 (Dredging and Excavation) within *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites*, EPA-540-R-05-012, OSWER 9355.0-85, December 2005 |

Abbreviations:

CCMP: Comprehensive Conservation and Management Plan
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
CFR: Code of Federal Regulations
FBFM: Flood Boundary Floodway Map
FEMA: Federal Emergency Management Agency
FIRM: Flood Insurance Rate Map
FIS: Flood Insurance Study
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal
RSL: regional screening level
SGCN: Species of Greatest Conservation Need
SSL: soil screening level
SWAP: State Wildlife Action Plan
TBC: To-Be-Considered Information
USEPA: U.S. Environmental Protection Agency

# APPENDIX III

## ADMINISTRATIVE RECORD INDEX

# ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

**FINAL**

**12/19/2024**

**REGION ID: 02**

Site Name: NEWTOWN CREEK
CERCLIS ID: NYN000206282
OUID: 04
SSID: A206
Action: East Branch Early Action

| DocID: | Doc Date: | Title: | Image Count: | Doc Type: | Addressee Name/Organization: | Author Name/Organization: |
|---|---|---|---|---|---|---|
| 676981 | 12/19/2024 | ADMINISTRATIVE RECORD INDEX FOR OU4 FOR THE NEWTOWN CREEK SITE | 13 | Administrative Record Index | | (US ENVIRONMENTAL PROTECTION AGENCY) |
| 109610 | 07/07/2011 | ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT FOR REMEDIAL INVESTIGATION/FEASIBILITY STUDY, U.S. EPA Region 2, CERCLA Docket No. CERCLA-02-2011-2011, Proceeding Under Sections 104, 107 and 122 of the Comprehensive Environmental Response,... | 354 | Legal Instrument | | (US ENVIRONMENTAL PROTECTION AGENCY) |
| 377068 | 02/24/2014 | PUBLIC HEALTH ASSESSMENT FINAL RELEASE FOR THE NEWTOWN CREEK SITE | 44 | Other | | (NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION) |
| 707475 | 12/02/2014 | NEWTOWN CREEK COMMUNITY ADVISORY GROUP COMMENTS AND QUESTIONS ON THE PHASE 2 WORK PLAN FOR THE NEWTOWN CREEK SITE | 6 | Letter | (US ENVIRONMENTAL PROTECTION AGENCY)\|MUGDAN,WALTER (US ENVIRONMENTAL PROTECTION AGENCY) | |
| 707471 | 02/06/2015 | US EPA'S RESPONSE TO COMMENTS AND QUESTIONS ON THE PHASE 2 WORK PLAN FOR THE NEWTOWN CREEK SITE | 11 | Chart / Table | | (US ENVIRONMENTAL PROTECTION AGENCY) |
| 707563 | 02/18/2015 | NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION 2013-2014 EBULLITION OBSERVATIONS PRESENTATION FOR THE NEWTOWN CREEK SITE | 13 | Other | | (NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION) |

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| DocID: | Doc Date: | Title: | Image Count: | Doc Type: | Addressee Name/Organization: | Author Name/Organization: |
|---|---|---|---|---|---|---|
| 707564 | 09/11/2015 | NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION EVALUATION OF EBULLITION-FACILITATED NAPL MIGRATION PRESENTATION FOR THE NEWTOWN CREEK SITE | 12 | Other | | (NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION) |
| 707562 | 12/01/2016 | NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION NAPL MIGRATION RECONNAISSANCE SURVEY PRESENTATION FOR THE NEWTOWN CREEK SITE | 40 | Other | | (NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION) |
| 707566 | 12/01/2016 | NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION NAPL DELINEATION IN SEDIMENTS PRESENTATION FOR THE NEWTOWN CREEK SITE | 24 | Other | | (NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION) |
| 707554 | 12/14/2016 | NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION LASER INDUCED FLUORESCENCE NON-AQUEOUS PHASE LIQUID DELINEATION MEMO FOR THE NEWTOWN CREEK SITE | 11 | Memorandum | | (NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION) |
| 707556 | 05/01/2017 | NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION SAMPLING PLAN FOR VERIFICATION OF RESPONSES FROM THE LASER INDUCED FLUORESCENCE SAMPLING FOR THE NEWTOWN CREEK SITE | 6 | Work Plan | | (NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION) |
| 503866 | 06/20/2017 | BASELINE HUMAN HEALTH RISK ASSESSMENT WITH ATTACHMENTS A1 AND ATTACHMENTS B TO K FOR THE NEWTOWN CREEK SITE | 969 | Report | | (ANCHOR QEA) |

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SSID: A206
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| DocID: | Doc Date: | Title: | Image Count: | Doc Type: | Addressee Name/Organization: | Author Name/Organization: |
|---|---|---|---|---|---|---|
| 503867 | 06/20/2017 | BASELINE HUMAN HEALTH RISK ASSESSMENT ATTACHMENTS A2 TO A6 FOR THE NEWTOWN CREEK SITE | 10636 | Report | | (ANCHOR QEA) |
| 541451 | 06/30/2017 | COMBINED SEWER OVERFLOW LONG TERM CONTROL PLAN FOR OU2 FOR THE NEWTOWN CREEK SITE | 382 | Work Plan | | (NYSDEC) |
| 510612 | 07/13/2017 | COMMUNITY INVOLVEMENT PLAN FOR THE NEWTOWN CREEK SITE | 119 | Work Plan | | (CDM SMITH)\|(US ENVIRONMENTAL PROTECTION AGENCY) |
| 707555 | 07/26/2017 | NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION NAPL VERIFICATION CORING PROGRAM PRESENTATION FOR THE NEWTOWN CREEK SITE | 15 | Other | | (NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION) |
| 707468 | 08/22/2018 | NEWTOWN CREEK COMMUNITY ADVISORY GROUP'S COMMENTS ON THE BASELINE ECOLOGICAL RISK ASSESSMENT FOR THE NEWTOWN CREEK SITE | 2 | Letter | (US ENVIRONMENTAL PROTECTION AGENCY)\|KWAN,CAROLINE (US ENVIRONMENTAL PROTECTION AGENCY)\|VAUGHN,STEPHANIE (US ENVIRONMENTAL PROTECTION AGENCY) | |
| 544529 | 10/31/2018 | FINAL BASELINE ECOLOGICAL RISK ASSESSMENT REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR THE NEWTOWN CREEK SITE | 828 | Report | | (ANCHOR QEA) |

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| DocID: | Doc Date: | Title: | Image Count: | Doc Type: | Addressee Name/Organization: | Author Name/Organization: |
|---|---|---|---|---|---|---|
| 570213 | 10/31/2018 | FINAL BASELINE ECOLOGICAL RISK ASSESSMENT - ATTACHMENTS A01 - A03 FOR THE NEWTOWN CREEK SITE | 1675 | Report | | (ANCHOR QEA) |
| 570214 | 10/31/2018 | FINAL BASELINE ECOLOGICAL RISK ASSESSMENT - ATTACHMENTS A04-A4a FOR THE NEWTOWN CREEK SITE | 478 | Report | | (ANCHOR QEA) |
| 570215 | 10/31/2018 | FINAL BASELINE ECOLOGICAL RISK ASSESSMENT - ATTACHMENTS A04-A4b FOR THE NEWTOWN CREEK SITE | 1565 | Report | | (ANCHOR QEA) |
| 570218 | 10/31/2018 | FINAL BASELINE ECOLOGICAL RISK ASSESSMENT - ATTACHMENTS B - G FOR THE NEWTOWN CREEK SITE | 673 | Report | | (ANCHOR QEA) |
| 607089 | 05/04/2020 | SEDIMENT CHARACTERIZATION STUDY DATA SUMMARY REPORT FOR OU3 FOR THE NEWTOWN CREEK SITE | 71 | Report | | (ANCHOR QEA) |
| 707567 | 06/18/2020 | HYDROCARBON INTERIM RISK-BASED PRG DERIVATION PRESENTATION FOR THE NEWTOWN CREEK SITE | 30 | Other | | |

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| DocID: | Doc Date: | Title: | Image Count: | Doc Type: | Addressee Name/Organization: | Author Name/Organization: |
|---|---|---|---|---|---|---|
| 707462 | 11/19/2020 | TREATABILITY STUDY PRE-DESIGN INVESTIGATION DATA SUMMARY REPORT FOR THE NEWTOWN CREEK SITE | 1587 | Report | | (NATURAL RESOURCE TECHNOLOGY INCORPORATED) |
| 707463 | 11/19/2020 | TREATABILITY STUDY PRE-DESIGN INVESTIGATION DATA SUMMARY REPORT - APPENDIX E FOR THE NEWTOWN CREEK SITE | 38165 | Report | | (NATURAL RESOURCE TECHNOLOGY INCORPORATED) |
| 707553 | 12/21/2020 | FEASIBILITY STUDY GEOTECHNICAL DATA EVALUATION REPORT FOR THE NEWTOWN CREEK SITE | 334 | Report | | (ANCHOR QEA) |
| 609882 | 04/12/2021 | RECORD OF DECISION FOR OU2 FOR THE NEWTOWN CREEK SITE | 536 | Report | | EVANGELISTA,PAT (US ENVIRONMENTAL PROTECTION AGENCY) |
| 707465 | 04/14/2021 | TREATABILITY STUDY PRE-DESIGN INVESTIGATION DATA SUMMARY REPORT - ISS ADDENDUM FOR THE NEWTOWN CREEK SITE | 9048 | Memorandum | (US ENVIRONMENTAL PROTECTION AGENCY) | (NATURAL RESOURCE TECHNOLOGY INCORPORATED) |
| 707469 | 05/11/2021 | NEWTOWN CREEK COMMUNITY ADVISORY GROUP'S COMMENTS ON THE DRAFT REMEDIAL INVESTIGATION REPORT FOR THE NEWTOWN CREEK SITE | 19 | Letter | (US ENVIRONMENTAL PROTECTION AGENCY)\|KWAN,CAROLINE (US ENVIRONMENTAL PROTECTION AGENCY)\|VAUGHN,STEPHANIE (US ENVIRONMENTAL PROTECTION AGENCY) | |

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**12/19/2024**

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Site Name: NEWTOWN CREEK
CERCLIS ID: NYN000206282
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| DocID: | Doc Date: | Title: | Image Count: | Doc Type: | Addressee Name/Organization: | Author Name/Organization: |
|---|---|---|---|---|---|---|
| 707615 | 12/06/2021 | DEVELOPMENT OF RISK-BASED PRELIMINARY REMEDIATION GOALS FOR THE NEWTOWN CREEK SITE | 245 | Report | | (ANCHOR QEA) |
| 707576 | 01/14/2022 | SUMMARY OF SHEEN AND NAPL-RELATED INVESTIGATION WORK PERFORMED TO DATE FOR THE NEWTOWN CREEK SITE | 49 | Memorandum | (US ENVIRONMENTAL PROTECTION AGENCY) | (ANCHOR QEA) |
| 707570 | 03/03/2022 | FEASIBILITY STUDY NONAQUEOUS PHASE LIQUID MOBILITY DATA EVALUATION REPORT FOR THE NEWTOWN CREEK SITE | 181 | Report | | (ANCHOR QEA) |
| 707572 | 09/30/2022 | FEASIBILITY STUDY GAS EBULLITION DATA EVALUATION REPORT FOR THE NEWTOWN CREEK SITE | 162 | Report | | (ANCHOR QEA) |
| 654262 | 11/22/2022 | FEASIBILITY STUDY WORK PLAN ADDENDUM 1: EAST BRANCH EARLY ACTION FOCUSED FEASIBILITY STUDY WORK PLAN FOR THE NEWTOWN CREEK SITE | 17 | Report | (NEWTOWN CREEK GROUP) | (ANCHOR QEA) |
| 652508 | 03/30/2023 | REMEDIAL INVESTIGATION / FEASIBILITY STUDY REPORT FOR THE NEWTOWN CREEK SITE | 2050 | Report | | (ANCHOR QEA, LLC) |

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|---|---|---|---|---|---|---|
| 704611 | 03/30/2023 | REMEDIAL INVESTIGATION / FEASIBILITY STUDY REPORT - APPENDIX A - SUPPLEMENTAL REMEDIAL INVESTIGATION REPORT INFORMATION FOR THE NEWTOWN CREEK SITE | 18117 | Report | | (ANCHOR QEA, LLC) |
| 704612 | 03/30/2023 | REMEDIAL INVESTIGATION / FEASIBILITY STUDY REPORT - APPENDIX Bi - PHASE 2 REMEDIAL INVESTIGATION FIELD PROGRAM DATA SUMMARY REPORT FOR THE NEWTOWN CREEK SITE | 983 | Report | | (ANCHOR QEA, LLC) |
| 704613 | 03/30/2023 | REMEDIAL INVESTIGATION / FEASIBILITY STUDY REPORT - APPENDIX Bii - FEASIBILITY STUDY FIELD PROGRAM DATA SUMMARY REPORT PART 1 FOR THE NEWTOWN CREEK SITE | 151 | Report | | (ANCHOR QEA, LLC) |
| 704614 | 03/30/2023 | REMEDIAL INVESTIGATION / FEASIBILITY STUDY REPORT - APPENDIX Biii - PHASE 1 REMEDIAL INVESTIGATION DATA USABILITY ASSESSMENT FOR THE NEWTOWN CREEK SITE | 17 | Report | | (ANCHOR QEA, LLC) |
| 704615 | 03/30/2023 | REMEDIAL INVESTIGATION / FEASIBILITY STUDY REPORT - APPENDIX C - NONAQUEOUS PHASE LIQUID EVALUATION FOR THE NEWTOWN CREEK SITE | 617 | Report | | (ANCHOR QEA, LLC) |

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| 704616 | 03/30/2023 | REMEDIAL INVESTIGATION / FEASIBILITY STUDY REPORT - APPENDIX D - GAS EBULLITION EVALUATION FOR THE NEWTOWN CREEK SITE | 170 | Report | | (ANCHOR QEA, LLC) |
| 704617 | 03/30/2023 | REMEDIAL INVESTIGATION / FEASIBILITY STUDY REPORT - APPENDIX E - POINT SOURCES EVALUATION FOR THE NEWTOWN CREEK SITE | 3272 | Report | | (ANCHOR QEA, LLC) |
| 704618 | 03/30/2023 | REMEDIAL INVESTIGATION / FEASIBILITY STUDY REPORT - APPENDIX F - GROUNDWATER EVALUATION FOR THE NEWTOWN CREEK SITE | 5747 | Report | | (ANCHOR QEA, LLC) |
| 704619 | 03/30/2023 | REMEDIAL INVESTIGATION / FEASIBILITY STUDY REPORT - APPENDIX G - FINAL MODELING RESULTS MEMORANDUM FOR THE NEWTOWN CREEK SITE | 3228 | Report | | (ANCHOR QEA, LLC) |
| 704620 | 03/30/2023 | REMEDIAL INVESTIGATION / FEASIBILITY STUDY REPORT - APPENDIX H - BASELINE HUMAN HEALTH RISK ASSESSMENT FOR THE NEWTOWN CREEK SITE | 971 | Report | | (ANCHOR QEA, LLC) |
| 704621 | 03/30/2023 | REMEDIAL INVESTIGATION / FEASIBILITY STUDY REPORT - APPENDIX I - BASELINE ECOLOGICAL RISK ASSESSMENT (BERA) FOR THE NEWTOWN CREEK SITE | 1204 | Report | | (ANCHOR QEA, LLC) |

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| 704622 | 03/30/2023 | REMEDIAL INVESTIGATION / FEASIBILITY STUDY REPORT - APPENDIX J - DAR RELEVANT MATERIALS FOR THE NEWTOWN CREEK SITE | 7647 | Report | | (ANCHOR QEA, LLC) |
| 707575 | 09/11/2023 | ANCHOR QEA QUANTITATIVE EVALUATION OF NAPL SEEPS DISCHARGING TO EAST BRANCH PRESENTATION FOR THE NEWTOWN CREEK SITE | 15 | Other | | (ANCHOR QEA) |
| 646374 | 09/26/2023 | CONTAMINATED SEDIMENTS TECHNICAL ADVISORY GROUP (CSTAG) RECOMMENDATIONS ON PROPOSED EARLY ACTION FOR MILESTONE 3 FOR THE NEWTOWN CREEK SITE | 10 | Memorandum | KWAN,CAROLINE (US ENVIRONMENTAL PROTECTION AGENCY) | |
| 646375 | 11/03/2023 | US EPA REGION 2 RESPONSE TO CONTAMINATED SEDIMENTS TECHNICAL ADVISORY GROUP (CSTAG) RECOMMENDATIONS ON PROPOSED EARLY ACTION FOR MILESTONE 3 FOR THE NEWTOWN CREEK SITE | 19 | Memorandum | | CARPENTER,ANGELA (US ENVIRONMENTAL PROTECTION AGENCY) |
| 700886 | 01/10/2024 | COMMERCIAL NAVIGATION ANALYSIS FOR THE NEWTOWN CREEK SITE | 81 | Report | (US ENVIRONMENTAL PROTECTION AGENCY) | (US ARMY CORPS OF ENGINEERS) |

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|---|---|---|---|---|---|---|
| 707474 | 01/11/2024 | NEWTOWN CREEK COMMUNITY ADVISORY GROUP REQUEST FOR CLARIFICATION ON THE BOUNDARIES OF UPLAND PROPERTIES FOR THE NEWTOWN CREEK SITE | 2 | Letter | (US ENVIRONMENTAL PROTECTION AGENCY)\|KWAN,CAROLINE (US ENVIRONMENTAL PROTECTION AGENCY)\|VAUGHN,STEPHANIE (US ENVIRONMENTAL PROTECTION AGENCY) | |
| 646991 | 02/02/2024 | US EPA KEY CONCERNS ON THE EAST BRANCH EARLY ACTION FFS FOR THE NEWTOWN CREEK SITE | 2 | Email | (NEWTOWN CREEK GROUP) | Schmidt,Mark (US ENVIRONMENTAL PROTECTION AGENCY) |
| 707530 | 02/15/2024 | CORRESPONDENCE REGARDING REVISED LANGUAGE TO DEFINE PRINCIPAL THREAT WASTE AND OTHER RELATED MATTERS FOR THE EAST BRANCH EARLY ACTION FOR THE NEWTOWN CREEK SITE | 3 | Email | | VAUGHN,STEPHANIE (US ENVIRONMENTAL PROTECTION AGENCY) |
| 707470 | 03/19/2024 | US EPA RESPONSE TO THE NEWTOWN CREEK COMMUNITY ADVISORY GROUP REQUESTED CLARIFICATION ON THE BOUNDARIES OF UPLAND PROPERTIES FOR THE NEWTOWN CREEK SITE | 2 | Letter | | (US ENVIRONMENTAL PROTECTION AGENCY)\|LESHAK,ANDREA (US ENVIRONMENTAL PROTECTION AGENCY) |
| 647002 | 04/09/2024 | CSTAG RECOMMENDATIONS FOR MILESTONE 4 ON PROPOSED EARLY ACTION EAST BRANCH NEWTOWN CREEK FOR THE NEWTOWN CREEK SITE | 7 | Memorandum | | KETU,RUPIKA (US ENVIRONMENTAL PROTECTION AGENCY)\|KWAN,CAROLINE (US ENVIRONMENTAL PROTECTION AGENCY)\|Schmidt,Mark (US ENVIRONMENTAL PROTECTION AGENCY) |

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| 707577 | 05/02/2024 | INTERIM ESTIMATES OF POST-REMEDY SURFACE SEDIMENT CONCENTRATIONS FOR THE NEWTOWN CREEK SITE | 172 | Report | | (ANCHOR QEA) |
| 707552 | 05/07/2024 | DRAFT REMEDIAL INVESTIGATION/FEASIBILITY STUDY ALTERNATIVES MEMORANDUM FOR THE NEWTOWN CREEK SITE | 259 | Memorandum | | (ANCHOR QEA) |
| 707460 | 05/24/2024 | US EPA RESPONSES TO THE CSTAG RECOMMENDATIONS ON PROPOSED EARLY ACTION MILESTONE 4 FOR OU4 FOR THE NEWTOWN CREEK SITE | 13 | Memorandum | GUSTAVSON,KARL (US ENVIRONMENTAL PROTECTION AGENCY) | CARPENTER,ANGELA (US ENVIRONMENTAL PROTECTION AGENCY) |
| 707561 | 06/05/2024 | PROBABILISTIC MODEL CALCULATION OF CURRENT AND POST-REMEDY SURFACE SEDIMENT CONCENTRATIONS FOR THE NEWTOWN CREEK SITE | 50 | Report | (US ENVIRONMENTAL PROTECTION AGENCY) | (CDM SMITH) |
| 719256 | 06/28/2024 | NYSDEC CONCURRENCE ON THE PROPOSED EAST BRANCH EARLY ACTION REMEDIAL PLAN FOR OU4 FOR THE NEWTOWN CREEK SITE | 2 | Letter | EVANGELISTA,PAT (US ENVIRONMENTAL PROTECTION AGENCY) | GUGLIELMI,ANDREW (NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION) |

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|---|---|---|---|---|---|---|
| 707558 | 08/21/2024 | DRAFT FINAL EAST BRANCH EARLY ACTION FOCUSED FEASIBILITY STUDY FOR OU4 FOR THE NEWTOWN CREEK SITE | 983 | Report | | (ANCHOR QEA) |
| 744520 | 08/21/2024 | PROPOSED PLAN FOR OU4 - EAST BRANCH EARLY ACTION FOR THE NEWTOWN CREEK SITE | 36 | Publication | | (US ENVIRONMENTAL PROTECTION AGENCY) |
| 735823 | 06/13/2024 | COMPREHENSIVE UPLAND SITE CHARACTERIZATION REPORT FOR THE NEWTOWN CREEK SITE | 244 | Report | (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION) | (HRP ASSOCIATES, INCORPORATED) |
| 735824 | 06/13/2024 | COMPREHENSIVE UPLAND SITE CHARACTERIZATION REPORT - APPENDIX A FOR THE NEWTOWN CREEK SITE | 530 | Report | (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION) | (HRP ASSOCIATES, INCORPORATED) |
| 735825 | 06/13/2024 | COMPREHENSIVE UPLAND SITE CHARACTERIZATION REPORT - APPENDIX B FOR THE NEWTOWN CREEK SITE | 1270 | Report | (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION) | (HRP ASSOCIATES, INCORPORATED) |
| 735826 | 06/13/2024 | COMPREHENSIVE UPLAND SITE CHARACTERIZATION REPORT - APPENDIX C - E FOR THE NEWTOWN CREEK SITE | 347 | Report | (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION) | (HRP ASSOCIATES, INCORPORATED) |

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|---|---|---|---|---|---|---|
| 735827 | 06/13/2024 | COMPREHENSIVE UPLAND SITE CHARACTERIZATION REPORT - APPENDIX F PART 1 OF 3 FOR THE NEWTOWN CREEK SITE | 36438 | Report | (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION) | (HRP ASSOCIATES, INCORPORATED) |
| 735828 | 06/13/2024 | COMPREHENSIVE UPLAND SITE CHARACTERIZATION REPORT - APPENDIX F PART 2 OF 3 FOR THE NEWTOWN CREEK SITE | 11646 | Report | (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION) | (HRP ASSOCIATES, INCORPORATED) |
| 735829 | 06/13/2024 | COMPREHENSIVE UPLAND SITE CHARACTERIZATION REPORT - APPENDIX F PART 3 OF 3 FOR THE NEWTOWN CREEK SITE | 16689 | Report | (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION) | (HRP ASSOCIATES, INCORPORATED) |
| 735830 | 06/13/2024 | COMPREHENSIVE UPLAND SITE CHARACTERIZATION REPORT - APPENDIX G - H FOR THE NEWTOWN CREEK SITE | 1428 | Report | (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION) | (HRP ASSOCIATES, INCORPORATED) |
| 736269 | 12/19/2024 | CLIMATE ASSESSMENT ON THE INTERIM EARLY ACTION REMEDY FOR OU4 FOR THE NEWTOWN CREEK SITE | 5 | Memorandum | | (US ENVIRONMENTAL PROTECTION AGENCY) |

# APPENDIX IV

## STATE LETTER OF CONCURRENCE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Office of the Director
625 Broadway, 12th Floor, Albany, New York 12233-7011
P: (518) 402-9706 I F: (518) 402-9722
www.dec.ny.gov

**Transmitted via Email**

December 20, 2024

Pat Evangelista - Director
Superfund and Emergency Response Division
U.S. Environmental Protection Agency
290 Broadway, 19th Floor
New York, NY 10007-1866

Re: Newtown Creek Superfund Site
Operable Unit 4, Kings County and Queens County
NYSDEC. Site No. 241117

Dear Pat Evangelista:

The New York State Department of Environmental Conservation (NYSDEC) and Department of Health (NYSDOH) have reviewed the United States Environmental Protection Agency's December 2024, draft Superfund Record of Decision for the Newtown Creek Operable Unit 4 (OU4), Kings County and Queens County, New York. Based on that review, NYSDEC understands that the selected remedy is an interim action to address contamination in the East Branch tributary of Newtown Creek while the Remedial Investigation/Feasibility Study for Operable Unit 1 is ongoing.

Based on information currently available, NYSDEC agrees that the selected Alternative EB-D of this Superfund Record of Decision meets the threshold criteria and is protective of human health and the environment. Therefore, NYSDEC concurs with EPA's selected alternative.

Sincerely,

Andrew Guglielmi

Andrew O. Guglielmi, Director
Division of Environmental Remediation

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Wendy Kuehner (NYSDOH), Wendy.Kuehner@health.ny.gov
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Caroline Kwan (USEPA), Kwan.Caroline@epa.gov
Stephanie Vaughn (USEPA), Vaughn.Stephanie@epa.gov
Rupika Ketu (USEPA), Ketu.Rupika@epa.gov
John Brennan (USEPA), Brennan.John.F@epa.gov

# APPENDIX V

## RESPONSIVENESS SUMMARY

# APPENDIX V

## RESPONSIVENESS SUMMARY

### INTRODUCTION

This Responsiveness Summary provides a summary of the public's comments and concerns regarding the Proposed Plan for Operable Unit 4 (OU4) of the Newtown Creek Superfund site (Site), and the U.S. Environmental Protection Agency's (EPA's) responses to those comments. All comments summarized in this document have been considered in EPA's decision for the selection of a remedy for OU4 at the site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

This Responsiveness Summary is divided into the following sections:

I. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS
This section provides the history of community involvement and interests regarding the site.

II. COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS, AND RESPONSES
This section contains summaries of written and verbal comments received by EPA at the public meeting and during the public comment period, and it contains EPA's responses to these comments.

The last section of this Responsiveness Summary includes attachments which document public participation in the remedy selection process for this site. They are as follows:

**Attachment A** contains the Proposed Plan that was distributed to the public for review and comment;

**Attachment B** contains the public notice that was published in the Brooklyn Daily Eagle on August 28, 2024; in El Diario on September 6, 2024; and in Nowy Dziennik on September 14, 2024. It also includes the first notice of extension published in El Diaro on September 13, 2024, and in the Brooklyn Daily Eagle on September 16, 2024. Finally, it includes the second notice of extension published in the Brooklyn Daily Eagle on October 21, 2024. The notices were published in English, as well as in Spanish and Polish for the non-English speaking communities within and surrounding the Newtown Creek Superfund Site.

**Attachment C** contains the public comments received during the public comment period; and

**Attachment D** contains the transcript of the public meeting held on September 18, 2024, at a venue called the Chatroom at Elsewhere, located at 599 Johnson Avenue, Brooklyn, New York.

## I. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

Public interest in the Site has been high since the Site was listed on the National Priorities List in 2010. EPA has strongly encouraged and received public input since the listing of the Site. EPA published a Community Involvement Plan in 2017. The Community Involvement Plan outlines specific outreach tools to facilitate transparent and accessible communication with the community in the decision-making process and to solicit public input on site activities.

In 2024, EPA provided Technical Assistance Services for Communities (TASC) support to the Newtown Creek Community Advisory Group (CAG) for technical support to review technical reports and materials related to the interim, early action for the East Branch. EPA also provides the support of a neutral facilitator to the CAG. The neutral facilitator assists in planning and conducting meetings.

The CAG holds its meetings in the surrounding community and serves in a technical review and advocacy capacity on behalf of the community. The CAG membership includes representatives from local businesses, environmental organizations, community residents, and other interested parties from Brooklyn and Queens. The CAG regularly conducts outreach in the community to encourage public participation in Site-related activities and engages social-media outlets to ensure project information is broadcast widely. In addition, the CAG maintains a webpage and an email list to disseminate project-related information, including the dates of upcoming meetings and site
updates

## II. COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS AND RESPONSES

A hybrid public meeting to discuss the Proposed Plan was held on September 18, 2024. Comments and/or questions were received at the public meeting, in addition to eighteen written letters (via email) and five comments via email. Written letters or emails were received from the CAG, the Long Island City Partnership, the City of New York Community Board No.1, the Brooklyn Chamber of Commerce, the North Brooklyn Chamber, the Office of the Brooklyn Borough President, the City of New York, several elected officials, various private parties, including some that have been named by EPA as Potentially Responsible Parties (PRPs), the Newtown Creek Group, local business owners, and several community members. Copies of the comment letters and emails are provided in Attachment A, and a copy of the public meeting transcript is provided in Attachment D. A summary of the significant comments provided at the public meeting and in writing, as well as EPA's responses to those comments, are provided below.

Note that New York State Department of Environmental Conservation (NYSDEC), the National Oceanic and Atmospheric Association and the U.S. Fish and Wildlife Service did not submit written comments during the public comment period. These organizations have been engaged with EPA throughout the development of the RI/FS for OU1 and OU4 of the Newtown Creek Site, and NYSDEC did review a draft of the Proposed Plan, as our sister agency, so their input is incorporated into this Record of Decision.

The sign-in sheets indicate that approximately 160 (60 in-person and 100 virtually) people attended the hybrid public meeting on September 18, 2024. The meetings' attendees included residents, Community Advisory Group members, local business representatives, interested community members, journalists, elected officials, and representatives from NYSDEC and the New York State Department of Health.

## Part 1: Verbal Comments

*EPA received a number of verbal comments from community members, elected officials and other interested parties during the public meeting held on September 18, 2024. The comments are provided below, generally in order received, along with EPA's responses.*

**Comment 1**: The co-chair of the Newtown Creek CAG affiliated with the Newtown Creek Alliance noted that only one public meeting was being held and that the responsiveness summary would not be provided for review before issuance of the ROD. As such, the commenter stressed the importance of asking questions during this meeting, including if they may inform development of written comments that an attendee may want to submit.

> **EPA Response 1**: EPA indicated that this statement was correct.

**Comment 2:** The same commenter noted disappointment that the presentation did not include more detailed information.

> **EPA Response 2:** EPA stated that the presentation was developed in consideration of all attendees at the meeting, including those that may be completely unfamiliar with the Site. As such, the Site team purposely kept the presentation relatively high level but is happy to drill down into the details of any questions people may have.

**Comment 3:** The same commenter asked a series of questions related to the preferred alternative.

> **EPA Response 3:** EPA responded that, in general, the details provided in the Proposed Plan, including in the figures, are preliminary. The details will be refined during the remedial design (RD) process, after conduct of the pre-design investigation (PDI). These are all important questions that will be addressed during the design of the remedy.

**Comment 4:** The commenter asked about the rationale for choosing a 3-foot dredge depth.

> **EPA Response 4:** While not stated at the meeting, the dredge depth proposed with the preferred alternative ranges from 36 inches to 53 inches, not including areas where deeper dredging would be performed based on the four considerations outlined in the Proposed Plan. These depths are based on the thickness of the cap proposed in different areas of the East Branch since the dredging would be performed to allow installation of a cap while maintaining the pre-construction mudline elevations. EPA stated at the meeting

that the thickness of the cap will range from an estimated 2.5 to 4.5 feet to account for the different dredge depths.

To expand upon what was stated at the meeting, three feet of dredging allows for placement of a sufficiently robust armored and amended cap designed to prevent exposure to remaining contamination beneath the cap without changing the elevation of the sediment bed. In addition, and to clarify, the current assumption is that the dredging depth will be 3 feet in deeper water areas and 53 inches (nearly 4.5 feet) in shallower areas. These depths will be refined during the design of the remedy, but the current estimate is that dredging depth will actually be greater than 3 feet on average. In addition, Alternative EB-D includes the option for even deeper dredging based on 4 conditions: potential for NAPL migration from the deeper soft and/or native material; potential for exposure to Principal Threat Waste (PTW); depth to uncontaminated material; and comparatively higher COC concentrations in remaining sediment. The need for deeper dredging due to these conditions will be determined during the design of the remedy, but overall these criteria will further increase the overall average depth of dredging.

To further expand upon what was said at the meeting, the thickness of the cap will be designed to be protective of both upward migration of contamination and erosive forces from the surface. In areas with deeper water, an armoring layer may not be needed to protect the cap; therefore, a shallower dredge depth is tentatively planned to accommodate the cap while maintaining pre-construction mudline elevations. In shallower areas where it would be necessary to protect the cap from advective forces such as boat propeller wash and combined sewer overflow discharges, an armor layer would be required to protect the cap. Therefore, in these areas a cap thickness of 53 inches is estimated. All that said, the cap thicknesses shown in the Proposed Plan are not final, and the exact thickness, and composition, of the cap will be refined during the RD based on data collected during the PDI, additional modeling runs, and additional engineering considerations.

**Comment 5:** The commenter asked for a better explanation of how the areas of deeper dredging, shown as the brown areas in the figure included in the presentation, were determined (note: see Figure 9 of the Proposed Plan).

**EPA Response 5:** EPA stated that the brown areas shown on Figure 9 are related to only one of the four criteria that will be used to determine if deeper dredging is needed. Specifically, the brown areas shown display where the remaining depth to native material is small and, therefore, deeper dredging would be conducted. The need for deeper dredging related to the other three criteria -- relatively higher concentrations of chemicals of concern (COCs) in remaining sediment, potential for exposure to PTW, and potential for upward migration of NAPL -- is not shown on the figure. These areas will be determined during the design of the remedy. To supplement what was said at the meeting, these areas are not shown on the figure because additional data is needed to determine where these criteria are met. This additional data will be obtained during the PDI. In addition, note that the Proposed Plan referred to the depth to native material but the ROD refers to the depth to uncontaminated material for this condition, where uncontaminated material is defined as material with COC concentrations below remediation goals (RGs). Regardless, the idea is that if only a thin lens of contamination remains, on the order of approximately 5 feet or less, then additional dredging may be conducted to remove it.

**Comment 6:** A commenter and a representative from Congresswoman Velazquez' office asked whether EPA is considering changing the current bathymetry of the creek to a more natural bathymetry which would be shallower at the heads of the tributary and deeper towards the tributary's confluence with the main channel.

**EPA Response 6**: EPA stated that potential changes to the bathymetry can be taken into account during the design of the remedy and it may make sense to consider a slightly varied bathymetry in some areas. The concern is that if we were to adjust the bathymetry significantly, this could affect surface water flow rates and contaminant fate and transport, and could have a ripple effect throughout the system. Therefore, changes to the bathymetry could not be made without significant evaluation. To expand upon what was said at the meeting, significant changes to the bathymetry of the East Branch could have significant impacts on the site conceptual site model (CSM). While these types of changes can be considered during the design of the remedy, they would require significant evaluation and consideration if they were to be implemented.

**Comment 7:** A member of the public, who is also an active member of the CAG, thanked EPA for holding the public meeting and clarified for participants that may not be as familiar with the site that the focus of the Proposed Plan is related to Superfund-related contamination, not bacterial contamination.

**EPA Response:** Comment noted. While not stated at the meeting, the commenter is correct in that the Proposed Plan to address the East Branch is related to Superfund hazardous substances only. Other types of contamination that is present in Newtown Creek, including that related to bacteria and pathogens, is regulated under the Clean Water Act.

**Comment 8**: A member of the public, who is also an active member of the CAG, asked EPA to define NAPL, and noted that the constituents of NAPL can cause cancer in humans over time.

**EPA Response 8**: EPA stated that NAPL is, very generally, an oily substance that does not readily mix with water and that may or may not be an indicator of site-related contamination. NAPL can be made up of various constituents, including the contaminants of concern for the site. At this site, NAPL has been found to contain PAHs, petroleum hydrocarbons, and/or PCBs, at different locations and at varying concentrations.

**Comment 9**: A member of the public asked how long EPA will monitor the cleanup after it is implemented and how the public will remain informed of the findings, including how EPA is addressing any problems found.

**EPA Response 9**: EPA stated that after implementation of a remedy is complete, EPA prepares a remedial action report which basically summarizes what the cleanup consisted of, the results at the end, and how the remedy will be monitored moving forward to ensure that it continues to function effectively and remains protective [of human health and the environment]. In this case in particular, that includes making sure it is not adversely impacted by ongoing sources. Because residual contamination will remain in the creek below the capped areas, post-remedy implementation monitoring will be conducted in perpetuity. To expand upon what was said at the meeting, the post-remedy implementation monitoring program will be initially developed as part of the design of the remedy and will be refined over time, as needed. EPA will issue monitoring reports presenting data and findings from the post-remedy implementation monitoring. The frequency of these reports will be determined during the RD, but they will be shared with the public. In addition, because this remedy will result in hazardous substances remaining on-site above health-based levels that allow for unlimited use and unrestricted exposure, a review of the remedial action pursuant to CERCLA Section121(c), 42 U.S.C. §9621(c) will be conducted five years after the commencement of the remedial action to ensure that the remedy continues to provide adequate protection to human health and the environment. EPA notifies the community at the commencement of the five-year review process and makes the reports publicly available once they are completed. In addition, the post-remedy implementation monitoring plan for this action will have a dual purpose. The first is to assess the performance of the remedy itself within the East Branch portion of the OU1 Study Area. The second is to assess the impact on the protectiveness of the remedy from ongoing sources over time, as is described further in the ROD.

**Comment 10**: A member of the public and founder of the 501c 185668232, Inc. expressed that he was attending the meeting with his fellow board members and commented that they were told to put in a bid as a lease holder for this area. They also expressed they wanted to allow for access to cleanup for charity purposes and allow for this cleanup to be an accountability report back and forth. He also mentioned he would be sending his official bid along with his CGIs. He expressed they are looking to build their communication center compound, Humanities Hotel and their arts trailer park. He did not have any questions related to the cleanup itself.

**EPA Response 10**: EPA thanked the members for attending the meeting.

**Comment 11**: A member of the public expressed concern regarding ongoing sources and the lack of NAPL seeps being included on the conceptual site model. They referenced a study of NAPL seeps performed in 2016/2017 by the Louis Berger Group, a contractor that has worked for EPA and other government agencies, which they said indicates that the NAPL could be coal tar, petroleum oil, jet fuel, gasoline, or creosote and identified pools of NAPL in the East Branch. They discussed an instance of cap recontamination during construction at another Superfund site in New York City due to ongoing contaminant loading from a seep that had not been identified prior to cap construction. They noted that EPA is proposing a systematic investigation of seeps as part of the PDI but questioned the sincerity and commitment of EPA's intention. The member of the public indicated that they felt that EPA has dismissed the study by Louis Berger Group and that since NAPL seeps are an ongoing concern, that EPA's lack of investigating this issue could lead to an unsuccessful remediation. The commenter noted that opportunistic seep sampling does not provide a comprehensive evaluation of the issue.

**EPA Response 11**: EPA pointed out that the CSM for the East Branch does include seeps as an input and NAPL as being present in subsurface sediment. EPA has collected additional seep samples during the lateral groundwater study that was recently completed, and that data will be available to help inform the design of the remedy, as will the data from the robust PDI that will be conducted as part of the design of the remedy. EPA went on to point out that the NYC studies that were mentioned by the commenter are included in the Administrative Record for this action and are being considered as part of the evaluation process. EPA also pointed out that sealed bulkheads are a common element of all active alternatives that were considered; these would provide a preliminary measure to prevent seeps from entering the East Branch, where determined to be necessary, while additional cleanup actions are evaluated and considered in the adjacent upland property and/or source. As such, the remedy actively addresses seeps.

To expand upon what was said at the meeting, the CSM shows NAPL in the sub-surface which may dissolve into porewater and then flow up to the surface through porewater. The CSM also shows that NAPL may reach the surface sediment and be transported throughout the Study Area through ebullition-facilitated transport. The CSM also shows that there are many ongoing sources of contamination to the East Branch, including but not limited to, seeps. All of these sources and fate and transport mechanisms will be evaluated as part of the design of the remedy for the East Branch and will continue to be evaluated on an ongoing basis as part of the post-remedy implementation monitoring plan. The post-remedy implementation monitoring program that will be developed as part of this action is an integral part of the remedy. It will provide the basis for being able to assess (1) the performance of the remedy itself within the East Branch portion of the OU1 Study Area and (2) the impact on the protectiveness of the remedy from ongoing sources over time. The remedy also provides direction on how any impacts to the protectiveness of the remedy that may be discovered will be addressed (through state and/or federal enforcement authorities). This monitoring program has been uniquely developed for this action and sets this decision apart from other complex sediment sites, including the other sediment site in NYC that was referenced.

**Comment 12**: A member of the public asked EPA to clarify what a seep is.

**EPA Response 12**: Seeps are inputs to a water body from the surrounding uplands. They can contain NAPL, contaminants and/or other substances.

**Comment 13**: A member of the public, who is executive director of Evergreen, a local development corporation that helps businesses in industrial and north Brooklyn grow in an effort to keep working class jobs in the community, and also identified herself as a long time member of the CAG, asked EPA to discuss how the East Branch early action will inform the cleanup of the remaining pieces of the Creek, specifically asking about the early action timeline relative to overall site cleanup timeline.

**EPA Response 13**: EPA stated that the East Branch cleanup is being conducted in parallel with continued development of the Feasibility Study that is currently underway for the rest of the Creek. In addition, the lessons learned from the RD and/or implementation of the East Branch remedy will help inform remedial actions in the remainder of the Creek The approach to be used, including additional details regarding timelines, will be further memorialized in the Adaptive Site Management Plan that EPA is currently developing for the site.

**Comment 14**: The same community member asked if what is selected for the East Branch portion of the OU1 Study Area will be the same as what is selected for the rest of the Study Area, and whether there will be flexibility over time in how the cleanup of the Creek is implemented as we learn more.

**EPA Response 14**: EPA stated that the same process that we are going through now, of developing a feasibility study, presenting a Proposed Plan for public comment, and then selecting a remedy after review of all comments received, will be followed for all subsequent cleanup decisions for the site. The remedy selected for other portions of the creek will be developed based on consideration of the particular portion being evaluated. In addition, EPA has the flexibility to adapt both this current, and future, cleanup plans to address the contamination more efficiently and/or effectively as we learn more through design and implementation of this remedy. To expand upon what was said at the meeting, EPA is developing a formal Adaptive Site Management Plan which will help coordinate and guide the ongoing cleanup efforts at the Site.

**Comment 15**: A member of the public pointed out that sealing bulkheads is a temporary measure to address seeps. They asked what the permanent remedial solution is for addressing seeps.

**EPA Response 15**: EPA stated that a permanent measure to address seeps will be determined on a case-by-case basis. To expand on what was said at the meeting, if a seep is found during the PDI, during implementation of the remedy, or during the post-remedy implementation monitoring program, the seep will be further investigated and EPA will determine whether it should be addressed through federal and/or state authority.

**Comment 16**: A member of the public expressed concern regarding the slow progress of voluntary actions or NYSDEC-led cleanups and asked how long the sealed bulkheads would be expected to last until the upland sources were addressed. They also asked how EPA would decide whether additional work is needed at an upland site, especially given the fact that there are many that are already under the purview of a NYSDEC program (such as Brownfields). Overall, the commenter also noted that she thinks the threat of ongoing contamination to the Creek from the failure to act on upland properties requiring cleanup is a threat to the remedy.

**EPA Response 16**: EPA stated that addressing seeps would have to be determined on a case-by-case basis. The current intent is that the state would be primarily responsible for upland contamination that needs to be addressed in order for the remedy to remain protective and that EPA, through Superfund, would be responsible for putting preliminary measures, such as sealed bulkheads, in place until upland cleanup actions are implemented by the State. EPA understands the concern regarding the pace of cleanup actions and, if a situation is found where a preliminary measure is not sufficient to address an ongoing source while waiting for action through the State, then EPA would work more closely with the State to help facilitate work.

**Comment 17**: A member of the public asked EPA to clarify the basis for the average 3-foot dredge depth, calling attention to the fact that a previous data presentation given by the Newtown Creek Group showed that a majority of the sediment contamination is below 3 feet of sediment.

**EPA Response 17**: EPA clarified that the dredging depth was selected based on factors such as risk and contaminant concentrations identified during the RI/FS, but that it is a preliminary estimate. The dredge depths will be refined based on data collected during the PDI during the RD. See EPA Response 4 for additional detail related to this question.

**Comment 18**: A member of the public asked EPA to provide more information regarding dredged material management since dredging can result in resuspension of contaminated sediment.

**EPA Response 18**: EPA stated that as part of the remedial action there will be a site-wide monitoring plan, which will include at a minimum, community air monitoring, dust control, noise control, and baseline conditions monitoring. In addition, during the active dredging process, EPA will conduct what is called residual sampling, or monitoring, to ensure the amount of contamination being released to other parts of the Creek is minimized. The residual monitoring can include sampling of water and sediment upstream and downstream of the active work area to ensure the work is being conducted in a safe and efficient manner.

**Comment 19**: A member of the public asked whether EPA has considered bioremediation alternative that would be less destructive to the environment. The same speaker also asked if we could use bioremediation as a first step, prior to dredging, to help reduce the toxicity of the sediment, and noted that it could be used to address the sludge layers containing petroleum and hydrocarbons. Another participant asked if EPA had ever used bioremediation at a Superfund site.

**EPA Response 19**: EPA explained that when a feasibility study is conducted for a site, various technology options are screened to determine which would be effective methods for cleaning up the site. For this action, bioremediation was screened out of further consideration during this process because it would not be able to effectively address all contaminants that are present in the East Branch. However, there may be ways of managing the dredged sediment in a more environmentally friendly way and beneficially reusing some of them so that they are not all simply disposed of at a landfill. These options will be evaluated during the design of the remedy. Bioremediation has been used successfully at other Superfund sites, where the conditions are appropriate for its use, but here it would not be effective as either a final or a pre-treatment step.

To expand upon what was said at the meeting, Table 4-1 of the FFS states: As noted in Renholds 1998, a "disadvantage of [in situ] biological and chemical treatment is that it only is applicable to organic contaminants. If metals contamination is present, the only in situ treatment options available are stabilization or solidification." USEPA 1993 further notes: "Because of variances in sediment type and contaminant distribution, it is difficult to ensure uniform dosages of treatment chemicals or to measure treatment efficiency. This can result in different levels of treatment for different areas of the sediment. Another limitation … is the impact the [in-situ treatment] process has on the water column. Ideally, a remediation method will not result in the release of contaminants to the water column. However, the mixing of treatment chemicals or microorganisms may result in the resuspension of sediments or contaminants." [Note that a written comment was submitted on this topic; further response can be found in EPA Response 104.]

**Comment 20**: A member of the public asked what habitat layer materials would be used to help kickstart habitat restoration and allow the ecosystem to re-establish post-remediation.

**EPA Response 20**: This question was inadvertently not addressed at the meeting. To respond now, the cap for the remedy will be designed to include a habitat layer. The purpose of the habitat layer is to allow reestablishment of biota in the creek so that it is eventually restored to its natural conditions. The details of this habitat layer will be determined during the design of the remedy.

**Comment 21**: A member of the public asked whether the dredging would affect the 8.3-acre property adjoining the East Branch cleanup area, including the bulkhead on the property, the environmental conditions of the property and the businesses activities on the property.

**EPA Response 21**: EPA stated that any properties along the Creek or the East Branch may be temporarily impacted by the remedial work. That said, the remedial work will be conducted in a safe manner and shoreline stabilization will be implemented as needed to ensure the bulkheads and shorelines remain intact and in good condition. To expand upon what was said at the meeting, depending on the location, it may be necessary to replace and/or repair existing bulkheads, or install new bulkheads, adjacent to the areas to be dredged. EPA will work with all relevant parties, including the parties implementing the remedy, the adjacent property owner (and tenant, if appropriate) and NYSDEC to address any measures to assure the stability of the adjacent shoreline during and after the remedial work is conducted. In addition, health and safety plans will be developed to ensure people living and/or working adjacent to the work areas are not negatively impacted by the contamination or the work activities.

**Comment 22**: A member of the public asked EPA to discuss the process of capping, whether cap removal is possible if the cap fails, what the cost of cap removal would be, and whether that cost is considered in the cost estimate provided.

**EPA Response 22**: EPA stated that caps can consist of multiple layers, including deposition, habitat, erosion protection, filter, chemical isolation, and stabilization layers. Though the FFS presented a capping evaluation, the exact details of the cap will be determined during the RD. In addition, as part of the post-remedy implementation monitoring plan, the cap itself will be monitored to ensure it (1) remains protective and (2) is performing as designed. The monitoring will look for top-down impacts to determine if any ongoing sources such as those from seeps, discharges and overland flow are impacting the protectiveness of the cap over time. The monitoring will also look for bottom-up impacts, which will be used to confirm that the cap is preventing any contamination remaining beneath it from rising to the surface. Any problems identified in the cap will be addressed, and regular maintenance of the cap is factored into the cost of the remedy. As has been also mentioned, the East Branch decision is an interim remedy. In the very unlikely scenario that it is determined that capping is not an effective piece of the remedy for the East Branch portion of the OU1 Study Area, there will be one or more decision documents in the future for the Site, through which adjustments to the remedy can be made, including removal of the cap, though we think this would be very highly unlikely.

**Comment 23**: A member of the public and member of Blissville's Civic Association asked how dredged material will be removed from the site and if it is removed by trucks, how the neighborhoods around Newtown Creek would be impacted.

**EPA Response 23**: EPA stated the tentative plan is that dredged material will be transported from the site using barges. To expand on that, a full dredged materials management plan will be developed as part of the RD to safely handle contaminated sediment and minimize impacts to surrounding neighborhoods. The exact details are not known at this time, but regardless of the transportation options used, including any possible need to use the roadways in addition to on-water transport, the health and safety of the surrounding community is a key concern and EPA will keep the community updated as these plans are developed.

**Comment 24**: A member of the public asked EPA to share solutions used in the past for dealing with offsite dredge material disposal, indicating that the discussion regarding disposal has been vague.

**EPA Response 24**: EPA expressed that dredged material management varies from site to site. But as an example, at another site in Region 2 EPA conducted the dredging on water and placed the dredged material onto barges for transport via water to an existing upland sediment processing facility. At this facility, the sediment was sent through filter presses to extract the water, which was then pumped into tanker trucks for disposal at a certified facility, and then the dried sediment was brought to a separate certified disposal facility. The dredged material management plan for this action will be finalized during the RD.

**Comment 25**: A member of the public asked where water generated from dredged material dewatering goes.

**EPA Response 25**: EPA stated that waste, including water extracted from sediment, is disposed of at an EPA-approved off-site disposal facility. A facility will be selected shortly before the remedial work is implemented.

**Comment 26**: A member of the public asked whether the community will be able to comment on the pre-design investigation since it seems so important for determining where deeper dredging will be performed as part of the proposed remedy. The member also asked how much more data EPA is planning to collect, noting that there are data gaps in the data presented in the FFS.

> **EPA Response 26**: EPA stated that the community would stay informed during the PDI and EPA would welcome the community's input. It is critical that the community provide input into decisions made during the design of the remedy, including transportation paths and impacts to upland properties. At this time EPA is not able to definitively say how much more data will be collected, but the overall goal of the PDI is to fill in data gaps that exist in the East Branch. The exact number of samples to be collected and their locations will be determined during the PDI.

**Comment 27**: A member of the public asked how the cleanup will inform and affect the health impacts of the community around the cleanup area. They indicated that they live close to the creek, and their family is dealing with multiple environmentally related health conditions. They stressed the need for the cleanup to prioritize community health. They also asked when the last time was that the laws and standards that govern the remedial action were updated. They are worried that the regulations are out of date and therefore are not protective of current exposure to the public. They pointed to the fact that the wastewater treatment plant was only recently begun to operate in accordance with the 1972 Clean Water Act. They are concerned that the regulations informing the process are out of date.

> **EPA Response 27**: EPA stated that as part of this early action, EPA will be removing highly contaminated sediment bank to bank down to at least three feet across the East Branch, which will help reduce the impacts to the health of the surrounding community. This remedial action will also help reduce ecological exposures to the site contamination because the area that the benthic invertebrates, the fish, and the birds feed in will be remediated. The rest of the Creek will be addressed in the future as well. Regarding the laws and regulations portion of the comment, EPA regularly updates the methodologies and technologies used for evaluating contaminants, contaminant toxicity, and their health impacts in both humans and ecological receptors. While the Superfund law has not been updated since the 1980s, EPA's mission to protect human health and the environment is unchanged. EPA will use the current state of science to conduct its analyses and make determinations related to protectiveness of the remedy. To expand upon what was said at the meeting, a Community Health and Safety Plan will also be developed to ensure that the community is not adversely impacted by the cleanup activities.

**Comment 28**: A member of the public raised concerns regarding EPA's determination of the depth of the biologically active zone. EPA has defined the biologically active zone (BAZ) for the site to only include the top six inches. NYSDEC has noted that the zero to 6-inch interval fails to provide adequate ecological protection in Newtown Creek. To appropriately characterize ecological exposure and evaluate long-term effectiveness of remedial technologies, DEC recommends 2 feet or 60 centimeters as the zone of surface sediment used to evaluate remedial alternatives. Plant roots grow to depths of more than 6 inches, so the biologically active/available zone is much deeper than just 6 inches. This is the crux of how the success of the remediation will be measured in the future. I am concerned that the 6-inch depth for the BAZ is going to result in underestimation of the amount of contamination in the sediments, especially since you're expecting a net deposition from the East River over time. Why has the EPA limited the definition of the BAZ to just the top six inches?

> **EPA Response 28**: EPA provided an answer at the meeting that explained the BAZ is defined as the area of sediment where the majority of the benthic organisms spend the greatest amount of time. To expand upon what was said at the meeting, the BAZ was identified as 0-6 inches for this waterbody based on EPA's guidance and site-specific information. However, the risk-based sediment cleanup goals, which are based on the more sensitive of human or ecological exposure for each COC, are being applied to depths below the BAZ depth. The selected remedy includes dredging of at least three feet of sediments, so there will be a much deeper zone that will have clean material that will reduce exposure to human and ecological receptors. The post-remedy implementation monitoring plan will be developed as part of the RD and will be refined on an ongoing basis as conditions warrant. It will be designed to ensure that the remedy remains protective for all receptors.

**Comment 29**: A member of the public asked if EPA has already identified the bulkheads that will need to be newly installed and/or repaired as part of its efforts to prevent ongoing seeps, and if so, how EPA identified these locations. They also asked what agreements will be made with the upland owners to prevent damage to the upland owners' property. The individual also asked whether the current investigations are funded by the Newtown Creek Group or by EPA.

> **EPA Response 29**: EPA indicated that determining whether a bulkhead needs to be repaired, replaced or put in place will be a component of the PDI. To expand upon what was said as the meeting, EPA will coordinate with all relevant parties, including the upland property owner(s) and/or tenant(s) and NYSDEC, as needed, to repair, replace or put in place bulkheads. The purposes of bulkheads are twofold: 1) to help prevent ongoing seeps and/or 2) to provide shoreline stability so that upland properties are not adversely impacted during implementation of the remedy and remain stable after implementation is complete. The current RI/FS investigations at the Site are being funded by the Newtown Creek Group with EPA oversight.

**Comment 30**: A member of the public asked what materials are used for the cap, specifically the habitat layer, and what is meant by the term "reactive cap."

> **EPA Response 30**: Generally, the habitat layer is placed to allow reestablishment of biota in the creek so that it is eventually restored to its natural conditions. The purpose of a reactive layer in a cap is to help trap any contamination that may be migrating upwards from underneath the cap. This layer helps isolate the contamination in place. The materials of the cap for this action will be determined during the RD.

**Comment 31**: A member of the public asked whether EPA has any commitments to local hiring, awarding contracts to local businesses, or any kind of local workforce development so that economic benefits from this work can flow to the communities impacted.

**EPA Response 31**: EPA indicated that the agency has job training initiatives and programs geared towards working with local residents to help with the cleanup of a site. During the RD, EPA will work with the community to minimize any negative impacts that may result from the work and consider how this action can have a positive economic outcome for the community.

**Comment 32**: A member of the public indicated that based on the documents they have reviewed, there is a chance that the remedy may not work or will have issues. They asked: What will happen during the post-monitoring program? How often will samples be collected and what will be sampled? How will EPA make sure that the remedy will work so that the community will benefit from the work that was done?

**EPA Response 32**: EPA indicated that this is a very important topic and the details of the post-remedy implementation monitoring program will be refined during the RD. Generally, the program will include a high frequency of sampling so that any potential issues with the cap or contamination from ongoing sources are detected before they become a real problem. The frequency of sampling can be adjusted throughout the program depending on the results, whether the sampling is related to the cap or ongoing sources.

**Comment 33**: A representative from Congresswoman Velazquez' office indicated his appreciation that EPA is taking an early action and his support for previous comments made. He then echoed three of those previous comments. First, he noted that the current depth of the East Branch is somewhat arbitrary and so, therefore, maintaining that depth may not make sense; he wondered if we should look for ways to help it flow as a tributary again. Second, he noted that the figures shown may underestimate where the deeper contaminated areas might be, particularly with respect to NAPL, and thinks the representations used in the figures can be improved. He noted that the CSM had been updated after advocacy by the CAG and he wanted that to be more widely acknowledged. Third, he asked that the schematic representation of Alternative EB-D be updated and better described. For example, it may want to include what slot dredging means and also asked why ISS was not included to be performed in more areas of the East Branch and was only included in the Western Beef slip to, he presumes, seal the bottom of the creek to prevent NAPL and contamination from seeping upwards.

**EPA Response 33**: EPA noted that we have been going through this process on an expedited basis and have based the FFS and development of alternatives on existing data. The area denoted on the schematic for ISS has a higher density of samples because a pilot study was conducted in that area. We suspect that additional areas will be identified to need ISS at the base of dredging once the PDI is complete, and the final figures developed as part of the RD will denote this. While this is assumed, after significant discussion between EPA and the PRP group, we decided not to arbitrarily denote additional areas on the schematic as needing ISS or deeper dredging, whether due to the presence of NAPL or for some other reason. The schematic is based on existing data, which will be substantially increased during the PDI. EPA acknowledges that the schematic is potentially misleading in its current form, but also does not know of a better approach. EPA went on to note that a 3-foot dredge depth is not arbitrary; it is related to the depth needed to place a protective cap without impacting the current bathymetry. The depth of dredging varies between sites, and, for example, there are other sites where only a 1-foot dredge depth is determined to be necessary, and generally between 1 and 3 feet of dredging is conducted at similar sediment sites. EPA noted that all of this will be made clearer in the ROD itself, and that EPA will work with the community during the RD process. In particular, EPA will work to minimize the amount of bulkheading needed and recognizes that many in the community would like to see an increase in the amount of soft shoreline.

**Comment 34**: A member of the public expressed that they need to have a clear picture of hotspots and that they've seen figures previously by Anchor that show contamination below 3 feet. They asked what criteria EPA is going by to determine the 3-foot dredge depth and how that will change according to the criteria that we are applying it to. They asked if we are applying it to human health or something else. They also asked that EPA clarify what is meant by the protectiveness of the remedy.

**EPA Response 34**: EPA clarified that the main difference between Alternative C and Alternative D is that Alternative D has four criteria, or options, for where to perform deeper dredging. One of those criteria is comparatively higher COC concentrations in remaining sediment, which will allow EPA to dredge beyond three feet where there is highly contaminated sediment below three feet. The areas requiring deeper dredging will be defined during the RD. Both EPA and the responsible parties want to design and implement a remedy that is protective in the long term, so it doesn't fail. EPA further clarified that a remedy is protective when the remedial action objectives and cleanup criteria for a site, or in this case a portion of the site, are met. See EPA Response 4 for additional detail related to this question.

**Comment 35**: A member of the public expressed their desire to see more pro-life and probiotic methods be used, including fungi and other different, greener methods. The member of the public also expressed concern that any archeological/cultural resources associated with Native American nations in the surrounding area not be ignored during the cleanup process.

**EPA Response 35**: EPA indicated that bioremediation was not found to be effective for cleaning up the East Branch. A cultural resource survey was conducted during the RI/FS to ensure any sensitive archaeological areas are addressed appropriately.

**Comment 36**: A representative of Councilmember Jennifer Gutierrez asked how the reconstruction of the Grand Street Bridge will interact with the East Branch early action. They asked whether EPA was coordinating their work with New York State or other governmental agencies, whether there are any concerns with construction debris or coordinating the work, and whether the Grand Street Bridge work would affect the remediation and vice versa.

**EPA Response 36**: EPA indicated that the agency regularly meets with the NYCDOT to coordinate on the remedial action and the replacement of the Grand Street Bridge. Both parties provide updates on project timelines and share information to ensure all work will be conducted in a consistent manner. As we get closer to the start of actual construction work (for either project), we will work together to ensure the work is conducted in a safe manner that does not adversely affect the Creek or the surrounding community.

**Comment 37**: A member of the public asked what health studies are being done to understand the immediate effects of the construction (e.g., air quality, direct impacts to human health to the community and workers). They asked whether studies were being done to understand the impact the contaminated materials are having on the community and how the construction would impact the health of the project workers, community members, and surrounding wildlife.

**EPA Response 37**: EPA stated that during the cleanup, health and safety plans will be implemented to ensure the workers, community, and wildlife are protected from Site contaminants and construction hazards. People actually working to cleanup the East Branch will be under their own health and safety plan and will be wearing personal protective equipment appropriate for the job and will also, generally, be provided with medical monitoring. There will also be a Community Health and Safety Plan to ensure that the community is not adversely impacted, and this will include air monitoring. If operations need to be modified because we detect a problem, changes will be made. The health and safety plans will help ensure that workers, the surrounding community and wildlife (to the extent possible) are protected from contamination during construction.

**Comment 38**: A member of the public asked us to define slot dredging, which is shown as a remediation technique on the Alternative EB-D schematic slide.

**EPA Response 38**: EPA explained that slot dredging is a form of dredging that uses a smaller dredge bucket when dredging closer to shorelines or underground utilities. In the middle of the branch, we may use a larger, clamshell bucket to conduct the dredging. Overall, the appropriate equipment will be used where needed to conduct the work safely and efficiently. See EPA Response 74 for more detail on dredging.

**Comment 39**: A member of the public asked what it means when we state that NYSDEC has concurred with the Proposed Plan. The commenter noted that they have played a vital role in this process, have submitted comments throughout and also have a significant role with the upland sites surrounding the branch. He wondered if they would be submitting comments on the Proposed Plan.

**EPA Response 39**: EPA noted that concurrence means that NYSDEC reviewed the draft Proposed Plan, submitted comments to EPA on it, which EPA addressed, and then they sent us a letter stating that they concurred with EPA's Preferred Alternative. They may submit additional comments on the Proposed Plan, and these comments will become part of the public record along with all other comments received. As our sister agency, NYSDEC also reviews the draft ROD prior to its finalization and release. NYSDEC concurred on the ROD as well. Their letter of concurrence is an attachment to the ROD. [Note: NYSDEC did not submit any comments on the Proposed Plan during the comment period.]

## Part 2: Written Comments

*Several elected officials submitted comments on the Proposed Plan. These include Congresswoman Nydia Velazquez, 7th District, New York; Council Members Jennifer Gutierrez and Lincoln Restler; Emily Gallagher, Assemblymember for the 50th District of New York State; and Antonio Reynoso, Brooklyn Borough President. Their letters were similar in that they all generally expressed (i) a concern that the cleanup be conducted properly; (ii) a list of conditions to assure that Alternative EB-D is protective since it is leaving contaminated sediment in place (as opposed to Alternative EB-F); and (iii) the general paucity of detail provided in the Proposed Plan and FFS. Most also expressed appreciation for EPA's efforts to start cleanup of Newtown Creek sooner rather than later, and urged EPA to take action in a thorough and effective manner that does not compromise the long-term protectiveness of the remedy. Their specific comments and questions are provided below.*

**Comment 40**: The elected officials submitted the following list of community priorities and conditions that need to be addressed in order to ensure Alternative EB-D will be protective of human health and the environment. These conditions are:

> **Comment 40a**: A Pre-Design Investigation Plan that is completed by an independent party overseen by EPA and presented to the Community Advisory Group for comments.
>
>> **EPA Response 40a**: A robust PDI will be conducted with oversight by EPA. The PDI is an integral part of the selected remedy. The PDI plan will be reviewed with the community before it is implemented, and the results will be presented and shared with the community after implementation. The results will be formally incorporated into the RD report.
>
> **Comment 40b**: A clear and comprehensive sampling plan that includes different sampling methods and different characterization methods to fully analyze NAPL in seeps and sediments, conducted by an independent contractor hired by the EPA and presented to the Community Advisory Group for comments.
>
>> **EPA Response 40b**: A robust monitoring plan will be developed and conducted with oversight by EPA, and the plan and results will be presented to the community.
>
> **Comment 40c**: A cap design should be reassessed following systematic identification of, and quantitative data collection from, NAPL contamination sources.
>
>> **EPA Response 40c**: The cap design will be developed/refined as part of the RD after completion of the PDI so that it addresses the types of contamination found in different parts of the East Branch. NAPL-related monitoring performed as part of the PDI will be a key component to identifying where capping or other remedial technologies (ISS or deeper dredging) should be implemented to address NAPL.

**Comment 40d**: If any location of NAPL-contaminated sediment is assessed unsuitable for removal, then in-situ stabilization (ISS) should be based upon a comprehensive data set from this location, as per the protocols followed at the Gowanus Canal Superfund site.

**EPA Response 40d**: The use of ISS will be evaluated as part of the design of the remedy developed specifically for the East Branch portion of the Newtown Creek Superfund site. This evaluation will be finalized after completion of the PDI.

**Comment 40e**: A map of Principal Threat Waste sources should be developed in collaboration with work already conducted by the NYSDEC and NYCDEP, such that the effectiveness of any proposed bulkhead can be clarified and presented to the Community Advisory Group for comments.

**EPA Response 40e**: The details of the sources of PTW and their locations will be included in the PDI report and considered in the RD developed for this action. As has been noted, all existing data, as well as new data obtained as part of the PDI, will be considered in developing the RD.

**Comment 40f**: A post remediation restoration plan that sets targets for and identifies potential sites of ecological restoration in the East Branch should be developed.

**EPA Response 40f**: A restoration plan for the entire East Branch will be developed as part of the RD and RA work plans. The plans will be reviewed with the community.

**Comment 41**: The elected officials stated that EPA must fully identify and dredge the contaminated hotspots in the East Branch to ensure a thoroughly protective remedy.

**EPA Response 41**: The selected remedy includes the option for deeper dredging based on four considerations, including if comparatively higher concentrations are present in remaining sediment. The other three conditions for deeper dredging are (i) potential for NAPL migration from the deeper soft and/or native material; (ii) potential for human/ecological exposure to principal threat waste; and (iii) depth to uncontaminated material. Determinations will be made during the RD, after conducting the PDI, on where these conditions apply.

**Comment 42**: The elected officials stated that EPA must fully characterize and identify where contaminated sediment hotspots are located in the East Branch and provide additional details on what criteria would determine when deeper dredging would be required. The EPA should not move forward without knowledge of potential contaminant reservoirs and how the agency will make dredging decisions. The Pre-Design Investigation should detail this information and be provided for public comment.

**EPA Response 42**: A robust PDI is an integral part of the selected remedy and will be conducted with oversight by EPA. The results of the PDI, as well as all existing data, will be used to inform the design of the remedy, and the path forward will be reviewed with the public prior to implementation.

**Comment 43**: The EPA must provide more information on what long-term monitoring will be required to evaluate the protectiveness of the remedy and clarify how the EPA will work with state agencies to ensure contamination from upland sources, CSO discharges, and storm-related impacts are addressed and remediated.

> **EPA Response 43**: The details of the long-term monitoring program will be developed in the RD. As with the PDI, the post-remedy implementation monitoring plan is an integral part of this remedy and will require close coordination with NYSDEC. NYSDEC is aware of this requirement.

**Comment 44**: There is significant concern that ongoing contamination from upland sources, CSO discharges and runoff, and from the rest of the Creek, as well as the potential for erosion of the cap due to increasing storms, will threaten the long-term viability of the remedy. Details on the monitoring program were not included in the Proposed Plan, and more information is needed. Additionally, my constituents need clarity about long-term health risks associated with a remedy as well as the prevention of an outcome comparable to the Hudson River Superfund, where PCBs are still posing local human and ecological health risks. Will the costs of long-term monitoring – and any post-remedy recontamination clean-up be shouldered by responsible parties or taxpayers/municipalities?

> **EPA Response 44**: The long-term, post-remedy implementation monitoring program, the details of which will be developed as part of the RD, will be developed to ensure the implemented remedy remains protective of human health and the environment. It will measure both bottom-up concerns that may be associated with contamination remaining beneath the cap as well as top-down concerns related to ongoing sources of contamination, both from the uplands and from other portions of the Creek. In general, if increasing concentrations in the surface sediment are detected, they will be further investigated to determine the source and then additional actions will be taken, as determined to be appropriate on a case-by-case basis. These additional actions may be taken under Federal authority (through Superfund or possibly another program), through state authority (through one of its programs such as brownfields or state superfund), or through a combination of state and federal authority (if, for example, in-creek measures are needed in the short term while a long-term solution is developed and implemented for the uplands). The broad outline of this post-remedy implementation monitoring program has been further detailed in this ROD than it was in the Proposed Plan (see Overview of Remedy Approach section, and specifically the Monitoring and Evaluation Approach subsection) and it will continue to be refined after completion of the PDI, as well as during and on an ongoing basis after implementation of the remedy, as new data is incorporated into our understanding of what is going on both in the Creek and in the uplands. Because this is an interim remedy, the remedy for the East Branch will eventually be subsumed by a subsequent decision document, but regardless of whether it is conducted under this decision document or a future one, it is EPA's expectation that the post-remedy implementation monitoring plan will be conducted in perpetuity. It is

EPA's expectation that responsible parties will pay for ongoing efforts through state and/or federal enforcement agreements, consistent with EPA Superfund's enforcement first approach.

**Comment 45**: The Remedy must include safe access and thriving ecosystems, ensuring that human recreation on the East Branch and revitalization of the aquatic habitat is made possible.

**EPA Response 45**: The remediated creek bottom will provide opportunities for the establishment of a more diverse and healthy ecosystem in the East Branch. The restoration plans for the East Branch will be developed to ensure the habitat of the East Branch is reestablished after implementation of the remedy and will take into account the expressed desire for increased soft shorelines and accessibility. While EPA cannot make or require improvements to the East Branch that are not necessary for remedy implementation, we can develop restoration plans that are mindful of future plans for the East Branch. Open communication with the community will continue throughout the development and implementation of the remedy. EPA understands that the East Branch portion of Newtown Creek, and the Creek as a whole, is an important natural resource and community asset.

**Comment 46**: Currently, the EPA has approved swimming as a designated use for Newtown Creek and the East Branch, and the remedy must allow for safe immersion in the water and prevent direct contact with contaminants, as well as fishing, paddling, and boating. Further, salt marsh restoration in this section must be prioritized, and shoreline reconstruction should facilitate the ongoing revitalization of our local aquatic ecosystems by incorporating habitat for shellfish, fish, crabs, and other marine animals as well as aquatic plants.

**EPA Response 46**: The Superfund remedy will address the risks associated with hazardous substances found in the East Branch. Additional action by other programs as per the Clean Water Act may be needed before the creek fully meets its designated use. EPA Superfund will continue to coordinate with all relevant parties to improve the usability of the East Branch. EPA will also continue to coordinate with all relevant parties in the restoration efforts for the East Branch. Please refer to EPA Response 45 regarding the establishment of a healthy ecosystem in the East Branch, post-remedy implementation.

**Comment 47**: Ensure that the cleanup timeline progresses efficiently while maintaining the thoroughness needed to achieve these goals. The community has waited fourteen years since the Superfund designation, and we need a remedy that will stand the test of time.

**EPA Response 47**: EPA will develop a schedule for design and implementation of the remedy for the East Branch that balances expediency with thoroughness. A first step will be developing enforcement instruments so that responsible parties conduct the work, consistent with EPA's "enforcement first" policy. It is EPA's current intention to develop an enforcement instrument for the RD so that it may begin as soon as possible. Then the enforcement instrument for the RA can be developed while the RD is being completed.

*The CAG submitted a detailed comment letter.*

**Comment 48**: After extensive review and rigorous discussion, the CAG concluded that, as presented in the FFS, Alternative EB-F is the only option that will be protective of human health and the environment. However, they listed a series of conditions that, if addressed, could alleviate their concerns with Alternative EB-D. Several of these conditions mirror those listed by the elected officials, and likely informed the development of the elected officials' letters. The full list is provided below.

> **EPA Response 48**: EPA appreciates the CAG's concern with the selection of an alternative other than Alternative EB-F, and the detailed list of concerns provided by the CAG about this selection. Each of the concerns are addressed below.
>
> > **Comment 48a**: Coordination with NYSDEC on use of currently available upland data to quantify and remediate PTW sources of ongoing contamination;
> >
> > > **EPA Response 48a**: Coordination with NYSDEC on ongoing sources of contamination that negatively impact the protectiveness of the remedy is a key aspect of the selected remedy. As is stated in the ROD, "a robust post-remedy implementation evaluation monitoring program [will be developed] to ensure the remedy is performing as designed and remains protective over time. The monitoring program will be structured so that any ongoing sources negatively impacting the remedy can be identified and it can be determined if those sources require additional controls, either through state and/or federal enforcement authorities."
> > >
> > > In addition, a robust PDI is also an integral part of the selected remedy and will include data collection to fill data gaps and to refine our understanding of the East Branch CSM. The PDI will include, at a minimum, the collection of: additional sediment COC data to refine the remedial footprints and depths of the various remedy components and to delineate potential PTW and Toxic Substances Control Act (TSCA) regulated material (like high concentrations of TPCBs); additional porewater and/or groundwater COC data to refine cap designs; additional data to further delineate NAPL, investigate NAPL mobility, and determine the constituents present in NAPL; and additional geotechnical data to support dredge design, cap design, and shoreline stability evaluations. The PDI will also include the conduct of systematic as well as opportunistic seep sampling and surveys to inform decisions on the need for upland source controls and data from the PDI will be used to refine the outputs of the LTE model that will be used to develop the initial IEMs that will be refined over time. The development of the PDI plan will be based on all existing data for the site, including that obtained by NYSDEC on upland properties and data we have received from NYCDEP, and it will be developed with clear data quality objectives and assessment methods.

Overall, the development, implementation, and post-remedy implementation monitoring of this action will take place on an on-going basis and will continue to be refined and adjusted over time as new data informs EPA's understanding of the East Branch. Coordination with NYSDEC will be an ongoing and very important part of this process.

**Comment 48b**: Coordination with NYSDEC to develop a map of upland seep locations that will provide clarity on how any proposed bulkhead will address inflow of contamination from the shore;

**EPA Response 48b**: EPA will coordinate with NYSDEC to develop our understanding of the ongoing sources of contamination to the East Branch, including through seeps. Existing information will be compiled prior to development of the PDI plan, additional monitoring will occur during the PDI, and then more monitoring will occur on an ongoing basis during and after implementation of the remedy. Through all of this, EPA will coordinate with NYSDEC to ensure information is shared between our agencies in a timely manner so that the remedy can remain protective, including through the installation of bulkheads where needed.

**Comment 48c**: Re-evaluation of cap design following comprehensive analysis of PTW in the tributary –it is recognized that native sediments may also be contaminated and require capping; Use of currently available NYCDEP pilot data on NAPL principal threat waste in the East Branch in order to guide these follow-up actions:

- o NAPL compositional analysis that will confirm or invalidate existence of specific COCs and their measured concentrations at seep locations and LIF-identified sediment pools.
- o NAPL migration measures out of sediment pools and seeps with methods successfully applied at the Gowanus Canal Superfund site.

**EPA Response 48c**: All existing data will be reviewed as part of the design of the remedy for the East Branch portion of the OU1 Study Area, including data that NYCDEP has shared with EPA. Additionally, new data using appropriate methods will be collected for the purpose of characterizing NAPL that poses an unacceptable risk of migration/recontamination to the remedy. This information, along with additional information obtained through the PDI, will be used to develop the design of the cap. The objectives of the cap are to provide: (i) physical isolation of COCs in the sediment from the benthic environment; (ii) erosion protection to maintain cap stability against forces resulting from open water flows, propwash, vessel wakes, and other forces; and/or (iii) chemical isolation to sequester COCs that could be transported from the contaminated sediment below the cap via dissolved phase advection, diffusion, and/or gas-ebullition facilitated transport and, where containment is possible, NAPL and/or its constituents that could be transported via gas-ebullition facilitated transport and/or advection.

**Comment 48d**: Assignment of a PDI plan to an independent party overseen by EPA.

**EPA Response 48d**: A robust PDI will be conducted with oversight by EPA. The PDI is an integral part of the selected remedy. The PDI plan will be reviewed with the community before it is implemented, and the results will be presented and shared with the community after implementation. The results will be formally incorporated into the RD report.

**Comment 48e**: Development of a post remediation restoration plan that sets targets for and identifies potential sites of ecological restoration in the East Branch.

**EPA Response 48e**: A restoration plan will be developed as part of the RD and RA work plans. The plans will be reviewed with the community. See also EPA Response 45.

**Comment 49**: Clearly state the objective of the early action plan and convey the EPA's overall site strategy to achieve cleanup.

**EPA Response 49**: The objectives of the early action and the strategy to achieve and maintain protection of human health and the environment in the long term is outlined in the "Remedial Action Objectives" section of the ROD. This section, as well as the "Overview of Remedy Approach" section, has been expanded from the Proposed Plan to more clearly articulate the overall goals, approaches and strategies for this action. Rather than reiterate all of this information here, please refer to the relevant sections of the ROD.

**Comment 50**: Clearly define the boundaries of each operable unit and the cleanup status of each operable unit.

**EPA Response 50**: The operable units are clearly defined in the "Scope and Role of Response Action" section of the ROD and the full definition of the OU1 Study Area is provided in the "Site History and Enforcement Activities" section of the ROD.

**Comment 51**: Clearly define the responsibilities and boundaries of each agency (city, state and federal) that is involved with the cleanup of the overall site (OU1).

**EPA Response 51**: EPA is the lead agency for the Newtown Creek Superfund site and NYSDEC is the supporting agency for the site. This means that EPA has final authority over the site, which is defined broadly as the nature and extent of contamination, but consults with NYSDEC on all major decisions, including RODs. NYSDEC in turn consults with the NYSDOH regarding human health concerns at this and other NPL sites. NYSDEC, as our sister agency, has expressed a preference to take the lead on addressing contamination associated with upland properties that may be adversely impacting OU1 of the site, and EPA has agreed to work with NYSDEC in a cooperative manner to ensure the upland properties are addressed in a manner consistent with the needs of the cleanup of OU1 of the site. In addition, EPA does have the ability to take the lead, from an enforcement perspective, on particular upland properties if it is determined to be warranted; such a decision would be made in consultation and coordination with NYSDEC.

NOAA and USFWS are EPA's Federal partner agencies for the site; they have the opportunity to review and comment on all documents and decisions for the site. USACE also has a role at the site, particularly in matters related to navigation and permitting.

NYCDEP is a PRP for the site. The city does not have a regulatory role with regard to the cleanup of the site.

**Comment 52**: Who will conduct each step in the PDI (EPA, CDM Smith, Anchor QEA, etc.)?

**EPA Response 52**: After the ROD is signed, new enforcement instruments will be developed to conduct the RD and the RA for the action. The group of PRPs that will perform the RD and the RA is not yet known. Since the time of the original 2011 AOC that EPA entered into with 6 parties (the NCG plus NYCDEP) to conduct the RI/FS, 24 additional PRPs have been named. If, for example, a new AOC is developed to conduct the RD for the East Branch Early Action, it would likely be EPA's goal to have all named PRPs as signatories to the agreement. This new group of PRPs may elect to hire a common consultant (such as Anchor QEA), but the common consultant will not necessarily be Anchor QEA. Similarly, EPA will oversee all work conducted as part of the action and will have final approval authority over all work plans, reports and activities (and enforcement agreements typically include a provision for EPA to take-back the work at a site if necessary). EPA may or may not use CDM Smith to assist with its oversight work; selection of an oversight consultant must go through a contracting process.

Note that it is EPA's understanding that the NCG will no longer exist as an entity to conduct the East Branch Early Action RD or RA, though they will continue to exist as the entity conducting the OU1 RI/FS, along with the other original PRP, which is NYCDEP.

**Comment 53**: The Proposed Plan states that alternative EB-D is the EPA's preferred alternative because it meets the threshold criteria of protecting human health and the environment and complying with applicable or relevant and appropriate requirements. It also states this alternative provides the best balance of the remaining criteria. However, when reviewing table 7-2 in the Focused Feasibility Study (FFS), TASC assigned a ranking of 0 to 4 for the balancing criteria (none to low = 0, low to moderate = 1, moderate = 2, moderate to high = 3, high = 4) and in doing so, alternatives EB-B, EB-D and EB-E have the same numerical score of 12. Can EPA further explain how EB-D will provide more reduction in toxicity, mobility or volume than EB-B and EB-C? Does one criterion on the rating matrix carry more weight than another criterion? Why does it appear that EB-C scores equivalently to EB-D on this balancing criterion, and EB-B has a higher treatment score than EB-C and EB-D but a slightly lower score for ex situ treatment?

**EPA Response 53**: The rankings provided in Table 7-2 of the FFS are meant to be viewed qualitatively, not quantitatively. Assigning numeric values to the markers used in that table is not the intended use of this table and is not how EPA uses this table. The discussion provided in the "Summary of Comparative Analysis of Alternatives" section of the ROD more clearly describes EPA's interpretation of each of the balancing criteria, each of which is weighted equally.

To summarize the conclusions of the comparative analysis of alternatives, EPA has selected Alternative EB-D as the remedy for the East Branch portion of OU1 because it meets the threshold criteria of protecting human health and the environment and complying with ARARs and it provides the best balance of the remaining criteria. It would be more effective in the long-term and provide more reduction in toxicity, mobility or volume through treatment than Alternatives EB-B or EB-C since it would remove more contaminated sediment and would be less reliant on capping to maintain effectiveness. Alternative EB-D would also be more effective in the short-term, more easily implementable, and more cost-effective than Alternatives EB-E or EB-F since it will remove less contaminated sediment, thus reducing the opportunities for short term impacts to the community, to workers and to the environment.

**Comment 54**: The CAG is very concerned about the lack of comprehensive data in the Proposed Plan, which fails to provide sufficient information for a remedy that would adequately protect human and environmental health.

**EPA Response 54**: A robust PDI is an integral part of the selected remedy. EPA agrees that while there is currently insufficient data on which to design the remedy for the East Branch, there is sufficient information on which to base a remedy decision. EPA understands the types of contamination present in the East Branch, the overall sources of contamination and how the contamination moves in the environment, and thus there is sufficient data to select a remedy for the East Branch. At this time, the density of data is not sufficient to design the remedy and there are data gaps, especially related to seeps and the specific ongoing sources of contamination to the East Branch. This is why the PDI is an integral part of the remedy. The post-remedy implementation monitoring plan is also an integral part of the remedy because, even though a comprehensive PDI will be conducted, it is possible that ongoing sources of contamination that impact the long-term protectiveness of the remedy could be missed during the RD. The post-remedy implementation monitoring plan will be used to identify both bottom-up sources of contamination that may need to be addressed after implementation of the remedy (such as breakthrough of NAPL from beneath the cap) and top-down sources of contamination that need to be addressed (such as from unidentified seeps). While EPA does not anticipate that bottom-up issues will occur, we fully expect that top-down issues may be found. In either case, if any problems are identified during the post-remedy implementation monitoring plan, they will be addressed by state and/or federal enforcement authority, to be decided on a case-by-case basis.

**Comment 55**: Will the PDI be released for public review and comment prior to the start of the PDI investigation? Does EPA have an estimate of the time frame for the PDI and will results from the investigation be shared with the community?

> **EPA Response 55**: A robust PDI will be conducted with oversight and approval authority by EPA. The PDI plan will be reviewed with the community as it is being developed for input, the final draft will be shared with the community, and the results will be presented and shared with the community after implementation. The community will also be made aware of any adjustments that are found to be needed as the fieldwork is being conducted, and additional input will be sought, as appropriate. The results will be formally incorporated into the RD report. EPA does not have an estimate of the timeframe for the PDI yet, but given the scope of the effort, thinks the field work will likely take at least a year to complete after development of the work plan.

**Comment 56**: Will the cleanup alternatives be re-evaluated based on findings from the PDI? The Proposed Plan states there is a relatively large degree of uncertainty associated with the potential of ongoing contamination. For example, the PDI may identify larger volumes of contaminated sediments that may require additional dredging. This waste material will require planning for dewatering and decontamination. Another example is that the PDI may identify a greater contribution of inflowing contamination from upland areas, thus reducing the effectiveness of an early action cleanup.

> **EPA Response 56**: Design of the remedy will not begin until after the PDI is completed. Therefore, questions like the volume of sediments to be dredged and therefore the amount requiring dewatering will be based on the findings of the PDI, not the estimates included in the ROD. The selected remedy is sufficiently flexible such that changes to the estimates included in the ROD will not affect the appropriateness of the remedy. That said, if something is discovered during the PDI that calls into question the assumptions EPA made in selecting the remedy, then it could be changed; EPA considers this to be a highly unlikely scenario for this action.

**Comment 57**: Can EPA provide clarification on whether the findings of ongoing studies relating to OU1 will be available during the public comment period to determine if any modifications are necessary to the preferred alternative? Will any of the alternatives change significantly if these sitewide studies suggest that external sources are still contributing to significant ongoing contaminant loading to Newtown Creek and the East Branch?

> **EPA Response 57**: The alternative would not change. The selected remedy has been designed with sufficient flexibility to incorporate the findings of the PDI. Information from ongoing studies related to OU1 of the Site will be incorporated into the RD and cleanup of the East Branch as they are available and as appropriate. On the specific question of whether it is found that external sources are contributing significant ongoing contaminant loading to the East Branch, this would also not alter the selected remedy. As has been noted, the alternative includes a robust post-remedy implementation monitoring plan that includes metrics for taking additional action, as described in the "Overview of

Remedy Approach" section of the ROD. As such, the remedy will remain appropriate whether a small or large number of significant ongoing sources are identified.

**Comment 58**: One of the fundamental objectives for the early action is, "to inform the OU1 site-wide FS alternative development." However, the footnote on page 2 of the FFS states "The project schedule as of April 2024 will not allow for incorporation of evaluation monitoring data to inform the draft OU1 FS." Can EPA clarify if a site-wide feasibility study will be drafted before any Early Action post-construction evaluation information is available?

> **EPA Response 58**: The exact timing for implementation of the East Branch Early Action is unknown at this time and, therefore, EPA cannot state definitively whether the site-wide FS will be drafted before or after post-construction evaluation information is available. The "Scope and Role of Response Action" section of the ROD, and specifically the "Basis for an Interim Remedy for the East Branch" subsection fully describes the rationale for taking this early action. As is noted, the site is being addressed in an adaptive management framework and a formal Adaptive Site Management plan for the entire site is currently under development.

**Comment 59**: The CAG notes that the conclusions regarding the presence of NAPL in the East Branch are based only on visual observations blebs or sheens in sediment and ignore the NYCDEP's more quantitative laser-induced fluorescence (LIF) study and seep investigations conducted by both NYCDEP and NYSDEC. The CAG is specifically concerned that the RI/FS investigations conducted under EPA oversight thus have excluded rigorous investigation of NAPL contamination, and demands that the following be conducted:

- Systematic low-tide surveys of NAPL seeps**;**
- Comprehensive chemical analysis of NAPL composition across all sources: sediment reservoirs, seeps, water surface sheens;
- Quantitative mapping of aerial and vertical distribution of NAPL across East Branch sediments using optical scanning technology employed in the Gowanus Canal Superfund Site and by NYCDEP;
- Accurate assessment of sediment NAPL mobility as opposed to the use of centrifugation on fine-grain sediment samples – a technique wherein rotation speed, rotation period and particle size are biased towards the finding of low NAPL mobility.

> **EPA Response 59**: Significant additional NAPL-related monitoring, analysis and assessment will be conducted as part of the PDI for the East Branch Early Action. All of the techniques listed will be considered for inclusion in the PDI program, and the decisions on how to approach the ongoing NAPL-related investigations will be based on a review of all data EPA has collected and/or received for the site, including NYCDEP's LIF study and NYSDEC and NYCDEP's seep investigations, and the approach will likely be revised and updated as additional data are collected and evaluated. The PDI will be developed with clear data quality objectives and assessment methods. See also EPA Response 61.

**Comment 60**: The CAG asks what stakeholders have reviewed the NCG report included in Appendix B, Section 3.4.4 of the FFS which concludes that NAPL seeps are a "minor source of

COCs to sediments in East Branch." The study that the report is based on does not include low-tide surveys for potential seep outfalls or any NAPL sample analysis and relies on sample analysis for TPAH34 only.

**EPA Response 60**: EPA and NYSDEC reviewed the entire draft FFS report for the East Branch early action, including Appendix B, and NOAA and FWS were also provided the opportunity to review the entire report. Significant additional data will be collected as part of the PDI to support the design of the remedy and a robust post-remedy implementation monitoring plan will be conducted in perpetuity. Any decisions made regarding how to address NAPL seeps will be made based on the additional data. Upon implementation, the selected remedy will have addressed the contamination that is already present in the sediment in the East Branch.

**Comment 61**: How will the previous NYCDEP Seep Study and LIF data be used as another line of evidence as a basis to design further pre-design investigations of NAPL to confirm the presence or absence of any NAPL reservoir(s)? What definitive methods will be used to assess the presence of NAPL or PTW? If the PDI shows larger areas of NAPL, would more remedy components be warranted to address the NAPL beyond ISS or amended capping and dredging for the early action?

**EPA Response 61**: The NYCDEP Seep Study and LIF data can be used as another line of evidence to inform development of the PDI. The PDI will include NAPL observations and shake tests, similar to what was done as part of previous investigations, and will also include other methods to assess the presence of NAPL, such as those identified in Comment 59. These methods may include LIF, coring/dying/UV light/photographs, coring with shake tests, visual observations and sorption paper, and other techniques to be determined. The components of the proposed remedy that can address NAPL include dredging to remove the NAPL (including deeper dredging where warranted) or if the NAPL is left in place, amended capping and/or ISS. These components are sufficient to address larger areas of NAPL that may be identified during the PDI.

Please note that LIF is a field screening tool that can be used to determine the presences/absence and general degree of pore saturation of many NAPLs or residual organic substances in various media. A probe is pushed or driven into the media and a laser or UV light beam is induced into the subsurface, exciting any fluorescent molecules of the substances that are present Electrons in the aromatic molecules absorb the light energy at a given wavelength and re-emit it in the form of fluorescence at a lower energy level. The corresponding fluorescence is recorded and logged as function of the probe depth. Analytical measurements are not collected in the LIF process and specific contaminant concentrations are not determined by LIF fluorescence logs.

The LIF results would be interpreted during the RD in alignment with other lines of evidence such as corresponding analytical chemistry data and a good understanding of the CSM. In addition, the limitations, and interferences of a LIF investigation must be understood (e.g., organic rich material, soil grain size). However, LIF logs can be used to inform location selection for additional sampling and laboratory chemical analyses, such as coring during PDI.

**Comment 62**: What other quantitative methods will be used during the predesign investigation other than sheen/bleb observations or shaker tests to determine the extent of NAPL? The NYCDEP LIF and Upland seep data documented seeps emanating from the shoreline of 11 upland sites and from in-creek structures. These data represent only a small subset of the NAPL seeps that occur throughout the Study Area and the 2020 NYCDEP seep study recommended that more studies are needed to develop a robust understanding of upland properties which are a source of NAPL to the Creek. Currently, the Proposed Plan defers cleanup of the upland sources either to voluntary actions or through federal and/or state of New York enforcement authorities. If such actions are deferred, clarification is warranted in the Proposed Plan to understand how such actions will be integrated with the ongoing Superfund response actions.

> **EPA Response 62**: The investigation methods for the PDI are likely to include collection of sediment cores, laboratory analysis of sediment samples to determine the COC concentrations, and visual observations of NAPL. Other methods for determining the extent of NAPL will be evaluated during development of the PDI scope. Regarding cleanup of upland sources, this has been clarified in the "Overview of Remedy Approach" section of the ROD.

**Comment 63**: Is ISS the only option for addressing NAPL based on the minimal NAPL information cited in the Focused Feasibility Study and Proposed Plan. Would additional remedy components be considered if NAPL reservoirs are discovered (e.g., extraction of NAPL from behind bulkheads).

> **EPA Response 63**: In addition to ISS, the selected remedy includes the option for deeper dredging to address NAPL. The determination for how NAPL within the East Branch portion of the OU1 Study Area will be addressed will be made as part of the RD based on results of the PDI. NAPL discovered in upland areas, either during the PDI or later during the post-remedy implementation monitoring program, will be addressed in coordination with NYSDEC, through state and/or Federal enforcement authorities. The method to address the NAPL will be determined on a case-by-case basis. EPA will work with NYSDEC to address any upland NAPL sources that are identified during the PDI, that could impact the protectiveness of the remedy, prior to implementation of the remedy.

**Comment 64**: Will any additional ISS be needed if deeper dredging cannot remove all the NAPL-contaminated sediment due to structures or other limitations for alternative EB-D (e.g., the Grand Avenue bridge structure).

> **EPA Response 64**: Additional ISS may be warranted to treat contaminated sediments around structures if dredging is unable to remove the contaminated material.

**Comment 65**: The Focused Feasibility Study and Proposed Plan show the same amount of sediment for NAPL treatment (9,900 cubic yards) for alternatives EB-C and EB-D; however, if alternative EB-D includes deeper dredging, possibly to remove more NAPL-impacted sediments, why are the estimated dredging volumes the same.

**EPA Response 65**: The estimated dredging volumes for EB-C and EB-D are 92,300 and 101,000 cy of sediment. The volume presented for NAPL treatment of 9,900 cy is for the purposes of ISS, not dredging. Alternative EB-D includes the option for deeper dredging based on 4 conditions: potential for NAPL migration from the deeper soft and/or native material; potential for human and/or ecological exposure to PTW; depth uncontaminated material; and comparatively higher COC concentrations in remaining sediment. The need for deeper dredging due to these conditions will be determined during the design of the remedy. The estimates included in the ROD will be refined. The volume to be dredged will likely increase based on the results of the PDI since the FFS did not include evaluation of all the conditions for deeper dredging.

**Comment 66**: The CAG asked several questions related to upland source control. They are concerned the selected remedy does not address potential NAPL areas and sources in the upland areas surrounding the East Branch.

**Comment 66a**: How will seeps be addressed in the long-term, and does the LTE model consider the limited effect of bulkhead sealing? How will discontinuous shoreline controls be connected? We are concerned that unless controlled or reduced, the contamination from upland sources will continue to enter the East Branch at the same rate that it currently does. Additionally, sealing sections of bulkheads may address localized areas of known seeps but may not prevent the lateral migration of NAPL to adjacent seeps and non-bulkheaded shoreline.

**EPA Response 66a**: EPA recognizes the importance of identifying, characterizing, and controlling and/or reducing all ongoing sources of contamination from upland areas that may impact the long-term protectiveness of the remedy for the East Branch. As is described in the "Description of Remedial Alternatives" section of the ROD, sealed bulkheads will be used as a preliminary measure to address seeps while cleanup of the related upland source is evaluated and implemented. Sealed bulkheads are typically not a stand-alone solution. They are used as a component of a long-term solution, in combination with other response actions that reduce or control sources of seeps. The identification of seeps will continue after completion of the PDI and after implementation of the remedy. The LTE model will continue to be updated with new data as the post-remedy implementation monitoring plan is conducted and will be used to help identify areas where additional upland controls are needed. The implementation of these additional upland controls may be through state and/or federal enforcement authorities, to be decided on a case-by-case basis. As an example, the post-remedy implementation monitoring program may identify a previously unknown seep from an upland property that is adversely impacting the in-Creek remedy. In this instance, EPA may require the installation of a sealed bulkhead on the creek-side of the property as a preliminary measure while the state works with the responsible party for the upland property to address the source of the contamination in the long term. Alternatively, and depending on the situation, EPA could use its enforcement authorities to address the upland source of the contamination as well. The selected remedy includes an approach for addressing any impacts to the protectiveness of the remedy in both the short and long-term, with the goal of maintaining the protectiveness of the remedy in the long-term.

**Comment 66b**: Can EPA provide an inventory of bulkhead status around the East Branch early action area, identifying areas that need bulkhead repairs as well as areas of concentrated inflows from potential upland sources? This information can be included for the community in the suggested site map to be developed in collaboration with State and City agencies.

**EPA Response 66b**: A detailed bulkhead evaluation will be performed as part of the PDI, including an inventory of existing bulkheads and their condition. The PDI, as well as the results of the lateral groundwater study recently completed by EPA, will also be used to update areas of potential concentrated inflows from upland properties. EPA will work with NYSDEC, our sister agency, in developing a map displaying this information and updating the CSM.

**Comment 66c**: Provide construction details on the existing bulkheads. It is likely that bulkheads were historically installed for bank stabilization and not for groundwater control. The bulkheads may not extend to the lower confining layer to impede NAPL migration.

**EPA Response 66c**: A detailed bulkhead evaluation will be performed as part of the PDI. Construction details will be included in this inventory to the extent they are available.

**Comment 66d**: Will banks that are currently stabilized by riprap be replaced or enhanced by an impervious barrier? By study area definition this amendment to the riprap to prevent NAPL seeps would need to be at the riprap. Adding a slurry wall behind the riprap would technically fall beyond the boundaries of the early action area.

**EPA Response 66d**: The banks can be stabilized using several methods. Additional investigations will be completed as part of the PDI and the data will be used to inform the need for and design of bank stabilization as necessary.

**Comment 66e**: Can EPA provide details on how bulkhead replacement will happen? We are concerned about new bulkheads being installed on the waterside of upland properties, thus reducing the footprint of the public waterway.

**EPA Response 66e**: Details on how bulk replacement would be implemented will be determined as part of the RD. EPA will keep in mind the footprint of the waterway in the RD process.

**Comment 67**: The CAG asked several questions related to the Capping Evaluation Report included in the FFS.

**Comment 67a**: During the EPA's public meeting about the Proposed Plan on September 18, 2024, the EPA indicated that further studies are needed to evaluate upland sources. Considering this statement, are the groundwater flow rates and contaminant concentrations published in the Capping Evaluation Study only preliminary at this time? Further, if there are inaccuracies how easily can these inaccuracies serve to modify the cap recommendation? The 2011 AOC for the RI/FS identified numerous upland sources that are or will be addressed under a variety of cleanup programs. Will the status of these other cleanup programs be used in future upland sources and groundwater inflow evaluations, and how will this affect the early action?

> **EPA Response 67b**: The capping evaluations included in the FFS Report, including the groundwater flow rates and contaminant concentrations used in the evaluations, are preliminary. A PDI will be performed to collect additional data in the East Branch to inform cap design. Information from other studies, including NYCDEP and NYSDEC investigations, will be evaluated during development of the PDI scope. Status of other cleanup programs will be considered to provide context during the PDI and long-term, post-remedy implementation monitoring.

**Comment 67b**: Has the Capping Evaluation Study been reviewed? How will the cap construction recommendations be implemented?

> **EPA Response 67b**: The capping evaluations provided in Appendix C of the FFS report have been reviewed by EPA. During RD, cap evaluations will be refined based on additional data collected during the PDI and will serve as the basis for the cap design. The information in Appendix C is preliminary.

**Comment 67c**: What studies have demonstrated that a cap topped with 12 to 20 inches of sand, gravel or cobbles satisfies the requirement for a biologically active zone at the top of the cap? clarify if the cap will require a 6-inch biologically active zone layer or a 20-inch biologically active zone layer as required by NYSDEC.

> **EPA Response 67c**: A habitat layer will be installed on top of the cap. The specific design of this habitat layer will be developed as part of the RD. The habitat layer is placed over the other layers of the cap and does not play a role in sequestering contamination that remains below the cap or preventing erosion. Also see <u>EPA Response 28</u>.

**Comment 67d**: The CAG is concerned about the effectiveness of capping remedies. Can EPA provide details on similar Superfund remedies that have utilized caps, including details such as depth of cap, type of cap, was the cap on native sediment or contaminated sediment, etc? Please describe the risk of cap failure in as much detail as possible so that the CAG can fully understand potential risks. The CAG is aware of past cap failures, including sites worked on by AnchorQEA.

> **EPA Response 67d**: Capping is used as a sediment remediation technology at many sites. Please see EPA's Contaminated Sediment Remediation guidance and

EPA's Clu-In Website on sediment remediation for examples: https://clu-in.org/issues/default.focus/sec/Sediments/cat/Remediation/p/1.

To maintain cap effectiveness, caps need to be properly designed, monitored, and maintained. A PDI will be performed to obtain all the necessary data to properly design the cap for the early action remedy, the cap design will then be performed under the oversight of EPA, and the post-remedy implementation monitoring program will be used to monitor cap effectiveness. Maintenance will be conducted, as needed.

**Comment 68**: The CAG asked how the determination will be made between using ISS versus additional dredging to address NAPL and/or PTW, and expressed a preference for dredging and removal of the hazardous chemicals unless impossible.

**EPA Response 68**: The determination to use ISS versus dredging to address NAPL and/or PTW will be made during the RD, after conduct of the PDI. One consideration for the use of one technology over another would be stability of the shoreline. Other considerations will be clearly explained once the RD is developed. EPA notes the CAG's preference for dredging over using ISS and capping.

**Comment 69**: Does the 0.6-acre ISS estimate include the proposed ISS testing in the Western Beef slip, or does this estimate incorporate ISS needed as necessary where EPA identifies and delineates NAPL?

**EPA Response 69**: The 0.6-acre estimate for ISS included in the FFS is just an estimate. Note that the ROD assumes a 0.4-acre estimate for ISS. However, the actual areas requiring ISS and/or deeper dredging will be determined during the RD, after conduct of the PDI.

**Comment 70**: The CAG expressed concern with EPA's ability to identify possible sources of contamination prior to IEM exceedances occuring. They do not want the default assumption to be that any exceedances are due to CSO and MS4 inputs.

**EPA Response 70**: EPA understands the CAG's concern and will work to develop a post-remedy implementation sampling plan that is designed to detect potential issues before risk-based cleanup goals are exceeded and that is able to determine the cause of any potential issue through the monitoring process; the source will not be assumed. Also note that, if an exceedance were to occur despite best efforts, the impacted area would need to be addressed as part of the operations and maintenance plan for the remedy.

**Comment 71**: Considering that the preferred cleanup plan maintains existing water depths, the EPA is assuming that the waters will be removed from the navigational waterway designation. Would the Proposed Plan and evaluation of cleanup alternatives need to be re-evaluated if navigational deauthorization is not passed? Does the initiation of the cleanup action, or even issuance of a Record of Decision require this navigational deauthorization?

**EPA Response 71**: Deauthorization of the East Branch navigation channel was included in the Water Resources Development Act of 2024 (WRDA 2024) bill. The WRDA 2024 bill was signed into law on January 4, 2025 and, as such, the East Branch navigation channel is no longer authorized. The deauthorization is consistent with the remedy and will allow EPA to implement the remedy as selected.

**Comment 72**: How will the cleanup and the Grand Street bridge replacement projects be scheduled (simultaneous or sequential scheduling) and which would be done first? How might the early action cleanup impact the bridge replacement project and vice versa? If the DOT implements a non-movable bridge in the future, which is possible with a navigation delisting, how will this impact dredging, capping, bulkhead replacement work, and all other components of an early action? Will any potential bridge construction after the cleanup damage the caps and other remediation techniques?

**EPA Response 72**: EPA and NYDOT have been actively participating in quarterly coordination meetings regarding the Grand Street Bridge and the East Branch Early Action. The intent of the meetings is to ensure that the work on the bridge and the remedial activities are well coordinated and that the work will proceed without significant impacts to either activity. The exact sequencing of activities is not yet known.

**Comment 73**: Will EPA consider prioritizing working with a contractor who can transport dredged materials and remediation equipment with vessels less than a 25' air draft to avoid ongoing openings of the Pulaski and Greenpoint Avenue bridges? This would significantly help mitigate local impacts through increased local traffic, congestion, and resulting air quality.

**EPA Response 73**: EPA will evaluate several different approaches for transporting dredged material on the Creek and will choose the approach and/or combination of approaches that provides the best balance of minimizing local impacts while maintaining a reasonable schedule. These types of decisions will be discussed with the community prior to being finalized.

**Comment 74**: Can EPA provide a more detailed overview of the dredging process? EPA identifies "slot dredging" in the Proposed Plan. The EPA further clarified that dredging would likely be conducted with a clamshell-style mechanical dredger.

**EPA Response 74**: The dredging process consists of debris removal, sediment removal (the dredging itself), transport of the dredged material to a staging area for dewatering and any needed pretreatment. Dredging can be performed mechanically or hydraulically. Slot dredging is a dredging method that involves dredging a narrow slot, or trench, of sediment and then backfilling the slot/trench immediately to prevent slope instability, and repeating the process. It can be used around infrastructure and utilities to address potential sediment/soil stability. While the design of the remedy will consider all dredging techniques, it is currently assumed that a clamshell-style dredger will be used for the majority of the work (except, as stated, in areas near infrastructure and utilities).

**Comment 75**: Will a suction dredge be considered? A suction dredge may reduce contaminated sediment resuspension and reduce contaminated sediments from leaving the project area. As the EPA has proposed a suction-style dredging removal operation at a similar site in Baltimore to remove similar contaminants (Bear Creek Sediments site), can EPA explain to the community the pros and cons of various dredging techniques?

> **EPA Response 75**: The specifics of the dredging, including the type of dredge to be used, will be developed as part of the RD and likely refined by the RA construction contractor during the remedial action. However, due to the amount of debris that is present in the East Branch, it is expected that suction dredging would be less effective than mechanical dredging (since the debris would still have to be removed by mechanical means).

**Comment 76**: The CAG asked a series of questions about potential on-site waste management of dredged sediments. Specifically:

- Will the waste be staged on land adjacent to the dredging operation prior to removal by barge?
- Will the waste sediments be dewatered on site and how would the water removed from the waste be handled? Would the EPA consider an on-site dewatering facility and water treatment plant?
- If waste is staged on land for dewatering, will there be controls in place for dust control?
- Does EPA have a plan to move sediment from the dredge site to barges downstream of the Grand Avenue bridge? They are concerned that operation of the Grand Avenue bridge for barge navigation may not be possible.

> **EPA Response 76**: Waste management, handling, and offsite transportation and disposal processes for the East Branch early action remedy will be developed as part of the RD. Answers to all to these questions will be included in the RD, and the approach will be discussed with the CAG prior to finalization.

**Comment 77**: How will EPA address the pipeline crossing at the East Branch? Are there any other buried utilities and structures in the proposed dredging area?

> **EPA Response 77**: A preliminary layout of utilities and creek crossing in the East Branch is provided in Appendix A of the FFS report. Buried infrastructure will be investigated during the PDI and how to perform the work safely around the infrastructure will be developed as part of the RD. Based on the results of the PDI, stabilizing, removing, or relocating the infrastructure may be necessary. Details regarding how buried infrastructure will be addressed during remedy construction will be developed as part of the RD.

**Comment 78**: What controls will be in place if the dredging operation results in increased resuspension of the sediments? Does the EPA plan to use sediment controls like a silt fence to contain turbid water at the site?

**EPA Response 78**: Prior to remedial action, a Remedial Action Work Plan (RAWP) will be developed to guide the remedial action. The RAWP will identify best management practices that will be employed during construction that would include activities such as monitoring, silt curtains and/or sheet piles, dredge operation controls (e.g., dredge operation speed), dredge type, and other such variables. The requirements for this type of plan will be developed in the RD.

**Comment 79**: Has a contingency plan has been developed if contamination moves beyond the site boundaries during dredging and waste handling.

**EPA Response 79**: Contingency plans will be included in the RD and developed fully as part of the RAWP.

**Comment 80**: What happens if more contamination, or more toxic contamination, is exposed during dredging, that was not identified during the PDI?

**EPA Response 80**: The RD and RAWP will develop and include contingency plans to deal with unexpected items such as additional contamination and debris.

**Comment 81**: Is there a contingency plan if a high-water event occurs during cleanup?

**EPA Response 81**: The RD and RAWP will develop and include contingency plans for potential high-water events to ensure the public and remedial operations are protected and to minimize any adverse effects on the cleanup process that is underway.

**Comment 82**: Will EPA have a point of contact if community members have concerns about noise, dust or other cleanup-related issues? How will the EPA provide periodic updates to keep community members informed of cleanup progress and any issues encountered? We are concerned about having access to real time monitoring and protocols in place for getting quick and thorough responses to concerns as they arise.

**EPA Response 82**: EPA will have a point of contact for community members. A communication plan will be developed as part of the RD/RAWP development process, in consultation with the CAG and members of the public, in general. EPA understands the goal of having access to real-time monitoring data and a clear chain of command in case concerns arise.

**Comment 83**: Regarding post-construction evaluation monitoring, the CAG notes that the plan seems to generally address the specifics requested by the EPA Contaminated Sediments Technical Advisory Group's September 2023 memo, by including multiple lines of evidence for evaluating cap performance, but the plan is vague on the monitoring required to evaluate ISS or bulkhead effectiveness in the long term. Specifically, they ask the following series of questions:

**Comment 83a**: What long-term monitoring is required for evaluating ISS or bulkhead remedy components.

**EPA Response 83a**: Long-term monitoring requirements will be determined during RD. The monitoring plan will identify specific methods to evaluate ISS and bulkhead remedy components. These may include sampling of porewater and groundwater.

**Comment 83b**: Who will be conducting the long-term monitoring (EPA, CDM, AnchorQEA)?

**EPA Response 83b**: Consistent with EPA's "enforcement first" policy, EPA intends to negotiate a Remedial Action Consent Decree with the PRPs. As a result, it is expected that the long-term (post-remedy implementation) monitoring will be conducted by PRPs under EPA oversight. Please see EPA Response 52 for additional details.

**Comment 83c**: How will the evaluation process be conducted during the long-term monitoring? Is there a period of time for monitoring that must pass before "lessons have been learned" and the next stage of Newtown Creek cleanup can begin?

**EPA Response 83c**: The long-term (post-remedy implementation) monitoring will consist of monitoring various media using consistent methods at specific frequencies. The monitoring will specify triggers to identify any potential problems and if the monitoring needs to be increased, the general outlines of which are discussed in the "Overview of Remedy Approach" section of the ROD. Lessons will be learned throughout the process of designing, implementing and monitoring the East Branch early action remedy. These lessons will be applied to the rest of the site but will not hold up work on the rest of the site. All of this will be further detailed in the Adaptive Site Management Plan currently under development for the site.

**Comment 83d**: Who is responsible for addressing and paying for repair and damages if there is an issue with the remedy, including post OU-1 ROD? This question is of critical importance given the outcome of US District Court Case 1:19-CV-1029, wherein the NYSDEC lost its argument that the EPA improperly issued a Certificate of Completion to GE. New York State residents are now required to fund remediation of remaining PCB contamination in the Hudson River.

**EPA Response 83d**: EPA anticipates that any maintenance activities associated with the in-creek portion of the remedy will be paid for by the PRPs that implement the remedy, and this will be part of the Operations & Maintenance Plan that will be developed as part of the RD/RA work plans for the work. Since this is an interim remedy, EPA's expectation is that it will eventually be subsumed by a future decision for OU1 of the site, and that all O&M requirements will then become part of the final remedy. Once a final remedy for OU1 is in place, EPA will continue to evaluate the protectiveness of the remedy in the five-year review. EPA reserves enforcement authority to require additional response actions that EPA determines are necessary to carry out and maintain the effectiveness of the remedy. In addition, EPA reserves enforcement authority to compel PRPs to perform further response actions after the remedy is complete if there is new information or previously unknown conditions that indicate the remedy is not protective of public health or welfare or the environment.

**Comment 84**: The CAG asked EPA to explain its rationale for determining a biologically active zone to be 6 inches (15 centimeters). The NYSDEC states that it: "does not accept the 0 to 6-inch interval of sediment as an appropriate definition of the Biologically Active Zone (BAZ) in Newtown Creek or basis for remedial decision making. The 0 to 6-inch interval fails to provide adequate ecological protection in Newtown Creek. To appropriately characterize ecological exposure and evaluate long-term effectiveness of remedial technologies, NYSDEC recommends 2 feet (~60 centimeters) as the zone of surface sediment used to evaluate remedial alternatives." This discrepancy represents a significant disagreement in the plan between EPA and DEC. The definition of the BAZ is at the crux of the remedy, and completely defines it. Why has EPA limited the definition of the BAZ to 6 inches? Given that EPA expects net deposition of sediments from the East River, the measurement of only the top 6 inches (or potentially less, as EPA has allowed GE to measure only the top 2 inches of sediment, to be representative of the top 12 inches defined as the bio-available zone in the Hudson River PCB cleanup) will almost certainly underestimate the contaminant levels in the bioavailable sediments. If EPA believes that the average depth of plants in Newtown Creek are only six inches, has it considered the possibility that this reduced depth is due to the contamination?

**EPA Response 84**: See EPA Response 28.

**Comment 85**: How is this early action plan incorporating potential Natural Resources Damages projects and the potential for shoreline and intertidal restoration? The community firmly believes in the opportunity and value of pursuing restoration within the East Branch tributary and rejects a remedy that may limit the options for future restoration work

**EPA Response 85**: EPA has quarterly meetings with the Trustees and EPA has been briefed about the Trustees restoration plans. EPA will continue to meet with the Trustees including during the RD process to ensure that the restoration work is coordinated with the remedial action in the East Branch.

**Comment 86**: Will EPA consider bulkheads that integrate intertidal habitat into their design? The community has repeatedly raised concerns about the sterile surfaces that sheet pile structures present and rejects a plan that does not incorporate ecological value.

**EPA Response 86**: Yes, EPA will consider integrating intertidal habitat into its considerations while designing the remedy.

**Comment 87**: Will mitigation be required for any shoreline plants and trees that must be removed for remediation? If so, where will this mitigation occur?

**EPA Response 87**: It is possible that mitigation will be required if shoreline plants and trees need to be removed to implement the remedy. Any required restoration or mitigation work will be performed in accordance with the requirements of the appropriate regulatory agency.

**Comment 88**: If in-situ stabilization is used, how will that affect restoration of that part of the Creek to more natural functions?

**EPA Response 88**: Where and how ISS will be used will be determined during the design of the remedy, after conduct of the PDI. Appropriate restoration of these areas will also be considered during the RD.

**Comment 89**: Will EPA consider the bathymetry of the East Branch and prioritize a depth that is more naturalized (shallowed in the head end areas, and deeper downstream as it connects to the navigable main channel? The community is very concerned about the damage that will be done in maintaining arbitrary depths in East Branch that do not help with flow and circulation of water and create severely impacted water quality issues, for which the DEP aeration system is required to mitigate. In addition, can EPA weigh in on plans to temporarily or permanently remove the system as part of a proposed remedy in East Branch, and will EPA evaluate how current bathymetric conditions in East Branch contribute to stagnant water and low dissolved oxygen levels that require mechanical intervention such as an in-stream aeration system?

**EPA Response 89**: Adjustments to current bathymetry cannot be made without the conduct of significant modeling to ensure the changes do not have an adverse effect on the rest of the system. EPA Superfund generally restores sites to their current condition. The aeration system will need to be removed to implement the remedy. EPA Superfund will coordinate with our Clean Water Division and NYSDEC on the need for and design of an aeration system after implementation of the selected remedy. This is a topic outside the direct purview of EPA Superfund, but it will be discussed as part of the design of the remedy, in consideration of the LTCP.

**Comment 90**: The Proposed Plan characterizes the designated use of Newtown Creek as "suitable for fish survival only," but that is incorrect. The plan must also acknowledge that the creek is designated for primary contact recreation. As explained by EPA Region 2 Clean Water Division Director Javier Laureano, New York State Department of Environmental Conservation promulgated, and EPA approved, the recreational use in 2015 and 2016, Respectively: For the purposes of federal law, and especially for actions taken pursuant to EPA oversight, EPA must incorporate the designated use approved by its own Region 2 office.

**EPA Response 90**: In 2020, NYSDEC amended sections 701.13 and 701.14 of Title 6 of the Official Compilation of Codes, Rules, and Regulations of the State of New York (6 NYCRR). The amendments preserve the more protective water quality standards in Part 703 and clarify the best uses of Class I and Class SD waters in Part 701 as "secondary contact recreation and fishing" and "fishing," respectively. The water in Newtown Creek is currently classified by NYSDEC as Class SD, saline surface water with a protected use of fishing. The language contained in the ROD is consistent with the more recent 2020 amendments. Also note that EPA has delegated to New York State the authority to administer the Clean Water Act in its waters.

**Comment 91**: What is the status of the delisting for navigation for the East Branch via the Water Resource Development Act (WRDA) and how will this affect the remedy?

> **EPA Response 91**: The WRDA 2024 bill, which included a plan to deauthorize the East Branch navigation channel, was signed into law on January 4, 2025. As such, the East Branch navigation channel is no longer authorized.

**Comment 92**: Can EPA address potential recontamination shown within the Long Term Equilibrium Model via CSO and MS4 discharges? The FFS states that "Current estimates of the LTE concentrations for certain COCs indicate that LTE concentrations within East Branch may, over time, be greater than some risk-based PRGs (specifically D/F TEQ and C19-C36 and potentially TPCB), regardless of the remedy selected due to ongoing external inputs." The CAG opposed the OU2 decision by EPA precisely because it would continue to allow COC discharges in amounts that would obviously lead to recontamination. The CAG continues to oppose EPA's inaction to address and reduce CSO and MS4 discharges that will inevitably result in recontamination.

> **EPA Response 92**: There are many ongoing inputs to the East Branch and the loading from these inputs is expected to decrease, over time, as greater regulatory control and improved best management practices are implemented. If any of the ongoing sources, including CSO and/or MS4 discharges, are determined to be impacting the protectiveness of the remedy for the East Branch portion of the OU1 Study Area, then additional measures will need to be developed to address the source, under state and/or Federal enforcement authority.

**Comment 93**: Could EPA provide in its final decision, a clear graphic or workflow that shows all the variety of actions here and the coordinate/integrate/sequence: 1) East Branch early action; 2) whole site FS and PP; 3) Grand Street Bridge replacement; 4) Delisting of some areas; 5) CSO monitoring; 6) National Grid Pump House; 7) NYSDEC upland work

> **EPA Response 93**: EPA is developing a formal Adaptive Site Management Plan for the site and this type of information will be included in that document.

*Several written comments were submitted by representatives of various public interest groups, including the Brooklyn Chamber of Commerce, North Brooklyn Chamber of Commerce, the Long Island City Partnership, and Evergreen Exchange.*

**Comment 94**: The Brooklyn Chamber of Commerce submitted a letter of support, indicating that the organization supports EPA's East Branch Early Action and the preferred remedial alternative (Alternative EB-D) because the organization believes Alternative EB-D will be protective of human health and the environment while balancing the need to maintain Newtown Creek as a significant maritime industrial area which supports businesses and jobs in Brooklyn, which is vital to our city's economy.

> **EPA Response 94**: EPA appreciates the letter of support.

**Comment 95**: The North Brooklyn Chamber of Commerce submitted a letter of support stressing the importance of the voices of the local business communities and raised concerns regarding the potential for the remedy to create waste, noise, odor, and traffic that can negatively impact community members and the successful operation of local businesses. The organization indicated that they believe that the proposed remedy will protect the safety and well-being of the community and achieve EPA's clean-up goals while minimizing the hardships to businesses and the local community.

> **EPA Response 95**: EPA appreciates the support and agrees that ongoing community engagement, including with local business communities, is vital to the success of this remedy.

**Comment 96**: The Long Island City Partnership submitted a letter indicating their support for EPA's proposed remedy. They noted that the project area is part of the Industrial Business Zone designated by New York City to support industrial uses and freight mobility; therefore, they urged EPA to work with them and the local business community to prioritize minimizing the impact on local businesses, especially any impacts associated with traffic congestion.

> **EPA Response 96**: EPA appreciates the support and agrees that ongoing community engagement, including with local business communities in the Industrial Business Zone, is vital to the success of this remedy.

**Comment 97**: Evergreen Exchange, the Long Island City Partnership and the Maspeth Industrial Business Association submitted a joint email noting that they collectively represent businesses along the Brooklyn and Queens sides of Newtown Creek. They submitted a series of questions about the proposed plan to remediate the East Branch of Newtown Creek, as follows:

> **Comment 97a**: Has EPA identified the specific sources of pollution in the East Branch?
>
> > **EPA Response 97a**: There are many historic sources of contamination to the East Branch that are no longer actively contributing contamination to the Creek. There are also many ongoing, external sources of contamination to the East Branch. These include municipal storm sewer system outfalls, the Newtown Creek wastewater treatment plant treated effluent outfall, permitted industrial discharges, other permitted/non-permitted discharges, overland flow/direct drainage, other non-point sources, the tidal effects of the East River, atmospheric deposition, shoreline seeps/groundwater discharge from upland properties, and shoreline bank erosion, as well as CSO discharges. This is described in more detail in the "Results of the Remedial Investigation" portion of the ROD.
>
> **Comment 97b**: Who will bear the costs of remediation? Will those responsible for polluting be held accountable, or will costs be distributed as part of a broader cleanup of Newtown Creek?

**EPA Response 97b**: EPA has a longstanding policy to pursue "enforcement first" throughout the Superfund cleanup process. This policy promotes the "polluter pays" principle and helps to conserve the resources of the Hazardous Substance Trust Fund for the cleanup of those sites where viable responsible parties do not exist. EPA has named thirty PRPs for the site and intends to develop enforcement instruments under which PRPs will conduct the RD and remedial action (RA) for the cleanup of the East Branch.

**Comment 97c**: How does the remediation schedule align with the planned replacement of the Grand Street Bridge?

**EPA Response 97c**: The exact schedules for the cleanup of the East Branch and for the replacement of the Grand Street Bridge are still unknown. That said, EPA is meeting regularly with the NYCDOT to coordinate on the remedial action and the replacement of the Grand Street Bridge. Both parties provide updates on project timelines and share information to ensure all work will be conducted in a consistent manner. As we get closer to the start of actual construction work (for either project) we will work together to ensure the work is conducted in a safe manner that does not adversely affect the Creek or the surrounding community.

**Comment 97d**: What are the specific locations along the East Branch where remediation will begin?

**EPA Response 97d**: The specific locations in the East Branch where remediation will begin will be determined during development of the RD. This decision will take into account various factors, including other ongoing actions on the Creek (such as the Grand Street Bridge replacement), community concerns, as well as the engineering and hydrodynamic needs of the work.

**Comment 97e**: What will be the upland requirements for staging and operations during remediation, and where does the EPA plan to establish these areas?

**EPA Response 97e**: Requirements for upland staging and operations, and the location of any upland areas that may need to be utilized to conduct the cleanup work, will be determined during the RD, in consideration of the concerns of the local community.

**Comment 97f**: How will the East Branch remediation affect navigability throughout Newtown Creek?

**EPA Response 97f**: During implementation of the East Branch cleanup, use of this portion of the waterway for on-creek activities will need to be impacted/restricted for health and safety reasons. Navigation throughout the rest of Newtown Creek may also be impacted to account for potential movement of barges up and down the Creek as part of management of dredged sediment and placement of capping materials. Both the in-water and upland transportation plans will be developed during the RD and likely further refined as part of the RA work planning documentation. These concerns will be discussed with the community and impacted entities, and every effort will be made to minimize disruptions to the extent possible, while keeping everyone's health and safety as a top priority.

**Comment 97g**: What is the plan for bulkhead replacements along the East Branch?

**EPA Response 97g**: The need for bulkhead replacement, repair, and/or installation will be determined during the RD. Depending on the location in the East Branch, it may be necessary to replace and/or repair any existing bulkheads, or install new bulkheads, adjacent to the areas to be dredged. EPA will work with all relevant parties, including the parties implementing the remedy, the adjacent property owner (and tenant, if appropriate) and NYSDEC to address any measures to ensure the stability of the adjacent shoreline is maintained during and after the remedial work is conducted. Health and safety plans will be developed to ensure people living and/or working adjacent to the work areas are not negatively impacted by the contamination or the work activities.

**Comment 98**: Brooklyn Community Board No. 1 submitted a series of questions regarding the East Branch Early Action.

**Comment 98a**: Why is the proposal to dredge in Alternative EB-D only 3 feet? How is this adequate?

**EPA Response 98a**: Please see EPA Response 4.

**Comment 98b**: Possibly related to the question above, EPA notes the biological zone to be at depth of just 6" in the creek bed, whereas NYS DEC designates 2' as the biological zone. Why is EPA using a shallower depth for this designation?

**EPA Response 98b**: Please see EPA Response 28.

**Comment 98c**: What is the makeup of the proposed cap in Alternative EB-D? In the public hearing EPA gave the indication they would use a "let's see what happens" and "experiment" approach. We need to know the details regarding the composition of the proposed cap layers.

**EPA Response 98c**: The cap will be designed after completion of the PDI. At the meeting, EPA described a general schematic of the layers that will be included in the cap so that it effectively prevents exposure to contamination remaining beneath it, can withstand erosive forces and can support re-habitation of the impacted portion of the Creek. The detailed cap design requires additional data to complete. Please also see EPA Response 4 and EPA Response 48c.

**Comment 98d**: Chemical analysis methods and result standards, and health and environmental impacts studies are antiquated, and must be updated.

**EPA Response 98d**: EPA will ensure the sampling plan to support the PDI, and the post-remedy implementation monitoring program, is based on the most current and appropriate standards.

**Comment 98e**: In the listing of remediation elements, sealing bulkheads will be implemented "as a temporary measure to address seeps while upland cleanup measures are evaluated and implemented". What is the permanent measure(s)?

**EPA Response 98e**: The permanent measures will be determined on a case-by-case basis, depending on the specific situation at the upland property. Note that sealed bulkheads are described as preliminary measures in the ROD.

**Comment 98f**: The remedial investigation and remediation of upland sites adjacent to the East Branch should be expedited as soon as possible, to ensure the 3-year estimated remediation term is adhered to, and potentially inform a permanent remedial solution(s) for seeps emanating from problematic bulkheads and other sources.

**EPA Response 98f**: The 3-year estimated timeline refers only to the in-Creek portion of the remedy. After in-Creek implementation is complete, a post-remedy implementation monitoring program will be conducted. This program may identify additional upland properties and/or sources that need to be addressed to ensure the remedy remains protective in the long-term.

**Comment 98g**: What is the assessed failure risk and life span of alternative EB-D, and the other alternatives.

**EPA Response 98g**: Dredging and capping is a remediation approach that has been used effectively at many other sediment sites. Preliminary cap evaluations performed for the FFS were conducted using a cap design life of 100 years and, consistent with EPA guidance, were evaluated to withstand forces with a probability of 0.01 per year (e.g., the 100-year storm). The alternatives also require ongoing O&M to ensure the remedy remains protective of human health and the environment, and some repair activities may be needed over time. Proper O&M in conjunction with the post-remedy implementation monitoring plan, which will look any ongoing sources of contamination that may impact the protectiveness of the remedy, should ensure that this remedy remains effective in the very long term.

**Comment 98h**: More data and comment periods should be made available to the public after the details of the preferred alternative are determined and made known, before the Record of Decision is issued.

**EPA Response 98h**: EPA is following the process laid out by Superfund law in reaching this Record of Decision. There will be many future opportunities for the public to comment upon the design and implementation of the selected remedy, as well as future decisions for other parts of the creek and the OU1 creek-wide remedy. EPA will continue to communicate regularly with the community, largely through the CAG, will present approaches and findings, and will work with all stakeholders to ensure the remedy is implemented and maintained in a safe and effective manner.

*Several written comments were submitted directly by members of the public.*

**Comment 99**: Several members of the community submitted comments/letters of support for the proposed action. One also voiced support for the Newtown Creek Vision Plan and urged that general community improvement be taken in parallel and/or ahead of the cleanup being conducted, including planting trees, painting road lines, and adding sidewalks and bike lanes.

**EPA Response 99**: EPA appreciates the support.

**Comment 100:** Members of the community submitted comments supporting the CAG's comments. One stated that the release of the East Branch Early Action Proposed Cleanup Plan is a significant first step towards the cleanup of Newtown Creek. If done properly, cleaning the East Branch tributary will reduce human health risks and contaminants in this area of the Creek, create opportunities for habitat restoration and community access, and serve as a reference for the rest of the Newtown Creek cleanup. I ask EPA to take to incorporate the comments of the Newtown Creek Alliance in a revised plan and take action. As waterfront development continues apace, lower income residents are being encouraged to move in by Newtown Creek, and sea level rises, lives are increasingly at risk from these deadly pollutants.

**EPA Response 100**: Comment noted. EPA will continue to engage with the Newtown Creek Alliance as the design and implementation of the selected remedy are conducted.

**Comment 101**: A long-time active member of the CAG voiced great concern that EPA is basing this decision on vague, incomplete data without clear details on how the plan will prevent recontamination in the creek, how it will prevent further human exposure, and whether the community will have the opportunity for input on the information that has not yet come forward.

**EPA Response 101**: EPA will be removing highly contaminated sediment bank to bank down to at least three feet across the East Branch, which will help reduce the impacts to the health of the surrounding community. This remedial action will also help reduce ecological exposures to the site contamination because the area that the benthic invertebrates, the fish, and the birds feed in will be remediated. After implementation of the remedy, a comprehensive post-remedy remedy implementation monitoring plan will be conducted to ensure the remedy remains protective of human health and the environment in the long-term. The plan will be designed to locate potential in-Creek concerns with the remedy itself and potential impacts from ongoing sources outside of the Creek that may need to be addressed. This will be a long-term, iterative process that allows us to start cleaning up the Creek sooner rather than later while maintaining long-term protectiveness.

EPA agrees significantly more data is needed in order to design the remedy. That will be collected as part of the PDI, which is included as an integral part of the remedy. In addition, clarification has been added to the ROD to more clearly explain how the selected remedy will remain protective of human health and the environment in the long term through a robust post-remedy implementation monitoring plan. See the “Overview of Remedy Approach” section of the ROD. EPA will continue to meet with the community throughout the development of the PDI, the RD, and the RA work plan, during implementation of the cleanup plan and after, during conduct of the post-remedy implementation monitoring plan. EPA will inform the community of its findings and will ask for input from the community throughout the process. EPA will also coordinate closely with our state and Federal partners to ensure the remedy is implemented and maintained in a safe and effective manner that is supportive of the community’s long-term vision for the area.

**Comment 102**: The same commenter stated that during a recent online meeting with EPA, the agency was not able to answer my question about the state of the laws they claim they will follow during the East Branch trial cleanup. When EPA stated at CAG meetings that they will ensure that environmentally protective laws will be followed, what laws were they talking about? If the agency can’t summarize them or has knowledge about how old or perhaps obsolete those laws are, how will the laws be followed and protect us? As a community member, I want to know if the laws governing the contaminants and exposures being discussed are truly protective and whether or not the agency and elected officials have discussed improving upon them. From the beginning of the process my primary concern has been that of human and environmental health. And community members have been clear that they are concerned about cumulative effects of every environmental incident that happens in this community. It is important for us to know if the laws, standards and such take that into consideration. And if not, the agency has to say it out loud. So, given that data, information and explanations are being withheld from the community, I don’t believe the proposed plan achieves adequate protection for all the reasons that the CAG has outlined in its Nov 11th letter to you. And I support the EB-F alternative as outlined by the CAG.

**EPA Response 102**: EPA regularly updates the methodologies and technologies used for evaluating contaminants, contaminant toxicity, and their health impacts in both humans and ecological receptors. EPA is using the current state of science to conduct its analyses and make determinations.

From a legal standpoint, Section 121(d) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires that on-site remedial actions attain or waive federal environmental Applicable, or Relevant and Appropriate Requirements (ARARs), or more stringent state environmental ARARs, upon completion of the remedial action. The 1990 National Oil and Hazardous Substances Pollution Contingency Plan (NCP) also requires compliance with ARARs during removal and remedial actions to the extent practicable. ARARs often help define remedy protectiveness and are intended to ensure the response is performed in accordance with promulgated regulations or statutory provisions. The ARARs and TBCs identified for this action are identified in Tables 10, 11, and 12.

**Comment 103**: The same commenter noted that the Greenpoint community, which borders the Creek, has been disproportionately impacted by environmental problems for many years. They want to assure EPA is fully transparent in obtaining and providing information related to preventing further seeps and contamination, conducts adequate dust and odor control, and properly characterizes the environmental and human exposures. The commenter notes that the Proposed Plan itself lists the Creek as "suitable for fish survival only" which disregards the fact that other divisions within EPA and the community know it is used for "primary contact recreation." The commenter fully supports the CAG's comments on the plan.

> **EPA Response 103**: Comment noted. EPA will strive to be as transparent as possible and will continue to work closely with the community throughout this process. Responses to the CAG's full set of comments have been provided herein.

**Comment 104**: A member of the public submitted a paper discussing the potential use and benefits of a bioremediation product to address contamination in place to prevent resuspending and mobilizing contamination, which would occur as part of dredging and capping. The paper discusses the benefits of Genki Balls, which use a proprietary liquid probiotic made up of three types of microbes to detoxify water and break down petroleum and hydrocarbon products. They are being used in remediating sludge in the Ala Wai Canal in Honolulu, Hawaii. The comment notes that the resuspension and mobilization of toxins into the water by disturbing the sediment layer through dredging puts the human community and wildlife at high risk to hazardous exposure as well as air pollution. The commenter also noted that caps will start to breakdown and are not indestructible; they add another pollutant to the system. The commenter suggested that the Genki balls could be thrown over the top of the completed cap to help address any ongoing sources of contamination and as a base layer to supporting re-habitation of the Creek.

> **EPA Response 104**: EPA appreciates the input. The contamination that is present in Newtown Creek is highly heterogeneous and consists of metals, PCBs and Dioxins/Furans in addition to hydrocarbons. The use of a bioremediation-based approach at the site was considered early on this process of developing alternatives for the site but screened out because it would not be able to address all of the types of contaminants that are present. EPA will keep this in mind for potential use after implementation of the remedy. See also EPA Response 19 for additional information.

**Comment 105**: A commenter noted that we need new laws to prevent pollution, trash, and warehousing companies from occupying the space. This is the location for our chosen nonprofit placement, since 2020 – we sighted this to Senator Julia Salazar. The commenter asked how the community would be kept informed about the eviction of fraud-based companies on the waterfront.

> **EPA Response 105**: Comment noted. Regarding evictions, or potential re-locations, EPA will keep the community informed if any evictions/re-locations are needed in order to properly conduct the remedy.

**Comment 106**: A member of the public asked whether ecological concrete (eco-concrete) could be used for replacement bulkheads.

**EPA Response 106**: EPA will consider this as part of the design of the remedy.

*Anchor QEA, on behalf of the Newtown Creek Group (NCG), a group of private PRPs for the site that includes Phelps Dodge Refining Corporation, Texaco, Inc., BP Products North America Inc., the Brooklyn Union Gas Company D/B/A National Grid NY, and ExxonMobil Oil Corporation, submitted comments on the Proposed Plan. Some of the individual members of the NCG also submitted separate comments (listed below these).*

**Comment 107**: The group notes that current members of the NCG have worked diligently and cooperatively with EPA to complete an FFS for the East Branch under EPA oversight. The Draft Final FFS Report (Anchor QEA 2024) provided the technical support for the Proposed Plan and is a comprehensive document, prepared at EPA's direction in an expedited manner, to facilitate near-term remediation in Newtown Creek. While Anchor QEA and the NCG will continue to work on the OU1 creek-wide FS, the NCG, as a group, will not be working on East Branch beyond issuance of the ROD. The NCG's obligations under the 2011 AOC are limited to the RI and FS and do not include RD or implementation of a remedial action. Consistent with both EPA policy and its stated intentions, once the ROD for East Branch is issued, the members of the NCG expect that any discussions regarding the implementation of the East Branch Interim Action RD/RA will include the formation of a new group to perform such work

**EPA Response 107**: EPA agrees that the 2011 Agreement and Order on Consent would not cover the RD or implementation of a remedial action for the East Branch Early Action. EPA anticipates that all identified potentially responsible parties will be invited to negotiate a new settlement agreement regarding the East Branch Early Action.

**Comment 108**: The ROD should make clear that upland property owners will be responsible for the installation of any sealed bulkheads, including any upland work required to manage any hydraulic or other issues resulting from the installation of a sealed bulkhead, that may be necessary to prevent migration of contaminants from upland properties to the Study Area.

**EPA Response 108**: Sealed bulkheads, as a preliminary measure where needed until a more comprehensive remedy for uplands properties can be developed, are a component of the selected remedy, and EPA anticipates that PRPs will implement, with EPA oversight, the selected remedy in its entirety. At this time, EPA is not able to weigh in on whether, and how, responsibility for the different components of the remedy may be divided among the parties implementing the remedy.

**Comment 109**: One of the "common elements" that EPA requested be included in the FFS Report that EPA has similarly listed as a common element in the Proposed Plan (page 17) is that sealed bulkheads will be used "if and where needed to reduce migration" from upland sites. While the NCG agrees with USEPA that "the need for sealed bulkheads is not currently indicated by the existing data" (Proposed Plan page 17), the ROD should make clear that upland property owners shall be responsible for the installation of any sealed bulkheads that may be necessary to prevent migration of contaminants from upland properties into the Study Area. EPA has previously stated that separate state and federal enforcement authorities shall be used as necessary and appropriate to address migration of contaminants from upland properties. Consistent with those previous statements, the NCG requests that the ROD clearly state that upland contamination, and any resulting migration from upland properties, is the responsibility of the upland property owners and not the parties who implement the sediment remedy in East Branch

> **EPA Response 109**: See previous response. In addition, the ROD states that ongoing sources requiring additional controls will be addressed through state and/or federal enforcement authorities. The exact approach will be determined on a case-by-case basis.

**Comment 110**: The Proposed Plan references "opportunistic seep sampling" conducted during the PDI to inform decisions on the need for upland controls. The NCG requests that the ROD not use the word "opportunistic" and instead include language that indicates that the PDI will include a systematic, planned investigation of seeps to determine whether upland controls are necessary rather than relying on opportunistic data. Consistent with this request, the NCG also requests that the ROD clearly indicate that the PDI will be designed with clear data quality objectives and assessment methods to alleviate stakeholder concerns about the current perceived lack of information regarding the presence of NAPL and PTW as well as the conditions under which ISS will be used or deeper dredging will be needed.

> **EPA Response 110**: Comment noted. The ROD states that systematic seep sampling, as well as opportunistic sampling, will be conducted and that the PDI will be designed with clear data quality objectives and assessment methods.

**Comment 111**: The Proposed Plan states that "sealed bulkheads may be used as a temporary measure to address seeps while cleanup of the related upland source is evaluated and implemented." The text for the ROD should include a clear provision for an acceptable time frame for remediating upland sources that have been treated using a sealed bulkhead as a temporary measure. This is necessary because contamination contained in this manner without co-occurring remediation or containment of the upland contamination may eventually circumvent the bulkhead barrier and enter the creek elsewhere, potentially causing remedy failure.

> **EPA Response 111**: The appropriate timeframe will be determined on a case-by-case basis during the PDI, or later if a source is identified during the post-remedy implementation monitoring program.

**Comment 112**: The ROD should make clear that upland property owners will be responsible for any stabilization of their bulkheads, including repair or replacement, that is necessary in order to implement the sediment remedy.

> **EPA Response 112**: A component of the selected remedy is shoreline stabilization, which includes bulkhead replacement, stabilization, and/or installation. While the responsibility for bulkhead-related work will vary, depending on the nature of the work

required, EPA anticipates that the performing PRP group will implement the remedy in its entirety, including shoreline stabilization measures related to bulkheads. Note that in the absence of the dredging remedy, property owners are legally required to maintain their bulkheads in a structurally adequate manner.

**Comment 113**: The Proposed Plan lists repair or replacement of bulkheads as one example of the “Stabilization Measures” common element for each of the active alternatives. While it is not clear at this point which bulkheads, if any, in East Branch may need stabilizing, the ROD should contain clear language regarding EPA’s expectation that any such costs will be borne by the affected property owner(s). Consistent with prior RODs in Region 2 (e.g., the Gowanus Canal Superfund site ROD [USEPA 2013]), the ROD should also contain a discussion of the resources EPA will make available to those property owners—such as standardized plans to minimize those costs, coordination among parties to achieve economies of scale, and application of the Comprehensive Environmental Response, Compensation, and Liability Act permit exception—to reduce the costs to those property owners

**EPA Response 113**: The waterway and upland conditions that influenced the selection of the remedy for the Gowanus Canal site differ in several fundamental ways from the East Branch. For example, EPA’s decision for the Gowanus assumed that, at minimum, temporary shoring would be required for the majority of the waterway to allow for the implementation of the remedy, based upon the requirements of the in-river cleanup and poor condition of the majority of the bulkheads. By contrast, this ROD only establishes ground rules for the installation/shoring of bulkheads if they are determined to be necessary, with that decision deferred to the RD. It is unclear where, or even if bulkhead replacement will be needed. Furthermore, at the time of the Gowanus ROD, EPA had been made aware of many cases where upland reuse plans would require bulkhead replacement, regardless of EPA’s decision. This led the agency to develop a systematic approach with multiple property owners to achieve permanent bulkhead replacement that met EPA’s requirements for the remedy. EPA has not found that similar upland reuse plans exist, at least for the East Branch. Be that as it may, as the comment highlights, there are many practices or efficiencies that EPA has employed for the Gowanus cleanup that EPA can bring to this and other phases of the Newtown site.

**Comment 114**: The ROD should clarify that NAPL in upland soil should not be included in the definition of PTW that might potentially be present at the site. Instead, any measures to identify and treat NAPL at upland properties should be handled by separate state or federal authorities and directed at the relevant upland responsible party.

**EPA Response 114**: This concern is clarified in the “Remedial Action Objectives” section of the ROD.

**Comment 115**: The Proposed Plan confirms that there is no known PTW in the East Branch based on the findings of the OU1 RI and the FFS Report, but it outlines how PTW will be treated in the event it is encountered. The Proposed Plan also identifies NAPL that has the potential to migrate to surface sediment and surface water as one potential category of PTW. The NCG does not take issue with the inclusion of NAPL in subsurface sediment, should any be encountered during post-ROD sampling, but the description of potential NAPL PTW should not include NAPL that might be detected in the soil in upland properties. The Proposed Plan explains on page 15 that if action is necessary to address source control related to a seep from a contaminated upland property, that action will be taken through state and/or federal enforcement authority, as determined on a case-by-case basis. The ROD should make clear that any post-ROD investigations of potential NAPL in upland soils should take place in the context of state and/or federal enforcement authorities against the upland responsible party.

> **EPA Response 115**: The "Remedial Action Objectives" section of the ROD provides greater clarity on this point. All decisions regarding control of upland sources will be made on a case-by-case basis.

**Comment 116**: Regarding the selection of Remedial Alternative EB-D, while the NCG supports a hybrid dredge-and-cap remedy as the best approach to managing contaminated sediments in Newtown Creek, the NCG is concerned that some of the reasons and language contained in EPA's "Basis for Remedy Preference" in the Proposed Plan supporting the selection of Alternative EB-D are not consistent with the FFS Report, in particular the following:

> **Comment 116a**: The Proposed Plan is consistent with the FFS Report in stating that each of the active remedial alternatives, including those that include more reliance on in situ management of contamination than Alternative EB-D (i.e., Alternatives EB-B and EB-C), would meet the threshold criteria of overall protection of human health and the environment. However, EPA's "Basis for Remedy Preference" supporting the selection of Alternative EB-D as the preferred alternative does not acknowledge the evaluations summarized in Table 6-1, Table 7-2, and Section 7.8 of the FFS Report that conclude that Alternatives EB-B and EB-C are similarly protective over the long term while being more effective in the short term and could be implemented more easily, quickly, and cost-effectively than Alternative EB-D.
>
>> **EPA Response 116a**: Prior to releasing the Proposed Plan, EPA's selection of a preferred alternative is based on the equal consideration of all balancing criteria for the alternatives that meet the threshold criteria. EPA did consider the tables and sections of the FFS that are referred to in the comment in reaching its conclusion. While this comment focuses on short-term effectiveness and implementability, it does not recognize that Alternative EB-D would be more effective in the long-term and provide more reduction in toxicity, mobility or volume through treatment than Alternatives EB-B or EB-C since it would remove more contaminated sediment and would be less reliant on capping to maintain effectiveness. NYSDEC concurred with EPA's preference and, now that the public comment period is over, the community, on balance, supports the selection of Alternative EB-D (though some members would have preferred the selection of Alternative EB-F). None of the comments received during the public comment period have caused EPA to reconsider its selection of Alternative EB-D, though many of the details have been clarified and/or refined.

**Comment 116b**: In addition, USEPA's "Basis for Remedy Preference" (Proposed Plan page 25) states that Alternative EB-D "would likely result in the greatest volume of in-situ treatment since Alternative EB-D would include ISS where necessary to address relatively high COC concentrations in sediment, the potential for exposure to PTW, and/or the potential for NAPL migration." This implies that ISS as an "option" is only applicable to EB-D, which is not correct. ISS is not contemplated in the FFS Report to address relatively high contaminant of concern (COC) concentrations in sediment (see also Technical Clarification Comment No. 35).

**EPA Response 116b**: This point has been clarified in the "Basis for Remedy Preference" section of the ROD.

**Comment 116c**: Additionally, USEPA's conclusion that amended capping is not considered in situ treatment is also not correct, which further underestimates the amount of in situ treatment provided by each of the active alternatives.

**EPA Response 116c**: This point has been clarified in the "Summary of Comparative Analysis of Alternatives" section of the ROD.

**Comment 116d**: The NCG concludes that, for these reasons, the ROD should be flexible with respect to decisions regarding dredge depths vs. in situ treatment so areas of deeper dredging are determined to be consistent with National Oil and Hazardous Substances Pollution Contingency Plan (NCP) criteria, and the potential benefits of additional dredging should be balanced with the short-term impacts, the reduction of in situ treatment, implementability concerns, time to complete remedy construction, and cost-effectiveness. Details finalized as part of the RD/RA process should also leave flexibility for future habitat restoration in certain areas of East Branch and be consistent with the objectives of green remediation noted in USEPA Region 2's Clean and Green policy, including (but not limited to) minimizing impacts to water quality, reducing air emissions and greenhouse gas production, and minimizing waste production.

**EPA Response 116d**: All decisions on how to initially implement Alternative EB-D will be based on the findings of the PDI, with EPA review and oversight, and in consideration of all existing data for the site. Whether to conduct deeper dredging, based on the four criteria to consider for deeper dredging, or to use ISS at any particular location will be decided on a case-by-case basis, based on all of the relevant information that is available at the time.

**Comment 117**: Regarding dredge depths in the East Branch, as detailed in Section 5.2.4 of the FFS Report, under Alternative EB-D, the depth of dredging for most areas (with the exception of the "deeper dredging" areas) is a function of two constraints: 1) the thickness of the cap required in different portions of East Dredge Depths in East Branch - the first reason, the NCG is not aware of any comprehensive analysis completed to date to determine whether a remedy in East Branch that results in a reduction of water depths be detrimental to New York City's obligations under the LTCP, and the NCG recommends that the ROD state that such an analysis should be completed. Regarding the second reason, the NCG believes that improved habitat conditions can be accomplished in East Branch through less dredging in some areas that would result in a change in existing water depths but would not compromise the design and implementation of a protective remedy. For example, placing a cap on existing grades in some areas would create shallower water, which could make it easier to implement future habitat restoration projects in these areas. This decrease in water depth in some areas could be balanced by the deeper dredging and deeper water in other areas, if needed, to result in a no-net change in water depths to balance ecological function. In addition, Section 4 of Appendix C of the FFS Report demonstrated that Alternative EB-B, which would result in shallower water over current conditions over the entirety of East Branch, would not adversely impact flood levels. Language in the ROD should be flexible enough to allow for these considerations to be incorporated during remedial design.

> **EPA Response 117**: Comment noted. Both cap thickness(es) and dredge depth(s) will be refined during the RD process. The NCG is correct in that for EPA to consider implementing an action where water depths would change, studies/analyses would need to be performed to determine impacts to the system dynamics, contaminant fate and transport, potential for flooding, etc. Future habitat restoration areas and approaches will be considered as part of the RD/RA process.

**Comment 118**: Regarding the potential for deeper dredging due to the presence of comparatively higher COC concentrations, the Proposed Plan contains no process for determination of "comparatively higher COC concentrations," leaving the implementation of deeper dredging on this basis unclear. The NCG believes that "comparatively higher COC concentrations" should be defined within the context of capping effectiveness. Therefore, the maximum COC concentrations identified during the RI/FS investigations, as detailed in Section 3.1.2.1.1 of Appendix C of the FFS Report, should be the basis of comparison for new data collected during post-ROD sampling when evaluating whether additional dredging is required, because the FFS Report has demonstrated that these existing maximum COC concentrations can be effectively contained by the chemical isolation layer within the proposed cap system. As noted, Appendix C of the FFS Report details the comprehensive and conservative approach used to design the chemical isolation layers in the caps proposed for East Branch. The thickness of the chemical isolation layers and the amounts of amendments required in these layers were conservatively based on the maximum concentration of every COC in East Branch RI/FS data for sediment, porewater, and groundwater regardless of depth within the sediment (or native material in the case of groundwater). Depending on the COC, the existing cap design may already be sufficient to address concentrations that are only slightly higher than the maximum observed values in East Branch or could readily be addressed by a minor modification in the cap design, such as a slight increase in sorptive amendment content. The ROD should clearly state that deeper dredging would be required if (and only if) the higher concentrations identified in sediments, porewater, or groundwater are higher than those maximum values used in Appendix C of the FFS Report and could not be effectively managed through minor (or potentially no) modifications to cap design.

> **EPA Response 118**: The definition of "comparatively higher COC concentrations" will be determined during the design of the remedy, likely after conduct of the PDI. EPA considers the cap system included in Appendix C of the FFS preliminary at this time; it will need to be refined after conduct of the PDI.

**Comment 119**: Regarding capping as a form of treatment - Page 23 of the Proposed Plan states that "amended capping is not considered treatment," which is inaccurate and creates a risk that the public will misunderstand the remedy being selected by USEPA. This statement is inconsistent with the FFS Report (Table 6-1), which states that "amendments included in the caps would permanently sequester contaminants that migrate into the treatment layer (chemical isolation layer) of the caps and would be considered a form of in situ treatment." The statement in the Proposed Plan is also inconsistent with the definition of a treatment technology in Section 300.5 of the NCP, which states that "treatment technology means any unit operation or series of unit operations that alters the composition of a hazardous substance or pollutant or contaminant through chemical, biological, or physical means so as to reduce toxicity, mobility, or volume of the contaminated materials being treated" (EPA 1990). USEPA has previously considered amended capping as treatment in the RODs and other remedy selection documents issued for several other contaminated sediment sites, summarized as follows: • Quanta Resources Superfund site (Edgewater, New Jersey) Operable Unit 2 ROD: "… a multilayer NAPL cap resistant to erosion and consisting of isolation materials, including clean sediment and/or sand with armoring (as needed), and treatment components, such as organoclay or activated carbon, would be placed" (EPA 2024). • Gowanus Canal Superfund site ROD: "The treatment layer would reduce the mobility of NAPL and is considered a treatment technology. The overall reduction of NAPL mobility expected to be achieved by the treatment layer is high" (EPA 2013). • Portland Harbor Superfund site ROD: "In-situ treatment such as cap amendment will be applied over 133 acres. With these treatment actions, the preference for treatment requirement of the NCP has been met" (EPA 2017). • Lower Duwamish Waterway Superfund site ROD: "The remedy does include potential treatment of some contaminated sediment through provisions of amendment of caps and ENR with activated carbon or other contaminant-sequestering agents" (EPA 2014). Any evaluation of the various alternatives' ability to reduce toxicity, mobility, or volume through treatment in the ROD should correctly account for the in-situ treatment provided by capping.

> **EPA Response 119**: This point has been clarified in the ROD. While amended capping does not by itself satisfy the NCP criterion of reduction of toxicity, mobility or volume through treatment, as treatment caps do not directly address the source material beneath them, it does provide a means of sequestering the contamination in place so it is not available for exposure to human or ecological receptors, thus reducing the toxic effects.

**Comment 120**: Regarding the proposed approach for evaluating post-remedy recontamination-related data, although the Proposed Plan mentions that the post-remedy long-term monitoring program has two objectives, the Proposed Plan does not consistently differentiate between the two objectives and the resulting components of post-remedy long-term monitoring: 1) remedy performance; and 2) evaluation of recontamination due to the influence of ongoing sources. The ROD should make this distinction clear and should also be clear about the following points: – While these two components of long-term monitoring can be developed together, and there may be overlap in certain components, the ROD should make clear that some components will be used to evaluate remedy performance, and some components will be used to permit EPA to evaluate recontamination due to the impacts of ongoing sources. Although there may be overlap in the two aspects of the post-remedy monitoring plan, a robust monitoring program is needed to ensure that recontamination is not misinterpreted as remedy failure. Evaluating remedy performance over the long term is a responsibility of the implementing parties. The ROD should make clear that any necessary response to ongoing sources that are leading to unacceptable recontamination will be led by the appropriate regulatory authorities and, absent evidence that recontamination is coming from an implementing party's property or outfalls, will not be the responsibility of the implementing parties. – This clear separation of remedy performance and the expected recontamination of surface sediments due to external sources is important because the Proposed Plan currently notes that, for surface sediments post-remedy, "risk-based PRGs do appear to be achievable at this time for copper (PRG 490 ppm) and TPAH(34) (PRG 100 ppm), may be achievable with little or no additional source control work for PCBs (PRG 0.30 ppm), and will likely take time and additional source control work to achieve for dioxins/furans (PRG 18 ppt) and C19-C36 (PRG 200 ppm)." Any language in the ROD regarding discussion of risk-based PRGs not being attainable should be clearly linked to ongoing external sources and separate from sediment remedy performance and remedial action objective (RAO) attainment. Moreover, given that the Proposed Plan provides neither a definite timetable nor a clear mechanism for reduction of all external sources of COCs to meet risk-based PRGs, the ROD should also clearly state that remediation goals (RGs) may need to be established that are above risk-based PRGs due to external sources outside of the East Branch Early Action and OU1

**EPA Response 120**: These points have been clarified in the "Overview of Remedy Approach" section of the ROD as well as the "Remedial Action Objectives" section. As is stated in the ROD, it is EPA's expectation that the selected remedy, once constructed, will successfully address the RAOs for sources located within the East Branch portion of the OU1 Study Area and that the post-implementation monitoring plan will ensure that the RAOs are met and that the remedy remains protective over time. It goes on to say that the RAOs may be impacted broadly in two ways:

- Achievement of the RAOs may be compromised by impacts from within or adjacent to the East Branch portion of the OU1 Study Area. For example, it may be discovered during post-remedy implementation monitoring that the cap is not adequately preventing remaining contamination underneath it from rising towards the surface or that ebullition- assisted transport of contamination from portions of the Creek outside of the East Branch portion of the Study Area is settling on the surface of the cap. These types of impacts, and others related directly to the constructed remedy, would need to be addressed through federal Superfund authority.

- Achievement of the RAOs may be compromised by ongoing sources of contamination outside of the constructed portions of the OU4 remedy and outside of the OU1 Study Area. For example, post-remedy implementation monitoring may show that contamination entering the East Branch portion of the OU1 Study Area through seeps from a surrounding upland property is impacting the exposure-based RAOs over time. The constructed remedy would not have necessarily been designed to protect against such a source, though such as source could still impact the long-term protectiveness of the remedy and thus would need to be addressed. The appropriate entity to control sources originating outside of the OU1 Study Area will be determined on a situation-specific basis.

Regarding achievement of the risk-based PRGs, based on current data, EPA thinks they can be achieved, and maintained in the long term, throughout the East Branch through the conduct of an appropriately robust post-remedy implementation monitoring plan, for all COCs; some just may require more source control measures to be maintained in the long term.

**Comment 121**: The Proposed Plan prematurely includes details of the long-term monitoring program that should be developed when all the elements of the plan, including media to be sampled, numbers of samples, and sampling methodologies, are developed. In addition, the Proposed Plan does not clearly differentiate which components of the long-term monitoring program are specific to either of the two primary objectives of the monitoring program: 1) remedy performance; and 2) recontamination. The ROD should provide a high-level overview of the long-term monitoring plan and should indicate that details will be developed during the remedial design phase of the East Branch Early Action, for the following reasons: – It is premature to set the interim evaluation measures (IEMs) before the long-term monitoring plan, including how IEMs are to be applied, has been developed. There has been and will be a significant amount of new data collected during the lateral groundwater study, the PDI, and the OU2 monitoring program that will be used to update our understanding of existing conditions in East Branch and the nature of ongoing sources. This new information will be used to update the long-term equilibrium (LTE) model, the tool EPA will use to set IEMs and evaluate recontamination. – In addition, setting specific thresholds now may result in misinterpretation of post-remedy monitoring data, particularly if the appropriate spatial scale of comparison of monitoring data with IEMs using the LTE model is not defined. The IEMs for some COCs are based on the predictions made by the LTE model. The LTE model makes these predictions on a reach wide basis, not a point-by-point basis; it is therefore important to ensure that whatever value from the LTE model is used to set the IEM and any triggers for additional monitoring are applied at the correct spatial scale when evaluating long-term monitoring data. Comparing IEMs to individual sample results is not appropriate. For example, for some of the COCs, comparing individual sample results collected during a monitoring event to an IEM defined as the 50th percentile of the probabilistic LTE model results will lead to the conclusion that a large percentage of these sample results exceeds the IEM. This misinterpretation will be compounded if the sample results are compared to trigger values that are 75% to 90% of the IEM value. Under this scenario, USEPA may erroneously conclude that concentrations are exceeding LTE model predictions when, in fact, they are entirely consistent with those predictions (i.e., the reach average may still be less than the IEM). This may erroneously suggest that localized external sources are adversely impacting post-remedy surface sediment concentrations when, in fact, results are within the expected range of the LTE model predictions. EPA has recognized that there is uncertainty in the predictions of future LTE surface sediment concentrations due to recontamination from ongoing external sources (see Proposed Plan page 14, last full paragraph, second sentence), and that uncertainty should be reflected in the IEMs that are established in conjunction with development of the monitoring plan. Specifically, USEPA should define a range of uncertainty around a selected IEM value and explicitly consider these uncertainty bounds when setting triggers for additional monitoring.

> **EPA Response 121**: The “Overview of Remedy Approach” section of the ROD, and specifically the "Monitoring and Evaluation Approach” subsection, has been updated to provide greater clarity on the approach. Note that this comment seems to be based on a misunderstanding regarding the use of the LTE model in establishing the IEMs, how the IEMs will be used, and how the IEMs will change over time based on new data.

**Comment 122**: Regarding uncertainty in derivation of risk-based PRGs, the NCG believes it is important to emphasize that, although the derived risk-based PRG is a precise value, the derivation of these PRGs also contains inherent uncertainty given uncertainty in assumptions regarding exposure and effects made in the baseline human health and ecological risk assessments. In addition, the process that EPA used to establish the risk-based PRG for some of the COCs entailed changing some of the exposure variables in the approved Baseline Ecological Risk Assessment and/or was not well documented in reports or the Administrative Record, adding to the uncertainty regarding the selection of one value for each COC/PRG pair. Individual member NCG companies will be submitting COC/PRG-specific comments separately and distinct from collective NCG comments. The NCG recommends that EPA factor in this uncertainty when evaluating recontamination-related long-term monitoring data to avoid overinterpreting what will likely be exceedances of risk-based PRGs in some post-remedy samples due to ongoing sources of COCs

> **EPA Response 122**: Comment noted. The post-remedy implementation monitoring plan will be developed in a way that takes uncertainty into account. There are many sources of uncertainty in this process.

**Comment 123**: EPA should adopt the term “background” to describe post-remedy recontamination. EPA has developed the LTE model to evaluate the effect of ongoing sources to East Branch and throughout the creek. Through the use of the LTE model, EPA is effectively defining expected background conditions in the creek without explicit use of the term “background.” This is inconsistent with EPA policy and formal guidance documents. These guidance concepts include, but are not limited to, the following: 1) EPA typically does not set cleanup levels below background concentrations (EPA 2002); and 2) RAOs should reflect objectives that are achievable from the site cleanup (EPA 2005), and remediation below background is not an achievable objective (EPA 1988, 2005). Although evaluating background in the creek is “not clear cut” and will change over time, EPA has a tool that does just that, and EPA should be clear that this is what the LTE model is actually doing. Use of the term “IEM” as a substitute for “background” is confusing and implies that a comprehensive evaluation of background conditions can be reduced to a comparison with one number, an IEM; the evaluation of background will be more complex than that and should not be specified at this point in the process.

> **EPA Response 123**: EPA disagrees with this comment. The approach that EPA is taking has been outlined in the site-specific memorandum titled, “Framework for the Operable Unit One Remedial Action Objective and Preliminary Remediation Goal Approach” that EPA prepared in November 2023 and is included in the administrative record for this ROD. The approach as applied to this action is described in the “Remedial Action

Objectives" and "Overview of Remedy Approach" sections of the ROD, and this approach will be further memorialized in the Adaptive Site Management Plan that EPA is currently developing for the site.

*The NCG submitted a series of comments that describe a number of instances in the Proposed Plan and the accompanying fact sheet where the NCG thinks clarification is needed and/or there are inconsistencies between the documents and the FFS. These comments are briefly described below, but the full comments can be found in Attachment C of this Responsiveness Summary.*

**Comment 124**: The fact sheet is inconsistent about where capping will occur and the Proposed Plan is also inconsistent with the FFS.

**EPA Response 124**: The ROD was reviewed for consistency/accuracy.

**Comment 125**: The Proposed Plan does not discuss "technology options" for treating NAPL or PTW that are presented in the FFS. The ROD should clarify when ISS will be used versus deeper dredging based on the four conditions outlined in the description of the selected remedy. The purpose of using ISS should be clearly identified in the ROD.

**EPA Response 125**: EPA has added clarifying language to the ROD around this issue. In addition, the actual decision on how to proceed at any particular location will be determined as part of the design of the remedy, after completion of the PDI.

**Comment 126**: The text states that "EPA's preferred alternative for the East Branch portion of OU1 calls for…localized deeper dredging where needed based on the remaining depth to uncontaminated material, comparatively higher concentrations of contaminants in remaining sediment." The reference to "uncontaminated material" is not consistent with the FFS Report (Section 5.2.4), which states that localized deeper dredging would be based on depth of sediment to native material.

**EPA Response 126**: The ROD purposely states that this condition is based on remaining depth to "uncontaminated material" rather than "native material," where uncontaminated material is defined as sediment with COC concentrations below the RGs. The FFS defines a narrow lens of contaminated material as less than about 5 feet in thickness. Therefore, for example, if you have a 3' dredge in an area and going down to 5 feet would remove all contaminated material in this area, then this criterion would apply.

**Comment 127**: The Proposed Plan states that ISS will be used, where needed, to further address contaminant migration from beneath capped areas but does not state that it will be used for shoreline stabilization.

**EPA Response 127**: The ROD lists both uses of ISS, and states that the design of the cap may vary throughout the East Branch depending on location-specific conditions and/or constructability considerations.

**Comment 128**: The meaning of the statement on Page 4 of the PRAP that "these environmental indicators are above 50 percent of the national percentile at the site" is unclear.

**EPA Response 128**: This statement has been clarified in the ROD.

**Comment 129**: Language regarding internal/external interface sources of contamination in the Proposed Plan is inconsistent with the FFS.

**EPA Response 129**: This language has been clarified in the ROD.

**Comment 130**: The text of the Proposed Plan states "hydrodynamic and sediment transport models (which include groundwater and point source sub-models)." The groundwater and point source models are linked models, not sub-models. If similar language is included in the ROD, the text should be revised to state these are linked models.

**EPA Response 130**: Additional clarification has been provided in the ROD.

**Comment 131**: The text of the Proposed Plan states that "the lateral groundwater discharge study data and additional sediment and surface water data will help further refine the OU1 CSM." If similar language regarding this issue is included in the ROD, the OU2 point source sampling data should also be included in this list for completeness.

**EPA Response 131**: Additional clarification has been provided in the ROD.

**Comment 132**: The text states that "contamination is found, in particular, in the surface and subsurface sediment of the Creek and in the underlying native material." If similar language is included in the ROD, "in particular" should be removed from this sentence as the sentence implies contamination is found everywhere in the sediments, which is not particular.

**EPA Response 132**: The phrase has been removed from the ROD.

**Comment 133**: The text states that "the New York State Department of Health has developed fish consumption advisories identifying consumption limits for fish and crabs in Newtown Creek (and other waterways within New York City), and, in consultation with the community, EPA has placed signs at known fishing/crabbing locations along the Creek advising anglers of the Superfund site designation and the State fish consumption advisories." The common elements of the remedial alternatives on page 18 of the Proposed Plan note that fish consumption advisories currently in place through the state are assumed to remain in place after the East Branch Early Action. Any text in the ROD should clearly state that, because the fish consumption advisories are for the entirety of New York Harbor, including the East River, remediation in Newtown Creek will not address the conditions leading to fish and crab consumption advisories or result in removal of those advisories.

**EPA Response 133**: The ROD states that fish consumption advisories currently in place through the State are assumed to remain in place.

**Comment 134**: The text states that "uses of the areas surrounding the Creek are highly varied, and they include industrial/commercial properties, residential properties, limited recreational access areas, and abandoned properties." If similar language is included in the ROD, the word "limited" should be explained (e.g., amount of land, types of recreation, or limited access) or omitted. No qualifying adjectives have been used for the other land use types in the sentence.

**EPA Response 134**: Comment noted.

**Comment 135**: In describing the characteristics of the East Branch, the term "natural" before "hydrodynamics" should be deleted as the East Branch is a constructed water body; the hydrodynamics are not natural.

**EPA Response 135**: Natural has been deleted in this context.

**Comment 136**: The nature and extent of contamination section discusses 2,3,7,8-TCDD as representative of total dioxins/furans measured as toxicity equivalence quotients. The ROD should consistently use D/F TEQ when discussing COCs rather than 2,3,7,8-TCDD, which is only one of 17 congeners included in calculating the D/F TEQ.

**EPA Response 136**: The ROD refers to Dioxins/Furans TEQs for this group of contaminants.

**Comment 137**: The Proposed Plan states that NAPL from the OU1 study area generally consists of TPAH(34) and TPCBs. The NCG recommends this statement be deleted or modified based on the limited dataset we currently have.

**EPA Response 137**: Comment noted.

**Comment 138**: The text states that "visual observations of sediment samples collected in the eastern lobe (also referred to as the Western Beef slip) identified sheen in every sample collected." This text is incorrect; there are multiple sediment samples within the Western Beef Slip with no visual observations of sheen (see Figures A2-10a and A2-10b of the FFS Report). If similar language is included in the ROD, this statement should be updated to accurately describe the Western Beef Slip sheen data.

**EPA Response 138**: Text changed to "the majority" of samples.

**Comment 139**: The text states that gas ebullition occurs when "organic content in sediments is high enough to support the bacterial production of methane gas." If similar language is included in the ROD, the text should be revised to "to support the biogenic production of gases (mostly methane)" to recognize that other organisms in addition to bacteria (like archaea) can produce gas.

**EPA Response 139**: The text in the ROD was re-worded to address this comment.

**Comment 140**: The text states that "immobile NAPL may be mobilized during implementation of the remedy." If similar language is included in the ROD, this statement should be updated to reflect that evaluations presented in the FFS Report showed that NAPL in East Branch is immobile and incapable of migrating upward by advection under reasonably foreseeable field conditions (Section 2.5.1.4 of Appendix A) and that NAPL mobility is not expected to change because of the change in overburden pressure resulting from capping included in the range of remedial alternatives (Section 3.2.3 of Appendix C).

> **EPA Response 140**: The ROD has not been changed in response to this comment. EPA does not agree with the NCG's position on this.

**Comment 141**: The text states that "East River solids comprise approximately 30 percent of the deposited sediment and COC load in the East Branch." This is correct for the amount solids that are depositing in East Branch but is incorrect for COC load. The East River contributes less than 30% of the COC load to East Branch because there are lower COC concentrations on East River solids than on point sources solids. Consequently, the East River contributes 10% or less of the total COC load for each of the COCs in East Branch (see Figure B3-3 of the FFS Report). If similar language is included in the ROD statement should be updated to accurately describe the East River contribution to the East Branch load for each COC.

> **EPA Response 141**: Comment noted. The ROD is consistent with this comment.

**Comment 142**: The NCG is concerned with the "What is Risk and How is it Calculated" box in the Proposed Plan is being incomplete and not referring to sediment specifically.

> **EPA Response 142**: The text box is a generic one included in all Region 2 proposed plans to summarize the risk assessment process and is not media-specific. A similar box is not included in the ROD, and the risk sections are expanded in the ROD, to provide additional clarification and be media-specific.

**Comment 143**: The text states that "based on the findings of the BHHRA and the BERA for the full OU1 Study Area, six COCs have been identified for OU1 of the Site and risk-based PRGs have been developed for each of the COCs." Since the Baseline Human Health Risk Assessment (BHHRA) and the Baseline Ecological Risk Assessment (BERA) were not the only documents used as the basis to develop preliminary remediation goals (PRGs) for the six COCs, the portion of the statement that reads "based on the findings of the BHHRA and the BERA for the full OU1 Study Area" should be deleted.

> **EPA Response 143**: Comment noted. No change in ROD.

**Comment 144**: Monitoring after remedy construction is interchangeably referred to as "post-remedy monitoring" and "long-term monitoring." The ROD should use consistent terminology such as "long-term evaluation monitoring," which is used in the FFS Report.

> **EPA Response 144**: Comment noted. The term "post-remedy implementation monitoring is the consistent term used in the ROD.

**Comment 145**: Additional clarification is requested around the language used in describing the source control RAO, and monitoring being used to ensure the effectiveness of the remedy versus that used to ensure the RAOs are being met.

**EPA Response 145**: Clarification has been provided in the ROD.

**Comment 146**: The text states that "Figure 8 was developed through the use of the LTE model using existing data collected as part of the OU1 RI/FS process. It shows the expected range of long-term equilibrium concentrations for all of the COCs except lead based on existing data (lead is only a concern in the intertidal areas and is not included in the LTE model)." If similar language is included in the ROD, it should be revised to state which version of the model EPA intends to use (the NCG's deterministic model or EPA's probabilistic model) and should present the results of that model. Currently, the results of the NCG's deterministic model are presented, which is inconsistent with the NCG's understanding that EPA intends to use its probabilistic model.

**EPA Response 146**: Additional clarification has been provided in the ROD. The EPA intends to use the probabilistic model it developed for the site.

**Comment 147**: The text uses "ppt" as the units for the D/F TEQ PRG. As "ppt" can either stand for "parts per trillion" or "parts per thousand," the ROD should use SI concentration units (i.e., ng/kg) to avoid ambiguity.

**EPA Response 147**: Consistent units have been used in the ROD.

**Comment 148**: The NCG is concerned with correlating the reduction in CSO discharges by 65% as part of the LTCP with the achievability of the source-control RAO. First, the source control RAO is related to internal sources of COCs, not external. Second, the LTE concentrations due to CSOs are predicted to remain similar before and after implementation of the LTCP. Third, a reference should be provided for where 65% reductions came from and whether they apply to the creek as a whole or just the East Branch.

**EPA Response 148**: EPA disagrees the that the language in question equates CSO controls to the source control RAO. Rather, as described in the ROD, a reduction in volume of CSO discharges will reduce the loading of COCs from the CSOs, and this reduction should work towards being able to maintain the direct-contact RAOs in the long term. The post-remedy implementation monitoring conducted over time will help determine if the accuracy of the LTE model predictions and if the reduction in CSO loading will result in a reduction in LTE concentrations in the surface sediment. Based on recent presentations of modifications to the LTCP proposed by NYCDEP, the overall reduction of CSO discharge volumes to Newtown Creek are expected to be approximately 65% overall and approximately 71% to the East Branch in particular. EPA will continue to coordinate with NYCDEP as design of the LTCP for Newtown Creek continues.

**Comment 149**: The text states that "surface sediment concentrations of COCs are anticipated to increase due to the presence of ongoing sources of contamination." If similar language is included in the ROD, the text should be revised to state the type of ongoing sources (e.g., external, internal/external interface, or both)

> **EPA Response 149**: Clarification has been provided in the ROD.

**Comment 150**: Text around IEMs in different sections of the Proposed Plan is not consistent.

> **EPA Response 150**: The descriptions have been clarified and made consistent in the ROD.

**Comment 151**: The Proposed Plan text discusses multiple items that will be included in the PDI and states that data from the PDI will also be used to refine outputs of the LTE model. This text is misleading because the only item listed in this paragraph as part of the PDI Investigation that would represent an input to the LTE model is the presence of seeps. Other items such as additional delineation of COCs and NAPL and geotechnical investigations are not relevant to the LTE model. Text used in the ROD should be revised to state that "seep observation surveys may also be used to refine the outputs of the LTE model that will be used to develop the initial IEMs that will be refined over time."

> **EPA Response 151**: The details of the PDI will be determined after the ROD is signed and once the RD process is initiated.

**Comment 152**: The text states that NAPL could be transported from the contaminated sediment below the cap via dissolved phase advection or diffusion. NAPL does not get transported by dissolved phase advection or diffusion. The NAPL constituents can be transported by these mechanisms if (and only if) they are present in the porewater as a result of dissolution. Any text in a ROD should be updated to maintain scientific accuracy with respect to NAPL transport.

> **EPA Response 152**: The ROD describes this as "NAPL and/or its constituents."

**Comment 153**: The text states "given the industrial nature of the East Branch, each of the active remedial alternatives would also need to address infrastructure in and around the East Branch, including the Grand Street Bridge and the aeration system." As written, the wording could imply that each remedial alternative would include construction elements associated with Grand Street Bridge and the aeration system, which is not accurate. Instead, any text included in the ROD should be revised to clarify that the remedial alternatives "would also require coordination with other private and public entities to address infrastructure in and around East Branch, including the planned Grand Street bridge reconstruction, the NYCDEP aeration system, utility corridors, and shoreline slopes/structures," as noted in Section 7.6 of the FFS Report

> **EPA Response 153**: Comment noted. No change in ROD is necessary.

**Comment 154**: The description of Alternative EB-D in the Proposed Plan does not accurately describe the amount of dredging to occur.

**EPA Response 154**: The ROD has clarified this concern.

**Comment 155**: The description of Alternatives EB-D includes "ISS of 9,900 cy of sediment identified for NAPL treatment." This is inaccurate. The FFS Report (see Table 7-1 of the FFS Report, for example) states ISS is identified for 9,900 cubic yards of sediment for the purposes of shoreline stabilization, not NAPL treatment. Any text in the ROD should clarify the purpose of ISS in this area. As discussed in Section 5.1.1 of the FFS Report, NAPL or PTW warranting treatment using ISS have not been identified to date in East Branch. Although not discussed in the Proposed Plan, the FFS Report (Section 5.1.1) evaluates three technology options for treating NAPL/PTW if they were identified to be present through the PDI, and one of these options is ISS.

**EPA Response 155**: ISS may be used for two primary purposes in the remedy, (i) to reduce migration and/or treat NAPL and/or PTW and (ii) for shoreline stabilization. The ROD discusses both of these uses separately and the volume estimates in the ROD are described as such. Regardless, all volumes used herein are just estimates at this point and will need to be updated after conduct of the PDI.

**Comment 156**: The NCG suggests removing Alternative EB-E from the nine criteria evaluation descriptions for consistency with the statement made under Criteria 1 that it is not evaluated further.

**EPA Response 156**: Alternative EB-E has been removed from the remainder of the comparative analysis of alternatives in the ROD.

**Comment 157**: The text states "Alternative EB-D would remove and/or use ISS to treat remaining waste below the estimated 3-foot dredge limit, thus likely making it more effective in the long-term at preventing exposure to or migration of contamination from below the capped area to the surface than Alternative EB-C." This is an inaccurate statement; Alternative EB-D would not remove and/or use ISS to treat all material below the caps. In addition, reference to a "3-foot dredge limit" is not consistent with the variable dredge depths included in Alternative EB-D (see Comment No. 31). If this or similar language is included in the ROD, the text should be updated to accurately describe Alternative EB-D and the potential use of ISS.

**EPA Response 157**: Language in the ROD has clarified this concern.

**Comment 158**: The text of the Proposed Plan states that "while the volume of sediment requiring in-situ treatment would be refined using information collected during the PDI and during development of the RD, Alternative EB-D would likely result in the greatest volume of in-situ treatment since Alternative EB-D would include ISS where necessary to address relatively high COC concentrations in sediment, the potential for exposure to PTW, and/or the potential for NAPL migration." This implies that ISS as an "option" is only applicable to EB-D, which is not consistent with the FFS Report (Section 5.1.1). More importantly, this also implies that ISS as an "option" relates to the four considerations for deeper dredge depth, but this is not what the FFS Report or the description of Alternative EB-D as the preferred alternative states.

**EPA Response 158**: This point has been clarified in the ROD.

**Comment 159**: In the second paragraph of the Reduction of Toxicity, Mobility, or Volume through Treatment section of the Proposed Plan, the text states that amended capping is not considered treatment. However, this statement is inconsistent with the NCP 300.5 (EPA 1990), which states: "Treatment technology means any unit operation or series of unit operations that alters the composition of a hazardous substance or pollutant or contaminant through chemical, biological, or physical means so as to reduce toxicity, mobility, or volume of the contaminated materials being treated." The Proposed Plan statement is also inconsistent with EPA 2005, which states that immobilization treatment is "solidification, stabilization, or sequestering of contaminants by adding coal, coke breeze, Portland cement, fly ash, limestone, or other additives to the sediment for encapsulating the contaminants in a solid matrix and/or chemically altering the contaminants by converting them into a less bioavailable, less mobile, or less toxic form." EPA has previously considered amended capping as treatment in the RODs and other remedy selection documents issued by USEPA for several other sediment sites.

**EPA Response 159**: This point has been clarified in the ROD.

**Comment 160**: The text states "capping of all dredged areas" as part of the description of remedial alternatives. This is not consistent with the description of Alternative EB-D on page 20 of the Proposed Plan or in the FFS Report (Table 5-2), which discusses capping over 9.6 acres, ISS (including pre-dredge and post-ISS cap, if necessary) over 0.4 acre, and backfill in remaining areas. The text used in the ROD should be updated to accurately and consistently describe capping areas.

**EPA Response 160**: The text in the ROD has been reviewed for accuracy.

**Comment 161**: The "basis for preference" section of the Proposed Plan incorrectly states "the FFS assumes the placement of a multilayer engineering cap including the following layers: erosion protection, geotechnical filter, dissolved phase chemical isolation, NAPL sorption, and habitat layers." The FFS Report does not assume a geotechnical filter layer for all caps; only for the shallow water and wake zone caps. The FFS Report does not assume or require a habitat layer. The location of habitat layers can be evaluated during remedial design. Any language in the ROD regarding FFS cap assumptions should be revised to be consistent with the FFS Report

**EPA Response 161**: ROD language has been reviewed for accuracy. A habitat layer will be required, where needed, for the selected remedy.

**Comment 162**: In the Preferred Alternative and Basis for Preference section of the Proposed Plan, the text states that "a cap will be placed over the entire area treated through ISS." This is not consistent with the FFS Report, which states the need for a post-ISS cap would be determined based on treatability testing during the remedial design, as discussed in Section 5.3.5 of the FFS Report. This flexibility is appropriate given that ISS may be used for shoreline stabilization in areas where sediment concentrations may not necessitate a post-ISS cap.

Applicable text in the ROD regarding the need for a post-ISS cap should be consistent with Section 5.3.5 of the FFS Report

> **EPA Response 162**: The language in the ROD clarifies that the FFS assumes a cap will be placed over the entire area treated through ISS. During the RD, it may be determined that there are areas where shoreline stabilization is needed where sediment concentrations may not necessitate a post-ISS cap. The PDI and treatability studies will guide in identifying locations where conditions exist that warrant ISS for NAPL treatment and/or shoreline stabilization, as well as the need for a post-ISS cap.

*ExxonMobil provided a separate comment letter from the NCG.*

**Comment 163**: ExxonMobil notes that it appreciates the opportunity to comment on the Proposed Plan and agrees that Alternative EB-D will be protective of human health and the environment throughout the East Branch and will provide EPA with the flexibility to adjust the remedy as needed based on the findings of the PDI environmental and engineering studies.

> **EPA Response 163**: EPA appreciates the note of support.

**Comment 164**: ExxonMobil has concerns regarding the approach EPA has taken in establishing the PRG for C19-C36 Aliphatics (C19-C36) in the East Branch and NTC OU1. Given the complexity of the sediment media found in NTC, the lack of toxicity testing that isolates the impacts of C19-C36 from other total petroleum hydrocarbon (TPH) ranges, and the lack of a nationwide precedence for C19-C36 as an ecological risk-driving contaminant of concern (COC), ExxonMobil undertook a review of the C19-C36 toxicity data at the Newtown Creek Superfund Site (NTC SFS) and EPA's derivation of the PRG. This effort led to the identification of four key issues for EPA's consideration as it evaluates the Remediation Goal (RG) for East Branch and NTC OU-1:

1. There is inadequate detail in the administrative record documenting EPA's development of the C19-C36 PRG.
2. The scientific basis for aliphatic toxicity to benthic invertebrates and the results of an ExxonMobil led C19-C36 toxicity study do not support a PRG at 200mg/kg.
3. Two key areas in EPA's process for developing a risk-based C19-C36 PRG could benefit from reevaluation.
4. Several challenges exist when applying the Massachusetts Department of Environmental Protection (MADEP) Extractable Petroleum Hydrocarbon (EPH) method for analyzing C19-C36 in contaminated sediments, leading to the need for a site-specific method detection limit (MDL) validation study.

Considering that C19-C36 are not classified as Comprehensive Environmental Response Cost and Liability Act (CERCLA) contaminants (40 CFR 302.4), ExxonMobil requests that EPA consider these issues and the inherent analytical limitations in the test method before establishing a final RG for C19-C36. We ultimately recommend a site-specific MDL validation study be completed for C19-C36, using NTC sediments, in accordance with EPA policy. However, at this moment, we are not of the opinion that updating the C19-C36 MDL would alter the selected remedy for East Branch. Nevertheless, it will be important that the Pre-Design Investigation and Post-Remedy Monitoring efforts consider updated laboratory methodology to ensure improved C19-C36 data usability moving forward.

Note that the comment letter went on to include a 16-page analysis supporting four key issues listed above.

> **EPA Response 164**: The letter raised four concerns regarding the development of a preliminary remediation goal (PRG) for C19-C36 Aliphatic hydrocarbons: 1) a lack of administrative record; 2) a basis for aliphatic toxicity to benthic invertebrates; 3) technical concerns regarding development of risk-based PRG for C19-C36; and 4) a listing of challenges with the application of methods and detection limits. EPA's Newtown Creek team worked with EPA's Office of Research and Development as well as the NCG, NYCDEP, and NYSDEC to develop the risk-based PRGs for the site (see Attachment C of the document titled Development of Risk-Based Preliminary Remediation Goals for the Newtown Creek Site in the Administrative Record for this action). EPA reviewed each of the concerns and does not think they were supported by the arguments in the letter. Additionally, the NCG and all NCG members (including ExxonMobil) were involved in the PRG derivation process, which lasted well over a year, and ended three years ago with the finalization and EPA acceptance of the NCG's Development of Risk-Based Preliminary Remediation Goals, in December of 2021. The PRG for C19-C36 aliphatic hydrocarbons remains as 200 mg/kg in the ROD.

*National Grid provided a separate comment letter from the NCG.*

**Comment 165**: Several sections of the Proposed Plan contain contradictions, suggesting PRGs should be met "in the long term" while also acknowledging that LTE results might not achieve PRGs even after implementing a long-term control plan for ongoing sources. Although future reductions in COCs are anticipated with remedy implementation, there is no specific timeline or mechanism for lowering all COCs to meet risk-based PRGs because of constituent loading from ongoing sources. Therefore, RGs should reflect expected LTE/background levels. This issue needs clarification in the ROD.

> **EPA Response 165**: The "Overview of Remedy Approach" section of the ROD provides greater clarification on this issue. In addition, as is explained in EPA's November 2023 "Framework for the Operable Unit One Remedial Action Objective and Preliminary Remediation Goal Approach," while ongoing sources of contamination will continue post-remedy, there is an expectation that the overall external (including internal/external interface) loading to the Creek will decrease over time because of improved best management practices, ongoing cleanup actions (such as at upland sites), and additional regulatory control (including the LTCP both for Newtown Creek and for the East River overall). This approach will be further memorialized in the Adaptive Site Management Plan that EPA is currently developing for the site.

**Comment 166**: The proposed remedy includes "the use of sealed bulkheads, if and where needed, as a temporary measure to address seeps while cleanup of the related upland source is evaluated and implemented." National Grid suggests using the term "temporary sealed bulkheads". The Proposed Plan and ROD should specify a time limit for addressing known upland sources with temporary bulkheads, as these upland sources could cause recontamination of the surface sediments. The feasibility, implementability, and impact assessment to groundwater flow and discharge from sealing the bulkheads need to be identified in the ROD, and it should be made clear in the ROD that groundwater management costs are the responsibility of the upland property owners including any necessary treatment.

**EPA Response 166**: Comment noted. See EPA Response 108, 109 and 111.

**Comment 167**: The Proposed Plan states that a "highly robust pre- and postimplementation monitoring plan to demonstrate the ongoing performance and protectiveness of the remedy" will be conducted. National Grid requests further clarification as to the intent of this statement. The level of monitoring being proposed is not necessary to demonstrate the performance and protectiveness of the remedy. The monitoring results from the proposed monitoring program will be influenced by constituent loading from ongoing sources, which are not being addressed at this time. As such, monitoring results will not reliably evaluate remedy performance. We request that a specific monitoring plan not be included as part of the ROD. Inclusion at this time is premature and should be further developed during the Remedial Design Phase, informed by data collected during the Pre-design Investigation. Furthermore, we request that any proposed monitoring plan monitoring plan be separated into two components: 1.) monitoring for remedy performance; and 2.) monitoring for recontamination from ongoing sources. This distinction is necessary to differentiate results.

**EPA Response 167**: The “Remedial Action Objectives” and “Overview of Remedy Approach” sections of the ROD have clarified the post-remedy implementation monitoring approach. See EPA Response 120.

**Comment 168**: National Grid thinks consistently using the term OU4 to refer to the action rather than substituting OU4 with “the East Branch portion of OU1” would provide greater clarity.

**EPA Response 168**: Comment noted. OU4 was only created for internal, EPA administrative purposes. The ROD selects an interim remedy to address a portion of the OU1 Study Area. As such, the terminology is not changed in the ROD.

**Comment 169**: The “Scope and Role of Action” of the Proposed Plan states that as “an interim remedy, the selected remedy for the East Branch portion of OU1 will be reviewed on an ongoing basis to assure the assumptions made in reaching this conclusion remain appropriate." National Grid agrees with EPA that "the selected remedy for the East Branch portion of OU1 will be reviewed on an ongoing basis to assure the assumptions made in reaching [the interim remedy] remain appropriate", but requests clarification of the intent of the following statement "reviewed on an ongoing basis" and impact of the review on remedial action efforts in East Branch and OU1. Rather than stating EPA "fully anticipates", National Grid recommends softening the language to "work at East Branch will inform the scale and costs of the remedy before site wide implementation of the same or similar remedy".

**EPA Response 169**: Comment noted. EPA stands by its statement that we fully anticipate the East Branch Early Action remedy will be consistent with the eventual final OU1 remedy.

**Comment 170**: The Enforcement History section of the Proposed Plan states that additional "potentially responsible parties have been notified of their potential liability since the original 2011 AOC was signed. The role and contribution of these additional parties to each OU at the Site is yet to be determined, although it is anticipated that the additional PRPs will be asked to take part in the remedial design and/or remedial action activities associated with the Site, including the East Branch portion of OU1. Efforts to identify additional potentially responsible parties continues." The Agency has noticed many additional owners/operators of facilities which formerly or currently released hazardous substances to Newtown Creek. These parties have a significant legal obligation to fulfill by paying toward the East Branch work and earlier Creek wide remedial activities. EPA is correct to insist that all parties will take part in the remedial design and/or remedial action work, and we request all parties be subject to an Administrative Order.

**EPA Response 170**: EPA anticipates inviting all noticed PRPs to enter negotiations to perform the RD and implement the remedial action for the East Branch Early Action. See also EPA Response 107.

**Comment 171**: The Proposed Plan states that are many ongoing, external sources of contamination to the Study Area. These include MS4s, the Newtown Creek WWTP treated effluent outfall, permitted industrial discharges, other permitted/non-permitted discharges, overland flow/direct drainage, other non-point sources, the tidal effects of the East River, atmospheric deposition, shoreline seeps/groundwater discharge from upland properties, and shoreline bank erosion, as well as CSO discharges and that some of these sources may be considered both internal and external to the Study Area." This language is inconsistent with Section 3.4.2 of the FFS Report, which states: "The categorization of individual ongoing sources will be evaluated based on additional information collected during a pre-design investigation and considered during the RD and long-term remedy evaluation monitoring." Language discussing internal/external interface sources in the ROD should correctly reference the language included in the FFS Report. Additionally, EPAs referencing these types of sources as "internal/external interface sources" adds a new terminology to CERCLA's existing framework of sources and is unnecessary. Regardless of the source of a release (e.g., direct discharges, indirect discharges, overland flow) the contaminant being released to the Newtown Creek site and all such releasing parties are accountable under CERCLA. Furthermore, as EPA recognizes, the existence of uncontrolled, ongoing release of hazardous substances from upland sources could cause recontamination of the surface sediments. EPAs citation to "internal/external interface sources" adds only ambiguity to over four decades of liability attribution under CERCLA and should not be used.

**EPA Response 171**: This language has been clarified in the ROD.

**Comment 172**: The Proposed Plan states that "additional data from ongoing point sources and the East River will also be obtained as part of the OU2 post-ROD monitoring program. These data will be considered, as appropriate, in the design for the East Branch portion of OU1 remedy." The potential variability of East Branch point sources should be a recognized fact. The physical and chemical properties of the known point sources are expected to vary with rainfall, seasonality, and tidal influences, among other factors. The additional data from ongoing point sources and the East River should not be considered in the design for the East Branch portion of OU1 remedy. The OU1 remedy is not designed to address the ongoing contaminant loading from the point sources and East River. This should be reflected in the responsiveness summary and the ROD.

> **EPA Response 172**: The RD will take into consideration all ongoing inputs to the East Branch. While the constructed remedy may not directly address all ongoing inputs, it may be designed to account for them where necessary (for example, erosion control near CSO discharge locations). The impact of ongoing sources of contamination on the protectiveness of the implemented remedy will be evaluated through the post-remedy implementation monitoring program and it may be determined that additional action is needed to maintain the protectiveness of the implemented remedy, through state and/or federal enforcement authority, to be determined on a case-by-case basis.

**Comment 173**: The Proposed Plan states "In addition, ongoing sources of contamination will continue to add contamination to the Study Area. While EPA anticipates the amount of contamination entering the Creek from ongoing sources will decrease over time due to various factors, including cleanup of upland properties, greater regulatory control, and improved practices for managing waste and stormwater, all ongoing external sources of contamination cannot be completely eliminated." National Grid agrees that "all ongoing external sources of contamination cannot be completely eliminated." In-creek remediation will not provide a long-term solution if ongoing sources add contamination to the study area. We highly recommend source control be implemented prior to remedial action and that the concentrations of the "ongoing external sources of contamination" be recognized as background. Therefore, National Grid Recommends the contamination levels associated with these ongoing sources be assessed and understood prior to establishing IEMs and PRGs.

> **EPA Response 173**: Comment noted. No changes to ROD made. Please also see EPA Response 165.

**Comment 174**: National Grid notes that the navigational elevation is subject to change based on the outcome of the WRDA bill.

> **EPA Response 174**: Comment noted.

**Comment 175**: National Grid recommends a few lines on upland uses that could be beneficial for the impending bulkhead/structural support requirements. National Grid suggests language indicating that bulkheads are in poor condition and that upland owners should be constructing/developing their sites to support the clean-up and/or future uses of the Creek. The

ROD should recognize how this is the upland owners' responsibility, rather than the PRP's responsibility.

**EPA Response 175**: Please see previous responses on similar comments.

**Comment 176**: The Proposed Plan states that "Uses of the areas surrounding the Creek are highly varied, and they include industrial/commercial properties, residential properties, limited recreational access areas, and abandoned properties." National Grid recommends removing the word "limited" from future documents since no qualifying adjectives have been used for the other land uses types in this sentence.

**EPA Response 176**: Limited has been removed from this sentence in the ROD.

**Comment 177**: The Proposed Plan states "an aeration system operated and maintained by NYC to improve dissolved oxygen levels." National Grid recommends adding more detail about the aeration system that NYC operates as part of the ROD. The aeration system is necessary because this is essentially a dead-end system that was built for industrial purposes rather than environmental ones, and it's going to continue to be necessary. This highlights the problems that have existed with the Creek since the 1850s, and that will not be resolved as a result of the remedy.

**EPA Response 177**: Comment noted.

**Comment 178**: In reference to the basis for the East Branch Interim Early Action, the Proposed Plan states that "It will result in immediate risk reduction and contaminant mass removal in this portion of the OU1 Study Area (and, to a lesser extent, within the OU1 Study Area as a whole)." EPA's basis for the East Branch interim early action, in part, is that such action will result in "immediate risk reduction and contaminant removal". The automatic association of mass contaminant removal equating to risk reduction is unproven and in jeopardy given the constituent loading from ongoing sources. Monitoring the effectiveness of mass removal associated with remedy implementation requires establishing a practical baseline data set so valid comparisons can be understood from a pre- and post-dredging outcome analysis of expected ecological effects.

**EPA Response 178**: Comment noted. No changes to ROD made. The Early Action will address areas of the East Branch with elevated contaminant concentrations that act as ongoing sources to the water column, the sediment bed, and biota. Remediating these sources will immediately reduce concentrations and reduce biota exposure to contaminants. Note that significant pre- and post-remedy implementation monitoring will be conducted.

**Comment 179**: The Proposed Plan states that "The early action will include a robust post-implementation evaluation monitoring program, and if the monitoring shows that the assumptions used to develop the East Branch CSM are not accurate, the CSM will then be updated accordingly." Will there be sufficient data to be used as a duplicative model for other tributaries or all of OU1? If so, will it be similar or dissimilar?

**EPA Response 179**: Updates to the CSM for other portions of OU1 will be considered, if appropriate, based on the findings of the East Branch Early Action RD and RA.

**Comment 180**: The Proposed Plan states that "The natural hydrodynamics of the East Branch (similar to other areas of Newtown Creek) are dominated by twice-daily tidal flows from the East River and by storm-driven freshwater inputs from over 35 individual point source discharges (direct discharges from individual sites, highway drains, MS4 discharges, CSOs and overland flow) creating a dynamic local environment that exhibits a unique combination of solids loads and depositional characteristics." East Branch's characteristics are recognized by EPA as highly variable and stem from twice daily tidal flows, storm driven freshwater inputs from 35 individual point source discharges among other significant factors. These varying sources and associated contaminants pose ever shifting risks over the spatial scale and time frame in East Branch. The uncertainty of how such variability impacts the East Branch ecosystem and the ever-changing background concentrations make net risk reduction by dredging poorly understood. Accordingly, National Grid requests that EPA recognize that background variability impacts risk and will continue after implementation of the dredging/capping operation.

**EPA Response 180**: The post-remedy implementation monitoring program is an integral part of the selected remedy, the purpose of which is (i) to assess the performance of the remedy itself within the East Branch portion of the OU1 Study Area and (ii) to assess the impact on the protectiveness of the remedy from ongoing sources over time. These ongoing sources are not considered background for this action. See the "Detailed Rationale for Selection of RGs for this Action" subsection of the "Remedial Action Objectives" section of the ROD for additional information.

**Comment 181**: The Proposed Plan states "However, the mobility of NAPL in untested areas of the East Branch is unknown, and changes to in-situ conditions and/or anthropogenic disturbances could potentially mobilize NAPL." NAPL is located in isolated areas identified in the East Branch sediments. Therefore, National Grid requests this statement be clarified in the responsiveness summary and not included in the ROD.

**EPA Response 181**: Comment noted. No changes to ROD made.

**Comment 182**: Regarding the risk box in the Proposed Plan, the title should be "Understanding Human Health Risk and Its Calculation." This section solely addresses human risks, not those concerning ecological receptors. In the "Hazard Identification" part, substitute "soil" with "sediment" since Newtown Creek is a sediment site. Similarly, in the "Exposure Assessment" section, replace "soil" with "sediment" to reflect that Newtown Creek deals with sediment.

**EPA Response 182**: Comment noted.

**Comment 183**: The Proposed Plan states that "EPA is proposing that the long-term cleanup goals for the East Branch Early Action be set to the risk-based PRGs. EPA can select PRGs consistent with background conditions if risk-based remediation goals are lower than background concentrations. However, since the Creek is a dead-end water body without a natural up-river source of water and there are many ongoing sources of contamination to the Creek, the determination of background at this Site is not clear cut. Furthermore, while ongoing sources of contamination will continue post-remedy, there is an expectation that the overall external (including internal/external interface) loading to the Creek will decrease over time because of improved best management practices, ongoing cleanup actions (such as at upland sites), and additional regulatory control (including the LTCP both for Newtown Creek and for the East River overall). Since EPA anticipates that the risk-based PRGs are attainable in the long-term, background-based PRGs or action levels are not necessary for this action. The process that will be used to assure the RAOs are being met over time is described in the Summary of Remedial Alternatives section below." National Grid emphasizes the necessity of understanding how background levels from ongoing sources of contamination will evolve with implementation of source control. National Grid requests that EPA acknowledge that ongoing sources should constitute background for Newtown Creek until cleanup of ongoing sources are complete and should be incorporated into the ROD.

> **EPA Response 183**: EPA disagrees. Please see <u>EPA Response 123</u>.

**Comment 184**: The Proposed Plan states "Determine interim evaluation measures (IEMs) using empirical data, as well as the predictive LTE model developed for the Site. The IEMs will be used for remedy design, implementation, and post-implementation monitoring and will be adjusted periodically using empirical data to account for current conditions." National Grid requests that EPA clarify how the IEMs will be selected. Will empirical data be used or will the LTE model be used. If the LTE model will be used, please clarify which version, and specifically how IEMs will be based on model output. Finally, please clarify that the IEM will be set at the risk-based PRG if this concentration is higher than the expected equilibrium concentration from the LTE (as noted in the Proposed Plan page 18). This clarification language should be included in the ROD and any text in the ROD should confirm that language related to IEMs is consistent throughout.

> **EPA Response 184**: The "Overview of Remedy Approach" section of the ROD clearly explains the role of IEMs for this action.

**Comment 185**: The Proposed Plan states "Develop a long-term monitoring program that includes sampling of at least surface sediment, subsurface sediment, porewater, both suspended sediment and dissolved phase concentrations in surface water, and ongoing external sources of contamination (including, at a minimum, CSOs, MS4s, stormwater and overland flow, as needed if not being monitored under OU2)." National Grid recommends the long-term monitoring plan be developed based on the selected remedial action to evaluate the effectiveness of the remedy rather than meet a minimum number of predefined sampling criteria. Specifics of the sampling plan (e.g., sampling type, frequency, trigger values, etc.) should be developed after the ROD and informed by information collected and developed during the PDI and remedial design.

> **EPA Response 185**: Comment noted. The details of the post-remedy implementation monitoring plan will be developed after the ROD.

**Comment 186**: The Proposed Plan points to "technology inspections for NAPL, with chemical analysis to confirm the composition of NAPL identified, regular bank inspections for erosion, with sampling as needed, and regular inspections for the presence of seeps, with opportunistic sampling as possible. The purpose of this long-term monitoring program is to assess overall remedy effectiveness, including both the performance of the remedy itself within the East Branch portion of the OU1 Study." National Grid disagrees with this statement. The dredge and cap remedy remains protective as long as the cap stays intact. Material on top of the cap or in dredged areas does not indicate remedy failure and does not impact protectiveness. These assertions are inaccurate and should be excluded from future documents, including the ROD.

**EPA Response 186**: Comment noted. The ROD clarifies this concern.

**Comment 187**: The Proposed Plan indicates that "However, if the need for source control is related to a seep from a contaminated upland property, then the source control action would be taken through state and/or federal (Superfund and/or non-Superfund) enforcement authority, to be determined on a case-by-case basis." National Grid agrees and would want EPA and NYSDEC to address sources earlier. We believe a plan to address these ongoing sources must be addressed as a component of the ROD in order to develop a successful, long-term remedy.

**EPA Response 187**: Comment noted.

**Comment 188**: The Proposed Plan states that "This information will be updated based on sampling conducted during investigations to support the design of the remedy and on an ongoing basis after implementation of the remedy, but the existing data shows that risk-based PRGs do appear to be achievable at this time for copper (PRG 490 ppm) and TPAH(34) (PRG 100 ppm), may be achievable with little or no additional source control work for PCBs (PRG 0.30 ppm), and will likely take time and additional source control work to achieve for dioxins/furans (PRG 18 ppt) and C19-C36 (PRG 200 ppm)." National Grid states for the record that EPA's decision to set PRGs below known background levels is inconsistent with CERCLA's requirement for remedies to be cost-effective and technically practicable, and it also introduces the certainty of Agency-defined "recontamination." The EPA acknowledges that CERCLA authorities for Clean Water Act background sources have not been effectively integrated into the East Branch remedy selection. According to the EPA, "Close coordination between the Superfund and Clean Water Act (CWA) programs can make both programs more effective and better serve the public. For example, permits and other actions taken under CWA authority could reduce the risk of resedimentation" ("Promoting Water, Superfund and Enforcement Collaboration on Contaminated Sediments", EPA, (February 12, 2015). Simple collaboration between CERCLA and CWA staff will enhance Agency decision-making by identifying, for instance, conditions in NPDES permits to address CERCLA contaminants of concern as a beneficial first step.

**EPA Response 188**: EPA Superfund already does and will in the future coordinate with both the Federal and NYSDEC CWA programs during the RD, implementation, and post-remedy implementation portions of this action. See also EPA Response 123.

**Comment 189**: The Proposed Plan states that "This analysis illustrates that, based on EPA's current understanding, the RAOs that have been established for the East Branch portion of OU1 are achievable in the long-term. The model will be used to determine the IEMs." As mentioned in National Grid's comments earlier, please specify how the model and empirical data will be utilized, including which version of the model and which specific output will be employed.

**EPA Response 189**: Additional clarification has been provided in the ROD. The EPA intends to use the probabilistic model it developed for the site.

**Comment 190**: The phrasing in the last sentence of the 2$^{nd}$ paragraph in the "Monitoring and Evaluation Approach" section of the Proposed Plan suggest that data will be compared on a SWAC basis. National Grid points out that EPA has indicated in the past they will do a point-by-point comparison of samples to IEMs. National Grid recommends specifics of the monitoring and evaluation approach be developed after the ROD and informed by information collected and developed during the pre-design investigations and remedial design.

**EPA Response 190**: Additional clarification on the approach has been provided in the "Overview of Remedy Approach" section of the ROD, and the details will be further developed as part of the design of the remedy.

**Comment 191**: The Proposed Plan indicates that "IEMs will be developed through the use of the LTE model and will be set to the 50th percentile concentration prediction from the LTE model for each COC. A tiered monitoring program will be developed and refined over time. The initial tier will include a regular, post-implementation sampling plan that will be developed during the remedial design. The second tier would require increased monitoring of all potential sources of contamination if the surface sediment concentration of the remedy footprint reaches between 75% and 90% of the current IEM for each COC, depending on the COC." National Grid requests EPA to please clarify why increased monitoring is required at 75th and 90th percentile of the IEMs. If the IEMs are set based on the LTE model, then reaching 75th and 90th percentile of these concentrations is expected and should not result in increased monitoring. National Grid recommends specifics of the monitoring and evaluation approach be developed after the ROD and informed by information collected and developed during the pre-design investigations and remedial design.

**EPA Response 191**: See EPA Response 190.

**Comment 192**: The Proposed Plan states "This monitoring program will allow EPA to identify the specific, ongoing sources that may cause IEM exceedances before IEM exceedances actually occur and will enable EPA to develop an appropriate course of action to ideally prevent IEM exceedances from ever occurring. The IEMs will be refined over time as new empirical data is obtained, and the IEM for any particular COC could be consistent with the risk-based PRG. Over time, as additional external and internal/external interface source control measures are taken, the expectation is that all IEMs will be consistent with the risk-based PRGs, at which point the remedy would be protective and the ongoing monitoring would be conducted to assure it remains so." Based on the LTE model, risk-based PRGs for some COCs are expected to be exceeded if IEMs are set at the 50th percentile of the LTE model. Please clarify how IEMs will be consistent with PRGs if they are selected based on the LTE model. Additionally, please again clarify the version of the model being used and which specific output. It is important to clarify that the IEM should be set at the risk-based PRG if the risk-based PRG is higher than the LTE-model predicted equilibrium concentration. National Grid recommends specifics of the monitoring and evaluation approach be developed after the ROD and informed by information collected and developed during the pre-design investigations and remedial design.

**EPA Response 192**: See EPA Response 190.

**Comment 193**: The Proposed Plan indicates "any sheen observed in the future would need to be further investigated." National Grid requests clarification as to the intent of this statement. Investigation of every sheen would place undue burden on respondents. There are numerous ongoing external sources for sheens that are not being controlled by the remedy.

> **EPA Response 193**: The ROD states that "sheens could potentially be indicative of Site-related contamination at elevated concentrations that would impact the effectiveness of the implemented remedy. As such, sheens observed after implementation of the remedy would need to be further investigated, including through sampling and analysis. Depending on the results, additional remedial efforts could be required, again through either state and/or federal enforcement authorities (to be determined on a case-by-case basis)."

**Comment 194**: This comment is regarding the third bullet in the last sentence of the "Common Elements of Each Active Alternative" section of the Proposed Plan. National Grid clarifies for the record that saying NAPL can be transported by diffusion is incorrect. Only NAPL components that have dissolved in water are transported by diffusion.

**EPA Response 194**: The ROD describes this as "NAPL constituents."

**Comment 195**: The Proposed Plan states that "The post-implementation monitoring program (described under "Monitoring and Evaluation Approach") will be used to determine if the source-control RAOs are being met. Increased monitoring of all potential sources of contamination would be conducted when the surface sediment concentration of the remedy footprint reaches between 75% and 90% of the current IEM for each COC, depending on the COC. As described previously, additional source control actions will then be taken on an as-needed basis under state and/or federal enforcement authority, to be determined on a case-by-case basis." Please clarify how the 75th and 90th percentile values were selected and why this increased monitoring is required prior to reaching the IEMs, particularly since the IEMs will be set based on the LTE model, meaning reaching these concentrations is expected and should not result in increased monitoring. National Grid recommends specifics of the monitoring and evaluation approach be developed after the ROD and informed by information collected and developed during the pre-design investigations and remedial design

**EPA Response 195**: See EPA Response 190.

**Comment 196**: When discussing the EB-D Alternative in the Proposed Plan, EPA is consistent with the FFS description of this alternative. However, when discussing the "Evaluation of

Alternatives", EPA is not consistent with these descriptions of EB-D. National Grid notes for the record that this is not consistent with the options of ISS, dredging or capping outlined in the FFS, and requests that this be corrected in future documents.

**EPA Response 196**: Language in the ROD has been clarified.

**Comment 197**: The Proposed Plan states that "Alternative EB-D would remove and/or use ISS to treat remaining waste below the estimated 3- foot dredge limit…" National Grid notes for the record that this is not consistent with the options of ISS, dredging or capping outlined in the FFS, and requests that this be corrected in future documents.

**EPA Response 197**: Language in the ROD has been clarified.

**Comment 198**: The Proposed Plan states that "Alternative EB-D would include ISS where necessary to address relatively high COC concentrations in sediment, the potential for exposure to PTW, and/or the potential for NAPL migration." National Grid notes for the record that this is not consistent with the options of ISS, dredging or capping outlined in the FFS, and requests that this be corrected in future documents.

**EPA Response 198**: Language in the ROD has been clarified.

*Phelps Dodge Refining Corporation provided a separate comment letter from the NCG.*

**Comment 199**: As EPA directed, the PRG for copper (490 mg/kg) was derived using the dietary exposure model for mummichog in the screening level ecological risk assessment (SLERA) as opposed to deriving it from the model in the EPA-approved baseline ecological risk assessment (BERA) (Anchor QEA 2018; Anchor QEA, 2021). The SLERA, which is an initial step in the CERCLA risk assessment process, employs upper-bound conservative exposure assumptions in order to identify contaminants of potential ecological concern warranting additional evaluation in the BERA. In the BERA analyses, these upper-bound exposure assumptions are replaced with more realistic, yet still conservative assumptions to estimate potential ecological risk. The quantitative EPA-approved BERA analyses are typically what is relied upon for establishing PRGs and informing risk-management decisions. Thus, a copper PRG derived using the dietary exposure model from the SLERA is uncommon and overly conservative.

**EPA Response 199**: The NCG and all NCG members (including PDRC) were involved in the PRG derivation process, which lasted well over a year, and ended three years ago with the finalization and EPA acceptance of the NCG's Development of Risk-Based Preliminary Remediation Goals in December of 2021. EPA reviewed the arguments and does not think they were supported by the letter. PDRC used its own modeling inputs to calculate a copper PRG that is over four times higher than the PRG that was used in the Proposed Plan. EPA responded to each of the arguments made in the letter previously, during the aforementioned PRG derivation process.

*The City of New York, another PRP for the site, submitted comments on the Proposed Plan. These comments included input from NYCDEP and NYC Department of Transportation*

*(NYCDOT). A separate email was also received from NYCDEP related to the LTCP. The comments are grouped, as noted below.*

*New York City also provided a series of comments directly related to the draft final version of the FFS released with the Proposed Plan. These are provided in Attachment A to this Responsiveness Summary and will be responded to in an addendum to the FFS.*

**Comment 200**: Overall, the City is concerned with the approach towards controlling NAPL seeps from upland Sites. The Proposed Plan treats potential NAPL seeping from upland sources, a PTW for the Site, in a manner which could fail to meet the source control RAO. Rather than adopting a single, effective approach, the Proposed Plan has different and unequal approaches to controlling NAPL/oil/coal tar migrating to the Creek from sediments due to ebullition versus NAPL migrating via upland sites (i.e., NAPL seeps). The approach to control NAPL migration from sediments is aggressive, including a proposed bank-to-bank amended cap with a 9-inch NAPL sorption for cap designs. By contrast, the approach to NAPL seeps assumes that NAPL seeping from the upland sites is trivial.

> **EPA Response 200**: EPA recognizes the critical importance of identifying, characterizing, and abating ongoing sources of contamination to the East Branch that impact the long-term protectiveness of the implemented remedy. The language in the ROD has been expanded to clarify the intention of and the approach to be used for the East Branch Early Action, in particular the "Remedial Action Objectives" and "Overview of Remedy Approach" sections of the ROD.

**Comment 201**: The Proposed Plan only anticipates addressing NAPL from upland seeps if that NAPL "is found to be impacting the protectiveness of the implemented remedy," and even then, only provides that the seeps "will need to be addressed through either state and/or federal enforcement authorities (to be determined on a case-by-case basis)." This approach fails to adequately address the magnitude of the NAPL seep contributions. The City has documented pure product entering and migrating throughout the Creek. NAPL entering the Creek is not just thin sheens, but thick oil which has elevated concentrations of all measured Contaminants of Concern (COCs) for the Site.

> **EPA Response 201:** The PDI and/or the post-remedy implementation monitoring plan will be developed to identify any seeps that are likely to adversely impact the protectiveness of the remedy. The plans will be developed in consideration of all existing data for the site, including what NYC has provided to EPA.

**Comment 202**: The approach proposed to control these seeps is ineffective and in stark contrast with the rigorous approach proposed for NAPL migration from sediments. Even though there is continuing disagreement regarding the extent of NAPL migration through ebullition, the PRAP proposes aggressive controls for NAPL migration through ebullition. The PRAP does not require an assessment to see whether uncontrolled NAPL migration due to ebullition would impact the remedy before requiring protective measures. The protective measures proposed are appropriately conservative; the alternatives in the Proposed Plan propose a bank-to-bank amended cap with a 9-inch NAPL sorption for all cap design on soft sediments, despite the NCG surveys identifying ebullition occurrence in only narrow areas of EB and the contaminant loads for NAPL migration through ebullition as a fraction of loads from various other sources.

> **EPA Response 202:** The remedy will be designed in consideration of the results of the PDI, including information that is known at the time about potential significant impacts to the RAOs. The post-remedy implementation monitoring program, which is an integral part of the selected remedy, will be developed (i) to assess the performance of the remedy itself within the East Branch portion of the OU1 Study Area and (ii) to assess the impact on the protectiveness of the remedy from ongoing sources over time. Also see EPA Response 120.

**Comment 203**: In contrast, EPA prematurely determined that NAPL seeps from upland sources are a "minor source of contamination" to the EB sediments and that uncontrolled NAPL seeps will not impact the anticipated LTE concentrations. The City strongly disagrees with USEPA's position on NAPL seeps from upland sites. There are ongoing NAPL seeps, including within the East Branch, which the City first documented in 2016. EPA's prior comments on the Chemical Fate Transport model support the City's position – the analysis shows that NAPL migration impacts the sediments and results in elevated COC concentrations in sediments and sediment traps. See EPA comment on the statement of concurrence 1.

> **EPA Response 203:** Neither the Proposed Plan nor the ROD state that NAPL seeps from upland sources are a minor source of contamination. The significance of seeps as a source of contamination will be determined and reviewed on an ongoing basis through the RD, implementation, and post-remedy implementation monitoring of this action.

**Comment 204**: EPA determined that the LTE would be only "slightly" higher due to NAPL impact based on an NCG report which was not reviewed by any stakeholder, including EPA. See East Branch Focused Feasibility Study Section 3.4.4. The unreviewed AnchorQEA report concluded that NAPL seeps are a minor input by focusing only on one COC, TPAH34, even though data is available for all COCs. The report did not address the City data showing that the COC concentrations in NAPL seeps are orders of magnitude higher than the risk based PRGs and LTE and present risk to human health and the environment. EPA should not rely on an unreviewed NCG report which contradicts USEPA's technical assessments and guidance on NAPL control.

> **EPA Response 204:** Appendix B of the FFS contains an Upland Sources Evaluation the NCG conducted based on a review of existing information, including findings from the City's 2020 NAPL seeps related work. It states directly that additional characterization data is needed. EPA views this appendix as a preliminary review of existing information which will help in the development of the PDI and future monitoring efforts, not a definitive determination of the impact of seeps on the East Branch. EPA reviewed the appendix, from this perspective, as part of its review of the FFS for the East Branch Early Action. And as noted in EPA Response 203, neither the Proposed Plan nor the ROD state that NAPL seeps from upland sources are a minor source of contamination.

**Comment 205**: The proposed remedial action based on these conclusions is similarly concerning. In the PRAP, EPA states that NAPL seeps will be controlled only if NAPL seep "is found to be impacting the protectiveness of the implemented remedy." This means that if a NAPL seep is documented, rather than taking actions to control it, EPA will collect data to assess impact on sediments only, as sediment remediation/pathway is the remedy basis. This is stated on page 18 of the PRAP where the text states that the "monitoring and evaluation approach will be used to determine if the source control RAO is being met." The monitoring and evaluation approach only focuses on comparison of future sediment concentrations to LTE. EPA will not assess impact on surface water or direct impact on ecological receptors such as fish birds etc. This is inconsistent with all superfund guidance and a complete disregard to the presence of PTW. This is also in violation of the NYSDEC ARAR 6 NYCRR § 375-1.8.C.1, regarding presence of NAPL on water surface. EPA's conclusion that "need for sealed bulkheads is not currently indicated by existing data" is inaccurate and diverges from EPA's guiding pillar of controlling sources early.

> **EPA Response 205:** There are several reasons this comment is a mischaracterization for how NAPL seeps will be addressed. First, Superfund is a risk-based program and, as such, a remedy can only address unacceptable risks to human health and/or the environment. Therefore, NAPL seeps will only need to be addressed through state and/or federal enforcement authorities if they are found to be contributing to unacceptable levels of risk. Second, the source-control RAO is to "reduce migration of COCs, related to NAPL and its constituents and other sources of COCs within the East Branch, to surface sediment and surface water to levels that are protective for human health and ecological exposure." It includes both sediment and surface water. Third, NYSDEC has concurred with this remedy and the approach to NAPL seeps. Fourth, the need for sealed bulkheads as a preliminary measure will be determined, initially, based on the PDI and potentially in the future if a significant ongoing source is discovered during or after implementation of the remedy. Finally, please see Tables 8, 9, and 10 for the list of ARARs and TBCs relevant to this action. Because this is an interim action, chemical-specific ARARs have not been identified.

**Comment 206**: EPA should have a consistent approach for controlling PTW (i.e., NAPL) migration regardless of the pathway (sediments/ebullition transported versus upland sites/seeps). If a NAPL seep is documented, it should trigger the use of sealed bulkheads in the remedial alternative to control the NAPL seep/PTW from entering the Creek and impacting the ecological receptors followed by immediate investigation either through State or federal authorities for further upland controls. The added step of assessment to see if a NAPL seep impacts the sediments will inhibit overall protectiveness of human health and environment, limit the long-term effectiveness and permanence of remedial alternatives and prevent reduction of toxicity, mobility, or volume of contaminants through treatment.

> **EPA Response 206**: Comment noted. EPA disagrees that the documentation of a seep should trigger the need for sealed bulkheads as a blanket statement. The necessity for and approach for controlling PTW and/or NAPL will be determined on a situation-specific basis during the RD process and in the future during the implementation of the remedy and post-remedy implementation monitoring program.

**Comment 207**: The Proposed Plan rejects background-based PRGs on the assumption that "risk based PRGs are attainable long term" and goes on to state that if surface sediments do not continue trending towards long term remediation goals, EPA will assess the need for additional source control measures. See page 15. The City has several concerns with EPA not selecting background for PRGs.

**EPA Response 207**: Comment noted.

**Comment 208**: The EPA guidance on sediment remediation for hazardous waste sites states that "[u]nder CERCLA, cleanup levels are not set at concentrations below natural background levels. Similarly, for anthropogenic contaminant concentrations, the CERCLA program normally does not set cleanup levels below anthropogenic background concentrations." EPA's proposal for East Branch is in clear contradiction of EPA national policy. Even if ongoing sources are controlled significantly, the background will not converge to the risk-based PRGs as the concentrations of solids from ongoing sources stays the same. For example, as part of the LTCP, the CSO discharge to the Creek will be substantially reduced. Despite this significant reduction, there is minimal change (<10%) in the anticipated future background (LTE/IEM) concentrations in the Creek based on this reduction for contaminants of concern including C19-C36 aliphatic petroleum hydrocarbons and dioxins/furans where the background/LTE/ IEM exceed the risk-based PRG. The only contaminant which sees a significant change is TPCB, where the LTE concentrations increase by 40% after the CSOs are controlled after implementation of the LTCP. EPA can run these scenarios for various theoretical source control alternatives and will find that all ongoing solids-based sources, including the East River and all runoff, will have to be controlled almost completely (by 97%) to achieve the risk based PRGs. EPA has stated on page 6 of the Proposed Plan that all sources cannot be eliminated completely, showing that risk-based PRGs cannot be met and that background-based PRGs must be developed for the Site.

**EPA Response 208**: See EPA Response 123. Further, this is an interim action and will eventually be subsumed by a final remedy for OU1 of the site. Achieving the RAOs relies on the remedial alternatives' ability to meet remediation goals/cleanup levels. The remediation goals of an interim remedy are not necessarily the same as the final, protective remediation goals of a final remedy, but in this case the final remediation goals are anticipated to be met by interim action in the East Branch. While EPA anticipates that the selected remedy, once constructed, will successfully address the RAOs for sources located within the East Branch portion of the OU1 Study Area and that the post-remedy implementation monitoring plan will assure that the RAOs are met and that the remedy remains protective over time, if the assumptions used in reaching these conclusions prove false, the remedy and/or approach can be modified as necessary in future decision documents.

**Comment 209:** EPA has never defined what "long term" means for the sediments to achieve risk based PRGs and how the risk based PRGs will be met if non-NAPL sources continue at current loadings. Specificity is needed on EPA's expected timeline for the LTE/IEMs to be consistent with risk-based PRGs. EPA should also provide the assumptions underlying this time period and the process it will take for the IEMs to be equal to the risk-based PRGs. While it is true that the concentrations of COCs in the watershed are expected to decline, there is no data available to determine the rate of reduction. It is very likely that the RI and data collected under OU2 will remain representative for most background inputs and the LTE developed using these inputs will remain representative of the future conditions for solids-based inputs. As discussed above, if particle concentrations on solids coming in from all urban background sources do not reduce significantly, then almost complete control of sources would be needed to meet some risk-based PRGs, which USEPA recognizes is infeasible.

> **EPA Response 209**: The details for the post-remedy implementation monitoring plan, including timelines, will be developed during the design of the remedy, after the PDI is completed.

**Comment 210:** Without a thorough understanding of the rate in reduction of contaminant concentrations in ongoing urban background sources it is impossible for the City to support a remedy designed to meet PRGs rather than background concentrations as it is very likely that the background will never converge to the risk-based PRGs. The City strongly recommends Region 2 follow EPA guidance and the precedent set at other Region 2 Sites and nationally and select a background-based PRG (represented by the LTE/IEM) for the Site.

> **EPA Response 210**: The selected remedy for the East Branch Early Action is consistent with EPA guidance. In addition, the selection of final PRGs for an interim action is not necessary. See also EPA Response 123.

**Comment 211**: The Proposed Plan should be updated to correctly state the contaminants of concern driving risk in the Creek. The document refers to the C19-C36 aliphatic petroleum hydrocarbons as just C19-C36 aliphatics, which is inaccurate. Calling a class of petroleum hydrocarbons "aliphatics" is inaccurate and downplays the importance of sheens and NAPL in driving the toxicity in the sediments of the Creek. The Proposed Plan must be updated to reflect the class of contaminants driving the risk accurately by expanding the contaminant class "C19-C36 aliphatics" to include "C19- C36 aliphatic petroleum hydrocarbons". At a minimum, the first instance when this contaminant class is mentioned and in abbreviations, it should be stated as "C19-C36 aliphatic petroleum hydrocarbons". The EPA had previously asked the NCG to update the FFS to accurately represent these group of contaminants and the Proposed Plan should do the same.

> **EPA Response 211**: The ROD consistently refers to these contaminants as "C19-C36 aliphatic hydrocarbons."

**Comment 212**: The Proposed Plan identifies seeps as an external source of contamination to the Creek. Seep is an umbrella term used in the RI to include lateral groundwater (GW) seeping to the Creek and NAPL (gasoline, fuel oil, coal tar etc.). NAPL migration and seeps have been identified as a PTW for this Site (page 14 of the PRAP). The Proposed Plan must clearly state that the ongoing seeps to the Creek and even parts of EB, based on City data, include NAPL seeps. Please update the PRAP to discuss the types of seeps present at the Site.

> **EPA Response 212**: Clarification of seeps is provided in the ROD.

**Comment 213**: Remedial action within Newtown Creek poses challenges beyond many CERCLA sites given the dense surroundings and competing uses. The City appreciates EPA's coordination with City agencies, particularly the New York City Department of Transportation (NYCDOT) regarding the Grand Street Bridge Reconstruction and NYCDEP regarding construction of measures under the LTCP. These projects are all on similar timelines. As there is a high likelihood for construction overlap between the projects, the City requests continued coordination on scope and schedules to ensure that all projects proceed in an efficient and cost-effective manner while minimizing unnecessary impacts to the channel.

> **EPA Response 213**: Coordination efforts with NYCDOT and NYCDEP will continue during the RD, implementation, and post-remedy implementation portions of the action, as needed.

**Comment 214**: The Grand Street Bridge Project anticipates in-water foundations in temporary and permanent conditions that will require excavation, dredging, and structure demolition and/or removal. Close coordination between the agencies on both projects is needed, including to determine proper sequencing. As the Remedial Action progresses, it will be important to coordinate timeline, scope, and the limits of dredging, capping, and bulkhead work, as well as specific actions related to the Bridge protect, including removal of the existing fender system. Beyond coordinating with the City to prevent conflicts between the East Branch remedy and the reconstruction of the Grand Street Bridge, the City also recommends that EPA incorporate lessons learned from the Gowanus remediation in connection with transportation infrastructure and especially bridges. Scope, design documents, pre and post construction reports, and monitoring plans should be submitted to NYCDOT Bridges for review if any of the proposed work is taking place within 100 feet on above, or below of any portion of a bridge, tunnel, underpass, or overpass. If the remedy requires barges with equipment or materials exceeding the vertical clearances of the NYCDOT movable bridges, coordination with NYCDOT Bridges to safely open and close these bridges for vessel and vehicular traffic will be necessary. There are also some key differences between Gowanus and Newtown, including their uses, adjacent properties, and adjacent traffic networks should be considered when developing staging plans for the work. Unlike on the Gowanus project, there may not be an opportunity on Newtown Creek to leave any of the movable bridges in the open position for significant lengths of time due to a lack of viable alternate vehicular traffic routes. The extent to which bridge closures can be permitted should be discussed with NYCDOT. Considerations should also consider pedestrian safety mitigation measures. The two railroad movable bridges at the mouth of Dutch Kills that are owned by MTA are not able to open for navigation. This will greatly limit the ability to work around those structures and to get waterborne equipment from Newtown Creek upstream along Dutch Kills. Upstream of the MTA Dutch Kills bridges, NYCDOT has a movable bridge, Borden Avenue Bridge, which is similar in age and design to Carroll Street Bridge on the Gowanus Canal. Any operation that has the potential to create impact or compromise the structural integrity of the bridge structure should be brought to the attention of NYCDOT. During operations, additional care should be taken when working around this bridge.

> **EPA Response 214**: Comment noted.

**Comment 215**: The Proposed Plan must clearly state that the LTE model does not include NAPL seeps as an input. The LTE assumes that all NAPL sources to the Creek have been controlled. This is critical because Figure 8 in the PRAP which shows the "preliminary estimates of contribution of external inputs for East Branch" includes lateral groundwater/seeps as an input. This misrepresents the inputs to the LTE because it creates the impression the upland NAPL seeps are part of the LTE when they are not. Please update the Proposed Plan to address this.

**EPA Response 215**: The language in the ROD has been clarified.

**Comment 216**: The Proposed Plan lists all the sampling activities conducted under the RI. The list in this text includes NAPL, ebullition and seeps. The text as written gives the inaccurate impression that the sampling conducted for the RI sampled NAPL seeping into the Creek from upland properties. The seep sampling conducted under the RI was "opportunistic" seep sampling which did not sample any ongoing NAPL seeps. Characterization of NAPL seeps from the upland properties is a data gap for the Site which has not been addressed by data collected under the RI, including EPA's lateral groundwater study. Please update the text in the PRAP to accurately represent the sampling performed under the RI. Furthermore, clearly state that the seeps to the Creek include GW seeps and NAPL seeps.

**EPA Response 216**: Language in the ROD has been clarified.

**Comment 217**: The Proposed Plan states "Based on the 2022 bathymetric survey, the average bathymetric elevation in East Branch is -11 feet North American Vertical Datum of 1988 (NAVD88), with a minimum elevation of approximately -24 feet NAVD88 (See Figure 4). Water depths extend to a maximum of approximately 21 feet below mean lower low water (MLLW); MLLW is +2.61 feet above NAVD88." This appears to be somewhat internally inconsistent. EPA should verify MLLW elevation provided per NAVD88. A MLLW of -2.61 would be more consistent with the statement that "water depths extend to a maximum of approximately 21 feet below mean lower low water", given that the minimum elevation in the creek was mentioned to be -24 feet per NAVD88. A LLW of -2.61 would also be more consistent with findings for the Grand Street Bridge Project.

**EPA Response 217**: There was a typo in the Proposed Plan. MLLW is +0.261 feet above NAVD88. The text in the ROD is correct.

**Comment 218**: The Proposed Plan states "Lessons learned from conducting the action (and associated pre-design investigation, remedial construction, and pre- and postimplementation monitoring) will help inform the conduct of potential future early actions on other portions of the Creek, as well as the overall OU1 FS alternatives development, evaluation, and remedy selection as well as the eventual implementation of the OU1 remedy." These statements are not supported by the OU1 schedule approved by EPA Region 2 in Spring 2023 and the updated schedule in 2024. The alternatives memo was submitted to EPA for review in February 2024. Per the 2024 OU1 project schedule, the ROD for the EB EA is expected in December 2024. The Draft FS report for the OU1 is expected to be submitted to EPA in October 2026, with the final report approved in April 2028. Given that the two approvals are 3.5 years apart, it is unlikely that the pre-design investigation will even be completed for the EA. Remedial construction and post implementation monitoring are certainly not expected in that time frame. Therefore, any lessons learned from the EA will not be available to help in determining the remedy selection for OU1. Additional clarification is needed as to how the EA will provide insight into OU1 feasibility study and development of remedial alternatives.

**EPA Response 218**: Comment noted. Also, see EPA Response 58.

**Comment 219**: The Proposed Plan states that EB EA, "will provide an opportunity to validate and update the broader CSM that is being refined for the full OU1 Study Area". It is not clear how the post-construction monitoring in the EB EA will be used to update the CSM for the whole of the Creek, nor are the implications of the ongoing sources to EB explained. The Study Area (i.e., OU1) is not a homogenous waterbody with respect to contamination observed in the Creek and sources responsible for contamination. The contamination found in EB and the sources to EB contamination are not representative of the Study Area/OU1 as a whole. For example, the Turning Basin (TB) area of the Creek has the highest contamination in both surface and subsurface sediments of the Creek for PCBs, PAHs, and copper – reflective of the legacy industrial activities along the Creek near that area. NAPL impacts (presence of NAPL layers, blebs, sheens) in the sediments of the Creek are significantly higher in the TB than any other part of the Creek. The ongoing sources of solids to TB portion of the Creek are largely from East River (65%), followed by point sources. TB is also subject to boat traffic, which is not the case for EB. The CSM presented in the RI report for EB is not representative of the CSM for the TB or other areas of the Site. Therefore, any updates to the CSM or validation of the CSM for EB would not reflect the validity of the CSM in other parts of the Creek. EPA has not provided an explanation as to how the CSM for OU1 can be updated using EB as a surrogate. The City strongly believes that it is unlikely that data from the EB EA can update the CSM. The EPA should provide an explanation of how EB EA can update the CSM.

**EPA Response 219**: See EPA Response 58.

**Comment 220**: The Proposed Plan states that "NAPL and sheen in sediment: Laboratory analysis of NAPL from the OU1 Study Area shows that it generally consists of TPAH(34) and TPCBs" (emphasis added). This statement is incomplete and may misinform the reader. First, NAPL in sediments was never separately analyzed. Sediments with NAPL impacts were analyzed for various contaminants. As written ("laboratory analysis of NAPL"), the text implies that NAPL in sediments was extracted and separately analyzed for contaminants. The sediment samples collected (a smaller subset of samples in the second phase of the RI) were analyzed for petroleum hydrocarbons. Petroleum hydrocarbons, including C19-C36 aliphatic petroleum hydrocarbons, were measured in all NAPL-impacted sediments. Second, NAPL migrating due to ebullition was characterized for COCs in EB. The NAPL migrating due to ebullition has very high concentrations of petroleum hydrocarbons, including C19-C36 aliphatic petroleum hydrocarbons and dioxins/furans in addition to TPAH34 and TPCBs. The PRAP should accurately reflect the data and its findings.

**EPA Response 220**: Comment noted.

**Comment 221**: The long-term monitoring program proposed by EPA recommends opportunistic sampling of seeps. This proposal will not identify and sample seeps, particularly NAPL seeps. The RI sampling included opportunistic seep sample collection which did not identify and characterize many ongoing seeps. Seep reconnaissance and sampling must be a systematic approach where multiple low tide surveys are conducted over multiple months to identify and sample seeps. Without this approach, the long-term monitoring will not identify migration of groundwater and PTW from upland sites via seeps. The City strongly recommends EPA update the long-term monitoring to include systematic surveys and sampling for identification of seeps. The seep study component of the long-term monitoring program must be based on a probability-based sampling design so that average concentration of seeps and the total mass discharged to the Creek and tributaries can be estimated with statistically defensible confidence bounds.

> **EPA Response 221**: The ROD states that both systematic as well as opportunistic seep sampling will be conducted.

**Comment 222**: Figure 8 of the Proposed Plan displays LTE concentrations for different COCs in EB. In addition to showing the absolute LTE concentration of COCs, the plot also depicts individual parts of the LTE which is a weighted average concentration of all solids based and non-solids-based inputs. For the solids-based inputs the weighted concentration is calculated by multiplying the contaminant concentration on the solids with the percentage of solids contribution from a given source. Note that the concentrations of some COCs differ significantly. For example, for C19-C36 aliphatic petroleum hydrocarbons the LTE model assumes that the concentration in the East River solids is 16 mg/kg while that in CSOs and stormwater is 1600-2700 mg/kg. There are two orders of magnitude difference in the concentrations of C19-C36 aliphatic petroleum hydrocarbons in East River solids when compared to other solids-based sources. The non-East River solids sources are within a factor of two with respect to each other, with stormwater being on the higher range. This is an important distinction not captured by Figure 8. Without this information, the figure gives the illusion that if CSOs are controlled the LTE for C19-C36 aliphatic petroleum hydrocarbons is expected to decrease significantly. It appears that the text in PRAP also comes to a similar conclusion when the text states that, "Figure 8 also shows that CSOs currently provide a significant contribution to the long-term equilibrium concentration for most of the COCs, including dioxins/furans TEQ and C19-C36. The volume of CSO discharges to the Creek will decrease by approximately 65% once the LTCP NYCDEP is under order by NYSDEC to implement by 2042 is fully implemented. As such, it is known that significant source control will happen in the not-too-distant future". The NYC comment goes on to show that assessment suggested by Figure 8 of the Proposed Plan is inaccurate.

> **EPA Response 222**: Comment noted. The words "including dioxin/furan TEQs and C19-C36" are not included in the ROD. In addition, the LTE model will be updated with new information as it is obtained, and Figure 8 (or its equivalent) will be updated on an ongoing basis.

**Comment 223**: The Proposed Plan includes the use of IEMs which will be set at the 50th percentile of the concentration predicted by the LTE model to determine the frequency of the monitoring program. For the ecological risk-based PRGs, EPA is proposing to compare the IEM to individual sediment sampling locations. The PRAP and response to CSTAG states that the monitoring frequency will be increased if the individual sediment concentration is between 75 and 90 percent of the IEM for each COC. NYC has several concerns with this approach, as described below:

**Comment 223a**: The LTE model predicts future reach-wide average sediment concentrations in the Creek after the entire Creek has been remediated, assuming all ongoing, non-NAPL inputs to the Creek continue. This calculation should represent an average of contaminant sources, averaged over space and time. Mixing of source contamination occurs both spatially and temporally, so deposited contamination on the sediment bed is an average of these sources. Because the LTE is an average for an entire reach, it is inappropriate to compare individual samples on a point-by-point basis to an average. Under nearly all conditions individual samples would be expected to exceed estimates of the mean (50th percentile) and the 75th and 90th percentiles frequently, even when the EB remedy is performing as expected and the ongoing non-NAPL sources have not changed. Under EPA's proposed decision-making process, single sediment sample exceedances are inevitable and will trigger future increased searches and monitoring of sources, irrespective of the performance of the remedy and the influence of continuing ongoing non NAPL sources.

**EPA Response 223a**: The "Overview of the Remedy Approach" section of the ROD has been expanded to explain the development and use of IEMs in the post-remedy implementation monitoring program. The details of how this will be implemented in the field will be determined as part of the design of the remedy, and will be updated on an ongoing basis, as needed, during remedy implementation and post-remedy implementation monitoring.

**Comment 223b**: Because the LTE distribution should be representative of the distribution of mean concentrations, it is arbitrary to compare individual samples to the 75th and 90th percentiles of the distribution of the mean. EPA should explain the basis for choosing a range between 75 and 90th percentile to trigger additional sampling. The LTE is supported by a single year of data and has no temporal component, other than assumed reductions in source concentrations. As the City has commented previously, the LTE concentration is, by the nature of mixing and deposition, a spatial average. There is no evidence that the percentiles of EPA's LTE calculation provide accurate estimates of the percentiles of this long-term average, and these calculated percentiles do not provide accurate characterization of individual sediment sample values. There is no link between the probability distribution of in-situ sediment contaminant concentrations and the LTE calculations based on mixing of solids concentrations. As a result of this disconnect between the parameters of interest (percentiles of sediment concentrations at individual points), the City anticipates the monitoring approach will be an inaccurate indicator of performance of the EB EA.

**EPA Response 223b**: The "Overview of Remedy Approach" section of the ROD includes additional explanation of the approach, which will be refined over time as additional data is obtained through the PDI and other sampling efforts. Note that the monitoring approach has two purposes – to assess the performance of the remedy itself within the East Branch portion of the OU1 Study Area and to assess the impact on the protectiveness of the remedy from ongoing sources over time.

**Comment 223c**: It is unclear whether the trigger for additional monitoring is when the individual sediment concentrations approach 75% of the IEM or when the individual sediment concentrations approach the 75th percentile of the IEM as predicted by EPA's probabilistic model. The City recommends the latter. If EPA intends to implement increased monitoring when the individual points approach IEM (75% to 95% of the IEM), then EPA is really saying that the sediments approaching an expected value (i.e., IEM) is somehow an indication that the sources which are monitored to develop the IEM are not monitored enough. EPA should provide a technical rationale for this decision-making approach. EPA should also explain what the purpose of EPA's probabilistic model is for developing the LTE when the only metric to be used form the model for decision making is the 50th percentile which matches with the estimate from the excel based model.

**EPA Response 223c**: The "Overview of Remedy Approach" section of the ROD includes additional explanation of the approach, which will be refined over time.

**Comment 223d**: It is not clear why the focus is on increased monitoring in case of exceedances rather than holistic assessment of why the IEM is higher. Understanding why the IEM is higher should include assessing which sediment locations are driving the increase. The City recommends using a multiple lines of evidence approach to determine the need for increased frequency of sampling.

**EPA Response 223d**: The "Overview of Remedy Approach" section of the ROD includes additional explanation of the approach, which will be refined over time. The details of the approach will be developed in the RD. Multiple lines of evidence will be considered.

**Comment 223e**: EPA's approach is silent on what happens when the sediments are higher than the 90th percentile or 90% of the IEM estimated by the LTE. The USEPA should update the PRAP to provide an assessment of change in monitoring program if the 90th percentile or 90% of the IEM is exceeded.

**EPA Response 223e**: The "Overview of Remedy Approach" section of the ROD includes additional explanation of the approach, which will be refined over time.

**Comment 223f**: The City recommends using empirical estimates of LTE in EB to develop a formal Data Quality Objective (DQO) process with stated Type I and Type II error rates and a corresponding sample size to achieve them. The currently proposed decision rules are ad-hoc rather than statistically based procedures and provide no clear way to develop a DQO process leading to a defensible number of samples and defined Type I and Type II error rates. The decision rule proposed is arbitrary, requiring decisions based on samples of size one, which can result in highly unreliable statements about the degree to which the EB remedy is or is not functioning. This approach is very likely to trigger costly and unnecessary monitoring of inputs, simply based on random chance of an individual sample exceeding the LTE decision limits. The monitoring program should be developed based on EPA systematic planning and DQO guidance and precedent.

**EPA Response 223f**: Comment noted.

**Comment 224**: For human health risk-based contaminants the Proposed Plan is proposing to evaluate compliance using the IEMs developed over a reach–wide SWAC basis rather than a Creek-wide SWAC basis. This is an incorrect evaluation of the risk based PRGs for contaminants such as TPCBs and dioxin/furans, which pose a human health risk for the Site due to consumption of fish and crabs. The risk-based values of 0.3 ppm and 18 ng/kg for TPAH and dioxins/furans respectively were developed for the entire Creek, not individual reaches, so it is important to analyze inputs on a Creek-wide basis. For example, the dioxin furan concentrations in blue crabs pose a risk to human health, and the risk-based PRG for dioxin/furan TEQ of 18 ppt was developed by assuming a linear relationship between the tissue and sediment concentration for the entire Study Area. The risk-based assessments assumed that if the sediment concentrations for the entire Site were reduced by a factor of 8, the tissue concentrations will reduce proportionally. This assumes that the migratory species like fish and crabs are exposed to all parts of the Creek, not a particular reach. The analysis resulted in a PRG of 18 ppt. Given the assumptions used to develop a risk-based PRG for COCs posing human health risk, the appropriate point of compliance is the entire Creek, not individual reaches. The USEPA should explain the rationale for selecting reach-based SWAC for assessing compliance, including an explanation of how it proposes to modify the PRG to reflect a smaller averaging area. Because organisms spend less time within smaller areas and because human consumers are likely to fish in multiple areas, PRGs for smaller areas should be greater than PRGs for larger areas.

**EPA Response 224**: For this action, the RGs for TPCBs and dioxin/furan TEQs will be evaluated on a SWAC basis over the East Branch portion of the OU1 Study Area and the RG for lead will be evaluated on a SWAC basis over the intertidal portions of the East Branch portion of the OU1 Study Area. The RGs for an action are only applicable throughout the spatial scale of the action being performed. The spatial scale of the application of remediation goals can be revisited as additional portions of the Study Area are addressed, and the ROD states this directly. Note that the RGs for TPAH(34) and C19-C36 aliphatic hydrocarbons will be evaluated on a point-by-point basis.

**Comment 225**: The Proposed Plan states that alternative EB-D, the option for deeper dredging of sediments in select areas, includes potential for NAPL migration from the deeper soft and/or native material, potential for exposure to PTW and depth to native material. The Proposed Plan should clarify that currently, as developed, this alternative only considers additional dredging to reach the native material. Furthermore, EPA should explain why additional dredging is the only technology considered for addressing NAPL migration from deeper sediments and PTW. Amended caps are already being proposed by EPA to control NAPL migration due to ebullition. Amended caps and ISS should also be considered to address PTW and NAPL migration.

**EPA Response 225**: The description of Alternative EB-D has been clarified in the ROD. Amended capping and ISS are included as options for addressing PTW and NAPL migration, in addition to dredging.

**Comment 226**: The Proposed Plan states that the PDI will collect data to further delineate NAPL and investigate NAPL mobility. It is not clear whether the future investigations involve the same methods used in the RI. The City has significant concerns regarding the RI method and its ability to accurately assess NAPL mobility. The methods used in the RI showed zero mobile NAPL where significant NAPL impacts were present, as evidenced by observations of NAPL seeps and sheen generation in the area. NAPL mobility and delineation should be measured by standard methodology going forward.

**EPA Response 226**: Comment noted. The methods to assess NAPL, including NAPL mobility, in the East Branch will be developed as part of the PDI. Data quality objectives and assessment methods will be clearly developed and defined. Also see EPA Responses 59 and 61.

**Comment 227**: During the RI/FS for OU1 a three-staged approach was used to assess NAPL mobility in the Creek. A sample progressed to subsequent stages of sampling only if NAPL migration was observed in the previous stage and NAPL was considered mobile only if migration was documented in all three stages. The comment letter went on to describe a series of specific concerns with the approach.

**EPA Response 227**: Comments noted. NYC provided similar comments to EPA on the Newtown Creek NAPL Mobility Data Evaluation Report in 2020. The comments were discussed with EPA and addressed in the updated report. Also, see EPA Response 226.

**Comment 228**: Rainbow sheen, indicative of NAPL migration, was documented in most samples analyzed using Stage 2 approach in the RI/FS. However, the RI/FS does not define sheens or even rainbow sheens with petroleum odors as NAPL. This is contrary to all available guidance from NOAA and NYSDEC for indicators of NAPL. Despite evidence of NAPL migration in Stage 2, samples were not selected for Stage 3 testing due to an unsupported assessment of NAPL mobility. Therefore, by using inappropriate methods and inaccurate definitions of NAPL, the analysis arrived at the skewed conclusion that NAPL is not mobile in the sediments of the Creek. The current CSM for the Site, which states that NAPL is not mobile, is inconsistent with direct observations of NAPL. The CSM should be calibrated to match or more closely predict the directly observable field conditions.

**EPA Response 228**: The CSM for the East Branch will continue to be updated periodically as additional information is obtained.

**Comment 229**: In addition to NAPL mobility, the approach used in the RI to assess NAPL presence in the sediments is also flawed. In the RI, there were no continuous measurements/assessment of NAPL presence in the sediments of the Creek. Samples collected under Phase 1 were only assessed using subjective visual observations of NAPL. All sheen observations in the Phase 1 were discarded in the RI and subjectively assumed to not indicate

NAPL presence without any quantitative data. In Phase 2, shake tests were only conducted on some horizons of a limited number of sediment cores and were not comprehensive. The EPA has not included the comprehensive semi-quantitative LIF survey conducted by the City in their consideration. The LIF survey shows NAPL presence in most of the sediments of the Creek with varying levels. The LIF technology has been used by EPA Region 2 for Gowanus Canal to assess NAPL presence and mobility but has been disregarded by the same Region for Newtown Creek without any reason.

> **EPA Response 229**: See EPA Responses 59 and 61.

**Comment 230**: EPA must apply alternative methods to assess NAPL presence and mobility in the Creek. The City recommends use of LIF techniques similar to Gowanus Canal to decide NAPL presence and NAPL mobility. This is consistent with approaches used by EPA Region 2 for the Quanta resources Superfund Site. At this Site a wide range of NAPL investigation methods were utilized boat and time lapse photography sheen surveys, Targost field screening, probe sheen studies as well as sediment core investigations. At the Quanta Site multiple NAPL identification methods were applied to the sediment cores to assess the presence absence and potential mobility of NAPL in the sediment including visual screening, PID screening, UV light fluorescence of NAPL, laboratory analytical sample results, and hydrophobic NAPL sensitive Flute paper. These various NAPL investigation methods provided multiple lines of evidence in assessing the nature and extent of NAPL in the sediment. In summary, LIF is a common and reliable technique for assessing NAPL presence and mobility. The data collected by the City will help in this regard and should be used to update the assessment of NAPL in the rest of OU1 and during PDI for EB EA.

> **EPA Response 230**: EPA agrees that a multiple lines of evidence approach to investigating NAPL would be beneficial to the project. The methods to assess NAPL presence and NAPL mobility in the East Branch will be developed as part of the PDI. Data quality objectives and assessment methods will be clearly developed and defined. Quantitative and qualitative methods will be explored. See also EPA Responses 59 and 61.

**Comment 231**: NYCDEP is under a CSO Order on Consent from NYSDEC Case #CO2-20110512-25 with modification to Case #C02-2000107-8 Appendix A to construct a 50 MGD storage tunnel to reduce impacts of CSOs to Newtown Creek (at outfalls BB-026, NCB-15, NCB-083, and NCQ-077). As part of this project, the existing outfall structure at outfall NCB-083 which discharges into the East Branch channel of Newtown Creek will be relocated from its current position at the terminal (south) end of the channel to the western bank. Therefore future coordination between the CSO tunnel project and the proposed Early Action Superfund work is required.

> **EPA Response 231**: Comment noted. EPA will coordinate with NYCDEP with regards to CSO infrastructure upgrades and potential impacts on the design and implementation of the selected remedy.

*TRC submitted a comment letter on behalf of a group of the more recently named PRPs for the Site that are not respondents to the OU1 RI/FS AOC. The parties include Long Island Railroad, APU, Amtrak, Simsmetal East LLC, Con Edison and Enviri. These parties are all located at or near the Dutch Kills tributary of Newtown Creek.*

**Comment 232**: The comment letter did not take issue with selected remedy. Rather, it expressed concern about some of the bases for and assumptions in the LTE model which have been adopted in the probabilistic model calculation of current and post-remedy surface. The letter requests that if the same models are used in the decision-making process for other portions of the OU1 Study Area that further investigatory work precede such use.

> **EPA Response 232**: Comment noted. The LTE model and outputs of the model will continue to be updated as additional data (inputs) are obtained. The overall CSM for the site will also continue to be refined as our understanding of all aspects of the site improves.

**Comment 233**: The review identified significant bases for and assumptions in the LTE model, and adopted in the Probabilistic Model, which are either contrary to the RIR data or require further data collection to make the LTE and Probabilistic models representative of actual field conditions. A key issue is the speculative estimates of COC loading from bank erosion, including for PCBs. The Dutch Kills is used in the following simply for purposes of providing an example of the LTE and Probabilistic Model's questionable assumptions across the entire Creek.

> **EPA Response 233**: Comment noted.

**Comment 234**: Contrary to the RIR, which concluded that COC contribution from bank erosion is negligible, the LTE and Probabilistic Models indicate that "bank erosion" serves as a major source of PCBs to surface sediments and loading/contribution of PCBs to the LTE concentrations in certain reaches of the Creek (e.g., for Dutch Kills, the models forecast the PCBs contribution to be 25% of the total LTE PCB concentration). This prediction is inaccurate or speculative based on the following observations and actual RIR results:

> **Comment 234a**: The LTE calculations are based on assumed soil conditions and assumed annual volume of soil erosion. The RI and other investigations of the Newtown Creek included no actual measurements or observations of any of these parameters. The Anchor QEA 2024 Report refers to the assumptions as "… uncertain; the actual erodible shoreline extent and rate are unknown and cannot be accurately estimated based on existing information." Based on these significant gaps in information related to actual shoreline conditions, the LTE and Probabilistic Models are unreliable for reaches of the Creek assumed to have a high degree of erodible banks.
>
> > **EPA Response 234a**: Comment noted. The LTE model and outputs of the model will continue to be updated as additional data (inputs) are obtained.
>
> **Comment 234b**: As an example, the COC loadings and LTE calculations related to bank erosion are based on unsupported assumptions about COC concentrations and

contributions from the shoreline. Due to the absence of creek bank sampling, with no evidence, the models assume that the COC concentrations for shoreline sediment samples in and near erodible shorelines below the ordinary high water ("OHW") level are generally representative of COC concentrations in the creek banks above OHW.3 Figure 3-6 of the LTE Model report (included herein as Appendix A), however, shows that there are only localized sections of the banks with a limited extent of potentially erodible shorelines. These potentially erodible shoreline sections are also above the OHW elevation and predominantly located in areas that are not adjacent to surface sediment samples with high PCB concentrations, as shown in Figure 4-27 of the RIR (included herein as Appendix B).

**EPA Response 234b**: Comment noted.

**Comment 234c**: Using the above unsupported assumptions and calculations, it also would be expected that the bank erosion loading and PCB concentrations predicted by the LTE and Probabilistic Models would conceptually produce artificially higher PCB concentrations in surface water, pore water, particulate, and trapped sediment in the Dutch Kills area than the "actual" reported concentrations and should be higher than elsewhere in the Newtown Creek. Similarly, bank erosion loading and PCB concentrations predicted by the LTE and Probabilistic Models should theoretically produce higher PCB concentrations in surface sediments at the mouth of and immediately upstream and downstream of the Dutch Kills area than the "actual" reported trace or non-detectable PCB concentrations in these areas. This is not the case. Instead, PCB concentrations in surface water during both dry and wet seasons and pore water as well as in particulate and sediment trap samples in the Dutch Kills are mostly lower than or close to corresponding PCB concentrations in the rest of Newtown Creek (Figures 4-117 through 119; 4-163 through 167b; 4-182, 4-183; 4-191; 4-200; 4-201). These RI results contradict the conclusions of the LTE Model and baseline scenario of the Probabilistic Model, demonstrating that these models' assumptions about shoreline conditions are not representative of the observed site conditions.

**EPA Response 234c**: Comment noted.

**Comment 235**: In conclusion, the above Parties do not oppose the Early Action. They do, however, believe that it is important to go on record saying that based on TRC's review and EPA's conclusion the assumptions in the LTE and Probabilistic Models about bank erosion loading of COCs (including PCBs) are just that, assumptions unsupported by field data. Because of this, it is important that the assumptions embedded in the LTE or Probabilistic Models not be applied to other potential EPA decisions and efforts related to Newtown Creek without additional data on COC concentrations in the creek banks and a quantitative evaluation of the creek bank erosion rate and loading.

**EPA Response 235**: Comment noted. The dataset will continue to be supplemented by on-going data collection efforts. The LTE model is needed as one of multiple lines of evidence to aid in post-remedy implementation effectiveness and protectiveness monitoring. The uncertainty associated with the input dataset will be greatly reduced over time.

# ATTACHMENT A

# WRITTEN COMMENTS

5#185668232 inc.

-ifM

NONPROFIT@
185668232.ORG

We need new laws to prevent pollution, trash & warehousing companies from occupying the space.

This is the location for our chosen nonprofit placement, since 2020 - we sighted this to Senator Julia Salazar.

* How will we know about evicting the deed fraud-based companies on the water front?

* How can we place our bid to build your water way and my 501c3 3-site land on your records?

How long is life expetancy of cap?

Will there be a water barrier filtration to stop water from upstream from flowing the similar toxins, and toxic sediments back into the east Branch.

Is there a plan for ongoing Purification I believe Genki Balls and effective microorganisms can aid in ongoing maintenance of water quality.

• Can ecological (Econcrete) concretes be used for replacement bulkheads + if not why not?

[redacted]

## Proposal to EPA of Genki Ball use in Microbial Remediation of Newtown Creek Superfund Site.

**Brooklyn, NY. 09/18/2023**

**Halina James & Claire Unabia James**

My name is Halina James, born in Brooklyn, NYC and a student of Laguardia High School. I disagree with the Environmental Protection Agency's proposed remediation plan at Newtown Creek superfund site and propose bioremediation with Genki Balls, at least as a first step. Genki Balls are filled with Effective Microbes, proven to digest petroleum, sludge and toxins, therefore would greatly reduce the amount of toxic matter needing to be dreaded, reducing the worker and community exposure to the noxious chemicals as well as reduce the amount needing to be disposed.

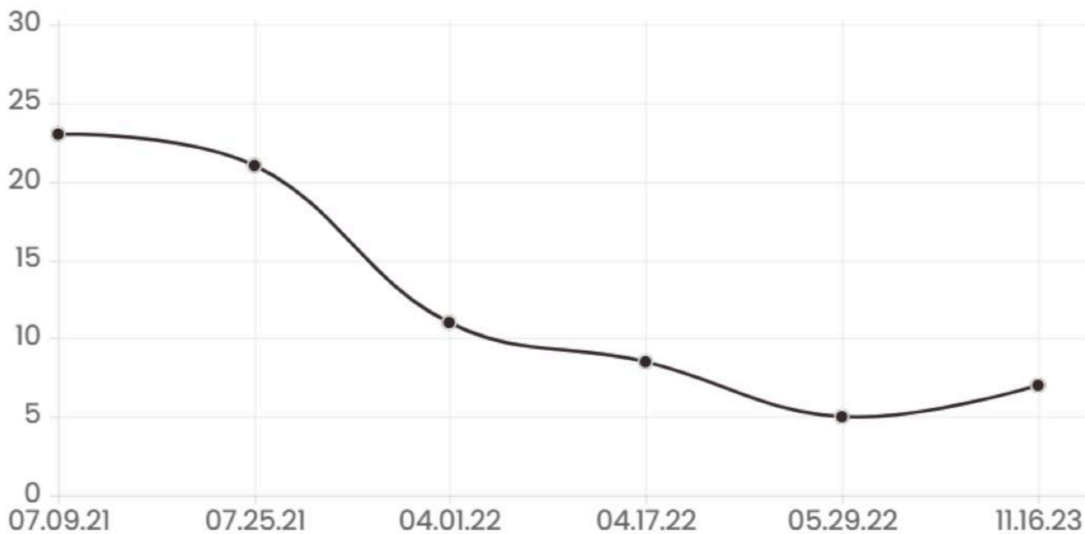
Genki Balls have also been shown to be a great way to get the community involved in the clean up. In the Genki Ala Wai project in Hawai'i where my family is from, thousands of school children, businesses and volunteers made 191,596 balls to date and threw it into the polluted water. A project like this at the Newtown Creek would bring needed attention and care to the area.

Dredging straightaway in the Newtown Creek will kick up a layer of contaminated sediment into the water, increasing hazardous exposure and further polluting the creek. I propose an organic solution of bioremediation with Genki Balls before the dredging and as well as after the cap is installed to make a self purifying nutrient base for new growth and returning wildlife.

EM1 solution was made in the 1980's by the agricultural scientist Teruo Higa, getting the motivation to develop this solution after becoming sick from chemical exposure before he turned 30. I was inspired by the use of Genki Balls after seeing their use in my parents hometown of Honolulu, Hawaii to clean up the Ala Wai Canal. My Aunt, a teacher there, works on the Genki Ala Wai Project with her Jefferson Elementary classroom; creating Genki Balls, throwing them in the water and monitoring the water results. Within a few years the Ala Wai Canal went from inhospitable to wildlife; to a monk seal, manta rays and many fishes being spotted swimming in the waters [1].

Genki balls are a mixture of clay soil, rice bran, molasses, water, and EM1 solution (Effective Microorganisms®). EM1 is a liquid probiotic made of three beneficial types of microbes: yeast: Saccharomyces cerevisiae; photosynthetic bacteria: Rhodopseudomonas palustris and lactic acid bacteria: Lactobacillus spp. EM1 has been proven to be beneficial in water detoxification and with petroleum and hydrocarbon products in particular [2,3]. They are able to break down organic matter and increase the nutrient availability in the soil, along with other positive effects while not affecting the wildlife population detrimentally. Genki balls are well suited for this project as the balls are thrown into the water, it sinks to the bottom and digests the toxic sludge where it is. Disturbing and dredging the sediment would cause the resuspension of toxic fine particles, heavy metals and remobilization of contaminants all over again.

Genki Balls and EM1 solutions have been used to effectively clean and revitalize many polluted waterways around the world with similar toxins: the Ala Wai Canal, Cikapundung River in Indonesia, Muchawka River Poland, Seto Inland sea, Ilusions Lake Mexico, and more [4]. At the Jefferson Elementary testing site the inches of toxic sludge went down in a matter of weeks. If this was to be used before dredging at the Newtown Creek it could therefore also save considerable amount of time in dredging.




Inches of sludge measured at Jefferson site at different testing dates.
Genki Ala Wai Project [5].

It is especially beneficial to create the Genki Balls with surrounding native soil, thus using bioaugmentation to help increase the natural microbe biome to help purify the pollutants. Studies have shown that utilizing bioaugmentation and biostimulation, which adds new microbes to the ecosystem, has been shown to shorten the time period and increase the amount of toxin degradation.

| **References** | **Pollutant** | **Micro-Organisms** | **Degraded Efficiencies** | **Time** |
|---|---|---|---|---|
| [94] | 0.5% (*v/v*) petroleum oil | *Pseudomonas, Rhodococcus and Acinetobacter.* | 66% | 15 days |

| | | | | |
|---|---|---|---|---|
| [95] | 1% (*v/v*) crude oil | *Bacillus sp., Corynebacterium sp., Pseudomonas sp., Pseudomonas sp.* | 77% | 25 days |
| [96] | 1% (*v/v*) crude oil | *Betaproteobacteria, Gammaproteobacteria, Bacillus subtilis* | 85.01% | 7 days |
| [97] | 1% (*v/v*) crude oil | *Acinetobacter, Pseudomonas, Gordonia, Rhodococcus, Cobetia, Halomonas, Alcanivorax, Marinobacter, Microbacterium* | 82% | 7 days |
| [98] | 2% (*v/v*) Cargo fuel | *Alcanivoraxborkumensis, Alcanivoraxdieselolei, Marinobacterhydrocarbonoclasticus, Cycloclasticus sp., Thalassolituusoleivorans* | 79 ± 3.2% | 14 days |
| [99] | 2% (*v/v*) diesel | *Pseudomonas aeruginosa, Bacillus subtilis* | 87% | 20 days |
| [100] | 5% (*v/v*) kerosene | *Citrobactersedlakii, Entrobacterhormeachei, Entrobacter cloacae* | 69% | 7 days |
| [101] | 1% (*v/v*) crude oil | *Bacillus algicola (003-Phe1), Rhodococcus soli (102-Na5), Isoptericolachiayiensis (103-Na4), Pseudoalteromonas agar-ivorans (SDRB-Py1)* | >85% | 14 days |

| | | | | |
|---|---|---|---|---|
| [102] | 1% (*v/v*) crude oil | *Paraburkholderia sp., Alloprevotellatannerae, Paraburkholderiatropica, Ralstonia sp., Paraburkholderiafungorum, Rhodococcus sp., Brevundimonas_diminuta, Lactobacillus sp., Acidocella sp., Fungus Scedosporiumboydii* | 81.45% | 7 days |
| [103] | 20 (g/L) crude oil/water | *Chlorella vulgaris* | 94% | 14 days |
| [104] | 10 mg/L crude oil polluted seawater | *Alcanivoraxborkumensis SK2* | 95% | 20 days |

Sayed, Baloo, Sharma, 2021 [5].

Dredging to place the cap can also destroy the local habitat, resulting in a loss of biodiversity and a change in the water quality. The resuspension and mobilization of the toxins back into the water by disturbing the sediment layer from dredging puts the human community and wildlife at high risk to hazardous exposure as well as possible air pollution [6].

The proposed cap is not biodegradable or indestructible. It therefore adds another pollutant into our waterway for my generation or the next to deal with when it eventually starts to break down after all the effort and energy put into remediating the creek. The EPA has not addressed the life expectancy of the cap, which is important to know for the implications it would have on the future of our community, environmental impact, and the ecosystem of Newtown Creek. Additionally, after dredging remobilized toxins will disperse into the water, where they'll settle down once again on the cap, and will be remobilized every time the cap must be replaced. The EPA has not addressed how it will be removed when it begins to break down and what environmental damage will that cause, placing us in an endless cycle of “remediation” for Newtown Creek. A layer of Genki Balls over the cap would help with any residual pollutants and new pollution. The Genki Balls can also act as a new base layer for the ecosystem, providing the needed nutrients and bio organisms to support the creek in flourishing once again.

Adding a biodegradable and environmentally friendly option to the remediation can be very beneficial. The results of lab and environment studies as well as case studies from around the world shows that microbial remediation of the Newtown Creek superfund site, should be considered and integrated into the current plan as it helps with a lot of weaknesses and unknowns in the proposed plan.

I propose the most efficient, environmentally friendly and cost effective remediation is through microbial bioremediation with Genki Balls.  This idea has been supported by the Gowanus Canal Conservancy currently in the process of their superfund remediation.  With the help of the community organizations, mobilization of my school community, little sister's school of Brooklyn New School, we could create enough Genki Balls to reduce the toxic sludge in the Newtown Creek and create a self purifying aquatic strata once remediation is complete.


1. Moore, Bryce.  Monk Seal spotted in Ala Wai, are Genki Balls working? 2023 [https://www.khon2.com/local-news/monk-seal-spotted-in-ala-wai-are-genki-balls-working/](https://www.khon2.com/local-news/monk-seal-spotted-in-ala-wai-are-genki-balls-working/)

2. Huang L, Li XW, Li XD, Liu SJ, Liu ZP, Tan ZL. [Function analysis of the effective strain Rhodococcus ruber Em1 in wastewater treatment system by quantitative competitive PCR]. Wei Sheng Wu Xue Bao. 2007 Apr;47(2):307-12. Chinese. PMID: 17552240.

3. Varjani S.J. Microbial degradation of petroleum hydrocarbons. Bioresource Technology. 2017; 223:277-286. https://doi.org/10.1016/j.biortech.2016.10.037. https://www.sciencedirect.com/science/article/abs/pii/S0960852416314432

4. Nugroho, Fadjari Lucia; Rusmaya, Deni; and Damayanti, Muthia. [Comparison of Cod and TSS Removals from artificial River Water by Mudballs made with Activated EM1 and EM4 solutions]. International Journal of GEOMATE, March, 2019 Vol.16, Issue 55, pp. 28 - 33. DOI: https://doi.org/10.21660/2019.55.4539

5. Sayed, Khalid; Baloo, Lavania; Sharma, Naresh Kumar. [Bioremediation of Total Petroleum Hydrocarbons (TPH) by Bioaugmentation and Biostimulation in Water with Floating Oil Spill Containment Booms as Bioreactor Basin . 2021.

6. ICES Journal of Marine Science, Volume 72, Issue 2, January/February 2015, Pages 328–340,

https://doi.org/10.1093/icesjms/fsu187

September 23, 2024

Caroline Kwan
Remedial Project Manager
Environmental Protection Agency
290 Broadway, 18th Floor,
New York, NY 10007-1866

Dear Ms. Kwan:

The Brooklyn Chamber of Commerce supports the USEPA's East Branch Early Action and the selected remedial alternative (EB-D). The Brooklyn Chamber of Commerce is a borough-wide membership and economic development organization dedicated to helping businesses through four channels -promotion, support, advocacy, and convening. The Brooklyn Chamber and its affiliate organizations, the Brooklyn Alliance, and Brooklyn Alliance Capital, provide direct business services, technical assistance, and support programs to help Brooklyn businesses grow.

We support the selected remedial alternative for the East Branch of Newtown Creek because we believe that EB-D will be protective of human health and the environment while balancing the need to maintain Newtown Creek as a significant maritime industrial area which supports businesses and jobs in Brooklyn, which is vital to our city's economy.

Thank you for your consideration of the Brooklyn Chamber of Commerce's support and please let me know if we can be of any assistance.

Sincerely,

R. a. P

Randy Peers
President and CEO

# COMMUNITY BOARD No. 1

**435 GRAHAM AVENUE - BROOKLYN, NY 11211- 8813**
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DISTRICT MANAGER

HON. LINCOLN RESTLER
COUNCILMEMBER, 33rd CD

HON. JENNIFER GUTIERREZ
COUNCILMEMBER, 34th CD


October 9, 2024

Caroline Kwan
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 18th Floor
New York, NY 10007
kwan.caroline@epa.gov

**RE: Comment on Newtown Creek Superfund Site East Branch Early Action**

Dear Ms. Kwan:

At the regular meeting of Brooklyn Community Board No. 1, held the evening of October 8, 2024, the board members received a report from the Environmental Protection Committee. Please be advised that the board members voted to support sending this letter.

The vote was as follows: 26 "YES"; 0 "NO"; 0 “ABSTENTIONS"; 0 “RECUSAL”

Brooklyn Community Board #1 has concerns and questions regarding the proposed Newtown Creek Superfund Site East Branch Early Action.

Why is the proposal to dredge in Alternative EB-D only 3’? How is this adequate?

Possibly related to the question above, EPA notes the biological zone to be at depth of just 6” in the creek bed, whereas NYS DEC designates 2’ as the biological zone. Why is EPA using a shallower depth for this designation?

What is the makeup of the proposed cap in Alternative EB-D? In the public hearing EPA gave the indication they would use a "let's see what happens" and "experiment" approach. We need to know the details regarding the composition of the proposed cap layers.

Chemical analysis methods and result standards, and health and environmental impacts studies are antiquated, and must be updated.

In the listing of remediation elements, sealing bulkheads will be implemented "as a temporary measure to address seeps while upland cleanup measures are evaluated and implemented". What is the permanent measure(s)?

The remedial investigation and remediation of upland sites adjacent to the East Branch should be expedited as soon as possible, to ensure the 3-year estimated remediation term is adhered to, and potentially inform a permanent remedial solution(s) for seeps emanating from problematic bulkheads and other sources.

What is the assessed failure risk and life span of alternative EB-D, and the other alternatives.

More data and comment periods should be made available to the public after the details of the preferred alternative are determined and made known, *before* the Record of Decision is issued.

The board looks forward to your response to these concerns and questions.

Working for Safer Williamsburg and Greenpoint.

Sincerely,

Dealice Fuller

Dealice Fuller
Chairperson

**From:** Kwan, Caroline
**To:** christopher houseknecht; Loney, Natalie; Hard, Taylor; Ketu, Rupika
**Cc:** info@newtowncreekalliance.org; mayoreric@cityhall.nyc.gov; partners@wwfus.org; info@catf.us; cleanup@oceanconservancy.org; media@leverforchange.org; partnerships@magiccabinet.org; pressoffice@parks.nyc.gov; mfnc@hpd.nyc.gov; Governor.Hochul@exec.ny.gov; Letitia.james@ag.ny.gov; msoler@cityhall.nyc.gov; action@earthjustice.org
**Subject:** RE: Newton Creek Restoration- Comments
**Date:** Wednesday, October 16, 2024 8:45:09 PM

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Comments received.

Thanks

*Caroline*

Caroline Kwan
Remedial Project Manager
U.S Environmental Protection Agency
Superfund and Emergency Management Division
Special Projects Branch
290 Broadway, 18th floor
New York, NY 10007-1866
Kwan.caroline@epa.gov
(212) 637-4275

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**From:** christopher houseknecht [redacted]
**Sent:** Wednesday, October 16, 2024 8:39 PM
**To:** Loney, Natalie <Loney.Natalie@epa.gov>; Kwan, Caroline <kwan.caroline@epa.gov>; Hard, Taylor <Hard.Taylor@epa.gov>
**Cc:** info@newtowncreekalliance.org; mayoreric@cityhall.nyc.gov; partners@wwfus.org; info@catf.us; cleanup@oceanconservancy.org; media@leverforchange.org; partnerships@magiccabinet.org; pressoffice@parks.nyc.gov; mfnc@hpd.nyc.gov; Governor.Hochul@exec.ny.gov; Letitia.james@ag.ny.gov; msoler@cityhall.nyc.gov; action@earthjustice.org
**Subject:** Newton Creek Restoration- Comments



Hi,

I wanted to take a moment to make some comments about the proposed preliminary work on the larger Newton Creek Vision Plan and restoration project. Please see below and let me know if you need anything from me. Thank you.

Comment:

“Attn: EPA, State of New York, City of New York, Newton Creek Alliance, The Borough of Brooklyn

I wanted to write to express my full support for the proposed plan for East Branch portion of the Newtown Creek Superfund site and more broadly the WHOLE plan that is proposed by the Newtown Creek Alliance, the Newtown Creek Vision Plan and **all** of it’s 85 projects for remediation in order to improve and restore East Williamsburg/North Brooklyn. <u>The matter of the fact is that remediations are decades overdue.</u> I was 12 when this was made a real issue in 2010. I’m 26, graduated college in the city, have had almost a dozen apartments- and the EPA and the city are still dragging their heels about getting this done. I will be almost 35 when you ‘expect’ to have this finished. I just hope that was worth the lifetime of exposure that will be allowed by the EPA, NY State and NYC. Absolutely anything and everything that can be done to move forward and expedite any- and all work to move the Newton Creek Vision Plan forward and to completion, SHOULD BE DONE. While I truly wish and hopped that work would start sooner on some of the additional impactful parts of the Vision Plan- I again restate that we, the people of Brooklyn are long overdue for this work and will take anything that we can get on this. Let’s get the work started ASAP and line up the rest of the Vision plan to start as soon as possible.

While the physical quality and health of our community is significantly important to me- <u>*our day-to-day safety is why I most support this plan.*</u> We’ve seen what North Greenpoint or Long Island City was like before revitalization- dark, kind of scary, often unsafe, erratic drivers, vulnerable members of our community falling victim to serious crime that goes unsolved, and overall- just not a place people want to be, nor feel like they want to invest/exist/take care of/improve- especially if then those in charge are not protecting the area. The Newton Creek Vision plan will change all of that- walkways and green areas along the creek will promote safe, healthy, well-lit places that people want to be. Security cameras and measures can be easily integrated throughout. Bike lanes and paths may reduce auto-biker accidents, congestion on the roads, and add alternate ways of transportation to an area already seriously lacking adequate train lines nearby. While many people in comparison to other neighborhoods may not live here- many do work here, as well as we know our corner has become a nightlife mecca- and those people deserve to have their safety address where they spend most of their days making a living to support their families and on a night out to experience the best of Brooklyn nightlife culture that exists.

The city in many advocacy groups say how they want to keep this area industrial and promote business in this area to stay, continue and grow- yet expect the people who they want to work here to travel to unsafe, hard to get to, polluted/unhealthy and to want to do that. Ding, ding. No one wants to work here because it's not very safe or easy to get too. The best office and areas with many workers in the city also have some of the best amenities for the people who work there too- it's not rocket science. And a white collar and a blue collar job should not have a difference in quality of life outside around them. It doesn't matter if East Williamsburg becomes the land of lofts or stays industrial forever- making it a healthy and happy place to be will promote whatever kind of development you want in the area. Take care of your people and they will show you results.

While I'm no conspiracy theorist- there have been an alarming number of deaths connected to Newtown Creek. Let's just fix it and we won't have this issue. Leave a dark, desert place that not many want to go in NYC- and I'd sadly think you'll see more of this- despite if they are accidental, murders, or whatever you may have. Just clean the place up already- the root of all problems surrounding the creek if no one has realized. From safety, to flooding to promoting development- it's starts with care for the infrastructure that already exists.

The city and all parties responsible for letting the Newton Creek get where it is today should be the most excited about getting this project to the finish line- the liability and blood on your hands is real- and only growing. Not only is this project and the whole vision plan the morally correct and the right thing to do- but it will also wash your hands free of lawsuits, prevent public health issues, relieve emergency services during flooding, and probably many other things that are still slipping my mind. This is also about the city, state, EPA, Federal government- everyone in power has a hand, even if you never contributed to the problem. Being a leader holds a responsibility to fix problems that already exist too.

I would lastly close with that if you can't get the renovations started for another year or a few- what is the possibility of getting the NYCDOT to redo, plant some trees, pave and paint new lines, add parking, add some new sidewalks and bike lanes, etc. in the next year or two? Redoing the roadways around the creek would already give it a whole new feel and a sense of a community that is nurtured by its leaders. And add parking garages and bike parking galore- with discounted parking for workers in the around and you've freed up the streets and encouraged people to come work there with just some very overdue road maintenance.

I appreciate your time and hearing out my comments, and I wish the EPA and Newton Creek Alliance the best of luck in moving the full Newton Creek Vision Plan to completion."

Chris Houseknecht

Sent from my iPhone

NB CHAMBER

October 28, 2024

Caroline Kwan, Remedial Project Manager
Environmental Protection Agency
290 Broadway, 18th Floor
New York, NY 10007

kwan.caroline@epa.gov

Dear Ms. Kwan,

We are writing this letter to advocate for the local business community operating on and around Newtown Creek. Our local businesses support our community and will be impacted by the EPA's selected remedy for the East Branch of Newtown Creek. It is therefore of the utmost importance that their voices be heard and their concerns be addressed.

The North Brooklyn Chamber of Commerce supports a remedy that is efficient, effective, based upon sound science, and of course, protects human health. We also support a remedy that reflects the needs of local businesses, both small and large. Any remedy the EPA selects has the potential to create waste, noise, and odor that can, without question, affect the successful operations of businesses around Newtown Creek; businesses that host uncountable local jobs and support our local economy. Additionally, the traffic and inconvenience created by a remedy can easily negatively impact all businesses and community members who live and work nearby.

The Chamber supports the EPA's proposed remedial alternative to dredge the sediment and place a cap in the East Branch of Newtown Creek, with deeper dredging in certain areas where it is determined to be needed. We believe this type of measured remedy will protect the safety and well-being of our community and achieve the EPAs clean-up goals, while minimizing the hardships to businesses and the local community that a less thoughtful remedy would create.

On behalf of the businesses and community members we proudly represent, we thank you for the work you have done to date towards the remediation of Newtown Creek. We appreciate the thoroughness and dedication the EPA has demonstrated over the years to make Newtown Creek cleaner and safer for our community and we look forward to this early action in the East Branch... and to the realistic and positive future of Newtown Creek.

Sincerely,

Elaine Brodsky

Elaine Brodsky
Chair, North Brooklyn Chamber

Paul Samulski
President, North Brooklyn Chamber

Long Island City Partnership

October 28, 2024

Caroline Kwan
Remedial Project Manager
Environmental Protection Agency
290 Broadway, 18th Floor
New York, NY 10007

Dear Ms. Kwan,

The Long Island City Partnership (LICP) represents the industrial businesses along Newtown Creek in the Long Island City section of Queens. We are writing to express our support for an efficient and science-based solution to remediate the East Branch of Newtown Creek.

As the local economic development organization for Long Island City, LICP works to attract new businesses, retain those already established, and foster a vibrant, mixed-use community that benefits residents, employees, and visitors alike. LICP also manages the LIC Business Improvement District (LIC BID) and the Industrial Business Zone (IBZ), supporting business services and operational needs in our area. Furthermore, we are actively represented on the Newtown Creek Superfund CAG.

LICP supports the EPA's proposed plan to dredge and cap the sediment in the East Branch, including deeper dredging in targeted areas. However, it is essential to recognize that this area is part of an IBZ designated by the City to support industrial uses and freight mobility. The planned remediation has the potential to create congestion and other disruptions that could negatively impact businesses that rely on consistent truck access for daily operations. We respectfully urge the EPA to work with us and the local business community to prioritize minimizing the impact on local businesses during implementation.

We have several questions regarding the proposed plan and its potential impact:

- Has the EPA identified the specific sources of pollution in the East Branch?
- Who will bear the costs of remediation? Will those responsible for polluting be held accountable, or will costs be distributed as part of a broader cleanup of Newtown Creek?
- How does the remediation schedule align with the planned replacement of the Grand Street Bridge?
- What are the specific locations along the East Branch where remediation will begin?
- What will be the upland requirements for staging and operations during remediation, and where does the EPA plan to establish these areas?
- How will the East Branch remediation affect navigability throughout Newtown Creek?
- What is the plan for bulkhead replacements along the East Branch?

We thank the EPA for its dedication to restoring Newtown Creek and look forward to further collaboration on this essential project.

Sincerely,

Laura Rothrock
President

27-01 Queens Plaza North, Level B
Long Island City, NY 11101
P: 718-786-5300
www.licqns.com

November 7, 2024

## Project Portal Cover Page

| | |
|---|---|
| **To:** | USEPA |
| **Cc:** | NCG |
| **From:** | David Haury, Anchor QEA |
| **Re:** | Newtown Creek Group Comments on the Proposed Plan for the East Branch Early Action Newtown Creek Superfund Site |

Newtown Creek Group Comments on the Proposed Plan for the East Branch Early Action Newtown Creek Superfund Site have been posted.

123 Tice Boulevard, Suite 205
Woodcliff Lake, New Jersey 07677
201.930.9890

November 7, 2024

Caroline Kwan
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 18th Floor
New York, New York 10007-1866

Re: Newtown Creek Group Comments on the Proposed Plan for the East Branch Early Action Newtown Creek Superfund Site

Dear Ms. Kwan,

The Newtown Creek Group (NCG) appreciates the opportunity to provide comments on the Proposed Plan for the East Branch portion of the Newtown Creek Superfund site.

## General Comments

### *1. Future Participation in the Remedial Design/Remedial Action for East Branch*

The current members of the NCG have worked diligently and cooperatively with the U.S. Environmental Protection Agency (USEPA) to complete a Focused Feasibility Study for East Branch under USEPA oversight. The Draft Final *East Branch Early Action Focused Feasibility Study* (FFS Report; Anchor QEA 2024) provided the technical support for the Proposed Plan and is a comprehensive document, prepared at USEPA's direction in an expedited manner, to facilitate near-term remediation in Newtown Creek. While Anchor QEA and the NCG will continue to work on the Operable Unit 1 (OU1) creekwide Feasibility Study (FS), the NCG, as a group, will not be working on East Branch beyond issuance of the Record of Decision (ROD). The NCG's obligations under the 2011 Agreement and Order on Consent are limited to Remedial Investigation (RI) and FS and do not include remedial design or implementation of a remedial action. Consistent with both USEPA policy and its stated intentions, once the ROD for East Branch is issued, the members of the NCG expect that any discussions regarding the implementation of the East Branch Interim Action remedial design/remedial action (RD/RA) will include the formation of a new group to perform such work.

### *2. Action to Address Potential Upland Property Issues*

a. **The ROD should make clear that upland property owners will be responsible for the installation of any sealed bulkheads, including any upland work required to manage any hydraulic or other issues resulting from the installation of a sealed bulkhead, that may be necessary to prevent migration of contaminants from upland properties to the Study Area.**

One of the "common elements" that USEPA requested be included in the FFS Report that USEPA has similarly listed as a common element in the Proposed Plan (page 17) is that sealed bulkheads will be used "*if and where needed to reduce migration*" from upland sites. While the NCG agrees with USEPA that "*the need for sealed bulkheads is not currently indicated by the existing data*" (Proposed Plan page 17), the ROD should make clear that upland property owners shall be responsible for the installation of any sealed bulkheads that may be necessary to prevent migration of contaminants from upland properties into the Study Area. USEPA has previously stated that separate state and federal enforcement authorities shall be used as necessary and appropriate to address migration of contaminants from upland properties. Consistent with those previous statements, the NCG requests that the ROD clearly state that upland contamination, and any resulting migration from upland properties, is the responsibility of the upland property owners and not the parties who implement the sediment remedy in East Branch.

In addition, the Proposed Plan (page 24, fifth subbullet under first bullet under the PREFERRED ALTERNATIVE AND BASIS FOR PREFERENCE section) references *"opportunistic seep sampling"* conducted during the Pre-Design Investigation (PDI) to inform decisions on the need for upland controls. The NCG requests that the ROD not use the word "opportunistic" and instead include language that indicates that the PDI will include a systematic, planned investigation of seeps to determine whether upland controls are necessary rather than relying on opportunistic data. Consistent with this request, the NCG also requests that the ROD clearly indicate that the PDI will be designed with clear data quality objectives and assessment methods to alleviate stakeholder concerns about the current perceived lack of information regarding the presence of nonaqueous phase liquid (NAPL) and principal threat waste (PTW) as well as the conditions under which in situ stabilization (ISS) will be used or deeper dredging will be needed.

The Proposed Plan (Proposed Plan page 17, Common Elements of Alternatives, fifth bullet) also states that *"sealed bulkheads may be used as a temporary measure to address seeps while cleanup of the related upland source is evaluated and implemented."* The text for the ROD should include a clear provision for an acceptable time frame for remediating upland sources that have been treated using a sealed bulkhead as a temporary measure. This is necessary because contamination contained in this manner without co-occurring remediation or containment of the upland contamination may eventually circumvent the bulkhead barrier and enter the creek elsewhere, potentially causing remedy failure.

b. **The ROD should make clear that upland property owners will be responsible for any stabilization of their bulkheads, including repair or replacement, that is necessary in order to implement the sediment remedy.**

The Proposed Plan lists repair or replacement of bulkheads as one example of the "Stabilization Measures" common element for each of the active alternatives (Proposed Plan page 17). While it is not clear at this point which bulkheads, if any, in East Branch may need stabilizing, the ROD should contain clear language regarding USEPA's expectation that any such costs will be borne by the affected property owner(s). Consistent with prior RODs in Region 2 (e.g., the Gowanus Canal Superfund site ROD [USEPA 2013]), the ROD should also contain a discussion of the resources USEPA will make available to those property owners—such as standardized plans to minimize those costs, coordination among parties to achieve economies of scale, and application of the Comprehensive Environmental Response, Compensation, and Liability Act permit exception—to reduce the costs to those property owners.

c. **The ROD should clarify that NAPL in upland soil should not be included in the definition of PTW that might potentially be present at the site. Instead, any measures to identify and treat NAPL at upland properties should be handled by separate state or federal authorities and directed at the relevant upland responsible party.**

The Proposed Plan confirms that there is no known PTW in East Branch based on the findings of the OU1 RI and the FFS Report, but it outlines how PTW will be treated in the event it is encountered. The Proposed Plan also identifies NAPL that has the potential to migrate to surface sediment and surface water as one potential category of PTW. The NCG does not take issue with the inclusion of NAPL in subsurface sediment, should any be encountered during post-ROD sampling, but the description of potential NAPL PTW should not include NAPL that might be detected in the soil in upland properties. The Proposed Plan explains on page 15 that if action is necessary to address source control related to a seep from a contaminated upland property, that action will be taken through state and/or federal enforcement authority, as determined on a case-by-case basis. The ROD should make clear that any post-ROD investigations of potential NAPL in upland soils should take place in the context of state and/or federal enforcement authorities against the upland responsible party.

## *3. Selection of Remedial Alternative EB-D*

While the NCG supports a hybrid dredge-and-cap remedy as the best approach to managing contaminated sediments in Newtown Creek, the NCG is concerned that some of the reasons and language contained in USEPA's "Basis for Remedy Preference" (Proposed Plan pages 24 and 25) supporting the selection of Alternative EB-D are not consistent with the FFS Report, in particular the following:

- The Proposed Plan (page 21) is consistent with the FFS Report (Table 6-1, Table 7-2 and Section 7.8) in stating that each of the active remedial alternatives, including those that include more reliance on in situ management of contamination than Alternative EB-D (i.e., Alternatives EB-B and EB-C), would meet the threshold criteria of overall protection of human health and the environment. However, USEPA's "Basis for Remedy Preference" (Proposed Plan pages 24 and 25) supporting the selection of Alternative EB-D as the preferred alternative does not acknowledge the evaluations summarized in Table 6-1, Table 7-2, and Section 7.8 of the FFS Report that conclude that Alternatives EB-B and EB-C are similarly protective over the long term while being more effective in the short term and could be implemented more easily, quickly, and cost-effectively[1] than Alternative EB-D.

- In addition, USEPA's "Basis for Remedy Preference" (Proposed Plan page 25) states that Alternative EB-D *"would likely result in the greatest volume of in-situ treatment since Alternative EB-D would include ISS where necessary to address relatively high COC concentrations in sediment, the potential for exposure to PTW, and/or the potential for NAPL migration."* This implies that ISS as an "option" is only applicable to EB-D, which is not correct. ISS is not contemplated in the FFS Report to address relatively high contaminant of concern (COC) concentrations in sediment (see also Technical Clarification Comment No. 35). Page 17 of the Proposed Plan lists ISS as a common element for all active alternatives; therefore, each active alternative would include the same amount of ISS for the purpose of treating NAPL or PTW. See also Technical Clarification Comment Nos. 2, 4, 32, and 35. Additionally, USEPA's conclusion (Proposed Plan page 23, Section 4, Reduction of Toxicity, Mobility, or Volume through Treatment) that amended capping is not considered in situ treatment is also not correct (see Specific Comment No. 3 herein), which further underestimates the amount of in situ treatment provided by each of the active alternatives.

For these reasons, the ROD should be flexible with respect to decisions regarding dredge depths vs. in situ treatment so areas of deeper dredging are determined to be consistent with National Oil and Hazardous Substances Pollution Contingency Plan (NCP) criteria, and the potential benefits of additional dredging should be balanced with the short-term impacts, the reduction of in situ treatment, implementability concerns, time to complete remedy construction, and cost-effectiveness. Details finalized as part of the RD/RA process should also leave flexibility for future habitat restoration in certain areas of East Branch and be consistent with the objectives of green remediation noted in USEPA Region 2's Clean and Green policy, including (but not limited to) minimizing impacts to water quality, reducing air emissions and greenhouse gas production, and minimizing waste production.

## *4. "Technical Clarification" Comments on the Proposed Plan*

Attachment 1 to these comments includes a compendium of instances in the Proposed Plan and Fact Sheet where the NCG believes revisions would provide additional clarification on technical issues or resolve technical inconsistencies within the Proposed Plan or between the Proposed Plan and the

[1] With respect to cost, the NCP deems a remedy "cost-effective if its costs are proportional to its overall effectiveness" where overall effectiveness includes consideration of long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; and short-term effectiveness (40 CFR 300.430[f][1][ii][D]).

FFS Report. The NCG recommends that USEPA consider rectifying these inconsistencies in the text of the forthcoming ROD and/or the Responsiveness Summary section of the ROD.

## Specific Comments

### *1. Dredge Depths in East Branch*

USEPA's description of the preferred alternative (Proposed Plan page 24) states the following with regard to dredge depths:

- *"Dredging to a minimum depth to accommodate capping without decreasing water depths. FFS dredge depth estimates range from 36 inches (in deeper water areas) to 53 inches (in shallower water areas) below the current mudline."*
- *"Deeper dredging in areas identified based on the following considerations: potential for NAPL migration from the deeper soft and/or native material; potential for exposure to principal threat waste; depth to native material; and comparatively higher COC concentrations in remaining sediment."*

As detailed in Section 5.2.4 of the FFS Report, under Alternative EB-D, the depth of dredging for most areas (with the exception of the "deeper dredging" areas) is a function of two constraints: 1) the thickness of the cap required in different portions of East Branch to provide both effective chemical isolation of contaminated sediments under the cap and physical stability that withstands erosive forces at the top of the cap; and 2) a desire to accommodate capping without decreasing current water depths.

Regarding the first constraint, Appendix C of the FFS Report documents the analyses conducted to develop a preliminary FS-level design for a multilayer engineered cap (including chemical isolation and erosion protection layers) in East Branch; the results of these evaluations provide the basis for the cap thicknesses used in FS evaluations and listed in the description of Alternative EB-D in the Proposed Plan. The ROD should be clear that the preliminary FS-level design will be refined and optimized during remedial design based on data collected during post-ROD sampling and that, if the cap thicknesses change, this could affect the corresponding dredge depths.

The NCG believes the ROD should also state that there is some flexibility regarding the second constraint of maintaining existing water depths. There are three primary reasons to maintain existing water depths: 1) to provide adequate assimilative capacity for combined sewer overflow discharges per the requirements of the Long Term Control Plan (LTCP) for East Branch; 2) to be consistent with New York State's stated preference for maintaining current water depths to conserve ecological function; and 3) due to concerns regarding a rise in flood levels as a result of an in-water project.

With respect to the first reason, the NCG is not aware of any comprehensive analysis completed to date to determine whether a remedy in East Branch that results in a reduction of water depths would be detrimental to New York City's obligations under the LTCP, and the NCG recommends that the ROD state that such an analysis should be completed.

Regarding the second reason, the NCG believes that improved habitat conditions can be accomplished in East Branch through less dredging in some areas that would result in a change in existing water depths but would not compromise the design and implementation of a protective remedy. For example, placing a cap on existing grades in some areas would create shallower water, which could make it easier to implement future habitat restoration projects in these areas. This decrease in water depth in some areas could be balanced by the deeper dredging and deeper water in other areas, if needed, to result in a no-net change in water depths to balance ecological function. In addition, Section 4 of Appendix C of the FFS Report demonstrated that Alternative EB-B, which would result in shallower water over current conditions over the entirety of East Branch, would not adversely impact flood levels. Language in the ROD should be flexible enough to allow for these considerations to be incorporated during remedial design.

## *2. Potential for Deeper Dredging Due to the Presence of Comparatively Higher COC Concentrations*

USEPA's description of the preferred alternative (Proposed Plan page 24) states the following with regard to deeper dredge depths:

- *"Deeper dredging in areas identified based on the following considerations: potential for NAPL migration from the deeper soft and/or native material; potential for exposure to principal threat waste; depth to native material; and comparatively higher COC concentrations in remaining sediment."*

Currently, the Proposed Plan contains no process for determination of "comparatively higher COC concentrations," leaving the implementation of deeper dredging on this basis unclear. The NCG believes that "comparatively higher COC concentrations" should be defined within the context of capping effectiveness. Therefore, the maximum COC concentrations identified during the RI/FS investigations, as detailed in Section 3.1.2.1.1 of Appendix C of the FFS Report, should be the basis of comparison for new data collected during post-ROD sampling when evaluating whether additional dredging is required, because the FFS Report has demonstrated that these existing maximum COC concentrations can be effectively contained by the chemical isolation layer within the proposed cap system. As noted, Appendix C of the FFS Report details the comprehensive and conservative approach used to design the chemical isolation layers in the caps proposed for East Branch. The thickness of the chemical isolation layers and the amounts of amendments required in these layers were conservatively based on the maximum concentration of every COC in East Branch RI/FS data for sediment, porewater, and groundwater regardless of depth within the sediment (or native material in the case of groundwater). Depending on the COC, the existing cap design may already be sufficient to address concentrations that are only slightly higher than the maximum observed values in East

Branch or could readily be addressed by a minor modification in the cap design, such as a slight increase in sorptive amendment content. The ROD should clearly state that deeper dredging would be required if (and only if) the higher concentrations identified in sediments, porewater, or groundwater are higher than those maximum values used in Appendix C of the FFS Report and could not be effectively managed through minor (or potentially no) modifications to cap design.

## *3. Capping as a Form of Treatment*

Page 23 of the Proposed Plan states that "*amended capping is not considered treatment,*" which is inaccurate and creates a risk that the public will misunderstand the remedy being selected by USEPA. This statement is inconsistent with the FFS Report (Table 6-1), which states that "*amendments included in the caps would permanently sequester contaminants that migrate into the treatment layer (chemical isolation layer) of the caps and would be considered a form of in situ treatment*."

The statement in the Proposed Plan is also inconsistent with the definition of a treatment technology in Section 300.5 of the NCP, which states that "*treatment technology means any unit operation or series of unit operations that alters the composition of a hazardous substance or pollutant or contaminant through chemical, biological, or physical means so as to reduce toxicity, mobility, or volume of the contaminated materials being treated*" (USEPA 1990). USEPA has previously considered amended capping as treatment in the RODs and other remedy selection documents issued for several other contaminated sediment sites, summarized as follows:

- Quanta Resources Superfund site (Edgewater, New Jersey) Operable Unit 2 ROD: "… *a multilayer NAPL cap resistant to erosion and consisting of isolation materials, including clean sediment and/or sand with armoring (as needed), and treatment components, such as organoclay or activated carbon, would be placed*" (USEPA 2024).
- Gowanus Canal Superfund site ROD: *"The treatment layer would reduce the mobility of NAPL and is considered a treatment technology. The overall reduction of NAPL mobility expected to be achieved by the treatment layer is high"* (USEPA 2013).
- Portland Harbor Superfund site ROD: *"In-situ treatment such as cap amendment will be applied over 133 acres. With these treatment actions, the preference for treatment requirement of the NCP has been met"* (USEPA 2017).
- Lower Duwamish Waterway Superfund site ROD: *"The remedy does include potential treatment of some contaminated sediment through provisions of amendment of caps and ENR with activated carbon or other contaminant-sequestering agents"* (USEPA 2014).

Any evaluation of the various alternatives' ability to reduce toxicity, mobility, or volume through treatment in the ROD should correctly account for the in situ treatment provided by capping.

## *4. Proposed Approach for Evaluating Post-Remedy Recontamination-Related Data*

The NCG appreciates USEPA's recognition in the Proposed Plan that post-remedy recontamination will occur in East Branch due to the influence of ongoing sources of COCs (see Proposed Plan pages 10 to 11 and 14 to 15). However, the NCG is concerned both about the lack of clarity and the premature level of detail about the long-term monitoring program included in the Proposed Plan for the following two reasons:

a. Although the Proposed Plan mentions that the post-remedy long-term monitoring program has two objectives (see Proposed Plan page 15, first full bullet, third sentence), the Proposed Plan does not consistently differentiate between the two objectives and the resulting components of post-remedy long-term monitoring: 1) remedy performance; and 2) evaluation of recontamination due to the influence of ongoing sources. The ROD should make this distinction clear and should also be clear about the following points:

   - While these two components of long-term monitoring can be developed together, and there may be overlap in certain components, the ROD should make clear that some components will be used to evaluate remedy performance, and some components will be used to permit USEPA to evaluate recontamination due to the impacts of ongoing sources.
   - Although there may be overlap in the two aspects of the post-remedy monitoring plan, a robust monitoring program is needed to ensure that recontamination is not misinterpreted as remedy failure. Evaluating remedy performance over the long term is a responsibility of the implementing parties. The ROD should make clear that any necessary response to ongoing sources that are leading to unacceptable recontamination will be led by the appropriate regulatory authorities and, absent evidence that recontamination is coming from an implementing party's property or outfalls, will not be the responsibility of the implementing parties.
   - This clear separation of remedy performance and the expected recontamination of surface sediments due to external sources is important because the Proposed Plan currently notes that, for surface sediments post-remedy, "*risk-based PRGs do appear to be achievable at this time for copper (PRG 490 ppm) and TPAH(34) (PRG 100 ppm), may be achievable with little or no additional source control work for PCBs (PRG 0.30 ppm), and will likely take time and additional source control work to achieve for dioxins/furans (PRG 18 ppt) and C19-C36 (PRG 200 ppm).*" Any language in the ROD regarding discussion of risk-based PRGs not being attainable should be clearly linked to ongoing external sources and separate from sediment remedy performance and remedial action objective (RAO) attainment. Moreover, given that the Proposed Plan provides neither a definite timetable nor a clear mechanism for reduction of all external sources of COCs to meet risk-based PRGs, the ROD should also clearly state that remediation goals (RGs)

may need to be established that are above risk-based PRGs due to external sources outside of the East Branch Early Action and OU1.

b. The Proposed Plan prematurely includes details of the long-term monitoring program that should be developed when all the elements of the plan, including media to be sampled, numbers of samples, and sampling methodologies, are developed (see Proposed Plan page 15, first full bullet, first and second sentences and page 16, second full paragraph). In addition, the Proposed Plan does not clearly differentiate which components of the long-term monitoring program are specific to either of the two primary objectives of the monitoring program: 1) remedy performance; and 2) recontamination. The ROD should provide a high-level overview of the long-term monitoring plan and should indicate that details will be developed during the remedial design phase of the East Branch Early Action, for the following reasons:

   – It is premature to set the interim evaluation measures (IEMs) before the long-term monitoring plan, including how IEMs are to be applied, has been developed. There has been and will be a significant amount of new data collected during the lateral groundwater study, the PDI, and the OU2 monitoring program that will be used to update our understanding of existing conditions in East Branch and the nature of ongoing sources. This new information will be used to update the long-term equilibrium (LTE) model, the tool USEPA will use to set IEMs and evaluate recontamination.
   – In addition, setting specific thresholds now may result in misinterpretation of post-remedy monitoring data, particularly if the appropriate spatial scale of comparison of monitoring data with IEMs using the LTE model is not defined. The IEMs for some COCs are based on the predictions made by the LTE model. The LTE model makes these predictions on a reach wide basis, not a point-by-point basis; it is therefore important to ensure that whatever value from the LTE model is used to set the IEM and any triggers for additional monitoring are applied at the correct spatial scale when evaluating long-term monitoring data. Comparing IEMs to individual sample results is not appropriate. For example, for some of the COCs, comparing individual sample results collected during a monitoring event to an IEM defined as the 50th percentile of the probabilistic LTE model results will lead to the conclusion that a large percentage of these sample results exceeds the IEM. This misinterpretation will be compounded if the sample results are compared to trigger values that are 75% to 90% of the IEM value. Under this scenario, USEPA may erroneously conclude that concentrations are exceeding LTE model predictions when, in fact, they are entirely consistent with those predictions (i.e., the reach average may still be less than the IEM). This may erroneously suggest that localized external sources are adversely impacting post-remedy surface

sediment concentrations when, in fact, results are within the expected range of the LTE model predictions.

- USEPA has recognized that there is uncertainty in the predictions of future LTE surface sediment concentrations due to recontamination from ongoing external sources (see Proposed Plan page 14, last full paragraph, second sentence), and that uncertainty should be reflected in the IEMs that are established in conjunction with development of the monitoring plan. Specifically, USEPA should define a range of uncertainty around a selected IEM value and explicitly consider these uncertainty bounds when setting triggers for additional monitoring.

## *5. Uncertainty in Derivation of Risk-Based PRGs*

The NCG believes it is important to emphasize that, although the derived risk-based PRG is a precise value, the derivation of these PRGs also contains inherent uncertainty given uncertainty in assumptions regarding exposure and effects made in the baseline human health and ecological risk assessments. In addition, the process that USEPA used to established the risk-based PRG for some of the COCs entailed changing some of the exposure variables in the approved Baseline Ecological Risk Assessment and/or was not well documented in reports or the Administrative Record, adding to the uncertainty regarding the selection of one value for each COC/PRG pair. Individual member NCG companies will be submitting COC/PRG-specific comments separately and distinct from collective NCG comments. The NCG recommends that USEPA factor in this uncertainty when evaluating recontamination-related long-term monitoring data to avoid overinterpreting what will likely be exceedances of risk-based PRGs in some post-remedy samples due to ongoing sources of COCs.

## *6. Adopt the Term "Background" to Describe Post-Remedy Recontamination*

USEPA should adopt the term "background" to describe post-remedy recontamination.

- USEPA has developed the LTE model to evaluate the effect of ongoing sources to East Branch and throughout the creek.
- Through the use of the LTE model, USEPA is effectively defining expected background conditions in the creek without explicit use of the term "background." This is inconsistent with USEPA policy and formal guidance documents. These guidance concepts include, but are not limited to, the following: 1) USEPA typically does not set cleanup levels below background concentrations (USEPA 2002); and 2) remedial action objectives should reflect objectives that are achievable from the site cleanup (USEPA 2005), and remediation below background is not an achievable objective (USEPA 1988, 2005).
- Although evaluating background in the creek is "not clear cut" (see Proposed Plan page 14, top of page) and will change over time, USEPA has a tool that does just that, and USEPA should be clear that this is what the LTE model is actually doing.

- Use of the term "IEM" as a substitute for "background" is confusing and implies that a comprehensive evaluation of background conditions can be reduced to a comparison with one number, an IEM; the evaluation of background will be more complex than that and should not be specified at this point in the process.

The NCG believes that USEPA's consideration of the comments on the Proposed Plan included in this letter and in the attachment will help to achieve the most effective remedy in East Branch.

Sincerely,

David Haury
Principal

cc: Dan Grapski, ExxonMobil
Alain Noel, National Grid
Cliff Firstenberg, Phelps Dodge Refining Corp.
Nathan Blomgren, Chevron
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## Attachment

Attachment 1 Technical Clarification Comments on the Proposed Plan

## References

Anchor QEA, 2024. *East Branch Early Action Focused Feasibility Study*. Draft Final. Remedial Investigation/Feasibility Study, Newtown Creek. August 2024.

USEPA (U.S. Environmental Protection Agency), 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA.* Interim Final. EPA/540/G-89/004. OSWER Directive 9355.3-01. Office of Emergency and Remedial Response, Washington, DC. October 1988.

USEPA, 1990. *National Oil and Hazardous Substances Pollution Contingency Plan, Final Rule, Codified as amended at 40 C.F.R. Part 300*.

USEPA, 2002. Transmittal of Policy Statement: *Role of Background in CERCLA Cleanup Program*. From Michael B. Cook, Director of Office of Emergency and Remedial Response to Superfund National Policy Managers Regions 1–10. OSWER 9285.6-07P. Washington, DC. May 1, 2002.

USEPA, 2005. *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites.* Office of Solid Waste and Emergency Services. EPA-540-R-05-012, OSWER 9355.0-85. December 2005.

USEPA, 2013. *Record of Decision*. Gowanus Canal Superfund Site, Brooklyn, Kings County, New York. September 2013.

USEPA, 2014. *Record of Decision*. Lower Duwamish Waterway Superfund Site. November 2014.

USEPA, 2017. *Record of Decision*. Portland Harbor Superfund Site, Portland, Oregon. January 2017.

USEPA, 2024. *Record of Decision*. Quanta Resources Superfund Site, Operable Unit 2, Edgewater, Bergen County, New Jersey. September 2024.

# Attachment 1
# Technical Clarification Comments on the Proposed Plan

**NCG "Technical Clarification" Comments on the Proposed Plan for Newtown Creek Superfund Site East Branch Early Action**

This attachment provides comments that describe a number of instances in the U.S. Environmental Protection Agency's (USEPA's) Proposed Plan for the East Branch Early Action (Proposed Plan) and Fact Sheet where the Newtown Creek Group (NCG) believes revisions would provide additional clarification on technical issues or resolve technical inconsistencies within the Proposed Plan or between the Proposed Plan and the Draft Final *East Branch Early Action Focused Feasibility Study* (FFS Report; Anchor QEA 2024a). The comments are generally arranged in order of occurrence in the Fact Sheet and Proposed Plan, to the extent practical. The following list represents key inconsistencies that USEPA should consider rectifying in the text of a forthcoming Record of Decision (ROD) and/or the Responsiveness Summary section of the ROD. This is not meant to be a comprehensive list of inconsistencies.

1. Fact Sheet: The Fact Sheet is inconsistent about where capping will occur as part of the proposed remedy. The third paragraph states that the Proposed Plan calls for "*capping of all dredged areas*," whereas the fourth paragraph states the proposed cleanup includes a "*cap over the entire dredged areas of about 10 acres*." Per the description of Alternative EB-D on page 20 of the Proposed Plan, Alternative EB-D includes sediment removal over 11.2 acres and capping over 10 acres. Both the Fact Sheet and the ROD should be clarified to prevent inconsistency with the FFS Report (see, for example, Table 5-2 of the FFS Report), which states that Alternative EB-D includes capping over 9.6 acres, with dredge and backfilling over 1.2 acres and in situ stabilization (ISS; including pre-dredge and post-ISS cap, if necessary) over 0.4 acre. Specifically, the statement "*capping of all dredged areas*" is not correct, and if this or similar language is included in the ROD, it should be corrected.
2. Proposed Plan (general comment): The Proposed Plan does not discuss the "technology options" for treating nonaqueous phase liquid (NAPL) or principal threat waste (PTW) presented in Sections 4.2 and 5.1.1 of the FFS Report or discuss the performance of those options relative to National Oil and Hazardous Substances Pollution Contingency Plan (NCP; USEPA 1990) criteria, as evaluated in Table 6-1 of the FFS Report. This information is important context for determining where in situ stabilization/solidification (ISS) may be evaluated as a remedial technology to reduce migration and/or for treating NAPL or PTW. It was apparent during the public meeting on September 18, 2024, that the public was confused about when and where ISS might be used. Clearly stating conditions (i.e., the presence of NAPL or PTW per Section 5.2.1 of the FFS Report) that may trigger the evaluation of ISS relative to the other technology options in the ROD would help alleviate confusion and improve functionality. Furthermore, the ROD should clearly state that the evaluation of ISS, amended capping, and removal as remedial technology options for addressing NAPL or PTW was included in the FFS Report as a hypothetical evaluation in the event that conditions warranting their use were identified to be present by the pre-design investigation

(PDI) and not due to a currently identified need for ISS in East Branch. See also Comment Nos. 17 and 35, which detail additional inconsistencies related to the purpose of the ISS included in Alternative EB-D and the preferred alternative.

3. Proposed Plan page 1, EPA Announces Proposed Plan, third paragraph: The text states that "*EPA's preferred alternative for the East Branch portion of OU1 calls for…localized deeper dredging where needed based on the remaining depth to uncontaminated material, comparatively higher concentrations of contaminants in remaining sediment*." The reference to "*uncontaminated material*" is not consistent with the FFS Report (Section 5.2.4), which states that localized deeper dredging would be based on depth of sediment to native material. Text later in the Proposed Plan on page 24 describing the preferred alternative is consistent with the FFS Report. Language discussing localized deeper dredging in the ROD should correctly and consistently use "*depth of sediment to native material*" consistent with the FFS Report. This is important because contaminants of concerns (COC) were detected in native material, albeit with concentrations that are an order of magnitude (or more) lower than COC concentrations in the subsurface sediment. The term "*uncontaminated*" does not have a specific definition and may be confusing to the reader. Implications of the use of the phrase *"comparatively higher concentrations of contaminants in remaining sediment"* are discussed in detail in Specific Comment No. 2 in the Newtown Creek Group Comments on the Proposed Plan for the East Branch Early Action Newtown Creek Superfund Site.
4. Proposed Plan page 1, EPA Announces Proposed Plan, last paragraph: The text states "*the use of in-situ stabilization, if and where needed, to further address contaminant migration from beneath the capped areas*." This is not consistent with the FFS Report, which contemplates two purposes for ISS: to stabilize shoreline areas or as an option for treating NAPL/PTW. Also, the need for a cap on top of ISS would be determined during the remedial design phase based on results of a treatability study to be conducted during the PDI, as discussed in Section 5.3.5 of the FFS Report. Again, similar discussions in the ROD should be written to prevent inconsistency with the FFS Report.
5. Proposed Plan page 4, Overall Site Description, third paragraph: The text states that "*these environmental indicators are above 50 percent of the national percentile at the Site*." The meaning of this statement is not clear and should be clarified in the ROD.
6. Proposed Plan page 5, OU1 Study Area Investigation, third paragraph: The text states that seeps, lateral groundwater, and shoreline bank erosion are *"internal/external interface sources."* This language is inconsistent with Section 3.4.2 of the FFS Report, which states: "*The categorization of individual ongoing sources will be evaluated based on additional information collected during a pre-design investigation and considered during the RD and long-term remedy evaluation monitoring*." (This specific language from the FFS Report was included based on comment on the FFS Report received from Rupika Ketu of USEPA by e-mail on August 13, 2024.) Language discussing internal/external interface sources in the ROD should correctly reference the language included in the FFS Report.

7. Proposed Plan page 5, OU1 Study Area General Findings, second paragraph: The text states "*hydrodynamic and sediment transport models (which include groundwater and point source sub-models)*." The groundwater and point source models are linked models, not sub-models. If similar language is included in the ROD, the text should be revised to state these are linked models.
8. Proposed Plan page 5, OU1 Study Area General Findings: The text states that "*the lateral groundwater discharge study data and additional sediment and surface water data will help further refine the OU1 CSM*." If similar language regarding this issue is included in the ROD, the OU2 point source sampling data should also be included in this list for completeness.
9. Proposed Plan page 6, OU1 Study Area General Findings, second paragraph: The text states that "*contamination is found, in particular, in the surface and subsurface sediment of the Creek and in the underlying native material*." If similar language is included in the ROD, "*in particular*" should be removed from this sentence as the sentence implies contamination is found everywhere in the sediments, which is not particular.
10. Proposed Plan page 6, Recreation, Fishing, and Crabbing: The text states that "*the New York State Department of Health has developed fish consumption advisories identifying consumption limits for fish and crabs in Newtown Creek (and other waterways within New York City), and, in consultation with the community, USEPA has placed signs at known fishing/crabbing locations along the Creek advising anglers of the Superfund site designation and the State fish consumption advisories*." The common elements of the remedial alternatives on page 18 of the Proposed Plan note that fish consumption advisories currently in place through the state are assumed to remain in place after the East Branch Early Action. Any text in the ROD should clearly state that, because the fish consumption advisories are for the entirety of New York Harbor, including the East River, remediation in Newtown Creek will not address the conditions leading to fish and crab consumption advisories or result in removal of those advisories.
11. Proposed Plan page 6, Upland Uses, first paragraph: The text states that "*uses of the areas surrounding the Creek are highly varied, and they include industrial/commercial properties, residential properties, limited recreational access areas, and abandoned properties*." If similar language is included in the ROD, the word "*limited*" should be explained (e.g., amount of land, types of recreation, or limited access) or omitted. No qualifying adjectives have been used for the other land use types in the sentence.
12. Proposed Plan page 8, Characteristics of East Branch, second paragraph: The term "*natural*" before "*hydrodynamics*" should be deleted as East Branch is a constructed waterbody, so the hydrodynamics are not natural.
13. Proposed Plan page 9, Nature and Extent of Contamination in the East Branch: Discussion of the East Branch conceptual site model (CSM) talks about 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) as representative of total dioxins/furans (D/F) measured as toxicity equivalence quotients (TEQs). For the evaluation of nature and extent of contamination in the

*Remedial Investigation Report* (RI Report; Anchor QEA 2023), 2,3,7,8-TCDD data were presented for D/F because 2,3,7,8-TCDD is a major contributor to the D/F TEQ. However, the FFS Report, including the CSM presented in Appendix A of the FFS Report, evaluates contaminant concentrations consistent with the list of OU1 COCs (as discussed in Section 3.1 of the FFS Report), and D/F TEQ is the relevant D/F metric for the OU1 COCs. The ROD should consistently use D/F TEQ when discussing COCs rather than 2,3,7,8-TCDD, which is only one of 17 congeners included in calculating the D/F TEQ.

14. Proposed Plan page 10, Nature and Extent of Contamination in the East Branch: The text states that "*laboratory analysis of NAPL from the OU1 Study Area shows that it generally consists of TPAH(34) and TPCBs*." COC presence in NAPL in the Study Area has not been comprehensively evaluated during the OU1 RI/FS process; therefore, the NCG recommends that this statement should not be included in the ROD.
15. Proposed Plan page 10, Nature and Extent of Contamination in the East Branch: The text states that "*visual observations of sediment samples collected in the eastern lobe (also referred to as the Western Beef slip) identified sheen in every sample collected.*" This text is incorrect; there are multiple sediment samples within the Western Beef Slip with no visual observations of sheen (see Figures A2-10a and A2-10b of the FFS Report). If similar language is included in the ROD, this statement should be updated to accurately describe the Western Beef Slip sheen data.
16. Proposed Plan page 10, Nature and Extent of Contamination in the East Branch: The text states that gas ebullition occurs when "*organic content in sediments is high enough to support the bacterial production of methane gas*." If similar language is included in the ROD, the text should be revised to "*to support the biogenic production of gases (mostly methane)*" to recognize that other organisms in addition to bacteria (like archaea) can produce gas.
17. Proposed Plan page 10, Nature and Extent of Contamination in the East Branch: The text states that "*immobile NAPL may be mobilized during implementation of the remedy.*" If similar language is included in the ROD, this statement should be updated to reflect that evaluations presented in the FFS Report showed that NAPL in East Branch is immobile and incapable of migrating upward by advection under reasonably foreseeable field conditions (Section 2.5.1.4 of Appendix A) and that NAPL mobility is not expected to change because of the change in overburden pressure resulting from capping included in the range of remedial alternatives (Section 3.2.3 of Appendix C).
18. Proposed Plan page 11, Ongoing Sources of Contamination, second paragraph: The text states that "*East River solids comprise approximately 30 percent of the deposited sediment and COC load in the East Branch.*" This is correct for the amount solids that are depositing in East Branch, but is incorrect for COC load. The East River contributes less than 30% of the COC load to East Branch because there are lower COC concentrations on East River solids than on point sources solids. Consequently, the East River contributes 10% or less of the total COC load for each of the COCs in East Branch (see Figure B3-3 of the FFS Report). If similar language is included in the ROD, this

statement should be updated to accurately describe the East River contribution to the East Branch load for each COC.

19. Proposed Plan page 12, the gray box titled "WHAT IS RISK AND HOW IS IT CALCULATED?": The section only discusses human health risk and does not consider ecological risk. Therefore, in the ROD, either the title of the section should be revised to "*What is Human Health Risk and How is it Calculated?*", or the discussion should be expanded to include ecological risks. In addition, the term "*soil*" should be replaced with "*sediment*" in this box as Newtown Creek is a sediment site.
20. Proposed Plan page 13, Preliminary Remediation Goals, first paragraph: The text states that "*based on the findings of the BHHRA and the BERA for the full OU1 Study Area, six COCs have been identified for OU1 of the Site and risk-based PRGs have been developed for each of the COCs*." Since the *Baseline Human Health Risk Assessment* (BHHRA) and the *Baseline Ecological Risk Assessment* (BERA) were not the only documents used as the basis to develop preliminary remediation goals (PRGs) for the six COCs, the portion of the statement that reads "*based on the findings of the BHHRA and the BERA for the full OU1 Study Area*" should be deleted.
21. Proposed Plan pages 13 and 14: Monitoring after remedy construction is interchangeably referred to as "*post-remedy monitoring*" and "*long-term monitoring*." The ROD should use consistent terminology such as "*long-term evaluation monitoring*," which is used in the FFS Report.
22. Proposed Plan page 13: The source control remedial action objective (RAO) is: *"Reduce migration of COCs related to NAPL and its constituents, and other sources of COCs within the East Branch, to surface sediment and surface water to levels that are protective for human health and ecological exposure."* The Proposed Plan text states: *"In particular, the long-term monitoring approach description explains how the source control RAO will be met over time."* Text in the ROD regarding attainment of the source control RAO should be updated to be consistent with Table 6-1 of the FFS Report. This table concludes that: "*Each of the active alternatives (EB-B, EB-C, EB-D, EB-E, and EB-F) would meet the source control RAO by reducing the migration of COCs related to NAPL and its constituents, and other sources of COCs within East Branch, from East Branch sediments to surface sediment and surface water within East Branch and other Study Area reaches through a combination of capping over the entire extent of East Branch, dredging, and in situ treatment (cap amendments and ISS). However, external sources outside the scope of the East Branch Early Action and OU1 would also impact surface water and surface sediment COC concentrations.*" Existing text in the Proposed Plan currently confuses the difference between internal and external sources, and monitoring alone would only evaluate attainment of the RAO, not assist in attaining it.
23. Proposed Plan page 15, Data-Based Rationale for Remedy Approach, first sentence: The text states that "*Figure 8 was developed through the use of the LTE model using existing data collected as part of the OU1 RI/FS process. It shows the expected range of long-term equilibrium concentrations for all of the COCs except lead based on existing data (lead is only a concern in the intertidal areas and is not included in the LTE model).*" If similar language is included in the ROD, it should be revised to state which version of the model USEPA intends to use (the NCG's

deterministic model or USEPA's probabilistic model) and should present the results of that model. Currently, the results of the NCG's deterministic model are presented, which is inconsistent with the NCG's understanding that USEPA intends to use its probabilistic model.

24. Proposed Plan page 15, Data-Based Rationale for Remedy Approach, first paragraph: The text uses "ppt" as the units for the D/F TEQ PRG. As "ppt" can either stand for "parts per trillion" or "parts per thousand," the ROD should use SI concentration units (i.e., ng/kg) to avoid ambiguity.
25. Proposed Plan pages 15 and 16, Data-Based Rationale for Remedy Approach, second and third paragraphs: The Proposed Plan appears to correlate the reduction in combined sewer overflows (CSOs) by 65% as part of the long-term control plan (LTCP) to the source control RAO being achievable. There are three issues with this statement.
    a. First, as discussed in Comment No. 22, the source control RAO relates to internal sources, not external sources such as CSOs. Any language in the ROD regarding discussion of risk-based PRGs not being attainable due to ongoing external sources should be clearly separate from sediment remedy performance and RAO attainment.
    b. Second, although the reduction of volume of CSO discharges may reduce overall COC loading to Newtown Creek, as noted in Section 4.2.3 of the *Interim Estimates of Post-Remedy Surface Sediment Concentrations* (LTE Report; Anchor QEA 2024b) the post-LTCP LTE concentrations are predicted to remain similar to the current LTE predictions and would still be higher than some risk-based PRGs. If the ROD includes language related to CSO controls and meeting risk-based PRGs, the conclusions should be consistent with the LTE Report and the FFS Report, which conclude that some risk-based PRGs would not be met even with the CSO reductions planned in the LTCP.
    c. In addition, it is not clear in the text whether the 65% reduction refers to CSO discharges to Newtown Creek as a whole or only to East Branch; regardless, a reference should be provided for the planned reductions. The Newtown Creek LTCP fact sheet (NYCDEP 2020) notes that LTCP projects will reduce CSO volumes to Newtown Creek as a whole by 69%. Any text in the ROD regarding reductions to CSOs should be clarified.
26. Proposed Plan page 16, Monitoring and Evaluation Approach, first paragraph: The text states that "*surface sediment concentrations of COCs are anticipated to increase due to the presence of ongoing sources of contamination*." If similar language is included in the ROD, the text should be revised to state the type of ongoing sources (e.g., external, internal/external interface, or both).
27. Proposed Plan page 16, Monitoring and Evaluation Approach: The text in this section is not consistent with the text on page 18 regarding the basis for developing the interim evaluation measures (IEMs). Specifically, the text on page 16 states IEMs will be set solely based on equilibrium concentrations predicted by the LTE model, while text on page 18 correctly states IEMs will be based on equilibrium concentrations or the risk-based PRG if it is higher. While the NCG believes it is premature to set specific values for IEMs in the ROD (see Specific Comment No. 4 in the Newtown Creek Group Comments on the Proposed Plan for the East Branch Early

Action Newtown Creek Superfund Site), any text in the ROD should confirm that language related to IEMs is consistent throughout. Text excerpts from each page are provided as follows:

- Page 16: *"IEMs will be developed through the use of the LTE model and will be set to the 50th percentile concentration prediction from the LTE model for each COC."*
- Page 18: *"The IEM for each COC will be set at the 50th percentile of the expected new equilibrium concentrations, as predicted by the LTE model, or the risk-based PRG if this concentration is equal to or higher than the expected equilibrium concentration*."

28. Proposed Plan page 17, Common Elements of Alternatives, first bullet: The text discusses multiple items that will be included in the PDI and states that data from the PDI will also be used to refine outputs of the LTE model. This text is misleading because the only item listed in this paragraph as part of the PDI Investigation that would represent an input to the LTE model is the presence of seeps. Other items such as additional delineation of COCs and NAPL and geotechnical investigations are not relevant to the LTE model. Text used in the ROD should be revised to state that "*seep observation surveys may also be used to refine the outputs of the LTE model that will be used to develop the initial IEMs that will be refined over time*."
29. Proposed Plan page 18, Common Elements of Alternatives, third bullet: The text states that NAPL could be transported from the contaminated sediment below the cap via dissolved phase advection or diffusion. NAPL does not get transported by dissolved phase advection or diffusion. The NAPL constituents can be transported by these mechanisms if (and only if) they are present in the porewater as a result of dissolution. Any text in a ROD should be updated to maintain scientific accuracy with respect to NAPL transport.
30. Proposed Plan page 18, Common Elements of Alternatives, first paragraph after bullets: The text states "*given the industrial nature of the East Branch, each of the active remedial alternatives would also need to address infrastructure in and around the East Branch, including the Grand Street Bridge and the aeration system.*" As written, the wording could imply that each remedial alternative would include construction elements associated with Grand Street Bridge and the aeration system, which is not accurate. Instead, any text included in the ROD should be revised to clarify that the remedial alternatives "*would also require coordination with other private and public entities to address infrastructure in and around East Branch, including the planned Grand Street bridge reconstruction, the NYCDEP aeration system, utility corridors, and shoreline slopes/structures*," as noted in Section 7.6 of the FFS Report.
31. Proposed Plan page 19, Alternative EB-D, first paragraph: The first paragraph in the description of Alternative EB-D states that the alternative "*consists of dredging an estimated 3 feet of sediments across the entire footprint of the East Branch to allow for placement of a 3-foot armored and amended cap to maintain existing water depth (3 feet of capping versus varying thicknesses).*" This description is not consistent with Section 5.2.4 of the FFS Report, which states that "*the depth of dredging would be the same as the amended armored cap thickness, which, based on preliminary analyses for the FFS, varies from 53 inches (including overplacement tolerances) in the wake zone*

*to 36 inches (including overplacement) in deeper water*." If this or similar language is included in the ROD, it should be updated to accurately and consistently describe the alternative.

32. Proposed Plan page 20, Alternative EB-D: The description of Alternatives EB-D includes "*ISS of 9,900 cy of sediment identified for NAPL treatment*." This is inaccurate. The FFS Report (see Table 7-1 of the FFS Report, for example) states ISS is identified for 9,900 cubic yards of sediment for the purposes of shoreline stabilization, not NAPL treatment. Any text in the ROD should clarify the purpose of ISS in this area.

    As discussed in Section 5.1.1 of the FFS Report, NAPL or PTW warranting treatment using ISS have not been identified to date in East Branch. Although not discussed in the Proposed Plan, the FFS Report (Section 5.1.1) evaluates three technology options for treating NAPL/PTW if they were identified to be present through the PDI, and one of these options is ISS.[1]

33. Proposed Plan pages 21 and 22, Overall Protection of Human Health and the Environment, third paragraph: The text states that "*Alternative EB-E is not considered further in the nine criteria evaluation*" due to the expected deauthorization of the federally authorized navigation channel in East Branch, but Alternative EB-E is still included in evaluations for Criteria 2, 5, 6, and 7. Text used in the ROD should be revised to remove Alternative EB-E from the evaluation of these criteria.

34. Proposed Plan page 22, Long-Term Effectiveness and Permanence, second paragraph: The text states "*Alternative EB-D would remove and/or use ISS to treat remaining waste below the estimated 3-foot dredge limit, thus likely making it more effective in the long-term at preventing exposure to or migration of contamination from below the capped area to the surface than Alternative EB-C*." This is an inaccurate statement; Alternative EB-D would not remove and/or use ISS to treat all material below the caps. In addition, reference to a "*3-foot dredge limit*" is not consistent with the variable dredge depths included in Alternative EB-D (see Comment No. 31). If this or similar language is included in the ROD, the text should be updated to accurately describe Alternative EB-D and the potential use of ISS.

35. Proposed Plan page 23, Reduction of Toxicity, Mobility, or Volume through Treatment, first paragraph: The text states that "*while the volume of sediment requiring in-situ treatment would be refined using information collected during the PDI and during development of the RD, Alternative EB-D would likely result in the greatest volume of in-situ treatment since Alternative EB-D would include ISS where necessary to address relatively high COC concentrations in sediment, the potential for exposure to PTW, and/or the potential for NAPL migration*." This implies that ISS as an "option" is only applicable to EB-D, which is not consistent with the FFS Report (Section 5.1.1). More importantly, this also implies that ISS as an "option" relates to

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[1] An approximately 0.6-acre area in the Western Beef Slip was selected to evaluate these remedial options for treating NAPL/PTW, but that area is completely separate from the 0.4 acre and 9,900 cy of sediment where ISS is identified for the purposes of shoreline stabilization under Alternative EB-D, as presented in Table 7-1 of the FFS Report.

the four considerations for deeper dredge depth, but this is not what the FFS Report (Section 5.2.4) or the description of Alternative EB-D as the preferred alternative states. Text in the ROD regarding use of ISS should be consistent with Section 5.1.1 of the FFS Report.

For reference, Section 5.2.4 of the FFS Report states the following:

> *"Alternative EB-D would be the same as Alternative EB-C (i.e., dredging to allow placement of an amended armored cap), but in select areas, sediment would be removed to a deeper depth than what is necessary to accommodate a cap (then capped or backfilled to the pre-construction mudline elevation) based on the following considerations:*
> - *Potential for NAPL migration from the deeper sediment and/or native material*
> - *Potential for exposure to PTW*
> - *Depth of sediment to native material*
> - *Comparatively higher COC concentrations in remaining sediment"*

Specific Comment No. 2 in the Newtown Creek Group Comments on the Proposed Plan for the East Branch Early Action Newtown Creek discusses that the phrase "*comparatively higher COC concentrations in remaining sediment*" must be tied to some known COC concentration to complete a meaningful evaluation of whether deeper dredging is required based on this consideration.

36. Proposed Plan page 23: Reduction of Toxicity, Mobility, or Volume through Treatment, second paragraph: The text states that amended capping is not considered treatment. However, this statement is inconsistent with the FFS Report (Table 6-1), which states that "*amendments included in the caps would permanently sequester contaminants that migrate into the treatment layer (chemical isolation layer) of the caps and would be considered a form of in situ treatment*."

    The aforementioned statement in the Proposed Plan is also inconsistent with the NCP 300.5 (USEPA 1990), which states: "*Treatment technology means any unit operation or series of unit operations that alters the composition of a hazardous substance or pollutant or contaminant through chemical, biological, or physical means so as to reduce toxicity, mobility, or volume of the contaminated materials being treated."* The Proposed Plan statement is also inconsistent with USEPA 2005, which states that immobilization treatment is *"solidification, stabilization, or sequestering of contaminants by adding coal, coke breeze, Portland cement, fly ash, limestone, or other additives to the sediment for encapsulating the contaminants in a solid matrix and/or chemically altering the contaminants by converting them into a less bioavailable, less mobile, or less toxic form."* USEPA has previously considered amended capping as treatment in the RODs and other remedy selection documents issued by USEPA for several other sediment sites, summarized as follows:

- Quanta Resources Superfund Site ROD (USEPA 2024): "… *a multilayer NAP cap resistant to erosion and consisting of isolation materials, including clean sediment and/or sand with armoring (as needed), and treatment components, such as organoclay or activated carbon.*"
- Gowanus Canal Superfund Site ROD (USEPA 2013): Reduction in Toxicity, Mobility, or Volume through Treatment: *"The treatment layer would reduce the mobility of NAPL and is considered a treatment technology. The overall reduction of NAPL mobility expected to be achieved by the treatment layer is high."*
- Portland Harbor Superfund Site ROD (USEPA 2017): *"In-situ treatment such as cap amendment will be applied over 133 acres. With these treatment actions, the preference for treatment requirement of the NCP has been met."*
- Lower Duwamish Waterway Superfund Site ROD (USEPA 2014): *"The remedy does include potential treatment of some contaminated sediment through provisions of amendment of caps and ENR with activated carbon or other contaminant-sequestering agents."*

The ROD should correctly identify amended capping as in situ treatment.

37. Proposed Plan page 24, Preferred Alternative and Basis for Preference, second-to-last bullet on the page: The text states "*capping of all dredged areas*" as part of the description of remedial alternatives. This is not consistent with the description of Alternative EB-D on page 20 of the Proposed Plan or in the FFS Report (Table 5-2), which discusses capping over 9.6 acres, ISS (including pre-dredge and post-ISS cap, if necessary) over 0.4 acre, and backfill in remaining areas. The text used in the ROD should be updated to accurately and consistently describe capping areas.
38. Proposed Plan page 24, Preferred Alternative and Basis for Preference, second-to-last bullet on the page: The text incorrectly states *"the FFS assumes the placement of a multilayer engineering cap including the following layers: erosion protection, geotechnical filter, dissolved phase chemical isolation, NAPL sorption, and habitat layers."*
    - The FFS Report (Figure C5-2) does not assume a geotechnical filter layer for all caps; only for the shallow water and wake zone caps.
    - The FFS Report does not assume or require a habitat layer (Figure C5-2). The location of habitat layers can be evaluated during remedial design.

    Any language in the ROD regarding FFS cap assumptions should be revised to be consistent with the FFS Report.
39. Proposed Plan page 25, Preferred Alternative and Basis for Preference, fourth bullet in second list of bullets on the page: The text states that *"a cap will be placed over the entire area treated through ISS."* This is not consistent with the FFS Report, which states the need for a post-ISS cap would be determined based on treatability testing during the remedial design, as discussed in Section 5.3.5 of the FFS Report. This flexibility is appropriate given that ISS may be used for shoreline stabilization in areas where sediment concentrations may not necessitate a post-ISS cap. Applicable text in the ROD regarding the need for a post-ISS cap should be consistent with Section 5.3.5 of the FFS Report.

## References

Anchor QEA, 2021. *Development of Risk-Based Preliminary Remediation Goals*. Remedial Investigation/Feasibility Study, Newtown Creek. December 2021.

Anchor QEA, 2023. *Remedial Investigation Report*. Remedial Investigation/Feasibility Study, Newtown Creek. March 2023.

Anchor QEA, 2024a. *East Branch Early Action Focused Feasibility Study*. Draft Final. Remedial Investigation/Feasibility Study, Newtown Creek. August 2024.

Anchor QEA, 2024b. *Interim Estimates of Post-Remedy Surface Sediment Concentrations*. Draft Final. Remedial Investigation/Feasibility Study, Newtown Creek. September 2024.

NYCDEP (New York City Department of Environmental Protection), 2020. Newtown Creek Fact Sheet. Accessed October 22, 2024. Available at: www1.nyc.gov/assets/dep/downloads/pdf/water/nycwaterways/newtown-creek/newtown-creek-fact-sheet.pdf.

USEPA (U.S. Environmental Protection Agency), 1990. National Oil and Hazardous Substances Pollution Contingency Plan, Final Rule, Codified as amended at 40 C.F.R. Part 300.

USEPA, 2005. *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites.* Office of Solid Waste and Emergency Services. EPA-540-R-05-012, OSWER 9355.0-85. December 2005.

USEPA, 2013. *Record of Decision*. Gowanus Canal Superfund Site, Brooklyn, Kings County, New York. September 2013.

USEPA, 2014. *Record of Decision*. Lower Duwamish Waterway Superfund Site. November 2014.

USEPA, 2017. *Record of Decision*. Portland Harbor Superfund Site, Portland, Oregon. January 2017.

USEPA, 2024. *Record of Decision*. Quanta Resources Superfund Site, Operable Unit 2, Edgewater, Bergen County, New Jersey. September 2024.

**From:** Kwan, Caroline
**To:** Leah Archibald
**Cc:** Quincy Ely-Cate; Charles Yu; Osagie Afe; Loney, Natalie; Ketu, Rupika; Hard, Taylor; Vaughn, Stephanie
**Subject:** RE: Comments on East Branch
**Date:** Thursday, November 7, 2024 4:04:50 PM

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Received!

Thanks

*Caroline*
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**From:** Leah Archibald <larchibald@evergreenexchange.org>
**Sent:** Thursday, November 7, 2024 3:53 PM
**To:** Kwan, Caroline <kwan.caroline@epa.gov>
**Cc:** Quincy Ely-Cate <qelycate@bocnet.org>; Charles Yu <CYu@licpartnership.org>; Osagie Afe <oafe@licpartnership.org>
**Subject:** Comments on East Branch



Carolyn:

Our organizations, Evergreen Exchange, the Long Island City Partnership and the Maspeth Industrial Business Association collectively represent the industrial businesses along the Brooklyn and Queens sides of the Newtown Creek. We have a number of questions about the EPA's proposed plan to remediate the East Branch of the Newtown Creek:

- Has the EPA determined the source of the pollution in the East Branch?
- Who is responsible for paying for this? Will it be those responsible for polluting the
- East Branch or will it be treated as a fraction of the Creek pollution as a whole?
- How does the remediation activities and timeline align with the plan to replace the Grand
- Street Bridge?

- Exactly where on the East Branch will remediation commence?
- What will the upland needs be during remediation?  Where does the EPA plan on staging?
- How will the East Branch remediation impact navigability on the remainder of the creek?
- What is the plan to replace bulkheads along the East Branch?

We look forward to hearing the EPA's response to our questions.  Thank you for your consideration.

Evergreen Exchange LIC Partnership MIBA

Leah Archibald, Executive Director

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November 8, 2024

***submitted via email:*** kwan.caroline@epa.gov

U.S. Environmental Protection Agency, Region II
290 Broadway, 18th Floor
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**Attn**: Ms. Caroline Kwan, Remedial Project Manager

**Re**: Response to EPA Request for Public Comment -
Proposed Cleanup Plan for the East Branch of Newtown Creek
Newtown Creek Probabilistic Model Calculation of Current and Post-Remedy Surface Sediment Concentrations and Long-Term Equilibrium Model
Newtown Creek Superfund Site, Queens/Brooklyn, New York

Dear Ms. Kwan:

This comment is being transmitted on behalf of the Long Island Railroad, APU, Amtrak, Simsmetal East LLC, Con Edison, and Enviri, all "Parties" located at the Dutch Kills and/or the portion of the Newtown Creek around Creek Mile (CM) 0.5 – 1.1 (designated herein as "Dutch Kills area"). This comment is not taking issue with the remedy (Early Action) selected by the U.S. Environmental Protection Agency (EPA) for the East Branch but is only expressing concern about some of the bases for and assumptions in the Long-Term Equilibrium (LTE) model, which have been adopted in the Probabilistic Model. Based on this concern, the above companies respectfully request that if EPA considers using the above-referenced models or the assumptions embedded in same to evaluate or address other efforts related to Newtown Creek, further investigatory work precede such use.

In connection with the review of the record, TRC has reviewed the Newtown Creek Probabilistic Model Calculation of Current and Post-Remedy Surface Sediment Concentrations report prepared by CDM Smith on behalf of the EPA, Region 2, dated June 2024 (the "Probabilistic Model"). In addition, we reviewed the Interim Estimates of Post-Remedy Surface Sediment Concentrations report prepared by Anchor QEA on behalf of the Newtown Creek Group (NCG), dated May 2024 (the "Anchor QEA 2024 Report"). The Anchor QEA 2024 Report provided the input and results (interim contaminants of concern (COC) concentrations) of the LTE model. The Probabilistic Model report indicated that the Probabilistic Model was based on and adopted the same assumptions, input parameters, and results of the LTE model. We further supplemented the review by data and results presented in the Remedial Investigation Report prepared by Anchor QEA, dated March 2023 (the "RIR").

The review identified significant bases for and assumptions in the LTE model, and adopted in the Probabilistic Model, which are either contrary to the RIR data or require further data collection to make the LTE and Probabilistic models representative of actual field conditions. A key issue is the speculative estimates of COC loading from bank erosion, including for PCBs. The Dutch Kills is used in the following simply for purposes of providing an example of the LTE and Probabilistic Model's questionable assumptions across the entire Creek.

Contrary to the RIR, which concluded that COC contribution from bank erosion is negligible, the LTE and Probabilistic Models indicate that “bank erosion” serves as a major source of PCBs to surface sediments and loading/contribution of PCBs to the LTE concentrations in certain reaches of the Creek (e.g., for Dutch Kills, the models forecast the PCBs contribution to be 25% of the total LTE PCB concentration).[1] This prediction is inaccurate or speculative based on the following observations and actual RIR results:

- The LTE calculations are based on *assumed* soil conditions and *assumed* annual volume of soil erosion. The RI and other investigations of the Newtown Creek included no actual measurements or observations of any of these parameters. The Anchor QEA 2024 Report refers to the assumptions as “… *uncertain; the actual erodible shoreline extent and rate are unknown and cannot be accurately estimated based on existing information*.”[2] Based on these significant gaps in information related to actual shoreline conditions, the LTE and Probabilistic Models are unreliable for reaches of the Creek assumed to have a high degree of erodible banks.

- As an example, the COC loadings and LTE calculations related to bank erosion are based on unsupported assumptions about COC concentrations and contributions from the shoreline. Due to the absence of creek bank sampling, with no evidence, the models *assume* that the COC concentrations for shoreline sediment samples in and near erodible shorelines below the ordinary high water (“OHW”) level are generally representative of COC concentrations in the creek banks above OHW.[3] Figure 3-6 of the LTE Model report (included herein as **Appendix A**), however, shows that there are only localized sections of the banks with a limited extent of potentially erodible shorelines. These potentially erodible shoreline sections are also above the OHW elevation and predominantly located in areas that are <u>not</u> adjacent to surface sediment samples with high PCB concentrations, as shown in Figure 4-27 of the RIR (included herein as **Appendix B**).

- Using the above unsupported assumptions and calculations, it also would be expected that the bank erosion loading and PCB concentrations predicted by the LTE and Probabilistic Models would conceptually produce artificially higher PCB concentrations in surface water, pore water, particulate, and trapped sediment in the Dutch Kills area than the “<u>actual</u>” reported concentrations and should be higher than elsewhere in the Newtown Creek.[4] Similarly, bank erosion loading and PCB concentrations predicted by the LTE and Probabilistic Models should theoretically produce higher PCB concentrations in surface sediments at the mouth of and immediately upstream and downstream of the Dutch Kills area than the “<u>actual”</u> reported trace or non-detectable

[1] See Table 4-6 of the Anchor QEA 2024 Report which shows Dutch Kills as having 25% of the LTE concentration (0.16 mg/kg PCBs due to bank erosion contribution of a total LTE concentration of 0.62 mg/kg PCBs).
[2] Anchor QEA 2024 Report, page 27.
[3] Anchor QEA 2024 Report, page 26.
[4] For example, EPA states that bank erosion has “appreciable impacts” in the PCB loading in Dutch Kills. Probabilistic Model Report, page 22.

PCB concentrations in these areas.[5] This is not the case. Instead, PCB concentrations in surface water during both dry and wet seasons and pore water as well as in particulate and sediment trap samples in the Dutch Kills are mostly lower than or close to corresponding PCB concentrations in the rest of Newtown Creek (Figures 4-117 through 119; 4-163 through 167b; 4-182, 4-183; 4-191; 4-200; 4-201). These RI results contradict the conclusions of the LTE Model and baseline scenario of the Probabilistic Model, demonstrating that these models' assumptions about shoreline conditions are not representative of the observed site conditions.

In conclusion, the above Parties do not oppose the Early Action. They do, however, believe that it is important to go on record saying that based on TRC's review and EPA's conclusion[6] the assumptions in the LTE and Probabilistic Models about bank erosion loading of COCs (including PCBs) are just that, assumptions unsupported by field data. Because of this, it is important that the assumptions embedded in the LTE or Probabilistic Models not be applied to other potential EPA decisions and efforts related to Newtown Creek without additional data on COC concentrations in the creek banks and a quantitative evaluation of the creek bank erosion rate and loading.

Very truly yours,

TRC ENVIRONMENTAL CORPORATION

Nidal Rabah, PhD, PE, LSRP
Senior Vice President

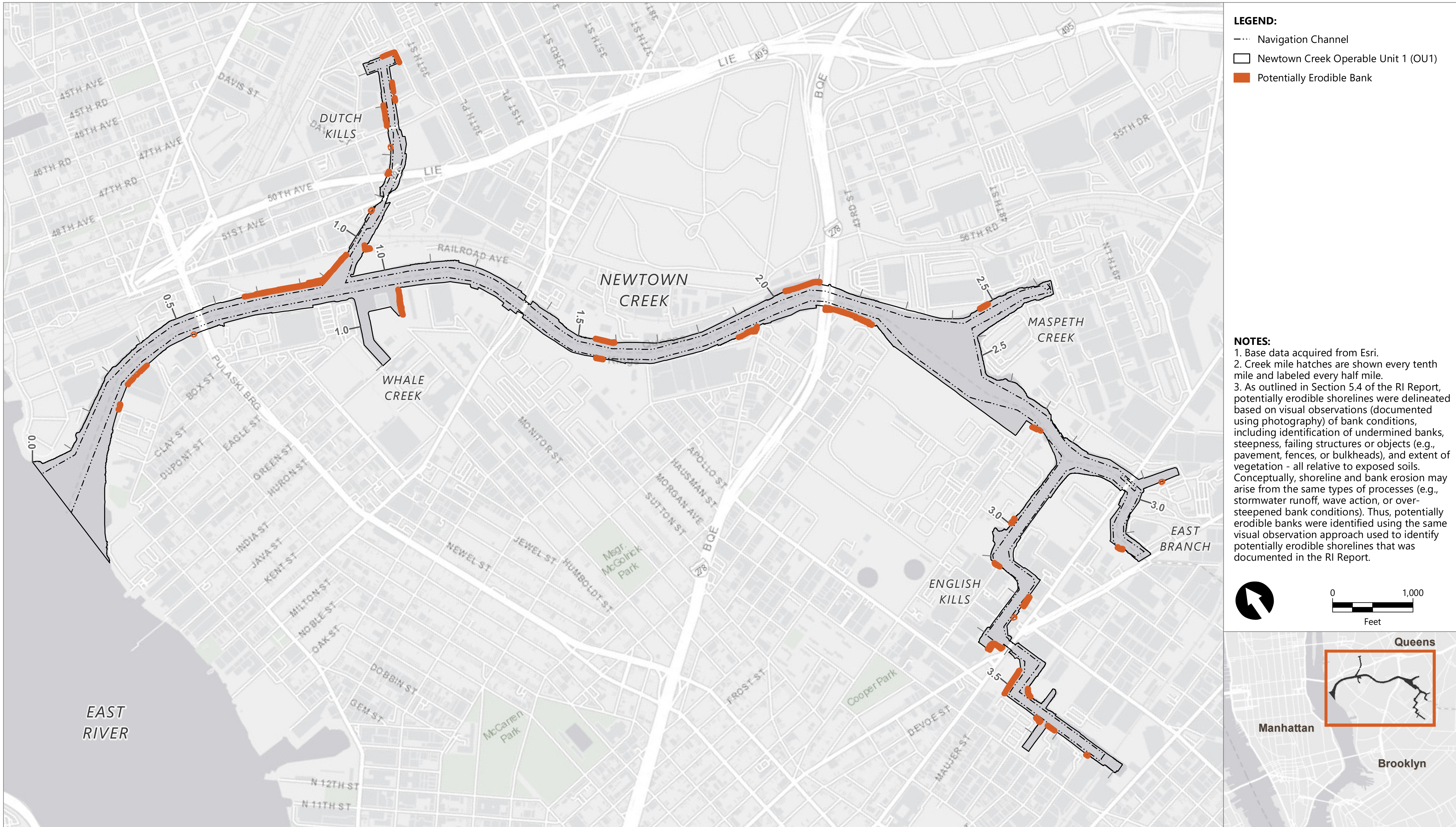
*L110824 Comment on EPA Proposed Plan for East Branch of NC-LTE & Probabilistic Models (CK_EPA)*

**Attachments**: **Appendix A**: Potentially Erodible Shorelines Adjacent to Newtown Creek Study Area
**Appendix B**: Total PCBs in Surface Sediment in Newtown Creek Study Area

[5] This observation is provided for illustration purposes applying the LTE and Probabilistic Models as they are currently constructed. TRC notes that Anchor QEA also separately assumes that the entire COC load from creek bank erosion would remain within the reach in which the load originated. Anchor QEA 2024 Report, page 27.

[6] The EPA concludes that "Bank erosion represents an uncertain source to the system, both in the spatial and temporal prevalence as well as the magnitude of the loadings… which itself is based on an assumed value." Probabilistic Model Report, page 22.

**Appendix A: Potentially Erodible Shorelines Adjacent to Newtown Creek Study Area (Figure 3-6 of the Interim Estimates of Post-Remedy Surface Sediment Concentrations for Newtown Creek, prepared by Anchor QEA and dated May 2024 [LTE Model Report])**




**LEGEND:**

- Navigation Channel
- Newtown Creek Operable Unit 1 (OU1)
- Potentially Erodible Bank

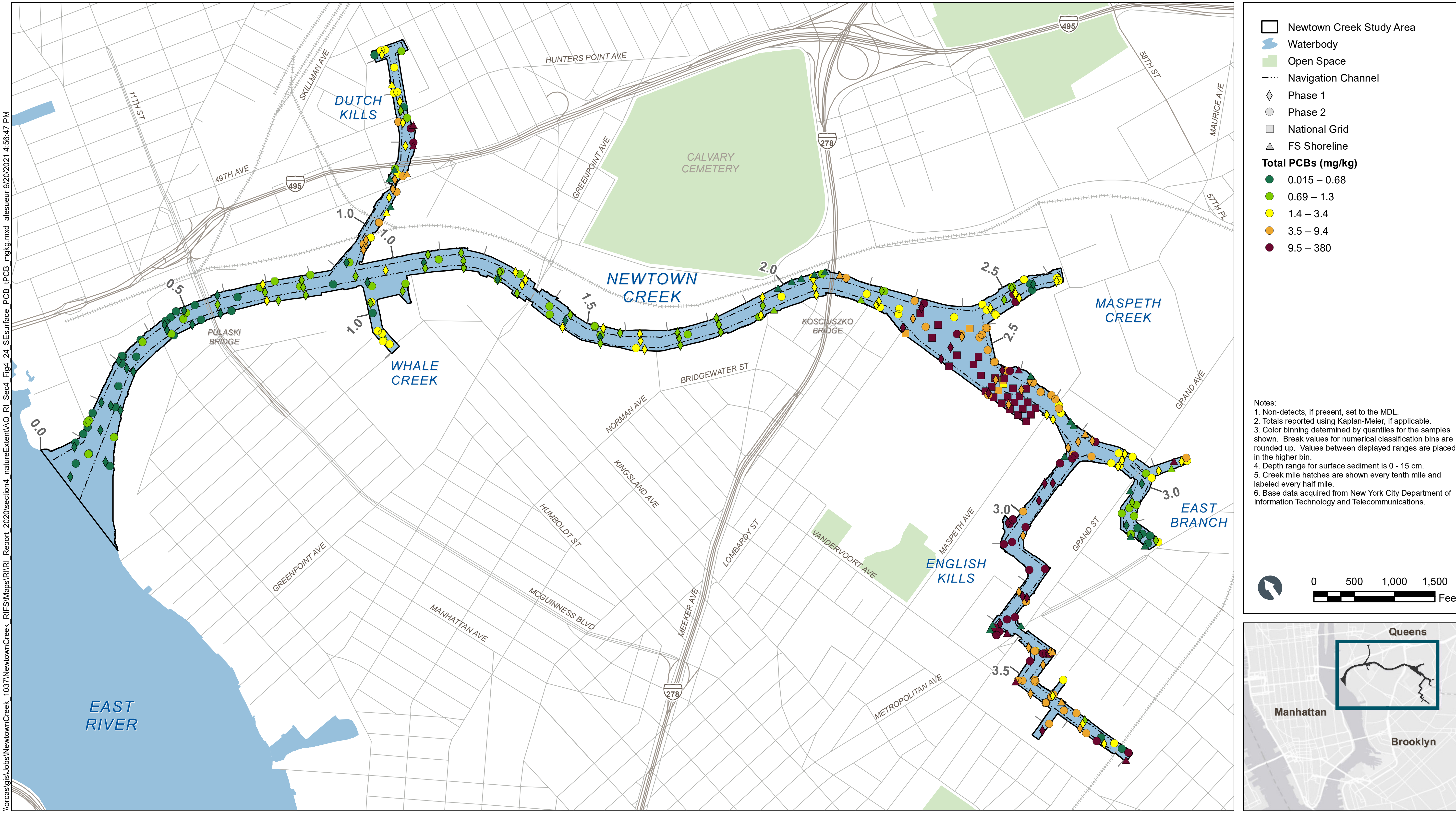
**NOTES:**

1. Base data acquired from Esri.
2. Creek mile hatches are shown every tenth mile and labeled every half mile.
3. As outlined in Section 5.4 of the RI Report, potentially erodible shorelines were delineated based on visual observations (documented using photography) of bank conditions, including identification of undermined banks, steepness, failing structures or objects (e.g., pavement, fences, or bulkheads), and extent of vegetation - all relative to exposed soils. Conceptually, shoreline and bank erosion may arise from the same types of processes (e.g., stormwater runoff, wave action, or over-steepened bank conditions). Thus, potentially erodible banks were identified using the same visual observation approach used to identify potentially erodible shorelines that was documented in the RI Report.



**Figure 3-6**
**Potentially Erodible Banks Adjacent to the Study Area**

**Appendix B: Total PCBs in Surface Sediment in Newtown Creek Study Area (Figure 4-24 of the Remedial Investigation Report for Newtown Creek prepared by Anchor QEA and dated March 2023)**




Notes:
1. Non-detects, if present, set to the MDL.
2. Totals reported using Kaplan-Meier, if applicable.
3. Color binning determined by quantiles for the samples shown. Break values for numerical classification bins are rounded up. Values between displayed ranges are placed in the higher bin.
4. Depth range for surface sediment is 0 - 15 cm.
5. Creek mile hatches are shown every tenth mile and labeled every half mile.
6. Base data acquired from New York City Department of Information Technology and Telecommunications.



ANCHOR QEA

**Figure 4-24**
Total PCBs in Surface Sediment – Plan View
Remedial Investigation Report
Newtown Creek RI/FS

Alain J. Noel
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National Grid NY
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November 8, 2024

VIA E-MAIL

Caroline Kwan
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 18th Floor
New York, NY 10007

Re: Comments on the Newtown Creek Superfund Site East Branch Early Action Proposed Plan

Dear Ms. Kwan:

The Brooklyn Union Gas Company d/b/a National Grid NY ("National Grid") submits the attached comments on the Newtown Creek Superfund Site East Branch Early Action Proposed Plan. If EPA has any questions or would like to discuss our comments, National Grid welcomes the opportunity to speak further on this topic.

National Grid appreciates your consideration of these comments.

Sincerely,

ALain J. Noel

Alain J. Noel

cc: Thomas Campbell
Donna L. Riccobono
William Donohue
Bradley S. Rochlen

**NATIONAL GRID COMMENTS ON THE PROPOSED PLAN FOR NEWTOWN CREEK SUPERFUND SITE EAST BRANCH EARLY ACTION**

The following comments represent a summary of National Grid's comments on the USEPA's Proposed Plan for the East Branch Early Action (Proposed Plan) and Fact Sheet. The comments are generally arranged in order of occurrence, to the extent practical.

1. Several sections of the Proposed Plan contain contradictions, suggesting PRGs should be met "in the long term" while also acknowledging that LTE results might not achieve PRGs even after implementing a long-term control plan for ongoing sources.

    a. Comment: Although future reductions in COCs are anticipated with remedy implementation, there is no specific timeline or mechanism for lowering all COCs to meet risk-based PRGs because of constituent loading from ongoing sources. Therefore, RGs should reflect expected LTE/background levels. This issue needs clarification in the ROD.

2. PDF p. 2, Section "EPA Announces Proposed Plan", 1st paragraph – The proposed remedy includes "the use of sealed bulkheads, if and where needed, as a temporary measure to address seeps while cleanup of the related upland source is evaluated and implemented".

    a. Comment: National Grid suggests using the term "temporary sealed bulkheads". The Proposed Plan and ROD should specify a time limit for addressing known upland sources with temporary bulkheads, as these upland sources could cause recontamination of the surface sediments. The feasibility, implementability, and impact assessment to groundwater flow and discharge from sealing the bulkheads need to be identified in the ROD, and it should be made clear in the ROD that groundwater management costs are the responsibility of the upland property owners including any necessary treatment.

3. PDF p. 2, Section "EPA Announces Proposed Plan", 1st paragraph - states "highly robust pre- and postimplementation monitoring plan to demonstrate the ongoing performance and protectiveness of the remedy."

    a. Comment: National Grid requests further clarification as to the intent of this statement. The level of monitoring being proposed is not necessary to demonstrate the performance and protectiveness of the remedy. The monitoring results from the proposed monitoring program will be influenced by constituent loading from ongoing sources, which are not being addressed at this time. As such, monitoring results will not reliably evaluate remedy performance. We request that a specific monitoring plan not be included as part of the ROD. Inclusion at this time is premature and should be further developed during the Remedial Design Phase, informed by data collected during the Pre-design Investigation. Furthermore, we request that any proposed monitoring plan monitoring plan be separated into two components: 1.) monitoring for remedy performance; and 2.) monitoring for recontamination from ongoing sources. This distinction is necessary to differentiate results.

4. PDF p. 1, Section "EPA Announces Proposed Plan", 2nd paragraph - states "For administrative purposes, this interim, early action is referred to as Operable Unit 4 (OU4). For clarity throughout the rest of this Proposed Plan, OU4 will be referred to as the 'East Branch portion of OU1.'"

a. Comment: National Grid raises concerns about the overall clarity in using two different names. The Proposed Plan initially designates it as OU4 but then refers to it as the "East Branch Portion of OU1." While the EPA clarifies the terminology, consistently using OU4 would enhance clarity.

5. PDF p. 3, Section “Scope and Role of Action”, 5th paragraph - "As an interim remedy, the selected remedy for the East Branch portion of OU1 will be reviewed on an ongoing basis to assure the assumptions made in reaching this conclusion remain appropriate."

   a. Comment: National Grid’s comments for this Proposed Plan are specific to East Branch and not the whole of Newtown Creek. National Grid agrees with EPA that "the selected remedy for the East Branch portion of OU1 will be reviewed on an ongoing basis to assure the assumptions made in reaching [the interim remedy] remain appropriate", but requests clarification of the intent of the following statement "reviewed on an ongoing basis" and impact of the review on remedial action efforts in East Branch and OU1. Rather than stating EPA "fully anticipates", National Grid recommends softening the language to "work at East Branch will inform the scale and costs of the remedy before site wide implementation of the same or similar remedy".

6. PDF p. 4, Section “Enforcement History”, 2nd paragraph - "Additional potentially responsible parties have been notified of their potential liability since the original 2011 AOC was signed. The role and contribution of these additional parties to each OU at the Site is yet to be determined, although it is anticipated that the additional PRPs will be asked to take part in the remedial design and/or remedial action activities associated with the Site, including the East Branch portion of OU1. Efforts to identify additional potentially responsible parties continues."

   a. Comment: The Agency has noticed many additional owners/operators of facilities which formerly or currently released hazardous substances to Newtown Creek. These parties have a significant legal obligation to fulfill by paying toward the East Branch work and earlier Creek wide remedial activities. EPA is correct to insist that all parties will take part in the remedial design and/or remedial action work, and we request all parties be subject to an Administrative Order.

7. PDF p. 5, Section “OU1 Study Area Investigation”, 2nd paragraph - "There are many ongoing, external sources of contamination to the Study Area. These include municipal separate storm sewer system outfalls (MS4s), the Newtown Creek wastewater treatment plant (WWTP) treated effluent outfall, permitted industrial discharges, other permitted/non-permitted discharges, overland flow/direct drainage, other non-point sources, the tidal effects of the East River, atmospheric deposition, shoreline seeps/groundwater discharge from upland properties, and shoreline bank erosion, as well as CSO discharges." and 3rd paragraph "Some of these sources may be considered both internal and external to the Study Area."

   a. Comment: This language is inconsistent with Section 3.4.2 of the FFS Report, which states: “The categorization of individual ongoing sources will be evaluated based on additional information collected during a pre-design investigation and considered during the RD and long-term remedy evaluation monitoring.” Language discussing internal/external interface sources in the ROD should correctly reference the language included in the FFS Report. Additionally, EPAs referencing these types of sources as "internal/external interface sources" adds a new terminology to CERCLA's existing framework of sources and is unnecessary. Regardless of the source of a release (e.g., direct discharges, indirect discharges, overland flow) the contaminant being released to the Newtown Creek site and all such releasing parties are accountable under CERCLA. Furthermore, as EPA recognizes, the existence of uncontrolled, ongoing release of hazardous substances from upland sources could cause recontamination of the surface sediments. EPAs citation to "internal/external interface sources" adds only ambiguity to over four decades of liability attribution under CERCLA and should not be used.

8. PDF p. 5, Section "OU1 Study Area Investigation", 5th paragraph - "Additional data from ongoing point sources and the East River will also be obtained as part of the OU2 post-ROD monitoring program. These data will be considered, as appropriate, in the design for the East Branch portion of OU1 remedy."

    a. Comment: The potential variability of East Branch point sources should be a recognized fact. The physical and chemical properties of the known point sources are expected to vary with rainfall, seasonality, and tidal influences, among other factors. The additional data from ongoing point sources and the East River should not be considered in the design for the East Branch portion of OU1 remedy. The OU1 remedy is not designed to address the ongoing contaminant loading from the point sources and East River. This should be reflected in the responsiveness summary and the ROD.

9. PDF p. 6, Section "OU1 Study Area General Findings", 3rd paragraph - states "In addition, ongoing sources of contamination will continue to add contamination to the Study Area. While EPA anticipates the amount of contamination entering the Creek from ongoing sources will decrease over time due to various factors, including cleanup of upland properties, greater regulatory control, and improved practices for managing waste and stormwater, all ongoing external sources of contamination cannot be completely eliminated."

    a. Comment: National Grid agrees that "all ongoing external sources of contamination cannot be completely eliminated." In-creek remediation will not provide a long-term solution if ongoing sources add contamination to the study area. We highly recommend source control be implemented prior to remedial action and that the concentrations of the "ongoing external sources of contamination" be recognized as background. Therefore, National Grid recommends the contamination levels associated with these ongoing sources be assessed and understood prior to establishing IEMs and PRGs.

10. PDF p. 6, Subsection "Navigation"

    a. Comment: National Grid notes that the navigational elevation is subject to change based on outcome of WRDA bill.

11. PDF p. 6, Subsection "Upland Uses"

    a. Comment: National Grid recommends a few lines on upland uses that could be beneficial for the impending bulkhead/structural support requirements. Suggest language indicating that bulkheads are in poor condition and that upland owners should be constructing/developing their sites to support the clean-up and/or future uses of the

Creek. The ROD should recognize state how this is the upland owners' responsibility, rather than the PRPs' responsibility.

12. PDF p. 6, Subsection "Upland Uses" - "Uses of the areas surrounding the Creek are highly varied, and they include industrial/commercial properties, residential properties, limited recreational access areas, and abandoned properties."

    a. Comment: National Grid recommends removing the word "limited" from future documents since no qualifying adjectives have been used for the other land use types in the sentence.

13. PDF p. 7, Section "General Overview of the East Branch", 4th paragraph - "an aeration system operated and maintain by NYC to improve dissolved oxygen levels."

    a. Comment: National Grid recommends adding more detail about the aeration system that NYC operates as part of the ROD. The aeration system is necessary because this is essentially a dead-end system that was built for industrial purposes rather than environmental ones, and it's going to continue to be necessary. This highlights the problems that have existed with the Creek since the 1850s, and that will not be resolved as a result of the remedy.

14. PDF p.7, Section "Basis for East Branch Interim Early Action", 2nd paragraph, 2nd bullet - "It will result in immediate risk reduction and contaminant mass removal in this portion of the OU1 Study Area (and, to a lesser extent, within the OU1 Study Area as a whole)."

    a. Comment: EPA's basis for the East Branch interim early action, in part, is that such action will result in "immediate risk reduction and contaminant removal". The automatic association of mass contaminant removal equating to risk reduction is unproven and in jeopardy given the constituent loading from ongoing sources. Monitoring the effectiveness of mass removal associated with remedy implementation requires establishing a practical baseline data set so valid comparisons can be understood from a pre- and post-dredging outcome analysis of expected ecological effects.

15. PDF p.8, Section "Basis for East Branch Interim Early Action", 3rd bullet - "The early action will include a robust post-implementation evaluation monitoring program, and if the monitoring shows that the assumptions used to develop the East Branch CSM are not accurate, the CSM will then be updated accordingly."

    a. Comment: Will there be sufficient data to be used as a duplicative model for other tributaries or all of OU1? If so, will it be similar or dissimilar?

16. PDF p. 8, Section "Characteristics of the East Branch", 2nd paragraph - "The natural hydrodynamics of the East Branch (similar to other areas of Newtown Creek) are dominated by twice-daily tidal flows from the East River and by storm-driven freshwater inputs from over 35 individual point source discharges (direct discharges from individual sites, highway drains, MS4 discharges, CSOs and overland flow) creating a dynamic local environment that exhibits a unique combination of solids loads and depositional characteristics."

a. Comment: East Branch’s characteristics are recognized by EPA as highly variable and stem from twice daily tidal flows, storm driven freshwater inputs from 35 individual point source discharges among other significant factors (p.8). These varying sources and associated contaminants pose ever shifting risks over the spatial scale and time frame in East Branch. The uncertainty of how such variability impacts the East Branch ecosystem and the ever-changing background concentrations make net risk reduction by dredging poorly understood. Accordingly, National Grid requests that EPA recognize that background variability impacts risk and will continue after implementation of the dredging/capping operation.

17. PDF p. 10, Subsection “NAPL and Sheen in Sediment”, 1st paragraph - "However, the mobility of NAPL in untested areas of the East Branch is unknown, and changes to in-situ conditions and/or anthropogenic disturbances could potentially mobilize NAPL."

    a. Comment: NAPL is located in isolated areas identified in the East Branch sediments. Therefore, National Grid requests this statement be clarified in the responsiveness summary and not included in the ROD.

18. PDF p. 10, Subsection “Summary”, 2nd paragraph - "NAPL may be mobilized during implementation of the remedy, and mobile NAPL may be identified during the pre-design investigation that will be conducted."

    a. Comment: NAPL is located in isolated areas identified in the East Branch sediments. Therefore, National Grid requests this statement be clarified in the responsiveness summary and not included in the ROD.

19. PDF p. 13, Risk Box

    a. Comment: The title should be “Understanding Human Health Risk and Its Calculation.” This section solely addresses human risks, not those concerning ecological receptors. In the “Hazard Identification” part, substitute “soil” with “sediment” since Newtown Creek is a sediment site. Similarly, in the “Exposure Assessment” section, replace “soil” with “sediment” to reflect that Newtown Creek deals with sediment.

20. PDF p. 13-14, Section “Preliminary Remediation Goals”, 2nd paragraph - "EPA is proposing that the long-term cleanup goals for the East Branch Early Action be set to the risk-based PRGs. EPA can select PRGs consistent with background conditions if risk-based remediation goals are lower than background concentrations. However, since the Creek is a dead-end water body without a natural up-river source of water and there are many ongoing sources of contamination to the Creek, the determination of background at this Site is not clear cut. Furthermore, while ongoing sources of contamination will continue post-remedy, there is an expectation that the overall external (including internal/external interface) loading to the Creek will decrease over time because of improved best management practices, ongoing cleanup actions (such as at upland sites), and additional regulatory control (including the long-term control plan both for Newtown Creek and for the East River overall). Since EPA anticipates that the risk-based PRGs are attainable in the long-term, background-based PRGs or action levels are not necessary for this action. The process that will be used to assure the RAOs are being met over time is described in the Summary of Remedial Alternatives section below."

a. Comment: National Grid emphasizes the necessity of understanding how background levels from ongoing sources of contamination will evolve with implementation of source control. National Grid requests that EPA acknowledge that ongoing sources should constitute background for Newtown Creek until cleanup of ongoing sources are complete and should be incorporated into the ROD.

21. PDF p. 14-15, Section “Overview of Remedy Approach”, 3rd paragraph, 2nd bullet - "Determine interim evaluation measures (IEMs) using empirical data, as well as the predictive LTE model developed for the Site. The IEMs will be used for remedy design, implementation, and post-implementation monitoring and will be adjusted periodically using empirical data to account for current conditions."

    a. Comment: National Grid requests that EPA clarify how the IEMs will be selected. Will empirical data be used or will the LTE model be used. If the LTE model will be used, please clarify which version, and specifically how IEMs will be based on model output. Finally, please clarify that the IEM will be set at the risk-based PRG if this concentration is higher than the expected equilibrium concentration from the LTE (as noted in the Proposed Plan page 18). This clarification language should be included in the ROD and any text in the ROD should confirm that language related to IEMs is consistent throughout.

22. PDF p. 15, Section “Overview of Remedy Approach”, 2nd bullet - "Develop a long-term monitoring program that includes sampling of at least surface sediment, subsurface sediment, porewater, both suspended sediment and dissolved phase concentrations in surface water, and ongoing external sources of contamination (including, at a minimum, CSOs, MS4s, stormwater and overland flow, as needed if not being monitored under OU2)."

    a. Comment: National Grid recommends the long-term monitoring plan be developed based on the selected remedial action to evaluate the effectiveness of the remedy rather than meet a minimum number of predefined sampling criteria. Specifics of the sampling plan (e.g., sampling type, frequency, trigger values, etc.) should be developed after the ROD and informed by information collected and developed during the pre-design investigations and remedial design.

23. PDF p. 15, Section “Overview of Remedy Approach”, 2nd bullet - "technology inspections for NAPL, with chemical analysis to confirm the composition of NAPL identified, regular bank inspections for erosion, with sampling as needed, and regular inspections for the presence of seeps, with opportunistic sampling as possible. The purpose of this long-term monitoring program is to assess overall remedy effectiveness, including both the performance of the remedy itself within the East Branch portion of the OU1 Study."

    a. Comment: National Grid disagrees with this statement. The dredge and cap remedy remains protective as long as the cap stays intact. Material on top of the cap or in dredged areas does not indicate remedy failure and does not impact protectiveness. These assertions are inaccurate and should be excluded from future documents, including the ROD.

24. PDF p. 15, 2nd paragraph - "However, if the need for source control is related to a seep from a contaminated upland property, then the source control action would be taken through state

and/or federal (Superfund and/or non-Superfund) enforcement authority, to be determined on a case-by-case basis."

a. Comment: National Grid agrees and would want EPA and NYSDEC to address sources earlier. We believe a plan to address these ongoing sources must be address as a component of the ROD in order to develop a successful, long-term remedy.

25. PDF p. 15, Section Data-Based Rationale for Remedy Approach, 1st paragraph - "This information will be updated based on sampling conducted during investigations to support the design of the remedy and on an ongoing basis after implementation of the remedy, but the existing data shows that risk-based PRGs do appear to be achievable at this time for copper (PRG 490 ppm) and TPAH(34) (PRG 100 ppm), may be achievable with little or no additional source control work for PCBs (PRG 0.30 ppm), and will likely take time and additional source control work to achieve for dioxins/furans (PRG 18 ppt) and C19-C36 (PRG 200 ppm)."

    a. Comment: National Grid states for the record that EPA's decision to set PRGs below known background levels is inconsistent with CERCLA's requirement for remedies to be cost-effective and technically practicable, and it also introduces the certainty of Agency-defined "recontamination." The EPA acknowledges that CERCLA authorities for Clean Water Act background sources have not been effectively integrated into the East Branch remedy selection. According to the EPA, "Close coordination between the Superfund and Clean Water Act (CWA) programs can make both programs more effective and better serve the public. For example, permits and other actions taken under CWA authority could reduce the risk of resedimentation" ("Promoting Water, Superfund and Enforcement Collaboration on Contaminated Sediments", EPA, (February 12, 2015). Simple collaboration between CERCLA and CWA staff will enhance Agency decision-making by identifying, for instance, conditions in NPDES permits to address CERCLA contaminants of concern as a beneficial first step.

26. PDF p. 16, Subsection "Data-Based Rationale for Remedy Approach", 1st paragraph - "This analysis illustrates that, based on EPA's current understanding, the RAOs that have been established for the East Branch portion of OU1 are achievable in the long-term. The model will be used to determine the IEMs."

    a. Comment: As mentioned earlier, please specify how the model and empirical data will be utilized, including which version of the model and which specific output will be employed.

27. PDF p. 16, Section "Monitoring and Evaluation Approach", 2nd paragraph - The phrasing in the last full sentence of the paragraph suggests that data will be compared on a SWAC basis.

    a. Comment: EPA has indicated in the past they will do a point-by-point comparison of samples to IEMs. National Grid recommends specifics of the monitoring and evaluation approach be developed after the ROD and informed by information collected and developed during the pre-design investigations and remedial design.

28. PDF p. 16, Section Monitoring and Evaluation Approach, 2nd paragraph - "IEMs will be developed through the use of the LTE model and will be set to the 50th percentile concentration prediction from the LTE model for each COC. A tiered monitoring program will be developed and refined over time. The initial tier will include a regular, post-implementation sampling plan that will be

developed during the remedial design. The second tier would require increased monitoring of all potential sources of contamination if the surface sediment concentration of the remedy footprint reaches between 75% and 90% of the current IEM for each COC, depending on the COC."

a. Comment: Please clarify why increased monitoring is required at 75th and 90th percentile of the IEMs. If the IEMs are set based on the LTE model, then reaching 75th and 90th percentile of these concentrations is expected and should not result in increased monitoring. National Grid recommends specifics of the monitoring and evaluation approach be developed after the ROD and informed by information collected and developed during the pre-design investigations and remedial design.

29. PDF p. 16, Section Monitoring and Evaluation Approach, 3rd paragraph - "This monitoring program will allow EPA to identify the specific, ongoing sources that may cause IEM exceedances before IEM exceedances actually occur and will enable EPA to develop an appropriate course of action to ideally prevent IEM exceedances from ever occurring. The IEMs will be refined over time as new empirical data is obtained, and the IEM for any particular COC could be consistent with the risk-based PRG. Over time, as additional external and internal/external interface source control measures are taken, the expectation is that all IEMs will be consistent with the risk-based PRGs, at which point the remedy would be protective and the ongoing monitoring would be conducted to assure it remains so."

a. Comment: Based on the LTE model, risk-based PRGs for some COCs are expected to be exceeded if IEMs are set at the 50th percentile of the LTE model. Please clarify how IEMs will be consistent with PRGs if they are selected based on the LTE model. Additionally, please again clarify the version of the model being used and which specific output. It is important to clarify that the IEM should be set at the risk-based PRG if the risk-based PRG is higher than the LTE-model predicted equilibrium concentration. National Grid recommends specifics of the monitoring and evaluation approach be developed after the ROD and informed by information collected and developed during the pre-design investigations and remedial design.

30. PDF p. 16, Section Monitoring and Evaluation Approach, 5th paragraph - "any sheen observed in the future would need to be further investigated."

a. Comment: National Grid requests clarification as to the intent of this statement. Investigation of every sheen would place undue burden on respondents. There are numerous ongoing external sources for sheens that are not being controlled by the remedy.

31. PDF p. 17, Section “Common Elements of Each Active Alternative”, 3rd bullet, last sentence.

a. Comments: National Grid clarifies for the record that saying NAPL can be transported by diffusion is incorrect. Only NAPL components that have dissolved in water are transported by diffusion.

32. PDF p. 18, subsection “Common Elements of Each Active Alternative”, 3rd paragraph - "The post-implementation monitoring program (described under “Monitoring and Evaluation Approach”) will be used to determine if the source-control RAOs are being met. Increased monitoring of all potential sources of contamination would be conducted when the surface sediment

concentration of the remedy footprint reaches between 75% and 90% of the current IEM for each COC, depending on the COC. As described previously, additional source control actions will then be taken on an as-needed basis under state and/or federal enforcement authority, to be determined on a case-by-case basis."

a. Comment: Please clarify how the 75th and 90th percentile values were selected and why this increased monitoring is required prior to reaching the IEMs, particularly since the IEMs will be set based on the LTE model, meaning reaching these concentrations is expected and should not result in increased monitoring. National Grid recommends specifics of the monitoring and evaluation approach be developed after the ROD and informed by information collected and developed during the pre-design investigations and remedial design.

33. PDF p. 19-20, Section "EB-D Alternative", USEPA is consistent with the FFS description of this alternative. However, when discussing the "Evaluation of Alternatives", USEPA is not consistent with these descriptions of EB-D.

    a. Comment: National Grid notes for the record that this is not consistent with the options of ISS, dredging or capping outlined in the FFS, and requests that this be corrected in future documents.

34. PDF p. 22, Section "Long-Term Effectiveness and Permanence", 2nd paragraph, 5th sentence states "Alternative EB-D would remove and/or use ISS to treat remaining waste below the estimated 3- foot dredge limit….".

    a. Comment: National Grid notes for the record that this is not consistent with the options of ISS, dredging or capping outlined in the FFS, and requests that this be corrected in future documents.

35. PDF p. 23, Section "Reduction of Toxicity, Mobility or Volume Through Treatment", 1st paragraph, last sentence states "Alternative EB-D would include ISS where necessary to address relatively high COC concentrations in sediment, the potential for exposure to PTW, and/or the potential for NAPL migration."

    a. Comment: National Grid notes for the record that this is not consistent with the options of ISS, dredging or capping outlined in the FFS, and requests that this be corrected in future documents.

**OFFICE OF THE BROOKLYN BOROUGH PRESIDENT**

**ANTONIO REYNOSO**
Brooklyn Borough President

November 9, 2024

Caroline Kwan
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 18th Floor
New York, NY 10007

Dear Ms. Kwan,

I am writing to express my concerns regarding the Proposed Early Action Plan for the East Branch tributary of Newtown Creek, submitted for public comment on August 28, 2024. As Brooklyn Borough President, I am deeply committed to pushing for a cleanup of the Creek that is thorough, timely, and protective of human and ecological health. Further, any cleanup of Newtown Creek needs to center current and future uses of the creek that includes public access, recreational uses, and habitat restoration.

While I have concerns regarding the Proposed Early Action Plan for the East Branch, I would like to express my gratitude to the EPA team for the work you have done on this cleanup, which I know is very complex and challenging. That being said, this Proposed Plan is the first cleanup plan that has been released in the 14 years since Newtown Creek was designated a Superfund site, and as such, it is absolutely essential that it gets the details right and sets a high standard for the cleanup of the rest of the Creek.

In order to ensure a thorough and protective remedy that is responsive to community needs, I ask that the Proposed Plan be amended to address the following:

1. **The EPA needs to commit to the following community priorities to ensure Alternative EB-D will be protective of human and ecological health.**

The Proposed Plan is light on the details and leaves much to be desired when it comes to identifying specific locations of more contaminated sediment, NAPL characterization in the East Branch, upland seeps, and the Post Construction monitoring plan. This lack of detail around key issues in the cleanup leaves me concerned that the selected Alternative as described will not be protective of human health and the environment.

While Alternative EB-F would remove all the contaminated sediment down to native bedrock, Alternative EB-D would only remove three feet across the East Branch, with the option to do deeper dredging in particularly contaminated areas. Sediment thickness in the East Branch is up to 33 feet thick in areas. The Proposed Plan will leave dozens of feet of contaminated sediment in the East Branch in perpetuity – and as such, in order for this Alternative to be acceptable to me and my constituents, the EPA needs to ensure the following conditions are met:

1. A Pre-Design Investigation Plan that is completed by an independent party overseen by the EPA and presented to the Community Advisory Group for comments.
2. A clear and comprehensive sampling plan that includes different sampling methods and different characterization methods to fully analyze NAPL in seeps and sediments, conducted by an independent contractor hired by the EPA and presented to the Community Advisory Group for comments.
3. A cap design should be reassessed following systematic identification of, and quantitative data collection from, NAPL contamination sources.
4. If any location of NAPL-contaminated sediment is assessed unsuitable for removal, then in-situ stabilization (ISS) should be based upon a comprehensive data set from this location, as per the protocols followed at the Gowanus Canal Superfund site.
5. A map of Principal Threat Waste sources developed in collaboration with work already conducted by the NYSDEC and NYCDEP, such that the effectiveness of any proposed bulkhead can be clarified and presented to the Community Advisory Group for comments.
6. A post remediation restoration plan that sets targets for and identifies potential sites of ecological restoration in the East Branch.

Beyond the above commitments to address concerns in the selection of Alternative EB-D, the following concerns should be addressed:

2. **The EPA must fully identify and dredge the contaminated hotspots in the East Branch to ensure a thoroughly protective remedy.**

The EPA must fully characterize and identify where contaminated sediment hotspots are located in the East Branch and provide additional details on what criteria would determine when deeper dredging would be required. The EPA should not move forward without knowledge of potential contaminant reservoirs and how the agency will make dredging decisions. The Pre-Design Investigation should detail this information and be provided for public comment.

3. **The EPA must provide more information on what long-term monitoring will be required to evaluate the protectiveness of the remedy and clarify how the EPA will work with state agencies to ensure contamination from upland sources is addressed and remediated.**

There is significant concern that ongoing contamination from upland sources, CSO discharges and runoff, and from the rest of the Creek, as well as the potential for erosion of the cap due to increasing storms, will threaten the long-term viability of the remedy. Details on the monitoring program were not included in

**OFFICE OF THE BROOKLYN BOROUGH PRESIDENT**

**ANTONIO REYNOSO**
Brooklyn Borough President

the Proposed Plan, and more information is needed. Additionally, my constituents need clarity about long-term health risks associated with a remedy as well as the prevention of an outcome comparable to the Hudson River Superfund, where PCBs are still posing local human and ecological health risks. Will the costs of long-term monitoring – and any post-remedy recontamination clean-up be shouldered by responsible parties or taxpayers/municipalities?

4. **The Remedy must include safe access and thriving ecosystems, ensuring that human recreation on the East Branch and revitalization of the aquatic habitat is made possible.**

Currently, the EPA has approved swimming as a designated use for Newtown Creek and the East Branch, and the remedy must allow for safe immersion in the water and prevent direct contact with contaminants, as well as fishing, paddling, and boating. Further, salt marsh restoration in this section must be prioritized, and shoreline reconstruction should facilitate the ongoing revitalization of our local aquatic ecosystems by incorporating habitat for shellfish, fish, crabs, and other marine animals as well as aquatic plants.

Thank you again for this opportunity to submit comments.

Sincerely,

Antonio Reynoso
Brooklyn Borough President

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**HOWARD ADAMS**
[redacted]
Email: [redacted]

November 10, 2024

Caroline Kwan, Remedial Project Manager
Environmental Protection Agency
290 Broadway, 18th Floor
New York, NY 10007

Dear Ms. Kwan,

My name is Howard Adams. I have lived in Long Island City for over 25 years. I am also a commercial and residential property owner with several holdings in Long Island City near Newtown Creek. I am very concerned about how the EPA plans to clean up Newtown Creek and how that will affect the surrounding neighborhoods.

I of course support a remedy that protects people living and working in the area. But I also care about the local businesses which drive this community. I think the EPA needs to pick a clean-up plan that protects all interests.

I support the EPA's proposed plan to dredge the sediment and place a cap in the East Branch of Newtown Creek, with deeper dredging in certain areas where it may be needed. I believe this plan will minimize disruption to businesses and will provide a high level of clean-up considering the needs of the local community and the uses of Newtown Creek.

I want to thank the EPA for its work over the years and I look forward to this early action in the East Branch, and to the future of Newtown Creek.

Sincerely,

Howard Adams

MODERNSPACES

10-27 46th Avenue
Long Island City, NY 11101
modernspacesnyc.com

November 10, 2024

Caroline Kwan, Remedial Project Manager
Environmental Protection Agency
290 Broadway, 18th Floor
New York, NY 10007

Dear Ms. Kwan,

I am Eric Benaim, owner and CEO of the real estate brokerage firm Modern Spaces located in Long Island City, NY. I write as a long-time member of the Long Island City business community, with my business near Newtown Creek for over 16 years. Additionally, I have lived in the Long Island City area with my family for over 18 years. As a real estate brokerage with over 100 agents in the area, I interact with local businesses regularly. Local businesses support our community and will be impacted by the EPA's selected remedy for the East Branch of Newtown Creek.

Modern Spaces supports a remedy that is efficient, effective, based upon sound science, and of course, protects human health. I want to advocate for a plan that reflects the needs of local businesses, including my own. Any plan the EPA selects has the potential to create waste, noise, and odor that can affect the successful operations of businesses around Newtown Creek; businesses that host local jobs and support the local economy. Additionally, the traffic and inconvenience created by a remedy can negatively impact all businesses and community members who live and work nearby.

Modern Spaces supports the EPA's proposed plan to dredge the sediment and place a cap in the East Branch of Newtown Creek, with deeper dredging in certain areas where it may be needed. We believe this type of measured remedy will protect the safety and well-being of our community and achieve the EPAs clean-up goals, while minimizing the hardships to businesses and the local community that a less thoughtful remedy will create.

Thank you for the work you have done towards the remediation of Newtown Creek. We appreciate the thoroughness and dedication the EPA has demonstrated over the years to make Newtown Creek cleaner and safer for our community. We look forward to this early action in the East Branch, and to the future of Newtown Creek.

Sincerely,

Eric Benaim, CEO Modern Spaces

ExxonMobil Environmental and Property Solutions Company
22777 Springwoods Village Parkway
W3.2A E&PS
Spring TX 77389

November 11, 2024

Ms. Caroline Kwan
Superfund and Emergency Response Division
U.S. Environmental Protection Agency – Region II
290 Broadway, 18th Floor
New York, NY 1007-1866
kwan.caroline@epa.gov

Re: Newtown Creek East Branch Early Action
ExxonMobil Comments to EPA's Proposed Remedial Action Plan

ExxonMobil appreciates the opportunity to comment upon the United States Environmental Protection Agency's (EPA) Proposed Remedial Action Plan (PRAP) for the East Branch Early Action and agrees that EPA's selection of Alternative EB-D will be protective of human health and the environment throughout the East Branch of Newtown Creek (NTC). Additionally, we believe this selection will provide EPA the flexibility to adjust the remedy as needed, based upon findings from the Pre-Design Investigation (PDI) environmental and engineering sampling efforts.

However, ExxonMobil has concerns regarding the approach EPA has taken in establishing the Preliminary Remediation Goal (PRG) for $C_{19}$-$C_{36}$ Aliphatics (C19-C36) in the East Branch and NTC OU-1. Given the complexity of the sediment media found in NTC, the lack of toxicity testing that isolates the impacts of C19-C36 from other total petroleum hydrocarbon (TPH) ranges, and the lack of a nationwide precedence for C19-C36 as an ecological risk-driving contaminant of concern (COC), ExxonMobil undertook a review of the C19-C36 toxicity data at the Newtown Creek Superfund Site (NTC SFS) and EPA's derivation of the PRG. This effort led to the identification of four key issues for EPA's consideration as it evaluates the Remediation Goal (RG) for East Branch and NTC OU-1:

1. There is inadequate detail in the administrative record documenting EPA's development of the C19-C36 PRG.
2. The scientific basis for aliphatic toxicity to benthic invertebrates and the results of an ExxonMobil led C19-C36 toxicity study do not support a PRG at 200mg/kg.
3. Two key areas in EPA's process for developing a risk-based C19-C36 PRG could benefit from reevaluation
4. Several challenges exist when applying the Massachusetts Department of Environmental Protection (MADEP) Extractable Petroleum Hydrocarbon (EPH) method for analyzing C19-C36 in contaminated sediments, leading to the need for a site-specific method detection limit (MDL) validation study.

Considering that C19-C36 are not classified as Comprehensive Environmental Response Cost and Liability Act (CERCLA) contaminants (40 CFR 302.4), ExxonMobil requests that EPA consider these issues and the inherent analytical limitations in the test method before establishing a final RG for C19-C36. We ultimately recommend a site-specific MDL validation study be completed for C19-C36, using NTC sediments, in accordance with EPA policy. However, at this moment, we are not of the opinion that updating the C19-C36 MDL would alter the selected remedy for East Branch. Nevertheless, it will be important that the Pre-Design Investigation and Post-Remedy Monitoring efforts consider updated laboratory methodology to ensure improved C19-C36 data usability moving forward.

## ISSUE 1: DEVELOPMENT OF C19-C36 PRG AND LACK OF ADMINISTRATIVE RECORD

In 2014, as part of the Baseline Ecological Risk Assessment (BERA; Anchor QEA 2018), surface sediment samples (0 – 15 centimeters [cm]) were collected from 35 locations. These samples were analyzed using a sediment quality triad (SQT) approach to evaluate risks to the benthic macroinvertebrate community. The SQT approach measured concentrations of COCs in sediment samples and in co-located porewater. It also involved conducting *ex situ* 28-day toxicity tests on *Leptocheirus plumulosus (Leptocheirus)* as a proxy for toxicity to *in situ* benthic communities. The finalized BERA, which was approved by EPA in 2018, identified total polycyclic aromatic hydrocarbons 34 (TPAH34)[1] as the only hydrocarbon class posing ecological risk to benthic invertebrates. C19-C36 were not classified as an ecological risk-driving COC at the time, and while it was acknowledged that an "additional factor may be influencing 10-day survival," there was no evaluation of this COC in the BERA (BERA, 2018, p.221).

In 2020, EPA conducted further analysis of the BERA data to evaluate the toxicity of non-PAH hydrocarbons. This analysis found that 8 of the 35 sediment samples analyzed during the BERA exhibited *Leptocheirus* survival rates below 75% with TPAH34 toxic units (TUs) of less than or equal to one (Figure 1; EPA 2020). These findings suggested to EPA that for these samples, referred to herein as the "eight samples in question," other stressors were responsible for the higher mortality rates[2]. EPA inferred that the lower survival rates in the eight samples in question were due to an alternative non-PAH hydrocarbon source, without conducting an evaluation regarding whether other COCs identified in the BERA might also be posing ecological risk and impacting the samples. After evaluating the TPH, Diesel Range Organics (DRO) and C19-C36 hydrocarbon fractions, EPA concluded that the dose-response curve for C19-C36 in bulk sediment samples best described the observed toxicity in the eight samples in question (EPA, 2020). Documentation of EPA's additional analysis of the BERA data and development of a C19-C36 PRG was included in the administrative record in the form of a June 18, 2020 presentation that EPA gave to the Newtown Creek Group (NCG) (EPA, 2020) and a modified version of the June 2020 presentation submitted with the report *Development of Risk Based Preliminary Remediation Goals* (the report notes "slides 4 through 8 have been removed but no changes have been made" [Anchor QEA, December 2021]). Importantly, these documents are not cited in the Ecological Risk Assessment portion of the Proposed Plan for the East Branch Early Action (EPA, 2024). The PRAP appears to imply, by not providing this documentation, that the C19-C36 COC was developed in the 2018 BERA. To clarify, this was not the case and should be clearly documented in the PRAP.

The formal documentation of EPA's analysis and the detailed process/rationale for developing a C19-C36 PRG has only been documented in a PowerPoint presentation to the NCG and through a "series of technical meetings" (Anchor QEA, 2021), preventing the public and all PRPs from fully understanding how and why the PRG was developed at the currently proposed level. The contents of this letter are intended to support the request for additional documentation of the process used when setting the C19-C36 PRG and present additional material for EPA consideration as it develops the C19-C36 RG.

## ISSUE 2: SCIENTIFIC BASIS FOR ALIPHATIC TOXICITY TO BENTHIC INVERTEBRATES

To provide a technical basis for the proposed C19-C36 PRG, EPA cited an earlier study by Stanley et al. (2010) that reported the toxicity of mineral oil to *Leptocheirus*.[2] In that study, a heavier molecular weight range mineral oil consisting of aliphatic hydrocarbons was spiked into a natural sediment (Total Organic Carbon [TOC]=0.64 weight percent [wt%]) to evaluate effects on survival. Several tests were performed to evaluate the impact of variables such as beaker size, sediment volume, and organism loading density. The results indicated a 10-day Lethal Concentration 50% ($LC_{50}$) ranging from 110 to 210 milligram per kilogram (mg/kg) (dry weight), with limited effect of test design variables. While the purpose and design of the study was not related to identifying a toxicity threshold, these results appeared consistent with the 200 mg/kg dry weight PRG that EPA proposed for C19-C36.

There is considerable information on the toxicity of aliphatic hydrocarbons to benthic organisms given the use of these substances as oil field drilling fluids that do not appear to have been considered by EPA. ExxonMobil's comparative analysis of existing toxicity data for *Leptocheirus* indicated that the toxicity threshold identified in the Stanley et al. (2010) results might be at least an order of magnitude too low. Additionally, the toxicity of aliphatic hydrocarbons to benthic organisms is expected to decrease for compounds above C16 due to solubility constraints, which is consistent with aquatic chronic toxicity test results (Parkerton et al., 2021). At much higher concentrations that are associated with NAPL, toxicity due to physical impairment may occur. Therefore, ExxonMobil commissioned a targeted study to investigate the sensitivity of *Leptocheirus* to aliphatic hydrocarbons (Appendix A).

This new study involved spiking two different mineral oils to two different sediments and evaluating 10-day survival of *Leptocheirus* at five nominal concentrations ranging from 250 to 4,000 mg/kg (dry weight). The mineral oils were

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1 The NTC QAPP includes the full lists of PAHs included in the TPAH34 summation.

2 The Stanley et al. study was referenced in a March 12, 2020 EPA presentation to the NCG, but this citation was subsequently removed from the June 2020 EPA presentation provided to document C19-C36 toxicity evaluation in the Administrative Record.

added to toxicity test samples by gravimetric mineral oil weight, and the final sediment concentrations were confirmed by EPA Method 8015D (Table 1, Appendix A). Note that 10-day survival testing of *Leptocheirus* was chosen so that a direct comparison could be made to the results of the Stanley et al. (2010) study, and it was shown in the BERA to be more conservative than the 28-day tests.

In this new study, two mineral oils were tested: the original heavier molecular weight range mineral oil used by Stanley et al. (2010) and an alternative lighter molecular weight range mineral oil that more accurately represents the C19-C36 carbon range and is expected to be more toxic than the heavier molecular weight range mineral oil. Analytical characterization indicated the heavier molecular weight range mineral oil consisted of C20-C57 aliphatic hydrocarbons, while the lighter molecular weight range mineral oil consisted of C16-C36 aliphatic hydrocarbons (Figure 2). Two sediments with low levels of hydrocarbon contamination were used in these experiments: one collected from surface sediment near NC010 (at approximately Creek Mile [CM] 0.7 in the main stem of NTC), and a second obtained from Lake Pontchartrain, LA. The TOC content of these sediments was 3.56 wt% and 1.91 wt%, respectively. Preliminary studies showed >90% *Leptocheirus* survival for 10-day survival testing in both unspiked sediments, supporting their subsequent use in toxicity testing; this indicated that other potentially confounding sources of toxicity (such as high non-hydrocarbon COC concentrations) were not impacting *Leptocheirus* survival in these samples.

The results of this study showed that the 10-day LC50 for the lighter molecular weight range mineral oil spiked into the NTC sediment was 3,889 mg/kg (dry weight). For the heavier molecular weight range, mineral oil spiked into NTC sediment, as well as both mineral oils spiked to Lake Pontchartrain sediment, the 10-day LC50 was >4,000 mg/kg (dry weight). Note that 4,000 mg/kg (dry weight) was the highest concentration tested in is study).

**Table 1. Summary of LC50 and C9-C40 Total Petroleum Hydrocarbon Results (mg/kg)**

| Sediment Type | Mineral Oil Type[3] | Sample ID | LC50 (mg/kg) | Weight % Solid | TPH (C9-C44) (mg/kg) |
|---|---|---|---|---|---|
| Lake Pontchartrain | Heavier Molecular Weight Range | L-6470-24 (4000 mg/kg) | > 4,000 | 44.9 | 3,310 |
| Lake Pontchartrain | Lighter Molecular Weight Range | L-6471-24 (4000 mg/kg) | 3,889 | 44.6 | 3,060 |
| Newtown Creek (near NC010) | Heavier Molecular Weight Range | L-6472-24 (4000 mg/kg) | > 4,000 | 39.6 | 4,410 |
| Newtown Creek (near NC010) | Lighter Molecular Weight Range | L-6473-24 (4000 mg/kg) | > 4,000 | 40.9 | 4,700 |

These results support the expectation, based on relative solubility, of lower sensitivity of *Leptocheirus* to C16+ aliphatic hydrocarbon fluids. Furthermore, since tests that were performed in NTC sediment found no toxicity at concentrations of 4,000 mg/kg for either mineral oil type, it is unlikely that concentrations of C19-C36 starting at 200 mg/kg are the causative stressor responsible for the observed toxicity at sample locations with lower porewater PAH TUs. ExxonMobil intends on developing this study for peer-reviewed publication in early 2025, and results from this study have been provided for consideration as Appendix A.

The results of this analysis support the broader conclusion that there are underlying issues behind the analysis of the toxicity data used to derive of the C19-C36 PRG at 200 mg/kg.

## ISSUE 3: TECHNICAL CONCERNS RELATED TO EPA'S DEVELOPMENT OF A RISK-BASED PRG FOR C19-C36

ExxonMobil has identified two primary areas where EPA's process for developing a risk-based PRG for C19-C36 could benefit from reevaluation, including:

A. The reliability of the PAH porewater data for use in evaluating NTC benthic toxicity is limited.

[3] The carbon range of the lighter mineral oil is C16-C36, and the carbon range of the heavier mineral oil is C20-C57 (Figure 2).

B. The PAH bulk sediment results adequately account for hydrocarbon toxicity.

These are described in greater detail below.

### A. PAH porewater data is not reliable for use in evaluating NTC SFS benthic hydrocarbon toxicity

In its June 2020 presentation, EPA indicated that the majority of the PAH porewater concentration results from the BERA were below detection limits and, therefore, "did not lend itself to the PW RG method."[4] Yet after acknowledging the PAH porewater data limitations, EPA used the same porewater data to interpret the C19-C36 sediment toxicity response curve, concluding that low survivorship in samples with PAH porewater toxicity unit (TU) ≤ 1 must indicate another source of toxicity for the eight samples in question, and suggested that non-PAH hydrocarbons like C19-C36 caused the observed toxicity (EPA, 2020; Figure 3). Therefore, while it did not use the PAH porewater TU data to calculate PRGs, EPA considered it qualitatively, along with bulk sediment data, to conclude that TPAH34 does not fully explain hydrocarbon toxicity and that C19-C36 were driving the hydrocarbon toxicity in the eight samples in question (Figure 3).

There are several reasons why the PAH porewater data may have led to the unrepresentative low PAH TU results for the eight samples in question. Several critical issues with the PAH porewater data undermine EPA's conclusions, including:

- **Quality Control in Test Method ASTM D7363:** The PAH porewater data was analyzed using ASTM Test Method D7363 at the direction of EPA and its contractors. This method does not require analysis of the laboratory quality control spiked blanks or matrix spikes necessary for assessing method accuracy and precision (ASTM D7363, 2013). This omission limits the ability of data users to determine if the data reflects true *in situ* site conditions or if the data has been biased from artifacts due to matrix interferences or laboratory cleanup procedures (such as flocculating samples with aluminum potassium sulfate).

  Unlike ASTM D7363, EPA Test Method 8272, which also measures PAHs in porewater using a similar methodology, includes rigorous quality controls (such as laboratory control spike samples and matrix control spike samples) that provide greater confidence in the data.

- **Concerns from Third-Party Data Validator**: The third-party data validator, Laboratory Data Consultants, Inc. (LDC), noted the lack of quality control measures and stated the data was "usable for limited purposes only" (LDC, 2014). This alone indicates that the data should not have been used to inform critical analyses like the development of PRGs.

- **Handling of Non-Detects and Measurements Below Detection Limits:** Most PAH porewater results were below detection limits and were replaced with values at half the detection limit by EPA when calculating the TPAH34 value that was used in the analysis (EPA, 2022). This practice diminishes the reliability of the data, particularly at low levels, and may not reflect actual site conditions. These results have limited utility in informing the true site conditions and informing analysis like the development of hydrocarbon PRGs.

In summary, the PAH porewater data from the BERA, analyzed using ASTM D7363 did not have sufficient quality controls to ensure its accuracy, in accordance with EPA Method 8270 to EPA guidance (EPA, 2017) and according to EPA's own analysis of the PAH porewater data from the BERA (EPA, 2020). EPA's reliance on this data to infer sources of hydrocarbon toxicity did not account for the test method's limitations, data quality issues, or the flags from the data validator.

### B. PAH Bulk Sediment Results Adequately Account for Hydrocarbon Toxicity

In its analysis of the BERA data, EPA suggested that non-PAH hydrocarbons drove toxicity in some of the BERA samples (EPA, 2020; EPA, 2022). To evaluate this hypothesis, EPA analyzed bulk sediment chemistry, specifically TPAH34 concentrations; the resulting dose-response curve shows a clear correlation between TPAH34 bulk sediment concentrations and toxicity, with no indication of alternative toxic

[4] "*EPA Region 2 followed EPA's 2017 PW RG guidance, and after consultation with the authors of the guidance (EPA ORD), the results indicated that PW data from the 35 SQT locations did not lend itself to the PW RG method. The majority of the measured PW concentrations were below the detection limits, regardless of sediment concentrations. Using ½ the reporting limit for most of the PW $C_{free}$ concentrations yielded PW values not related to sediment concentrations*." (EPA, 2020, Slide 5) and "*EPA's PW-based bulk sediment PRG calculations did not yield reasonable remedial goals, because most PW samples were ND*." (EPA, 2020, Slide 7).

hydrocarbons like C19-C36 (Figure 4). This is further evidenced by seven of the eight samples in question having TPAH34 bulk sediment concentrations above the risk-based PRG of 100 mg/kg, with the eighth sample having a TPAH34 concentration of 76.7 mg/kg and a survival of 60%, which was between the BERA reference area envelope 5th and 20th percentile thresholds. The use of unreliable porewater data (Issue 2A) complicates what otherwise appears to be a clear connection between TPAH34 bulk sediment concentrations and observed toxicity.

## ISSUE 4: CHALLENGES IN APPLICATION OF MADEP EPH METHODOLOGY IN SETTING A PRG AND NEED FOR SITE-SPECIFIC MDL VALIDATION STUDY

The MADEP EPH method was initially developed to measure high concentrations of petroleum hydrocarbons (greater than 1,000 mg/kg) in soil samples at petroleum release sites (MADEP, 1994). It has since been modified and is widely used as a screening tool for assessing petroleum contamination in soils and groundwater at upland sites. However, the MADEP EPH method was not specifically designed, optimized, or validated for detecting lower levels of petroleum hydrocarbons in contaminated sediments, nor does it comply with several essential requirements outlined in EPA SW-846 methods for measuring TPH fractions. Instrument sensitivity limitations further hinder its effectiveness for measuring aliphatic concentrations near or below the C19-C36 PRG of 200 mg/kg (0.02 wt% petroleum hydrocarbons). Consequently, the MADEP EPH method is not reliable for calculating risk-based PRGs or accurately assessing low-concentration petroleum hydrocarbon contamination in sediments. Additional supporting rationale is detailed in the following subsections.

### A. Test Method is Not Validated by MADEP for Use in Sediments

Although the MADEP EPH method states that it is suitable for analyzing aqueous samples, soils, sediments, wastes, sludges, and non-aqueous phase liquids (NAPL), it has only been validated for soil and aqueous matrices (MADEP, 2019, Section 2.2). Sediment analysis presents unique challenges, such as elevated moisture levels and matrix interferences, necessitating customized analytical approaches to ensure data quality and usability (ASTM E3163). Using a non-SW-846 method like MADEP EPH at a sediment Superfund site is technically unsound without first conducting a test method validation study, in accordance with the EPA's *Flexible Approaches to Environmental Measurement* guidance, to ensure the method is optimized for site-specific sediment analysis and can reliably provide data of sufficient quality for ecological toxicity assessments (EPA, 2008; US Federal Register, 2009). Such validation was not performed at the NTC SFS before employing this method during the Remedial Investigation/Feasibility Study (RI/FS). For future sediment analysis, ExxonMobil is consulting with the NCG and project laboratories to modify the method to meet necessary data quality standards.

### B. MADEP EPH Method Was Not Developed by EPA for Use at CERCLA Sites and Is Not an SW-846 Method

The MADEP EPH method was not developed by the EPA to chemically characterize environmental samples at CERCLA sites and does not align with the recommendations and requirements of EPA methods for measuring carbon-range-defined TPH fractions, such as EPA Method 8015D for Nonhalogenated Organics Using Gas Chromatography/Flame Ionization Detection (GC/FID). A key deficiency of the MADEP EPH method is its lack of requirements for analyzing standard reference materials (SRMs) or certified reference materials (CRMs) to demonstrate accuracy. CRMs for C19-C36 in sediment are not commonly available—only soil and aqueous CRMs commonly exist. The absence of C19-C36 sediment CRMs in NTC SFS analysis means a lack of critical quality control confirmation of data accuracy, which limits users' understanding of the method's accuracy in a complicated environmental matrix like sediment.

In contrast, EPA Method 8015D includes stringent calibration and quality control requirements that enhance data reliability, such as preparing petroleum reference oil calibration standards alongside initial single-component calibration standards of normal alkanes. EPA Method 8015D specifies, *"[o]ne of the [petroleum reference] standards should be at a concentration at or below the quantitation limit necessary for the project"* (EPA Method 8015D, 2003, Section 11.3.3.1). Additionally, it highlights that *"the calibration of DRO and GRO is markedly different from that for single component analytes"* and emphasizes the need for calibration that captures the entire area of the chromatogram within the retention time range for the fuel type (EPA Method 8015D, 2003, Section 11.3.3). This requirement enables laboratories to demonstrate that the analytical method is sensitive enough to detect complex mixtures of hydrocarbons in petroleum-impacted samples at the stated quantitation limit. The MADEP EPH method lacks such requirements, meaning that initial calibrations using single-component standards do not accurately reflect the more muted response of complex mixtures of hydrocarbons, such as C19-C36, and thus overstates the instrument's sensitivity (see Issue 3C for related information). The lab reporting C19-C36 for the NTC SFS uses initial calibrations using single-component standards and does not analyze reference oil standards to demonstrate the sensitivity and accuracy of the method in measuring complex mixtures of hydrocarbons in contaminated sediments.

### C. Method Not Optimized for Quality Control of Results in Contaminated Sediment Analysis

The NTC SFS RI quality assurance project plan (QAPP) specifies critical laboratory quality control samples, such as laboratory control spikes (LCS), matrix spikes (MS), and matrix spike duplicates (MSD) (Anchor QEA, 2014), to ensure the reliability of field sample data. For the NTC SFS RI, the laboratory prepared the LCS, MS, and MSD for C19-C36 by spiking with discrete n-alkane standards at concentrations between 50 and 100 mg/kg. However, approximately 50% of the quality control batches analyzed during the RI failed to meet the QAPP acceptance criteria for MS and MSDs. This high failure rate indicates that the accuracy and precision of results in actual site matrices remain uncertain for the majority of the C19-C36 results reported. The high failure rate, using a standard MS/MSD approach, is another indication that the MADEP EPH method is not suitable for sediment analysis.

Additionally, analyzing environmental samples using GC/FID can introduce cross-contamination between samples. It is standard to run system solvent blanks (SSB) after contaminated samples to ensure instrument cleanliness and minimize cross-contamination. The MADEP EPH method states that *"[a]n SSB must be run after all highly contaminated samples to minimize potential sample carryover"* (MADEP EPH Method, 2019, Sections 10.1.2 and 11.2.5). However, MADEP EPH method does not require SSBs to be run as matter of routine practice, leaving the identification of highly contaminated samples up to the instrument operator. The lack of SSBs makes it challenging to monitor sample carryover and cross-contamination. This oversight can significantly affect the reported results for low-level samples analyzed after more contaminated ones. In reviewing RI/FS NTS SFS data, chromatograms with indications of sample carryover have been observed in some samples with results near the PRG, which indicates that results for these samples near the PRG have been compromised due to lack of solvent blanks. With the C19-C36 PRG set at 200 mg/kg, samples with concentrations near this threshold could yield results that erroneously exceed this PRG due to carryover from previously analyzed contaminated samples on the instrument.

Furthermore, the MADEP EPH method utilizes GC/FID as the determinative method; however, the NTC RI QAPP's quality control framework does not adequately address variability in processing raw gas chromatographic data for quantifying C19-C36 results. Bench analysts process raw data and must accurately integrate the relevant carbon range defined by retention times for the C19-C36 range. The integration technique utilized can significantly impact laboratory results; inadequate training or supervision may introduce variability from integration techniques, leading to biased results. The reviewed C19-C36 integrations from RI/FS samples reveal a range of integration techniques differing by analyst (and even different integration techniques used by the same analyst for different samples) across different samples. The NTC SFS lab should standardize its integration practices, as it currently employs varying techniques for method blanks and field samples without strict guidelines for approximating the natural chromatographic baseline in low-concentration samples. While integration issues are less prominent in heavily contaminated samples, small variations in raw data processing can substantially affect the final results reported for low-level samples near the 200 mg/kg PRG. The lack of objective quality control measures highlights the need for the laboratory to adopt definitive integration practices with clearly defined parameters, which should be documented in the laboratory's standard operating procedures (SOP).

### D. MADEP EPH MDLs Overstate Method Sensitivity

The MADEP EPH method used by the NTC SFS laboratory determines the MDL for C19-C36 using eight discrete n-alkane standards in the C19-C36 carbon range (C19, C20, C22, C24, C26, C28, C30, and C36) as calibration standards. These standards are spiked into a clean solid medium (sodium sulfate), and an MDL is calculated for each compound. The overall MDL for the C19-C36 fraction is the sum of the MDLs for these discrete standards. While this method provides a basic measure of sensitivity, accuracy, and precision for individual chemicals in a clean matrix, it fails to accurately assess these parameters for complex mixtures like C19-C36.

The C19-C36 range contains thousands of different hydrocarbon compounds, which are expressed as a blended range (i.e., an unresolved complex mixture) rather than individual peaks in gas chromatography analyses. The instrument's response to these complex mixtures is muted compared to the strong response of the individual calibration hydrocarbons, resulting in the true MDL and quantification limit (QL) for hydrocarbon ranges like C19-C36 being considerably higher than those determined using individual n-alkane standards.

Furthermore, utilizing high-purity sodium sulfate as the spiking substrate fails to accurately assess sensitivity, accuracy, and precision within highly contaminated real sediment matrices, such as NTC sediments. This high-purity sodium sulfate does not contain organic carbon, other contaminants, or variations in grain size and moisture content—all of which are present in actual site sediment samples and can lead to analytical matrix interferences. These interferences can negatively impact the test method's sensitivity, accuracy, and precision. Matrix-specific MDL studies and QC samples, such as matrix spikes and matrix spike duplicates, are essential to evaluate these interferences' effects on method performance. As noted above in Issue 4C, the high failure rate of acceptance criteria for MS/MSD is another indication that the MADEP method is not suitable for sediment analysis.

In summary, the current use of discrete n-alkane standards and sodium sulfate to determine the MDL for C19-C36 is inadequate for contaminated sediment analysis at sites like the NTC SFS. It does not accurately assess method sensitivity, accuracy, and precision for complex hydrocarbon mixtures in contaminated sediment matrices. The limitations of the laboratory's MDL determination highlight the need for an MDL verification study to accurately assess an Aliphatic MDL that reflects the hydrocarbon composition and matrix type encountered in NTC. See Issue 3, Section E and Appendix B for the results of ExxonMobil's C19-C36 Aliphatic MDL verification study.

## E. Aliphatic MDL Verification Study and Practical Quantitation Limit Determination

Given the methodological and data quality issues discussed above, the sensitivity, accuracy, and precision of the current C19-C36 methodology used by laboratories reporting data for the NTC sediments are likely overstated. This uncertainty is particularly concerning at concentrations near the PRG of 200 mg/kg, which led ExxonMobil to complete an MDL verification study for C19-C36, specific to complex sediment matrices such as NTC sediments. This study was conducted in accordance with EPA's latest protocol on determining MDLs, as outlined in the *Definition and Procedure for the Determination of the Method Detection Limit* (US Federal Register, 2017).

Currently, the laboratory that has processed the NTC sediment samples for C19-C36 uses discrete n-alkane standards to determine the C19-C36 MDL (6.67 mg/kg); this is allowed by the MADEP method but is not adequate for sediment samples contaminated with complex hydrocarbon mixtures, as detailed above. In contrast, the ExxonMobil MDL verification study used more realistic ranges of hydrocarbons than discrete n-alkane standards; CRM oils, including mineral oil and lubricating oil, were used as the evaluation standards. These oils are largely composed of complex mixtures of aliphatic hydrocarbons (>90% aliphatic content), making them suitable for this MDL study. This approach more accurately reflects the complex hydrocarbon mixtures found in NTC sediments, aligning with requirements for determining fraction-specific TPH MDLs (EPA Method 8015D, 2003; CCME, 2001).

The MDL verification study utilized the following CRM oils:

- Mineral Oil Standard (Sigma Aldrich, catalog #M8410, LOT# MKCR3541); and
- Lubricating Oil Standard (AccuStandard, catalog # FU-025-D-40X, LOT #212091320-1).

This study aimed to establish updated MDLs for C19-C36 in both ultra-clean lab matrices and actual sediment matrices, strictly following EPA protocols (US Federal Register, 2017). The MDL verification study was performed using uncontaminated marine sediment and actual site sediment from the NTC SFS. The use of actual sediment matrices, and reference oil standards more accurately represents the types of complex hydrocarbon mixtures and complicated sediment matrices encountered at contaminated sediment sites. A summary of the MDL verification study results is listed in Table 2.

**Table 2. Summary of MDL Verification Study Results**

| MDLs vs. NTC PRG | | | MDL Sodium Sulfate | | MDL Matrix Specific | | |
|---|---|---|---|---|---|---|---|
| Analyte | Units | NTC SFS PRG | Mineral Oil | Lubricating Oil | Mineral Oil - Marine Sediment | Lube Oil – Marine Sediment | Site Matrix – NTC SFS Sediment |
| C19-C36 | Mg/kg | 200 | 23.8 | 18.2 | 127 | 127 | 249 |

Note that the matrix-specific MDLs bracket the 200 mg/kg PRG for C19-C36. A regulatory limit (such as a PRG) should not be set at the MDL. EPA has stated that *"...MDLs, although useful to individual laboratories, do not provide a uniform measurement concentration that could be used to set standards"* (US Federal Register 1987).

Given the evaluation of the existing C19-C36 data and the results of the MDL verification study, it is recommended that the NTC SFS QAPP update the C19-C36 MDL to a level between 127 mg/kg and 249 mg/kg in accordance with the ExxonMobil Phase III MDL verification study performed in actual sediment matrices. Additionally, practical quantitation limits (PQLs) should be developed using the updated MDLs to determine reliable minimum C19-C36 levels that can be used with a reasonable degree of certainty for data reported using the MADEP EPH method.

In 1987, to ensure laboratories were reporting reliable data, the EPA formally adopted the use of PQLs to develop maximum contaminant levels (MCLs) for select volatile organic compounds in drinking water for the protection of human health (US Federal Register, 1987). The EPA stated that a PQL is defined as, *"the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions, PQLs thus represent a level considered to be achievable on a routine basis."* In addition, the Federal Register states that, *"[t]he Agency developed the PQL concept to define a measurement concentration that is time and laboratory independent for regulatory purposes. The LOQ and MDLs, although useful to individual laboratories, do not provide a uniform measurement concentration that could be used to set standards."* Lastly, the Federal Register states that *"…PQLs are estimated based upon the MDL and an estimate of a higher level which would represent a practical and routinely achievable level with relatively good certainty that the reported value is reliable. Traditionally, this level has been estimated at 5 to 10 times the MDL. EPA believes that setting the PQLs in a range between 5 and 10 times the MDL achieved by the best laboratories is a fair expectation for most State and commercial laboratories"* (US Federal Register 1985). More recently, in the EPA's 2024 *Final PFAS National Primary Drinking Water Regulation,* the PQL is defined, *"as the lowest concentration of a contaminant that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. These levels are set at specific concentrations and provide the precision and accuracy that the EPA estimates can be achieved across laboratories nationwide and are the most appropriate levels for use in determining the lowest feasible level that can be implemented. The PQLs are used for the MCL compliance determination" (EPA, 2024; Federal Register, 2024).*

The EPA has adopted the use of PQLs in the development of MCLs for the protection of human health in a simple matrix like drinking water. Accordingly, it is technically reasonable to apply the PQL framework for the protection of ecological health in a more complex matrix like contaminated sediments. The use of PQLs in evaluating C19-C36 results, analyzed by an unvalidated method like the MADEP EPH method, is the appropriate mechanism to ensure that results are reported with sufficient precision and accuracy for use in compliance determination, like the evaluation of risk-based PRGs at NTC SFS.

As stated in the Federal Register, the EPA sets the regulatory limit at the PQL (which is from 5X to 10X the MDL) when the risk-based criterion is at or below the MDL (US Federal Register 1987). The following PQL ranges should be considered: 635 to 1,245 mg/kg (5X MDLs) or 1,270 to 2,490 mg/kg (10X MDLs). A summary of recommended PQLs is listed in Table 3.

**Table 3. Summary of Proposed PQLs**

| PQLs vs. NTC PRG | | | | PQL (MDL Sodium Sulfate) | | PQL (MDL Matrix Specific) | | |
|---|---|---|---|---|---|---|---|---|
| PQL Limit | Analyte | Units | NTC PRG | Mineral Oil | Lubricating Oil | Mineral Oil – Marine Sediment | Lube Oil – Marine Sediment | Site Matrix – NTC SFS Sediment |
| 5X MDL | C19-C36 | mg/kg | 200 | 119 | 91.1 | 635 | 635 | 1,245 |
| 10X MDL | C19-C36 | mg/kg | 200 | 238 | 182 | 1,270 | 1,270 | 2,490 |

In light of the MADEP EPH methodological and data quality issues discussed above, adopting updated MDLs and developing technically defensible PQLs will provide a more robust and reliable framework to evaluate C19-C36 data and determine if the MADEP EPH methodology, and the data underlying the development of C19-C36 risk-based PRGs, are reliable for decision making purposes at the NTC SFS.

**ExxonMobil encourages EPA to consider undertaking its own MDL verification study using NTC sediment spiked with reference oil standards to verify the precision and accuracy of the MADEP EPH method and to set project-specific MDLs and PQLs accordingly.** The EPA can then determine the appropriate PRG and subsequent RG based on its own protocol regarding RGs and PQLs.

## SUMMARY AND RECOMMENDATIONS

The current approach to evaluating C19-C36 across the site would benefit from further refinement to ensure the data generated is sufficiently reliable for the development of valid PRGs. C19-C36 has not been previously identified as a contaminant at CERCLA sites, and there are also key questions about the scientific justification for its toxicity. Key observations identified include:

- The PRG for C19-C36 was developed outside of the BERA. This work has not been formally documented in the administrative record for the NTC SFS aside from a PowerPoint presentation intended to facilitate discussion between the EPA and NCG that was included as an attachment in the report *Development of Risk-Based Preliminary Remediation Goals* (Anchor QEA, 2021). This gap in documentation compromises transparency in EPA's technical process and rationale for determining a C19-C36 PRG.
- Data from oil field drilling fluid studies on the toxicity of aliphatic hydrocarbons to *Leptocheirus* indicated that the EPA's toxicity threshold of 200 mg/kg for C19-C36 was likely at least an order of magnitude too low. ExxonMobil's 2024 toxicity study corroborated this finding: the LC50 of a light molecular weight range mineral oil representative of C19-C36 was 3,889 mg/kg in NTC sediment, and the LC50 of the heavier molecular weight range mineral oil used in Stanley et al. (2010) was ≥4,000 mg/kg for *Leptocheirus* in NTC sediment. These results indicate that the current PRG of 200 mg/kg is likely unreliable and should be reevaluated.
- The technical process used by the EPA to develop the C19-C36 PRG diverged from the process used to evaluate benthic toxicity in the EPA-approved BERA, and it lacked the technical rigor required to evaluate a complicated toxicological environment like NTC.
- ExxonMobil's Phase III MDL verification study and RI/FS data quality issues indicate the MADEP EPH method does not reliably measure C19-C36 concentrations near the PRG. A full sediment validation study should be performed to ensure this method is suitable for future sediment analysis and that the participating NTC laboratories can demonstrate that reported results are sufficiently accurate, precise, and sensitive. This will become increasingly important as the East Branch PDI and post-remedy monitoring plans are developed.

**ExxonMobil respectfully requests that the EPA reevaluate the C19-C36 PRG before finalizing the RG as it finalizes the remedy selection for East Branch.** A thorough assessment of the issues presented in this technical memorandum is vital to ensure that remedial actions are grounded in sound science and accurately reflect the ecological risks posed by contaminants in NTC sediments.

ExxonMobil is open to discussing its C19-C36 toxicity and Phase III MDL verification studies and how updating the PRG may impact remedial decision making in East Branch and across OU-1. However, at this moment, we are not of the opinion that updating the C19-C36 MDL should alter the selected remedy for East Branch. Nevertheless, it will be important that the Pre-Design Investigation and Post-Remedy Monitoring efforts consider updated laboratory methodology to ensure improved C19-C36 data usability moving forward.

Thank you for your consideration. If you would like to discuss further, I can be reached at (346) 268-1513 or at daniel.grapski@exxonmobil.com.

Sincerely,

Dan Grapski

Senior Superfund Project Manager

Cc: Stephanie Vaughan, EPA

David Haury, Anchor QEA

David Bridgers, Holland and Knight

## REFERENCES


Anchor QEA, 2014. *Phase 2 Quality Assurance Project Plan – Version No. 3. Worksheet No. 12.* July 2014.

Anchor QEA, 2018. Final Baseline Ecological Risk Assessment, Remedial Investigation/Feasibility Study, Newtown Creek, October 2018.

Anchor QEA, 2020a. Developing Preliminary Remediation Goals (PRGs) for PAHs in Newtown Creek. Presentation to EPA, March 12, 2020.

Anchor QEA, 2020b. Proposed Revised Interim PRGs for PAHs. Presentation to EPA, October 15th, 2020.

Anchor QEA, 2021. Development of Risk-Based Preliminary Remediation Goals, December 2021.

Anchor QEA, 2023. *Remedial Investigation Report*. Remedial Investigation/Feasibility Study, Newtown Creek. March 2023.

ASTM International, 2013. *ASTM D7363-13a, Standard Test Method for Determination of Parent and Alkyl Polycyclic Aromatics in Sediment Pore Water Using Solid-Phase Microextraction and Gas Chromatography/Mass Spectrometry in Selected Ion Monitoring Mode*. West Conshohocken, PA.

ASTM International, 2024. *ASTM E3163-24, Standard Guide for Contaminated Sediment Site Risk-Based Corrective Action—Selection and Application of Analytical Methods and Test Procedures*. West Conshohocken, PA.

CCME, 2001. *Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil – Tier 1. Appendix 3 – Method Detection Limits*.

MADEP, 1994. *Interim Final Petroleum Report: Development of Health-Based Alternative to the Total Petroleum Hydrocarbon (TPH) Parameter*. August 1994.

MADEP, 2019. *Method for the Determination of Extractable Petroleum Hydrocarbons (EPH)*, Massachusetts Department of Environmental Protection, Revision 2.1. 2019.

EPA, 2003. *Method 8015D: Nonhalogenated Organics Using GC/FID.* Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846.

EPA, 2008. Flexible Approaches to Environmental Measurement – The Evolution of the Performance Approach.

EPA, 2020. *National Functional Guidelines for Organic Superfund Methods Data Review*. OLEM 9240.0-51. EPA 540-R-20-005, November 2020.

EPA, 2020. Newtown Creek Hydrocarbon Interim Risk-Based PRG Derivation. 707567. Presentation given to the Newtown Creek Group on June 18, 2020.

EPA, 2022. Developing Hydrocarbon Preliminary Remediation Goals (PRGs) Using Passive Sampling, Porewater, and Bulk Sediment. Society of Environmental Toxicology and Chemistry (SETAC). Pittsburgh, PA.

EPA, 2024. Newtown Creek Superfund Site, East Branch Early Action, Proposed Plan. August 28, 2024.

EPA, 2024. Final PFAS National Primary Drinking Water Regulation: Monitoring and Reporting. https://www.epa.gov/system/files/documents/2024-04/pfas-npdwr_fact-sheet_monitoring_4.8.24_0.pdf

Laboratory Data Consultants, Inc. (LDC), 2014. Newtown Creek, Phase 2, Data Validation: Data Validation Report PAH Porewater, LDC Report# 32698A2c.

Parkerton, T.F., Letinski, D.J., Febbo, E.J., Butler, J.D., Sutherland, C.A., Bragin, G.E., Hedgpeth, B.M., Kelley, B.A., Redman, A.D., Mayer, P. and Camenzuli, L., 2021. Assessing toxicity of hydrophobic aliphatic and monoaromatic hydrocarbons at the solubility limit using novel dosing methods. *Chemosphere*, *265*, p.129174.

Stanley, Jacob K., Alan J. Kennedy, J. Daniel Farrar, David R. Mount, and Jeffery A. Steevens. "Evaluation of Reduced Sediment Volume Procedures for Acute Toxicity Tests Using the Estuarine Amphipod *Leptocheirus plumulosus*." *Environmental Toxicology and Chemistry*, vol. 29, no. 12, 2010, pp. 2769–76.

US FEDERAL REGISTER, 1985; "*40 CFR Parts 141 and 142. National Primary Drinking Water Regulations – Volatile Synthetic Organic Chemicals, Proposed Rulemaking*"; United States Federal Register, Volume 50, Number 219, Pages 46904-46909; Wednesday November 13, 1985. 46867-46923.pdf (federalregister.gov)

US FEDERAL REGISTER, 1987; "*40 CFR Parts 141 and 142. National Primary Drinking Water Regulations - Synthetic Organic Chemicals, Monitoring for Unregulated Contaminants, Final Rule*"; United States Federal Register, Volume 52, Number 130, Pages 25699-25700; Wednesday July 8, 1987. 25685-25734.pdf (federalregister.gov)

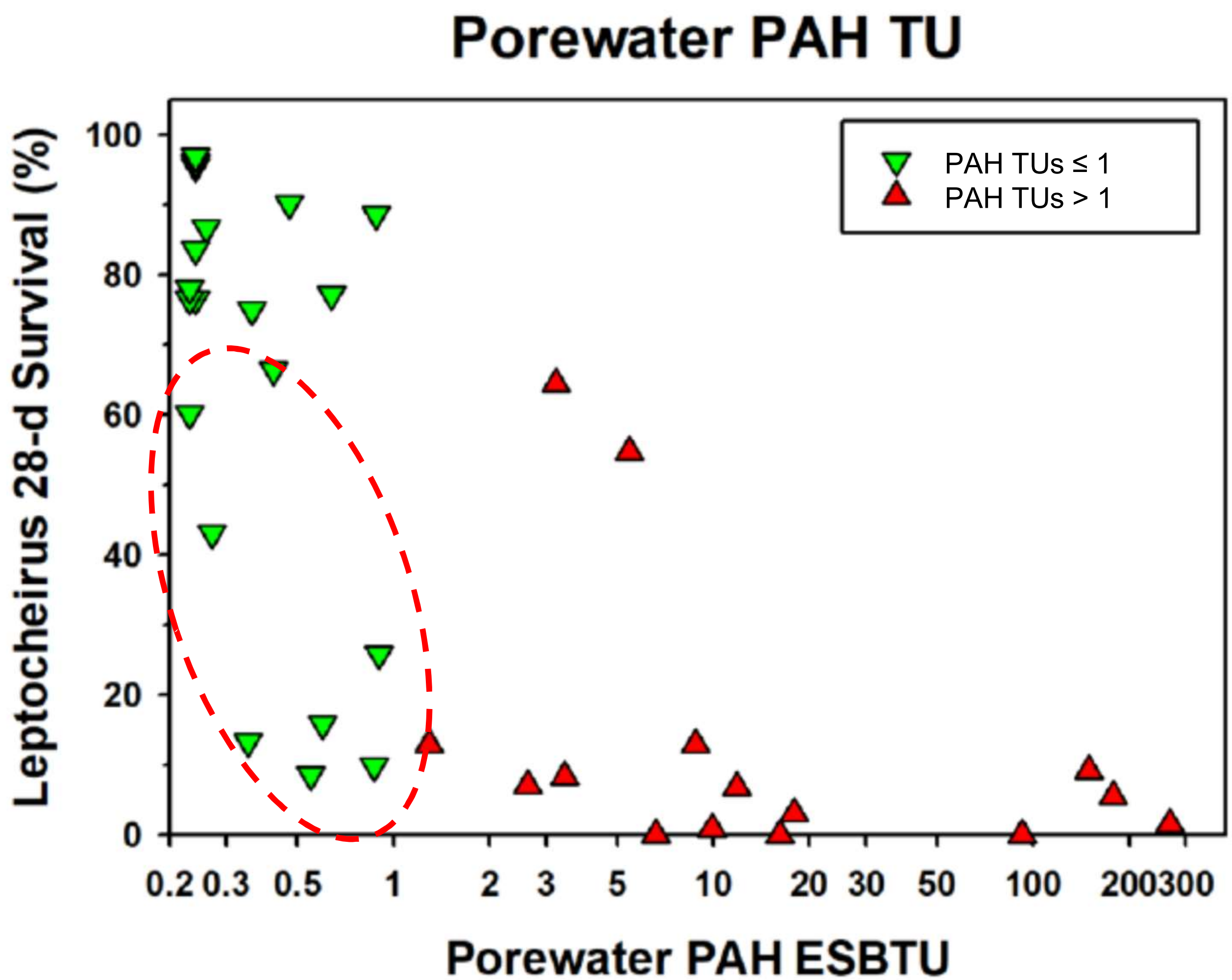
US Federal Register, 2009. 74 FR 36198. *Flexible Approaches to Environmental Measurement-The Evolution of the Performance Approach.* Pages 36198-36200. [EPA–HQ–ORD; FRL–8930–3]. https://www.gpo.gov/fdsys/pkg/FR-2009-07-22/pdf/E9-17402.pdf

US Federal Register, 2017. *"40 CFR, Title 40. Appendix B to Part 136. Clean Water Act Methods Update Rule for the Analysis of Effluent, Final Rule. Definition and Procedure for the Determination of the Method Detection Limit - Revision 2*." United States Federal Register, Volume 82, Number 165, Pages 40939-40941; Monday August 28, 2017. https://www.govinfo.gov/content/pkg/FR-2017-08-28/pdf/2017-17271.pdf

US Federal Register 2024. 40 CFR, Parts 141 and 142. "*PFAS National Primary Drinking Water Regulation"* United States Federal Register, Volume 89, Number 82. Page 32573. https://www.govinfo.gov/content/pkg/FR-2024-04-26/pdf/2024-07773.pdf

US Federal Register, 2024. *40 CFR, Part 302.4, Table 302.4*. "Designation of Hazardous substances and reportable quantities." Pages 281-326. https://www.govinfo.gov/content/pkg/CFR-2004-title40-vol26/pdf/CFR-2004-title40-vol26-sec302-4.pdf

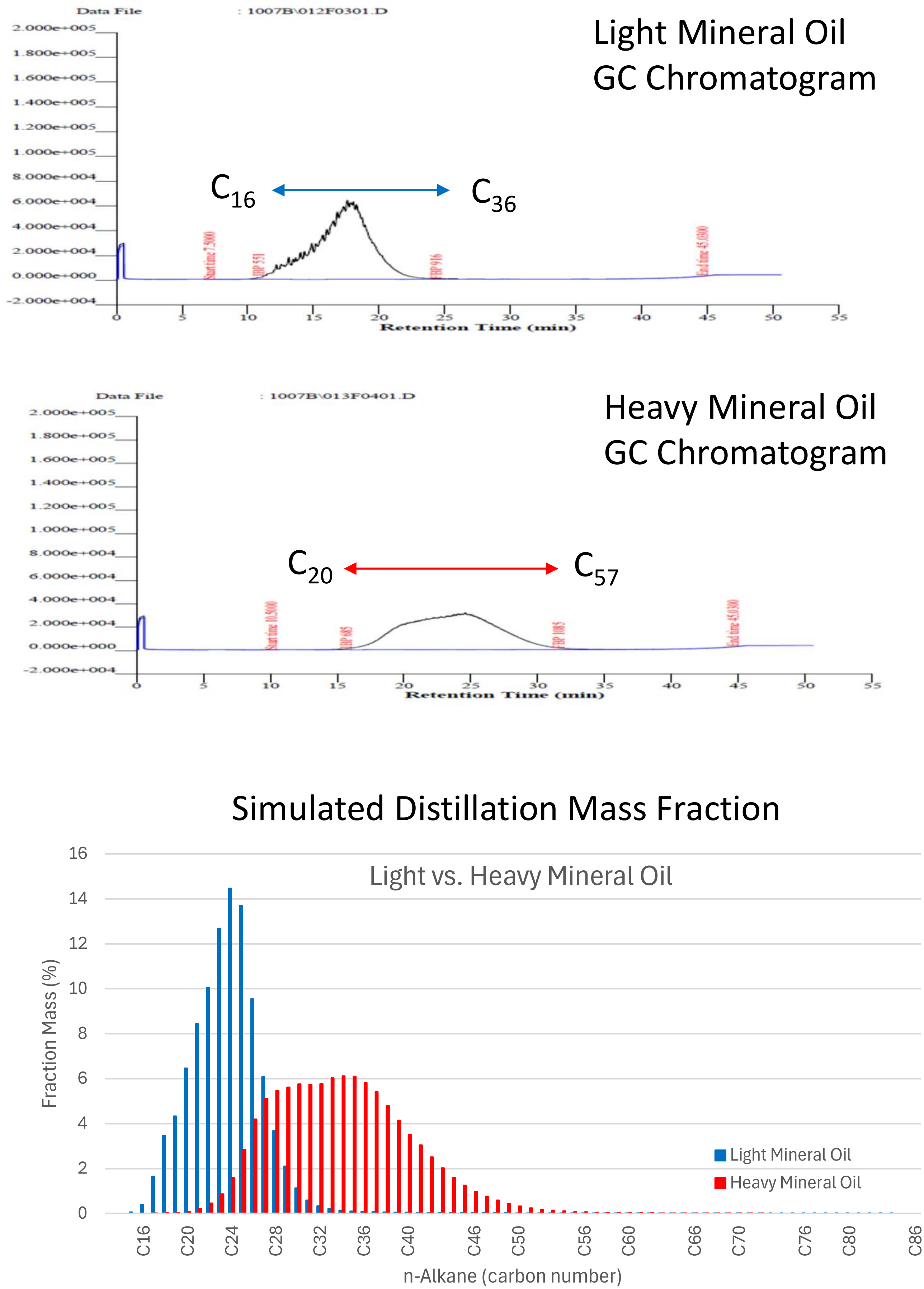
# Figure 1. Porewater PAH Toxicity Units (TU) vs. 28-Day Survival (%) (Figure: EPA, 2020)



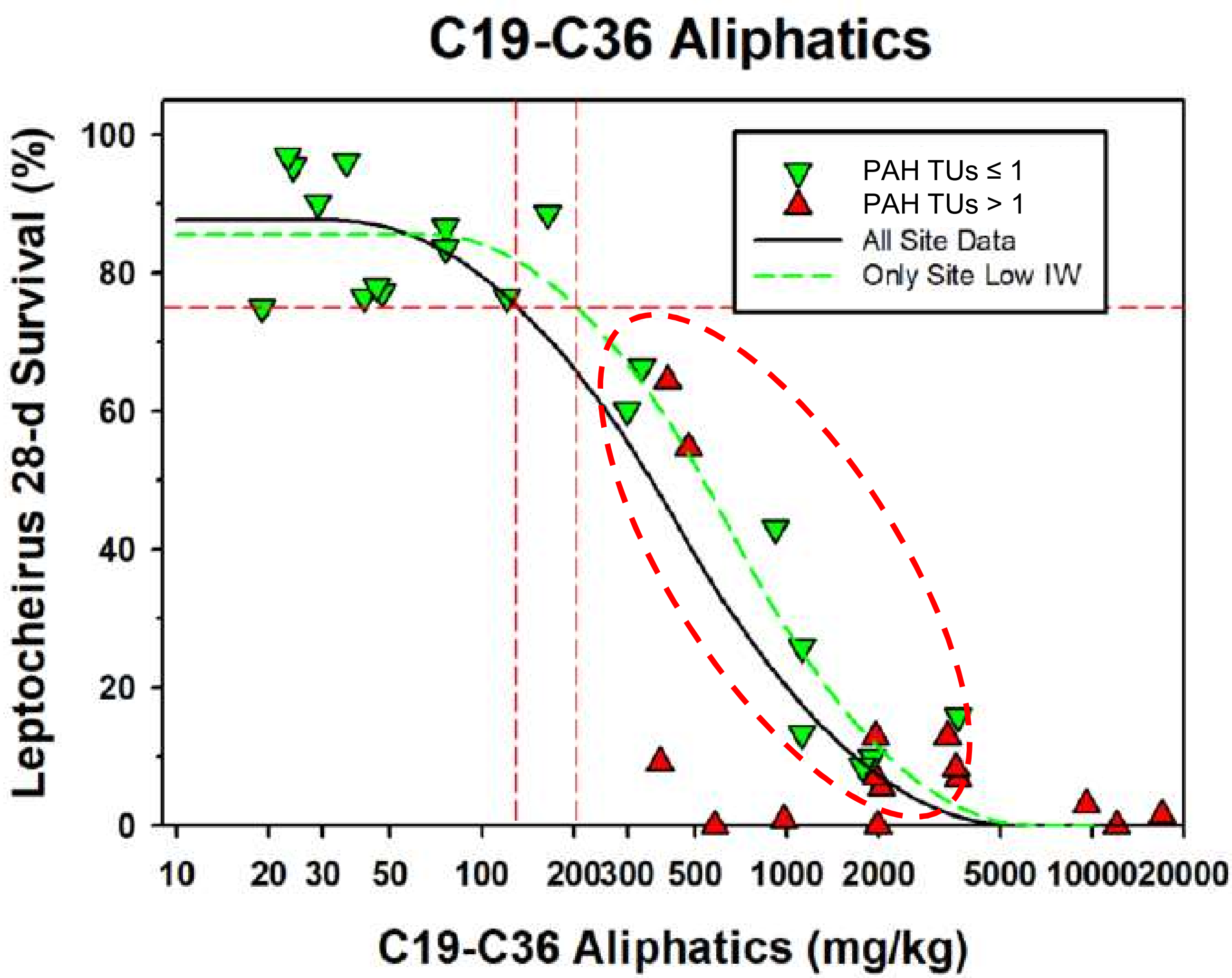

8 BERA Samples with PAH TUs ≤ 1.0 and 28-Day Survival < 75%

# Figure 2. Mineral Oil Chromatograms and Mass Fractions

## ASTM D7169 High Temperature Simulated Distillation

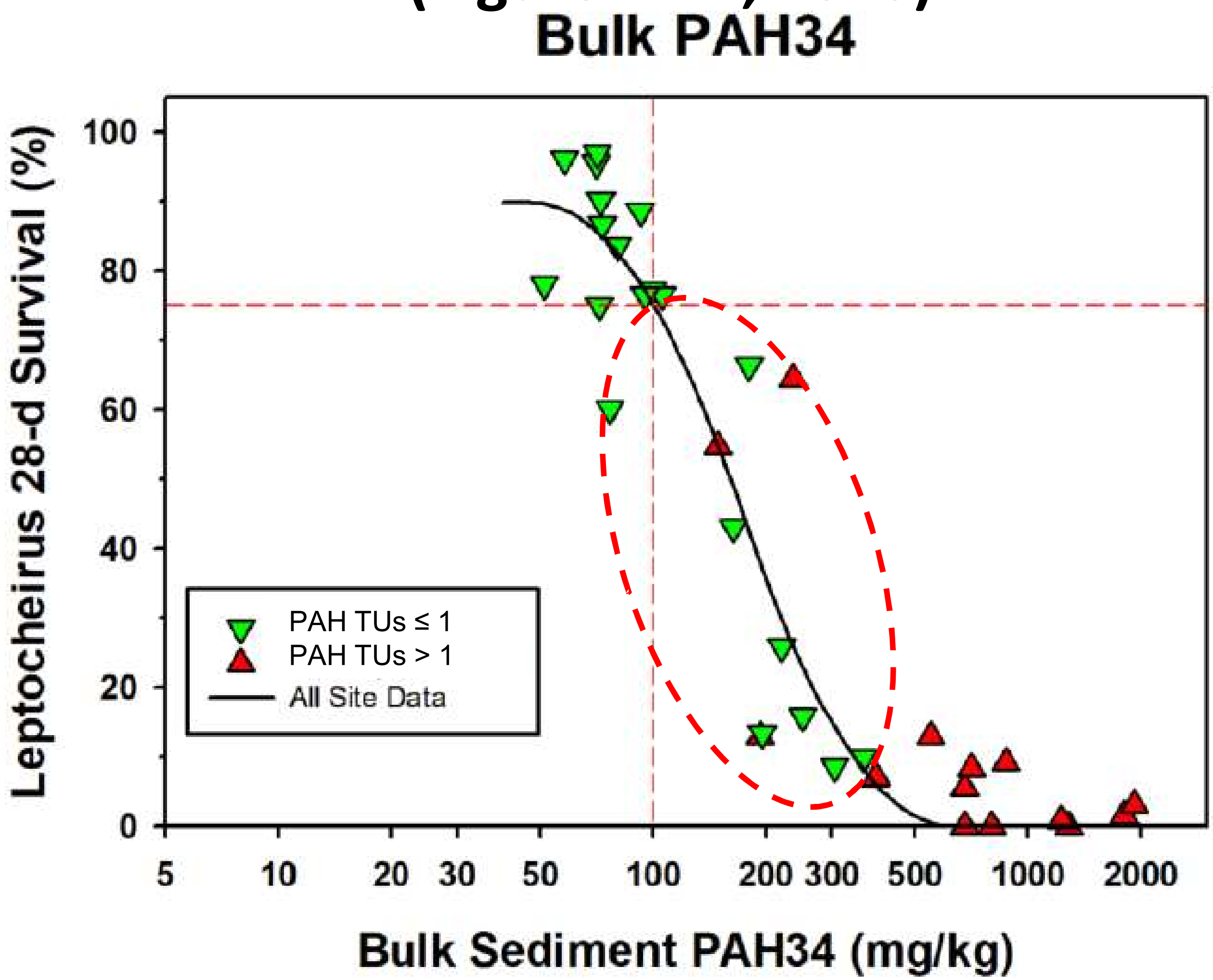


# Figure 3. C19-C36 Aliphatic Risk-Based PRG Dose Response Curve (Figure: EPA, 2020)




Bulk sediment samples associated with the 8 Porewater Samples with PAH TUs <= 1.0 and 28-Day Survival < 75%

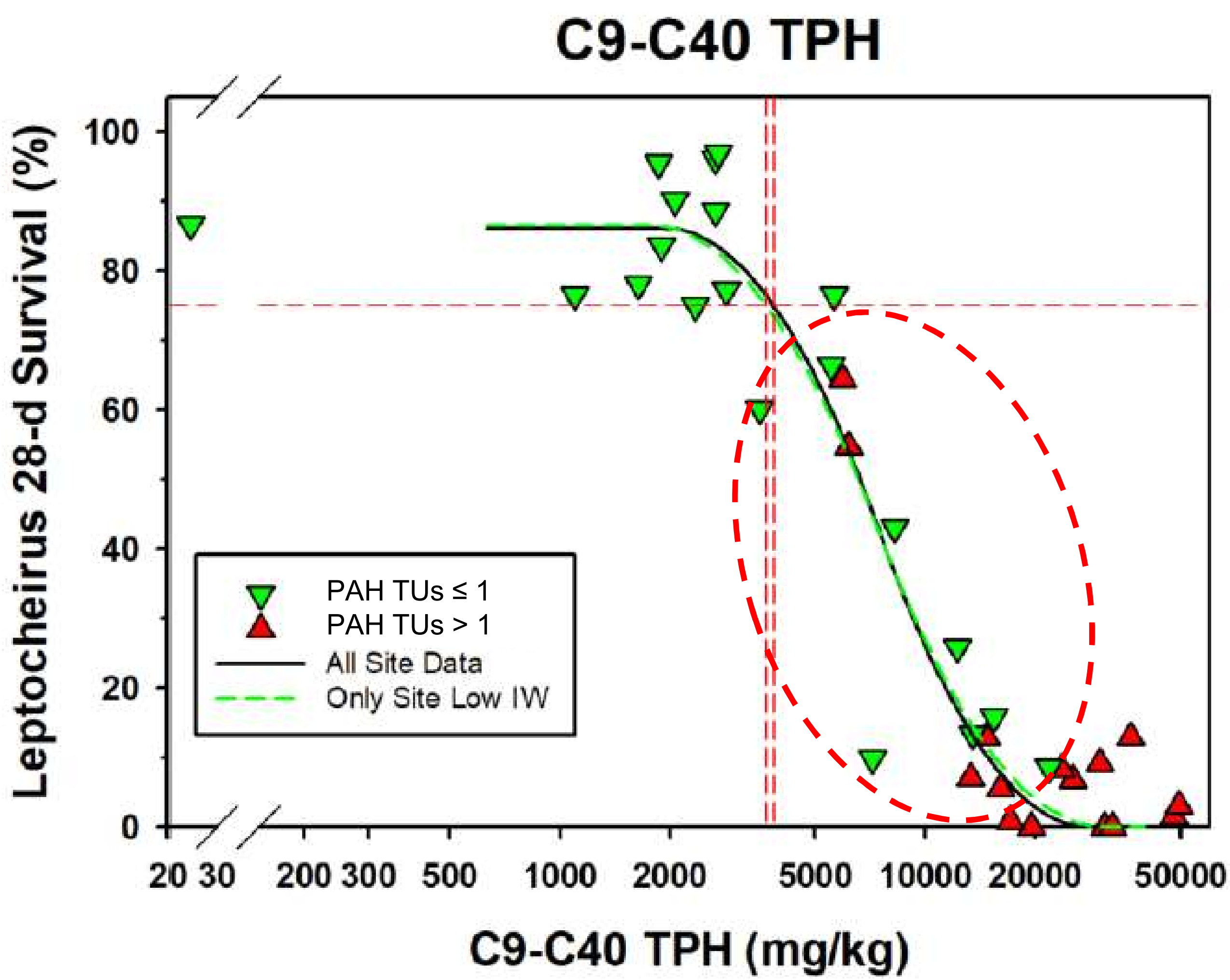
# Figure 4. TPAH34 Risk-Based PRG Dose Response Curve (Figure: EPA, 2020)




Bulk sediment samples associated with the 8 Porewater Samples with PAH TUs <= 1.0 and 28-Day Survival < 75%

Note: The TPAH34 dose-response curve demonstrates a clear relationship between TPAH34 bulk sediment concentrations and toxicity, with no indication of alternative toxic hydrocarbon sources like C19-C36. The porewater PAH TU color coding complicates the clear dose response relationship between TPAH34 and % survival. It is suspected that the porewater results for the eight samples in question (green triangles < 75% survival) underrepresent PAH porewater toxicity and are not reliable for this type of toxicity assessment (e.g. 7 of the 8 samples > PRG of 100 mg/kg TPAH34).

# Figure 5. C9-C40 TPH Risk-Based PRG Dose Response Curve (Figure: EPA, 2020)




Bulk sediment samples associated with the 8 Porewater Samples with PAH TUs <= 1.0 and 28-Day Survival < 75%

# APPENDIX A

# Sediment Toxicity Testing Report

prepared for
**Newfields Environmental**
Eric Litman, M.S., Senior Consultant and
Tom Parkerton, Ph.D., Environmental Consultant

*Leptocheirus plumulosus* ACUTE, STATIC 10-DAY SEDIMENT TOXICITY TEST
Method for Conducting a Sediment Toxicity Test with *Leptocheirus plumulosus* and Non-aqueous Drilling Fluids or Synthetic-based drilling muds: Test Method 1644, EPA 821-R-11-004 (1995)

| EE USA Sample # | Sample Identification | Natural Sediment |
|---|---|---|
| L-6470-24 | 330760-1L Mineral Oil (Heavy) | The Rigolets, LA, NS006. Water content = 53.9%. Appendix H. |
| L-6472-24 | | Newtown Creek, NY, NC-010, L-6432-24. Water content = 60.5%. Appendix C. |

Report Date: October 23, 2024

by
**ENVIRONMENTAL ENTERPRISES USA, INC.**
58485 PEARL ACRES ROAD, SUITE D
SLIDELL, LOUISIANA 70461
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(800) 966-2788

*This report contains five pages plus twelve appendices, A – L. This report must not be reproduced in part, only in whole. The results and conclusions presented in this report apply only to the sample(s) tested. All results should be considered valid unless otherwise noted in the report.*

Beau Peré
Drilling Fluids Lab Technician II
DATE: 10 25 24

Michele Ellis
QA/QC Supervisor
DATE: 10/25/24

David Daniel
EE USA President
DATE: 10/25/24

## EXCEUTIVE SUMMARY

*L. plumulosus* were tested in two natural sediments (Newton Creek, NY, TOC = 3.56% dry wt.; and The Rigolets, LA, which connects Lake Pontchartrain to Lake Borgne, TOC = 1.91% dry wt.) spiked with light mineral oil (CAS-No: 8042-47-5). Nominal concentrations were 250, 500, 1000, 2000, & 4000 mg/kg dry wt. and a negative control. Concentrations were selected based on results of range-finding tests which indicated a nominal LC50 > 972 mg/kg dry wt. Results indicated the 10-day LC50 was > 4000 mg/kg dry wt. in both natural sediments. The 10-day EC25 for growth was 1951 mg/kg dry wt. in Rigolets sediment and 1698 mg/kg dry wt. in Newtown Creek sediment.

## TEST OVERVIEW

Two 10-day natural sediment toxicity tests were initiated September 27, 2024, and complated October 07, 2024, at Environmental Enterprises USA, Inc. (EE USA). The sample, 330760-1L Mineral Oil (Heavy),was supplied by Newfields Environmental (Appendix D). Test L-6470-24 used Rigolets natural sediment, NS006, supplied by EE USA (Appendix I). Test L-6472-24 used Newtown Creek natural sediment, NC-010, supplied by Newfields Environmental (Appendix E). Each sediment was sieved through a 250-um sieve. *L. plumulosus* were cultured at EE USA. Synthetic seawater at 20 ppt salinity was used as the overlying water for each replicate of each treatment. This document presents methods, materials, and results of these tests.

## MATERIALS AND METHODS

*L. plumulosus* amphipods were cultured and maintained in Rigolets natural sediment at 20±1 parts per thousand (ppt) salinity and 23±2°C. Synthetic seawater for use with cultures and tests was prepared with hw-MARINEMIX + Bio-Elements and Crystal Sea Marinemix Bioassay Laboratory Formula sea salts (80:20) and deionized water and adjusted to 20 ppt salinity. *L. plumulosus* were acclimated to 20±1°C prior to test initiation. *L. plumulosus* cultures were fed a mixture of TetraMin, Wheat Grass, Alfalfa, and Neo-Novum (48:24:24:4) three times per week. *L. plumulosus* test organisms were randomly selected from a group that passed through a 1000-um sieve but were retained on a 710-um sieve and were 3.3 to 3.7 mm when these tests were initiated. Test organisms were not fed after these tests were initiated.

Sensitivity of test organisms to a known toxicant was determined by performing an acute Standard Reference Toxicant (SRT) test, LS-039-24, with potassium chloride (Fisher Chemical, Lot 234903). The SRT test was initiated on September 27, 2024. Appendix K contains the *L. plumulosus* SRT control charts.

96-hour LC50: 1,296 mg/L with a 95% confidence interval of 1,268 to 1,326 mg/L.

Wet-to-dry ratio, sediment density, and calculations for preparing each treatment of test L-6472-24 with Mineral Oil (Heavy) in NC010 natural sediment are presented in Appendix C. For test L-6470-24 in NS006 natural sediment, these data are presented in Appendix H. Six treatments were prepared with each natural sediment, five 330760-1L Mineral Oil (Heavy) concentrations and a negative control. Test concentrations were 250, 500, 1000, 2000, and 4000 mg 330760-1L Mineral Oil (Heavy) per kg of dry natural sediment. Six hundred milliliters of each NC010 natural sediment treatment and 925 ml of each NS006 natural sediment treatment were prepared and mixed for ten minutes with a KitchenAid Model KHM6 or similar hand-held mixer. Test chambers were 1-L glass jars. Three replicates were prepared for each NC010 natural sediment treatment and five replicates were prepared for each NS006 natural sediment treatment. Every replicate in both tests had approximately 150 ml or 2 cm of natural sediment and 800 ml 20 ppt salinity overlying synthetic seawater. These tests were preceded by 10-day range-finding tests (Appendix L). One additional replicate of each negative control or Laboratory Performance Control (LPC) without organisms was prepared for overlying water quality data and sediment pore water ammonia measurements on Day -1, the day before adding the test organisms. The pore water was obtained through centrifugation. Results indicated acceptable water quality (see summary below).

| Initial LPC Pore Water Measurements: Day -1 | | | | | |
|---|---|---|---|---|---|
| **EEUSA Sample #:** | **Test Concentration** | **Salinity, ppt** | **pH, su** | **Dissolved Oxygen, mg/L** | **Total Ammonia, ppm** |
| L-6470-24<br>NS006 with Heavy Mineral Oil | 0 mg/kg (LPC) | 19.7 | 7.4 | 7.6 | 2.0 |
| L-6472-24<br>NC010 with Heavy Mineral Oil | 0 mg/kg (LPC) | 20.1 | 7.7 | 7.9 | 1.0 |

Sediment characterization data for Rigolets natural sediment, NS006, are presented below (Appendix J).

| Bulk Sediment Data | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sediment Batch #** | **Gravel, %** | **Sand, %** | **Silt, %** | **Clay, %** | **Total Volatile Solids, %** | **Total Organic Carbon, %** | **Total Organic Matter, %** |
| NS006 | 0.0 | 19.8 | 46.6 | 33.6 | 6.21 | 2.00 | 6.50 |

Total Organic Carbon data for each sediment are noted below.

| Sediment Batch # | Total Organic Carbon, % |
|---|---|
| NS006 | 1.91 |
| NC010 | 3.56 |
| Alpha Analytical Mansfield Lab | |

All treatments were prepared and dispensed 18 to 24 hours before adding test organisms to each replicate. Treatments were kept in a dedicated environmental chamber with 14 hours light and 10 hours dark at 20±1°C. At 24-hour intervals, temperature, dissolved oxygen, pH, and salinity were measured in each treatment. After 10 days, all three replicates of each treatment of each test were terminated, and the number of surviving organisms recorded. On Day 2 and Day 8, total ammonia was measured in the LPC (Appendix A). This test was aerated at a rate between 50 – 140 mL/min.

Initial 0-hr and 10-day dry weights and 0-hr lengths of representative test organisms for with Mineral Oil (Heavy) in NC010 natural sediment, L-6472-24 are presented in Appendix A. Initial 0-hr and 10-day dry weights and 0-hr lengths of representative test organisms for with Mineral Oil (Heavy) in NS006 natural sediment, L-6470-24, are presented in Appendix F. The 10-day weight data are from surviving organisms.

## RESULTS

L-6472-24: LPC and five spiked sediment treatments, 250, 500, 1000, 2000, and 4000 mg 330760-1L Mineral Oil (Heavy) per kg of dry Newtown Creek natural sediment, NC-010 (Appendix B).

| 10-Day Survival, mg/kg dry wt. | | Mean Dry Weight, mg/kg dry wt. | |
|---|---|---|---|
| **NOEC** | **LOEC** | **NOEC** | **LOEC** |
| 4,000 | >4,000 | 1,000 | 2,000 |
| **LC25** | **LC50** | **EC25** | **EC50** |
| >4,000 | >4,000 | 1,698 | >4,000 |
| LPC Survival: 88.3% | | | |

NOEC: No Observed Effect Concentration.
LOEC: Lowest Observed Effect Concentration.
EC25: Concentration causing 25% reduction in growth as compared to the LPC.

L-6470-24: LPC and five spiked sediment treatments, 250, 500, 1000, 2000, and 4000 mg 330760-1L Mineral Oil (Heavy) per kg of dry Rigolets natural sediment, NS006 (Appendix H).

| 10-Day Survival, mg/kg | | Mean Dry Weight, mg/kg | |
|---|---|---|---|
| **NOEC** | **LOEC** | **NOEC** | **LOEC** |
| 4,000 | >4,000 | 1,000 | 2,000 |
| **LC25** | **LC50** | **EC25** | **EC50** |
| >4,000 | >4,000 | 1,951 | >4,000 |
| LPC Survival: 98% | | | |

## REFERENCES

ASTM, 1999. Standard Guide for Conducting 10-day Static Sediment Toxicity Tests with Marine and Estuarine Amphipods. E 1367-99.

Environmental Enterprises USA, Standard Operating Procedures, February 2022. (or most recent version).

Environmental Enterprises USA, Quality Assurance Plan, January 2021. (or most recent version).

NELAC Institute. TNI Standard, Environmental Laboratory Sector, adopted September 8, 2009. Management and Technical Requirements for Laboratories Performing Environmental Analysis. Volume 1. EL-V1-2009-ISO. Weatherford, TX 76086.

Tidepool Scientific Software. 2018. CETIS™ Comprehensive Environmental Toxicity Information System. Version 2.1.4.3. Tidepool Scientific, LLC, McKinleyville, CA 95519 (or most recent version).

U. S. Environmental Protection Agency, March 1983. Methods for Chemical Analysis of Water and Wastes, EPA 600-4-79-020. Office of Research and Development. Washington, DC 20460.

U.S. Environmental Protection Agency, 1994. Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods. EPA/600/R-94/025, Section 11. U.S. EPA Office of Research and Development. Washington, DC 20460.

U.S. Environmental Protection Agency. June 2000. Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the National Pollutant Discharge Elimination System Program. EPA 833-R-00-003. Office of Wastewater Management (423). Washington, DC 20460.

U.S. Environmental Protection Agency. July 2000. Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136). EPA 821-B-00-004. Office of Water (4303). Washington, DC 20460.

U.S. Environmental Protection Agency, December 2011. Analytic Methods for the Oil and Gas Extraction Point Source Category. EPA-821-R-11-004, Method 1644.U.S. EPA Office of Research and Development. Washington, DC 20460.

U.S. Environmental Protection Agency Region VI, Effective: May 11, 2023. Final NPDES General Permit for New and Existing Sources and New Dischargers in the Offshore Subcategory of the Oil and Gas Extraction Category for the Western Portion of the Outer Continental Shelf of the Gulf of Mexico (GMG290000). FR Volume 88, No. 106: 36316, June 2, 2023.

Environmental Enterprises USA, Inc.

# APPENDIX A

# Newfields Environmental
## Heavy Oil in NC010
## EE USA Lab #: L-6472-24 (L-6272-24)

*Leptocheirus plumulosus* Acute, Static 10-Day Sediment Toxicity Test.
EPA Test Method 1644

Test Concentrations Prepared 9/26/24 Sediment Batch #L-6432-24

Dilution Water Batch #: 20-079-24 Organism Batch #: Lp-153-24

Organisms Counted by: JL, CH Organisms QC/QA by: BCP

Aeration Rate: 80 ml/min. Feeding: This test was not fed.

Dilution Water:
Salinity: 20.0 Meter ID 1Q Temperature: 20.4 Meter ID 7H

**Initial $H_2O$ quality parameters for dilution water only: Salinity: 20ppt +/-1ppt; Temp.: 20°C +/-1°C**
Salinity (EPA Method 120.1): ppt Thermometric (EPA Method 180.1): °C

**Survival Data (*Leptocheirus plumulosus*)**

**Treatment, mg/kg**

| Time | REP | 0 LPC | REP | 250 | REP | 500 | REP | 1000 | REP | 2000 | REP | 4000 | Initials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 HR | A | 20 | A | 20 | A | 20 | A | 20 | A | 20 | A | 20 | 9/27/24 |
| | B | 20 | B | 20 | B | 20 | B | 20 | B | 20 | B | 20 | |
| | C | 20 | C | 20 | C | 20 | C | 20 | C | 20 | C | 20 | |
| 1132 | | | | | | | | | | | | | BCP |
| 10 Day | A | 17 | A | 19 | A | 18 | A | 14 | A | 17 | A | 14 | 10/07/24 |
| | B | 17 | B | 19 | B | 19 | B | 15 | B | 15 | B | 15 | |
| | C | 19 | C | 16 | C | 15 | C | 13 | C | 15 | C | 17 | |
| 1100 | | | | | | | | | | | | | JTL |

10-Day LC50 >4000 mg/kg, 95% CI N/A to N/A mg/kg,

Statistical Method Summary Statistics

Prep by: BCP
QA/QC by: CH

Data Analysis by: BCP
Raw Data QA/QC by: BCP

**_L. plumulosus_ Water Quality Data**

**Initial $H_2O$ quality parameters for dilution water only: Salinity: 20ppt +/-1ppt; Temp.: 20°C +/-1°C**

Salinity (EPA Method 120.1): ppt Thermometric (EPA Method 180.1): °C

| Day -1 | LPC Pore Water Measurements | |
|---|---|---|
| 9/26/24 | 0A | Meter # |
| Salinity | 20.1 | 1Q |
| Temp | 19.5 | 7H |
| pH | 7.7 | 7H |
| DO | 7.9 | 1L |
| Ammonia | 1.00 | Initials CH |
| Initials | bw | |
| Time | 1415 | |

| Day 0 | Control Overlying Water Measurements — **0 mg/kg** | | | |
|---|---|---|---|---|
| 09/27/24 | 0A | 0B | 0C | Meter # |
| Salinity | 32.7 | 32.7 | 32.6 | 1Q |
| Temp | 20.0 | 19.8 | 19.8 | 7H |
| pH | 7.7 | 7.7 | 7.7 | 7H |
| DO | 7.9 | 7.8 | 7.8 | 1L |
| Initials | bw | | | |
| Time | 1018 | | | |

| Day 0 | Overlying Water Measurements – **250 mg/kg** | | | |
|---|---|---|---|---|
| 09/27/24 | 250A | 250B | 250C | Meter # |
| Salinity | 32.7 | 32.6 | 32.7 | 1Q |
| Temp | 20.0 | 19.8 | 19.9 | 7H |
| pH | 7.7 | 7.7 | 7.7 | 7H |
| DO | 8.0 | 7.9 | 7.9 | 1L |
| Initials | bw | | | |
| Time | 1021 | | | |

Comments: ______

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

## *L. plumulosus* Water Quality Data Cont.

| Day 0 | Overlying Water Measurements — **500 mg/kg** | | | |
|---|---|---|---|---|
| 09/27/24 | 500A | 500B | 500C | Meter # |
| Salinity | 32.8 | 32.6 | 32.6 | 1Q |
| Temp | 20.0 | 20.0 | 20.0 | 7H |
| pH | 7.7 | 7.7 | 7.7 | 7H |
| DO | 8.0 | 7.9 | 7.9 | 1L |
| Initials | bw | | | |
| Time | 1024 | | | |

| Day 0 | Overlying Water Measurements — **1000 mg/kg** | | | |
|---|---|---|---|---|
| 09/27/24 | 1000A | 1000B | 1000C | Meter # |
| Salinity | 32.7 | 32.6 | 32.6 | 1Q |
| Temp | 20.1 | 19.9 | 19.9 | 7H |
| pH | 7.7 | 7.7 | 7.7 | 7H |
| DO | 7.9 | 7.8 | 7.9 | 1L |
| Initials | bw | | | |
| Time | ~~bw~~ 1028 | | | |

① err 092724 bw

| Day 0 | Overlying Water Measurements — **2000 mg/kg** | | | |
|---|---|---|---|---|
| 09/27/24 | 2000A | 2000B | 2000C | Meter # |
| Salinity | 32.7 | 32.6 | 32.6 | 1Q |
| Temp | 20.1 | 19.9 | 20.0 | 7H |
| pH | 7.7 | 7.7 | 7.7 | 7H |
| DO | 7.9 | 7.9 | 7.9 | 1L |
| Initials | bw | | | |
| Time | 1032 | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

## *L. plumulosus* Water Quality Data Cont.

| Day 0 | Overlying Water Measurements — **4000 mg/kg** | | | |
|---|---|---|---|---|
| 09/27/24 | 4000A | 4000B | 4000C | Meter # |
| Salinity | 32.7 | 32.6 | 32.6 | 1Q |
| Temp | 20.2 | 20.0 | 20.0 | 7H |
| pH | 7.7 | 7.7 | 7.7 | 7H |
| DO | 8.0 | 8.0 | 8.0 | 1L |
| Initials | Lm | | | |
| Time | 1024 | | | |

| Day 1 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 09/28/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 20.3 | 20.4 | 20.4 | 20.4 | 20.4 | 20.3 | 1Q |
| Temp | 20.1 | 20.2 | 20.2 | 20.2 | 20.2 | 20.2 | 7H |
| pH | 7.7 | 7.7 | 7.8 | 7.7 | 7.7 | 7.7 | 7H |
| DO | 7.8 | 7.8 | 7.8 | 7.7 | 7.7 | 7.7 | 1L |
| Initials | STL | | | | | | |
| Time | 0808 | | | | | | |

| Day 2 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 09/29/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 20.4 | 20.4 | 20.5 | 20.4 | 20.4 | 20.4 | 1Q |
| Temp | 20.2 | 20.3 | 20.3 | 20.3 | 20.3 | 20.3 | 7H |
| pH | 7.7 | 7.8 | 7.7 | 7.8 | 7.8 | 7.8 | 7H |
| DO | 7.8 | 7.9 | 7.9 | 7.9 | 7.9 | 7.9 | 1L |
| Ammonia | >20 | //////// | //////// | //////// | //////// | //////// | Initials STL |
| Initials | STL | | | | | | |
| Time | 0819 | | | | | | |

Comments: ______________________________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**

| Day 3 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 09/30/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 20.5 | 20.5 | 20.5 | 20.5 | 20.5 | 20.5 | 1Q |
| Temp | 20.1 | 20.1 | 20.2 | 20.2 | 20.2 | 20.3 | 7H |
| pH | 7.6 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7H |
| DO | 7.6 | 7.9 | 7.9 | 7.9 | 7.9 | 7.9 | 1L |
| Initials | STL | | | | | | |
| Time | 0912 | | | | | | |

| Day 4 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/01/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 20.5 | 20.5 | 20.6 | 20.5 | 20.5 | 20.5 | 1Q |
| Temp | 19.8 | 19.8 | 19.9 | 19.9 | 19.9 | 19.9 | 7H |
| pH | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7H |
| DO | 7.9 | 8.0 | 8.1 | 8.0 | 8.0 | 8.1 | 1L |
| Initials | GW | | | | | | |
| Time | 0858 | | | | | | |

| Day 5 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/02/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 20.5 | 20.5 | 20.6 | 20.6 | 20.6 | 20.6 | 1Q |
| Temp | 20.1 | 20.0 | 20.0 | 20.1 | 20.1 | 20.1 | 7H |
| pH | 7.8 | 7.8 | 7.9 | 7.9 | 7.9 | 7.9 | 7H |
| DO | 7.9 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 1L |
| Initials | GW | | | | | | |
| Time | 0841 | | | | | | |

Comments:

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

***L. plumulosus* Water Quality Data Cont.**

| Day 6 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/03/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 20.6 | 20.6 | 20.7 | 20.6 | 20.6 | 20.6 | 1Q |
| Temp | 20.2 | 20.2 | 20.2 | 20.3 | 20.3 | 20.4 | 7H |
| pH | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7.9 | 7H |
| DO | 8.0 | 8.0 | 7.9 | 8.0 | 8.0 | 8.0 | 1L |
| Initials | STL | | | | | | |
| Time | 0923 | | | | | | |

| Day 7 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/04/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 20.6 | 20.6 | 20.7 | 20.6 | 20.6 | 20.6 | 1Q |
| Temp | 20.0 | 20.0 | 20.1 | 20.1 | 20.1 | 20.1 | 7H |
| pH | 7.8 | 7.9 | 7.9 | 7.9 | 7.9 | 7.9 | 7H |
| DO | 8.0 | 8.1 | 8.0 | 8.0 | 8.0 | 8.1 | 1L |
| Initials | GW | | | | | | |
| Time | 0859 | | | | | | |

| Day 8 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/05/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 20.6 | 20.6 | 20.7 | 20.7 | 20.7 | 20.7 | 1Q |
| Temp | 20.1 | 20.1 | 20.0 | 20.0 | 20.1 | 20.1 | 7H |
| pH | 7.8 | 7.9 | 7.9 | 7.9 | 7.9 | 7.9 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Ammonia | 2.00 | //////// | //////// | //////// | //////// | //////// | Initials |
| Initials | GW | | | | | | |
| Time | 0748 | | | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

## *L. plumulosus* Water Quality Data Cont.

| Day 9 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/06/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 20.8 | 20.6 | 20.8 | 20.7 | 20.7 | 20.7 | 1Q |
| Temp | 20.1 | 20.1 | 20.1 | 20.2 | 20.2 | 20.2 | 7H |
| pH | 7.8 | 7.9 | 7.9 | 7.9 | 7.9 | 7.9 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.1 | 8.0 | 8.0 | 1L |
| Initials | bw | | | | | | |
| Time | 0822 | | | | | | |

**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Control Overlying Water Measurements— **0 mg/kg** | | | |
|---|---|---|---|---|
| 10/07/24 | 0A | 0B | 0C | Meter # |
| Salinity | 20.7 | 20.7 | 20.7 | 1Q |
| Temp | 20.1 | 20.0 | 19.8 | 7H |
| pH | 7.8 | 7.8 | 7.8 | 7H |
| DO | 8.1 | 8.0 | 8.0 | 1L |
| Initials | TAD | | | |
| Time | 0840 | | | |

| Day 10 | Overlying Water Measurements – **250 mg/kg** | | | |
|---|---|---|---|---|
| 10/07/24 | 250A | 250B | 250C | Meter # |
| Salinity | 20.7 | 20.6 | 20.8 | 1Q |
| Temp | 20.2 | 20.0 | 20.0 | 7H |
| pH | 7.9 | 7.9 | 7.9 | 7H |
| DO | 8.1 | 8.0 | 8.0 | 1L |
| Initials | TAD | | | |
| Time | 0842 | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**
**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Overlying Water Measurements — **500 mg/kg** | | | |
|---|---|---|---|---|
| 10/07/24 | 500A | 500B | 500C | Meter # |
| Salinity | 20.8 | 20.7 | 20.7 | 1Q |
| Temp | 20.2 | 20.0 | 20.0 | 7H |
| pH | 7.9 | 7.9 | 7.9 | 7H |
| DO | 8.1 | 8.0 | 8.0 | 1L |
| Initials | TAD | | | |
| Time | 0846 | | | |

| Day 10 | Overlying Water Measurements — **1000 mg/kg** | | | |
|---|---|---|---|---|
| 10/07/24 | 1000A | 1000B | 1000C | Meter # |
| Salinity | 20.7 | 20.7 | 20.7 | 1Q |
| Temp | 20.2 | 20.0 | 20.1 | 7H |
| pH | 7.9 | 7.9 | 7.9 | 7H |
| DO | 8.0 | 8.0 | 8.0 | 1L |
| Initials | TAD | | | |
| Time | 0848 | | | |

| Day 10 | Overlying Water Measurements — **2000 mg/kg** | | | |
|---|---|---|---|---|
| 10/07/24 | 2000A | 2000B | 2000C | Meter # |
| Salinity | 20.8 | 20.6 | 20.7 | 1Q |
| Temp | 20.3 | 20.1 | 20.1 | 7H |
| pH | 7.9 | 7.9 | 7.9 | 7H |
| DO | 8.1 | 8.0 | 8.0 | 1L |
| Initials | TAD | | | |
| Time | 0849 | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**
**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Overlying Water Measurements — **4000 mg/kg** | | | |
|---|---|---|---|---|
| 10/07/24 | 4000A | 4000B | 4000C | Meter # |
| Salinity | 20.7 | 20.7 | 20.7 | 1Q |
| Temp | 20.4 | 20.2 | 20.2 | 7H |
| pH | 7.9 | 7.9 | 7.9 | 7H |
| DO | 8.0 | 8.0 | 8.0 | 1L |
| Initials | TAb | | | |
| Time | 0853 | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

## *L. plumulosus* DRY LENGTH DATA

0-hr data: 20 representative organisms measured from antenna base to end of third pleon segment on the dorsal surface.

| # | Length |
|---|---|
| 1 | 3.7 |
| 2 | 3.5 |
| 3 | 3.5 |
| 4 | 3.4 |
| 5 | 3.3 |
| 6 | 3.6 |
| 7 | 3.5 |
| 8 | 3.5 |
| 9 | 3.5 |
| 10 | 3.6 |
| | mean = 3.5 |
| All data in mm / *L. plumulosus* | |

### Initial *L. plumulosus* Weights at Test Initiation

| Rep # | Project # or Sample Description | A Final Weight (mg) | B Initial Weight (mg) | Final Weight minus Initial Weight (mg) | C No. of Organisms | D Lepto Weight (mg) |
|---|---|---|---|---|---|---|
| 1 | L-6472-24 | 16.36 | 12.56 | 3.80 | 10 | 0.380 |
| 2 | " | 18.05 | 14.53 | 3.52 | 10 | 0.352 |
| 3 | " | 19.19 | 15.30 | 3.89 | 10 | 0.389 |
| 4 | " | — | — | — | 10 | — |
| 5 | " | — | — | — | 10 | — |
| | | | | Mean Weight (mg/Lepto): | | 0.374 |

Initial Foil Weights at: 1145 on 09/27/2024 by: JL Scale # 3B

Final Foil Weights at: 1139 on 09/28/2024 by: JTL Scale # 3B

## Surviving *L. plumulosus* Weights at Test Termination

| Rep. | Concentration, mg/kg | A Final Weight (mg) | B Initial Weight (mg) | C No. of Surviving Organisms |
|---|---|---|---|---|
| A | 0 | 20.75 | 13.48 | 17 |
| B | 0 | 18.99 | 13.50 | 17 |
| C | 0 | 19.45 | 13.14 | 19 |
| A | 250 | 22.30 | 16.50 | 19 |
| B | 250 | 21.67 | 15.13 | 19 |
| C | 250 | 18.26 | 12.90 | 16 |
| A | 500 | 22.81 | 16.12 | 18 |
| B | 500 | 20.09 | 14.05 | 19 |
| C | 500 | 16.57 | 12.23 | 15 |
| A | 1000 | 17.77 | 13.76 | 14 |
| B | 1000 | 18.91 | 14.63 | 15 |
| C | 1000 | 19.93 | 15.30 | 13 |
| A | 2000 | 19.03 | 15.52 | 17 |
| B | 2000 | 18.42 | 14.62 | 15 |
| C | 2000 | 18.94 | 14.44 | 15 |
| A | 4000 | 18.36 | 14.67 | 14 |
| B | 4000 | 18.81 | 15.23 | 15 |
| C | 4000 | 15.50 | 11.05 | 17 |

Initial Foil Weights at: 0927 on 10/7/2024 by: GW Scale # 3B

Final Foil Weights at: 1516 on 10/08/2024 by: JTL Scale # 3B

Environmental Enterprises USA, Inc.

# APPENDIX B

# Newfields Environmental

## L-6472-24 (L-6272-24) Heavy Oil in NC010

| 10-Day Survival | |
|---|---|
| **NOEC** | **LOEC** |
| 4000 | >4000 |
| **LC25** | **LC50** |
| >4000 | >4000 |

| Mean Dry Weight-mg | |
|---|---|
| **NOEC** | **LOEC** |
| 1000 | 2000 |
| **IC25** | **IC50** |
| 1698 | >4000 |

## CETIS Test Data Worksheet

Report Date: 10 Oct-24 09:55 (p 1 of 1)
Test Code/ID: L-6472-24 (G-S) / 08-0007-2066

**Leptocheirus 10-d Survival and Growth Test** — **Environmental Enterprises USA, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Start Date:** | 27 Sep-24 11:32 | **Species:** | Leptocheirus plumulosus | **Sample Code:** | L-6472-24 (G-S) |
| **End Date:** | 07 Oct-24 11:00 | **Protocol:** | EPA 821-R-11-004 (2011) | **Sample Source:** | |
| **Sample Date:** | 09 Oct-24 11:29 | **Material:** | Natural Sediment | **Sample Station:** | |

| Conc-mg/kg | Code | Rep | Pos | # Exposed | 1d Survival | 2d Survival | 3d Survival | 4d Survival | 5d Survival | 6d Survival | 7d Survival | 8d Survival | 9d Survival | 10d Survival | Total Weight-mg | Tare Weight-mg | Pan Count |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | LP | 1 | 4 | 20 | | | | | | | | | | 17 | 20.75 | 13.48 | 17 |
| 0 | LP | 2 | 7 | 20 | | | | | | | | | | 17 | 18.99 | 13.5 | 17 |
| 0 | LP | 3 | 10 | 20 | | | | | | | | | | 19 | 19.45 | 13.14 | 19 |
| 250 | | 1 | 1 | 20 | | | | | | | | | | 19 | 22.3 | 16.5 | 19 |
| 250 | | 2 | 17 | 20 | | | | | | | | | | 19 | 21.67 | 15.13 | 19 |
| 250 | | 3 | 5 | 20 | | | | | | | | | | 16 | 18.26 | 12.9 | 16 |
| 500 | | 1 | 18 | 20 | | | | | | | | | | 18 | 22.81 | 16.12 | 18 |
| 500 | | 2 | 2 | 20 | | | | | | | | | | 19 | 20.09 | 14.05 | 19 |
| 500 | | 3 | 3 | 20 | | | | | | | | | | 15 | 16.57 | 12.23 | 15 |
| 1000 | | 1 | 15 | 20 | | | | | | | | | | 14 | 17.77 | 13.76 | 14 |
| 1000 | | 2 | 8 | 20 | | | | | | | | | | 15 | 18.91 | 14.63 | 15 |
| 1000 | | 3 | 9 | 20 | | | | | | | | | | 13 | 19.93 | 15.3 | 13 |
| 2000 | | 1 | 12 | 20 | | | | | | | | | | 17 | 19.03 | 15.52 | 17 |
| 2000 | | 2 | 16 | 20 | | | | | | | | | | 15 | 18.42 | 14.62 | 15 |
| 2000 | | 3 | 13 | 20 | | | | | | | | | | 15 | 18.94 | 14.44 | 15 |
| 4000 | | 1 | 11 | 20 | | | | | | | | | | 14 | 18.36 | 14.67 | 14 |
| 4000 | | 2 | 14 | 20 | | | | | | | | | | 15 | 18.81 | 15.23 | 15 |
| 4000 | | 3 | 6 | 20 | | | | | | | | | | 17 | 15.5 | 11.05 | 17 |



Analyst: BCP QA: SN

Leptocheirus 10-d Survival and Growth Test — Environmental Enterprises USA, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 06-9381-1050 | **Endpoint:** | 10d Survival Rate | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 9:52 | **Analysis:** | Parametric-Control vs Treatments | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 12:49 | **MD5 Hash:** | CD3BF671C9E3CFA220C1FCA6B11AFA6 | **Editor ID:** | 002-227-489-6 |

| Data Transform | Alt Hyp | NOEL | LOEL | TOEL | Tox Units | MSDu | PMSD |
|---|---|---|---|---|---|---|---|
| Angular (Corrected) | C > T | 4000 | >4000 | --- | --- | 0.1648 | 18.66% |

### Dunnett Multiple Comparison Test

| Control | vs | Conc-mg/kg | df | Test Stat | Critical | MSD | P-Type | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|---|---|---|
| Control | | 250 | 4 | -0.4048 | 2.502 | 0.2189 | CDF | 0.9245 | Non-Significant Effect |
| | | 500 | 4 | 0.1903 | 2.502 | 0.2189 | CDF | 0.7716 | Non-Significant Effect |
| | | 1000* | 4 | 2.726 | 2.502 | 0.2189 | CDF | 0.0341 | Significant Effect |
| | | 2000 | 4 | 1.615 | 2.502 | 0.2189 | CDF | 0.2014 | Non-Significant Effect |
| | | 4000 | 4 | 1.829 | 2.502 | 0.2189 | CDF | 0.1479 | Non-Significant Effect |

### ANOVA Table

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|
| Between | 0.176174 | 0.0352347 | 5 | 3.069 | 0.0518 | Non-Significant Effect |
| Error | 0.13778 | 0.0114816 | 12 | | | |
| Total | 0.313953 | | 17 | | | |

### ANOVA Assumptions Tests

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) |
|---|---|---|---|---|---|
| Variance | Bartlett Equality of Variance Test | 2.26 | 15.09 | 0.8121 | Equal Variances |
| Distribution | Shapiro-Wilk W Normality Test | 0.9395 | 0.8546 | 0.2841 | Normal Distribution |

### 10d Survival Rate Summary

| Conc-mg/kg | Code | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | LP | 3 | 0.8833 | 0.7399 | 1.0000 | 0.8500 | 0.8500 | 0.9500 | 0.0333 | 6.54% | 0.00% |
| 250 | | 3 | 0.9000 | 0.6849 | 1.0000 | 0.9500 | 0.8000 | 0.9500 | 0.0500 | 9.62% | -1.89% |
| 500 | | 3 | 0.8667 | 0.6081 | 1.0000 | 0.9000 | 0.7500 | 0.9500 | 0.0601 | 12.01% | 1.89% |
| 1000 | | 3 | 0.7000 | 0.5758 | 0.8242 | 0.7000 | 0.6500 | 0.7500 | 0.0289 | 7.14% | 20.75% |
| 2000 | | 3 | 0.7833 | 0.6399 | 0.9268 | 0.7500 | 0.7500 | 0.8500 | 0.0333 | 7.37% | 11.32% |
| 4000 | | 3 | 0.7667 | 0.5769 | 0.9564 | 0.7500 | 0.7000 | 0.8500 | 0.0441 | 9.96% | 13.21% |

### Angular (Corrected) Transformed Summary

| Conc-mg/kg | Code | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | LP | 3 | 1.2300 | 0.9835 | 1.4770 | 1.1730 | 1.1730 | 1.3450 | 0.0574 | 8.08% | 0.00% |
| 250 | | 3 | 1.2660 | 0.9244 | 1.6070 | 1.3450 | 1.1070 | 1.3450 | 0.0794 | 10.86% | -2.88% |
| 500 | | 3 | 1.2140 | 0.8359 | 1.5920 | 1.2490 | 1.0470 | 1.3450 | 0.0878 | 12.53% | 1.35% |
| 1000 | | 3 | 0.9920 | 0.8561 | 1.1280 | 0.9912 | 0.9377 | 1.0470 | 0.0316 | 5.52% | 19.38% |
| 2000 | | 3 | 1.0890 | 0.9086 | 1.2700 | 1.0470 | 1.0470 | 1.1730 | 0.0420 | 6.67% | 11.49% |
| 4000 | | 3 | 1.0700 | 0.8390 | 1.3020 | 1.0470 | 0.9912 | 1.1730 | 0.0538 | 8.70% | 13.00% |

### 10d Survival Rate Detail

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | LP | 0.8500 | 0.8500 | 0.9500 |
| 250 | | 0.9500 | 0.9500 | 0.8000 |
| 500 | | 0.9000 | 0.9500 | 0.7500 |
| 1000 | | 0.7000 | 0.7500 | 0.6500 |
| 2000 | | 0.8500 | 0.7500 | 0.7500 |
| 4000 | | 0.7000 | 0.7500 | 0.8500 |

**Leptocheirus 10-d Survival and Growth Test** — **Environmental Enterprises USA, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** 06-9381-1050 | | **Endpoint:** | 10d Survival Rate | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** 10 Oct-24 9:52 | | **Analysis:** | Parametric-Control vs Treatments | **Status Level:** | 1 |
| **Edit Date:** 09 Oct-24 12:49 | | **MD5 Hash:** | CD3BF671C9E3CFA220C1FCA6B11AFA6 | **Editor ID:** | 002-227-489-6 |

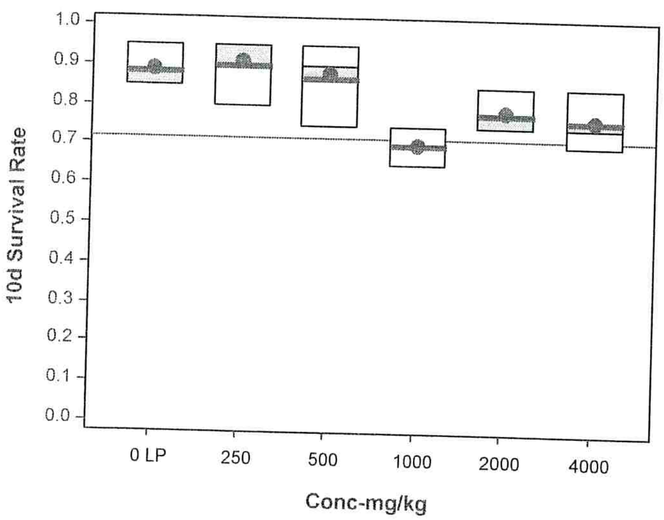
## Angular (Corrected) Transformed Detail

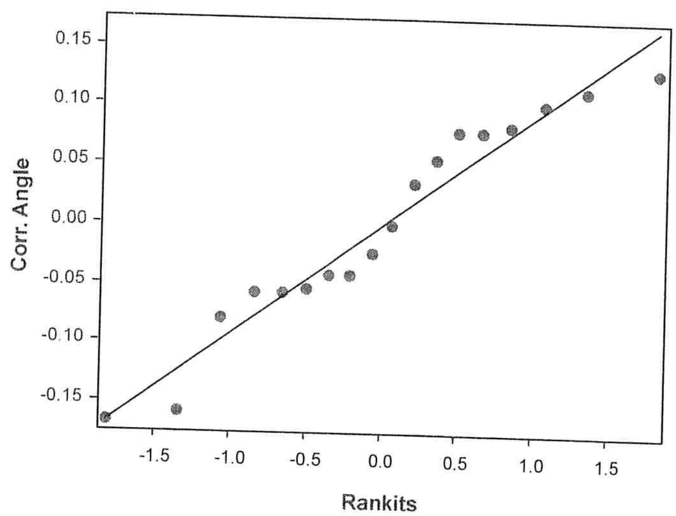
| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | LP | 1.1730 | 1.1730 | 1.3450 |
| 250 | | 1.3450 | 1.3450 | 1.1070 |
| 500 | | 1.2490 | 1.3450 | 1.0470 |
| 1000 | | 0.9912 | 1.0470 | 0.9377 |
| 2000 | | 1.1730 | 1.0470 | 1.0470 |
| 4000 | | 0.9912 | 1.0470 | 1.1730 |

## 10d Survival Rate Binomials

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | LP | 17/20 | 17/20 | 19/20 |
| 250 | | 19/20 | 19/20 | 16/20 |
| 500 | | 18/20 | 19/20 | 15/20 |
| 1000 | | 14/20 | 15/20 | 13/20 |
| 2000 | | 17/20 | 15/20 | 15/20 |
| 4000 | | 14/20 | 15/20 | 17/20 |

## Graphics



## CETIS Analytical Report

Report Date: 10 Oct-24 13:39 (p 1 of 2)
Test Code/ID: L-6472-24 (G-S) / 08-0007-2066

**Leptocheirus 10-d Survival and Growth Test** — Environmental Enterprises USA, Inc.

| | | | | | |
|---|---|---|---|---|---|
| Analysis ID: | 05-4889-2718 | Endpoint: | Mean Dry Weight-mg | CETIS Version: | CETISv2.1.4 |
| Analyzed: | 10 Oct-24 13:39 | Analysis: | Parametric-Control vs Treatments | Status Level: | 1 |
| Edit Date: | 09 Oct-24 12:49 | MD5 Hash: | ECB4D5332A935B25E098E804BB7861F5 | Editor ID: | 002-227-489-6 |

| Data Transform | Alt Hyp | NOEL | LOEL | TOEL | Tox Units | MSDu | PMSD |
|---|---|---|---|---|---|---|---|
| Untransformed | C > T | 1000 | 2000 | 1414 | --- | 0.08151 | 22.59% |

### Dunnett Multiple Comparison Test

| Control | vs | Conc-mg/kg | df | Test Stat | Critical | MSD | P-Type | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|---|---|---|
| Control | | 250 | 4 | 1.005 | 2.502 | 0.08151 | CDF | 0.4236 | Non-Significant Effect |
| | | 500 | 4 | 1.062 | 2.502 | 0.08151 | CDF | 0.3991 | Non-Significant Effect |
| | | 1000 | 4 | 1.584 | 2.502 | 0.08151 | CDF | 0.2104 | Non-Significant Effect |
| | | 2000* | 4 | 3.304 | 2.502 | 0.08151 | CDF | 0.0123 | Significant Effect |
| | | 4000* | 4 | 3.261 | 2.502 | 0.08151 | CDF | 0.0133 | Significant Effect |

### ANOVA Table

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|
| Between | 0.0280243 | 0.0056049 | 5 | 3.521 | 0.0344 | Significant Effect |
| Error | 0.0191015 | 0.0015918 | 12 | | | |
| Total | 0.0471258 | | 17 | | | |

### ANOVA Assumptions Tests

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) |
|---|---|---|---|---|---|
| Variance | Bartlett Equality of Variance Test | 3.791 | 15.09 | 0.5799 | Equal Variances |
| Distribution | Shapiro-Wilk W Normality Test | 0.9314 | 0.8546 | 0.2055 | Normal Distribution |

### Mean Dry Weight-mg Summary

| Conc-mg/kg | Code | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | LP | 3 | 0.3609 | 0.2168 | 0.5049 | 0.3321 | 0.3229 | 0.4276 | 0.03348 | 16.07% | 0.00% |
| 250 | | 3 | 0.3282 | 0.2776 | 0.3787 | 0.335 | 0.3053 | 0.3442 | 0.01175 | 6.20% | 9.07% |
| 500 | | 3 | 0.3263 | 0.2224 | 0.4301 | 0.3179 | 0.2893 | 0.3717 | 0.02414 | 12.81% | 9.59% |
| 1000 | | 3 | 0.3093 | 0.2085 | 0.4101 | 0.2864 | 0.2853 | 0.3562 | 0.02343 | 13.12% | 14.30% |
| 2000 | | 3 | 0.2533 | 0.1371 | 0.3694 | 0.2533 | 0.2065 | 0.3 | 0.027 | 18.46% | 29.82% |
| 4000 | | 3 | 0.2547 | 0.2202 | 0.2892 | 0.2618 | 0.2387 | 0.2636 | 0.008017 | 5.45% | 29.43% |

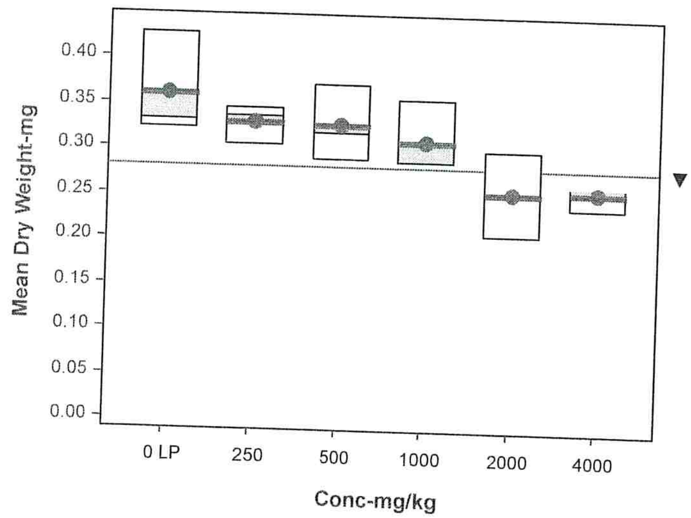
### Mean Dry Weight-mg Detail

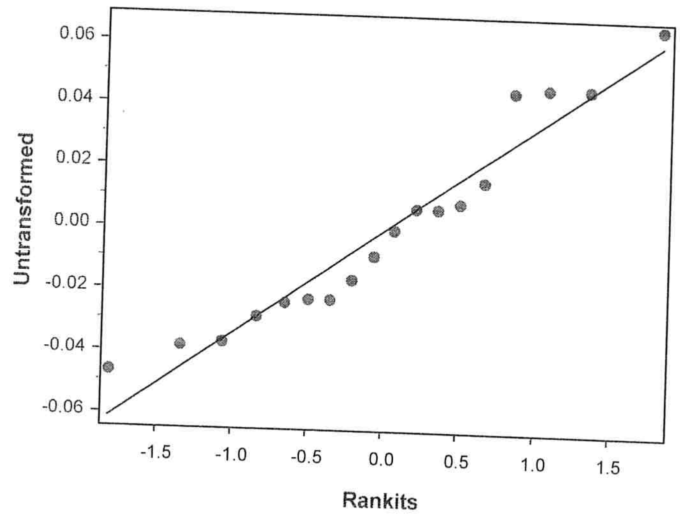
| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | LP | 0.4276 | 0.3229 | 0.3321 |
| 250 | | 0.3053 | 0.3442 | 0.335 |
| 500 | | 0.3717 | 0.3179 | 0.2893 |
| 1000 | | 0.2864 | 0.2853 | 0.3562 |
| 2000 | | 0.2065 | 0.2533 | 0.3 |
| 4000 | | 0.2636 | 0.2387 | 0.2618 |

**Leptocheirus 10-d Survival and Growth Test** — Environmental Enterprises USA, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 05-4889-2718 | **Endpoint:** | Mean Dry Weight-mg | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 13:39 | **Analysis:** | Parametric-Control vs Treatments | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 12:49 | **MD5 Hash:** | ECB4D5332A935B25E098E804BB7861F5 | **Editor ID:** | 002-227-489-6 |

**Graphics**



# CETIS Analytical Report

| | |
|---|---|
| Report Date: | 10 Oct-24 14:37 (p 1 of 2) |
| Test Code/ID: | L-6472-24 (G-S) / 08-0007-2066 |

**Leptocheirus 10-d Survival and Growth Test** — Environmental Enterprises USA, Inc.

| | | | | | |
|---|---|---|---|---|---|
| Analysis ID: | 15-4881-9379 | Endpoint: | 10d Survival Rate | CETIS Version: | CETISv2.1.4 |
| Analyzed: | 10 Oct-24 14:37 | Analysis: | Linear Interpolation (ICPIN) | Status Level: | 1 |
| Edit Date: | 09 Oct-24 12:49 | MD5 Hash: | CD3BF671C9E3CFA220C1FCA6B11AFA6 | Editor ID: | 002-227-489-6 |

## Linear Interpolation Options

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Linear | Linear | 292238 | 1000 | Yes | Two-Point Interpolation |

## Point Estimates

| Level | mg/kg | 95% LCL | 95% UCL |
|---|---|---|---|
| LC15 | 966.1 | 197.3 | --- |
| LC20 | >4000 | --- | --- |
| LC25 | >4000 | --- | --- |
| LC40 | >4000 | --- | --- |
| LC50 | >4000 | --- | --- |

## 10d Survival Rate Summary

| | | | Calculated Variate(A/B) | | | | | | | Isotonic Variate | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Conc-mg/kg | Code | Count | Mean | Median | Min | Max | CV% | %Effect | ΣA/ΣB | Mean | %Effect |
| 0 | LP | 3 | 0.8833 | 0.8500 | 0.8500 | 0.9500 | 6.54% | 0.00% | 53/60 | 0.8917 | 0.00% |
| 250 | | 3 | 0.9000 | 0.9500 | 0.8000 | 0.9500 | 9.62% | -1.89% | 54/60 | 0.8917 | 0.00% |
| 500 | | 3 | 0.8667 | 0.9000 | 0.7500 | 0.9500 | 12.01% | 1.89% | 52/60 | 0.8667 | 2.80% |
| 1000 | | 3 | 0.7000 | 0.7000 | 0.6500 | 0.7500 | 7.14% | 20.75% | 42/60 | 0.7500 | 15.89% |
| 2000 | | 3 | 0.7833 | 0.7500 | 0.7500 | 0.8500 | 7.37% | 11.32% | 47/60 | 0.7500 | 15.89% |
| 4000 | | 3 | 0.7667 | 0.7500 | 0.7000 | 0.8500 | 9.96% | 13.21% | 46/60 | 0.7500 | 15.89% |

## 10d Survival Rate Detail

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | LP | 0.8500 | 0.8500 | 0.9500 |
| 250 | | 0.9500 | 0.9500 | 0.8000 |
| 500 | | 0.9000 | 0.9500 | 0.7500 |
| 1000 | | 0.7000 | 0.7500 | 0.6500 |
| 2000 | | 0.8500 | 0.7500 | 0.7500 |
| 4000 | | 0.7000 | 0.7500 | 0.8500 |

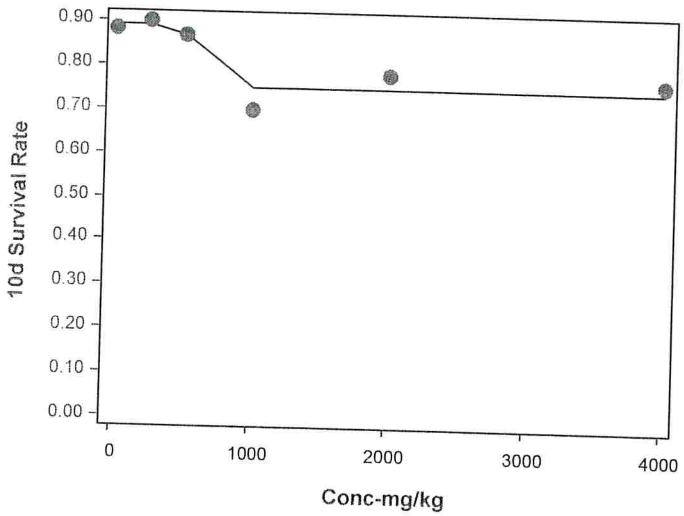
## 10d Survival Rate Binomials

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | LP | 17/20 | 17/20 | 19/20 |
| 250 | | 19/20 | 19/20 | 16/20 |
| 500 | | 18/20 | 19/20 | 15/20 |
| 1000 | | 14/20 | 15/20 | 13/20 |
| 2000 | | 17/20 | 15/20 | 15/20 |
| 4000 | | 14/20 | 15/20 | 17/20 |

**Leptocheirus 10-d Survival and Growth Test** — Environmental Enterprises USA, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 15-4881-9379 | **Endpoint:** | 10d Survival Rate | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 14:37 | **Analysis:** | Linear Interpolation (ICPIN) | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 12:49 | **MD5 Hash:** | CD3BF671C9E3CFA220C1FCA6B11AFA6 | **Editor ID:** | 002-227-489-6 |

**Graphics**



# CETIS Analytical Report

Report Date: 10 Oct-24 14:37 (p 1 of 1)
Test Code/ID: L-6472-24 (G-S) / 08-0007-2066

Leptocheirus 10-d Survival and Growth Test

Environmental Enterprises USA, Inc.

| | | | | | |
|---|---|---|---|---|---|
| Analysis ID: | 13-8908-3224 | Endpoint: | Mean Dry Weight-mg | CETIS Version: | CETISv2.1.4 |
| Analyzed: | 10 Oct-24 14:37 | Analysis: | Linear Interpolation (ICPIN) | Status Level: | 1 |
| Edit Date: | 09 Oct-24 12:49 | MD5 Hash: | ECB4D5332A935B25E098E804BB7861F5 | Editor ID: | 002-227-489-6 |

## Linear Interpolation Options

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Linear | Linear | 1311863 | 1000 | Yes | Two-Point Interpolation |

## Point Estimates

| Level | mg/kg | 95% LCL | 95% UCL |
|---|---|---|---|
| IC15 | 1046 | --- | 3589 |
| IC20 | 1372 | --- | 5898 |
| IC25 | 1698 | --- | --- |
| IC40 | >4000 | --- | --- |
| IC50 | >4000 | --- | --- |

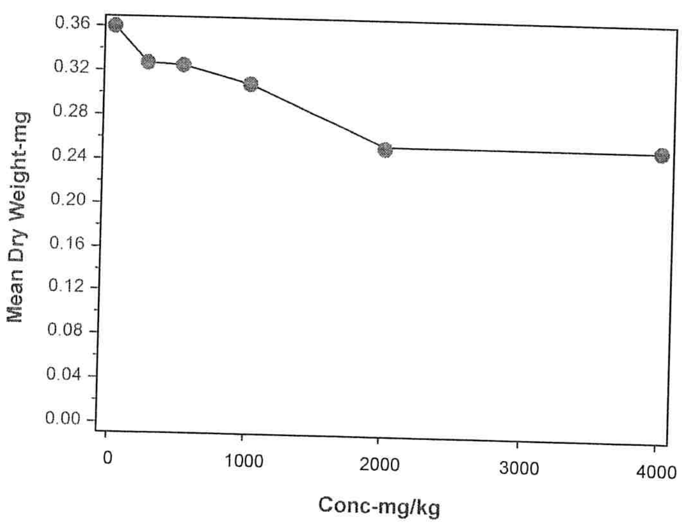
## Mean Dry Weight-mg Summary

| | | | Calculated Variate | | | | | | Isotonic Variate | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-mg/kg | Code | Count | Mean | Median | Min | Max | CV% | %Effect | Mean | %Effect |
| 0 | LP | 3 | 0.3609 | 0.3321 | 0.3229 | 0.4276 | 16.07% | 0.00% | 0.3609 | 0.00% |
| 250 | | 3 | 0.3282 | 0.335 | 0.3053 | 0.3442 | 6.20% | 9.07% | 0.3282 | 9.06% |
| 500 | | 3 | 0.3263 | 0.3179 | 0.2893 | 0.3717 | 12.81% | 9.59% | 0.3263 | 9.59% |
| 1000 | | 3 | 0.3093 | 0.2864 | 0.2853 | 0.3562 | 13.12% | 14.30% | 0.3093 | 14.30% |
| 2000 | | 3 | 0.2533 | 0.2533 | 0.2065 | 0.3 | 18.46% | 29.82% | 0.254 | 29.62% |
| 4000 | | 3 | 0.2547 | 0.2618 | 0.2387 | 0.2636 | 5.45% | 29.43% | 0.254 | 29.62% |

## Mean Dry Weight-mg Detail

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | LP | 0.4276 | 0.3229 | 0.3321 |
| 250 | | 0.3053 | 0.3442 | 0.335 |
| 500 | | 0.3717 | 0.3179 | 0.2893 |
| 1000 | | 0.2864 | 0.2853 | 0.3562 |
| 2000 | | 0.2065 | 0.2533 | 0.3 |
| 4000 | | 0.2636 | 0.2387 | 0.2618 |

## Graphics



Environmental Enterprises USA, Inc.

# APPENDIX C

## NEWFIELD NATURAL SEDIMENT (L-6432-24)

### EE NS SEDIMENT

| | NS Wet Weight g | NS Dry + Pan Weight g | Initial Pan Weight g | NS Dry Weight g | | Weight of 25 ml NS g |
|---|---|---|---|---|---|---|
| 1 | 30.09 | 12.89 | 0.97 | 11.92 | 1 | 32.09 |
| 2 | 30.05 | 12.88 | 0.97 | 11.91 | 2 | 31.65 |
| 3 | 30.03 | 12.86 | 0.98 | 11.88 | 3 | 32.05 |

### WET TO DRY RATIO (W2DR)

(Wet NS wt 1/Dry NS wt 1) + (Wet NS wt 2/Dry NS wt 2) + (Wet NS wt 3/ Dry NS wt 3) / 3 =

2.53 **NS Water Content =** 60.5 %

### WET NS DENSITY (WNSD)

(Wet NS wt 1/Wet NS vol. + Wet NS wt 2/Wet NS vol + Wet NS wt 3/Wet NS vol.) / 3 =

1.28 g/ml

### EXPOSURE CONCENTRATION CALCULATIONS

WET NS NEEDED

WNSD X VOL. OF NS REQUIRED = WT. NS REQUIRED/CONC.

1.2800 X 600 = 768.0 g WET NS/CONC.

DRY NS NEEDED

(WET NS PER CONC./W2DR)X(1kg/1000g)-DRY WT. NS/CONC.

600 ml 0.3036 kg = 303.6 g

**Newfields Environmental**
**Heavy Oil in NC010**
**L-6472-24 (L-6272-24)**

**Sample ID Double Check:** BCP

DESIRED CONC. IN mg/kg X DRY WT. NS IN kg. = TOXICANT REQUIRED IN mg.

| Conc. mg/kg | Dry NS kg | Calculated g | Actual +/- 0.01 g | Initial | Volume ml | Wet Wt. g | Actual +/- 0.1 g | Mixing tech initials |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.3036 | 0.00 | 0.00 | CH | 600 | 768.0 | 768.0 | TAD |
| 250 | 0.3036 | 0.08 | 0.08 | CH | 600 | 768.0 | 768.0 | TAD |
| 500 | 0.3036 | 0.15 | 0.14 | CH | 600 | 768.0 | 768.0 | STL |
| 1000 | 0.3036 | 0.30 | 0.30 | CH | 600 | 768.0 | 768.0 | JL |
| 2000 | 0.3036 | 0.61 | 0.61 | CH | 600 | 768.0 | 768.0 | TAD |
| 4000 | 0.3036 | 1.21 | 1.21 | CH | 600 | 768.0 | 768.0 | STL |

Scale ID: 45 Scale ID: 45

Prepared By: Ben Peri 9/25/24

Check By: CH 9/26/24



Raw Data QC/QA: BCP

Environmental Enterprises USA, Inc.

# APPENDIX D

# ENVIRONMENTAL ENTERPRISES USA, INC.

58485 Pearl Acres Rd., Suite D
Slidell, LA 70461
(985) 646-2787, Fax # (985) 646-2810

## CHAIN - OF - CUSTODY RECORD

Client: Newfields Environmental
Address: 300 Ledgewood Place Suite 305
Rockland, MA 02370, United States

Contact Person: Eric Litman, Thomas Parkerton
Phone #: (781) 681-5040
Email: elitman@newfields.com, thomas.parkerton@exxonmobil.com
Project: Newtown Creek

Client must fill in shaded area

| Sample Description | Date Collected | Time Collected | Analysis Request | Grab | Comp | No. of Containers | Waste Type | Preservation | Lab No. |
|---|---|---|---|---|---|---|---|---|---|
| 330760-1L Mineral Oil (Heavy) | N/A | N/A | Sediment Toxicity EPA Method 1644 | ☑ | X | 1 | X | N/A | L-6272-24 |
| M8410-500mL Mineral Oil (Light) | N/A | N/A | Sediment Toxicity EPA Method 1644 | ☑ | | 1 | | N/A | L-6273-24 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

| | |
|---|---|
| Collected By: Company Name<br>Print:<br>Sign:<br>Date & Time: | Relinquished By: Company Name<br>Print:<br>Sign:<br>Date & Time: |
| Received By: Company Name FedEx<br>Print:<br>Sign:<br>Date & Time: | Relinquished By: Company Name FedEx<br>Print:<br>Sign:<br>Date & Time: |
| Received By: Company Name EEUSA<br>Print: Christopher Calandro<br>Sign: Chris Calandro<br>Date & Time: 7-2-24 1410 | Relinquished By: Company Name EEUSA<br>Print: Christopher Calandro<br>Sign: Chris Calandro<br>Date & Time: 7-2-24 1420 |
| Received By: Company Name EEUSA<br>Print: Beau Peré<br>Sign: Beau Peré<br>Date & Time: 070224 1425 | Relinquished By: Company Name<br>Print:<br>Sign:<br>Date & Time: |
| Received By: Company Name<br>Print:<br>Sign:<br>Date & Time: | Relinquished By: Company Name<br>Print:<br>Sign:<br>Date & Time: |

**EE USA Use Only!**

**Comments:** COC Inititated by EEUSA on 07/02/2024 @14:10

POSTED 081524 BCP

S/R No.: SR-22730-24-NO1-L1 (L-6273-24), SR-22730-24-NO1-L2 (L-6272-24)

**Courier Tracking #:** FedEx 7770 9978 0068 **Kit #:** Box

* Temperature taken upon receipt at EE USA Lab

| * Temp $^0$C (T#) |
|---|
| 34.0°C, B3 on 07/02/2024 @14:10. Initials: CC |

# ENVIRONMENTAL ENTERPRISES USA, INC.
# SAMPLE RECEIPT / ACCEPTANCE (SRA) FORM

**CLIENT:** New fields
**DATE RECEIVED:** 7-2-24
**LOCATION:** Newtown Creek

**KIT NO.** BOX
**CL NO.** N/A **LAB NO.** L-6272-24, L-6273-24

**SAMPLE RECEIPT:**

1. Sample Kit Supplied by: EE USA….., Client.✓..
   Ice Chest….., Cardboard Box..✓.., Bucket….., Other…… How many containers in kit?..2......
2. Ice chest received... Circle one; *delivered by Hot Shot, FEDEX, UPS, Client, etc. mark NA.
   *NA or SB: Fridge, Ice & $H_2O$, Dry, $H_2O$, Ice Packs, Other
   At EE USA: Ice & $H_2O$, Dry, $H_2O$, Ice packs (Frozen? Yes….or No….), Other……
   If Ice & $H_2O$ received... How? Loose, Bagged, Bottled
3. Sample container(s) in good condition (sealed & unbroken)? YES..✓... NO……
4. Does sample container have a label(s)? YES..✓... NO……
   If yes, mark all that are incomplete and applicable.
   a) Date & time collected……………………… ______ b) Location ……………………... ______
   c) Collected by …………………………….... . ______ d) Well number ………………….. ______
   e) OCSG……………………………………………. ______
5. Chain-of-Custody form (COC) filled out completely? YES…… NO..✓...
   If not, mark all that apply.
   a) No COC……………………………… ✓ f) Date & time collected………… ______
   b) Collected by ……………………….. ______ g) Received by………………….. ______
   c) Relinquished by……………………. ______ h) Date and/or time of transfer... ______
   d) Location……………………………… ______ i) Waste type…………………….. ______
   e) Company name……………………. ______
6. Custody seal(s) received with this sample kit? YES….. NO..✓.. Were custody seals used? YES….. NO…..
   And if used, were they intact? YES…..NO….. Were custody seals filled out? YES….. NO…..

**COMMENTS:** ____________________________________________

Information recorded by: cc Date 7 / 2 / 24

**SAMPLE ACCEPTANCE:** **TOX: EFF**____ **CTS/F**____ **PW**____ **TCW** ____ **Product** ____
**O&G: PW**____ **WF/TCW**____ **Other**____
**DF: WBM**____ **SBM**____ **NP**____ **GC/MS**____ **Other** ✓

7. Was each sample container appropriate (EPA Protocol)? YES..✓... NO……
   Plastic..✓... Glass..✓... Number of samples for location?.....2.........
8. Does the recorded information on the COC and label agree? YES..✓... NO……
   Client Sample ID, Collection location, date, & time. Collected by.
9. Was sufficient amount of each sample received? YES..✓... NO……
   Container size ..1000 x1, 500 x1.., Estimated Volume ...800 x1, 400 x1.. Head space ...200 x1, 100 x1... (mls or liters)
10. Was each sample received within the proper holding time? YES..✓... NO……
11. Was each sample received at the proper temperature? (See COC for temp) YES..✓... NO……

**Oil & Grease Lab Only:**

12. Sample verified for proper acid preservation & temp within 30 minutes of sample receipt? YES…….. NO……
13. Is the initial pH <2 su? YES…….. NO……
    If no, how many mls of 6NHCL was added to make pH <2 su? mls………SL#……….

**COMMENTS :** ____________________________________________

Information recorded by: BCP Date 07/02/24

CL=certified lot number,NA=not applicable,SB=shorebase,EFF=effluent,CTS/F=chemically treated seawater/freshwater,PW=produced water,TCW=total completion workover,WF=well fluid,WBM=water based mud,SBM=synthetic based mud,NP=non-protocol

FROM:
Eric Litman (781) 681-5040
NewFields
300 Ledgewood Place
Suite 305
Rockland MA 02370
US

SHIP DATE: 27JUN24
ACTWGT: 10.00 LB
CAD: 109797687/INET4535
DIMMED: 12 X 12 X 12 IN

BILL SENDER

TO **David Daniel**
**Environmental Enterprises USA Inc.**
**58485 Pearl Acres Road**
**Suite D**
**SLIDELL LA 70461** (US)
**(781) 681-5040** REF: 850.0299.024
INV:
PO: DEPT:

583J5/B21D/8AE3

FedEx Ground

G

J242024032801uv

TRK# **7770 9978 0068**

**70461**

9632 0019 6 (000 000 0000) 0 00 7770 9978 0068

**After printing this label:**
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

**Warning:** IMPORTANT: TRANSMIT YOUR SHIPPING DATA AND PRINT A MANIFEST:
At the end of each shipping day, you should perform the FedEx Ground End of Day Close procedure to transmit your shipping data to FedEx. To do so, click on the Ground End of Day Close Button. If required, print the pickup manifest that appears. A printed manifest is required to be tendered along with your packages if they are being picked up by FedEx Ground. If you are dropping your packages off at a FedEx drop off location, the manifest is not required.

Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide and applicable tariff, available upon request. FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim. Limitations, including limitations on our liability, can be found in the current FedEx Service Guide and applicable tariff apply. In no event shall FedEx Ground be liable for any special, incidental, or consequential damages, including, without limitation, loss of profit, loss to the intrinsic value of the package, loss of sale, interest income or attorney's fees. Recovery cannot exceed actual documented loss. Items of extraordinary value are subject to separate limitations of liability set forth in the Service Guide and tariff. Written claims must be filed within strict time limits, see current FedEx Service Guide.

Environmental Enterprises USA, Inc.

# APPENDIX E

POSTED 091824 CH

SR-22935-24-N01-L1

**NEW YORK CHAIN OF CUSTODY**

ALPHA

Westborough, MA 01581 8 Walkup Dr. TEL: 508-898-9220 FAX: 508-898-9193

Mansfield, MA 02048 320 Forbes Blvd TEL: 508-822-9300 FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page 1 of 1

Date Rec'd in Lab 6/21/24

ALPHA Job # L2434913

**Project Information**

Project Name: NYC Toxicity Testing
Project Location: Newtown Creek, New York
Project #
(Use Project name as Project #) ☐
Project Manager: Susan O'Neil (Pace)/ Eric Litman (Newfields)
ALPHAQuote #:

**Turn-Around Time**

Standard ☐ Due Date:
Rush (only if pre approved) ☐ # of Days:

**Client Information**

Client: NewFields Environmental
Address: 300 Ledgewood Pl, Suite 205
Rockland, MA 02370
Phone: 781-424-5731
Fax:
Email: elitman@newfields.com

**Deliverables**

☐ ASP-A ☐ ASP-B
☐ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other

**Regulatory Requirement**

☐ NY TOGS ☐ NY Part 375
☐ AWQ Standards ☐ NY CP-51
☐ NY Restricted Use ☐ Other
☐ NY Unrestricted Use
☐ NYC Sewer Discharge

**Billing Information**

☐ Same as Client Info
PO #

**Disposal Site Information**

Please identify below location of applicable disposal facilities.
Disposal Facility:
☐ NJ ☐ NY
☐ Other:

These samples have been previously analyzed by Alpha ☐

**Other project specific requirements/comments:**

HOLD PENDING INSTRUCTIONS FROM NEWFIELDS

**Please specify Metals or TAL.**

ANALYSIS: Contact NewFields regarding analysis

*Sample Filtration*
☐ Done
☐ Lab to do
*Preservation*
☐ Lab to do
*(Please Specify below)*

Total Bottles

| ALPHA Lab ID (Lab Use Only) | Sample ID | Collection Date | Collection Time | Sample Matrix | Sampler's Initials | Contact NewFields regarding analysis | Sample Specific Comments |
|---|---|---|---|---|---|---|---|
| 34913-01 | NC010_0-15_Bucket 1 | 6/20/2024 | 09:04 | SEDIMENT | NB | X | L-6432-24 |
| -02 | NC010_0-15_Bucket 2 | 6/20/2024 | 10:07 | SEDIMENT | NB | X | |
| ~~-03~~ | ~~NC010_0-15_Bucket 3~~ | ~~6/20/2024~~ | ~~10:35~~ | ~~SEDIMENT~~ | ~~NB~~ | ~~X~~ | |

Fed Ex 7784 9266 9512 091324 CH

Preservative Code: A = None, B = HCl, C = $HNO_3$, D = $H_2SO_4$, E = NaOH, F = MeOH, G = $NaHSO_4$, H = $Na_2S_2O_3$, K/E = Zn Ac/NaOH, O = Other

Container Code: P = Plastic, A = Amber Glass, V = Vial, G = Glass, B = Bacteria Cup, C = Cube, O = Other, E = Encore, D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

| | Contact NewFields regarding analysis |
|---|---|
| Container Type | P |
| Preservative | A |

| Relinquished By: | Date/Time | Received By: | Date/Time |
|---|---|---|---|
| [signature] | 6/20/2024 14:03 | [signature] | 6/20/24 14:03 |
| [signature] | 6/20/24 18:00 | NTSC | 6/20/24 18:00 |
| [signature] | 6/20/24 | [signature] | 6/20/24 18:40 |
| | | [signature] | 6/20 2220 |

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS.

Form No: 01-25 (rev. 30-Sept-2013)

[signature] 6/21 130 [signature] 6/21/24 0130

1.6 B3 CC 9.12-24 1500

[signature] 6/21/24 500 [signature] AAC 6/21/24 0500

[signature] AAC 6/21/24 0700 [signature] -AAC 6/21/24 0700

[signature] 9/10/24 1700 p 1 of 2

**Environmental Enterprises USA, In.c**

S/R #: ______

Lab #: ______

Area & Block: ______

Released by: Print: ______ Date/Time: ______

Sign: ______

Received by: Print: Fed Ex Date/Time: ______

Sign: ______

---

Released by: Print: Fed Ex Date/Time: 9/12/24 1500

Sign: ______

Received by: Print: Chris Calandro Date/Time: 9/12/24 1517

Sign: Chris Calandro

---

Released by: Print: Chris Calandro Date/Time: 9/12/24

Sign: Chris Calandro

Received by: Print: Chris Holmes Date/Time: 9/13/24 0956

Sign: Chris Holmes

---

Released by: Print: ______ Date/Time: ______

Sign: ______

Received by: Print: ______ Date/Time: ______

Sign: ______

---

# ENVIRONMENTAL ENTERPRISES USA, INC.
## SAMPLE RECEIPT / ACCEPTANCE (SRA) FORM

CLIENT: New Fields
DATE RECEIVED: 9-12-24
LOCATION: Newtown Creek, New York

KIT NO. Theirs
CL NO. N/A
LAB NO. L-6432-24

**SAMPLE RECEIPT:**

1. Sample Kit Supplied by: EE USA....., Client.....✓
   Ice Chest....✓, Cardboard Box....., Bucket....., Other..... How many containers in kit?..2..
2. Ice chest received... Circle one; *delivered by Hot Shot, FEDEX, UPS, Client, etc. mark NA.
   *NA or SB: Fridge, Ice & $H_2O$, Dry, $H_2O$, Ice Packs, Other
   At EE USA: Ice & $H_2O$, Dry, $H_2O$, Ice packs (Frozen? Yes....or No....), Other.....
   If Ice & $H_2O$ received... How? Loose, Bagged, Bottled
3. Sample container(s) in good condition (sealed & unbroken)? YES..✓.. NO.....
4. Does sample container have a label(s)? YES..✓.. NO.....
   If yes, mark all that are incomplete and applicable.
   a) Date & time collected........ ____ b) Location ........ ____
   c) Collected by ........ ____ d) Well number ........ ____
   e) OCSG........ ____
5. Chain-of-Custody form (COC) filled out completely? YES..... NO..✓..
   If not, mark all that apply.
   a) No COC........ ____ f) Date & time collected........ ____
   b) Collected by ........ ____ g) Received by........ ✓
   c) Relinquished by........ ✓ h) Date and/or time of transfer... ✓
   d) Location........ ____ i) Waste type........ ____
   e) Company name........ ____
6. Custody seal(s) received with this sample kit? YES..... NO..✓.. Were custody seals used? YES..... NO.....
   And if used, were they intact? YES.....NO..... Were custody seals filled out? YES..... NO.....

**COMMENTS:**

Information recorded by: CC Date 9/12/24

**SAMPLE ACCEPTANCE:** TOX: EFF____ CTS/F____ PW____ TCW____ Product____
O&G: PW____ WF/TCW____ Other____
DF: WBM____ SBM____ NP____ GC/MS____ Other ✓

7. Was each sample container appropriate (EPA Protocol)? YES..✓.. NO.....
   Plastic..✓.. Glass..... Number of samples for location?.....2.....
8. Does the recorded information on the COC and label agree? YES..✓.. NO.....
   Client Sample ID, Collection location, date, & time. Collected by.
9. Was sufficient amount of each sample received? YES..✓.. NO.....
   Container size .3gal x2..., Estimated Volume 2.5gal x2, Head space ...5gal. (mls or liters)
10. Was each sample received within the proper holding time? YES..✓.. NO.....
11. Was each sample received at the proper temperature? (See COC for temp) YES..✓.. NO.....

**Oil & Grease Lab Only:**

12. Sample verified for proper acid preservation & temp within 30 minutes of sample receipt? YES....... NO.....
13. Is the initial pH <2 su? YES....... NO.....
    If no, how many mls of 6NHCL was added to make pH <2 su? mls........SL#.........

**COMMENTS :**

Information recorded by: CH Date 9/13/24

CL=certified lot number,NA=not applicable,SB=shorebase,EFF=effluent,CTS/F=chemically treated seawater/freshwater,PW=produced water,TCW=total completion workover,WF=well fluid,WBM=water based mud,SBM=synthetic based mud,NP=non-protocol

ORIGIN ID:PYMA (508) 822-9300
CLIENT SERVICES
PACE ANALYTICAL MANSFIELD
320 FORBES BLVD

MANSFIELD, MA 02048
UNITED STATES US

SHIP DATE: 10SEP24
ACTWGT: 65.00 LB
CAD: 5603379/INET4760
DIMS: 24x14x13 IN

BILL SENDER

TO **ATTN: DAVID DANIEL**
**ENVIRONMENTAL ENTERPRISES USA, INC.**
**58485 PEARL ACRES RD, SUITE D**

**SLIDELL LA 70461**
(985) 646-2787 REF:
INV:
PO: DEPT:

583J2/4EF9/9AE3

FedEx Express

E

J243024071301uv

**WED - 11 SEP 10:30A**
**PRIORITY OVERNIGHT**

TRK# 0201 **7784 9266 9512**

# XH BXAA

**70461**
LA-US **MSY**

**After printing this label:**
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

Environmental Enterprises USA, Inc.

# APPENDIX F

# EEUSA Natural Sediment
## Heavy Oil in NS006
## EE USA Lab #: L-6470-24 (L-6272-24)

*Leptocheirus plumulosus* Acute, Static 10-Day Sediment Toxicity Test.
EPA Test Method 1644

Test Concentrations Prepared 9 /26 /24 Sediment Batch #NS006

Dilution Water Batch #: 20-079-24 Organism Batch #: Lp-153-24

Organisms Counted by: BCP, JL Organisms QC/QA by: BCP

Aeration Rate: 66 ml/min. Feeding: This test was not fed.

Dilution Water:
Salinity: 20.0 Meter ID 1Q Temperature: 20.5 Meter ID 7H

**Initial $H_2O$ quality parameters for dilution water only: Salinity: 20ppt +/-1ppt; Temp.: 20°C +/-1°C**
Salinity (EPA Method 120.1): ppt Thermometric (EPA Method 180.1): °C

**Survival Data (*Leptocheirus plumulosus*)**

**Treatment, mg/kg**

| Time | REP | 0 LPC | REP | 250 | REP | 500 | REP | 1000 | REP | 2000 | REP | 4000 | Initials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 HR | A | 20 | A | 20 | A | 20 | A | 20 | A | 20 | A | 20 | 9/27/24 |
| | B | 20 | B | 20 | B | 20 | B | 20 | B | 20 | B | 20 | |
| | C | 20 | C | 20 | C | 20 | C | 20 | C | 20 | C | 20 | |
| | D | 20 | D | 20 | D | 20 | D | 20 | D | 20 | D | 20 | |
| 1151 | E | 20 | E | 20 | E | 20 | E | 20 | E | 20 | E | 20 | CH |
| 10 Day | A | 19 | A | 17 | A | 16 | A | 19 | A | 19 | A | 15 | 10/07/24 |
| | B | 19 | B | 19 | B | 20 | B | 16 | B | 17 | B | 19 | |
| | C | 20 | C | 20 | C | 18 | C | 20 | C | 16 | C | 19 | |
| | D | 20 | D | 20 | D | 20 | D | 19 | D | 17 | D | 18 | |
| 1245 | E | 20 | E | 20 | E | 18 | E | 20 | E | 20 | E | 20 | JL |

10-Day LC50 >4000 mg/kg, 95% CI N/A to N/A mg/kg,

Statistical Method Summary Statistics

Prep by: BCP
QA/QC by: CH

Data Analysis by: BCP
Raw Data QA/QC by: BCP

## *L. plumulosus* Water Quality Data

**Initial $H_2O$ quality parameters for dilution water only: Salinity: 20ppt +/-1ppt; Temp.: 20°C +/-1°C**

Salinity (EPA Method 120.1): ppt Thermometric (EPA Method 180.1): °C

| Day -1 | LPC Pore Water Measurements | |
|---|---|---|
| 9/26/24 | 0A | Meter # |
| Salinity | 19.7 | 1Q |
| Temp | 17.8 | 7H |
| pH | 7.4 | 7H |
| DO | 7.6 | 1L |
| Ammonia | 2.00 | Initials CH |
| Initials | GW | |
| Time | 1501 | |

| Day 0 | Control Overlying Water Measurements — **0 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 09/27/24 | 0A | 0B | 0C | 0D | 0E | Meter # |
| Salinity | 31.1 | 31.1 | 31.1 | 31.1 | 31.1 | 1Q |
| Temp | 19.6 | 19.6 | 19.5 | 19.4 | 19.6 | 7H |
| pH | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7H |
| DO | 8.1 | 8.0 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | GW | | | | | |
| Time | 1032 | | | | | |

| Day 0 | Overlying Water Measurements – **250 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 09/27/24 | 250A | 250B | 250C | 250D | 250E | Meter # |
| Salinity | 31.0 | 31.0 | 31.0 | 31.1 | 31.1 | 1Q |
| Temp | 19.4 | 19.7 | 19.6 | 19.7 | 19.7 | 7H |
| pH | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7H |
| DO | 8.1 | 8.0 | 8.0 | 8.1 | 8.1 | 1L |
| Initials | GW | | | | | |
| Time | 1037 | | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**

| Day 0 | Overlying Water Measurements — **500 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 09/27/24 | 500A | 500B | 500C | 500D | 500E | Meter # |
| Salinity | 31.0 | 31.4 | 31.1 | 31.1 | 31.1 | 1Q |
| Temp | 19.5 | 19.5 | 19.7 | 19.6 | 19.8 | 7H |
| pH | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.0 | 8.1 | 1L |
| Initials | bw | | | | | |
| Time | 1041 | | | | | |

| Day 0 | Overlying Water Measurements — **1000 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 09/27/24 | 1000A | 1000B | 1000C | 1000D | 1000E | Meter # |
| Salinity | 31.1 | 31.0 | 31.1 | 31.0 | 31.0 | 1Q |
| Temp | 19.6 | 19.6 | 19.5 | 19.6 | 20.1 | 7H |
| pH | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | bw | | | | | |
| Time | 1046 | | | | | |

| Day 0 | Overlying Water Measurements — **2000 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 09/27/24 | 2000A | 2000B | 2000C | 2000D | 2000E | Meter # |
| Salinity | 31.1 | 30.9 | 31.0 | 31.1 | 31.0 | 1Q |
| Temp | 19.8 | 19.8 | 19.5 | 19.9 | 19.6 | 7H |
| pH | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7H |
| DO | 8.0 | 8.0 | 8.1 | 8.0 | 8.1 | 1L |
| Initials | bw | | | | | |
| Time | 1050 | | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

## *L. plumulosus* Water Quality Data Cont.

| Day 0 | Overlying Water Measurements — **4000 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 09/27/24 | 4000A | 4000B | 4000C | 4000D | 4000E | Meter # |
| Salinity | 31.1 | 31.0 | 30.9 | 31.0 | 31.1 | 1Q |
| Temp | 19.4 | 19.8 | 19.7 | 19.9 | 19.6 | 7H |
| pH | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7H |
| DO | 8.2 | 8.2 | 8.1 | 8.0 | 8.1 | 1L |
| Initials | lw | | | | | |
| Time | 1054 | | | | | |

| Day 1 | Treatment mg/kg | | | | | |
|---|---|---|---|---|---|---|
| 09/28/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 18.8 | 18.7 | 18.9 | 18.8 | 18.9 | 18.8 | 1Q |
| Temp | 20.0 | 20.0 | 20.0 | 20.1 | 20.0 | 20.0 | 7H |
| pH | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7H |
| DO | 7.9 | 7.9 | 8.0 | 8.0 | 8.0 | 7.9 | 1L |
| Initials | STL | | | | | | |
| Time | 0802 | | | | | | |

| Day 2 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 09/29/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 18.6 | 18.4 | 18.8 | 18.6 | 18.7 | 18.5 | 1Q |
| Temp | 20.1 | 20.1 | 20.1 | 20.3 | 20.1 | 20.1 | 7H |
| pH | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7H |
| DO | 7.9 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 1L |
| Ammonia | 1.00 | //////// | //////// | //////// | //////// | //////// | Initials STL |
| Initials | STL | | | | | | |
| Time | 0812 | | | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**

| Day 3 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 09/30/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 18.5 | 18.3 | 18.7 | 18.4 | 18.6 | 18.4 | 1Q |
| Temp | 20.1 | 20.0 | 20.0 | 20.2 | 20.0 | 20.0 | 7H |
| pH | 7.3 | 7.3 | 7.3 | 7.3 | 7.4 | 7.4 | 7H |
| DO | 7.7 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 1L |
| Initials | JL | | | | | | |
| Time | 0905 | | | | | | |

| Day 4 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/01/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 18.5 | 18.2 | 18.7 | 18.4 | 18.6 | 18.4 | 1Q |
| Temp | 19.8 | 19.7 | 19.7 | 19.9 | 19.7 | 19.7 | 7H |
| pH | 7.3 | 7.3 | 7.3 | 7.3 | 7.3 | 7.3 | 7H |
| DO | 7.9 | 8.1 | 8.1 | 8.2 | 8.1 | 8.1 | 1L |
| Initials | GW | | | | | | |
| Time | 0841 | | | | | | |

| Day 5 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/02/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 18.5 | 18.1 | 18.6 | 18.3 | 18.6 | 18.3 | 1Q |
| Temp | 20.0 | 20.0 | 20.0 | 20.2 | 20.0 | 19.9 | 7H |
| pH | 7.3 | 7.3 | 7.3 | 7.3 | 7.3 | 7.3 | 7H |
| DO | 7.9 | 8.0 | 8.0 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | GW | | | | | | |
| Time | 0853 | | | | | | |

Comments: ________________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

## *L. plumulosus* Water Quality Data Cont.

| Day 6 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/03/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 18.5 | 18.1 | 18.6 | 18.3 | 18.6 | 18.3 | 1Q |
| Temp | 20.1 | 20.1 | 20.1 | 20.3 | 20.1 | 20.1 | 7H |
| pH | 7.0 | 7.0 | 7.1 | 7.1 | 7.1 | 7.1 | 7H |
| DO | 7.9 | 7.9 | 8.0 | 8.0 | 8.0 | 8.0 | 1L |
| Initials | STL | | | | | | |
| Time | 0913 | | | | | | |

| Day 7 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/04/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 18.5 | 18.1 | 18.7 | 18.3 | 18.6 | 18.3 | 1Q |
| Temp | 20.0 | 20.0 | 20.0 | 20.1 | 20.0 | 20.0 | 7H |
| pH | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7H |
| DO | 7.9 | 8.1 | 8.1 | 8.1 | 8.1 | 8.0 | 1L |
| Initials | BW | | | | | | |
| Time | 0910 | | | | | | |

| Day 8 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/05/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 18.5 | 18.1 | 18.7 | 18.3 | 18.6 | 18.3 | 1Q |
| Temp | 20.1 | 20.1 | 20.0 | 20.2 | 20.0 | 20.0 | 7H |
| pH | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7H |
| DO | 8.0 | 8.0 | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Ammonia | 0.10 | //////// | //////// | //////// | //////// | //////// | Initials |
| Initials | BW | | | | | | |
| Time | 0805 | | | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**

| Day 9 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/06/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 18.6 | 18.1 | 18.7 | 18.5 | 18.6 | 18.3 | 1Q |
| Temp | 20.1 | 20.0 | 20.0 | 20.2 | 20.0 | 20.1 | 7H |
| pH | 7.0 | 7.0 | 6.9 | 6.9 | 6.9 (A) | ~~8.9~~ 6.9 | 7H |
| DO | 7.9 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | bw | | | | | | |
| Time | 0829 | | | | | | |

**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Control Overlying Water Measurements— **0 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 10/07/24 | 0A | 0B | 0C | 0D | 0E | Meter # |
| Salinity | 18.4 | 18.2 | 18.5 | 18.6 | 18.4 | 1Q |
| Temp | 19.9 | 19.9 | 19.8 | 20.0 | 19.8 | 7H |
| pH | 7.5 | 7.2 | 7.1 | 6.8 | 6.7 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 7.9 | 8.1 | 1L |
| Initials | CH | | | | | |
| Time | 0811 | | | | | |

| Day 10 | Overlying Water Measurements – **250 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 10/07/24 | 250A | 250B | 250C | 250D | 250E | Meter # |
| Salinity | 18.1 | 18.3 | 18.5 | 18.5 | 18.3 | 1Q |
| Temp | 19.9 | 19.9 | 19.9 | 20.0 | 19.9 | 7H |
| pH | 7.2 | 7.0 | 7.0 | 7.1 | 7.3 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | CH | | | | | |
| Time | 0817 | | | | | |

Comments: (A) eRRoR 100624 bw

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

***L. plumulosus* Water Quality Data Cont.**
**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Overlying Water Measurements — **500 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 10/07/24 | 500A | 500B | 500C | 500D | 500E | Meter # |
| Salinity | 18.0 | 18.7 | 18.7 | 18.5 | 18.7 | 1Q |
| Temp | 19.9 | 19.8 | 20.0 | 19.9 | 20.0 | 7H |
| pH | 7.5 | 7.1 | 7.4 | 7.1 | 7.1 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | CH | | | | | |
| Time | 0822 | | | | | |

| Day 10 | Overlying Water Measurements — **1000 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 10/07/24 | 1000A | 1000B | 1000C | 1000D | 1000E | Meter # |
| Salinity | 18.5 | 18.3 | 18.5 | 18.4 | 18.4 | 1Q |
| Temp | 19.9 | 19.9 | 19.8 | 19.9 | 20.2 | 7H |
| pH | 7.3 | 7.1 | 7.0 | 7.3 | 7.4 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | CH | | | | | |
| Time | 0826 | | | | | |

| Day 10 | Overlying Water Measurements — **2000 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 10/07/24 | 2000A | 2000B | 2000C | 2000D | 2000E | Meter # |
| Salinity | 18.7 | 18.4 | 18.3 | 18.7 | 18.7 | 1Q |
| Temp | 20.0 | 20.0 | 19.8 | 19.9 | 19.8 | 7H |
| pH | 7.5 | 7.4 | 7.1 | 6.9 | 6.9 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | CH/TAD | | | | | |
| Time | 0830 | | | | | |

Comments: ______

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

***L. plumulosus* Water Quality Data Cont.**
**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Overlying Water Measurements — **4000 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 10/07/24 | 4000A | 4000B | 4000C | 4000D | 4000E | Meter # |
| Salinity | 18.6 | 18.5 | 18.3 | 18.4 | 18.8 | 1Q |
| Temp | 19.8 | 20.1 | 19.9 | 20.0 | 19.9 | 7H |
| pH | 6.7 | 6.7 | 6.6 | 6.6 | 6.6 | 7H |
| DO | 8.2 | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | TAD | | | | | |
| Time | 0835 | | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

## *L. plumulosus* DRY LENGTH DATA

0-hr data: 20 representative organisms measured from antenna base to end of third pleon segment on the dorsal surface.

| # | Length |
|---|---|
| 1 | 3.6 |
| 2 | 3.4 |
| 3 | 3.4 |
| 4 | 3.7 |
| 5 | 3.5 |
| 6 | 3.3 |
| 7 | 3.6 |
| 8 | 3.5 |
| 9 | 3.5 |
| 10 | 3.5 |
| mean = 3.5 | |
| All data in mm / *L. plumulosus* | |

**Initial *L. plumulosus* Weights at Test Initiation**

| Rep # | Project # or Sample Description | A Final Weight (mg) | B Initial Weight (mg) | Final Weight minus Initial Weight (mg) | C No. of Organisms | D Lepto Weight (mg) |
|---|---|---|---|---|---|---|
| 1 | L-6470-24 | 21.67 | 18.11 | 3.56 | 10 | 0.356 |
| 2 | " | 17.40 | 14.07 | 3.33 | 10 | 0.333 |
| 3 | " | 18.49 | 14.56 | 3.93 | 10 | 0.393 |
| 4 | " | 19.22 | 15.22 | 4.00 | 10 | 0.400 |
| 5 | " | 17.03 | 14.09 | 2.94 | 10 | 0.294 |
| | | | | Mean Weight (mg/Lepto): | | 0.355 |

Initial Foil Weights at: Ⓐ ~~JL~~ 1139 on 09 / 27 /2024 by: JL Scale # 2R

Final Foil Weights at: Ⓐ ~~JTL~~ 1145 on 09 / 28 /2024 by: JTL Scale # 3B

Ⓐ Error BCP 100924

## Surviving *L. plumulosus* Weights at Test Termination

| Rep. | Concentration, mg/kg | A Final Weight (mg) | B Initial Weight (mg) | C No. of Surviving Organisms |
|---|---|---|---|---|
| A | 0 | 21.19 | 14.85 | 19 |
| B | 0 | 20.95 | 14.91 | 19 |
| C | 0 | 21.63 | 15.40 | 20 |
| D | 0 | 25.84 | 14.82 | 20 |
| E | 0 | 25.20 | 18.23 | 20 |
| A | 250 | 22.94 | 16.95 | 17 |
| B | 250 | 20.47 | 15.12 | 18 |
| C | 250 | 20.90 | 14.30 | 20 |
| D | 250 | 20.48 | 14.78 | 20 |
| E | 250 | 23.94 | 17.10 | 20 |
| A | 500 | 19.18 | 13.70 | 16 |
| B | 500 | 20.60 | 14.20 | 20 |
| C | 500 | 19.49 | 14.53 | 18 |
| D | 500 | 19.97 | 13.42 | 20 |
| E | 500 | 21.37 | 15.30 | 18 |
| A | 1000 | 20.44 | 13.86 | 19 |
| B | 1000 | 18.93 | 13.85 | 16 |
| C | 1000 | 19.28 | 13.88 | 20 |
| D | 1000 | 19.89 | 14.36 | 19 |
| E | 1000 | 21.31 | 14.78 | 20 |

Comments:

| Surviving *L. plumulosus* Weights at Test Termination Cont. | | | | |
|---|---|---|---|---|
| A | 2000 | 19.44 | 14.26 | 19 |
| B | 2000 | 19.18 | 14.12 | 17 |
| C | 2000 | 18.67 | 14.40 | 16 |
| D | 2000 | 17.04 | 12.78 | 17 |
| E | 2000 | 15.11 | 9.36 | 20 |
| A | 4000 | 15.72 | 11.34 | 15 |
| B | 4000 | 20.38 | 15.45 | 19 |
| C | 4000 | 18.85 | 12.91 | 19 |
| D | 4000 | 19.09 | 13.65 | 18 |
| E | 4000 | 20.97 | 16.24 | 20 |

Initial Foil Weights at: 0855 on 10 / 7 /2024 by: GW Scale # 3B

Final Foil Weights at: 1436 on 10 / 08 /2024 by: STL Scale # 3B

Comments: ______

Environmental Enterprises USA, Inc.

# APPENDIX G

# Newfields Environmental

## L-6470-24 (L-6272-24) Heavy Oil in NS006

| 10-Day Survival | |
|---|---|
| **NOEC** | **LOEC** |
| 4000 | >4000 |
| **LC25** | **LC50** |
| >4000 | >4000 |

| Mean Dry Weight-mg | |
|---|---|
| **NOEC** | **LOEC** |
| 1000 | 2000 |
| **IC25** | **IC50** |
| 1951 | >4000 |

## CETIS Test Data Worksheet

Report Date: 09 Oct-24 11:34 (p 1 of 1)
Test Code/ID: L-6470-24 (G-S) / 06-0827-6473

Leptocheirus 10-d Survival and Growth Test — Environmental Enterprises USA, Inc.

Start Date: 27 Sep-24 11:51 | Species: Leptocheirus plumulosus | Sample Code: L-6470-24 (G-S)
End Date: 07 Oct-24 12:45 | Protocol: EPA 821-R-11-004 (2011) | Sample Source:
Sample Date: 09 Oct-24 11:29 | Material: Natural Sediment | Sample Station:

| Conc-mg/kg | Code | Rep | Pos | # Exposed | 1d Survival | 2d Survival | 3d Survival | 4d Survival | 5d Survival | 6d Survival | 7d Survival | 8d Survival | 9d Survival | 10d Survival | Total Weight-mg | Tare Weight-mg | Pan Count |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | LP | 1 | 30 | 20 | | | | | | | | | | 19 | 21.19 | 14.85 | 19 |
| 0 | LP | 2 | 10 | 20 | | | | | | | | | | 19 | 20.95 | 14.91 | 19 |
| 0 | LP | 3 | 19 | 20 | | | | | | | | | | 20 | 21.63 | 15.4 | 20 |
| 0 | LP | 4 | 23 | 20 | | | | | | | | | | 20 | 25.84 | 14.82 | 20 |
| 0 | LP | 5 | 21 | 20 | | | | | | | | | | 20 | 25.2 | 18.23 | 20 |
| 250 | | 1 | 27 | 20 | | | | | | | | | | 17 | 22.94 | 16.95 | 17 |
| 250 | | 2 | 25 | 20 | | | | | | | | | | 18 | 20.47 | 15.12 | 18 |
| 250 | | 3 | 20 | 20 | | | | | | | | | | 20 | 20.9 | 14.3 | 20 |
| 250 | | 4 | 26 | 20 | | | | | | | | | | 20 | 20.48 | 14.78 | 20 |
| 250 | | 5 | 4 | 20 | | | | | | | | | | 20 | 23.94 | 17.1 | 20 |
| 500 | | 1 | 2 | 20 | | | | | | | | | | 16 | 19.18 | 13.7 | 16 |
| 500 | | 2 | 8 | 20 | | | | | | | | | | 20 | 20.6 | 14.2 | 20 |
| 500 | | 3 | 17 | 20 | | | | | | | | | | 18 | 19.49 | 14.53 | 18 |
| 500 | | 4 | 18 | 20 | | | | | | | | | | 20 | 19.97 | 13.42 | 20 |
| 500 | | 5 | 16 | 20 | | | | | | | | | | 18 | 21.37 | 15.3 | 18 |
| 1000 | | 1 | 12 | 20 | | | | | | | | | | 19 | 20.44 | 13.86 | 19 |
| 1000 | | 2 | 29 | 20 | | | | | | | | | | 16 | 18.93 | 13.85 | 16 |
| 1000 | | 3 | 7 | 20 | | | | | | | | | | 20 | 19.28 | 13.88 | 20 |
| 1000 | | 4 | 15 | 20 | | | | | | | | | | 19 | 19.89 | 14.36 | 19 |
| 1000 | | 5 | 11 | 20 | | | | | | | | | | 20 | 21.31 | 14.78 | 20 |
| 2000 | | 1 | 3 | 20 | | | | | | | | | | 19 | 19.44 | 14.26 | 19 |
| 2000 | | 2 | 14 | 20 | | | | | | | | | | 17 | 19.18 | 14.12 | 17 |
| 2000 | | 3 | 5 | 20 | | | | | | | | | | 16 | 18.67 | 14.4 | 16 |
| 2000 | | 4 | 22 | 20 | | | | | | | | | | 17 | 17.04 | 12.78 | 17 |
| 2000 | | 5 | 13 | 20 | | | | | | | | | | 20 | 15.11 | 9.36 | 20 |
| 4000 | | 1 | 9 | 20 | | | | | | | | | | 15 | 15.72 | 11.34 | 15 |
| 4000 | | 2 | 6 | 20 | | | | | | | | | | 19 | 20.38 | 15.45 | 19 |
| 4000 | | 3 | 28 | 20 | | | | | | | | | | 19 | 18.85 | 12.91 | 19 |
| 4000 | | 4 | 1 | 20 | | | | | | | | | | 18 | 19.09 | 13.65 | 18 |
| 4000 | | 5 | 24 | 20 | | | | | | | | | | 20 | 20.97 | 16.24 | 20 |

# CETIS Analytical Report

Report Date: 10 Oct-24 09:35 (p 1 of 2)
Test Code/ID: L-6470-24 (G-S) / 06-0827-6473

**Leptocheirus 10-d Survival and Growth Test** — **Environmental Enterprises USA, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 06-1093-5407 | **Endpoint:** | 10d Survival Rate | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 9:34 | **Analysis:** | Parametric-Control vs Treatments | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 11:29 | **MD5 Hash:** | 3651C29145A455AF6FDDE5F6CAD2FA0B | **Editor ID:** | 002-227-489-6 |

| Data Transform | Alt Hyp | NOEL | LOEL | TOEL | Tox Units | MSDu | PMSD |
|---|---|---|---|---|---|---|---|
| Angular (Corrected) | C > T | 4000 | >4000 | --- | --- | 0.105 | 10.71% |

### Dunnett Multiple Comparison Test

| Control | vs | Conc-mg/kg | df | Test Stat | Critical | MSD | P-Type | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|---|---|---|
| Control | | 250 | 8 | 0.6218 | 2.362 | 0.2039 | CDF | 0.5927 | Non-Significant Effect |
| | | 500 | 8 | 1.26 | 2.362 | 0.2039 | CDF | 0.3101 | Non-Significant Effect |
| | | 1000 | 8 | 0.8146 | 2.362 | 0.2039 | CDF | 0.5042 | Non-Significant Effect |
| | | 2000 | 8 | 1.875 | 2.362 | 0.2039 | CDF | 0.1236 | Non-Significant Effect |
| | | 4000 | 8 | 1.439 | 2.362 | 0.2039 | CDF | 0.2442 | Non-Significant Effect |

### ANOVA Table

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|
| Between | 0.0821409 | 0.0164282 | 5 | 0.8817 | 0.5084 | Non-Significant Effect |
| Error | 0.447182 | 0.0186326 | 24 | | | |
| Total | 0.529323 | | 29 | | | |

### ANOVA Assumptions Tests

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) |
|---|---|---|---|---|---|
| Variance | Bartlett Equality of Variance Test | 3.111 | 15.09 | 0.6828 | Equal Variances |
| Distribution | Shapiro-Wilk W Normality Test | 0.9574 | 0.9031 | 0.2655 | Normal Distribution |

### 10d Survival Rate Summary

| Conc-mg/kg | Code | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | LP | 5 | 0.9800 | 0.9460 | 1.0000 | 1.0000 | 0.9500 | 1.0000 | 0.0123 | 2.79% | 0.00% |
| 250 | | 5 | 0.9500 | 0.8622 | 1.0000 | 1.0000 | 0.8500 | 1.0000 | 0.0316 | 7.44% | 3.06% |
| 500 | | 5 | 0.9200 | 0.8161 | 1.0000 | 0.9000 | 0.8000 | 1.0000 | 0.0374 | 9.09% | 6.12% |
| 1000 | | 5 | 0.9400 | 0.8380 | 1.0000 | 0.9500 | 0.8000 | 1.0000 | 0.0367 | 8.74% | 4.08% |
| 2000 | | 5 | 0.8900 | 0.7880 | 0.9920 | 0.8500 | 0.8000 | 1.0000 | 0.0367 | 9.23% | 9.18% |
| 4000 | | 5 | 0.9100 | 0.7906 | 1.0000 | 0.9500 | 0.7500 | 1.0000 | 0.0430 | 10.57% | 7.14% |

### Angular (Corrected) Transformed Summary

| Conc-mg/kg | Code | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | LP | 5 | 1.4130 | 1.3360 | 1.4910 | 1.4590 | 1.3450 | 1.4590 | 0.0278 | 4.40% | 0.00% |
| 250 | | 5 | 1.3600 | 1.1880 | 1.5310 | 1.4590 | 1.1730 | 1.4590 | 0.0619 | 10.17% | 3.80% |
| 500 | | 5 | 1.3050 | 1.1160 | 1.4940 | 1.2490 | 1.1070 | 1.4590 | 0.0681 | 11.67% | 7.70% |
| 1000 | | 5 | 1.3430 | 1.1650 | 1.5210 | 1.3450 | 1.1070 | 1.4590 | 0.0642 | 10.69% | 4.98% |
| 2000 | | 5 | 1.2510 | 1.0710 | 1.4320 | 1.1730 | 1.1070 | 1.4590 | 0.0652 | 11.64% | 11.45% |
| 4000 | | 5 | 1.2890 | 1.0980 | 1.4810 | 1.3450 | 1.0470 | 1.4590 | 0.0690 | 11.97% | 8.79% |

### 10d Survival Rate Detail

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | LP | 0.9500 | 0.9500 | 1.0000 | 1.0000 | 1.0000 |
| 250 | | 0.8500 | 0.9000 | 1.0000 | 1.0000 | 1.0000 |
| 500 | | 0.8000 | 1.0000 | 0.9000 | 1.0000 | 0.9000 |
| 1000 | | 0.9500 | 0.8000 | 1.0000 | 0.9500 | 1.0000 |
| 2000 | | 0.9500 | 0.8500 | 0.8000 | 0.8500 | 1.0000 |
| 4000 | | 0.7500 | 0.9500 | 0.9500 | 0.9000 | 1.0000 |

# CETIS Analytical Report

| | |
|---|---|
| Report Date: | 10 Oct-24 09:35 (p 2 of 2) |
| Test Code/ID: | L-6470-24 (G-S) / 06-0827-6473 |

**Leptocheirus 10-d Survival and Growth Test** — **Environmental Enterprises USA, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 06-1093-5407 | **Endpoint:** | 10d Survival Rate | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 9:34 | **Analysis:** | Parametric-Control vs Treatments | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 11:29 | **MD5 Hash:** | 3651C29145A455AF6FDDE5F6CAD2FA0B | **Editor ID:** | 002-227-489-6 |

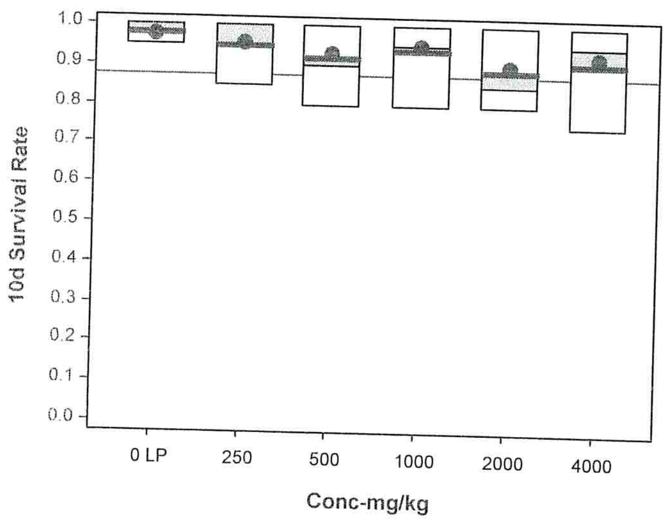
## Angular (Corrected) Transformed Detail

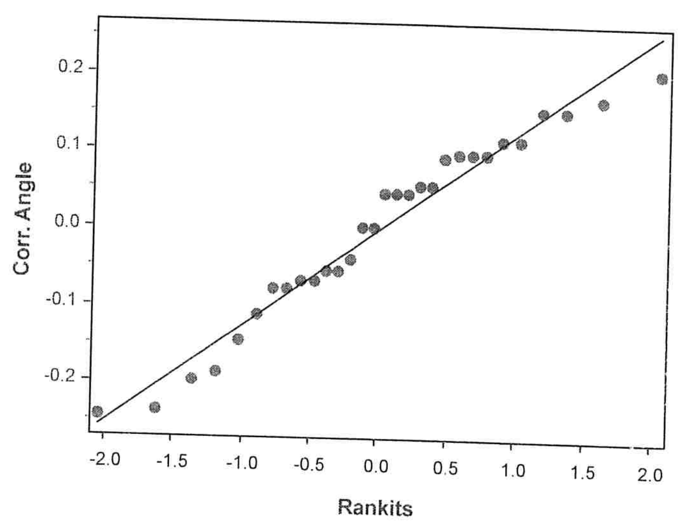
| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | LP | 1.3450 | 1.3450 | 1.4590 | 1.4590 | 1.4590 |
| 250 | | 1.1730 | 1.2490 | 1.4590 | 1.4590 | 1.4590 |
| 500 | | 1.1070 | 1.4590 | 1.2490 | 1.4590 | 1.2490 |
| 1000 | | 1.3450 | 1.1070 | 1.4590 | 1.3450 | 1.4590 |
| 2000 | | 1.3450 | 1.1730 | 1.1070 | 1.1730 | 1.4590 |
| 4000 | | 1.0470 | 1.3450 | 1.3450 | 1.2490 | 1.4590 |

## 10d Survival Rate Binomials

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | LP | 19/20 | 19/20 | 20/20 | 20/20 | 20/20 |
| 250 | | 17/20 | 18/20 | 20/20 | 20/20 | 20/20 |
| 500 | | 16/20 | 20/20 | 18/20 | 20/20 | 18/20 |
| 1000 | | 19/20 | 16/20 | 20/20 | 19/20 | 20/20 |
| 2000 | | 19/20 | 17/20 | 16/20 | 17/20 | 20/20 |
| 4000 | | 15/20 | 19/20 | 19/20 | 18/20 | 20/20 |

## Graphics



# CETIS Analytical Report



**Leptocheirus 10-d Survival and Growth Test** — Environmental Enterprises USA, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 18-0803-0165 | **Endpoint:** | Mean Dry Weight-mg | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 13:29 | **Analysis:** | Nonparametric-Control vs Treatments | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 11:29 | **MD5 Hash:** | 958A120296C922069169C61D76396233 | **Editor ID:** | 002-227-489-6 |

| Data Transform | Alt Hyp | NOEL | LOEL | TOEL | Tox Units | MSDu | PMSD |
|---|---|---|---|---|---|---|---|
| Untransformed | C > T | 1000 | 2000 | 1414 | --- | 0.07203 | 19.34% |

**Steel Many-One Rank Sum Test**

| Control | vs | Conc-mg/kg | df | Test Stat | Critical | Ties | P-Type | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|---|---|---|
| Control | | 250 | 8 | 24 | 16 | 0 | CDF | 0.5394 | Non-Significant Effect |
| | | 500 | 8 | 25 | 16 | 0 | CDF | 0.6353 | Non-Significant Effect |
| | | 1000 | 8 | 21 | 16 | 0 | CDF | 0.2625 | Non-Significant Effect |
| | | 2000* | 8 | 15 | 16 | 0 | CDF | 0.0191 | Significant Effect |
| | | 4000* | 8 | 16 | 16 | 0 | CDF | 0.0332 | Significant Effect |

**ANOVA Table**

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|
| Between | 0.0308362 | 0.0061673 | 5 | 2.652 | 0.0479 | Significant Effect |
| Error | 0.0558037 | 0.0023252 | 24 | | | |
| Total | 0.0866399 | | 29 | | | |

**ANOVA Assumptions Tests**

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) |
|---|---|---|---|---|---|
| Variance | Bartlett Equality of Variance Test | 16.25 | 15.09 | 0.0062 | Unequal Variances |
| Distribution | Shapiro-Wilk W Normality Test | 0.7977 | 0.9031 | 5.9E-05 | Non-Normal Distribution |

**Mean Dry Weight-mg Summary**

| Conc-mg/kg | Code | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | LP | 5 | 0.3725 | 0.2473 | 0.4977 | 0.3337 | 0.3115 | 0.551 | 0.04508 | 27.06% | 0.00% |
| 250 | | 5 | 0.3213 | 0.2853 | 0.3573 | 0.33 | 0.285 | 0.3524 | 0.01297 | 9.03% | 13.74% |
| 500 | | 5 | 0.3206 | 0.2875 | 0.3536 | 0.3275 | 0.2756 | 0.3425 | 0.0119 | 8.30% | 13.95% |
| 1000 | | 5 | 0.3103 | 0.273 | 0.3476 | 0.3175 | 0.27 | 0.3463 | 0.01343 | 9.68% | 16.71% |
| 2000 | | 5 | 0.275 | 0.2524 | 0.2977 | 0.2726 | 0.2506 | 0.2976 | 0.008175 | 6.65% | 26.16% |
| 4000 | | 5 | 0.2806 | 0.2412 | 0.3199 | 0.292 | 0.2365 | 0.3126 | 0.01417 | 11.29% | 24.68% |

**Mean Dry Weight-mg Detail**

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | LP | 0.3337 | 0.3179 | 0.3115 | 0.551 | 0.3485 |
| 250 | | 0.3524 | 0.2972 | 0.33 | 0.285 | 0.342 |
| 500 | | 0.3425 | 0.32 | 0.2756 | 0.3275 | 0.3372 |
| 1000 | | 0.3463 | 0.3175 | 0.27 | 0.2911 | 0.3265 |
| 2000 | | 0.2726 | 0.2976 | 0.2669 | 0.2506 | 0.2875 |
| 4000 | | 0.292 | 0.2595 | 0.3126 | 0.3022 | 0.2365 |

# CETIS Analytical Report

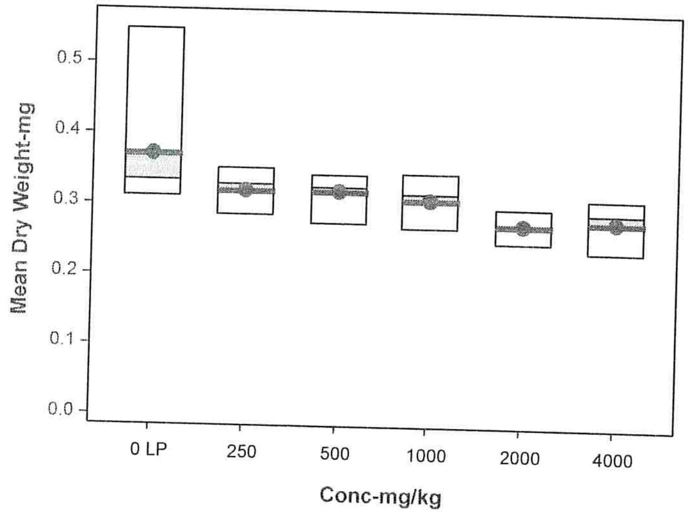
Report Date: 10 Oct-24 13:30 (p 2 of 2)
Test Code/ID: L-6470-24 (G-S) / 06-0827-6473

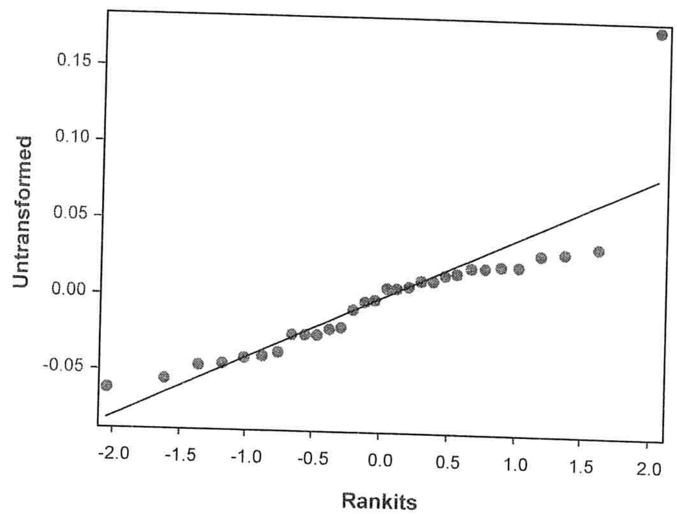
**Leptocheirus 10-d Survival and Growth Test**

**Environmental Enterprises USA, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 18-0803-0165 | **Endpoint:** | Mean Dry Weight-mg | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 13:29 | **Analysis:** | Nonparametric-Control vs Treatments | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 11:29 | **MD5 Hash:** | 958A120296C922069169C61D76396233 | **Editor ID:** | 002-227-489-6 |

**Graphics**



# CETIS Analytical Report

| | |
|---|---|
| Report Date: | 10 Oct-24 09:37 (p 1 of 2) |
| Test Code/ID: | L-6470-24 (G-S) / 06-0827-6473 |

**Leptocheirus 10-d Survival and Growth Test** — Environmental Enterprises USA, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 06-1948-3315 | **Endpoint:** | 10d Survival Rate | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 9:36 | **Analysis:** | Linear Interpolation (ICPIN) | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 11:29 | **MD5 Hash:** | 3651C29145A455AF6FDDE5F6CAD2FA0B | **Editor ID:** | 002-227-489-6 |

## Linear Interpolation Options

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Linear | Linear | 1302871 | 1000 | Yes | Two-Point Interpolation |

## Point Estimates

| Level | mg/kg | 95% LCL | 95% UCL |
|---|---|---|---|
| LC15 | >4000 | --- | --- |
| LC20 | >4000 | --- | --- |
| LC25 | >4000 | --- | --- |
| LC40 | >4000 | --- | --- |
| LC50 | >4000 | --- | --- |

## 10d Survival Rate Summary

| | | | Calculated Variate(A/B) | | | | | | | Isotonic Variate | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Conc-mg/kg | Code | Count | Mean | Median | Min | Max | CV% | %Effect | ΣA/ΣB | Mean | %Effect |
| 0 | LP | 5 | 0.9800 | 1.0000 | 0.9500 | 1.0000 | 2.79% | 0.00% | 98/100 | 0.9800 | 0.00% |
| 250 | | 5 | 0.9500 | 1.0000 | 0.8500 | 1.0000 | 7.44% | 3.06% | 95/100 | 0.9500 | 3.06% |
| 500 | | 5 | 0.9200 | 0.9000 | 0.8000 | 1.0000 | 9.09% | 6.12% | 92/100 | 0.9300 | 5.10% |
| 1000 | | 5 | 0.9400 | 0.9500 | 0.8000 | 1.0000 | 8.74% | 4.08% | 94/100 | 0.9300 | 5.10% |
| 2000 | | 5 | 0.8900 | 0.8500 | 0.8000 | 1.0000 | 9.23% | 9.18% | 89/100 | 0.9000 | 8.16% |
| 4000 | | 5 | 0.9100 | 0.9500 | 0.7500 | 1.0000 | 10.57% | 7.14% | 91/100 | 0.9000 | 8.16% |

## 10d Survival Rate Detail

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | LP | 0.9500 | 0.9500 | 1.0000 | 1.0000 | 1.0000 |
| 250 | | 0.8500 | 0.9000 | 1.0000 | 1.0000 | 1.0000 |
| 500 | | 0.8000 | 1.0000 | 0.9000 | 1.0000 | 0.9000 |
| 1000 | | 0.9500 | 0.8000 | 1.0000 | 0.9500 | 1.0000 |
| 2000 | | 0.9500 | 0.8500 | 0.8000 | 0.8500 | 1.0000 |
| 4000 | | 0.7500 | 0.9500 | 0.9500 | 0.9000 | 1.0000 |

## 10d Survival Rate Binomials

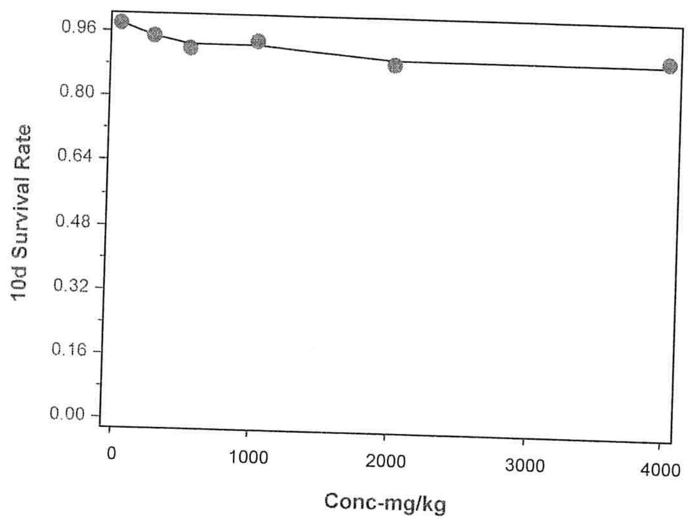
| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | LP | 19/20 | 19/20 | 20/20 | 20/20 | 20/20 |
| 250 | | 17/20 | 18/20 | 20/20 | 20/20 | 20/20 |
| 500 | | 16/20 | 20/20 | 18/20 | 20/20 | 18/20 |
| 1000 | | 19/20 | 16/20 | 20/20 | 19/20 | 20/20 |
| 2000 | | 19/20 | 17/20 | 16/20 | 17/20 | 20/20 |
| 4000 | | 15/20 | 19/20 | 19/20 | 18/20 | 20/20 |

Leptocheirus 10-d Survival and Growth Test

Environmental Enterprises USA, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** 06-1948-3315 | | **Endpoint:** | 10d Survival Rate | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 9:36 | **Analysis:** | Linear Interpolation (ICPIN) | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 11:29 | **MD5 Hash:** | 3651C29145A455AF6FDDE5F6CAD2FA0B | **Editor ID:** | 002-227-489-6 |

**Graphics**



# CETIS Analytical Report

| | |
|---|---|
| Report Date: | 10 Oct-24 13:30 (p 1 of 1) |
| Test Code/ID: | L-6470-24 (G-S) / 06-0827-6473 |

**Leptocheirus 10-d Survival and Growth Test**

**Environmental Enterprises USA, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 06-9866-4617 | **Endpoint:** | Mean Dry Weight-mg | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 13:30 | **Analysis:** | Linear Interpolation (ICPIN) | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 11:29 | **MD5 Hash:** | 958A120296C922069169C61D76396233 | **Editor ID:** | 002-227-489-6 |

**Linear Interpolation Options**

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Linear | Linear | 1098468 | 1000 | Yes | Two-Point Interpolation |

**Point Estimates**

| Level | mg/kg | 95% LCL | 95% UCL |
|---|---|---|---|
| IC15 | 690.5 | --- | --- |
| IC20 | 1378 | --- | --- |
| IC25 | 1951 | --- | --- |
| IC40 | >4000 | --- | --- |
| IC50 | >4000 | --- | --- |

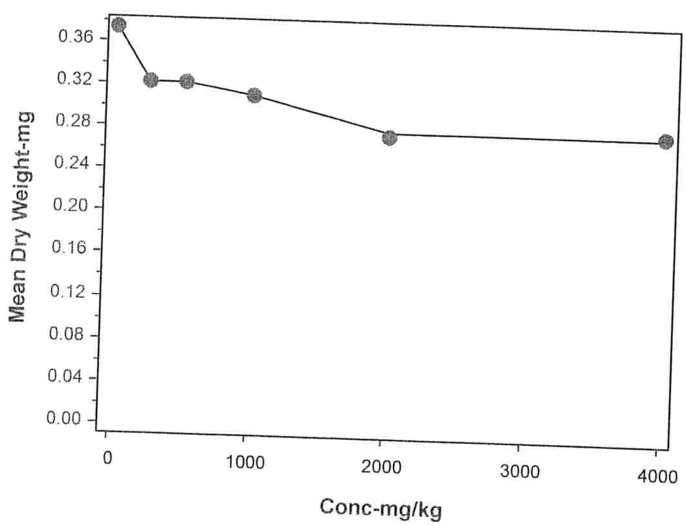
**Mean Dry Weight-mg Summary**

| | | | Calculated Variate | | | | | | Isotonic Variate | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-mg/kg | Code | Count | Mean | Median | Min | Max | CV% | %Effect | Mean | %Effect |
| 0 | LP | 5 | 0.3725 | 0.3337 | 0.3115 | 0.551 | 27.06% | 0.00% | 0.3725 | 0.00% |
| 250 | | 5 | 0.3213 | 0.33 | 0.285 | 0.3524 | 9.03% | 13.74% | 0.3213 | 13.74% |
| 500 | | 5 | 0.3206 | 0.3275 | 0.2756 | 0.3425 | 8.30% | 13.95% | 0.3206 | 13.93% |
| 1000 | | 5 | 0.3103 | 0.3175 | 0.27 | 0.3463 | 9.68% | 16.71% | 0.3103 | 16.70% |
| 2000 | | 5 | 0.275 | 0.2726 | 0.2506 | 0.2976 | 6.65% | 26.16% | 0.2778 | 25.42% |
| 4000 | | 5 | 0.2806 | 0.292 | 0.2365 | 0.3126 | 11.29% | 24.68% | 0.2778 | 25.42% |

**Mean Dry Weight-mg Detail**

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | LP | 0.3337 | 0.3179 | 0.3115 | 0.551 | 0.3485 |
| 250 | | 0.3524 | 0.2972 | 0.33 | 0.285 | 0.342 |
| 500 | | 0.3425 | 0.32 | 0.2756 | 0.3275 | 0.3372 |
| 1000 | | 0.3463 | 0.3175 | 0.27 | 0.2911 | 0.3265 |
| 2000 | | 0.2726 | 0.2976 | 0.2669 | 0.2506 | 0.2875 |
| 4000 | | 0.292 | 0.2595 | 0.3126 | 0.3022 | 0.2365 |

**Graphics**



Environmental Enterprises USA, Inc.

# APPENDIX H

## EE NATURAL SEDIMENT (NS006)

**EE NS SEDIMENT**

| | NS Wet Weight g | NS Dry + Pan Weight g | Initial Pan Weight g | NS Dry Weight g | | Weight of 25 ml NS g |
|---|---|---|---|---|---|---|
| 1 | 30.04 | 14.84 | 0.96 | 13.88 | 1 | 34.34 |
| 2 | 30.05 | 14.83 | 0.97 | 13.86 | 2 | 34.14 |
| 3 | 30.07 | 14.83 | 0.96 | 13.87 | 3 | 35.01 |

**WET TO DRY RATIO (W2DR)**

(Wet NS wt 1/Dry NS wt 1) + (Wet NS wt 2/Dry NS wt 2) + (Wet NS wt 3/ Dry NS wt 3) / 3 =

2.17 **NS Water Content = 53.9 %**

**WET NS DENSITY (WNSD)**

(Wet NS wt 1/Wet NS vol. + Wet NS wt 2/Wet NS vol + Wet NS wt 3/Wet NS vol.) / 3 =

1.38 g/ml

**EXPOSURE CONCENTRATION CALCULATIONS**

WET NS NEEDED

WNSD X VOL. OF NS REQUIRED = WT. NS REQUIRED/CONC.

1.3800 X 925 = 1276.5 g WET NS/CONC.

DRY NS NEEDED

(WET NS PER CONC./W2DR)X(1kg/1000g)-DRY WT. NS/CONC.

925 ml 0.5882 kg = 588.2 g

**EEUSA**
**Heavy Oil in NS006**
**L-6470-24 (L-6272-24)**

**Sample ID Double Check:** BCP

DESIRED CONC. IN mg/kg X DRY WT. NS IN kg. = TOXICANT REQUIRED IN mg.

| Conc. mg/kg | Dry NS kg | Calculated g | Actual +/- 0.01 g | Initial | Volume ml | Wet Wt. g | Actual +/- 0.1 g | Mixing Tech. Initials |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.5882 | 0.00 | 0.00 | CH | 925 | 1276.5 | 1276.5 | JL |
| 250 | 0.5882 | 0.15 | 0.15 | CH | 925 | 1276.5 | 1276.5 | JL |
| 500 | 0.5882 | 0.29 | 0.29 | CH | 925 | 1276.5 | 1276.5 | JTL |
| 1000 | 0.5882 | 0.59 | 0.58 | CH | 925 | 1276.5 | 1276.5 | GW |
| 2000 | 0.5882 | 1.18 | 1.18 | CH | 925 | 1276.5 | 1276.5 | JL |
| 4000 | 0.5882 | 2.35 | 2.34 | CH | 925 | 1276.5 | 1276.5 | JTL |

Scale ID: 4S Scale ID: 4S

Prepared By: [signature] 9/25/24

Check By: CH 9/26/24



Raw Data QC/QA: BCP

Environmental Enterprises USA, Inc.

# APPENDIX I

# ENVIRONMENTAL ENTERPRISES USA, INC.

58485 Pearl Acres Rd., Suite D
Slidell, LA 70461
(985) 646-2787, Fax # (985) 646-2810

## CHAIN - OF - CUSTODY RECORD

Client: Environmental Enterprises USA Inc.
Address: 58485 Pearl Acres Rd
Slidell, LA 70461

Contact Person:
Phone #:
Email #:
WBS/AFE/PO, etc:

| Sample Description | Collected Date | Collected Time | Collection Purpose | | No. of Containers* | Size of Container | Lot # |
|---|---|---|---|---|---|---|---|
| natural sediment | 8/5/24 | 1730 | Sediment for Culturing | | | 1gal Bucket | NS-006 |

| | | |
|---|---|---|
| Collected By: Print: Nicholas Becker<br>Company Name N/A<br>Sign: [signature] | | Relinquished By: Print: [signature] 8/15/24<br>Company Name N/A<br>Sign: [signature] 1630 hr |
| Received By: Print: M Robbins 8/16/24<br>Company Name EE USA<br>Sign: [signature] 0800 hr | | Relinquished By: Print: __/__/__<br>Company Name EE USA<br>Sign: __ hr |
| Received By: Print: __/__/__<br>Company Name EE USA<br>Sign: __ hr | | Relinquished By: Print: __/__/__<br>Company Name<br>Sign: __ hr |
| Received By: Print: __/__/__<br>Company Name<br>Sign: __ hr | | Relinquished By: Print: __/__/__<br>Company Name<br>Sign: __ hr |

**EE USA use only!** *Plastic or Glass container(s).

Tracking #: __________ Kit #: __________

Environmental Enterprises USA, Inc.

# APPENDIX J

EUSTIS ENGINEERING SINCE 1946

# Soil Mechanics Laboratory Testing



**Gulfport Office**
14368 Creosote Road
Gulfport, MS 39503
Phone: 228-575-9888

**Client:**

Environmental Enterprises USA, Inc
58485 Pearl Acres Road, Suite D
Slidell, LA 70461

**Project:**

G0501
Environmental Enterprises USA, Inc
58485 Pearl Acres Road, Suite D
Slidell, LA 70461

Transmitted herein are the test results for the material sampled on the date in the description.

Table of Contents

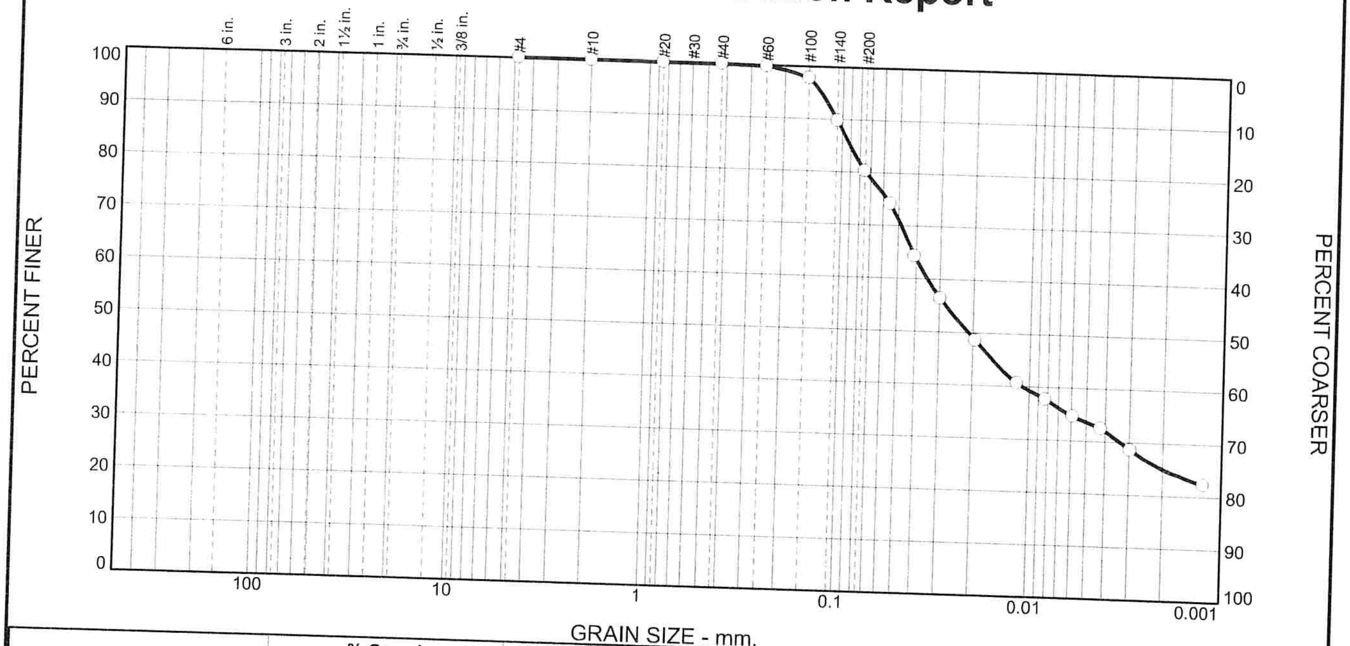






FL Firm Registration No. 31944
TBPE Firm Registration No. F-13895

# Particle Size Distribution Report




| % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 19.7 | 46.6 | 33.6 |

**Test Results (ASTM D 422 & ASTM D 1140)**

| Opening Size | Percent Finer | Spec.* (Percent) | Pass? (X=Fail) |
|---|---|---|---|
| #4 | 100.0 | | |
| #10 | 100.0 | | |
| #20 | 99.9 | | |
| #40 | 99.9 | | |
| #60 | 99.8 | | |
| #100 | 97.7 | | |
| #140 | 89.7 | | |
| #200 | 80.2 | | |
| 0.0551 mm. | 74.1 | | |
| 0.0407 mm. | 64.2 | | |
| 0.0297 mm. | 56.4 | | |
| 0.0193 mm. | 48.5 | | |
| 0.0115 mm. | 40.6 | | |
| 0.0082 mm. | 37.7 | | |
| 0.0059 mm. | 34.6 | | |
| 0.0042 mm. | 32.4 | | |
| 0.0030 mm. | 28.5 | | |
| 0.0012 mm. | 22.3 | | |

* (no specification provided)

**Material Description**

Wet, dark gray SILT W/ SAND (fine), some clay

**Atterberg Limits (ASTM D 4318)**

PL= LL= PI=

**Classification**

USCS (D 2487)= ML AASHTO (M 145)=

**Coefficients**

$D_{90}$= 0.1070 $D_{85}$= 0.0902 $D_{60}$= 0.0349
$D_{50}$= 0.0211 $D_{30}$= 0.0034 $D_{15}$=
$D_{10}$= $C_u$= $C_c$=

**Remarks**

**Date Received:** 9/13/24 **Date Tested:** 9/18/24

**Tested By:** KC & AS

**Checked By:** RR

**Title:** Lab Manager

**Sample Number:** SR-22904-24-AA1

**Date Sampled:** 9/12/24

EUSTIS ENGINEERING SINCE 1946

**Client:** ENVIRONMENTAL ENTERPRISES USA, INC.
**Project:** ENVIRONMENTAL ENTERPRISES USA, INC.
58485 PEARL ACRES ROAD, SLIDELL, LOUISIANA
**Project No:** G0501 **Figure**

**Tested By:** **Checked By:**

# ENVIRONMENTAL ENTERPRISES USA, INC.

58485 Pearl Acres Rd., Suite D
Slidell, Louisiana 70461
(985) 646-2787

## CHAIN - OF - CUSTODY RECORD

Kit No. 308 T

Client: EE USA
Address: 58485 Pearl Acres Rd., Suite D
Slidell, LA 70461

Contact Person: Chris Holmes
Phone#: Office: (985) 646-2787
P.O. #
Email: cholmes@eeusa.com
Project:

**Special Handling Request**

( ) RUSH
( ) VERBAL
( ) OTHER

| Lab Sample Description | No. of Containers | Analysis Request | EEUSA S/R No. | Eustis Lab No. |
|---|---|---|---|---|
| Natural Sediment Batch #: NS006 | 1 | PSD, ASTM D422 | SR-22904-24-AA1 | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| Collected By / Received By | Date | Time | Relinquished By | Date | Time |
|---|---|---|---|---|---|
| Collected By: Beau Pere' | 9/12/2024 | 14:20 | Relinquished By: Beau Pere' | 9/12/2024 | 14:45 |
| Received By: EEUSA Jennifer Calecurt | 9-12-24 | 1445 | Relinquished By: EEUSA Jennifer Calecurt | 9-13-24 | 0819 |
| Received By: Marie Kledias EEUSA | 9-13-24 | 0819 | Relinquished By: Marie Kledias EEUSA | 9-13-24 | 0910 |
| Received By: [illegible] | 9/13/24 | 9:11 | Relinquished By: | | |
| Received By: | | | Relinquished By: | | |



xl/m/eesam/chain of custodies/coc-2003.xls

9/12/2024 2:37 PM

Waypoint ANALYTICAL

5041 Taravella Road, Marrero, LA 70072
Main 504-371-8557 ° Fax 504-371-8560
www.waypointanalytical.com

10/8/2024

Environmental Enterprises
Ms. Jennifer Dupont
58485 Pearl Acres Rd., Suite D
Slidell, LA, 70461

Ref: Report Number: 24-274-0030
Project Description: SR-23031-24-AA1

Dear Ms. Jennifer Dupont:

Waypoint Analytical Louisiana, Inc. received sample(s) on 9/30/2024 for the analyses presented in the following report. The above referenced project has been analyzed per your instructions. Unless otherwise noted, the analyses were performed in our laboratory in accordance with Standard Methods, The Solid Waste Manual SW-846, EPA Methods for Chemical Analysis of Water and Wastes and /or 40 CFR part 136.

Certain parameters (chlorine, pH, dissolved oxygen, sulfite...) are required to be analyzed within 15 minutes of sampling. Usually, but not always, any field parameter analyzed at the laboratory is outside of this holding time. Refer to sample analysis time for confirmation of holding time compliance. Analyses reported which indicate "Field" for these parameters were analyzed by the client in the field. Results for solid samples are reported on an as received or "wet weight" basis unless otherwise specified.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, method validations, instrumentation maintenance and calibration for all parameters (NELAP and non-NELAP) were performed in accordance with guidelines established by the USEPA (including 40 CFR 136 Method Update Rule May 2021) and NELAC unless otherwise indicated. Any parameter for which the laboratory is not officially NELAP accredited is indicated by a '~' symbol. These are not included in the scope because NELAP accreditation is either not available or has not been applied for. Additional certifications may be held/are available for parameters, where NELAP accreditation is not required or applicable. A full list of certifications is available upon request.

All quality control measures undertaken in accordance with Waypoint Analytical Louisiana, Inc. CompQAP990807A and revisions under the terms of the Louisiana Environmental Laboratory Accreditation Program (Certificate #02041) are within acceptance ranges established in that document with the exception of the items indicated and/or discussed in a Case Narrative.

The results are shown on the attached analysis sheet(s). Be aware that the time analyzed for certain samples (e.g. - BOD, CBOD, etc.) refer to the time the sample batch was begun and not necessarily to the time an individual sample was begun. Thank you for allowing Waypoint Analytical Louisiana, Inc. to serve you. Should I be of further assistance, if you have any questions or need additional information please contact me or client services.

Sincerely,

Anthony J Albert

Anthony J. Albert
Technical Director

*Laboratory's liability in any claim relating to analyses performed shall be limited to, at laboratory's option, repeating the analysis in question at laboratory's expense, or the refund of the charges paid for performance of said analysis. This report may be reproduced in full only with the written permission of the laboratory and/or the entity to which it is addressed. Results contained herein relate only to the sample(s) submitted to the laboratory.*

Waypoint ANALYTICAL

5041 Taravella Road, Marrero, LA 70072
Main 504-371-8557 ° Fax 504-371-8560
www.waypointanalytical.com

# Certification Summary

**Laboratory ID: WP MLA: Waypoint Analytical Louisiana, Inc., Marrero, LA**

| State | Program | Lab ID | Expiration Date |
|---|---|---|---|
| Georgia | State Program | 02041 | 06/30/2025 |
| Louisiana | State Program - NELAP | 02041 | 06/30/2025 |

**Laboratory ID: WP MTN: Waypoint Analytical, LLC., Memphis, TN**

| State | Program | Lab ID | Expiration Date |
|---|---|---|---|
| Alabama | State Program | 40750 | 02/28/2025 |
| Arkansas | State Program | 88-0650 | 02/07/2025 |
| California | State Program | 2904 | 06/30/2025 |
| Florida | State Program - NELAP | E871157 | 06/30/2025 |
| Georgia | State Program | C044 | 11/14/2025 |
| Georgia | State Program | 04015 | 06/30/2024 |
| Illinois | State Program - NELAP | 200078 | 10/31/2025 |
| Kentucky | State Program | 90047 | 12/31/2024 |
| Kentucky | State Program | 80215 | 06/30/2025 |
| Kentucky | State Program | KY90047 | 12/31/2024 |
| Louisiana | State Program - NELAP | LA037 | 12/31/2024 |
| Louisiana | State Program - NELAP | 04015 | 06/30/2025 |
| Mississippi | State Program | MS | 11/14/2025 |
| North Carolina | State Program | 47701 | 07/31/2025 |
| North Carolina | State Program | 415 | 12/31/2024 |
| Pennsylvania | State Program - NELAP | 68-03195 | 05/31/2025 |
| South Carolina | State Program | 84002 | 06/30/2025 |
| Tennessee | State Program | 02027 | 11/14/2025 |
| Texas | State Program - NELAP | T104704180 | 09/30/2025 |
| Virginia | State Program | 00106 | 06/30/2025 |
| Virginia | State Program - NELAP | 460181 | 09/14/2025 |

Waypoint ANALYTICAL

5041 Taravella Road, Marrero, LA 70072
Main 504-371-8557 ° Fax 504-371-8560
www.waypointanalytical.com

## Sample Summary Table

**Report Number:** 24-274-0030

**Client Project Description:** SR-23031-24-AA1

| Lab No | Client Sample ID | Matrix | Date Collected | Date Received | Method | Lab ID |
|---|---|---|---|---|---|---|
| 90481 | Batch # NS006 | Solids | 09/30/2024 10:42 | 09/30/2024 | 2540G-2011 | WP MTN |
| 90481 | Batch # NS006 | Solids | 09/30/2024 10:42 | 09/30/2024 | WALK-BLACK | WP MTN |
| 90481 | Batch # NS006 | Solids | 09/30/2024 10:42 | 09/30/2024 | ASTM D2974 | WP MTN |

WP MTN - Memphis, TN: Waypoint Analytical - TN, Memphis, TN

Waypoint ANALYTICAL

5041 Taravella Road, Marrero, LA 70072
Main 504-371-8557 ° Fax 504-371-8560
www.waypointanalytical.com

00202
Environmental Enterprises
Ms. Jennifer Dupont
58485 Pearl Acres Rd., Suite D
Slidell , LA 70461

Project SR-23031-24-AA1

Information :

Report Date : 10/08/2024
Received : 09/30/2024

Report Number : **24-274-0030**

***REPORT OF ANALYSIS***

Lab No : **90481**
Sample ID : **Batch # NS006**

Matrix: **Solids**
Sampled: **9/30/2024 10:42**

| Test | Results | Units | MQL | DF | Date / Time Analyzed | By | Analytical Method |
|---|---|---|---|---|---|---|---|
| Organic Matter (750C) | **6.50** | % | 0.100 | 1 | 10/07/24 13:00 | VVP | ASTM D2974 |
| Total Organic Carbon | **2.00** | % | 0.05 | 1 | 10/03/24 10:18 | AAB | WALK-BLACK |
| Total Volatile Solids | **6.21** | % | 0.010 | 1 | 10/03/24 14:44 | CAH | 2540G-2011 |

**Qualifiers/ Definitions**

DF Dilution Factor

MQL Method Quantitation Limit

Waypoint ANALYTICAL

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Main 504-371-8557 ° Fax 504-371-8560
www.waypointanalytical.com

# Quality Control Data

**Client ID:** Environmental Enterprises
**Project Description:** SR-23031-24-AA1
**Report No:** 24-274-0030

**QC Analytical Batch:** L776729
**Analysis Method:** ASTM D2974
**Analysis Description:** Organic Matter/ASH

**Duplicate** A 90481-DUP

| Parameter | Units | Result | DUP Result | RPD | Max RPD | Analyzed |
|---|---|---|---|---|---|---|
| Organic Matter (750C) | % | 6.50 | 6.72 | 3.3 | 20.0 | 10/07/24 13:00 |

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Main 504-371-8557 ° Fax 504-371-8560
www.waypointanalytical.com

# Quality Control Data

**Client ID:** Environmental Enterprises
**Project Description:** SR-23031-24-AA1
**Report No:** 24-274-0030

**QC Analytical Batch:** L776030
**Analysis Method:** WALK-BLACK
**Analysis Description:** Total Organic Carbon - Walkley Black

**Lab Reagent Blank** LRB Matrix: SOL
Associated Lab Samples: 90481

| Parameter | Units | Blank Result | MQL | Analyzed |
|---|---|---|---|---|
| Total Organic Carbon | % | < 0.05 | 0.05 | 10/03/24 10:18 |

**Duplicate** A 90481-DUP

| Parameter | Units | Result | DUP Result | RPD | Max RPD | Analyzed |
|---|---|---|---|---|---|---|
| Total Organic Carbon | % | 2.00 | 2.00 | 0.0 | 20.0 | 10/03/24 10:18 |

Waypoint ANALYTICAL
5041 Taravella Road, Marrero, LA 70072
Main 504-371-8557 ° Fax 504-371-8560
www.waypointanalytical.com

## Shipment Receipt Form

Customer Number: **00202**
Customer Name: **Environmental Enterprises**
Report Number: **24-274-0030**

### Shipping Method

| | | | | |
|---|---|---|---|---|
| ○ Fed Ex | ○ US Postal | ● Lab | ○ Other : | |
| ○ UPS | ○ Client | ○ Courier | Thermometer ID: | IR 1 |

| | | | |
|---|---|---|---|
| Shipping container/cooler uncompromised? | ● Yes | ○ No | |
| Number of coolers/boxes received | 1 | | |
| Custody seals intact on shipping container/cooler? | ○ Yes | ○ No | ● Not Present |
| Custody seals intact on sample bottles? | ○ Yes | ○ No | ● Not Present |
| Chain of Custody (COC) present? | ● Yes | ○ No | |
| COC agrees with sample label(s)? | ● Yes | ○ No | |
| COC properly completed | ● Yes | ○ No | |
| Samples in proper containers? | ● Yes | ○ No | |
| Sample containers intact? | ● Yes | ○ No | |
| Sufficient sample volume for indicated test(s)? | ● Yes | ○ No | |
| All samples received within holding time? | ● Yes | ○ No | |
| Cooler temperature in compliance? | ● Yes | ○ No | ○ Not Present |
| Cooler/Samples arrived at the laboratory on ice. Samples were considered acceptable as cooling process had begun. | ● Yes | ○ No | |
| Water - Sample containers properly preserved | ● Yes | ○ No | ○ N/A |
| Water - VOA vials free of headspace | ○ Yes | ○ No | ● N/A |
| Trip Blanks received with VOAs | ○ Yes | ○ No | ● N/A |
| Soil VOA method 5035 – compliance criteria met | ○ Yes | ○ No | ● N/A |

- [ ] High concentration container (48 hr)
- [ ] Low concentration EnCore samplers (48 hr)
- [ ] High concentration pre-weighed (methanol -14 d)
- [ ] Low conc pre-weighed vials (Sod Bis -14 d)

Special precautions or instructions included? ○ Yes ● No

Comments:

Signature: Christina R. Varuso    Date & Time: 09/30/2024 16:23:03

24-274-0030
00202
09-30-2024
16:22:23
Environmental Enterprises
SR-23031-24-AA1

# ENVIRONMENTAL ENTERPRISES USA, INC.

58485 Pearl Acres Rd., Suite D
Slidell, Louisiana 70461
(985) 646-2787

Kit No.

## CHAIN - OF - CUSTODY RECORD

Client: EE USA
Address:

Contact Person: Chris Holmes
Phone#:
P.O. #
Email: cholmes@eeusa.com
Project:

**Special Handling Request**
(X) RUSH
( ) VERBAL
( ) OTHER

| Lab Sample Description | No. of Containers | Analysis Request | EEUSA S/R No. | Waypoint Lab No. |
|---|---|---|---|---|
| Batch # NS006 | 1 | Total Volatile Solids by SM-2540G | SR-23031-24-AA1 | 90481 |
| | | Total Organic Carbon by Walkley-Black | | ↓ |
| | | Organic Matter by ASTM D2974 | | |
| | | | | |
| | | | | |
| | | | | |

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| Collected By: Chris Holmes EEUSA | 9/30/2024 | 10:42 | Relinquished By: Chris Holmes | 9/30/2024 | 10:51 |
| Received By: Marie Kedoes EE USA | 9-30-24 | 1051 | Relinquished By: Marie Kedoes EEUSA | 9-30-24 | 1558 |
| Received By: | 9/30/24 | 1558 | Relinquished By: | | |
| Received By: | | | Relinquished By: | | |
| Received By: | | | Relinquished By: | | |

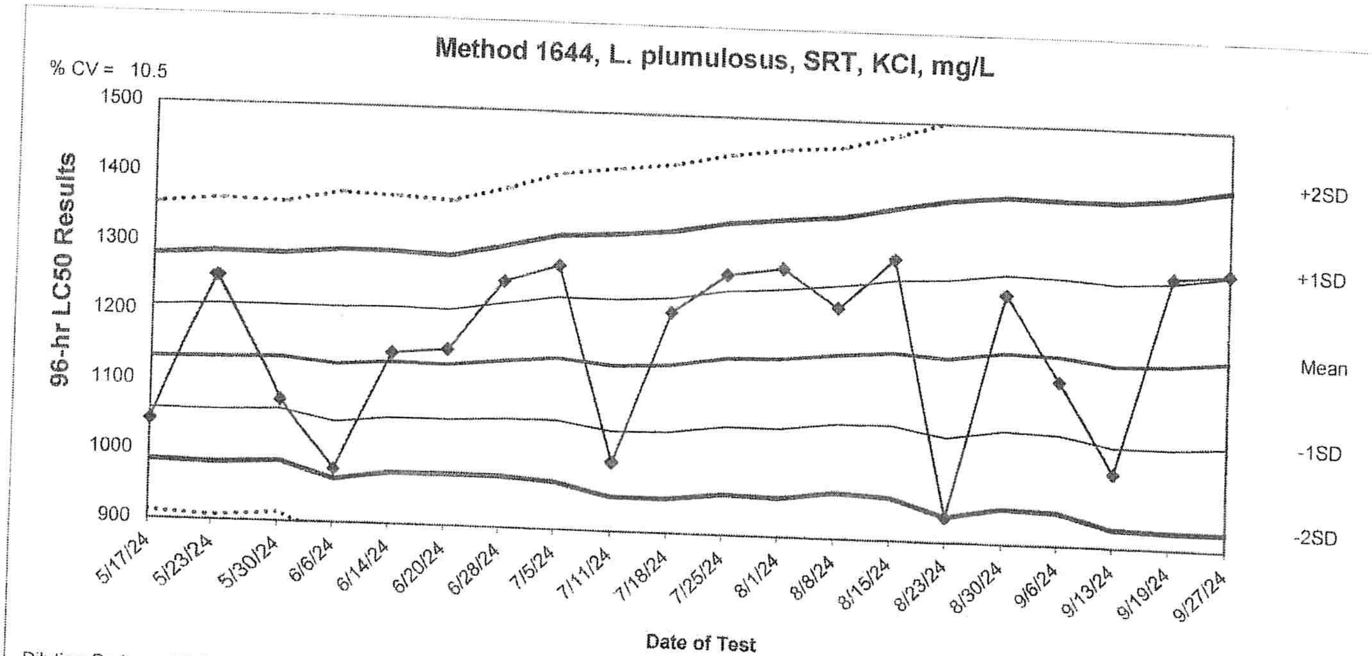
2.3°C

xl/m/eesam/chain of custodies/coc-2003.xls

9/30/2024 10:44 AM

Environmental Enterprises USA, Inc.

# APPENDIX K




Dilution Series = 380, 560, 800, 1100, & 1600 mg/L, Dilution Factor = 0.7

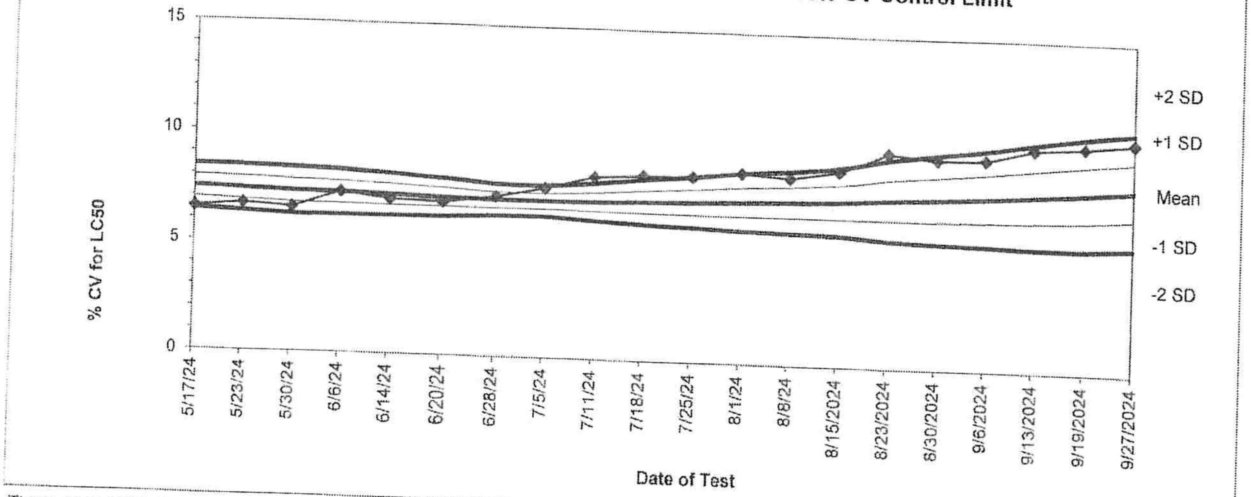
| Organism Source | EE# | Date | Values | Mean | -1SD | -2SD | -3SD | +1SD | +2SD | +3SD | Control % Survival | Toxicant Lot# |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EE | LS-020-24 | 5/17/24 | 1044 | 1133 | 1059 | 986 | 912 | 1207 | 1281 | 1355 | 95 | 223939 |
| EE | LS-021-24 | 5/23/24 | 1252 | 1135 | 1059 | 983 | 907 | 1211 | 1287 | 1363 | 100 | 223939 |
| EE | LS-022-24 | 5/30/24 | 1075 | 1136 | 1062 | 987 | 913 | 1211 | 1285 | 1360 | 100 | 223939 |
| EE | LS-023-24 | 6/6/24 | 977 | 1128 | 1045 | 963 | 880 | 1210 | 1292 | 1375 | 90 | 223939 |
| EE | LS-024-24 | 6/14/24 | 1146 | 1133 | 1053 | 974 | 894 | 1213 | 1292 | 1372 | 100 | 223939 |
| EE | LS-025-24 | 6/20/24 | 1153 | 1131 | 1053 | 974 | 895 | 1210 | 1289 | 1367 | 100 | 223939 |
| EE | LS-026-24 | 6/28/24 | 1254 | 1139 | 1056 | 974 | 891 | 1222 | 1305 | 1388 | 100 | 223939 |
| EE | LS-027-24 | 7/5/24 | 1279 | 1146 | 1057 | 969 | 880 | 1234 | 1323 | 1411 | 98 | 223939 |
| EE | LS-028-24 | 7/11/24 | 999 | 1138 | 1044 | 949 | 855 | 1233 | 1327 | 1421 | 100 | 223939 |
| EE | LS-029-24 | 7/18/24 | 1217 | 1142 | 1046 | 950 | 854 | 1238 | 1334 | 1430 | 100 | 223939 |
| EE | LS-030-24 | 7/25/24 | 1274 | 1153 | 1056 | 959 | 861 | 1251 | 1348 | 1445 | 100 | 223939 |
| EE | LS-031-24 | 8/1/24 | 1285 | 1156 | 1056 | 956 | 856 | 1256 | 1356 | 1456 | 90 | 223939 |
| EE | LS-032-24 | 8/8/24 | 1231 | 1164 | 1065 | 966 | 867 | 1263 | 1362 | 1461 | 100 | 223939 |
| EE | LS-033-24 | 8/15/24 | 1304 | 1169 | 1066 | 962 | 858 | 1273 | 1377 | 1481 | 100 | 223939 |
| EE | LS-034-24 | 8/23/24 | 936 | 1164 | 1050 | 937 | 824 | 1277 | 1390 | 1504 | 98 | 223939 |
| EE | LS-035-24 | 8/30/24 | 1258 | 1174 | 1062 | 951 | 839 | 1286 | 1398 | 1510 | 97 | 223939 |
| EE | LS-036-24 | 9/6/24 | 1135 | 1172 | 1059 | 947 | 835 | 1284 | 1396 | 1508 | 100 | 234903 |
| EE | LS-037-24 | 9/13/24 | 1006 | 1161 | 1043 | 926 | 809 | 1278 | 1395 | 1512 | 100 | 234903 |
| EE | LS-038-24 | 9/19/24 | 1289 | 1163 | 1044 | 924 | 805 | 1282 | 1401 | 1521 | 100 | 234903 |
| EE | LS-039-24 | 9/27/24 | 1296 | 1171 | 1048 | 925 | 802 | 1293 | 1416 | 1539 | 100 | 234903 |

Comments:

**LS-034-24:** One out of twenty points fell outside -2 SD but is within -3 SD. At the P0.05 probability level this is expected to occur by chance alone. EE USA's control limits are very narrow. The %CV is 9.7, which is well within %CV control limit of 30.0. Ongoing laboratory performance is acceptable.

QC/QA by: ECP 100224

## EPA Method 1644, *L. plumulosus* SRT KCl, Survival LC50 % CV, Environment Canada Reasonable Degree of Variation 30% CV Control Limit




There are no EPA test method defined CV percentiles or % CV warning and control limits for EPA 1644. Environment Canada in Report EPS1/RM/46, "Guidance Document on Statistical Methods for Environmental Toxicity Tests", suggests 30% CV as a reasonable degree of variation for SRT test methods when a % CV control limit has not been established. Environment Canada's suggested reasonable degree of variation of 30% CV is being applied to EPA 1644.

| Test # | Test Date | % CV for LC50 | Mean % CV | -1 SD | -2 SD | +1 SD | +2 SD | | % CV Control Limit | SRT Lot # |
|---|---|---|---|---|---|---|---|---|---|---|
| LS-020-24 | 5/17/24 | 6.5 | 7.4 | 6.9 | 6.4 | 7.9 | 8.4 | | 30.0 | 221920 |
| LS-021-24 | 5/23/24 | 6.7 | 7.4 | 6.9 | 6.3 | 7.9 | 8.4 | | 30.0 | 221920 |
| LS-022-24 | 5/30/24 | 6.6 | 7.3 | 6.8 | 6.3 | 7.8 | 8.4 | | 30.0 | 221920 |
| LS-023-24 | 6/6/24 | 7.3 | 7.3 | 6.8 | 6.3 | 7.8 | 8.3 | | 30.0 | 221920 |
| LS-024-24 | 6/14/24 | 7.0 | 7.2 | 6.8 | 6.3 | 7.7 | 8.2 | | 30.0 | 221920 |
| LS-025-24 | 6/20/24 | 7.0 | 7.2 | 6.7 | 6.3 | 7.6 | 8.0 | | 30.0 | 221920 |
| LS-026-24 | 6/28/24 | 7.3 | 7.1 | 6.8 | 6.4 | 7.5 | 7.8 | | 30.0 | 221920 |
| LS-027-24 | 7/5/24 | 7.7 | 7.1 | 6.8 | 6.4 | 7.5 | 7.8 | | 30.0 | 221920 |
| LS-028-24 | 7/11/24 | 8.3 | 7.2 | 6.7 | 6.3 | 7.6 | 8.0 | | 30.0 | 221920 |
| LS-029-24 | 7/18/24 | 8.4 | 7.2 | 6.7 | 6.2 | 7.7 | 8.2 | | 30.0 | 223939 |
| LS-030-24 | 7/25/24 | 8.4 | 7.3 | 6.7 | 6.1 | 7.9 | 8.4 | | 30.0 | 223939 |
| LS-031-24 | 8/1/24 | 8.7 | 7.4 | 6.7 | 6.1 | 8.0 | 8.7 | | 30.0 | 223939 |
| LS-032-24 | 8/8/24 | 8.5 | 7.4 | 6.7 | 6.0 | 8.1 | 8.8 | | 30.0 | 223939 |
| LS-033-24 | 8/15/2024 | 8.9 | 7.5 | 6.7 | 6.0 | 8.3 | 9.0 | | 30.0 | 223939 |
| LS-034-24 | 8/23/2024 | 9.7 | 7.6 | 6.7 | 5.8 | 8.5 | 9.5 | | 30.0 | 223939 |
| LS-035-24 | 8/30/2024 | 9.5 | 7.7 | 6.7 | 5.7 | 8.7 | 9.7 | | 30.0 | 223939 |
| LS-036-24 | 9/6/2024 | 9.6 | 7.8 | 6.8 | 5.7 | 8.9 | 10.0 | | 30.0 | 223939 |
| LS-037-24 | 9/13/2024 | 10.1 | 8.0 | 6.8 | 5.6 | 9.2 | 10.3 | | 30.0 | 223939 |
| LS-038-24 | 9/19/2024 | 10.3 | 8.1 | 6.9 | 5.6 | 9.4 | 10.7 | | 30.0 | 234903 |
| LS-039-24 | 9/27/2024 | 10.5 | 8.3 | 7.0 | 5.8 | 9.6 | 10.9 | | 30.0 | 234903 |

Comments:

QAQC by: BCP 100224

Environmental Enterprises USA, Inc.

# APPENDIX L

**Newfields Environmental**
Heavy Oil in NC010
**EE USA Lab #: L-6393-24 (L-6272-24)**

*Leptocheirus plumulosus* Acute, Static 10-Day Sediment Toxicity Test.
EPA Test Method 1644

Test Concentrations Prepared 08/30/24 Sediment Batch #L-6223-24

Dilution Water Batch #: 20-071-24 Organism Batch #: Lp-140-24

Organisms Counted by: BW, EL, MLD Organisms QC/QA by: STL

Aeration Rate: 80 ml/min. Feeding: This test was not fed.

Dilution Water:
Salinity: 19.8 Meter ID 10 Temperature: 19.1 Meter ID 7H

**Initial $H_2O$ quality parameters for dilution water only: Salinity: 20ppt +/-1ppt; Temp.: 20°C +/-1°C**
Salinity (EPA Method 120.1): ppt Thermometric (EPA Method 180.1): °C

**Survival Data (*Leptocheirus plumulosus*)**

| Time | REP | 0 LPC | REP | 12 | REP | 36 | REP | 108 | REP | 324 | REP | 972 | Initials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 HR | 1 | 20 | 1 | 20 | 1 | 20 | 1 | 20 | 1 | 20 | 1 | 20 | 8/31/24 |
| | 2 | 20 | 2 | 20 | 2 | 20 | 2 | 20 | 2 | 20 | 2 | 20 | |
| | 3 | 20 | 3 | 20 | 3 | 20 | 3 | 20 | 3 | 20 | 3 | 20 | |
| 1306 | 4 | 20 | 4 | 20 | 4 | 20 | 4 | 20 | 4 | 20 | 4 | 20 | STL |
| 10 Day | 1 | 18 | 1 | 18 | 1 | 16 | 1 | 16 | 1 | 17 | 1 | 19 | 9/10/24 |
| | 2 | 20 | 2 | 17 | 2 | 19 | 2 | 17 | 2 | 18 | 2 | 18 | |
| | 3 | 18 | 3 | 17 | 3 | 20 | 3 | 18 | 3 | 16 | 3 | 14 | |
| 1207 | 4 | 16 | 4 | 17 | 4 | 17 | 4 | 20 | 4 | 14 | 4 | 13 | JL |

10-Day LC50 >972 mg/kg, 95% CI N/A to N/A mg/kg,

Statistical Method Summary Statistics

Prep by: BCP
QA/QC by: CH

Data Analysis by: BCP
Raw Data QA/QC by: BCP

## *L. plumulosus* Water Quality Data

**Initial $H_2O$ quality parameters for dilution water only: Salinity: 20ppt +/-1ppt; Temp.: 20°C +/-1°C**
Salinity (EPA Method 120.1): ppt Thermometric (EPA Method 180.1): °C

| Day -1 | Pore Water Measurements | | | | | | |
|---|---|---|---|---|---|---|---|
| 8/30/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 20.0 | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 | 1Q |
| pH | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7H |
| Initials | JL | | | | | | |
| Time | 1554 | | | | | | |

| Day 0 | Control Overlying Water Measurements — **0 mg/kg** | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 0A | 0B | 0C | 0D | Meter # |
| Salinity | 20.2 | 20.0 | 20.0 | 20.1 | 1Q |
| Temp | 20.1 | 20.1 | 20.1 | 20.3 | 7H |
| pH | 7.7 | 7.8 | 7.8 | 7.8 | 7H |
| DO | 8.4 | 8.2 | 8.2 | 8.2 | 1L |
| Initials | JL | | | | |
| Time | 1336 | | | | |

| Day 0 | Overlying Water Measurements – **12 mg/kg** | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 12A | 12B | 12C | 12D | Meter # |
| Salinity | 20.2 | 19.9 | 20.0 | 20.1 | 1Q |
| Temp | 20.2 | 20.1 | 20.0 | 20.3 | 7H |
| pH | 7.8 | 7.8 | 7.8 | 7.8 | 7H |
| DO | 8.2 | 8.2 | 8.2 | 8.2 | 1L |
| Initials | JL | | | | |
| Time | 1340 | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

## *L. plumulosus* Water Quality Data Cont.

| Day 0 | Overlying Water Measurements — **36 mg/kg** | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 36A | 36B | 36C | 36D | Meter # |
| Salinity | 20.2 | 20.0 | 20.0 | 20.1 | 1Q |
| Temp | 20.1 | 20.1 | 20.1 | 20.3 | 7H |
| pH | 7.8 | 7.8 | 7.8 | 7.8 | 7H |
| DO | 8.3 | 8.2 | 8.2 | 8.3 | 1L |
| Initials | JL | | | | |
| Time | 1342 | | | | |

| Day 0 | Overlying Water Measurements — **108 mg/kg** | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 108A | 108B | 108C | 108D | Meter # |
| Salinity | 20.2 | 20.0 | 20.0 | 20.1 | 1Q |
| Temp | 20.2 | 20.1 | 20.0 | 20.3 | 7H |
| pH | 7.8 | 7.8 | 7.8 | 7.8 | 7H |
| DO | 8.3 | 8.2 | 8.2 | 8.2 | 1L |
| Initials | JL | | | | |
| Time | 1346 | | | | |

| Day 0 | Overlying Water Measurements — **324 mg/kg** | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 324A | 324B | 324C | 324D | Meter # |
| Salinity | 20.2 | 20.0 | 20.0 | 20.1 | 1Q |
| Temp | 20.1 | 20.1 | 20.1 | 20.2 | 7H |
| pH | 7.8 | 7.8 | 7.8 | 7.8 | 7H |
| DO | 8.2 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | JL | | | | |
| Time | 1353 | | | | |

Comments: ______

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

***L. plumulosus* Water Quality Data Cont.**

| Day 0 | Overlying Water Measurements — **924 mg/kg** | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 924A | 924B | 924C | 924D | Meter # |
| Salinity | 20.2 | 19.9 | 20.0 | 20.1 | 1Q |
| Temp | 20.2 | 20.1 | 20.1 | 20.2 | 7H |
| pH | 7.8 | 7.8 | 7.8 | 7.8 | 7H |
| DO | 8.0 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | JL | | | | |
| Time | 1354 | | | | |

| Day 1 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/01/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 20.1 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 1Q |
| Temp | 20.0 | 20.1 | 20.2 | 20.2 | 20.2 | 20.3 | 7H |
| pH | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7H |
| DO | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 7.9 | 1L |
| Initials | JTL | | | | | | |
| Time | 0809 | | | | | | |

| Day 2 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/02/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 20.2 | 20.1 | 20.1 | 20.1 | 20.0 | 20.0 | 1Q |
| Temp | 20.2 | 20.2 | 20.2 | 20.2 | 20.2 | 20.2 | 7H |
| pH | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7.8 | 7H |
| DO | 8.0 | 8.0 | 8.0 | 7.9 | 7.9 | 8.0 | 1L |
| Initials | TAD | | | | | | |
| Time | 1129 | | | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**

| Day 3 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/03/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 20.3 | 20.1 | 20.1 | 20.1 | 20.1 | 20.1 | 1Q |
| Temp | 20.4 | 20.4 | 20.4 | 20.4 | 20.4 | 20.4 | 7H |
| pH | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7H |
| DO | 8.2 | 8.1 | 8.0 | 8.0 | 8.0 | 8.1 | 1L |
| Initials | BCP | | | | | | |
| Time | 1124 | | | | | | |

| Day 4 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/04/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 20.2 | 20.2 | 20.2 | 20.2 | 20.1 | 20.1 | 1Q |
| Temp | 20.1 | 20.1 | 20.2 | 20.2 | 20.2 | 20.1 | 7H |
| pH | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7H |
| DO | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 7.9 | 1L |
| Initials | LW | | | | | | |
| Time | 0859 | | | | | | |

| Day 5 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/05/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 20.5 | 20.1 | 20.2 | 20.2 | 20.2 | 20.2 | 1Q |
| Temp | 20.0 | 20.1 | 20.1 | 20.1 | 20.1 | 20.2 | 7H |
| pH | 8.1 | 7.9 | 7.9 | 7.9 | 7.9 | 7.9 | 7H |
| DO | 8.1 | 7.8 | 7.9 | 8.0 | 8.0 | 8.0 | 1L |
| Initials | TAD | | | | | | |
| Time | 0900 | | | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

***L. plumulosus* Water Quality Data Cont.**

| Day 6 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/06/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 20.3 | 20.2 | 20.2 | 20.2 | 20.2 | 20.2 | 1Q |
| Temp | 20.1 | 20.1 | 20.1 | 20.1 | 20.1 | 20.2 | 7H |
| pH | 7.9 | 7.9 | 8.0 | 8.0 | 8.0 | 8.0 | 7H |
| DO | 7.9 | 7.9 | 7.9 | 8.0 | 7.9 | 7.9 | 1L |
| Initials | GW | | | | | | |
| Time | 0850 | | | | | | |

| Day 7 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/07/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 20.4 | 20.2 | 20.3 | 20.2 | 20.2 | 20.2 | 1Q |
| Temp | 20.1 | 20.1 | 20.1 | 20.1 | 20.2 | 20.1 | 7H |
| pH | 7.9 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 7H |
| DO | 8.0 | 8.0 | 8.0 | 7.9 | 7.9 | 7.9 | 1L |
| Initials | GW | | | | | | |
| Time | 0742 | | | | | | |

| Day 8 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/08/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 20.4 | 20.3 | 20.3 | 20.3 | 20.3 | 20.2 | 1Q |
| Temp | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.1 | 7H |
| pH | 8.0 | 8.1 | 8.2 | 8.2 | 8.2 | 8.2 | 7H |
| DO | 8.1 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 1L |
| Initials | GW | | | | | | |
| Time | 0745 | | | | | | |

Comments: ______________________________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**

| Day 9 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/09/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 20.5 | 20.3 | 20.4 | 20.4 | 20.3 | 20.2 | 1Q |
| Temp | 20.4 | 20.5 | 20.4 | 20.5 | 20.5 | 20.5 | 7H |
| pH | 8.1 | 8.2 | 8.3 | 8.3 | 8.3 | 8.3 | 7H |
| DO | 8.1 | 8.0 | 8.0 | 8.0 | 8.0 | 7.9 | 1L |
| Initials | GW | | | | | | |
| Time | 0859 | | | | | | |

**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Control Overlying Water Measurements—All Replicates | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 0A | 0B | 0C | 0D | Meter # |
| Salinity | 20.5 | 20.3 | 20.4 | 20.4 | 1Q |
| Temp | 20.1 | 20.1 | 20.1 | 20.2 | 7H |
| pH | 8.0 | 8.1 | 8.1 | 8.1 | 7H |
| DO | 8.2 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | TAD | | | | |
| Time | 0857 | | | | |

| Day 10 | Overlying Water Measurements – **12 mg/kg** | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 12A | 12B | 12C | 12D | Meter # |
| Salinity | 20.3 | 20.4 | 20.3 | 20.5 | 1Q |
| Temp | 20.2 | 20.1 | 20.0 | 20.2 | 7H |
| pH | 8.2 | 8.3 | 8.3 | 8.3 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.0 | 1L |
| Initials | TAD | | | | |
| Time | 0900 | | | | |

Comments: 

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**
**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Overlying Water Measurements — **36 mg/kg** | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 36A | 36B | 36C | 36D | Meter # |
| Salinity | 20.4 | 20.3 | 20.4 | 20.4 | 1Q |
| Temp | 20.2 | 20.1 | 20.0 | 20.2 | 7H |
| pH | 8.2 | 8.3 | 8.3 | 8.3 | 7H |
| DO | 8.0 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | TAD | | | | |
| Time | 0902 | | | | |

| Day 10 | Overlying Water Measurements — **108 mg/kg** | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 108A | 108B | 108C | 108D | Meter # |
| Salinity | 20.3 | 20.3 | 20.4 | 20.5 | 1Q |
| Temp | 20.2 | 20.1 | 20.1 | 20.1 | 7H |
| pH | 8.3 | 8.3 | 8.3 | 8.3 | 7H |
| DO | 8.0 | 8.0 | 8.1 | 8.1 | 1L |
| Initials | TAD | | | | |
| Time | 0905 | | | | |

| Day 10 | Overlying Water Measurements — **324 mg/kg** | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 324A | 324B | 324C | 324D | Meter # |
| Salinity | 20.3 | 20.3 | 20.4 | 20.6 | 1Q |
| Temp | 20.2 | 20.1 | 20.0 | 20.0 | 7H |
| pH | 8.3 | 8.3 | 8.3 | 8.3 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.2 | 1L |
| Initials | TAD | | | | |
| Time | 0907 | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**
**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Overlying Water Measurements — **924 mg/kg** | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 924A | 924B | 924C | 924D | Meter # |
| Salinity | 20.3 | 20.3 | 20.3 | 20.4 | 1Q |
| Temp | 20.3 | 20.0 | 20.0 | 20.3 | 7H |
| pH | 8.3 | 8.3 | 8.3 | 8.3 | 7H |
| DO | 8.0 | 8.0 | 8.0 | 8.1 | 1L |
| Initials | TAD | | | | |
| Time | 0909 | | | | |

Comments: ______

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

8/30/2024

Sediment Batch #L-6223-24

## NEWFIELD NC NATURAL SEDIMENT (L-6223-24)

### NEWFIELD NCNS SEDIMENT

| | NS Wet Weight g | NS Dry + Pan Weight g | Initial Pan Weight g | NS Dry Weight g | | Weight of 25 ml NS g |
|---|---|---|---|---|---|---|
| 1 | 30.04 | 12.97 | 0.90 | 12.07 | 1 | 37.76 |
| 2 | 30.03 | 12.93 | 0.96 | 11.97 | 2 | 37.80 |
| 3 | 30.03 | 12.97 | 0.97 | 12.00 | 3 | 38.40 |

### WET TO DRY RATIO (W2DR)

(Wet NS wt 1/Dry NS wt 1) + (Wet NS wt 2/Dry NS wt 2) + (Wet NS wt 3/ Dry NS wt 3) / 3 =
2.50

**NCNS Water Content = 60.0 %**

### WET NCNS DENSITY (WNSD)

(Wet NS wt 1/Wet NS vol. + Wet NS wt 2/Wet NS vol + Wet NS wt 3/Wet NS vol.) / 3 =
1.52 g/ml

### EXPOSURE CONCENTRATION CALCULATIONS

WET NS NEEDED

WNSD X VOL. OF NS REQUIRED = WT. NS REQUIRED/CONC.

1.5200 X 900 = 1368.0 g WET NS/CONC.

DRY NS NEEDED

(WET NS PER CONC./W2DR)X(1kg/1000g)-DRY WT. NS/CONC.

900 ml 0.5472 kg = 547.2 g

**ExxonMobil Production Company**
**330760-1L (Heavy)**
**L-6393-24**
**Sample ID Double Check:** BCP

1) Prepare 600 ml at 0 mg/kg and 900 ml at 972 ml. 2) prepare lower dilutions with portio of 972 mg/kg and portion of clean NC.

DESIRED CONC. IN mg/kg X DRY WT. NS IN kg. = TOXICANT REQUIRED IN mg.

| Conc. mg/kg | kg | Calculated g | Actual +/- 0.01 g | Initial | Volume ml | Wet Wt. g | Actual +/- 0.1 g | Mixing Tech. Initials |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.3648 | 0.0000 | 0.00 | CH | 600 | 912.0 | 912.0 | RYW |
| 972 | 0.5472 | 0.5319 | 0.53 | CH | 900 | 1368.0 | 1368.0 | RYW |

| | ml 972 | g 972 | Actual +/- 0.01 g | Initial | ml Clean NCNS | g Clean NCNS | Actual +/- 0.1 g | Mixing Tech. Initials |
|---|---|---|---|---|---|---|---|---|
| 972 | /// | /// | /// | /// | 900.0 | /// | /// | /// |
| 324 | 200.0 | 304.0 | 304.0 | CH | 400.0 | 608.0 | 608.0 | RYW |
| 108 | 66.7 | 101.4 | 101.40 | CH | 533.3 | 810.6 | 810.60 | GW |
| 36 | 22.2 | 33.7 | 33.70 | CH | 577.8 | 878.3 | 878.30 | JL |
| 12 | 7.4 | 11.2 | 11.20 | CH | 592.6 | 900.8 | 900.80 | RYW |
| 0 | 0.0 | 0.0 | /// | /// | /// | /// | /// | /// |

Scale ID: 45 Scale ID: 45

Prepared By: BCP 8/30/24
8/30/2024 18:13

Check By: CH 8/30/24



Raw Data QC/QA: BCP

L-6223-24

POSTED 071824 CH

Environmental Enterprises USA, Inc.
58485 Pearl Acres Rd, Suite D
Slidell, LA 70461
Att: David Daniel

# Chain of Custody Record

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

| Client Contact | |
|---|---|
| NewFields Environmental | Project Manager: Eric Litman |
| 300 Ledgewood Pl, Suite 205 | Email: elitman@newfields.com |
| Rockland, MA 02370 | Tel/Fax: |
| 781-424-5731 | Analysis Turnaround Time: ☐ CALENDAR DAYS ☐ WORKING DAYS |
| Project Name: Newtown Creek | TAT if different from Below ____ ☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day |
| Site: | |
| P O # | |

Site Contact: Natalia Barragan
Lab Contact: David Daniel
Date: 6/20/2024
Carrier: FedEx

COC No: 1
1 of 1 COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

| Sample Identification | Sample Date | Sample Time | Sample Type (C=Comp, G=Grab) | Matrix | # of Cont. | Filtered Sample (Y / N) | Perform MS / MSD (Y / N) | Contact NewFields regarding analysis | Sample Specific Notes: |
|---|---|---|---|---|---|---|---|---|---|
| NC010_0-15_Bucket 4 5.8°C Ⓐ | 6/20/24 | 10:55 | C | SED. | 1 | | | X | SR-22524-24-N01-L1 |
| NC010_0-15_Bucket 5 5.8°C Ⓐ | 6/20/24 | 11:16 | C | SED. | 1 | | | X | |
| NC010_0-15_Bucket 6 9.8°C Ⓐ | 6/20/24 | 11:45 | C | SED. | 1 | | | X | |
| NC010_0-15_Bucket 7 9.8°C Ⓐ | 6/20/24 | 11:53 | C | SED. | 1 | | | X | |
| NC010_0-15_Bucket 8 7.8°C Ⓐ | 6/20/24 | 12:10 | C | SED. | 1 | | | X | |

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:
FedEx #'s 7002423437 90, 3804, 3815

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: ______ Corr'd: ______ Therm ID No.: ______

| Relinquished by: | Company: | Date/Time: | Received by: | Company: | Date/Time: |
|---|---|---|---|---|---|
| Natalia B. | Roux | 6/20/24 15:00 | FedEx | | |
| FedEx | | | Stacy Heiler | EEUSA | 6-21-24 0928 |
| Stacy Heiler | EEUSA | 6-21-24 0930 | Received in Laboratory by: | | |

Ⓐ all temps taken with A2
SH 6-21-24 0928

# ENVIRONMENTAL ENTERPRISES USA, INC.
# SAMPLE RECEIPT / ACCEPTANCE (SRA) FORM

CLIENT: NewFields Environmental KIT NO. theirs x3
DATE RECEIVED: 6-21-24 CL NO. 019 LAB NO. L-6223-24
LOCATION: NC010

SAMPLE RECEIPT:

1. Sample Kit Supplied by: EE USA....., Client..✓
   Ice Chest.✓., Cardboard Box....., Bucket....., Other...... How many containers in kit? 2, 2, 1
2. Ice chest received... Circle one; *delivered by Hot Shot, ~~FEDEX~~, UPS, Client, etc. mark NA.
   *NA or SB: Fridge, Ice & $H_2O$, Dry, $H_2O$, Ice Packs, Other
   At EE USA: Ice & $H_2O$, Dry, $H_2O$, Ice packs (Frozen? Yes....or No....), Other......
   If Ice & $H_2O$ received... How? Loose, Bagged, Bottled
3. Sample container(s) in good condition (sealed & unbroken)? YES.✓. NO......
4. Does sample container have a label(s)? YES..✓. NO......
   If yes, mark all that are incomplete and applicable.
   a) Date & time collected............................ ____ b) Location ......................... ____
   c) Collected by ........................................ ____ d) Well number ..................... ____
   e) OCSG.................................................. ____
5. Chain-of-Custody form (COC) filled out completely? YES...... NO..✓..
   If not, mark all that apply.
   a) No COC.................................... ____ f) Date & time collected............ ____
   b) Collected by .............................. ____ g) Received by..................... ✓
   c) Relinquished by.......................... ✓ h) Date and/or time of transfer... ✓
   d) Location.................................... ____ i) Waste type......................... ____
   e) Company name........................... ✓
6. Custody seal(s) received with this sample kit? YES..... NO..✓.. Were custody seals used? YES..... NO.....
   And if used, were they intact? YES.....NO..... Were custody seals filled out? YES..... NO.....

COMMENTS:

Information recorded by: SH Date 6/21/24

SAMPLE ACCEPTANCE: TOX: EFF____ CTS/F____ PW____ TCW____ Product____
O&G: PW____ WF/TCW____ Other____
DF: WBM____ SMB____ NP____ GC/MS____ Other ✓

7. Was each sample container appropriate (EPA Protocol)? YES..✓.. NO......
   Plastic..✓.. Glass...... Number of samples for location?........5.........
8. Does the recorded information on the COC and label agree? YES...... NO......
   Client Sample ID, Collection location, date, & time. Collected by.
9. Was sufficient amount of each sample received? YES...... NO......
   Container size (A) ~~4~~ 3 gal x5 Estimated Volume (A) ~~4~~ 3 gal x5...., Head space .....0..... (mls or liters)
10. Was each sample received within the proper holding time? YES..✓.. NO......
11. Was each sample received at the proper temperature? (See COC for temp) YES..✓.. NO......

Oil & Grease Lab Only:

12. Sample verified for proper acid preservation & temp within 30 minutes of sample receipt? YES........ NO......
13. Is the initial pH <2 su? YES........ NO......
    If no, how many mls of 6NHCL was added to make pH <2 su? mls.........SL#.........

COMMENTS: (A) Error BCP 071724

Information recorded by: BCP Date 7/16/24

CL=certified lot number,NA=not applicable,SB=shorebase,EFF=effluent,CTS/F=chemically treated seawater/freshwater,PW=produced water,TCW=total completion workover,WF=well fluid,WBM=water based mud,SBM=synthetic based mud,NP=non-protocol

# Newfields Environmental
## Heavy Oil in NS004
## EE USA Lab #: L-6391-24 (L-6272-24)

*Leptocheirus plumulosus* Acute, Static 10-Day Sediment Toxicity Test.
EPA Test Method 1644

Test Concentrations Prepared 08/30/24 Sediment Batch #NS004

Dilution Water Batch #: 20-071-24 Organism Batch #: Lp-140-24

Organisms Counted by: RV, RG Organisms QC/QA by: JTL

Aeration Rate: 80 ml/min. Feeding: This test was not fed.

Dilution Water:
Salinity: 19.8 Meter ID 1a Temperature: 19.1 Meter ID 7H

**Initial $H_2O$ quality parameters for dilution water only: Salinity: 20ppt +/-1ppt; Temp.: 20°C +/-1°C**
Salinity (EPA Method 120.1): ppt Thermometric (EPA Method 180.1): °C

**Survival Data (*Leptocheirus plumulosus*)**

**Treatment, mg/kg**

| Time | REP | 0 LPC | REP | 12 | REP | 36 | REP | 108 | REP | 324 | REP | 972 | Initials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 HR | 1 | 20 | 1 | 20 | 1 | 20 | 1 | 20 | 1 | 20 | 1 | 20 | 8/31/24 |
| | 2 | 20 | 2 | 20 | 2 | 20 | 2 | 20 | 2 | 20 | 2 | 20 | |
| | 3 | 20 | 3 | 20 | 3 | 20 | 3 | 20 | 3 | 20 | 3 | 20 | |
| 1320 | 4 | 20 | 4 | 20 | 4 | 20 | 4 | 20 | 4 | 20 | 4 | 20 | JTL |
| 10 Day | 1 | 20 | 1 | 17 | 1 | 18 | 1 | 20 | 1 | 18 | 1 | 19 | 9/10/24 |
| | 2 | 19 | 2 | 17 | 2 | 18 | 2 | 17 | 2 | 19 | 2 | 17 | |
| | 3 | 16 | 3 | 18 | 3 | 17 | 3 | 18 | 3 | 19 | 3 | 18 | |
| | 4 | 19 | 4 | 18 | 4 | 17 | 4 | 19 | 4 | 19 | 4 | 17 | JTL/TAD |

10-Day LC50 >972 mg/kg, 95% CI N/A to N/A mg/kg,

Statistical Method Summary Statistics

Prep by: BCP
QA/QC by: CH

Data Analysis by: BCP
Raw Data QA/QC by: BCP

# ExxonMobil Production Company
330760-1L (Heavy)
**EE USA Lab #: L-6391-24**

*Leptocheirus plumulosus* Acute, Static 10-Day Sediment Toxicity Test.
EPA Test Method 1644

Test Concentrations Prepared 08 / 30 /24

Sediment Batch #NS004

Dilution Water Batch #: 20-071-24

Organism Batch #: Lp-140-24

Organisms Counted by: RV, RG

Organisms QC/QA by: JTL

Aeration Rate: 80 ml/min.

Feeding: This test was not fed.

Dilution Water:
Salinity: 19.8 Meter ID 1Q Temperature: 19.1 Meter ID 7H

**Initial $H_2O$ quality parameters for dilution water only: Salinity: 20ppt +/-1ppt; Temp.: 20°C +/-1°C**
Salinity (EPA Method 120.1): ppt Thermometric (EPA Method 180.1): °C

## Survival Data (*Leptocheirus plumulosus*)

**Treatment, mg/kg**

| Time | REP | 0 LPC | REP | 12 | REP | 36 | REP | 108 | REP | 324 | REP | 972 | Initials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 HR | 1 | 20 | 1 | 20 | 1 | 20 | 1 | 20 | 1 | 20 | 1 | 20 | 8/31/24 |
| | 2 | 20 | 2 | 20 | 2 | 20 | 2 | 20 | 2 | 20 | 2 | 20 | |
| | 3 | 20 | 3 | 20 | 3 | 20 | 3 | 20 | 3 | 20 | 3 | 20 | |
| 1320 | 4 | 20 | 4 | 20 | 4 | 20 | 4 | 20 | 4 | 20 | 4 | 20 | JTL |
| 10 Day | 1 | 20 | 1 | 17 | 1 | 18 | 1 | 20 | 1 | 18 | 1 | 19 | 9/10/24 |
| | 2 | 19 | 2 | 17 | 2 | 18 | 2 | 17 | 2 | 19 | 2 | 17 | |
| | 3 | 16 | 3 | 18 | 3 | 17 | 3 | 18 | 3 | 19 | 3 | 18 | |
| 1211 | 4 | 19 | 4 | 18 | 4 | 17 | 4 | 19 | 4 | 19 | 4 | 17 | JTL/AD |

10-Day LC50 >972 mg/kg, 95% CI N/A to N/A mg/kg,

Statistical Method Summary Statistics

Prep by: BCP

QA/QC by: CH

Data Analysis by: BCP

Raw Data QA/QC by: BCP

## *L. plumulosus* Water Quality Data

**Initial $H_2O$ quality parameters for dilution water only: Salinity: 20ppt +/-1ppt; Temp.: 20°C +/-1°C**
Salinity (EPA Method 120.1): ppt Thermometric (EPA Method 180.1): °C

| Day -1 | Pore Water Measurements | | | | | | |
|---|---|---|---|---|---|---|---|
| 8/30/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 20 | 19.8 | 19.8 | 20.0 | 19.9 | 19.9 | 1Q |
| pH | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7H |
| Initials | JL | | | | | | |
| Time | 1729 | | | | | | |

| Day 0 | Control Overlying Water Measurements — **0 mg/kg** | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 0A | 0B | 0C | 0D | Meter # |
| Salinity | 19.1 | 19.0 | 19.2 | 19.2 | 1Q |
| Temp | 20.0 | 19.9 | 19.8 | 19.3 | 7H |
| pH | 7.6 | 7.6 | 7.6 | 7.6 | 7H |
| DO | 8.3 | 8.2 | 8.2 | 8.2 | 1L |
| Initials | JL | | | | |
| Time | 1400 | | | | |

| Day 0 | Overlying Water Measurements – **12 mg/kg** | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 12A | 12B | 12C | 12D | Meter # |
| Salinity | 19.1 | 19.0 | 19.1 | 19.1 | 1Q |
| Temp | 19.8 | 19.7 | 19.7 | 19.9 | 7H |
| pH | 7.7 | 7.6 | 7.6 | 7.5 | 7H |
| DO | 8.3 | 8.2 | 8.2 | 8.1 | 1L |
| Initials | JL | | | | |
| Time | 1402 | | | | |

Comments: ______________________________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

## *L. plumulosus* Water Quality Data Cont.

| Day 0 | Overlying Water Measurements — **36 mg/kg** | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 36A | 36B | 36C | 36D | Meter # |
| Salinity | 19.2 | 19.0 | 19.0 | 19.1 | 1Q |
| Temp | 19.9 | 19.9 | 19.7 | 19.7 | 7H |
| pH | 7.7 | 7.6 | 7.6 | 7.5 | 7H |
| DO | 8.3 | 8.2 | 8.2 | 8.1 | 1L |
| Initials | JL | | | | |
| Time | 1405 | | | | |

| Day 0 | Overlying Water Measurements — **108 mg/kg** | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 108A | 108B | 108C | 108D | Meter # |
| Salinity | 19.2 | 19.0 | 19.1 | 19.1 | 1Q |
| Temp | 19.3 | 19.9 | 19.7 | 19.3 | 7H |
| pH | 7.6 | 7.6 | 7.6 | 7.5 | 7H |
| DO | 8.3 | 8.2 | 8.2 | 8.2 | 1L |
| Initials | JL | | | | |
| Time | 1405 | | | | |

| Day 0 | Overlying Water Measurements — **324 mg/kg** | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 324A | 324B | 324C | 324D | Meter # |
| Salinity | 19.3 | 19.1 | 19.0 | 19.2 | 1Q |
| Temp | 19.3 | 19.3 | 19.7 | 19.7 | 7H |
| pH | 7.7 | 7.6 | 7.5 | 7.5 | 7H |
| DO | 8.3 | 8.2 | 8.3 | 8.4 | 1L |
| Initials | JL | | | | |
| Time | 1408 | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

***L. plumulosus* Water Quality Data Cont.**

| Day 0 | Overlying Water Measurements — **924 mg/kg** | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 924A | 924B | 924C | 924D | Meter # |
| Salinity | 19.2 | 19.1 | 19.0 | 19.2 | 1Q |
| Temp | 19.9 | 20.0 | 19.9 | 20.0 | 7H |
| pH | 7.7 | 7.6 | 7.6 | 7.6 | 7H |
| DO | 8.3 | 8.2 | 8.2 | 8.3 | 1L |
| Initials | JL | | | | |
| Time | 1409 | | | | |

| Day 1 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/01/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 18.8 | 18.8 | 18.8 | 18.9 | 18.9 | 18.8 | 1Q |
| Temp | 20.0 | 19.9 | 20.0 | 20.0 | 20.1 | 20.2 | 7H |
| pH | 7.4 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7H |
| DO | 7.8 | 8.0 | 8.0 | 8.0 | 8.0 | 7.9 | 1L |
| Initials | STL | | | | | | |
| Time | 0817 | | | | | | |

| Day 2 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/02/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 18.8 | 18.7 | 18.8 | 18.8 | 18.9 | 18.7 | 1Q |
| Temp | 19.9 | 19.9 | 19.9 | 19.9 | 20.0 | 20.1 | 7H |
| pH | 7.5 | 7.4 | 7.3 | 7.3 | 7.3 | 7.3 | 7H |
| DO | 7.9 | 7.6 | 8.0 | 8.0 | 8.0 | 8.0 | 1L |
| Initials | TAD | | | | | | |
| Time | 0800 | | | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**

| Day 3 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/03/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 18.7 | 18.6 | 18.6 | 18.7 | 18.7 | 18.6 | 1Q |
| Temp | 20.1 | 20.1 | 20.2 | 20.2 | 20.2 | 20.3 | 7H |
| pH | 7.6 | 7.4 | 7.3 | 7.3 | 7.3 | 7.2 | 7H |
| DO | 8.2 | 8.1 | 8.1 | 8.0 | 8.1 | 8.0 | 1L |
| Initials | BCP | | | | | | |
| Time | 1128 | | | | | | |

| Day 4 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/04/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 18.7 | 18.6 | 18.6 | 18.7 | 18.8 | 18.7 | 1Q |
| Temp | 20.0 | 19.9 | 20.0 | 20.0 | 20.1 | 20.2 | 7H |
| pH | 7.5 | 7.4 | 7.3 | 7.3 | 7.2 | 7.2 | 7H |
| DO | 8.1 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 1L |
| Initials | GW | | | | | | |
| Time | 0903 | | | | | | |

| Day 5 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/05/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 18.7 | 18.6 | 18.6 | 18.7 | 18.7 | 18.7 | 1Q |
| Temp | 19.9 | 19.9 | 19.9 | 19.9 | 19.8 | 20.1 | 7H |
| pH | 7.7 | 7.3 | 7.3 | 7.3 | 7.3 | 7.2 | 7H |
| DO | 8.2 | 8.0 | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | TAD | | | | | | |
| Time | 0904 | | | | | | |

Comments: ______

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**

| Day 6 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/06/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 18.7 | 18.6 | 18.6 | 18.7 | 18.7 | 18.7 | 1Q |
| Temp | 20.0 | 19.9 | 19.9 | 20.0 | 20.0 | 20.1 | 7H |
| pH | 7.5 | 7.3 | 7.2 | 7.1 | 7.1 | 7.1 | 7H |
| DO | 8.0 | 8.0 | 8.0 | 8.0 | 8.1 | 8.1 | 1L |
| Initials | Gw | | | | | | |
| Time | 0859 | | | | | | |

| Day 7 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/07/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 18.8 | 18.6 | 18.7 | 18.7 | 18.7 | 18.7 | 1Q |
| Temp | 19.9 | 19.9 | 19.9 | 20.0 | 20.0 | 20.1 | 7H |
| pH | 7.5 | 7.3 | 7.2 | 7.1 | 7.1 | 7.1 | 7H |
| DO | 8.1 | 8.0 | 8.1 | 8.0 | 8.1 | 8.0 | 1L |
| Initials | Gw | | | | | | |
| Time | 0801 | | | | | | |

| Day 8 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/08/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 18.6 | 18.6 | 18.7 | 18.7 | 18.7 | 18.8 | 1Q |
| Temp | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 | 20.0 | 7H |
| pH | 7.4 | 7.3 | 7.3 | 7.1 | 7.0 | 7.0 | 7H |
| DO | 8.0 | 8.0 | 8.2 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | Gw | | | | | | |
| Time | 0758 | | | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

***L. plumulosus* Water Quality Data Cont.**

| Day 9 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/09/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 18.8 | 18.7 | 18.7 | 18.7 | 18.8 | 18.8 | 1Q |
| Temp | 20.2 | 20.3 | 20.2 | 20.3 | 20.3 | 20.3 | 7H |
| pH | 7.1 | 7.0 | 7.0 | 6.9 | 6.9 | 6.8 | 7H |
| DO | 7.8 | 7.9 | 7.8 | 7.9 | 8.0 | 8.0 | 1L |
| Initials | GW | | | | | | |
| Time | ~~0800~~ 0859 Ⓐ | | | | | | |

**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Control Overlying Water Measurements—All Replicates | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 0A | 0B | 0C | 0D | Meter # |
| Salinity | 18.8 | 18.7 | 19.0 | 19.0 | 1Q |
| Temp | 20.0 | 19.9 | 20.0 | 20.0 | 7H |
| pH | 7.1 | 7.0 | 7.0 | 7.0 | 7H |
| DO | 8.1 | 8.0 | 8.0 | 8.1 | 1L |
| Initials | TAD | | | | |
| Time | 0917 | | | | |

| Day 10 | Overlying Water Measurements – **12 mg/kg** | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 12A | 12A | 12A | 12A | Meter # |
| Salinity | 18.6 | 18.5 | 18.8 | 19.0 | 1Q |
| Temp | 20.0 | 19.8 | 19.9 | 20.0 | 7H |
| pH | 7.0 | 7.1 | 7.0 | 7.0 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | TAD | | | | |
| Time | 0921 | | | | |

Comments: Ⓐ ERROR 090924 GW

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**
**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Overlying Water Measurements — **36 mg/kg** | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 36A | 36A | 36A | 36A | Meter # |
| Salinity | 18.7 | 18.7 | 18.7 | 19.0 | 1Q |
| Temp | 20.1 | 19.9 | 19.9 | 19.9 | 7H |
| pH | 6.9 | 6.8 | 6.8 | 6.8 | 7H |
| DO | 8.2 | 8.1 | 8.0 | 8.1 | 1L |
| Initials | TAD | | | | |
| Time | 0923 | | | | |

| Day 10 | Overlying Water Measurements — **108 mg/kg** | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 108A | 108A | 108A | 108A | Meter # |
| Salinity | 18.9 | 18.7 | 18.9 | 18.8 | 1Q |
| Temp | 20.0 | 19.9 | 19.9 | 20.0 | 7H |
| pH | 6.7 | 6.7 | 6.7 | 6.6 | 7H |
| DO | 8.2 | 8.1 | 8.1 | 8.2 | 1L |
| Initials | TAD | | | | |
| Time | 0926 | | | | |

| Day 10 | Overlying Water Measurements — **324 mg/kg** | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 324A | 324A | 324A | 324A | Meter # |
| Salinity | 18.8 | 18.9 | 18.8 | 18.9 | 1Q |
| Temp | 20.1 | 20.0 | 19.9 | 20.0 | 7H |
| pH | 7.0 | 7.0 | ~~8~~ 6.8 | 6.8 | 7H |
| DO | 8.2 | 8.1 | 8.1 | 8.2 | 1L |
| Initials | TAD | | | | |
| Time | 0926 | | | | |

Comments: ______________________________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**
**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Overlying Water Measurements — **924 mg/kg** | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 924A | 924A | 924A | 924A | Meter # |
| Salinity | 18.9 | 18.7 | 18.8 | 18.8 | 1Q |
| Temp | 20.2 | 20.1 | 20.1 | 20.2 | 7H |
| pH | 7.0 | 7.0 | 6.9 | 6.9 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.0 | 1L |
| Initials | TAD | | | | |
| Time | 0932 | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

# EE NATURAL SEDIMENT (NS004)

**EE NS SEDIMENT**

| | NS Wet Weight g | NS Dry + Pan Weight g | Initial Pan Weight g | NS Dry Weight g |
|---|---|---|---|---|
| 1 | 30.03 | 18.14 | 0.96 | 17.18 |
| 2 | 30.03 | 18.12 | 0.97 | 17.15 |
| 3 | 30.06 | 18.13 | 0.96 | 17.17 |

| | Weight of 25 ml NS g |
|---|---|
| 1 | 33.70 |
| 2 | 34.00 |
| 3 | 33.05 |

**WET TO DRY RATIO (W2DR)**

(Wet NS wt 1/Dry NS wt 1) + (Wet NS wt 2/Dry NS wt 2) + (Wet NS wt 3/ Dry NS wt 3) / 3 =

1.75

**NS Water Content = 42.9 %**

**WET NS DENSITY (WNSD)**

(Wet NS wt 1/Wet NS vol. + Wet NS wt 2/Wet NS vol + Wet NS wt 3/Wet NS vol.) / 3 =

1.34 g/ml

**EXPOSURE CONCENTRATION CALCULATIONS**

WET NS NEEDED

WNSD X VOL. OF NS REQUIRED = WT. NS REQUIRED/CONC.

1.3400 X 600 = 804.0 g WET NS/CONC.

DRY NS NEEDED

(WET NS PER CONC./W2DR)X(1kg/1000g)-DRY WT. NS/CONC.

600 ml 0.4594 kg = 459.4 g

**ExxonMobil Production Company**
**330760-1L (Heavy)**
**L-6391-24**
**Sample ID Double Check:** BCP

1) Prepare 600 ml at 0 mg/kg and 900 ml at 972 ml.
prepare lower dilutions with portio of 972 mg/kg and portion of clean NC. 2)

DESIRED CONC. IN mg/kg X DRY WT. NS IN kg. = TOXICANT REQUIRED IN mg.

| Conc. mg/kg | kg | Calculated g | Actual +/- 0.01 g | Initial | Volume ml | Wet Wt. g | Actual +/- 0.1 g | Mixing Tech. Initials |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.4594 | 0.0000 | 0.00 | CH | 600 | 804.0 | 804.0 | RYW |
| 972 | 0.6891 | 0.6698 | 0.667 | CH | 900 | 1206.0 | 1206.0 | GW |

| | ml 972 | g 972 | Actual +/- 0.01 g | Initial | ml Clean NS004 | g Clean NS004 | Actual +/- 0.1 g | Mixing Tech. Initials |
|---|---|---|---|---|---|---|---|---|
| 972 | /// | /// | /// | /// | 900.0 | /// | /// | /// |
| 324 | 200.0 | 268.0 | 268.0 | CH | 400.0 | 536.0 | 536.0 | CC |
| 108 | 66.7 | 89.8 | 89.80 | CH | 533.3 | 714.2 | 714.20 | |
| 36 | 22.2 | 29.5 | 29.50 | CH | 577.8 | 774.5 | 774.50 | CC |
| 12 | 7.4 | 9.4 | 9.40 | CH | 592.6 | 794.6 | 794.60 | RYW |
| 0 | 0.0 | 0.0 | /// | /// | /// | /// | /// | /// |

Prepared By: BCP 8/30/24
8/30/2024 18:14

Check By: CH 8/30/23



Raw Data QC/QA: BCP

**ENVIRONMENTAL ENTERPRISES USA, INC.**
58485 Pearl Acres Rd., Suite D
Slidell, LA 70461
(985) 646-2787, Fax # (985) 646-2810

## CHAIN - OF - CUSTODY RECORD

Client: Environmental Enterprises USA Inc.
Address: 58485 Pearl Acres Rd
Slidell, LA 70461

Contact Person:
Phone #:
Email #:
WBS/AFE/PO, etc:

| Sample Description | Collected Date | Collected Time | Collection Purpose | | No. of Containers* | Size of Container | Lot # |
|---|---|---|---|---|---|---|---|
| natural Sediment | 5/20/24 | 1700 | Sediment for Culturing | | 11 | 5gal buckets | NS.004 |

Collected By: Print: Nicholas Bertrand
Company Name: N/A
Sign: [signature]

Relinquished By: Print: Nicholas Bertrand 5/20/24
Company Name: N/A
Sign: [signature] 1708 hr

Received By: Print: M Robbins 5/20/24
Company Name: EE USA
Sign: MRob 1731 hr

Relinquished By: Print: ____ __/__/__
Company Name: EE USA
Sign: ____ hr

Received By: Print: ____ __/__/__
Company Name: EE USA
Sign: ____ hr

Relinquished By: Print: ____ __/__/__
Company Name:
Sign: ____ hr

Received By: Print: ____ __/__/__
Company Name:
Sign: ____ hr

Relinquished By: Print: ____ __/__/__
Company Name:
Sign: ____ hr

**EE USA use only!**

*Plastic or Glass container(s).

Tracking #: ____ Kit #: ____

# Sediment Toxicity Testing Report

prepared for

**Newfields Environmental**

Eric Litman, M.S., Senior Consultant and
Tom Parkerton, Ph.D., Environmental Consultant

*Leptocheirus plumulosus* ACUTE, STATIC 10-DAY SEDIMENT TOXICITY TEST
Method for Conducting a Sediment Toxicity Test with *Leptocheirus plumulosus* and Non-aqueous Drilling Fluids or Synthetic-based drilling muds: Test Method 1644, EPA 821-R-11-004 (1995)

| EE USA Sample # | Sample Identification | Natural Sediment |
|---|---|---|
| L-6471-24 | M8410-500mL Mineral Oil (Light) | The Rigolets, LA, NS006. Water content = 53.9%. Appendix H. |
| L-6473-24 | | Newtown Creek, NY, NC-010, L-6432-24. Water content = 60.5%. Appendix C. |

Report Date: October 23, 2024

by

**ENVIRONMENTAL ENTERPRISES USA, INC.**
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*This report contains five pages plus twelve appendices, A – L. This report must not be reproduced in part, only in whole. The results and conclusions presented in this report apply only to the sample(s) tested. All results should be considered valid unless otherwise noted in the report.*

Beau Peré
Drilling Fluids Lab Technician II

10 25 24
DATE

Michele Ellis
QA/QC Supervisor

10/25/24
DATE

David Daniel
EE USA President

10/25/24
DATE

## EXCEUTIVE SUMMARY

*L. plumulosus* were tested in two natural sediments (Newton Creek, NY, TOC = 3.56% dry wt.; and The Rigolets, LA, which connects Lake Pontchartrain to Lake Borgne, TOC = 1.91% dry wt.) spiked with light mineral oil (CAS-No: 8042-47-5). Nominal concentrations were 250, 500, 1000, 2000, & 4000 mg/kg dry wt. and a negative control. Concentrations were selected based on results of range-finding tests which indicated a nominal LC50 > 972 mg/kg dry wt. Results indicated the 10-day LC50 was > 4000 mg/kg dry wt. and the 10-day EC25 for growth was > 4000 mg/kg dry wt.in Rigolets sediment. In Newtown Creek sediment, the 10-day LC50 was 3889 mg/kg dry wt. and the 10-day EC25 for growth was 811 mg/kg dry wt.

## TEST OVERVIEW

Two 10-day natural sediment toxicity tests were initiated September 27, 2024, and completed October 07, 2024, at Environmental Enterprises USA, Inc. (EE USA). The sample, M8410-500mL Mineral Oil (Light), was supplied by Newfields Environmental (Appendix D). Test L-6471-24 used Rigolets natural sediment, NS006, supplied by EE USA (Appendix I). Test L-6473-24 used Newtown Creek natural sediment, NC-010, supplied by Newfields Environmental (Appendix E). Each sediment was sieved through a 250-um sieve. *L. plumulosus* were cultured at EE USA. Synthetic seawater at 20 ppt salinity was used as the overlying water for each replicate of each treatment. This document presents methods, materials, and results of these tests.

## MATERIALS AND METHODS

*L. plumulosus* amphipods were cultured and maintained in Rigolets natural sediment at 20$\pm$1 parts per thousand (ppt) salinity and 23$\pm$2°C. Synthetic seawater for use with cultures and tests was prepared with hw-MARINEMIX + Bio-Elements and Crystal Sea Marinemix Bioassay Laboratory Formula sea salts (80:20) and deionized water and adjusted to 20 ppt salinity. *L. plumulosus* were acclimated to 20$\pm$1°C prior to test initiation. *L. plumulosus* cultures were fed a mixture of TetraMin, Wheat Grass, Alfalfa, and Neo-Novum (48:24:24:4) three times per week. *L. plumulosus* test organisms were randomly selected from a group that passed through a 1000-um sieve but were retained on a 710-um sieve and were 3.3 to 3.7 mm when these tests were initiated. Test organisms were not fed after these tests were initiated.

Sensitivity of test organisms to a known toxicant was determined by performing an acute Standard Reference Toxicant (SRT) test, LS-039-24, with potassium chloride (Fisher Chemical, Lot 234903). The SRT test was initiated on September 27, 2024. Appendix K contains the *L. plumulosus* SRT control charts.

96-hour LC50: 1,296 mg/L with a 95% confidence interval of 1,268 to 1,326 mg/L.

Wet-to-dry ratio, sediment density, and calculations for preparing each treatment of test L-6473-24 with Mineral Oil (Heavy) in NC010 natural sediment are presented in Appendix C. For test L-6471-24 in NS006 natural sediment, these data are presented in Appendix H. Six treatments were prepared with each natural sediment, five M8410-500mL Mineral Oil (Light) concentrations and a negative control. Test concentrations were 250, 500, 1000, 2000, and 4000 mg M8410-500mL Mineral Oil (Light) per kg of dry natural sediment. Six hundred milliliters of each NC010 natural sediment treatment and 925 ml of each NS006 natural sediment treatment were prepared and mixed for ten minutes with a KitchenAid Model KHM6 or similar hand-held mixer. Test chambers were 1-L glass jars. Three replicates were prepared for each NC010 natural sediment treatment and five replicates were prepared for each NS006 natural sediment treatment. Every replicate in both tests had approximately 150 ml or 2 cm of natural sediment and 800 ml 20 ppt salinity overlying synthetic seawater. These tests were preceded by 10-day range-finding tests (Appendix L). One additional replicate of each negative control or Laboratory Performance Control (LPC) without organisms was prepared for overlying water quality data and sediment pore water ammonia measurements on Day -1, the day before adding the test organisms. The pore water was obtained through centrifugation. Results indicated acceptable water quality (see summary below).

| Initial LPC Pore Water Measurements: Day -1 | | | | | |
|---|---|---|---|---|---|
| EEUSA Sample #: | Test Concentration | Salinity, ppt | pH, su | Dissolved Oxygen, mg/L | Total Ammonia, ppm |
| L-6471-24 NS006 with Heavy Mineral Oil | 0 mg/kg (LPC) | 19.8 | 7.7 | 8.0 | 2.0 |
| L-6473-24 NC010 with Heavy Mineral Oil | 0 mg/kg (LPC) | 20.1 | 7.7 | 7.8 | 1.0 |

Sediment characterization data for Rigolets natural sediment, NS006, are presented below (Appendix J).

| Bulk Sediment Data | | | | | | | |
|---|---|---|---|---|---|---|---|
| Sediment Batch # | Gravel, % | Sand, % | Silt, % | Clay, % | Total Volatile Solids, % | Total Organic Carbon, % | Total Organic Matter, % |
| NS006 | 0.0 | 19.8 | 46.6 | 33.6 | 6.21 | 2.00 | 6.50 |

Total Organic Carbon data for each sediment are noted below.

| Sediment Batch # | Total Organic Carbon, % |
|---|---|
| NS006 | 1.91 |
| NC010 | 3.56 |
| Alpha Analytical, Mansfield Lab | |

All treatments were prepared and dispensed 18 to 24 hours before adding test organisms to each replicate. Treatments were kept in a dedicated environmental chamber with 14 hours light and 10 hours dark at 20±1°C. At 24-hour intervals, temperature, dissolved oxygen, pH, and salinity were measured in each treatment. After 10 days, all three replicates of each treatment of each test were terminated, and the number of surviving organisms recorded. On Day 2 and Day 8, total ammonia was measured in the LPC (Appendix A). This test was aerated at a rate between 50 – 140 mL/min.

Initial 0-hr and 10-day dry weights and 0-hr lengths of representative test organisms for with Mineral Oil (Heavy) in NC010 natural sediment, L-6473-24 are presented in Appendix A. Initial 0-hr and 10-day dry weights and 0-hr lengths of representative test organisms for with Mineral Oil (Heavy) in NS006 natural sediment, L-6471-24, are presented in Appendix F. The 10-day weight data are from surviving organisms.

## RESULTS

L-6473-24: LPC and five spiked sediment treatments, 250, 500, 1000, 2000, and 4000 mg M8410-500mL Mineral Oil (Light) per kg of dry Newtown Creek natural sediment, NC-010 (Appendix B).

| 10-Day Survival, mg/kg dry wt. | | Mean Dry Weight, mg/kg dry wt. | |
|---|---|---|---|
| **NOEC** | **LOEC** | **NOEC** | **LOEC** |
| 2,000 | 4,000 | 2,000 | >2,000 |
| **LC25** | **LC50** | **IC25** | **IC50** |
| 2,389 | 3,889 | 811 | >4,000 |
| LPC Survival: 90% | | | |

NOEC: No Observed Effect Concentration.
LOEC: Lowest Observed Effect Concentration.
EC25: Concentration causing 25% reduction in growth as compared to the LPC.

L-6471-24: LPC and five spiked sediment treatments, 250, 500, 1000, 2000, and 4000 mg M8410-500mL Mineral Oil (Light) per kg of dry Rigolets natural sediment, NS006 (Appendix H).

| 10-Day Survival, mg/kg dry wt. | | Mean Dry Weight, mg/kg dry wt. | |
|---|---|---|---|
| **NOEC** | **LOEC** | **NOEC** | **LOEC** |
| <250 | 250 | <250 | <250 |
| **LC25** | **LC50** | **EC25** | **EC50** |
| 3,654 | >4,000 | >4,000 | >4,000 |
| LPC Survival: 99% | | | |

## REFERENCES

ASTM, 1999. Standard Guide for Conducting 10-day Static Sediment Toxicity Tests with Marine and Estuarine Amphipods. E 1367-99.

Environmental Enterprises USA, Standard Operating Procedures, February 2022. (or most recent version).

Environmental Enterprises USA, Quality Assurance Plan, January 2021. (or most recent version).

NELAC Institute. TNI Standard, Environmental Laboratory Sector, adopted September 8, 2009. Management and Technical Requirements for Laboratories Performing Environmental Analysis. Volume 1. EL-V1-2009-ISO. Weatherford, TX 76086.

Tidepool Scientific Software. 2018. CETIS™ Comprehensive Environmental Toxicity Information System. Version 2.1.4.3. Tidepool Scientific, LLC, McKinleyville, CA 95519 (or most recent version).

U. S. Environmental Protection Agency, March 1983. Methods for Chemical Analysis of Water and Wastes, EPA 600-4-79-020. Office of Research and Development. Washington, DC 20460.

U.S. Environmental Protection Agency, 1994. Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods. EPA/600/R-94/025, Section 11. U.S. EPA Office of Research and Development. Washington, DC 20460.

U.S. Environmental Protection Agency. June 2000. Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the National Pollutant Discharge Elimination System Program. EPA 833-R-00-003. Office of Wastewater Management (423). Washington, DC 20460.

U.S. Environmental Protection Agency. July 2000. Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136). EPA 821-B-00-004. Office of Water (4303). Washington, DC 20460.

U.S. Environmental Protection Agency, December 2011. Analytic Methods for the Oil and Gas Extraction Point Source Category. EPA-821-R-11-004, Method 1644.U.S. EPA Office of Research and Development. Washington, DC 20460.

U.S. Environmental Protection Agency Region VI, Effective: May 11, 2023. Final NPDES General Permit for New and Existing Sources and New Dischargers in the Offshore Subcategory of the Oil and Gas Extraction Category for the Western Portion of the Outer Continental Shelf of the Gulf of Mexico (GMG290000). FR Volume 88, No. 106: 36316, June 2, 2023.

Environmental Enterprises USA, Inc.

# APPENDIX A

# Newfields Environmental
## Light Oil in NC010
## EE USA Lab #: L-6473-24 (L-6273-24)

*Leptocheirus plumulosus* Acute, Static 10-Day Sediment Toxicity Test.
EPA Test Method 1644

Test Concentrations Prepared 9 / 26 /24 Sediment Batch #L-6432-24

Dilution Water Batch #: 20-079-24 Organism Batch #: Lp-153-24

Organisms Counted by: JL/CH Organisms QC/QA by: BCP

Aeration Rate: 76 ml/min. Feeding: This test was not fed.

Dilution Water:
Salinity: 20.0 Meter ID 1Q Temperature: 20.4 Meter ID 7H

**Initial $H_2O$ quality parameters for dilution water only: Salinity: 20ppt +/-1ppt; Temp.: 20°C +/-1°C**
Salinity (EPA Method 120.1): ppt Thermometric (EPA Method 180.1): °C

**Survival Data (*Leptocheirus plumulosus*)**

**Treatment, mg/kg**

| Time | REP | 0 LPC | REP | 250 | REP | 500 | REP | 1000 | REP | 2000 | REP | 4000 | Initials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 HR | A | 20 | A | 20 | A | 20 | A | 20 | A | 20 | A | 20 | 9/27/24 |
| | B | 20 | B | 20 | B | 20 | B | 20 | B | 20 | B | 20 | |
| | C | 20 | C | 20 | C | 20 | C | 20 | C | 20 | C | 20 | |
| 1133 | | | | | | | | | | | | | CH |
| 10 Day | A | 18 | A | 16 | A | 16 | A | 15 | A | 19 | A | 11 | 10/07/24 |
| | B | 17 | B | 17 | B | 15 | B | 18 | B | 15 | B | 7 | |
| | C | 19 | C | 16 | C | 17 | C | 14 | C | 10 | C | 8 | |
| 1155 | | | | | | | | | | | | | GW |

10-Day LC50 >4,000 mg/kg, 95% CI 3,296 to >4,000 mg/kg,

Statistical Method Probit

Prep by: BCP
QA/QC by: CH

Data Analysis by: BCP
Raw Data QA/QC by: BCP

**<u>*L. plumulosus* Water Quality Data</u>**

**Initial $H_2O$ quality parameters for dilution water only: Salinity: 20ppt +/-1ppt; Temp.: 20°C +/-1°C**

Salinity (EPA Method 120.1): ppt Thermometric (EPA Method 180.1): °C

| Day -1 | LPC Pore Water Measurements | |
|---|---|---|
| 9/26/24 | 0A | Meter # |
| Salinity | 20.1 | 1Q |
| Temp | 19.9 | 7H |
| pH | 7.7 | 7H |
| DO | 7.8 | 1L |
| Ammonia | 1.00 | Initials CH |
| Initials | GW | |
| Time | 01418 | |

| Day 0 | Control Overlying Water Measurements — **0 mg/kg** | | | |
|---|---|---|---|---|
| 09/27/24 | 0A | 0B | 0C | Meter # |
| Salinity | 32.7 | 32.6 | 32.7 | 1Q |
| Temp | 20.1 | 20.0 | 20.0 | 7H |
| pH | 7.7 | 7.6 | 7.7 | 7H |
| DO | 7.8 | 7.7 | 7.9 | 1L |
| Initials | GW | | | |
| Time | 0947 | | | |

| Day 0 | Overlying Water Measurements – **250 mg/kg** | | | |
|---|---|---|---|---|
| 09/27/24 | 250A | 250B | 250C | Meter # |
| Salinity | 32.8 | 32.7 | 32.6 | 1Q |
| Temp | 20.1 | 20.0 | 20.0 | 7H |
| pH | 7.7 | 7.7 | 7.7 | 7H |
| DO | 8.0 | 7.8 | 7.7 | 1L |
| Initials | GW | | | |
| Time | 0949 | | | |

Comments: ______________________________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**

| Day 0 | Overlying Water Measurements — **500 mg/kg** | | | |
|---|---|---|---|---|
| 09/27/24 | 500A | 500B | 500C | Meter # |
| Salinity | 32.7 | 32.7 | 32.6 | 1Q |
| Temp | 20.1 | 19.9 | 19.8 | 7H |
| pH | 7.7 | 7.7 | 7.7 | 7H |
| DO | 7.9 | 7.8 | 7.9 | 1L |
| Initials | GW | | | |
| Time | 0951 | | | |

| Day 0 | Overlying Water Measurements — **1000 mg/kg** | | | |
|---|---|---|---|---|
| 09/27/24 | 1000A | 1000B | 1000C | Meter # |
| Salinity | 32.7 | 32.6 | 32.6 | 1Q |
| Temp | 20.1 | 19.9 | 19.7 | 7H |
| pH | 7.7 | 7.7 | 7.8 | 7H |
| DO | 7.9 | 7.9 | 7.9 | 1L |
| Initials | GW | | | |
| Time | 0954 | | | |

| Day 0 | Overlying Water Measurements — **2000 mg/kg** | | | |
|---|---|---|---|---|
| 09/27/24 | 2000A | 2000B | 2000C | Meter # |
| Salinity | 32.7 | 32.6 | 32.7 | 1Q |
| Temp | 20.1 | 19.9 | 19.9 | 7H |
| pH | 7.7 | 7.7 | 7.7 | 7H |
| DO | 7.9 | 7.8 | 7.9 | 1L |
| Initials | GW | | | |
| Time | 0956 | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**

| Day 0 | Overlying Water Measurements — **4000 mg/kg** | | | |
|---|---|---|---|---|
| 09/27/24 | 4000A | 4000B | 4000C | Meter # |
| Salinity | 32.7 | 32.6 | 32.6 | 1Q |
| Temp | 20.2 | 20.2 | 20.1 | 7H |
| pH | 7.7 | 7.7 | 7.7 | 7H |
| DO | 7.9 | 7.8 | 7.9 | 1L |
| Initials | bw | | | |
| Time | 0950 | | | |

| Day 1 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 09/28/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 20.4 | 20.3 | 20.3 | 20.4 | 20.4 | 20.4 | 1Q |
| Temp | 20.1 | 20.1 | 20.1 | 20.1 | 20.2 | 20.3 | 7H |
| pH | 7.7 | 7.7 | 7.7 | 7.8 | 7.7 | 7.7 | 7H |
| DO | 7.7 | 7.8 | 7.7 | 7.8 | 7.7 | 7.7 | 1L |
| Initials | STL | | | | | | |
| Time | 0813 | | | | | | |

| Day 2 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 09/29/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 20.4 | 20.4 | 20.4 | 20.5 | 20.4 | 20.4 | 1Q |
| Temp | 20.3 | 20.3 | 20.3 | 20.3 | 20.3 | 20.4 | 7H |
| pH | 7.7 | 7.8 | 7.7 | 7.8 | 7.8 | 7.8 | 7H |
| DO | 7.6 | 7.9 | 7.8 | 7.9 | 7.9 | 7.9 | 1L |
| Ammonia | >20 | //////// | //////// | //////// | //////// | //////// | Initials STL |
| Initials | STL | | | | | | |
| Time | 0827 | | | | | | |

Comments: ______________________________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**

| Day 3 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 09/30/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 20.5 | 20.5 | 20.4 | 20.5 | 20.5 | 20.5 | 1Q |
| Temp | 20.3 | 20.2 | 20.2 | 20.2 | 20.3 | 20.4 | 7H |
| pH | 7.7 | 7.8 | 7.7 | 7.8 | 7.8 | 7.8 | 7H |
| DO | 7.6 | 7.9 | 7.8 | 7.9 | 7.9 | 7.9 | 1L |
| Initials | JTL | | | | | | |
| Time | 0917 | | | | | | |

| Day 4 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/01/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 20.6 | 20.5 | 20.5 | 20.6 | 20.6 | 20.6 | 1Q |
| Temp | 20.0 | 19.9 | 19.9 | 20.1 | 20.1 | 20.1 | 7H |
| pH | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7H |
| DO | 8.0 | 8.0 | 8.0 | 8.1 | 8.0 | 8.0 | 1L |
| Initials | GW | | | | | | |
| Time | 0903 | | | | | | |

| Day 5 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/02/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 20.5 | 20.5 | 20.5 | 20.6 | 20.6 | 20.6 | 1Q |
| Temp | 20.1 | 20.1 | 20.0 | 20.1 | 20.1 | 20.2 | 7H |
| pH | 7.8 | 7.8 | 7.8 | 7.9 | 7.9 | 7.9 | 7H |
| DO | 7.9 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 1L |
| Initials | GW | | | | | | |
| Time | 0846 | | | | | | |

Comments: ________________________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**

| Day 6 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/03/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 20.6 | 20.6 | 20.5 | 20.7 | 20.6 | 20.6 | 1Q |
| Temp | 20.3 | 20.3 | 20.3 | 20.3 | 20.4 | 20.4 | 7H |
| pH | 7.8 | 7.8 | 7.8 | 7.9 | 7.8 | 7.8 | 7H |
| DO | 7.9 | 7.9 | 7.9 | 7.9 | 7.9 | 7.9 | 1L |
| Initials | STL | | | | | | |
| Time | 0928 | | | | | | |

| Day 7 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/04/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 20.6 | 20.6 | 20.6 | 20.7 | 20.7 | 20.7 | 1Q |
| Temp | 20.2 | 20.1 | 20.1 | 20.1 | 20.1 | 20.2 | 7H |
| pH | 7.8 | 7.8 | 7.9 | 7.9 | 7.9 | 7.9 | 7H |
| DO | 8.0 | 8.0 | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | GW | | | | | | |
| Time | 0903 | | | | | | |

| Day 8 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/05/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 20.6 | 20.6 | 20.6 | 20.7 | 20.7 | 20.7 | 1Q |
| Temp | 20.2 | 20.2 | 20.0 | 20.1 | 20.1 | 20.2 | 7H |
| pH | 7.9 | 7.9 | 7.9 | 7.9 | 7.9 | 7.9 | 7H |
| DO | 8.1 | 8.0 | 8.0 | 8.0 | 8.1 | 8.1 | 1L |
| Ammonia | 2.00 | //////// | //////// | //////// | //////// | //////// | Initials |
| Initials | GW | | | | | | |
| Time | 0750 | | | | | | |

Comments: ______________________________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**L. plumulosus Water Quality Data Cont.**

| Day 9 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/06/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 20.7 | 20.7 | 20.6 | 20.8 | 20.7 | 20.7 | 1Q |
| Temp | 20.2 | 20.2 | 20.2 | 20.2 | 20.2 | 20.3 | 7H |
| pH | 7.8 | 7.9 | 7.9 | 7.9 | 7.9 | 7.9 | 7H |
| DO | 7.9 | 8.0 | 8.0 | 8.0 | 8.1 | 8.0 | 1L |
| Initials | GW | | | | | | |
| Time | 0818 | | | | | | |

**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Control Overlying Water Measurements— **0 mg/kg** | | | |
|---|---|---|---|---|
| 10/07/24 | 0A | 0B | 0C | Meter # |
| Salinity | 20.8 | 20.7 | 20.7 | 1Q |
| Temp | 20.3 | 20.2 | 20.2 | 7H |
| pH | 7.8 | 7.8 | 7.9 | 7H |
| DO | 8.0 | 8.0 | 8.0 | 1L |
| Initials | TAD | | | |
| Time | 0856 | | | |

| Day 10 | Overlying Water Measurements – **250 mg/kg** | | | |
|---|---|---|---|---|
| 10/07/24 | 250A | 250B | 250C | Meter # |
| Salinity | 20.7 | 20.8 | 20.6 | 1Q |
| Temp | 20.3 | 20.1 | 20.1 | 7H |
| pH | 7.9 | 7.9 | 7.9 | 7H |
| DO | 7.9 | 8.0 | 8.0 | 1L |
| Initials | TAD | | | |
| Time | 0900 | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**
**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Overlying Water Measurements — **500 mg/kg** | | | |
|---|---|---|---|---|
| 10/07/24 | 500A | 500B | 500C | Meter # |
| Salinity | 20.6 | 20.6 | 20.7 | 1Q |
| Temp | 20.3 | 20.1 | 19.9 | 7H |
| pH | 7.8 | 7.9 | 7.9 | 7H |
| DO | 7.9 | 8.0 | 8.1 | 1L |
| Initials | TAD | | | |
| Time | 0903 | | | |

| Day 10 | Overlying Water Measurements — **1000 mg/kg** | | | |
|---|---|---|---|---|
| 10/07/24 | 1000A | 1000B | 1000C | Meter # |
| Salinity | 20.9 | 20.7 | 20.7 | 1Q |
| Temp | 20.3 | 20.0 | 19.8 | 7H |
| pH | 7.9 | 7.9 | 7.9 | 7H |
| DO | 8.1 | 8.0 | 8.1 | 1L |
| Initials | TAD | | | |
| Time | 0905 | | | |

| Day 10 | Overlying Water Measurements — **2000 mg/kg** | | | |
|---|---|---|---|---|
| 10/07/24 | 2000A | 2000B | 2000C | Meter # |
| Salinity | 20.8 | 20.7 | 20.8 | 1Q |
| Temp | 20.3 | 20.1 | 20.0 | 7H |
| pH | 7.9 | 7.9 | 7.9 | 7H |
| DO | 8.1 | 8.1 | 8.0 | 1L |
| Initials | TAD | | | |
| Time | 0907 | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**
**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Overlying Water Measurements — **4000 mg/kg** | | | |
|---|---|---|---|---|
| 10/07/24 | 4000A | 4000B | 4000C | Meter # |
| Salinity | 20.8 | 20.7 | 20.8 | 1Q |
| Temp | 20.3 | 20.3 | 20.1 | 7H |
| pH | 7.9 | 7.9 | 7.9 | 7H |
| DO | 8.1 | 8.0 | 8.1 | 1L |
| Initials | TAD | | | |
| Time | 0910 | | | |

Comments: ______________________________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

## *L. plumulosus* DRY LENGTH DATA

0-hr data: 20 representative organisms measured from antenna base to end of third pleon segment on the dorsal surface.

| # | Length |
|---|---|
| 1 | 3.4 |
| 2 | 3.2 |
| 3 | 3.6 |
| 4 | 3.5 |
| 5 | 3.4 |
| 6 | 3.4 |
| 7 | 3.4 |
| 8 | 3.6 |
| 9 | 3.6 |
| 10 | 3.6 |
| | mean = 3.5 |
| | All data in mm / *L. plumulosus* |

## Initial *L. plumulosus* Weights at Test Initiation

| Rep # | Project # or Sample Description | A Final Weight (mg) | B Initial Weight (mg) | Final Weight minus Initial Weight (mg) | C No. of Organisms | D Lepto Weight (mg) |
|---|---|---|---|---|---|---|
| 1 | L-6473-24 | 18.23 | 14.18 | 4.05 | 10 | 0.405 |
| 2 | " | 17.91 | 14.11 | 3.80 | 10 | 0.380 |
| 3 | " | 18.71 | 14.84 | 3.87 | 10 | 0.387 |
| 4 | " | — | — | — | 10 | — |
| 5 | " | — | — | — | 10 | — |
| | | | | Mean Weight (mg/Lepto): | | 3.91 |

Initial Foil Weights at: 1149 on 09 / 27 /2024 by: JL Scale # 2R

Final Foil Weights at: 1135 on 09 / 28 /2024 by: JTL Scale # 3B

# Surviving *L. plumulosus* Weights at Test Termination

| Rep. | Concentration, mg/kg | A Final Weight (mg) | B Initial Weight (mg) | C No. of Surviving Organisms |
|---|---|---|---|---|
| A | 0 | 23.77 | 13.65 | 18 |
| B | 0 | 22.35 | 14.87 | 17 |
| C | 0 | 20.27 | 14.30 | 19 |
| A | 250 | 20.35 | 14.79 | 16 |
| B | 250 | 19.79 | 13.79 | 17 |
| C | 250 | 17.55 | 14.67 | 16 |
| A | 500 | 22.67 | 14.68 | 16 |
| B | 500 | 19.31 | 13.00 | 15 |
| C | 500 | 21.83 | 14.15 | 17 |
| A | 1000 | 20.02 | 15.58 | 15 |
| B | 1000 | 19.54 | 14.62 | 18 |
| C | 1000 | 17.60 | 13.97 | 14 |
| A | 2000 | 17.88 | 12.55 | 19 |
| B | 2000 | 16.88 | 12.90 | 15 |
| C | 2000 | 16.50 | 12.73 | A ~~14~~ 10 |
| A | 4000 | 18.39 | 15.10 | 11 |
| B | 4000 | 16.19 | 14.10 | 7 |
| C | 4000 | 15.71 | 12.85 | 8 |

Initial Foil Weights at: 0940 on 10 / 7 /2024 by: GW Scale # 3B

Final Foil Weights at: 1528 on 10 / 08 /2024 by: STL Scale # 3B

A Error BCP
100924

Environmental Enterprises USA, Inc.

# APPENDIX B

# Newfields Environmental

## L-6473-24 (L-6273-24) Light Oil in NC010

| 10-Day Survival | |
|---|---|
| **NOEC** | **LOEC** |
| 2000 | 4000 |
| **LC25** | **LC50** |
| 2389 | 3889 |

| Mean Dry Weight-mg | |
|---|---|
| **NOEC** | **LOEC** |
| 2000 | >2000 |
| **IC25** | **IC50** |
| 811 | >4000 |

# CETIS Test Data Worksheet

Report Date: 10 Oct-24 09:58 (p 1 of 1)
Test Code/ID: L-6473-24 (G-S) / 08-7594-9524

Leptocheirus 10-d Survival and Growth Test — Environmental Enterprises USA, Inc.

| | | | | | |
|---|---|---|---|---|---|
| Start Date: | 27 Sep-24 11:33 | Species: | Leptocheirus plumulosus | Sample Code: | L-6473-24 (G-S) |
| End Date: | 07 Oct-24 11:55 | Protocol: | EPA 821-R-11-004 (2011) | Sample Source: | |
| Sample Date: | 09 Oct-24 11:29 | Material: | Natural Sediment | Sample Station: | |

| Conc-mg/kg | Code | Rep | Pos | # Exposed | 1d Survival | 2d Survival | 3d Survival | 4d Survival | 5d Survival | 6d Survival | 7d Survival | 8d Survival | 9d Survival | 10d Survival | Total Weight-mg | Tare Weight-mg | Pan Count |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | LP | 1 | 4 | 20 | | | | | | | | | | 18 | 23.77 | 13.65 | 18 |
| 0 | LP | 2 | 7 | 20 | | | | | | | | | | 17 | 22.35 | 14.87 | 17 |
| 0 | LP | 3 | 10 | 20 | | | | | | | | | | 19 | 20.27 | 14.3 | 19 |
| 250 | | 1 | 1 | 20 | | | | | | | | | | 16 | 20.35 | 14.74 | 16 |
| 250 | | 2 | 17 | 20 | | | | | | | | | | 17 | 19.79 | 13.79 | 17 |
| 250 | | 3 | 5 | 20 | | | | | | | | | | 16 | 17.55 | 14.67 | 16 |
| 500 | | 1 | 18 | 20 | | | | | | | | | | 16 | 22.67 | 14.68 | 16 |
| 500 | | 2 | 2 | 20 | | | | | | | | | | 15 | 19.31 | 13 | 15 |
| 500 | | 3 | 3 | 20 | | | | | | | | | | 17 | 21.83 | 14.15 | 17 |
| 1000 | | 1 | 15 | 20 | | | | | | | | | | 15 | 20.02 | 15.58 | 15 |
| 1000 | | 2 | 8 | 20 | | | | | | | | | | 18 | 19.54 | 14.62 | 18 |
| 1000 | | 3 | 9 | 20 | | | | | | | | | | 14 | 17.6 | 13.97 | 14 |
| 2000 | | 1 | 12 | 20 | | | | | | | | | | 19 | 17.88 | 12.55 | 19 |
| 2000 | | 2 | 16 | 20 | | | | | | | | | | 15 | 16.88 | 12.9 | 15 |
| 2000 | | 3 | 13 | 20 | | | | | | | | | | 10 | 16.5 | 12.73 | 10 |
| 4000 | | 1 | 11 | 20 | | | | | | | | | | 11 | 18.39 | 15.1 | 11 |
| 4000 | | 2 | 14 | 20 | | | | | | | | | | 7 | 16.19 | 14.1 | 7 |
| 4000 | | 3 | 6 | 20 | | | | | | | | | | 8 | 15.71 | 12.85 | 8 |

Leptocheirus 10-d Survival and Growth Test — Environmental Enterprises USA, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 17-1323-5099 | **Endpoint:** | 10d Survival Rate | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 9:56 | **Analysis:** | Parametric-Control vs Treatments | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 12:56 | **MD5 Hash:** | 6BA841D379EC39FC359FF9D48C364CB1 | **Editor ID:** | 002-227-489-6 |

| Data Transform | Alt Hyp | NOEL | LOEL | TOEL | Tox Units | MSDu | PMSD |
|---|---|---|---|---|---|---|---|
| Angular (Corrected) | C > T | 2000 | 4000 | 2828 | --- | 0.2234 | 24.82% |

### Dunnett Multiple Comparison Test

| Control | vs | Conc-mg/kg | df | Test Stat | Critical | MSD | P-Type | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|---|---|---|
| Control | | 250 | 4 | 1.093 | 2.502 | 0.2899 | CDF | 0.3859 | Non-Significant Effect |
| | | 500 | 4 | 1.266 | 2.502 | 0.2899 | CDF | 0.3170 | Non-Significant Effect |
| | | 1000 | 4 | 1.381 | 2.502 | 0.2899 | CDF | 0.2751 | Non-Significant Effect |
| | | 2000 | 4 | 1.696 | 2.502 | 0.2899 | CDF | 0.1796 | Non-Significant Effect |
| | | 4000* | 4 | 4.644 | 2.502 | 0.2899 | CDF | 0.0012 | Significant Effect |

### ANOVA Table

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|
| Between | 0.491832 | 0.0983665 | 5 | 4.886 | 0.0114 | Significant Effect |
| Error | 0.241601 | 0.0201334 | 12 | | | |
| Total | 0.733433 | | 17 | | | |

### ANOVA Assumptions Tests

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) |
|---|---|---|---|---|---|
| Variance | Bartlett Equality of Variance Test | 7.667 | 15.09 | 0.1756 | Equal Variances |
| Distribution | Shapiro-Wilk W Normality Test | 0.9479 | 0.8546 | 0.3934 | Normal Distribution |

### 10d Survival Rate Summary

| Conc-mg/kg | Code | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | LP | 3 | 0.9000 | 0.7758 | 1.0000 | 0.9000 | 0.8500 | 0.9500 | 0.0289 | 5.56% | 0.00% |
| 250 | | 3 | 0.8167 | 0.7450 | 0.8884 | 0.8000 | 0.8000 | 0.8500 | 0.0167 | 3.53% | 9.26% |
| 500 | | 3 | 0.8000 | 0.6758 | 0.9242 | 0.8000 | 0.7500 | 0.8500 | 0.0289 | 6.25% | 11.11% |
| 1000 | | 3 | 0.7833 | 0.5248 | 1.0000 | 0.7500 | 0.7000 | 0.9000 | 0.0601 | 13.29% | 12.96% |
| 2000 | | 3 | 0.7333 | 0.1733 | 1.0000 | 0.7500 | 0.5000 | 0.9500 | 0.1302 | 30.74% | 18.52% |
| 4000 | | 3 | 0.4333 | 0.1748 | 0.6919 | 0.4000 | 0.3500 | 0.5500 | 0.0601 | 24.02% | 51.85% |

### Angular (Corrected) Transformed Summary

| Conc-mg/kg | Code | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | LP | 3 | 1.2560 | 1.0410 | 1.4700 | 1.2490 | 1.1730 | 1.3450 | 0.0498 | 6.87% | 0.00% |
| 250 | | 3 | 1.1290 | 1.0350 | 1.2240 | 1.1070 | 1.1070 | 1.1730 | 0.0220 | 3.37% | 10.09% |
| 500 | | 3 | 1.1090 | 0.9527 | 1.2660 | 1.1070 | 1.0470 | 1.1730 | 0.0364 | 5.68% | 11.68% |
| 1000 | | 3 | 1.0960 | 0.7589 | 1.4330 | 1.0470 | 0.9912 | 1.2490 | 0.0783 | 12.38% | 12.74% |
| 2000 | | 3 | 1.0590 | 0.3634 | 1.7550 | 1.0470 | 0.7854 | 1.3450 | 0.1617 | 26.45% | 15.65% |
| 4000 | | 3 | 0.7178 | 0.4565 | 0.9790 | 0.6847 | 0.6331 | 0.8355 | 0.0607 | 14.65% | 42.85% |

### 10d Survival Rate Detail

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | LP | 0.9000 | 0.8500 | 0.9500 |
| 250 | | 0.8000 | 0.8500 | 0.8000 |
| 500 | | 0.8000 | 0.7500 | 0.8500 |
| 1000 | | 0.7500 | 0.9000 | 0.7000 |
| 2000 | | 0.9500 | 0.7500 | 0.5000 |
| 4000 | | 0.5500 | 0.3500 | 0.4000 |

**Leptocheirus 10-d Survival and Growth Test** — Environmental Enterprises USA, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 17-1323-5099 | **Endpoint:** | 10d Survival Rate | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 9:56 | **Analysis:** | Parametric-Control vs Treatments | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 12:56 | **MD5 Hash:** | 6BA841D379EC39FC359FF9D48C364CB1 | **Editor ID:** | 002-227-489-6 |

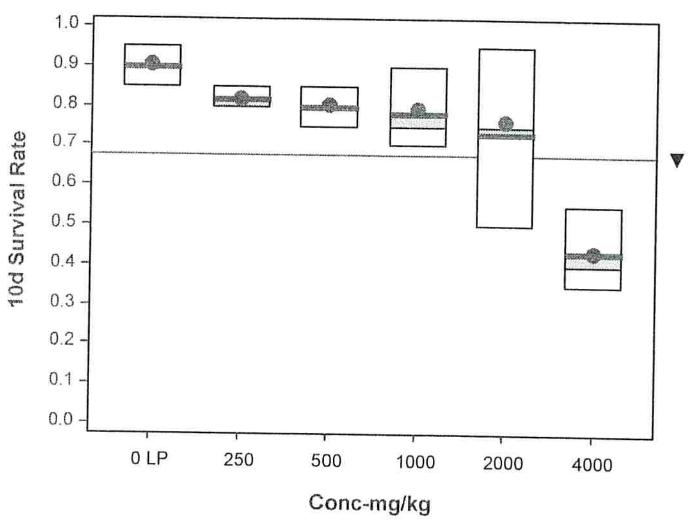
## Angular (Corrected) Transformed Detail

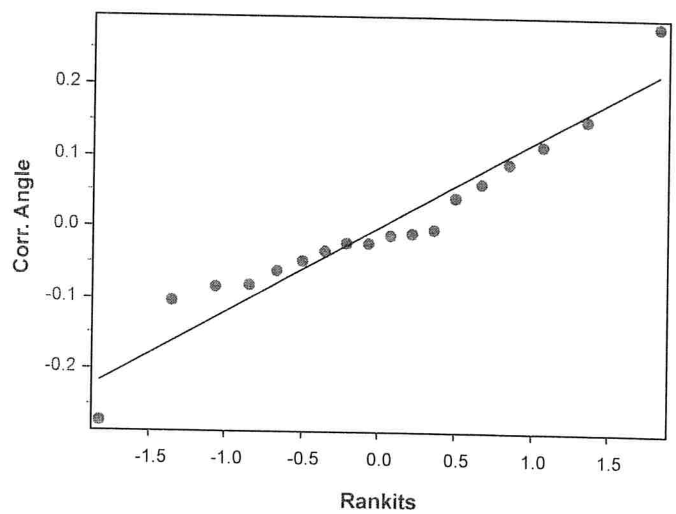
| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | LP | 1.2490 | 1.1730 | 1.3450 |
| 250 | | 1.1070 | 1.1730 | 1.1070 |
| 500 | | 1.1070 | 1.0470 | 1.1730 |
| 1000 | | 1.0470 | 1.2490 | 0.9912 |
| 2000 | | 1.3450 | 1.0470 | 0.7854 |
| 4000 | | 0.8355 | 0.6331 | 0.6847 |

## 10d Survival Rate Binomials

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | LP | 18/20 | 17/20 | 19/20 |
| 250 | | 16/20 | 17/20 | 16/20 |
| 500 | | 16/20 | 15/20 | 17/20 |
| 1000 | | 15/20 | 18/20 | 14/20 |
| 2000 | | 19/20 | 15/20 | 10/20 |
| 4000 | | 11/20 | 7/20 | 8/20 |

## Graphics



# CETIS Analytical Report

Report Date: 10 Oct-24 15:20 (p 1 of 2)
Test Code/ID: L-6473-24 (G-S) / 08-7594-9524

Leptocheirus 10-d Survival and Growth Test — Environmental Enterprises USA, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 08-3665-7827 | **Endpoint:** | Mean Dry Weight-mg | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 15:20 | **Analysis:** | Parametric-Control vs Treatments | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 12:56 | **MD5 Hash:** | 9A3E10EA58A846AB876AC13501C0F1AF | **Editor ID:** | 002-227-489-6 |

| Data Transform | Alt Hyp | NOEL | LOEL | TOEL | Tox Units | MSDu | PMSD |
|---|---|---|---|---|---|---|---|
| Untransformed | C > T | 2000 | >2000 | --- | --- | 0.158 | 36.01% |

### Dunnett Multiple Comparison Test

| Control | vs | Conc-mg/kg | df | Test Stat | Critical | MSD | P-Type | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|---|---|---|
| Control | | 250 | 4 | 2.252 | 2.466 | 0.158 | CDF | 0.0703 | Non-Significant Effect |
| | | 500 | 4 | -0.288 | 2.466 | 0.158 | CDF | 0.8788 | Non-Significant Effect |
| | | 1000* | 4 | 2.537 | 2.466 | 0.158 | CDF | 0.0445 | Significant Effect |
| | | 2000 | 4 | 2.047 | 2.466 | 0.158 | CDF | 0.0965 | Non-Significant Effect |

### ANOVA Table

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|
| Between | 0.088782 | 0.0221955 | 4 | 3.603 | 0.0456 | Significant Effect |
| Error | 0.0615978 | 0.0061598 | 10 | | | |
| Total | 0.15038 | | 14 | | | |

### ANOVA Assumptions Tests

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) |
|---|---|---|---|---|---|
| Variance | Bartlett Equality of Variance Test | 5.648 | 13.28 | 0.2270 | Equal Variances |
| Distribution | Shapiro-Wilk W Normality Test | 0.9663 | 0.8328 | 0.7997 | Normal Distribution |

### Mean Dry Weight-mg Summary

| Conc-mg/kg | Code | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | LP | 3 | 0.4388 | 0.1308 | 0.7469 | 0.44 | 0.3142 | 0.5622 | 0.0716 | 28.26% | 0.00% |
| 250 | | 3 | 0.2945 | 0.04813 | 0.5409 | 0.3506 | 0.18 | 0.3529 | 0.05726 | 33.68% | 32.88% |
| 500 | | 3 | 0.4573 | 0.3588 | 0.5557 | 0.4518 | 0.4207 | 0.4994 | 0.02289 | 8.67% | -4.21% |
| 1000 | | 3 | 0.2762 | 0.2302 | 0.3222 | 0.2733 | 0.2593 | 0.296 | 0.0107 | 6.71% | 37.06% |
| 2000 | | 3 | 0.3076 | 0.1572 | 0.4581 | 0.2805 | 0.2653 | 0.377 | 0.03497 | 19.69% | 29.90% |

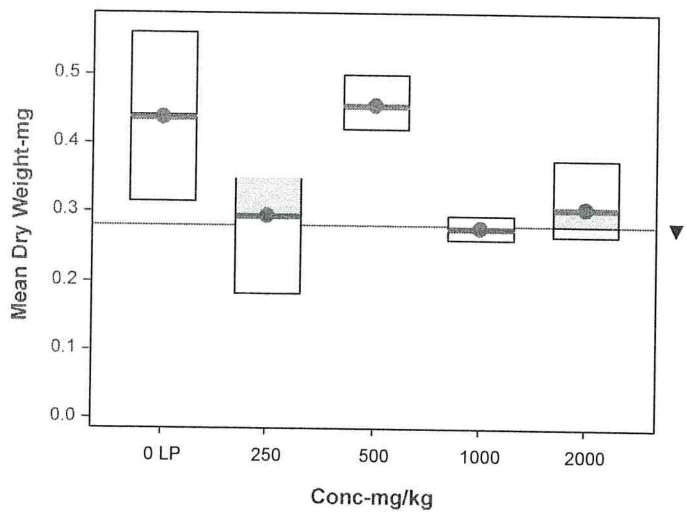
### Mean Dry Weight-mg Detail

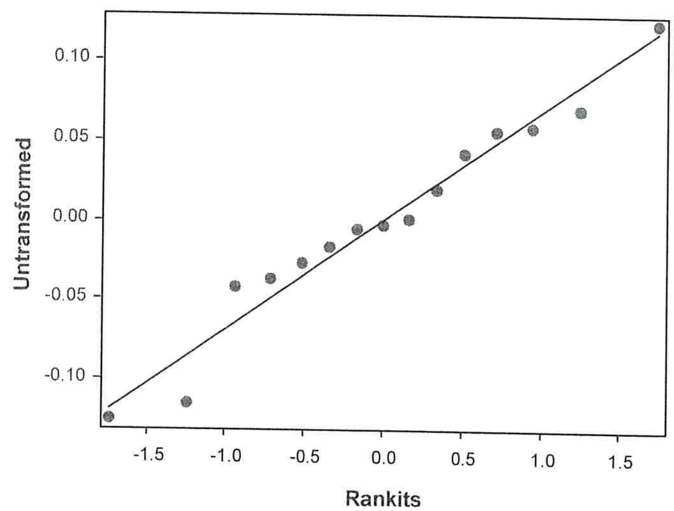
| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | LP | 0.5622 | 0.44 | 0.3142 |
| 250 | | 0.3506 | 0.3529 | 0.18 |
| 500 | | 0.4994 | 0.4207 | 0.4518 |
| 1000 | | 0.296 | 0.2733 | 0.2593 |
| 2000 | | 0.2805 | 0.2653 | 0.377 |

Leptocheirus 10-d Survival and Growth Test — Environmental Enterprises USA, Inc.

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 08-3665-7827 | **Endpoint:** | Mean Dry Weight-mg | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 15:20 | **Analysis:** | Parametric-Control vs Treatments | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 12:56 | **MD5 Hash:** | 9A3E10EA58A846AB876AC13501C0F1AF | **Editor ID:** | 002-227-489-6 |

### Graphics



# CETIS Analytical Report

| | |
|---|---|
| Report Date: | 10 Oct-24 09:58 (p 1 of 2) |
| Test Code/ID: | L-6473-24 (G-S) / 08-7594-9524 |

Leptocheirus 10-d Survival and Growth Test — Environmental Enterprises USA, Inc.

| | | | | | |
|---|---|---|---|---|---|
| Analysis ID: | 12-7002-0661 | Endpoint: | 10d Survival Rate | CETIS Version: | CETISv2.1.4 |
| Analyzed: | 10 Oct-24 9:57 | Analysis: | Linear Interpolation (ICPIN) | Status Level: | 1 |
| Edit Date: | 09 Oct-24 12:56 | MD5 Hash: | 6BA841D379EC39FC359FF9D48C364CB1 | Editor ID: | 002-227-489-6 |

## Linear Interpolation Options

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Linear | Linear | 1004125 | 1000 | Yes | Two-Point Interpolation |

## Point Estimates

| Level | mg/kg | 95% LCL | 95% UCL |
|---|---|---|---|
| LC15 | 1367 | --- | 3712 |
| LC20 | 2089 | --- | 3465 |
| LC25 | 2389 | --- | 3710 |
| LC40 | 3289 | 402.2 | --- |
| LC50 | 3889 | 2507 | --- |

## 10d Survival Rate Summary

| | | | Calculated Variate(A/B) | | | | | | | Isotonic Variate | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Conc-mg/kg | Code | Count | Mean | Median | Min | Max | CV% | %Effect | ΣA/ΣB | Mean | %Effect |
| 0 | LP | 3 | 0.9000 | 0.9000 | 0.8500 | 0.9500 | 5.56% | 0.00% | 54/60 | 0.9000 | 0.00% |
| 250 | | 3 | 0.8167 | 0.8000 | 0.8000 | 0.8500 | 3.53% | 9.26% | 49/60 | 0.8167 | 9.26% |
| 500 | | 3 | 0.8000 | 0.8000 | 0.7500 | 0.8500 | 6.25% | 11.11% | 48/60 | 0.8000 | 11.11% |
| 1000 | | 3 | 0.7833 | 0.7500 | 0.7000 | 0.9000 | 13.29% | 12.96% | 47/60 | 0.7833 | 12.97% |
| 2000 | | 3 | 0.7333 | 0.7500 | 0.5000 | 0.9500 | 30.74% | 18.52% | 44/60 | 0.7333 | 18.52% |
| 4000 | | 3 | 0.4333 | 0.4000 | 0.3500 | 0.5500 | 24.02% | 51.85% | 26/60 | 0.4333 | 51.86% |

## 10d Survival Rate Detail

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | LP | 0.9000 | 0.8500 | 0.9500 |
| 250 | | 0.8000 | 0.8500 | 0.8000 |
| 500 | | 0.8000 | 0.7500 | 0.8500 |
| 1000 | | 0.7500 | 0.9000 | 0.7000 |
| 2000 | | 0.9500 | 0.7500 | 0.5000 |
| 4000 | | 0.5500 | 0.3500 | 0.4000 |

## 10d Survival Rate Binomials

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | LP | 18/20 | 17/20 | 19/20 |
| 250 | | 16/20 | 17/20 | 16/20 |
| 500 | | 16/20 | 15/20 | 17/20 |
| 1000 | | 15/20 | 18/20 | 14/20 |
| 2000 | | 19/20 | 15/20 | 10/20 |
| 4000 | | 11/20 | 7/20 | 8/20 |

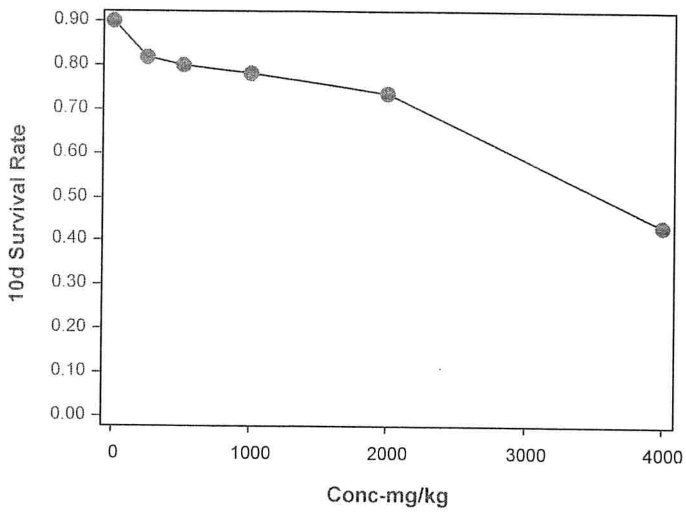


B. U

**Leptocheirus 10-d Survival and Growth Test** — **Environmental Enterprises USA, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 12-7002-0661 | **Endpoint:** | 10d Survival Rate | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 9:57 | **Analysis:** | Linear Interpolation (ICPIN) | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 12:56 | **MD5 Hash:** | 6BA841D379EC39FC359FF9D48C364CB1 | **Editor ID:** | 002-227-489-6 |

## Graphics



# CETIS Analytical Report

| | |
|---|---|
| Report Date: | 10 Oct-24 13:42 (p 1 of 1) |
| Test Code/ID: | L-6473-24 (G-S) / 08-7594-9524 |

**Leptocheirus 10-d Survival and Growth Test** — **Environmental Enterprises USA, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 01-6174-4512 | **Endpoint:** | Mean Dry Weight-mg | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 13:42 | **Analysis:** | Linear Interpolation (ICPIN) | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 12:56 | **MD5 Hash:** | 719AFC05ABFCD6BB0AAE0398B21857F | **Editor ID:** | 002-227-489-6 |

## Linear Interpolation Options

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Linear | Linear | 429180 | 1000 | Yes | Two-Point Interpolation |

## Point Estimates

| Level | mg/kg | 95% LCL | 95% UCL |
|---|---|---|---|
| IC15 | 519.3 | --- | 1499 |
| IC20 | 665.3 | --- | --- |
| IC25 | 811.3 | --- | --- |
| IC40 | >4000 | --- | --- |
| IC50 | >4000 | --- | --- |

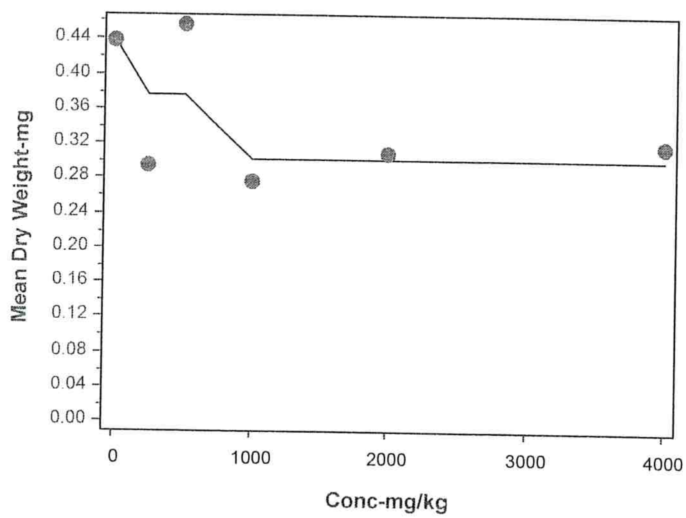
## Mean Dry Weight-mg Summary

| | | | Calculated Variate | | | | | | Isotonic Variate | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-mg/kg | Code | Count | Mean | Median | Min | Max | CV% | %Effect | Mean | %Effect |
| 0 | LP | 3 | 0.4388 | 0.44 | 0.3142 | 0.5622 | 28.26% | 0.00% | 0.4388 | 0.00% |
| 250 | | 3 | 0.2945 | 0.3506 | 0.18 | 0.3529 | 33.68% | 32.88% | 0.3759 | 14.33% |
| 500 | | 3 | 0.4573 | 0.4518 | 0.4207 | 0.4994 | 8.67% | -4.21% | 0.3759 | 14.33% |
| 1000 | | 3 | 0.2762 | 0.2733 | 0.2593 | 0.296 | 6.71% | 37.06% | 0.3007 | 31.47% |
| 2000 | | 3 | 0.3076 | 0.2805 | 0.2653 | 0.377 | 19.69% | 29.90% | 0.3007 | 31.47% |
| 4000 | | 3 | 0.3184 | 0.2991 | 0.2986 | 0.3575 | 10.64% | 27.44% | 0.3007 | 31.47% |

## Mean Dry Weight-mg Detail

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | LP | 0.5622 | 0.44 | 0.3142 |
| 250 | | 0.3506 | 0.3529 | 0.18 |
| 500 | | 0.4994 | 0.4207 | 0.4518 |
| 1000 | | 0.296 | 0.2733 | 0.2593 |
| 2000 | | 0.2805 | 0.2653 | 0.377 |
| 4000 | | 0.2991 | 0.2986 | 0.3575 |

## Graphics



Environmental Enterprises USA, Inc.

# APPENDIX C

## NEWFIELD NATURAL SEDIMENT (L-6432-24)

**EE NS SEDIMENT**

| | NS Wet Weight g | NS Dry + Pan Weight g | Initial Pan Weight g | NS Dry Weight g |
|---|---|---|---|---|
| 1 | 30.09 | 12.89 | 0.97 | 11.92 |
| 2 | 30.05 | 12.88 | 0.97 | 11.91 |
| 3 | 30.03 | 12.86 | 0.98 | 11.88 |

| | Weight of 25 ml NS g |
|---|---|
| 1 | 32.09 |
| 2 | 31.65 |
| 3 | 32.05 |

**WET TO DRY RATIO (W2DR)**

(Wet NS wt 1/Dry NS wt 1) + (Wet NS wt 2/Dry NS wt 2) + (Wet NS wt 3/ Dry NS wt 3) / 3 =

2.53 **NS Water Content = 60.5 %**

**WET NS DENSITY (WNSD)**

(Wet NS wt 1/Wet NS vol. + Wet NS wt 2/Wet NS vol + Wet NS wt 3/Wet NS vol.) / 3 =

1.28 g/ml

**EXPOSURE CONCENTRATION CALCULATIONS**

WET NS NEEDED

WNSD X VOL. OF NS REQUIRED = WT. NS REQUIRED/CONC.

1.2800 X 600 = 768.0 g WET NS/CONC.

DRY NS NEEDED

(WET NS PER CONC./W2DR)X(1kg/1000g)-DRY WT. NS/CONC.

600 ml 0.3036 kg = 303.6 g

**Newfields Environmental**
**Light Oil in NC010**
**L-6473-24 (L-6273-24)**

**Sample ID Double Check:** BCP

DESIRED CONC. IN mg/kg X DRY WT. NS IN kg. = TOXICANT REQUIRED IN mg.

| Conc. mg/kg | Dry NS kg | Calculated g | Actual +/- 0.01 g | Initial | Volume ml | Wet Wt. g | Actual +/- 0.1 g | Mixing tech initials |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.3036 | 0.00 | 0.00 | CH | 600 | 768.0 | 768.0 | TAD |
| 250 | 0.3036 | 0.08 | 0.08 | CH | 600 | 768.0 | 768.0 | JL |
| 500 | 0.3036 | 0.15 | 0.15 | CH | 600 | 768.0 | 768.0 | TAD |
| 1000 | 0.3036 | 0.30 | 0.31 | CH | 600 | 768.0 | 768.0 | JL |
| 2000 | 0.3036 | 0.61 | 0.61 | CH | 600 | 768.0 | 768.0 | TAD |
| 4000 | 0.3036 | 1.21 | 1.21 | CH | 600 | 768.0 | 768.0 | JL |

Scale ID: 45 Scale ID: 45

[signature] 9/25/24
Prepared By:

CH 9/26/24
Check By:



Raw Data QC/QA: BCP

Environmental Enterprises USA, Inc.

# APPENDIX D

**ENVIRONMENTAL ENTERPRISES USA, INC.**
58485 Pearl Acres Rd., Suite D
Slidell, LA 70461
(985) 646-2787, Fax # (985) 646-2810

# CHAIN - OF - CUSTODY RECORD

Client: Newfields Environmental
Address: 300 Ledgewood Place Suite 305
Rockland, MA 02370, United States

Contact Person: Eric Litman, Thomas Parkerton
Phone #: (781) 681-5040
Email: elitman@newfields.com, thomas.parkerton@exxonmobil.com
Project: Newtown Creek

Client must fill in shaded area

| Sample Description | Date Collected | Time Collected | Analysis Request | Grab | Comp | No. of Containers | Waste Type | Preservation | Lab No. |
|---|---|---|---|---|---|---|---|---|---|
| 330760-1L Mineral Oil (Heavy) | N/A | N/A | Sediment Toxicity EPA Method 1644 | ☑ | X | 1 | X | N/A | L-6272-24 |
| M8410-500mL Mineral Oil (Light) | N/A | N/A | Sediment Toxicity EPA Method 1644 | ☑ | | 1 | | N/A | L-6273-24 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

| | |
|---|---|
| Collected By: Print: Date & Time: Company Name Sign: | Relinquished By: Print: Date & Time: Company Name Sign: |
| Received By: Print: Date & Time: Company Name **FedEx** Sign: | Relinquished By: Print: Date & Time: Company Name **FedEx** Sign: |
| Received By: Print: Christopher Calandro Date & Time: 7-2-24 1410 Company Name **EEUSA** Sign: Chris Calandro | Relinquished By: Print: Christopher Calandro Date & Time: 7-2-24 1420 Company Name **EEUSA** Sign: Chris Calandro |
| Received By: Print: Beau Peré Date & Time: 070224 1425 Company Name **EEUSA** Sign: Beau Peré | Relinquished By: Print: Date & Time: Company Name Sign: |
| Received By: Print: Date & Time: Company Name Sign: | Relinquished By: Print: Date & Time: Company Name Sign: |

**EE USA Use Only!**

Comments: COC Inititated by EEUSA on 07/02/2024 @14:10

S/R No.: SR-22730-24-NO1-L1 (L-6273-24), SR-22730-24-NO1-L2 (L-6272-24)

POSTED 081524 BCP

* Temp °C (T#)
34.0°C, B3 on 07/02/2024 @14:10.
Initials: CC

Courier Tracking #: FedEx 7770 9978 0068 Kit #: Box

* Temperature taken upon receipt at EE USA Lab

# ENVIRONMENTAL ENTERPRISES USA, INC.
# SAMPLE RECEIPT / ACCEPTANCE (SRA) FORM

CLIENT: New fields
DATE RECEIVED: 7-2-24
LOCATION: Newtown Creek

KIT NO. BOX
CL NO. N/A
LAB NO. L-6272-24
L-6273-24

**SAMPLE RECEIPT:**

1. Sample Kit Supplied by: EE USA....., Client.✓..
   Ice Chest....., Cardboard Box..✓, Bucket....., Other....... How many containers in kit? 2......
2. Ice chest received... Circle one; *delivered by Hot Shot, FEDEX, UPS, Client, etc. mark NA.
   *NA or SB: Fridge, Ice & $H_2O$, Dry, $H_2O$, Ice Packs, Other
   At EE USA: Ice & $H_2O$, Dry, $H_2O$, Ice packs (Frozen? Yes....or No....), Other......
   If Ice & $H_2O$ received... How? Loose, Bagged, Bottled
3. Sample container(s) in good condition (sealed & unbroken)? YES..✓.. NO......
4. Does sample container have a label(s)? YES..✓.. NO......
   If yes, mark all that are incomplete and applicable.
   a) Date & time collected.............................. ____
   b) Location .......................... ____
   c) Collected by .......................................... ____
   d) Well number ...................... ____
   e) OCSG.................................................... ____
5. Chain-of-Custody form (COC) filled out completely? YES..... NO..✓..
   If not, mark all that apply.
   a) No COC........................................ ✓
   b) Collected by ........................................ ____
   c) Relinquished by........................................ ____
   d) Location........................................ ____
   e) Company name........................................ ____
   f) Date & time collected............ ____
   g) Received by..................... ____
   h) Date and/or time of transfer... ____
   i) Waste type........................ ____
6. Custody seal(s) received with this sample kit? YES..... NO.✓.. Were custody seals used? YES..... NO.....
   And if used, were they intact? YES.....NO..... Were custody seals filled out? YES..... NO.....

**COMMENTS:**

Information recorded by: CC Date 7/2/24

**SAMPLE ACCEPTANCE:** TOX: EFF____ CTS/F____ PW____ TCW____ Product____
O&G: PW____ WF/TCW____ Other____
DF: WBM____ SBM____ NP____ GC/MS____ Other ✓

7. Was each sample container appropriate (EPA Protocol)? YES..✓.. NO......
   Plastic..✓.. Glass..✓.. Number of samples for location?....2..........
8. Does the recorded information on the COC and label agree? YES..✓.. NO......
   Client Sample ID, Collection location, date, & time. Collected by.
9. Was sufficient amount of each sample received? YES..✓.. NO......
   Container size ..1000 x1, 500 x1.., Estimated Volume ..800 x1, 400 x1.., Head space ..200 x1, 100 x1.. (mls or liters)
10. Was each sample received within the proper holding time? YES..✓.. NO......
11. Was each sample received at the proper temperature? (See COC for temp) YES..✓.. NO......

**Oil & Grease Lab Only:**

12. Sample verified for proper acid preservation & temp within 30 minutes of sample receipt? YES....... NO......
13. Is the initial pH <2 su? YES....... NO......
    If no, how many mls of 6NHCL was added to make pH <2 su? mls........SL#.........

**COMMENTS :**

Information recorded by: BCP Date 07/02/24

CL=certified lot number,NA=not applicable,SB=shorebase,EFF=effluent,CTS/F=chemically treated seawater/freshwater,PW=produced water,TCW=total completion workover,WF=well fluid,WBM=water based mud,SBM=synthetic based mud,NP=non-protocol

FROM:
Eric Liman
NewFields
300 Ledgewood Place
Suite 305
Rockland MA 02370
US

(781) 681-5040

SHIP DATE: 27JUN24
ACTWGT: 10.00 LB
CAD: 109797687/INET4535
DIMMED: 12 X 12 X 12 IN
BILL SENDER

TO David Daniel
Environmental Enterprises USA Inc.
58485 Pearl Acres Road
Suite D
SLIDELL LA 70461
(781) 681-5040
INV:
PO:

REF: 850.0299.024

DEPT:

(US)

683J5/B21D/9AE3

FedEx Ground

J242024032601uv

TRK# 7770 9978 0068

70461

9632 0019 5 (000 000 0000) 0 00 7770 9978 0068

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: IMPORTANT: TRANSMIT YOUR SHIPPING DATA AND PRINT A MANIFEST:
At the end of each shipping day, you should perform the FedEx Ground End of Day Close procedure to transmit your shipping data to FedEx. To do so, click on the Ground End of Day Close Button. If required, print the pickup manifest that appears. A printed manifest is required to be tendered along with your packages if they are being picked up by FedEx Ground. If you are dropping your packages off at a FedEx drop off location, the manifest is not required.

Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide and applicable tariff, available upon request. FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim. Limitations, including limitations on our liability, can be found in the current FedEx Service Guide and applicable tariff apply. In no event shall FedEx Ground be liable for any special, incidental, or consequential damages, including, without limitation, loss of profit, loss to the intrinsic value of the package, loss of sale, interest income or attorney's fees. Recovery cannot exceed actual documented loss. Items of extraordinary value are subject to separate limitations of liability set forth in the Service Guide and tariff. Written claims must be filed within strict time limits, see current FedEx Service Guide.

Environmental Enterprises USA, Inc.

# APPENDIX E

POSTED 091824 CH

SR-22935-24-N01-L1

ALPHA

# NEW YORK CHAIN OF CUSTODY

Westborough, MA 01581, 8 Walkup Dr., TEL: 508-898-9220, FAX: 508-898-9193

Mansfield, MA 02048, 320 Forbes Blvd, TEL: 508-822-9300, FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page 1 of 1

Date Rec'd in Lab: 6/21/24

ALPHA Job #: L2434913

**Project Information**

Project Name: NTC Toxicity Testing
Project Location: Newtown Creek, New York
Project #
(Use Project name as Project #) ☐
Project Manager: Susan O'Neil (Pace)/ Eric Litman (Newfields)
ALPHAQuote #:

**Turn-Around Time**

Standard ☐ Due Date:
Rush (only if pre approved) ☐ # of Days:

**Client Information**

Client: NewFields Environmental
Address: 300 Ledgewood Pl, Suite 205
Rockland, MA 02370
Phone: 781-424-5731
Fax:
Email: elitman@newfields.com

**Deliverables**
☐ ASP-A ☐ ASP-B
☐ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other

**Billing Information**
☐ Same as Client Info
PO #

**Regulatory Requirement**
☐ NY TOGS ☐ NY Part 375
☐ AWQ Standards ☐ NY CP-51
☐ NY Restricted Use ☐ Other
☐ NY Unrestricted Use
☐ NYC Sewer Discharge

**Disposal Site Information**
Please identify below location of applicable disposal facilities.
Disposal Facility
☐ NJ ☐ NY
☐ Other:

These samples have been previously analyzed by Alpha ☐

**Other project specific requirements/comments:**
HOLD PENDING INSTRUCTIONS FROM NEWFIELDS

**Please specify Metals or TAL.**

ANALYSIS: Contact NewFields regarding analysis

*Sample Filtration*
☐ Done
☐ Lab to do
*Preservation*
☐ Lab to do
*(Please Specify below)*

Total Bottles

| ALPHA Lab ID (Lab Use Only) | Sample ID | Collection Date | Collection Time | Sample Matrix | Sampler's Initials | Contact NewFields regarding analysis | Sample Specific Comments |
|---|---|---|---|---|---|---|---|
| 34913-01 | NC010_0-15_Bucket 1 | 6/20/2024 | 09:04 | SEDIMENT | NB | X | L-6432-24 |
| -02 | NC010_0-15_Bucket 2 | 6/20/2024 | 10:07 | SEDIMENT | NB | X | |
| ~~-03~~ | ~~NC010_0-15_Bucket 3~~ | ~~6/20/2024~~ | ~~10:35~~ | ~~SEDIMENT~~ | ~~NB~~ | ~~X~~ | |

Fed Ex 7784 9266 9512 091324 CH

Container Type: P
Preservative: A

Preservative Code: A = None, B = HCl, C = $HNO_3$, D = $H_2SO_4$, E = NaOH, F = MeOH, G = $NaHSO_4$, H = $Na_2S_2O_3$, K/E = Zn Ac/NaOH, O = Other

Container Code: P = Plastic, A = Amber Glass, V = Vial, G = Glass, B = Bacteria Cup, C = Cube, O = Other, E = Encore, D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

| Relinquished By: | Date/Time | Received By: | Date/Time |
|---|---|---|---|
| [signature] | 6/20/2024 14:03 | [signature] | 6/20/24 14:03 |
| [signature] | 6/20/24 18:00 | NJSC | 6/20/24 18:00 |
| [signature] | 6/20/24 | [signature] | 6/20/24 18:42 |
| | | [signature] | 6/20 2220 |

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS.

Form No: 01-25 (rev. 30-Sept-2013)

1.6 B3 CC 9.12.24 1500

6/21 130

6/21/24 0130

6/21/24 500

R. Mendoza ARL 6/21/24 0500

R. Mendoza ARL 6/21/24 0700

ARL 6/21/24 0700

9/10/24 1700

p 1 of 2

**Environmental Enterprises USA, In.c**

S/R #: ____________

Lab #: ____________

Area & Block: ____________

Released by: Print: ____________ Date/Time: ____________

Sign: ____________

Received by: Print: Fed Ex Date/Time: ____________

Sign: ____________

---

Released by: Print: Fed Ex Date/Time: 9/12/24 1500

Sign: ____________

Received by: Print: Chris Calandro Date/Time: 9/12/24 1517

Sign: Chris Calandro

---

Released by: Print: Chris Calandro Date/Time: 9/12/24

Sign: Chris Calandro

Received by: Print: Chris Holmes Date/Time: 9/13/24 0956

Sign: Chris Holmes

---

Released by: Print: ____________ Date/Time: ____________

Sign: ____________

Received by: Print: ____________ Date/Time: ____________

Sign: ____________

---

# ENVIRONMENTAL ENTERPRISES USA, INC.
## SAMPLE RECEIPT / ACCEPTANCE (SRA) FORM

CLIENT: New Feilds KIT NO. Thelvs
DATE RECEIVED: 9-12-24 CL NO. N/A LAB NO. L-6432-24
LOCATION: Newtown Creek, New York

**SAMPLE RECEIPT:**

1. Sample Kit Supplied by: EE USA....., Client..✓..
   Ice Chest..✓..., Cardboard Box....., Bucket....., Other...... How many containers in kit?...2....
2. Ice chest received... Circle one; *delivered by Hot Shot, FEDEX, UPS, Client, etc. mark NA.
   *NA or SB: Fridge, Ice & $H_2O$, Dry, $H_2O$, Ice Packs, Other
   At EE USA: Ice & $H_2O$, Dry, $H_2O$, Ice packs (Frozen? Yes....or No....), Other......
   If Ice & $H_20$ received... How? Loose, Bagged, Bottled
3. Sample container(s) in good condition (sealed & unbroken)? YES..✓.. NO.....
4. Does sample container have a label(s)? YES..✓.. NO.....
   If yes, mark all that are incomplete and applicable.
   a) Date & time collected.......................... ____ b) Location .......................... ____
   c) Collected by .......................................... ____ d) Well number ...................... ____
   e) OCSG.......................................................... ____
5. Chain-of-Custody form (COC) filled out completely? YES..... NO..✓..
   If not, mark all that apply.
   a) No COC.................................... ____ f) Date & time collected............ ✓
   b) Collected by ............................ ____ g) Received by...................... ✓
   c) Relinquished by........................ ✓ h) Date and/or time of transfer... ✓
   d) Location.................................... ____ i) Waste type.......................... ____
   e) Company name.......................... ____
6. Custody seal(s) received with this sample kit? YES..... NO..✓.. Were custody seals used? YES..... NO.....
   And if used, were they intact? YES.....NO..... Were custody seals filled out? YES..... NO.....

**COMMENTS:**

Information recorded by: CC Date 9/12/24

**SAMPLE ACCEPTANCE:** TOX: EFF____ CTS/F____ PW____ TCW ____ Product ____
O&G: PW____ WF/TCW____ Other____
DF: WBM____ SBM____ NP____ GC/MS____ Other ✓

7. Was each sample container appropriate (EPA Protocol)? YES..✓.. NO.....
   Plastic..✓.. Glass..... Number of samples for location?....2.....
8. Does the recorded information on the COC and label agree? YES..✓.. NO.....
   Client Sample ID, Collection location, date, & time. Collected by.
9. Was sufficient amount of each sample received? YES..✓.. NO.....
   Container size .3gal x2..., Estimated Volume 2.5gal x2, Head space ..5gal. (mls or liters)
10. Was each sample received within the proper holding time? YES..✓.. NO.....
11. Was each sample received at the proper temperature? (See COC for temp) YES..✓.. NO.....

**Oil & Grease Lab Only:**

12. Sample verified for proper acid preservation & temp within 30 minutes of sample receipt? YES....... NO.....
13. Is the initial pH <2 su? YES....... NO.....
    If no, how many mls of 6NHCL was added to make pH <2 su? mls......... SL#.........

**COMMENTS :**

Information recorded by: CH Date 9/13/24

CL=certified lot number,NA=not applicable,SB=shorebase,EFF=effluent,CTS/F=chemically treated seawater/freshwater,PW=produced water,TCW=total completion workover,WF=well fluid,WBM=water based mud,SBM=synthetic based mud,NP=non-protocol

ORIGIN ID:PYMA (508) 822-9300
CLIENT SERVICES
PACE ANALYTICAL MANSFIELD
320 FORBES BLVD

MANSFIELD, MA 02048
UNITED STATES US

SHIP DATE: 10SEP24
ACTWGT: 65.00 LB
CAD: 5603379/INET4760
DIMS: 24x14x13 IN

BILL SENDER

TO **ATTN: DAVID DANIEL**
**ENVIRONMENTAL ENTERPRISES USA, INC.**
**58485 PEARL ACRES RD, SUITE D**

**SLIDELL LA 70461**
(985) 646-2787 REF:
INV:
PO: DEPT:

583J2/4EF9/9AE3

FedEx Express

E

J243024071301uv

**WED - 11 SEP 10:30A**
**PRIORITY OVERNIGHT**

TRK# 0201 **7784 9266 9512**

# XH BXAA

**70461**
LA-US **MSY**

**After printing this label:**
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

Environmental Enterprises USA, Inc.

# APPENDIX F

# EEUSA Natural Sediment
## Light Oil in NS006
## EE USA Lab #: L-6471-24 (L-6273-24)

*Leptocheirus plumulosus* Acute, Static 10-Day Sediment Toxicity Test.
EPA Test Method 1644

Test Concentrations Prepared 9 / 26 /24 Sediment Batch #NS006

Dilution Water Batch #: 20-079-24 Organism Batch #: Lp-153-24

Organisms Counted by: BCP/CH Organisms QC/QA by: BCP

Aeration Rate: 78 ml/min. Feeding: This test was not fed.

Dilution Water:
Salinity: 20.0 Meter ID 1Q Temperature: 20.4 Meter ID 7H

**Initial $H_2O$ quality parameters for dilution water only: Salinity: 20ppt +/-1ppt; Temp.: 20°C +/-1°C**
Salinity (EPA Method 120.1): ppt Thermometric (EPA Method 180.1): °C

**Survival Data (*Leptocheirus plumulosus*)**

**Treatment, mg/kg**

| Time | REP | 0 LPC | REP | 250 | REP | 500 | REP | 1000 | REP | 2000 | REP | 4000 | Initials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 HR | A | 20 | A | 20 | A | 20 | A | 20 | A | 20 | A | 20 | 9/27/24 |
| | B | 20 | B | 20 | B | 20 | B | 20 | B | 20 | B | 20 | |
| | C | 20 | C | 20 | C | 20 | C | 20 | C | 20 | C | 20 | |
| 1208 | D | 20 | D | 20 | D | 20 | D | 20 | D | 20 | D | 20 | CH |
| | E | 20 | E | 20 | E | 20 | E | 20 | E | 20 | E | 20 | |
| 10 Day | A | 20 | A | 19 | A | 20 | A | 17 | A | 18 | A | 15 | 10/07/24 |
| | B | 20 | B | 19 | B | 18 | B | 19 | B | 16 | B | 15 | |
| | C | 19 | C | 19 | C | 16 | C | 18 | C | 17 | C | 14 | |
| 1242 | D | 20 | D | 17 | D | 17 | D | 18 | D | 16 | D | 15 | TAD |
| | E | 20 | E | 17 | E | 15 | E | 19 | E | 18 | E | 13 | |

10-Day LC50 >4000 mg/kg, 95% CI N/A to N/A mg/kg,

Statistical Method Summary Statistics

Prep by: BCP
QA/QC by: CH

Data Analysis by: BCP
Raw Data QA/QC by: BCP

## *L. plumulosus* Water Quality Data

**Initial $H_2O$ quality parameters for dilution water only: Salinity: 20ppt +/-1ppt; Temp.: 20°C +/-1°C**

Salinity (EPA Method 120.1): ppt Thermometric (EPA Method 180.1): °C

| Day -1 | LPC Pore Water Measurements | |
|---|---|---|
| 9/26/24 | 0A | Meter # |
| Salinity | 19.8 | 1Q |
| Temp | 18.1 | 7H |
| pH | 7.7 | 7H |
| DO | 8.0 | 1L |
| Ammonia | 2.00 | Initials: CH |
| Initials | bw | |
| Time | 1505 | |

| Day 0 | Control Overlying Water Measurements — **0 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 09/27/24 | 0A | 0B | 0C | 0D | 0E | Meter # |
| Salinity | 30.8 | 30.9 | 31.0 | 31.0 | 31.0 | 1Q |
| Temp | 19.8 | 19.6 | 19.5 | 20.0 | 19.6 | 7H |
| pH | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7H |
| DO | 7.9 | 8.0 | 8.0 | 8.0 | 8.0 | 1L |
| Initials | bw | | | | | |
| Time | 0912 | | | | | |

| Day 0 | Overlying Water Measurements – **250 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 09/27/24 | 250A | 250B | 250C | 250D | 250E | Meter # |
| Salinity | 31.2 | 31.2 | 31.1 | 31.0 | 31.2 | 1Q |
| Temp | 20.0 | 19.9 | 19.6 | 19.8 | 19.7 | 7H |
| pH | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7H |
| DO | 8.0 | 8.0 | 8.0 | 8.0 | 8.1 | 1L |
| Initials | bw | | | | | |
| Time | 0917 | | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

***L. plumulosus*** **Water Quality Data Cont.**

| Day 0 | Overlying Water Measurements — **500 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 09/27/24 | 500A | 500B | 500C | 500D | 500E | Meter # |
| Salinity | 31.1 | 31.0 | 31.1 | 31.1 | 31.1 | 1Q |
| Temp | 19.7 | 19.5 | 19.7 | 19.7 | 20.1 | 7H |
| pH | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7H |
| DO | 8.0 | 8.1 | 8.0 | 8.1 | 8.0 | 1L |
| Initials | bw | | | | | |
| Time | 0923 | | | | | |

| Day 0 | Overlying Water Measurements — **1000 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 09/27/24 | 1000A | 1000B | 1000C | 1000D | 1000E | Meter # |
| Salinity | 31.1 | 31.1 | 31.1 | 31.1 | 31.2 | 1Q |
| Temp | 19.7 | 19.7 | 19.6 | 19.7 | 20.1 | 7H |
| pH | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7H |
| DO | 8.0 | 8.0 | 8.1 | 8.1 | 8.0 | 1L |
| Initials | bw | | | | | |
| Time | 0929 | | | | | |

| Day 0 | Overlying Water Measurements — **2000 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 09/27/24 | 2000A | 2000B | 2000C | 2000D | 2000E | Meter # |
| Salinity | 31.1 | 31.2 | 31.1 | 31.1 | 31.0 | 1Q |
| Temp | 19.8 | 19.7 | 19.6 | 20.0 | 19.6 | 7H |
| pH | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7H |
| DO | 8.0 | 8.1 | 8.1 | 8.0 | 8.0 | 1L |
| Initials | bw | | | | | |
| Time | 0932 | | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**L. plumulosus Water Quality Data Cont.**

| Day 0 | Overlying Water Measurements — **4000 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 09/27/24 | 4000A | 4000B | 4000C | 4000D | 4000E | Meter # |
| Salinity | 31.1 | 31.1 | 31.0 | 31.0 | 30.8 | 1Q |
| Temp | 19.7 | 19.8 | 19.7 | 20.1 | 19.7 | 7H |
| pH | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 | 7H |
| DO | 8.1 | 8.0 | 8.0 | 8.0 | 8.0 | 1L |
| Initials | LW | | | | | |
| Time | 0939 | | | | | |

| Day 1 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 09/28/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 18.8 | 19.0 | 18.8 | 18.9 | 18.8 | 18.8 | 1Q |
| Temp | 20.2 | 20.2 | 20.3 | 20.2 | 20.3 | 20.2 | 7H |
| pH | 7.6 | 7.6 | 7.6 | 7.6 | 7.5 | 7.5 | 7H |
| DO | 7.9 | 7.9 | 7.9 | 7.9 | 7.9 | 7.9 | 1L |
| Initials | STL | | | | | | |
| Time | 0838 | | | | | | |

| Day 2 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 09/29/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 18.5 | 18.8 | 18.5 | 18.6 | 18.6 | 18.6 | 1Q |
| Temp | 20.4 | 20.4 | 20.5 | 20.4 | 20.5 | 20.4 | 7H |
| pH | 7.4 | 7.5 | 7.5 | 7.5 | 7.4 | 7.4 | 7H |
| DO | 7.7 | 7.9 | 8.0 | 8.0 | 7.9 | 7.9 | 1L |
| Ammonia | 1.00 | //////// | //////// | //////// | //////// | //////// | Initials: STL |
| Initials | STL | | | | | | |
| Time | 0847 | | | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

***L. plumulosus* Water Quality Data Cont.**

| Day 3 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 09/30/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 18.4 | 18.7 | 18.4 | 18.5 | 18.4 | 18.5 | 1Q |
| Temp | 20.3 | 20.3 | 20.4 | 20.3 | 20.4 | 20.4 | 7H |
| pH | 7.3 | 7.4 | 7.4 | 7.4 | 7.3 | 7.3 | 7H |
| DO | 7.8 | 7.9 | 8.0 | 8.0 | 7.9 | 8.0 | 1L |
| Initials | JTL | | | | | | |
| Time | 0937 | | | | | | |

| Day 4 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/01/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 18.4 | 18.7 | 18.3 | 18.5 | 18.4 | 18.4 | 1Q |
| Temp | 20.0 | 20.0 | 20.1 | 20.1 | 20.0 | 20.0 | 7H |
| pH | 7.6 | 7.5 | 7.4 | 7.4 | 7.4 | 7.3 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | bw | | | | | | |
| Time | 0924 | | | | | | |

| Day 5 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/02/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 18.3 | 18.7 | 18.3 | 18.4 | 18.3 | 18.4 | 1Q |
| Temp | 20.1 | 20.1 | 20.2 | 20.1 | 20.1 | 20.1 | 7H |
| pH | 7.3 | 7.3 | 7.3 | 7.3 | 7.3 | 7.3 | 7H |
| DO | 8.1 | 8.0 | 8.0 | 8.1 | 8.0 | 8.0 | 1L |
| Initials | bw | | | | | | |
| Time | 0830 | | | | | | |

Comments: ______________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**

| Day 6 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/03/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 18.3 | 18.7 | 18.2 | 18.4 | 18.3 | 18.4 | 1Q |
| Temp | 20.4 | 20.4 | 20.5 | 20.5 | 20.4 | 20.4 | 7H |
| pH | 7.0 | 7.1 | 7.1 | 7.1 | 7.0 | 7.0 | 7H |
| DO | 7.9 | 7.9 | 7.9 | 8.0 | 7.9 | 7.9 | 1L |
| Initials | JTL | | | | | | |
| Time | 0948 | | | | | | |

| Day 7 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/04/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 18.2 | 18.7 | 18.2 | 18.4 | 18.4 | 18.4 | 1Q |
| Temp | 20.2 | 20.3 | 20.3 | 20.1 | 20.1 | 20.1 | 7H |
| pH | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7H |
| DO | 8.0 | 8.0 | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | bw | | | | | | |
| Time | 0835 | | | | | | |

| Day 8 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/05/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 18.3 | 18.7 | 18.2 | 18.4 | 18.4 | 18.4 | 1Q |
| Temp | 20.2 | 20.2 | 20.2 | 20.0 | 20.2 | 20.2 | 7H |
| pH | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Ammonia | 0.10 | /////// | /////// | /////// | /////// | /////// | Initials |
| Initials | bw | | | | | | |
| Time | 0727 | | | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**

| Day 9 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 10/06/24 | 0 | 250 | 500 | 1000 | 2000 | 4000 | Meter # |
| Salinity | 18.5 | 18.7 | 18.3 | 18.4 | 18.4 | 18.5 | 1Q |
| Temp | 20.3 | 20.2 | 20.3 | 20.3 | 20.3 | 20.3 | 7H |
| pH | 7.0 | 6.9 | 6.9 | 6.9 | 6.8 | 6.8 | 7H |
| DO | 7.9 | 8.0 | 8.1 | 8.1 | 8.1 | 8.0 | 1L |
| Initials | GW | | | | | | |
| Time | 0758 | | | | | | |

**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Control Overlying Water Measurements—<br>**0 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 10/07/24 | 0A | 0B | 0C | 0D | 0E | Meter # |
| Salinity | 18.1 | 18.2 | 18.4 | 18.4 | 18.2 | 1Q |
| Temp | 20.1 | 19.9 | 20.0 | 20.3 | 19.9 | 7H |
| pH | 7.0 | 7.0 | 6.9 | 6.9 | 6.8 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.0 | 8.1 | 1L |
| Initials | TAD | | | | | |
| Time | 0915 | | | | | |

| Day 10 | Overlying Water Measurements –<br>**250 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 10/07/24 | 250A | 250B | 250C | 250D | 250E | Meter # |
| Salinity | 18.8 | 18.7 | 18.5 | 18.5 | 18.6 | 1Q |
| Temp | 20.3 | 20.2 | 20.0 | 20.0 | 19.9 | 7H |
| pH | 7.0 | 7.0 | 7.0 | 6.8 | 6.8 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | TAD | | | | | |
| Time | 0921 | | | | | |

Comments: ______________________________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**
**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Overlying Water Measurements — **500 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 10/07/24 | 500A | 500B | 500C | 500D | 500E | Meter # |
| Salinity | 18.6 | 18.2 | 18.4 | 18.5 | 18.4 | 1Q |
| Temp | 20.0 | 20.0 | 20.0 | 20.0 | 20.3 | 7H |
| pH | 6.7 | 6.6 | 6.6 | 6.6 | 6.7 | 7H |
| DO | 8.1 | 8.1 | 8.0 | 8.2 | 8.1 | 1L |
| Initials | TAD | | | | | |
| Time | 0926 | | | | | |

| Day 10 | Overlying Water Measurements — **1000 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 10/07/24 | 1000A | 1000B | 1000C | 1000D | 1000E | Meter # |
| Salinity | 18.4 | 18.5 | 18.7 | 18.5 | 18.2 | 1Q |
| Temp | 20.1 | 20.0 | 20.0 | 20.3 | 20.0 | 7H |
| pH | 7.1 | 7.0 | 7.0 | 6.9 | 6.9 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.1 | 8.0 | 1L |
| Initials | TAD | | | | | |
| Time | 0934 | | | | | |

| Day 10 | Overlying Water Measurements — **2000 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 10/07/24 | 2000A | 2000B | 2000C | 2000D | 2000E | Meter # |
| Salinity | 18.2 | 18.3 | 18.4 | 18.7 | 18.5 | 1Q |
| Temp | 20.0 | 19.9 | 20.1 | 19.8 | 20.4 | 7H |
| pH | 7.0 | 7.0 | 7.0 | 6.7 | 7.0 | 7H |
| DO | 8.1 | 8.1 | 8.0 | 8.1 | 8.1 | 1L |
| Initials | TAD | | | | | |
| Time | 0938 | | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**
**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Overlying Water Measurements — **4000 mg/kg** | | | | | |
|---|---|---|---|---|---|---|
| 10/07/24 | 4000A | 4000B | 4000C | 4000D | 4000E | Meter # |
| Salinity | 20.8 | 18.6 | 18.8 | 18.6 | 18.4 | 1Q |
| Temp | 20.0 | 20.0 | 20.0 | 20.1 | 20.1 | 7H |
| pH | 6.8 | 6.7 | 6.8 | 6.6 | 6.6 | 7H |
| DO | 8.3 | 8.2 | 8.1 | 8.1 | 8.0 | 1L |
| Initials | TAD | | | | | |
| Time | 0943 | | | | | |

Comments: ____________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

## *L. plumulosus* DRY LENGTH DATA

0-hr data: 20 representative organisms measured from antenna base to end of third pleon segment on the dorsal surface.

| # | Length |
|---|---|
| 1 | 3.6 |
| 2 | 3.4 |
| 3 | 3.2 |
| 4 | 3.5 |
| 5 | 3.5 |
| 6 | 3.5 |
| 7 | 3.6 |
| 8 | 3.7 |
| 9 | 3.5 |
| 10 | 3.4 |
| | mean = 3.5 |
| All data in mm / *L. plumulosus* | |

### Initial *L. plumulosus* Weights at Test Initiation

| Rep # | Project # or Sample Description | A Final Weight (mg) | B Initial Weight (mg) | Final Weight minus Initial Weight (mg) | C No. of Organisms | D Lepto Weight (mg) |
|---|---|---|---|---|---|---|
| 1 | L-6471-24 | 19.56 | 15.44 | 4.12 | 10 | 0.412 |
| 2 | " | 15.95 | 12.55 | 3.40 | 10 | 0.340 |
| 3 | " | 15.81 | 11.55 | 4.26 | 10 | 0.426 |
| 4 | " | 14.90 | 11.62 | 3.28 | 10 | 0.328 |
| 5 | " | 15.68 | 11.96 | 3.72 | 10 | 0.372 |
| | | | | Mean Weight (mg/Lepto): | | 0.376 |

Initial Foil Weights at: 1143 on 09/27/2024 by: JL Scale # 2R

Final Foil Weights at: 1142 on 09/28/2024 by: JTL Scale # 3B

## Surviving *L. plumulosus* Weights at Test Termination

| Rep. | Concentration, mg/kg | A<br>Final Weight<br>(mg) | B<br>Initial Weight<br>(mg) | C<br>No. of Surviving Organisms |
|---|---|---|---|---|
| A | 0 | ~~16.3~~ (A) 21.54 | 16.33 | 20 |
| B | 0 | 20.51 | 15.20 | 20 |
| C | 0 | 18.43 | 14.35 | 19 |
| D | 0 | 21.37 | 14.27 | 20 |
| E | 0 | 17.56 | 12.24 | 20 |
| A | 250 | 21.46 | 16.12 | 19 |
| B | 250 | 21.07 | 15.16 | 19 |
| C | 250 | 17.51 | 12.40 | 19 |
| D | 250 | 17.66 | 12.13 | 17 |
| E | 250 | 17.08 | 12.01 | 17 |
| A | 500 | 23.10 | 16.81 | 20 |
| B | 500 | 21.41 | 16.41 | 18 |
| C | 500 | 19.06 | 14.67 | 16 |
| D | 500 | 20.97 | 16.26 | 17 |
| E | 500 | 20.15 | 15.40 | 18 |
| A | 1000 | 20.84 | 14.92 | 17 |
| B | 1000 | 18.46 | 13.22 | 19 |
| C | 1000 | 17.43 | 13.68 | 18 |
| D | 1000 | 17.79 | 13.76 | 18 |
| E | 1000 | 17.60 | 12.62 | 19 |

Comments: (A) ERROR/100724GW

| Surviving *L. plumulosus* Weights at Test Termination Cont. | | | | |
|---|---|---|---|---|
| A | 2000 | 20.63 | 15.78 | 18 |
| B | 2000 | 19.75 | 14.97 | 16 |
| C | 2000 | 19.65 | 15.34 | 17 |
| D | 2000 | 20.39 | 14.33 | 16 |
| E | 2000 | 17.16 | 12.71 | 18 |
| A | 4000 | 16.47 | 12.72 | 15 |
| B | 4000 | 17.50 | 13.79 | 15 |
| C | 4000 | 18.15 | 14.62 | 14 |
| D | 4000 | 16.99 | 13.05 | 15 |
| E | 4000 | 19.08 | 14.98 | 13 |

Initial Foil Weights at: 0904 on 10 / 7 /2024 by: GW Scale # 3B

Final Foil Weights at: 1503 on 10 / 08 /2024 by: JTL Scale # 3B

Comments: ______

# Newfields Environmental

## L-6471-24 (L-6273-24) Light Oil in NS006

| 10-Day Survival | |
|---|---|
| **NOEC** | **LOEC** |
| <250 | 250 |
| **LC25** | **LC50** |
| 3654 | >4000 |

| Mean Dry Weight-mg | |
|---|---|
| **NOEC** | **LOEC** |
| <250 | <250 |
| **IC25** | **IC50** |
| >4000 | >4000 |

# CETIS Test Data Worksheet

**Report Date:** 10 Oct-24 09:51 (p 1 of 1)
**Test Code/ID:** L-6471-24 (G-S) / 00-2431-5139

**Leptocheirus 10-d Survival and Growth Test** — **Environmental Enterprises USA, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Start Date:** | 27 Sep-24 12:08 | **Species:** | Leptocheirus plumulosus | **Sample Code:** | L-6471-24 (G-S) |
| **End Date:** | 07 Oct-24 12:42 | **Protocol:** | EPA 821-R-11-004 (2011) | **Sample Source:** | |
| **Sample Date:** | 09 Oct-24 11:29 | **Material:** | Natural Sediment | **Sample Station:** | |

| Conc-mg/kg | Code | Rep | Pos | # Exposed | 1d Survival | 2d Survival | 3d Survival | 4d Survival | 5d Survival | 6d Survival | 7d Survival | 8d Survival | 9d Survival | 10d Survival | Total Weight-mg | Tare Weight-mg | Pan Count |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | LP | 1 | 30 | 20 | | | | | | | | | | 20 | 21.54 | 16.33 | 20 |
| 0 | LP | 2 | 10 | 20 | | | | | | | | | | 20 | 20.51 | 15.2 | 20 |
| 0 | LP | 3 | 19 | 20 | | | | | | | | | | 19 | 18.43 | 14.35 | 19 |
| 0 | LP | 4 | 23 | 20 | | | | | | | | | | 20 | 21.37 | 14.27 | 20 |
| 0 | LP | 5 | 21 | 20 | | | | | | | | | | 20 | 17.56 | 12.24 | 20 |
| 250 | | 1 | 27 | 20 | | | | | | | | | | 19 | 21.46 | 16.12 | 19 |
| 250 | | 2 | 25 | 20 | | | | | | | | | | 19 | 21.07 | 15.16 | 19 |
| 250 | | 3 | 20 | 20 | | | | | | | | | | 19 | 17.51 | 12.4 | 19 |
| 250 | | 4 | 26 | 20 | | | | | | | | | | 17 | 17.66 | 12.13 | 17 |
| 250 | | 5 | 4 | 20 | | | | | | | | | | 17 | 17.08 | 12.01 | 17 |
| 500 | | 1 | 2 | 20 | | | | | | | | | | 20 | 23.1 | 16.81 | 20 |
| 500 | | 2 | 8 | 20 | | | | | | | | | | 18 | 21.41 | 16.41 | 18 |
| 500 | | 3 | 17 | 20 | | | | | | | | | | 16 | 19.06 | 14.67 | 16 |
| 500 | | 4 | 18 | 20 | | | | | | | | | | 17 | 20.97 | 16.26 | 17 |
| 500 | | 5 | 16 | 20 | | | | | | | | | | 18 | 20.15 | 15.4 | 18 |
| 1000 | | 1 | 12 | 20 | | | | | | | | | | 17 | 20.84 | 14.92 | 17 |
| 1000 | | 2 | 29 | 20 | | | | | | | | | | 19 | 18.46 | 13.22 | 19 |
| 1000 | | 3 | 7 | 20 | | | | | | | | | | 18 | 17.43 | 13.68 | 18 |
| 1000 | | 4 | 15 | 20 | | | | | | | | | | 18 | 17.79 | 13.76 | 18 |
| 1000 | | 5 | 11 | 20 | | | | | | | | | | 19 | 17.6 | 12.62 | 19 |
| 2000 | | 1 | 3 | 20 | | | | | | | | | | 18 | 20.63 | 15.78 | 18 |
| 2000 | | 2 | 14 | 20 | | | | | | | | | | 16 | 19.75 | 14.97 | 16 |
| 2000 | | 3 | 5 | 20 | | | | | | | | | | 17 | 19.65 | 15.34 | 17 |
| 2000 | | 4 | 22 | 20 | | | | | | | | | | 16 | 20.39 | 14.33 | 16 |
| 2000 | | 5 | 13 | 20 | | | | | | | | | | 18 | 17.16 | 12.71 | 18 |
| 4000 | | 1 | 9 | 20 | | | | | | | | | | 15 | 16.47 | 12.72 | 15 |
| 4000 | | 2 | 6 | 20 | | | | | | | | | | 15 | 17.5 | 13.79 | 15 |
| 4000 | | 3 | 28 | 20 | | | | | | | | | | 14 | 18.15 | 14.62 | 14 |
| 4000 | | 4 | 1 | 20 | | | | | | | | | | 15 | 16.99 | 13.05 | 15 |
| 4000 | | 5 | 24 | 20 | | | | | | | | | | 13 | 19.08 | 14.98 | 13 |

# CETIS Analytical Report

Report Date: 10 Oct-24 09:39 (p 1 of 2)
Test Code/ID: L-6471-24 (G-S) / 00-2431-5139

**Leptocheirus 10-d Survival and Growth Test** — **Environmental Enterprises USA, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 16-8648-6335 | **Endpoint:** | 10d Survival Rate | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 9:38 | **Analysis:** | Parametric-Control vs Treatments | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 12:38 | **MD5 Hash:** | CBC70C79B6B66E71574FB36CD8A0336E | **Editor ID:** | 002-227-489-6 |

| Data Transform | Alt Hyp | NOEL | LOEL | TOEL | Tox Units | MSDu | PMSD |
|---|---|---|---|---|---|---|---|
| Angular (Corrected) | C > T | <250 | 250 | --- | --- | 0.05578 | 5.63% |

**Dunnett Multiple Comparison Test**

| Control | vs | Conc-mg/kg | df | Test Stat | Critical | MSD | P-Type | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|---|---|---|
| Control | | 250* | 8 | 3.025 | 2.362 | 0.1246 | CDF | 0.0121 | Significant Effect |
| | | 500* | 8 | 3.574 | 2.362 | 0.1246 | CDF | 0.0033 | Significant Effect |
| | | 1000* | 8 | 3.102 | 2.362 | 0.1246 | CDF | 0.0101 | Significant Effect |
| | | 2000* | 8 | 4.907 | 2.362 | 0.1246 | CDF | 0.0001 | Significant Effect |
| | | 4000* | 8 | 7.995 | 2.362 | 0.1246 | CDF | <1.0E-05 | Significant Effect |

**ANOVA Table**

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---|---|---|---|---|---|---|
| Between | 0.479053 | 0.0958105 | 5 | 13.76 | <1.0E-05 | Significant Effect |
| Error | 0.167122 | 0.0069634 | 24 | | | |
| Total | 0.646174 | | 29 | | | |

**ANOVA Assumptions Tests**

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) |
|---|---|---|---|---|---|
| Variance | Bartlett Equality of Variance Test | 5.359 | 15.09 | 0.3737 | Equal Variances |
| Distribution | Shapiro-Wilk W Normality Test | 0.9409 | 0.9031 | 0.0960 | Normal Distribution |

**10d Survival Rate Summary**

| Conc-mg/kg | Code | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | LP | 5 | 0.9900 | 0.9622 | 1.0000 | 1.0000 | 0.9500 | 1.0000 | 0.0100 | 2.26% | 0.00% |
| 250 | | 5 | 0.9100 | 0.8420 | 0.9780 | 0.9500 | 0.8500 | 0.9500 | 0.0245 | 6.02% | 8.08% |
| 500 | | 5 | 0.8900 | 0.7979 | 0.9821 | 0.9000 | 0.8000 | 1.0000 | 0.0332 | 8.33% | 10.10% |
| 1000 | | 5 | 0.9100 | 0.8581 | 0.9619 | 0.9000 | 0.8500 | 0.9500 | 0.0187 | 4.60% | 8.08% |
| 2000 | | 5 | 0.8500 | 0.7879 | 0.9121 | 0.8500 | 0.8000 | 0.9000 | 0.0224 | 5.88% | 14.14% |
| 4000 | | 5 | 0.7200 | 0.6645 | 0.7755 | 0.7500 | 0.6500 | 0.7500 | 0.0200 | 6.21% | 27.27% |

**Angular (Corrected) Transformed Summary**

| Conc-mg/kg | Code | Count | Mean | 95% LCL | 95% UCL | Median | Min | Max | Std Err | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | LP | 5 | 1.4360 | 1.3730 | 1.4990 | 1.4590 | 1.3450 | 1.4590 | 0.0227 | 3.53% | 0.00% |
| 250 | | 5 | 1.2760 | 1.1590 | 1.3940 | 1.3450 | 1.1730 | 1.3450 | 0.0422 | 7.39% | 11.12% |
| 500 | | 5 | 1.2470 | 1.0830 | 1.4120 | 1.2490 | 1.1070 | 1.4590 | 0.0591 | 10.59% | 13.14% |
| 1000 | | 5 | 1.2720 | 1.1810 | 1.3640 | 1.2490 | 1.1730 | 1.3450 | 0.0328 | 5.77% | 11.40% |
| 2000 | | 5 | 1.1770 | 1.0890 | 1.2650 | 1.1730 | 1.1070 | 1.2490 | 0.0317 | 6.03% | 18.03% |
| 4000 | | 5 | 1.0140 | 0.9531 | 1.0750 | 1.0470 | 0.9377 | 1.0470 | 0.0220 | 4.84% | 29.38% |

**10d Survival Rate Detail**

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | LP | 1.0000 | 1.0000 | 0.9500 | 1.0000 | 1.0000 |
| 250 | | 0.9500 | 0.9500 | 0.9500 | 0.8500 | 0.8500 |
| 500 | | 1.0000 | 0.9000 | 0.8000 | 0.8500 | 0.9000 |
| 1000 | | 0.8500 | 0.9500 | 0.9000 | 0.9000 | 0.9500 |
| 2000 | | 0.9000 | 0.8000 | 0.8500 | 0.8000 | 0.9000 |
| 4000 | | 0.7500 | 0.7500 | 0.7000 | 0.7500 | 0.6500 |

Leptocheirus 10-d Survival and Growth Test

Environmental Enterprises USA, Inc.

| | | | | | |
|---|---|---|---|---|---|
| Analysis ID: | 16-8648-6335 | Endpoint: | 10d Survival Rate | CETIS Version: | CETISv2.1.4 |
| Analyzed: | 10 Oct-24 9:38 | Analysis: | Parametric-Control vs Treatments | Status Level: | 1 |
| Edit Date: | 09 Oct-24 12:38 | MD5 Hash: | CBC70C79B6B66E71574FB36CD8A0336E | Editor ID: | 002-227-489-6 |

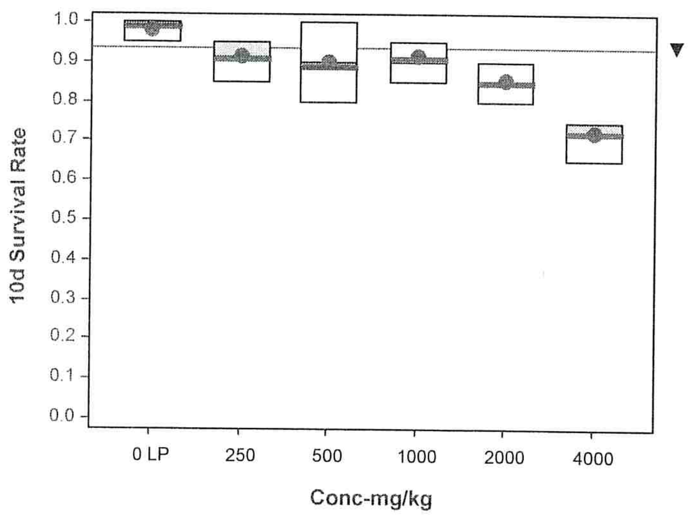
### Angular (Corrected) Transformed Detail

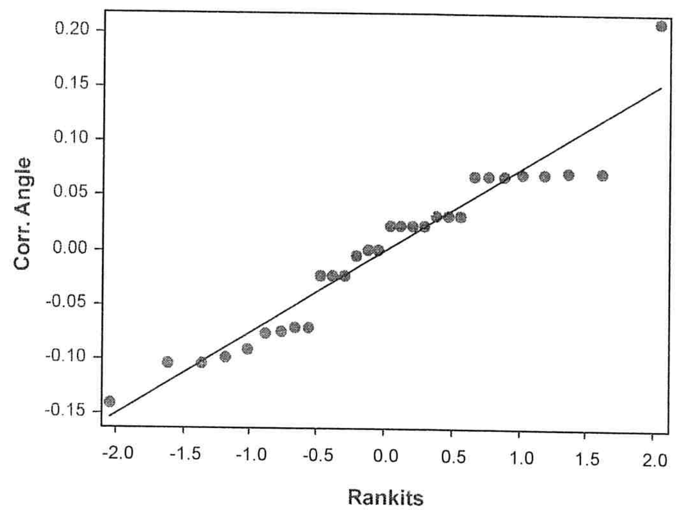
| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | LP | 1.4590 | 1.4590 | 1.3450 | 1.4590 | 1.4590 |
| 250 | | 1.3450 | 1.3450 | 1.3450 | 1.1730 | 1.1730 |
| 500 | | 1.4590 | 1.2490 | 1.1070 | 1.1730 | 1.2490 |
| 1000 | | 1.1730 | 1.3450 | 1.2490 | 1.2490 | 1.3450 |
| 2000 | | 1.2490 | 1.1070 | 1.1730 | 1.1070 | 1.2490 |
| 4000 | | 1.0470 | 1.0470 | 0.9912 | 1.0470 | 0.9377 |

### 10d Survival Rate Binomials

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | LP | 20/20 | 20/20 | 19/20 | 20/20 | 20/20 |
| 250 | | 19/20 | 19/20 | 19/20 | 17/20 | 17/20 |
| 500 | | 20/20 | 18/20 | 16/20 | 17/20 | 18/20 |
| 1000 | | 17/20 | 19/20 | 18/20 | 18/20 | 19/20 |
| 2000 | | 18/20 | 16/20 | 17/20 | 16/20 | 18/20 |
| 4000 | | 15/20 | 15/20 | 14/20 | 15/20 | 13/20 |

### Graphics



# CETIS Summary Report

Report Date: 10 Oct-24 09:43 (p 1 of 1)
Test Code/ID: L-6471-24 (G-S) / 00-2431-5139

Leptocheirus 10-d Survival and Growth Test

Environmental Enterprises USA, Inc.

## Mean Dry Biomass-mg Summary

| Conc-mg/kg | Code | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | LP | 5 | 0.2702 | 0.203 | 0.3374 | 0.204 | 0.355 | 0.02419 | 0.0541 | 20.02% | 0.00% |
| 250 | | 5 | 0.2696 | 0.2482 | 0.291 | 0.2535 | 0.2955 | 0.007692 | 0.0172 | 6.38% | 0.22% |
| 500 | | 5 | 0.2514 | 0.2056 | 0.2972 | 0.2195 | 0.3145 | 0.0165 | 0.0369 | 14.68% | 6.96% |
| 1000 | | 5 | 0.2392 | 0.1839 | 0.2945 | 0.1875 | 0.296 | 0.01992 | 0.04454 | 18.62% | 11.47% |
| 2000 | | 5 | 0.2445 | 0.2016 | 0.2874 | 0.2155 | 0.303 | 0.01546 | 0.03457 | 14.14% | 9.51% |
| 4000 | | 5 | 0.1903 | 0.1767 | 0.2039 | 0.1765 | 0.205 | 0.004911 | 0.01098 | 5.77% | 29.57% |

## Mean Dry Biomass-mg Detail

MD5: 5EFE7441B25C2E24D9B4404F08F9B1AE

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | LP | 0.2605 | 0.2655 | 0.204 | 0.355 | 0.266 |
| 250 | | 0.267 | 0.2955 | 0.2555 | 0.2765 | 0.2535 |
| 500 | | 0.3145 | 0.25 | 0.2195 | 0.2355 | 0.2375 |
| 1000 | | 0.296 | 0.262 | 0.1875 | 0.2015 | 0.249 |
| 2000 | | 0.2425 | 0.239 | 0.2155 | 0.303 | 0.2225 |
| 4000 | | 0.1875 | 0.1855 | 0.1765 | 0.197 | 0.205 |

## CETIS Analytical Report


Test Code/ID: L-6471-24 (G-S) / 00-2431-5139

**Leptocheirus 10-d Survival and Growth Test** — **Environmental Enterprises USA, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 19-9381-4951 | **Endpoint:** | 10d Survival Rate | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 14:33 | **Analysis:** | Linear Interpolation (ICPIN) | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 12:38 | **MD5 Hash:** | CBC70C79B6B66E71574FB36CD8A0336E | **Editor ID:** | 002-227-489-6 |

### Linear Interpolation Options

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Linear | Linear | 1063415 | 1000 | Yes | Two-Point Interpolation |

### Point Estimates

| Level | mg/kg | 95% LCL | 95% UCL |
|---|---|---|---|
| LC15 | 2131 | 1273 | 2875 |
| LC20 | 2892 | 2094 | 3544 |
| LC25 | 3654 | 2973 | --- |
| LC40 | >4000 | --- | --- |
| LC50 | >4000 | --- | --- |

### 10d Survival Rate Summary

| | | | Calculated Variate(A/B) | | | | | | | Isotonic Variate | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Conc-mg/kg | Code | Count | Mean | Median | Min | Max | CV% | %Effect | ΣA/ΣB | Mean | %Effect |
| 0 | LP | 5 | 0.9900 | 1.0000 | 0.9500 | 1.0000 | 2.26% | 0.00% | 99/100 | 0.9900 | 0.00% |
| 250 | | 5 | 0.9100 | 0.9500 | 0.8500 | 0.9500 | 6.02% | 8.08% | 91/100 | 0.9100 | 8.08% |
| 500 | | 5 | 0.8900 | 0.9000 | 0.8000 | 1.0000 | 8.33% | 10.10% | 89/100 | 0.9000 | 9.09% |
| 1000 | | 5 | 0.9100 | 0.9000 | 0.8500 | 0.9500 | 4.60% | 8.08% | 91/100 | 0.9000 | 9.09% |
| 2000 | | 5 | 0.8500 | 0.8500 | 0.8000 | 0.9000 | 5.88% | 14.14% | 85/100 | 0.8500 | 14.14% |
| 4000 | | 5 | 0.7200 | 0.7500 | 0.6500 | 0.7500 | 6.21% | 27.27% | 72/100 | 0.7200 | 27.27% |

### 10d Survival Rate Detail

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | LP | 1.0000 | 1.0000 | 0.9500 | 1.0000 | 1.0000 |
| 250 | | 0.9500 | 0.9500 | 0.9500 | 0.8500 | 0.8500 |
| 500 | | 1.0000 | 0.9000 | 0.8000 | 0.8500 | 0.9000 |
| 1000 | | 0.8500 | 0.9500 | 0.9000 | 0.9000 | 0.9500 |
| 2000 | | 0.9000 | 0.8000 | 0.8500 | 0.8000 | 0.9000 |
| 4000 | | 0.7500 | 0.7500 | 0.7000 | 0.7500 | 0.6500 |

### 10d Survival Rate Binomials

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | LP | 20/20 | 20/20 | 19/20 | 20/20 | 20/20 |
| 250 | | 19/20 | 19/20 | 19/20 | 17/20 | 17/20 |
| 500 | | 20/20 | 18/20 | 16/20 | 17/20 | 18/20 |
| 1000 | | 17/20 | 19/20 | 18/20 | 18/20 | 19/20 |
| 2000 | | 18/20 | 16/20 | 17/20 | 16/20 | 18/20 |
| 4000 | | 15/20 | 15/20 | 14/20 | 15/20 | 13/20 |



Analyst: SN QA: CH

B.65 error 10.10.24 SN

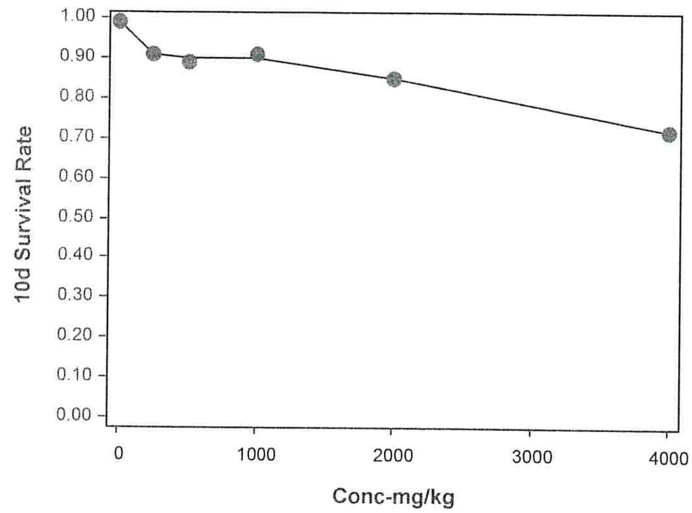
# CETIS Analytical Report

| | |
|---|---|
| Report Date: | 10 Oct-24 14:33 (p 2 of 2) |
| Test Code/ID: | L-6471-24 (G-S) / 00-2431-5139 |

**Leptocheirus 10-d Survival and Growth Test** — **Environmental Enterprises USA, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 19-9381-4951 | **Endpoint:** | 10d Survival Rate | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 14:33 | **Analysis:** | Linear Interpolation (ICPIN) | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 12:38 | **MD5 Hash:** | CBC70C79B6B66E71574FB36CD8A0336E | **Editor ID:** | 002-227-489-6 |

**Graphics**






B.76 error 10-10-24 SN

# CETIS Analytical Report

| | |
|---|---|
| Report Date: | 10 Oct-24 14:33 (p 1 of 1) |
| Test Code/ID: | L-6471-24 (G-S) / 00-2431-5139 |

**Leptocheirus 10-d Survival and Growth Test** — **Environmental Enterprises USA, Inc.**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis ID:** | 04-3825-1696 | **Endpoint:** | Mean Dry Weight-mg | **CETIS Version:** | CETISv2.1.4 |
| **Analyzed:** | 10 Oct-24 14:33 | **Analysis:** | Linear Interpolation (ICPIN) | **Status Level:** | 1 |
| **Edit Date:** | 09 Oct-24 12:38 | **MD5 Hash:** | 0C18162AEB274CF6BA6C5673D882CD83 | **Editor ID:** | 002-227-489-6 |

## Linear Interpolation Options

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|---|---|---|---|---|---|
| Linear | Linear | 926750 | 1000 | Yes | Two-Point Interpolation |

## Point Estimates

| Level | mg/kg | 95% LCL | 95% UCL |
|---|---|---|---|
| IC15 | >4000 | --- | --- |
| IC20 | >4000 | --- | --- |
| IC25 | >4000 | --- | --- |
| IC40 | >4000 | --- | --- |
| IC50 | >4000 | --- | --- |

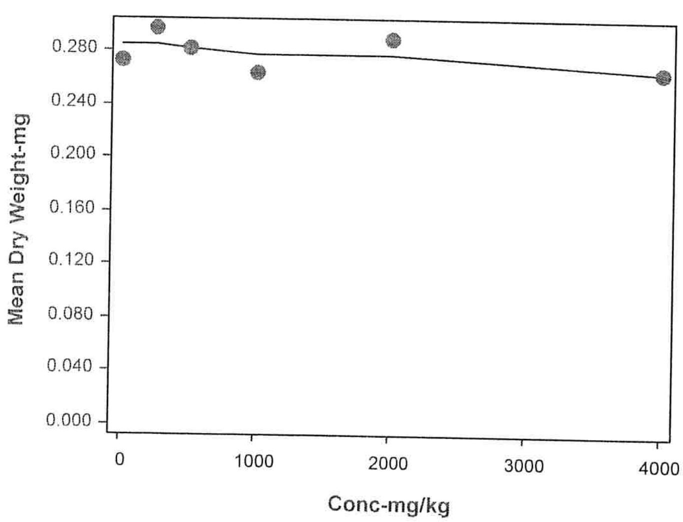
## Mean Dry Weight-mg Summary

| | | | Calculated Variate | | | | | | Isotonic Variate | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-mg/kg | Code | Count | Mean | Median | Min | Max | CV% | %Effect | Mean | %Effect |
| 0 | LP | 5 | 0.2723 | 0.2655 | 0.2147 | 0.355 | 18.70% | 0.00% | 0.2846 | 0.00% |
| 250 | | 5 | 0.2969 | 0.2982 | 0.2689 | 0.3253 | 7.61% | -9.02% | 0.2846 | 0.00% |
| 500 | | 5 | 0.2815 | 0.2771 | 0.2639 | 0.3145 | 6.84% | -3.37% | 0.2815 | 1.09% |
| 1000 | | 5 | 0.2637 | 0.2621 | 0.2083 | 0.3482 | 20.73% | 3.19% | 0.2766 | 2.81% |
| 2000 | | 5 | 0.2895 | 0.2694 | 0.2472 | 0.3788 | 18.55% | -6.31% | 0.2766 | 2.81% |
| 4000 | | 5 | 0.2655 | 0.2521 | 0.2473 | 0.3154 | 10.73% | 2.51% | 0.2655 | 6.71% |

## Mean Dry Weight-mg Detail

| Conc-mg/kg | Code | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | LP | 0.2605 | 0.2655 | 0.2147 | 0.355 | 0.266 |
| 250 | | 0.2811 | 0.3111 | 0.2689 | 0.3253 | 0.2982 |
| 500 | | 0.3145 | 0.2778 | 0.2744 | 0.2771 | 0.2639 |
| 1000 | | 0.3482 | 0.2758 | 0.2083 | 0.2239 | 0.2621 |
| 2000 | | 0.2694 | 0.2988 | 0.2535 | 0.3788 | 0.2472 |
| 4000 | | 0.25 | 0.2473 | 0.2521 | 0.2627 | 0.3154 |

## Graphics






B.87
error 10.10.24 SN

# EE NATURAL SEDIMENT (NS006)

## EE NS SEDIMENT

| | NS Wet Weight g | NS Dry + Pan Weight g | Initial Pan Weight g | NS Dry Weight g | | Weight of 25 ml NS g |
|---|---|---|---|---|---|---|
| 1 | 30.04 | 14.84 | 0.96 | 13.88 | 1 | 34.34 |
| 2 | 30.05 | 14.83 | 0.97 | 13.86 | 2 | 34.14 |
| 3 | 30.07 | 14.83 | 0.96 | 13.87 | 3 | 35.01 |

## WET TO DRY RATIO (W2DR)

(Wet NS wt 1/Dry NS wt 1) + (Wet NS wt 2/Dry NS wt 2) + (Wet NS wt 3/ Dry NS wt 3) / 3 =

2.17

**NS Water Content = 53.9 %**

## WET NS DENSITY (WNSD)

(Wet NS wt 1/Wet NS vol. + Wet NS wt 2/Wet NS vol + Wet NS wt 3/Wet NS vol.) / 3 =

1.38 g/ml

## EXPOSURE CONCENTRATION CALCULATIONS

WET NS NEEDED

WNSD X VOL. OF NS REQUIRED = WT. NS REQUIRED/CONC.

1.3800 X 925 = 1276.5 g WET NS/CONC.

DRY NS NEEDED

(WET NS PER CONC./W2DR)X(1kg/1000g)-DRY WT. NS/CONC.

925 ml 0.5882 kg = 588.2 g

**EEUSA**
**Light Oil in NS006**
**L-6471-24 (L-6273-24)**

**Sample ID Double Check:** TAD

DESIRED CONC. IN mg/kg X DRY WT. NS IN kg. = TOXICANT REQUIRED IN mg.

| Conc. mg/kg | Dry NS kg | Calculated g | Actual +/- 0.01 g | Initial | Volume ml | Wet Wt. g | Actual +/- 0.1 g | Mixing Tech. Initials |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.5882 | 0.00 | 0.00 | CH | 925 | 1276.5 | 1276.5 | JL |
| 250 | 0.5882 | 0.15 | 0.15 | CH | 925 | 1276.5 | 1276.5 | GW |
| 500 | 0.5882 | 0.29 | 0.29 | CH | 925 | 1276.5 | 1276.5 | STL |
| 1000 | 0.5882 | 0.59 | 0.58 | CH | 925 | 1276.5 | 1276.5 | JL |
| 2000 | 0.5882 | 1.18 | 1.18 | CH | 925 | 1276.5 | 1276.5 | STL |
| 4000 | 0.5882 | 2.35 | 2.35 | CH | 925 | 1276.5 | 1276.5 | GW |

Scale ID: 45

Scale ID: 45

Prepared By: [signature] 9/25/24

Check By: CH 9/26/24



Raw Data QC/QA: BCP

**ENVIRONMENTAL ENTERPRISES USA, INC.**
58485 Pearl Acres Rd., Suite D
Slidell, LA 70461
(985) 646-2787, Fax # (985) 646-2810

## CHAIN - OF - CUSTODY RECORD

Client: Environmental Enterprises USA Inc.
Address: 58485 Pearl Acres Rd
Slidell, LA 70461

Contact Person:
Phone #:
Email #:
WBS/AFE/PO, etc.:

| Sample Description | Collected Date | Collected Time | Collection Purpose | | No. of Containers* | Size of Container | Lot # |
|---|---|---|---|---|---|---|---|
| natural Sediment | 8/5/24 | 1730 | Sediment for Culturing | | | 1gal Buckt | NS-006 |

| | |
|---|---|
| Collected By: Print: Nichola Beck; Company Name: N/A; Sign: [signature] | Relinquished By: Print: [signature]; Company Name: N/A; Sign: [signature]; 8/15/24; 1630 hr |
| Received By: Print: M Robbins; Company Name: EE USA; Sign: [signature]; 8/16/24; 0800 hr | Relinquished By: Print: ; Company Name: EE USA; Sign: ; / / ; hr |
| Received By: Print: ; Company Name: EE USA; Sign: ; / / ; hr | Relinquished By: Print: ; Company Name: ; Sign: ; / / ; hr |
| Received By: Print: ; Company Name: ; Sign: ; / / ; hr | Relinquished By: Print: ; Company Name: ; Sign: ; / / ; hr |

**EE USA use only!** *Plastic or Glass container(s).

Tracking #: ______ Kit #: ______

# Soil Mechanics Laboratory Testing

EUSTIS ENGINEERING SINCE 1946

**Gulfport Office**
14368 Creosote Road
Gulfport, MS 39503
Phone: 228-575-9888

**Client:**

Environmental Enterprises USA, Inc
58485 Pearl Acres Road, Suite D
Slidell, LA 70461

**Project:**

G0501
Environmental Enterprises USA, Inc
58485 Pearl Acres Road, Suite D
Slidell, LA 70461

Transmitted herein are the test results for the material sampled on the date in the description.

Table of Contents

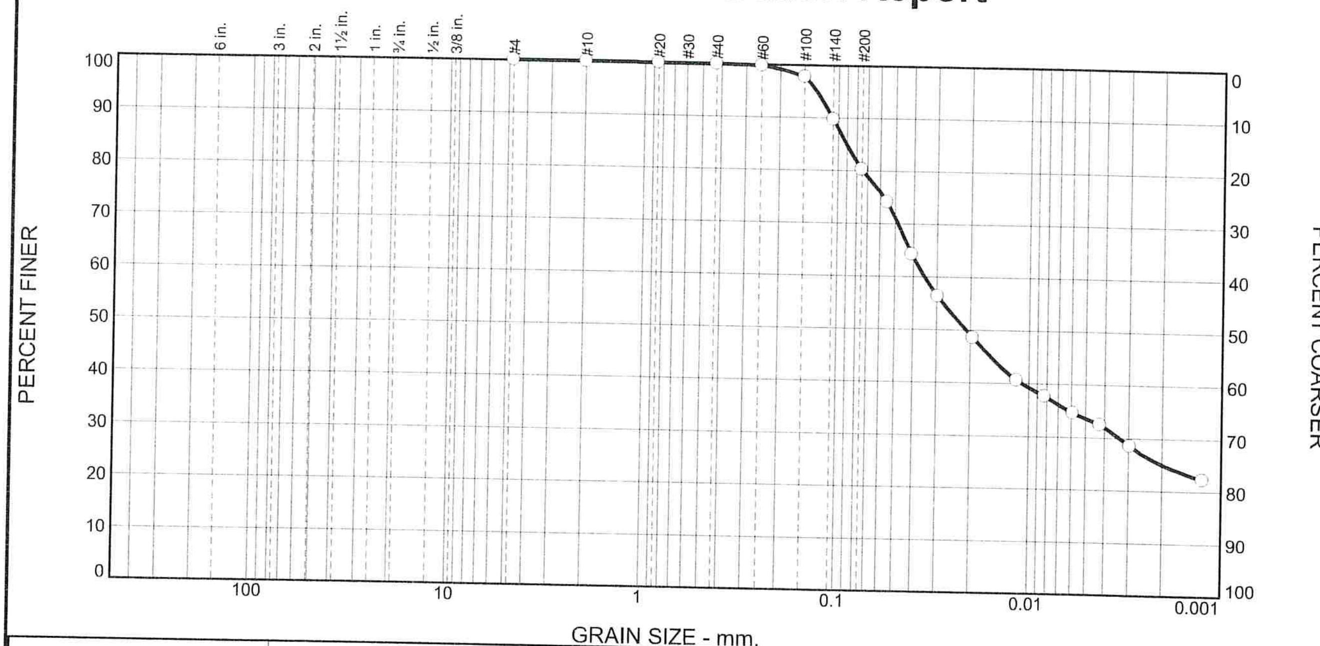






FL Firm Registration No. 31944
TBPE Firm Registration No. F-13895

# Particle Size Distribution Report




| % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 19.7 | 46.6 | 33.6 |

**Test Results (ASTM D 422 & ASTM D 1140)**

| Opening Size | Percent Finer | Spec.* (Percent) | Pass? (X=Fail) |
|---|---|---|---|
| #4 | 100.0 | | |
| #10 | 100.0 | | |
| #20 | 99.9 | | |
| #40 | 99.9 | | |
| #60 | 99.8 | | |
| #100 | 97.7 | | |
| #140 | 89.7 | | |
| #200 | 80.2 | | |
| 0.0551 mm. | 74.1 | | |
| 0.0407 mm. | 64.2 | | |
| 0.0297 mm. | 56.4 | | |
| 0.0193 mm. | 48.5 | | |
| 0.0115 mm. | 40.6 | | |
| 0.0082 mm. | 37.7 | | |
| 0.0059 mm. | 34.6 | | |
| 0.0042 mm. | 32.4 | | |
| 0.0030 mm. | 28.5 | | |
| 0.0012 mm. | 22.3 | | |

* (no specification provided)

**Material Description**

Wet, dark gray SILT W/ SAND (fine), some clay

**Atterberg Limits (ASTM D 4318)**

PL= LL= PI=

**Classification**

USCS (D 2487)= ML AASHTO (M 145)=

**Coefficients**

$D_{90}$= 0.1070 $D_{85}$= 0.0902 $D_{60}$= 0.0349
$D_{50}$= 0.0211 $D_{30}$= 0.0034 $D_{15}$=
$D_{10}$= $C_u$= $C_c$=

**Remarks**

**Date Received:** 9/13/24 **Date Tested:** 9/18/24

**Tested By:** KC & AS

**Checked By:** RR

**Title:** Lab Manager

**Sample Number:** SR-22904-24-AA1

**Date Sampled:** 9/12/24

EUSTIS ENGINEERING SINCE 1946

**Client:** ENVIRONMENTAL ENTERPRISES USA, INC.

**Project:** ENVIRONMENTAL ENTERPRISES USA, INC.
58485 PEARL ACRES ROAD, SLIDELL, LOUISIANA

**Project No:** G0501 **Figure**

**Tested By:** **Checked By:**

**ENVIRONMENTAL ENTERPRISES USA, INC.**
*58485 Pearl Acres Rd., Suite D*
*Slidell, Louisiana 70461*
*(985) 646-2787*

Kit No. 308 T

## CHAIN - OF - CUSTODY RECORD

Client: EE USA
Contact Person: Chris Holmes
Address: 58485 Pearl Acres Rd., Suite D
Slidell, LA 70461
Phone#: Office: (985) 646-2787
P.O. #
Email: cholmes@eeusa.com
Project:

**Special Handling Request**
( ) RUSH
( ) VERBAL
( ) OTHER

| Lab Sample Description | No. of Containers | Analysis Request | EEUSA S/R No. | Eustis Lab No. |
|---|---|---|---|---|
| Natural Sediment Batch #: NS006 | 1 | PSD, ASTM D422 | SR-22904-24-AA1 | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| Collected By: Beau Pere' | 9/12/2024 | 14:20 | Relinquished By: Beau Pere' | 9/12/2024 | 14:45 |
| Received By: EEUSA Jenifer Calecart | 9-12-24 | 1445 | Relinquished By: EEUSA Jenifer Calecart | 9-13-24 | 0819 |
| Received By: Marie Kledas EEUSA | 9-13-24 | 0819 | Relinquished By: Marie Kledas EEUSA | 9-13-24 | 0910 |
| Received By: [illegible] | 9/13/24 | 9:11 | Relinquished By: | | |
| Received By: | | | Relinquished By: | | |



xl/m/eesam/chain of custodies/coc-2003.xls

9/12/2024 2:37 PM

Waypoint ANALYTICAL

5041 Taravella Road, Marrero, LA 70072
Main 504-371-8557 ° Fax 504-371-8560
www.waypointanalytical.com

10/8/2024

Environmental Enterprises
Ms. Jennifer Dupont
58485 Pearl Acres Rd., Suite D
Slidell, LA, 70461

Ref: Report Number: 24-274-0030
Project Description: SR-23031-24-AA1

Dear Ms. Jennifer Dupont:

Waypoint Analytical Louisiana, Inc. received sample(s) on 9/30/2024 for the analyses presented in the following report. The above referenced project has been analyzed per your instructions. Unless otherwise noted, the analyses were performed in our laboratory in accordance with Standard Methods, The Solid Waste Manual SW-846, EPA Methods for Chemical Analysis of Water and Wastes and /or 40 CFR part 136.

Certain parameters (chlorine, pH, dissolved oxygen, sulfite...) are required to be analyzed within 15 minutes of sampling. Usually, but not always, any field parameter analyzed at the laboratory is outside of this holding time. Refer to sample analysis time for confirmation of holding time compliance. Analyses reported which indicate "Field" for these parameters were analyzed by the client in the field. Results for solid samples are reported on an as received or "wet weight" basis unless otherwise specified.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, method validations, instrumentation maintenance and calibration for all parameters (NELAP and non-NELAP) were performed in accordance with guidelines established by the USEPA (including 40 CFR 136 Method Update Rule May 2021) and NELAC unless otherwise indicated. Any parameter for which the laboratory is not officially NELAP accredited is indicated by a '~' symbol. These are not included in the scope because NELAP accreditation is either not available or has not been applied for. Additional certifications may be held/are available for parameters, where NELAP accreditation is not required or applicable. A full list of certifications is available upon request.

All quality control measures undertaken in accordance with Waypoint Analytical Louisiana, Inc. CompQAP990807A and revisions under the terms of the Louisiana Environmental Laboratory Accreditation Program (Certificate #02041) are within acceptance ranges established in that document with the exception of the items indicated and/or discussed in a Case Narrative.

The results are shown on the attached analysis sheet(s). Be aware that the time analyzed for certain samples (e.g. - BOD, CBOD, etc.) refer to the time the sample batch was begun and not necessarily to the time an individual sample was begun. Thank you for allowing Waypoint Analytical Louisiana, Inc. to serve you. Should I be of further assistance, if you have any questions or need additional information please contact me or client services.

Sincerely,

Anthony J Albert

Anthony J. Albert
Technical Director

*Laboratory's liability in any claim relating to analyses performed shall be limited to, at laboratory's option, repeating the analysis in question at laboratory's expense, or the refund of the charges paid for performance of said analysis. This report may be reproduced in full only with the written permission of the laboratory and/or the entity to which it is addressed. Results contained herein relate only to the sample(s) submitted to the laboratory.*

Waypoint ANALYTICAL

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# Certification Summary

## Laboratory ID: WP MLA: Waypoint Analytical Louisiana, Inc., Marrero, LA

| State | Program | Lab ID | Expiration Date |
|---|---|---|---|
| Georgia | State Program | 02041 | 06/30/2025 |
| Louisiana | State Program - NELAP | 02041 | 06/30/2025 |

## Laboratory ID: WP MTN: Waypoint Analytical, LLC., Memphis, TN

| State | Program | Lab ID | Expiration Date |
|---|---|---|---|
| Alabama | State Program | 40750 | 02/28/2025 |
| Arkansas | State Program | 88-0650 | 02/07/2025 |
| California | State Program | 2904 | 06/30/2025 |
| Florida | State Program - NELAP | E871157 | 06/30/2025 |
| Georgia | State Program | C044 | 11/14/2025 |
| Georgia | State Program | 04015 | 06/30/2024 |
| Illinois | State Program - NELAP | 200078 | 10/31/2025 |
| Kentucky | State Program | 90047 | 12/31/2024 |
| Kentucky | State Program | 80215 | 06/30/2025 |
| Kentucky | State Program | KY90047 | 12/31/2024 |
| Louisiana | State Program - NELAP | LA037 | 12/31/2024 |
| Louisiana | State Program - NELAP | 04015 | 06/30/2025 |
| Mississippi | State Program | MS | 11/14/2025 |
| North Carolina | State Program | 47701 | 07/31/2025 |
| North Carolina | State Program | 415 | 12/31/2024 |
| Pennsylvania | State Program - NELAP | 68-03195 | 05/31/2025 |
| South Carolina | State Program | 84002 | 06/30/2025 |
| Tennessee | State Program | 02027 | 11/14/2025 |
| Texas | State Program - NELAP | T104704180 | 09/30/2025 |
| Virginia | State Program | 00106 | 06/30/2025 |
| Virginia | State Program - NELAP | 460181 | 09/14/2025 |

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## Sample Summary Table

**Report Number:** 24-274-0030

**Client Project Description:** SR-23031-24-AA1

| Lab No | Client Sample ID | Matrix | Date Collected | Date Received | Method | Lab ID |
|---|---|---|---|---|---|---|
| 90481 | Batch # NS006 | Solids | 09/30/2024 10:42 | 09/30/2024 | 2540G-2011 | WP MTN |
| 90481 | Batch # NS006 | Solids | 09/30/2024 10:42 | 09/30/2024 | WALK-BLACK | WP MTN |
| 90481 | Batch # NS006 | Solids | 09/30/2024 10:42 | 09/30/2024 | ASTM D2974 | WP MTN |

WP MTN - Memphis, TN: Waypoint Analytical - TN, Memphis, TN

Waypoint ANALYTICAL
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Main 504-371-8557 ° Fax 504-371-8560
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00202
Environmental Enterprises
Ms. Jennifer Dupont
58485 Pearl Acres Rd., Suite D
Slidell , LA 70461

Project Information : SR-23031-24-AA1

Report Date : 10/08/2024
Received : 09/30/2024

Report Number : **24-274-0030**

***REPORT OF ANALYSIS***

Lab No : **90481**
Sample ID : **Batch # NS006**

Matrix: **Solids**
Sampled: **9/30/2024 10:42**

| Test | Results | Units | MQL | DF | Date / Time Analyzed | By | Analytical Method |
|---|---|---|---|---|---|---|---|
| Organic Matter (750C) | **6.50** | % | 0.100 | 1 | 10/07/24 13:00 | VVP | ASTM D2974 |
| Total Organic Carbon | **2.00** | % | 0.05 | 1 | 10/03/24 10:18 | AAB | WALK-BLACK |
| Total Volatile Solids | **6.21** | % | 0.010 | 1 | 10/03/24 14:44 | CAH | 2540G-2011 |

**Qualifiers/ Definitions**

| | | | |
|---|---|---|---|
| DF | Dilution Factor | MQL | Method Quantitation Limit |

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# Quality Control Data

**Client ID:** Environmental Enterprises
**Project Description:** SR-23031-24-AA1
**Report No:** 24-274-0030

**QC Analytical Batch:** L776729
**Analysis Method:** ASTM D2974
**Analysis Description:** Organic Matter/ASH

**Duplicate** A 90481-DUP

| Parameter | Units | Result | DUP Result | RPD | Max RPD | Analyzed |
|---|---|---|---|---|---|---|
| Organic Matter (750C) | % | 6.50 | 6.72 | 3.3 | 20.0 | 10/07/24 13:00 |

Date: 10/08/2024 11:18 AM

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# Quality Control Data

**Client ID:** Environmental Enterprises
**Project Description:** SR-23031-24-AA1
**Report No:** 24-274-0030

**QC Analytical Batch:** L776030
**Analysis Method:** WALK-BLACK
**Analysis Description:** Total Organic Carbon - Walkley Black

**Lab Reagent Blank** LRB Matrix: SOL
Associated Lab Samples: 90481

| Parameter | Units | Blank Result | MQL | Analyzed |
|---|---|---|---|---|
| Total Organic Carbon | % | < 0.05 | 0.05 | 10/03/24 10:18 |

**Duplicate** A 90481-DUP

| Parameter | Units | Result | DUP Result | RPD | Max RPD | Analyzed |
|---|---|---|---|---|---|---|
| Total Organic Carbon | % | 2.00 | 2.00 | 0.0 | 20.0 | 10/03/24 10:18 |

Waypoint ANALYTICAL

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Main 504-371-8557 ° Fax 504-371-8560
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## Shipment Receipt Form

Customer Number: **00202**
Customer Name: **Environmental Enterprises**
Report Number: **24-274-0030**

### Shipping Method

| | | | | |
|---|---|---|---|---|
| ○ Fed Ex | ○ US Postal | ● Lab | ○ Other : | |
| ○ UPS | ○ Client | ○ Courier | Thermometer ID: | IR 1 |

| | | | |
|---|---|---|---|
| Shipping container/cooler uncompromised? | ● Yes | ○ No | |
| Number of coolers/boxes received | 1 | | |
| Custody seals intact on shipping container/cooler? | ○ Yes | ○ No | ● Not Present |
| Custody seals intact on sample bottles? | ○ Yes | ○ No | ● Not Present |
| Chain of Custody (COC) present? | ● Yes | ○ No | |
| COC agrees with sample label(s)? | ● Yes | ○ No | |
| COC properly completed | ● Yes | ○ No | |
| Samples in proper containers? | ● Yes | ○ No | |
| Sample containers intact? | ● Yes | ○ No | |
| Sufficient sample volume for indicated test(s)? | ● Yes | ○ No | |
| All samples received within holding time? | ● Yes | ○ No | |
| Cooler temperature in compliance? | ● Yes | ○ No | ○ Not Present |
| Cooler/Samples arrived at the laboratory on ice. Samples were considered acceptable as cooling process had begun. | ● Yes | ○ No | |
| Water - Sample containers properly preserved | ● Yes | ○ No | ○ N/A |
| Water - VOA vials free of headspace | ○ Yes | ○ No | ● N/A |
| Trip Blanks received with VOAs | ○ Yes | ○ No | ● N/A |
| Soil VOA method 5035 – compliance criteria met | ○ Yes | ○ No | ● N/A |

☐ High concentration container (48 hr) ☐ Low concentration EnCore samplers (48 hr)
☐ High concentration pre-weighed (methanol -14 d) ☐ Low conc pre-weighed vials (Sod Bis -14 d)

Special precautions or instructions included? ○ Yes ● No

Comments:

Signature: Christina R. Varuso Date & Time: 09/30/2024 16:23:03

24-274-0030
00202
09-30-2024
16:22:23
Environmental Enterprises
SR-23031-24-AA1


# ENVIRONMENTAL ENTERPRISES USA, INC.
58485 Pearl Acres Rd., Suite D
Slidell, Louisiana 70461
(985) 646-2787


Kit No. ____________

## CHAIN - OF - CUSTODY RECORD

Client: EE USA
Address:

Contact Person: Chris Holmes
Phone#:
P.O. #
Email: cholmes@eeusa.com
Project:

**Special Handling Request**
(X) RUSH
( ) VERBAL
( ) OTHER

| Lab Sample Description | No. of Containers | Analysis Request | EEUSA S/R No. | Waypoint Lab No. |
|---|---|---|---|---|
| Batch # NS006 | 1 | Total Volatile Solids by SM-2540G | SR-23031-24-AA1 | 90481 |
| | | Total Organic Carbon by Walkley-Black | | ↓ |
| | | Organic Matter by ASTM D2974 | | |
| | | | | |
| | | | | |
| | | | | |

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| Collected By: Chris Holmes EEUSA | 9/30/2024 | 10:42 | Relinquished By: Chris Holmes | 9/30/2024 | 10:51 |
| Received By: Marie Keldas EE USA | 9.30.24 | 1051 | Relinquished By: Marie Keldas EEUSA | 9.30.24 | 1558 |
| Received By: [illegible] | 9/30/24 | 1558 | Relinquished By: | | |
| Received By: | | | Relinquished By: | | |
| Received By: | | | Relinquished By: | | |

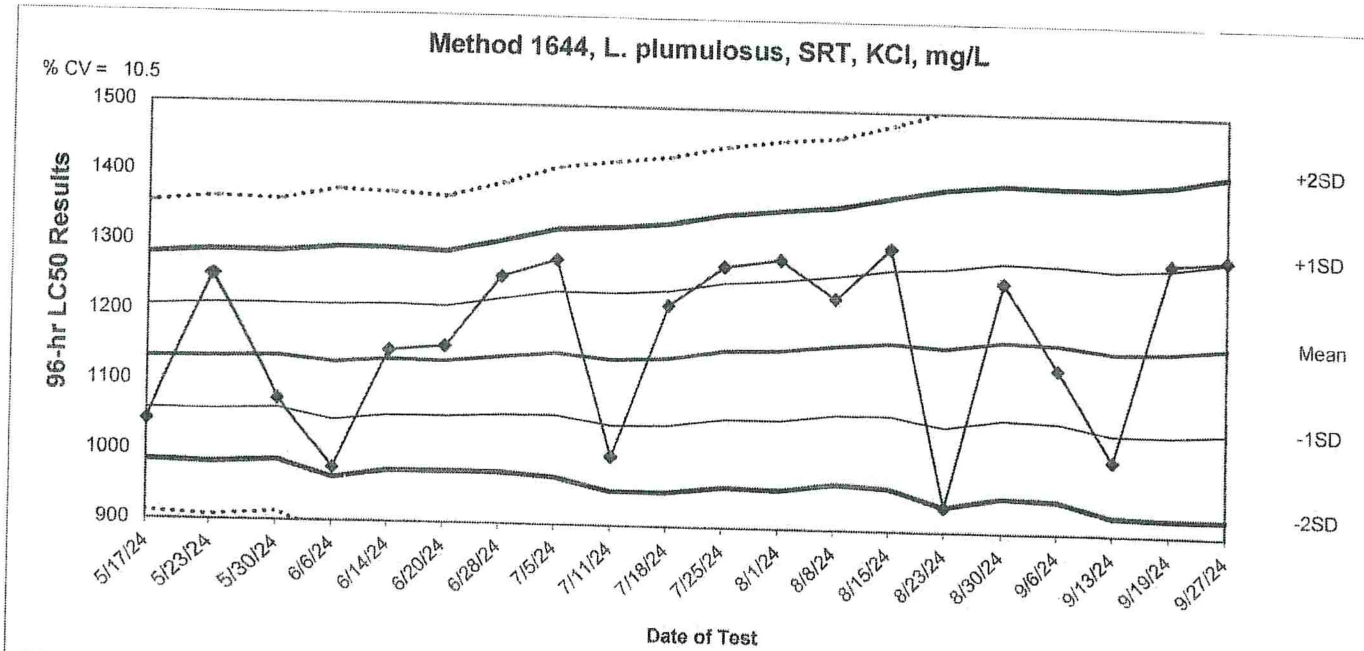
2.3°C

xl/m/eesam/chain of custodies/coc-2003.xls

9/30/2024 10:44 AM

Environmental Enterprises USA, Inc.

# APPENDIX G



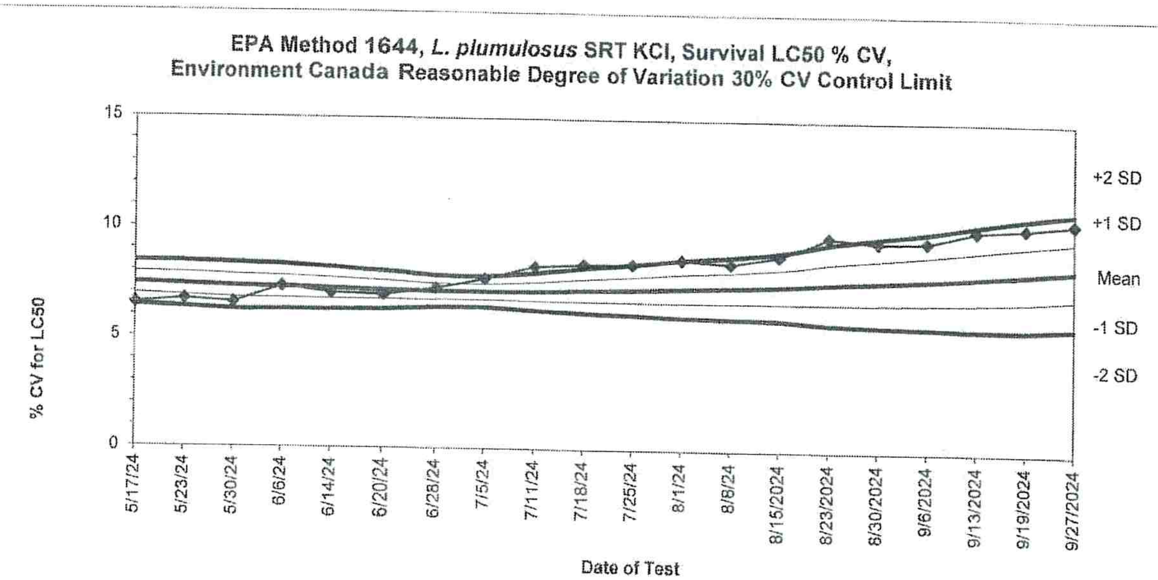

Dilution Series = 380, 560, 800, 1100, & 1600 mg/L, Dilution Factor = 0.7

| Organism Source | EE# | Date | Values | Mean | -1SD | -2SD | -3SD | +1SD | +2SD | +3SD | Control % Survival | Toxicant Lot# |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EE | LS-020-24 | 5/17/24 | 1044 | 1133 | 1059 | 986 | 912 | 1207 | 1281 | 1355 | 95 | 223939 |
| EE | LS-021-24 | 5/23/24 | 1252 | 1135 | 1059 | 983 | 907 | 1211 | 1287 | 1363 | 100 | 223939 |
| EE | LS-022-24 | 5/30/24 | 1075 | 1136 | 1062 | 987 | 913 | 1211 | 1285 | 1360 | 100 | 223939 |
| EE | LS-023-24 | 6/6/24 | 977 | 1128 | 1045 | 963 | 880 | 1210 | 1292 | 1375 | 90 | 223939 |
| EE | LS-024-24 | 6/14/24 | 1146 | 1133 | 1053 | 974 | 894 | 1213 | 1292 | 1372 | 100 | 223939 |
| EE | LS-025-24 | 6/20/24 | 1153 | 1131 | 1053 | 974 | 895 | 1210 | 1289 | 1367 | 100 | 223939 |
| EE | LS-026-24 | 6/28/24 | 1254 | 1139 | 1056 | 974 | 891 | 1222 | 1305 | 1388 | 100 | 223939 |
| EE | LS-027-24 | 7/5/24 | 1279 | 1146 | 1057 | 969 | 880 | 1234 | 1323 | 1411 | 98 | 223939 |
| EE | LS-028-24 | 7/11/24 | 999 | 1138 | 1044 | 949 | 855 | 1233 | 1327 | 1421 | 100 | 223939 |
| EE | LS-029-24 | 7/18/24 | 1217 | 1142 | 1046 | 950 | 854 | 1238 | 1334 | 1430 | 100 | 223939 |
| EE | LS-030-24 | 7/25/24 | 1274 | 1153 | 1056 | 959 | 861 | 1251 | 1348 | 1445 | 100 | 223939 |
| EE | LS-031-24 | 8/1/24 | 1285 | 1156 | 1056 | 956 | 856 | 1256 | 1356 | 1456 | 90 | 223939 |
| EE | LS-032-24 | 8/8/24 | 1231 | 1164 | 1065 | 966 | 867 | 1263 | 1362 | 1461 | 100 | 223939 |
| EE | LS-033-24 | 8/15/24 | 1304 | 1169 | 1066 | 962 | 858 | 1273 | 1377 | 1481 | 100 | 223939 |
| EE | LS-034-24 | 8/23/24 | 936 | 1164 | 1050 | 937 | 824 | 1277 | 1390 | 1504 | 98 | 223939 |
| EE | LS-035-24 | 8/30/24 | 1258 | 1174 | 1062 | 951 | 839 | 1286 | 1398 | 1510 | 97 | 223939 |
| EE | LS-036-24 | 9/6/24 | 1135 | 1172 | 1059 | 947 | 835 | 1284 | 1396 | 1508 | 100 | 234903 |
| EE | LS-037-24 | 9/13/24 | 1006 | 1161 | 1043 | 926 | 809 | 1278 | 1395 | 1512 | 100 | 234903 |
| EE | LS-038-24 | 9/19/24 | 1289 | 1163 | 1044 | 924 | 805 | 1282 | 1401 | 1521 | 100 | 234903 |
| EE | LS-039-24 | 9/27/24 | 1296 | 1171 | 1048 | 925 | 802 | 1293 | 1416 | 1539 | 100 | 234903 |

Comments:

**LS-034-24:** One out of twenty points fell outside -2 SD but is within -3 SD. At the P0.05 probability level this is expected to occur by chance alone. EE USA's control limits are very narrow. The %CV is 9.7, which is well within %CV control limit of 30.0. Ongoing laboratory performance is acceptable.

QC/QA by: BCP 100224




There are no EPA test method defined CV percentiles or % CV warning and control limits for EPA 1644. Environment Canada in Report EPS1/RM/46, "Guidance Document on Statistical Methods for Environmental Toxicity Tests", suggests 30% CV as a reasonable degree of variation for SRT test methods when a % CV control limit has not been established. Environment Canada's suggested reasonable degree of variation of 30% CV is being applied to EPA 1644.

| Test # | Test Date | % CV for LC50 | Mean % CV | -1 SD | -2 SD | +1 SD | +2 SD | | % CV Control Limit | SRT Lot # |
|---|---|---|---|---|---|---|---|---|---|---|
| LS-020-24 | 5/17/24 | 6.5 | 7.4 | 6.9 | 6.4 | 7.9 | 8.4 | | 30.0 | 221920 |
| LS-021-24 | 5/23/24 | 6.7 | 7.4 | 6.9 | 6.3 | 7.9 | 8.4 | | 30.0 | 221920 |
| LS-022-24 | 5/30/24 | 6.6 | 7.3 | 6.8 | 6.3 | 7.8 | 8.4 | | 30.0 | 221920 |
| LS-023-24 | 6/6/24 | 7.3 | 7.3 | 6.8 | 6.3 | 7.8 | 8.3 | | 30.0 | 221920 |
| LS-024-24 | 6/14/24 | 7.0 | 7.2 | 6.8 | 6.3 | 7.7 | 8.2 | | 30.0 | 221920 |
| LS-025-24 | 6/20/24 | 7.0 | 7.2 | 6.7 | 6.3 | 7.6 | 8.0 | | 30.0 | 221920 |
| LS-026-24 | 6/28/24 | 7.3 | 7.1 | 6.8 | 6.4 | 7.5 | 7.8 | | 30.0 | 221920 |
| LS-027-24 | 7/5/24 | 7.7 | 7.1 | 6.8 | 6.4 | 7.5 | 7.8 | | 30.0 | 221920 |
| LS-028-24 | 7/11/24 | 8.3 | 7.2 | 6.7 | 6.3 | 7.6 | 8.0 | | 30.0 | 221920 |
| LS-029-24 | 7/18/24 | 8.4 | 7.2 | 6.7 | 6.2 | 7.7 | 8.2 | | 30.0 | 221920 |
| LS-030-24 | 7/25/24 | 8.4 | 7.3 | 6.7 | 6.1 | 7.9 | 8.4 | | 30.0 | 223939 |
| LS-031-24 | 8/1/24 | 8.7 | 7.4 | 6.7 | 6.1 | 8.0 | 8.7 | | 30.0 | 223939 |
| LS-032-24 | 8/8/24 | 8.5 | 7.4 | 6.7 | 6.0 | 8.1 | 8.8 | | 30.0 | 223939 |
| LS-033-24 | 8/15/2024 | 8.9 | 7.5 | 6.7 | 6.0 | 8.3 | 9.0 | | 30.0 | 223939 |
| LS-034-24 | 8/23/2024 | 9.7 | 7.6 | 6.7 | 5.8 | 8.5 | 9.5 | | 30.0 | 223939 |
| LS-035-24 | 8/30/2024 | 9.5 | 7.7 | 6.7 | 5.7 | 8.7 | 9.7 | | 30.0 | 223939 |
| LS-036-24 | 9/6/2024 | 9.6 | 7.8 | 6.8 | 5.7 | 8.9 | 10.0 | | 30.0 | 223939 |
| LS-037-24 | 9/13/2024 | 10.1 | 8.0 | 6.8 | 5.6 | 9.2 | 10.3 | | 30.0 | 223939 |
| LS-038-24 | 9/19/2024 | 10.3 | 8.1 | 6.9 | 5.6 | 9.4 | 10.7 | | 30.0 | 234903 |
| LS-039-24 | 9/27/2024 | 10.5 | 8.3 | 7.0 | 5.8 | 9.6 | 10.9 | | 30.0 | 234903 |

Comments:

QAQC by: BCP 100224

Environmental Enterprises USA, Inc.

# APPENDIX H

**ExxonMobil Production Company**
M8410-500ML (Light)
**EE USA Lab #: L-6392-24**

*Leptocheirus plumulosus* Acute, Static 10-Day Sediment Toxicity Test.
EPA Test Method 1644

Test Concentrations Prepared 08/30/24 Sediment Batch #L-6223-24

Dilution Water Batch #: 20-071-24 Organism Batch #: Lp-140-24

Organisms Counted by: JTL, RV Organisms QC/QA by: JTL

Aeration Rate: 50 ml/min. Feeding: This test was not fed.

Dilution Water:
Salinity: 19.8 Meter ID 10 Temperature: 19.1 Meter ID 7H

**Initial water quality parameters for Laboratory Performance Control (LPC) only:**
**Salinity: 18.5ppt – 21.4ppt; Temp.: 18.5°C – 21.4°C; Dissolved Oxygen: 7.7 – 8.2 mg/L**

**Survival Data (*Leptocheirus plumulosus*)**

| Time | REP | 0 LPC | REP | 108 | REP | 324 | REP | 972 | Initials |
|---|---|---|---|---|---|---|---|---|---|
| 0 HR | A | 20 | A | 20 | A | 20 | A | 20 | 08/31/24 |
| | B | 20 | B | 20 | B | 20 | B | 20 | |
| | C | 20 | C | 20 | C | 20 | C | 20 | |
| 1216 | D | 20 | D | 20 | D | 20 | D | 20 | JTL |
| 96 HR | A | 18 | A | 14 | A | 20 | A | 17 | 09/10/24 |
| | B | 20 | B | 18 | B | 18 | B | 17 | |
| | C | 18 | C | 17 | C | 17 | C | 16 | |
| 1127 | D | 16 | D | 19 | D | 18 | D | 16 | CH |

(Treatment, mg/kg)

LC50 >972 mg/kg, 95% CI N/A to N/A mg/kg,

Statistical Method Summary Statistics

Prep by: BCP
QA/QC by: CH

Data Analysis by: BCP
Raw Data QA/QC by: BCP

**Initial $H_2O$ quality parameters for dilution water only: Salinity: 20ppt +/-1ppt; Temp.: 20°C +/-1°C**
Salinity (EPA Method 120.1): ppt Thermometric (EPA Method 180.1): °C

| Day -1 | Pore Water Measurements | | | |
|---|---|---|---|---|
| 8/30/24 | 108 | 324 | 972 | Meter # |
| Salinity | 20.2 | 20.0 | 20.0 | 1Q |
| pH | 7.7 | 7.7 | 7.7 | 7H |
| Initials | JL | | | |
| Time | 1741 | | | |

***L. plumulosus* Water Quality Data**

| Day 0 | Control Overlying Water Measurements—All Replicates | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 0A | 0B | 0C | 0D | Meter # |
| Salinity | 20.2 | 20.0 | 20.0 | 20.1 | 1Q |
| Temp | 20.1 | 20.1 | 20.1 | 20.3 | 7H |
| pH | 7.7 | 7.8 | 7.8 | 7.8 | 7H |
| DO | 8.4 | 8.2 | 8.2 | 8.2 | 1L |
| Initials | JL | | | | |
| Time | 1339 | | | | |

| Day 0 | Overlying Water Measurements—<br>Treatment mg/kg, Replicate | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 108A | 108B | 108C | 108D | Meter # |
| Salinity | 20.0 | 20.0 | 20.0 | 20.0 | 1Q |
| Temp | 20.1 | 20.1 | 20.0 | 19.9 | 7H |
| pH | 7.8 | 7.8 | 7.8 | 7.8 | 7H |
| DO | 8.2 | 8.2 | 8.2 | 8.2 | 1L |
| Initials | JL | | | | |
| Time | 1150 | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**

| Day 0 | Overlying Water Measurements—Treatment mg/kg, Replicate | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 324A | 324B | 324C | 324D | Meter # |
| Salinity | 20.0 | 20.0 | 19.9 | 19.9 | 1Q |
| Temp | 19.8 | 19.9 | 19.9 | 19.9 | 7H |
| pH | 7.8 | 7.7 | 7.7 | 7.7 | 7H |
| DO | 8.3 | 8.2 | 8.1 | 8.1 | 1L |
| Initials | JL | | | | |
| Time | 1152 | | | | |

| Day 0 | Overlying Water Measurements—Treatment mg/kg, Replicate | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 972A | 972B | 972C | 972D | Meter # |
| Salinity | 20.0 | 20.0 | 20.0 | 19.9 | 1Q |
| Temp | 19.9 | 19.9 | 19.8 | 19.8 | 7H |
| pH | 7.8 | 7.8 | 7.8 | 7.8 | 7H |
| DO | 8.3 | 8.2 | 8.2 | 8.2 | 1L |
| Initials | JL | | | | |
| Time | 1134 | | | | |

| Day 1 | Treatment mg/kg | | | | |
|---|---|---|---|---|---|
| 9/01/24 | Ⓐ 0 | 108 | 324 | 972 | Meter # |
| Salinity | ~~20.7~~ 20.1 | 20.0 | 20.0 | 20.0 | 1Q |
| Temp Ⓐ | ~~20.4~~ 20.0 | 20.1 | 20.1 | 20.1 | 7H |
| pH Ⓐ | ~~7.8~~ 7.8 | 7.8 | 7.8 | 7.8 | 7H |
| DO Ⓐ | ~~7.9~~ 8.0 | 7.9 | 7.9 | 7.9 | 1L |
| Initials | JTL | | | | |
| Time | 0757 | | | | |

Comments: Ⓐ Umr JTL 090324

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**

| Day 2 | Treatment mg/kg | | | | |
|---|---|---|---|---|---|
| 9/02/24 | 0 | 108 | 324 | 972 | Meter # |
| Salinity | 20.2 | 20.2 | 20.0 | 20.0 | 1Q |
| Temp | 20.2 | 20.1 | 20.0 | 20.1 | 7H |
| pH | 7.7 | 7.7 | 7.7 | 7.7 | 7H |
| DO | 8.0 | 8.0 | 8.0 | 8.0 | 1L |
| Initials | TAD | | | | |
| Time | 0805 | | | | |

| Day 3 | Treatment mg/kg | | | | |
|---|---|---|---|---|---|
| 9/03/24 | 0 | 108 | 324 | 972 | Meter # |
| Salinity | 20.3 | 20.1 | 20.1 | 20.0 | 1Q |
| Temp | 20.4 | 20.2 | 20.2 | 20.1 | 7H |
| pH | 7.7 | 7.7 | 7.7 | 7.7 | 7H |
| DO | 8.2 | 8.2 | 8.1 | 8.1 | 1L |
| Initials | BCP | | | | |
| Time | 1130 | | | | |

| Day 4 | Treatment mg/kg | | | | |
|---|---|---|---|---|---|
| 9/04/24 | 0 | 108 | 324 | 972 | Meter # |
| Salinity | 26.2 | 20.1 | 20.1 | 20.1 | 1Q |
| Temp | 20.1 | 20.1 | 20.0 | 20.1 | 7H |
| pH | 7.8 | 7.8 | 7.8 | 7.8 | 7H |
| DO | 8.0 | 8.0 | 7.9 | 7.9 | 1L |
| Initials | BW | | | | |
| Time | 0848 | | | | |

Comments: ______________________________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

***L. plumulosus* Water Quality Data Cont.**

| Day 5 | Treatment mg/kg | | | | |
|---|---|---|---|---|---|
| 9/05/24 | 0 | 108 | 324 | 972 | Meter # |
| Salinity | 20.5 | 20.1 | 20.1 | 20.1 | 1Q |
| Temp | 20.0 | 20.1 | 20.0 | 20.1 | 7H |
| pH | 8.1 | 7.9 | 7.9 | 7.9 | 7H |
| DO | 8.1 | 8.0 | 8.0 | 8.0 | 1L |
| Initials | TAD | | | | |
| Time | 0907 | | | | |

| Day 6 | Treatment mg/kg | | | | |
|---|---|---|---|---|---|
| 9/06/24 | 0 | 108 | 324 | 972 | Meter # |
| Salinity | 20.3 | 20.2 | 20.1 | 20.1 | 1Q |
| Temp | 20.1 | 20.1 | 20.0 | 20.0 | 7H |
| pH | 7.9 | 7.9 | 7.9 | 7.9 | 7H |
| DO | 7.9 | 8.0 | 7.9 | 7.9 | 1L |
| Initials | GW | | | | |
| Time | 0859 | | | | |

| Day 7 | Treatment mg/kg | | | | |
|---|---|---|---|---|---|
| 9/07/24 | 0 | 108 | 324 | 972 | Meter # |
| Salinity | 20.4 | 20.2 | 20.1 | 20.2 | 1Q |
| Temp | 20.1 | 20.1 | 20.0 | 20.0 | 7H |
| pH | 7.9 | 8.0 | 8.0 | 8.0 | 7H |
| DO | 8.0 | 8.1 | 8.0 | 8.0 | 1L |
| Initials | GW | | | | |
| Time | 0747 | | | | |

Comments: ______

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**

| Day 8 | Treatment mg/kg | | | | |
|---|---|---|---|---|---|
| 9/08/24 | 0 | 108 | 324 | 972 | Meter # |
| Salinity | 20.4 | 20.2 | 20.1 | 20.2 | 1Q |
| Temp | 20.1 | 20.1 | 20.0 | 19.9 | 7H |
| pH | 8.0 | 8.1 | 8.1 | 8.1 | 7H |
| DO | 8.1 | 8.1 | 8.0 | 8.1 | 1L |
| Initials | GW | | | | |
| Time | 0746 | | | | |

| Day 9 | Treatment mg/kg | | | | |
|---|---|---|---|---|---|
| 9/09/24 | 0 | 108 | 324 | 972 | Meter # |
| Salinity | 20.3 | 20.4 | 20.2 | 20.2 | 1Q |
| Temp | 20.4 | 20.3 | 20.3 | 20.2 | 7H |
| pH | 8.1 | 8.2 | 8.2 | 8.2 | 7H |
| DO | 8.1 | 8.1 | 8.0 | 8.0 | 1L |
| Initials | GW | | | | |
| Time | 0914 | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Control Overlying Water Measurements—All Replicates | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 0A | 0B | 0C | 0D | Meter # |
| Salinity | 20.~~8~~5 Ⓐ | 20.3 | 20.4 | 20.4 | 1Q |
| Temp | 20.1 | 20.1 | 20.1 | 20.2 | 7H |
| pH | ~~7.7~~ 8.0 Ⓐ | 8.1 | 8.1 | 8.1 | 7H |
| DO | 8.2 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | TAD | | | | |
| Time | 0857 | | | | |

| Day 10 | Overlying Water Measurements—Treatment mg/kg, Replicate | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 108A | 108B | 108C | 108D | Meter # |
| Salinity | 20.5 | 20.3 | 20.2 | 20.3 | 1Q |
| Temp | 20.2 | 20.1 | 19.9 | 19.9 | 7H |
| pH | 8.1 | 8.2 | 8.2 | 8.1 | 7H |
| DO | 8.0 | 8.0 | 8.1 | 8.1 | 1L |
| Initials | TAD | | | | |
| Time | 1001 | | | | |

| Day 10 | Overlying Water Measurements—Treatment mg/kg, Replicate | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 324A | 324B | 324C | 324D | Meter # |
| Salinity | 20.3 | 20.2 | 20.3 | 20.3 | 1Q |
| Temp | 20.6 | 20.6 | 19.9 | 19.9 | 7H |
| pH | 8.1 | 8.2 | 8.2 | 8.2 | 7H |
| DO | 8.2 | 8.6 | 8.2 | 8.2 | 1L |
| Initials | TAD | | | | |
| Time | 1004 | | | | |

Comments: Ⓐ error TAD 091024

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**
**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Overlying Water Measurements—Treatment mg/kg, Replicate | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 972A | 972B | 972C | 972D | Meter # |
| Salinity | 20.3 | 20.2 | 20.2 | 20.3 | 1Q |
| Temp | 20.1 | 19.9 | 19.9 | 19.8 | 7H |
| pH | 8.2 | 8.3 | 8.2 | 8.2 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | TAD | | | | |
| Time | 1006 | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

## NEWFIELD NC NATURAL SEDIMENT (L-6223-24)

### NEWFIELD NCNS SEDIMENT

| | NS Wet Weight g | NS Dry + Pan Weight g | Initial Pan Weight g | NS Dry Weight g | | Weight of 25 ml NS g |
|---|---|---|---|---|---|---|
| 1 | 30.04 | 12.97 | 0.90 | 12.07 | 1 | 37.76 |
| 2 | 30.03 | 12.93 | 0.96 | 11.97 | 2 | 37.80 |
| 3 | 30.03 | 12.97 | 0.97 | 12.00 | 3 | 38.40 |

### WET TO DRY RATIO (W2DR)

(Wet NS wt 1/Dry NS wt 1) + (Wet NS wt 2/Dry NS wt 2) + (Wet NS wt 3/ Dry NS wt 3) / 3 =

2.50 **NCNS Water Content = 60.0 %**

### WET NCNS DENSITY (WNSD)

(Wet NS wt 1/Wet NS vol. + Wet NS wt 2/Wet NS vol + Wet NS wt 3/Wet NS vol.) / 3 =

1.52 g/ml

### EXPOSURE CONCENTRATION CALCULATIONS

WET NS NEEDED

WNSD X VOL. OF NS REQUIRED = WT. NS REQUIRED/CONC.

1.5200 X 600 = 912.0 g WET NS/CONC.

DRY NS NEEDED

(WET NS PER CONC./W2DR)X(1kg/1000g)-DRY WT. NS/CONC.

600 ml 0.3648 kg = 364.8 g

**ExxonMobil Production Company**
**M8410-500ML (Light)**
**L-6392-24**
**Sample ID Double Check:** BCP

1) Prepare 600 ml at 0 mg/kg and 900 ml at 972 ml. 2)
prepare lower dilutions with portio of 972 mg/kg and portion of clean NC.

DESIRED CONC. IN mg/kg X DRY WT. NS IN kg. = TOXICANT REQUIRED IN mg.

| Conc. mg/kg | kg | Calculated g | Actual +/- 0.01 g | Initial | Volume ml | Wet Wt. g | Actual +/- 0.1 g | Mixing Tech. Initials |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.3648 | 0.0000 | 0.00 | CH | 600 | 912.0 | 912.0 | JL |
| 972 | 0.5472 | 0.5319 | 0.53 | CH | 900 | 1368.0 | 1368.0 | JL |

| | ml 972 | g 972 | Actual +/- 0.01 g | Initial | ml Clean NCNS | g Clean NCNS | Actual +/- 0.1 g | Mixing Tech. Initials |
|---|---|---|---|---|---|---|---|---|
| 972 | /// | /// | /// | /// | 900.0 | /// | /// | /// |
| 324 | 200.0 | 304.0 | 304.0 | CH | 400.0 | 608.0 | 608.00 | RV |
| 108 | 66.7 | 101.4 | 101.40 | CH | 533.3 | 810.6 | 810.60 | RV |
| /// | /// | /// | /// | /// | /// | /// | /// | /// |
| /// | /// | /// | /// | /// | /// | /// | /// | /// |
| 0 | 0.0 | 0.0 | /// | /// | /// | /// | /// | /// |

Scale ID: 45 Scale ID: 45

Prepared By: BCP 8/30/24 8/30/2024 18:17

Check By: CH 8/30/24



Raw Data QC/QA: BCP

L-6223-24

POSTED 071824 CH

# Chain of Custody Record

Environmental Enterprises USA, Inc.
58485 Pearl Acres Rd, Suite D
Slidell, LA 70461
Att: David Daniel

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

| | | | |
|---|---|---|---|
| **Client Contact** | Project Manager: Eric Litman | Site Contact: Natalia Barragan | Date: 6/20/2024 |
| NewFields Environmental | Email: elitman@newfields.com | Lab Contact: David Daniel | Carrier: FedEx |
| 300 Ledgewood Pl, Suite 205 | Tel/Fax: | | |
| Rockland, MA 02370 | Analysis Turnaround Time: ☐ CALENDAR DAYS ☐ WORKING DAYS | | |
| 781-424-5731 | TAT if different from Below ____ | | |
| Project Name: Newtown Creek | ☐ 2 weeks | | |
| Site: | ☐ 1 week | | |
| P O # | ☐ 2 days | | |
| | ☐ 1 day | | |

COC No: 1
1 of 1 COCs
TALS Project #:
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

| Sample Identification | Sample Date | Sample Time | Sample Type (C=Comp, G=Grab) | Matrix | # of Cont. | Filtered Sample (Y / N) | Perform MS / MSD (Y / N) | Contact NewFields regarding analysi | Sample Specific Notes: |
|---|---|---|---|---|---|---|---|---|---|
| NC010_0-15_Bucket 4 5.8°C (A) | 6/20/24 | 10:55 | C | SED. | 1 | | | X | SR-22524-24-N01-LI |
| NC010_0-15_Bucket 5 5.8°C (A) | 6/20/24 | 11:16 | C | SED. | 1 | | | X | |
| NC010_0-15_Bucket 6 9.8°C (A) | 6/20/24 | 11:45 | C | SED. | 1 | | | X | |
| NC010_0-15_Bucket 7 9.8°C (A) | 6/20/24 | 11:53 | C | SED. | 1 | | | X | |
| NC010_0-15_Bucket 8 7.8°C (A) | 6/20/24 | 12:10 | C | SED. | 1 | | | X | |

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments:
FedEx #S 70024234 3790, 3804, 3815

| | | | | | |
|---|---|---|---|---|---|
| Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | | Cooler Temp. (°C): Obs'd: ____ Corr'd: ____ | | Therm ID No.: ____ |
| Relinquished by: [signature] | Company: Roux | Date/Time: 6/20/24 15:00 | Received by: FedEx | Company: | Date/Time: |
| Relinquished by: FedEx | Company: | Date/Time: | Received by: Stacy Haley | Company: EEUSA | Date/Time: 6-21-24 0928 |
| Relinquished by: Stacy Haley | Company: EEUSA | Date/Time: 6-21-24 0930 | Received in Laboratory by: | Company: | Date/Time: |

(A) all temps taken with A2
SH 6-21-24 0928

# ENVIRONMENTAL ENTERPRISES USA, INC.
# SAMPLE RECEIPT / ACCEPTANCE (SRA) FORM

CLIENT: NewFields Environmental KIT NO. theirs x3
DATE RECEIVED: 6-21-24 CL NO. 019 LAB NO. L-6223-24
LOCATION: NC010

**SAMPLE RECEIPT:**

1. Sample Kit Supplied by: EE USA....., Client...✓
   Ice Chest...✓, Cardboard Box....., Bucket....., Other...... How many containers in kit? 2, 2, 1
2. Ice chest received... Circle one; *delivered by Hot Shot, FEDEX, UPS, Client, etc. mark NA.
   *NA or SB: Fridge, Ice & $H_2O$, Dry, $H_2O$, Ice Packs, Other
   At EE USA: Ice & $H_2O$, Dry, $H_2O$, Ice packs (Frozen? Yes....or No....), Other......
   If Ice & $H_2O$ received... How? Loose, Bagged, Bottled
3. Sample container(s) in good condition (sealed & unbroken)? YES...✓ NO......
4. Does sample container have a label(s)? YES...✓ NO......
   If yes, mark all that are incomplete and applicable.
   a) Date & time collected.......... ____ b) Location .......... ____
   c) Collected by .......... ____ d) Well number .......... ____
   e) OCSG.......... ____
5. Chain-of-Custody form (COC) filled out completely? YES...... NO...✓
   If not, mark all that apply.
   a) No COC.......... ____ f) Date & time collected.......... ____
   b) Collected by .......... ____ g) Received by.......... ✓
   c) Relinquished by.......... ✓ h) Date and/or time of transfer... ✓
   d) Location.......... ____ i) Waste type.......... ____
   e) Company name.......... ✓
6. Custody seal(s) received with this sample kit? YES..... NO...✓ Were custody seals used? YES..... NO.....
   And if used, were they intact? YES.....NO..... Were custody seals filled out? YES..... NO.....

**COMMENTS:**

Information recorded by: SA Date 6/21/24

**SAMPLE ACCEPTANCE:** TOX: EFF____ CTS/F____ PW____ TCW____ Product____
O&G: PW____ WF/TCW____ Other____
DF: WBM____ SMB____ NP____ GC/MS____ Other ✓

7. Was each sample container appropriate (EPA Protocol)? YES...✓ NO......
   Plastic..✓.. Glass...... Number of samples for location?........5.........
8. Does the recorded information on the COC and label agree? YES...... NO......
   Client Sample ID, Collection location, date, & time. Collected by.
9. Was sufficient amount of each sample received? YES...... NO......
   Container size Ⓐ ~~4~~ 3 gal x5, Estimated Volume Ⓐ ~~4~~ 3 gal x5......, Head space ......0...... (mls or liters)
10. Was each sample received within the proper holding time? YES...✓ NO......
11. Was each sample received at the proper temperature? (See COC for temp) YES...✓ NO......

**Oil & Grease Lab Only:**

12. Sample verified for proper acid preservation & temp within 30 minutes of sample receipt? YES........ NO......
13. Is the initial pH <2 su? YES........ NO......
    If no, how many mls of 6NHCL was added to make pH <2 su? mls.........SL#..........

**COMMENTS:** Ⓐ Error BCP 071724

Information recorded by: BCP Date 7/16/24

CL=certified lot number,NA=not applicable,SB=shorebase,EFF=effluent,CTS/F=chemically treated seawater/freshwater,PW=produced water,TCW=total completion workover,WF=well fluid,WBM=water based mud,SBM=synthetic based mud,NP=non-protocol

# ExxonMobil Production Company
M8410-500ML (Light)
**EE USA Lab #: L-6390-24**

*Leptocheirus plumulosus* Acute, Static 10-Day Sediment Toxicity Test.
EPA Test Method 1644

Test Concentrations Prepared 08/30/24 Sediment Batch #NS004

Dilution Water Batch #: 20-071-24 Organism Batch #: Lp-140-24

Organisms Counted by: RV, JTL Organisms QC/QA by: JTL

Aeration Rate: 108 ml/min. Feeding: This test was not fed.

Dilution Water:
Salinity: 19.8 Meter ID 10 Temperature: 19.1 Meter ID 7H

**Initial $H_2O$ quality parameters for dilution water only: Salinity: 20ppt +/-1ppt; Temp.: 20°C +/-1°C**
Salinity (EPA Method 120.1): ppt Thermometric (EPA Method 180.1): °C

**Survival Data (*Leptocheirus plumulosus*)**

**Treatment, mg/kg**

| Time | REP | 0 LPC | REP | 12 | REP | 36 | REP | 108 | REP | 324 | REP | 972 | Initials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 HR | 1 | 20 | 1 | 20 | 1 | 20 | 1 | 20 | 1 | 20 | 1 | 20 | 8/31/24 |
| | 2 | 20 | 2 | 20 | 2 | 20 | 2 | 20 | 2 | 20 | 2 | 20 | |
| | 3 | 20 | 3 | 20 | 3 | 20 | 3 | 20 | 3 | 20 | 3 | 20 | |
| 1335 | 4 | 20 | 4 | 20 | 4 | 20 | 4 | 20 | 4 | 20 | 4 | 20 | JTL |
| 10 Day | 1 | 19 | 1 | 19 | 1 | 19 | 1 | 20 | 1 | 20 | 1 | 16 | 9/10/24 |
| | 2 | 20 | 2 | 19 | 2 | 14 | 2 | 20 | 2 | 18 | 2 | 19 | |
| | 3 | 20 | 3 | 20 | 3 | 19 | 3 | 20 | 3 | 19 | 3 | 18 | |
| 1438 | 4 | 18 | 4 | 19 | 4 | 17 | 4 | 16 | 4 | 18 | 4 | 20 | BCP |

10-Day LC50 >972 mg/kg, 95% CI N/A to N/A mg/kg,

Statistical Method Summary Statistics

Prep by: BCP

QA/QC by: CH

Data Analysis by: BCP

Raw Data QA/QC by: BCP

## *L. plumulosus* Water Quality Data

**Initial $H_2O$ quality parameters for dilution water only: Salinity: 20ppt +/-1ppt; Temp.: 20°C +/-1°C**
Salinity (EPA Method 120.1): ppt Thermometric (EPA Method 180.1): °C

| Day -1 | Pore Water Measurements | | | | | | |
|---|---|---|---|---|---|---|---|
| 8/30/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 20.2 | 20.2 | 20.2 | 20.0 | 19.9 | 19.8 | 1Q |
| pH | 7.7 | 7.7 | 7.7 | 7.8 | 7.8 | 7.8 | 7H |
| Initials | JL | | | | | | |
| Time | 1758 | | | | | | |

| Day 0 | Control Overlying Water Measurements — **0 mg/kg** | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 0A | 0B | 0C | 0D | Meter # |
| Salinity | 19.2 | 19.0 | 19.0 | 19.1 | 1Q |
| Temp | 19.7 | 19.7 | 19.7 | 19.6 | 7H |
| pH | 7.6 | 7.6 | 7.6 | 7.5 | 7H |
| DO | 8.4 | 8.3 | 8.2 | 8.2 | 1L |
| Initials | JL | | | | |
| Time | 1226 | | | | |

| Day 0 | Overlying Water Measurements – **12 mg/kg** | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 12A | 12B | 12C | 12D | Meter # |
| Salinity | 19.2 | 19.0 | 19.1 | 19.0 | 1Q |
| Temp | 19.6 | 19.5 | 19.5 | 19.6 | 7H |
| pH | 7.6 | 7.6 | 7.6 | 7.5 | 7H |
| DO | 8.3 | 8.2 | 8.2 | 8.1 | 1L |
| Initials | JL | | | | |
| Time | 1228 | | | | |

Comments: ______________________________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

***L. plumulosus* Water Quality Data Cont.**

| Day 0 | Overlying Water Measurements — **36 mg/kg** | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 36A | 36B | 36C | 36D | Meter # |
| Salinity | 19.0 | 19.2 | 19.1 | 19.1 | 1Q |
| Temp | 19.6 | 19.5 | 19.4 | 19.5 | 7H |
| pH | 7.6 | 7.5 | 7.5 | 7.5 | 7H |
| DO | 8.2 | 8.1 | 8.1 | 8.0 | 1L |
| Initials | JL | | | | |
| Time | 1230 | | | | |

| Day 0 | Overlying Water Measurements — **108 mg/kg** | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 108A | 108B | 108C | 108D | Meter # |
| Salinity | 19.1 | 19.0 | 19.2 | 19.2 | 1Q |
| Temp | 19.6 | 19.5 | 19.3 | 19.4 | 7H |
| pH | 7.7 | 7.5 | 7.5 | 7.5 | 7H |
| DO | 8.3 | 8.1 | 8.2 | 7.8 | 1L |
| Initials | JL | | | | |
| Time | 1235 | | | | |

| Day 0 | Overlying Water Measurements — **324 mg/kg** | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 324A | 324B | 324C | 324D | Meter # |
| Salinity | 19.0 | 19.0 | 19.0 | 18.9 | 1Q |
| Temp | 19.6 | 19.5 | 19.4 | 19.5 | 7H |
| pH | 7.6 | 7.5 | 7.5 | 7.5 | 7H |
| DO | 8.1 | 8.1 | 8.2 | 8.3 | 1L |
| Initials | JL | | | | |
| Time | 1235 | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

## *L. plumulosus* Water Quality Data Cont.

| Day 0 | Overlying Water Measurements — **924 mg/kg** | | | | |
|---|---|---|---|---|---|
| 08/31/24 | 924A | 924B | 924C | 924D | Meter # |
| Salinity | ~~19.9~~ B 18.8 | 18.9 | 18.9 | 19.0 | 1Q |
| Temp | 19.6 | 19.5 | 19.5 | 19.6 | 7H |
| pH | 7.6 | 7.5 | 7.7 | 7.5 | 7H |
| DO | 8.2 | 8.1 | 7.8 | 8.0 | 1L |
| Initials | JL | | | | |
| Time | 1240 | | | | |

| Day 1 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/01/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | A ~~20.1~~ 18.8 | 19.0 | 18.8 | 18.9 | 18.7 | 18.5 | 1Q |
| Temp | B ~~20.0~~ 19.9 | 19.8 | 19.8 | 19.8 | 19.8 | 19.8 | 7H |
| pH | B ~~7.8~~ 7.6 | 7.5 | 7.5 | 7.5 | 7.3 | 7.3 | 7H |
| DO | 8.0 | 8.0 | 7.9 | 7.9 | 7.9 | 8.0 | 1L |
| Initials | STL | | | | | | |
| Time | 0740 | | | | | | |

| Day 2 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/02/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 18.7 | 19.0 | 18.7 | 18.9 | 18.7 | 18.4 | 1Q |
| Temp | 19.9 | 19.9 | 19.8 | 19.7 | 19.8 | 19.8 | 7H |
| pH | 7.4 | 7.4 | 7.3 | 7.3 | 7.2 | 7.2 | 7H |
| DO | 8.1 | 8.0 | 8.0 | 8.0 | 8.0 | 8.2 | 1L |
| Initials | TAD | | | | | | |
| Time | 0812 | | | | | | |

Comments: A error STL 090424 B error JL 091324

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

***L. plumulosus* Water Quality Data Cont.**

| Day 3 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/03/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 18.6 | 19.0 | 18.6 | 18.7 | 18.7 | 18.2 | 1Q |
| Temp | 20.0 | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 | 7H |
| pH | 7.5 | 7.4 | 7.3 | 7.3 | 7.2 | 7.1 | 7H |
| DO | 8.2 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | BCP | | | | | | |
| Time | 1120 | | | | | | |

| Day 4 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/04/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 18.5 | 19.0 | 18.6 | 18.7 | 18.7 | 18.1 | 1Q |
| Temp | 19.9 | 19.8 | 19.8 | 19.8 | 19.8 | 19.8 | 7H |
| pH | 7.3 | 7.3 | 7.2 | 7.2 | 7.1 | 7.1 | 7H |
| DO | 8.0 | 8.0 | 8.0 | 8.0 | 8.1 | 8.0 | 1L |
| Initials | GW | | | | | | |
| Time | 0849 | | | | | | |

| Day 5 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/05/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 18.6 | 19.0 | 18.6 | 18.7 | 18.8 | 18.2 | 1Q |
| Temp | 19.9 | 19.8 | 19.8 | 19.8 | 19.8 | 19.8 | 7H |
| pH | 7.7 | 7.3 | 7.2 | 7.2 | 7.1 | 7.1 | 7H |
| DO | 8.2 | 8.1 | 8.1 | 7.2 | 7.8 | 8.0 | 1L |
| Initials | TAD | | | | | | |
| Time | 0911 | | | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**

| Day 6 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/06/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 18.5 | 19.1 | 18.6 | 18.7 | 18.8 | 18.2 | 1Q |
| Temp | 19.9 | 19.8 | 19.8 | 19.8 | 19.8 | 19.9 | 7H |
| pH | 7.3 | 7.3 | 7.1 | 7.1 | 7.0 | 6.9 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.0 | 8.0 | 8.0 | 1L |
| Initials | GW | | | | | | |
| Time | 0909 | | | | | | |

| Day 7 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/07/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 18.5 | 19.1 | 18.7 | 18.8 | 18.8 | 18.2 | 1Q |
| Temp | 19.8 | 19.8 | 19.7 | 19.7 | 19.7 | 19.7 | 7H |
| pH | 7.3 | 7.3 | 7.1 | 7.1 | 7.0 | 7.0 | 7H |
| DO | 8.1 | 8.1 | 8.0 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | GW | | | | | | |
| Time | 0751 | | | | | | |

| Day 8 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/08/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 18.5 | 19.1 | 18.6 | 18.8 | 18.8 | 18.1 | 1Q |
| Temp | 19.8 | 19.7 | 19.7 | 19.5 | 19.7 | 19.7 | 7H |
| pH (A) | 7.~~6~~3 | 7.3 | 7.1 | 7.0 | 6.9 | 6.8 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | GW | | | | | | |
| Time | 0752 | | | | | | |

Comments: (A) eRROR 0908GW

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

## *L. plumulosus* Water Quality Data Cont.

| Day 9 | Treatment mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/09/24 | 0 | 12 | 36 | 108 | 324 | 972 | Meter # |
| Salinity | 18.6 | 19.1 | 18.8 | 18.8 | 18.9 | 18.2 | 1Q |
| Temp | 20.1 | 20.1 | 20.0 | 20.0 | 19.9 | 20.0 | 7H |
| pH | 7.3 | 7.2 | 7.0 | 6.9 | 6.8 | 6.7 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.1 | 8.2 | 8.1 | 1L |
| Initials | GW | | | | | | |
| Time | 0922 | | | | | | |

**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Control Overlying Water Measurements—All Replicates | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 0A | 0B | 0C | 0D | Meter # |
| Salinity | 18.5 | 18.2 | 18.6 | 18.6 | 1Q |
| Temp | 20.0 | 19.9 | 19.8 | 19.8 | 7H |
| pH | 7.~~5~~0 | 7.0 | 7.0 | 7.0 | 7H |
| DO | 8.1 | 8.1 | 8.1 | 8.1 | 1L |
| Initials | TAD | | | | |
| Time | 0937 | | | | |

| Day 10 | Overlying Water Measurements – **12 mg/kg** | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 12A | 12B | 12C | 12D | Meter # |
| Salinity | 19.2 | 18.6 | 18.6 | 18.6 | 1Q |
| Temp | 19.8 | 19.6 | 19.7 | 19.7 | 7H |
| pH | 6.9 | 6.8 | 6.7 | 6.6 | 7H |
| DO | 8.2 | 8.1 | 8.2 | 8.2 | 1L |
| Initials | TAD | | | | |
| Time | 0941 | | | | |

Comments: ______________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**
**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Overlying Water Measurements — **36 mg/kg** | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 36A | 36B | 36C | 36D | Meter # |
| Salinity | 18.8 | 19.0 | 18.5 | 18.9 | 1Q |
| Temp | 19.8 | 19.6 | 19.7 | 19.8 | 7H |
| pH | 6.6 | 6.5 | 6.5 | 6.5 | 7H |
| DO | 8.3 | 8.2 | 8.1 | 8.2 | 1L |
| Initials | TAD | | | | |
| Time | 0944 | | | | |

| Day 10 | Overlying Water Measurements — **108 mg/kg** | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 108A | 108B | 108C | 108D | Meter # |
| Salinity | 18.8 | 18.8 | 18.9 | 18.9 | 1Q |
| Temp | 19.8 | 19.7 | 19.5 | 19.5 | 7H |
| pH | 6.5 | 6.5 | 6.5 | 6.5 | 7H |
| DO | 8.2 | 8.2 | 8.2 | 8.2 | 1L |
| Initials | TAD | | | | |
| Time | 0947 | | | | |

| Day 10 | Overlying Water Measurements — **324 mg/kg** | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 324A | 324B | 324C | 324D | Meter # |
| Salinity | 18.9 | 18.8 | 18.9 | 19.0 | 1Q |
| Temp | 19.9 | 19.7 | 19.5 | 19.4 | 7H |
| pH | 6.6 | 6.5 | 6.5 | 6.3 | 7H |
| DO | 8.3 | 8.2 | 8.3 | 8.3 | 1L |
| Initials | TAD | | | | |
| Time | 0952 | | | | |

Comments: ______________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

**_L. plumulosus_ Water Quality Data Cont.**
**Final $H_2O$ quality for all treatments: Temp.: 20°C +/-1°C**

| Day 10 | Overlying Water Measurements — **924 mg/kg** | | | | |
|---|---|---|---|---|---|
| 09/10/24 | 924A | 924B | 924C | 924D | Meter # |
| Salinity | 18.2 | 18.4 | 18.2 | 18.7 | 1Q |
| Temp | 19.9 | 19.8 | 19.7 | 19.7 | 7H |
| pH | 7.4 | 7.4 | 7.4 | 7.2 | 7H |
| DO | 8.2 | 8.2 | 8.2 | 8.2 | 1L |
| Initials | TAD | | | | |
| Time | 0956 | | | | |

Comments: ______________________________________________

Salinity (EPA Method 120.1): ppt; pH (EPA Method 150.1): su; Dissolved Oxygen, Electrode (EPA Method 360.1): mg/L; Temperature, Thermometric (EPA Method 180.1): °C

# EE NATURAL SEDIMENT (NS004)

## EE NS SEDIMENT

| | NS Wet Weight g | NS Dry + Pan Weight g | Initial Pan Weight g | NS Dry Weight g | | Weight of 25 ml NS g |
|---|---|---|---|---|---|---|
| 1 | 30.03 | 18.14 | 0.96 | 17.18 | 1 | 33.70 |
| 2 | 30.03 | 18.12 | 0.97 | 17.15 | 2 | 34.00 |
| 3 | 30.06 | 18.13 | 0.96 | 17.17 | 3 | 33.05 |

## WET TO DRY RATIO (W2DR)

(Wet NS wt 1/Dry NS wt 1) + (Wet NS wt 2/Dry NS wt 2) + (Wet NS wt 3/ Dry NS wt 3) / 3 =

1.75 **NS Water Content =** **42.9 %**

## WET NS DENSITY (WNSD)

(Wet NS wt 1/Wet NS vol. + Wet NS wt 2/Wet NS vol + Wet NS wt 3/Wet NS vol.) / 3 =

1.34 g/ml

## EXPOSURE CONCENTRATION CALCULATIONS

WET NS NEEDED

WNSD X VOL. OF NS REQUIRED = WT. NS REQUIRED/CONC.

1.3400 X 600 = 804.0 g WET NS/CONC.

DRY NS NEEDED

(WET NS PER CONC./W2DR)X(1kg/1000g)-DRY WT. NS/CONC.

600 ml 0.4594 kg = 459.4 g

**ExxonMobil Production Company**
**M8410-500ML (Light)**
**L-6390-24**
**Sample ID Double Check:** BCP

1) Prepare 600 ml at 0 mg/kg and 900 ml at 972 ml.
prepare lower dilutions with portio of 972 mg/kg and portion of clean NC. 2)

DESIRED CONC. IN mg/kg X DRY WT. NS IN kg. = TOXICANT REQUIRED IN mg.

| Conc. mg/kg | kg | Calculated g | Actual +/- 0.01 g | Initial | Volume ml | Wet Wt. g | Actual +/- 0.1 g | Mixing Tech. Initials |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.4594 | 0.0000 | 0.00 | CH | 600 | 804.0 | 804.0 | GW |
| 972 | 0.6891 | 0.6698 | 0.67 | CH | 900 | 1206.0 | 1206.0 | GW |

| | ml 972 | g 972 | Actual +/- 0.01 g | Initial | ml Clean NS004 | g Clean NS004 | Actual +/- 0.1 g | Mixing Tech. Initials |
|---|---|---|---|---|---|---|---|---|
| 972 | /// | /// | /// | /// | 900.0 | /// | /// | /// |
| 324 | 200.0 | 268.0 | 268.0 | CH | 400.0 | 536.0 | 536.00 | CC |
| 108 | 66.7 | 89.8 | 89.80 | CH | 533.3 | 714.2 | 714.20 | RyGW |
| 36 | 22.2 | 29.5 | 29.50 | CH | 577.8 | 774.5 | 774.50 | CC |
| 12 | 7.4 | 9.4 | 9.40 | CH | 592.6 | 794.6 | 794.60 | MLD |
| 0 | 0.0 | 0.0 | /// | /// | /// | /// | /// | /// |

BCP 8/30/24
Prepared By: 8/30/2024 18:12

CH 8/30/23
Check By:



Raw Data QC/QA: BCP

# ENVIRONMENTAL ENTERPRISES USA, INC.

*58485 Pearl Acres Rd., Suite D*
*Slidell, LA 70461*
*(985) 646-2787, Fax # (985) 646-2810*

## CHAIN - OF - CUSTODY RECORD

**Client:** Environmental Enterprises USA Inc.
**Address:** 58485 Pearl Acres Rd
Slidell, LA 70461

**Contact Person:**
**Phone #:**
**Email #:**
**WBS/AFE/PO, etc:**

| Sample Description | Collected Date | Collected Time | Collection Purpose | | No. of Containers* | Size of Container | Lot # |
|---|---|---|---|---|---|---|---|
| natural Sediment | 5/20/24 | 1700 | Sediment for Culturing | | 11 | 5gal Buckets | NS 004 |

| | |
|---|---|
| Collected By: Print: Nicholas Bertrand<br>Company Name: N/A<br>Sign: [signature] | Relinquished By: Print: Nicholas Bertrand 5/20/24<br>Company Name: N/A<br>Sign: [signature] 1708 hr |
| Received By: Print: M Robbins 5/20/24<br>Company Name: EE USA<br>Sign: [signature] 1731 hr | Relinquished By: Print: ___/___/___<br>Company Name: EE USA<br>Sign: ______ hr |
| Received By: Print: ___/___/___<br>Company Name: EE USA<br>Sign: ______ hr | Relinquished By: Print: ___/___/___<br>Company Name<br>Sign: ______ hr |
| Received By: Print: ___/___/___<br>Company Name<br>Sign: ______ hr | Relinquished By: Print: ___/___/___<br>Company Name<br>Sign: ______ hr |

**EE USA use only!**

*Plastic or Glass container(s).

Tracking #: ________________. Kit #: ________

# ANALYTICAL REPORT

| | |
|---|---|
| Lab Number: | L2456458 |
| Client: | NewFields<br>300 Ledgewood Place<br>Suite 205<br>Rockland, MA 02370 |
| ATTN: | Eric Litman |
| Phone: | (781) 681-5040 |
| Project Name: | EXXONMOBIL SEDIMENT TOX STUDY |
| Project Number: | Not Specified |
| Report Date: | 10/22/24 |



Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0825), DoD (L2474), FL (E87814), IL (200081), IN (C-MA-04), KY (KY98046), LA (85084), ME (MA00030), MD (350), MI (9110), MN (025-999-495), NJ (MA015), NY (11627), NC (685), OR (MA-0262), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #525-23-107-88708A1), USFWS (Permit #A24920).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

| | | | |
|---|---|---|---|
| **Project Name:** | EXXONMOBIL SEDIMENT TOX STUDY | **Lab Number:** | L2456458 |
| **Project Number:** | Not Specified | **Report Date:** | 10/22/24 |

| Alpha Sample ID | Client ID | Matrix | Sample Location | Collection Date/Time | Receive Date |
|---|---|---|---|---|---|
| L2456458-01 | L-6470-24,L-6471-24 (0 MG/KG) | SEDIMENT | Not Specified | 09/26/24 13:38 | 10/01/24 |
| L2456458-02 | L-6470-24 (250 MG/KG) | SEDIMENT | Not Specified | 09/26/24 14:02 | 10/01/24 |
| L2456458-03 | L-6470-24 (500 MG/KG) | SEDIMENT | Not Specified | 09/26/24 14:03 | 10/01/24 |
| L2456458-04 | L-6470-24 (1000 MG/KG) | SEDIMENT | Not Specified | 09/26/24 14:04 | 10/01/24 |
| L2456458-05 | L-6470-24 (2000 MG/KG) | SEDIMENT | Not Specified | 09/26/24 14:16 | 10/01/24 |
| L2456458-06 | L-6470-24 (4000 MG/KG) | SEDIMENT | Not Specified | 09/26/24 14:17 | 10/01/24 |
| L2456458-07 | L-6471-24 (250 MG/KG) | SEDIMENT | Not Specified | 09/26/24 13:39 | 10/01/24 |
| L2456458-08 | L-6471-24 (500 MG/KG) | SEDIMENT | Not Specified | 09/26/24 13:40 | 10/01/24 |
| L2456458-09 | L-6471-24 (1000 MG/KG) | SEDIMENT | Not Specified | 09/26/24 13:42 | 10/01/24 |
| L2456458-10 | L-6471-24 (2000 MG/KG) | SEDIMENT | Not Specified | 09/26/24 13:48 | 10/01/24 |
| L2456458-11 | L-6471-24 (4000 MG/KG) | SEDIMENT | Not Specified | 09/26/24 13:54 | 10/01/24 |
| L2456458-12 | L-6472-24,L-6473-24 (0 MG/KG) | SEDIMENT | Not Specified | 09/26/24 09:04 | 10/01/24 |
| L2456458-13 | L-6472-24 (250 MG/KG) | SEDIMENT | Not Specified | 09/26/24 09:44 | 10/01/24 |
| L2456458-14 | L-6472-24 (500 MG/KG) | SEDIMENT | Not Specified | 09/26/24 09:55 | 10/01/24 |
| L2456458-15 | L-6472-24 (1000 MG/KG) | SEDIMENT | Not Specified | 09/26/24 09:57 | 10/01/24 |
| L2456458-16 | L-6472-24 (2000 MG/KG) | SEDIMENT | Not Specified | 09/26/24 10:02 | 10/01/24 |
| L2456458-17 | L-6472-24 (4000 MG/KG) | SEDIMENT | Not Specified | 09/26/24 10:06 | 10/01/24 |
| L2456458-18 | L-6473-24 (250 MG/KG) | SEDIMENT | Not Specified | 09/26/24 09:10 | 10/01/24 |
| L2456458-19 | L-6473-24 (500 MG/KG) | SEDIMENT | Not Specified | 09/26/24 09:22 | 10/01/24 |
| L2456458-20 | L-6473-24 (1000 MG/KG) | SEDIMENT | Not Specified | 09/26/24 09:30 | 10/01/24 |
| L2456458-21 | L-6473-24 (2000 MG/KG) | SEDIMENT | Not Specified | 09/26/24 09:35 | 10/01/24 |
| L2456458-22 | L-6473-24 (4000 MG/KG) | SEDIMENT | Not Specified | 09/26/24 09:39 | 10/01/24 |

## Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments and solids are reported on a dry weight basis unless otherwise noted. Tissues are reported "as received" or on a wet weight basis, unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

**Case Narrative (continued)**

Report Submission

October 22, 2024: This is a preliminary report pendng completion of the alkylated PAH results.

October 17, 2024: This is a preliminary report pending completion of the TPH results.

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

L2456458-01: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 13:38. At the client's request, the collection date/time is reported as 26-SEP-24 13:38.

L2456458-02: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 14:02. At the client's request, the collection date/time is reported as 26-SEP-24 14:02.

L2456458-03: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 14:03. At the client's request, the collection date/time is reported as 26-SEP-24 14:03.

L2456458-04: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 14:04. At the client's request, the collection date/time is reported as 26-SEP-24 14:04.

L2456458-05: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 14:16. At the client's request, the collection date/time is reported as 26-SEP-24 14:16.

L2456458-06: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 14:17. At the client's request, the collection date/time is reported as 26-SEP-24 14:17.

L2456458-07: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the

**Case Narrative (continued)**

collection date/time on the container label was 26-SEP-24 13:39. At the client's request, the collection date/time is reported as 26-SEP-24 13:39.

L2456458-08: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 13:40. At the client's request, the collection date/time is reported as 26-SEP-24 13:40.

L2456458-09: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 13:42. At the client's request, the collection date/time is reported as 26-SEP-24 13:42.

L2456458-10: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 13:48. At the client's request, the collection date/time is reported as 26-SEP-24 13:48.

L2456458-11: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 13:54. At the client's request, the collection date/time is reported as 26-SEP-24 13:54.

L2456458-12: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 09:04. At the client's request, the collection date/time is reported as 26-SEP-24 09:04.

L2456458-13: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 09:44. At the client's request, the collection date/time is reported as 26-SEP-24 09:44.

L2456458-14: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 09:55. At the client's request, the collection date/time is reported as 26-SEP-24 09:55.

L2456458-15: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 09:57. At the client's request, the collection date/time is reported as 26-SEP-24 09:57.

L2456458-16: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the

**Case Narrative (continued)**

collection date/time on the container label was 26-SEP-24 10:02. At the client's request, the collection date/time is reported as 26-SEP-24 10:02.
L2456458-17: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 10:06. At the client's request, the collection date/time is reported as 26-SEP-24 10:06.
L2456458-18: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 09:10. At the client's request, the collection date/time is reported as 26-SEP-24 09:10.
L2456458-19: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 09:22. At the client's request, the collection date/time is reported as 26-SEP-24 09:22.
L2456458-20: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 09:30. At the client's request, the collection date/time is reported as 26-SEP-24 09:30.
L2456458-21: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 09:35. At the client's request, the collection date/time is reported as 26-SEP-24 09:35.
L2456458-22: The collection date and time on the chain of custody was 26-SEP-24 14:00; however, the collection date/time on the container label was 26-SEP-24 09:39. At the client's request, the collection date/time is reported as 26-SEP-24 09:39.

Petroleum Hydrocarbon Quantitation

The WG1982015-1 Method Blank, associated with L2456458-01 through -20, has concentrations below the reporting limits and "J" qualified. Associated field sample results are "B" qualified if the concentrations are less than 10x the concentrations in the blank.
Due to a mis-spike of internal standard into WG1982019-2, associated with L2456458-21 and -22, the surrogate and LCS recoveries failed criteria. The extract was reanalyzed with similar results. The WG1982019-

**Case Narrative (continued)**

3 LCSD recoveries were within the acceptance criteria for all individual compounds, therefore the associated sample results are reported.

Total Organic Carbon

The WG1981471-5 MS recoveries for total organic carbon (rep1) (127%) and total organic carbon (rep2) (134%) performed on L2456458-01, are outside the 75-125% acceptance criteria, possibly due to sample matrix. The associated SRM recoveries are within criteria, indicating the sample batch was in control, and all sample results were accepted.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Susan E O'Neil Susan O' Neil

Title: Technical Director/Representative Date: 10/22/24

# ORGANICS

# PETROLEUM HYDROCARBONS

| | | | |
|---|---|---|---|
| **Project Name:** | EXXONMOBIL SEDIMENT TOX STUDY | **Lab Number:** | L2456458 |
| **Project Number:** | Not Specified | **Report Date:** | 10/22/24 |

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-01 | Date Collected: | 09/26/24 13:38 |
| Client ID: | L-6470-24,L-6471-24 (0 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | Extraction Method: | SOP-MANS-0023 |
| Analytical Method: | 1,8015D(M) | Extraction Date: | 10/10/24 10:45 |
| Analytical Date: | 10/17/24 02:16 | Cleanup Method: | EPA 3611B |
| Analyst: | MJS | Cleanup Date: | 10/15/24 |
| Percent Solids: | 45% | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 58.6 | | mg/kg | 7.30 | 0.067 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 88 | | 50-130 |
| d50-Tetracosane | 94 | | 50-130 |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-02 | Date Collected: | 09/26/24 14:02 |
| Client ID: | L-6470-24 (250 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | Extraction Method: | SOP-MANS-0023 |
| Analytical Method: | 1,8015D(M) | Extraction Date: | 10/10/24 10:45 |
| Analytical Date: | 10/17/24 05:10 | Cleanup Method: | EPA 3611B |
| Analyst: | MJS | Cleanup Date: | 10/15/24 |
| Percent Solids: | 46% | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 242 | | mg/kg | 7.11 | 0.066 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 81 | | 50-130 |
| d50-Tetracosane | 85 | | 50-130 |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-03
Client ID: L-6470-24 (500 MG/KG)
Sample Location: Not Specified
Date Collected: 09/26/24 14:03
Date Received: 10/01/24
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8015D(M)
Analytical Date: 10/17/24 06:37
Analyst: MJS
Percent Solids: 46%

Extraction Method: SOP-MANS-0023
Extraction Date: 10/10/24 10:45
Cleanup Method: EPA 3611B
Cleanup Date: 10/15/24

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 444 | | mg/kg | 7.14 | 0.066 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 83 | | 50-130 |
| d50-Tetracosane | 88 | | 50-130 |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-04 | Date Collected: | 09/26/24 14:04 |
| Client ID: | L-6470-24 (1000 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | Extraction Method: | SOP-MANS-0023 |
| Analytical Method: | 1,8015D(M) | Extraction Date: | 10/10/24 10:45 |
| Analytical Date: | 10/17/24 08:05 | Cleanup Method: | EPA 3611B |
| Analyst: | MJS | Cleanup Date: | 10/15/24 |
| Percent Solids: | 46% | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 805 | | mg/kg | 7.06 | 0.065 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 81 | | 50-130 |
| d50-Tetracosane | 85 | | 50-130 |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY **Lab Number:** L2456458
**Project Number:** Not Specified **Report Date:** 10/22/24

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-05 | Date Collected: | 09/26/24 14:16 |
| Client ID: | L-6470-24 (2000 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | Extraction Method: | SOP-MANS-0023 |
| Analytical Method: | 1,8015D(M) | Extraction Date: | 10/10/24 10:45 |
| Analytical Date: | 10/17/24 09:32 | Cleanup Method: | EPA 3611B |
| Analyst: | MJS | Cleanup Date: | 10/15/24 |
| Percent Solids: | 46% | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 1900 | | mg/kg | 11.9 | 0.110 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 83 | | 50-130 |
| d50-Tetracosane | 88 | | 50-130 |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-06 | Date Collected: | 09/26/24 14:17 |
| Client ID: | L-6470-24 (4000 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | Extraction Method: | SOP-MANS-0023 |
| Analytical Method: | 1,8015D(M) | Extraction Date: | 10/10/24 10:45 |
| Analytical Date: | 10/17/24 10:59 | Cleanup Method: | EPA 3611B |
| Analyst: | MJS | Cleanup Date: | 10/15/24 |
| Percent Solids: | 45% | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 3310 | | mg/kg | 18.2 | 0.168 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 83 | | 50-130 |
| d50-Tetracosane | 88 | | 50-130 |

| | | | |
|---|---|---|---|
| **Project Name:** | EXXONMOBIL SEDIMENT TOX STUDY | **Lab Number:** | L2456458 |
| **Project Number:** | Not Specified | **Report Date:** | 10/22/24 |

**SAMPLE RESULTS**

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-07 | Date Collected: | 09/26/24 13:39 |
| Client ID: | L-6471-24 (250 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | Extraction Method: | SOP-MANS-0023 |
| Analytical Method: | 1,8015D(M) | Extraction Date: | 10/10/24 10:45 |
| Analytical Date: | 10/17/24 12:26 | Cleanup Method: | EPA 3611B |
| Analyst: | MJS | Cleanup Date: | 10/15/24 |
| Percent Solids: | 46% | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 349 | | mg/kg | 6.90 | 0.064 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 83 | | 50-130 |
| d50-Tetracosane | 88 | | 50-130 |

| | | | |
|---|---|---|---|
| **Project Name:** | EXXONMOBIL SEDIMENT TOX STUDY | **Lab Number:** | L2456458 |
| **Project Number:** | Not Specified | **Report Date:** | 10/22/24 |

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-08 | Date Collected: | 09/26/24 13:40 |
| Client ID: | L-6471-24 (500 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | Extraction Method: | SOP-MANS-0023 |
| Analytical Method: | 1,8015D(M) | Extraction Date: | 10/10/24 10:45 |
| Analytical Date: | 10/17/24 18:15 | Cleanup Method: | EPA 3611B |
| Analyst: | MJS | Cleanup Date: | 10/15/24 |
| Percent Solids: | 46% | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 496 | | mg/kg | 7.16 | 0.066 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 89 | | 50-130 |
| d50-Tetracosane | 92 | | 50-130 |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY **Lab Number:** L2456458
**Project Number:** Not Specified **Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-09
Client ID: L-6471-24 (1000 MG/KG)
Sample Location: Not Specified
Date Collected: 09/26/24 13:42
Date Received: 10/01/24
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8015D(M)
Analytical Date: 10/17/24 19:42
Analyst: MJS
Percent Solids: 47%

Extraction Method: SOP-MANS-0023
Extraction Date: 10/10/24 10:45
Cleanup Method: EPA 3611B
Cleanup Date: 10/15/24

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 818 | | mg/kg | 7.06 | 0.065 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 87 | | 50-130 |
| d50-Tetracosane | 88 | | 50-130 |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY **Lab Number:** L2456458
**Project Number:** Not Specified **Report Date:** 10/22/24

**SAMPLE RESULTS**

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-10 | Date Collected: | 09/26/24 13:48 |
| Client ID: | L-6471-24 (2000 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | Extraction Method: | SOP-MANS-0023 |
| Analytical Method: | 1,8015D(M) | Extraction Date: | 10/10/24 10:45 |
| Analytical Date: | 10/17/24 21:10 | Cleanup Method: | EPA 3611B |
| Analyst: | MJS | Cleanup Date: | 10/15/24 |
| Percent Solids: | 47% | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 1490 | | mg/kg | 8.57 | 0.079 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 89 | | 50-130 |
| d50-Tetracosane | 90 | | 50-130 |

| | | | |
|---|---|---|---|
| **Project Name:** | EXXONMOBIL SEDIMENT TOX STUDY | **Lab Number:** | L2456458 |
| **Project Number:** | Not Specified | **Report Date:** | 10/22/24 |

**SAMPLE RESULTS**

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-11 | Date Collected: | 09/26/24 13:54 |
| Client ID: | L-6471-24 (4000 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | Extraction Method: | SOP-MANS-0023 |
| Analytical Method: | 1,8015D(M) | Extraction Date: | 10/10/24 10:45 |
| Analytical Date: | 10/17/24 22:37 | Cleanup Method: | EPA 3611B |
| Analyst: | MJS | Cleanup Date: | 10/15/24 |
| Percent Solids: | 45% | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 3060 | | mg/kg | 48.3 | 0.446 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 100 | | 50-130 |
| d50-Tetracosane | 103 | | 50-130 |

| | | | |
|---|---|---|---|
| **Project Name:** | EXXONMOBIL SEDIMENT TOX STUDY | **Lab Number:** | L2456458 |
| **Project Number:** | Not Specified | **Report Date:** | 10/22/24 |

**SAMPLE RESULTS**

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-12 | Date Collected: | 09/26/24 09:04 |
| Client ID: | L-6472-24,L-6473-24 (0 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | Extraction Method: | SOP-MANS-0023 |
| Analytical Method: | 1,8015D(M) | Extraction Date: | 10/10/24 10:45 |
| Analytical Date: | 10/18/24 00:04 | Cleanup Method: | EPA 3611B |
| Analyst: | MJS | Cleanup Date: | 10/15/24 |
| Percent Solids: | 39% | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 1180 | | mg/kg | 27.6 | 0.255 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 77 | | 50-130 |
| d50-Tetracosane | 82 | | 50-130 |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY **Lab Number:** L2456458
**Project Number:** Not Specified **Report Date:** 10/22/24

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-13 | Date Collected: | 09/26/24 09:44 |
| Client ID: | L-6472-24 (250 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | Extraction Method: | SOP-MANS-0023 |
| Analytical Method: | 1,8015D(M) | Extraction Date: | 10/10/24 10:45 |
| Analytical Date: | 10/18/24 01:31 | Cleanup Method: | EPA 3611B |
| Analyst: | MJS | Cleanup Date: | 10/15/24 |
| Percent Solids: | 40% | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 1360 | | mg/kg | 27.5 | 0.254 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 83 | | 50-130 |
| d50-Tetracosane | 89 | | 50-130 |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY **Lab Number:** L2456458
**Project Number:** Not Specified **Report Date:** 10/22/24

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-14 | Date Collected: | 09/26/24 09:55 |
| Client ID: | L-6472-24 (500 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | Extraction Method: | SOP-MANS-0023 |
| Analytical Method: | 1,8015D(M) | Extraction Date: | 10/10/24 10:45 |
| Analytical Date: | 10/18/24 02:58 | Cleanup Method: | EPA 3611B |
| Analyst: | MJS | Cleanup Date: | 10/15/24 |
| Percent Solids: | 39% | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 1440 | | mg/kg | 28.0 | 0.258 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 74 | | 50-130 |
| d50-Tetracosane | 78 | | 50-130 |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY **Lab Number:** L2456458
**Project Number:** Not Specified **Report Date:** 10/22/24

**SAMPLE RESULTS**

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-15 | Date Collected: | 09/26/24 09:57 |
| Client ID: | L-6472-24 (1000 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | Extraction Method: | SOP-MANS-0023 |
| Analytical Method: | 1,8015D(M) | Extraction Date: | 10/10/24 10:45 |
| Analytical Date: | 10/18/24 04:25 | Cleanup Method: | EPA 3611B |
| Analyst: | MJS | Cleanup Date: | 10/15/24 |
| Percent Solids: | 41% | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 1480 | | mg/kg | 22.7 | 0.210 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 73 | | 50-130 |
| d50-Tetracosane | 77 | | 50-130 |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-16
Client ID: L-6472-24 (2000 MG/KG)
Sample Location: Not Specified
Date Collected: 09/26/24 10:02
Date Received: 10/01/24
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8015D(M)
Analytical Date: 10/18/24 05:52
Analyst: MJS
Percent Solids: 41%

Extraction Method: SOP-MANS-0023
Extraction Date: 10/10/24 10:45
Cleanup Method: EPA 3611B
Cleanup Date: 10/15/24

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 2510 | | mg/kg | 32.0 | 0.296 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 78 | | 50-130 |
| d50-Tetracosane | 82 | | 50-130 |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY **Lab Number:** L2456458
**Project Number:** Not Specified **Report Date:** 10/22/24

**SAMPLE RESULTS**

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-17 | Date Collected: | 09/26/24 10:06 |
| Client ID: | L-6472-24 (4000 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | Extraction Method: | SOP-MANS-0023 |
| Analytical Method: | 1,8015D(M) | Extraction Date: | 10/10/24 10:45 |
| Analytical Date: | 10/18/24 07:20 | Cleanup Method: | EPA 3611B |
| Analyst: | MJS | Cleanup Date: | 10/15/24 |
| Percent Solids: | 40% | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 4410 | | mg/kg | 41.0 | 0.379 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 87 | | 50-130 |
| d50-Tetracosane | 92 | | 50-130 |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY | **Lab Number:** L2456458

**Project Number:** Not Specified | **Report Date:** 10/22/24

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-18 | Date Collected: | 09/26/24 09:10 |
| Client ID: | L-6473-24 (250 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | Extraction Method: | SOP-MANS-0023 |
| Analytical Method: | 1,8015D(M) | Extraction Date: | 10/10/24 10:45 |
| Analytical Date: | 10/18/24 08:47 | Cleanup Method: | EPA 3611B |
| Analyst: | MJS | Cleanup Date: | 10/15/24 |
| Percent Solids: | 41% | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 1440 | | mg/kg | 23.1 | 0.214 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 78 | | 50-130 |
| d50-Tetracosane | 82 | | 50-130 |

| | | | |
|---|---|---|---|
| **Project Name:** | EXXONMOBIL SEDIMENT TOX STUDY | **Lab Number:** | L2456458 |
| **Project Number:** | Not Specified | **Report Date:** | 10/22/24 |

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-19 | Date Collected: | 09/26/24 09:22 |
| Client ID: | L-6473-24 (500 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | Extraction Method: | SOP-MANS-0023 |
| Analytical Method: | 1,8015D(M) | Extraction Date: | 10/10/24 10:45 |
| Analytical Date: | 10/18/24 10:14 | Cleanup Method: | EPA 3611B |
| Analyst: | MJS | Cleanup Date: | 10/15/24 |
| Percent Solids: | 42% | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 1440 | | mg/kg | 25.8 | 0.238 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 75 | | 50-130 |
| d50-Tetracosane | 79 | | 50-130 |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-20 | Date Collected: | 09/26/24 09:30 |
| Client ID: | L-6473-24 (1000 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | Extraction Method: | SOP-MANS-0023 |
| Analytical Method: | 1,8015D(M) | Extraction Date: | 10/10/24 10:45 |
| Analytical Date: | 10/18/24 11:41 | Cleanup Method: | EPA 3611B |
| Analyst: | MJS | Cleanup Date: | 10/15/24 |
| Percent Solids: | 40% | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 2030 | | mg/kg | 32.9 | 0.304 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 85 | | 50-130 |
| d50-Tetracosane | 89 | | 50-130 |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY **Lab Number:** L2456458
**Project Number:** Not Specified **Report Date:** 10/22/24

**SAMPLE RESULTS**

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-21 | Date Collected: | 09/26/24 09:35 |
| Client ID: | L-6473-24 (2000 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | Extraction Method: | SOP-MANS-0023 |
| Analytical Method: | 1,8015D(M) | Extraction Date: | 10/10/24 09:56 |
| Analytical Date: | 10/18/24 23:24 | Cleanup Method: | EPA 3611B |
| Analyst: | MJS | Cleanup Date: | 10/16/24 |
| Percent Solids: | 38% | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 3090 | | mg/kg | 55.2 | 0.510 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 97 | | 50-130 |
| d50-Tetracosane | 102 | | 50-130 |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY **Lab Number:** L2456458
**Project Number:** Not Specified **Report Date:** 10/22/24

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-22 | Date Collected: | 09/26/24 09:39 |
| Client ID: | L-6473-24 (4000 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | Extraction Method: | SOP-MANS-0023 |
| Analytical Method: | 1,8015D(M) | Extraction Date: | 10/10/24 09:56 |
| Analytical Date: | 10/19/24 02:18 | Cleanup Method: | EPA 3611B |
| Analyst: | MJS | Cleanup Date: | 10/16/24 |
| Percent Solids: | 41% | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| **Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab** | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 4700 | | mg/kg | 52.5 | 0.485 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 113 | | 50-130 |
| d50-Tetracosane | 123 | | 50-130 |

| | | | |
|---|---|---|---|
| **Project Name:** | EXXONMOBIL SEDIMENT TOX STUDY | **Lab Number:** | L2456458 |
| **Project Number:** | Not Specified | **Report Date:** | 10/22/24 |

# Method Blank Analysis
## Batch Quality Control

| | | | |
|---|---|---|---|
| Analytical Method: | 1,8015D(M) | Extraction Method: | SOP-MANS-0023 |
| Analytical Date: | 10/16/24 20:27 | Extraction Date: | 10/10/24 10:45 |
| Analyst: | MJS | Cleanup Method: | EPA 3611B |
| | | Cleanup Date: | 10/15/24 |

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab for sample(s): 01-20 Batch: WG1982015-1 | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 2.15 | J | mg/kg | 3.26 | 0.030 |

| Surrogate | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 86 | | 50-130 |
| d50-Tetracosane | 91 | | 50-130 |

| | | | |
|---|---|---|---|
| **Project Name:** | EXXONMOBIL SEDIMENT TOX STUDY | **Lab Number:** | L2456458 |
| **Project Number:** | Not Specified | **Report Date:** | 10/22/24 |

## Method Blank Analysis
### Batch Quality Control

| | | | |
|---|---|---|---|
| Analytical Method: | 1,8015D(M) | Extraction Method: | SOP-MANS-0023 |
| Analytical Date: | 10/18/24 17:35 | Extraction Date: | 10/10/24 09:56 |
| Analyst: | MJS | Cleanup Method: | EPA 3611B |
| | | Cleanup Date: | 10/16/24 |

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab for sample(s): 21-22 Batch: WG1982019-1 | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | ND | | mg/kg | 3.20 | 0.030 |

| Surrogate | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| o-Terphenyl | 86 | | 50-130 |
| d50-Tetracosane | 94 | | 50-130 |

# Lab Control Sample Analysis
## Batch Quality Control

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab Associated sample(s): 01-20 Batch: WG1982015-2 WG1982015-3 | | | | | | | | |
| Nonane (C9) | 59 | | 56 | | 50-130 | 5 | | 30 |
| Decane (C10) | 68 | | 66 | | 50-130 | 3 | | 30 |
| Dodecane (C12) | 74 | | 74 | | 50-130 | 0 | | 30 |
| Tetradecane (C14) | 78 | | 78 | | 50-130 | 0 | | 30 |
| Hexadecane (C16) | 86 | | 88 | | 50-130 | 2 | | 30 |
| Octadecane (C18) | 93 | | 96 | | 50-130 | 3 | | 30 |
| Nonadecane (C19) | 86 | | 88 | | 50-130 | 2 | | 30 |
| Eicosane (C20) | 88 | | 91 | | 50-130 | 3 | | 30 |
| Docosane (C22) | 87 | | 90 | | 50-130 | 3 | | 30 |
| Tetracosane (C24) | 93 | | 96 | | 50-130 | 3 | | 30 |
| Hexacosane (C26) | 88 | | 91 | | 50-130 | 3 | | 30 |
| Octacosane (C28) | 89 | | 92 | | 50-130 | 3 | | 30 |
| Triacontane (C30) | 91 | | 94 | | 50-130 | 3 | | 30 |
| Hexatriacontane (C36) | 90 | | 94 | | 50-130 | 4 | | 30 |

| Surrogate | LCS %Recovery | Qual | LCSD %Recovery | Qual | Acceptance Criteria |
|---|---|---|---|---|---|
| o-Terphenyl | 80 | | 83 | | 50-130 |
| d50-Tetracosane | 85 | | 88 | | 50-130 |

# Lab Control Sample Analysis
## Batch Quality Control

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Project Number:** Not Specified

**Lab Number:** L2456458
**Report Date:** 10/22/24

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab Associated sample(s): 21-22 Batch: WG1982019-2 WG1982019-3 | | | | | | | | |
| Nonane (C9) | **155** | Q | 58 | | 50-130 | **91** | Q | 30 |
| Decane (C10) | **180** | Q | 69 | | 50-130 | **89** | Q | 30 |
| Dodecane (C12) | **188** | Q | 75 | | 50-130 | **86** | Q | 30 |
| Tetradecane (C14) | **212** | Q | 78 | | 50-130 | **92** | Q | 30 |
| Hexadecane (C16) | **228** | Q | 94 | | 50-130 | **83** | Q | 30 |
| Octadecane (C18) | **270** | Q | 100 | | 50-130 | **92** | Q | 30 |
| Nonadecane (C19) | **236** | Q | 94 | | 50-130 | **86** | Q | 30 |
| Eicosane (C20) | **257** | Q | 97 | | 50-130 | **90** | Q | 30 |
| Docosane (C22) | **218** | Q | 96 | | 50-130 | **78** | Q | 30 |
| Tetracosane (C24) | **211** | Q | 104 | | 50-130 | **68** | Q | 30 |
| Hexacosane (C26) | **208** | Q | 99 | | 50-130 | **71** | Q | 30 |
| Octacosane (C28) | **302** | Q | 99 | | 50-130 | **101** | Q | 30 |
| Triacontane (C30) | **249** | Q | 101 | | 50-130 | **85** | Q | 30 |
| Hexatriacontane (C36) | 110 | | 87 | | 50-130 | 23 | | 30 |

| Surrogate | LCS %Recovery | Qual | LCSD %Recovery | Qual | Acceptance Criteria |
|---|---|---|---|---|---|
| o-Terphenyl | **275** | Q | 89 | | 50-130 |
| d50-Tetracosane | **218** | Q | 95 | | 50-130 |



ALPHA ANALYTICAL

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Project Number:** Not Specified
**Lab Number:** L2456458
**Report Date:** 10/22/24

| Parameter | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|
| Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1982015-4 QC Sample: L2456458-01 Client ID: L-6470-24,L-6471-24 (0 MG/KG) | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 58.6 | 49.3 | mg/kg | 17 | | 30 |

| Surrogate | %Recovery | Qualifier | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|---|---|
| o-Terphenyl | 88 | | 84 | | 50-130 |
| d50-Tetracosane | 94 | | 89 | | 50-130 |

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Project Number:** Not Specified

**Lab Number:** L2456458
**Report Date:** 10/22/24

| Parameter | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|
| Total Petroleum Hydrocarbon by GC-FID - Mansfield Lab Associated sample(s): 21-22 QC Batch ID: WG1982019-4 QC Sample: L2456458-21 Client ID: L-6473-24 (2000 MG/KG) | | | | | | |
| Total Petroleum Hydrocarbons (C9-C44) | 3090 | 2900 | mg/kg | 6 | | 30 |

| Surrogate | %Recovery | Qualifier | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|---|---|
| o-Terphenyl | 97 | | 98 | | 50-130 |
| d50-Tetracosane | 102 | | 100 | | 50-130 |

# INORGANICS
# &
# MISCELLANEOUS

| | | | |
|---|---|---|---|
| **Project Name:** | EXXONMOBIL SEDIMENT TOX STUDY | **Lab Number:** | L2456458 |
| **Project Number:** | Not Specified | **Report Date:** | 10/22/24 |

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-01 | Date Collected: | 09/26/24 13:38 |
| Client ID: | L-6470-24,L-6471-24 (0 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total Organic Carbon - Mansfield Lab** | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 1.85 | | % | 0.010 | 0.010 | 1 | - | 10/13/24 11:24 | 1,9060A | SPP |
| Total Organic Carbon (Rep2) | 1.97 | | % | 0.010 | 0.010 | 1 | - | 10/13/24 11:24 | 1,9060A | SPP |
| Total Organic Carbon (Average) | 1.91 | | % | 0.010 | 0.010 | 1 | - | 10/13/24 11:24 | 1,9060A | SPP |
| **General Chemistry - Mansfield Lab** | | | | | | | | | | |
| Solids, Total | 44.9 | | % | 0.100 | 0.100 | 1 | - | 10/10/24 12:28 | 121,2540G | BLR |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-02
Date Collected: 09/26/24 14:02
Client ID: L-6470-24 (250 MG/KG)
Date Received: 10/01/24
Sample Location: Not Specified
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 46.1 | | % | 0.100 | 0.100 | 1 | - | 10/10/24 12:28 | 121,2540G | BLR |

| | | | |
|---|---|---|---|
| **Project Name:** | EXXONMOBIL SEDIMENT TOX STUDY | **Lab Number:** | L2456458 |
| **Project Number:** | Not Specified | **Report Date:** | 10/22/24 |

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-03 | Date Collected: | 09/26/24 14:03 |
| Client ID: | L-6470-24 (500 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 45.9 | | % | 0.100 | 0.100 | 1 | - | 10/10/24 12:28 | 121,2540G | BLR |

| | | | |
|---|---|---|---|
| **Project Name:** | EXXONMOBIL SEDIMENT TOX STUDY | **Lab Number:** | L2456458 |
| **Project Number:** | Not Specified | **Report Date:** | 10/22/24 |

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L2456458-04 | Date Collected: | 09/26/24 14:04 |
| Client ID: | L-6470-24 (1000 MG/KG) | Date Received: | 10/01/24 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Sample Depth: | | | |
| Matrix: | Sediment | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 45.9 | | % | 0.100 | 0.100 | 1 | - | 10/10/24 12:28 | 121,2540G | BLR |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-05
Date Collected: 09/26/24 14:16
Client ID: L-6470-24 (2000 MG/KG)
Date Received: 10/01/24
Sample Location: Not Specified
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 46.0 | | % | 0.100 | 0.100 | 1 | - | 10/08/24 12:38 | 121,2540G | HLD |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY **Lab Number:** L2456458
**Project Number:** Not Specified **Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-06 Date Collected: 09/26/24 14:17
Client ID: L-6470-24 (4000 MG/KG) Date Received: 10/01/24
Sample Location: Not Specified Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 44.9 | | % | 0.100 | 0.100 | 1 | - | 10/10/24 12:28 | 121,2540G | BLR |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-07
Date Collected: 09/26/24 13:39
Client ID: L-6471-24 (250 MG/KG)
Date Received: 10/01/24
Sample Location: Not Specified
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 46.4 | | % | 0.100 | 0.100 | 1 | - | 10/08/24 12:38 | 121,2540G | HLD |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-08
Date Collected: 09/26/24 13:40
Client ID: L-6471-24 (500 MG/KG)
Date Received: 10/01/24
Sample Location: Not Specified
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total Organic Carbon - Mansfield Lab** | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 1.91 | | % | 0.010 | 0.010 | 1 | - | 10/13/24 11:24 | 1,9060A | SPP |
| Total Organic Carbon (Rep2) | 1.94 | | % | 0.010 | 0.010 | 1 | - | 10/13/24 11:24 | 1,9060A | SPP |
| Total Organic Carbon (Average) | 1.93 | | % | 0.010 | 0.010 | 1 | - | 10/13/24 11:24 | 1,9060A | SPP |
| **General Chemistry - Mansfield Lab** | | | | | | | | | | |
| Solids, Total | 45.8 | | % | 0.100 | 0.100 | 1 | - | 10/10/24 12:28 | 121,2540G | BLR |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-09
Client ID: L-6471-24 (1000 MG/KG)
Sample Location: Not Specified
Date Collected: 09/26/24 13:42
Date Received: 10/01/24
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 46.6 | | % | 0.100 | 0.100 | 1 | - | 10/08/24 12:38 | 121,2540G | HLD |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-10
Date Collected: 09/26/24 13:48
Client ID: L-6471-24 (2000 MG/KG)
Date Received: 10/01/24
Sample Location: Not Specified
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 47.0 | | % | 0.100 | 0.100 | 1 | - | 10/10/24 12:28 | 121,2540G | BLR |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-11
Client ID: L-6471-24 (4000 MG/KG)
Sample Location: Not Specified
Date Collected: 09/26/24 13:54
Date Received: 10/01/24
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 44.6 | | % | 0.100 | 0.100 | 1 | - | 10/10/24 12:28 | 121,2540G | BLR |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-12
Date Collected: 09/26/24 09:04
Client ID: L-6472-24,L-6473-24 (0 MG/KG)
Date Received: 10/01/24
Sample Location: Not Specified
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Organic Carbon - Mansfield Lab | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 3.61 | | % | 0.010 | 0.010 | 1 | - | 10/13/24 11:24 | 1,9060A | SPP |
| Total Organic Carbon (Rep2) | 3.51 | | % | 0.010 | 0.010 | 1 | - | 10/13/24 11:24 | 1,9060A | SPP |
| Total Organic Carbon (Average) | 3.56 | | % | 0.010 | 0.010 | 1 | - | 10/13/24 11:24 | 1,9060A | SPP |
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 39.0 | | % | 0.100 | 0.100 | 1 | - | 10/10/24 12:28 | 121,2540G | BLR |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-13
Date Collected: 09/26/24 09:44
Client ID: L-6472-24 (250 MG/KG)
Date Received: 10/01/24
Sample Location: Not Specified
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 39.7 | | % | 0.100 | 0.100 | 1 | - | 10/10/24 12:28 | 121,2540G | BLR |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-14
Date Collected: 09/26/24 09:55
Client ID: L-6472-24 (500 MG/KG)
Date Received: 10/01/24
Sample Location: Not Specified
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 39.0 | | % | 0.100 | 0.100 | 1 | - | 10/10/24 12:28 | 121,2540G | BLR |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY **Lab Number:** L2456458
**Project Number:** Not Specified **Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-15
Client ID: L-6472-24 (1000 MG/KG)
Sample Location: Not Specified

Date Collected: 09/26/24 09:57
Date Received: 10/01/24
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 41.0 | | % | 0.100 | 0.100 | 1 | - | 10/10/24 12:28 | 121,2540G | BLR |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-16
Date Collected: 09/26/24 10:02
Client ID: L-6472-24 (2000 MG/KG)
Date Received: 10/01/24
Sample Location: Not Specified
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| **General Chemistry - Mansfield Lab** | | | | | | | | | | |
| Solids, Total | 41.0 | | % | 0.100 | 0.100 | 1 | - | 10/10/24 12:28 | 121,2540G | BLR |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-17
Date Collected: 09/26/24 10:06
Client ID: L-6472-24 (4000 MG/KG)
Date Received: 10/01/24
Sample Location: Not Specified
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 39.6 | | % | 0.100 | 0.100 | 1 | - | 10/10/24 12:28 | 121,2540G | BLR |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-18
Date Collected: 09/26/24 09:10
Client ID: L-6473-24 (250 MG/KG)
Date Received: 10/01/24
Sample Location: Not Specified
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 40.5 | | % | 0.100 | 0.100 | 1 | - | 10/08/24 12:38 | 121,2540G | HLD |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-19
Date Collected: 09/26/24 09:22
Client ID: L-6473-24 (500 MG/KG)
Date Received: 10/01/24
Sample Location: Not Specified
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total Organic Carbon - Mansfield Lab** | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 3.59 | | % | 0.010 | 0.010 | 1 | - | 10/13/24 11:24 | 1,9060A | SPP |
| Total Organic Carbon (Rep2) | 3.51 | | % | 0.010 | 0.010 | 1 | - | 10/13/24 11:24 | 1,9060A | SPP |
| Total Organic Carbon (Average) | 3.55 | | % | 0.010 | 0.010 | 1 | - | 10/13/24 11:24 | 1,9060A | SPP |
| **General Chemistry - Mansfield Lab** | | | | | | | | | | |
| Solids, Total | 42.0 | | % | 0.100 | 0.100 | 1 | - | 10/10/24 12:28 | 121,2540G | BLR |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-20
Date Collected: 09/26/24 09:30
Client ID: L-6473-24 (1000 MG/KG)
Date Received: 10/01/24
Sample Location: Not Specified
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| **General Chemistry - Mansfield Lab** | | | | | | | | | | |
| Solids, Total | 39.8 | | % | 0.100 | 0.100 | 1 | - | 10/08/24 12:38 | 121,2540G | HLD |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-21
Date Collected: 09/26/24 09:35
Client ID: L-6473-24 (2000 MG/KG)
Date Received: 10/01/24
Sample Location: Not Specified
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Solids, Total | 38.3 | | % | 0.100 | 0.100 | 1 | - | 10/10/24 10:24 | 121,2540G | BLR |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

## SAMPLE RESULTS

Lab ID: L2456458-22
Date Collected: 09/26/24 09:39
Client ID: L-6473-24 (4000 MG/KG)
Date Received: 10/01/24
Sample Location: Not Specified
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total Organic Carbon - Mansfield Lab** | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 3.84 | | % | 0.010 | 0.010 | 1 | - | 10/13/24 11:24 | 1,9060A | SPP |
| Total Organic Carbon (Rep2) | 3.77 | | % | 0.010 | 0.010 | 1 | - | 10/13/24 11:24 | 1,9060A | SPP |
| Total Organic Carbon (Average) | 3.81 | | % | 0.010 | 0.010 | 1 | - | 10/13/24 11:24 | 1,9060A | SPP |
| **General Chemistry - Mansfield Lab** | | | | | | | | | | |
| Solids, Total | 40.9 | | % | 0.100 | 0.100 | 1 | - | 10/10/24 10:24 | 121,2540G | BLR |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY **Lab Number:** L2456458
**Project Number:** Not Specified **Report Date:** 10/22/24

## Method Blank Analysis
### Batch Quality Control

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Organic Carbon - Mansfield Lab for sample(s): 01,08,12,19,22 Batch: WG1981471-1 | | | | | | | | | | |
| Total Organic Carbon (Rep1) | ND | | % | 0.010 | 0.010 | 1 | - | 10/13/24 11:24 | 1,9060A | SPP |
| Total Organic Carbon (Rep2) | ND | | % | 0.010 | 0.010 | 1 | - | 10/13/24 11:24 | 1,9060A | SPP |
| Total Organic Carbon (Average) | ND | | % | 0.010 | 0.010 | 1 | - | 10/13/24 11:24 | 1,9060A | SPP |

# Matrix Spike Analysis
## Batch Quality Control

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Lab Number:** L2456458
**Project Number:** Not Specified
**Report Date:** 10/22/24

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Organic Carbon - Mansfield Lab Associated sample(s): 01,08,12,19,22 QC Batch ID: WG1981471-4 WG1981471-5 QC Sample: L2456458-01 Client ID: L-6470-24,L-6471-24 (0 MG/KG) | | | | | | | | | | | | |
| Total Organic Carbon (Rep1) | 1.85 | 0.866 | 2.84 | 114 | | 3.18 | **127** | Q | 75-125 | 11 | | 25 |
| Total Organic Carbon (Rep2) | 1.97 | 0.984 | 3.04 | 109 | | 3.19 | **134** | Q | 75-125 | 5 | | 25 |

# Lab Duplicate Analysis

***Batch Quality Control***

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Project Number:** Not Specified

***Lab Number:*** L2456458
***Report Date:*** 10/22/24

| Parameter | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|
| Total Organic Carbon - Mansfield Lab Associated sample(s): 01,08,12,19,22 QC Batch ID: WG1981471-3 QC Sample: L2456458-01 Client ID: L-6470-24,L-6471-24 (0 MG/KG) | | | | | | |
| Total Organic Carbon (Rep1) | 1.85 | 1.95 | % | 5 | | 25 |
| Total Organic Carbon (Rep2) | 1.97 | 1.92 | % | 3 | | 25 |
| Total Organic Carbon (Average) | 1.91 | 1.94 | % | 2 | | 25 |
| General Chemistry - Mansfield Lab Associated sample(s): 05,07,09,18,20 QC Batch ID: WG1982036-1 QC Sample: L2400378-64 Client ID: DUP Sample | | | | | | |
| Solids, Total | 81.9 | 81.4 | % | 1 | | 10 |
| General Chemistry - Mansfield Lab Associated sample(s): 21-22 QC Batch ID: WG1982612-1 QC Sample: L2453574-04 Client ID: DUP Sample | | | | | | |
| Solids, Total | 82.8 | 82.8 | % | 0 | | 10 |
| General Chemistry - Mansfield Lab Associated sample(s): 01-04,06,08,10-17,19 QC Batch ID: WG1982651-1 QC Sample: L2457261-12 Client ID: DUP Sample | | | | | | |
| Solids, Total | 16.7 | 18.1 | % | 8 | | 10 |

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY **Lab Number:** L2456458
**Project Number:** Not Specified **Report Date:** 10/22/24

## S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1981471-2

| Parameter | % Recovery | Qual | QC Criteria |
|---|---|---|---|
| Total Organic Carbon (Rep1) | 108 | | 75-125 |
| Total Organic Carbon (Rep2) | 100 | | 75-125 |
| Total Organic Carbon (Average) | 103 | | 75-125 |

## Sample Receipt and Container Information

Were project specific reporting limits specified? YES

### Cooler Information

| Cooler | Custody Seal |
|---|---|
| A | Absent |

### Container Information

| Container ID | Container Type | Cooler | Initial pH | Final pH | Temp deg C | Pres | Seal | Frozen Date/Time | Analysis(*) |
|---|---|---|---|---|---|---|---|---|---|
| L2456458-01A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-TOC-9060-2REPS(28),A2-NFTPH(14),A2-NFALKPAH(14) |
| L2456458-02A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-NFTPH(14) |
| L2456458-03A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-NFTPH(14) |
| L2456458-04A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-NFTPH(14) |
| L2456458-05A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-NFTPH(14) |
| L2456458-06A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-NFTPH(14) |
| L2456458-07A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-NFTPH(14) |
| L2456458-08A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-NFTPH(14),A2-TOC-9060-2REPS(28) |
| L2456458-09A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-NFTPH(14) |
| L2456458-10A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-NFTPH(14) |
| L2456458-11A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-NFTPH(14) |
| L2456458-12A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-TOC-9060-2REPS(28),A2-NFTPH(14),A2-NFALKPAH(14) |
| L2456458-13A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-NFTPH(14) |
| L2456458-14A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-NFTPH(14) |
| L2456458-15A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-NFTPH(14) |
| L2456458-16A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-NFTPH(14) |
| L2456458-17A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-NFTPH(14) |
| L2456458-18A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-NFTPH(14) |
| L2456458-19A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-TOC-9060-2REPS(28),A2-NFTPH(14) |
| L2456458-20A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-NFTPH(14) |
| L2456458-21A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-NFTPH(14) |

*Values in parentheses indicate holding time in days

**Project Name:** EXXONMOBIL SEDIMENT TOX STUDY
**Project Number:** Not Specified

**Lab Number:** L2456458
**Report Date:** 10/22/24

### Container Information

| Container ID | Container Type | Cooler | Initial pH | Final pH | Temp deg C | Pres | Seal | Frozen Date/Time | Analysis(*) |
|---|---|---|---|---|---|---|---|---|---|
| L2456458-22A | Glass 120ml/4oz unpreserved | A | NA | | 3.6 | Y | Absent | | A2-TS(7),A2-NFTPH(14),A2-TOC-9060-2REPS(28) |



*Values in parentheses indicate holding time in days

| | | | |
|---|---|---|---|
| **Project Name:** | EXXONMOBIL SEDIMENT TOX STUDY | **Lab Number:** | L2456458 |
| **Project Number:** | Not Specified | **Report Date:** | 10/22/24 |

## GLOSSARY

***Acronyms***

| | |
|---|---|
| DL | - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) |
| EDL | - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME). |
| EMPC | - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration. |
| EPA | - Environmental Protection Agency. |
| LCS | - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. |
| LCSD | - Laboratory Control Sample Duplicate: Refer to LCS. |
| LFB | - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. |
| LOD | - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) |
| LOQ | - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)<br><br>Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) |
| MDL | - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. |
| MS | - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values. |
| MSD | - Matrix Spike Sample Duplicate: Refer to MS. |
| NA | - Not Applicable. |
| NC | - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit. |
| NDPA/DPA | - N-Nitrosodiphenylamine/Diphenylamine. |
| NI | - Not Ignitable. |
| NP | - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil. |
| NR | - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests. |
| RL | - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable. |
| RPD | - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report. |
| SRM | - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples. |
| STLP | - Semi-dynamic Tank Leaching Procedure per EPA Method 1315. |
| TEF | - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD. |
| TEQ | - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values. |
| TIC | - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations. |

*Report Format: DU Report with 'J' Qualifiers*

***Footnotes***

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

***Terms***

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

***Data Qualifiers***

**A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

**B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

**C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

**D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

**E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

**F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

**G** - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

**H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

**I** - The lower value for the two columns has been reported due to obvious interference.

**J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

***Data Qualifiers***

Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

**M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

**ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

**NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

**P** - The RPD between the results for the two columns exceeds the method-specified criteria.

**Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

**R** - Analytical results are from sample re-analysis.

**RE** - Analytical results are from sample re-extraction.

**S** - Analytical results are from modified screening analysis.

**V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

**Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

## REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

## LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

# Certification Information

**The following analytes are not included in our Primary NELAP Scope of Accreditation:**

**Westborough Facility**
**EPA 624.1:** m/p-xylene, o-xylene, Naphthalene
**EPA 625.1:** alpha-Terpineol
**EPA 8260D:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
**EPA 8270E:** NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol, Azobenzene; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
**SM4500**: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

**Mansfield Facility**
**SM 2540D:** TSS.
**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
**Nonpotable Water: EPA RSK-175 Dissolved Gases**
**Biological Tissue Matrix:** EPA 3050B

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**The following analytes are included in our Massachusetts DEP Scope of Accreditation**

**Westborough Facility:**

***Drinking Water***
**EPA 300.0**: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
**EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
**Microbiology**: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

***Non-Potable Water***
**SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH:** Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
**EPA 624.1**: Volatile Halocarbons & Aromatics,
**EPA 608.3**: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
**EPA 625.1**: SVOC (Acid/Base/Neutral Extractables).
**Microbiology**: **SM9223B-Colilert-QT; Enterolert-QT, EPA 1600, EPA 1603, SM9222D.**

**Mansfield Facility:**

***Drinking Water***
**EPA 200.7:** Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
**EPA 522, EPA 537.1.**

***Non-Potable Water***
**EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
**EPA 200.8:** Al, Sb**,** As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
**EPA 245.1** Hg.
**SM2340B**

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For a complete listing of analytes and methods, please contact your Alpha Project Manager.

 22456458

ENVIRONMENTAL ENTERPRISES USA, INC.
58485 Pearl Acres Rd., Suite D
Slidell, Louisiana 70461
(985) 646-2787

Kit No.

## CHAIN - OF - CUSTODY RECORD

Client: Alpha Analytical
Address: 320 Forbes Blvd, Mansfield, MA 02048
Attn. Susan O'Neil

Contact Person: Eric Litman
Phone#: 781-424-5731
P.O. #
Email: elitman@newfields.com
Project:

Special Handling Request
( ) RUSH
( ) VERBAL
( ) OTHER

| Lab Sample Description | No. of Containers | Analysis Request | EEUSA S/R No. | |
|---|---|---|---|---|
| L-6470-24, L-6471-24 (0 mg/kg) | 1 | | | |
| L-6470-24 (250, 500, 1000, 2000, 4000 ng/kg) | 5 | | | |
| L-6471-24 (250, 500, 1000, 2000, 4000 ng/kg) | 5 | | | |
| L-6472-24, L-6473-24 (0 mg/kg) | 1 | | | |
| L-6471-24 (250, 500, 1000, 2000, 4000 ng/kg) | 5 | | | |
| L-6472-24 (250, 500, 1000, 2000, 4000 ng/kg) | 5 | | | |

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| Collected By: Beau Pere<br>Signature: For [signature] | 9/26/2024 | 14:00 | Relinquished By: Beau Pere<br>Signature: For [signature] | 9/30/2024 | 0900 |
| Received By:<br>Signature: [signature] | 9-30-24 | 0900 | Relinquished By:<br>Signature: [signature] | 9-30-24 | 1600 |
| Received By:<br>Signature: OMH ~~Fedex~~ UPS | | | Relinquished By:<br>Signature: OMH ~~Fedex~~ UPS | | |
| Received By: Olivia Hoyland<br>Signature: [signature] | 10/01/24 | 10:05 | Relinquished By:<br>Signature: | | |
| Received By:<br>Signature: | | | Relinquished By:<br>Signature: | | |


x:/mreesam/chain of custodies/coc-2003.x
9/26/2024 4:07 PM

10/1/24 L2456458

| | Alpha Lab ID | Client/Field ID | Jar Label | Matrix | Date Collected |
|---|---|---|---|---|---|
| -01 | L2456458-01 | L-6470-24,L-6471-24 (0 MG/KG) | NS006 | Sediment | 9/26/2024 14:00 |
| -02 | L2456458-02 | L-6470-24 (250 MG/KG) | NS006 Heavy 250 | Sediment | 9/26/2024 14:00 |
| -03 | L2456458-03 | L-6470-24 (500 MG/KG) | NS006 Heavy 500 | Sediment | 9/26/2024 14:00 |
| -04 | L2456458-04 | L-6470-24 (1000 MG/KG) | NS006 Heavy 1000 | Sediment | 9/26/2024 14:00 |
| -05 | L2456458-05 | L-6470-24 (2000 MG/KG) | NS006 Heavy 2000 | Sediment | 9/26/2024 14:00 |
| -06 | L2456458-06 | L-6470-24 (4000 MG/KG) | NS006 Heavy 4000 | Sediment | 9/26/2024 14:00 |
| -07 | L2456458-07 | L-6471-24 (250 MG/KG) | NS006 Light 250 | Sediment | 9/26/2024 14:00 |
| -08 | L2456458-08 | L-6471-24 (500 MG/KG) | NS006 Light 500 | Sediment | 9/26/2024 14:00 |
| -09 | L2456458-09 | L-6471-24 (1000 MG/KG) | NS006 Light 1000 | Sediment | 9/26/2024 14:00 |
| -10 | L2456458-10 | L-6471-24 (2000 MG/KG) | NS006 Light 2000 | Sediment | 9/26/2024 14:00 |
| -11 | L2456458-11 | L-6471-24 (4000 MG/KG) | NS006 Light 4000 | Sediment | 9/26/2024 14:00 |
| -12 | L2456458-12 | L-6472-24,L-6473-24 (0 MG/KG) | NC010 | Sediment | 9/26/2024 14:00 |
| -13 | L2456458-13 | L-6472-24 (250 MG/KG) | NC010 Heavy 250 | Sediment | 9/26/2024 14:00 |
| -14 | L2456458-14 | L-6472-24 (500 MG/KG) | NC010 Heavy 500 | Sediment | 9/26/2024 14:00 |
| -15 | L2456458-15 | L-6472-24 (1000 MG/KG) | NC010 Heavy 1000 | Sediment | 9/26/2024 14:00 |
| -16 | L2456458-16 | L-6472-24 (2000 MG/KG) | NC010 Heavy 2000 | Sediment | 9/26/2024 14:00 |
| -17 | L2456458-17 | L-6472-24 (4000 MG/KG) | NC010 Heavy 4000 | Sediment | 9/26/2024 14:00 |
| -18 | L2456458-18 | L-6473-24 (250 MG/KG) | NC010 Light 250 | Sediment | 9/26/2024 14:00 |
| -19 | L2456458-19 | L-6473-24 (500 MG/KG) | NC010 Light 500 | Sediment | 9/26/2024 14:00 |
| -20 | L2456458-20 | L-6473-24 (1000 MG/KG) | NC010 Light 1000 | Sediment | 9/26/2024 14:00 |
| -21 | L2456458-21 | L-6473-24 (2000 MG/KG) | NC010 Light 2000 | Sediment | 9/26/2024 14:00 |
| -22 | L2456458-22 | L-6473-24 (4000 MG/KG) | NC010 Light 4000 | Sediment | 9/26/2024 14:00 |

**FROM:** **56 LBS** **1 OF 1**

SHIPPING RECEIVING DWT: 27,14,14
(985) 646-2787 AH
ENVIRONMENTAL ENTERPRISES USA,
58485 PEARL ACRES RD
SLIDELL LA 70461-5400

**MA 024 9-02**

SHIP TO:

ATTN: SUSAN O'NEIL
ALPHA ANALYTICAL, INC.
320 FORBES BLVD
**MANSFIELD MA 02048**

**UPS NEXT DAY AIR** **1**

TRACKING #: 1Z 172 5X3 01 7597 2768

REF 1:sediment from mud lab

BILLING: P/P

WS 27.0.10 HP LaserJet M 39.0A 09/2024

Fold here and place in label pouch

# APPENDIX B

# $C_{19}$ – $C_{36}$ Aliphatics MDL Verification Study

Newtown Creek SFS
November 2024

NewFields Companies, LLC
300 Ledgewood Place, Suite 305
Rockland, MA 02370

November 11, 2024

# Contents



# Tables



# Appendices

# Keywords

Detection Limit (DL): The DL is the lowest concentration that can reliably be distinguished from zero, but it is not quantifiable with acceptable accuracy and precision (EPA, 2006; EPA, 1991).

Method Detection Limit (MDL): The MDL is defined as the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results (US Federal Register, 2017).

Quantitation Limit (QL): The QL, also known as the minimum level or the level of quantitation, is the lowest concentration which can be detected and quantified with a specified degree of accuracy and precision (van Buuren, 2017).

# 1. MDL Verification Study

The Massachusetts Department of Environmental Protection (MADEP) extractable petroleum hydrocarbons (EPH) method has not been formerly validated for sediment analysis, and there is uncertainty regarding the accuracy, precision and sensitivity of this method for use in sediments. This uncertainty prompted ExxonMobil to initiate a method detection limit (MDL) verification study to evaluate the reliability of the MADEP EPH method at concentrations near the Newtown Creek Superfund Site (NTC SFS) $C_{19}$-$C_{36}$ Aliphatics (C19-C36) preliminary remediation goal (PRG) of 200 milligrams per kilogram (mg/kg). This MDL verification study was conducted according to EPA's most recent guidance for determining MDLs, *Definition and Procedure for the Determination of the Method Detection Limit* (US Federal Register, 2017). In the future, the material presented herein will be prepared for submission to a peer-reviewed publication.

The MADEP EPH method allows for the use of discrete *n*-alkane standards to perform initial calibrations and to determine MDLs. However, using single-component standards, like *n*-alkanes, does not accurately reflect the more muted response typically observed with complex mixtures of hydrocarbons, such as C19-C36, and therefore may overstate the instrument's sensitivity. In contrast, this MDL verification study used more representative ranges of hydrocarbons rather than relying on discrete n-alkanes. Certified reference standard oils—specifically mineral oil and lubricating oil—were used as evaluation standards for this study. The MDL verification study used the following certified reference oils:

- Mineral Oil Standard (Sigma Aldrich, catalog #M8410, LOT# MKCR3541)
- Lubricating Oil Standard (AccuStandard, catalog # FU-025-D-40X, LOT #212091320-1)

These certified reference oils were selected as standards for this MDL study because both are largely composed of complex mixtures of aliphatic hydrocarbons (>90% aliphatic), which is precisely the types of hydrocarbons that the method was intended to measure. The use of reference oils as standards better approximates the types of complex hydrocarbon mixtures encountered in NTC SFS sediments. This approach (as opposed to the use of discrete n-alkanes as the spiking material) is required in some jurisdictions in Canada for the determination of fraction-specific total petroleum hydrocarbon (TPH) MDLs (Canadian Council of Ministers of the Environment [CCME], 2001).

Updated MDLs for C19-C36 were established by strictly following the United States Environmental Protection Agency (EPA) guidance for determining laboratory MDLs (US Federal Register, 2017). The MDL verification study was conducted in three phases:

1) Phase I: Detection Limit (DL) Determination
2) Phase II: Sodium Sulfate Sample Matrix MDL Determination
3) Phase III: Matrix Specific MDL Determination

These three phases are described in greater detail below.

## 1.1. Phase I: C19-C36 Detection Limit (DL) Determination

The DL is the lowest concentration that can reliably be distinguished from zero by the gas chromatographic instrument, but it is not quantifiable with acceptable accuracy and precision. The DL is a basic measure of instrument sensitivity and represents the lowest level that an instrument can detect a given compound or series of compounds. Following EPA guidance, this determination is made by evaluating the signal-to-noise ratio (S/N), which is the measure of the response of a compound divided by the instrument's noise (response) when no compounds are being measured. The DL is determined as the lowest concentration that meets the 3-to-1 S/N threshold (EPA, 2006; EPA, 1991).

To determine the DL (3-to-1 S/N), the mineral oil and lubricating oil standards were prepared in two sets of serial dilutions using dichloromethane beginning at 70 mg/kg and decreasing by 5 mg/kg increments to 20 mg/kg. This resulted in the analysis of 11 diluted standards for each reference oil (70 mg/kg, 65 mg/kg, 60 mg/kg, 55 mg/kg, 50 mg/kg, 45 mg/kg, 40 mg/kg, 35 mg/kg, 30 mg/kg, 25 mg/kg, and 20 mg/kg). Based on this analysis the DL for C19-C36 was determined to be 25 mg/kg for mineral oil and 30 mg/kg for lubricating oil. The supporting documentation for the Phase I DL study can be found in Attachment A.

**Table 1: Phase I Detection Limit Summary**

| Phase I: Level of Detection | | Lab Stated | | Level of Detection Determination | | |
|---|---|---|---|---|---|---|
| Analyte | Units | MDL | RL | Test Range | Mineral Oil | Lubricating Oil |
| **C19-C36 Aliphatics** | **mg/kg** | **6.67** | **6.67** | **20 - 70** | **25** | **30** |

## 1.2. Phase II: C19-C36 MDL Determination (sodium sulfate)

The objective of the second phase of the MDL verification study was to perform an MDL determination in a clean sodium sulfate laboratory matrix. This phase aimed to determine the minimum measurable concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results in a clean lab matrix.

The Phase I DL study described in the previous section was used to determine the MDL spiking concentration. The EPA guidance indicates that the MDL spiking level should target a concentration between 2 and 10 times the DL. Considering that the focus of the MDL verification study was to determine the lowest reliable MDL, the MDL spiking concentration was set at 2 times the DL (EPA, 2017). This resulted in an MDL spiking concentration of 50 mg/kg for mineral oil and 60 mg/kg for lubricating oil.

This MDL procedure is designed to estimate the MDL for C19-C36 reported by the study laboratory's EPH methodology. The results of this procedure are dependent on the specific requirements of the MADEP EPH method (MADEP, 2019) and the laboratory's EPH standard operating procedure (SOP). It was essential that all sample preparation steps used by the laboratory to process field samples were also used in preparing and analyzing the MDL study samples.

Sodium sulfate sample matrix MDL samples were prepared according to the following procedure:

- Using sodium sulfate as the sample matrix, eight MDL samples were spiked with mineral oil at 50 mg/kg, and eight MDL samples were spiked with lubricating oil at 60 mg/kg.
- Eight method blank samples (unspiked sodium sulfate) were prepared along with the spiked MDL samples.
- The samples were prepared and analyzed in three separate quality control (QC) batches prepared on three separate calendar days. Preparing the samples in three separate QC batches captures variability arising from the extraction procedure and the bench level chemists processing the samples.
- The MDL study samples were analyzed using three different instruments, with a different instrument used to analyze MDL samples prepared on each preparation day. The use of multiple instruments captures the variability introduced by differences in instrument performance.
- When the MDL sample analysis was complete, the chromatograms were reviewed to ensure that the data in the C19-C36 range exceeded 3:1 S/N. All MDL samples passed this qualitative screening test.

- The MDLs were then determined for both mineral oil and lubricating oil replicates by calculating the standard deviation (STDEV) of the eight MDL replicates and multiplying the STDEV by the student *t* value appropriate for a single-tailed 99th percentile for 8 replicates ($t_8$ = 2.998).
- The MDL blank replicates were then calculated by multiplying the STDEV of the eight blank replicates by the student *t* value appropriate for a single-tailed 99th percentile for 8 replicates, 7 degrees of freedom ($t_8$ = 2.998) and adding that value to the arithmetic mean value determined for the eight replicates.
- The MDL results for C19-C36 were 23.8 mg/kg (mineral oil), 18.2 mg/kg (lubricating oil), and 13.2 mg/kg (method blank).

**Table 2: Phase II Sodium Sulfate MDL Summary**

| Phase II: MDL Sodium Sulfate | | Lab Stated | | MDL Sodium Sulfate Spiking Study | | | |
|---|---|---|---|---|---|---|---|
| Analyte | Units | MDL | RL | MDL Spike | Blank | Mineral Oil | Lubricating Oil |
| **C19-C36 Aliphatics** | **mg/kg** | **6.67** | **6.67** | **50** | **13.2** | **23.8** | **18.2** |

The raw laboratory data and supporting documentation for the Phase II MDL Study in sodium sulfate can be found in Attachment B.

## 1.3. Phase III: C19-C36 MDL Determination (matrix specific)

In Phase III, an MDL verification study for C19-C36 was performed using actual environmental sediment matrices. Using sediment matrices to determine MDLs provides a relevant assessment of method sensitivity, accuracy, and precision in those specific sediments.

The following two sediment matrices were selected for use in the Phase III MDL verification study.

- **Clean Marine Sediment:** NewFields maintains an archive of clean sediment samples for use in laboratory studies. An appropriate clean marine sediment from a non-industrial location in Prince William Sound, Alaska was selected from this archive. This sediment material contained natural background hydrocarbons (i.e., low-level anthropogenic hydrocarbons from diffuse background sources but not from point source contamination). This sample matrix had similar grain size and total organic carbon to native NTC SFS sediment materials.
- **Native Sediment Sample from the NTC SFS Turning Basin:** A native material sample was collected in the NTC SFS Turning Basin from the 400-500 cm depth interval. This sample was collected from below the contaminated sediments at the NTC SFS during a 2022 ExxonMobil sampling event. This sample contained anthropogenic hydrocarbon residues.

Following EPA guidance, each matrix was evaluated for suitability as part of a matrix-specific MDL study. The clean marine sediment matrix was analyzed by the MADEP EPH methodology and was determined to have C19-C36 present at less than 5 times S/N. This qualified the marine sediment sample as a suitable matrix for an MDL spiking study. The native NTC SFS sediment was also analyzed by the EPH methodology and determined to have C19-C36 present at greater than 5 times S/N but less than 20 times S/N. This qualified the NTC SFS sediment to be used as an unspiked MDL sample matrix (US Federal Register, 2017). The C19-C36 present in this sediment material serves as the test for the site-specific MDL. The EPA includes this approach in their most recent MDL guidance (US Federal Register, 2017).

The sediment MDL samples were prepared according to the following procedure:

- Eight replicates of marine sediment were spiked with 100 mg/kg of mineral oil, and eight replicates were spiked with 100 mg/kg lubricating oil; the samples were then extracted. The spiking concentrations were determined by following the EPA's MDL guidance, which indicates the matrix-specific MDLs should be spiked between 10-20 times S/N.
- Eight replicates of the NTC native material (unspiked) were extracted.
- Eight sodium sulfate method blanks were also extracted.
- The MDL results were compliant with S/N requirements, and MDLs were calculated according to the protocol outlined in the Phase II sodium sulfate MDL verification study.
- The C19-C36 matrix-specific sediment MDLs were determined as 127 mg/kg (marine sediment-mineral oil), 127 mg/kg (marine sediment-lubricating oil), 249 mg/kg (NTC native material) and 9.3 mg/kg (method blank).

**Table 3: Phase III Matrix Specific Sediment MDL Summary**

| **Phase III MDL: Matrix Specific** | | **MDL Marine Sediment and Site Specific Sediment Results** | | | | |
|---|---|---|---|---|---|---|
| Analyte | Units | MDL Spike | Sodium Sulfate Method Blank | Mineral Oil - Marine Sediment | Lube Oil - Marine Sediment | Site Matrix - SFS Sediment |
| **C19-C36 Aliphatics** | **mg/kg** | **100** | **9.3** | **127** | **127** | **249** |

The raw laboratory data and supporting documentation for the Phase III MDL Verification Study can be found in Attachment C.

## 2. References

CCME, 2001. *Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil – Tier 1. Appendix 3 – Method Detection Limits*.

EPA, 1991. *Regional Guidance on Handling Chemical Concentration Data Near the Detection Limit in Risk Assessments*, U.S. Environmental Protection Agency, Region Hazardous Waste Management Division Office of Superfund Programs 1650 Arch St. Philadelphia, PA 19103-2029. https://www.epa.gov/risk/regional-guidance-handling-chemical-concentration-data-near-detection-limit-risk-assessments

EPA, 2006. *IDL- MDL- PQL; What the "L" is going on?; What does all this alphabet soup really mean?,* U.S. Environmental Protection Agency, Region III Quality Assurance, Washington, D.C., (MDL Factsheet – Revision No.:2.5 ). https://19january2017snapshot.epa.gov/sites/production/files/2015-06/documents/whatthel.pdf

MADEP, 2019. *Method for the Determination of Extractable Petroleum Hydrocarbons (EPH)*, Massachusetts Department of Environmental Protection, Revision 2.1. 2019.

US Federal Register, 2017. *"40 CFR, Title 40. Appendix B to Part 136. Clean Water Act Methods Update Rule for the Analysis of Effluent, Final Rule. Definition and Procedure for the Determination of the Method Detection Limit - Revision 2*." United States Federal Register, Volume 82, Number 165, Pages 40939-40941; Monday August 28, 2017. https://www.govinfo.gov/content/pkg/FR-2017-08-28/pdf/2017-17271.pdf

van Buuren, Beverly H. 2017. "Introduction to Reporting Limits." Moss Landing, CA: Marine Pollution Studies Laboratory at the Moss Landing Marine Laboratories. Presentation. https://acwi.gov/monitoring/webinars/mpsl_qa_services_intro_rls_012517.pdf

# Attachment A: Phase I Detection Limit Study

# Attachment A. Phase I Detection Limit Study – Lubricating Oil

| No. | Sample ID | File ID | Acquisition Date | Concentration | Units | Fraction | > 3-1 S/N |
|---|---|---|---|---|---|---|---|
| 1 | 5w30 20 | P21230406n13.D | 4/7/2023 16:30 | 20 | mg/kg | Aromatic | No |
| 2 | 5w30 20 | P21230406n14.D | 4/7/2023 16:30 | 20 | mg/kg | Aliphatic | No |
| 3 | 5w30 25 | P21230406n15.D | 4/7/2023 16:55 | 25 | mg/kg | Aromatic | No |
| 4 | 5w30 25 | P21230406n16.D | 4/7/2023 16:55 | 25 | mg/kg | Aliphatic | No |
| 5 | 5w30 30 | P21230406n17.D | 4/7/2023 17:20 | 30 | mg/kg | Aromatic | Yes |
| 6 | 5w30 30 | P21230406n18.D | 4/7/2023 17:20 | 30 | mg/kg | Aliphatic | Yes |
| 7 | 5w30 35 | P21230406n19.D | 4/7/2023 17:45 | 35 | mg/kg | Aromatic | Yes |
| 8 | 5w30 35 | P21230406n20.D | 4/7/2023 17:45 | 35 | mg/kg | Aliphatic | Yes |
| 9 | 5w30 40 | P21230406n21.D | 4/7/2023 18:10 | 40 | mg/kg | Aromatic | Yes |
| 10 | 5w30 40 | P21230406n22.D | 4/7/2023 18:10 | 40 | mg/kg | Aliphatic | Yes |
| 11 | 5w30 45 | P21230406n23.D | 4/7/2023 18:35 | 45 | mg/kg | Aromatic | Yes |
| 12 | 5w30 45 | P21230406n24.D | 4/7/2023 18:35 | 45 | mg/kg | Aliphatic | Yes |
| 13 | 5w30 50 | P21230406n25.D | 4/7/2023 19:00 | 50 | mg/kg | Aromatic | Yes |
| 14 | 5w30 50 | P21230406n26.D | 4/7/2023 19:00 | 50 | mg/kg | Aliphatic | Yes |
| 15 | 5w30 55 | P21230406n27.D | 4/7/2023 19:25 | 55 | mg/kg | Aromatic | Yes |
| 16 | 5w30 55 | P21230406n28.D | 4/7/2023 19:25 | 55 | mg/kg | Aliphatic | Yes |
| 17 | 5w30 60 | P21230406n29.D | 4/7/2023 19:49 | 60 | mg/kg | Aromatic | Yes |
| 18 | 5w30 60 | P21230406n30.D | 4/7/2023 19:49 | 60 | mg/kg | Aliphatic | Yes |
| 19 | 5w30 65 | P21230406n31.D | 4/7/2023 20:14 | 65 | mg/kg | Aromatic | Yes |
| 20 | 5w30 65 | P21230406n32.D | 4/7/2023 20:14 | 65 | mg/kg | Aliphatic | Yes |
| 21 | 5w30 70 | P21230406n33.D | 4/7/2023 20:39 | 70 | mg/kg | Aromatic | Yes |
| 22 | 5w30 70 | P21230406n34.D | 4/7/2023 20:39 | 70 | mg/kg | Aliphatic | Yes |

Phase I Detection Limit Study
Raw Data Quant Reports

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n13.D
Signal(s) : FID2B.ch
Acq On : 7 Apr 2023 4:30 pm
Operator : Petro21b:sr
Sample : 5w30 20
Misc : 5w30 ARO oil
ALS Vial : 57 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 13:31:32 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.318 | 861086 | 12.303 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 61.52% | |
| 5) s 2-Bromonaphthalene | 4.820 | 583460 | 11.838 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 59.19% | |
| 10) S o-terphenyl | 0.000 | 0 | N.D. mg/L | d |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 0.00%# | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 12.013 | 1071587 | 12.818 mg/L | M5 |

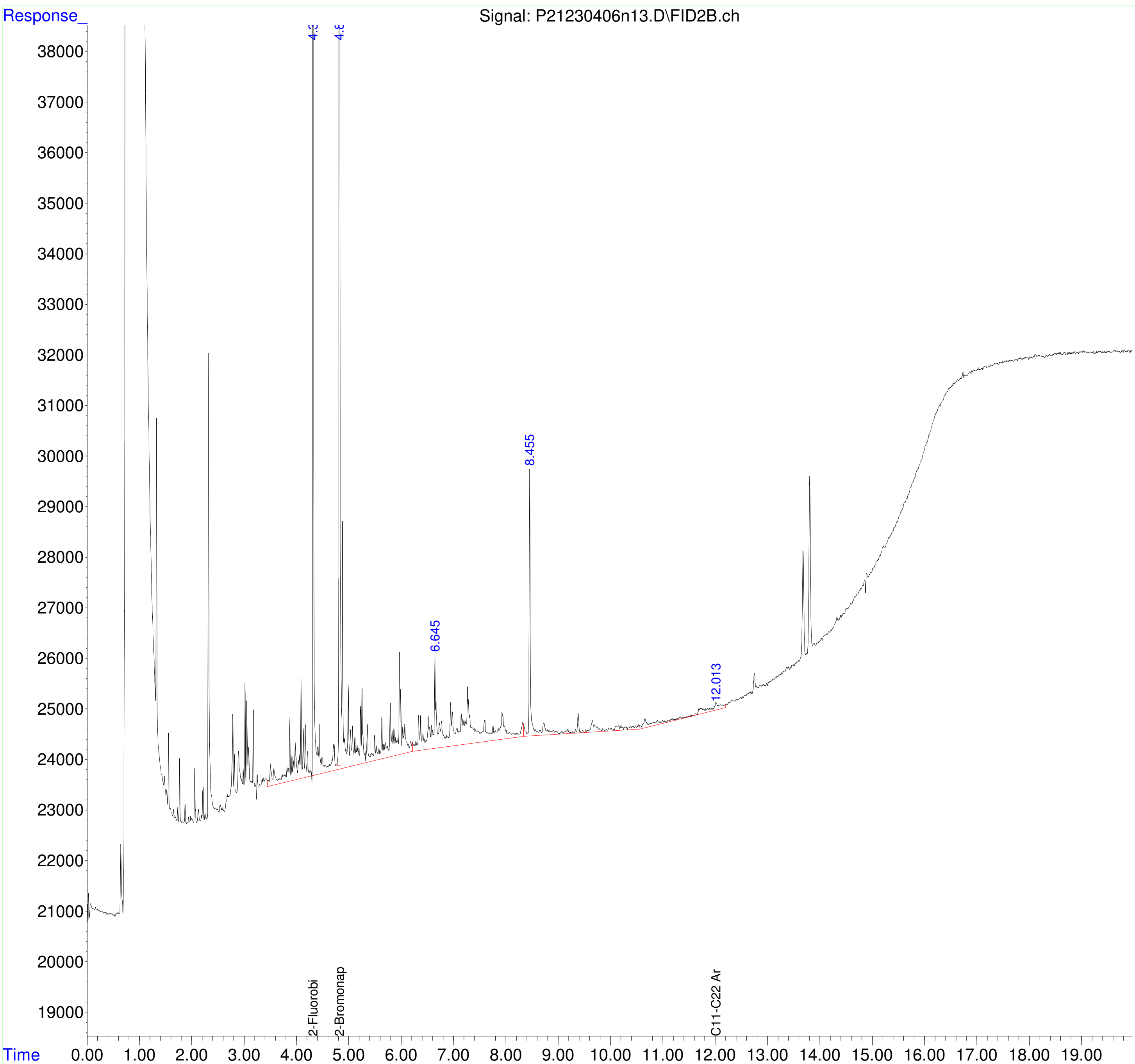
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n13.D
Signal(s) : FID2B.ch
Acq On    :  7 Apr 2023   4:30 pm
Operator  : Petro21b:sr
Sample    : 5w30 20
Misc      : 5w30 ARO oil
ALS Vial  : 57   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 13:31:32 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

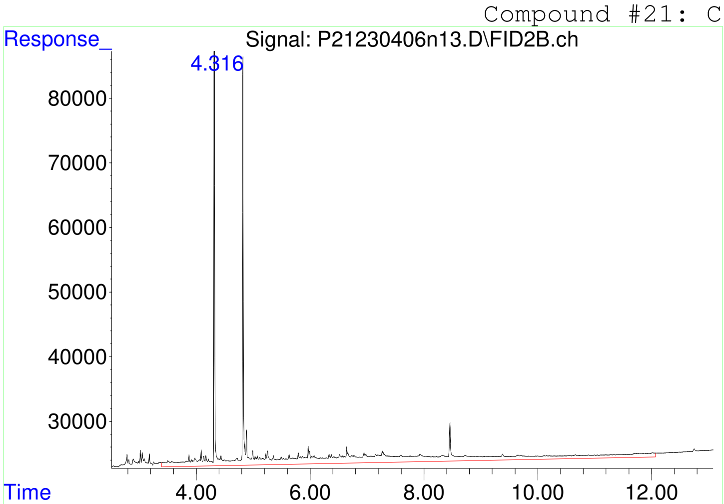
Volume Inj.  :
Signal Phase :
Signal Info  :

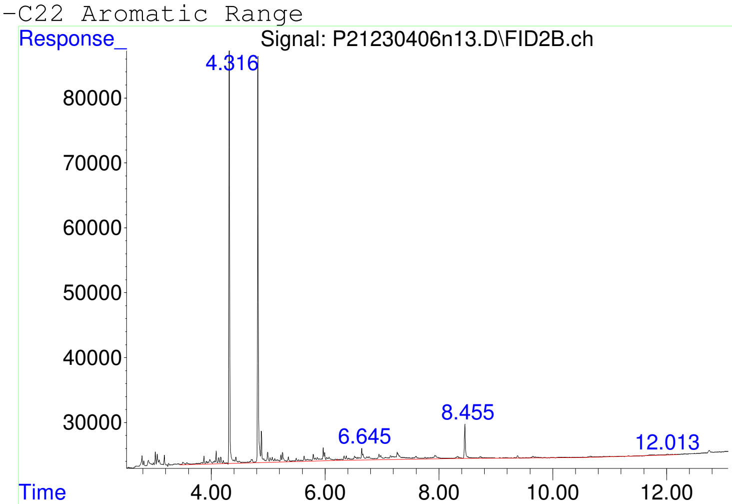


Manual Integration Report

```
Data Path   : I:\PETRO\Petro21\2023\230406N.SEC\    QMethod     : MAARO211129B.M
Data File   : P21230406n13.D                        Operator    : Petro21b:sr
Date Inj'd  : 4/7/2023  4:30 pm                     Instrument  : Petro 21
Sample      : 5w30 20                               Quant Date  : 4/10/2023  1:27 pm
```

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 4034772          Manual Peak Response = 1071587 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n14.D
Signal(s) : FID1A.ch
Acq On : 7 Apr 2023 4:30 pm
Operator : Petro21a:sr
Sample : 5w30 20
Misc : 5w30 ALI Oil
ALS Vial : 7 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:16:27 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) S Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 5) S 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) S 2-Fluorobiphenyl | 0.000 | 0 | N.D. mg/kg | d |
| 8) S 2-Bromonaphthalene | 0.000 | 0 | N.D. mg/kg | d |
| 13) S 1-Chlorooctadecane | 0.000 | 0 | N.D. mg/L | d |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 0.00%# | |
| **Target Compounds** | | | | |
| 1) Nonane (C9) | 0.000 | 0 | N.D. mg/L | |
| 2) Decane (C10) | 0.000 | 0 | N.D. mg/L | |
| 4) Dodecane (C12) | 0.000 | 0 | N.D. mg/L | d |
| 7) Tetradecane (C14) | 0.000 | 0 | N.D. mg/L | d |
| 9) Hexadecane (C16) | 0.000 | 0 | N.D. mg/L | d |
| 10) Octadecane (C18) | 0.000 | 0 | N.D. mg/L | d |
| 11) Nonadecane (c19) | 0.000 | 0 | N.D. mg/kg | d |
| 12) Eicosane (C20) | 0.000 | 0 | N.D. mg/L | d |
| 14) Docosane (C22) | 0.000 | 0 | N.D. mg/L | d |
| 15) Tetracosane (C24) | 0.000 | 0 | N.D. mg/L | d |
| 16) Hexacosane (C26) | 0.000 | 0 | N.D. mg/L | d |
| 17) Octacosane (C28) | 0.000 | 0 | N.D. mg/L | d |
| 18) Triacontane (C30) | 0.000 | 0 | N.D. mg/L | d |
| 19) Hexatriacontane (C36) | 0.000 | 0 | N.D. mg/L | |
| 20) H C9-C18 Aliphatics | 6.031 | 1396883 | 19.518 mg/L | M5 |
| 21) H C19-C36 Aliphatics | 14.013f | 1428984 | 20.748 mg/L | M5 |

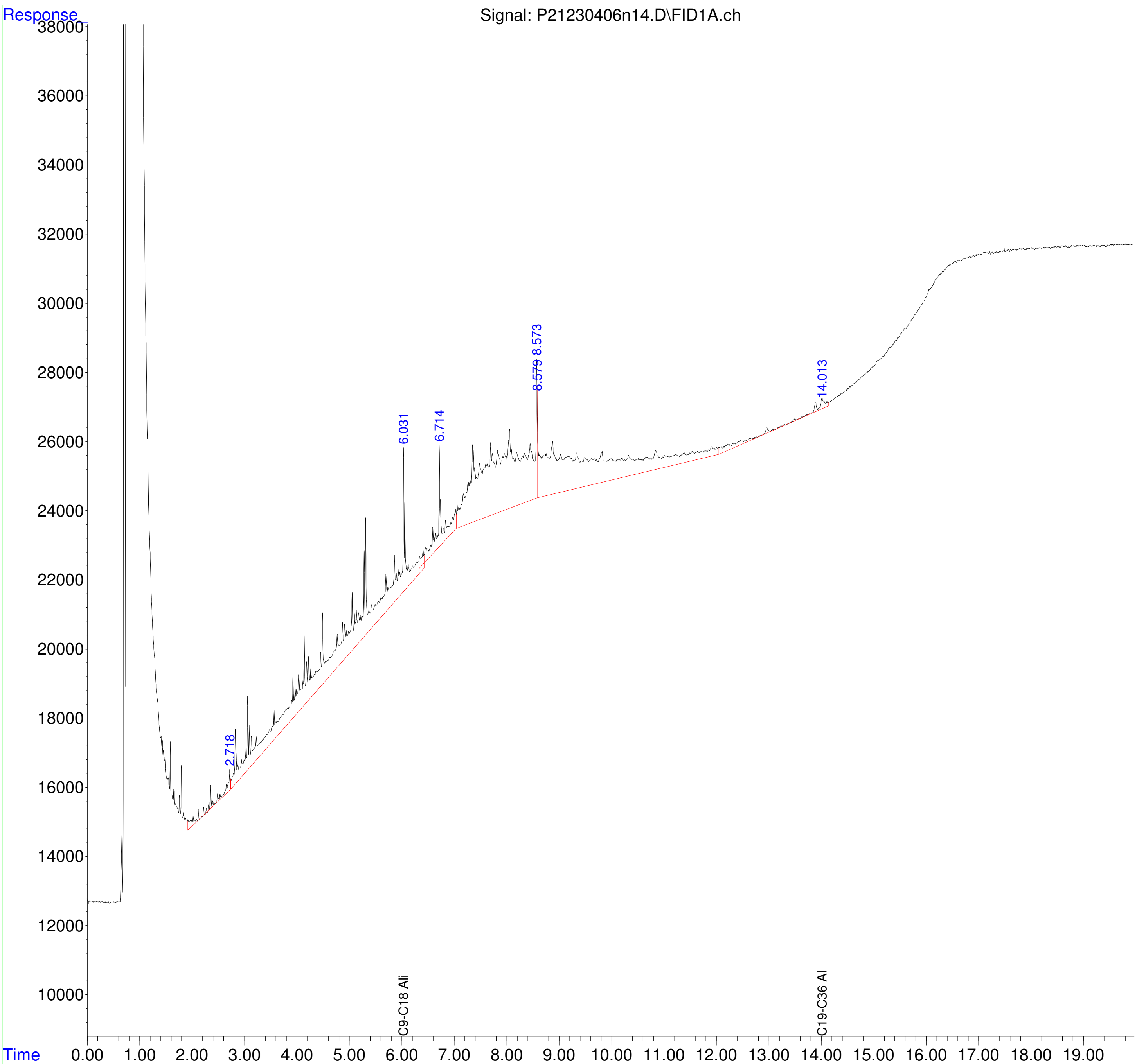
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n14.D
Signal(s) : FID1A.ch
Acq On    :  7 Apr 2023   4:30 pm
Operator  : Petro21a:sr
Sample    : 5w30 20
Misc      : 5w30 ALI Oil
ALS Vial  : 7   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:16:27 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

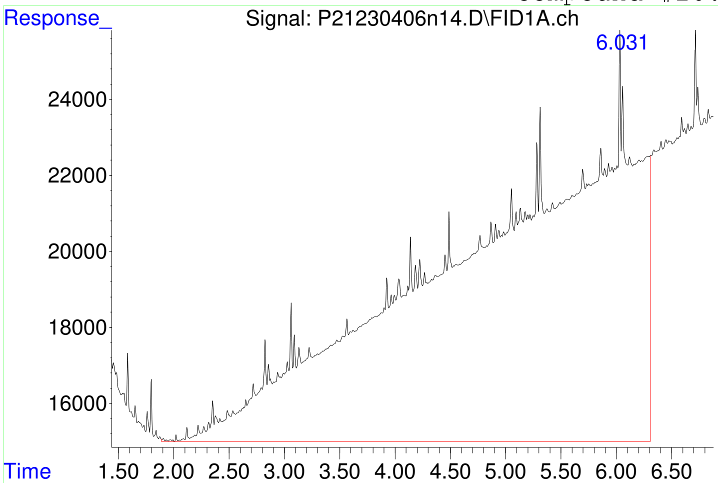


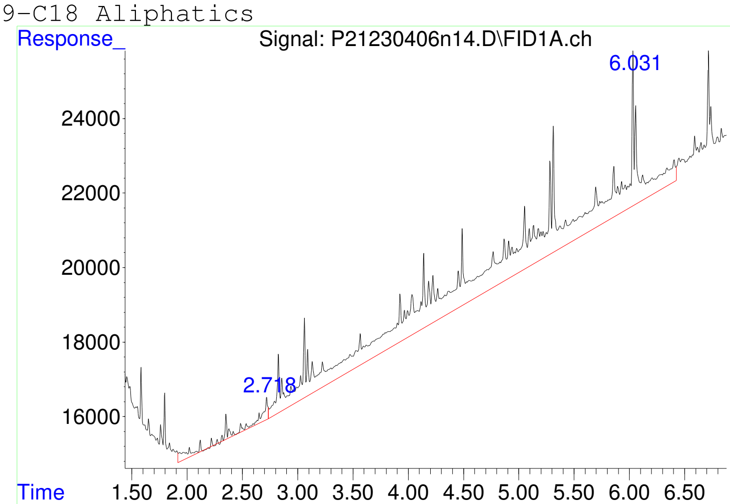
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n14.D
Date Inj'd : 4/7/2023 4:30 pm
Sample : 5w30 20

QMethod : MAALI211129A.M
Operator : Petro21a:sr
Instrument : Petro 21
Quant Date : 4/10/2023 1:08 pm

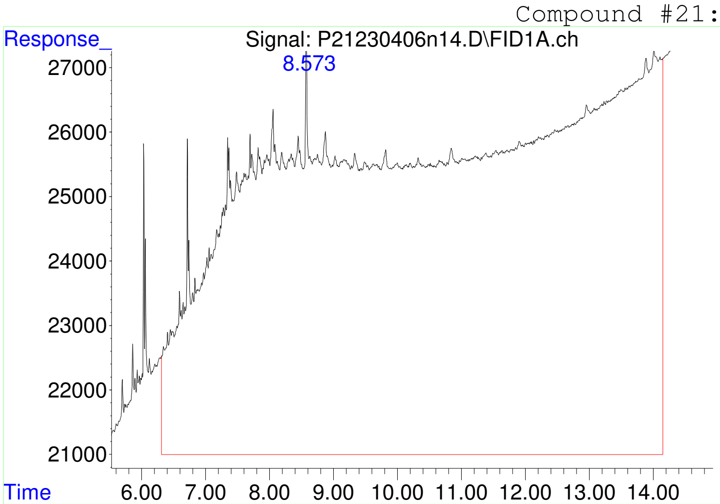
Compound #20: C9-C18 Aliphatics

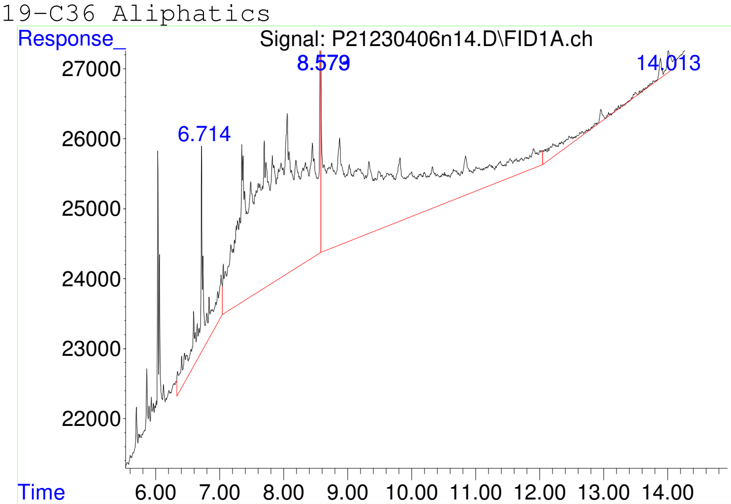



Original Peak Response = 10193262
Manual Peak Response = 1396883 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 21293788
Manual Peak Response = 1428984 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

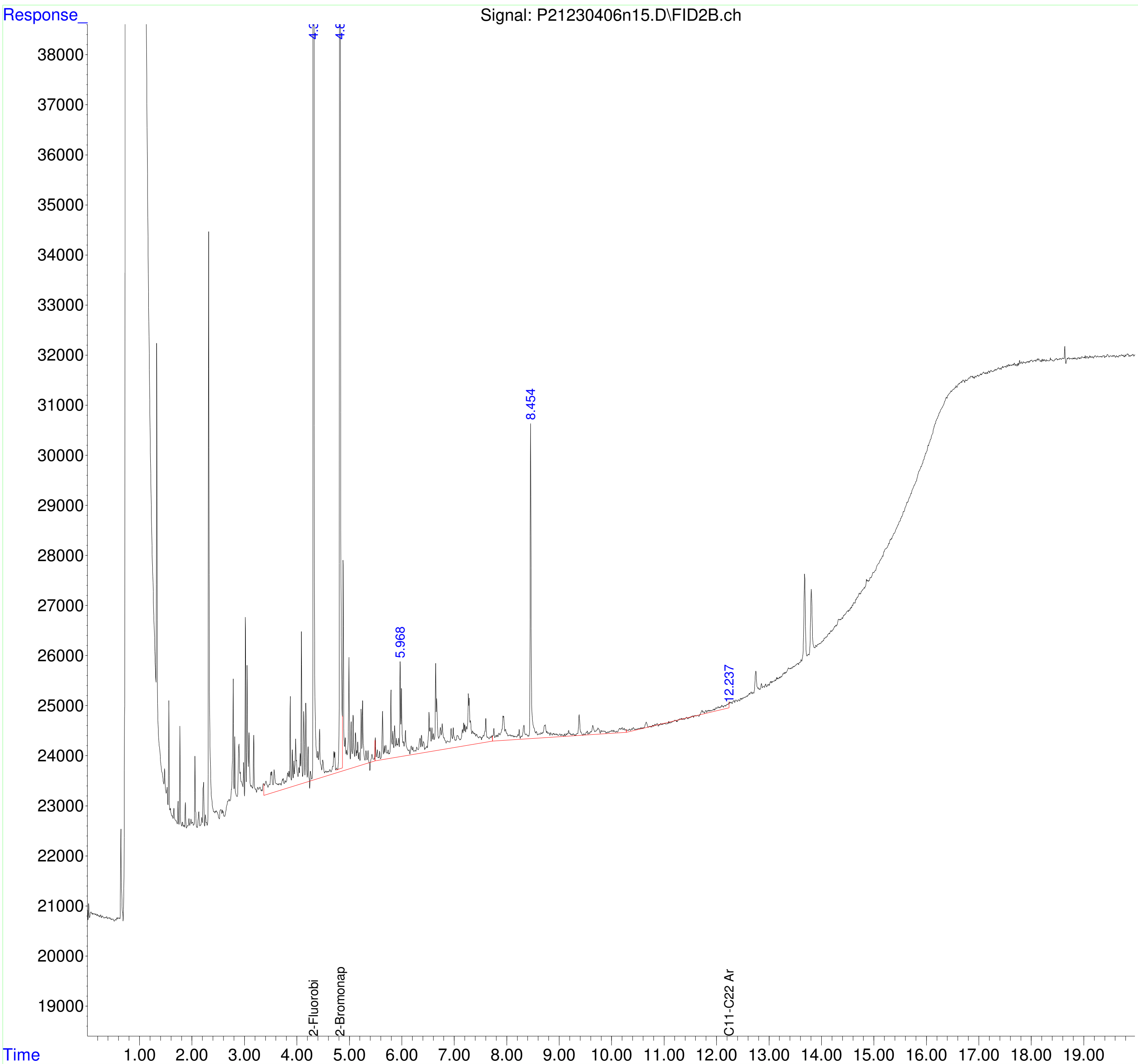
```
Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n15.D
Signal(s) : FID2B.ch
Acq On    :  7 Apr 2023   4:55 pm
Operator  : Petro21b:sr
Sample    : 5w30 25
Misc      : 5w30 ARO oil
ALS Vial  : 58   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 13:55:18 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed

       Compound                        R.T.       Response    Conc Units
 ---------------------------------------------------------------------------

 System Monitoring Compounds
 3) s   2-Fluorobiphenyl              4.318       1012156   14.462 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   72.31%
 5) s   2-Bromonaphthalene            4.820        690213   14.004 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   70.02%
10) S   o-terphenyl                   0.000             0    N.D.  mg/L  d
Spiked Amount     20.000   Range  40 - 140    Recovery   =    0.00%#

 Target Compounds
 1)     Naphthalene                   0.000             0    N.D.  mg/L
 2)     2-Methylnaphthalene           0.000             0    N.D.  mg/L  d
 4)     Acenaphthalene                0.000             0    N.D.  mg/L  d
 6)     Acenaphthene                  0.000             0    N.D.  mg/L  d
 7)     Fluorene                      0.000             0    N.D.  mg/L  d
 8)     Phenanthrene                  0.000             0    N.D.  mg/L  d
 9)     Anthracene                    0.000             0    N.D.  mg/L  d
11)     Fluoranthene                  0.000             0    N.D.  mg/L
12)     Pyrene                        0.000             0    N.D.  mg/L
13)     Benzo(a)anthracene            0.000             0    N.D.  mg/L
14)     Chrysene                      0.000             0    N.D.  mg/L
15)     Benzo(b)fluoranthene          0.000             0    N.D.  mg/L
16)     Benzo(k)fluoranthene          0.000             0    N.D.  mg/L
17)     Benzo(a)pyrene                0.000             0    N.D.  mg/L
18)     Indeno(1,2,3-cd)pyrene        0.000             0    N.D.  mg/L
19)     Dibenzo(a,h)anthracene        0.000             0    N.D.  mg/L
20)     Benzo(ghi)perylene            0.000             0    N.D.  mg/L
21) H   C11-C22 Aromatic Range       12.237f      1010517   12.088 mg/L  M5
 ---------------------------------------------------------------------------

(f)=RT Delta > 1/2 Window                            (m)=manual int.
```

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n15.D
Signal(s) : FID2B.ch
Acq On    :  7 Apr 2023   4:55 pm
Operator  : Petro21b:sr
Sample    : 5w30 25
Misc      : 5w30 ARO oil
ALS Vial  : 58   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 13:55:18 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

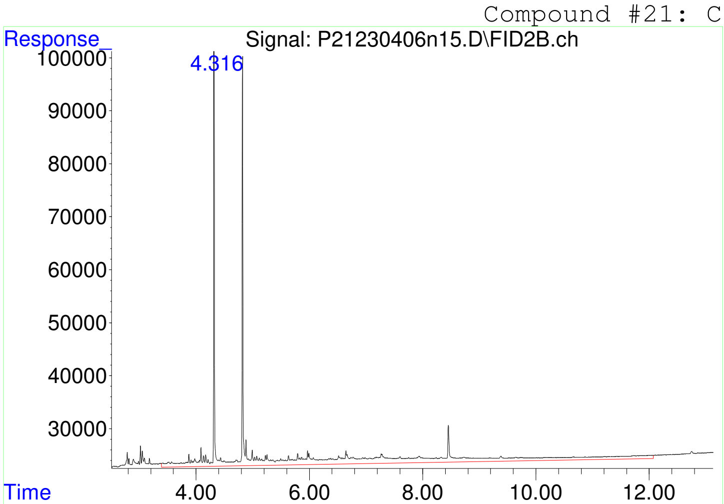


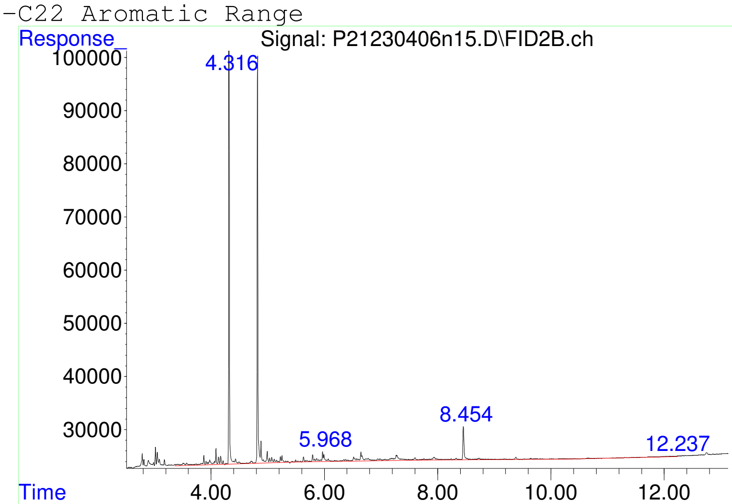
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n15.D
Date Inj'd : 4/7/2023 4:55 pm
Sample : 5w30 25

QMethod : MAARO211129B.M
Operator : Petro21b:sr
Instrument : Petro 21
Quant Date : 4/10/2023 1:27 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 4274480

Manual Peak Response = 1010517 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n16.D
Signal(s) : FID1A.ch
Acq On : 7 Apr 2023 4:55 pm
Operator : Petro21a:sr
Sample : 5w30 25
Misc : 5w30 ALI Oil
ALS Vial : 8 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:17:02 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | | |
| 3) | S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) | S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) | S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) | S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) | S | 1-Chlorooctadecane | 0.000 | 0 | N.D. | mg/L | d |
| Spiked Amount 20.000 | | Range 40 - 140 | | Recovery = | 0.00%# | | |
| Target Compounds | | | | | | | |
| 1) | | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | |
| 2) | | Decane (C10) | 0.000 | 0 | N.D. | mg/L | |
| 4) | | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) | H | C9-C18 Aliphatics | 6.031 | 682743 | 9.540 | mg/L | M5 |
| 21) | H | C19-C36 Aliphatics | 14.010f | 2373518 | 34.462 | mg/L | M5 |

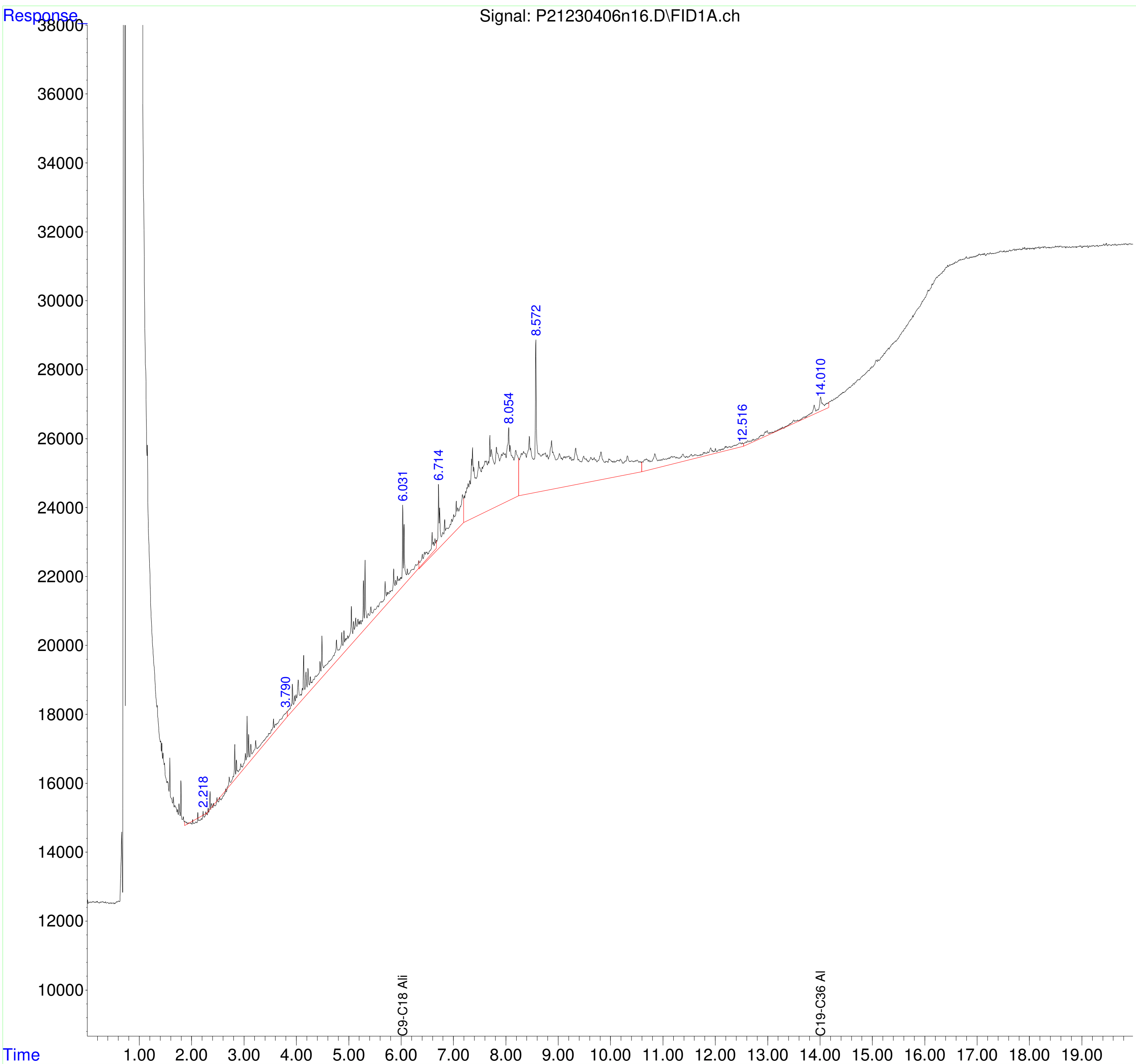
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n16.D
Signal(s) : FID1A.ch
Acq On    :  7 Apr 2023   4:55 pm
Operator  : Petro21a:sr
Sample    : 5w30 25
Misc      : 5w30 ALI Oil
ALS Vial  : 8   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:17:02 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

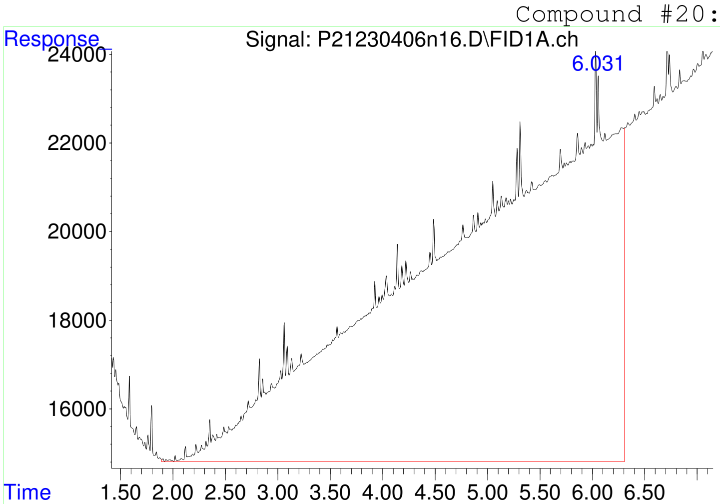
Volume Inj.  :
Signal Phase :
Signal Info  :

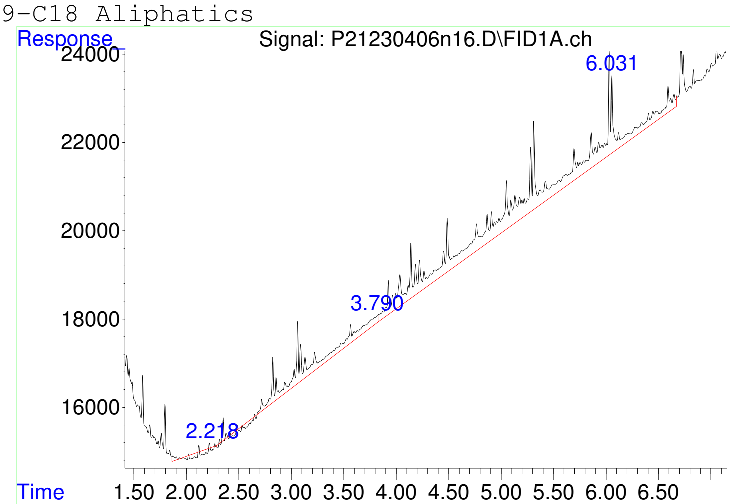


Manual Integration Report

```
Data Path    : I:\PETRO\Petro21\2023\230406n\        QMethod      : MAALI211129A.M
Data File    : P21230406n16.D                        Operator     : Petro21a:sr
Date Inj'd   : 4/7/2023  4:55 pm                     Instrument   : Petro 21
Sample       : 5w30 25                               Quant Date   : 4/10/2023  1:08 pm
```

Compound #20: C9-C18 Aliphatics

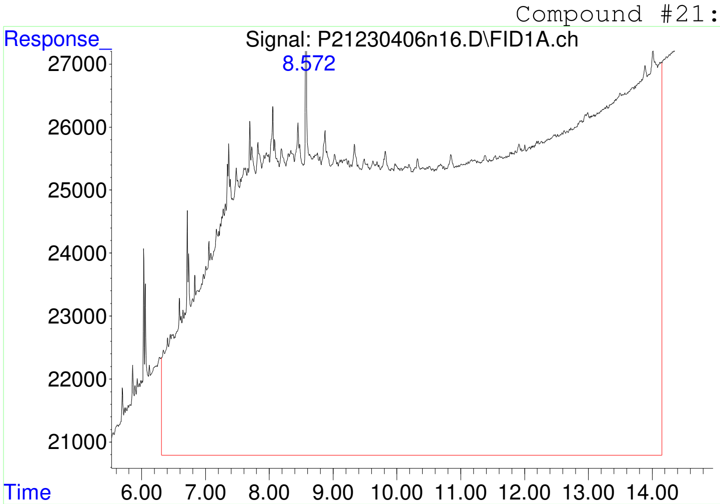


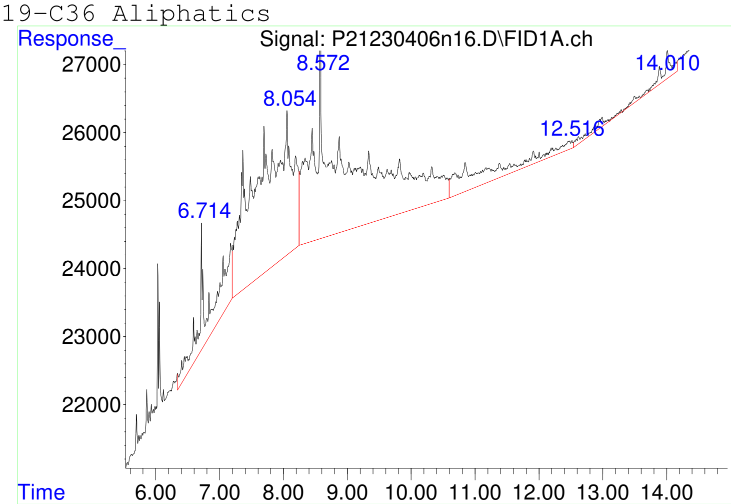




Original Peak Response = 10045831        Manual Peak Response = 682743 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 21694320        Manual Peak Response = 2373518 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n17.D
Signal(s) : FID2B.ch
Acq On : 7 Apr 2023 5:20 pm
Operator : Petro21b:sr
Sample : 5w30 30
Misc : 5w30 ARO oil
ALS Vial : 59 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 14:11:55 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.318 | 1082790 | 15.471 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 77.35% | |
| 5) s 2-Bromonaphthalene | 4.820 | 729367 | 14.798 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 73.99% | |
| 10) S o-terphenyl | 0.000 | 0 | N.D. mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 0.00%# | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 12.073 | 1031138 | 12.334 mg/L | M5 |

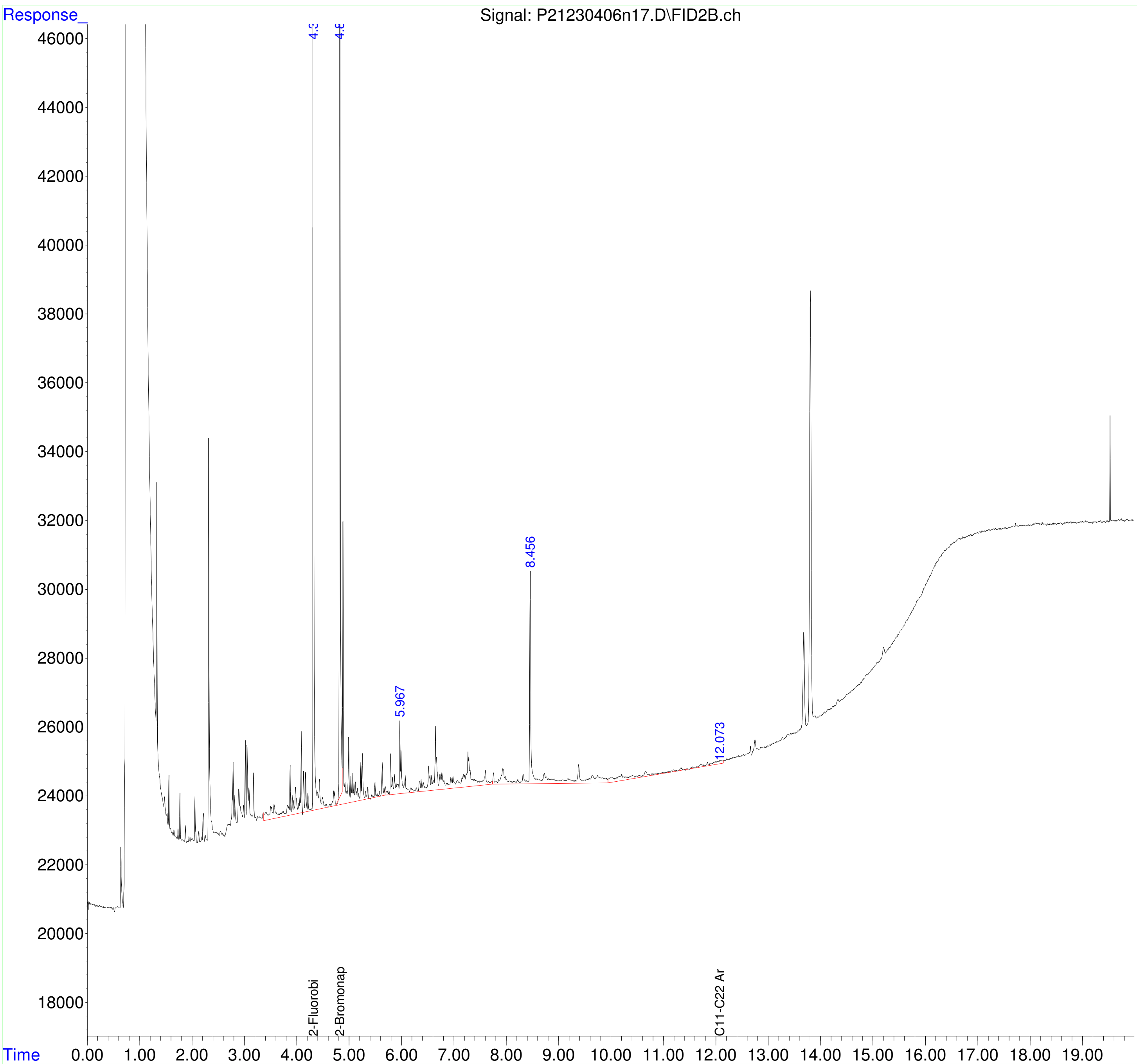
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n17.D
Signal(s) : FID2B.ch
Acq On    :  7 Apr 2023   5:20 pm
Operator  : Petro21b:sr
Sample    : 5w30 30
Misc      : 5w30 ARO oil
ALS Vial  : 59   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 14:11:55 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

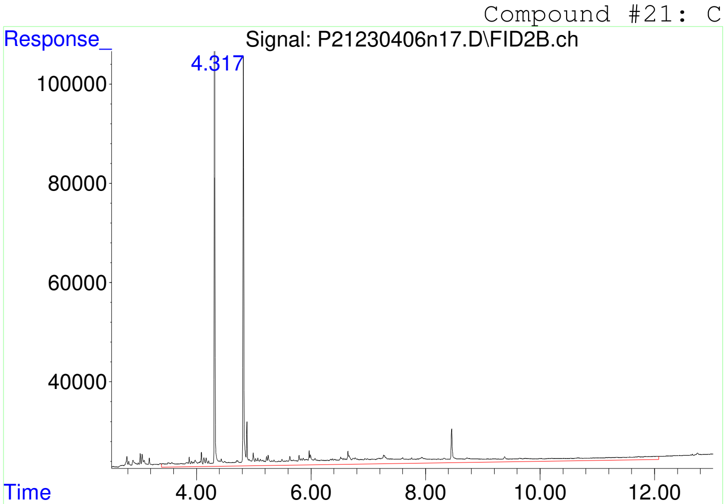
Volume Inj.  :
Signal Phase :
Signal Info  :

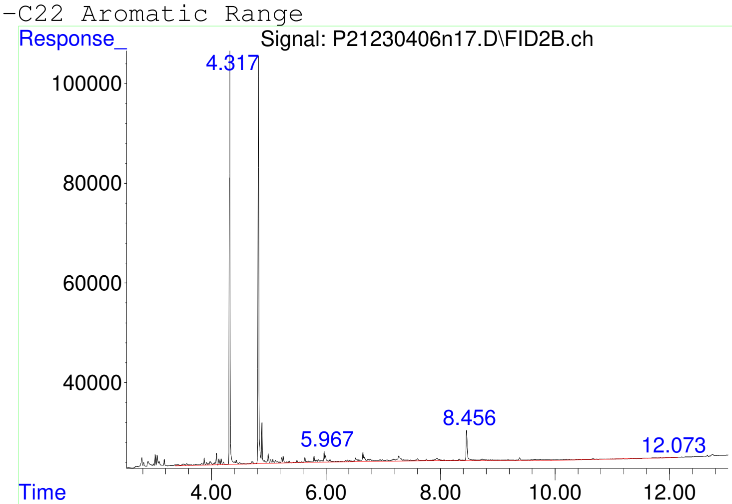


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230406N.SEC\ | QMethod | : MAARO211129B.M |
| Data File | : P21230406n17.D | Operator | : Petro21b:sr |
| Date Inj'd | : 4/7/2023 5:20 pm | Instrument | : Petro 21 |
| Sample | : 5w30 30 | Quant Date | : 4/10/2023 1:27 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 4207767

Manual Peak Response = 1031138 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n18.D
Signal(s) : FID1A.ch
Acq On : 7 Apr 2023 5:20 pm
Operator : Petro21a:sr
Sample : 5w30 30
Misc : 5w30 ALI Oil
ALS Vial : 9 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:17:39 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 0.000 | 0 | N.D. | mg/L | d |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 0.00%# | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 6.031 | 2353904 | 32.890 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.012f | 4841118 | 70.291 | mg/L | M5 |

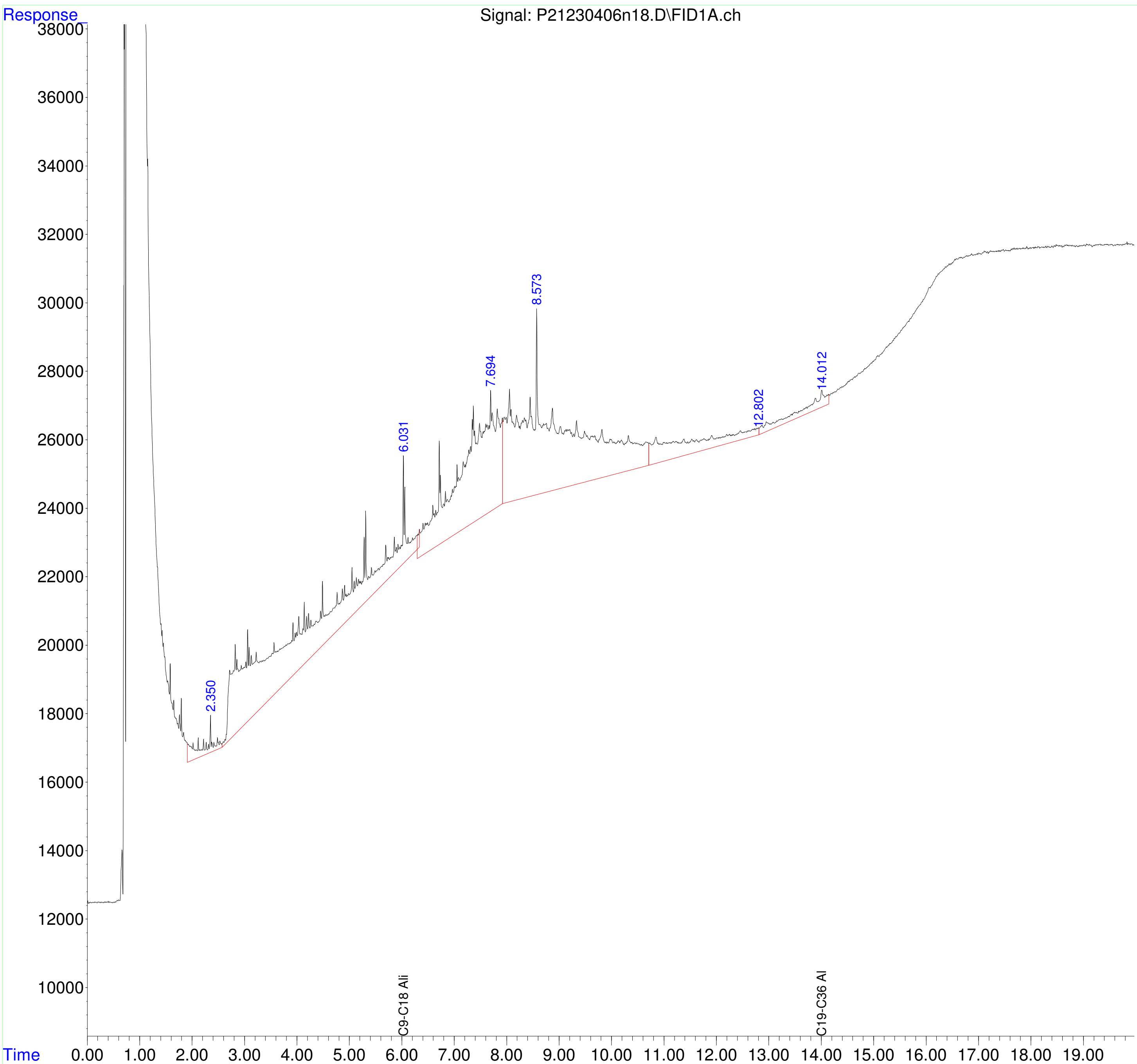
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n18.D
Signal(s) : FID1A.ch
Acq On    :  7 Apr 2023   5:20 pm
Operator  : Petro21a:sr
Sample    : 5w30 30
Misc      : 5w30 ALI Oil
ALS Vial  : 9   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:17:39 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

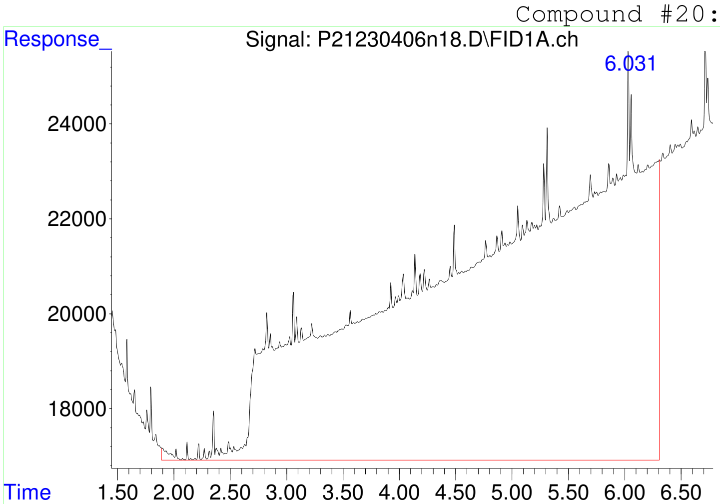


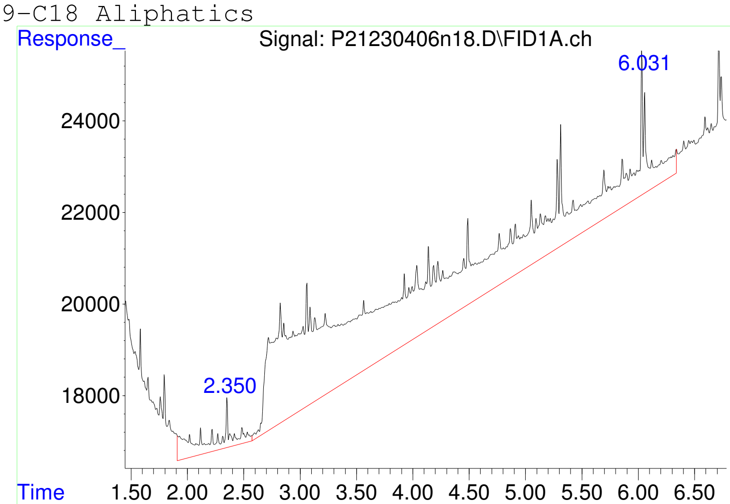
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n18.D
Date Inj'd : 4/7/2023 5:20 pm
Sample : 5w30 30

QMethod : MAALI211129A.M
Operator : Petro21a:sr
Instrument : Petro 21
Quant Date : 4/10/2023 1:08 pm

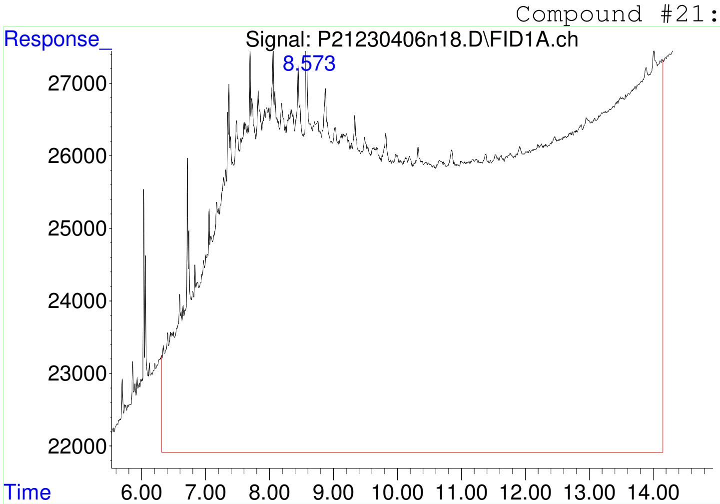
Compound #20: C9-C18 Aliphatics

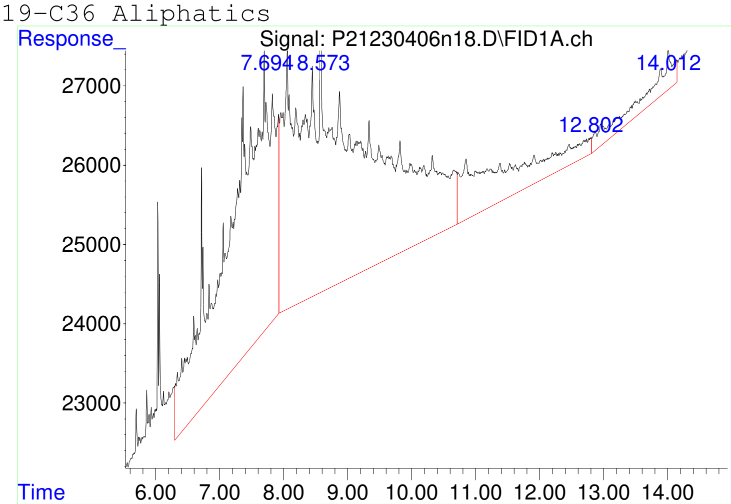



Original Peak Response = 8999140 Manual Peak Response = 2353904 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 19399062 Manual Peak Response = 4841118 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n19.D
Signal(s) : FID2B.ch
Acq On : 7 Apr 2023 5:45 pm
Operator : Petro21b:sr
Sample : 5w30 35
Misc : 5w30 ARO oil
ALS Vial : 60 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 14:12:20 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.318 | 957395 | 13.679 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 68.40% | |
| 5) s 2-Bromonaphthalene | 4.820 | 654482 | 13.279 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 66.40% | |
| 10) S o-terphenyl | 0.000 | 0 | N.D. mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 0.00%# | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 12.153 | 1430877 | 17.116 mg/L | M5 |

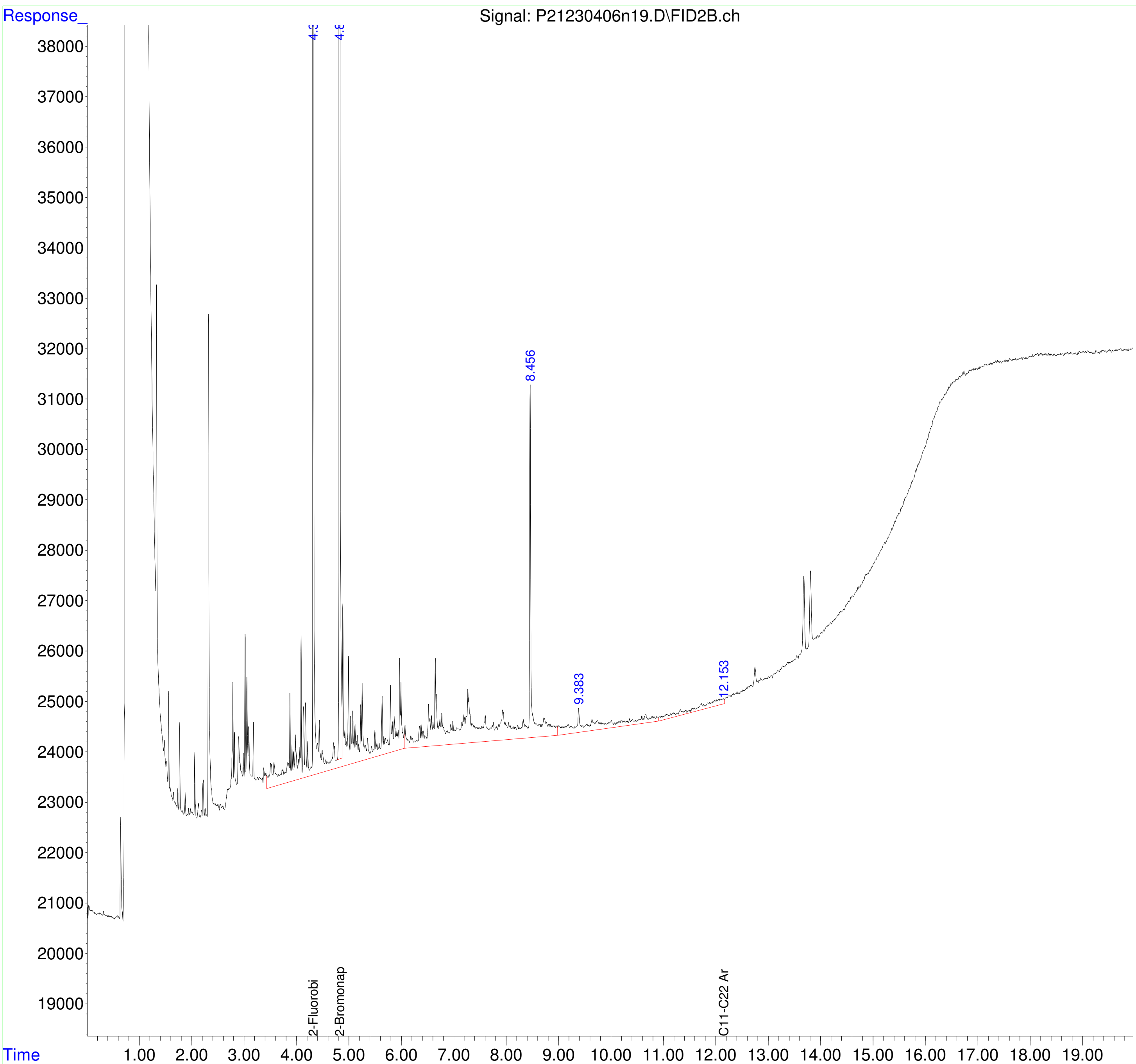
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n19.D
Signal(s) : FID2B.ch
Acq On : 7 Apr 2023 5:45 pm
Operator : Petro21b:sr
Sample : 5w30 35
Misc : 5w30 ARO oil
ALS Vial : 60 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 14:12:20 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

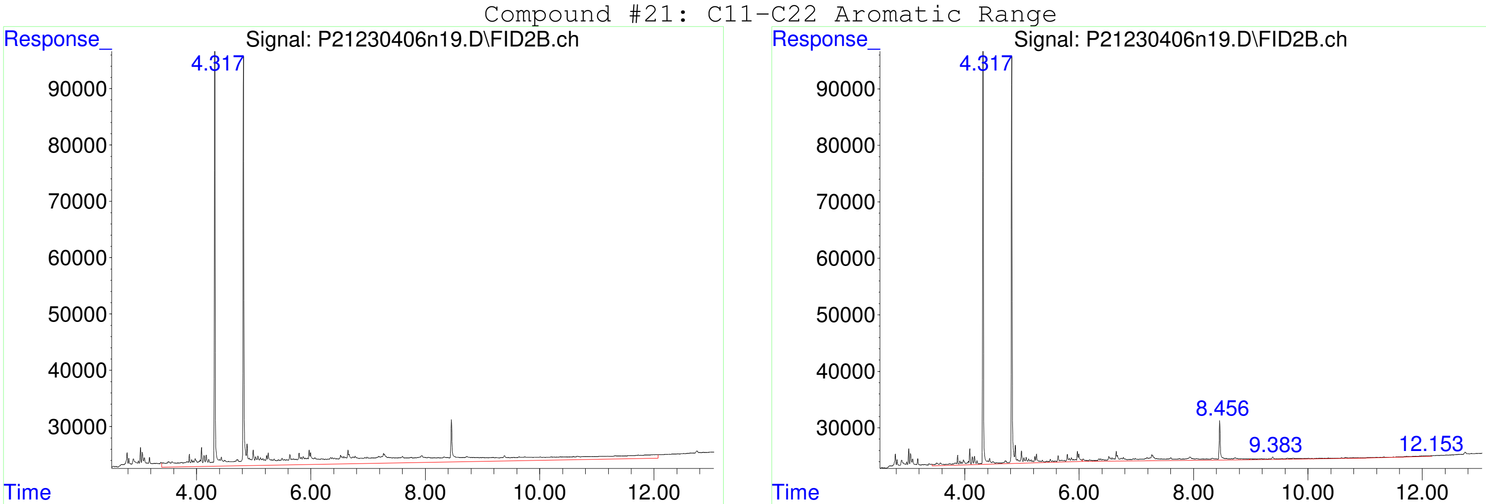
Volume Inj. :
Signal Phase :
Signal Info :



Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230406N.SEC\ | QMethod | : MAARO211129B.M |
| Data File | : P21230406n19.D | Operator | : Petro21b:sr |
| Date Inj'd | : 4/7/2023 5:45 pm | Instrument | : Petro 21 |
| Sample | : 5w30 35 | Quant Date | : 4/10/2023 1:27 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 4245022 Manual Peak Response = 1430877 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

# Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n20.D
Signal(s) : FID1A.ch
Acq On : 7 Apr 2023 5:45 pm
Operator : Petro21a:sr
Sample : 5w30 35
Misc : 5w30 ALI Oil
ALS Vial : 10 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:18:17 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | | |
| 3) | S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) | S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) | S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) | S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) | S | 1-Chlorooctadecane | 0.000 | 0 | N.D. | mg/L | d |

Spiked Amount 20.000 Range 40 - 140 Recovery = 0.00%#

| | | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|---|
| Target Compounds | | | | | | | |
| 1) | | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | |
| 2) | | Decane (C10) | 0.000 | 0 | N.D. | mg/L | |
| 4) | | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) | H | C9-C18 Aliphatics | 6.031 | 1562914 | 21.838 | mg/L | M5 |
| 21) | H | C19-C36 Aliphatics | 14.011f | 3891023 | 56.496 | mg/L | M5 |

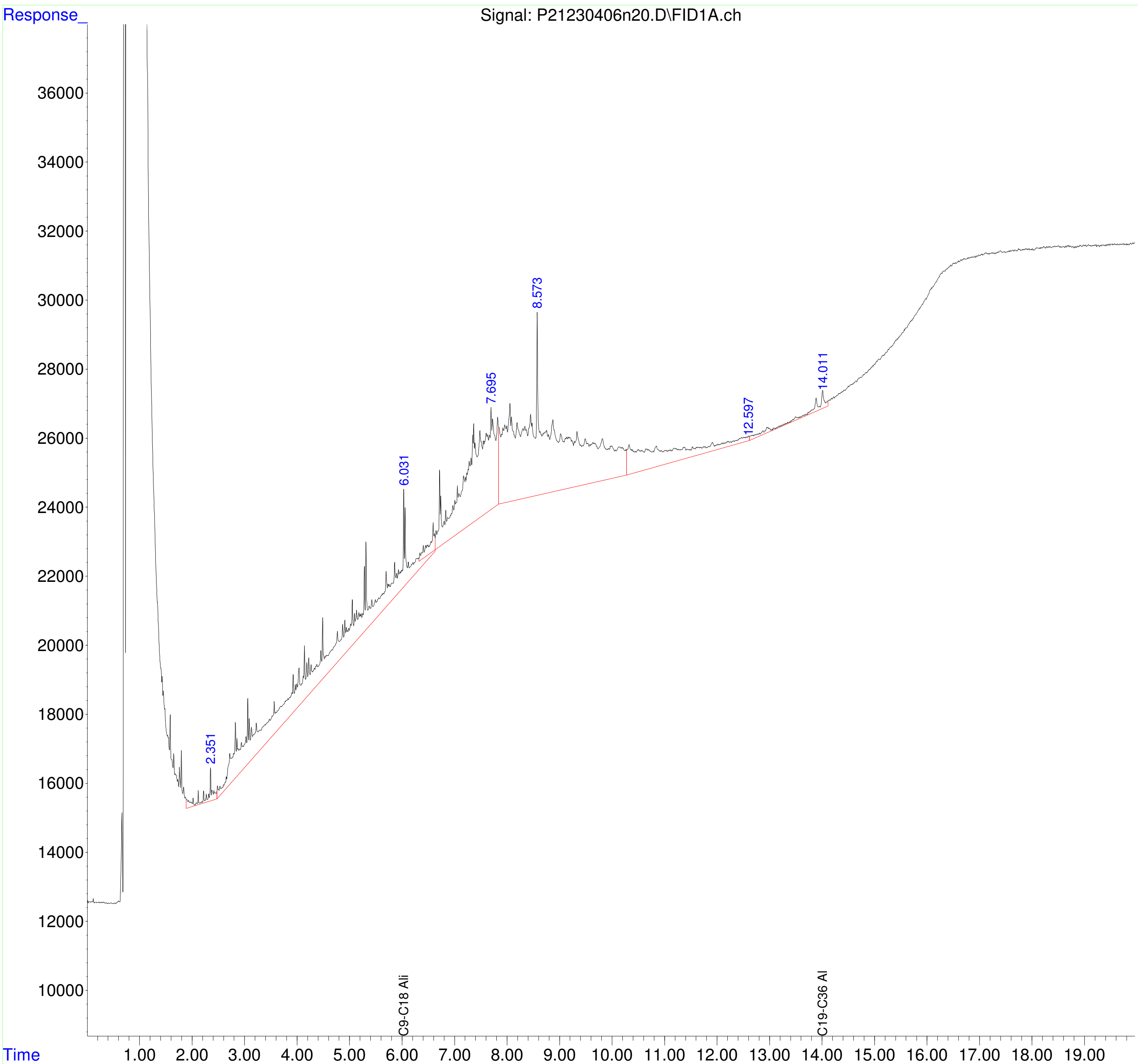
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n20.D
Signal(s) : FID1A.ch
Acq On : 7 Apr 2023 5:45 pm
Operator : Petro21a:sr
Sample : 5w30 35
Misc : 5w30 ALI Oil
ALS Vial : 10 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:18:17 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

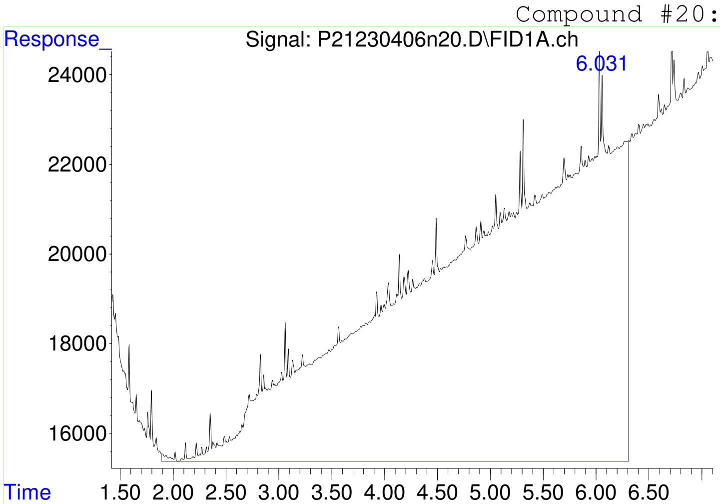


Manual Integration Report

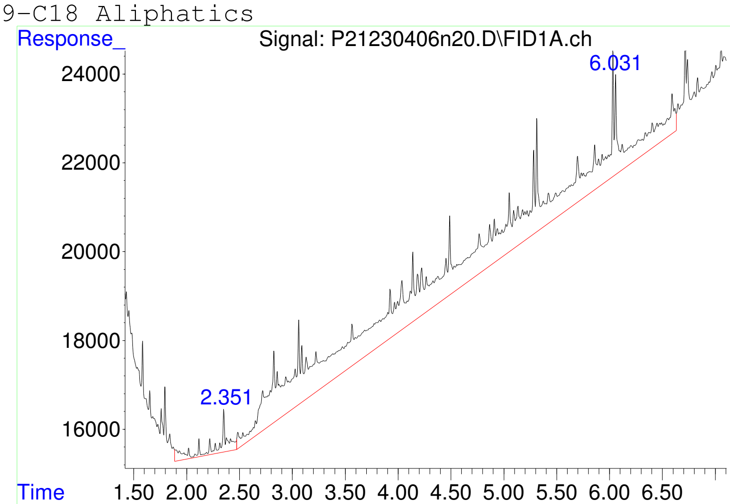
Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n20.D
Date Inj'd : 4/7/2023 5:45 pm
Sample : 5w30 35

QMethod : MAALI211129A.M
Operator : Petro21a:sr
Instrument : Petro 21
Quant Date : 4/10/2023 1:08 pm

Compound #20: C9-C18 Aliphatics



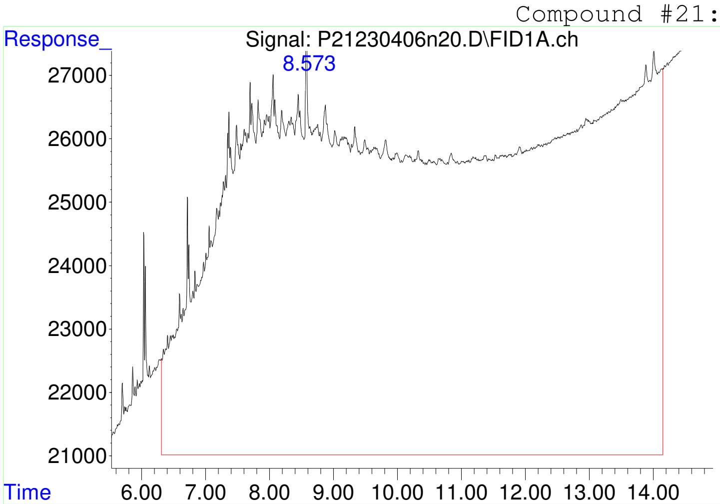

Original Peak Response = 9458889



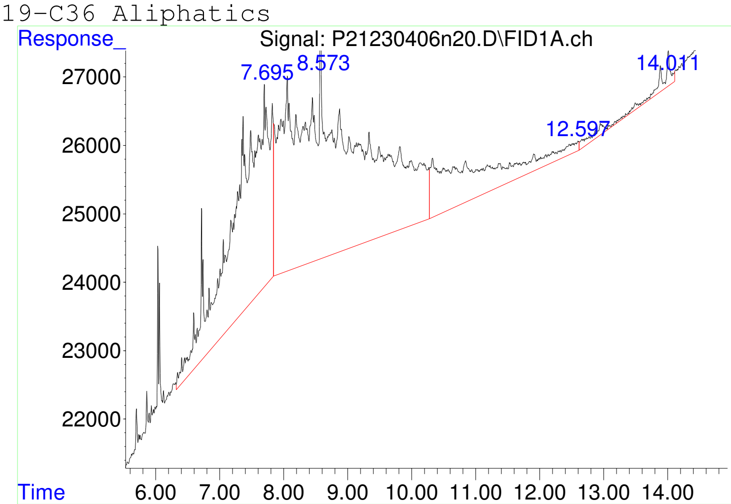

Manual Peak Response = 1562914 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 22244118




Manual Peak Response = 3891023 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

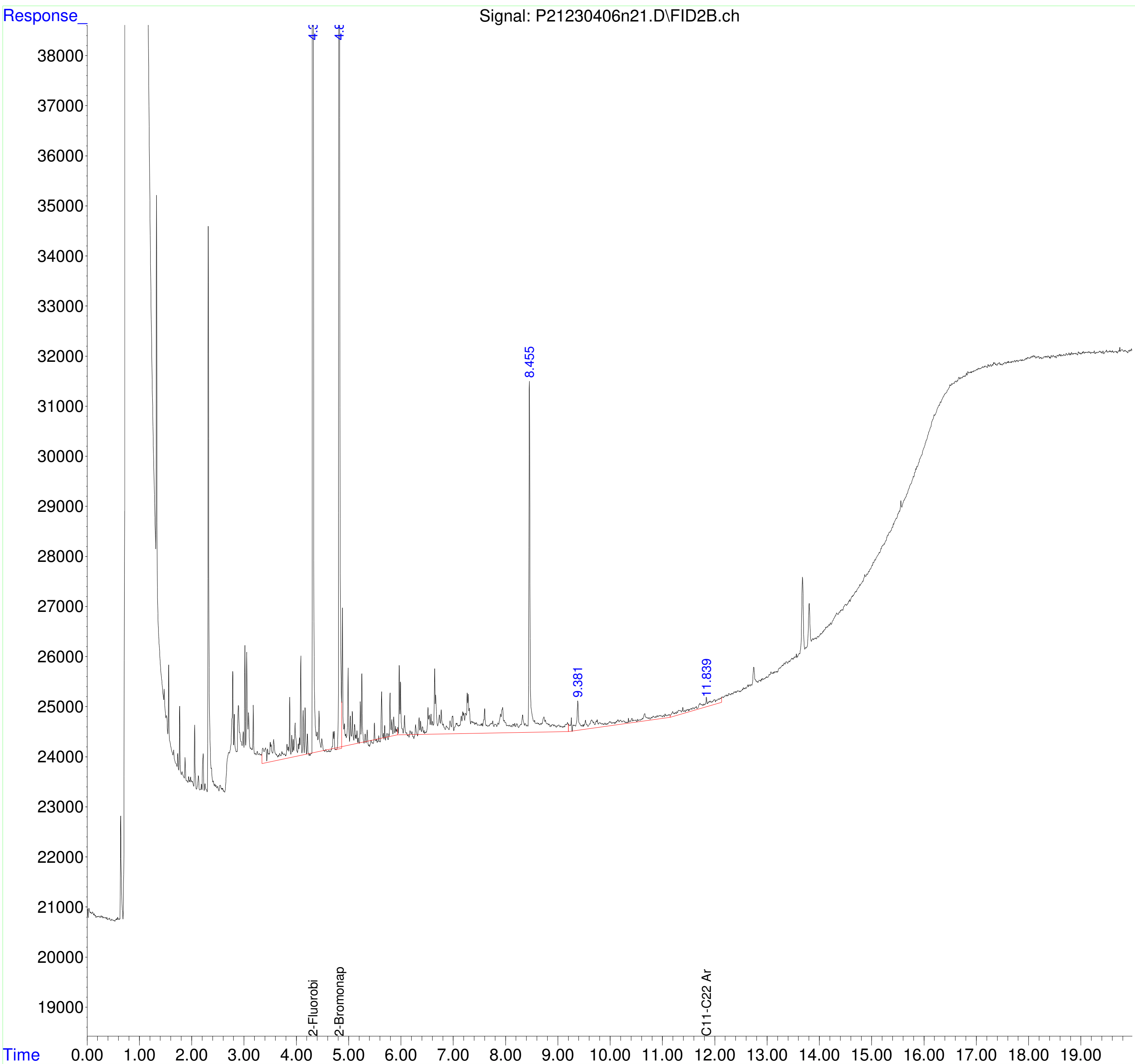
```
Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n21.D
Signal(s) : FID2B.ch
Acq On    :  7 Apr 2023   6:10 pm
Operator  : Petro21b:sr
Sample    : 5w30 40
Misc      : 5w30 ARO oil
ALS Vial  : 61   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 14:12:46 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed

        Compound                        R.T.       Response    Conc Units
 ---------------------------------------------------------------------------

 System Monitoring Compounds
 3) s   2-Fluorobiphenyl               4.318       1028657   14.698 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   73.49%
 5) s   2-Bromonaphthalene             4.820        700166   14.206 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   71.03%
10) S   o-terphenyl                    0.000             0    N.D.  mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =    0.00%#

 Target Compounds
 1)     Naphthalene                    0.000             0    N.D.  mg/L
 2)     2-Methylnaphthalene            0.000             0    N.D.  mg/L  d
 4)     Acenaphthalene                 0.000             0    N.D.  mg/L
 6)     Acenaphthene                   0.000             0    N.D.  mg/L  d
 7)     Fluorene                       0.000             0    N.D.  mg/L  d
 8)     Phenanthrene                   0.000             0    N.D.  mg/L  d
 9)     Anthracene                     0.000             0    N.D.  mg/L  d
11)     Fluoranthene                   0.000             0    N.D.  mg/L
12)     Pyrene                         0.000             0    N.D.  mg/L
13)     Benzo(a)anthracene             0.000             0    N.D.  mg/L
14)     Chrysene                       0.000             0    N.D.  mg/L
15)     Benzo(b)fluoranthene           0.000             0    N.D.  mg/L
16)     Benzo(k)fluoranthene           0.000             0    N.D.  mg/L
17)     Benzo(a)pyrene                 0.000             0    N.D.  mg/L
18)     Indeno(1,2,3-cd)pyrene         0.000             0    N.D.  mg/L
19)     Dibenzo(a,h)anthracene         0.000             0    N.D.  mg/L
20)     Benzo(ghi)perylene             0.000             0    N.D.  mg/L
21) H   C11-C22 Aromatic Range        11.839        901803   10.787 mg/L  M5
 ---------------------------------------------------------------------------

 (f)=RT Delta > 1/2 Window                              (m)=manual int.
```

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n21.D
Signal(s) : FID2B.ch
Acq On    :  7 Apr 2023   6:10 pm
Operator  : Petro21b:sr
Sample    : 5w30 40
Misc      : 5w30 ARO oil
ALS Vial  : 61   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 14:12:46 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

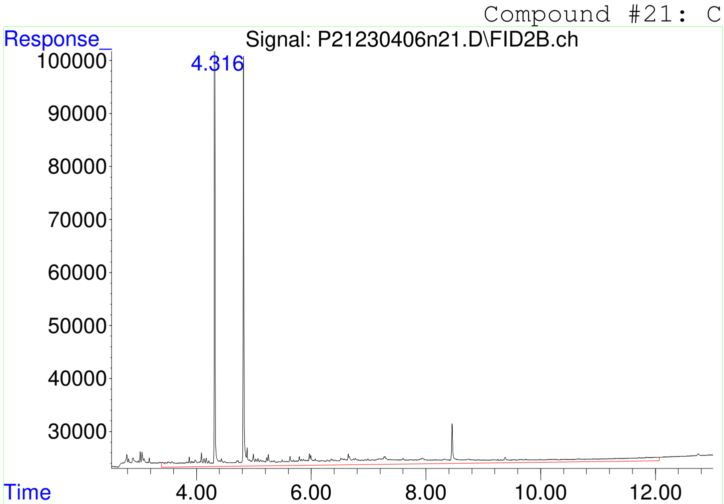
Volume Inj.  :
Signal Phase :
Signal Info  :

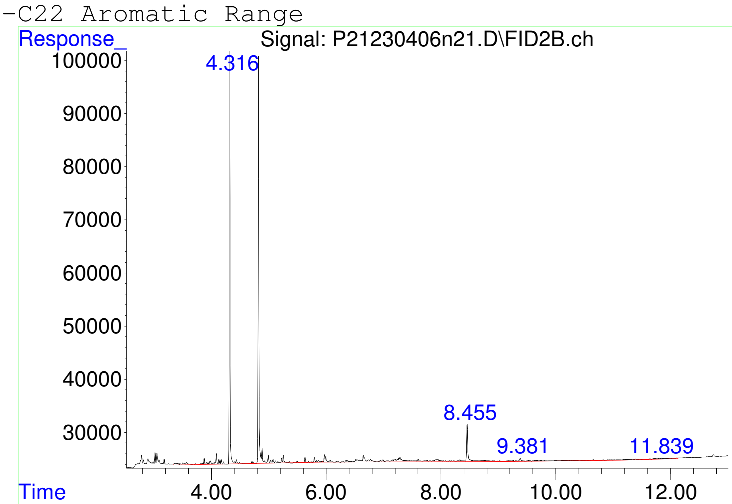


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230406N.SEC\ | QMethod | : MAARO211129B.M |
| Data File | : P21230406n21.D | Operator | : Petro21b:sr |
| Date Inj'd | : 4/7/2023 6:10 pm | Instrument | : Petro 21 |
| Sample | : 5w30 40 | Quant Date | : 4/10/2023 1:27 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3841307 Manual Peak Response = 901803 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n22.D
Signal(s) : FID1A.ch
Acq On : 7 Apr 2023 6:10 pm
Operator : Petro21a:sr
Sample : 5w30 40
Misc : 5w30 ALI Oil
ALS Vial : 11 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:18:58 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | | |
| 3) | S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) | S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) | S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) | S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) | S | 1-Chlorooctadecane | 0.000 | 0 | N.D. | mg/L | d |
| Spiked Amount 20.000 | | Range 40 - 140 | | Recovery = | 0.00%# | | |
| Target Compounds | | | | | | | |
| 1) | | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | |
| 2) | | Decane (C10) | 0.000 | 0 | N.D. | mg/L | |
| 4) | | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | |
| 19) | | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | |
| 20) | H | C9-C18 Aliphatics | 6.030 | 492286 | 6.879 | mg/L | M5 |
| 21) | H | C19-C36 Aliphatics | 13.882f | 3965875 | 57.583 | mg/L | M5 |

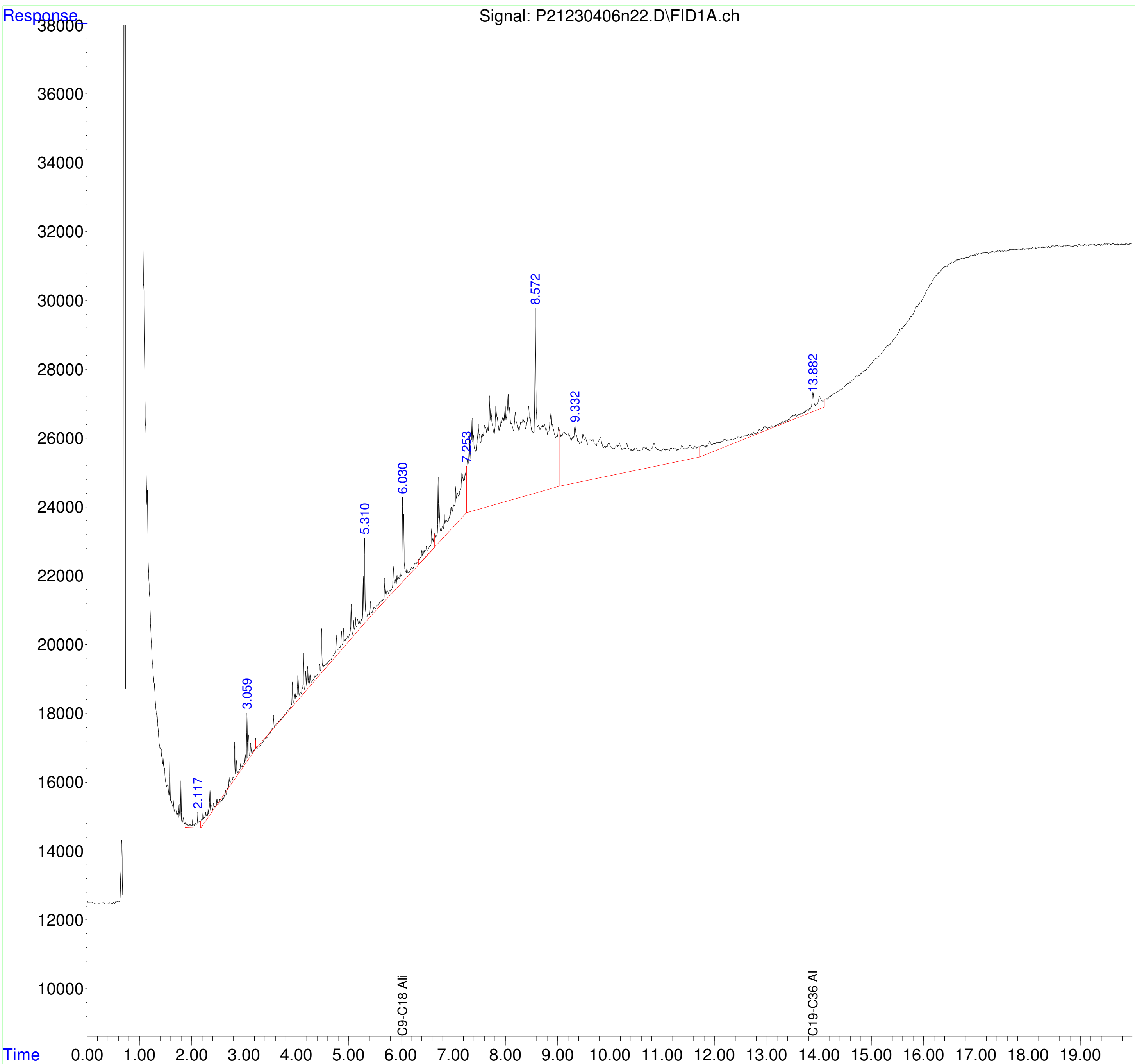
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n22.D
Signal(s) : FID1A.ch
Acq On    :  7 Apr 2023   6:10 pm
Operator  : Petro21a:sr
Sample    : 5w30 40
Misc      : 5w30 ALI Oil
ALS Vial  : 11   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:18:58 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

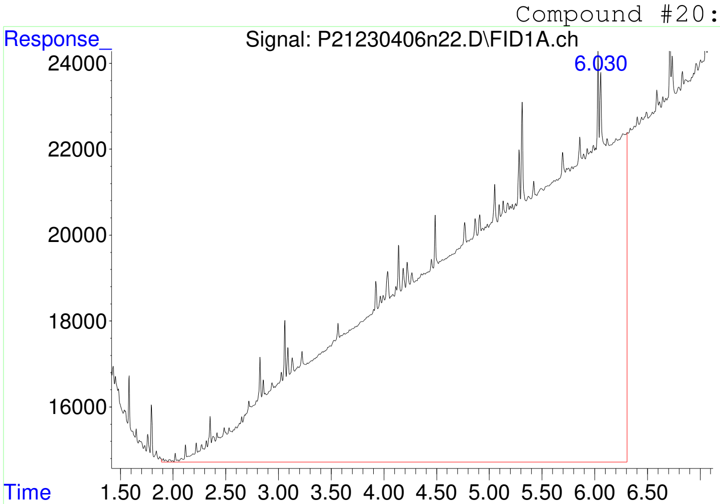


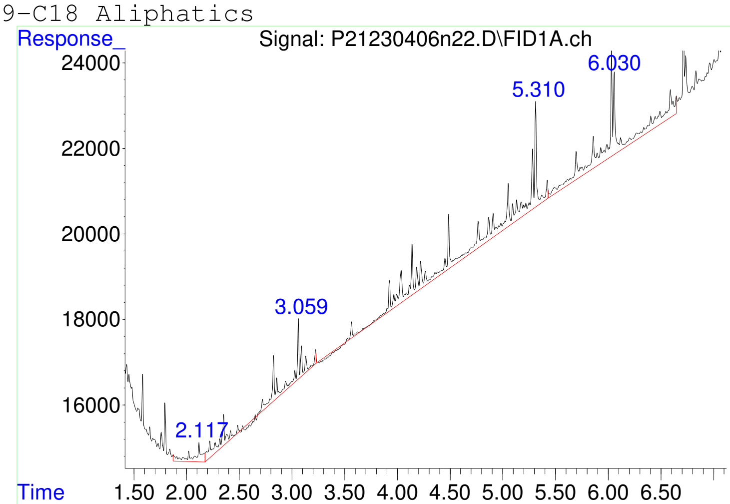
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n22.D
Date Inj'd : 4/7/2023 6:10 pm
Sample : 5w30 40

QMethod : MAALI211129A.M
Operator : Petro21a:sr
Instrument : Petro 21
Quant Date : 4/10/2023 1:08 pm

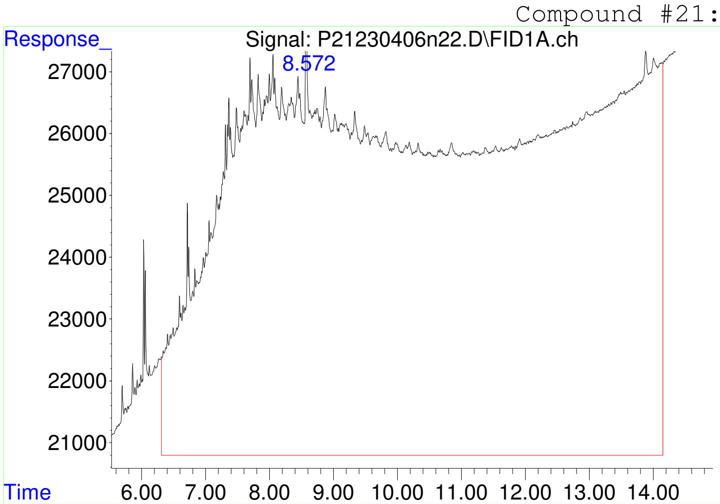
Compound #20: C9-C18 Aliphatics

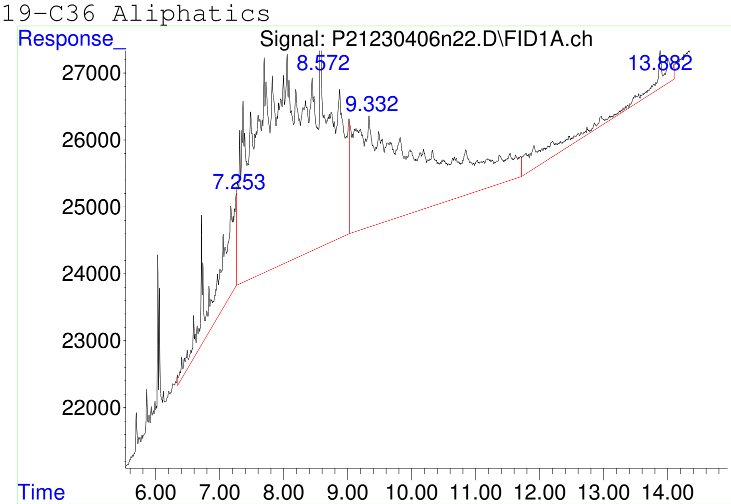



Original Peak Response = 10244039
Manual Peak Response = 492286 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 23591150
Manual Peak Response = 3965875 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n23.D
Signal(s) : FID2B.ch
Acq On : 7 Apr 2023 6:35 pm
Operator : Petro21b:sr
Sample : 5w30 45
Misc : 5w30 ARO oil
ALS Vial : 62 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 14:13:12 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.318 | 800015 | 11.431 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 57.16% | |
| 5) s 2-Bromonaphthalene | 4.820 | 542000 | 10.997 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 54.98% | |
| 10) S o-terphenyl | 0.000 | 0 | N.D. mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 0.00%# | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 12.047 | 979167 | 11.713 mg/L | M5 |

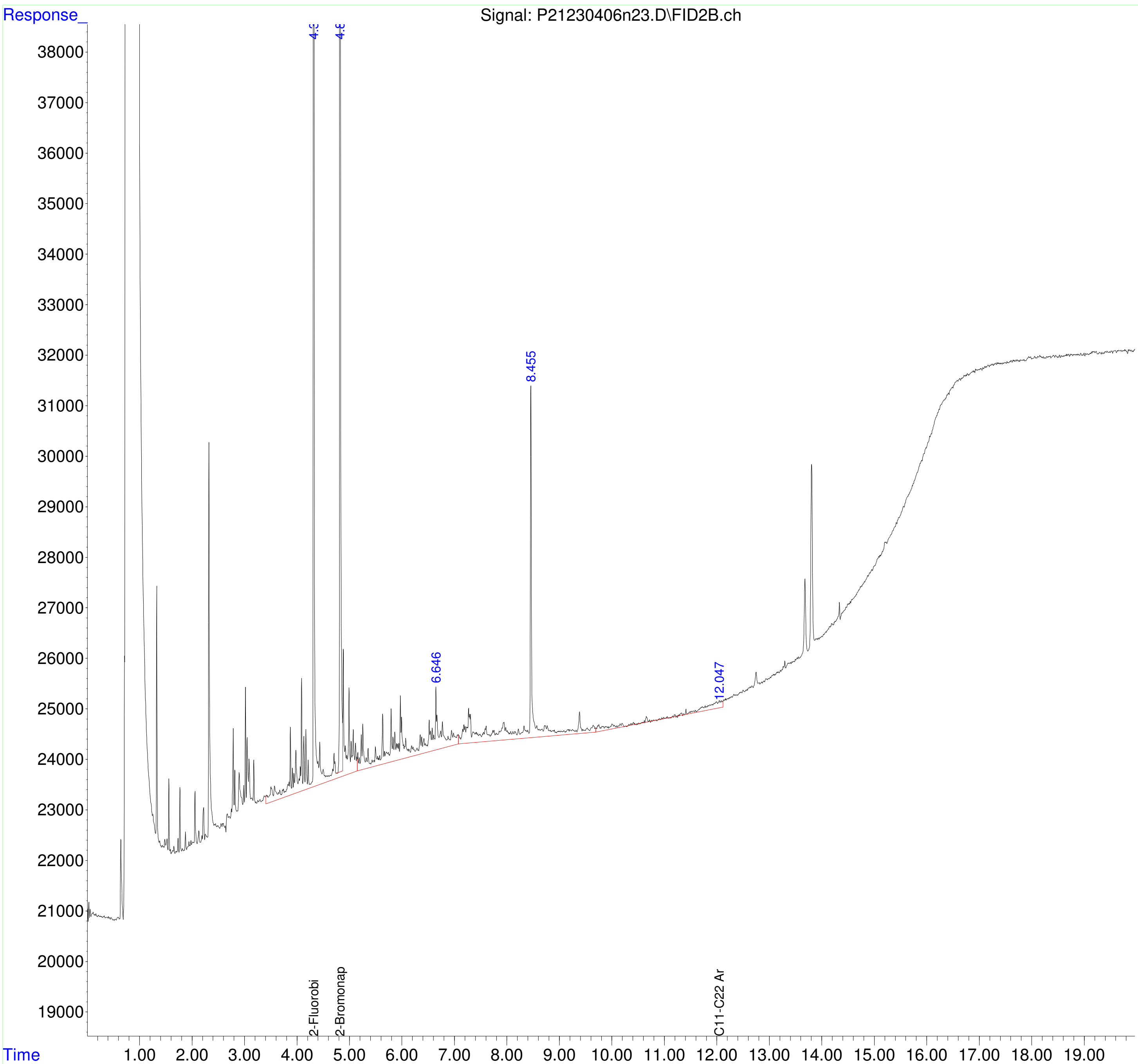
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n23.D
Signal(s) : FID2B.ch
Acq On    :  7 Apr 2023   6:35 pm
Operator  : Petro21b:sr
Sample    : 5w30 45
Misc      : 5w30 ARO oil
ALS Vial  : 62   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 14:13:12 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

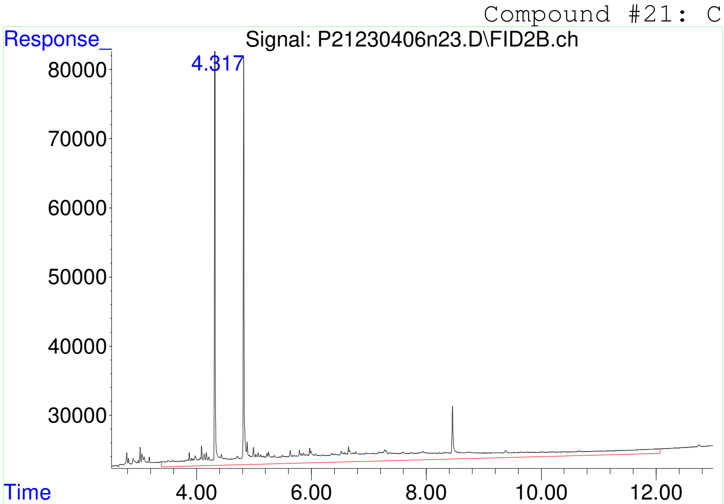


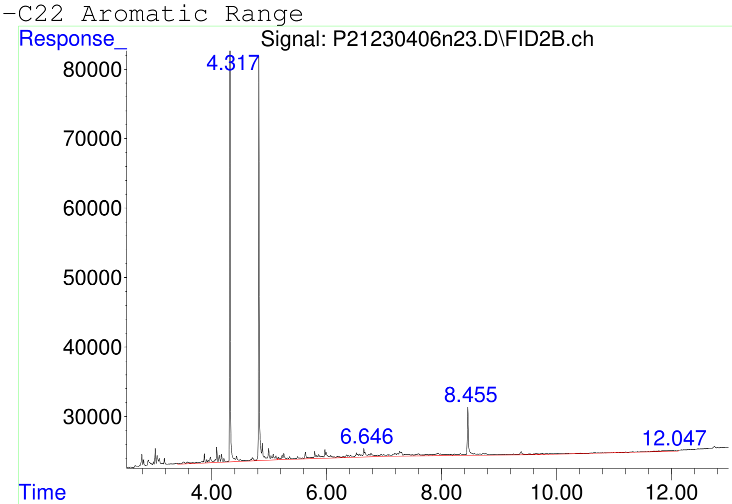
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n23.D
Date Inj'd : 4/7/2023 6:35 pm
Sample : 5w30 45

QMethod : MAARO211129B.M
Operator : Petro21b:sr
Instrument : Petro 21
Quant Date : 4/10/2023 1:27 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 4715794

Manual Peak Response = 979167 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n24.D
Signal(s) : FID1A.ch
Acq On : 7 Apr 2023 6:35 pm
Operator : Petro21a:sr
Sample : 5w30 45
Misc : 5w30 ALI Oil
ALS Vial : 12 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:19:30 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 0.000 | 0 | N.D. | mg/L | d |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 0.00%# | | |
| Target Compounds | | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 6.031 | 1227640 | 17.153 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.006f | 5775910 | 83.864 | mg/L | M5 |

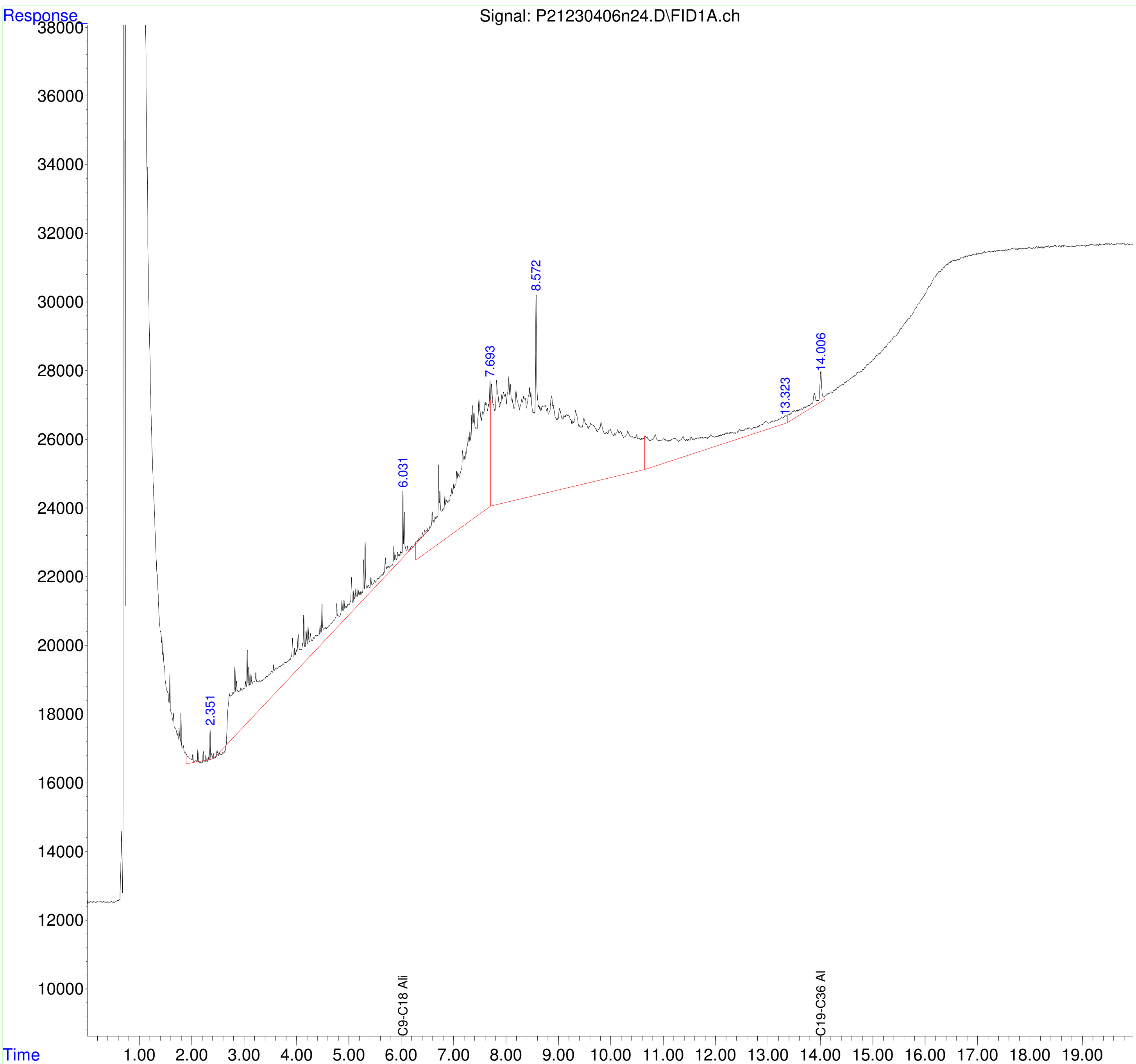
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n24.D
Signal(s) : FID1A.ch
Acq On    :  7 Apr 2023   6:35 pm
Operator  : Petro21a:sr
Sample    : 5w30 45
Misc      : 5w30 ALI Oil
ALS Vial  : 12   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:19:30 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

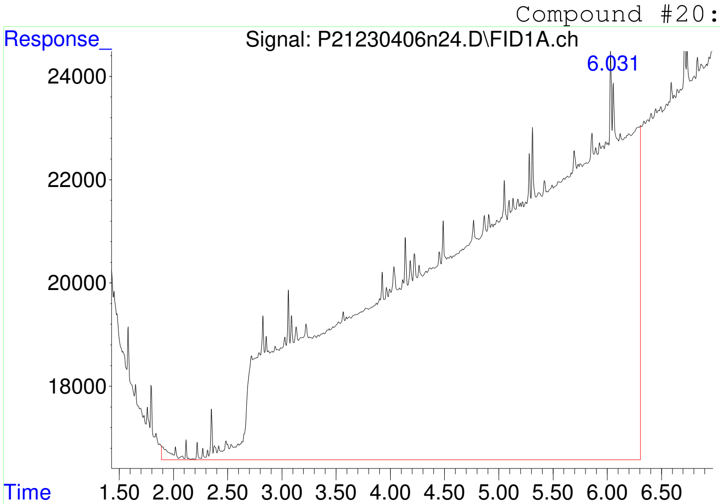
Volume Inj.  :
Signal Phase :
Signal Info  :

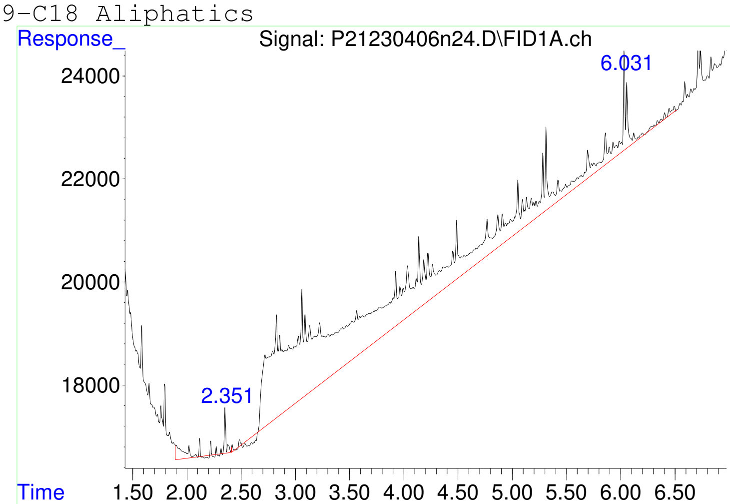


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230406n\ | QMethod | : MAALI211129A.M |
| Data File | : P21230406n24.D | Operator | : Petro21a:sr |
| Date Inj'd | : 4/7/2023 6:35 pm | Instrument | : Petro 21 |
| Sample | : 5w30 45 | Quant Date | : 4/10/2023 1:08 pm |

Compound #20: C9-C18 Aliphatics

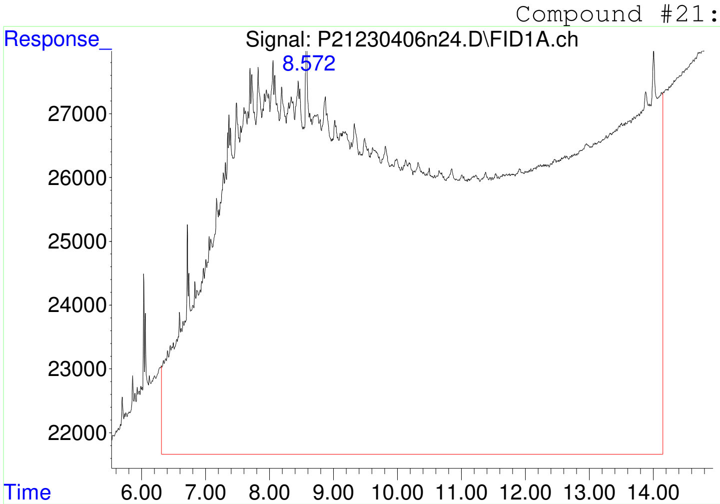


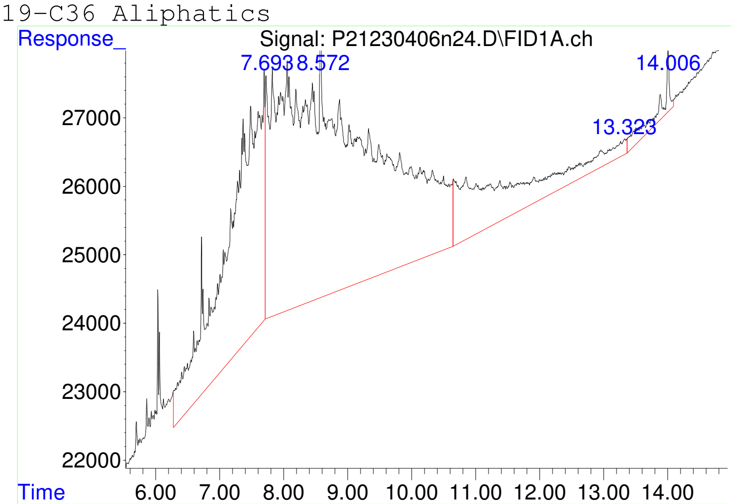




Original Peak Response = 8848819 Manual Peak Response = 1227640 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 21483621 Manual Peak Response = 5775910 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n25.D
Signal(s) : FID2B.ch
Acq On : 7 Apr 2023 7:00 pm
Operator : Petro21b:sr
Sample : 5w30 50
Misc : 5w30 ARO oil
ALS Vial : 63 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 14:13:35 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.318 | 927168 | 13.247 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 66.23% | |
| 5) s 2-Bromonaphthalene | 4.821 | 626023 | 12.702 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 63.51% | |
| 10) S o-terphenyl | 0.000 | 0 | N.D. mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 0.00%# | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 12.158 | 992152 | 11.868 mg/L | M5 |

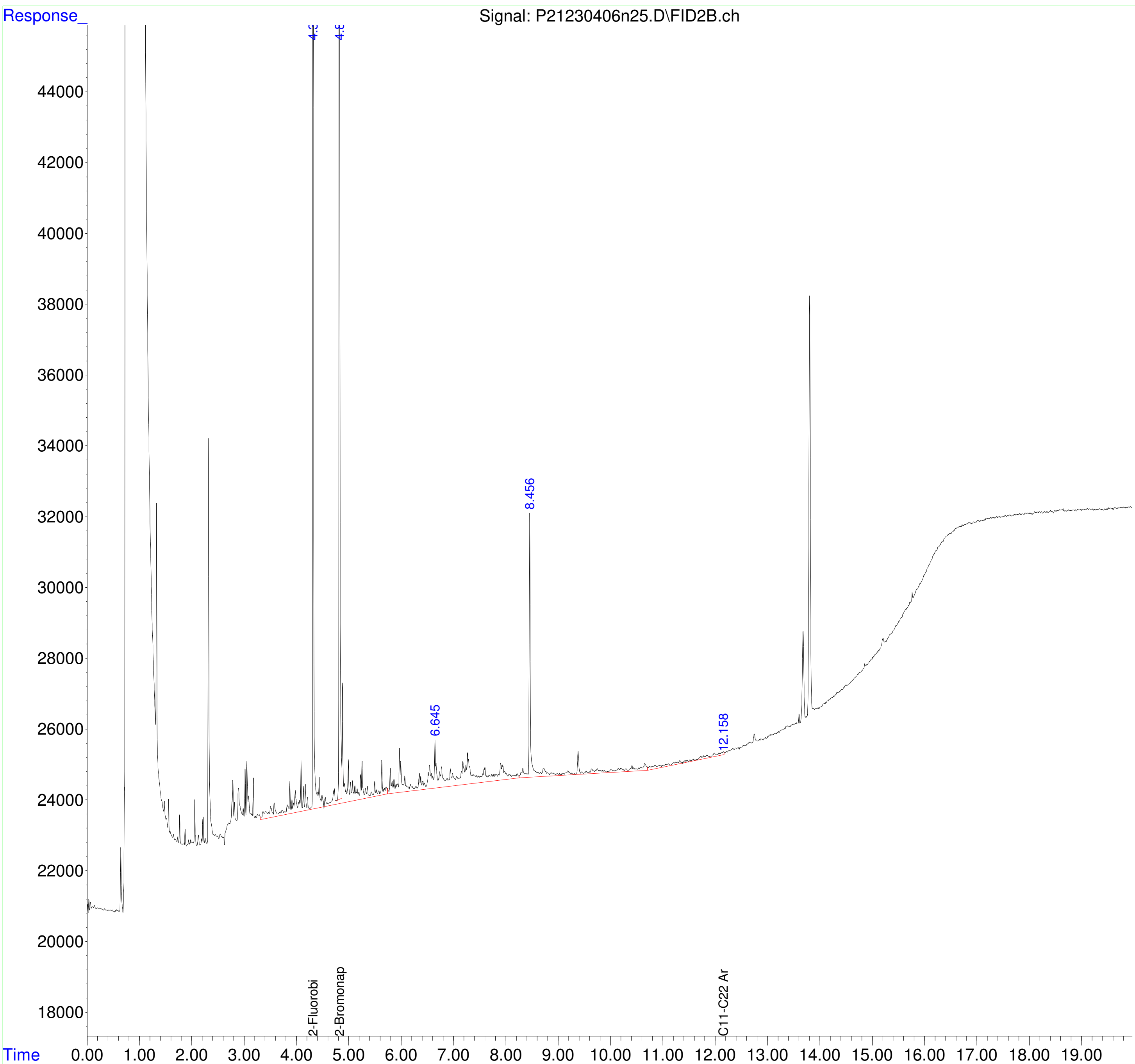
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n25.D
Signal(s) : FID2B.ch
Acq On    :  7 Apr 2023   7:00 pm
Operator  : Petro21b:sr
Sample    : 5w30 50
Misc      : 5w30 ARO oil
ALS Vial  : 63   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 14:13:35 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

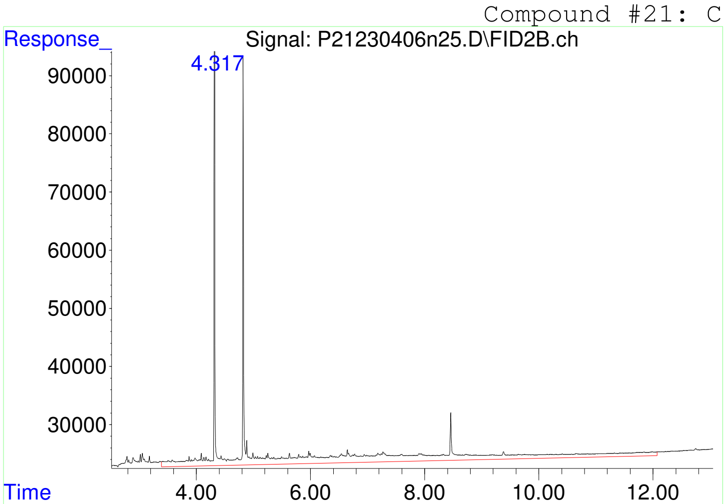
Volume Inj.  :
Signal Phase :
Signal Info  :

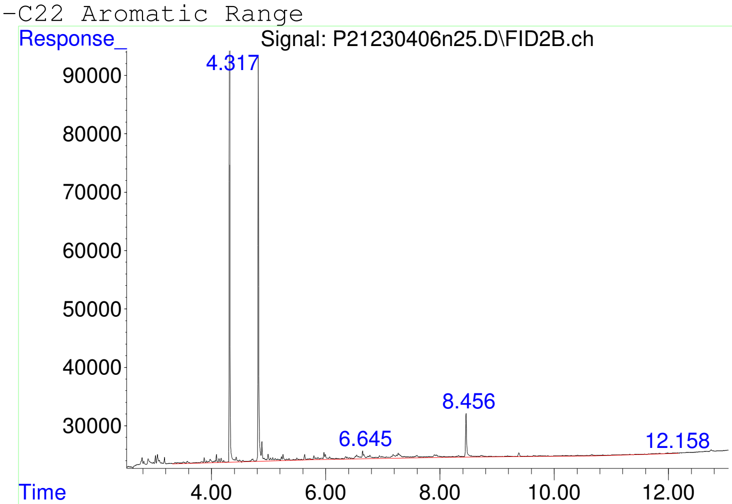


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230406N.SEC\ | QMethod | : MAARO211129B.M |
| Data File | : P21230406n25.D | Operator | : Petro21b:sr |
| Date Inj'd | : 4/7/2023 7:00 pm | Instrument | : Petro 21 |
| Sample | : 5w30 50 | Quant Date | : 4/10/2023 1:27 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 4896136

Manual Peak Response = 992152 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n26.D
Signal(s) : FID1A.ch
Acq On : 7 Apr 2023 7:00 pm
Operator : Petro21a:sr
Sample : 5w30 50
Misc : 5w30 ALI Oil
ALS Vial : 13 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:21:06 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 0.000 | 0 | N.D. | mg/L | d |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 0.00%# | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 6.031 | 784539 | 10.962 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.008f | 4599300 | 66.780 | mg/L | M5 |

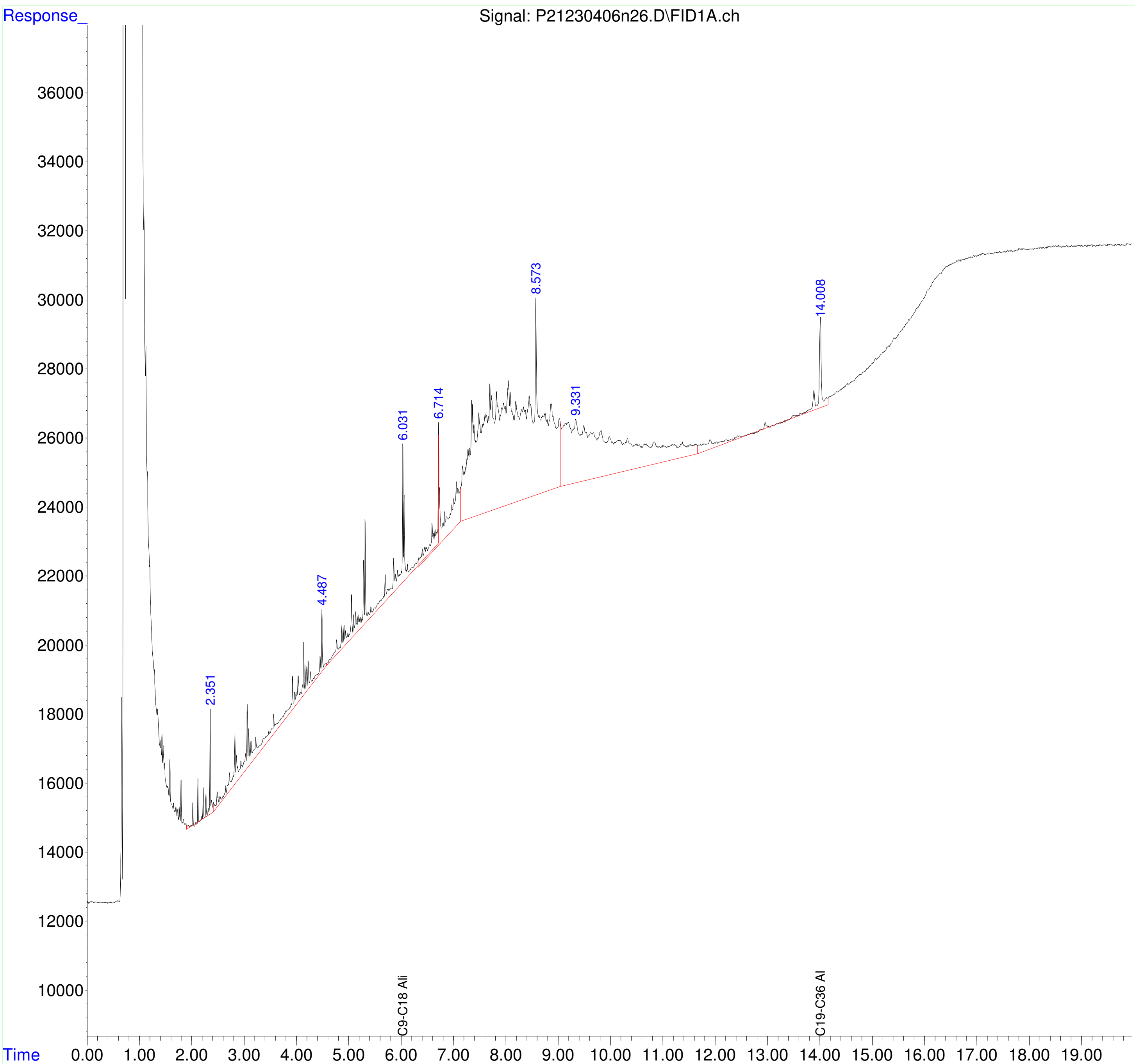
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n26.D
Signal(s) : FID1A.ch
Acq On : 7 Apr 2023 7:00 pm
Operator : Petro21a:sr
Sample : 5w30 50
Misc : 5w30 ALI Oil
ALS Vial : 13 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:21:06 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

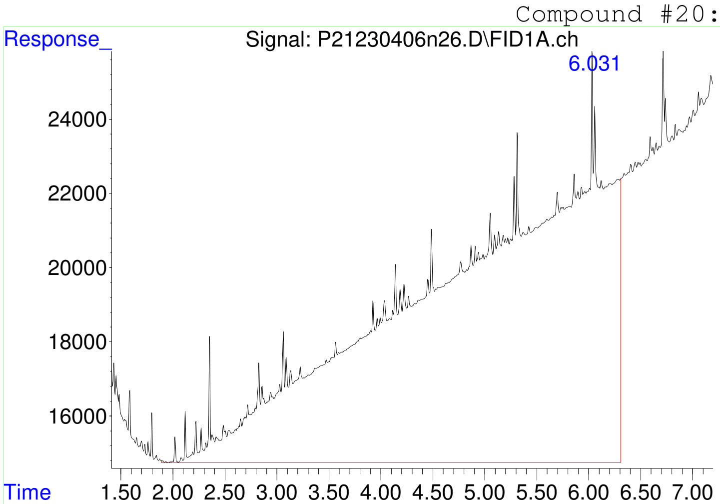
Volume Inj. :
Signal Phase :
Signal Info :

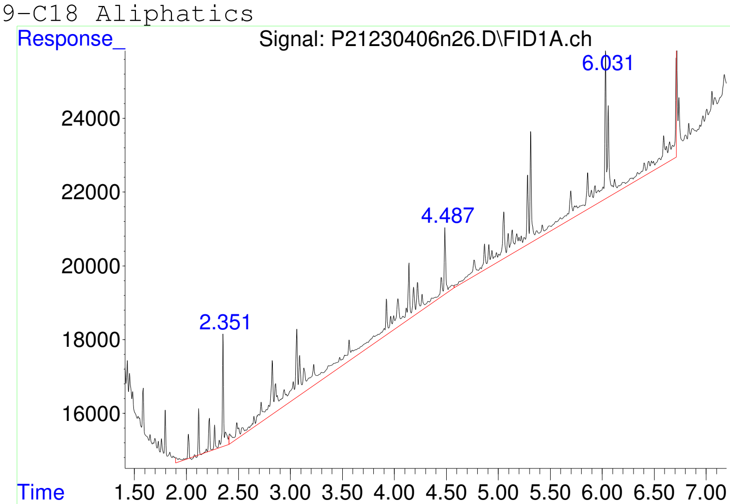


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230406n\ | QMethod | : MAALI211129A.M |
| Data File | : P21230406n26.D | Operator | : Petro21a:sr |
| Date Inj'd | : 4/7/2023 7:00 pm | Instrument | : Petro 21 |
| Sample | : 5w30 50 | Quant Date | : 4/10/2023 1:09 pm |

Compound #20: C9-C18 Aliphatics

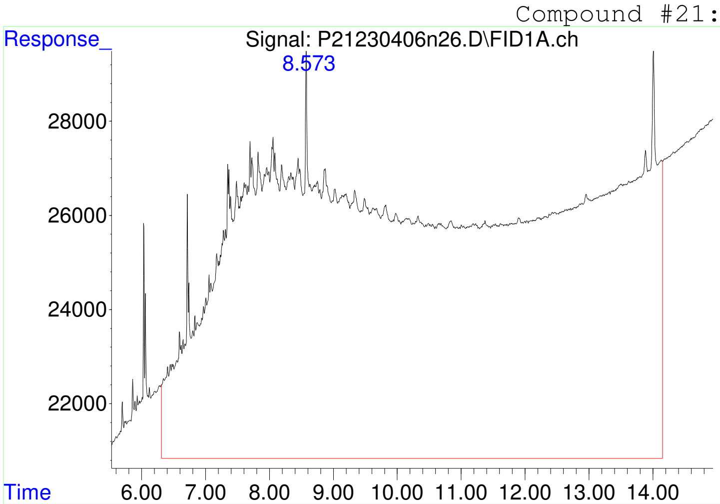


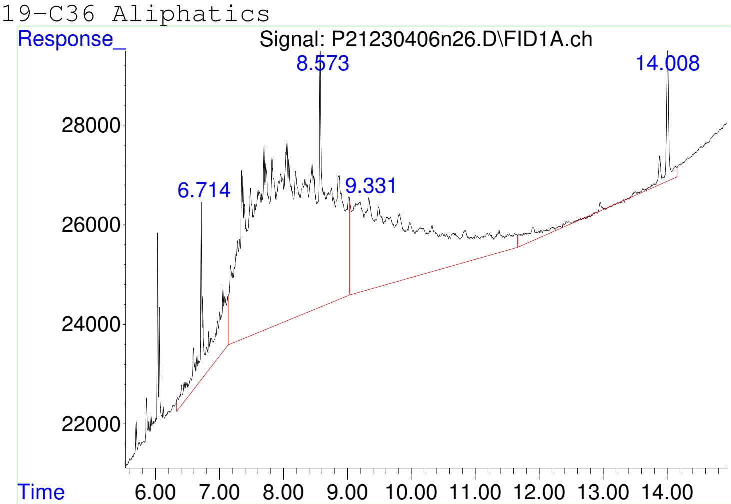




Original Peak Response = 10399315    Manual Peak Response = 784539 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 24057319    Manual Peak Response = 4599300 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n27.D
Signal(s) : FID2B.ch
Acq On : 7 Apr 2023 7:25 pm
Operator : Petro21b:sr
Sample : 5w30 55
Misc : 5w30 ARO oil
ALS Vial : 64 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 14:14:03 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | |
| 3) s | 2-Fluorobiphenyl | 4.318 | 780634 | 11.154 mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 55.77% | |
| 5) s | 2-Bromonaphthalene | 4.821 | 527462 | 10.702 mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 53.51% | |
| 10) S | o-terphenyl | 0.000 | 0 | N.D. mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 0.00%# | |
| | **Target Compounds** | | | | |
| 1) | Naphthalene | 0.000 | 0 | N.D. mg/L | |
| 2) | 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) | Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) | Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) | Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) | Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) | Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) | Fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 12) | Pyrene | 0.000 | 0 | N.D. mg/L | |
| 13) | Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | |
| 14) | Chrysene | 0.000 | 0 | N.D. mg/L | |
| 15) | Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) | Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) | Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) | Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) | Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) | Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H | C11-C22 Aromatic Range | 12.227f | 602947 | 7.212 mg/L | M5 |

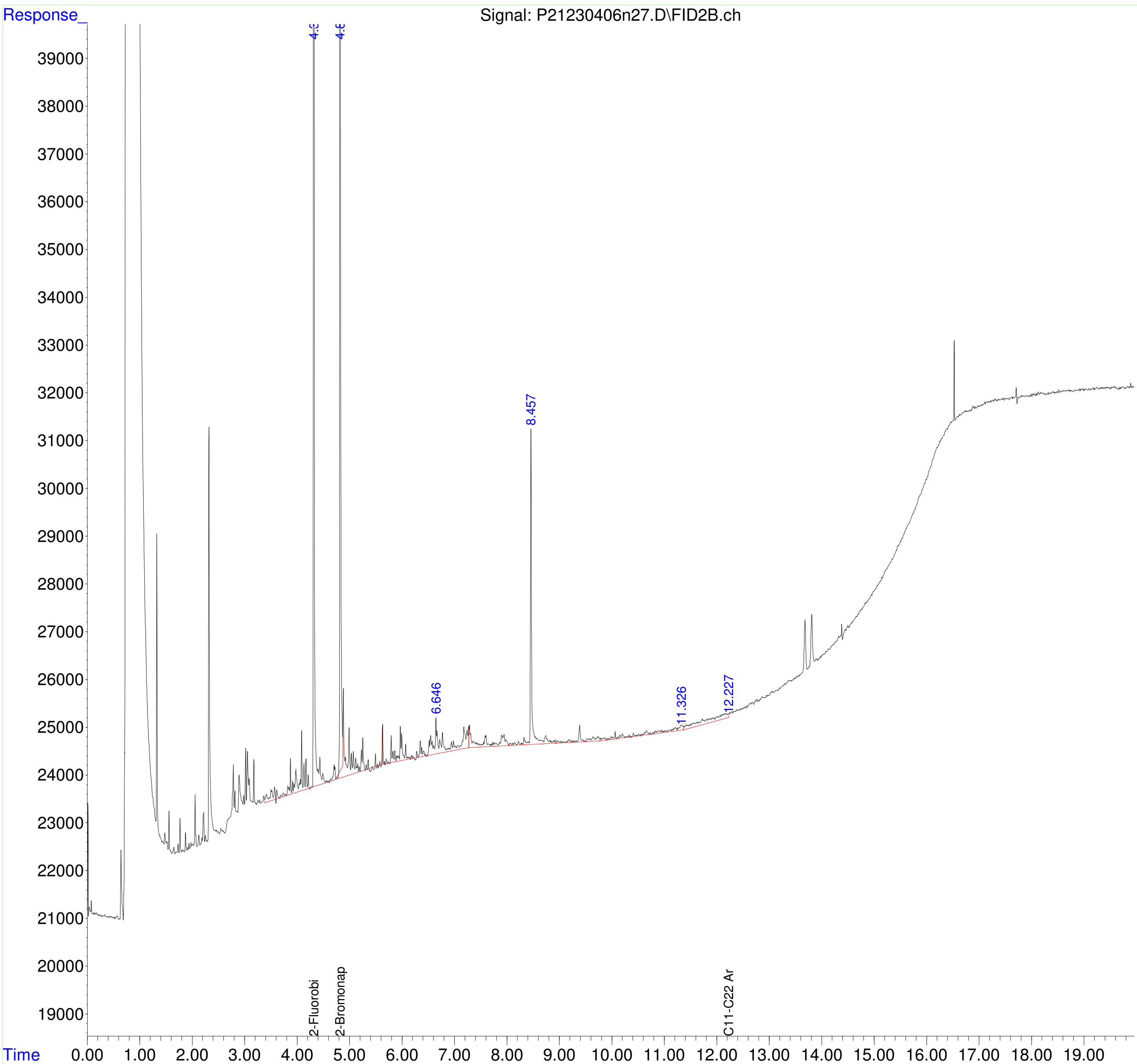
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n27.D
Signal(s) : FID2B.ch
Acq On : 7 Apr 2023 7:25 pm
Operator : Petro21b:sr
Sample : 5w30 55
Misc : 5w30 ARO oil
ALS Vial : 64 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 14:14:03 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

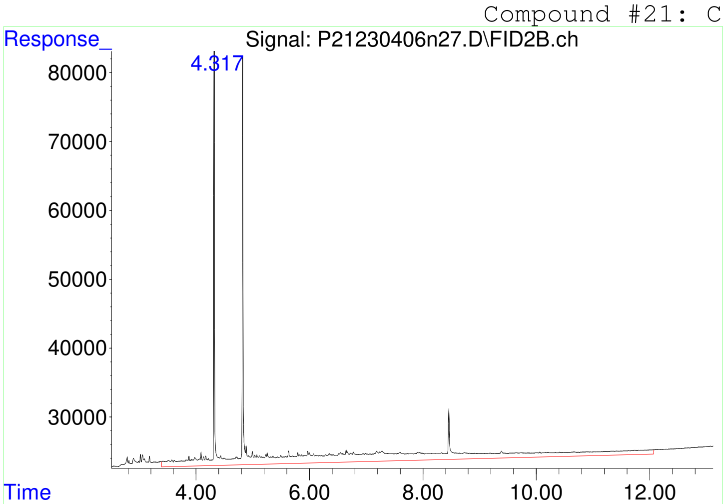


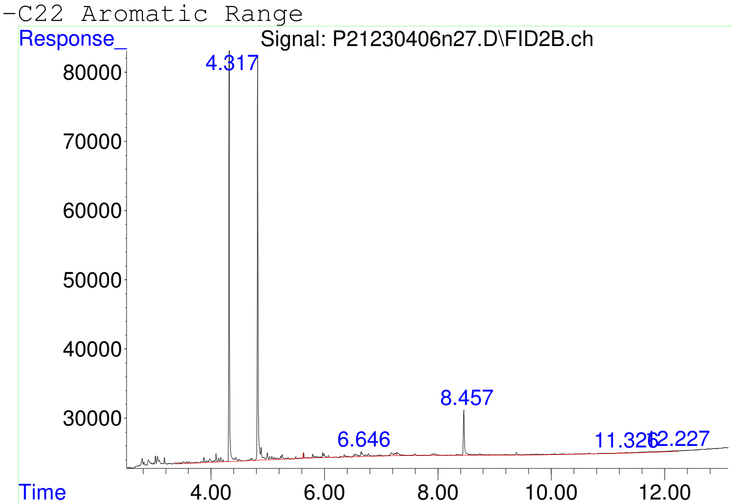
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n27.D
Date Inj'd : 4/7/2023 7:25 pm
Sample : 5w30 55

QMethod : MAARO211129B.M
Operator : Petro21b:sr
Instrument : Petro 21
Quant Date : 4/10/2023 1:27 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 4532871

Manual Peak Response = 602947 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n28.D
Signal(s) : FID1A.ch
Acq On : 7 Apr 2023 7:25 pm
Operator : Petro21a:sr
Sample : 5w30 55
Misc : 5w30 ALI Oil
ALS Vial : 14 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:23:22 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

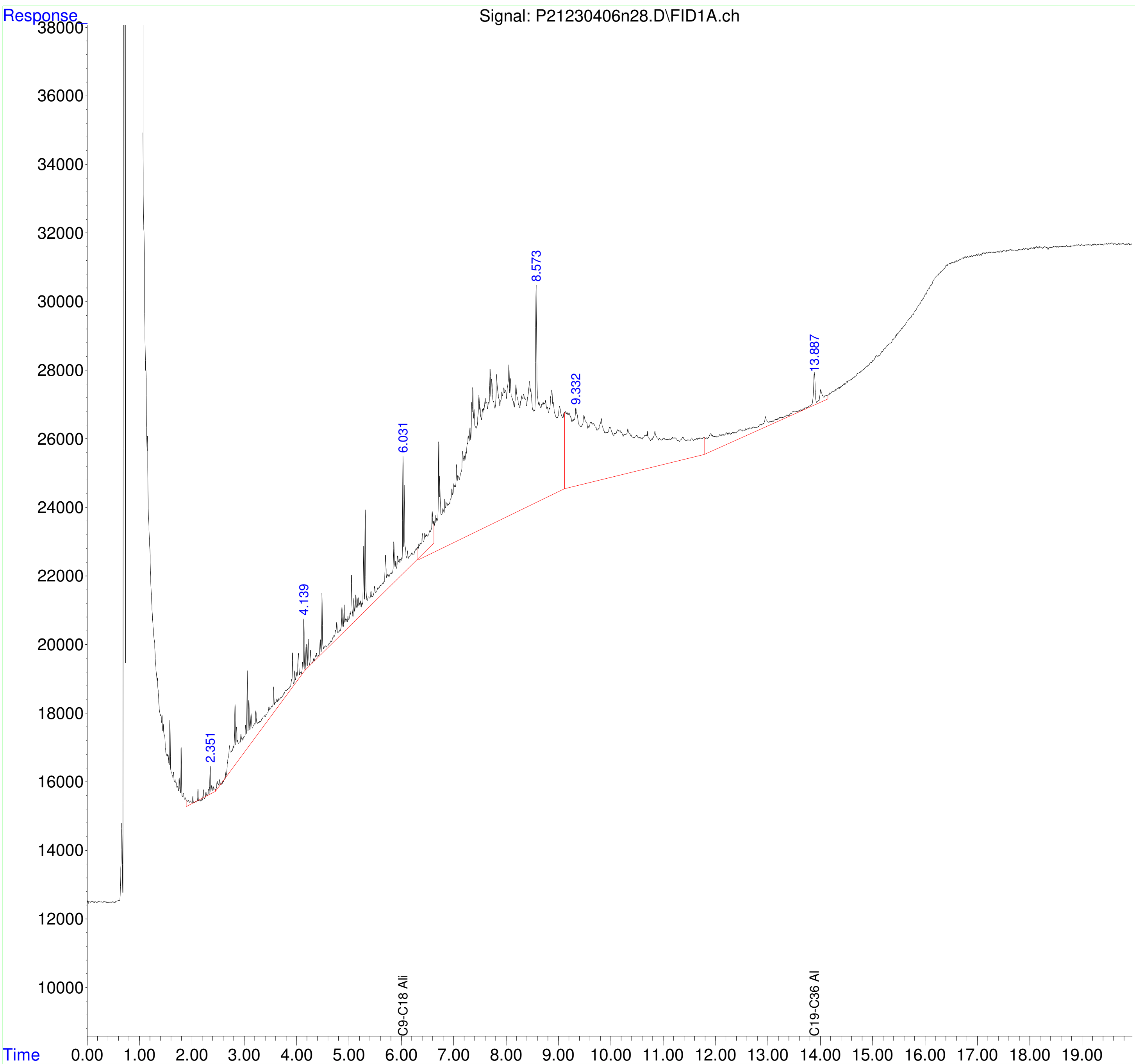
Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 0.000 | 0 | N.D. | mg/L | d |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 0.00%# | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 6.031 | 933971 | 13.050 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 13.887f | 6366479 | 92.439 | mg/L | M5 |

(f)=RT Delta > 1/2 Window (m)=manual int.

```
Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n28.D
Signal(s) : FID1A.ch
Acq On    :  7 Apr 2023   7:25 pm
Operator  : Petro21a:sr
Sample    : 5w30 55
Misc      : 5w30 ALI Oil
ALS Vial  : 14   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:23:22 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :
```

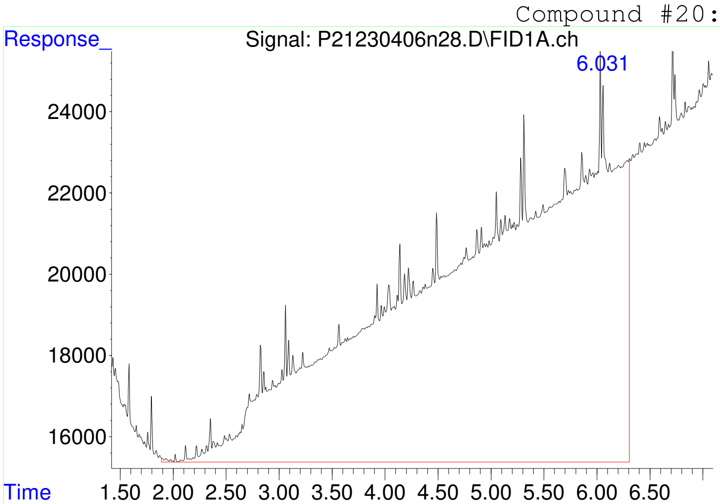


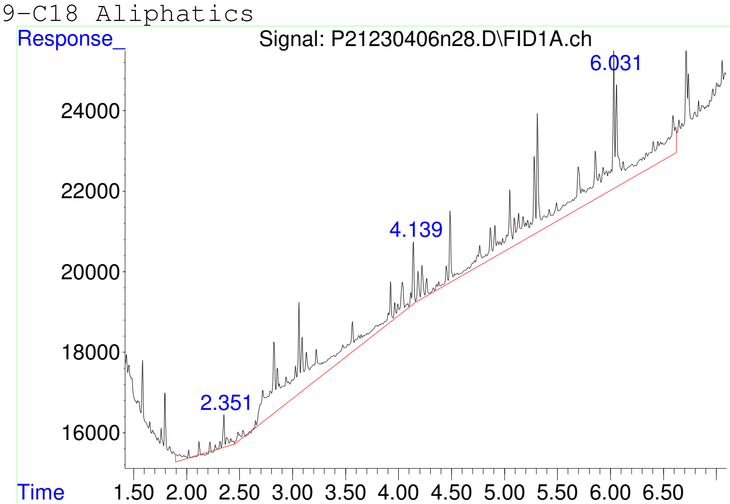
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n28.D
Date Inj'd : 4/7/2023 7:25 pm
Sample : 5w30 55

QMethod : MAALI211129A.M
Operator : Petro21a:sr
Instrument : Petro 21
Quant Date : 4/10/2023 1:09 pm

Compound #20: C9-C18 Aliphatics



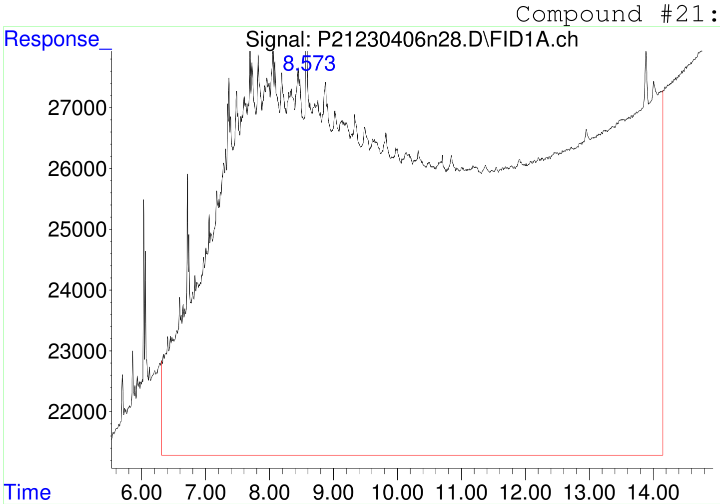



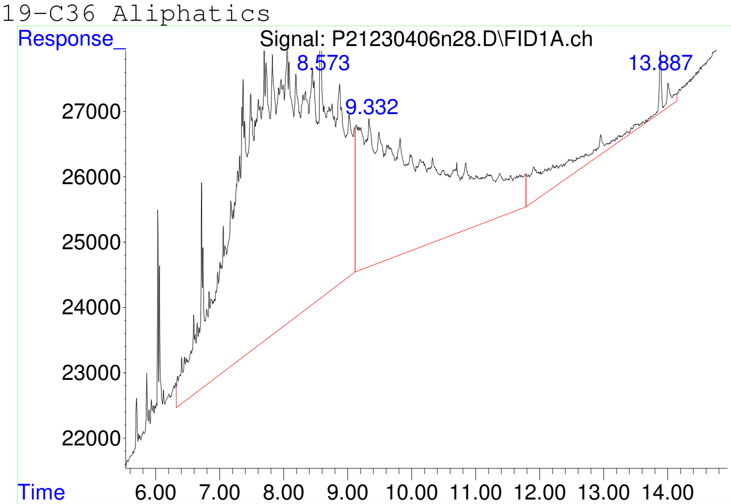

Original Peak Response = 10093591

Manual Peak Response = 933971 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 23290214

Manual Peak Response = 6366479 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n29.D
Signal(s) : FID2B.ch
Acq On : 7 Apr 2023 7:49 pm
Operator : Petro21b:sr
Sample : 5w30 60
Misc : 5w30 ARO oil
ALS Vial : 65 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 14:14:25 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.318 | 872943 | 12.473 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 62.37% | |
| 5) s 2-Bromonaphthalene | 4.821 | 594216 | 12.056 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 60.28% | |
| 10) S o-terphenyl | 0.000 | 0 | N.D. mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 0.00%# | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 12.156 | 1076883 | 12.882 mg/L | M5 |

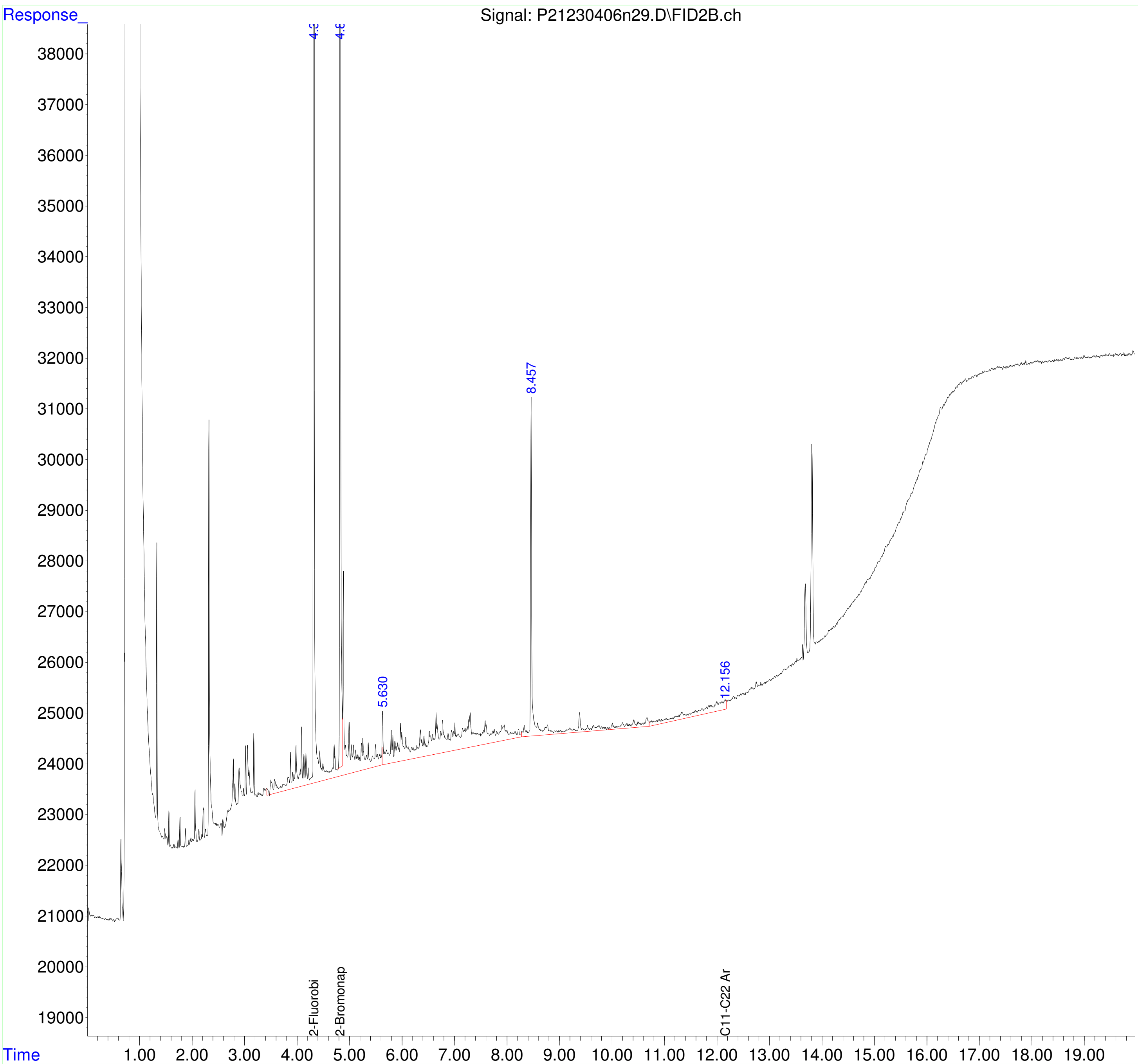
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n29.D
Signal(s) : FID2B.ch
Acq On    :  7 Apr 2023   7:49 pm
Operator  : Petro21b:sr
Sample    : 5w30 60
Misc      : 5w30 ARO oil
ALS Vial  : 65   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 14:14:25 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

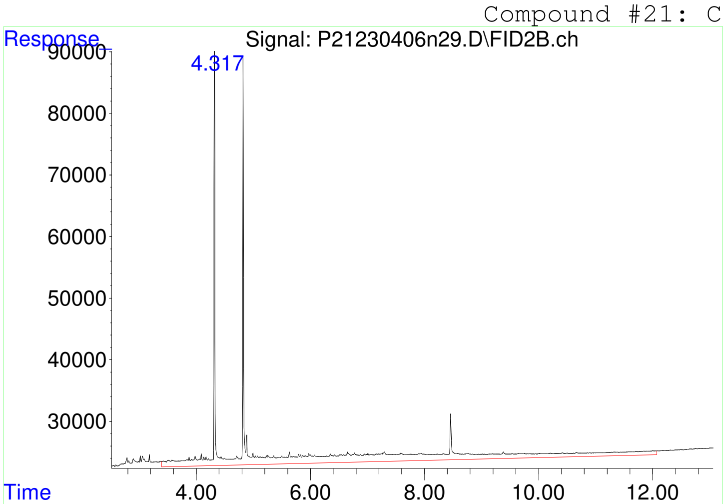


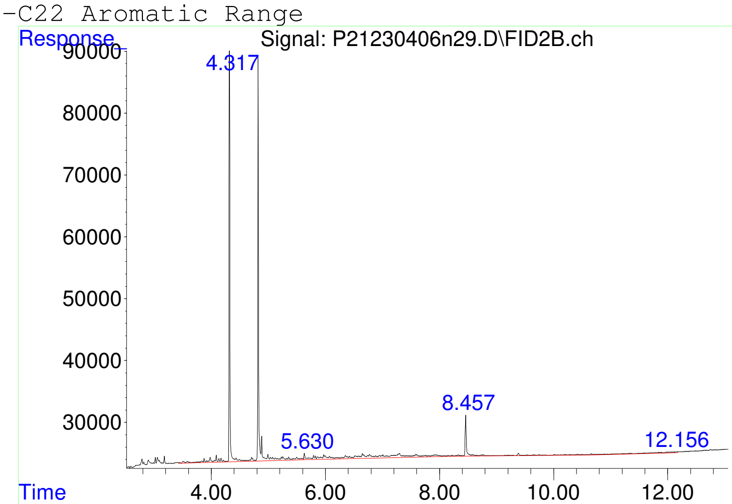
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n29.D
Date Inj'd : 4/7/2023 7:49 pm
Sample : 5w30 60

QMethod : MAARO211129B.M
Operator : Petro21b:sr
Instrument : Petro 21
Quant Date : 4/10/2023 1:28 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 4925798

Manual Peak Response = 1076883 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n30.D
Signal(s) : FID1A.ch
Acq On : 7 Apr 2023 7:49 pm
Operator : Petro21a:sr
Sample : 5w30 60
Misc : 5w30 ALI Oil
ALS Vial : 15 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:24:11 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | | |
| 3) | S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) | S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) | S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) | S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) | S | 1-Chlorooctadecane | 0.000 | 0 | N.D. | mg/L | d |
| Spiked Amount 20.000 | | Range 40 - 140 | | Recovery = | 0.00%# | | |
| Target Compounds | | | | | | | |
| 1) | | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | |
| 2) | | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) | H | C9-C18 Aliphatics | 6.031 | 595256 | 8.317 | mg/L | M5 |
| 21) | H | C19-C36 Aliphatics | 13.889f | 7875348 | 114.347 | mg/L | M5 |

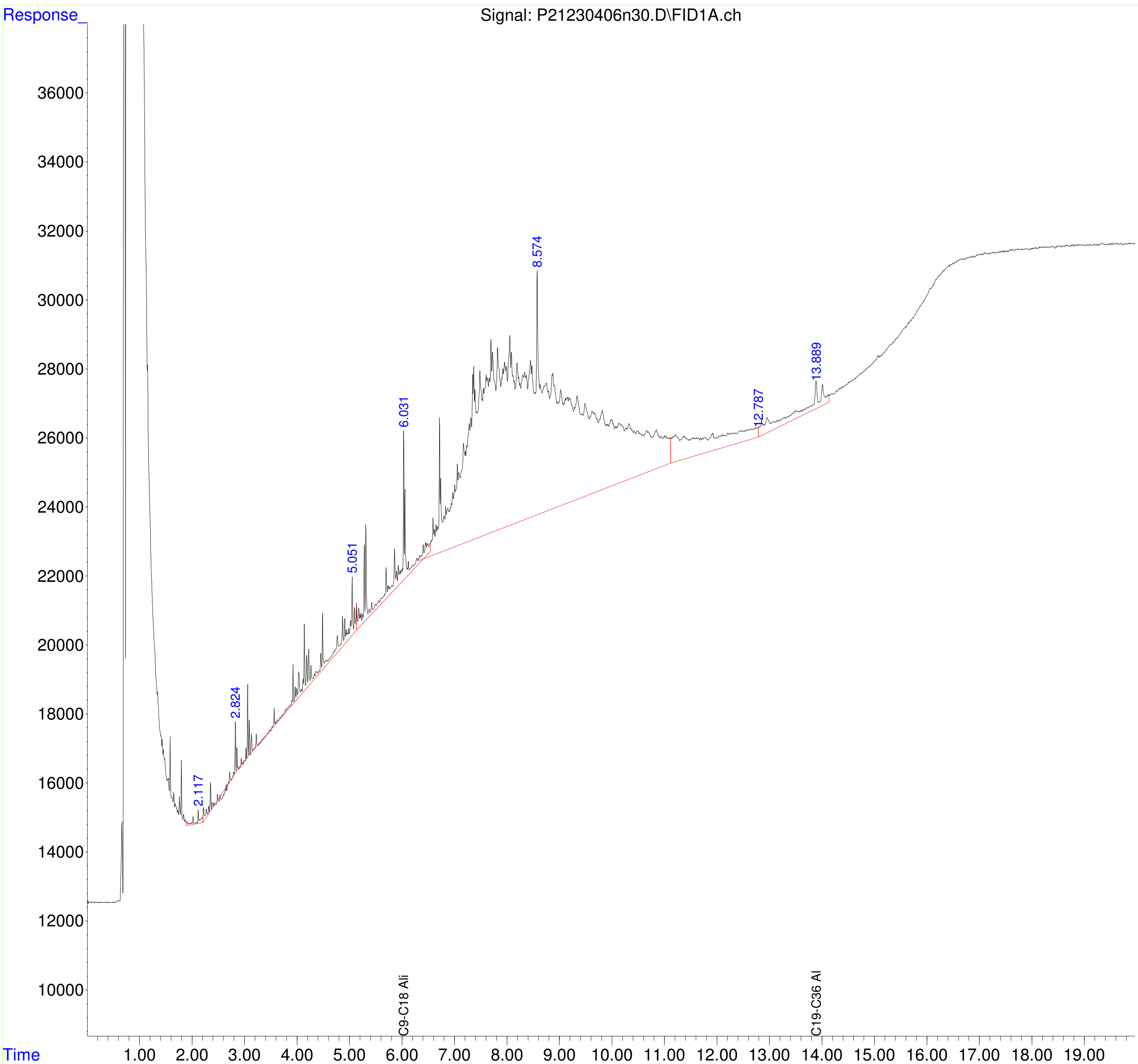
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n30.D
Signal(s) : FID1A.ch
Acq On : 7 Apr 2023 7:49 pm
Operator : Petro21a:sr
Sample : 5w30 60
Misc : 5w30 ALI Oil
ALS Vial : 15 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:24:11 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

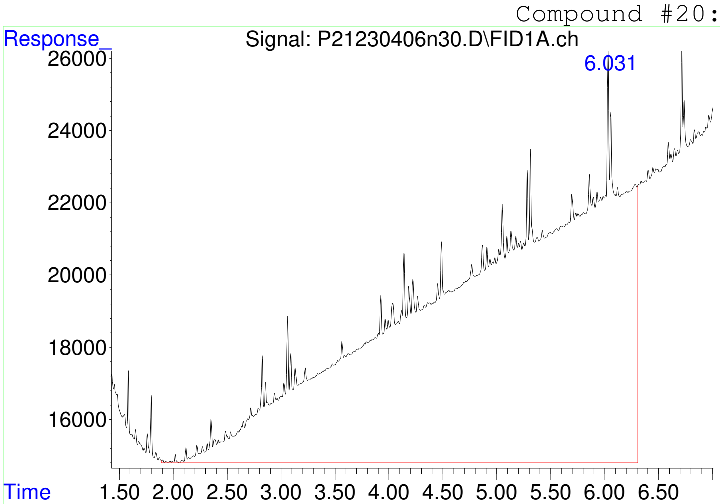


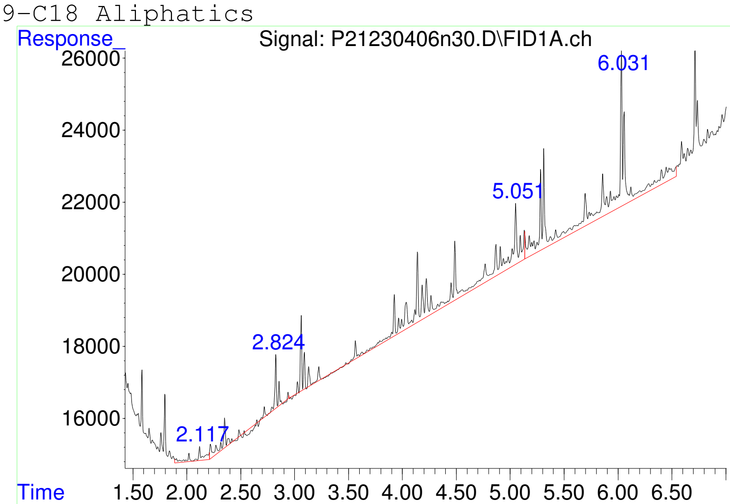
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n30.D
Date Inj'd : 4/7/2023 7:49 pm
Sample : 5w30 60

QMethod : MAALI211129A.M
Operator : Petro21a:sr
Instrument : Petro 21
Quant Date : 4/10/2023 1:09 pm

Compound #20: C9-C18 Aliphatics



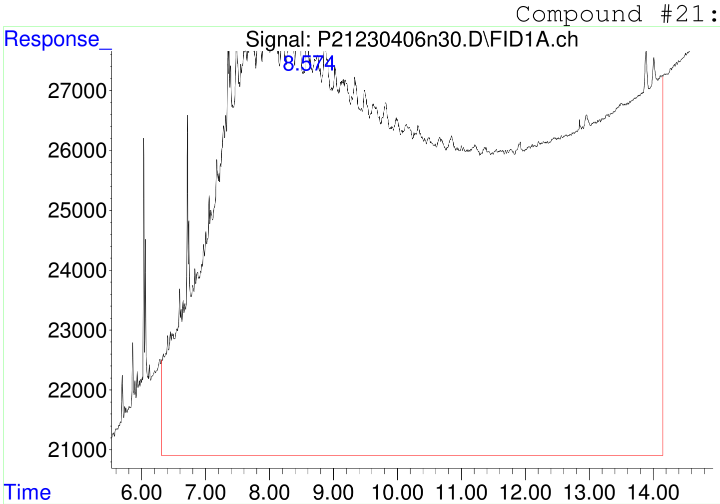



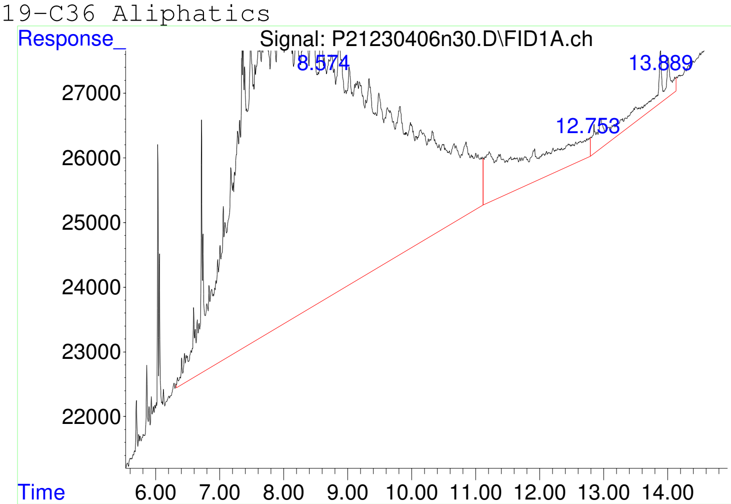

Original Peak Response = 10409702

Manual Peak Response = 595256 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 25735460

Manual Peak Response = 7875348 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n31.D
Signal(s) : FID2B.ch
Acq On : 7 Apr 2023 8:14 pm
Operator : Petro21b:sr
Sample : 5w30 65
Misc : 5w30 ARO oil
ALS Vial : 66 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 14:14:50 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.318 | 852008 | 12.174 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 60.87% | |
| 5) s 2-Bromonaphthalene | 4.821 | 575154 | 11.669 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 58.34% | |
| 10) S o-terphenyl | 0.000 | 0 | N.D. mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 0.00%# | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 11.985 | 776126 | 9.284 mg/L | M5 |

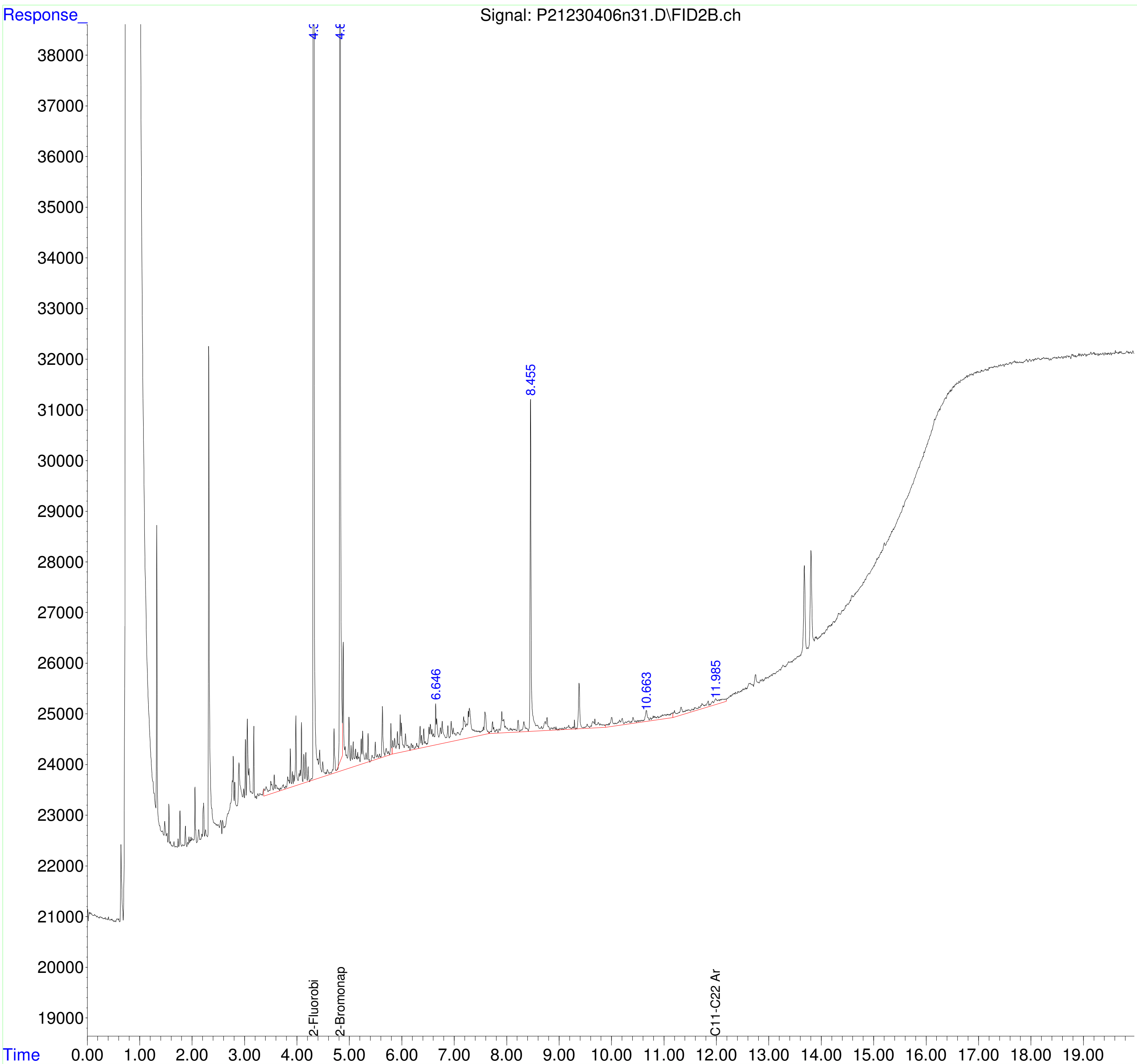
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n31.D
Signal(s) : FID2B.ch
Acq On    :  7 Apr 2023   8:14 pm
Operator  : Petro21b:sr
Sample    : 5w30 65
Misc      : 5w30 ARO oil
ALS Vial  : 66   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 14:14:50 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

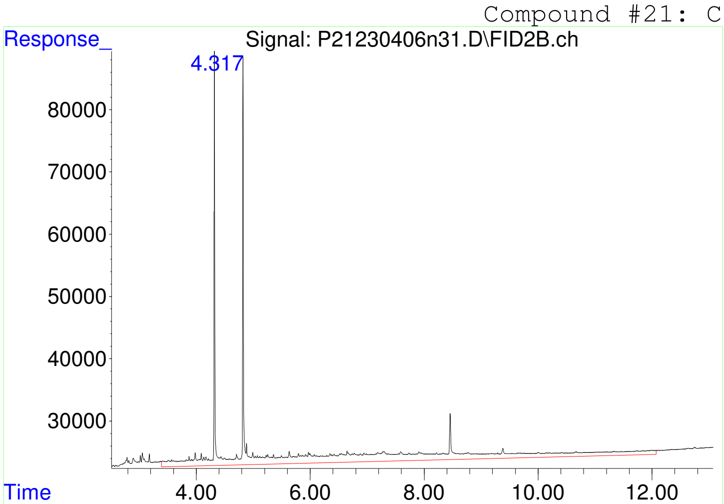
Volume Inj.  :
Signal Phase :
Signal Info  :

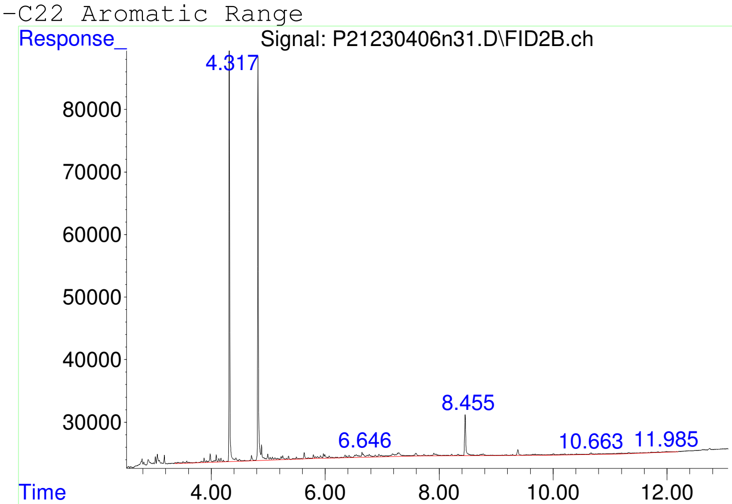


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230406N.SEC\ | QMethod | : MAARO211129B.M |
| Data File | : P21230406n31.D | Operator | : Petro21b:sr |
| Date Inj'd | : 4/7/2023 8:14 pm | Instrument | : Petro 21 |
| Sample | : 5w30 65 | Quant Date | : 4/10/2023 1:28 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 4972345 Manual Peak Response = 776126 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n32.D
Signal(s) : FID1A.ch
Acq On : 7 Apr 2023 8:14 pm
Operator : Petro21a:sr
Sample : 5w30 65
Misc : 5w30 ALI Oil
ALS Vial : 16 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:24:52 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 0.000 | 0 | N.D. | mg/L | d |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 0.00%# | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 6.032 | 1036898 | 14.488 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 13.886f | 7624892 | 110.710 | mg/L | M5 |

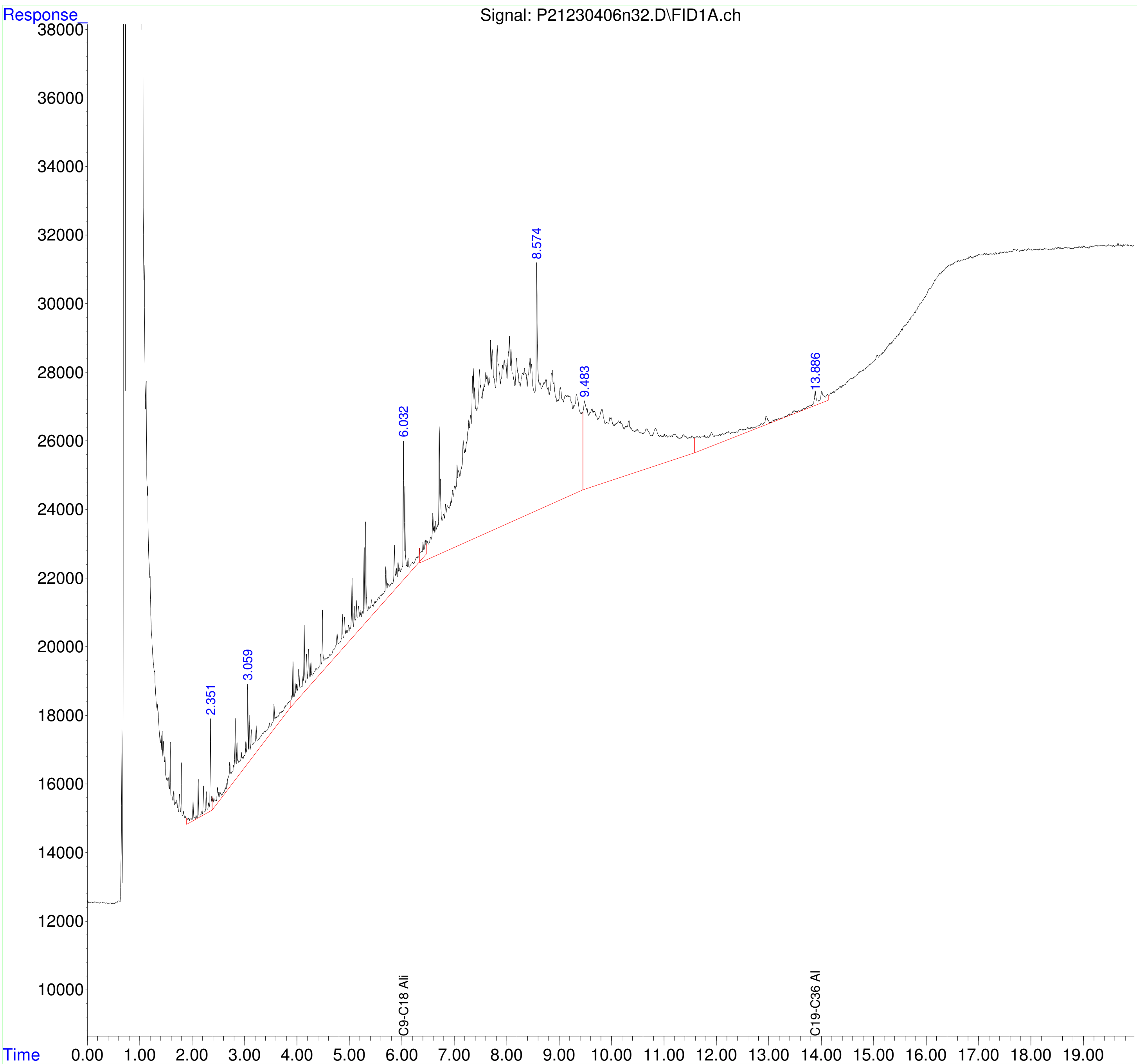
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n32.D
Signal(s) : FID1A.ch
Acq On : 7 Apr 2023 8:14 pm
Operator : Petro21a:sr
Sample : 5w30 65
Misc : 5w30 ALI Oil
ALS Vial : 16 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:24:52 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

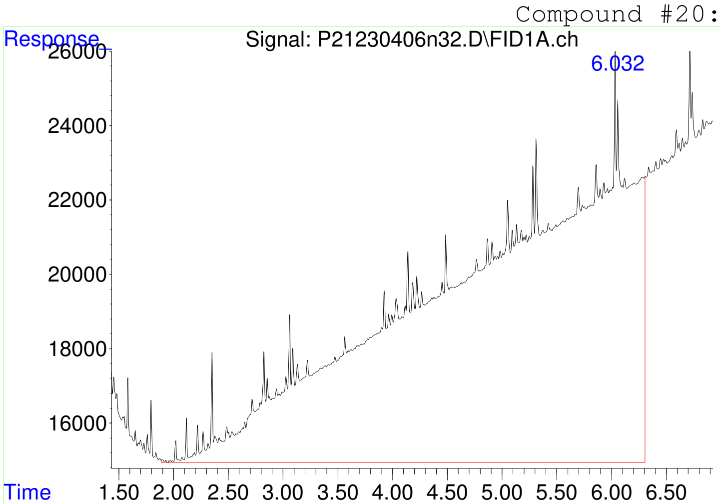


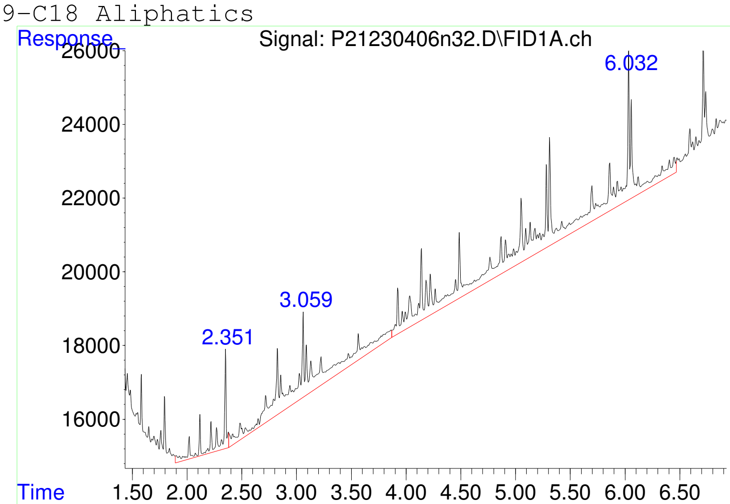
# Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n32.D
Date Inj'd : 4/7/2023 8:14 pm
Sample : 5w30 65

QMethod : MAALI211129A.M
Operator : Petro21a:sr
Instrument : Petro 21
Quant Date : 4/10/2023 1:09 pm

Compound #20: C9-C18 Aliphatics



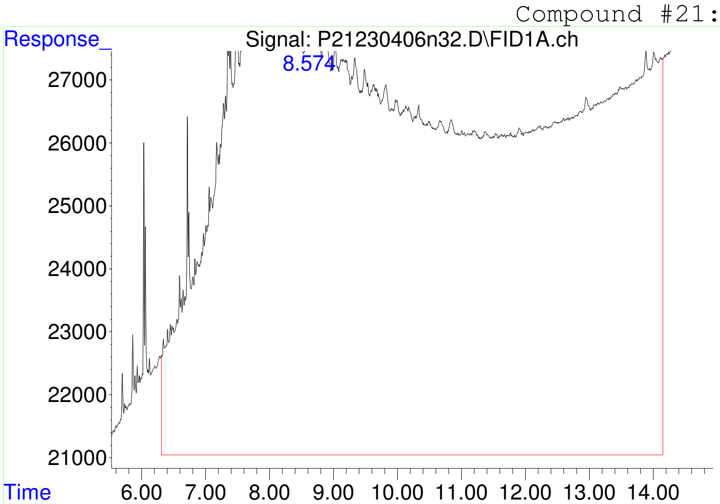



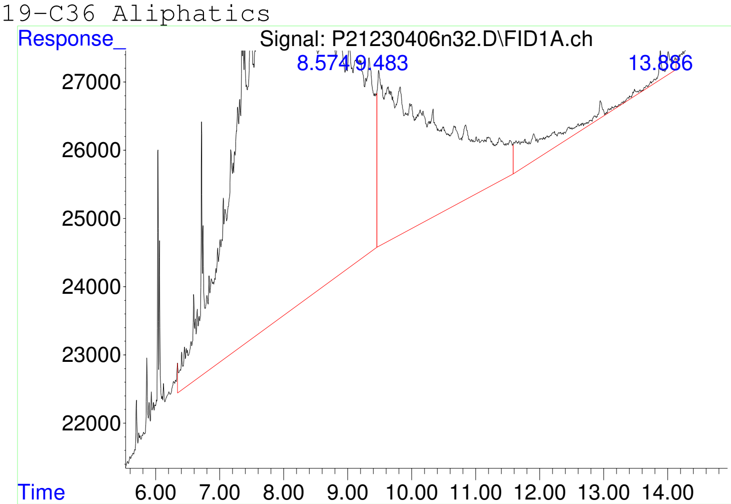

Original Peak Response = 10486947

Manual Peak Response = 1036898 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 25717021

Manual Peak Response = 7624892 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n33.D
Signal(s) : FID2B.ch
Acq On : 7 Apr 2023 8:39 pm
Operator : Petro21b:sr
Sample : 5w30 70
Misc : 5w30 ARO oil
ALS Vial : 67 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 14:15:18 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.318 | 1011150 | 14.447 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 72.23% | |
| 5) s 2-Bromonaphthalene | 4.820 | 689388 | 13.987 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 69.94% | |
| 10) S o-terphenyl | 0.000 | 0 | N.D. mg/L | d |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 0.00%# | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 12.260f | 1028462 | 12.302 mg/L | M5 |

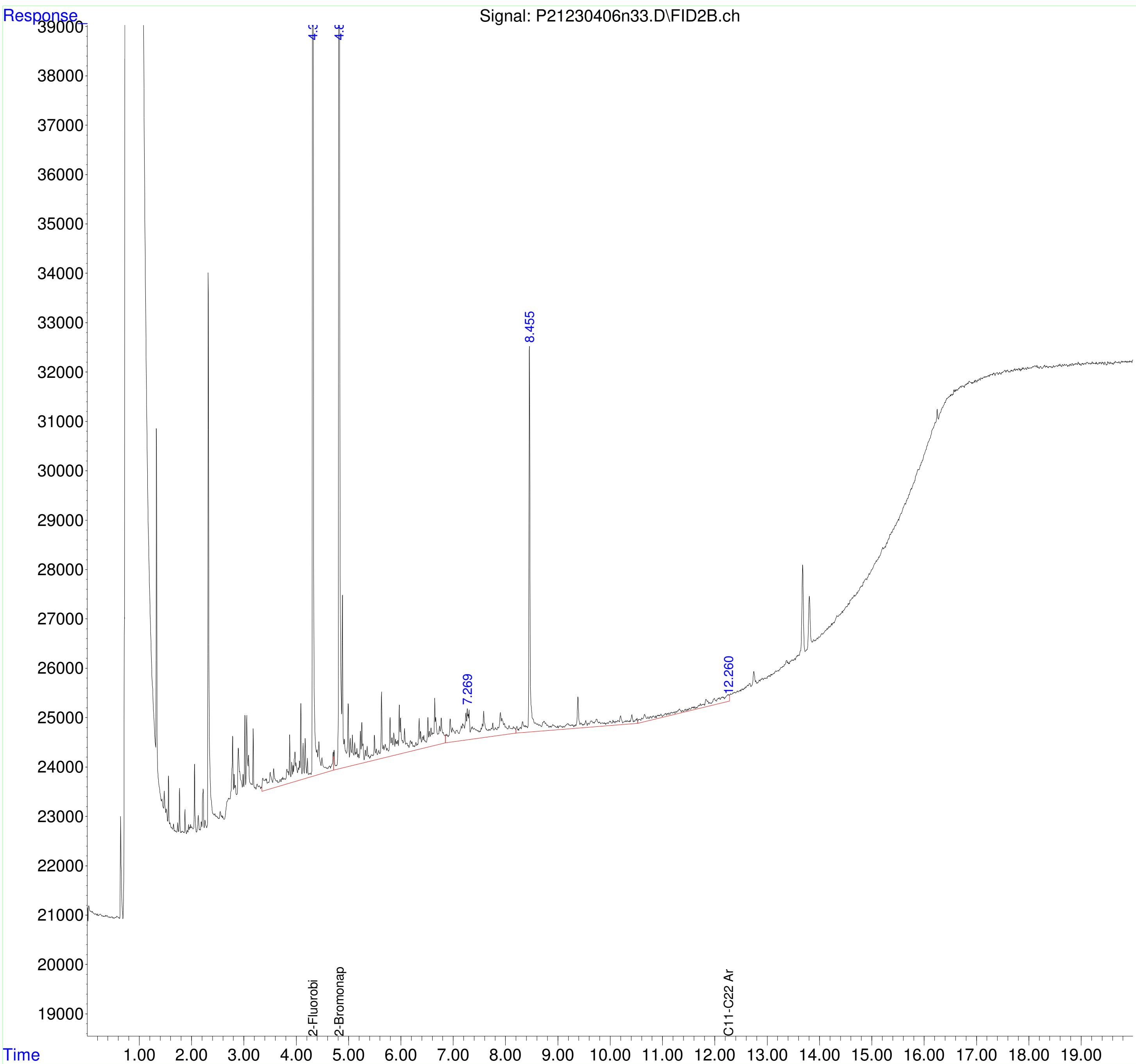
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406N.SEC\
Data File : P21230406n33.D
Signal(s) : FID2B.ch
Acq On : 7 Apr 2023 8:39 pm
Operator : Petro21b:sr
Sample : 5w30 70
Misc : 5w30 ARO oil
ALS Vial : 67 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 10 14:15:18 2023
Quant Method : I:\PETRO\Petro21\230406N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Mon Apr 03 07:32:23 2023
Response via : Initial Calibration
Integrator: ChemStation

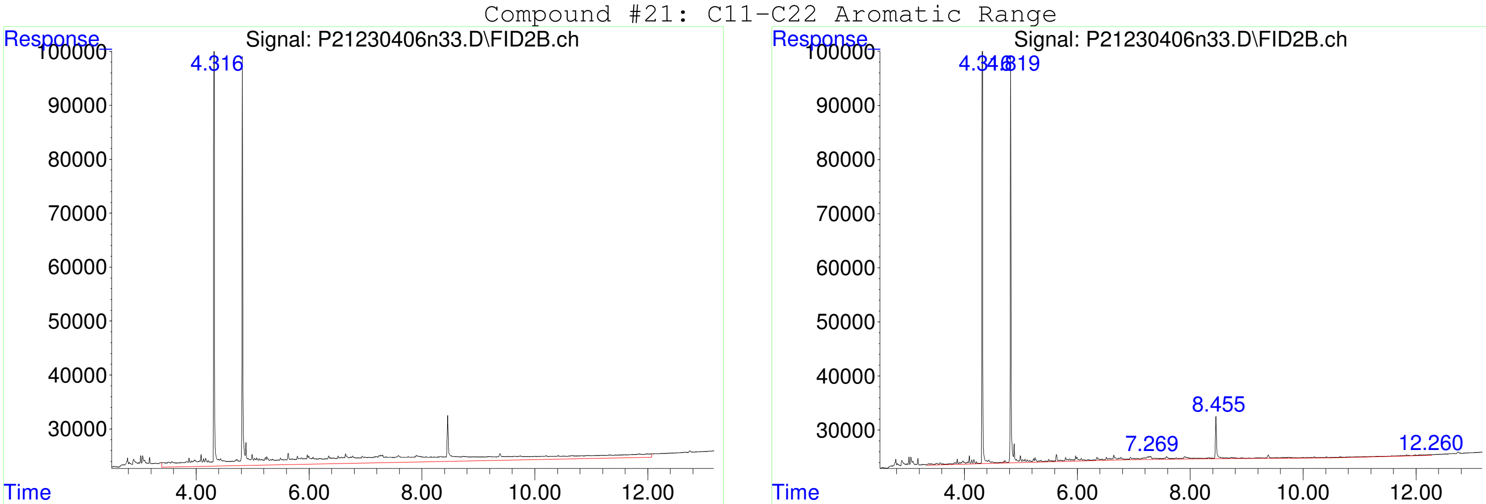
Volume Inj. :
Signal Phase :
Signal Info :



# Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230406N.SEC\ | QMethod | : MAARO211129B.M |
| Data File | : P21230406n33.D | Operator | : Petro21b:sr |
| Date Inj'd | : 4/7/2023 8:39 pm | Instrument | : Petro 21 |
| Sample | : 5w30 70 | Quant Date | : 4/10/2023 1:28 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 4486637

Manual Peak Response = 1028462 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n34.D
Signal(s) : FID1A.ch
Acq On : 7 Apr 2023 8:39 pm
Operator : Petro21a:sr
Sample : 5w30 70
Misc : 5w30 ALI Oil
ALS Vial : 17 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:26:11 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | | |
| 3) | S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) | S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) | S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) | S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) | S | 1-Chlorooctadecane | 0.000 | 0 | N.D. | mg/L | d |
| Spiked Amount 20.000 | | Range 40 - 140 | | Recovery = | 0.00%# | | |
| Target Compounds | | | | | | | |
| 1) | | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | |
| 2) | | Decane (C10) | 0.000 | 0 | N.D. | mg/L | |
| 4) | | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) | H | C9-C18 Aliphatics | 6.031 | 3366618 | 47.041 | mg/L | M5 |
| 21) | H | C19-C36 Aliphatics | 13.884f | 9519833 | 138.224 | mg/L | M5 |

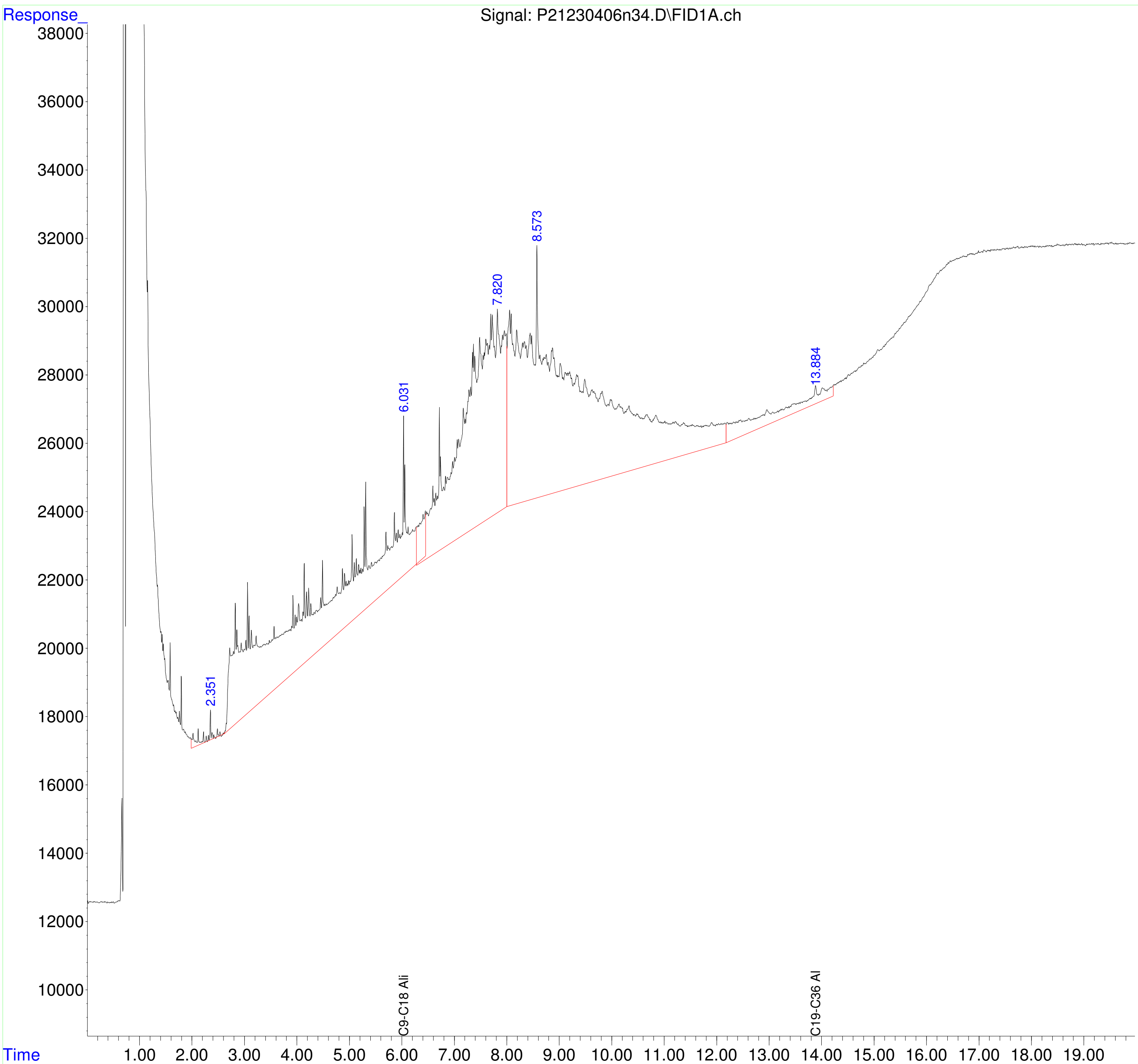
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n34.D
Signal(s) : FID1A.ch
Acq On    :  7 Apr 2023   8:39 pm
Operator  : Petro21a:sr
Sample    : 5w30 70
Misc      : 5w30 ALI Oil
ALS Vial  : 17   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 10 13:26:11 2023
Quant Method : I:\PETRO\Petro21\230406n\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Wed Mar 22 07:49:55 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

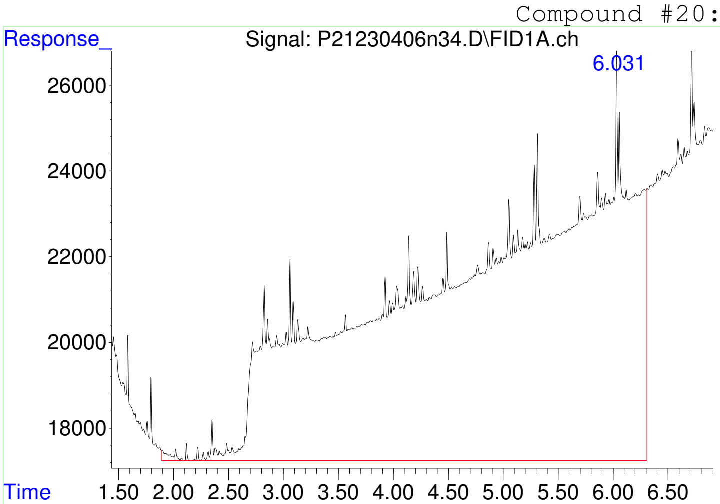


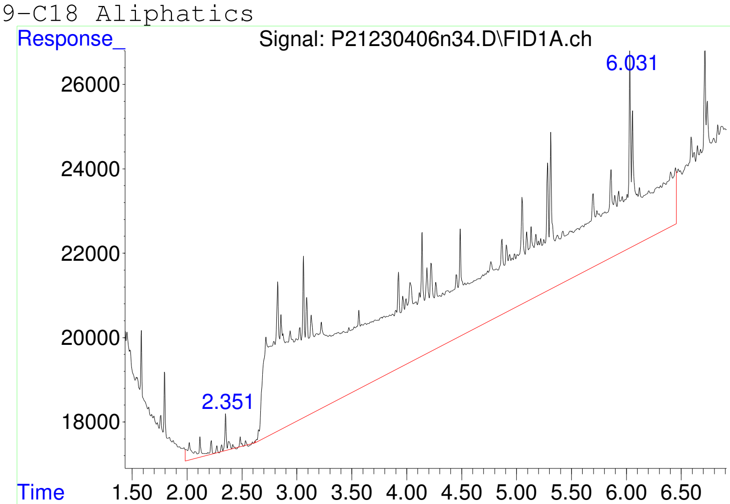
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230406n\
Data File : P21230406n34.D
Date Inj'd : 4/7/2023 8:39 pm
Sample : 5w30 70

QMethod : MAALI211129A.M
Operator : Petro21a:sr
Instrument : Petro 21
Quant Date : 4/10/2023 1:09 pm

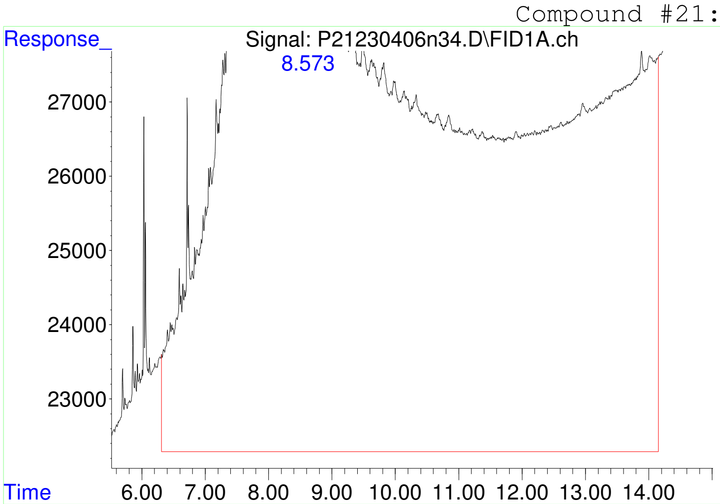
Compound #20: C9-C18 Aliphatics

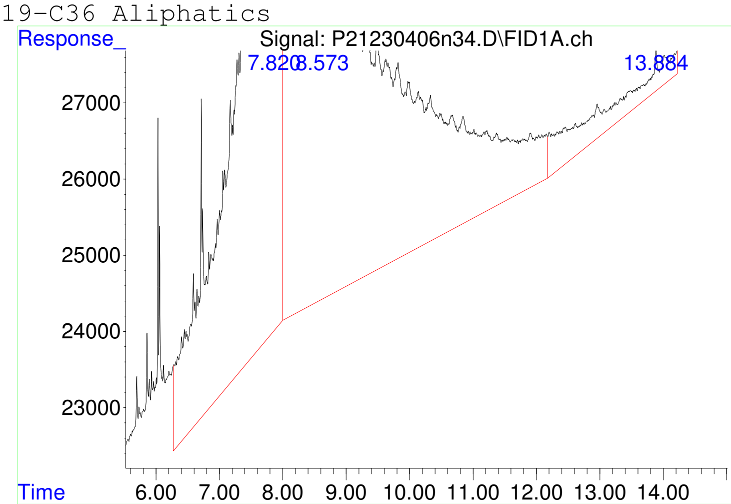



Original Peak Response = 9367307
Manual Peak Response = 3366618 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 22683954
Manual Peak Response = 9519833 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

# Appendix A. Phase I Detection Limit Study – Mineral Oil

| No. | Sample ID | File ID | Acquisition Date | Concentration | Units | Fraction | > 3-1 S/N |
|---|---|---|---|---|---|---|---|
| 1 | eph 5238 20 ul | P2123042024.D | 4/20/2023 21:13 | 20 | mg/kg | Aliphatic | No |
| 2 | eph 5238 20 ul | P2123042023.D | 4/20/2023 21:13 | 20 | mg/kg | Aromatic | No |
| 3 | eph 5237 25 ul | P2123042022.D | 4/20/2023 20:48 | 25 | mg/kg | Aliphatic | Yes |
| 4 | eph 5237 25 ul | P2123042021.D | 4/20/2023 20:48 | 25 | mg/kg | Aromatic | Yes |
| 5 | eph 5236 30 ul | P2123042020.D | 4/20/2023 20:23 | 30 | mg/kg | Aliphatic | Yes |
| 6 | eph 5236 30 ul | P2123042019.D | 4/20/2023 20:23 | 30 | mg/kg | Aromatic | Yes |
| 7 | eph 5235 35 ul | P2123042018.D | 4/20/2023 19:58 | 35 | mg/kg | Aliphatic | Yes |
| 8 | eph 5235 35 ul | P2123042017.D | 4/20/2023 19:58 | 35 | mg/kg | Aromatic | Yes |
| 9 | eph 5234 40 ul | P2123042016.D | 4/20/2023 19:34 | 40 | mg/kg | Aliphatic | Yes |
| 10 | eph 5234 40 ul | P2123042015.D | 4/20/2023 19:34 | 40 | mg/kg | Aromatic | Yes |
| 11 | eph 5233 45 ul | P2123042014.D | 4/20/2023 19:09 | 45 | mg/kg | Aliphatic | Yes |
| 12 | eph 5233 45 ul | P2123042013.D | 4/20/2023 19:09 | 45 | mg/kg | Aromatic | Yes |
| 13 | eph 5232 50 ul | P2123042012.D | 4/20/2023 18:44 | 50 | mg/kg | Aliphatic | Yes |
| 14 | eph 5232 50 ul | P2123042011.D | 4/20/2023 18:44 | 50 | mg/kg | Aromatic | Yes |
| 15 | eph 5231 55 ul | P2123042010.D | 4/20/2023 18:19 | 55 | mg/kg | Aliphatic | Yes |
| 16 | eph 5231 55 ul | P2123042009.D | 4/20/2023 18:19 | 55 | mg/kg | Aromatic | Yes |
| 17 | eph 5230 60 ul | P2123042008.D | 4/20/2023 17:54 | 60 | mg/kg | Aliphatic | Yes |
| 18 | eph 5230 60 ul | P2123042007.D | 4/20/2023 17:54 | 60 | mg/kg | Aromatic | Yes |
| 19 | eph 5229 65 ul | P2123042006.D | 4/20/2023 17:29 | 65 | mg/kg | Aliphatic | Yes |
| 20 | eph 5229 65 ul | P2123042005.D | 4/20/2023 17:29 | 65 | mg/kg | Aromatic | Yes |
| 21 | eph 5228 70 ul | P2123042004.D | 4/20/2023 17:04 | 70 | mg/kg | Aliphatic | Yes |
| 22 | eph 5228 70 ul | P2123042003.D | 4/20/2023 17:04 | 70 | mg/kg | Aromatic | Yes |

Phase I Detection Limit Study
Raw Data Quant Reports

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042024.D
Signal(s) : FID1A.ch
Acq On : 20 Apr 2023 9:13 pm
Operator : Petro21a/b:cre
Sample : eph 5238 20 ul
Misc :
ALS Vial : 12 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 15:46:30 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|---|
| | | **System Monitoring Compounds** | | | | | |
| 3) | S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) | S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) | S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) | S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) | S | 1-Chlorooctadecane | 0.000 | 0 | N.D. | mg/L | d |
| Spiked Amount 20.000 | | Range 40 - 140 | | Recovery = | 0.00%# | | |
| | | **Target Compounds** | | | | | |
| 1) | | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) | H | C9-C18 Aliphatics | 6.195f | 2126229 | 29.709 | mg/L | M5 |
| 21) | H | C19-C36 Aliphatics | 14.278f | 4377109 | 63.554 | mg/L | M5 |

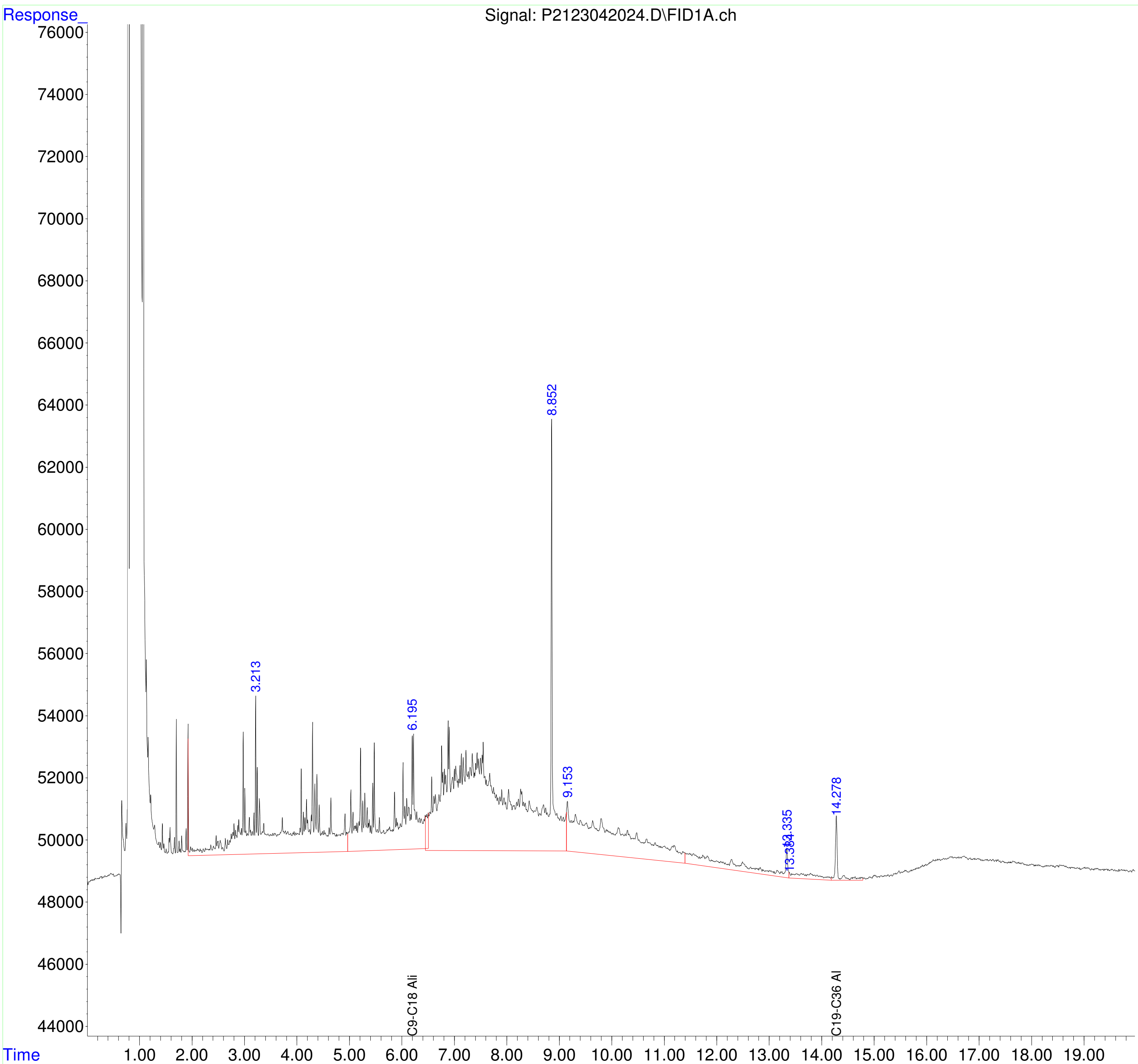
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042024.D
Signal(s) : FID1A.ch
Acq On    : 20 Apr 2023   9:13 pm
Operator  : Petro21a/b:cre
Sample    : eph 5238 20 ul
Misc      :
ALS Vial  : 12   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 15:46:30 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

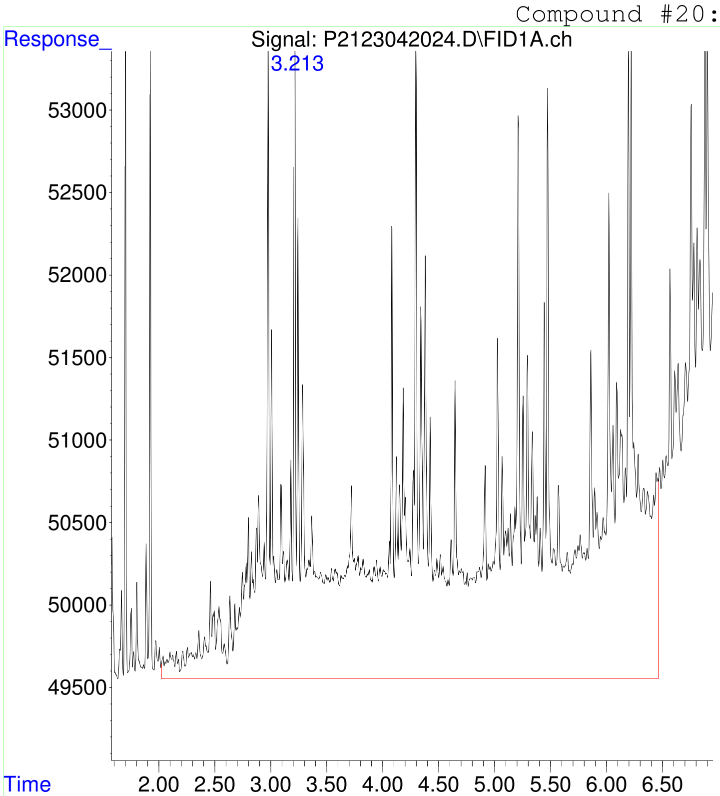


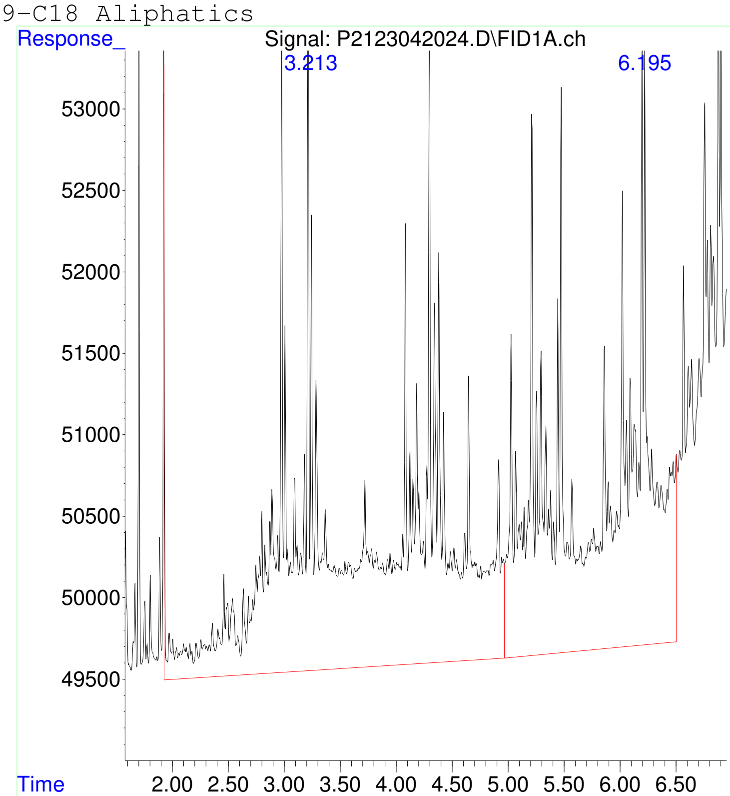
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042024.D
Date Inj'd : 4/20/2023 9:13 pm
Sample : eph 5238 20 ul

QMethod : MAALI211129A.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:08 pm

Compound #20: C9-C18 Aliphatics




Original Peak Response = 2187501

Manual Peak Response = 2126229 M5

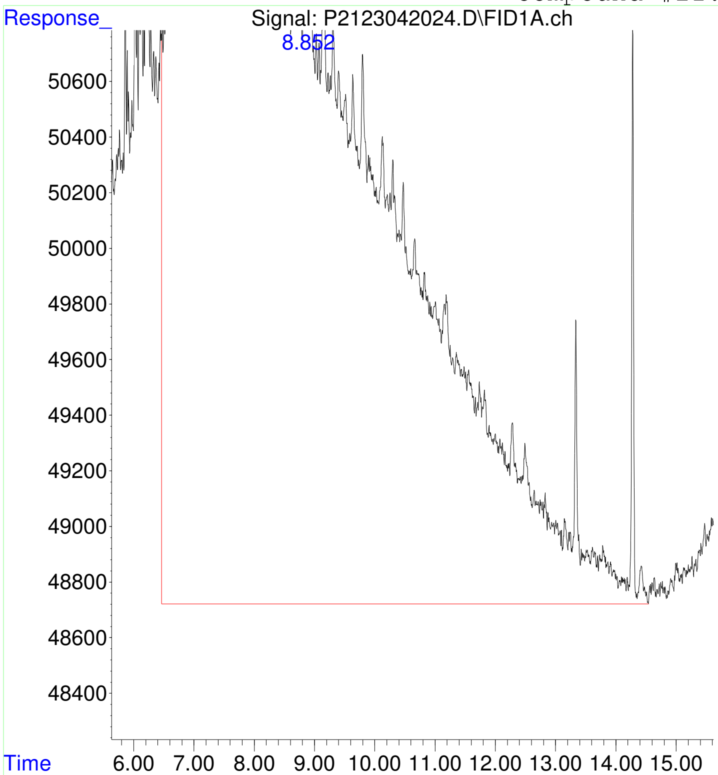
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

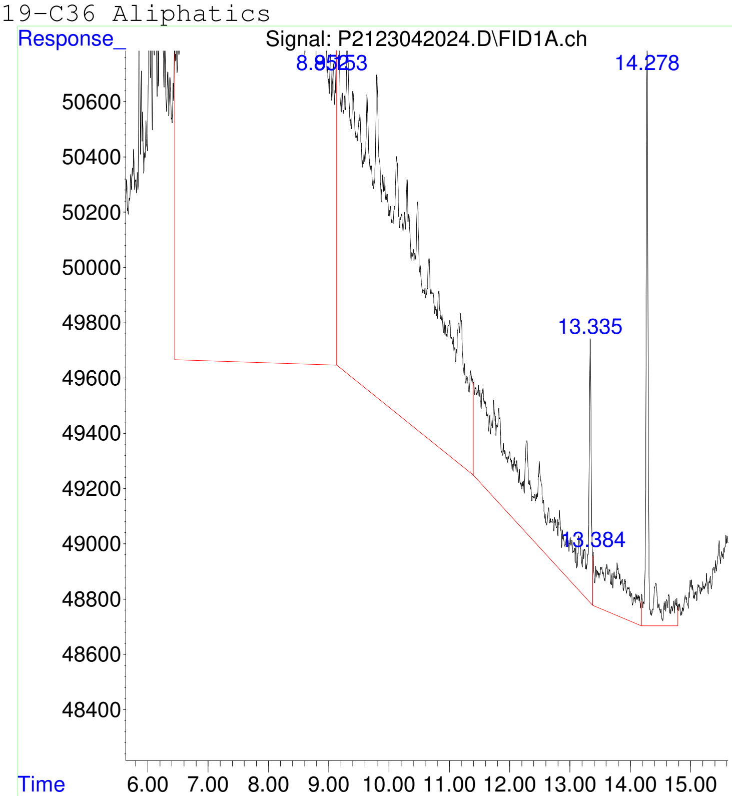
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042024.D
Date Inj'd : 4/20/2023 9:13 pm
Sample : eph 5238 20 ul

QMethod : MAALI211129A.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:08 pm

Compound #21: C19-C36 Aliphatics




Original Peak Response = 7146197

Manual Peak Response = 4377109 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042023.D
Signal(s) : FID2B.ch
Acq On : 20 Apr 2023 9:13 pm
Operator : Petro21a/b:cre
Sample : eph 5238 20 ul
Misc :
ALS Vial : 62 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:45:39 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.517 | 1039447 | 14.852 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 74.26% | |
| 5) s 2-Bromonaphthalene | 5.024 | 734060 | 14.893 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 74.47% | |
| 10) S o-terphenyl | 0.000 | 0 | N.D. mg/L | d |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 0.00%# | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 11.702 | 2555385 | 30.567 mg/L | M5 |

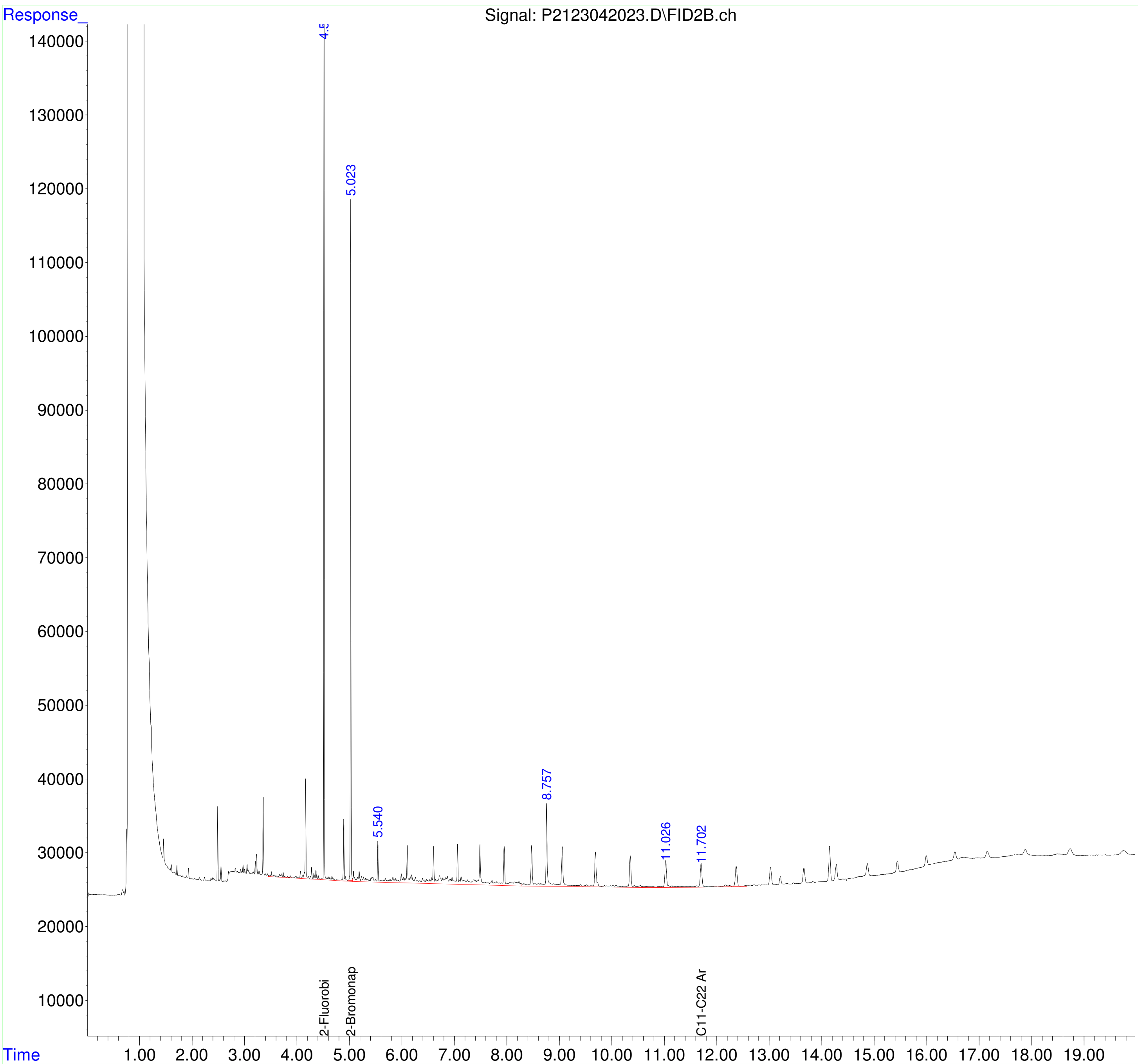
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042023.D
Signal(s) : FID2B.ch
Acq On : 20 Apr 2023 9:13 pm
Operator : Petro21a/b:cre
Sample : eph 5238 20 ul
Misc :
ALS Vial : 62 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:45:39 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

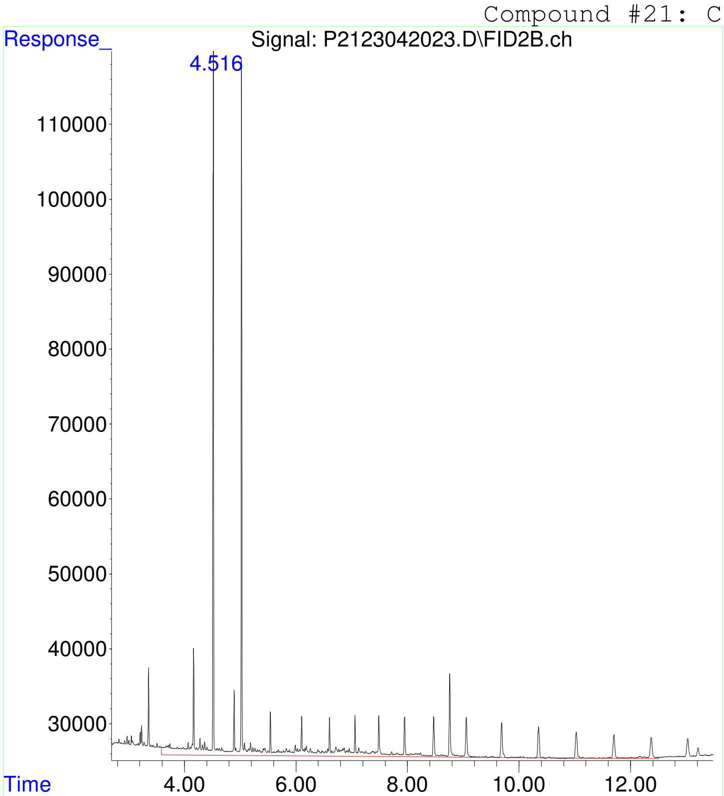


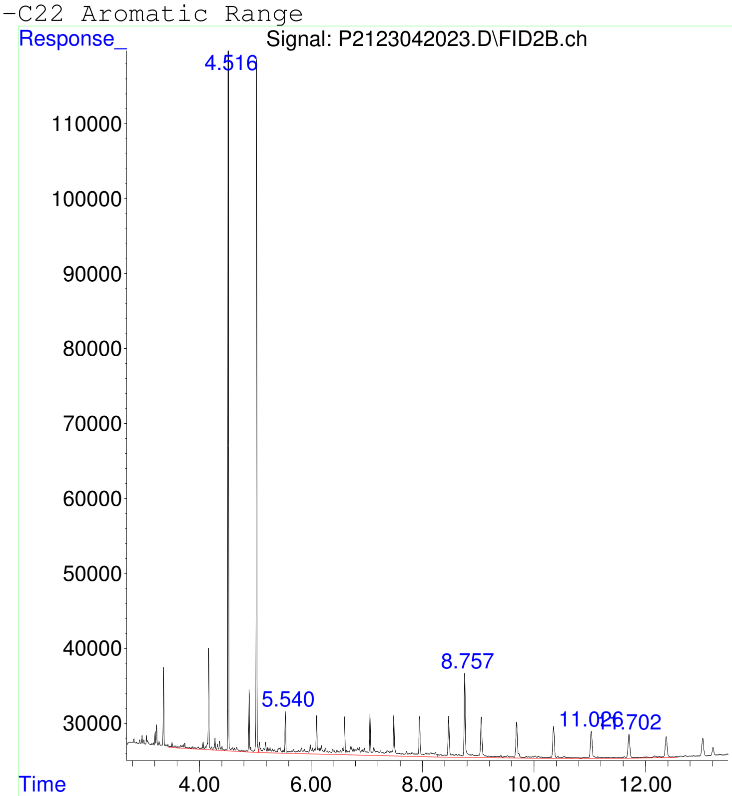
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042023.D
Date Inj'd : 4/20/2023 9:13 pm
Sample : eph 5238 20 ul

QMethod : MAARO211129B.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:39 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3096659

Manual Peak Response = 2555385 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042022.D
Signal(s) : FID1A.ch
Acq On : 20 Apr 2023 8:48 pm
Operator : Petro21a/b:cre
Sample : eph 5237 25 ul
Misc :
ALS Vial : 11 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 15:45:29 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

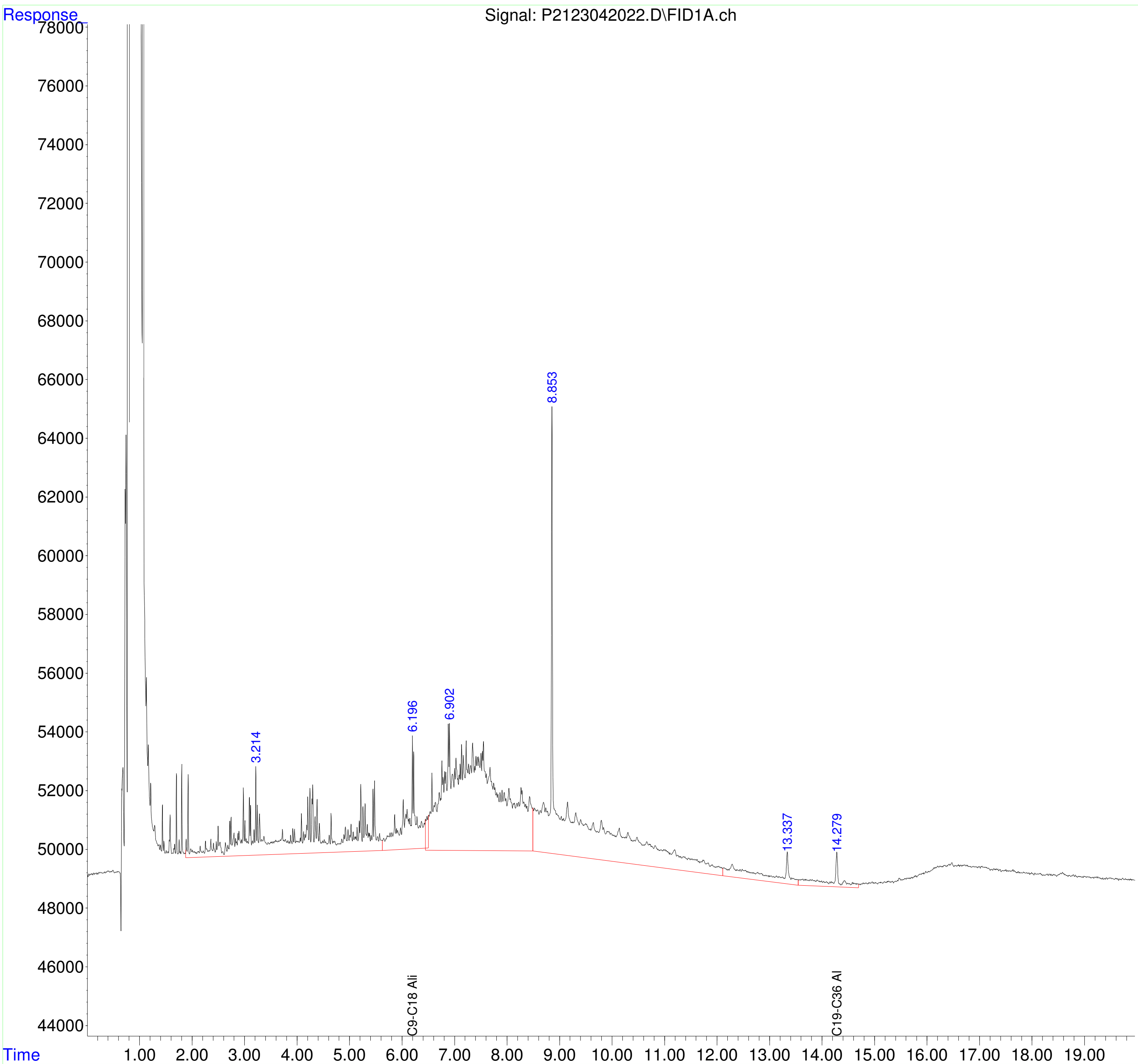
Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 0.000 | 0 | N.D. | mg/L | d |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 0.00%# | | |
| Target Compounds | | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 6.196f | 1648906 | 23.040 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.279f | 5046054 | 73.267 | mg/L | M5 |

(f)=RT Delta > 1/2 Window (m)=manual int.

```
Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042022.D
Signal(s) : FID1A.ch
Acq On    : 20 Apr 2023   8:48 pm
Operator  : Petro21a/b:cre
Sample    : eph 5237 25 ul
Misc      :
ALS Vial  : 11   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 15:45:29 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :
```

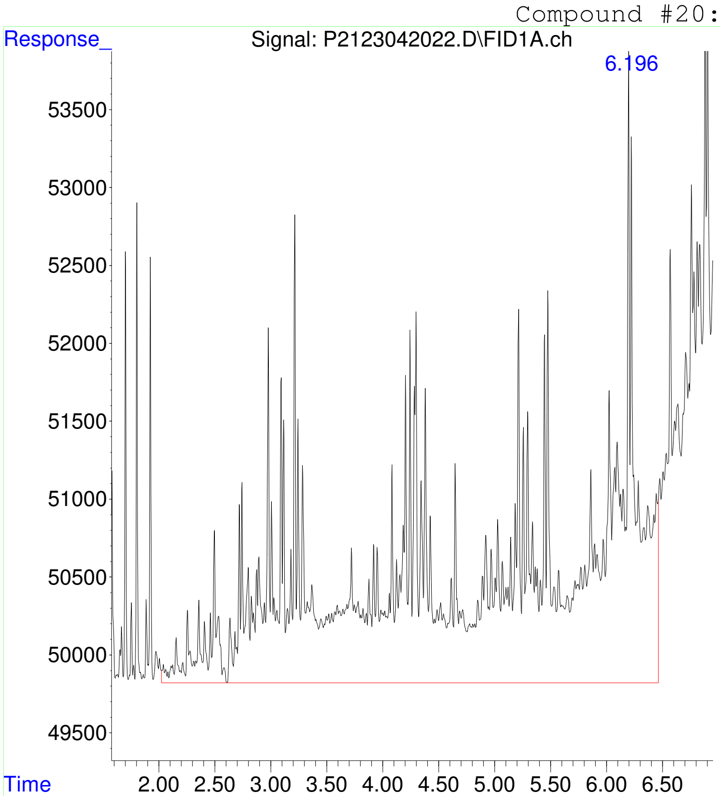


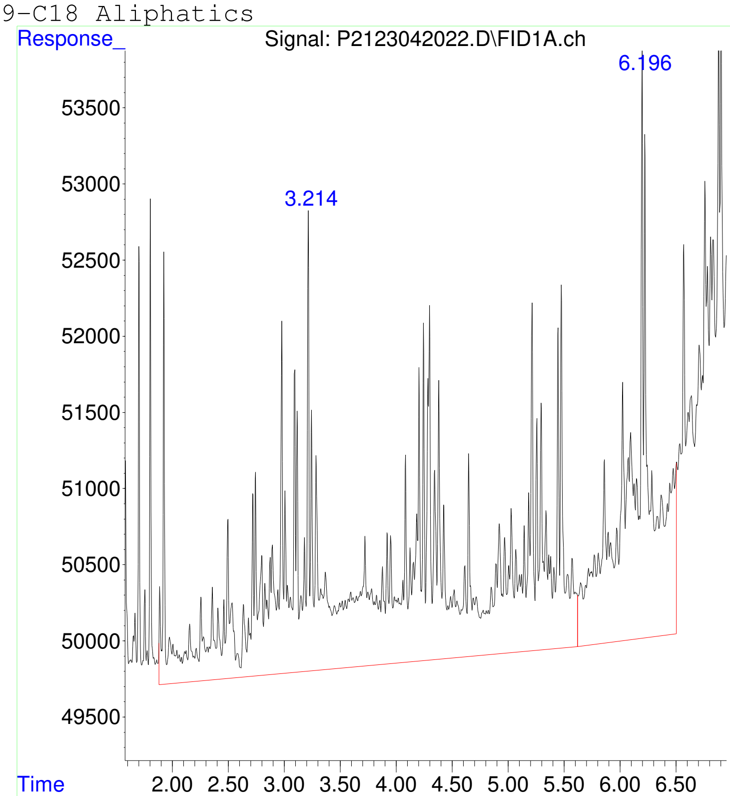
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042022.D
Date Inj'd : 4/20/2023 8:48 pm
Sample : eph 5237 25 ul

QMethod : MAALI211129A.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:08 pm

Compound #20: C9-C18 Aliphatics




Original Peak Response = 1695488

Manual Peak Response = 1648906 M5

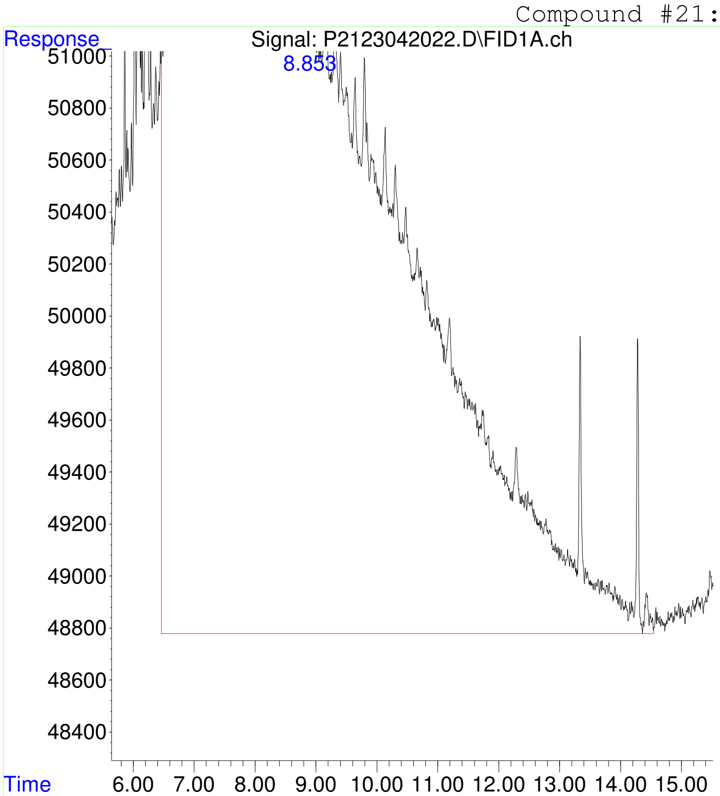
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

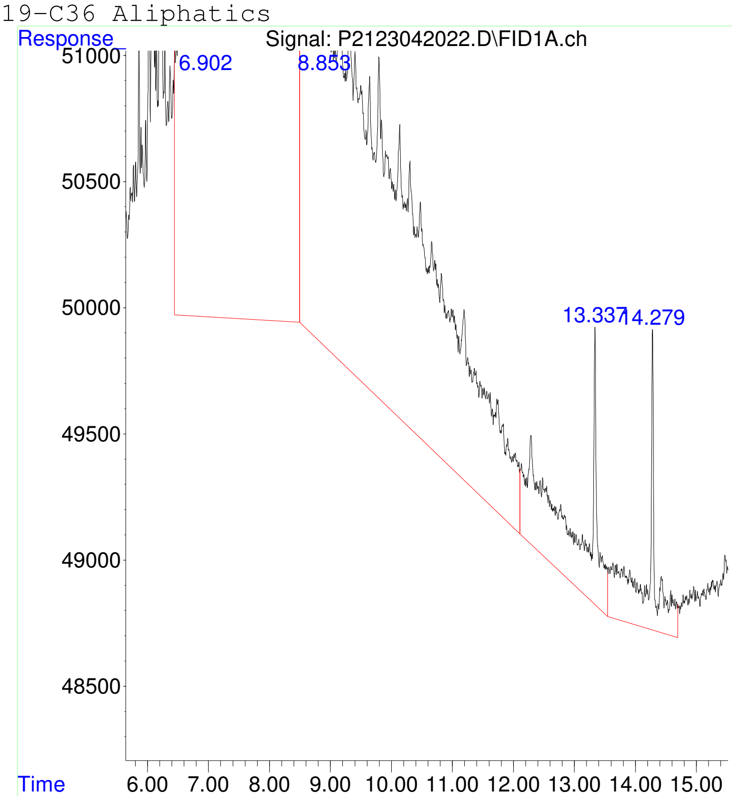
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042022.D
Date Inj'd : 4/20/2023 8:48 pm
Sample : eph 5237 25 ul

QMethod : MAALI211129A.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:08 pm

Compound #21: C19-C36 Aliphatics




Original Peak Response = 8156016
Manual Peak Response = 5046054 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042021.D
Signal(s) : FID2B.ch
Acq On : 20 Apr 2023 8:48 pm
Operator : Petro21a/b:cre
Sample : eph 5237 25 ul
Misc :
ALS Vial : 61 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:45:06 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

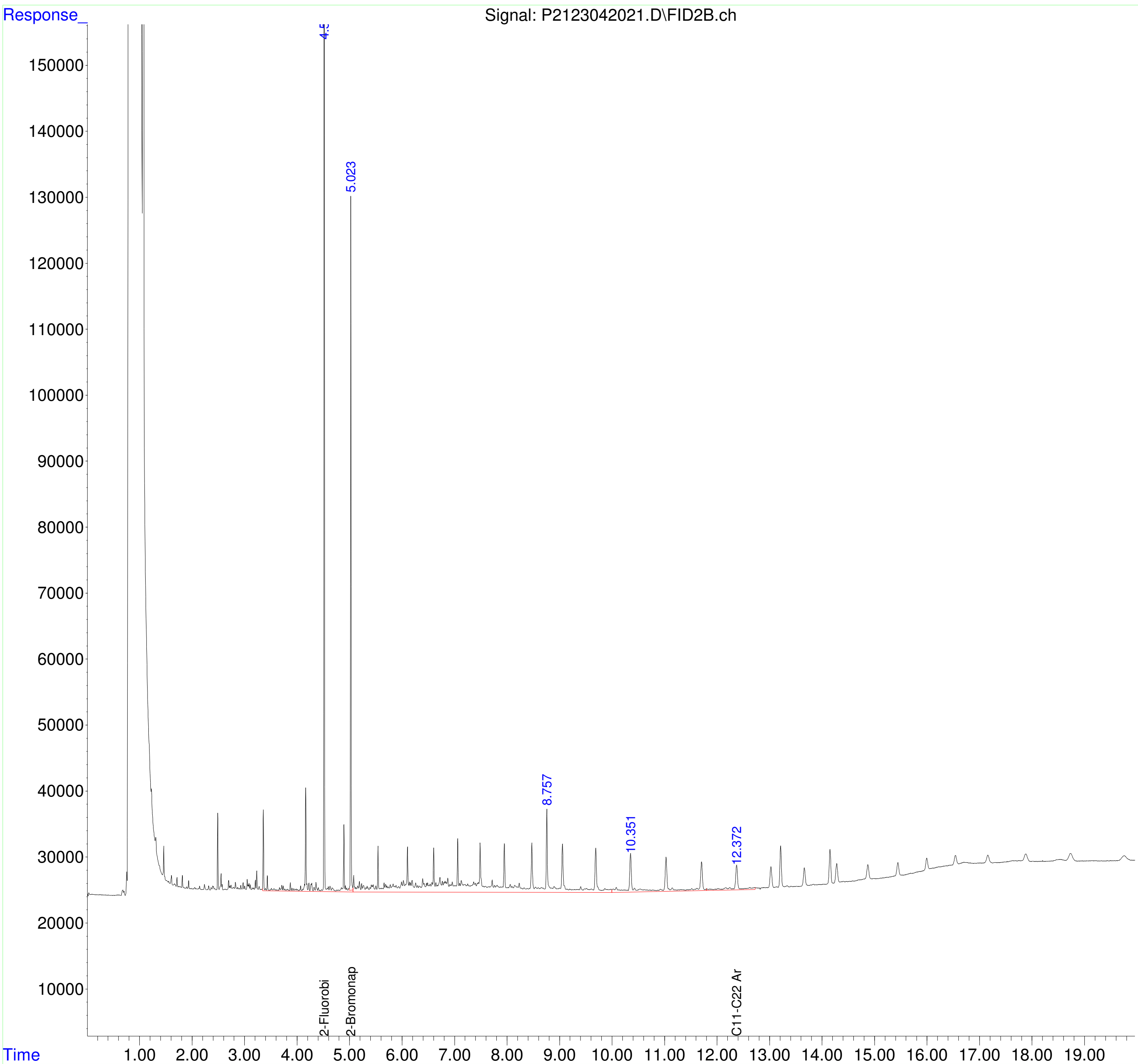
Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.517 | 1182353 | 16.894 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 84.47% | |
| 5) s 2-Bromonaphthalene | 5.025 | 830812 | 16.857 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 84.28% | |
| 10) S o-terphenyl | 0.000 | 0 | N.D. mg/L | d |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 0.00%# | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 12.372f | 4756631 | 56.898 mg/L | M5 |

(f)=RT Delta > 1/2 Window (m)=manual int.

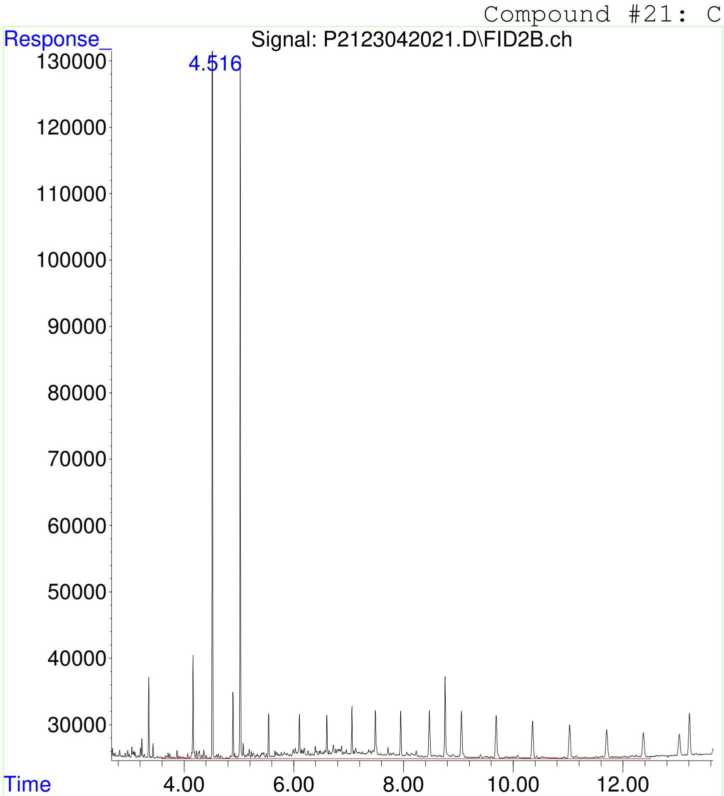
```
Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042021.D
Signal(s) : FID2B.ch
Acq On    : 20 Apr 2023   8:48 pm
Operator  : Petro21a/b:cre
Sample    : eph 5237 25 ul
Misc      :
ALS Vial  : 61   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:45:06 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :
```

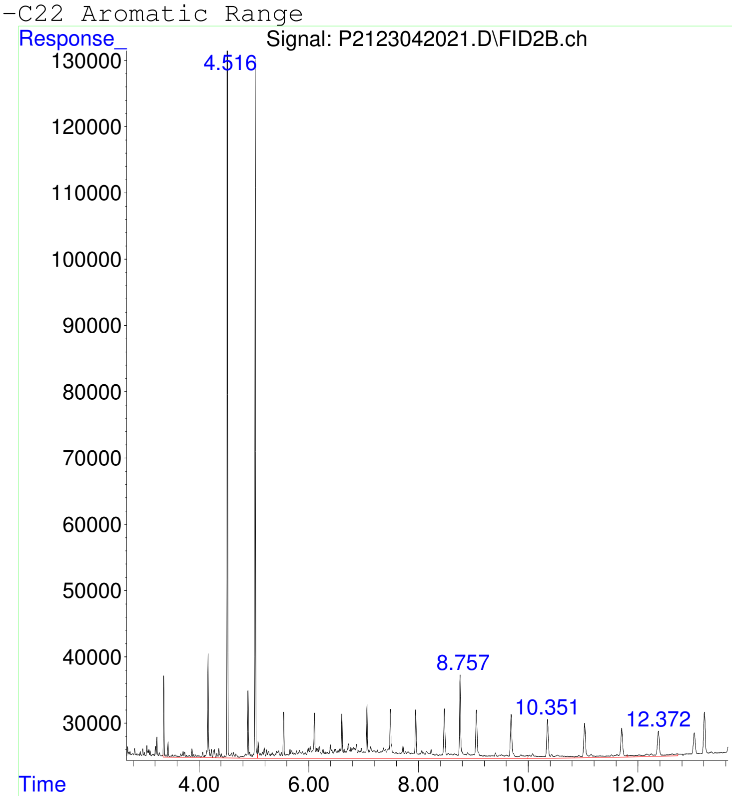


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230420.SEC\ | QMethod | : MAARO211129B.M |
| Data File | : P2123042021.D | Operator | : Petro21a/b:cre |
| Date Inj'd | : 4/20/2023 8:48 pm | Instrument | : Petro 21 |
| Sample | : eph 5237 25 ul | Quant Date | : 4/21/2023 2:39 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3765068

Manual Peak Response = 4756631 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042020.D
Signal(s) : FID1A.ch
Acq On : 20 Apr 2023 8:23 pm
Operator : Petro21a/b:cre
Sample : eph 5236 30 ul
Misc :
ALS Vial : 10 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 14:33:58 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | System Monitoring Compounds | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 0.000 | 0 | N.D. | mg/L | d |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 0.00%# | | |
| | Target Compounds | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 6.196f | 1525473 | 21.315 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.281f | 3995365 | 58.011 | mg/L | M5 |

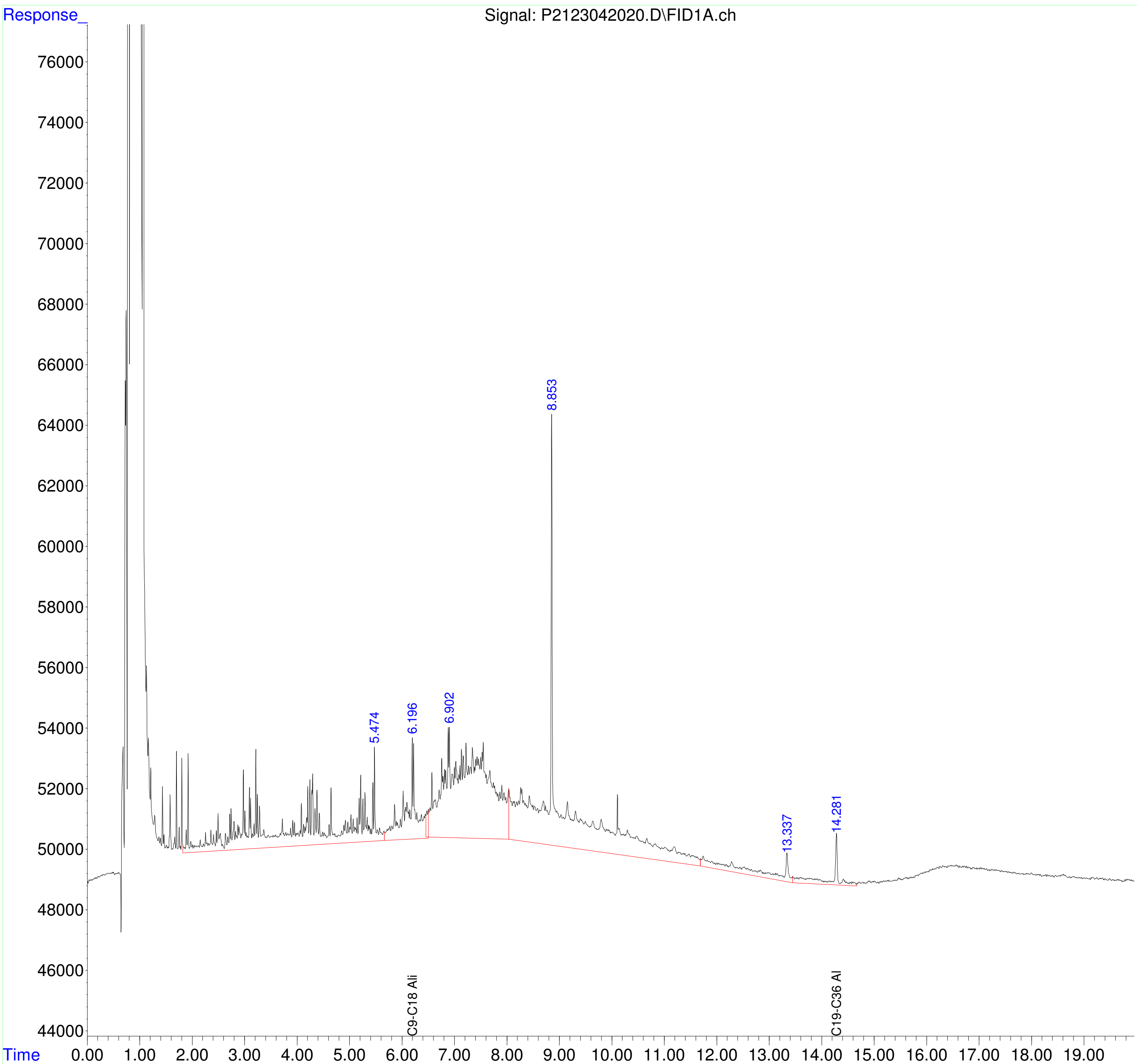
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042020.D
Signal(s) : FID1A.ch
Acq On     : 20 Apr 2023   8:23 pm
Operator  : Petro21a/b:cre
Sample     : eph 5236 30 ul
Misc       :
ALS Vial  : 10   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 14:33:58 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title   : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

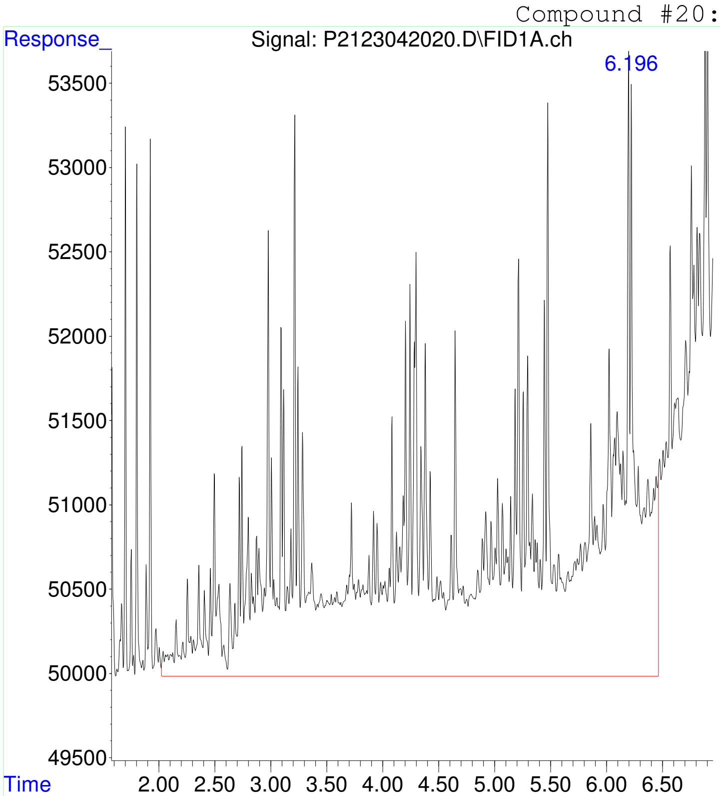


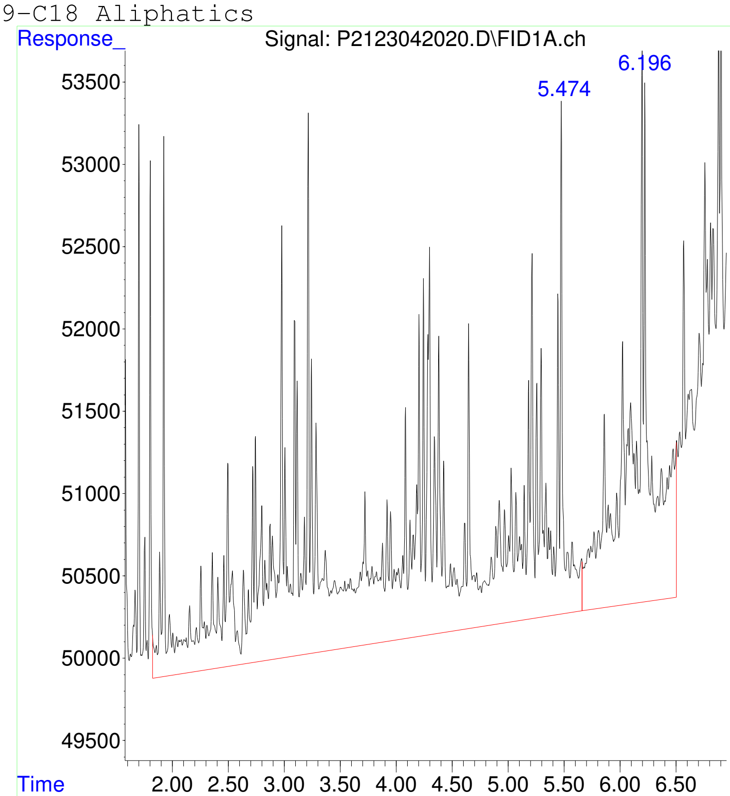
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042020.D
Date Inj'd : 4/20/2023 8:23 pm
Sample : eph 5236 30 ul

QMethod : MAALI211129A.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:08 pm

Compound #20: C9-C18 Aliphatics




Original Peak Response = 1863568

Manual Peak Response = 1525473 M5

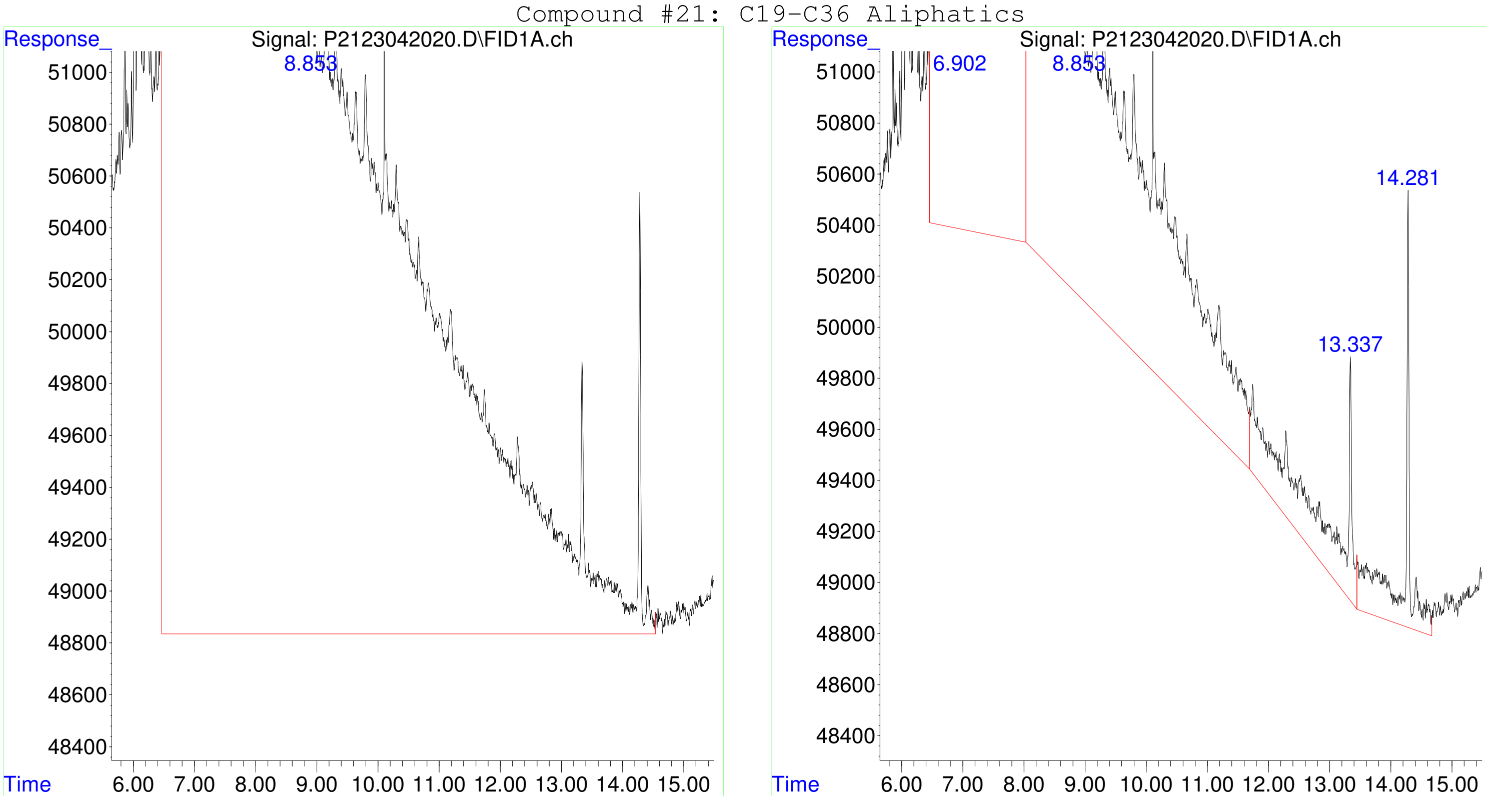
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042020.D
Date Inj'd : 4/20/2023 8:23 pm
Sample : eph 5236 30 ul

QMethod : MAALI211129A.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:08 pm

Compound #21: C19-C36 Aliphatics




Original Peak Response = 8103549

Manual Peak Response = 3995365 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042019.D
Signal(s) : FID2B.ch
Acq On : 20 Apr 2023 8:23 pm
Operator : Petro21a/b:cre
Sample : eph 5236 30 ul
Misc :
ALS Vial : 60 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:44:40 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.517 | 1019097 | 14.561 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 72.80% | |
| 5) s 2-Bromonaphthalene | 5.024 | 724224 | 14.694 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 73.47% | |
| 10) S o-terphenyl | 0.000 | 0 | N.D. mg/L | d |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 0.00%# | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 12.374f | 4417175 | 52.838 mg/L | M5 |

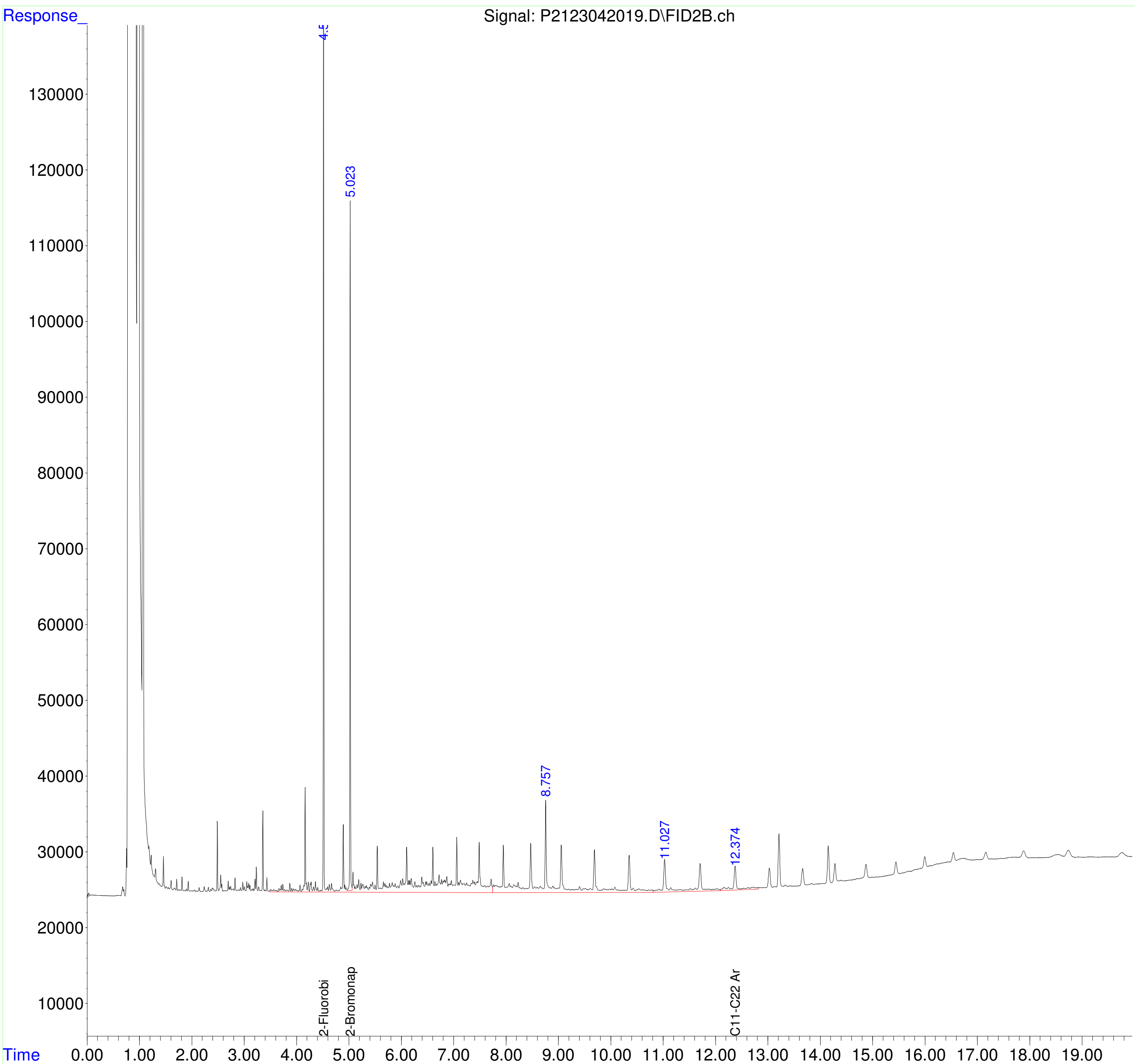
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042019.D
Signal(s) : FID2B.ch
Acq On    : 20 Apr 2023   8:23 pm
Operator  : Petro21a/b:cre
Sample    : eph 5236 30 ul
Misc      :
ALS Vial  : 60   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:44:40 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

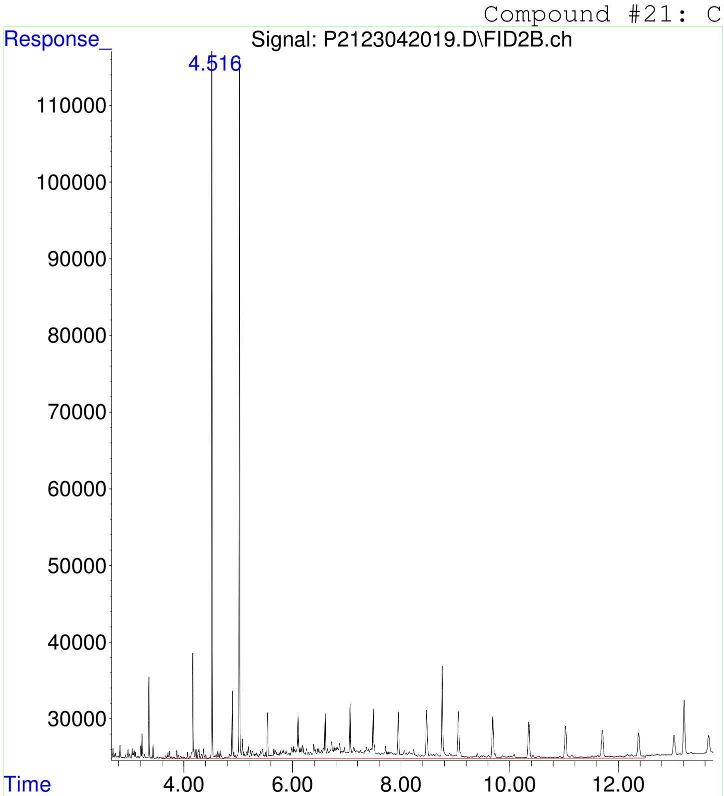


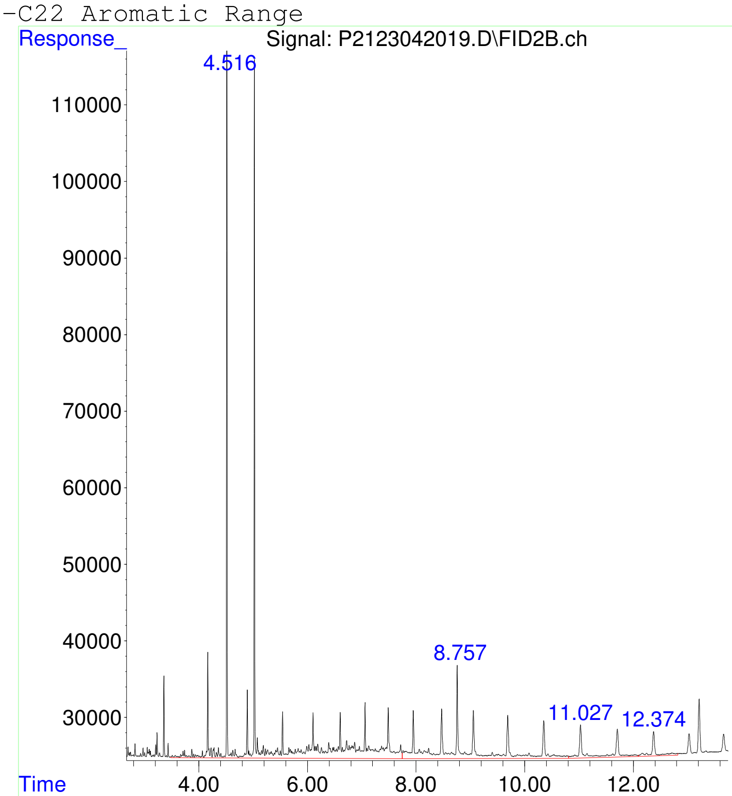
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042019.D
Date Inj'd : 4/20/2023 8:23 pm
Sample : eph 5236 30 ul

QMethod : MAARO211129B.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:39 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3575144

Manual Peak Response = 4417175 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

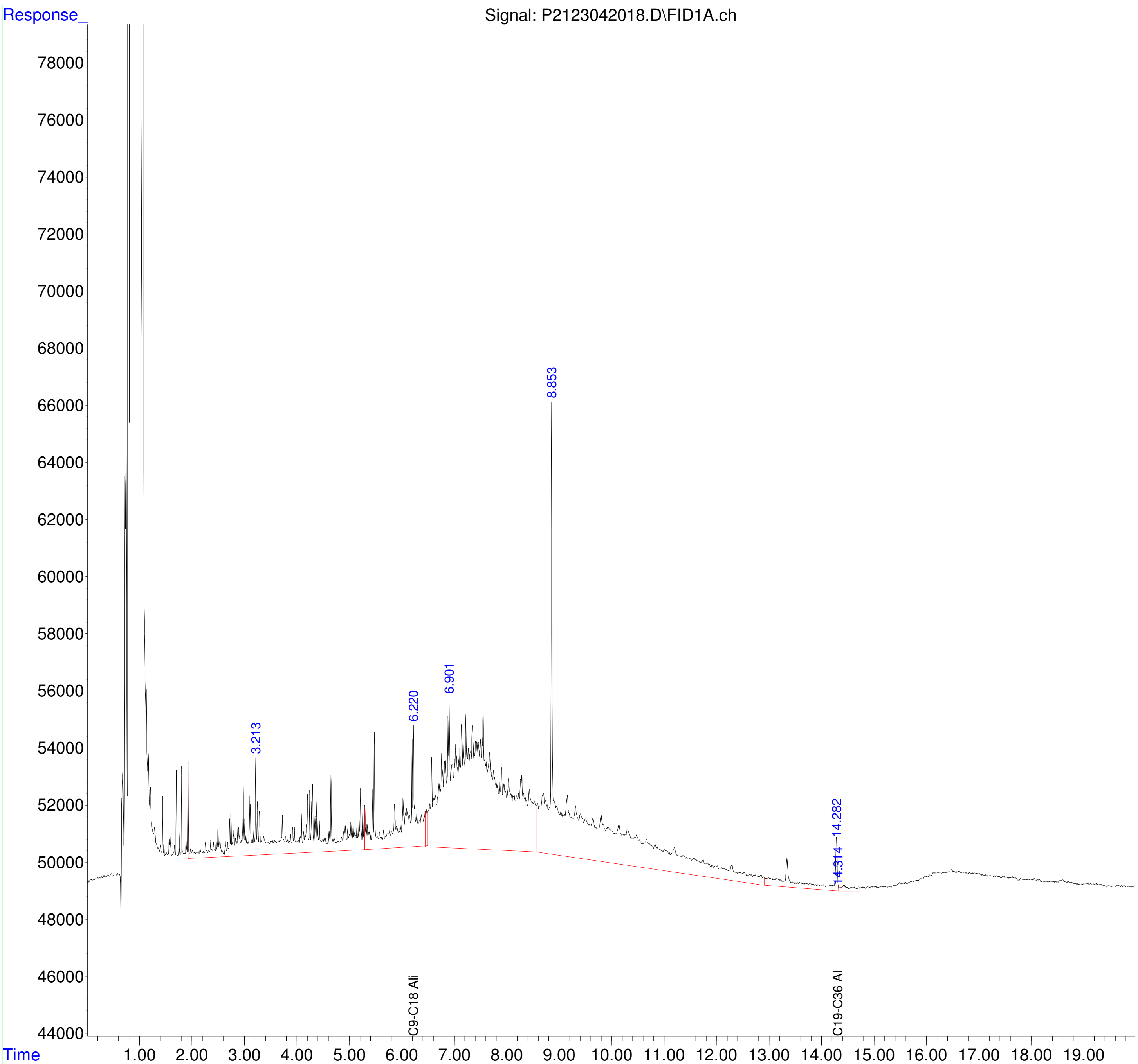
```
Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042018.D
Signal(s) : FID1A.ch
Acq On    : 20 Apr 2023   7:58 pm
Operator  : Petro21a/b:cre
Sample    : eph 5235 35 ul
Misc      :
ALS Vial  : 9   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 14:33:12 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed

       Compound                        R.T.       Response    Conc Units
 ----------------------------------------------------------------------------

 System Monitoring Compounds
  3) S   Naphthalene                  0.000              0    N.D.  mg/L  d
  5) S   2-Methylnaphthalene          0.000              0    N.D.  mg/L  d
  6) S   2-Fluorobiphenyl             0.000              0    N.D.  mg/kg d
  8) S   2-Bromonaphthalene           0.000              0    N.D.  mg/kg d
 13) S   1-Chlorooctadecane           0.000              0    N.D.  mg/L  d
 Spiked Amount     20.000   Range  40 - 140    Recovery   =    0.00%#

 Target Compounds
  1)     Nonane (C9)                  0.000              0    N.D.  mg/L  d
  2)     Decane (C10)                 0.000              0    N.D.  mg/L  d
  4)     Dodecane (C12)               0.000              0    N.D.  mg/L  d
  7)     Tetradecane (C14)            0.000              0    N.D.  mg/L  d
  9)     Hexadecane (C16)             0.000              0    N.D.  mg/L  d
 10)     Octadecane (C18)             0.000              0    N.D.  mg/L  d
 11)     Nonadecane (c19)             0.000              0    N.D.  mg/kg d
 12)     Eicosane (C20)               0.000              0    N.D.  mg/L  d
 14)     Docosane (C22)               0.000              0    N.D.  mg/L  d
 15)     Tetracosane (C24)            0.000              0    N.D.  mg/L  d
 16)     Hexacosane (C26)             0.000              0    N.D.  mg/L  d
 17)     Octacosane (C28)             0.000              0    N.D.  mg/L  d
 18)     Triacontane (C30)            0.000              0    N.D.  mg/L  d
 19)     Hexatriacontane (C36)        0.000              0    N.D.  mg/L  d
 20) H   C9-C18 Aliphatics            6.220f       1739692   24.308 mg/L  M5
 21) H   C19-C36 Aliphatics          14.314f       5695661   82.699 mg/L  M5
 ----------------------------------------------------------------------------

 (f)=RT Delta > 1/2 Window                              (m)=manual int.
```

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042018.D
Signal(s) : FID1A.ch
Acq On    : 20 Apr 2023   7:58 pm
Operator  : Petro21a/b:cre
Sample    : eph 5235 35 ul
Misc      :
ALS Vial  : 9   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 14:33:12 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

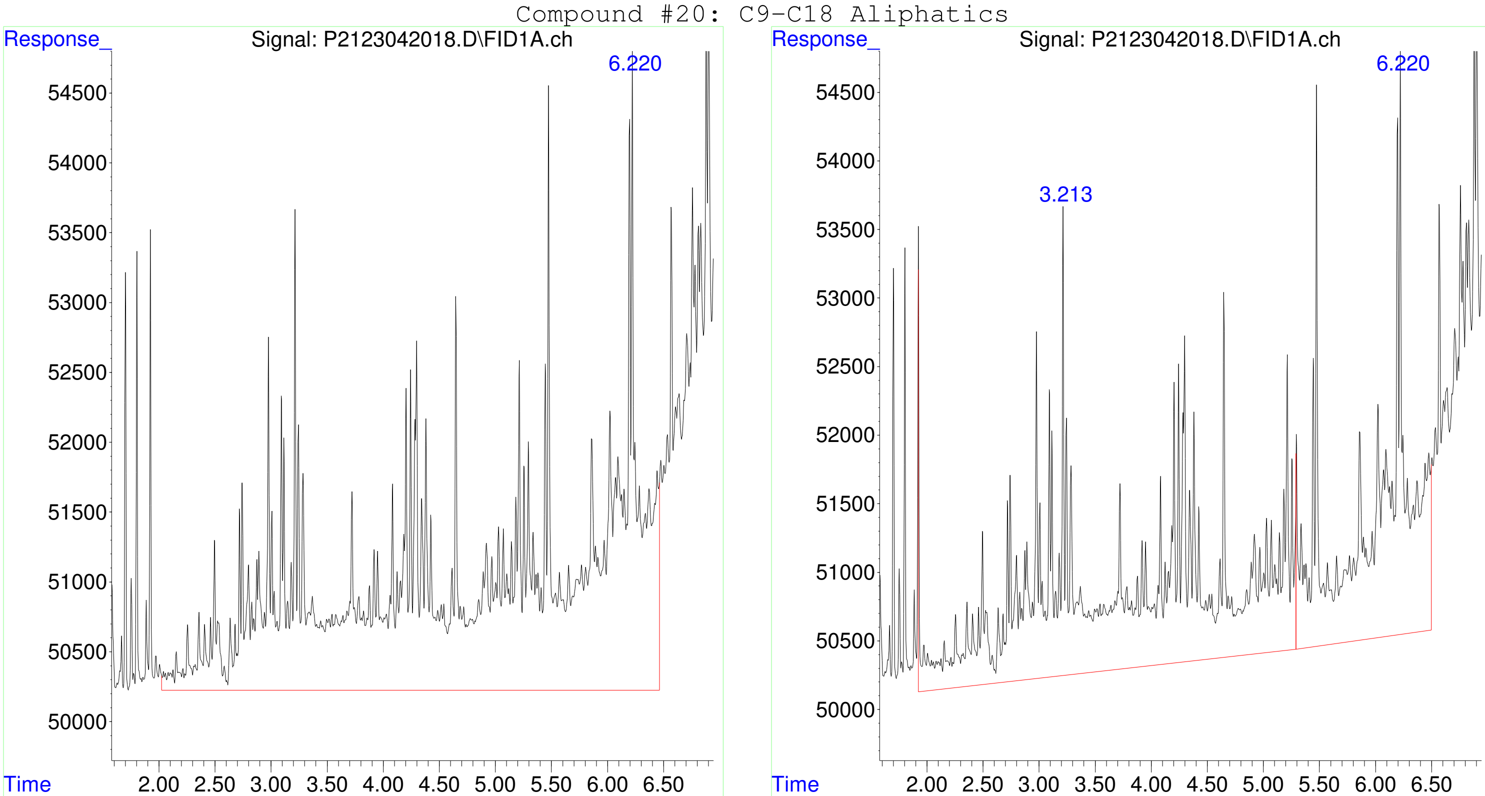


Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042018.D
Date Inj'd : 4/20/2023 7:58 pm
Sample : eph 5235 35 ul

QMethod : MAALI211129A.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:08 pm

Compound #20: C9-C18 Aliphatics




Original Peak Response = 2022621

Manual Peak Response = 1739692 M5

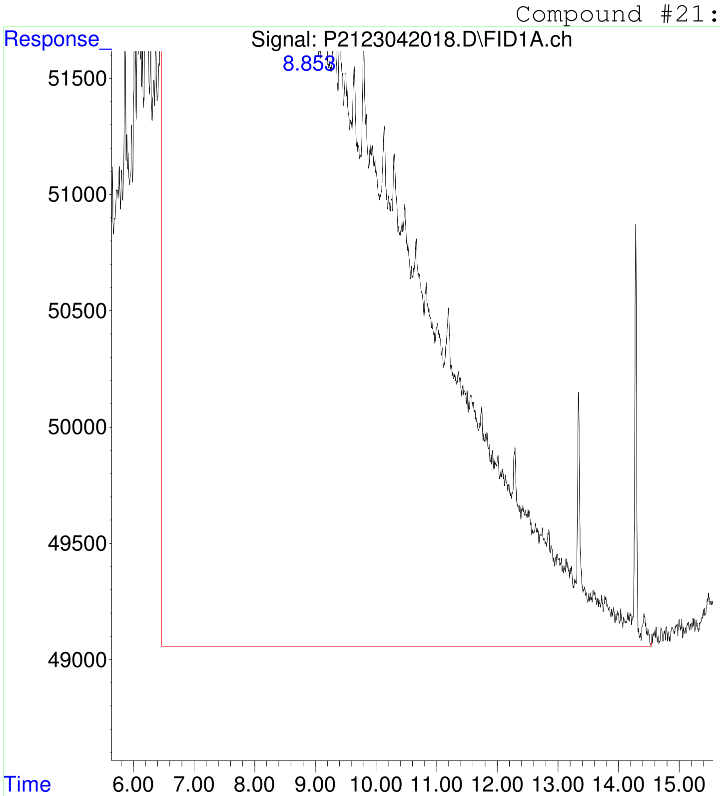
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042018.D
Date Inj'd : 4/20/2023 7:58 pm
Sample : eph 5235 35 ul

QMethod : MAALI211129A.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:08 pm

Compound #21: C19-C36 Aliphatics





Original Peak Response = 9522564

Manual Peak Response = 5695661 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

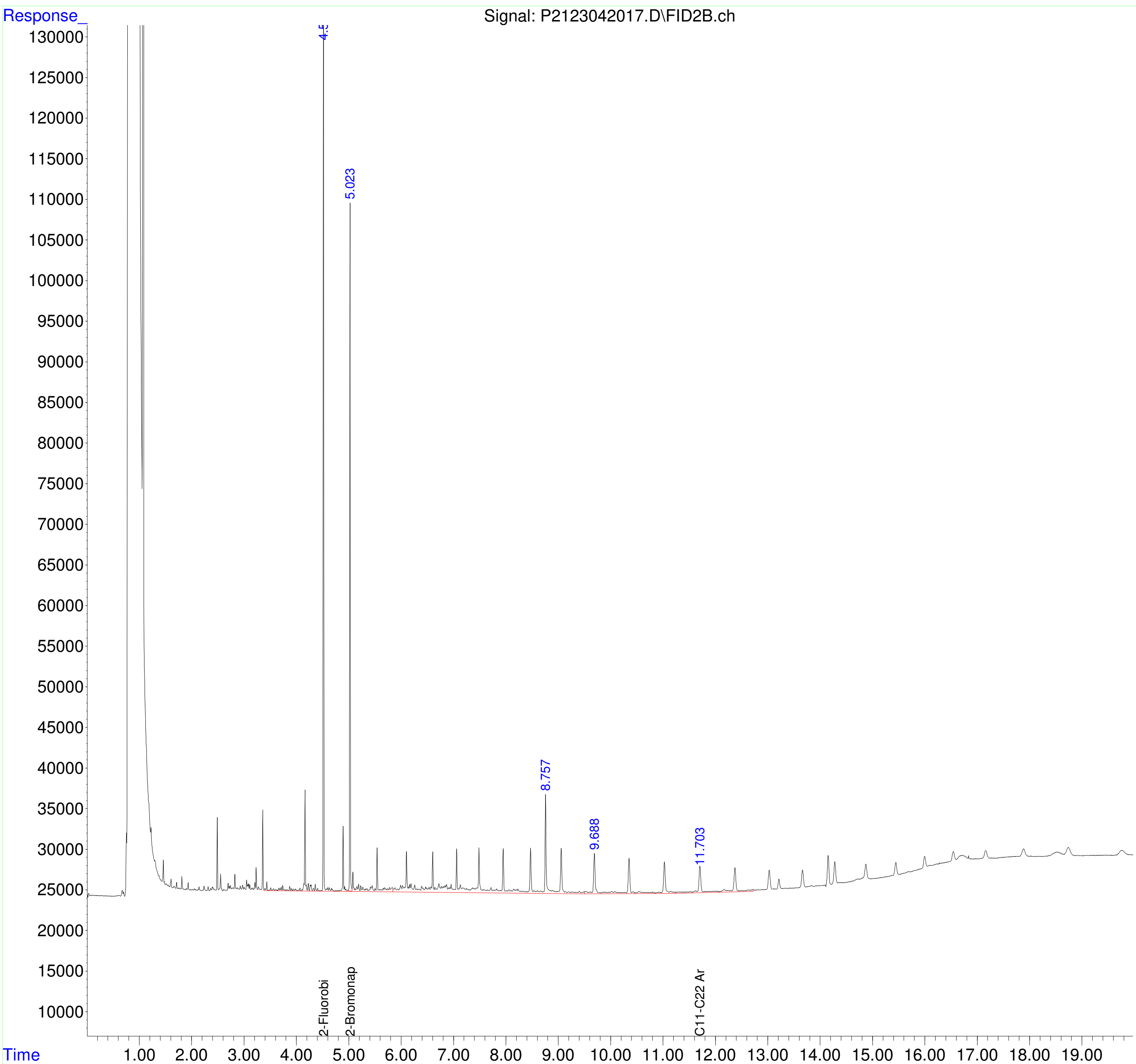
```
Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042017.D
Signal(s) : FID2B.ch
Acq On    : 20 Apr 2023   7:58 pm
Operator  : Petro21a/b:cre
Sample    : eph 5235 35 ul
Misc      :
ALS Vial  : 59   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:43:37 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed

        Compound                      R.T.       Response    Conc Units
 ---------------------------------------------------------------------------

 System Monitoring Compounds
 3) s   2-Fluorobiphenyl             4.517        946908   13.529 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   67.64%
 5) s   2-Bromonaphthalene           5.024        664320   13.479 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   67.39%
10) S   o-terphenyl                  0.000             0    N.D.  mg/L  d
Spiked Amount     20.000   Range  40 - 140    Recovery   =    0.00%#

 Target Compounds
 1)     Naphthalene                  0.000             0    N.D.  mg/L  d
 2)     2-Methylnaphthalene          0.000             0    N.D.  mg/L  d
 4)     Acenaphthalene               0.000             0    N.D.  mg/L  d
 6)     Acenaphthene                 0.000             0    N.D.  mg/L  d
 7)     Fluorene                     0.000             0    N.D.  mg/L  d
 8)     Phenanthrene                 0.000             0    N.D.  mg/L  d
 9)     Anthracene                   0.000             0    N.D.  mg/L  d
11)     Fluoranthene                 0.000             0    N.D.  mg/L  d
12)     Pyrene                       0.000             0    N.D.  mg/L  d
13)     Benzo(a)anthracene           0.000             0    N.D.  mg/L  d
14)     Chrysene                     0.000             0    N.D.  mg/L  d
15)     Benzo(b)fluoranthene         0.000             0    N.D.  mg/L  d
16)     Benzo(k)fluoranthene         0.000             0    N.D.  mg/L  d
17)     Benzo(a)pyrene               0.000             0    N.D.  mg/L  d
18)     Indeno(1,2,3-cd)pyrene       0.000             0    N.D.  mg/L  d
19)     Dibenzo(a,h)anthracene       0.000             0    N.D.  mg/L  d
20)     Benzo(ghi)perylene           0.000             0    N.D.  mg/L  d
21) H   C11-C22 Aromatic Range      11.703       2614152   31.270 mg/L  M5
 ---------------------------------------------------------------------------

(f)=RT Delta > 1/2 Window                               (m)=manual int.
```

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042017.D
Signal(s) : FID2B.ch
Acq On     : 20 Apr 2023   7:58 pm
Operator  : Petro21a/b:cre
Sample     : eph 5235 35 ul
Misc       :
ALS Vial  : 59   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:43:37 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

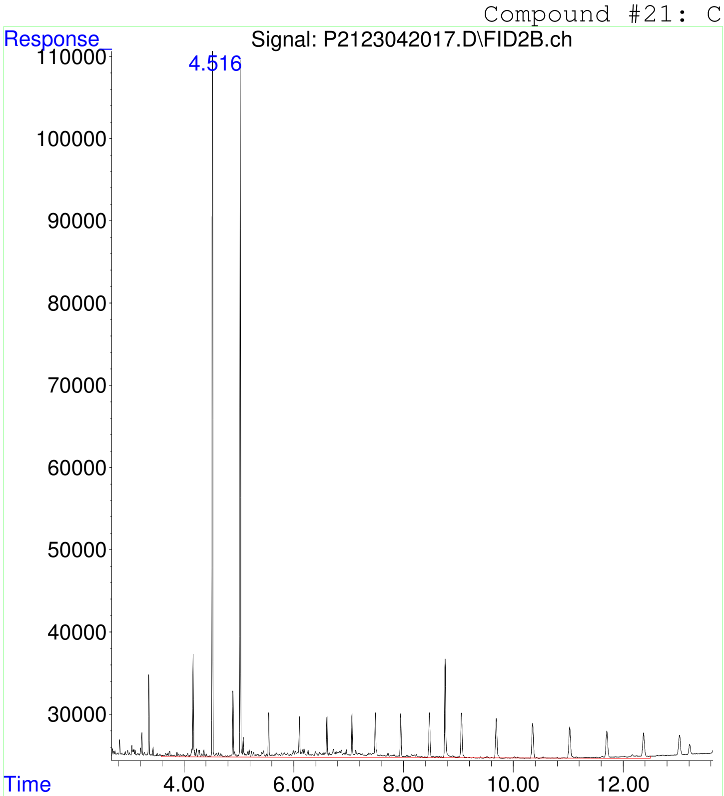


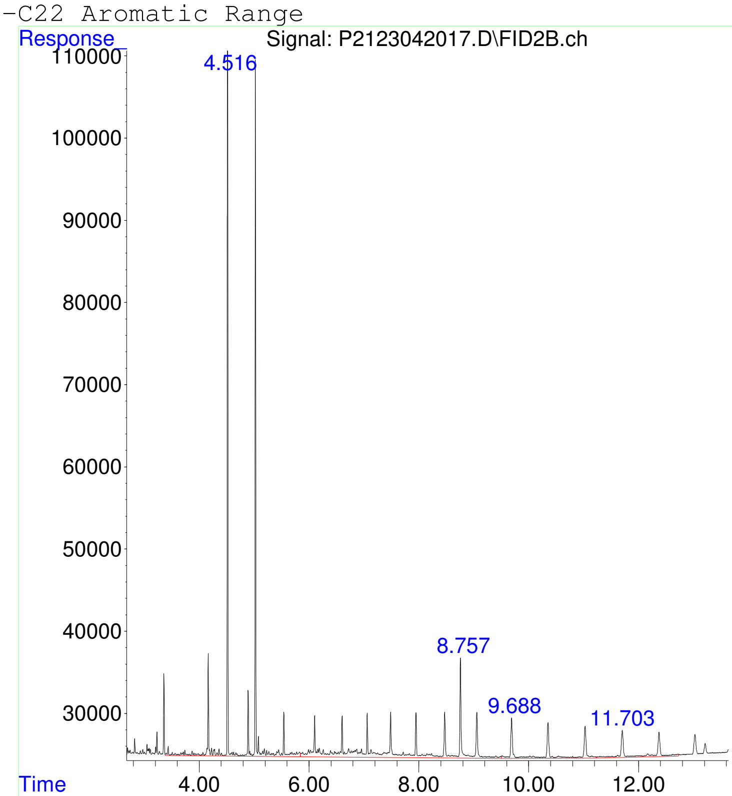
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042017.D
Date Inj'd : 4/20/2023 7:58 pm
Sample : eph 5235 35 ul

QMethod : MAARO211129B.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:39 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 2214182

Manual Peak Response = 2614152 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042016.D
Signal(s) : FID1A.ch
Acq On : 20 Apr 2023 7:34 pm
Operator : Petro21a/b:cre
Sample : eph 5234 40 ul
Misc :
ALS Vial : 8 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 14:31:27 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 0.000 | 0 | N.D. | mg/L | d |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 0.00%# | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 6.220f | 1785388 | 24.947 | mg/L | |
| 21) H | C19-C36 Aliphatics | 14.282f | 6946407 | 100.859 | mg/L | M5 |

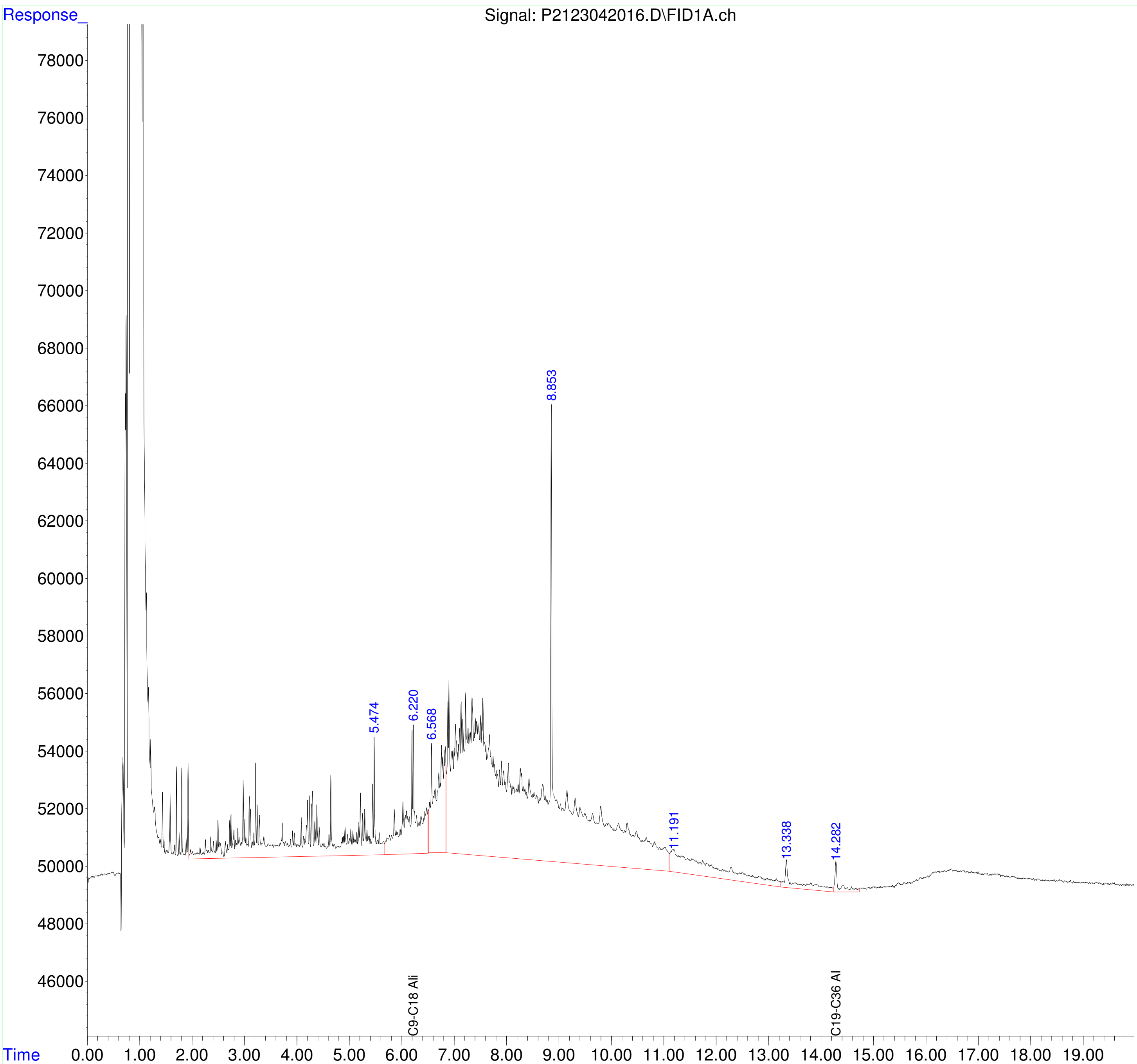
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042016.D
Signal(s) : FID1A.ch
Acq On : 20 Apr 2023 7:34 pm
Operator : Petro21a/b:cre
Sample : eph 5234 40 ul
Misc :
ALS Vial : 8 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 14:31:27 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

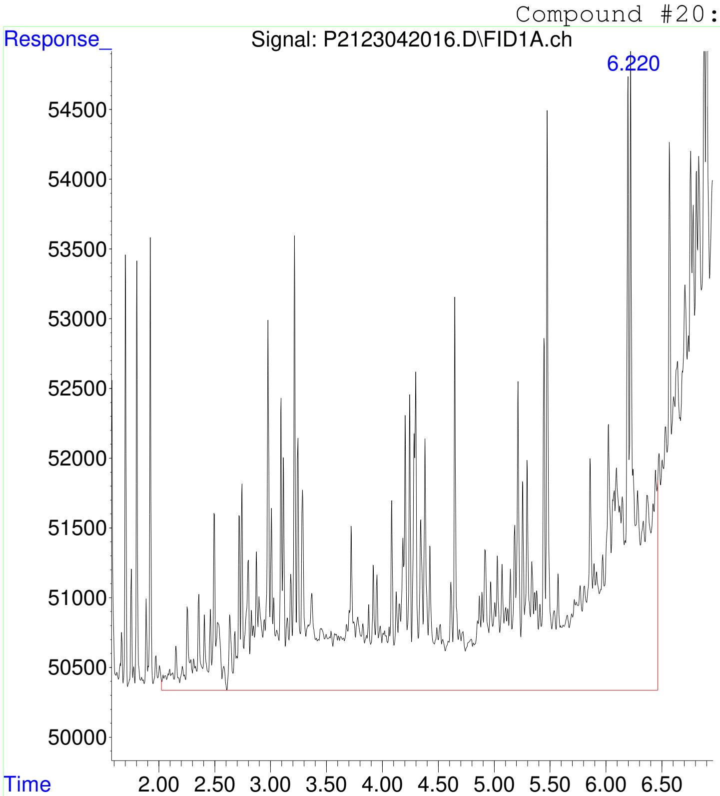


Manual Integration Report

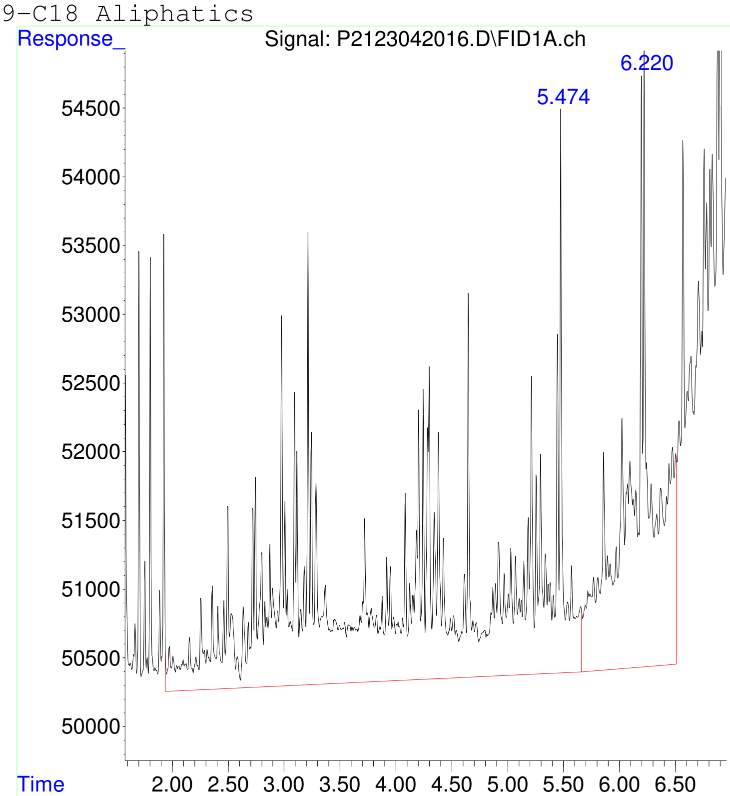
Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042016.D
Date Inj'd : 4/20/2023 7:34 pm
Sample : eph 5234 40 ul

QMethod : MAALI211129A.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:08 pm

Compound #20: C9-C18 Aliphatics




Original Peak Response = 1764710

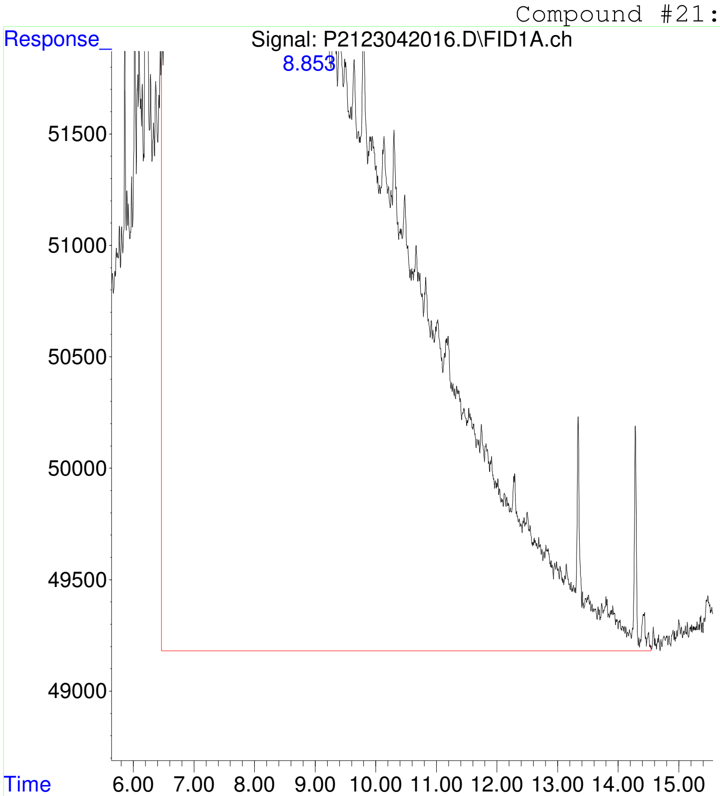


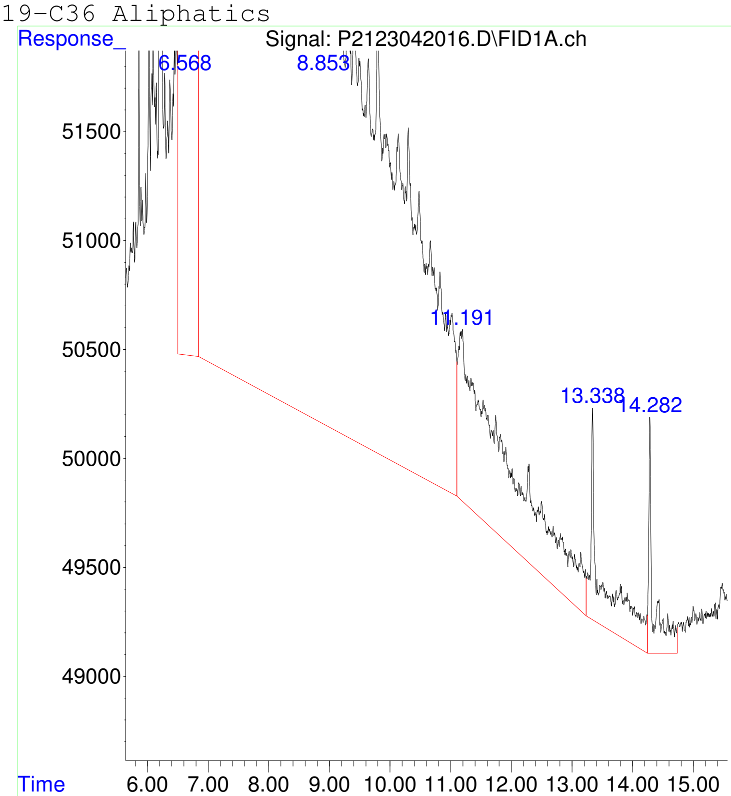

Manual Peak Response = 1785388 m

Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230420\ | QMethod | : MAALI211129A.M |
| Data File | : P2123042016.D | Operator | : Petro21a/b:cre |
| Date Inj'd | : 4/20/2023 7:34 pm | Instrument | : Petro 21 |
| Sample | : eph 5234 40 ul | Quant Date | : 4/21/2023 2:08 pm |

Compound #21: C19-C36 Aliphatics




Original Peak Response = 10195730

Manual Peak Response = 6946407 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042015.D
Signal(s) : FID2B.ch
Acq On : 20 Apr 2023 7:34 pm
Operator : Petro21a/b:cre
Sample : eph 5234 40 ul
Misc :
ALS Vial : 58 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:43:14 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.517 | 1276511 | 18.239 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 91.20% | |
| 5) s 2-Bromonaphthalene | 5.024 | 900704 | 18.275 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 91.38% | |
| 10) S o-terphenyl | 0.000 | 0 | N.D. mg/L | d |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 0.00%# | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 11.704 | 4113562 | 49.206 mg/L | M5 |

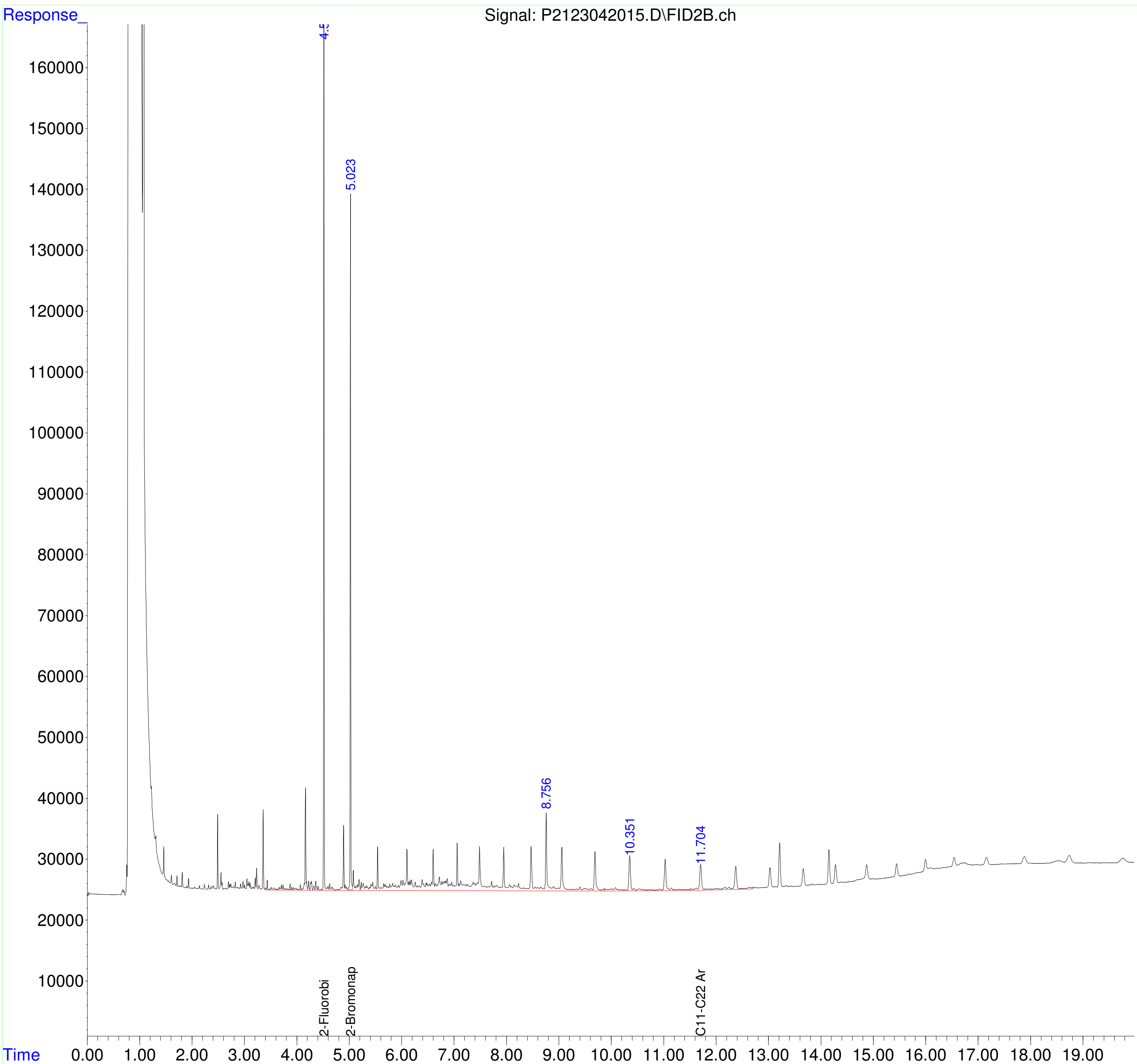
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042015.D
Signal(s) : FID2B.ch
Acq On     : 20 Apr 2023    7:34 pm
Operator  : Petro21a/b:cre
Sample     : eph 5234 40 ul
Misc       :
ALS Vial  : 58    Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:43:14 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title   : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

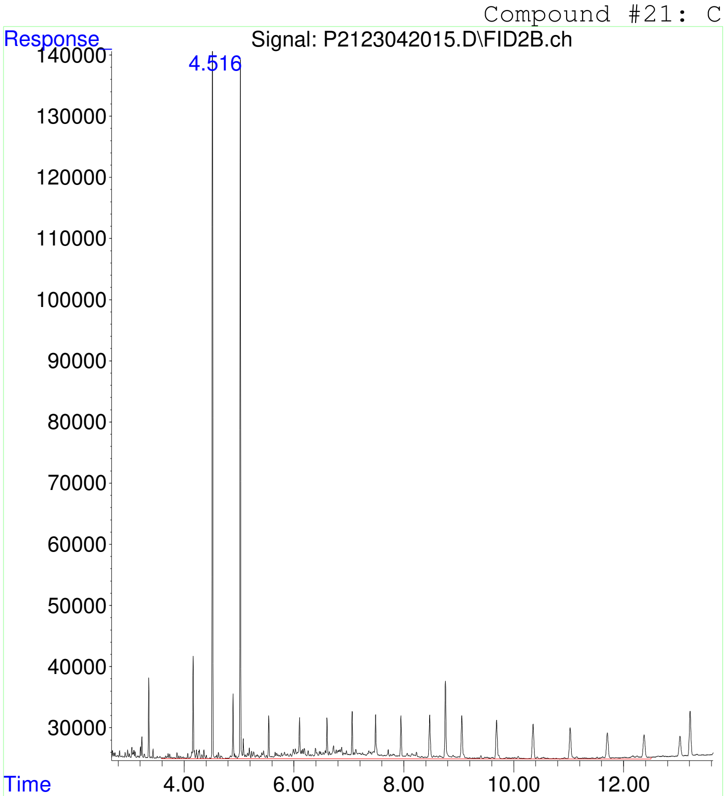
Volume Inj.  :
Signal Phase :
Signal Info  :

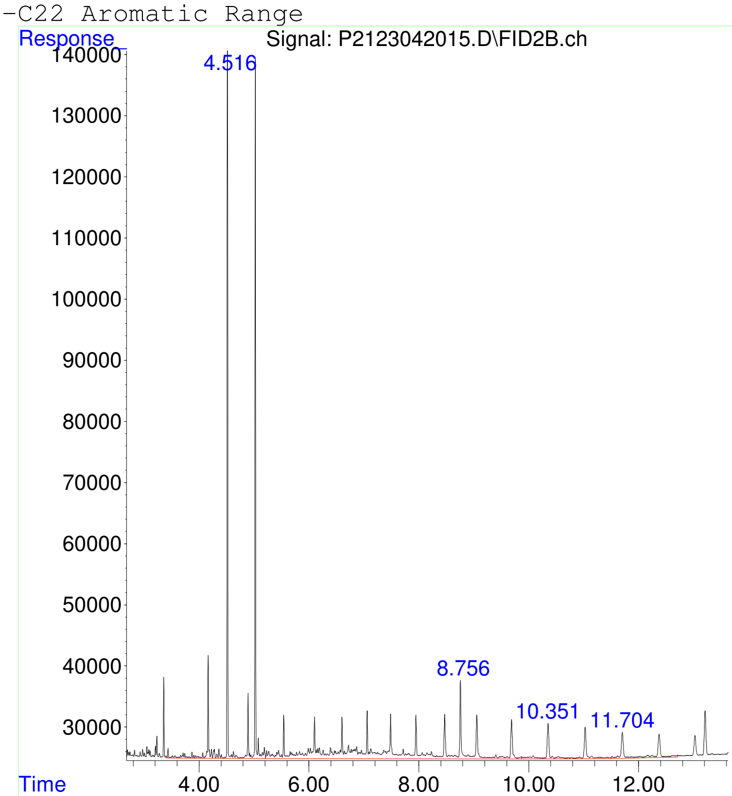


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230420.SEC\ | QMethod | : MAARO211129B.M |
| Data File | : P2123042015.D | Operator | : Petro21a/b:cre |
| Date Inj'd | : 4/20/2023 7:34 pm | Instrument | : Petro 21 |
| Sample | : eph 5234 40 ul | Quant Date | : 4/21/2023 2:39 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3690788 Manual Peak Response = 4113562 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042014.D
Signal(s) : FID1A.ch
Acq On : 20 Apr 2023 7:09 pm
Operator : Petro21a/b:cre
Sample : eph 5233 45 ul
Misc :
ALS Vial : 7 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 14:29:36 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

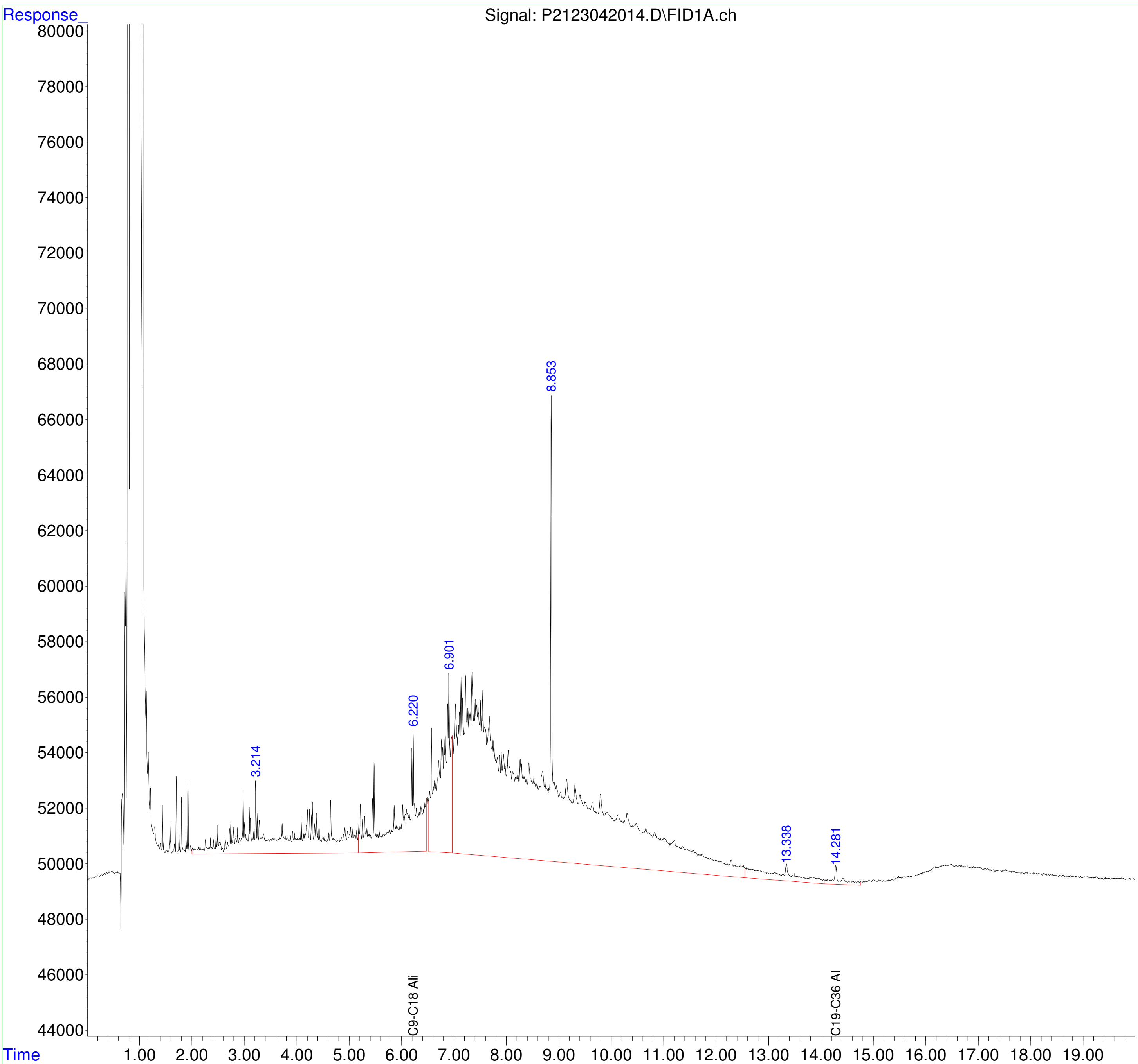
| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 0.000 | 0 | N.D. | mg/L | d |

Spiked Amount 20.000 Range 40 - 140 Recovery = 0.00%#

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 6.220f | 1873573 | 26.179 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.281f | 8551693 | 124.167 | mg/L | M5 |

(f)=RT Delta > 1/2 Window (m)=manual int.

```
Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042014.D
Signal(s) : FID1A.ch
Acq On    : 20 Apr 2023   7:09 pm
Operator  : Petro21a/b:cre
Sample    : eph 5233 45 ul
Misc      :
ALS Vial  : 7   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 14:29:36 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :
```

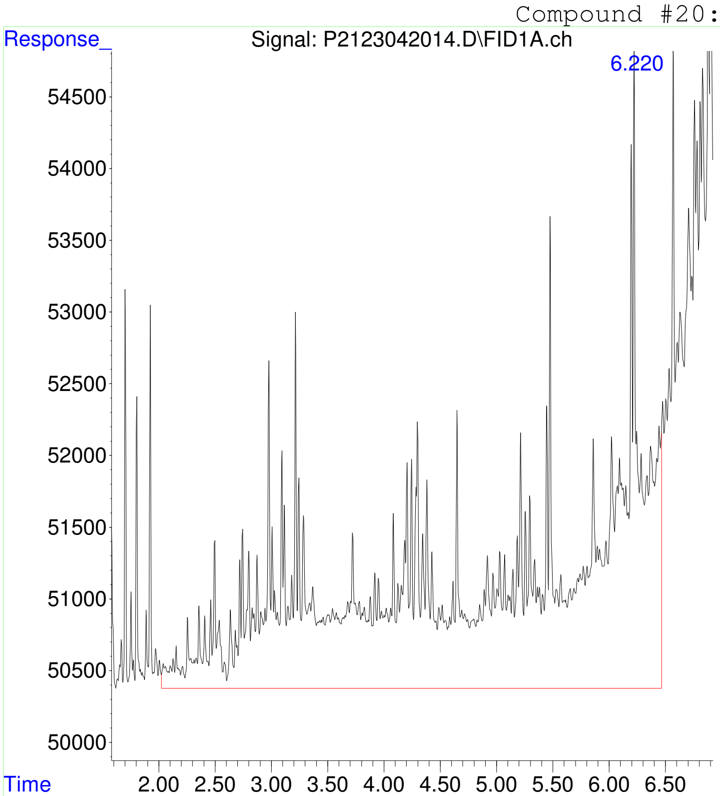


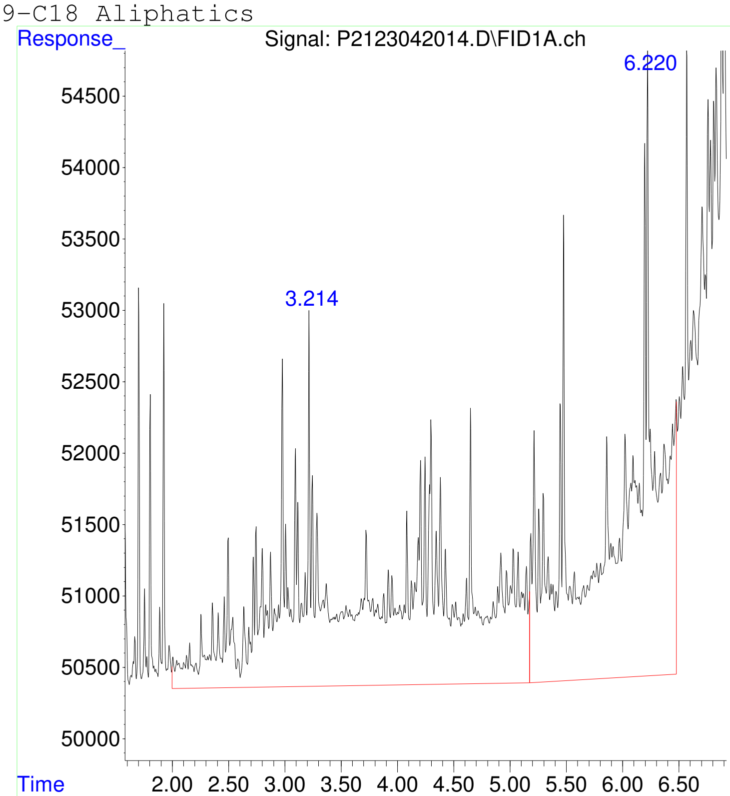
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042014.D
Date Inj'd : 4/20/2023 7:09 pm
Sample : eph 5233 45 ul

QMethod : MAALI211129A.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:08 pm

Compound #20: C9-C18 Aliphatics




Original Peak Response = 1885862

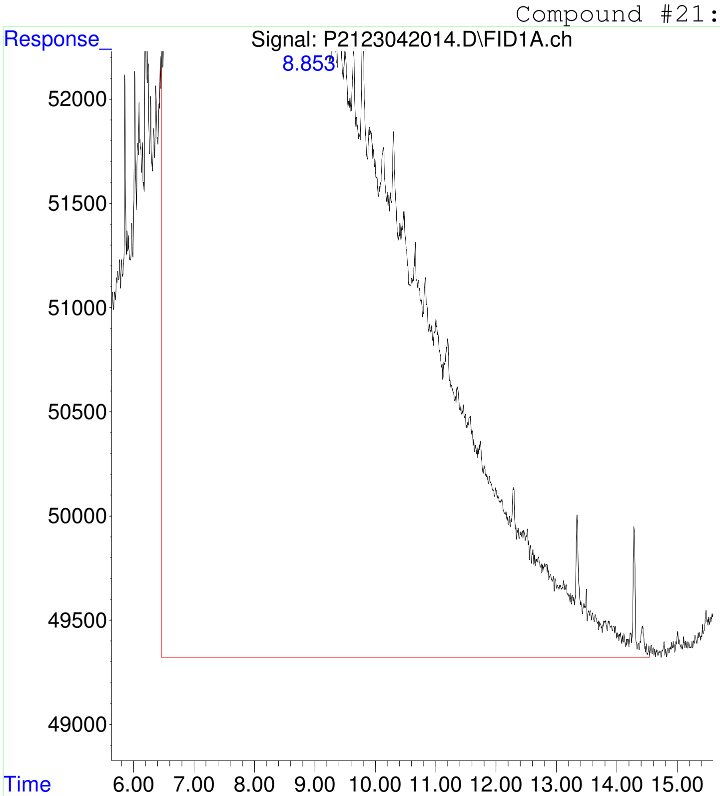
Manual Peak Response = 1873573 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230420\ | QMethod | : MAALI211129A.M |
| Data File | : P2123042014.D | Operator | : Petro21a/b:cre |
| Date Inj'd | : 4/20/2023 7:09 pm | Instrument | : Petro 21 |
| Sample | : eph 5233 45 ul | Quant Date | : 4/21/2023 2:08 pm |

Compound #21: C19-C36 Aliphatics





Original Peak Response = 11037624

Manual Peak Response = 8551693 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042013.D
Signal(s) : FID2B.ch
Acq On : 20 Apr 2023 7:09 pm
Operator : Petro21a/b:cre
Sample : eph 5233 45 ul
Misc :
ALS Vial : 57 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:42:50 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.517 | 1119452 | 15.995 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 79.97% | |
| 5) s 2-Bromonaphthalene | 5.024 | 806612 | 16.366 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 81.83% | |
| 10) S o-terphenyl | 0.000 | 0 | N.D. mg/L | d |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 0.00%# | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 12.372f | 5768555 | 69.003 mg/L | M5 |

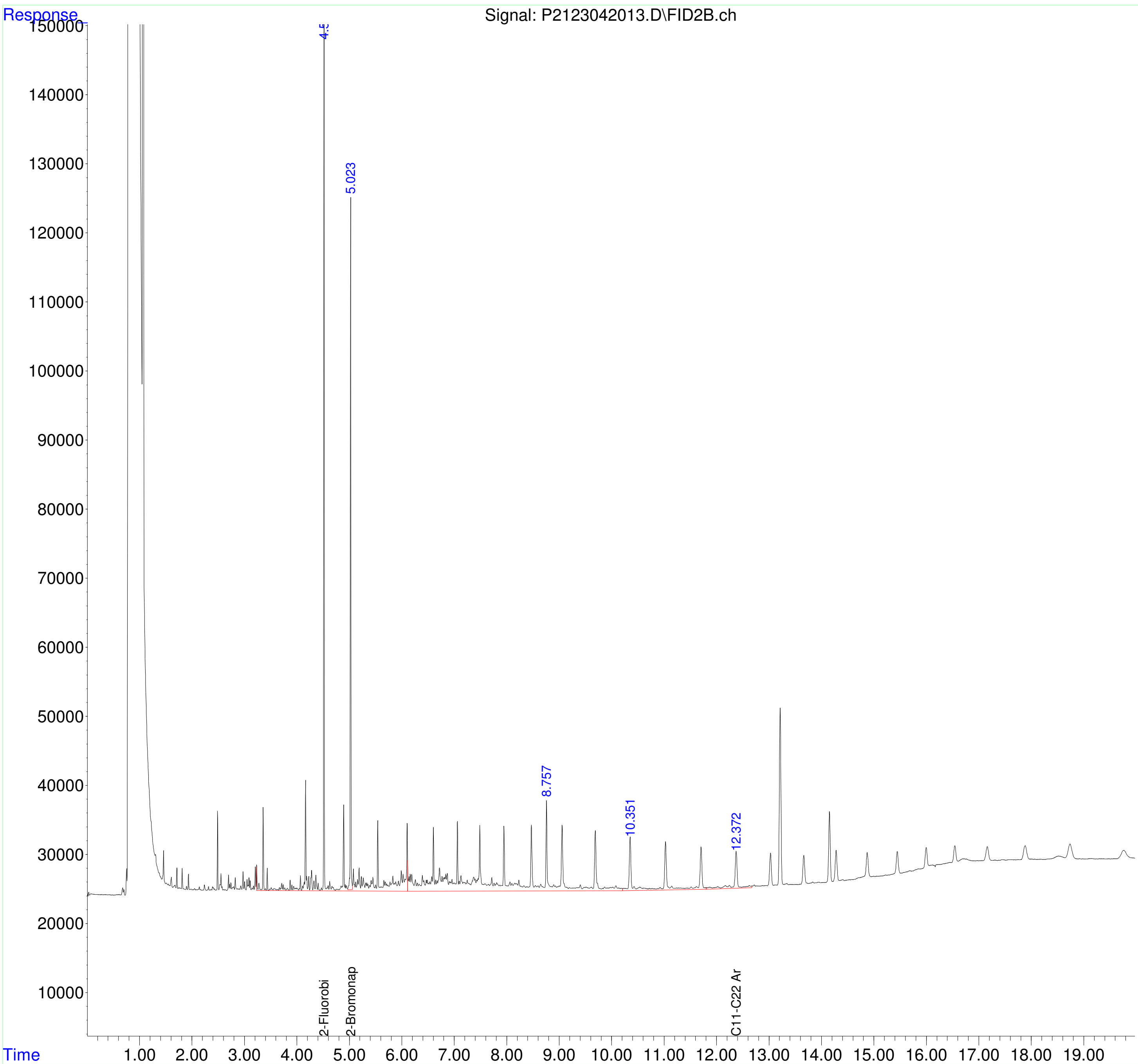
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042013.D
Signal(s) : FID2B.ch
Acq On    : 20 Apr 2023   7:09 pm
Operator  : Petro21a/b:cre
Sample    : eph 5233 45 ul
Misc      :
ALS Vial  : 57   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:42:50 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

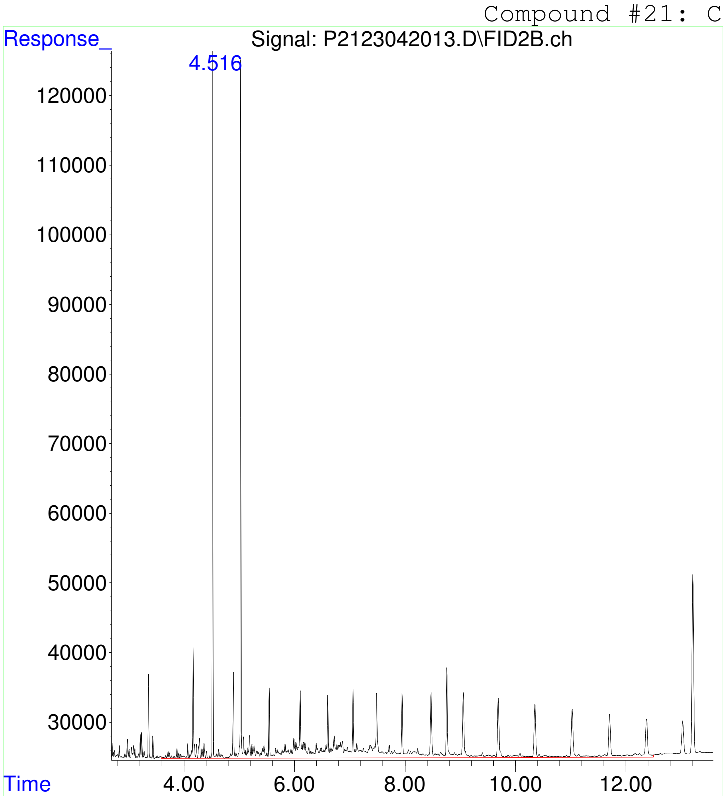
Volume Inj.  :
Signal Phase :
Signal Info  :

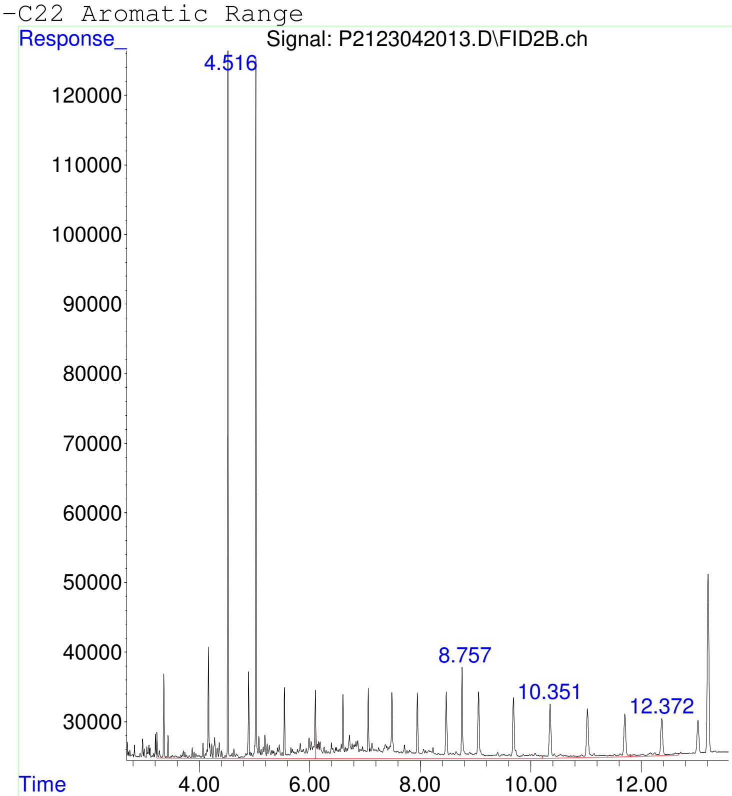


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230420.SEC\ | QMethod | : MAARO211129B.M |
| Data File | : P2123042013.D | Operator | : Petro21a/b:cre |
| Date Inj'd | : 4/20/2023 7:09 pm | Instrument | : Petro 21 |
| Sample | : eph 5233 45 ul | Quant Date | : 4/21/2023 2:39 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 4918544

Manual Peak Response = 5768555 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042012.D
Signal(s) : FID1A.ch
Acq On : 20 Apr 2023 6:44 pm
Operator : Petro21a/b:cre
Sample : eph 5232 50 ul
Misc :
ALS Vial : 6 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 14:27:27 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 0.000 | 0 | N.D. | mg/L | d |
| Spiked Amount 20.000 | Range 40 - 140 | Recovery = 0.00%# | | | | |
| Target Compounds | | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 6.221f | 2660876 | 37.180 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 13.342f | 12899938 | 187.302 | mg/L | M5 |

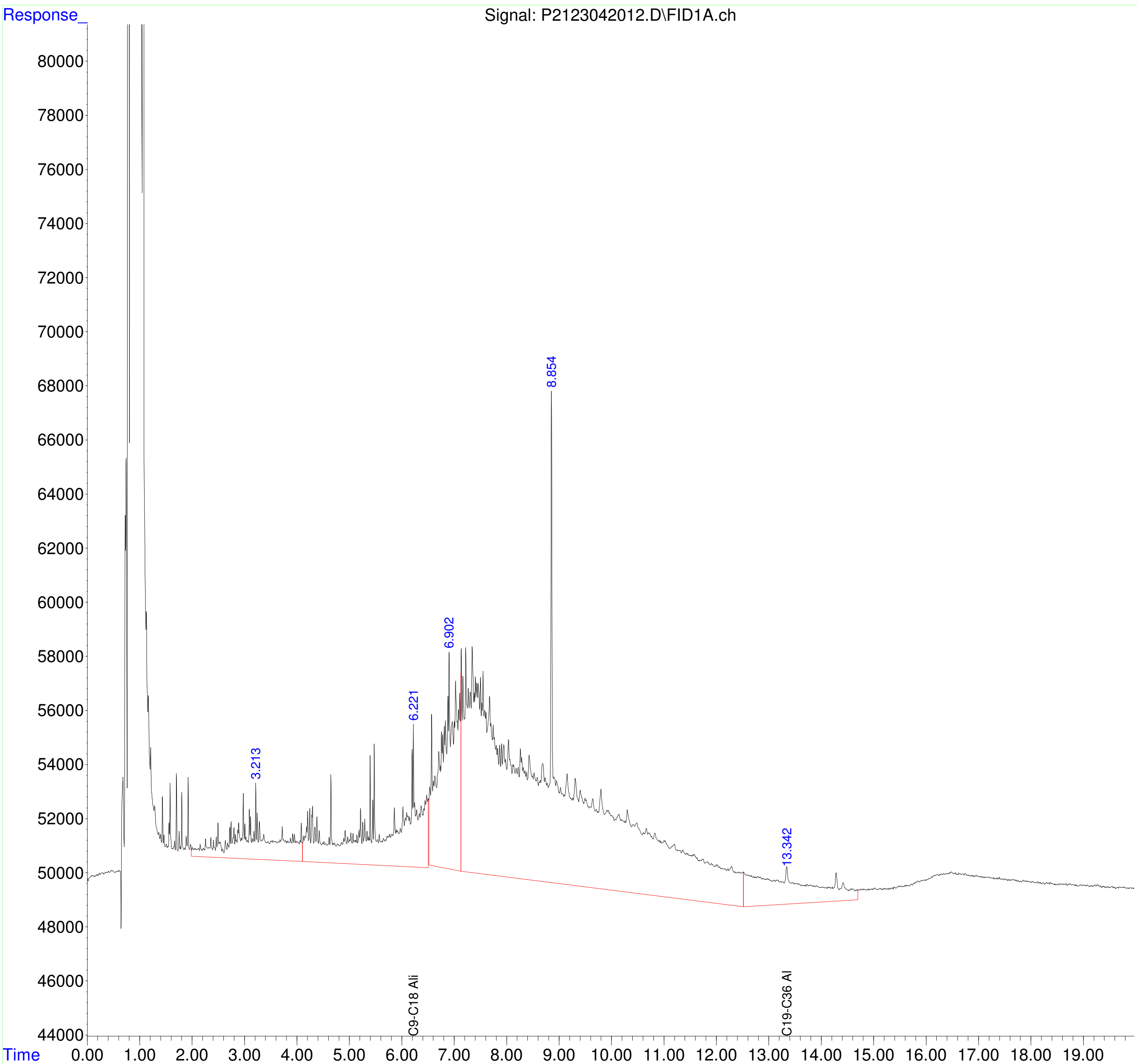
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042012.D
Signal(s) : FID1A.ch
Acq On    : 20 Apr 2023   6:44 pm
Operator  : Petro21a/b:cre
Sample    : eph 5232 50 ul
Misc      :
ALS Vial  : 6   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 14:27:27 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

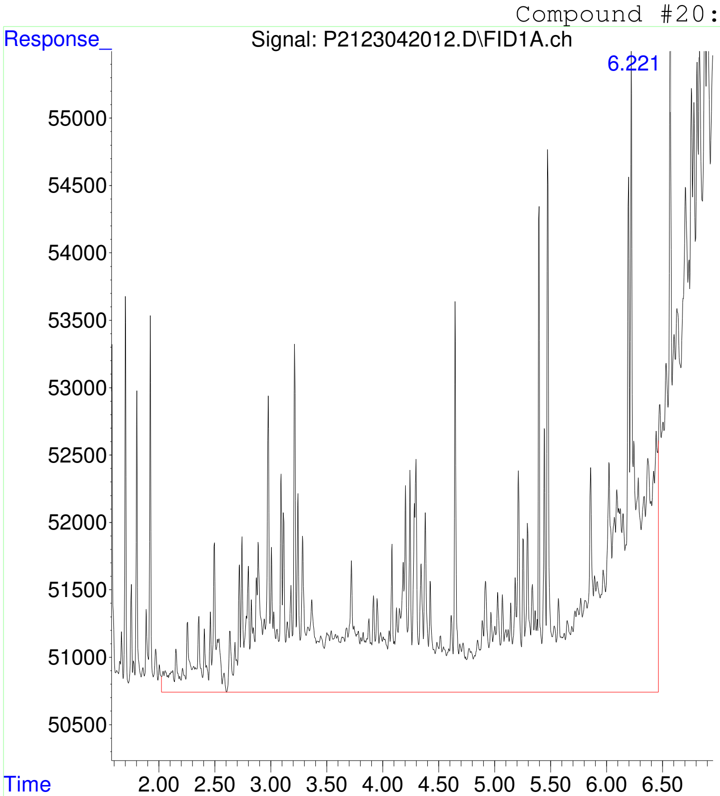


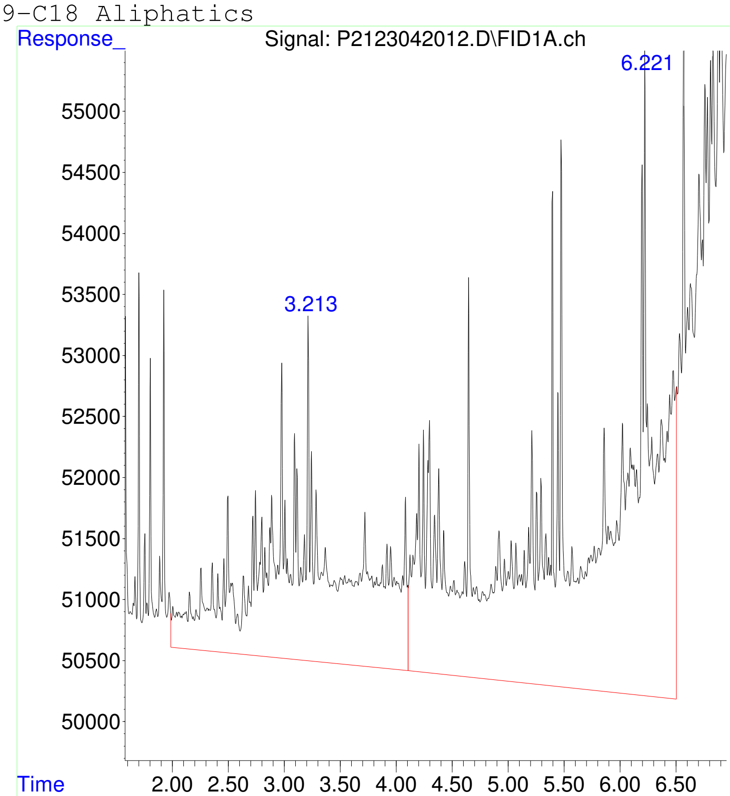
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042012.D
Date Inj'd : 4/20/2023 6:44 pm
Sample : eph 5232 50 ul

QMethod : MAALI211129A.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:08 pm

Compound #20: C9-C18 Aliphatics



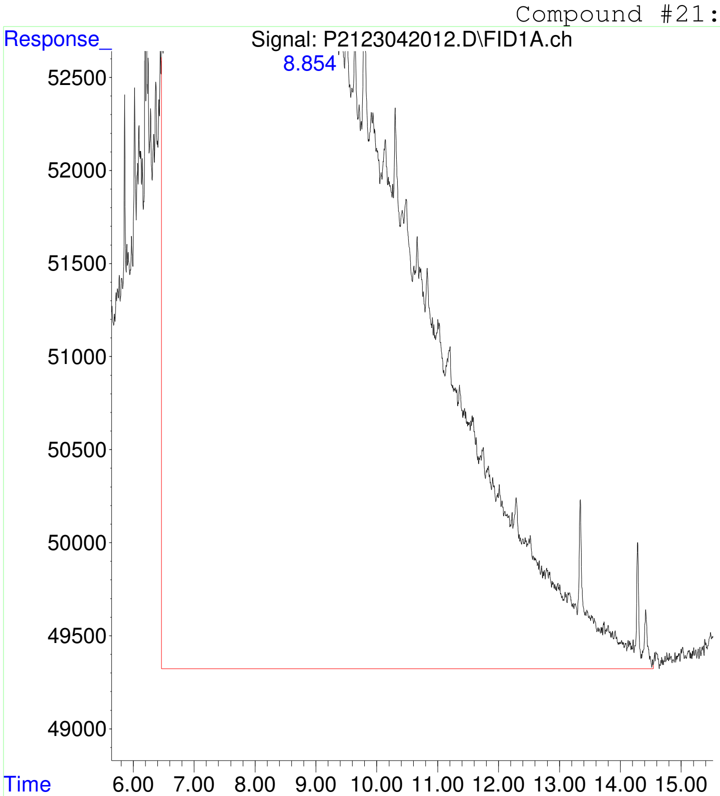



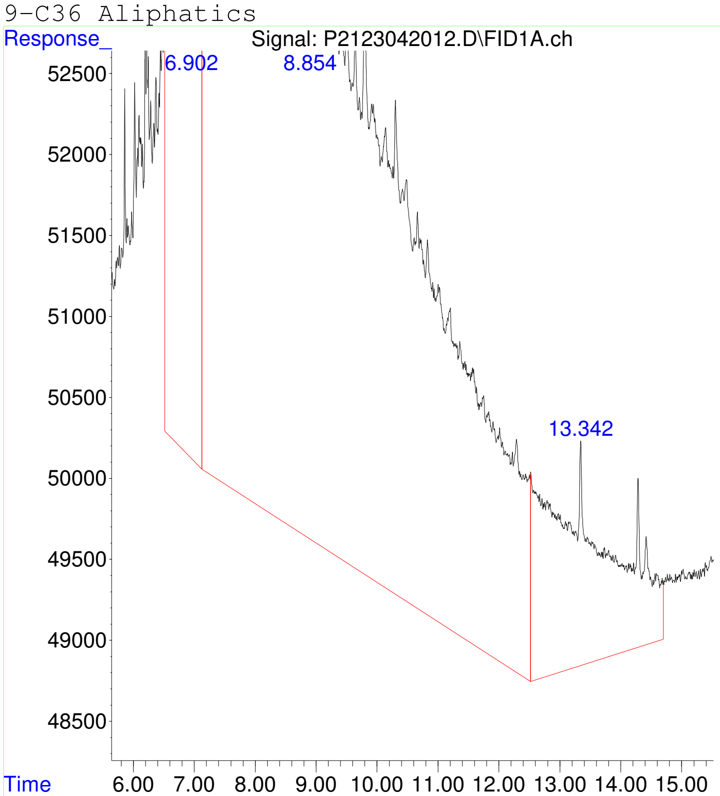

Original Peak Response = 1682429
Manual Peak Response = 2660876 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

# Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230420\ | QMethod | : MAALI211129A.M |
| Data File | : P2123042012.D | Operator | : Petro21a/b:cre |
| Date Inj'd | : 4/20/2023 6:44 pm | Instrument | : Petro 21 |
| Sample | : eph 5232 50 ul | Quant Date | : 4/21/2023 2:08 pm |

Compound #21: C19-C36 Aliphatics




Original Peak Response = 12969956 Manual Peak Response = 12899938 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042011.D
Signal(s) : FID2B.ch
Acq On : 20 Apr 2023 6:44 pm
Operator : Petro21a/b:cre
Sample : eph 5232 50 ul
Misc :
ALS Vial : 56 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:42:21 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.517 | 1290404 | 18.437 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 92.19% | |
| 5) s 2-Bromonaphthalene | 5.024 | 916396 | 18.593 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 92.97% | |
| 10) S o-terphenyl | 0.000 | 0 | N.D. mg/L | d |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 0.00%# | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 12.373f | 5497287 | 65.758 mg/L | M5 |

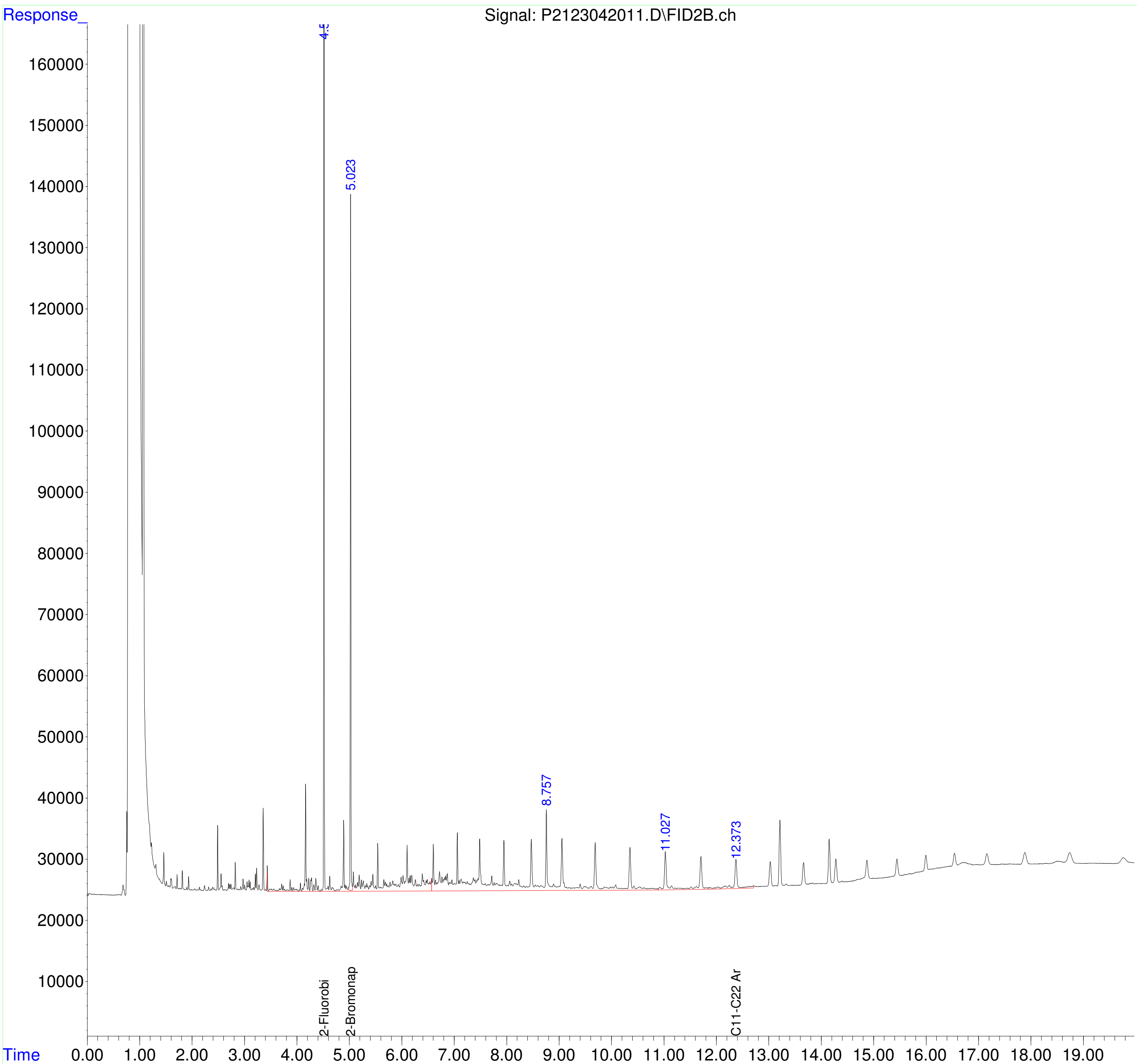
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042011.D
Signal(s) : FID2B.ch
Acq On    : 20 Apr 2023   6:44 pm
Operator  : Petro21a/b:cre
Sample    : eph 5232 50 ul
Misc      :
ALS Vial  : 56   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:42:21 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

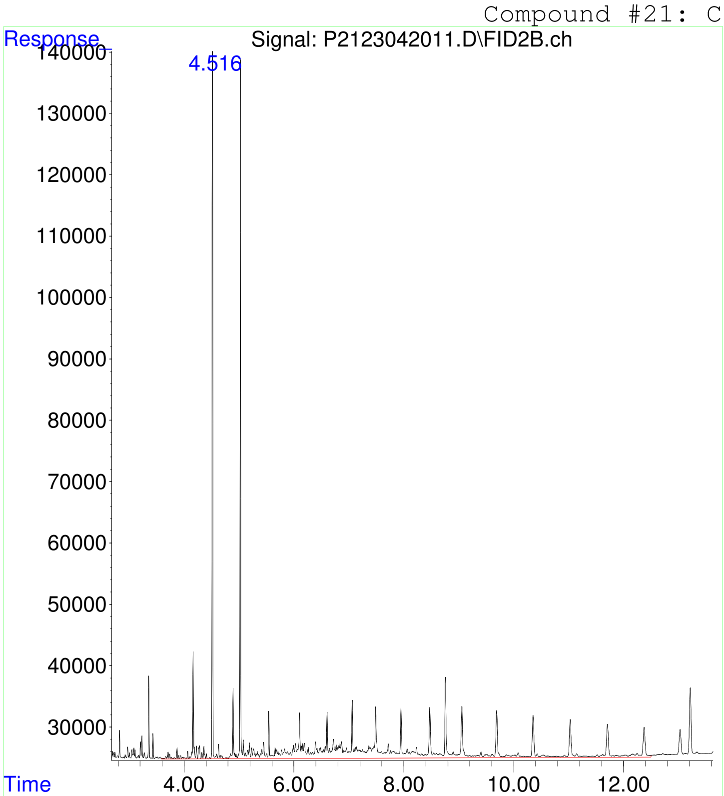


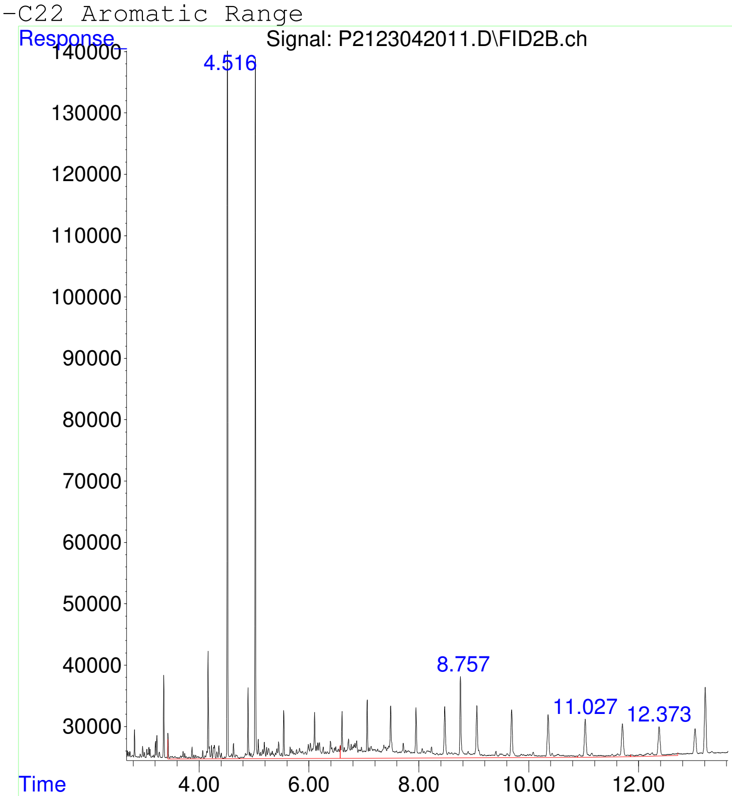
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042011.D
Date Inj'd : 4/20/2023 6:44 pm
Sample : eph 5232 50 ul

QMethod : MAARO211129B.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:39 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 4960526

Manual Peak Response = 5497287 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

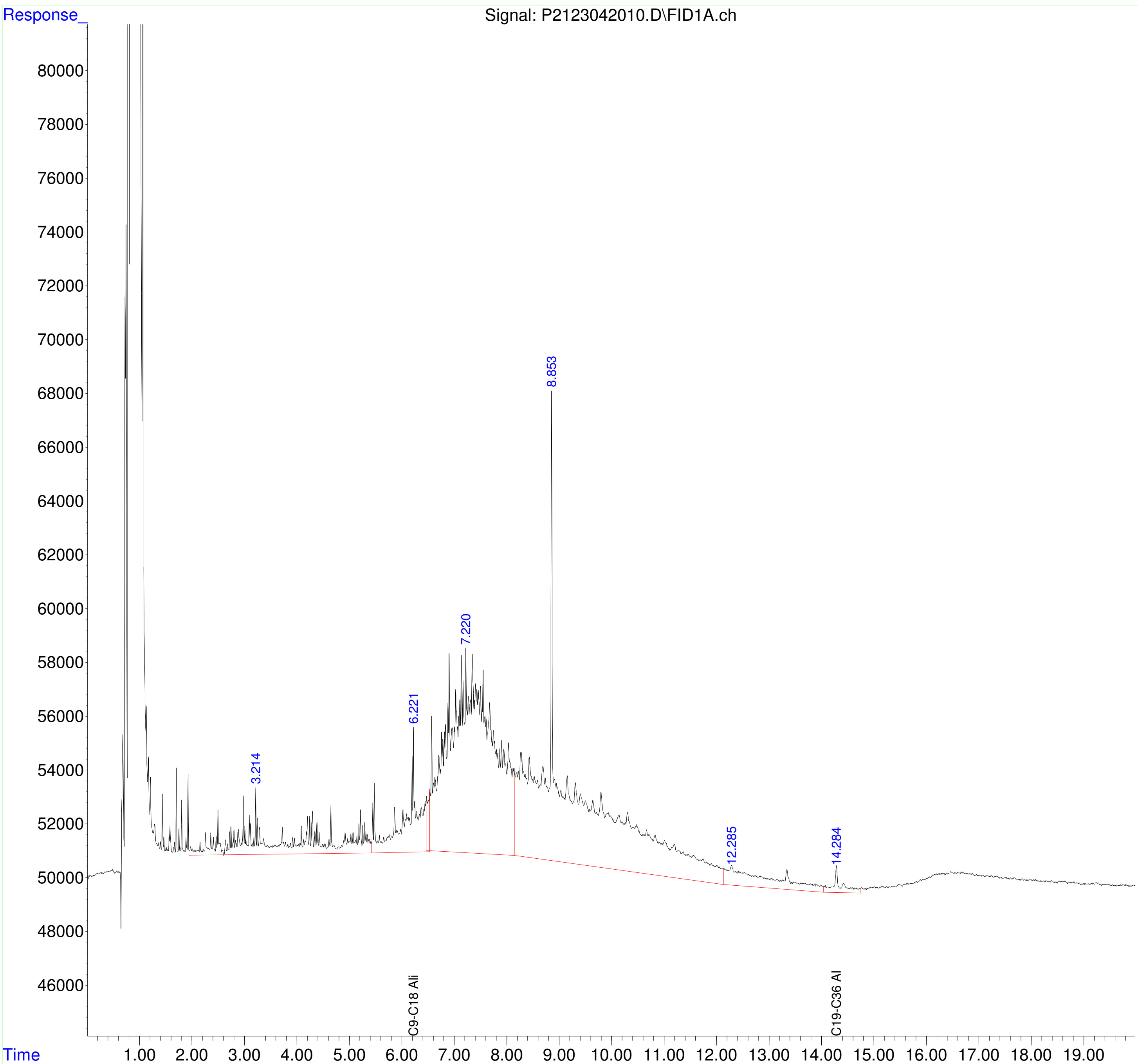
```
Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042010.D
Signal(s) : FID1A.ch
Acq On    : 20 Apr 2023   6:19 pm
Operator  : Petro21a/b:cre
Sample    : eph 5231 55 ul
Misc      :
ALS Vial  : 5   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 15:39:26 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed

       Compound                        R.T.       Response    Conc Units
 ---------------------------------------------------------------------------

 System Monitoring Compounds
 3) S   Naphthalene                   0.000              0    N.D.  mg/L  d
 5) S   2-Methylnaphthalene           0.000              0    N.D.  mg/L  d
 6) S   2-Fluorobiphenyl              0.000              0    N.D.  mg/kg d
 8) S   2-Bromonaphthalene            0.000              0    N.D.  mg/kg d
13) S   1-Chlorooctadecane            0.000              0    N.D.  mg/L  d
Spiked Amount     20.000   Range  40 - 140    Recovery   =    0.00%#

 Target Compounds
 1)     Nonane (C9)                   0.000              0    N.D.  mg/L  d
 2)     Decane (C10)                  0.000              0    N.D.  mg/L  d
 4)     Dodecane (C12)                0.000              0    N.D.  mg/L  d
 7)     Tetradecane (C14)             0.000              0    N.D.  mg/L  d
 9)     Hexadecane (C16)              0.000              0    N.D.  mg/L  d
10)     Octadecane (C18)              0.000              0    N.D.  mg/L  d
11)     Nonadecane (c19)              0.000              0    N.D.  mg/kg d
12)     Eicosane (C20)                0.000              0    N.D.  mg/L  d
14)     Docosane (C22)                0.000              0    N.D.  mg/L  d
15)     Tetracosane (C24)             0.000              0    N.D.  mg/L  d
16)     Hexacosane (C26)              0.000              0    N.D.  mg/L  d
17)     Octacosane (C28)              0.000              0    N.D.  mg/L  d
18)     Triacontane (C30)             0.000              0    N.D.  mg/L  d
19)     Hexatriacontane (C36)         0.000              0    N.D.  mg/L  d
20) H   C9-C18 Aliphatics             6.221f       1630148   22.778 mg/L  M5
21) H   C19-C36 Aliphatics           14.284f       9462426  137.390 mg/L  M5
 ---------------------------------------------------------------------------

(f)=RT Delta > 1/2 Window                          (m)=manual int.
```

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042010.D
Signal(s) : FID1A.ch
Acq On : 20 Apr 2023 6:19 pm
Operator : Petro21a/b:cre
Sample : eph 5231 55 ul
Misc :
ALS Vial : 5 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 15:39:26 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

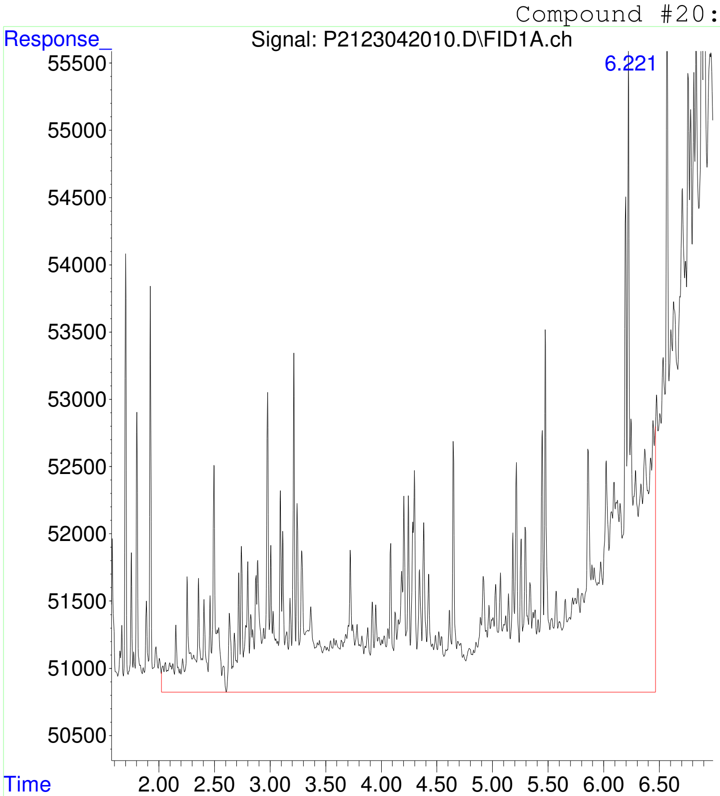
Volume Inj. :
Signal Phase :
Signal Info :

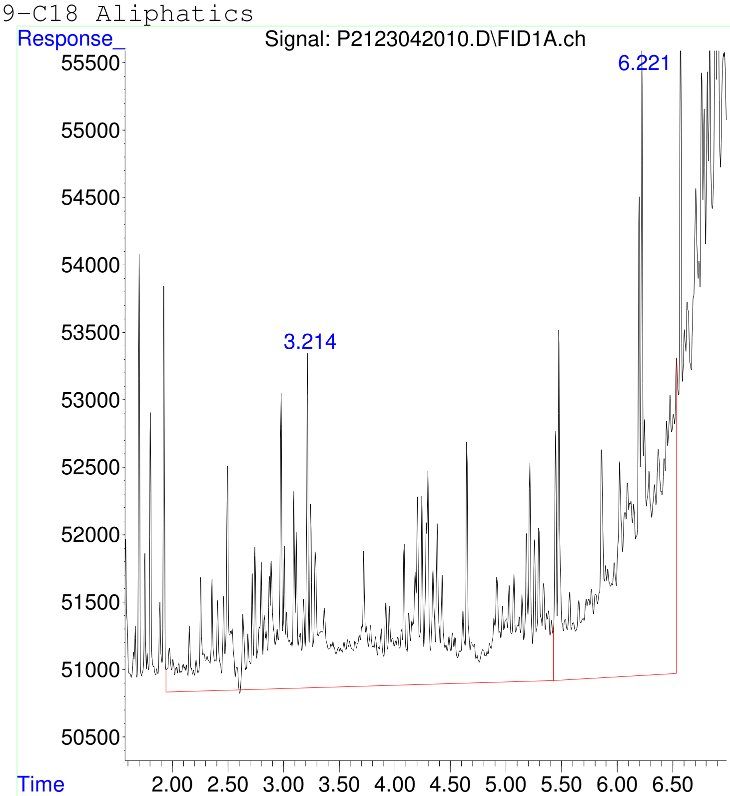


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230420\ | QMethod | : MAALI211129A.M |
| Data File | : P2123042010.D | Operator | : Petro21a/b:cre |
| Date Inj'd | : 4/20/2023 6:19 pm | Instrument | : Petro 21 |
| Sample | : eph 5231 55 ul | Quant Date | : 4/21/2023 2:08 pm |

Compound #20: C9-C18 Aliphatics



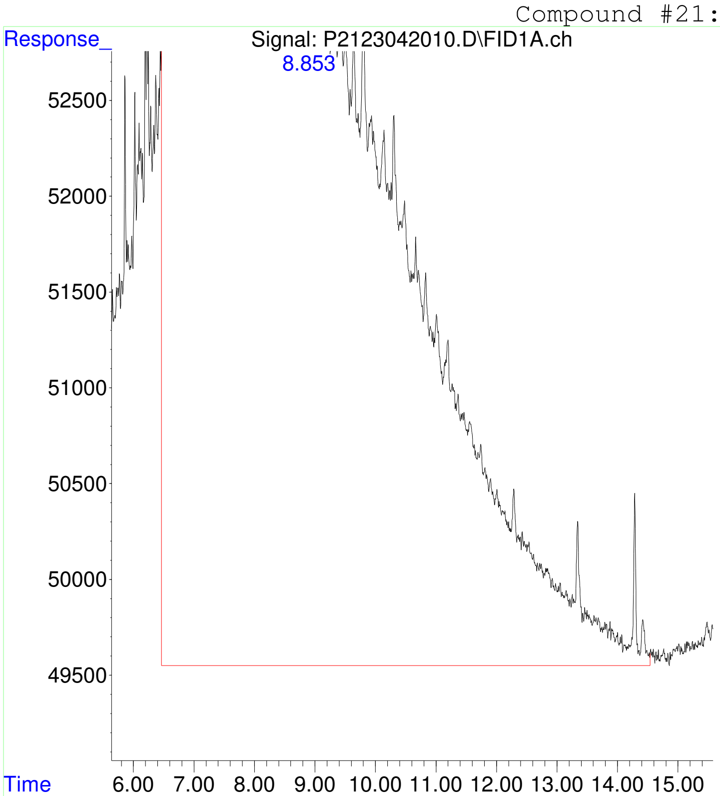

Original Peak Response = 1704904　　Manual Peak Response = 1630148 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230420\ | QMethod | : MAALI211129A.M |
| Data File | : P2123042010.D | Operator | : Petro21a/b:cre |
| Date Inj'd | : 4/20/2023 6:19 pm | Instrument | : Petro 21 |
| Sample | : eph 5231 55 ul | Quant Date | : 4/21/2023 2:08 pm |

Compound #21: C19-C36 Aliphatics





Original Peak Response = 12489402

Manual Peak Response = 9462426 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042009.D
Signal(s) : FID2B.ch
Acq On : 20 Apr 2023 6:19 pm
Operator : Petro21a/b:cre
Sample : eph 5231 55 ul
Misc :
ALS Vial : 55 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:41:57 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.517 | 1011721 | 14.456 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 72.28% | |
| 5) s 2-Bromonaphthalene | 5.024 | 715264 | 14.512 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 72.56% | |
| 10) S o-terphenyl | 0.000 | 0 | N.D. mg/L | d |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 0.00%# | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 11.703 | 4419082 | 52.861 mg/L | M5 |

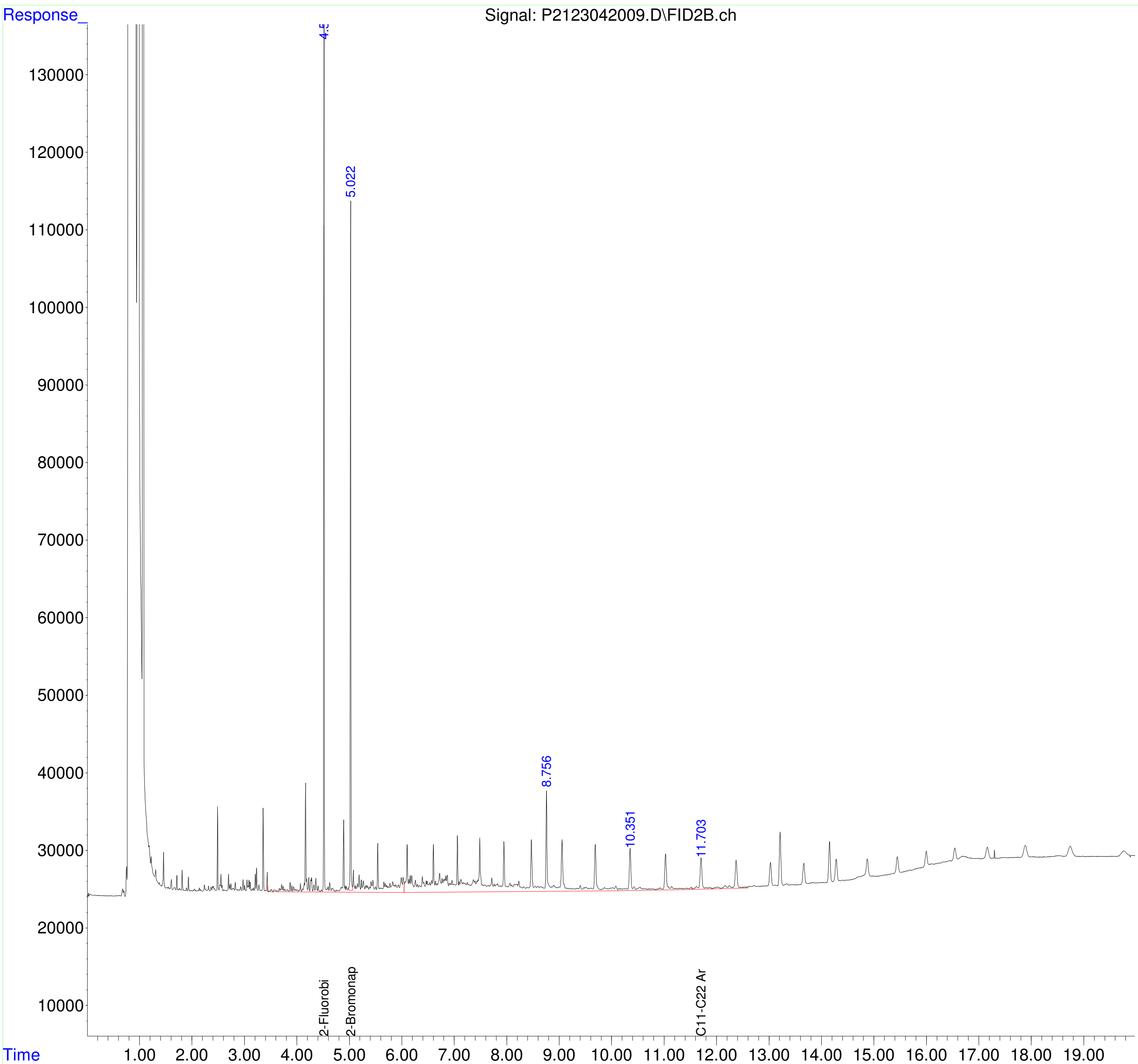
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042009.D
Signal(s) : FID2B.ch
Acq On    : 20 Apr 2023   6:19 pm
Operator  : Petro21a/b:cre
Sample    : eph 5231 55 ul
Misc      :
ALS Vial  : 55   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:41:57 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

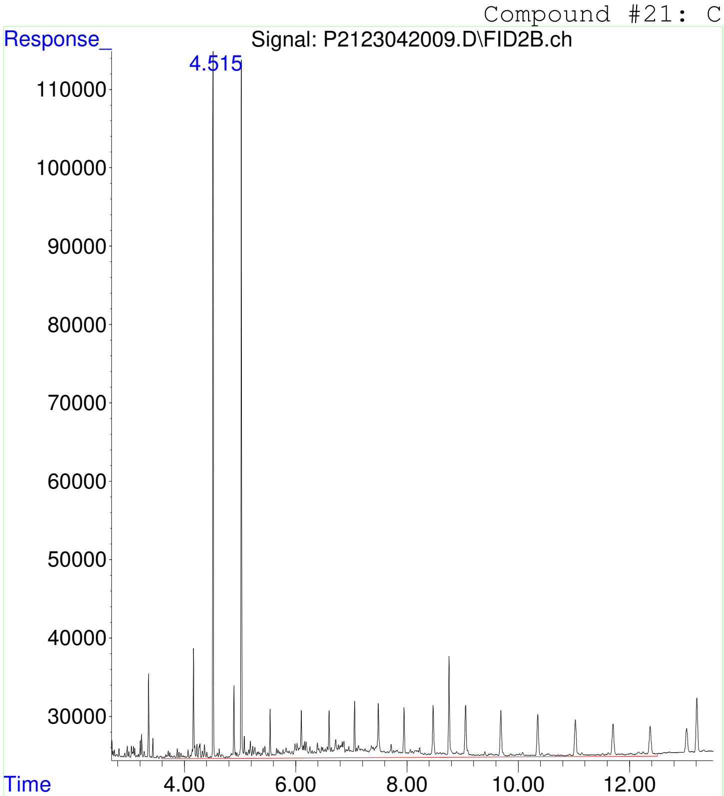


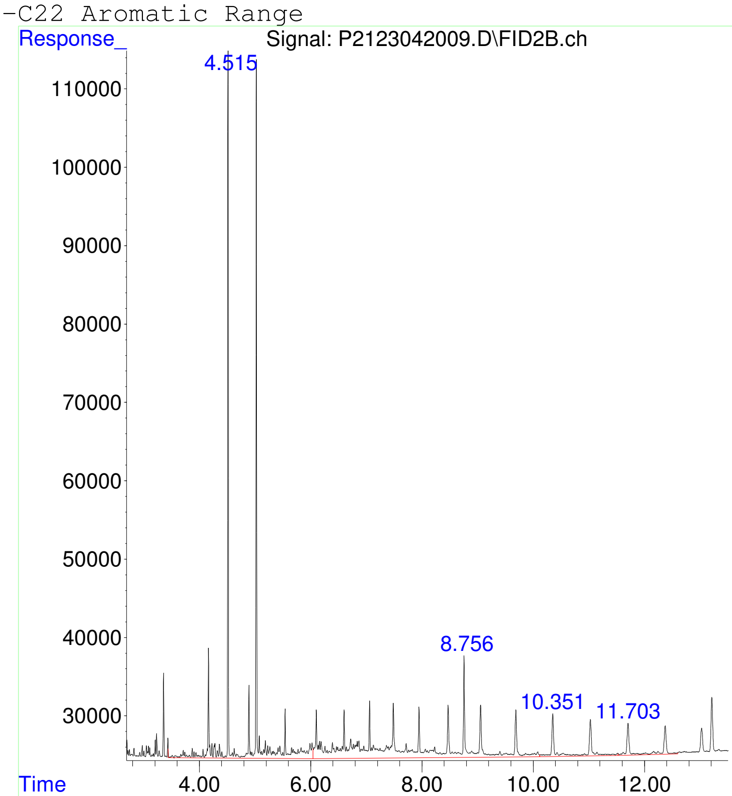
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042009.D
Date Inj'd : 4/20/2023 6:19 pm
Sample : eph 5231 55 ul

QMethod : MAARO211129B.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:39 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 4099881

Manual Peak Response = 4419082 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042008.D
Signal(s) : FID1A.ch
Acq On : 20 Apr 2023 5:54 pm
Operator : Petro21a/b:cre
Sample : eph 5230 60 ul
Misc :
ALS Vial : 4 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 14:23:24 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 0.000 | 0 | N.D. | mg/L | d |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 0.00%# | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 6.220f | 1446480 | 20.211 | mg/L | |
| 21) H | C19-C36 Aliphatics | 14.282f | 8728295 | 126.731 | mg/L | M5 |

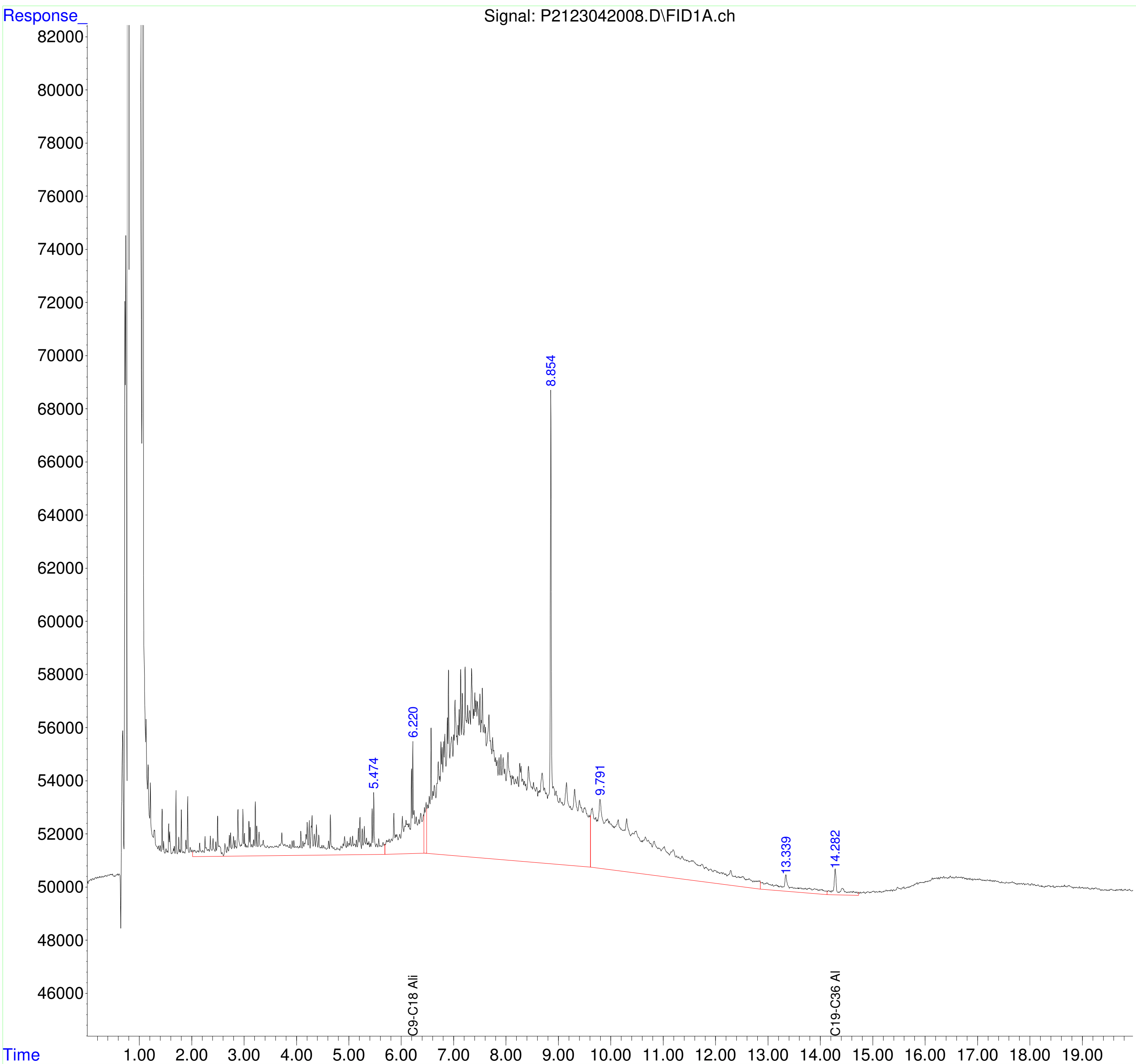
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042008.D
Signal(s) : FID1A.ch
Acq On    : 20 Apr 2023   5:54 pm
Operator  : Petro21a/b:cre
Sample    : eph 5230 60 ul
Misc      :
ALS Vial  : 4   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 14:23:24 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

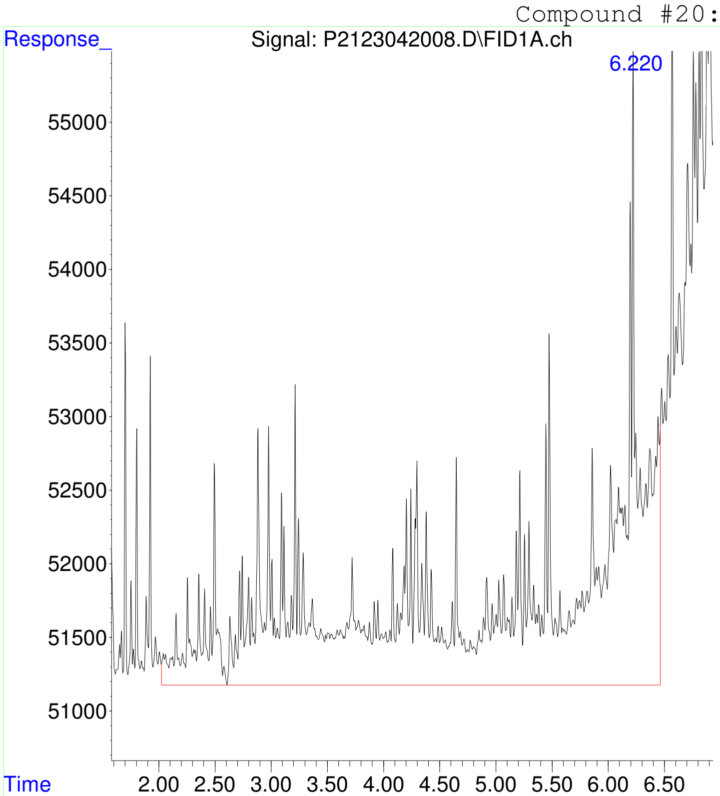


Manual Integration Report

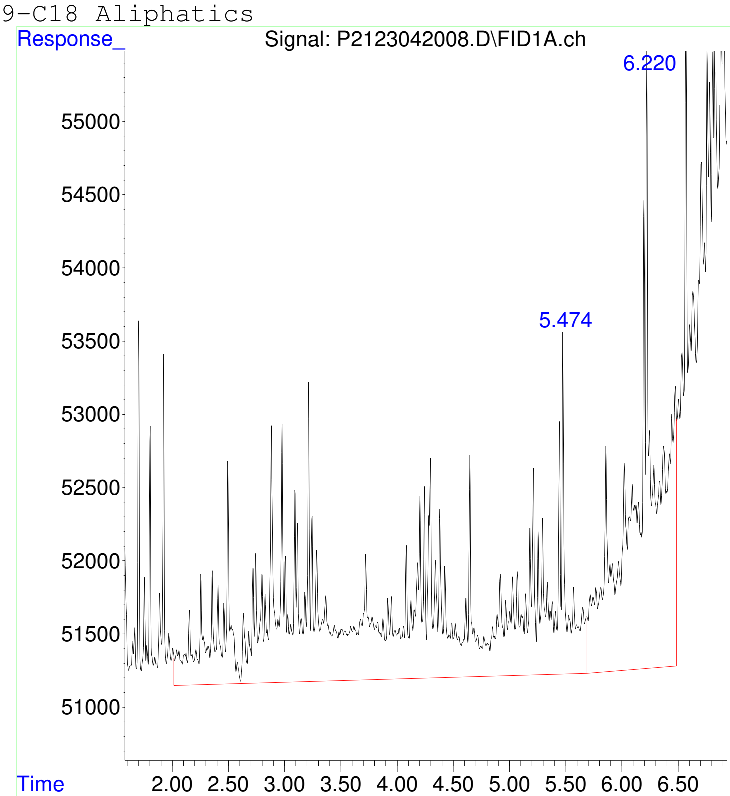
Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042008.D
Date Inj'd : 4/20/2023 5:54 pm
Sample : eph 5230 60 ul

QMethod : MAALI211129A.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:08 pm

Compound #20: C9-C18 Aliphatics




Original Peak Response = 1492660



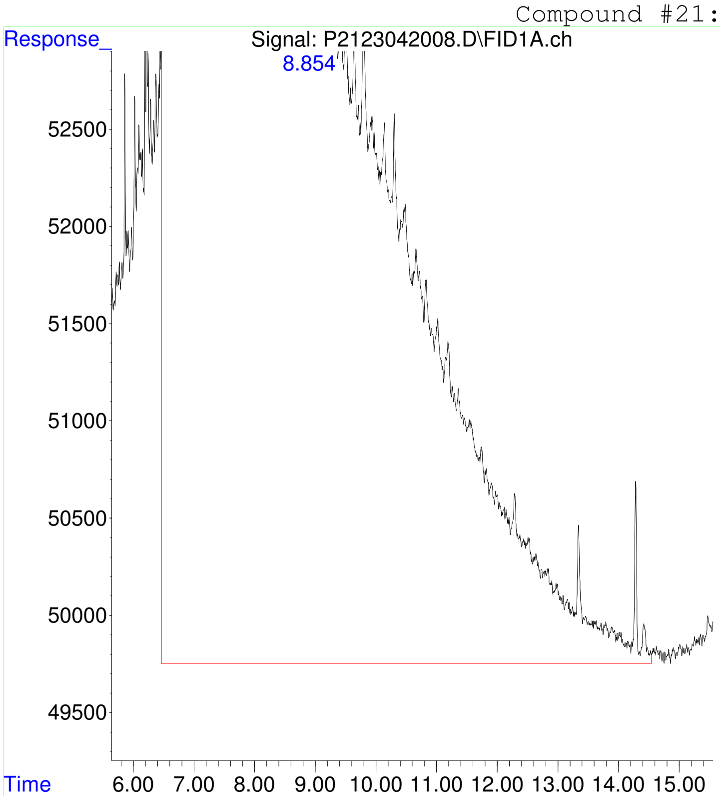

Manual Peak Response = 1446480 m

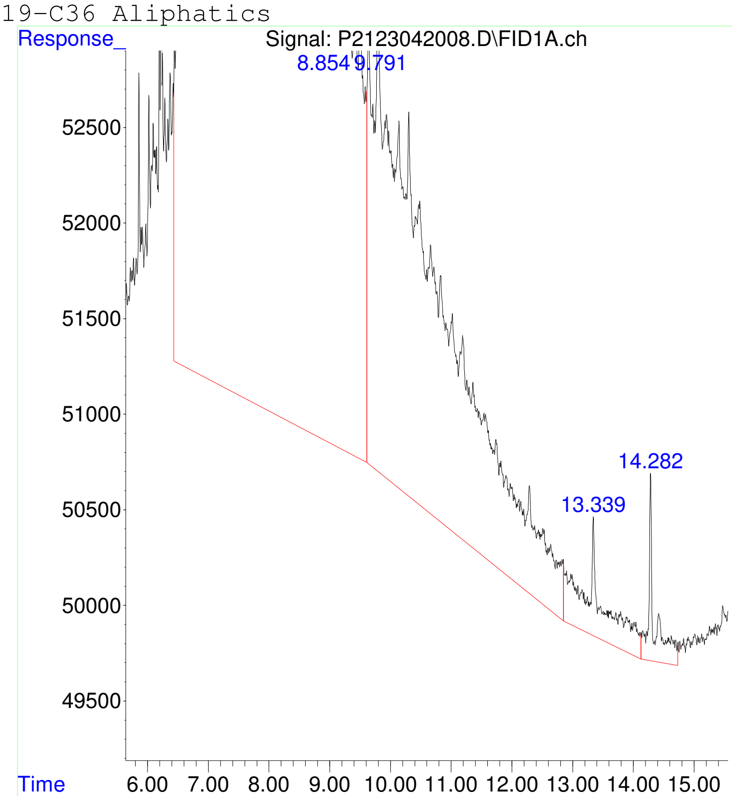
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042008.D
Date Inj'd : 4/20/2023 5:54 pm
Sample : eph 5230 60 ul

QMethod : MAALI211129A.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:08 pm

Compound #21: C19-C36 Aliphatics




Original Peak Response = 12229213

Manual Peak Response = 8728295 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042007.D
Signal(s) : FID2B.ch
Acq On : 20 Apr 2023 5:54 pm
Operator : Petro21a/b:cre
Sample : eph 5230 60 ul
Misc :
ALS Vial : 54 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:41:31 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | |
| 3) s | 2-Fluorobiphenyl | 4.517 | 1280194 | 18.292 mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 91.46% | |
| 5) s | 2-Bromonaphthalene | 5.024 | 913774 | 18.540 mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 92.70% | |
| 10) S | o-terphenyl | 0.000 | 0 | N.D. mg/L | d |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 0.00%# | |
| | **Target Compounds** | | | | |
| 1) | Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) | 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) | Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) | Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) | Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) | Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) | Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) | Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) | Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) | Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) | Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) | Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) | Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) | Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) | Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) | Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) | Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H | C11-C22 Aromatic Range | 12.371f | 7548238 | 90.291 mg/L | M5 |

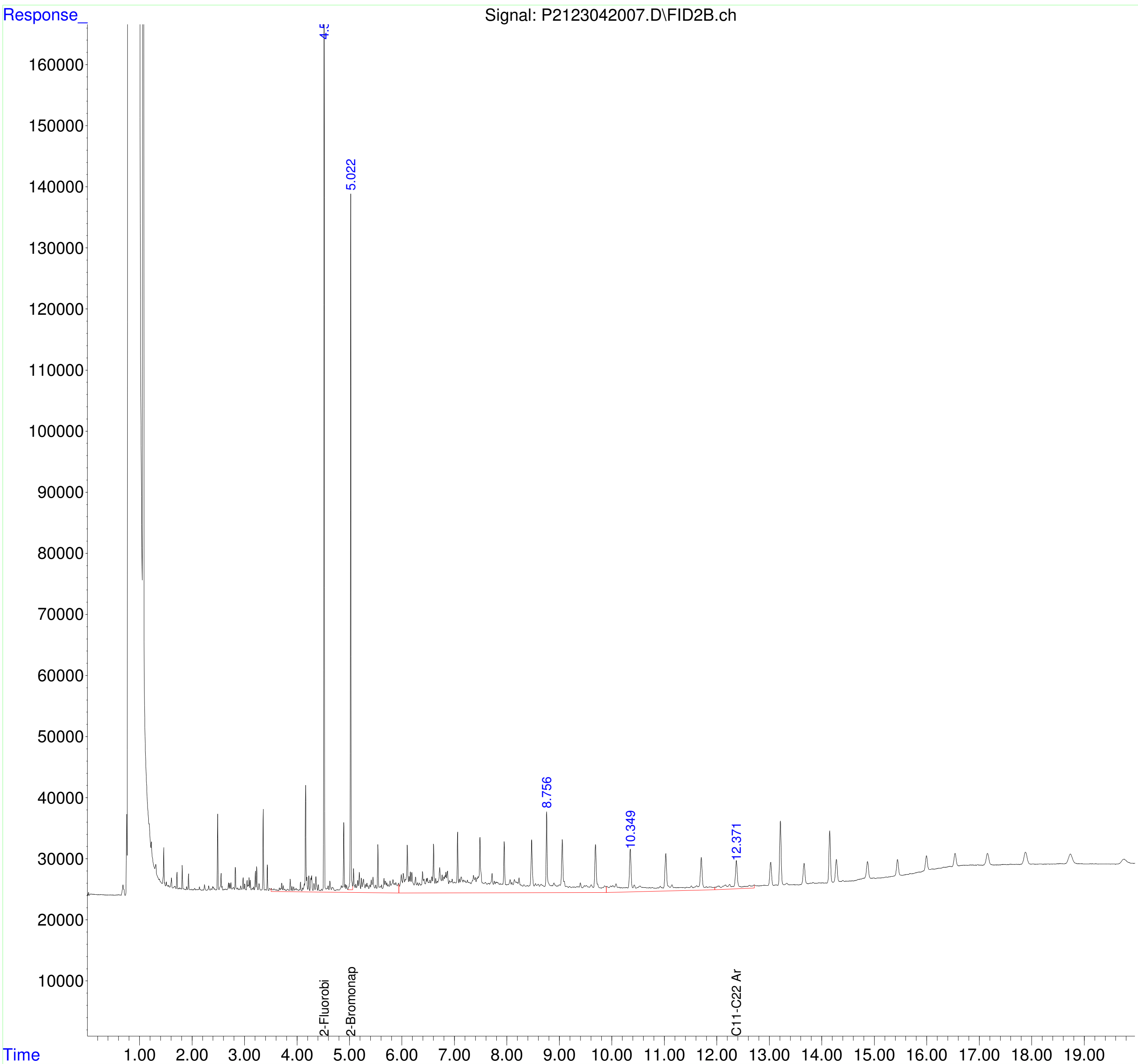
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042007.D
Signal(s) : FID2B.ch
Acq On    : 20 Apr 2023   5:54 pm
Operator  : Petro21a/b:cre
Sample    : eph 5230 60 ul
Misc      :
ALS Vial  : 54   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:41:31 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

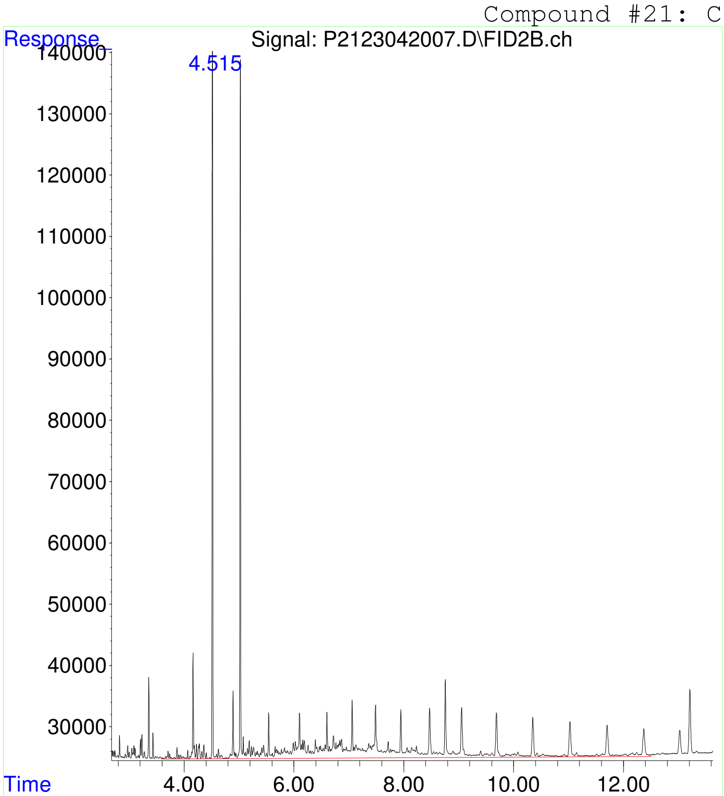


Manual Integration Report

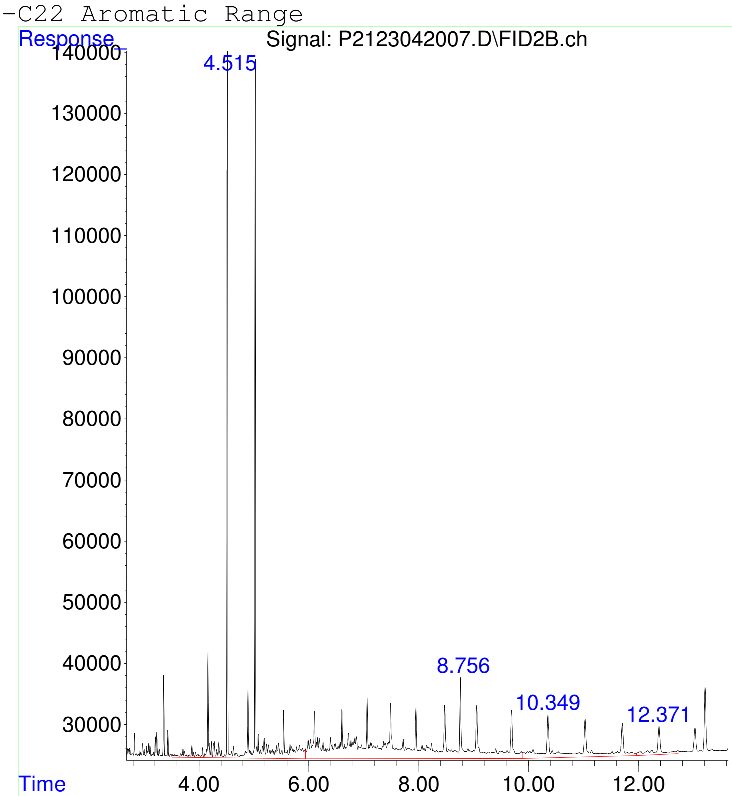
Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042007.D
Date Inj'd : 4/20/2023 5:54 pm
Sample : eph 5230 60 ul

QMethod : MAARO211129B.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:39 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 5345980




Manual Peak Response = 7548238 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042006.D
Signal(s) : FID1A.ch
Acq On : 20 Apr 2023 5:29 pm
Operator : Petro21a/b:cre
Sample : eph 5229 65 ul
Misc :
ALS Vial : 3 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 14:18:52 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

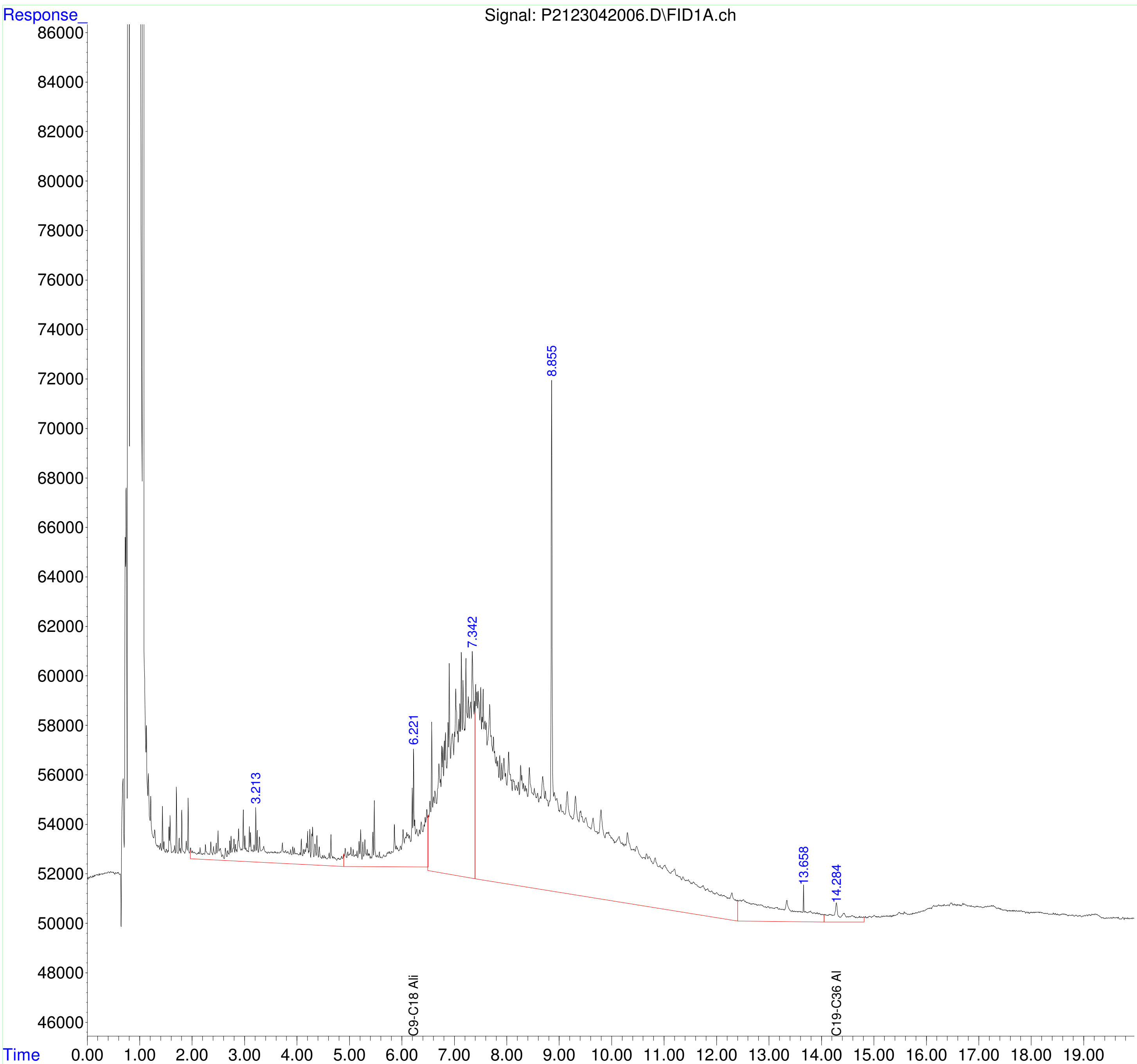
Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 0.000 | 0 | N.D. | mg/L | d |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 0.00%# | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 6.221f | 1684114 | 23.532 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.284f | 12225448 | 177.508 | mg/L | M5 |

(f)=RT Delta > 1/2 Window (m)=manual int.

```
Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042006.D
Signal(s) : FID1A.ch
Acq On    : 20 Apr 2023   5:29 pm
Operator  : Petro21a/b:cre
Sample    : eph 5229 65 ul
Misc      :
ALS Vial  : 3   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 14:18:52 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :
```

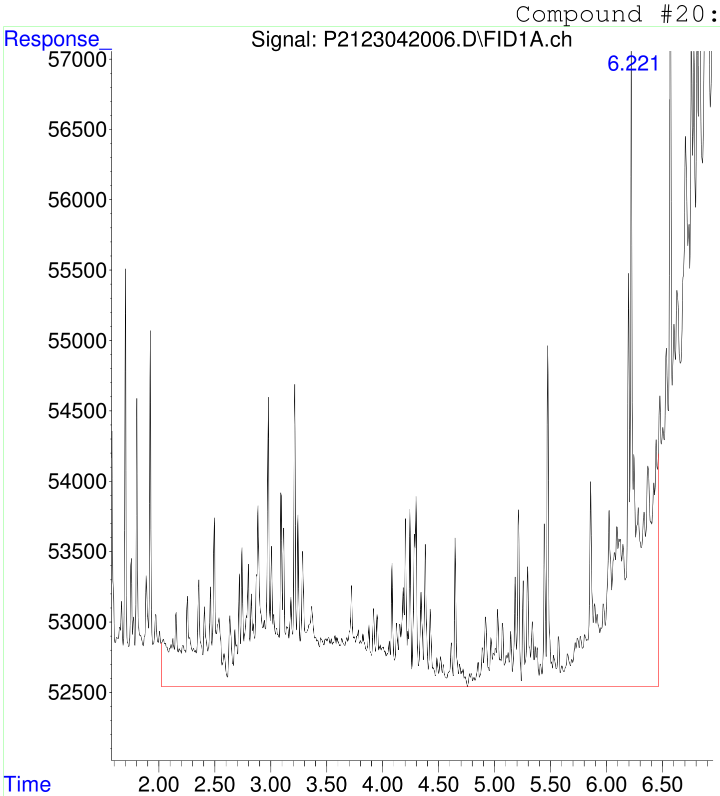


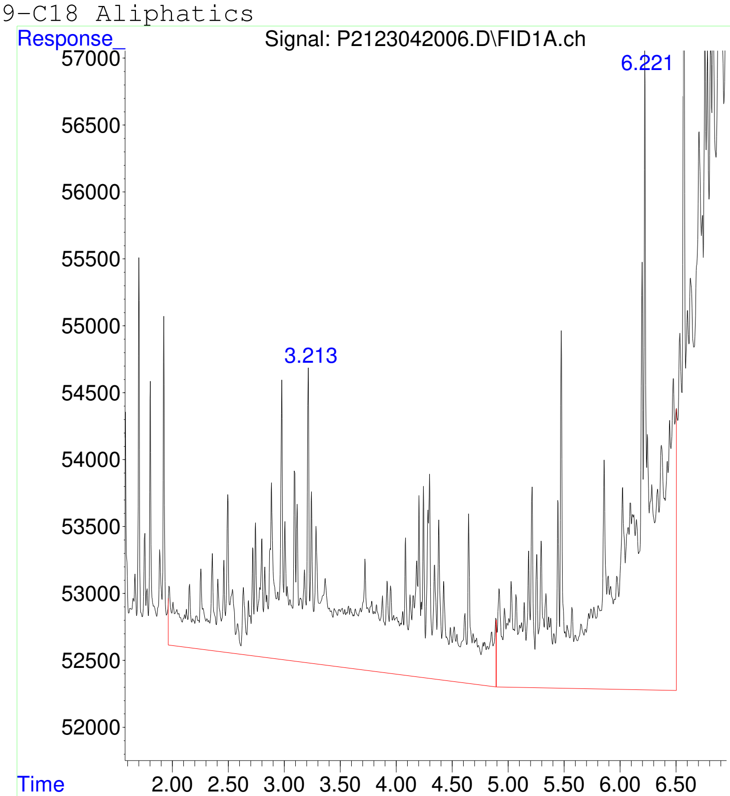
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042006.D
Date Inj'd : 4/20/2023 5:29 pm
Sample : eph 5229 65 ul

QMethod : MAALI211129A.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:08 pm

Compound #20: C9-C18 Aliphatics




Original Peak Response = 1243614

Manual Peak Response = 1684114 M5

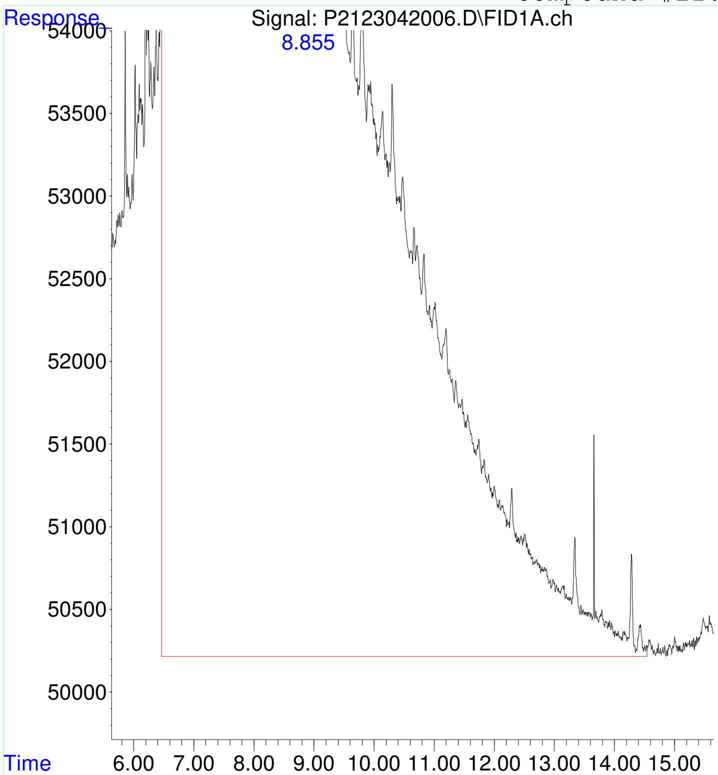
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

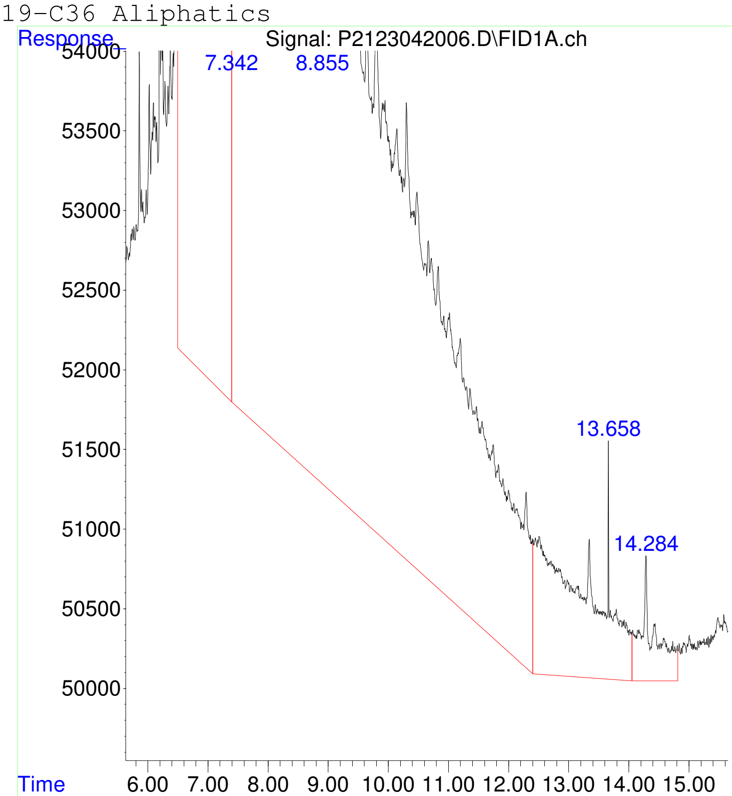
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042006.D
Date Inj'd : 4/20/2023 5:29 pm
Sample : eph 5229 65 ul

QMethod : MAALI211129A.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:08 pm

Compound #21: C19-C36 Aliphatics




Original Peak Response = 15221060

Manual Peak Response = 12225448 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042005.D
Signal(s) : FID2B.ch
Acq On : 20 Apr 2023 5:29 pm
Operator : Petro21a/b:cre
Sample : eph 5229 65 ul
Misc :
ALS Vial : 53 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:41:04 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| System Monitoring Compounds | | | | |
| 3) s 2-Fluorobiphenyl | 4.517 | 1217929 | 17.402 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 87.01% | |
| 5) s 2-Bromonaphthalene | 5.024 | 871056 | 17.673 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 88.36% | |
| 10) S o-terphenyl | 0.000 | 0 | N.D. mg/L | d |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 0.00%# | |
| Target Compounds | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 11.703 | 5406670 | 64.674 mg/L | M5 |

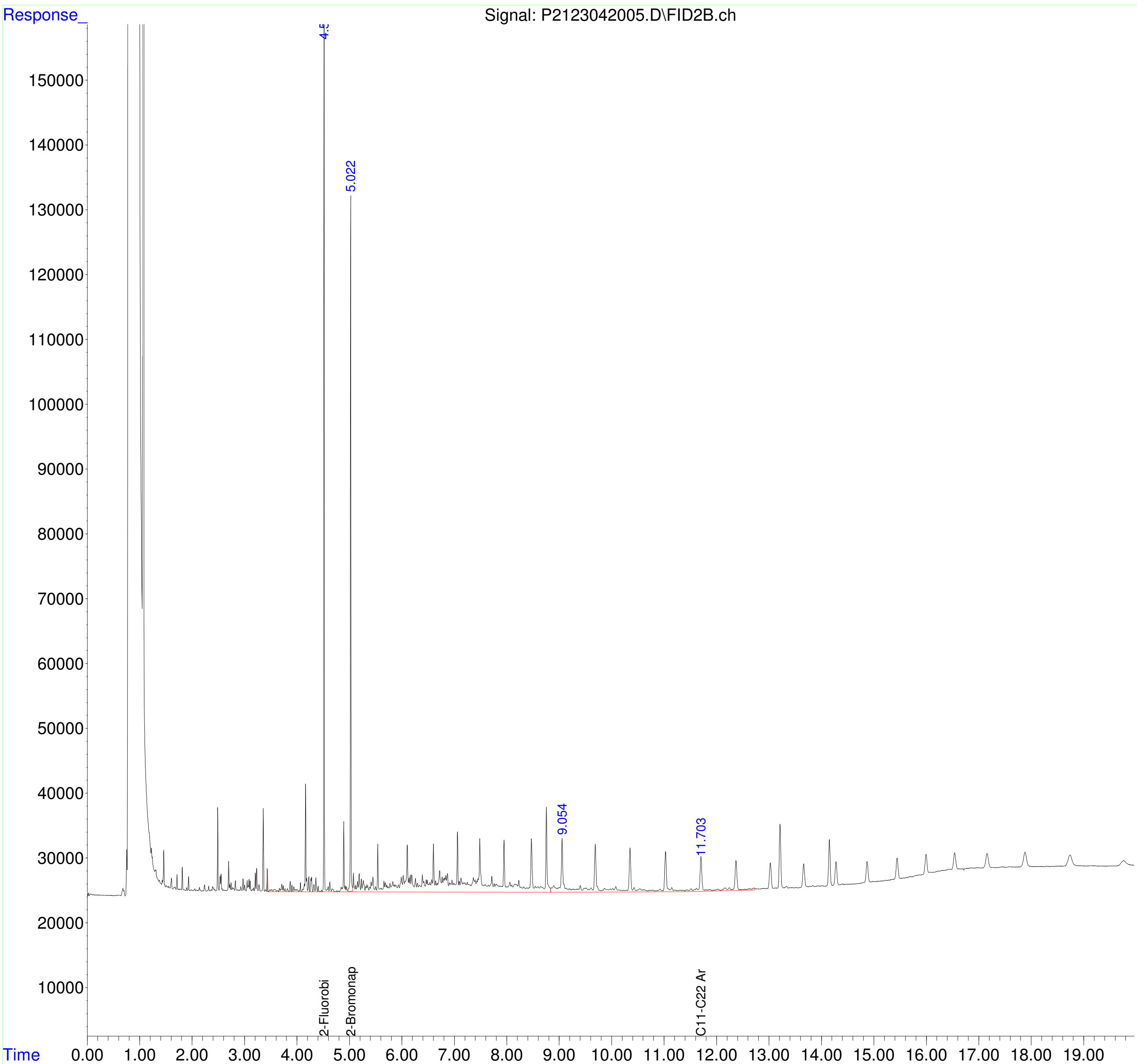
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042005.D
Signal(s) : FID2B.ch
Acq On : 20 Apr 2023 5:29 pm
Operator : Petro21a/b:cre
Sample : eph 5229 65 ul
Misc :
ALS Vial : 53 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:41:04 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

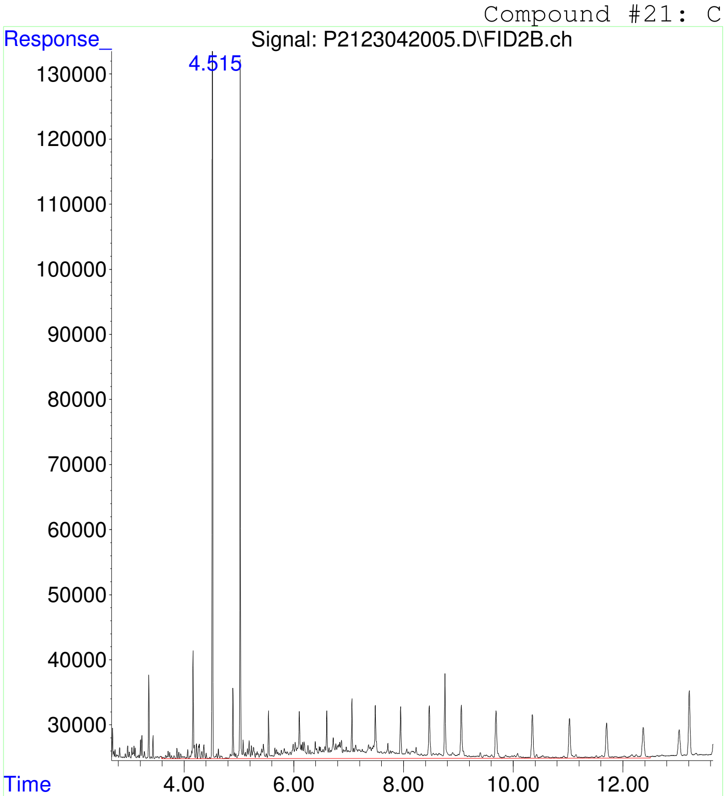


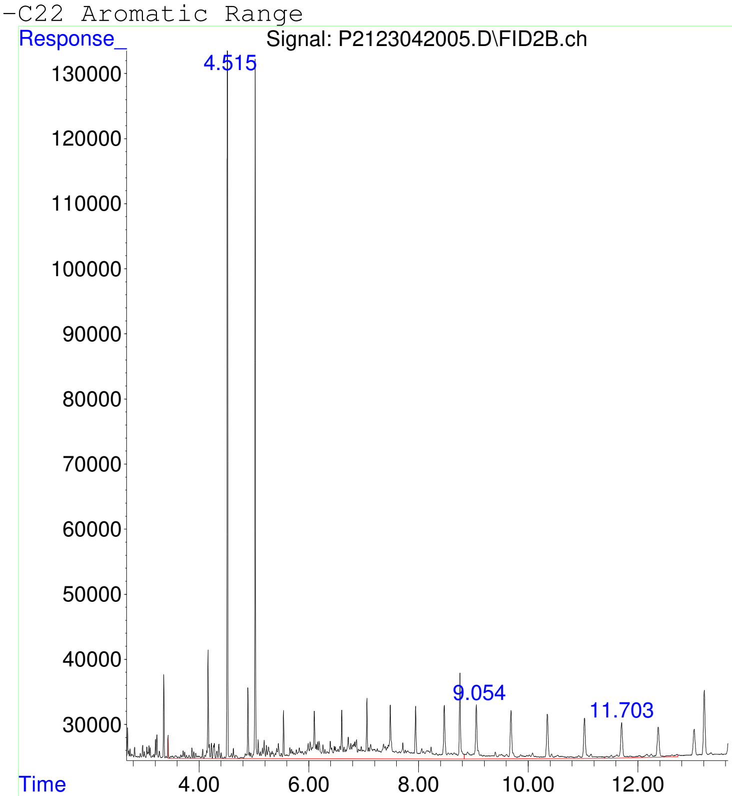
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042005.D
Date Inj'd : 4/20/2023 5:29 pm
Sample : eph 5229 65 ul

QMethod : MAARO211129B.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:39 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 4917636

Manual Peak Response = 5406670 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042004.D
Signal(s) : FID1A.ch
Acq On : 20 Apr 2023 5:04 pm
Operator : Petro21a/b:cre
Sample : eph 5228 70 ul
Misc :
ALS Vial : 2 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 14:17:24 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | | |
| 3) | S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) | S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) | S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) | S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) | S | 1-Chlorooctadecane | 0.000 | 0 | N.D. | mg/L | d |
| Spiked Amount 20.000 | | Range 40 - 140 | | Recovery = | 0.00%# | | |
| Target Compounds | | | | | | | |
| 1) | | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) | H | C9-C18 Aliphatics | 6.219f | 2157088 | 30.140 | mg/L | M5 |
| 21) | H | C19-C36 Aliphatics | 14.279f | 13399929 | 194.561 | mg/L | M5 |

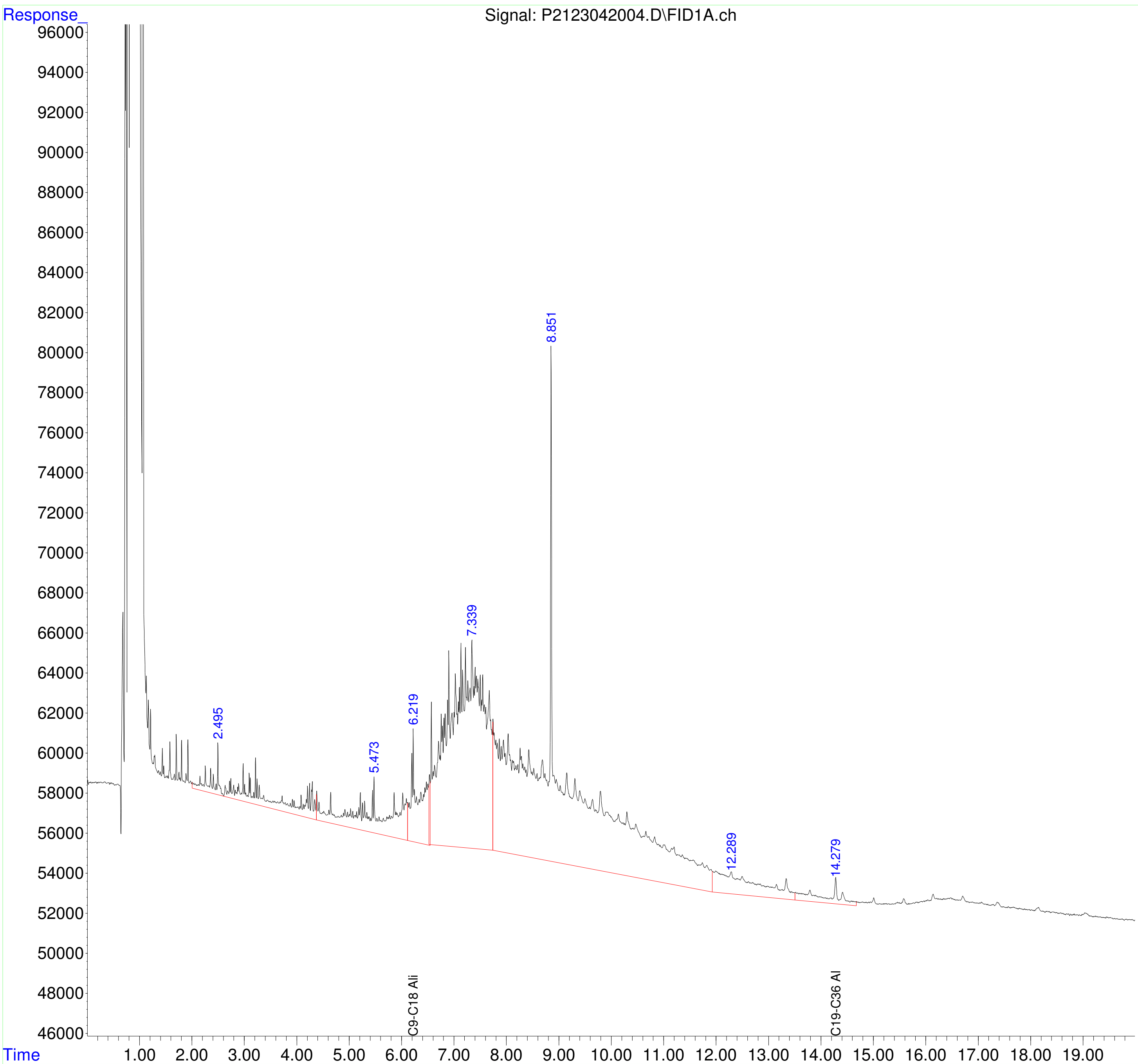
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042004.D
Signal(s) : FID1A.ch
Acq On    : 20 Apr 2023   5:04 pm
Operator  : Petro21a/b:cre
Sample    : eph 5228 70 ul
Misc      :
ALS Vial  : 2   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 21 14:17:24 2023
Quant Method : I:\PETRO\Petro21\2023\230420\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

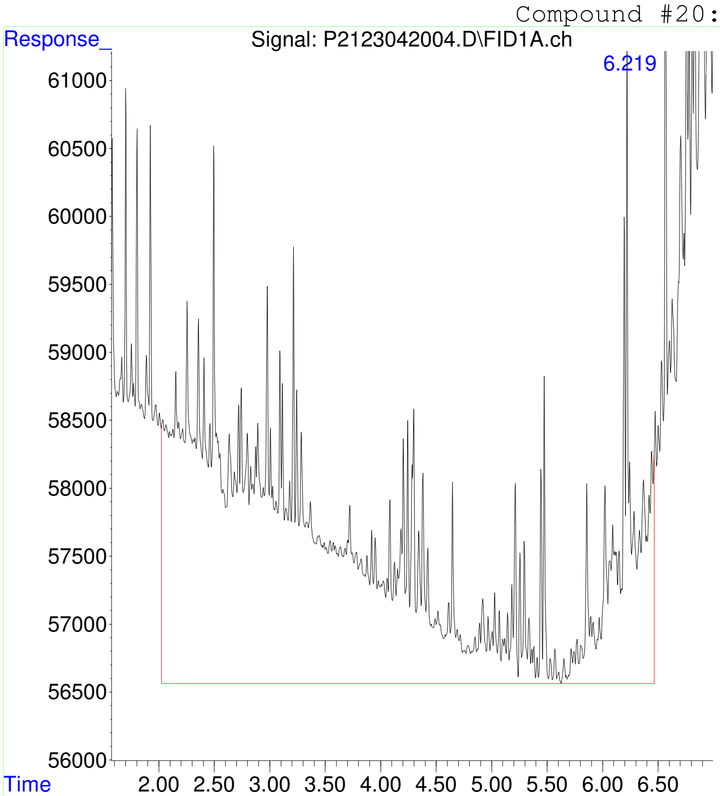


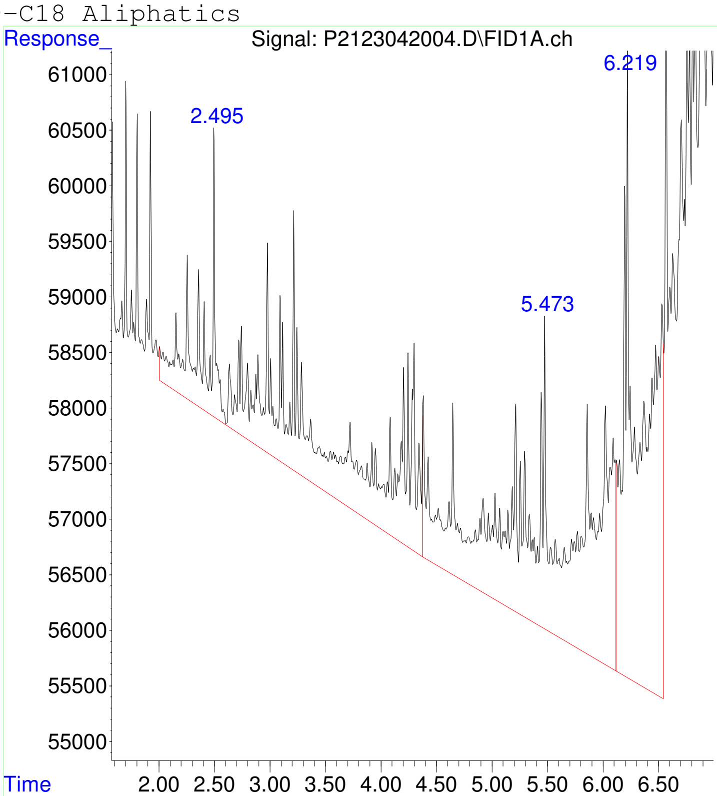
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420\
Data File : P2123042004.D
Date Inj'd : 4/20/2023 5:04 pm
Sample : eph 5228 70 ul

QMethod : MAALI211129A.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:08 pm

Compound #20: C9-C18 Aliphatics



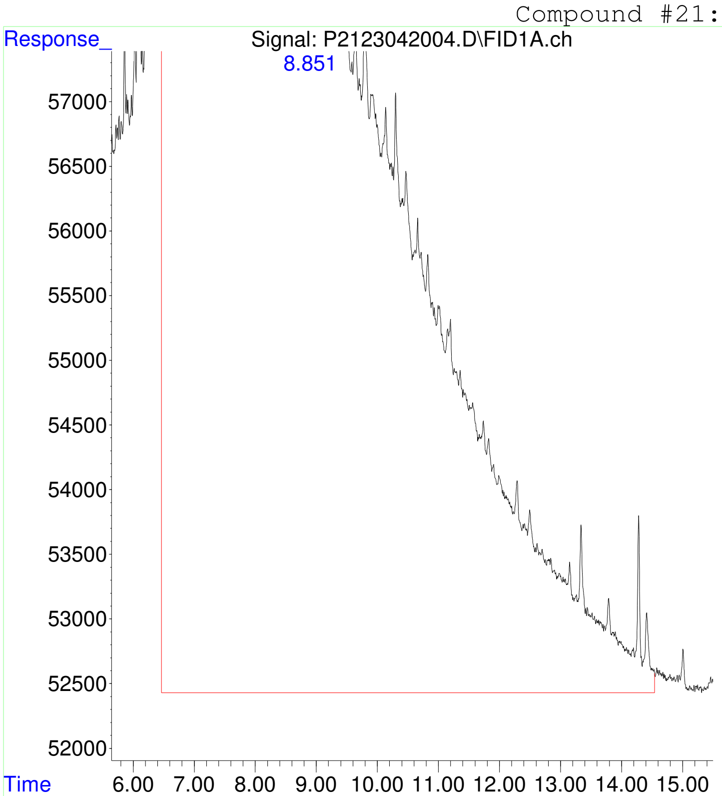

Original Peak Response = 2618575
Manual Peak Response = 2157088 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230420\ | QMethod | : MAALI211129A.M |
| Data File | : P2123042004.D | Operator | : Petro21a/b:cre |
| Date Inj'd | : 4/20/2023 5:04 pm | Instrument | : Petro 21 |
| Sample | : eph 5228 70 ul | Quant Date | : 4/21/2023 2:08 pm |

Compound #21: C19-C36 Aliphatics





Original Peak Response = 20334617 Manual Peak Response = 13399929 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042003.D
Signal(s) : FID2B.ch
Acq On : 20 Apr 2023 5:04 pm
Operator : Petro21a/b:cre
Sample : eph 5228 70 ul
Misc :
ALS Vial : 52 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:40:38 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.516 | 957704 | 13.684 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 68.42% | |
| 5) s 2-Bromonaphthalene | 5.023 | 683153 | 13.861 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 69.31% | |
| 10) S o-terphenyl | 0.000 | 0 | N.D. mg/L | d |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 0.00%# | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 11.701 | 4999264 | 59.801 mg/L | M5 |

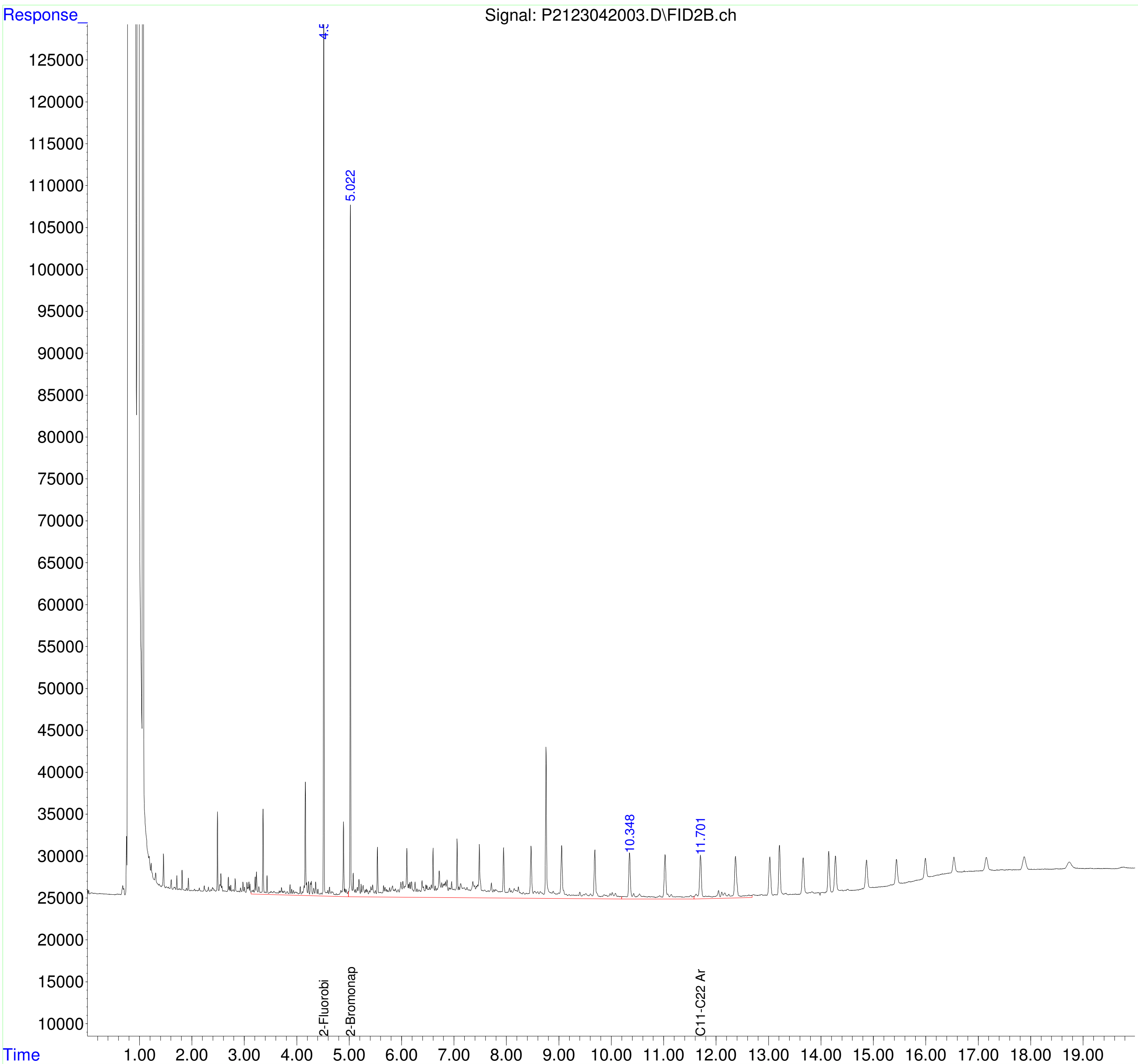
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042003.D
Signal(s) : FID2B.ch
Acq On    : 20 Apr 2023   5:04 pm
Operator  : Petro21a/b:cre
Sample    : eph 5228 70 ul
Misc      :
ALS Vial  : 52   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 21 14:40:38 2023
Quant Method : I:\PETRO\Petro21\2023\230420.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

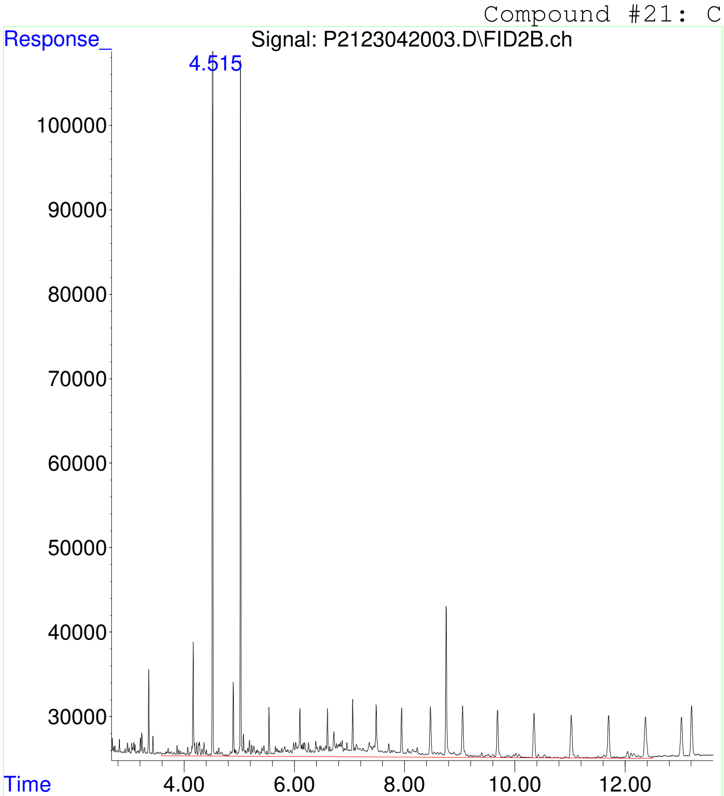


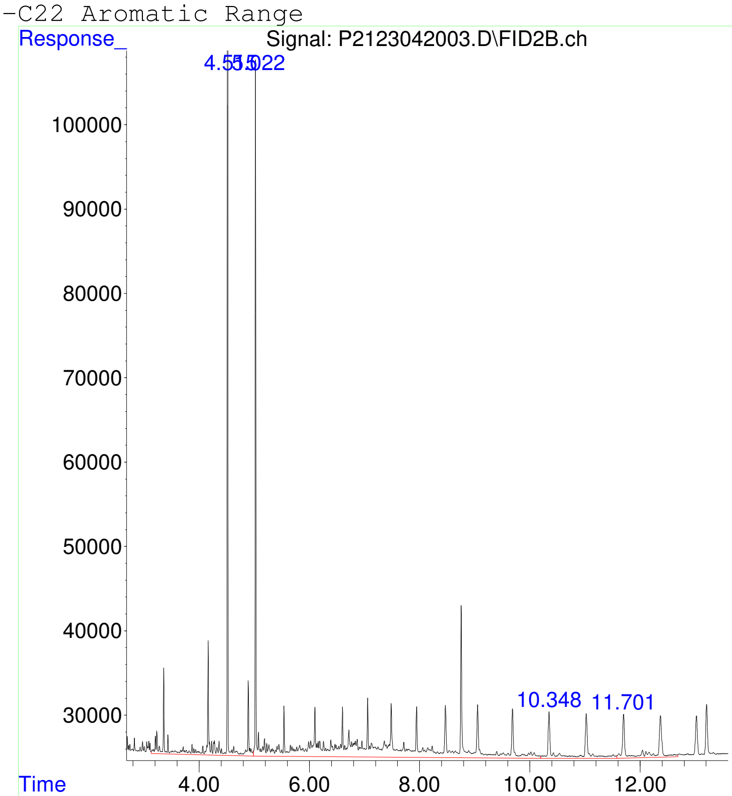
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230420.SEC\
Data File : P2123042003.D
Date Inj'd : 4/20/2023 5:04 pm
Sample : eph 5228 70 ul

QMethod : MAARO211129B.M
Operator : Petro21a/b:cre
Instrument : Petro 21
Quant Date : 4/21/2023 2:39 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3793641

Manual Peak Response = 4999264 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Attachment B: Phase II MDL Study

# Attachment B. $C_{19}$-$C_{36}$ Aliphatics MDL Study – Mineral Oil

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample Name | | | Mineral Oil MDL 1 | Mineral Oil MDL 2 | Mineral Oil MDL 3 | Mineral Oil MDL 4 | Mineral Oil MDL 5 | Mineral Oil MDL 6 | Mineral Oil MDL 7 | Mineral Oil MDL 8 |
| Lab ID | | | L2322455-01 | L2322455-02 | L2322455-03 | L2322455-04 | L2322455-05 | L2322455-06 | L2322455-07 | L2322455-08 |
| Day | | | Day 1 | Day 1 | Day 1 | Day 2 | Day 2 | Day 2 | Day 3 | Day3 |
| Extraction Date | | | 4/26/2023 | 4/26/2023 | 4/26/2023 | 4/272023 | 4/272023 | 4/272023 | 4/28/2023 | 4/28/2023 |
| Analysis Date | | | 4/27/2023 | 4/27/2023 | 4/27/2023 | 4/28/2023 | 4/28/2023 | 4/28/2023 | 5/2/2023 | 5/2/2023 |
| File ID | | | P21230426n36.D | P21230426n38.D | P21230426n40.D | P25230428A00005.D | P25230428A00006.D | P25230428A00007.D | P11230501n10.D | P11230501n12.D |
| Analysis Date | | | 27-Apr-23 | 27-Apr-23 | 27-Apr-23 | 28-Apr-23 | 28-Apr-23 | 28-Apr-23 | 2-May-23 | 2-May-23 |
| Sample Size (g) | | | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Final Volume (mL) | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Split Factor | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

**On Column Concentration**

| Analyte | Units | Target Concentration | MDL 1 | MDL 2 | MDL 3 | MDL 4 | MDL 5 | MDL 6 | MDL 7 | MDL 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| C11-C22 Aromatics | mg/L | 50 | 15.3 | 23.0 | 17.4 | 27.0 | 26.4 | 29.1 | 20.0 | 22.3 |
| C9-C18 Aliphatics | mg/L | 50 | 9.61 | 11.0 | 21.5 | 19.2 | 18.7 | 30.8 | 22.7 | 20.9 |
| C19-C36 Aliphatics | mg/L | 50 | 78.3 | 84.2 | 83.8 | 95.6 | 112 | 140 | 96.5 | 95.5 |

**Final Concentration**

| Analyte | Units | Target Concentration | MDL 1 | MDL 2 | MDL 3 | MDL 4 | MDL 5 | MDL 6 | MDL 7 | MDL 8 | Mean | STD | $t_8$ | **$MDL_s$** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C11-C22 Aromatics | mg/kg | 50 | 6.12 | 9.20 | 6.94 | 10.8 | 10.6 | 11.6 | 7.99 | 8.9 | 9.0 | 1.94 | 2.998 | **5.8** |
| C9-C18 Aliphatics | mg/kg | 50 | 3.84 | 4.41 | 8.59 | 7.69 | 7.50 | 12.3 | 9.09 | 8.36 | 7.72 | 2.68 | 2.998 | **8.02** |
| C19-C36 Aliphatics | mg/kg | 50 | 31.3 | 33.7 | 33.5 | 38.2 | 44.8 | 56.0 | 38.6 | 38.2 | 39.3 | 7.94 | 2.998 | **23.8** |

# Attachment B. $C_{19}$-$C_{36}$ Aliphatics MDL Study –Lubricating Oil

| Sample Name | Lubricating Oil MDL 1 | Lubricating Oil MDL 2 | Lubricating Oil MDL 3 | Lubricating Oil MDL 4 | Lubricating Oil MDL 5 | Lubricating Oil MDL 6 | Lubricating Oil MDL 7 | Lubricating Oil MDL 8 |
|---|---|---|---|---|---|---|---|---|
| Lab ID | L2322455-09 | L2322455-10 | L2322455-11 | L2322455-12 | L2322455-13 | L2322455-14 | L2322455-15 | L2322455-16 |
| Day | Day 1 | Day 1 | Day 1 | Day 2 | Day 2 | Day 2 | Day 3 | Day3 |
| Extraction Date | 4/26/2023 | 4/26/2023 | 4/26/2023 | 4/272023 | 4/272023 | 4/272023 | 4/28/2023 | 4/28/2023 |
| Analysis Date | 4/27/2023 | 4/27/2023 | 4/27/2023 | 4/28/2023 | 4/28/2023 | 4/28/2023 | 5/2/2023 | 5/2/2023 |
| File ID | P21230426n42.D | P21230426n44.D | P21230426n46.D | P25230428A00008.D | P25230428A00009.D | P25230428A00010.D | P11230501n14.D | P11230501n16.D |
| Analysis Date | 27-Apr-23 | 27-Apr-23 | 27-Apr-23 | 28-Apr-23 | 28-Apr-23 | 28-Apr-23 | 2-May-23 | 2-May-23 |
| Sample Size (g) | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Final Volume (mL) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Split Factor | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

**On Column Concentration**

| Analyte | Units | Target Concentration | MDL 1 | MDL 2 | MDL 3 | MDL 4 | MDL 5 | MDL 6 | MDL 7 | MDL 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| C11-C22 Aromatics | mg/L | 60 | 14.7 | 13.6 | 13.0 | 31.8 | 26.1 | 25.5 | 14.7 | 23.1 |
| C9-C18 Aliphatics | mg/L | 60 | 11.9 | 13.0 | 16.6 | 20.5 | 13.1 | 16.0 | 22.1 | 17.4 |
| C19-C36 Aliphatics | mg/L | 60 | 82.7 | 78.2 | 82.9 | 124 | 91.3 | 100 | 79.8 | 88.6 |

**Final Concentration**

| Analyte | Units | Target Concentration | MDL 1 | MDL 2 | MDL 3 | MDL 4 | MDL 5 | MDL 6 | MDL 7 | MDL 8 | Mean | STD | $t_8$ | **MDL$_s$** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C11-C22 Aromatics | mg/kg | 50 | 5.87 | 5.45 | 5.18 | 12.7 | 10.46 | 10.21 | 5.89 | 9.24 | 8.13 | 2.88 | 2.998 | **8.62** |
| C9-C18 Aliphatics | mg/kg | 50 | 4.76 | 5.22 | 6.64 | 8.2 | 5.24 | 6.40 | 8.83 | 6.96 | 6.53 | 1.46 | 2.998 | **4.37** |
| C19-C36 Aliphatics | mg/kg | 50 | 33.1 | 31.3 | 33.2 | 49.7 | 36.54 | 39.99 | 31.91 | 35.43 | 36.4 | 6.07 | 2.998 | **18.2** |

# Attachment B. $C_{19}$-$C_{36}$ Aliphatics MDL Study – Method Blank

| | | | Blank 1 | Blank 2 | Blank 3 | Blank 4 | Blank 5 | Blank 6 | Blank 7 | Blank 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample Name | | | Blank 1 | Blank 2 | Blank 3 | Blank 4 | Blank 5 | Blank 6 | Blank 7 | Blank 8 |
| Lab ID | | | WG1771451-1 | WG1771451-2 | WG1771451-3 | WG1772046-1 | WG1772046-2 | WG1772046-3 | WG1772379-1 | WG1772379-2 |
| Day | | | Day 1 | Day 1 | Day 1 | Day 2 | Day 2 | Day 2 | Day 3 | Day3 |
| Extraction Date | | | 4/26/2023 | 4/26/2023 | 4/26/2023 | 4/272023 | 4/272023 | 4/272023 | 4/28/2023 | 4/28/2023 |
| Analysis Date | | | 4/27/2023 | 4/27/2023 | 4/27/2023 | 4/28/2023 | 4/28/2023 | 4/28/2023 | 5/2/2023 | 5/2/2023 |
| File ID | | | P21230426n30.D | P21230426n32.D | P21230426n34.D | P25230428A00002.D | P25230428A00003.D | P25230428A00004.D | P11230501n06.D | P11230501n08.D |
| Analysis Date | | | 27-Apr-23 | 27-Apr-23 | 27-Apr-23 | 28-Apr-23 | 28-Apr-23 | 28-Apr-23 | 2-May-23 | 2-May-23 |
| Sample Size (g) | | | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Final Volume (mL) | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Split Factor | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

**On Column Concentration**

| Analyte | Units | Target Concentration | Blank 1 | Blank 2 | Blank 3 | Blank 4 | Blank 5 | Blank 6 | Blank 7 | Blank 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| C11-C22 Aromatics | mg/L | NA | 14.22 | 16.77 | 15.89 | 27.7 | 27.2 | 23.8 | 26.0 | 19.9 |
| C9-C18 Aliphatics | mg/L | NA | 7.38 | 9.06 | 13.41 | 16.2 | 14.6 | 13.6 | 26.2 | 18.6 |
| C19-C36 Aliphatics | mg/L | NA | 9.16 | 7.83 | 9.37 | 11.2 | 11.8 | 13.5 | 28.5 | 14.8 |

**Final Concentration**

| Analyte | Units | Target Concentration | Blank 1 | Blank 2 | Blank 3 | Blank 4 | Blank 5 | Blank 6 | Blank 7 | Blank 8 | Mean | STD | $t_8$ | $MDL_B$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C11-C22 Aromatics | mg/kg | NA | 5.69 | 6.71 | 6.36 | 11.09 | 10.89 | 9.54 | 10.41 | 7.95 | 8.58 | 2.18 | 2.998 | **15.1** |
| C9-C18 Aliphatics | mg/kg | NA | 2.95 | 3.62 | 5.36 | 6.49 | 5.84 | 5.42 | 10.48 | 7.43 | 5.95 | 2.33 | 2.998 | **12.9** |
| C19-C36 Aliphatics | mg/kg | NA | 3.66 | 3.13 | 3.75 | 4.49 | 4.72 | 5.41 | 11.39 | 5.92 | 5.31 | 2.63 | 2.998 | **13.2** |

Phase II MDL Study
Raw Data Quant Reports

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n29.D
Signal(s) : FID2B.ch
Acq On : 27 Apr 2023 6:06 pm
Operator : Petro21a/b:all
Sample : WG1771451-1,42,,
Misc :
ALS Vial : 65 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 28 15:24:01 2023
Quant Method : I:\PETRO\Petro21\2023\230426N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.516 | 1154884 | 16.501 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 82.51% | |
| 5) s 2-Bromonaphthalene | 5.023 | 800658 | 16.245 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 81.23% | |
| 10) S o-terphenyl | 6.532 | 1115978 | 12.256 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 61.28% | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 12.438f | 1188322 | 14.215 mg/L | M5 |

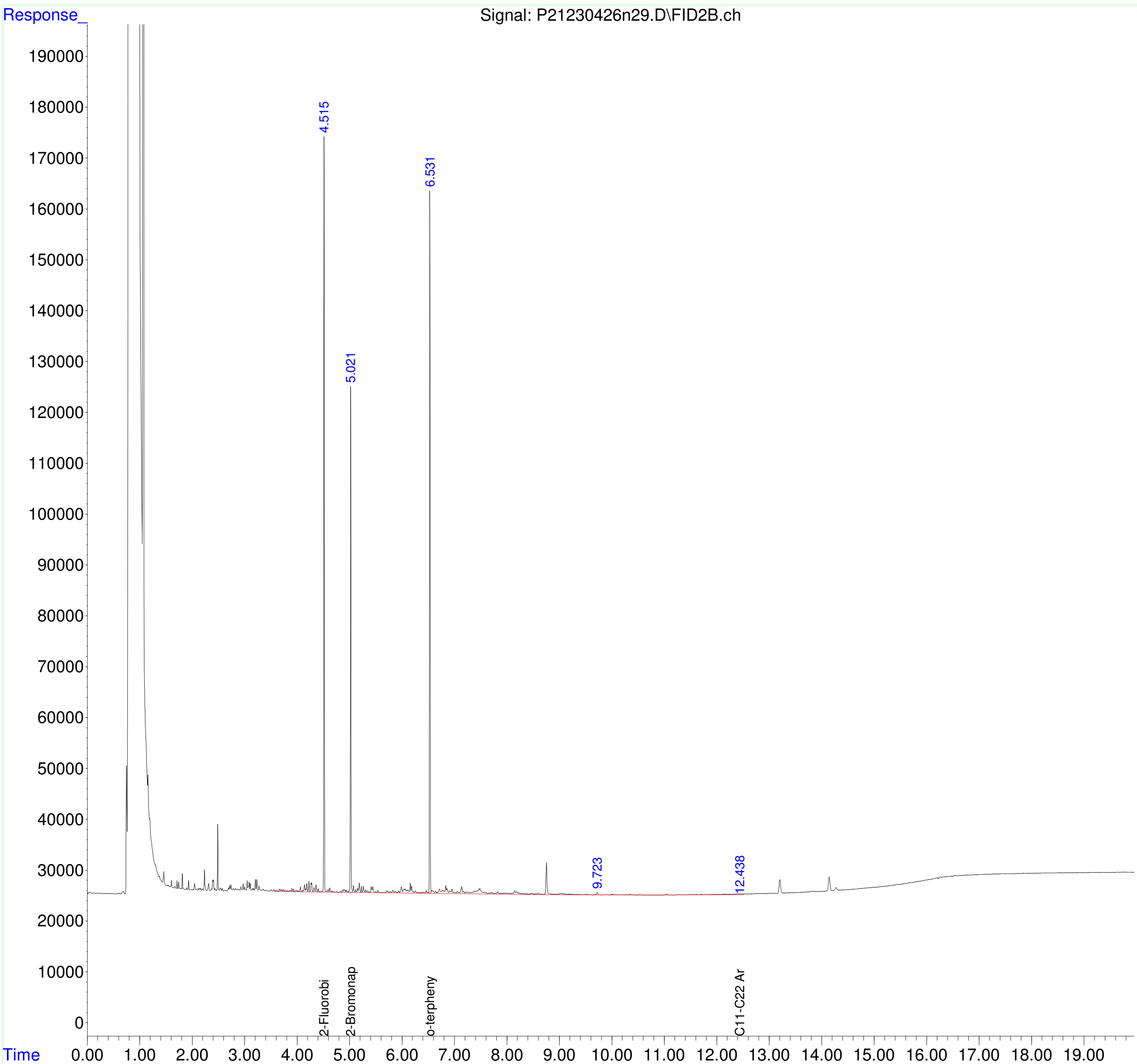
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n29.D
Signal(s) : FID2B.ch
Acq On    : 27 Apr 2023   6:06 pm
Operator  : Petro21a/b:all
Sample    : WG1771451-1,42,,
Misc      :
ALS Vial  : 65   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 28 15:24:01 2023
Quant Method : I:\PETRO\Petro21\2023\230426N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

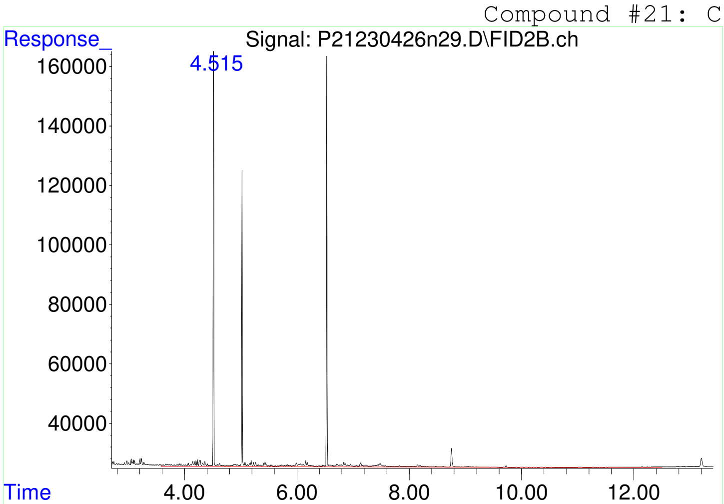


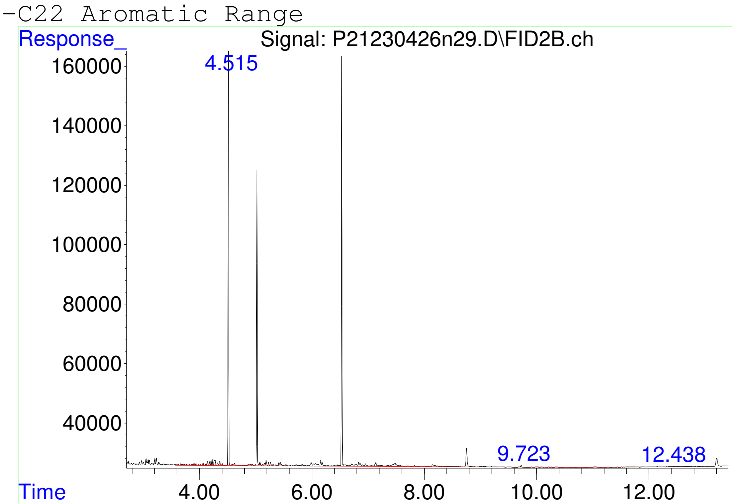
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n29.D
Date Inj'd : 4/27/2023 6:06 pm
Sample : WG1771451-1,42,,

QMethod : MAARO211129B.M
Operator : Petro21a/b:all
Instrument : Petro 21
Quant Date : 4/28/2023 3:22 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 1705341
Manual Peak Response = 1188322 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n30.D
Signal(s) : FID1A.ch
Acq On : 27 Apr 2023 6:06 pm
Operator : Petro21a/b:all
Sample : WG1771451-1,42,,
Misc :
ALS Vial : 15 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 28 15:10:04 2023
Quant Method : I:\PETRO\Petro21\2023\230426n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) S Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 5) S 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) S 2-Fluorobiphenyl | 0.000 | 0 | N.D. mg/kg | d |
| 8) S 2-Bromonaphthalene | 0.000 | 0 | N.D. mg/kg | d |
| 13) S 1-Chlorooctadecane | 7.180 | 915239 | 14.710 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 73.55% | |
| **Target Compounds** | | | | |
| 1) Nonane (C9) | 0.000 | 0 | N.D. mg/L | d |
| 2) Decane (C10) | 0.000 | 0 | N.D. mg/L | d |
| 4) Dodecane (C12) | 0.000 | 0 | N.D. mg/L | d |
| 7) Tetradecane (C14) | 0.000 | 0 | N.D. mg/L | d |
| 9) Hexadecane (C16) | 0.000 | 0 | N.D. mg/L | d |
| 10) Octadecane (C18) | 0.000 | 0 | N.D. mg/L | d |
| 11) Nonadecane (c19) | 0.000 | 0 | N.D. mg/kg | d |
| 12) Eicosane (C20) | 0.000 | 0 | N.D. mg/L | d |
| 14) Docosane (C22) | 0.000 | 0 | N.D. mg/L | d |
| 15) Tetracosane (C24) | 0.000 | 0 | N.D. mg/L | d |
| 16) Hexacosane (C26) | 0.000 | 0 | N.D. mg/L | d |
| 17) Octacosane (C28) | 0.000 | 0 | N.D. mg/L | d |
| 18) Triacontane (C30) | 0.000 | 0 | N.D. mg/L | d |
| 19) Hexatriacontane (C36) | 0.000 | 0 | N.D. mg/L | d |
| 20) H C9-C18 Aliphatics | 6.187f | 527902 | 7.376 mg/L | M5 |
| 21) H C19-C36 Aliphatics | 14.260f | 630884 | 9.160 mg/L | M5 |

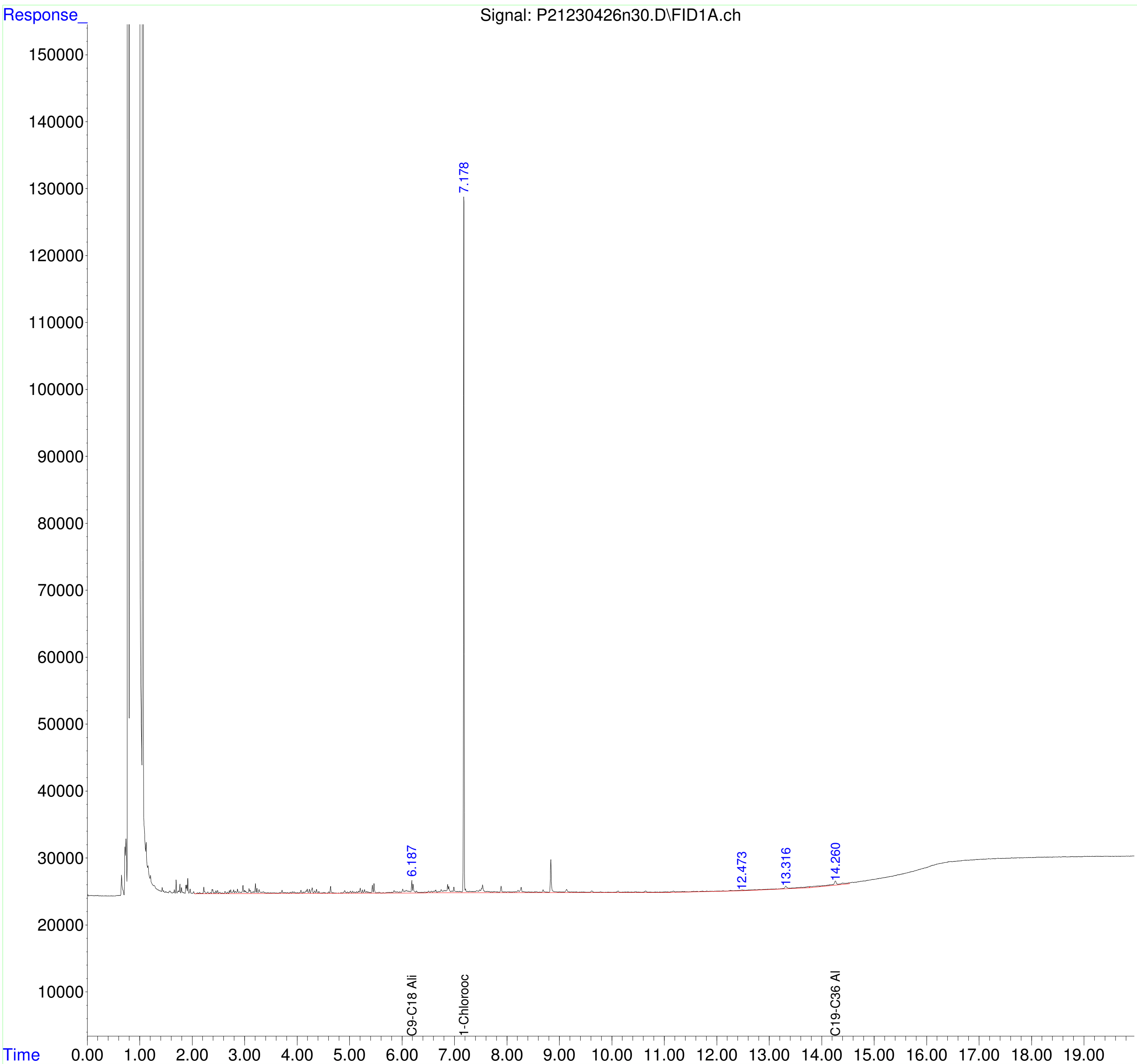
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n30.D
Signal(s) : FID1A.ch
Acq On    : 27 Apr 2023   6:06 pm
Operator  : Petro21a/b:all
Sample    : WG1771451-1,42,,
Misc      :
ALS Vial  : 15   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 28 15:10:04 2023
Quant Method : I:\PETRO\Petro21\2023\230426n\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

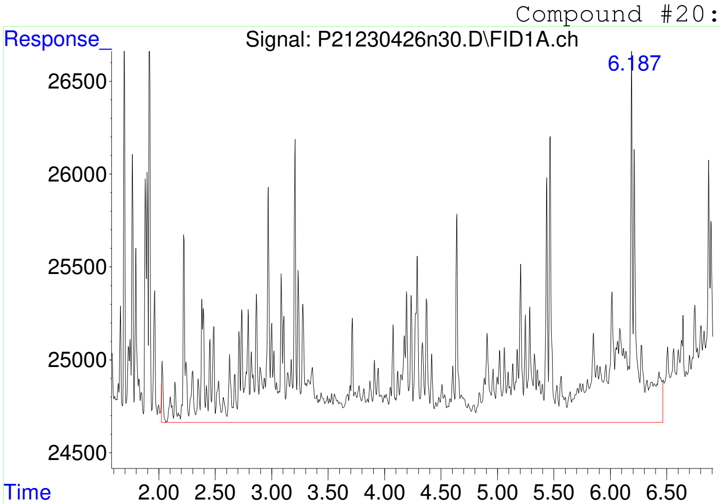


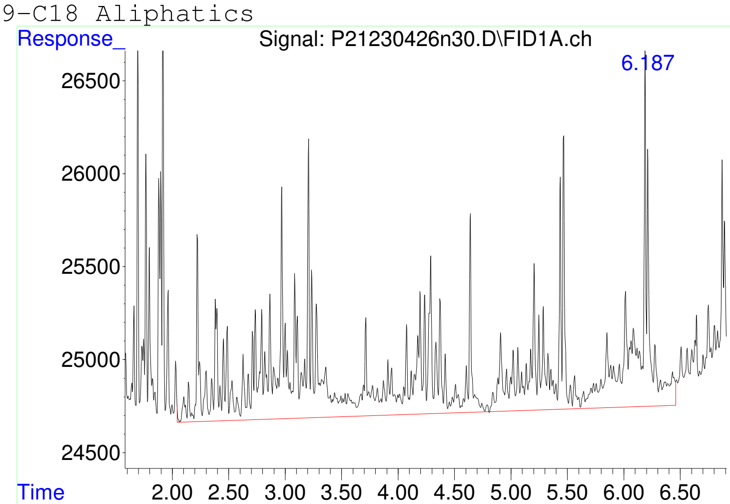
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n30.D
Date Inj'd : 4/27/2023 6:06 pm
Sample : WG1771451-1,42,,

QMethod : MAALI211129A.M
Operator : Petro21a/b:all
Instrument : Petro 21
Quant Date : 4/28/2023 3:08 pm

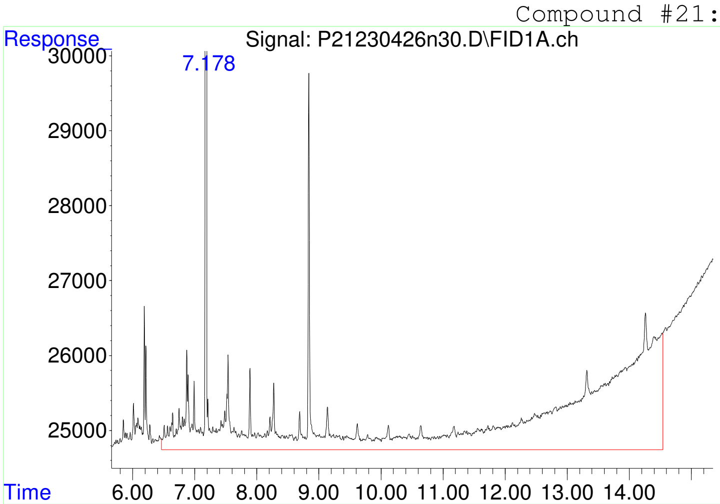
Compound #20: C9-C18 Aliphatics

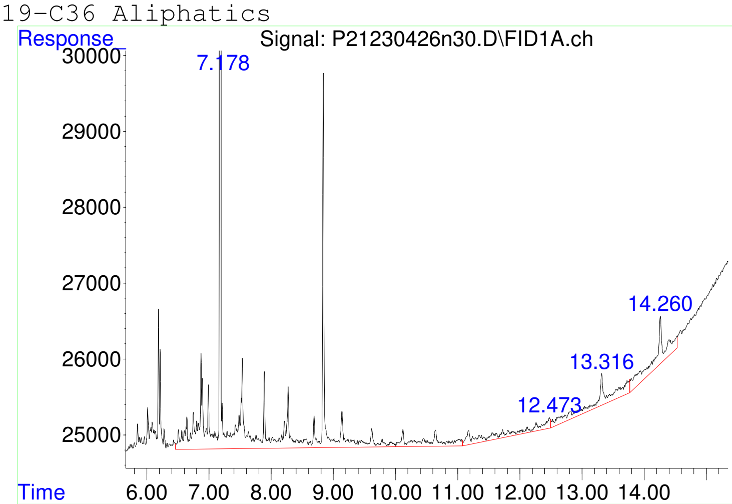



Original Peak Response = 649285 Manual Peak Response = 527902 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 2027392 Manual Peak Response = 630884 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n31.D
Signal(s) : FID2B.ch
Acq On : 27 Apr 2023 6:31 pm
Operator : Petro21a/b:all
Sample : WG1771451-2,42,,
Misc :
ALS Vial : 66 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 28 15:24:28 2023
Quant Method : I:\PETRO\Petro21\2023\230426N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.516 | 885327 | 12.650 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 63.25% | | |
| 5) s 2-Bromonaphthalene | 5.023 | 597791 | 12.129 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 60.64% | | |
| 10) S o-terphenyl | 6.533 | 832457 | 9.142 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 45.71% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 12.397f | 1402194 | 16.773 mg/L | M5 |

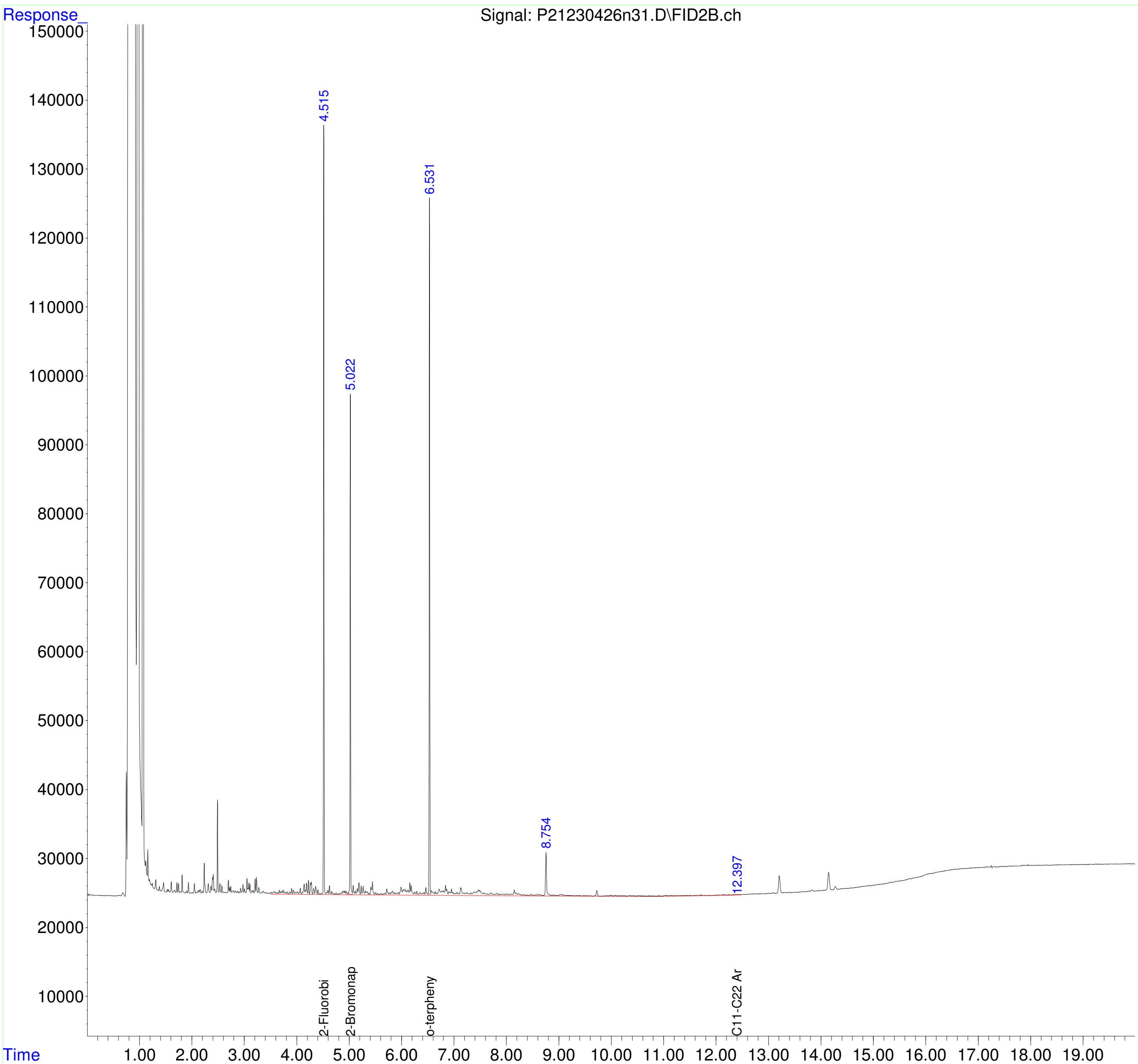
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n31.D
Signal(s) : FID2B.ch
Acq On    : 27 Apr 2023   6:31 pm
Operator  : Petro21a/b:all
Sample    : WG1771451-2,42,,
Misc      :
ALS Vial  : 66   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 28 15:24:28 2023
Quant Method : I:\PETRO\Petro21\2023\230426N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

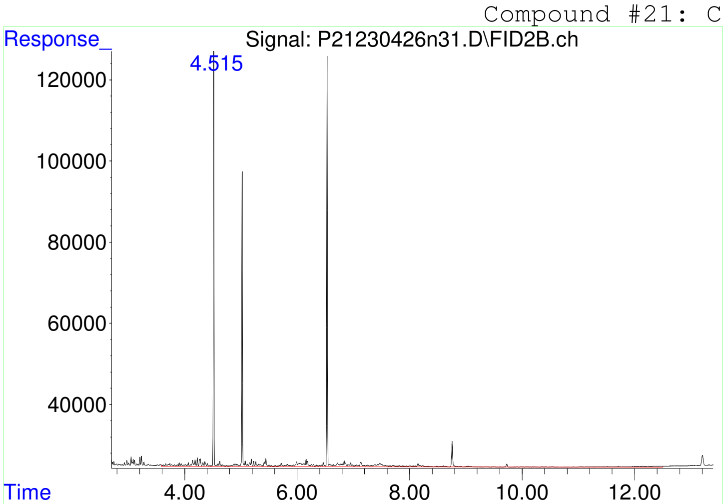
Volume Inj.  :
Signal Phase :
Signal Info  :

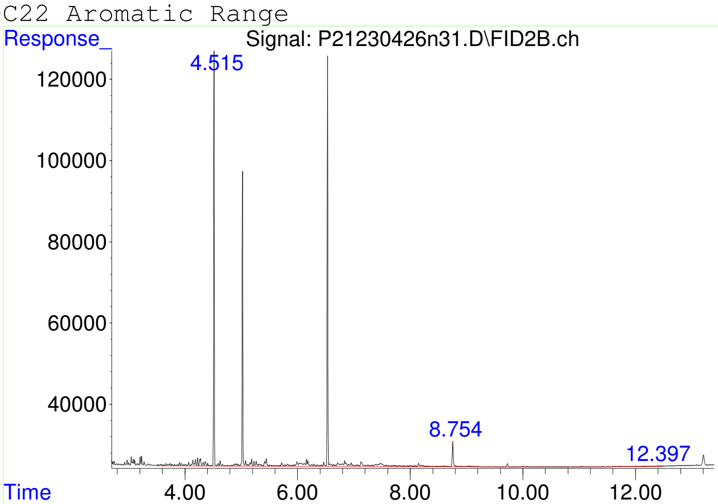


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230426N.SEC\ | QMethod | : MAARO211129B.M |
| Data File | : P21230426n31.D | Operator | : Petro21a/b:all |
| Date Inj'd | : 4/27/2023 6:31 pm | Instrument | : Petro 21 |
| Sample | : WG1771451-2,42,, | Quant Date | : 4/28/2023 3:22 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 1380297

Manual Peak Response = 1402194 M5

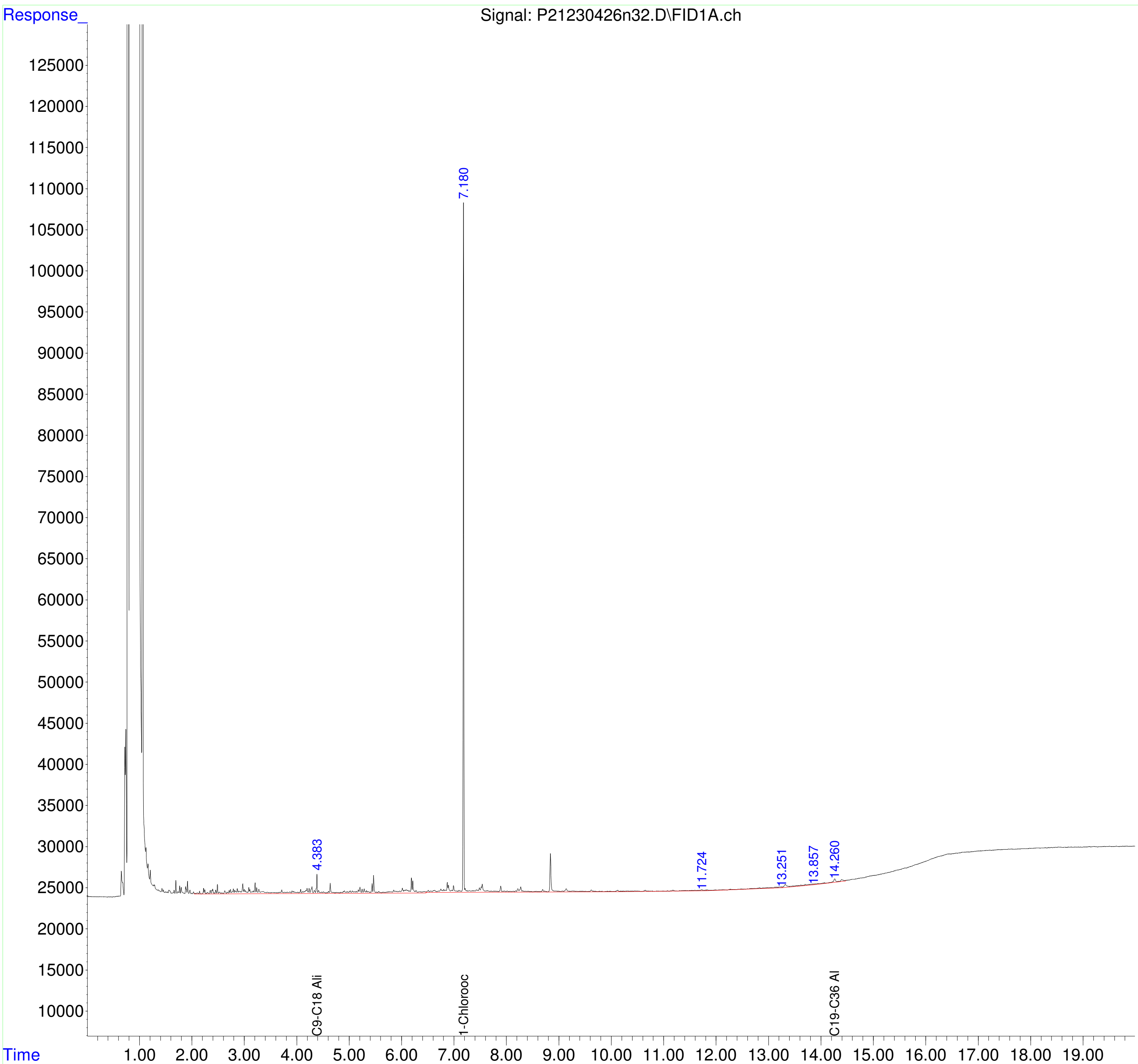
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

```
Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n32.D
Signal(s) : FID1A.ch
Acq On    : 27 Apr 2023   6:31 pm
Operator  : Petro21a/b:all
Sample    : WG1771451-2,42,,
Misc      :
ALS Vial  : 16   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 28 15:10:40 2023
Quant Method : I:\PETRO\Petro21\2023\230426n\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed
```

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.181 | 720734 | 11.584 | mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 57.92% | | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 4.383 | 648245 | 9.058 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.260f | 538934 | 7.825 | mg/L | M5 |

(f)=RT Delta > 1/2 Window (m)=manual int.

```
Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n32.D
Signal(s) : FID1A.ch
Acq On    : 27 Apr 2023   6:31 pm
Operator  : Petro21a/b:all
Sample    : WG1771451-2,42,,
Misc      :
ALS Vial  : 16   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 28 15:10:40 2023
Quant Method : I:\PETRO\Petro21\2023\230426n\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :
```

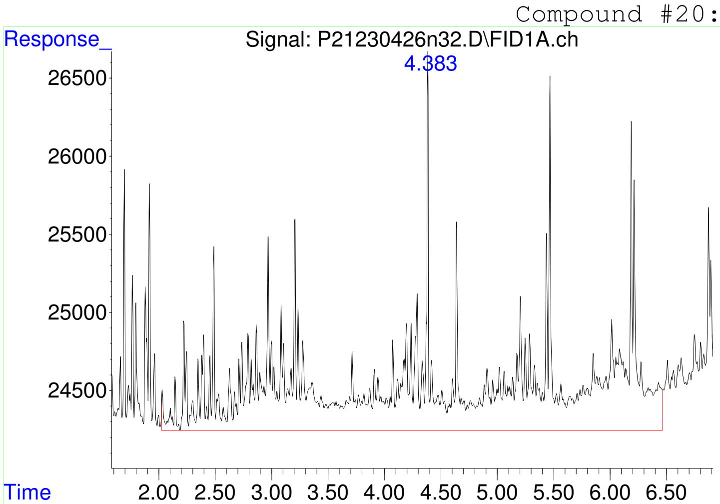


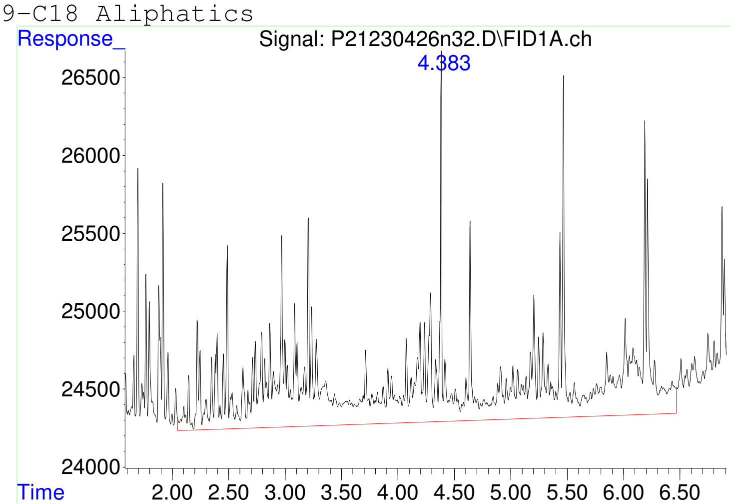
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n32.D
Date Inj'd : 4/27/2023 6:31 pm
Sample : WG1771451-2,42,,

QMethod : MAALI211129A.M
Operator : Petro21a/b:all
Instrument : Petro 21
Quant Date : 4/28/2023 3:08 pm

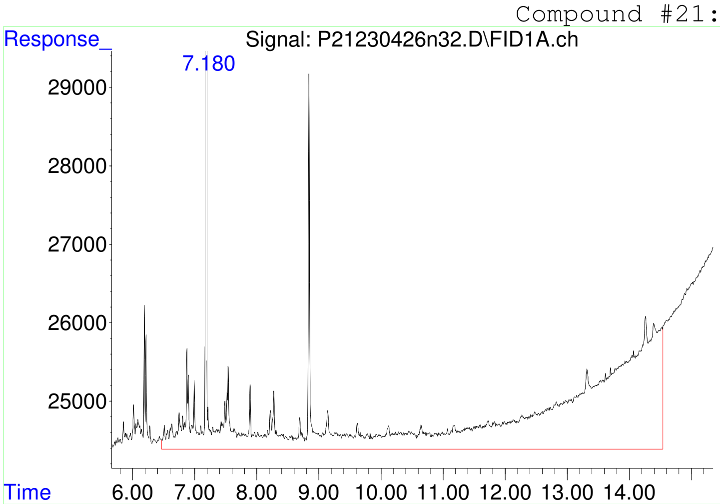
Compound #20: C9-C18 Aliphatics

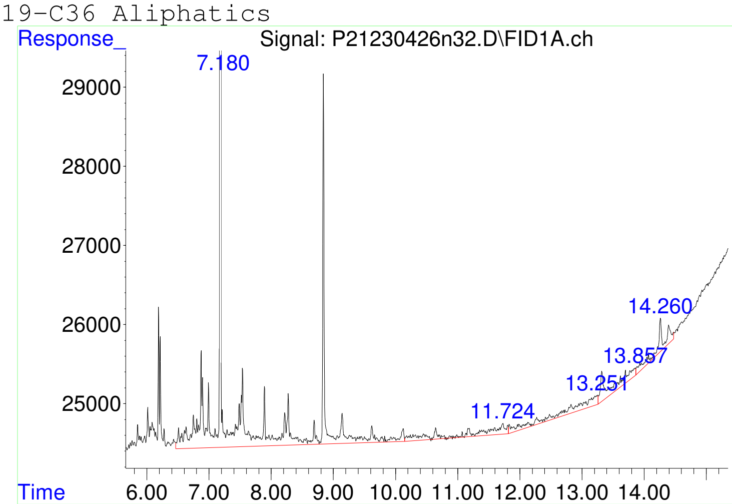



Original Peak Response = 770629
Manual Peak Response = 648245 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 2052908
Manual Peak Response = 538934 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

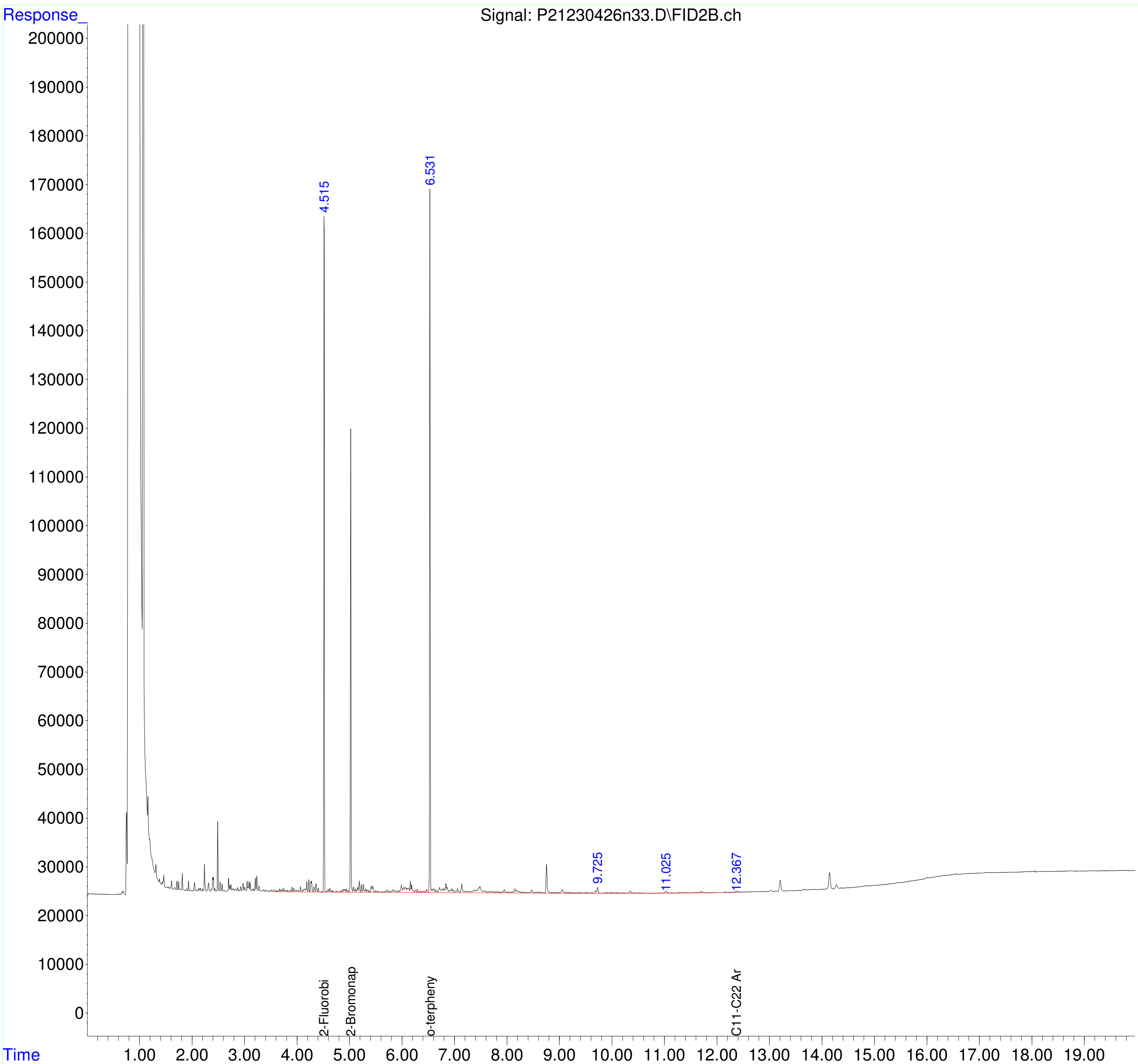
```
Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n33.D
Signal(s) : FID2B.ch
Acq On    : 27 Apr 2023   6:56 pm
Operator  : Petro21a/b:all
Sample    : WG1771451-3,42,,
Misc      :
ALS Vial  : 67   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 28 15:24:56 2023
Quant Method : I:\PETRO\Petro21\2023\230426N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed

        Compound                        R.T.       Response    Conc Units
 ---------------------------------------------------------------------------

 System Monitoring Compounds
 3) s   2-Fluorobiphenyl               4.516       1106762   15.814 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   79.07%
 5) s   2-Bromonaphthalene             5.023        771905   15.661 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   78.31%
10) S   o-terphenyl                    6.533       1204497   13.228 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   66.14%

 Target Compounds
 1)     Naphthalene                    0.000             0    N.D.  mg/L  d
 2)     2-Methylnaphthalene            0.000             0    N.D.  mg/L  d
 4)     Acenaphthalene                 0.000             0    N.D.  mg/L  d
 6)     Acenaphthene                   0.000             0    N.D.  mg/L  d
 7)     Fluorene                       0.000             0    N.D.  mg/L  d
 8)     Phenanthrene                   0.000             0    N.D.  mg/L  d
 9)     Anthracene                     0.000             0    N.D.  mg/L  d
11)     Fluoranthene                   0.000             0    N.D.  mg/L  d
12)     Pyrene                         0.000             0    N.D.  mg/L  d
13)     Benzo(a)anthracene             0.000             0    N.D.  mg/L  d
14)     Chrysene                       0.000             0    N.D.  mg/L  d
15)     Benzo(b)fluoranthene           0.000             0    N.D.  mg/L  d
16)     Benzo(k)fluoranthene           0.000             0    N.D.  mg/L
17)     Benzo(a)pyrene                 0.000             0    N.D.  mg/L
18)     Indeno(1,2,3-cd)pyrene         0.000             0    N.D.  mg/L
19)     Dibenzo(a,h)anthracene         0.000             0    N.D.  mg/L
20)     Benzo(ghi)perylene             0.000             0    N.D.  mg/L
21) H   C11-C22 Aromatic Range        12.367f      1328279   15.889 mg/L  M5
 ---------------------------------------------------------------------------

(f)=RT Delta > 1/2 Window                               (m)=manual int.
```

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n33.D
Signal(s) : FID2B.ch
Acq On    : 27 Apr 2023   6:56 pm
Operator  : Petro21a/b:all
Sample    : WG1771451-3,42,,
Misc      :
ALS Vial  : 67   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 28 15:24:56 2023
Quant Method : I:\PETRO\Petro21\2023\230426N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

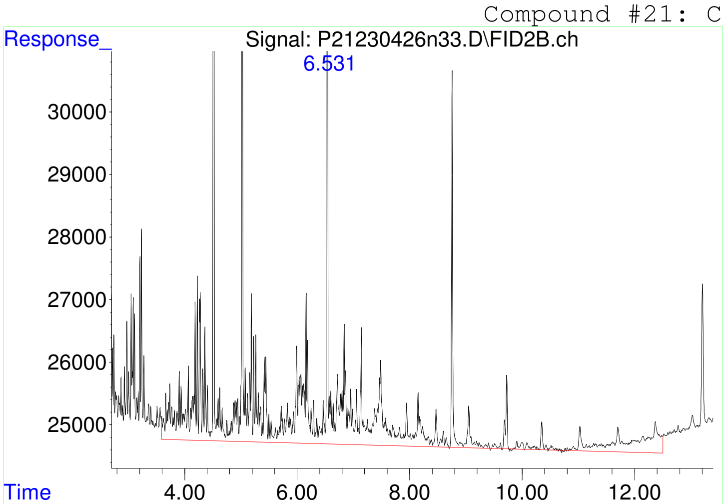
Volume Inj.  :
Signal Phase :
Signal Info  :

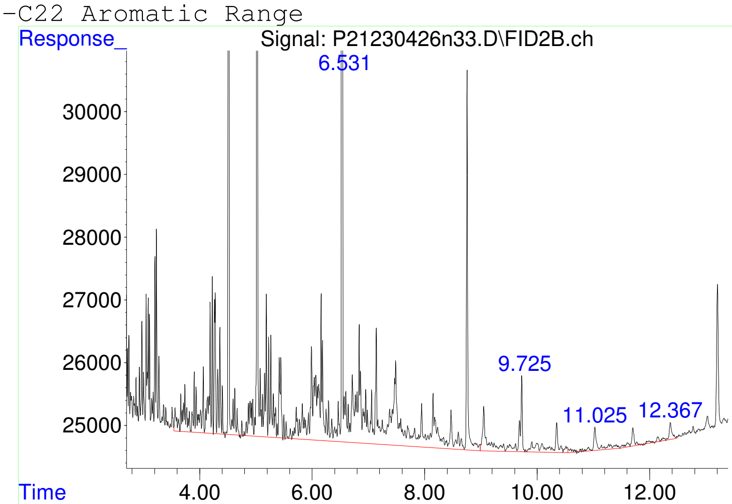


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230426N.SEC\ | QMethod | : MAARO211129B.M |
| Data File | : P21230426n33.D | Operator | : Petro21a/b:all |
| Date Inj'd | : 4/27/2023 6:56 pm | Instrument | : Petro 21 |
| Sample | : WG1771451-3,42,, | Quant Date | : 4/28/2023 3:22 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 1558018

Manual Peak Response = 1328279 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n34.D
Signal(s) : FID1A.ch
Acq On : 27 Apr 2023 6:56 pm
Operator : Petro21a/b:all
Sample : WG1771451-3,42,,
Misc :
ALS Vial : 17 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 28 15:11:35 2023
Quant Method : I:\PETRO\Petro21\2023\230426n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.181 | 888030 | 14.273 | mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 71.36% | | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 6.187f | 959779 | 13.411 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.261f | 645162 | 9.367 | mg/L | M5 |

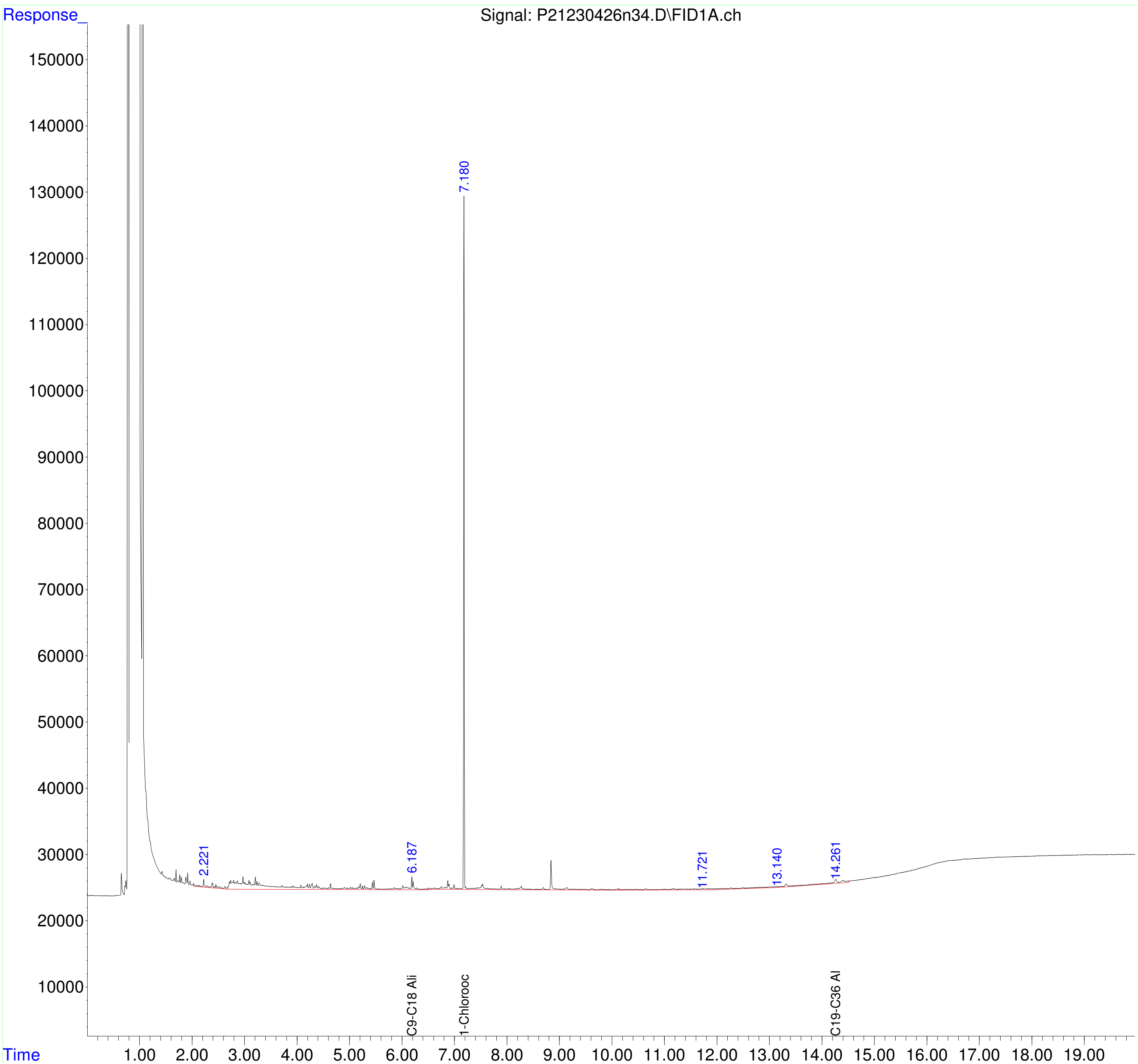
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n34.D
Signal(s) : FID1A.ch
Acq On     : 27 Apr 2023    6:56 pm
Operator  : Petro21a/b:all
Sample     : WG1771451-3,42,,
Misc       :
ALS Vial  : 17   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 28 15:11:35 2023
Quant Method : I:\PETRO\Petro21\2023\230426n\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

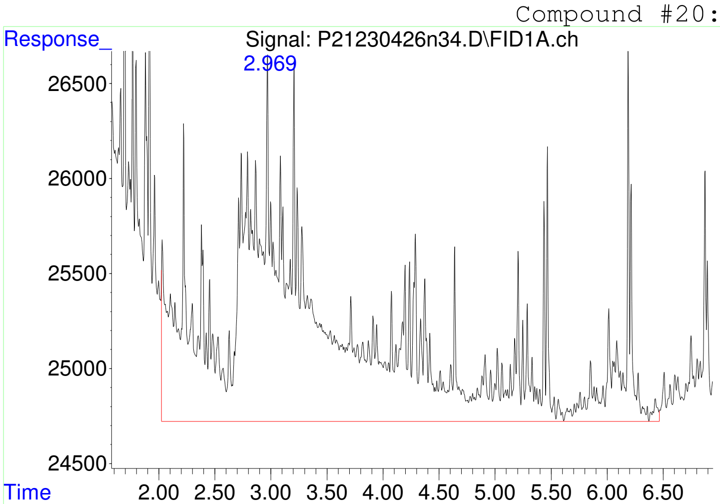


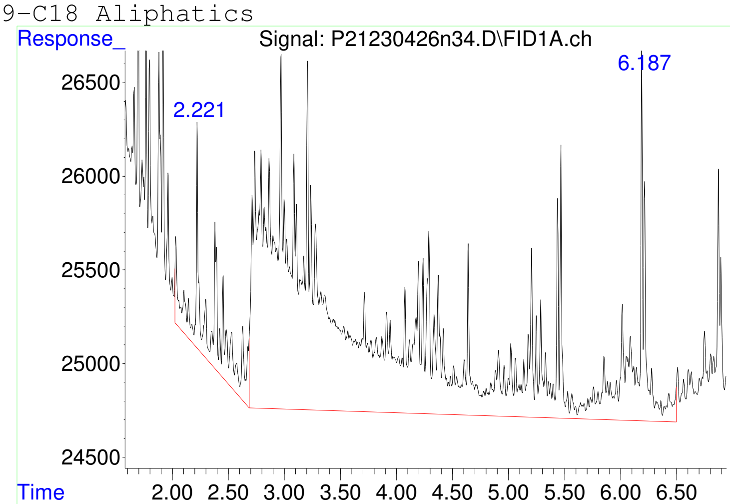
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n34.D
Date Inj'd : 4/27/2023 6:56 pm
Sample : WG1771451-3,42,,

QMethod : MAALI211129A.M
Operator : Petro21a/b:all
Instrument : Petro 21
Quant Date : 4/28/2023 3:08 pm

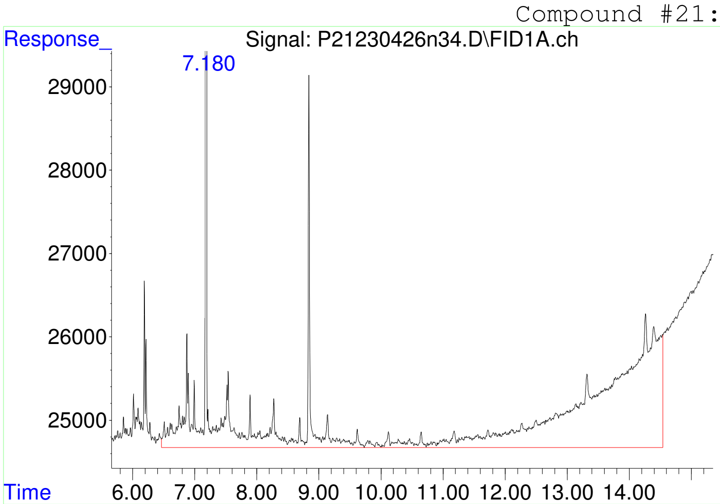
Compound #20: C9-C18 Aliphatics

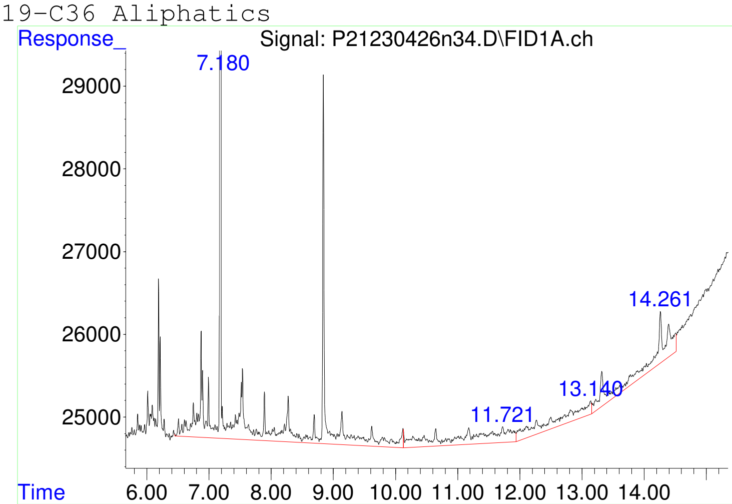



Original Peak Response = 1068434
Manual Peak Response = 959779 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 1475473
Manual Peak Response = 645162 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n35.D
Signal(s) : FID2B.ch
Acq On : 27 Apr 2023 7:21 pm
Operator : Petro21a/b:all
Sample : L2322455-01,42,,
Misc :
ALS Vial : 68 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 28 15:25:22 2023
Quant Method : I:\PETRO\Petro21\2023\230426N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.516 | 1012353 | 14.465 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 72.32% | |
| 5) s 2-Bromonaphthalene | 5.024 | 702932 | 14.262 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 71.31% | |
| 10) S o-terphenyl | 6.533 | 910943 | 10.004 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 50.02% | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 12.362f | 1279686 | 15.307 mg/L | M5 |

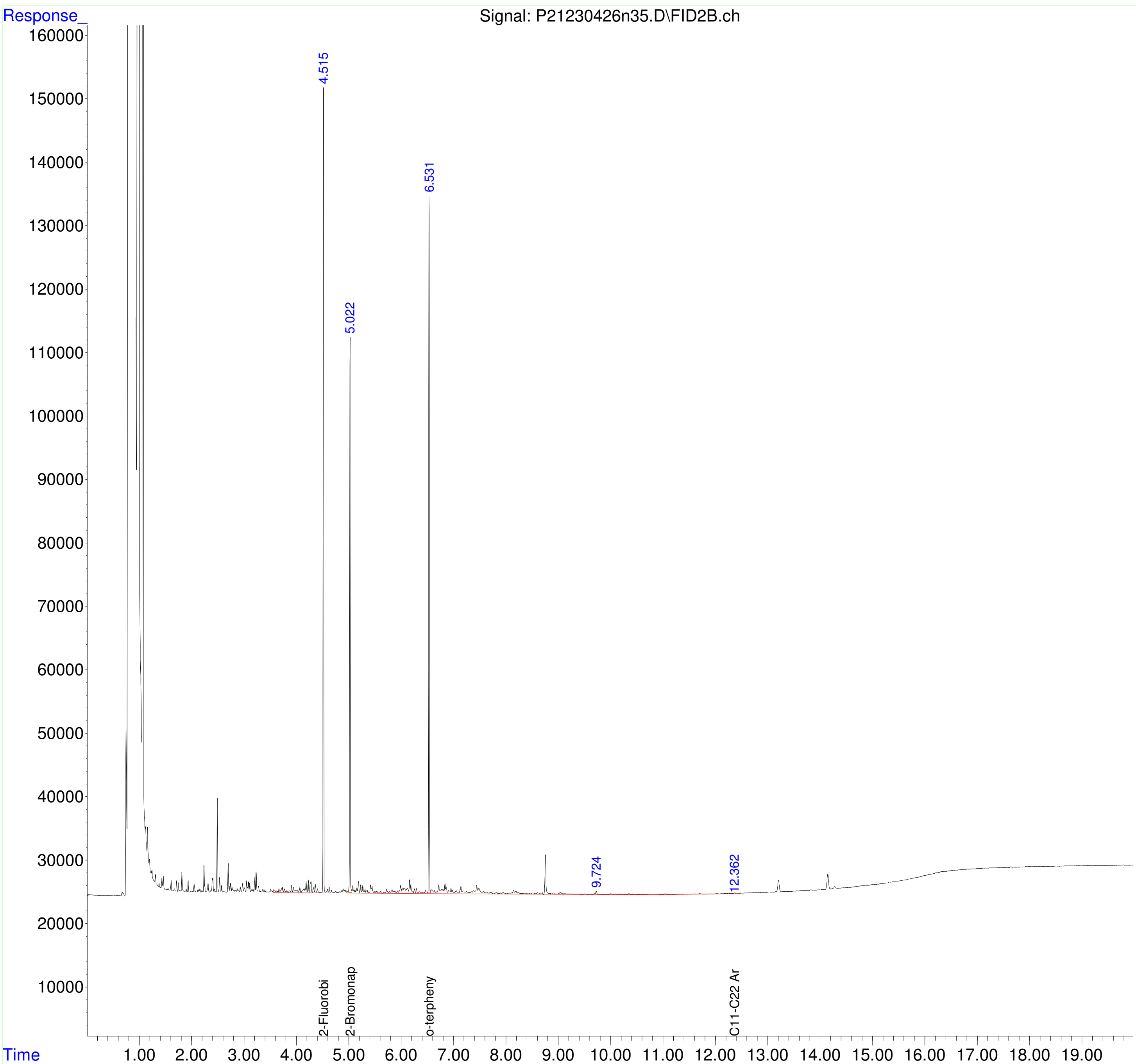
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n35.D
Signal(s) : FID2B.ch
Acq On     : 27 Apr 2023    7:21 pm
Operator  : Petro21a/b:all
Sample     : L2322455-01,42,,
Misc       :
ALS Vial  : 68   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 28 15:25:22 2023
Quant Method : I:\PETRO\Petro21\2023\230426N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

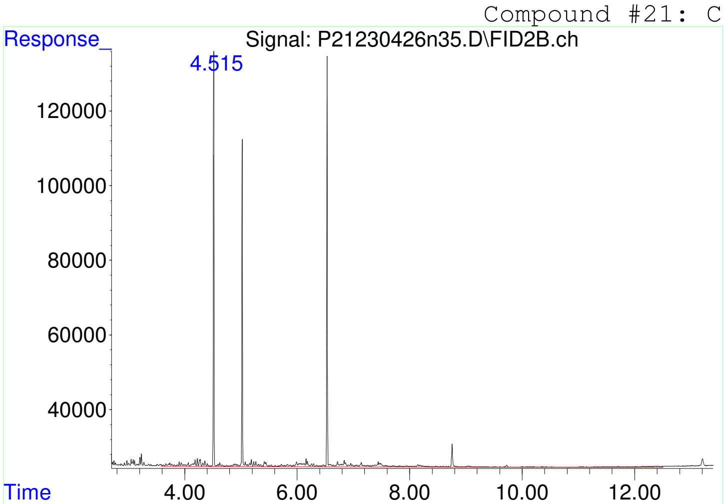
Volume Inj.  :
Signal Phase :
Signal Info  :

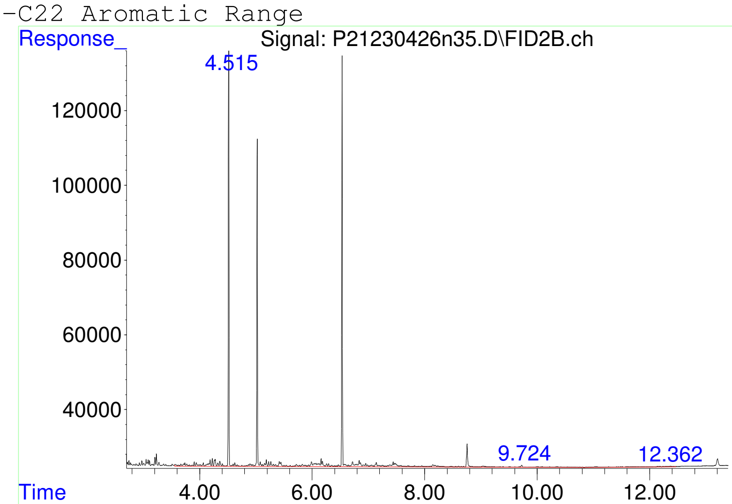


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230426N.SEC\ | QMethod | : MAARO211129B.M |
| Data File | : P21230426n35.D | Operator | : Petro21a/b:all |
| Date Inj'd | : 4/27/2023 7:21 pm | Instrument | : Petro 21 |
| Sample | : L2322455-01,42,, | Quant Date | : 4/28/2023 3:22 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 1527064

Manual Peak Response = 1279686 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n36.D
Signal(s) : FID1A.ch
Acq On : 27 Apr 2023 7:21 pm
Operator : Petro21a/b:all
Sample : L2322455-01,42,,
Misc :
ALS Vial : 18 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 28 15:12:23 2023
Quant Method : I:\PETRO\Petro21\2023\230426n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.180 | 763537 | 12.272 | mg/L | M4 |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 61.36% | | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 6.213f | 687672 | 9.609 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.261f | 5394424 | 78.325 | mg/L | M5 |

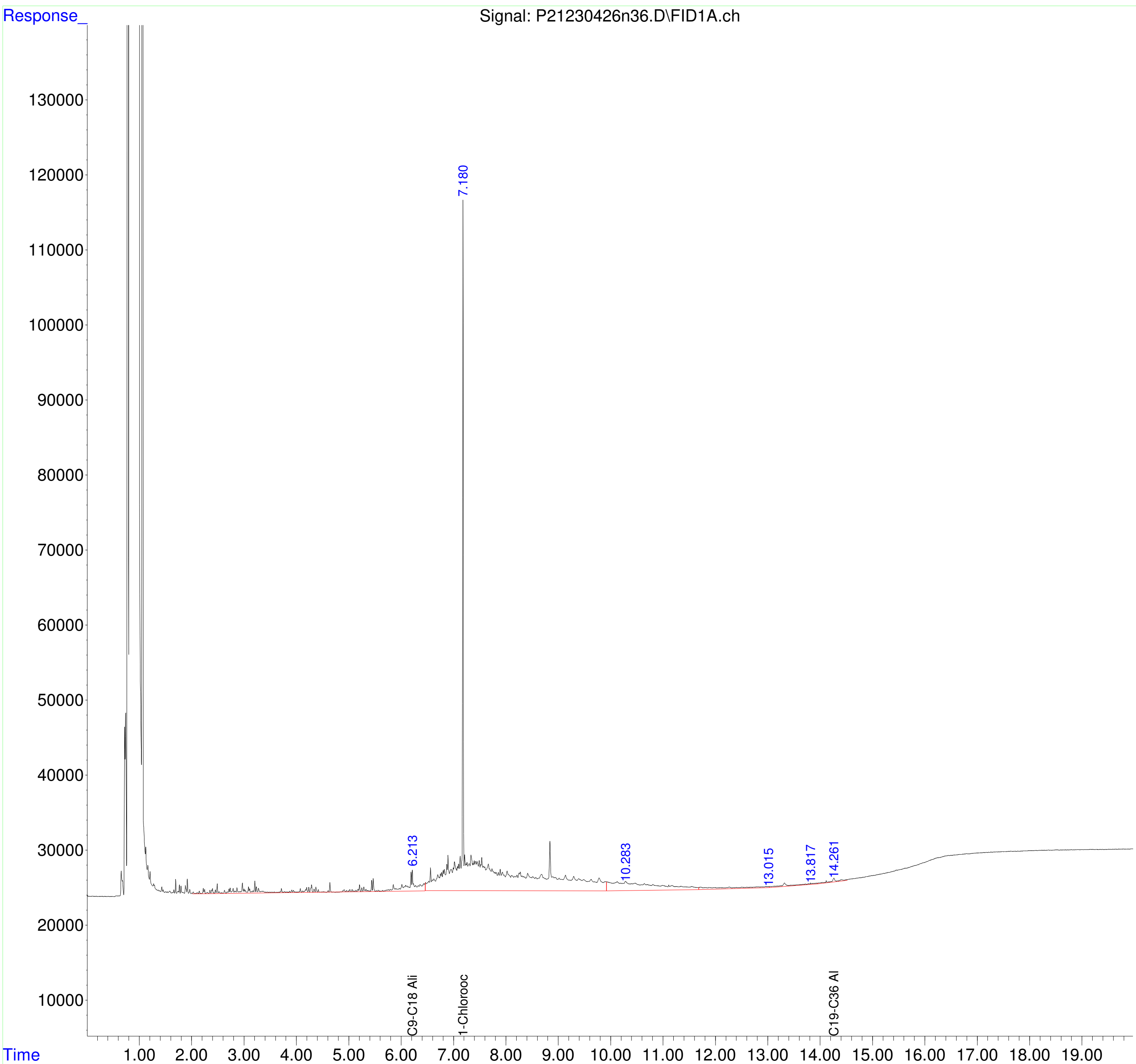
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n36.D
Signal(s) : FID1A.ch
Acq On    : 27 Apr 2023   7:21 pm
Operator  : Petro21a/b:all
Sample    : L2322455-01,42,,
Misc      :
ALS Vial  : 18   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 28 15:12:23 2023
Quant Method : I:\PETRO\Petro21\2023\230426n\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

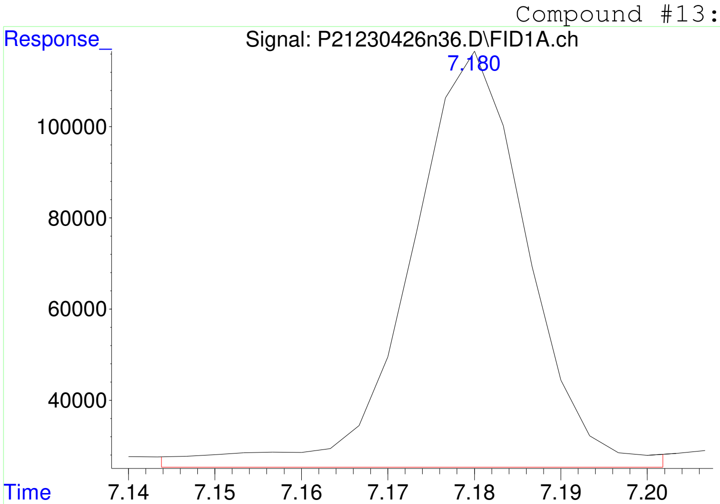


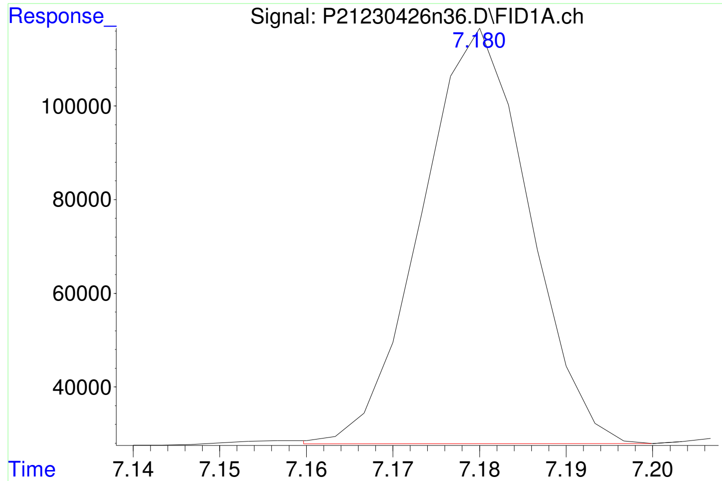
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n36.D
Date Inj'd : 4/27/2023 7:21 pm
Sample : L2322455-01,42,,

QMethod : MAALI211129A.M
Operator : Petro21a/b:all
Instrument : Petro 21
Quant Date : 4/28/2023 3:08 pm

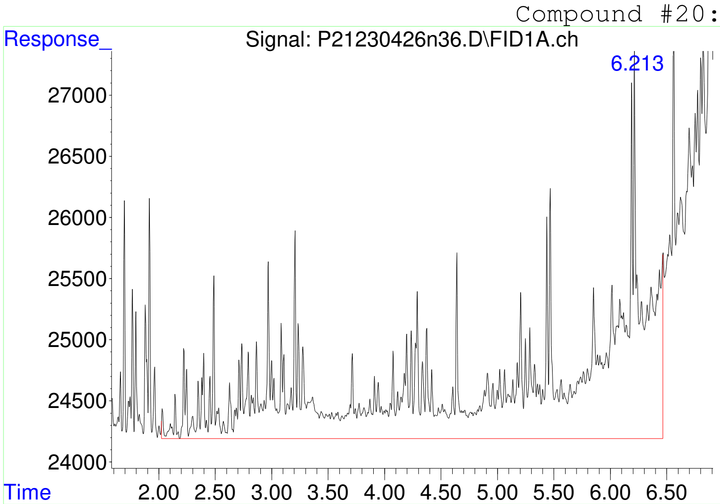
Compound #13: 1-Chlorooctadecane

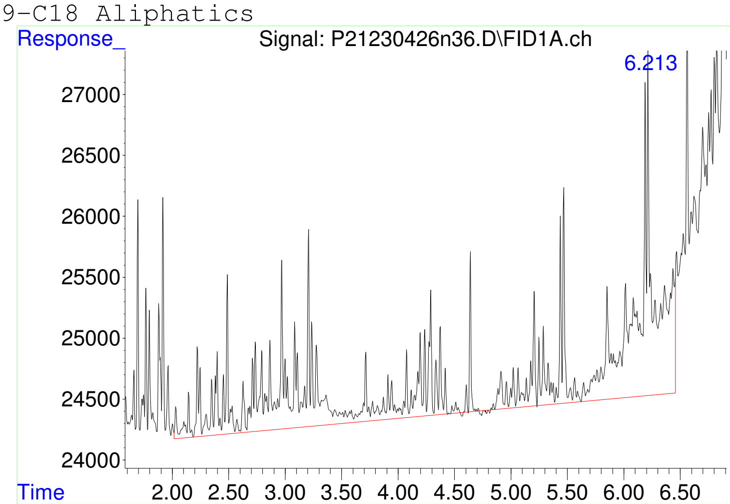



Original Peak Response = 855490
Manual Peak Response = 763537 M4
M4 = Poor automated baseline construction.

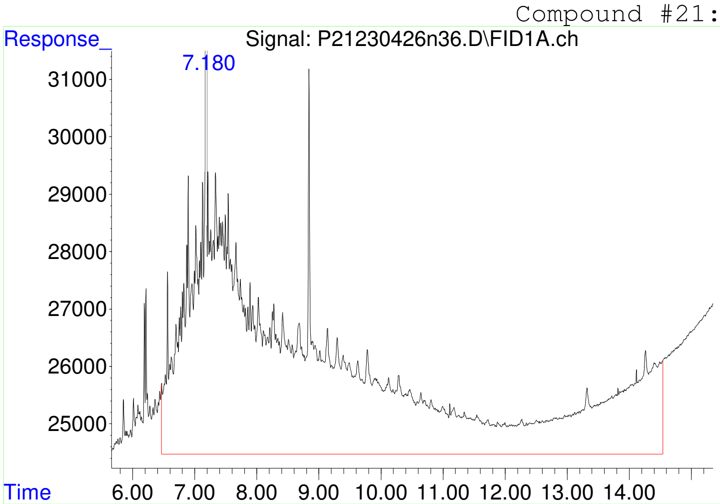
Compound #20: C9-C18 Aliphatics

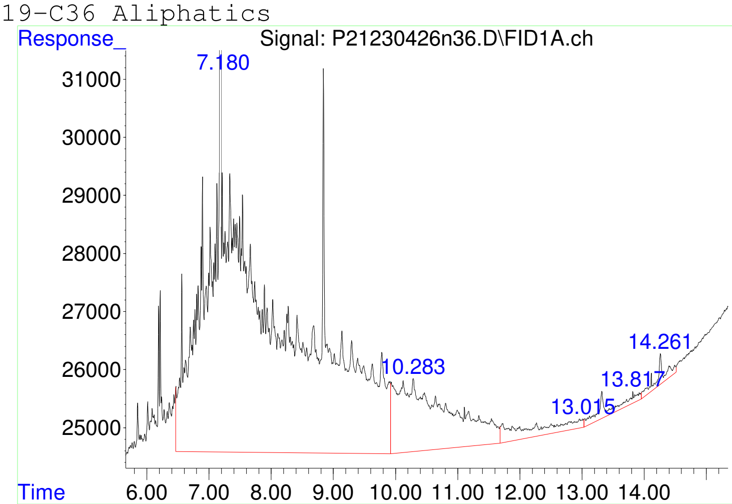



Original Peak Response = 1148999
Manual Peak Response = 687672 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 6961651
Manual Peak Response = 5394424 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n37.D
Signal(s) : FID2B.ch
Acq On : 27 Apr 2023 7:46 pm
Operator : Petro21a/b:all
Sample : L2322455-02,42,,
Misc :
ALS Vial : 69 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 28 15:25:49 2023
Quant Method : I:\PETRO\Petro21\2023\230426N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.516 | 1322991 | 18.903 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 94.51% | |
| 5) s 2-Bromonaphthalene | 5.023 | 935836 | 18.987 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 94.93% | |
| 10) S o-terphenyl | 6.533 | 1323455 | 14.534 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 72.67% | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 12.367f | 1922152 | 22.993 mg/L | M5 |

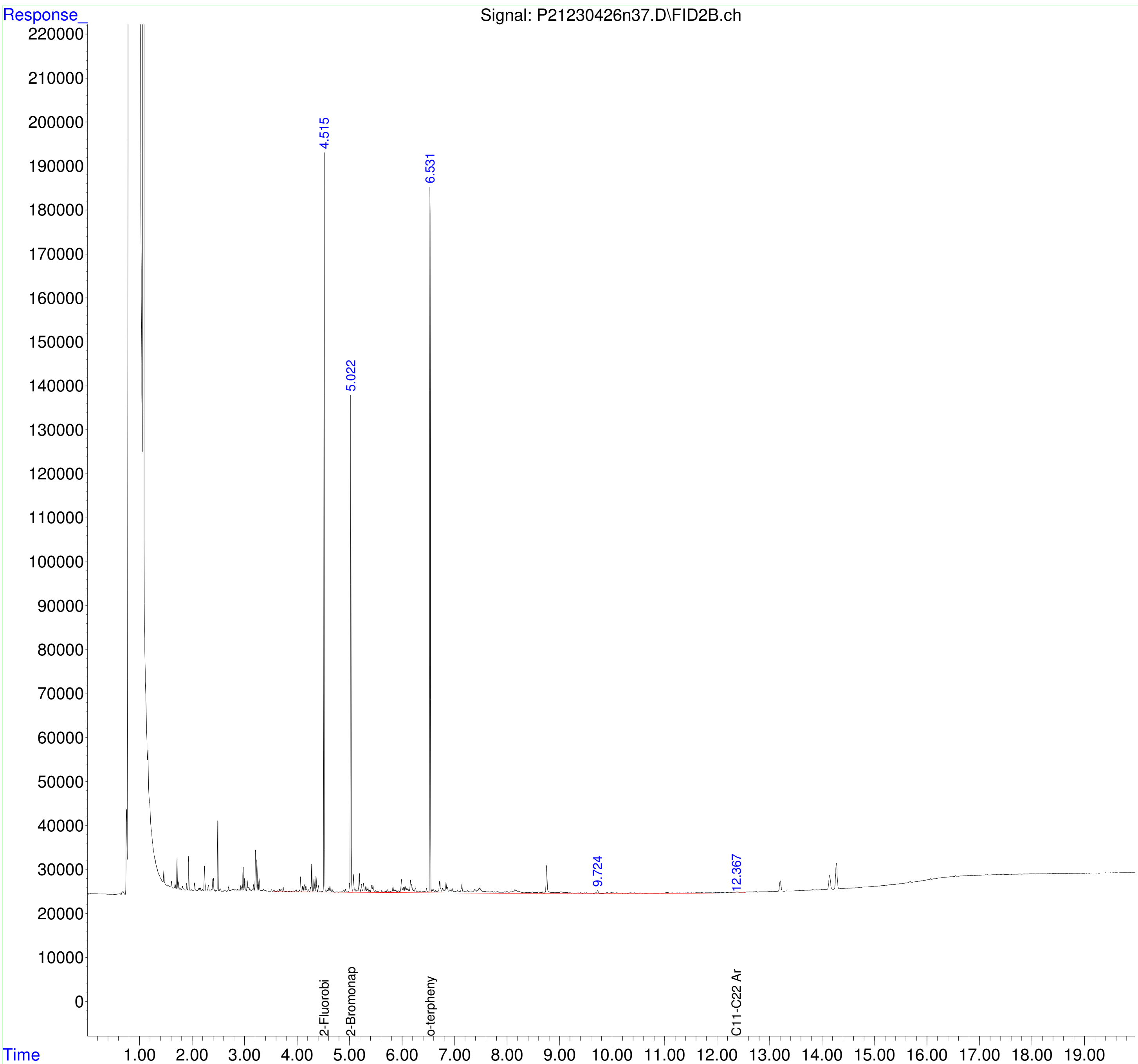
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n37.D
Signal(s) : FID2B.ch
Acq On    : 27 Apr 2023   7:46 pm
Operator  : Petro21a/b:all
Sample    : L2322455-02,42,,
Misc      :
ALS Vial  : 69   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 28 15:25:49 2023
Quant Method : I:\PETRO\Petro21\2023\230426N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

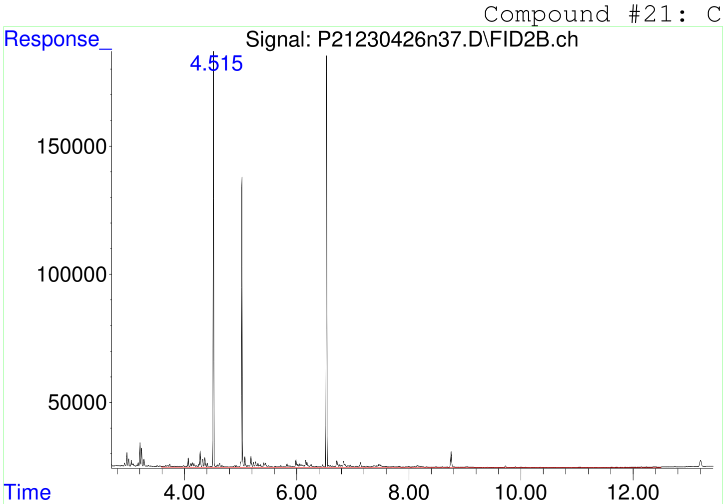


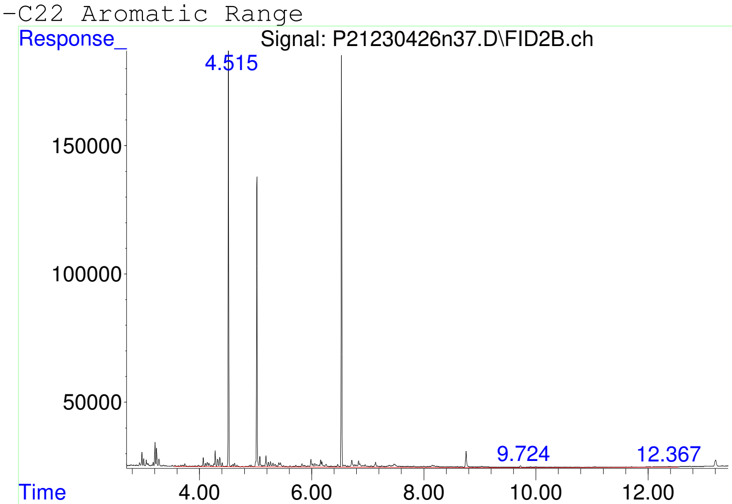
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n37.D
Date Inj'd : 4/27/2023 7:46 pm
Sample : L2322455-02,42,,

QMethod : MAARO211129B.M
Operator : Petro21a/b:all
Instrument : Petro 21
Quant Date : 4/28/2023 3:22 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 1754727

Manual Peak Response = 1922152 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n38.D
Signal(s) : FID1A.ch
Acq On : 27 Apr 2023 7:46 pm
Operator : Petro21a/b:all
Sample : L2322455-02,42,,
Misc :
ALS Vial : 19 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 28 15:13:39 2023
Quant Method : I:\PETRO\Petro21\2023\230426n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | | |
| 3) | S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) | S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) | S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) | S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) | S | 1-Chlorooctadecane | 7.180 | 850286 | 13.666 | mg/L | M4 |
| Spiked Amount 20.000 | | Range 40 - 140 | | Recovery = 68.33% | | | |
| Target Compounds | | | | | | | |
| 1) | | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) | H | C9-C18 Aliphatics | 6.188f | 788468 | 11.017 | mg/L | M5 |
| 21) | H | C19-C36 Aliphatics | 14.391f | 5797191 | 84.173 | mg/L | M5 |

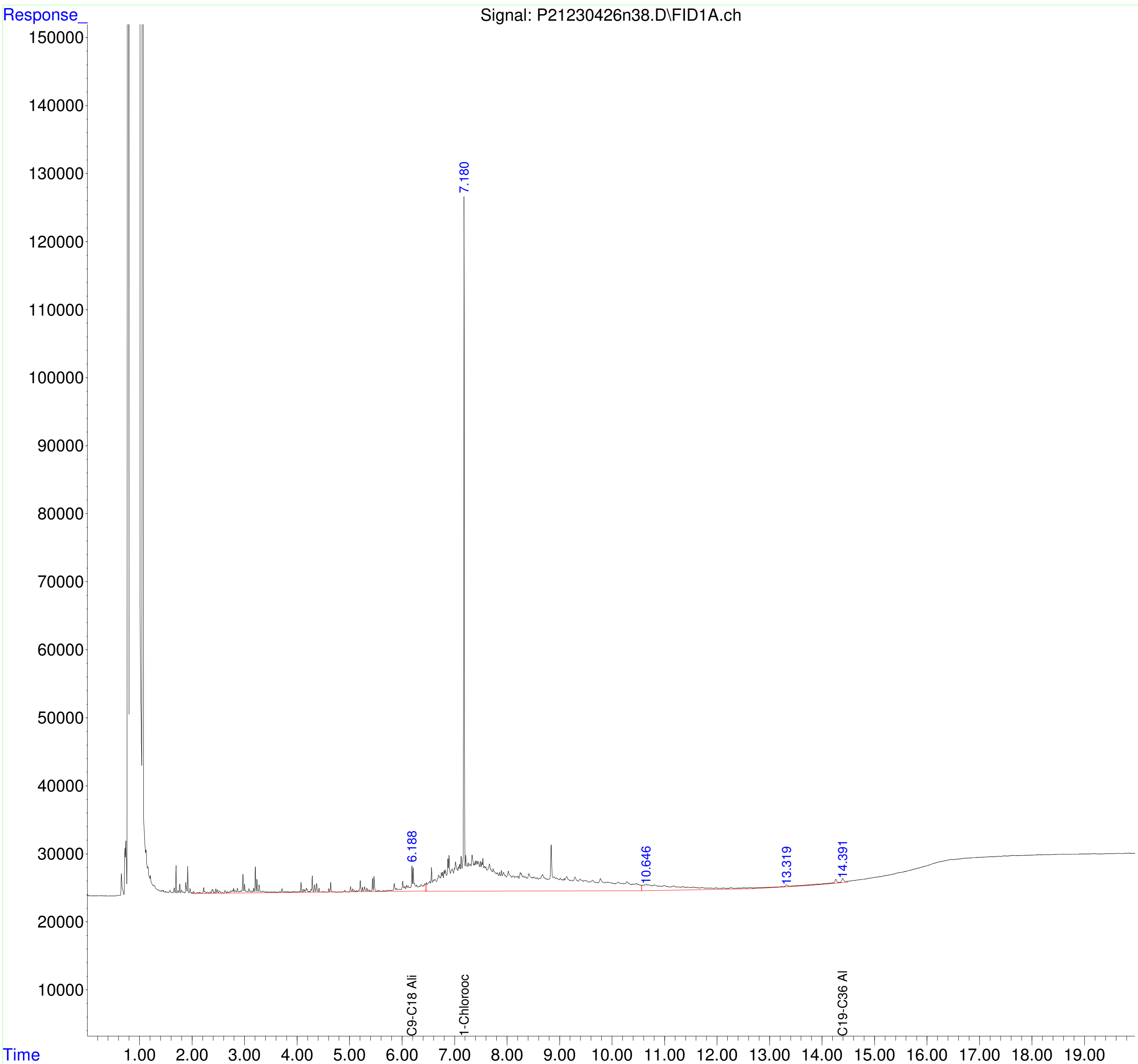
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n38.D
Signal(s) : FID1A.ch
Acq On : 27 Apr 2023 7:46 pm
Operator : Petro21a/b:all
Sample : L2322455-02,42,,
Misc :
ALS Vial : 19 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 28 15:13:39 2023
Quant Method : I:\PETRO\Petro21\2023\230426n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

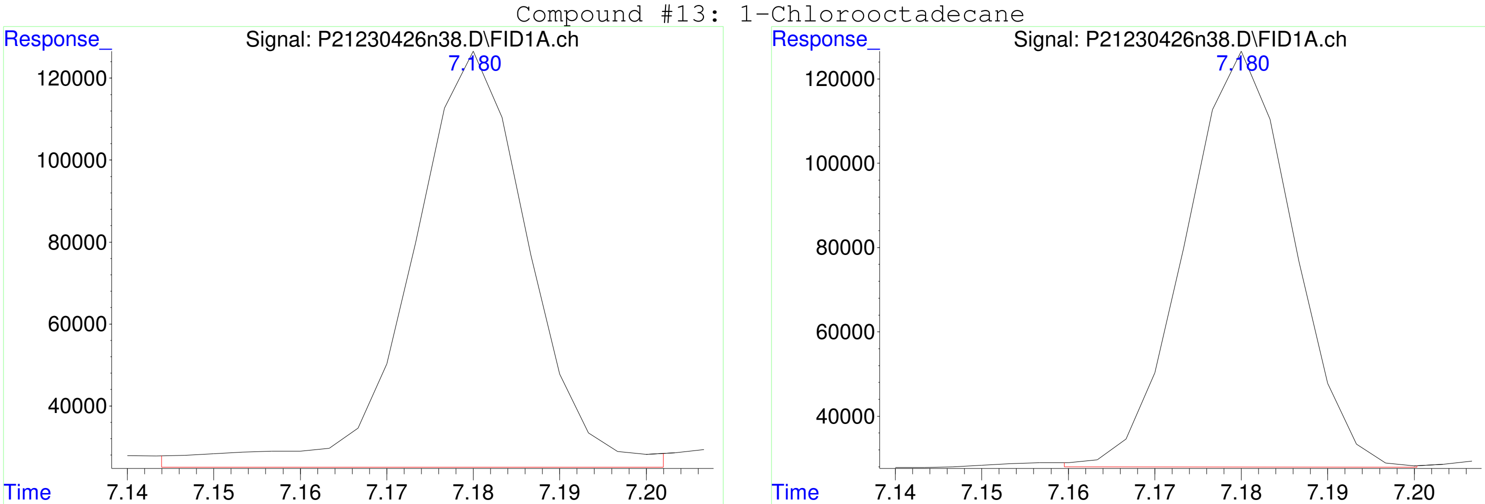
Volume Inj. :
Signal Phase :
Signal Info :



Manual Integration Report

```
Data Path   : I:\PETRO\Petro21\2023\230426n\       QMethod     : MAALI211129A.M
Data File   : P21230426n38.D                       Operator    : Petro21a/b:all
Date Inj'd  : 4/27/2023  7:46 pm                   Instrument  : Petro 21
Sample      : L2322455-02,42,,                     Quant Date  : 4/28/2023  3:08 pm
```

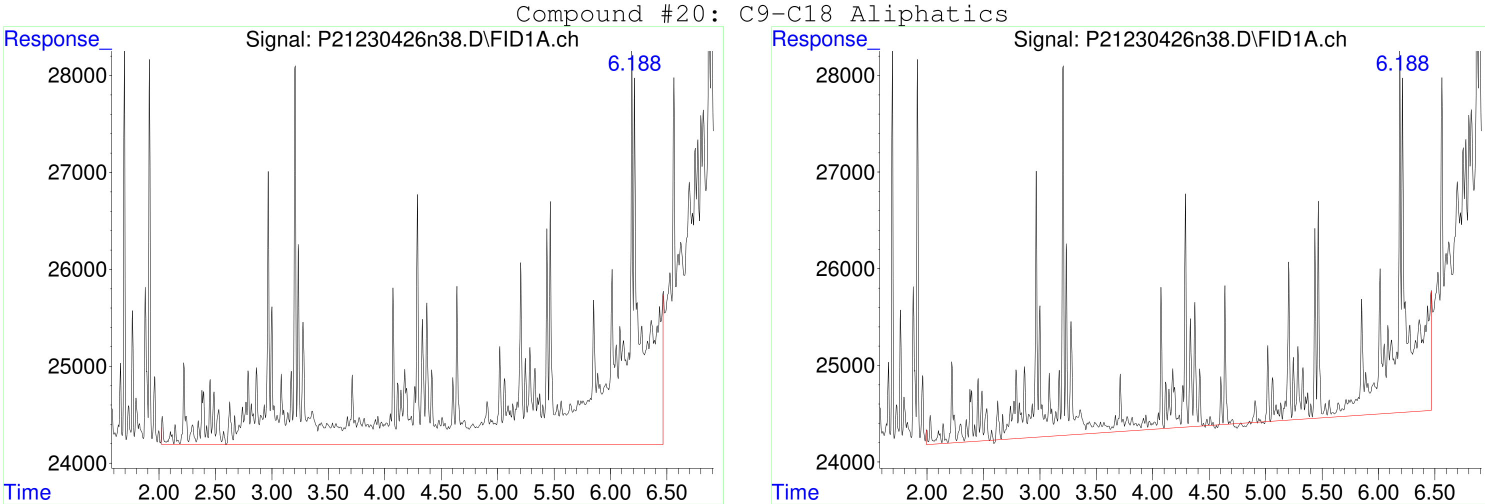
Compound #13: 1-Chlorooctadecane




Original Peak Response = 955337
M4 = Poor automated baseline construction.

Manual Peak Response = 850286 M4

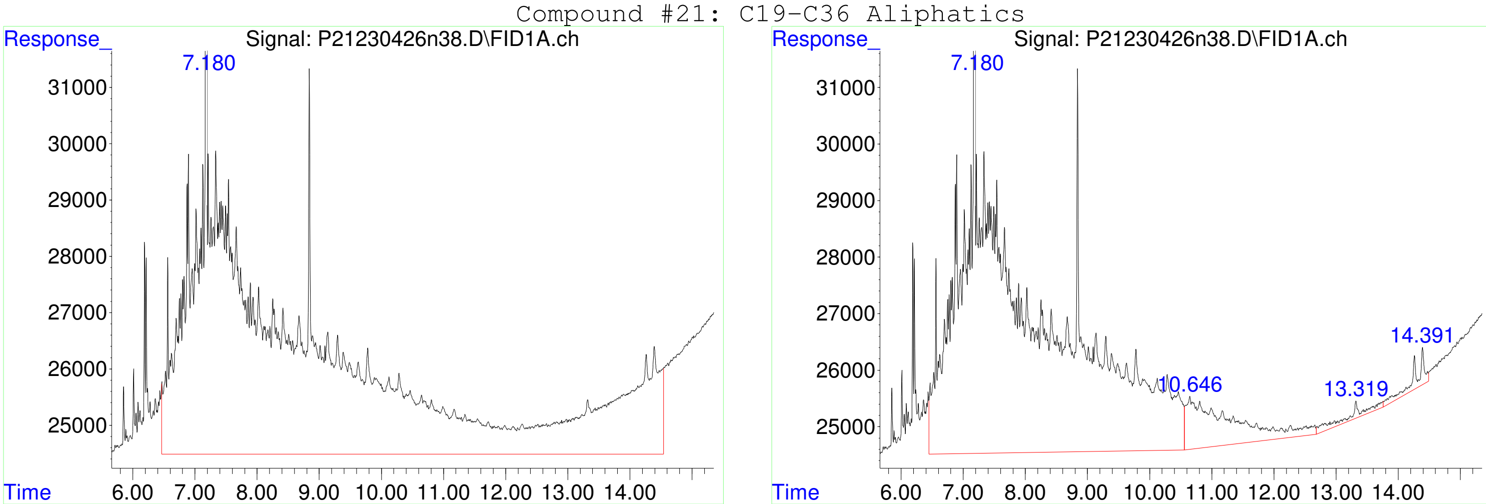
Compound #20: C9-C18 Aliphatics




Original Peak Response = 1225198
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Manual Peak Response = 788468 M5

Compound #21: C19-C36 Aliphatics




Original Peak Response = 7180682
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Manual Peak Response = 5797191 M5

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n39.D
Signal(s) : FID2B.ch
Acq On : 27 Apr 2023 8:11 pm
Operator : Petro21a/b:all
Sample : L2322455-03,42,,
Misc :
ALS Vial : 70 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 28 15:27:02 2023
Quant Method : I:\PETRO\Petro21\2023\230426N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| System Monitoring Compounds | | | | |
| 3) s 2-Fluorobiphenyl | 4.516 | 1212303 | 17.321 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 86.61% | |
| 5) s 2-Bromonaphthalene | 5.023 | 857166 | 17.391 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 86.95% | |
| 10) S o-terphenyl | 6.533 | 1278615 | 14.042 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 70.21% | |
| Target Compounds | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 12.354f | 1451410 | 17.362 mg/L | M5 |

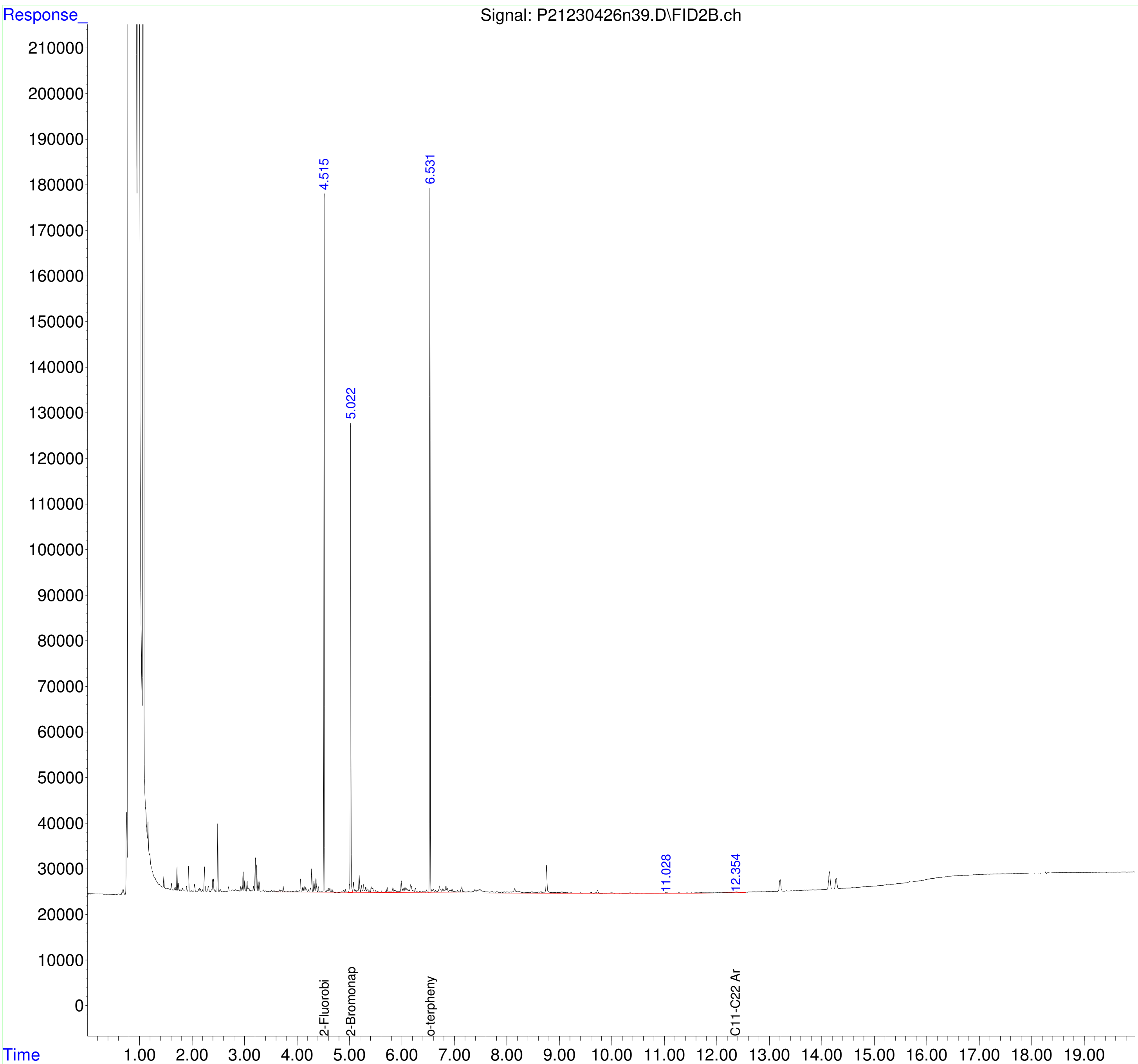
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n39.D
Signal(s) : FID2B.ch
Acq On    : 27 Apr 2023   8:11 pm
Operator  : Petro21a/b:all
Sample    : L2322455-03,42,,
Misc      :
ALS Vial  : 70   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 28 15:27:02 2023
Quant Method : I:\PETRO\Petro21\2023\230426N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

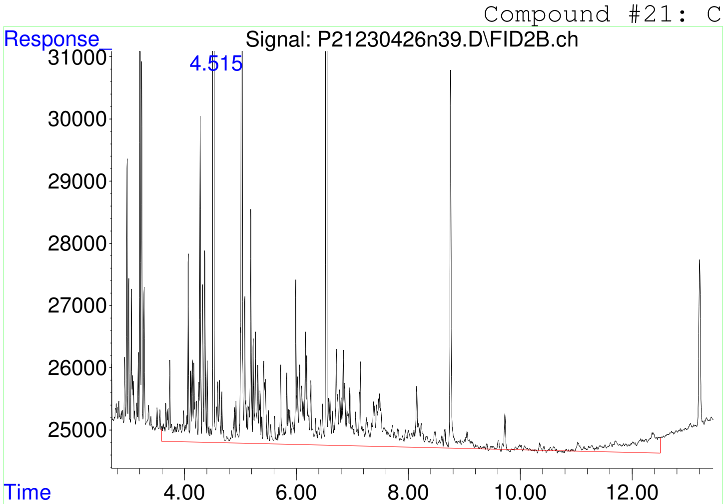
Volume Inj.  :
Signal Phase :
Signal Info  :

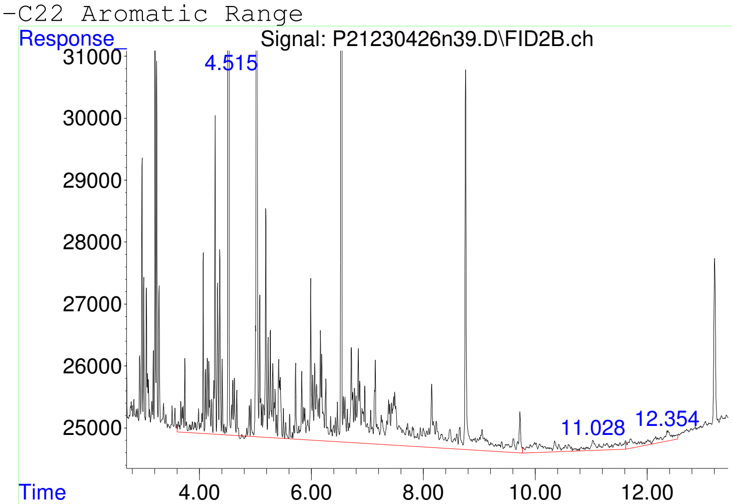


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230426N.SEC\ | QMethod | : MAARO211129B.M |
| Data File | : P21230426n39.D | Operator | : Petro21a/b:all |
| Date Inj'd | : 4/27/2023 8:11 pm | Instrument | : Petro 21 |
| Sample | : L2322455-03,42,, | Quant Date | : 4/28/2023 3:22 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 1507833

Manual Peak Response = 1451410 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n40.D
Signal(s) : FID1A.ch
Acq On : 27 Apr 2023 8:11 pm
Operator : Petro21a/b:all
Sample : L2322455-03,42,,
Misc :
ALS Vial : 20 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 28 15:14:22 2023
Quant Method : I:\PETRO\Petro21\2023\230426n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.180 | 774720 | 12.452 | mg/L | M4 |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 62.26% | | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 3.205f | 1536730 | 21.472 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.263f | 5772465 | 83.814 | mg/L | M5 |

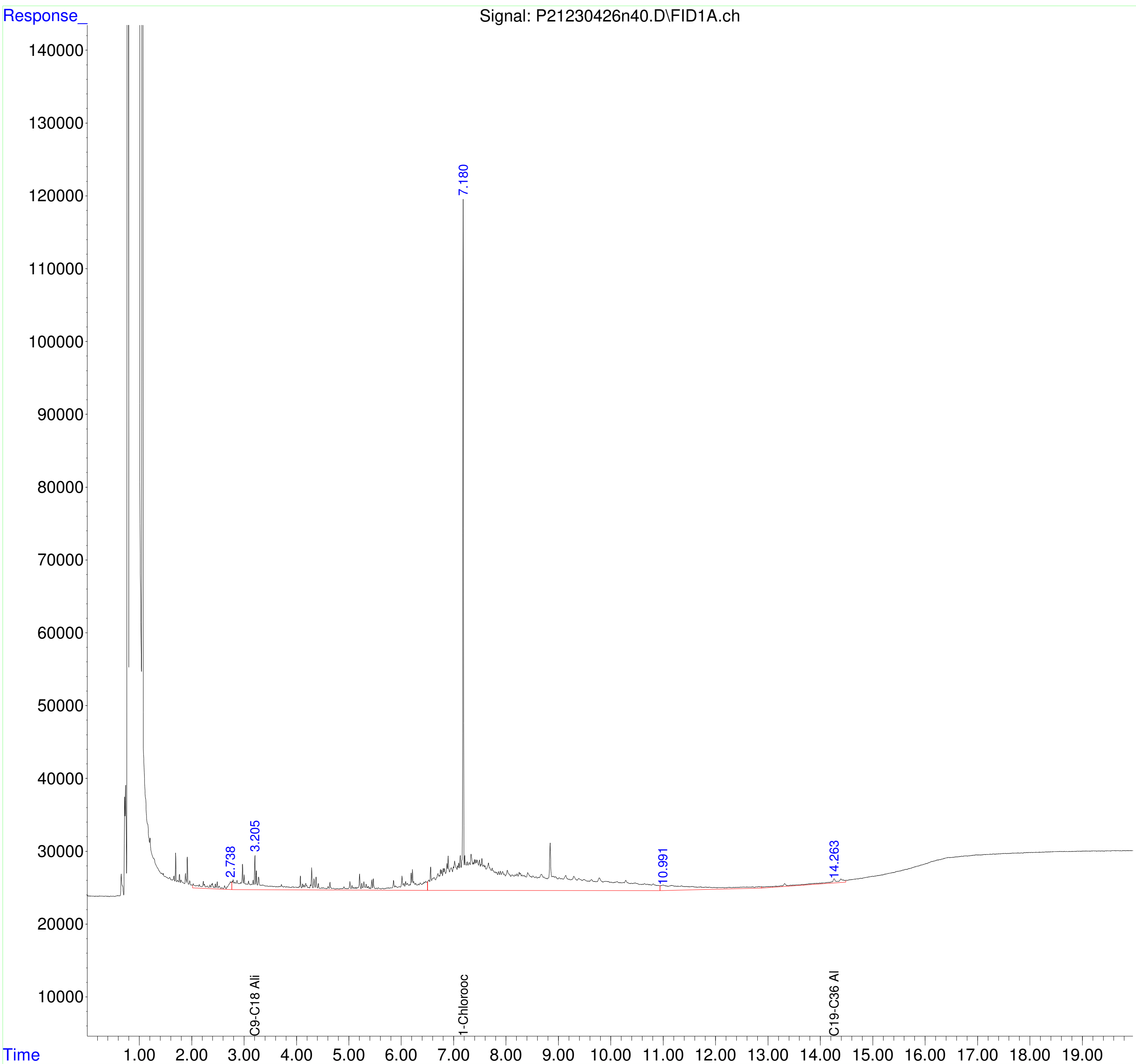
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n40.D
Signal(s) : FID1A.ch
Acq On    : 27 Apr 2023   8:11 pm
Operator  : Petro21a/b:all
Sample    : L2322455-03,42,,
Misc      :
ALS Vial  : 20   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 28 15:14:22 2023
Quant Method : I:\PETRO\Petro21\2023\230426n\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

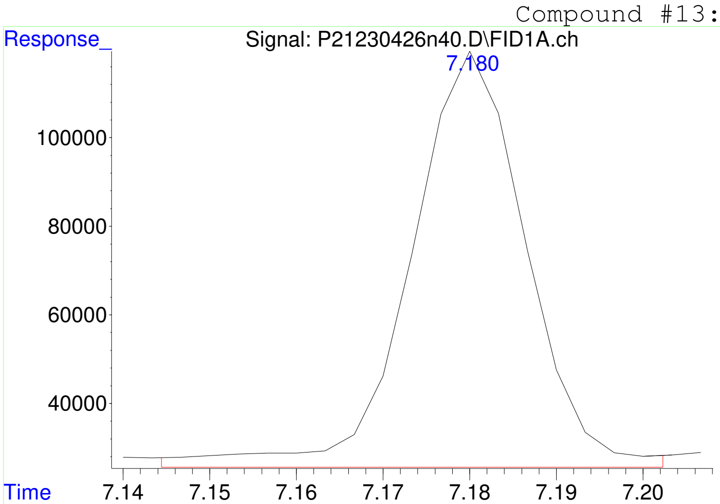
Volume Inj.  :
Signal Phase :
Signal Info  :

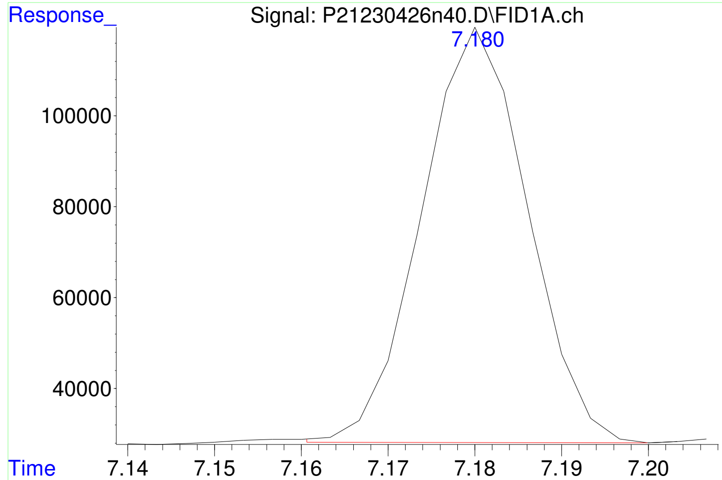


# Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230426n\ | QMethod | : MAALI211129A.M |
| Data File | : P21230426n40.D | Operator | : Petro21a/b:all |
| Date Inj'd | : 4/27/2023 8:11 pm | Instrument | : Petro 21 |
| Sample | : L2322455-03,42,, | Quant Date | : 4/28/2023 3:08 pm |

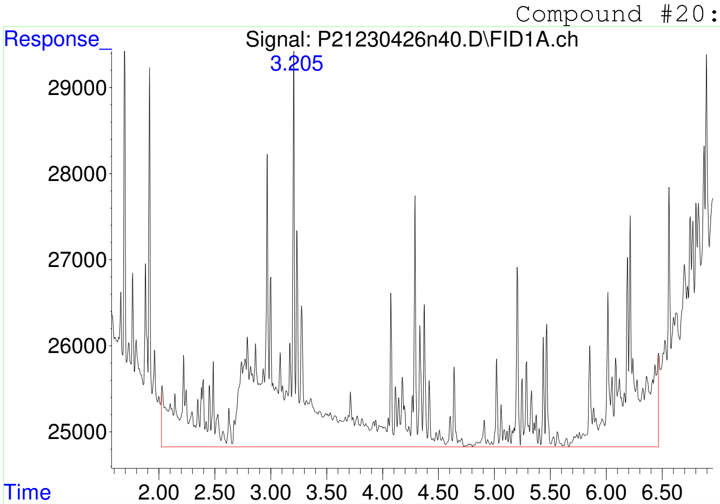
Compound #13: 1-Chlorooctadecane

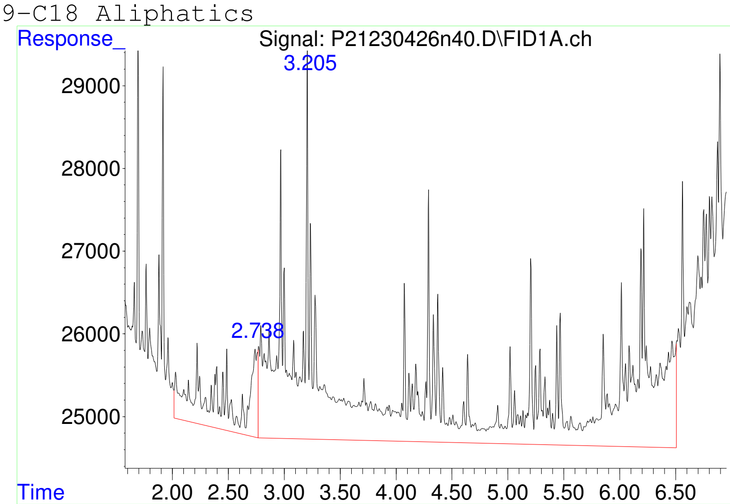



Original Peak Response = 864196
Manual Peak Response = 774720 M4
M4 = Poor automated baseline construction.

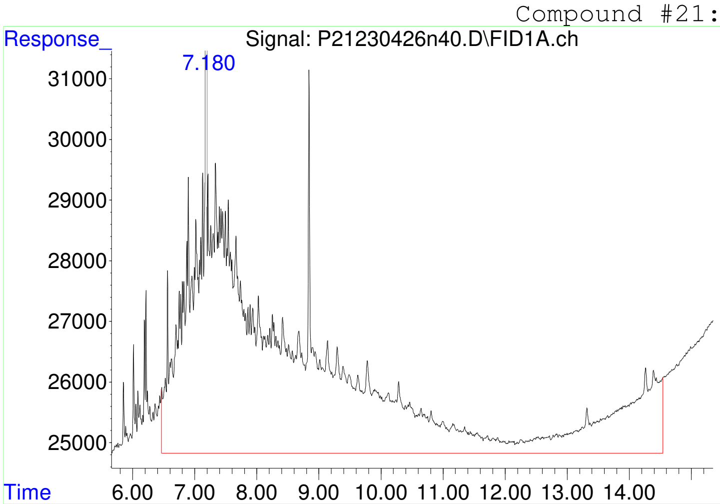
Compound #20: C9-C18 Aliphatics

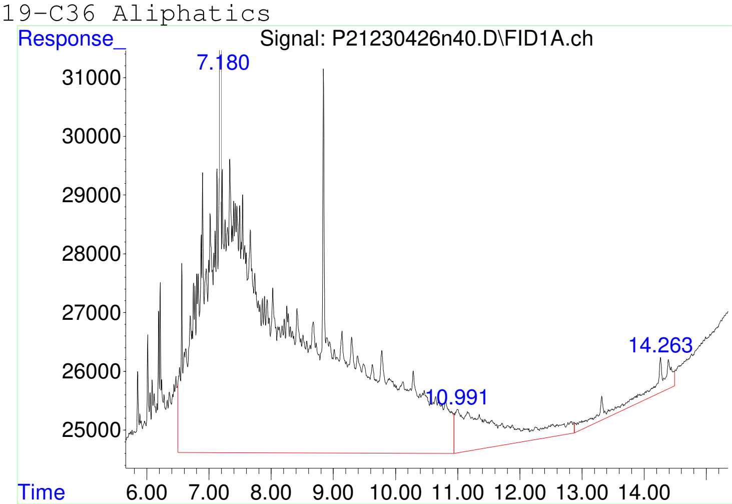



Original Peak Response = 1200196
Manual Peak Response = 1536730 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 5678513
Manual Peak Response = 5772465 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n41.D
Signal(s) : FID2B.ch
Acq On : 27 Apr 2023 8:36 pm
Operator : Petro21a/b:all
Sample : L2322455-09,42,,
Misc :
ALS Vial : 71 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 28 15:27:27 2023
Quant Method : I:\PETRO\Petro21\2023\230426N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.516 | 1002277 | 14.321 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 71.60% | | |
| 5) s 2-Bromonaphthalene | 5.023 | 700334 | 14.209 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 71.05% | | |
| 10) S o-terphenyl | 6.533 | 1008779 | 11.079 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 55.40% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 12.386f | 1227274 | 14.681 mg/L | M5 |

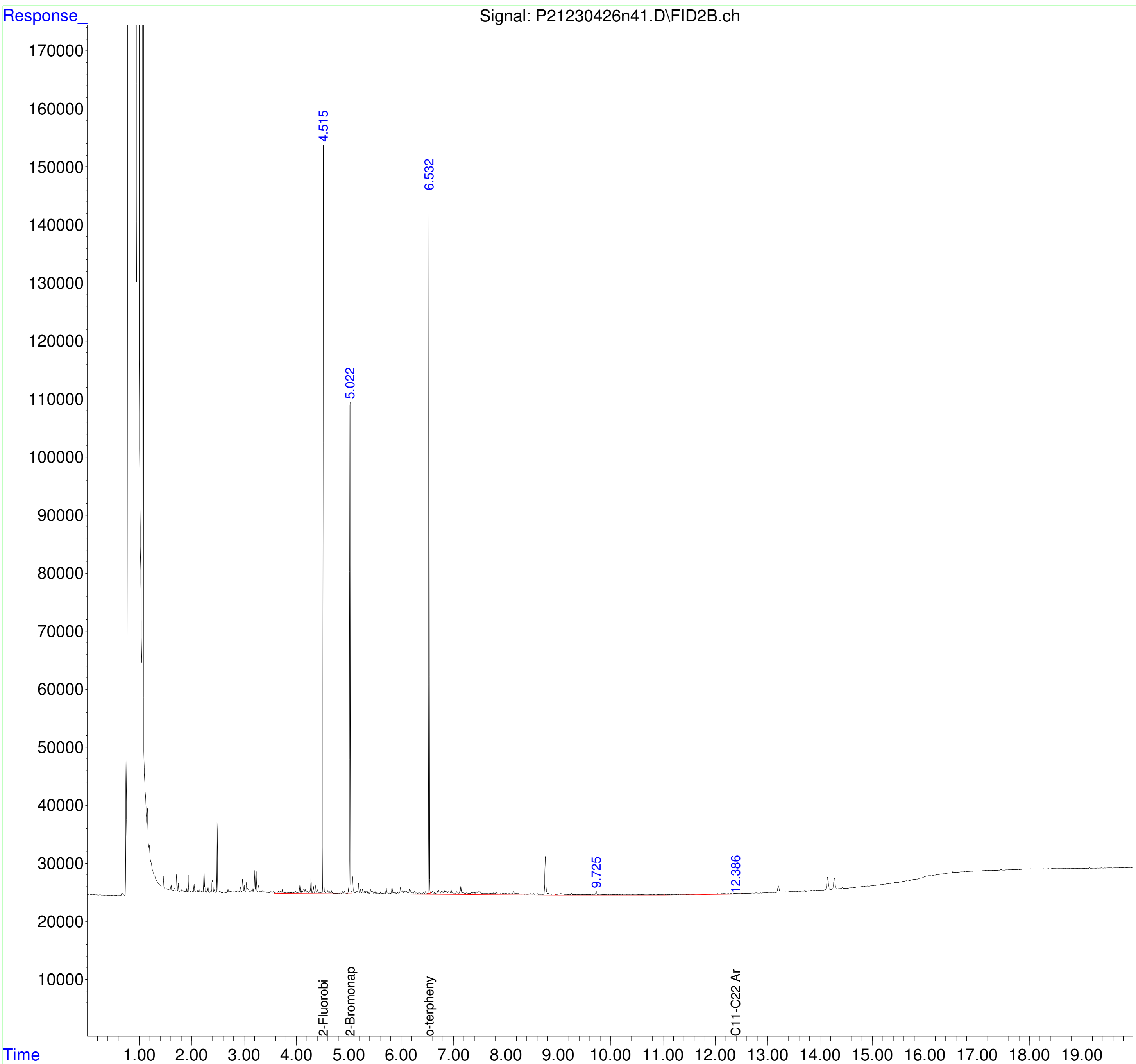
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n41.D
Signal(s) : FID2B.ch
Acq On    : 27 Apr 2023   8:36 pm
Operator  : Petro21a/b:all
Sample    : L2322455-09,42,,
Misc      :
ALS Vial  : 71   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 28 15:27:27 2023
Quant Method : I:\PETRO\Petro21\2023\230426N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

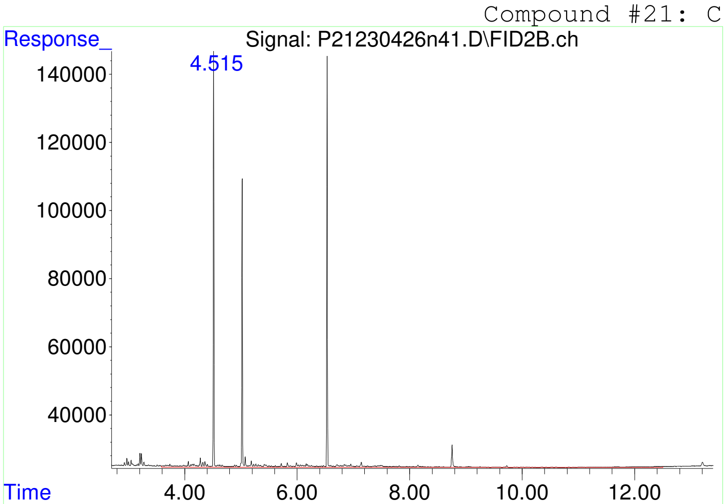


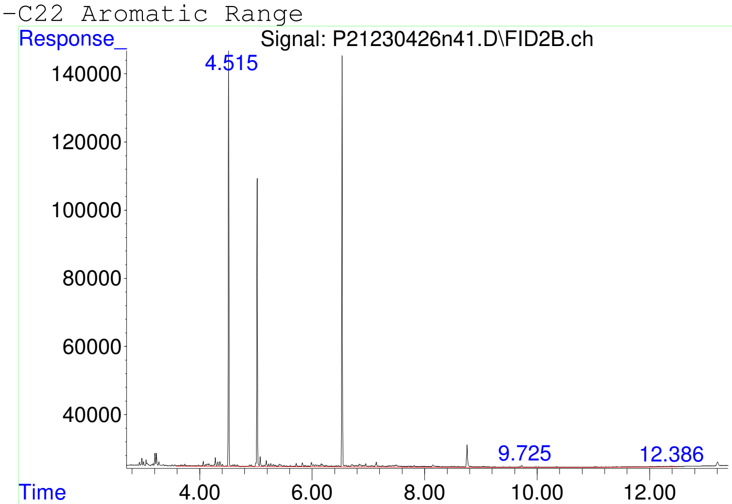
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n41.D
Date Inj'd : 4/27/2023 8:36 pm
Sample : L2322455-09,42,,

QMethod : MAARO211129B.M
Operator : Petro21a/b:all
Instrument : Petro 21
Quant Date : 4/28/2023 3:22 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 1345609

Manual Peak Response = 1227274 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n42.D
Signal(s) : FID1A.ch
Acq On : 27 Apr 2023 8:36 pm
Operator : Petro21a/b:all
Sample : L2322455-09,42,,
Misc :
ALS Vial : 21 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 28 15:15:00 2023
Quant Method : I:\PETRO\Petro21\2023\230426n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | | |
| 3) | S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) | S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) | S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) | S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) | S | 1-Chlorooctadecane | 7.180 | 799824 | 12.855 | mg/L | M4 |
| Spiked Amount 20.000 | | Range 40 - 140 | | Recovery = 64.28% | | | |
| Target Compounds | | | | | | | |
| 1) | | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) | H | C9-C18 Aliphatics | 3.206f | 850779 | 11.888 | mg/L | M5 |
| 21) | H | C19-C36 Aliphatics | 14.263f | 5698075 | 82.734 | mg/L | M5 |

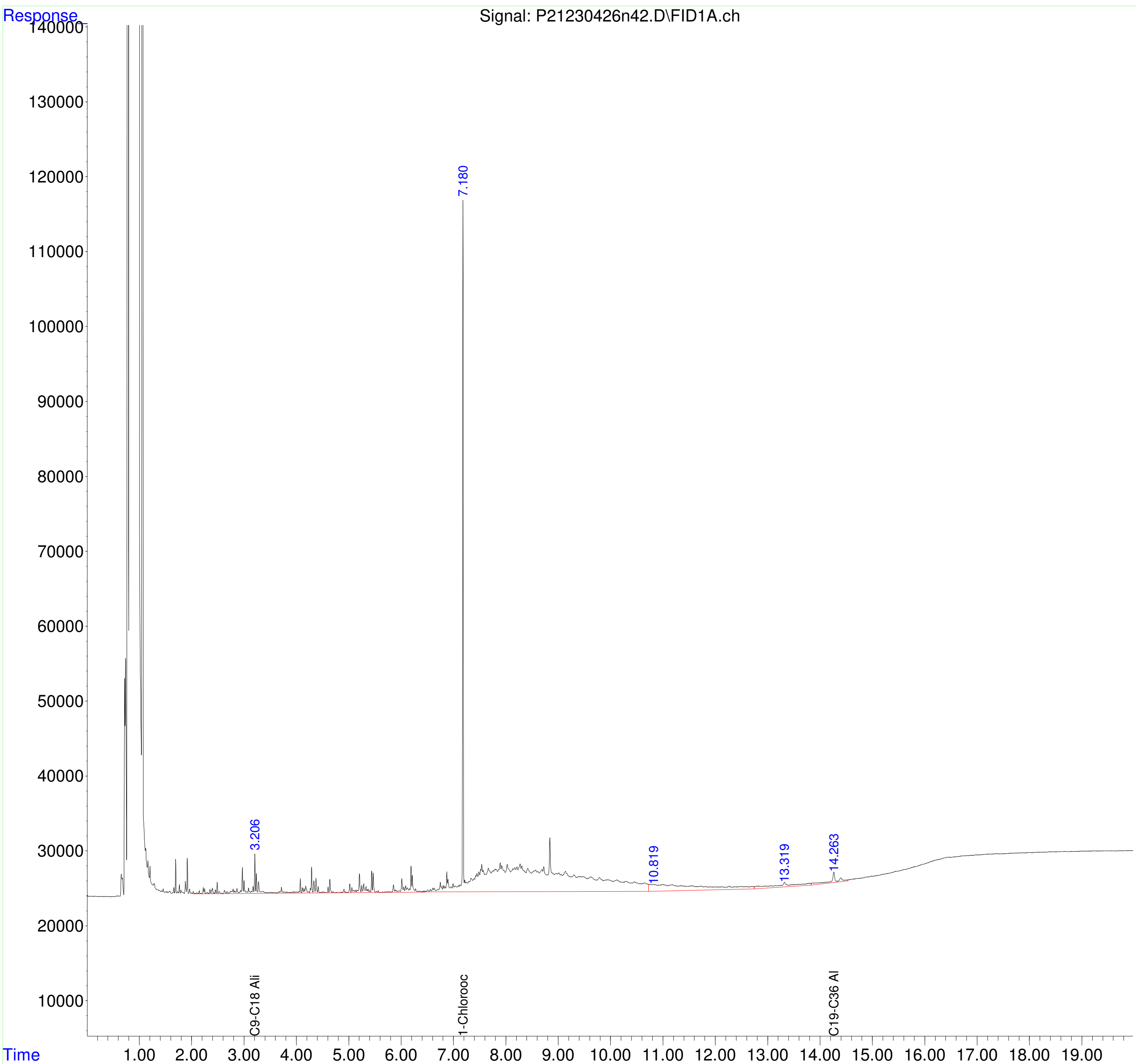
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n42.D
Signal(s) : FID1A.ch
Acq On    : 27 Apr 2023   8:36 pm
Operator  : Petro21a/b:all
Sample    : L2322455-09,42,,
Misc      :
ALS Vial  : 21   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 28 15:15:00 2023
Quant Method : I:\PETRO\Petro21\2023\230426n\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

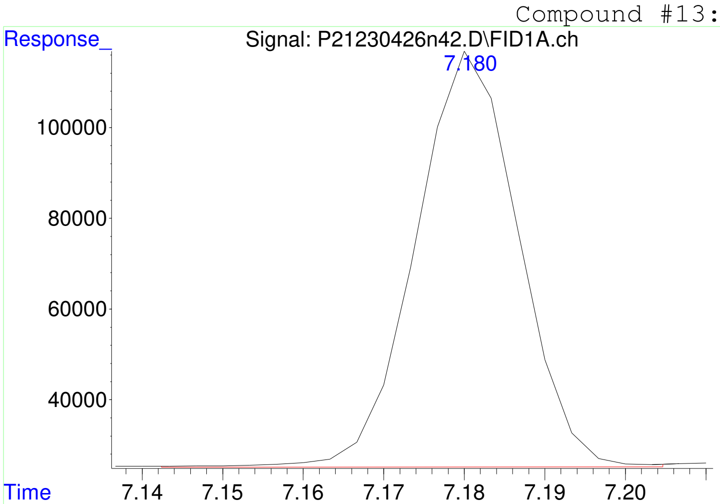


Manual Integration Report

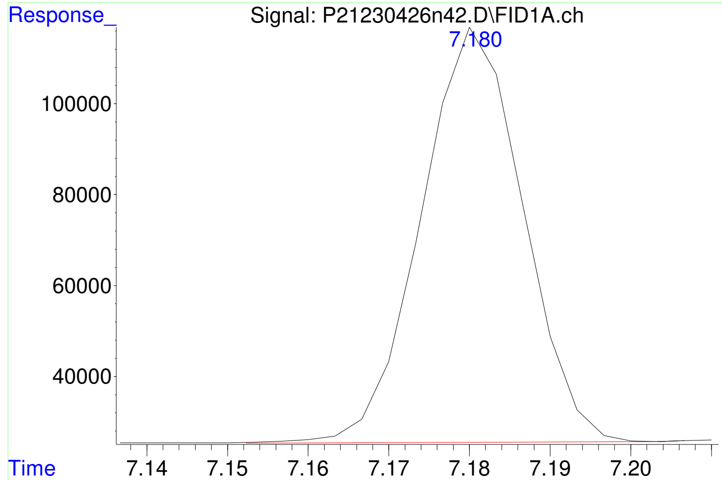
Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n42.D
Date Inj'd : 4/27/2023 8:36 pm
Sample : L2322455-09,42,,

QMethod : MAALI211129A.M
Operator : Petro21a/b:all
Instrument : Petro 21
Quant Date : 4/28/2023 3:08 pm

Compound #13: 1-Chlorooctadecane

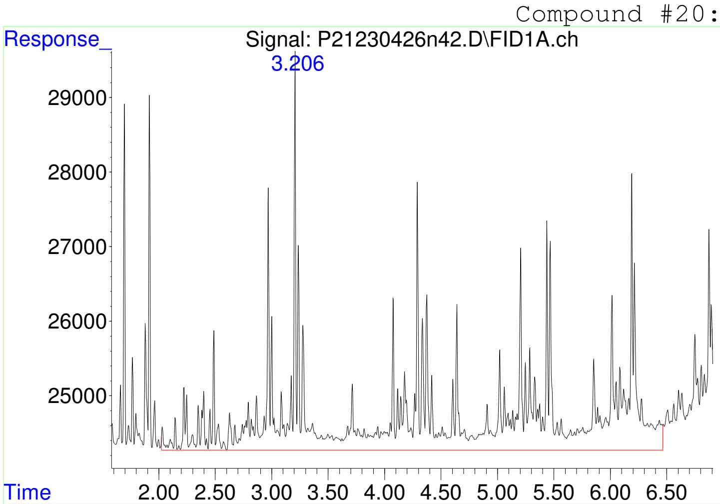



Original Peak Response = 812071
M4 = Poor automated baseline construction.

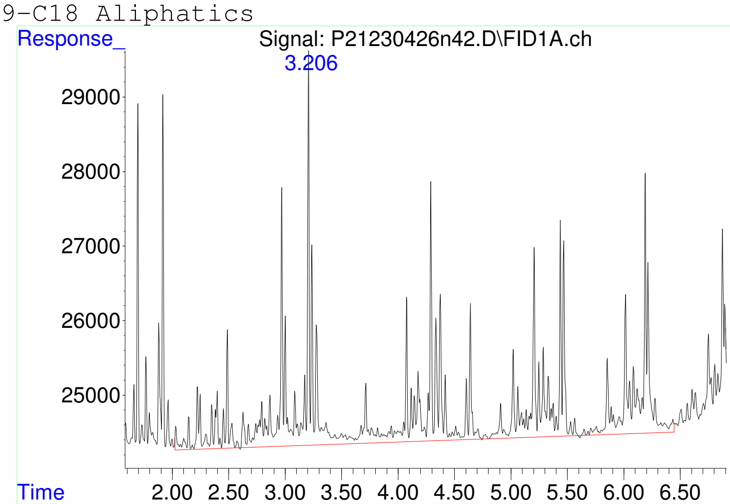



Manual Peak Response = 799824 M4

Compound #20: C9-C18 Aliphatics

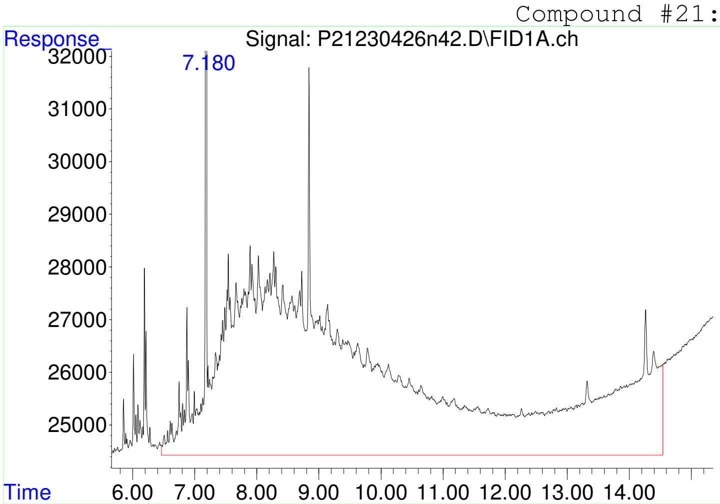



Original Peak Response = 1145014
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

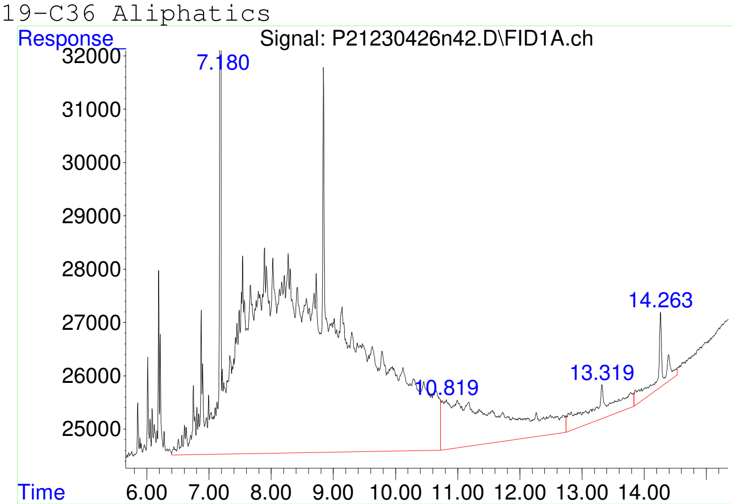



Manual Peak Response = 850779 M5

Compound #21: C19-C36 Aliphatics




Original Peak Response = 7498990
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.




Manual Peak Response = 5698075 M5

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n43.D
Signal(s) : FID2B.ch
Acq On : 27 Apr 2023 9:01 pm
Operator : Petro21a/b:all
Sample : L2322455-10,42,,
Misc :
ALS Vial : 72 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 28 15:27:57 2023
Quant Method : I:\PETRO\Petro21\2023\230426N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.516 | 1163614 | 16.626 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 83.13% | | |
| 5) s 2-Bromonaphthalene | 5.023 | 820516 | 16.648 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 83.24% | | |
| 10) S o-terphenyl | 6.532 | 1213322 | 13.325 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 66.63% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 12.365f | 1139512 | 13.631 mg/L | M5 |

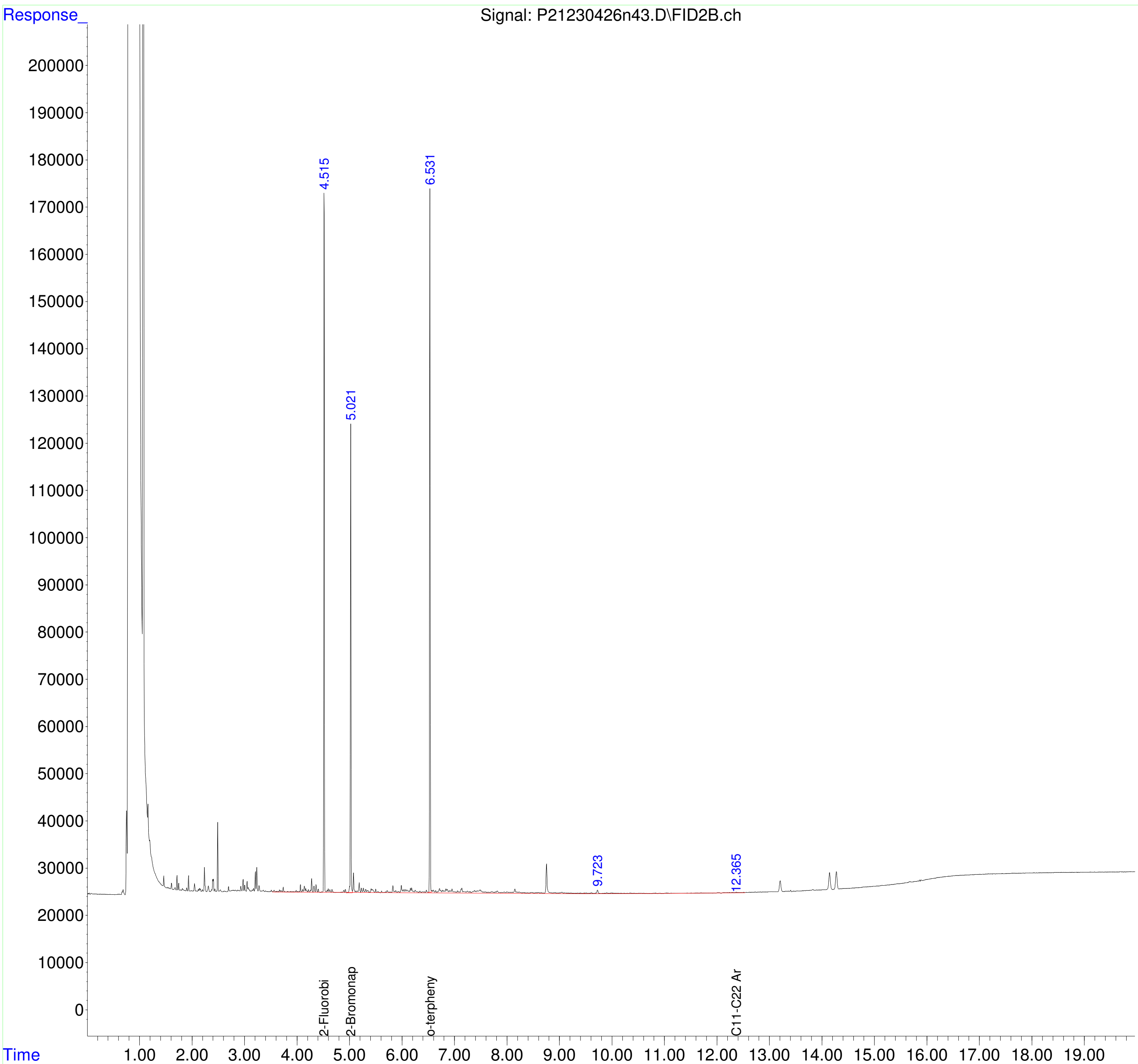
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n43.D
Signal(s) : FID2B.ch
Acq On    : 27 Apr 2023   9:01 pm
Operator  : Petro21a/b:all
Sample    : L2322455-10,42,,
Misc      :
ALS Vial  : 72   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 28 15:27:57 2023
Quant Method : I:\PETRO\Petro21\2023\230426N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

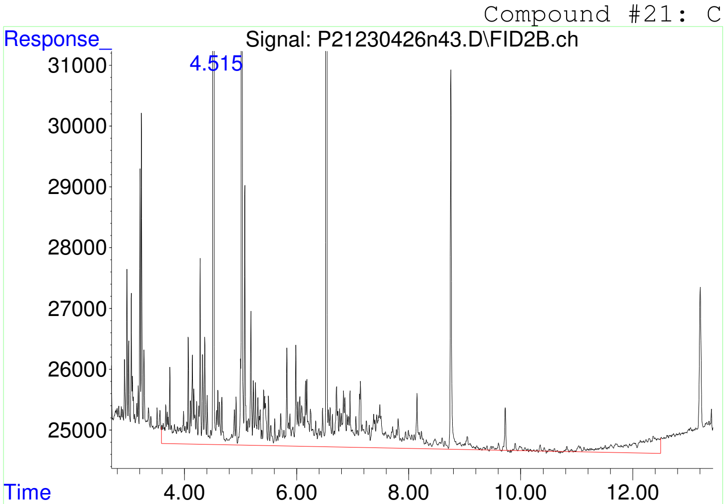


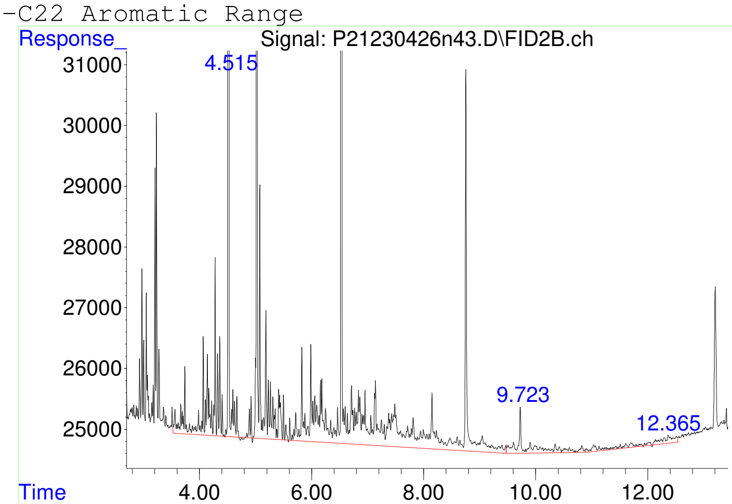
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n43.D
Date Inj'd : 4/27/2023 9:01 pm
Sample : L2322455-10,42,,

QMethod : MAARO211129B.M
Operator : Petro21a/b:all
Instrument : Petro 21
Quant Date : 4/28/2023 3:22 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 1300690

Manual Peak Response = 1139512 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n44.D
Signal(s) : FID1A.ch
Acq On : 27 Apr 2023 9:01 pm
Operator : Petro21a/b:all
Sample : L2322455-10,42,,
Misc :
ALS Vial : 22 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 28 15:16:06 2023
Quant Method : I:\PETRO\Petro21\2023\230426n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | | |
| 3) | S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) | S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) | S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) | S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) | S | 1-Chlorooctadecane | 7.180 | 792546 | 12.738 | mg/L | M4 |
| Spiked Amount 20.000 | | Range 40 - 140 | | Recovery = 63.69% | | | |
| Target Compounds | | | | | | | |
| 1) | | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) | H | C9-C18 Aliphatics | 3.205f | 933720 | 13.047 | mg/L | M5 |
| 21) | H | C19-C36 Aliphatics | 14.261f | 5384072 | 78.174 | mg/L | M5 |

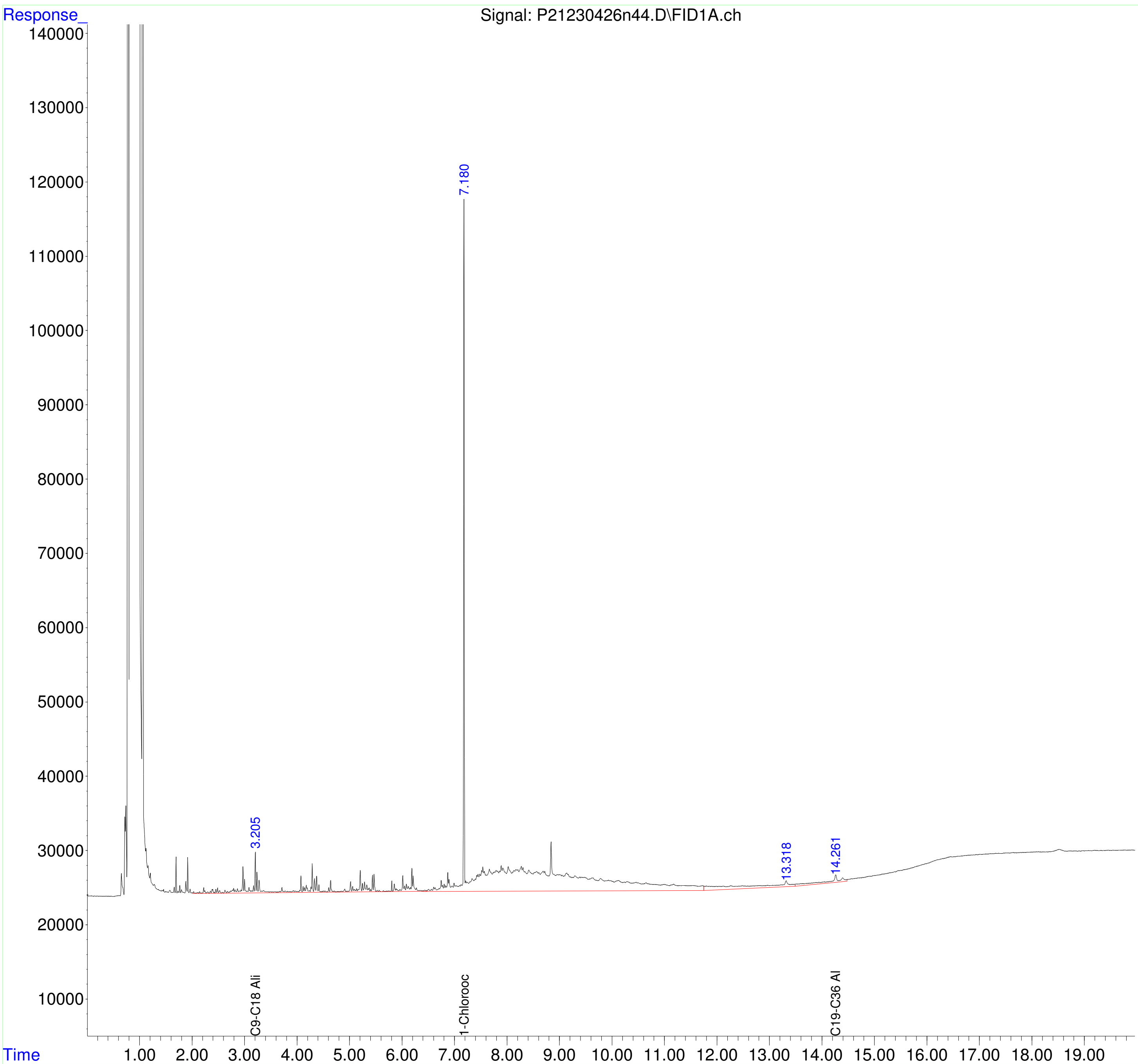
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n44.D
Signal(s) : FID1A.ch
Acq On    : 27 Apr 2023   9:01 pm
Operator  : Petro21a/b:all
Sample    : L2322455-10,42,,
Misc      :
ALS Vial  : 22   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 28 15:16:06 2023
Quant Method : I:\PETRO\Petro21\2023\230426n\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

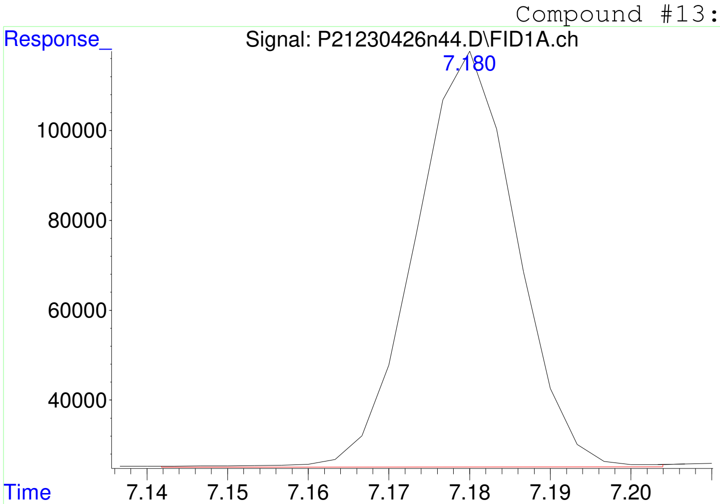
Volume Inj.  :
Signal Phase :
Signal Info  :



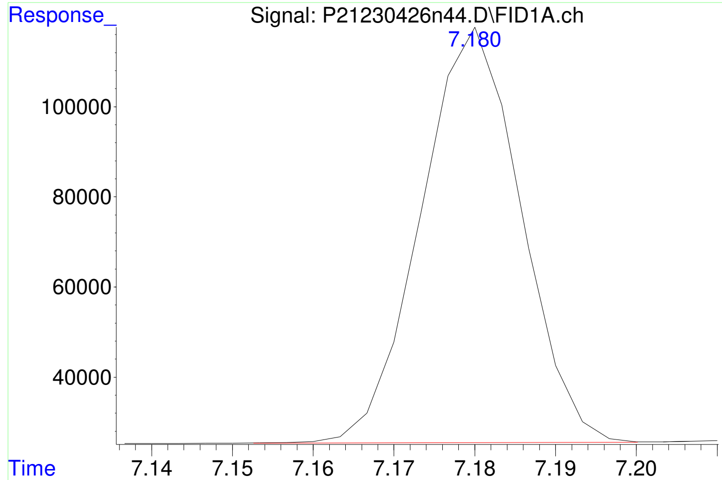
Manual Integration Report

```
Data Path    : I:\PETRO\Petro21\2023\230426n\       QMethod      : MAALI211129A.M
Data File    : P21230426n44.D                       Operator     : Petro21a/b:all
Date Inj'd   : 4/27/2023  9:01 pm                   Instrument   : Petro 21
Sample       : L2322455-10,42,,                     Quant Date   : 4/28/2023  3:08 pm
```

Compound #13: 1-Chlorooctadecane

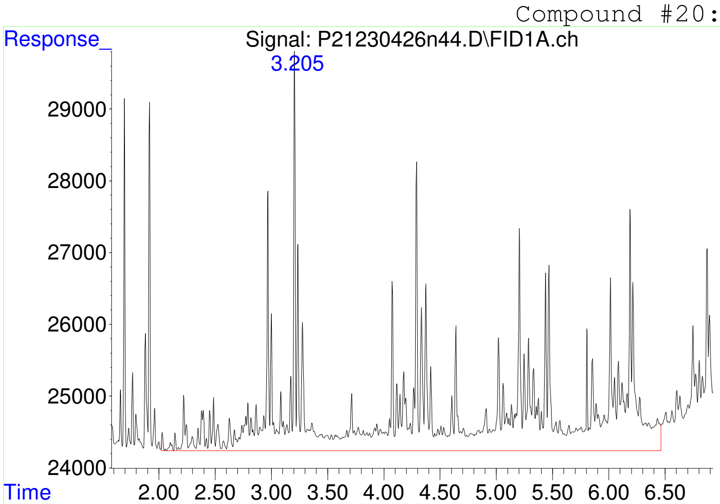



Original Peak Response = 805163
M4 = Poor automated baseline construction.

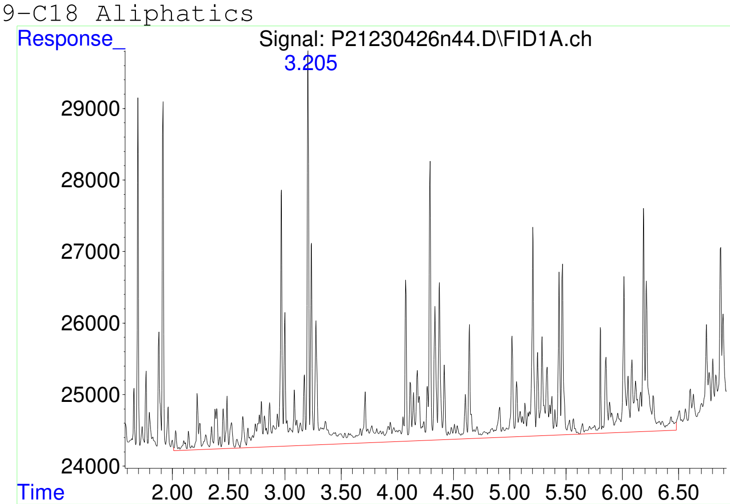



Manual Peak Response = 792546 M4

Compound #20: C9-C18 Aliphatics

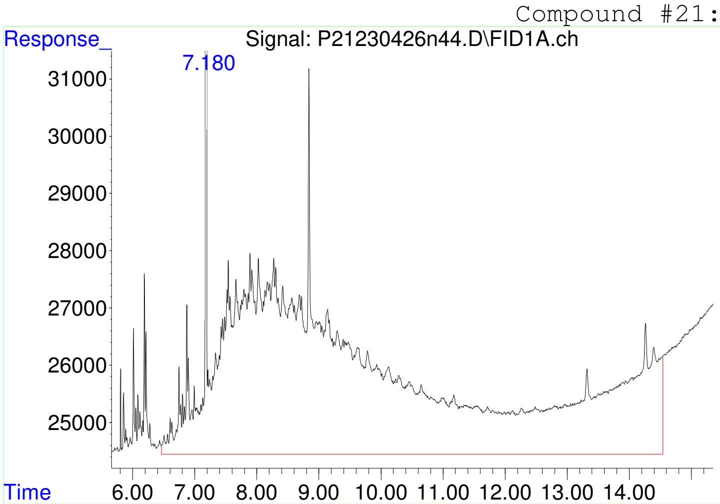



Original Peak Response = 1253526
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

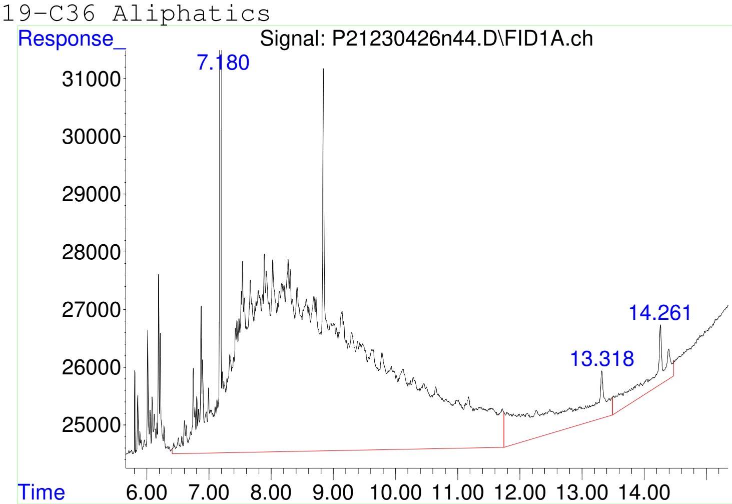



Manual Peak Response = 933720 M5

Compound #21: C19-C36 Aliphatics




Original Peak Response = 6876878
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.




Manual Peak Response = 5384072 M5

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n45.D
Signal(s) : FID2B.ch
Acq On : 27 Apr 2023 9:25 pm
Operator : Petro21a/b:all
Sample : L2322455-11,42,,
Misc :
ALS Vial : 73 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 28 15:28:30 2023
Quant Method : I:\PETRO\Petro21\2023\230426N.SEC\MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.516 | 1020387 | 14.579 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 72.89% | |
| 5) s 2-Bromonaphthalene | 5.023 | 717047 | 14.548 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 72.74% | |
| 10) S o-terphenyl | 6.533 | 1024445 | 11.251 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 56.26% | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 12.382f | 1083609 | 12.962 mg/L | M5 |

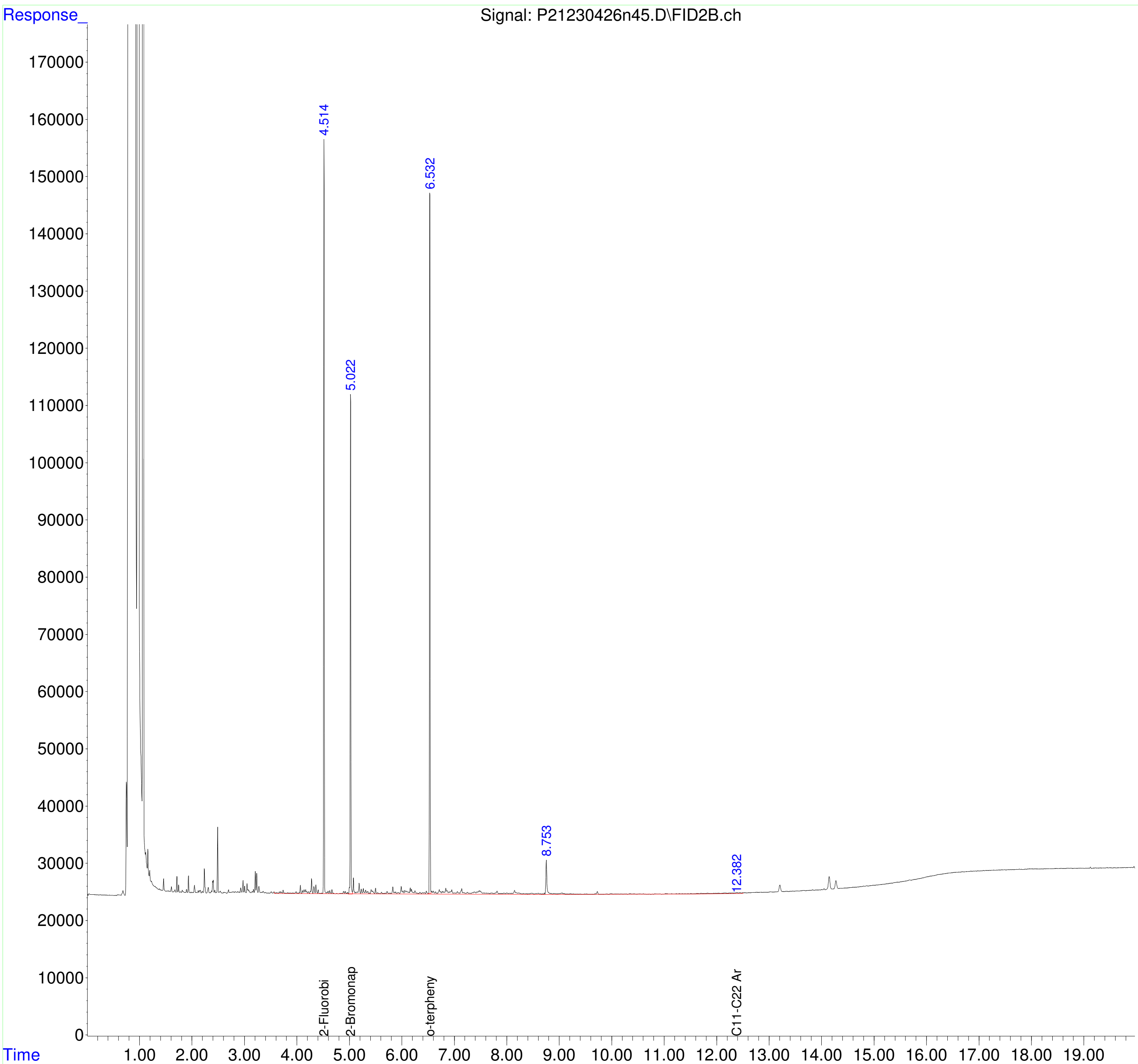
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n45.D
Signal(s) : FID2B.ch
Acq On    : 27 Apr 2023   9:25 pm
Operator  : Petro21a/b:all
Sample    : L2322455-11,42,,
Misc      :
ALS Vial  : 73   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Apr 28 15:28:30 2023
Quant Method : I:\PETRO\Petro21\2023\230426N.SEC\MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

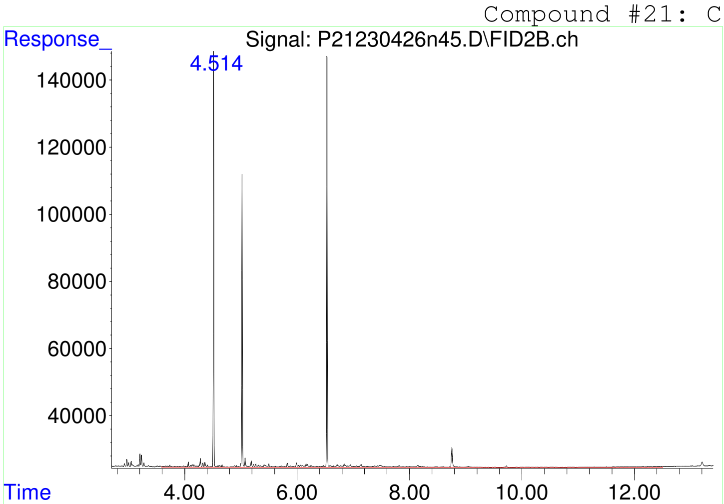


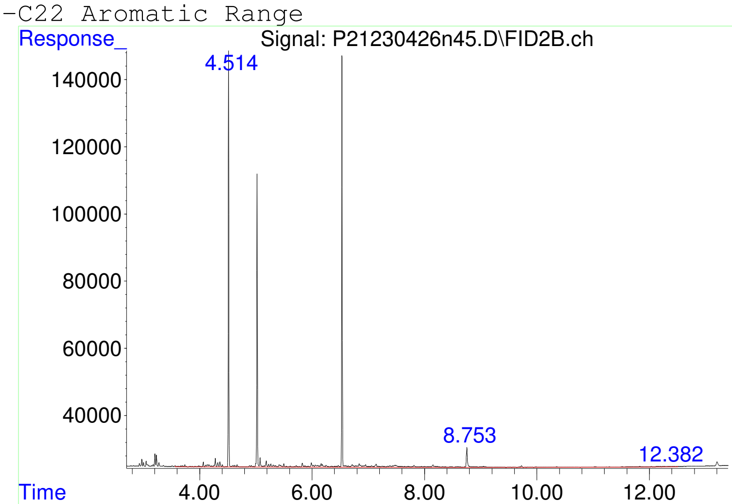
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230426N.SEC\
Data File : P21230426n45.D
Date Inj'd : 4/27/2023 9:25 pm
Sample : L2322455-11,42,,

QMethod : MAARO211129B.M
Operator : Petro21a/b:all
Instrument : Petro 21
Quant Date : 4/28/2023 3:22 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 1183379

Manual Peak Response = 1083609 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n46.D
Signal(s) : FID1A.ch
Acq On : 27 Apr 2023 9:25 pm
Operator : Petro21a/b:all
Sample : L2322455-11,42,,
Misc :
ALS Vial : 23 Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 28 15:16:40 2023
Quant Method : I:\PETRO\Petro21\2023\230426n\MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) S Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 5) S 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) S 2-Fluorobiphenyl | 0.000 | 0 | N.D. mg/kg | d |
| 8) S 2-Bromonaphthalene | 0.000 | 0 | N.D. mg/kg | d |
| 13) S 1-Chlorooctadecane | 7.181 | 778988 | 12.520 mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | Recovery = | 62.60% | |
| **Target Compounds** | | | | |
| 1) Nonane (C9) | 0.000 | 0 | N.D. mg/L | d |
| 2) Decane (C10) | 0.000 | 0 | N.D. mg/L | d |
| 4) Dodecane (C12) | 0.000 | 0 | N.D. mg/L | d |
| 7) Tetradecane (C14) | 0.000 | 0 | N.D. mg/L | d |
| 9) Hexadecane (C16) | 0.000 | 0 | N.D. mg/L | d |
| 10) Octadecane (C18) | 0.000 | 0 | N.D. mg/L | d |
| 11) Nonadecane (c19) | 0.000 | 0 | N.D. mg/kg | d |
| 12) Eicosane (C20) | 0.000 | 0 | N.D. mg/L | d |
| 14) Docosane (C22) | 0.000 | 0 | N.D. mg/L | d |
| 15) Tetracosane (C24) | 0.000 | 0 | N.D. mg/L | d |
| 16) Hexacosane (C26) | 0.000 | 0 | N.D. mg/L | d |
| 17) Octacosane (C28) | 0.000 | 0 | N.D. mg/L | d |
| 18) Triacontane (C30) | 0.000 | 0 | N.D. mg/L | d |
| 19) Hexatriacontane (C36) | 0.000 | 0 | N.D. mg/L | d |
| 20) H C9-C18 Aliphatics | 3.205f | 1188865 | 16.612 mg/L | M5 |
| 21) H C19-C36 Aliphatics | 14.259f | 5711916 | 82.935 mg/L | M5 |

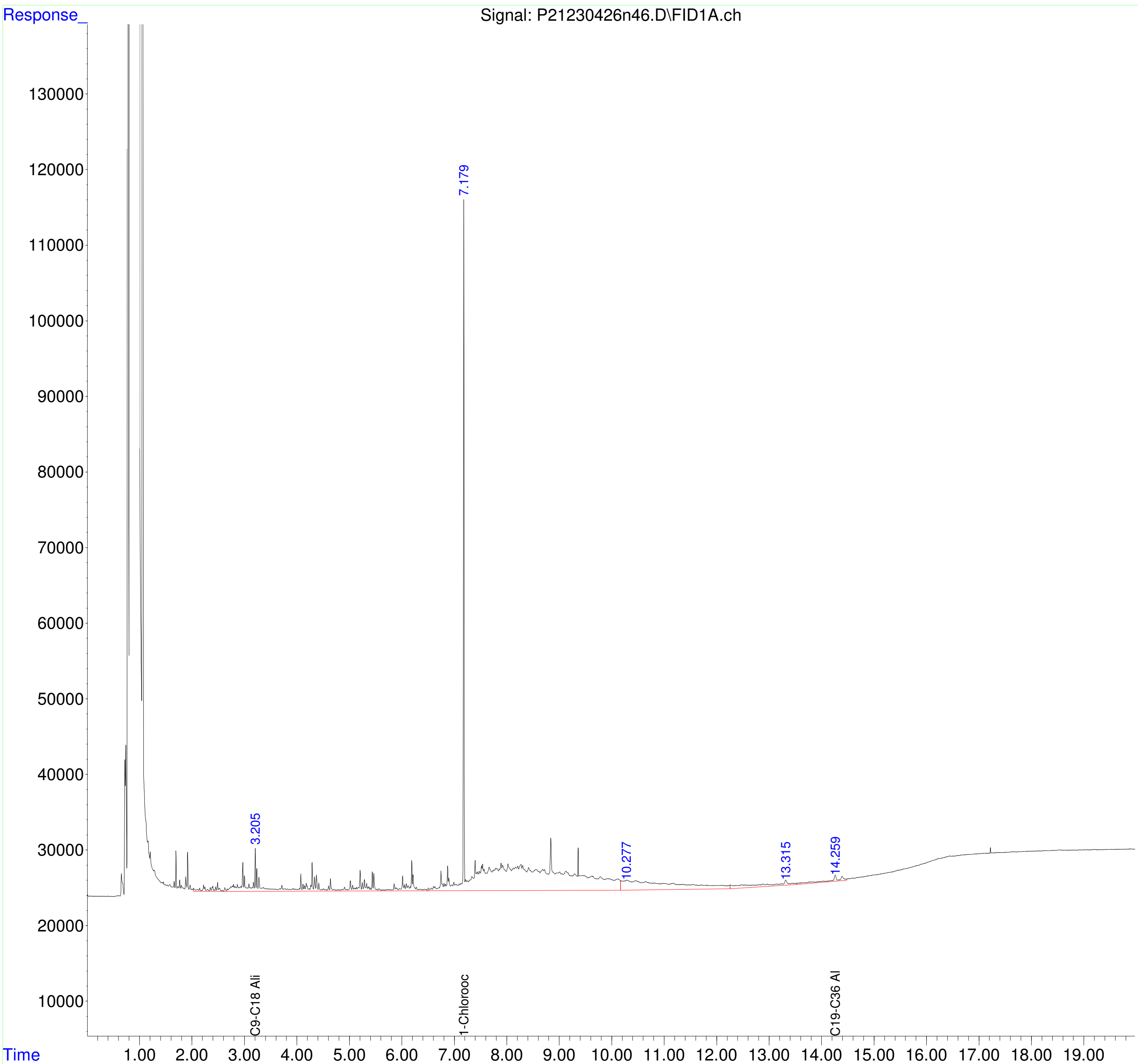
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230426n\
Data File : P21230426n46.D
Signal(s) : FID1A.ch
Acq On    : 27 Apr 2023   9:25 pm
Operator  : Petro21a/b:all
Sample    : L2322455-11,42,,
Misc      :
ALS Vial  : 23   Sample Multiplier: 1

Integration File: events.e
Quant Time: Apr 28 15:16:40 2023
Quant Method : I:\PETRO\Petro21\2023\230426n\MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 20 09:17:13 2023
Response via : Initial Calibration
Integrator: ChemStation

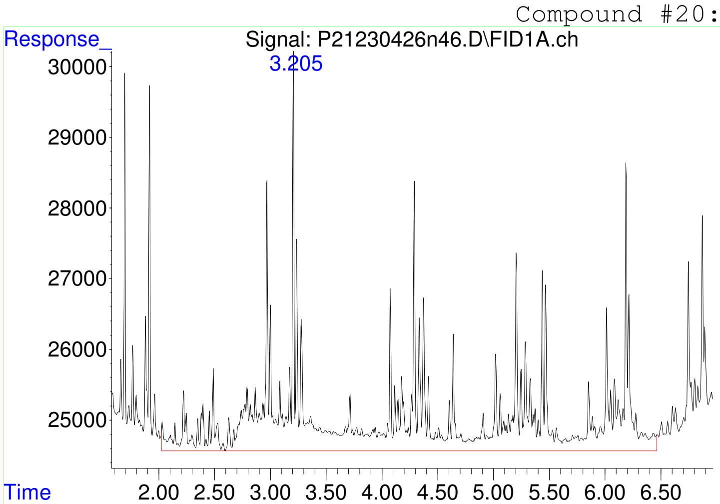
Volume Inj.  :
Signal Phase :
Signal Info  :

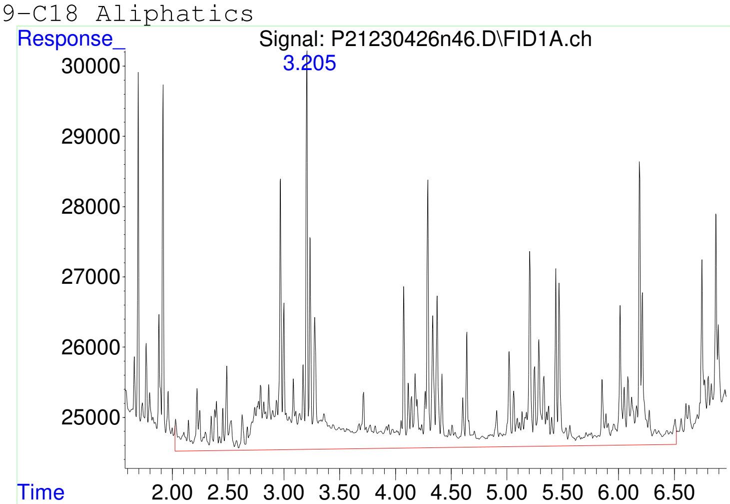


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230426n\ | QMethod | : MAALI211129A.M |
| Data File | : P21230426n46.D | Operator | : Petro21a/b:all |
| Date Inj'd | : 4/27/2023 9:25 pm | Instrument | : Petro 21 |
| Sample | : L2322455-11,42,, | Quant Date | : 4/28/2023 3:08 pm |

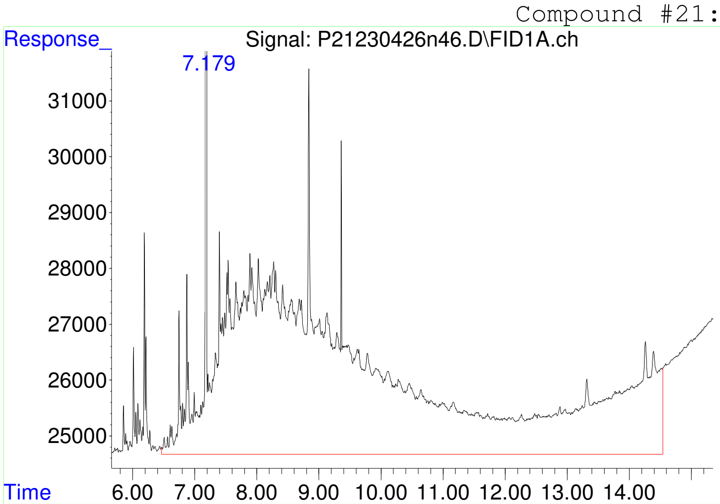
Compound #20: C9-C18 Aliphatics

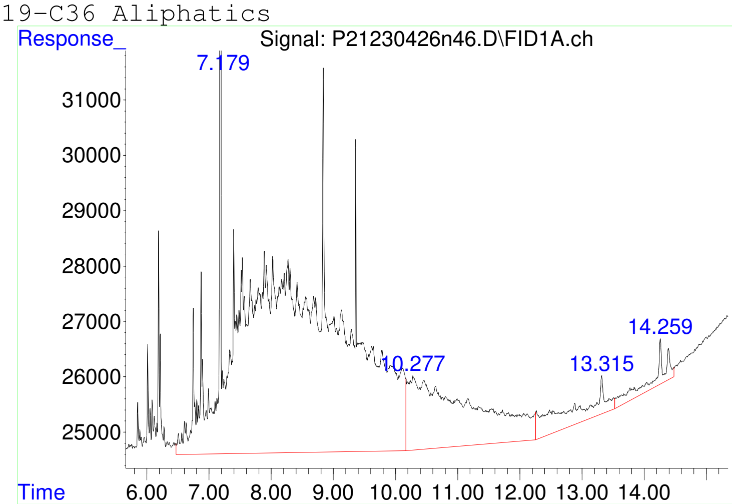



Original Peak Response = 1193334 Manual Peak Response = 1188865 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 6753066 Manual Peak Response = 5711916 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00002.D
Signal(s) : FID1A.ch
Acq On : 28-Apr-2023, 13:22:35
Operator : SYSTEM
Sample : WG1772046-1,42,,
Misc :
ALS Vial : 2 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 01 09:07:47 2023
Quant Method : I:\PETRO\Petro25\2023\230428\MAALI220425D.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 27 17:16:16 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) S Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 5) S 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) S 2-Fluorobiphenyl | 0.000 | 0 | N.D. mg/kg | d |
| 8) S 2-Bromonaphthalene | 0.000 | 0 | N.D. mg/kg | d |
| 13) S 1-Chlorooctadecane | 6.949 | 1203462 | 14.010 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 70.05% | |
| **Target Compounds** | | | | |
| 1) Nonane (C9) | 0.000 | 0 | N.D. mg/L | d |
| 2) Decane (C10) | 0.000 | 0 | N.D. mg/L | d |
| 4) Dodecane (C12) | 0.000 | 0 | N.D. mg/L | d |
| 7) Tetradecane (C14) | 0.000 | 0 | N.D. mg/L | d |
| 9) Hexadecane (C16) | 0.000 | 0 | N.D. mg/L | d |
| 10) Octadecane (C18) | 0.000 | 0 | N.D. mg/L | d |
| 11) Nonadecane (c19) | 0.000 | 0 | N.D. mg/kg | d |
| 12) Eicosane (C20) | 0.000 | 0 | N.D. mg/L | d |
| 14) Docosane (C22) | 0.000 | 0 | N.D. mg/L | d |
| 15) Tetracosane (C24) | 0.000 | 0 | N.D. mg/L | d |
| 16) Hexacosane (C26) | 0.000 | 0 | N.D. mg/L | d |
| 17) Octacosane (C28) | 0.000 | 0 | N.D. mg/L | d |
| 18) Triacontane (C30) | 0.000 | 0 | N.D. mg/L | d |
| 19) Hexatriacontane (C36) | 0.000 | 0 | N.D. mg/L | d |
| 20) H C9-C18 Aliphatics | 2.966f | 1602427 | 16.226 mg/L | M5 |
| 21) H C19-C36 Aliphatics | 13.630f | 1088412 | 11.237 mg/L | M5 |

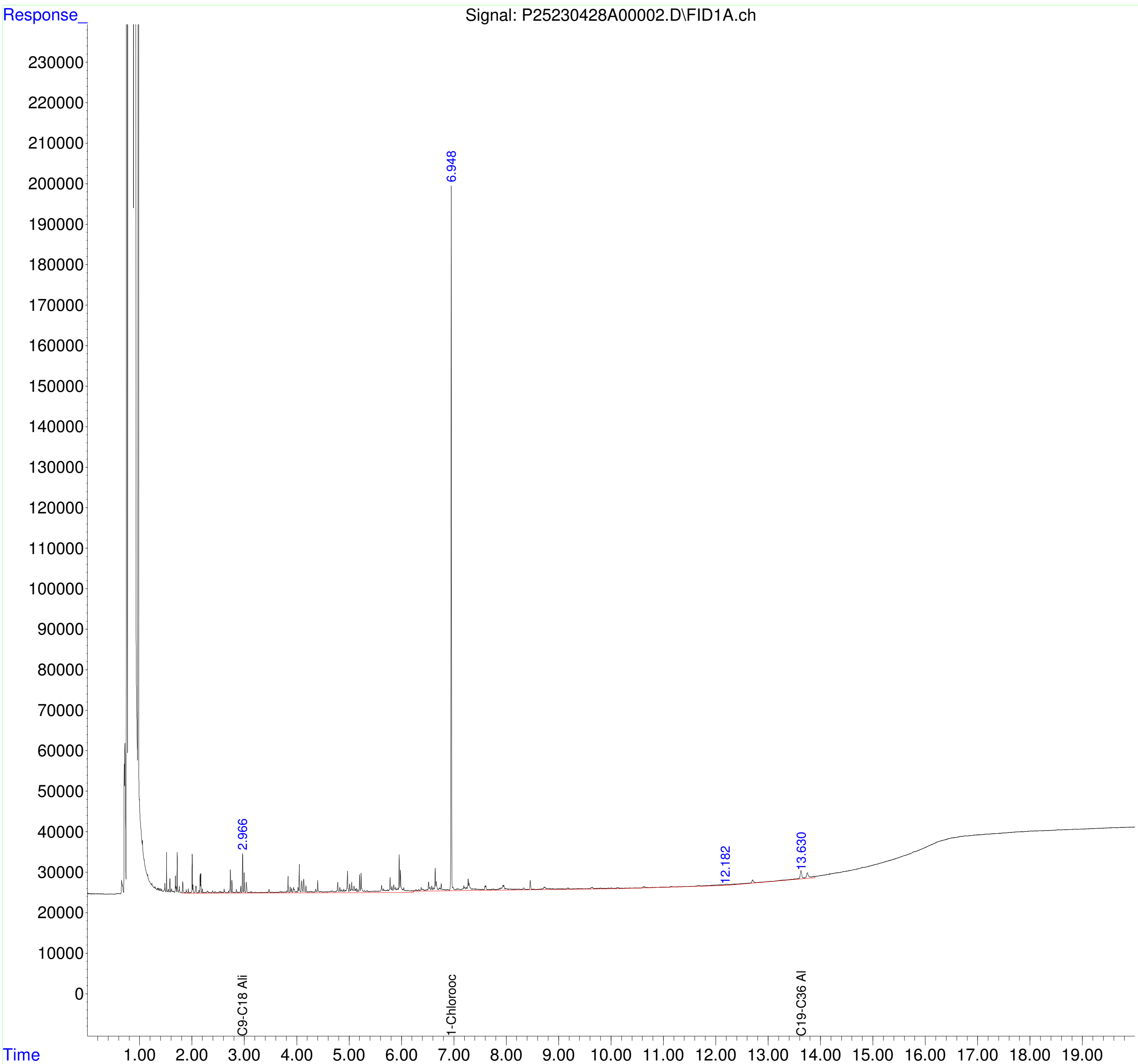
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00002.D
Signal(s) : FID1A.ch
Acq On    : 28-Apr-2023, 13:22:35
Operator  : SYSTEM
Sample    : WG1772046-1,42,,
Misc      :
ALS Vial  : 2   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 01 09:07:47 2023
Quant Method : I:\PETRO\Petro25\2023\230428\MAALI220425D.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 27 17:16:16 2023
Response via : Initial Calibration
Integrator: ChemStation

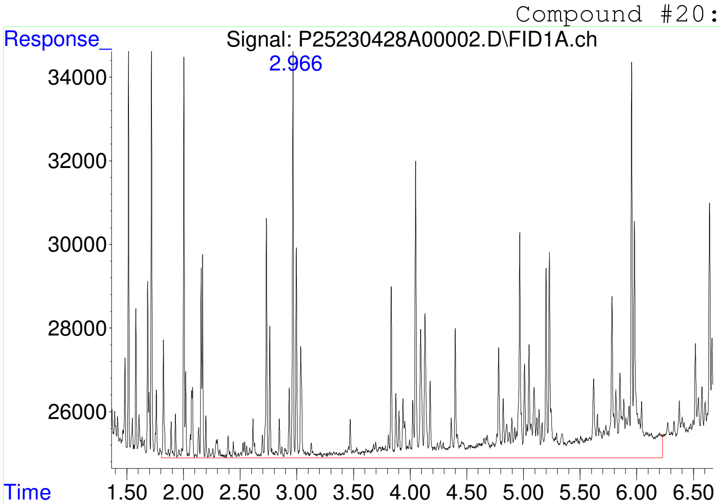
Volume Inj.  :
Signal Phase :
Signal Info  :

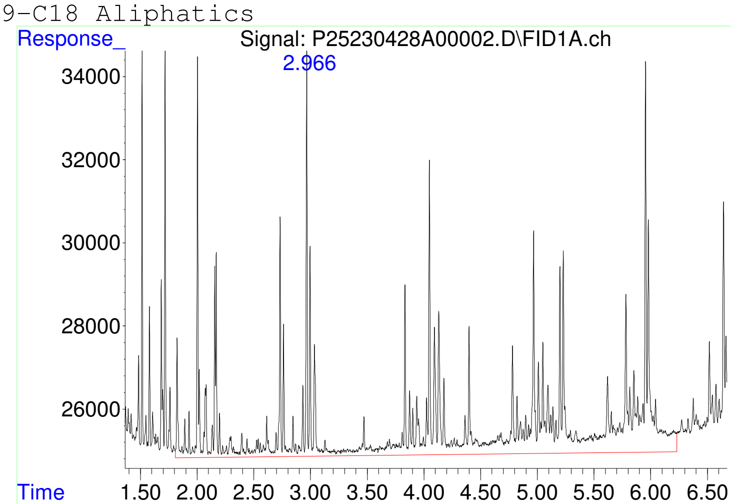


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro25\2023\230428\ | QMethod | : MAALI220425D.M |
| Data File | : P25230428A00002.D | Operator | : SYSTEM |
| Date Inj'd | : 4/28/2023 13:22 35 | Instrument | : GCI |
| Sample | : WG1772046-1,42,, | Quant Date | : 5/1/2023 9:05 am |

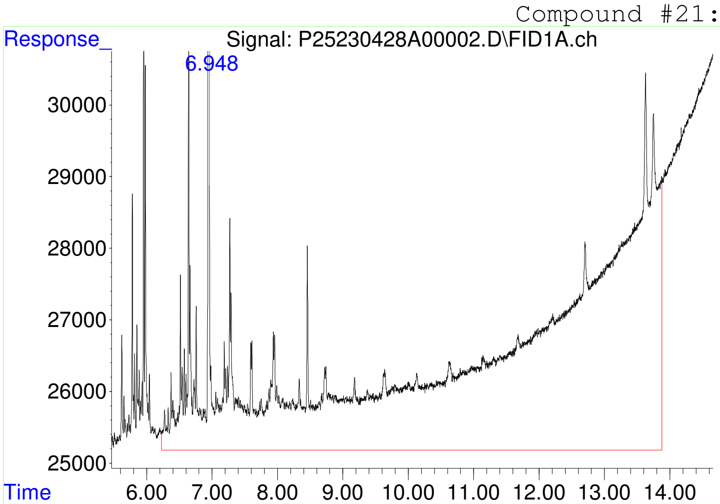
Compound #20: C9-C18 Aliphatics

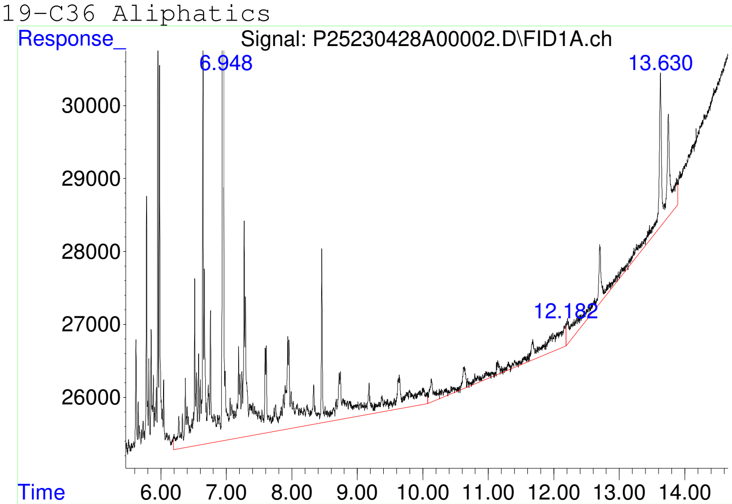



Original Peak Response = 1606989 Manual Peak Response = 1602427 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 6004974 Manual Peak Response = 1088412 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00003.D
Signal(s) : FID1A.ch
Acq On : 28-Apr-2023, 14:08:55
Operator : SYSTEM
Sample : WG1772046-2,42,,
Misc :
ALS Vial : 3 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 01 09:08:28 2023
Quant Method : I:\PETRO\Petro25\2023\230428\MAALI220425D.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 27 17:17:30 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 6.947 | 1102882 | 12.839 | mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 64.20% | | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 5.953 | 1442717 | 14.609 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 13.743f | 1141762 | 11.788 | mg/L | M5 |

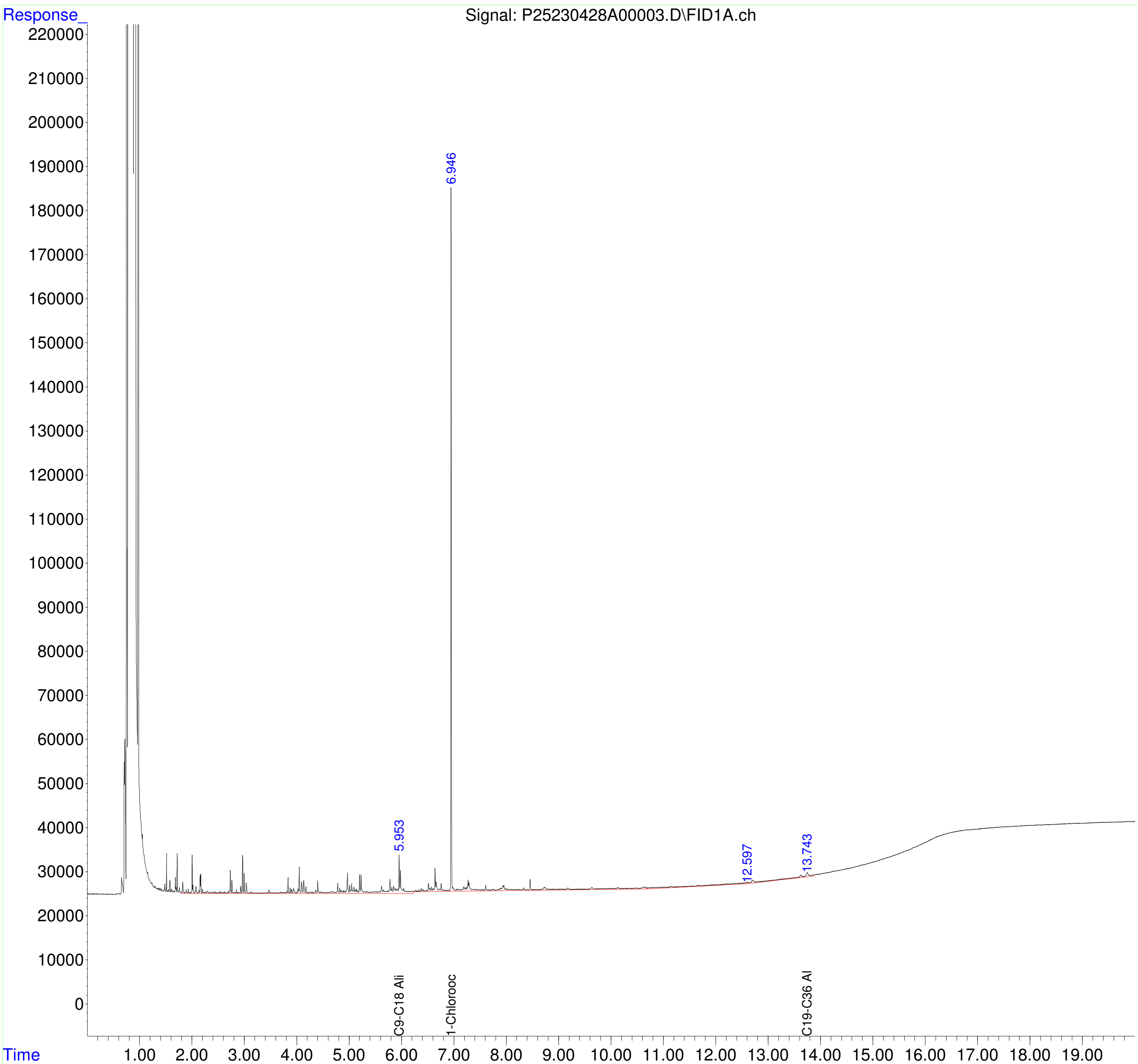
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00003.D
Signal(s) : FID1A.ch
Acq On    : 28-Apr-2023, 14:08:55
Operator  : SYSTEM
Sample    : WG1772046-2,42,,
Misc      :
ALS Vial  : 3   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 01 09:08:28 2023
Quant Method : I:\PETRO\Petro25\2023\230428\MAALI220425D.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 27 17:17:30 2023
Response via : Initial Calibration
Integrator: ChemStation

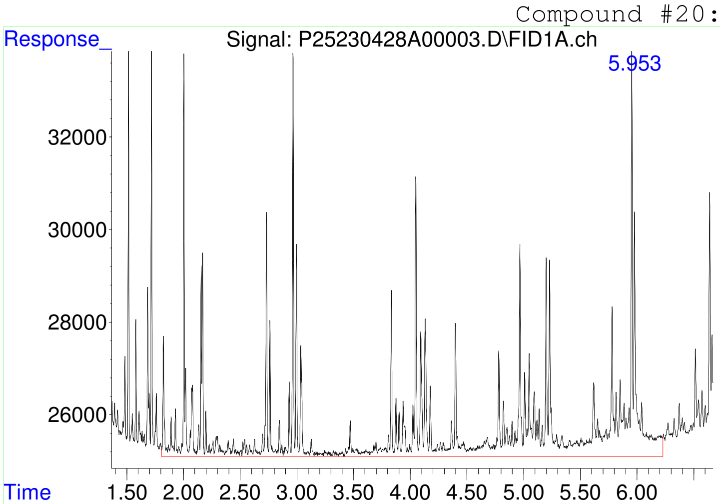
Volume Inj.  :
Signal Phase :
Signal Info  :

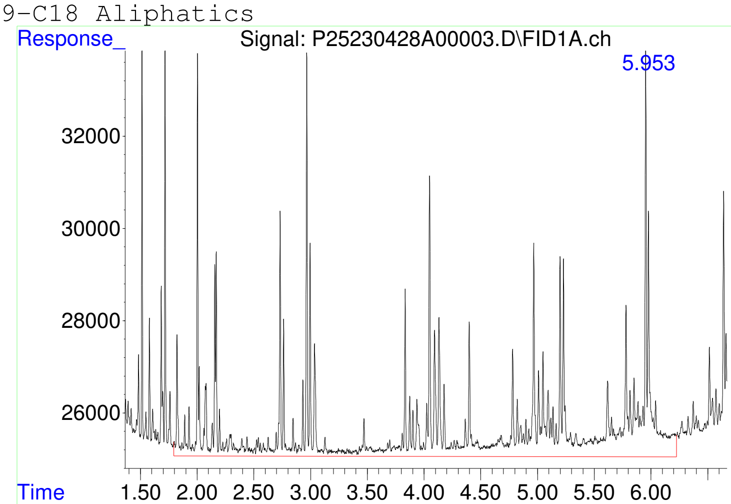


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro25\2023\230428\ | QMethod | : MAALI220425D.M |
| Data File | : P25230428A00003.D | Operator | : SYSTEM |
| Date Inj'd | : 4/28/2023 14:08 55 | Instrument | : GCI |
| Sample | : WG1772046-2,42,, | Quant Date | : 5/1/2023 9:05 am |

Compound #20: C9-C18 Aliphatics

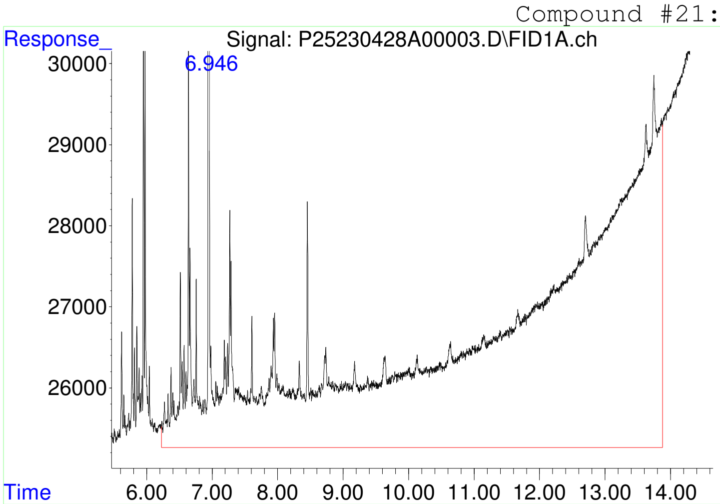


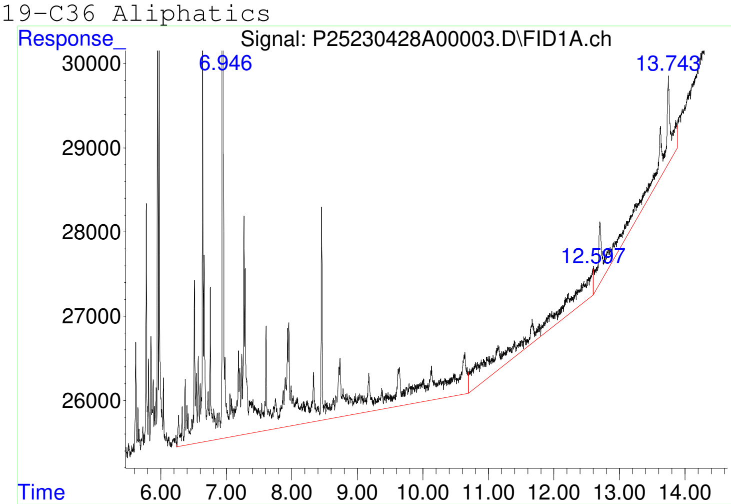




Original Peak Response = 1345446 Manual Peak Response = 1442717 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 6306559 Manual Peak Response = 1141762 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00004.D
Signal(s) : FID1A.ch
Acq On : 28-Apr-2023, 14:34:55
Operator : SYSTEM
Sample : WG1772046-3,42,,
Misc :
ALS Vial : 4 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 01 09:09:04 2023
Quant Method : I:\PETRO\Petro25\2023\230428\MAALI220425D.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 27 17:17:30 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | |
| 3) S Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S 1-Chlorooctadecane | 6.933 | 1198223 | 13.949 | mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 69.75% | | |
| Target Compounds | | | | | |
| 1) Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H C9-C18 Aliphatics | 2.959f | 1339194 | 13.561 | mg/L | M5 |
| 21) H C19-C36 Aliphatics | 13.718f | 1310233 | 13.527 | mg/L | M5 |

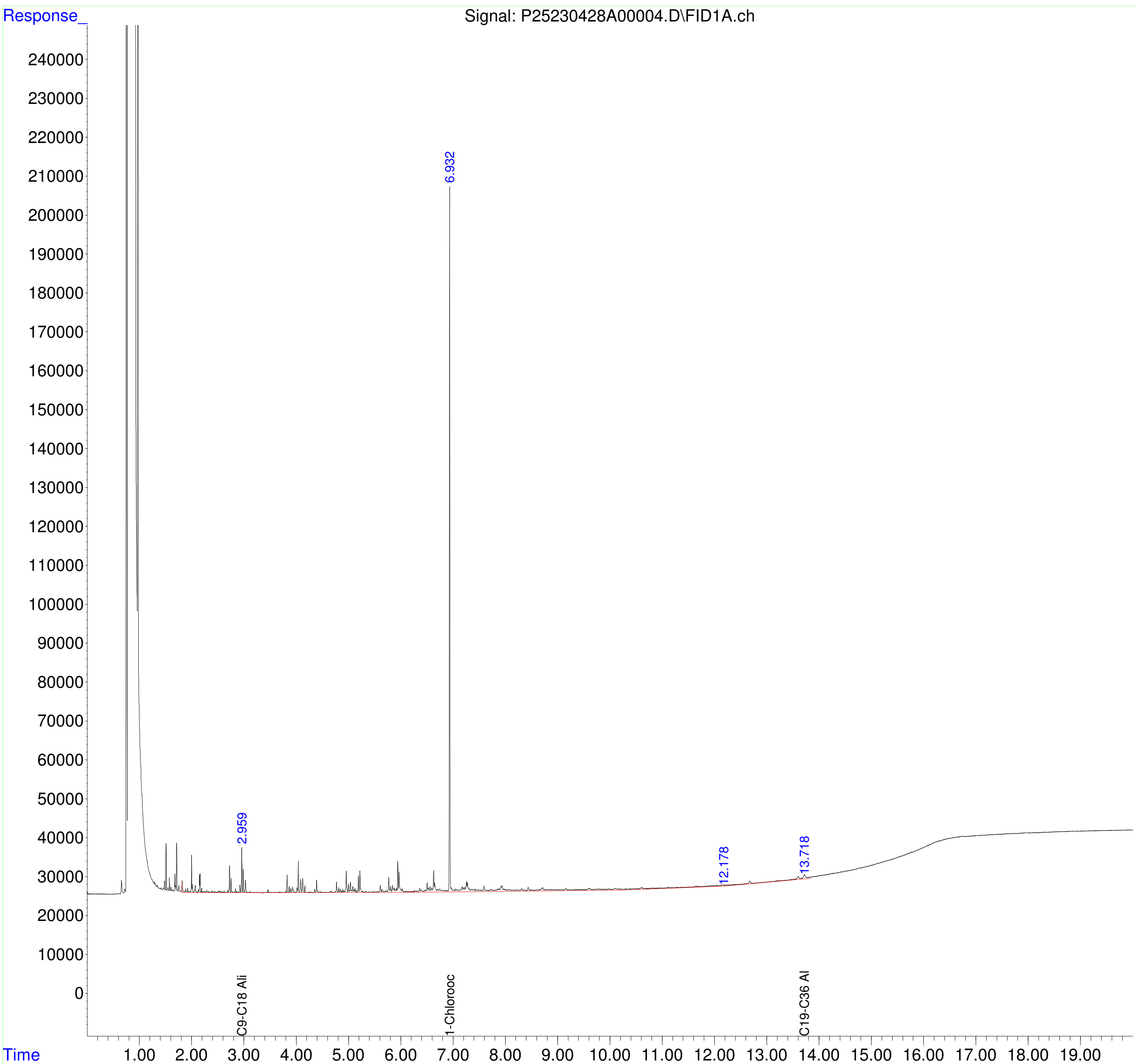
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00004.D
Signal(s) : FID1A.ch
Acq On    : 28-Apr-2023, 14:34:55
Operator  : SYSTEM
Sample    : WG1772046-3,42,,
Misc      :
ALS Vial  : 4   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 01 09:09:04 2023
Quant Method : I:\PETRO\Petro25\2023\230428\MAALI220425D.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 27 17:17:30 2023
Response via : Initial Calibration
Integrator: ChemStation

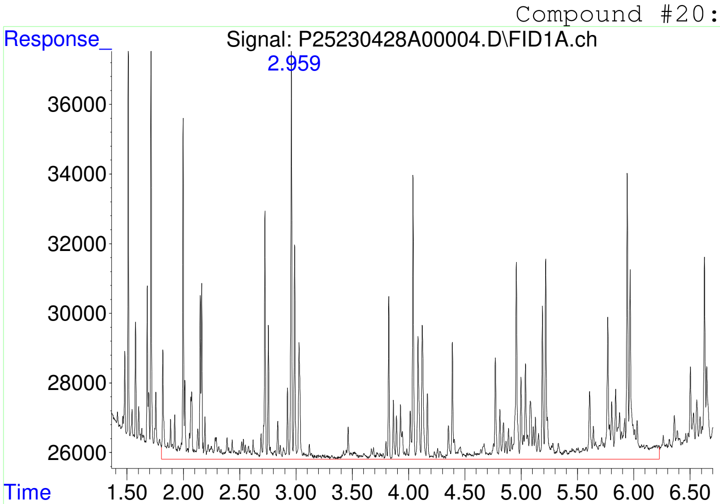
Volume Inj.  :
Signal Phase :
Signal Info  :

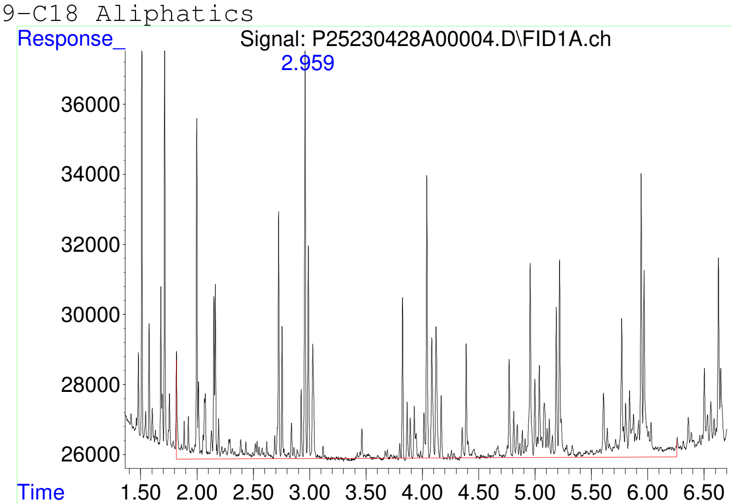


# Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro25\2023\230428\ | QMethod | : MAALI220425D.M |
| Data File | : P25230428A00004.D | Operator | : SYSTEM |
| Date Inj'd | : 4/28/2023 14:34 55 | Instrument | : GCI |
| Sample | : WG1772046-3,42,, | Quant Date | : 5/1/2023 9:05 am |

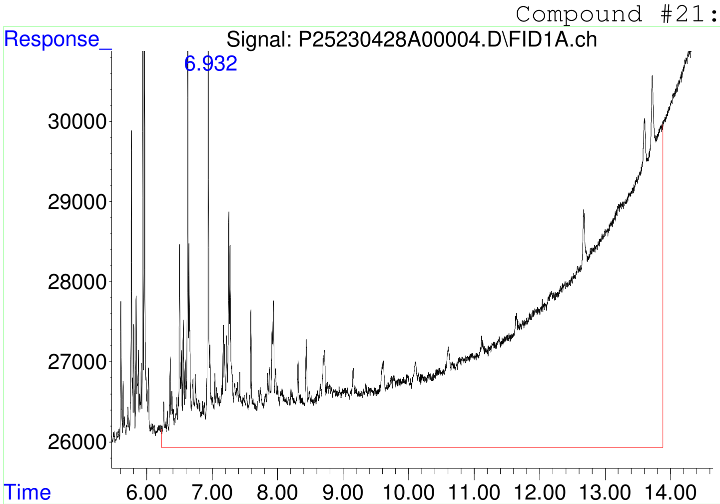
Compound #20: C9-C18 Aliphatics

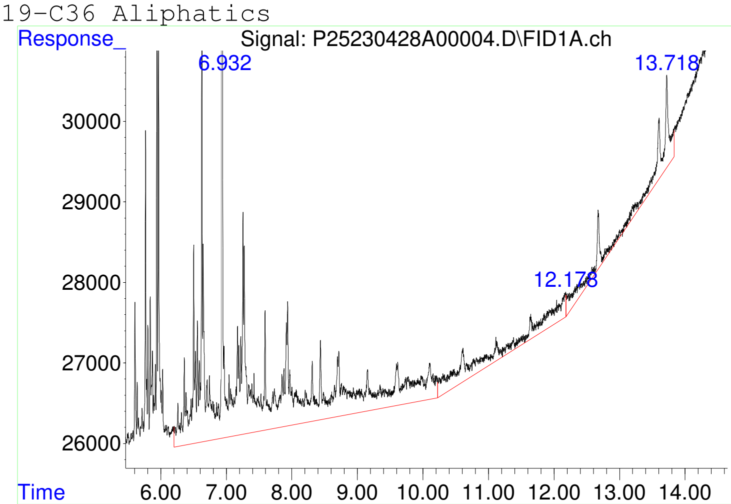



Original Peak Response = 1581531 Manual Peak Response = 1339194 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 6149922 Manual Peak Response = 1310233 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00005.D
Signal(s) : FID1A.ch
Acq On : 28-Apr-2023, 15:00:23
Operator : SYSTEM
Sample : L2322455-04,42,,
Misc :
ALS Vial : 5 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 01 09:09:45 2023
Quant Method : I:\PETRO\Petro25\2023\230428\MAALI220425D.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 27 17:17:30 2023
Response via : Initial Calibration
Integrator: ChemStation

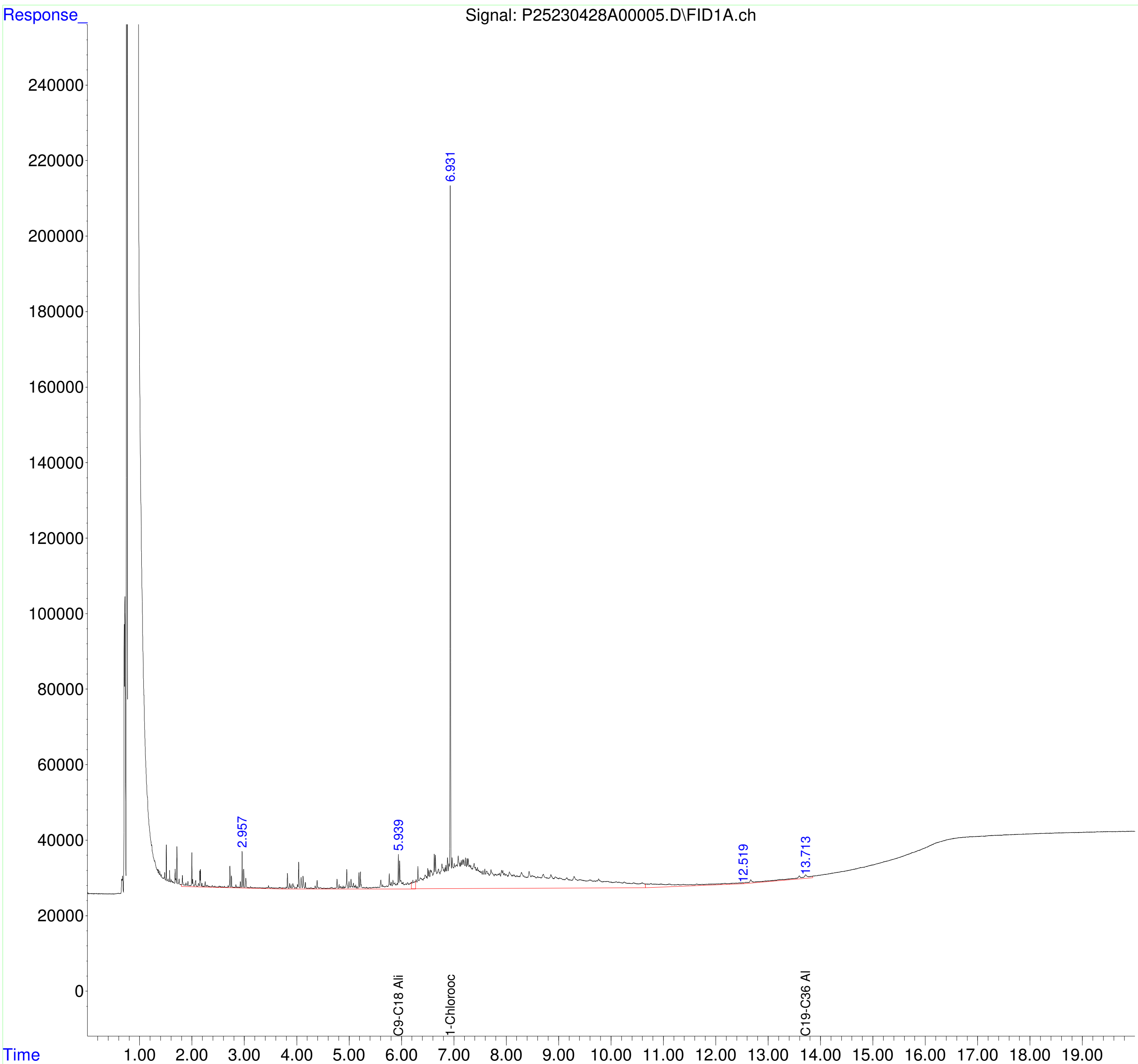
Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 6.931 | 1200270 | 13.972 | mg/L | M4 |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 69.86% | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 5.939 | 1899546 | 19.235 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 13.713f | 9258196 | 95.583 | mg/L | M5 |

(f)=RT Delta > 1/2 Window (m)=manual int.

```
Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00005.D
Signal(s) : FID1A.ch
Acq On    : 28-Apr-2023, 15:00:23
Operator  : SYSTEM
Sample    : L2322455-04,42,,
Misc      :
ALS Vial  : 5   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 01 09:09:45 2023
Quant Method : I:\PETRO\Petro25\2023\230428\MAALI220425D.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 27 17:17:30 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :
```

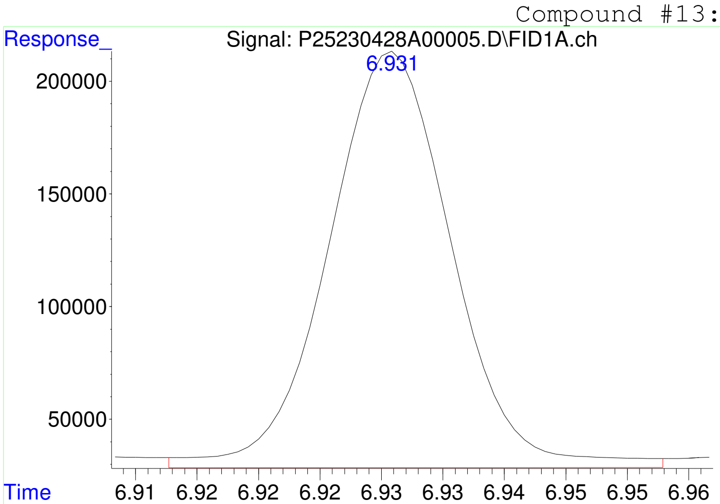


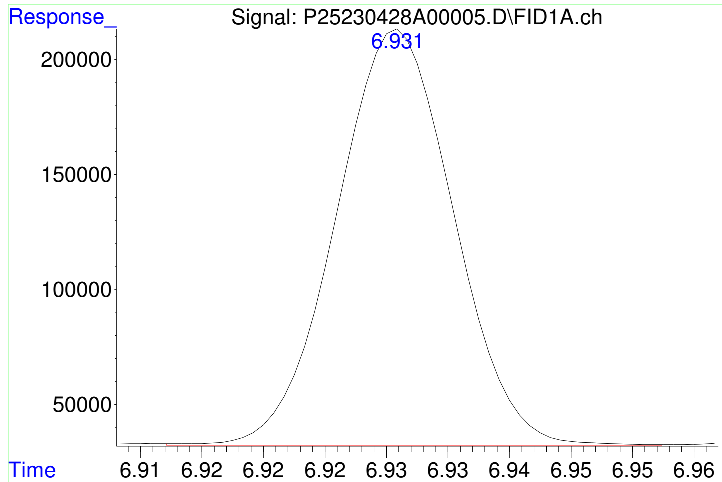
Manual Integration Report

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00005.D
Date Inj'd : 4/28/2023 15:00 23
Sample : L2322455-04,42,,

QMethod : MAALI220425D.M
Operator : SYSTEM
Instrument : GCI
Quant Date : 5/1/2023 9:05 am

Compound #13: 1-Chlorooctadecane

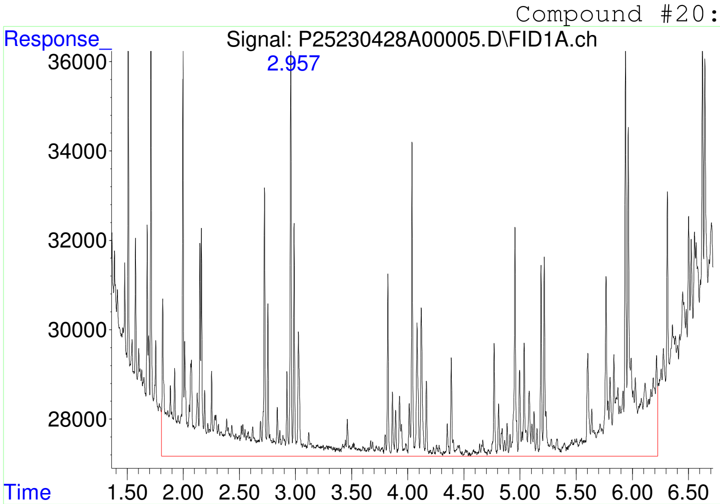


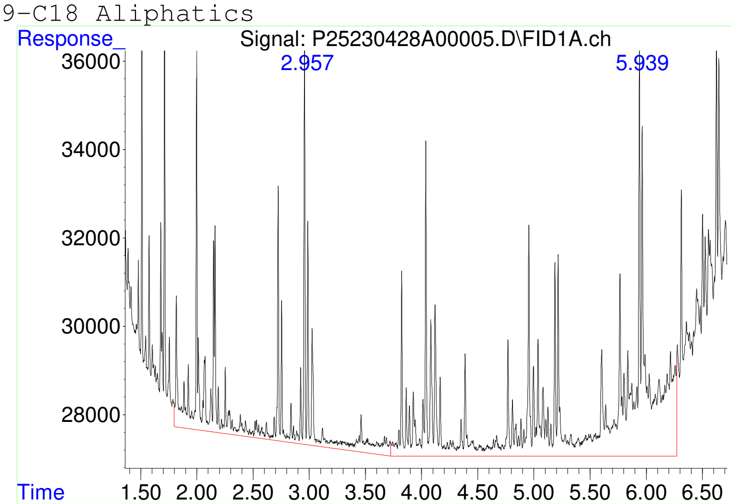




Original Peak Response = 1290876
M4 = Poor automated baseline construction.

Manual Peak Response = 1200270 M4

Compound #20: C9-C18 Aliphatics



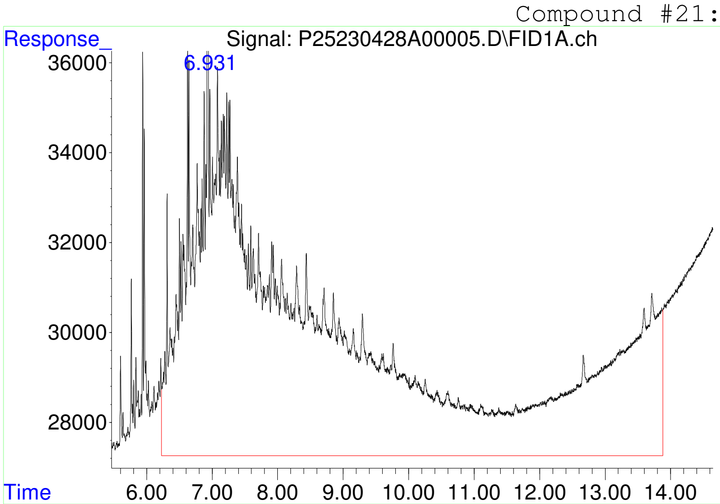



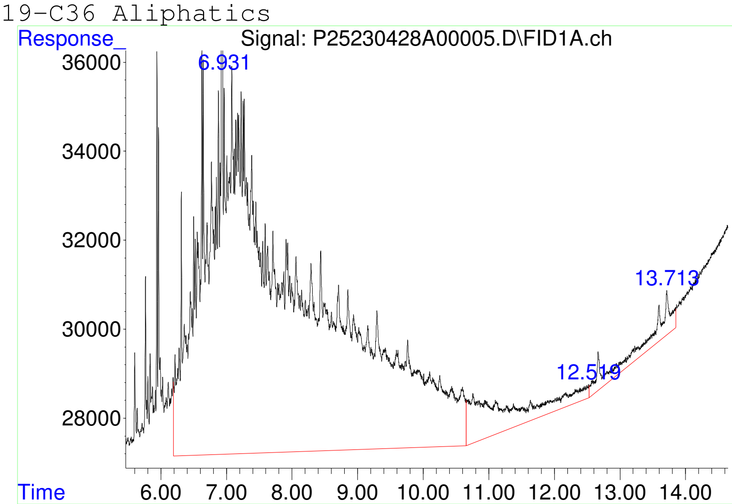

Original Peak Response = 1899186

Manual Peak Response = 1899546 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 11638702

Manual Peak Response = 9258196 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00006.D
Signal(s) : FID1A.ch
Acq On : 28-Apr-2023, 15:25:44
Operator : SYSTEM
Sample : L2322455-05,42,,
Misc :
ALS Vial : 6 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 01 09:10:37 2023
Quant Method : I:\PETRO\Petro25\2023\230428\MAALI220425D.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 27 17:17:30 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | | |
| 3) | S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) | S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) | S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) | S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) | S | 1-Chlorooctadecane | 6.931 | 1228877 | 14.305 | mg/L | M4 |

Spiked Amount 20.000 Range 40 - 140 Recovery = 71.52%

| | | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|---|
| Target Compounds | | | | | | | |
| 1) | | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) | H | C9-C18 Aliphatics | 5.939 | 1850822 | 18.741 | mg/L | M5 |
| 21) | H | C19-C36 Aliphatics | 13.710f | 10836712 | 111.880 | mg/L | M5 |

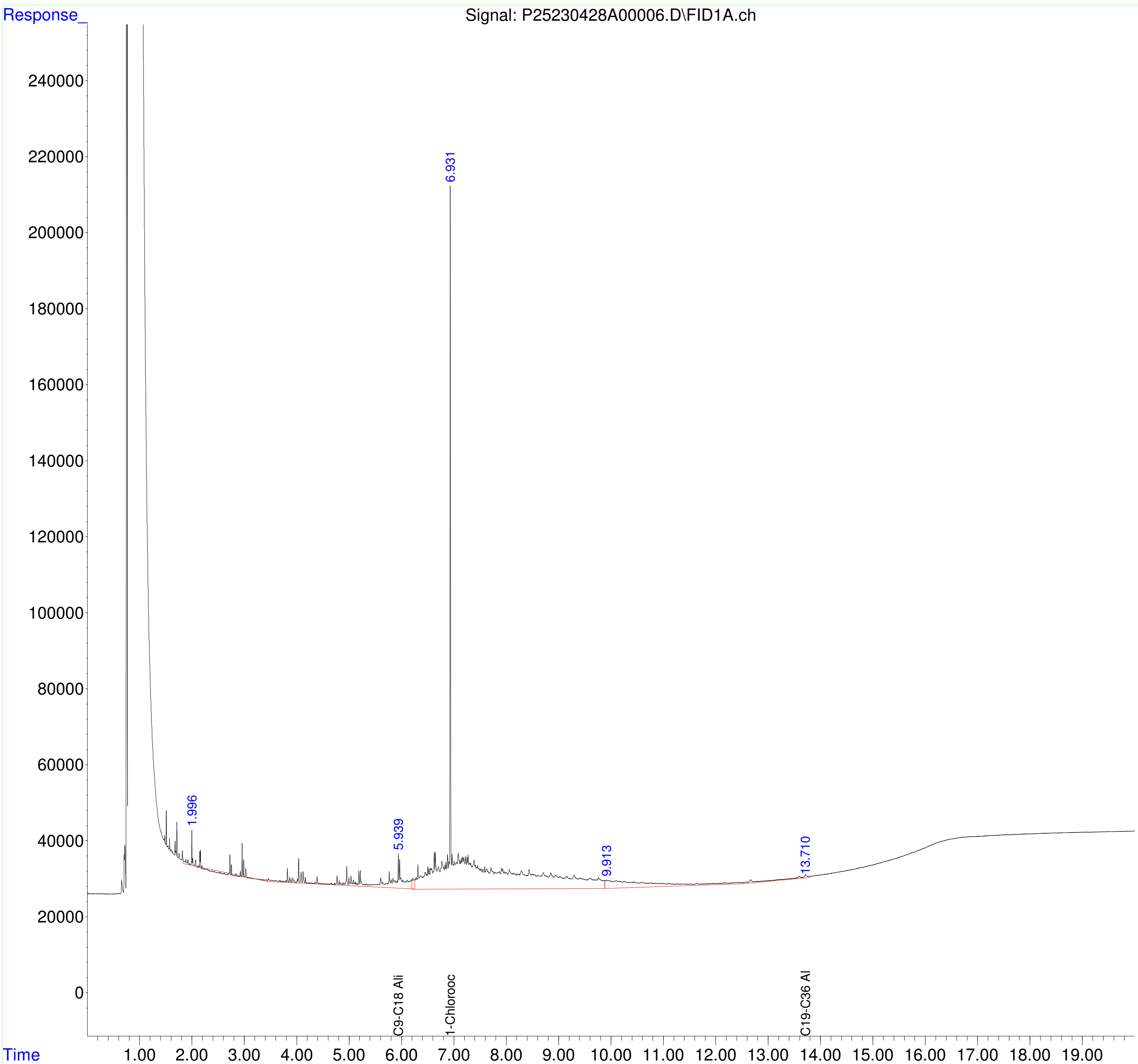
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00006.D
Signal(s) : FID1A.ch
Acq On    : 28-Apr-2023, 15:25:44
Operator  : SYSTEM
Sample    : L2322455-05,42,,
Misc      :
ALS Vial  : 6   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 01 09:10:37 2023
Quant Method : I:\PETRO\Petro25\2023\230428\MAALI220425D.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 27 17:17:30 2023
Response via : Initial Calibration
Integrator: ChemStation

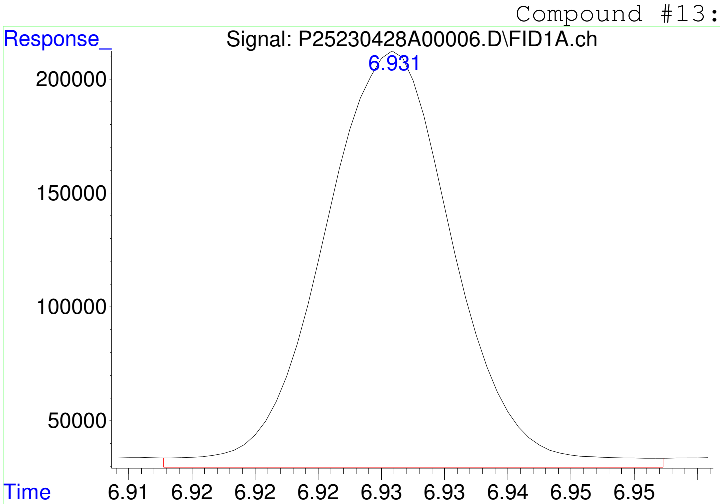
Volume Inj.  :
Signal Phase :
Signal Info  :

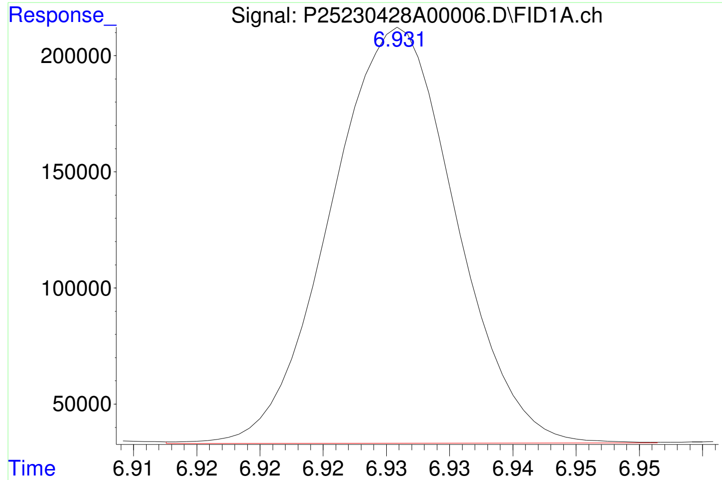


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro25\2023\230428\ | QMethod | : MAALI220425D.M |
| Data File | : P25230428A00006.D | Operator | : SYSTEM |
| Date Inj'd | : 4/28/2023 15:25 44 | Instrument | : GCI |
| Sample | : L2322455-05,42,, | Quant Date | : 5/1/2023 9:06 am |

Compound #13: 1-Chlorooctadecane



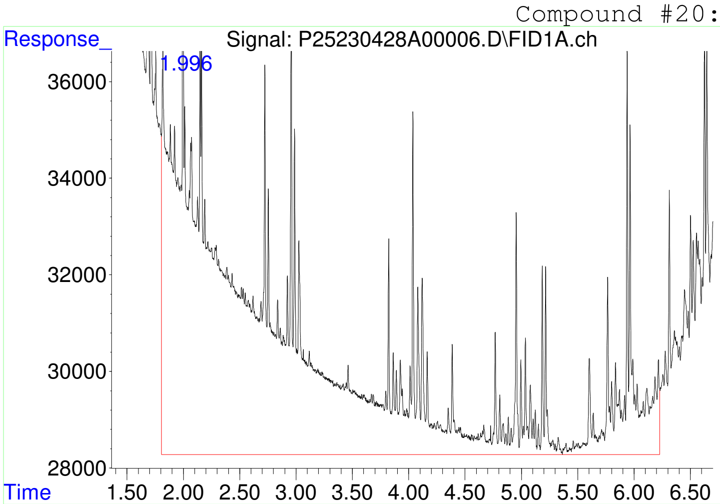



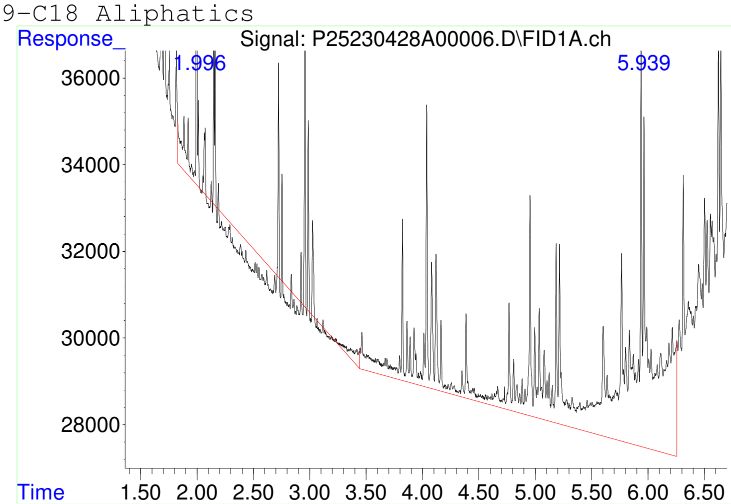

Original Peak Response = 1313922

Manual Peak Response = 1228877 M4

M4 = Poor automated baseline construction.

Compound #20: C9-C18 Aliphatics



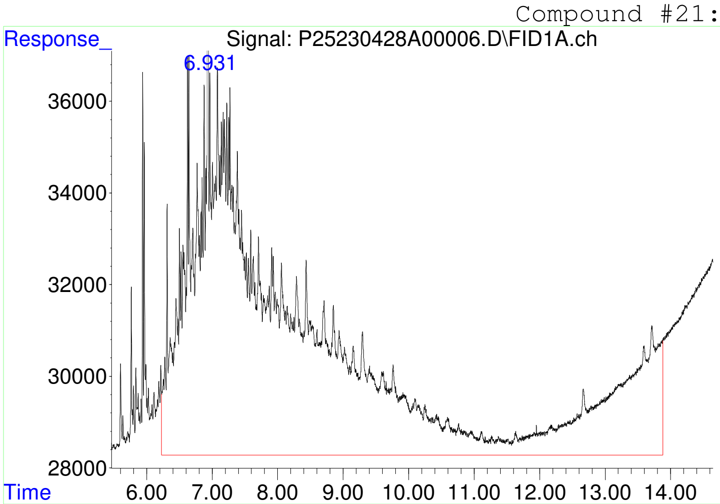



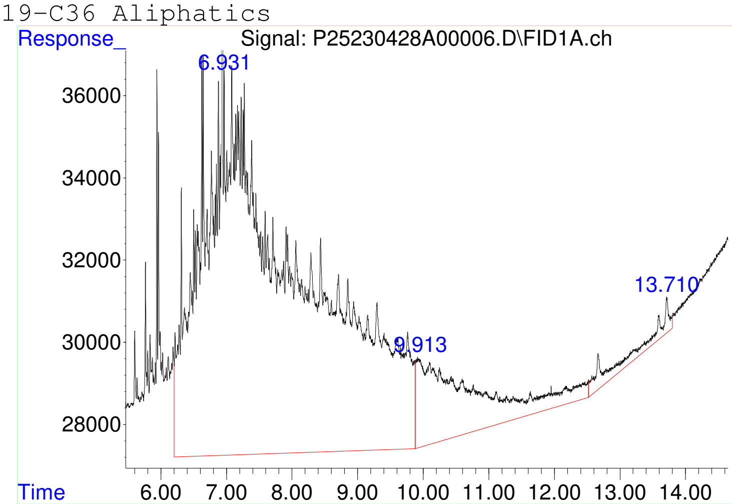

Original Peak Response = 5002284

Manual Peak Response = 1850822 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 9346190

Manual Peak Response = 10836712 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00007.D
Signal(s) : FID1A.ch
Acq On : 28-Apr-2023, 15:51:09
Operator : SYSTEM
Sample : L2322455-06,42,,
Misc :
ALS Vial : 7 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 01 09:11:29 2023
Quant Method : I:\PETRO\Petro25\2023\230428\MAALI220425D.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 27 17:17:30 2023
Response via : Initial Calibration
Integrator: ChemStation

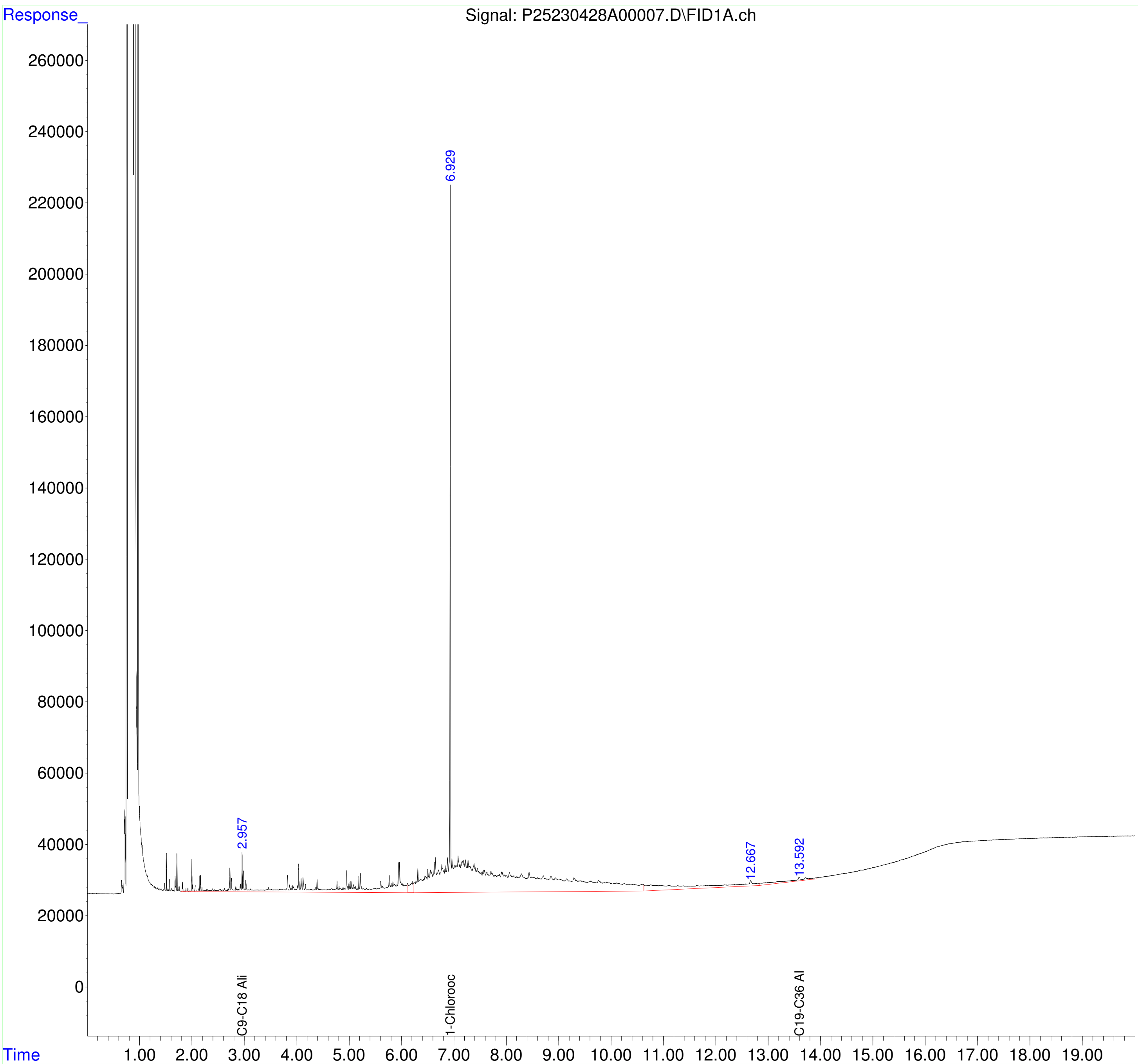
Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 6.929 | 1257689 | 14.641 | mg/L | M4 |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 73.20% | | | |
| Target Compounds | | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 2.957f | 3037504 | 30.758 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 13.592f | 13569581 | 140.095 | mg/L | M5 |

(f)=RT Delta > 1/2 Window (m)=manual int.

```
Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00007.D
Signal(s) : FID1A.ch
Acq On    : 28-Apr-2023, 15:51:09
Operator  : SYSTEM
Sample    : L2322455-06,42,,
Misc      :
ALS Vial  : 7   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 01 09:11:29 2023
Quant Method : I:\PETRO\Petro25\2023\230428\MAALI220425D.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 27 17:17:30 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :
```

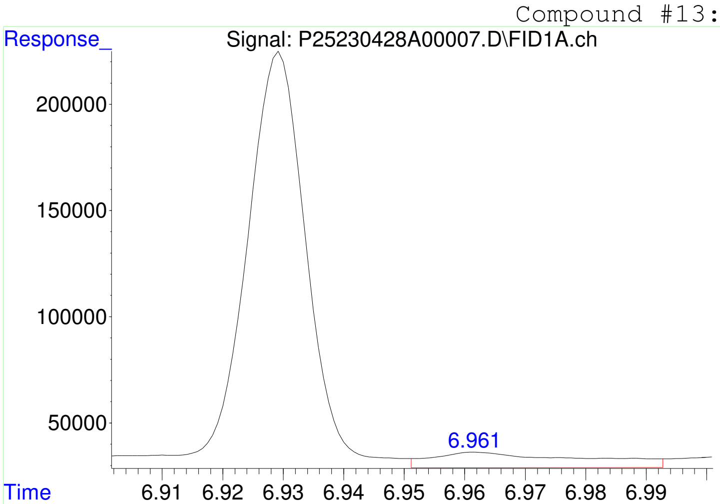


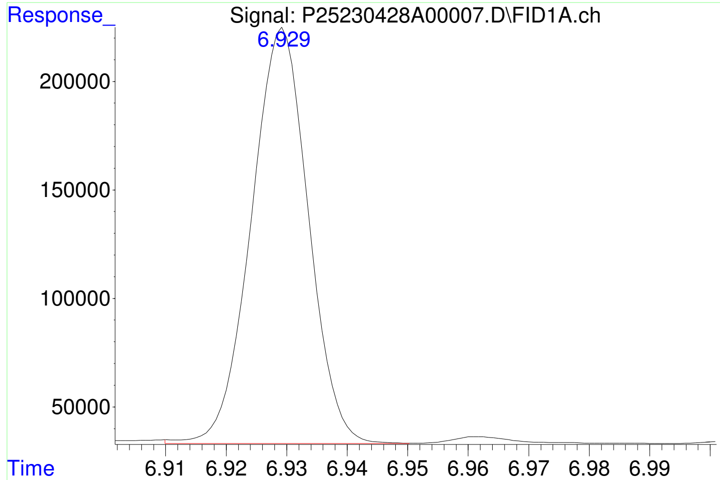
Manual Integration Report

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00007.D
Date Inj'd : 4/28/2023 15:51 09
Sample : L2322455-06,42,,

QMethod : MAALI220425D.M
Operator : SYSTEM
Instrument : GCI
Quant Date : 5/1/2023 9:06 am

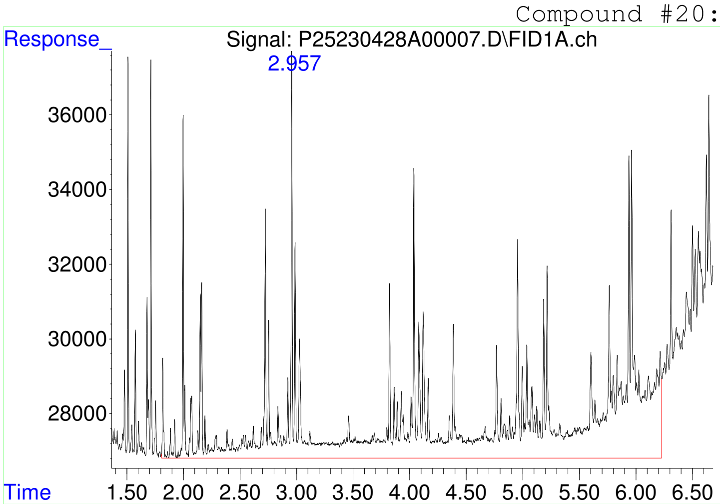
Compound #13: 1-Chlorooctadecane

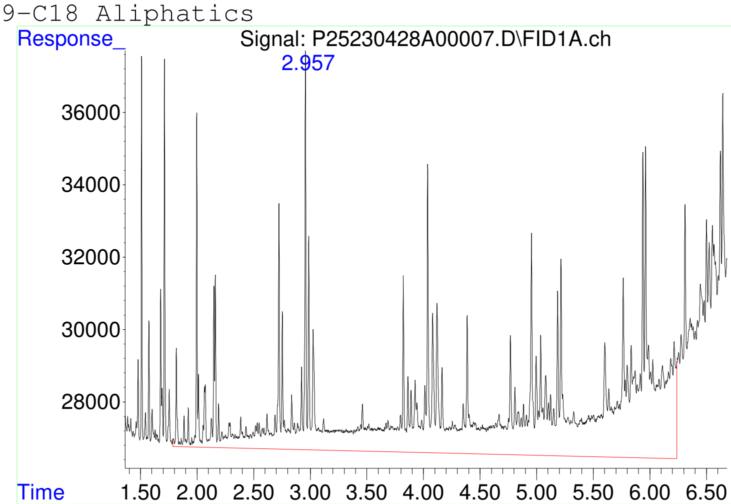



Original Peak Response = 127428
Manual Peak Response = 1257689 M4
M4 = Poor automated baseline construction.

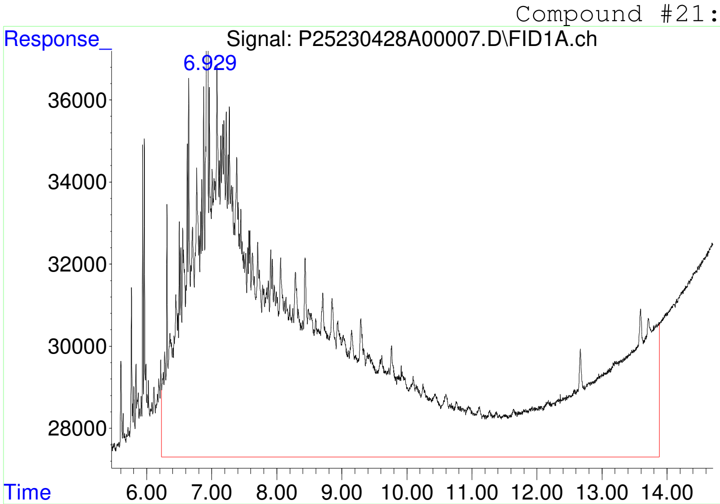
Compound #20: C9-C18 Aliphatics

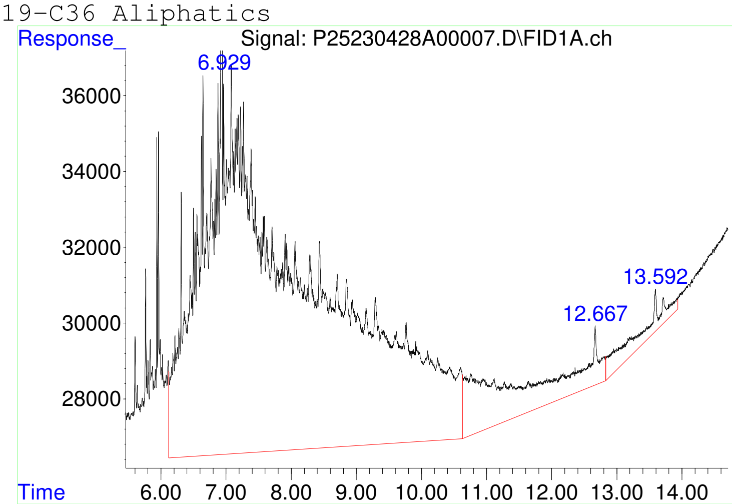



Original Peak Response = 2460682
Manual Peak Response = 3037504 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 13660319
Manual Peak Response = 13569581 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

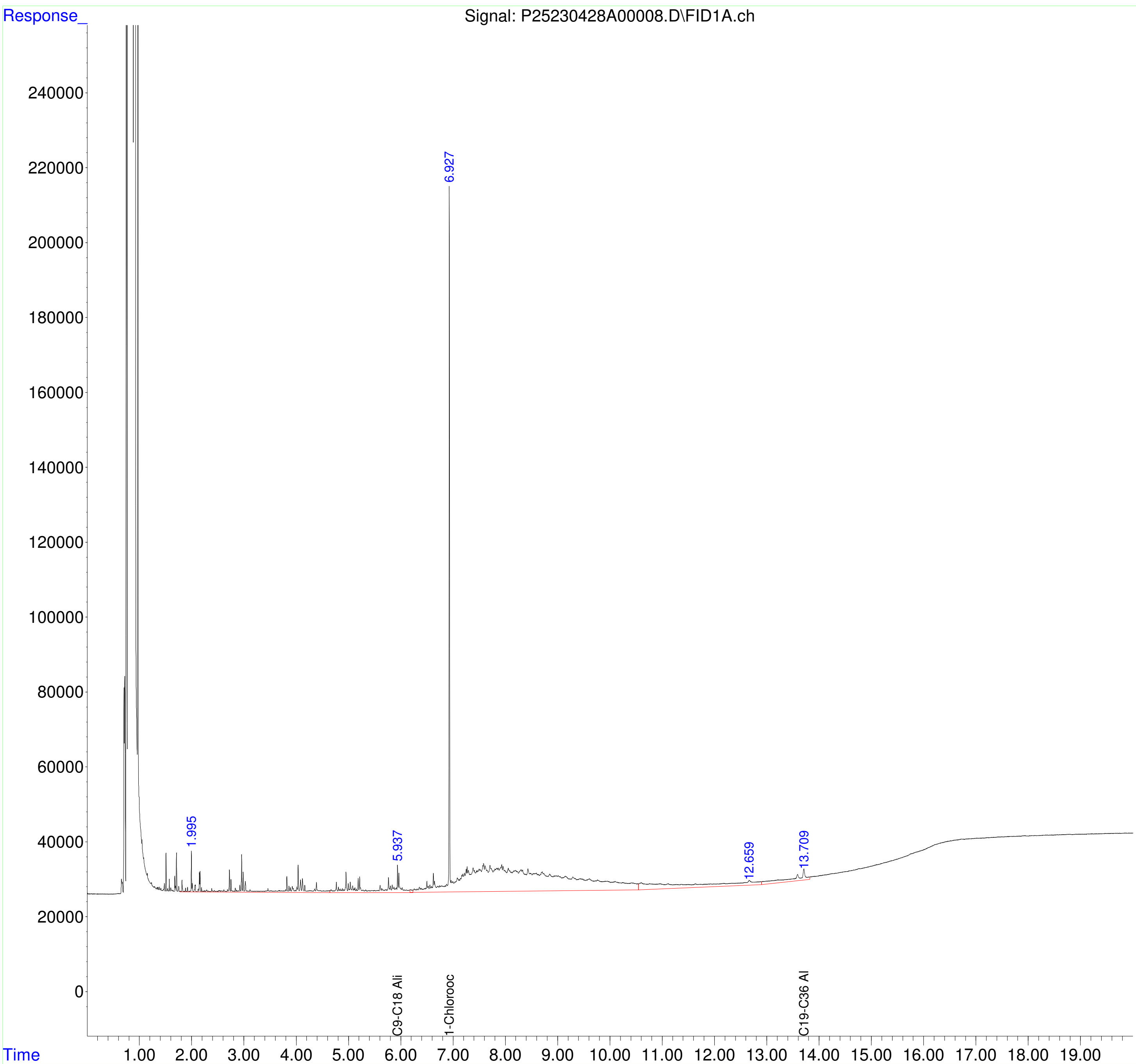
```
Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00008.D
Signal(s) : FID1A.ch
Acq On    : 28-Apr-2023, 16:15:59
Operator  : SYSTEM
Sample    : L2322455-12,42,,
Misc      :
ALS Vial  : 8   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 01 09:12:11 2023
Quant Method : I:\PETRO\Petro25\2023\230428\MAALI220425D.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 27 17:17:30 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed

        Compound                        R.T.       Response    Conc Units
 ---------------------------------------------------------------------------

 System Monitoring Compounds
 3) S   Naphthalene                   0.000              0    N.D.  mg/L  d
 5) S   2-Methylnaphthalene           0.000              0    N.D.  mg/L  d
 6) S   2-Fluorobiphenyl              0.000              0    N.D.  mg/kg d
 8) S   2-Bromonaphthalene            0.000              0    N.D.  mg/kg d
13) S   1-Chlorooctadecane            6.927        1268332   14.765 mg/L  M4
Spiked Amount     20.000   Range  40 - 140    Recovery   =   73.83%

 Target Compounds
 1)     Nonane (C9)                   0.000              0    N.D.  mg/L  d
 2)     Decane (C10)                  0.000              0    N.D.  mg/L  d
 4)     Dodecane (C12)                0.000              0    N.D.  mg/L  d
 7)     Tetradecane (C14)             0.000              0    N.D.  mg/L  d
 9)     Hexadecane (C16)              0.000              0    N.D.  mg/L  d
10)     Octadecane (C18)              0.000              0    N.D.  mg/L  d
11)     Nonadecane (c19)              0.000              0    N.D.  mg/kg d
12)     Eicosane (C20)                0.000              0    N.D.  mg/L  d
14)     Docosane (C22)                0.000              0    N.D.  mg/L  d
15)     Tetracosane (C24)             0.000              0    N.D.  mg/L  d
16)     Hexacosane (C26)              0.000              0    N.D.  mg/L  d
17)     Octacosane (C28)              0.000              0    N.D.  mg/L  d
18)     Triacontane (C30)             0.000              0    N.D.  mg/L  d
19)     Hexatriacontane (C36)         0.000              0    N.D.  mg/L  d
20) H   C9-C18 Aliphatics             5.937        2028781   20.543 mg/L  M5
21) H   C19-C36 Aliphatics           13.709f      12032075  124.221 mg/L  M5
 ---------------------------------------------------------------------------

(f)=RT Delta > 1/2 Window                              (m)=manual int.
```

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00008.D
Signal(s) : FID1A.ch
Acq On    : 28-Apr-2023, 16:15:59
Operator  : SYSTEM
Sample    : L2322455-12,42,,
Misc      :
ALS Vial  : 8   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 01 09:12:11 2023
Quant Method : I:\PETRO\Petro25\2023\230428\MAALI220425D.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 27 17:17:30 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

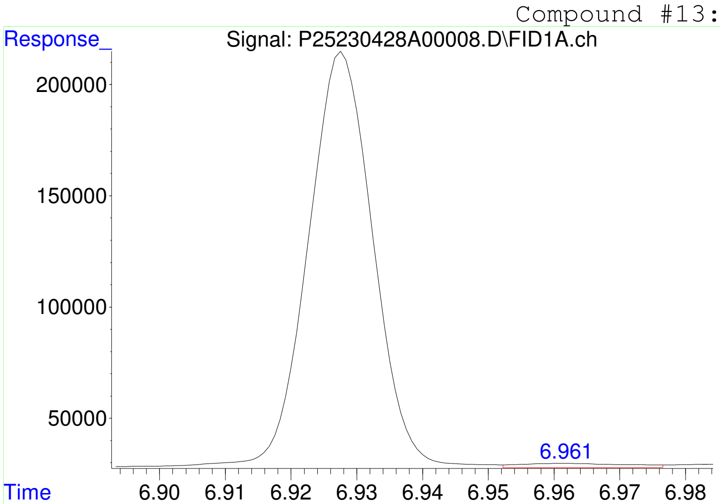


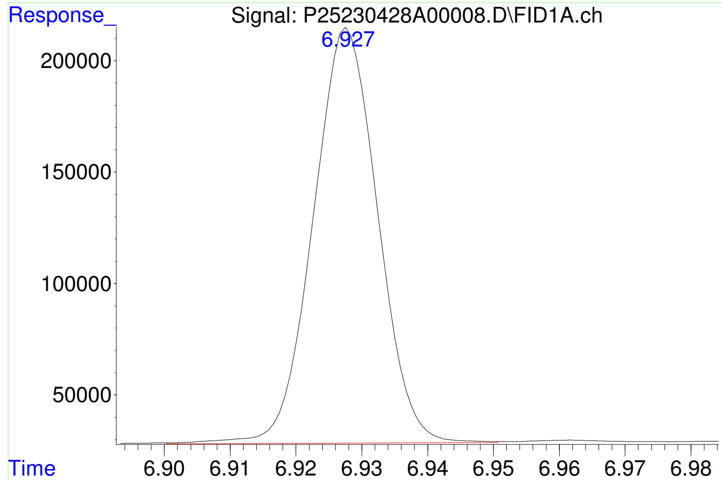
Manual Integration Report

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00008.D
Date Inj'd : 4/28/2023 16:15 59
Sample : L2322455-12,42,,

QMethod : MAALI220425D.M
Operator : SYSTEM
Instrument : GCI
Quant Date : 5/1/2023 9:06 am

Compound #13: 1-Chlorooctadecane

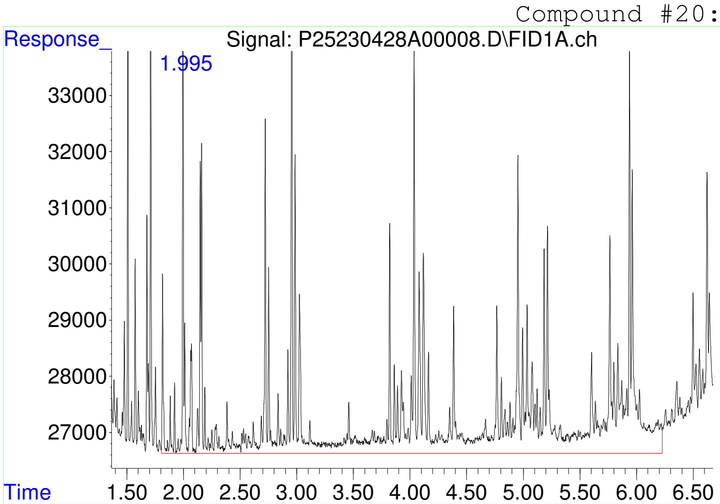


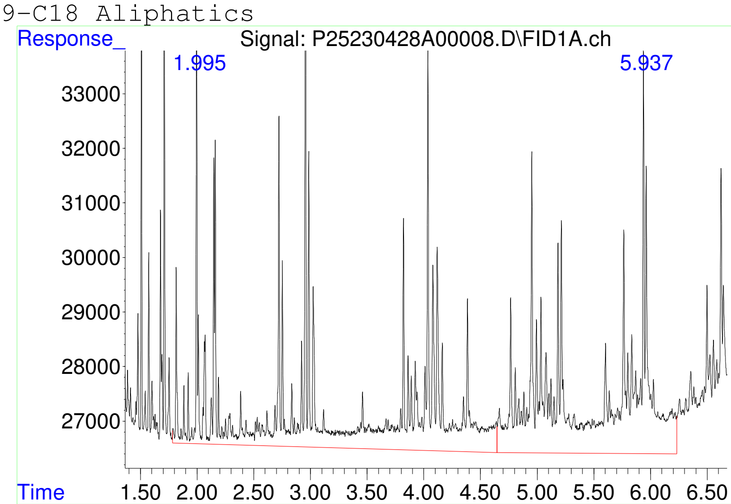




Original Peak Response = 22870
M4 = Poor automated baseline construction.

Manual Peak Response = 1268332 M4

Compound #20: C9-C18 Aliphatics



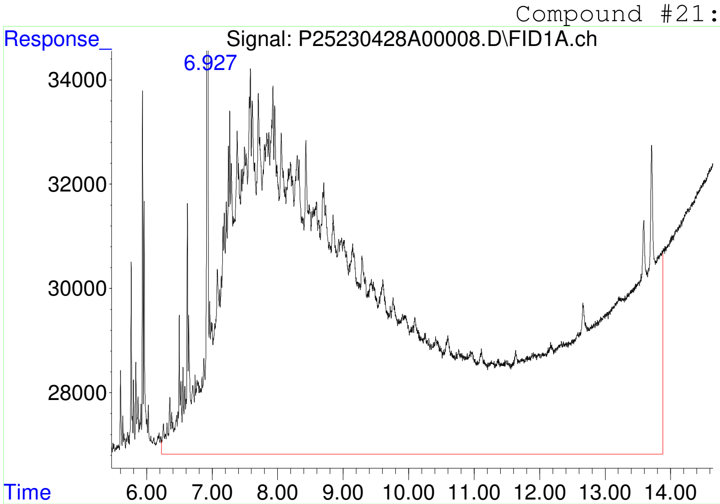



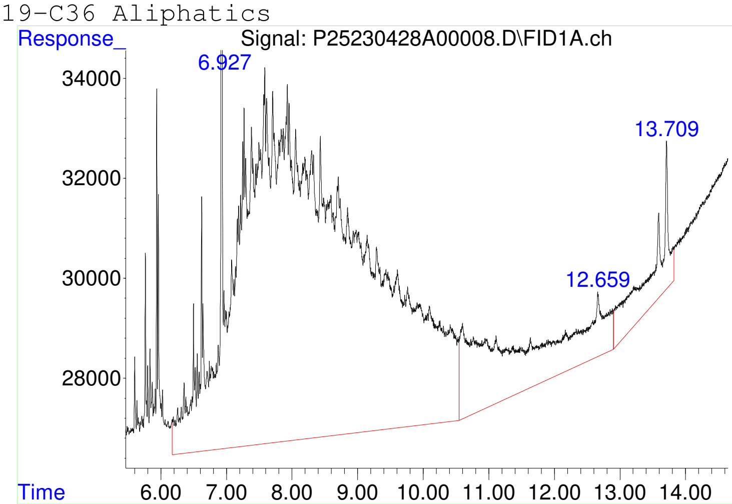

Original Peak Response = 1604431

Manual Peak Response = 2028781 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 14944987

Manual Peak Response = 12032075 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00009.D
Signal(s) : FID1A.ch
Acq On : 28-Apr-2023, 16:44:25
Operator : SYSTEM
Sample : L2322455-13,42,,
Misc :
ALS Vial : 9 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 01 09:12:53 2023
Quant Method : I:\PETRO\Petro25\2023\230428\MAALI220425D.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 27 17:17:30 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 6.935 | 1222069 | 14.226 | mg/L | M4 |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 71.13% | | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 2.961f | 1294944 | 13.112 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 13.724f | 8847435 | 91.342 | mg/L | M5 |

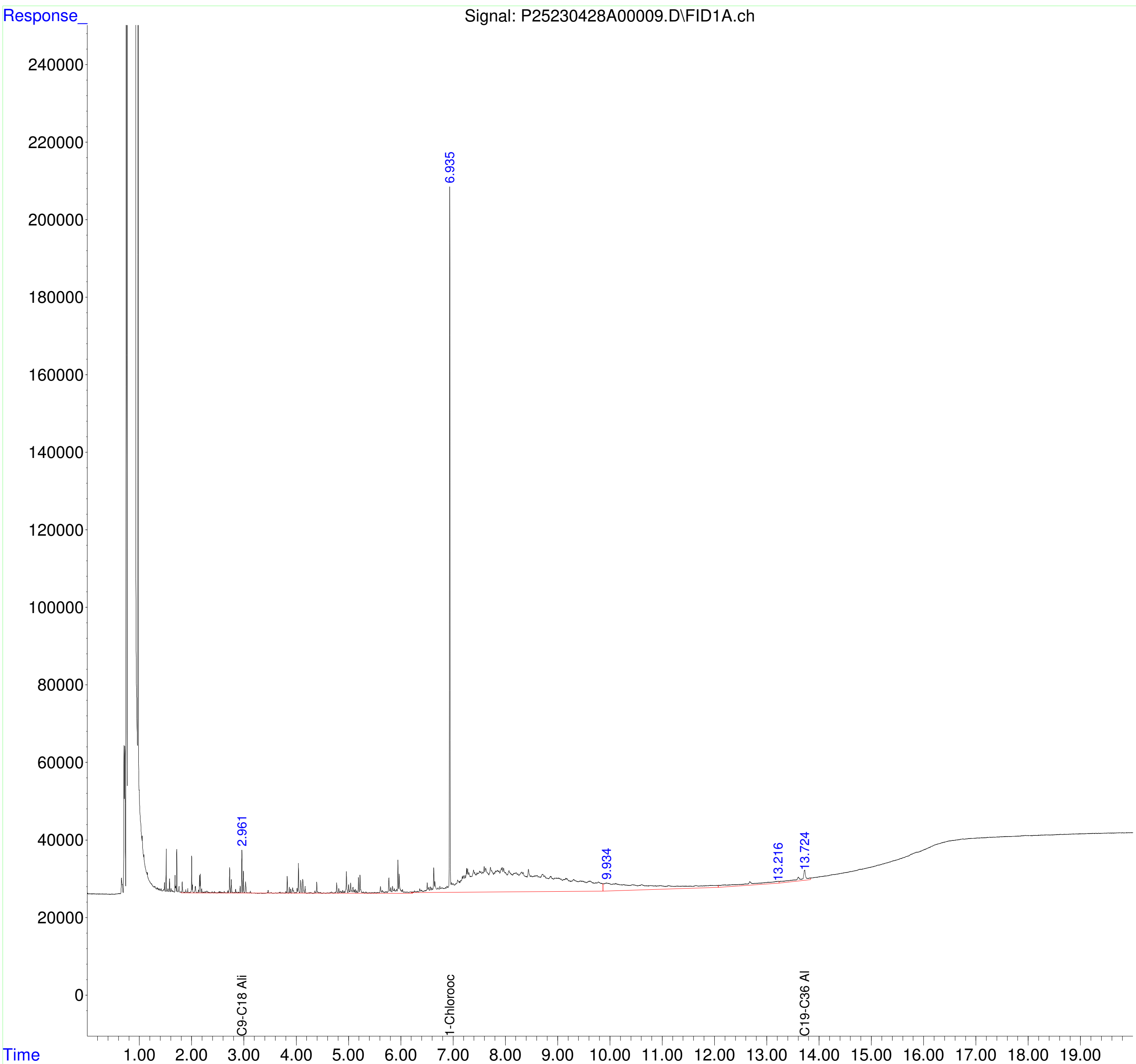
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00009.D
Signal(s) : FID1A.ch
Acq On    : 28-Apr-2023, 16:44:25
Operator  : SYSTEM
Sample    : L2322455-13,42,,
Misc      :
ALS Vial  : 9   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 01 09:12:53 2023
Quant Method : I:\PETRO\Petro25\2023\230428\MAALI220425D.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 27 17:17:30 2023
Response via : Initial Calibration
Integrator: ChemStation

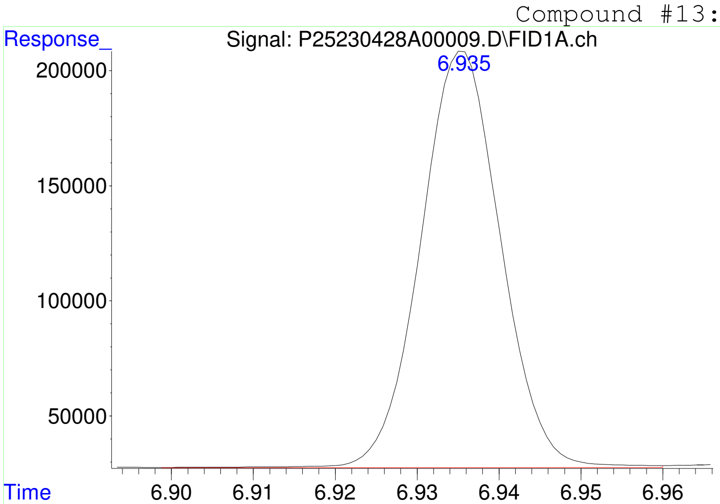
Volume Inj.  :
Signal Phase :
Signal Info  :

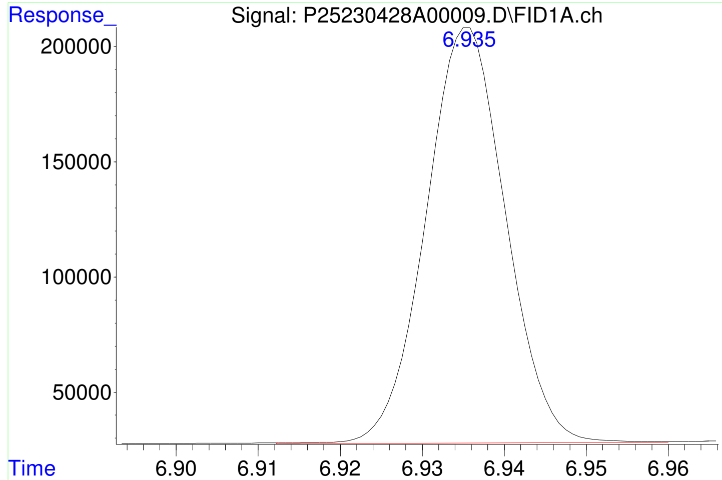


# Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro25\2023\230428\ | QMethod | : MAALI220425D.M |
| Data File | : P25230428A00009.D | Operator | : SYSTEM |
| Date Inj'd | : 4/28/2023 16:44 25 | Instrument | : GCI |
| Sample | : L2322455-13,42,, | Quant Date | : 5/1/2023 9:06 am |

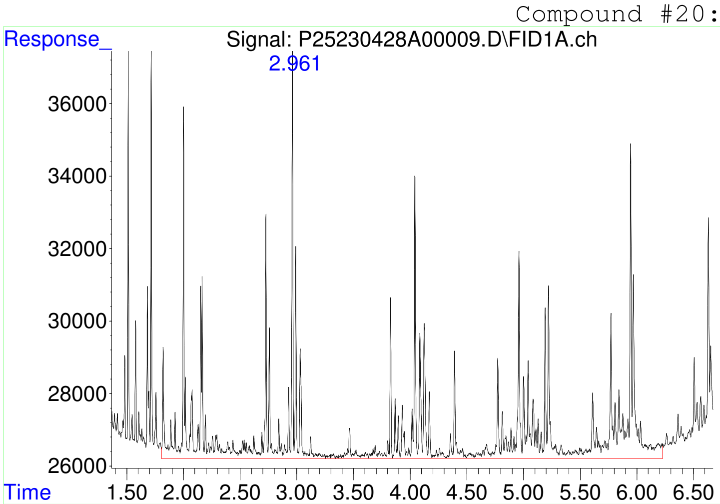
Compound #13: 1-Chlorooctadecane

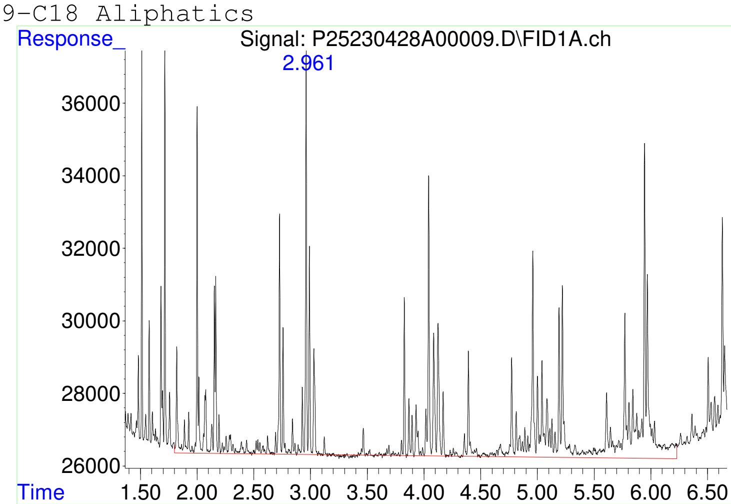



Original Peak Response = 1231137
Manual Peak Response = 1222069 M4
M4 = Poor automated baseline construction.

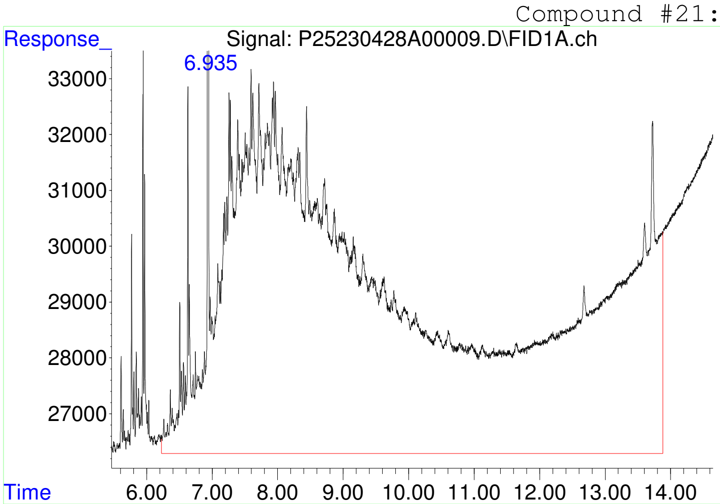
Compound #20: C9-C18 Aliphatics

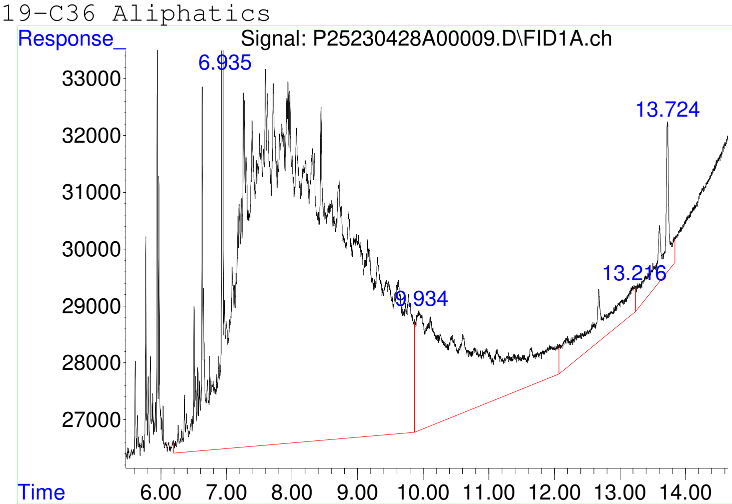



Original Peak Response = 1493408
Manual Peak Response = 1294944 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 13467625
Manual Peak Response = 8847435 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00010.D
Signal(s) : FID1A.ch
Acq On : 28-Apr-2023, 17:09:28
Operator : SYSTEM
Sample : L2322455-14,42,,
Misc :
ALS Vial : 10 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 01 09:13:39 2023
Quant Method : I:\PETRO\Petro25\2023\230428\MAALI220425D.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu Apr 27 17:17:30 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|
| **System Monitoring Compounds** | | | | | |
| 3) S Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S 1-Chlorooctadecane | 6.930 | 1143254 | 13.309 | mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 66.55% | | |
| **Target Compounds** | | | | | |
| 1) Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H C9-C18 Aliphatics | 5.938 | 1579564 | 15.995 | mg/L | M5 |
| 21) H C19-C36 Aliphatics | 13.713f | 9683947 | 99.979 | mg/L | M5 |

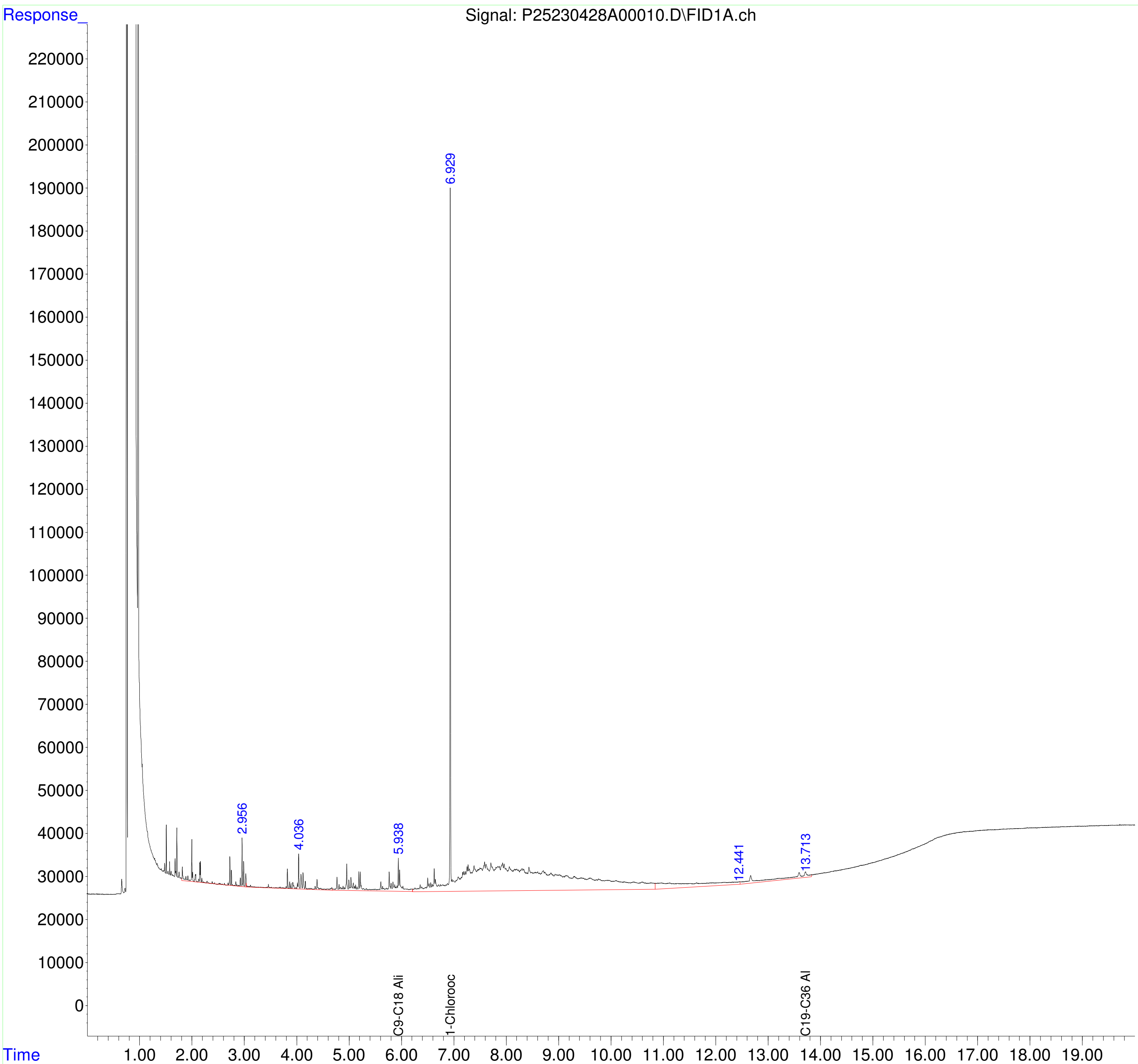
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00010.D
Signal(s) : FID1A.ch
Acq On    : 28-Apr-2023, 17:09:28
Operator  : SYSTEM
Sample    : L2322455-14,42,,
Misc      :
ALS Vial  : 10   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 01 09:13:39 2023
Quant Method : I:\PETRO\Petro25\2023\230428\MAALI220425D.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu Apr 27 17:17:30 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

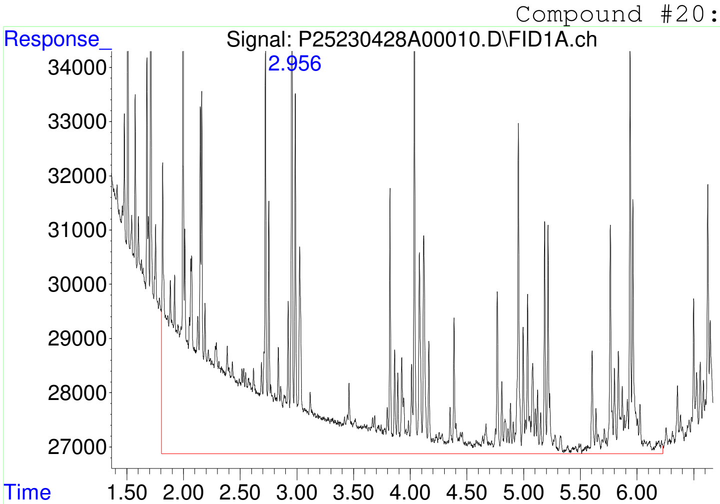


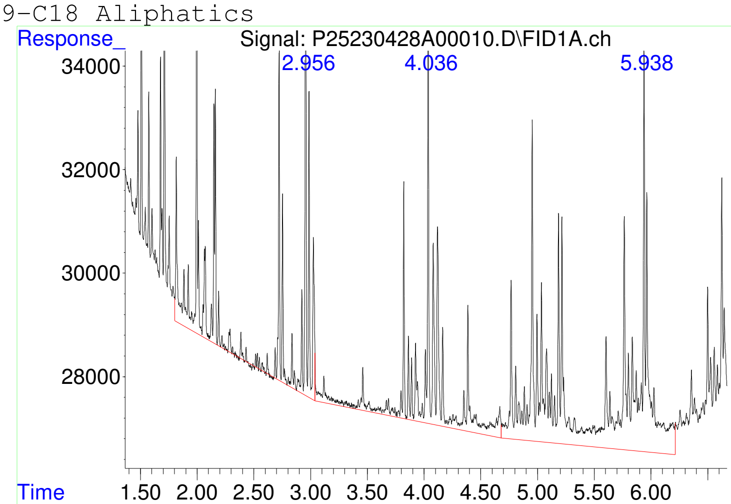
Manual Integration Report

Data Path : I:\PETRO\Petro25\2023\230428\
Data File : P25230428A00010.D
Date Inj'd : 4/28/2023 17:09 28
Sample : L2322455-14,42,,

QMethod : MAALI220425D.M
Operator : SYSTEM
Instrument : GCI
Quant Date : 5/1/2023 9:06 am

Compound #20: C9-C18 Aliphatics



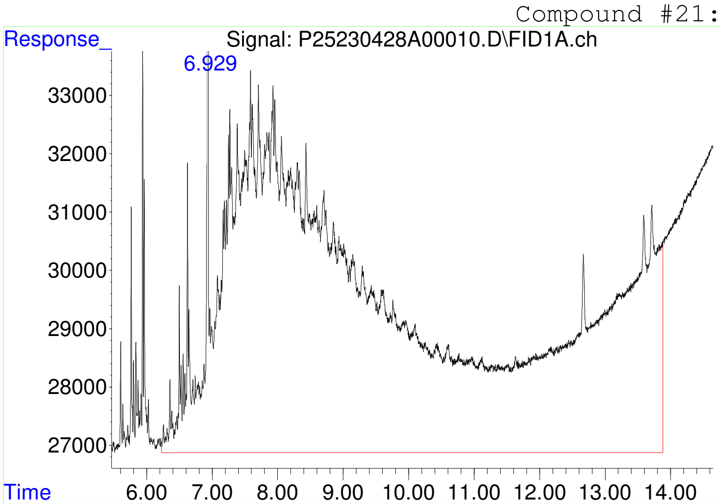



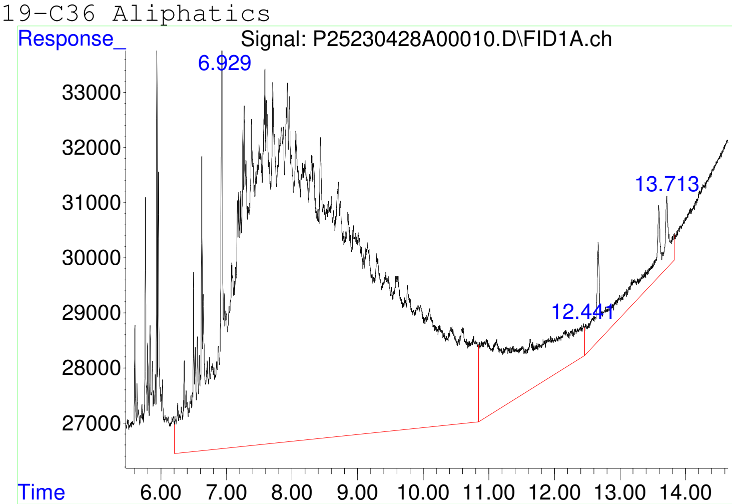

Original Peak Response = 2719132

Manual Peak Response = 1579564 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 11935343

Manual Peak Response = 9683947 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00002.D
Signal(s) : FID2B.ch
Acq On : 28-Apr-2023, 13:22:35
Operator : SYSTEM
Sample : WG1772046-1,42,,
Misc :
ALS Vial : 52 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 01 09:17:11 2023
Quant Method : I:\PETRO\Petro25\2023\230428.sec\MAARO220425D.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 27 16:59:42 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units |
|---|---|---|---|
| **System Monitoring Compounds** | | | |
| 3) s 2-Fluorobiphenyl | 4.244 | 1371282 | 17.383 mg/L |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 86.91% | |
| 5) s 2-Bromonaphthalene | 4.751 | 966808 | 17.650 mg/L |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 88.25% | |
| 10) S o-terphenyl | 6.269 | 1474613 | 16.317 mg/L |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 81.58% | |
| **Target Compounds** | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L d |
| 21) H C11-C22 Aromatic Range | 11.769 | 2491088 | 27.736 mg/L M5 |

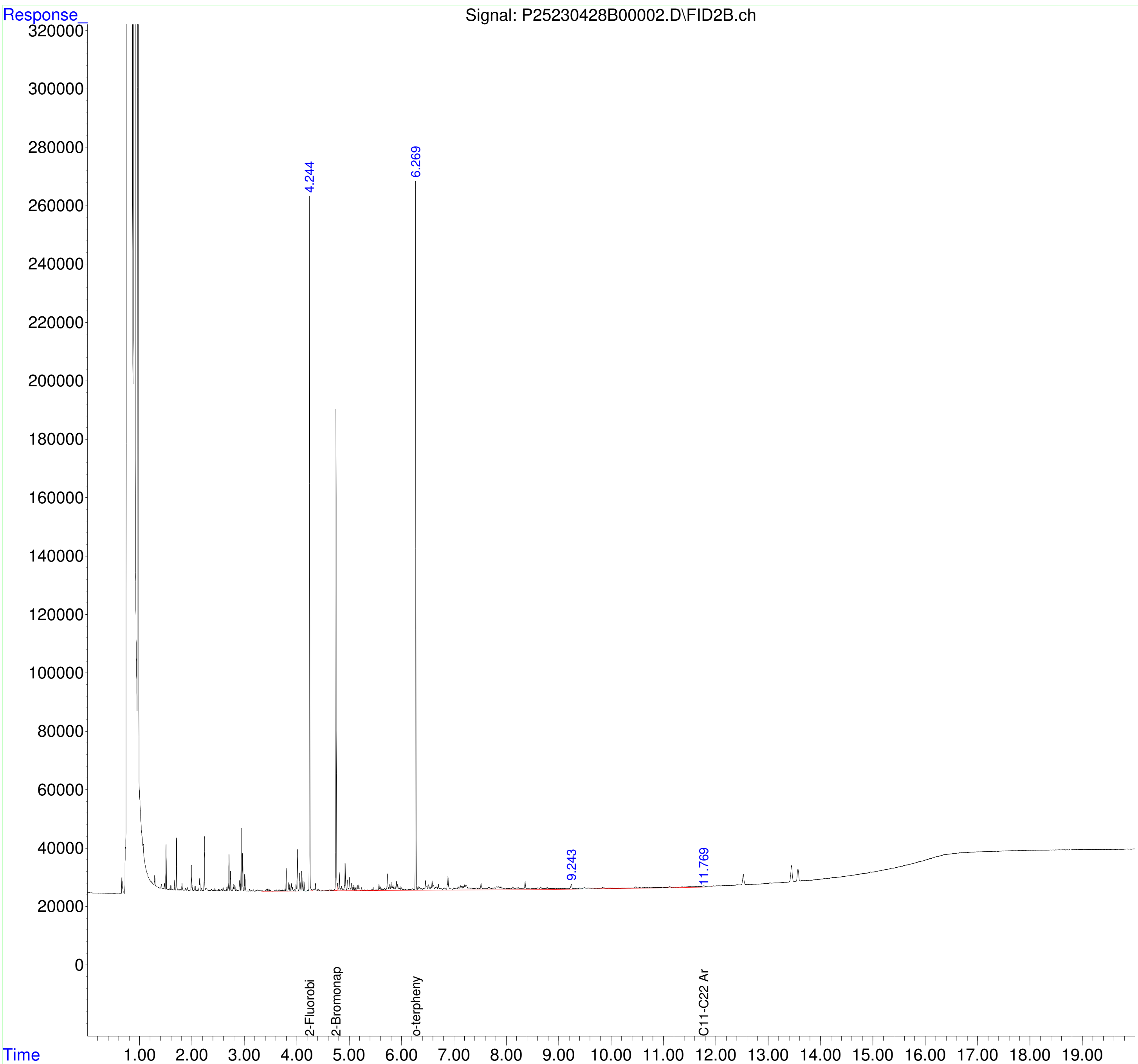
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00002.D
Signal(s) : FID2B.ch
Acq On     : 28-Apr-2023, 13:22:35
Operator  : SYSTEM
Sample     : WG1772046-1,42,,
Misc       :
ALS Vial  : 52   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 01 09:17:11 2023
Quant Method : I:\PETRO\Petro25\2023\230428.sec\MAARO220425D.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 27 16:59:42 2023
Response via : Initial Calibration
Integrator: ChemStation

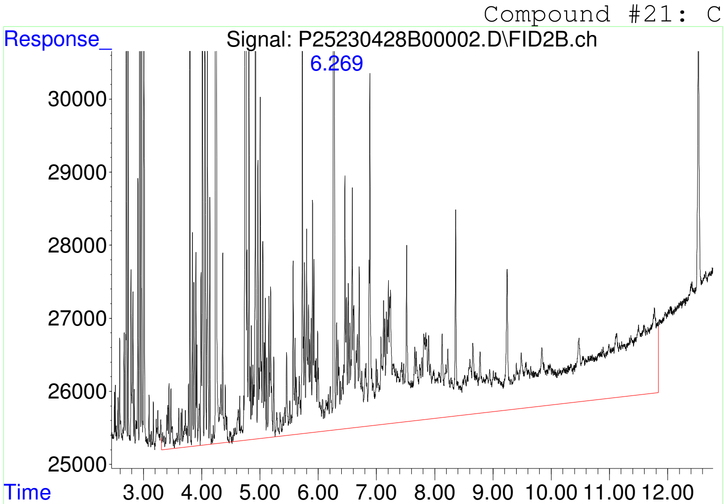
Volume Inj.  :
Signal Phase :
Signal Info  :

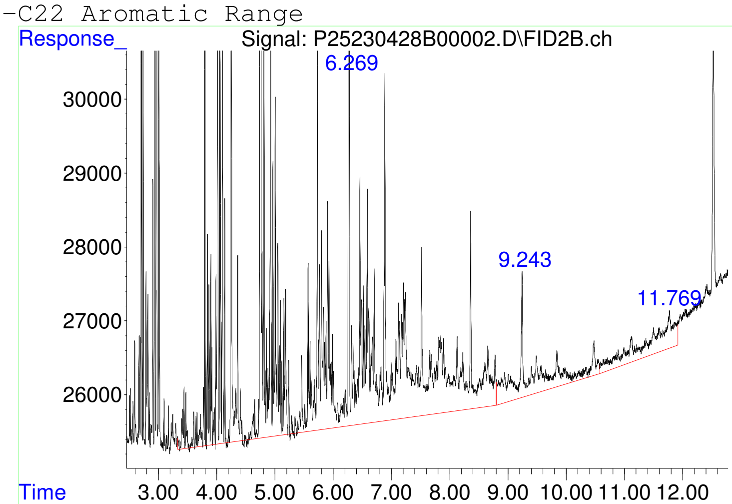


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro25\2023\230428.sec\ | QMethod | : MAARO220425D.M |
| Data File | : P25230428B00002.D | Operator | : SYSTEM |
| Date Inj'd | : 4/28/2023 13:22 35 | Instrument | : GCI |
| Sample | : WG1772046-1,42,, | Quant Date | : 5/1/2023  9:14 am |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3547233    Manual Peak Response = 2491088 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00003.D
Signal(s) : FID2B.ch
Acq On : 28-Apr-2023, 14:08:55
Operator : SYSTEM
Sample : WG1772046-2,42,,
Misc :
ALS Vial : 53 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 01 09:17:43 2023
Quant Method : I:\PETRO\Petro25\2023\230428.sec\MAARO220425D.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 27 16:59:42 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.244 | 1310186 | 16.609 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 83.05% | | |
| 5) s 2-Bromonaphthalene | 4.750 | 918841 | 16.774 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 83.87% | | |
| 10) S o-terphenyl | 6.268 | 1358169 | 15.028 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 75.14% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 11.760 | 2444655 | 27.219 mg/L | M5 |

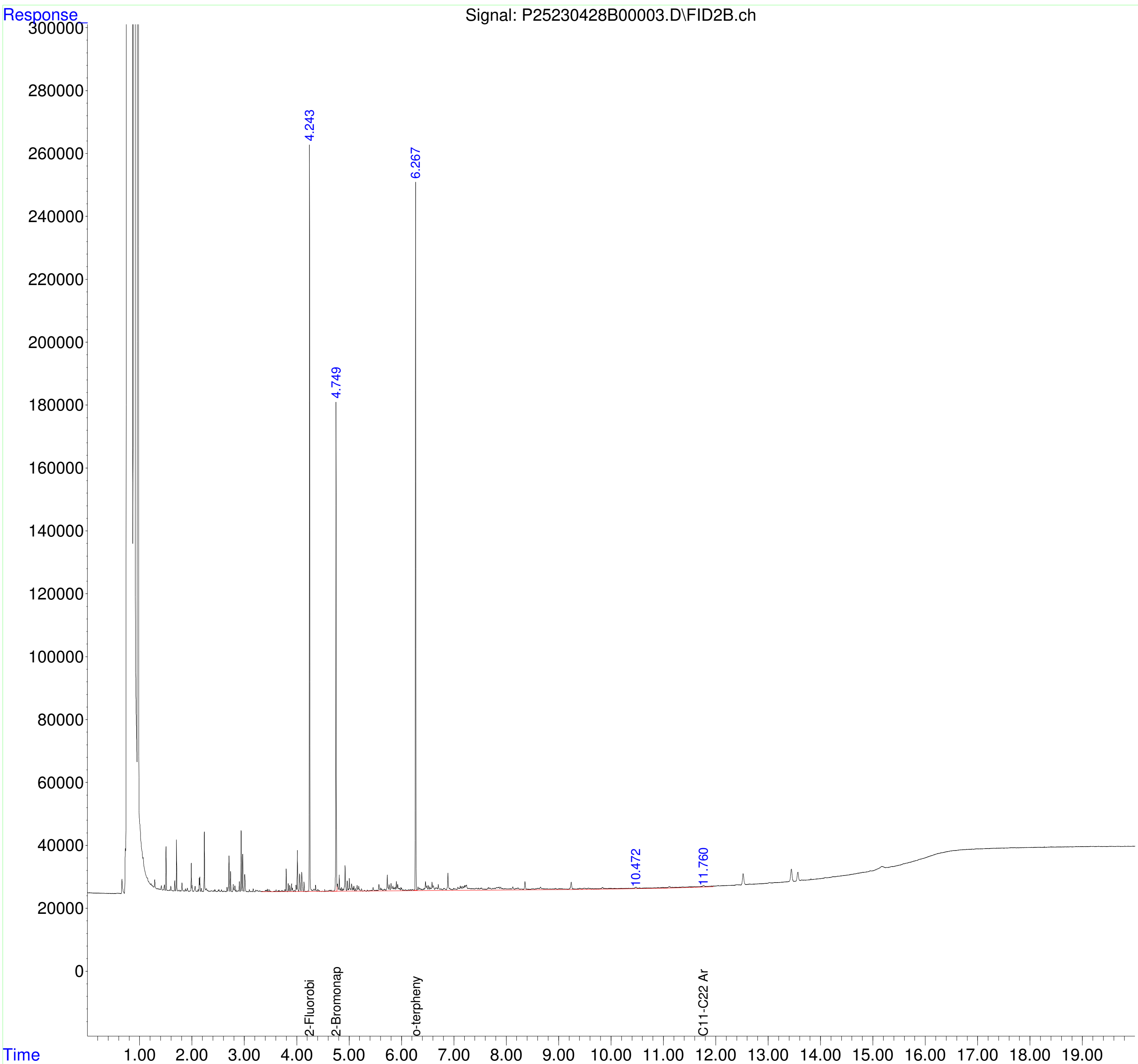
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00003.D
Signal(s) : FID2B.ch
Acq On    : 28-Apr-2023, 14:08:55
Operator  : SYSTEM
Sample    : WG1772046-2,42,,
Misc      :
ALS Vial  : 53   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 01 09:17:43 2023
Quant Method : I:\PETRO\Petro25\2023\230428.sec\MAARO220425D.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 27 16:59:42 2023
Response via : Initial Calibration
Integrator: ChemStation

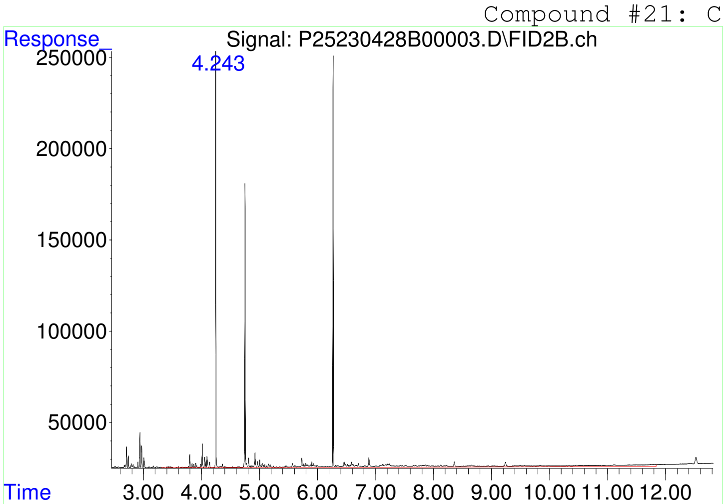
Volume Inj.  :
Signal Phase :
Signal Info  :

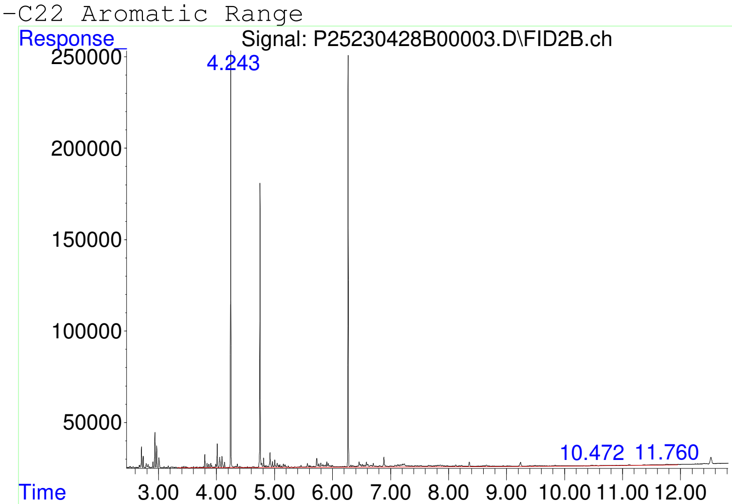


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro25\2023\230428.sec\ | QMethod | : MAARO220425D.M |
| Data File | : P25230428B00003.D | Operator | : SYSTEM |
| Date Inj'd | : 4/28/2023 14:08 55 | Instrument | : GCI |
| Sample | : WG1772046-2,42,, | Quant Date | : 5/1/2023 9:14 am |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3441760 Manual Peak Response = 2444655 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00004.D
Signal(s) : FID2B.ch
Acq On : 28-Apr-2023, 14:34:55
Operator : SYSTEM
Sample : WG1772046-3,42,,
Misc :
ALS Vial : 54 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 01 09:18:36 2023
Quant Method : I:\PETRO\Petro25\2023\230428.sec\MAARO220425D.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 27 16:59:42 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| System Monitoring Compounds | | | | |
| 3) s 2-Fluorobiphenyl | 4.239 | 1188700 | 15.069 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 75.35% | |
| 5) s 2-Bromonaphthalene | 4.745 | 829566 | 15.144 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 75.72% | |
| 10) S o-terphenyl | 6.261 | 1266627 | 14.015 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 70.08% | |
| Target Compounds | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 11.740 | 2141845 | 23.848 mg/L | M5 |

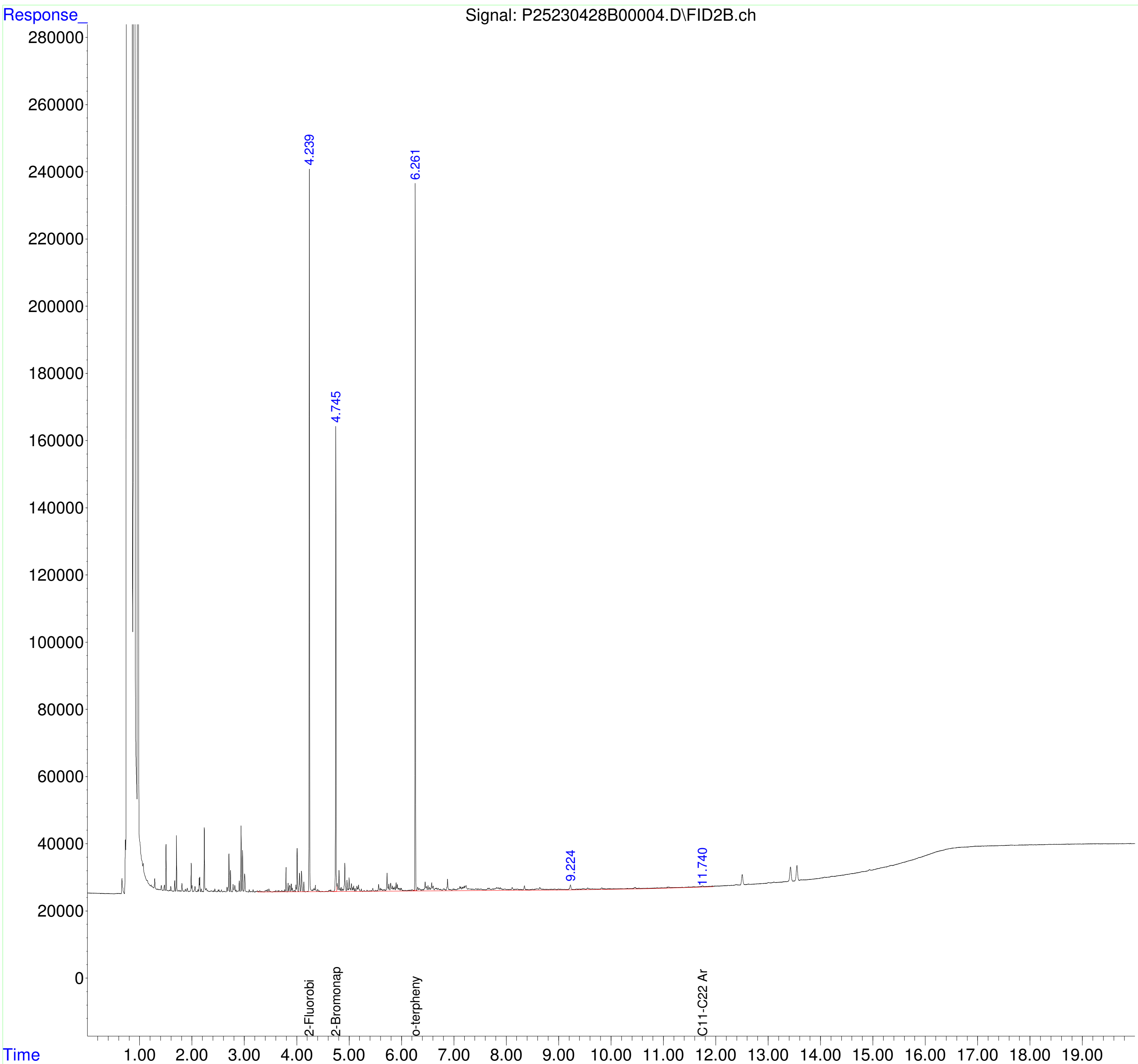
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00004.D
Signal(s) : FID2B.ch
Acq On    : 28-Apr-2023, 14:34:55
Operator  : SYSTEM
Sample    : WG1772046-3,42,,
Misc      :
ALS Vial  : 54   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 01 09:18:36 2023
Quant Method : I:\PETRO\Petro25\2023\230428.sec\MAARO220425D.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 27 16:59:42 2023
Response via : Initial Calibration
Integrator: ChemStation

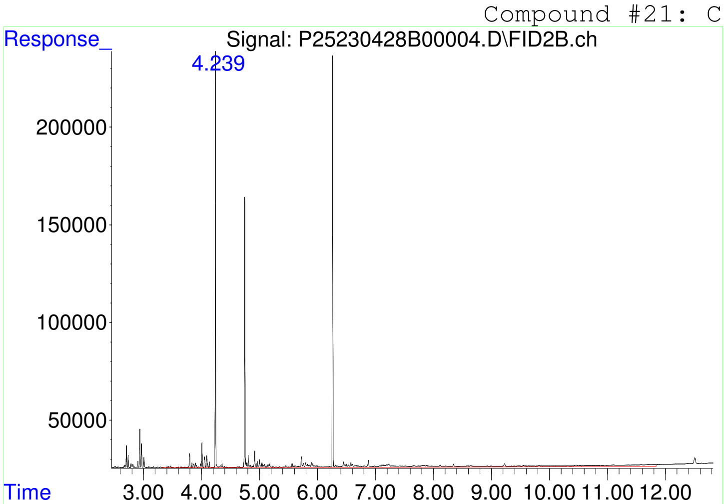
Volume Inj.  :
Signal Phase :
Signal Info  :

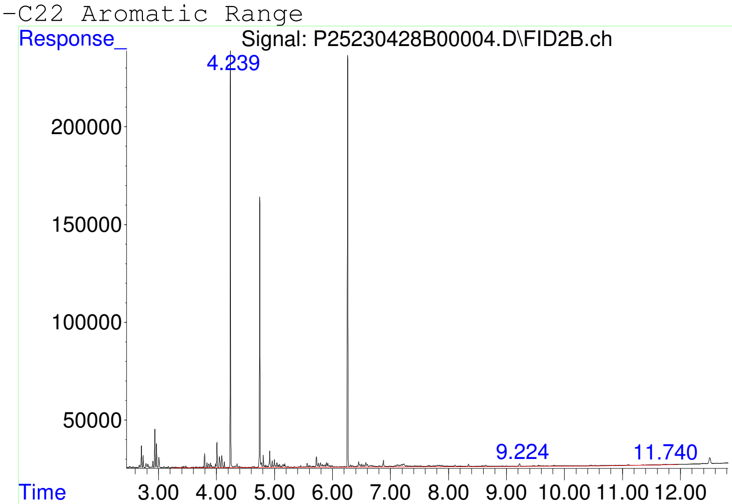


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro25\2023\230428.sec\ | QMethod | : MAARO220425D.M |
| Data File | : P25230428B00004.D | Operator | : SYSTEM |
| Date Inj'd | : 4/28/2023 14:34 55 | Instrument | : GCI |
| Sample | : WG1772046-3,42,, | Quant Date | : 5/1/2023 9:14 am |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3204140

Manual Peak Response = 2141845 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00005.D
Signal(s) : FID2B.ch
Acq On : 28-Apr-2023, 15:00:23
Operator : SYSTEM
Sample : L2322455-04,42,,
Misc :
ALS Vial : 55 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 01 09:30:39 2023
Quant Method : I:\PETRO\Petro25\2023\230428.sec\MAARO220425D.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 27 16:59:42 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units |
|---|---|---|---|
| **System Monitoring Compounds** | | | |
| 3) s 2-Fluorobiphenyl | 4.239 | 1162839 | 14.741 mg/L |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 73.70% |
| 5) s 2-Bromonaphthalene | 4.744 | 812412 | 14.831 mg/L |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 74.15% |
| 10) S o-terphenyl | 6.260 | 1280234 | 14.166 mg/L |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 70.83% |
| **Target Compounds** | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L |
| 21) H C11-C22 Aromatic Range | 11.931 | 2428555 | 27.040 mg/L M5 |

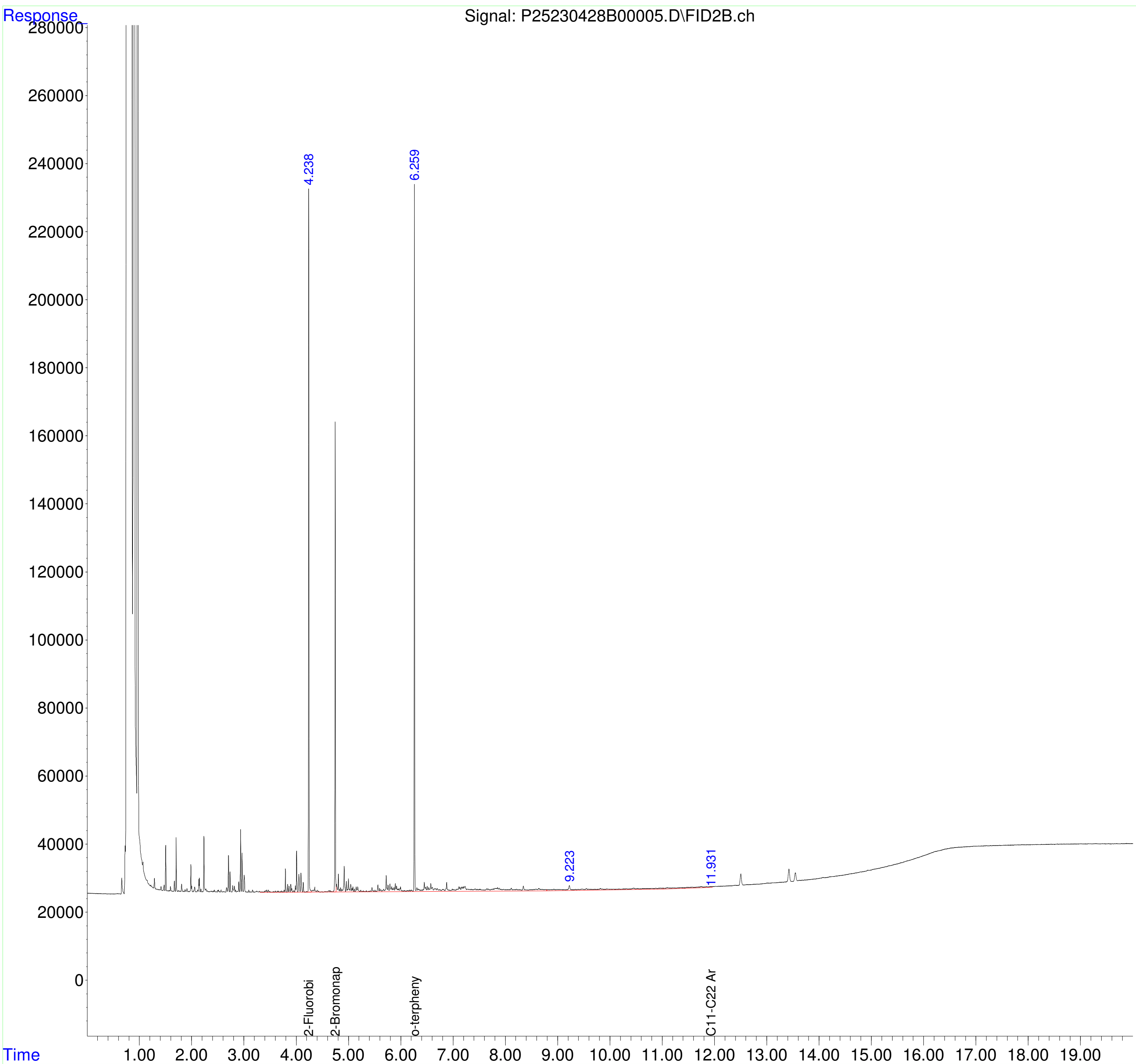
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00005.D
Signal(s) : FID2B.ch
Acq On    : 28-Apr-2023, 15:00:23
Operator  : SYSTEM
Sample    : L2322455-04,42,,
Misc      :
ALS Vial  : 55   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 01 09:30:39 2023
Quant Method : I:\PETRO\Petro25\2023\230428.sec\MAARO220425D.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 27 16:59:42 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

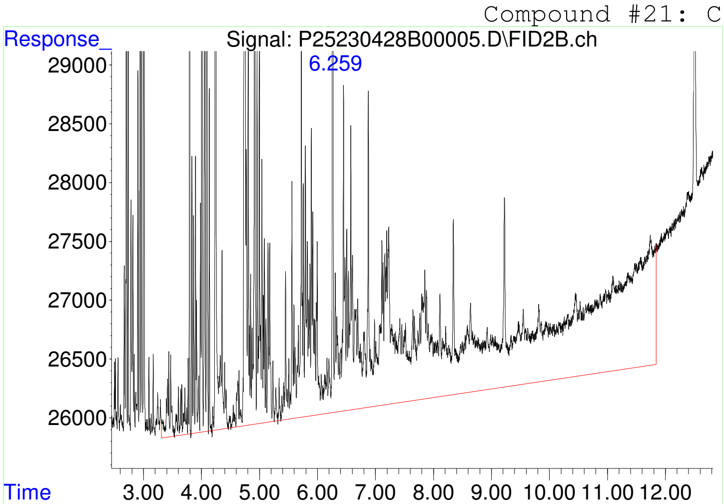


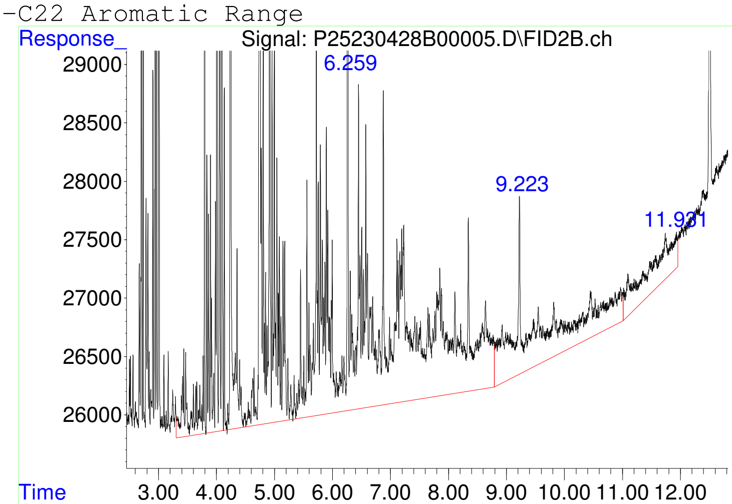
Manual Integration Report

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00005.D
Date Inj'd : 4/28/2023 15:00 23
Sample : L2322455-04,42,,

QMethod : MAARO220425D.M
Operator : SYSTEM
Instrument : GCI
Quant Date : 5/1/2023 9:14 am

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 2952999

Manual Peak Response = 2428555 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00006.D
Signal(s) : FID2B.ch
Acq On : 28-Apr-2023, 15:25:44
Operator : SYSTEM
Sample : L2322455-05,42,,
Misc :
ALS Vial : 56 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 01 09:31:42 2023
Quant Method : I:\PETRO\Petro25\2023\230428.sec\MAARO220425D.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 27 16:59:42 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.239 | 1268095 | 16.075 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 80.38% | | |
| 5) s 2-Bromonaphthalene | 4.744 | 889665 | 16.241 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 81.20% | | |
| 10) S o-terphenyl | 6.260 | 1381952 | 15.291 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 76.46% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 11.742 | 2372957 | 26.421 mg/L | M5 |

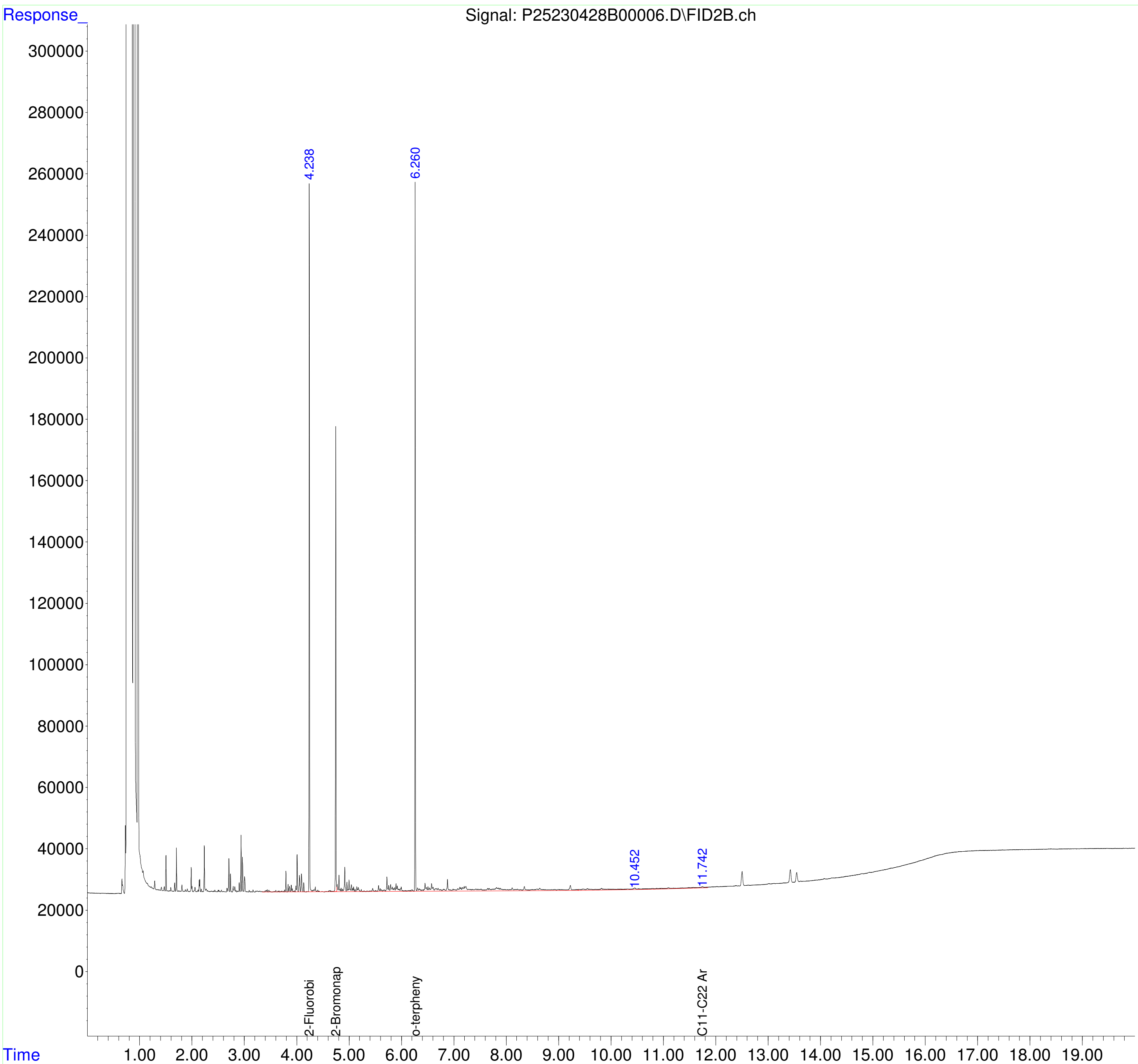
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00006.D
Signal(s) : FID2B.ch
Acq On : 28-Apr-2023, 15:25:44
Operator : SYSTEM
Sample : L2322455-05,42,,
Misc :
ALS Vial : 56 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 01 09:31:42 2023
Quant Method : I:\PETRO\Petro25\2023\230428.sec\MAARO220425D.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 27 16:59:42 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

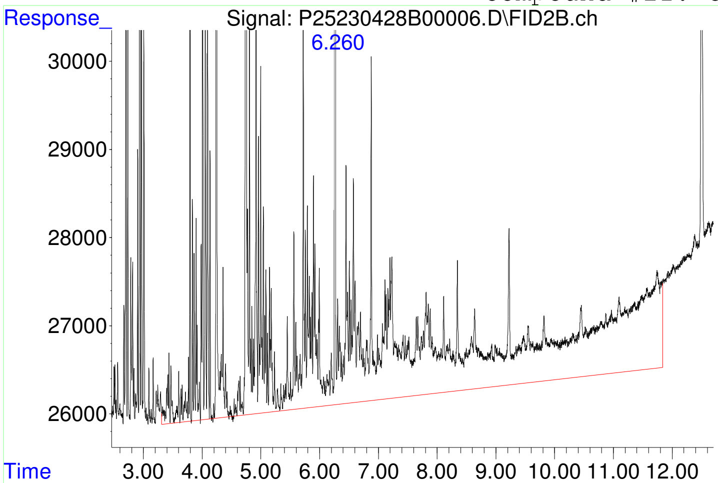


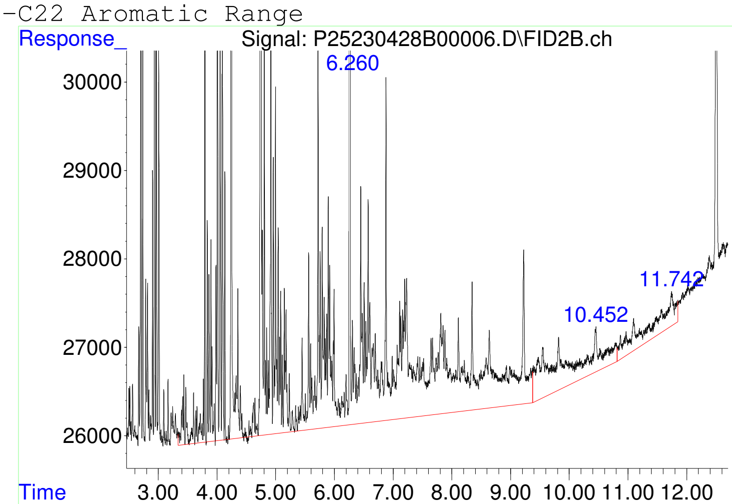
Manual Integration Report

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00006.D
Date Inj'd : 4/28/2023 15:25 44
Sample : L2322455-05,42,,

QMethod : MAARO220425D.M
Operator : SYSTEM
Instrument : GCI
Quant Date : 5/1/2023 9:14 am

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 2987435

Manual Peak Response = 2372957 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

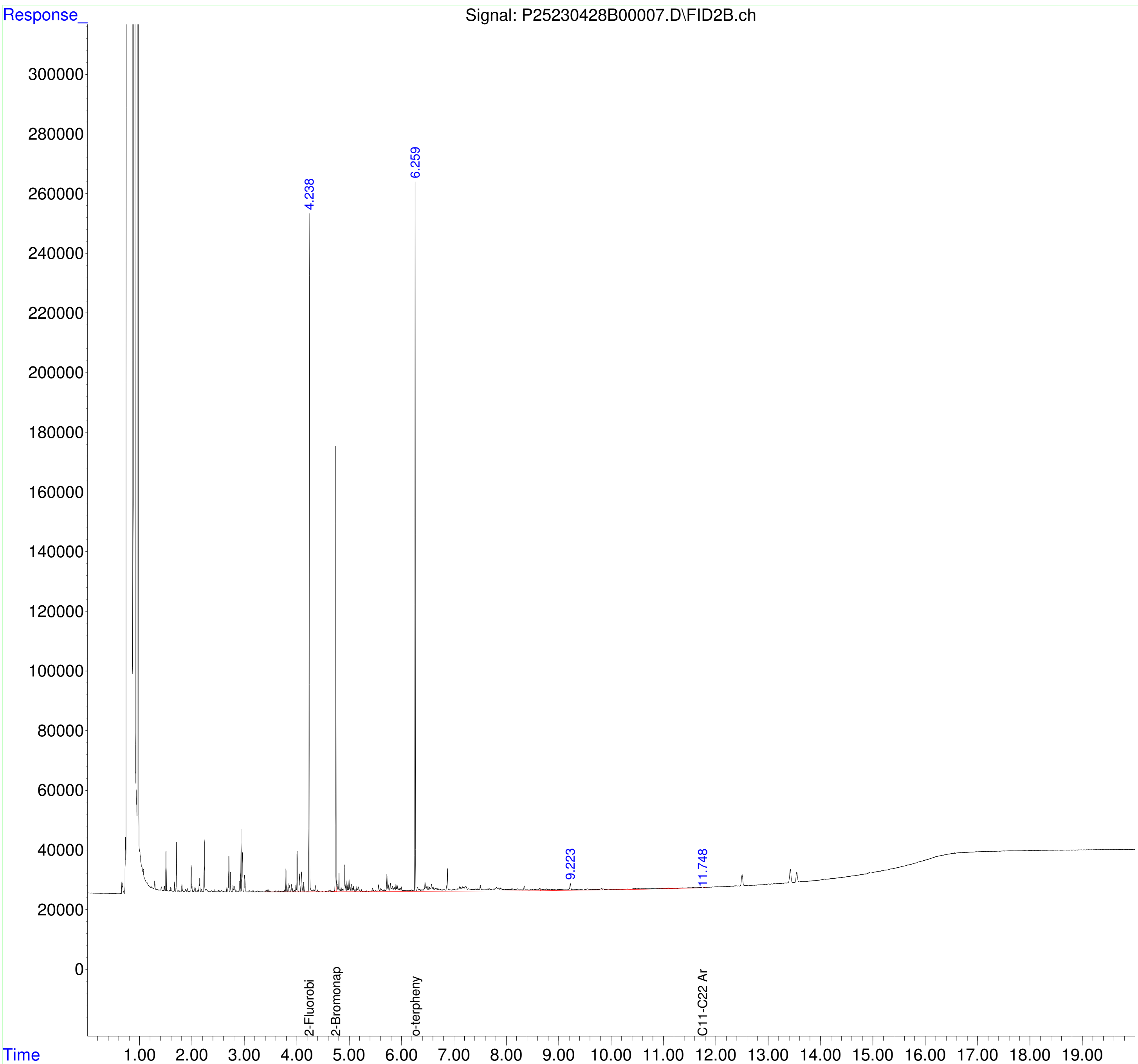
```
Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00007.D
Signal(s) : FID2B.ch
Acq On    : 28-Apr-2023, 15:51:09
Operator  : SYSTEM
Sample    : L2322455-06,42,,
Misc      :
ALS Vial  : 57   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 01 09:32:13 2023
Quant Method : I:\PETRO\Petro25\2023\230428.sec\MAARO220425D.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 27 16:59:42 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed

        Compound                         R.T.       Response    Conc Units
 ----------------------------------------------------------------------------

 System Monitoring Compounds
 3) s   2-Fluorobiphenyl                 4.239       1263133   16.012 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   80.06%
 5) s   2-Bromonaphthalene               4.744        889225   16.233 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   81.16%
10) S   o-terphenyl                      6.259       1423768   15.754 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   78.77%

 Target Compounds
 1)     Naphthalene                      0.000             0    N.D.  mg/L  d
 2)     2-Methylnaphthalene              0.000             0    N.D.  mg/L  d
 4)     Acenaphthalene                   0.000             0    N.D.  mg/L  d
 6)     Acenaphthene                     0.000             0    N.D.  mg/L  d
 7)     Fluorene                         0.000             0    N.D.  mg/L  d
 8)     Phenanthrene                     0.000             0    N.D.  mg/L  d
 9)     Anthracene                       0.000             0    N.D.  mg/L  d
11)     Fluoranthene                     0.000             0    N.D.  mg/L  d
12)     Pyrene                           0.000             0    N.D.  mg/L  d
13)     Benzo(a)anthracene               0.000             0    N.D.  mg/L  d
14)     Chrysene                         0.000             0    N.D.  mg/L  d
15)     Benzo(b)fluoranthene             0.000             0    N.D.  mg/L  d
16)     Benzo(k)fluoranthene             0.000             0    N.D.  mg/L
17)     Benzo(a)pyrene                   0.000             0    N.D.  mg/L
18)     Indeno(1,2,3-cd)pyrene           0.000             0    N.D.  mg/L
19)     Dibenzo(a,h)anthracene           0.000             0    N.D.  mg/L
20)     Benzo(ghi)perylene               0.000             0    N.D.  mg/L
21) H   C11-C22 Aromatic Range          11.748       2614851   29.114 mg/L  M5
 ----------------------------------------------------------------------------

(f)=RT Delta > 1/2 Window                             (m)=manual int.
```

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00007.D
Signal(s) : FID2B.ch
Acq On    : 28-Apr-2023, 15:51:09
Operator  : SYSTEM
Sample    : L2322455-06,42,,
Misc      :
ALS Vial  : 57   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 01 09:32:13 2023
Quant Method : I:\PETRO\Petro25\2023\230428.sec\MAARO220425D.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 27 16:59:42 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

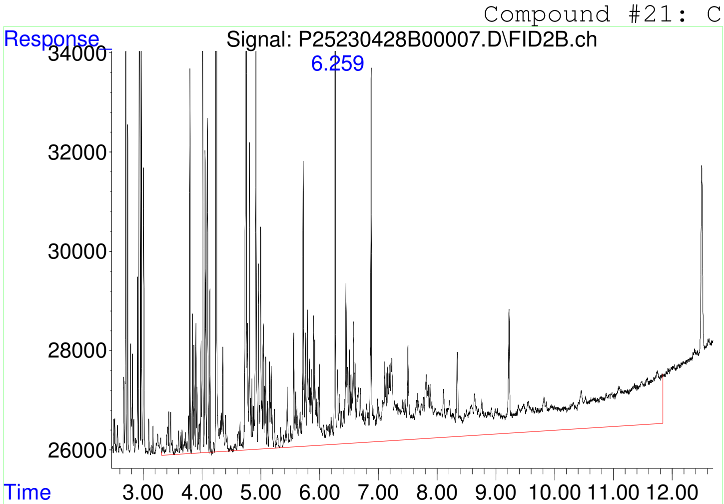


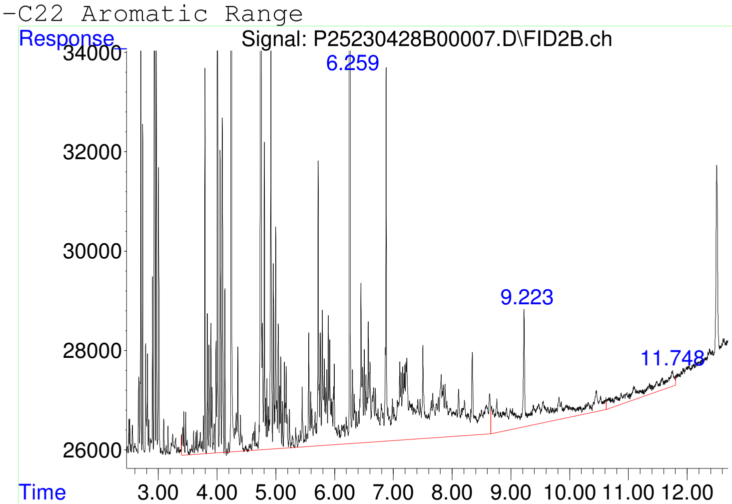
Manual Integration Report

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00007.D
Date Inj'd : 4/28/2023 15:51 09
Sample : L2322455-06,42,,

QMethod : MAARO220425D.M
Operator : SYSTEM
Instrument : GCI
Quant Date : 5/1/2023 9:15 am

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3319440

Manual Peak Response = 2614851 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00008.D
Signal(s) : FID2B.ch
Acq On : 28-Apr-2023, 16:15:59
Operator : SYSTEM
Sample : L2322455-12,42,,
Misc :
ALS Vial : 58 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 01 09:32:41 2023
Quant Method : I:\PETRO\Petro25\2023\230428.sec\MAARO220425D.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 27 16:59:42 2023
Response via : Initial Calibration
Integrator: ChemStation

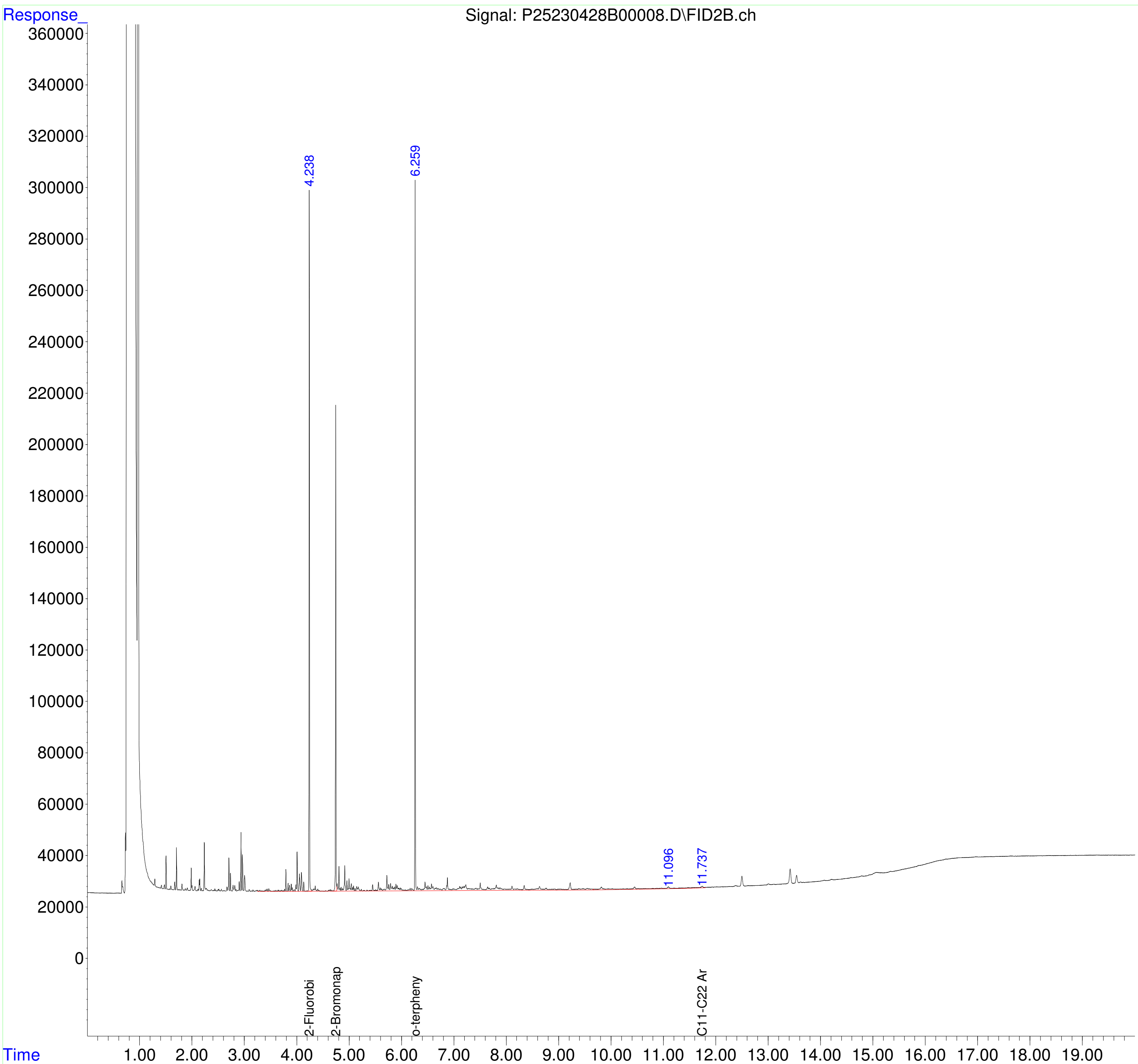
Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.238 | 1528838 | 19.380 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 96.90% | | |
| 5) s 2-Bromonaphthalene | 4.744 | 1084939 | 19.806 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 99.03% | | |
| 10) S o-terphenyl | 6.259 | 1695437 | 18.760 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 93.80% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 11.737 | 2852779 | 31.763 mg/L | M5 |

(f)=RT Delta > 1/2 Window (m)=manual int.

```
Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00008.D
Signal(s) : FID2B.ch
Acq On    : 28-Apr-2023, 16:15:59
Operator  : SYSTEM
Sample    : L2322455-12,42,,
Misc      :
ALS Vial  : 58   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 01 09:32:41 2023
Quant Method : I:\PETRO\Petro25\2023\230428.sec\MAARO220425D.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 27 16:59:42 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :
```

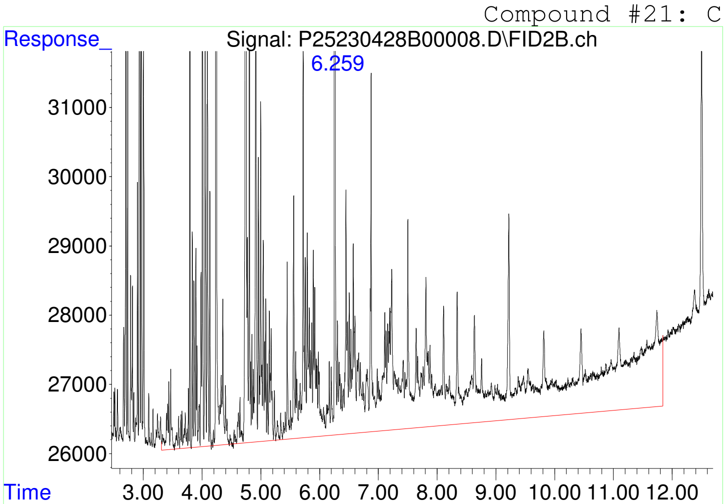


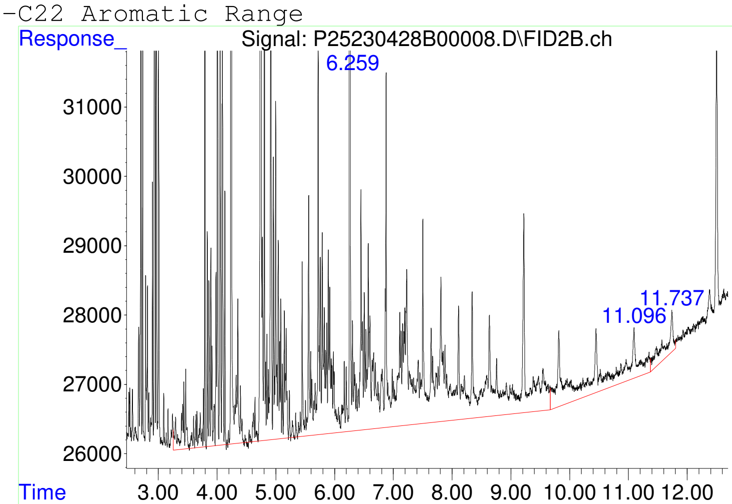
Manual Integration Report

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00008.D
Date Inj'd : 4/28/2023 16:15 59
Sample : L2322455-12,42,,

QMethod : MAARO220425D.M
Operator : SYSTEM
Instrument : GCI
Quant Date : 5/1/2023 9:15 am

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3581195

Manual Peak Response = 2852779 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00009.D
Signal(s) : FID2B.ch
Acq On : 28-Apr-2023, 16:44:25
Operator : SYSTEM
Sample : L2322455-13,42,,
Misc :
ALS Vial : 59 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 01 09:33:08 2023
Quant Method : I:\PETRO\Petro25\2023\230428.sec\MAARO220425D.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 27 16:59:42 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.240 | 1249322 | 15.837 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 79.18% | |
| 5) s 2-Bromonaphthalene | 4.746 | 877392 | 16.017 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 80.08% | |
| 10) S o-terphenyl | 6.262 | 1357941 | 15.026 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 75.13% | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 11.749 | 2348220 | 26.145 mg/L | M5 |

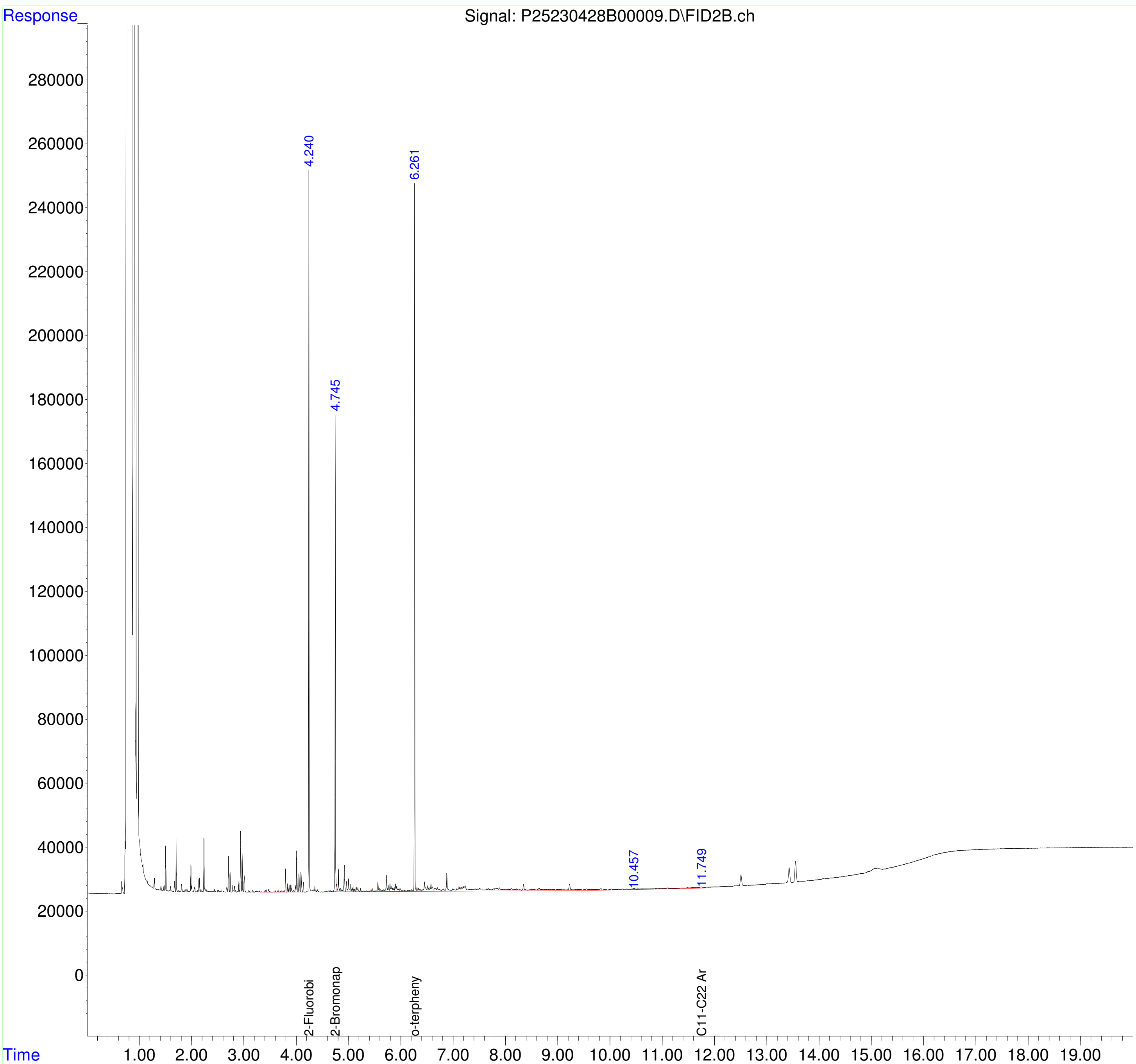
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00009.D
Signal(s) : FID2B.ch
Acq On     : 28-Apr-2023, 16:44:25
Operator  : SYSTEM
Sample     : L2322455-13,42,,
Misc       :
ALS Vial  : 59   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 01 09:33:08 2023
Quant Method : I:\PETRO\Petro25\2023\230428.sec\MAARO220425D.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 27 16:59:42 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

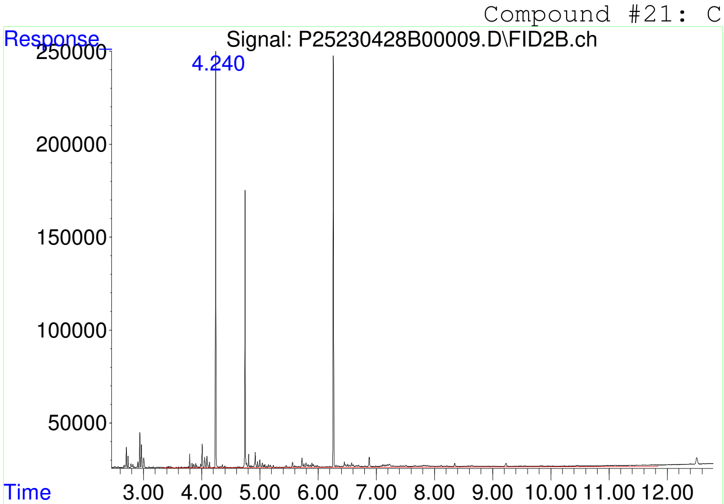


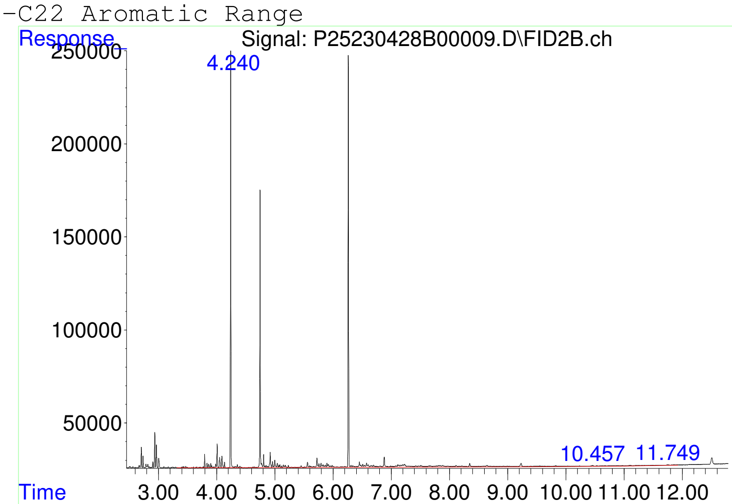
Manual Integration Report

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00009.D
Date Inj'd : 4/28/2023 16:44 25
Sample : L2322455-13,42,,

QMethod : MAARO220425D.M
Operator : SYSTEM
Instrument : GCI
Quant Date : 5/1/2023 9:15 am

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3077990

Manual Peak Response = 2348220 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00010.D
Signal(s) : FID2B.ch
Acq On : 28-Apr-2023, 17:09:28
Operator : SYSTEM
Sample : L2322455-14,42,,
Misc :
ALS Vial : 60 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 01 09:33:33 2023
Quant Method : I:\PETRO\Petro25\2023\230428.sec\MAARO220425D.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 27 16:59:42 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.238 | 1244690 | 15.778 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 78.89% | |
| 5) s 2-Bromonaphthalene | 4.744 | 879208 | 16.050 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 80.25% | |
| 10) S o-terphenyl | 6.259 | 1359672 | 15.045 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 75.22% | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 11.742 | 2291690 | 25.516 mg/L | M5 |

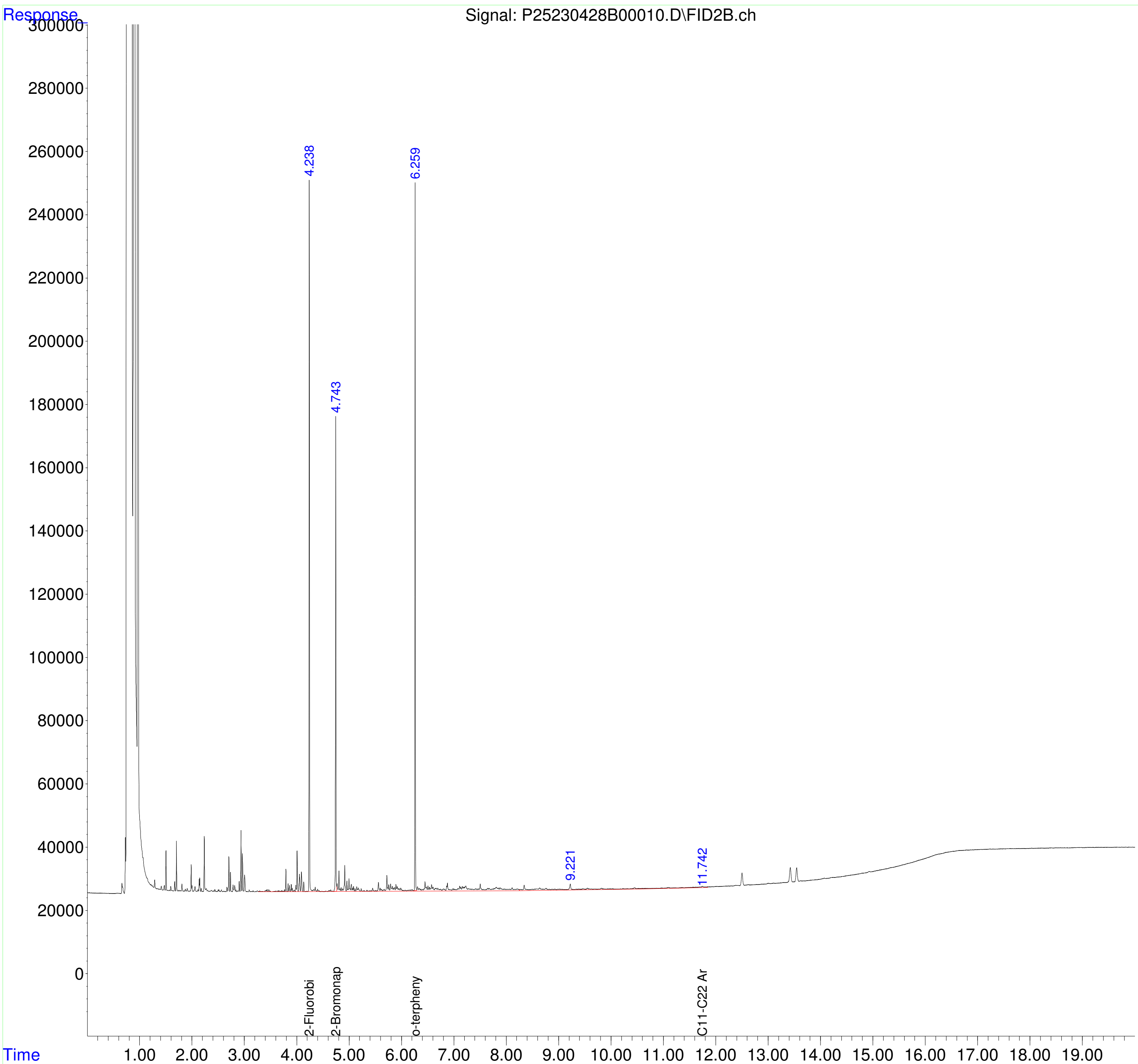
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00010.D
Signal(s) : FID2B.ch
Acq On : 28-Apr-2023, 17:09:28
Operator : SYSTEM
Sample : L2322455-14,42,,
Misc :
ALS Vial : 60 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 01 09:33:33 2023
Quant Method : I:\PETRO\Petro25\2023\230428.sec\MAARO220425D.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 27 16:59:42 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

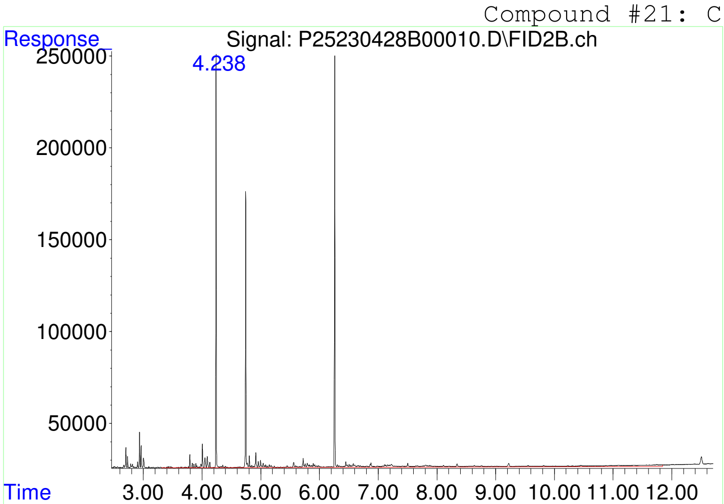


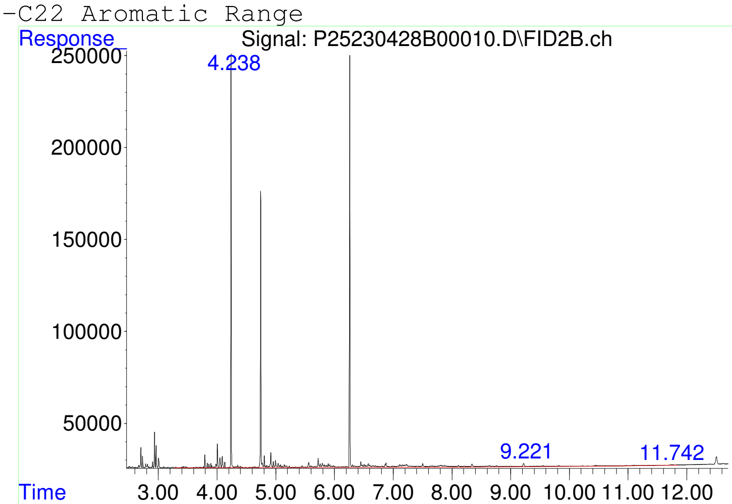
Manual Integration Report

Data Path : I:\PETRO\Petro25\2023\230428.sec\
Data File : P25230428B00010.D
Date Inj'd : 4/28/2023 17:09 28
Sample : L2322455-14,42,,

QMethod : MAARO220425D.M
Operator : SYSTEM
Instrument : GCI
Quant Date : 5/1/2023 9:15 am

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3057532
Manual Peak Response = 2291690 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230501N.SEC\
Data File : P11230501n05.D
Signal(s) : FID2B.CH
Acq On : 02-May-23, 09:46:07
Operator : petro11a/b:all
Sample : WG1772379-1,42,,
Misc :
ALS Vial : 53 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 02 13:49:52 2023
Quant Method : I:\PETRO\Petro11\2023\230501N.SEC\MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 27 08:38:54 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.282 | 1467107 | 19.009 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 95.05% | | |
| 5) s 2-Bromonaphthalene | 4.789 | 1033189 | 19.406 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 97.03% | | |
| 10) S o-terphenyl | 6.300 | 1578994 | 17.989 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 89.95% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 11.869 | 2252499 | 26.032 mg/L | M5 |

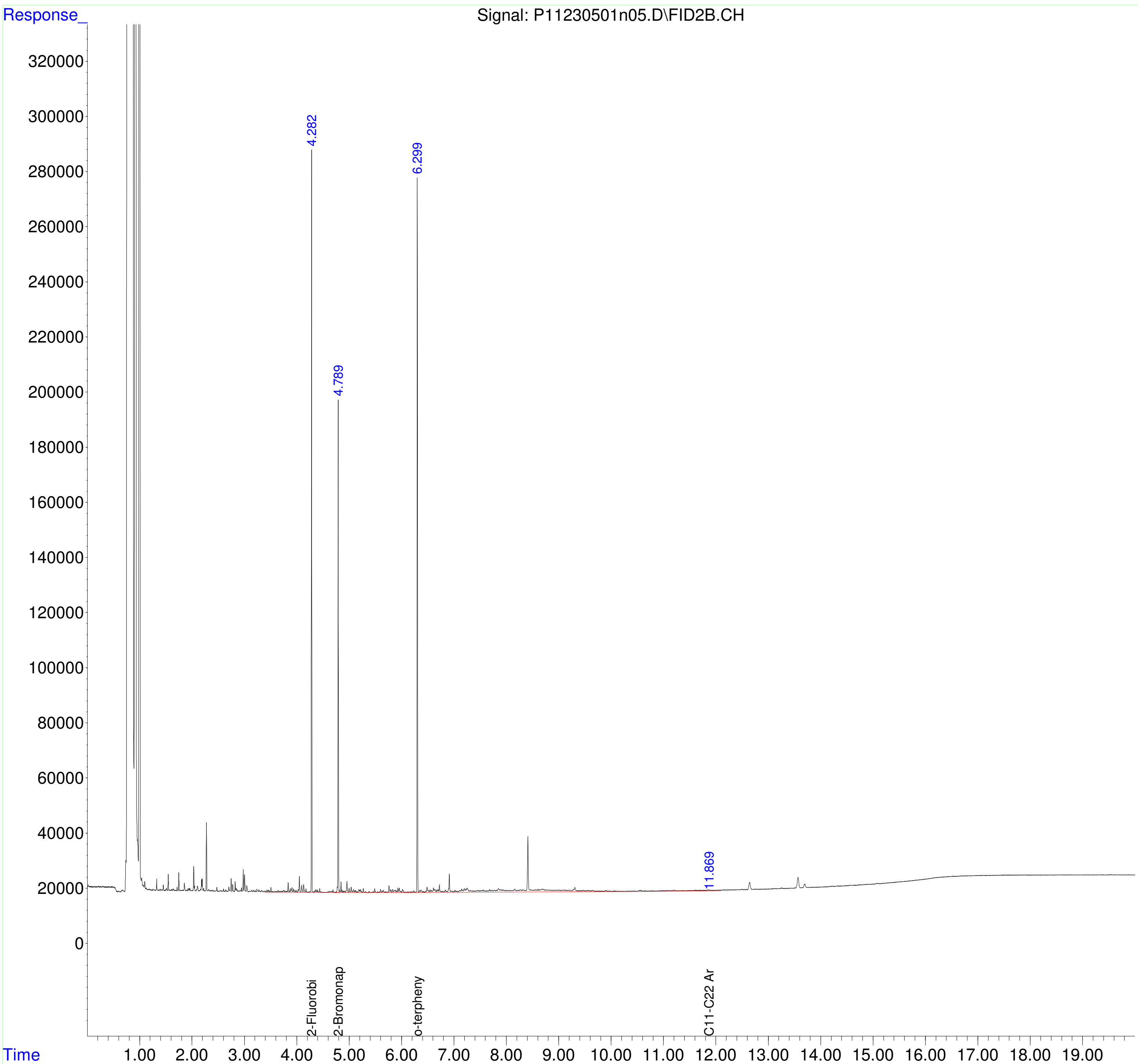
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230501N.SEC\
Data File : P11230501n05.D
Signal(s) : FID2B.CH
Acq On    : 02-May-23, 09:46:07
Operator  : petro11a/b:all
Sample    : WG1772379-1,42,,
Misc      :
ALS Vial  : 53   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 02 13:49:52 2023
Quant Method : I:\PETRO\Petro11\2023\230501N.SEC\MAARO220328.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 27 08:38:54 2023
Response via : Initial Calibration
Integrator: ChemStation    6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :

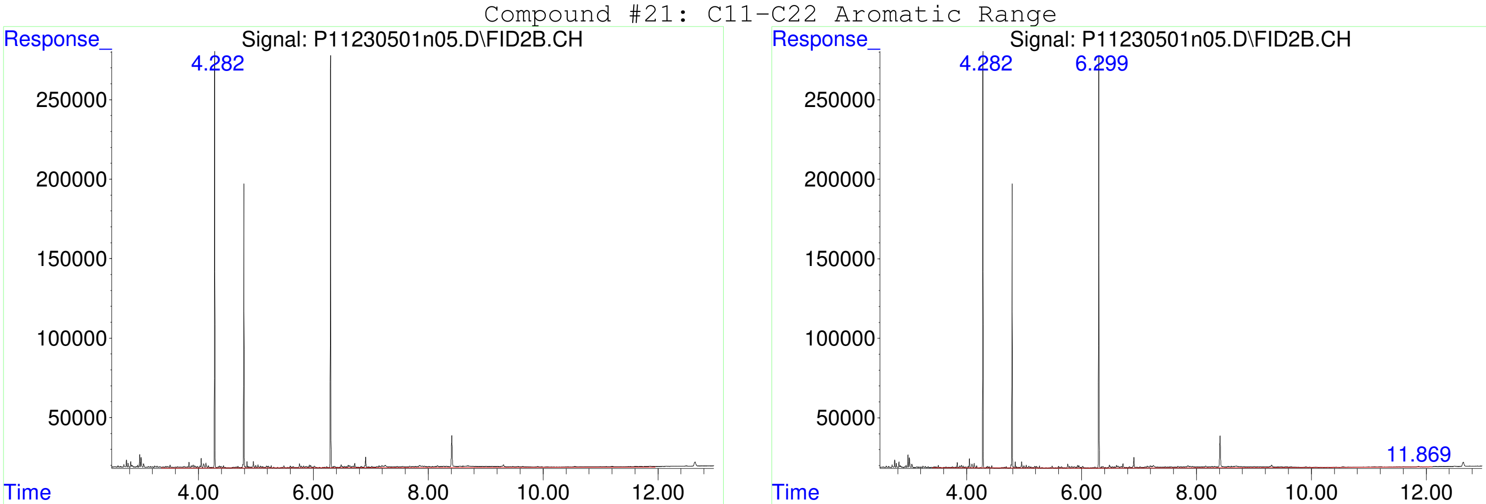


Manual Integration Report

Data Path : I:\PETRO\Petro11\2023\230501N.SEC\
Data File : P11230501n05.D
Date Inj'd : 5/2/2023 9:46 07
Sample : WG1772379-1,42,,

QMethod : MAARO220328.M
Operator : petro11a/b:all
Instrument : Petro 11
Quant Date : 5/2/2023 1:24 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 2869541

Manual Peak Response = 2252499 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro11\2023\230501n\
Data File : P11230501n06.D
Signal(s) : FID1A.CH
Acq On : 02-May-23, 09:46:07
Operator : petro11a/b:all
Sample : WG1772379-1,42,,
Misc :
ALS Vial : 3 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 02 13:24:50 2023
Quant Method : I:\PETRO\Petro11\2023\230501n\MAALI220328.M
Quant Title : MA EPH Aliphatic
QLast Update : Tue May 02 09:35:15 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

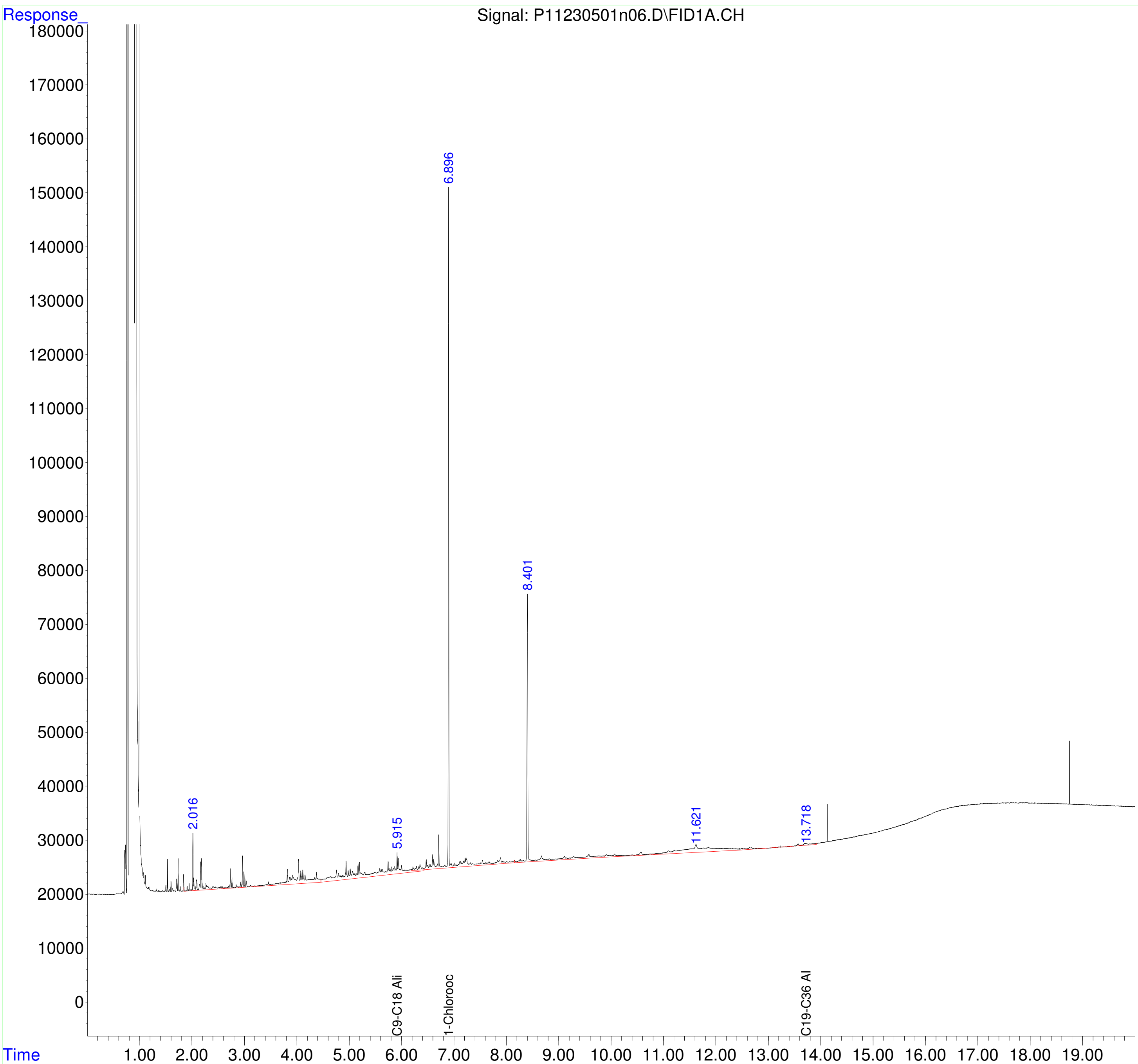
Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 6.896 | 828827 | 13.332 | mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 66.66% | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 5.915 | 1788591 | 26.206 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 13.718f | 2032307 | 28.484 | mg/L | M5 |

(f)=RT Delta > 1/2 Window (m)=manual int.

```
Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230501n\
Data File : P11230501n06.D
Signal(s) : FID1A.CH
Acq On    : 02-May-23, 09:46:07
Operator  : petro11a/b:all
Sample    : WG1772379-1,42,,
Misc      :
ALS Vial  : 3   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 02 13:24:50 2023
Quant Method : I:\PETRO\Petro11\2023\230501n\MAALI220328.M
Quant Title  : MA EPH Aliphatic
QLast Update : Tue May 02 09:35:15 2023
Response via : Initial Calibration
Integrator: ChemStation    6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :
```

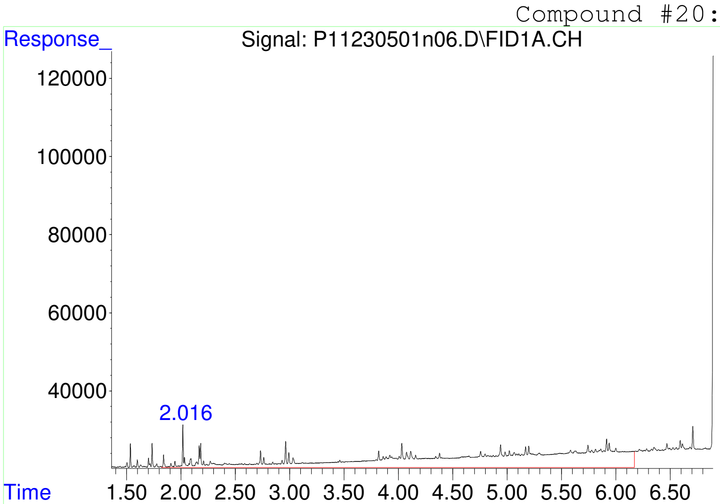


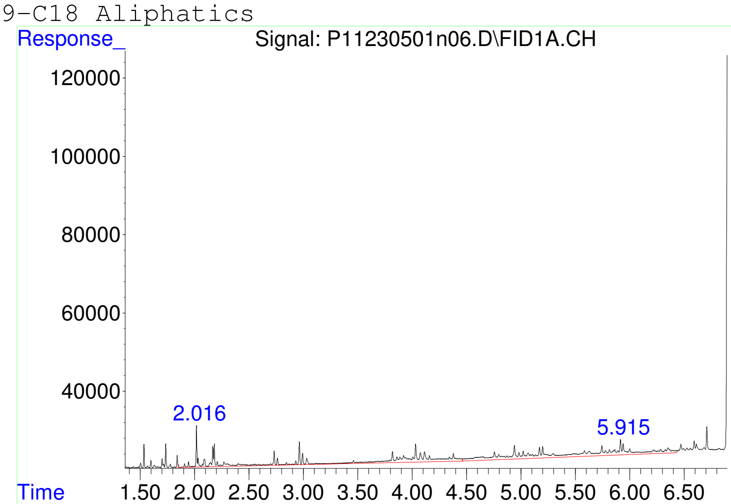
Manual Integration Report

Data Path : I:\PETRO\Petro11\2023\230501n\
Data File : P11230501n06.D
Date Inj'd : 5/2/2023 9:46 07
Sample : WG1772379-1,42,,

QMethod : MAALI220328.M
Operator : petro11a/b:all
Instrument : Petro 11
Quant Date : 5/2/2023 1:22 pm

Compound #20: C9-C18 Aliphatics



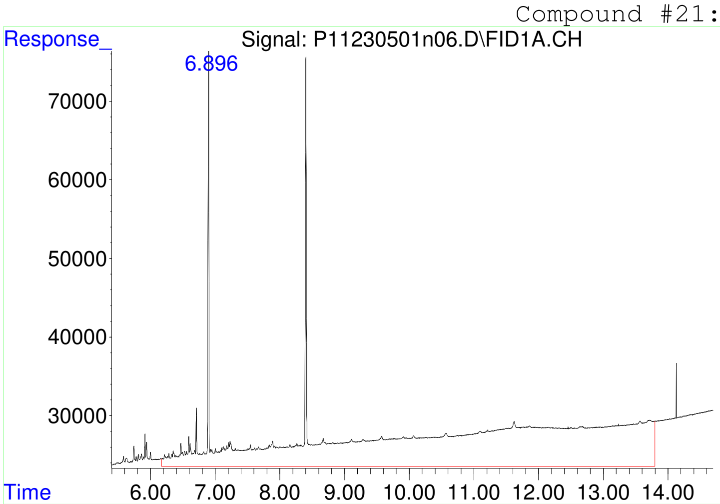



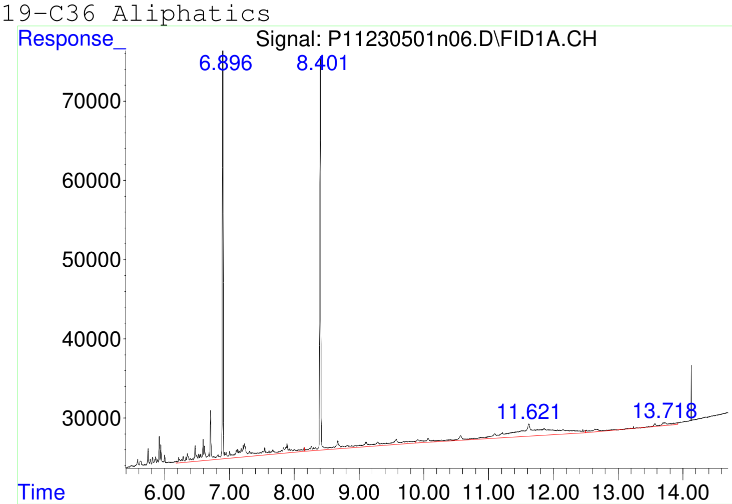

Original Peak Response = 6025911

Manual Peak Response = 1788591 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 16901897

Manual Peak Response = 2032307 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro11\2023\230501N.SEC\
Data File : P11230501n07.D
Signal(s) : FID2B.CH
Acq On : 02-May-23, 10:11:15
Operator : petro11a/b:all
Sample : WG1772379-2,42,,
Misc :
ALS Vial : 54 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 02 13:50:18 2023
Quant Method : I:\PETRO\Petro11\2023\230501N.SEC\MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 27 08:38:54 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.279 | 1349818 | 17.490 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 87.45% | | |
| 5) s 2-Bromonaphthalene | 4.786 | 945141 | 17.752 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 88.76% | | |
| 10) S o-terphenyl | 6.295 | 1403034 | 15.984 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 79.92% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 11.855 | 1719011 | 19.867 mg/L | M5 |

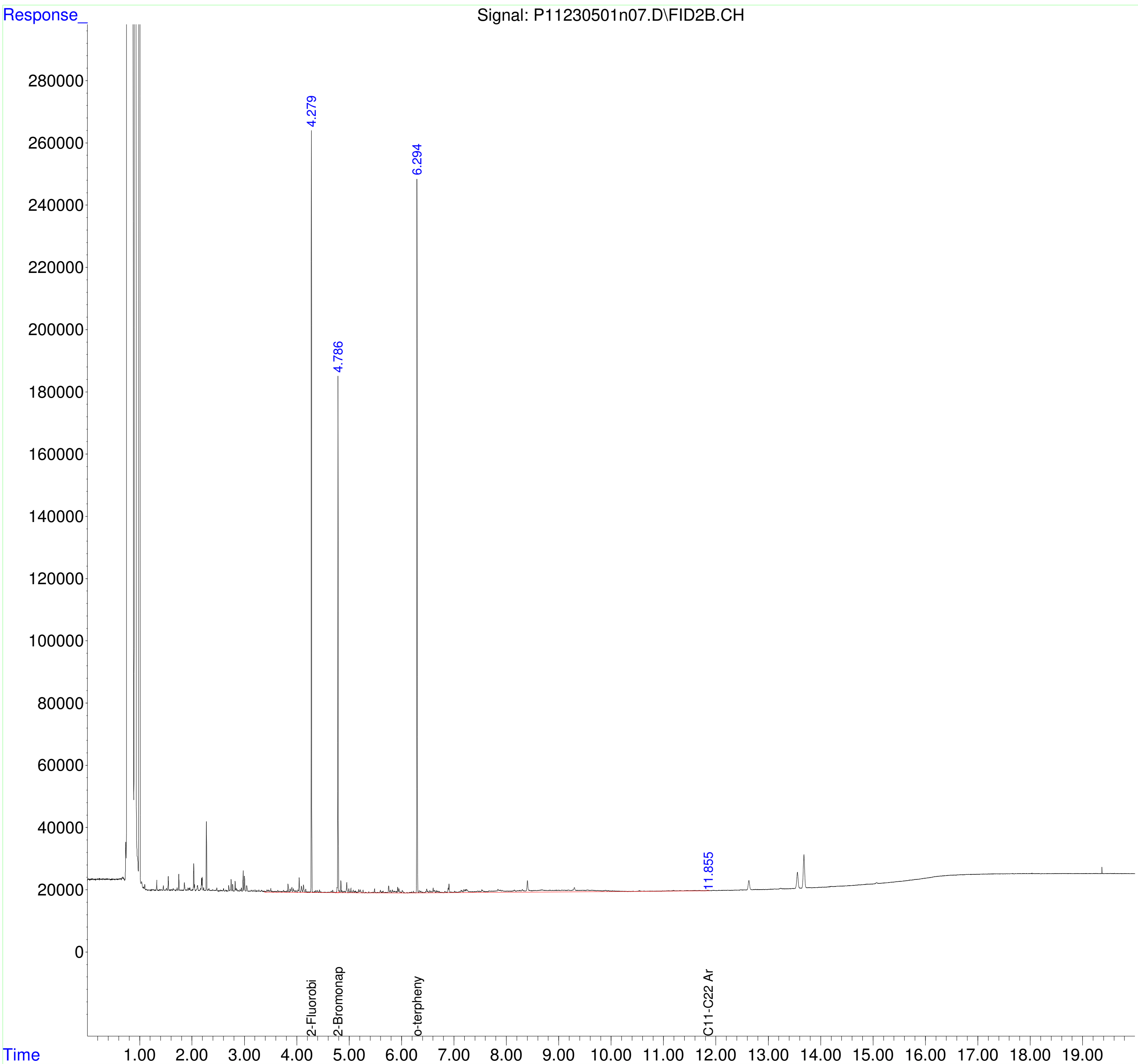
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230501N.SEC\
Data File : P11230501n07.D
Signal(s) : FID2B.CH
Acq On    : 02-May-23, 10:11:15
Operator  : petro11a/b:all
Sample    : WG1772379-2,42,,
Misc      :
ALS Vial  : 54   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 02 13:50:18 2023
Quant Method : I:\PETRO\Petro11\2023\230501N.SEC\MAARO220328.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 27 08:38:54 2023
Response via : Initial Calibration
Integrator: ChemStation    6890 Scale Mode: Large solvent peaks clipped

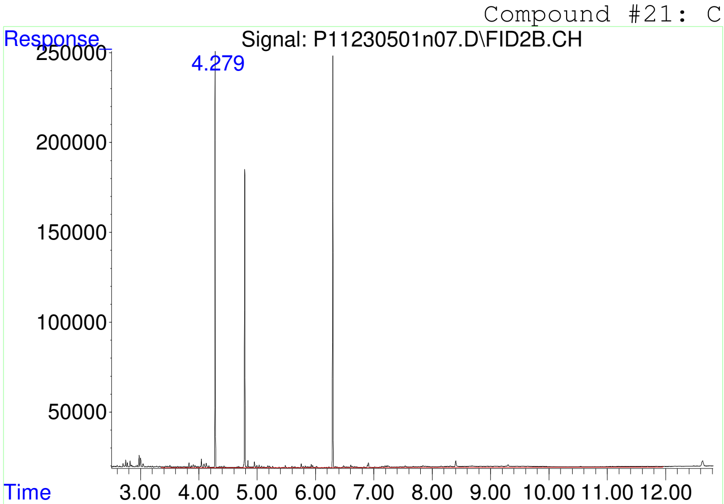
Volume Inj.  :
Signal Phase :
Signal Info  :

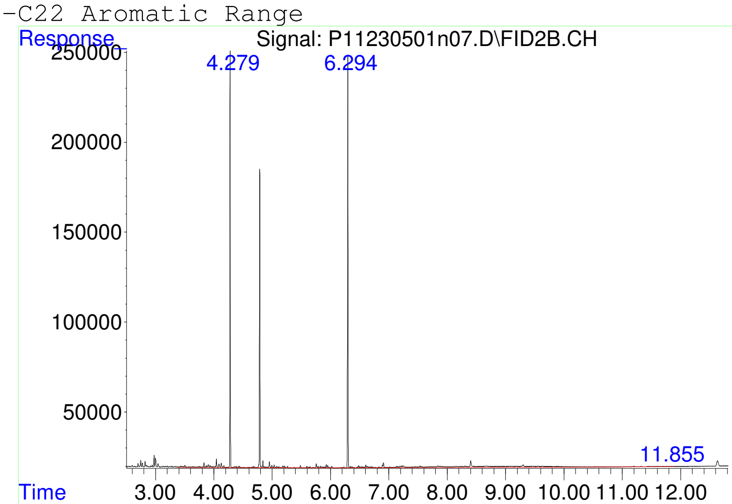


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro11\2023\230501N.SEC\ | QMethod | : MAARO220328.M |
| Data File | : P11230501n07.D | Operator | : petro11a/b:all |
| Date Inj'd | : 5/2/2023 10:11 15 | Instrument | : Petro 11 |
| Sample | : WG1772379-2,42,, | Quant Date | : 5/2/2023 1:24 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 2127076

Manual Peak Response = 1719011 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro11\2023\230501n\
Data File : P11230501n08.D
Signal(s) : FID1A.CH
Acq On : 02-May-23, 10:11:15
Operator : petro11a/b:all
Sample : WG1772379-2,42,,
Misc :
ALS Vial : 4 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 02 13:25:31 2023
Quant Method : I:\PETRO\Petro11\2023\230501n\MAALI220328.M
Quant Title : MA EPH Aliphatic
QLast Update : Tue May 02 09:35:15 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| # | | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|---|
| | | **System Monitoring Compounds** | | | | | |
| 3) | S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) | S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) | S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) | S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) | S | 1-Chlorooctadecane | 6.886 | 862274 | 13.870 | mg/L | |
| Spiked Amount | | 20.000 Range 40 - 140 | | Recovery = | 69.35% | | |
| | | **Target Compounds** | | | | | |
| 1) | | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) | H | C9-C18 Aliphatics | 5.905 | 1267068 | 18.565 | mg/L | M5 |
| 21) | H | C19-C36 Aliphatics | 13.548f | 1055197 | 14.789 | mg/L | M5 |

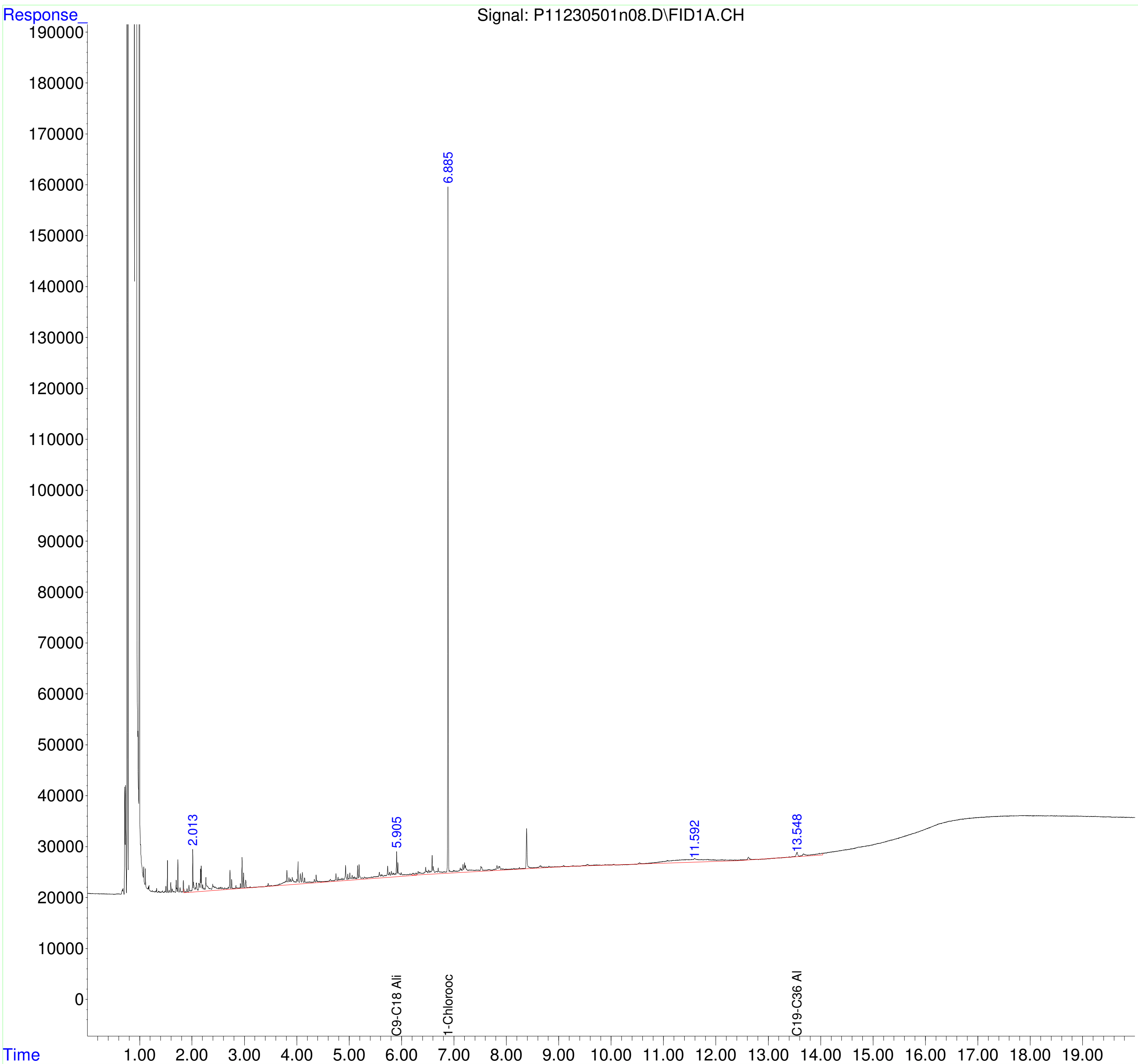
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230501n\
Data File : P11230501n08.D
Signal(s) : FID1A.CH
Acq On    : 02-May-23, 10:11:15
Operator  : petro11a/b:all
Sample    : WG1772379-2,42,,
Misc      :
ALS Vial  : 4   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 02 13:25:31 2023
Quant Method : I:\PETRO\Petro11\2023\230501n\MAALI220328.M
Quant Title  : MA EPH Aliphatic
QLast Update : Tue May 02 09:35:15 2023
Response via : Initial Calibration
Integrator: ChemStation   6890 Scale Mode: Large solvent peaks clipped

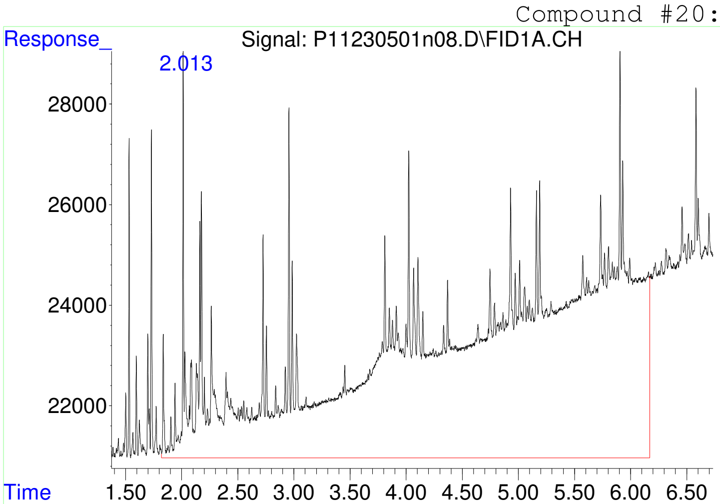
Volume Inj.  :
Signal Phase :
Signal Info  :

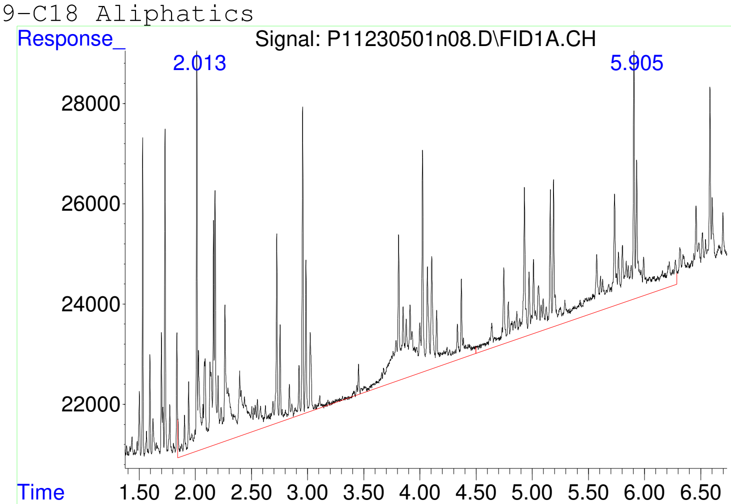


# Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro11\2023\230501n\ | QMethod | : MAALI220328.M |
| Data File | : P11230501n08.D | Operator | : petro11a/b:all |
| Date Inj'd | : 5/2/2023 10:11 15 | Instrument | : Petro 11 |
| Sample | : WG1772379-2,42,, | Quant Date | : 5/2/2023 1:22 pm |

Compound #20: C9-C18 Aliphatics

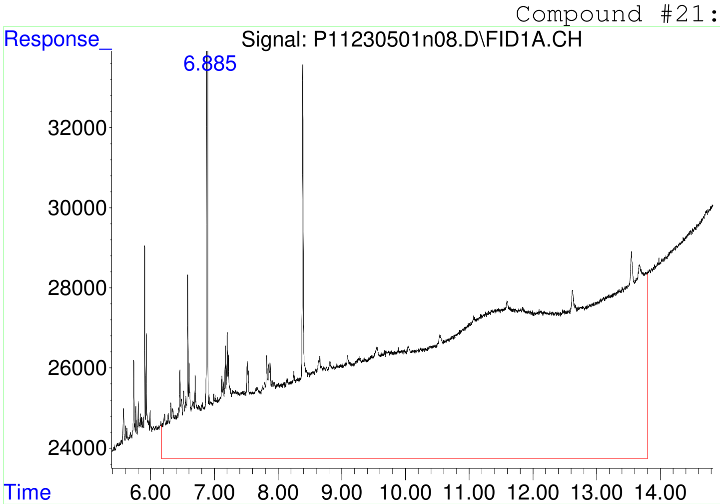


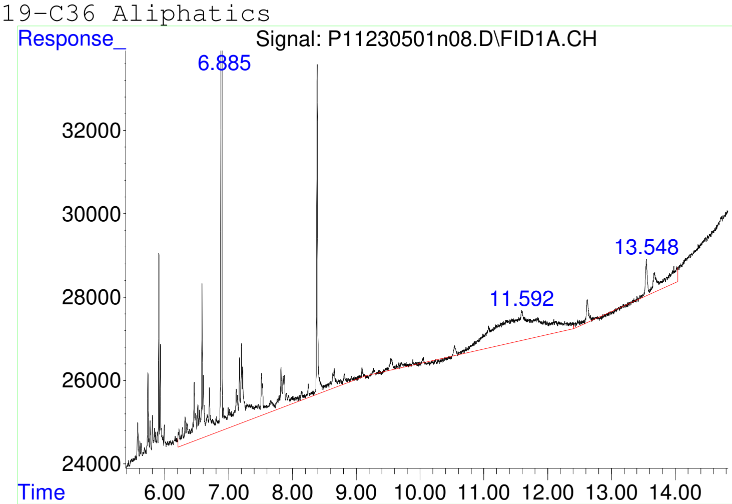




Original Peak Response = 5559343 Manual Peak Response = 1267068 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 12788678 Manual Peak Response = 1055197 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro11\2023\230501N.SEC\
Data File : P11230501n09.D
Signal(s) : FID2B.CH
Acq On : 02-May-23, 10:36:31
Operator : petro11a/b:all
Sample : L2322455-07,42,,
Misc :
ALS Vial : 55 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 02 13:50:44 2023
Quant Method : I:\PETRO\Petro11\2023\230501N.SEC\MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 27 08:38:54 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.279 | 1245746 | 16.141 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 80.70% | |
| 5) s 2-Bromonaphthalene | 4.785 | 868635 | 16.315 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 81.58% | |
| 10) S o-terphenyl | 6.294 | 1183235 | 13.480 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 67.40% | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 11.681 | 1729216 | 19.985 mg/L | M5 |

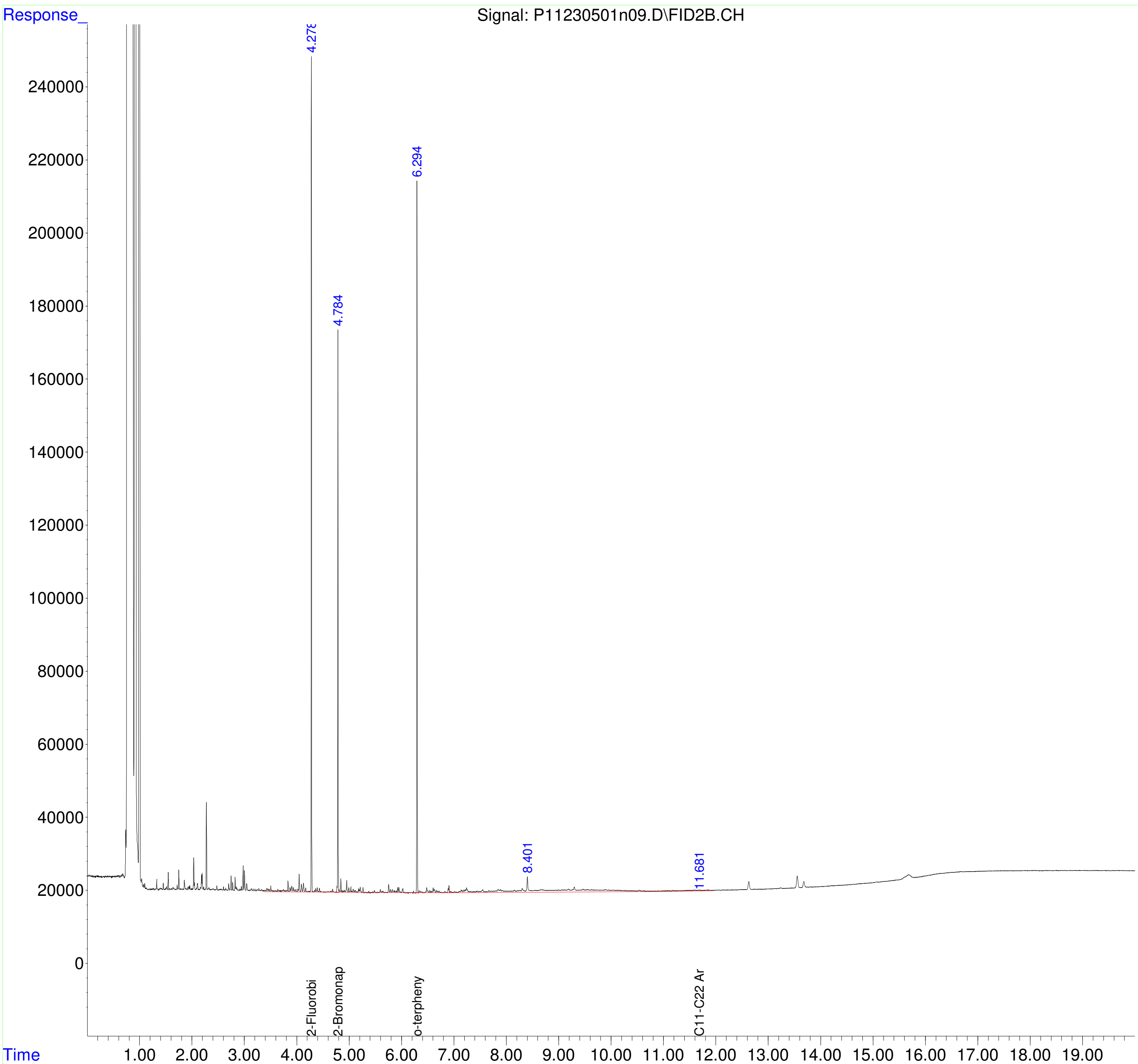
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230501N.SEC\
Data File : P11230501n09.D
Signal(s) : FID2B.CH
Acq On    : 02-May-23, 10:36:31
Operator  : petro11a/b:all
Sample    : L2322455-07,42,,
Misc      :
ALS Vial  : 55   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 02 13:50:44 2023
Quant Method : I:\PETRO\Petro11\2023\230501N.SEC\MAARO220328.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 27 08:38:54 2023
Response via : Initial Calibration
Integrator: ChemStation    6890 Scale Mode: Large solvent peaks clipped

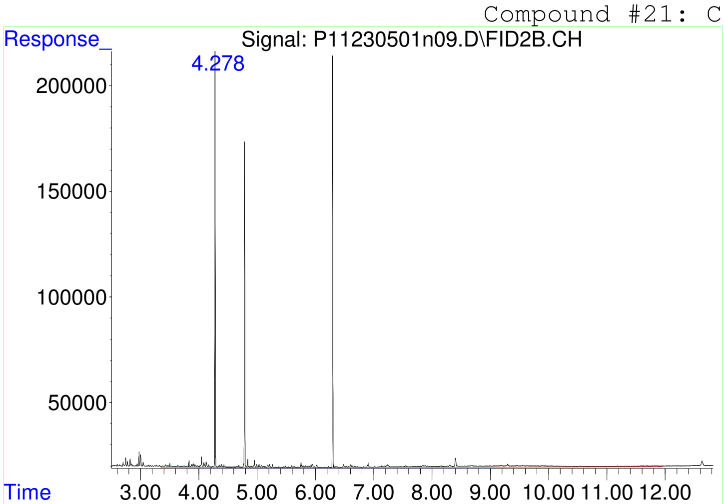
Volume Inj.  :
Signal Phase :
Signal Info  :

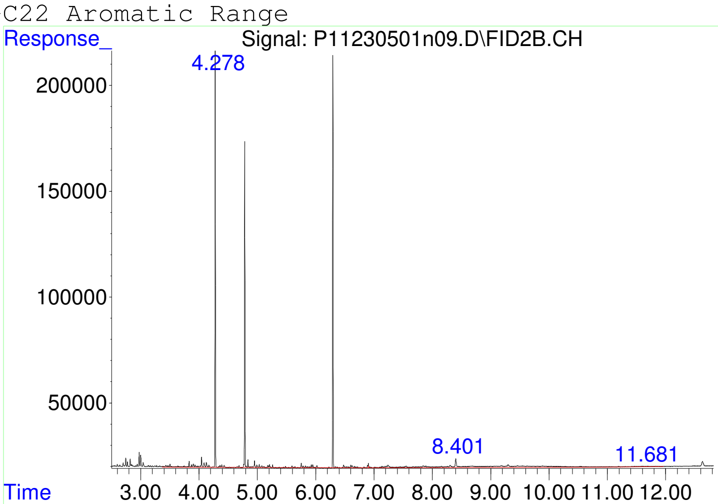


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro11\2023\230501N.SEC\ | QMethod | : MAARO220328.M |
| Data File | : P11230501n09.D | Operator | : petro11a/b:all |
| Date Inj'd | : 5/2/2023 10:36 31 | Instrument | : Petro 11 |
| Sample | : L2322455-07,42,, | Quant Date | : 5/2/2023 1:24 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 2480312 Manual Peak Response = 1729216 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

```
Data Path : I:\PETRO\Petro11\2023\230501n\
Data File : P11230501n10.D
Signal(s) : FID1A.CH
Acq On    : 02-May-23, 10:36:31
Operator  : petro11a/b:all
Sample    : L2322455-07,42,,
Misc      :
ALS Vial  : 5   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 02 13:26:55 2023
Quant Method : I:\PETRO\Petro11\2023\230501n\MAALI220328.M
Quant Title  : MA EPH Aliphatic
QLast Update : Tue May 02 09:35:15 2023
Response via : Initial Calibration
Integrator: ChemStation   6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed
```

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| **System Monitoring Compounds** | | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 6.885 | 655881 | 10.550 | mg/L | M4 |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 52.75% | | |
| **Target Compounds** | | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 5.929 | 1551136 | 22.727 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 13.671f | 6886194 | 96.513 | mg/L | M5 |

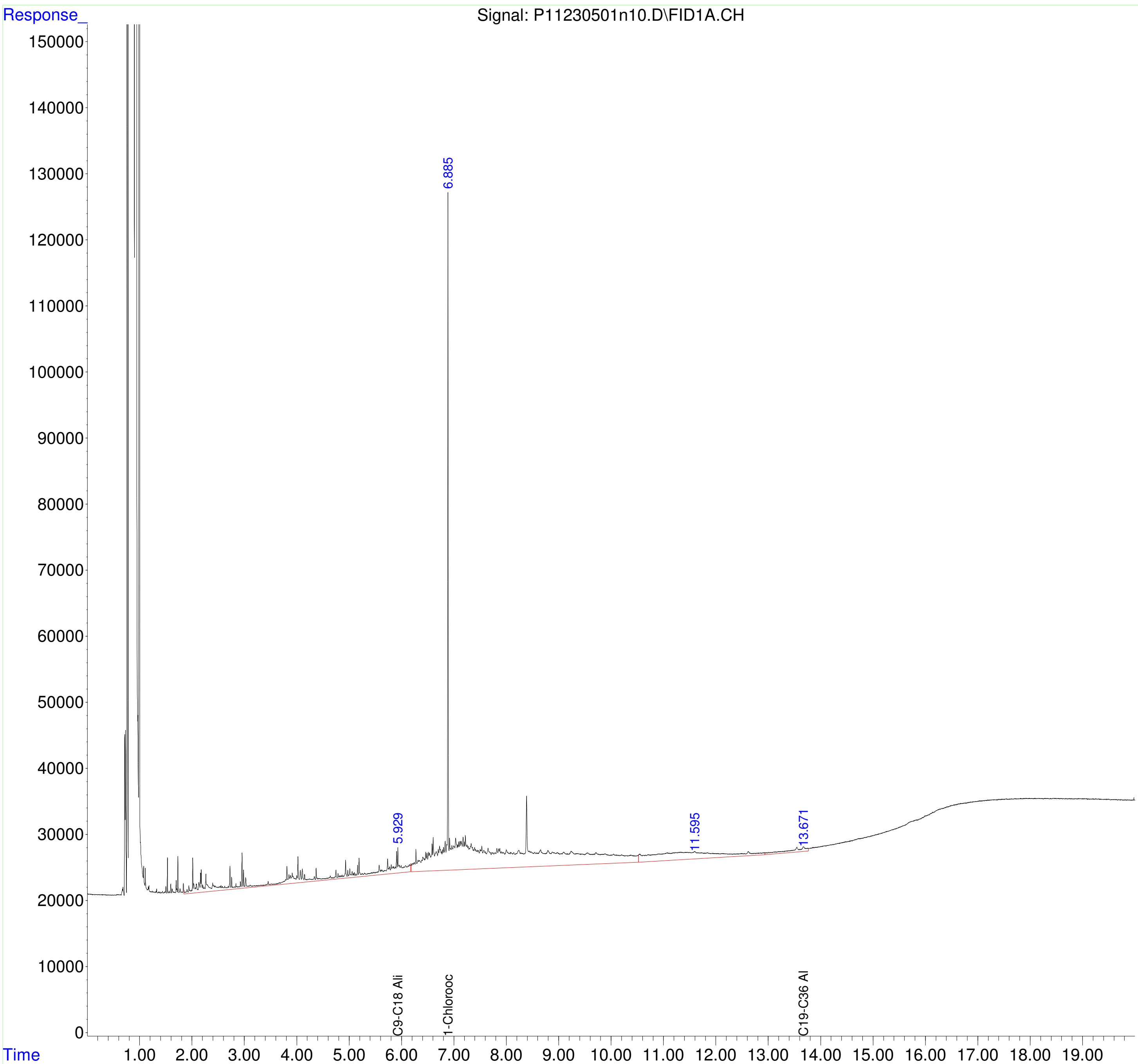
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230501n\
Data File : P11230501n10.D
Signal(s) : FID1A.CH
Acq On    : 02-May-23, 10:36:31
Operator  : petro11a/b:all
Sample    : L2322455-07,42,,
Misc      :
ALS Vial  : 5   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 02 13:26:55 2023
Quant Method : I:\PETRO\Petro11\2023\230501n\MAALI220328.M
Quant Title  : MA EPH Aliphatic
QLast Update : Tue May 02 09:35:15 2023
Response via : Initial Calibration
Integrator: ChemStation   6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :

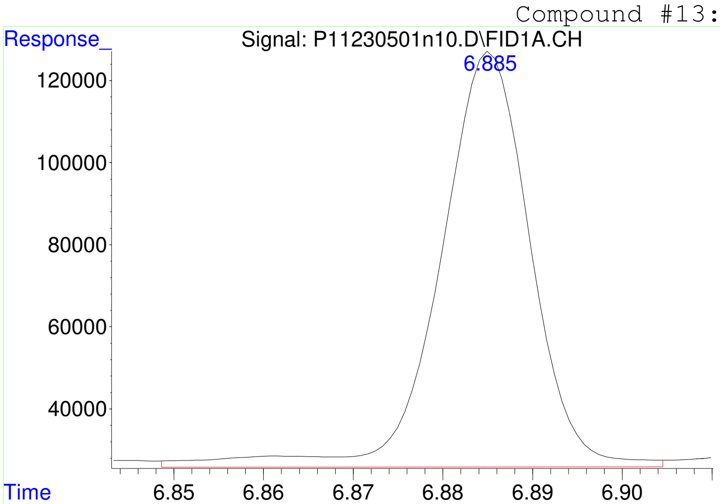


Manual Integration Report

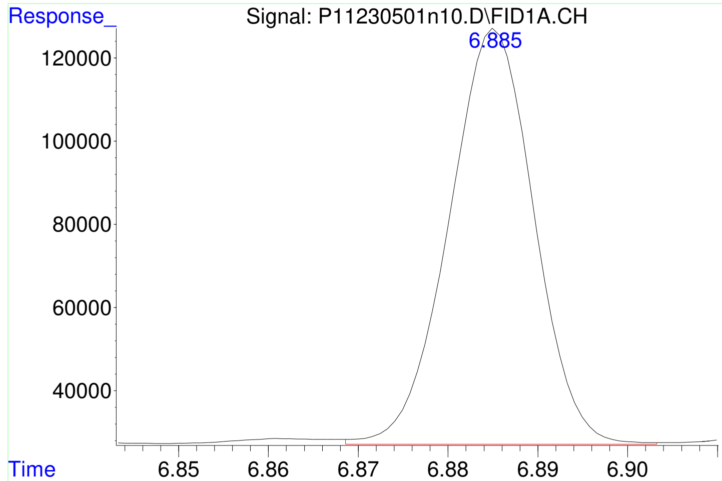
Data Path : I:\PETRO\Petro11\2023\230501n\
Data File : P11230501n10.D
Date Inj'd : 5/2/2023 10:36 31
Sample : L2322455-07,42,,

QMethod : MAALI220328.M
Operator : petro11a/b:all
Instrument : Petro 11
Quant Date : 5/2/2023 1:22 pm

Compound #13: 1-Chlorooctadecane

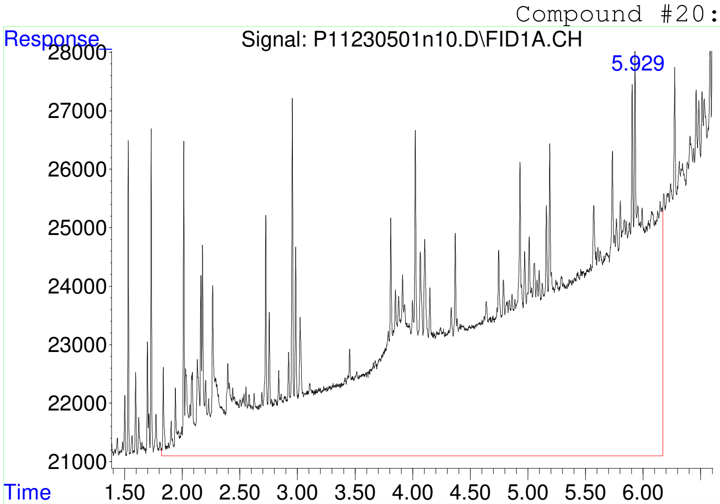



Original Peak Response = 712241
M4 = Poor automated baseline construction.

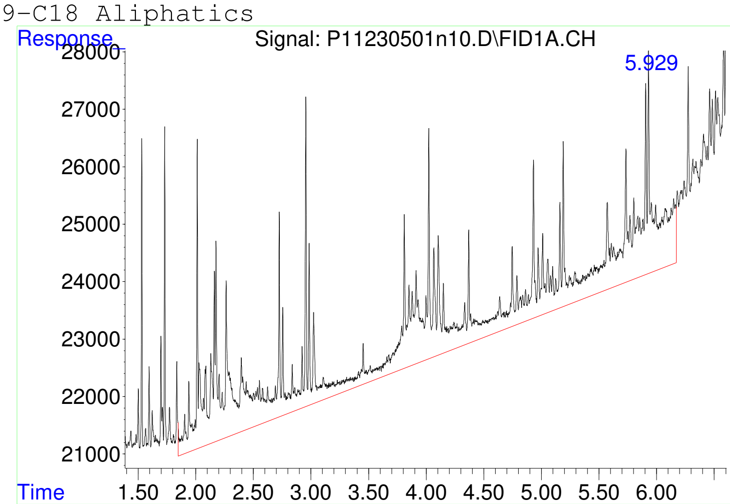



Manual Peak Response = 655881 M4

Compound #20: C9-C18 Aliphatics



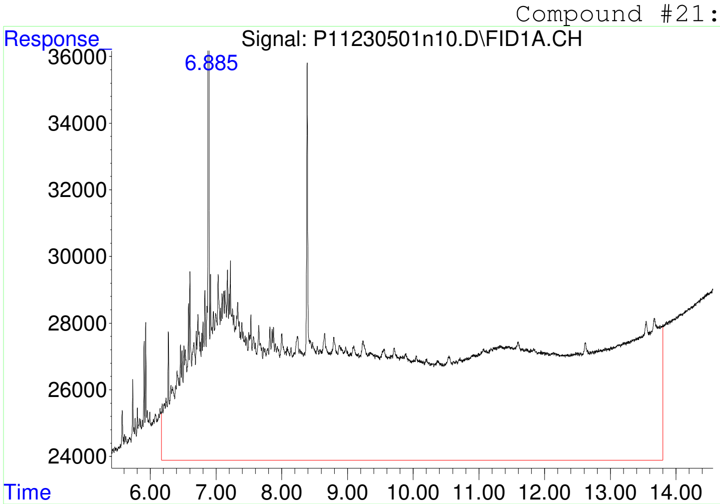

Original Peak Response = 5580773



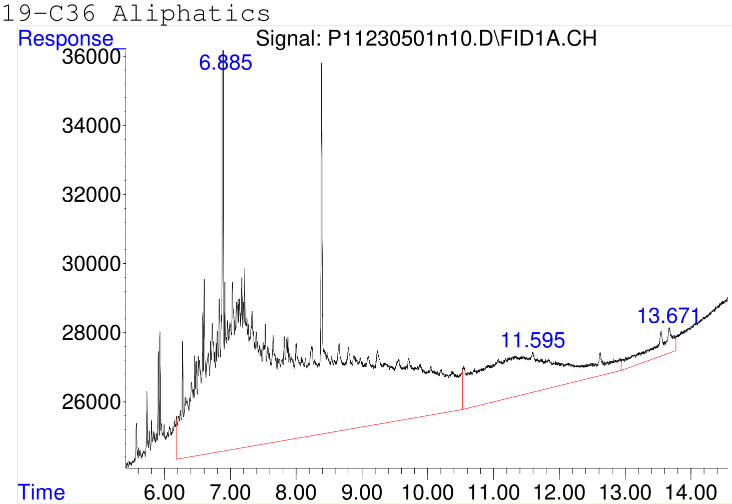

Manual Peak Response = 1551136 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 15212539




Manual Peak Response = 6886194 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro11\2023\230501N.SEC\
Data File : P11230501n11.D
Signal(s) : FID2B.CH
Acq On : 02-May-23, 11:01:59
Operator : petro11a/b:all
Sample : L2322455-08,42,,
Misc :
ALS Vial : 56 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 02 13:51:10 2023
Quant Method : I:\PETRO\Petro11\2023\230501N.SEC\MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 27 08:38:54 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.279 | 1402828 | 18.177 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 90.88% | |
| 5) s 2-Bromonaphthalene | 4.785 | 986699 | 18.532 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 92.66% | |
| 10) S o-terphenyl | 6.294 | 1380338 | 15.725 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 78.63% | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 11.840 | 1929989 | 22.305 mg/L | M5 |

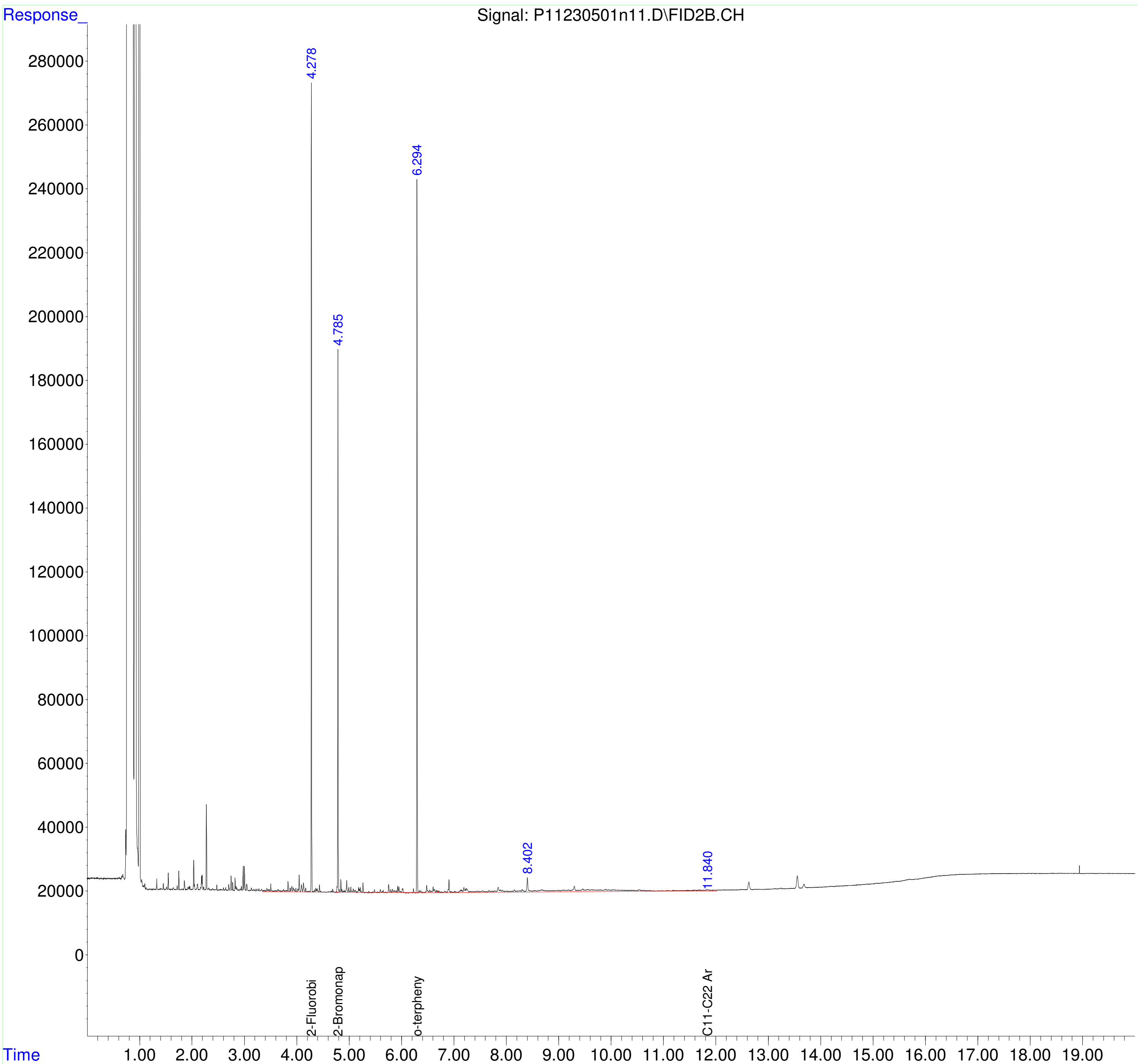
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230501N.SEC\
Data File : P11230501n11.D
Signal(s) : FID2B.CH
Acq On : 02-May-23, 11:01:59
Operator : petro11a/b:all
Sample : L2322455-08,42,,
Misc :
ALS Vial : 56 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 02 13:51:10 2023
Quant Method : I:\PETRO\Petro11\2023\230501N.SEC\MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 27 08:38:54 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

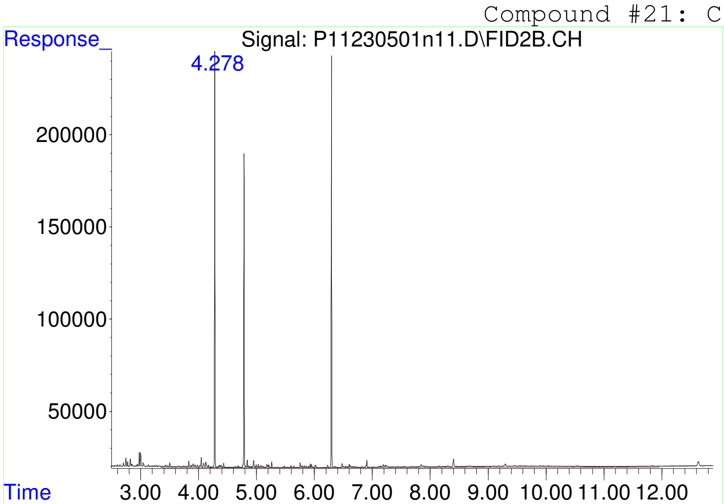
Volume Inj. :
Signal Phase :
Signal Info :

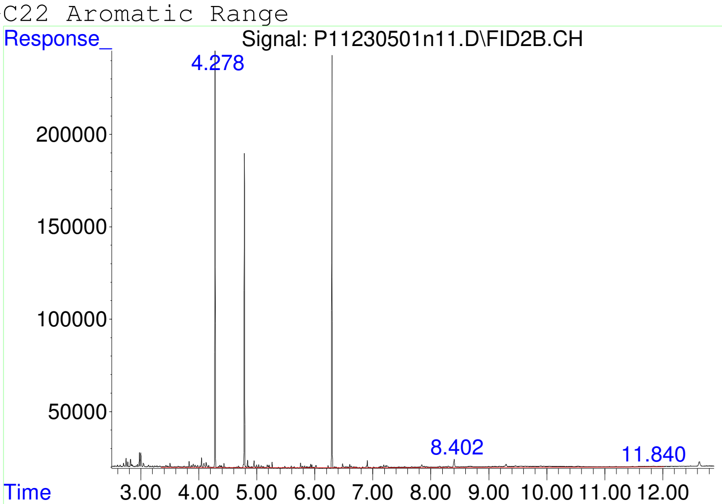


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro11\2023\230501N.SEC\ | QMethod | : MAARO220328.M |
| Data File | : P11230501n11.D | Operator | : petro11a/b:all |
| Date Inj'd | : 5/2/2023 11:01 59 | Instrument | : Petro 11 |
| Sample | : L2322455-08,42,, | Quant Date | : 5/2/2023 1:24 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 2790380

Manual Peak Response = 1929989 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

```
Data Path : I:\PETRO\Petro11\2023\230501n\
Data File : P11230501n12.D
Signal(s) : FID1A.CH
Acq On    : 02-May-23, 11:01:59
Operator  : petro11a/b:all
Sample    : L2322455-08,42,,
Misc      :
ALS Vial  : 6   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 02 13:27:34 2023
Quant Method : I:\PETRO\Petro11\2023\230501n\MAALI220328.M
Quant Title  : MA EPH Aliphatic
QLast Update : Tue May 02 09:35:15 2023
Response via : Initial Calibration
Integrator: ChemStation   6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed
```

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 6.885 | 761074 | 12.242 | mg/L | M4 |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 61.21% | | |
| Target Compounds | | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 2.013f | 1427167 | 20.911 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 13.665f | 6816405 | 95.535 | mg/L | M5 |

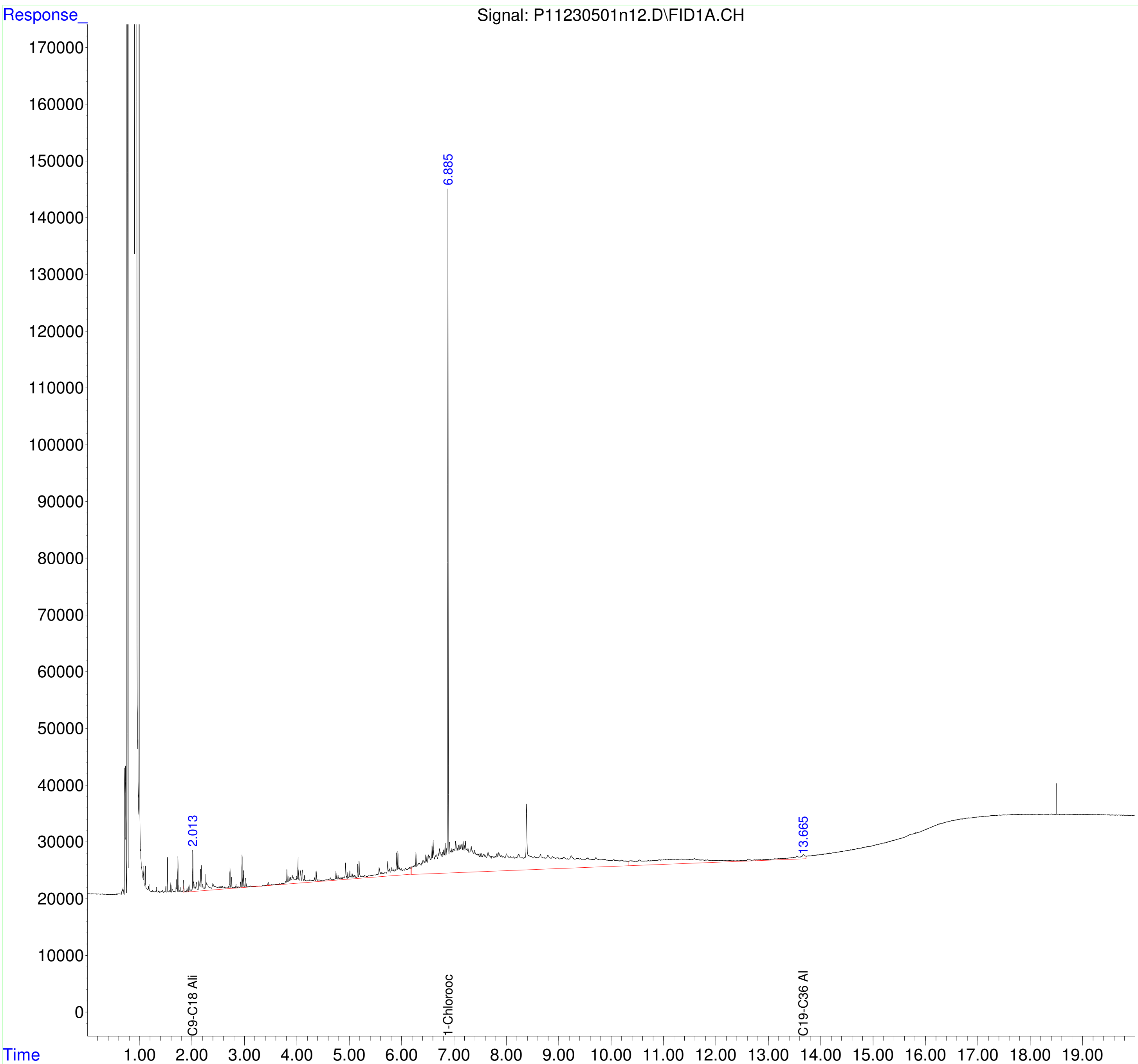
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230501n\
Data File : P11230501n12.D
Signal(s) : FID1A.CH
Acq On    : 02-May-23, 11:01:59
Operator  : petro11a/b:all
Sample    : L2322455-08,42,,
Misc      :
ALS Vial  : 6   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 02 13:27:34 2023
Quant Method : I:\PETRO\Petro11\2023\230501n\MAALI220328.M
Quant Title  : MA EPH Aliphatic
QLast Update : Tue May 02 09:35:15 2023
Response via : Initial Calibration
Integrator: ChemStation    6890 Scale Mode: Large solvent peaks clipped

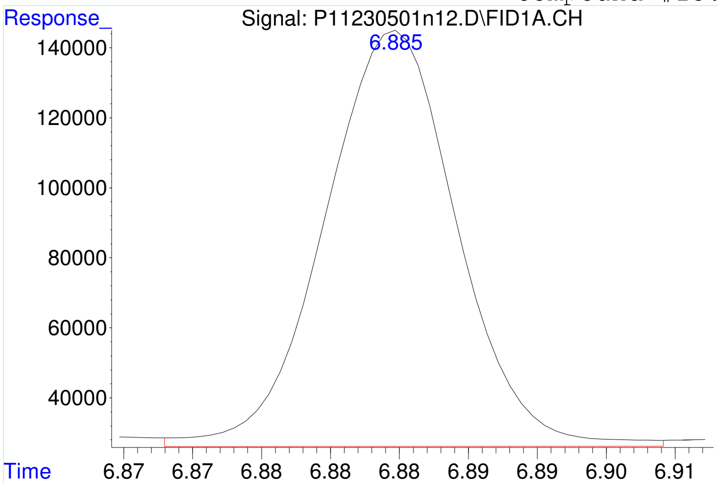
Volume Inj.  :
Signal Phase :
Signal Info  :

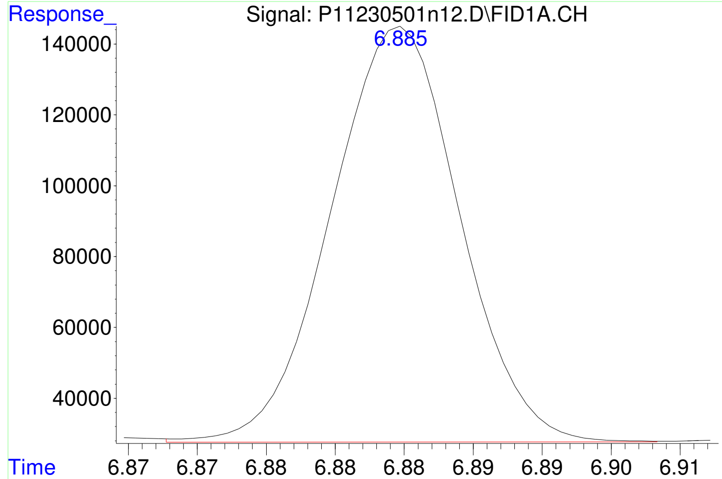


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro11\2023\230501n\ | QMethod | : MAALI220328.M |
| Data File | : P11230501n12.D | Operator | : petro11a/b:all |
| Date Inj'd | : 5/2/2023 11:01 59 | Instrument | : Petro 11 |
| Sample | : L2322455-08,42,, | Quant Date | : 5/2/2023 1:22 pm |

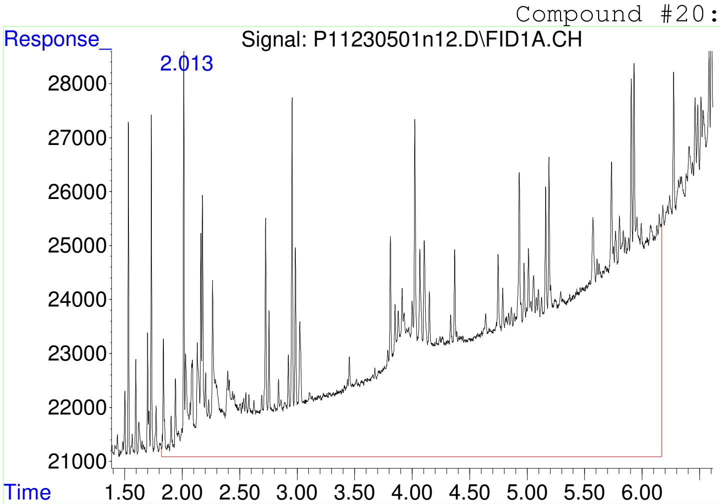
Compound #13: 1-Chlorooctadecane

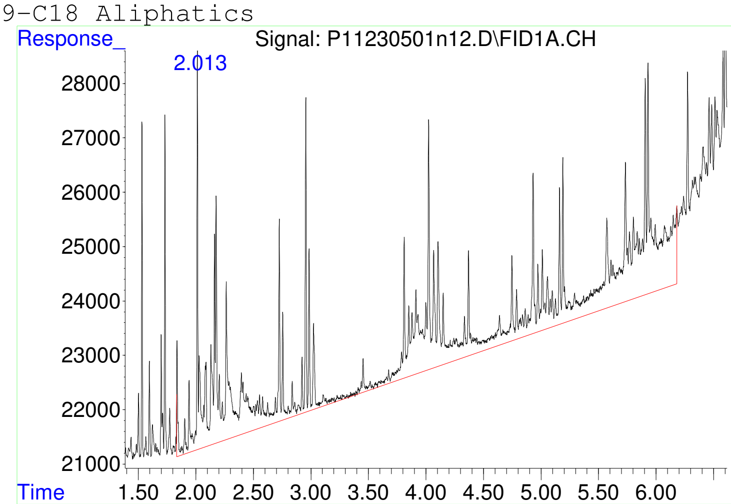



Original Peak Response = 793008
Manual Peak Response = 761074 M4
M4 = Poor automated baseline construction.

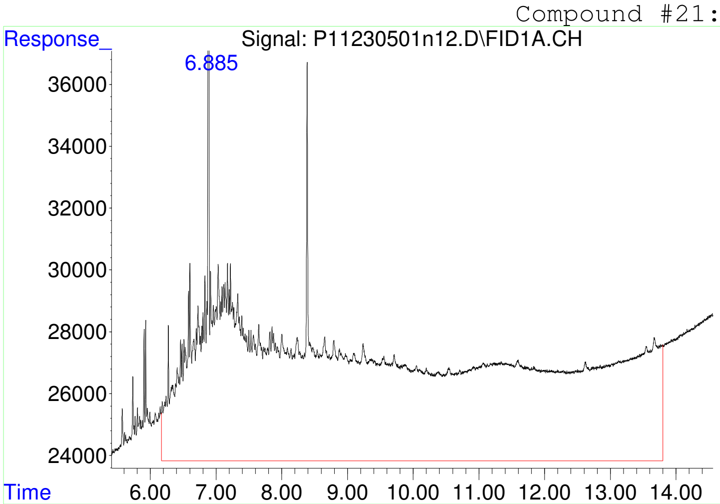
Compound #20: C9-C18 Aliphatics

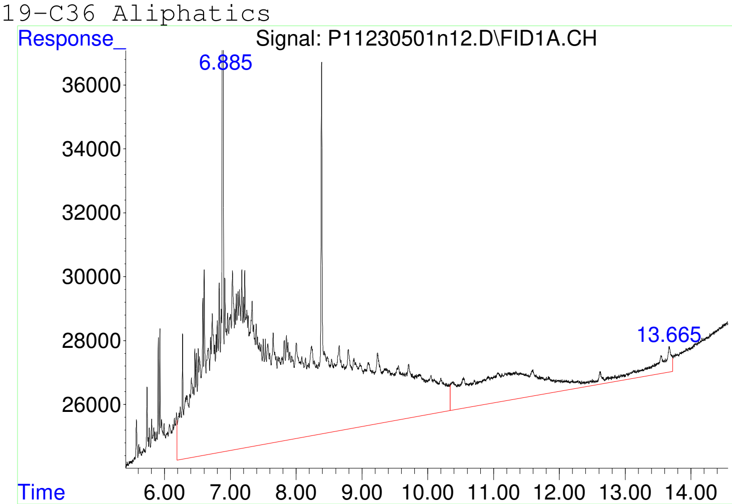



Original Peak Response = 5684206
Manual Peak Response = 1427167 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 15246644
Manual Peak Response = 6816405 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230501N.SEC\
Data File : P11230501n13.D
Signal(s) : FID2B.CH
Acq On : 02-May-23, 11:27:13
Operator : petro11a/b:all
Sample : L2322455-15,42,,
Misc :
ALS Vial : 57 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 02 13:51:37 2023
Quant Method : I:\PETRO\Petro11\2023\230501N.SEC\MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 27 08:38:54 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.279 | 1284747 | 16.647 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 83.23% | | |
| 5) s 2-Bromonaphthalene | 4.785 | 904123 | 16.981 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 84.91% | | |
| 10) S o-terphenyl | 6.294 | 1292487 | 14.725 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 73.63% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | |
| 21) H C11-C22 Aromatic Range | 11.845 | 1273389 | 14.717 mg/L | M5 |

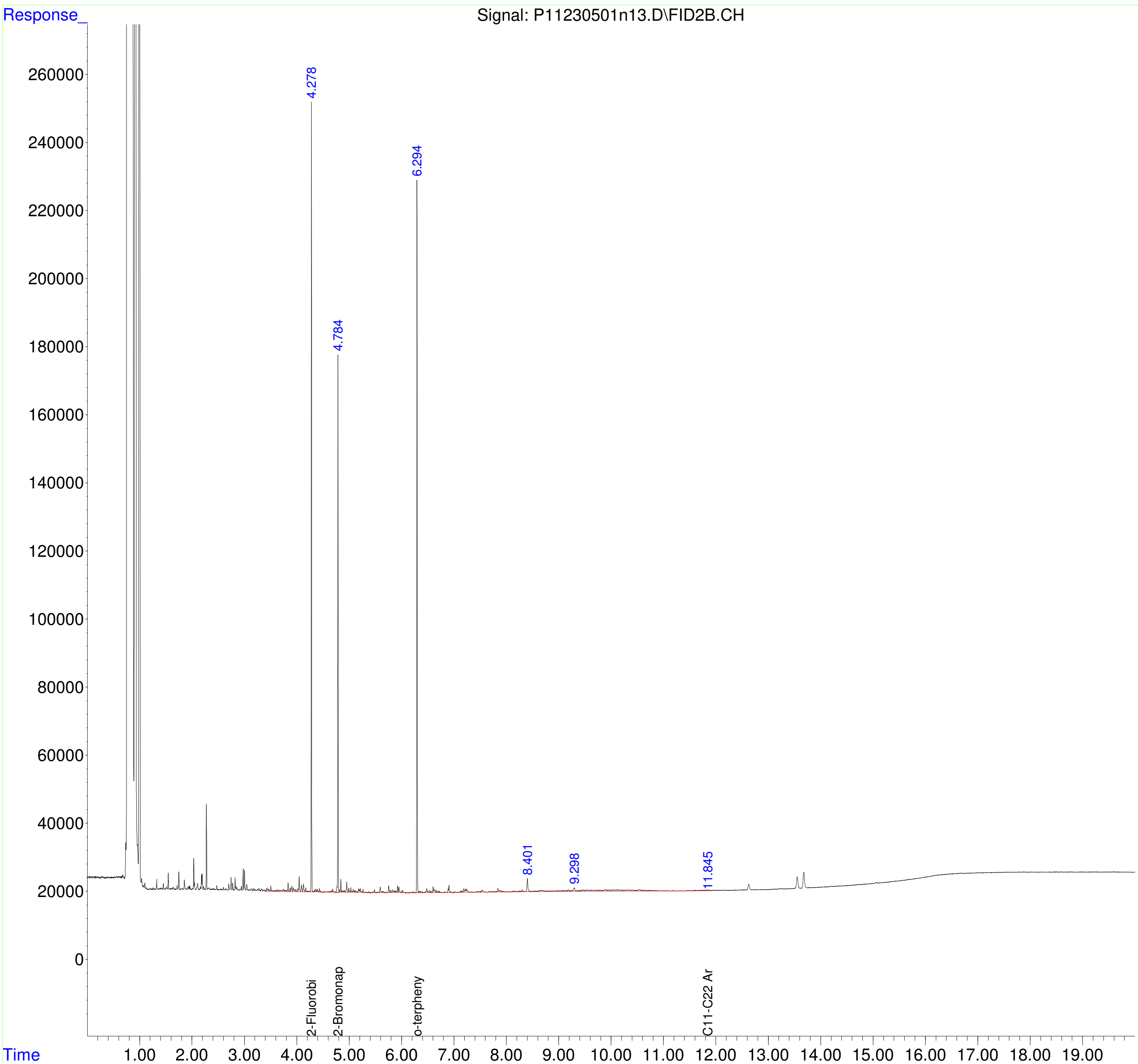
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230501N.SEC\
Data File : P11230501n13.D
Signal(s) : FID2B.CH
Acq On     : 02-May-23, 11:27:13
Operator  : petro11a/b:all
Sample     : L2322455-15,42,,
Misc       :
ALS Vial  : 57   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 02 13:51:37 2023
Quant Method : I:\PETRO\Petro11\2023\230501N.SEC\MAARO220328.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 27 08:38:54 2023
Response via : Initial Calibration
Integrator: ChemStation    6890 Scale Mode: Large solvent peaks clipped

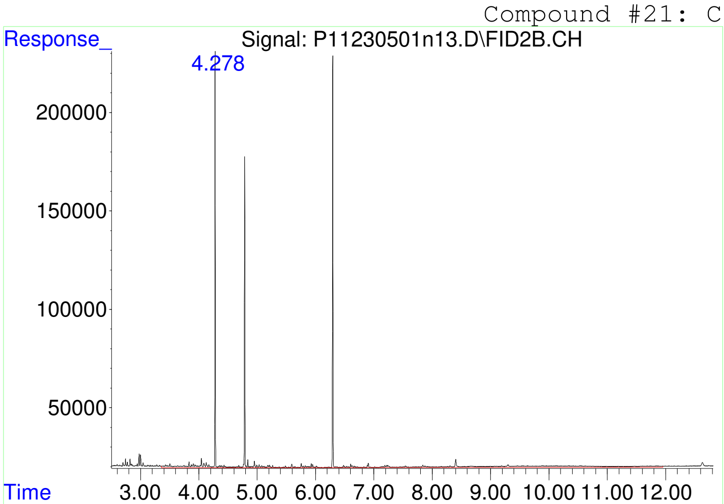
Volume Inj.  :
Signal Phase :
Signal Info  :

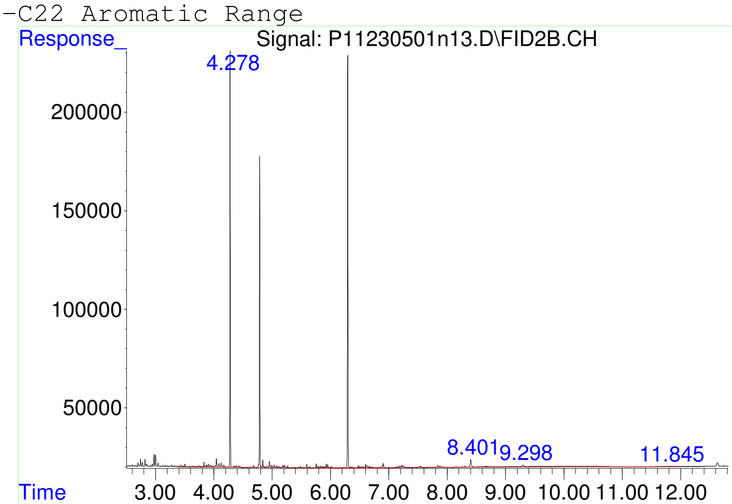


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro11\2023\230501N.SEC\ | QMethod | : MAARO220328.M |
| Data File | : P11230501n13.D | Operator | : petro11a/b:all |
| Date Inj'd | : 5/2/2023 11:27 13 | Instrument | : Petro 11 |
| Sample | : L2322455-15,42,, | Quant Date | : 5/2/2023 1:24 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 2823569

Manual Peak Response = 1273389 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro11\2023\230501n\
Data File : P11230501n14.D
Signal(s) : FID1A.CH
Acq On : 02-May-23, 11:27:13
Operator : petro11a/b:all
Sample : L2322455-15,42,,
Misc :
ALS Vial : 7 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 02 13:28:11 2023
Quant Method : I:\PETRO\Petro11\2023\230501n\MAALI220328.M
Quant Title : MA EPH Aliphatic
QLast Update : Tue May 02 09:35:15 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 6.885 | 719899 | 11.580 | mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 57.90% | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 5.905 | 1506459 | 22.073 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 13.964f | 5691735 | 79.772 | mg/L | M5 |

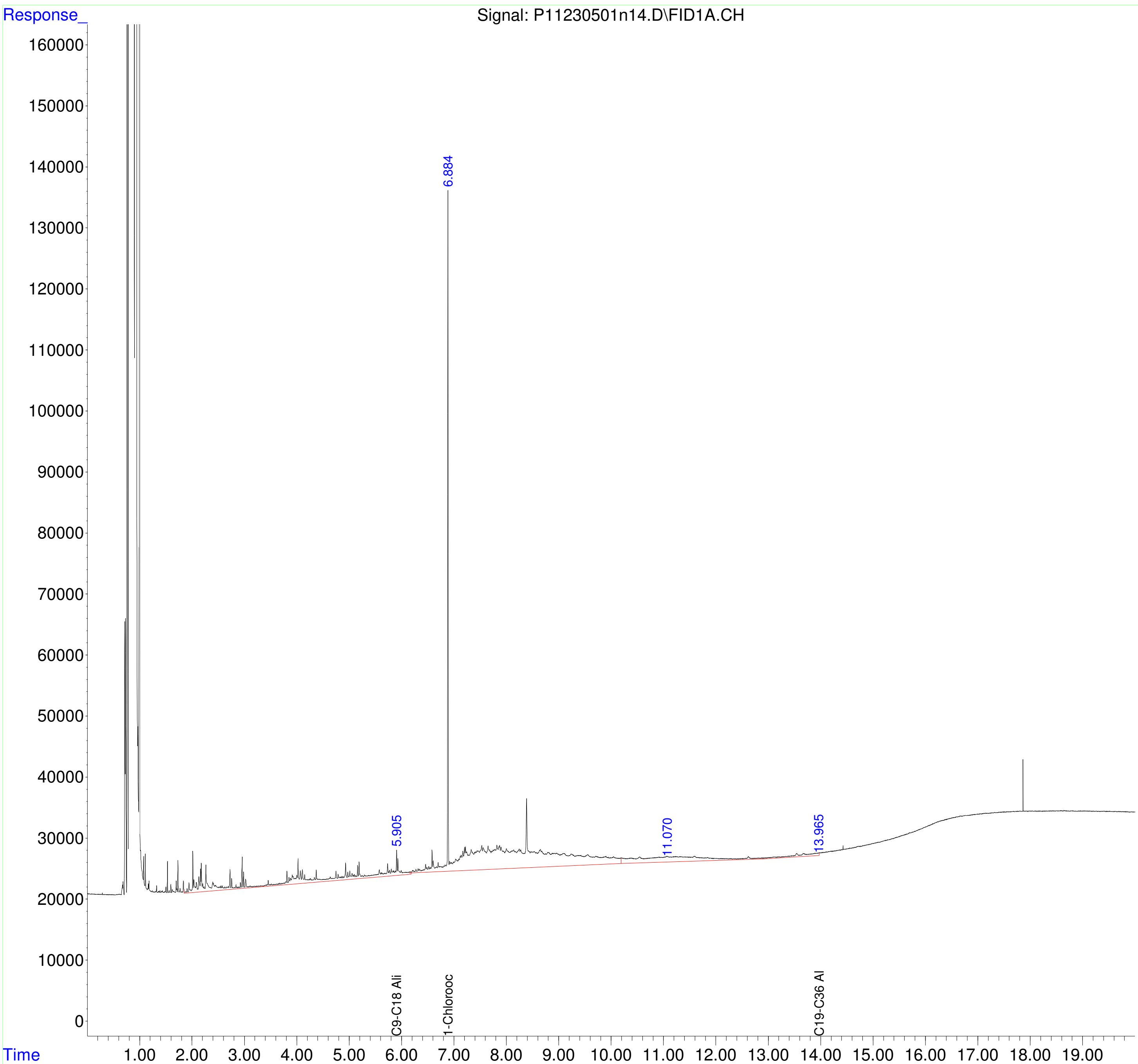
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230501n\
Data File : P11230501n14.D
Signal(s) : FID1A.CH
Acq On : 02-May-23, 11:27:13
Operator : petro11a/b:all
Sample : L2322455-15,42,,
Misc :
ALS Vial : 7 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 02 13:28:11 2023
Quant Method : I:\PETRO\Petro11\2023\230501n\MAALI220328.M
Quant Title : MA EPH Aliphatic
QLast Update : Tue May 02 09:35:15 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

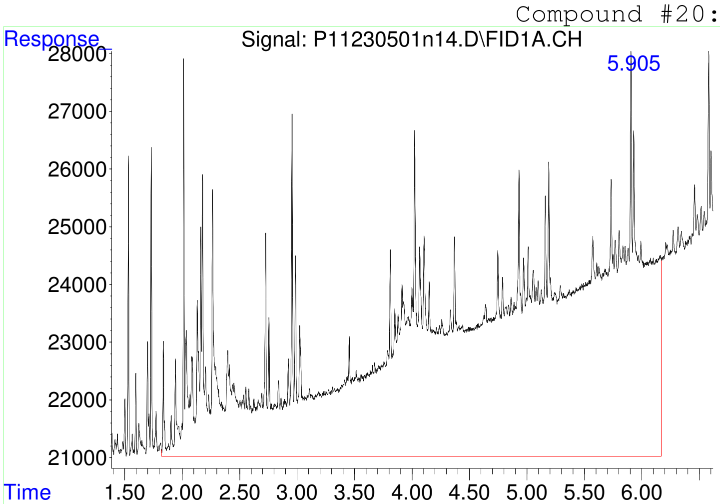
Volume Inj. :
Signal Phase :
Signal Info :

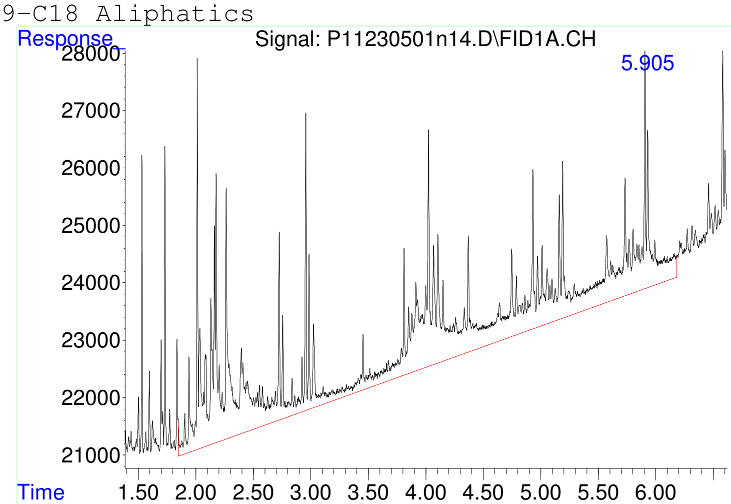


Manual Integration Report

Data Path : I:\PETRO\Petro11\2023\230501n\
Data File : P11230501n14.D
Date Inj'd : 5/2/2023 11:27 13
Sample : L2322455-15,42,,
QMethod : MAALI220328.M
Operator : petro11a/b:all
Instrument : Petro 11
Quant Date : 5/2/2023 1:22 pm

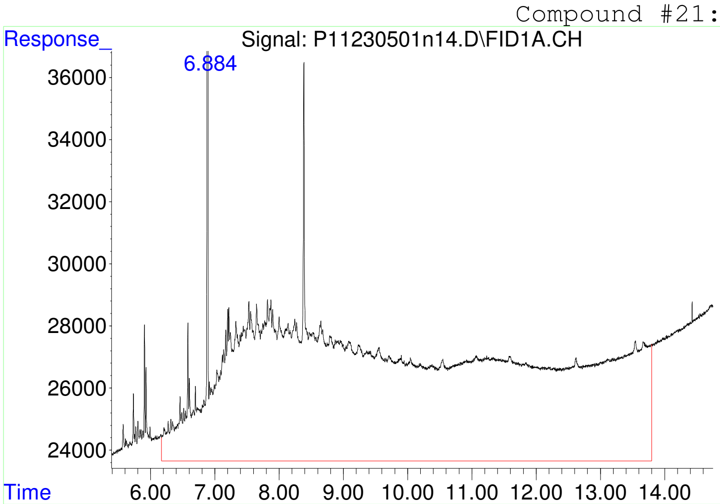
Compound #20: C9-C18 Aliphatics

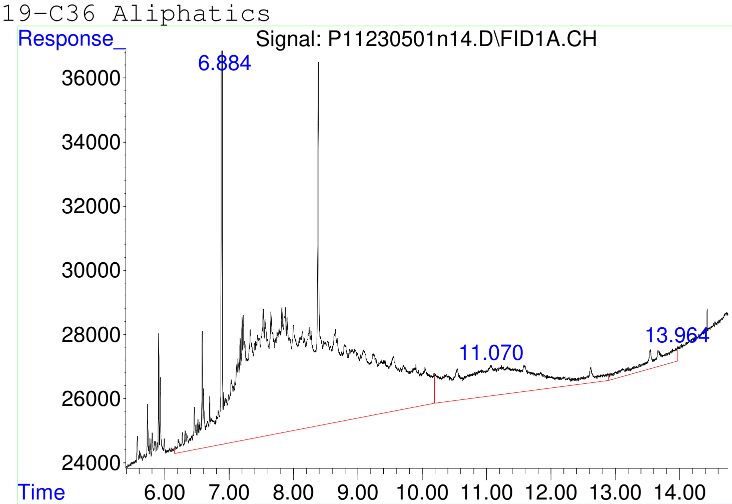



Original Peak Response = 5432702
Manual Peak Response = 1506459 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 14926240
Manual Peak Response = 5691735 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro11\2023\230501N.SEC\
Data File : P11230501n15.D
Signal(s) : FID2B.CH
Acq On : 02-May-23, 11:52:25
Operator : petro11a/b:all
Sample : L2322455-16,42,,
Misc :
ALS Vial : 58 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 02 13:52:09 2023
Quant Method : I:\PETRO\Petro11\2023\230501N.SEC\MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 27 08:38:54 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) s | 2-Fluorobiphenyl | 4.278 | 1270676 | 16.464 | mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 82.32% | | |
| 5) s | 2-Bromonaphthalene | 4.785 | 899867 | 16.901 | mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 84.50% | | |
| 10) S | o-terphenyl | 6.294 | 1310314 | 14.928 | mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 74.64% | | |
| | **Target Compounds** | | | | | |
| 1) | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 2) | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Acenaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) | Acenaphthene | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Fluorene | 0.000 | 0 | N.D. | mg/L | d |
| 8) | Phenanthrene | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Anthracene | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Fluoranthene | 0.000 | 0 | N.D. | mg/L | d |
| 12) | Pyrene | 0.000 | 0 | N.D. | mg/L | d |
| 13) | Benzo(a)anthracene | 0.000 | 0 | N.D. | mg/L | |
| 14) | Chrysene | 0.000 | 0 | N.D. | mg/L | |
| 15) | Benzo(b)fluoranthene | 0.000 | 0 | N.D. | mg/L | |
| 16) | Benzo(k)fluoranthene | 0.000 | 0 | N.D. | mg/L | |
| 17) | Benzo(a)pyrene | 0.000 | 0 | N.D. | mg/L | |
| 18) | Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. | mg/L | |
| 19) | Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. | mg/L | |
| 20) | Benzo(ghi)perylene | 0.000 | 0 | N.D. | mg/L | |
| 21) H | C11-C22 Aromatic Range | 11.830 | 1998458 | 23.096 | mg/L | M5 |

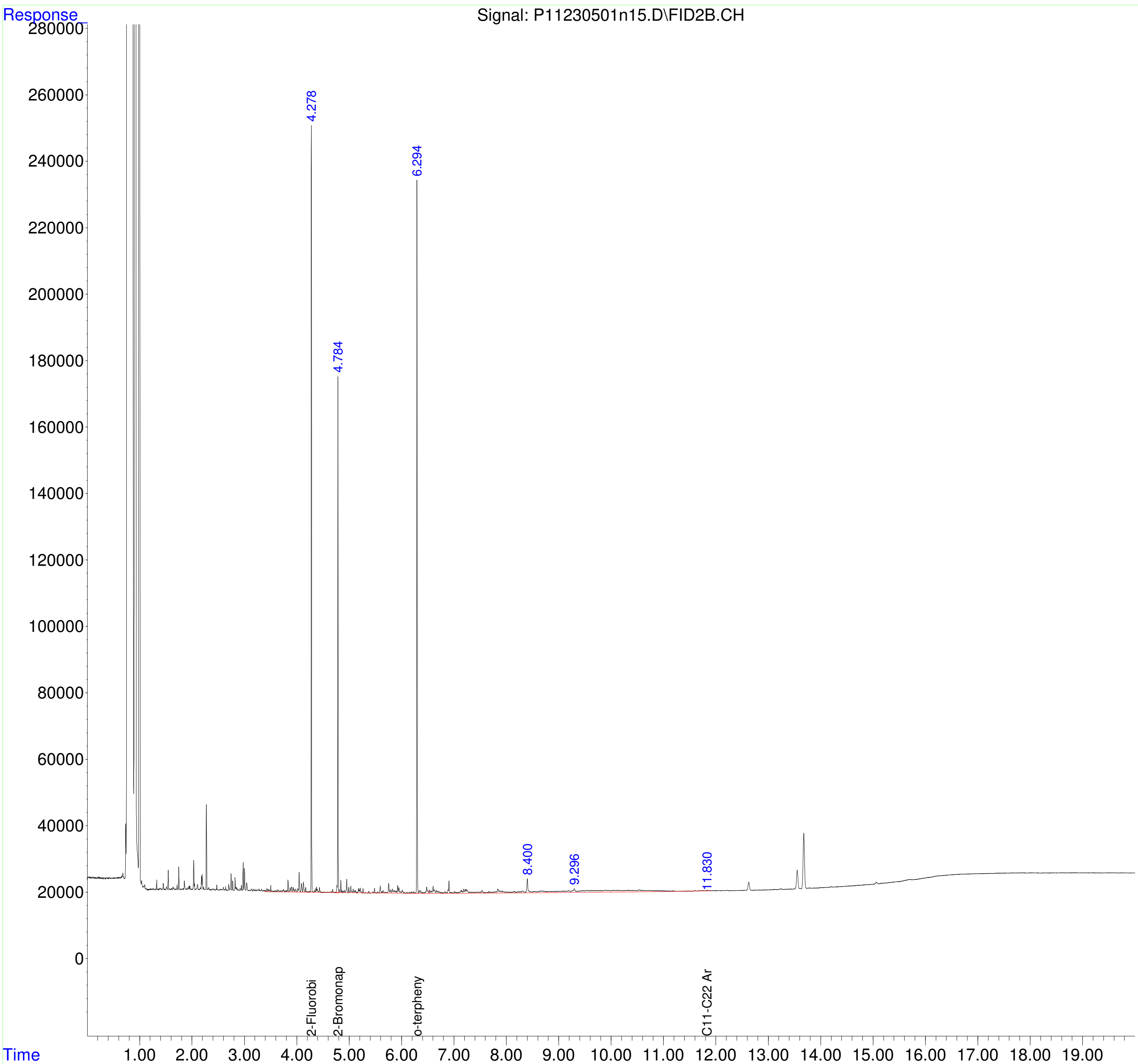
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230501N.SEC\
Data File : P11230501n15.D
Signal(s) : FID2B.CH
Acq On    : 02-May-23, 11:52:25
Operator  : petro11a/b:all
Sample    : L2322455-16,42,,
Misc      :
ALS Vial  : 58   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 02 13:52:09 2023
Quant Method : I:\PETRO\Petro11\2023\230501N.SEC\MAARO220328.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 27 08:38:54 2023
Response via : Initial Calibration
Integrator: ChemStation    6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :

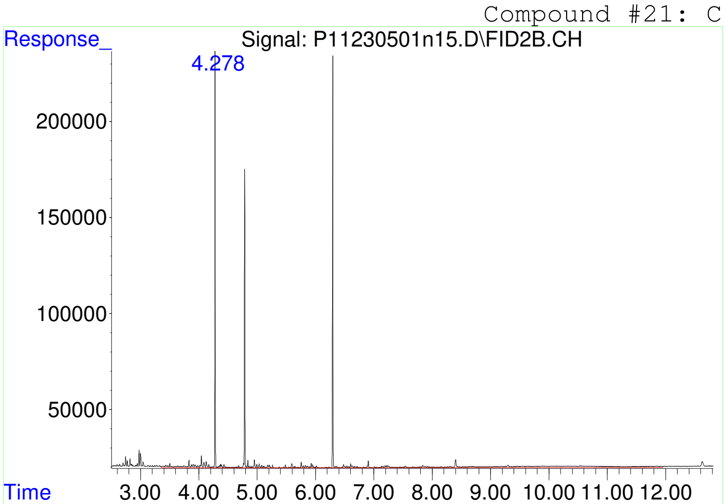


Manual Integration Report

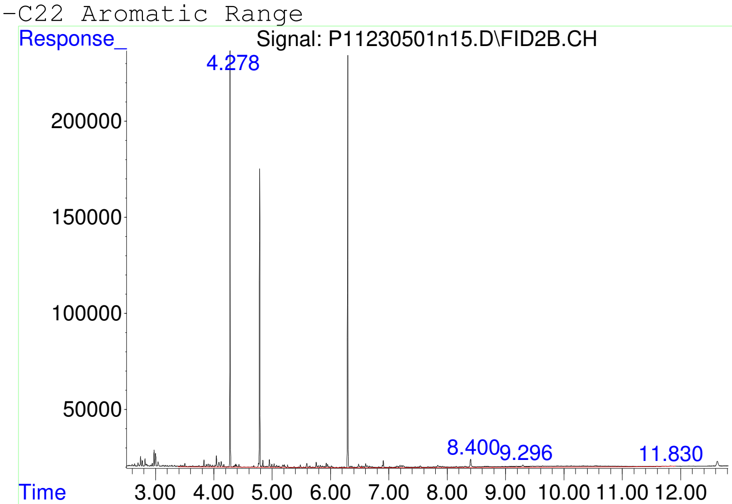
Data Path : I:\PETRO\Petro11\2023\230501N.SEC\
Data File : P11230501n15.D
Date Inj'd : 5/2/2023 11:52 25
Sample : L2322455-16,42,,

QMethod : MAARO220328.M
Operator : petro11a/b:all
Instrument : Petro 11
Quant Date : 5/2/2023 1:24 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 2698143




Manual Peak Response = 1998458 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230501n\
Data File : P11230501n16.D
Signal(s) : FID1A.CH
Acq On : 02-May-23, 11:52:25
Operator : petro11a/b:all
Sample : L2322455-16,42,,
Misc :
ALS Vial : 8 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 02 13:28:52 2023
Quant Method : I:\PETRO\Petro11\2023\230501n\MAALI220328.M
Quant Title : MA EPH Aliphatic
QLast Update : Tue May 02 09:35:15 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

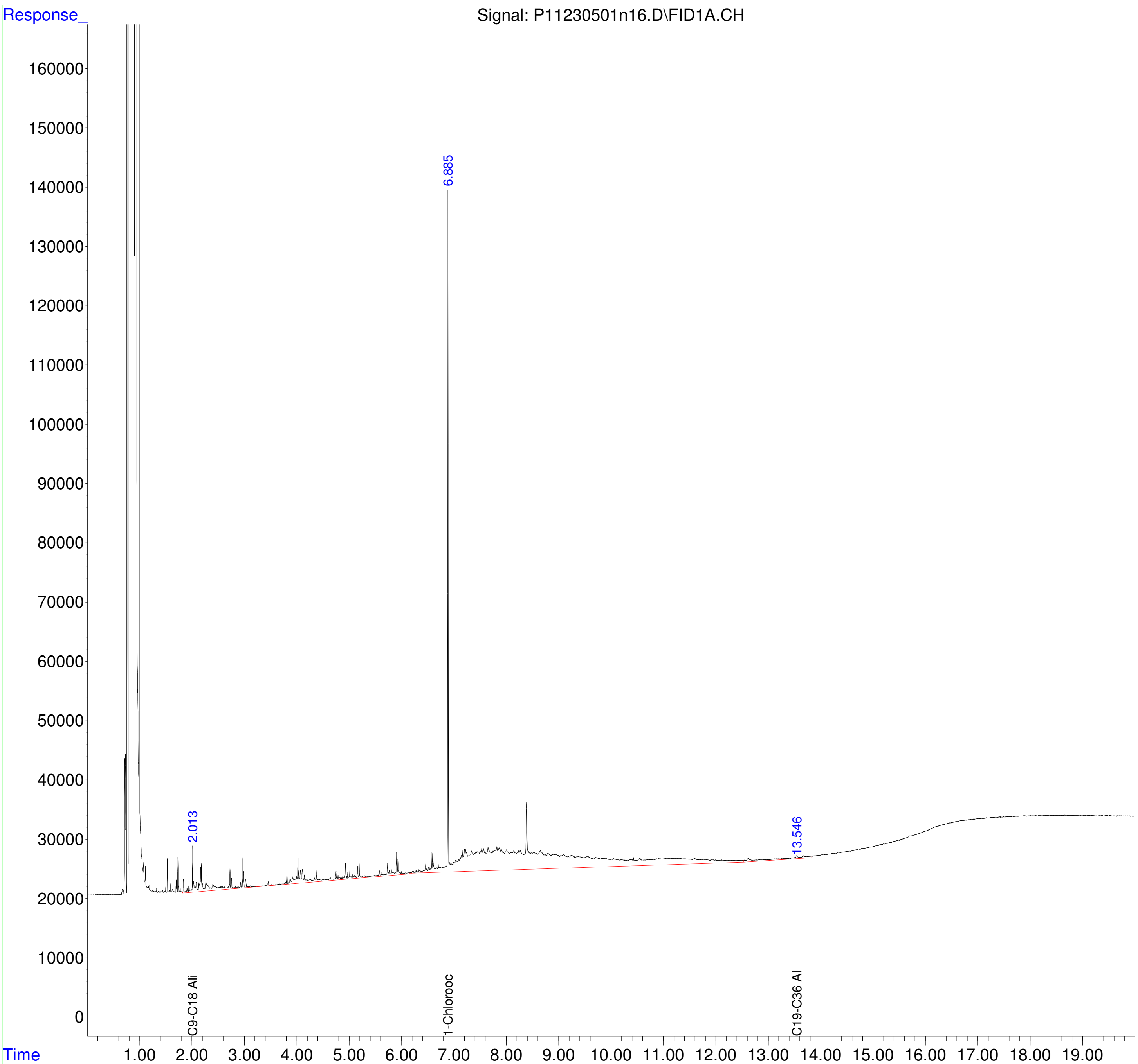
Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 6.885 | 745523 | 11.992 | mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 59.96% | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 2.013f | 1188406 | 17.412 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 13.546f | 6319057 | 88.565 | mg/L | M5 |

(f)=RT Delta > 1/2 Window (m)=manual int.

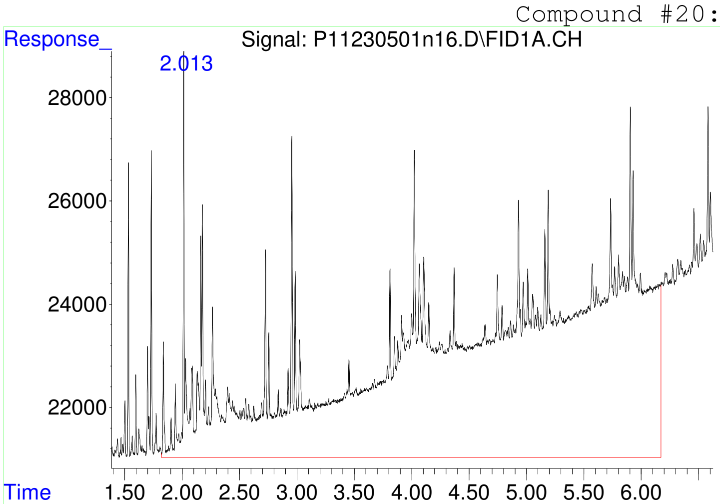
```
Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230501n\
Data File : P11230501n16.D
Signal(s) : FID1A.CH
Acq On    : 02-May-23, 11:52:25
Operator  : petro11a/b:all
Sample    : L2322455-16,42,,
Misc      :
ALS Vial  : 8   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 02 13:28:52 2023
Quant Method : I:\PETRO\Petro11\2023\230501n\MAALI220328.M
Quant Title  : MA EPH Aliphatic
QLast Update : Tue May 02 09:35:15 2023
Response via : Initial Calibration
Integrator: ChemStation    6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :
```

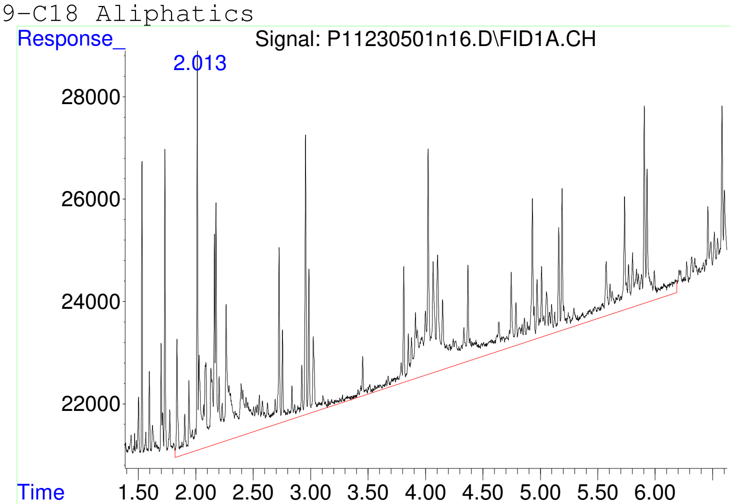


Manual Integration Report

```
Data Path    : I:\PETRO\Petro11\2023\230501n\        QMethod      : MAALI220328.M
Data File    : P11230501n16.D                        Operator     : petro11a/b:all
Date Inj'd   : 5/2/2023 11:52 25                     Instrument   : Petro 11
Sample       : L2322455-16,42,,                      Quant Date   : 5/2/2023  1:22 pm
```

Compound #20: C9-C18 Aliphatics

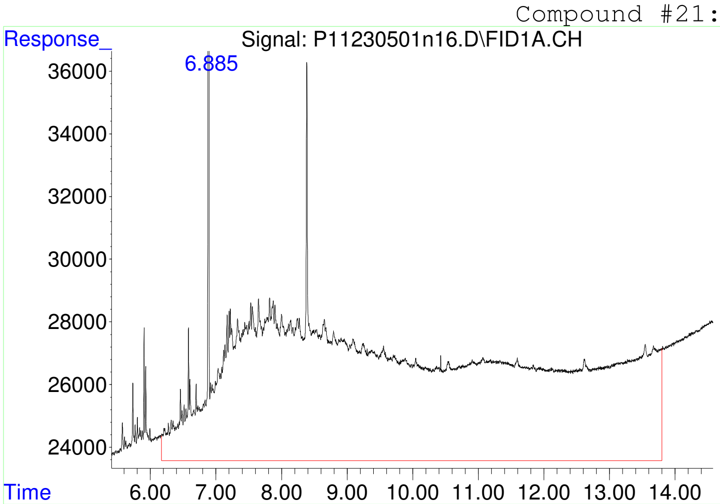


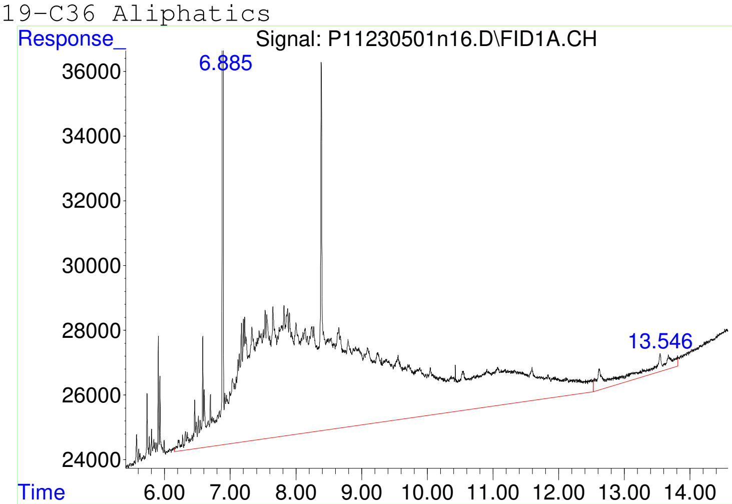




Original Peak Response = 5172126     Manual Peak Response = 1188406 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 14698649     Manual Peak Response = 6319057 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

# Attachment C: Phase III Sediment MDL Study

# Attachment C. $C_{19}$-$C_{36}$ Aliphatics Sediment MDL Study – NTC Sediment

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Name | | | NTC Sediment MDL 1 | NTC Sediment MDL 2 | NTC Sediment MDL 3 | NTC Sediment MDL 4 | NTC Sediment MDL 5 | NTC Sediment MDL 6 | NTC Sediment MDL 7 | NTC Sediment MDL 8 | | | | |
| Lab ID | | | L2326777-01 | L2326777-02 | L2326777-03 | L2326777-04 | L2326777-05 | L2326777-06 | L2326777-07 | L2326777-08 | | | | |
| Day | | | Day 1 | Day 1 | Day 1 | Day 2 | Day 2 | Day 2 | Day 3 | Day3 | | | | |
| Extraction Date | | | 5/16/2023 | 5/16/2023 | 5/16/2023 | 5/17/2023 | 5/17/2023 | 5/17/2023 | 5/18/2023 | 5/18/2023 | | | | |
| Analysis Date | | | 5/17/2023 | 5/17/2023 | 5/17/2023 | 5/25/2023 | 5/25/2023 | 5/25/2023 | 5/21/2023 | 5/21/2023 | | | | |
| File ID | | | P2123051740.D | P2123051742.D | P2123051744.D | P11230524n10.D | P11230524n12.D | P11230524n14.D | P2123052120.D | P2123052122.D | | | | |
| Analysis Date | | | 17-May-23 | 17-May-23 | 17-May-23 | 25-May-23 | 25-May-23 | 25-May-23 | 21-May-23 | 21-May-23 | | | | |
| Sample Size (g) | | | 5.82 | 5.38 | 5.57 | 5.14 | 5.25 | 5.37 | 5.80 | 5.27 | | | | |
| Final Volume (mL) | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| %Solids | | | 79.4% | 79.4% | 79.4% | 79.4% | 79.4% | 79.4% | 79.4% | 79.4% | | | | |
| Split Factor | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | | |
| **On Column Concentration** | | | | | | | | | | | | | | |
| Analyte | Units | Target Concentration | MDL 1 | MDL 2 | MDL 3 | MDL 4 | MDL 5 | MDL 6 | MDL 7 | MDL 8 | | | | |
| C11-C22 Aromatics | mg/L | | 73.81 | 109.44 | 70.499 | 337.5 | 183.9 | 104.4 | 21.3 | 13.7 | | | | |
| C9-C18 Aliphatics | mg/L | | 57.91 | 63.11 | 51.415 | 208.3 | 123.6 | 86.1 | 16.9 | 18.1 | | | | |
| C19-C36 Aliphatics | mg/L | | 121.98 | 148.87 | 114.283 | 540.0 | 256 | 175 | 16.9 | 12.0 | | | | |
| **Final Concentration** | | | | | | | | | | | | | | |
| Analyte | Units | Target Concentration | MDL 1 | MDL 2 | MDL 3 | MDL 4 | MDL 5 | MDL 6 | MDL 7 | MDL 8 | Mean | STD | $t_8$ | **$MDL_s$** |
| C11-C22 Aromatics | mg/kg | | 31.95 | 51.24 | 31.88 | 165.4 | 88.2 | 49.0 | 9.26 | 6.6 | 54.2 | 51.88 | 2.998 | **156** |
| C9-C18 Aliphatics | mg/kg | | 25.06 | 29.55 | 23.25 | 102.06 | 59.32 | 40.4 | 7.32 | 8.65 | 36.95 | 31.20 | 2.998 | **93.5** |
| C19-C36 Aliphatics | mg/kg | | 52.79 | 69.70 | 51.68 | 264.6 | 122.9 | 82.0 | 7.3 | 5.8 | 82.1 | 83.1 | 2.998 | **249** |

# Attachment C. $C_{19}$-$C_{36}$ Aliphatics Sediment MDL Study – Mineral Oil

| Sample Name | | | Mineral Oil MDL 1 | Mineral Oil MDL 2 | Mineral Oil MDL 3 | Mineral Oil MDL 4 | Mineral Oil MDL 5 | Mineral Oil MDL 6 | Mineral Oil MDL 7 | Mineral Oil MDL 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | | | L2326777-09 | L2326777-10 | L2326777-11 | L2326777-12 | L2326777-13 | L2326777-14 | L2326777-15 | L2326777-16 |
| Day | | | Day 1 | Day 1 | Day 1 | Day 2 | Day 2 | Day 2 | Day 3 | Day3 |
| Extraction Date | | | 5/16/2023 | 5/16/2023 | 5/16/2023 | 5/17/2023 | 5/17/2023 | 5/17/2023 | 5/18/2023 | 5/18/2023 |
| Analysis Date | | | 5/17/2023 | 5/17/2023 | 5/17/2023 | 5/25/2023 | 5/25/2023 | 5/25/2023 | 5/21/2023 | 5/21/2023 |
| File ID | | | P2123051746.D | P2123051748.D | P2123051750.D | P11230524n16.D | P11230524n18.D | P11230524n20.D | P2123052124.D | P2123052126.D |
| Analysis Date | | | 17-May-23 | 17-May-23 | 17-May-23 | 25-May-23 | 25-May-23 | 25-May-23 | 21-May-23 | 21-May-23 |
| Sample Size (g) | | | 5.28 | 5.41 | 5.31 | 5.29 | 5.29 | 5.35 | 5.23 | 5.62 |
| Final Volume (mL) | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| %Solids | | | 54.3% | 54.3% | 54.3% | 54.3% | 54.3% | 54.3% | 54.3% | 54.3% |
| Split Factor | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

**On Column Concentration**

| Analyte | Units | Target Concentration | MDL 1 | MDL 2 | MDL 3 | MDL 4 | MDL 5 | MDL 6 | MDL 7 | MDL 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| C11-C22 Aromatics | mg/L | 100 | 30.55 | 28.26 | 31.48 | 28.7 | 44.9 | 37.9 | 10.5 | 22.8 |
| C9-C18 Aliphatics | mg/L | 100 | 26.57 | 25.56 | 39.97 | 71.4 | 68.9 | 66.7 | 17.7 | 18.5 |
| C19-C36 Aliphatics | mg/L | 100 | 153.3 | 158.6 | 181.0 | 268.8 | 272.9 | 300.5 | 174.7 | 168.7 |

**Final Concentration**

| Analyte | Units | Target Concentration | MDL 1 | MDL 2 | MDL 3 | MDL 4 | MDL 5 | MDL 6 | MDL 7 | MDL 8 | Mean | STD | $t_8$ | **$MDL_s$** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C11-C22 Aromatics | mg/kg | 100 | 21.30 | 19.23 | 21.82 | 20.0 | 31.23 | 26.05 | 7.39 | 14.94 | 20.24 | 7.10 | 2.998 | **21.3** |
| C9-C18 Aliphatics | mg/kg | 100 | 18.52 | 17.39 | 27.71 | 49.7 | 47.91 | 45.88 | 12.46 | 12.12 | 28.96 | 16.36 | 2.998 | **49.1** |
| C19-C36 Aliphatics | mg/kg | 100 | 106.9 | 107.9 | 125.5 | 187.0 | 189.91 | 206.76 | 122.98 | 110.47 | 144.7 | 42.23 | 2.998 | **127** |

# Attachment C. $C_{19}$-$C_{36}$ Aliphatics Sediment MDL Study – Lubricating Oil

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Name | | | Lubricating Oil MDL 1 | Lubricating Oil MDL 2 | Lubricating Oil MDL 3 | Lubricating Oil MDL 4 | Lubricating Oil MDL 5 | Lubricating Oil MDL 6 | Lubricating Oil MDL 7 | Lubricating Oil MDL 8 | | | | |
| Lab ID | | | L2326777-17 | L2326777-18 | L2326777-19 | L2326777-20 | L2326777-21 | L2326777-22 | L2326777-23 | L2326777-24 | | | | |
| Day | | | Day 1 | Day 1 | Day 1 | Day 2 | Day 2 | Day 2 | Day 3 | Day3 | | | | |
| Extraction Date | | | 5/16/2023 | 5/16/2023 | 5/16/2023 | 5/17/2023 | 5/17/2023 | 5/17/2023 | 5/18/2023 | 5/18/2023 | | | | |
| Analysis Date | | | 5/17/2023 | 5/17/2023 | 5/17/2023 | 5/25/2023 | 5/25/2023 | 5/25/2023 | 5/21/2023 | 5/21/2023 | | | | |
| File ID | | | P2123051752.D | P2123051754.D | P2123051756.D | P11230524n22.D | P11230524n24.D | P11230524n26.D | P2123052128.D | P2123052130.D | | | | |
| Sample Size (g) | | | 5.33 | 5.91 | 5.54 | 5.74 | 5.55 | 5.31 | 5.23 | 5.80 | | | | |
| Final Volume (mL) | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| %Solids | | | 54.3% | 54.3% | 54.3% | 54.3% | 54.3% | 54.3% | 54.3% | 54.3% | | | | |
| Split Factor | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | | |
| **On Column Concentration** | | | | | | | | | | | | | | |
| Analyte | Units | Target Concentration | MDL 1 | MDL 2 | MDL 3 | MDL 4 | MDL 5 | MDL 6 | MDL 7 | MDL 8 | | | | |
| C11-C22 Aromatics | mg/L | 100 | 31.13 | 30.78 | 31.5 | 40.8 | 49.8 | 38.8 | 22.5 | 22.0 | | | | |
| C9-C18 Aliphatics | mg/L | 100 | 33.04 | 21.64 | 23.6 | 61.1 | 62.7 | 63.7 | 17.3 | 16.0 | | | | |
| C19-C36 Aliphatics | mg/L | 100 | 168.35 | 180.39 | 193.8 | 297.2 | 250.6 | 275.4 | 110.7 | 159.5 | | | | |
| **Final Concentration** | | | | | | | | | | | | | | |
| Analyte | Units | Target Concentration | MDL 1 | MDL 2 | MDL 3 | MDL 4 | MDL 5 | MDL 6 | MDL 7 | MDL 8 | Mean | STD | $t_8$ | **$MDL_s$** |
| C11-C22 Aromatics | mg/kg | 100 | 21.50 | 19.17 | 20.94 | 26.1 | 33.03 | 26.89 | 15.86 | 13.97 | 22.19 | 6.26 | 2.998 | **18.8** |
| C9-C18 Aliphatics | mg/kg | 100 | 22.82 | 13.48 | 15.70 | 39.2 | 41.56 | 44.19 | 12.15 | 10.14 | 24.90 | 14.41 | 2.998 | **43.2** |
| C19-C36 Aliphatics | mg/kg | 100 | 116.3 | 112.4 | 128.8 | 190.6 | 166.23 | 190.95 | 77.91 | 101.22 | 135.5 | 42.25 | 2.998 | **127** |

# Attachment C. $C_{19}$-$C_{36}$ Aliphatics Sediment MDL Study – Method Blank

| Sample Name | | | Blank 1 | Blank 2 | Blank 3 | Blank 4 | Blank 5 | Blank 6 | Blank 7 | Blank 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab ID | | | WG1779452-1 | WG1779452-2 | WG1779452-3 | WG1780020-1 | WG1780020-2 | WG1780020-3 | WG1780597-1 | WG1780597-2 | | | | |
| Day | | | Day 1 | Day 1 | Day 1 | Day 2 | Day 2 | Day 2 | Day 3 | Day3 | | | | |
| Extraction Date | | | 5/16/2023 | 5/16/2023 | 5/16/2023 | 5/17/2023 | 5/17/2023 | 5/17/2023 | 5/18/2023 | 5/18/2023 | | | | |
| Analysis Date | | | 5/17/2023 | 5/17/2023 | 5/17/2023 | 5/25/2023 | 5/25/2023 | 5/25/2023 | 5/21/2023 | 5/21/2023 | | | | |
| File ID | | | P2123051734.D | P2123051736.D | P2123051738.D | 11230524n04.D | P11230524n06.D | P11230524n08.D | P2123052116.D | P2123052118.D | | | | |
| Sample Size (g) | | | 5.47 | 5.29 | 5.55 | 5.53 | 5.46 | 5.42 | 5.72 | 5.39 | | | | |
| Final Volume (mL) | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | |
| Split Factor | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | | |
| **On Column Concentration** | | | | | | | | | | | | | | |
| Analyte | Units | Target Concentration | Blank 1 | Blank 2 | Blank 3 | Blank 4 | Blank 5 | Blank 6 | Blank 7 | Blank 8 | | | | |
| C11-C22 Aromatics | mg/L | 0 | 31.33 | 27.11 | 28.87 | 33.0 | 36.8 | 25.9 | 18.1 | 18.6 | | | | |
| C9-C18 Aliphatics | mg/L | 0 | 14.29 | 13.82 | 14.83 | 34.3 | 30.8 | 26.2 | 13.0 | 14.8 | | | | |
| C19-C36 Aliphatics | mg/L | 0 | 11.12 | 10.53 | 8.52 | 19.6 | 14.6 | 18.5 | 12.2 | 9.7 | | | | |
| **Final Concentration** | | | | | | | | | | | | | | |
| Analyte | Units | Target Concentration | Blank 1 | Blank 2 | Blank 3 | Blank 4 | Blank 5 | Blank 6 | Blank 7 | Blank 8 | Mean | STD | $t_8$ | **$MDL_B$** |
| C11-C22 Aromatics | mg/kg | 0 | 11.46 | 10.25 | 10.40 | 11.94 | 13.49 | 9.57 | 6.34 | 6.91 | 10.05 | 2.43 | 2.998 | **17.3** |
| C9-C18 Aliphatics | mg/kg | 0 | 5.23 | 5.23 | 5.34 | 12.39 | 11.29 | 9.67 | 4.54 | 5.49 | 7.40 | 3.18 | 2.998 | **16.9** |
| C19-C36 Aliphatics | mg/kg | 0 | 4.06 | 3.98 | 3.07 | 7.10 | 5.33 | 6.82 | 4.26 | 3.61 | 4.78 | 1.49 | 2.998 | **9.3** |

Phase III Sediment MDL Study
Raw Data Quant Reports

```
Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051733.D
Signal(s) : FID2B.ch
Acq On    : 17 May 2023   6:32 pm
Operator  : Petro21b:sr
Sample    : WG1779452-1,42,,
Misc      : wg1779451  DAY 1 Blank
ALS Vial  : 67   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:49:21 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed
```

| Compound | R.T. | Response | Conc Units |
|---|---|---|---|
| **System Monitoring Compounds** | | | |
| 3) s 2-Fluorobiphenyl | 4.513 | 1090634 | 15.583 mg/L |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 77.92% |
| 5) s 2-Bromonaphthalene | 5.020 | 771049 | 15.644 mg/L |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 78.22% |
| 10) S o-terphenyl | 6.529 | 798906 | 8.774 mg/L |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 43.87% |
| **Target Compounds** | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L d |
| 21) H C11-C22 Aromatic Range | 11.017 | 2619140 | 31.330 mg/L M5 |

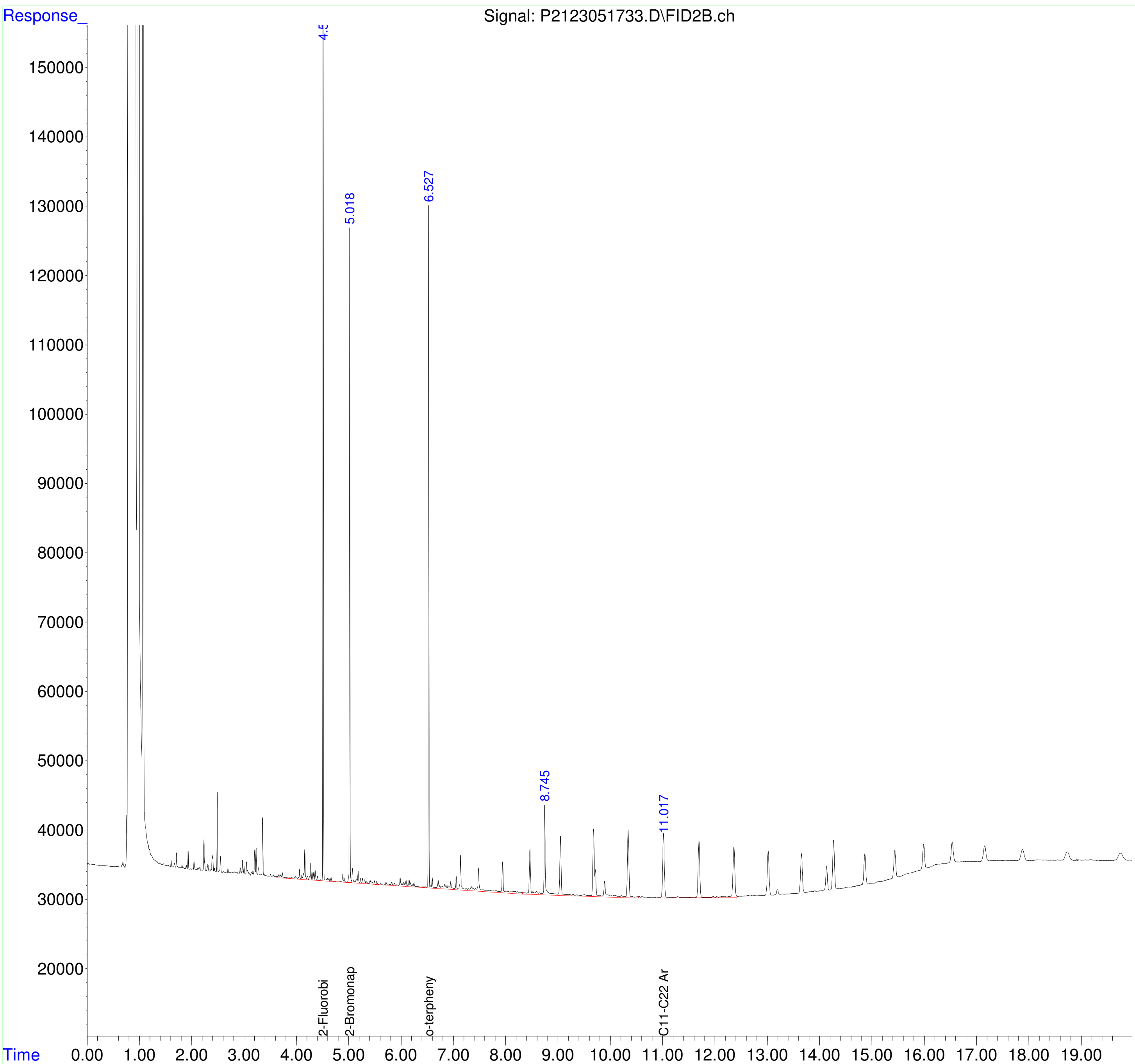
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051733.D
Signal(s) : FID2B.ch
Acq On    : 17 May 2023   6:32 pm
Operator  : Petro21b:sr
Sample    : WG1779452-1,42,,
Misc      : wg1779451  DAY 1 Blank
ALS Vial  : 67   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:49:21 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:24:28 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

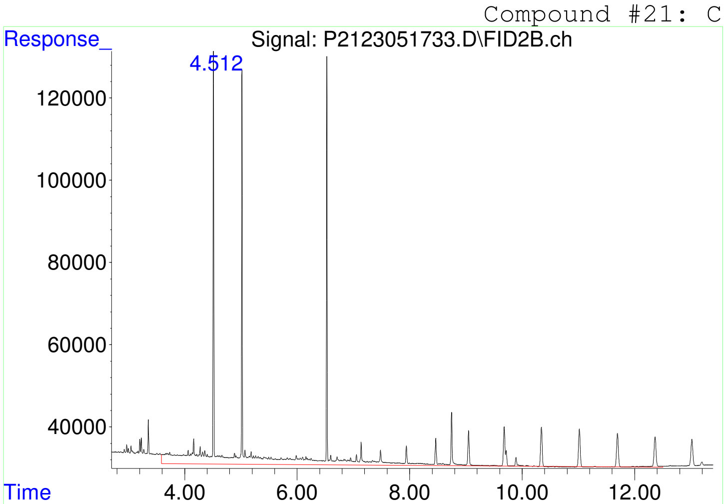


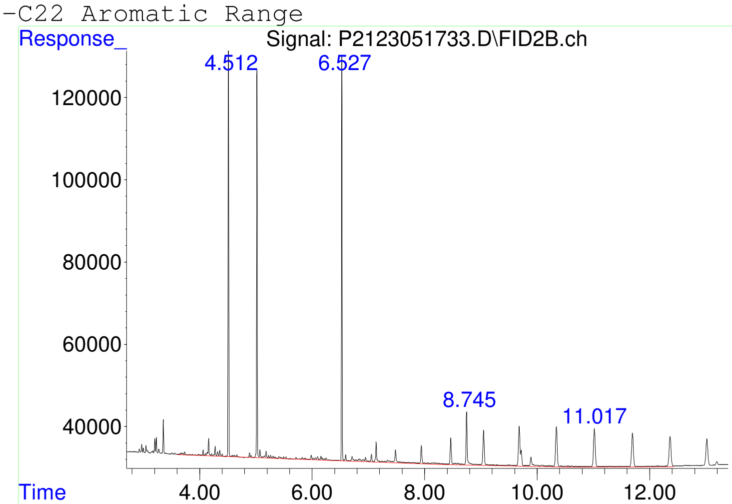
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051733.D
Date Inj'd : 5/17/2023 6:32 pm
Sample : WG1779452-1,42,,

QMethod : P21MAARO211129B.M
Operator : Petro21b:sr
Instrument : Petro 21
Quant Date : 5/18/2023 8:23 am

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 5534542

Manual Peak Response = 2619140 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051734.D
Signal(s) : FID1A.ch
Acq On : 17 May 2023 6:32 pm
Operator : Petro21a:sr
Sample : WG1779452-1,42,,
Misc : WG1779451 DAY 1 Blanks (ALI)
ALS Vial : 17 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:38:27 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:10:41 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.171 | 611999 | 9.836 | mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 49.18% | | |
| Target Compounds | | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 2.215f | 1022968 | 14.294 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.470f | 765578 | 11.116 | mg/L | M5 |

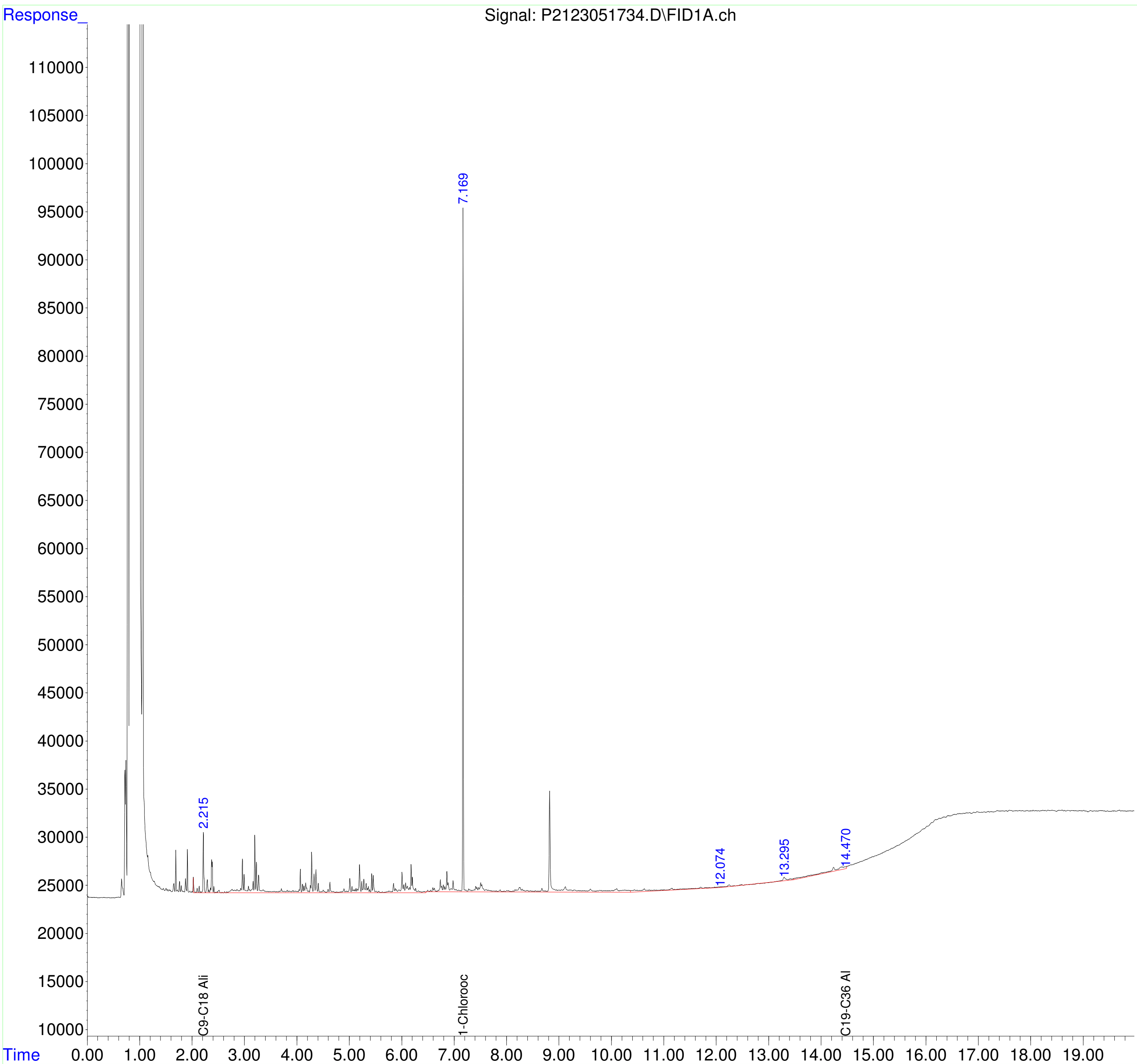
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051734.D
Signal(s) : FID1A.ch
Acq On    : 17 May 2023   6:32 pm
Operator  : Petro21a:sr
Sample    : WG1779452-1,42,,
Misc      : WG1779451  DAY 1 Blanks  (ALI)
ALS Vial  : 17   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:38:27 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:10:41 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

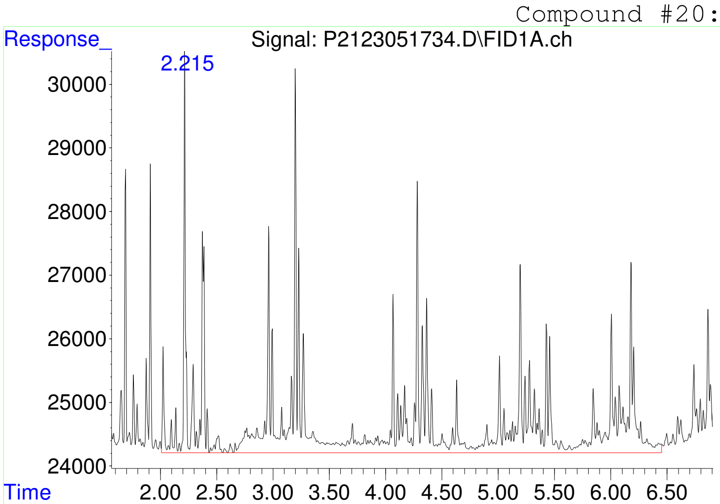


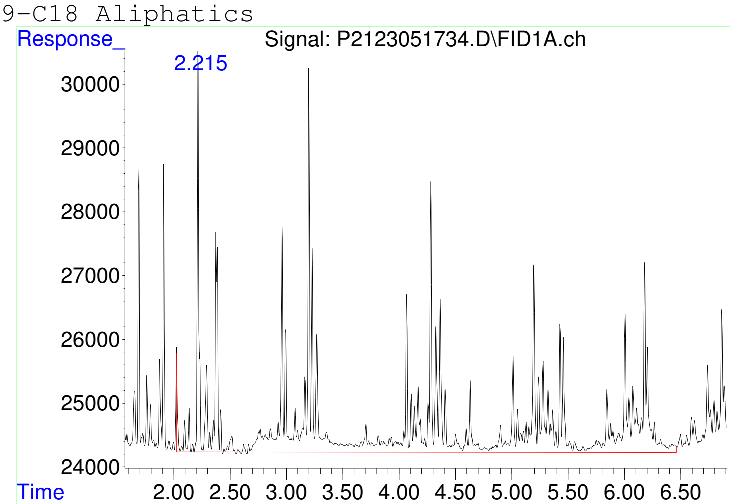
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051734.D
Date Inj'd : 5/17/2023 6:32 pm
Sample : WG1779452-1,42,,

QMethod : P21MAALI211129A.M
Operator : Petro21a:sr
Instrument : Petro 21
Quant Date : 5/18/2023 8:21 am

Compound #20: C9-C18 Aliphatics



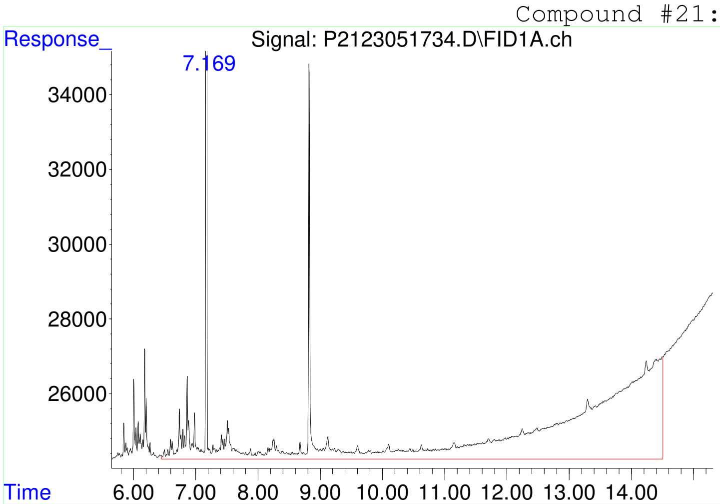



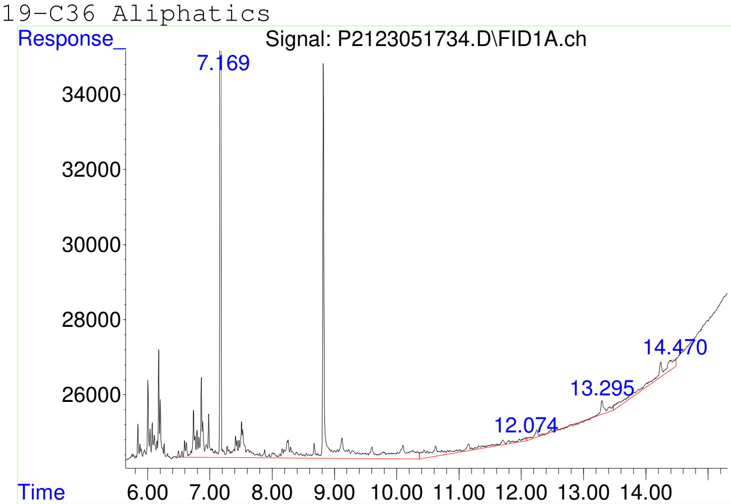

Original Peak Response = 1092719

Manual Peak Response = 1022968 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 3168524

Manual Peak Response = 765578 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051735.D
Signal(s) : FID2B.ch
Acq On : 17 May 2023 6:57 pm
Operator : Petro21b:sr
Sample : WG1779452-2,42,,
Misc : wg1779451 DAY 1 Blank
ALS Vial : 68 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:50:55 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.513 | 993612 | 14.197 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 70.98% | |
| 5) s 2-Bromonaphthalene | 5.020 | 702264 | 14.248 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 71.24% | |
| 10) S o-terphenyl | 6.529 | 839739 | 9.222 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 46.11% | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 12.363f | 2266452 | 27.111 mg/L | M5 |

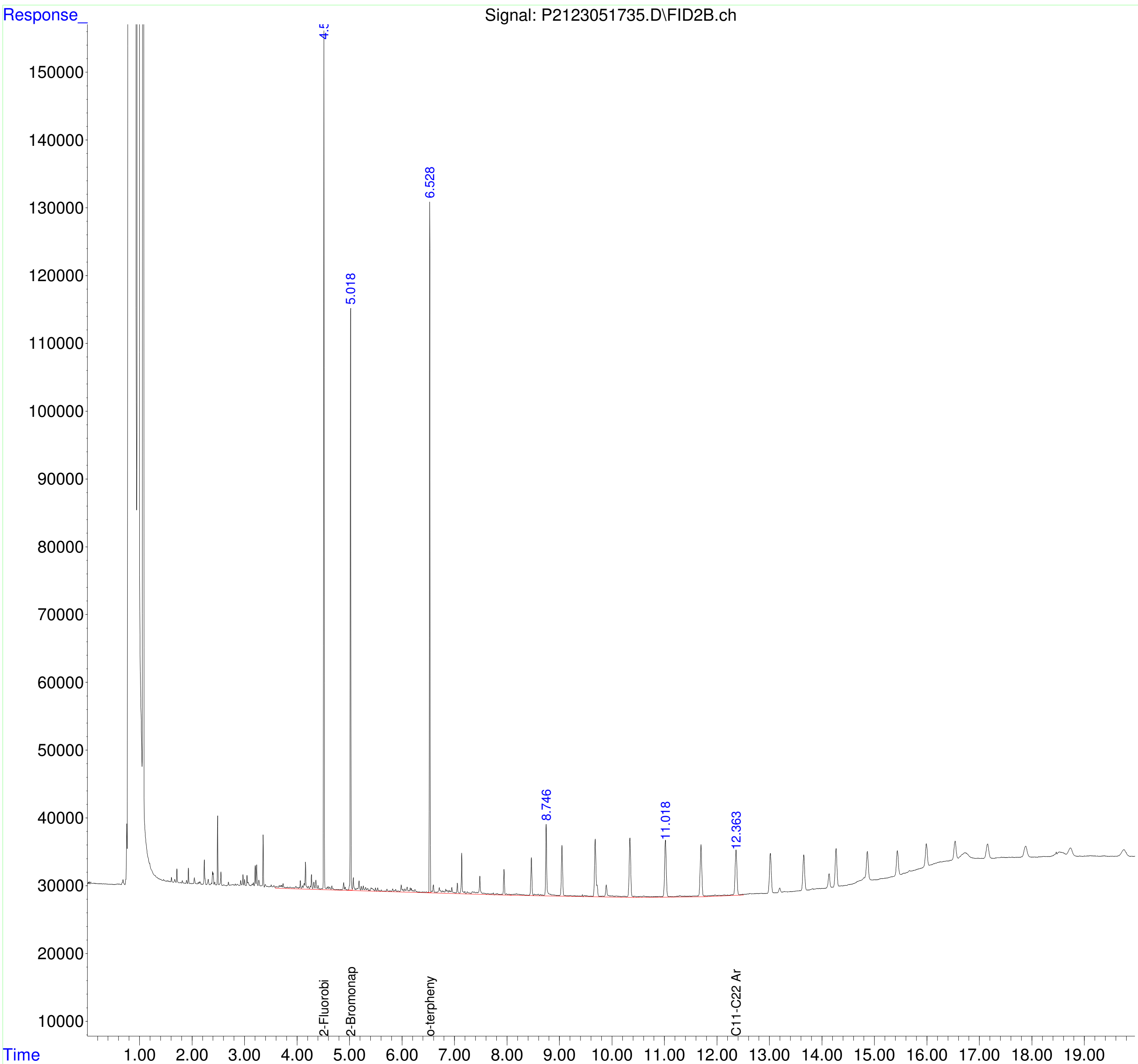
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051735.D
Signal(s) : FID2B.ch
Acq On    : 17 May 2023   6:57 pm
Operator  : Petro21b:sr
Sample    : WG1779452-2,42,,
Misc      : wg1779451  DAY 1 Blank
ALS Vial  : 68   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:50:55 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

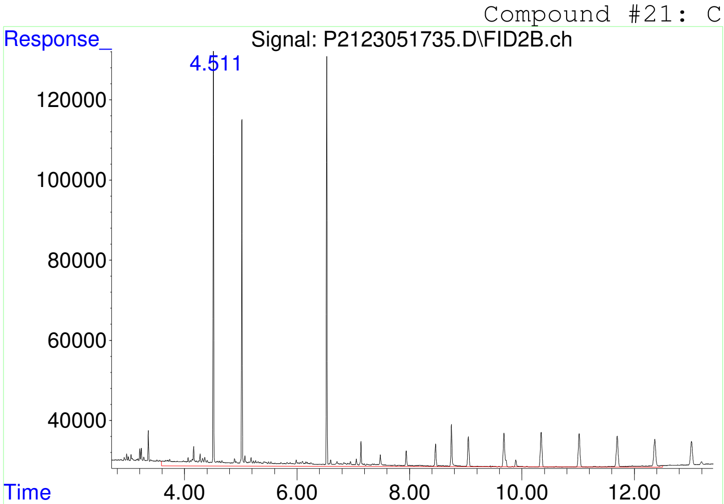
Volume Inj.  :
Signal Phase :
Signal Info  :

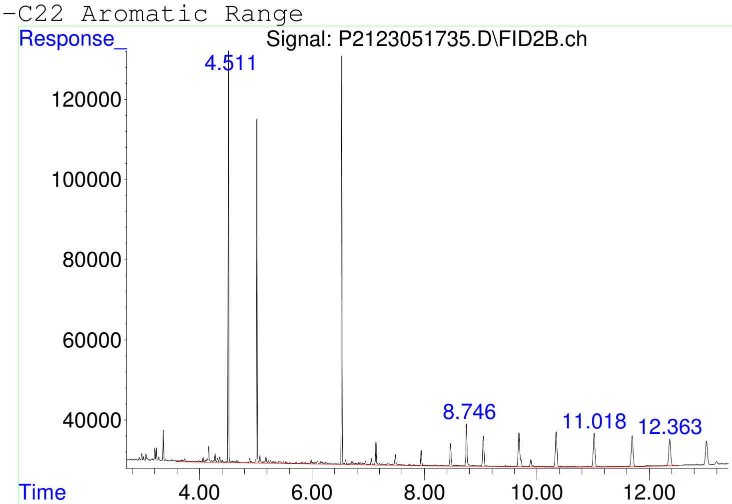


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230517.SEC\ | QMethod | : P21MAARO211129B.M |
| Data File | : P2123051735.D | Operator | : Petro21b:sr |
| Date Inj'd | : 5/17/2023 6:57 pm | Instrument | : Petro 21 |
| Sample | : WG1779452-2,42,, | Quant Date | : 5/18/2023 8:23 am |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3765324 Manual Peak Response = 2266452 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051736.D
Signal(s) : FID1A.ch
Acq On : 17 May 2023 6:57 pm
Operator : Petro21a:sr
Sample : WG1779452-2,42,,
Misc : WG1779451 DAY 1 Blanks (ALI)
ALS Vial : 18 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:40:28 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.172 | 685577 | 11.019 | mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 55.10% | | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 2.214f | 989124 | 13.821 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.373f | 725269 | 10.531 | mg/L | M5 |

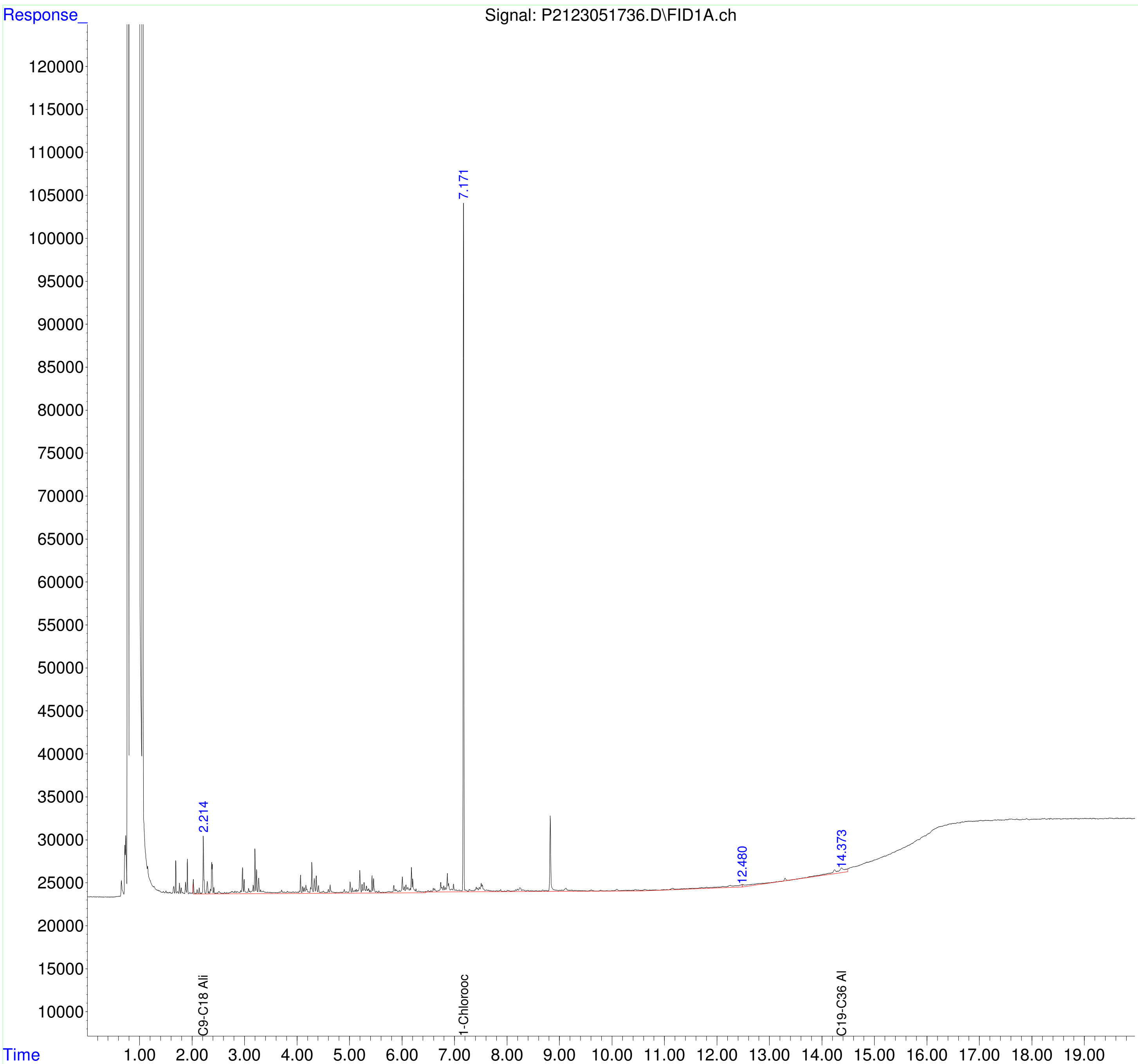
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051736.D
Signal(s) : FID1A.ch
Acq On    : 17 May 2023   6:57 pm
Operator  : Petro21a:sr
Sample    : WG1779452-2,42,,
Misc      : WG1779451  DAY 1 Blanks  (ALI)
ALS Vial  : 18   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:40:28 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

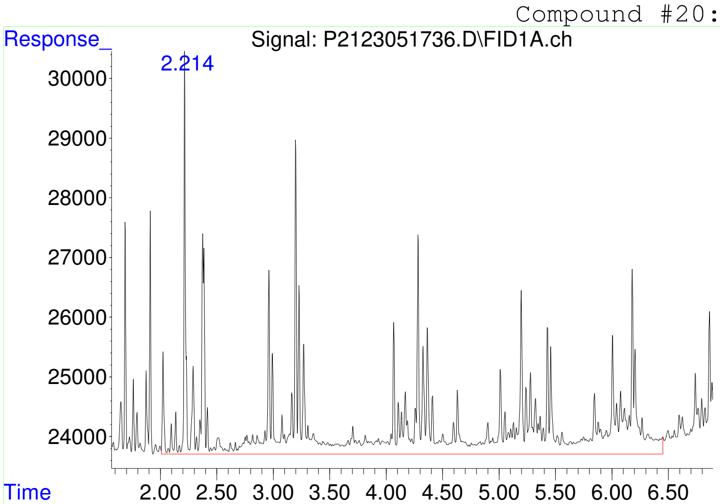


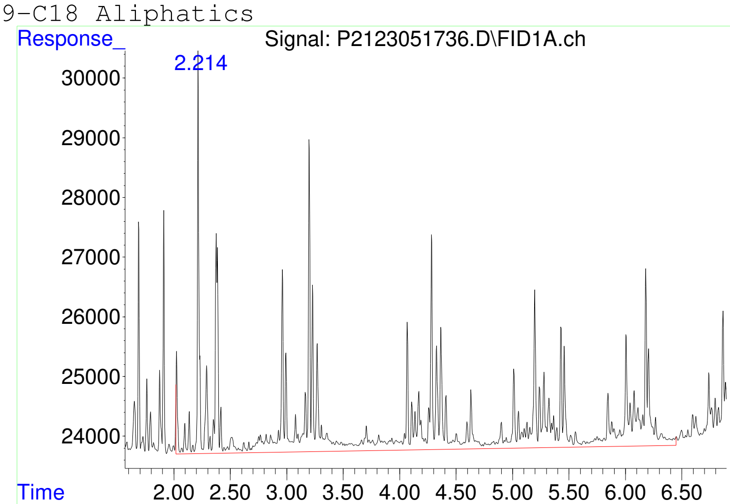
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051736.D
Date Inj'd : 5/17/2023 6:57 pm
Sample : WG1779452-2,42,,

QMethod : P21MAALI211129A.M
Operator : Petro21a:sr
Instrument : Petro 21
Quant Date : 5/18/2023 8:21 am

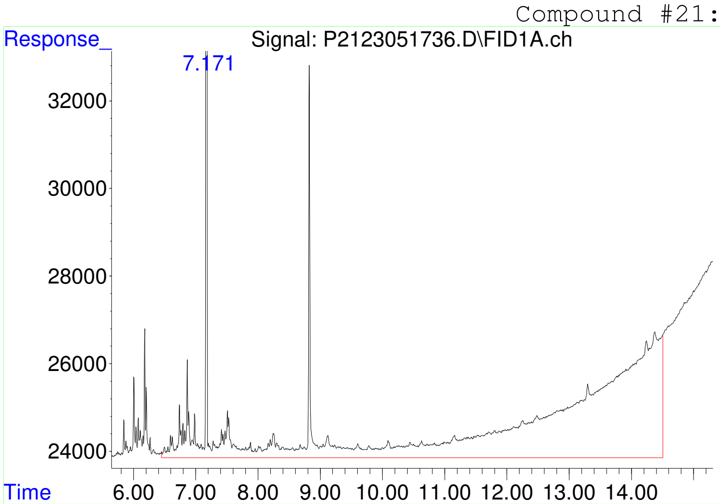
Compound #20: C9-C18 Aliphatics

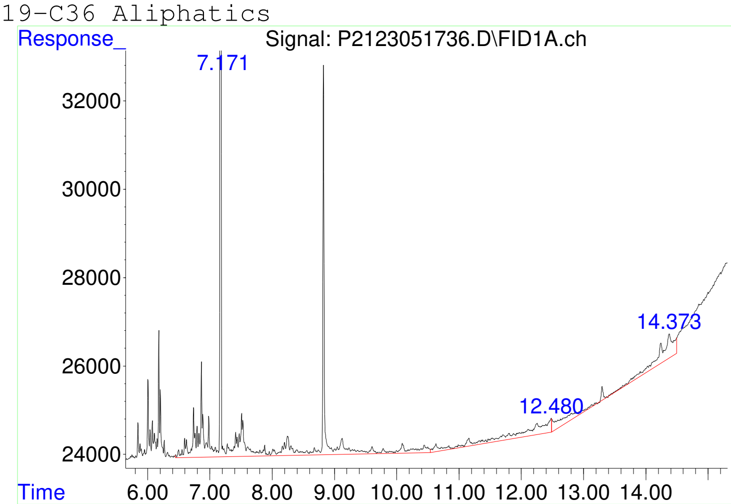



Original Peak Response = 1168103
Manual Peak Response = 989124 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 3402048
Manual Peak Response = 725269 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051737.D
Signal(s) : FID2B.ch
Acq On : 17 May 2023 7:22 pm
Operator : Petro21b:sr
Sample : WG1779452-3,42,,
Misc : wg1779451 DAY 1 Blank
ALS Vial : 69 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:51:28 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

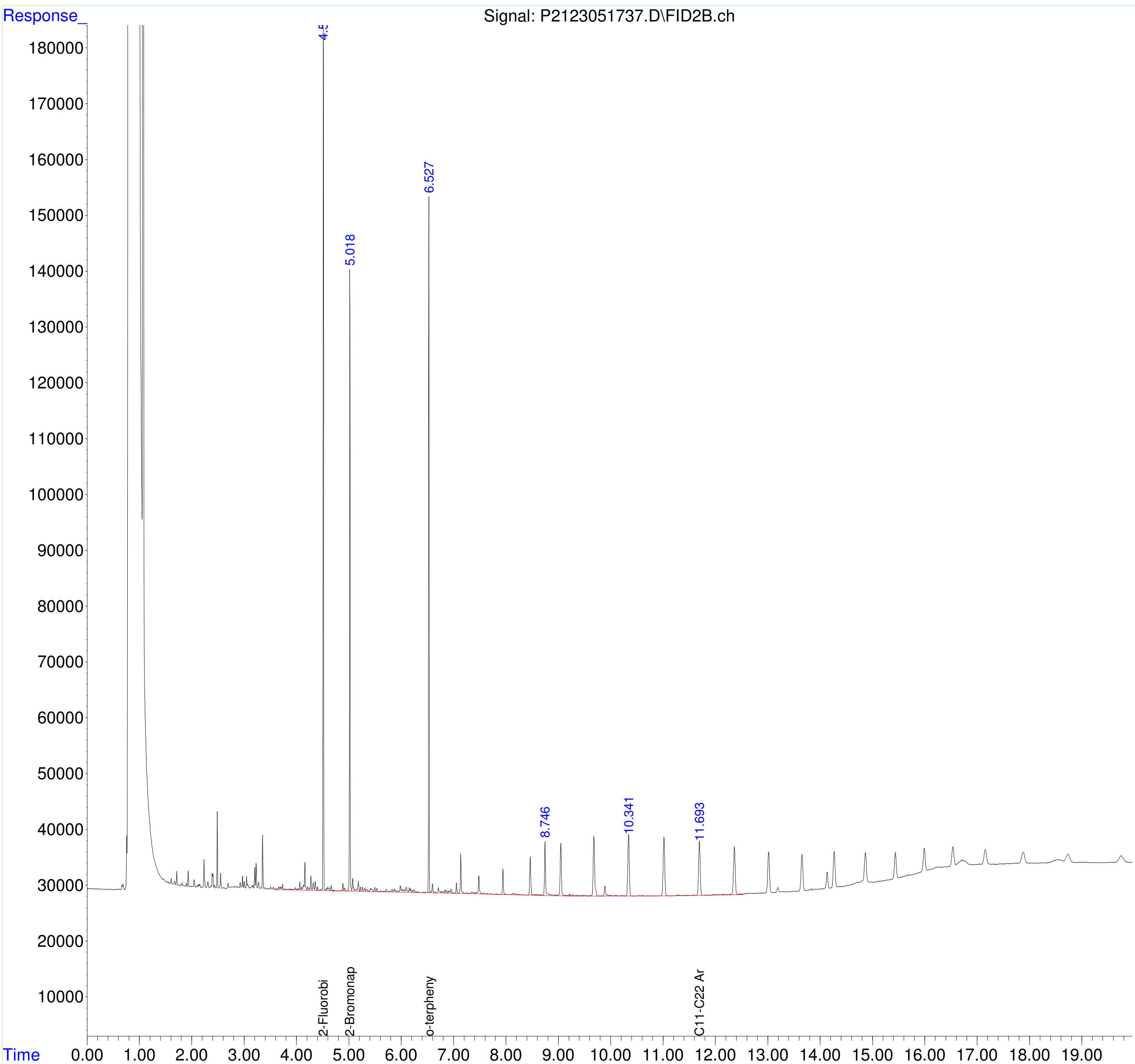
Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.512 | 1261271 | 18.021 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 90.11% | |
| 5) s 2-Bromonaphthalene | 5.019 | 879545 | 17.845 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 89.22% | |
| 10) S o-terphenyl | 6.529 | 994684 | 10.924 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 54.62% | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 11.693 | 2413208 | 28.867 mg/L | M5 |

(f)=RT Delta > 1/2 Window (m)=manual int.

```
Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051737.D
Signal(s) : FID2B.ch
Acq On    : 17 May 2023   7:22 pm
Operator  : Petro21b:sr
Sample    : WG1779452-3,42,,
Misc      : wg1779451  DAY 1 Blank
ALS Vial  : 69   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:51:28 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :
```

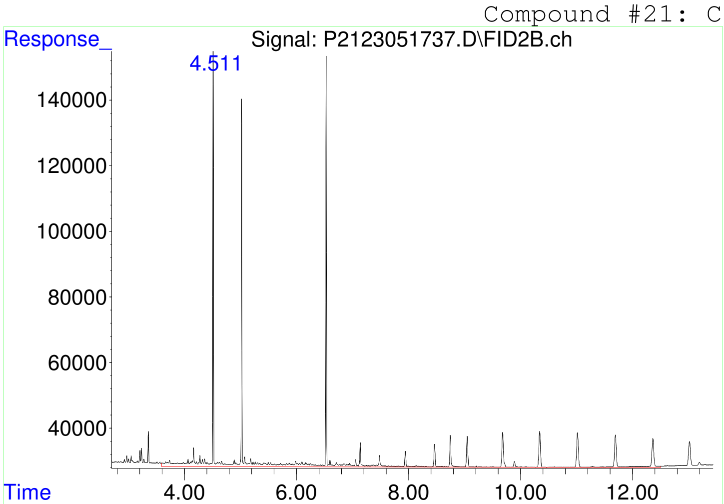


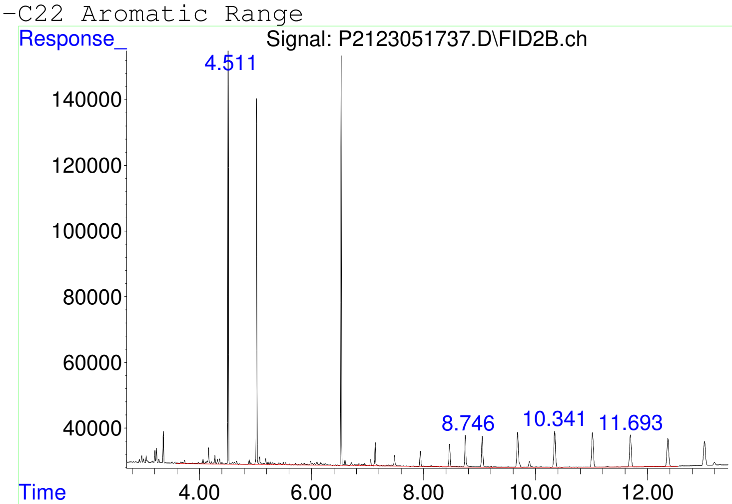
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051737.D
Date Inj'd : 5/17/2023 7:22 pm
Sample : WG1779452-3,42,,

QMethod : P21MAARO211129B.M
Operator : Petro21b:sr
Instrument : Petro 21
Quant Date : 5/18/2023 8:23 am

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3921962

Manual Peak Response = 2413208 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

# Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051738.D
Signal(s) : FID1A.ch
Acq On : 17 May 2023 7:22 pm
Operator : Petro21a:sr
Sample : WG1779452-3,42,,
Misc : WG1779451 DAY 1 Blanks (ALI)
ALS Vial : 19 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:41:03 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| **System Monitoring Compounds** | | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.172 | 641142 | 10.305 | mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 51.52% | | |
| **Target Compounds** | | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 3.198f | 1061020 | 14.825 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.240f | 586924 | 8.522 | mg/L | M5 |

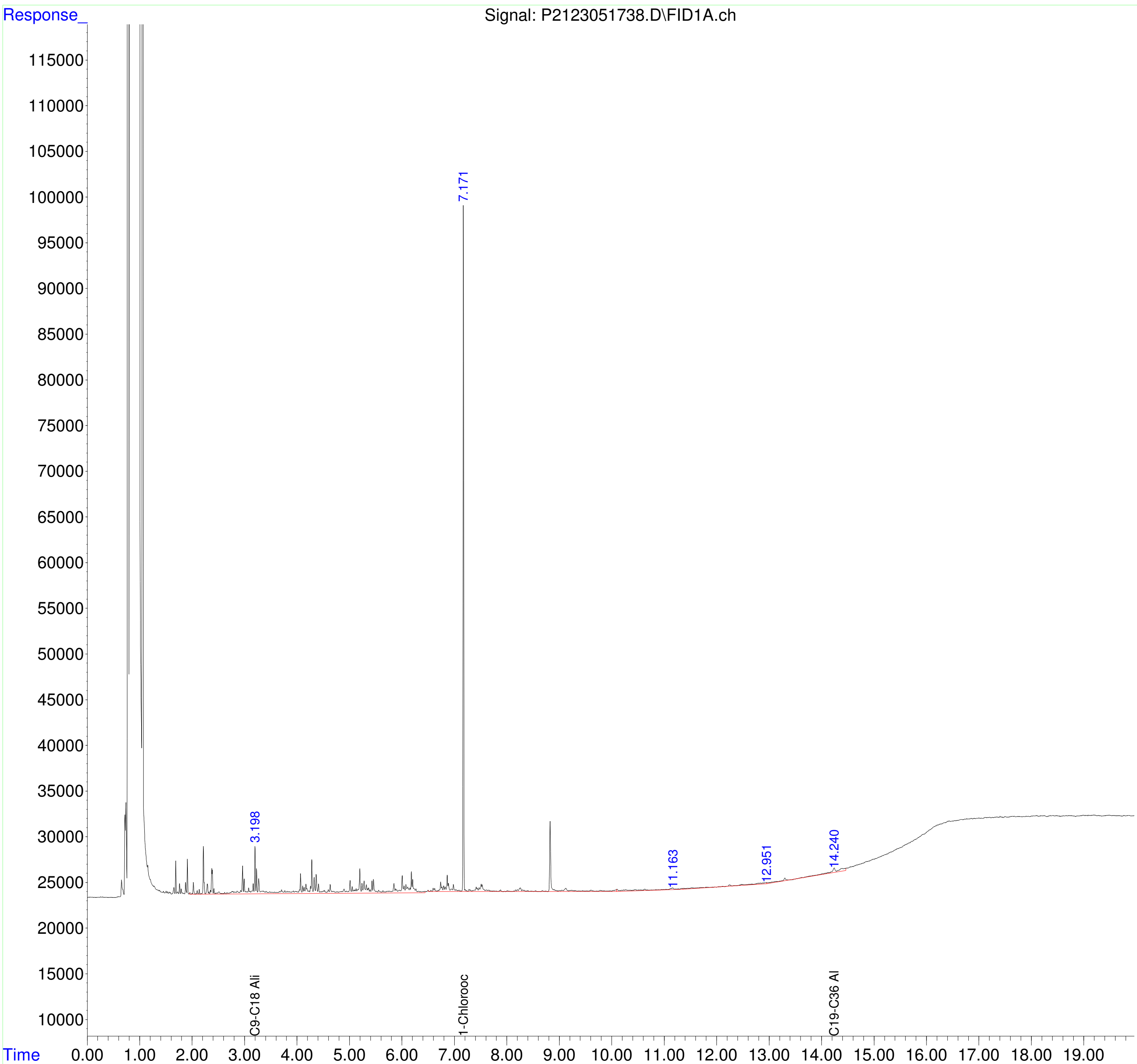
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051738.D
Signal(s) : FID1A.ch
Acq On    : 17 May 2023   7:22 pm
Operator  : Petro21a:sr
Sample    : WG1779452-3,42,,
Misc      : WG1779451  DAY 1 Blanks  (ALI)
ALS Vial  : 19   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:41:03 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

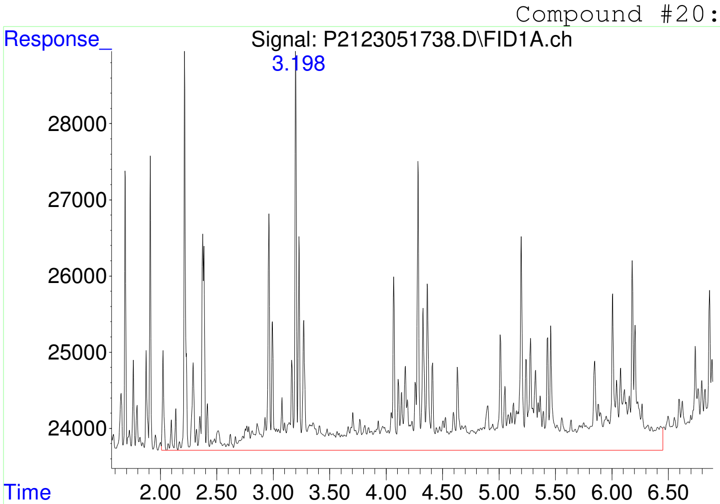
Volume Inj.  :
Signal Phase :
Signal Info  :

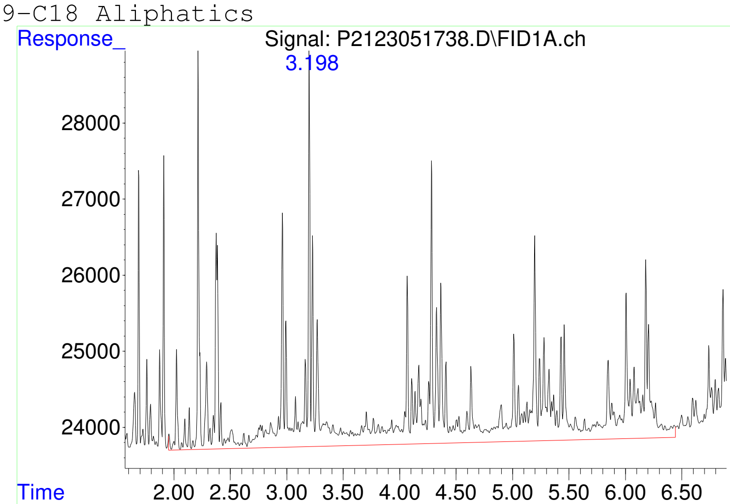


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230517\ | QMethod | : P21MAALI211129A.M |
| Data File | : P2123051738.D | Operator | : Petro21a:sr |
| Date Inj'd | : 5/17/2023 7:22 pm | Instrument | : Petro 21 |
| Sample | : WG1779452-3,42,, | Quant Date | : 5/18/2023 8:21 am |

Compound #20: C9-C18 Aliphatics

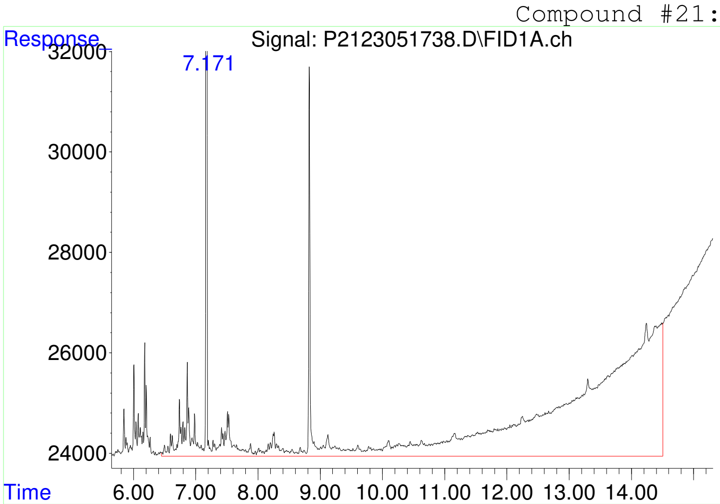


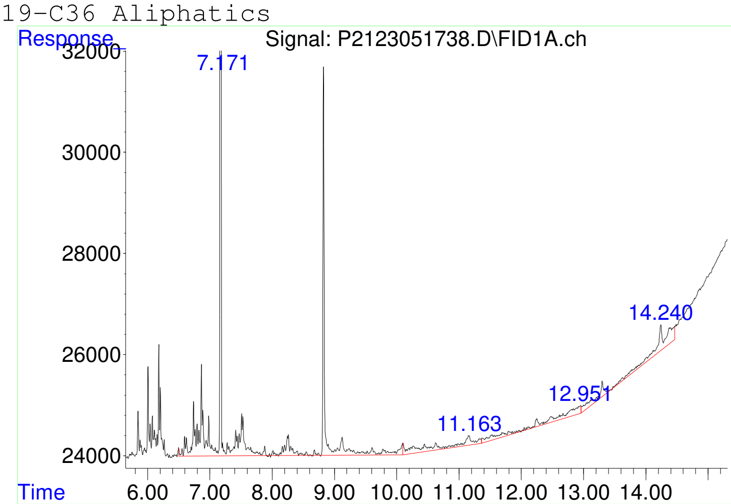




Original Peak Response = 1248225    Manual Peak Response = 1061020 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 2992924    Manual Peak Response = 586924 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051739.D
Signal(s) : FID2B.ch
Acq On : 17 May 2023 7:47 pm
Operator : Petro21b:sr
Sample : L2326777-01,42,,
Misc : wg1779451 DAY 1 L2233244-18
ALS Vial : 70 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:51:58 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.512 | 1020531 | 14.581 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 72.91% | | |
| 5) s 2-Bromonaphthalene | 5.019 | 717952 | 14.567 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 72.84% | | |
| 10) S o-terphenyl | 6.528 | 845963 | 9.291 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 46.45% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 4.511f | 6170715 | 73.813 mg/L | M5 |

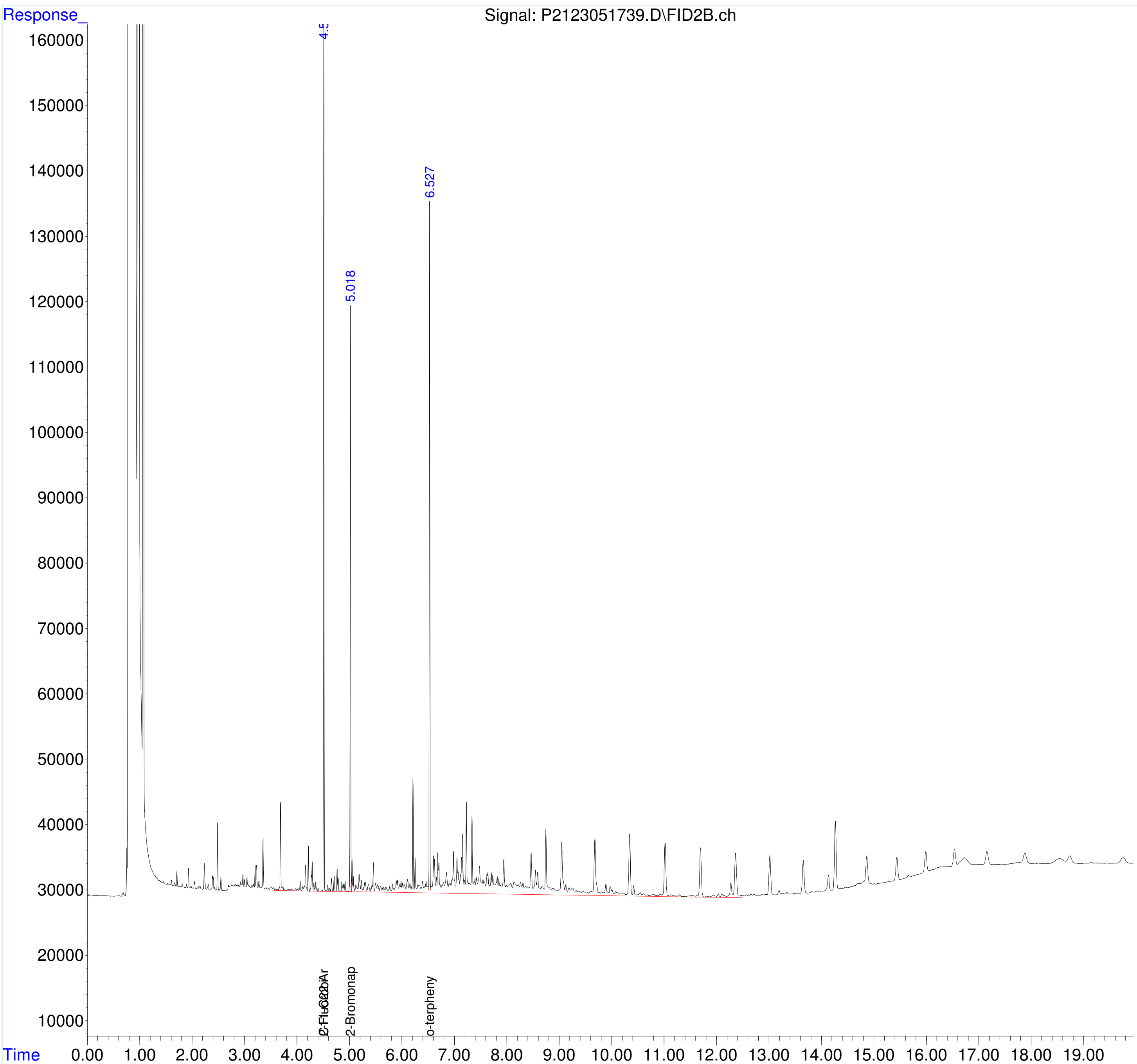
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051739.D
Signal(s) : FID2B.ch
Acq On    : 17 May 2023   7:47 pm
Operator  : Petro21b:sr
Sample    : L2326777-01,42,,
Misc      : wg1779451  DAY 1 L2233244-18
ALS Vial  : 70   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:51:58 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

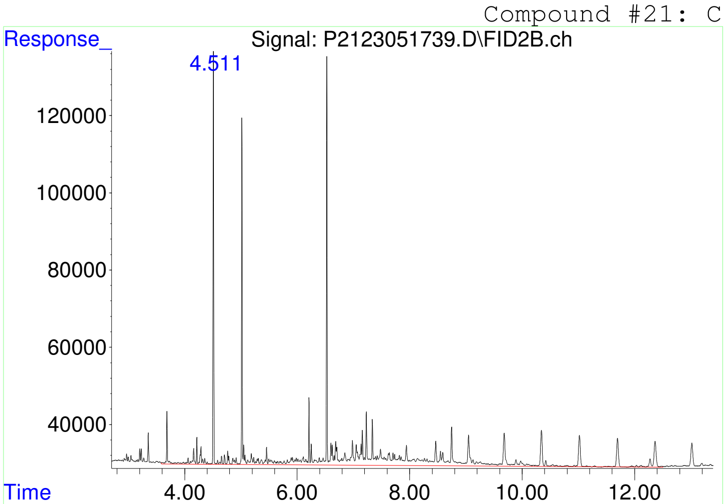
Volume Inj.  :
Signal Phase :
Signal Info  :

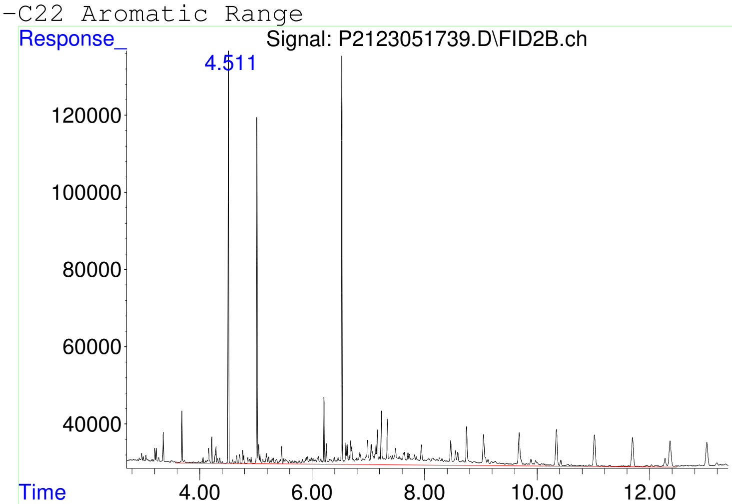


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230517.SEC\ | QMethod | : P21MAARO211129B.M |
| Data File | : P2123051739.D | Operator | : Petro21b:sr |
| Date Inj'd | : 5/17/2023 7:47 pm | Instrument | : Petro 21 |
| Sample | : L2326777-01,42,, | Quant Date | : 5/18/2023 8:23 am |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 6357818

Manual Peak Response = 6170715 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051740.D
Signal(s) : FID1A.ch
Acq On : 17 May 2023 7:47 pm
Operator : Petro21a:sr
Sample : L2326777-01,42,,
Misc : WG1779451 DAY 1 L2233244-18 (ALI)
ALS Vial : 20 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:41:38 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| **System Monitoring Compounds** | | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.171 | 680960 | 10.945 | mg/L | M4 |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 54.73% | | |
| **Target Compounds** | | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 5.852 | 4144130 | 57.905 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.379f | 8401140 | 121.981 | mg/L | M5 |

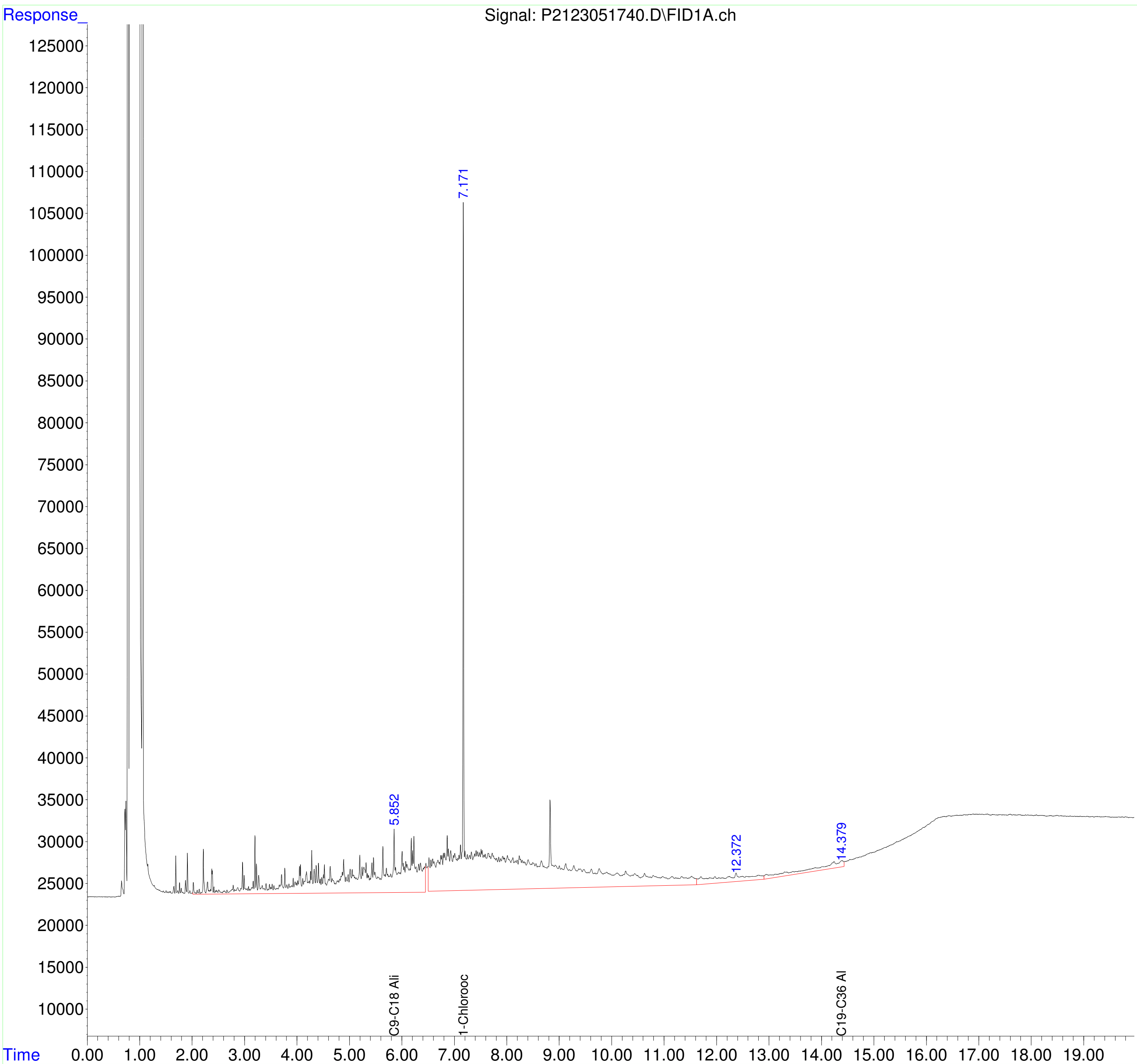
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051740.D
Signal(s) : FID1A.ch
Acq On    : 17 May 2023   7:47 pm
Operator  : Petro21a:sr
Sample    : L2326777-01,42,,
Misc      : WG1779451  DAY 1 L2233244-18  (ALI)
ALS Vial  : 20   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:41:38 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

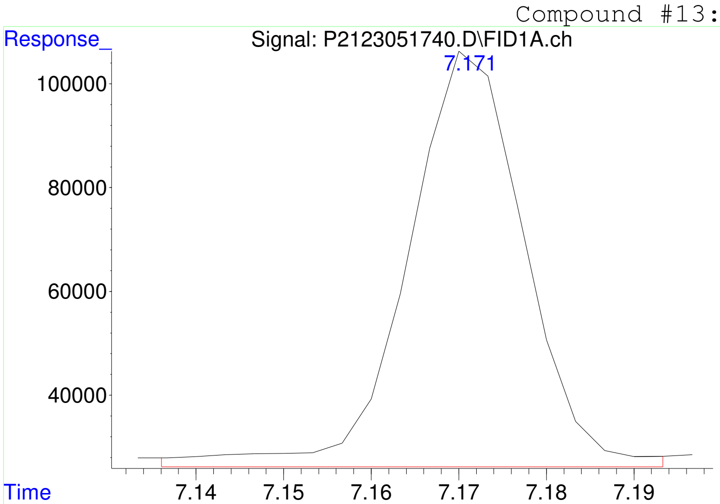
Volume Inj.  :
Signal Phase :
Signal Info  :

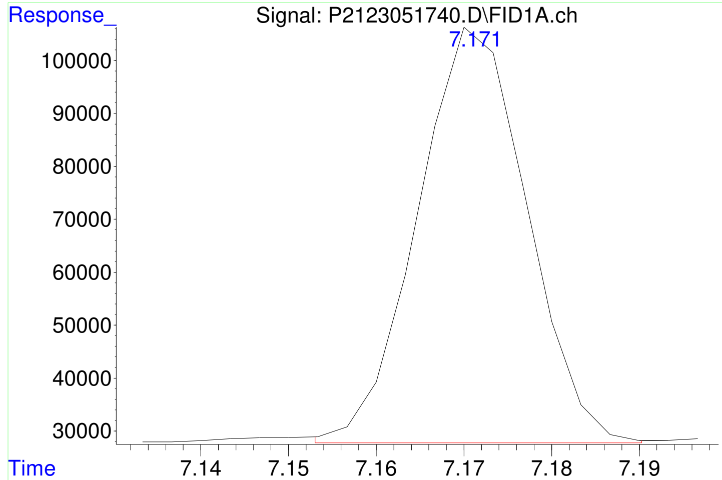


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230517\ | QMethod | : P21MAALI211129A.M |
| Data File | : P2123051740.D | Operator | : Petro21a:sr |
| Date Inj'd | : 5/17/2023 7:47 pm | Instrument | : Petro 21 |
| Sample | : L2326777-01,42,, | Quant Date | : 5/18/2023 8:21 am |

Compound #13: 1-Chlorooctadecane

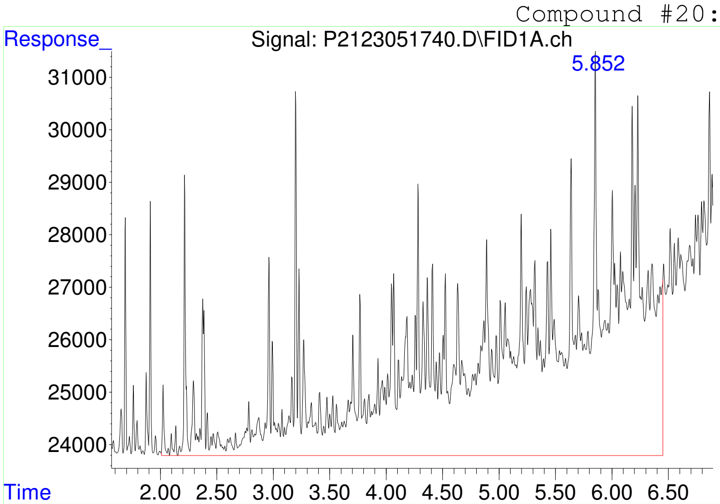


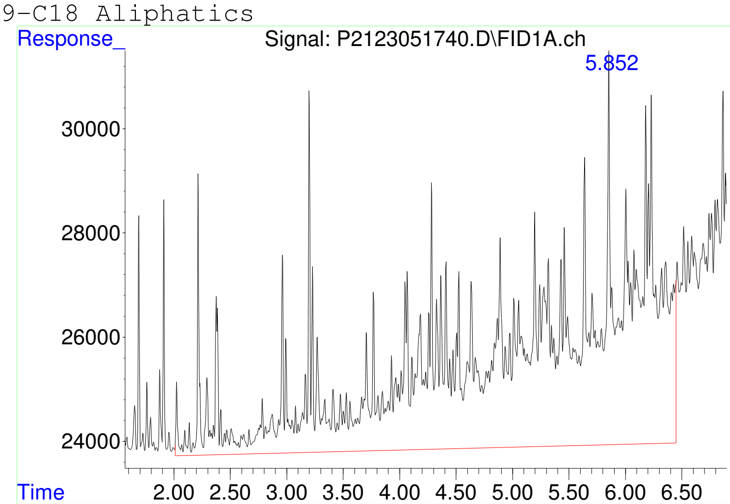




Original Peak Response = 742048
M4 = Poor automated baseline construction.

Manual Peak Response = 680960 M4

Compound #20: C9-C18 Aliphatics



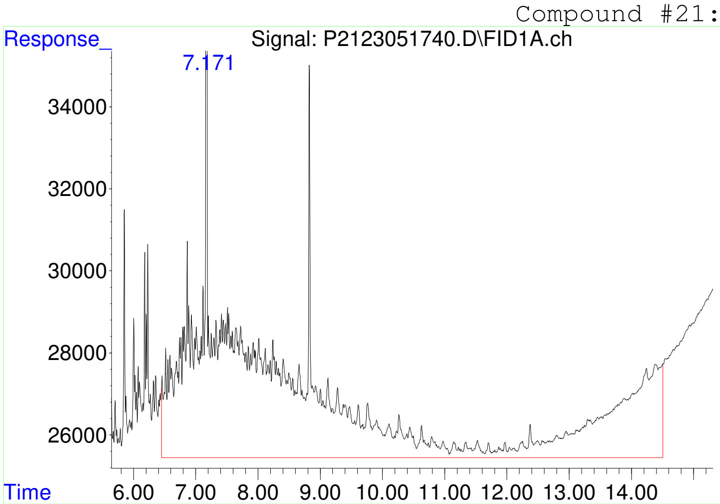



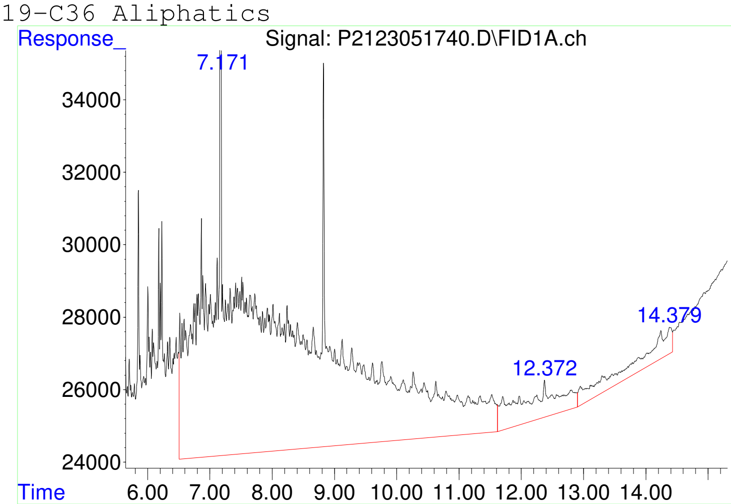

Original Peak Response = 4287808

Manual Peak Response = 4144130 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 6073639

Manual Peak Response = 8401140 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051741.D
Signal(s) : FID2B.ch
Acq On : 17 May 2023 8:12 pm
Operator : Petro21b:sr
Sample : L2326777-02,42,,
Misc : wg1779451 DAY 1 L2233244-18
ALS Vial : 71 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:52:29 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.512 | 1271566 | 18.168 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 90.84% | |
| 5) s 2-Bromonaphthalene | 5.019 | 898981 | 18.240 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 91.20% | |
| 10) S o-terphenyl | 6.528 | 996289 | 10.941 mg/L | M4 |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 54.71% | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 4.511f | 9149355 | 109.444 mg/L | M5 |

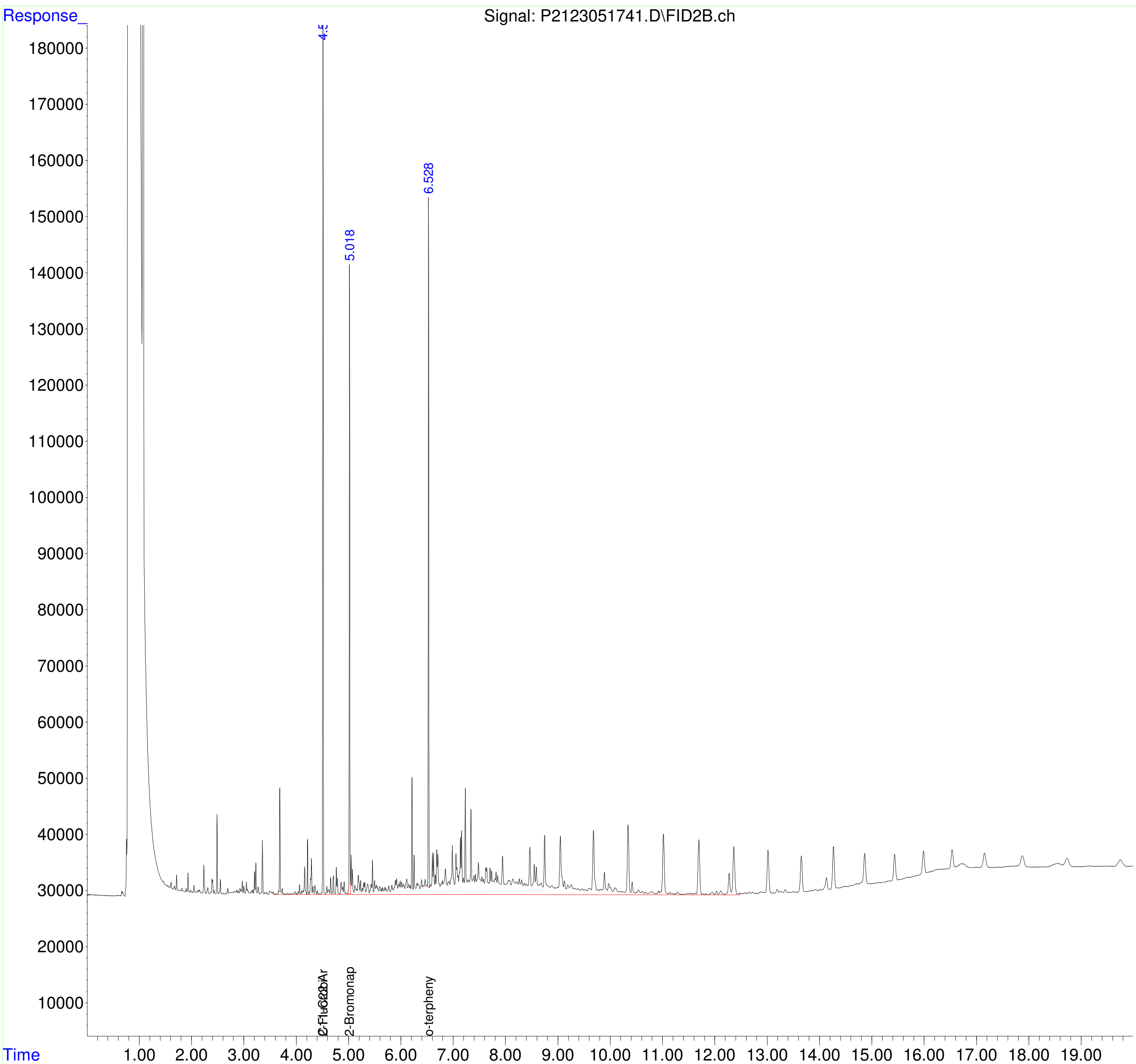
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051741.D
Signal(s) : FID2B.ch
Acq On : 17 May 2023 8:12 pm
Operator : Petro21b:sr
Sample : L2326777-02,42,,
Misc : wg1779451 DAY 1 L2233244-18
ALS Vial : 71 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:52:29 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

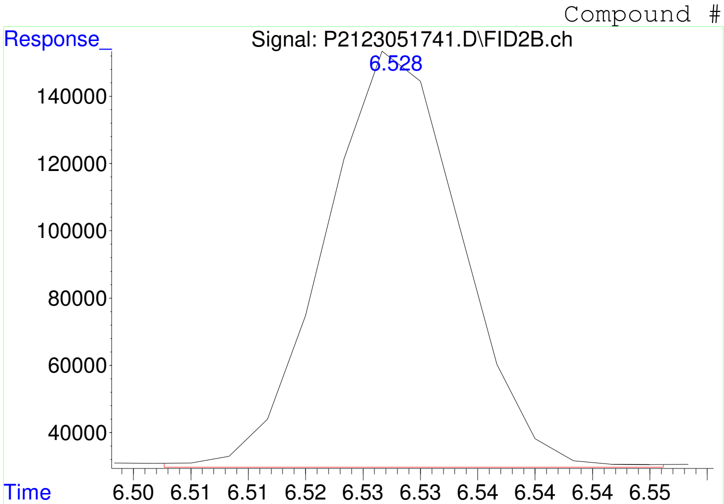


# Manual Integration Report

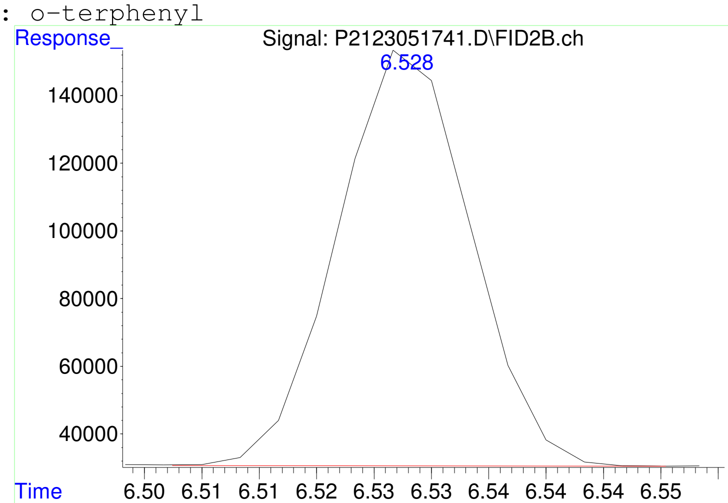
Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051741.D
Date Inj'd : 5/17/2023 8:12 pm
Sample : L2326777-02,42,,

QMethod : P21MAARO211129B.M
Operator : Petro21b:sr
Instrument : Petro 21
Quant Date : 5/18/2023 8:23 am

## Compound #10: o-terphenyl

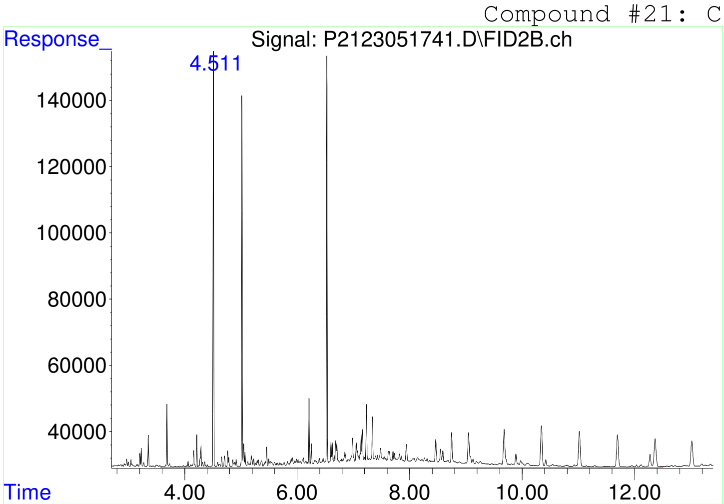



Original Peak Response = 1019435
M4 = Poor automated baseline construction.

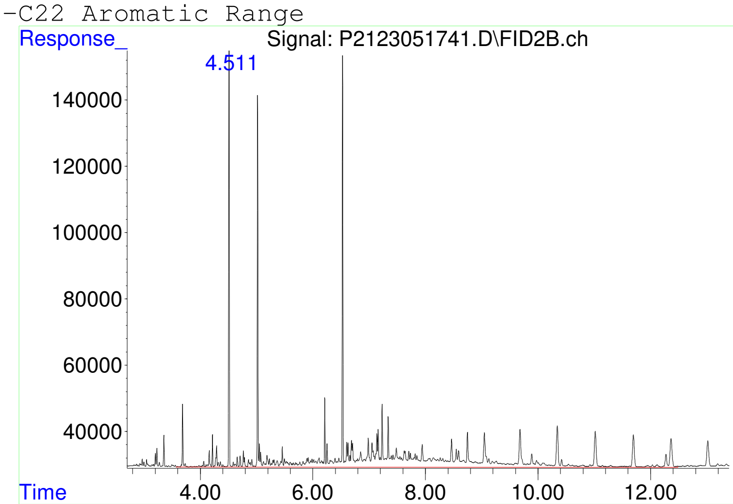



Manual Peak Response = 996289 M4

## Compound #21: C11-C22 Aromatic Range




Original Peak Response = 9230423




Manual Peak Response = 9149355 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051742.D
Signal(s) : FID1A.ch
Acq On : 17 May 2023 8:12 pm
Operator : Petro21a:sr
Sample : L2326777-02,42,,
Misc : WG1779451 DAY 1 L2233244-18 (ALI)
ALS Vial : 21 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:42:21 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

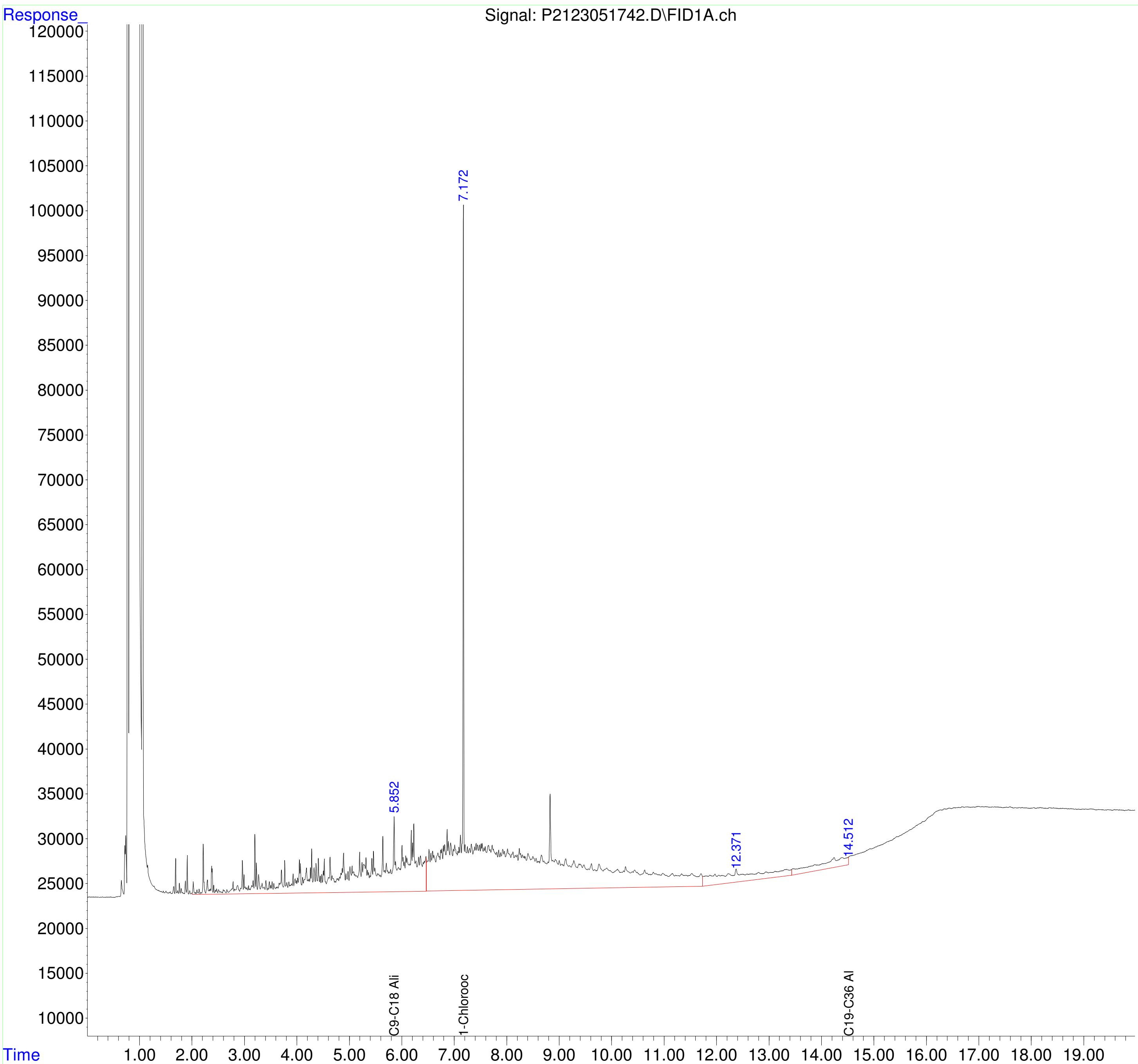
Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.172 | 643878 | 10.349 | mg/L | M4 |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 51.74% | | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 5.852 | 4516305 | 63.105 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.512f | 10253331 | 148.874 | mg/L | M5 |

(f)=RT Delta > 1/2 Window (m)=manual int.

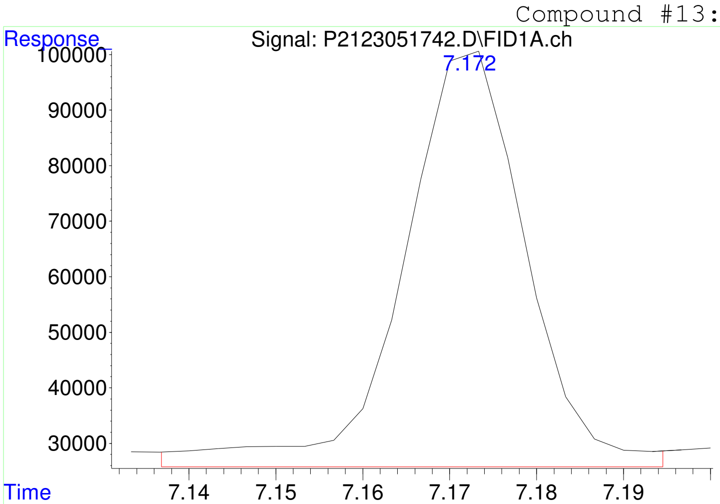
```
Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051742.D
Signal(s) : FID1A.ch
Acq On    : 17 May 2023   8:12 pm
Operator  : Petro21a:sr
Sample    : L2326777-02,42,,
Misc      : WG1779451  DAY 1 L2233244-18  (ALI)
ALS Vial  : 21   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:42:21 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :
```

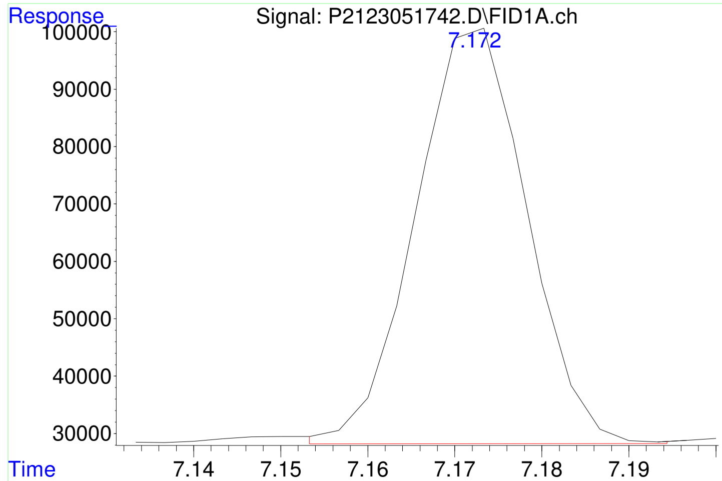


# Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230517\ | QMethod | : P21MAALI211129A.M |
| Data File | : P2123051742.D | Operator | : Petro21a:sr |
| Date Inj'd | : 5/17/2023 8:12 pm | Instrument | : Petro 21 |
| Sample | : L2326777-02,42,, | Quant Date | : 5/18/2023 8:21 am |

## Compound #13: 1-Chlorooctadecane

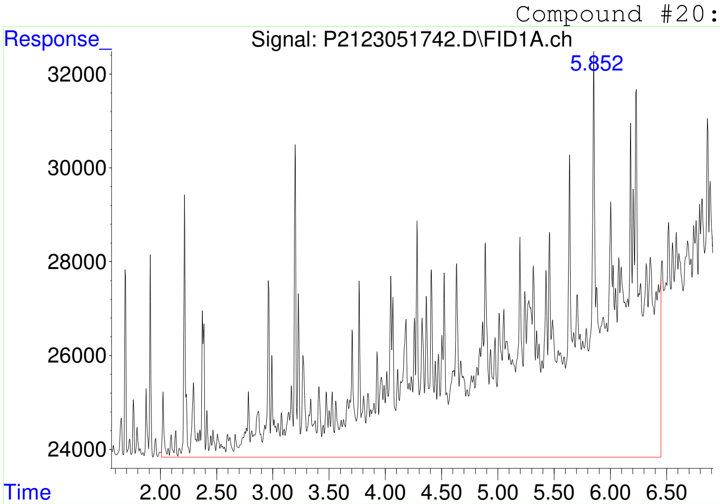


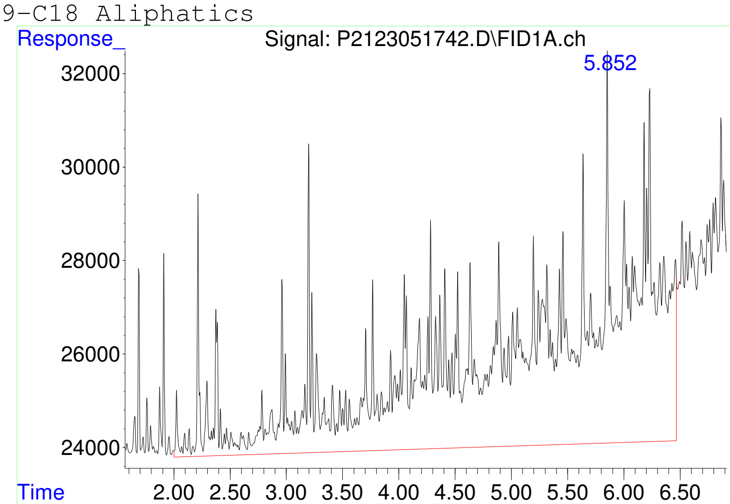




Original Peak Response = 738081
M4 = Poor automated baseline construction.

Manual Peak Response = 643878 M4

## Compound #20: C9-C18 Aliphatics



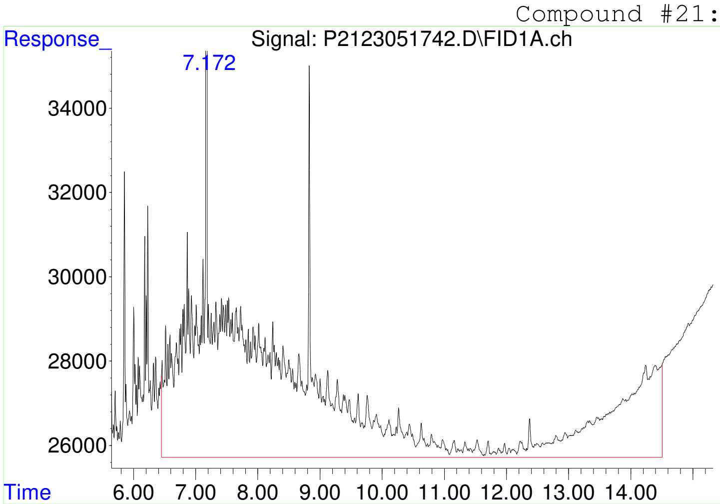



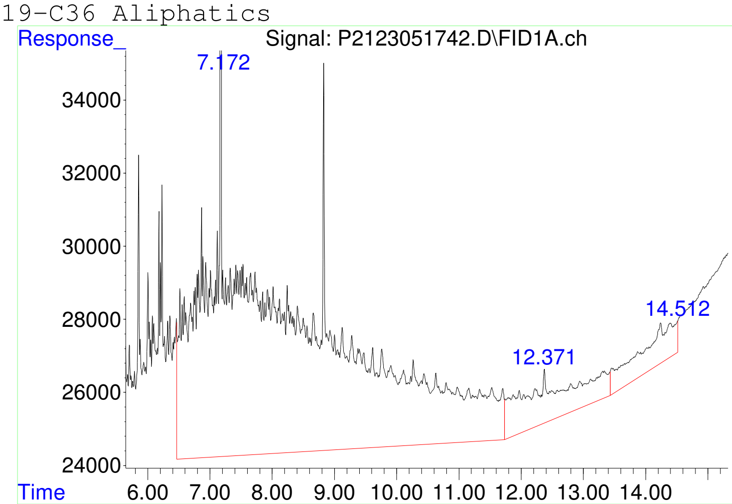

Original Peak Response = 4827742

Manual Peak Response = 4516305 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

## Compound #21: C19-C36 Aliphatics




Original Peak Response = 6291594

Manual Peak Response = 10253331 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051743.D
Signal(s) : FID2B.ch
Acq On : 17 May 2023 8:37 pm
Operator : Petro21b:sr
Sample : L2326777-03,42,,
Misc : wg1779451 DAY 1 L2233244-18
ALS Vial : 72 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:52:57 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.512 | 1008018 | 14.403 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 72.02% | | |
| 5) s 2-Bromonaphthalene | 5.019 | 709744 | 14.400 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 72.00% | | |
| 10) S o-terphenyl | 6.529 | 774424 | 8.505 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 42.52% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 10.342 | 5893616 | 70.499 mg/L | M5 |

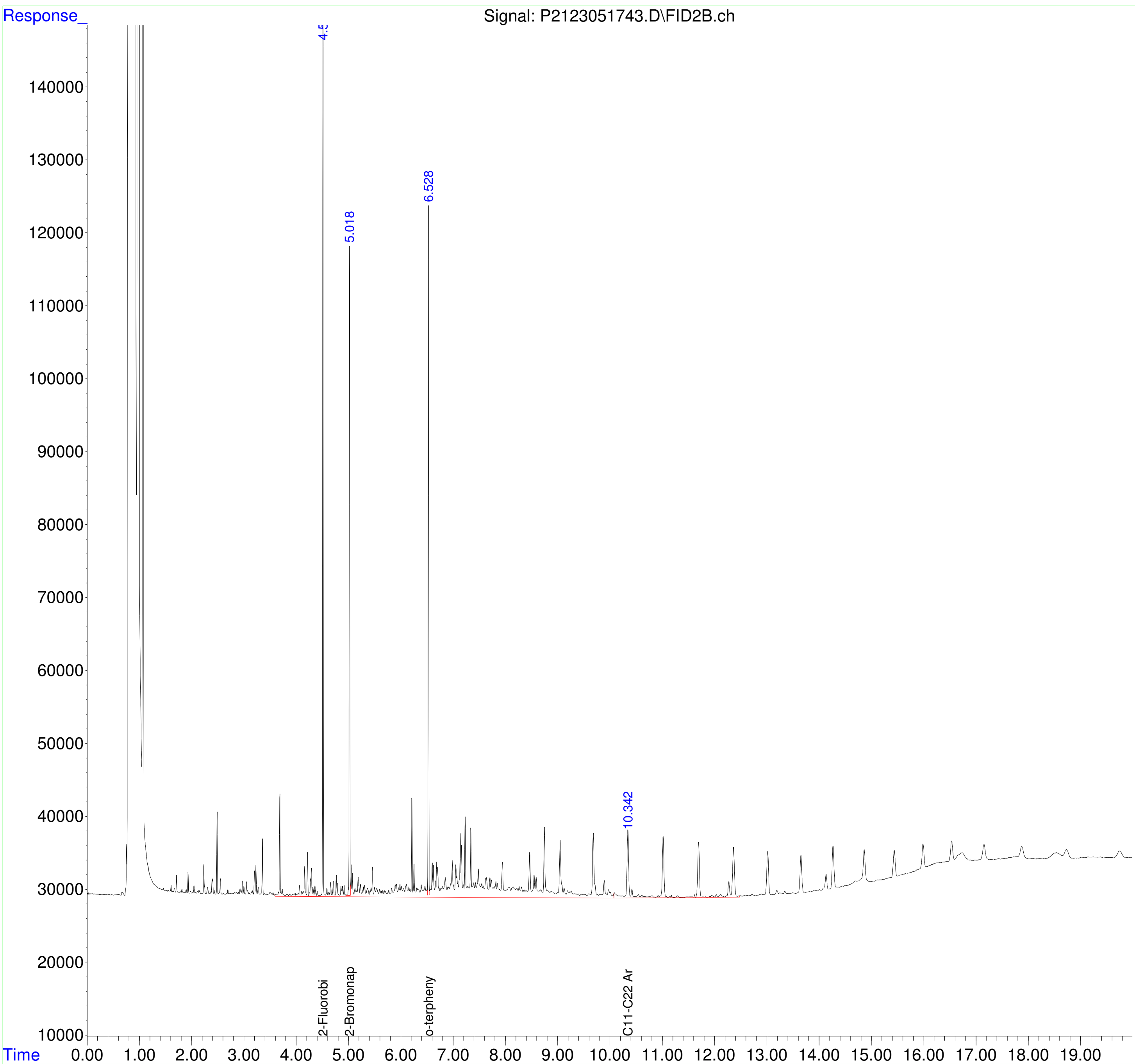
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051743.D
Signal(s) : FID2B.ch
Acq On    : 17 May 2023   8:37 pm
Operator  : Petro21b:sr
Sample    : L2326777-03,42,,
Misc      : wg1779451  DAY 1 L2233244-18
ALS Vial  : 72   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:52:57 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

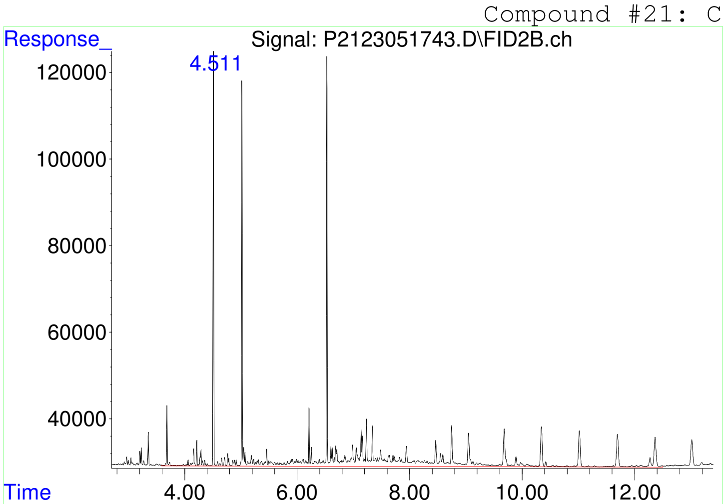
Volume Inj.  :
Signal Phase :
Signal Info  :

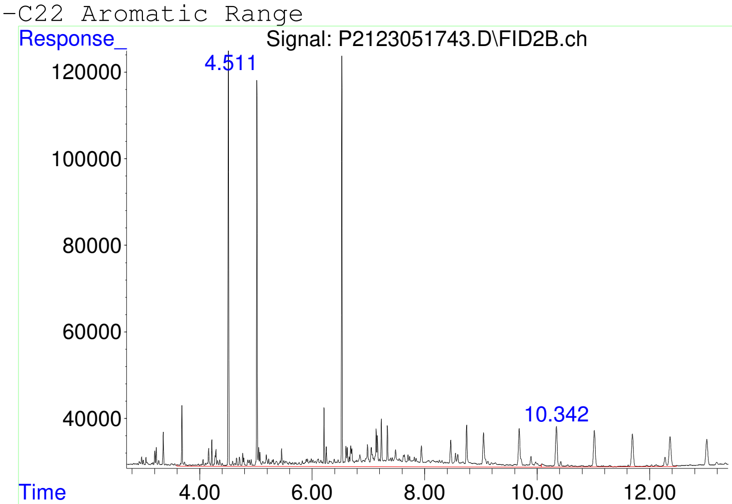


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230517.SEC\ | QMethod | : P21MAARO211129B.M |
| Data File | : P2123051743.D | Operator | : Petro21b:sr |
| Date Inj'd | : 5/17/2023 8:37 pm | Instrument | : Petro 21 |
| Sample | : L2326777-03,42,, | Quant Date | : 5/18/2023 8:23 am |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 5401257 Manual Peak Response = 5893616 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051744.D
Signal(s) : FID1A.ch
Acq On : 17 May 2023 8:37 pm
Operator : Petro21a:sr
Sample : L2326777-03,42,,
Misc : WG1779451 DAY 1 L2233244-18 (ALI)
ALS Vial : 22 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:43:18 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

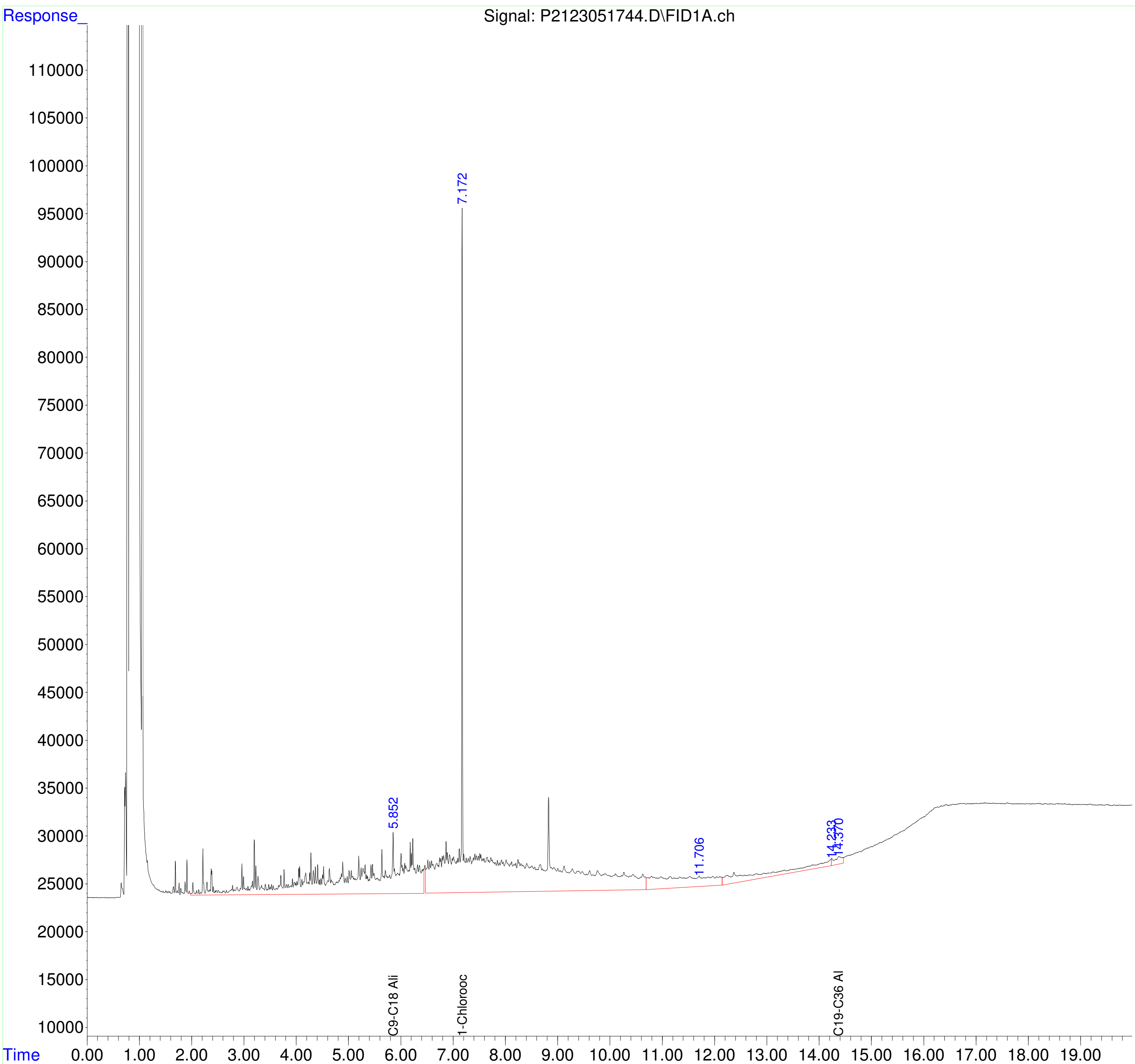
Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | | |
| 3) | S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) | S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) | S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) | S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) | S | 1-Chlorooctadecane | 7.172 | 590839 | 9.496 | mg/L | M4 |
| Spiked Amount 20.000 | | Range 40 - 140 | | Recovery = 47.48% | | | |
| Target Compounds | | | | | | | |
| 1) | | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) | H | C9-C18 Aliphatics | 5.852 | 3679682 | 51.415 | mg/L | M5 |
| 21) | H | C19-C36 Aliphatics | 14.370f | 7870962 | 114.283 | mg/L | M5 |

(f)=RT Delta > 1/2 Window (m)=manual int.

```
Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051744.D
Signal(s) : FID1A.ch
Acq On    : 17 May 2023   8:37 pm
Operator  : Petro21a:sr
Sample    : L2326777-03,42,,
Misc      : WG1779451  DAY 1 L2233244-18  (ALI)
ALS Vial  : 22   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:43:18 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :
```

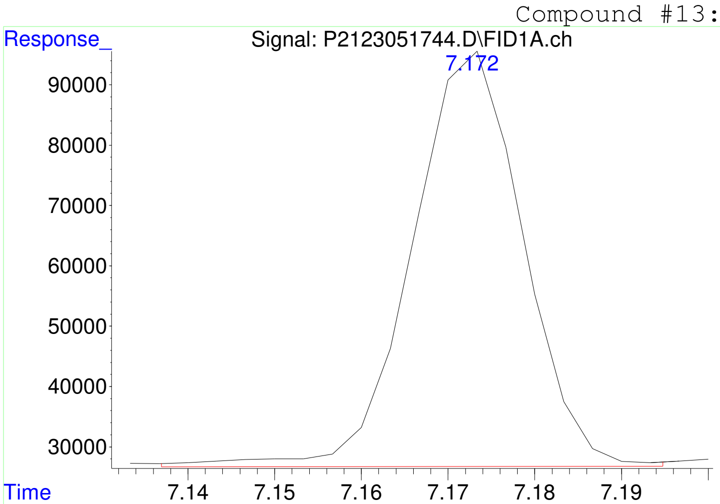


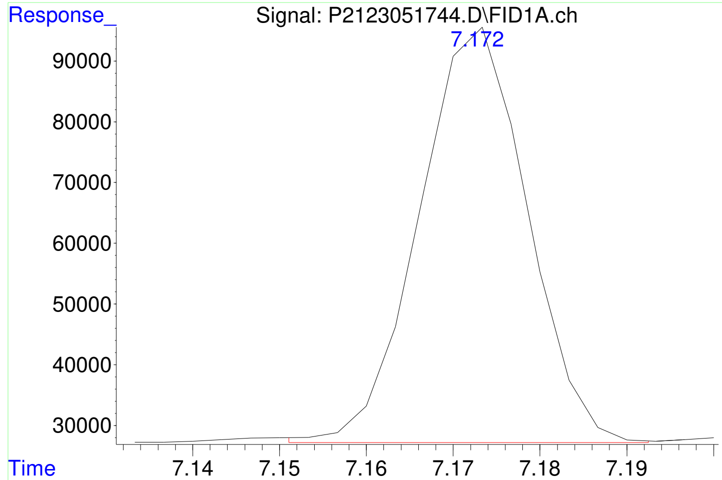
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051744.D
Date Inj'd : 5/17/2023 8:37 pm
Sample : L2326777-03,42,,

QMethod : P21MAALI211129A.M
Operator : Petro21a:sr
Instrument : Petro 21
Quant Date : 5/18/2023 8:21 am

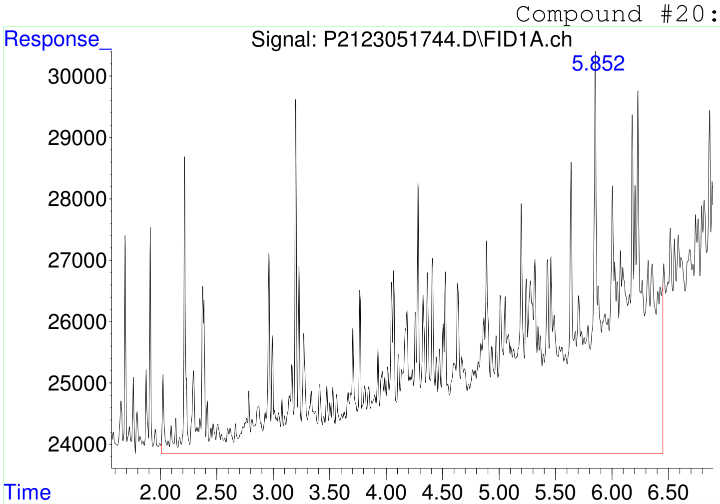
Compound #13: 1-Chlorooctadecane

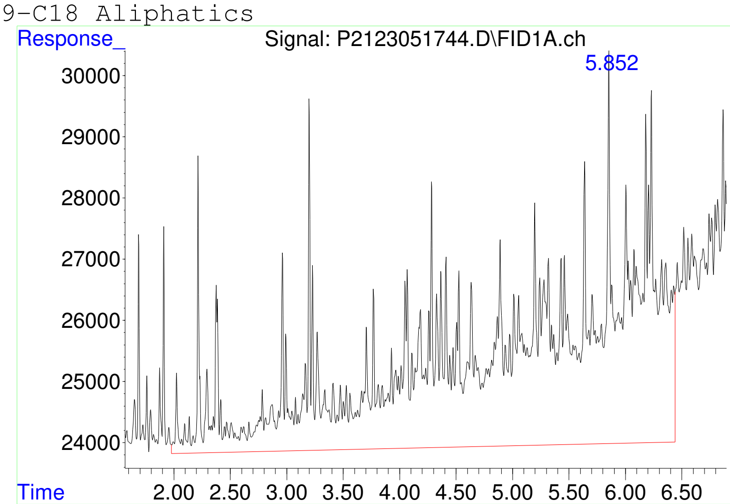



Original Peak Response = 610669
Manual Peak Response = 590839 M4
M4 = Poor automated baseline construction.

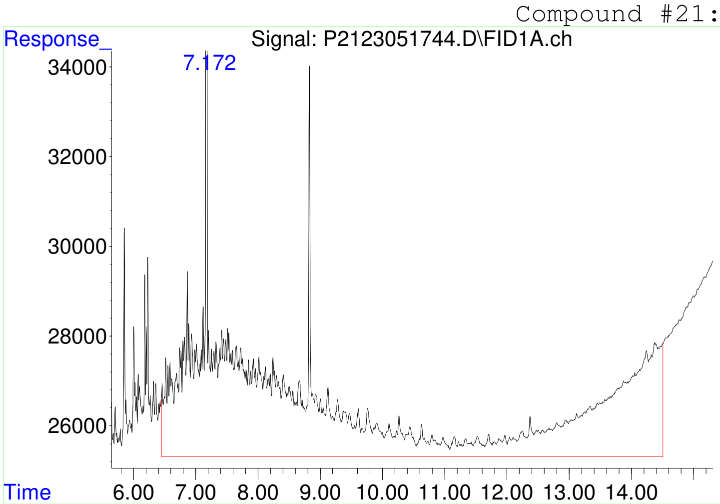
Compound #20: C9-C18 Aliphatics

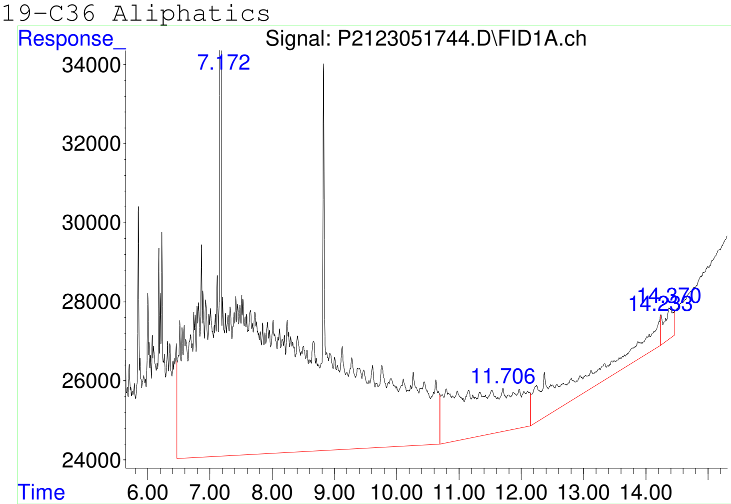



Original Peak Response = 3860614
Manual Peak Response = 3679682 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 5532757
Manual Peak Response = 7870962 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051745.D
Signal(s) : FID2B.ch
Acq On : 17 May 2023 9:02 pm
Operator : Petro21b:sr
Sample : L2326777-09,42,,
Misc : wg1779451 DAY 1 Mineral Oil Composite
ALS Vial : 73 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:53:26 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.512 | 943961 | 13.487 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 67.44% | | |
| 5) s 2-Bromonaphthalene | 5.019 | 674257 | 13.680 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 68.40% | | |
| 10) S o-terphenyl | 6.529 | 805023 | 8.841 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 44.20% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 11.015 | 2553536 | 30.545 mg/L | M5 |

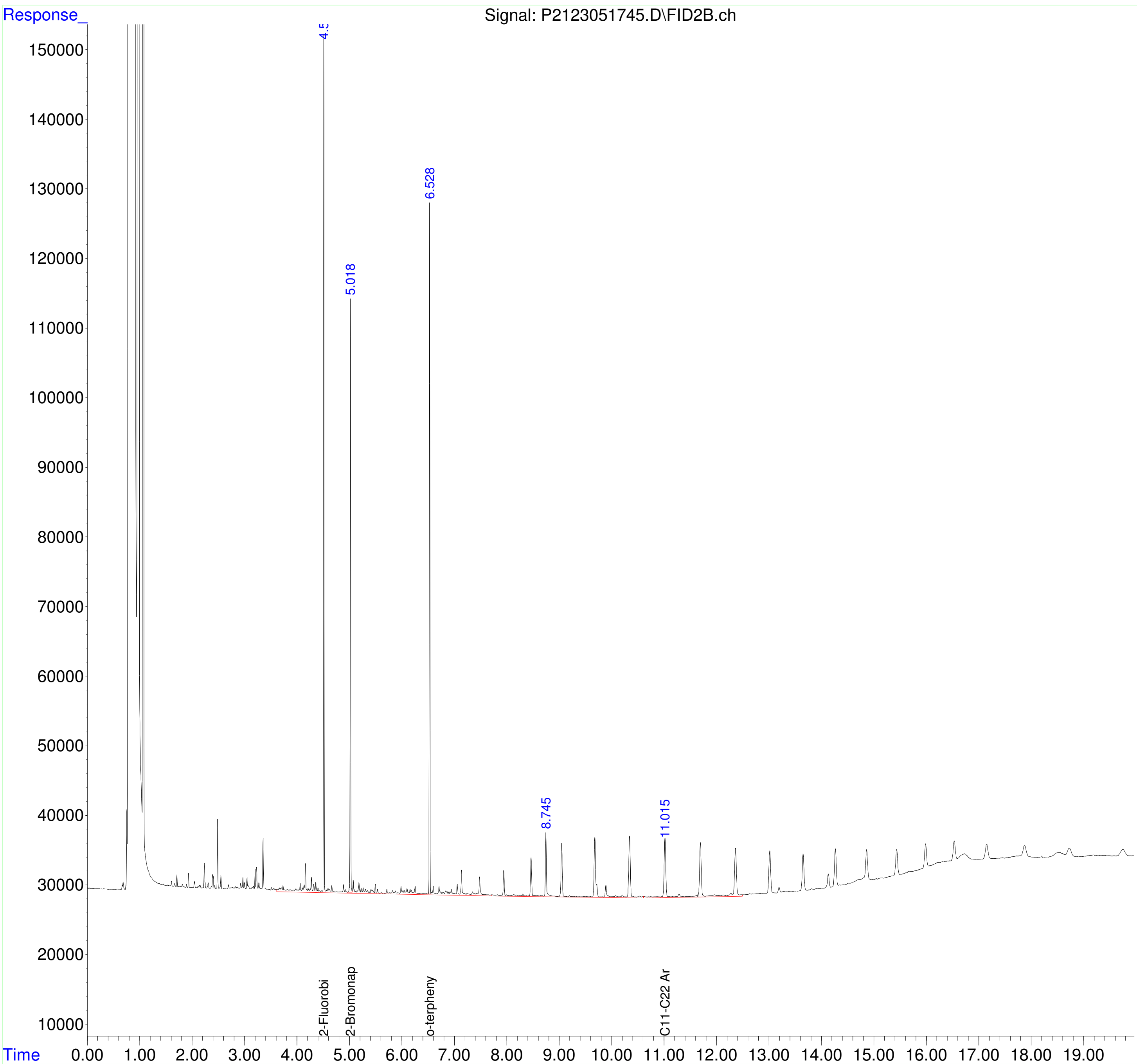
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051745.D
Signal(s) : FID2B.ch
Acq On    : 17 May 2023   9:02 pm
Operator  : Petro21b:sr
Sample    : L2326777-09,42,,
Misc      : wg1779451  DAY 1 Mineral Oil Composite
ALS Vial  : 73   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:53:26 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

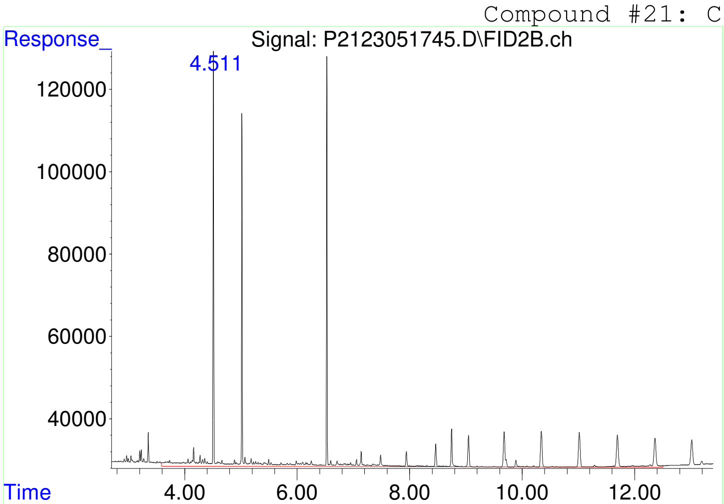


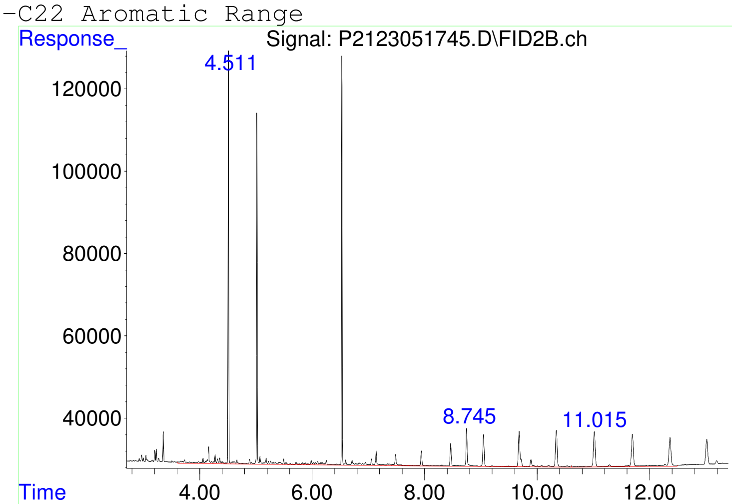
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051745.D
Date Inj'd : 5/17/2023 9:02 pm
Sample : L2326777-09,42,,

QMethod : P21MAARO211129B.M
Operator : Petro21b:sr
Instrument : Petro 21
Quant Date : 5/18/2023 8:23 am

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3208516

Manual Peak Response = 2553536 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051746.D
Signal(s) : FID1A.ch
Acq On : 17 May 2023 9:02 pm
Operator : Petro21a:sr
Sample : L2326777-09,42,,
Misc : WG1779451 DAY 1 Mineral Oil Composite (ALI)
ALS Vial : 23 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:43:59 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.172 | 671366 | 10.791 | mg/L | M4 |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 53.95% | | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 2.214f | 1901366 | 26.567 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.368f | 10561245 | 153.345 | mg/L | M5 |

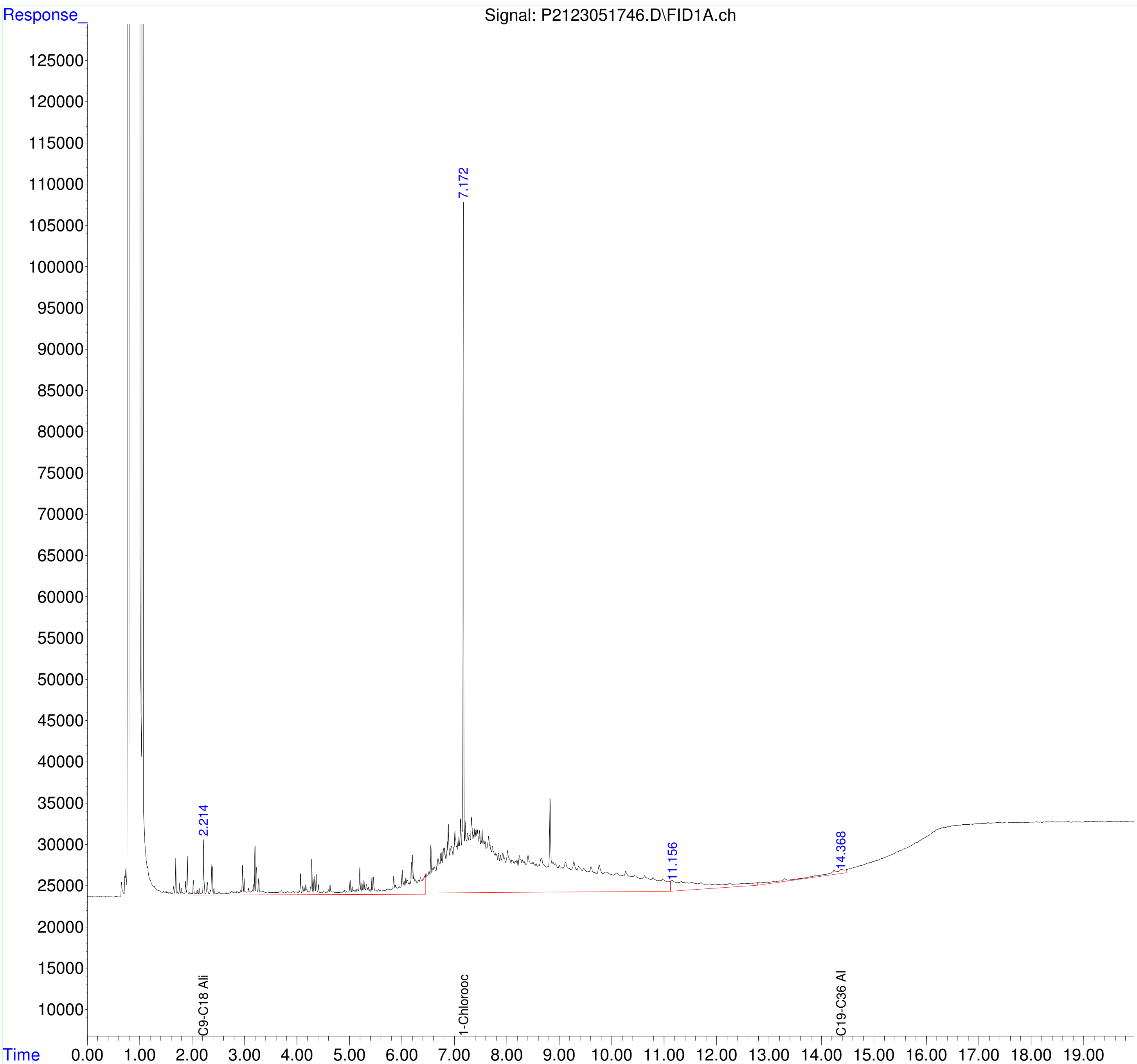
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051746.D
Signal(s) : FID1A.ch
Acq On    : 17 May 2023   9:02 pm
Operator  : Petro21a:sr
Sample    : L2326777-09,42,,
Misc      : WG1779451  DAY 1 Mineral Oil Composite  (ALI)
ALS Vial  : 23   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:43:59 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

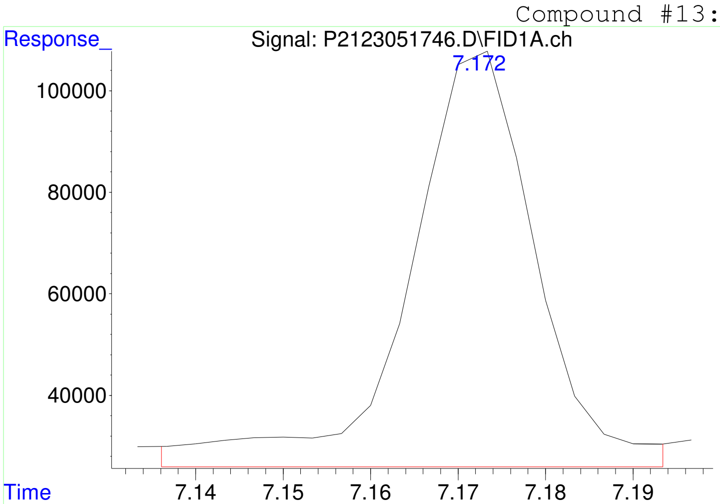


Manual Integration Report

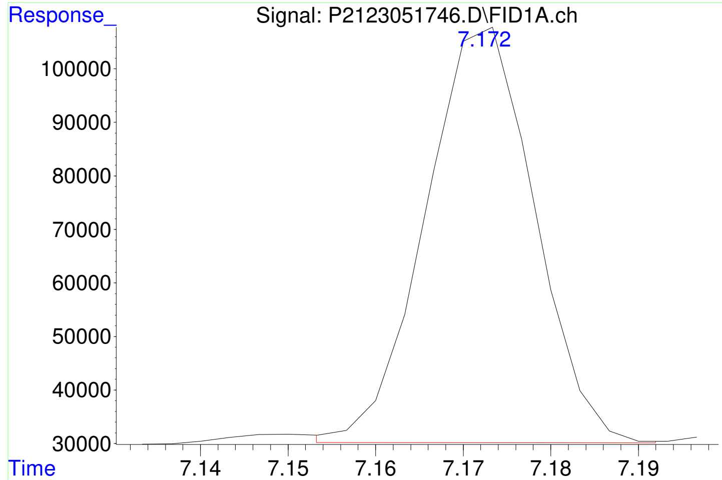
Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051746.D
Date Inj'd : 5/17/2023 9:02 pm
Sample : L2326777-09,42,,

QMethod : P21MAALI211129A.M
Operator : Petro21a:sr
Instrument : Petro 21
Quant Date : 5/18/2023 8:22 am

Compound #13: 1-Chlorooctadecane

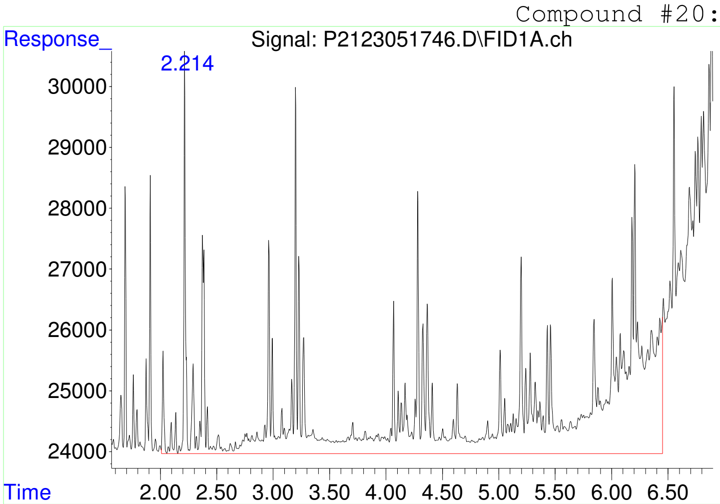



Original Peak Response = 826941
M4 = Poor automated baseline construction.

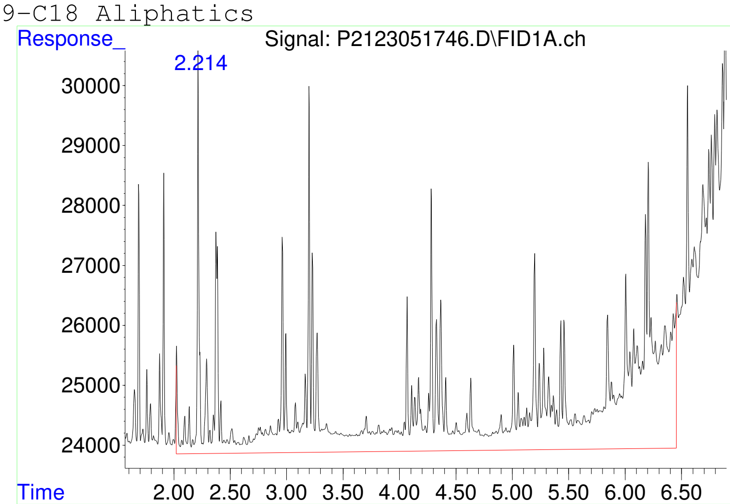



Manual Peak Response = 671366 M4

Compound #20: C9-C18 Aliphatics

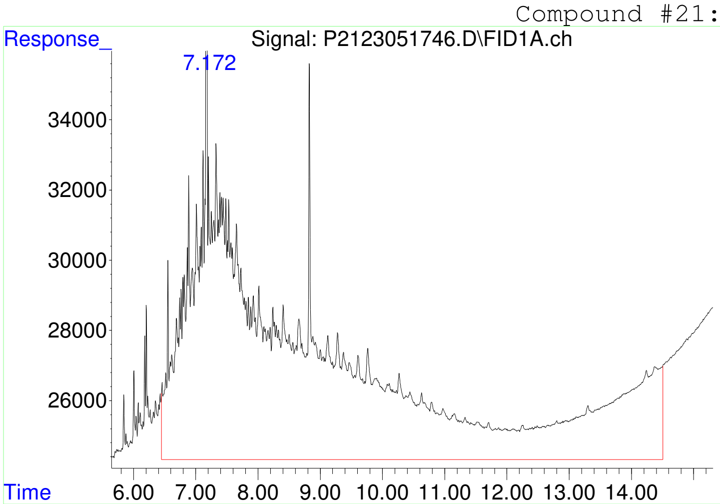



Original Peak Response = 1729880

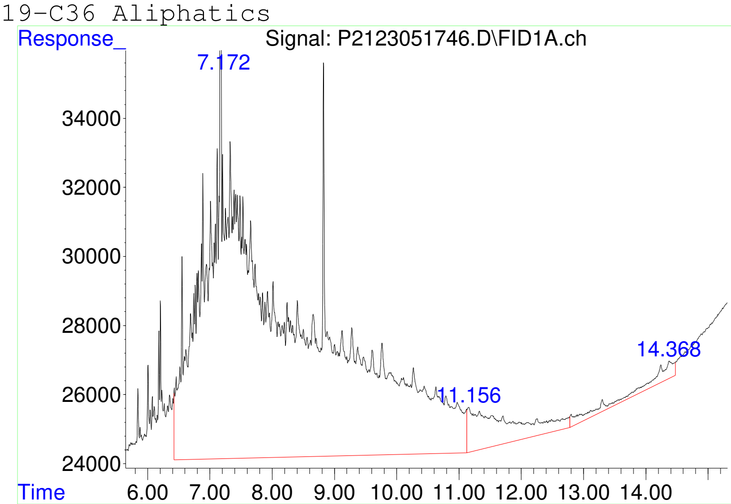



Manual Peak Response = 1901366 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 12125689




Manual Peak Response = 10561245 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051747.D
Signal(s) : FID2B.ch
Acq On : 17 May 2023 9:27 pm
Operator : Petro21b:sr
Sample : L2326777-10,42,,
Misc : wg1779451 DAY 1 Mineral Oil Composite
ALS Vial : 74 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:53:54 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.512 | 1140316 | 16.293 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 81.47% | | |
| 5) s 2-Bromonaphthalene | 5.019 | 803908 | 16.311 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 81.56% | | |
| 10) S o-terphenyl | 6.529 | 935129 | 10.270 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 51.35% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 10.342 | 2362849 | 28.264 mg/L | M5 |

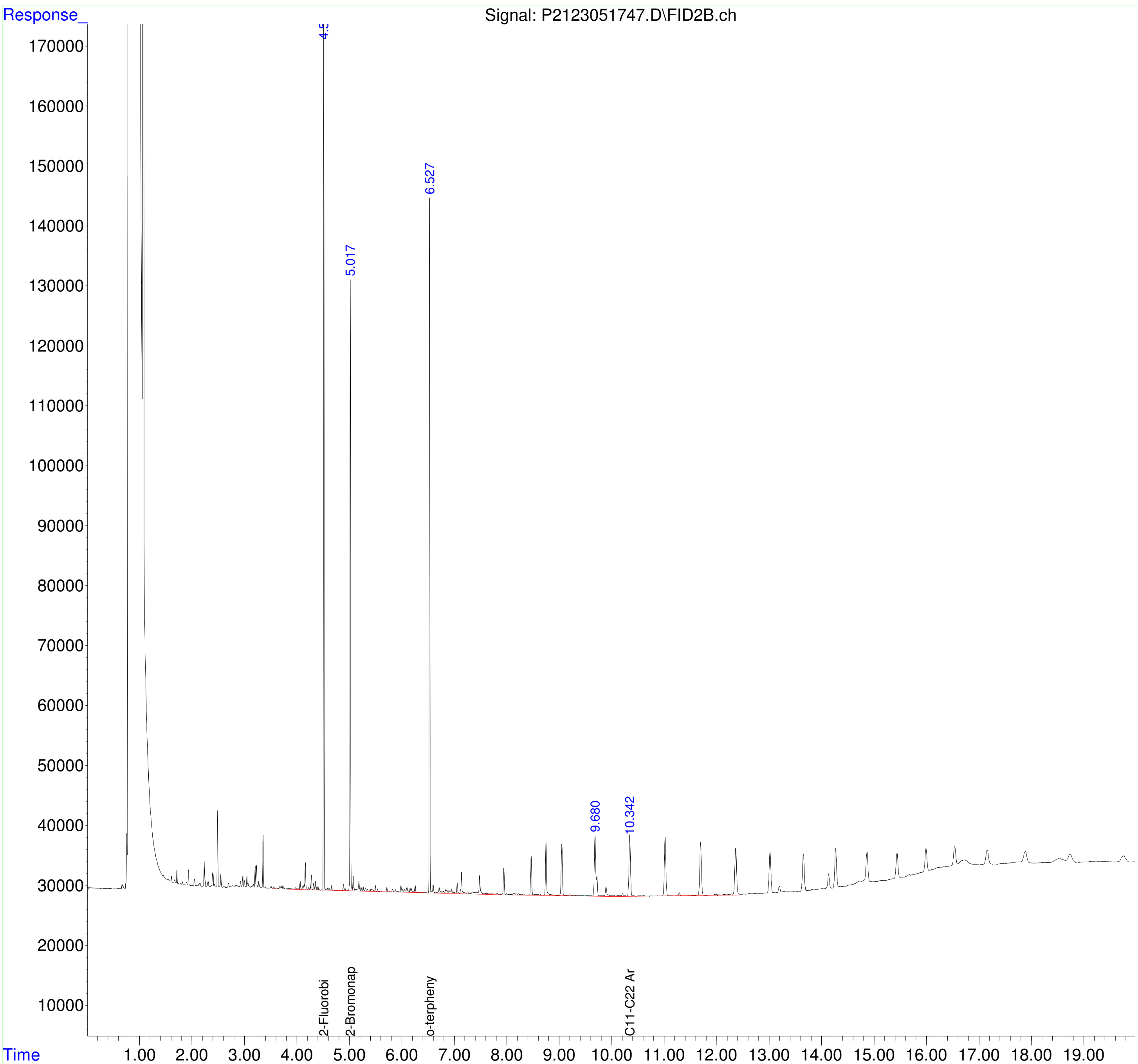
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051747.D
Signal(s) : FID2B.ch
Acq On    : 17 May 2023   9:27 pm
Operator  : Petro21b:sr
Sample    : L2326777-10,42,,
Misc      : wg1779451  DAY 1 Mineral Oil Composite
ALS Vial  : 74   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:53:54 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

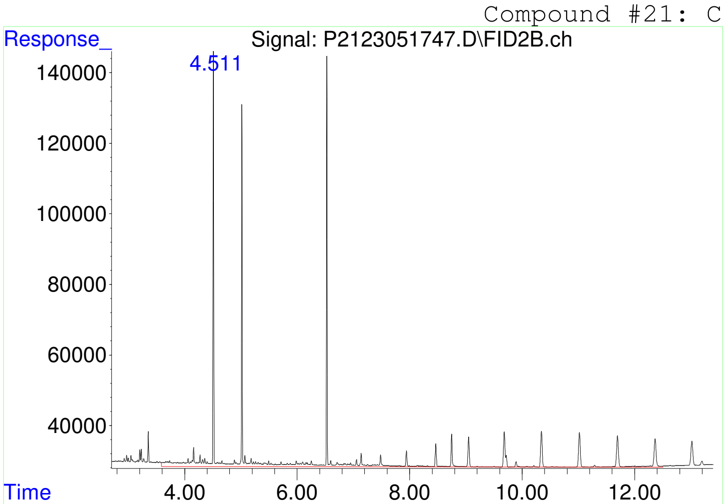


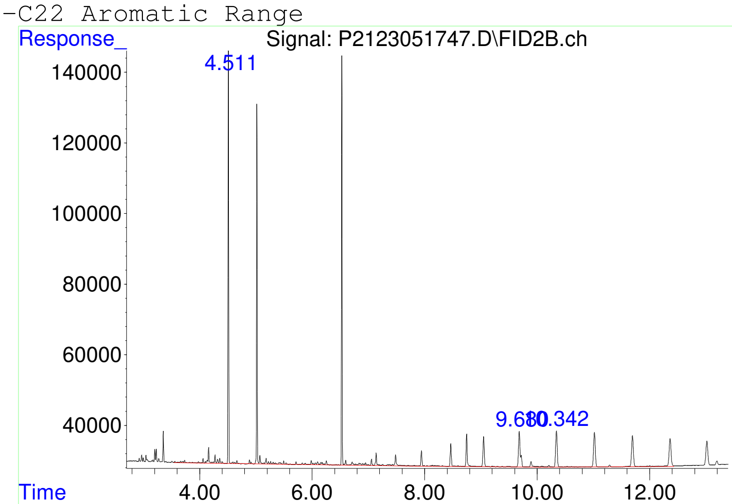
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051747.D
Date Inj'd : 5/17/2023 9:27 pm
Sample : L2326777-10,42,,

QMethod : P21MAARO211129B.M
Operator : Petro21b:sr
Instrument : Petro 21
Quant Date : 5/18/2023 8:23 am

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3832222

Manual Peak Response = 2362849 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051748.D
Signal(s) : FID1A.ch
Acq On : 17 May 2023 9:27 pm
Operator : Petro21a:sr
Sample : L2326777-10,42,,
Misc : WG1779451 DAY 1 Mineral Oil Composite (ALI)
ALS Vial : 24 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:44:44 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.172 | 702510 | 11.291 | mg/L | M4 |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 56.45% | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 2.214f | 1828931 | 25.555 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.243f | 10923087 | 158.599 | mg/L | M5 |

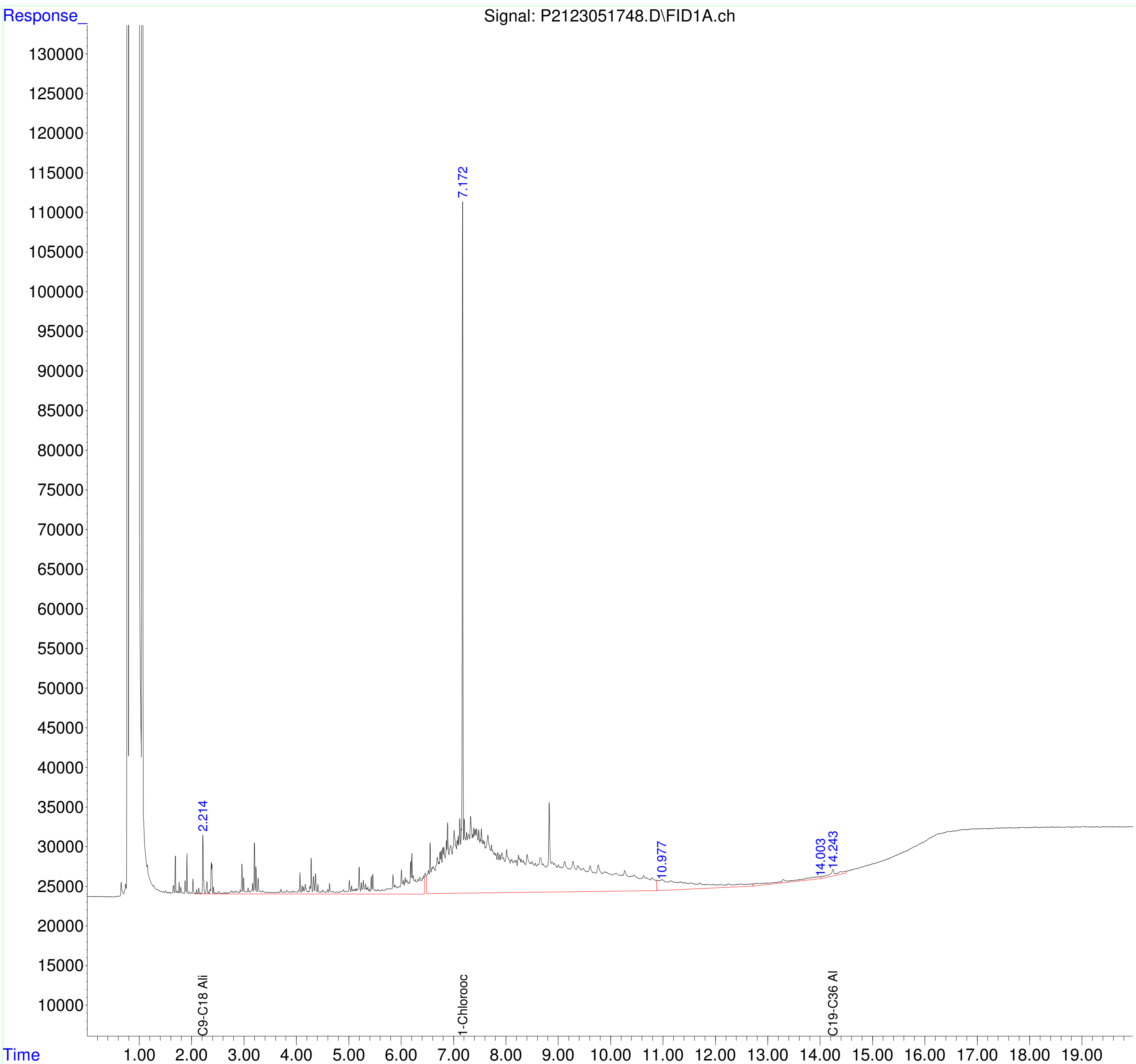
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051748.D
Signal(s) : FID1A.ch
Acq On    : 17 May 2023   9:27 pm
Operator  : Petro21a:sr
Sample    : L2326777-10,42,,
Misc      : WG1779451  DAY 1 Mineral Oil Composite  (ALI)
ALS Vial  : 24   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:44:44 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

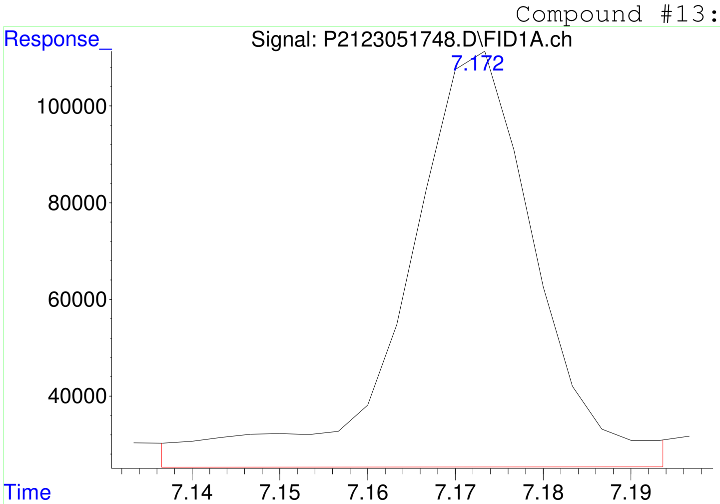


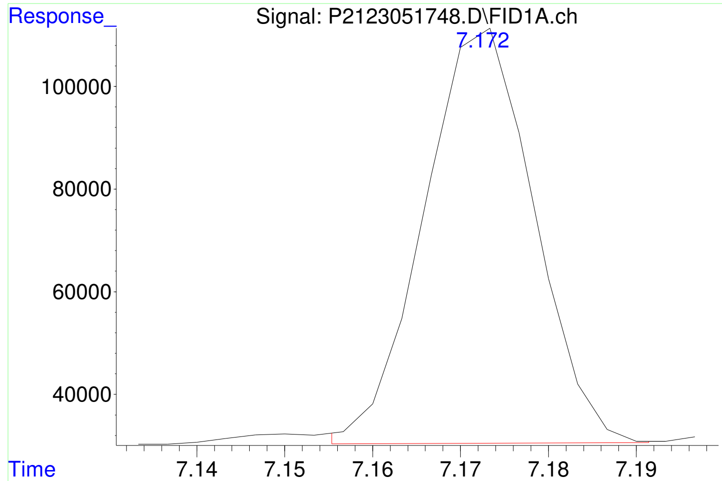
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051748.D
Date Inj'd : 5/17/2023 9:27 pm
Sample : L2326777-10,42,,

QMethod : P21MAALI211129A.M
Operator : Petro21a:sr
Instrument : Petro 21
Quant Date : 5/18/2023 8:22 am

Compound #13: 1-Chlorooctadecane

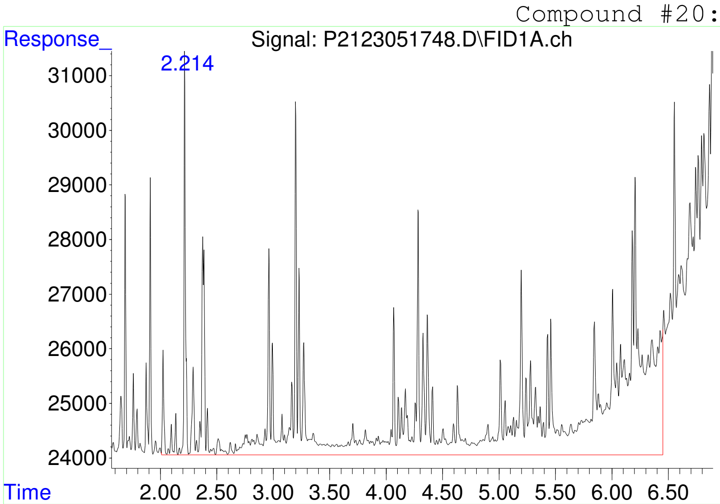


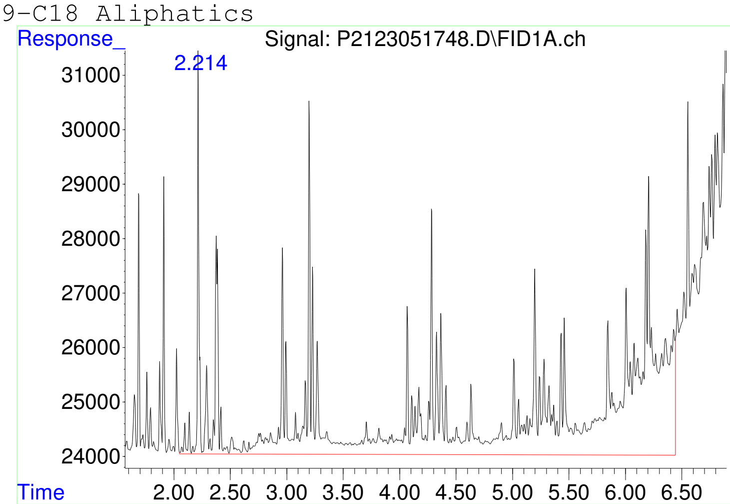




Original Peak Response = 891556
M4 = Poor automated baseline construction.

Manual Peak Response = 702510 M4

Compound #20: C9-C18 Aliphatics



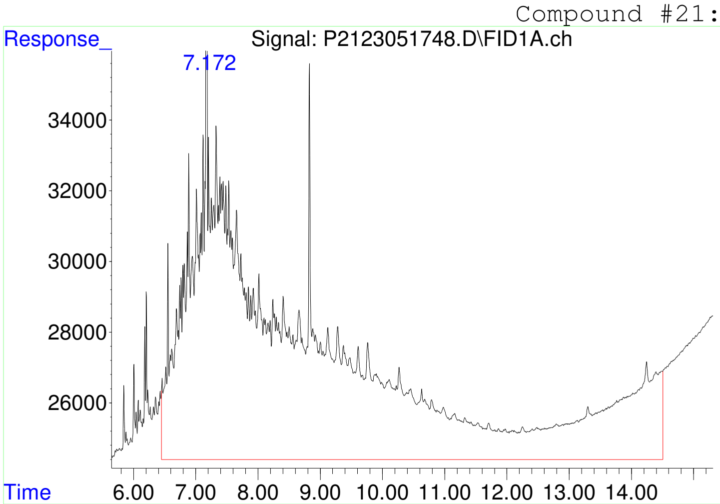



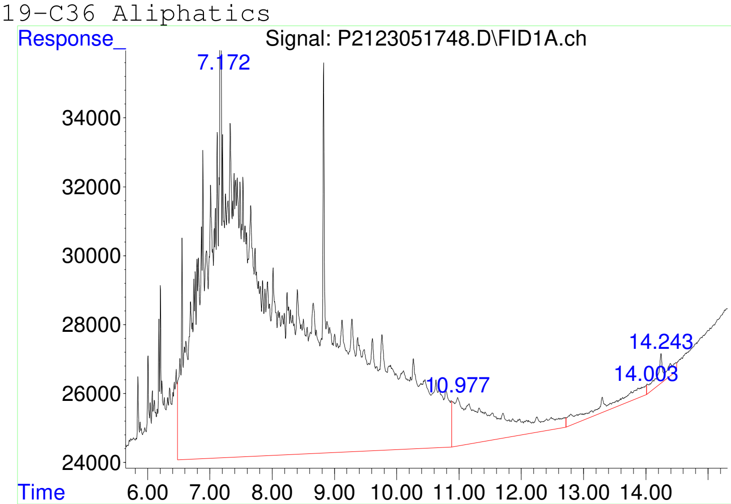

Original Peak Response = 1799583

Manual Peak Response = 1828931 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 12383839

Manual Peak Response = 10923087 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051749.D
Signal(s) : FID2B.ch
Acq On : 17 May 2023 9:52 pm
Operator : Petro21b:sr
Sample : L2326777-11,42,,
Misc : wg1779451 DAY 1 Mineral Oil Composite
ALS Vial : 75 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:54:22 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units |
|---|---|---|---|
| **System Monitoring Compounds** | | | |
| 3) s 2-Fluorobiphenyl | 4.512 | 1170424 | 16.723 mg/L |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 83.61% | |
| 5) s 2-Bromonaphthalene | 5.019 | 826686 | 16.773 mg/L |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 83.86% | |
| 10) S o-terphenyl | 6.529 | 1136827 | 12.485 mg/L |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 62.42% | |
| **Target Compounds** | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L d |
| 21) H C11-C22 Aromatic Range | 11.016 | 2631314 | 31.476 mg/L M5 |

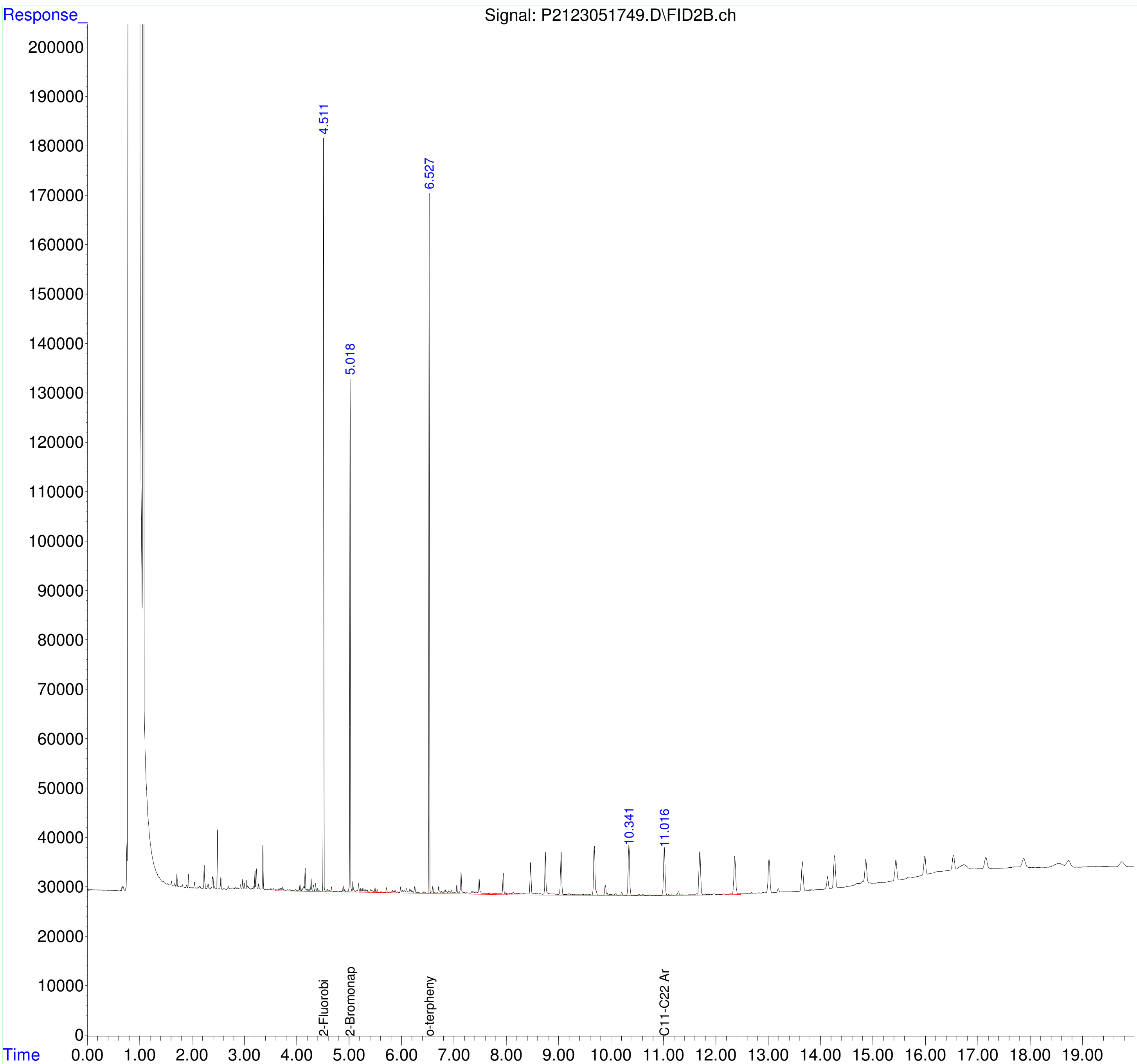
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051749.D
Signal(s) : FID2B.ch
Acq On    : 17 May 2023   9:52 pm
Operator  : Petro21b:sr
Sample    : L2326777-11,42,,
Misc      : wg1779451  DAY 1 Mineral Oil Composite
ALS Vial  : 75   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:54:22 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

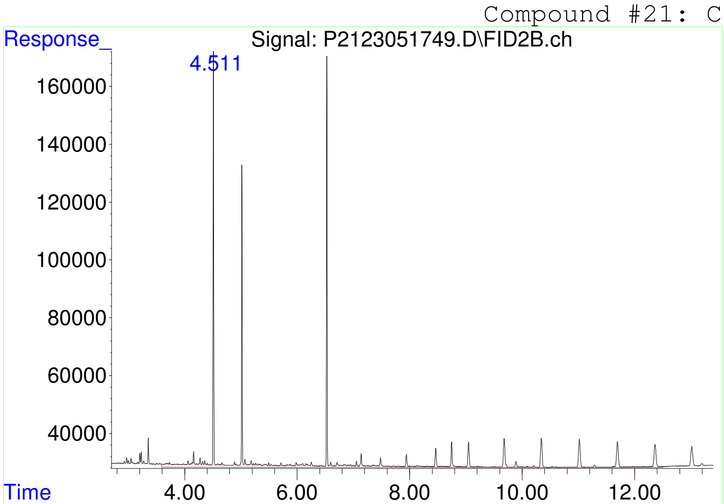


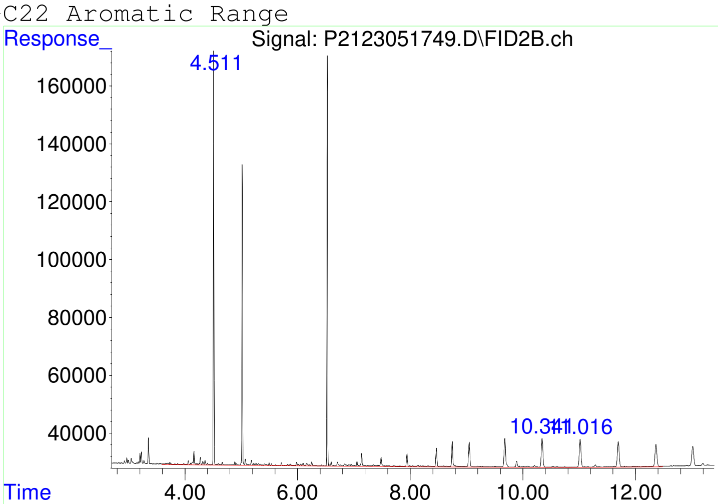
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051749.D
Date Inj'd : 5/17/2023 9:52 pm
Sample : L2326777-11,42,,

QMethod : P21MAARO211129B.M
Operator : Petro21b:sr
Instrument : Petro 21
Quant Date : 5/18/2023 8:23 am

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3886109

Manual Peak Response = 2631314 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051750.D
Signal(s) : FID1A.ch
Acq On : 17 May 2023 9:52 pm
Operator : Petro21a:sr
Sample : L2326777-11,42,,
Misc : WG1779451 DAY 1 Mineral Oil Composite (ALI)
ALS Vial : 25 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:45:28 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | | |
| 3) | S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) | S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) | S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) | S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) | S | 1-Chlorooctadecane | 7.171 | 824657 | 13.254 | mg/L | M4 |
| Spiked Amount 20.000 | | Range 40 - 140 | | Recovery = 66.27% | | | |
| Target Compounds | | | | | | | |
| 1) | | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) | H | C9-C18 Aliphatics | 6.204f | 2860719 | 39.972 | mg/L | M5 |
| 21) | H | C19-C36 Aliphatics | 14.370f | 12465363 | 180.992 | mg/L | M5 |

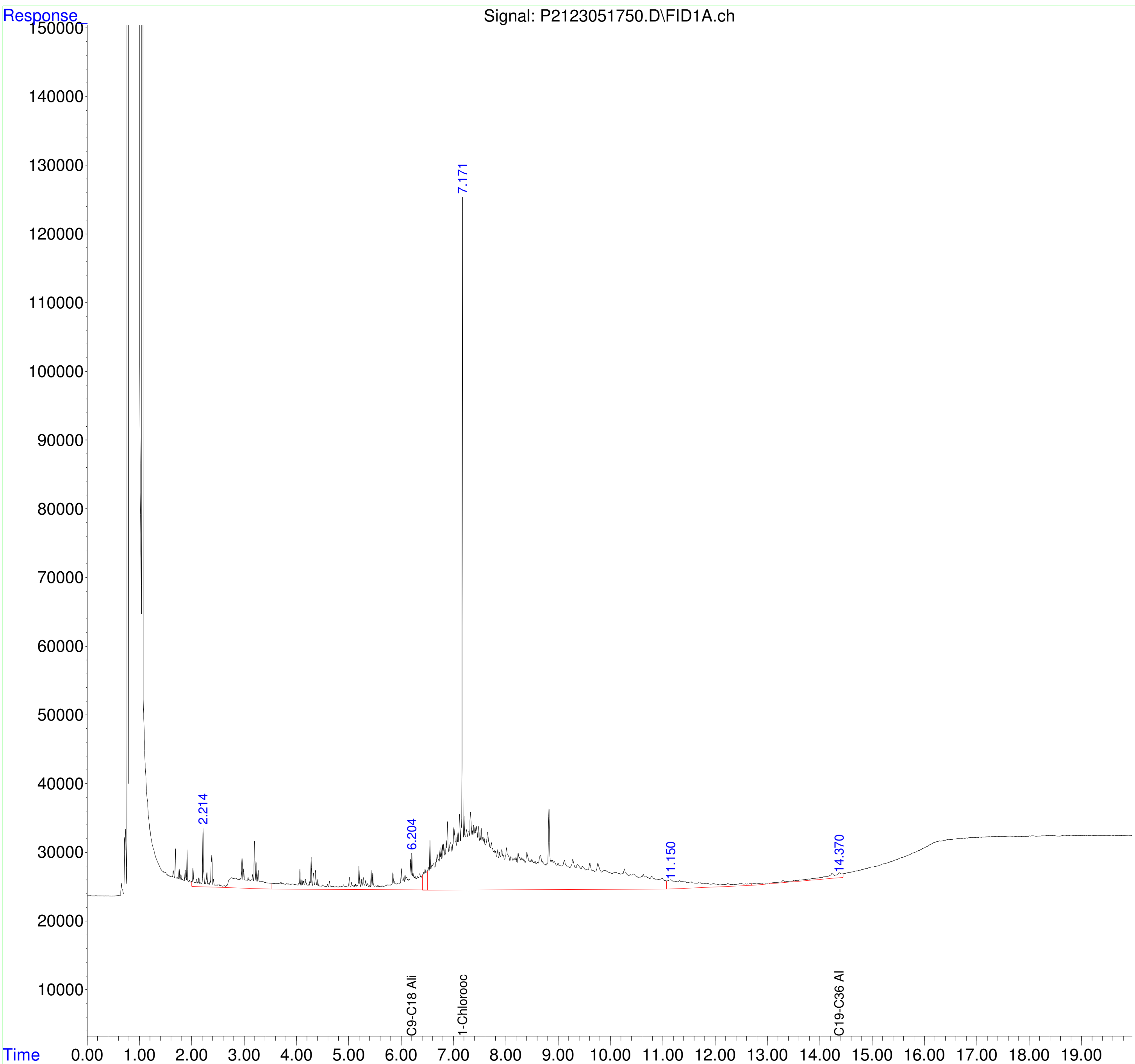
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051750.D
Signal(s) : FID1A.ch
Acq On    : 17 May 2023   9:52 pm
Operator  : Petro21a:sr
Sample    : L2326777-11,42,,
Misc      : WG1779451  DAY 1 Mineral Oil Composite  (ALI)
ALS Vial  : 25   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:45:28 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

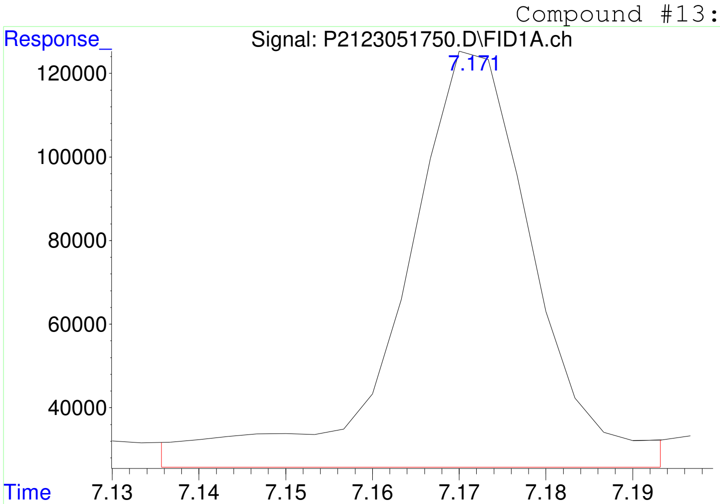
Volume Inj.  :
Signal Phase :
Signal Info  :

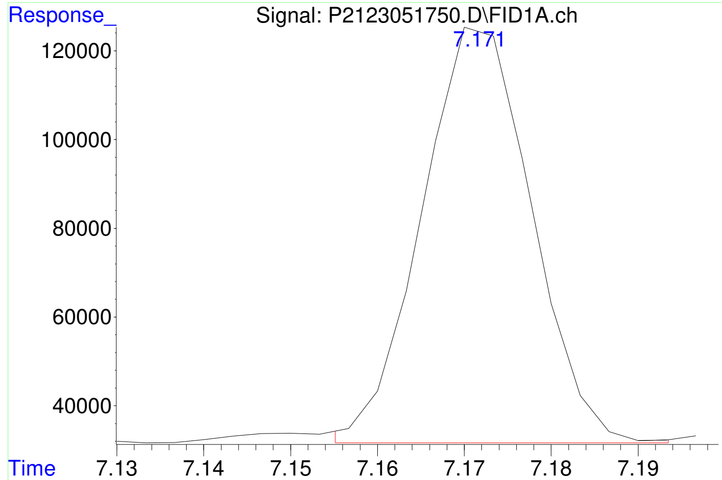


## Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230517\ | QMethod | : P21MAALI211129A.M |
| Data File | : P2123051750.D | Operator | : Petro21a:sr |
| Date Inj'd | : 5/17/2023 9:52 pm | Instrument | : Petro 21 |
| Sample | : L2326777-11,42,, | Quant Date | : 5/18/2023 8:22 am |

### Compound #13: 1-Chlorooctadecane

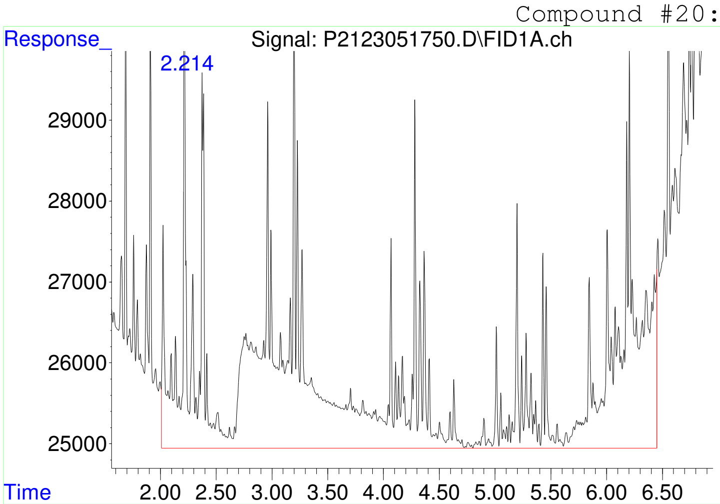


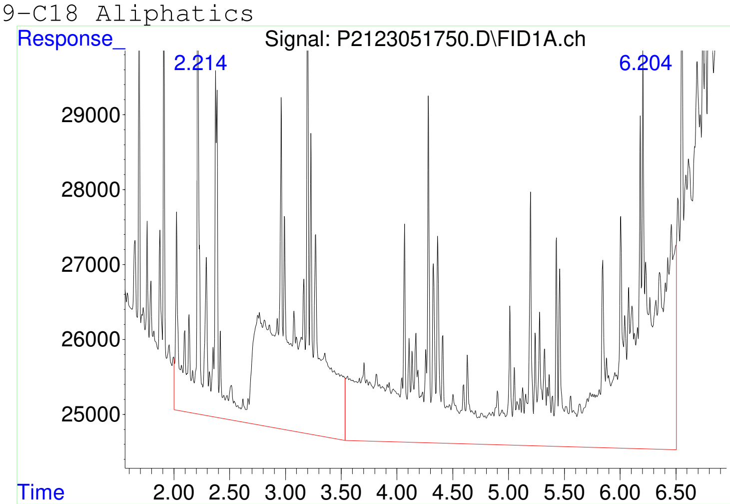




Original Peak Response = 1042437
M4 = Poor automated baseline construction.

Manual Peak Response = 824657 M4

### Compound #20: C9-C18 Aliphatics



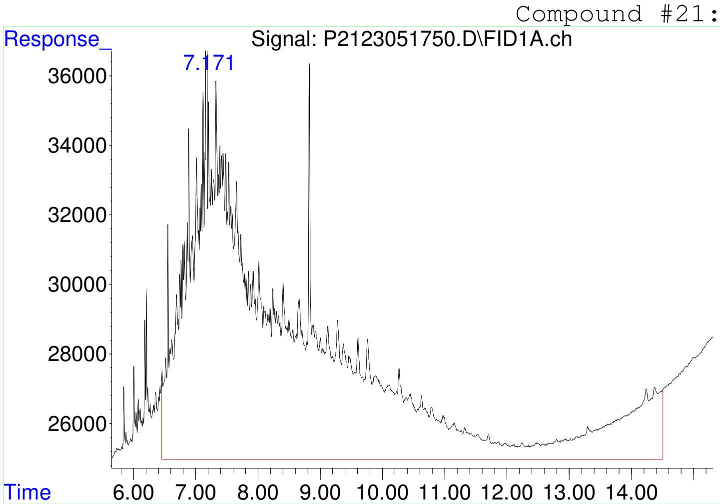



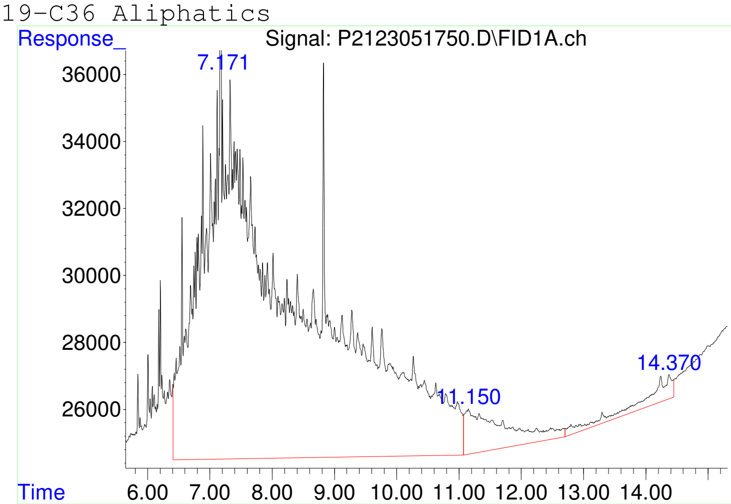

Original Peak Response = 2043261

Manual Peak Response = 2860719 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

### Compound #21: C19-C36 Aliphatics




Original Peak Response = 12159513

Manual Peak Response = 12465363 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051751.D
Signal(s) : FID2B.ch
Acq On : 17 May 2023 10:17 pm
Operator : Petro21b:sr
Sample : L2326777-17,42,,
Misc : wg1779451 DAY 1 Lubricating Oil Composite
ALS Vial : 76 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:54:51 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | |
| 3) s | 2-Fluorobiphenyl | 4.512 | 1211660 | 17.312 mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 86.56% | |
| 5) s | 2-Bromonaphthalene | 5.019 | 850695 | 17.260 mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 86.30% | |
| 10) S | o-terphenyl | 6.529 | 1097412 | 12.052 mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 60.26% | |
| | **Target Compounds** | | | | |
| 1) | Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) | 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) | Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) | Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) | Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) | Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) | Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) | Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) | Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) | Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) | Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) | Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) | Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) | Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) | Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) | Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) | Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H | C11-C22 Aromatic Range | 12.361f | 2602001 | 31.125 mg/L | M5 |

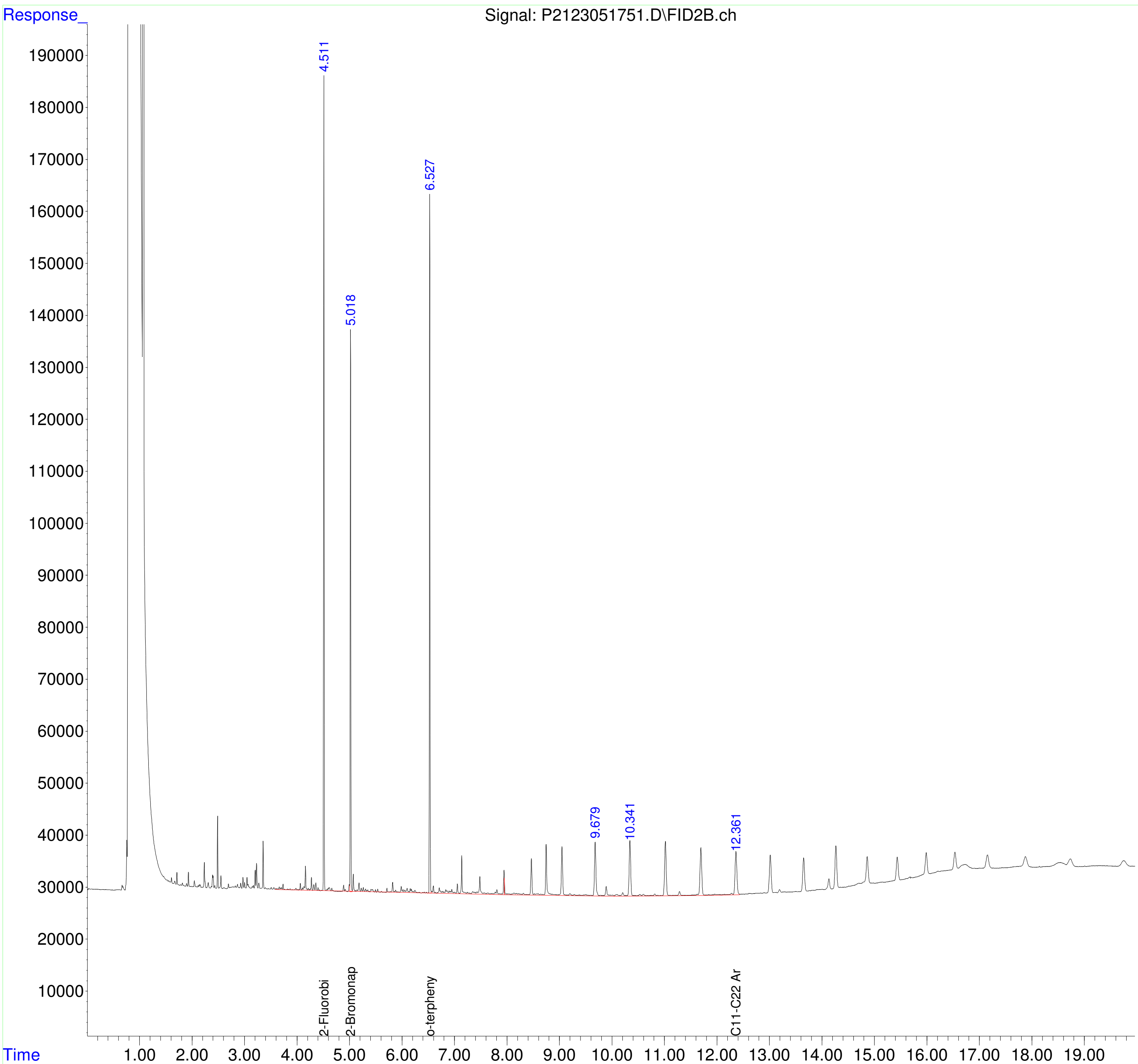
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051751.D
Signal(s) : FID2B.ch
Acq On    : 17 May 2023  10:17 pm
Operator  : Petro21b:sr
Sample    : L2326777-17,42,,
Misc      : wg1779451  DAY 1 Lubricating Oil Composite
ALS Vial  : 76   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:54:51 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

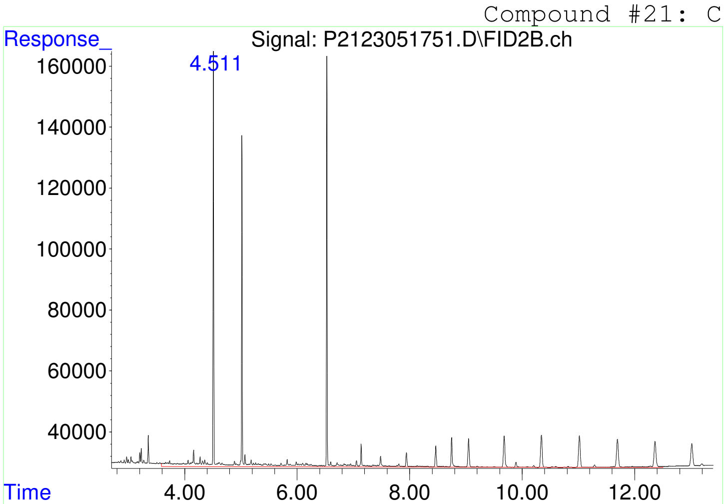
Volume Inj.  :
Signal Phase :
Signal Info  :

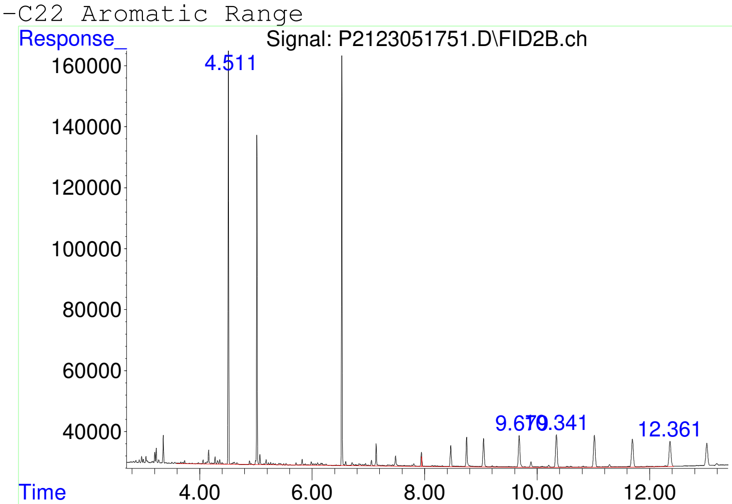


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230517.SEC\ | QMethod | : P21MAARO211129B.M |
| Data File | : P2123051751.D | Operator | : Petro21b:sr |
| Date Inj'd | : 5/17/2023 10:17 pm | Instrument | : Petro 21 |
| Sample | : L2326777-17,42,, | Quant Date | : 5/18/2023 8:23 am |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3651655

Manual Peak Response = 2602001 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051752.D
Signal(s) : FID1A.ch
Acq On : 17 May 2023 10:17 pm
Operator : Petro21a:sr
Sample : L2326777-17,42,,
Misc : WG1779451 DAY 1 Lubricating Oil composite (ALI)
ALS Vial : 26 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:46:13 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.172 | 728759 | 11.713 | mg/L | M4 |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 58.56% | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 6.180f | 2364766 | 33.042 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.237f | 11594736 | 168.351 | mg/L | M5 |

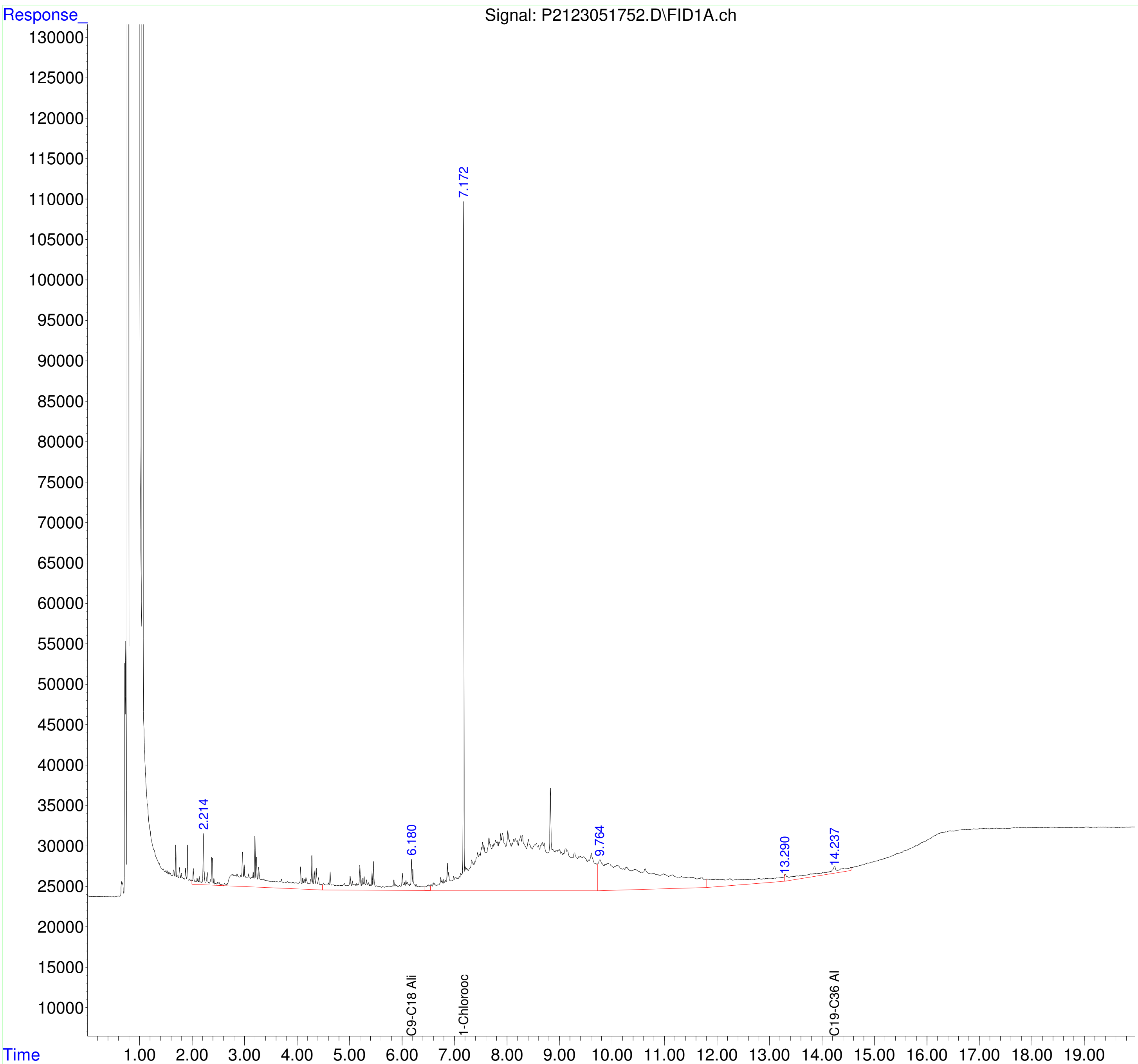
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051752.D
Signal(s) : FID1A.ch
Acq On : 17 May 2023 10:17 pm
Operator : Petro21a:sr
Sample : L2326777-17,42,,
Misc : WG1779451 DAY 1 Lubricating Oil composite (ALI)
ALS Vial : 26 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:46:13 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

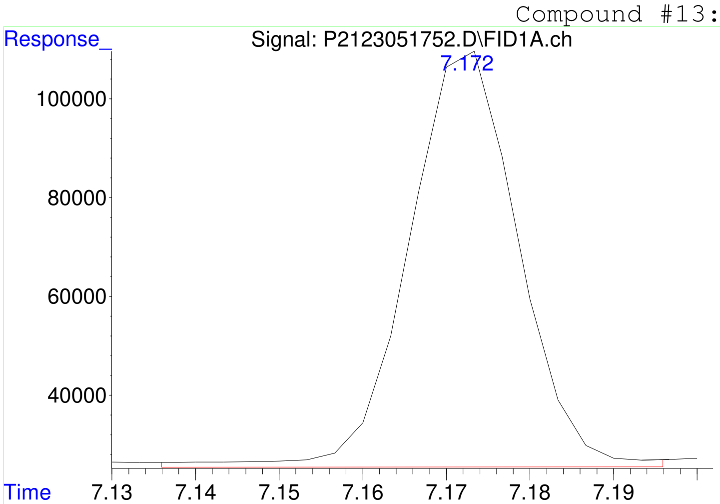
Volume Inj. :
Signal Phase :
Signal Info :



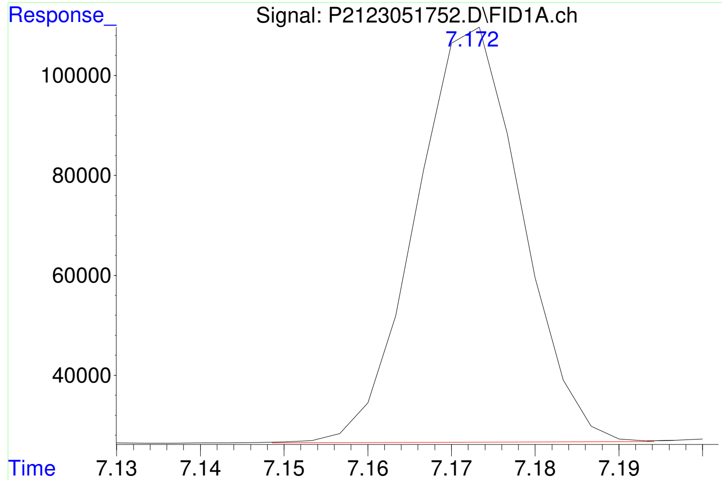
Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230517\ | QMethod | : P21MAALI211129A.M |
| Data File | : P2123051752.D | Operator | : Petro21a:sr |
| Date Inj'd | : 5/17/2023 10:17 pm | Instrument | : Petro 21 |
| Sample | : L2326777-17,42,, | Quant Date | : 5/18/2023 8:22 am |

Compound #13: 1-Chlorooctadecane

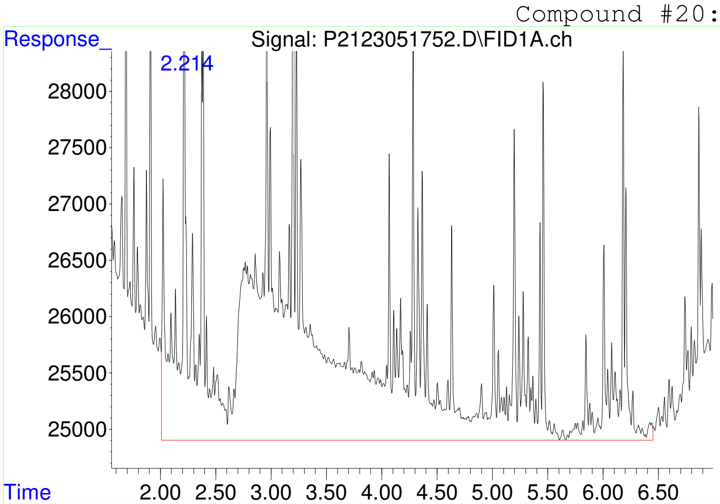



Original Peak Response = 767375
M4 = Poor automated baseline construction.

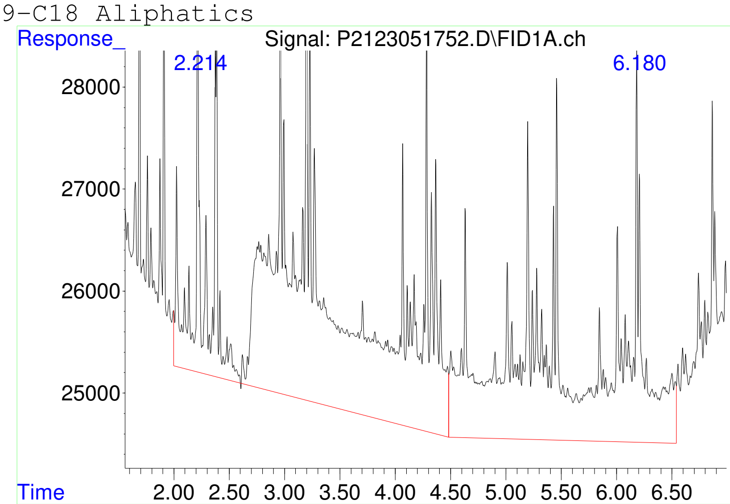



Manual Peak Response = 728759 M4

Compound #20: C9-C18 Aliphatics

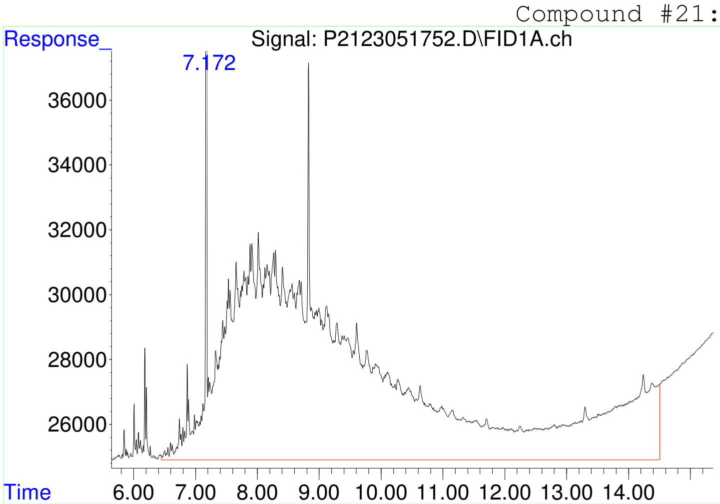



Original Peak Response = 1898357

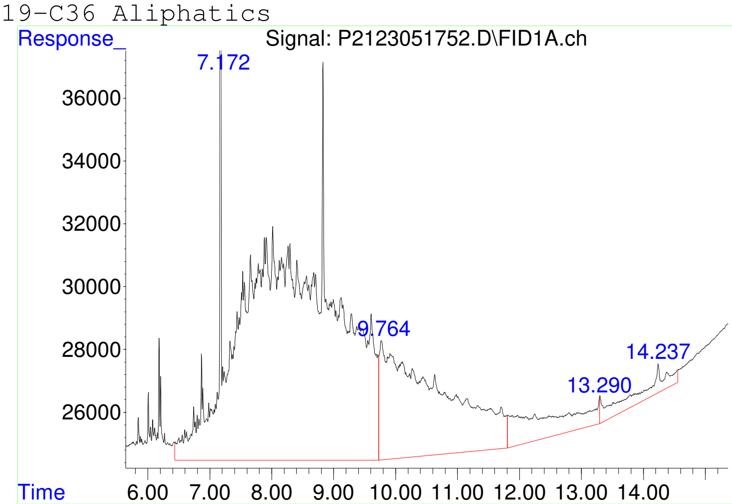



Manual Peak Response = 2364766 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 11749473




Manual Peak Response = 11594736 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051753.D
Signal(s) : FID2B.ch
Acq On : 17 May 2023 10:42 pm
Operator : Petro21b:sr
Sample : L2326777-18,42,,
Misc : wg1779451 DAY 1 Lubricating Oil Composite
ALS Vial : 77 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:55:18 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.512 | 1147592 | 16.397 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 81.98% | | |
| 5) s 2-Bromonaphthalene | 5.019 | 806828 | 16.370 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 81.85% | | |
| 10) S o-terphenyl | 6.528 | 1177562 | 12.932 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 64.66% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 11.693 | 2573269 | 30.781 mg/L | M5 |

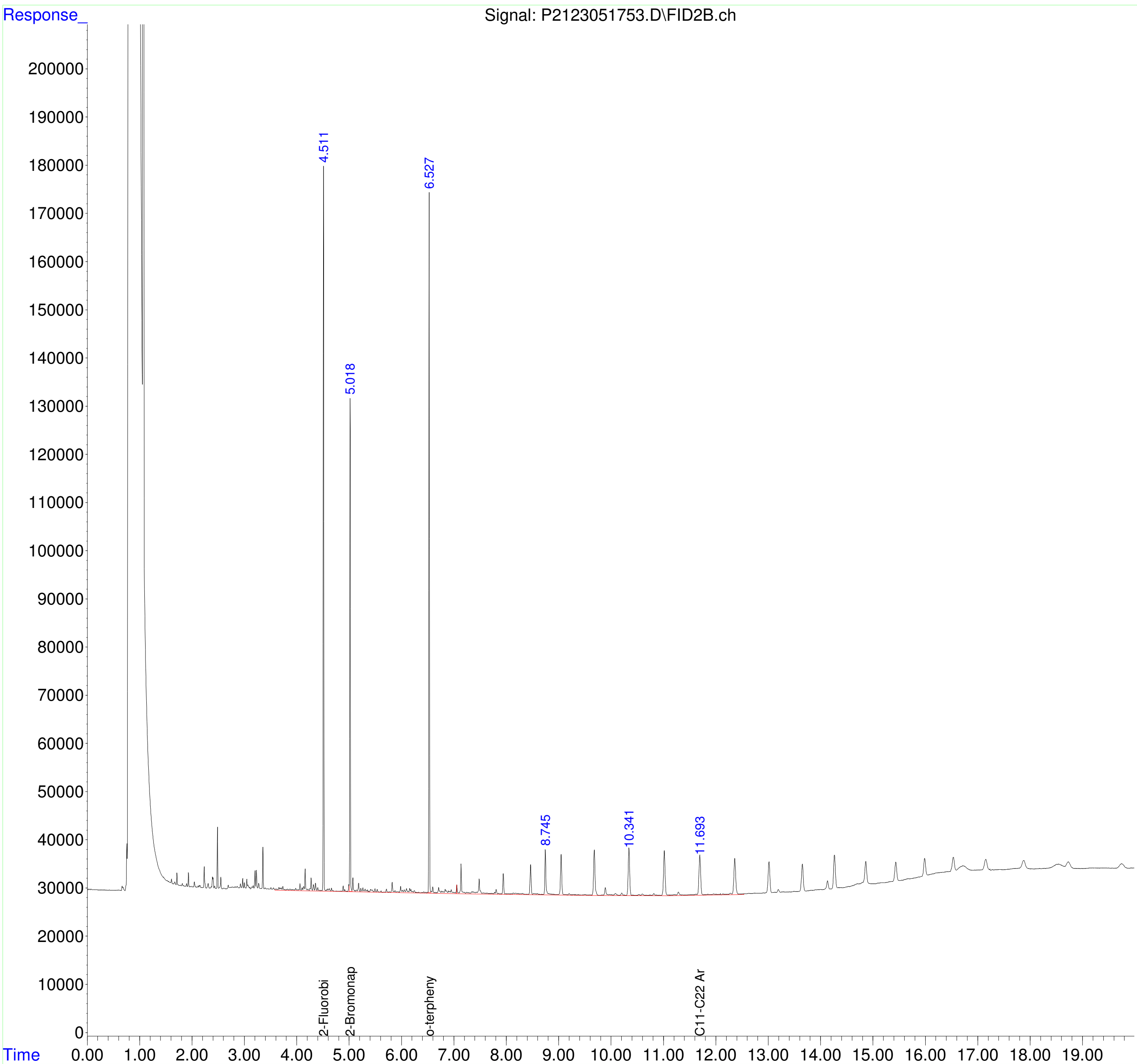
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051753.D
Signal(s) : FID2B.ch
Acq On : 17 May 2023 10:42 pm
Operator : Petro21b:sr
Sample : L2326777-18,42,,
Misc : wg1779451 DAY 1 Lubricating Oil Composite
ALS Vial : 77 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:55:18 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

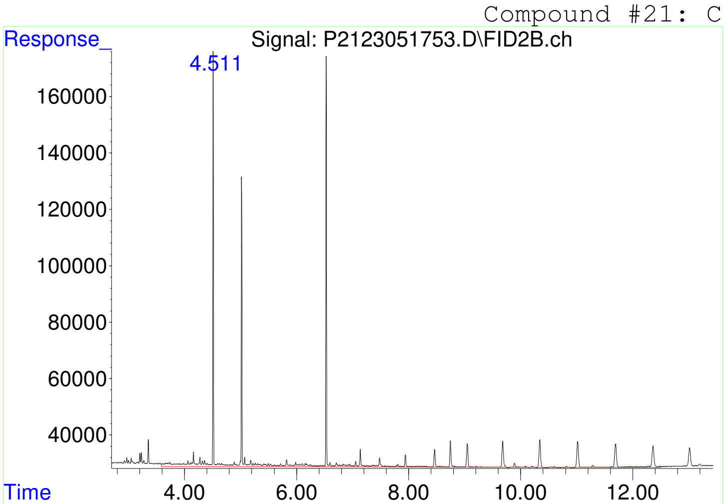
Volume Inj. :
Signal Phase :
Signal Info :

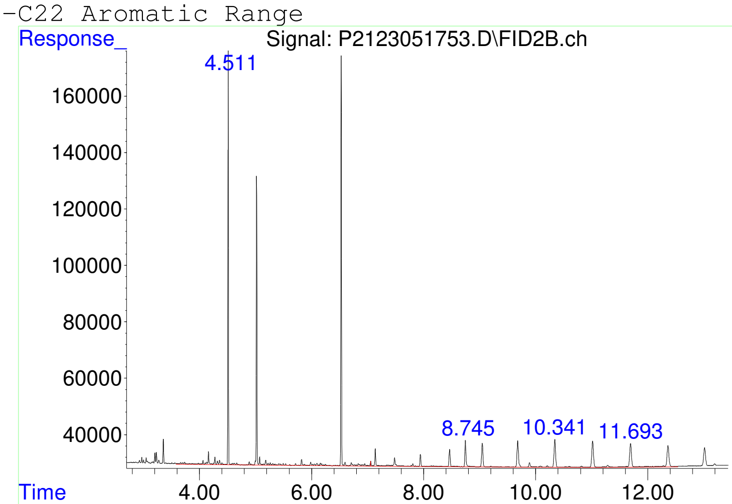


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230517.SEC\ | QMethod | : P21MAARO211129B.M |
| Data File | : P2123051753.D | Operator | : Petro21b:sr |
| Date Inj'd | : 5/17/2023 10:42 pm | Instrument | : Petro 21 |
| Sample | : L2326777-18,42,, | Quant Date | : 5/18/2023 8:23 am |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3594417

Manual Peak Response = 2573269 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051754.D
Signal(s) : FID1A.ch
Acq On : 17 May 2023 10:42 pm
Operator : Petro21a:sr
Sample : L2326777-18,42,,
Misc : WG1779451 DAY 1 Lubricating Oil composite (ALI)
ALS Vial : 27 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:46:59 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.171 | 837848 | 13.467 | mg/L | M4 |

Spiked Amount 20.000 Range 40 - 140 Recovery = 67.33%

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 2.214f | 1548415 | 21.636 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.238f | 12424172 | 180.394 | mg/L | M5 |

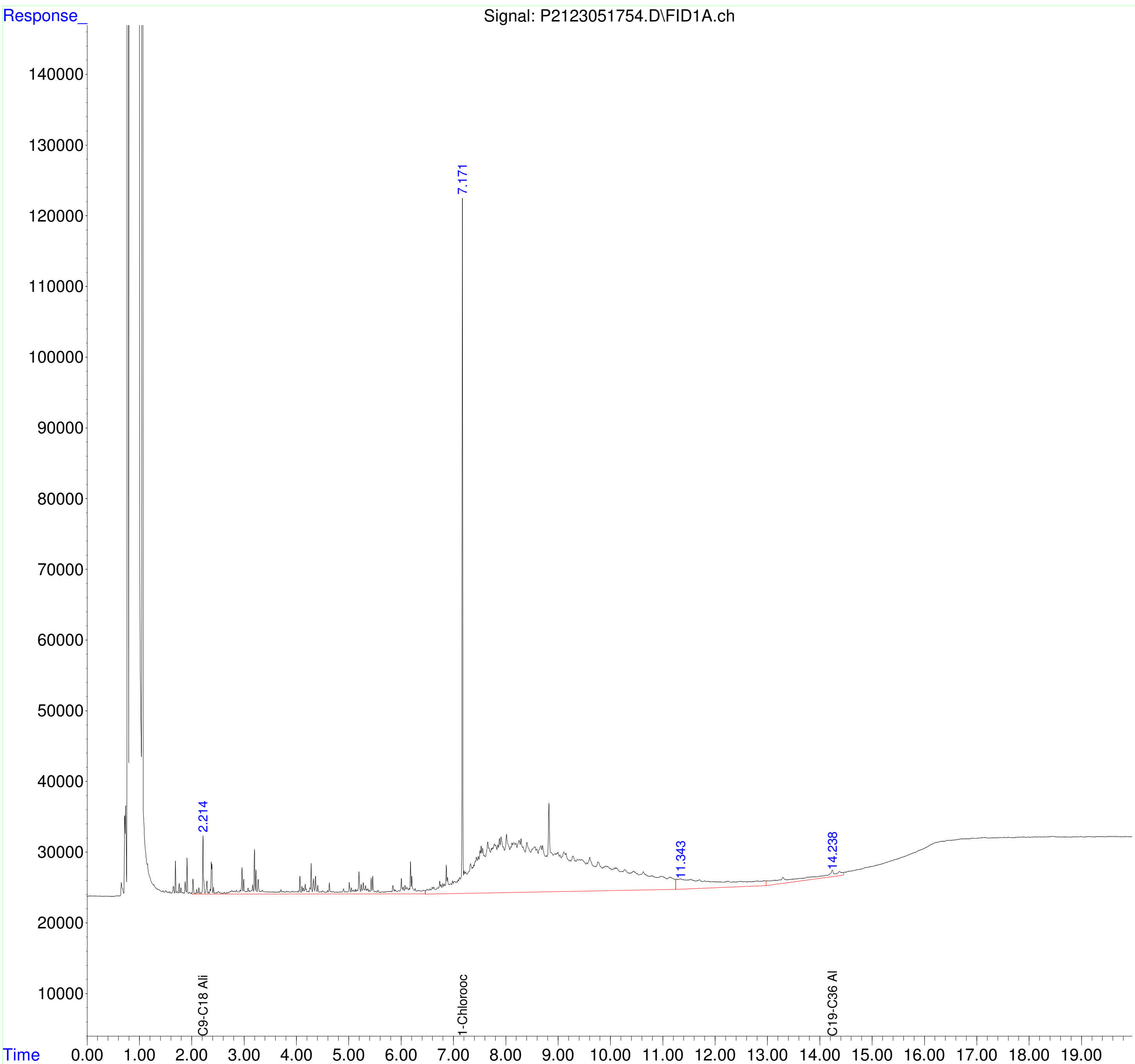
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051754.D
Signal(s) : FID1A.ch
Acq On    : 17 May 2023  10:42 pm
Operator  : Petro21a:sr
Sample    : L2326777-18,42,,
Misc      : WG1779451  DAY 1 Lubricating Oil composite  (ALI)
ALS Vial  : 27   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:46:59 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

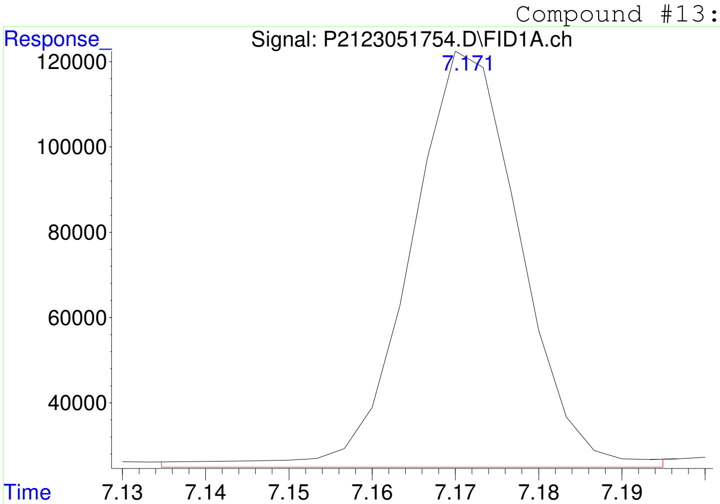


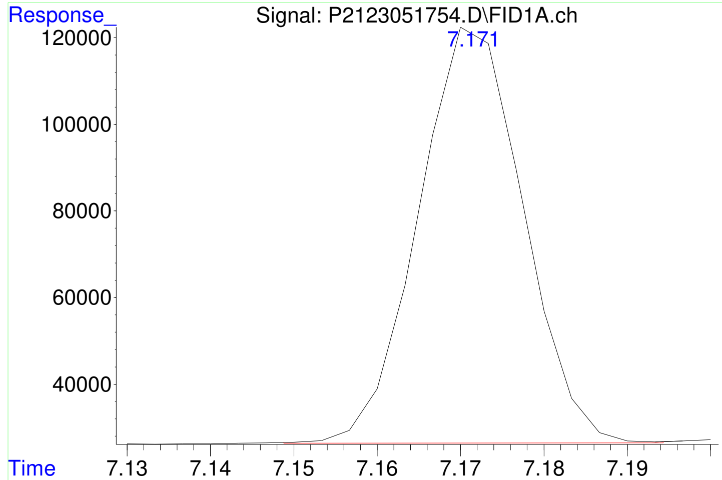
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051754.D
Date Inj'd : 5/17/2023 10:42 pm
Sample : L2326777-18,42,,

QMethod : P21MAALI211129A.M
Operator : Petro21a:sr
Instrument : Petro 21
Quant Date : 5/18/2023 8:22 am

Compound #13: 1-Chlorooctadecane

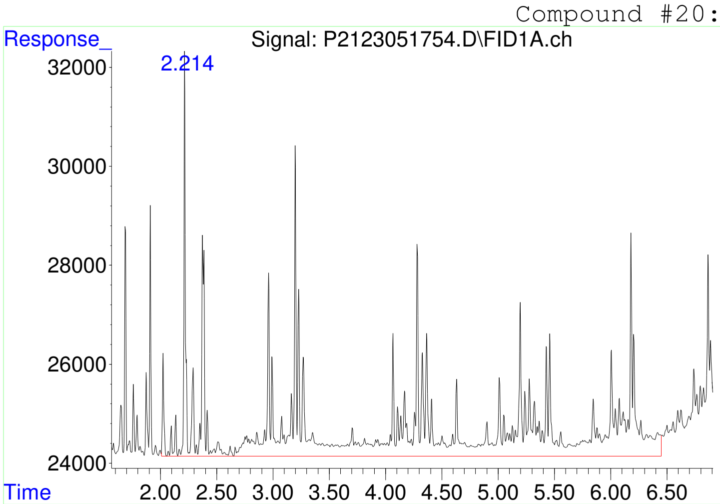


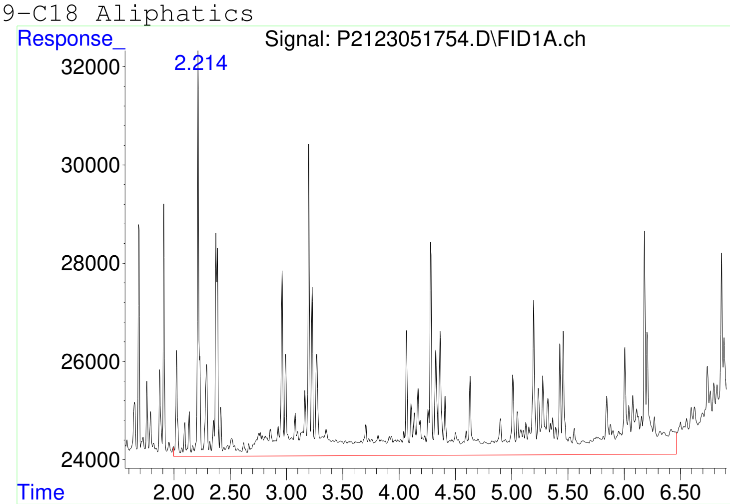




Original Peak Response = 890537
M4 = Poor automated baseline construction.

Manual Peak Response = 837848 M4

Compound #20: C9-C18 Aliphatics



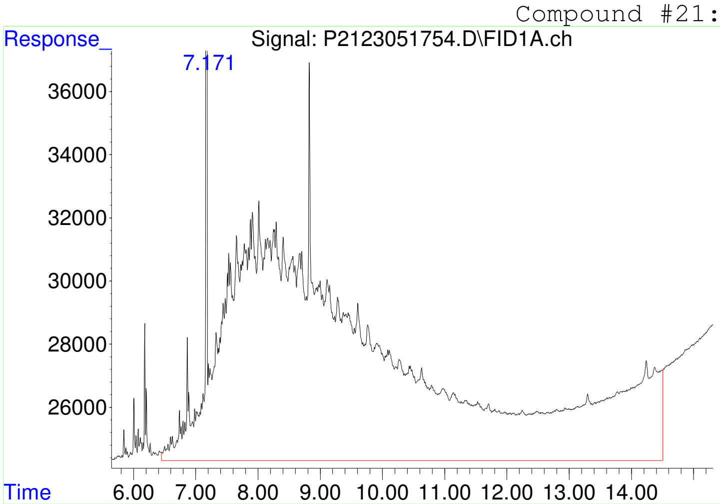



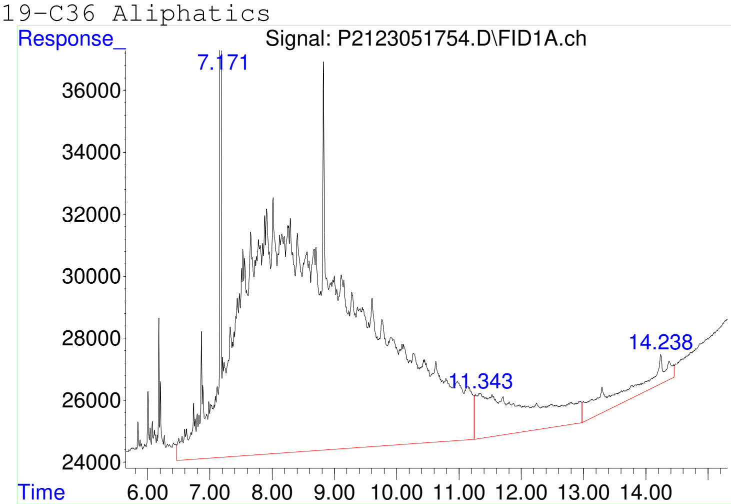

Original Peak Response = 1411446

Manual Peak Response = 1548415 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 14932874

Manual Peak Response = 12424172 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

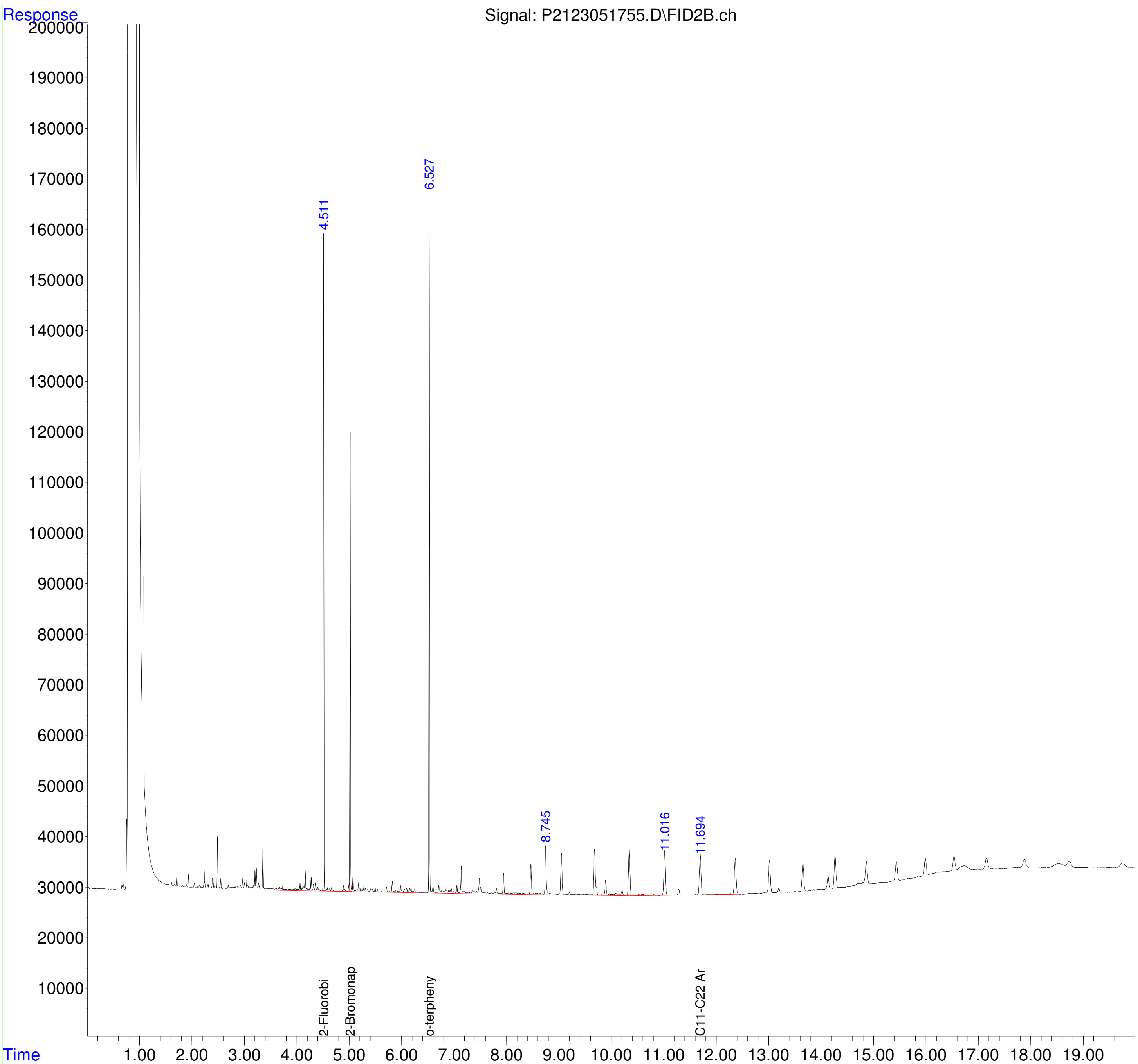
```
Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051755.D
Signal(s) : FID2B.ch
Acq On    : 17 May 2023  11:07 pm
Operator  : Petro21b:sr
Sample    : L2326777-19,42,,
Misc      : wg1779451  DAY 1 Lubricating Oil Composite
ALS Vial  : 78   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:55:46 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed

        Compound                        R.T.       Response    Conc Units
 ---------------------------------------------------------------------------

 System Monitoring Compounds
 3) s   2-Fluorobiphenyl              4.512        999045   14.274 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   71.37%
 5) s   2-Bromonaphthalene            5.019        721155   14.632 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   73.16%
10) S   o-terphenyl                   6.528       1114974   12.245 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   61.22%

 Target Compounds
 1)     Naphthalene                   0.000             0    N.D.  mg/L  d
 2)     2-Methylnaphthalene           0.000             0    N.D.  mg/L  d
 4)     Acenaphthalene                0.000             0    N.D.  mg/L  d
 6)     Acenaphthene                  0.000             0    N.D.  mg/L  d
 7)     Fluorene                      0.000             0    N.D.  mg/L  d
 8)     Phenanthrene                  0.000             0    N.D.  mg/L  d
 9)     Anthracene                    0.000             0    N.D.  mg/L  d
11)     Fluoranthene                  0.000             0    N.D.  mg/L  d
12)     Pyrene                        0.000             0    N.D.  mg/L  d
13)     Benzo(a)anthracene            0.000             0    N.D.  mg/L  d
14)     Chrysene                      0.000             0    N.D.  mg/L  d
15)     Benzo(b)fluoranthene          0.000             0    N.D.  mg/L  d
16)     Benzo(k)fluoranthene          0.000             0    N.D.  mg/L  d
17)     Benzo(a)pyrene                0.000             0    N.D.  mg/L  d
18)     Indeno(1,2,3-cd)pyrene        0.000             0    N.D.  mg/L  d
19)     Dibenzo(a,h)anthracene        0.000             0    N.D.  mg/L  d
20)     Benzo(ghi)perylene            0.000             0    N.D.  mg/L  d
21) H   C11-C22 Aromatic Range       11.694       2634986   31.519 mg/L  M5
 ---------------------------------------------------------------------------

 (f)=RT Delta > 1/2 Window                            (m)=manual int.
```

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517.SEC\
Data File : P2123051755.D
Signal(s) : FID2B.ch
Acq On    : 17 May 2023  11:07 pm
Operator  : Petro21b:sr
Sample    : L2326777-19,42,,
Misc      : wg1779451  DAY 1 Lubricating Oil Composite
ALS Vial  : 78   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 18 10:55:46 2023
Quant Method : I:\PETRO\Petro21\2023\230517.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu Apr 20 09:25:05 2023
Response via : Initial Calibration
Integrator: ChemStation

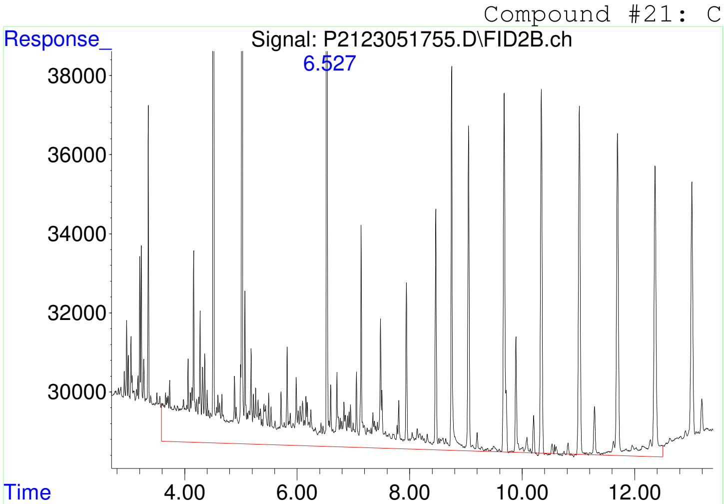
Volume Inj.  :
Signal Phase :
Signal Info  :

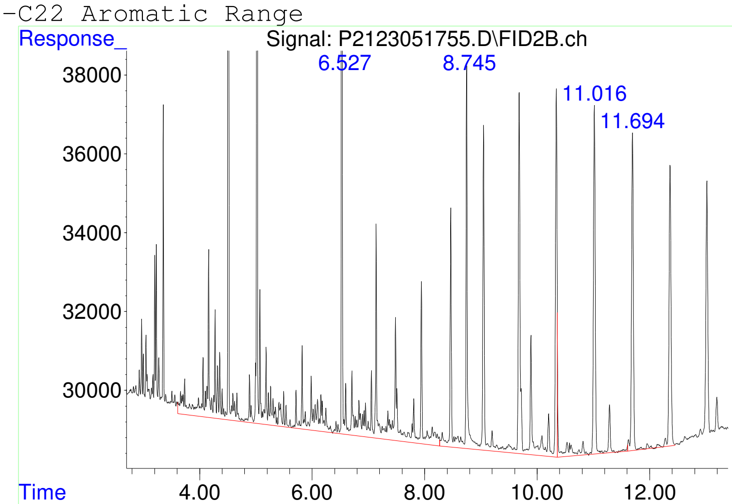


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230517.SEC\ | QMethod | : P21MAARO211129B.M |
| Data File | : P2123051755.D | Operator | : Petro21b:sr |
| Date Inj'd | : 5/17/2023 11:07 pm | Instrument | : Petro 21 |
| Sample | : L2326777-19,42,, | Quant Date | : 5/18/2023 8:23 am |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3624144

Manual Peak Response = 2634986 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051756.D
Signal(s) : FID1A.ch
Acq On    : 17 May 2023  11:07 pm
Operator  : Petro21a:sr
Sample    : L2326777-19,42,,
Misc      : WG1779451  DAY 1 Lubricating Oil composite  (ALI)
ALS Vial  : 28   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:47:39 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.171 | 890326 | 14.310 | mg/L | M4 |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = | 71.55% | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 3.198f | 1691121 | 23.630 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.239f | 13349475 | 193.829 | mg/L | M5 |

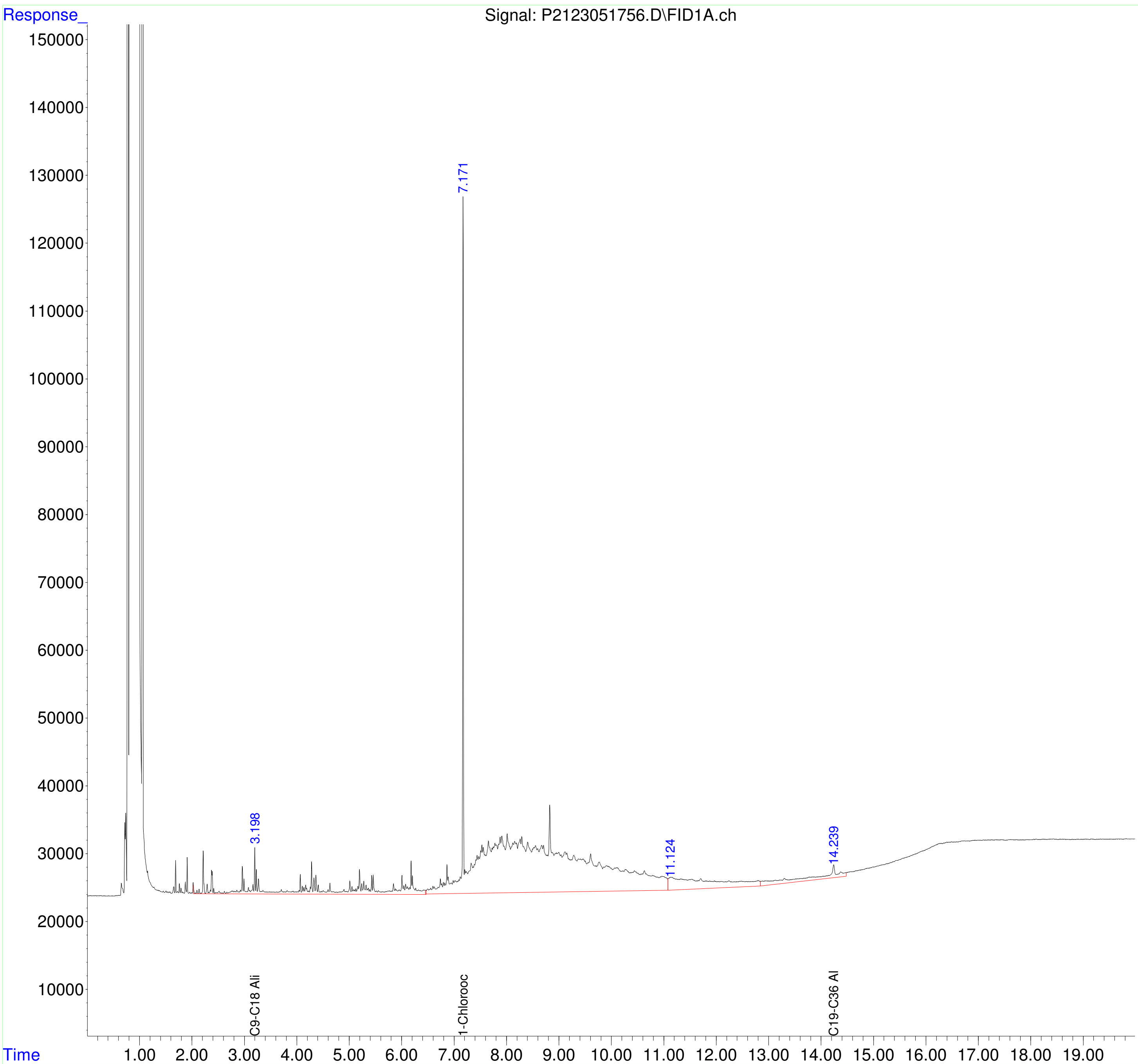
(f)=RT Delta > 1/2 Window                (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051756.D
Signal(s) : FID1A.ch
Acq On : 17 May 2023 11:07 pm
Operator : Petro21a:sr
Sample : L2326777-19,42,,
Misc : WG1779451 DAY 1 Lubricating Oil composite (ALI)
ALS Vial : 28 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 18 10:47:39 2023
Quant Method : I:\PETRO\Petro21\2023\230517\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

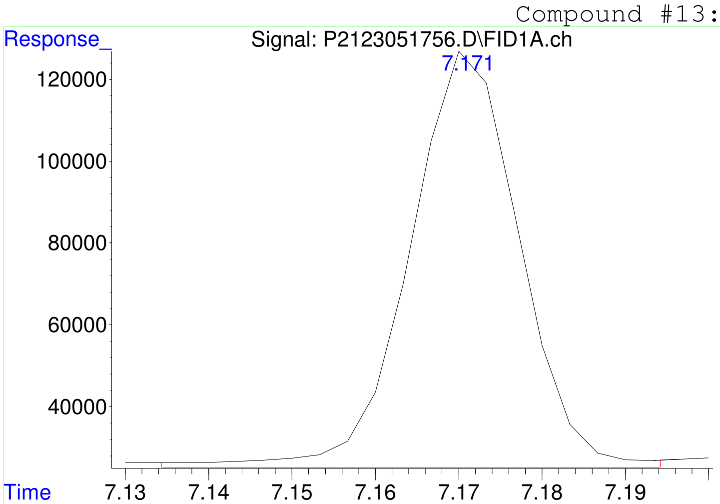


Manual Integration Report

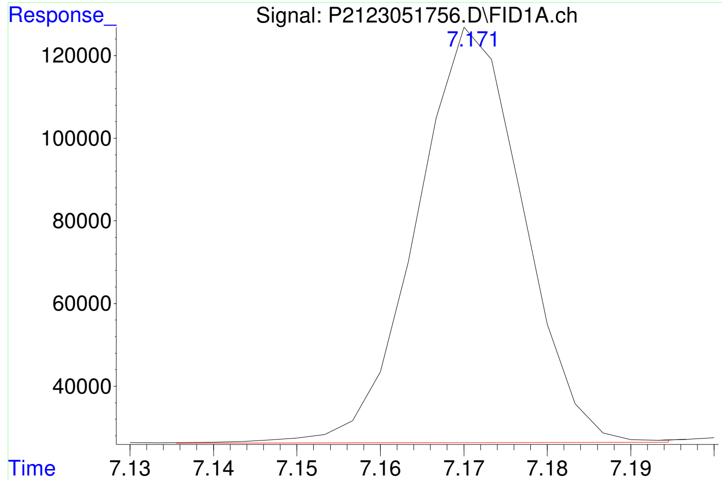
Data Path : I:\PETRO\Petro21\2023\230517\
Data File : P2123051756.D
Date Inj'd : 5/17/2023 11:07 pm
Sample : L2326777-19,42,,

QMethod : P21MAALI211129A.M
Operator : Petro21a:sr
Instrument : Petro 21
Quant Date : 5/18/2023 8:22 am

Compound #13: 1-Chlorooctadecane

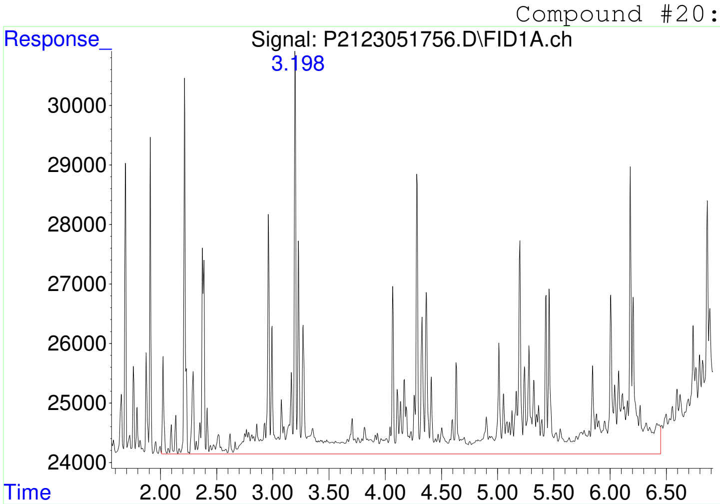



Original Peak Response = 928397
M4 = Poor automated baseline construction.

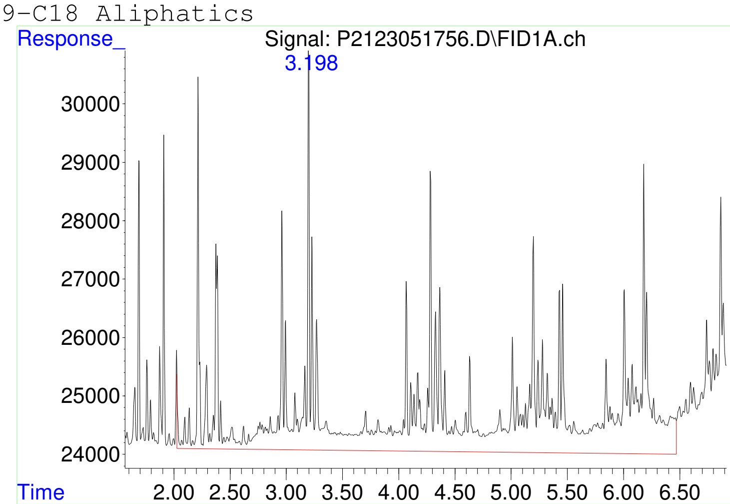



Manual Peak Response = 890326 M4

Compound #20: C9-C18 Aliphatics

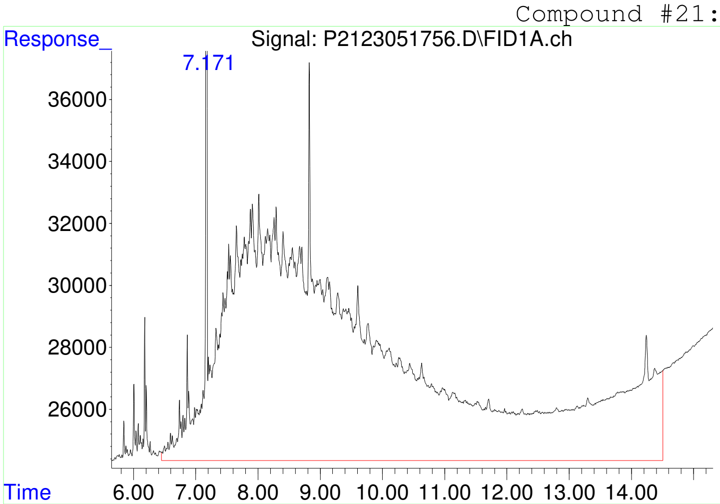



Original Peak Response = 1442137

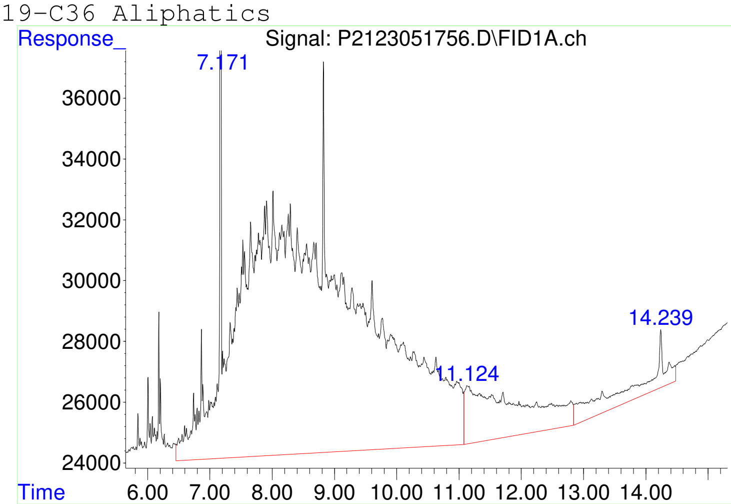



Manual Peak Response = 1691121 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 15592457




Manual Peak Response = 13349475 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n03.D
Signal(s) : FID2B.CH
Acq On : 25-May-23, 08:08:14
Operator : petro11b:sr
Sample : WG1780020-1,42,,
Misc : wg1780020 Day 2 ARO Blanks
ALS Vial : 52 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 12:08:24 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 25 06:42:40 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.331 | 1332964 | 17.271 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 86.36% | | |
| 5) s 2-Bromonaphthalene | 4.837 | 941203 | 17.678 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 88.39% | | |
| 10) S o-terphenyl | 6.344 | 1468257 | 16.727 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 83.64% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 11.278 | 2857362 | 33.023 mg/L | M5 |

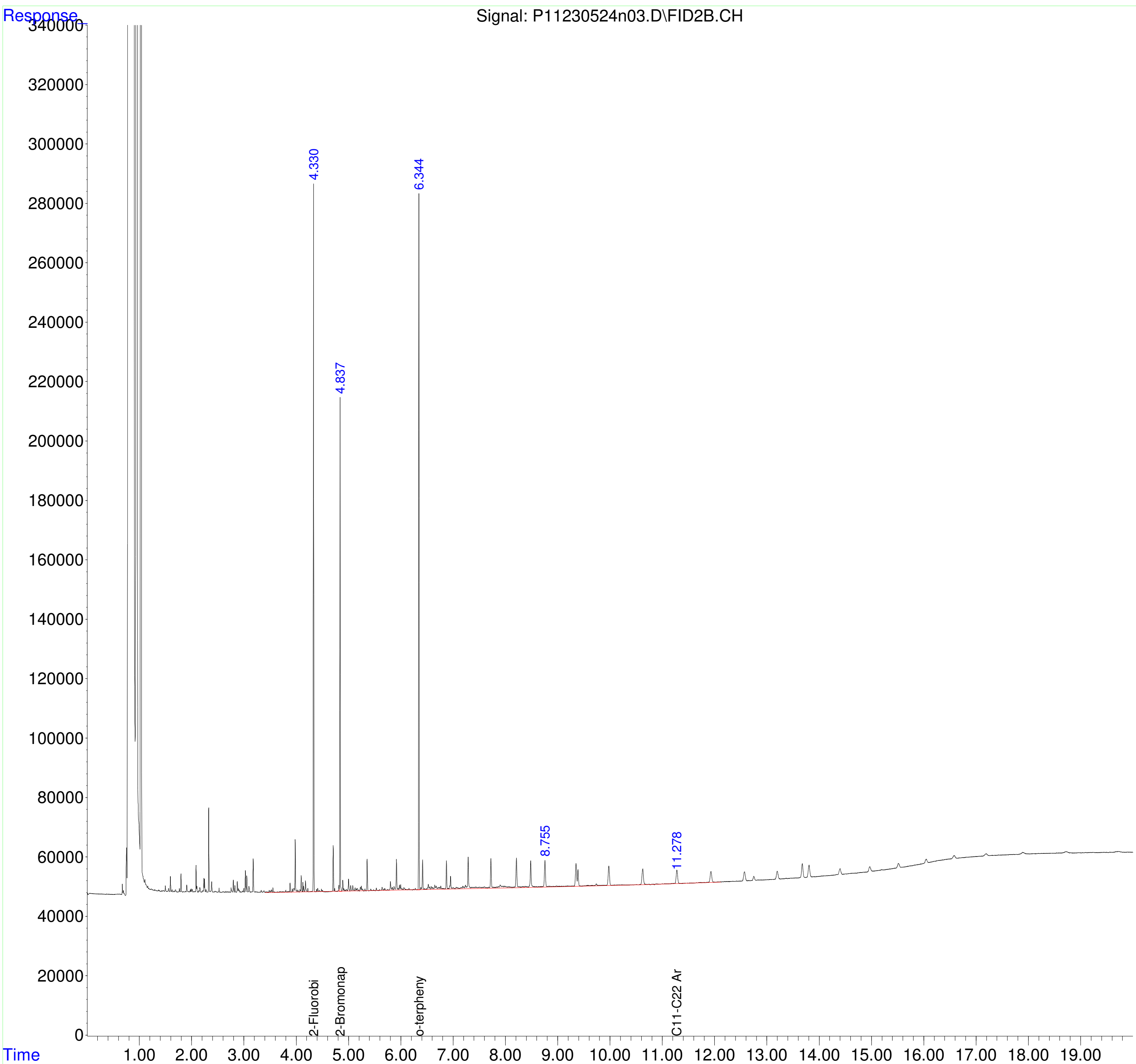
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n03.D
Signal(s) : FID2B.CH
Acq On : 25-May-23, 08:08:14
Operator : petro11b:sr
Sample : WG1780020-1,42,,
Misc : wg1780020 Day 2 ARO Blanks
ALS Vial : 52 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 12:08:24 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 25 06:42:40 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

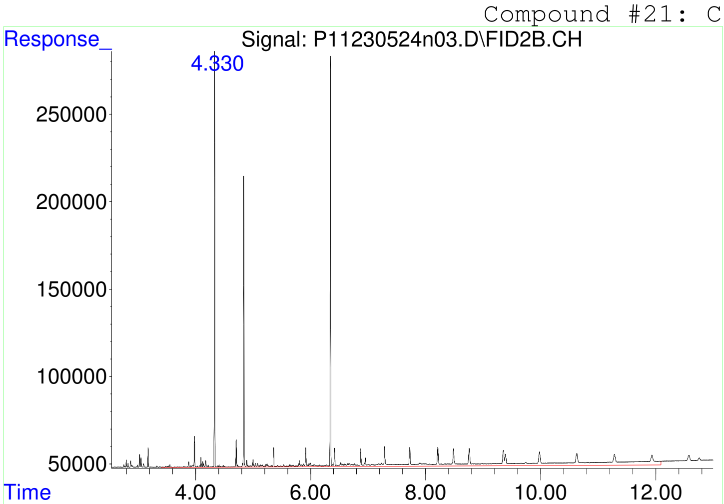
Volume Inj. :
Signal Phase :
Signal Info :

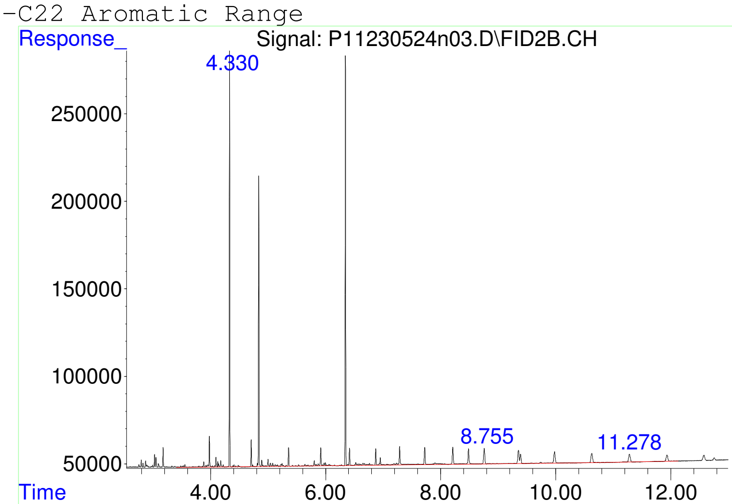


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro11\2023\230524N.SEC\ | QMethod | : P11MAARO220328.M |
| Data File | : P11230524n03.D | Operator | : petro11b:sr |
| Date Inj'd | : 5/25/2023 8:08 14 | Instrument | : Petro 11 |
| Sample | : WG1780020-1,42,, | Quant Date | : 5/25/2023 12:04 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 6878389

Manual Peak Response = 2857362 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n04.D
Signal(s) : FID1A.CH
Acq On : 25-May-23, 08:08:14
Operator : petro11a:sr
Sample : WG1780020-1,42,,
Misc : Day 2 MDL ALI Soil Blanks
ALS Vial : 2 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:54:35 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu May 25 06:30:58 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| **System Monitoring Compounds** | | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | |
| 13) S | 1-Chlorooctadecane | 6.998 | 920366 | 14.804 | mg/L | |
| Spiked Amount | 20.000 | | Recovery = | 74.02% | | |
| **Target Compounds** | | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | |
| 20) H | C9-C18 Aliphatics | 2.092f | 2338465 | 34.263 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 13.836f | 1401494 | 19.643 | mg/L | M5 |

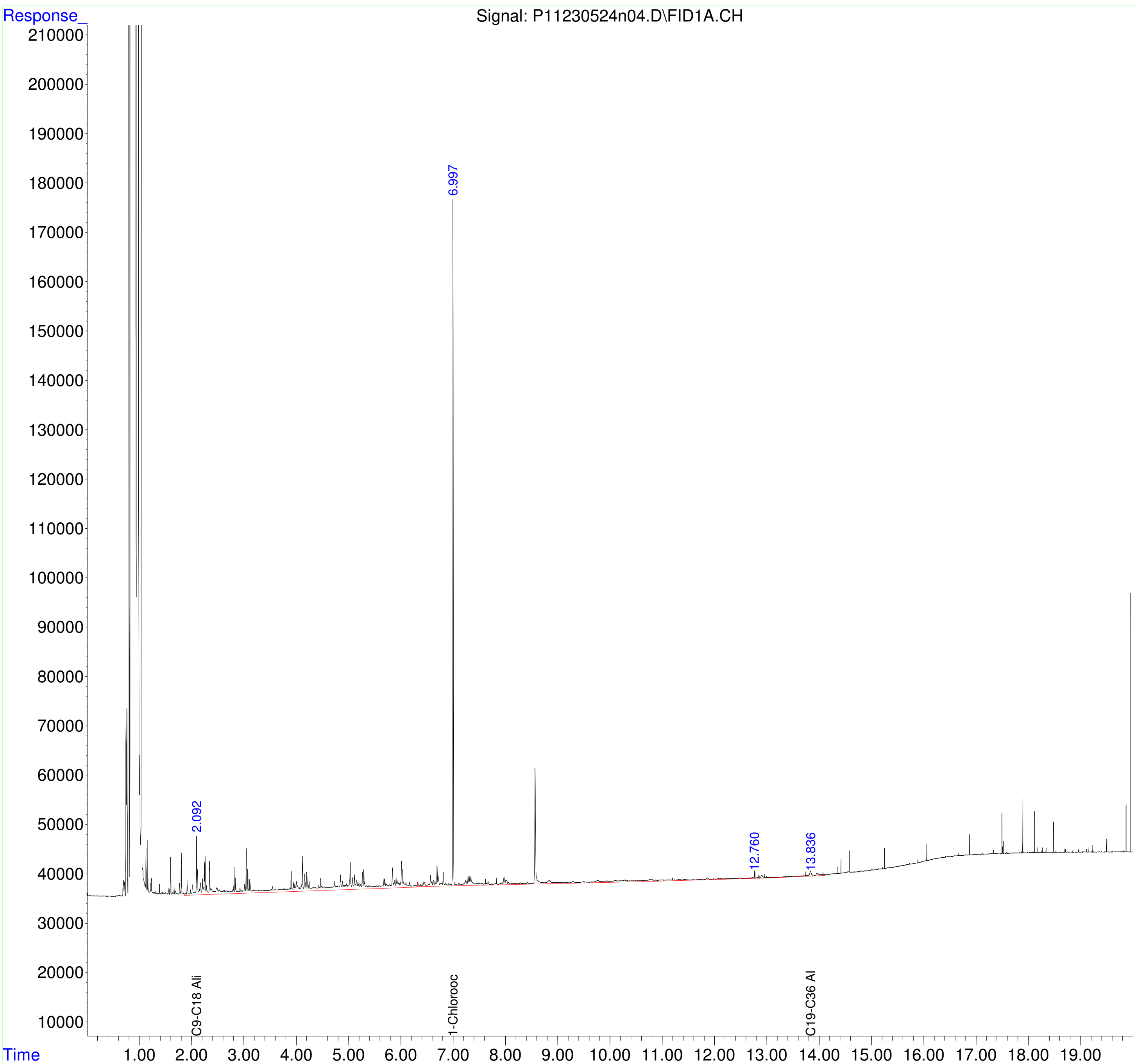
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n04.D
Signal(s) : FID1A.CH
Acq On    : 25-May-23, 08:08:14
Operator  : petro11a:sr
Sample    : WG1780020-1,42,,
Misc      : Day 2 MDL ALI Soil  Blanks
ALS Vial  : 2   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:54:35 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu May 25 06:30:58 2023
Response via : Initial Calibration
Integrator: ChemStation   6890 Scale Mode: Large solvent peaks clipped

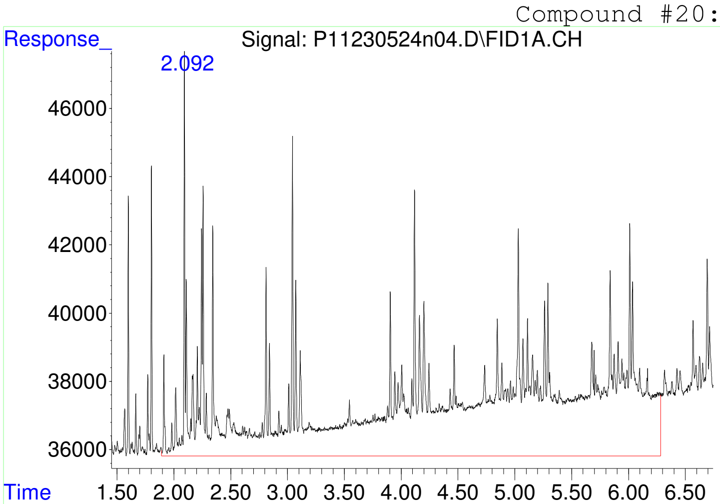
Volume Inj.  :
Signal Phase :
Signal Info  :

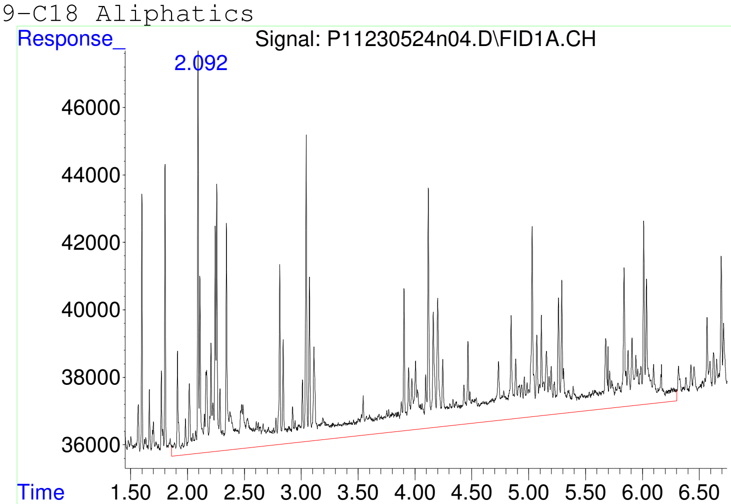


Manual Integration Report

```
Data Path    : I:\PETRO\Petro11\2023\230524n\        QMethod      : P11MAALI220328.M
Data File    : P11230524n04.D                         Operator     : petro11a:sr
Date Inj'd   : 5/25/2023  8:08 14                     Instrument   : Petro 11
Sample       : WG1780020-1,42,,                       Quant Date   : 5/25/2023 11:51 am
```

Compound #20: C9-C18 Aliphatics

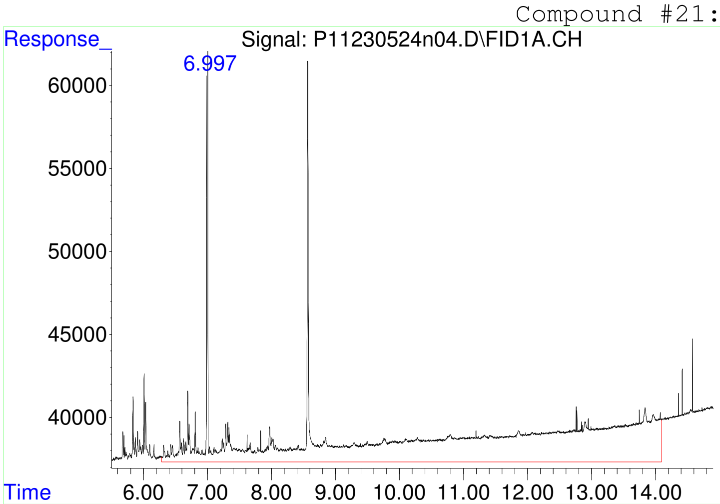


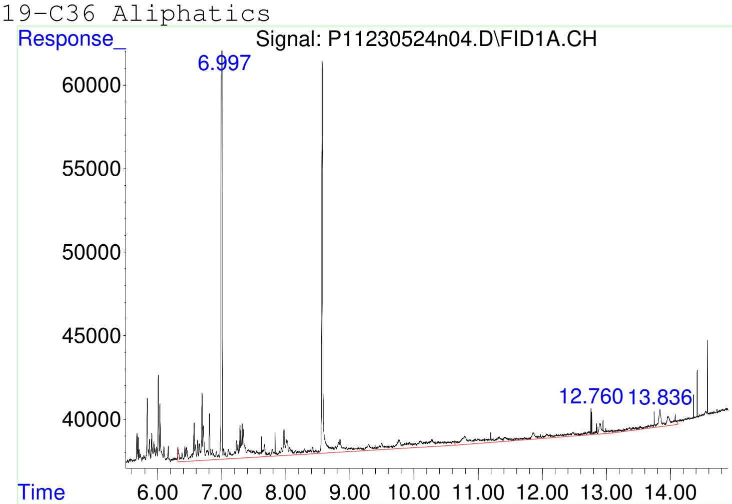




Original Peak Response = 4119818        Manual Peak Response = 2338465 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 6509322        Manual Peak Response = 1401494 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n05.D
Signal(s) : FID2B.CH
Acq On : 25-May-23, 08:33:29
Operator : petro11b:sr
Sample : WG1780020-2,42,,
Misc : wg1780020 Day 2 ARO Blanks
ALS Vial : 53 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 12:08:50 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.331 | 1262541 | 16.359 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 81.80% | | |
| 5) s 2-Bromonaphthalene | 4.838 | 893323 | 16.779 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 83.89% | | |
| 10) S o-terphenyl | 6.345 | 1338514 | 15.249 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 76.25% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 10.625 | 3187034 | 36.833 mg/L | M5 |

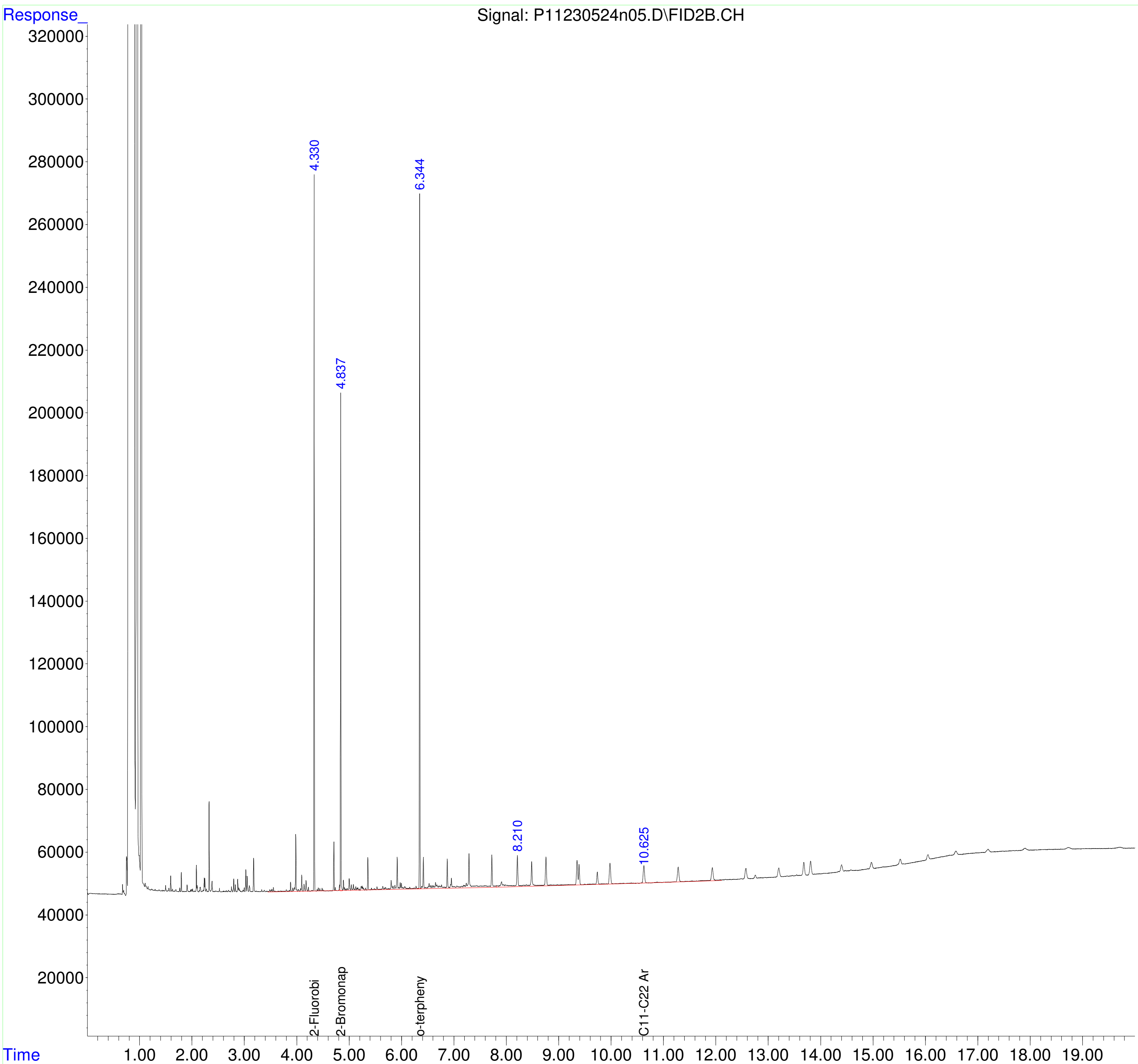
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n05.D
Signal(s) : FID2B.CH
Acq On    : 25-May-23, 08:33:29
Operator  : petro11b:sr
Sample    : WG1780020-2,42,,
Misc      : wg1780020 Day 2 ARO Blanks
ALS Vial  : 53   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 12:08:50 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation   6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :

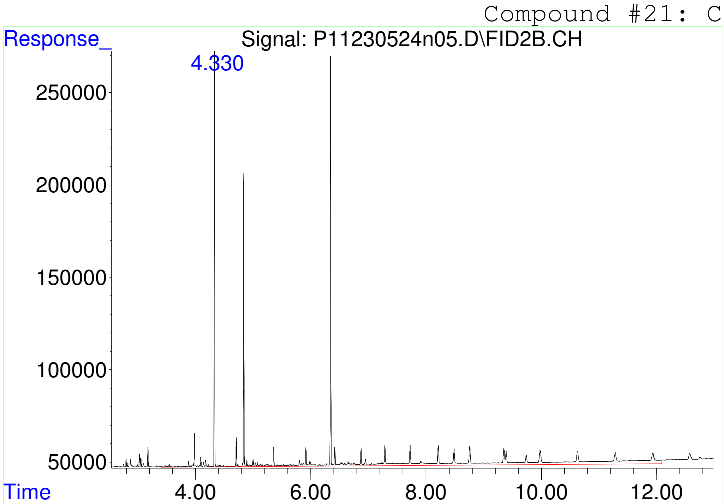


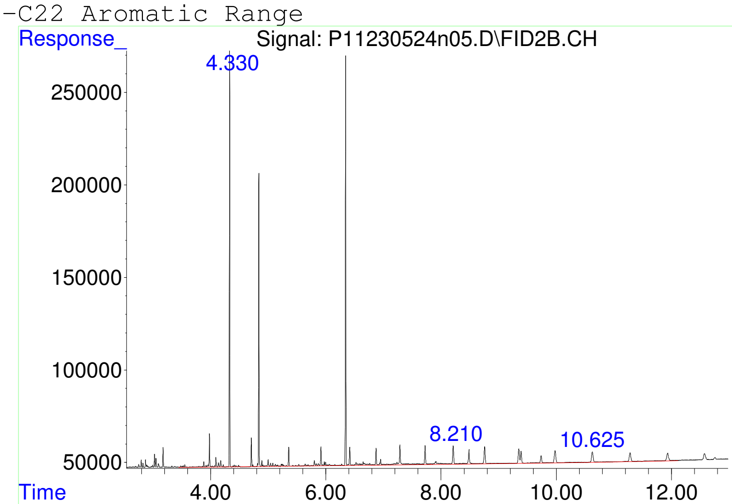
Manual Integration Report

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n05.D
Date Inj'd : 5/25/2023 8:33 29
Sample : WG1780020-2,42,,

QMethod : P11MAARO220328.M
Operator : petro11b:sr
Instrument : Petro 11
Quant Date : 5/25/2023 12:04 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 6988860

Manual Peak Response = 3187034 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n06.D
Signal(s) : FID1A.CH
Acq On    : 25-May-23, 08:33:30
Operator  : petro11a:sr
Sample    : WG1780020-2,42,,
Misc      : Day 2 MDL ALI Soil  Blanks
ALS Vial  : 3   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:55:00 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation   6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | System Monitoring Compounds | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | |
| 13) S | 1-Chlorooctadecane | 7.001 | 907752 | 14.601 | mg/L | |
| Spiked Amount | 20.000 | | Recovery = | 73.01% | | |
| | Target Compounds | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | |
| 20) H | C9-C18 Aliphatics | 2.532f | 2103502 | 30.820 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 7.000f | 1039012 | 14.562 | mg/L | M5 |

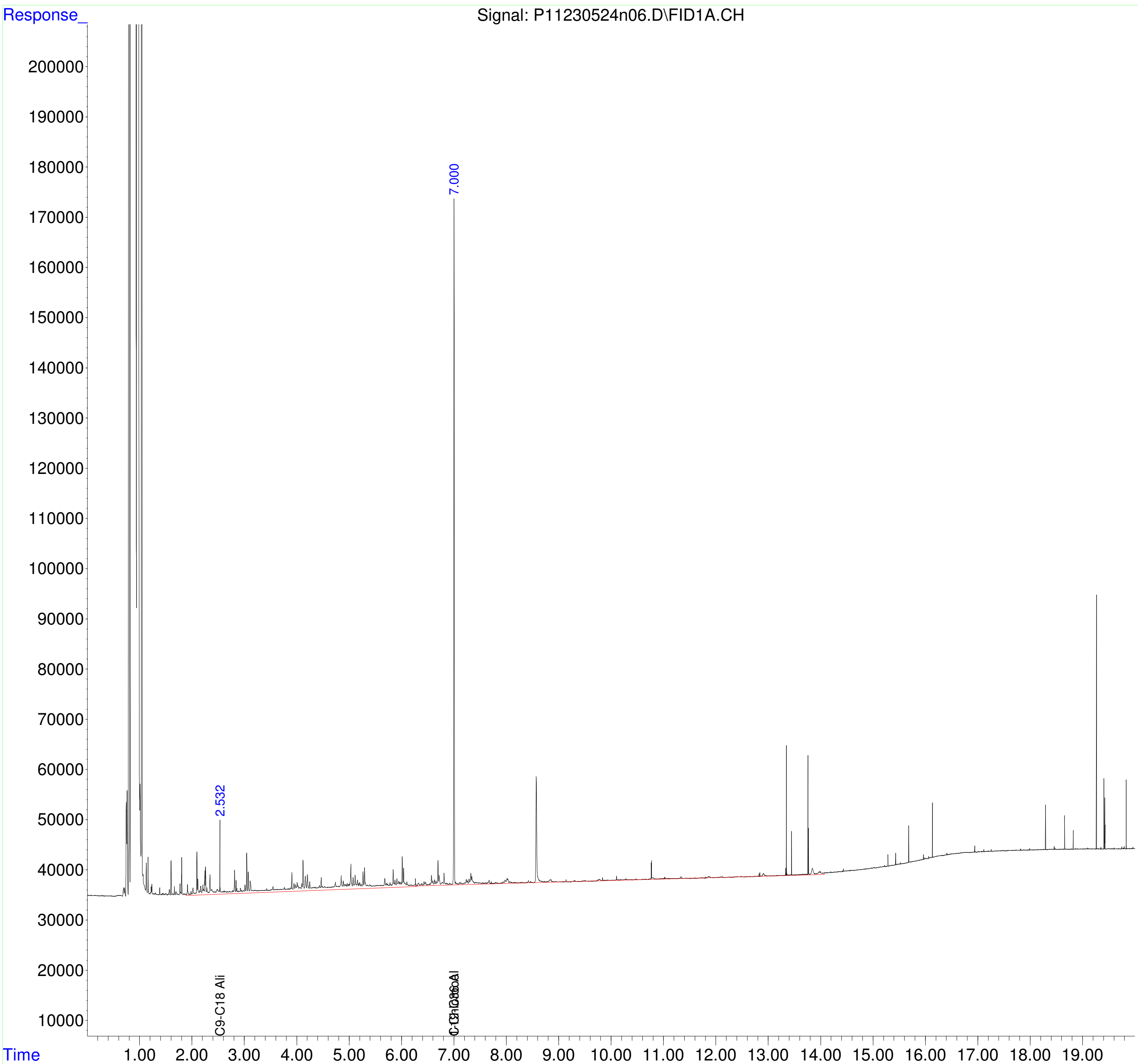
(f)=RT Delta > 1/2 Window                    (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n06.D
Signal(s) : FID1A.CH
Acq On    : 25-May-23, 08:33:30
Operator  : petro11a:sr
Sample    : WG1780020-2,42,,
Misc      : Day 2 MDL ALI Soil  Blanks
ALS Vial  : 3   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:55:00 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation   6890 Scale Mode: Large solvent peaks clipped

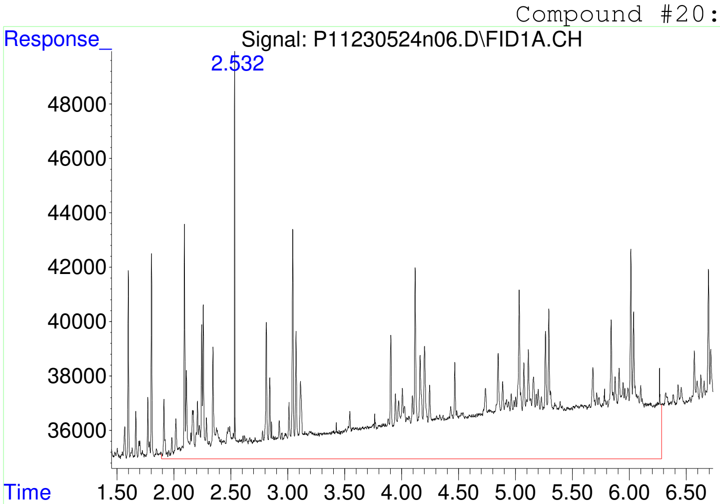
Volume Inj.  :
Signal Phase :
Signal Info  :

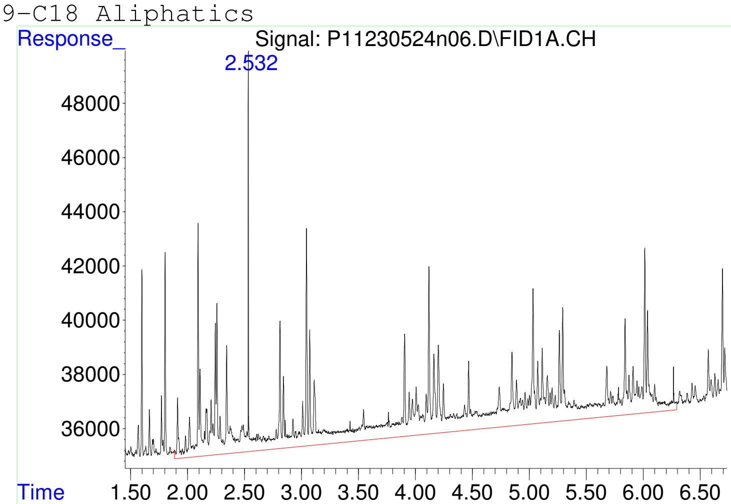


Manual Integration Report

```
Data Path    : I:\PETRO\Petro11\2023\230524n\        QMethod      : P11MAALI220328.M
Data File    : P11230524n06.D                        Operator     : petro11a:sr
Date Inj'd   : 5/25/2023  8:33 30                    Instrument   : Petro 11
Sample       : WG1780020-2,42,,                      Quant Date   : 5/25/2023 11:51 am
```

Compound #20: C9-C18 Aliphatics

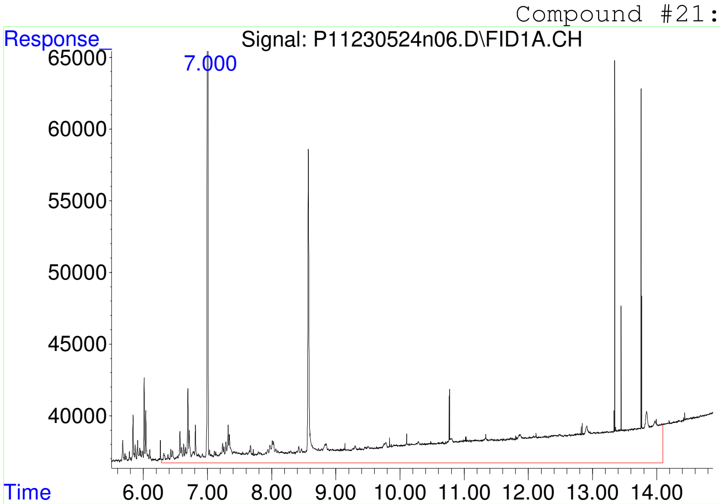


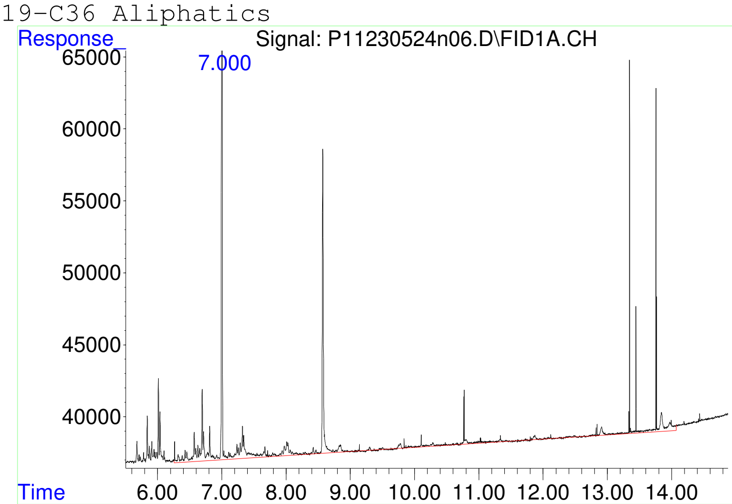




Original Peak Response = 4308848 Manual Peak Response = 2103502 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 6750122 Manual Peak Response = 1039012 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n07.D
Signal(s) : FID2B.CH
Acq On : 25-May-23, 08:58:39
Operator : petro11b:sr
Sample : WG1780020-3,42,,
Misc : wg1780020 Day 2 ARO Blanks
ALS Vial : 54 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 12:09:20 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| System Monitoring Compounds | | | | |
| 3) s 2-Fluorobiphenyl | 4.331 | 966404 | 12.522 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 62.61% | |
| 5) s 2-Bromonaphthalene | 4.837 | 680899 | 12.789 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 63.94% | |
| 10) S o-terphenyl | 6.345 | 1017323 | 11.590 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 57.95% | |
| Target Compounds | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 9.978 | 2244205 | 25.936 mg/L | M5 |

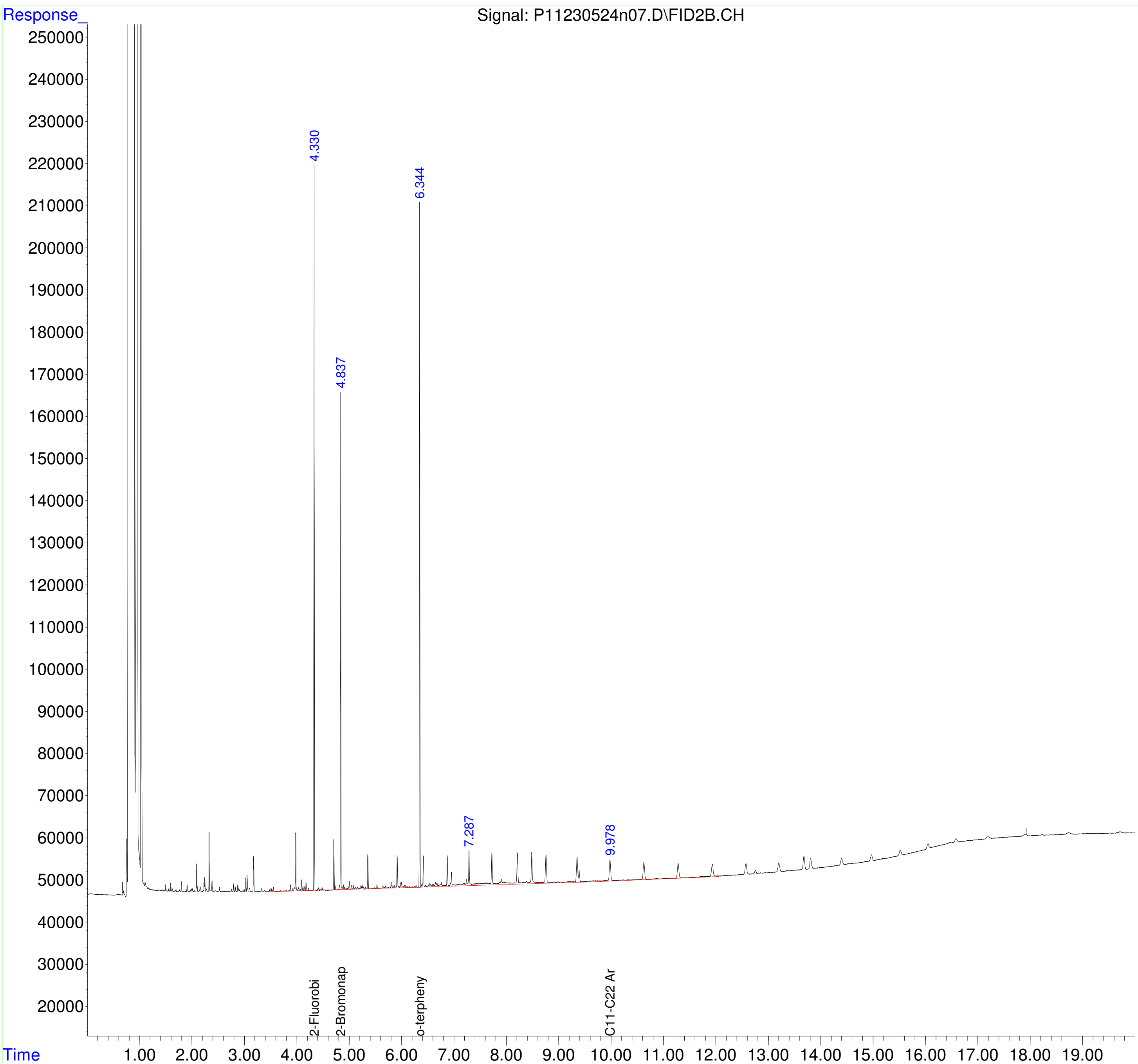
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n07.D
Signal(s) : FID2B.CH
Acq On    : 25-May-23, 08:58:39
Operator  : petro11b:sr
Sample    : WG1780020-3,42,,
Misc      : wg1780020 Day 2 ARO Blanks
ALS Vial  : 54   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 12:09:20 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation    6890 Scale Mode: Large solvent peaks clipped

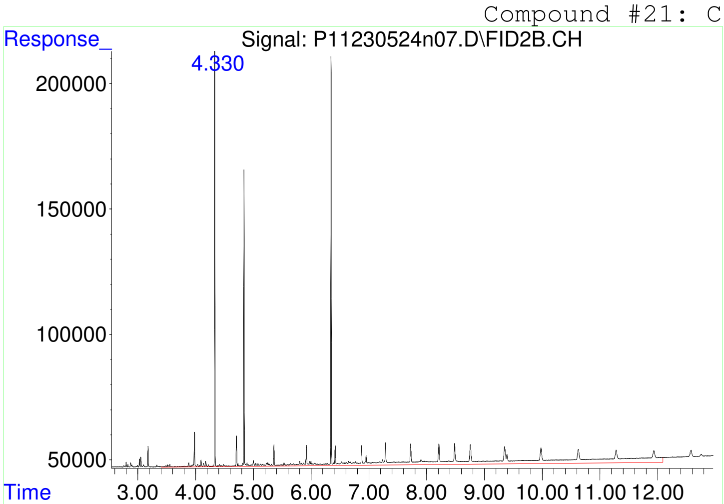
Volume Inj.  :
Signal Phase :
Signal Info  :

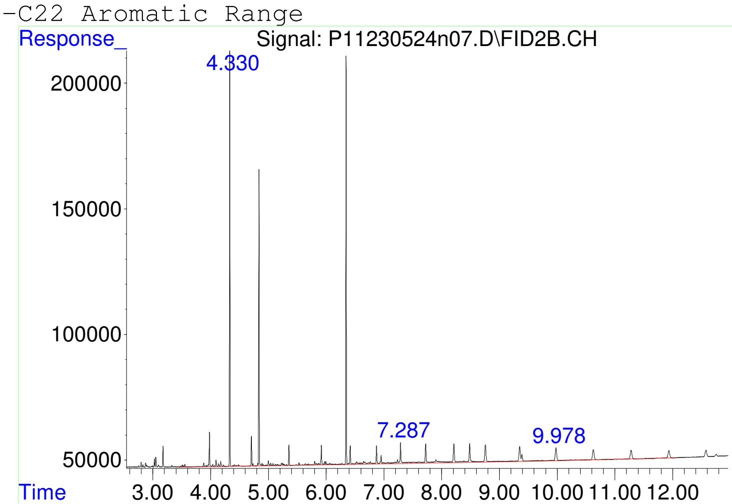


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro11\2023\230524N.SEC\ | QMethod | : P11MAARO220328.M |
| Data File | : P11230524n07.D | Operator | : petro11b:sr |
| Date Inj'd | : 5/25/2023 8:58 39 | Instrument | : Petro 11 |
| Sample | : WG1780020-3,42,, | Quant Date | : 5/25/2023 12:04 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 6254207 Manual Peak Response = 2244205 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n08.D
Signal(s) : FID1A.CH
Acq On : 25-May-23, 08:58:39
Operator : petro11a:sr
Sample : WG1780020-3,42,,
Misc : Day 2 MDL ALI Soil Blanks
ALS Vial : 4 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:55:27 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| **System Monitoring Compounds** | | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | |
| 13) S | 1-Chlorooctadecane | 7.001 | 861357 | 13.855 | mg/L | |
| Spiked Amount | 20.000 | | Recovery = | 69.27% | | |
| **Target Compounds** | | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | |
| 20) H | C9-C18 Aliphatics | 4.170 | 1789212 | 26.215 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 13.842f | 1319548 | 18.494 | mg/L | M5 |

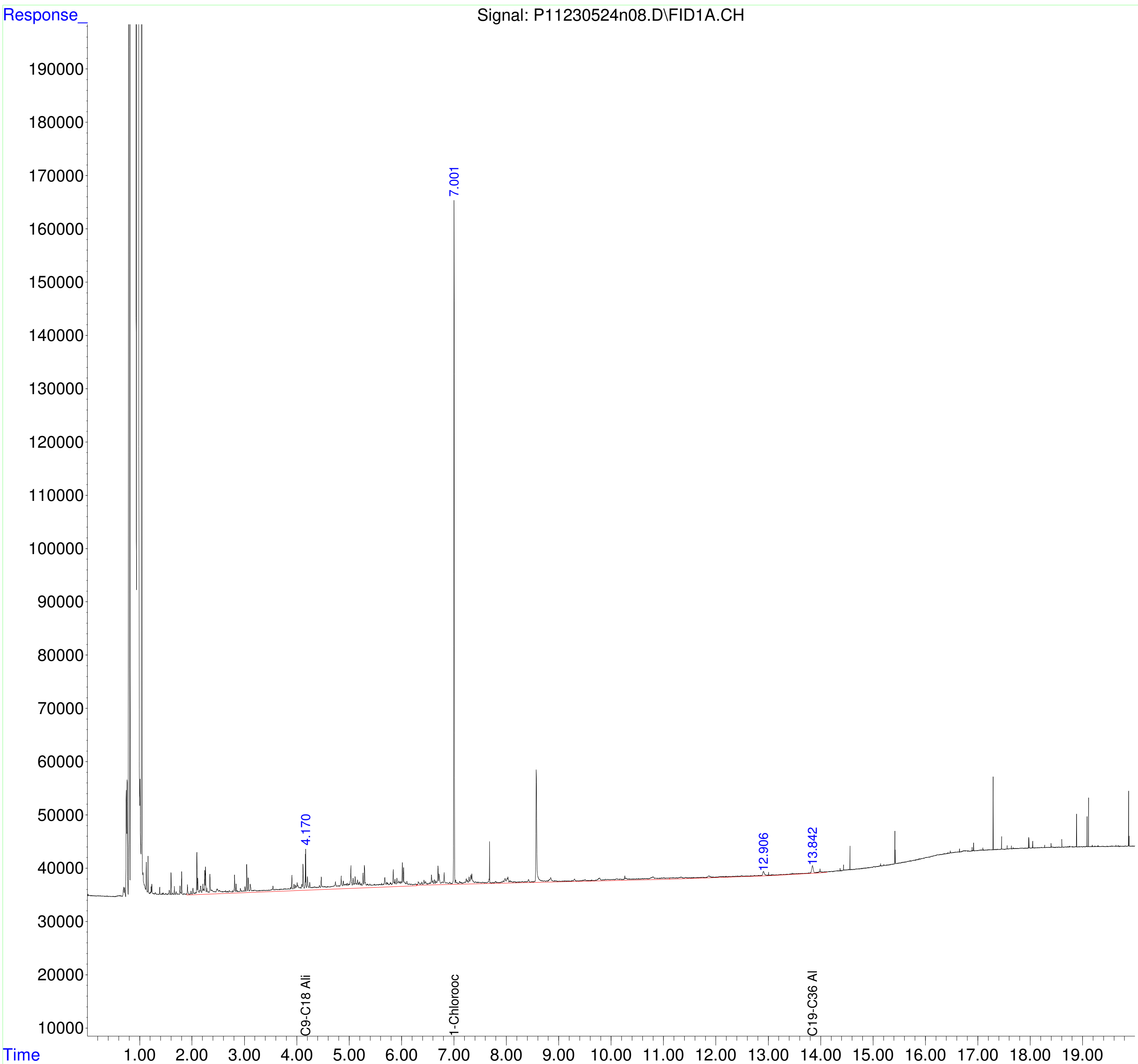
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n08.D
Signal(s) : FID1A.CH
Acq On    : 25-May-23, 08:58:39
Operator  : petro11a:sr
Sample    : WG1780020-3,42,,
Misc      : Day 2 MDL ALI Soil  Blanks
ALS Vial  : 4   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:55:27 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation   6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :

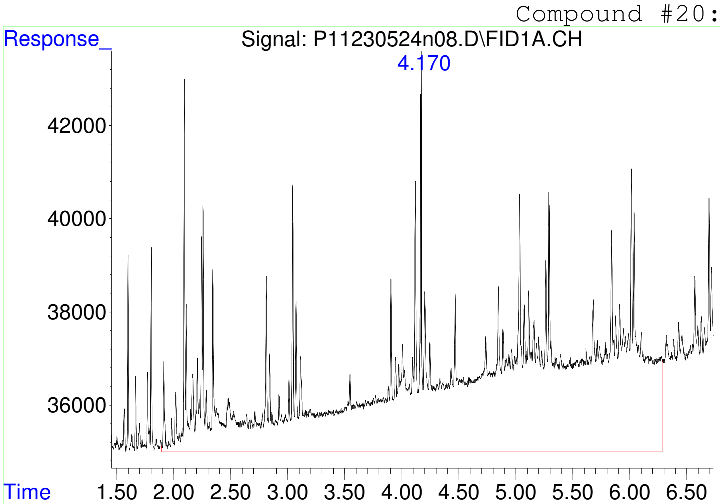


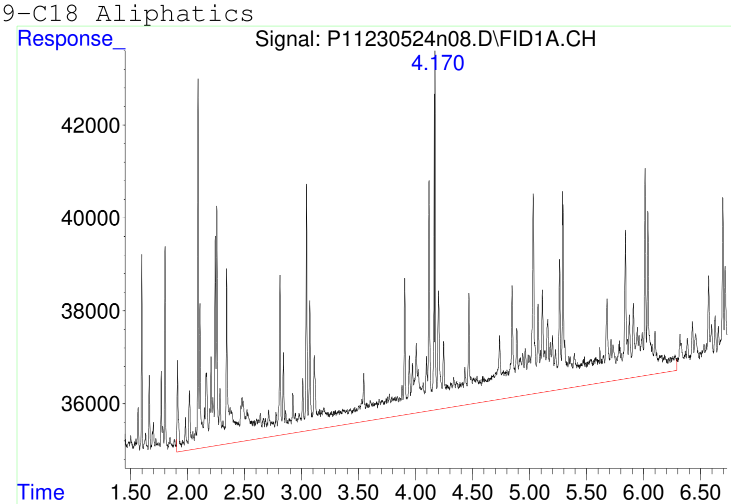
Manual Integration Report

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n08.D
Date Inj'd : 5/25/2023 8:58 39
Sample : WG1780020-3,42,,

QMethod : P11MAALI220328.M
Operator : petro11a:sr
Instrument : Petro 11
Quant Date : 5/25/2023 11:51 am

Compound #20: C9-C18 Aliphatics



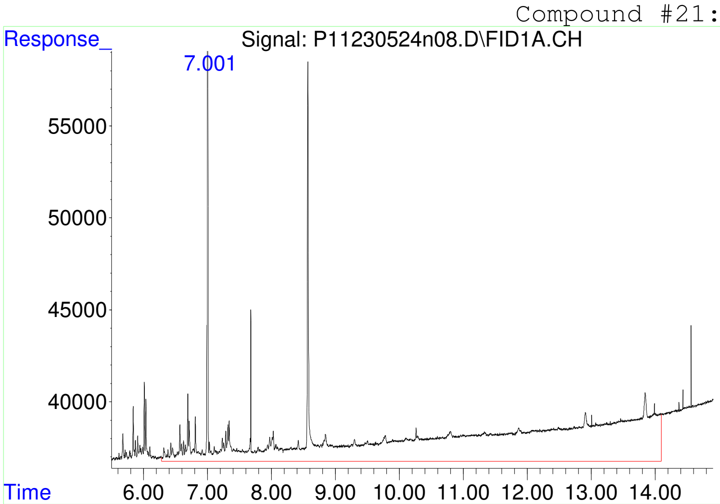



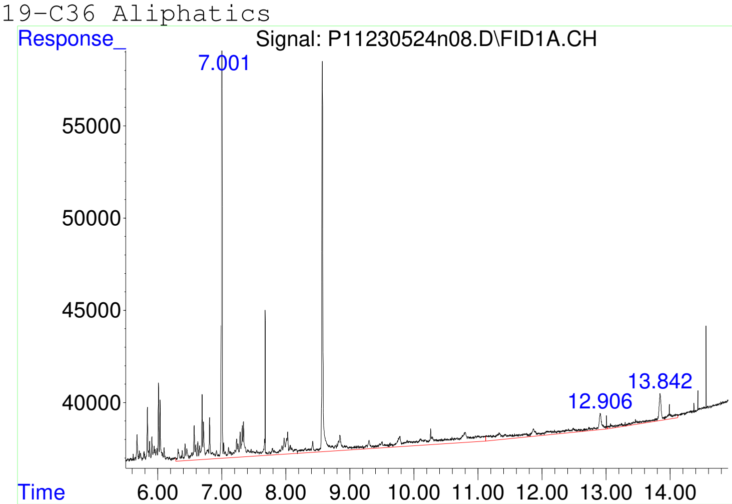

Original Peak Response = 4003247

Manual Peak Response = 1789212 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 6152298

Manual Peak Response = 1319548 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n09.D
Signal(s) : FID2B.CH
Acq On : 25-May-23, 09:24:04
Operator : petro11b:sr
Sample : L2326777-04,42,,
Misc : wg1780020 Day 2 ARO L2233244-18
ALS Vial : 55 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 12:11:06 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| System Monitoring Compounds | | | | |
| 3) s 2-Fluorobiphenyl | 4.331 | 1174315 | 15.216 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 76.08% | | |
| 5) s 2-Bromonaphthalene | 4.838 | 863435 | 16.217 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 81.08% | | |
| 10) S o-terphenyl | 6.345 | 1417293 | 16.146 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 80.73% | | |
| Target Compounds | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 6.345f | 29202908 | 337.499 mg/L | M5 |

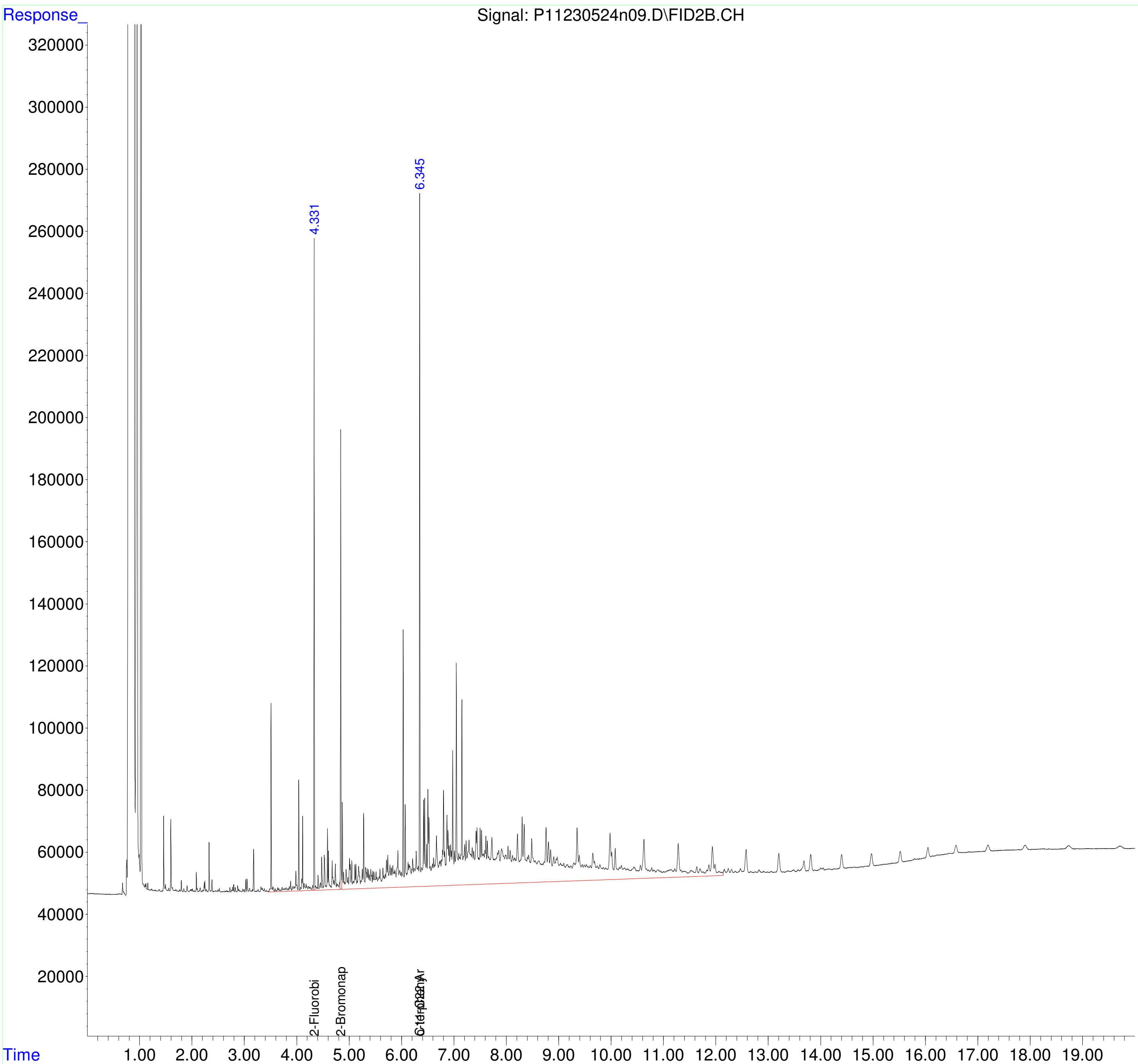
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n09.D
Signal(s) : FID2B.CH
Acq On    : 25-May-23, 09:24:04
Operator  : petro11b:sr
Sample    : L2326777-04,42,,
Misc      : wg1780020 Day 2 ARO L2233244-18
ALS Vial  : 55   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 12:11:06 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation   6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :

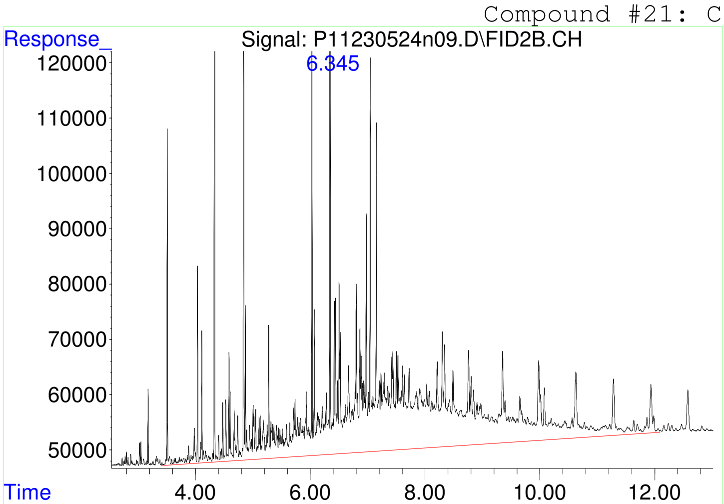


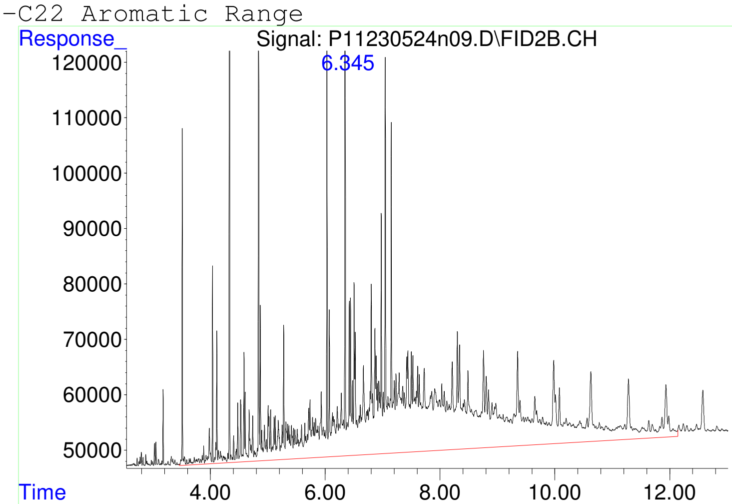
Manual Integration Report

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n09.D
Date Inj'd : 5/25/2023 9:24 04
Sample : L2326777-04,42,,

QMethod : P11MAARO220328.M
Operator : petro11b:sr
Instrument : Petro 11
Quant Date : 5/25/2023 12:04 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 27348494

Manual Peak Response = 29202908 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n10.D
Signal(s) : FID1A.CH
Acq On : 25-May-23, 09:24:04
Operator : petro11a:sr
Sample : L2326777-04,42,,
Misc : Day 2 MDL ALI Soil L2233244-18
ALS Vial : 5 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:57:06 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| # | | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|---|
| | | **System Monitoring Compounds** | | | | | |
| 3) | S | Naphthalene | 0.000 | 0 | N.D. | mg/L | |
| 5) | S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | |
| 6) | S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | |
| 8) | S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | |
| 13) | S | 1-Chlorooctadecane | 7.001 | 743593 | 11.961 | mg/L | M4 |
| Spiked Amount | | 20.000 | | Recovery = | 59.81% | | |
| | | **Target Compounds** | | | | | |
| 1) | | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | |
| 2) | | Decane (C10) | 0.000 | 0 | N.D. | mg/L | |
| 4) | | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | |
| 7) | | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | |
| 9) | | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | |
| 10) | | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | |
| 11) | | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | |
| 12) | | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | |
| 14) | | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | |
| 15) | | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | |
| 16) | | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | |
| 17) | | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | |
| 18) | | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | |
| 19) | | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | |
| 20) | H | C9-C18 Aliphatics | 5.688 | 14214120 | 208.264 | mg/L | M5 |
| 21) | H | C19-C36 Aliphatics | 11.871 | 38531403 | 540.036 | mg/L | M5 |

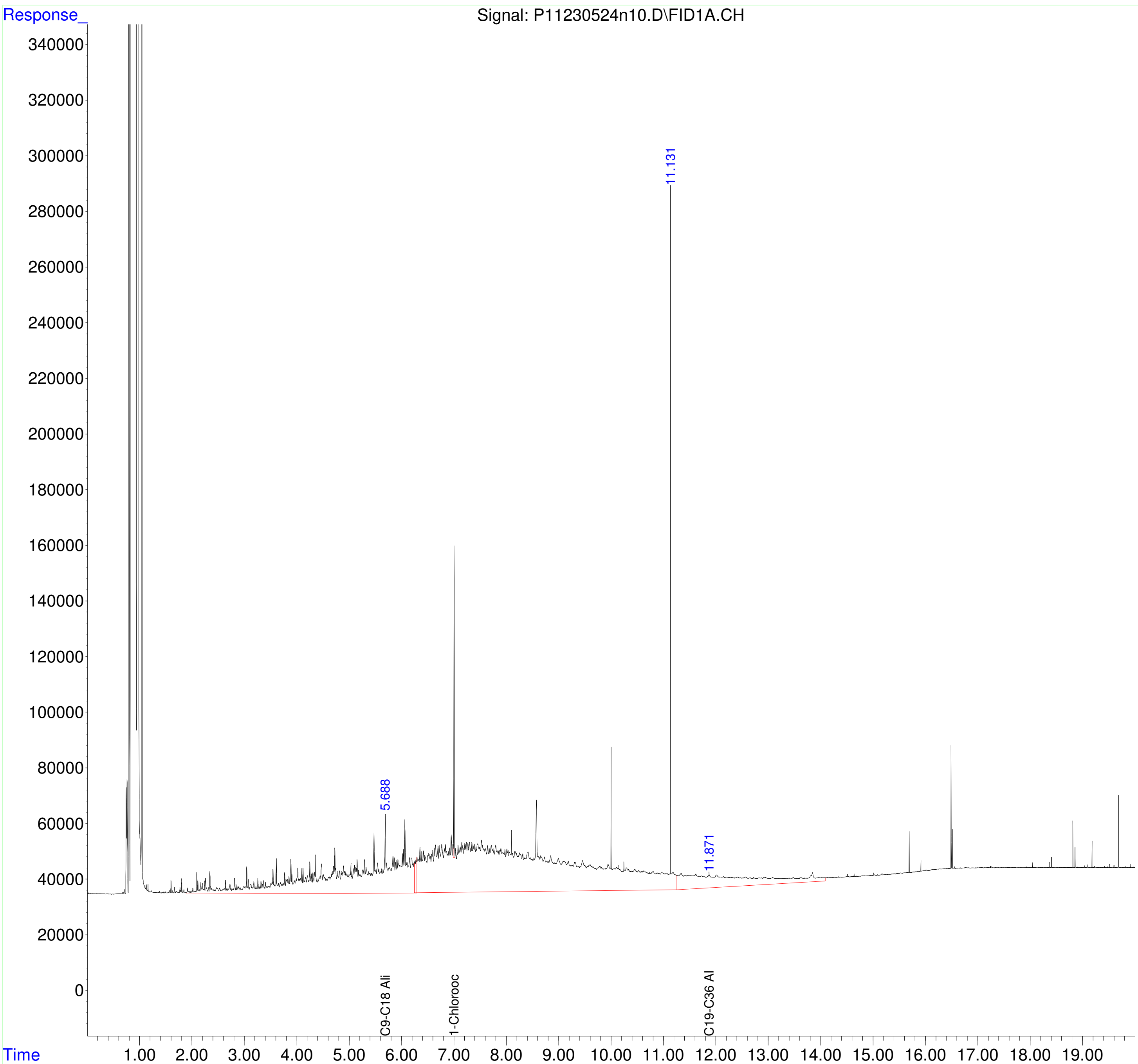
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n10.D
Signal(s) : FID1A.CH
Acq On : 25-May-23, 09:24:04
Operator : petro11a:sr
Sample : L2326777-04,42,,
Misc : Day 2 MDL ALI Soil L2233244-18
ALS Vial : 5 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:57:06 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

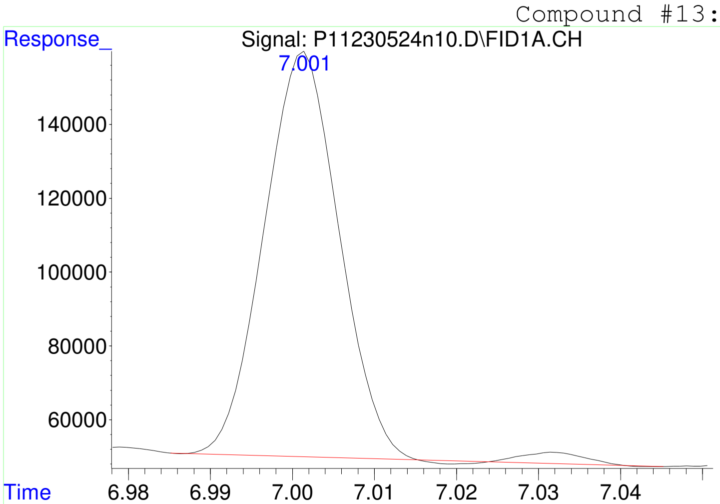
Volume Inj. :
Signal Phase :
Signal Info :

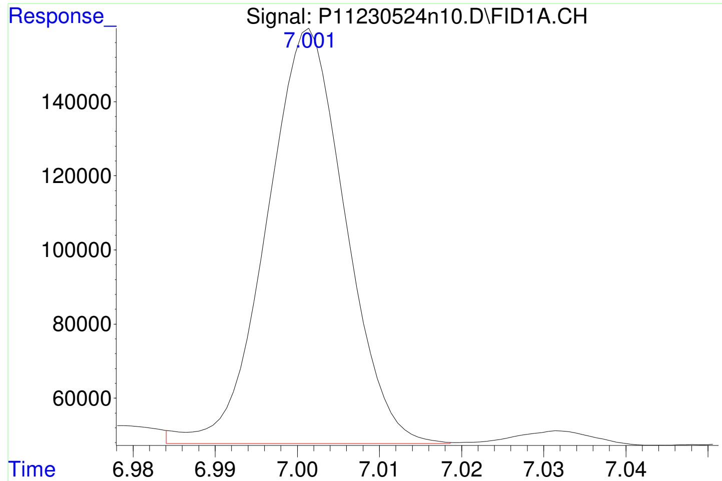


Manual Integration Report

```
Data Path   : I:\PETRO\Petro11\2023\230524n\      QMethod     : P11MAALI220328.M
Data File   : P11230524n10.D                      Operator    : petro11a:sr
Date Inj'd  : 5/25/2023  9:24 04                  Instrument  : Petro 11
Sample      : L2326777-04,42,,                    Quant Date  : 5/25/2023 11:51 am
```

Compound #13: 1-Chlorooctadecane

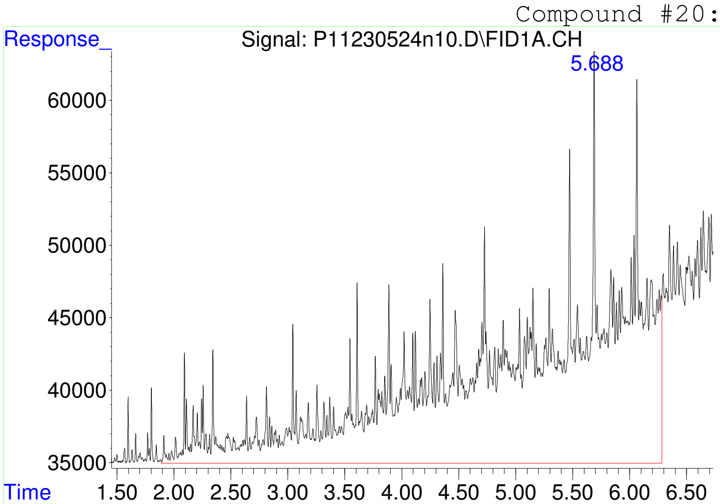


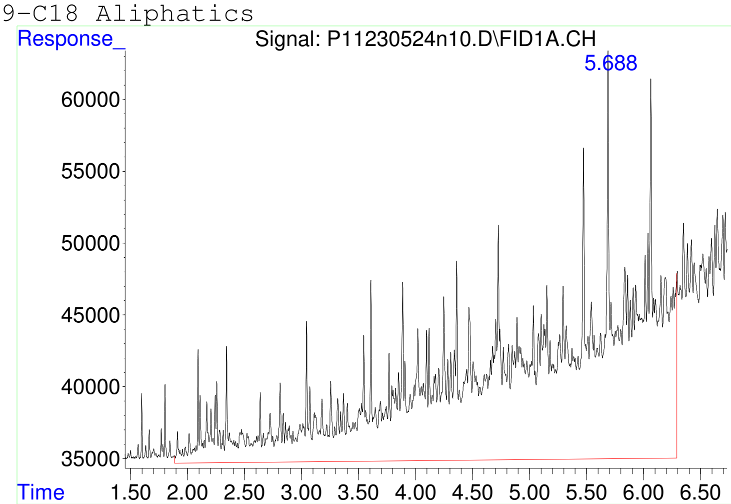




Original Peak Response = 713309      Manual Peak Response = 743593 M4

M4 = Poor automated baseline construction.

Compound #20: C9-C18 Aliphatics

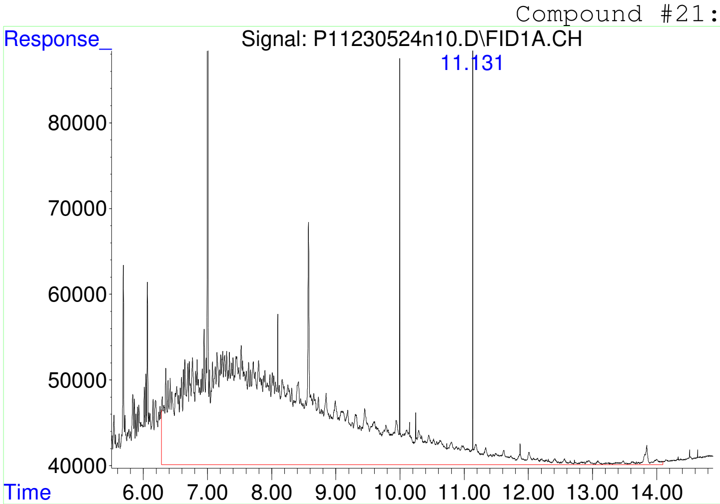


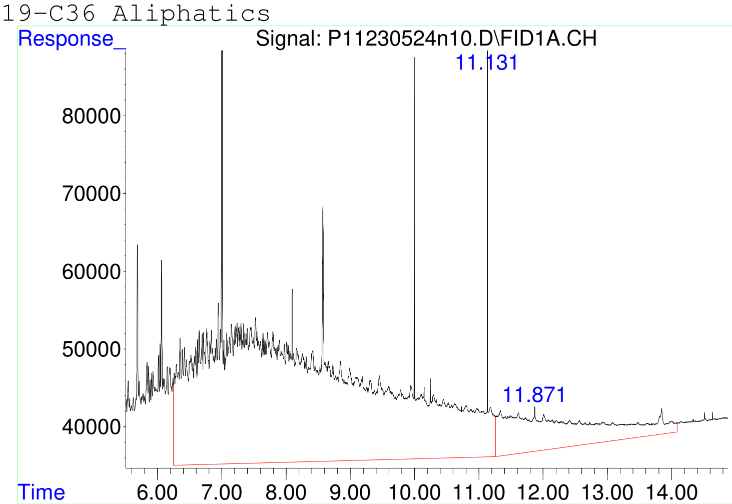




Original Peak Response = 13845485      Manual Peak Response = 14214120 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 20796406      Manual Peak Response = 38531403 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n11.D
Signal(s) : FID2B.CH
Acq On : 25-May-23, 09:49:17
Operator : petro11b:sr
Sample : L2326777-05,42,,
Misc : wg1780020 Day 2 ARO L2233244-18
ALS Vial : 56 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 12:14:59 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

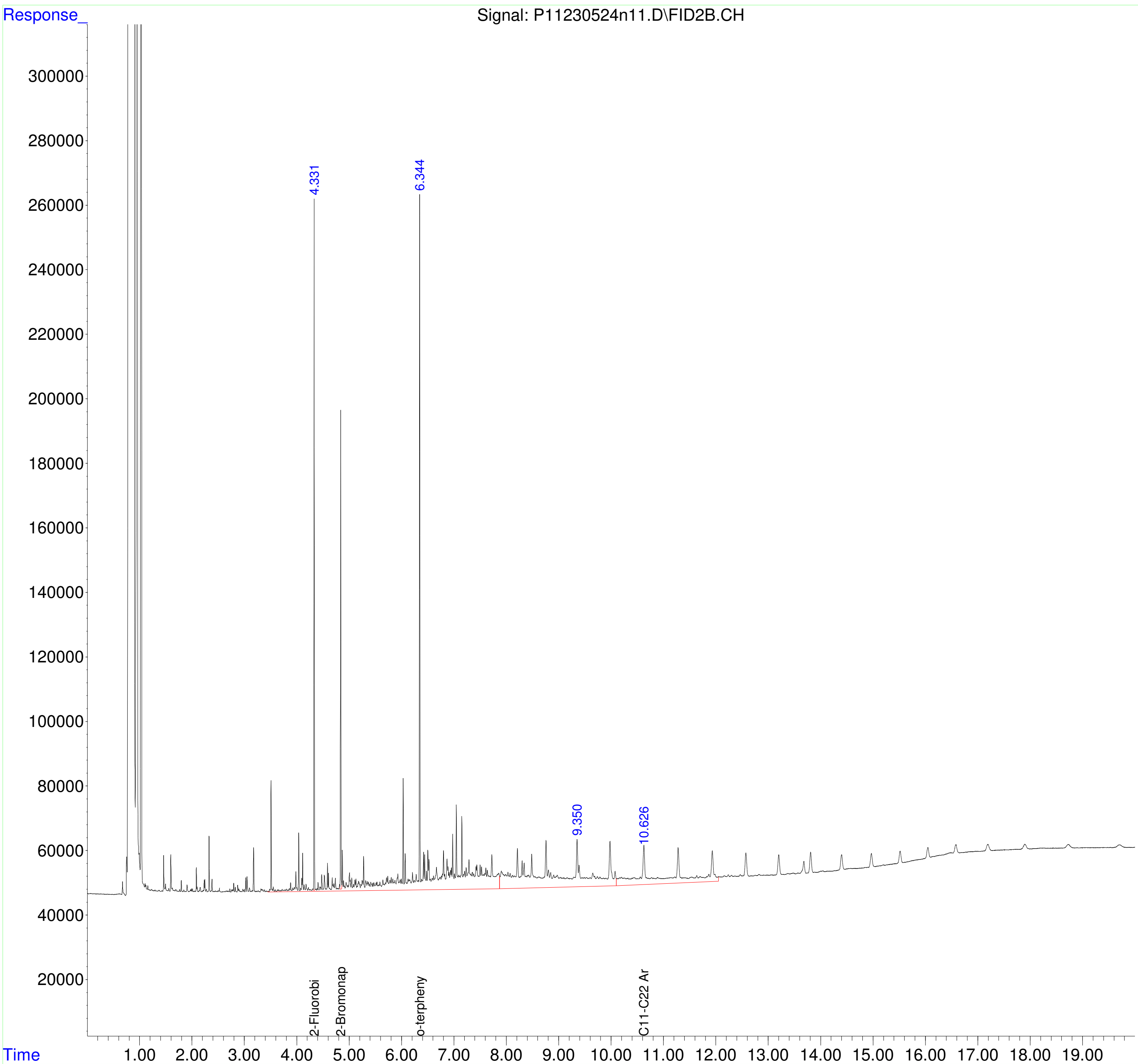
Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| System Monitoring Compounds | | | | |
| 3) s 2-Fluorobiphenyl | 4.331 | 1179700 | 15.285 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 76.42% | |
| 5) s 2-Bromonaphthalene | 4.838 | 842177 | 15.818 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 79.09% | |
| 10) S o-terphenyl | 6.345 | 1309326 | 14.916 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 74.58% | |
| Target Compounds | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 10.626 | 15911689 | 183.892 mg/L | M5 |

(f)=RT Delta > 1/2 Window (m)=manual int.

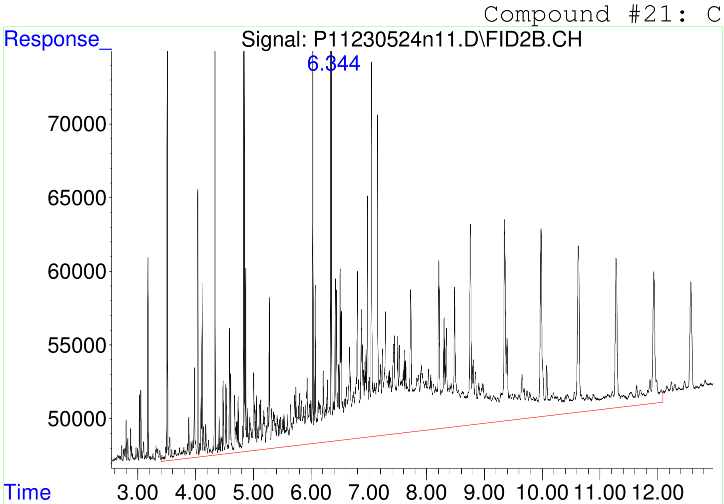
```
Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n11.D
Signal(s) : FID2B.CH
Acq On    : 25-May-23, 09:49:17
Operator  : petro11b:sr
Sample    : L2326777-05,42,,
Misc      : wg1780020 Day 2 ARO L2233244-18
ALS Vial  : 56   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 12:14:59 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation    6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :
```

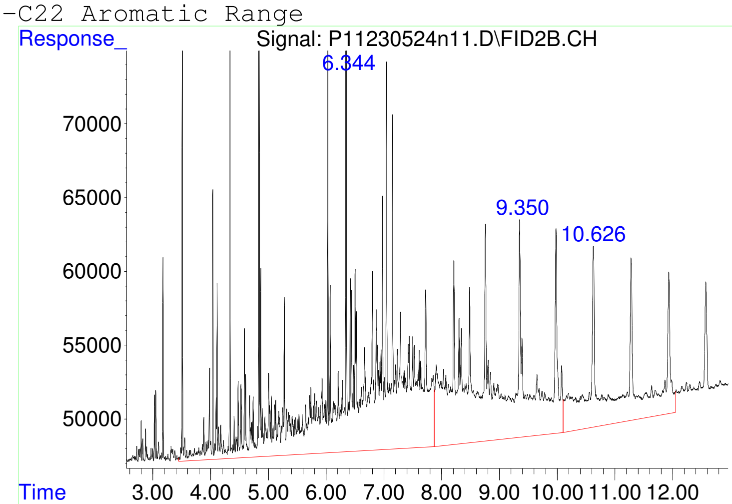


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro11\2023\230524N.SEC\ | QMethod | : P11MAARO220328.M |
| Data File | : P11230524n11.D | Operator | : petro11b:sr |
| Date Inj'd | : 5/25/2023 9:49 17 | Instrument | : Petro 11 |
| Sample | : L2326777-05,42,, | Quant Date | : 5/25/2023 12:04 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 12148459 Manual Peak Response = 15911689 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n12.D
Signal(s) : FID1A.CH
Acq On : 25-May-23, 09:49:17
Operator : petro11a:sr
Sample : L2326777-05,42,,
Misc : Day 2 MDL ALI Soil L2233244-18
ALS Vial : 6 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:57:39 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | | |
| 3) | S | Naphthalene | 0.000 | 0 | N.D. | mg/L | |
| 5) | S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | |
| 6) | S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | |
| 8) | S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | |
| 13) | S | 1-Chlorooctadecane | 7.001 | 929094 | 14.945 | mg/L | M4 |
| Spiked Amount | | 20.000 | | Recovery = | 74.72% | | |
| Target Compounds | | | | | | | |
| 1) | | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | |
| 2) | | Decane (C10) | 0.000 | 0 | N.D. | mg/L | |
| 4) | | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | |
| 7) | | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | |
| 9) | | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | |
| 10) | | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | |
| 11) | | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | |
| 12) | | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | |
| 14) | | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | |
| 15) | | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | |
| 16) | | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | |
| 17) | | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | |
| 18) | | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | |
| 19) | | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | |
| 20) | H | C9-C18 Aliphatics | 5.687 | 8438831 | 123.645 | mg/L | M5 |
| 21) | H | C19-C36 Aliphatics | 11.419 | 18278776 | 256.186 | mg/L | M5 |

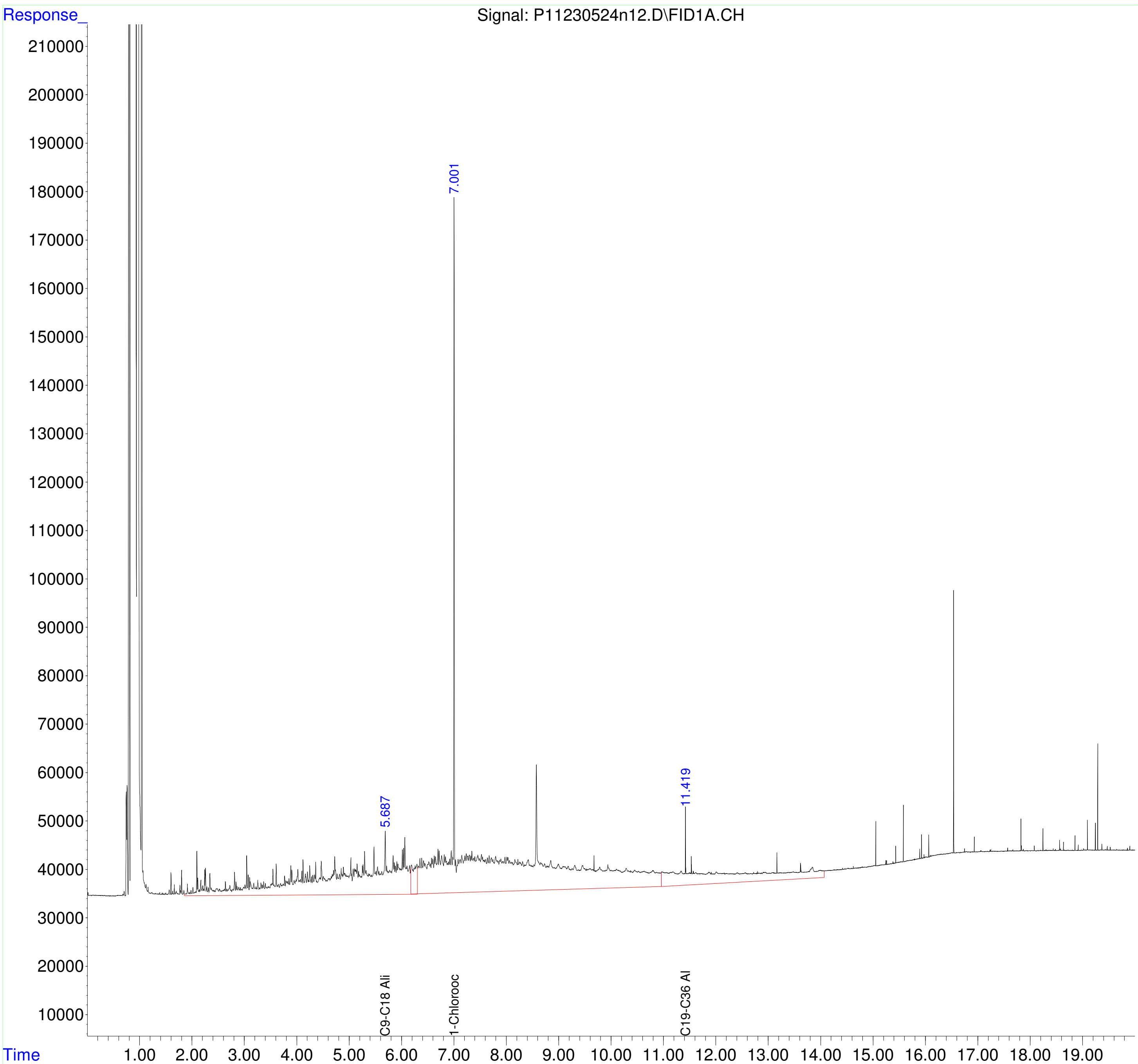
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n12.D
Signal(s) : FID1A.CH
Acq On    : 25-May-23, 09:49:17
Operator  : petro11a:sr
Sample    : L2326777-05,42,,
Misc      : Day 2 MDL ALI Soil  L2233244-18
ALS Vial  : 6   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:57:39 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation   6890 Scale Mode: Large solvent peaks clipped

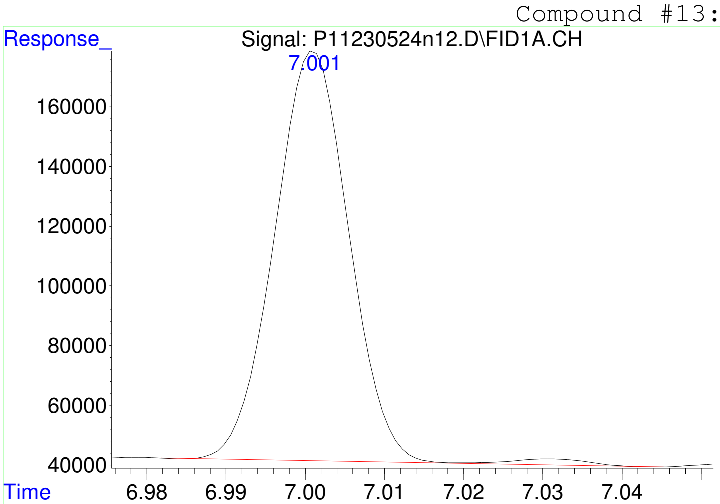
Volume Inj.  :
Signal Phase :
Signal Info  :



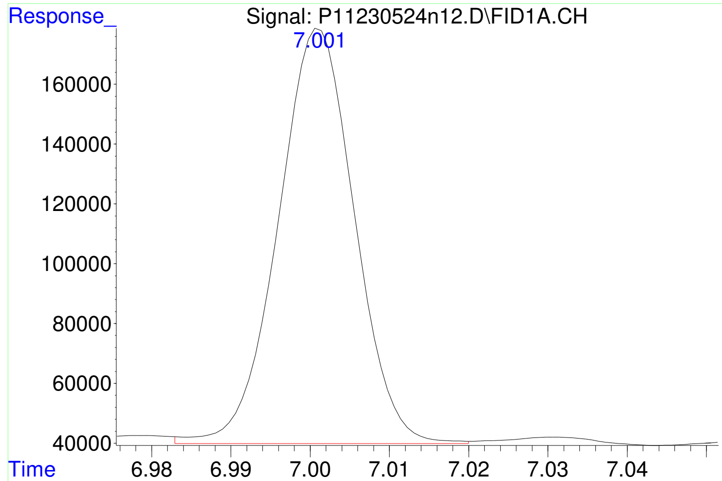
Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro11\2023\230524n\ | QMethod | : P11MAALI220328.M |
| Data File | : P11230524n12.D | Operator | : petro11a:sr |
| Date Inj'd | : 5/25/2023 9:49 17 | Instrument | : Petro 11 |
| Sample | : L2326777-05,42,, | Quant Date | : 5/25/2023 11:51 am |

Compound #13: 1-Chlorooctadecane

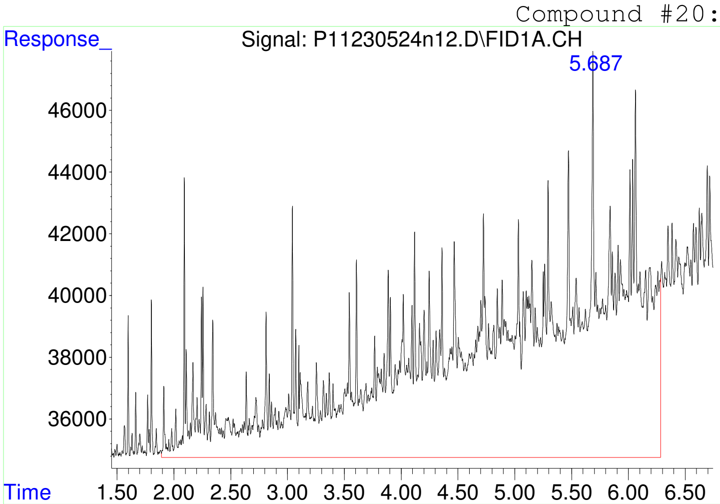



Original Peak Response = 909046
M4 = Poor automated baseline construction.

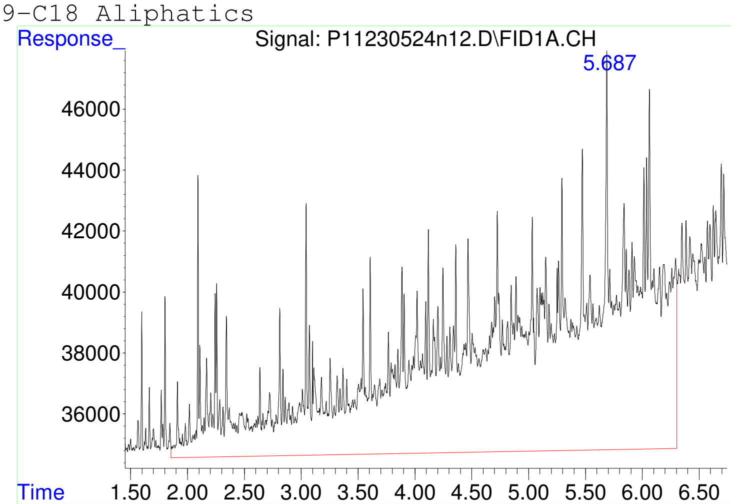



Manual Peak Response = 929094 M4

Compound #20: C9-C18 Aliphatics

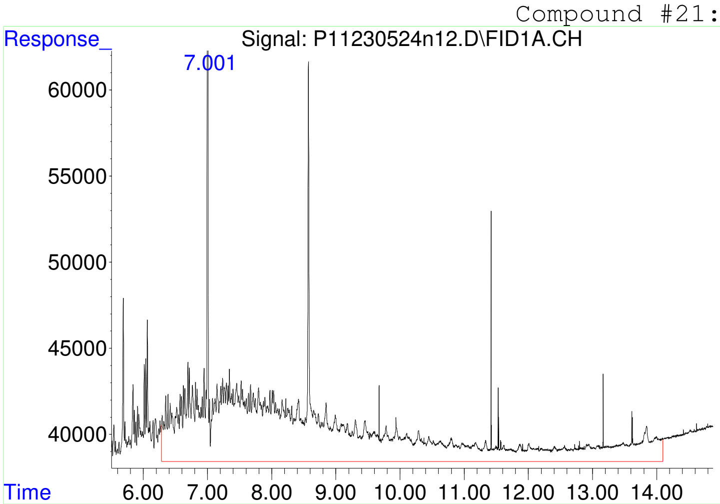



Original Peak Response = 8263122

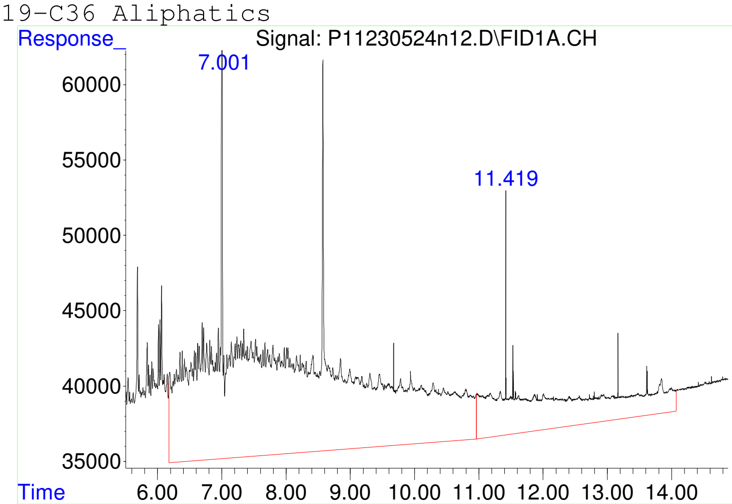



Manual Peak Response = 8438831 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 8410302




Manual Peak Response = 18278776 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n13.D
Signal(s) : FID2B.CH
Acq On : 25-May-23, 10:14:28
Operator : petro11b:sr
Sample : L2326777-06,42,,
Misc : wg1780020 Day 2 ARO L2233244-18
ALS Vial : 57 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 12:15:23 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.331 | 1406183 | 18.220 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 91.10% | | |
| 5) s 2-Bromonaphthalene | 4.838 | 996471 | 18.716 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 93.58% | | |
| 10) S o-terphenyl | 6.345 | 1536103 | 17.500 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 87.50% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 4.330f | 9032378 | 104.387 mg/L | M5 |

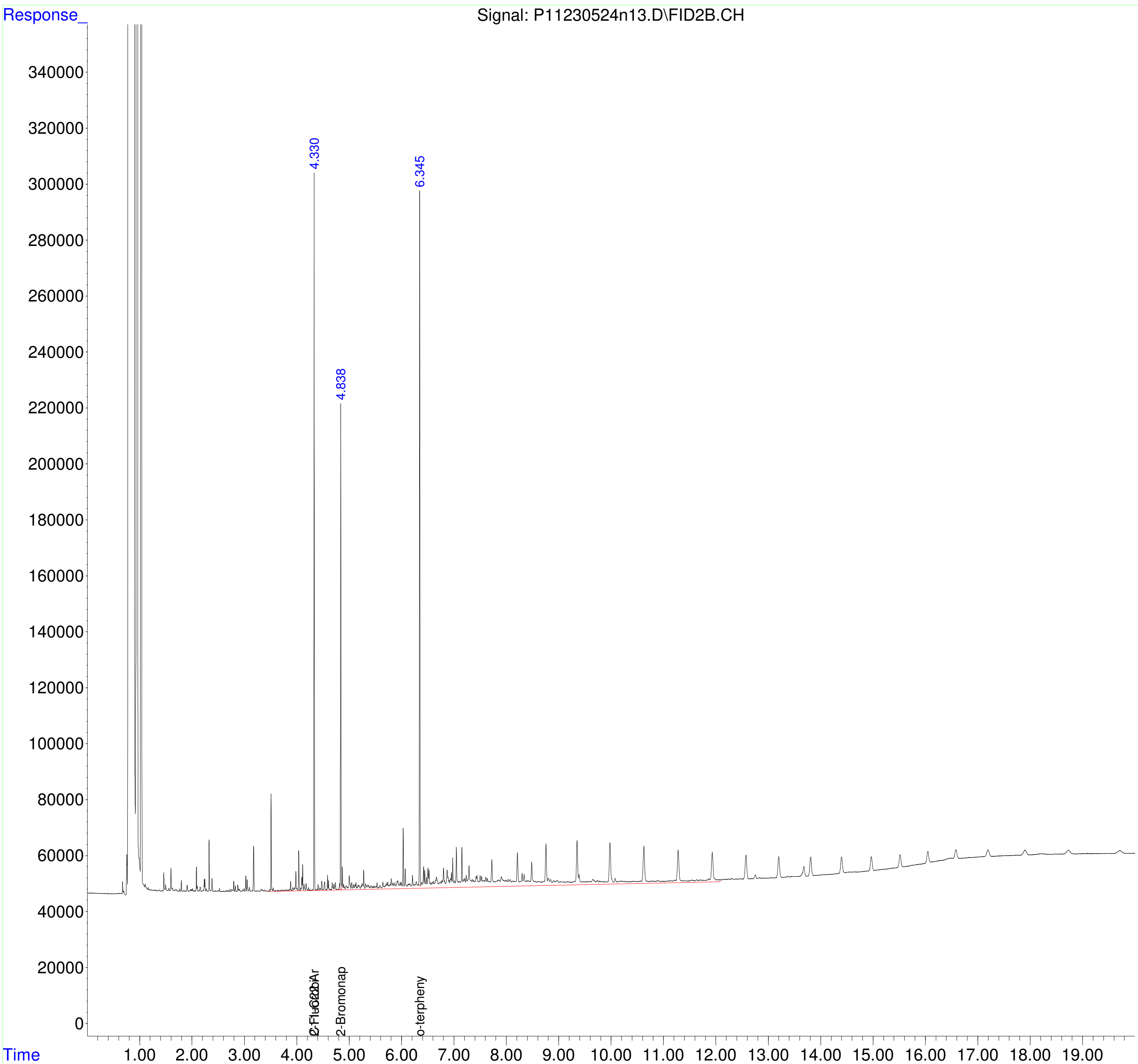
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n13.D
Signal(s) : FID2B.CH
Acq On : 25-May-23, 10:14:28
Operator : petro11b:sr
Sample : L2326777-06,42,,
Misc : wg1780020 Day 2 ARO L2233244-18
ALS Vial : 57 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 12:15:23 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

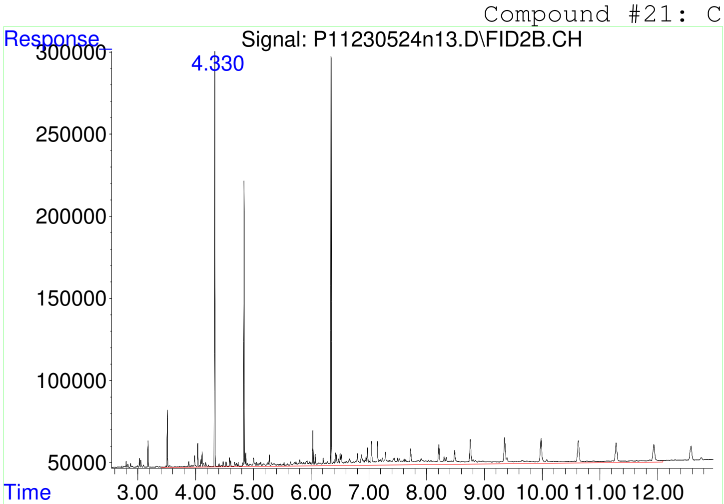
Volume Inj. :
Signal Phase :
Signal Info :

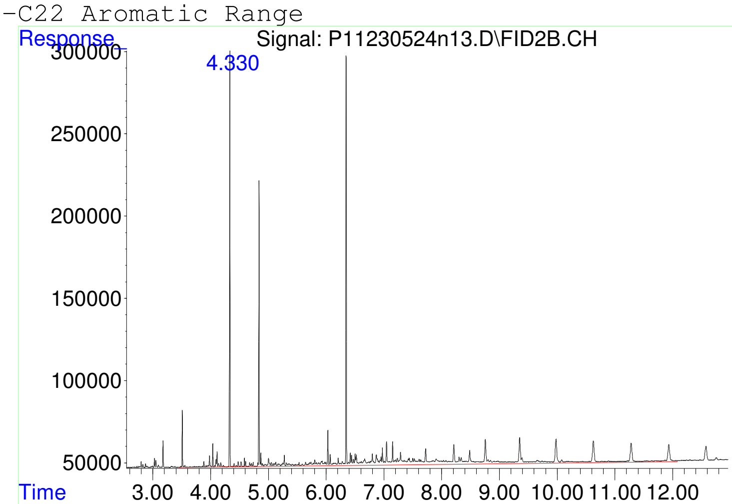


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro11\2023\230524N.SEC\ | QMethod | : P11MAARO220328.M |
| Data File | : P11230524n13.D | Operator | : petro11b:sr |
| Date Inj'd | : 5/25/2023 10:14 28 | Instrument | : Petro 11 |
| Sample | : L2326777-06,42,, | Quant Date | : 5/25/2023 12:04 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 9986700

Manual Peak Response = 9032378 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n14.D
Signal(s) : FID1A.CH
Acq On : 25-May-23, 10:14:28
Operator : petro11a:sr
Sample : L2326777-06,42,,
Misc : Day 2 MDL ALI Soil L2233244-18
ALS Vial : 7 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:58:58 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | |
| 13) S | 1-Chlorooctadecane | 7.000 | 985649 | 15.854 | mg/L | M4 |
| Spiked Amount | 20.000 | | Recovery = | 79.27% | | |
| Target Compounds | | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | |
| 20) H | C9-C18 Aliphatics | 5.004 | 5879134 | 86.141 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 13.617f | 12473763 | 174.826 | mg/L | M5 |

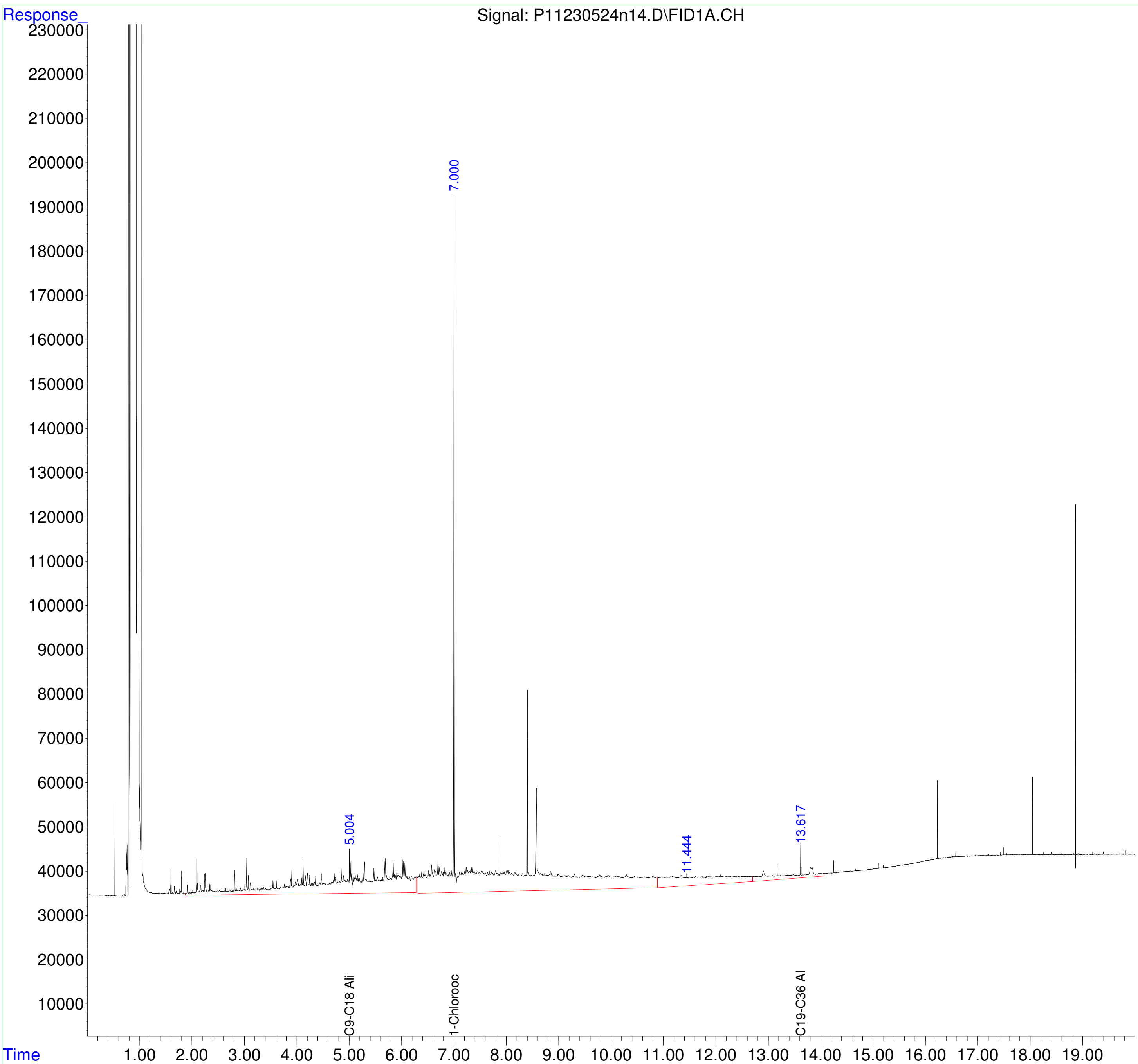
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n14.D
Signal(s) : FID1A.CH
Acq On : 25-May-23, 10:14:28
Operator : petro11a:sr
Sample : L2326777-06,42,,
Misc : Day 2 MDL ALI Soil L2233244-18
ALS Vial : 7 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:58:58 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

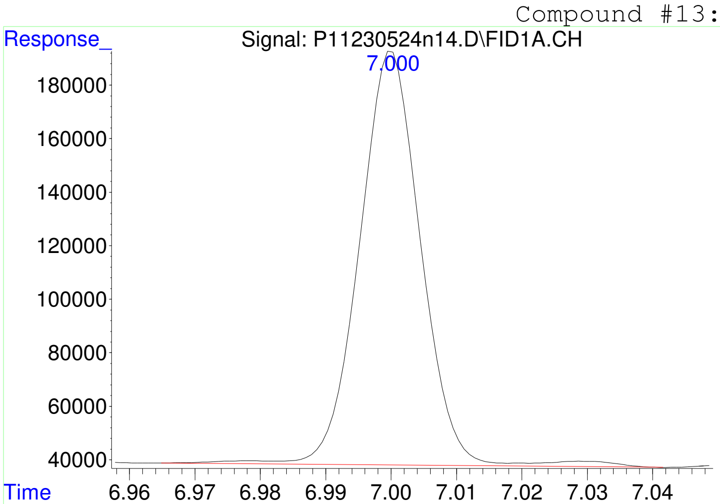
Volume Inj. :
Signal Phase :
Signal Info :

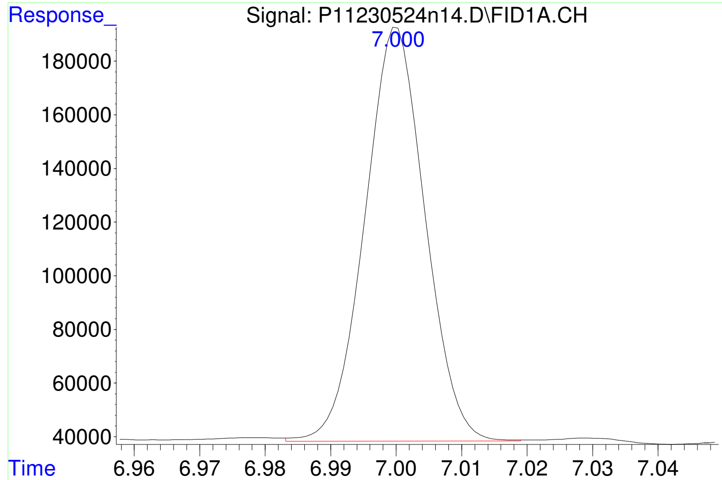


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro11\2023\230524n\ | QMethod | : P11MAALI220328.M |
| Data File | : P11230524n14.D | Operator | : petro11a:sr |
| Date Inj'd | : 5/25/2023 10:14 28 | Instrument | : Petro 11 |
| Sample | : L2326777-06,42,, | Quant Date | : 5/25/2023 11:51 am |

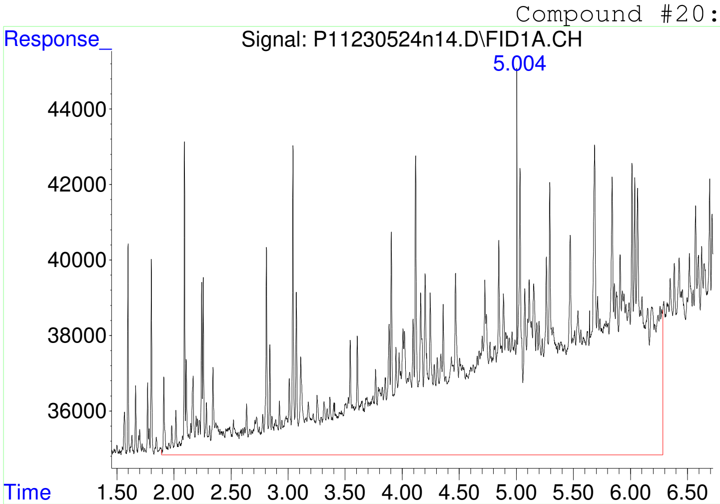
Compound #13: 1-Chlorooctadecane

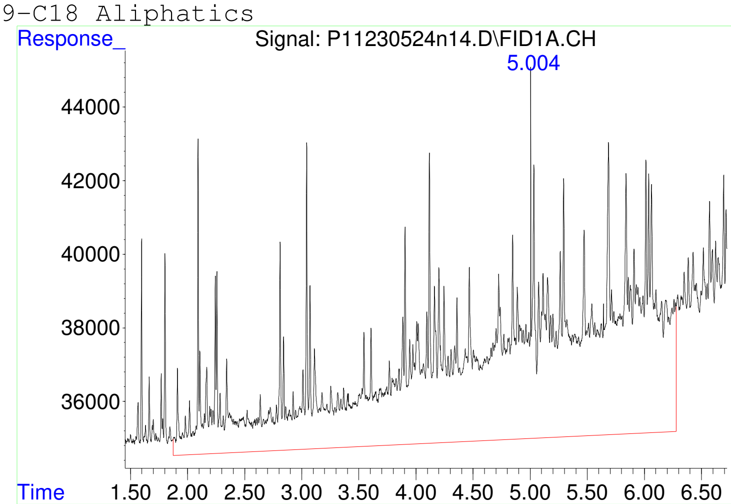



Original Peak Response = 1016399
Manual Peak Response = 985649 M4
M4 = Poor automated baseline construction.

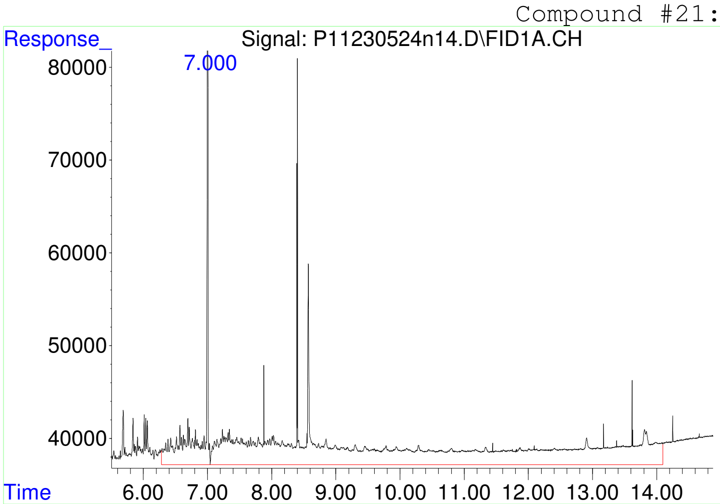
Compound #20: C9-C18 Aliphatics

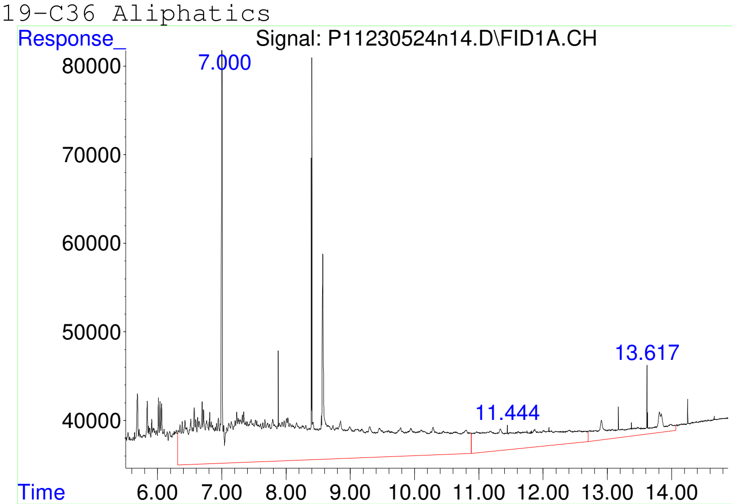



Original Peak Response = 5956253
Manual Peak Response = 5879134 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 9005308
Manual Peak Response = 12473763 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n15.D
Signal(s) : FID2B.CH
Acq On : 25-May-23, 10:39:55
Operator : petro11b:sr
Sample : L2326777-12,42,,
Misc : wg1780020 Day 2 ARO Compisite Mineral OIl
ALS Vial : 58 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 12:16:27 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.331 | 1026174 | 13.296 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 66.48% | | |
| 5) s 2-Bromonaphthalene | 4.838 | 729708 | 13.706 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 68.53% | | |
| 10) S o-terphenyl | 6.345 | 1142162 | 13.012 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 65.06% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 6.345f | 2481785 | 28.682 mg/L | M5 |

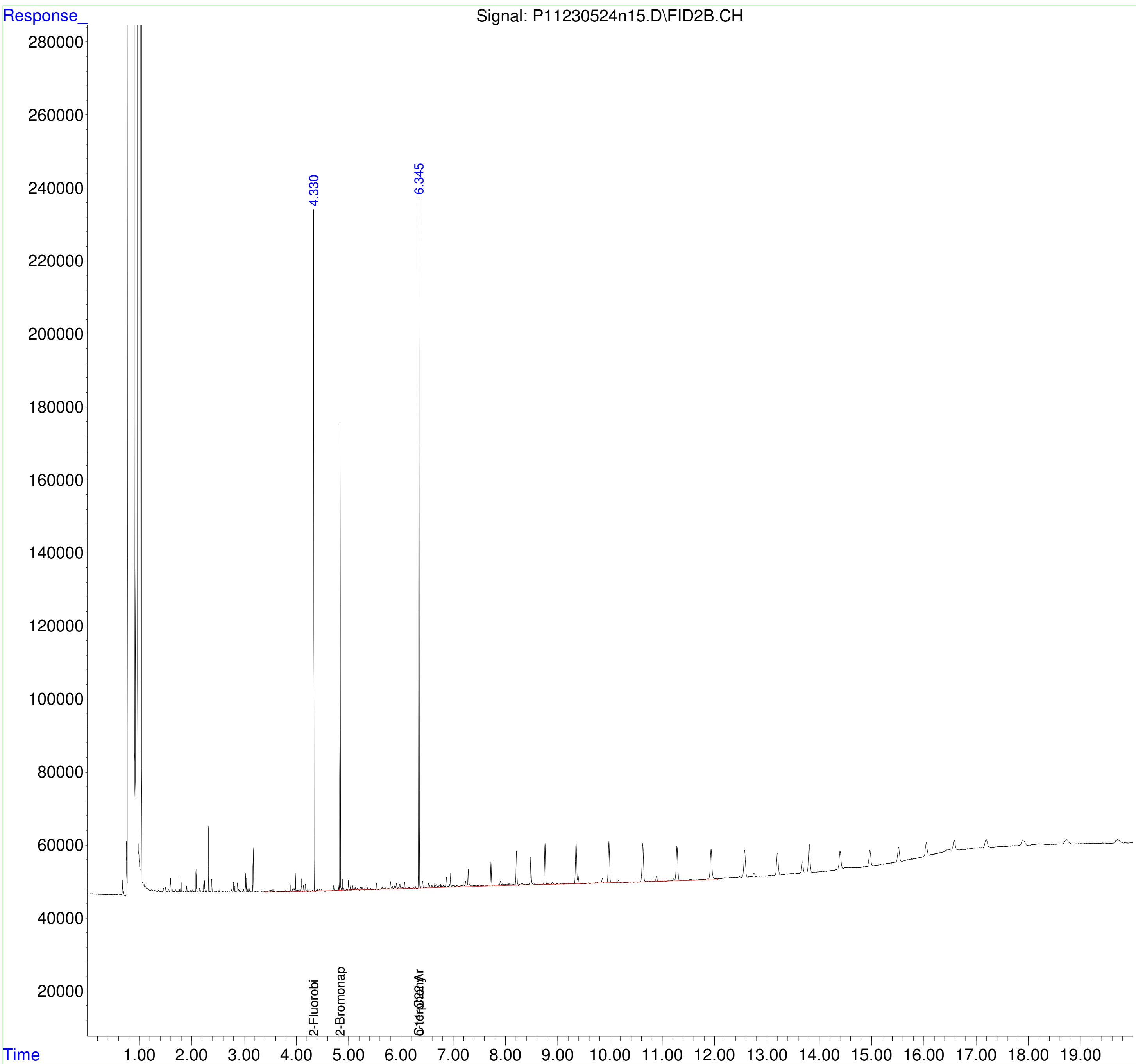
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n15.D
Signal(s) : FID2B.CH
Acq On : 25-May-23, 10:39:55
Operator : petro11b:sr
Sample : L2326777-12,42,,
Misc : wg1780020 Day 2 ARO Compisite Mineral OIl
ALS Vial : 58 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 12:16:27 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

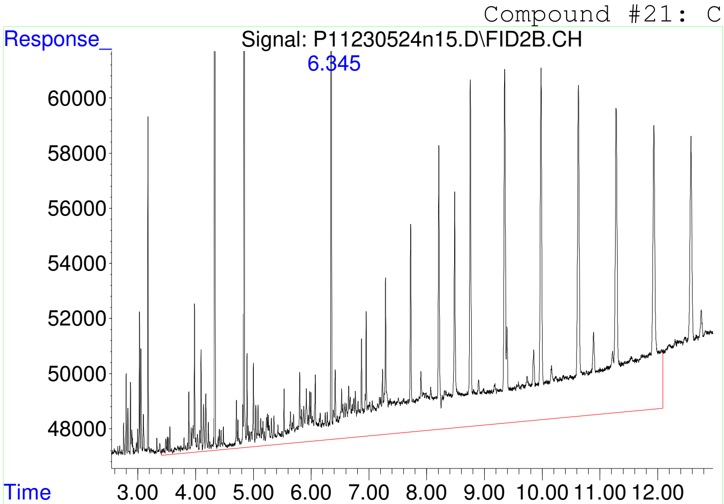


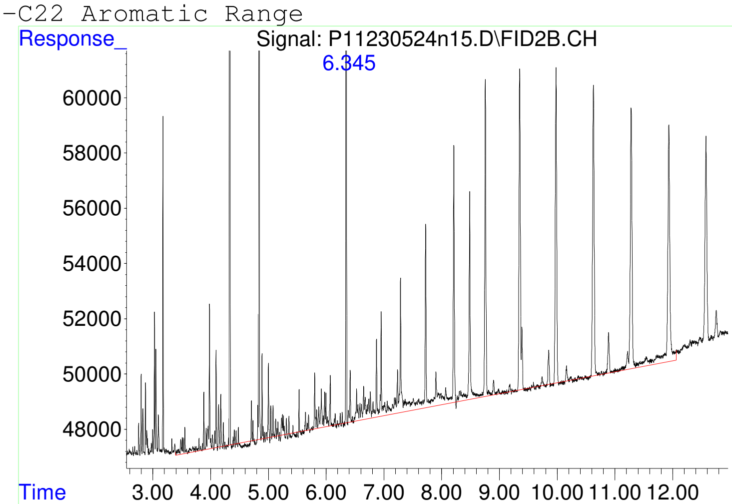
Manual Integration Report

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n15.D
Date Inj'd : 5/25/2023 10:39 55
Sample : L2326777-12,42,,

QMethod : P11MAARO220328.M
Operator : petro11b:sr
Instrument : Petro 11
Quant Date : 5/25/2023 12:04 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 7097009

Manual Peak Response = 2481785 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n16.D
Signal(s) : FID1A.CH
Acq On : 25-May-23, 10:39:55
Operator : petro11a:sr
Sample : L2326777-12,42,,
Misc : Day 2 MDL ALI Soil Composite Mineral OIl
ALS Vial : 8 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:59:55 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | |
| 13) S | 1-Chlorooctadecane | 7.000 | 835438 | 13.438 | mg/L | M4 |
| Spiked Amount | 20.000 | | Recovery = | 67.19% | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | |
| 20) H | C9-C18 Aliphatics | 6.037 | 4869772 | 71.352 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 13.844f | 19176081 | 268.762 | mg/L | M5 |

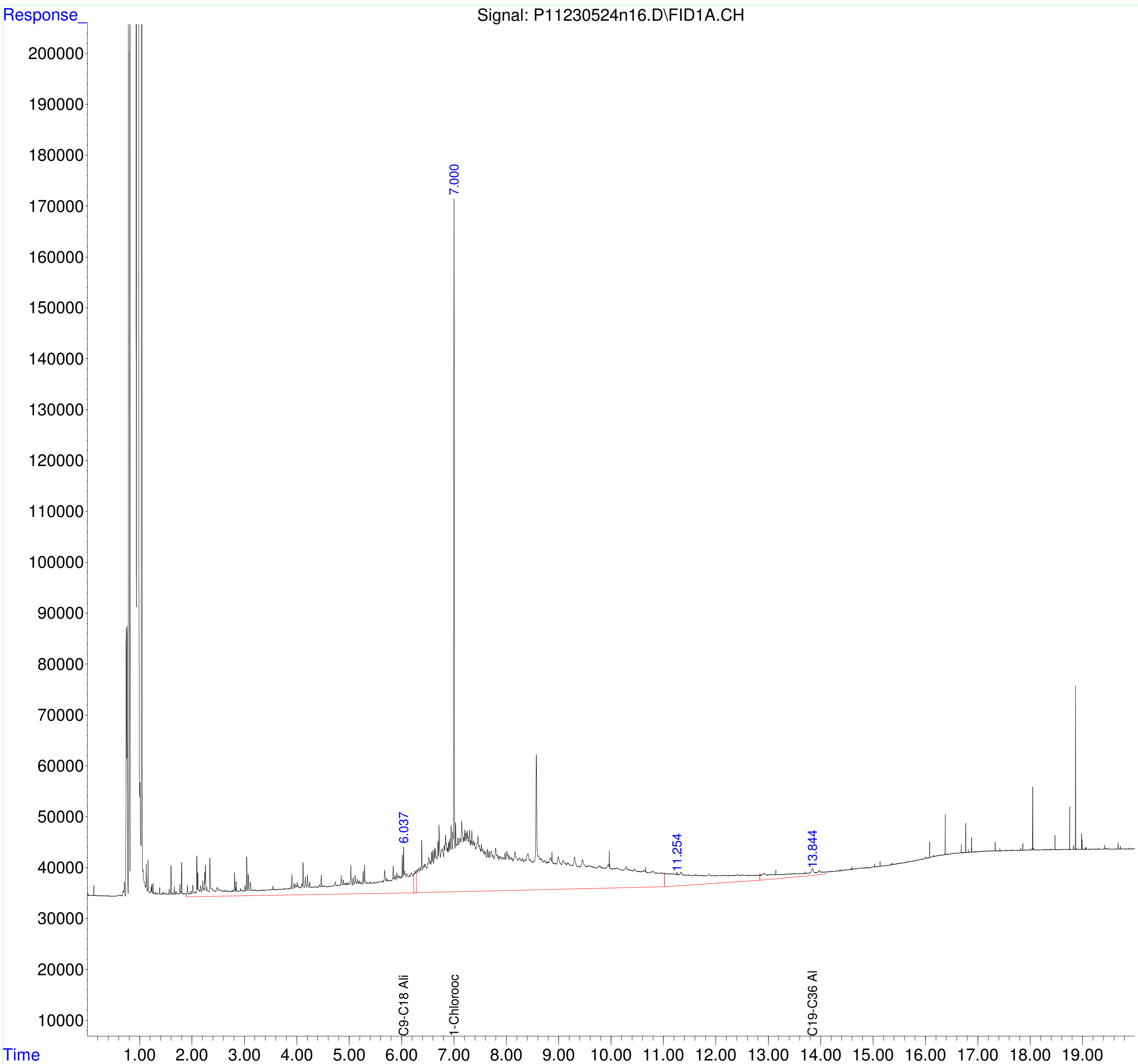
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n16.D
Signal(s) : FID1A.CH
Acq On : 25-May-23, 10:39:55
Operator : petro11a:sr
Sample : L2326777-12,42,,
Misc : Day 2 MDL ALI Soil Composite Mineral OIl
ALS Vial : 8 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:59:55 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

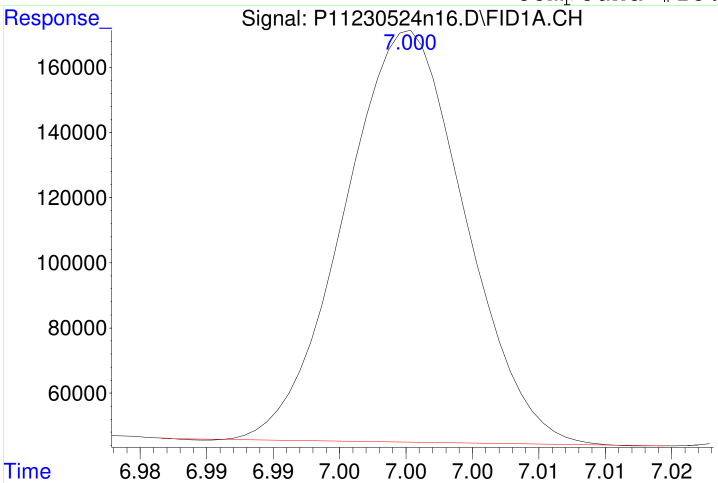


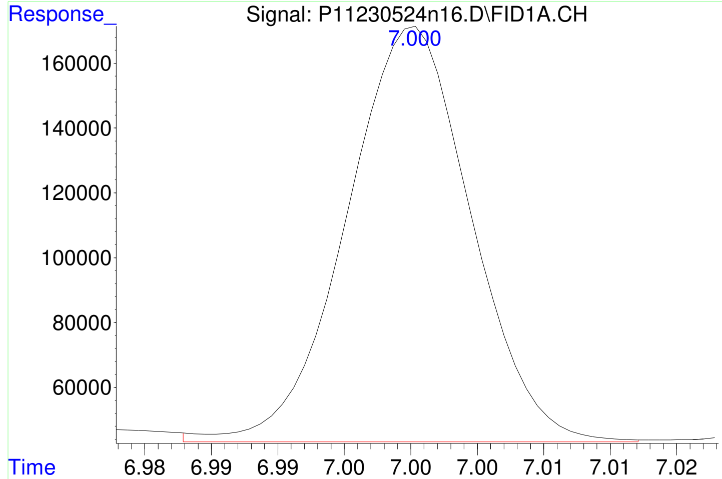
Manual Integration Report

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n16.D
Date Inj'd : 5/25/2023 10:39 55
Sample : L2326777-12,42,,

QMethod : P11MAALI220328.M
Operator : petro11a:sr
Instrument : Petro 11
Quant Date : 5/25/2023 11:51 am

Compound #13: 1-Chlorooctadecane

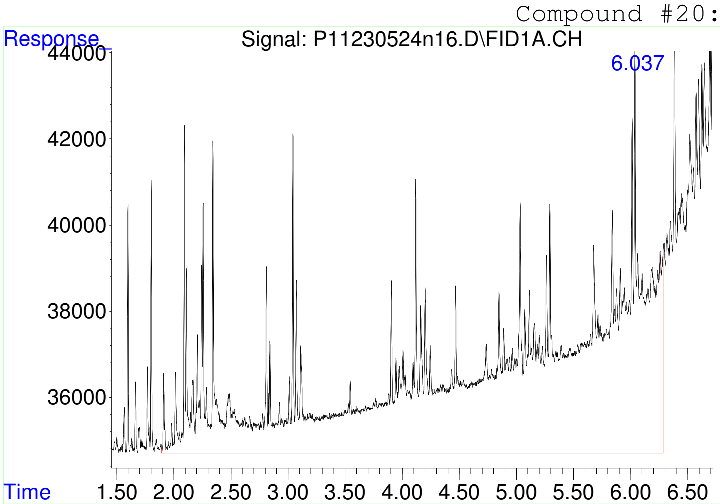


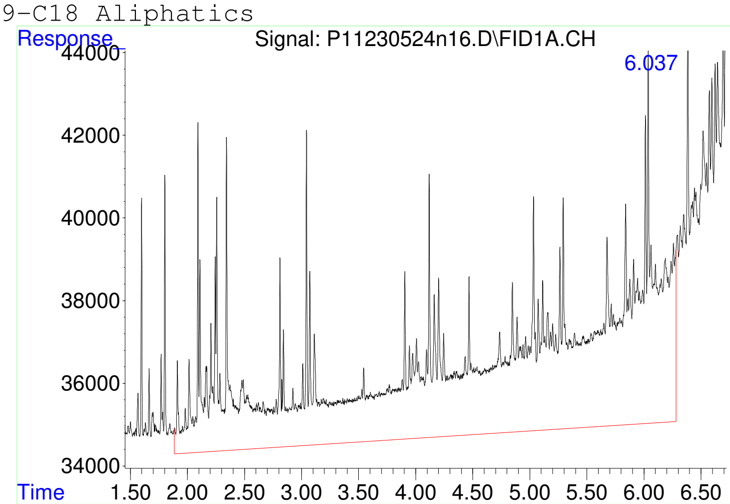




Original Peak Response = 799409
M4 = Poor automated baseline construction.

Manual Peak Response = 835438 M4

Compound #20: C9-C18 Aliphatics



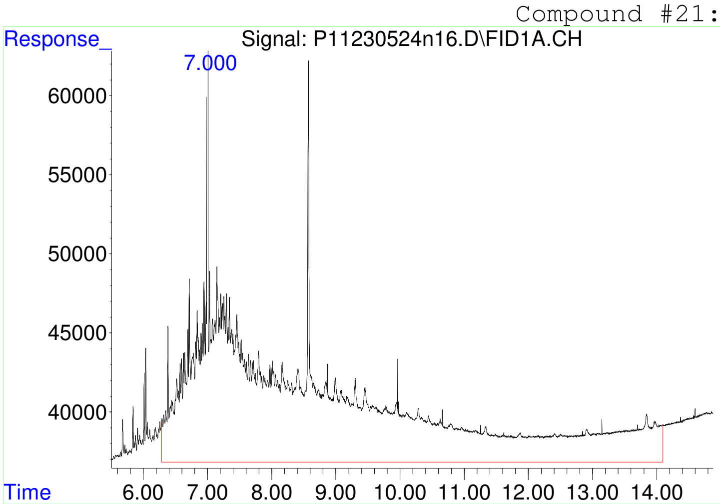



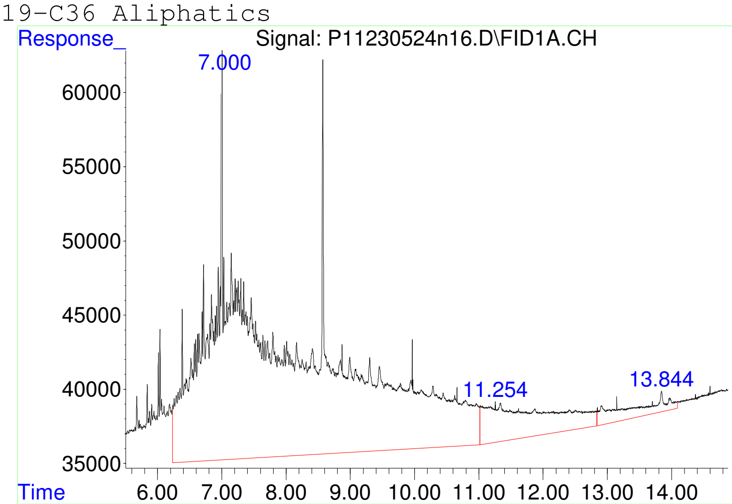

Original Peak Response = 4815654

Manual Peak Response = 4869772 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 16822196

Manual Peak Response = 19176081 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n17.D
Signal(s) : FID2B.CH
Acq On : 25-May-23, 11:05:06
Operator : petro11b:sr
Sample : L2326777-13,42,,
Misc : wg1780020 Day 2 ARO Compisite Mineral OIl
ALS Vial : 59 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 12:17:05 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.331 | 1194644 | 15.479 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 77.39% | | |
| 5) s 2-Bromonaphthalene | 4.838 | 851966 | 16.002 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 80.01% | | |
| 10) S o-terphenyl | 6.345 | 1348464 | 15.362 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 76.81% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 9.978 | 3883590 | 44.883 mg/L | M5 |

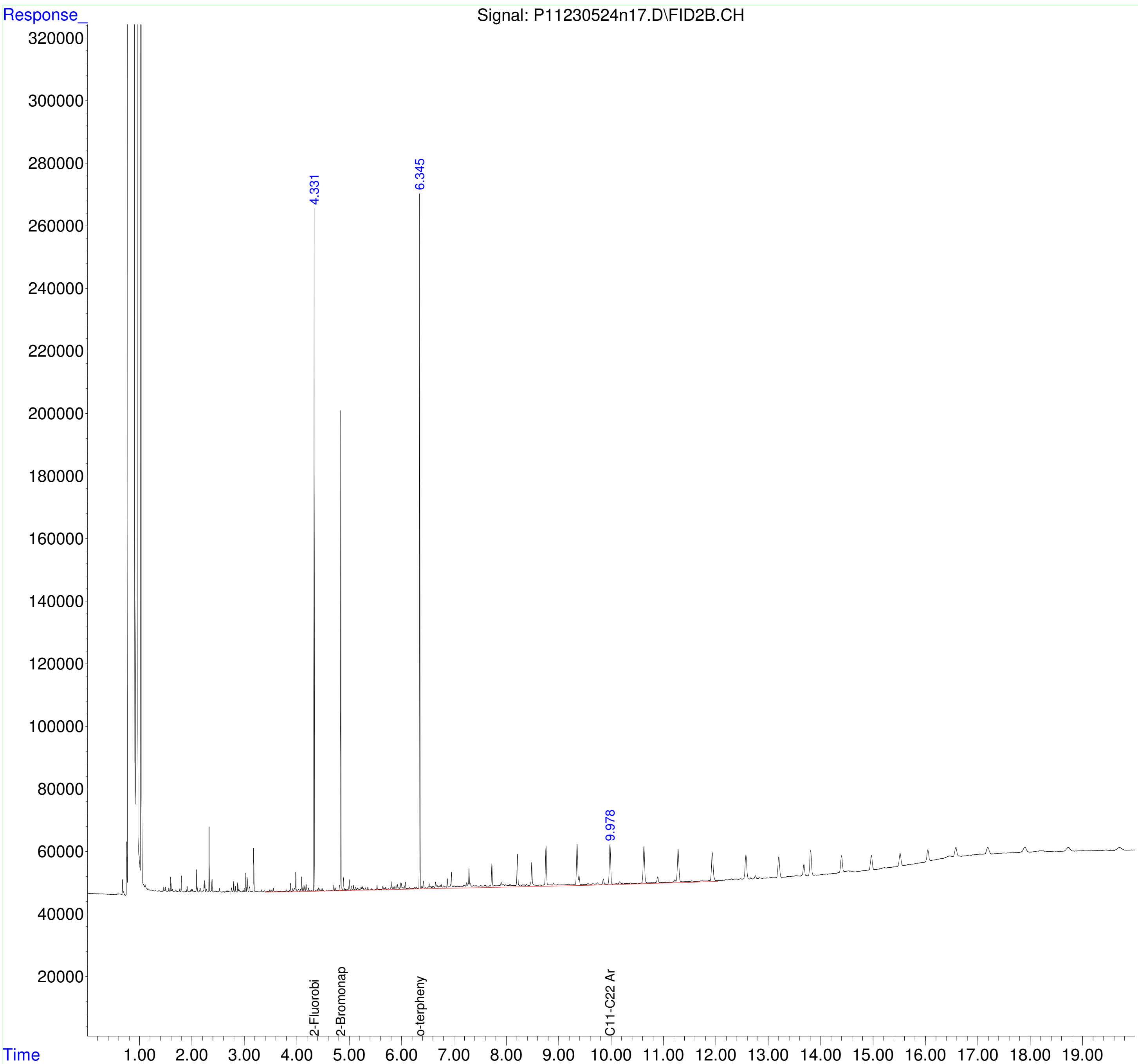
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n17.D
Signal(s) : FID2B.CH
Acq On     : 25-May-23, 11:05:06
Operator  : petro11b:sr
Sample     : L2326777-13,42,,
Misc       : wg1780020 Day 2 ARO Compisite Mineral OIl
ALS Vial   : 59   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 12:17:05 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation   6890 Scale Mode: Large solvent peaks clipped

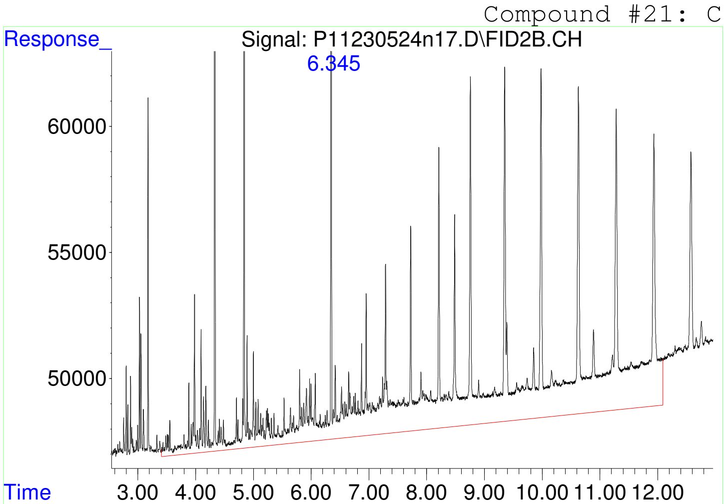
Volume Inj.  :
Signal Phase :
Signal Info  :

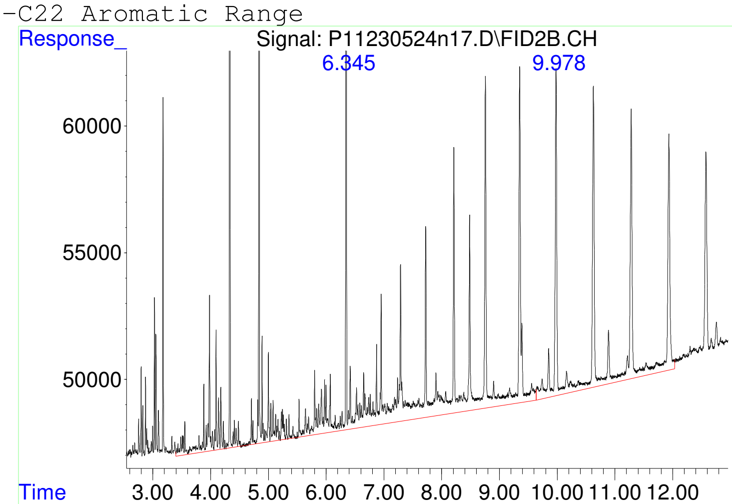


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro11\2023\230524N.SEC\ | QMethod | : P11MAARO220328.M |
| Data File | : P11230524n17.D | Operator | : petro11b:sr |
| Date Inj'd | : 5/25/2023 11:05 06 | Instrument | : Petro 11 |
| Sample | : L2326777-13,42,, | Quant Date | : 5/25/2023 12:05 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 7196304

Manual Peak Response = 3883590 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n18.D
Signal(s) : FID1A.CH
Acq On : 25-May-23, 11:05:06
Operator : petro11a:sr
Sample : L2326777-13,42,,
Misc : Day 2 MDL ALI Soil Composite Mineral OIl
ALS Vial : 9 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 12:00:31 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | |
| 13) S | 1-Chlorooctadecane | 7.000 | 819692 | 13.185 | mg/L | M4 |
| Spiked Amount | 20.000 | | Recovery = | 65.92% | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | |
| 20) H | C9-C18 Aliphatics | 6.037 | 4699084 | 68.851 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 13.839f | 19471361 | 272.900 | mg/L | M5 |

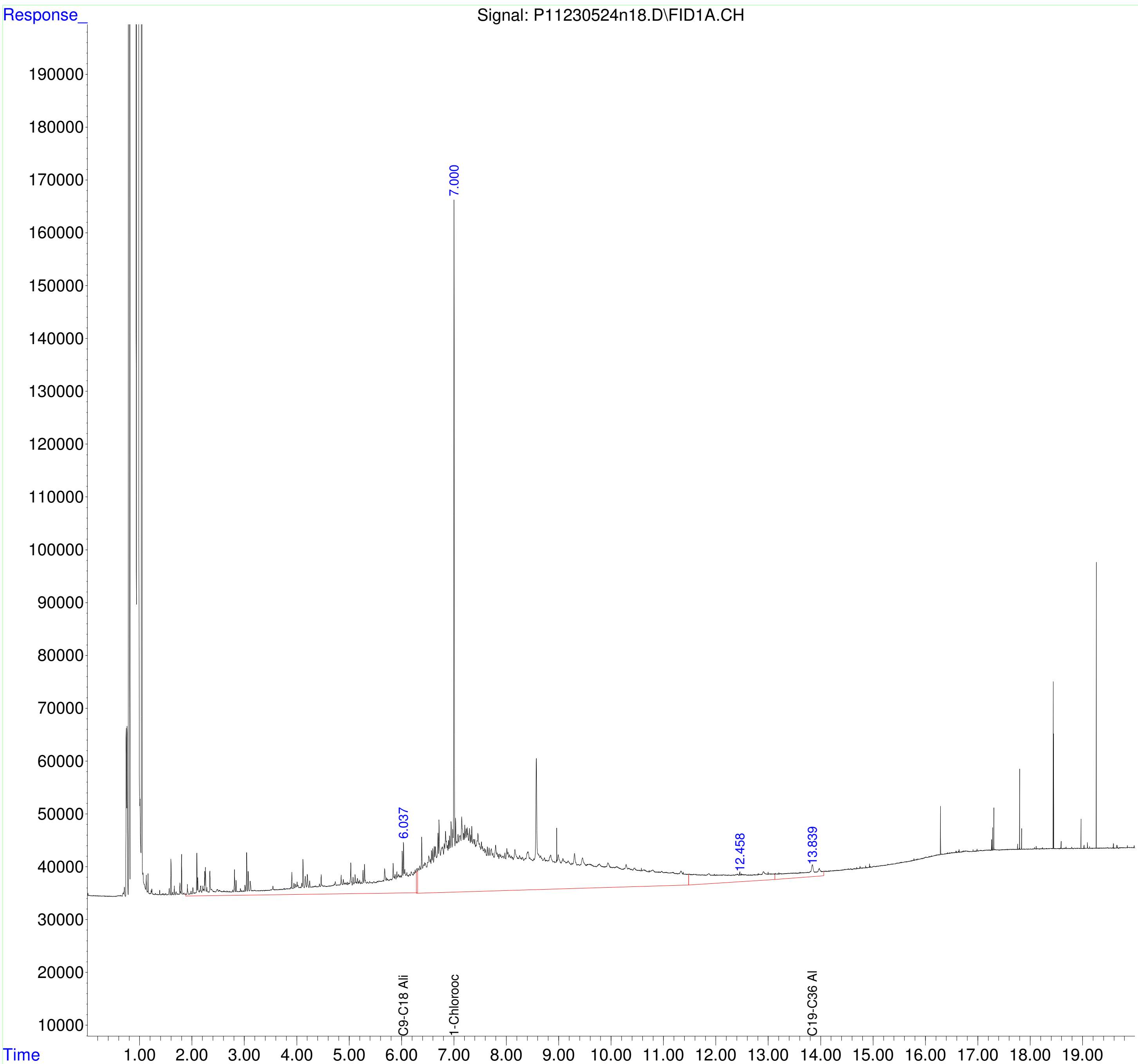
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n18.D
Signal(s) : FID1A.CH
Acq On    : 25-May-23, 11:05:06
Operator  : petro11a:sr
Sample    : L2326777-13,42,,
Misc      : Day 2 MDL ALI Soil  Composite Mineral OIl
ALS Vial  : 9   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 12:00:31 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation    6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :

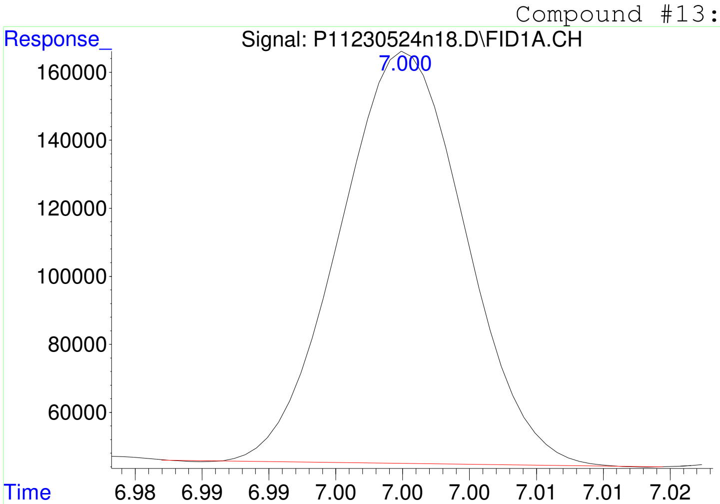


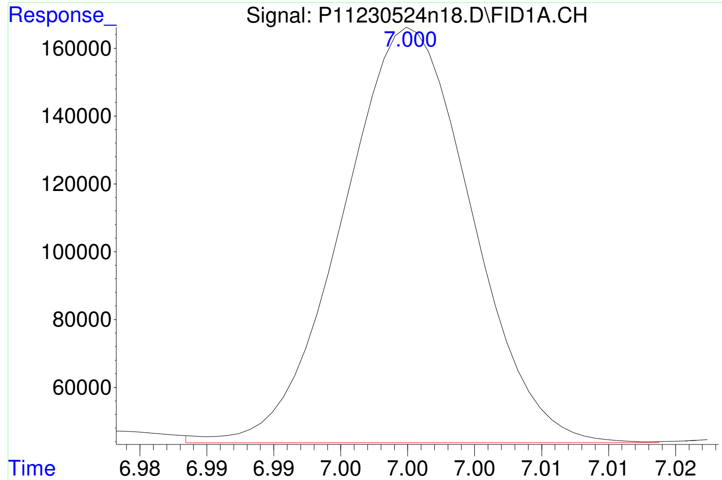
Manual Integration Report

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n18.D
Date Inj'd : 5/25/2023 11:05 06
Sample : L2326777-13,42,,

QMethod : P11MAALI220328.M
Operator : petro11a:sr
Instrument : Petro 11
Quant Date : 5/25/2023 11:51 am

Compound #13: 1-Chlorooctadecane

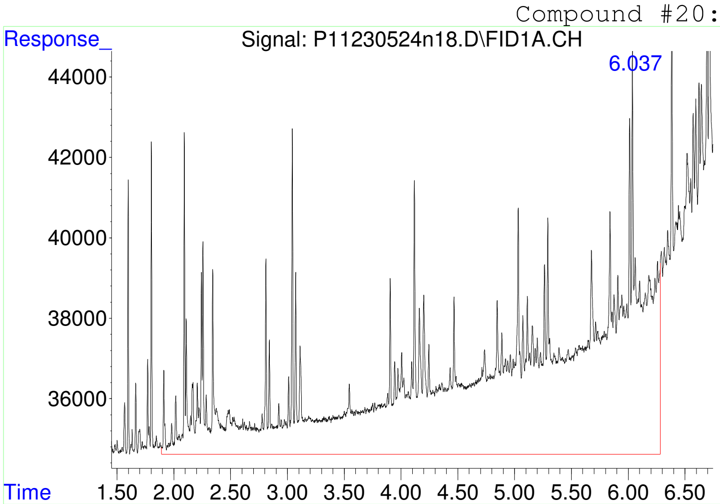


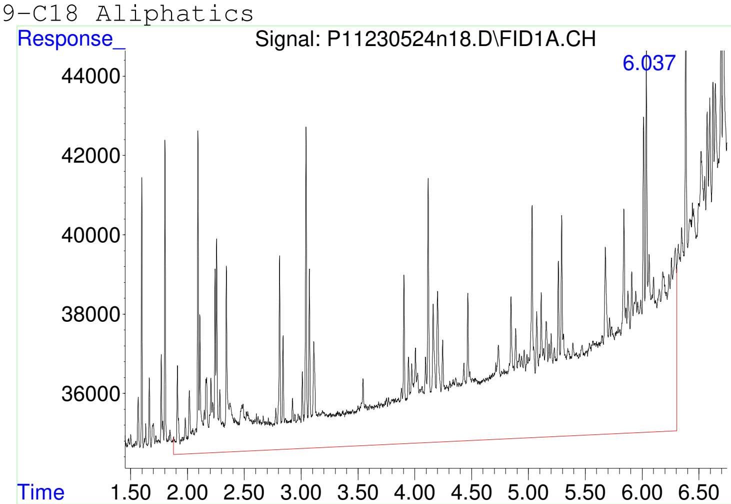




Original Peak Response = 792337
M4 = Poor automated baseline construction.

Manual Peak Response = 819692 M4

Compound #20: C9-C18 Aliphatics



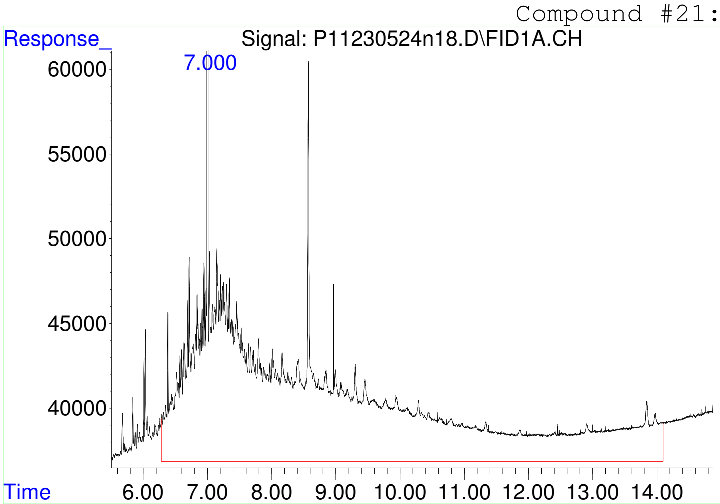



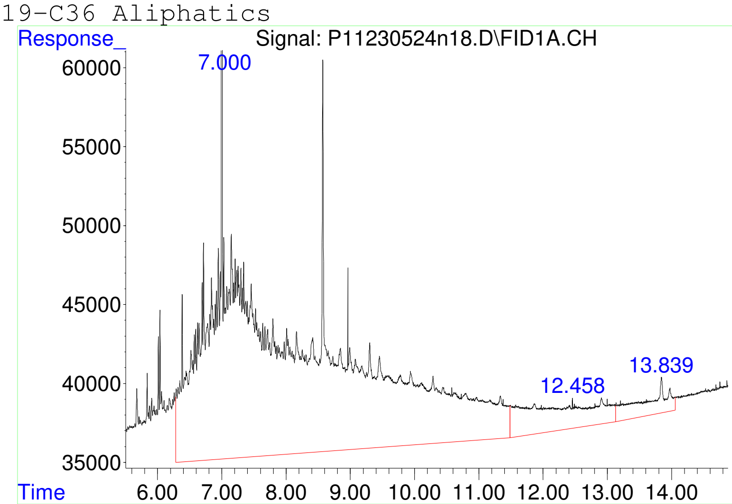

Original Peak Response = 5012110

Manual Peak Response = 4699084 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 16998553

Manual Peak Response = 19471361 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n19.D
Signal(s) : FID2B.CH
Acq On : 25-May-23, 11:30:20
Operator : petro11b:sr
Sample : L2326777-14,42,,
Misc : wg1780020 Day 2 ARO Compisite Mineral OIl
ALS Vial : 60 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 12:17:38 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| System Monitoring Compounds | | | | |
| 3) s 2-Fluorobiphenyl | 4.331 | 1356567 | 17.577 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 87.89% | |
| 5) s 2-Bromonaphthalene | 4.838 | 959684 | 18.025 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 90.12% | |
| 10) S o-terphenyl | 6.345 | 1499677 | 17.085 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 85.43% | |
| Target Compounds | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 4.330f | 3275732 | 37.858 mg/L | M5 |

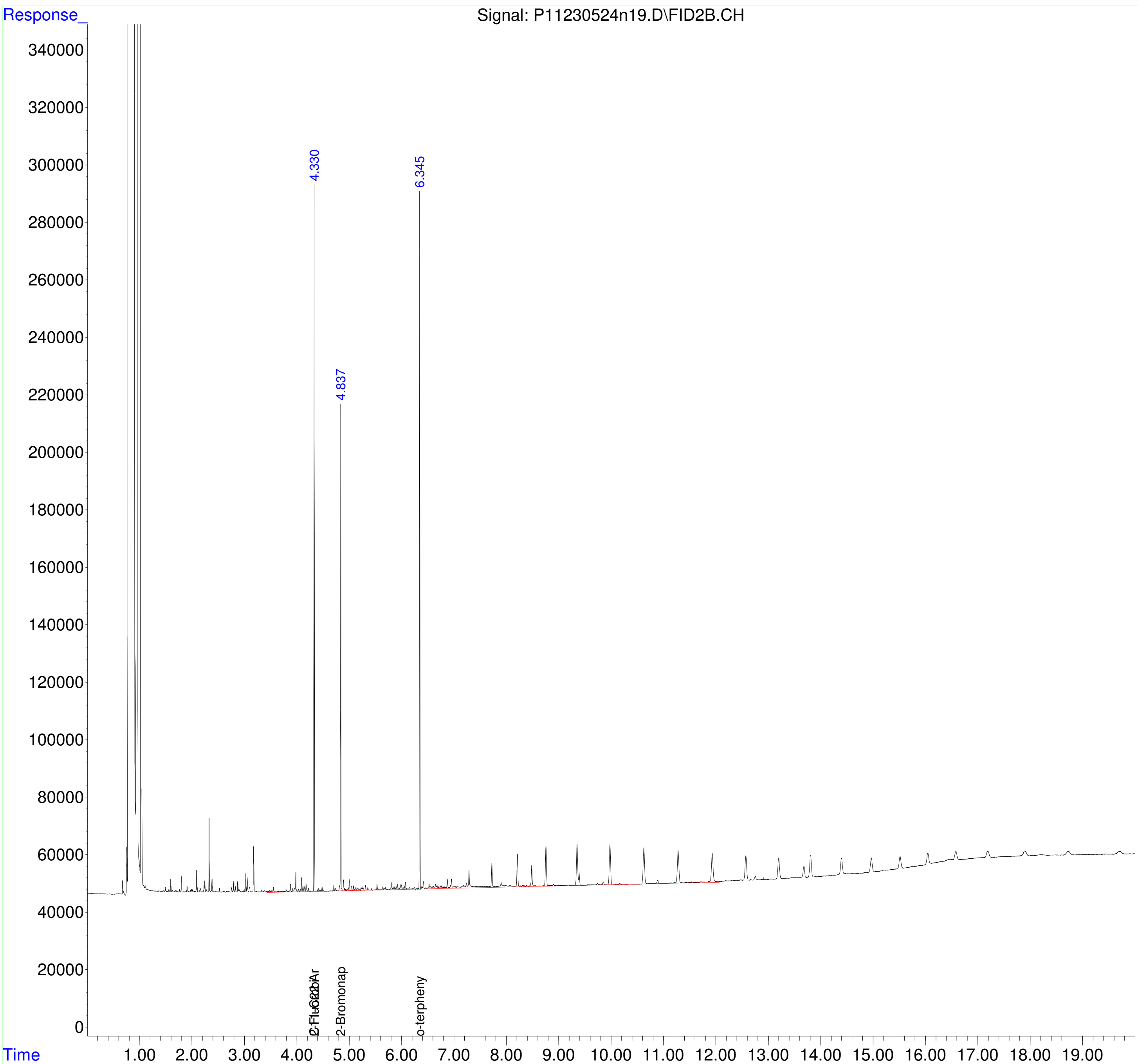
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n19.D
Signal(s) : FID2B.CH
Acq On    : 25-May-23, 11:30:20
Operator  : petro11b:sr
Sample    : L2326777-14,42,,
Misc      : wg1780020 Day 2 ARO Compisite Mineral OIl
ALS Vial  : 60   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 12:17:38 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation    6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :

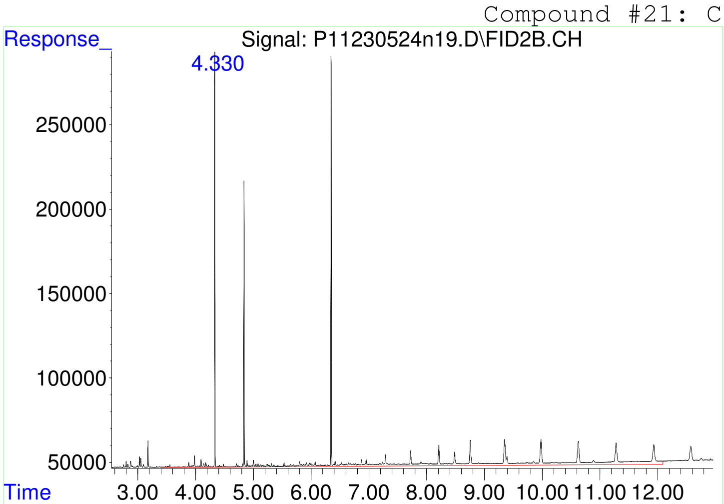


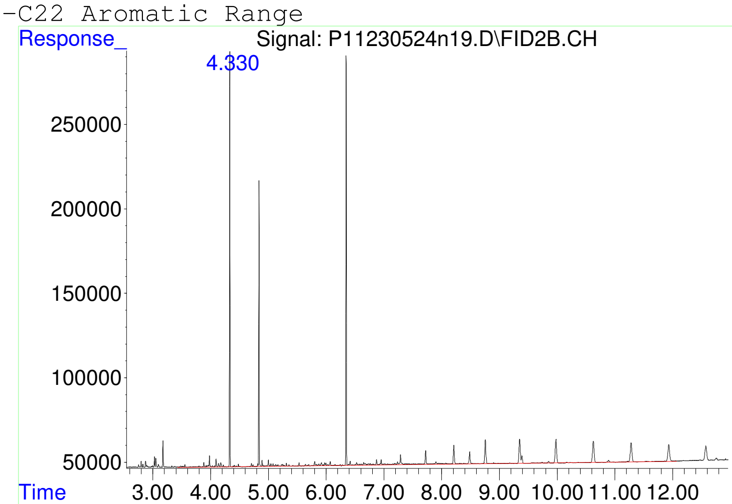
Manual Integration Report

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n19.D
Date Inj'd : 5/25/2023 11:30 20
Sample : L2326777-14,42,,

QMethod : P11MAARO220328.M
Operator : petro11b:sr
Instrument : Petro 11
Quant Date : 5/25/2023 12:05 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 7178699

Manual Peak Response = 3275732 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n20.D
Signal(s) : FID1A.CH
Acq On : 25-May-23, 11:30:20
Operator : petro11a:sr
Sample : L2326777-14,42,,
Misc : Day 2 MDL ALI Soil Composite Mineral OIl
ALS Vial : 10 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 12:01:21 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | System Monitoring Compounds | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | |
| 13) S | 1-Chlorooctadecane | 7.000 | 580540 | 9.338 | mg/L | M4 |
| Spiked Amount | 20.000 | | Recovery = | 46.69% | | |
| | Target Compounds | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | |
| 20) H | C9-C18 Aliphatics | 6.037 | 4550999 | 66.681 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 13.891f | 21440300 | 300.496 | mg/L | M5 |

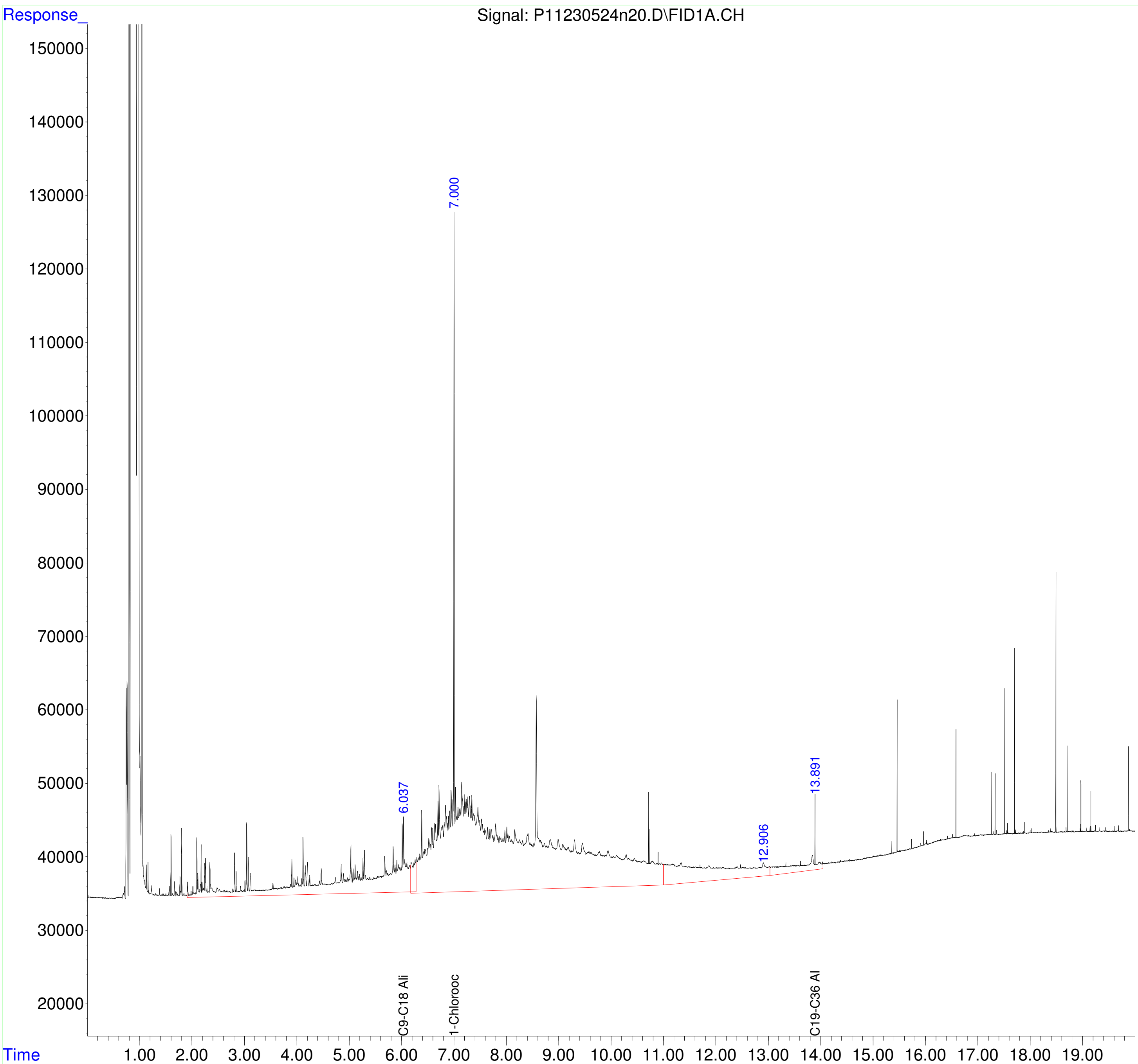
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n20.D
Signal(s) : FID1A.CH
Acq On    : 25-May-23, 11:30:20
Operator  : petro11a:sr
Sample    : L2326777-14,42,,
Misc      : Day 2 MDL ALI Soil  Composite Mineral OIl
ALS Vial  : 10   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 12:01:21 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation   6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :

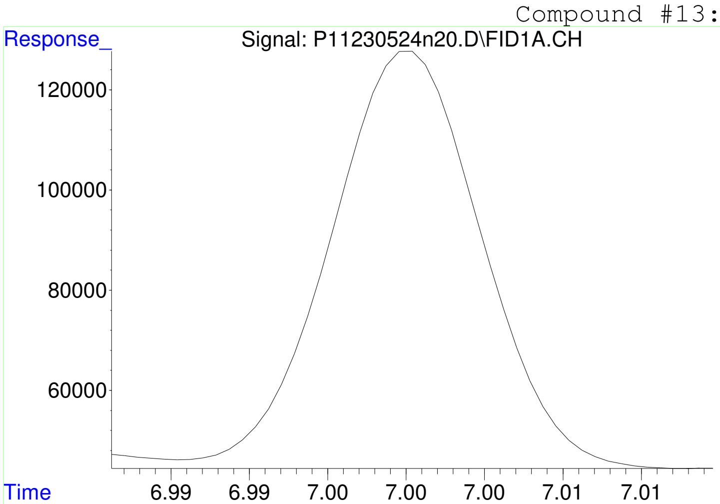


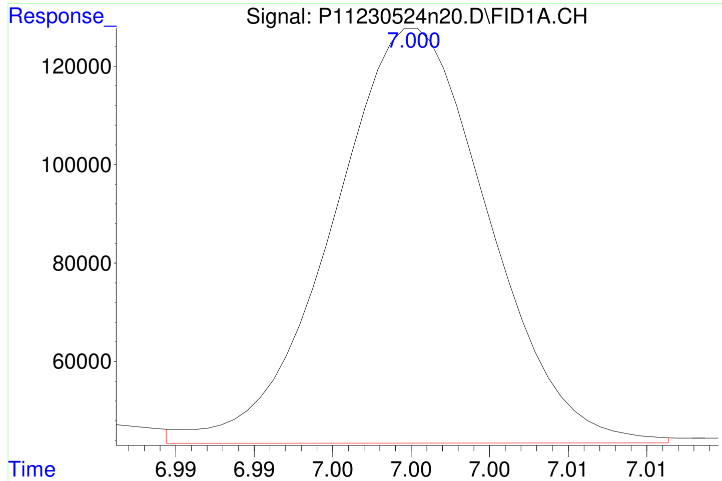
# Manual Integration Report

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n20.D
Date Inj'd : 5/25/2023 11:30 20
Sample : L2326777-14,42,,

QMethod : P11MAALI220328.M
Operator : petro11a:sr
Instrument : Petro 11
Quant Date : 5/25/2023 11:51 am

Compound #13: 1-Chlorooctadecane

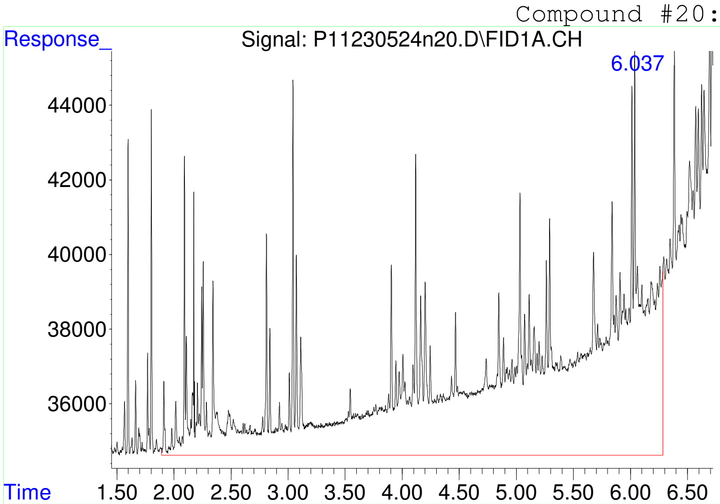


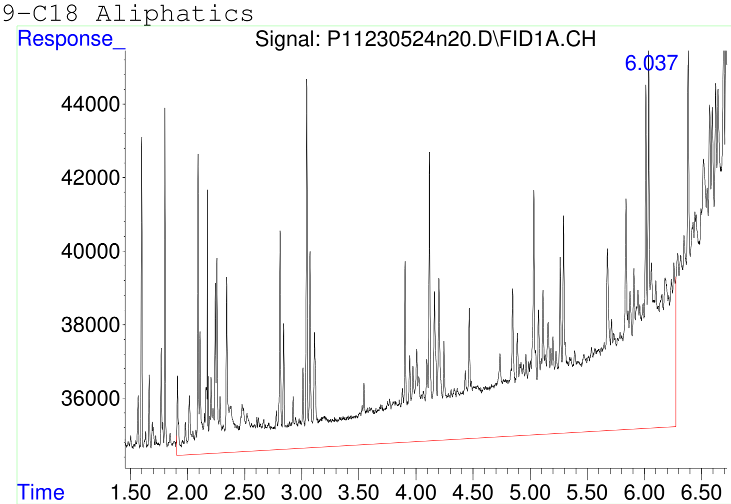




Original Peak Response = 0
M4 = Poor automated baseline construction.

Manual Peak Response = 580540 M4

Compound #20: C9-C18 Aliphatics



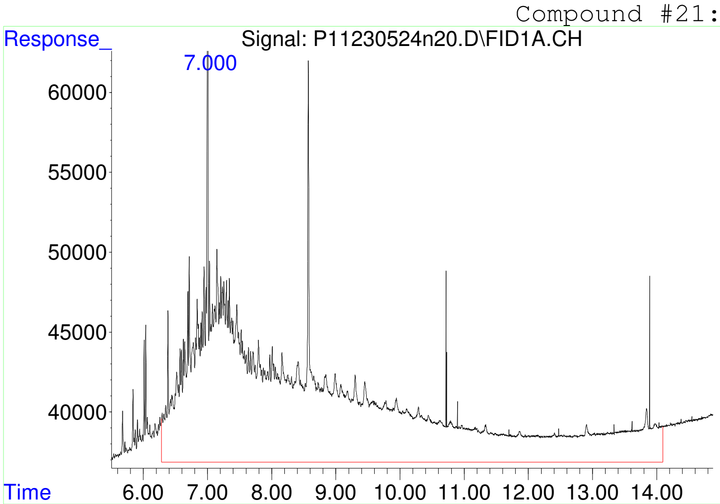



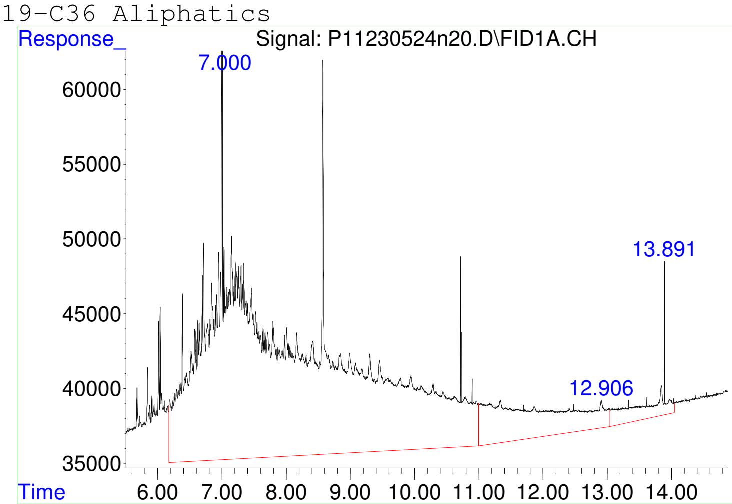

Original Peak Response = 5138409

Manual Peak Response = 4550999 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 18327732

Manual Peak Response = 21440300 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n21.D
Signal(s) : FID2B.CH
Acq On : 25-May-23, 11:55:47
Operator : petro11b:sr
Sample : L2326777-20,42,,
Misc : wg1780020 Day 2 ARO Compisite Lubricating OIl
ALS Vial : 61 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 13:10:42 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 25 06:42:40 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.331 | 1284398 | 16.642 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 83.21% | | |
| 5) s 2-Bromonaphthalene | 4.838 | 904548 | 16.989 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 84.95% | | |
| 10) S o-terphenyl | 6.345 | 1345696 | 15.331 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 76.66% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 10.626 | 3526104 | 40.751 mg/L | M5 |

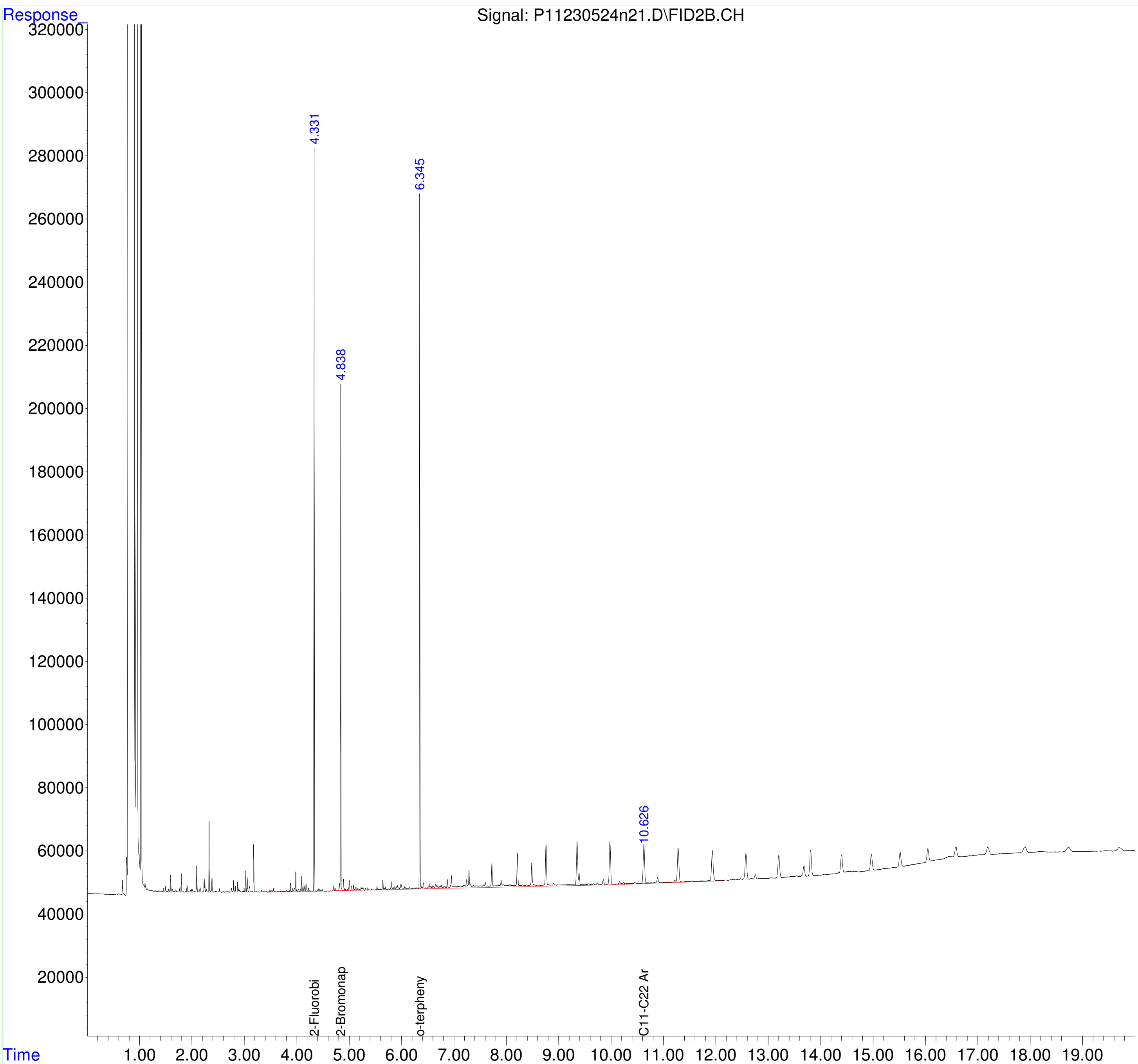
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n21.D
Signal(s) : FID2B.CH
Acq On     : 25-May-23, 11:55:47
Operator  : petro11b:sr
Sample     : L2326777-20,42,,
Misc       : wg1780020 Day 2 ARO Compisite Lubricating OIl
ALS Vial  : 61   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 13:10:42 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu May 25 06:42:40 2023
Response via : Initial Calibration
Integrator: ChemStation   6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :

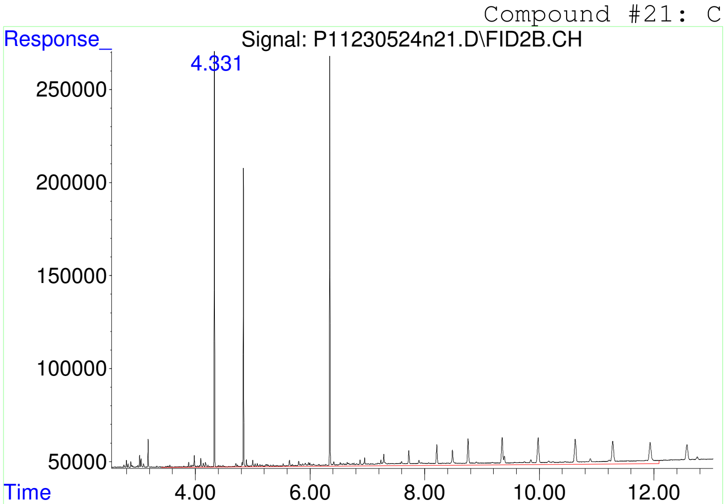


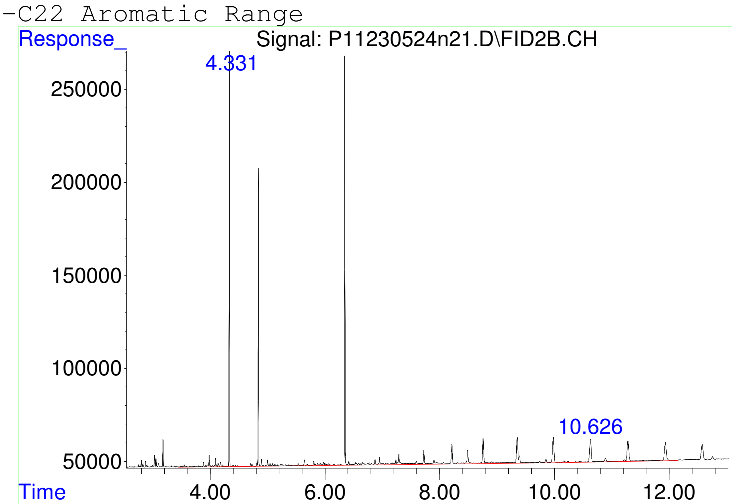
Manual Integration Report

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n21.D
Date Inj'd : 5/25/2023 11:55 47
Sample : L2326777-20,42,,

QMethod : P11MAARO220328.M
Operator : petro11b:sr
Instrument : Petro 11
Quant Date : 5/25/2023 1:09 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 7031402

Manual Peak Response = 3526104 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n22.D
Signal(s) : FID1A.CH
Acq On : 25-May-23, 11:55:47
Operator : petro11a:sr
Sample : L2326777-20,42,,
Misc : Day 2 MDL ALI Soil Composite Lubricating OIl
ALS Vial : 11 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 13:14:39 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu May 25 06:30:58 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | |
| 13) S | 1-Chlorooctadecane | 7.001 | 901545 | 14.501 | mg/L | |
| Spiked Amount | 20.000 | | Recovery = | 72.50% | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | |
| 20) H | C9-C18 Aliphatics | 5.060 | 4169207 | 61.087 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 12.674f | 21203310 | 297.174 | mg/L | M5 |

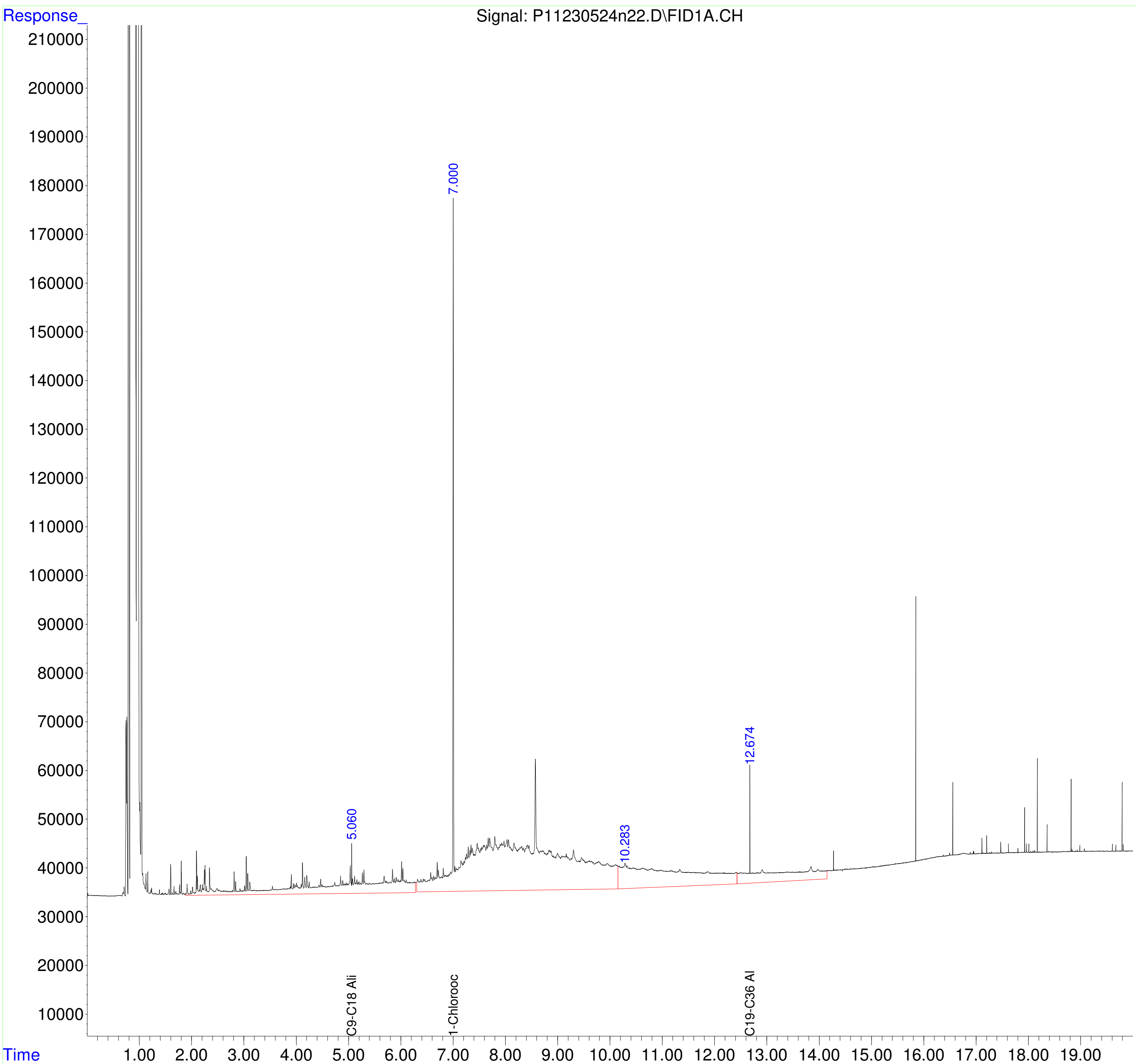
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n22.D
Signal(s) : FID1A.CH
Acq On    : 25-May-23, 11:55:47
Operator  : petro11a:sr
Sample    : L2326777-20,42,,
Misc      : Day 2 MDL ALI Soil  Composite Lubricating OIl
ALS Vial  : 11   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 13:14:39 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu May 25 06:30:58 2023
Response via : Initial Calibration
Integrator: ChemStation   6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :

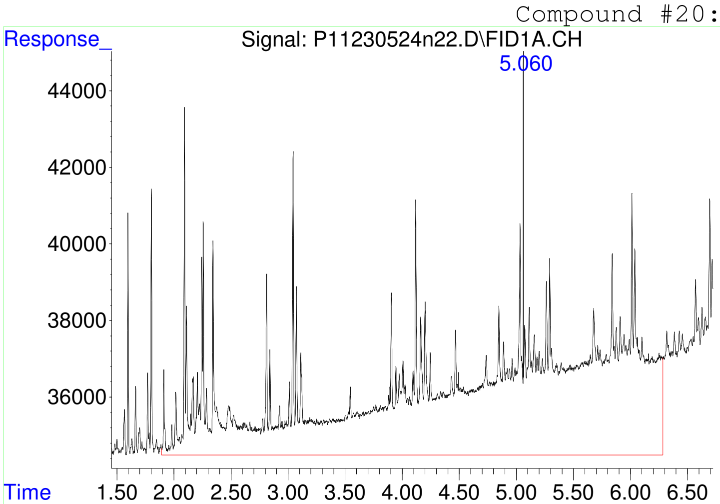


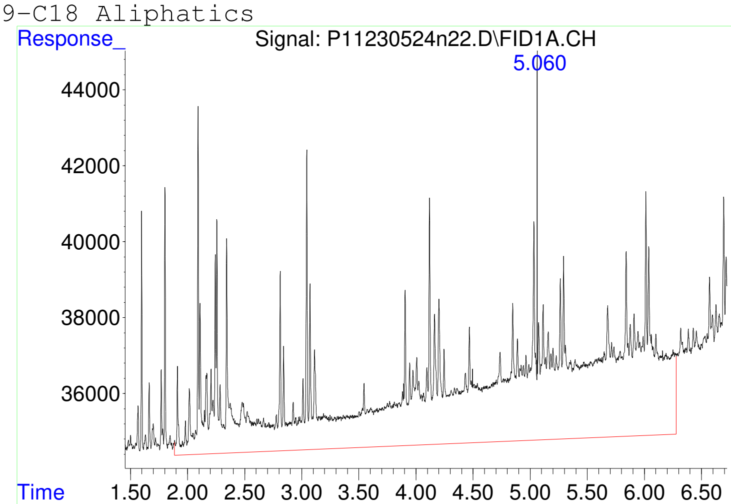
Manual Integration Report

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n22.D
Date Inj'd : 5/25/2023 11:55 47
Sample : L2326777-20,42,,

QMethod : P11MAALI220328.M
Operator : petro11a:sr
Instrument : Petro 11
Quant Date : 5/25/2023 1:14 pm

Compound #20: C9-C18 Aliphatics



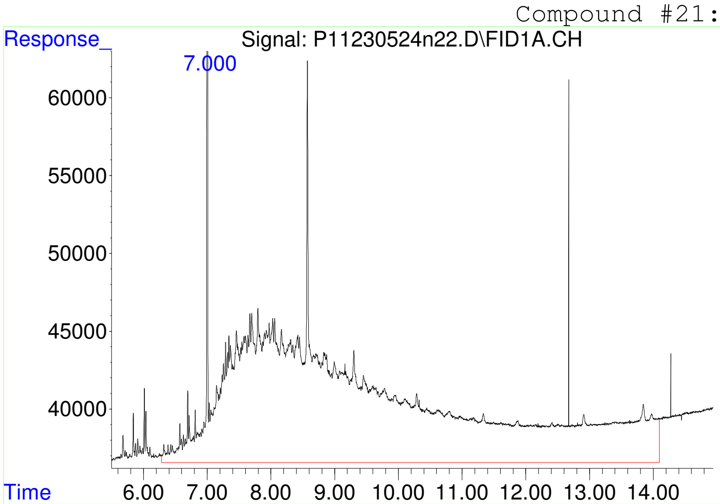



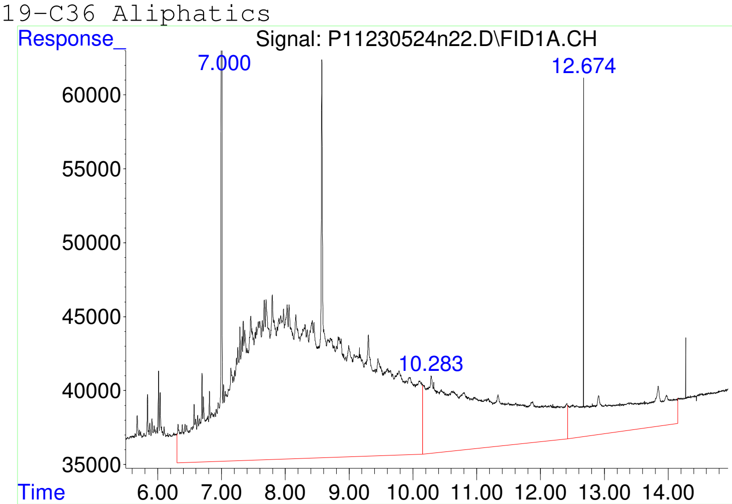

Original Peak Response = 4611237

Manual Peak Response = 4169207 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 18662014

Manual Peak Response = 21203310 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n23.D
Signal(s) : FID2B.CH
Acq On : 25-May-23, 12:20:58
Operator : petro11b:sr
Sample : L2326777-21,42,,
Misc : wg1780020 Day 2 ARO Compisite Lubricating OIl
ALS Vial : 62 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 13:11:15 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units |
|---|---|---|---|
| **System Monitoring Compounds** | | | |
| 3) s 2-Fluorobiphenyl | 4.331 | 1356380 | 17.575 mg/L |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 87.87% |
| 5) s 2-Bromonaphthalene | 4.838 | 956871 | 17.972 mg/L |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 89.86% |
| 10) S o-terphenyl | 6.345 | 1341641 | 15.285 mg/L |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 76.42% |
| **Target Compounds** | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L d |
| 21) H C11-C22 Aromatic Range | 10.624 | 4308295 | 49.791 mg/L M5 |

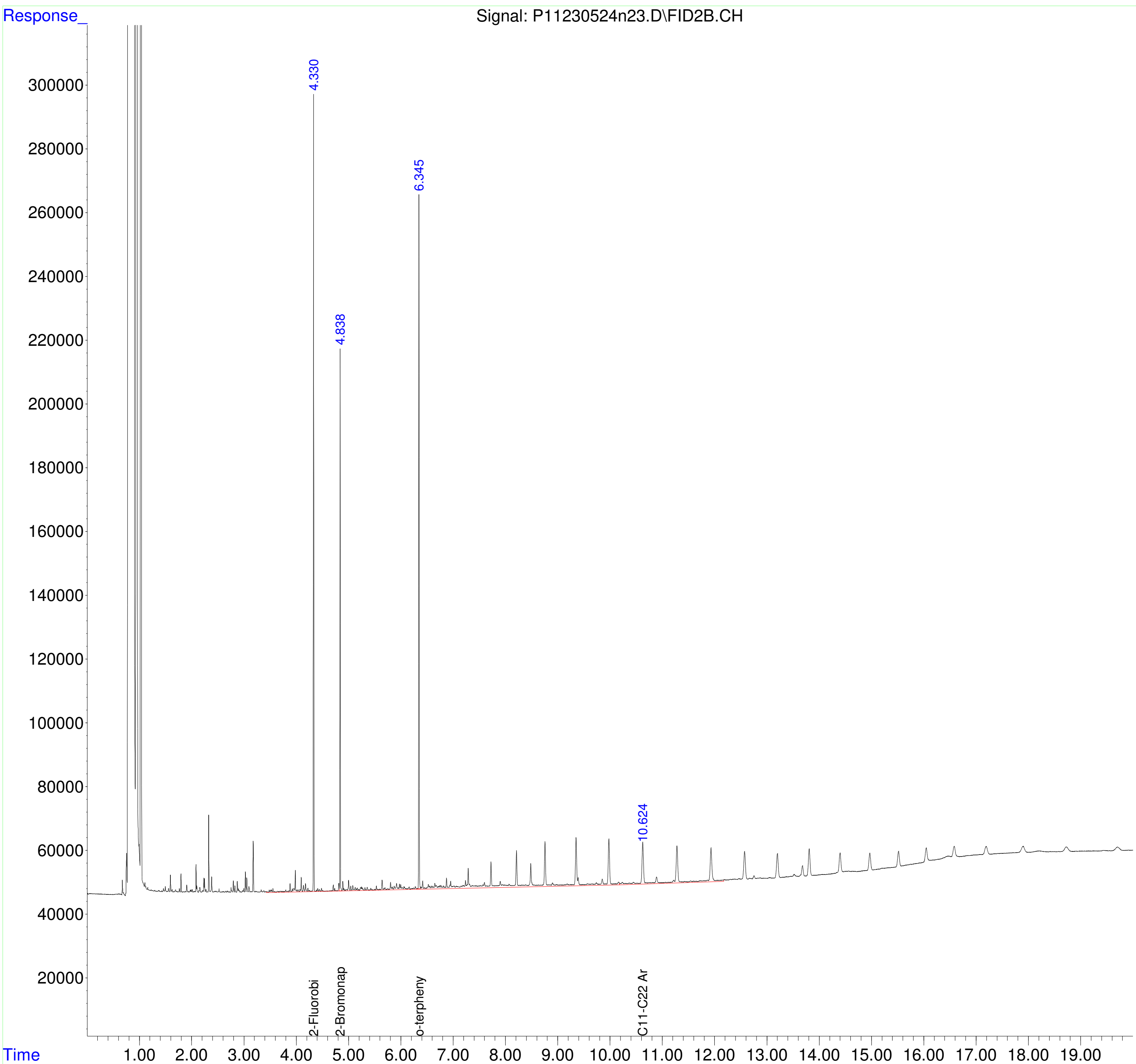
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n23.D
Signal(s) : FID2B.CH
Acq On    : 25-May-23, 12:20:58
Operator  : petro11b:sr
Sample    : L2326777-21,42,,
Misc      : wg1780020 Day 2 ARO Compisite Lubricating OIl
ALS Vial  : 62   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 13:11:15 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation    6890 Scale Mode: Large solvent peaks clipped

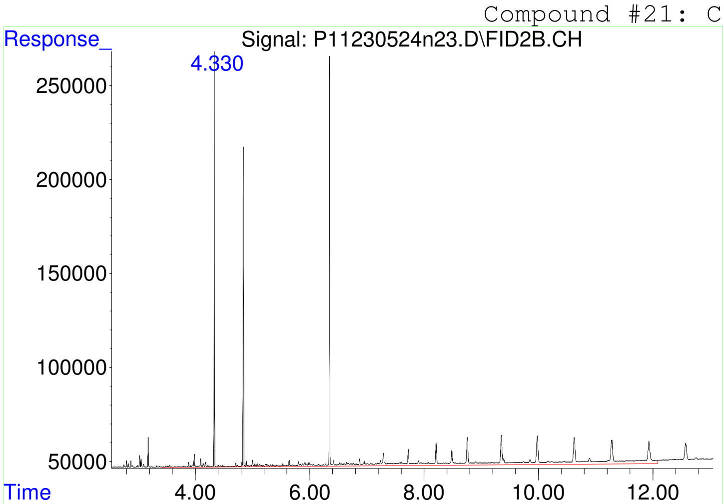
Volume Inj.  :
Signal Phase :
Signal Info  :

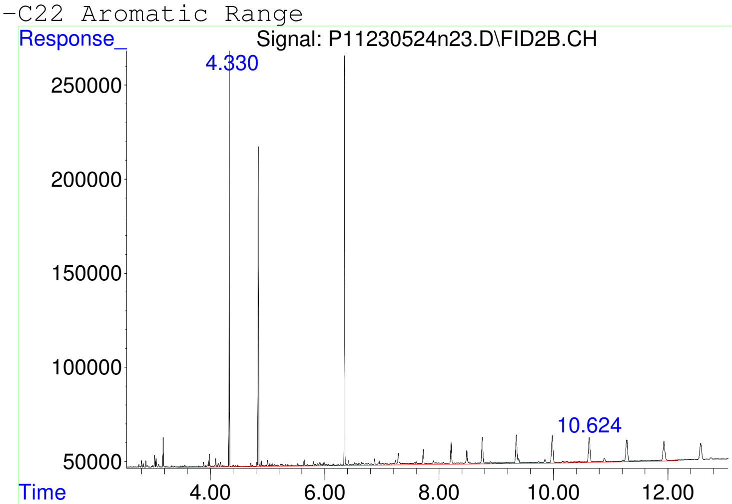


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro11\2023\230524N.SEC\ | QMethod | : P11MAARO220328.M |
| Data File | : P11230524n23.D | Operator | : petro11b:sr |
| Date Inj'd | : 5/25/2023 12:20 58 | Instrument | : Petro 11 |
| Sample | : L2326777-21,42,, | Quant Date | : 5/25/2023 1:09 pm |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 7046559

Manual Peak Response = 4308295 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n24.D
Signal(s) : FID1A.CH
Acq On : 25-May-23, 12:20:58
Operator : petro11a:sr
Sample : L2326777-21,42,,
Misc : Day 2 MDL ALI Soil Composite Lubricating OIl
ALS Vial : 12 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 13:15:08 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

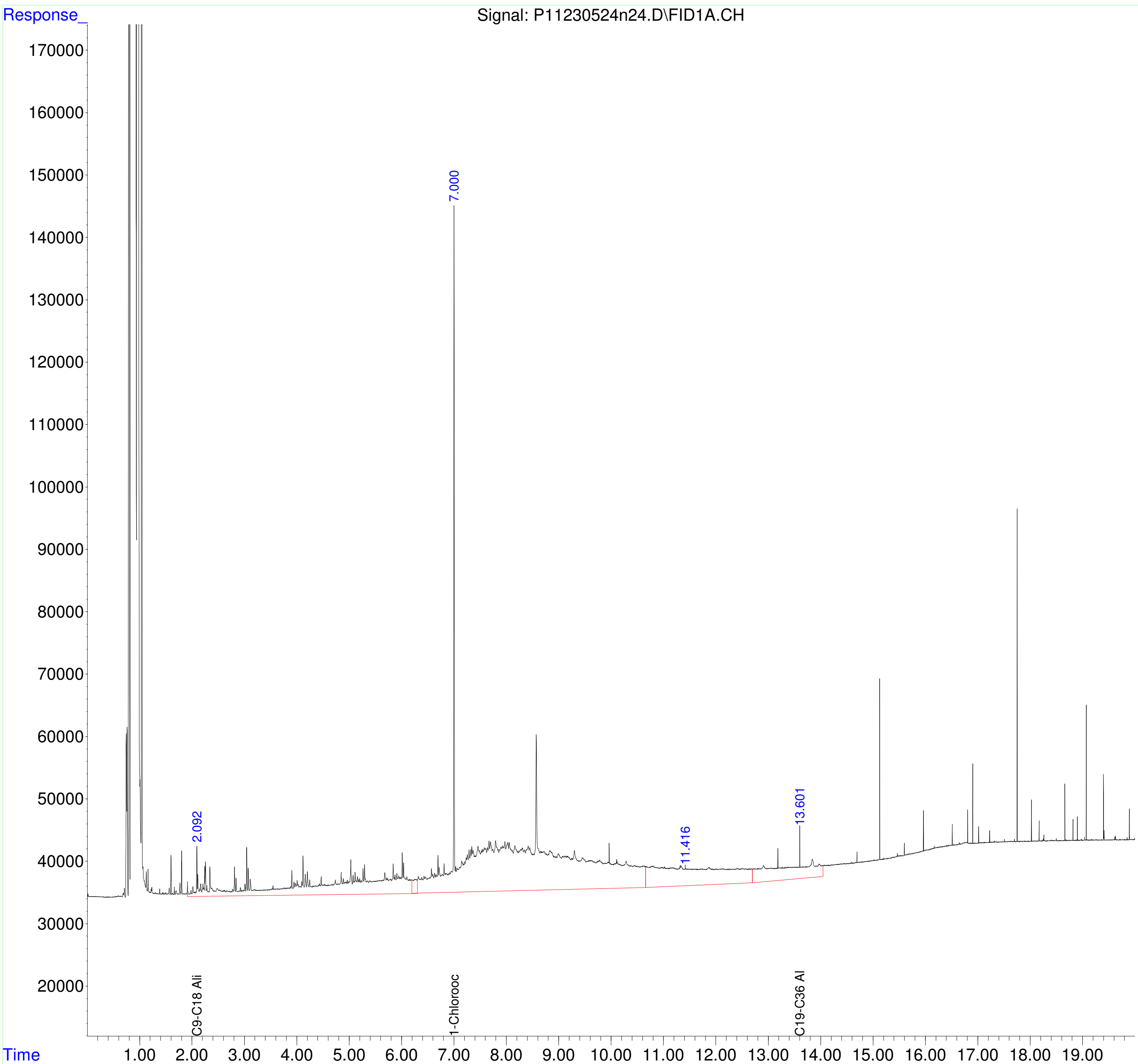
Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) S Naphthalene | 0.000 | 0 | N.D. mg/L | |
| 5) S 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | |
| 6) S 2-Fluorobiphenyl | 0.000 | 0 | N.D. mg/kg | |
| 8) S 2-Bromonaphthalene | 0.000 | 0 | N.D. mg/kg | |
| 13) S 1-Chlorooctadecane | 7.000 | 724430 | 11.653 mg/L | |
| Spiked Amount 20.000 | | Recovery = | 58.27% | |
| **Target Compounds** | | | | |
| 1) Nonane (C9) | 0.000 | 0 | N.D. mg/L | |
| 2) Decane (C10) | 0.000 | 0 | N.D. mg/L | |
| 4) Dodecane (C12) | 0.000 | 0 | N.D. mg/L | |
| 7) Tetradecane (C14) | 0.000 | 0 | N.D. mg/L | |
| 9) Hexadecane (C16) | 0.000 | 0 | N.D. mg/L | |
| 10) Octadecane (C18) | 0.000 | 0 | N.D. mg/L | |
| 11) Nonadecane (c19) | 0.000 | 0 | N.D. mg/kg | |
| 12) Eicosane (C20) | 0.000 | 0 | N.D. mg/L | |
| 14) Docosane (C22) | 0.000 | 0 | N.D. mg/L | |
| 15) Tetracosane (C24) | 0.000 | 0 | N.D. mg/L | |
| 16) Hexacosane (C26) | 0.000 | 0 | N.D. mg/L | |
| 17) Octacosane (C28) | 0.000 | 0 | N.D. mg/L | |
| 18) Triacontane (C30) | 0.000 | 0 | N.D. mg/L | |
| 19) Hexatriacontane (C36) | 0.000 | 0 | N.D. mg/L | |
| 20) H C9-C18 Aliphatics | 2.092f | 4276130 | 62.654 mg/L | M5 |
| 21) H C19-C36 Aliphatics | 13.601f | 17881745 | 250.621 mg/L | M5 |

(f)=RT Delta > 1/2 Window (m)=manual int.

```
Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n24.D
Signal(s) : FID1A.CH
Acq On    : 25-May-23, 12:20:58
Operator  : petro11a:sr
Sample    : L2326777-21,42,,
Misc      : Day 2 MDL ALI Soil  Composite Lubricating OIl
ALS Vial  : 12   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 13:15:08 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation    6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :
```

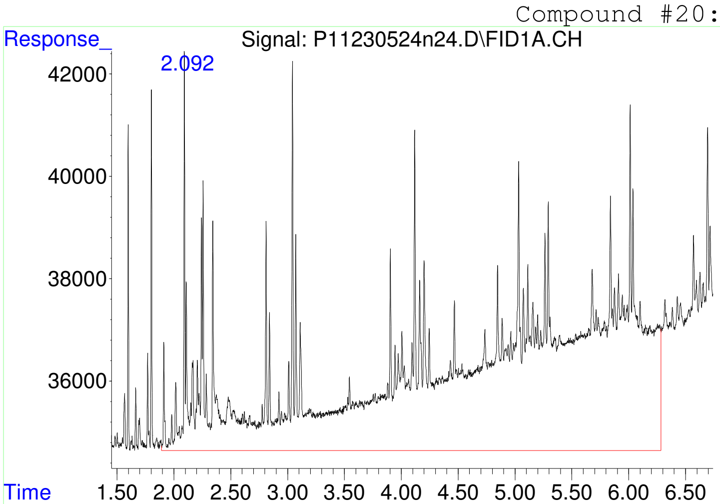


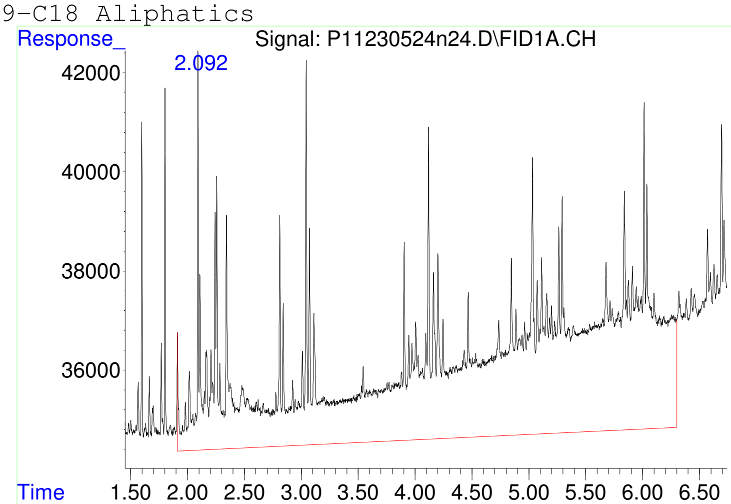
Manual Integration Report

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n24.D
Date Inj'd : 5/25/2023 12:20 58
Sample : L2326777-21,42,,

QMethod : P11MAALI220328.M
Operator : petro11a:sr
Instrument : Petro 11
Quant Date : 5/25/2023 1:14 pm

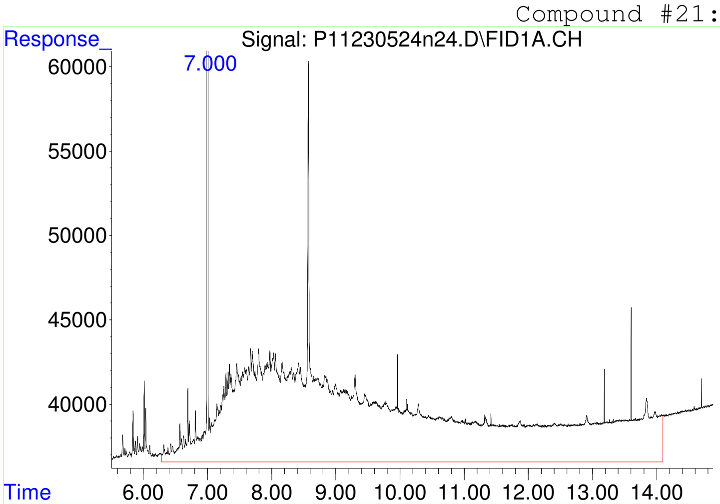
Compound #20: C9-C18 Aliphatics

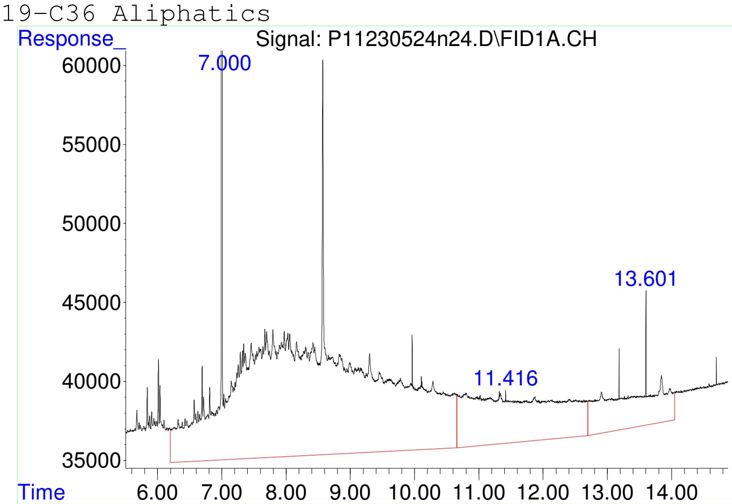



Original Peak Response = 4157192
Manual Peak Response = 4276130 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics

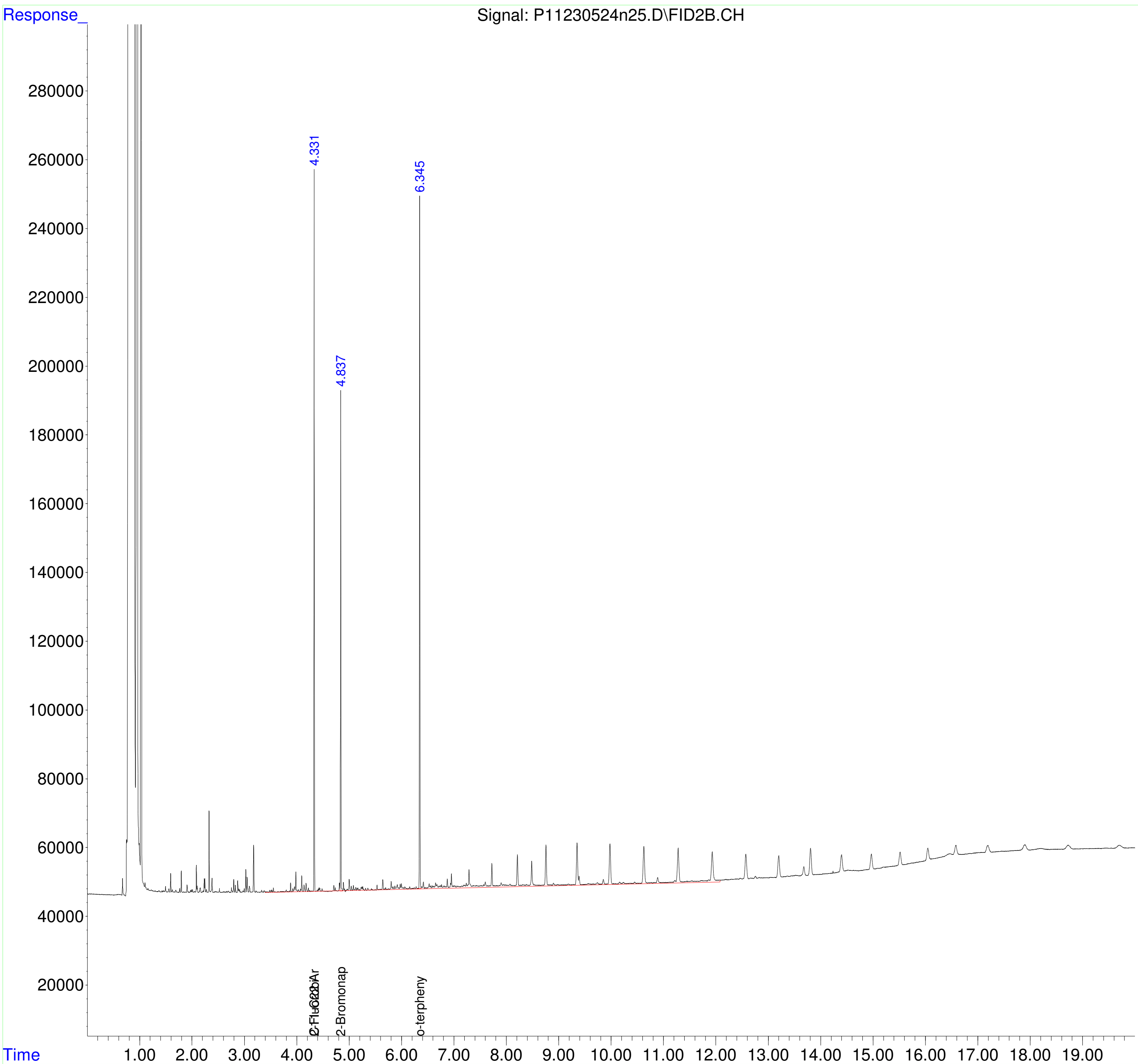



Original Peak Response = 14513828
Manual Peak Response = 17881745 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

```
Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n25.D
Signal(s) : FID2B.CH
Acq On    : 25-May-23, 12:46:16
Operator  : petro11b:sr
Sample    : L2326777-22,42,,
Misc      : wg1780020 Day 2 ARO Compisite Lubricating OIl
ALS Vial  : 63   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 13:11:45 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation   6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed

        Compound                        R.T.       Response    Conc Units
 ------------------------------------------------------------------------

 System Monitoring Compounds
 3) s   2-Fluorobiphenyl              4.331       1154988   14.965 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   74.83%
 5) s   2-Bromonaphthalene            4.838        818149   15.367 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   76.84%
10) S   o-terphenyl                   6.345       1259879   14.353 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   71.77%

 Target Compounds
 1)     Naphthalene                   0.000             0    N.D.  mg/L  d
 2)     2-Methylnaphthalene           0.000             0    N.D.  mg/L  d
 4)     Acenaphthalene                0.000             0    N.D.  mg/L  d
 6)     Acenaphthene                  0.000             0    N.D.  mg/L  d
 7)     Fluorene                      0.000             0    N.D.  mg/L  d
 8)     Phenanthrene                  0.000             0    N.D.  mg/L  d
 9)     Anthracene                    0.000             0    N.D.  mg/L  d
11)     Fluoranthene                  0.000             0    N.D.  mg/L  d
12)     Pyrene                        0.000             0    N.D.  mg/L  d
13)     Benzo(a)anthracene            0.000             0    N.D.  mg/L  d
14)     Chrysene                      0.000             0    N.D.  mg/L  d
15)     Benzo(b)fluoranthene          0.000             0    N.D.  mg/L  d
16)     Benzo(k)fluoranthene          0.000             0    N.D.  mg/L  d
17)     Benzo(a)pyrene                0.000             0    N.D.  mg/L  d
18)     Indeno(1,2,3-cd)pyrene        0.000             0    N.D.  mg/L  d
19)     Dibenzo(a,h)anthracene        0.000             0    N.D.  mg/L  d
20)     Benzo(ghi)perylene            0.000             0    N.D.  mg/L  d
21) H   C11-C22 Aromatic Range        4.331f      3356567   38.792 mg/L  M5
 ------------------------------------------------------------------------

(f)=RT Delta > 1/2 Window                             (m)=manual int.
```

```
Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n25.D
Signal(s) : FID2B.CH
Acq On    : 25-May-23, 12:46:16
Operator  : petro11b:sr
Sample    : L2326777-22,42,,
Misc      : wg1780020 Day 2 ARO Compisite Lubricating OIl
ALS Vial  : 63   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 13:11:45 2023
Quant Method : I:\PETRO\Petro11\2023\230524N.SEC\P11MAARO220328.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu May 25 06:43:43 2023
Response via : Initial Calibration
Integrator: ChemStation   6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :
```

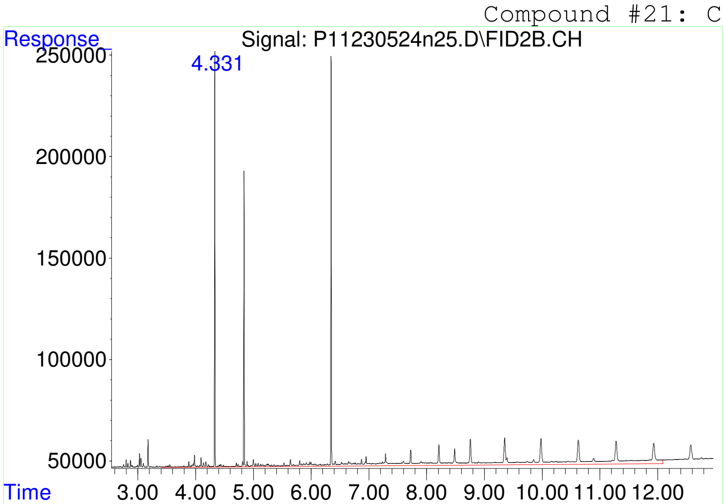


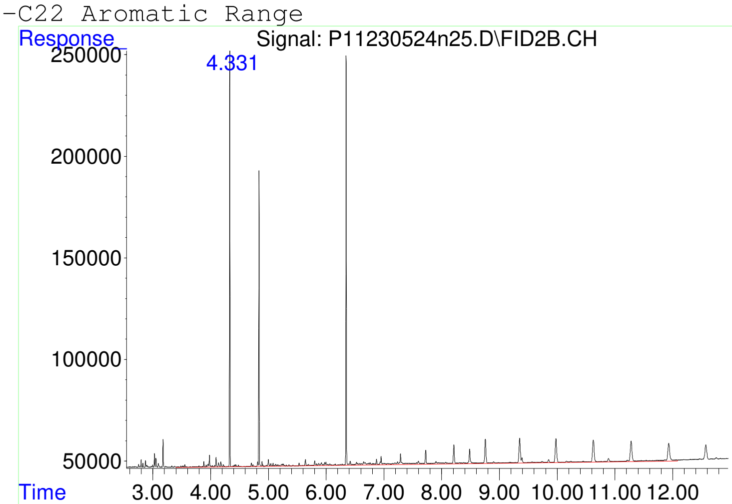
Manual Integration Report

Data Path : I:\PETRO\Petro11\2023\230524N.SEC\
Data File : P11230524n25.D
Date Inj'd : 5/25/2023 12:46 16
Sample : L2326777-22,42,,

QMethod : P11MAARO220328.M
Operator : petro11b:sr
Instrument : Petro 11
Quant Date : 5/25/2023 1:09 pm

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 6666221

Manual Peak Response = 3356567 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n26.D
Signal(s) : FID1A.CH
Acq On : 25-May-23, 12:46:16
Operator : petro11a:sr
Sample : L2326777-22,42,,
Misc : Day 2 MDL ALI Soil Composite Lubricating OIl
ALS Vial : 13 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 13:15:45 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Large solvent peaks clipped

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | |
| 13) S | 1-Chlorooctadecane | 7.000 | 762931 | 12.272 | mg/L | M4 |
| Spiked Amount | 20.000 | | Recovery = | 61.36% | | |
| Target Compounds | | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | |
| 20) H | C9-C18 Aliphatics | 3.043f | 4350903 | 63.749 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 13.732f | 19652048 | 275.433 | mg/L | M5 |

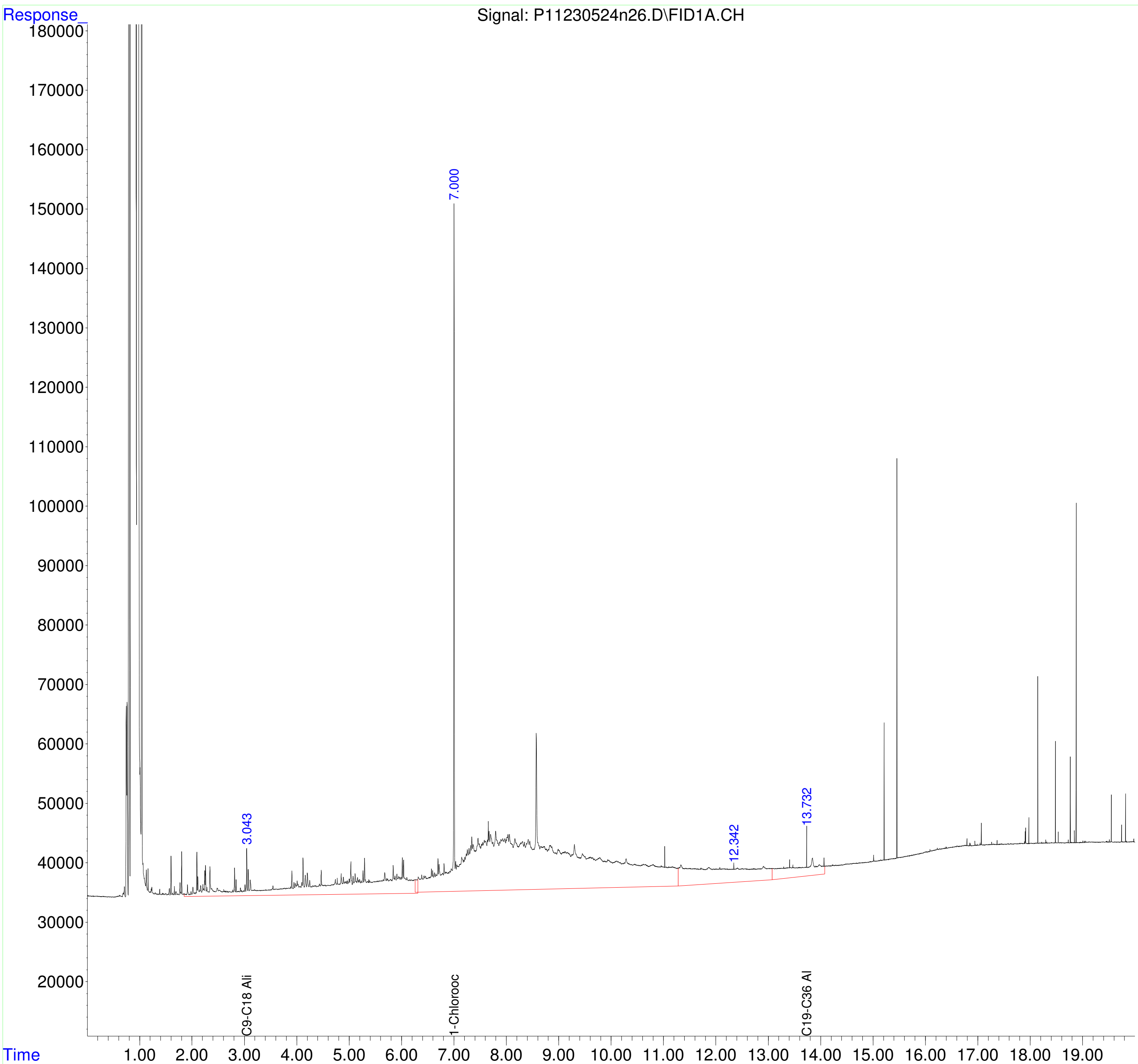
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n26.D
Signal(s) : FID1A.CH
Acq On    : 25-May-23, 12:46:16
Operator  : petro11a:sr
Sample    : L2326777-22,42,,
Misc      : Day 2 MDL ALI Soil  Composite Lubricating OIl
ALS Vial  : 13   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 13:15:45 2023
Quant Method : I:\PETRO\Petro11\2023\230524n\P11MAALI220328.M
Quant Title  : MA EPH Aliphatic
QLast Update : Thu May 25 06:34:23 2023
Response via : Initial Calibration
Integrator: ChemStation   6890 Scale Mode: Large solvent peaks clipped

Volume Inj.  :
Signal Phase :
Signal Info  :

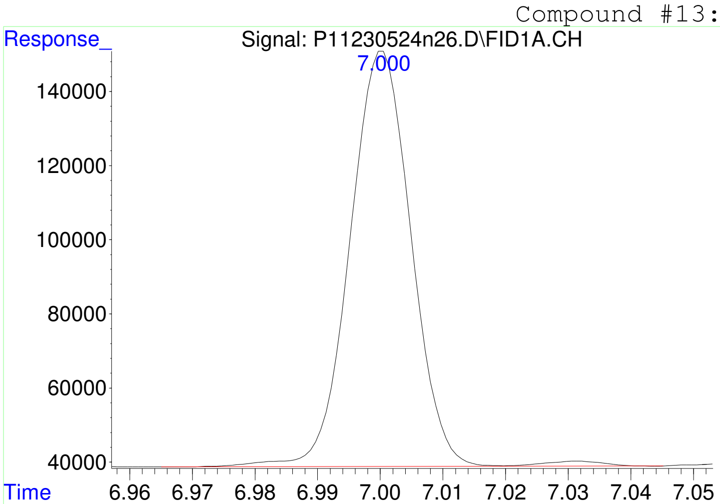


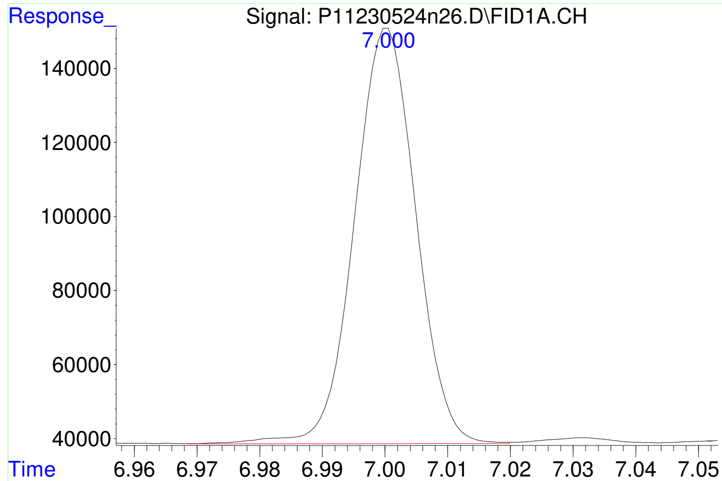
Manual Integration Report

Data Path : I:\PETRO\Petro11\2023\230524n\
Data File : P11230524n26.D
Date Inj'd : 5/25/2023 12:46 16
Sample : L2326777-22,42,,

QMethod : P11MAALI220328.M
Operator : petro11a:sr
Instrument : Petro 11
Quant Date : 5/25/2023 1:14 pm

Compound #13: 1-Chlorooctadecane

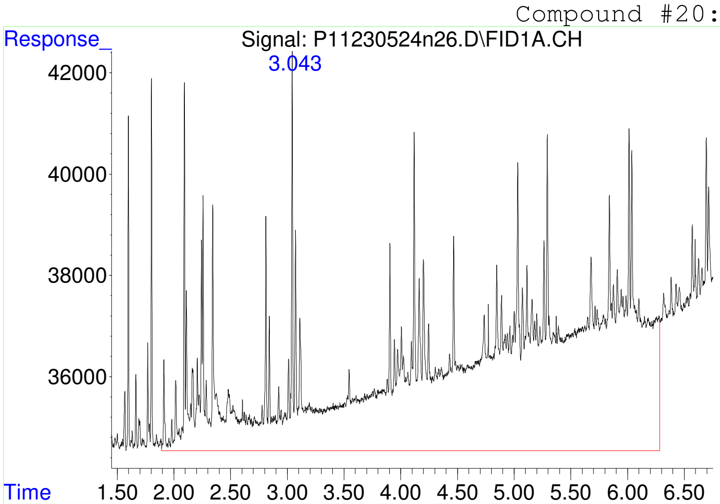


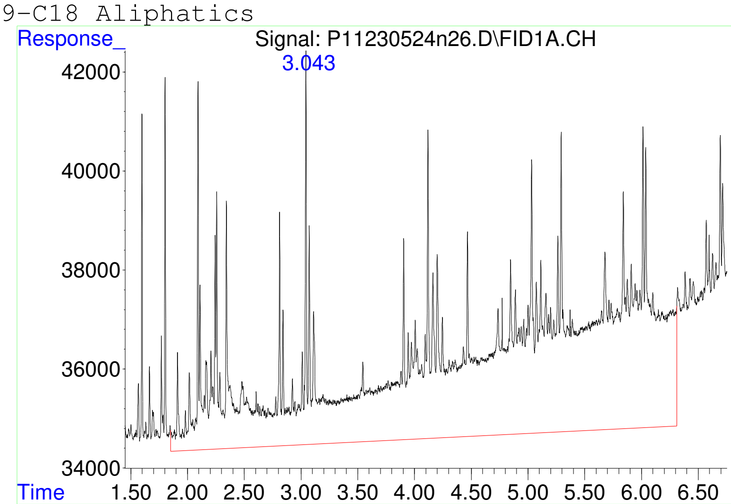




Original Peak Response = 767360
M4 = Poor automated baseline construction.

Manual Peak Response = 762931 M4

Compound #20: C9-C18 Aliphatics



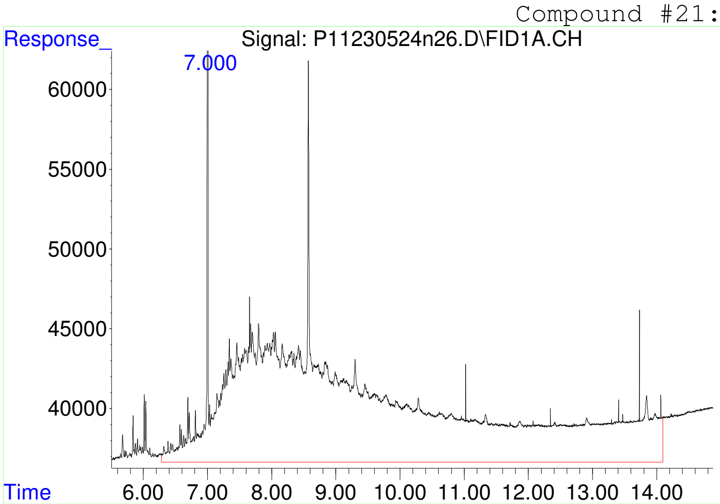



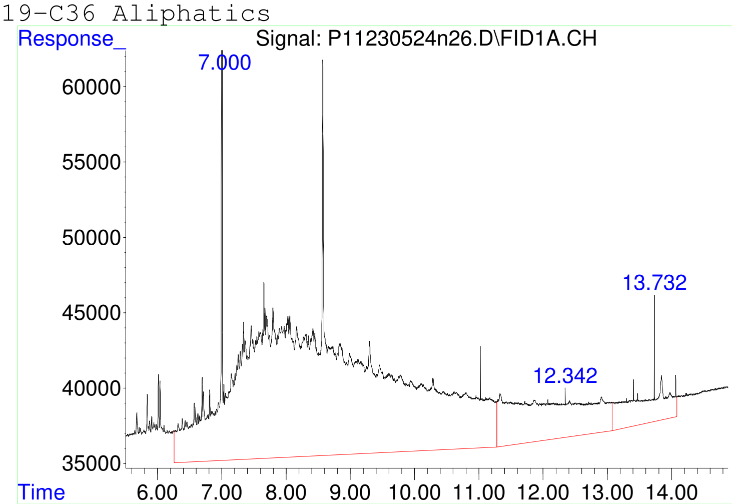

Original Peak Response = 4457486

Manual Peak Response = 4350903 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 16975062

Manual Peak Response = 19652048 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

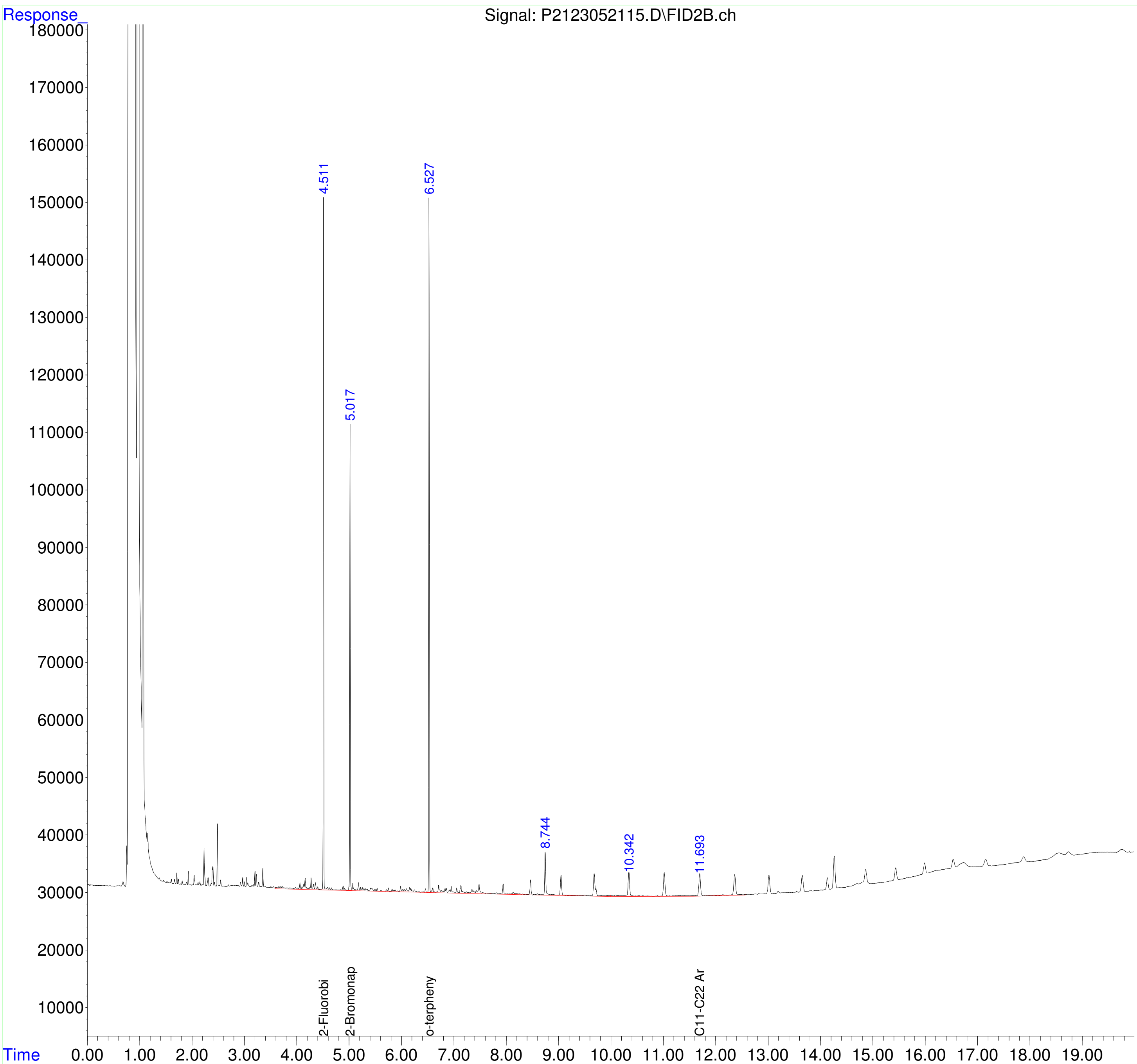
```
Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052115.D
Signal(s) : FID2B.ch
Acq On    : 21 May 2023   4:10 pm
Operator  : Petro21b:sr
Sample    : WG1780597-1,42,, mdl
Misc      : wg1780597 Day 3 ARO Blanks
ALS Vial  : 58   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 11:42:18 2023
Quant Method : I:\PETRO\Petro21\2023\230521.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu May 18 08:24:31 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed

        Compound                       R.T.       Response    Conc Units
 ---------------------------------------------------------------------------

 System Monitoring Compounds
 3) s   2-Fluorobiphenyl              4.512        912031   13.031 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   65.16%
 5) s   2-Bromonaphthalene            5.019        636481   12.914 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   64.57%
10) S   o-terphenyl                   6.528        973129   10.687 mg/L
Spiked Amount     20.000   Range  40 - 140    Recovery   =   53.44%

 Target Compounds
 1)     Naphthalene                   0.000             0    N.D.  mg/L
 2)     2-Methylnaphthalene           0.000             0    N.D.  mg/L  d
 4)     Acenaphthalene                0.000             0    N.D.  mg/L  d
 6)     Acenaphthene                  0.000             0    N.D.  mg/L  d
 7)     Fluorene                      0.000             0    N.D.  mg/L  d
 8)     Phenanthrene                  0.000             0    N.D.  mg/L  d
 9)     Anthracene                    0.000             0    N.D.  mg/L  d
11)     Fluoranthene                  0.000             0    N.D.  mg/L  d
12)     Pyrene                        0.000             0    N.D.  mg/L  d
13)     Benzo(a)anthracene            0.000             0    N.D.  mg/L  d
14)     Chrysene                      0.000             0    N.D.  mg/L  d
15)     Benzo(b)fluoranthene          0.000             0    N.D.  mg/L  d
16)     Benzo(k)fluoranthene          0.000             0    N.D.  mg/L  d
17)     Benzo(a)pyrene                0.000             0    N.D.  mg/L  d
18)     Indeno(1,2,3-cd)pyrene        0.000             0    N.D.  mg/L  d
19)     Dibenzo(a,h)anthracene        0.000             0    N.D.  mg/L  d
20)     Benzo(ghi)perylene            0.000             0    N.D.  mg/L  d
21) H   C11-C22 Aromatic Range       11.693       1516575   18.141 mg/L  M5
 ---------------------------------------------------------------------------

 (f)=RT Delta > 1/2 Window                              (m)=manual int.
```

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052115.D
Signal(s) : FID2B.ch
Acq On     : 21 May 2023    4:10 pm
Operator  : Petro21b:sr
Sample     : WG1780597-1,42,, mdl
Misc       : wg1780597 Day 3 ARO Blanks
ALS Vial   : 58    Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 11:42:18 2023
Quant Method : I:\PETRO\Petro21\2023\230521.SEC\P21MAARO211129B.M
Quant Title   : MA EPH Aromatic
QLast Update : Thu May 18 08:24:31 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

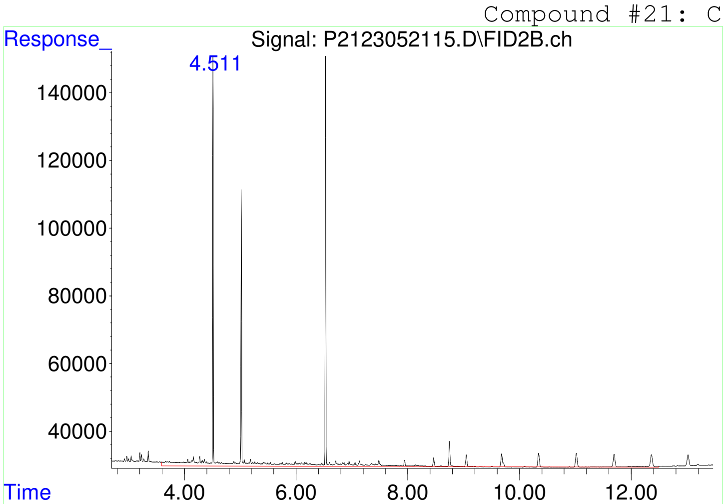


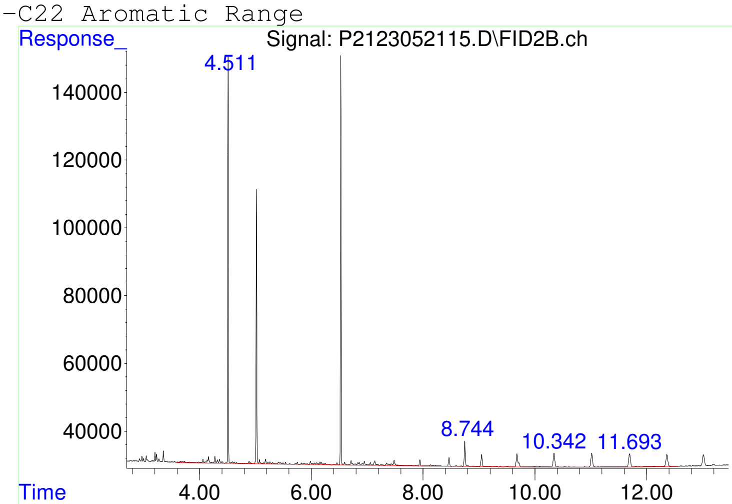
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052115.D
Date Inj'd : 5/21/2023 4:10 pm
Sample : WG1780597-1,42,, mdl

QMethod : P21MAARO211129B.M
Operator : Petro21b:sr
Instrument : Petro 21
Quant Date : 5/25/2023 11:40 am

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 2947238

Manual Peak Response = 1516575 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052116.D
Signal(s) : FID1A.ch
Acq On : 21 May 2023 4:10 pm
Operator : Petro21a:sr
Sample : WG1780597-1,42,, mdl
Misc : wg1780597 Day 3 ALI Blanks
ALS Vial : 8 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:31:22 2023
Quant Method : I:\PETRO\Petro21\2023\230521\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:10:41 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.171 | 891828 | 14.334 | mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 71.67% | | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 2.214f | 930035 | 12.995 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.236f | 841555 | 12.219 | mg/L | M5 |

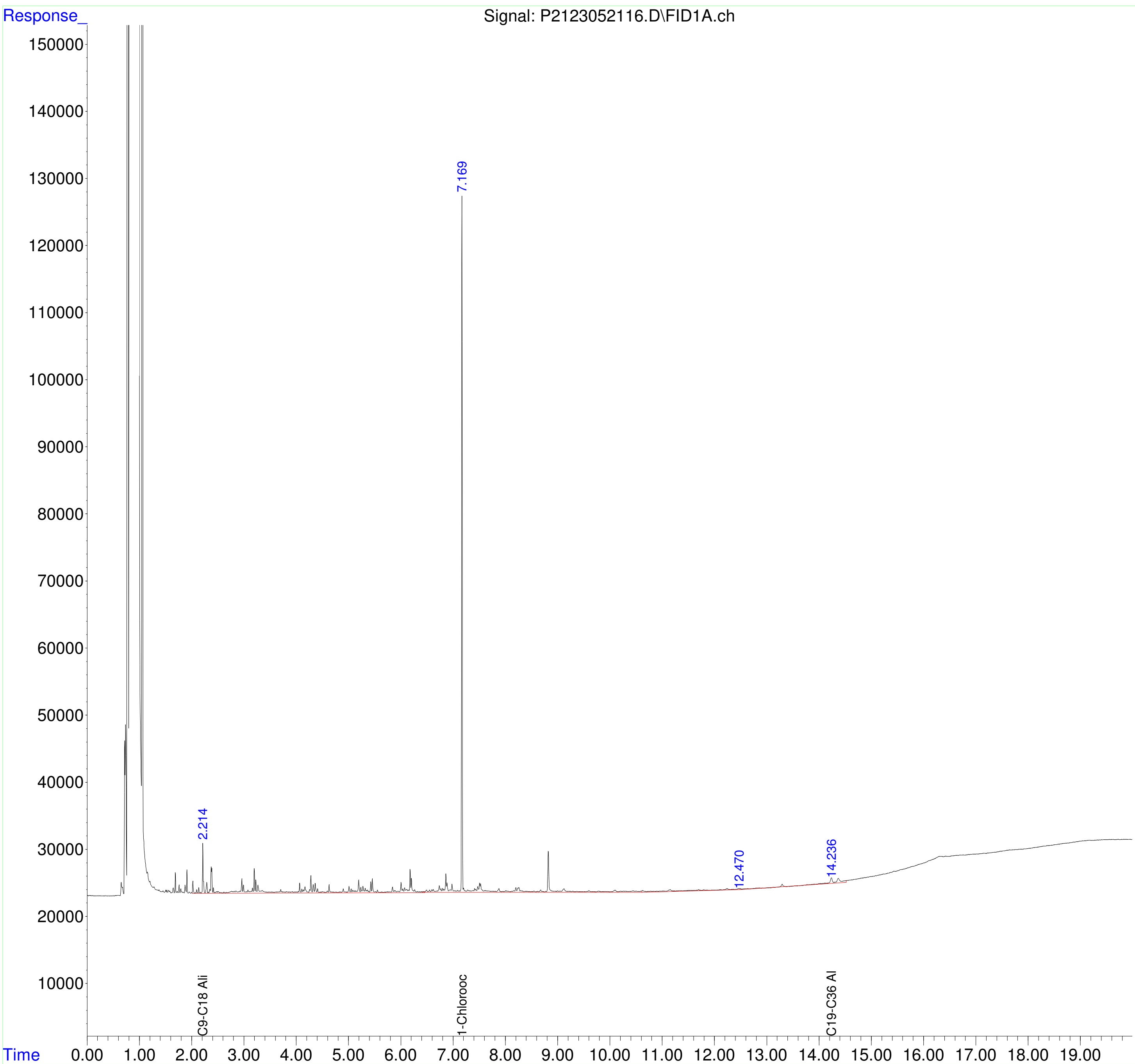
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052116.D
Signal(s) : FID1A.ch
Acq On    : 21 May 2023   4:10 pm
Operator  : Petro21a:sr
Sample    : WG1780597-1,42,, mdl
Misc      : wg1780597 Day 3 ALI  Blanks
ALS Vial  : 8   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:31:22 2023
Quant Method : I:\PETRO\Petro21\2023\230521\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:10:41 2023
Response via : Initial Calibration
Integrator: ChemStation

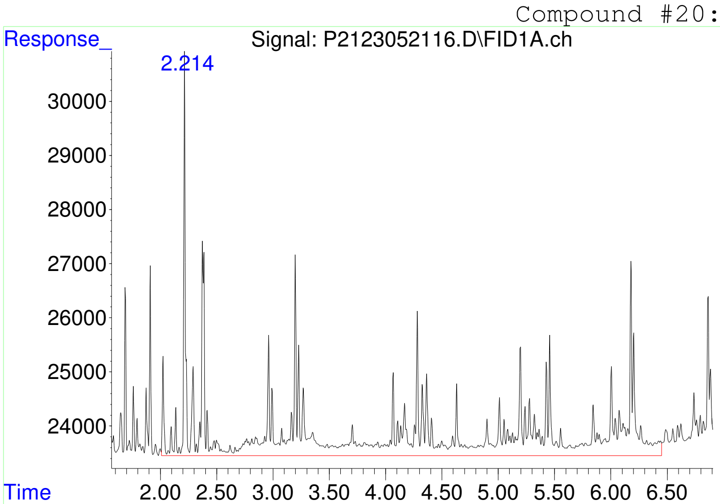
Volume Inj.  :
Signal Phase :
Signal Info  :

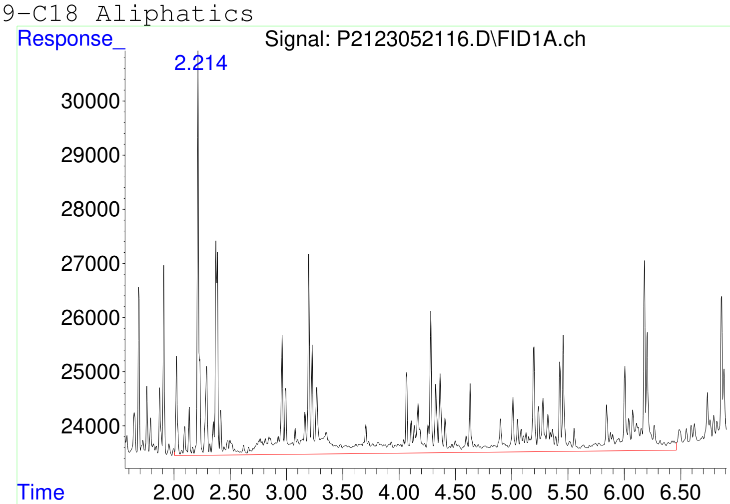


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230521\ | QMethod | : P21MAALI211129A.M |
| Data File | : P2123052116.D | Operator | : Petro21a:sr |
| Date Inj'd | : 5/21/2023 4:10 pm | Instrument | : Petro 21 |
| Sample | : WG1780597-1,42,, mdl | Quant Date | : 5/25/2023 11:29 am |

Compound #20: C9-C18 Aliphatics

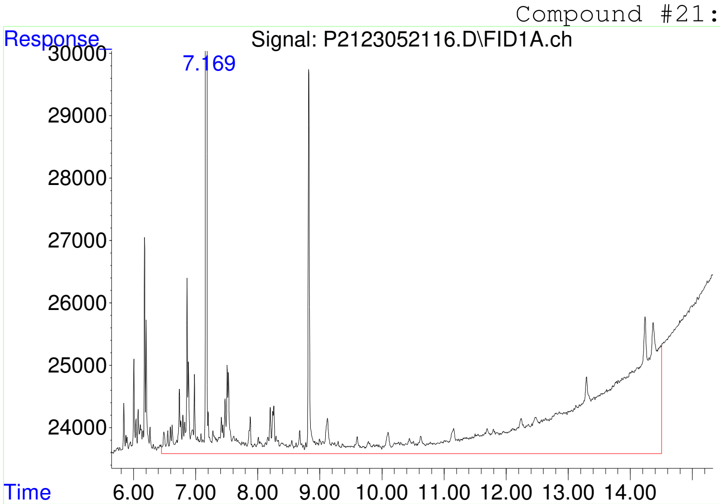


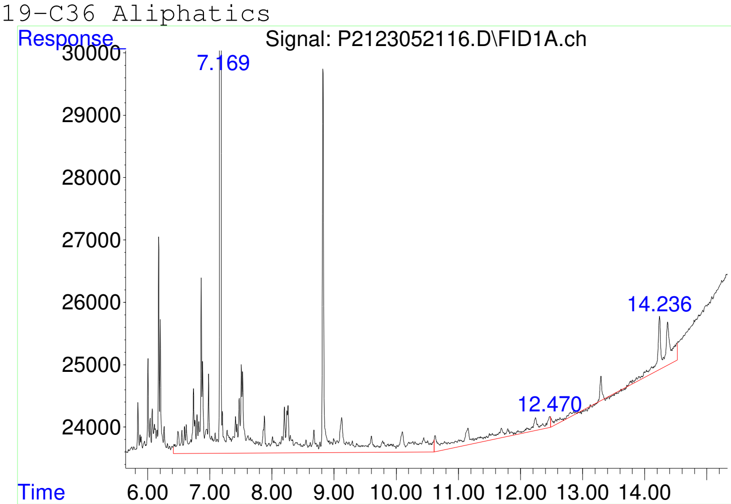




Original Peak Response = 1058172    Manual Peak Response = 930035 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 2222513    Manual Peak Response = 841555 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052117.D
Signal(s) : FID2B.ch
Acq On : 21 May 2023 4:35 pm
Operator : Petro21b:sr
Sample : WG1780597-2,42,, mdl
Misc : wg1780597 Day 3 ARO Blanks
ALS Vial : 59 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 11:42:43 2023
Quant Method : I:\PETRO\Petro21\2023\230521.SEC\P21MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 18 08:24:56 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | |
| 3) s | 2-Fluorobiphenyl | 4.512 | 869715 | 12.427 mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 62.13% | | |
| 5) s | 2-Bromonaphthalene | 5.019 | 608742 | 12.351 mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 61.76% | | |
| 10) S | o-terphenyl | 6.528 | 936013 | 10.279 mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 51.40% | | |
| | **Target Compounds** | | | | |
| 1) | Naphthalene | 0.000 | 0 | N.D. mg/L | |
| 2) | 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) | Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) | Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) | Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) | Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) | Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) | Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) | Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) | Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) | Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) | Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) | Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) | Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) | Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) | Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) | Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H | C11-C22 Aromatic Range | 12.362f | 1556368 | 18.617 mg/L | M5 |

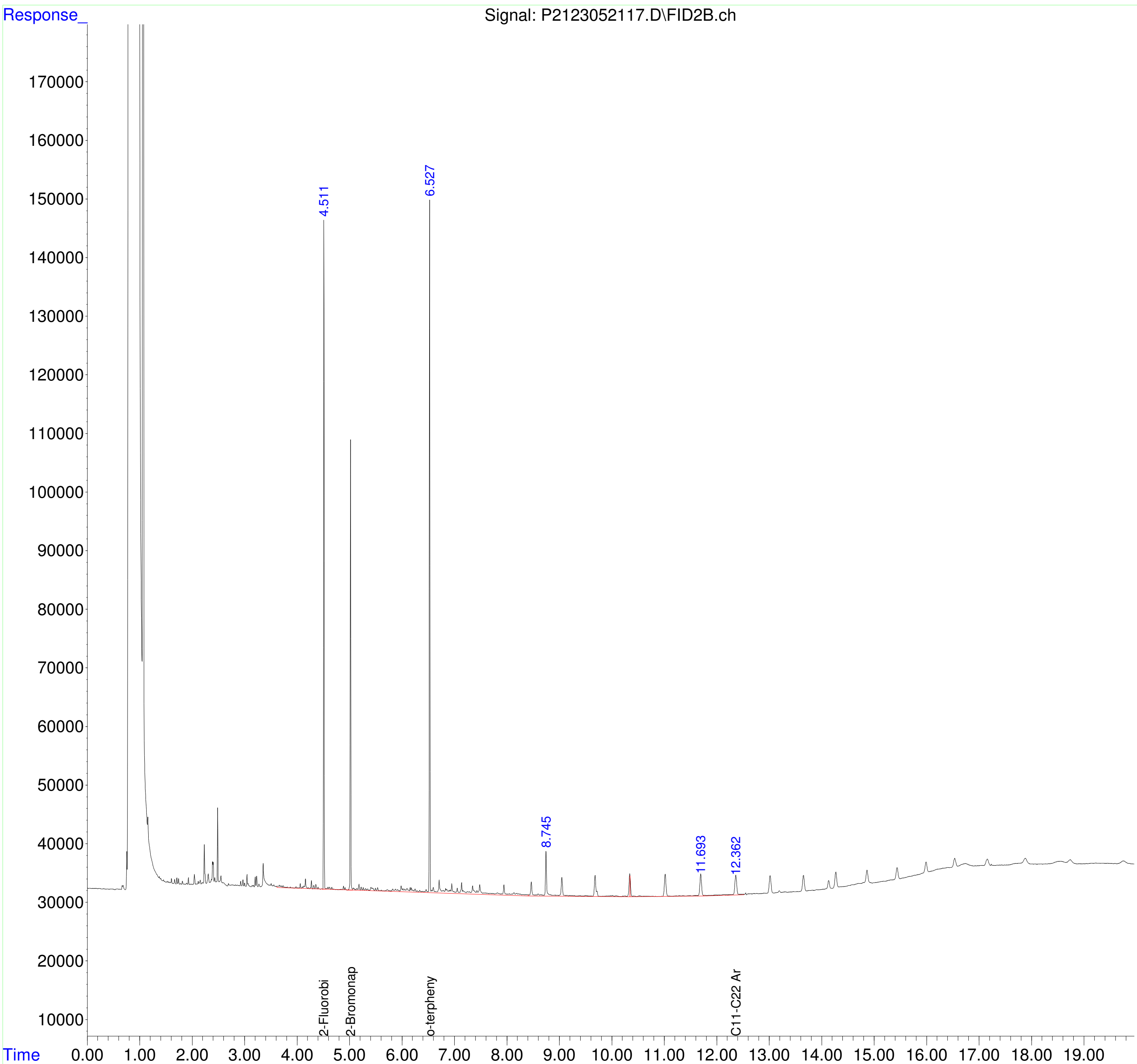
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052117.D
Signal(s) : FID2B.ch
Acq On    : 21 May 2023   4:35 pm
Operator  : Petro21b:sr
Sample    : WG1780597-2,42,, mdl
Misc      : wg1780597 Day 3 ARO Blanks
ALS Vial  : 59   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 11:42:43 2023
Quant Method : I:\PETRO\Petro21\2023\230521.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu May 18 08:24:56 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

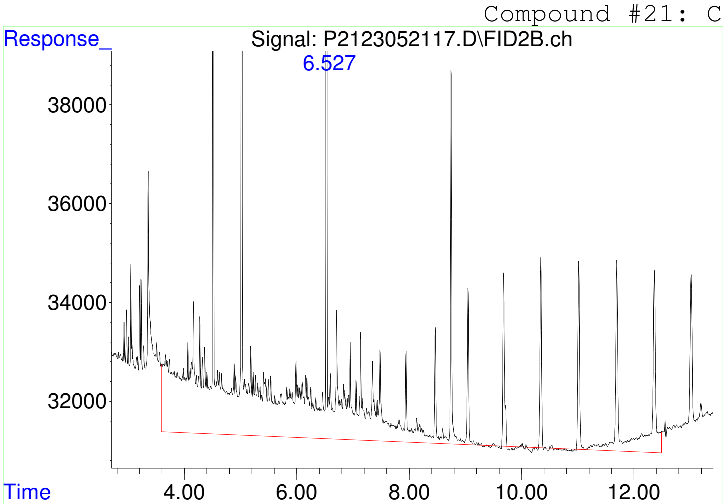


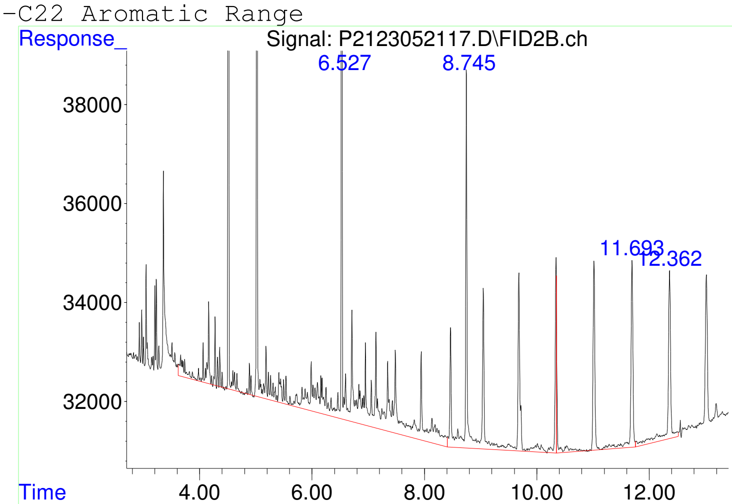
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052117.D
Date Inj'd : 5/21/2023 4:35 pm
Sample : WG1780597-2,42,, mdl

QMethod : P21MAARO211129B.M
Operator : Petro21b:sr
Instrument : Petro 21
Quant Date : 5/25/2023 11:40 am

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3107676

Manual Peak Response = 1556368 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052118.D
Signal(s) : FID1A.ch
Acq On    : 21 May 2023   4:35 pm
Operator  : Petro21a:sr
Sample    : WG1780597-2,42,, mdl
Misc      : wg1780597 Day 3 ALI  Blanks
ALS Vial  : 9   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:31:52 2023
Quant Method : I:\PETRO\Petro21\2023\230521\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.170 | 737969 | 11.861 | mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 59.31% | | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 2.214f | 1059673 | 14.807 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.234f | 670323 | 9.733 | mg/L | M5 |

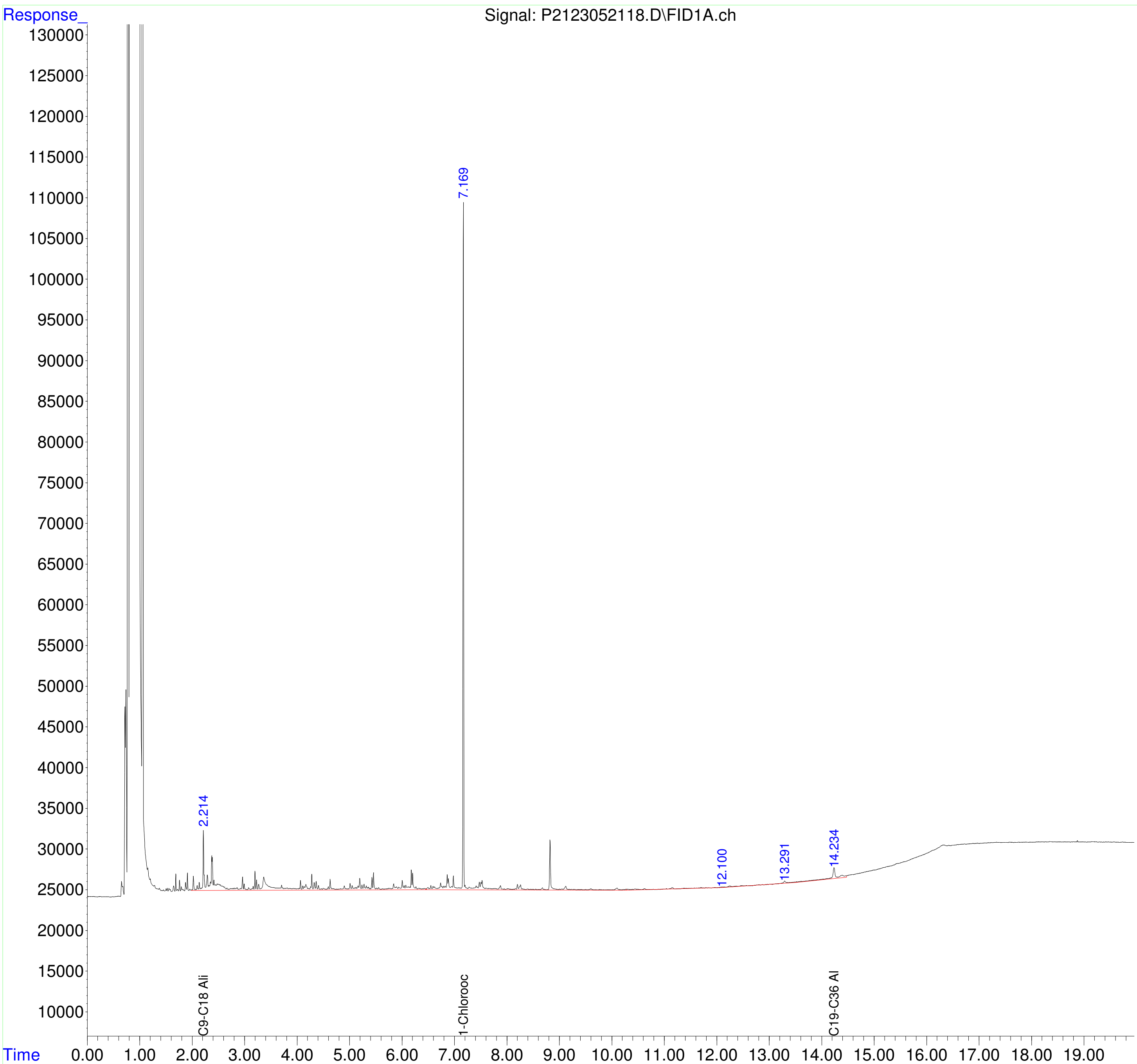
(f)=RT Delta > 1/2 Window                    (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052118.D
Signal(s) : FID1A.ch
Acq On : 21 May 2023 4:35 pm
Operator : Petro21a:sr
Sample : WG1780597-2,42,, mdl
Misc : wg1780597 Day 3 ALI Blanks
ALS Vial : 9 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:31:52 2023
Quant Method : I:\PETRO\Petro21\2023\230521\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

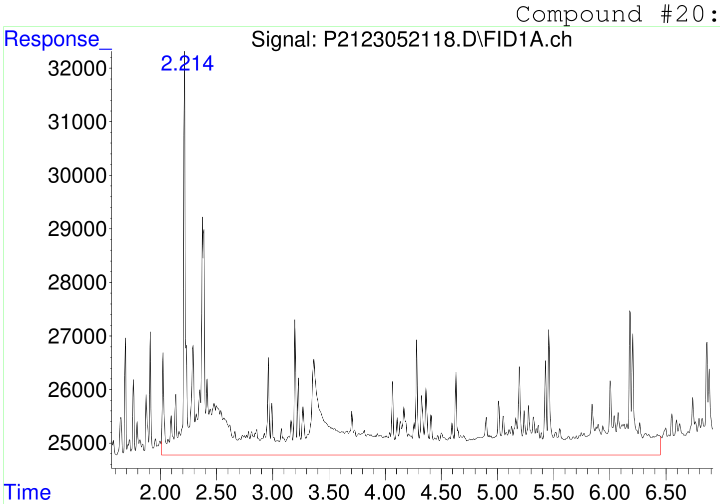


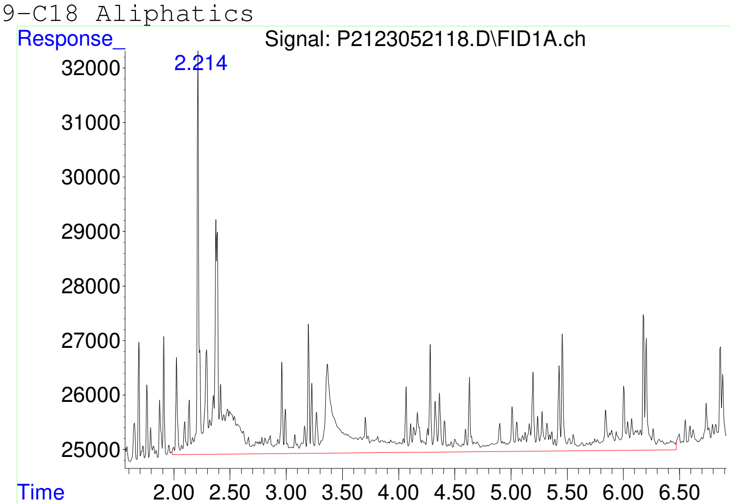
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052118.D
Date Inj'd : 5/21/2023 4:35 pm
Sample : WG1780597-2,42,, mdl

QMethod : P21MAALI211129A.M
Operator : Petro21a:sr
Instrument : Petro 21
Quant Date : 5/25/2023 11:29 am

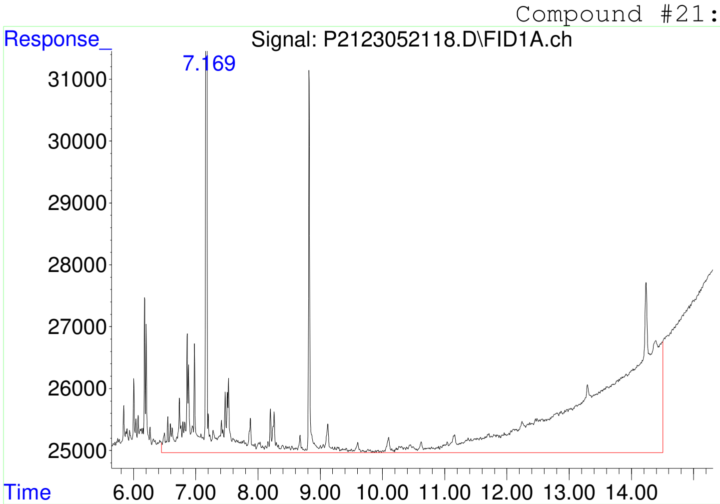
Compound #20: C9-C18 Aliphatics

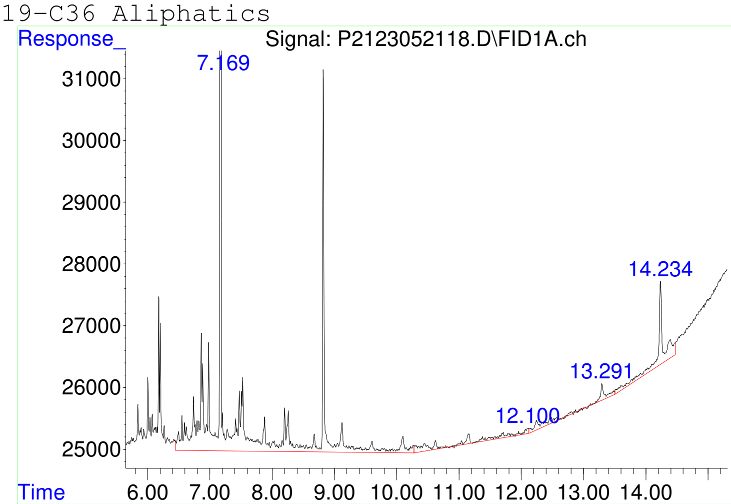



Original Peak Response = 1515727
Manual Peak Response = 1059673 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 2083726
Manual Peak Response = 670323 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052119.D
Signal(s) : FID2B.ch
Acq On : 21 May 2023 5:00 pm
Operator : Petro21b:sr
Sample : L2326777-07,42,, mdl
Misc : wg1780597 Day 3 ARO L2233244-18
ALS Vial : 60 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 11:43:08 2023
Quant Method : I:\PETRO\Petro21\2023\230521.SEC\P21MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 18 08:24:56 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.512 | 807927 | 11.544 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 57.72% | | |
| 5) s 2-Bromonaphthalene | 5.019 | 566825 | 11.500 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 57.50% | | |
| 10) S o-terphenyl | 6.529 | 879115 | 9.655 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = 48.27% | | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 10.340 | 1783024 | 21.328 mg/L | M5 |

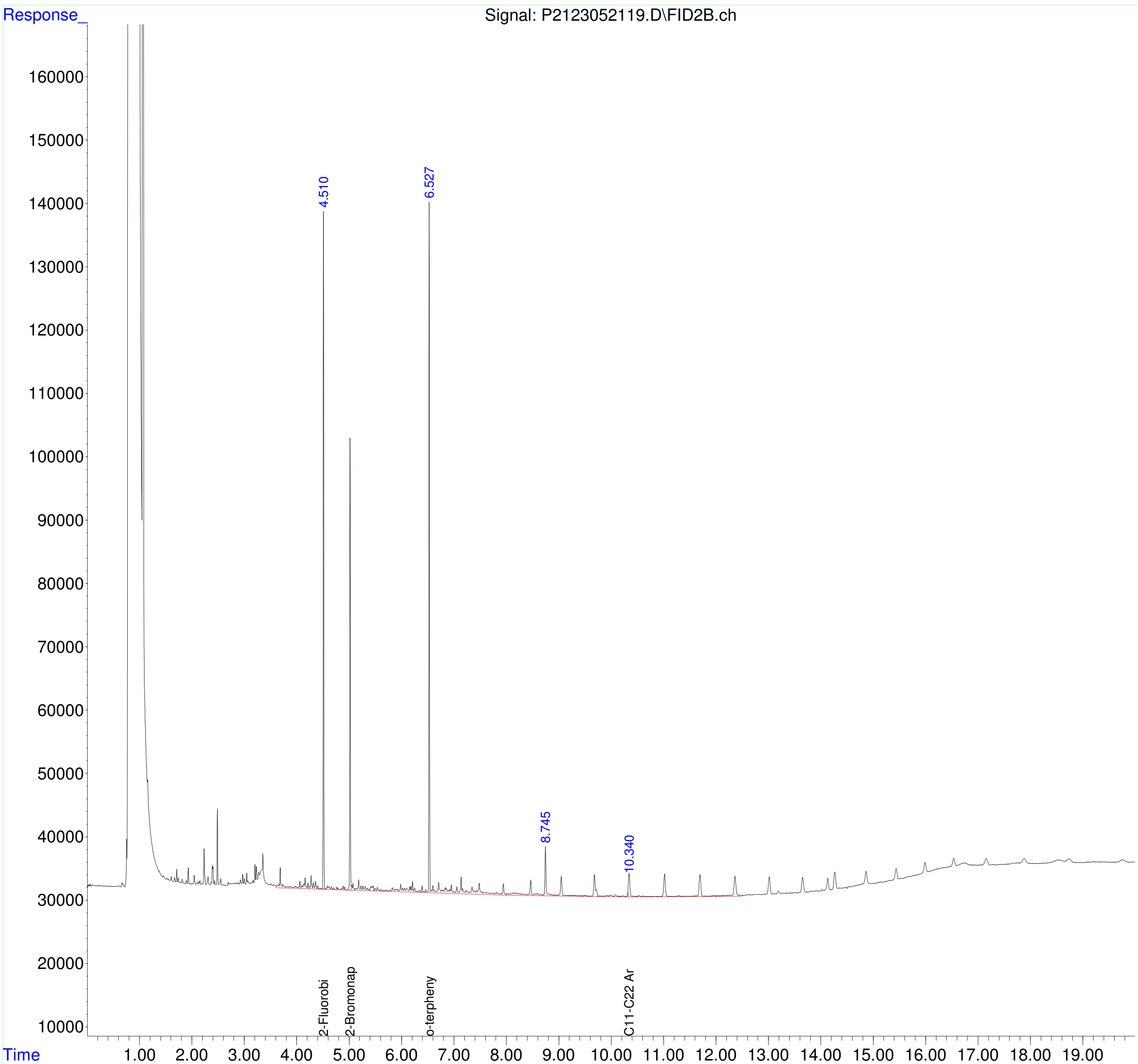
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052119.D
Signal(s) : FID2B.ch
Acq On : 21 May 2023 5:00 pm
Operator : Petro21b:sr
Sample : L2326777-07,42,, mdl
Misc : wg1780597 Day 3 ARO L2233244-18
ALS Vial : 60 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 11:43:08 2023
Quant Method : I:\PETRO\Petro21\2023\230521.SEC\P21MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 18 08:24:56 2023
Response via : Initial Calibration
Integrator: ChemStation

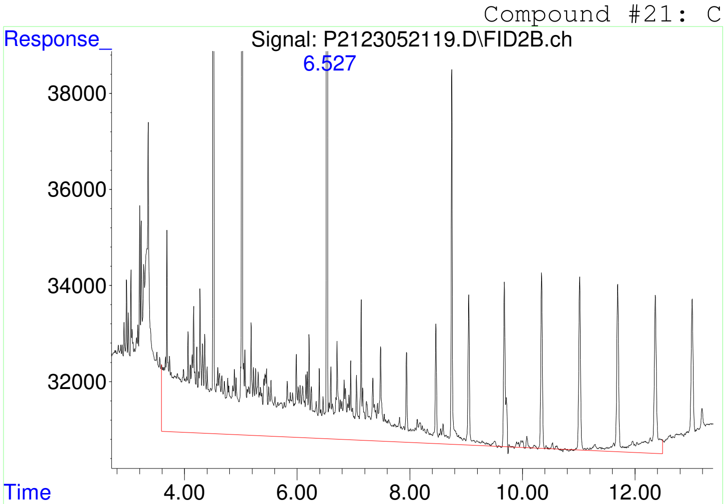
Volume Inj. :
Signal Phase :
Signal Info :

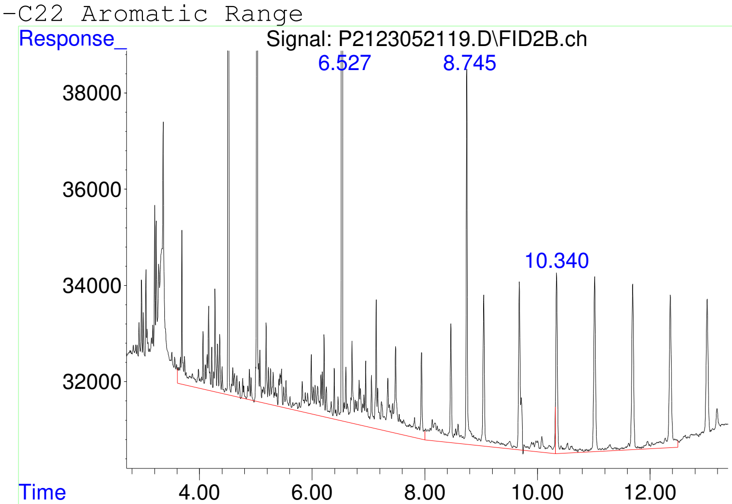


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230521.SEC\ | QMethod | : P21MAARO211129B.M |
| Data File | : P2123052119.D | Operator | : Petro21b:sr |
| Date Inj'd | : 5/21/2023 5:00 pm | Instrument | : Petro 21 |
| Sample | : L2326777-07,42,, mdl | Quant Date | : 5/25/2023 11:40 am |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3179697

Manual Peak Response = 1783024 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052120.D
Signal(s) : FID1A.ch
Acq On    : 21 May 2023   5:00 pm
Operator  : Petro21a:sr
Sample    : L2326777-07,42,, mdl
Misc      : wg1780597 Day 3 ALI  L2233244-18
ALS Vial  : 10   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:32:27 2023
Quant Method : I:\PETRO\Petro21\2023\230521\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.171 | 808009 | 12.987 | mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 64.94% | | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | |
| 20) H | C9-C18 Aliphatics | 2.214f | 1206705 | 16.861 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.233f | 1162418 | 16.878 | mg/L | M5 |

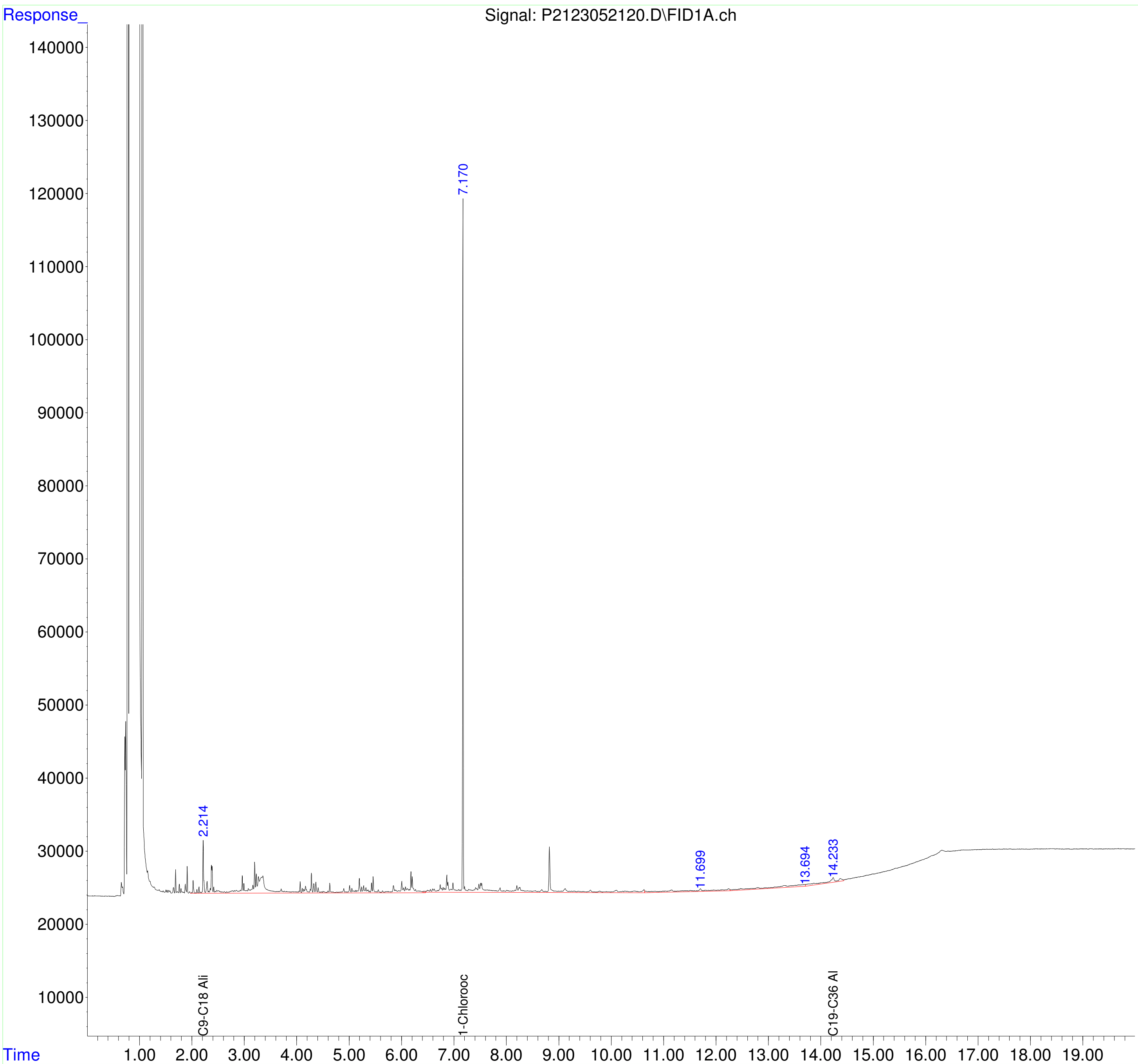
(f)=RT Delta > 1/2 Window    (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052120.D
Signal(s) : FID1A.ch
Acq On    : 21 May 2023   5:00 pm
Operator  : Petro21a:sr
Sample    : L2326777-07,42,, mdl
Misc      : wg1780597 Day 3 ALI  L2233244-18
ALS Vial  : 10   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:32:27 2023
Quant Method : I:\PETRO\Petro21\2023\230521\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

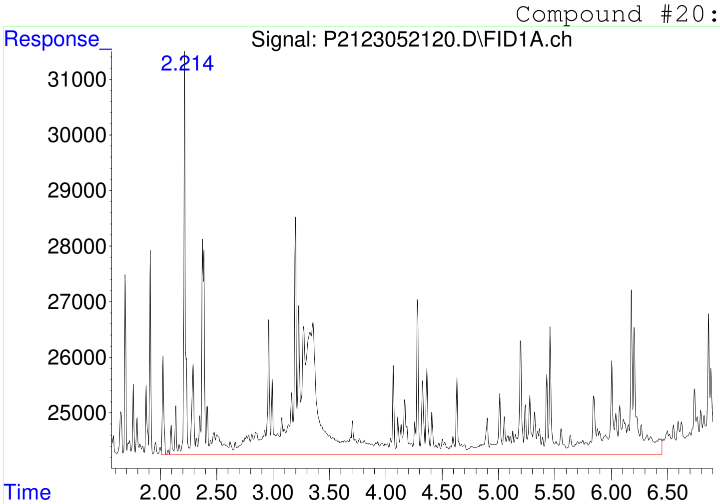


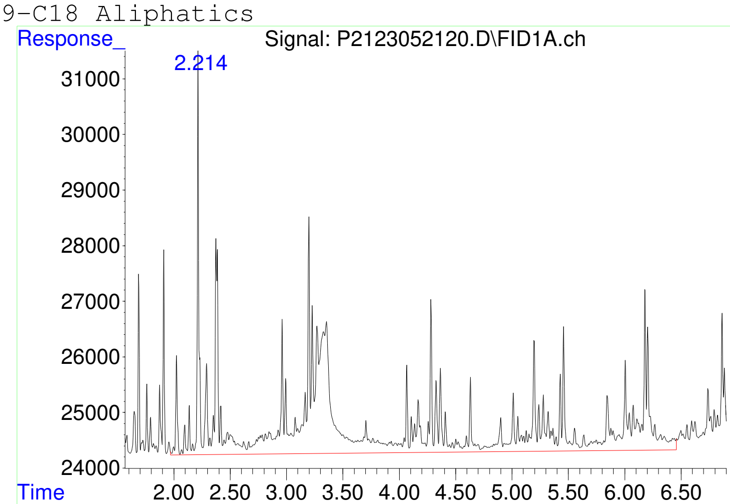
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052120.D
Date Inj'd : 5/21/2023 5:00 pm
Sample : L2326777-07,42,, mdl

QMethod : P21MAALI211129A.M
Operator : Petro21a:sr
Instrument : Petro 21
Quant Date : 5/25/2023 11:29 am

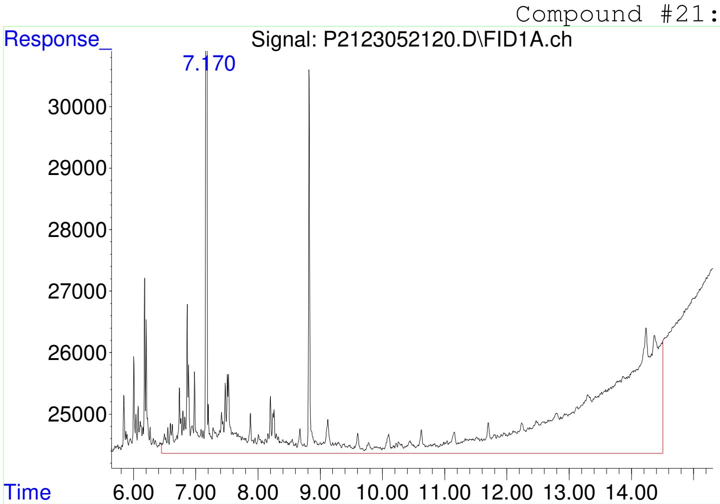
Compound #20: C9-C18 Aliphatics

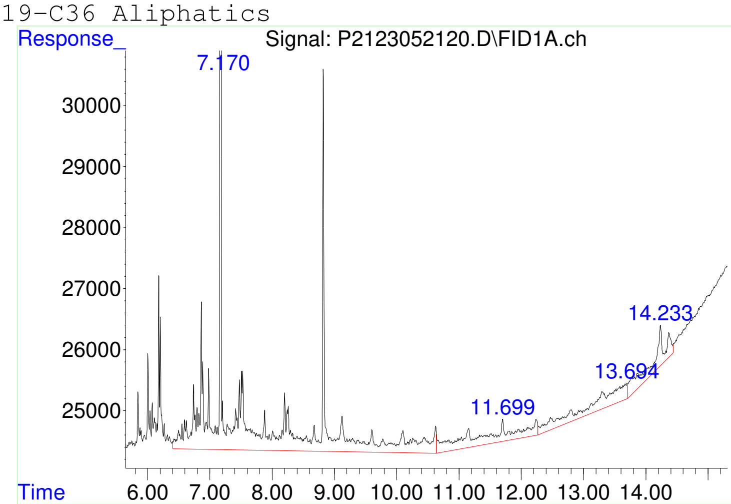



Original Peak Response = 1304871
Manual Peak Response = 1206705 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 2232849
Manual Peak Response = 1162418 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052121.D
Signal(s) : FID2B.ch
Acq On : 21 May 2023 5:26 pm
Operator : Petro21b:sr
Sample : L2326777-08,42,, mdl
Misc : wg1780597 Day 3 ARO L2233244-18 (low ARO frac and OTP)
ALS Vial : 61 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 11:43:35 2023
Quant Method : I:\PETRO\Petro21\2023\230521.SEC\P21MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 18 08:24:56 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| **System Monitoring Compounds** | | | | |
| 3) s 2-Fluorobiphenyl | 4.512 | 433480 | 6.194 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 30.97%# | |
| 5) s 2-Bromonaphthalene | 5.019 | 305463 | 6.198 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 30.99%# | |
| 10) S o-terphenyl | 6.528 | 476672 | 5.235 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 26.18%# | |
| **Target Compounds** | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | d |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 11.693 | 1147598 | 13.727 mg/L | M5 |

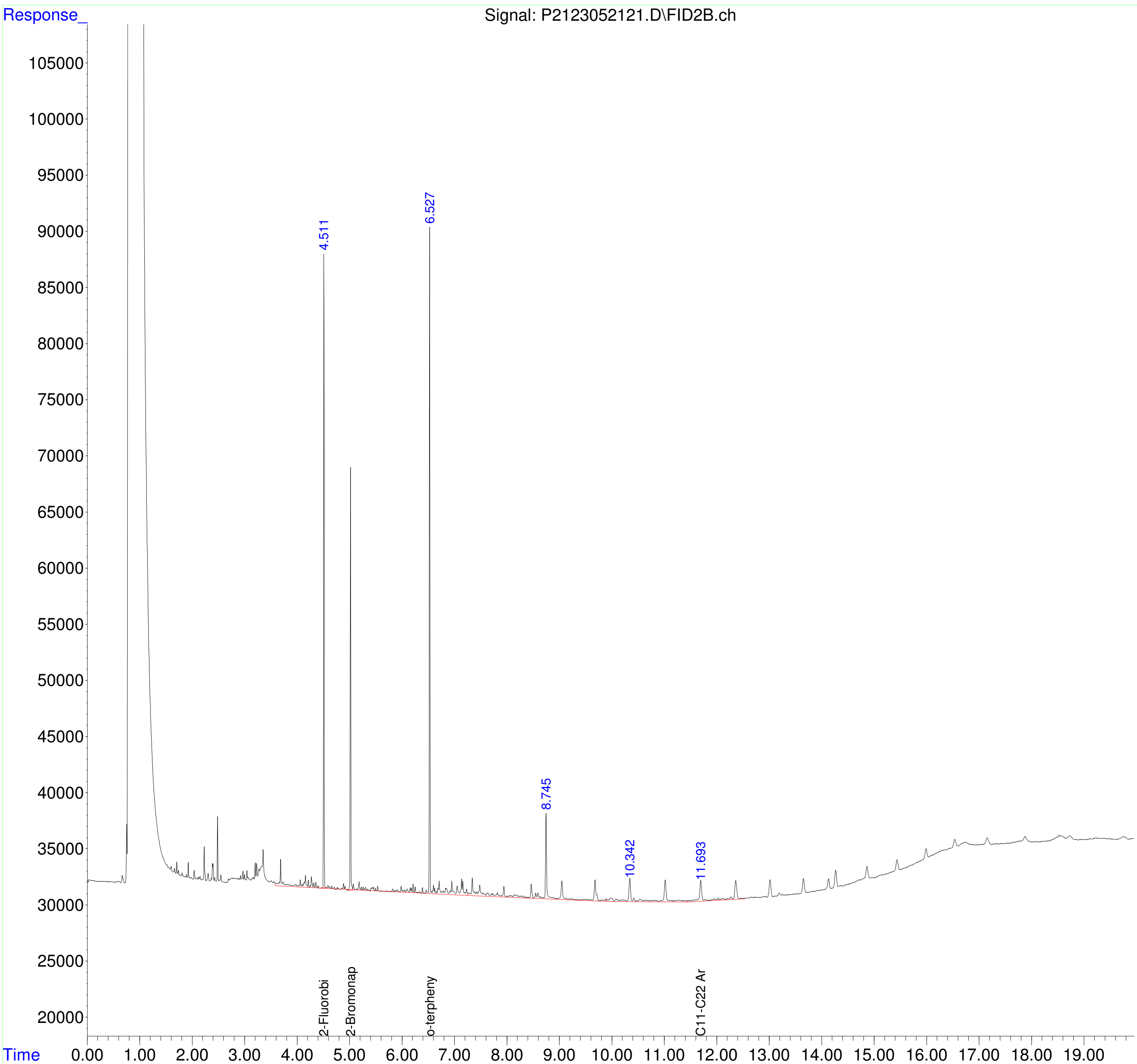
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052121.D
Signal(s) : FID2B.ch
Acq On    : 21 May 2023   5:26 pm
Operator  : Petro21b:sr
Sample    : L2326777-08,42,, mdl
Misc      : wg1780597 Day 3 ARO L2233244-18   (low ARO frac and OTP)
ALS Vial  : 61   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 11:43:35 2023
Quant Method : I:\PETRO\Petro21\2023\230521.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu May 18 08:24:56 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

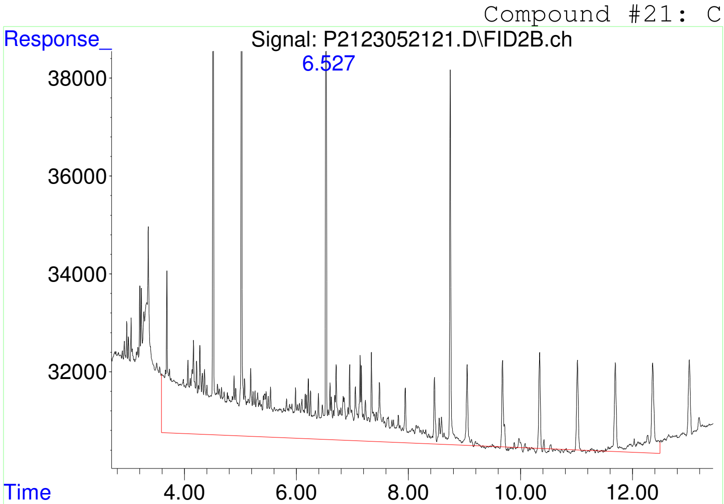


# Manual Integration Report

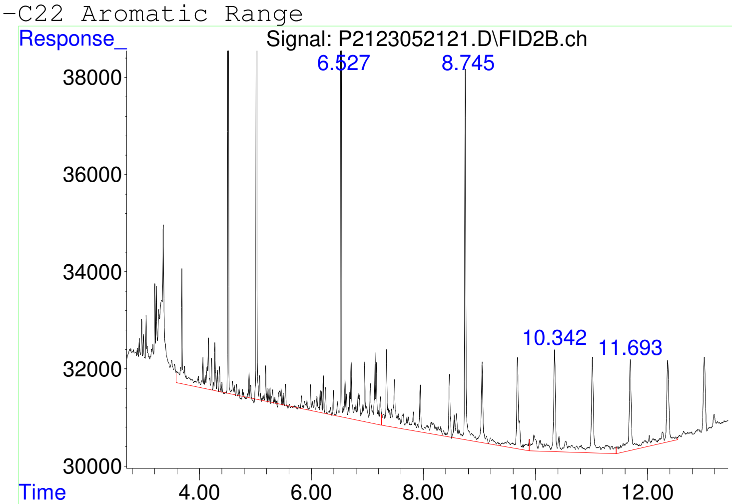
Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052121.D
Date Inj'd : 5/21/2023 5:26 pm
Sample : L2326777-08,42,, mdl

QMethod : P21MAARO211129B.M
Operator : Petro21b:sr
Instrument : Petro 21
Quant Date : 5/25/2023 11:40 am

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 2490917




Manual Peak Response = 1147598 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052122.D
Signal(s) : FID1A.ch
Acq On : 21 May 2023 5:26 pm
Operator : Petro21a:sr
Sample : L2326777-08,42,, mdl
Misc : wg1780597 Day 3 ALI L2233244-18
ALS Vial : 11 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:32:59 2023
Quant Method : I:\PETRO\Petro21\2023\230521\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| **System Monitoring Compounds** | | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.171 | 967759 | 15.555 | mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 77.77% | | | |
| **Target Compounds** | | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 2.214f | 1294931 | 18.094 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.369f | 828639 | 12.031 | mg/L | M5 |

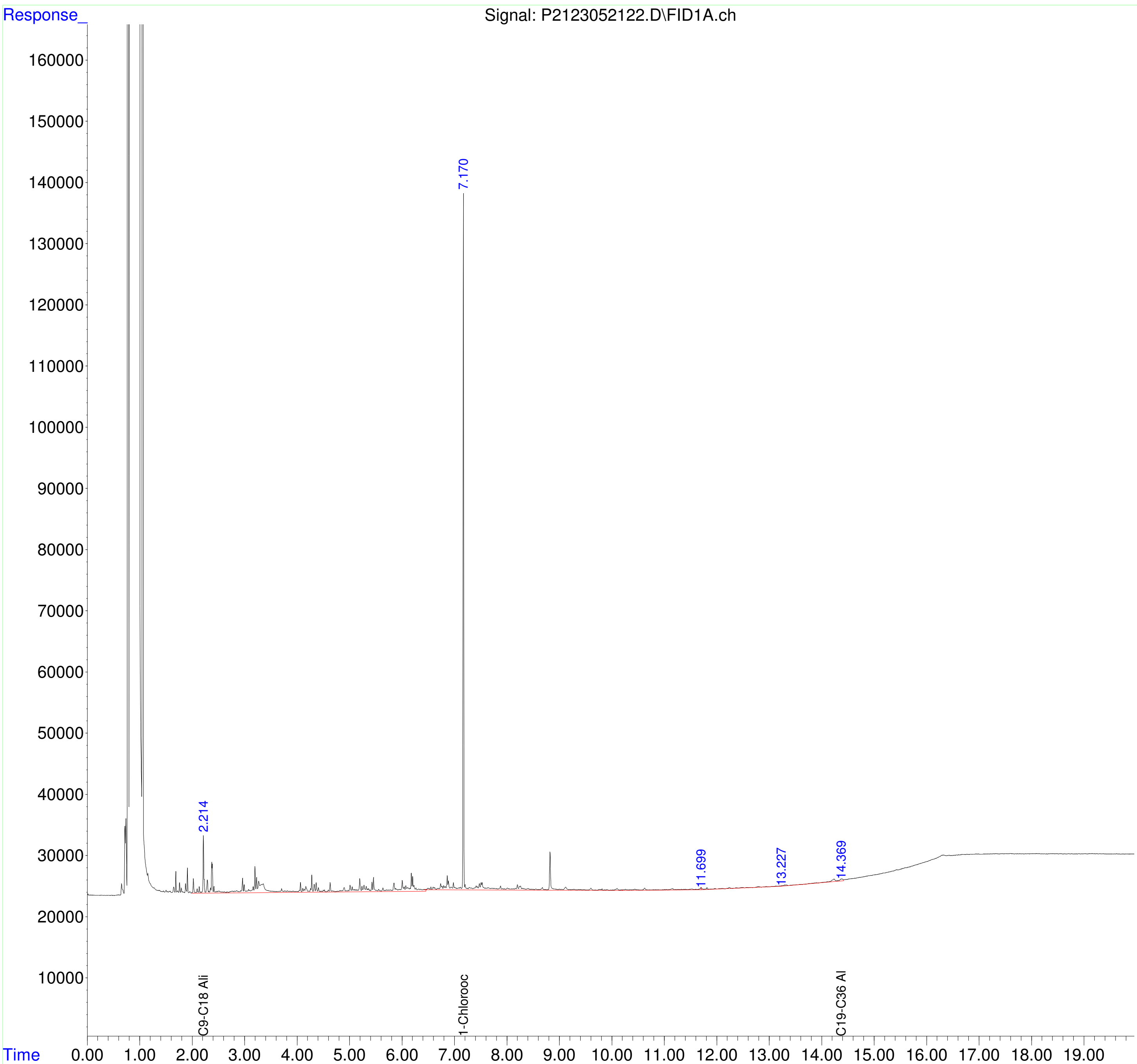
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List : Default - All compounds listedport (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052122.D
Signal(s) : FID1A.ch
Acq On : 21 May 2023 5:26 pm
Operator : Petro21a:sr
Sample : L2326777-08,42,, mdl
Misc : wg1780597 Day 3 ALI L2233244-18
ALS Vial : 11 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:32:59 2023
Quant Method : I:\PETRO\Petro21\2023\230521\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

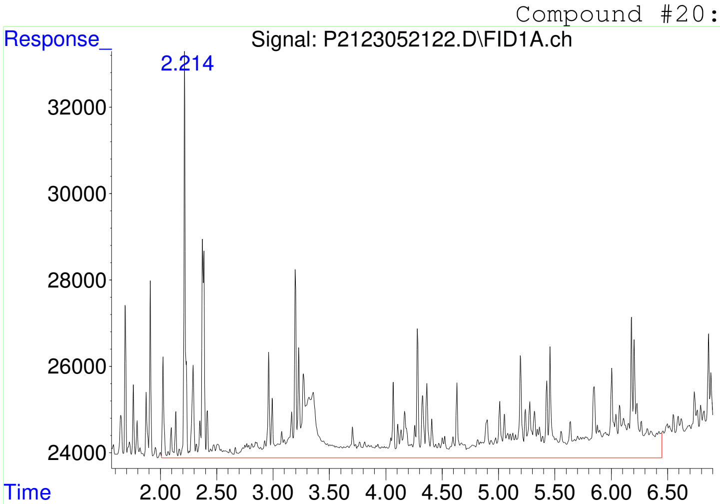
Volume Inj. :
Signal Phase :
Signal Info :

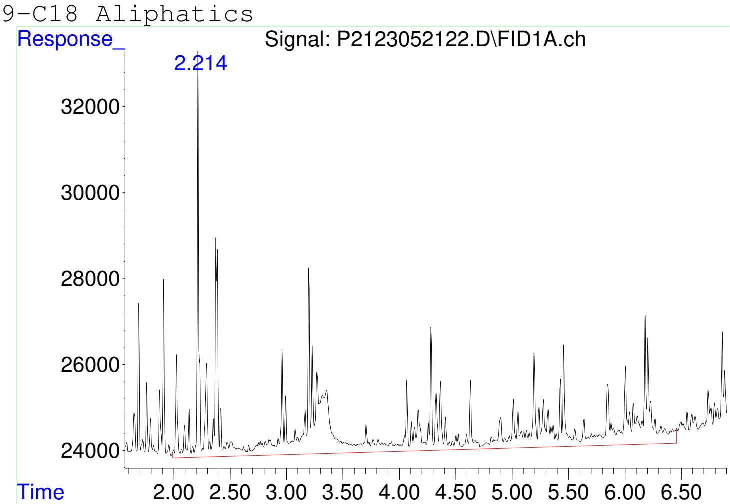


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230521\ | QMethod | : P21MAALI211129A.M |
| Data File | : P2123052122.D | Operator | : Petro21a:sr |
| Date Inj'd | : 5/21/2023 5:26 pm | Instrument | : Petro 21 |
| Sample | : L2326777-08,42,, mdl | Quant Date | : 5/25/2023 11:29 am |

Compound #20: C9-C18 Aliphatics

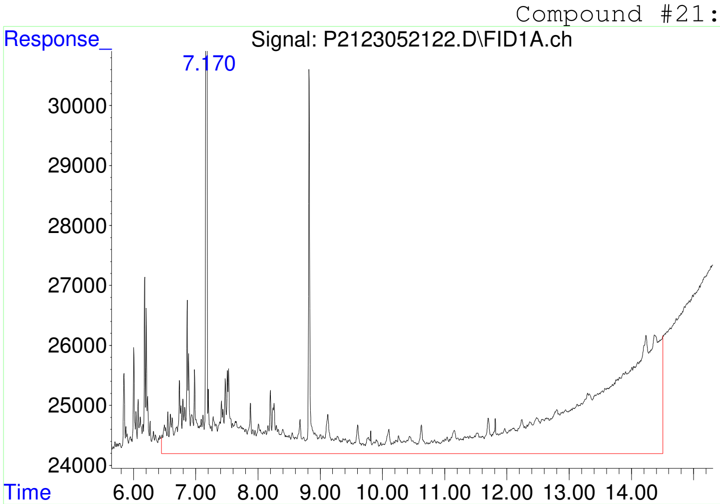


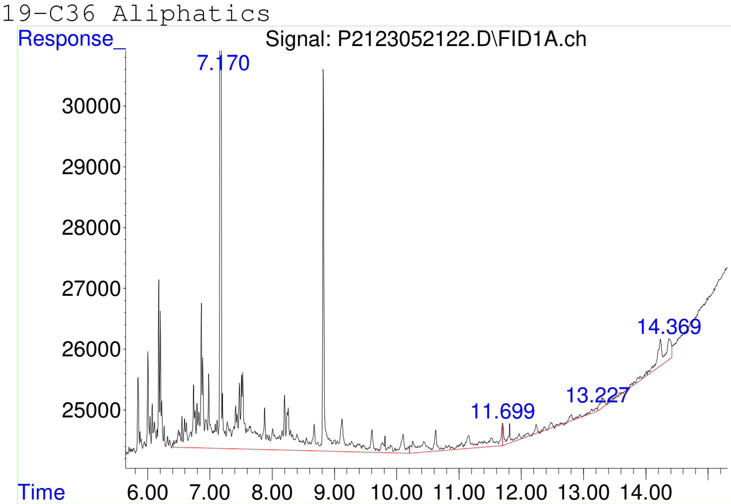




Original Peak Response = 1596946 Manual Peak Response = 1294931 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 2733965 Manual Peak Response = 828639 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052123.D
Signal(s) : FID2B.ch
Acq On : 21 May 2023 5:51 pm
Operator : Petro21b:sr
Sample : L2326777-15,42,, mdl
Misc : wg1780597 Day 3 ARO Composite Mineral Oil (low ARO frac and OTP)
ALS Vial : 62 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 11:44:01 2023
Quant Method : I:\PETRO\Petro21\2023\230521.SEC\P21MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 18 08:24:56 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | |
| 3) s | 2-Fluorobiphenyl | 4.512 | 350380 | 5.006 mg/L | |
| Spiked Amount 20.000 | | Range 40 - 140 | Recovery = | 25.03%# | |
| 5) s | 2-Bromonaphthalene | 5.019 | 241912 | 4.908 mg/L | |
| Spiked Amount 20.000 | | Range 40 - 140 | Recovery = | 24.54%# | |
| 10) S | o-terphenyl | 6.528 | 370840 | 4.073 mg/L | |
| Spiked Amount 20.000 | | Range 40 - 140 | Recovery = | 20.37%# | |
| | **Target Compounds** | | | | |
| 1) | Naphthalene | 0.000 | 0 | N.D. mg/L | |
| 2) | 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) | Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) | Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) | Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) | Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) | Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) | Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) | Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) | Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) | Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) | Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) | Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) | Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) | Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) | Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) | Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H | C11-C22 Aromatic Range | 11.693 | 877929 | 10.502 mg/L | M5 |

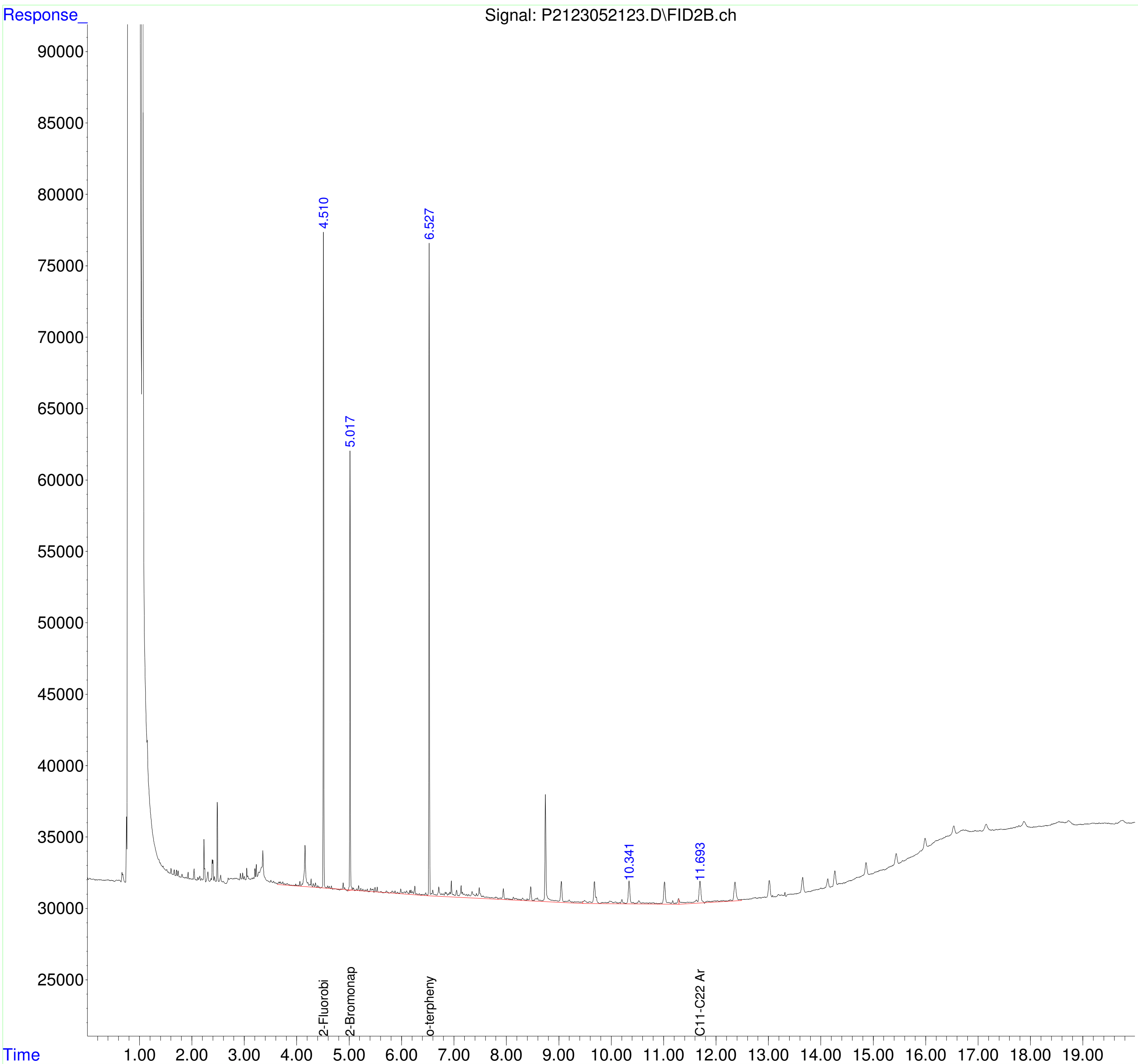
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052123.D
Signal(s) : FID2B.ch
Acq On    : 21 May 2023   5:51 pm
Operator  : Petro21b:sr
Sample    : L2326777-15,42,, mdl
Misc      : wg1780597 Day 3 ARO Composite Mineral Oil  (low ARO frac and OTP)
ALS Vial  : 62   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 11:44:01 2023
Quant Method : I:\PETRO\Petro21\2023\230521.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu May 18 08:24:56 2023
Response via : Initial Calibration
Integrator: ChemStation

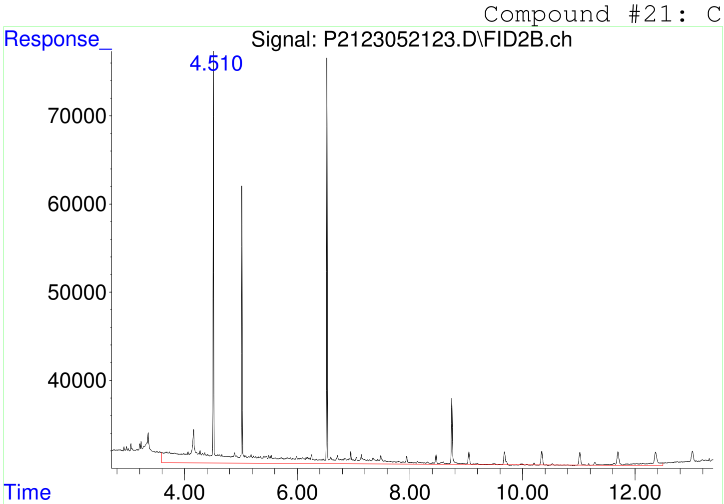
Volume Inj.  :
Signal Phase :
Signal Info  :

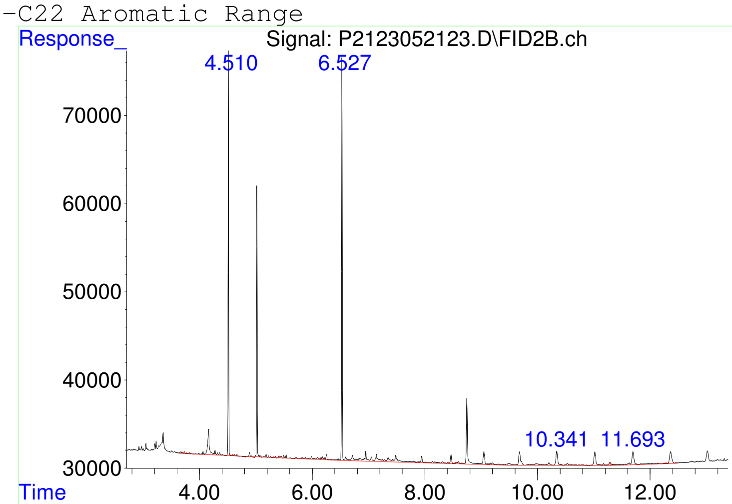


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230521.SEC\ | QMethod | : P21MAARO211129B.M |
| Data File | : P2123052123.D | Operator | : Petro21b:sr |
| Date Inj'd | : 5/21/2023 5:51 pm | Instrument | : Petro 21 |
| Sample | : L2326777-15,42,, mdl | Quant Date | : 5/25/2023 11:40 am |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 2277442

Manual Peak Response = 877929 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

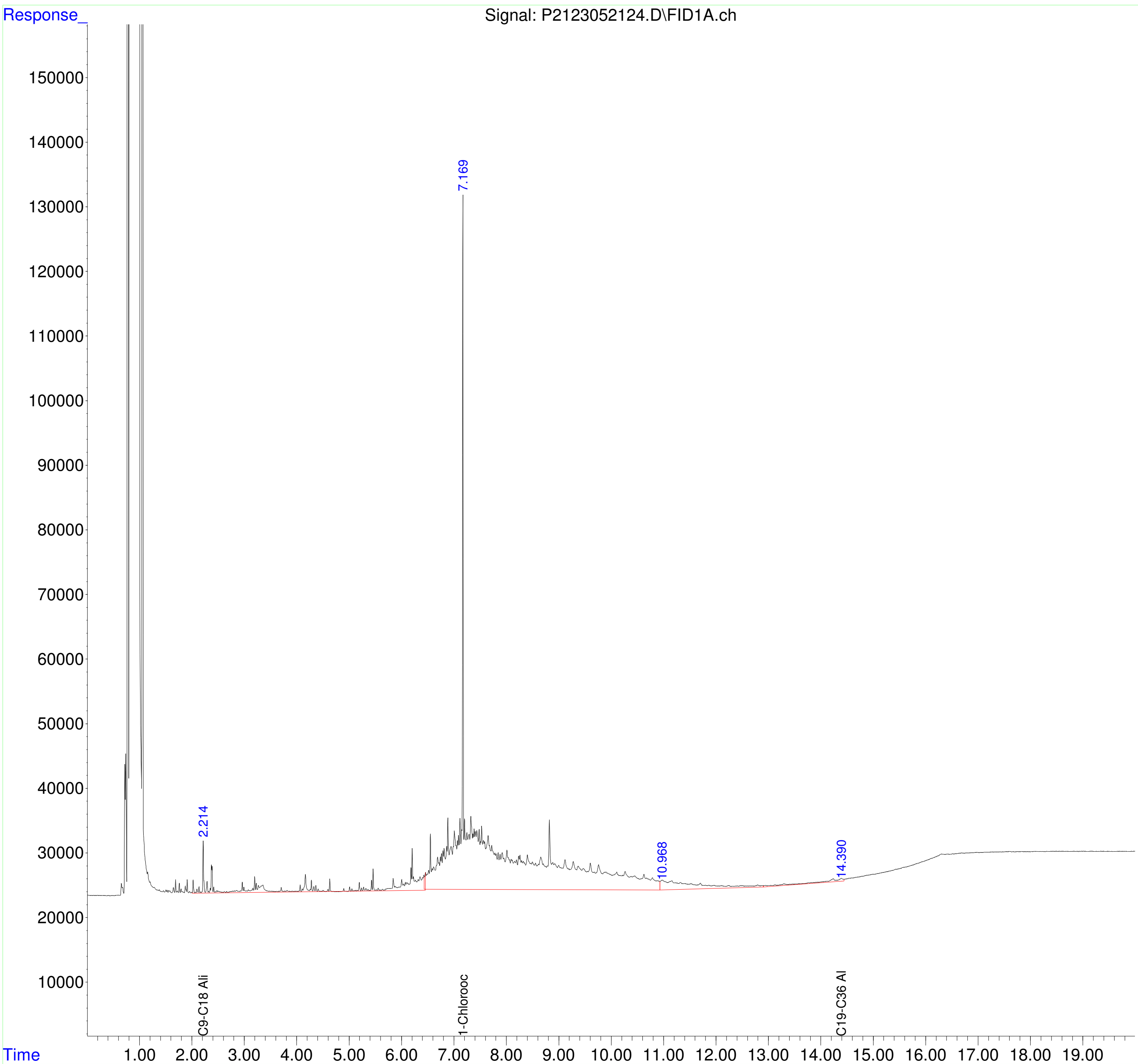
Quantitation Report (QT Reviewed)

```
Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052124.D
Signal(s) : FID1A.ch
Acq On    : 21 May 2023   5:51 pm
Operator  : Petro21a:sr
Sample    : L2326777-15,42,, mdl
Misc      : wg1780597 Day 3 ALI  Compistite Mineral Oil
ALS Vial  : 12   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:33:35 2023
Quant Method : I:\PETRO\Petro21\2023\230521\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed
```

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.169 | 876892 | 14.094 | mg/L | M4 |
| | Spiked Amount 20.000 Range 40 - 140 | | Recovery = 70.47% | | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 2.214f | 1266921 | 17.702 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.390f | 12033406 | 174.720 | mg/L | M5 |

(f)=RT Delta > 1/2 Window (m)=manual int.

```
Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052124.D
Signal(s) : FID1A.ch
Acq On    : 21 May 2023   5:51 pm
Operator  : Petro21a:sr
Sample    : L2326777-15,42,, mdl
Misc      : wg1780597 Day 3 ALI  Compistite Mineral Oil
ALS Vial  : 12   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:33:35 2023
Quant Method : I:\PETRO\Petro21\2023\230521\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :
```

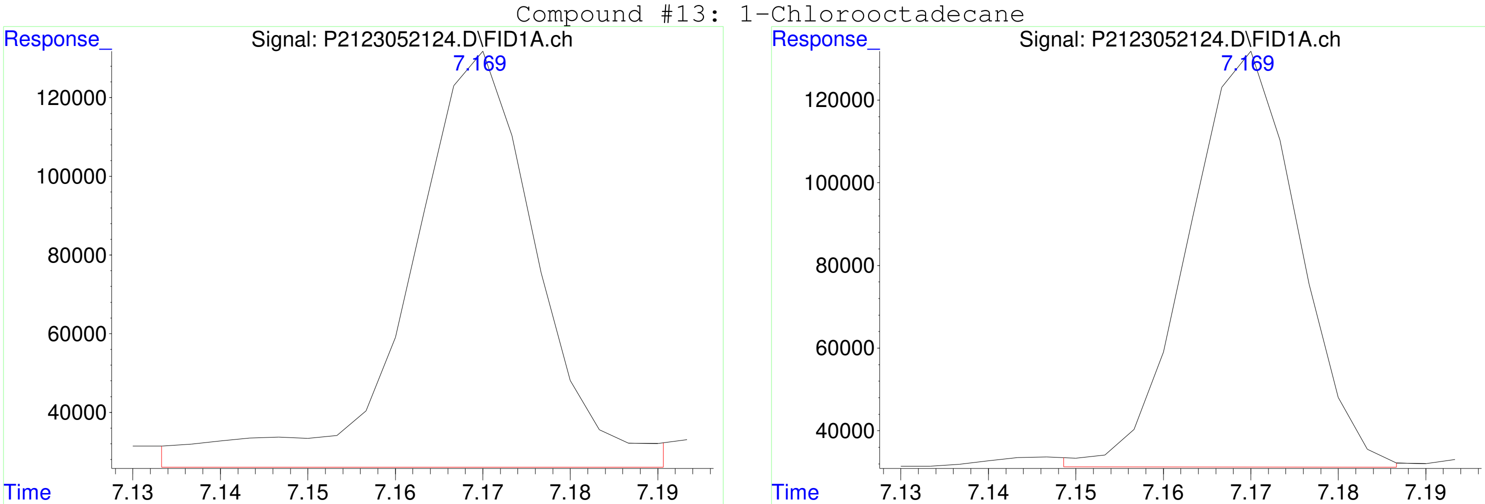


Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052124.D
Date Inj'd : 5/21/2023 5:51 pm
Sample : L2326777-15,42,, mdl

QMethod : P21MAALI211129A.M
Operator : Petro21a:sr
Instrument : Petro 21
Quant Date : 5/25/2023 11:29 am

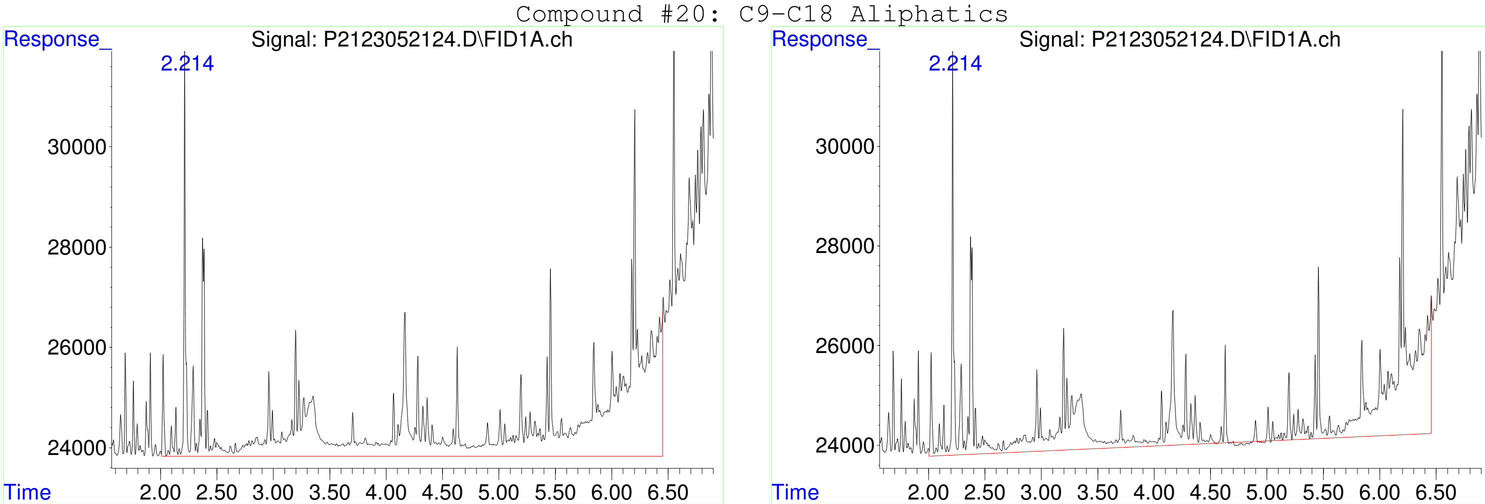
Compound #13: 1-Chlorooctadecane




Original Peak Response = 1072992
M4 = Poor automated baseline construction.

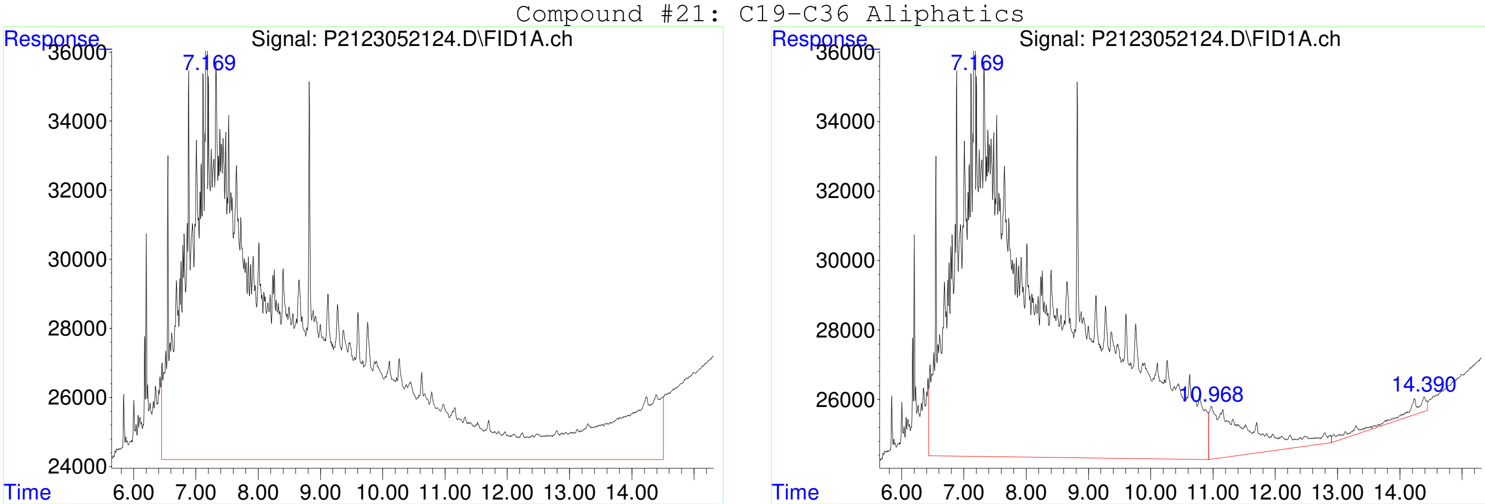
Manual Peak Response = 876892 M4

Compound #20: C9-C18 Aliphatics




Original Peak Response = 1714829
Manual Peak Response = 1266921 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 13728966
Manual Peak Response = 12033406 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report    (QT Reviewed)

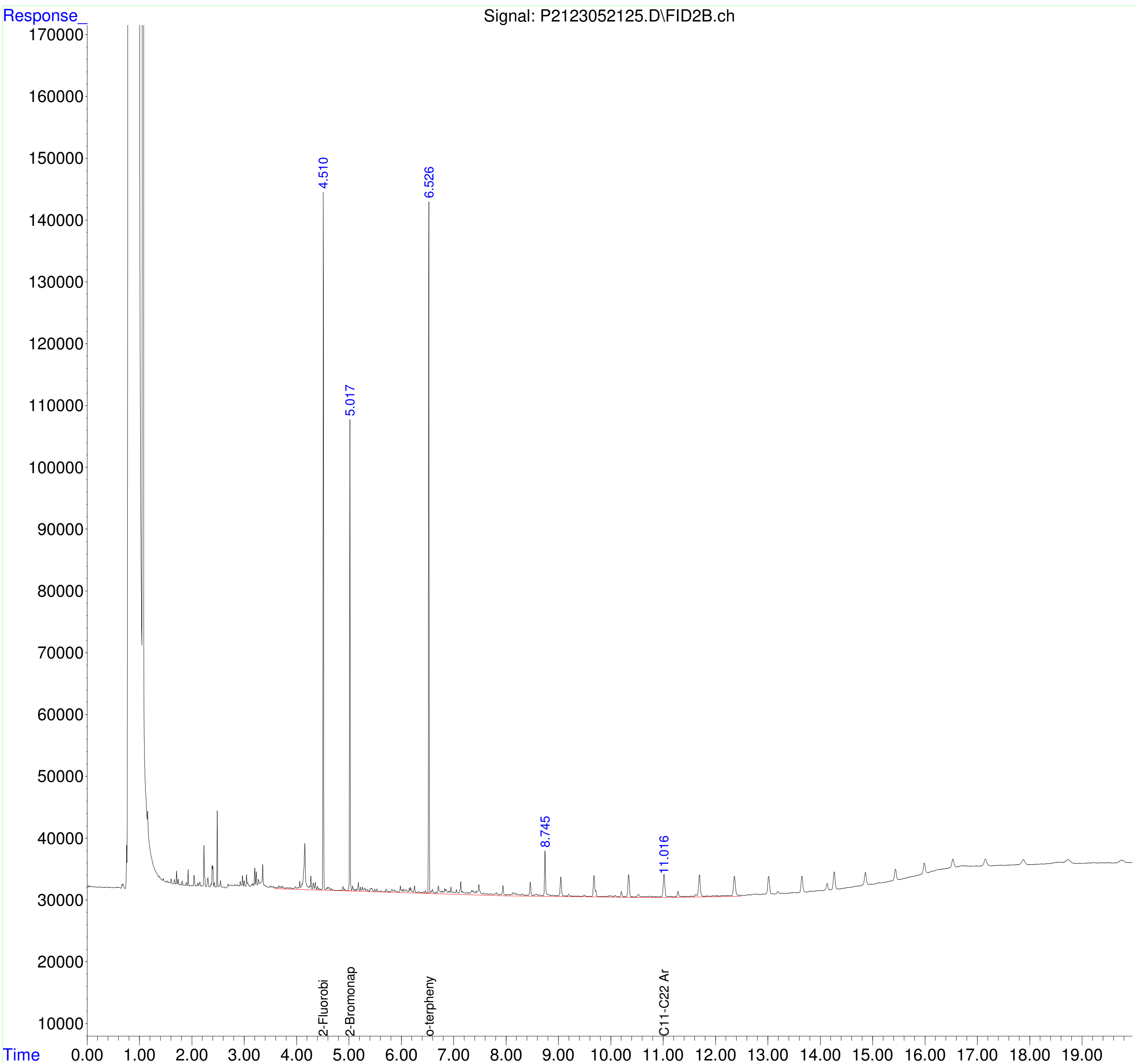
```
Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052125.D
Signal(s) : FID2B.ch
Acq On    : 21 May 2023   6:16 pm
Operator  : Petro21b:sr
Sample    : L2326777-16,42,, mdl
Misc      : wg1780597 Day 3 ARO Composite Mineral Oil
ALS Vial  : 63   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 11:44:37 2023
Quant Method : I:\PETRO\Petro21\2023\230521.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu May 18 08:24:56 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

Sub List     : Default - All compounds listed

        Compound                       R.T.       Response    Conc Units
 ---------------------------------------------------------------------------

 System Monitoring Compounds
  3) s   2-Fluorobiphenyl            4.512        854045   12.203 mg/L
 Spiked Amount     20.000   Range  40 - 140    Recovery   =   61.02%
  5) s   2-Bromonaphthalene          5.019        596000   12.092 mg/L
 Spiked Amount     20.000   Range  40 - 140    Recovery   =   60.46%
 10) S   o-terphenyl                 6.527        911291   10.008 mg/L
 Spiked Amount     20.000   Range  40 - 140    Recovery   =   50.04%

 Target Compounds
  1)     Naphthalene                 0.000             0    N.D.  mg/L
  2)     2-Methylnaphthalene         0.000             0    N.D.  mg/L  d
  4)     Acenaphthalene              0.000             0    N.D.  mg/L  d
  6)     Acenaphthene                0.000             0    N.D.  mg/L  d
  7)     Fluorene                    0.000             0    N.D.  mg/L  d
  8)     Phenanthrene                0.000             0    N.D.  mg/L  d
  9)     Anthracene                  0.000             0    N.D.  mg/L  d
 11)     Fluoranthene                0.000             0    N.D.  mg/L  d
 12)     Pyrene                      0.000             0    N.D.  mg/L  d
 13)     Benzo(a)anthracene          0.000             0    N.D.  mg/L  d
 14)     Chrysene                    0.000             0    N.D.  mg/L  d
 15)     Benzo(b)fluoranthene        0.000             0    N.D.  mg/L  d
 16)     Benzo(k)fluoranthene        0.000             0    N.D.  mg/L  d
 17)     Benzo(a)pyrene              0.000             0    N.D.  mg/L  d
 18)     Indeno(1,2,3-cd)pyrene      0.000             0    N.D.  mg/L  d
 19)     Dibenzo(a,h)anthracene      0.000             0    N.D.  mg/L  d
 20)     Benzo(ghi)perylene          0.000             0    N.D.  mg/L  d
 21) H   C11-C22 Aromatic Range     11.016       1907280   22.815 mg/L  M5
 ---------------------------------------------------------------------------

 (f)=RT Delta > 1/2 Window                              (m)=manual int.
```

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052125.D
Signal(s) : FID2B.ch
Acq On    : 21 May 2023   6:16 pm
Operator  : Petro21b:sr
Sample    : L2326777-16,42,, mdl
Misc      : wg1780597 Day 3 ARO Composite Mineral Oil
ALS Vial  : 63   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 11:44:37 2023
Quant Method : I:\PETRO\Petro21\2023\230521.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu May 18 08:24:56 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

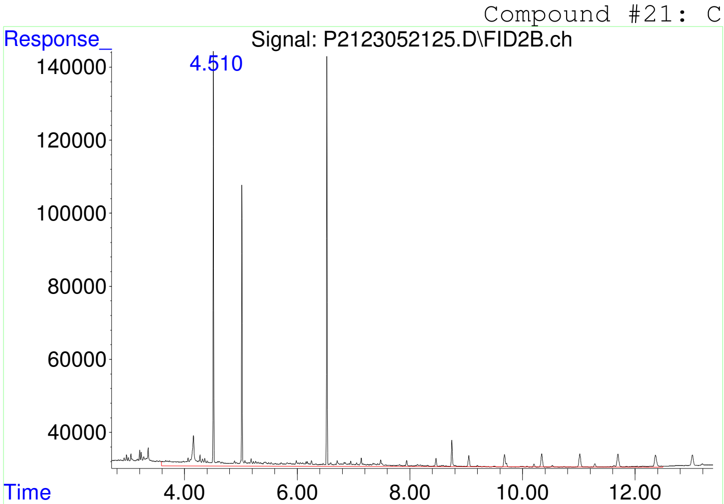


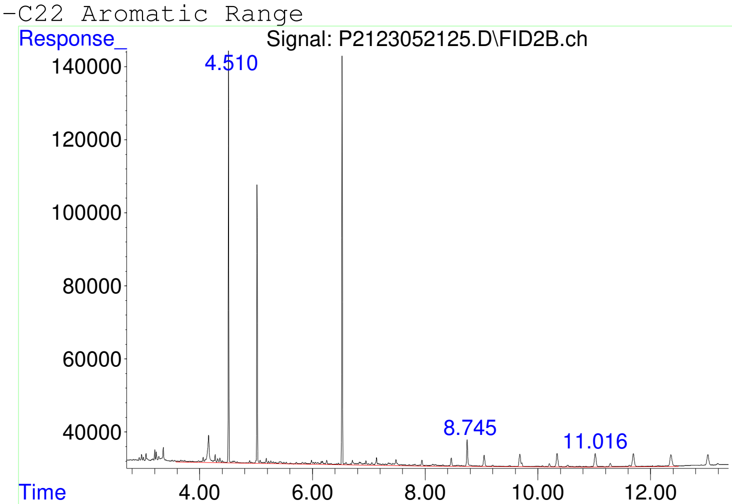
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052125.D
Date Inj'd : 5/21/2023 6:16 pm
Sample : L2326777-16,42,, mdl

QMethod : P21MAARO211129B.M
Operator : Petro21b:sr
Instrument : Petro 21
Quant Date : 5/25/2023 11:40 am

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3133391

Manual Peak Response = 1907280 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052126.D
Signal(s) : FID1A.ch
Acq On : 21 May 2023 6:16 pm
Operator : Petro21a:sr
Sample : L2326777-16,42,, mdl
Misc : wg1780597 Day 3 ALI Compistite Mineral Oil
ALS Vial : 13 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:34:08 2023
Quant Method : I:\PETRO\Petro21\2023\230521\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

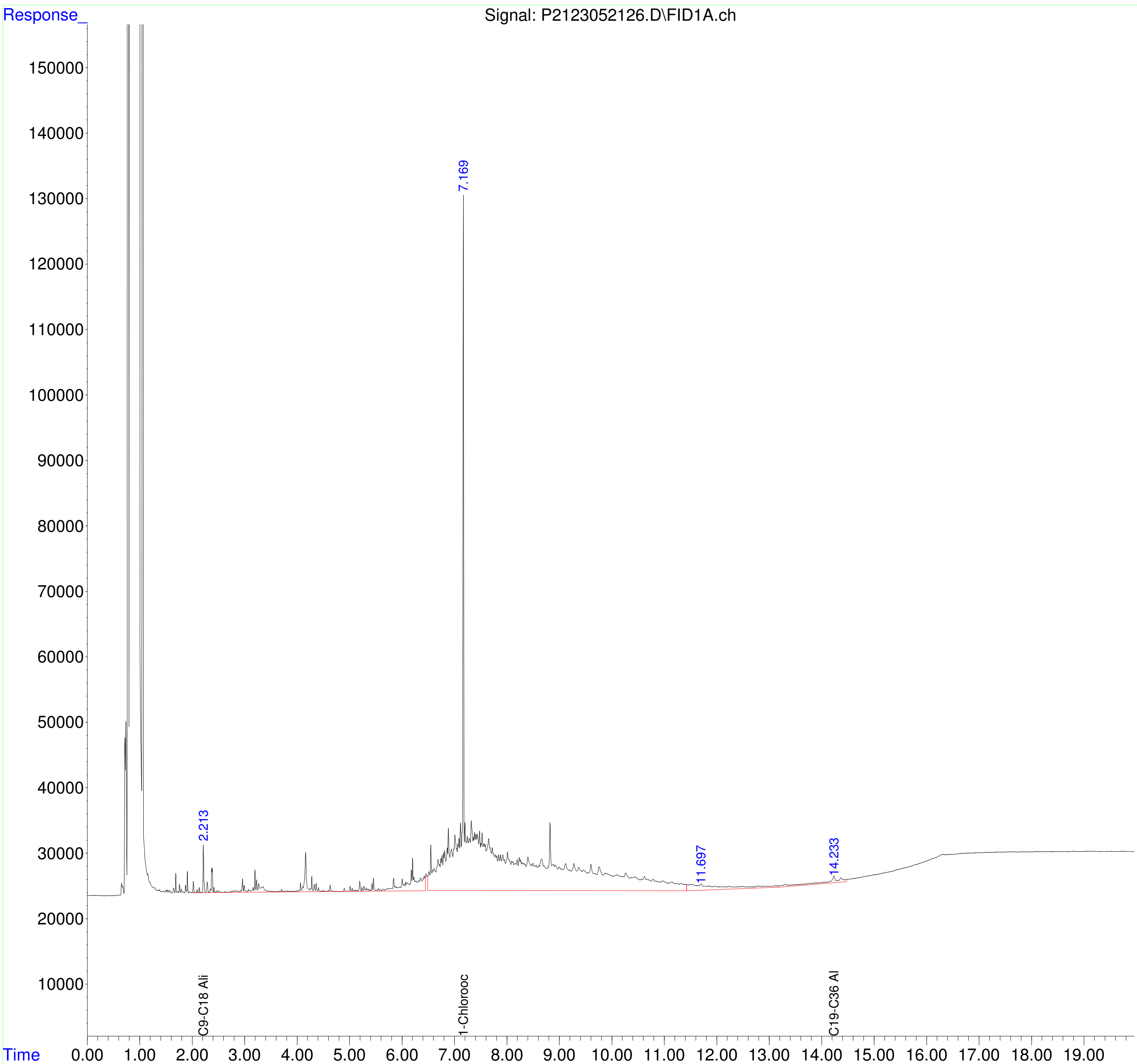
Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| **System Monitoring Compounds** | | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.169 | 858183 | 13.793 | mg/L | M4 |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 68.97% | | | |
| **Target Compounds** | | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 2.213f | 1324373 | 18.505 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.233f | 11615683 | 168.655 | mg/L | M5 |

(f)=RT Delta > 1/2 Window (m)=manual int.

```
Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052126.D
Signal(s) : FID1A.ch
Acq On    : 21 May 2023   6:16 pm
Operator  : Petro21a:sr
Sample    : L2326777-16,42,, mdl
Misc      : wg1780597 Day 3 ALI  Compistite Mineral Oil
ALS Vial  : 13   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:34:08 2023
Quant Method : I:\PETRO\Petro21\2023\230521\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :
```

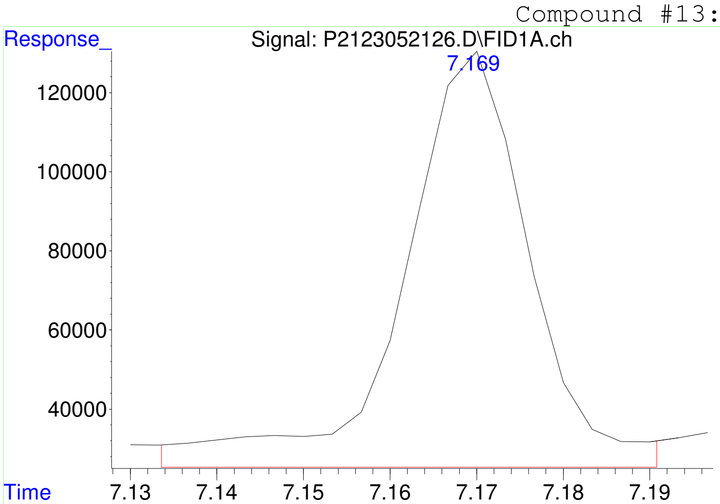


Manual Integration Report

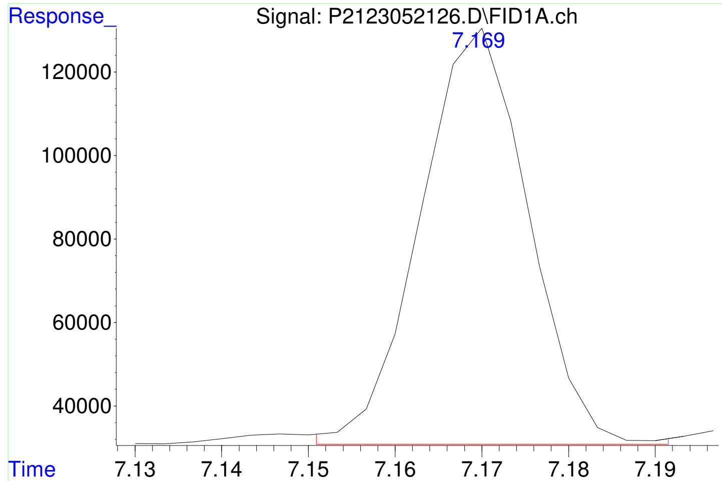
Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052126.D
Date Inj'd : 5/21/2023 6:16 pm
Sample : L2326777-16,42,, mdl

QMethod : P21MAALI211129A.M
Operator : Petro21a:sr
Instrument : Petro 21
Quant Date : 5/25/2023 11:29 am

Compound #13: 1-Chlorooctadecane

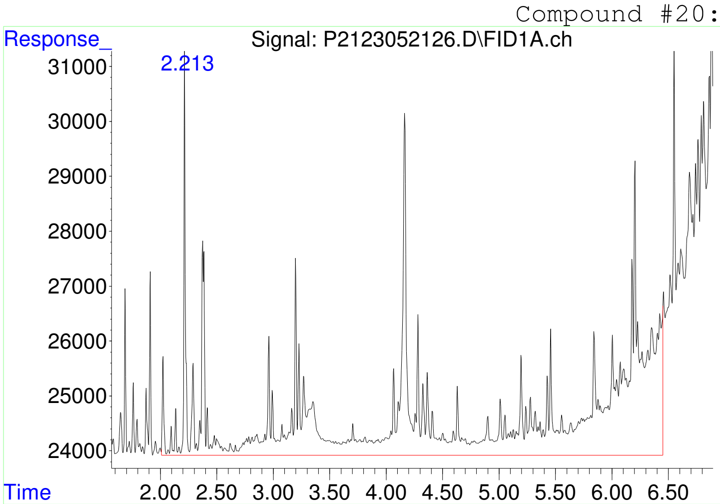



Original Peak Response = 1064705
M4 = Poor automated baseline construction.

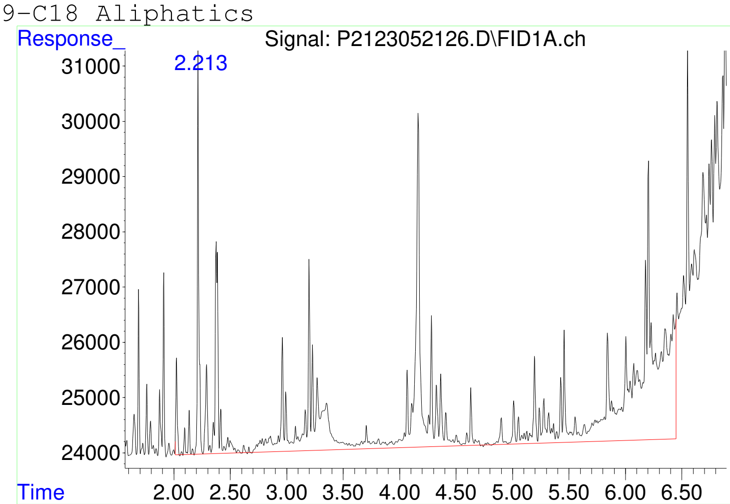



Manual Peak Response = 858183 M4

Compound #20: C9-C18 Aliphatics

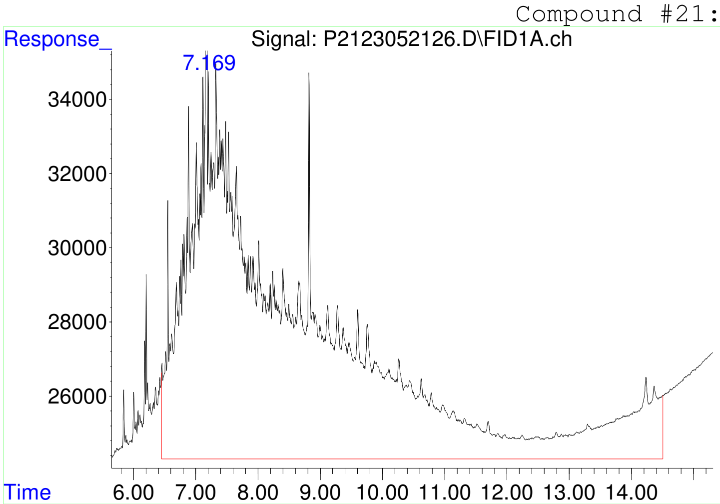



Original Peak Response = 1801863
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

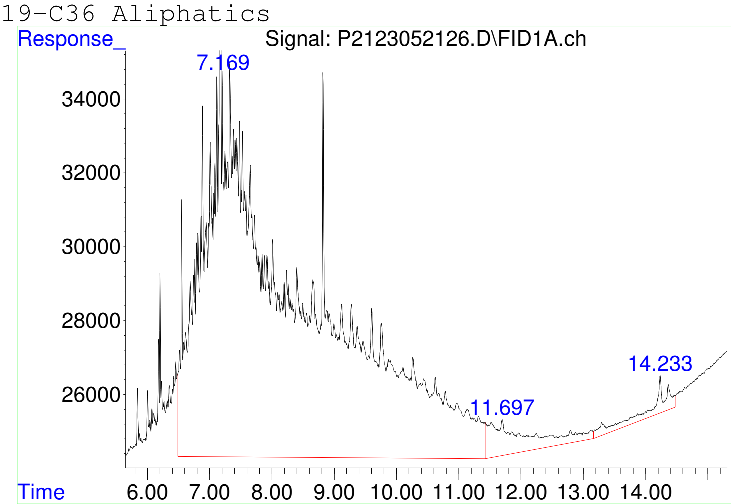



Manual Peak Response = 1324373 M5

Compound #21: C19-C36 Aliphatics




Original Peak Response = 12616050
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.




Manual Peak Response = 11615683 M5

Quantitation Report (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052127.D
Signal(s) : FID2B.ch
Acq On : 21 May 2023 6:42 pm
Operator : Petro21b:sr
Sample : L2326777-23,42,, mdl
Misc : wg1780597 Day 3 ARO Compistite Lubricating Oil
ALS Vial : 64 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 11:45:03 2023
Quant Method : I:\PETRO\Petro21\2023\230521.SEC\P21MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 18 08:24:56 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | |
| 3) s | 2-Fluorobiphenyl | 4.512 | 883833 | 12.628 mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 63.14% | | |
| 5) s | 2-Bromonaphthalene | 5.019 | 624482 | 12.670 mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 63.35% | | |
| 10) S | o-terphenyl | 6.527 | 947852 | 10.409 mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 52.05% | | |
| | **Target Compounds** | | | | |
| 1) | Naphthalene | 0.000 | 0 | N.D. mg/L | |
| 2) | 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) | Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) | Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) | Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) | Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) | Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) | Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) | Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) | Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) | Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) | Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) | Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) | Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) | Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) | Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) | Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H | C11-C22 Aromatic Range | 11.693 | 1883160 | 22.526 mg/L | M5 |

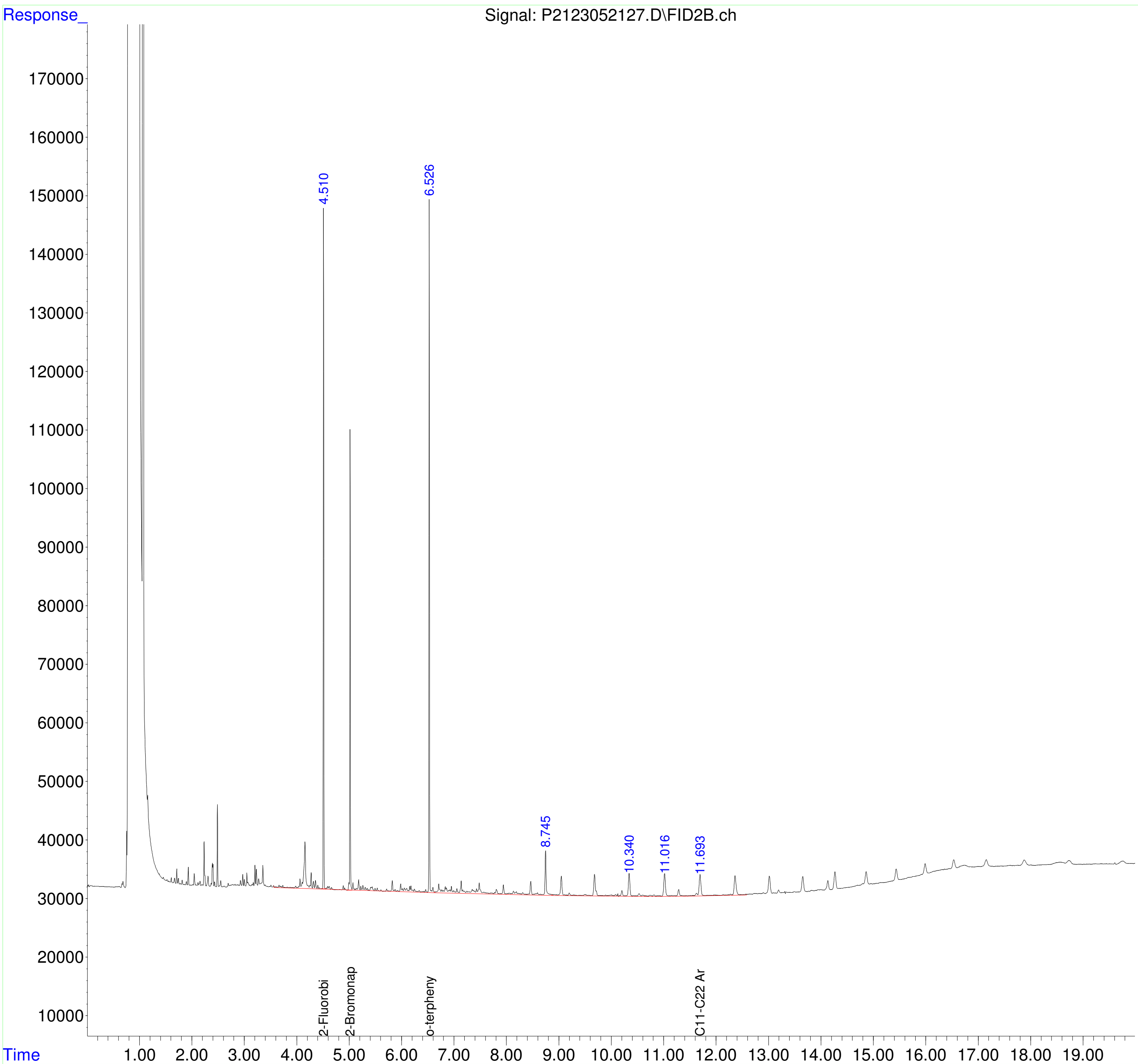
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052127.D
Signal(s) : FID2B.ch
Acq On    : 21 May 2023   6:42 pm
Operator  : Petro21b:sr
Sample    : L2326777-23,42,, mdl
Misc      : wg1780597 Day 3 ARO Compistite Lubricating Oil
ALS Vial  : 64   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 11:45:03 2023
Quant Method : I:\PETRO\Petro21\2023\230521.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu May 18 08:24:56 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :

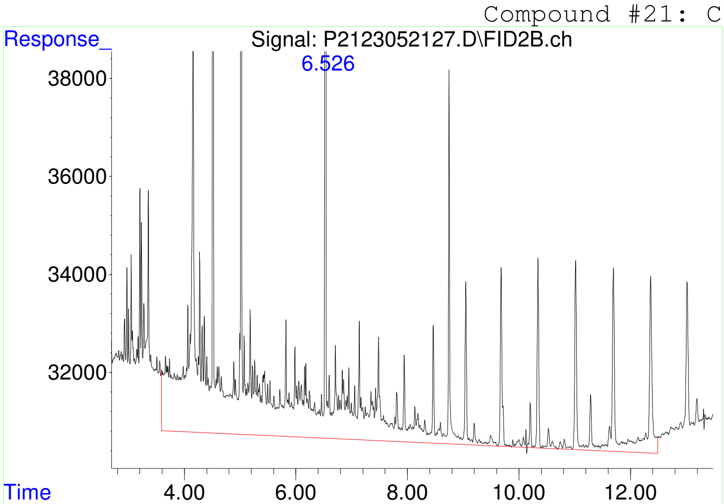


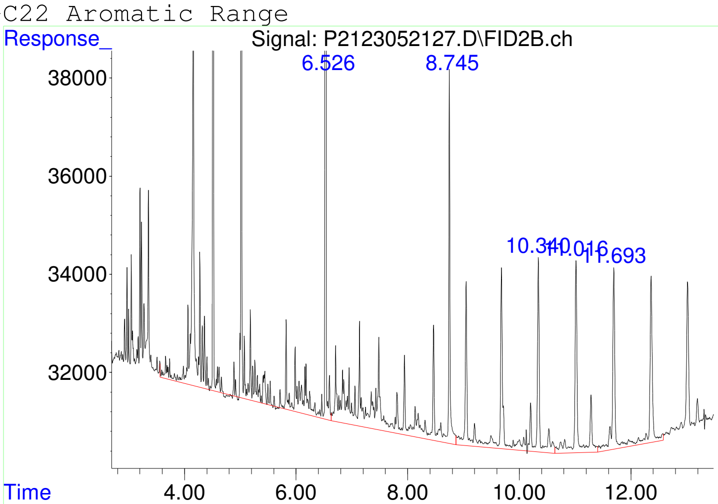
Manual Integration Report

Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052127.D
Date Inj'd : 5/21/2023 6:42 pm
Sample : L2326777-23,42,, mdl

QMethod : P21MAARO211129B.M
Operator : Petro21b:sr
Instrument : Petro 21
Quant Date : 5/25/2023 11:40 am

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3421269

Manual Peak Response = 1883160 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052128.D
Signal(s) : FID1A.ch
Acq On : 21 May 2023 6:42 pm
Operator : Petro21a:sr
Sample : L2326777-23,42,, mdl
Misc : wg1780597 Day 3 ALI Composite Lubricating OIl
ALS Vial : 14 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:34:42 2023
Quant Method : I:\PETRO\Petro21\2023\230521\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | **System Monitoring Compounds** | | | | | |
| 3) S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) S | 1-Chlorooctadecane | 7.171 | 727509 | 11.693 | mg/L | |
| Spiked Amount 20.000 | Range 40 - 140 | | Recovery = 58.47% | | | |
| | **Target Compounds** | | | | | |
| 1) | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) H | C9-C18 Aliphatics | 4.163 | 1234919 | 17.255 | mg/L | M5 |
| 21) H | C19-C36 Aliphatics | 14.234f | 7623489 | 110.690 | mg/L | M5 |

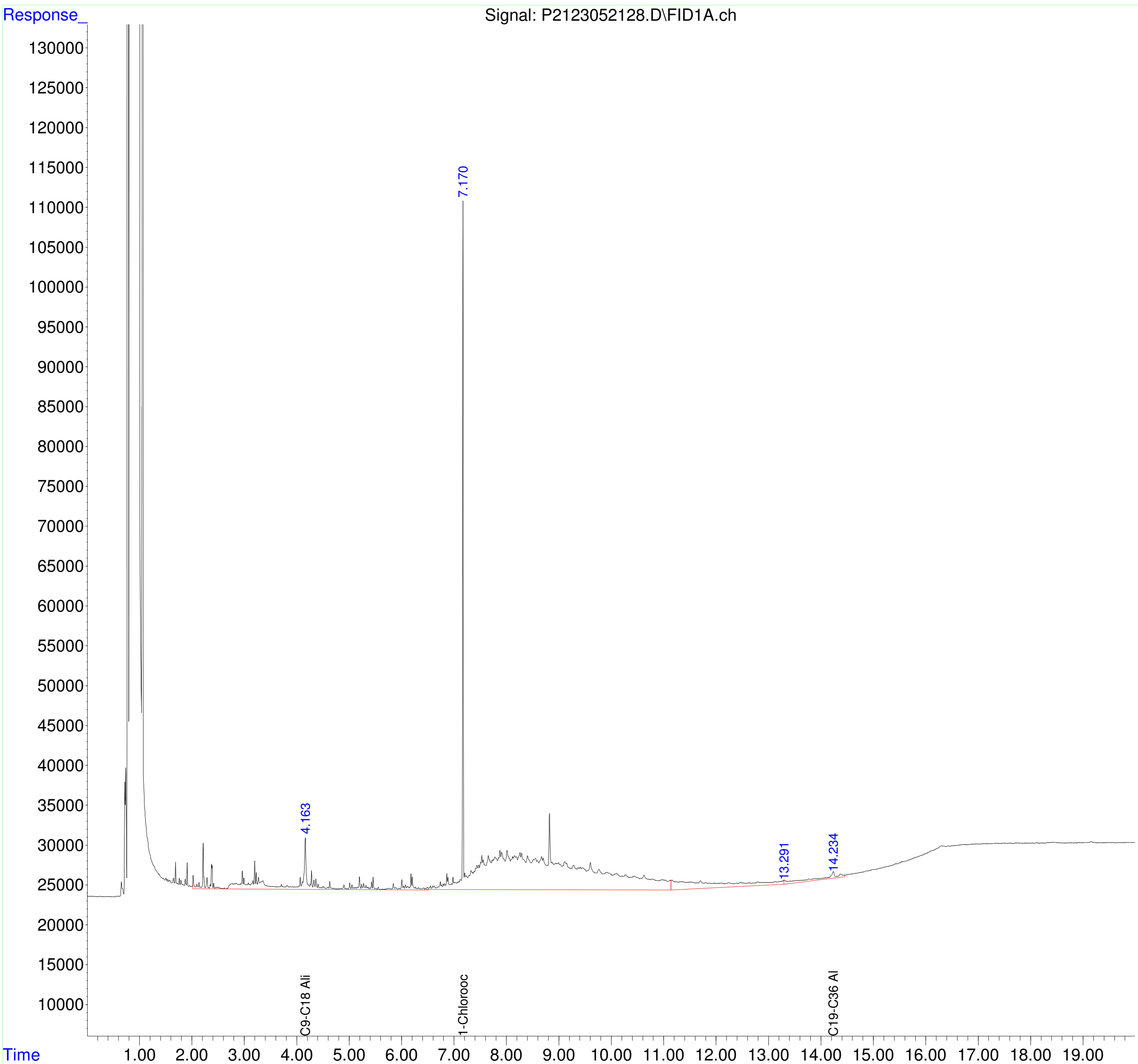
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052128.D
Signal(s) : FID1A.ch
Acq On     : 21 May 2023   6:42 pm
Operator  : Petro21a:sr
Sample     : L2326777-23,42,, mdl
Misc       : wg1780597 Day 3 ALI  Composite Lubricating OIl
ALS Vial  : 14   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:34:42 2023
Quant Method : I:\PETRO\Petro21\2023\230521\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

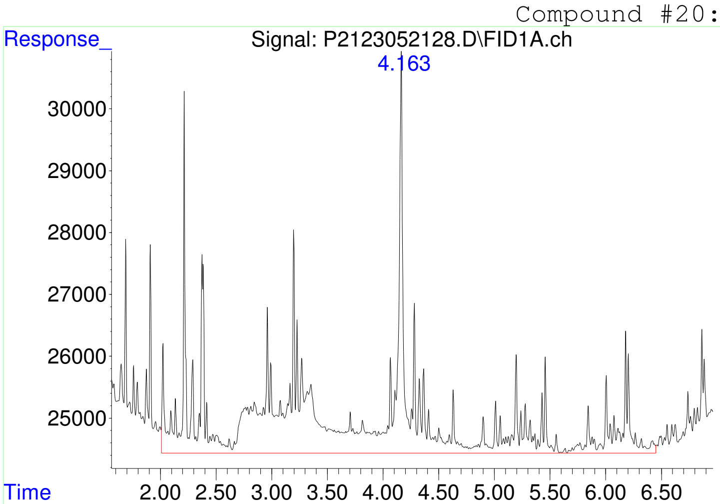
Volume Inj.  :
Signal Phase :
Signal Info  :

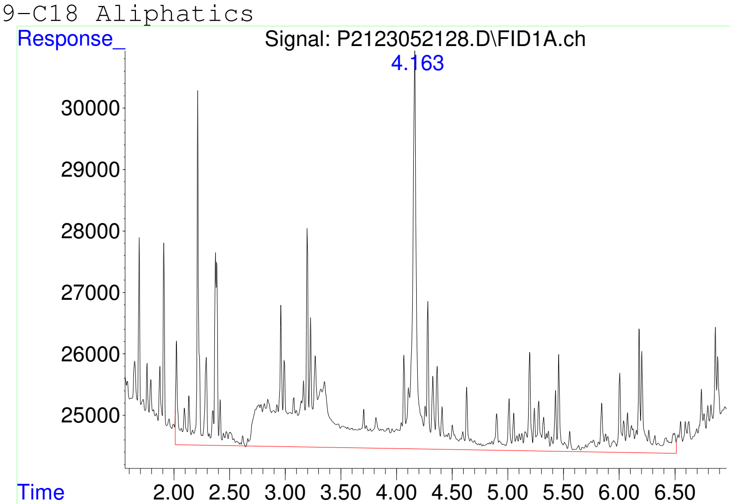


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230521\ | QMethod | : P21MAALI211129A.M |
| Data File | : P2123052128.D | Operator | : Petro21a:sr |
| Date Inj'd | : 5/21/2023 6:42 pm | Instrument | : Petro 21 |
| Sample | : L2326777-23,42,, mdl | Quant Date | : 5/25/2023 11:29 am |

Compound #20: C9-C18 Aliphatics



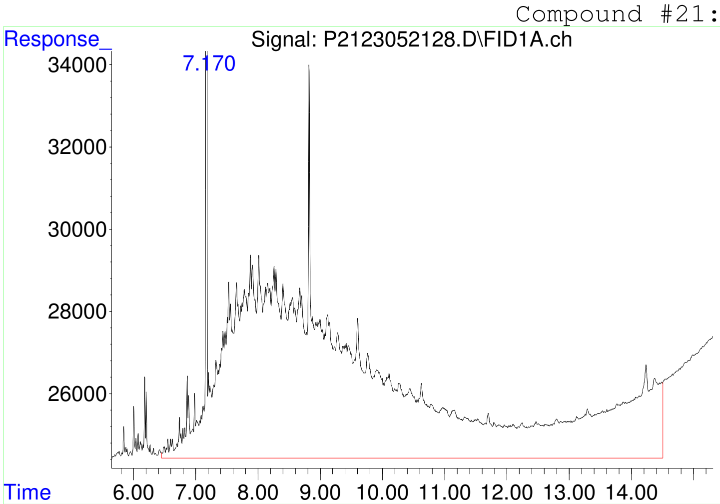



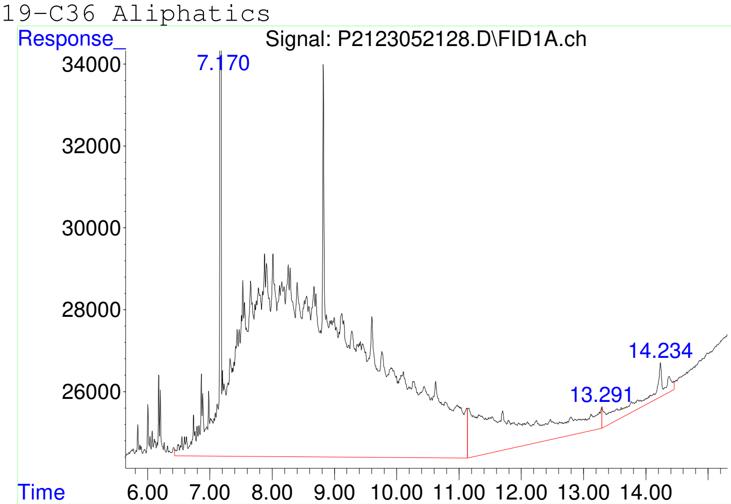

Original Peak Response = 1282443

Manual Peak Response = 1234919 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 8786204

Manual Peak Response = 7623489 M5

M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052129.D
Signal(s) : FID2B.ch
Acq On : 21 May 2023 7:07 pm
Operator : Petro21b:sr
Sample : L2326777-24,42,, mdl
Misc : wg1780597 Day 3 ARO Compistite Lubricating Oil
ALS Vial : 65 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 11:45:29 2023
Quant Method : I:\PETRO\Petro21\2023\230521.SEC\P21MAARO211129B.M
Quant Title : MA EPH Aromatic
QLast Update : Thu May 18 08:24:56 2023
Response via : Initial Calibration
Integrator: ChemStation

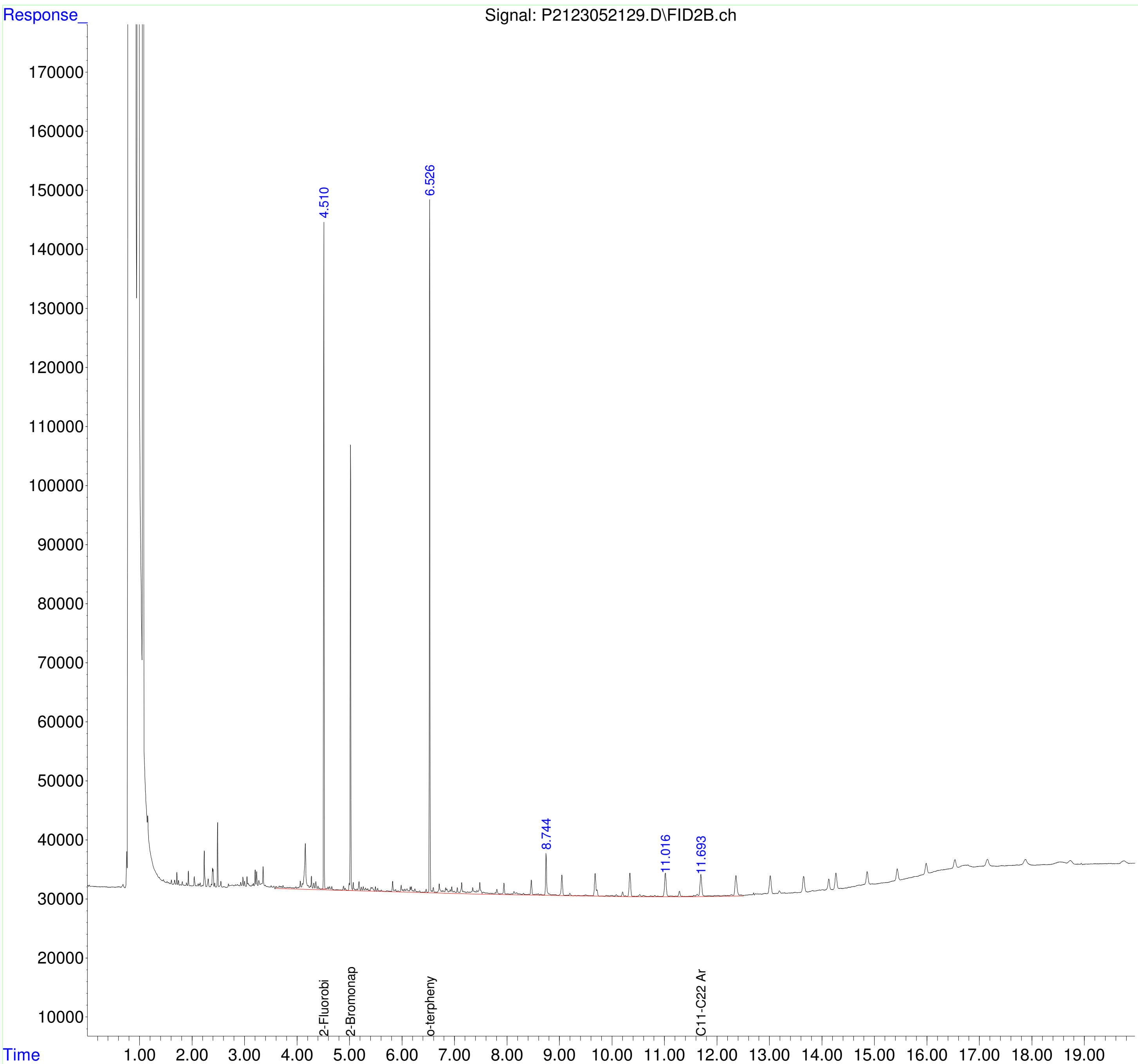
Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| Compound | R.T. | Response | Conc Units | |
|---|---|---|---|---|
| System Monitoring Compounds | | | | |
| 3) s 2-Fluorobiphenyl | 4.512 | 849913 | 12.144 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 60.72% | |
| 5) s 2-Bromonaphthalene | 5.019 | 605424 | 12.284 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 61.42% | |
| 10) S o-terphenyl | 6.528 | 945987 | 10.389 mg/L | |
| Spiked Amount 20.000 Range 40 - 140 | | Recovery = | 51.94% | |
| Target Compounds | | | | |
| 1) Naphthalene | 0.000 | 0 | N.D. mg/L | |
| 2) 2-Methylnaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 4) Acenaphthalene | 0.000 | 0 | N.D. mg/L | d |
| 6) Acenaphthene | 0.000 | 0 | N.D. mg/L | d |
| 7) Fluorene | 0.000 | 0 | N.D. mg/L | d |
| 8) Phenanthrene | 0.000 | 0 | N.D. mg/L | d |
| 9) Anthracene | 0.000 | 0 | N.D. mg/L | d |
| 11) Fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 12) Pyrene | 0.000 | 0 | N.D. mg/L | d |
| 13) Benzo(a)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 14) Chrysene | 0.000 | 0 | N.D. mg/L | d |
| 15) Benzo(b)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 16) Benzo(k)fluoranthene | 0.000 | 0 | N.D. mg/L | d |
| 17) Benzo(a)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 18) Indeno(1,2,3-cd)pyrene | 0.000 | 0 | N.D. mg/L | d |
| 19) Dibenzo(a,h)anthracene | 0.000 | 0 | N.D. mg/L | d |
| 20) Benzo(ghi)perylene | 0.000 | 0 | N.D. mg/L | d |
| 21) H C11-C22 Aromatic Range | 11.693 | 1839825 | 22.008 mg/L | M5 |

(f)=RT Delta > 1/2 Window (m)=manual int.

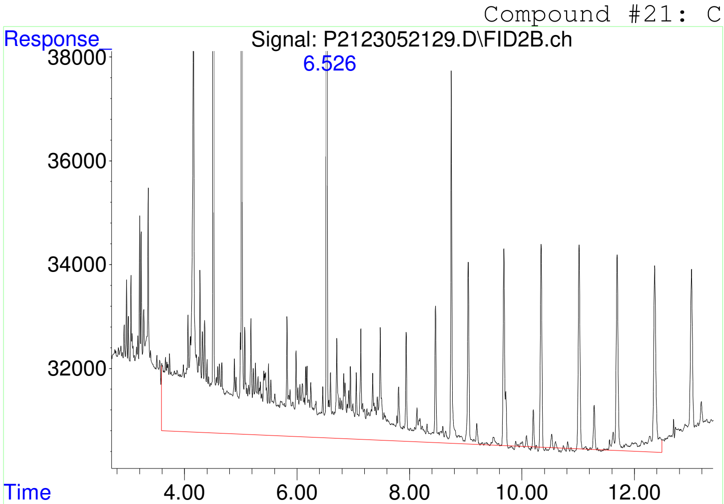
```
Sub List      : Default - All compounds listedport    (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521.SEC\
Data File : P2123052129.D
Signal(s) : FID2B.ch
Acq On    : 21 May 2023   7:07 pm
Operator  : Petro21b:sr
Sample    : L2326777-24,42,, mdl
Misc      : wg1780597 Day 3 ARO Compistite Lubricating Oil
ALS Vial  : 65   Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: May 25 11:45:29 2023
Quant Method : I:\PETRO\Petro21\2023\230521.SEC\P21MAARO211129B.M
Quant Title  : MA EPH Aromatic
QLast Update : Thu May 18 08:24:56 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj.  :
Signal Phase :
Signal Info  :
```

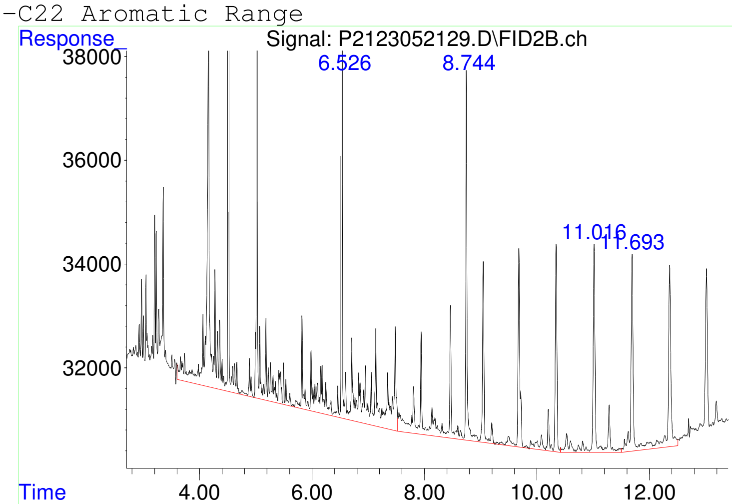


Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path | : I:\PETRO\Petro21\2023\230521.SEC\ | QMethod | : P21MAARO211129B.M |
| Data File | : P2123052129.D | Operator | : Petro21b:sr |
| Date Inj'd | : 5/21/2023 7:07 pm | Instrument | : Petro 21 |
| Sample | : L2326777-24,42,, mdl | Quant Date | : 5/25/2023 11:40 am |

Compound #21: C11-C22 Aromatic Range




Original Peak Response = 3213868
Manual Peak Response = 1839825 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052130.D
Signal(s) : FID1A.ch
Acq On : 21 May 2023 7:07 pm
Operator : Petro21a:sr
Sample : L2326777-24,42,, mdl
Misc : wg1780597 Day 3 ALI Composite Lubricating OIl
ALS Vial : 15 Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:35:17 2023
Quant Method : I:\PETRO\Petro21\2023\230521\P21MAALI211129A.M
Quant Title : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Sub List : Default - All compounds listed

| | | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|---|
| System Monitoring Compounds | | | | | | | |
| 3) | S | Naphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 5) | S | 2-Methylnaphthalene | 0.000 | 0 | N.D. | mg/L | d |
| 6) | S | 2-Fluorobiphenyl | 0.000 | 0 | N.D. | mg/kg | d |
| 8) | S | 2-Bromonaphthalene | 0.000 | 0 | N.D. | mg/kg | d |
| 13) | S | 1-Chlorooctadecane | 7.169 | 838146 | 13.471 | mg/L | M4 |
| Spiked Amount 20.000 | | Range 40 - 140 | | Recovery = 67.36% | | | |
| Target Compounds | | | | | | | |
| 1) | | Nonane (C9) | 0.000 | 0 | N.D. | mg/L | d |
| 2) | | Decane (C10) | 0.000 | 0 | N.D. | mg/L | d |
| 4) | | Dodecane (C12) | 0.000 | 0 | N.D. | mg/L | d |
| 7) | | Tetradecane (C14) | 0.000 | 0 | N.D. | mg/L | d |
| 9) | | Hexadecane (C16) | 0.000 | 0 | N.D. | mg/L | d |
| 10) | | Octadecane (C18) | 0.000 | 0 | N.D. | mg/L | d |
| 11) | | Nonadecane (c19) | 0.000 | 0 | N.D. | mg/kg | d |
| 12) | | Eicosane (C20) | 0.000 | 0 | N.D. | mg/L | d |
| 14) | | Docosane (C22) | 0.000 | 0 | N.D. | mg/L | d |
| 15) | | Tetracosane (C24) | 0.000 | 0 | N.D. | mg/L | d |
| 16) | | Hexacosane (C26) | 0.000 | 0 | N.D. | mg/L | d |
| 17) | | Octacosane (C28) | 0.000 | 0 | N.D. | mg/L | d |
| 18) | | Triacontane (C30) | 0.000 | 0 | N.D. | mg/L | d |
| 19) | | Hexatriacontane (C36) | 0.000 | 0 | N.D. | mg/L | d |
| 20) | H | C9-C18 Aliphatics | 2.213f | 1142942 | 15.970 | mg/L | M5 |
| 21) | H | C19-C36 Aliphatics | 14.231f | 10984071 | 159.484 | mg/L | M5 |

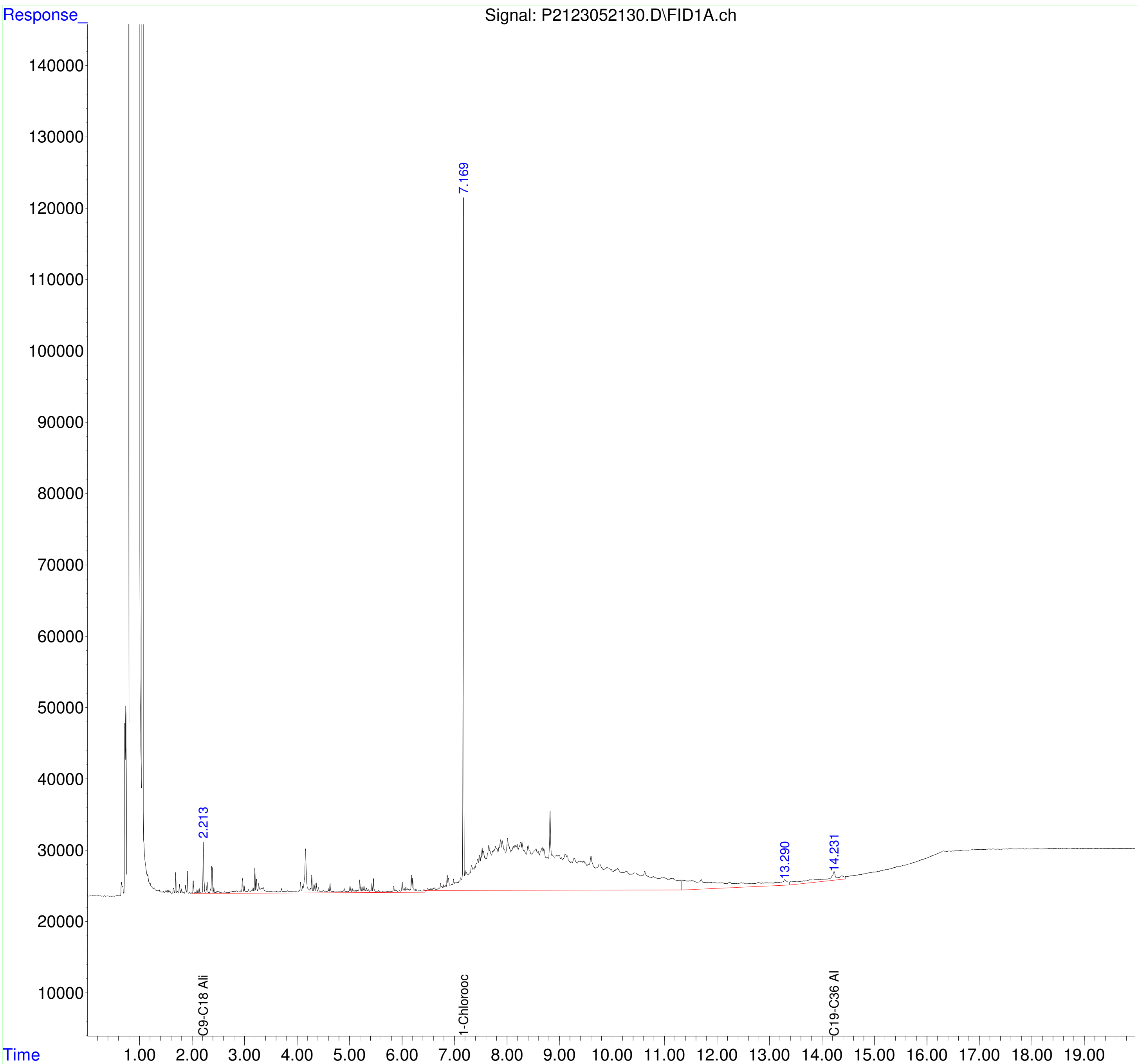
(f)=RT Delta > 1/2 Window (m)=manual int.

Sub List      : Default - All compounds listedport     (QT Reviewed)

Data Path : I:\PETRO\Petro21\2023\230521\
Data File : P2123052130.D
Signal(s) : FID1A.ch
Acq On    : 21 May 2023   7:07 pm
Operator  : Petro21a:sr
Sample    : L2326777-24,42,, mdl
Misc      : wg1780597 Day 3 ALI  Composite Lubricating OIl
ALS Vial  : 15   Sample Multiplier: 1

Integration File: events.e
Quant Time: May 25 11:35:17 2023
Quant Method : I:\PETRO\Petro21\2023\230521\P21MAALI211129A.M
Quant Title  : MA EPH Aliphatic
QLast Update : Sun May 14 08:11:25 2023
Response via : Initial Calibration
Integrator: ChemStation

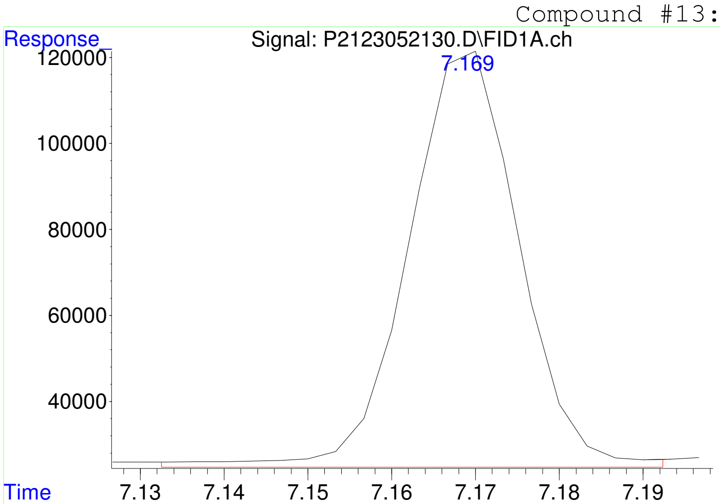
Volume Inj.  :
Signal Phase :
Signal Info  :



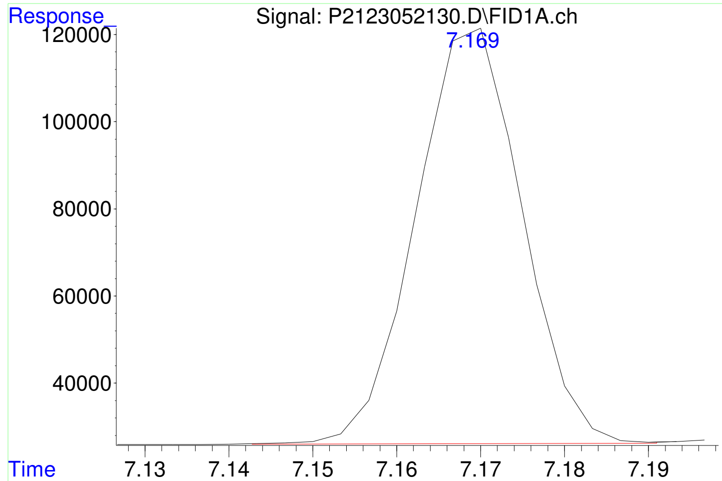
Manual Integration Report

| | | | |
|---|---|---|---|
| Data Path : I:\PETRO\Petro21\2023\230521\ | | QMethod : P21MAALI211129A.M | |
| Data File : P2123052130.D | | Operator : Petro21a:sr | |
| Date Inj'd : 5/21/2023 7:07 pm | | Instrument : Petro 21 | |
| Sample : L2326777-24,42,, mdl | | Quant Date : 5/25/2023 11:29 am | |

Compound #13: 1-Chlorooctadecane

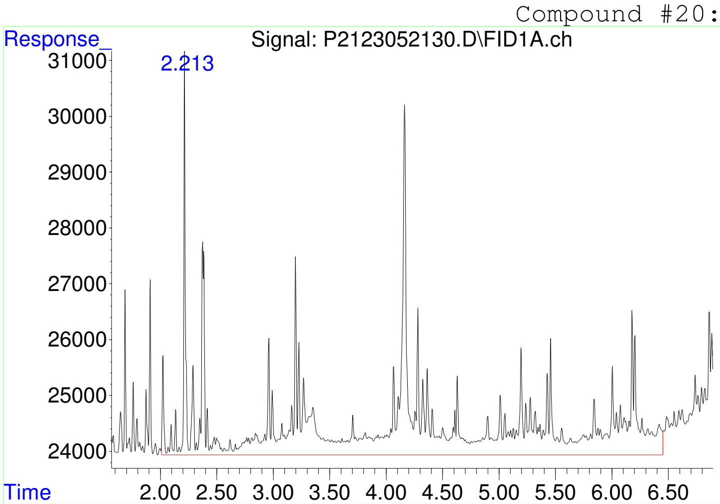



Original Peak Response = 888032
M4 = Poor automated baseline construction.

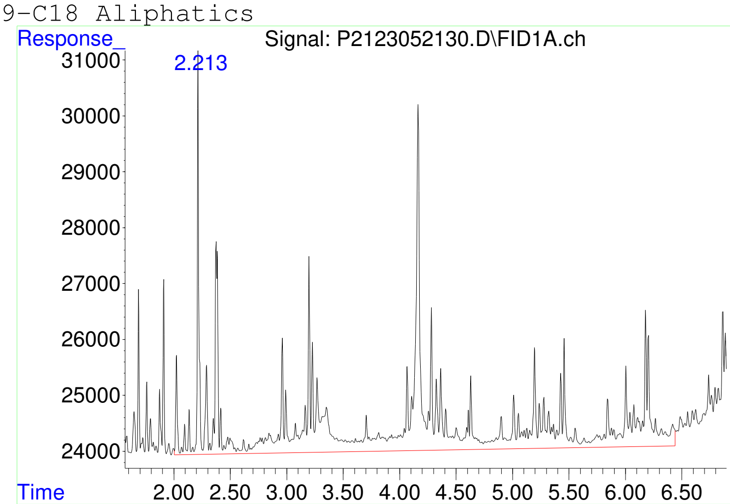



Manual Peak Response = 838146 M4

Compound #20: C9-C18 Aliphatics

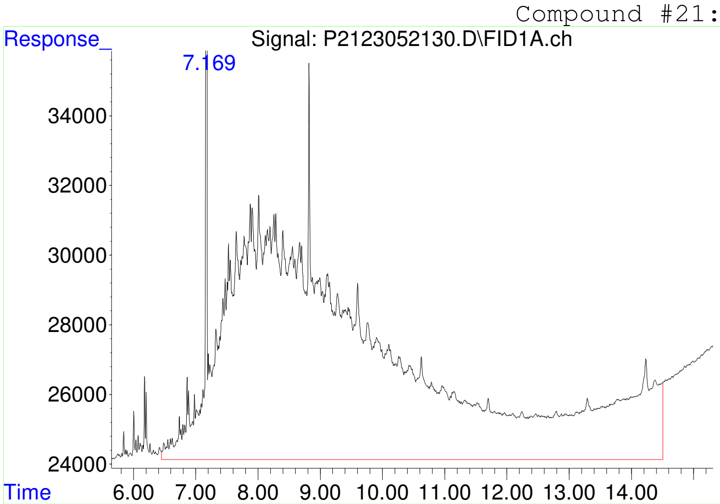



Original Peak Response = 1353235

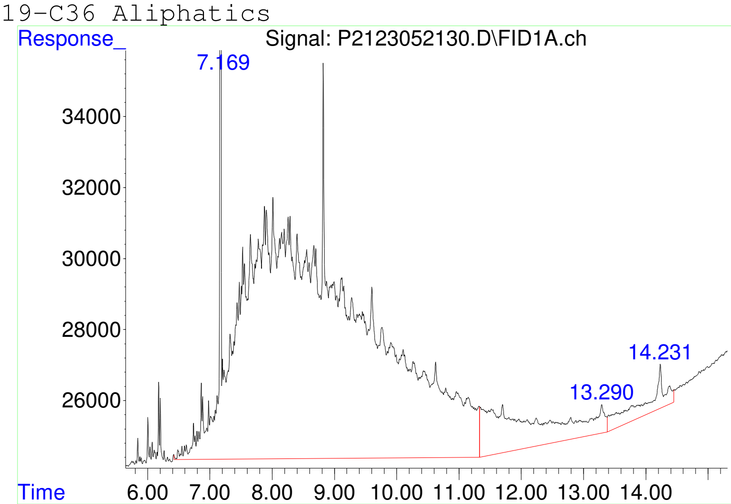



Manual Peak Response = 1142942 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

Compound #21: C19-C36 Aliphatics




Original Peak Response = 13449018




Manual Peak Response = 10984071 M5
M5 = Manual integration over a retention time range required, i.e. for hydrocarbon range methods.

COMMITTEE ON SMALL BUSINESS
RANKING MEMBER

COMMITTEE ON FINANCIAL SERVICES
SUBCOMMITTEE ON HOUSING AND INSURANCE

SUBCOMMITTEE ON FINANCIAL INSTITUTIONS AND MONETARY POLICY

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Congress of the United States
House of Representatives
Washington, DC 20515

NYDIA M. VELAZQUEZ
7TH DISTRICT, NEW YORK

CONGRESSIONAL HISPANIC CAUCUS

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CONGRESSIONAL PROGRESSIVE CAUCUS

OLDER AMERICANS CAUCUS

CONGRESSIONAL CHILDREN'S CAUCUS

CONGRESSIONAL ASIAN PACIFIC AMERICAN CAUCUS

November 12, 2024

Caroline Kwan
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 18th Floor
New York, NY 10007
email: kwan.caroline@epa.gov

Dear Ms. Kwan:

I would like to share my concerns regarding the Proposed Early Action Plan for the East Branch tributary of Newtown Creek, submitted by EPA for public comment. As the Congresswoman representing both sides of the Newtown Creek in Brooklyn and Queens, I worked nearly two decades ago for the designation of this 3.8-mile waterbody as a Superfund cleanup site to address enormous environmental burdens. Fourteen years after listing, full cleanup of this large and complex waterbody remains a long way off with the overall feasibility study still in process. I appreciate the early action and focused feasibility conducted for the East Branch to get cleanup methods fleshed out and implemented sooner on a section of the creek. However, the feasibility study is lacking when it comes to detailing where the contamination is and sources are, and the proposed plan falls short compared with actions taken at the Gowanus Canal Superfund site which was in my district and listed the same year as Newtown Creek. This Newtown Creek early action will set the standard for cleanup of the larger creek, and we must get it right. We cannot afford an inadequate solution that does not protect human health and the environment.

The Proposed Plan is light on the details and leaves much to be desired when it comes to identifying specific locations of more contaminated sediment, Non-Aqueous Phase Liquids (NAPL) characterization, upland seeps, and the post construction monitoring plan. This lack of detail on key issues in the cleanup leaves me concerned about the selected Alternative EB-D which would dredge only 3 feet across the East Branch with capping to maintain existing water depths, with the option for deeper dredging only in particularly contaminated areas. However, sediment thickness in the East Branch can be 16 to 20 feet thick or more in areas. The Proposed Plan could leave sizeable amounts of contaminated sediment in the East Branch in perpetuity and inadequately capped if EPA doesn't fully characterize and identify where contaminated sediment hotspots are located. EPA needs to provide additional details on what criteria would determine when deeper dredging would be required. EPA should not move forward without knowledge of potential contaminant reservoirs and how the agency will make dredging decisions. The Pre-Design Investigation should detail this information and be provided for public comment.

Without adequate understanding for where the contamination is, Alternative EB-F to remove all the contaminated sediment down to native material would be much safer. For Alternative EB-D to be acceptable to me and my constituents, the EPA would need to ensure a set of conditions outlined by the Newtown Creek Community Advisory Group:

- A Pre-Design Investigation Plan that is completed by an independent party overseen by EPA and presented to the Community Advisory Group for comments.
- A clear and comprehensive sampling plan that includes different sampling methods and different characterization methods to fully analyze NAPL in seeps and sediments, conducted by an independent contractor hired by the EPA and presented to the Community Advisory Group for comments.
- A cap design should be reassessed following systematic identification of, and quantitative data collection from, NAPL contamination sources.
- If any location of NAPL-contaminated sediment is assessed unsuitable for removal, then in-situ stabilization (ISS) should be based upon a comprehensive data set from this location, as per the protocols followed at the Gowanus Canal Superfund site.
- A map of Principal Threat Waste sources developed in collaboration with work already conducted by the NYSDEC and NYCDEP, such that the effectiveness of any proposed bulkhead can be clarified and presented to the Community Advisory Group for comments.
- A post remediation restoration plan that sets targets for and identifies potential sites of ecological restoration in the East Branch.

In lieu of the above, deeper dredging in the EB-F alternative down to native sediment will ensure more contamination is removed and maximize up-front remediation funding. Dredging to native sediment will also enable in-situ stabilization on more firm native material as was done in Gowanus. Shallower dredging in areas is contingent on delisting of the navigation channel for the East Branch in the Water Resource Development Act (WRDA) now in process. Note that in the case of Gowanus, navigation channel depths were not modified, or delisted, and dredging goes deeper and caps thicker than what is proposed for Newtown Creek.

The EPA must provide more information on what long-term monitoring will be required to evaluate the protectiveness of the remedy and clarify how the EPA will work with state agencies to ensure contamination from upland sources is addressed and remediated. There is significant concern that ongoing contamination from upland sources, CSO discharges and runoff, and from the rest of the Creek, and the potential for erosion of the cap due to increasing storms, will threaten the long-term viability of the remedy. Details on the monitoring program were not included in the Proposed Plan, and more information is needed. Will the costs of long-term monitoring - and any post-remedy recontamination clean-up be shouldered by responsible parties or taxpayers/municipalities?

Lastly, the Remedy must include safe access and thriving ecosystems, ensuring that human recreation on the East Branch and revitalization of the aquatic habitat is made possible. Further, salt marsh restoration in this section must be prioritized, and shoreline reconstruction should facilitate the ongoing revitalization of our local aquatic ecosystems by incorporating habitat for shellfish, fish, crabs, and other marine animals as well as aquatic plants. I have secured funding for some of these types of efforts, and they should be planned for.

Thank you for your consideration of these concerns shared by my constituents and community stakeholders.

Sincerely,

Nydia M. Velázquez
Member of Congress

THE CITY OF NEW YORK
**LAW DEPARTMENT**
100 CHURCH STREET
NEW YORK, NY 10007-2601

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kathsmit@law.nyc.gov

November 12, 2024

VIA email to: kwan.caroline@epa.gov

Caroline Kwan
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 18th Floor
New York, NY 10007

Dear Ms. Kwan,

The City of New York ("City") appreciates the opportunity to comment on the East Branch Early Action Proposed Remedial Action Plan ("Plan"). The City maintains the positions it has shared with EPA previously, particularly regarding the treatment of Non-Aqueous Phase Liquid (NAPL) seeps from upland sites and the proposed choice of preliminary remediation goals. In relation to the East Branch, the City also encourages the continued collaboration between EPA and the City to avoid or minimize impacts to essential infrastructure in the area. The following comments also provide specific feedback on certain sections of the Plan.

**Control of Principal Threat Waste/ NAPL Seeps from Upland Properties:**

The City is concerned with the approach towards controlling NAPL seeps from upland Sites. The PRAP treats potential NAPL seeping from upland sources, a Principal Threat Waste (PTW) for the Site, in a manner which could fail to meet the source control Remedial Action Objective (RAO). Rather than adopting a single, effective approach, the PRAP has different and unequal approaches to controlling NAPL/oil/coal tar migrating to the Creek from sediments due to ebullition versus NAPL migrating via upland sites (*i.e.,* NAPL seeps). The approach to control NAPL migration from sediments is aggressive, including a proposed bank-to-bank amended cap with a 9-inch NAPL sorption for cap designs. By contrast, the approach to NAPL seeps assumes that NAPL seeping from the upland sites is trivial.

The PRAP only anticipates addressing NAPL from upland seeps if that NAPL "is found to be impacting the protectiveness of the implemented remedy," and even then, only provides that the seeps "*will need to be addressed through either state and/or federal enforcement authorities (to be determined on a case-by-case basis)*." This approach fails to adequately address the magnitude of the NAPL seep contributions. The City has documented pure product entering and migrating throughout the Creek. NAPL entering the Creek is not just thin sheens, but thick oil which has elevated concentrations of all measured Contaminants of Concern (COCs) for the Site.

The approach proposed to control these seeps is ineffective and in stark contrast with the rigorous approach proposed for NAPL migration from sediments. Even though there is continuing disagreement regarding the extent of NAPL migration through ebullition, the PRAP proposes aggressive controls for NAPL migration through ebullition. The PRAP does not require an assessment to see whether uncontrolled NAPL migration due to ebullition would impact the remedy before requiring protective measures. The protective measures proposed are appropriately conservative; the alternatives in the PRAP for the EA propose a bank-to-bank amended cap with a 9-inch NAPL sorption for all cap design on soft sediments, despite the Newtown Creek Group (NCG) surveys identifying ebullition occurrence in only narrow areas of EB (Figure A2-16 of the EB FFS) and the contaminant loads, presented in section 5.4 of the ebullition data evaluation report, for NAPL migration through ebullition as a fraction of loads from various other sources.

In contrast, EPA prematurely determined that NAPL seeps from upland sources are a "minor source of contamination" to the EB sediments and that uncontrolled NAPL seeps will not impact the anticipated long-term equilibrium (LTE) concentrations. The City strongly disagrees with USEPA's position on NAPL seeps from upland sites. There are ongoing NAPL seeps, including within the East Branch, which the City first documented in 2016. EPA's prior comments on the Chemical Fate Transport model support the City's position – the analysis shows that NAPL migration impacts the sediments and results in elevated COC concentrations in sediments and sediment traps. *See* EPA comment on the statement of concurrence 1.

EPA determined that the Long-Term Equilibrium (LTE) would be only "slightly" higher due to NAPL impact based on a NCG report[1] which was not reviewed by any stakeholder, including USEPA. *See* East Branch Focused Feasibility Study Section 3.4.4. The unreviewed AnchorQEA report concluded that NAPL seeps are a minor input by focusing only on one COC, TPAH34, even though data is available for all COCs. The report did not address the City data[2] showing that the COC concentrations in NAPL seeps are orders of magnitude higher than the risk based PRGs and LTE and present risk to human health and the environment.. EPA should

[1] Anchor QEA, *Quantitative Bounding Evaluation of the Importance of Nonaqueous Phase Liquid Seeps in the East Branch Early Action Area of Newtown Creek* (September 2023).
[2] NYCDEP, *2017 Upland NAPL Seep Sampling Data Summary Report.* Newtown Creek Superfund Site (September 2020).

not rely on an unreviewed NCG report which contradicts USEPA's technical assessments and guidance on NAPL control.

The proposed remedial action based on these conclusions is similarly concerning. In the PRAP, USEPA states that NAPL seeps will be controlled only if NAPL seep "*is found to be impacting the protectiveness of the implemented remedy.*" This means that if a NAPL seep is documented, rather than taking actions to control it, USEPA will collect data to assess impact on sediments only, as sediment remediation/pathway is the remedy basis. This is stated on page 18 of the PRAP where the text states that the *"monitoring and evaluation approach will be used to determine if the source control RAO is being met.*" The monitoring and evaluation approach only focuses on comparison of future sediment concentrations to LTE. USEPA will not assess impact on surface water[3] or direct impact on ecological receptors such as fish birds etc. This is inconsistent with all superfund guidance and a complete disregard to the presence of PTW. This is also in violation of the NYSDEC ARAR 6 NYCRR § 375-1.8.C.1, regarding presence of NAPL on water surface. EPA's conclusion that "*need for sealed bulkheads is not currently indicated by existing data"* is inaccurate and diverges from EPA's guiding pillar of controlling sources early.

USEPA should have a consistent approach for controlling PTW (i.e., NAPL) migration regardless of the pathway (sediments/ebullition transported versus upland sites/seeps). If a NAPL seep is documented, it should trigger the use of sealed bulkheads in the remedial alternative to control the NAPL seep/PTW from entering the Creek and impacting the ecological receptors followed by immediate investigation either through State or federal authorities for further upland controls. The added step of assessment to see if a NAPL seep impacts the sediments will inhibit overall protectiveness of human health and environment, limit the long-term effectiveness and permanence of remedial alternatives and prevent reduction of toxicity, mobility, or volume of contaminants through treatment.

**Background-based Preliminary Remediation Goals (PRGs) for the EA and the Site:**

The PRAP rejects background-based PRGs on the assumption that "risk based PRGs are attainable long term." *See* pages 13-14. The PRAP goes on to state that if surface sediments do not continue trending towards long term remediation goals, USEPA will assess the need for additional source control measures. *See* page 15. There are several concerns with USEPA not selecting background for PRGs.

The USEPA (USEPA 2005) guidance on sediment remediation for hazardous waste sites states that "[u]nder CERCLA, cleanup levels are not set at concentrations below natural background levels. Similarly, for anthropogenic contaminant concentrations, the CERCLA program normally does not set cleanup levels below anthropogenic background concentrations." EPA's proposal for East Branch is in clear contradiction of USEPA national policy. Even if ongoing sources are controlled significantly, the background will not converge to the risk-based

---

[3] Surface water data collected during RI did not show in ecological or human health risk, however surface water which contained NAPL was not sampled. A surface water sampling program which captures NAPL migration reflects the risk to ecological receptors due to NAPL presence. This is a data gap for the Site.

PRGs as the concentrations of solids from ongoing sources stays the same. For example, as part of the LTCP, the CSO discharge to the Creek will be substantially reduced. Despite this significant reduction, there is minimal change (<10%) in the anticipated future background (LTE/IEM) concentrations in the Creek based on this reduction for contaminants of concern including C19-C36 aliphatic petroleum hydrocarbons and Di/furans where the background/LTE/Interim Evaluation Measures (IEM) exceed the risk-based PRG. The only contaminant which sees a significant change is TPCB, where the LTE concentrations *increase* by 40% after the CSOs are controlled after implementation of the LTCP. USEPA can run these scenarios for various theoretical source control alternatives. USEPA will find that all ongoing solids-based sources, including the East River and all runoff, will have to be controlled almost completely (by 97%) to achieve the risk based PRGs. USEPA has stated on page 6 of the PRAP that all sources cannot be eliminated completely, showing that risk-based PRGs cannot be met and that background-based PRGs must be developed for the Site.

USEPA has never defined what "long term" means for the sediments to achieve risk based PRGs and how the risk based PRGs will be met if non-NAPL sources continue at current loadings. Specificity is needed on USEPA's expected timeline for the LTE/IEMs to be consistent with risk-based PRGs. USEPA should also provide the assumptions underlying this time period and the process it will take for the IEMs to be equal to the risk-based PRGs. While it is true that the concentrations of COCs in the watershed are expected to decline, there is no data available to determine the rate of reduction. It is very likely that the RI and data collected under Operable Unit 2 (OU2) will remain representative for most background inputs and the LTE developed using these inputs will remain representative of the future conditions for solids-based inputs. As discussed above, if particle concentrations on solids coming in from all urban background sources do not reduce significantly, then almost complete control of sources would be needed to meet some risk-based PRGs, which USEPA recognizes is infeasible.

Without a thorough understanding of the rate in reduction of contaminant concentrations in ongoing urban background sources it is impossible for the City to support a remedy designed to meet PRGs rather than background concentrations as it is very likely that the background will never converge to the risk-based PRGs. The City strongly recommends Region 2 follow USEPA guidance and the precedent set at other Region 2 Sites and nationally and select a background-based PRG (represented by the LTE/IEM) for the Site.

***Classifications and definitions***

**C19-C36 Aliphatics Petroleum Hydrocarbons**

The PRAP should be updated to correctly state the contaminants of concern driving risk in the Creek. The document refers to the C19-C36 aliphatics petroleum hydrocarbons[4] as just C19-C36 aliphatics, which is inaccurate. Calling a class of petroleum hydrocarbons "aliphatics"

[4] The C19-C36 aliphatics were measured using the Massachusetts DEP Extractable Petroleum Hydrocarbon sampling procedure, which focuses on measuring different expressions of petroleum hydrocarbons. Furthermore, USEPA headquarters analysis showed toxicity due to several other expressions of petroleum hydrocarbons, including Diesel Range Organics and Total Petroleum Hydrocarbons.

is inaccurate and downplays the importance of sheens and NAPL in driving the toxicity in the sediments of the Creek. The PRAP must be updated to reflect the class of contaminants driving the risk accurately by expanding the contaminant class “C19-C36 aliphatics” to include “C19-C36 aliphatic petroleum hydrocarbons”. At a minimum, the first instance (page 9 of the PRAP) when this contaminant class is mentioned and in abbreviations, it should be stated as “C19-C36 aliphatic petroleum hydrocarbons”. The USEPA had previously asked the NCG to update the FFS to accurately represent these group of contaminants and the PRAP should do the same.

**Seeps**

The PRAP identifies seeps as an external source of contamination to the Creek. Seep is an umbrella term used in the RI to include lateral groundwater (GW) seeping to the Creek and NAPL (gasoline, fuel oil, coal tar etc.). NAPL migration and seeps have been identified as a PTW for this Site (page 14 of the PRAP). The PRAP must clearly state that the ongoing seeps to the Creek and even parts of EB, based on City data, include NAPL seeps. Please update the PRAP to discuss the types of seeps present at the Site.

***Coordination regarding essential infrastructure***

Remedial action within Newtown Creek poses challenges beyond many CERCLA sites given the dense surroundings and competing uses. The City appreciates EPA’s coordination with City agencies, particularly the New York City Department of Transportation (“DOT”) regarding the Grand Street Bridge Reconstruction and DEP regarding construction of measures under the Long Term Control Plan. These projects are all on similar timelines. As there is a high likelihood for construction overlap between the projects, the City requests continued coordination on scope and schedules to ensure that all projects proceed in an efficient and cost-effective manner while minimizing unnecessary impacts to the channel.

**Grand Street Bridge Reconstruction**

The Grand Street Bridge Project anticipates in-water foundations in temporary and permanent conditions that will require excavation, dredging, and structure demolition and/or removal. Close coordination between the agencies on both projects is needed, including to determine proper sequencing. As the Remedial Action progresses, it will be important to coordinate timeline, scope, and the limits of dredging, capping, and bulkhead work, as well as specific actions related to the Bridge proect, including removal of the existing fender system.

Beyond coordinating with the City to prevent conflicts between the East Branch remedy and the reconstruction of the Grand Street Bridge, the City also recommends that EPA incorporate lessons learned from the Gowanus remediation in connection with transportation infrastructure and especially bridges. Scope, design documents, pre and post construction reports, and monitoring plans should be submitted to NYCDOT Bridges for review if any of the proposed work is taking place within 100 feet on above, or below of any portion of a bridge, tunnel, underpass, or overpass. If the remedy requires barges with equipment or materials exceeding the vertical clearances of the NYCDOT movable bridges, coordination with

NYCDOT Bridges to safely open and close these bridges for vessel and vehicular traffic will be necessary.

There are also some key differences between Gowanus and Newtown, including their uses, adjacent properties, and adjacent traffic networks should be considered when developing staging plans for the work.

Unlike on the Gowanus project, there may not be an opportunity on Newtown Creek to leave any of the movable bridges in the open position for significant lengths of time due to a lack of viable alternate vehicular traffic routes. The extent to which bridge closures can be permitted should be discussed with NYCDOT. Considerations should also consider pedestrian safety mitigation measures.

The two railroad movable bridges at the mouth of Dutch Kills that are owned by MTA are not able to open for navigation. This will greatly limit the ability to work around those structures and to get waterborne equipment from Newtown Creek upstream along Dutch Kills.

Upstream of the MTA Dutch Kills bridges, NYCDOT has a movable bridge, Borden Avenue Bridge, which is similar in age and design to Carroll Street Bridge on the Gowanus Canal. Any operation that has the potential to create impact or compromise the structural integrity of the bridge structure should be brought to the attention of NYCDOT. During operations, additional care should be taken when working around this bridge.

***Specific Comments***

- The PRAP must clearly state that the LTE model does not include NAPL seeps as an input. The LTE assumes that all NAPL sources to the Creek have been controlled. This is critical because Figure 8 in the PRAP which shows the *"preliminary estimates of contribution of external inputs for East Branch*" includes lateral groundwater/seeps as an input. This misrepresents the inputs to the LTE because it creates the impression the upland NAPL seeps are part of the LTE when they are not. Please update the PRAP to address this.

- Page 5: The text here lists all the sampling activities conducted under the RI. The list in this text includes NAPL, ebullition and seeps. The text as written gives the inaccurate impression that the sampling conducted for the RI sampled NAPL seeping into the Creek from upland properties. The seep sampling conducted under the RI was "opportunistic" seep sampling which did not sample any ongoing NAPL seeps. Characterization of NAPL seeps from the upland properties is a data gap for the Site which has not been addressed by data collected under the RI, including USEPA's lateral groundwater study. Please update the text in the PRAP to accurately represent the sampling performed under the RI. Furthermore, clearly state that the seeps to the Creek include GW seeps and NAPL seeps.

- Page 7: The text states "Based on the 2022 bathymetric survey, the average bathymetric elevation in East Branch is -11 feet North American Vertical Datum of 1988 (NAVD88), with a minimum elevation of approximately -24 feet NAVD88 (See Figure 4). Water depths extend to a maximum of approximately 21 feet below mean lower low water (MLLW); MLLW is +2.61 feet above NAVD88." This appears to be somewhat internally inconsistent. EPA should verify MLLW elevation provided per NAVD88. A MLLW of -2.61 would be more consistent with the statement that "water depths extend to a maximum of approximately 21 feet below mean lower low water", given that the minimum elevation in the creek was mentioned to be -24 feet per NAVD88. A MLLW of -2.61 would also be more consistent with findings for the Grand Street Bridge Project.

- Page 8, bullet 2: This bullet states: "Lessons learned from conducting the action (and associated pre-design investigation, remedial construction, and pre- and postimplementation monitoring) will help inform the conduct of potential future early actions on other portions of the Creek, as well as the overall OU1 FS alternatives development, evaluation, and remedy selection as well as the eventual implementation of the OU1 remedy." These statements are not supported by the OU1 schedule approved by USEPA Region 2 in Spring 2023 and the updated schedule in 2024. The alternatives memo was submitted to USEPA for review in February 2024. Per the 2024 OU1 project schedule, the Record of Decision (ROD) for the EB EA is expected in December 2024. The Draft FS report for the OU1 is expected to be submitted to USEPA in October 2026, with the final report approved in April 2028. Given that the two approvals are 3.5 years apart, it is unlikely that the pre-design investigation will even be completed for the EA. Remedial construction and post implementation monitoring are certainly not expected in that time frame. Therefore, any lessons learned from the EA will not be available to help in determining the remedy selection for OU1. Additional clarification is needed as to how the EA will provide insight into OU1 feasibility study and development of remedial alternatives.

- Page 8, bullet 3: This bullet states that EB EA, "*will provide an opportunity to validate and update the broader CSM that is being refined for the full OU1 Study Area"*. It is not clear how the post-construction monitoring in the EB EA will be used to update the Conceptual Site Model (CSM) for the whole of the Creek, nor are the implications of the ongoing sources to EB explained. The Study Area (i.e., OU1) is not a homogenous waterbody with respect to contamination observed in the Creek and sources responsible for contamination. The contamination found in EB and the sources to EB contamination are not representative of the Study Area/OU1 as a whole. For example, the Turning Basin (TB) area of the Creek has the highest contamination in both surface and subsurface sediments of the Creek for PCBs, PAHs, and copper – reflective of the legacy industrial activities along the Creek near that area. NAPL impacts (presence of NAPL layers, blebs, sheens) in the sediments of the Creek are significantly higher in the TB than any other part of the Creek. The ongoing sources of solids to TB portion of the Creek are largely from East River (65%), followed by point sources. TB is also subject to boat traffic, which is not the case for EB. The CSM presented in the RI report for EB is not representative of the CSM for the TB or other areas of the Site. Therefore, any updates to the CSM or validation of the CSM for EB would not reflect the validity of the CSM in other parts of the Creek. The USEPA has not provided an explanation as to how the CSM for OU1 can be updated using EB as a surrogate. The City strongly believes that it is unlikely that data from the EB EA can update the CSM. The USEPA should provide an explanation of how EB EA can update the CSM.

- Page 10: The text states that, "*NAPL and sheen in sediment*: Laboratory analysis of NAPL from the OU1 Study Area shows that it generally consists of TPAH(34) and TPCBs" (emphasis added). This statement is incomplete and may misinform the reader. First, NAPL in sediments was never separately analyzed. Sediments with NAPL impacts were analyzed for various contaminants. As written ("laboratory analysis of NAPL"), the text implies that NAPL in sediments was extracted and separately analyzed for contaminants. The sediment samples collected (a smaller subset of samples in the second phase of the RI) were analyzed for petroleum hydrocarbons. Petroleum hydrocarbons, including C19-C36 aliphatic petroleum hydrocarbons, were measured in all NAPL-impacted sediments. Second, NAPL migrating due to ebullition was characterized for COCs in EB. The NAPL migrating due to ebullition has very high concentrations of petroleum hydrocarbons, including C19-C36 aliphatic petroleum hydrocarbons and Di/Furans in addition to TPAH34 and TPCBs. The PRAP should accurately reflect the data and its findings.

- Opportunistic sampling as part of long-term monitoring program, page 15: The long-term monitoring program proposed by USEPA recommends opportunistic sampling of seeps. This proposal will not identify and sample seeps, particularly NAPL seeps. The RI sampling included opportunistic seep sample collection which did not identify and characterize many ongoing seeps. Seep reconnaissance and sampling must be a systematic approach where multiple low tide surveys are conducted over multiple months to identify and sample seeps. Without this approach, the long-term monitoring will not identify migration of groundwater and PTW from upland sites via seeps. The City strongly recommends USEPA update the long-term monitoring to include systematic surveys and sampling for identification of seeps. The seep study component of the long-term monitoring program must be based on a probability-based sampling design so that average concentration of seeps and the total mass discharged to the Creek and tributaries can be estimated with statistically defensible confidence bounds.

- Figure 8 and USEPA's assumptions about source control and impact on LTE concentrations, page 15: Figure 8 of the PRAP is LTE concentration for different COCs in EB. In addition to showing the absolute LTE concentration of COCs, the plot also depicts individual parts of the LTE which is a weighted average concentration of all solids based and non-solids-based inputs. For the solids-based inputs the weighted concentration is calculated by multiplying the contaminant concentration on the solids with the percentage of solids contribution from a given source. Note that the concentrations of some COCs differ significantly. For example, for C19-C36 aliphatic petroleum hydrocarbons the LTE model assumes that the concentration in the East River solids is 16 mg/kg while that in CSOs and stormwater is 1600-2700 mg/kg. There are two orders of magnitude difference in the concentrations of C19-C36 aliphatic petroleum hydrocarbons in East River solids when compared to other solids-based sources. The non-East

River solids sources are within a factor of two with respect to each other, with stormwater being on the higher range. This is an important distinction not captured by Figure 8. Without this information, the figure gives the illusion that if CSOs are controlled the LTE for C19-C36 aliphatic petroleum hydrocarbons is expected to decrease significantly. It appears that the text in PRAP also comes to a similar conclusion when the text states that, "*Figure 8 also shows that CSOs currently provide a significant contribution to the long-term equilibrium concentration for most of the COCs, including dioxins/furans TEQ and C19-C36. The volume of CSO discharges to the Creek will decrease by approximately 65% once the long-term control plan NYCDEP is under order by NYSDEC to implement by 2042 is fully implemented. As such, it is known that significant source control will happen in the not-too-distant future*".

This assessment is inaccurate. The figure below shows the anticipated LTE concentrations for C19-C36 aliphatic petroleum hydrocarbons when USEPA-approved input concentrations for solids-based sources and the excel-based model is used[5]. This figure shows the anticipated LTE for current conditions and various source control scenarios, including the controls under LTCP and theoretical scenarios such as 100% CSO control and 100% CSO and Municipal Separate Storm Sewer System (MS4) control. The figure shows that there is no significant change in the LTE from the current conditions for post-LTCP and 100% CSO control. Although the LTE decreases by 40% for the theoretical (and infeasible) 100% CSO and MS4 control scenario, it is still well above the PRG. USEPA should clearly state this in the PRAP to accurately describe the LTE. As written, the PRAP gives the inaccurate impression that City inputs cause the C19-C36 aliphatic petroleum hydrocarbons LTE to exceed the PRG. The same is true for Di/Furans as well.

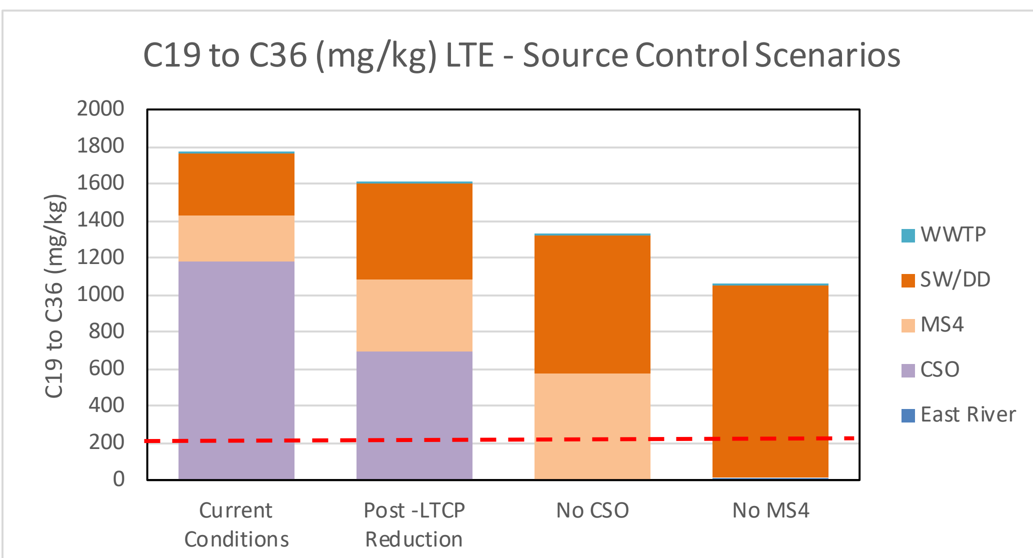


**Figure 2 – Even with 100% reduction of CSO/MS4 the Risk-based PRG are not met**

[5] USEPA used the same inputs and excel-based model to create Figure 8 in the PRAP.

- Monitoring and Evaluation Approach, page 16: The PRAP is proposing to use IEM which will be set at the 50$^{th}$ percentile of the concentration predicted by the LTE model to determine the frequency of the monitoring program. For the ecological risk-based PRGs, USEPA is proposing to compare the IEM to individual sediment sampling locations. The PRAP and response to CSTAG states that the monitoring frequency will be increased if the individual sediment concentration is between 75 and 90 percent of the IEM for each COC. There are serval concerns with this approach which must be addressed:

a) The LTE model predicts future reach-wide average sediment concentrations in the Creek after the entire Creek has been remediated, assuming all ongoing, non-NAPL inputs to the Creek continue. This calculation should represent an average of contaminant sources, averaged over space and time. Mixing of source contamination occurs both spatially and temporally, so deposited contamination on the sediment bed is an average of these sources. Because the LTE is an average for an entire reach, it is inappropriate to compare individual samples on a point-by-point basis to an average. Under nearly all conditions individual samples would be expected to exceed estimates of the mean (50th percentile) and the 75th and 90th percentiles frequently, even when the EB remedy is performing as expected and the ongoing non-NAPL sources have not changed. Under USEPA's proposed decision making process, single sediment sample exceedances are inevitable and will trigger future increased searches and monitoring of sources, irrespective of the performance of the remedy and the influence of continuing ongoing non NAPL sources.

b) Because the LTE distribution should be representative of the distribution of mean concentrations, it is arbitrary to compare individual samples to the 75th and 90th percentiles of the distribution of the mean. The USEPA should explain the basis for choosing a range between 75 and 90th percentile to trigger additional sampling. The LTE is supported by a single year of data and has no temporal component, other than assumed reductions in source concentrations. As the City has commented previously, the LTE concentration is, by the nature of mixing and deposition, a spatial average. There is no evidence that the percentiles of USEPA's LTE calculation provide accurate estimates of the percentiles of this long-term average, and these calculated percentiles do not provide accurate characterization of individual sediment sample values. There is no link between the probability distribution of in-situ sediment contaminant concentrations and the LTE calculations based on mixing of solids concentrations. As a result of this disconnect between the parameters of interest (percentiles of sediment concentrations at individual points), the City anticipates the monitoring approach will be an inaccurate indicator of performance of the EB EA.

c) It is unclear whether the trigger for additional monitoring is when the individual sediment concentrations approach 75% of the IEM or when the individual sediment concentrations approach the 75$^{th}$ percentile of the IEM as predicted by USEPA's probabilistic model. The City recommends the latter. If USEPA intends to implement increased monitoring when the individual points approach IEM (75% to 95% of the IEM), then USEPA is really saying that the sediments approaching an expected value (*i.e.*, IEM) is somehow an indication that the sources which are monitored to develop the IEM are not monitored enough. USEPA should provide a technical rationale for this decision-making approach. EPA should also explain what the purpose of USEPA's probabilistic model is for developing the LTE when the only metric to be used form the model for decision making is the 50th percentile which matches with the estimate from the excel based model.

d) It is not clear why the focus is on increased monitoring in case of exceedances rather than holistic assessment of why the IEM is higher. Understanding why the IEM is higher should include assessing which sediment locations are driving the increase. The City recommends using a multiple lines of evidence approach to determine the need for increased frequency of sampling.
e) USEPA's approach is silent on what happens when the sediments are higher than the $90^{th}$ percentile or 90% of the IEM estimated by the LTE. The USEPA should update the PRAP to provide an assessment of change in monitoring program if the $90^{th}$ percentile or 90% of the IEM is exceeded.

The City recommends using empirical estimates of LTE in EB to develop a formal Data Quality Objective (DQO) process with stated Type I and Type II error rates and a corresponding sample size to achieve them. The currently proposed decision rules are ad-hoc rather than statistically based procedures and provide no clear way to develop a DQO process leading to a defensible number of samples and defined Type I and Type II error rates. The decision rule proposed is arbitrary, requiring decisions based on samples of size one, which can result in highly unreliable statements about the degree to which the EB remedy is or is not functioning. This approach is very likely to trigger costly and unnecessary monitoring of inputs, simply based on random chance of an individual sample exceeding the LTE decision limits. The monitoring program should be developed based on USEPA systematic planning and DQO guidance and precedent.

- Monitoring and Evaluation Approach, page 16: For human health risk-based contaminants the PRAP is proposing to evaluate compliance using the IEMs developed over a reach–wide Surface Weighted Average Concentration (SWAC) basis rather than a Creek-wide SWAC basis. This is an incorrect evaluation of the risk based PRGs for contaminants such as TPCBs and dioxin/furans, which pose a human health risk for the Site due to consumption of fish and crabs. The risk-based values of 0.3 ppm and 18 ng/kg for TPAH and Di/Furans respectively were developed for the entire Creek, not individual reaches, so it is important to analyze inputs on a Creek-wide basis. For example, the dioxin furan concentrations in blue crabs pose a risk to human health, and the risk-based PRG for dioxin/furan TEQ of 18 ppt was developed by assuming a linear relationship between the tissue and sediment concentration for the entire Study Area. The risk-based assessments assumed that if the sediment concentrations for the entire Site were reduced by a factor of 8, the tissue concentrations will reduce proportionally. This assumes that the migratory species like fish and crabs are exposed to all parts of the Creek, not a particular reach. The analysis resulted in a PRG of 18 ppt. Given the assumptions used to develop a risk-based PRG for COCs posing human health risk, the appropriate point of compliance is the entire Creek, not individual reaches. The USEPA should explain the rationale for selecting reach-based SWAC for assessing compliance, including an explanation of how it proposes to modify the PRG to reflect a smaller averaging area. Because organisms spend less time within smaller areas and because human consumers are likely to fish in multiple areas, PRGs for smaller areas should be greater than PRGs for larger areas.

- Options in Alternative EB-D, page 19: The PRAP states that alternative EB-D, the option for deeper dredging of sediments in select areas, includes potential for NAPL migration from the deeper soft and/or native material, potential for exposure to PTW and depth to native material. The PRAP should clarify that currently, as developed, this alternative only considers additional dredging to reach the native material. Furthermore, USEPA should explain why additional dredging is the only technology considered for addressing NAPL migration from deeper sediments and PTW. Amended caps are already being proposed by USEPA to control NAPL migration due to ebullition. Amended caps and ISS should also be considered to address PTW and NAPL migration.

- Data collection for further delineation of NAPL and investigate NAPL mobility, page 24: The PRAP states that the Pre-Design Investigation (PDI) will collect data to further delineate NAPL and investigate NAPL mobility. It is not clear whether the future investigations involve the same methods used in the RI. The City has significant concerns regarding the RI method and its ability to accurately assess NAPL mobility. The methods used in the RI showed zero mobile NAPL where significant NAPL impacts were present, as evidenced by observations of NAPL seeps and sheen generation in the area. NAPL mobility and delineation should be measured by standard methodology going forward.

During the RI/FS a three-staged approach was used to assess NAPL mobility in the Creek. A sample progressed to subsequent stages of sampling only if NAPL migration was observed in the previous stage. NAPL is considered mobile only if migration was documented in all three stages.

The stage 1 method used to test NAPL mobility was not a standard or validated method to test mobility of NAPL in fine-grained sediments such as those found in Newtown Creek. Rather, the method used was a variation of ASTM Method D425, which is a method to test the moisture content in coarse-grained soils which drain easily. Methods designed for fine-grained sediments and coarse-grained soils differ greatly.

The ASTM guidance does not recommend centrifugal analysis to determine moisture content in fine-grained material. ASTM Method D425 refers to ASTM method 6836 for testing fine grained material for soil water curve. ASTM Method 6836 notes that the centrifuge method (Method E) "is typically used for coarser soils". Nonetheless, the method used for the Newtown Creek samples relied on the centrifuge method.

Additionally, the sampling method used inappropriately strong forces typically reserved for coarse-grained material. The forces used for coarse-grained material, under ASTM method D425 are 1000 G for 1 hour, as opposed to 25 G for 10 hours for fine-grained material. The higher forces in the NAPL testing were used under the assumption that if the NAPL is not mobile at such forces, it is unlikely it will be mobile in-situ. This assumption is incorrect and could result in remedy failure if testing is carried out this way through the remedial design. Compressing fine grained sediments is well-known to be a way to decrease permeability and therefore NAPL mobility. During the RI Stage 1 testing, the sample volume was compressed by the high pressure placed on soft samples, decreasing the permeability. The sample volume decreased by an average of 10% (up to 31%), which results in a larger change of the void ratio. Compressing the sample and reducing the void ratio decreases the conductivity of the sediment (because of lower viscosity, water will be expressed from the sediment before the NAPL, so loss of water is the most likely reason for the compression).

Further, the treatability study conducted in the Western Beef fork of EB showed a significant decrease in permeability with decreasing void ratios. Therefore, it is inappropriate to rule out NAPL migration when the testing method limited the mobility of NAPL that was being tested. To assess the applicability of the deviation of an ASTM method not designed for fine-grained material, at a minimum, samples with high NAPL saturation where Stage 1 ruled out additional testing should be tested using Stage 2 methods. This is a significant flaw in the analysis and brings into question the reliability of the NAPL study.

Despite the unintended effect of preventing NAPL migration by using the method, the labs did document NAPL (product) migration in a few samples and for most samples a discoloration and petroleum odor was documented. However, samples where discoloration and odor were documented were not selected for further analysis.

Rainbow sheen, indicative of NAPL migration, was documented in most samples analyzed using Stage 2 approach in the RI/FS. However, the RI/FS does not define sheens or even rainbow sheens with petroleum odors as NAPL. This is contrary to all available guidance from NOAA and NYSDEC for indicators of NAPL. Despite evidence of NAPL migration in Stage 2, samples were not selected for Stage 3 testing due to an unsupported assessment of NAPL mobility. Therefore, by using inappropriate methods and inaccurate definitions of NAPL, the analysis arrived at the skewed conclusion that NAPL is not mobile in the sediments of the Creek. The current CSM for the Site, which states that NAPL is not mobile, is inconsistent with direct observations of NAPL. The CSM should be calibrated to match or more closely predict the directly observable field conditions.

In addition to NAPL mobility, the approach used in the RI to assess NAPL presence in the sediments is also flawed. In the RI, there were no continuous measurements/assessment of NAPL presence in the sediments of the Creek. Samples collected under Phase 1 were only assessed using subjective visual observations of NAPL. All sheen observations in the Phase 1 were discarded in the RI and subjectively assumed to not indicate NAPL presence without any quantitative data. In Phase 2, shake tests were only conducted on some horizons of a limited number of sediment cores and were not comprehensive. The USEPA has not included the comprehensive semi-quantitative Laser Induced Fluorescence (LIF) survey conducted by the City in their consideration. The LIF survey shows NAPL presence in most of the sediments of the Creek with varying levels. The LIF technology has been used by USEPA Region 2 for Gowanus Canal to assess NAPL presence and mobility but has been disregarded by the same Region for Newtown Creek without any reason.

The USEPA must apply alternative methods to assess NAPL presence and mobility in the Creek. The City recommends use of LIF techniques similar to Gowanus Canal to decide NAPL presence and NAPL mobility. This is consistent with approaches used by USEPA Region 2 for the Quanta resources Superfund Site. At this Site a wide range of NAPL investigation methods were utilized boat and time lapse photography sheen surveys, Targost field screening, probe sheen studies as well as sediment core investigations. At the Quanta Site multiple NAPL identification methods were applied to the sediment cores to assess the presence absence and potential mobility of NAPL in the sediment including visual screening, PID screening, UV light fluorescence of NAPL, laboratory analytical sample results, and hydrophobic NAPL sensitive Flute paper. These various NAPL investigation methods provided multiple lines of evidence in assessing the nature and extent of NAPL in the sediment. In summary, LIF is a common and reliable technique for assessing NAPL presence and mobility. The data collected by the City will help in this regard and should be used to update the assessment of NAPL in the rest of OU1 and during PDI for EB EA.

Specific Comments on the East Branch Focused Feasibility Study

- Page ES-5, second-to-last paragraph:

a) The text as written is incomplete and incorrect. The text should be updated to state that the spreadsheet model does not include NAPL seeps/migration as an ongoing input to the Creek. This addition should be in the main text and not a footnote.

b) The text must also clearly state that because the calculation of LTE does not include NAPL migration from upland properties, the statement in the last paragraph which states that the use of the LTE is to, "*approximate the effect (over the long term) of ongoing contributions of COCs from external sources after remedy implementation*" is incorrect and should be deleted. If this statement is to be included, then there must be a subsequent sentence which lists the external sources used in the LTE evaluation.

- Page ES-6: The last sentence of the paragraph must be updated to reflect the fact that the LTE does include NAPL seeps as an ongoing input. The text should read: "The monitoring program would also need to be able to distinguish remedy performance from inputs of COCs from ongoing external sources, other portions of Newtown Creek and NAPL seeps within EB and rest of the Creek."

- Table ES-3, first row, second column, second bullet: The text here discusses external inputs and how they will impact the EA post-remedy. First, the text should be clear that this is a sediment remedy. Second, there is a general statement on "*external inputs as outside the scope of EA*." This is incorrect as all alternatives are required to include a sealed bulkhead to control potential NAPL inputs to the Creek. The long-term monitoring includes surveys to identify NAPL seeps from upland properties and subsequent control under source control RAO.

- Chapter 2, Environmental Settings: The hydrodynamic section is missing a discussion of groundwater. Groundwater is an important source to the EA and must be discussed here.

- Chapter 2, Risk and nature and extent of contamination: The sampling media text should be updated to include sampling of NAPL sheens migrating due to ebullition in the EB.

- Chapter 2, Contaminant sources, fate and transport: The text must also state that NAPL seeps have been documented in the EA but have not been sampled under the RI. The COC loads from this input are a data gap.

- Chapter 3, Section 3.4.2**:** The text states that "the actual LTE concentrations *may be slightly* higher than the current LTE model predictions for an EA in East Branch because other reaches of Newtown Creek that have not been remediated yet may result in some additional loading of COCs to surface sediments in East Branch" (emphasis added). To support this statement, USEPA must provide an assessment or a report showing that the other un-remediated reaches of the Creek, where NAPL migration from uplands and sediments is ongoing, will not impact the LTE in EB. The word "slightly" higher implies that there is data available to assess the impact of other reaches on EB EA. During the RI /FS there was no data collected on NAPL seeps in EB and other reaches of the Creek. The data gap associated with the NAPL seeps in EB and the rest of the Creek prevents an assessment of the impact of the other reaches on EB. Please update the sentence to state that the LTE concentrations in the EB will be higher than estimated because the other reaches have not been remediated.

- Chapter 3, Table 3-4, note 3: This note lists the data sets/sampling programs which will address the limitations associated with D/F TEQ and C19-C36 aliphatic petroleum hydrocarbons. One of the data sets listed includes CM0-2 surface sediment sampling. This should be deleted because the sediment samples cannot be used to estimate the source input values for the LTE. Sediment samples are a result of the mixing of several ongoing sources including groundwater, ebullition and NAPL seeps and are not a surrogate for a particular source.

- Chapter 4, Section 4.1.4, page 31: Delete the sentence stating: "Although the current data and information do not indicate that there is an upland source to the creek that would require upland remedial action such as sealing bulkheads in conjunction with an upland regulatory action separate from the sediment remedy." The sentence is inaccurate because data has not been collected under the RI/FS to assess the impact of upland sources on the Creek. Data collected by NYCDEP and others show that NAPL seeps do exist in EB and evaluation of that data along with the sediment trap and surface sediment data clearly demonstrates that upland seeps will re-contaminate the sediment remedy requiring the need for sealed bulkheads.

- Appendix A, Footnote 1: Update the footnote to include examples of NAPL to be comprehensive so that the reader can understand why it is important. Currently it minimizes the importance of NAPL by just stating that, "*NAPL is a separate phase material (i.e., a liquid that is not water).*" Examples of NAPL include coal tar, fuel oil, diesel, etc.

- Appendix A, Footnote 28**:** This footnote inaccurately states: "Nearshore discharge of groundwater from the upland Fill Unit in areas of sloping permeable shorelines (riprap and natural ground) is accounted for in the measurements of groundwater discharge at the base of East Branch." The studies and models conducted by NCG did not include shallow groundwater and did not consider the effects of tides. As repeatedly pointed out by NYCDEP, the idea of 'lateral groundwater discharge' is flawed, the appropriate and scientifically supported term is 'intertidal zone discharge' because in a tidal system, groundwater discharge is forced to the intertidal zone.

- Appendix A, Section 2.4.4: There is no data in the RI to assess the impact of seeps (NAPL or aqueous). The tables in the RI state that the loads from these sources cannot be determined. Delete the text which states that seeps are a minor source to the Creek as there is no data to support this.

- EB FFS Appendix A, Footnote 34**:** Delete references to the DRAFT CFT model. This model is under review, and in 2024 USEPA indicated that the model is not needed for the purposes of RI/FS. Discussion of the results from the draft CFT model, which was not reviewed by other stakeholders, including USEPA, is inappropriate and must be deleted.

- EB FFS Appendix B, Footnote 3: This note states that overwater activities were evaluated in the RI report are not considered to be significant sources. This statement is incorrect because there is no data available to assess the significance of overwater activities and therefore the significance of this source cannot be tested. The tables in executive summary of the RI which tabulate the COC loads for these sources are blank because of lack of data. Delete the overwater activity source from this footnote for accuracy.

- Appendix B, Section 3.4.1.2.2, page 13: USEPA looked for NAPL seeps only in locations where USEPA collected GW samples upland.[6] The text in this section must clarify that. The language, which states that "NAPL was not observed at any of the seep locations" is incorrect. Sheen was documented near seep locations SP3 and SP7, but USEPA could not identify the source of the sheen. Update the text to accurately describe USEPA findings.[7]

- Appendix B, Section 3.4.4: This entire section must be deleted from the USEPA approved document. This section arrives at the conclusion that NAPL seeps are a "*minor source of COCs to sediments in East Branch*" based on an NCG report which has several serious issues, discussed above.

- Appendix C, Section 5, page 72 considerations related to placement of cap and cap performance: The text stating that "subsurface sediment (from 15 cm below the sediment surface

[6] USEPA 2024, Newtown Creek CFT Workshop – EPA responses, email from Mark Schmidt (USEPA Region 2) to Ramzy Makhlouf (Anchor QEA – consultant to NCG).
[7] *Id*.

to native material interface) tends to be medium stiff, with lower moisture content compared to surface sediment" is incorrect and must be deleted. The 2020 FS Geotech DER states that, in addition to the "fluid-like" soil sediment present, Native material "will likely exhibit plastic-like characteristics because it is in a transitional state between a solid and fluid." This indicates that all the material below is weak, not just the top 15 cm. The FFS should discuss this data and further state that sediment stability is a concern for cap placement and needs careful consideration about constructing over a low-strength substrate. Differential settlement, especially in treatment layers, could result in fractures through the cap, allowing short-circuiting of groundwater and gas to occur. Controlling or avoiding differential settlement of cap materials is important during and after construction to make sure that the amended cap provides adequate treatment. The effect of gas migration on the stability of low-strength sediments such as those present in EB should also be discussed.

Once again, the City appreciates the opportunity to comment on the PRAP and is available to discuss at your convenience.

Sincerely yours,

/s/ Katherine Smith
Katherine Smith
Assistant Corporation Counsel

Caroline Kwan
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 18th Floor
New York, NY 10007
email: kwan.caroline@epa.gov

Dear Ms. Kwan,

As the elected representatives of the communities surrounding the Newtown Creek Superfund Site, we appreciate the opportunity to provide input on the proposed early cleanup action for the East Branch of the creek. This is a critical step in the decades-long effort to restore the health of this vital waterway and the neighborhoods it flows through.

Over the fourteen years since Newtown Creek was designated as a Superfund site, the surrounding communities have undergone drastic changes. What was once an isolated, industrial area is now a vibrant, mixed-use neighborhood with a growing residential and commercial population. Along with this transformation, the relationship between the community and the creek has evolved. Where Newtown Creek was once seen as a forgotten industrial waterway, it is now recognized as an important natural resource and community asset.

It is in this context that we review the EPA's proposed cleanup plan. While we appreciate the significant progress represented by this interim action, we believe the plan requires additional detail and stronger commitments to ensure the protection of human and ecological health. The feedback we have received from residents, community organizations, and the experts who have dedicated years to this issue is clear - the cleanup must be more comprehensive and forward-looking in its approach.

Specifically, we urge the EPA to:

- Conduct thorough pre-design investigations and comprehensive sampling, with independent oversight and community input through the Community Advisory Group. This should include detailed mapping of contaminated hotspots and NAPL characterization.
- Develop and implement a robust long-term monitoring program to ensure the remedy remains protective, with clear accountability for addressing any future contamination from upland sources, CSO discharges, or storm-related impacts.

- Incorporate restoration goals that support safe public access and recreational uses, including swimming, fishing, and boating, while enhancing the creek's ecological functions through features like salt marsh restoration and habitat creation.
- Ensure that the cleanup timeline progresses efficiently while maintaining the thoroughness needed to achieve these goals. The community has waited fourteen years since the Superfund designation, and we need a remedy that will stand the test of time.

The Newtown Creek community has demonstrated an unwavering commitment to the restoration of this waterway. We owe it to them to deliver a cleanup plan that is truly transformative, one that recognizes both the creek's importance as a natural resource and the community's evolved relationship with it. We stand ready to work closely with the EPA to ensure this happens.

Thank you for your consideration.

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|  |  |
| Council Member Jennifer Gutierrez | Council Member Lincoln Restler |

THE ASSEMBLY
STATE OF NEW YORK
ALBANY

COMMITTEES
Alcoholism and Drug Abuse
Consumer Affairs and Protection
Election Law
Small Business
Transportation

EMILY GALLAGHER
Assembly Member 50th District

Caroline Kwan
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 18th Floor
New York, NY 10007
email: kwan.caroline@epa.gov.

Dear Ms. Kwan,

I am the NY State Assemblymember for District 50, writing to express my concerns regarding the Proposed Early Action Plan for the East Branch tributary of Newtown Creek, submitted for public comment on August 28th, 2024.

Proper cleanup is of the utmost importance to my district– in fact, I would say it is one of my constituents top priorities outside of daily living concerns. The health and safety impacts, both for human and ecological life, have been deeply felt in this community over generations, and the Superfund designation was a massive win for the future of my district. It's vital that this cleanup proceed appropriately.

1. **The EPA needs to commit to the following community priorities to ensure Alternative EB-D will be protective of human and ecological health.**

The Proposed Plan is light on the details, and leaves much to be desired when it comes to identifying specific locations of more contaminated sediment, NAPL characterization in the East Branch, upland seeps, and the Post Construction monitoring plan. This lack of detail around key issues in the cleanup leaves me concerned that the selected Alternative as described will not be protective of human health and the environment.

While Alternative EB-F would remove all of the contaminated sediment down to native bedrock, Alternative EB-D would only remove 3 feet across the East Branch, with the option to do deeper dredging in particularly contaminated areas. Sediment thickness in the East Branch is up to 33 feet thick in areas. The Proposed Plan will leave dozens of feet of contaminated sediment in the East Branch in perpetuity – and as such, in order for this Alternative to be acceptable to me and my constituents, the EPA needs to ensure the following conditions are met:

1. A Pre-Design Investigation Plan that is completed by an independent party overseen by EPA, and presented to the Community Advisory Group for comments.

2. A clear and comprehensive sampling plan that includes different sampling methods and different characterization methods to fully analyze NAPL in seeps and sediments, conducted by an independent contractor hired by the EPA and presented to the Community Advisory Group for comments.

3. A cap design should be reassessed following systematic identification of, and quantitative data collection from, NAPL contamination sources.

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4. If any location of NAPL-contaminated sediment is assessed unsuitable for removal, then in-situ stabilization (ISS) should be based upon a comprehensive data set from this location, as per the protocols followed at the Gowanus Canal Superfund site.

5. A map of Principal Threat Waste sources developed in collaboration with work already conducted by the NYSDEC and NYCDEP, such that the effectiveness of any proposed bulkhead can be clarified and presented to the Community Advisory Group for comments.

6. A post remediation restoration plan that sets targets for and identifies potential sites of ecological restoration in the East Branch.

Beyond the above commitments to address concerns in the selection of Alternative EB-D, the following concerns should be addressed:

1. **The EPA needs to commit to the following community priorities to ensure Alternative EB-D will be protective of human and ecological health.**

The Proposed Plan is light on the details, and leaves much to be desired when it comes to identifying specific locations of more contaminated sediment, NAPL characterization in the East Branch, upland seeps, and the Post Construction monitoring plan. This lack of detail around key issues in the cleanup leaves me concerned that the selected Alternative as described will not be protective of human health and the environment.

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Beyond the above commitments to address concerns in the selection of Alternative EB-D, the following concerns should be addressed:

2. **The EPA must fully identify and dredge the contaminated hotspots in the East Branch, to ensure a thoroughly protective remedy.**

EPA must fully characterize and identify where contaminated sediment hotspots are located in the East Branch and provide additional details on what criteria would determine when deeper dredging would be required. EPA should not move forward without knowledge of potential contaminant reservoirs and how the agency will make dredging decisions. The Pre-Design Investigation should detail this information, and be provided for public comment.

3. **The EPA must provide more information on what long-term monitoring will be required to evaluate the protectiveness of the remedy, and clarify how the EPA will work with state agencies to ensure contamination from upland sources is addressed and remediated.**

There is significant concern that ongoing contamination from upland sources, CSO discharges and runoff, and from the rest of the Creek, and the potential for erosion of the cap due to increasing storms, will threaten the long term viability of the remedy. Details on the monitoring program were not included in the Proposed Plan, and more information is needed. Additionally, my constituents need clarity about long term potential health risks associated with a remedy and to prevent an outcome comparable to the Hudson River Superfund, where PCB's are still posing local human and ecological health risks. Will the costs of long-term monitoring - and any post-remedy recontamination clean-up be shouldered by responsible parties or tax-payers/municipalities?

4. **The Remedy must include safe access and thriving ecosystems, ensuring that human recreation on the East Branch and revitalization of the aquatic habitat is made possible.**

Currently, the EPA has approved swimming as a designated use for Newtown Creek and the East Branch, and the remedy must allow for safe immersion in the water and prevent direct contact with contaminants, as well as fishing, paddling and boating. Further, salt marsh restoration in this section must be prioritized, and shoreline reconstruction should facilitate the ongoing revitalization of our local aquatic ecosystems by incorporating habitat for shellfish, fish, crabs, and other marine animals as well as aquatic plants.

Thank you again for this opportunity to submit comments. You can reach my office at (718) 383-7474.

Sincerely,

Emily Gallagher

Assemblymember Emily Gallagher
50th District

Date: November 11, 2024

To: Ms. Caroline Kwan
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**Re: Phelps Dodge Refining Corporation Comment on Newtown Creek East Branch Early Action: The Calculation of the Copper PRG for Newtown Creek**

As USEPA directed, the preliminary remediation goal (PRG) for copper (490 mg/kg) was derived using the dietary exposure model for mummichog in the screening level ecological risk assessment (SLERA) as opposed to deriving it from the model in the USEPA-approved baseline ecological risk assessment (BERA) (Anchor QEA 2018; Anchor QEA, 2021). The SLERA, which is an initial step in the CERCLA risk assessment process, employs upper-bound conservative exposure assumptions in order to identify contaminants of potential ecological concern warranting additional evaluation in the BERA. In the BERA analyses, these upper-bound exposure assumptions are replaced with more realistic, yet still conservative assumptions to estimate potential ecological risk. The quantitative USEPA-approved BERA analyses are typically what is relied upon for establishing PRGs and informing risk-management decisions. Thus, a copper PRG derived using the dietary exposure model from the SLERA is uncommon and overly conservative.

This important point may be illustrated by calculating what the copper PRG would be if it were derived using the USEPA-approved BERA dietary model and exposure assumptions (Anchor QEA, 2018). The dietary exposure model from the BERA assumed mummichog ingestion consisting of 50% polychaetes (sediment prey organisms), 50% bivalves (surrogate for water column prey organisms), and the incidental ingestion of sediment at 1% of the dietary intake (occurring 50% of the time while foraging on polychaetes). The BERA calculation of dietary risk to mummichog utilizes a prey tissue concentration equal to the 95% Upper Confidence Limit (UCL) on the mean. Applying this model yields a copper PRG for sediment of approximately 2,100 mg/kg when calculated consistent with the USEPA-approved BERA.

Nevertheless, USEPA directed that the upper-bound conservative dietary exposure model from the SLERA be used to derive the copper PRG, which assumed ingestion of prey consisting of 100% polychaetes in the mummichog diet and an incidental ingestion of sediment at 1% of the dietary intake (occurring 100% of the time while foraging on polychaetes) (Anchor QEA, 2018). The USEPA calculation assumes that copper in the tissues of these prey items would remain constant at levels equal to the Remedial Investigation (RI)/Feasibility Study (FS) maximum detected concentrations, adding a layer of conservatism beyond that of the SLERA (which included the evaluation of prey tissue concentrations equal to the 95% UCL on the mean). The stated rationale for USEPA's decision was the alleged uncertainty associated with how the potential remedial actions (e.g., capping, dredging, and combined sewer overflow inputs) may influence bioavailability parameters in the Study Area.

Contrary to USEPA's rationale, analyses performed as part of the RI/FS showed that copper in sediment was not bioavailable based on acid volatile sulfide (AVS)/simultaneously extracted metal (SEM) concentrations, mummichog tissue concentrations, and laboratory-exposed benthic invertebrate tissue concentrations (Anchor QEA, 2018). In addition, the RI/FS analyses included studies which showed that copper bioavailability was stable even with additional aeration and sediment disturbance and thus unlikely to become bioavailable in the future (Anchor QEA, 2023).

Absent any technical basis for what new conditions might occur in the future to cause copper to be more bioavailable, the approach adopted in the USEPA-approved BERA is more than sufficient to calculate a copper PRG that is ecologically protective. Therefore, for the reasons stated above, it should be recognized that USEPA's selected sediment copper PRG of 490 mg/kg (EPA, 2023; EPA, 2024) is extreme and greater than 4 times more conservative than the value that would have been derived if the model from the USEPA-approved BERA were used.

**References**

Anchor QEA. 2018. Final Baseline Ecological Risk Assessment. Newtown Creek Remedial Investigation/Feasibility Study. Prepared for the Newtown Creek Group. October 2018.

Anchor QEA. 2021. Development of Risk-Based Preliminary Remediation Goals. Newtown Creek Remedial Investigation/Feasibility Study. Prepared for the Newtown Creek Group. October 2021.

Anchor QEA. 2023. Remedial Investigation Report. Newtown Creek Remedial Investigation/Feasibility Study. Prepared for the Newtown Creek Group. March 2023

EPA 2023. Preliminary Risk-Based Remediation Goals (PRGs). Presentation to Newtown Creek Community Advisory Group. June 1, 2023.

EPA 2024. Newtown Creek Superfund Site, East Branch Early Action, Proposed Plan. August 28, 2024.

Newtown Creek Community Advisory Group (CAG)

November 11, 2024

Caroline Kwan
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**Re: Proposed Early Action Plan for East Branch Tributary of Newtown Creek**

Dear Ms. Kwan and EPA Team:

Thank you for the careful consideration of the following commentary on the proposed early action plan for the East Branch tributary of Newtown Creek (the Proposed Plan). Since the designation of the site on the National Priorities List in 2010, the communities have eagerly awaited a comprehensive remediation plan to address the extensive levels of chemicals of concern present within the sediments of Newtown Creek. Over the past 14 years the Newtown Creek Community Advisory Group (CAG) has expressed significant concerns over key issues including poorly delineated sources of upland contamination, inadequate assessment of contaminant mobility, and disregard of available data for follow-up analyses of principal threat waste (PTW) composition and extent. Only if these issues are addressed can the site be properly remediated.

After extensive review and rigorous discussion amongst members of the CAG and relevant stakeholders we have come to the conclusion that alternative EB-D fails to meet the core Superfund goal of protecting human and ecological health. As is presented in the Focussed Feasibility Study (FFS) alternative EB-F is the only option that we can trust given the above concerns. These concerns can be addressed by:

- Coordination with NYSDEC on use of currently available upland data to quantify and remediate sources PTW sources of ongoing contamination;
- Coordination with NYSDEC to develop a map of upland seep locations that will provide clarity on how any proposed bulkhead will address inflow of contamination from the shore;
- Re-evaluation of cap design following comprehensive analysis of PTW in the tributary – it is recognized that native sediments may also be contaminated and require capping;

- Use of currently available NYCDEP pilot data on NAPL principal threat waste in the East Branch in order to guide these follow-up actions:
    - NAPL compositional analysis that will confirm or invalidate existence of specific chemicals of concern (COCs) and their measured concentrations at seep locations and LIF-identified sediment pools
    - NAPL migration measures out of sediment pools and seeps with methods successfully applied at the Gowanus Canal Superfund site[1][2]
- Assignment of a Pre Design Investigation (PDI) plan to an independent party overseen by EPA;
- Development of a post remediation restoration plan that sets targets for and identifies potential sites of ecological restoration in the East Branch.

In addition to the key concerns outlined above we have compiled the following comments and questions for your consideration:

## 1. Scope of Early Action

The EPA has indicated that the focus of the early action plan is to clean up the contaminated sediments currently within the East Branch. Restricting the plan's focus to existing sediment contamination while disregarding comprehensive investigation of potential PTW contamination from upland sites ensures remedy failure; hence, the necessity of NYSDEC collaboration on development of a site map and rigorous testing protocol for PTW composition and migration rate/volume measures from upland sources.

- *Can EPA clearly state the objective of the early action plan and to convey the EPA's overall site strategy to achieve cleanup?*

- *Can EPA clearly define the boundaries of each operable unit and the cleanup status of each operable unit?*

- *Can EPA clearly define the responsibilities and boundaries of each agency (city, state and federal) that is involved with the cleanup of the overall site (OU-1)?*

- *Who will conduct each step in the pre-design investigation (EPA, CDM Smith, Anchor QEA, etc,)?*

## 2. Evaluation of Alternatives

[1] 1. Gee, G. L., Grubb, D. G., Gentry, J. L., Tsiamis, C. D., & Hess, J. (2022). Gowanus canal superfund site. IV: Delineation of potentially migrating NAPL layers for ISS treatment. *Journal of Hazardous, Toxic, and Radioactive Waste*, *26*(3), 04022020.
[2] Niemet, M. R., Gentry, J. L., Bruno, M., Berggren, D. R., & Tsiamis, C. D. (2015). Gowanus Canal Superfund site. I: NAPL mobility testing of MGP-impacted sediments. *Journal of Hazardous, Toxic, and Radioactive Waste*, *19*(1), C4014003.

The CAG has stated its preference for alternative EB-F given that the associated FFS reveals little PTW data was collected, that existing PTW data was disregarded and that inappropriate methods were applied to determination of NAPL migration (as noted below). Additionally, the CAG and its technical advisors have concerns regarding the EPA's argument presented for selection of EB-D as the preferred alternative instead of EB-F.

The Proposed Plan states that alternative EB-D is the EPA's preferred alternative because it meets the threshold criteria of protecting human health and the environment and complying with applicable or relevant and appropriate requirements. It also states this alternative provides the best balance of the remaining criteria. However, when reviewing table 7-2 in the Focused Feasibility Study (FFS), TASC assigned a ranking of 0 to 4 for the balancing criteria (none to low = 0, low to moderate = 1, moderate = 2, moderate to high = 3, high = 4) and in doing so, alternatives EB-B, EB-D and EB-E have the same numerical score of 12.

The Proposed Plan states that EB-D would provide more reduction in toxicity, mobility or volume through treatment than Alternatives EB-B or EB-C. It is clear to the CAG that greater contaminated sediment removal is directly correlated to a reduction in those three factors so the ultimate conclusion is correct. It is improbable that the scores for reduction of toxicity, mobility or volume through treatment could result in the same combined score for all three alternatives.

In addition, Table 5-3 in the FFS shows that EB-D would leave 16,000 cubic yards of Sediment With Observations of NAPL in East Branch, meanwhile EB-A (No Action) would leave 16,200 cubic yards. This means that the preferred alternative EB-D would only remove 200 cubic yards of Sediment With Observations of NAPL, which is only 1.2% out of the total estimated Sediment With Observations of NAPL in East Branch. NAPL is a PTW; this miniscule amount of reduction would not be protective of human health and the environment.

- *Can EPA further explain how EB-D will provide more reduction in toxicity, mobility or volume than EB-B and EB-C? Does one criterion on the rating matrix carry more weight than another criterion? Why does it appear that EB-C scores equivalently to EB-D on this balancing criterion, and EB-B has a higher treatment score than EB-C and EB-D but a slightly lower score for ex situ treatment.*

## 3. Pre-design Investigation (PDI)

The CAG is very concerned about the lack of comprehensive data in the Proposed Plan, which fails to provide sufficient information for a remedy that would adequately protect human and environmental health.

As indicated in Table 1, the maximum number of core samples collected for any one Contaminant of Concern (COC) is 17, which is grossly inadequate for the 11 acres of East Branch. Furthermore, as illustrated in Figure 1, while Total PAH (34) has 17 core samples, the collection of these samples does not follow a geospatial pattern. This has resulted in many areas of East Branch lacking any core samples altogether.

| COC | # of Core Samples Collected |
|---|---|
| Total PCBs | 17 |
| Dioxin/Furan TEQ | 9 |
| Copper | 17 |
| Lead | 17 |
| PAH (34) | 17 |
| C19-C36 Aliphatic Petroleum Hydrocarbons | 2 |

*Table 1. Total number of core samples collected for each Contaminants of Concern in the East Branch, based on Figures in the FFS.*

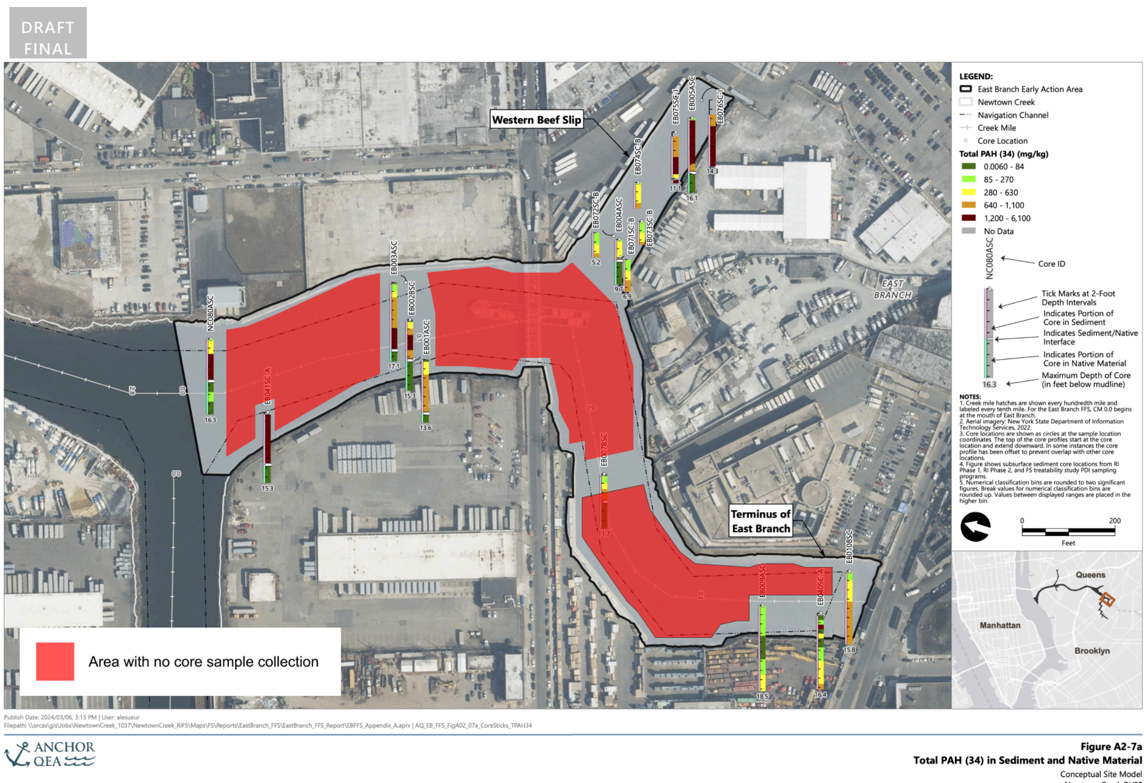


*Figure 1. Total PAH (34) in Sediment and Native Material (Figure A2-7a of FFS) with area of core sample gaps highlighted in red.*

The lack of data in the Proposed Plan further stresses the need for a robust, comprehensive, and systemic Pre-Design Investigation plan (PDI). The CAG requests a PDI that is completed by an independent party overseen by the EPA, and presented to the Community Advisory Group and community at large for comments.

Additionally, the CAG has the following questions regarding the lack of robust and comprehensive sampling:

- *Will a sampling plan be released for public review and comment prior to the start of the pre-design investigation?*

- *Does EPA have an estimate of the time frame for the pre-design investigation and will results from the investigation be shared with the community?*

- *Will the cleanup alternatives be reevaluated based on findings from the pre-design investigation? The Proposed Plan states there is a relatively large degree of uncertainty associated with the potential of ongoing contamination. For example, the pre-design investigation may identify larger volumes of contaminated sediments that may require additional dredging. This waste material will require planning for dewatering and decontamination. Another example is that the pre-design investigation may identify a greater contribution of inflowing contamination from upland areas, thus reducing the effectiveness of an early action cleanup.*

## 4. Ongoing Studies

The Proposed Plan states that there are several investigative activities related to the OU-1 study area that are ongoing including:

- Characterization of lateral groundwater discharge along the shoreline of the creek to refine the groundwater contaminant loading estimates to the creek.

- Collection of more sediment and water quality samples from the creek and the East River to supplement previously collected data.

- Collection of more data from ongoing point sources and the East River as part of the OU-2 post-Record of Decision monitoring program.

The Proposed Plan notes that "These data will be considered, as appropriate, in the design for the East Branch portion of OU1 remedy."

- *Can EPA provide clarification on whether the findings of ongoing studies relating to OU-1 will be available during the public comment period to determine if any modifications are necessary to the preferred alternative.*

- *Will any of the alternatives change significantly if these sitewide studies suggest that external sources are still contributing to significant ongoing contaminant loading to Newtown Creek and the East Branch?*

- *One of the fundamental objectives for the early action is, "to inform the OU1 site-wide FS alternative development". However the footnote on page 2 of the FFS states "The project* *schedule as of April 2024 will not allow for incorporation of evaluation monitoring data to inform the draft OU1 FS." Can EPA clarify if a site-wide feasibility study will be drafted before any Early Action post-construction evaluation information is available?*

## 5. Concerns About Non-Aqueous Phase Liquids (NAPL)

Throughout the Focused Feasibility Study there is routine mention that the presence of NAPL has been identified only as blebs or sheens in sediment and that NAPL or principal threat waste warranting treatment using ISS have not been identified to date in the East Branch. These documents do not appear to acknowledge the results of the New York City Department of Environmental Protection laser-induced fluorescence study and seep investigations.

The CAG disapproves the characterization of NAPL locations in the FFS and Proposed Response Action Plan (PP) as they are based solely on "visual observations," and not on systematic sampling and quantitative analysis. Precision is required in locating NAPL contamination sources. Opportunistic and subjective sampling is unacceptable for a waste that can carry high concentrations of multiple COCs, and is listed by the EPA as a Principal Threat Waste for the Newtown Creek Superfund site.

Quantitative, comprehensive, and reliable analysis of NAPL composition and distribution is the foundation for a remedy that is protective of human and ecological health for generations to come. The FFS and Proposed Plan has failed to establish this critical foundation. Thus, the CAG rejects the claims in the Proposed Plan that states "existing data does not indicate this remedy component [ISS] will be necessary" and that "the need for sealed bulkheads is not currently indicated by the existing data."

A remedy that is protective of human and ecological health must effectively address the threat of NAPL. The CAG demands:

- Systematic low-tide surveys of NAPL seeps;
- Comprehensive chemical analysis of NAPL composition across all sources: sediment reservoirs, seeps, water surface sheens;
- Quantitative mapping of aerial and vertical distribution of NAPL across East Branch sediments using optical scanning technology employed in the Gowanus Canal Superfund Site and by the NYCDEP;
- Accurate assessment of sediment NAPL mobility as opposed to the use of centrifugation on fine-grain sediment samples – a technique wherein rotation speed, rotation period and particle size are biased towards the finding of low NAPL mobility.

The Focused Feasibility Study and Proposed Plan appear to rely on blebs and sheen detection via observations and shake tests of sediment samples evaluated by the NCG contractor Anchor QEA but omits the data collected by the NYCDEP, such as the 2016 NYCDEP laser-induced fluorescence data and the NYCDEP 2017 *Upland NAPL Seep Sampling Data Summary Report*.

The 2017 NYCDEP report observed NAPL values in upland areas that were several orders of magnitude greater than all other sampled sources to the creek, which indicates the importance of this study in understanding the sources of ecological and human health risk drivers and for development of the conceptual site model for the study area.

The Focused Feasibility Study emphasizes the need for further NAPL characterization during the pre-design investigation to determine if NAPL even exists and if it is mobile. The Proposed Plan states that “existing data does not indicate this remedy component [ISS] will be necessary, for costing purposes the Focused Feasibility Study assumes that ISS to treat NAPL and/or [principal threat waste] will be needed to address 0.6 acres of the East Branch, which equates to 5.5 percent of the total surface area of the East Branch.” Furthermore, the Proposed Plan states that “the need for sealed bulkheads is not currently indicated by the existing data, for cost estimating purposes the Focused Feasibility Study assumes that 20 percent of the length of bulkheads required for each alternative will need to be sealed.” In sum, the Proposed Plan dismisses quantitative data that addresses NAPL composition, seep location and sediment distribution.

Throughout the Focused Feasibility Study there is an acknowledgment of a significant amount of uncertainty in estimating the volume of sediment that contains observations of NAPL. The Focused Feasibility Study estimates the volume of sediment containing NAPL based on shake tests and visual observations.

To date, the CAG has expressed grave concern about underestimating contamination caused by NAPL, specifically outlined in comments by the CAG on the Remedial Investigation report. The East Branch PP does not alleviate the CAG’s concerns that rigorous investigation of NAPL contamination, with technologies successfully implemented at the Gowanus Superfund site, will replace the inadequate methods of the Remedial Investigation (RI) that excluded:

- Systematic low-tide surveys of NAPL seeps**,** sources of ongoing contamination (references are made to “opportunistic” observations);
- Comprehensive chemical analysis of NAPL composition across all sources: sediment reservoirs, seeps, water surface sheens (NAPL sheens arbitrarily classified as *not* NAPL);
- Aerial Mapping and vertical distribution of NAPL across Creek sediments (>130 sediment cores not assessed for NAPL contamination; remaining cores assessed qualitatively instead of quantitatively with optical scanning for induced fluorescence, as for Gowanus cores);
- Accurate assessment of sediment NAPL mobility.

The PP for the East Branch tributary of Newtown Creek fails to propose a PDI that eliminates current practices for avoiding NAPL discovery and analysis. These practices must be replaced with rigorous methods for quantifying NAPL extent, composition, migration and loading from the shoreline seeps that were identified by municipal and state environmental agencies, respectively, the NYCDEP and NYSDEC. Appropriate technologies for meeting this goal have been successfully employed by the EPA for the Gowanus Superfund[1,2] and by the NYCDEP at

Newtown Creek (2016-2017). Core samples from the latter investigation were made available to the EPA for further testing, but have remained unanalyzed for seven years.

Additionally, we take great concern with what is included and excluded from the FFS. For instance within the FFS is included an unreviewed AQ/NCG report (Appendix B, Section 3.4.4) that concludes NAPL seeps are a "minor source of COCs to sediments in East Branch." This report refers to a seep study without a single low tide survey of potential seep outfalls, without a NAPL sample analysis and with data restricted to sampling a single COC, TPAH34. A NAPL sample can contain multiple contaminants. *What stakeholders reviewed this study and why was the CAG not appraised of this study?*

This above omission is in stark contrast to the NYCDEP East Branch NAPL seep study released in 2017, which represents the most extensive data set available to characterize East Branch NAPL seeps. Placement of the NYCDEP NAPL seep study and associated NAPL sediment studies in an Appendix of the RI/FS of FFS does not constitute either the use of these data as a guide to more extensive follow-up analysis nor as a guide to inform a remedy design.

- *How will the previous NYCDEP Seep Study and laser-induced fluorescence data be used as another line of evidence as a basis to design further pre-design investigations of NAPL to confirm the presence or absence of any NAPL reservoir(s)? What definitive methods will be used to assess the presence of NAPL or principal threat waste? If the pre-design investigation shows larger areas of NAPL, what remedy components can address the NAPL beyond ISS or amended capping and dredging for the early action?*

- *What quantitative methods will be used during the pre-design investigation beyond sheen/bleb observations or shaker tests to determine the extent of NAPL? The NYCDEP laser-induced fluorescence and upland seep data documented seeps emanating from the shoreline of 11 upland sites and from in-creek structures. These data represent only a small subset of the NAPL seeps that occur throughout the study area. The 2020 NYCDEP seep study recommended that more studies are needed to develop a robust understanding of upland properties that are a source of NAPL to the creek. Currently, the Proposed Plan defers cleanup of the upland sources either to voluntary actions or through federal and/or state of New York enforcement authorities. If such actions are deferred, clarification is warranted in the Proposed Plan to understand how such actions will be integrated with the planned Superfund cleanup.*

- *Is ISS the only option for addressing NAPL based on the minimal NAPL information cited in the Focused Feasibility Study and Proposed Plan? Would additional remedy components be considered if NAPL reservoirs are discovered (ex. extraction of NAPL from behind bulkheads)?*

- *Will any additional ISS be needed if deeper dredging cannot remove all the NAPL-contaminated sediment due to structures or other limitations (e.g., the Grand Street bridge structure)?*

- *Why are the estimated dredging volumes the same for alternatives EB-C and EB-D? The Focused Feasibility Study and Proposed Plan show the same volume of sediment for NAPL treatment (9,900 cubic yards) for alternatives EB-C and EB-D; however, alternative EB-D includes deeper dredging, possibly to remove more NAPL-impacted sediments.*

## 6. Upland Source Control

The Newtown Creek community has expressed concern about the mobility of NAPL and the inflow of new contamination into the East Branch after completion of the early action cleanup. Community members are particularly concerned about the mobility of NAPL. The Focused Feasibility Study indicates that NAPL within the East Branch sediments is not mobile. However, community members are concerned with the occurrence of blebs and sheens, which indicate the presence of NAPL. The Proposed Plan does not address potential NAPL areas and sources upgradient from the East Branch.

As noted above, the early action study area is bounded by the bulkheads and riprap at the water's edge. The Proposed Plan indicates the study area will be temporarily isolated from upland contamination by repairing and sealing bulkheads, where needed.

- *How will seeps be addressed in the long-term, and does the Long-term Equilibrium model consider the limited effect of bulkhead sealing? How will discontinuous shoreline controls be connected? We are concerned that unless controlled or reduced, the contamination from upland sources will continue to enter the East Branch at the same rate that it currently does. Additionally, sealing sections of bulkheads may address localized areas of known seeps but may not prevent the lateral migration of NAPL to adjacent seeps and non-bulkheaded shoreline.*

- *Can EPA provide an inventory of the bulkhead status around the East Branch early action area, identifying areas that need bulkhead repairs as well as areas of concentrated inflows from potential upland sources?This information can be included for the community in the suggested site map to be developed in collaboration with State and City agencies.*

- *Can EPA provide construction details on the existing bulkheads? Because it is likely that bulkheads were historically installed for bank stabilization and not for groundwater control, they may not extend to the lower confining layer to impede NAPL migration, and the CAG seeks further details on existing bulkhead ability to prevent potential migration/recontamination.*

- *Will banks that are currently stabilized by riprap be replaced or enhanced by an impervious barrier? By study area definition this amendment to the riprap to prevent NAPL seeps would need to be at the riprap. Adding a slurry wall behind the riprap would technically fall beyond the boundaries of the early action area.*

- *Can EPA provide details on how bulkhead replacement will happen? We are concerned about new bulkheads being installed on the waterside of upland properties, thus reducing the footprint of the public waterway.*

## 7. Capping Evaluation Report

Within the Focused Feasibility Study, the Newtown Creek Group also released a Capping Evaluation Study (Appendix C of the *Early Action Focused Feasibility* report). This report evaluates various cap configurations to address channel-bed contamination. Channel-bed contamination includes contaminated soils that remain after dredging operations and the future inflow of contamination from groundwater and seeps into the East Branch.

The report provides recommendations for cap construction, taking into account erosion and strategies for contamination isolation and containment. In summary, the Capping Evaluation Study suggests a three-layer cap: the top erosion layer would be 12 to 20 inches of sand, gravel or cobbles, the middle filter layer would be up to 9 inches of gravel and the lower chemical isolation layer would comprise 15 inches of sand mixed with activated carbon. In addition, the cap over contaminated sediments would include 9 inches of sand with an organoclay.

- *During the EPA's public meeting about the Proposed Plan on September 18, 2024, the EPA indicated that further studies are needed to evaluate upland sources. Considering this statement, are the groundwater flow rates and contaminant concentrations published in the Capping Evaluation Study only preliminary at this time? Further, if there are inaccuracies how easily can these inaccuracies serve to modify the cap recommendation? A 2011 Administrative Order on Consent identified numerous upland sources that are or will be addressed under a variety of cleanup programs. Will the status of these other cleanup programs be used in future upland sources and groundwater inflow evaluations, and how will this affect the early action?*

- *Has the Capping Evaluation Study been reviewed? How will the cap construction recommendations be implemented?*

- *What studies have demonstrated that a cap topped with 12 to 20 inches of sand, gravel or cobbles satisfies the requirement for a biologically active zone at the top of the cap? Can EPA clarify if the cap will require a 6-inch biologically active layer or a 20-inch biologically active layer as required by the New York State Department of Environmental Conservation?*

- *The CAG is concerned about the effectiveness of capping remedies. Can EPA provide details on similar Superfund remedies that have utilized caps, including details such as depth of cap, type of cap, was the cap on native sediment or contaminated sediment, etc? Please describe the risk of cap failure in as much detail as possible so that the CAG can fully understand potential risks. The CAG is aware of past cap failures, including sites worked on by AnchorQEA.* [3][4]

3 https://semspub.epa.gov/work/06/9384668.pdf

4 https://semspub.epa.gov/work/02/372861.pdf

## 8. In Situ Stabilization/Solidification

The FFS states that:

> For the purposes of technology evaluation in this FFS, application of the three technology options was assumed within a 0.6-acre evaluation area within the western beef slip. Note that other factors, such as the concentration of COCs in remaining sediment and constructability, may be taken into account during the design of the remedy when evaluating where to apply ISS as well.
>
> In situ stabilization and solidification (ISS). where needed to reduce migration and for treating NAPL or PTW. While existing data does not indicate this option will be necessary for costing purposes the FFS assumes that ISS to treat NAPL and/or PTW will be needed to address 0.6 acres of the East Branch, which equates to 5.5 percent of the total surface area of the East Branch.

*Does the 0.6-acre ISS estimate include the proposed ISS testing in the Western Beef slip, or does this estimate incorporate ISS needed as necessary where EPA identifies and delineates NAPL?*

Despite EPA's response to CSTAG's comment, it remains unclear what determining factors EPA will rely on when confronting non-aqueous phase liquids and/or principal threat waste to decide between additional dredging and in situ stabilization/solidification. The CAG prefers dredging and removal of the hazardous chemicals unless impossible.

> This monitoring program will allow EPA to identify the specific, ongoing sources that may cause IEM exceedances before IEM exceedances actually occur and will enable EPA to develop an appropriate course of action to ideally prevent IEM exceedances from ever occurring.

Based on EPA's more than decade timeline for studying groundwater, identifying seeps, and delineating NAPL, all of which are still not done, the CAG questions whether EPA could possibly identify sources of contamination prior to IEM exceedances, if such contamination sources are not to be blamed on CSO and MS4 inputs.

## 9. Cleanup Logistics

- *Considering that the preferred cleanup plan maintains existing water depths, the EPA is assuming that the waters will be removed from the navigational waterway designation.*

*Would the Proposed Plan and evaluation of cleanup alternatives need to be re-evaluated if this navigational delisting is not passed? Does the initiation of the cleanup action or the issuance of a Record of Decision require this navigational delisting?*

- *How will the cleanup and the Grand Street bridge replacement projects be scheduled (simultaneous or sequential scheduling) and which would be done first? How might the early action cleanup impact the bridge replacement project and vice versa? If the DOT implements a non-movable bridge in the future, which is possible with a navigation delisting, how will this impact dredging, capping, bulkhead replacement work, and all other components of an early action? Will any potential bridge construction after the cleanup damage the caps and other remediation techniques?*

- *Will EPA consider prioritizing working with a contractor who can transport dredged materials and remediation equipment with vessels less than a 25' air draft to avoid ongoing openings of the Pulaski and Greenpoint Avenue bridges? This would significantly help mitigate local impacts through increased local traffic, congestion, and resulting air quality.*

- *Can EPA provide a more detailed overview of the dredging process? EPA identifies "slot dredging" in the Proposed Plan. The EPA further clarified that dredging would likely be with a clamshell-style mechanical dredger.*

- *Will a suction dredge be considered? A suction dredge may reduce contaminated sediment resuspension and reduce contaminated sediments from leaving the project area. As the EPA has proposed a suction-style dredging removal operation at a similar site in Baltimore to remove similar contaminants (Bear Creek Sediments site), can EPA explain to the community the pros and cons of various dredging techniques?*

- *We have a series of questions about potential on-site waste management of dredged sediments:*

    - o *Will the waste be staged on land next to the dredging operation before removal by barge?*

    - o *Will the waste sediments be dewatered on site and how would the water removed from the waste be handled? Would the EPA consider a dewatering facility and water treatment plant on site?*

    - o *If staged on land for dewatering, will there be controls in place for dust control?*

    - *o* *Does the EPA have a plan to move sediment from the dredge site to a barge downstream of the Grand Street bridge? We are concerned about the operation of the Grand Street bridge for barge navigation not being highly feasible, whether for new bridge construction, excessive impact to local road traffic or due to possibly inoperable bridge rotating machinery.*

- *How will the EPA address the pipeline crossing at the East Branch? Are there any other buried utilities and structures in the proposed dredging area?*

- *What controls will be in place if the dredging operation results in increased resuspension of the sediments? Does the EPA plan to use sediment controls like a silt fence to contain turbid water at the site?*

- *Has a contingency plan been developed if that contamination moves beyond the site boundaries during dredging and waste handling?*

- *What happens if more contamination, or more toxic contamination, is exposed during dredging, which was not identified during the pre-design investigation study?*

- *Does the EPA have a contingency plan if a storm surge/flooding event occurs during cleanup?*

- *Will EPA have a point of contact if community members have concerns about noise, dust or other cleanup-related issues? How will the EPA provide periodic updates to keep community members informed of cleanup progress and any issues encountered? We are concerned about having access to real time monitoring and protocols in place for getting quick and thorough responses to concerns as they arise.*

## 10. Post-Construction Evaluation Monitoring

The long-term remedy evaluation monitoring appears to generally address the monitoring specifics requested by the EPA Contaminated Sediments Technical Advisory Group (CSTAG) September 2023 memo, by including multiple lines of evidence for evaluating cap performance. However, the Focused Feasibility Study and Proposed Plan are vague in the monitoring required to evaluate the effectiveness of ISS or bulkheads as the long-term monitoring component.

- *What long-term monitoring is required for evaluating ISS or bulkhead remedy components?*

- *Who will be conducting the long-term monitoring (EPA, CDM Smith, Anchor QEA, etc.)?*

- *How will the evaluation process be conducted during the long-term monitoring? Is there a period of time for monitoring that must pass before "lessons have been learned" and the next stage of Newtown Creek cleanup can begin?*

- *Who is responsible for addressing and paying for repair and damages if there is an issue with the remedy, including post OU-1 ROD? This question is of critical importance given the outcome of US District Court Case 1:19-CV-1029, wherein the NYSDEC lost its argument that the EPA improperly issued a Certificate of Completion to GE. New York State residents are now required to fund remediation of remaining PCB contamination in the Hudson River.*

## 11. Future Use and Ecological Restoration

- *Please explain the EPA's rationale for determining a biologically active zone (BAZ) to be 6 inches (15 centimeters). The NYSDEC states that it: "does not accept the 0 to 6-inch* *interval of sediment as an appropriate definition of the Biologically Active Zone (BAZ) in Newtown Creek or basis for remedial decision making. The 0 to 6-inch interval fails to provide adequate ecological protection in Newtown Creek. To appropriately characterize ecological exposure and evaluate long-term effectiveness of remedial technologies, NYSDEC recommends 2 feet (~60 centimeters) as the zone of surface sediment used to evaluate remedial alternatives." This discrepancy represents a significant disagreement in the plan between EPA and DEC. The definition of the BAZ is at the crux of the remedy, and completely defines it. Why has EPA limited the definition of the BAZ to 6 inches? Given that EPA expects net deposition of sediments from the East River, the measurement of only the top 6 inches (or potentially less, as EPA has allowed GE to measure only the top 2 inches of sediment, to be representative of the top 12 inches defined as the bio-available zone in the Hudson River PCB cleanup) will almost certainly underestimate the contaminant levels in the bioavailable sediments. If EPA believes that the average depth of plants in Newtown Creek are only six inches, has it considered the possibility that this reduced depth is due to the contamination?*

- *How is this early action plan incorporating potential Natural Resources Damages projects and the potential for shoreline and intertidal restoration? The community firmly believes in the opportunity and value of pursuing restoration within the East Branch tributary and rejects a remedy that may limit the options for future restoration work.*

- *Will EPA consider bulkheads that integrated intertidal habitat into their design? The community has repeatedly raised concerns about the sterile surfaces that sheet pile structures present and rejects a plan that does not incorporate ecological value.*

- *Will mitigation be required for any shoreline plants and trees that must be removed for remediation? If so, where will this mitigation occur?*

- *If in-situ stabilization is used, how will that affect restoration of that part of the Creek to more natural functions?*

- *Will EPA consider the bathymetry of East Branch and prioritize a depth that is more naturalized (shallowed in the head end areas, and deeper downstream as it connects to the navigable main channel? The community is very concerned about the damage that will be done in maintaining arbitrary depths in East Branch that do not help with flow and circulation of water and create severely impacted water quality issues, for which the DEP aeration system is required to mitigate.*

- *The Proposed Plan characterizes the designated use of Newtown Creek as "suitable for fish survival only," but that is incorrect. The plan must also acknowledge that the creek is designated for primary contact recreation. As explained by EPA Region 2 Clean Water Division Director Javier Laureano, New York State Department of Environmental Conservation promulgated, and EPA approved, the recreational use in 2015 and 2016, respectively:*

> "On February 24, 2016, the U.S. Environmental Protection Agency (EPA) received the New York State Department of Environmental Conservation (NYSDEC) revisions to New York State's water quality standards (NYSWQS). These revised water quality standards (WQS), adopted by the NYSDEC on November 4, 2015, amended the designated uses of Class I and Class SD saline surface waters [including Newtown Creek] to include a designated use of primary contact recreation (6 NYCRR §§ 701.13 and 701.14). Additionally, these revised WQS amended the water quality criteria for Class I and Class SD saline surface waters (6 NYCRR Part 703). In a letter dated May 9, 2016, the EPA approved, pursuant to Section 303(c) of the Clean Water Act (CWA), 33 U.S.C. §1313(c), the revised designated uses of Class I and Class SD saline surface waters at 6 NYCRR Part 701."

For the purposes of federal law, and especially for actions taken pursuant to EPA oversight, EPA must incorporate the designated use approved by its own Region 2 office.

- *The East Branch tributary currently features an in-stream aeration system installed and operated by NYCDEP to elevate dissolved oxygen levels during summer months. Can EPA weigh in on plans to temporarily or permanently remove the system as part of a proposed remedy in East Branch. Additionally, will EPA evaluate how current bathymetric conditions in East Branch contribute to stagnant water and low dissolved oxygen levels that require mechanical intervention such as an in-stream aeration system?*

## 12. Additional Topics

- *What is the status of the delisting for navigation for the East Branch via the Water Resource Development Act (WRDA) and how will this affect the remedy?*

- *Can EPA address potential recontamination shown within the Long Term Equilibrium Model via CSO and MS4 discharges? The FFS states that "Current estimates of the LTE concentrations for certain COCs indicate that LTE concentrations within East Branch may, over time, be greater than some risk-based PRGs (specifically D/F TEQ and C19-C36 and potentially TPCB), regardless of the remedy selected due to ongoing external inputs." The CAG opposed the OU-2 decision by EPA precisely because it would continue to allow COC discharges in amounts that would obviously lead to recontamination. The CAG continues to oppose EPA's inaction to address and reduce CSO and MS4 discharges that will inevitably result in recontamination.*

- *Could EPA provide in its final decision, a clear graphic or workflow that shows all the variety of actions here and the coordinate/integrate/sequence: 1) East Branch early action; 2) whole site FS and PP; 3) Grand Street Bridge replacement; 4) Delisting of* *some areas; 5) CSO monitoring; 6) National Grid Pump House; 7) NYSDEC upland work?*

## 12. CAG Preference for Alternative EB-F

Lastly, we would like to close by expanding upon the case as to why the community is obliged to recommend the most comprehensive remedy, EB-F:

- EB-F eliminates all contaminated fine-grained sediments overlying the native sandy substrate, thereby reducing opportunity for further biased investigation of contamination and risk of inadequate remedy.
- EB-F can render shoreline NAPL seeps more easily identifiable because removal of fine sediment ("black mayonnaise") will expose more shore boundaries, increasing the opportunity to map seep sites.
- EB-F removal of contaminated sediment can be followed by sand deposition onto native sediment, restoring naturalized water depths. Increased sand deposit depth provides a more effective barrier to contamination and greater opportunity for restoration of the benthic invertebrate community. Sand filling to raise sediment surface level has been successfully implemented elsewhere.[5]
- EB-F protects Creek communities by maximizing up-front remediation funding from the potentially responsible parties. Maximizing the initial funding and duration of the remediation effort reduces probability of recontamination. Recontamination after a Record of Decision (ROD) is completed would likely shift clean-up costs onto chronically underfunded government departments to pursue a continued remediation effort lasting generational time. It is worth noting the scenario unfolding around the Hudson River PCB Superfund Cleanup. Widespread PCB contamination was discovered after the EPA awarded the GE corporation a "Certificate of Completion" for PCB remediation. New York State (NYSDEC & Basil Seggos as NYSDEC Commissioner, *Plaintiffs*) lost its case against the EPA (EPA & GE, *Defendants*) for allowing GE to abrogate its responsibility for the contamination by improperly awarding GE certification. The case was heard in US District Court before Judge David N. Hurd, who made the following statement: "*In short, CERCLA does not squarely impose a requirement of a finding of protectiveness before a remedial action may be considered complete*.[6]

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[5] Jamaica Bay Marsh Islands, 10-26-2024, https://www.nan.usace.army.mil/Missions/Environmental/Environmental-Restoration/Elders-Point-Jamaica-Bay-Salt-Marsh-Islands/, US Army Corps of Engineers

[6] Case 1:19-cv-01029-DNH-CFH Document 103 Filed 03/11/21
https://stateimpactcenter.org/files/State-of-New-York-et-al-v.-United-States-Environmental-Protection-Agency-et-al-No.-1_19-cv-01029-Decision-Order.pdf

In closing, we appreciate the opportunity to comment on this proposed plan and greatly look forward to ongoing communication and collaboration in creating a cleaner, safer, and healthier Newtown Creek.

**Sincerely,**
Steering Committee of the Newtown Creek Community Advisory Group, on behalf of the full Newtown Creek Community Advisory Group

Leah Archibald, Evergreen Exchange
Kendall Charter, Greenpoint YMCA
Mike Dulong, Riverkeeper
Sarah Durand, LaGuardia Community College - CUNY
Willis Elkins, Newtown Creek Alliance
Quincy Ely-Cate, Maspeth Industrial Business Association
Christine Holowacz
Louis Kleinman
Paul Pullo
Shangtong 'Sandy' Li, Newtown Creek Alliance
Charles Yu, Long Island City Partnership

CC:
Stephanie Vaughn, US EPA
Rupika Ketu, US EPA
Taylor Hard, US EPA
Natalie Loney, US EPA
Pat Evagelista, US EPA
John Prince, US EPA
Marnie DeLuke, NYS DEC
Michael Haggerty, NYS DEC
Patrick Foster, NYS DEC
Ron Weissbard, NYC DEP
David Haury, AnchorQEA
David Bridgers, Newtown Creek Group
US Congresswoman Nydia Velazquez
NYS Assembly Member Emily Gallagher
NYS Assembly Member Maritza Davila
NYS Assembly Member Elect Claire Valdez
NYS Senator Julia Salazar
NYS Senator Michael Gianaris
NYS Senator Kristen Gonzalez
NYC Council Member Jennifer Gutierrez
NYC Council Member Robert Holden
NYC Council Member Julie Won
NYC Council Member Lincoln Restler
Brooklyn Borough President Antonio Reynoso
Queens Borough President Donovan Richards

| | |
|---|---|
| **From:** | Kwan, Caroline |
| **To:** | Vaughn, Stephanie; Ketu, Rupika; Hard, Taylor; Kaster, Kimberly; Button, Joseph; Schmidt, Mark D. |
| **Subject:** | FW: Newtown Creek Superfund- East Branch Early Action |
| **Date:** | Tuesday, November 12, 2024 5:35:12 PM |

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**From:** Edden, Kate <CEdden@dep.nyc.gov>
**Sent:** Tuesday, November 12, 2024 4:34 PM
**To:** Kwan, Caroline <kwan.caroline@epa.gov>
**Cc:** Yu, Wei <WeiY@dep.nyc.gov>; chitra.prabhu@hdrinc.com; Tysvaer, Roy <rtysvaer@dep.nyc.gov>; Marulanda, Dabeiba <DabeibaM@dep.nyc.gov>
**Subject:** Newtown Creek Superfund- East Branch Early Action



Good Afternoon Ms. Kwan,

New York City Department of Environmental Protection (NYC DEP) is under a CSO Order on Consent from New York State Department of Environmental Conservation (NYS DEC) Case #CO2-20110512-25 with modification to Case #C02-2000107-8 Appendix A to construct a 50 MGD storage tunnel to reduce impacts of CSOs to Newtown Creek (at outfalls BB-026, NCB-15, NCB-083, and NCQ-077). As part of this project, the existing outfall structure at outfall NCB-083 which discharges into the East Branch channel of Newtown Creek will be relocated from its current position at the terminal (south) end of the channel to the western bank. Therefore future coordination between the CSO tunnel project and the proposed Early Action Superfund work is required.

Thank you,

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**Kate Edden | Accountable Manager | NYC Environmental Protection**

**Bureau of Engineering, Design & Construction**

**(o) 718-595-5606 | kedden@dep.nyc.gov**

| | |
|---|---|
| **From:** | Kwan, Caroline |
| **To:** | Vaughn, Stephanie; Ketu, Rupika; Hard, Taylor; Kaster, Kimberly; Button, Joseph; Schmidt, Mark D. |
| **Subject:** | FW: Proposed Early Action Plan for East Branch Tributary of Newtown Creek |
| **Date:** | Tuesday, November 12, 2024 5:37:10 PM |

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**From:** Laura Hofmann [redacted]
**Sent:** Tuesday, November 12, 2024 4:16 PM
**To:** Kwan, Caroline <kwan.caroline@epa.gov>
**Cc:** Steve Chesler [redacted] Will Elkins <welkins@newtowncreekalliance.org>; Michael Hofmann Sr [redacted] Patrick Field [redacted]
**Subject:** Proposed Early Action Plan for East Branch Tributary of Newtown Creek



November 12, 2024

Caroline Kwan

Remedial Project Manager

United States Environmental Protection Agency

290 Broadway, 18th Floor

New York, New York 10007

Via email: kwan.caroline@epa.gov

Re: Proposed Early Action Plan for East Branch Tributary of Newtown Creek

Dear Ms. Kwan and EPA staff,

Thank you for the opportunity to comment on the Early Action Plan. I've been a member of the Newtown Creek CAG since the beginning of this process. Even though I've missed very few meetings and have a better understanding of the involved issues than the typical Greenpointer, I'm stunned that at the end of meetings with the involved agencies, I have more questions than answers. I have found that information provided to the community has been at best vague, incomplete, lacking data and dismissive. And the agency seemingly is attempting to base their cleanup plan on that information; failing to explain the details on how the plan will prevent recontamination of the creek and prevent further human exposure. And the agency is failing to tell the community whether or not we would have input on the information that has not yet come forward from the EPA.

During a recent online meeting with EPA, the agency was not able to answer my question about the state of the laws they claim they will follow during the East Branch trial cleanup. When EPA stated at CAG meetings that they will ensure that environmentally protective laws will be followed, what laws were they talking about? If the agency can't summarize them or has knowledge about how old or perhaps obsolete those laws are, how will the laws be followed and protect us? As a community member, I want to know if the laws governing the contaminants and exposures being discussed are truly protective and whether or not the agency and elected officials have discussed improving upon them. From the beginning of the process my primary concern has been that of human and environmental health. And community members have been clear that they are concerned about cumulative effects of every environmental incident that happens in this community. It is important for us to know if the laws, standards and such take that into consideration. And if not, the agency has to say it out loud. So, given that data, information and explanations are being withheld from the community, I don't believe the proposed plan achieves adequate protection for all the reasons that the CAG has outlined in its Nov 11th letter to you. And I support the EB-F alternative as outlined by the CAG.

The Greenpoint community has gone through the ringer in terms of environmental and human health. I live a few blocks away from the Newtown Creek, and multiple other environmental legacy sites. I continue to remind the EPA that my family's medical health history reads like an Area 51 report and keeps expanding every year to include more and more family members and evidence of autoimmune disease and other environmentally related illnesses. I'm grateful to the CAG members that worked so hard on their wonderful comments and included mine. Because while they were doing that, my husband and I have been tending to yet another family medical crisis. Doctors have already identified that there is an autoimmune issue going on with yet another son. Aside from myself, five of my six children have been diagnosed with autoimmune diseases or illnesses, etc. So, the consequences of environmental exposures are very real and very personal for me.

I'm very concerned. The EPA must provide all the information that deals with further seeps, further contamination, dust and odor control, environmental and human exposures, characterizations of pollutants, etc. And the agency must be mindful of how it characterizes the site itself. It concerns me that the proposed plan characterizes the Creek as "suitable for fish survival only", disregarding the fact that the other arms of the agency and the community itself know it to be used for "primary contact recreation". Allowing knowledge such as that to be glazed over highlights that community health is in jeopardy if the proposed plan is approved. So again, I along with my husband and family members support plans that will ensure protecting community health. The Newtown Creek CAG comments and recommendations are something my entire family can get behind.

Sincerely,

Laura Hofmann

[redacted]

**From:** Kwan, Caroline
**To:** Ketu, Rupika; Hard, Taylor; Vaughn, Stephanie; Schmidt, Mark D.; Kaster, Kimberly; Button, Joseph
**Subject:** FW: Please include community input in a revised early action plan for Newtown Creek
**Date:** Tuesday, November 12, 2024 5:32:19 PM

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**From:** Mary Arnold [redacted]
**Sent:** Tuesday, November 12, 2024 4:49 PM
**To:** Kwan, Caroline <kwan.caroline@epa.gov>
**Cc:** welkins@newtowncreekalliance.org
**Subject:** Please include community input in a revised early action plan for Newtown Creek

> **Caution:** This email originated from outside EPA, please exercise additional caution when deciding whether to open attachments or click on provided links.

Ms. Kwan, The release of the East Branch Early Action Proposed Cleanup Plan is a significant first step towards the cleanup of Newtown Creek. If done properly, cleaning the East Branch tributary will reduce human health risks and contaminants in this area of the Creek, create opportunities for habitat restoration and community access, and serve as a reference for the rest of the Newtown Creek cleanup. I ask EPA to take to incorporate the comments of the Newtown Creek Alliance in a revised plan and take action. As waterfront development continues apace, lower income residents are being encouraged to move in by Newtown Creek, and sea level rises, lives are increasingly at risk from these deadly pollutants.

Mary Arnold
[redacted]

# ATTACHMENT B

# PROPOSED PLAN

Superfund Program
Proposed Plan

U.S. Environmental Protection Agency
Region 2

# Newtown Creek Superfund Site
# East Branch Early Action
## New York City, New York

August 2024

**EPA ANNOUNCES PROPOSED PLAN**

This Proposed Plan describes the remedial alternatives that the United States Environmental Protection Agency (EPA) considered to address a portion of Operable Unit 1 (OU1) of the Newtown Creek Superfund site (Site) located in Queens and Brooklyn, New York. The OU1 Study Area is defined, generally, as the water and sediment of Newtown Creek and its tributaries up to and including the landward edge of the shoreline[1], and this Proposed Plan relates specifically to the East Branch portion of the Study Area. This Proposed Plan also identifies EPA's preferred alternative for the East Branch portion of the OU1 Study Area and provides the rationale for this preference.

The overall Site is being addressed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also known as the Superfund Law), as amended. A comprehensive remedial investigation and feasibility study (RI/FS) for all of OU1 of the Site is currently ongoing. EPA has determined that there is enough information available for the East Branch portion of OU1 to select an interim, early action remedy for this portion of the Site while the full OU1 RI/FS continues. For administrative purposes, this interim, early action is referred to as Operable Unit 4 (OU4). For clarity throughout the rest of this Proposed Plan, OU4 will be referred to as the "East Branch portion of OU1."

EPA's preferred alternative for the East Branch portion of OU1 calls for the following: dredging to allow placement of a multi-layered amended armored cap to maintain the existing water depth; localized deeper dredging where needed based on the remaining depth to uncontaminated material, comparatively higher concentrations of contaminants in remaining sediment, the potential for exposure to principal threat waste, and the potential for upward migration of non-aqueous phase liquids (NAPL); the use of in-situ stabilization, if and where needed, to further address contaminant migration from beneath the capped areas; backfill, as needed, in areas that are dredged deeper to maintain

**MARK YOUR CALENDAR**

**PUBLIC COMMENT PERIOD:**
***August 28, 2024 to September 27, 2024***
EPA will accept written comments on the Proposed Plan during the public comment period. Written comments should be addressed to:

Caroline Kwan
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 18th Floor
New York, NY 10007
Email: kwan.caroline@epa.gov

Written comments must be postmarked no later than September 27, 2024. To request an extension, send a request in writing to Caroline Kwan by 5:00 pm on September 27, 2024.

**PUBLIC MEETING:**
EPA will hold a hybrid public meeting to explain the Proposed Plan and all of the alternatives presented in the Focused Feasibility Study. Oral and written comments will also be accepted at the meeting. The meeting will be held in person at the location below or join virtually using https://usepa.zoomgov.com/meeting/register/vJItd-6spzoiGSfaTmPGUoT_YeJV1kdDPXY

**September 18, 2024**
**6:30pm to 8:30pm**
The Chatroom at Elsewhere
599 Johnson Avenue
Brooklyn, New York 11237

**In addition, documents from the administrative record are available on-line at:**
https://www.epa.gov/superfund/newtown-creek

[1] The full definition of the Study Area can be found in, https://semspub.epa.gov/src/document/02/109610 (see Section IV, Paragraph 13v).

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existing water depth; the use of sealed bulkheads, if and where needed, as a temporary measure to address seeps while cleanup of the related upland source is evaluated and implemented; shoreline stabilization measures, as needed; offsite disposition of dredged sediment; institutional controls; and a highly robust pre- and post-implementation monitoring plan to demonstrate the ongoing performance and protectiveness of the remedy. Any upland source control measures that are determined to be needed to support the long-term protectiveness of the remedy will be implemented under state and/or federal enforcement authorities, as to be determined on a case-by-case basis.

This Proposed Plan was developed by EPA, the lead agency, in consultation with the New York State Department of Environmental Conservation (NYSDEC), the support agency. EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of CERCLA, as amended, and Section 300.430(f) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

Release of this Proposed Plan initiates a 30-day public comment period. EPA, in consultation with NYSDEC, will select a remedy for the East Branch portion of OU1 after reviewing and considering all information submitted during the public comment period. EPA, in consultation with NYSDEC, may modify the preferred alternative or select another alternative presented in this Proposed Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all the alternatives presented in this Proposed Plan.

This Proposed Plan summarizes information that can be found in greater detail in the focused feasibility study (FFS) report prepared for the East Branch portion of OU1, which can be found in the administrative record for this remedial decision. The dates for the public comment period, the public meeting described below, and the location of the administrative record can be found in the “Mark Your Calendars” text box on Page 1 and in the “For Further Information” text box on Page 26. EPA and NYSDEC encourage the public to review these documents to gain a more comprehensive understanding of activities for the Site.

**COMMUNITY ROLE IN SELECTION PROCESS**

This Proposed Plan is being issued to inform the public of EPA’s preferred alternative to address the East Branch portion of the OU1 Study Area and to solicit public comments pertaining to all the remedial alternatives evaluated, including the preferred alternative. Changes to the preferred alternative, or a change to another alternative, may be made if public comments or additional data indicate that such a change would result in a more appropriate remedial action. The final decision regarding a selected remedy will be made after EPA has taken into consideration all public comments. EPA is soliciting public comments on all the alternatives considered in the Proposed Plan because EPA may select a remedy other than the preferred alternative.

This Proposed Plan has been made available to the public for a public comment period that concludes on September 27, 2024.

A public meeting will be held during the public comment period to present the conclusions of the FFS, to elaborate further on the reasons for proposing the preferred alternative, and to receive public comments. The public meeting will include a presentation by EPA of the preferred alternative and other cleanup options.

This Proposed Plan and all associated outreach materials are being released in Chinese, Polish and Spanish in addition to English, and live interpretation services will be available at the public meeting.

Comments received at the public meeting, as well as written comments received during the public comment period, will be documented in a Responsiveness Summary section of a Record of Decision (ROD), along with EPA’s responses. A ROD is a document that memorializes the selection of a remedy and the basis for the selection.

**SCOPE AND ROLE OF ACTION**

As with many Superfund sites, the contamination at this Site is complex, and the cleanup is being managed through several operable units, or OUs.

OU1 includes the entire Study Area, as generally described above and as fully defined in a 2011 administrative order on consent (AOC) between EPA and six Respondents, including the City of New York (NYC) and a group of five private parties known as the Newtown Creek Group (NCG). The NCG includes Phelps Dodge Refining Corporation, Texaco, Inc., BP Products North America Inc., the Brooklyn Union Gas Company D/B/A National Grid NY, and ExxonMobil Oil Corporation. The 2011 AOC requires the Respondents to perform a Remedial Investigation (RI) and Feasibility Study (FS) for OU1 under EPA oversight. That RI/FS is currently ongoing.

OU2 relates to current and reasonably anticipated future releases of CERCLA hazardous substances from combined sewer overflow (CSO) discharges to the Study Area, as described in a 2018 AOC between EPA and NYC (CERCLA Docket No. CERCLA-02-2018-2020). A ROD was signed in April 2021 which selected a remedy of no further action at this time under the Superfund program to address the volume of CSO discharges to Newtown Creek, where no further action in this case assumes that the Newtown Creek CSO Long-Term Control Plan that the New York City Department of Environmental Protection (NYCDEP) is under order by NYSDEC to implement is, in fact, implemented as required by the schedule developed pursuant to the NYSDEC order. The ROD requires a post-ROD monitoring program to assure the assumptions made in reaching this conclusion remain appropriate. The monitoring plan was finalized in April 2024 pursuant to a 2022 AOC between EPA and NYC (CERCLA Docket No. CERCLA-02-2022-2003).

OU3 refers to the evaluation of a potential interim, early action for the lower two miles of the Creek in the Study Area, as described in a 2019 AOC between EPA and the NCG (CERCLA Docket No. CERCLA-02-2019-2011). The NCG conducted an FFS under the AOC to see if an interim, early action remedy for OU3 was scientifically and technically appropriate and to develop and evaluate a focused range of cleanup action alternatives for OU3. After EPA's technical review and consultation with stakeholders, EPA determined that the selection of a remedy for this portion of the Creek should be deferred pending completion of the OU1 studies.

This Proposed Plan identifies an interim remedy for the East Branch portion of the OU1 Study Area (see Figure 1, all figures are at the end of this Proposed Plan). The East Branch is one of the five tributaries to Newtown Creek. It is a dead-end tributary to the upper main stem of the Creek, located between the creek head at the intersection of Metropolitan and Onderdonk Avenues and approximately Creek Mile 2.8 where it converges with English Kills. The downstream extent of the East Branch begins just upstream of the Turning Basin and continues upstream for approximately 0.16 miles before branching off into two lobes. The western lobe extends up to the CSOs located near Metropolitan Avenue, and the eastern lobe is referred to as the Western Beef Slip (see Figure 2). The RI/FS for the entire OU1 Study Area is still ongoing. As such, any remedy selected for the East Branch portion of OU1 is considered interim at this time while EPA’s overall conceptual site model (CSM) of the Site is being further refined.

As an interim remedy, the selected remedy for the East Branch portion of OU1 will be reviewed on an ongoing basis to assure the assumptions made in reaching this conclusion remain appropriate. That said, EPA fully anticipates that the remedy selected for the East Branch portion of OU1 will be consistent with the eventual final remedy selected for OU1. EPA further anticipates that the East Branch portion of OU1 remedy, and the associated operation and maintenance activities, will be subsumed by the eventual final OU1 remedy. Early actions in other portions of the Creek may also be considered in the future.

**OVERALL SITE DESCRIPTION**

The Site is located in Kings County and Queens County, New York City, New York. The Site includes Newtown Creek and its five tributaries, including Whale Creek, Dutch Kills, East Branch, English Kills and Maspeth Creek.

The Site is located within the Newtown Creek Significant Maritime and Industrial Area (SMIA), one of six designated SMIAs in New York City. The Newtown Creek SMIA, at over 780 acres, is the largest SMIA in New York City, and includes portions of the Greenpoint, Williamsburg, Long Island City, and Maspeth industrial areas.

Newtown Creek and its tributaries comprise an estuarine water body that is generally oriented in an east-west direction, although the easternmost section of

Newtown Creek and several of the tributaries are oriented north-south. The water in Newtown Creek is currently classified by the NYSDEC as Class SD, saline surface water with a protected use of fish survival only, though it does not presently meet parameters for that protected use.

The Creek itself is used for both commercial/industrial and recreational purposes and it is surrounded by a mix of residential, commercial, and industrial uses.

The total human population within a one-mile radius of the Site is estimated to be approximately 380,000. EPA's environmental justice screening tool was recently used to generate a report for the area. The report found that people of color make up more than half of the community and approximately 47% of the population consists of non-English speakers. Potential environmental justice concerns within the community include particulate matter, ozone, diesel particulate matter, air toxics cancer risk, air toxics respiratory hazard index, toxic releases to air, traffic proximity, lead paint, Superfund proximity, hazardous waste proximity, underground storage tanks, and wastewater discharge. These environmental indicators are above 50 percent of the national percentile at the Site.

The findings of the report confirm that the outreach efforts EPA has been making are reasonable and appropriate. Regular community engagement at the Site has been ongoing for more than 10 years. Outreach has been conducted through social media, public meetings, and by attending Community Advisory Group meetings, and Site-related information has been provided in multiple languages including English, Polish, Spanish, and Chinese. This ensures the factors above are taken into account for effective and appropriate outreach.

**SITE BACKGROUND**

Historically, Newtown Creek drained the uplands of western Long Island and flowed through wetlands and marshes. In the mid-1800s, the area next to the 3.8-mile-long Creek was one of the busiest industrial areas in New York City. Industrial facilities were located along its banks, including more than 50 oil refineries, petrochemical plants, fertilizer and glue factories, sawmills, and lumber and coal yards. Newtown Creek was crowded with commercial vessels, including large ships bringing in raw materials and fuel and taking out finished products including petroleum products, chemicals, and metals. In addition to the industrial pollution that resulted from all of this activity, New York City began dumping raw sewage directly into the water in 1856. During World War II, the Creek was one of the busiest ports in the nation. Currently, factories, warehouses, public utilities, and municipal facilities operate along the Creek. Various contaminated facilities upland of the Creek have been, and some continue to be, sources of the contamination at Newtown Creek.

This industrial development resulted in a major reworking of the Creek banks and channel for drainage and navigation purposes. The channelizing and deepening of Newtown Creek and its tributaries were largely completed by the 1930s, defining its current configuration. This historical development has resulted in changes in the nature of Newtown Creek and its tributaries' natural drainage condition from one with tributary flow, to one that is governed largely by engineered and institutional systems.

In the early 1990s, New York State declared that Newtown Creek was not meeting water quality standards under the Clean Water Act. Since then, several state- and city-sponsored cleanups of properties in the Newtown Creek area have taken place, and many such cleanups are ongoing. A major upgrade of the Newtown Creek Wastewater Treatment Plant was completed in 2012.

The Site was added in 2010 to the EPA National Priorities List pursuant to CERCLA.

**Enforcement History**

As noted previously, six responsible parties have entered into a 2011 AOC to conduct the OU1 RI/FS, and monitoring related to OU2 is being conducted per the terms of a 2022 AOC with NYC only.

Additional potentially responsible parties have been notified of their potential liability since the original 2011 AOC was signed. The role and contribution of these additional parties to each OU at the Site is yet to be determined, although it is anticipated that the additional PRPs will be asked to take part in the remedial design and/or remedial action activities associated with the Site, including the East Branch portion of OU1. Efforts to identify additional potentially responsible parties continues.

## OVERALL SITE CHARACTERISTICS

The Site has been extensively studied through the OU1 RI/FS process.

### OU1 Study Area Investigation

Field work for the OU1 RI/FS began in February 2012 and is still ongoing. The RI/FS work has included sampling of surface water, surface sediment, subsurface sediment, groundwater, air, NAPL, ebullition, seeps, shoreline soil, point and non-point discharges, and biota, as well as physical and ecological surveys, multiple bathymetry surveys, and toxicity testing.

There are many ongoing, external sources of contamination to the Study Area. These include municipal separate storm sewer system outfalls (MS4s), the Newtown Creek wastewater treatment plant (WWTP) treated effluent outfall, permitted industrial discharges, other permitted/non-permitted discharges, overland flow/direct drainage, other non-point sources, the tidal effects of the East River, atmospheric deposition, shoreline seeps/groundwater discharge from upland properties, and shoreline bank erosion, as well as CSO discharges.

Some of these sources may be considered both internal and external to the Study Area. For example, contamination may be entering the Creek below the mean high-water line through seeps, but the source of the contamination may be from the surrounding upland area. The other ongoing sources that fall into this category include lateral groundwater and shoreline bank erosion. These types of sources are referred to as "internal/external interface sources" herein. As is explained later in this Proposed Plan, this distinction is important to the development of the remedy for the East Branch portion of OU1.

Representative samples from all of the ongoing sources were collected as part of the OU1 RI/FS process.

Investigation activities related to the OU1 Study Area are ongoing. EPA is currently concluding a study to characterize lateral groundwater discharge along the shoreline of the Creek to refine the groundwater contaminant loading estimates to the Creek, and additional sediment and water quality samples are also currently being collected from the Creek and from the East River to supplement previously collected data. Additional data from ongoing point sources and the East River will also be obtained as part of the OU2 post-ROD monitoring program. These data will be considered, as appropriate, in the design for the East Branch portion of OU1 remedy.

### OU1 Study Area General Findings

A draft RI Report was initially submitted to EPA by the Respondents to the 2011 AOC in November 2016. Revised versions responding to EPA comments were submitted in April 2019, June 2020, October 2021, December 2022, and January 2023. The final RI Report was approved by EPA in April 2023. A Baseline Human Health Risk Assessment (BHHRA) was approved by EPA in June 2017, and a Baseline Ecological Risk Assessment (BERA) was approved by EPA in November 2018. The draft FS Report for the entire OU1 Study Area is currently being prepared.

As part of the OU1 RI/FS, a complex set of interrelated models has been developed. Hydrodynamic and sediment transport models (which include groundwater and point source sub-models) were submitted with the RI Report and have been reviewed (both internally and through the peer review process), refined, and finalized. EPA has also developed a long-term equilibrium (LTE) model to assess the impact of ongoing sources of contamination on the OU1 Study Area (including the East Branch). The LTE model is currently going through review by technical experts outside of the project team. This model and its use in the remedial process is described more fully in later sections of this document. A contaminant fate and transport model had also been under development. However, EPA determined that the hydrodynamic and sediment transport models provide a detailed understanding of site characteristics and potential physical transport mechanisms impacting the Site, and those models, in conjunction with the LTE model, can be used in the evaluation of remedial alternatives for OU1. As such, completion of the contaminant fate and transport model was discontinued. Based on data collected as part of the OU1 RI/FS field program and current modeling, development of the CSM for the OU1 Study Area is well advanced. Additionally, the lateral groundwater discharge study data and additional sediment and surface water data will help further refine the OU1 CSM, as will the design and implementation of a remedy for the East Branch portion of OU1.

Elevated concentrations of contamination were found throughout the OU1 Study Area. Much of this contamination is due to historic inputs of contamination to the Creek, and contamination is found, in particular, in the surface and subsurface sediment of the Creek and in the underlying native material. In-Creek processes may lead to the spread of this contamination within the Study Area. These processes include gas ebullition (bubbling)-facilitated contaminant/NAPL transport, sediment resuspension, NAPL dissolution and migration, and vertical groundwater discharge.

In addition, ongoing sources of contamination will continue to add contamination to the Study Area. While EPA anticipates the amount of contamination entering the Creek from ongoing sources will decrease over time due to various factors, including cleanup of upland properties, greater regulatory control, and improved practices for managing waste and stormwater, all ongoing external sources of contamination cannot be completely eliminated.

**Current and Reasonably Anticipated Future Site Uses**

***Navigation***

Newtown Creek is currently an active navigable waterway with a federally authorized channel and is expected to continue to be an industrial waterway in the future. Based upon recent analysis from the U.S Army Corps of Engineers, the currently authorized navigational depths for portions of the Creek can be reduced in extent and depth and still meet the expected future industrial uses, and other portions can be deauthorized for navigation purposes.

***Recreation, Fishing, and Crabbing***

Newtown Creek is currently used for recreational purposes such as boating. Recreational uses are expected to continue and likely expand as cleanup of the waterway enhances the opportunities for use. The Creek is also currently used by some people for fishing and crabbing. The New York State Department of Health has developed fish consumption advisories identifying consumption limits for fish and crabs in Newtown Creek (and other waterways within New York City), and, in consultation with the community, EPA has placed signs at known fishing/crabbing locations along the Creek advising anglers of the Superfund site designation and the State fish consumption advisories. However, the Creek is still used for fishing and crabbing, and some people continue to consume what they catch. This is expected to continue.

***Upland Uses***

Uses of the areas surrounding the Creek are highly varied, and they include industrial/commercial properties, residential properties, limited recreational access areas, and abandoned properties. In addition, many upland properties adjacent to the Creek are contaminated from past industrial uses and are being addressed through State and non-Superfund federal cleanup actions.

EPA expects that when development/reuse of land adjacent to the Creek occurs, it will result in a broader range of land use, generally leading to increased human presence at the Creek. While the mix of industrial, commercial, and residential properties may remain similar over time, the exact use of particular lots may change, and there is a strong desire from the community to create more recreational options and soft shorelines.

***Ecological Uses***

Newtown Creek includes urban ecosystems that provide ecological benefits to environmental flora and fauna. EPA expects that general trends already underway in the Creek toward healthier and more diverse ecosystems will continue and will be supported by actions taken by EPA to address the Newtown Creek Site, along with other actions (*e.g.*, improved watershed management practices and greater regulatory control). EPA also expects that several locations along the waterway may be changed from bulkheads to soft shorelines that would enhance ecosystem diversity.

## EAST BRANCH EARLY ACTION OVERVIEW

### General Overview of the East Branch

The East Branch is a dead-end tributary to Newtown Creek with a surface area of approximately 11 acres. It is approximately 0.5 miles in length. The geographic extent is described more fully in the Scope and Role of this Action section of this Proposed Plan.

The East Branch was created in 1884 by cutting into the previously marshy edges of the waterway to increase distribution of building materials to supply the residential population near this area of the Creek. Similar to other portions of OU1, the East Branch is a highly engineered water body that was almost completely bulkheaded by the early 1900s. Approximately 80 percent of the shoreline within the East Branch currently contains bulkheads, with nearly all of the remaining shorelines containing riprap or other armoring. The bulkheads vary in their condition, and some require significant maintenance (See Figure 3). Based on the 2022 bathymetric survey, the average bathymetric elevation in East Branch is -11 feet North American Vertical Datum of 1988 (NAVD88), with a minimum elevation of approximately -24 feet NAVD88 (See Figure 4). Water depths extend to a maximum of approximately 21 feet below mean lower low water (MLLW); MLLW is +2.61 feet above NAVD88. Tidal ranges are approximately up to 5 feet, and there are portions of the East Branch sediment that are exposed during low tide. The average width of the East Branch is approximately 214 feet in the downstream portion and western lobe and 111 feet in the narrower Western Beef slip.

A federally authorized navigation channel is currently present in a majority of the East Branch. A recent study by the U.S. Army Corps of Engineers did not identify any commercial users of the East Branch that would require a navigation channel. The 2024 Water Resources Development Act (WRDA) bill includes a plan to deauthorize the East Branch navigation channel, and EPA expects that WRDA will be passed prior to EPA's remedy decision on this proposed plan.

Important infrastructure located in the East Branch includes the Grand Street swing bridge, an aeration system operated and maintained by NYC to improve dissolved oxygen levels, submerged electrical cable crossings below the Grand Street bridge, stormwater outfalls including two CSOs, two MS4 outfalls, and approximately 35 stormwater outfalls. A project to replace the Grand Street bridge is currently being developed by NYC; EPA is actively coordinating with NYC on this activity (see Figure 5).

### Basis for East Branch Interim Early Action

EPA is using an adaptive management approach for OU1 of the Site consistent with EPA's Adaptive Management Framework, which is described as "a formalized process to manage risks from contaminated sediment sites where iterations of remediation, monitoring, and progress evaluations are guided by a formalized adaptive management plan that establishes the goals of the project, sets expectations, uses monitoring data to evaluate progress towards those expectations, and adapts the remedy as necessary based on those evaluations" (OLEM Directive No. 9200.1-166). EPA has developed a Site-specific memorandum titled, "Framework for the Operable Unit One Remedial Action Objective and Preliminary Remediation Goal Approach" that is included in the administrative record for this Proposed Plan (EPA, November 2023, referred to herein as the "Framework"). This Framework is an initial step towards describing the adaptive management approach that will be utilized at this Site, and the East Branch interim early action is consistent with this Framework.

Broadly, EPA is proposing to conduct an interim early action in the East Branch portion of the OU1 Study Area so that remedial action can occur in this tributary while the full OU1 FS is being completed. It would be beneficial to move forward with conducting an interim early action in the East Branch for the following primary reasons:

- It will expedite the overall Site response by implementing remedial measures in one of the most upstream portions of the OU1 Study Area.

- It will result in immediate risk reduction and contaminant mass removal in this portion of the OU1 Study Area (and, to a lesser extent, within the OU1 Study Area as a whole).

- It will provide an opportunity to gain direct remedial experience working in the Creek, which would help all parties involved gain experience with the logistics of conducting remedial work in the remainder of the Site and help inform future efforts.

- Lessons learned from conducting the action (and associated pre-design investigation, remedial construction, and pre- and post-implementation monitoring) will help inform the conduct of potential future early actions on other portions of the Creek, as well as the overall OU1 FS alternatives development, evaluation, and remedy selection as well as the eventual implementation of the OU1 remedy.

- It will provide an opportunity to validate and update the broader CSM that is being refined for the full OU1 Study Area. The early action will include a robust post-implementation evaluation monitoring program, and if the monitoring shows that the assumptions used to develop the East Branch CSM are not accurate, the CSM will then be updated accordingly.

It is EPA's expectation at this time that the post-implementation monitoring conducted as part of this early action would continue until such a time as the interim Early Action remedy is subsumed into a final remedy for the Site.

**Characteristics of the East Branch**

The sediment bed throughout the East Branch is a cohesive (muddy) bed, with varying amounts of fine (clay or silt-sized) particles and coarse (sand-sized) material, with an average sediment thickness of 13 feet, and with significantly greater sediment thicknesses in the western lobe of between 16 and 26 feet (see Figure 6). The sediment bed is underlain by native materials, which consist of glacial (Upper Glacial Aquifer) and post-glacial (historical marsh, lacustrine, and fluvial creek deposits) deposits.

The natural hydrodynamics of the East Branch (similar to other areas of Newtown Creek) are dominated by twice-daily tidal flows from the East River and by storm-driven freshwater inputs from over 35 individual point source discharges (direct discharges from individual sites, highway drains, MS4 discharges, CSOs and overland flow) creating a dynamic local environment that exhibits a unique combination of solids loads and depositional characteristics. Freshwater also enters the East Branch from groundwater discharge, which occurs vertically at the base of the East Branch through the sediment bed and laterally through vertical permeable shorelines to the surface water (*i.e.*, lateral discharge). EPA is currently investigating the groundwater entering the East Branch laterally from upland properties as part of the lateral groundwater discharge investigation, and information from this study will be incorporated into the design of the remedy for the East Branch.

During dry weather, salinity values in the East Branch range from approximately 12 to 24 practical salinity units and are slightly lower than those of the main stem and the East River. However, during wet weather, salinity values are more variable and are generally less than salinity values measured during dry weather.

Potential climate change impacts to the East Branch include high vulnerability to sea level rise, extreme winds, extreme heat, and air quality risks. The average daily maximum temperature is expected to increase to around 72°F and total precipitation is expected to increase 5 to 8 inches if global emissions of heat-trapping gases continue increasing through the year 2100. Annual counts of intense rainstorms — those that drop two or more inches in one day – are projected to increase by 1%. Historically, Kings County averaged one intense rainstorm per year. The design of the remedial action will consider resiliency measures related to these anticipated hazards and will specifically consider the intensity, frequency, and duration of extreme weather events; sea level rise; seasonal changes in precipitation and/or temperatures; and increasing risk of floods.

**Nature and Extent of Contamination in the East Branch**

The following discussion of the nature and extent of contamination in the East Branch is focused on the list of Contaminants of Concern (COCs) that has been developed for the overall OU1 Study Area. Based on the results of the human and ecological risk assessments that were conducted for the entire OU1 Study Area, the COCs include total polycyclic aromatic hydrocarbons (TPAH(34)), C19- C36 aliphatic hydrocarbons, total polychlorinated biphenyls (TPCBs), total dioxins/furans (measured as toxicity equivalence quotients, or TEQs, and represented below by 2,3,7,8-TCDD), copper, and lead. More information about the development of the list of COCs and risk-based preliminary remediation goals (PRGs) is presented in the Summary of Site Risks and Remedial Action Objectives sections below. The CSM for the East Branch is presented in Figure 7. Appendix A of the East Branch FFS report, which is included in the administrative record for this remedial decision, includes several figures showing the nature and extent of contamination in the East Branch portion of the OU1 Study Area.

***Surface sediment*** (sediment within the top 6 inches of the sediment column): In surface sediment, there is no clear spatial distribution pattern associated with measurements of TPAH(34), C19-C36 aliphatic hydrocarbons, and lead concentrations in the East Branch. However, concentrations of TPCBs, 2,3,7,8-TCDD, and copper in surface sediment decline from the East Branch's confluence with the main stem of the Creek moving upstream to the head of the tributary (western lobe). Generally, COC concentrations in surface sediment in the East Branch are similar to or lower than COC concentrations in other areas of Newtown Creek. All COCs were detected in surface sediment at concentrations greater than their respective risk-based PRG.

***Subsurface sediment*** (sediment below the top 6 inches of the sediment column to the native material interface): COC concentrations in subsurface sediment in the East Branch are higher than surface sediment concentrations in nearly all cases. There is no clear spatial distribution pattern associated with measurements of TPCBs and lead concentrations in subsurface sediment in the East Branch. Generally, TPAH(34) and copper concentrations are elevated at the confluence with the main stem and in Western Beef Slip and decrease upstream toward the head of the tributary (western lobe). On the other hand, concentrations of C19–C36 aliphatic hydrocarbons and 2,3,7,8-TCDD are higher at the head of tributary (western lobe). Generally, COC concentrations in subsurface sediment in the East Branch are similar to or lower than COC concentrations in other areas of Newtown Creek. All COCs were detected in subsurface sediment at concentrations greater than their respective risk-based PRG.

***Native Material*** (glacial and post-glacial deposits present below the sediment): TPAH(34), C19-C36 aliphatic hydrocarbons, and lead concentrations in native material are generally two to three orders of magnitude less than those in subsurface sediment. TPCBs and copper concentrations are generally one to two orders of magnitude less than those in subsurface sediment. 2,3,7,8-TCDD was detected in one sample in the native material. Other than one sample with a C19-C36 aliphatic hydrocarbons concentration greater than the risk-based PRG, all other COC concentrations detected in native material were less than their respective risk-based PRG.

***Porewater***: Shallow porewater samples (0 to 12 inches below sediment surface) were analyzed for all Site COCs except for C19–C36 aliphatic hydrocarbons and 2,3,7,8-TCDD, because these were not initially identified as potential COCs for the Site. There is no clear spatial distribution pattern associated with measurements of TPAH(34) and lead concentrations in shallow porewater in the East Branch. Concentrations of TPCBs and copper in shallow porewater are higher near the East Branch's confluence with the main stem of the Creek than at the locations closer to its head (western lobe). TPCB concentrations in porewater from 1 to 2 feet below sediment surface (collected during the FS) in the eastern lobe are higher than in shallow porewater at the confluence with the main stem.

Only one mid-depth porewater sample was collected in the East Branch, from a depth interval of 1.5 to 3.5 feet. Mid-depth porewater samples are porewater samples collected from mid-depth within the subsurface sediment, at the approximate midpoint between the mudline and underlying native material. Since only one sample was collected, no spatial pattern could be determined. However, in the mid-depth porewater sample, TPCBs and copper concentrations were greater than, TPAH(34) concentrations were similar to, and lead concentrations were less than, concentrations detected in shallow porewater samples collected at this one location.

***Groundwater***: Groundwater samples, collected from monitoring wells within the Creek, were analyzed for all Site COCs except for 2,3,7,8-TCDD. Dissolved lead was only detected in one groundwater sample; as such, no spatial pattern could be determined. There is no clear spatial distribution pattern associated with measurements of TPAH(34), C19–C36 aliphatic hydrocarbons, and dissolved copper in groundwater below the East Branch. The lowest concentrations of TPCBs in groundwater were observed at the head of the tributary (western lobe). The lateral groundwater study described above will provide additional information on groundwater impacts to the Creek.

***NAPL and sheen in sediment***: Laboratory analysis of NAPL from the OU1 Study Area shows that it generally consists of TPAH(34) and TPCBs. Observations of NAPL blebs in sediment were located sporadically throughout the East Branch area and are not clustered at a particular location. Similarly, visual observations of surface and subsurface sediment samples identified sheen intermittently throughout the East Branch, and visual observations of sediment samples collected in the eastern lobe (also referred to as the Western Beef slip) identified sheen in every sample collected (note that sheen is the appearance of iridescence on the surface of sediment or water and can be due to biological degradation of organic material or other processes; it is not necessarily indicative of the presence of Site COCs). NAPL blebs were also observed in the shake tests of two subsurface sediment cores collected in the eastern lobe. Mobile NAPL, defined as non-residual NAPL that can move through advection and as measured through laboratory testing, was not identified in the East Branch. However, the mobility of NAPL in untested areas of the East Branch is unknown, and changes to in-situ conditions and/or anthropogenic disturbances could potentially mobilize NAPL.

***Gas ebullition***: Gas ebullition originates primarily in surface and shallow subsurface sediment when water/sediment temperatures are generally higher and water depths are shallower (near the hours of low tides) and organic content in sediments is high enough to support the bacterial production of methane gas. When gas ebullition occurs in the presence of sheen-bearing material (NAPL or other organic materials), or below these materials, those constituents may be transported with gas bubbles to the water column, creating sheens that develop and/or expand. Gas ebullition-facilitated sheens were observed during surveys within the East Branch, indicating that gas ebullition-facilitated transport of NAPL is an on-going process. Gas ebullition can also transport contaminants from the sediment bed to the water column.

***Particulate phase concentrations in surface water***: In Newtown Creek overall, spatial patterns in particulate phase TPAH(34), TPCB, copper, and lead concentrations in surface water show similar patterns to those in whole water (particulate, plus dissolved phase) samples, specifically that concentrations tend to increase with increasing distance upstream in the main stem of the Creek. Particulate phase TPAH(34) and TPCB concentrations also tend to be higher in the more upstream tributaries, like the East Branch. These patterns tend to be more prevalent during wet weather conditions.

***Summary***: In summary, COC concentrations in the sediment generally increase with depth, whereas COC concentrations in native material are generally one or more orders of magnitude lower than COC concentrations in the surface and subsurface sediment. Areas of sediment where COC concentrations do not increase with depth (*e.g.*, near CSO discharge locations at the head of the western lobe) have likely been affected by resuspension, redeposition, and mixing.

COCs are detected and elevated in media other than sediments, including surface water, porewater and groundwater. Sheens have been observed intermittently throughout surface and subsurface sediment; NAPL blebs have been occasionally observed in subsurface sediment. Sheens have been observed in surface water due to ebullition. NAPL has been observed to be immobile (under conservative laboratory test conditions) at two locations tested in the East Branch, but existing immobile NAPL may be mobilized during implementation of the remedy, and mobile NAPL may be identified during the pre-design investigation that will be conducted.

**Ongoing Sources of Contamination to the East Branch**

There are many ongoing sources of contamination to the East Branch portion of OU1, both internal to the OU1 Study Area and external to the Creek.

Internal ongoing sources of contamination to the East Branch include sediment resuspension from within the

OU1 Study Area, movement of sediment and surface water through tidal flow, and ebullition-facilitated transport.

External sources of contamination to the East Branch include CSOs, MS4s, permitted and non-permitted discharges, overland flow, vertical groundwater flow and atmospheric deposition. There are also many ongoing sources of contamination to the East Branch that lie at the interface of the Study Area and the uplands and may be considered both internal and external sources of contamination. These include sources such as lateral groundwater flow, seeps from contaminated upland properties, and bank erosion, and as mentioned previously, they are referred to herein as internal/external interface sources.

Overall, the East Branch is net depositional, though there are locally erosional areas. The relative impact of the ongoing sources varies throughout the East Branch. Depositing solids and COC loads originate primarily from point sources (*i.e.*, CSO and stormwater outfalls). East River solids comprise approximately 30 percent of the deposited sediment and COC load in the East Branch. Findings of the OU1 RI/FS show that the contribution to COC loads from the other ongoing sources is less significant in the East Branch portion of OU1 than in other portions of OU1, though this finding will continue to be evaluated on an ongoing basis during and after implementation of a remedy for the East Branch.

EPA has developed the LTE model mentioned previously to assess the impact of ongoing sources of contamination on the OU1 Study Area (including the East Branch). The LTE model estimates the concentration of COCs in surface sediment that would occur from the external ongoing sources of contamination assuming that the concentration of COCs in sediment were zero to start. In other words, it measures the amount of recontamination that would be expected to occur from ongoing external sources after a remedy is implemented. The LTE model was developed using data from the OU1 RI/FS and will be updated over time using data obtained through the ongoing OU1 RI/FS, OU2 post-ROD monitoring program, and pre- and post-implementation monitoring conducted as part of the East Branch remedy. The output of EPA's LTE model is a cumulative distribution function for each COC which shows the percentage of likelihood that a concentration is equal to or below the concentration indicated.

**East Branch Focused Feasibility Study (FFS)**

Information gained through the full OU1 RI/FS was used to conduct a FFS. The FFS develops and evaluates remedial alternatives for the East Branch portion of the OU1 Study Area. A draft FFS was submitted to EPA in July 2023, and a draft final version was submitted in August 2024 shortly before the release of this Proposed Plan. The latter version is available for review and comment as part of the Administrative Record for this action. The FFS will be finalized once all comments on this Proposed Plan are received and considered.

## SUMMARY OF SITE RISKS

### OU1 Risk Assessments

As part of the OU1 RI/FS process, baseline human health and ecological risk assessments were conducted, and the reports have been approved by EPA. Superfund risk assessments identify unacceptable risks to public health or welfare and the environment from actual or threatened releases of hazardous substances from a Superfund site into the environment. The identification of unacceptable risks forms the basis for developing and selecting cleanup options for a site.

### Human Health Risk Assessment

The Baseline Human Health Risk Assessment (BHHRA) for OU1 was approved in June 2017. The risk of a reasonably maximally exposed (RME) individual developing cancer or noncancer health effects as a result of exposure to CERCLA hazardous substances through ingestion of fish or crab exceeds the acceptable risk range identified in the NCP. The BHHRA evaluated a wide variety of possible exposure pathways, including recreational boaters, swimmers, shoreline recreators/waders, dockside and landside workers, as well as risks to residents and workers due to flooding events.

Unacceptable risks were associated with exposure to total non-dioxin-like PCB congeners, total PCB congeners, and total dioxins/furans through ingestion of fish and crab in the Creek. Specifically, fish and crab consumption risks and HIs for the RME scenarios exceed CERCLA-acceptable risk levels of an excess cancer risk of $10^{-6}$ to $10^{-4}$ and a noncancer goal of protection of an HI of 1 for adult, adolescent and child anglers and crabbers.

For all other receptors and pathways, the cancer risks from exposure to CERCLA hazardous substances were found to be below or within EPA's acceptable risk range. The only other receptor found to have unacceptable risks was the general construction worker. While cancer risks for this receptor were found to be within the acceptable risk range, noncancer hazards exceeded the hazard threshold of an HI of 1.

**Ecological Risk Assessment**

The Baseline Ecological Risk Assessment (BERA) for OU1 was approved in September 2018. Overall, the results of the BERA indicate that Study Area sediment, particularly in the Turning Basin and most of the tributaries, is toxic to benthic invertebrates and presents exposure risks for bivalves, blue crabs, fish and birds. The primary contaminants leading to unacceptable risk were hydrocarbons (including PAHs), PCBs, and copper, with additional risk from dioxins/furans and lead.

**Conclusion**

Sediment is the primary media of concern for all CERCLA elevated risks at the East Branch portion of OU1.

Based on the results of the remedial investigation and the risk assessments, EPA has determined that the preferred alternative identified in this Proposed Plan, or one of the other active measures considered in the Proposed Plan, is necessary to protect public health or welfare and the environment from actual or threatened releases of hazardous substances into the environment.

## REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) describe what the proposed site cleanup is expected to accomplish. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs), to-be-considered (TBC) guidance, and site-specific risk-based levels (*e.g.*,

**WHAT IS RISK AND HOW IS IT CALCULATED?**

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these releases under current- and anticipated future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

*Hazard Identification:* In this step, the chemicals of potential concern (COPCs) at the site in various media (*i.e.*, soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

*Exposure Assessment:* In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil and ingestion of and dermal contact with contaminated groundwater. Factors relating to the exposure assessment include, but are not limited to, the concentrations in specific media that people might be exposed to and the frequency and duration of that exposure. Using these factors, a "reasonable maximum exposure" scenario that portrays the highest level of human exposure that could reasonably be expected to occur is calculated.

*Toxicity Assessment:* In this step, the types of adverse health effects associated with chemical exposures and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health hazards, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health hazards.

*Risk Characterization:* This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks for all COPCs. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a $10^{-4}$ cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions identified in the Exposure Assessment. Current Superfund regulations for exposures identify the range for determining whether remedial action is necessary as an individual excess lifetime cancer risk of $10^{-4}$ to $10^{-6}$, corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk. For non-cancer health effects, a "hazard index" (HI) is calculated. The key concept for a non-cancer HI is that a "threshold" (measured as an HI of less than or equal to 1) exists below which non-cancer health hazards are not expected to occur. The goal of protection is $10^{-6}$ for cancer risk and an HI of 1 for a noncancer health hazard. Chemicals that exceed a $10^{-4}$ cancer risk or an HI of 1 are typically those that will require remedial action at a site and are referred to as chemicals of concern, or COCs, in the final remedial decision document or Record of Decision.

PRGs). The following RAOs have been established for the East Branch portion of the OU1 Study Area:

**Exposure-based RAOs**

- Reduce potential current and future human exposure to COCs from ingestion of fish and crab by preventing biota exposure to sediments in the East Branch with COC concentrations above protective PRGs/Remediation Goals (RGs).
- Reduce ecological exposure to Site COCs in sediment by reducing the concentrations of COCs in contaminated sediment in the East Branch to protective PRGs/RGs.

**Source Control RAO**

- Reduce migration of COCs related to NAPL and its constituents, and other sources of COCs within the East Branch, to surface sediment and surface water to levels that are protective for human health and ecological exposure.

The exposure-based RAOs would be achieved by reducing concentrations of COCs in surface sediment to concentrations below the RGs that are selected. For Newtown Creek, it was estimated that the top 6 inches of the sediment is the biologically active zone. This depth is the current definition for surface sediment associated with the source control RAO.

It is expected that these interim RAOs will be consistent with the RAOs selected for the OU1 Study Area. The interim remedy selected for the East Branch will include a robust pre- and post-implementation monitoring program to assure that both the exposure-based and source control RAOs are being met on an ongoing basis over time, and until such a time as the long-term monitoring of this action is subsumed into a final OU1 Study Area remedy monitoring program. The long-term monitoring approach for the East Branch is described more fully below in the Overview of Remedy Approach section of this Proposed Plan. In particular, the long-term monitoring approach description explains how the source control RAO will be met over time.

**WHAT IS A "PRINCIPAL THREAT?"**

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air, or acts as a source for direct exposure. Contaminated groundwater generally is not considered a source material; however, non-aqueous phase liquids in groundwater may be viewed as source material. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. A decision whether and how to treat these wastes is made on a site-specific basis through a detailed analysis of the alternatives using the nine remedy selection criteria. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

**Preliminary Remediation Goals**

Based on the findings of the BHHRA and the BERA for the full OU1 Study Area, six COCs have been identified for OU1 of the Site and risk-based PRGs have been developed for each of the COCs. Table 1 at the end of this document lists the COCs, the risk-based PRGs, and the basis for selecting each of the PRGs. They were developed in consultation with EPA's Office of Research and Development and were selected based on the most sensitive exposure pathway, whether it be due to human health or ecological risk. These COCs and PRGs will be used for the East Branch portion of the OU1 Study Area as well (once a remedy is selected, the PRGs become the RGs for the action).

EPA is proposing that the long-term cleanup goals for the East Branch Early Action be set to the risk-based PRGs. EPA can select PRGs consistent with background conditions if risk-based remediation goals are lower than background concentrations. However, since the Creek is a dead-end water body without a natural up-river source of water and there are many ongoing sources of contamination to the Creek, the determination of background at this Site is not clear cut. Furthermore, while ongoing sources of contamination will continue post-remedy, there is an expectation that the overall external (including internal/external interface) loading to the Creek will decrease over time because of improved best management practices, ongoing cleanup actions (such as at upland sites), and additional regulatory control (including the long-term control plan both for Newtown Creek and for the East River overall). Since EPA anticipates that the risk-based PRGs are attainable in the long-term, background-based PRGs or action levels are not necessary for this action.

The process that will be used to assure the RAOs are being met over time is described in the Summary of Remedial Alternatives section below.

**PRINCIPAL THREAT WASTE**

Principal threat wastes (PTW) are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. They include liquids and other highly mobile materials (*e.g.*, solvents) or materials having high concentrations of toxic compounds. A detailed explanation of principle threat wastes can be found in the information box, "What is a Principal Threat?" on the preceding page.

For this action, two types of PTW are potentially present. These include:

- Contaminated sediment with PCB concentrations above 500 parts per million (ppm).
- NAPL in subsurface sediment or upland soil that has the potential to migrate to surface sediment and surface water.

Based on the findings of the RI/FS, there is no known PTW in the East Branch. However, additional sampling will be conducted to support the design of the remedy that is selected for the East Branch portion of the OU1 Study Area and, if PTW is encountered, it will be treated as described below.

**OVERVIEW OF REMEDY APPROACH**

The general intent of the action for the East Branch portion of OU1 is to remove contaminated sediment to a depth that will result in immediate risk reduction and contaminant mass removal in this portion of the Creek (and, to a lesser extent, within the Study Area as a whole) and to assure the risk reductions are maintained in the long-term.

As previously discussed, there are many ongoing sources of contamination to the East Branch portion of OU1. These sources are internal to the Creek, external to the Creek and at the internal/external interface between the Creek itself and the surrounding upland areas, and any of these ongoing sources of contamination could impact the protectiveness of the remedy.

While the CSM for the East Branch portion of OU1 is well developed at this point, there is uncertainty around the impact of these ongoing sources to the protectiveness of any remedy selected. It would take considerable additional time (on the order of years) to significantly reduce this uncertainty and given the Creek's location in a densely populated urban environment, there will always be a relatively large degree of uncertainty associated with the potential impact of ongoing contamination on any implemented remedy. As such, rather than delay taking any in-Creek remedial action until the uncertainty is reduced, EPA developed the Site-specific Framework, mentioned previously, for OU1 to allow remedial work to proceed sooner rather than later. The Framework provides both an approach for evaluating the long-term effectiveness of remedies implemented for the Site, as well as a roadmap for addressing any impacts to the protectiveness that are discovered. It includes an iterative approach to post-remedy monitoring and evaluation to assure that risk-based remediation goals are achieved in the long term. This iterative approach, as applied specifically to the East Branch portion of OU1, is described as follows:

- Set long-term PRGs for the East Branch portion of OU1 equal to the risk-based human health and ecological concentrations.
- Determine interim evaluation measures (IEMs) using empirical data, as well as the predictive

LTE model developed for the Site. The IEMs will be used for remedy design, implementation, and post-implementation monitoring and will be adjusted periodically using empirical data to account for current conditions.

- Develop a long-term monitoring program that includes sampling of at least surface sediment, subsurface sediment, porewater, both suspended sediment and dissolved phase concentrations in surface water, and ongoing external sources of contamination (including, at a minimum, CSOs, MS4s, stormwater and overland flow, as needed if not being monitored under OU2). The monitoring program will also include regular visual and/or fluorescence technology inspections for NAPL, with chemical analysis to confirm the composition of NAPL identified, regular bank inspections for erosion, with sampling as needed, and regular inspections for the presence of seeps, with opportunistic sampling as possible. The purpose of this long-term monitoring program is to assess overall remedy effectiveness, including both the performance of the remedy itself within the East Branch portion of the OU1Study Area and the impact on the protectiveness of the remedy from ongoing sources over time.
- If surface sediment concentrations do not meet the IEMs and do not continue trending towards the long-term remediation goals, determine if this is due to the performance of the in-Creek remedy itself or if additional external or internal/external interface source control measures are needed, either through voluntary actions or through federal and/or State of New York enforcement authorities, as appropriate.

The appropriate source control measures would be determined on a location-specific basis. The appropriate entity to control the source would be determined on a situation-specific basis. For example, if the need for source control is determined to be related to an issue with the in-Creek remedy, then the additional source control measures would be taken through federal Superfund enforcement authority. However, if the need for source control is related to a seep from a contaminated upland property, then the source control action would be taken through state and/or federal (Superfund and/or non-Superfund) enforcement authority, to be determined on a case-by-case basis.

It is EPA's expectation that the alternative selected for the East Branch would successfully address internal sources of contamination. The approach described above provides a means to confirm this is true and to assure the RAOs for the action are met in the long-term by ensuring impacts from all potential sources are understood and addressed, as needed and under the appropriate enforcement authority.

**Data-Based Rationale for Remedy Approach**

Figure 8 was developed through the use of the LTE model using existing data collected as part of the OU1 RI/FS process. It shows the expected range of long-term equilibrium concentrations for all of the COCs except lead based on existing data (lead is only a concern in the intertidal areas and is not included in the LTE model). This information will be updated based on sampling conducted during investigations to support the design of the remedy and on an ongoing basis after implementation of the remedy, but the existing data shows that risk-based PRGs do appear to be achievable at this time for copper (PRG 490 ppm) and TPAH(34) (PRG 100 ppm), may be achievable with little or no additional source control work for PCBs (PRG 0.30 ppm), and will likely take time and additional source control work to achieve for dioxins/furans (PRG 18 ppt) and C19-C36 (PRG 200 ppm).

Figure 8 also shows that CSOs currently provide a significant contribution to the long-term equilibrium concentration for most of the COCs, including dioxins/furans TEQ and C19-C36. The volume of CSO discharges to the Creek will decrease by approximately 65% once the long-term control plan NYCDEP is under order by NYSDEC to implement by 2042 is fully implemented. As such, it is known that significant source control will happen in the not-too-distant future. In addition, as is described more fully below, the active remedial alternatives will help reduce other contributors to the long-term equilibrium concentrations, including lateral groundwater/seeps, bank erosion, and porewater advection on a temporary basis, until appropriate source control measures can be taken under either state and/or federal enforcement authorities.

This analysis illustrates that, based on EPA's current understanding, the RAOs that have been established for the East Branch portion of OU1 are achievable in the long-term. The model will be used to determine the IEMs.

**Monitoring and Evaluation Approach**

Immediately after implementation of the remedy selected for the East Branch portion of OU1, COC concentrations in the surface sediment should be clean (meaning non-detect or well below any regulatory standards for non-metals and at or below concentrations consistent with naturally occurring levels for metals). Over time, however, the surface sediment concentrations of COCs are anticipated to increase due to the presence of ongoing sources of contamination. The LTE model was developed to estimate what the new equilibrium concentrations in the surface sediment will be based on data collected from the ongoing sources. Based on the current outputs of the LTE model, copper and TPAH from ongoing sources have less potential to cause PRG exceedances post-remedy than dioxins/furans and C19-C36. TPCBs fall somewhere in the middle.

IEMs will be developed through the use of the LTE model and will be set to the 50$^{th}$ percentile concentration prediction from the LTE model for each COC. A tiered monitoring program will be developed and refined over time. The initial tier will include a regular, post-implementation sampling plan that will be developed during the remedial design. The second tier would require increased monitoring of all potential sources of contamination if the surface sediment concentration of the remedy footprint reaches between 75% and 90% of the current IEM for each COC, depending on the COC.

This monitoring program will allow EPA to identify the specific, ongoing sources that may cause IEM exceedances before IEM exceedances actually occur and will enable EPA to develop an appropriate course of action to ideally prevent IEM exceedances from ever occurring. The IEMs will be refined over time as new empirical data is obtained, and the IEM for any particular COC could be consistent with the risk-based PRG. Over time, as additional external and internal/external interface source control measures are taken, the expectation is that all IEMs will be consistent with the risk-based PRGs, at which point the remedy would be protective and the ongoing monitoring would be conducted to assure it remains so.

Regarding NAPL and sheens specifically, if NAPL from ongoing sources, including upland seeps, is found to be impacting the protectiveness of the implemented remedy, it will need to be addressed through either state and/or federal enforcement authorities (to be determined on a case-by-case basis).

In addition, sheens could potentially be indicative of Site-related contamination at elevated concentrations that would impact the effectiveness of the implemented remedy. As such, any sheen observed in the future would need to be further investigated, including through sampling and analysis. Depending on the results, additional remedial efforts could be required, again through either state and/or federal enforcement authorities (to be determined on a case-by-case basis).

**SUMMARY OF REMEDIAL ALTERNATIVES**

Section 121(b)(1) of CERCLA, 42 U.S.C. § 9621(b)(1), mandates that remedial actions must be protective of human health and the environment, be cost-effective, comply with applicable or relevant and appropriate requirements (ARARs), and utilize permanent solutions, alternative treatment technologies, and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) of CERCLA also establishes a preference for remedial actions that employ, as a principal element, treatment to reduce permanently and significantly the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants at a site. Section 121(d) of CERCLA, 42 U.S.C. § 9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants that at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to Section 121(d)(4) of CERCLA, 42 U.S.C. § 9621(d)(4). In addition, interim actions must also protect human health and the environment from the threats they are addressing, be cost effective, and consistent with the final remedy.

The remedial alternatives evaluated for the East Branch portion of OU1 (except for the no action alternative) focus on the removal of contaminated sediments and capping. Five active remedial alternatives were developed. Brief descriptions of the remedial alternatives considered to address the East Branch portion of the OU1 Study Area are provided below.

More detail can be found in the FFS report prepared for the East Branch.

**Common Elements of Each Active Alternative**

Common elements of each of the active alternatives will include the following:

- Pre-design investigation - A robust pre-design investigation (PDI) will be conducted. The PDI will include, at a minimum, data collection to refine the footprints and depths of various remedy components and fill data gaps and would include: additional delineation of NAPL, potential PTW and potential Toxic Substances Control Act (TSCA) regulated material (like high concentrations of TPCBs); further delineation of the COCs; additional surveys, including for the presence of NAPL and seeps; and additional geotechnical investigations to support design of the remedy. If needed, treatability studies will be conducted to obtain any additional required information to inform the design of the early action remedy. Data from the PDI will also be used to refine the outputs of the LTE model that will be used to develop the initial IEMs that will be refined over time.
- Dredging - Each of the active remedial alternatives includes various amounts of dredging that will reduce the volume of contaminated sediment remaining in the East Branch. Because of the presence of debris in the East Branch, it is assumed that mechanical rather than hydraulic dredging will be used.
- Capping – Each active alternative includes placement of amended caps in areas that vary by alternative. An amended cap consists of addition of specialized or manufactured materials intermixed with typical cap aggregate materials at specified amounts. The objectives of the cap in each area are to provide (i) physical isolation of COCs in the sediment from the benthic environment; (ii) erosion protection to maintain cap stability against forces resulting from open water flows, propwash, vessel wakes, and other forces; and/or (iii) chemical isolation to sequester COCs and, where containment is possible, NAPL, that could be transported from the contaminated sediment below the cap via dissolved phase advection, diffusion, and/or gas-ebullition facilitated transport.
- In situ stabilization and solidification (ISS), where needed to reduce migration, and/or for treating NAPL or PTW. While existing data does not indicate this option will be necessary, for costing purposes the FFS assumes that ISS to treat NAPL and/or PTW will be needed to address 0.6 acres of the East Branch, which equates to 5.5 percent of the total surface area of the East Branch.
- Sealed bulkheads - if and where needed to reduce migration, sealed bulkheads may be used as a temporary measure to address seeps while cleanup of the related upland source is evaluated and implemented. Again, while the need for sealed bulkheads is not currently indicated by the existing data, for cost estimating purposes the FFS assumes that 20 percent of the length of bulkheads required for each alternative will need to be sealed, and it is further noted in the FFS that sealed bulkheads may be required in areas that do not otherwise require bulkheads for stabilization purposes.
- Stabilization measures - Each remedial alternative includes stabilization measures that may be applicable depending on the location-specific conditions. These stabilization measures may include the use of ISS for bank stabilization or adjacent to sensitive structures, placing limits on the means and methods of dredging (*e.g.*, prescribing slot dredging in some areas), and temporary or permanent structural support (*i.e.*, repair or replacement of a bulkhead).
- Dredged Material Management and Disposition – Each alternative assumes dredged material will be barged to an offsite processing facility where it would be treated through stabilization/solidification with amendment as necessary to reduce the moisture content of the material and meet transport and disposal requirements. Dredged material would then be transported by truck and disposed of in an

offsite permitted Subtitle C, Subtitle D, and/or TSCA waste landfill, depending on the waste profile for a given dredged material management area. The potential for offsite beneficial reuse of some portion of the dredged material will also be considered, as appropriate. Debris would also need to be disposed of and/or beneficially reused, as appropriate.
- Institutional controls - institutional controls may be required to protect the constructed components of the alternative, as needed. Fish consumption advisories currently in place through the State are assumed to remain in place.
- Evaluation monitoring – as described in the Overview of Remedy Approach section of this Proposed Plan, a robust evaluation monitoring program will include baseline monitoring, construction-phase monitoring, and long-term monitoring to assess both the performance of the remedy itself and the impact on the protectiveness of the remedy from ongoing sources post-implementation.

Given the industrial nature of the East Branch, each of the active remedial alternatives would also need to address infrastructure in and around the East Branch, including the Grand Street Bridge and the aeration system. Debris removal will also be a required component of each alternative prior to any dredging occurring.

For each of the active alternatives, the exposure-based RAOs would be achieved immediately following completion of construction because a clean cap would be placed over the entire surface of the East Branch, thus reducing surface sediment concentrations to "clean" at time zero (as described in the previous section of this Proposed Plan). Concentrations of COCs in the surface sediment are anticipated to increase over time as a result of the influence of ongoing external and internal/external interface sources of contamination until a new equilibrium surface concentration is reached. It is then expected that surface sediment concentrations should start decreasing over time as the loading of ongoing sources of contamination to the East Branch decreases. The IEM for each COC will be set at the $50^{th}$ percentile of the expected new equilibrium concentrations, as predicted by the LTE model, or the risk-based PRG if this concentration is equal to or higher than the expected equilibrium concentration. The post-implementation monitoring program (described under "Monitoring and Evaluation Approach") will be used to determine if the source-control RAOs are being met. Increased monitoring of all potential sources of contamination would be conducted when the surface sediment concentration of the remedy footprint reaches between 75% and 90% of the current IEM for each COC, depending on the COC. As described previously, additional source control actions will then be taken on an as-needed basis under state and/or federal enforcement authority, to be determined on a case-by-case basis.

The construction time provided below for each alternative does not include the time required to design the remedy, to negotiate the implementation performance of the remedy with any potentially responsible parties, or to procure necessary contracts. It also does not include any additional source control actions that may be needed over time. For costing purposes, the evaluation monitoring is assumed to continue for a period of 10 years (as captured in the Total Operation & Maintenance (O&M) dollar figure), after which it is assumed the O&M will be subsumed by the final OU1 remedy. In addition, since contamination would remain in the Creek above levels that would otherwise allow for unrestricted use and unlimited exposure, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, additional response actions may be implemented.

Finally, each of the alternatives developed for this action is focused on addressing the East Branch portion of the OU1 Study Area and, to some extent, the interface between the Study Area and the upland properties (for example, seeps and shoreline erosion). The evaluation monitoring program will help determine if there are impacts to the protectiveness of the alternative from ongoing sources.

**Alternative EB-A - No Action**

The NCP requires that a "No Action" alternative be evaluated to establish a baseline for comparison with other remedial alternatives. Under this alternative, no action would be initiated to remediate contaminated sediment that poses unacceptable risks to human health and the environment.

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|---|---|
| *Total Capital Cost:* | *$0* |
| *Total O&M:* | *$0* |
| *Total Cost:* | *$0* |
| *Present Worth Cost:* | *$0* |
| *Construction Time:* | *0 years* |

**Alternative EB-B – Dredge to Allow Placement of Cap at or Below 0 foot MLLW**

Alternative EB-B consists of dredging of sediments where necessary to allow for placement of an armored and amended cap to be installed entirely at (or below) an elevation of 0 foot MLLW.

For this alternative, there would be more cap material placed than sediment removed via dredging; therefore, this alternative would result in a mudline elevation in East Branch that is shallower on average than the current mudline and would reduce water depths in the East Branch following remedy implementation.

Based on the assumptions used in the FFS, Alternative EB-B is expected to take 13 months to construct (over two construction seasons) and includes the following:

- Removal of approximately 34,000 cubic yards (CY) of debris and sediment (32,300 cy of sediment and 1,700 cy of debris; 24 scow trips for sediment and debris) over 3.5 acres;
- Capping with 79,400 cy of material (40 scow trips), over 11.2 acres (including post-ISS cap);
- ISS of 26,000 cy of sediment identified for NAPL treatment;
- Sealed bulkheads along 60 linear feet (LF) of shoreline; and
- Shoreline stabilization along 1,850 LF, or 36 percent, of the shoreline through the use of ISS, bulkheads and/or slot dredging.

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| *Capital Cost:* | *$ 141.4 million* |
| *Total O&M Cost:* | *$ 33.4 million* |
| *Total Cost:* | *$ 174.8 million* |
| *Present Worth Cost:* | *$ 152.0 million* |
| *Construction Time Frame:* | *2 years* |

**Alternative EB-C – Dredge to Allow Placement of a Cap to Maintain Existing Water Depth**

Alternative EB-C consists of dredging sediment to a minimum depth (assumed to be 3 feet on average) across the entire footprint of the East Branch to allow for placement of an armored and amended cap to maintain the existing water depth.
Based on the assumptions used in the FFS, Alternative EB-C is expected to take 22 months to construct (over three construction seasons) and includes the following:

- Removal of approximately 97,200 CY of debris and sediment (92,300 cy of sediment and 4,900 cy of debris; 63 scow trips for sediment and debris) over 11.2 acres;
- Capping with 77,000 cy of material (39 scow trips), over 11.2 acres (including post-ISS cap);
- ISS of 9,900 cy of sediment identified for NAPL treatment;
- Sealed bulkheads along 180 LF of shoreline; and
- Shoreline stabilization along 3,850 LF, or 76 percent, of the shoreline through the use of ISS, bulkheads and slot dredging.

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| *Capital Cost:* | *$ 236.8 million* |
| *Total O&M Cost:* | *$ 33.3 million* |
| *Total Cost:* | *$ 270.1 million* |
| *Present Worth Cost:* | *$ 235.2 million* |
| *Construction Time Frame:* | *3 years* |

**Alternative EB-D – Dredge to Allow Placement of a Cap to Maintain Existing Water Depth with Localized Deeper Dredging**

Alternative EB-D is similar to EB-C and consists of dredging an estimated 3 feet of sediments across the entire footprint of the East Branch to allow for placement of a 3-foot armored and amended cap to maintain existing water depth. In addition, this alternative includes the option for deeper dredging of sediments in select areas based on the following considerations:

- Potential for NAPL migration from the deeper soft and/or native material
- Potential for exposure to principal threat waste
- Depth to native material

- Comparatively higher COC concentrations in remaining sediment

Based on the assumptions used in the FFS, Alternative EB-D is expected to take 22 months to construct (over three construction seasons) and includes the following:

- Removal of approximately 106,300 CY of debris and sediment (101,000 cy of sediment and 5,300 cy of debris; 69 scow trips for sediment and debris) over 11.2 acres;
- Capping with 69,600 cy of material (35 scow trips), over 10.0 acres (including post-ISS cap);
- Backfilling with 14,400 CY of sand (8 scow trips), as needed to maintain existing water depth where deeper dredging is conducted;
- ISS of 9,900 cy of sediment identified for NAPL treatment;
- Sealed bulkheads along 180 LF of shoreline; and
- Shoreline stabilization along 3,850 LF, or 76 percent, of the shoreline through the use of ISS, bulkheads and slot dredging.

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|---|---|
| *Capital Cost:* | *$ 245.9 million* |
| *Total O&M Cost:* | *$ 33.3 million* |
| *Total Cost:* | *$ 279.2 million* |
| *Present Worth Cost:* | *$ 243.5million* |
| *Construction Time Frame:* | *3 years* |

**Alternative EB-E – Dredge All Within Navigation Channel, and Cap Outside Channel**

Alternative EB-E consists of dredging the federally authorized navigation channel to a depth necessary to accommodate a cap below the current authorized depth plus a buffer (the depth of which is to be determined in consultation with the U.S. Army Corps of Engineers), or to native material, whichever is shallower. Areas dredged to native material would include backfill, if necessary. The remedy also includes dredging and/or capping with an armored and amended cap outside of the navigation channel, including in the Western Beef Slip, which is outside of the navigation channel, or in areas determined to have a relatively high flux of COCs from groundwater. The alternative also includes backfill, as needed, and would result in deeper water depths on average.

This alternative was included in the FFS because, at the time of preparation, deauthorization of the federally authorized navigation channel in the East Branch was uncertain.

Based on the assumptions used in the FFS, Alternative EB-E is expected to take 37 months to construct (over five construction seasons) and includes the following:

- Removal of approximately 246,100 CY of debris and sediment (233,800 cy of sediment and 12,300 cy of debris; 157 scow trips for sediment and debris) over 10.6 acres;
- Capping with 42,700 cy of material (22 scow trips), over 8.1 acres (including post-ISS cap);
- Backfilling with 7,200 CY of sand (4 scow trips);
- ISS of 17,300 cy of sediment identified for NAPL treatment;
- Sealed bulkheads along 490 LF of shoreline; and
- Shoreline stabilization along 4,250 LF, or 84 percent, of the shoreline through the use of ISS, bulkheads and slot dredging.

| | |
|---|---|
| *Capital Cost:* | *$ 467.4 million* |
| *Total O&M Cost:* | *$ 32.4 million* |
| *Total Cost:* | *$ 499.8 million* |
| *Present Worth Cost:* | *$ 418.7 million* |
| *Construction Time Frame:* | *5 years* |

**Alternative EB-F – Dredge All**

Alternative EB-F would consist of dredging down to uncontaminated material across the entire footprint of the East Branch and backfill and would result in deeper water depths on average. Even though this alternative includes dredging of all contaminated sediment, armored/amended caps would be placed over areas determined to have a relatively high flux of COCs from groundwater.

Based on the assumptions used in the FFS, Alternative EB-F is expected to take 46 months to construct (over seven construction seasons) and includes the following:

- Removal of approximately 268,100 CY of debris and sediment (254,700 cy of sediment and 13,400 cy of debris; 171 scow trips for sediment and debris) over 11.2 acres;

- Capping with 31,500 cy of material (16 scow trips), over 6.8 acres (including post-ISS cap);
- Backfilling with 10,100 CY of sand (6 scow trips);
- ISS would not be needed for NAPL treatment since this alternative would dredge all contaminated sediments;
- Sealed bulkheads along 850 LF of shoreline; and
- Shoreline stabilization along 4,500 LF, or 88 percent, of the shoreline through the use of ISS or bulkheads.

| | |
|---|---|
| *Capital Cost:* | *$ 578.0 million* |
| *Total O&M Cost:* | *$ 32.1 million* |
| *Total Cost:* | *$ 610.1 million* |
| *Present Worth Cost:* | *$ 492.7 million* |
| *Construction Time Frame:* | *7 years* |

## EVALUATION OF ALTERNATIVES

### Nine Criteria Evaluation

Nine criteria are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy (see table below, Evaluation Criteria for Superfund Remedial Alternatives). This section of the Proposed Plan describes the relative performance of each alternative against the nine criteria, noting how each compares to the other options under consideration. A detailed analysis of the alternatives can be found in the East Branch Early Action FFS Report.

### *1. Overall Protection of Human Health and the Environment*

Alternative EB-A (No Action) would not be protective of human health and the environment because it would not reduce the potential exposure of human and ecological receptors to COCs in sediment. As it would not meet this threshold criterion, Alternative EB-A was not evaluated against the other NCP criteria.

The remaining alternatives would meet the threshold criteria of overall protection of human health and the environment. Exposure to contaminated sediment and migration of contaminants through sediment would be addressed through an appropriately designed combination of dredging, capping, ISS, sealed bulkheads, and treatment. Each alternative also assumes bank-to-bank remediation will be conducted, so that a clean surface would be present immediately after dredging and capping were completed.

At this time, deauthorization of the federally authorized navigation channel in the East Branch of Newtown Creek is included in the 2024 WRDA bill and is expected to be approved prior to issuance of the remedy decision on this proposed plan. As such, Alternative

**EVALUATION CRITERIA FOR SUPERFUND REMEDIAL ALTERNATIVES**

**Overall Protectiveness of Human Health and the Environment** evaluates whether and how an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

**Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)** evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

**Long-term Effectiveness and Permanence** considers the ability of an alternative to maintain protection of human health and the environment over time.

**Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment** evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

**Short-term Effectiveness** considers the length of time needed to implement an alternative and the risks the alternative poses to workers, the community, and the environment during implementation.

**Implementability** considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

**Cost** includes estimated capital and annual operation and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

**State/Support Agency Acceptance** considers whether the State agrees with the EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.

**Community Acceptance** considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

EB-E is not considered further in the nine criteria evaluation. The evaluation of Alternative EB-E would be very similar to that for Alternative EB-F.

### 2. *Compliance with Applicable or Relevant and Appropriate Requirements*

Under CERCLA, remedial actions must comply with all federal and state environmental requirements, standards, criteria, and limitations, unless such ARARs are waived under certain specific conditions. Because the remedy for the East Branch portion of OU1 is considered an interim early action, identification of ARARs is not necessary at this time. It is nonetheless expected that each of the active alternatives could be designed in such a way that it attains location- and action-specific ARARs. Chemical-specific ARARs would be addressed by the eventual, final remedy selected for OU1.

There are no chemical-specific ARARs for sediments. Alternatives EB-B, EB-C, EB-D, EB-E, and EB-F would satisfy location-specific ARARs (key potential location-specific ARARs include the Endangered Species Act, the Migratory Bird Treaty Act, the Coastal Zone Management Act, Protection of Wetlands regulations, and Floodplain Management regulations) and action-specific ARARs (key potential action-specific ARARs include the requirements of the Clean Water Act that would apply to dredging and capping, the RCRA requirements that would apply to management of dredged materials, and the Clean Air Act).

Alternatives EB-B, EB-C, EB-D, EB-E, and EB-F would be anticipated to comply with location- and action-specific ARARs through appropriate engineering design and agency review processes. Confirmation of ARAR compliance is typically demonstrated during remedial design and through the remedial action work plan (*e.g.*, environmental protection plan, construction quality control plan, waste management plan, transportation and disposal plan, stormwater pollution and spill prevention plan, and best management practices [BMPs]) as well as monitoring during the construction period.

### 3. *Long-Term Effectiveness and Permanence*

Each of the remaining alternatives would be effective in the long term through the use of appropriate remedial technologies, including dredging, ISS, and the installation of amended caps and/or backfill layers, as well as the use of sealed bulkheads, where needed, as a temporary measure until a long-term solution can be implemented. Long-term effectiveness would be maintained through the ongoing conduct of a robust post-implementation monitoring plan designed to detect both bottom-up concerns with the remedy (for example, from underlying NAPL or groundwater facilitated transport) as well as top-down concerns (for example, from the effects of climate change and scouring, and from the effects of ongoing sources of contamination from upland properties). If an impact on the protectiveness of the remedy is found, then the appropriate entity to address that impact will be determined on a case-by-case basis.

Alternative EB-B would raise the average elevation of the sediment bed thus potentially making it less resilient than the other active alternatives to the effects of climate change such as erosional impacts resulting from more frequent and higher intensity rainfall and higher intensity outfall and overland flows both currently and in the future. As such, the long-term effectiveness and permanence of Alternative EB-B is less than the other alternatives. Alternatives EB-C and EB-D would maintain existing water depths and therefore maintain the current hydraulics of the system. Alternatives EB-F would increase the average water depths in the East Branch, thus potentially making it more resilient to climate change though also altering the hydrodynamics of the system. Alternative EB-D would remove and/or use ISS to treat remaining waste below the estimated 3-foot dredge limit, thus likely making it more effective in the long-term at preventing exposure to or migration of contamination from below the capped area to the surface than Alternative EB-C. It would also require less O&M than Alternative EB-C since it would be less reliant on capping in the long term to maintain long-term effectiveness and permanence. Alternative EB-F would be effective in the long term since all contaminated material would be dredged to uncontaminated material.

The robust post-implementation monitoring plan, plus maintenance of the cap in perpetuity, would be an integral part of each potential alternative to assure it remains effective in the long term, considering both potential internal and external impacts to the remedy.

### 4. *Reduction of Toxicity, Mobility, or Volume through Treatment*

Each remaining alternative includes a combination of in-situ treatment (through ISS) and ex-situ treatment (of dredged sediment). Alternative EB-F would result in the greatest volume of ex-situ treatment, followed by EB-D, EB-C and EB-B. While the volume of sediment requiring in-situ treatment would be refined using information collected during the PDI and during development of the RD, Alternative EB-D would likely result in the greatest volume of in-situ treatment since Alternative EB-D would include ISS where necessary to address relatively high COC concentrations in sediment, the potential for exposure to PTW, and/or the potential for NAPL migration.

Both ISS and amended armored capping would be used in all alternatives to address the toxicity and mobility of contamination. While amended capping is not considered treatment, it does provide a means of sequestering the contamination in place so it is not available for exposure to human or ecological receptors, thus reducing the toxic effects. ISS and amended armored capping would also reduce the mobility of contamination remaining in the East Branch after dredging occurs. Reduction of toxicity and mobility (in the sense they were just described) increase from Alternative EB-B to EB-F.

### 5. *Short-Term Effectiveness*

Impacts to the community for each alternative increase from Alternative EB-B to EB-F. The length of time to implement each alternative increases from 13 months for Alternative EB-B, to 22 months for Alternatives EB-C or EB-D, to 37 months for Alternative EB-E and to 46 months for Alternative EB-F. The longer the timeframe and the greater the quantity of sediment to be addressed, the more significant the short-term impacts to the community would be. These short-term impacts include aesthetic impacts to the waterway, potential for odors and dust, increased noise and decreased access to the Creek. Handling larger quantities of sediment and backfill/capping materials would also have a greater short-term impact on the environment and more opportunities for impacts to worker safety. Short-term impacts would be controlled through the use of construction BMPs, personal protective equipment (PPE), engineering controls, and health and safety plans. On balance, Alternative EB-B would be the most effective in the short term. Alternatives EB-C and EB-D would be more effective in the short term than Alternatives EB-E or EB-F.

### 6. *Implementability*

It is expected that each of the alternatives would be implementable from a technical standpoint as each alternative employs well-established technologies and approaches. Additionally, services and materials needed to complete each of the active alternatives are readily available. From an administrative standpoint, NYSDEC may have concerns with Alternative EB-B because it would decrease the depth of water and, therefore, could impact water quality and may not comply with their water quality regulations. Specifically, it may affect the ability of the long-term control plan NYCDEP is currently under order by NYSDEC to implement to reach its goals. Alternatives EB-C and EB-D are more readily implementable than Alternative EB-E or EB-F since the depth of dredging would, generally, be less and they would require less structural/engineering support to safely conduct.

There may be location-specific implementability issues associated with the use of ISS where needed to reduce migration of contamination and/or for treating NAPL or PTW. Specifically, successful implementation of ISS near CSO or other large discharges could be problematic if a large storm event were to occur while the stabilizing agent is curing. Mitigation measures to address this concern will be developed during the design of the remedy and implemented if needed.

### 7. *Cost*

Total present worth costs for Alternatives EB-B, EB-C, EB-D, EB-E and EB-F are summarized below. Present worth is calculated using a discount rate of seven percent. Long term monitoring (LTM) is assumed to be 10 years for each alternative since monitoring would continue until subsumed by the eventual final OU1 remedy.

Alternative EB-B:

- Total Present-Worth Cost $152.0 million
- Implemented within 2 years

- LTM for 0-10 Years at a total cost of $33.4 million

Alternative EB-C:

- Total Present-Worth Cost $235.2 million
- Implemented within 3 years
- LTM for 0-10 Years at a total cost of $33.3 million

Alternative EB-D:

- Total Present-Worth Cost $243.5 million
- Implemented within 3 Years
- LTM for 0-10 Years at a total cost of $33.3 million

Alternative EB-E:

- Total Present-Worth Cost $ 418.7 million
- Implemented within 5 Years
- LTM for 0-10 Years at a total cost of $32.4 million

Alternative EB-F:

- Total Present-Worth Cost $492.7 million
- Implemented within 7 Years
- LTM for 0-10 Years at a total cost of $32.1 million

**8. State Acceptance**

NYSDEC concurs with EPA's preferred alternative.

**9. Community Acceptance**

Community acceptance of the preferred alternative will be evaluated after the public comment period ends.

**PREFERRED ALTERNATIVE AND BASIS FOR PREFERENCE**

EPA's preferred alternative for the East Branch interim remedial action is Alternative EB-D – Dredge to Allow Placement of a Cap to Maintain Existing Water Depth with Localized Deeper Dredging. This alternative includes the following primary components:

- A PDI in the East Branch which would include, at a minimum, the following activities. The PDI will help fill data gaps identified in the FFS report and determine whether PTW is present in the East Branch.
  - Additional sediment COC data collection to refine the remedial footprints and depths of the various remedy components and to delineate potential PTW and TSCA materials;
  - Additional porewater and/or groundwater COC data collection to refine cap designs;
  - Data collection to further delineate NAPL and investigate NAPL mobility;
  - Geotechnical data collection to support dredge design, cap design and shoreline stability evaluations;
  - Investigation (*i.e.*, opportunistic seep sampling) to inform decisions on the need for upland controls (*i.e.*, sealed bulkheads).
- Dredging to a minimum depth to accommodate capping without decreasing water depths. FFS dredge depth estimates range from 36 inches (in deeper water areas) to 53 inches (in shallower water areas) below the current mud line.
- Deeper dredging in areas identified based on the following considerations: potential for NAPL migration from the deeper soft and/or native material; potential for exposure to principal threat waste; depth to native material; and comparatively higher COC concentrations in remaining sediment.
- ISS where needed to reduce migration, and/or for treating NAPL or PTW.
- Capping of all dredged areas. The design of the cap would be determined based on Site conditions, including considerations for areas of relatively high groundwater dissolved phase COCs, NAPL presence, and erosion potential (particularly near CSO discharges). The FFS assumes the placement of a multilayer engineering cap including the following layers: erosion protection, geotechnical filter, dissolved phase chemical isolation, NAPL sorption, and habitat layers. Design of the cap may vary throughout the East Branch depending on location-specific condition and/or constructability considerations.
- Backfill (*e.g.,* a clean sand layer), as needed, to maintain existing water depths.

- Shoreline stabilization, including ISS, slot dredging, or bulkhead replacement, stabilization and/or installation, as needed.
- Sealed bulkheads to address shoreline seeps, as needed based on the results of the PDI and as a temporary measure while the related upland source is addressed through either state or federal enforcement authorities.
- Dewatering and offsite disposition of all dredged sediment and debris.
- Institutional controls, as needed.
- A robust post-implementation evaluation monitoring program to assure the remedy is performing as designed and remains protective over time. The monitoring program would be structured so that any ongoing sources negatively impacting the remedy can be identified and it can be determined if those sources require additional controls, either through state and/or federal enforcement authorities.
- Remediation and monitoring in the East Branch would be a key element and integrated with the OU1 adaptive site management strategy that is being developed.

Preliminary estimates are as follows. All of these estimates will be refined during the PDI:

- 101,000 CYs of sediment will be dredged through this action and 5,300 CY of debris will be removed.
- ISS will be used to address 9,900 CY of sediment in-place over an area of 0.4 acres.
- Deeper dredging to uncontaminated material will occur over 1.2 acres.
- A cap will be placed over the entire area treated through ISS and that an additional 10.0 acres of the East Branch will be covered with an amended cap after dredging, resulting in the need for 69,600 CY of capping material.
- 14,400 CY of backfill material will be needed over 1.2 acres where deeper dredging will occur.
- Shoreline stabilization will be required along 3,850 LF, which equates to approximately 76 percent of the shoreline.
- Sealed bulkheads will be needed over an estimated length of 180 LF.
- It is estimated that the entire action would take 22 months (over 3 construction seasons) to implement.
- The total net-present value cost is expected to be approximately $243.5 million.

Figure 9 illustrates Alternative EB-D.

Any upland source control measures that are determined to be needed to support the long-term protectiveness of the remedy will be implemented under state and/or federal enforcement authorities, as to be determined on a case-by-case basis.

The design of the remedial action will consider resiliency measures related to these anticipated hazards and will specifically consider the intensity, frequency, or duration of extreme weather events; sea level rise; seasonal changes in precipitation and/or temperatures; and increasing risk of floods.

**Basis for Remedy Preference**

Alternative EB-D is the preferred alternative because it meets the threshold criteria of protecting human health and the environment and complying with ARARs and it provides the best balance of the remaining criteria. It would be more effective in the long-term and provide more reduction in toxicity, mobility or volume through treatment than Alternatives EB-B or EB-C since it would remove more contaminated sediment and would be less reliant on capping to maintain effectiveness. Alternative EB-D would also be more effective in the short-term, more easily implementable and more cost-effective than Alternatives EB-E or EB-F since it will remove less contaminated sediment, thus reducing the opportunities for short-term impacts to the community, to workers and to the environment.

Based on information currently available, EPA believes the preferred alternative meets the threshold criteria and provides the best balance of tradeoffs among the alternatives with respect to the balancing and modifying criteria. EPA expects the preferred alternative to satisfy the following statutory requirements of CERCLA Section 121(b) because (1) it will be protective of human health and the environment, either through this action or through additional actions to be determined as part of the OU1 ROD; (2) it will comply with location and action-specific ARARs; (3) it is cost-effective; and

(4) it utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. In addition, CERCLA Section 121 includes a preference for remedies that permanently and significantly reduce the volume, toxicity or mobility of hazardous substances as a principal element.

With respect to the two modifying criteria of the comparative analysis, which are state acceptance and community acceptance, NYSDEC concurs with the preferred alternative and community acceptance will be evaluated upon close of the public comment period.

Consistent with EPA Region 2's Clean and Green policy, EPA will evaluate the use of sustainable technologies and practices with respect to implementation of a selected remedy.

## COMMUNITY PARTICIPATION

EPA encourages the public to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted there.

Instructions for submitting written comments on the Proposed Plan and the dates for the public comment period, the date, location, and time of the public meeting, and the locations of the Administrative Record files are provided in the text box entitled, "Mark Your Calendar" located on the front page of this Proposed Plan and in the highlight box on this page.

**For further information on the Newtown Creek Superfund Site, please contact:**

| | |
|---|---|
| Caroline Kwan | Natalie Loney |
| Remedial Project Manager | Community Involvement Coordinator |
| (212) 637- 4275 | (212) 637-3639 |
| kwan.caroline@epa.gov | loney.natalie@epa.gov |

The administrative record file, which contains copies of the Proposed Plan and support documentation, is available at the following location:

**EPA Region 2 Superfund Records Center**
290 Broadway, 18th Floor
New York, New York 10007-1866
(212) 637- 4308
Hours: Monday-Friday, 9 A.M to 5 P.M.

**Written comments on this Proposed Plan should be mailed to Mrs. Kwan at the address below or sent via email.**

Caroline Kwan
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 18th Floor
New York, NY 10007
Email: kwan.caroline@epa.gov

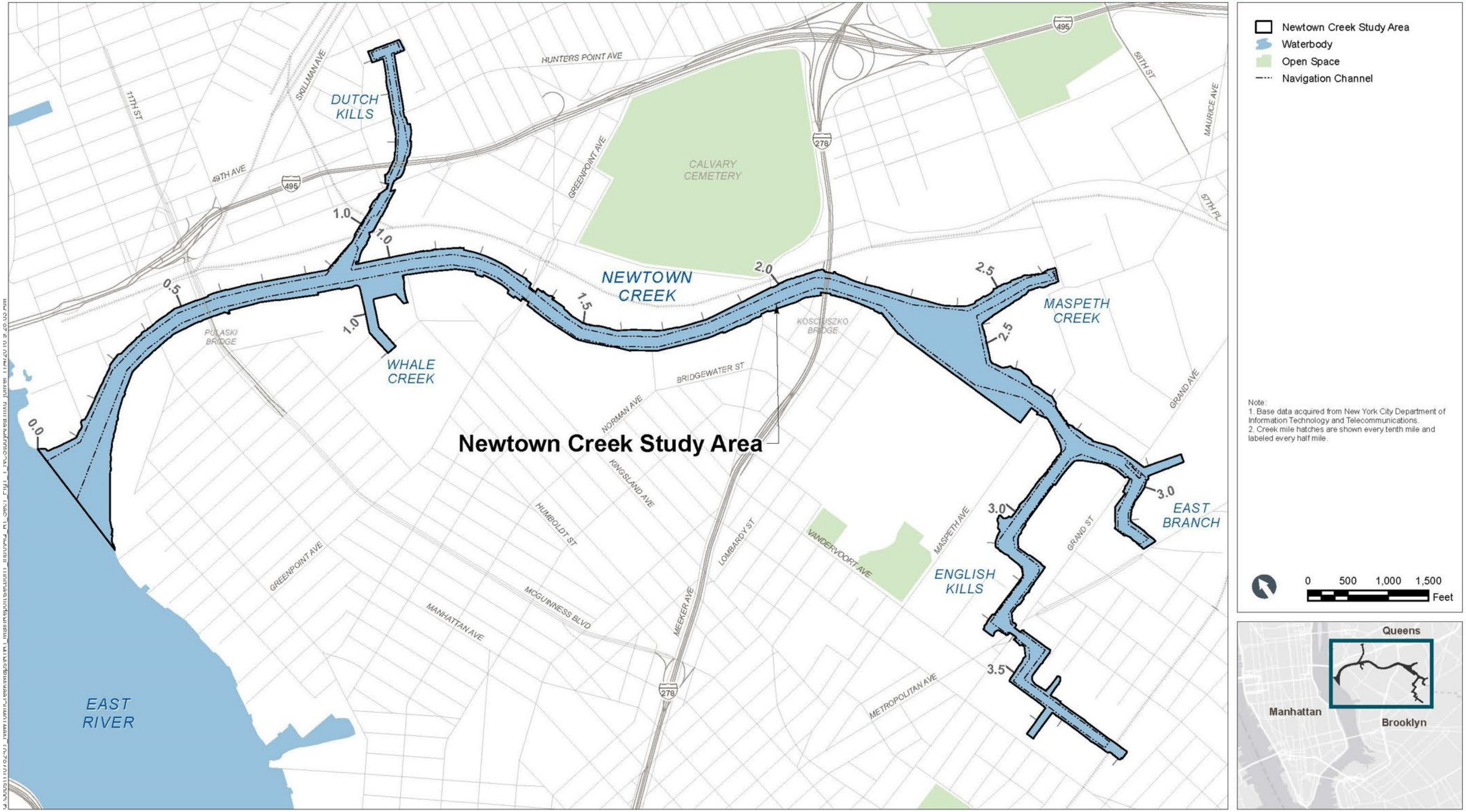



**Figure 1** – Newtown Creek Study Area

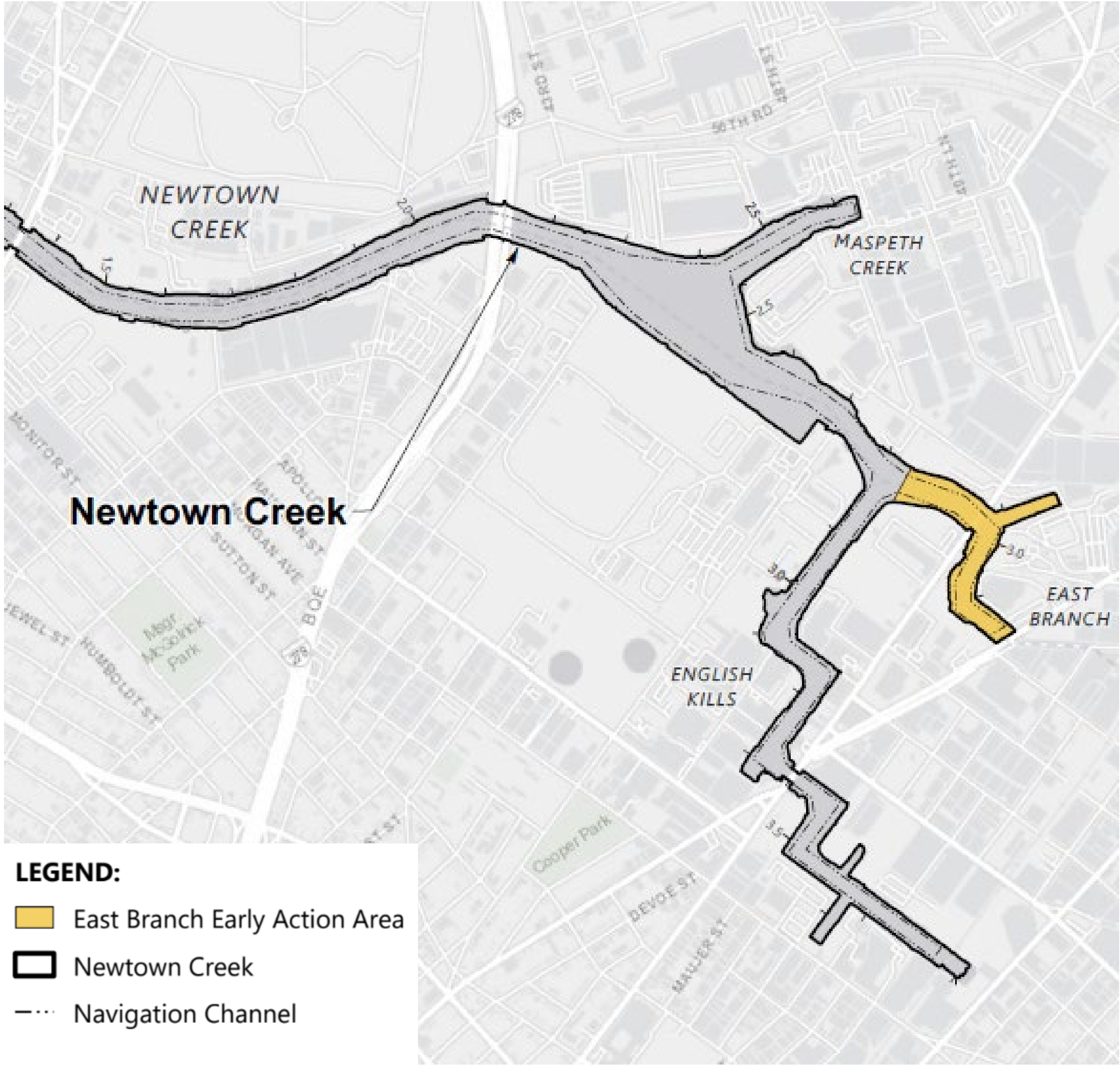



**Figure 2** – East Brach Tributary


**Figure 3** – Existing Shoreline Conditions East Branch

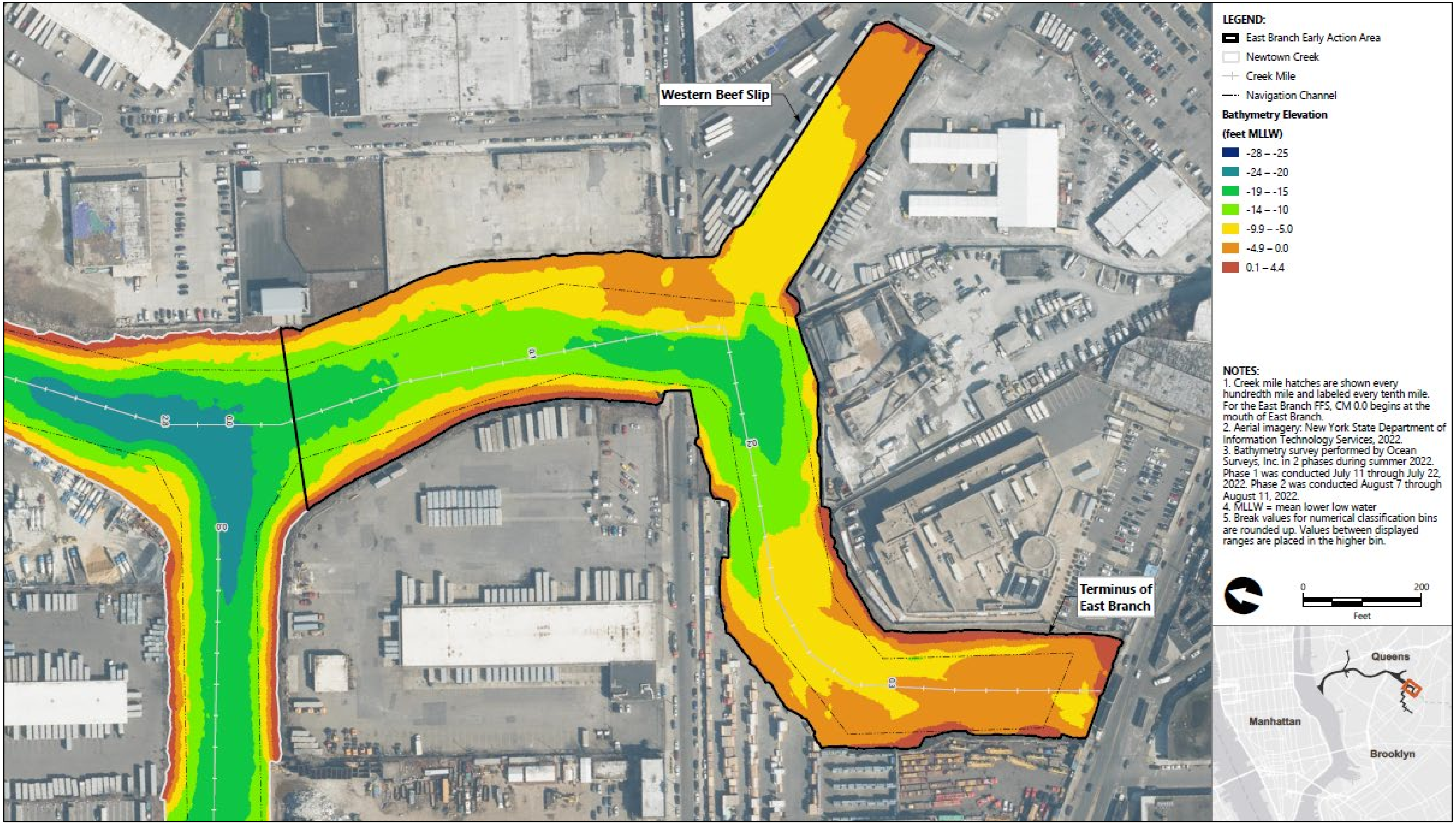



**Figure 4** – East Branch Bathymetry


**Figure 5** – Point Source Discharge Locations to East Branch

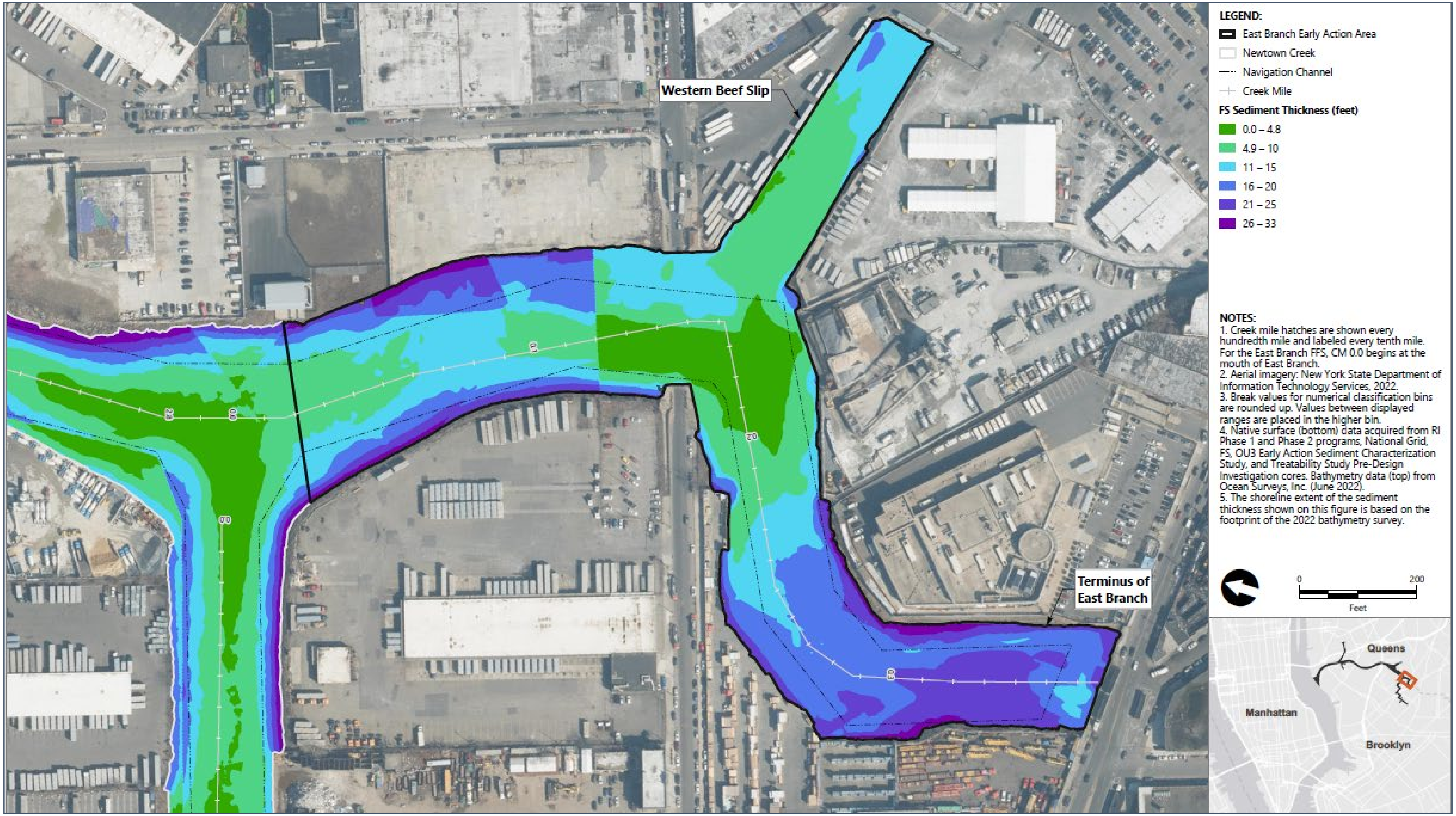



**Figure 6** – Sediment Thickness in East Branch

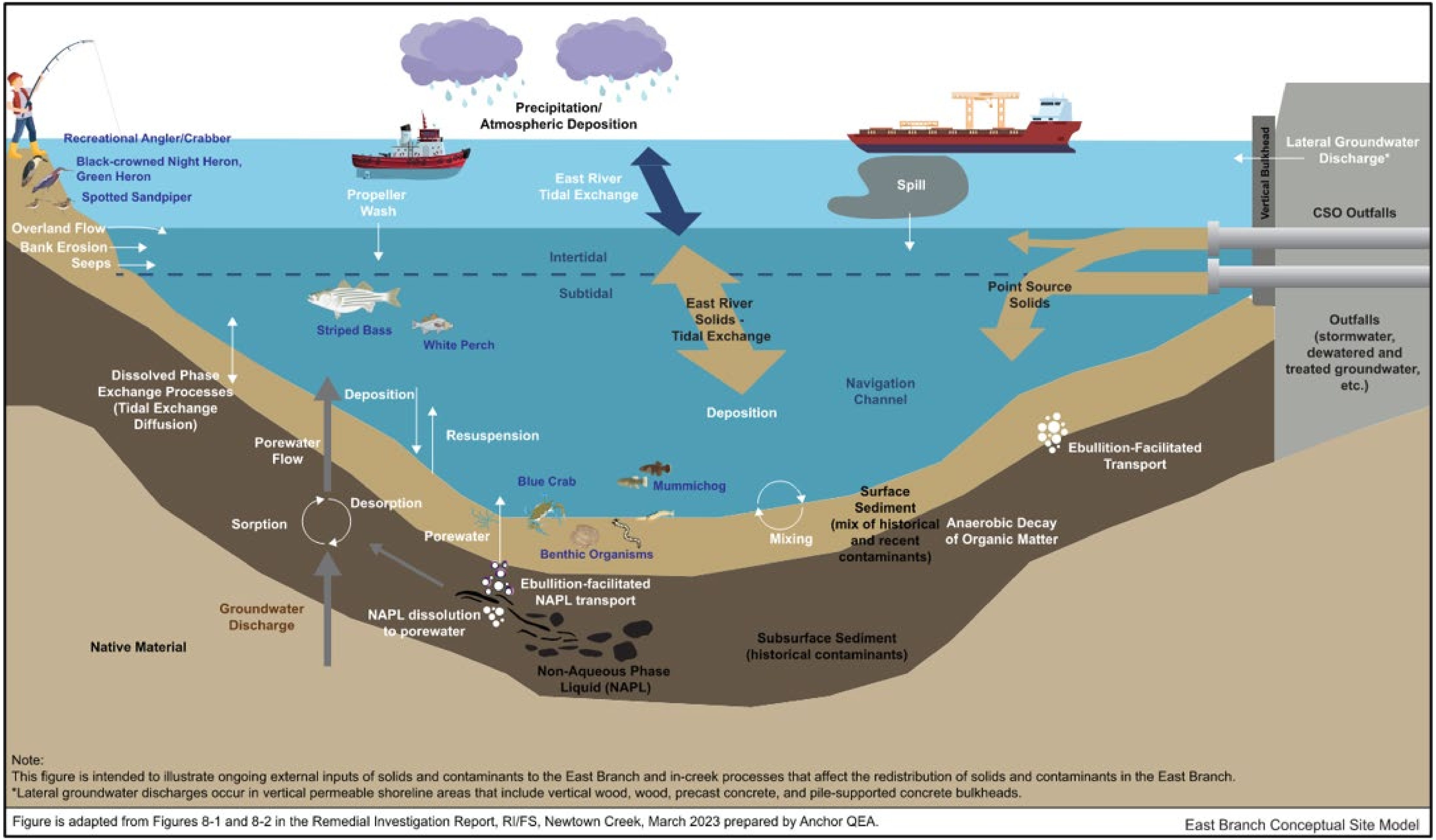
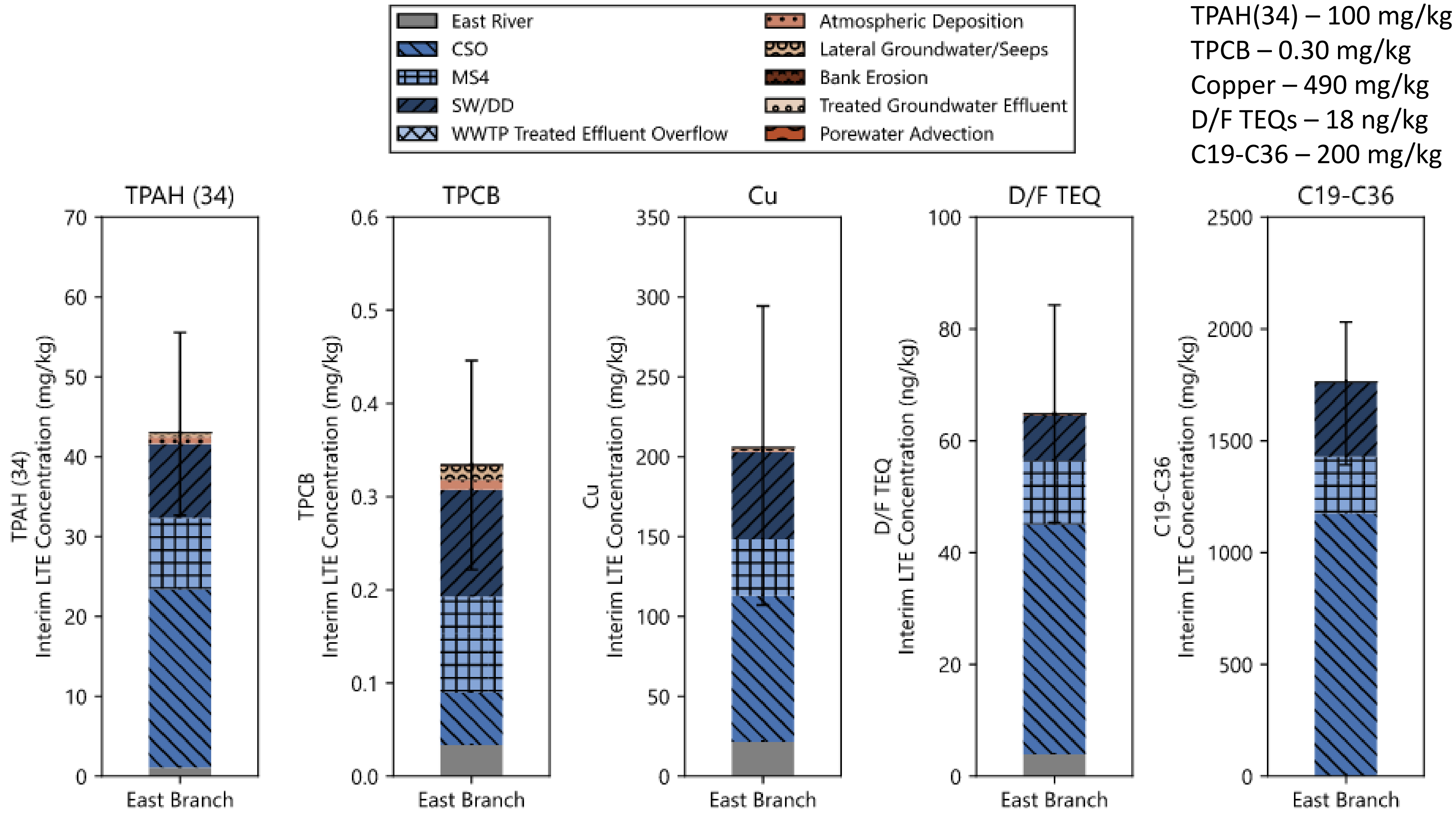



**Figure 7** – Conceptual Site Model for East Branch

Risk-Based PRGs
TPAH(34) – 100 mg/kg
TPCB – 0.30 mg/kg
Copper – 490 mg/kg
D/F TEQs – 18 ng/kg
C19-C36 – 200 mg/kg




Notes: The range on each bar indicates the calculated long-term equilibrium concentrations with upper- and lower-bound ranges, while the bar itself shows the base case scenario.
WWTP treated effluent overflow and treated groundwater effluent are sources that originate outside of East Branch. Their contribution to long-term equilibrium in East Branch is a result of tidal transport.
CSO: combined sewer overflow; MS4: municipal separate storm sewer system; SW/DD: stormwater and direct drainage; WWTP: wastewater treatment plant
TPAH (34): total polycyclic aromatic hydrocarbon (34); TPCB: total polychlorinated biphenyl; Cu: copper; D/F TEQ: total dioxin/furan toxic equivalence quotient (mammal); C19-C36: C19-C36 aliphatics

**Figure 8** – Preliminary Estimates of Contribution of External Inputs for East Branch*

*Note: this figure will be updated based on data collected during the Preliminary Design Investigation

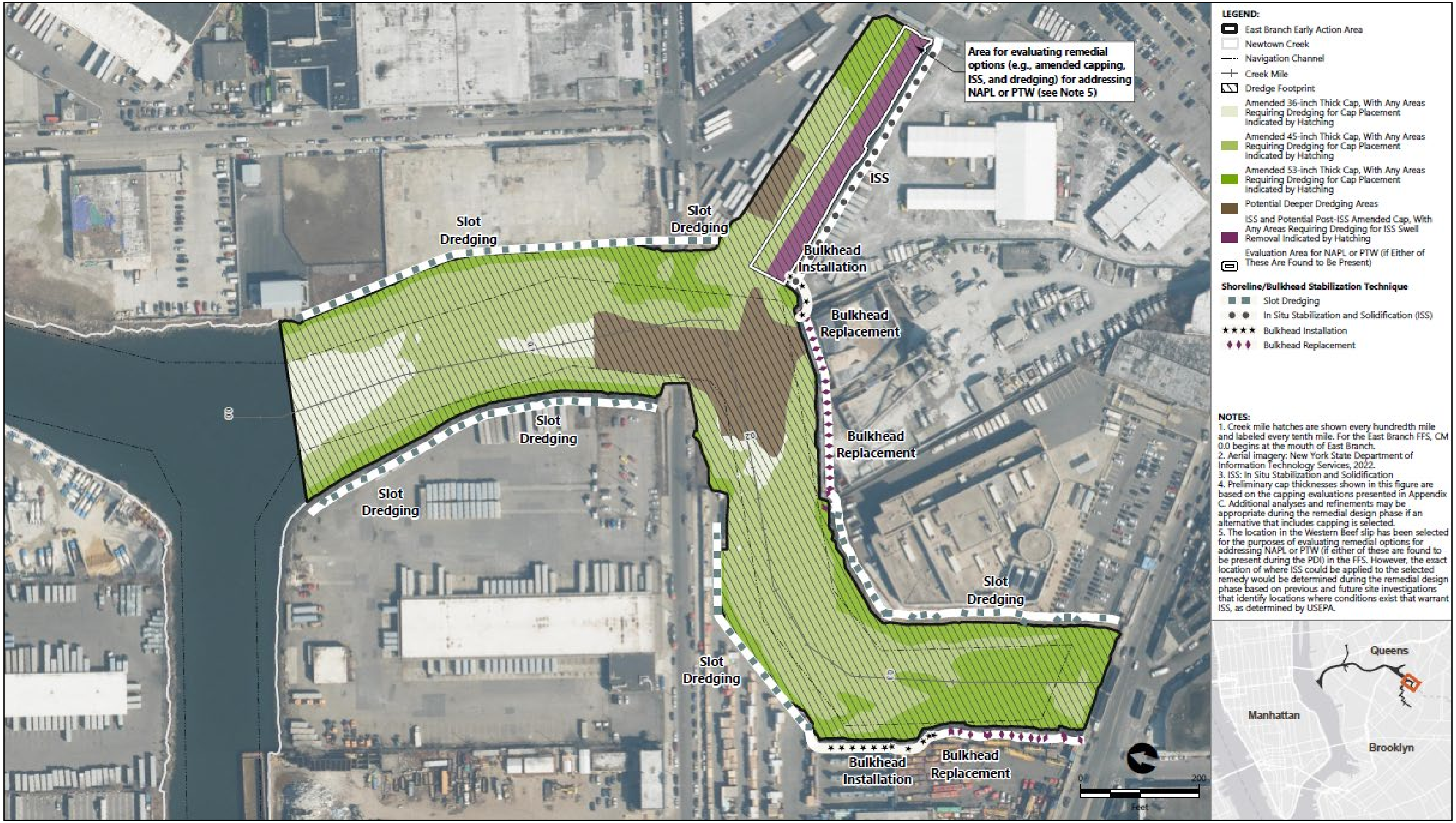



**Figure 9** – Alternative EB-D

**Table 1** – Newtown Creek Contaminants of Concern (COCs) and Risk-Based Preliminary Remediation Goals (PRGs)

| Contaminants of Concern | Risk-Based PRG | Most Sensitive Receptor and Exposure Pathway |
|---|---|---|
| TPCBs[1] | 0.30 mg/kg | Humans via crab consumption |
| Dioxins/Furans TEQ[1] | 18 ng/kg | Humans via crab consumption |
| Copper[2] | 490 mg/kg | Mummichog via dietary intake |
| Lead[1] | 340 mg/kg | Spotted sandpiper via dietary intake[3] |
| TPAH(34)[2] | 100 mg/kg | Benthic macroinvertebrates via sediment toxicity |
| C19-C36 Aliphatic Hydrocarbons[2] | 200 mg/kg | Benthic macroinvertebrates via sediment toxicity |

**Notes:**
TPCBs – total polychlorinated biphenyls
TEQ – toxic equivalence quotient
mg/kg – milligrams per kilogram
ng/kg – nanograms per kilogram

1. Evaluated on SWAC basis
2. Evaluated on point-by-point basis (not to exceed)
3. Occurs in intertidal mud flats

# ATTACHMENT C

# PUBLIC NOTICE

# SPORTS

# Liberty Rises Over Mercury in Phoenix

## *New York rebounds quickly from first loss since July*

***By John Torenli, Sports Editor***
Brooklyn Daily Eagle


Though she had a rough collision in the first half, Courtney Vandersloot (center) got up and lifted the Liberty over the Mercury Monday in Phoenix.
AP Photo by Ross D. Franklin

Liberty coach Sandy Brondello was concerned with her league-leading team's lack of urgency following Saturday's loss to Connecticut at Downtown's Barclays Center.

A change of venue and time zone, the return of a vital member of the rotation and Courtney Vandersloot's most productive game of the season proved urgent enough in Phoenix Monday night.

Vandersloot scored a season-high 16 points, Betnijah Laney-Hamilton saw her first action since before the Olympic break and the Liberty used a big second half to pull away for an 84-70 victory over the Mercury in front of 10,299 fans at the Footprint Center.

"We had a couple of mishaps on defense that we weren't connected on (in the first half)," said Vandersloot. "We came in and made the adjustments at halftime. Then, we were on the same page and I think it showed in the second half."

The Liberty had a season high-tying eight-game winning streak snapped by the second-place Sun (22-7) in Brooklyn over the weekend, threatening their spot atop the WNBA standings and home-court advantage throughout next month's playoffs.

"They controlled the whole game," Brondello lamented following her team's first loss since an 83-78 setback at Indiana on July 6, which was 10 days before the league took a month-long break for the 2024 Paris Games.

"We didn't come out with the urgency we needed against a good team," Brondello added.

New York (26-5) came out of the gate strong against Phoenix (16-15), rushing out to an 18-9 lead after 10 minutes. But the Mercury reeled the Liberty in during the second quarter, forging a 38-38 tie at intermission.

Vandersloot, who put up 15 points against Dallas at Barclays a week ago, made sure New York didn't suffer its first back-to-back losses since May 23-25.

She scored 10 of her points after halftime and opened the fourth quarter with a pair of key buckets.

With the Liberty clinging to a four-point lead following one in a series of uncontested layups by Phoenix center Brittney Griner, Vandersloot pulled up and buried a 26-footer off a feed from Laney-Hamilton.

The future Hall of Fame point guard backed it up with a 19-foot pull-up via another pass from Laney-Hamilton to stretch the advantage to 64-55 with 8:10 to play.

"You know, those moments are important," Vandersloot noted.

Sabrina Ionescu, playing her second straight game since missing a pair with a neck injury, knocked down a 3-pointer with just over five minutes remaining to cap a 10-0 burst and give New York a 74-57 cushion.

Vandersloot finished 5-of-8 from the floor, including 3-of-4 from beyond the arc. She also grabbed six rebounds, handed out four assists, picked up a pair of steals and blocked a shot in 25 strong minutes.

Laney-Hamilton, back on the hardwood for the first time since July 6 in Indiana after undergoing surgery on her right knee ahead of the Olympics, added nine points, three boards and three assists in 27 minutes off the bench.

After nine games without their starting forward, the Liberty were pleased to have the former All-Star back in the mix.

"It's great to have B back," Brondello said. "I spoke about before the game. (She's) one of the best two-way players in the league."

"It's nice to have her back," Vandersloot added. "She helps our defense so much. She really set the tone as soon as she checked in. ... She looked really great."

Reigning WNBA Most Valuable Player Breanna Stewart scored a team-high 21 points, Jonquel Jones added 15 and Ionescu had 13 for the Liberty, who extended their lead over the idle Sun to three games.

"No matter what, whether we did things right or wrong, we had each other's backs," Stewart said.

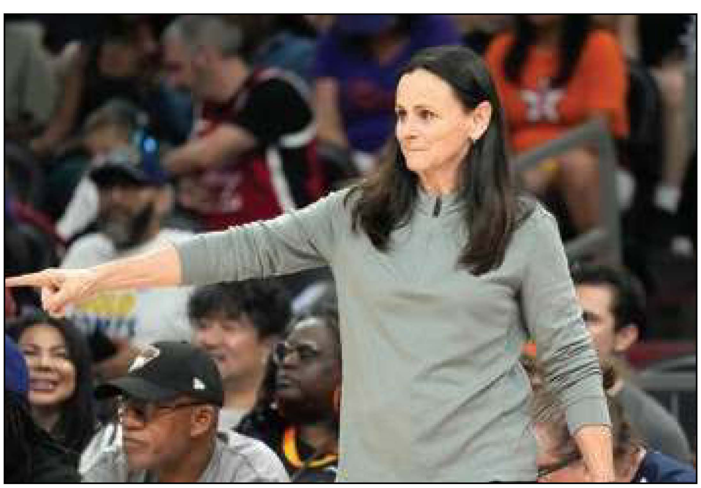
Griner scored a game-high 22 points and Natasha Cloud added 18 for the Mercury, who stunned New York, 99-93, at Footprint Center on June 18.

That wasn't the case on Monday, thanks to Vandersloot's second-half heroics, Laney-Hamilton's return and the Liberty displaying a renewed sense of urgency to allay their coach's pre-game concern.

"So it was getting back to our identity that allowed us to be the number one seed at the moment," said Brondello. "That's what we want. To stay there because we've done all that hard work."

The Liberty will continue their quest for the No. 1 seed and the first championship in franchise history Wednesday night in Los Angeles.

Tip-off against the Sparks is scheduled for 10 p.m. ET



Liberty coach Sandy Brondello watched her team respond to its first loss in seven weeks by pulling away late for a win in Phoenix on Monday.
AP Photo by Ross D. Franklin

# #ViveNY

**Verónica Romero**
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**comunidad@eldiariony.com**
¿Tienes alguna queja que informarnos?
¿Ves problemas en tu vecindario?
¿Deseas compartir un mensaje?

## Tu barrio: No te lo pierdas

### Conferencia de restaurantes latinos

La Queens Chamber of Commerce invita a su evento "Latino Restaurant Conference 2024", para conectar y educar profesionales del mundo de restaurantes y bebidas que buscan solidificar sus negocios y emprendimientos en Queens. El evento será el 10 de septiembre, de 3 a7 p.m. en el Astoria World Manor, localizado en el 25-22 Astoria Boulevard en Astoria, Queens. Los interesados pueden registrarse en https://queenschamber.glueup.com/event/115539/register/.

### Desfile dominicano este domingo en Nueva Jersey

Luego del izamiento de la bandera dominicana el pasado sábado en Paterson y la fiesta de gala en The Venetian de Garfield (con la presentación del merenguero Toño Rosario), el Desfile Dominicano de NJ, que preside Elsa Mantilla, anunció su marcha anual de carrozas para este domingo a las 11 a.m. por la Avenida Park hacia el centro de Paterson, culminando las festividades quisqueyanas dedicadas este año al estado de Nueva Jersey.

### Tarifas reducidas de OMNY

El asambleísta Harvey Epstein auspicia el lunes 9 de septiembre una presentación multilingüe de OMNY con tarifa reducida de 11 a.m. a 1 p.m. en el Wald Senior Center (12 Avenue D). Obtenga información sobre cómo puede viajar en autobús o tren a mitad de precio a través del programa OMNY con tarifa reducida de la MTA. Puede calificar si tiene más de 65 años o alguna discapacidad. Habrá interpretación en vivo en español y chino. Este evento está copatrocinado por la MTA, el Wald Senior Center y el 504 Democratic Club.Puede registrarse en tinyurl.com/harveyomny.

### Sobre seguridad en los medicamentos

El NYC Poison Center organiza seminarios web sobre seguridad de los medicamentos para padres y cuidadores. Estas sesiones se ofrecerán en inglés y español. El lunes 9 de septiembre de 11 a.m. a 12 p.m. se ofrecerá el seminario en español. Puede registrarse en https://tinyurl.com/2ekpetky. Habrá otro seminario, de 2 a 3 p.m. Para registrarse: https://tinyurl.com/bth424tb.

### Clínica legal gratuita

El concejal Shekar Krishnan invita a sus constituyentes a aprovechar la ayuda que se provee en la Clínica legal gratuita de Jackson Heights, donde se ofrece una consulta de 30 minutos con abogados voluntarios en temas como desalojos, reparaciones, problemas inquilinos-caseros y hostigamiento. Debe inscribirse en el (718) 316-9993 para poder participar.

**Cuándo:** sábados 14 de septiembre y 9 de noviembre.
**Hora:** 12:30 p.m. a 3:30 p.m.
**Dónde:** AAFE Jackson Heights, 37-61 84th St., Jackson Heights, Queens.

### Vea partido de fútbol gratis

El Centro Comunitario Andino invita a los ecuatorianos residentes en la Gran Manzana a ver el partido Brasil vs. Ecuador, que se jugará hoy por fecha FIFA de calificación al Mundial 2026, de forma gratuita a las 7 p.m. en el 102-14 37 ave., 2do piso, Corona. Información en (718) 576-5311 o (718) 905-9761.

### Computación en español

La Biblioteca Pública de Queens (QPL) ofrece clases de computación en español en las sucursales de Flushing y Langston Hughes.

• Microsoft Word: 7, 14, y 28 de septiembre
• Microsoft Excel: 5, 12, y 19 de octubre

Se recomienda la inscripción previa; llame a la Biblioteca de Flushing/ Cyber Center al (718) 661-1280. Será de 10 a.m. a 12 p.m. en Flushing Library 41-17 Main Street.

• Introducción a computación: 7, 14 y 28 de septiembre
• Introducción al uso de Inteligencia Artificial (AI): 5 de octubre

Para inscribirse, llame al 718-661-1100. Será de 2 a 4 p.m. en Langston Hughes Library, 100-01 Northern Boulevard, Corona.



## CLIC

## De vuelta a las aulas

**Más de un millón de estudiantes regresaron ayer a las escuelas en Nueva York. En las fotos arriba y a la izq. el alcalde Eric Adams, dio la bienvenida a los estudiantes y sus familias en la escuela PS 257 John F. Hylan en Brooklyn. En la foto abajo, altos funcionarios de la MTA distribuyeron información sobre las tarjetas OMNY para estudiantes en esa misma institución.** /FOTOS MICHAEL APPLETON/MAYORAL PHOTOGRAPHY OFFICE Y MARC A. HERMANN/MTA

**Envíe su foto a: comunidad@eldiariony.com**

# II ROCKOWY FESTIWAL
## W CENTRUM POLSKO-SŁOWIAŃSKIM

**PRZED NAMI KOLEJNA POLONIJNA ROCKOWA IMPREZA. W SOBOTĘ, 14 WRZEŚNIA, W CENTRUM POLSKO – SŁOWIAŃSKIM NA GREENPOINCIE PRZY 177 KENT STREET, ODBĘDZIE SIĘ DRUGA EDYCJA PSC ROCK FESTIVAL, A NOWO ODRESTAUROWANY BUDYNEK BYŁEGO KOŚCIOŁA PO RAZ KOLEJNY ZAMIENI SIĘ W ŚWIĄTYNIĘ ROCKA.**


ZDJĘCIA ARCHIWUM ORGANIZATORA

Pierwsza edycja PSC Rock Festiwal odbyła się jesienią 2023 roku i zgromadziła znakomitych wykonawców, a przybyła publiczność przez cały wieczór bawiła się wyśmienicie. W tym roku z pewnością nie będzie inaczej. Na scenie wystąpią młodzi wykonawcy, ale nie zabraknie też rutyniarzy. Podczas II CPS Rock Festiwal zagrają zespoły: Minimal Absolution, Simple Sound i Dzieci PRL-u. Zespół Minimal Absolution powstał w 2017 roku. 5 - osobowa formacja wykonuje muzykę metalowo - rockową z elementami punka. Zespół gra jednocześnie melodyjnie i agresywnie. Frontman kapeli, Piotr Golda, zapowiada podczas festiwalu wiele energii i sporej dawki ostrego grania. Minimal Absolution wystąpi w składzie: Piotr Golda (wokal), Ruben Jessurum (gitara) i Robert Lewis (gitara). Paweł Golda (perkusja), Shahob Newman (gitara basowa).

Duet Simple Sound w składzie Łukasz Zdrojewski (gitara, harmonia) i Dorota Flisikowska (wokal) powstał pod koniec 2019 roku. Zespół wykonuje szeroko rozumiany indie rock z elementami folku i z dużą domieszką bluesa. Jak podkreśla Łukasz Zdrojewski, duet stara się tworzyć utwory, które wpadają w ucho, często poparte mocnym wokalem.

Dzieci PRL-u to formacja rockowa założona w 2010 roku w Nowym Jorku. Zespół ten to już prawdziwa legenda polonijnej sceny Wschodniego Wybrzeża od blisko 15 lat występujący na wielu imprezach. Zgodnie z nazwą, Dzieci PRL-u swoim stylem nawiązują do korzeni współczesnej polskiej muzyki rockowej, która rodziła się w czasach, kiedy Polska znajdowała się za Żelazną Kurtyną. Dawid Czajka, założyciel i lider formacji, podkreślił w wywiadzie, że zespół podczas Festiwalu jak zwykle da z siebie wszystko. Znając Dawida nie należy mieć w tej kwestii żadnych wątpliwości. Dzieci PRL-u zagrają w składzie: Dawid Czajka (wokal, gitara basowa), Piotr Klassek (gitara), Maciej Majchrowski (gitara), Paweł „Mieczu" Bernasiuk (perkusja).

- Bardzo się cieszę, że na scenie w Centrum Polsko Słowiańskim pojawiają się różni artyści, którzy reprezentują różnorakie gatunki muzyczne. Koncerty rockowe i metalowe od roku są nowością w naszym polonijnym kalendarzu i jestem niezwykle dumna, że przyciągają koleje zespoły i nową publiczność. Dziękuję bardzo Radzie Dyrektorów CPS, która zaufała nam i wyraziła zgodną na nowe inicjatywy na największej polonijnej organizacjami na wschodnim wybrzeżu - powiedziała Agnieszka Granatowska, Dyrektor Wykonawczy CPS.

- Wybór artystów, którzy wystąpią podczas Festiwalu nie jest przypadkowy - powiedział Marcin Żurawicz, twórca Festiwalu i jego współorganizator.

- Zarówno Minimal Absolution jak i Simple Sound to młodzi, niezwykle utalentowani muzycy, którzy ciągle się rozwijają. Warto, aby ich autorska twórczość była prezentowana jak najczęściej, tym bardziej, że są to zespoły, które doskonale wypadają grając na żywo. Z kolei weterani z Dzieci PRL-u to artyści, którym muzycznego talentu również nie można odmówić. A scenicznego wigoru tym bardziej. Myślę, że szykuje się ekscytujący wieczór dla wszystkich miłośników rockowego grania. Z pewnością będzie to kolejny niezapomniany koncert w gościnnych murach Centrum - dodał.

Sponsorami drugiej edycji festiwalu rockowego w Centrum Polsko Słowiańskim są: Centrum Polsko-Słowiańskie, Karczma, ArtPix Photo Agency, Princess Manor Catering Hall, Sparrow - A Contemporary Funeral Home

***PR CPS***

**#Nacional**
**#Temporal**

**EEUU reclama protección para trabajadores humanitarios**
El secretario de Estado de EEUU, Antony Blinken, pidió ayer protección para el personal humanitario que trabaja en la Franja de Gaza, horas después del ataque israelí que causó 18 víctimas mortales, 6 de ellas empleados de Naciones Unidas.

# Declaran emergencia por estragos del huracán Francine en Louisiana

**EFE**
**MIAMI**

El huracán Francine se degradó ayer a depresión tropical tras causar graves inundaciones y apagones en Louisiana, especialmente en el área metropolitana de Nueva Orleans, lo que obligó a la declaración de emergencia para agilizar la ayuda federal.

Los vientos máximos sostenidos de Francine disminuyeron a cerca de 35 millas por hora, según el Centro Nacional de Huracanes (NHC, en inglés).

Sin embargo, el sistema tropical seguirá provocando fuertes lluvias, que se extenderán por Misisipi, Alabama y el llamado 'Panhandle' de Florida, en el noroeste del estado.

> Nueva Orleans fue una de las zonas más afectadas por las inundaciones

La depresión tropical se encontraba a 30 millas al sur de Jackson (Misisipi), según el boletín de las 08:00 a.m.

Francine se está moviendo hacia el norte-noreste a cerca de 12 millas por hora y se espera una disminución de la velocidad tras un giro hacia el norte durante hoy viernes.

En la trayectoria pronosticada, el centro de Francine se moverá sobre el centro y el norte de Misisipi hasta las primeras horas del viernes.

Se pronostica un debilitamiento continuo y se espera que Francine se convierta en un ciclón postropical.

**Cuarto ciclón de la temporada**

El ciclón, el cuarto de la temporada atlántica, entró a Estados Unidos por la localidad de Terrebonne, a unas 28 millas al sur-suroeste de Morgan City, como un huracán de categoría 2 en la escala Saffir-Simpson de un máximo de 5.

El anterior sistema ciclónico fue Ernesto, que llegó a ser un huracán de categoría 2 y causó graves inundaciones y apagones en Puerto Rico, lo mismo que estragos en las Islas Bermudas.

Ya son cuatro los huracanes que se han formado en lo que va de temporada atlántica -que comenzó el pasado 1 de junio y termina el 30 de noviembre- junto con Beryl, Debby y Ernesto.

Beryl alcanzó rápidamente la mayor categoría, la 5, causando destrucción y muerte en el Caribe y Estados Unidos.

Se prevé que esta temporada de huracanes en el Atlántico sea una de las más activas e intensas en décadas, con la formación de hasta 25 tormentas y 13 huracanes.●

**Residentes de Kenner, Louisiana, hallaron hasta peces varados .** /EFE

## Intensidad

**Se prevé que esta temporada de huracanes en el Atlántico sea una de las más activas e intensas en décadas, con la formación de hasta 25 tormentas y 13 huracanes.**



The EPA Extends the Public Comment on a Proposed Cleanup Plan for the East Branch portion of Newtown Creek Superfund Site in Queens, New York

The U.S. Environmental Protection Agency issued a **proposed** cleanup plan for the **Newtown Creek Superfund site** on **August 28, 2024**. The proposed cleanup plan is available at www.epa.gov/superfund/newtown-creek. A **30-day public comment period** for the proposed plan **has been extended an additional 30 days and will now run from August 28, 2024 to October 28, 2024**.

To address public questions and concerns about the proposed cleanup plan, the EPA will host a **public meeting on Wednesday, September 18, 2024 from 6:30 p.m.–8:30 p.m. ET** at the **Chatroom at Elsewhere, 599 Johnson Avenue, Brooklyn, NY 11237**

The EPA's proposed cleanup plan includes dredging and offsite removal of contaminated sediment from the East Branch portion of the creek. Other components of the proposed plan include capping all dredged areas to keep the water depth the same, deeper dredging in specific areas as well as stabilizing sediment where needed using a process called in-situ stabilization and sealing the bulkheads where needed to address shoreline leaks as a temporary measure to prevent contaminated water from seeping from the shoreline to the creek. Finally, the EPA will implement a robust monitoring program to make sure the cleanup method is protective in the long-term.

To attend the meeting virtually, register here:
https://usepa.zoomgov.com/meeting/register/vJItd-6spzoiGSfaTmPGUoT_YeJV1kdDPXY

To learn more about the public meeting, and to review site related documents, visit www.epa.gov/superfund/newtown-creek or contact Natalie Loney at loney.natalie@epa.gov or (212) 637-3639.

Stakeholders are encouraged to review the proposed plan, attend the public meeting, and comment on the cleanup alternatives. **Written comments should be sent by October 28, 2024** and emailed to **Caroline Kwan,** Remedial Project Manager, kwan.caroline@epa.gov

# State Senator Presents Bklyn Chamber With Funds for Local Businesses

***By Wayne Daren Schneiderman***
Brooklyn Daily Eagle

CONEY ISLAND — Small businesses in Brooklyn are on the upswing. While North Brooklyn leads the charge, Southern Brooklyn is also seeing a significant increase, according to a recent report from the New York City Economic Development Corporation.

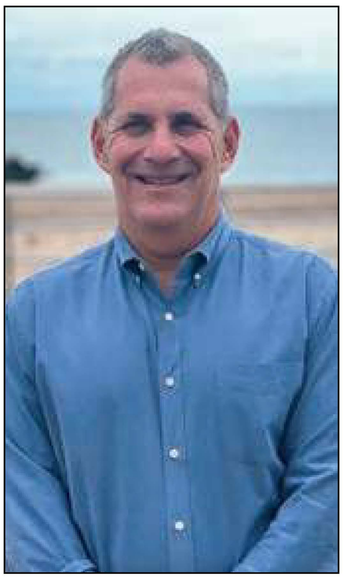
Most notably, Gravesend, Bensonhurst, Borough Park, Sunset Park and parts of Coney Island all saw a near-20% growth spurt or more from 2019 to 2022.

The Brooklyn Beach Shop, located on the Coney Island boardwalk, recently played host to New York State Sen. Jessica Scarcella-Spanton as she presented the Brooklyn Chamber of Commerce (BCC) a $15,000 check to assist small businesses in the district.

Scarcella-Spanton represents the 23rd District serving the north shore of Staten Island, as well as parts of Southern Brooklyn that include Sea Gate, Coney Island, Brighton Beach, Manhattan Beach and Sheepshead Bay. She said she was excited to present the BCC with funds for the economic development of the area. She described the effort as "crucial and critical."


Holding a giant check for $15,000 are, from left: **Camille Hastick, Steve Cohen, Maya Haddad Miller, Jessica Scarcella-Spanton, Randy Peers and Daniel Murphy**.

Eagle photos by Wayne Daren Schneiderman



**Steve Cohen**, vice president of the Brooklyn Cyclones, chair of the Alliance for Coney Island and Brooklyn Chamber of Commerce board member,

Randy Peers, BCC president and CEO, referred to Scarcella-Spanton as "a true champion for small businesses."

"She stepped up and gave us a $15,000 allocation, which is going to assist via our Small Business Resource Network," Peers said. "This is our technical assistance on the ground provider. Support like this enables us to expand our reach. It comes in many forms: helping businesses access financing, marketing support, including digital marketing, and it also helps small businesses build effective websites."

Peers also spoke very highly about the host of the event, Maya Haddad Miller, and her establishment, the Brooklyn Beach Shop.

"The Brooklyn Beach Shop is one of our favorite small businesses in the area, and we are so happy to be here and have them hosting," Peers said. "We love you, and we love Coney Island. You are a symbol of why this place is so great and special."

Miller, who said she is a big fan of both the Chamber and Scarcella-Spanton, said she is "honored to be a part of this amazing day."

Daniel Murphy, executive director for the Alliance for Coney Island, and Steve Cohen, chair of the Alliance, vice president of the Brooklyn Cyclones and a BCC board member, were also there to support Scarcella-Spanton's announcement and monetary presentation.

"What is being done here for small businesses is critical to the life blood of Coney Island," Cohen explained. "We need to support and help grow the business along the boardwalk here."

Camille Hastick, vice president of external affairs and government relations for the Chamber, pointed out that economic development and revitalization for the area is imperative.

"Small businesses need the infusion," Hastick said. "They are extremely important to the continued growth and development of the area."

**Camille Hastick**, vice president of external affairs and government relations for the Brooklyn Chamber of Commerce.

# ATTACHMENT D

# PUBLIC MEETING TRANSCRIPT

Transcript of Video File:

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION 2

NEWTOWN CREEK SUPERFUND SITE

PROPOSED PLAN PUBLIC MEETING

OU4   EAST BRANCH EARLY ACTION

WEDNESDAY, SEPTEMBER 18, 2024

6:33 P.M.

Video Runtime:  2 Hours 27 Minutes

APPEARANCES

U.S. ENVIRONMENTAL PROTECTION AGENCY
290 BROADWAY
NEW YORK, NEW YORK 10007

Caroline Kwan, Remedial Project Manager

Rupika Ketu, Remedial Project Manager

Taylor Hard, Remedial Project Manager

Natalie Loney, Community Involvement Coordinator

Shereen Kandil, Community Involvement Coordinator

Stephanie Vaughn, Section Chief

Chuck Nace, Environmental Toxicologist

Abigail DeBofsky, Environmental Toxicologist

Andrea Leshak, Esq., Site Attorney

Members of the public:

Willis Elkins, Newtown Creek Alliance/CAG Co-Chair

Sandy Li, Newtown Creek Alliance

Laura Hofmann, Newtown Creek Alliance

Thomas J. Mituzas, Blissville Civic Association

Mike Dulong, Hudson Riverkeeper, CAG Member,
Board Member of Newtown Creek Alliance

Louis Kleinman, All Home Services Agency, CAG
Member

Leah Archibald, Executive Director of Evergreen

APPEARANCES (CONT.)

Steve Chesler, Environmental Protection Committee on Brooklyn Community Board
Christine Holowacz, CAG Member
Jan Mun, CAG Member, Newtown Creek Alliance
Jason, CAG Member
Gideon Davidson, Newtown Creek Alliance
Emily Ruby, Riverkeeper
Dan Wiley, District Director for Congresswoman Velazquez
Halina James
Claire James
Anthony Argento
Sean Leone, No One's Arks
Iam Mick
Sarah Ellen Durand
Anya Lehr, representative from Councilmember Jennifer Gutierrez
Lindsay Arden Cooper
George Duke, Esq, Connell Foley LLP
Kel Jordan

(Beginning of Meeting.)

MS. LONEY: Thank you, everyone, as I said, for attending. This is a -- the public meeting for the early action for East Branch. My name is Natalie Loney. I'm with -- I'm the community involvement coordinator for the Environmental Protection Agency.

With me are several of my colleagues. To my left and your right is Caroline Kwan. She's also a remedial project manager for the site. We also have Rupika Ketu, who will be doing the presentation. We also -- also have risk assessors, Chuck Nace there and --

MS. LESHAK: Andrea.

MS. LONEY: Thank you. Andrea.

MS. LESHAK: Yes.

MS. LONEY: I had a -- I had a senior moment. I just turned 60, so there's -- it's downhill right after you're past 59 for some reason.

But anyway, so just a couple of housekeeping things before we get started with the presentation. Since this is a -- this is a public meeting, everything is being recorded by our stenographer. So if you would like to make -- submit your comment verbally tonight, you can do so. When you are asking a question at the -- at the end of the presentation, when we open the floor for Q and A, we do ask that you state your name clearly for the record. That's one of the reasons we ask everyone to sign in as well, so that the -- at the end of all of this, when we have the transcript, we have an accurate representation of who you are and what you said, okay?

So I just want to -- before we go into the details of the -- of this project, I wanted to kind of take you through the Superfund process and how we got to be where we are today. So basically, the way Superfund sites come to be, in this case, with the Newtown Creek, a site assessment was conducted, and we determined that there -- there is a problem. And that site assessment resulted in Newtown Creek being placed on the Superfund list, what made -- which made it eligible for Superfund funding. And in this case, responsible parties are financing the remediation and all the work associated with it.

So once we've determined that there's a problem -- oops. Once we've determined that there's a problem, we need to identify, well, what are the risks? What are the challenges that this particular site presents? And so EPA conducted a remedial investigation, and we also did a risk assessment to kind of evaluate the nature and extent of contamination. So first, we've identified there's a problem. Next, we're looking at what risks the site poses. And -- and then from that, we look at, how can it be cleaned up?

So we did our remedial investigation, and then we did something called a feasibility study. The feasibility study looks at, what are options that are available to us to address contamination at the site? So now that we've done the assessment and the remedial investigation and the feasibility study, EPA is now presenting to the community what we believe is the approach that we should apply to address contamination at the site.

And so here we are having the public meeting. And normally, when EPA releases proposed plans, we have a 30-day comment period. We did -- before this meeting, several days before, maybe actually several weeks before, we received a request from the community to extend the comment period. We have granted that extension, so instead of a 30-day comment period that we normally have, for this particular proposed plan, we have a 30-day comment -- sorry, a 60-day comment period, okay?

So you are able to submit your comments verbally today. I also have -- I also have index cards if you'd like to submit a written comment, and you also have until October 28th to submit e-mail or snail mail comments to Caroline. All of that information will be presented at the end of the presentation, so you don't have to remember all of that.

So once we have -- once we've received the comments and evaluated all of that, EPA then makes its final decision as to how the -- the -- the creek will be cleaned up. And that's something called a record of decision. So we're a couple of step -- we're a step away from the record of decision. We do not anticipate that you'll be -- we'll be coming up with a record of decision by the end of the year. It will take some time, depending on the number of comments that we receive, to compile all of those things, evaluate it, and then -- and then come up with our -- our final remedy.

So what is the purpose of tonight's meeting? I kind of laid out for you, the roadmap for the entire creek. What EPA has done, however, is that instead of addressing the entire creek, we are actually addressing the East Branch. So we're -- we're looking at one portion of the creek that we will be presenting our proposed remedy. This is an early action. Instead of addressing the entire creek, we decided that it would be more expedient for us to address this portion. So the presentation that we will be -- you -- you'll be hearing tonight is really just for the -- for the East Branch.

Now, we also expect that this is an interim action. That means that once the cleanup begins and is completed, we'll determine whether additional work is needed to address any remaining contamination in this portion of the creek. And we expect -- we expect, however, that this will be the -- the remedy that will be applied at the -- at the site, at the creek. So again, this action will allow us to start cleaning up the creek rather -- this -- this portion of the creek rather than trying to address the entire water body.

Okay. I'm going to turn the microphone over to Rupika now. She is, as I said, the project manager for the site. She's going to walk through the entire process. Kind of keep in the back of your mind that map that I just laid out for you. At the end of her presentation, we'll open up the floor for question and answer. There are people online as well, so the way we will work it, we'll address any questions in the room. Then I'll turn to my colleague online, Shereen Kandil, and she'll allow folks who are -- are online to ask their questions, right? So if you need a notepad or anything to write your questions down, just raise your hand, and I'll pass them to you. So I'll come back to you as soon as Rupika is done. So thank you.

MS. KETU: Thanks, Natalie.

Hi, everyone. Thanks, all, for coming out tonight. I'm Rupika. I'm one of the project managers for the site, and I'm going to start with an overview of Newtown Creek, go through the site a little bit itself, and then we'll focus on the East Branch. So Newtown Creek forms a portion of the border between North/South Brooklyn and Queens, and it's right here. It's part of the New York/New Jersey Harbor Estuary, and it's also designated by New York City as one of six significant maritime and industrial areas in the city. It's 3.8 miles long, and it has five tributaries. I'm just getting organized. And those include Dutch Kills, Maspeth Creek, the East Branch, which we're talking about today, English Kills, and Willow Creek.

This here is a figure of the study area. So you can see the tributaries. This is Queens up here and then Brooklyn down here. The majority of the creek is channelized, and its banks have been stabilized with bulkheads of riprap. The drainage is largely governed by engineered, institutionalized systems, and there's a lot of activity along the creek, including industrial, commercial operations, warehouse facilities. And then there's also been a lot of residential development along and near the creek in recent years. And there's a lot of strong support for increased natural shorelines in connection with the creek.

In terms of inputs to the creek, it gets twice daily tides from the East River. The tidal range is approximately five to six feet. And then fresh water inputs to the creek also include groundwater, point and non-point sources, discharges, and overland flow. And I'll talk about all that in detail a little later on.

Historically, Newtown Creek was one of the busiest industrial areas in New York City. Heavy industrial facilities were located along its banks, including oil refineries, petrochemical plants, fertilizer and glue factories, sawmills, and lumber and coal yards. New York City began dumping raw sewage directly into the water body in 1856, and then the creek was also crowded with commercial vessels, including large boats bringing in raw materials and fuel and taking out refined petroleum products, chemicals, and metals. During World War II, the creek was one of the busiest ports in the nation. And then as I mentioned, industrial and commercial facilities still operate along the creek to this day.

The Newtown Creek Superfund site was listed on the National Priorities List in September of 2010. After that, six respondents signed an administrative order on consent in 2011 to conduct the remedial investigation and feasibility study for the site under EPA oversight. The six respondents include the Newtown Creek Group, which consists of five private parties. Those are Phelps Dodge Refining Corporation, Texaco, BP, Brooklyn Union Gas, also known as National Grid, and ExxonMobil. And then the New York City is also one of the six respondents. We refer to the five parties, though, as Newtown Creek Group, so if you hear me say NCG or Newtown Creek Group, that's what I'm talking about.

And then the study area itself is defined as -- it's Newtown Creek proper, so the -- the figure that I showed before, and its five branches or tributaries, as well as sediments below the water and the water column above the sediments, up to and including the landward edge of the shoreline, and including also any bulkhead or riprap containing the water body, except where no bulkhead or riprap exists. And then the study area shall extend to the ordinary high-water mark.

Just, you know, as an FYI, bulkheads are just manmade structures to reduce shoreline erosion along the creek or stabilize shorelines. They could be made of steel sheet piles, wood, concrete, or similar materials. I'm sure you all have been along the creek. You've seen those. And then riprap is just rocky material, also used to prevent erosion and protect shorelines.

Just a quick overview of the contamination at the creek, surface and subsurface sediment contaminant concentrations are lowest in Creek Miles 0 to 2 and increase moving upstream. And just for reference, Creek Mile 0 is the confluence of the East River and Newtown Creek. Contaminant concentrations in subsurface sediment are higher than those in surface sediment, and contaminant concentrations in surface water during wet weather events are higher than during dry weather. And then Non-Aqueous Phase Liquids, NAPL, and sheens are present in sediment and surface water. And there are many ongoing sources of contamination to the creek, which I'm going to get into on the next slide.

This here is a visual representation of the site. We call this the conceptual site model. And just for reference, this is actually the East Branch conceptual site model, but it's very similar to the site-wide conceptual site model. But because the focus is East Branch, we figured we would show this one tonight. And so just in general, a CSM is a living representation or a 3D picture of the site based on information that we've collected through the remedial investigation, and it helps us visualize our understanding of the site, including contaminant distributions, release mechanisms, exposure pathways, migration routes, and potential receptors.

And so I mentioned on -- just sources to the creek, so there are various types of sources. So there are internal ongoing sources of contamination, which includes sediment re-suspension from within the study area, movement of sediment and surface water through tidal flow, and ebullition-facilitated transport. External sources to the creek include Combined Sewer Overflows, or CSOs, MS4s, permitted and non permitted discharges, overland flow, vertical groundwater flow, and atmospheric deposition. And so you can sort of visualize all of the terms that I mentioned on this figure. And then some of the receptors include fish and recreational crabbers or anglers, different birds.

And I'm trying to see what else I want to touch on. And then other, like, important fate and transport processes within the East Branch include dissolution of NAPL, ebullition-facilitated contaminant transport, and vertical groundwater flow water -- sorry, porewater exchange with the surface water. So all those mechanisms are -- are at play and kind of labeled on this representation here.

So part of what we do through the Superfund process is study the risks present at the site. So part of the Remedial Investigation includes collecting enough data at the site to understand the site, create that visual representation of the site.

And then we also conduct human health and ecological health risk assessments. And so based on the data that's been collected and the conclusions of those risk assessments, these are the risks that we found present at the site. And these are the unacceptable risks at the site, just to clarify. And this is what's going to be addressed through the cleanup action.

So for the human health risk, a wide variety of possible exposure pathways were -- were evaluated, including boaters, swimmers, waders, construction workers, and residents. Unacceptable risks associated with exposure to PCBs, dioxins, furans, were through fish and crab ingestion to human health.

In terms of the eco risk, elevated risks are present for benthic macroinvertebrates, bivalves, blue crab, fish, and birds. And the elevated risk here is associated mainly with hydrocarbons, PCBs, copper, and then there's additional risk from dioxins and furans and lead. Sediment is the primary media of concern for all elevated risks. And then the key contaminants overall for the site, we call them the contaminants of concern, are hydrocarbons, PCBs, copper, dioxins and furans, and lead.

So our goal today is to walk you through a high-level overview of the proposed plan that was released for the East Branch on August 28th, and why we're proposing early action here, what we're proposing to do, and get input from all of you on it. The proposed plan itself has a lot more detail than what I'm going to present today. So I might not necessarily touch on everything that you read in the plan, but during the Q and A, if there's something specific you want to ask that you read in the plan, maybe that I didn't touch on, you can feel free to do so. But just keep in mind, this is a very high-level overview.

So the East Branch is the focus of the proposed plan, and it's a tributary of Newtown Creek. It's approximately half a mile in length, and the surface area is about 11 acres. The depth in the channel is between 10.3 and 16.5 feet, and it's shallower at the head of the tributary. And we've done extensive investigations as part of the site-wide Remedial Investigation and Feasibility Study.

About 80 percent of the shoreline contains bulkheads. The remaining shoreline contains riprap or other armoring. The maximum -- sorry. The tidal ranges are approximately up to five feet. And then there are portions of the East Branch sediment that are exposed during low tide. Infrastructure within or around the East Branch includes the Grand Street Bridge, combined sewer outfalls, and storm water outfalls. It's also a navigation channel. And then there is an aeration system that's operated by the New York City Department of Environmental Protection.

I just wanted to go through some pictures so you all can get a visual of the creek. This is the shoreline. This is the former Maspeth Concrete Corporation and Western Beef. So it's facing southeast. This is, you can see part of the Grand Street Bridge over here. It's facing northeast. This is the inlet, adjacent to the MTA Transit Center, facing south. The bottom right picture is a shoreline across from Western Beef at the east inlet, facing northwest. And then just a couple more pictures of the creek.

Based on the conclusions of the risk assessment, which identified the unacceptable risks of the site, we've established cleanup goals for the East Branch. In other words, these are just our goals for this cleanup and what we're expecting to achieve. Our -- and -- and so we also refer to them as remedial action objectives, but cleanup goals is all -- all you need to keep in mind.

So our exposure-based cleanup goals are to reduce potential and current -- reduce potential current and human exposure to contaminants of concern from ingestion of fish and crab by preventing biota exposure to sediments in the East Branch with COC concentrations above the remediation goals, which I will show on the next slide. The second exposure-based cleanup goal is to reduce ecological exposure to site COCs in sediment by reducing the concentrations of COCs in contaminated sediment in the East Branch to protective remediation goals.

Our source control cleanup goal is to reduce the migration of COCs related to NAPL and its constituents, and other sources of COCs within the East Branch, to surface sediment and surface water to levels that are protective for human health and ecological exposure.

I mentioned the -- the key contaminants that we identified during the risk assessments. Those are contaminants of concerns, also what I've been referring to as COCs. And they're the PCBs, dioxins and furans, copper, lead, hydrocarbons, this is the specific type of hydrocarbon, and then also the C19-C36 hydrocarbons.

And so these numerical values here, these are our cleanup goals for this action. I'm not necessarily going to read every one, but just so you know, the units are mostly milligrams per kilogram, except for dioxins and furans to nanograms per kilogram. But these are our risk-based cleanup goals for this action here. And these will help address the unacceptable risks of the site.

So I'm going to go through each of the cleanup options, or we refer to them as alternatives, that were evaluated for the East Branch portion of the site. In order to meet the cleanup goals that we -- that I just presented, the numerical ones and the -- the other, like, written qualitative goals, we evaluated six active alternatives. And I'll explain what that means more on the next slide. Basically, we just have to evaluate a no-action alternative as a baseline, and then we have six active alternatives.

So these are the common elements of each active alternative. And while these technologies are common in each active alternative, the way they're varied across each of those alternatives -- or sorry, the way they're applied across each of those alternatives varies. But I just want to kind of go through these terms here, define them a little bit so that when I go through each of the alternatives, or cleanup options that we looked at, you all can better understand just what I'm talking about.

So the first term is a pre-design investigation, we refer to it as a PDI. And so during a PDI, we collect additional data before we actually implement the cleanup. And at a minimum, this preliminary design investigation includes additional sediment, porewater -- porewater and groundwater sampling.

We also will do data collection to further delineate NAPL and investigate NAPL mobility. There's also geotechnical data that's collected to help us design the cap and just the dredging specifics. And then it also help -- will help us decide what we need to do with some certain, like, upland controls and properties.

Dredging is just removing sediment from the creek. Capping, when we talk about capping, it usually consists of layers of clean material. It could be sand or some kind of specialized material that's placed on the sediment surface to physically and chemically isolate existing sediments. And the cap -- in this case, the cap also includes a habitat layer.

In situ stabilization, or ISS, is a method that can be used to prevent or slow the release of contaminants from sediment by solidifying or stabilizing sediment. And so the preliminary design investigation will help us determine the exact locations of where that will be applied, and it'll be used where needed to reduce the migration of contaminants and to treat NAPL.

Each active alternative also includes sealed bulkheads. This is just the type of bulkhead used to prevent contamination from entering the creek from upland properties. It's typically -- you know, you can use interlocking joints of sheet pile wall to build that sort of sealed bulkhead. This will also be applied where needed to reduce migration as a temporary measure to address seeps while upland cleanup measures are evaluated and implemented.

We're also going to -- we also included structural support measures with each active alternative. And so during the preliminary design investigation, that'll help us determine the exact locations of where these support measures might be needed. And so that could also include ISS, that could be a support measure, but then it could also be placing limits on the means and methods of dredging, and temporary or permanent structural support wherever it's needed.

Dredge material management is -- it generally consists of transporting dredge material to an EPA-approved processing facility and treating the water that settles out from the dredge sediment. Institutional controls, which are part of each active alternative. These are typically administrative or legal controls put in place to protect the constructive components of the remedy or the cleanup as needed. For example, fish consumption advisories are currently in place, through the state, throughout the creek and those are expected to remain in place.

And then we will also be conducting evaluation monitoring. And that's a robust evaluation monitoring program, which will include baseline monitoring, construction phase monitoring, and long-term monitoring to assess the performance of the cleanup itself and the impact on the protectiveness of the cleanup from ongoing sources after this cleanup is implemented. So basically, after we clean up the creek we're going to -- we're going to do a lot of monitoring and additional data collection to make sure that we can track whether any upland sources are impacting the remedy. And if so, then we can address them.

So I'm going to run through each of the alternatives that are outlined in the proposed plan, and the ones that we evaluated. The first one was no action. And we are legally required to evaluate no action. It helps us establish a baseline for comparison with the other alternatives. And in this case, obviously no action will be taken to address contaminated sediment at the creek.

The second cleanup alternative is Alternative EB-B. And this would -- this consists of dredging to allow placement of a cap at or below zero foot mean lower low water. And this would include dredging where necessary to allow placement for an armored or amended cap. The cap would be placed entirely at or below the mean low water line. And then the thickness of the cap would be determined after the preliminary design investigation.

On average, this one would reduce water depths in the East Branch. It would remove approximately 32,000 cubic yards of sediment, over three and a half acres. The estimated present worth cost for this alternative is $152 million and it would take about two years to implement this cleanup method.

We also evaluated a cleanup method that would allow -- where we would dredge to allow placement of a cap to maintain the existing water depth. So dredging would be to an average depth of -- depth of three feet across the entire footprint of the East Branch to allow for placement of an armored or amended cap to maintain existing water depth. And then the thickness of the armored and amended cap would be determined in the future. And this alternative would remove around 92,000 cubic yards of sediment over approximately 11.2 acres. The estimated cost here is 235.2 million And the timeline for this would be three years.

The next alternative that we looked at was Alternative EB-D. As part of this alternative, we would dredge to allow placement of a cap to maintain existing water depth, with localized deeper dredging, dredging to an average of three feet across the entire footprint of the East Branch to allow for --

Okay. So we would dredge to an average depth of -- depth of three feet across the entire footprint of the East Branch and place a cap. There would be localized deeper dredging where needed based on four criteria, which is remaining depth to uncontaminated material, contaminant concentrations in remaining sediment, potential for exposure to principal threat waste, and potential for upward migration of NAPL.

The existing water depth would be maintained. The thickness of the cap would be approximately three feet. And additional backfill would be needed to maintain the water depths. This would remove approximately 101,000 cubic yards of sediment over 11.2 acres. And the estimated present worth cost is $243.5 million and the construction time frame is three years.

The next alternative is Alternative EB-E, which would allow us to dredge all within the navigation channel and cap outside of the channel. So we would dredge the federally authorized navigation channel to a depth necessary to accommodate a cap below the current authorized depth, plus a buffer or to uncontaminated material, whichever is shallower, and the sediment outside of the navigation channel would also be dredged as needed. The thickness of the cap would be determined based on the PDI and the design.

And then this would result in deeper water depths on average. It would remove around 233,000 or upwards of 234,000 cubic yards of sediment over 10.6 acres. And the estimated present worth cost is $418.7 million, and the construction time frame would be five years.

The last alternative that we evaluated was dredging all of it. So we would dredge down to uncontaminated material across the entire footprint of the East Branch and backfill as needed. This would result in deeper water depths on average, and we would remove approximately 254,000 cubic yards of sediment over 11.2 acres. The cost for this is estimated to be around $492.7 million, and the construction time frame would be about seven years.

Before I discuss the EPA's preferred alternative that's proposed or that's highlighted in the proposed plan, I wanted to go through how we evaluate each of these cleanup alternatives and how we chose a preferred cleanup method. So there are nine criteria by which we evaluate the alternatives to determine which one is the preferred one. And I just want to make clear that this is a qualitative assessment that we do, and it's presented in the focused feasibility study, which is part of our administrative record on our website that -- you can all take a look at as well. And it's -- I believe it's briefly summarized in the proposed plan as well. But for more details, you should refer to the focused feasibility study.

The first two criteria that are considered are threshold criteria. Any cleanup that we implement must be protective of human health and the environment, and it must follow the appropriate laws and regulations. For -- for the balancing criteria, we have five balancing criteria, and these include things like how effective is the alternative going to be, both in the long and the short term, and if it's something that can actually be implemented. Cost is also one of these balancing criteria, but it's only one of them, and we consider all of these balancing criteria equally. We also look at, how will this cleanup method reduce the toxicity and mobility of the contamination of the site? And then we go through -- what we do is, we go through these seven criteria first, so the threshold criteria and then the balancing criteria on the left before we release a proposed plan to the public and for public comment.

And so the last two criteria are public acceptance and state acceptance, and that's part of the reason why we're here today. And we want to hear your input, and we'll take it into account as part of our decision process. Again, Natalie mentioned this at the beginning: Any comments we've received during the public comment period, either verbally today or in writing or via e-mail, will be addressed and considered prior to us making a final decision. And I'll touch -- we'll -- we'll touch on a little bit more at the end.

So EPA's preferred cleanup method for the East Branch is Alternative EB-D, and this is, again, to dredge, to allow placement of a cap to maintain existing water depths with localized, deeper dredging. And there are those four criteria for which we would decide where we -- we are to do this deeper dredging. Again, it would remove 101,000 cubic yards of sediment over approximately 11.2 acres. I have the costs listed here again. And then just some other details I want to mention are that it would remove approximately combined 106,000 cubic yards of debris and sediment, and so that's where the 101,000 cubic yards of sediment comes in. And then there would be like an additional 5,300 cubic yards of debris that would be removed.

It would require 69 scow trips to remove the sediment and the debris -- debris, sorry, and this would be done over 11.2 acres. There would be capping with approximately 69,000 cubic yards of material, which would require 35 scow trips over 10 acres. There would be backfilling with approximately 14,000 cubic yards of sand, as needed to maintain the existing water depth where deeper dredging is conducted. We would apply in situ stabilization or ISS on approximately 10,000 cubic yards of sediment for NAPL treatment or reduction of mobility of contaminants. Sealed bulkheads would be -- oh, sorry. I missed a talking point. Shoreline stabilization would be about 76 percent of the shoreline as well through the use of ISS bulkheads and slot dredging.

I know that's a lot of detail and a lot of numbers, but I just want to remind everyone that these are all preliminary estimates. And once we do the preliminary design investigation, we'll -- and -- and come up with our engineering design for this part of the creek, we'll really be able to nail down the exact locations where we're doing deeper dredging, the exact amount of sediment to be removed and backfilled. So I just want everyone to keep that in mind as well, along with, like, the thickness of the cap. All that is to be finalized during the preliminary design investigation and the actual design itself of the cleanup.

This is just a visual representation of the cleanup. I can walk you through the legend because I know it's a little small. So the light green area is, like, an -- is an amended approximately 36-inch cap. The dark green areas, or I guess, like, the middle green area, because there's like three shades of green, approximately 45-inch-thick cap. And then the darker it gets, approximately 53-inch cap. And -- and this is with any areas requiring dredging for the cap placement as well. The brown areas here are our preliminary areas where we have us doing deeper dredging in. And then this purple area here is our preliminary estimate for in situ stabilization, and same with, like, the bulkhead replacement and locations for slot dredging. So this is our, again, just preliminary estimates all to be refined during the preliminary design investigation and the remedial design.

Once the cleanup is implemented, and it's complete, we're going to do some post-implementation evaluation monitoring. So the numerical goals that I showed before, those are expected to be met immediate -- immediately following the cleanup. However, because there are ongoing sources around the creek that could impact the cleanup after it's done, we have to do post-implementation monitoring so that we can -- we can address those ongoing sources. So in other words, this is sort of like a contingency plan if additional contamination is discovered and needs to be addressed, or if it enters the creek from any surrounding properties. And that's something that will be addressed through either federal or state enforcement authorities, and it'll be decided on a case-by-case basis.

But in general, our post-implementation monitoring program has two goals: to determine if the in-creek remedy is functioning as designed, and to determine if the cleanup objectives are being met. And this really, again, provides us a process for evaluating these questions and taking additional action where necessary. It's going to be structured so that the potential impacts to the protectiveness of the remedy are addressed as soon as possible. And this is something that will be, again, addressed through federal or state actions, depending on what the scenario is. And -- and this monitoring program would include sampling of at least sediment, surface water, external sources of contamination, regular bank inspections for both erosion and seeps, and additional sampling as -- as needed or appropriate.

So right now, we are in the midst of our public comment period, which started on August 28th, and we are accepting public comments until October 28th. There, like Natalie mentioned, it's become a 60-day public comment period because an extension was requested. Here's the information for Caroline's contacts or contact information. So you can either mail your comments to the office, or you can e-mail them. Either way, they will be taken into account and put on the record. And then that's just the link where our proposed plan is available.

And so after the public comment period closes, what we're going to do is, we're going to prepare something called a record of decision, which will be the final decision document that formalizes the preferred cleanup alternative for the East Branch. And the record of decision will include responses to all the comments received through October 28th, including all the questions that are going to be asked here tonight and then any written or e-mailed questions we might get. And so just keep in mind, if we're not able to answer everything or, like, certain detailed questions today, there will -- there will be a detailed response as well in the responsiveness summary.

And I think that's it. So just a quick reminder: As we do questions, can you please state your name and any organization you might be affiliated with if you'd like to mention that? But it's really important for our -- our responsiveness summary to know who asked the question and all that. But I'm going to keep the slide up, sorry, just so you can see Caroline's contact information.

MS. LONEY: Sure. No problem. Do we have the QR?

MS. KETU: Oh, yeah. Actually, sorry, I'm going to keep this up.

MS. LONEY: So you -- that's the QR code for the -- the webpage, which has all of this information on it, including Caroline's contact information.

Okay. So we're going to open up the floor for Q&A. I see one hand. So one, two, and then three in the back.

MS. KANDIL: Sorry to interrupt, Natalie. Can you just please use the microphone? Because it's hard to hear you.

MS. LONEY: Oh.

UNIDENTIFIED SPEAKER: This one.

MS. LONEY: Oh, that one?

UNIDENTIFIED SPEAKER: Must be this one.

MS. LONEY: Okay. One second.

MS. KANDIL: And that microphone -- yeah, that microphone is --

UNIDENTIFIED SPEAKER: No, it's not that microphone.

MS. KETU: The Zoom is here. Yeah. It's like -- yeah. It -- it may be a little hard to hear the questions on Zoom only.

MS. KANDIL: That's okay. Can you just repeat it, Rupika, when you get the question?

MS. KETU: Yeah, yeah. That's fine.

MS. LONEY: Yeah. Okay.

MS. KANDIL: Thank you.

MR. ELKINS: Hi. My name is Willis Elkins. I'm with Newtown Creek Alliance and co-chair of the CAG. The -- the first is actually a comment for the -- for the room that this is the only hearing the EPA is having during this public comment period.

And correct me if I'm wrong, but it's the only chance that we have to ask questions before the comments are due, correct?

MS. KETU: Any questions can be submitted after the meeting to Caroline, too, and -- and those will also be answered in the responsiveness summary. So this is not the only chance to ask questions.

MR. ELKINS: But the responsiveness summary won't be released until after the comment period --

MS. KETU: Correct.

MS. LONEY: Correct.

MR. ELKINS: -- correct? Okay. So just to -- if anyone has any questions about anything that's presented, now is the time to ask, especially anything that might inform your comments that you want to submit. So I just want to say that.

UNIDENTIFIED SPEAKER: Because we might not get a response, ever, after tonight, is what you're saying?

MR. ELKINS: You might get a response, but you -- after, when they -- when they announce the plan. So it's very important to try to get as much information as we can.

And first, all I would say, my first one is that there -- there's a lot in here, so I'm a little disappointed the presentation was so short because there is -- the plan itself is 36 pages, and then there's a focused feasibility study document that is 980 pages. That has lots of figures and charts and maps. It's very helpful to go through. So I wish there was a little bit more of that, but maybe some of these questions can -- can get to some of those answers.

I'll start -- my first question is about the -- the depth of East Branch and that you're proposing a

3-feet dredging mostly across the board, except for those brown areas. And my question is -- is -- what is the rationale for choosing 3 feet, is the first question.

The second is: Did or are you considering the current bathymetry of the creek and how -- like, it seems, like, a little bit arbitrary that you want to keep the current depth. And in my understanding of something like this, the way it's -- the way it is now is -- is because of different uses and boat traffic and things like that. It would be much better to have an ecological incorporation of a natural bathymetry, where it's more shallow at the heads and deeper as you go out towards the main channel. And it doesn't seem like that is the proposal that's here.

And then the third question about this is, too, is -- is if you can better explain those brown areas, and why you're proposing deeper dredging in those brown areas as well?

MS. KETU: Yes. So I'm going to ask if --

MS. LONEY: One quick thing before you -- before you respond.

Shereen, were you able to hear all of those questions?

MS. KANDIL: We heard some of it. I just

got the gist, but we can -- we can move on.

MS. LONEY: So do we want to -- well, is -- does this microphone work for --

MR. ELKINS: It does.

MS. LONEY: For -- for -- for people asking questions, should we use this one?

MR. ELKINS: I think my microphone would work a little bit better for the Zoom.

Yeah, because neither of these are feeding into the Zoom.

MS. LONEY: Okay. Yeah.

UNIDENTIFIED SPEAKER: So --

MS. LONEY: All right. So --

MS. KETU: Okay. Sorry. Sorry for the folks on Zoom, but again, it'll be documented in the responsiveness summary in case you're --

MS. LONEY: But before -- JUST just so you know, the -- this meeting is live-streamed on -- on Facebook, on the EPA Facebook page. So if you want to review it, if you want to -- you -- you still have access to the -- the meeting, okay?

UNIDENTIFIED SPEAKER: Can you repeat the question for the people on Zoom so they can hear what you said?

MS. LONEY: Yeah. She's doing that.

MS. KETU: Yeah. So I -- well, correct me if I'm wrong, but there were a few questions. So the first question --

MS. LONEY: First question --

MS. KETU: And I'm hearing an echo if someone on Zoom could mute.

MS. VAUGHN: And, Rupika, it's -- I'm -- I'm unmuted. Sorry, this is -- is Stephanie.

MS. KETU: Okay.

MS. VAUGHN: I -- I was jotting down the questions because I'm home. If you want me to try to start off with some of them?

MS. KETU: Yeah, sure. Go ahead. Yeah.

MS. LONEY: If you could introduce yourself, Stephanie?

MS. VAUGHN: So first, let me say hi and introduce myself. I'm Stephanie Vaughn, the section supervisor for this site. I -- I'm -- I would -- would have been there tonight, but I'm home with the flu. So I apologize for -- for being online. I really wanted to be there in person.

In -- in terms of -- the first question or -- or point made was -- was that the -- you were disappointed with the level of detail in the presentation. I understand that. And -- but just keep in mind that we -- we tried to do this presentation to be useful for everyone who may be in attendance, which would be people like yourself and the CAD that attend our monthly meetings and -- or attends your monthly meetings and are really familiar with the site, as well as probably some people who are completely unfamiliar. So we -- we purposely kept it high level and -- but we're happy to drill into the details.

So it is -- and -- and Rupika, the next question, if you want to talk about it is -- is the sort of -- it was -- it was a series of questions about how the -- the -- the dredged areas in this figure that you're showing were determined. And I just want to make the point that this is A, very preliminary. It will all be refined during the pre-design investigation. The brown area shown here is only based on one of -- on one of the four criteria that we are using to design or to determine where deeper dredging may be needed. So this is based only on the remaining depth to non-contaminated material.

The other three criteria, the relatively higher concentrations in remaining sediments, the potential for exposure to principal threat -- threat waste, which for those who may not be familiar is, just to put it simply, particularly concerning waste, and the potential for upward migration of NAPL. Those are not on this figure, but they will be included and -- and determined during the design.

Further, as -- as it shows on this slide, I think, yeah, the thickness of the cap will range, we estimate, from two and a half to four and a half feet. And that's to account for that. It's not going to be a uniform depth throughout. So there -- all -- all of the questions and points you raised, Willis, are good points and those will be considered during the design. This is just a -- a broad outline of what it would look like. I'm not sure I captured all your points, but that's what I jotted down.

MS. LONEY: Was it you who was next, please? Number 2? Were you 2 in the back?

MR. KLEINMAN: We're 3.

MS. LONEY: You're 3. Okay.

MR. ELKINS: Oh, wait. Could -- there was one more question that just about the progression, the bathymetry and why -- why you're doing it. Sorry. The question was about the -- the bathymetry and that right now you're saying you're -- you're going to go to current depths. And why not redesign the bathymetry to be more of like a natural system where water can -- can flow more easily where there's a better circulation from the head out to the -- towards -- towards the main branch.

MS. KETU: Stephanie, do you want me to chime in or did you hear that one?

MS. VAUGHN: Yeah, I heard that, but please go ahead.

MS. KETU: Okay. I was going to say that all the physical characteristics such as like the bathymetry, all of that's going to be taken into account also as part of like, the engineering design. And again, like, it -- it depends on where there is elevated risk. And those are the areas that we're going to be addressing. You can feel free to add on to that, Stephanie, if you want.

MS. VAUGHN: No, I mean, that's true. And -- and I mean, we can -- I -- I can't give you a good answer right now, Willis, but that's something we can certainly take into account during the design is whether it might make sense to look at, you know, a -- a slightly varied bathymetry in areas. The -- the problem with -- if we were to adjust the bathymetry significantly, it would also affect the flow rates. It would affect the contaminant fate and transport. It would have a ripple effect. So it's not something we could just do without -- without significant evaluate -

- consideration and evaluation.

MR. ELKINS: Thank you.

MS. VAUGHN: But we can -- we can respond to that more fully in the responsiveness summary.

MR. KLEINMAN: First, let's give --

MS. KWAN: Name?

MR. KLEINMAN: Oh -- oh, I'm sorry. Louis Kleinman, All Home Services Agency. First, thank you to EPA for doing this public presentation, even though it's required by law. Nevertheless, thank you.

Second of all, for the newcomers in the room, and I think they are listening, I think there might be quite a few, let's remember that the original federal authorization is only for chemical and metal contaminations as it concerns human health. Bacteriology is basically are not covered under Superfund. And that is another area of health concern, which has to be addressed in a different point brought in through CSOs essentially, but also for upland problems.

For the purposes of everyone, would you kindly define NAPL so people know what that means?

MS. KETU: I don't have the exact definition up in front of me, but it's non-aqueous phase liquids. And it can be -- like, what's the best way to describe it, Caroline?

MS. KWAN: Yeah, oil or water. So the oil is the NAPL.

MS. KETU: It's liquids that are -- that can't mix with water, basically. And they can carry other constituents, but it's not always necessarily an indicator of contamination.

MR. KLEINMAN: Which is essentially brought in through the petrochemical industry existence.

MS. KANDIL: And sorry to interrupt, Rupika, can you just try to repeat the question when they're -- when they're asked?

MS. KETU: Yeah, the question was, what is NAPL?

MS. KANDIL: Thank you.

MR. KLEINMAN: You are going to be --

MS. VAUGHN: Yeah. I -- I would just add to -- sorry. I would just add to that definition that -- that NAPL is -- is like a phase of substance. You know, as this as -- as Caroline and Rupika said, it's an oily substance that doesn't mix mix in with water. But -- but what NAPL is made up of can vary. There can be various contaminants that make up the NAPL, including the contaminants of concern for this site. So it could be the PAHs. It could be the hydrocarbons and it could be the PCBs. All of those can be found in NAPL and are found in the NAPL at this site in varying places and concentrations and locations. It's not uniform.

MR. KLEINMAN: And all of which can cause cancer in human beings over a period of time. That's one of the reasons of the concern. The general question about reviewing this -- the work that has been done. We want to go into how many years you are going to be doing this review, how it -- how the review will be handled, how it would be published. How will the community in fact know that what you're doing is addressing the problems that you're looking at?

MS. LONEY: Are you talking me about the preliminary design investigation, the PDI?

MR. KLEINMAN: After -- after the work is finished.

MS. LONEY: Oh the oh, the post -- post-construction monitoring, okay.

MS. KETU: Yeah. After any cleanup is implemented at Superfund sites, we do a remedial action report, which is like a final report that outlines basically what the cleanup consisted of, what method was implemented, the results in the end, and it just summarizes like, the whole action itself. And also then details, like how going forward we're going to monitor that this action is going to continue to operate effectively, that it's going to maintain the same protectiveness, and that it's -- in case it is impacted by ongoing sources, how that will be addressed.

MR. KLEINMAN: For how long?

MS. KETU: In perpetuity.

MS. LONEY: Another question.

MR. MICK: Hello. I am -- my name is Iam, and I am the 501c founder of 185668232, Inc. We were told to come here. I've got four of my board members in the room with me here. We were told to put in a bid as a lease holder for generally this area. And we wanted to allow for access cleanup for charity purposes and allow for this cleanup to be an accountability report back and forth.

So I just wanted to say hello. I'm going to be sending in my official bid along with my CGIs. We're looking to build at our communication center compound, Humanities Hotel, and our arts trailer park. And this would be perfect space. So I just wanted to say hello. I don't really have any questions. Great presentation. Thank you so much everybody.

MS. KETU: Thank you.

MS. VAUGHN: Thank you.

MS. LONEY: Thank you. Before I -- before I go back to the room, Shereen, are there any questions online?

MS. KANDIL: We do have a hand up, so I'm going to call on Sarah Ellen Durand, please. Please unmute yourself.

MS. DURAND: Hi, Rupika.

MS. KETU: Hey, Sarah.

MS. DURAND: Hey. So you had mentioned a list of external sources of potential contamination and you showed us a conceptual site model. And neither the external sources lived nor the conceptual site model included seeps of oil, or should I say NAPL, as a source of ongoing contamination, even though those of us who work contamination entering the waterway and in 2016, 2017, a systematic study of these ongoing contamination sources conducted by the Louis Berger Group, a contractor that had a record of successful government contracts for the EPA and other government agencies. And I think the absence of systematic identification is deeply concerning, as is your mention NAPL is not always an indicator of contamination.

I think it always has been for the EPA, but what is -- what happened at our sister fund -- sister

Superfund [inaudible 00:57:06]. Before a new cap had been placed, it was already becoming contaminated because a seep had not been identified in advance of the installation of the remedy. So the -- the seep study was done seven years ago by a reputable contractor, was never followed up in those seven years. And now we are looking at -- well, we will do the -- a thorough systematic investigation of seeps as part of the pre-designed study. But that -- that leaves us with a few questions as to the sincerity and commitment of this statement, because, for seven years, this study was not done when it could have been done.

And lastly, as part of that Louis Berger set of studies on NAPL, which could be coal tar, which could be petroleum oil, which could be jet fuel, gasoline, creosote, whatever, that Louis Berger Group also did a study of NAPL reservoirs in the sediments and identified contaminated sediments, pools of -- of NAPL in the East Branch. And this study too has been dismissed as a source of information for guiding the proposed plan. So that is my concern. And you've all heard it as an ongoing concern. I still feel it is not being significantly addressed. And the fear is that putting it off -- putting it off is not going to lead to a successful remediation. So thank you for patience and I look forward to your response.

MS. KETU: Thanks, Sarah. So I'll just start off, Stephanie. And then -- and then you can chime in. I just --

MS. LONEY: If you could just kind of paraphrase what she said for the --

MS. KETU: Yeah. So --

MS. LONEY: There were some things that were hard to hear.

MS. KETU: Yeah, so Sarah is concerned about the lack of seeps and NAPL being pointed out on the CSM as inputs to the creek and contamination in the creek. There have been additional NAPL studies done not under EPA oversight or by EPA that she's mentioning that should be taken into account by EPA. And so I completely understand.

And I'd just like to point out that we actually have accounted for seeps on the CSM as an input. And we do have a visual representation of the NAPL contamination that we found in the East Branch. And so that can be seen here in the subsurface. And then in addition, as part of our lateral we have been doing the last couple years, we did do opportunistic seep sampling as part of that. So if we found a seep, we would sample it.

And that information is going to be available this fall as well. We're just in the process of compiling the data summary report. And then lastly, I just want to say, as part of the preliminary design investigation, sampling seeps will also be one of the requirements in the PDI.

UNIDENTIFIED SPEAKER: What exactly are seeps?

MS. KETU: Seeps are inputs to the creek that can contain NAPL, I guess, and --

UNIDENTIFIED SPEAKER: Will --

MS. KETU: -- other substances, coming from, like, upland properties, contamination from upland properties that can get drained into the creek.

UNIDENTIFIED SPEAKER: Thank you.

MS. KETU: Yeah. No problem.

Sarah -- I mean, sorry, Stephanie, did you want to add anything?

MS. VAUGHN: Again, no. You covered most of what I was going to say. Just a couple more points. First, the -- the New York City studies that -- that Sarah referenced are included in the administrative record that we put out with this proposed plan. So they are being considered in our evaluation process. And I also wanted to point out that one of the -- one of the elements of this alternative, the common element of all the alternatives that were considered, is sealed bulkheads.

And the sealed bulkheads, as -- as Rupika described, are meant as temporary measures to prevent seeps, so, you know, any contamination coming in from the shoreline, whatever form it's in, to prevent seeps from entering the creek while additional actions are considered and evaluated in the adjacent upland property or in the source zone. So -- so we are actively considering seeps as part of this remedy.

MS. LONEY: Thank you.

MS. KANDIL: Stephanie, Sarah has her hand up and, I believe, may have a followup question.

MS. DURAND: I was just going to respond briefly.

UNIDENTIFIED SPEAKER: Yeah.

MS. DURAND: Looking at their conceptual site model, I do see NAPL in the sediments, but a seep would mean a -- a migration of NAPL from the shoreline that is coming into the sediment. And an opportunistic observation is not the quality of a systematic study, which is a mapping, low-tide mapping, of sources of contamination. Opportunistic means, should -- should the audience not realize, that if you happen to be present when a seep is occurring, it's recorded, which is not a thorough study of the problem.

MS. LONEY: I don't know if there's a response to that. She has a question? That was a statement.

MS. ARCHIBALD: Hi -- hi, you guys. My name is Leah Archibald. I'm the executive director of Evergreen. We're the local development corporation that helps businesses here in Industrial and North Brooklyn grow so we can keep working class jobs in our community. And I am a member, a long-time member of the CAG.

So I have kind of a two-part question.

MS. LONEY: I'm sorry. Could you, for those who don't know, if you can say what the CAG is?

MS. ARCHIBALD: The Community Advisory Group, which has been assembled to represent the community's interests as we wend our way through the Superfund process, and it's been 14 almost years, and this is kind of like the starting gun of the cleanup. So that is an exciting -- it's an exciting inflection point. But, you know, every -- like, yeah, everybody has questions and opinions. And here's mine right now.

So can you -- can you discuss how the cleanup of the East Branch, the -- the -- the preferred version of the East Branch cleanup, can you discuss, A, how it will inform the cleanup of the remaining pieces of the creek, and how you see those timelines aligning?

MS. KETU: Yeah. I'm actually going to start with the timeline question first. So we're currently in the process of conducting the feasibility study for the entire creek, right? So we're evaluating cleanup alternatives for the rest of the creek. As we go through this action and work with certain -- like, our stakeholders and logistics, like the Grand Street Bridge, and actually conduct our PDI, like, we'll -- we'll be able to apply what we learned through this action to the rest of the creek. Any hiccups we might run into, or, you know, successes, we'll be able to apply to the rest of the creek.

MS. ARCHIBALD: And then the -- but --

MS. LONEY: Timeline.

MS. ARCHIBALD: -- timeline. You have -- the question is, like, so, like, if it's a seven-year or a five-year, I can't remember which for that slide it was --

MS. LONEY: Three-year.

MS. ARCHIBALD: Three-year.

MS. LONEY: Oh, yeah.

MS. ARCHIBALD: Right? So we start, and

then so this is going on one track years, one through three, what is happening with the cleanup of the rest of the creek, years 1 through 3? And, like, is it sequential? Is it -- does it happen simultaneously? Like, how -- how do these things go on their own tracks?

MS. KETU: I think the best way we can answer that --

MS. LONEY: Repeat it --

MS. KETU: I'm sorry?

MS. LONEY: Repeat the --

MS. KETU: Oh, okay. Yeah. So Leah is asking how we're going to work in parallel with, like, the rest of the creek and the East Branch as the East Branch is being cleaned up. I would say that that largely depends on the cleanup method we -- we end up selecting for the rest of the creek, whether it's for the entire creek or another portion of the creek. Those are the -- kind of the details that we're working out right now for how we're going to address the rest of the creek. So I don't know if I have a better answer than that.

MS. ARCHIBALD: Okay.

MS. KETU: Yeah.

MS. ARCHIBALD: Well, it's just, I mean, I think it's important for folks to understand, you know, particularly communities --

MS. KETU: Right.

MS. ARCHIBALD: -- or, like, there's just a little piece, just one piece, and we got the whole rest of the creek.

MS. KETU: Exactly. Yeah.

MS. ARCHIBALD: So then I -- my last followup on that would be, you know, if -- if we move forward with this preferred cleanup alternative for East Branch, you know, does that indicate that this is what's going to happen when -- in the other parts of the creek?

MS. KETU: Not necessarily. Like, where -- I'm not saying that we're going to select the exact same remedy for the rest of the creek. Like, we -- we're going to use this to learn, like, for the rest of the creek or parts of the creek. This information will help out with what works and what doesn't work, or.

MS. ARCHIBALD: Will you have the flexibility to make changes in the plan for the remainder of the creek, as -- as, like, frankly, as -- as this gets in years 1 through 3, this gets completed, and then it's the monitoring. And then you see maybe a thing -- something works or poorly or something works very well.

MS. KETU: Yeah.

MS. ARCHIBALD: Will there be the flexibility?

MS. KETU: Yeah. We'll be able to adapt to, like, whatever is going on at the creek. Like, if we implement this cleanup, but there's some sort of, like, ongoing source that's contaminating it, we'll be able to basically use, like, the knowledge of how we addressed that in other parts of the creek, if that makes sense.

MS. LONEY: If I could add to that.

MS. KETU: Does that help? Yeah.

MS. LONEY: The -- the process that we're going through now, looking at alternatives, presenting our preferred cleanup plan, that's the same process that would happen in other portions of the creek, so that if there are lessons learned from this portion of the remedy, that will be used when we're looking at proposed alternatives to address the balance of the -- of the creek.

So we'll be doing this process again, presenting our alternatives, evaluating them, having a public meeting, allowing for sharing that information, getting feedback from the community. So we would not be moving forward with remediating the balance of the creek without going through this same process again.

MS. KETU: And obviously, there would be coordination across, like, if there are simultaneous cleanups going on at the same time, depending on how the timeline ends up being. So yeah.

MS. ARCHIBALD: Right. Thank you.

MS. KETU: You're welcome.

MS. LONEY: Another question?

MS. KANDIL: I think that Stephanie has her hand up.

MS. KETU: Okay.

MS. LONEY: We have one person in the room and then -- oh, Stephanie is responding?

Oh, Stephanie --

Okay.

MS. VAUGHN: No -- no. It's okay. I was going to add something that I -- I think the question was covered. I -- I'm excited to have a [inaudible 01:08:59] to start cleaning up the creek.

MR. CHESLER: Yes. Hi. I'm Steve Chesler. I'm chair of the Environmental Protection Committee on Brooklyn Community Board 1. I thank you very much for the presentation. Regarding the -- the remedial proposal for seeps, as I understand it, temporarily --

was sealing bulkheads as a temporary measure to address seeps.

What is the permanent remedial solution for addressing seeps from those sources?

MS. KETU: So the permanent measure would depend on the exact situation -- oh, sorry. The question was, what's the permanent measure for addressing seeps or contamination coming in from upland properties?

So it -- it would really be determined on a case-by-case basis whether we would take a federal action there or work with our partners or the state, if they would take an action there or it -- it really depends on what the case is. But it would be addressed either through federal or state authority.

MR. CHESLER: So is it about identifying the sources and then going after the --

MS. KETU: Yeah. Yeah. There would be further investigation into, like, where is the seep coming from? And we would do, like, a -- some additional sampling and data collection around that as well to determine the specifics and -- and whether the state is going to address it or EPA is going to address it. But it depends on what the results of those investigations are, I would say.

MS. RUBY: Hi there, Emily Ruby with Riverkeeper. I have two questions I want to follow up on Steve's question, which is, we know that there's ongoing seepage. That's presumably why these temporary bulkheads are being put into place. In the plan, it says that these are temporary, assuming that there will be state or voluntary action.

I think that a lot of us here know that a lot of these voluntary actions or DEC-led cleanups are not moving forward and they're not moving forward on a timeline that is, like, good for the community. So how long are these temporary bulkheads supposed to, like, last and be in place?

And then also, you mentioned that the EPA would consider taking federal action to address some of those ongoing seepages. But -- so, again, like, it says on a case-by-case basis. But I feel like there's been a lot of information on some of these pieces, on these brownfield sites, that folks are -- are aware of. And so I'm curious, like, what would cause the EPA to, like, trigger an actual step in -- along one of those sites?

And then my second question has to do with the depth, but I'll just pause for a second.

MS. KETU: Okay. So for those online, the question was basically, what would trigger EPA to get involved with upland sites, as opposed to DEC addressing them? Which Emily feels is being done at a slower pace right now. Did -- did I miss anything or that's the gist of it?

MS. RUBY: Yeah. And also, like, the temporary bulkhead, how long would those -- does that last?

MS. KETU: Oh. Yeah. Yeah. Stephanie, do you -- can you provide some insight on, like, the engineering specifics of a sealed bulkhead and how long that would be in place for?

MS. VAUGHN: So I -- I think I -- I have to say that it really depends on -- it would have to be determined on a case-by-case basis. The intent right now is that the state would primarily be responsible for upland contamination that is -- that needs to be addressed in order for the remedy to remain protective. And that EPA, through Superfund, would be responsible for putting those temporary measures in place until that upland action is implemented, whatever is determined to be needed.

We understand the concern with the -- with the timelines. And, you know, each situation will be different. So I -- I can't give a blanket statement there. But if -- if there is an ongoing source that is -- that a temporary measure could not contain sufficiently until an upland action were taken, then there could be an instance where -- where EPA may work more closely with the state. I -- I don't think we can say much more than that because each situation would be unique.

MS. RUBY: Okay. Thank you, Stephanie, for that response. And I just want to mention that there are over, I believe, 40 creeks that are under, you know, DEC and voluntary action to be remediated. So I think that, just for everybody here, like, this -- the threat of ongoing contamination to the creek from failure to act on upland cleanups is, as I see it, a real threat to the remedy.

And then my second question is just really to follow up on Melissa's question, with -- on the average depth being selected here as 3 feet. I guess I'm really just why the -- that metric is being -- like, why 4 feet? Why not 4 feet? Why not 5 feet?

And I mean, I understand, of course, like, the -- another option that was listed was, like, dredging all, you know, down to the sediment, and that that was much more costly and had a much longer timeline. But I just -- I agree that I feel that 3 feet is arbitrary. And it's hard with this plan to identify, like, to compare 3 feet to, you know, again, 4 or 5 feet, and what this all means for ecological and human health.

MS. KETU: So yeah. I can address part of that question. So our goal with the cleanup plan that we select is to make sure that it addresses the unacceptable risks of the site. And so based on those nine criteria that we go through, based on different data analysis of, like, everything that was collected through the RI/FS. We come up with, like, a baseline of like, you know, on average, we will need to at least, like, dredge 3 feet. And so -- but when we do our PDI, if we find that in certain areas or certain grouped areas, concentrations are higher or -- or additional material needs to be dredged, we'll incorporate that into the design. So it's not like a final number that we're only dredging 3 feet. It could be deeper. It could be a little shallower in some places. So it really depends on -- on the engineering design that we're going to come up with for this final plan.

MS. RUBY: Okay. Thank you so much. Appreciate all the work that you guys are doing on this.

MS. KETU: Thanks. Natalie, we've had a hand in the front for a while.

MS. LONEY: Yeah. Okay. I'm sorry.

MS. KETU: Sorry.

MS. LONEY: Wait, wait, wait. I'm going to have to start taking names. Okay. Who had their hand up?

MS. JAMES: Hi, my name is Halina James. I'm not with any organization. I'm just a resident, but -- or I'm with LaGuardia High School. I was just wondering if you could go into detail about the dredged material management, as dredging can kick -- kick up contaminants. And I was also wondering as well if the EPA has considered any bioremediation alternatives that would be maybe a little less invasive to the environment, like capping and dredging would be.

I was also wondering if -- for example, you talked about habitat materials after capping. I was wondering if you could explain, like, what habitat materials you were thinking of using afterwards that would help kickstart the process of the habitat ecosystem coming back from the dredging and capping and even coming back from the seepage and contamination that's currently happening.

MS. KETU: Thank you. I'm going to start

with the first question, which was about dredge materials management and how we make sure contamination is, like, not coming up or becoming -- or volatilizing or whatever, like not spreading in the community, right, through this action. So as part of any cleanup, we have a community or a site-wide monitoring plan or a community air monitoring plan. And so this involves monitoring the air quality, doing dust control, noise control, depending on, like, what the -- the situation is. But we do have baseline monitoring that we conduct during any cleanup action, so -- so we'll be doing that.

Can you repeat your second question for me?

MS. JAMES: My second question was: Have the -- has the EPA considered a bioremediation alternative, such as like Genki balls or EM1 -- EM1 liquid, which is just using microbes and -- sorry, using microbes that are a little bit more natural and environmentally friendly? I was just wondering if that was an option, or have you already considered that and decided that wasn't an appropriate alternative?

MS. KETU: Stephanie, were you going to say something? I can, like, give a general answer and then --

MS. VAUGHN: Okay.

MS. KETU: -- and then --

MS. VAUGHN: Yeah. Let me -- let me jump in after. Thank you.

MS. KETU: Okay. So as part of the feasibility study, we screen, like, various technology options for what would be the best way to clean up the site. So while we only presented a few cleanup alternatives in the focused feasibility study, it does talk about, like, the screening process and how we basically decide, like, which ones should be finalized -- or not finalized. Which ones should be evaluated in the feasibility studies, I believe.

MS. VAUGHN: Retained.

MS. KETU: Yeah, or retained, sorry, for the feasibility study itself.

Regarding bioremediation options, Stephanie, can you speak to that a little more and why we select certain technologies?

MS. VAUGHN: Sure. Sure. I actually want to go back first to the -- the first part of the question, which was the monitoring we do to assure that the action is taken in a safe and effective manner. In addition to the things that Rupika mentioned, we also will do -- during the active dredging process, we will be doing, in-creek, what's called residual sampling.

So we'll be testing the water and the -- and the sediment upstream and downstream of where we're taking action to make sure that we're not -- we're not releasing too much contamination to other parts of the creek.  And we'll do that in a -- you know, that's -- it's very important to not spread the problem out and make things worse.

Regarding doing this action in a more environmentally friendly way, a few things I'd say. First, as -- as Rupika mentioned, using bioremediation for the mixture of contamination that we have at this site, bioremediation was sort of screened out, as it would not be effective.  It would not be able to address all of the contaminants that are present in the creek.  However, in the -- in the dredged materials management, you know, in other words, once we remove the sediments from the creek, there are options for what can be done with that sediment.  So it could be disposed of in a landfill, but we could also consider other ways of perhaps beneficially reusing some of it if there's lower-level contamination in it so that it's not all just thrown into a landfill for -- you know, to move the contamination from one location to another. So -- so those are things that will absolutely be evaluated during the design of the remedy.

MS. LONEY: Shereen?

MS. KANDIL: Rupika and Natalie, just a friendly reminder to please repeat the questions because it's really hard to hear it online.

MS. LONEY: Okay. Are there anyone -- is there anyone with a question online before I go to the room?

MS. KANDIL: Yes. We do have several questions in the chat.

MR. ARGENTO: I -- I have a question. Can you guys hear me?

MS. KETU: Yes.

MS. KANDIL: Okay. Yes. Anthony, you --

MR. ARGENTO: Anthony Argento. I am the owner of the 8.3-acre site adjoining this cleanup area. Will the dredging affect the bulkhead on this site? Will the dredging affect the environmental conditions of the site, and will the dredging interfere with the existing business there?

MS. KETU: What was the specific site that you mentioned along the creek?

MR. ARGENTO: It's the -- the large site with the trucking facility, where -- where the work is going to be done.

MS. KETU: I'll -- I'll have to provide a more detailed response in the responsiveness summary only because I'm not entirely sure which property you're referring to. But any action that we take in the creek, we're going to -- we're going to implement certain, like, stability measures and support measures to make sure that, you know, the bulkheads and the shorelines remain in -- in a -- in -- intact and in a good condition. Yeah. And if they're not, then -- then we will address that as well.

MS. LONEY: Yeah.

MS. VAUGHN: I -- I would just add, in general, any properties along with -- along the creek or this portion of the creek, I -- they may be temporarily impacted by the work. There -- there may not be a way around it, but everything we do will be done in a safe manner, and we will make whole any -- any temporary disturbances that are -- are necessary.

MS. LONEY: Thank you, Stefanie.

Shereen, what -- what I think we'll do is, we'll take a -- a question from the room, and then I'll take -- we'll take a question online.

Does that work for you?

MS. KANDIL: That's fine. Thank you.

MR. LEONE: I'm Sean Leone. I'm with No One's Arks, a nonprofit that refurbishes old ferries into community centers to bring awareness and fundraising to contaminated waterways. It seems for all the -- all alternatives -- all but one, they do require a cap. What is the process of capping, and is the cost -- well, is the -- if -- if things fail, is the extraction of a cap possible? And is the cost of it -- of the cap extraction considered into the estimation provided?

MS. KETU: Yeah. So the question was: What does a cap generally consist of, and if a cap fails, do we address that? So caps are made up of different materials. It could either be, like, sand or stabilized materials, but there's, like, layers to caps.

And I actually have a figure I could show you as an example. I have some -- oops, sorry. So this is an example of an armored and amended cap. So you have your surface water, you have a deposition layer, habitat layer, erosion protection, filter layer, chemical isolation layer, stabilization layer, and then the underlying sediment. So this is just an example. The exact details of the cap that we're going to place is going to be determined during the design. The feasibility study -- the focused feasibility study that was done does have a capping evaluation in it.

And so it -- just for reference, you can also take a look at that if you're interested in learning more about it. And caps can be repaired. If -- if there's an issue with it, -- it -- it's going to be repaired. So yes, we have the ability to go in and fix a problem in a cap.

MS. LONEY: Shereen, any questions?

MS. VAUGHN: Can I just add --

MS. KETU: Yeah. Go ahead.

MS. VAUGHN: Sorry. I -- I apologize to keep barging in here. Just a couple of additional things. So first off, the -- the post-implementation monitoring plan that we talked about, there are two key aspects to it. There's the sort of top-down monitoring to determine if any of these ongoing sources, like the seeps and -- and discharges and overland runoff and all those things, to determine if those are impacting the protectiveness of the cap sort of at the surface.

And then there will also be monitoring to determine -- to confirm that the cap itself is performing as it's designed. So that -- that would be more to determine if there are bottom-up problems with the cap. And we said -- so -- so any -- any problems that are identified can be fixed and -- and, you know, addressed. Now, we mentioned in the beginning, this is an interim remedy in the very, very -- you know --

MS. KETU: Sorry. Sorry. I -- I was just trying to adjust which slide I was on. Sorry.

MS. VAUGHN: In the very unlikely scenario that it's determined that this cap is -- is just not effective here, then yes, the remedy could be reconsidered as part of the -- the final remedy for the site. So -- so this particular action that we're discussing today is related to the East Branch. This is beyond your question, but I don't think it's really been said yet. This particular action is related to the East Branch portion of the site.

We will have one or more decision documents in the future, so one or more proposed plans like this in the future to address the rest of the creek. And then the last proposed point we have will be -- will sort of cover the whole creek. And through that, we can make any adjustments that are needed to the remedy, including if it is determined appropriate to remove the cap. I highly, highly, highly doubt that would be the case.

MS. KETU: Oh, I'm so sorry. I'm just trying to --

MS. VAUGHN: It might have -- it could be adjusted.

MS. KETU: I'm sorry. I'm just trying to get back to presentation mode because it wasn't changing on Zoom. So I apologize for that.

MS. LONEY: Shereen?

MS. KETU: It seems like it's not -- it -- it's not working on -- it's not working on Zoom. Yeah, it's not going into presentation mode. Oh, there it goes. It's working now.

MS. LONEY: Shereen? Well, let's move on to the room.

MS. KETU: Okay.

MS. LONEY: I -- I do want to make sure she's hearing us.

UNIDENTIFIED SPEAKER: It is on Zoom.

MS. KETU: Like, on Zoom, my slide --

MS. LONEY: I'm sorry?

MS. KETU: I know, but --

MS. LONEY: It is on -- okay. You can -- he -- Dan is seeing it, but I'm not.

MS. KETU: Yeah. But it's not -- it's not sharing it on -- like, if I advance a slide on here, it's not advancing on Zoom.

MS. LONEY: He's -- he's on Zoom. He's -- he was just seeing --

UNIDENTIFIED SPEAKER: No. It just popped off.

MS. KETU:  Okay.  Hold on.

MS. LONEY:  Go back to the presentation.

UNIDENTIFIED SPEAKER:  Oh, there it is.

MS. LONEY:  Okay.  Is it advancing?

MS. KETU:  Like, it's on here, but it's not on there.  That's the problem I'm having.  Hold on.

MS. LONEY:  It's not going to be on this one.

MS. KETU:  You don't want to share anymore on --

MS. LONEY:  No, no, no, no.  This one was never sharing.  This was just the -- the camera for the room.

MS. KETU:  No, because I was sharing my screen on Zoom before so that people online could see it.  Yeah.  Sorry.  Let me try that one more time.  I'm not sure how to connect here.

MS. LONEY:  I'm sorry.  This is the challenges of hybrids.

Sandy?

UNIDENTIFIED SPEAKER:  Now it's on.

MS. LONEY:  It's --

UNIDENTIFIED SPEAKER:  Yeah, it's on there.

MS. LONEY:  You're getting it again?

MS. KETU: Yeah.
UNIDENTIFIED SPEAKER: Yeah.
MS. LONEY: Can you hear us? Shereen, can you hear us?
MS. KANDIL: Yes, I hear you. I'm sorry. It took a minute for my unmute to --
MS. LONEY: Oh, okay. I just want to -- if -- a question from the chat?
MS. KANDIL: Yes. So -- and I apologize early on for butchering anyone's name, but the first comment/question is from Thomas J. Mituzas.
And I apologize for the -- for the pronunciation. Thomas is with Blissville's Civic Association, representing residents of the Blissville section of Long Island City. Our question: "How will the dredged material be removed from the site? And if it is by roadway, how can we expect the -- Blissville's neighborhood to be impacted? Note: Blissville is a tiny hamlet bordered by Calvary Cemetery to the east, Dutch Kills tributary to west, the LIE to north, and Newtown Creek to the south. Thank you.
MS. KETU: Yeah. Any material that's dredged from -- as part of the cleanup will be taken off site using a barge, so we won't be using any roadways, but we're going to develop like a -- an

offsite dredging.

MS. KANDIL: We do have more in the back. Any questions?

MS. LONEY: I'm taking -- I'm taking a question from the room, Sandy, and then we'll come back to you.

MS. KANDIL: Sounds great.

MS. LI: Hi everyone. My name is Sandy. I am the Community Engagement Coordinator with Newtown Creek Alliance. Thank you so much for the presentation. Could we go to -- I -- I guess I have questions about the localized deeper dredging, so can we go to the alternative EB-D localized dredging map?

MS. KETU: Yeah, I apologize. I'm having -- on -- on Zoom, the slides are advancing, but they are advancing first in the room, so I'm not sure why that's happening. So just give me one second. I'm just going to disconnect this real quick while I try to work that out. Shereen, by any chance do you have -- would you be able to share the PowerPoint from your computer? Or I'm going to have Taylor log on here in the room, and she'll share through Zoom. So I apologize for that.

UNIDENTIFIED SPEAKER: Can you share any past EPA solutions to dealing with offsite dredging disposal? Like it's just really vague and like without us ever knowing what's going to happen now, if we can't ever hear later, it's really unsettling.

MS. KETU: So I'll have to take a look at what was done at other sites. I don't know off the top of my head, just the -- the way that -- like, for example, for Gowanus, how they did it there. So I would have to answer that in the responsiveness summary, unless Stephanie is better able to answer how the dredged materials were managed at Gowanus.

MS. VAUGHN: Was -- was that the question? Was it Gowanus in particular?

MS. KETU: No, it was just like, do you have an example of how dredged material was managed at other sediment construction sites?

MS. VAUGHN: So yeah, I mean, it -- it -- you know, once again, it varies. I -- I can speak to another site that was involved in -- we used barges to transport the material to a processing facility where it was -- the sediment was basically -- we did the entire operation on the water. The -- the water -- the sediment was pressed so that the water could be extracted, and the water was placed into giant -- like trucks for disposal, and then the sediment was brought to its ultimate destination. It's too early to answer that question for this action. That is something that will be developed during the design of the remedy.

UNIDENTIFIED SPEAKER: Where does the toxic water go?

MS. KETU: It goes to like an EPA-approved offsite disposal facility. So it's treated before sometimes or it's treated at the facility. It just depends on, like, the sampling.

UNIDENTIFIED SPEAKER: You have to de-water it off of the barge --

MS. KETU: Yes.

UNIDENTIFIED SPEAKER: -- before you put it on the truck.

MS. KETU: Exactly.

UNIDENTIFIED SPEAKER: Usually on a -- an adjacent site, you know -- you know, the cleanup site.

MS. KETU: Yeah. We have not selected any sort of facility yet, so I can't answer that question.

UNIDENTIFIED SPEAKER: Just while you're figuring out your intern or, like, not intern, but technological difficulties. Like --

UNIDENTIFIED SPEAKER: Hey, could you speak a little closer?

MS. KETU: Yeah. I'm sorry.

MS. JAMES: Why not -- this is again about the bioremediation, but why not -- you were saying that after the dredging and capping, you would then proceed with like -- like taking -- like, how do I say? Fixing and like taking away all of the sediment and stuff like that. But why not use a bioremediation alternative before the dredging and capping, which could help with the toxic sediment? So while you're dredging it up, it doesn't affect the water and the natural wildlife.

UNIDENTIFIED SPEAKER: So you're saying in addition to dredging, but previous to dredging?

MS. JAMES: Just previously.

MS. KETU: I'm not sure I fully understand the question. I'm sorry. So --

MS. JAMES: Just like -- sorry, I'm like [inaudible 01:35:00] but I'll explain myself. But just before we dredge, which dredging does cause like pickup of toxic sediment and the toxic sediment can stay in the water, even after pulling up the sediments, why not have an alternative like before the dredging that to help take away the toxicity in the sediments?

MS. JAMES: Using -- using like -- beneficial microbes -- beneficial microbes.

MS. KETU: Right. So I think Stephanie kind of answered that before where that wasn't -- it wouldn't be enough to address the contamination at the site. So as opposed to like implement multiple like measures or remedies, it's more effective to clean up the creek in this way in both the short term and the long term.

MS. JAMES:  Okay.

MS. VAUGHN:  I think we're -- so and we -- we can respond more fully in our responsiveness summary, but we can -- we can check with our consultants and develop a more detailed response.

UNIDENTIFIED SPEAKER:  Has her idea ever been used --

UNIDENTIFIED SPEAKER:  Very many times.

UNIDENTIFIED SPEAKER:  -- in the Superfund site elsewhere?

UNIDENTIFIED SPEAKER:  Not in Superfund site --

UNIDENTIFIED SPEAKER:  Yes, no.  The EPA has used bioremediation in the Superfund --

MS. VAUGHN:  Oh, no, we -- we absolute --

MS. KETU:  Yeah.

MS. VAUGHN:  Sorry.

MS. KETU:  No, no.  Go ahead.

MS. VAUGHN:  We -- we absolutely use bioremediation -- had bioremediation.  There's no single solution for every site.  So bioremediation is effective at many sites.  I've used it at sites.  It was determined to not be effective for this site. For this contamination. We have metals, we have PCBs and we have organics. So bioremediation is generally not effective on organic -- on the metals that we can seize.

UNIDENTIFIED SPEAKER: But it would help a lot with the petroleums and hydrocarbons, which is a big part of the issue and just even the sludge layers, like the amount of material that would have to be removed and then taken offsite. It can take it down in many inches, just even within like months.

MS. JAMES: Also introduces like beneficial microbes to the --

MS. LONEY: Can -- can the folks in the back hear what they are saying?

No. You have to speak louder --

MS. LONEY: Well, can we pass for the mic? I mean, if someone has the mic.

MS. LI: Sorry. It's still my turn.

MS. LONEY: We kind of lost the flow.

MS. KETU: Sorry about that. Sorry just to close that out. The bioremediation concerns that we have, like there's a transcript for this meeting, we're going to fully respond to every question that's received or every comment that's received. So I think we answered it the best way we can right now. And then just, you know, in the response summary, you can see a full, detailed response.

UNIDENTIFIED SPEAKER: So a reminder, just speak your name before you make a comment.

MS. LI: Yeah, I -- I said my name, but hi everyone. I'm Sandy. I am with Newtown Creek Alliance. My questions are really -- I have a series of questions relating to localized, deeper dredging. So that's the map that we're looking at right now. I guess I know that right now, the brown area, our proposed deeper dredging area, and then deeper dredging is what differentiates alternative EB-D, I guess, since the pre-design investigation is so important. Can the community comment on the pre-design investigations? Since right now, we're only looking at conceptual presentations.

MS. VAUGHN: Yeah. Yeah. I was going to say this as well, so thank you for bringing it up. You know, you -- you've all been very, very -- has been very involved with us thus far and during the design of your remedy, that does not end. So you know, we will absolutely keep you informed of, you know, what we're doing in terms of the pre-design investigation and some of the questions that have been raised today. Like, what are the -- what are the transportation paths? What are the -- you know, what are the impacts in the community? What are the -- a lot of those types of questions are -- are critical for -- for the community ahead on. So the -- you know, some of you at the meeting tonight are already involved with this site, and that level of involvement will not -- you choose to keep that level of public will not decrease once the remedy is collected, I put it that way.

MS. LI: So -- so is that an answer for yes, we can comment on the pre-design investigation or no, we can't comment? The public can't comment on the pre-design investigation after.

MS. VAUGHN: No, I'm trying to say that yes, we would -- we would present to you the -- what we're intending to do as part of the pre-design investigation and take your inputs.

MS. LI: Thank you. Sorry, I have one last question regarding pre-design investigation. How many -- I know that there's currently 16 core sample data that's being presented in the focused -- sorry, feasibility study. How many more data, to you guys' knowledge, are you planning to collect in addition to the current 16 core sample data? Because the -- the really long chemical name, I can't remember. That only has core sample. That one only has two core sample data. So how many more data are you EPA planning on collecting to inform the pre-design investigation?

MS. KETU: I don't -- I don't think we can give you an exact number right now, but we're just going to be collecting a lot more data to fill in some of the data gaps that you did mention. That's the whole point of a pre-design investigation is to fill in the data gaps.

MS. LI: Thank you.

MS. KETU: No problem.

MS. LONEY: Shereen, is there anyone online who has a question?

MS. KANDIL: Yeah. We still have a few comments -- comments. So I'll go to the next one. This is from Laura and Mike Hoffman. You answered a question about how this branch cleanup will inform the rest of the Creek's cleanup. My primary interest is about how this cleanup will inform and affect the actual health impacts of the community associated with the cleanup. I live close to the creek, and my family is heavily impacted by environmental issues. As someone dealing with multiple environmentally related conditions, I want a cleanup that prioritizes community health impacts. Also during the presentation, it was stated that all -- all -- all alternatives will be in accordance with current laws and standards. When was the last time the laws and standards were updated to inform today's chemical exposure related to this particular Superfund site?

As an example, when was the last time the laws and standards related to dioxins and furans, sorry, I'm not saying it wrong, was updated? As you know, the sewage facility has only begun to operate in accordance with the 1972 Clean Water Act in the last decade or so. We're concerned about the outdated condition of our laws and standards in informing this process.

MS. KETU: Okay. Shereen, can you repeat the first part of the question, please? Because that was a lot.

MS. KANDIL: Yeah. So -- so to summarize during the presentation, it was stated that all alternatives will be in accordance with current laws and standards. When was the last time the laws and standards were updated to inform today's chemical exposure related to this particular Superfund site?

MS. KETU: I don't remember when the guidance was last updated for evaluating that. I don't know if Andrea, you have some --

MS. LESHAK:  We need to respond in the responsiveness summary.

MS. KETU:  Yeah.  We'll -- we'll have to get back to you in the responsiveness summary on that one.

MS. VAUGHN:  I -- hey, I -- I think maybe Chuck can speak to this though because the -- this information is updated on a regular basis.  I don't know.  Not to put you on the spot, Chuck, but --

MR. NACE:  Yeah.  Hi, this is Chuck Nace. I'm an ecological human health risk assessor that has worked on the site.  What we're doing with this early action.  We will be removing highly contaminated sediment bank to bank down to three feet.  So that will help the -- the health impacts to people that may be exposed to this area in the future because the contamination won't be there anymore.  It will also help with the ecological exposures because the benthic invertebrates, the fish, the birds that feed in that area will now be in clean areas.  Granted, yes, the rest of the creek, it still has contamination.  We will be addressing that as we move forward.  As far as the laws and regulations, we consistently, you know, update our methodologies and technologies for evaluating contaminants, looking at toxicity, looking at their impacts and the -- the health impacts in both humans and -- and ecological receptors. So although maybe laws and rules maybe haven't changed for a while. The way we are evaluating them and using them, we are using the current state of the science.

MS. KETU: Thanks, Chuck.

MS. LONEY: Thank you. Mike?

MR. DULONG: Thanks, Natalie, and thanks to EPA for the presentation and for your responsiveness tonight. Thanks everybody for taking the time to attend and for your really great questions. My name is Mike Dulong. I am with Hudson Riverkeeper. I'm also on the board of Newtown Creek Alliance and a member of the CAG. Is anybody here from DEC? All right. It's good to see you guys. Thanks for coming. I'm going to read a quote from DEC with great appreciation. And this is -- my question's going to be about the biologically active zone. EPA has defined it to include only six inches, but DEC, the state Department of Environmental Conservation, writes, "Zero to 6-inch interval fails to provide adequate ecological protection in Newtown Creek. To appropriately characterize ecological exposure and evaluate long term effectiveness of remedial technologies, DEC recommends 2 feet or 60 centimeters as the zone surface sediment used to evaluate remedial alternatives." And that's the end of the quote. I'll speak for Riverkeeper when I say that plant roots grow to depths of more than 6 inches. So the biologically active zone or the biologically available zone is much deeper than just 6 inches.

And this is going to be -- I mean, this is the crux of the remediation and the crux of how it will be measured and how your success will be measured in the future. I'm very concerned that that 6-inch depth or biological active zone that you define is going to cause you to underestimate the amount of contamination that's in the waterway -- in the sediments under the waterway in the future. Especially because you're expecting a net deposition from the East River over time. So again, the question is, why has the EPA limited the definition of the biologically active zone to just 6 inches?

MS. KETU: Sure. Thank -- thank you for your question. I'm actually going to ask -- should I --

Chuck, would you like to answer, or should I call on --

MR. NACE: Yeah. Abby should be able to --

MS. KETU: Okay. Abby, our eco risk assessor for the site, is online.

And, Abby, the question was, how do we determine a 6-inch BAZ, and why do we think that's effective, as compared to DEC's -- I guess the quote that Mike read was 6 inches is not effective to protect eco-life in 6 inches?

MS. DEBOFSKY: Yeah. Thanks -- thanks, Rupika.

So to start with, the way the biologically active zone is defined is that it's predictive of the majority of species, but it's not necessarily protective of every single species. Is -- we're protecting populations. We're not protecting, you know, every single individual. And so when we're evaluating the risk, we use the 6-inch defined boundary.

However, when we're looking -- when we're looking at the remedy, we're going to essentially be removing to this 3-foot depth. In essence, there will be a much deeper zone that will have clean material on it for these deeper-dwelling organisms. And that way, it will be protective of those organisms and everything else that will be colonizing the area.

Does that answer the question?

MS. KETU: And I would -- I just want to add to that, that DEC has concurred with the preferred remedy that we picked for the East Branch in the proposed plan.

MS. LONEY: I have Jason. Oh, wait. Did you -- has that addressed your question?

MR. DULONG: I -- I understand. I appreciate the answer. Thanks.

MS. LONEY: Oh, Shereen, anyone online?

MS. KANDIL: Yes. We have [inaudible 03:33:22] for comments. So just a reminder, we have several comments online asking us -- asking you all to repeat the questions. So this is just a friendly reminder. The next comment we received -- or question that we received is from George Duke.

"Good evening. My name is George Duke. I'm an environmental lawyer from Connell Foley, who represents certain upland owners elsewhere around Newtown Creek, outside of the East Branch area of the creek, in [inaudible 03:33:50] upland remediation efforts outside of the EPA's current efforts. My question is whether EPA has already identified which bulkheads will need to be newly installed and/or repaired as part of its efforts to prevent ongoing seeps. If so, how is it identified? How -- how have you identified these locations? Also, what agreements will be made with upland owners to prevent damage to the upland owners' property?"

MS. KETU: So the location of the bulkheads that will be repaired will be based on what we find during our pre-design investigation of bulkhead conditions. We've done some preliminary evaluations on bulkhead conditions as part of the focused feasibility study. But I would say that definitively that will be looked at in the PDI.

And then Shereen, what was the second part again about the -- the upland properties? What was the second part of the question, or whatever I didn't answer?

MS. KANDIL: If so, how -- sorry. Has EPA already identified which bulkheads will need to be newly installed or repaired as part of its efforts to prevent ongoing seeps? If so, how has it been -- how have these locations been identified? What agreement have they made with upland owners to prevent damage to the upland owners' property?

MS. KETU: Okay. So I answered the first part of that question. Regarding the agreement or coordination with the upland property owners, I'm going to ask Andrea if you could chime in on that. What would be required of them?

MS. LESHAK: Oh, I think we may want to

respond in the responsiveness summary.

MS. KETU: Okay. That's fine. Yeah. The second part, unless, Stephanie, you have something to add, we'll definitely be coordinating with any property owners where we need to do a bulkhead replacement installation, whatever kind of bulkhead work it is. But I think we can get back to you in a more detailed way in the responsiveness summary.

MS. KANDIL: I also have another follow-up from George Duke, if you don't mind me just asking that, and then we can go to the room.

MS. KETU: Yeah, please.

MS. LONEY: Yes.

MS. KANDIL: Are the current investigations and studies being privately funded by the NCG or by EPA itself?

MS. KETU: Not that I'm aware of. Not that I'm aware of right now.

MS. LONEY: I didn't --

MS. VAUGHN: No. There -- it's being funded by the -- the NCG, with EPA oversight.

MS. KETU: Are they -- is he referring to upland properties, though, or, like, the study?

MS. VAUGHN: No. No. I think he's referring to the -- the -- RI/FS.

MS. KANDIL: Just the current. Yeah.

MS. KETU: Okay. Sorry. Then I misheard the question. Yeah.

JASON: Hi, my name is Jason. I'm a member of the CAG. As far as capping, if -- just to clarify what is meant by a habitat layer, and what materials are used for that? Also, what is meant by a reactive cap? If that includes -- or I guess that's more than one type of thing, but, like, is that biochar, or what could -- what could those include, material-wise?

MS. KETU: Yeah. The materials to be used -- oh, so the question was, what do layers in the cap consist of, such as the habitat layer and the reactive layer? So the composition of the cap itself, the layers required for the cap, their -- the size of, like, each layer, basically how many inches, that's all going to be determined during the actual design of the remedy.

JASON: But what materials are going to be used?

MS. VAUGHN: I would --

MS. KETU: Yeah. Go ahead.

MS. VAUGHN: Sorry. I would just add that the -- the purpose of the reactive layer is to help trap any contamination that may be migrating up from underneath the cap.  It'll help isolate it in place. And then the part that's the habitat layer is to allow reestablishment of biota in the creek so that it -- it -- the eventually the -- the cap will be -- you know, it'll be restored to its natural conditions.  And Chuck may be able to say that better.  Sorry.

MS. KETU:  And depending on, like, what type of cap it ends up being, it could use materials like -- like sand or activated carbon.  It really depends, you know, in the end, yeah, what we design.

MS. LONEY:  Shereen, the next comment or question from the chat?

MS. KANDIL:  We don't have anything in the chat, but we do have a hand raised.

Gideon Davidson, if I may ask you to please unmute yourself.

MR. DAVIDSON:  Yeah.  Hey.  Hopefully, you all can hear me.  My name is Gideon Davidson.  I'm with the Newtown Creek Alliance.  Also, a local resident. And my question is about economic impact to the community, which may be out the scope of this meeting, but I'm going to ask it anyway.  I think the preferred alternative had an anticipated cost, yeah, of $240 million.  So does the EPA, as part of this project, have any commitments to local hiring, awarding of contracts to local businesses, or just kind of local workforce development, so that the economic benefits from this can flow to the communities impacted? Thank you.

MS. KETU: Sure. I'm actually going to defer to Stephanie on that question, because she has a lot more experience working on these types of sites than I do.

MS. VAUGHN: Sure. Thanks, Rupika.

That -- that is certainly something that we can consider during the design and -- and development of the remedial action itself. We do have job training initiatives and programs that can help with using local -- local residents to -- to help with this -- with the actual clean-up work. Depending on the action itself, those are more or less effective, but we'll certainly meet with and discuss any options with -- with you and the other local business interests in the community so that we minimize the -- the -- the negative impact and -- and perhaps try to come up with some positive economic impact through this action.

MS. LONEY: Thank you, Stephanie.

MS. HOLOWACZ: My name is Christine Holowacz and I am on the CAG, and I would like to ask a question. As I read this whole thing, that 36 pages, and as I'm listening to all of of this, I can see that there's a lot of chances of this thing really not working or having problems. I'm sorry. But -- so my question is, what happens to the program that's the post-monitoring program? How often are you going to sample, whether it is the cap or whether it's the seepage? Is it going to be once a year, or it's going to be every month, every week, after you install the remedy? Because I think that would be the most important thing, to -- afterwards, to make sure that this really stands and that we benefit from everything that we've -- you know, you've done so far. Thank you.

MS. KETU: Stephanie, not sure if you fully heard that question online, but Christina is asking how often we're going to sample and what the post-implementation evaluation monitoring program will really look like after the -- the remedy is completed? Do -- can you -- yeah.

MS. VAUGHN: Right. I'm sorry. That -- yeah. No. That's -- that's a great question and a very important question. And it is something that we need to refine during the design. We -- it needs to be a high frequency of sampling so that we detect any issues before they become -- any potential issues before they become a real problem. You know, we -- we want to find them when they're a little problem, not a big problem.

I don't know exactly what that frequency is, but that is one of the things we will certainly be looking at during the design and also evaluating on an ongoing basis as we go on. You know, if we -- if we pick a frequency of sampling of -- you know, it'll be more -- it'll -- in the beginning, it would, you know -- well, I mean, we can refine the frequency of sampling either up or down, depending on what we find.

MR. WILEY: Good evening. Dan Wiley from Congresswoman Nydia Velazquez's office. I'm also here with my colleague, Evelyn Cruz. We're both district directors for Congresswoman Velazquez. Evelyn has a little seniority over me, having covered the area for, how many? 30?

MS. CRUZ: Not more than Christine.

MR. WILEY: We -- we'll try not to date you.

MS. CRUZ: Christine has 20 years -- 22 years on this project.

MR. WILEY: We'll try not to date ourselves. We just wanted to appreciate the fact that, you know, EPA is doing an early action, so at least we see some progress, and test some things out on Newtown Creek, since the overall cleanup seemed to be pushed back and taking so long. So we are hopeful that the East Branch is representative of more of the creek and has more that we can learn to apply for the whole creek.

And I wanted to just echo what Willis (phonetic) started out with about the depths and really reconsidering just dredging to the current -- just to maintain the current depths, which -- which you might consider kind of arbitrary, just as you might consider the navigation deeper depth as being arbitrary. I think we -- we should look at it for how it could become a tributary again so water flows out and we're pushing stuff away instead of just having a stagnant situation.

And also wanted to echo the sentiments about NAPL, non-aqueous phase liquids, that viscous stuff that can carry the contaminants of concern and transport them. I think the representation that is schematic of the map, unfortunately, kind of underestimates where the deeper areas might be, if you're only looking at one kind of contaminant and not having a schematic that is kind of representative of the four different ones that you're looking at. We appreciate that the pre-designed implementation will look at that more, but I think the representation is important. And also, I wanted to point out that the representation of NAPL and seeps and ebullition and all the ways that they can move around being represented in the schematic design was something that was advocated by the CAG and incorporated after CAG advocacy, which is something that often isn't acknowledged.

So I think representation is important, particularly for maps and things like that. I don't know if they can be updated to show composites to give a better picture. If you could go to the map, though, I just had a few questions on -- actually, it was earlier. No. No. The -- the map of the East Branch --

MS. KETU: Oh, that's the actual --

MR. WILEY: -- that shows the bulkhead and in situ stabilization.

MS. KETU: Yeah. Sorry. This one, right? The figure of the Alternative EB-D itself?

MR. WILEY: Yeah. So for instance, maybe it would be good to unpack for people what does slot dredging mean and also bulkhead replacement. I know you don't like to compare it too much with -- with Gowanus, but I know that a lot of -- a lot of area of Gowanus, new sheet pile bulkhead was put all along in from the existing bulkhead to shore it up since the dredge, you know, would make it deeper. You don't want the bulkhead to fail. So wondering what slot dredging is.

Also, the ISS, the in situ stabilization, which would help to seal the -- I'm assuming to seal the bottom to keep NAPL and the contaminants from seeping up or -- or coming up, is only representing that purple area at the top of the slide just on one segment. And you think that it would be in more places. So you know, why is that not represented in more areas? Why is it located right there on that Western Beef section of East Branch?

MS. KETU: So I'm going to start with that, actually. Okay. So one of the questions for those online is why was just this purple area assumed for ISS? Again, that was just to establish, like, a baseline. That's not the only area or the final area where ISS will be done. It'll be based on data that's collected in the PDI. We just have to assume a certain amount -- amount for, you know, developing, like, a baseline or -- or for our estimation purposes, which is why this area was selected. Slot dredging is a type of dredging. I would have to review the specifics and get back to you in the responsiveness summary -- summary of exactly what that entails.

I don't know if, Stephanie, you can speak to slot dredging more than I can.

MS. VAUGHN: No. I -- I -- why don't you finish going through, and then I'll add a few things.

MS. KETU: Okay. And then so one was about slot dredging, the ISS, and then anything else that I missed from --

MR. WILEY: Well, but -- but can you explain that again, why ISS is only shown for that one section, how that is based?

MS. VAUGHN: So can I -- I can jump in there, Rupika, if you want.

MS. KETU: Okay.

MS. VAUGHN: So we -- as -- as you know, we -- we are trying to go through this process on an expedited basis. So the data we have, we have a higher density of data in that area where it's purple because we conducted a pilot study there. So we know that area will likely need ISS. Based on the existing data, we don't know of any other areas that will definitely need an ISS.

We suspect there will be additional areas that will need ISS, but -- and -- and believe me, this was a topic of great discussion that we had with the -- with the NCG, but to -- it -- it would be sort of arbitrary to -- to pick another area of the East Branch as needing ISS without the data to support it, you know? So -- and the same goes for the other criteria for deeper dredging.

We don't know where that will be needed yet. So it's just not shown on this figure. I -- I fully understand that this figure is misleading, perhaps, and frustrating. I also don't know if there's a better solution.

A couple other things I wanted to say. First, going back to something earlier in the presentation, the 3-foot dredge depth, the approximate 3-foot dredge depth is not -- is not an arbitrary depth. It's -- it's related to the depth needed to place a protective cap. So it was determined for Newtown Creek that we needed at least this 3-foot dredge depth in order to be able to place a -- a protective cap, or, on average, a 3-foot dredge, to place a protective cap. On other water bodies, sometimes, that's a 1-foot dredge cap.

I -- I'm sure there are ones with deeper, but I'm not aware of any sites that have been deeper than 3-foot average dredge depth. So I would say between 1 and 3 feet is sort of typically what we would see on sediment sites. And I was making notes while you were talking.

I think the other thing I wanted to mention is that we will, as part of considering these comments, see if there's any ways we can update the FFS prior to finalizing the ROD to make all this clearer. But we will certainly make all this clearer in the ROD itself -- in, sorry, the record of decision itself, both in the responsiveness summary and in the text of the record of decision itself.

Did I address your concerns, Dan?

MS. KANDIL: I -- sorry to jump in here, but I had to mute Rupika because there was feedback. So you'd have to -- you'll have to unmute yourself again, Rupika -- or yeah, Rupika, please unmute yourself. Thank you.

MS. KETU: Okay. Hold on.

MR. WILEY: Yeah. I -- I guess that did it just -- just overall the -- the bathymetry or -- or how -- how -- how deep it is compared to the end versus going downstream toward the East River. I think the end depths, you know, is the -- is the question. So -- so for the ecology and so that stuff flows out as opposed to just stay stagnant. But I'll pass it on.

MS. VAUGHN: Okay. Yeah. No, understood. And -- and one other thing I wanted to mention, the bulkhead is -- you know, we -- we will also -- we -- we know it is a concern of the community -- or I shouldn't say the -- the community doesn't necessarily all have the same opinion, but I know many in the community would like to see an increase on soft shorelines. So you know, we will work to minimize the amounts of bulkhead needed and -- and during the design of the remedy.

MS. LONEY: Thank you, Stephanie. Just the point of order, we are now at 8:44, and -- and we need to wrap this up by 9:00. That's what the contract says. So if there are four more -- there are four more people -- five more people who've got questions.

Willis, I know you're one of those people. Would you be willing to allow folks who haven't asked the questions to go before you?

MR. ELKINS: Yeah. Thank you.

MS. LONEY: Such a giving guy.

Jan?

MS. MUN: Hi, my name is Jan Mun. I'm a part of the CAG and Newtown Creek Alliance. I'm going back to the 3-foot dredging question. I guess getting back to what -- what Sandy was saying, that we really need to sort of have a clear picture of these hotspots. And luckily, and also years ago, Anchor had presented some of their studies with the depth and the contamination of different depths.

And in that study, it showed that a lot of the contaminations were actually right below 3 feet. So I think, you know, this is -- this is questionable how the 3 feet is being determined. And also, because if the 3 feet is not necessarily -- is not arbitrary, but there is a reason why that was determined, and I know Stephanie had sort of explained some of that.

I guess the criteria is, are we going by human health, or are we going by the law, or are we going by what criteria does it say 3 feet? Could it not be something else? And could you please clarify what the reasoning and -- and how that will change according to the criteria that you're applying it to? So is it human health that you're applying it to, or is it something else?

MS. KETU: I think Stephanie has answered this question, but I'm going to let her --

MS. MUN: I -- I --

MS. KETU: Yeah.

MS. MUN: I don't think so. That's why I'm asking it again.

MS. VAUGHN: So yeah. No. I'll -- I'll say the -- the thing that differentiates Alternative C from Alternative D and makes Alternative D more attractive to us is because it has the four options for deeper dredging. So those four -- one of those four options for deeper dredging would be comparatively higher concentrations in the remaining sediment. So if we see that stopping at 3 feet is going to leave, you know, a -- a highly contaminated mass just below it, then we could go deeper, and there are the other reasons to go deeper as well.

So we will be, during the design, making very detailed and thoughtful decisions on where to depth -- dredge deeper based on both -- based on protectiveness. Everybody here wants to design and implement a remedy that is protective in the long term, including the responsible parties, because they don't want to have to go back and redo it.

MS. LONEY: Before I ask the --

MS. MUN: So you go by the protectiveness -- protectiveness?

MS. LONEY: Say that again?

MS. MUN: Could she please clarify what she means by protectiveness?

MS. LONEY: Okay. The question is: Can you please clarify what you mean by protectiveness?

MS. VAUGHN: So yeah. So when Rupika was talking earlier -- an earlier slide about the -- she showed the -- the remedial action objectives, we want to show -- and -- and the -- and the cleanup criteria, we want the cleanup criteria to be met. So as long as the cleanup criteria are met, then the remedy is protective. And -- but in order for there to be a risk, there needs to be exposure.

So as long as the cleanup criteria are met in the areas where humans and/or biota can be exposed to the contamination, then the remedy is protective. Does that make sense? Maybe Chuck could say it more smoothly.

MS. LONEY: Chuck says you -- you did a great job. Just one -- one quick point of order. If you have a comment or a question that you're not going to -- you don't feel comfortable asking or you -- we run out of time, I do have the index cards where you can write your -- write your question or your comment, and we can -- it would just be -- instead of you having to go home and e-mail or text or -- or text Stephanie, I mean, you can do it here. So this is still available. So anybody who wants one of these, raise your hand, and I'll pass one over to you.

Anya, I thought I saw -- I think I saw Anya leave the room. Okay.

Kel?

KEL: Thank you. Thank you so much. I am a former resident of one of the artist activist ferries in the area. And I also work with a nonprofit at 185668232. So many numbers. And thinking about the depth of the issue we have at hand, it's so important that we think about -- yeah, I mean, we definitely don't want to have a trail of toxic waste and dealing it with something at the site, I think, is the smartest idea and using bioremediation. And I -- I immediately think of Paul Stamets, who did a TED Talk about all the powerful ways that fungi can take care of all the things that you mentioned.

And I just really want to, like, just hope and pray that we could maybe get some other pro-life, probiotic things into the river, not only fungi, but also different, maybe greener methods, just because I just think about -- I don't know about archeology so much and what the -- the depth of this would be. And if they're just going to be shifted in another site -- or sifted through in another site and whatever is taken is taken.

And there's not any mention of the five nations that were the Native Americans that were here. And when I think about history, I think maybe this was a creek that was manmade, but I think a lot of these things would be ignored by our -- our -- the EPA. And I'm sorry, just track record here. And we need to take immediate action, of course, you know, that's why I -- I mentioned Paul Stamets and why we want to make sure that artists and activists can get the word out, as well as get into these sites to help get those probiotics and -- and different ways to help the environment made known, because so much of us -- so much of us don't know about these methods. That being said, yeah, I'm really curious about that 3 feet. Thank you so much.

MS. KETU: Okay. So yeah, thank you so much. And we totally hear your concerns about the creek, and the significance of it. Again, going back to the bioremediation, we found that this site, it would not be effective for addressing all the contamination at the site in the long term. But with that being said, I know that this concern has been brought up, and in the responsiveness summary, we hope to provide more details on the exact technologies that were evaluated, why they were screened out, and -- and additional details on that.

MS. VAUGHN: And I'll just quickly add. I know we're out of time. But the -- the cultural resource surveys are a part of any Superfund action.

So we do -- that is part of the process to make sure that we're not -- you know, that there aren't any sensitive, archeological, or -- or other concerns at the site that we need to address accordingly.

MS. LEHR: Hi. A very quick last question, I'm Anya. I work with the Councilmember -- Councilmember Jennifer Gutierrez and the chief of staff. Thank you guys for coming and chatting with us. Probably some people in this room can answer this question, but I'm curious how the reconstruction of the Grand Street Bridge, which is coming in the next few years, is going to interact with this project. And if there's, like, if you're -- how you're speaking with the state and the other parts of the federal government to figure that out.

MS. KETU: Yeah, of course. Thanks. So we actually hold regular coordination calls. Oh, so the question -- sorry. The question was about how we're going to coordinate with the replacement of the Grand Street Bridge. So we actually meet regularly with the New York City DOT to get updates on their project, compare timelines, share information so that we can coordinate with that project, when our remedy is going to be implemented, and when their project starts too. So -- so yes, we do meet with them regularly. We're aware that they're in the process of replacing that bridge. So we keep each other informed and -- and coordinated on it.

MS. LEHR: Are there any concerns about, like, construction debris, how it's going to work with all this remediation at the same time?

MS. KETU: Concerns about their construction, specifically?

MS. LEHR: As you're working through all this remediation of the timeline, is it going to affect each other?

MS. KETU: I think as we get closer to the actual replacement of the bridge and when the work starts, we'll be able to better answer that question.

LINDSAY: Hi, I'm Lindsay, I'm a community member and active member of the working waterfront. And I guess my curiosity is what health studies are being done to, in regards to the, like, immediate effects of the air quality and other kinds of direct impact that, like -- so while this process is going on, all of this stuff is being dredged up. It's being brought up into the air. It's being brought up into -- the people who are working on these projects are in direct contact with it.

Is there anything being studied on what

impact these materials are having on people directly, immediately now?

MS. KETU: It did -- I'm going to start by just saying -- okay, sorry. The question, I keep forgetting to repeat the question. The question was, how -- what kind of health studies are being done regarding this site, how the construction might impact the health of those working on this project --

LINDSAY: I'm sorry, and the nearby communities?

MS. KETU: -- and -- and the, you know, nearby communities. So I want to start by saying that we conducted a human health risk assessment for the site. And based on -- on that, we evaluated different exposure pathways and how people might be exposed to these contaminants. I don't know, Chuck, if you want to provide a little more detail on that, like the human health risk assessment? I -- do you mind passing the mic? Thanks.

MR. NACE: Sure. Hi, this is Chuck Nace again. So the human health risk assessment looked at exposures to sediment surface water and eating biota, to give us a baseline on whether there's unacceptable risk from doing those activities in the creek. And yes, there -- there were for eating contaminated fish.

And that's one thing that is spurring us to -- to do this cleanup.

During the cleanup, I know you had mentioned what we're doing health study-wise. I -- I wouldn't call them health studies, but what we will be doing, we will have health and safety plans -- community health and safety plans, where we will have perimeter air monitors up. We will do other sampling that we need to -- to ensure that nothing is leaving the site and getting into the community.

LINDSAY: But what about the people who are on the site working and around it, who are breathing the air while this stuff is being mucked up to the bottom of the creek, like, people who are -- it's on your skin. It's in your lungs. Like, is there any awareness, or of what kind of impact, or what can be done to -- what impact that might have?

MR. NACE: So -- so workers that are actually working on remediation and -- and doing the work will be under their own health and safety plan. They will -- generally will have medical monitoring that is done. They'll be wearing personal protective equipment, respirators, and -- and other equipment as needed for what they're being exposed to. So they -- they will be taken care of on that.

LINDSAY: But is there a study of what they're being exposed to, of what that is, what those concerns actually are? You know, everyone around that area will also be breathing the air and -- and experiencing that kind of -- in -- in the -- in the moment where all of this work is being done, everything gets dredged up, and it is in the air. It's in the environment. It's on the street. It's on people's clothes. It's around. It's -- what is that?

MR. NACE: Right. And -- and I did understand that concern. As I said, we will be monitoring. We'll be able to report out what is in the air or what may be leaving the site. But as soon as we find out that it's leaving the site, the concentrations that we're concerned about, we will change our activities. We will put in engineering controls so that doesn't happen. So it's not going to be a long-term thing. I won't say that there won't be maybe puffs of stuff to get out or -- or something, but we will know that, and we will take care of it and make sure that it does not continue.

LINDSAY: And how about the surrounding wildlife? Is there any concerns for --

MS. LONEY: You have to talk into the mic, so we can hear you.

LINDSAY: Any concern about the surrounding wildlife? Is that taken into consideration during the three years?

MS. LONEY: Oh, I'm sorry. I'm walking away. I'm sorry.

MR. NACE: I guess, she didn't want me to answer.

MS. LONEY: No, I'm sorry.

MR. NACE: We -- we are concerned about the wildlife, but that's why we're cleaning up. Obviously, we can't put respirators on wildlife or anything. But we -- we can try to minimize, you know, the -- the disturbance and -- and the, you know, the sediment leaving the site and -- and that type of thing. So --

LINDSAY: So you expect everything to just die in there?

MR. NACE: No, we do not. No.

MS. LONEY: Just so you know, the PowerPoint presentation -- tonight's PowerPoint presentation will be uploaded to the Newtown Creek page, so you can review it if -- if you need information to inform your comments.

We have two questions left. Willis and Louis? So I think we're going to go with Willis first. And Louis, you get to close out the night.

MR. ELKINS: Louis always gets to close out, so I'm happy to go first. The -- the first is just a follow-up. Someone asked of what slot dredging is. And I -- I feel like you -- you guys have to be able to answer that. It's written on that slide, like, six different times. It's one of the remediation strategies. There's nothing you can find online by Googling slot dredging. It's not mentioned in the FFS, as far as I can find in the 980 pages. So either you can try to respond to it now, but I just want to make the point that that is one of the remediation techniques, and we should be able to understand what that is.

The second point I want to make is that, you said DEC has concurred with remediation strategy EB-D. What does that mean? Has DEC formally weighed in before you released the plan? Are they still submitting comments? They've played a very vital role in this entire process, submitted numerous comments at every stage, and have significant role with all these upland sites that we've talked about. Seen pictures of the shorelines, the State Superfund sites, brownfields, et cetera, so it's really important to know. And DEC is welcome to comment on this if they want to as well. What that means that DEC has concurred with this plan.

MS. VAUGHN: So you want me to quickly weigh in on both of those, Rupika?

MS. KETU: Yeah. Go ahead.

MS. VAUGHN: Sure. So slot dredging, it's -- it's -- it's -- it's just a different form of dredging that's usually conducted when you're closer to the shoreline or closer to underground utilities such as sites or cables. It's -- it would be using a -- a smaller dredge bucket. It's -- it's -- it -- perhaps we overemphasize it. It's just we will -- we will use the appropriate dredging means depending on the location. Like, in the middle of the branch, we might be using a clamshell dredger, this sort of big thing. It opens and closes like a clamshell. When closer to the shore, we might use a smaller instrument.

What DEC concurrence means is they review the proposed plan. They sent us comments on it. And they sent us a letter saying that they concurred with our preferred alternative. That doesn't mean that they will not submit additional comments during the comment period, and -- and I expect they will. Their comments will become part of the public record, as will everyone else's comments. And then we will need to ask them for another letter of concurrence on the record of decision itself. So they will get the chance to review a draft of the record of decision before it is finalized.

LINDSAY: I can't help but think of missing persons. Whenever you say dredge, I just think of you, like, going through and just, you know, looking for a dead body or something, that it is -- that's what I think of when I think of dredging. That's how I think of it. So forgive me. It's like -- I know it's -- there's a difference there. You know, there's probably a lot of different aspects to this that I'm not aware of. But dredging to me, it sounds dreadful.

MS. KETU: Dredging is just the -- so the question is about dredging or the comments about what is dredging? It's just the act of removing sediment or mud from the creek using different types of equipment. Okay. I'm going to go to Louis for the last question.

MR. KLEINMAN: Great.

MS. KETU: Or comment.

MR. KLEINMAN: Yeah. It's only a -- a comment. Make it -- make it simple. I had about 20 questions, but before Natalie grabs the mic from my hand, I'm not going to ask anyone. I want to remind everybody that the CAG meets monthly. It is open to everybody. You can get the actual time and the date by doing a Google for it and make sure you do a Google for the CAG, which is not EPA regulated. It is an independent dot, not a government organization.  And everybody, as I said, is invited to join and participate.  So I hope some of you might, in fact, get onto that.

MS. LONEY:  Thank you, Louis.  That's the Newtown CAG.

UNIDENTIFIED SPEAKER:  Yay.

MS. LONEY:  So thank you all for -- for participating.  Thank you for your questions.  You have until October 28th to submit your comments and -- and/or questions to EPA.  Thank you all and have a good night.

UNIDENTIFIED SPEAKER:  Thanks, you guys.

MS. KETU:  Thanks everyone.  Good night.

(MEETING CONCLUDED AT 9:05 P.M.)

CERTIFICATE

I, John Sheffield, do hereby certify that I was authorized to and transcribed the foregoing recorded proceedings, and that the transcript is a true record, to the best of my ability.

Dated this 25th day, of September, 2024.

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John Sheffield

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