DAMAGE ASSESSMENT AND RESTORATION PLAN FOR THE CSX TRANSPORTATION TRAIN DERAILMENT IN MT. CARBON, WEST VIRGINIA

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PREPARED BY:

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Note to Reader:

Following is the final Damage Assessment and Restoration Plan (DARP) for the CSX Transportation, Inc. (CSX) train derailment that occurred on February 16, 2015 in Mt. Carbon (Fayette County), West Virginia.

Executive Summary:

The final DARP has been prepared by state and federal natural resource trustees to address natural resources and services injured or lost due to the release of Bakken crude oil from the CSX train derailment in Mt. Carbon, West Virginia. The designated natural resource trustee agencies involved in the development of this document are the United States Department of the Interior (DOI) represented by the U.S. Fish and Wildlife Service (USFWS) and the West Virginia Division of Natural Resources (WVDNR) representing the state (collectively, the Trustees).

On February 16, 2015, 27 cars of a 109-car CSX train carrying Bakken crude oil derailed in Mt. Carbon (Fayette County), West Virginia adjacent to Armstrong Creek, a tributary of the Kanawha River. The derailment resulted in an explosion and the release of Bakken oil into Armstrong Creek and the Kanawha River. Remedial actions at the site to contain the oil included the placement of a sheet-pile wall in the Kanawha River at the confluence with Armstrong Creek and the grounding of a work barge for staging of heavy equipment and booming operations. Habitat and associated ecological services affected by the spill and remedial actions included aquatic, benthic, and riparian. The Trustees determined that this release of oil and residue from the explosion and fire posed a direct threat to natural resources for which the federal and/or state governments may assert trusteeship under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9601 *et seq.*; the Clean Water Act (CWA), 33 U.S.C. § 1321 *et seq.*; the Oil Pollution Act (OPA), 33 U.S.C. § 2701 *et seq.*; and W.Va. Code 20-1-1, 20-1-7 and 20-2-3.

For this incident, the Trustees identified CSX Transportation, Inc. (CSX) as the responsible party for the release of oil and corresponding natural resource damages. To facilitate the settlement and achieve a cost-effective resolution, the Trustees invited CSX to conduct a cooperative assessment. The Trustees and CSX reviewed site-specific data, conducted on-site surveys and evaluated a reasonable range of restoration alternatives to compensate for injuries to natural

resources and lost services. The overall objective of the restoration planning process is to identify restoration alternatives that are appropriate to restore, rehabilitate, replace, or acquire natural resources and their services equivalent to natural resources injured or lost as a result of the release. The purpose of restoration is to make the public whole by providing compensation for injuries and losses to natural resources. The Trustees evaluated various restoration options, and have determined that the rehabilitation of 660 feet of shoreline where the incident occurred is the most appropriate restoration option for the natural resource injuries which occurred and selected it as the preferred restoration alternative. This rehabilitation includes the reforestation of 0.32 acres, invasive plant control and removal on 0.13 acres, restoration of 0.06 acres of wetlands and the placement of topsoil with a native upland seed mix on 1.03 acres restoration.

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DAMAGE ASSESSMENT AND RESTORATION PLAN FOR THE CSX TRANSPORTATION TRAIN DERAILMENT IN MT. CARBON, WEST VIRGINIA

1 INTRODUCTION AND INCIDENT SUMMARY

This Damage Assessment and Restoration Plan (DARP) has been prepared by the Natural Resource Trustees to address natural resources injured and services lost as a result of the CSX Transportation, Inc. (CSX) train derailment in Mt. Carbon, West Virginia on February 16, 2015. The designated natural resource trustee agencies involved in the development of this document are the United States Department of the Interior (DOI) represented by the U.S. Fish and Wildlife Service (USFWS) and the West Virginia Division of Natural Resources (WVDNR) representing the state (collectively, the Trustees). The Trustees are responsible under state and/or federal law to assess, recover, and seek compensation for natural resources injured and/or services lost as the result of unauthorized discharges of oil and or release of hazardous substances to the environment.

The DARP is intended to inform members of the public on the Trustees' assessment of the natural resource injuries and service losses described herein and the restoration actions that are proposed to be undertaken to compensate the public for those injuries and losses. The draft DARP was made available April 22, 2017 for public review and comment for 30 days. No public comments were received.

1.1 Overview of the Incident

On February 16, 2015, 27 cars of a 109-car CSX train carrying Bakken crude oil derailed in Mt. Carbon (Fayette County), West Virginia adjacent to Armstrong Creek, a tributary of the Kanawha River (Figure 1). The derailment resulted in an explosion and the release of Bakken oil into Armstrong Creek and the Kanawha River. Remedial actions at the site to contain the oil included the placement of a sheet-pile wall in the Kanawha River at the confluence with Armstrong Creek and the grounding of a work barge for staging of heavy equipment and booming operations. Habitat and associated ecological services affected by the spill and remedial actions included aquatic, benthic, and riparian.

The response actions did not contemplate or provide for the restoration of injuries to natural resources. Based upon site visits and surveys and observations by Trustee staff, the Trustees determined actual or potential injuries to natural resources and services had occurred as a result of the release, and that restoration planning was necessary.

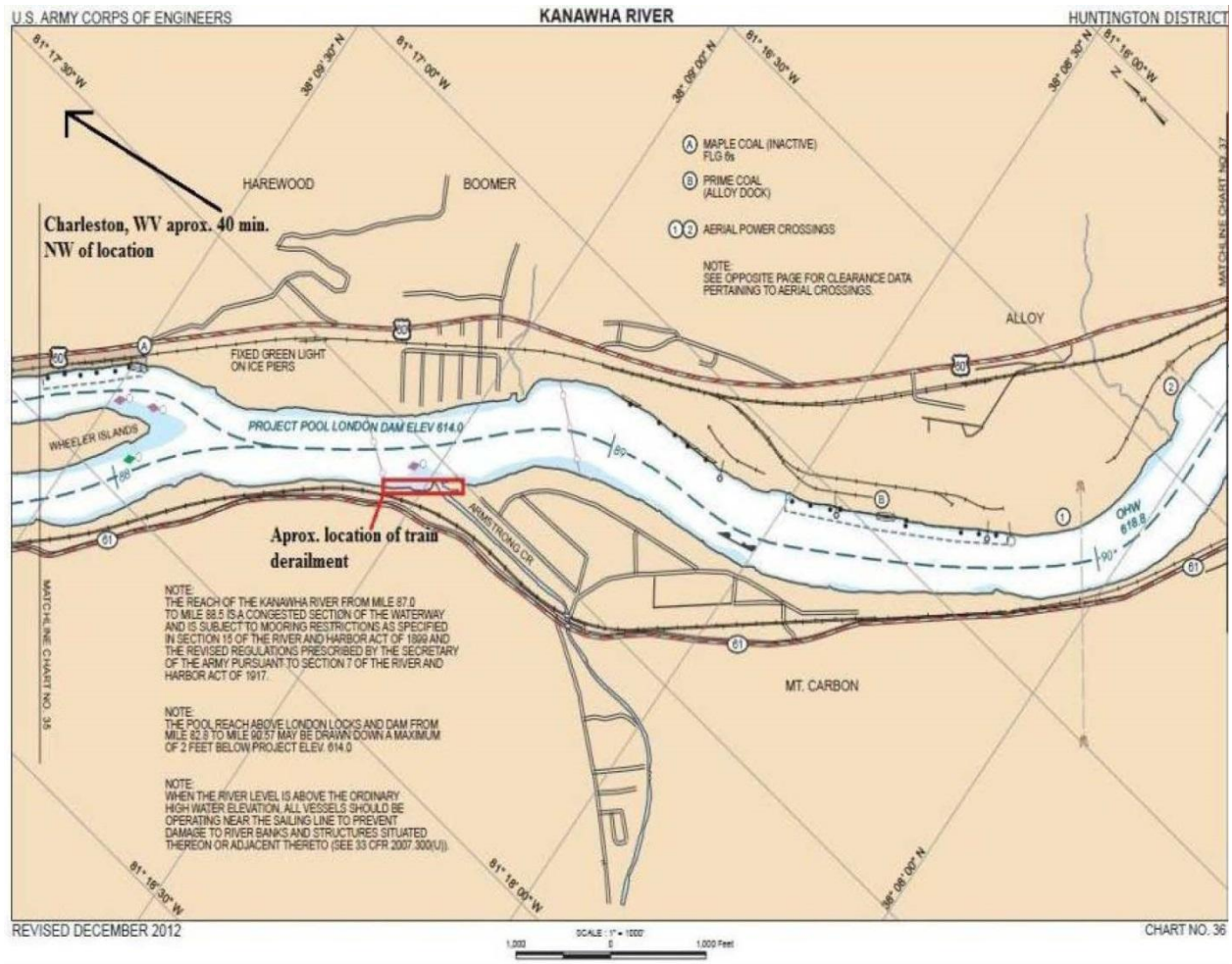

Figure 1. CSX train derailment location in Mt. Carbon (Fayette County), West Virginia.

1.2 Natural Resources Injuries

Restoration planning is needed to evaluate the magnitude of actual and potential injuries to natural resources and natural resource services and to determine the need for, and scale of, restoration actions. Natural resource services are the ecological and public services that natural resources provide, such as foraging and nesting habitat for bird populations, structural and ecological habitat for aquatic invertebrates, or fishing, hiking, swimming, nature photography, or similar recreational or educational services. Restoration planning uses information about these lost natural resources and services to determine the type and amount of restoration required. It provides the link between the injury and the restoration and has two basic components: injury assessment and restoration selection.

The goal of injury assessment is to determine the nature and extent of injuries to natural resources and services, thereby providing a factual basis for evaluating the need for, type of, and scale of restoration actions. Consistent with the Oil Pollution Act of 1990 (OPA, 33 U.S.C. §2701 et seq.), the goal of the restoration actions presented in this DARP is to make the environment and the public whole for injuries to, or lost use of, natural resources and services resulting from the release. This will be accomplished through the restoration, rehabilitation,

replacement, or acquisition, collectively referred to as restoration, of equivalent natural resources and services. The specific goals for this action are to restore the natural resources, such as migratory birds, affected by the spill and habitat that supports West Virginia trust resources.

1.3 Natural Resource Trustees and Authority

This DARP has been prepared jointly by the USFWS and WVDNR. Each of these agencies is a designated Natural Resource Trustee pursuant to the OPA (33 U.S.C. §2706), and the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR §§300.600 and 300.605), for natural resources injured by the release. As a designated Trustee, each agency is authorized to act on behalf of the public under state and/or federal law to assess and recover natural resource damages and to plan and implement actions to restore natural resources and resource services injured or lost as the result of a discharge of oil. Applicable laws and regulations regarding natural resources damage assessment and restoration planning include:

- OPA of 1990 (33 U.S.C. §2701 et seq.)
- Natural Resource Damage Assessment Regulations under OPA (15 CFR Part 990)
- National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300, Subpart G)
- National Environmental Policy Act (NEPA, 42 U.S.C. §4321 et seq.)

1.3.1 Overview of OPA Requirements

OPA establishes a liability regime for oil spills that injure or are likely to injure natural resources and/or the services that those resources provide to the ecosystem or humans. Federal and state agencies and Indian tribes act as Trustees on behalf of the public to assess the injuries, scale restoration to compensate for those injuries and implement restoration. Section l006(e)(1) of OPA (33 U.S.C. §2706(e)(1)) requires the President, acting through the Under Secretary of Commerce, to promulgate regulations for the assessment of natural resource damages resulting from a discharge or substantial threat of a discharge of oil. These regulations are found at 15 CFR Part 990. Assessments are intended to provide the basis for restoring, replacing, rehabilitating, and acquiring the equivalent of injured natural resources and services. The process emphasizes both public involvement and participation by the responsible party or parties.

Under OPA (33 U.S.C. §2706(d)), Trustees can recover:

1) the cost of restoring, rehabilitating, replacing, or acquiring the equivalent of the damaged natural resources ("primary restoration");
2) the diminution in value of those injured natural resources pending restoration ("compensatory restoration"); and
3) the reasonable assessment costs.

Incident, oil, and natural resources are defined under OPA (33 U.S.C. §2701):

- Incident means "any occurrence or series of occurrences having the same origin, involving one or more vessels, facilities, or any combination thereof, resulting in the discharge or substantial threat of discharge of oil."
- Oil means "oil of any kind or in any form, including petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil, but does not include any substance which is specifically listed or designated as a hazardous substance under

Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. 9601)."

- Natural resources are "land, fish, wildlife, biota, air, water, groundwater, drinking water supplies, and other such resources belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by the United States, any State or local government or Indian tribe."

1.3.2 *Natural Resource Damage Assessment Regulations under OPA*

As described in the OPA regulations, a NRDA consists of three phases: (1) Preassessment, (2) Restoration Planning, and (3) Restoration Implementation. Based on early available information collected during the preassessment phase, the Trustees make a preliminary determination as to whether natural resources and/or services have been injured and/or are likely to be injured by the release. Through coordination with response agencies (e.g., for this case the WVDEQ), the Trustees next determine whether the oil spill response actions will eliminate the injury or the threat of injury to natural resources and fully compensate for any interim losses. If there have been or will be uncompensated injuries, and feasible restoration alternatives exist to address such injuries, the Trustees may proceed with the restoration planning phase.

Before initiating a natural resource damage assessment (NRDA), the Trustees must determine that (15 CFR §990.41):

- an incident has occurred;
- the incident is not from a public vessel;
- the incident is not from an onshore facility subject to the Trans-Alaska Pipeline Authority Act;
- the incident is not permitted under federal, state, or local law; and
- public trust natural resources and/or services may have been injured as a result of the incident.

The Trustees made the above determination on August 24, 2015.

Injury is defined in the regulations as "an observable or measurable adverse change in a natural resource or impairment of a natural resource service" (15 CFR §990.30).

The purpose of the restoration planning phase is to evaluate the potential injuries to natural resources and services and use that information to determine the need for and scale of associated restoration actions. This phase provides the link between injury and restoration and has two basic components: (1) injury assessment, and (2) restoration selection. The goal of injury assessment is to determine the nature and extent of injuries to natural resources and services, thus providing a factual basis for evaluating the need for, type of, and scale of restoration actions. As the injury assessment is being completed, the Trustees develop a plan for restoring the injured natural resources and services.

During the restoration planning phase, the Trustees must:

- identify a reasonable range of restoration alternatives,
- evaluate and select the preferred alternative(s),
- develop a Restoration Plan presenting the alternative(s) to the public,

- solicit public comment on the Restoration Plan, and
- incorporate comments into a Final Restoration Plan.

1.3.3 Designation of Natural Resource Trustees

The National Oil and Hazardous Substances Pollution Contingency Plan, more commonly called the National Contingency Plan (NCP), is the federal government's blueprint for responding to both oil spills and hazardous substance releases. The NCP designates Federal and State agencies to act as Natural Resource Trustees at40 CFR Part 300, Subpart G.

1.3.4 National Environmental Policy Act Compliance

The National Environmental Policy Act (NEPA) requires an assessment of any federal action that may impact the environment. NEPA applies to restoration actions undertaken by federal Trustees, except where a categorical exclusion or other exception to NEPA applies. Restoration of natural resources under OPA which involves federal Trustee agencies must comply with the NEPA (42 U.S.C. §4321 et seq.) and the Council on Environmental Quality (CEQ) regulations implementing NEPA at 40 CFR Part 1500. The process outlined in OPA for NRDA selection of restoration alternatives is substantially similar to NEPA and therefore is in compliance with NEPA and the CEQ regulations. The DARP summarizes the current environmental setting, describes the purpose and need for action, identifies alternative actions, assesses their applicability and environmental consequences, and summarizes Trustee actions taken to facilitate opportunities for public participation in the decision-making process. Based on the previous information the Trustees determined that as proposed, the preferred restoration alternative meets the criteria for Categorical Exclusion from further environmental assessment or environmental impact statement evaluation as provided by the DOI Revised NEPA Implementation Procedures (DOI 1996).

1.3.5 Coordination and Settlement with the Responsible Party

Federal regulations direct the Trustees to invite the potential responsible party (PRP) to participate in the damage assessment and restoration process. The Trustees determined that a cooperative assessment was appropriate and entered into a cooperative assessment agreement with CSX Corporation on September 23, 2015. Although CSX Corporation contributed to the assessment process, final authority to make determinations regarding injury and restoration rests solely with the Trustees.

1.3.6 Public Participation

Public review of the Draft DARP is an integral component of the restoration planning process. Through the public review process, the Trustees seek public comment on the methods used to define and quantify natural resource injuries and service losses and the proposal to restore injured natural resources or replace lost resource services. The Draft DARP was available for public review and comment for a period of 30 days to provide the public with current information about the nature and extent of the natural resource injuries identified and restoration alternatives evaluated and proposed for implementation.

A notice of availability was posted in the Charleston Gazette newspaper and copies of the Draft DARP were available online at: https://www.fws.gov/northeast/virginiafield/news/news.html.

As restoration progresses, the Trustees may amend the DARP if significant changes are made to the types, scope, or impact of the project. In the event of a significant modification to the DARP, the Trustees will provide the public with an opportunity to comment on that particular amendment.

The Trustees have maintained records documenting the information considered and actions taken by the Trustees during this assessment and restoration planning process, and these records collectively comprise the Trustees' administrative record (AR) supporting the DARP. The AR records are available for review by interested members of the public. Arrangements must be made in advance to review or obtain copies of these records by contacting the office listed above. Access to and copying of these records is subject to all applicable laws and policies, including, laws and policies relating to copying fees and the reproduction or use of any material that is copyrighted.

2 AFFECTED ENVIRONMENT

This section describes the toxicity profile of the material spilled, the description of injured resources and services, as well as federal and state endangered and/or threatened species potentially affected by the incident. The description of these resources focuses primarily on the natural resources and services that are relevant to the discussion of injuries and restoration projects presented in this document.

2.1 Bakken Crude Oil Toxicity Profile

An estimated 375,000 of Bakken crude oil were discharged from the CSX train derailment. Bakken crude oil is also known as North Dakota Light or North Dakota Sweet Crude, is similar to West Texas intermediate crude oil and regulated under OPA (NWAC 2015). In general, Bakken crude oil has the same physical properties as gasoline and other light, sweet crude oils. It has a specific gravity less than 1 and will float on water (NWAC 2015). It is moderately volatile and contains higher concentrations of light end petroleum hydrocarbons including methane, ethane, propane and butane which can increase vapor pressure, lower the flashpoint, lower the initial boiling point and make it highly flammable when released (NWAC 2015). Although considered a light crude, Bakken may contain hydrogen sulfide. It can be acutely toxic to biota depending on the type and concentration of aromatic compounds present.

2.2 Description of Injured Resources and Services

Based on field observations and cooperative surveys, the Trustees determined that aquatic, benthic, shoreline, and riparian habitats within Armstrong Creek and the Kanawha River were injured due to the incident.

2.3 Biological Resources

Aquatic fauna associated with the aquatic and benthic habitats injured due to the incident include but are not limited to fish, aquatic mammals, amphibians, reptiles, migratory birds, and benthic macroinvertebrates. Other potential injured biological resources include flora impacted by the incident along the shoreline and within the riparian area where the spill and fire occurred.

2.4 Injury and Service Losses Due to Response Actions

Response actions focus on controlling exposure to crude oil products, by removing, neutralizing, or isolating them in order to protect human health and the environment from the threat of harm. Response actions are separate and distinct from the damage assessment process. However, at times, response actions can cause additional injuries to natural resources. When such injuries result from response actions, the additional injuries are included in the damage assessment (15 CFR §990.51).

As part of the incident response, a sheet pile wall was constructed along the south bank of the Kanawha River to prevent released crude from migrating into the river (Figure 2). Barges were deployed along the bank of the river to serve as work platforms and secondary containment (Figure 3). Excavation activities have removed approximately 19,000 tons of soil, and over

Figure 2. Sheet pile wall on south bank of Kanawha River.

Figure 3. Barges on south bank of Kanawha River.

300,000 gallons of oil and water were disposed of as non-hazardous waste. Filtermat™ AS material was installed at the bottom of the excavation area to absorb residual crude oil and Reactive Core Mat barriers were installed in two locations below the rail road tracks to control the run off following precipitation for areas unable to be excavated.

The Trustees have reason to believe that the response actions undertaken during the incident did not prevent, remedy, or compensate for potential injuries to or losses of natural resources under their jurisdiction and have concluded that a compensable injury resulted from the incident and the subsequent response actions.

2.5 Endangered and Threatened Species

The federal Endangered Species Act (ESA) of 1973 (16 USC Section §1531 *et seq*.) direct the Trustees to protect and conserve listed endangered and threatened animals. Four federally listed endangered mussel species (pink mucket (*Lampsilis abrupta*), fanshell (*Cyprogenia stegaria*), sheepnose (*Plethobasus cyphyus*), and spectaclecase (*Cumberlandia monodonta*)) have been documented to occur in the Kanawha River in close proximity to the incident site.

2.6 Human and Cultural Environment

The incident occurred near CSXT Mile Post CA 424.4, approximately 150 feet from the left descending bank of the Kanawha River, near the confluence of Armstrong Creek. The location is bound to the north and east by the Kanawha River, Armstrong Creek to the southeast West Virginia Route 61 to the west. The area is primarily residential; a subdivision is located to the southeast side of Armstrong Creek and the town of Boomer Branch is on the eastern side of the Kanawha River.

3 INJURY AND SERVICE LOSS EVALUATION

This section describes the potential injuries and quantifies the potential ecological service losses caused by the Incident and subsequent response actions. It begins with an overview of the Trustees' preassessment evaluation, assessment strategy, and restoration planning. The remainder of the section presents the results of Trustee assessments for the specific resources affected by the incident, including the approaches used to determine potential or actual injuries and quantify service losses.

3.1 Preassessment Evaluation

The preassessment phase is the initial step undertaken by the Trustees as part of the NRDA process at an oil spill. During the preassessment phase, trustees collect the necessary information to make critical determinations that shape the remainder of the NRDA. The preassessment is based on the circumstances of a given incident and helps the trustees determine whether NRDA actions under OPA are justified and make the necessary preliminary determinations regarding the type of injury assessment and restoration actions that may be pursued. The preassessment serves to document the Trustees decision process as well as coordinating other matters that may be considered during the preassessment phase including data collection, opening the Administrative Record, coordination, and emergency restoration.

The preassessment phase as described in the NRDA regulations pursuant to OPA has three threshold requirements that must be met during the preassessment phase before restoration planning can proceed. It must be concluded that:

1. a release of oil has occurred as defined by OPA § 990.30,
2. the release was not a permitted action, and
3. natural resources under trusteeship may have been or may be injured as a result of the incident.

The Trustees must also make the further determination to conduct restoration planning. OPA requires the Trustees to address the following criteria in making a determination to conduct restoration planning:

1. Injuries to natural resources that the Trustees have trusteeship over are likely to or have been injured.
2. Response actions taken have not or are not expected to compensate for natural resource injuries.
3. Primary or compensatory restoration actions are feasible.

The Trustees made an early decision to conduct a preassessment to determine if natural resources damage assessment was necessary. Immediately after the spill, during response activities, Trustee agencies had representatives at the Facility. The information collected during the preassessment phase for the spill satisfies the three criteria listed above and confirms the need for restoration planning to address injuries to natural resources as a result of the spill. In accordance with 15 CFR §990.42, the Trustees determined in February 2015 that the requisite conditions existed to justify proceeding with natural resource damage assessment and restoration planning beyond the preassessment phase. These conditions, discussed in more detail below, include: existence of natural resource injuries resulting from the discharge or from associated response actions; response actions were inadequate or inapplicable to restoration of natural resource injuries and losses; and existence of feasible actions to address the injured resources.

3.2 Assessment Strategy

In a cooperative approach, the Trustees and CSX conducted field surveys to document natural resource injuries and recovery at the site. Specifically, these assessment actions included developing a bathymetry map of the potentially impacted area of the Kanawha River (Appendix A); conducting sediment sampling within this area (Appendix B); and performing freshwater mussel surveys within the area because of the concerns for potential impacts to federally listed species identified in Section 2.5 of the DARP (Appendix C). Information gathered during these assessments allowed the Trustees to quantify the percent reduction in ecological services provided by the impacted ecological communities. The Trustees also quantified the resources provided by the restoration alternatives evaluated. The scale (or size) of the restoration action should be that which provides the value to adequately offset the value of the losses. The process of determining the size of restoration is called restoration scaling. Restoration scaling requires a framework for quantifying the value of losses and for quantifying the benefits of restoration so the losses and benefits can be compared.

3.3 Quantification of Injury

The Trustees incorporated data from scientific literature, survey results and professional judgment to quantify injuries to natural resources. To support their injury determination, the Trustees assessed injury based on physical, chemical, or biological adverse changes in a resource resulting from the incident. Examples of these injuries include changes in an organism's physical development, health, reproductive success, or behavior.

Results of the sediment sampling and freshwater mussel surveys indicated that there were no quantifiable interim losses of these resources due to the incident. However because of the spill, explosion, fire, and subsequent response actions the Trustees estimated that 400 linear feet of shoreline habitat and supporting riparian area had been directly injured. Considering the interim loss services from the time of the incident to when restoration can begin, the Trustees determined that a minimum of 600 feet of shoreline habitat and supporting riparian area was injured.

4 General Restoration Alternatives

The goal of the OPA is to make the environment and public whole for injuries to natural resources and services resulting from an incident involving the discharge or substantial threat of a discharge of oil. OPA recommends that this goal be achieved by returning injured natural resources to their baseline condition and by compensating for any interim losses of natural resources and services that occur during the period of recovery to baseline or pre-spill condition. The overall objective of the restoration planning process is to identify restoration alternatives that are appropriate to restore, rehabilitate, replace or acquire natural resources and their services equivalent to natural resources injured or lost as a result of discharges of oil. The restoration planning process has two components: primary restoration and compensatory restoration. Primary restoration actions are actions designed to return resources and services to their baseline levels on a natural recovery (no action) or accelerated (active restoration actions) time frame. Compensatory restoration is any action taken to compensate for interim losses of natural resources and services, pending return of the resources and their services to baseline level.
In accordance with NRDA regulations, the Trustees developed appropriate restoration

alternatives and selected preferred alternatives to address resource injuries and losses of services. The Trustees first identified and evaluated general alternatives capable of serving as compensatory restoration for the injured natural resources and/or services. As part of the effort to develop general restoration alternatives, the Trustees consulted with local scientists and state agency personnel to get their perspective on the benefits and feasibility of various types of restoration alternatives. These efforts were important in assisting the Trustees in identifying projects that are potentially feasible, have strong net environmental benefits, and meet restoration requirements to compensate for injuries resulting from the incident.

Some compensatory alternatives considered by the Trustees would provide similar resources and/or services to those injured, while other alternatives would compensate by providing a comparable resource enhancement or preservation. The Trustees preferentially seek to restore injured natural resources in-kind (e.g., restore shoreline and riparian habitat), in the geographical vicinity affected, while working to maximize ecosystem benefit, benefit to human uses of the environment (such as fisheries), and cost-effectiveness of restoration as a whole. However, in-kind restoration is not always possible or feasible, or may not otherwise fit the restoration selection criteria, and in those instances, enhancement or acquisition of alternative resources that provide similar ecological benefits may be appropriate. Finally, increased benefits and improved cost-effectiveness may often be obtained by addressing several injured resources and/or services or classes of injury with a single restoration project.

4.1 Evaluation Criteria for Selecting Preferred Restoration Alternatives

Once a reasonable range of restoration alternatives is developed, the OPA NRDA regulations (15 CFR §990.54) require the Trustees to identify preferred restoration alternatives based on certain criteria. The Trustees used the evaluation criteria listed below to consider and prioritize all restoration project alternatives currently identified. The criteria are not ranked in order of priority:

The cost to carry out the alternative: The benefits of a project relative to its cost are a major factor in evaluating restoration alternatives. In addition, the Trustees consider the total cost of the project. Factors that can affect and increase the costs of implementing the restoration alternatives may include project timing, access to the project site (for example with heavy equipment), obtaining state or federal permits, acquiring the land needed to complete a project, and potential liability from project construction.

The extent to which each alternative is expected to meet the Trustees' goals and objectives in returning the injured natural resource and services to baseline and/or compensating for interim losses: The fundamental goal of any compensatory restoration project is to provide resources and services of the same quality that were lost. Thus, the ability of the restoration project to provide comparable resources and services is an important consideration in the project selection process. Projects that restore, rehabilitate, replace, enhance, or acquire the equivalent of the resources and services injured by the spill are preferred to projects that benefit other comparable resources or services. To quantify the provision of resources and services, the Trustees must consider the potential relative productivity of the restored habitat. Finally, future site management issues and the opportunity for conservation easements are also considered

because they can influence the extent that the project meets objectives. The proposed alternative must comply with all applicable federal or state laws and regulations.

The likelihood of success of each alternative: The Trustees consider technical factors that represent either risk to the success of project construction or the long-term viability of the resources and services involved. For example, project sites with high subsidence rates are problematic due to concerns about the long-term existence of constructed habitats. An alternative that is susceptible to future degradation or loss through contaminant releases or erosion is considered less viable. Sites that require long-term maintenance of project features are less feasible. A proven track record demonstrating success of projects utilizing a similar or identical restoration technique can be used to satisfy these evaluation criteria.

The extent to which each alternative will prevent future injury as a result of the incident and avoid collateral injury as a result of implementing the alternative: Alternatives should avoid or minimize adverse impacts to the environment and the associated natural resources. Projects should not contaminate the surrounding area or conflict with the viability of endangered species populations. Projects should be compatible with surrounding land use.

The extent to which each alternative benefits more than one natural resource and/or service: This concept is related to the interrelationships among natural resources and between natural resources and the services they provide. Projects that provide benefits to more than one resource and/or service yield more benefits.

The effect of each alternative on public health and safety: Projects that would negatively affect public health or safety are not appropriate.

The regulations allow the Trustees to prioritize these criteria, and to use additional criteria as appropriate. The key criterion for the Trustees are the extent to which an alternative will compensate for losses and the likelihood of its success as these criterion most clearly indicate whether the goal of making the public whole from losses resulting from the discharge is met.

4.2 Compensatory Restoration Alternatives

As previously discussed and in accordance with the OPA regulations, the Trustees developed a reasonable range of restoration alternatives to address resource injuries and losses of service. Primary restoration under natural attenuation was not appropriate. The injuries considered for compensatory restoration consisted of the interim lost services associated with loss of productivity of riparian habitat. During the compensatory restoration planning, the Trustees evaluated what actions, if any, were appropriate to replace equivalent ecological services lost due to exposure to oil as a result of the spill. Some compensatory alternatives considered by the Trustees would provide similar resources and/or services to those injured, while other alternatives would compensate by providing a comparable resource or service.

4.2.1 General Alternatives Considered

The following subsections discuss a range of possible alternatives for restoration, an evaluation of each alternative as compared to the selection criteria shown above, and describe the

alternative selected by the Trustees for implementation.

Alternative 1 - No action
The Trustees evaluated the No Action alternative, which would provide no compensation beyond natural attenuation for injuries at the site. Under this alternative, the Trustees would take no direct action to obtain compensation for interim losses, pending recovery, associated with the injured resource and/or lost service in question. This alternative would be appropriate where no significant interim losses were incurred as a result of the incident, or where actions to provide compensation for those losses are not cost-effective.

The principal advantages of this approach are the ease of implementation and the absence of monetary costs. The Trustees may select natural recovery under three conditions: (1) if feasible, (2) if cost-effective primary restoration is not available, or (3) if injured resources would recover quickly to baseline without human intervention. The No Action alternative is not appropriate for the spill because the Trustees have determined that there were significant interim losses of natural resource services and that the No Action alternative would not provide compensation for lost use of natural resources and services. Further, it is inconsistent with OPA because interim ecological service losses have occurred and the public and the environment would not be made whole (compensated) through this alternative and cost-effective methods to achieve compensation are available. The Trustees have not selected the No Action alternative as the preferred restoration alternative.

Alternative 2 - Creation of habitat
This alternative would involve the creation of shoreline and riparian habitats to offset the injuries from the incident. The creation of shoreline and riparian habitats is technically feasible.
This alternative while technically feasible and meeting the OPA criteria is a very costly process with varying levels of success. It is generally recognized that constructed habitats never fully reach the productivity levels of natural habitats, thus requiring additional acreage to offset lost services. Due to the difficulty of constructing these different types of habitats and the reduced probability of success this alternative is not selected as the preferred restoration alternative.

Alternative 3 - Acquisition and preservation of existing high quality habitat
This alternative would provide protection for existing shoreline and riparian habitats. This alternative meets all the selection criteria described by OPA. However high quality property is not available in sufficient quantity nor at a reasonable fair market value within the area. Consequently this alternative is not selected as the preferred restoration alternative.

Alternative 4 – Acquisition and restoration/enhancement of habitat
Restoration and enhancement of existing shoreline habitat and supporting riparian habitat would create additional services to compensate for lost natural resources services from the incident. This alternative is technically feasible and cost effective because CSX has already purchased the property where the incident occurred. In addition, this alternative restores the services directly where the injury occurred. The Trustees conclude that the acquisition, which will be held in perpetuity, and restoration/enhancement of shoreline and riparian habitats would compensate the public for services lost due to the incident. Therefore, this alternative is selected as the preferred

restoration alternative.

4.2.2 Proposed Restoration Alternative

The Trustees, having concluded the alternatives analysis as required by OPA, have selected Alternative 4 as the preferred restoration project, the acquisition and restoration/enhancement of shoreline and riparian habitats as the proposed restoration alternative which meets all the selection criteria and best meets the Trustees' goals and objectives in compensating for interim losses. It is technically feasible and cost-effective to implement. In compliance with OPA, the selection of a preferred restoration alternative was finalized following public review and comment on the Draft DARP.

5 RESTORATION SCALING

Since the primary injury associated with the incident was to shoreline habitat and supporting riparian habitat, restoration "credits" were scaled to these habitat types. Scaled to the injury, a minimum of 600 linear feet of shoreline restoration/enhancement and supportive riparian restoration/enhancement would be necessary to offset lost resources and services from the incident.

6 PREFERRED RESTORATION PROJECT

In Section 4.2.2 the Trustees determined that the acquisition and restoration/enhancement of shoreline and riparian habitats was the preferred restoration alternative. CSX has purchased the property directly impacted by the incident and will rehabilitate 660 feet of shoreline habitat to include the reforestation of 0.32 acres, invasive plant control and removal on 0.13 acres, restoration of 0.06 acres of wetlands and the placement of topsoil with a native upland seed mix on 1.03 acres (for specific details see Appendix D). Therefore, this project was selected as the preferred restoration project.

7 CONCLUSION

As described above, the overall objective of the restoration process is to make the environment and public whole for injuries to natural resources and/or service losses resulting from the spill. To meet that objective, the benefits of restoration actions must be related, or have an appropriate nexus, to the natural resource injuries and losses due to the incident. The relationships that must be considered include the following:

- Equivalency of created or enhanced resources or services to those affected or potentially affected by the discharge of oil, and
- Potential for restoration at or near the area where natural resource injuries/service losses occurred.

To achieve this fundamental objective, the Trustees determined that the restoration alternative selected must have an ecological and a geographical relationship to injured resources and lost services. The Trustees approached restoration planning with the view that the injured natural resources/lost services are part of an integrated ecological system and that the selected acquisition and restoration/enhancement of shoreline and riparian habitats where the injury occurred provides the most relevant ecological benefits within the geographical area targeted for restoration actions.

8 REFERENCES

Northwest Area Committee (NWAC). 2015. Bakken Crude Oil. NWAC at www.rrt10nwac.com 22 pp.

Damage Assessment and Restoration Plan for the CSX Transportation Train Derailment in Mount Carbon, West Virginia

In accordance with U.S. Department of the Interior (Department) policy regarding documentation for natural resource damage assessment and restoration projects (521 DM 3), the Authorized Official for the Department must demonstrate approval of draft and final Restoration Plans and their associated National Environmental Policy Act documentation, with concurrence from the Department's Office of the Solicitor.

The Authorized Official for the CSX Transportation Train Derailment is the Regional Director for the U.S. Fish and Wildlife Service's Northeast Region.

The draft DARP was released April 22, 2017 for public review and comment for 30 days. No public comments were received. By the signatures below, the Damage Assessment and Restoration Plan (DARP) is hereby finalized and approved.

Approved:

Acting Wendi Weber Date
Regional Director
Northeast Region
U.S. Fish and Wildlife Service

Concurred:

6/13/2017

Mark Barash Date
Senior Attorney
Northeast Region
Office of the Solicitor

Approved:

Stephen S. McDaniel Date
Director
West Virginia Division of Natural Resources

Appendix A

Bathymetry Map of Potentially Impacted Area of the Kanawha River

Figure 1. Kanawha River Bathymetry. Mount Carbon, WV.

Date Created: July 15, 2015

Appendix B

Sediment Sampling within the Potentially Impacted Area of the Kanawha River

Sediment Sampling and Analysis Plan for Mt. Carbon, WV
Prepared for: CSX Transportation, Inc.
Prepared by: EnviroScience, Inc
Date: September 28, 2015

Purpose

On behalf of CSXT, EnviroScience (ES) has prepared the following *Sediment Sampling and Analysis Plan* ("SAP") in response to a derailment in Mount Carbon, WV, and subsequent crude oil release, which occurred on February 16, 2015 ("the incident"). The intent of this SAP is to provide resultant data for consideration in an assessment of potential damages to natural resources in the vicinity of the incident with regard to petroleum-derived compounds and/or related pyrogenic residues. This SAP has been developed at the request of and in cooperation with natural resources Trustees, led by USFWS. Sampling will occur coincident with a freshwater mussel survey to be conducted the week of September 28, 2015.

Sampling Locations

Eleven surficial sediment samples (0-6 inches) will be collected from Armstrong Creek and the Kanawha River in the vicinity of the incident. Sampled locations will include upstream reference sediments from both Armstrong Creek and the Kanawha River, the confluence of Armstrong Creek and the Kanawha River, six locations within the cell-based freshwater mussel survey area, and two locations in the Kanawha River 50 meters and 100 meters downstream of the overall freshwater mussel survey extents, respectively. Target sampling locations are shown on attached Figure 1.

Sampling locations may require adjustment based on site conditions and availability of fine grained sediments. Sediment samples will be collected prior to freshwater mussel survey activities at each location.

Sample Collection and Handling

It is anticipated that samples will be collected directly from native substrates by a diver. The diver will use a pre-cleaned stainless steel scoop to transfer fine grained sediments from the river or creek bed to an unpreserved 8-ounce soil jar. Samples will be collected with the sampler positioned upstream of the dive vessel and facing upstream, whenever possible. Samples will be labeled as indicated on attached Figure 1. All samples will be transferred to coolers, chilled

to 4ºC, sealed, and shipped to Alpha Analytical's Mansfield, MA laboratory under chain-of-custody protocols and within recommended holding times.

Stainless steel scoops will be thoroughly decontaminated and stored wrapped in aluminum foil prior to sampling. Scoops will be decontaminated using the following process:

1. Detergent wash
2. Deionized water (DI) rinse
3. Solvent rinse
4. Triple DI rinse

Laboratory Analyses

The Trustees have requested that sediment samples be analyzed for polycyclic aromatic hydrocarbons (PAHs). Samples will be analyzed for a suite of hydrocarbon fingerprinting parameters, which will include PAHs. Collected samples will be processed and analyzed at Alpha Analytical for the parameters listed below, using the noted laboratory methods described in detail elsewhere.[1] A method blank (B), lab control sample (LCS), lab control sample duplicate (LCSD) and laboratory sample duplicate (D) will be prepared and analyzed for quality control (QC).

- Alumina extract cleanup – Method 3610B
- Total petroleum hydrocarbons (TPH) and saturated hydrocarbons – Method 8015M
- PAHs, Alkyl-PAHs, and S-PAHs – Method 8270M
- Biomarkers – Method 8270M

[1] Douglas, G.S., Emsbo-Mattingly, S.D., Stout, S.A., Uhler, A.D., McCarthy, K.J. (2015). Hydrocarbon Fingerprinting Methods. In: Introduction to Environmental Forensics, 3rd Ed., Murphy, B.L., Morrison, R.D., Eds., pp. 201–309.

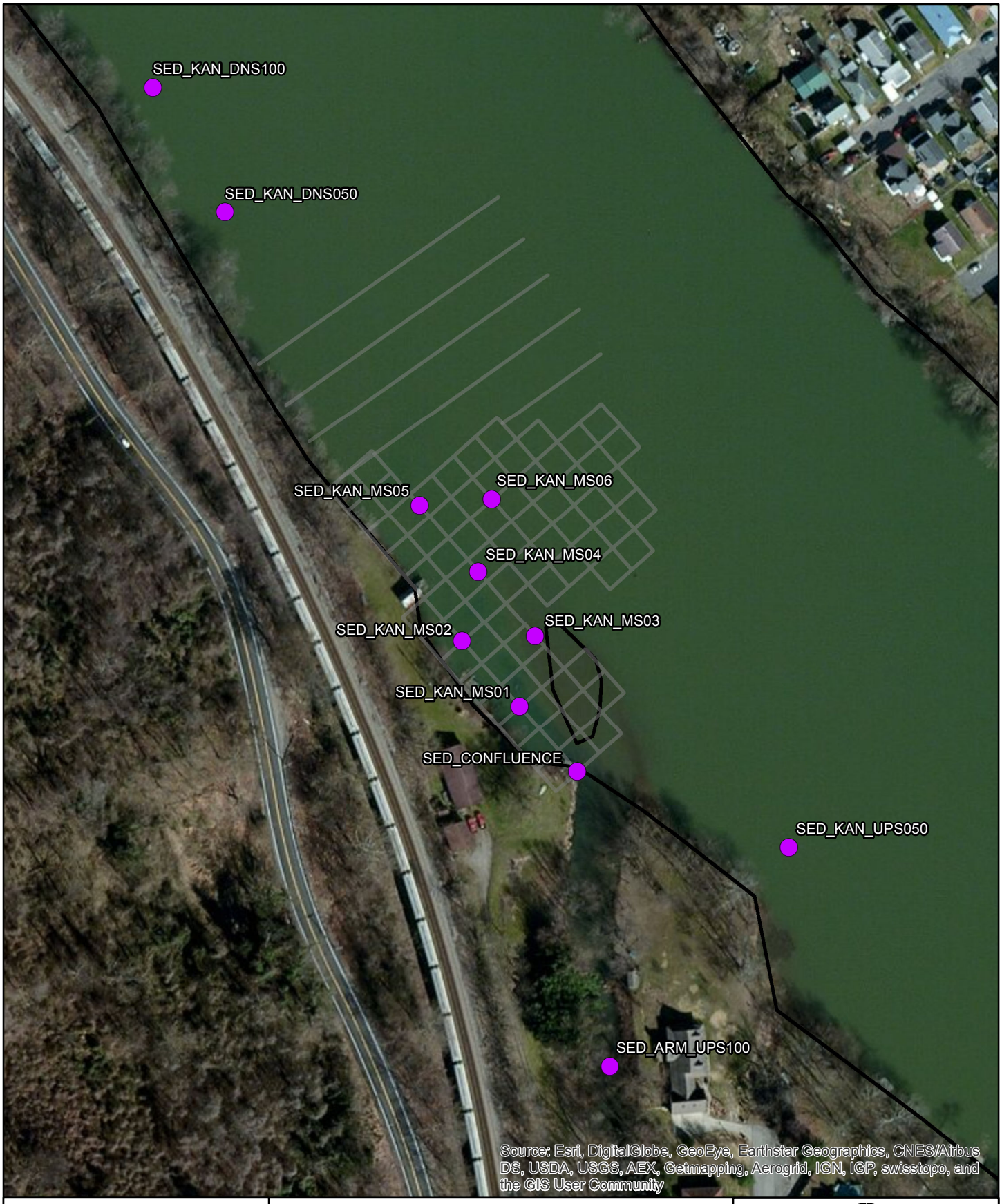

Figure 1. Target Sediment Sampling Locations. CSXT Mt. Carbon, WV.

Sediment Sample Location

Mussel Survey Transect

Mussell Survey Cell

0 75 150 ft

0 25 50 m

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Chemical Fingerprinting Assessment of Impact to Kanawha River Sediments due to the CSXT Train Derailment, Mt. Carbon, West Virginia

March 16, 2016

Scott A. Stout, Ph.D.
NewFields Environmental Forensics Practice, LLC

Abstract
Potential petroleum-derived impacts to Kanawha River sediments from the derailment of a CSX Transportation (CSXT) train carrying Bakken crude oil on February 16, 2015, in Mt. Carbon, West Virginia were assessed in two Phases. In Phase 1, detailed chemical analyses of fresh and weathered cargo oil – the latter represented by pooled oil collected in February 2015 at the base of the embankment and an oil sheen floating within the boomed area of the River – were conducted. In Phase 2, these results were compared to results from 11 surface sediments collected in September 2015 from the Kanawha River and Armstrong Creek as a means to assess any chemical impact on the sediment.

The results show that none of the sampled Kanawha River or Armstrong Creek sediments were impacted by liquid crude oil from the derailment. Instead, these sediments overwhelming contained hydrocarbons derived from particulate coal and natural organic matter (NOM, e.g., plant debris), which was pervasive in the sediments, including those collected upstream, proximal to, and downstream of the derailment site. Detailed analysis of PAHs, however, revealed that PAHs, mostly combustion-derived (pyrogenic) Priority Pollutant PAHs, were enriched in some sediments, particularly sediment collected from the confluence of Armstrong Creek and River. These “extra” pyrogenic PAHs could not be attributed to “background” (particulate coal or NOM), and notably, were also enriched in the partially-combusted pooled cargo oil collected below the derailment site in Phase 1. These “extra” PAHs were thereby most reasonably attributed to soot particles generated during the derailment’s oil fire that were subsequently accumulated below the derailment/fire site.

Calculations of biomarker-(hopane-) normalized PAH concentrations showed that most soot particles from the oil fire were deposited at the confluence (contributing ~7.2 mg/kg of “extra” Priority Pollutant PAHs), less were deposited at the MS01 location (~1.9 mg/kg “extra”), and even less were deposited at the MS02, MS05 and MS06 locations (0.5 to 1.1 mg/kg “extra”). No soot was recognized to have been deposited in any other sediments studied, including those further downstream of the derailment (DNS050 and DNS100).

In summary, the only chemical impact of the derailment, oil spill, and oil fire on Kanawha River sediments recognized from this study was the addition of fire-derived, PAH-bearing soot particles to surface sediments within a limited “footprint” of the river (confluence, MS01, MS02, MS05 and MS06).

Introduction

NewFields Companies, LLC is pleased to provide CSX Transportation (CSXT) with the results of our chemical fingerprinting assessment surrounding the derailment of a CSXT train carrying Bakken crude oil on February 16, 2015, in Mt. Carbon, West Virginia. Multiple cars were breached during derailment, which resulted in an oil spill and associated oil fire. The objective of the assessment was to determine the impact, if any, of the spilled crude oil and fire on sediments from the Kanawha River.

The study was conducted in two phases (described below). An inventory of the samples from both phases is provided in Table 1. The locations of these samples are depicted in maps shown in Fig. 1.

> Phase 1 (Feb. 2015): Fresh cargo oil and two weathered equivalents were characterized. The latter included (a) pooled oil collected at the base of the trackside slope immediately below the derailment and (b) a floating sheen collected within the boomed area on the River (Fig. 1A). In addition, a reference sheen observed ~650 m upstream of the derailment in the Kanawha River was also collected and studied (Fig. 1A).
>
> Phase 2 (Sept. 2015): Surface sediment samples were collected from the Kanawha River (10) and Armstrong Creek (1). Most of these sediments (7) were collected near and immediately downstream of the spill site with the remainder collected from upstream (2) and downstream (2) locations (Fig. 1B).

Samples and Analytical Methods

All of the samples were collected by personnel from EnviroScience (Stow, OH) and sent to Alpha Analytical (Mansfield, MA) under chain-of-custody. Copies of chain-of-custody documents are attached to this letter.

The samples were prepared and analyzed using methods appropriate for the study's objectives, and which have been described in detail elsewhere.[1] Prior to analysis the samples were prepared as described in the following paragraph.

Briefly, oils were diluted in dichloromethane (DCM) and spiked with recovery and surrogate internal standards prior to analysis. The sheen and sediments samples were spiked with recovery surrogates and serially-extracted (3x) using fresh DCM on a shaker table. Sheen sample extracts were combined, dried with anhydrous Na_2SO_4, concentrated to 1 mL, and spiked with surrogate internal standards prior to analysis. Sediment sample extracts were combined, filtered through glass wool, dried with anhydrous Na_2SO_4, concentrated to 1 mL, treated with activated copper to remove sulfur, silica gel-cleaned using EPA Method 3630C, re-concentrated to 1 mL and spiked with surrogate internal standards prior to instrument analysis.

All samples were analyzed using:

- *Total Extractable Hydrocarbon (TEH) and Selected Hydrocarbon (SHC) Quantification and Fingerprinting*: a modified EPA Method 8015D was used to

[1] Douglas, G.S., Emsbo-Mattingly, S.D., Stout, S.A., Uhler, A.D., McCarthy, K.J. (2015) Chemical fingerprinting methods. In: *Introduction to Environmental Forensics,* 3rd Ed., (B.L. Murphy and R.D. Morrison, Eds.), Acad. Press, Boston, pp. 201-309.

determine the TEH concentration (C_9-C_{44}) and concentrations of *n*-alkanes (C_9-C_{40}) and selected (C_{15}-C_{20}) acyclic isoprenoids (e.g., pristane and phytane), and simultaneously provide a detailed fingerprint via high resolution gas chromatography-flame ionization detection (GC/FID).

- *PAH, Alkyl-PAH and Sulfur-Containing Aromatics Quantification and Fingerprinting*: a modified EPA Method 8270C employing GC/MS-SIM was used to determine the concentrations of sixty-six (66) semi-volatile compounds or compound groups, included decalins, Priority Pollutant PAHs, alkylated PAHs, and sulfur-containing aromatics.

    - Total PAHs (TPAH) represents the sum of concentrations of 51 analytes (excluding retene) ranging from naphthalene through benzo(*ghi*)perylene.
    - Total Priority Pollutant PAH (PPAH) represents the sum of 16 Priority Pollutant PAHs.

- *Quantitative Biomarker Fingerprinting*: a modified EPA Method 8270D using GC/MS-SIM was used to determine the concentration of 53 tri-, tetra- and penta-cyclic triterpanes, regular and rearranged steranes, and aromatic steroids. The concentration of a conservative internal marker, viz., 17α(H),21β(H)-hopane (hopane), was used to calculate percent mass depletions/enrichment of other hydrocarbons.[2] This can be accomplished using the following equation:

$$\%\text{Depletion of A} = [((A_0/H_0) - (A_s/H_s))/(A_0/H_0)] \times 100 \qquad \textit{Eq. (1)}$$

  Where A_s and H_s are the concentrations of analyte A and hopane in the sample, respectively, and A_0 and H_0 are the concentrations of analyte A and hopane in the fresh cargo oil.

Finally, the fresh cargo oil and pooled oil were also analyzed using:

- *PIANO Quantification and Fingerprinting*: a modified EPA Method 8260B was used to measure 88 volatiles ranging from C_5-C_{13} from five major hydrocarbon classes, paraffins, isoparaffins, aromatics, naphthenes, and olefins (PIANO).

For each of the analyses above, a method blank (B), lab control sample (LCS), lab control sample duplicate (LCSD), sample duplicate (D) and reference oil were prepared and analyzed for quality control (QC).

Results and Discussion

All tabulated and chromatographic data from both phases are also attached to this letter. Tabulated data discussed herein is compiled in Table 2.

[2] Prince, R. C., D. L. Elmendorf, J. R. Lute, C. S. Hsu, C. E. Haith, J. D. Senius, G. J. Dechert, G. S. Douglas and E. L. Butler, 1994. 17α(H),21β(H)-hopane as a conserved internal marker for estimating the biodegradation of crude oil. Environ. Sci. .Tech.. 28(1): 142-145.

Phase 1

The fresh cargo oil was comprised of Bakken crude oil containing hydrocarbons ranging from C_5 up to ~C_{40} (Fig. 2A).[3] Compounds spanning this range were dominated by *n*-alkanes that decreased in abundance with increasing carbon number, which is typical of fresh crude oils. The prominence of gasoline range compounds (<C_{12}) indicates the fresh cargo oil was a very "light" crude oil, a known feature of the Bakken crude oils.[4] The specific concentrations specific volatiles present in the fresh cargo oil were revealed by the PIANO analysis (Table 2).

Not surprisingly the pooled oil below the derailment and sheen collected from within the boomed area on the Kanawha River (Fig. 1A) were comprised of weathered cargo oil (Fig. 2B-C). These oils exhibited a loss of volatiles due to the combined effects of natural evaporation and distillation enhanced by the fire. The latter was revealed by a depletion of *n*-alkanes (relative to hopane; per Eq. 1) extending up to approximately *n*-C_{30}; i.e., far beyond losses reasonably attributable to natural evaporation (especially given the low ambient temperatures and solar radiation that existed in the area during the spill). However, such losses are consistent with spilled crude oils that are intentionally burned as a remedial action, in the process known as *in situ* burning.[5] Of practical importance is that the combined effect of natural evaporation and the fire have caused the loss of virtually all volatile hydrocarbons in the weathered oils below C_{10} (Fig. 2B-C), including the BTEX compounds in the pooled oil (Table 2).

The fresh cargo oil contained 8665 mg/kg of TPAH and 360 mg/kg of PPAH. The pooled oil and oil sheen within the boom area contained 6667 and 11,043 mg/kg of TPAH and 405 to 530 mg/kg of PPAH, respectively, i.e., both lower and higher concentrations than in the fresh cargo oil (Table 2). This is not surprising as evaporation initially increases the concentration of PAH but as the more volatile PAHs are subsequently evaporated (or consumed via fire), the PAH concentration is reduced relative to the fresh oil.

The PAH were dominated by 2- and 3-ring low molecular weight PAHs (LPAHs), which comprised 90% of the TPAH (Table 2), and in turn, were dominated by alkyl-naphthalenes and alkyl-phenanthrenes (Fig. 3A). These alkyl homologue groups exhibit a characteristic "bell-shaped" pattern that is typical of petroleum-derived (petrogenic) PAHs.[6]

The evaporative loss of the volatile decalins (D0-D4) and alkyl naphthalenes (N0-N4) was evident in both weathered oil (Fig. 3B-C) and resulted in a lower %LPAH in the weathered oils (77-78%) than in the fresh cargo oil (90%; Table 2). The unweathered

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[3] Compounds <C_5 were assuredly present in the cargo oil but these highly volatile compounds were not analyzed as part of this fingerprinting study, which focused on liquid oil.

[4] Wybenga, F. (2014) A survey of Bakken crude oil characteristics assembled for the U.S. Department of Transportation. Am. Fuel & Petrochemical Manufacturers report to U.S. DOT, dated May 14, 2014.

[5] Garrett, R. M., C. D. Guénette, C. E. Haith and R. C. Prince, (2000). Pyrogenic polycyclic aromatic hydrocarbons in oil burn residues. *Environ. Sci. Tech.* **34**(10): 1934-1937.

[6] In contrast, combustion-derived (pyrogenic) PAHs have alkyl homologue groups that exhibit "skewed" patterns with much higher percentages of PPAH comprising the TPAH. For more details on PAH fingerprinting see: Boehm, P.D. (2006), Chapter 15, In: *Environmental Forensics: A Contaminant Specific Approach*, B. Murphy and R. Morrison, Eds.,. Elsevier Publishing Co., San Francisco, CA.

alkyl homologue groups in the weathered oils (e.g., P0-PA4) still exhibit the characteristic "bell-shaped" pattern typical of petroleum-derived (petrogenic) PAHs (Fig. 6).

Notably, a minor amount of "extra" PPAH were present in both weathered oils (Fig. 3B and C), e.g., "extra" fluoranthene (FL0) and pyrene (PY0) are present compared the fresh cargo oil. The presence of "extra" PPAH can be more easily seen when the % depletions for the PAHs are calculated (Eq. 1). Most homologues show a typical weathering loss that decreases with increasing degree of alkylation (Fig.4). However, numerous other Priority Pollutant PAHs were enriched (i.e., show negative % depletions) in the weathered oils, which (along with evaporation of naphthalenes) increased the percentage of PPAH in the weathered oils (Table 2).

This clearly indicates these pyrogenic PPAH were produced during the spill's fire. While this enrichment may seem "problematic" in terms of any potential impact to the environment, it is important to look at the *total* mass balance (and not just individual PPAHs). Specifically, when the total depletion of all PPAHs is calculated (Eq. 1) it was shown that the two weathered oils studied had actually lost 44 and 49 wt% of the PPAH originally present in the fresh cargo oil (Table 2). This results from the fact that naphthalene, the most abundant PPAH in the fresh oils (Fig. 3A) was significantly depleted in the weathered oil (~90 %; Fig. 4). The "extra" PPAH produced during the oil fire were still only present in relatively low concentrations among the total PAH (Fig. 3B-C). Thus, while the oil fire may seem like it produced "extra" PPAHs, the fire actually reduced the total Priority Pollutant PAHs by nearly half (44 and 49 wt%; Table 2) from what was originally present. Similarly, total PAHs (TPAH) were reduced between 41 and 59 wt% (Table 2). This degree of reduction in PPAH and TPAH has also been observed in spilled oils that were intentionally burned.[7]

A diagnostic feature revealed by the PAH results was the relative abundance of sulfur-containing aromatics (S-PAH) in the fresh and weathered source oil (pink bars in Fig. 3). These compounds' abundance was expressed by ratios between alkyl-dibenzothiophenes and alkyl-phenanthrenes (DBT2/PA2 and DBT3/PA3).
The fresh and weathered cargo oils had DBT2/PA2 and DBT3/PA3 ratios of ~0.30 and 0.32, respectively (Table 2).

Petroleum biomarkers are high boiling compounds that are resistant to weathering and highly specific to individual crude oils, and therefore are widely used in oil spill fingerprinting.[8] As they are high boiling (~C_{30}) they are present in relatively low concentrations in the light Bakken cargo oil; e.g., hopane is present in a concentration of only ~13 mg/kg (T19 in Fig. 5A; Table 2). The concentration of hopane increased in the weathered oils (Table 2) allowing calculation of total mass loss of the pooled oil and oil sheen in the boom area (41-45 and 59 wt%, respectively; Table 2).

More importantly than the increased concentrations, the biomarker fingerprint of the fresh cargo oil (Fig. 5A) was unchanged in the weathered oils (Fig. 5B-C). Numerous biomarker diagnostic ratios remained stable during weathering allowing the two

[7] Garrett, R.M., Guenette, C.C., Haith, C.E., Prince, R.C. (2000) Pyrogenic polycyclic aromatic hydrocarbons in oil burn residues. Environ. Sci. Technol. 34: 1934-1937.
[8] Wang, Z.. Stout, S.A., and Fingas, M. (2006) Forensic fingerprinting of biomarkers for oil spill characterization and source identification (Review). Environ. Forensics 7(2): 105-146.

weathered oils to still be recognized and "matched" to the cargo oil (Table 2). These ratios will be used in Phase 2 for comparison to sediments from the River.

Finally, the oil sheen collected upstream of the derailment in the Kanawha River (Fig. 1) exhibited a distinct chemical character revealed in its disparate GC/FID chromatograms, PAH histogram, and biomarker histogram (Fig. 6). Every feature of this oil sheen was distinct from the fresh or weathered cargo oils discussed above (Figs. 2-5; Table 2). The upstream oil sheen exhibited features consistent with a severely weathered middle distillate petroleum (e.g., diesel fuel or fuel oil #2) – not Bakken or any other crude oil. Therefore, it was clear that the upstream oil sheen studied herein was unrelated to the crude oil spilled during the derailment. The existence of oil sheen, ~650 m upstream of the derailment (Fig. 1), was important as it indicates the Kanawha River is subject to input of petroleum from (at least one) other source(s).

Phase 2

The sediments studied in Phase 2 each contained extractable hydrocarbons. The concentrations of these were reflected in the TEH concentration of sediments that ranged from 41 to 434 mg/kg (Table 2). The character of the TEH was revealed by the GC/FID chromatograms, which are shown in Fig. 7 (along with those of the fresh and weathered cargo oils for comparison).

Inspection of the sediments' chromatograms reveals them to be distinct from those of the fresh and weathered cargo oils – indicating the spilled oil does not appear to have impacted the sediments (Fig. 7). For example, each of the sediments contain some lower boiling hydrocarbons ($<C_{10}$) that were absent (evaporated) from the spilled oil. Although higher boiling *n*-alkanes were present in the oil and sediments, those present in sediments exhibited distinctive profiles compared to the weathered oils, *viz*., the sediments were dominated by odd-carbon numbered *n*-alkanes above *n*-C_{25} (reflected in the elevated carbon preference indices in the sediments (CPI; Table 2). In addition, none of the sediments exhibited a prominent UCM typical of weathered oil, and most contained a narrow UCM in the C_{32}-C_{35} region topped by multiple peaks typical of naturally occurring terpenoids (Fig. 7). Pristane/phytane ratios in the sediments were much higher than in the spilled oil (Table 2).

Collectively, the chromatographic features of the hydrocarbons in sediments of the Kanawha River (and Armstrong Creek) are derived from mixtures of particulate coal and naturally-occurring organic matter (e.g., vegetation debris). There is no evidence for the presence of fresh or weathered crude oil contributing to the sediments' TEH. Notably, both sediments collected upstream of the derailment site contained hydrocarbons derived from particulate coal (not spilled oil), indicating this material is pervasive within the River's sediments. The presence of particulate coal[9] and naturally-occurring organic matter (NOM)[10] in sediments has been widely recognized, but fortunately can be readily

[9]Stout, S.A. and S.D. Emsbo-Mattingly, S.D. (2008) Concentration and character of PAHs and other hydrocarbons in coals of varying rank – Implications for environmental studies of soils and sediments containing particulate coal. *Org. Geochem*. 39; 801-819; Achten, C. and T. Hofmann. (2009) Native polycyclic aromatic hydrocarbons (PAH) in coals – A hardly recognized source of environmental contamination. *Sci. Total. Environ*. 407; 2461-2473.

[10] Wang, Z., C. Yang, F. Kelley-Hooper, B.P. Hollebone, X. Peng, C.E. Brown, M. Landriault, J. Sun, Z. Yang. (2009) Forensic differentiation of biogenic organic compounds from petroleum hydrocarbons and petrogenic compounds cross-contaminated soils and sediments. *J. Chromat.*

distinguished from spilled petroleum (in this case, crude oil). Variability among the coal TEH fingerprints likely reflects varying degrees of weathering of the coal, although coal rank can also contribute.

Further confirmation regarding the absence of spilled Bakken crude oil in the sediments was obtained from the biomarkers results for the sediments. Fig. 8 shows the distributions of triterpane, sterane, and triaromatic steroids (TAS) biomarkers in the sediments and the fresh and weathered cargo oils. There was an obvious disparity in the character of these highly diagnostic compounds in the sediments and cargo oils that, like the TEH fingerprints described above, indicated the hydrocarbons in the sediments were not spilled crude oil. Rather, the biomarkers in the sediments appeared consistent with those found in the upstream sediment samples recognized to contain particulate coal (Fig. 8). Several sediments also contained excessive relative amounts of selected biomarkers (T14b, T20, T26, T32, and T33) relative to the particulate coal (see stippled bars in Fig. 8). These particular excesses were attributed to co-eluting terpenoids (e.g., 17β(H),21β(H)-hopanoids and other naturally-occurring plant/bacteria-derived compounds).[10] Thus, as was the case for the TEH, the biomarkers in the Kanawha River sediments were consistent with those derived from mixtures of particulate coal and NOM – not spilled crude oil).

The disparity in biomarkers was further revealed by inspection and cross-plots of selected diagnostic ratios among these compounds (Table 2). Fig. 9 shows two double-ratio plots for selected biomarker diagnostic ratios that highlight the differences that existed between the biomarkers found in the River and Creek sediments and the fresh and weathered cargo oils. Notably, sediments upstream, midstream, and downstream of the spill site contain consistent biomarkers attributable to the particular type of coal present in the region.

The Kanawha River and Armstrong Creek sediments all contained PAHs. The concentrations TPAH and PPAH in sediments ranged from 2.3 to 19.5 mg/kg and 0.50 to 8.4 mg/kg, respectively (dry wt.; Table 2). Excluding the confluence sediments sample (described below), the %TPAH that occurs as PPAH in each of the sediments ranged from 19.1 to 29.6, which was markedly higher than was represented by the fresh or weathered crude oils (4.2 to 6.1%; Table 2). However, the higher percentages were consistent with particulate coal in all of the sediments except the confluence sample (see below). Thus, the varying concentrations of PAH in the sediments largely reflect varying concentrations of particulate coal in the River's sediments.

Fig. 10 shows the PAH distributions for the sediments studied along with those for the fresh and weathered cargo oils. As can be seen there was an obvious disparity between the distribution of PAHs in the sediments *versus* the fresh and weathered cargo oils. One set of metrics that quickly revealed this disparity was the DBT2/PA2 and DBT3/PA3 ratios (discussed previous in the Phase 1 results) between the Bakken crude oil (~0.30 and 0.32, respectively) and the River's sediments (0.09-0.12 and 0.11-0.17, respectively; Table 2), which indicated the River's coal contained markedly lower relative amounts of sulfur-containing aromatics than the spilled crude oil. Collectively, the disparity in PAH patterns and characteristics provided no basis to recognize that PAHs from the spilled oil contributed

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A; 1216; 1174-1191.; Stout, S.A. and A.D. Uhler (2006) Distinguishing "background" hydrocarbons from contamination using chemical fingerprinting. *Environ. Claims J.* 15(2); 241-259;; Stout, S.A., B. Liu, G.C. Millner, D. Hamlin, E. Healey (2007) Use of chemical fingerprinting to establish the presence of spilled crude oil in a residential area following Hurricane Katrina, St. Bernard Parish, Louisiana. *Environ. Sci. Technol*. 41; 7242-7251.

to the PAHs in the River (or Creek) sediments. Instead, most sediments (i.e., except the confluence sample) exhibited PAH distributions consistent with those found in the particulate coal-bearing sediments collected upstream of the derailment/spill site (Fig. 10).

The confluence sediment sample was unique among the sediments studied (Fig. 10). This sediment contained PAHs that, unlike the other sediments, were much more strongly dominated by pyrogenic PAHs. This difference can be seen in the confluence sediment sample's higher %TPAH at PPAH (49.6), % high molecular weight PAHs (59), and % pyrogenic PAHs (62) compared to the other sediments (Table 2). In addition, numerous PAH isomer ratios were distinct in this sample (MPR1 through BaA/C0; Table 2) indicating that the manner by which the PAHs were formed (i.e., heating conditions during PAH formation) was different.[11] Collectively, these differences indicated that the dominant source of PAHs in the confluence sediment sample were distinct pyrogenic PAHs, such as occur in partially combusted organic matter, i.e., soot particles.[12]

Soot particles are derived from the combustion of a variety of sources. For example, forest fires and combustion engines will each generate pyrogenic PAH-rich soot particles. However, given the circumstances of this investigation, *viz*., a proximal oil fire in which "extra" PAHs were generated and found to be enriched in the partially combusted oil found pooled below the derailment site (see above; Fig. 3B-C), and considering the proximity of the confluence sample in particular to the derailment site (Fig. 1A), it is most reasonable to attribute the unique character and elevated concentration of the confluence sediment's PAHs to the deposition of soot particles generated by the oil fire. Thus, while there is no evidence that the liquid oil itself impacted the Kanawha River sediments there does appear to have been an impact of PAHs generated by the derailment's accompanying oil fire to the sediments. This impact is most obvious at the confluence site (Fig. 10) where sheet flow off of the embankment is envisioned to have accumulated soot particles from the fire.

The potential contribution of such particles to the other sediments in the River was also investigated. This was achieved by calculating the %depletion of each PAH in the River's sediment samples *versus* the River's particulate coal – as represented by the upstream River sediment (UPS50). Any "extra" pyrogenic PAHs (relative to the "background" coal in these sediments) in the midstream and downstream sediments might be assumed to represent PAHs derived from soot particles from the oil fire that were deposited in these sediments. The % depletion was calculated using *Eq.1*, wherein A_0 and H_0 are the concentrations of each PAH analyte, A, and hopane in the UPS50 sediment.

The results of these calculations are provided in Table 3 and graphically displayed in Fig. 11 for the other 10 sediments (excluding UPS50, wherein all PAHs are derived from "background" coal). The *y*-axis on the histograms plotted are shown in reverse order so that any *negative* % depletions (i.e., % enrichments) point upwards. As can be seen the confluence sediment sample exhibits hundreds to thousands percent enrichments of most Priority Pollutant (pyrogenic) PAHs – which was why it was "easy" to recognize the impact of

[11] For example: Yunker M.B. et al. (2002) PAHs in the Fraser River basin: A critical appraisal of PAH ratios as indicators of PAH source and composition. *Org. Geochem.* 33: 489-515.
[12] For example: Stout, S.A., A.D. Uhler, and S.D. Emsbo-Mattingly. (2004) Comparative evaluation of background anthropogenic hydrocarbons in surficial sediments from nine urban waterways. *Environ. Sci. Technol.,* 38; 2987-2994 and refs. Therein.

the soot particles on this sediment (Fig. 10). The impact of soot particles on the other sediment is less obvious; however, close inspection revealed that there were enrichments of numerous pyrogenic PAHs in the MS01, MS02, MS05, and MS06 sediments. Each of these sediments contains a 100 to about 300% enrichment in acenaphthylene, fluorene, anthracene, fluoranthene, pyrene, benz(a)anthracene, and/or multiple 5- and 6-ring PAHs (Fig. 10). The locations of these sediments suggests soot particles may be entered the River and were spread downstream toward MS01, MS02, MS05 and MS06 (Fig. 1B).

Marginally significant and more sporadic enrichments of a few pyrogenic PAHs were also evident in the MS04 and DNS050 sediments, but these enrichments are equivocal as to whether they actually represent any "extra" PAH deposition or simply limitations of the estimates (e.g., assumed representativeness of the UPS50 upstream sample). This limitation is demonstrated by the marginal enrichment of alkylated naphthalenes in the UPS100 sediment from Armstrong Creek (Fig. 11), which was solely due to the higher proportion of these petrogenic PAHs in the particular (possibly less weathered) coal present in this sample (Figs. 10 and 11). No enrichment of PAHs was evident in the MS03 or DNS100 sediments (Fig. 11).

Because the enrichments calculated and depicted in Fig. 10 are percentages, they do not reflect the absolute concentrations of any "extra" PAHs due to the deposition of soot particles from the derailment's oil fire. As such, an additional calculation was performed in order to estimate the absolute concentrations of PAHs added to the sediments due to the deposition of soot. This calculation was achieved by first assuming all of the hopane present in any given sediment was derived from coal particles as represented by the upstream sediment containing particulate coal (UPS050). This was a reasonable assumption given that no crude oil was present in any of the sediments (see above; Fig. 7) and NOM does not contain nor contribute hopane to sediments; i.e., "background" coal was the overwhelming source of PAHs in the sediments (Fig. 10).[8] The concentration of each PAH in a given sediments was then normalized to hopane and subtracted from the concentration of that PAH in the UPS050 sediment. Any positive resulting values reflect "extra" PAHs in the sediment that was not attributable to "background" coal.

The results of these calculations are provided in Table 4 and graphically displayed in Fig. 12. Inspection reveals that, not surprisingly the confluence sediment sample contains the highest concentrations of "extra" PAHs – not attributable to coal. It was estimated that approximately 7.2 mg/kg of PPAH and 11.4 mg/kg of TPAH were added to this sample due to deposition of soot particles. The particles impart a strong pyrogenic character to the PAHs in this sample, as evidenced by the strongly skewed alkylated homologue patterns (Fig. 12).[6]

Not surprisingly given its immediately downstream location (Fig. 1B), the MS01 sediment contained the next highest concentrations of "extra" PAHs due to the presence of soot particles, *viz*., approximately 1.9 and 2.9 mg/kg of PPAH and TPAH, respectively (Table 4). These were dominated by fluoranthene and pyrene (Fig. 12). Further downstream, the MS02, MS05, and MS06 sediments contained even lower concentrations of "extra" PAHs ranging from 0.5 to 1.1 mg/kg PPAH and 0.6 to 1.3 mg/kg of TPAH (Table 4). Sediments collected further downstream at DNS100 and DNS050 contained very low concentrations of "extra" PPAH (187 and 104 ug/kg; Table 4), which were generally comparable to those observed in the sediment upstream in Armstrong Creek (94 ug/kg; Table 4). Thus, these low concentrations cannot be reasonably attributed to the deposition of soot particles at DNS100 or DNS050, but rather to variations in the nature of the "background" coal in the River.

In summary, the overall pattern in the concentrations of “extra” PAHs in sediments attributed to soot particles (Confluence >>> MS01 > MS02~MS05~MS06 > DNS100~DNS050) indicate that PAH-bearing soot particles generated during the derailment’s oil fire were mostly deposited near the confluence of Armstrong Creek and the Kanawha River and were spread downstream to have only a minor impact at MS01, MS02, MS05, and MS06.

Conclusions

Phase 1 of NewFields’ chemical fingerprinting assessment of the fresh Bakken cargo oil and two weathered equivalents spilled during the CSXT derailment in Mt. Carbon, West Virginia has provided for the following conclusions:

(1) The fresh cargo oil was a light, highly volatile crude oil typical of Bakken crude oil that was prone to evaporation and combustion.
(2) The fresh cargo oil contained 917 mg/kg of benzene, 8584 mg/kg of total BTEX, 8665 mg/kg of total PAH (TPAH) and 360 mg/kg of Priority Pollutant PAH (PPAH).[13]
(3) Numerous diagnostic features of the fresh cargo oil were measured (Table 2; Figs. 2-5), which were used in assessing the potential presence of Bakken oil residues in sediments of Armstrong Creek and Kanawha River during Phase 2 of the study.

Chemical analysis of two weathered oils collected adjacent to and 11 days after the derailment (i.e., oil pooled near the track and an oil sheen within the boomed area of the Kanawha River; Fig. 1A) showed the weathered oils:

(4) contained virtually no volatile compounds ($<C_{10}$), including the BTEX compounds, which were lost to evaporation.
(5) had lost between about half to two-thirds (50 to 65%) of their total mass overwhelming due to evaporation, which was enhanced by the accompanying oil fire.
(6) contained 6667 and 11,043 mg/kg of TPAH and 405 and 530 mg/kg of PPAH, the concentration of which varied depending upon the extent of evaporation.
(7) contained minor amounts of “extra” combustion-derived (pyrogenic) PPAH that formed during the spill’s accompanying oil fire. Although some specific PPAH were “extra”, the total masses of TPAH and PPAH in the weathered oils were significantly reduced compared to the fresh cargo oil (56 to 64% and 44 to 49%, respectively). Thus, the accidental burning of the spilled oil reduced the total mass of PAH present in the unburned weathered oils by about half.
(8) contained petroleum biomarkers that were consistent with the fresh cargo oil, despite the effects of evaporation and combustion, which were used in assessing the potential presence of Bakken oil residues in sediments of Armstrong Creek and Kanawha River during Phase 2 of the study.

Chemical analysis of an oil sheen collected ~650 m upstream of, and 11 days after, the derailment on the Kanawha River showed the upstream (reference) sheen (Fig. 1A) was:

[13] As described in the *Analytical Methods* section, total PAH (TPAH) refers to the total of 51 PAH analytes (naphthalene through benzo(ghi)perylene, excluding retene) and Priority Pollutant PAH (PPAH) refers to the total of 16 Priority Pollutant PAH analytes.

(9) comprised of severely weathered middle distillate (diesel fuel or fuel oil #2) that was unrelated to the derailment's spilled oil. The existence of this distinct sheen indicates petroleum discharges to the Kanawha River are not unique to the CSXT derailment.

Phase 2

Sediments throughout the study area:

(10) contained total extractable hydrocarbons (TEH; 41 to 434 mg/kg) that are exclusively derived from variable mixtures of coal and naturally-occurring organic matter (NOM; e.g., plant debris), which were ubiquitous in the River and Creek sediments.
(11) did not contain crude oil derived from the spilled cargo oil. The absence of fresh or weathered crude oil in the sediments was revealed by numerous diagnostic features of the sediments that were inconsistent with the fresh or weathered crude oil (Phase 1) and consistent with upstream coal-bearing sediment. Thus, any liquid oil that may have entered the Creek/River during the derailment did not accumulate in sediment studied.
(12) also did not contain middle distillate petroleum potentially attributable to the upstream (sheen) source recognized in Phase 1 (see #9 above).
(13) contained TPAH concentrations that ranged from 2.3 to 19.5 mg/kg and PPAH concentrations that ranged from 0.50 to 8.4 mg/kg. The varying concentrations of TPAH largely reflect varying concentrations of particulate coal in the sediments. However, the highest concentrations of combustion-derived (pyrogenic) PPAH were found in sediment collected nearest the derailment, i.e., a the confluence of Armstrong Creek and the Kanawha River (CONFLUENCE location; Fig. 1B).

Sediment collected proximal to the derailment/fire at the confluence of the Armstrong Creek and Kanawha River:

(14) clearly contained elevated concentrations of "extra" combustion-derived (pyrogenic) PPAH that, in the absence of any other known source(s) and the observed presence of "extra" PPAH in the weathered oils (#7 above), were reasonably attributable to the deposition of PPAH-rich soot particles that were generated from the oil fire (and deposited at the bottom of the embankment near the confluence).

Close inspection and calculations of the PAH distributions and concentration data from other River sediments – after accounting for the contribution of PAHs from "background" coal (as represented by the upstream River sediment; UPS050) – revealed:

(15) only minor "extra" combustion-derived (pyrogenic) PPAH were present at the MS01 location (Fig. 1B), indicating the impact of soot particles generated from the oil fire extended, but decreased downstream of the confluence.
(16) traces of "extra" combustion-derived PPAH appeared also present in sediments from MS02, MS05, and MS06 (Fig. 1B).
(17) no "extra" PAH appear to be present in sediments from MS03, MS04, DNS50 or DNS100 (Fig. 1B).

Estimates of the absolute concentrations of "extra" (non-coal derived) combustion-derived PAHs attributed to soot from the derailment's oil fire showed:

(16) the confluence sediment received approximately 7.2 mg/kg of PPAH and 11.4 mg/kg of TPAH from the soot that was deposited, probably via sheet flow off of the embankment.
(17) the MS01 sediment location received approximately 1.9 and 2.9 mg/kg of PPAH and TPAH, respectively.
(18) the MS02, MS05 and MS06 locations received between approximately 0.5 to 1.1 mg/kg PPAH and 0.6 to 1.3 mg/kg of TPAH.
(19) downstream sediments at DNS050 and DNS100 received no “extra” PAHs from soot.

Thus, PAH-bearing soot particles generated during the derailment’s oil fire were mostly deposited near the confluence of Armstrong Creek and the Kanawha River and were spread and deposited downstream to have only a minor impact at MS01, MS02, MS05, and MS06.

Table 1: Inventory and description of samples included in Phase 1 and Phase 2 of this study.

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Phase 1

Client ID	Lab ID	Matrix	Date Collected	Description
CBTX-742201-022715	1503002-02	NAPL	02/27/2015	Fresh Cargo Oil
CBTX-742201-022715	1503002-02D	NAPL	02/27/2015	Fresh Cargo Oil (dup)
Pool-022715	1503002-01	NAPL	02/27/2015	Pooled Oil
Pool-022715	1503002-01XD	NAPL	02/27/2015	NAPL - Pool (dup)
Sheen Boom-022715	1503002-04	Sheen	02/27/2015	Boomed Sheen
Sheen Reference-022715	1503002-03	Sheen	02/27/2015	Reference Sheen

Phase 2

Client ID	Lab ID	Matrix	Date Collected	Description
SED-KAN-DNS100	1510001-01	Sediment	09/29/2015	Downstream River
SED-KAN-DNS100 (dup)	1510001-01D	Sediment	09/29/2015	Downstream River (dup)
SED-KAN-DNS050	1510001-02	Sediment	09/29/2015	Downstream River
SED-KAN-MS06	1510001-03	Sediment	09/29/2015	Spill Area
SED-KAN-MS05	1510001-04	Sediment	09/29/2015	Spill Area
SED-KAN-MS04	1510001-05	Sediment	09/29/2015	Spill Area
SED-KAN-MS03	1510001-06	Sediment	09/29/2015	Spill Area
SED-KAN-MS02	1510001-07	Sediment	09/29/2015	Spill Area
SED-KAN-MS01	1510001-08	Sediment	09/29/2015	Spill Area
SED-CONFLUENCE	1510001-09	Sediment	09/29/2015	Creek/River Confluence
SED-KAN-UPS050	1510001-10	Sediment	09/29/2015	Upstream River
SED-ARM-UPS100	1510001-11	Sediment	09/29/2015	Upstream Creek

Table 2: Tabulated data for the samples studied in Phase 1 (left) and Phase 2 (right).
Percent depletions of weathered oil in sediments not calculated because no oil was present in sediments.

	Fresh Cargo Oil	Pooled Oil	Pooled Oil (dup)	Boomed Sheen	Upstream Reference Sheen	DOWNSTREAM			MIDSTREAM						SED-CONFLUENCE	UPSTREAM	
						SED-KAN-DNS100	SED-KAN-DNS100 (dup)	SED-KAN-DNS050	SED-KAN-MS06	SED-KAN-MS05	SED-KAN-MS04	SED-KAN-MS03	SED-KAN-MS02	SED-KAN-MS01		SED-KAN-UPS050	SED-ARM-UPS100
		NAPL	NAPL	Sheen	Sheen	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
TOC, TPH and Alkanes																	
TEH (C9-C44) (mg/kg)	576000	497000	528000	749000	982000	98	101	76	159	433	119	41	258	212	98	135	48
nC17/Pr	1.7	1.5	1.6	1.6	0.1	0.8	0.7	0.9	0.8	1.2	0.9	1.1	0.8	0.6	0.9	0.9	1.0
nC18/Ph	1.7	1.6	1.6	1.7	0.0	3.6	3.1	3.4	2.2	2.6	3.0	4.9	2.0	1.8	0.8	3.1	nc
Pr/Ph	1.4	1.2	1.3	1.2	1.4	3.9	4.0	3.7	3.4	3.5	4.0	2.9	3.4	3.6	0.8	3.8	nc
CPI	1.1	1.0	1.0	1.1	1.4	2.1	3.4	2.5	2.5	4.4	3.3	1.0	3.3	1.6	1.1	1.4	1.4
Volatiles																	
Total Volatiles	190276	2267	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Total Monoaromatics	19281	245	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Total BTEX	8584	12	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Benzene	917	nd	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Toluene	2640	2	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Ethylbenzene	757	nd	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Total Xylenes	4270	11	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
PAH and S-PAH																	
TPAH (Σ51) (mg/kg)	8665	6667	6899	11043	3405	6.1	6.1	4.4	9.1	16.5	4.6	2.3	9.6	19.5	17.0	9.6	3.5
PPAH (Σ16) (mg/kg)	360	405	418	530	75	1.7	1.5	1.1	2.6	4.8	1.2	0.5	2.6	5.8	8.4	2.0	0.7
%TEH as TPAH	1.5	1.3	1.3	1.5	0.3	6.3	6.0	5.7	5.7	3.8	3.9	5.7	3.7	9.2	17.3	7.1	7.5
%TPAH as PP PAH	4.2	6.1	6.1	4.8	2.2	28.0	24.5	25.1	28.4	29.0	24.9	21.4	27.3	29.6	49.6	21.1	19.1
%TEH as PP PAH	0.1	0.1	0.1	0.1	0.0	1.8	1.5	1.4	1.6	1.1	1.0	1.2	1.0	2.7	8.6	1.5	1.4
%LPAH of TPAH	90	77	77	78	99	57	56	61	56	54	59	70	56	60	41	64	66
%HPAH of TPAH	10	23	23	22	1	43	44	39	44	46	41	30	44	40	59	36	34
%Petrogenic	97	91	91	92	96	63	65	66	62	61	66	73	63	62	38	69	74
%Pyrogenic	3	9	9	8	4	37	35	34	38	39	34	27	37	38	62	31	26
MPI 1	0.7	0.6	0.6	0.6	1.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.6	0.5
MPR	0.9	0.9	0.9	0.9	1.1	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.8	1.3	1.3
AN/P0	0.0	0.10	0.10	0.10	0.00	0.05	0.07	0.06	0.11	0.10	0.08	0.04	0.09	0.09	0.25	0.02	0.04
FL/PY	0.21	0.98	1.00	0.77	1.19	1.38	0.93	1.10	1.15	1.17	1.10	1.09	1.15	1.28	1.35	0.90	0.98
BaA/C0	0.06	0.46	0.46	0.30	0.26	0.43	0.55	0.57	0.72	0.67	0.59	0.47	0.67	0.72	1.07	0.38	0.44
DBT2/PA2	0.30	0.30	0.29	0.30	0.53	0.10	0.09	0.10	0.11	0.11	0.11	0.12	0.12	0.10	0.11	0.09	0.10
DBT3/PA3	0.32	0.34	0.33	0.32	0.67	0.13	0.11	0.13	0.14	0.14	0.14	0.17	0.16	0.11	0.15	0.11	0.14
Biomarkers																	
Hopane (T19; ug/kg)	13100	26300	28600	37600	44100	41	27	25	40	91	27	10	52	72	20	34	13
Total Triterpanes (ug/kg)	96280	180750	195890	292700	343500	272	239	192	310	1134	308	64	548	399	106	185	75
Total Steranes (ug/kg)	136400	228870	237960	366340	216880	60	43	40	66	178	51	22	113	98	33	49	29
Total TAS (ug/kg)	109100	190200	200400	299600	48010	24	18	22	34	108	25	10	71	34	13	12	13
T11/T12	nc	1.7	1.8	2.4	0.9	0.3	0.4	0.3	0.4	0.4	0.5	0.5	0.5	0.3	0.4	0.3	0.5
T15/T16	2.1	1.9	2.1	2.1	3.1	6.6	4.6	6.4	6.0	5.0	4.5	4.2	5.5	9.0	7.2	9.1	4.7
T15/T19	0.5	0.46	0.44	0.42	0.77	0.7	0.8	0.8	0.7	0.9	0.8	0.7	0.8	0.7	0.7	0.6	0.7
(ΣT7-10)/T19	1.0	0.73	0.75	0.86	0.00	0.0	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.0	0.1
Total Steranes/T19	10	8702	8320	9743	4918	1.5	1.6	1.6	1.6	2.0	1.9	2.2	2.2	1.4	1.7	1.5	2.2
Total TAS/T19	8	7232	7007	7968	1089	0.6	0.7	0.9	0.8	1.2	0.9	1.0	1.4	0.5	0.7	0.3	1.0

Percent Depletions in Weathered Oil (relative to hopane; Eq. 1)

TEH	0	100	100	100	na*
TPAH (51)	nc	62	64	56	na*
PP PAH (16)	nc	44	47	49	na*
LPAH	nc	67	69	61	na*
HPAH	nc	16	19	5	na*

na - not analyzed
nc - not calculable
(dup) - laboratory duplicate

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Table 3: Calculated percent depletion of individual PAHs in sediments relative to UPS050 sediment per Equation 1. (See text for description). Negative depletions indicate enrichments of PAHs not attributable to particulate coal, the overwhelming source of PAHs in the River's sediments. Data are plotted in Fig. 11.

	DNS100	DNS050	MS06	MS05	MS04	MS03	MS02	MS01	CONFLUENCE	UPS100
N0	15	-10	-32	1	11	-61	2	-33	-101	-74
N1	23	-1	-8	18	14	-89	15	-22	-65	-129
N2	29	6	-4	22	12	-82	17	-24	-66	-109
N3	35	16	3	27	17	-48	19	-22	-85	-58
N4	47	35	17	38	32	-7	29	-4	-49	-4
B	40	26	20	44	40	-34	41	9	-2	-42
DF	47	31	27	45	43	-4	41	6	-128	-17
AY	-19	-75	-198	-172	-107	-64	-149	-31	-4064	-38
AE	34	23	17	27	27	-18	29	-91	-538	6
F0	5	-6	-11	-28	-11	-97	-2	-148	-3456	-105
F1	4	-2	0	5	-12	-140	6	-14	-672	-149
F2	70	64	55	64	63	43	61	46	20	50
F3	68	67	56	64	65	53	60	35	28	56
A0	27	-2	-120	-64	-15	-2	-47	-211	-2751	-5
P0	63	58	52	60	63	43	58	20	-176	38
PA1	69	62	53	63	63	49	61	35	-34	45
PA2	64	57	42	55	55	44	54	28	-20	39
PA3	58	51	33	45	46	36	42	13	-29	29
PA4	57	47	28	41	42	35	33	11	-18	26
DBT0	44	35	27	33	34	-5	29	-31	-442	-13
DBT1	56	48	35	47	43	19	40	15	-94	17
DBT2	59	50	27	44	41	23	38	18	-57	28
DBT3	52	42	16	31	31	5	18	14	-71	12
DBT4	53	46	11	30	27	9	2	15	-48	21
FL0	-73	0	-99	-62	-12	3	-48	-187	-1773	26
PY0	-13	17	-56	-25	8	20	-16	-102	-1150	31
FP1	34	30	0	21	28	20	24	-10	-470	4
FP2	52	54	37	48	51	45	48	28	-127	32
FP3	65	62	48	55	57	54	55	40	-39	40
FP4	64	60	48	53	55	55	51	40	-23	35
NBT0	58	56	36	48	52	48	48	26	-166	40
NBT1	66	60	50	57	57	53	55	40	-51	29
NBT2	60	53	41	47	47	41	44	33	-39	10
NBT3	48	35	23	23	27	13	18	25	-57	-33
NBT4	42	28	10	8	18	6	-3	15	-10	-53
BA0	23	2	-93	-45	-7	8	-40	-85	-1387	3
C0	32	35	-1	18	32	27	21	2	-427	17
BC1	56	47	26	40	46	43	38	26	-220	2
BC2	53	44	24	39	42	40	34	21	-109	-17
BC3	47	36	16	30	32	24	24	15	-79	-39
BC4	49	36	18	26	27	16	22	21	-65	-36
BBF	-7	-30	-85	-70	-29	-17	-55	-72	-934	-29
BJKF	-44	-78	-221	-172	-110	-46	-162	-205	-2302	-28
BAF	-46	-141	-341	-275	-175	-81	-245	-237	-3933	-60
BEP	10	-15	-33	-17	0	-11	-11	-27	-546	-59
BAP	-12	-74	-181	-149	-80	-44	-134	-183	-2029	-53
PER	-107	-328	-214	-191	-136	-47	-149	-162	-1858	11
IND	-32	-97	-198	-190	-116	-66	-174	-219	-2032	-41
DA	18	-21	-67	-54	-26	-13	-45	-72	-1056	-38
GHI	-7	-56	-66	-58	-33	-37	-48	-76	-839	-57

Table 4: Calculated concentrations (μg/kg dry wt) of "extra" PAHs in sediments relative to UPS050 sediment. "Extra" PAHs are not attributable to particulate coal, the overwhelming source of PAHs in the River's sediments, but more likely to soot particles attributed to the derailment oil fire. Only the five shaded samples clearly contain "extra" PAH exceeding 2-times that of UPS100 upstream sediment, and thereby are considered significant and indicative of the addition of soot particles to the Confluence, MS01, MS02, MS05, and MS06 sediments. (See text for description). Data are plotted in Fig. 12.

	DNS100	DNS050	MS06	MS05	MS04	MS03	MS02	MS01	CONFLUENCE	UPS100
N0	0	15	80	0	0	37	0	147	120	58
N1	0	4	44	0	0	117	0	212	170	223
N2	0	0	24	0	0	120	0	261	192	210
N3	0	0	0	0	0	48	0	164	169	76
N4	0	0	0	0	0	4	0	16	59	3
B	0	0	0	0	0	9	0	0	1	15
DF	0	0	0	0	0	2	0	0	154	14
AY	2	5	19	37	7	1	18	5	190	1
AE	0	0	0	0	0	1	0	27	43	0
F0	0	1	2	10	1	4	0	44	283	6
F1	0	0	0	0	2	10	0	8	97	14
F2	0	0	0	0	0	0	0	0	0	0
F3	0	0	0	0	0	0	0	0	0	0
A0	0	0	36	43	3	0	18	111	393	1
P0	0	0	0	0	0	0	0	0	1034	0
PA1	0	0	0	0	0	0	0	0	225	0
PA2	0	0	0	0	0	0	0	0	76	0
PA3	0	0	0	0	0	0	0	0	41	0
PA4	0	0	0	0	0	0	0	0	11	0
DBT0	0	0	0	0	0	0	0	20	79	2
DBT1	0	0	0	0	0	0	0	0	38	0
DBT2	0	0	0	0	0	0	0	0	18	0
DBT3	0	0	0	0	0	0	0	0	11	0
DBT4	0	0	0	0	0	0	0	0	3	0
FL0	123	1	165	233	14	0	102	550	1420	0
PY0	25	0	103	105	0	0	37	333	1021	0
FP1	0	0	0	0	0	0	0	45	590	0
FP2	0	0	0	0	0	0	0	0	335	0
FP3	0	0	0	0	0	0	0	0	98	0
FP4	0	0	0	0	0	0	0	0	36	0
NBT0	0	0	0	0	0	0	0	0	122	0
NBT1	0	0	0	0	0	0	0	0	47	0
NBT2	0	0	0	0	0	0	0	0	21	0
NBT3	0	0	0	0	0	0	0	0	11	4
NBT4	0	0	0	0	0	0	1	0	1	4
BA0	0	0	91	98	5	0	50	147	652	0
C0	0	0	3	0	0	0	0	0	531	0
BC1	0	0	0	0	0	0	0	0	290	0
BC2	0	0	0	0	0	0	0	0	119	13
BC3	0	0	0	0	0	0	0	0	79	26
BC4	0	0	0	0	0	0	0	0	38	14
BBF	7	17	78	145	18	4	65	117	414	9
BJKF	19	20	93	162	31	5	87	153	468	4
BAF	3	6	24	43	8	1	22	29	133	1
BEP	0	11	39	45	0	3	16	57	314	22
BAP	6	22	88	162	26	5	83	157	475	8
PER	14	27	28	57	12	2	25	38	119	0
IND	9	17	55	119	22	4	62	108	274	4
DA	0	2	13	23	3	1	11	24	97	2
GHI	4	21	39	77	13	5	36	80	239	11
PPAH	187	104	785	1070	125	63	505	1886	7239	94
TPAH	212	170	1023	1360	165	384	634	2853	11350	742

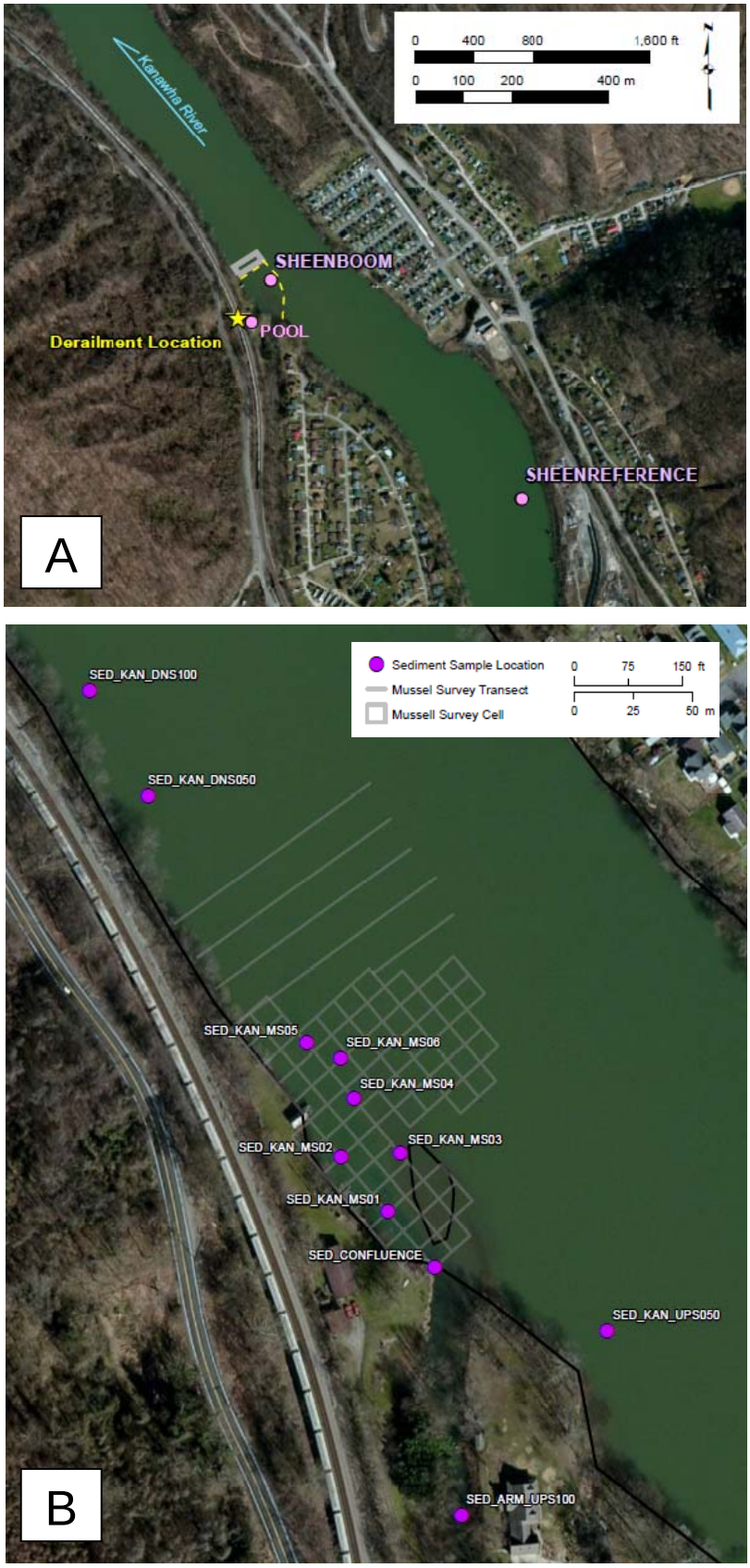

Figure 1: Maps showing the locations of the samples included in (A) Phase 1 and (B) Phase 2 of this study (see Table 1 for sample identifications). Modified from maps provided by EnvironScience.

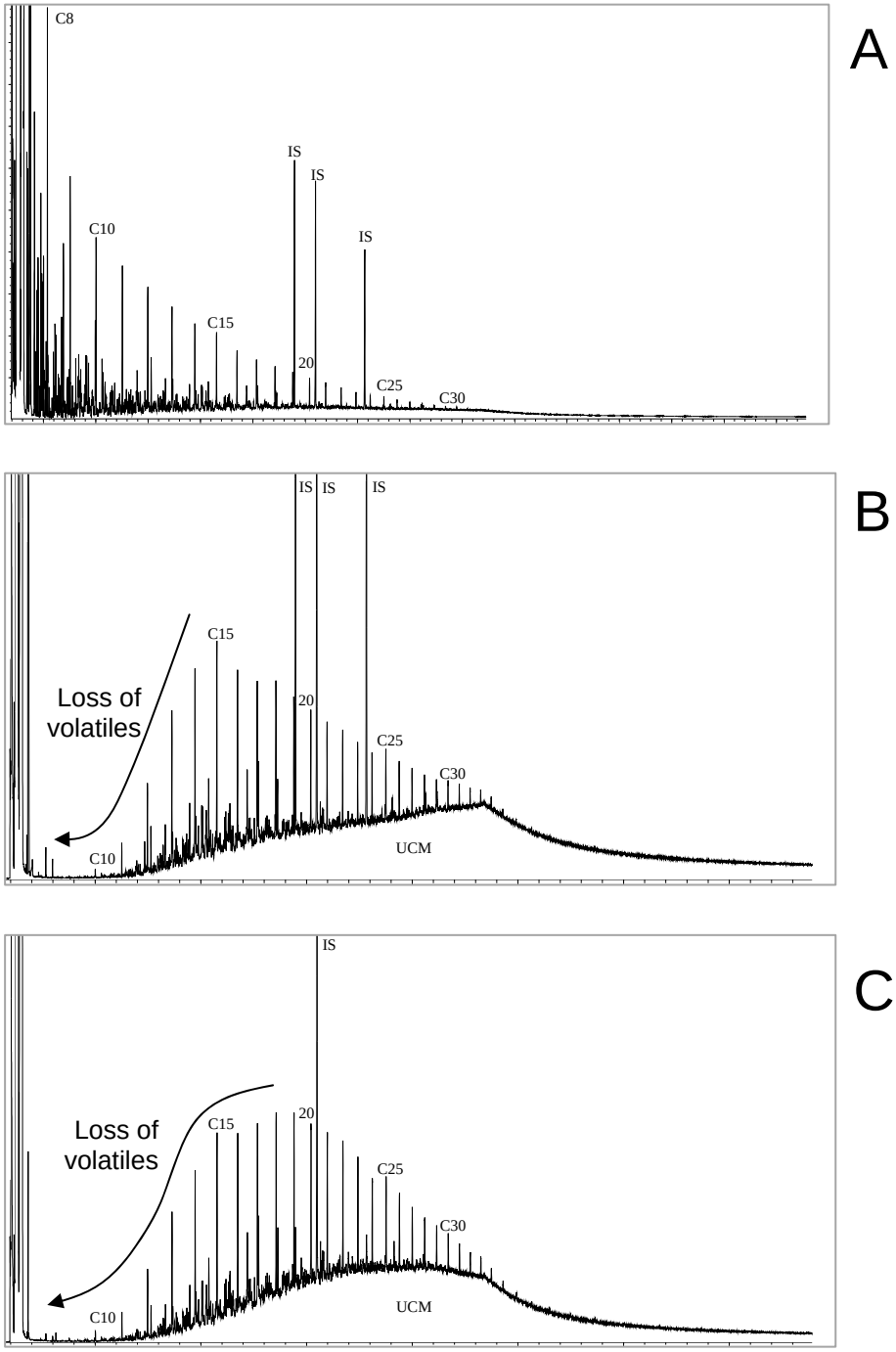

Figure 2: Gas chromatograms of (A) fresh cargo oil, (B) weathered oil pooled near the tracks, and (C) weathered oil from a sheen in boomed area of the Kanawha River. # - n-alkane carbon number; UCM – unresolved complex mixture; IS – internal standard.

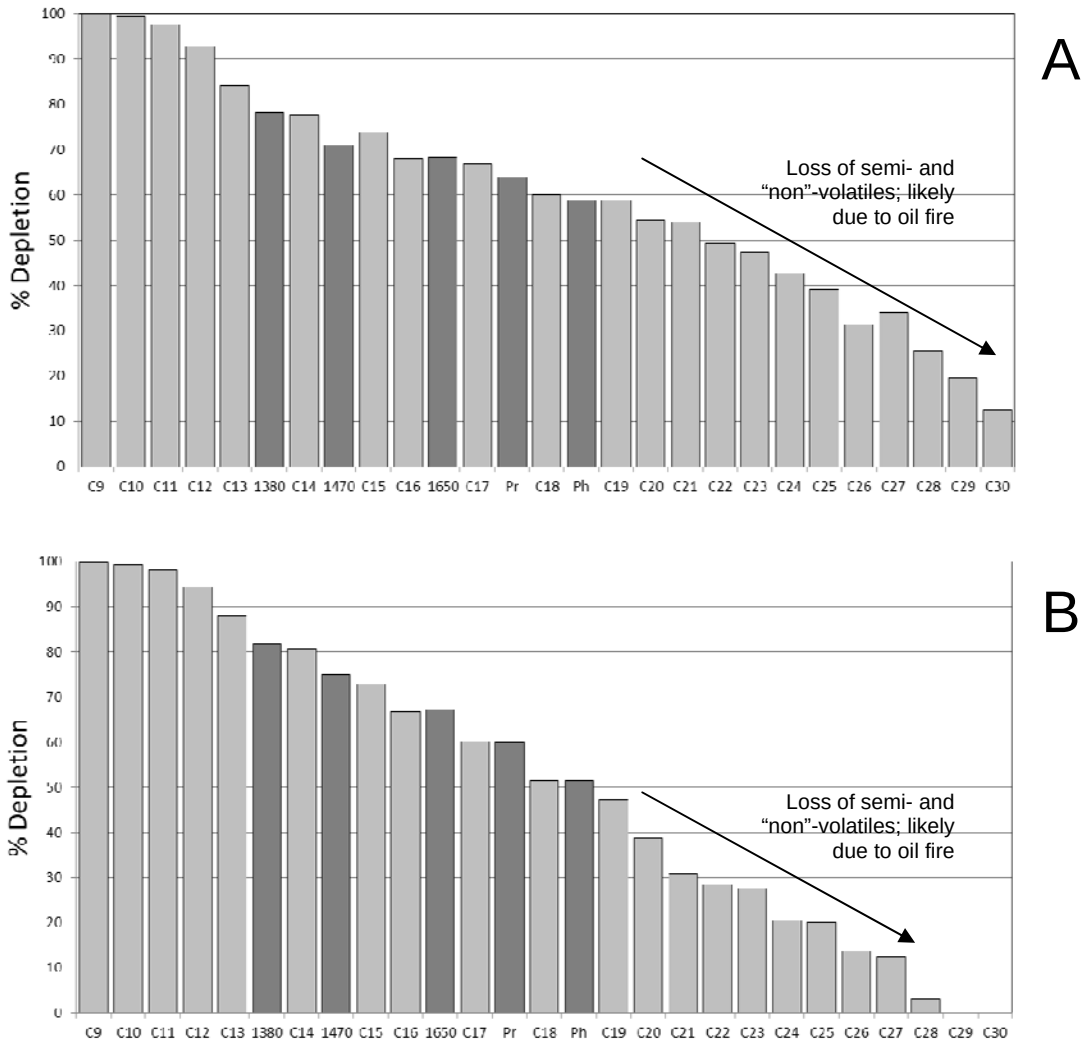

Figure 3: Histograms showing the percent mass depletion (loss) of n-alkanes and isoprenoids in the (A) weathered oil pooled near the tracks and (B) weathered oil from a sheen in boomed area of the Kanawha River relative to the fresh cargo oil. Light grey - n-alkanes; dark grey - isoprenoids. See Footnote 11 for calculation and text for description. Loss of typically non-volatiles argues losses due to the spill's associated oil fire, which led to greater losses in the pooled oil (A) than oil sheen (B).

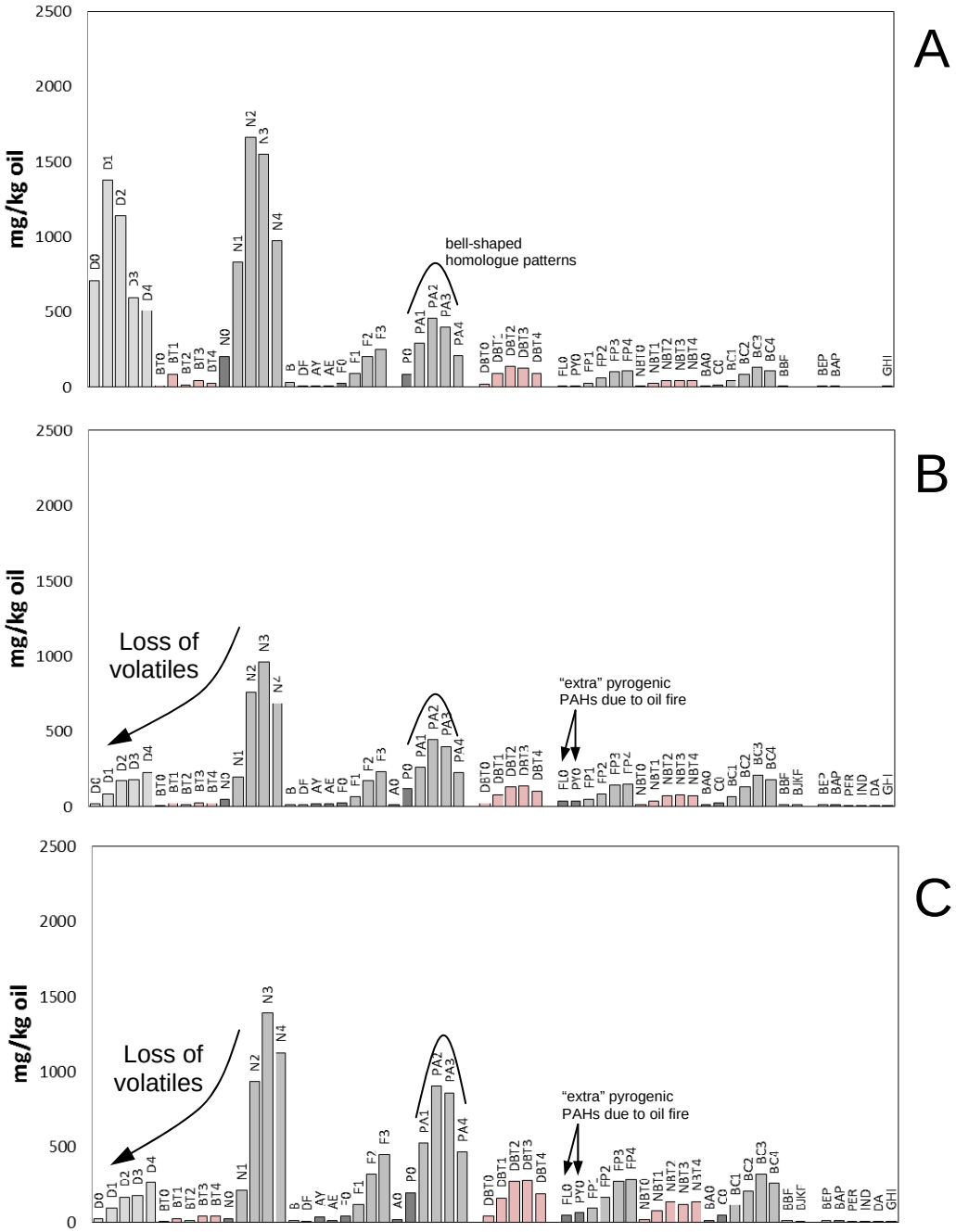

Figure 3: Histograms of PAH and sulfur-containing aromatics in (A) fresh cargo oil, (B) weathered oil pooled near the tracks, and (C) weathered oil from a sheen in boomed area of the Kanawha River. Dk. Grey – Priority Pollutant PAH; Pink: sulfur-containing aromatics. See attached data tables for analyte abbreviations and absolute concentrations.

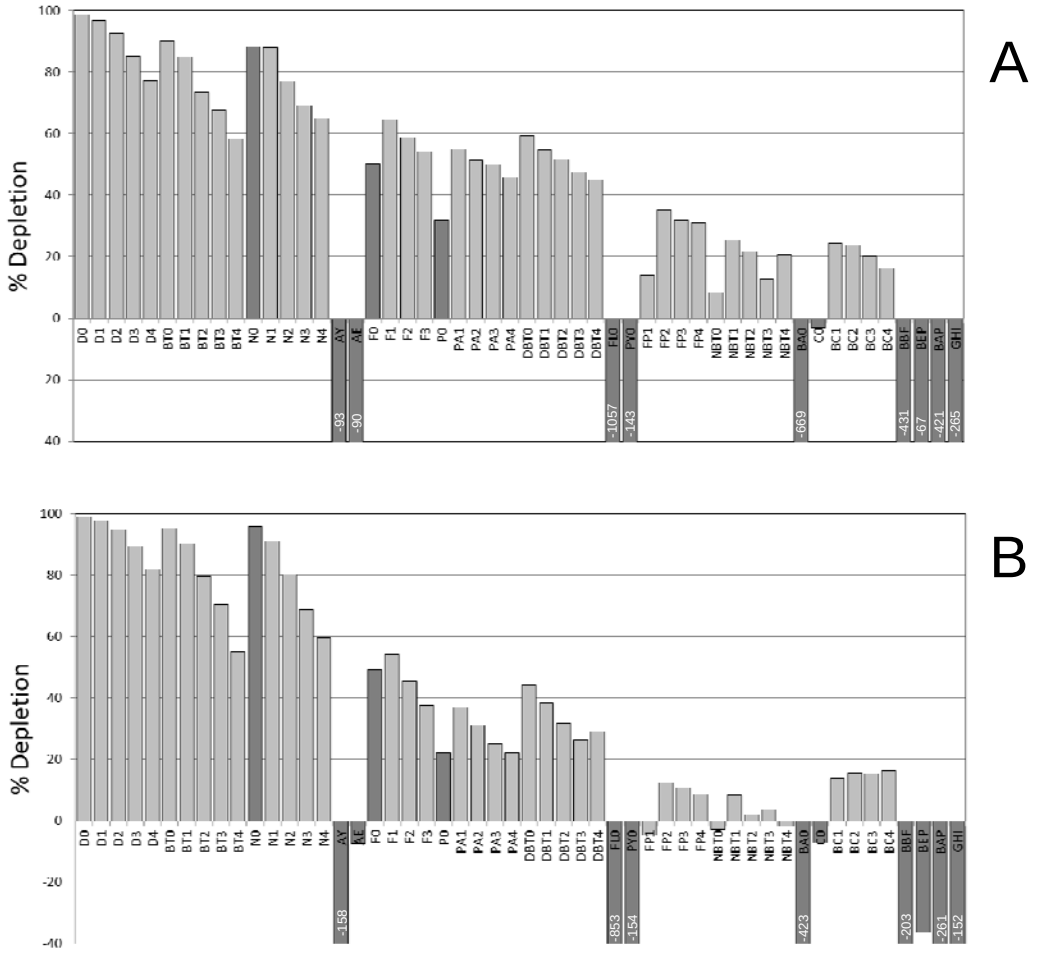

Figure 4: Histograms showing the percent depletion of PAH and sulfur-containing aromatics in (A) weathered oil pooled near the tracks and (B) weathered oil from a sheen in boomed area of the Kanawha River. Dk. Grey – Priority Pollutant PAH. See attached data tables for analyte abbreviations. %Depletions calculated per Eq. 1. Negative % depletion = % enrichment; off-scale values given in "white text". All analytes showing enrichment are Priority Pollutant PAHs. See text for further description.

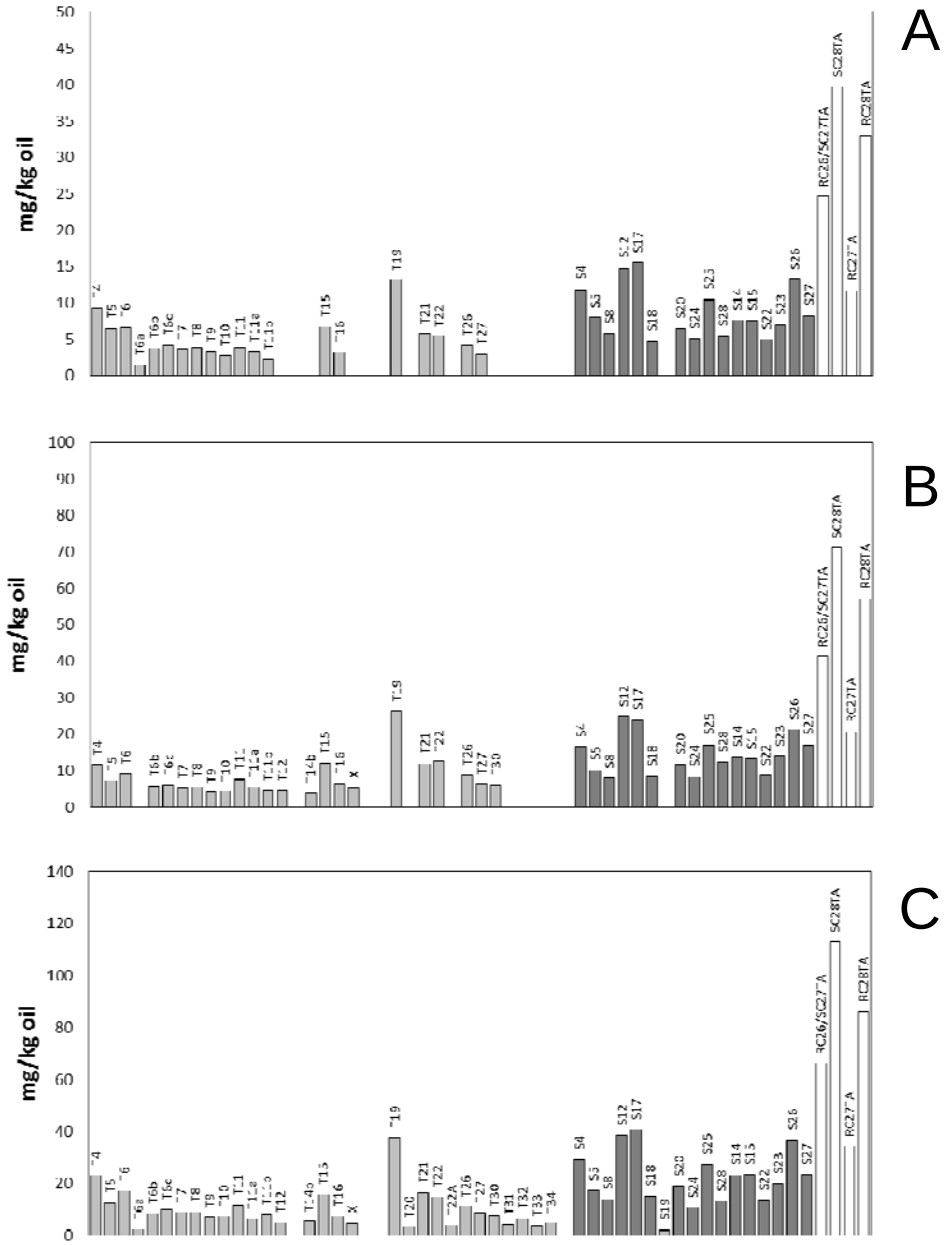

Figure 5: Histograms showing concentrations of biomarkers in (A) fresh cargo oil, (B) weathered oil pooled near the tracks, and (C) weathered oil from a sheen in boomed area of the Kanawha River. There is a good "match" between the samples indicating that weathering has not affected the biomarkers utility for fingerprinting. Light grey – triterpanes; dark grey – steranes; white – triaromatic steroids. See attached data tables for compound abbreviations and absolute concentrations. Note: T19 = 17α(H),21β(H)-hopane (hopane).

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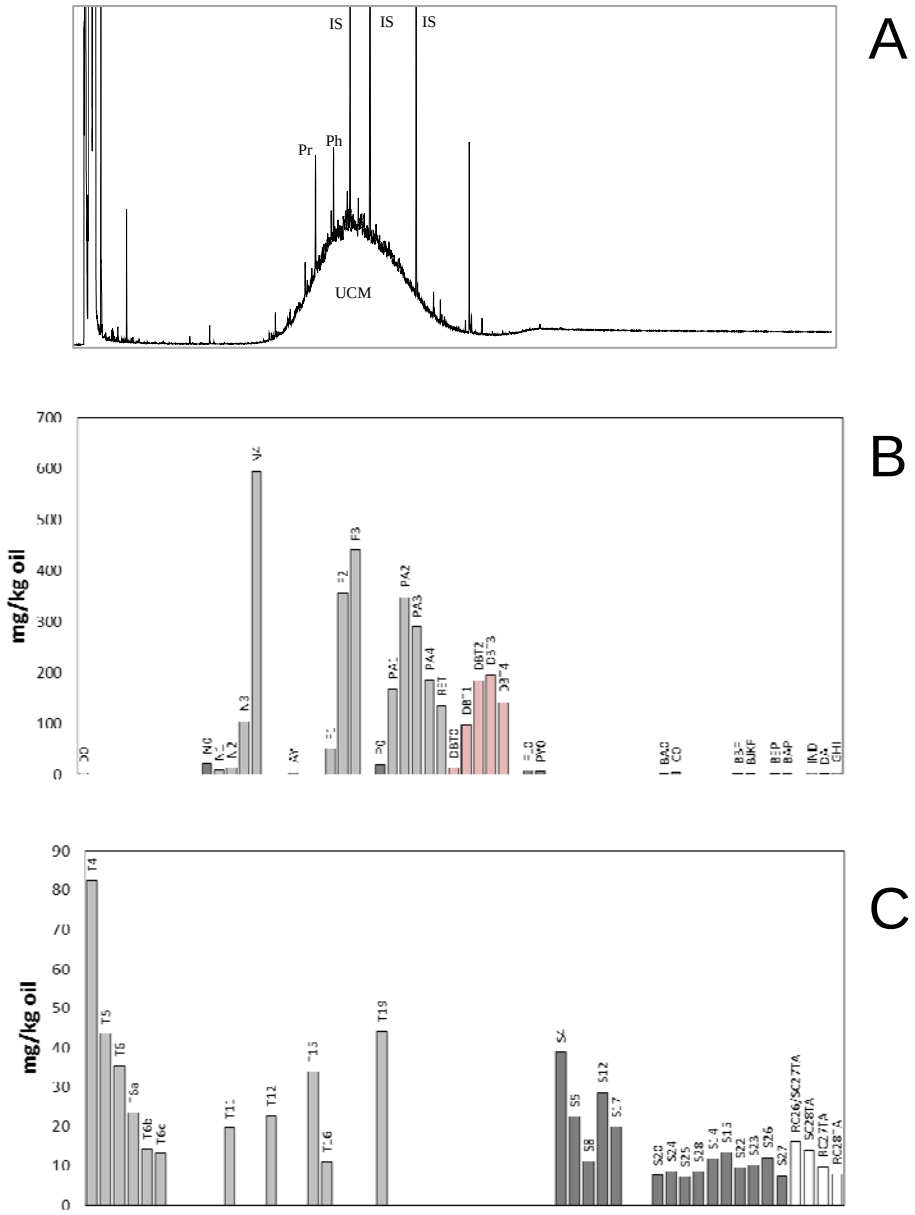
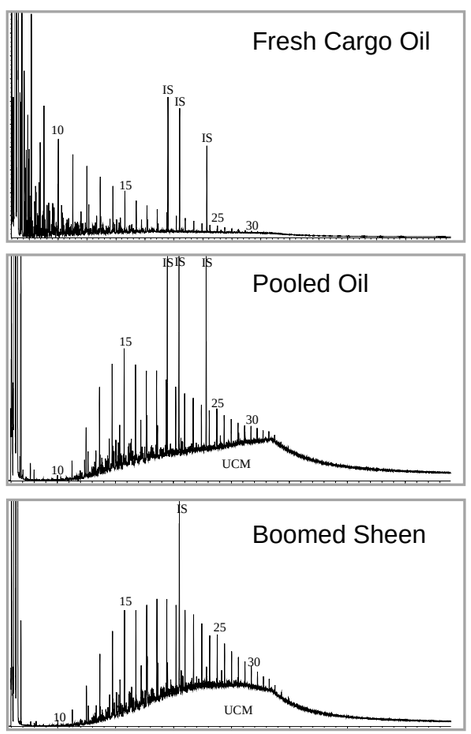
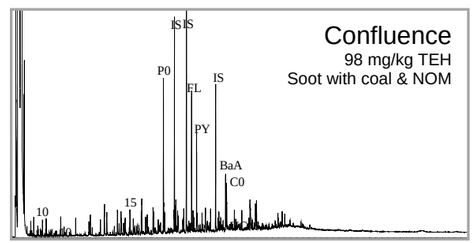


Figure 6: Multiple fingerprints of the upstream oil sheen sample studied. (A) GC/FID showing C_8 to C_{40} distribution, (B) histogram showing concentrations of semi-volatile analytes (decalins, PAHs, and sulfur-containing aromatics), and (C) histogram showing concentrations of biomarkers. This upstream (reference) oil sheen (Fig. 1) is derived from a severely weathered middle distillate fuel (diesel or fuel oil #2) and is unrelated to the derailment's oil spill.

Figure 7: Gas chromatograms of Phase 1 fresh and weathered cargo oils (left) *versus* 11 Phase 2 sediment samples (center and right). Sediment samples are roughly arranged per location (see Fig. 1B). TEH concentration in sediment samples are indicated (Table 2) as well as description of TEH origin(s). NOM – natural organic matter. # - n-alkane carbon number; UCM – unresolved complex mixture; P0-phenanthrene; FL-fluoranthene; PY-pyrene; BaA-benz(a)anthracene; C0-chrysene; IS – internal standard.

CARGO OIL





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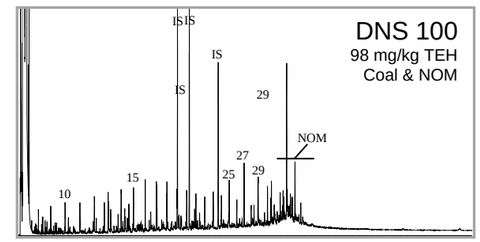

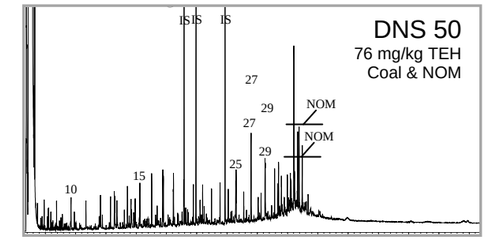

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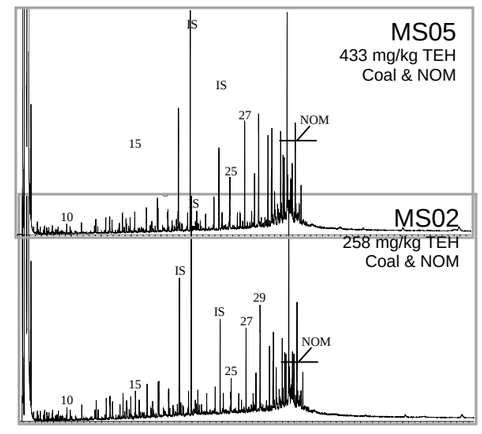

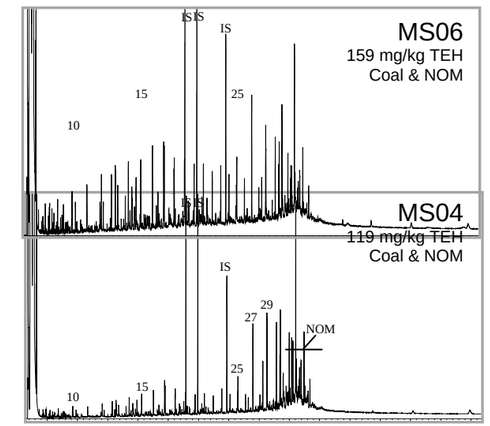

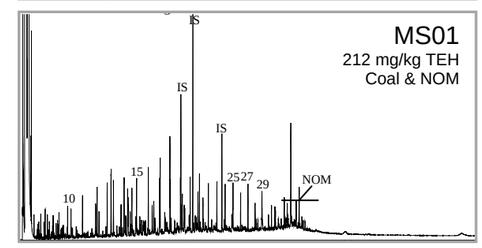

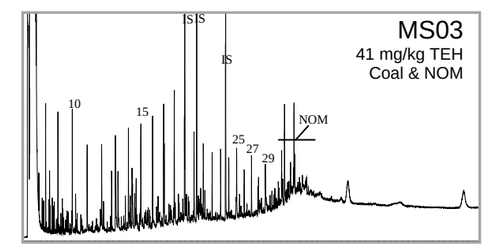

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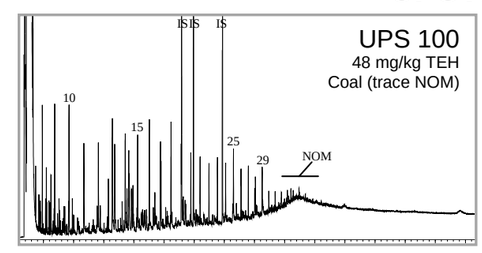


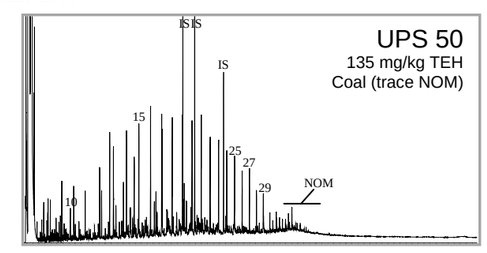
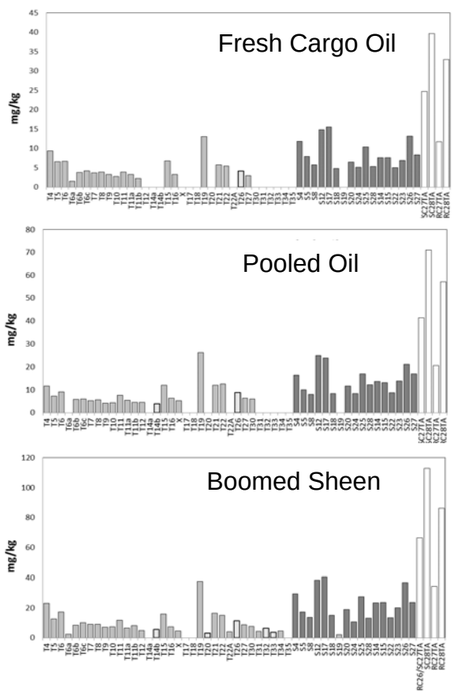
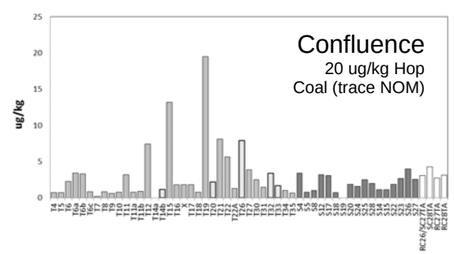


Figure 8: Biomarker histograms of Phase 1 fresh and weathered cargo oils (left) *versus* 11 Phase 2 sediment samples (center and right). Sediment samples are roughly arranged per location (see Fig. 1B). Hopane (Hop) concentration in sediment samples are indicated (Table 2) as well as description of biomarker origin(s). NOM – natural organic matter. Light grey – triterpanes; dark grey – steranes; white – triaromatic steroids; stippled triterpanes (T14b, 20, 26, 32, & 33) are co-eluting with naturally-occurring terpenoids in NOM. See attached data tables for compound abbreviations and absolute concentrations.

CARGO OIL





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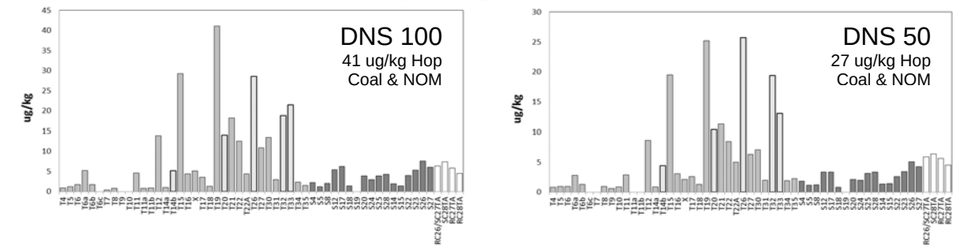

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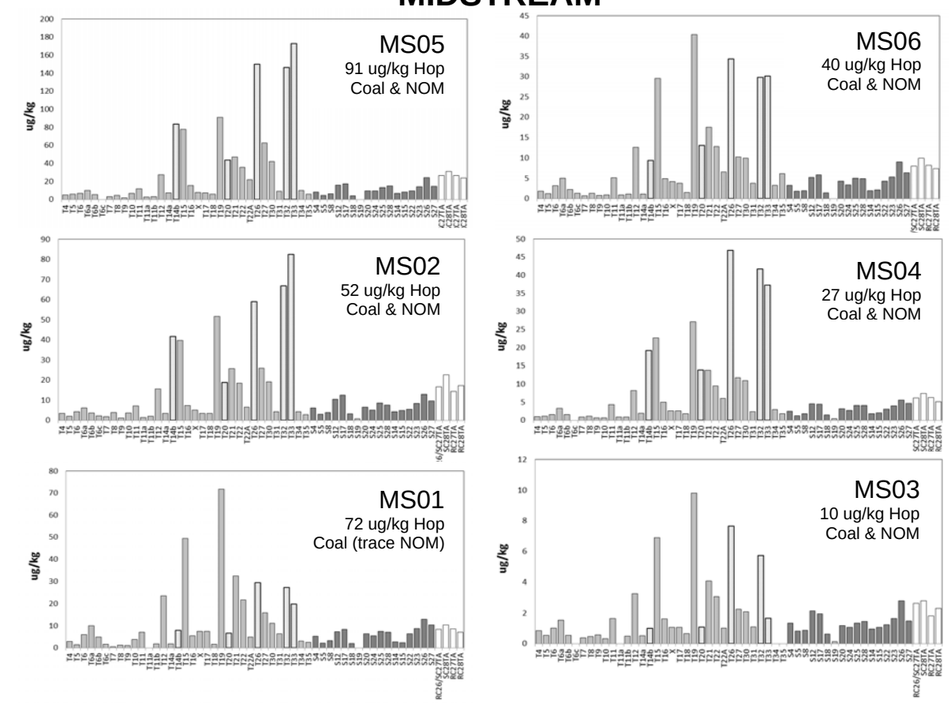

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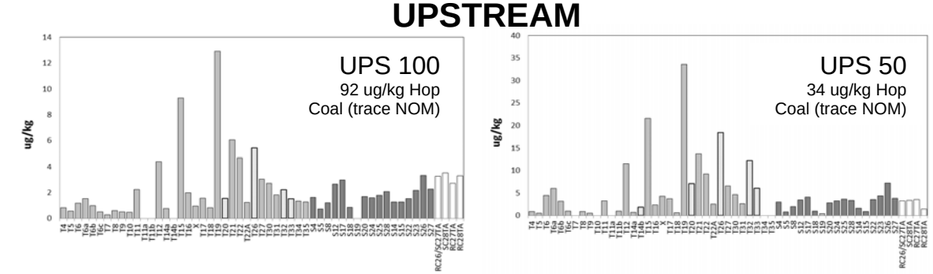


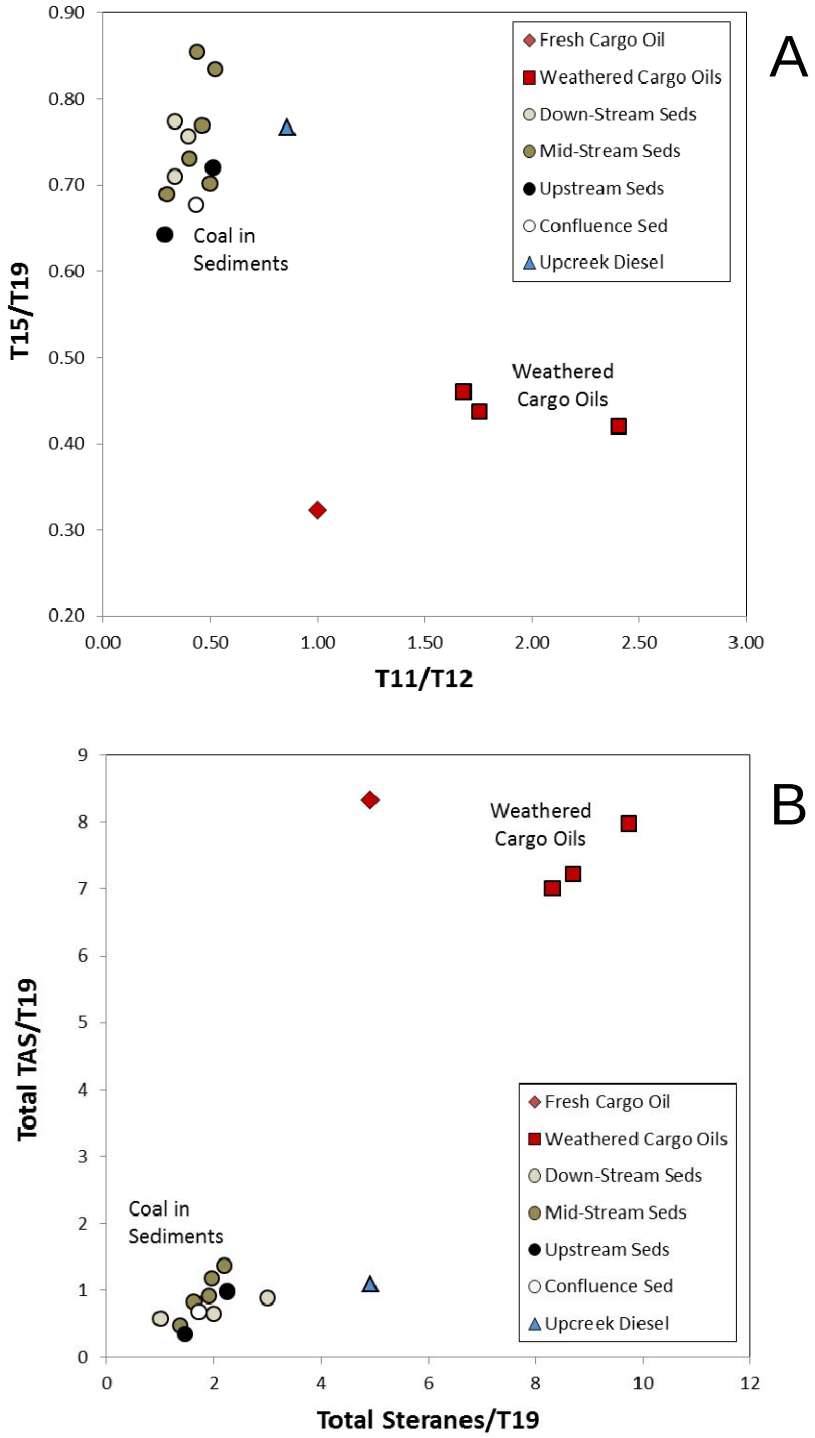
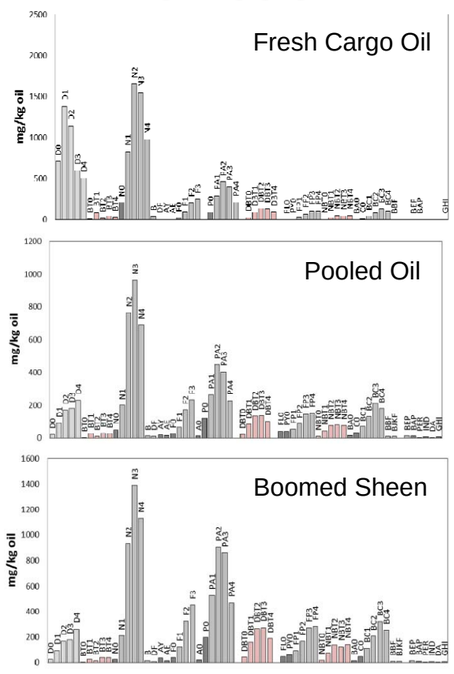
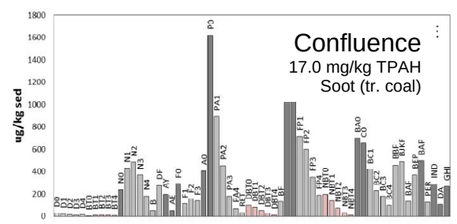


Figure 9: Double-ratio plots showing clear distinction between fresh and weathered cargo oil and Kanawha River sediments containing coal. (A) Ts/Tm (T11/T12) ratio v. norhopane/hopane (T15/T19) and (B) total steranes/hopane v. total triaromatic steroids/hopane. Data from Table 2.

Figure 10: PAH histograms of Phase 1 fresh and weathered cargo oils (left) *versus* 11 Phase 2 sediment samples (center and right). Sediment samples are roughly arranged per location (see Fig. 1B). TPAH concentration in sediment samples are indicated (per Table 2) as well as description of PAH origin(s). Dk. Grey – Priority Pollutant PAH; Pink: sulfur-containing aromatics. See attached data tables for compound abbreviations and absolute concentrations.

CARGO OIL





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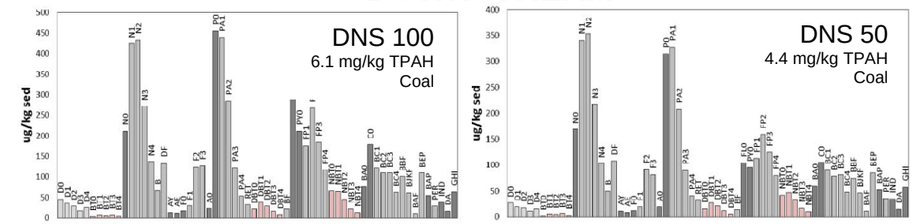

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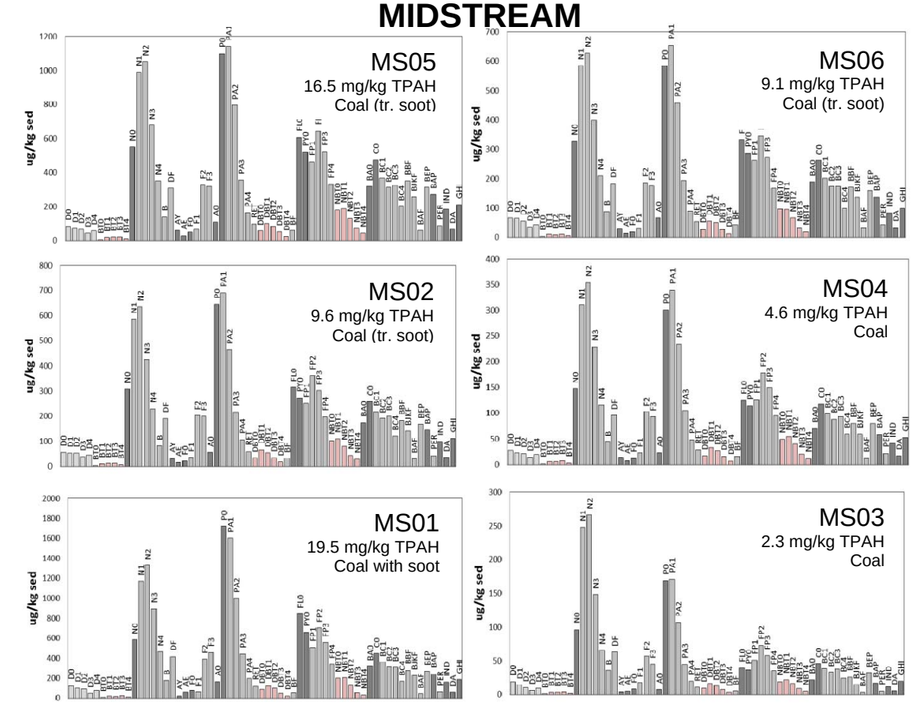

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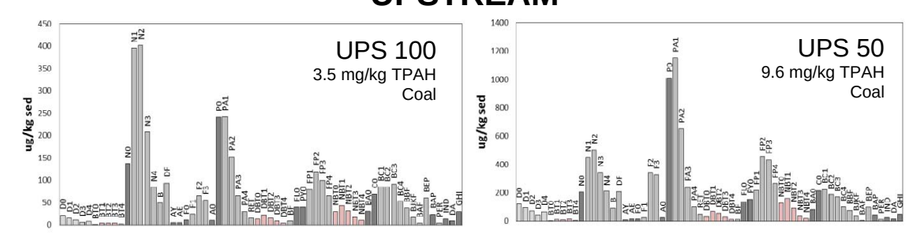

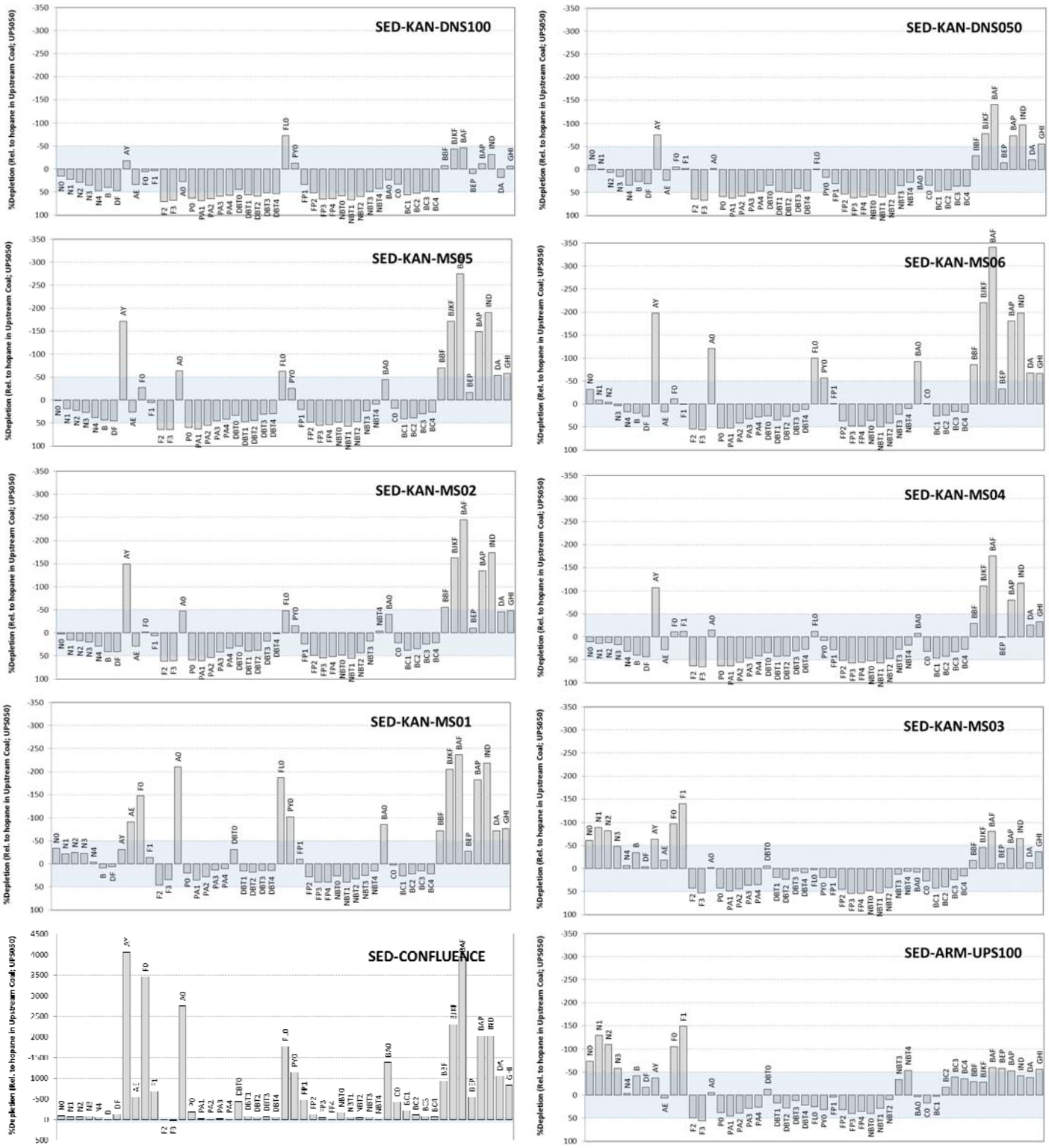

Figure 11: Histograms showing percent depletions and enrichments of PAH (relative to hopane; Eq.1) for the sediments relative to coal represented by the UPS50 upstream sediment. Negative % depletions = enrichments. Blue shading depicts general error. PAHs showing significant % enrichments plot upward and extend above blue shading. Enrichments of Priority Pollutant PAHs are evident in the Confluence, MS01, MS02, MS05 and MS06 samples, whereas no enrichments are evident in the MS03, MS04, DNS50, DNS100, or UPS100. Data from Table 3.

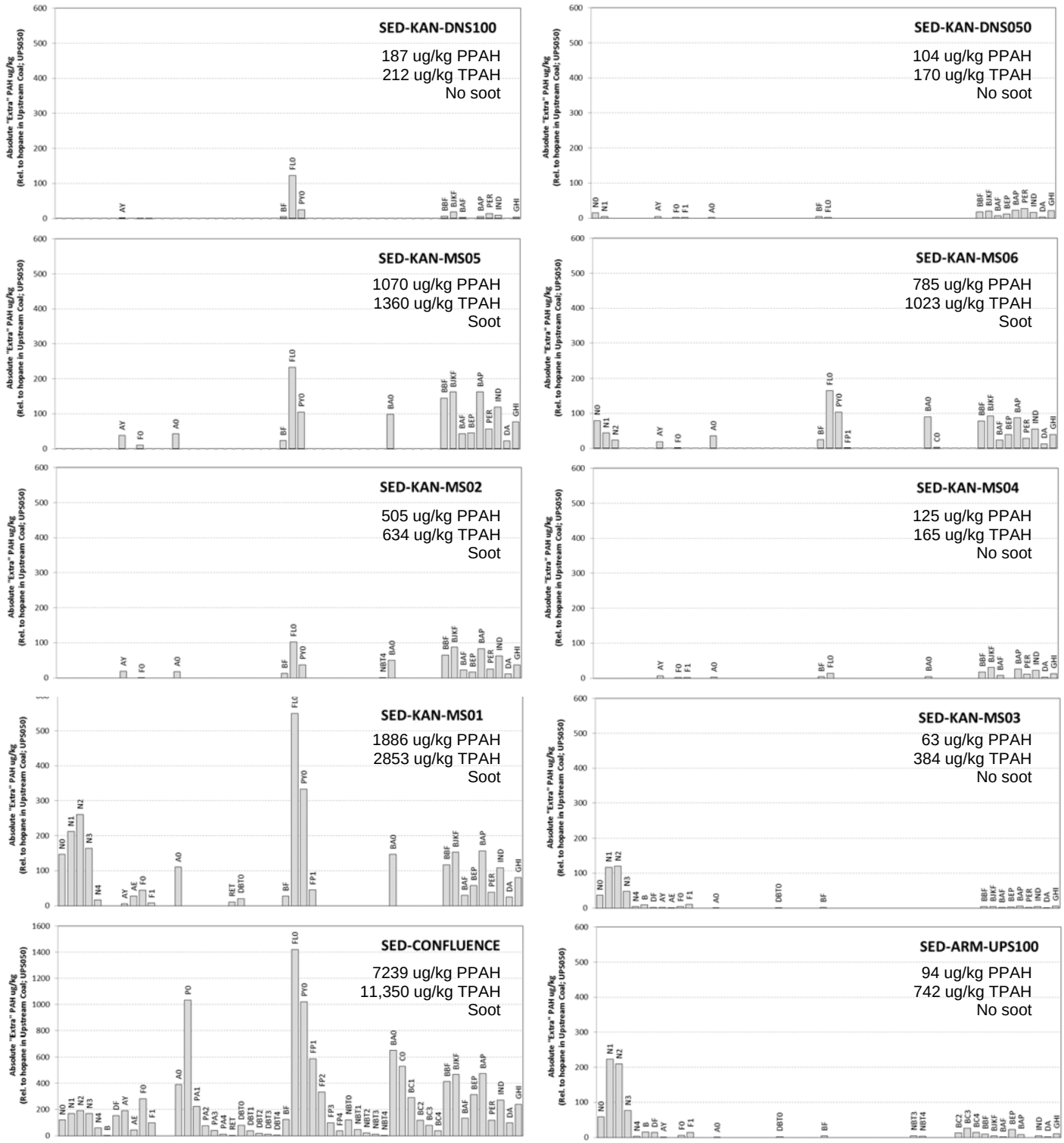

Figure 12: Histograms showing the estimated concentrations of "extra" (non-coal derived) PAH present in sediments potentially attributed to soot from the oil fire and/or variation in the nature of the coal particles. Extra PPAHs and TPAH from soot are only evident in the Confluence, MS01, MS02, MS05 and MS06 samples. Other samples reflect variation in nature of "background" coal in the region, as represented by the presence of "extra" PAH in the upstream UPS100 sample. Data from Table 4.

Attachments

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Environmental Forensics Practice LLC

Proj. No	Proj. Name
7197	CSXT-MT. CARBON, WV.

SAMPLERS: Signature: Sarah Walters
SARAH WALTERS

ANALYSIS REQUESTED→ "NUMBER OF CONTANIERS"

DATE	TIME	LAB ID	CLIENT ID	SAMPLE DESCRIPTION	MATRIX (Oil/Soil/Water)	GC-FID-TPH (C_8+)	GCMS-Alkyl PAH	GCMS-Biomarkers	PIANO - VOA	Organic Lead	METALS	PCB	Pesticides	PRESERVED	Total Number of Containers
022715	1120	SHEENREPLENE-022715		TEFLON NET SCREEN	OIL		X							NP	1
022715	1135	SHEENBOOM-022715		TEFLON NET SCREEN	OIL		X							NP	1
															2

Relinquished by:	Date/Time	Received by:	Date/Time
SARAH WALTERS	030215 1247	PATRICK EVANKOVICH	030215 1247
PATRICK EVANKOVICH	030215 1730	Kim O'Reilly - AAL	3/3/15 8:04

Comments: Samples to be shipped to: Alpha Laboratory
320 Forbes Blvd.
Mansfield, MA 02048
Tel: (508) 822-9300
Attn: Sue O'Neil

SEND REPORT TO: SUE PAPINEAU - ENVIRO SCIENCE INC.
SPAPINEAU@ENVIROSCIENCEINC.COM
330.688.0111

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Environmental Forensics Practice LLC

Proj. No	Proj. Name
7197	CSXT - MT. CARBON, WV.

SAMPLERS: Signature: Sarah Walters
SARAH WALTERS

ANALYSIS REQUESTED→ "NUMBER OF CONTANIERS"

DATE	TIME	LAB ID	CLIENT ID	SAMPLE DESCRIPTION	MATRIX (Oil/Soil/Water)	GC-FID-TPH (C_8^{+})	GCMS-Alkyl PAH	GCMS-Biomarkers	PIANO - VOA	Organic Lead	METALS	PCB	Pesticides	PRESERVED	Total Number of Containers
022715	1520	POOL-022715		2-20ML	OIL		X							NP	2
022715	1535	CBTX-742201-022715		2-20ML	OIL		X							NP	2

Relinquished by:	Date/Time		Received by:	Date/Time	
SARAH WALTERS	030215	1247	PATRICK EVANKOVICH	030215	1247
Relinquished by: PATRICK EVANKOVICH	Date/Time		Received by:	Date/Time	
	030215	1730	Kim Bailey - AAL	3/3/15	8:04

Comments: Samples to be shipped to: Alpha Laboratory
320 Forbes Blvd.
Mansfield, MA 02048
Tel: (508) 822-9300
Attn: Sue O'Neil

SEND REPORT TO: JOE PAPINEAU - ENVIROSCIENCE INC
JPAPINEAU@ENVIROSCIENCEINC.COM
330.688.0111

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Chain of Custody

Environmental Forensics Practice LLC

Proj. No	Proj. Name
	CSKT MT. CARBON

SAMPLERS: Signature [signature] FOR D. DUNFORD

ANALYSIS REQUESTED→ "NUMBER OF CONTANIERS"

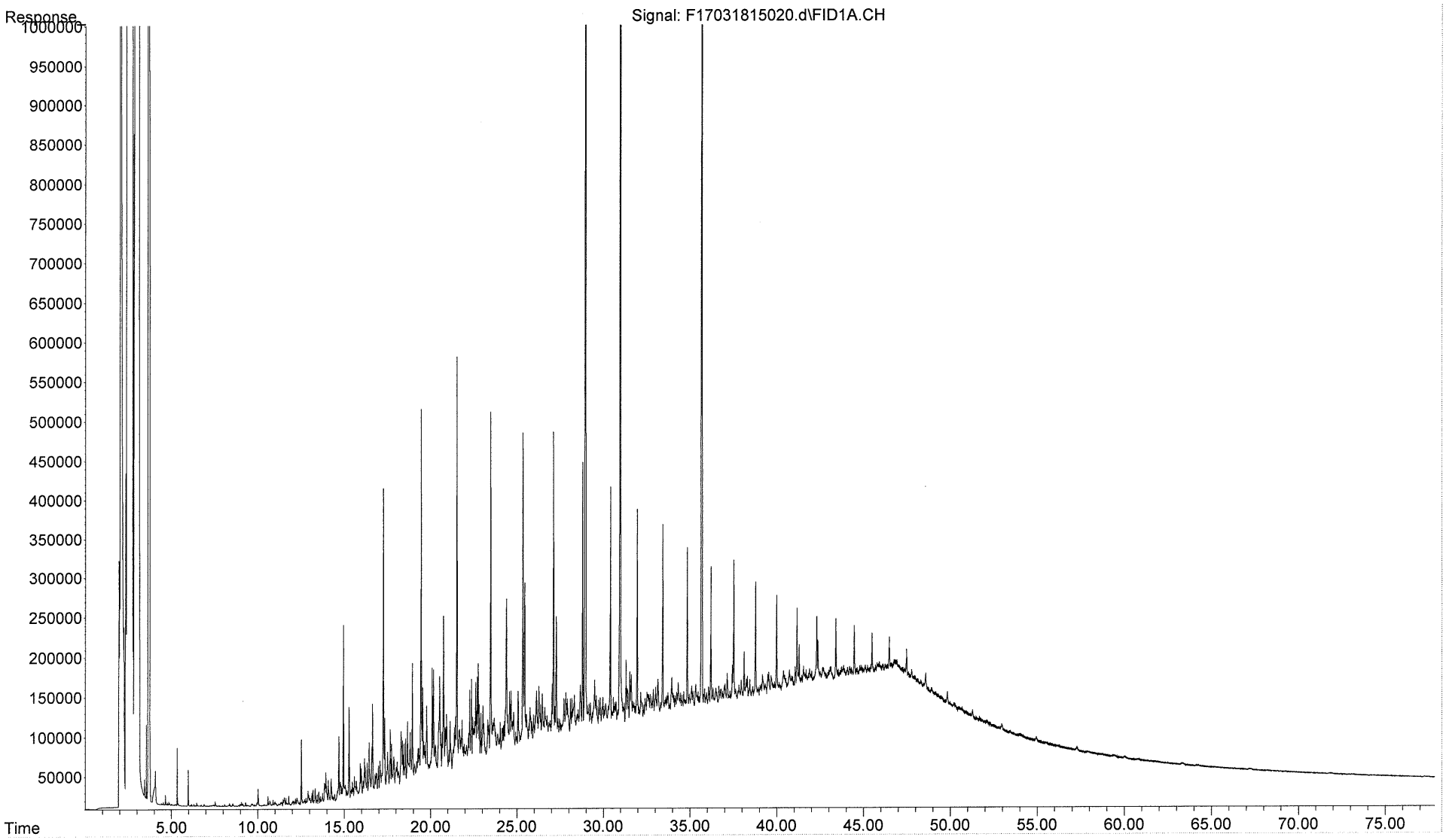
DATE	TIME	LAB ID	CLIENT ID	SAMPLE DESCRIPTION	MATRIX (Oil/Soil/Water)	GC-FID-TPH (C_8+)	GCMS-Alkyl PAH	GCMS-Biomarkers	PIANO - VOA	Organic Lead	METALS	PCB	Pesticides	PRESERVED	Total Number of Containers
9/29/15	0935		SED_KAN_DNS100	8oz WM AMBER G	ANALYZE PER S. STOUT - NEWFIELDS									—	1
	0955		SED_KAN_DNS050												
	1035		SED_KAN_MS006												
	1015		SED_KAN_MS005												
	1045		SED_KAN_MS004												
	1050		SED_KAN_MS003												
	1125		SED_KAN_MS002												
	1130		SED_KAN_MS001												
	1215		SED_CONFLUENCE												
	1145		SED_KAN_UPS050												
	1230		SED_ARN_UPS100												

Relinquished by:	Date/Time		Received by:	Date/Time	
[signature]	9/30/15	17:00	Fed Ex		
Relinquished by:	Date/Time		Received by:	Date/Time	
Fed Ex			[signature]	10-1-15	10:23 am

Comments: Samples to be shipped to: Alpha Laboratory
320 Forbes Blvd.
Mansfield, MA 02048
Tel: (508) 822-9300
Attn: Sue O'Neil

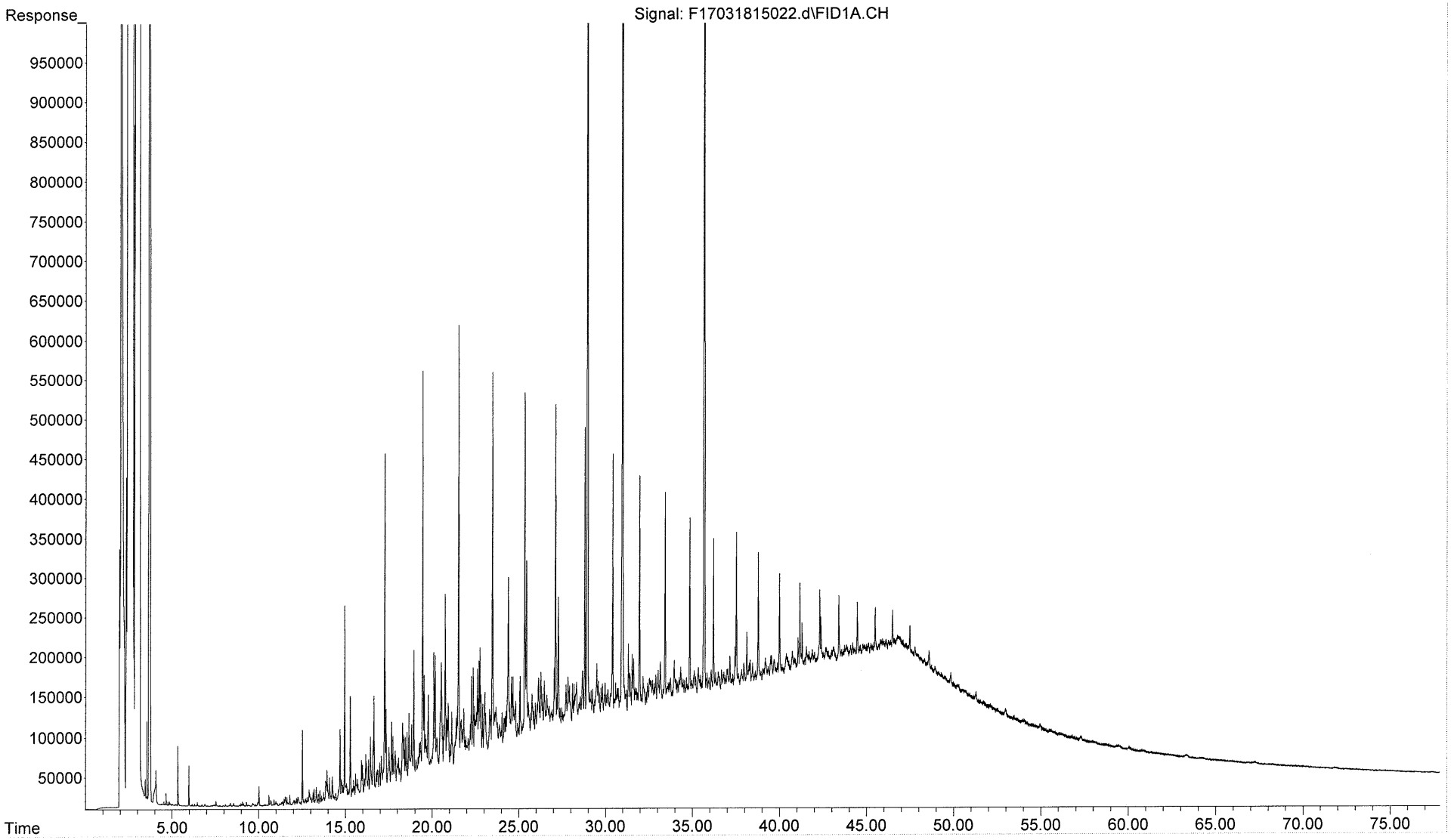
File :V:\nfef_whg\2015 AWHL Data\CSXT Mt Carbon WV\1503002\Prelim
... SHC Sample 01\F17031815020.d
Operator : FID17:NL
Instrument : FID17
Acquired : 19 Mar 2015 7:52 am using AcqMethod FID17.M
Sample Name: 1503002-01-RX
Misc Info : 1X

Pool-022715
1503002-01-RX



File :V:\nfef_whg\2015 AWHL Data\CSXT Mt Carbon WV\1503002\Prelim
... SHC Sample 01\F17031815022.d
Operator : FID17:NL
Instrument : FID17
Acquired : 19 Mar 2015 9:20 am using AcqMethod FID17.M
Sample Name: 1503002-01D-RX
Misc Info : FRAV13 50ug/mL

Pool-022715
1503002-01D-RX



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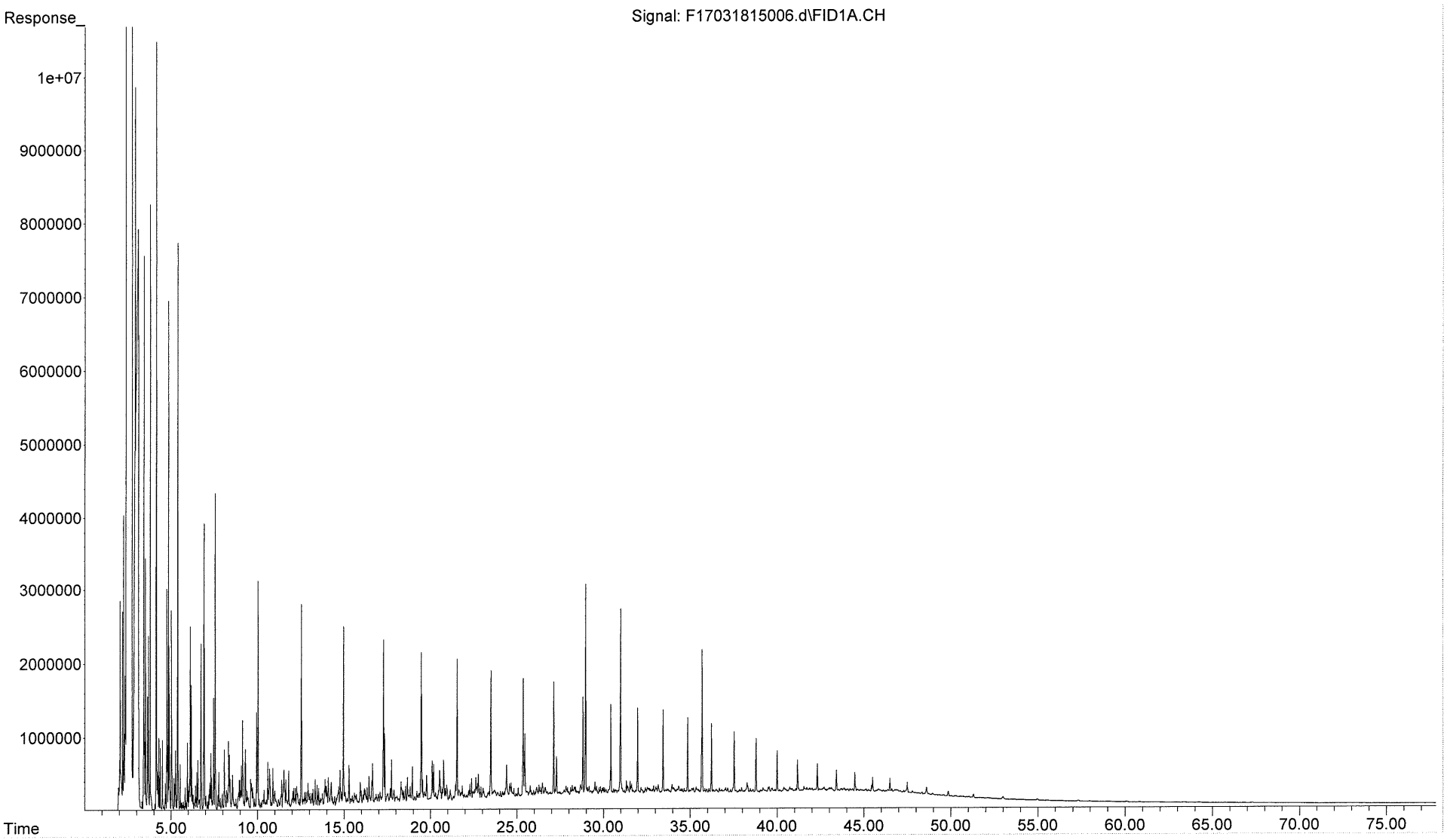
... SHC Sample 01\F17031815006.d
Operator : FID17:NL
Instrument : FID17
Acquired : 18 Mar 2015 9:34 pm using AcqMethod FID17.M
Sample Name: ANS
Misc Info : FRAU76 10.045mg/mL

North Slope Crude
Reference Standard



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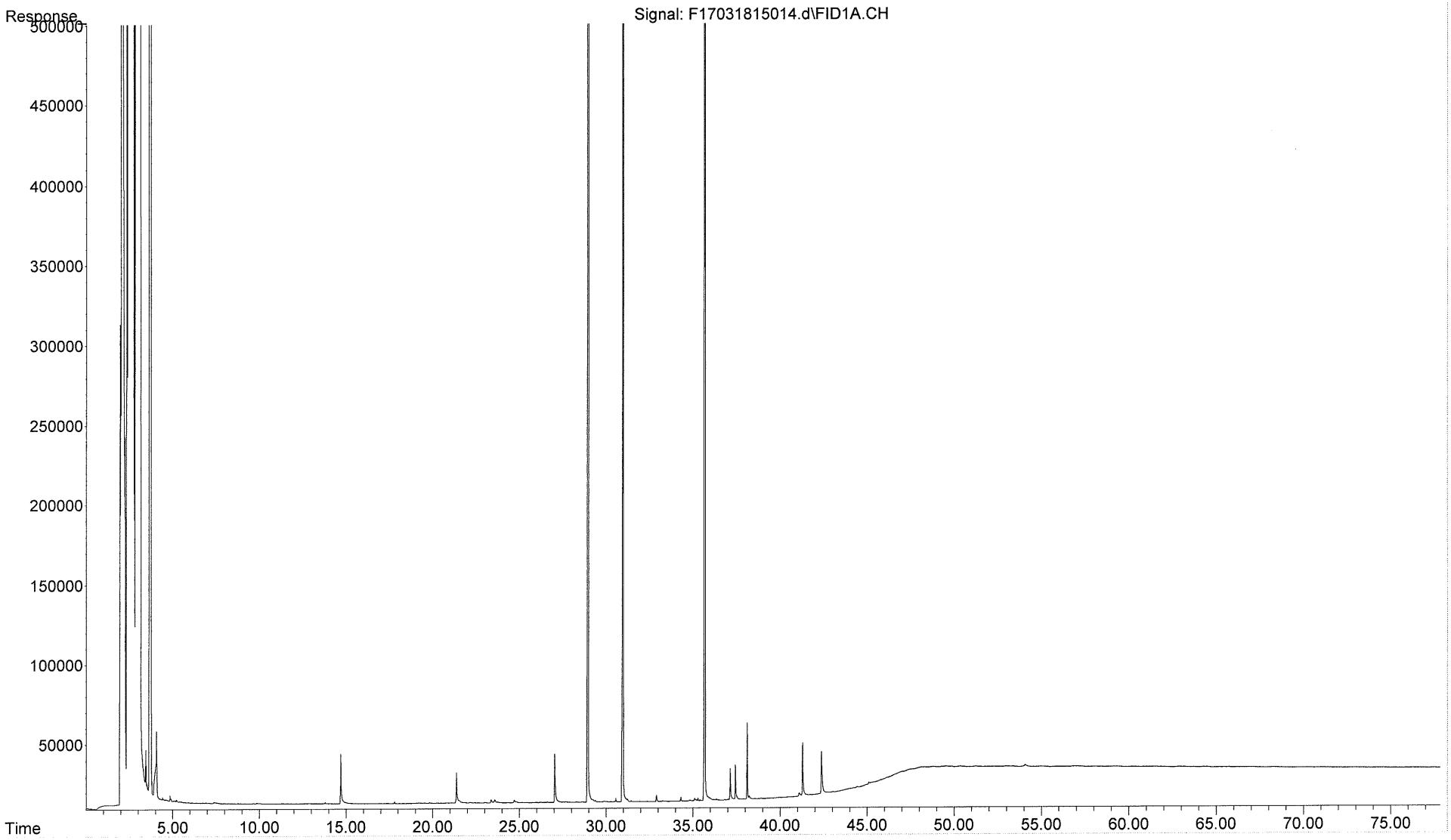
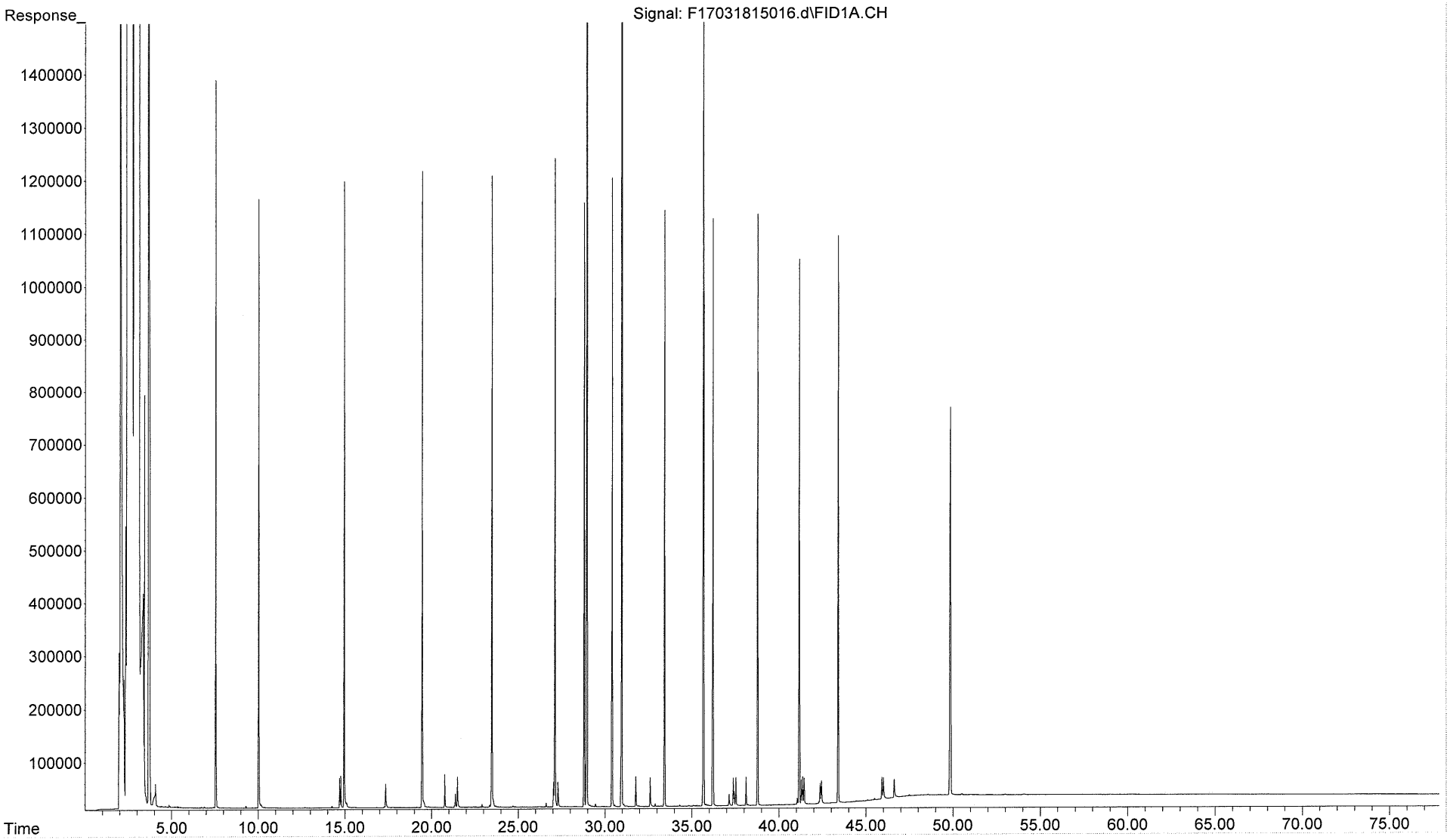
... SHC Sample 01\F17031815014.d
Operator : FID17:NL
Instrument : FID17
Acquired : 19 Mar 2015 3:27 am using AcqMethod FID17.M
Sample Name: SO031815B01
Misc Info : 1X ETR 1503002

Method Blank
SO031815B01



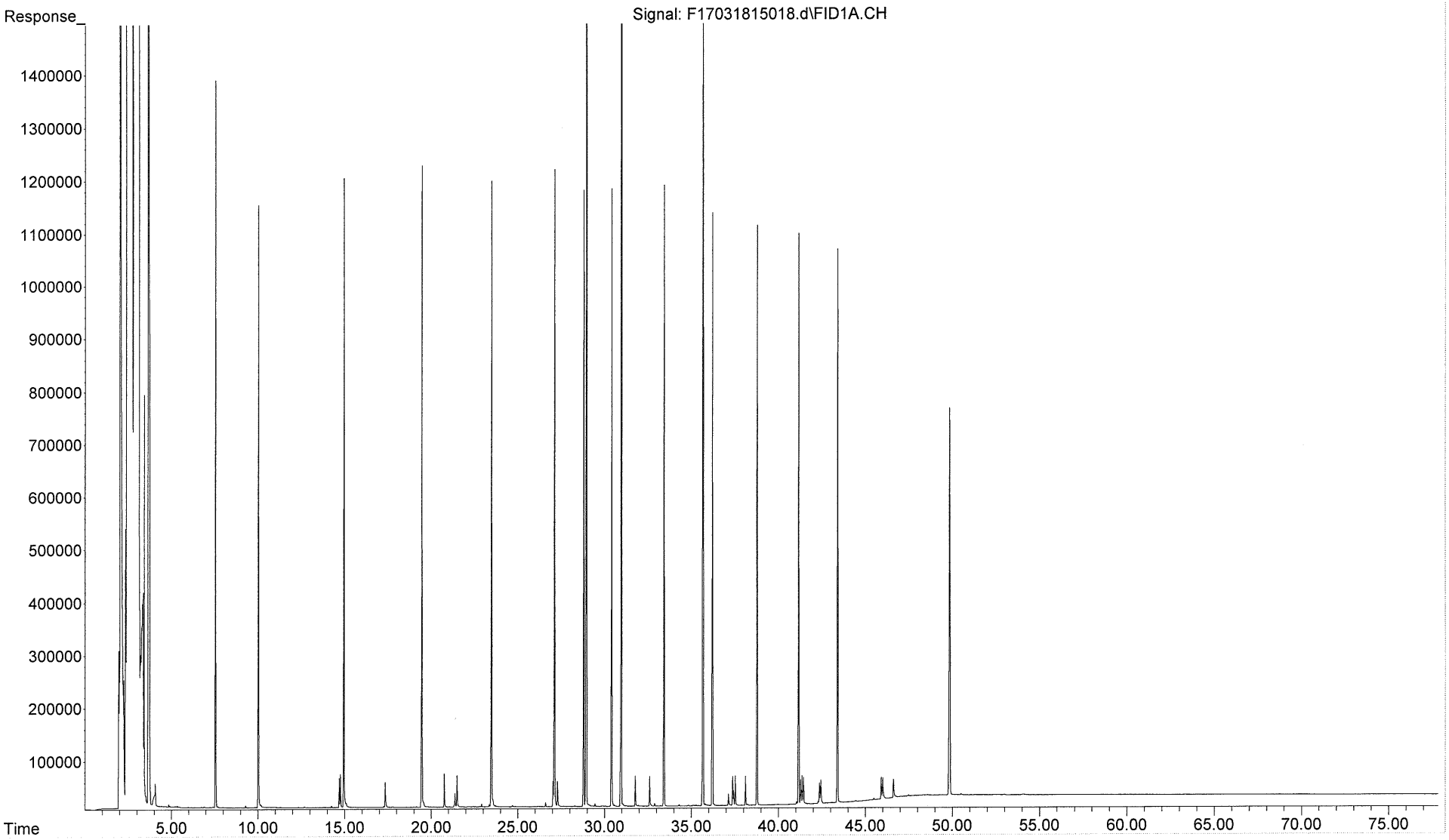
File :V:\nfef_whg\2015 AWHL Data\CSXT Mt Carbon WV\1503002\Prelim
... SHC Sample 01\F17031815016.d
Operator : FID17:NL
Instrument : FID17
Acquired : 19 Mar 2015 4:55 am using AcqMethod FID17.M
Sample Name: SO031815LCS01
Misc Info : 1X ETR 1503002

Lab Control Sample
SO031815LCS01



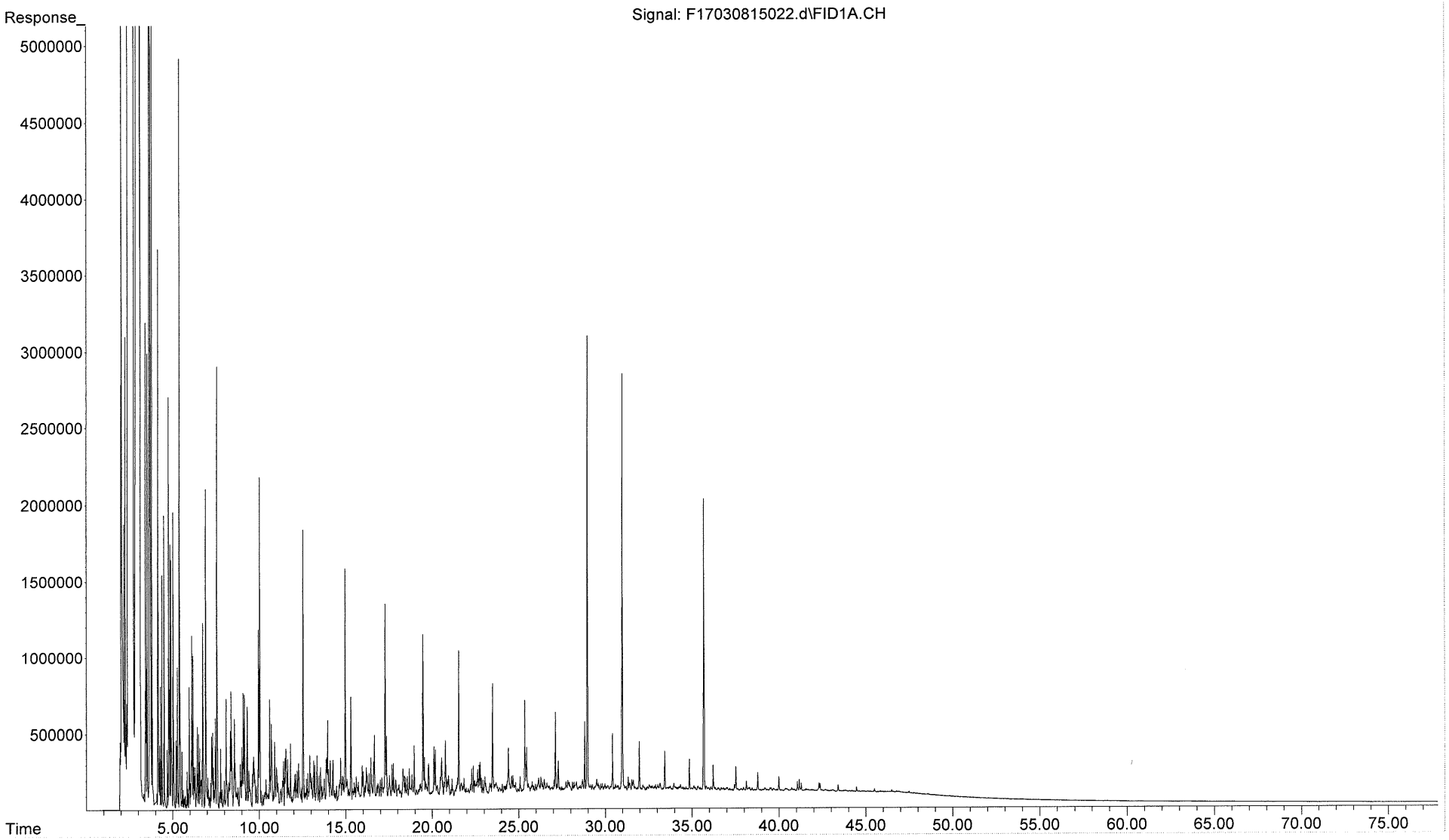
File :V:\nfef_whg\2015 AWHL Data\CSXT Mt Carbon WV\1503002\Prelim
... SHC Sample 01\F17031815018.d
Operator : FID17:NL
Instrument : FID17
Acquired : 19 Mar 2015 6:23 am using AcqMethod FID17.M
Sample Name: SO031815LCSD01
Misc Info : 1X ETR 1503002

Lab Control Sample Duplicate
SO031815LCSD01



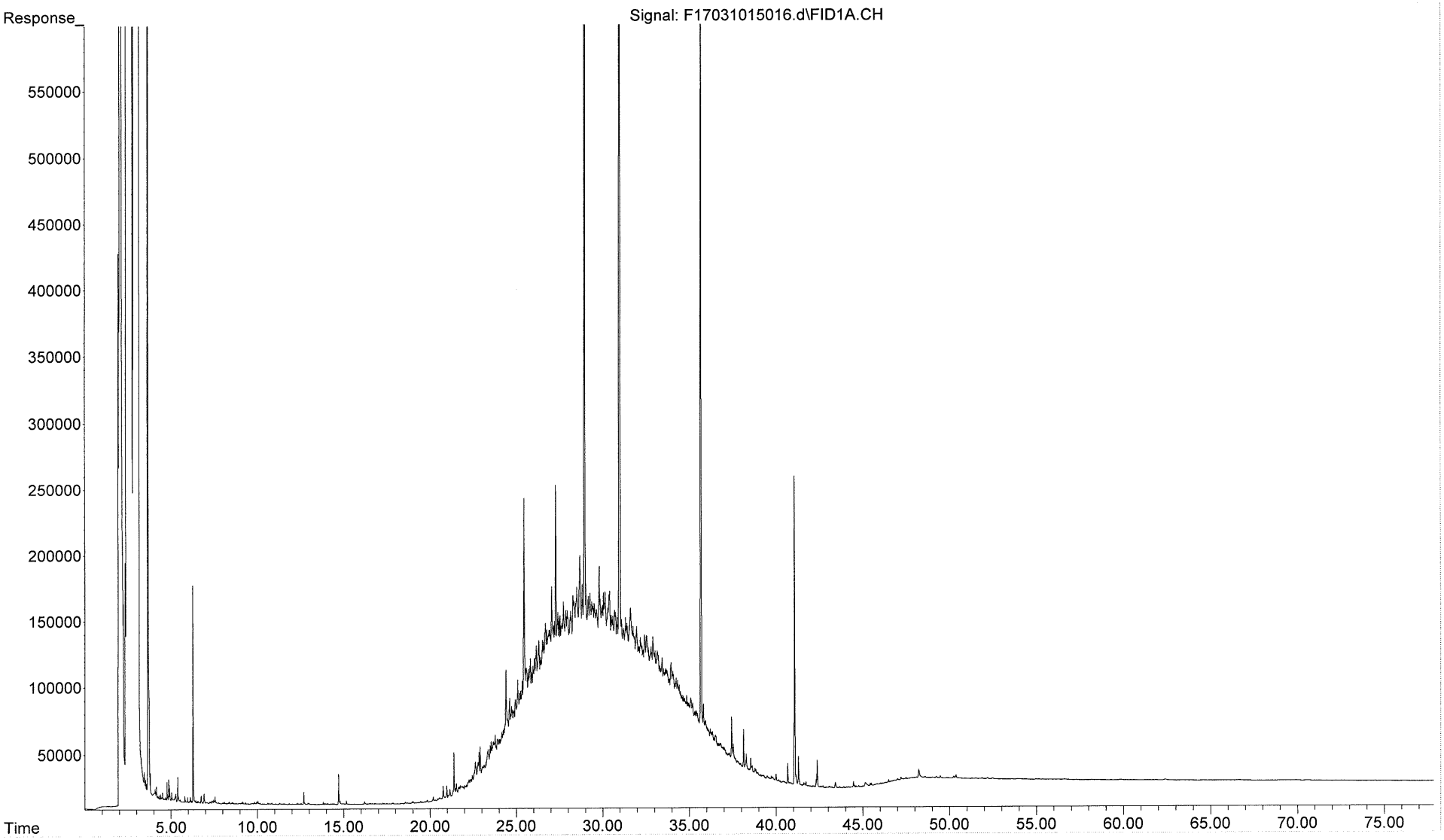
File :V:\nfef_whg\2015 AWHL Data\CSXT Mt Carbon WV\1503002\Prelim
... SHC\F17030815022.d
Operator : FID17:NLJr
Instrument : FID17
Acquired : 09 Mar 2015 4:20 am using AcqMethod FID17.M
Sample Name: 1503002-02
Misc Info : 1X

CBTX-742201-022715
1503002-02



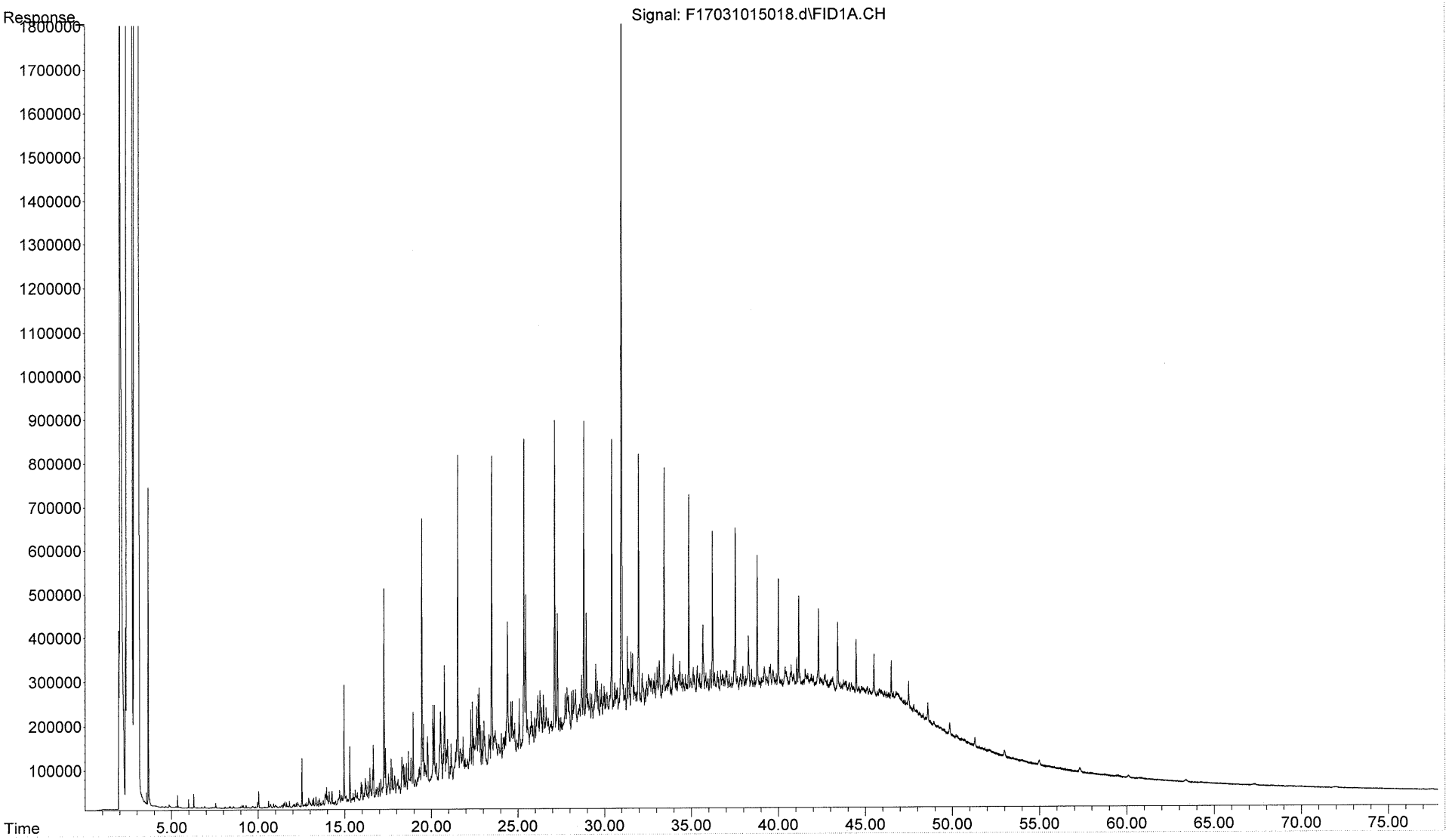
File :V:\nfef_whg\2015 AWHL Data\CSXT Mt Carbon WV\1503002\Prelim
... SHC\F17031015016.d
Operator : FID17:NL
Instrument : FID17
Acquired : 11 Mar 2015 6:07 am using AcqMethod FID17.M
Sample Name: 1503002-03
Misc Info : 1X

Sheen Reference-022715
1503002-03



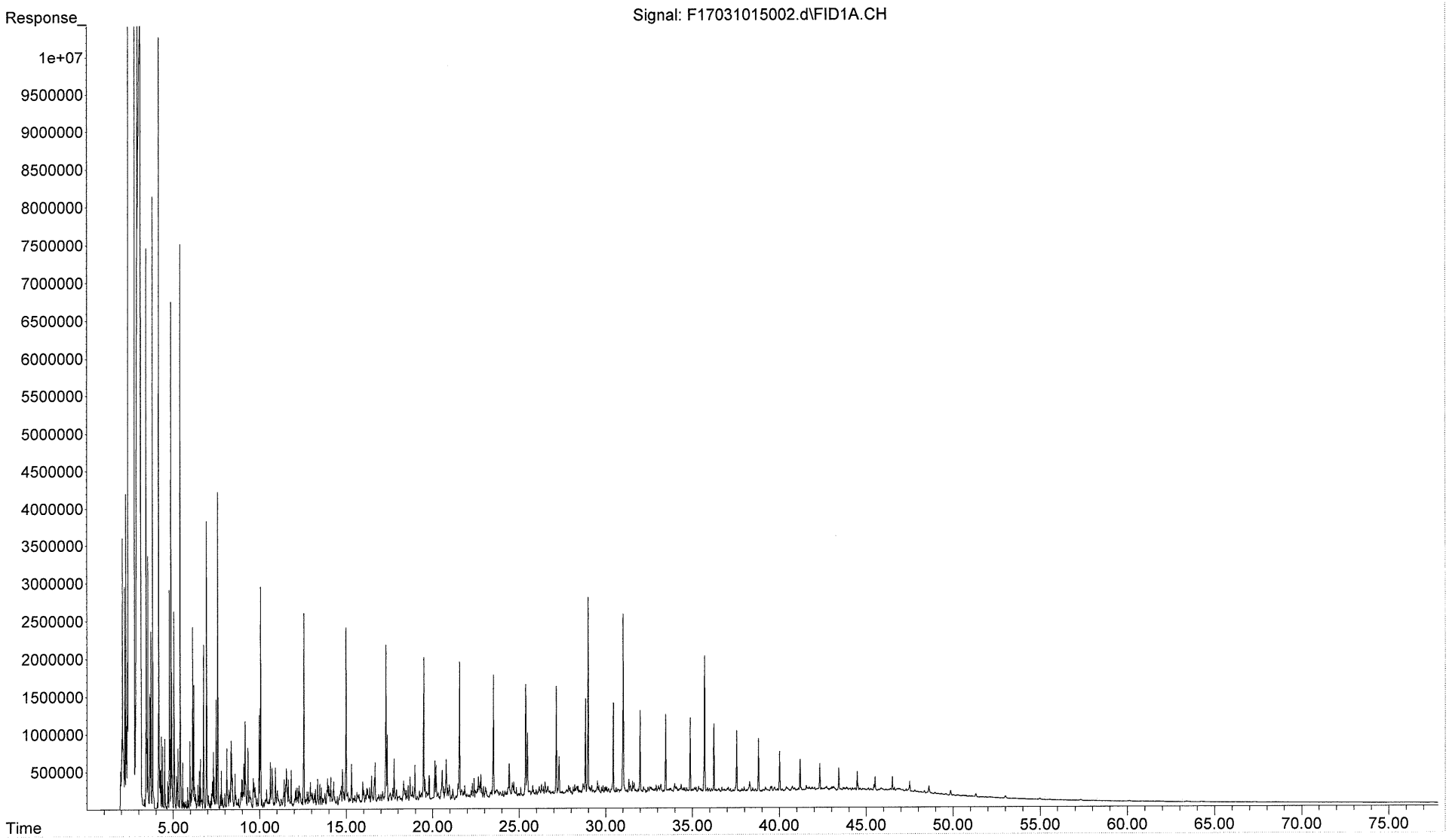
File :V:\nfef_whg\2015 AWHL Data\CSXT Mt Carbon WV\1503002\Prelim
... SHC\F17031015018.d
Operator : FID17:NL
Instrument : FID17
Acquired : 11 Mar 2015 7:36 am using AcqMethod FID17.M
Sample Name: 1503002-04
Misc Info : 1X

Sheen Boom-022715
1503002-04



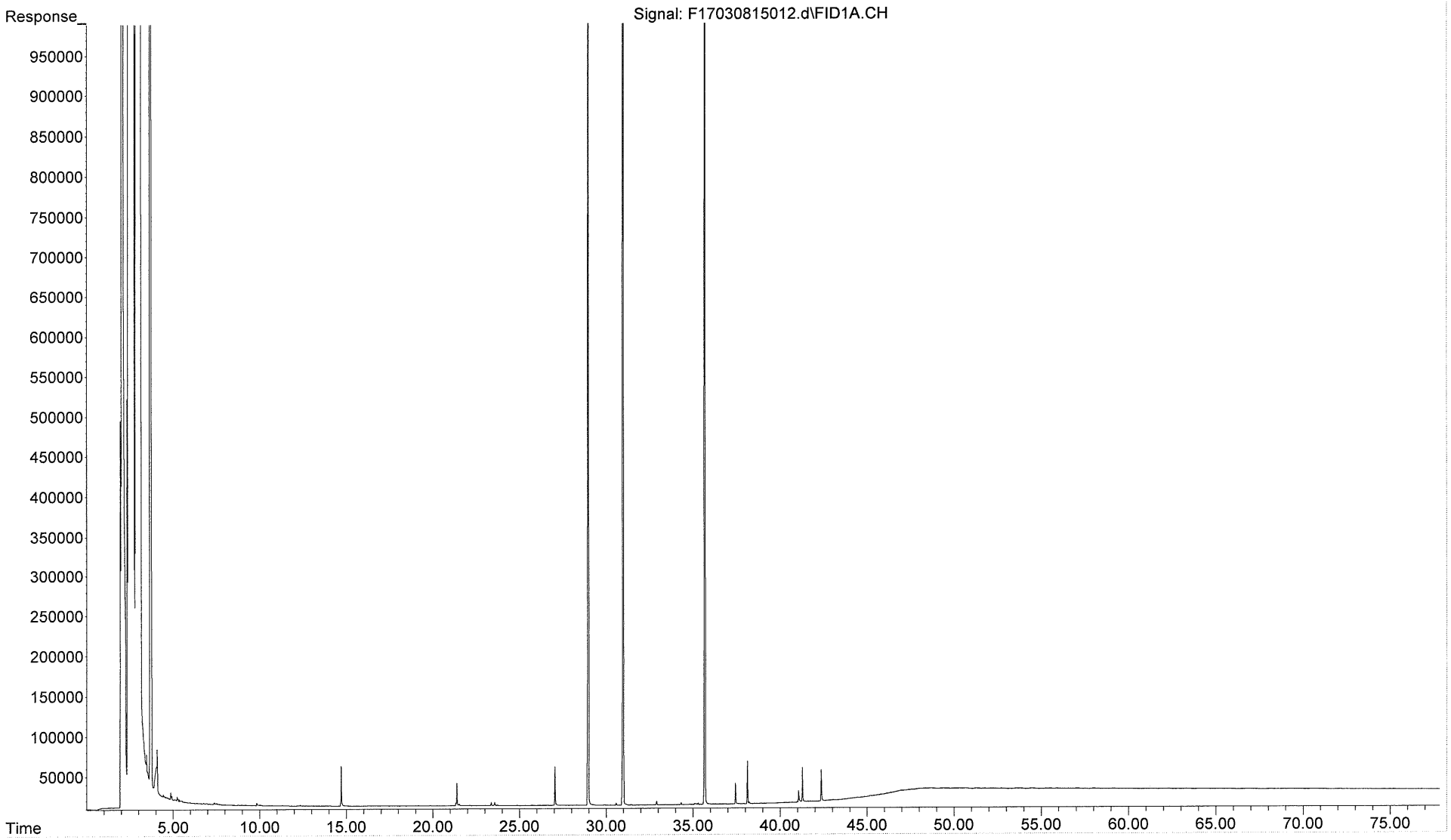
File :V:\nfef_whg\2015 AWHL Data\CSXT Mt Carbon WV\1503002\Prelim
... SHC\F17031015002.d
Operator : FID17:NL
Instrument : FID17
Acquired : 10 Mar 2015 7:49 pm using AcqMethod FID17.M
Sample Name: ANS
Misc Info : FRAU76 10.045mg/mL

North Slope Crude
Reference Standard



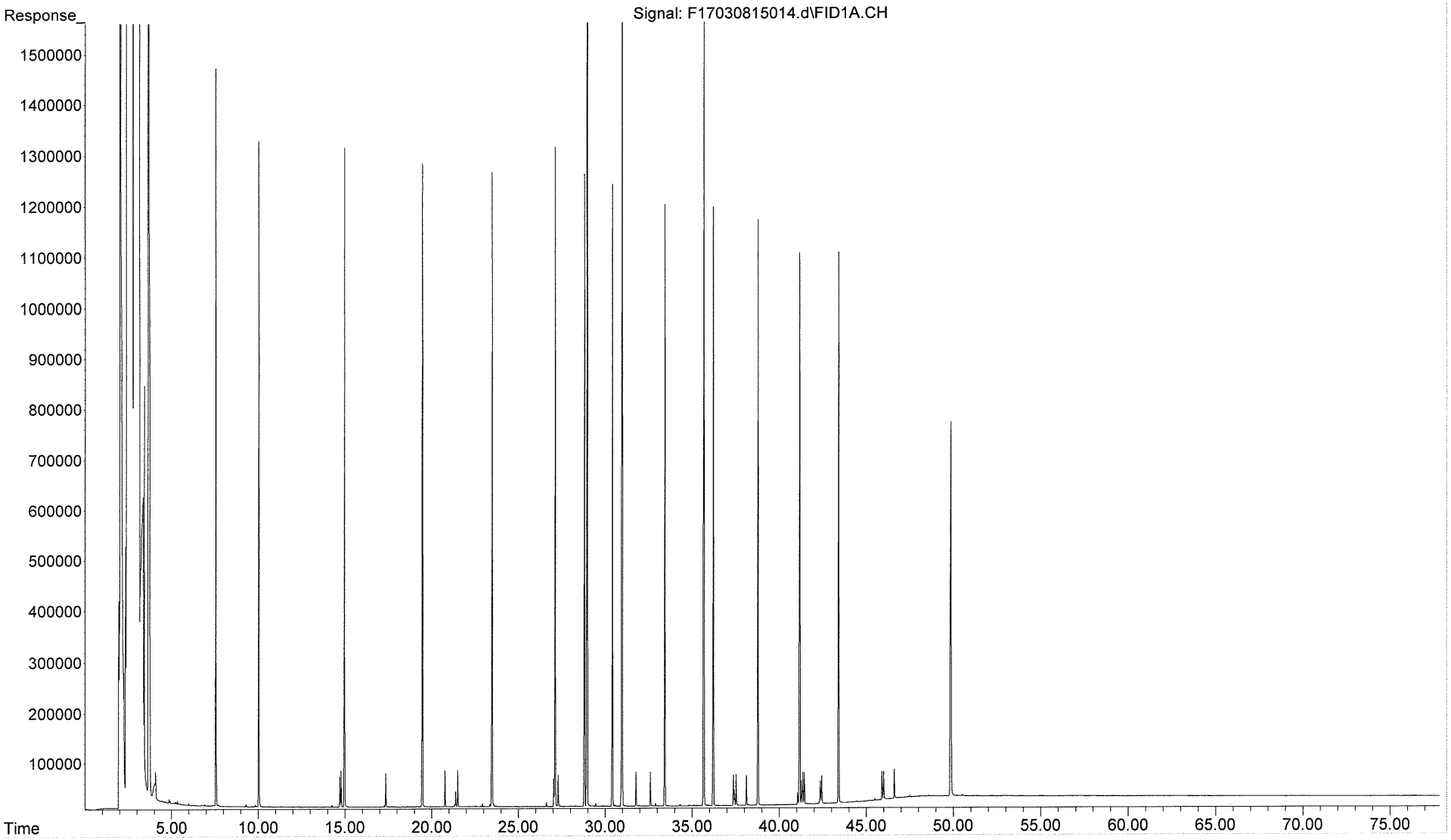
File :V:\nfef_whg\2015 AWHL Data\CSXT Mt Carbon WV\1503002\Prelim
... SHC\F17030815012.d
Operator : FID17:NLJr
Instrument : FID17
Acquired : 08 Mar 2015 8:59 pm using AcqMethod FID17.M
Sample Name: SO030715B01
Misc Info : 1X ETR 1503002

Method Blank
SO030715B01



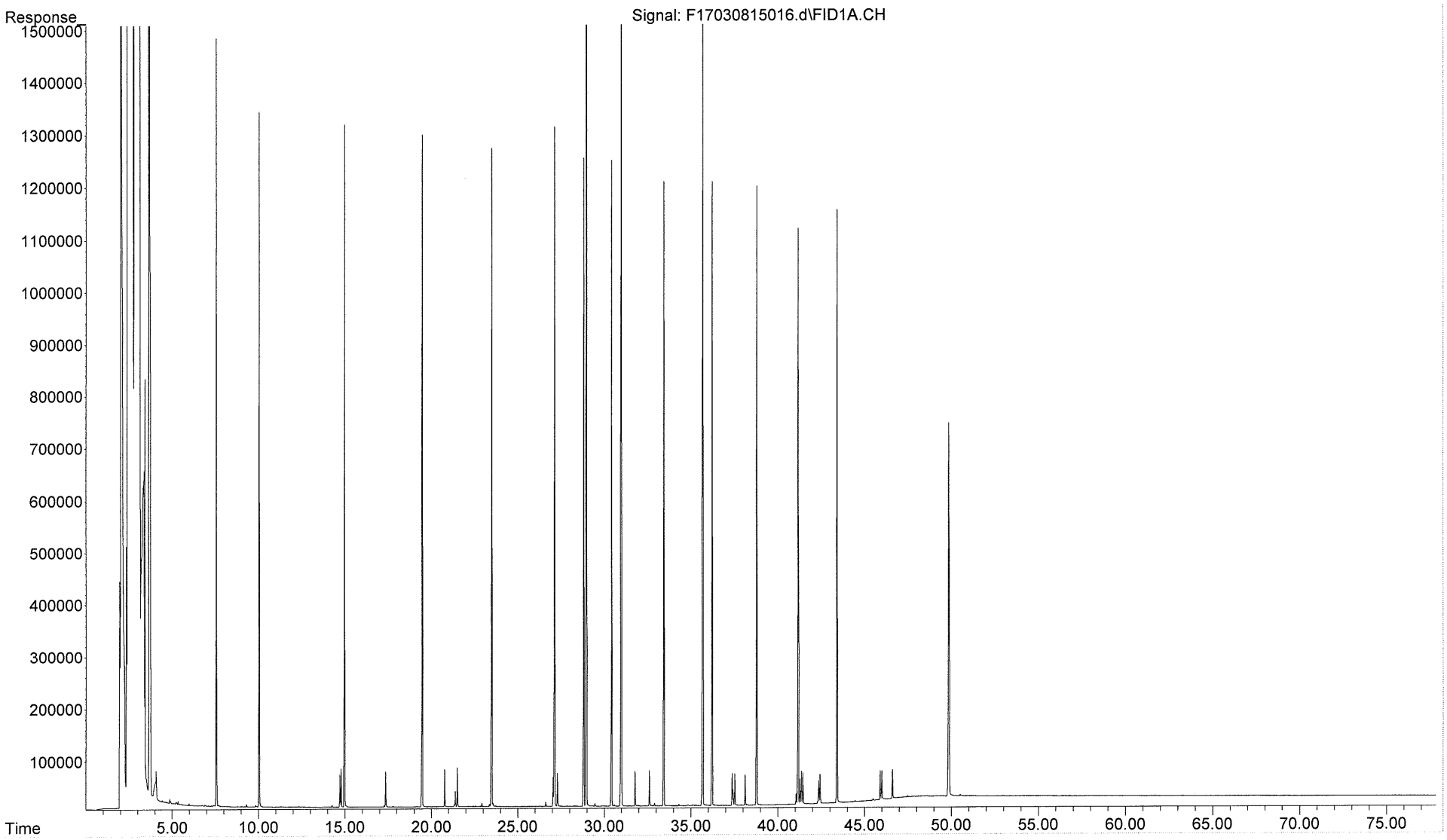
File :V:\nfef_whg\2015 AWHL Data\CSXT Mt Carbon WV\1503002\Prelim
... SHC\F17030815014.d
Operator : FID17:NLJr
Instrument : FID17
Acquired : 08 Mar 2015 10:27 pm using AcqMethod FID17.M
Sample Name: SO030715LCS01
Misc Info : 1X ETR 1503002

Lab Control Sample
SO030715LCS01



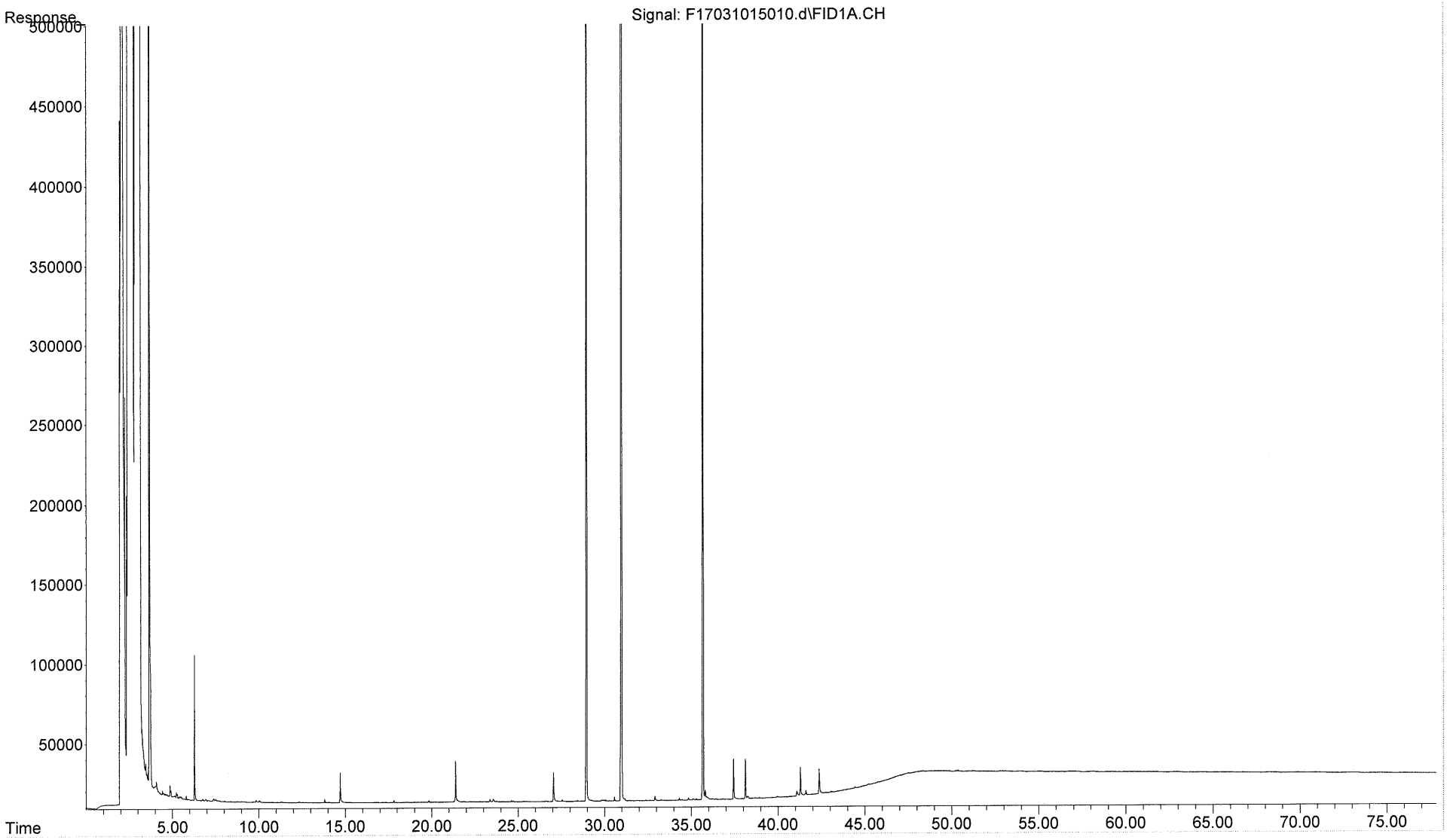
File :V:\nfef_whg\2015 AWHL Data\CSXT Mt Carbon WV\1503002\Prelim
... SHC\F17030815016.d
Operator : FID17:NLJr
Instrument : FID17
Acquired : 08 Mar 2015 11:55 pm using AcqMethod FID17.M
Sample Name: SO030715LCSD01
Misc Info : 1X ETR 1503002

Lab Control Sample Duplicate
SO030715LCSD01



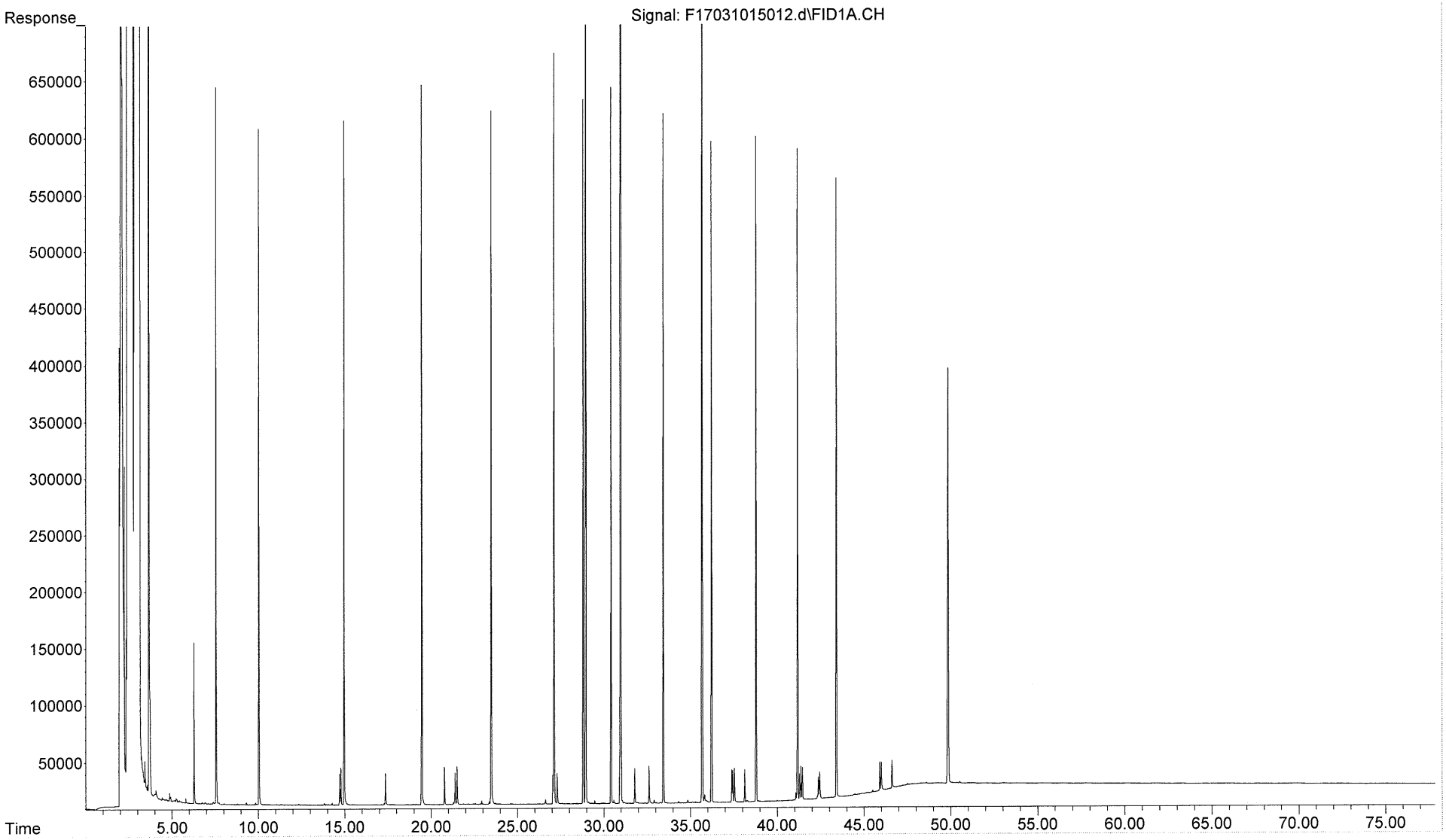
File :V:\nfef_whg\2015 AWHL Data\CSXT Mt Carbon WV\1503002\Prelim
... SHC\F17031015010.d
Operator : FID17:NL
Instrument : FID17
Acquired : 11 Mar 2015 1:42 am using AcqMethod FID17.M
Sample Name: SO031015B01
Misc Info : 1X ETR 1503002

Method Blank
SO031015B01



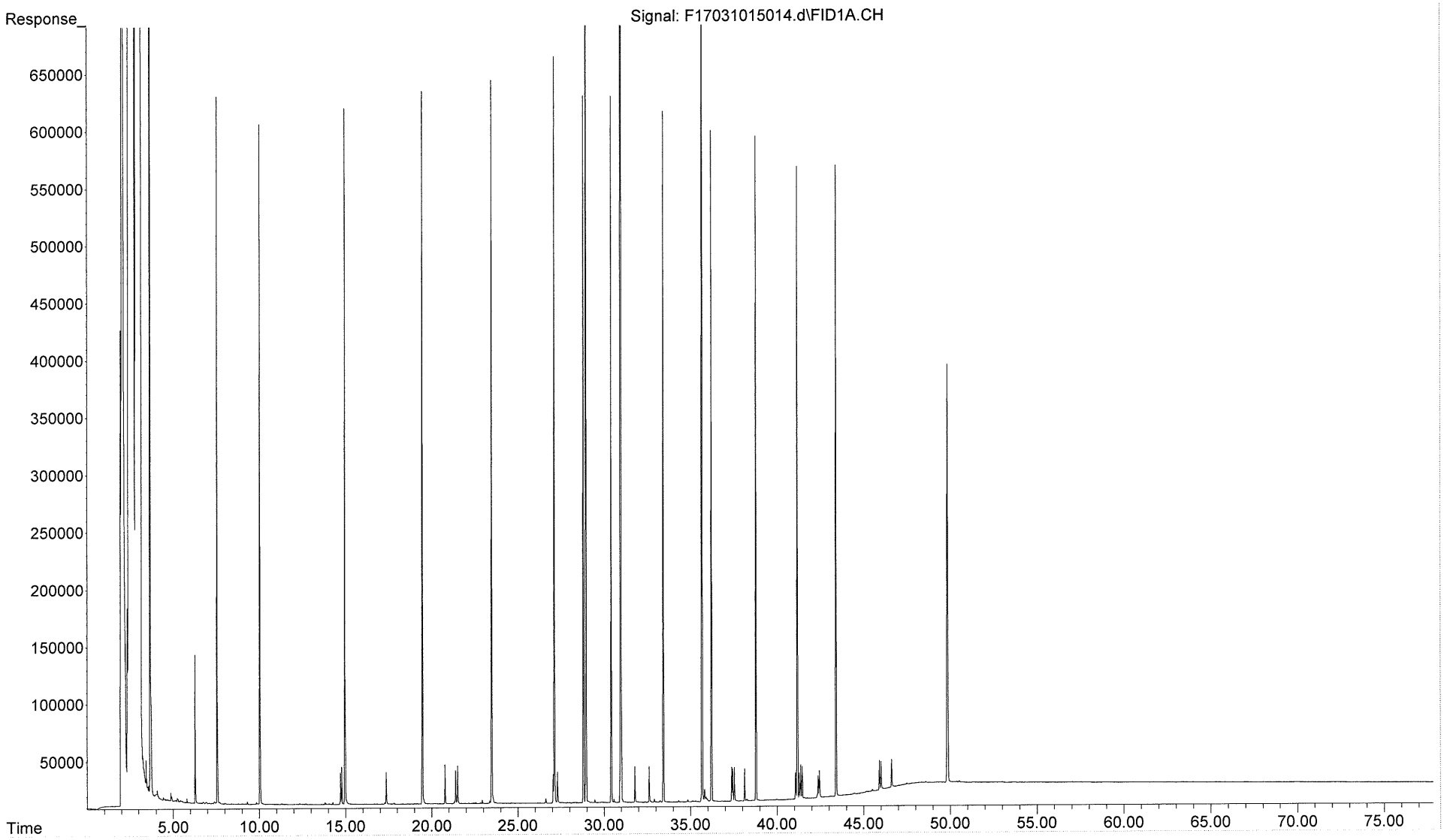
File :V:\nfef_whg\2015 AWHL Data\CSXT Mt Carbon WV\1503002\Prelim
... SHC\F17031015012.d
Operator : FID17:NL
Instrument : FID17
Acquired : 11 Mar 2015 3:11 am using AcqMethod FID17.M
Sample Name: SO031015LCS01
Misc Info : 1X ETR 1503002

Lab Control Sample
SO031015LCS01



File :V:\nfef_whg\2015 AWHL Data\CSXT Mt Carbon WV\1503002\Prelim
... SHC\F17031015014.d
Operator : FID17:NL
Instrument : FID17
Acquired : 11 Mar 2015 4:39 am using AcqMethod FID17.M
Sample Name: SO031015LCSD01
Misc Info : 1X ETR 1503002

Lab Control Sample Duplicate
SO031015LCSD01



Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID		Method Blank		Method Blank		Method Blank	
Lab ID		SO030715B01		SO031015B01		SO031815B01	
Matrix		NAPL		Sheen		NAPL	
Reference Method		SHC		SHC		SHC	
Batch ID		SO030715B01		SO031015B01		SO031815B01	
Date Collected		N/A		N/A		N/A	
Date Received		N/A		N/A		N/A	
Date Prepped		03/07/2015		03/10/2015		03/18/2015	
Date Analyzed		03/08/2015		03/11/2015		03/19/2015	
Sample Size (wet)		0.1		0.04		0.1	
% Solid		100.00		100.00		100.00	
File ID		F17030815012.d		F17031015010.d		F17031815014.d	
Units		mg/Kg		mg/Kg		mg/Kg	
Final Volume		20		2		20	
Dilution		1		1		1	
Reporting Limit		200		50.0		200	
Class	Abbrev	Analytes	Result	SSRL	Result	SSRL	Result	SSRL
SHC	C9	n-Nonane (C9)	U 200		0.450 J 50.0		U 200	
SHC	C10	n-Decane (C10)	4.60 J 200		1.90 J 50.0		U 200	
SHC	C11	n-Undecane (C11)	U 200		U 50.0		U 200	
SHC	C12	n-Dodecane (C12)	U 200		U 50.0		U 200	
SHC	C13	n-Tridecane (C13)	0.600 J 200		U 50.0		U 200	
SHC	1380	2,6,10 Trimethyldodecane (1380)	U 200		U 50.0		U 200	
SHC	C14	n-Tetradecane (C14)	0.800 J 200		U 50.0		0.600 J 200	
SHC	1470	2,6,10 Trimethyltridecane (1470)	U 200		U 50.0		U 200	
SHC	C15	n-Pentadecane (C15)	11.0 J 200		1.50 J 50.0		U 200	
SHC	C16	n-Hexadecane (C16)	2.80 J 200		U 50.0		U 200	
SHC	1650	Norpristane (1650)	U 200		U 50.0		U 200	
SHC	C17	n-Heptadecane (C17)	U 200		U 50.0		U 200	
SHC	Pr	Pristane	U 200		U 50.0		U 200	
SHC	C18	n-Octadecane (C18)	U 200		U 50.0		U 200	
SHC	Ph	Phytane	U 200		U 50.0		U 200	
SHC	C19	n-Nonadecane (C19)	U 200		U 50.0		U 200	
SHC	C20	n-Eicosane (C20)	U 200		U 50.0		U 200	
SHC	C21	n-Heneicosane (C21)	U 200		U 50.0		U 200	
SHC	C22	n-Docosane (C22)	U 200		U 50.0		U 200	
SHC	C23	n-Tricosane (C23)	2.60 J 200		1.90 J 50.0		U 200	
SHC	C24	n-Tetracosane (C24)	U 200		U 50.0		U 200	
SHC	C25	n-Pentacosane (C25)	U 200		U 50.0		U 200	
SHC	C26	n-Hexacosane (C26)	U 200		U 50.0		U 200	
SHC	C27	n-Heptacosane (C27)	U 200		U 50.0		U 200	
SHC	C28	n-Octacosane (C28)	U 200		U 50.0		U 200	
SHC	C29	n-Nonacosane (C29)	U 200		U 50.0		U 200	
SHC	C30	n-Triacontane (C30)	U 200		U 50.0		U 200	
SHC	C31	n-Hentriacontane (C31)	U 200		1.10 J 50.0		U 200	
SHC	C32	n-Dotriacontane (C32)	U 200		U 50.0		U 200	
SHC	C33	n-Tritriacontane (C33)	U 200		U 50.0		U 200	
SHC	C34	n-Tetratriacontane (C34)	U 200		U 50.0		U 200	
SHC	C35	n-Pentatriacontane (C35)	U 200		U 50.0		U 200	
SHC	C36	n-Hexatriacontane (C36)	U 200		1.05 J 50.0		U 200	
SHC	C37	n-Heptatriacontane (C37)	U 200		U 50.0		U 200	
SHC	C38	n-Octatriacontane (C38)	U 200		U 50.0		U 200	
SHC	C39	n-Nonatriacontane (C39)	U 200		U 50.0		U 200	
SHC	C40	n-Tetracontane (C40)	U 200		U 50.0		U 200	
SHC	TSH	Total Saturated Hydrocarbons	22.4 J 200		7.90 J 50.0		0.600 J 200	
SHC	TPH	Total Petroleum Hydrocarbons (C9-C44)	U 6600		U 1650		U 6600	

Surrogates (% Recovery)			
ortho-Terphenyl	92	90	96
d50-Tetracosane	89	88	90

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Laboratory Control Sample
Lab ID	SO030715LCS01
Matrix	NAPL
Reference Method	SHC
Batch ID	SO030715B01
Date Collected	N/A
Date Received	N/A
Date Prepped	03/07/2015
Date Analyzed	03/08/2015
Sample Size (wet)	0.1
% Solid	100.00
File ID	F17030815014.d
Units	mg/Kg
Final Volume	20
Dilution	1
Reporting Limit	200

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	n-Nonane (C9)	3970	S	200	99	4000	50	130
SHC	C10	n-Decane (C10)	4100	S	200	103	4000	50	130
SHC	C12	n-Dodecane (C12)	4130	S	200	103	4000	50	130
SHC	C14	n-Tetradecane (C14)	4140	S	200	103	4000	50	130
SHC	C16	n-Hexadecane (C16)	4280	S	200	107	4000	50	130
SHC	C18	n-Octadecane (C18)	4260	S	200	106	4000	50	130
SHC	C19	n-Nonadecane (C19)	4050	S	200	101	4000	50	130
SHC	C20	n-Eicosane (C20)	4110	S	200	103	4000	50	130
SHC	C22	n-Docosane (C22)	4050	S	200	101	4000	50	130
SHC	C24	n-Tetracosane (C24)	4010	S	200	100	4000	50	130
SHC	C26	n-Hexacosane (C26)	3910	S	200	98	4000	50	130
SHC	C28	n-Octacosane (C28)	3900	S	200	97	4000	50	130
SHC	C30	n-Triacontane (C30)	3920	S	200	98	4000	50	130
SHC	C36	n-Hexatriacontane (C36)	3960	S	200	99	4000	50	130

Surrogates (% Recovery)	
ortho-Terphenyl	93
d50-Tetracosane	90

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Laboratory Control Sample Dup
Lab ID	SO030715LCSD01
Matrix	NAPL
Reference Method	SHC
Batch ID	SO030715B01
Date Collected	N/A
Date Received	N/A
Date Prepped	03/07/2015
Date Analyzed	03/08/2015
Sample Size (wet)	0.1
% Solid	100.00
File ID	F17030815016.d
Units	mg/Kg
Final Volume	20
Dilution	1
Reporting Limit	200

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
SHC	C9	n-Nonane (C9)	4010	S	200	100	4000	50	130	1	30
SHC	C10	n-Decane (C10)	4150	S	200	104	4000	50	130	1	30
SHC	C12	n-Dodecane (C12)	4200	S	200	105	4000	50	130	2	30
SHC	C14	n-Tetradecane (C14)	4210	S	200	105	4000	50	130	2	30
SHC	C16	n-Hexadecane (C16)	4350	S	200	109	4000	50	130	2	30
SHC	C18	n-Octadecane (C18)	4330	S	200	108	4000	50	130	2	30
SHC	C19	n-Nonadecane (C19)	4130	S	200	103	4000	50	130	2	30
SHC	C20	n-Eicosane (C20)	4190	S	200	105	4000	50	130	2	30
SHC	C22	n-Docosane (C22)	4120	S	200	103	4000	50	130	2	30
SHC	C24	n-Tetracosane (C24)	4080	S	200	102	4000	50	130	2	30
SHC	C26	n-Hexacosane (C26)	3970	S	200	99	4000	50	130	2	30
SHC	C28	n-Octacosane (C28)	3940	S	200	99	4000	50	130	1	30
SHC	C30	n-Triacontane (C30)	3960	S	200	99	4000	50	130	1	30
SHC	C36	n-Hexatriacontane (C36)	3960	S	200	99	4000	50	130	0	30

Surrogates (% Recovery)	
ortho-Terphenyl	95
d50-Tetracosane	91

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Laboratory Control Sample
Lab ID	SO031815LCS01
Matrix	NAPL
Reference Method	SHC
Batch ID	SO031815B01
Date Collected	N/A
Date Received	N/A
Date Prepped	03/18/2015
Date Analyzed	03/19/2015
Sample Size (wet)	0.1
% Solid	100.00
File ID	F17031815016.d
Units	mg/Kg
Final Volume	20
Dilution	1
Reporting Limit	200

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	n-Nonane (C9)	3810	S	200	95	4000	50	130
SHC	C10	n-Decane (C10)	3790	S	200	95	4000	50	130
SHC	C12	n-Dodecane (C12)	3850	S	200	96	4000	50	130
SHC	C14	n-Tetradecane (C14)	3910	S	200	98	4000	50	130
SHC	C16	n-Hexadecane (C16)	4080	S	200	102	4000	50	130
SHC	C18	n-Octadecane (C18)	4140	S	200	103	4000	50	130
SHC	C19	n-Nonadecane (C19)	3920	S	200	98	4000	50	130
SHC	C20	n-Eicosane (C20)	3990	S	200	100	4000	50	130
SHC	C22	n-Docosane (C22)	3930	S	200	98	4000	50	130
SHC	C24	n-Tetracosane (C24)	3880	S	200	97	4000	50	130
SHC	C26	n-Hexacosane (C26)	3800	S	200	95	4000	50	130
SHC	C28	n-Octacosane (C28)	3800	S	200	95	4000	50	130
SHC	C30	n-Triacontane (C30)	3800	S	200	95	4000	50	130
SHC	C36	n-Hexatriacontane (C36)	3840	S	200	96	4000	50	130

Surrogates (% Recovery)	
ortho-Terphenyl	96
d50-Tetracosane	91

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Laboratory Control Sample Dup
Lab ID	SO031815LCSD01
Matrix	NAPL
Reference Method	SHC
Batch ID	SO031815B01
Date Collected	N/A
Date Received	N/A
Date Prepped	03/18/2015
Date Analyzed	03/19/2015
Sample Size (wet)	0.1
% Solid	100.00
File ID	F17031815018.d
Units	mg/Kg
Final Volume	20
Dilution	1
Reporting Limit	200

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
SHC	C9	n-Nonane (C9)	3830	S	200	96	4000	50	130	1	30
SHC	C10	n-Decane (C10)	3840	S	200	96	4000	50	130	1	30
SHC	C12	n-Dodecane (C12)	3910	S	200	98	4000	50	130	2	30
SHC	C14	n-Tetradecane (C14)	3960	S	200	99	4000	50	130	1	30
SHC	C16	n-Hexadecane (C16)	4130	S	200	103	4000	50	130	1	30
SHC	C18	n-Octadecane (C18)	4180	S	200	105	4000	50	130	1	30
SHC	C19	n-Nonadecane (C19)	3970	S	200	99	4000	50	130	1	30
SHC	C20	n-Eicosane (C20)	4040	S	200	101	4000	50	130	1	30
SHC	C22	n-Docosane (C22)	3980	S	200	100	4000	50	130	1	30
SHC	C24	n-Tetracosane (C24)	3940	S	200	99	4000	50	130	1	30
SHC	C26	n-Hexacosane (C26)	3850	S	200	96	4000	50	130	1	30
SHC	C28	n-Octacosane (C28)	3850	S	200	96	4000	50	130	1	30
SHC	C30	n-Triacontane (C30)	3860	S	200	96	4000	50	130	2	30
SHC	C36	n-Hexatriacontane (C36)	3900	S	200	98	4000	50	130	2	30

Surrogates (% Recovery)	
ortho-Terphenyl	96
d50-Tetracosane	91

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Laboratory Control Sample
Lab ID	SO031015LCS01
Matrix	Sheen
Reference Method	SHC
Batch ID	SO031015B01
Date Collected	N/A
Date Received	N/A
Date Prepped	03/10/2015
Date Analyzed	03/11/2015
Sample Size (wet)	0.04
% Solid	100.00
File ID	F17031015012.d
Units	mg/Kg
Final Volume	2
Dilution	1
Reporting Limit	50.0

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	n-Nonane (C9)	428	S	50.0	86	500	50	130
SHC	C10	n-Decane (C10)	464	S	50.0	93	500	50	130
SHC	C12	n-Dodecane (C12)	478	S	50.0	96	500	50	130
SHC	C14	n-Tetradecane (C14)	489	S	50.0	98	500	50	130
SHC	C16	n-Hexadecane (C16)	518	S	50.0	104	500	50	130
SHC	C18	n-Octadecane (C18)	517	S	50.0	103	500	50	130
SHC	C19	n-Nonadecane (C19)	494	S	50.0	99	500	50	130
SHC	C20	n-Eicosane (C20)	503	S	50.0	101	500	50	130
SHC	C22	n-Docosane (C22)	496	S	50.0	99	500	50	130
SHC	C24	n-Tetracosane (C24)	491	S	50.0	98	500	50	130
SHC	C26	n-Hexacosane (C26)	477	S	50.0	95	500	50	130
SHC	C28	n-Octacosane (C28)	475	S	50.0	95	500	50	130
SHC	C30	n-Triacontane (C30)	475	S	50.0	95	500	50	130
SHC	C36	n-Hexatriacontane (C36)	474	S	50.0	95	500	50	130

Surrogates (% Recovery)	
ortho-Terphenyl	91
d50-Tetracosane	89

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Laboratory Control Sample Dup
Lab ID	SO031015LCSD01
Matrix	Sheen
Reference Method	SHC
Batch ID	SO031015B01
Date Collected	N/A
Date Received	N/A
Date Prepped	03/10/2015
Date Analyzed	03/11/2015
Sample Size (wet)	0.04
% Solid	100.00
File ID	F17031015014.d
Units	mg/Kg
Final Volume	2
Dilution	1
Reporting Limit	50.0

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
SHC	C9	n-Nonane (C9)	420	S	50.0	84	500	50	130	2	30
SHC	C10	n-Decane (C10)	459	S	50.0	92	500	50	130	1	30
SHC	C12	n-Dodecane (C12)	476	S	50.0	95	500	50	130	1	30
SHC	C14	n-Tetradecane (C14)	486	S	50.0	97	500	50	130	1	30
SHC	C16	n-Hexadecane (C16)	514	S	50.0	103	500	50	130	1	30
SHC	C18	n-Octadecane (C18)	512	S	50.0	102	500	50	130	1	30
SHC	C19	n-Nonadecane (C19)	489	S	50.0	98	500	50	130	1	30
SHC	C20	n-Eicosane (C20)	498	S	50.0	100	500	50	130	1	30
SHC	C22	n-Docosane (C22)	490	S	50.0	98	500	50	130	1	30
SHC	C24	n-Tetracosane (C24)	486	S	50.0	97	500	50	130	1	30
SHC	C26	n-Hexacosane (C26)	472	S	50.0	94	500	50	130	1	30
SHC	C28	n-Octacosane (C28)	470	S	50.0	94	500	50	130	1	30
SHC	C30	n-Triacontane (C30)	471	S	50.0	94	500	50	130	1	30
SHC	C36	n-Hexatriacontane (C36)	468	S	50.0	94	500	50	130	1	30

Surrogates (% Recovery)	
ortho-Terphenyl	90
d50-Tetracosane	88

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Pool-022715	Pool-022715
Lab ID	1503002-01X	1503002-01XD
Matrix	NAPL	NAPL
Reference Method	SHC	SHC
Batch ID	SO031815B01	SO031815B01
Date Collected	02/27/2015	02/27/2015
Date Received	03/03/2015	03/03/2015
Date Prepped	03/18/2015	03/18/2015
Date Analyzed	03/19/2015	03/19/2015
Sample Size (wet)	0.0998	0.0998
% Solid	100.00	100.00
File ID	F17031815020.d	F17031815022.d
Units	mg/Kg	mg/Kg
Final Volume	20	20
Dilution	1	1
Reporting Limit	200	200

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
SHC	C9	n-Nonane (C9)	18.0	J	200	17.6	J	200	2	30	
SHC	C10	n-Decane (C10)	78.4	J	200	82.2	J	200	5	30	
SHC	C11	n-Undecane (C11)	293		200	303		200	3	30	
SHC	C12	n-Dodecane (C12)	708		200	729		200	3	30	
SHC	C13	n-Tridecane (C13)	1380		200	1350		200	2	30	
SHC	1380	2,6,10 Trimethyldodecane (1380)	500		200	526		200	5	30	
SHC	C14	n-Tetradecane (C14)	1600		200	1640		200	2	30	
SHC	1470	2,6,10 Trimethyltridecane (1470)	922		200	908		200	2	30	
SHC	C15	n-Pentadecane (C15)	1740		200	1810		200	4	30	
SHC	C16	n-Hexadecane (C16)	1560		200	1570		200	1	30	
SHC	1650	Norpristane (1650)	857		200	866		200	1	30	
SHC	C17	n-Heptadecane (C17)	1480		200	1560		200	5	30	
SHC	Pr	Pristane	977		200	995		200	2	30	
SHC	C18	n-Octadecane (C18)	1270		200	1280		200	1	30	
SHC	Ph	Phytane	784		200	794		200	1	30	
SHC	C19	n-Nonadecane (C19)	1110		200	1120		200	1	30	
SHC	C20	n-Eicosane (C20)	1100		200	1130		200	3	30	
SHC	C21	n-Heneicosane (C21)	932		200	961		200	3	30	
SHC	C22	n-Docosane (C22)	885		200	882		200	0	30	
SHC	C23	n-Tricosane (C23)	678		200	683		200	1	30	
SHC	C24	n-Tetracosane (C24)	585		200	592		200	1	30	
SHC	C25	n-Pentacosane (C25)	656		200	680		200	4	30	
SHC	C26	n-Hexacosane (C26)	585		200	586		200	0	30	
SHC	C27	n-Heptacosane (C27)	441		200	459		200	4	30	
SHC	C28	n-Octacosane (C28)	351		200	348		200	1	30	
SHC	C29	n-Nonacosane (C29)	294		200	300		200	2	30	
SHC	C30	n-Triacontane (C30)	290		200	309		200	6	30	
SHC	C31	n-Hentriacontane (C31)	225		200	236		200	5	30	
SHC	C32	n-Dotriacontane (C32)	174	J	200	183	J	200	5	30	
SHC	C33	n-Tritriacontane (C33)	170	J	200	169	J	200	0	30	
SHC	C34	n-Tetratriacontane (C34)	133	J	200	138	J	200	4	30	
SHC	C35	n-Pentatriacontane (C35)	117	J	200	98.4	J	200	17	30	
SHC	C36	n-Hexatriacontane (C36)	85.0	J	200	75.6	J	200	12	30	
SHC	C37	n-Heptatriacontane (C37)	66.3	J	200	60.3	J	200	9	30	
SHC	C38	n-Octatriacontane (C38)	52.7	J	200	54.7	J	200	4	30	
SHC	C39	n-Nonatriacontane (C39)		U	200		U	200		30	N/A
SHC	C40	n-Tetracontane (C40)		U	200		U	200		30	N/A
SHC	TSH	Total Saturated Hydrocarbons	23100		200	23500		200	2	30	
SHC	TPH	Total Petroleum Hydrocarbons (C9-C44)	497000		6610	528000		6610	6	30	

Surrogates (% Recovery)		
ortho-Terphenyl	95	94
d50-Tetracosane	91	89

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Alaska North Slope Crude
Lab ID	TO111714ANC01
Matrix	Oil
Reference Method	SHC
Batch ID	N/A
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	11/11/2014
Sample Size (wet)	0.10045
% Solid	100.00
File ID	F17111014030.d
Units	mg/Kg
Final Volume	10
Dilution	1
Reporting Limit	99.6

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	n-Nonane (C9)	6320		99.6	100	6286.00	65	135
SHC	C10	n-Decane (C10)	5110		99.6	101	5047.00	65	135
SHC	C11	n-Undecane (C11)	4640		99.6	99	4703.00	65	135
SHC	C12	n-Dodecane (C12)	4290		99.6	103	4155.00	65	135
SHC	C13	n-Tridecane (C13)	3870		99.6	95	4058.00	65	135
SHC	1380	2,6,10 Trimethyldodecane (1380)	898		99.6	106	845.00	65	135
SHC	C14	n-Tetradecane (C14)	3420		99.6	93	3670.00	65	135
SHC	1470	2,6,10 Trimethyltridecane (1470)	1350		99.6	99	1367.00	65	135
SHC	C15	n-Pentadecane (C15)	3540		99.6	97	3660.00	65	135
SHC	C16	n-Hexadecane (C16)	3100		99.6	93	3330.00	65	135
SHC	1650	Norpristane (1650)	1030		99.6	95	1093.00	65	135
SHC	C17	n-Heptadecane (C17)	2820		99.6	94	3012.00	65	135
SHC	Pr	Pristane	2210		99.6	103	2145.00	65	135
SHC	C18	n-Octadecane (C18)	2410		99.6	89	2700.00	65	135
SHC	Ph	Phytane	1340		99.6	110	1215.00	65	135
SHC	C19	n-Nonadecane (C19)	2410		99.6	105	2305.00	65	135
SHC	C20	n-Eicosane (C20)	2420		99.6	104	2337.00	65	135
SHC	C21	n-Heneicosane (C21)	2080		99.6	102	2044.00	65	135
SHC	C22	n-Docosane (C22)	1950		99.6	99	1972.00	65	135
SHC	C23	n-Tricosane (C23)	1710		99.6	98	1745.00	65	135
SHC	C24	n-Tetracosane (C24)	1640		99.6	100	1641.00	65	135
SHC	C25	n-Pentacosane (C25)	1510		99.6	97	1562.00	65	135
SHC	C26	n-Hexacosane (C26)	1330		99.6	97	1378.00	65	135
SHC	C27	n-Heptacosane (C27)	1070		99.6	99	1083.00	65	135
SHC	C28	n-Octacosane (C28)	740		99.6	95	776.00	65	135
SHC	C29	n-Nonacosane (C29)	720		99.6	98	734.00	65	135
SHC	C30	n-Triacontane (C30)	580		99.6	93	627.00	65	135
SHC	C31	n-Hentriacontane (C31)	454		99.6	88	514.00	65	135
SHC	C32	n-Dotriacontane (C32)	496		99.6	108	458.00	65	135
SHC	C33	n-Tritriacontane (C33)	388		99.6	100	388.00	65	135
SHC	C34	n-Tetratriacontane (C34)	323		99.6	93	347.00	65	135
SHC	C35	n-Pentatriacontane (C35)	221		99.6	79	278.00	65	135
SHC	C36	n-Hexatriacontane (C36)	190		99.6	102	186.00	65	135
SHC	C37	n-Heptatriacontane (C37)	147		99.6	97	152.00	65	135
SHC	C38	n-Octatriacontane (C38)	135		99.6	103	131.00	65	135
SHC	C39	n-Nonatriacontane (C39)	92.6	J	99.6	104	89.00	65	135
SHC	C40	n-Tetracontane (C40)	83.5	J	99.6	91	92.00	65	135
SHC	TSH	Total Saturated Hydrocarbons	67000		99.6	98	68122.00	65	135
SHC	TPH	Total Petroleum Hydrocarbons (C9-C44)	520000		3280	94	554993.00	65	135

Surrogates (% Recovery)
ortho-Terphenyl
d50-Tetracosane

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Pool-022715			CBTX-742201-022715	
Lab ID	1503002-01X			1503002-02	
Matrix	NAPL			NAPL	
Reference Method	SHC			SHC	
Batch ID	SO031815B01			SO030715B01	
Date Collected	02/27/2015			02/27/2015	
Date Received	03/03/2015			03/03/2015	
Date Prepped	03/18/2015			03/07/2015	
Date Analyzed	03/19/2015			03/09/2015	
Sample Size (wet)	0.0998			0.1012	
% Solid	100.00			100.00	
File ID	F17031815020.d			F17030815022.d	
Units	mg/Kg			mg/Kg	
Final Volume	20			20	
Dilution	1			1	
Reporting Limit	200			198	

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL
SHC	C9	n-Nonane (C9)	18.0	J	200	7440		198
SHC	C10	n-Decane (C10)	78.4	J	200	6800		198
SHC	C11	n-Undecane (C11)	293		200	5860		198
SHC	C12	n-Dodecane (C12)	708		200	4790		198
SHC	C13	n-Tridecane (C13)	1380		200	4330		198
SHC	1380	2,6,10 Trimethyldodecane (1380)	500		200	1140		198
SHC	C14	n-Tetradecane (C14)	1600		200	3550		198
SHC	1470	2,6,10 Trimethyltridecane (1470)	922		200	1580		198
SHC	C15	n-Pentadecane (C15)	1740		200	3310		198
SHC	C16	n-Hexadecane (C16)	1560		200	2430		198
SHC	1650	Norpristane (1650)	857		200	1350		198
SHC	C17	n-Heptadecane (C17)	1480		200	2230		198
SHC	Pr	Pristane	977		200	1350		198
SHC	C18	n-Octadecane (C18)	1270		200	1580		198
SHC	Ph	Phytane	784		200	946		198
SHC	C19	n-Nonadecane (C19)	1110		200	1340		198
SHC	C20	n-Eicosane (C20)	1100		200	1200		198
SHC	C21	n-Heneicosane (C21)	932		200	1010		198
SHC	C22	n-Docosane (C22)	885		200	867		198
SHC	C23	n-Tricosane (C23)	678		200	639		198
SHC	C24	n-Tetracosane (C24)	585		200	508		198
SHC	C25	n-Pentacosane (C25)	656		200	537		198
SHC	C26	n-Hexacosane (C26)	585		200	424		198
SHC	C27	n-Heptacosane (C27)	441		200	333		198
SHC	C28	n-Octacosane (C28)	351		200	235		198
SHC	C29	n-Nonacosane (C29)	294		200	182	J	198
SHC	C30	n-Triacontane (C30)	290		200	165	J	198
SHC	C31	n-Hentriacontane (C31)	225		200	108	J	198
SHC	C32	n-Dotriacontane (C32)	174	J	200	66.8	J	198
SHC	C33	n-Tritriacontane (C33)	170	J	200	55.3	J	198
SHC	C34	n-Tetratriacontane (C34)	133	J	200	39.3	J	198
SHC	C35	n-Pentatriacontane (C35)	117	J	200	27.3	J	198
SHC	C36	n-Hexatriacontane (C36)	85.0	J	200		U	198
SHC	C37	n-Heptatriacontane (C37)	66.3	J	200		U	198
SHC	C38	n-Octatriacontane (C38)	52.7	J	200		U	198
SHC	C39	n-Nonatriacontane (C39)		U	200		U	198
SHC	C40	n-Tetracontane (C40)		U	200		U	198
SHC	TSH	Total Saturated Hydrocarbons	23100		200	56400		198
SHC	TPH	Total Petroleum Hydrocarbons (C9-C44)	497000		6610	576000		6520

Surrogates (% Recovery)		
ortho-Terphenyl	95	92
d50-Tetracosane	91	89

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Sheen Reference-022715	Sheen Boom-022715
Lab ID	1503002-03	1503002-04
Matrix	Sheen	Sheen
Reference Method	SHC	SHC
Batch ID	SO031015B01	SO031015B01
Date Collected	02/27/2015	02/27/2015
Date Received	03/03/2015	03/03/2015
Date Prepped	03/10/2015	03/10/2015
Date Analyzed	03/11/2015	03/11/2015
Sample Size (wet)	0.00144	0.08184
% Solid	100.00	100.00
File ID	F17031015016.d	F17031015018.d
Units	mg/Kg	mg/Kg
Final Volume	2	16
Dilution	1	1
Reporting Limit	1390	196

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL
SHC	C9	n-Nonane (C9)	90.3	J	1390	29.7	J	196
SHC	C10	n-Decane (C10)	75.0	J	1390	115	J	196
SHC	C11	n-Undecane (C11)	18.1	J	1390	334		196
SHC	C12	n-Dodecane (C12)	9.72	J	1390	794		196
SHC	C13	n-Tridecane (C13)	18.1	J	1390	1490		196
SHC	1380	2,6,10 Trimethyldodecane (1380)	26.4	J	1390	594		196
SHC	C14	n-Tetradecane (C14)	34.7	J	1390	1980		196
SHC	1470	2,6,10 Trimethyltridecane (1470)	271	J	1390	1140		196
SHC	C15	n-Pentadecane (C15)	236	J	1390	2580		196
SHC	C16	n-Hexadecane (C16)	289	J	1390	2320		196
SHC	1650	Norpristane (1650)	1700		1390	1270		196
SHC	C17	n-Heptadecane (C17)	365	J	1390	2560		196
SHC	Pr	Pristane	5200		1390	1560		196
SHC	C18	n-Octadecane (C18)		U	1390	2200		196
SHC	Ph	Phytane	3740		1390	1320		196
SHC	C19	n-Nonadecane (C19)	731	J	1390	2030		196
SHC	C20	n-Eicosane (C20)	1640		1390	2110		196
SHC	C21	n-Heneicosane (C21)		U	1390	2000		196
SHC	C22	n-Docosane (C22)	415	J	1390	1780		196
SHC	C23	n-Tricosane (C23)		U	1390	1330		196
SHC	C24	n-Tetracosane (C24)		U	1390	1160		196
SHC	C25	n-Pentacosane (C25)	324	J	1390	1230		196
SHC	C26	n-Hexacosane (C26)	76.4	J	1390	1050		196
SHC	C27	n-Heptacosane (C27)	131	J	1390	835		196
SHC	C28	n-Octacosane (C28)	214	J	1390	654		196
SHC	C29	n-Nonacosane (C29)	125	J	1390	569		196
SHC	C30	n-Triacontane (C30)	158	J	1390	512		196
SHC	C31	n-Hentriacontane (C31)	97.2	J	1390	425		196
SHC	C32	n-Dotriacontane (C32)	48.6	J	1390	302		196
SHC	C33	n-Tritriacontane (C33)	51.4	J	1390	314		196
SHC	C34	n-Tetratriacontane (C34)	27.8	J	1390	246		196
SHC	C35	n-Pentatriacontane (C35)	20.8	J	1390	190	J	196
SHC	C36	n-Hexatriacontane (C36)	15.3	J	1390	136	J	196
SHC	C37	n-Heptatriacontane (C37)	16.7	J	1390	114	J	196
SHC	C38	n-Octatriacontane (C38)	8.33	J	1390	134	J	196
SHC	C39	n-Nonatriacontane (C39)	22.2	J	1390	102	J	196
SHC	C40	n-Tetracontane (C40)		U	1390	99.9	J	196
SHC	TSH	Total Saturated Hydrocarbons	16200		1390	37600		196
SHC	TPH	Total Petroleum Hydrocarbons (C9-C44)	982000		45800	749000		6450

Surrogates (% Recovery)		
ortho-Terphenyl	89	104
d50-Tetracosane	86	134 §

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID		Method Blank			Method Blank	
Lab ID		SO030715B01			SO031015B01	
Matrix		NAPL			Sheen	
Reference Method		Modified 8270D			Modified 8270D	
Batch ID		SO030715B01			SO031015B01	
Date Collected		N/A			N/A	
Date Received		N/A			N/A	
Date Prepped		03/07/2015			03/10/2015	
Date Analyzed		03/11/2015			03/12/2015	
Sample Size (wet)		0.1			0.04	
% Solid		100.00			100.00	
File ID		F1403111507.D			F1403111515.D	
Units		mg/Kg			mg/Kg	
Final Volume		20			2	
Dilution		1			1	
Reporting Limit		2.00			0.500	
Class	Abbrev	Analytes	Result	SSRL	Result	SSRL
2	D0	cis/trans-Decalin	U	2.00	U	0.500
2	D1	C1-Decalins	U	2.00	U	0.500
2	D2	C2-Decalins	U	2.00	U	0.500
2	D3	C3-Decalins	U	2.00	U	0.500
2	D4	C4-Decalins	U	2.00	U	0.500
2	BT0	Benzothiophene	U	2.00	U	0.500
2	BT1	C1-Benzo(b)thiophenes	U	2.00	U	0.500
2	BT2	C2-Benzo(b)thiophenes	U	2.00	U	0.500
2	BT3	C3-Benzo(b)thiophenes	U	2.00	U	0.500
2	BT4	C4-Benzo(b)thiophenes	U	2.00	U	0.500
2	N0	Naphthalene	U	2.00	0.0507 J	0.500
2	N1	C1-Naphthalenes	U	2.00	U	0.500
2	N2	C2-Naphthalenes	U	2.00	U	0.500
2	N3	C3-Naphthalenes	U	2.00	U	0.500
2	N4	C4-Naphthalenes	U	2.00	U	0.500
2	B	Biphenyl	U	2.00	U	0.500
3	DF	Dibenzofuran	U	2.00	U	0.500
3	AY	Acenaphthylene	U	2.00	U	0.500
3	AE	Acenaphthene	U	2.00	U	0.500
3	F0	Fluorene	U	2.00	U	0.500
3	F1	C1-Fluorenes	U	2.00	U	0.500
3	F2	C2-Fluorenes	U	2.00	U	0.500
3	F3	C3-Fluorenes	U	2.00	U	0.500
3	A0	Anthracene	U	2.00	U	0.500
3	P0	Phenanthrene	0.171 J	2.00	0.0600 J	0.500
3	PA1	C1-Phenanthrenes/Anthracenes	U	2.00	U	0.500
3	PA2	C2-Phenanthrenes/Anthracenes	U	2.00	U	0.500
3	PA3	C3-Phenanthrenes/Anthracenes	U	2.00	U	0.500
3	PA4	C4-Phenanthrenes/Anthracenes	U	2.00	U	0.500
3	RET	Retene	U	2.00	U	0.500
3	DBT0	Dibenzothiophene	0.111 J	2.00	U	0.500
3	DBT1	C1-Dibenzothiophenes	U	2.00	U	0.500
3	DBT2	C2-Dibenzothiophenes	U	2.00	U	0.500
3	DBT3	C3-Dibenzothiophenes	U	2.00	U	0.500
3	DBT4	C4-Dibenzothiophenes	U	2.00	U	0.500
4	BF	Benzo(b)fluorene	U	2.00	U	0.500
4	FL0	Fluoranthene	0.115 J	2.00	0.0424 J	0.500
4	PY0	Pyrene	0.145 J	2.00	0.0486 J	0.500
4	FP1	C1-Fluoranthenes/Pyrenes	U	2.00	U	0.500
4	FP2	C2-Fluoranthenes/Pyrenes	U	2.00	U	0.500
4	FP3	C3-Fluoranthenes/Pyrenes	U	2.00	U	0.500
4	FP4	C4-Fluoranthenes/Pyrenes	U	2.00	U	0.500
4	NBT0	Naphthobenzothiophenes	U	2.00	U	0.500
4	NBT1	C1-Naphthobenzothiophenes	U	2.00	U	0.500
4	NBT2	C2-Naphthobenzothiophenes	U	2.00	U	0.500
4	NBT3	C3-Naphthobenzothiophenes	U	2.00	U	0.500
4	NBT4	C4-Naphthobenzothiophenes	U	2.00	U	0.500
4	BA0	Benz[a]anthracene	0.0998 J	2.00	0.0278 J	0.500
4	C0	Chrysene/Triphenylene	0.137 J	2.00	0.0496 J	0.500
4	BC1	C1-Chrysenes	U	2.00	U	0.500
4	BC2	C2-Chrysenes	U	2.00	U	0.500
4	BC3	C3-Chrysenes	U	2.00	U	0.500
4	BC4	C4-Chrysenes	U	2.00	U	0.500
5	BBF	Benzo[b]fluoranthene	0.167 J	2.00	U	0.500
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene	0.179 J	2.00	U	0.500
5	BAF	Benzo[a]fluoranthene	U	2.00	U	0.500
5	BEP	Benzo[e]pyrene	0.250 J	2.00	0.0602 J	0.500
5	BAP	Benzo[a]pyrene	0.170 J	2.00	0.0693 J	0.500
5	PER	Perylene	U	2.00	U	0.500
6	IND	Indeno[1,2,3-cd]pyrene	0.317 J	2.00	0.0844 J	0.500
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	U	2.00	U	0.500
6	GHI	Benzo[g,h,i]perylene	0.372 J	2.00	0.112 J	0.500
3	CAR	Carbazole	U	2.00	U	0.500
3	4MDT	4-Methyldibenzothiophene	U	2.00	U	0.500
3	2MDT	2/3-Methyldibenzothiophene	U	2.00	U	0.500
3	1MDT	1-Methyldibenzothiophene	U	2.00	U	0.500
3	3MP	3-Methylphenanthrene	U	2.00	U	0.500
3	2MP	2-Methylphenanthrene	U	2.00	U	0.500
3	2MA	2-Methylanthracene	U	2.00	U	0.500
3	9MP	9/4-Methylphenanthrene	U	2.00	U	0.500
3	1MP	1-Methylphenanthrene	U	2.00	U	0.500

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID		Method Blank		Method Blank
Lab ID		SO030715B01		SO031015B01
Matrix		NAPL		Sheen
Reference Method		Modified 8270D		Modified 8270D
Batch ID		SO030715B01		SO031015B01
Date Collected		N/A		N/A
Date Received		N/A		N/A
Date Prepped		03/07/2015		03/10/2015
Date Analyzed		03/11/2015		03/12/2015
Sample Size (wet)		0.1		0.04
% Solid		100.00		100.00
File ID		F1403111507.D		F1403111515.D
Units		mg/Kg		mg/Kg
Final Volume		20		2
Dilution		1		1
Reporting Limit		2.00		0.500

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL
t23	T4	C23 Tricyclic Terpane		U	2.00		U	0.500
t24	T5	C24 Tricyclic Terpane		U	2.00		U	0.500
t25	T6	C25 Tricyclic Terpane		U	2.00		U	0.500
te24	T6a	C24 Tetracyclic Terpane		U	2.00		U	0.500
t26S	T6b	C26 Tricyclic Terpane-22S		U	2.00		U	0.500
t26R	T6c	C26 Tricyclic Terpane-22R		U	2.00		U	0.500
t28S	T7	C28 Tricyclic Terpane-22S		U	2.00		U	0.500
t28R	T8	C28 Tricyclic Terpane-22R		U	2.00		U	0.500
t29S	T9	C29 Tricyclic Terpane-22S		U	2.00		U	0.500
t29R	T10	C29 Tricyclic Terpane-22R		U	2.00		U	0.500
Ts	T11	18a-22,29,30-Trisnorneohopane-TS		U	2.00		U	0.500
t30S	T11a	C30 Tricyclic Terpane-22S		U	2.00		U	0.500
t30R	T11b	C30 Tricyclic Terpane-22R		U	2.00		U	0.500
Tm	T12	17a(H)-22,29,30-Trisnorhopane-TM		U	2.00		U	0.500
BNH	T14a	17a/b,21b/a 28,30-Bisnorhopane		U	2.00		U	0.500
25N	T14b	17a(H),21b(H)-25-Norhopane		U	2.00		U	0.500
H29	T15	30-Norhopane		U	2.00		U	0.500
C29Ts	T16	18a(H)-30-Norneohopane-C29Ts		U	2.00		U	0.500
X	X	17a(H)-Diahopane		U	2.00		U	0.500
M29	T17	30-Normoretane		U	2.00		U	0.500
OL	T18	18a(H)&18b(H)-Oleananes		U	2.00		U	0.500
H30	T19	Hopane		U	2.00		U	0.500
M30	T20	Moretane		U	2.00		U	0.500
H31S	T21	30-Homohopane-22S		U	2.00		U	0.500
H31R	T22	30-Homohopane-22R		U	2.00		U	0.500
T22A	T22A	T22a-Gammacerane/C32-diahopane		U	2.00		U	0.500
H32S	T26	30,31-Bishomohopane-22S		U	2.00		U	0.500
H32R	T27	30,31-Bishomohopane-22R		U	2.00		U	0.500
H33S	T30	30,31-Trishomohopane-22S		U	2.00		U	0.500
H33R	T31	30,31-Trishomohopane-22R		U	2.00		U	0.500
H34S	T32	Tetrakishomohopane-22S		U	2.00		U	0.500
H34R	T33	Tetrakishomohopane-22R		U	2.00		U	0.500
H35S	T34	Pentakishomohopane-22S		U	2.00		U	0.500
H35R	T35	Pentakishomohopane-22R		U	2.00		U	0.500
d27S	S4	13b(H),17a(H)-20S-Diacholestane		U	2.00		U	0.500
d27R	S5	13b(H),17a(H)-20R-Diacholestane		U	2.00		U	0.500
d28S	S8	13b,17a-20S-Methyldiacholestane		U	2.00		U	0.500
aa27S	S12	14a(H),17a(H)-20S-Cholestane/13b(H),17a(H)-20S-Ethyldiacholestane (S12)		U	2.00		U	0.500
aa27R	S17	14a(H),17a(H)-20R-Cholestane/13b(H),17a(H)-20R-Ethyldiacholestane (S17)		U	2.00		U	0.500
d29R	S18	Unknown Sterane (S18)		U	2.00		U	0.500
d29S	S19	13a,17b-20S-Ethyldiacholestane		U	2.00		U	0.500
aa28S	S20	14a,17a-20S-Methylcholestane		U	2.00		U	0.500
aa28R	S24	14a,17a-20R-Methylcholestane		U	2.00		U	0.500
aa29S	S25	14a(H),17a(H)-20S-Ethylcholestane		U	2.00		U	0.500
aa29R	S28	14a(H),17a(H)-20R-Ethylcholestane		U	2.00		U	0.500
bb27R	S14	14b(H),17b(H)-20R-Cholestane		U	2.00		U	0.500
bb27S	S15	14b(H),17b(H)-20S-Cholestane		U	2.00		U	0.500
bb28R	S22	14b,17b-20R-Methylcholestane		U	2.00		U	0.500
bb28S	S23	14b,17b-20S-Methylcholestane		U	2.00		U	0.500
bb29R	S26	14b(H),17b(H)-20R-Ethylcholestane		U	2.00		U	0.500
bb29S	S27	14b(H),17b(H)-20S-Ethylcholestane		U	2.00		U	0.500
RC26/SC27TA	RC26/SC27TA	C26,20R- +C27,20S- triaromatic steroid		U	2.00		U	0.500
SC28TA	SC28TA	C28,20S-triaromatic steroid		U	2.00		U	0.500
RC27TA	RC27TA	C27,20R-triaromatic steroid		U	2.00		U	0.500
RC28TA	RC28TA	C28,20R-triaromatic steroid		U	2.00		U	0.500

Surrogates (% Recovery)		
Naphthalene-d8	88	77
Phenanthrene-d10	92	87
Benzo[a]pyrene-d12	93	85
5B(H)Cholane	110	105

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Method Blank
Lab ID	SO031815B01
Matrix	NAPL
Reference Method	Modified 8270D
Batch ID	SO031815B01
Date Collected	N/A
Date Received	N/A
Date Prepped	03/18/2015
Date Analyzed	03/19/2015
Sample Size (wet)	0.1
% Solid	100.00
File ID	F1403191506.D
Units	mg/Kg
Final Volume	20
Dilution	1
Reporting Limit	2.00

Class	Abbrev	Analytes	Result		SSRL
2	D0	cis/trans-Decalin		U	2.00
2	D1	C1-Decalins		U	2.00
2	D2	C2-Decalins		U	2.00
2	D3	C3-Decalins		U	2.00
2	D4	C4-Decalins		U	2.00
2	BT0	Benzothiophene		U	2.00
2	BT1	C1-Benzo(b)thiophenes		U	2.00
2	BT2	C2-Benzo(b)thiophenes		U	2.00
2	BT3	C3-Benzo(b)thiophenes		U	2.00
2	BT4	C4-Benzo(b)thiophenes		U	2.00
2	N0	Naphthalene	0.234	J	2.00
2	N1	C1-Naphthalenes		U	2.00
2	N2	C2-Naphthalenes		U	2.00
2	N3	C3-Naphthalenes		U	2.00
2	N4	C4-Naphthalenes		U	2.00
2	B	Biphenyl	0.475	J	2.00
3	DF	Dibenzofuran		U	2.00
3	AY	Acenaphthylene	0.328	J	2.00
3	AE	Acenaphthene	0.351	J	2.00
3	F0	Fluorene	0.401	J	2.00
3	F1	C1-Fluorenes		U	2.00
3	F2	C2-Fluorenes		U	2.00
3	F3	C3-Fluorenes		U	2.00
3	A0	Anthracene		U	2.00
3	P0	Phenanthrene	1.25	J	2.00
3	PA1	C1-Phenanthrenes/Anthracenes		U	2.00
3	PA2	C2-Phenanthrenes/Anthracenes		U	2.00
3	PA3	C3-Phenanthrenes/Anthracenes		U	2.00
3	PA4	C4-Phenanthrenes/Anthracenes		U	2.00
3	RET	Retene		U	2.00
3	DBT0	Dibenzothiophene	0.155	J	2.00
3	DBT1	C1-Dibenzothiophenes		U	2.00
3	DBT2	C2-Dibenzothiophenes		U	2.00
3	DBT3	C3-Dibenzothiophenes		U	2.00
3	DBT4	C4-Dibenzothiophenes		U	2.00
4	BF	Benzo(b)fluorene		U	2.00
4	FL0	Fluoranthene	0.332	J	2.00
4	PY0	Pyrene	0.432	J	2.00
4	FP1	C1-Fluoranthenes/Pyrenes		U	2.00
4	FP2	C2-Fluoranthenes/Pyrenes		U	2.00
4	FP3	C3-Fluoranthenes/Pyrenes		U	2.00
4	FP4	C4-Fluoranthenes/Pyrenes		U	2.00
4	NBT0	Naphthobenzothiophenes		U	2.00
4	NBT1	C1-Naphthobenzothiophenes		U	2.00
4	NBT2	C2-Naphthobenzothiophenes		U	2.00
4	NBT3	C3-Naphthobenzothiophenes		U	2.00
4	NBT4	C4-Naphthobenzothiophenes		U	2.00
4	BA0	Benz[a]anthracene	0.179	J	2.00
4	C0	Chrysene/Triphenylene	0.207	J	2.00
4	BC1	C1-Chrysenes		U	2.00
4	BC2	C2-Chrysenes		U	2.00
4	BC3	C3-Chrysenes		U	2.00
4	BC4	C4-Chrysenes		U	2.00
5	BBF	Benzo[b]fluoranthene		U	2.00
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene		U	2.00
5	BAF	Benzo[a]fluoranthene		U	2.00
5	BEP	Benzo[e]pyrene		U	2.00
5	BAP	Benzo[a]pyrene		U	2.00
5	PER	Perylene		U	2.00
6	IND	Indeno[1,2,3-cd]pyrene	0.175	J	2.00
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene		U	2.00
6	GHI	Benzo[g,h,i]perylene	0.285	J	2.00
3	CAR	Carbazole		U	2.00
3	4MDT	4-Methyldibenzothiophene		U	2.00
3	2MDT	2/3-Methyldibenzothiophene		U	2.00
3	1MDT	1-Methyldibenzothiophene		U	2.00
3	3MP	3-Methylphenanthrene		U	2.00
3	2MP	2-Methylphenanthrene		U	2.00
3	2MA	2-Methylanthracene		U	2.00
3	9MP	9/4-Methylphenanthrene		U	2.00
3	1MP	1-Methylphenanthrene		U	2.00

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Method Blank
Lab ID	SO031815B01
Matrix	NAPL
Reference Method	Modified 8270D
Batch ID	SO031815B01
Date Collected	N/A
Date Received	N/A
Date Prepped	03/18/2015
Date Analyzed	03/19/2015
Sample Size (wet)	0.1
% Solid	100.00
File ID	F1403191506.D
Units	mg/Kg
Final Volume	20
Dilution	1
Reporting Limit	2.00

Class	Abbrev	Analytes	Result	SSRL
t23	T4	C23 Tricyclic Terpane	U	2.00
t24	T5	C24 Tricyclic Terpane	U	2.00
t25	T6	C25 Tricyclic Terpane	U	2.00
te24	T6a	C24 Tetracyclic Terpane	U	2.00
t26S	T6b	C26 Tricyclic Terpane-22S	U	2.00
t26R	T6c	C26 Tricyclic Terpane-22R	U	2.00
t28S	T7	C28 Tricyclic Terpane-22S	U	2.00
t28R	T8	C28 Tricyclic Terpane-22R	U	2.00
t29S	T9	C29 Tricyclic Terpane-22S	U	2.00
t29R	T10	C29 Tricyclic Terpane-22R	U	2.00
Ts	T11	18a-22,29,30-Trisnorneohopane-TS	U	2.00
t30S	T11a	C30 Tricyclic Terpane-22S	U	2.00
t30R	T11b	C30 Tricyclic Terpane-22R	U	2.00
Tm	T12	17a(H)-22,29,30-Trisnorhopane-TM	U	2.00
BNH	T14a	17a/b,21b/a 28,30-Bisnorhopane	U	2.00
25N	T14b	17a(H),21b(H)-25-Norhopane	U	2.00
H29	T15	30-Norhopane	U	2.00
C29Ts	T16	18a(H)-30-Norneohopane-C29Ts	U	2.00
X	X	17a(H)-Diahopane	U	2.00
M29	T17	30-Normoretane	U	2.00
OL	T18	18a(H)&18b(H)-Oleananes	U	2.00
H30	T19	Hopane	U	2.00
M30	T20	Moretane	U	2.00
H31S	T21	30-Homohopane-22S	U	2.00
H31R	T22	30-Homohopane-22R	U	2.00
T22A	T22A	T22a-Gammacerane/C32-diahopane	U	2.00
H32S	T26	30,31-Bishomohopane-22S	U	2.00
H32R	T27	30,31-Bishomohopane-22R	U	2.00
H33S	T30	30,31-Trishomohopane-22S	U	2.00
H33R	T31	30,31-Trishomohopane-22R	U	2.00
H34S	T32	Tetrakishomohopane-22S	U	2.00
H34R	T33	Tetrakishomohopane-22R	U	2.00
H35S	T34	Pentakishomohopane-22S	U	2.00
H35R	T35	Pentakishomohopane-22R	U	2.00
d27S	S4	13b(H),17a(H)-20S-Diacholestane	U	2.00
d27R	S5	13b(H),17a(H)-20R-Diacholestane	U	2.00
d28S	S8	13b,17a-20S-Methyldiacholestane	U	2.00
aa27S	S12	14a(H),17a(H)-20S-Cholestane/13b(H),17a(H)-20S-Ethyldiacholestane (S12)	U	2.00
aa27R	S17	14a(H),17a(H)-20R-Cholestane/13b(H),17a(H)-20R-Ethyldiacholestane (S17)	U	2.00
d29R	S18	Unknown Sterane (S18)	U	2.00
d29S	S19	13a,17b-20S-Ethyldiacholestane	U	2.00
aa28S	S20	14a,17a-20S-Methylcholestane	U	2.00
aa28R	S24	14a,17a-20R-Methylcholestane	U	2.00
aa29S	S25	14a(H),17a(H)-20S-Ethylcholestane	U	2.00
aa29R	S28	14a(H),17a(H)-20R-Ethylcholestane	U	2.00
bb27R	S14	14b(H),17b(H)-20R-Cholestane	U	2.00
bb27S	S15	14b(H),17b(H)-20S-Cholestane	U	2.00
bb28R	S22	14b,17b-20R-Methylcholestane	U	2.00
bb28S	S23	14b,17b-20S-Methylcholestane	U	2.00
bb29R	S26	14b(H),17b(H)-20R-Ethylcholestane	U	2.00
bb29S	S27	14b(H),17b(H)-20S-Ethylcholestane	U	2.00
RC26/SC27TA	RC26/SC27TA	C26,20R- +C27,20S- triaromatic steroid	U	2.00
SC28TA	SC28TA	C28,20S-triaromatic steroid	U	2.00
RC27TA	RC27TA	C27,20R-triaromatic steroid	U	2.00
RC28TA	RC28TA	C28,20R-triaromatic steroid	U	2.00

Surrogates (% Recovery)	
Naphthalene-d8	102
Phenanthrene-d10	96
Benzo[a]pyrene-d12	96
5B(H)Cholane	105

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Laboratory Control Sample
Lab ID	SO030715LCS01
Matrix	NAPL
Reference Method	Modified 8270D
Batch ID	SO030715B01
Date Collected	N/A
Date Received	N/A
Date Prepped	03/07/2015
Date Analyzed	03/11/2015
Sample Size (wet)	0.1
% Solid	100.00
File ID	F1403111508.D
Units	mg/Kg
Final Volume	20
Dilution	1
Reporting Limit	2.00

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit
2	N0	Naphthalene	222	S	2.00	111	200	50	130
3	AY	Acenaphthylene	230	S	2.00	115	200	50	130
3	AE	Acenaphthene	230	S	2.00	115	200	50	130
3	F0	Fluorene	233	S	2.00	116	200	50	130
3	A0	Anthracene	239	S	2.00	120	200	50	130
3	P0	Phenanthrene	233	S	2.00	116	200	50	130
4	FL0	Fluoranthene	236	S	2.00	118	200	50	130
4	PY0	Pyrene	219	S	2.00	110	200	50	130
4	BA0	Benz[a]anthracene	225	S	2.00	112	200	50	130
4	C0	Chrysene/Triphenylene	216	S	2.00	108	200	50	130
5	BBF	Benzo[b]fluoranthene	236	S	2.00	118	200	50	130
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene	235	S	2.00	117	200	50	130
5	BAP	Benzo[a]pyrene	237	S	2.00	118	200	50	130
6	IND	Indeno[1,2,3-cd]pyrene	226	S	2.00	113	200	50	130
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	222	S	2.00	111	200	50	130
6	GHI	Benzo[g,h,i]perylene	214	S	2.00	107	200	50	130

Surrogates (% Recovery)	
Naphthalene-d8	93
Phenanthrene-d10	95
Benzo[a]pyrene-d12	92
5B(H)Cholane	107

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Laboratory Control Sample Dup
Lab ID	SO030715LCSD01
Matrix	NAPL
Reference Method	Modified 8270D
Batch ID	SO030715B01
Date Collected	N/A
Date Received	N/A
Date Prepped	03/07/2015
Date Analyzed	03/11/2015
Sample Size (wet)	0.1
% Solid	100.00
File ID	F1403111509.D
Units	mg/Kg
Final Volume	20
Dilution	1
Reporting Limit	2.00

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
2	N0	Naphthalene	228	S	2.00	114	200	50	130	2	30
3	AY	Acenaphthylene	237	S	2.00	118	200	50	130	3	30
3	AE	Acenaphthene	238	S	2.00	119	200	50	130	4	30
3	F0	Fluorene	241	S	2.00	120	200	50	130	3	30
3	A0	Anthracene	246	S	2.00	123	200	50	130	3	30
3	P0	Phenanthrene	240	S	2.00	120	200	50	130	3	30
4	FL0	Fluoranthene	243	S	2.00	121	200	50	130	3	30
4	PY0	Pyrene	226	S	2.00	113	200	50	130	3	30
4	BA0	Benz[a]anthracene	230	S	2.00	115	200	50	130	2	30
4	C0	Chrysene/Triphenylene	222	S	2.00	111	200	50	130	3	30
5	BBF	Benzo[b]fluoranthene	241	S	2.00	120	200	50	130	2	30
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene	239	S	2.00	120	200	50	130	2	30
5	BAP	Benzo[a]pyrene	242	S	2.00	121	200	50	130	2	30
6	IND	Indeno[1,2,3-cd]pyrene	225	S	2.00	112	200	50	130	1	30
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	225	S	2.00	113	200	50	130	2	30
6	GHI	Benzo[g,h,i]perylene	218	S	2.00	109	200	50	130	2	30

Surrogates (% Recovery)	
Naphthalene-d8	94
Phenanthrene-d10	99
Benzo[a]pyrene-d12	94
5B(H)Cholane	108

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Laboratory Control Sample
Lab ID	SO031815LCS01
Matrix	NAPL
Reference Method	Modified 8270D
Batch ID	SO031815B01
Date Collected	N/A
Date Received	N/A
Date Prepped	03/18/2015
Date Analyzed	03/19/2015
Sample Size (wet)	0.1
% Solid	100.00
File ID	F1403191507.D
Units	mg/Kg
Final Volume	20
Dilution	1
Reporting Limit	2.00

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit
2	N0	Naphthalene	226	S	2.00	113	200	50	130
3	AY	Acenaphthylene	217	S	2.00	108	200	50	130
3	AE	Acenaphthene	223	S	2.00	112	200	50	130
3	F0	Fluorene	218	S	2.00	109	200	50	130
3	A0	Anthracene	218	S	2.00	109	200	50	130
3	P0	Phenanthrene	207	S	2.00	104	200	50	130
4	FL0	Fluoranthene	233	S	2.00	117	200	50	130
4	PY0	Pyrene	215	S	2.00	108	200	50	130
4	BA0	Benz[a]anthracene	215	S	2.00	108	200	50	130
4	C0	Chrysene/Triphenylene	208	S	2.00	104	200	50	130
5	BBF	Benzo[b]fluoranthene	215	S	2.00	107	200	50	130
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene	229	S	2.00	115	200	50	130
5	BAP	Benzo[a]pyrene	224	S	2.00	112	200	50	130
6	IND	Indeno[1,2,3-cd]pyrene	202	S	2.00	101	200	50	130
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	210	S	2.00	105	200	50	130
6	GHI	Benzo[g,h,i]perylene	198	S	2.00	99	200	50	130

Surrogates (% Recovery)	
Naphthalene-d8	102
Phenanthrene-d10	98
Benzo[a]pyrene-d12	96
5B(H)Cholane	101

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Laboratory Control Sample Dup
Lab ID	SO031815LCSD01
Matrix	NAPL
Reference Method	Modified 8270D
Batch ID	SO031815B01
Date Collected	N/A
Date Received	N/A
Date Prepped	03/18/2015
Date Analyzed	03/19/2015
Sample Size (wet)	0.1
% Solid	100.00
File ID	F1403191508.D
Units	mg/Kg
Final Volume	20
Dilution	1
Reporting Limit	2.00

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
2	N0	Naphthalene	231	S	2.00	116	200	50	130	2	30
3	AY	Acenaphthylene	221	S	2.00	111	200	50	130	2	30
3	AE	Acenaphthene	227	S	2.00	114	200	50	130	2	30
3	F0	Fluorene	220	S	2.00	110	200	50	130	1	30
3	A0	Anthracene	221	S	2.00	110	200	50	130	1	30
3	P0	Phenanthrene	210	S	2.00	105	200	50	130	1	30
4	FL0	Fluoranthene	236	S	2.00	118	200	50	130	1	30
4	PY0	Pyrene	219	S	2.00	109	200	50	130	1	30
4	BA0	Benz[a]anthracene	217	S	2.00	109	200	50	130	1	30
4	C0	Chrysene/Triphenylene	211	S	2.00	105	200	50	130	1	30
5	BBF	Benzo[b]fluoranthene	218	S	2.00	109	200	50	130	2	30
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene	229	S	2.00	115	200	50	130	0	30
5	BAP	Benzo[a]pyrene	226	S	2.00	113	200	50	130	1	30
6	IND	Indeno[1,2,3-cd]pyrene	210	S	2.00	105	200	50	130	4	30
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	211	S	2.00	106	200	50	130	0	30
6	GHI	Benzo[g,h,i]perylene	201	S	2.00	101	200	50	130	1	30

Surrogates (% Recovery)	
Naphthalene-d8	101
Phenanthrene-d10	100
Benzo[a]pyrene-d12	95
5B(H)Cholane	102

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Laboratory Control Sample
Lab ID	SO031015LCS01
Matrix	Sheen
Reference Method	Modified 8270D
Batch ID	SO031015B01
Date Collected	N/A
Date Received	N/A
Date Prepped	03/10/2015
Date Analyzed	03/12/2015
Sample Size (wet)	0.04
% Solid	100.00
File ID	F1403111516.D
Units	mg/Kg
Final Volume	2
Dilution	1
Reporting Limit	0.500

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit
2	N0	Naphthalene	26.3	S	0.500	105	25.0	50	130
3	AY	Acenaphthylene	26.8	S	0.500	107	25.0	50	130
3	AE	Acenaphthene	27.9	S	0.500	112	25.0	50	130
3	F0	Fluorene	27.9	S	0.500	112	25.0	50	130
3	A0	Anthracene	27.4	S	0.500	109	25.0	50	130
3	P0	Phenanthrene	27.8	S	0.500	111	25.0	50	130
4	FL0	Fluoranthene	28.5	S	0.500	114	25.0	50	130
4	PY0	Pyrene	26.6	S	0.500	106	25.0	50	130
4	BA0	Benz[a]anthracene	26.3	S	0.500	105	25.0	50	130
4	C0	Chrysene/Triphenylene	26.6	S	0.500	106	25.0	50	130
5	BBF	Benzo[b]fluoranthene	27.4	S	0.500	110	25.0	50	130
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene	29.6	S	0.500	118	25.0	50	130
5	BAP	Benzo[a]pyrene	27.7	S	0.500	111	25.0	50	130
6	IND	Indeno[1,2,3-cd]pyrene	25.4	S	0.500	102	25.0	50	130
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	26.0	S	0.500	104	25.0	50	130
6	GHI	Benzo[g,h,i]perylene	25.6	S	0.500	102	25.0	50	130

Surrogates (% Recovery)	
Naphthalene-d8	85
Phenanthrene-d10	93
Benzo[a]pyrene-d12	87
5B(H)Cholane	103

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Laboratory Control Sample Dup
Lab ID	SO031015LCSD01
Matrix	Sheen
Reference Method	Modified 8270D
Batch ID	SO031015B01
Date Collected	N/A
Date Received	N/A
Date Prepped	03/10/2015
Date Analyzed	03/12/2015
Sample Size (wet)	0.04
% Solid	100.00
File ID	F1403111517.D
Units	mg/Kg
Final Volume	2
Dilution	1
Reporting Limit	0.500

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
2	N0	Naphthalene	26.4	S	0.500	105	25.0	50	130	0	30
3	AY	Acenaphthylene	26.6	S	0.500	106	25.0	50	130	1	30
3	AE	Acenaphthene	27.8	S	0.500	111	25.0	50	130	0	30
3	F0	Fluorene	27.3	S	0.500	109	25.0	50	130	2	30
3	A0	Anthracene	27.4	S	0.500	109	25.0	50	130	0	30
3	P0	Phenanthrene	27.5	S	0.500	110	25.0	50	130	1	30
4	FL0	Fluoranthene	28.2	S	0.500	113	25.0	50	130	1	30
4	PY0	Pyrene	26.3	S	0.500	105	25.0	50	130	1	30
4	BA0	Benz[a]anthracene	25.9	S	0.500	104	25.0	50	130	1	30
4	C0	Chrysene/Triphenylene	26.4	S	0.500	106	25.0	50	130	1	30
5	BBF	Benzo[b]fluoranthene	26.9	S	0.500	108	25.0	50	130	2	30
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene	29.5	S	0.500	118	25.0	50	130	0	30
5	BAP	Benzo[a]pyrene	27.1	S	0.500	108	25.0	50	130	2	30
6	IND	Indeno[1,2,3-cd]pyrene	24.8	S	0.500	99	25.0	50	130	3	30
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	25.7	S	0.500	103	25.0	50	130	1	30
6	GHI	Benzo[g,h,i]perylene	25.3	S	0.500	101	25.0	50	130	1	30

Surrogates (% Recovery)	
Naphthalene-d8	86
Phenanthrene-d10	91
Benzo[a]pyrene-d12	84
5B(H)Cholane	99

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Pool-022715	Pool-022715
Lab ID	1503002-01X	1503002-01XD
Matrix	NAPL	NAPL
Reference Method	Modified 8270D	Modified 8270D
Batch ID	SO031815B01	SO031815B01
Date Collected	02/27/2015	02/27/2015
Date Received	03/03/2015	03/03/2015
Date Prepped	03/18/2015	03/18/2015
Date Analyzed	03/19/2015	03/19/2015
Sample Size (wet)	0.0998	0.0998
% Solid	100.00	100.00
File ID	F1403191509.D	F1403191510.D
Units	mg/Kg	mg/Kg
Final Volume	20	20
Dilution	1	1
Reporting Limit	2.00	2.00

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
2	D0	cis/trans-Decalin	19.8		2.00	21.1		2.00	6	30	
2	D1	C1-Decalins	88.7		2.00	92.9		2.00	5	30	
2	D2	C2-Decalins	170		2.00	177		2.00	4	30	
2	D3	C3-Decalins	180		2.00	186		2.00	3	30	
2	D4	C4-Decalins	231		2.00	247		2.00	7	30	
2	BT0	Benzothiophene	2.76		2.00	2.72		2.00	2	30	
2	BT1	C1-Benzo(b)thiophenes	26.0		2.00	27.4		2.00	5	30	
2	BT2	C2-Benzo(b)thiophenes	10.9		2.00	11.9		2.00	9	30	
2	BT3	C3-Benzo(b)thiophenes	29.8		2.00	30.6		2.00	2	30	
2	BT4	C4-Benzo(b)thiophenes	25.7		2.00	26.3		2.00	2	30	
2	N0	Naphthalene	49.2		2.00	50.0		2.00	2	30	
2	N1	C1-Naphthalenes	200		2.00	207		2.00	3	30	
2	N2	C2-Naphthalenes	764		2.00	794		2.00	4	30	
2	N3	C3-Naphthalenes	963		2.00	993		2.00	3	30	
2	N4	C4-Naphthalenes	690		2.00	710		2.00	3	30	
2	B	Biphenyl	12.8		2.00	12.5		2.00	3	30	
3	DF	Dibenzofuran	10.3		2.00	10.6		2.00	3	30	
3	AY	Acenaphthylene	18.5		2.00	18.8		2.00	2	30	
3	AE	Acenaphthene	15.3		2.00	15.7		2.00	3	30	
3	F0	Fluorene	26.2		2.00	27.6		2.00	5	30	
3	F1	C1-Fluorenes	66.2		2.00	67.8		2.00	2	30	
3	F2	C2-Fluorenes	171		2.00	175		2.00	3	30	
3	F3	C3-Fluorenes	233		2.00	239		2.00	3	30	
3	A0	Anthracene	12.0	G	2.00	12.5	G	2.00	4	30	
3	P0	Phenanthrene	120		2.00	123		2.00	2	30	
3	PA1	C1-Phenanthrenes/Anthracenes	263		2.00	271		2.00	3	30	
3	PA2	C2-Phenanthrenes/Anthracenes	448		2.00	460		2.00	3	30	
3	PA3	C3-Phenanthrenes/Anthracenes	402		2.00	421		2.00	5	30	
3	PA4	C4-Phenanthrenes/Anthracenes	228		2.00	233		2.00	2	30	
3	RET	Retene		U	2.00		U	2.00		30	N/A
3	DBT0	Dibenzothiophene	21.0		2.00	22.0		2.00	4	30	
3	DBT1	C1-Dibenzothiophenes	82.8		2.00	82.8		2.00	0	30	
3	DBT2	C2-Dibenzothiophenes	133		2.00	135		2.00	1	30	
3	DBT3	C3-Dibenzothiophenes	136		2.00	138		2.00	2	30	
3	DBT4	C4-Dibenzothiophenes	102		2.00	112		2.00	9	30	
4	BF	Benzo(b)fluorene		U	2.00		U	2.00		30	N/A
4	FL0	Fluoranthene	40.4		2.00	42.0		2.00	4	30	
4	PY0	Pyrene	41.3		2.00	42.0		2.00	2	30	
4	FP1	C1-Fluoranthenes/Pyrenes	53.0		2.00	52.6		2.00	1	30	
4	FP2	C2-Fluoranthenes/Pyrenes	85.7		2.00	86.9		2.00	1	30	
4	FP3	C3-Fluoranthenes/Pyrenes	145		2.00	148		2.00	2	30	
4	FP4	C4-Fluoranthenes/Pyrenes	151		2.00	156		2.00	3	30	
4	NBT0	Naphthobenzothiophenes	10.4		2.00	10.7		2.00	4	30	
4	NBT1	C1-Naphthobenzothiophenes	42.2		2.00	43.6		2.00	3	30	
4	NBT2	C2-Naphthobenzothiophenes	77.1		2.00	77.6		2.00	1	30	
4	NBT3	C3-Naphthobenzothiophenes	77.7		2.00	78.1		2.00	1	30	
4	NBT4	C4-Naphthobenzothiophenes	76.3		2.00	80.3		2.00	5	30	
4	BA0	Benz[a]anthracene	14.1		2.00	14.6		2.00	3	30	
4	C0	Chrysene/Triphenylene	30.6		2.00	31.9		2.00	4	30	
4	BC1	C1-Chrysenes	69.5		2.00	75.0		2.00	8	30	
4	BC2	C2-Chrysenes	131		2.00	138		2.00	6	30	
4	BC3	C3-Chrysenes	212		2.00	227		2.00	7	30	
4	BC4	C4-Chrysenes	180		2.00	197		2.00	9	30	
5	BBF	Benzo[b]fluoranthene	11.2		2.00	11.5		2.00	3	30	
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene	9.49		2.00	10.3		2.00	9	30	
5	BAF	Benzo[a]fluoranthene		U	2.00		U	2.00		30	N/A
5	BEP	Benzo[e]pyrene	12.1		2.00	12.6		2.00	4	30	
5	BAP	Benzo[a]pyrene	11.3		2.00	11.9		2.00	5	30	
5	PER	Perylene	2.63		2.00	2.78		2.00	6	30	
6	IND	Indeno[1,2,3-cd]pyrene	6.10		2.00	6.55		2.00	7	30	
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	2.31		2.00	2.53		2.00	9	30	
6	GHI	Benzo[g,h,i]perylene	7.76		2.00	8.25		2.00	6	30	
3	CAR	Carbazole		U	2.00		U	2.00		30	N/A
3	4MDT	4-Methyldibenzothiophene	43.4		2.00	43.6		2.00	1	30	
3	2MDT	2/3-Methyldibenzothiophene	25.2		2.00	23.8		2.00	5	30	
3	1MDT	1-Methyldibenzothiophene	10.6		2.00	11.1		2.00	5	30	
3	3MP	3-Methylphenanthrene	50.3		2.00	51.8		2.00	3	30	
3	2MP	2-Methylphenanthrene	52.1		2.00	54.6		2.00	5	30	
3	2MA	2-Methylanthracene	2.50		2.00	2.82		2.00	12	30	
3	9MP	9/4-Methylphenanthrene	89.1		2.00	91.6		2.00	3	30	
3	1MP	1-Methylphenanthrene	60.1		2.00	61.7		2.00	3	30	

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Pool-022715	Pool-022715
Lab ID	1503002-01X	1503002-01XD
Matrix	NAPL	NAPL
Reference Method	Modified 8270D	Modified 8270D
Batch ID	SO031815B01	SO031815B01
Date Collected	02/27/2015	02/27/2015
Date Received	03/03/2015	03/03/2015
Date Prepped	03/18/2015	03/18/2015
Date Analyzed	03/19/2015	03/19/2015
Sample Size (wet)	0.0998	0.0998
% Solid	100.00	100.00
File ID	F1403191509.D	F1403191510.D
Units	mg/Kg	mg/Kg
Final Volume	20	20
Dilution	1	1
Reporting Limit	2.00	2.00

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
t23	T4	C23 Tricyclic Terpane	11.6		2.00	13.5		2.00	15	30	
t24	T5	C24 Tricyclic Terpane	7.33		2.00	7.38		2.00	1	30	
t25	T6	C25 Tricyclic Terpane	9.12		2.00	11.9		2.00	27	30	
te24	T6a	C24 Tetracyclic Terpane		U	2.00		U	2.00		30	N/A
t26S	T6b	C26 Tricyclic Terpane-22S	5.72		2.00	5.48		2.00	4	30	
t26R	T6c	C26 Tricyclic Terpane-22R	5.89		2.00	6.41		2.00	8	30	
t28S	T7	C28 Tricyclic Terpane-22S	5.24		2.00	6.04		2.00	14	30	
t28R	T8	C28 Tricyclic Terpane-22R	5.62		2.00	5.35		2.00	5	30	
t29S	T9	C29 Tricyclic Terpane-22S	4.06		2.00	4.78		2.00	16	30	
t29R	T10	C29 Tricyclic Terpane-22R	4.32		2.00	5.34		2.00	21	30	
Ts	T11	18a-22,29,30-Trisnorneohopane-TS	7.66		2.00	6.81		2.00	12	30	
t30S	T11a	C30 Tricyclic Terpane-22S	5.42		2.00	4.26		2.00	24	30	
t30R	T11b	C30 Tricyclic Terpane-22R	4.60		2.00	4.65		2.00	1	30	
Tm	T12	17a(H)-22,29,30-Trisnorhopane-TM	4.56		2.00	3.88		2.00	16	30	
BNH	T14a	17a/b,21b/a 28,30-Bisnorhopane		U	2.00		U	2.00		30	N/A
25N	T14b	17a(H),21b(H)-25-Norhopane	3.85		2.00	4.46		2.00	15	30	
H29	T15	30-Norhopane	12.1		2.00	12.5		2.00	3	30	
C29Ts	T16	18a(H)-30-Norneohopane-C29Ts	6.43		2.00	5.83		2.00	10	30	
X	X	17a(H)-Diahopane	5.24		2.00	4.15		2.00	23	30	
M29	T17	30-Normoretane		U	2.00		U	2.00		30	N/A
OL	T18	18a(H)&18b(H)-Oleananes		U	2.00		U	2.00		30	N/A
H30	T19	Hopane	26.3		2.00	28.6		2.00	8	30	
M30	T20	Moretane		U	2.00		U	2.00		30	N/A
H31S	T21	30-Homohopane-22S	12.0		2.00	14.6		2.00	20	30	
H31R	T22	30-Homohopane-22R	12.5		2.00	14.6		2.00	16	30	
T22A	T22A	T22a-Gammacerane/C32-diahopane		U	2.00		U	2.00		30	N/A
H32S	T26	30,31-Bishomohopane-22S	8.79		2.00	10.1		2.00	14	30	
H32R	T27	30,31-Bishomohopane-22R	6.38		2.00	8.35		2.00	27	30	
H33S	T30	30,31-Trishomohopane-22S	6.02		2.00	6.92		2.00	14	30	
H33R	T31	30,31-Trishomohopane-22R		U	2.00		U	2.00		30	N/A
H34S	T32	Tetrakishomohopane-22S		U	2.00		U	2.00		30	N/A
H34R	T33	Tetrakishomohopane-22R		U	2.00		U	2.00		30	N/A
H35S	T34	Pentakishomohopane-22S		U	2.00		U	2.00		30	N/A
H35R	T35	Pentakishomohopane-22R		U	2.00		U	2.00		30	N/A
d27S	S4	13b(H),17a(H)-20S-Diacholestane	16.4		2.00	16.2		2.00	1	30	
d27R	S5	13b(H),17a(H)-20R-Diacholestane	10.1		2.00	9.16		2.00	10	30	
d28S	S8	13b,17a-20S-Methyldiacholestane	7.98		2.00	9.70		2.00	19	30	
aa27S	S12	14a(H),17a(H)-20S-Cholestane/13b(H),17a(H)-20S-Ethyldiacholestane (S12)	25.0		2.00	27.7		2.00	10	30	
aa27R	S17	14a(H),17a(H)-20R-Cholestane/13b(H),17a(H)-20R-Ethyldiacholestane (S17)	23.9		2.00	28.1		2.00	16	30	
d29R	S18	Unknown Sterane (S18)	8.40		2.00	10.5		2.00	22	30	
d29S	S19	13a,17b-20S-Ethyldiacholestane		U	2.00		U	2.00		30	N/A
aa28S	S20	14a,17a-20S-Methylcholestane	11.7		2.00	12.7		2.00	8	30	
aa28R	S24	14a,17a-20R-Methylcholestane	8.37		2.00	5.11		2.00	48	30	¤
aa29S	S25	14a(H),17a(H)-20S-Ethylcholestane	17.0		2.00	17.9		2.00	5	30	
aa29R	S28	14a(H),17a(H)-20R-Ethylcholestane	12.3		2.00	9.92		2.00	21	30	
bb27R	S14	14b(H),17b(H)-20R-Cholestane	13.7		2.00	13.4		2.00	2	30	
bb27S	S15	14b(H),17b(H)-20S-Cholestane	13.2		2.00	12.8		2.00	4	30	
bb28R	S22	14b,17b-20R-Methylcholestane	8.72		2.00	8.77		2.00	1	30	
bb28S	S23	14b,17b-20S-Methylcholestane	13.9		2.00	14.2		2.00	2	30	
bb29R	S26	14b(H),17b(H)-20R-Ethylcholestane	21.2		2.00	23.6		2.00	11	30	
bb29S	S27	14b(H),17b(H)-20S-Ethylcholestane	17.0		2.00	18.2		2.00	6	30	
RC26/SC27TA	RC26/SC27TA	C26,20R- +C27,20S- triaromatic steroid	41.4		2.00	45.3		2.00	9	30	
SC28TA	SC28TA	C28,20S-triaromatic steroid	71.1		2.00	74.2		2.00	4	30	
RC27TA	RC27TA	C27,20R-triaromatic steroid	20.6		2.00	22.0		2.00	6	30	
RC28TA	RC28TA	C28,20R-triaromatic steroid	57.1		2.00	58.9		2.00	3	30	

Surrogates (% Recovery)		
Naphthalene-d8	97	97
Phenanthrene-d10	96	96
Benzo[a]pyrene-d12	95	97
5B(H)Cholane	107	109

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Alaska North Slope Crude
Lab ID	SO022515ANC01
Matrix	Oil
Reference Method	Modified 8270D
Batch ID	N/A
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	02/25/2015
Sample Size (wet)	0.05055
% Solid	100.00
File ID	F1402241515.D
Units	mg/Kg
Final Volume	10
Dilution	1
Reporting Limit	1.98

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit
2	D0	cis/trans-Decalin	475		1.98	99	479.20	65
2	D1	C1-Decalins	769		1.98	106	728.90	65
2	D2	C2-Decalins	647		1.98	102	635.50	65
2	D3	C3-Decalins	376		1.98	114	329.80	65
2	D4	C4-Decalins	368		1.98	113	326.50	65
2	BT0	Benzothiophene	5.94		1.98	110	5.40	65
2	BT1	C1-Benzo(b)thiophenes	35.1		1.98	121	28.90	65
2	BT2	C2-Benzo(b)thiophenes	52.0		1.98	105	49.60	65
2	BT3	C3-Benzo(b)thiophenes	113		1.98	115	99.00	65
2	BT4	C4-Benzo(b)thiophenes	91.9		1.98	105	87.10	65
2	N0	Naphthalene	566		1.98	102	555.80	65
2	N1	C1-Naphthalenes	1180		1.98	101	1167.30	65
2	N2	C2-Naphthalenes	1500		1.98	107	1409.70	65
2	N3	C3-Naphthalenes	1060		1.98	102	1035.90	65
2	N4	C4-Naphthalenes	613		1.98	109	561.10	65
2	B	Biphenyl	136		1.98	93	145.70	65
3	DF	Dibenzofuran	49.7		1.98	97	51.20	65
3	AY	Acenaphthylene	6.06		1.98	93	6.50	65
3	AE	Acenaphthene	14.0		1.98	75	18.70	65
3	F0	Fluorene	72.7		1.98	97	74.60	65
3	F1	C1-Fluorenes	169		1.98	100	170.20	65
3	F2	C2-Fluorenes	260		1.98	102	255.40	65
3	F3	C3-Fluorenes	245		1.98	103	238.50	65
3	A0	Anthracene		U	1.98			
3	P0	Phenanthrene	203		1.98	96	212.20	65
3	PA1	C1-Phenanthrenes/Anthracenes	411		1.98	95	432.70	65
3	PA2	C2-Phenanthrenes/Anthracenes	477		1.98	102	465.90	65
3	PA3	C3-Phenanthrenes/Anthracenes	326		1.98	103	317.40	65
3	PA4	C4-Phenanthrenes/Anthracenes	131		1.98	102	129.00	65
3	RET	Retene		U	1.98			
3	DBT0	Dibenzothiophene	128		1.98	92	138.90	65
3	DBT1	C1-Dibenzothiophenes	267		1.98	96	278.60	65
3	DBT2	C2-Dibenzothiophenes	375		1.98	99	377.50	65
3	DBT3	C3-Dibenzothiophenes	344		1.98	101	341.40	65
3	DBT4	C4-Dibenzothiophenes	184		1.98	100	183.40	65
4	BF	Benzo(b)fluorene	5.65		1.98			
4	FL0	Fluoranthene	3.47		1.98	87	4.00	65
4	PY0	Pyrene	11.1		1.98	86	13.00	65
4	FP1	C1-Fluoranthenes/Pyrenes	52.5		1.98	83	63.10	65
4	FP2	C2-Fluoranthenes/Pyrenes	82.9		1.98	81	102.20	65
4	FP3	C3-Fluoranthenes/Pyrenes	102		1.98	85	119.60	65
4	FP4	C4-Fluoranthenes/Pyrenes	87.7		1.98	84	104.00	65
4	NBT0	Naphthobenzothiophenes	35.9		1.98	82	43.80	65
4	NBT1	C1-Naphthobenzothiophenes	101		1.98	86	117.20	65
4	NBT2	C2-Naphthobenzothiophenes	148		1.98	91	163.30	65
4	NBT3	C3-Naphthobenzothiophenes	118		1.98	92	128.70	65
4	NBT4	C4-Naphthobenzothiophenes	89.1		1.98	100	89.00	65
4	BA0	Benz[a]anthracene	2.11		1.98	100	2.10	65
4	C0	Chrysene/Triphenylene	34.8		1.98	99	35.20	65
4	BC1	C1-Chrysenes	64.6		1.98	103	62.80	65
4	BC2	C2-Chrysenes	88.8		1.98	103	86.00	65
4	BC3	C3-Chrysenes	106		1.98	109	97.60	65
4	BC4	C4-Chrysenes	74.1		1.98	125	59.40	65
5	BBF	Benzo[b]fluoranthene	5.20		1.98	100	5.20	65
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene		U	1.98			
5	BAF	Benzo[a]fluoranthene		U	1.98			
5	BEP	Benzo[e]pyrene	9.10		1.98	93	9.80	65
5	BAP	Benzo[a]pyrene	1.36	J	1.98	72	1.90	65
5	PER	Perylene	2.61		1.98	93	2.80	65
6	IND	Indeno[1,2,3-cd]pyrene	0.770	J	1.98			
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	1.07	J	1.98			
6	GHI	Benzo[g,h,i]perylene	2.91		1.98	94	3.10	65
3	CAR	Carbazole	4.92		1.98	82	6.00	65
3	4MDT	4-Methyldibenzothiophene	129		1.98	98	131.80	65
3	2MDT	2/3-Methyldibenzothiophene	90.4		1.98	93	97.50	65
3	1MDT	1-Methyldibenzothiophene	40.3		1.98	91	44.20	65
3	3MP	3-Methylphenanthrene	83.7		1.98	94	89.40	65
3	2MP	2-Methylphenanthrene	90.7		1.98	93	97.70	65
3	2MA	2-Methylanthracene	2.81		1.98	88	3.20	65
3	9MP	9/4-Methylphenanthrene	133		1.98	94	141.20	65
3	1MP	1-Methylphenanthrene	92.4		1.98	95	97.40	65

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Alaska North Slope Crude
Lab ID	SO022515ANC01
Matrix	Oil
Reference Method	Modified 8270D
Batch ID	N/A
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	02/25/2015
Sample Size (wet)	0.05055
% Solid	100.00
File ID	F1402241515.D
Units	mg/Kg
Final Volume	10
Dilution	1
Reporting Limit	1.98

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit
t23	T4	C23 Tricyclic Terpane	63.5		1.98	94	67.30	65
t24	T5	C24 Tricyclic Terpane	39.1		1.98	91	43.00	65
t25	T6	C25 Tricyclic Terpane	36.7		1.98	87	42.00	65
te24	T6a	C24 Tetracyclic Terpane	13.7		1.98	92	14.80	65
t26S	T6b	C26 Tricyclic Terpane-22S	15.1		1.98	85	17.70	65
t26R	T6c	C26 Tricyclic Terpane-22R	13.6		1.98	89	15.40	65
t28S	T7	C28 Tricyclic Terpane-22S	14.0		1.98	83	16.80	65
t28R	T8	C28 Tricyclic Terpane-22R	16.0		1.98	88	18.10	65
t29S	T9	C29 Tricyclic Terpane-22S	19.0		1.98	91	20.80	65
t29R	T10	C29 Tricyclic Terpane-22R	18.7		1.98	83	22.60	65
Ts	T11	18a-22,29,30-Trisnorneohopane-TS	26.1		1.98	83	31.30	65
t30S	T11a	C30 Tricyclic Terpane-22S	16.2		1.98	100	16.20	65
t30R	T11b	C30 Tricyclic Terpane-22R	14.8		1.98	90	16.40	65
Tm	T12	17a(H)-22,29,30-Trisnorhopane-TM	30.6		1.98	81	37.80	65
BNH	T14a	17a/b,21b/a 28,30-Bisnorhopane	7.61		1.98	109	7.00	65
25N	T14b	17a(H),21b(H)-25-Norhopane	8.56		1.98	98	8.70	65
H29	T15	30-Norhopane	89.0		1.98	89	99.70	65
C29Ts	T16	18a(H)-30-Norneohopane-C29Ts	22.4		1.98	89	25.20	65
X	X	17a(H)-Diahopane	12.9		1.98	91	14.20	65
M29	T17	30-Normoretane	11.6		1.98	100	11.60	65
OL	T18	18a(H)&18b(H)-Oleananes		U	1.98			
H30	T19	Hopane	155		1.98	89	173.60	65
M30	T20	Moretane	14.4		1.98	82	17.50	65
H31S	T21	30-Homohopane-22S	64.4		1.98	86	75.10	65
H31R	T22	30-Homohopane-22R	54.7		1.98	85	64.10	65
T22A	T22A	T22a-Gammacerane/C32-diahopane	10.1		1.98			
H32S	T26	30,31-Bishomohopane-22S	45.5		1.98	85	53.60	65
H32R	T27	30,31-Bishomohopane-22R	34.8		1.98	88	39.60	65
H33S	T30	30,31-Trishomohopane-22S	36.2		1.98	87	41.80	65
H33R	T31	30,31-Trishomohopane-22R	24.0		1.98	88	27.20	65
H34S	T32	Tetrakishomohopane-22S	25.2		1.98	84	29.80	65
H34R	T33	Tetrakishomohopane-22R	18.3		1.98	86	21.20	65
H35S	T34	Pentakishomohopane-22S	25.2		1.98	83	30.20	65
H35R	T35	Pentakishomohopane-22R	19.7		1.98	84	23.50	65
d27S	S4	13b(H),17a(H)-20S-Diacholestane	45.9		1.98	92	50.00	65
d27R	S5	13b(H),17a(H)-20R-Diacholestane	24.9		1.98	95	26.30	65
d28S	S8	13b,17a-20S-Methyldiacholestane	23.3		1.98	91	25.70	65
aa27S	S12	14a(H),17a(H)-20S-Cholestane/13b(H),17a(H)-20S-Ethyldiacholestane (S12)	63.7		1.98	98	65.00	65
aa27R	S17	14a(H),17a(H)-20R-Cholestane/13b(H),17a(H)-20R-Ethyldiacholestane (S17)	73.4		1.98	97	75.80	65
d29R	S18	Unknown Sterane (S18)	17.2		1.98	81	21.30	65
d29S	S19	13a,17b-20S-Ethyldiacholestane	3.42		1.98	88	3.90	65
aa28S	S20	14a,17a-20S-Methylcholestane	29.1		1.98	78	37.30	65
aa28R	S24	14a,17a-20R-Methylcholestane	31.0		1.98	90	34.50	65
aa29S	S25	14a(H),17a(H)-20S-Ethylcholestane	43.2		1.98	85	51.00	65
aa29R	S28	14a(H),17a(H)-20R-Ethylcholestane	39.2		1.98	99	39.50	65
bb27R	S14	14b(H),17b(H)-20R-Cholestane	42.3		1.98	102	41.50	65
bb27S	S15	14b(H),17b(H)-20S-Cholestane	43.6		1.98	103	42.50	65
bb28R	S22	14b,17b-20R-Methylcholestane	45.8		1.98	102	44.80	65
bb28S	S23	14b,17b-20S-Methylcholestane	57.9		1.98	104	55.40	65
bb29R	S26	14b(H),17b(H)-20R-Ethylcholestane	62.3		1.98	102	60.90	65
bb29S	S27	14b(H),17b(H)-20S-Ethylcholestane	36.0		1.98	89	40.30	65
RC26/SC27TA	RC26/SC27TA	C26,20R- +C27,20S- triaromatic steroid	238		1.98	81	293.90	65
SC28TA	SC28TA	C28,20S-triaromatic steroid	149		1.98	79	187.60	65
RC27TA	RC27TA	C27,20R-triaromatic steroid	146		1.98	81	180.20	65
RC28TA	RC28TA	C28,20R-triaromatic steroid	123		1.98	81	150.50	65

Surrogates (% Recovery)
Naphthalene-d8
Phenanthrene-d10
Benzo[a]pyrene-d12
5B(H)Cholane

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID
Lab ID
Matrix
Reference Method
Batch ID
Date Collected
Date Received
Date Prepped
Date Analyzed
Sample Size (wet)
% Solid
File ID
Units
Final Volume
Dilution
Reporting Limit

Class	Abbrev	Analytes	Upper Limit
2	D0	cis/trans-Decalin	135
2	D1	C1-Decalins	135
2	D2	C2-Decalins	135
2	D3	C3-Decalins	135
2	D4	C4-Decalins	135
2	BT0	Benzothiophene	135
2	BT1	C1-Benzo(b)thiophenes	135
2	BT2	C2-Benzo(b)thiophenes	135
2	BT3	C3-Benzo(b)thiophenes	135
2	BT4	C4-Benzo(b)thiophenes	135
2	N0	Naphthalene	135
2	N1	C1-Naphthalenes	135
2	N2	C2-Naphthalenes	135
2	N3	C3-Naphthalenes	135
2	N4	C4-Naphthalenes	135
2	B	Biphenyl	135
3	DF	Dibenzofuran	135
3	AY	Acenaphthylene	135
3	AE	Acenaphthene	135
3	F0	Fluorene	135
3	F1	C1-Fluorenes	135
3	F2	C2-Fluorenes	135
3	F3	C3-Fluorenes	135
3	A0	Anthracene	
3	P0	Phenanthrene	135
3	PA1	C1-Phenanthrenes/Anthracenes	135
3	PA2	C2-Phenanthrenes/Anthracenes	135
3	PA3	C3-Phenanthrenes/Anthracenes	135
3	PA4	C4-Phenanthrenes/Anthracenes	135
3	RET	Retene	
3	DBT0	Dibenzothiophene	135
3	DBT1	C1-Dibenzothiophenes	135
3	DBT2	C2-Dibenzothiophenes	135
3	DBT3	C3-Dibenzothiophenes	135
3	DBT4	C4-Dibenzothiophenes	135
4	BF	Benzo(b)fluorene	
4	FL0	Fluoranthene	135
4	PY0	Pyrene	135
4	FP1	C1-Fluoranthenes/Pyrenes	135
4	FP2	C2-Fluoranthenes/Pyrenes	135
4	FP3	C3-Fluoranthenes/Pyrenes	135
4	FP4	C4-Fluoranthenes/Pyrenes	135
4	NBT0	Naphthobenzothiophenes	135
4	NBT1	C1-Naphthobenzothiophenes	135
4	NBT2	C2-Naphthobenzothiophenes	135
4	NBT3	C3-Naphthobenzothiophenes	135
4	NBT4	C4-Naphthobenzothiophenes	135
4	BA0	Benz[a]anthracene	135
4	C0	Chrysene/Triphenylene	135
4	BC1	C1-Chrysenes	135
4	BC2	C2-Chrysenes	135
4	BC3	C3-Chrysenes	135
4	BC4	C4-Chrysenes	135
5	BBF	Benzo[b]fluoranthene	135
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene	
5	BAF	Benzo[a]fluoranthene	
5	BEP	Benzo[e]pyrene	135
5	BAP	Benzo[a]pyrene	135
5	PER	Perylene	135
6	IND	Indeno[1,2,3-cd]pyrene	
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	
6	GHI	Benzo[g,h,i]perylene	135
3	CAR	Carbazole	135
3	4MDT	4-Methyldibenzothiophene	135
3	2MDT	2/3-Methyldibenzothiophene	135
3	1MDT	1-Methyldibenzothiophene	135
3	3MP	3-Methylphenanthrene	135
3	2MP	2-Methylphenanthrene	135
3	2MA	2-Methylanthracene	135
3	9MP	9/4-Methylphenanthrene	135
3	1MP	1-Methylphenanthrene	135

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID
Lab ID
Matrix
Reference Method
Batch ID
Date Collected
Date Received
Date Prepped
Date Analyzed
Sample Size (wet)
% Solid
File ID
Units
Final Volume
Dilution
Reporting Limit

Class	Abbrev	Analytes	Upper Limit
t23	T4	C23 Tricyclic Terpane	135
t24	T5	C24 Tricyclic Terpane	135
t25	T6	C25 Tricyclic Terpane	135
te24	T6a	C24 Tetracyclic Terpane	135
t26S	T6b	C26 Tricyclic Terpane-22S	135
t26R	T6c	C26 Tricyclic Terpane-22R	135
t28S	T7	C28 Tricyclic Terpane-22S	135
t28R	T8	C28 Tricyclic Terpane-22R	135
t29S	T9	C29 Tricyclic Terpane-22S	135
t29R	T10	C29 Tricyclic Terpane-22R	135
Ts	T11	18a-22,29,30-Trisnorneohopane-TS	135
t30S	T11a	C30 Tricyclic Terpane-22S	135
t30R	T11b	C30 Tricyclic Terpane-22R	135
Tm	T12	17a(H)-22,29,30-Trisnorhopane-TM	135
BNH	T14a	17a/b,21b/a 28,30-Bisnorhopane	135
25N	T14b	17a(H),21b(H)-25-Norhopane	135
H29	T15	30-Norhopane	135
C29Ts	T16	18a(H)-30-Norneohopane-C29Ts	135
X	X	17a(H)-Diahopane	135
M29	T17	30-Normoretane	135
OL	T18	18a(H)&18b(H)-Oleananes	
H30	T19	Hopane	135
M30	T20	Moretane	135
H31S	T21	30-Homohopane-22S	135
H31R	T22	30-Homohopane-22R	135
T22A	T22A	T22a-Gammacerane/C32-diahopane	
H32S	T26	30,31-Bishomohopane-22S	135
H32R	T27	30,31-Bishomohopane-22R	135
H33S	T30	30,31-Trishomohopane-22S	135
H33R	T31	30,31-Trishomohopane-22R	135
H34S	T32	Tetrakishomohopane-22S	135
H34R	T33	Tetrakishomohopane-22R	135
H35S	T34	Pentakishomohopane-22S	135
H35R	T35	Pentakishomohopane-22R	135
d27S	S4	13b(H),17a(H)-20S-Diacholestane	135
d27R	S5	13b(H),17a(H)-20R-Diacholestane	135
d28S	S8	13b,17a-20S-Methyldiacholestane	135
aa27S	S12	14a(H),17a(H)-20S-Cholestane/13b(H),17a(H)-20S-Ethyldiacholestane (S12)	135
aa27R	S17	14a(H),17a(H)-20R-Cholestane/13b(H),17a(H)-20R-Ethyldiacholestane (S17)	135
d29R	S18	Unknown Sterane (S18)	135
d29S	S19	13a,17b-20S-Ethyldiacholestane	135
aa28S	S20	14a,17a-20S-Methylcholestane	135
aa28R	S24	14a,17a-20R-Methylcholestane	135
aa29S	S25	14a(H),17a(H)-20S-Ethylcholestane	135
aa29R	S28	14a(H),17a(H)-20R-Ethylcholestane	135
bb27R	S14	14b(H),17b(H)-20R-Cholestane	135
bb27S	S15	14b(H),17b(H)-20S-Cholestane	135
bb28R	S22	14b,17b-20R-Methylcholestane	135
bb28S	S23	14b,17b-20S-Methylcholestane	135
bb29R	S26	14b(H),17b(H)-20R-Ethylcholestane	135
bb29S	S27	14b(H),17b(H)-20S-Ethylcholestane	135
RC26/SC27TA	RC26/SC27TA	C26,20R- +C27,20S- triaromatic steroid	135
SC28TA	SC28TA	C28,20S-triaromatic steroid	135
RC27TA	RC27TA	C27,20R-triaromatic steroid	135
RC28TA	RC28TA	C28,20R-triaromatic steroid	135

Surrogates (% Recovery)
Naphthalene-d8
Phenanthrene-d10
Benzo[a]pyrene-d12
5B(H)Cholane

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID		Pool-022715			CBTX-742201-022715	
Lab ID		1503002-01X			1503002-02	
Matrix		NAPL			NAPL	
Reference Method		Modified 8270D			Modified 8270D	
Batch ID		SO031815B01			SO030715B01	
Date Collected		02/27/2015			02/27/2015	
Date Received		03/03/2015			03/03/2015	
Date Prepped		03/18/2015			03/07/2015	
Date Analyzed		03/19/2015			03/12/2015	
Sample Size (wet)		0.0998			0.1012	
% Solid		100.00			100.00	
File ID		F1403191509.D			F1403111512.D	
Units		mg/Kg			mg/Kg	
Final Volume		20			20	
Dilution		1			1	
Reporting Limit		2.00			1.98	
Class	Abbrev	Analytes	Result	SSRL	Result	SSRL
2	D0	cis/trans-Decalin	19.8	2.00	711	1.98
2	D1	C1-Decalins	88.7	2.00	1380	1.98
2	D2	C2-Decalins	170	2.00	1140	1.98
2	D3	C3-Decalins	180	2.00	597	1.98
2	D4	C4-Decalins	231	2.00	508	1.98
2	BT0	Benzothiophene	2.76	2.00	14.0	1.98
2	BT1	C1-Benzo(b)thiophenes	26.0	2.00	86.1	1.98
2	BT2	C2-Benzo(b)thiophenes	10.9	2.00	20.4	1.98
2	BT3	C3-Benzo(b)thiophenes	29.8	2.00	46.0	1.98
2	BT4	C4-Benzo(b)thiophenes	25.7	2.00	30.6	1.98
2	N0	Naphthalene	49.2	2.00	209	1.98
2	N1	C1-Naphthalenes	200	2.00	830	1.98
2	N2	C2-Naphthalenes	764	2.00	1660	1.98
2	N3	C3-Naphthalenes	963	2.00	1550	1.98
2	N4	C4-Naphthalenes	690	2.00	976	1.98
2	B	Biphenyl	12.8	2.00	36.0	1.98
3	DF	Dibenzofuran	10.3	2.00	4.87	1.98
3	AY	Acenaphthylene	18.5	2.00	4.78	1.98
3	AE	Acenaphthene	15.3	2.00	4.02 G	1.98
3	F0	Fluorene	26.2	2.00	26.2	1.98
3	F1	C1-Fluorenes	66.2	2.00	92.8	1.98
3	F2	C2-Fluorenes	171	2.00	206	1.98
3	F3	C3-Fluorenes	233	2.00	253	1.98
3	A0	Anthracene	12.0 G	2.00	U	1.98
3	P0	Phenanthrene	120	2.00	87.7	1.98
3	PA1	C1-Phenanthrenes/Anthracenes	263	2.00	291	1.98
3	PA2	C2-Phenanthrenes/Anthracenes	448	2.00	459	1.98
3	PA3	C3-Phenanthrenes/Anthracenes	402	2.00	400	1.98
3	PA4	C4-Phenanthrenes/Anthracenes	228	2.00	210	1.98
3	RET	Retene	U	2.00	U	1.98
3	DBT0	Dibenzothiophene	21.0	2.00	25.7	1.98
3	DBT1	C1-Dibenzothiophenes	82.8	2.00	91.0	1.98
3	DBT2	C2-Dibenzothiophenes	133	2.00	137	1.98
3	DBT3	C3-Dibenzothiophenes	136	2.00	129	1.98
3	DBT4	C4-Dibenzothiophenes	102	2.00	92.3	1.98
4	BF	Benzo(b)fluorene	U	2.00	U	1.98
4	FL0	Fluoranthene	40.4	2.00	1.74 J	1.98
4	PY0	Pyrene	41.3	2.00	8.46	1.98
4	FP1	C1-Fluoranthenes/Pyrenes	53.0	2.00	30.7	1.98
4	FP2	C2-Fluoranthenes/Pyrenes	85.7	2.00	66.0	1.98
4	FP3	C3-Fluoranthenes/Pyrenes	145	2.00	106	1.98
4	FP4	C4-Fluoranthenes/Pyrenes	151	2.00	109	1.98
4	NBT0	Naphthobenzothiophenes	10.4	2.00	5.65	1.98
4	NBT1	C1-Naphthobenzothiophenes	42.2	2.00	28.2	1.98
4	NBT2	C2-Naphthobenzothiophenes	77.1	2.00	49.0	1.98
4	NBT3	C3-Naphthobenzothiophenes	77.7	2.00	44.4	1.98
4	NBT4	C4-Naphthobenzothiophenes	76.3	2.00	47.9	1.98
4	BA0	Benz[a]anthracene	14.1	2.00	0.913 JB	1.98
4	C0	Chrysene/Triphenylene	30.6	2.00	14.8	1.98
4	BC1	C1-Chrysenes	69.5	2.00	45.7	1.98
4	BC2	C2-Chrysenes	131	2.00	85.7	1.98
4	BC3	C3-Chrysenes	212	2.00	132	1.98
4	BC4	C4-Chrysenes	180	2.00	107	1.98
5	BBF	Benzo[b]fluoranthene	11.2	2.00	1.05 JB	1.98
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene	9.49	2.00	U	1.98
5	BAF	Benzo[a]fluoranthene	U	2.00	U	1.98
5	BEP	Benzo[e]pyrene	12.1	2.00	3.60	1.98
5	BAP	Benzo[a]pyrene	11.3	2.00	1.08 JB	1.98
5	PER	Perylene	2.63	2.00	U	1.98
6	IND	Indeno[1,2,3-cd]pyrene	6.10	2.00	U	1.98
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	2.31	2.00	U	1.98
6	GHI	Benzo[g,h,i]perylene	7.76	2.00	1.06 JB	1.98
3	CAR	Carbazole	U	2.00	3.66	1.98
3	4MDT	4-Methyldibenzothiophene	43.4	2.00	49.2	1.98
3	2MDT	2/3-Methyldibenzothiophene	25.2	2.00	24.7	1.98
3	1MDT	1-Methyldibenzothiophene	10.6	2.00	11.7	1.98
3	3MP	3-Methylphenanthrene	50.3	2.00	55.7	1.98
3	2MP	2-Methylphenanthrene	52.1	2.00	61.2	1.98
3	2MA	2-Methylanthracene	2.50	2.00	2.39	1.98
3	9MP	9/4-Methylphenanthrene	89.1	2.00	96.6	1.98
3	1MP	1-Methylphenanthrene	60.1	2.00	68.4	1.98

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Pool-022715	CBTX-742201-022715
Lab ID	1503002-01X	1503002-02
Matrix	NAPL	NAPL
Reference Method	Modified 8270D	Modified 8270D
Batch ID	SO031815B01	SO030715B01
Date Collected	02/27/2015	02/27/2015
Date Received	03/03/2015	03/03/2015
Date Prepped	03/18/2015	03/07/2015
Date Analyzed	03/19/2015	03/12/2015
Sample Size (wet)	0.0998	0.1012
% Solid	100.00	100.00
File ID	F1403191509.D	F1403111512.D
Units	mg/Kg	mg/Kg
Final Volume	20	20
Dilution	1	1
Reporting Limit	2.00	1.98

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL
t23	T4	C23 Tricyclic Terpane	11.6		2.00	9.30		1.98
t24	T5	C24 Tricyclic Terpane	7.33		2.00	6.51		1.98
t25	T6	C25 Tricyclic Terpane	9.12		2.00	6.65		1.98
te24	T6a	C24 Tetracyclic Terpane		U	2.00	1.48	J	1.98
t26S	T6b	C26 Tricyclic Terpane-22S	5.72		2.00	3.73		1.98
t26R	T6c	C26 Tricyclic Terpane-22R	5.89		2.00	4.22		1.98
t28S	T7	C28 Tricyclic Terpane-22S	5.24		2.00	3.68		1.98
t28R	T8	C28 Tricyclic Terpane-22R	5.62		2.00	3.89		1.98
t29S	T9	C29 Tricyclic Terpane-22S	4.06		2.00	3.30		1.98
t29R	T10	C29 Tricyclic Terpane-22R	4.32		2.00	2.77		1.98
Ts	T11	18a-22,29,30-Trisnorneohopane-TS	7.66		2.00	3.86		1.98
t30S	T11a	C30 Tricyclic Terpane-22S	5.42		2.00	3.28		1.98
t30R	T11b	C30 Tricyclic Terpane-22R	4.60		2.00	2.26		1.98
Tm	T12	17a(H)-22,29,30-Trisnorhopane-TM	4.56		2.00		U	1.98
BNH	T14a	17a/b,21b/a 28,30-Bisnorhopane		U	2.00		U	1.98
25N	T14b	17a(H),21b(H)-25-Norhopane	3.85		2.00		U	1.98
H29	T15	30-Norhopane	12.1		2.00	6.78		1.98
C29Ts	T16	18a(H)-30-Norneohopane-C29Ts	6.43		2.00	3.23		1.98
X	X	17a(H)-Diahopane	5.24		2.00		U	1.98
M29	T17	30-Normoretane		U	2.00		U	1.98
OL	T18	18a(H)&18b(H)-Oleananes		U	2.00		U	1.98
H30	T19	Hopane	26.3		2.00	13.1		1.98
M30	T20	Moretane		U	2.00		U	1.98
H31S	T21	30-Homohopane-22S	12.0		2.00	5.72		1.98
H31R	T22	30-Homohopane-22R	12.5		2.00	5.42		1.98
T22A	T22A	T22a-Gammacerane/C32-diahopane		U	2.00		U	1.98
H32S	T26	30,31-Bishomohopane-22S	8.79		2.00	4.17		1.98
H32R	T27	30,31-Bishomohopane-22R	6.38		2.00	2.93		1.98
H33S	T30	30,31-Trishomohopane-22S	6.02		2.00		U	1.98
H33R	T31	30,31-Trishomohopane-22R		U	2.00		U	1.98
H34S	T32	Tetrakishomohopane-22S		U	2.00		U	1.98
H34R	T33	Tetrakishomohopane-22R		U	2.00		U	1.98
H35S	T34	Pentakishomohopane-22S		U	2.00		U	1.98
H35R	T35	Pentakishomohopane-22R		U	2.00		U	1.98
d27S	S4	13b(H),17a(H)-20S-Diacholestane	16.4		2.00	11.8		1.98
d27R	S5	13b(H),17a(H)-20R-Diacholestane	10.1		2.00	7.93		1.98
d28S	S8	13b,17a-20S-Methyldiacholestane	7.98		2.00	5.73		1.98
aa27S	S12	14a(H),17a(H)-20S-Cholestane/13b(H),17a(H)-20S-Ethyldiacholestane (S12)	25.0		2.00	14.8		1.98
aa27R	S17	14a(H),17a(H)-20R-Cholestane/13b(H),17a(H)-20R-Ethyldiacholestane (S17)	23.9		2.00	15.5		1.98
d29R	S18	Unknown Sterane (S18)	8.40		2.00	4.77		1.98
d29S	S19	13a,17b-20S-Ethyldiacholestane		U	2.00		U	1.98
aa28S	S20	14a,17a-20S-Methylcholestane	11.7		2.00	6.46		1.98
aa28R	S24	14a,17a-20R-Methylcholestane	8.37		2.00	5.10		1.98
aa29S	S25	14a(H),17a(H)-20S-Ethylcholestane	17.0		2.00	10.4		1.98
aa29R	S28	14a(H),17a(H)-20R-Ethylcholestane	12.3		2.00	5.37		1.98
bb27R	S14	14b(H),17b(H)-20R-Cholestane	13.7		2.00	7.59		1.98
bb27S	S15	14b(H),17b(H)-20S-Cholestane	13.2		2.00	7.58		1.98
bb28R	S22	14b,17b-20R-Methylcholestane	8.72		2.00	4.99		1.98
bb28S	S23	14b,17b-20S-Methylcholestane	13.9		2.00	6.91		1.98
bb29R	S26	14b(H),17b(H)-20R-Ethylcholestane	21.2		2.00	13.2		1.98
bb29S	S27	14b(H),17b(H)-20S-Ethylcholestane	17.0		2.00	8.27		1.98
RC26/SC27TA	RC26/SC27TA	C26,20R- +C27,20S- triaromatic steroid	41.4		2.00	24.7		1.98
SC28TA	SC28TA	C28,20S-triaromatic steroid	71.1		2.00	39.7		1.98
RC27TA	RC27TA	C27,20R-triaromatic steroid	20.6		2.00	11.7		1.98
RC28TA	RC28TA	C28,20R-triaromatic steroid	57.1		2.00	33.0		1.98

Surrogates (% Recovery)		
Naphthalene-d8	97	86
Phenanthrene-d10	96	92
Benzo[a]pyrene-d12	95	93
5B(H)Cholane	107	111

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Sheen Reference-022715			Sheen Boom-022715	
Lab ID	1503002-03			1503002-04	
Matrix	Sheen			Sheen	
Reference Method	Modified 8270D			Modified 8270D	
Batch ID	SO031015B01			SO031015B01	
Date Collected	02/27/2015			02/27/2015	
Date Received	03/03/2015			03/03/2015	
Date Prepped	03/10/2015			03/10/2015	
Date Analyzed	03/12/2015			03/12/2015	
Sample Size (wet)	0.00144			0.08184	
% Solid	100.00			100.00	
File ID	F1403111518.D			F1403111519.D	
Units	mg/Kg			mg/Kg	
Final Volume	2			16	
Dilution	1			1	
Reporting Limit	13.9			1.96	

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL
2	D0	cis/trans-Decalin	3.94	J	13.9	23.2		1.96
2	D1	C1-Decalins		U	13.9	94.0		1.96
2	D2	C2-Decalins		U	13.9	169		1.96
2	D3	C3-Decalins		U	13.9	180		1.96
2	D4	C4-Decalins		U	13.9	264		1.96
2	BT0	Benzothiophene		U	13.9	1.95	J	1.96
2	BT1	C1-Benzo(b)thiophenes		U	13.9	24.6		1.96
2	BT2	C2-Benzo(b)thiophenes		U	13.9	12.0		1.96
2	BT3	C3-Benzo(b)thiophenes		U	13.9	39.0		1.96
2	BT4	C4-Benzo(b)thiophenes		U	13.9	39.6		1.96
2	N0	Naphthalene	22.0		13.9	24.9		1.96
2	N1	C1-Naphthalenes	9.36	J	13.9	212		1.96
2	N2	C2-Naphthalenes	13.4	J	13.9	935		1.96
2	N3	C3-Naphthalenes	105		13.9	1390		1.96
2	N4	C4-Naphthalenes	594		13.9	1130		1.96
2	B	Biphenyl		U	13.9	13.4		1.96
3	DF	Dibenzofuran		U	13.9	7.55		1.96
3	AY	Acenaphthylene	2.98	J	13.9	35.4		1.96
3	AE	Acenaphthene		U	13.9	12.4		1.96
3	F0	Fluorene		U	13.9	38.1		1.96
3	F1	C1-Fluorenes	49.4		13.9	122		1.96
3	F2	C2-Fluorenes	356		13.9	323		1.96
3	F3	C3-Fluorenes	440		13.9	453		1.96
3	A0	Anthracene		U	13.9	20.2	G	1.96
3	P0	Phenanthrene	19.5		13.9	196		1.96
3	PA1	C1-Phenanthrenes/Anthracenes	169		13.9	527		1.96
3	PA2	C2-Phenanthrenes/Anthracenes	348		13.9	906		1.96
3	PA3	C3-Phenanthrenes/Anthracenes	290		13.9	860		1.96
3	PA4	C4-Phenanthrenes/Anthracenes	186		13.9	469		1.96
3	RET	Retene	135		13.9		U	1.96
3	DBT0	Dibenzothiophene	12.7	J	13.9	41.1		1.96
3	DBT1	C1-Dibenzothiophenes	97.9		13.9	161		1.96
3	DBT2	C2-Dibenzothiophenes	184		13.9	268		1.96
3	DBT3	C3-Dibenzothiophenes	195		13.9	273		1.96
3	DBT4	C4-Dibenzothiophenes	141		13.9	188		1.96
4	BF	Benzo(b)fluorene		U	13.9		U	1.96
4	FL0	Fluoranthene	7.46	J	13.9	47.6		1.96
4	PY0	Pyrene	6.28	J	13.9	61.6		1.96
4	FP1	C1-Fluoranthenes/Pyrenes		U	13.9	92.2		1.96
4	FP2	C2-Fluoranthenes/Pyrenes		U	13.9	166		1.96
4	FP3	C3-Fluoranthenes/Pyrenes		U	13.9	272		1.96
4	FP4	C4-Fluoranthenes/Pyrenes		U	13.9	286		1.96
4	NBT0	Naphthobenzothiophenes		U	13.9	16.7		1.96
4	NBT1	C1-Naphthobenzothiophenes		U	13.9	74.1		1.96
4	NBT2	C2-Naphthobenzothiophenes		U	13.9	138		1.96
4	NBT3	C3-Naphthobenzothiophenes		U	13.9	123		1.96
4	NBT4	C4-Naphthobenzothiophenes		U	13.9	140		1.96
4	BA0	Benz[a]anthracene	1.31	J	13.9	13.7		1.96
4	C0	Chrysene/Triphenylene	5.05	J	13.9	45.6		1.96
4	BC1	C1-Chrysenes		U	13.9	113		1.96
4	BC2	C2-Chrysenes		U	13.9	208		1.96
4	BC3	C3-Chrysenes		U	13.9	321		1.96
4	BC4	C4-Chrysenes		U	13.9	257		1.96
5	BBF	Benzo[b]fluoranthene	2.25	J	13.9	9.14		1.96
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene	1.69	J	13.9	8.72		1.96
5	BAF	Benzo[a]fluoranthene		U	13.9		U	1.96
5	BEP	Benzo[e]pyrene	2.41	J	13.9	14.1		1.96
5	BAP	Benzo[a]pyrene	1.51	J	13.9	11.2		1.96
5	PER	Perylene		U	13.9	3.30		1.96
6	IND	Indeno[1,2,3-cd]pyrene	2.88	J	13.9	5.34		1.96
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	0.890	J	13.9	1.65	J	1.96
6	GHI	Benzo[g,h,i]perylene	3.16	J	13.9	7.66		1.96
3	CAR	Carbazole		U	13.9	6.29		1.96
3	4MDT	4-Methyldibenzothiophene	35.0		13.9	85.0		1.96
3	2MDT	2/3-Methyldibenzothiophene	37.1		13.9	45.2		1.96
3	1MDT	1-Methyldibenzothiophene	6.50	J	13.9	21.0		1.96
3	3MP	3-Methylphenanthrene	29.1		13.9	98.4		1.96
3	2MP	2-Methylphenanthrene	37.1		13.9	109		1.96
3	2MA	2-Methylanthracene		U	13.9	5.49		1.96
3	9MP	9/4-Methylphenanthrene	47.3		13.9	179		1.96
3	1MP	1-Methylphenanthrene	32.5		13.9	125		1.96

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID		Sheen Reference-022715		Sheen Boom-022715	
Lab ID		1503002-03		1503002-04	
Matrix		Sheen		Sheen	
Reference Method		Modified 8270D		Modified 8270D	
Batch ID		SO031015B01		SO031015B01	
Date Collected		02/27/2015		02/27/2015	
Date Received		03/03/2015		03/03/2015	
Date Prepped		03/10/2015		03/10/2015	
Date Analyzed		03/12/2015		03/12/2015	
Sample Size (wet)		0.00144		0.08184	
% Solid		100.00		100.00	
File ID		F1403111518.D		F1403111519.D	
Units		mg/Kg		mg/Kg	
Final Volume		2		16	
Dilution		1		1	
Reporting Limit		13.9		1.96	
Class	Abbrev	Analytes	Result	SSRL	Result	SSRL
t23	T4	C23 Tricyclic Terpane	82.4	13.9	23.0	1.96
t24	T5	C24 Tricyclic Terpane	43.7	13.9	12.6	1.96
t25	T6	C25 Tricyclic Terpane	35.3	13.9	17.1	1.96
te24	T6a	C24 Tetracyclic Terpane	23.6	13.9	2.41	1.96
t26S	T6b	C26 Tricyclic Terpane-22S	14.3	13.9	8.37	1.96
t26R	T6c	C26 Tricyclic Terpane-22R	13.1 J	13.9	9.97	1.96
t28S	T7	C28 Tricyclic Terpane-22S	U	13.9	8.95	1.96
t28R	T8	C28 Tricyclic Terpane-22R	U	13.9	9.07	1.96
t29S	T9	C29 Tricyclic Terpane-22S	U	13.9	6.92	1.96
t29R	T10	C29 Tricyclic Terpane-22R	U	13.9	7.34	1.96
Ts	T11	18a-22,29,30-Trisnorneohopane-TS	19.5	13.9	11.6	1.96
t30S	T11a	C30 Tricyclic Terpane-22S	U	13.9	6.36	1.96
t30R	T11b	C30 Tricyclic Terpane-22R	U	13.9	8.18	1.96
Tm	T12	17a(H)-22,29,30-Trisnorhopane-TM	22.7	13.9	4.82	1.96
BNH	T14a	17a/b,21b/a 28,30-Bisnorhopane	U	13.9	U	1.96
25N	T14b	17a(H),21b(H)-25-Norhopane	U	13.9	5.57	1.96
H29	T15	30-Norhopane	33.8	13.9	15.8	1.96
C29Ts	T16	18a(H)-30-Norneohopane-C29Ts	11.0 J	13.9	7.45	1.96
X	X	17a(H)-Diahopane	U	13.9	4.64	1.96
M29	T17	30-Normoretane	U	13.9	U	1.96
OL	T18	18a(H)&18b(H)-Oleananes	U	13.9	U	1.96
H30	T19	Hopane	44.1	13.9	37.6	1.96
M30	T20	Moretane	U	13.9	3.10	1.96
H31S	T21	30-Homohopane-22S	U	13.9	16.5	1.96
H31R	T22	30-Homohopane-22R	U	13.9	14.9	1.96
T22A	T22A	T22a-Gammacerane/C32-diahopane	U	13.9	3.92	1.96
H32S	T26	30,31-Bishomohopane-22S	U	13.9	11.2	1.96
H32R	T27	30,31-Bishomohopane-22R	U	13.9	8.78	1.96
H33S	T30	30,31-Trishomohopane-22S	U	13.9	7.56	1.96
H33R	T31	30,31-Trishomohopane-22R	U	13.9	4.24	1.96
H34S	T32	Tetrakishomohopane-22S	U	13.9	6.49	1.96
H34R	T33	Tetrakishomohopane-22R	U	13.9	3.58	1.96
H35S	T34	Pentakishomohopane-22S	U	13.9	4.68	1.96
H35R	T35	Pentakishomohopane-22R	U	13.9	U	1.96
d27S	S4	13b(H),17a(H)-20S-Diacholestane	39.0	13.9	29.2	1.96
d27R	S5	13b(H),17a(H)-20R-Diacholestane	22.4	13.9	17.3	1.96
d28S	S8	13b,17a-20S-Methyldiacholestane	11.2 J	13.9	13.7	1.96
aa27S	S12	14a(H),17a(H)-20S-Cholestane/13b(H),17a(H)-20S-Ethyldiacholestane (S12)	28.6	13.9	38.4	1.96
aa27R	S17	14a(H),17a(H)-20R-Cholestane/13b(H),17a(H)-20R-Ethyldiacholestane (S17)	19.7	13.9	40.7	1.96
d29R	S18	Unknown Sterane (S18)	U	13.9	15.1	1.96
d29S	S19	13a,17b-20S-Ethyldiacholestane	U	13.9	2.04	1.96
aa28S	S20	14a,17a-20S-Methylcholestane	7.67 J	13.9	18.8	1.96
aa28R	S24	14a,17a-20R-Methylcholestane	8.53 J	13.9	10.6	1.96
aa29S	S25	14a(H),17a(H)-20S-Ethylcholestane	7.13 J	13.9	27.3	1.96
aa29R	S28	14a(H),17a(H)-20R-Ethylcholestane	8.47 J	13.9	13.1	1.96
bb27R	S14	14b(H),17b(H)-20R-Cholestane	11.7 J	13.9	23.2	1.96
bb27S	S15	14b(H),17b(H)-20S-Cholestane	13.4 J	13.9	23.4	1.96
bb28R	S22	14b,17b-20R-Methylcholestane	9.49 J	13.9	13.5	1.96
bb28S	S23	14b,17b-20S-Methylcholestane	10.1 J	13.9	19.9	1.96
bb29R	S26	14b(H),17b(H)-20R-Ethylcholestane	12.0 J	13.9	36.7	1.96
bb29S	S27	14b(H),17b(H)-20S-Ethylcholestane	7.49 J	13.9	23.4	1.96
RC26/SC27TA	RC26/SC27TA	C26,20R- +C27,20S- triaromatic steroid	16.3	13.9	66.3	1.96
SC28TA	SC28TA	C28,20S-triaromatic steroid	14.0	13.9	113	1.96
RC27TA	RC27TA	C27,20R-triaromatic steroid	9.77 J	13.9	34.2	1.96
RC28TA	RC28TA	C28,20R-triaromatic steroid	7.94 J	13.9	86.1	1.96

Surrogates (% Recovery)		
Naphthalene-d8	78	76
Phenanthrene-d10	96	88
Benzo[a]pyrene-d12	85	92
5B(H)Cholane	105	178 §

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Method Blank
Lab ID	VO030415B01
Matrix	NAPL
Reference Method	PIANO High
Batch ID	VO030415B01
Date Collected	N/A
Date Received	N/A
Date Prepped	03/04/2015
Date Analyzed	03/06/2015
Sample Size (wet)	0.1
% Solid	100.00
File ID	V4008373.D
Units	mg/Kg
Final Volume	5
Dilution	1
Reporting Limit	10.0

Class	Abbrev	Analytes	Result		SSRL
I	IP	Isopentane		U	10.0
O	1P	1-Pentene		U	10.0
O	2M1B	2-Methyl-1-butene		U	10.0
P	C5	Pentane		U	10.0
O	T2P	2-Pentene (trans)		U	10.0
O	C2P	2-Pentene (cis)		U	10.0
OX	TBA	Tertiary butanol		U	125
N	CYP	Cyclopentane		U	10.0
I	23DMB	2,3-Dimethylbutane		U	10.0
I	2MP	2-Methylpentane		U	10.0
OX	MTBE	MTBE		U	10.0
I	3MP	3-Methylpentane		U	10.0
O	1HEX	1-Hexene		U	10.0
P	C6	Hexane		U	10.0
OX	DIPE	Diisopropyl Ether (DIPE)		U	10.0
OX	ETBE	Ethyl Tertiary Butyl Ether (ETBE)		U	10.0
I	22DMP	2,2-Dimethylpentane		U	10.0
N	MCYP	Methylcyclopentane		U	10.0
I	24DMP	2,4-Dimethylpentane		U	10.0
ADD	12DCA	1,2-Dichloroethane		U	10.0
N	CH	Cyclohexane		U	10.0
		2-Methylhexane		U	10.0
A	B	Benzene		U	10.0
I	23DMP	2,3-Dimethylpentane		U	10.0
S	THIO	Thiophene		U	10.0
I	3MH	3-Methylhexane		U	10.0
OX	TAME	TAME		U	10.0
O	1H	1-Heptene/1,2-DMCP (trans)[1]		U	20.0
I	ISO	Isooctane		U	10.0
P	C7	Heptane		U	10.0
		Methylcyclohexane		U	10.0
I	25DMH	2,5-Dimethylhexane		U	10.0
I	24DMH	2,4-Dimethylhexane		U	10.0
I	223TMP	2,2,3-Trimethylpentane		U	10.0
I	234TMP	2,3,4-Trimethylpentane		U	10.0
I	233TMP	2,3,3-Trimethylpentane		U	10.0
I	23DMH	2,3-Dimethylhexane		U	10.0
I	3EH	3-Ethylhexane		U	10.0
I	2MHEP	2-Methylheptane		U	10.0
I	3MHEP	3-Methylheptane		U	10.0
A	T	Toluene		U	10.0
S	2MTHIO	2-Methylthiophene		U	10.0
S	3MTHIO	3-Methylthiophene		U	10.0
O	1O	1-Octene		U	10.0
P	C8	Octane		U	10.0

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Method Blank
Lab ID	VO030415B01
Matrix	NAPL
Reference Method	PIANO High
Batch ID	VO030415B01
Date Collected	N/A
Date Received	N/A
Date Prepped	03/04/2015
Date Analyzed	03/06/2015
Sample Size (wet)	0.1
% Solid	100.00
File ID	V4008373.D
Units	mg/Kg
Final Volume	5
Dilution	1
Reporting Limit	10.0

Class	Abbrev	Analytes	Result		SSRL
ADD	12DBE	1,2-Dibromoethane		U	10.0
A	EB	Ethylbenzene		U	10.0
S	2ETHIO	2-Ethylthiophene		U	10.0
A	MPX	p/m-Xylene		U	20.0
O	1N	1-Nonene		U	10.0
P	C9	Nonane		U	10.0
A	STY	Styrene		U	10.0
A	OX	o-Xylene		U	10.0
A	IPB	Isopropylbenzene		U	10.0
A	PROPB	n-Propylbenzene		U	10.0
A	1M3EB	1-Methyl-3-ethylbenzene		U	10.0
A	1M4EB	1-Methyl-4-ethylbenzene		U	10.0
A	135TMB	1,3,5-Trimethylbenzene		U	10.0
O	1D	1-Decene		U	10.0
A	1M2EB	1-Methyl-2-ethylbenzene		U	10.0
P	C10	Decane		U	10.0
A	124TMB	1,2,4-Trimethylbenzene		U	10.0
A	SECBUT	sec-Butylbenzene		U	10.0
A	1M3IPB	1-Methyl-3-isopropylbenzene		U	10.0
A	1M4IPB	1-Methyl-4-isopropylbenzene		U	10.0
A	1M2IPB	1-Methyl-2-isopropylbenzene		U	10.0
A	IN	Indan		U	10.0
A	1M3PB	1-Methyl-3-propylbenzene		U	10.0
A	1M4PB	1-Methyl-4-propylbenzene		U	10.0
A	BUTB	n-Butylbenzene		U	10.0
A	12DM4EB	1,2-Dimethyl-4-ethylbenzene		U	10.0
A	12DEB	1,2-Diethylbenzene		U	10.0
A	1M2PB	1-Methyl-2-propylbenzene		U	10.0
A	14DM2EB	1,4-Dimethyl-2-ethylbenzene		U	10.0
P	C11	Undecane		U	10.0
A	13DM4EB	1,3-Dimethyl-4-ethylbenzene		U	10.0
A	13DM5EB	1,3-Dimethyl-5-ethylbenzene		U	10.0
A	13DM2EB	1,3-Dimethyl-2-ethylbenzene		U	10.0
A	12DM3EB	1,2-Dimethyl-3-ethylbenzene		U	10.0
A	1245TMP	1,2,4,5-Tetramethylbenzene		U	10.0
A	PENTB	Pentylbenzene		U	10.0
P	C12	Dodecane		U	10.0
2	N0	Naphthalene		U	10.0
2	BT0	Benzothiophene		U	10.0
ADD	MMT	MMT		U	25.0
P	C13	Tridecane		U	25.0
A	2MN	2-Methylnaphthalene	3.50	J	25.0
A	1MN	1-Methylnaphthalene	1.98	J	25.0

Surrogates (% Recovery)	
Dibromofluoromethane	93
Toluene-d8	88
4-Bromofluorobenzene	93

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Laboratory Control Sample
Lab ID	VO030415LCS01
Matrix	NAPL
Reference Method	PIANO High
Batch ID	VO030415B01
Date Collected	N/A
Date Received	N/A
Date Prepped	03/04/2015
Date Analyzed	03/06/2015
Sample Size (wet)	0.1
% Solid	100.00
File ID	V4008370.D
Units	mg/Kg
Final Volume	5
Dilution	1
Reporting Limit	10.0

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit
O	1P	1-Pentene	95.3	S	10.0	95	100	50	130
P	C5	Pentane	94.0	S	10.0	94	100	50	130
OX	TBA	Tertiary butanol	528	S	125	105	500	50	130
N	CYP	Cyclopentane	85.4	S	10.0	85	100	50	130
I	2MP	2-Methylpentane	97.7	S	10.0	98	100	50	130
OX	MTBE	MTBE	87.4	S	10.0	87	100	50	130
I	3MP	3-Methylpentane	95.9	S	10.0	96	100	50	130
O	1HEX	1-Hexene	91.6	S	10.0	92	100	50	130
P	C6	Hexane	93.3	S	10.0	93	100	50	130
OX	DIPE	Diisopropyl Ether (DIPE)	91.4	S	10.0	91	100	50	130
OX	ETBE	Ethyl Tertiary Butyl Ether (ETBE)	93.6	S	10.0	94	100	50	130
N	MCYP	Methylcyclopentane	94.5	S	10.0	95	100	50	130
I	24DMP	2,4-Dimethylpentane	95.0	S	10.0	95	100	50	130
N	CH	Cyclohexane	95.6	S	10.0	96	100	50	130
		2-Methylhexane	93.8	S	10.0	94	100	50	130
A	B	Benzene	87.8	S	10.0	88	100	50	130
I	23DMP	2,3-Dimethylpentane	95.2	S	10.0	95	100	50	130
I	3MH	3-Methylhexane	88.2	S	10.0	88	100	50	130
OX	TAME	TAME	82.6	S	10.0	83	100	50	130
I	ISO	Isooctane	89.1	S	10.0	89	100	50	130
P	C7	Heptane	88.6	S	10.0	89	100	50	130
		Methylcyclohexane	86.6	S	10.0	87	100	50	130
I	2MHEP	2-Methylheptane	96.6	S	10.0	97	100	50	130
I	3MHEP	3-Methylheptane	87.4	S	10.0	87	100	50	130
A	T	Toluene	90.2	S	10.0	90	100	50	130
P	C8	Octane	91.8	S	10.0	92	100	50	130
A	EB	Ethylbenzene	87.7	S	10.0	88	100	50	130
A	MPX	p/m-Xylene	179	S	20.0	90	200	50	130
P	C9	Nonane	84.4	S	10.0	84	100	50	130
A	OX	o-Xylene	89.1	S	10.0	89	100	50	130
A	IPB	Isopropylbenzene	88.6	S	10.0	89	100	50	130
A	PROPB	n-Propylbenzene	86.6	S	10.0	87	100	50	130
A	1M3EB	1-Methyl-3-ethylbenzene	85.6	S	10.0	86	100	50	130
A	1M4EB	1-Methyl-4-ethylbenzene	85.6	S	10.0	86	100	50	130
A	135TMB	1,3,5-Trimethylbenzene	88.4	S	10.0	88	100	50	130
O	1D	1-Decene	88.6	S	10.0	89	100	50	130
A	1M2EB	1-Methyl-2-ethylbenzene	89.0	S	10.0	89	100	50	130
P	C10	Decane	92.1	S	10.0	92	100	50	130
A	124TMB	1,2,4-Trimethylbenzene	89.7	S	10.0	90	100	50	130
A	SECBUT	sec-Butylbenzene	86.6	S	10.0	87	100	50	130
A	1M4PB	1-Methyl-4-propylbenzene	83.9	S	10.0	84	100	50	130
A	BUTB	n-Butylbenzene	84.6	S	10.0	85	100	50	130
A	12DEB	1,2-Diethylbenzene	92.1	S	10.0	92	100	50	130
A	PENTB	Pentylbenzene	88.1	S	10.0	88	100	50	130
P	C12	Dodecane	108	S	10.0	108	100	50	130

Surrogates (% Recovery)	
Dibromofluoromethane	92
Toluene-d8	89
4-Bromofluorobenzene	94

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Laboratory Control Sample Dup
Lab ID	VO030415LCSD01
Matrix	NAPL
Reference Method	PIANO High
Batch ID	VO030415B01
Date Collected	N/A
Date Received	N/A
Date Prepped	03/04/2015
Date Analyzed	03/06/2015
Sample Size (wet)	0.1
% Solid	100.00
File ID	V4008371.D
Units	mg/Kg
Final Volume	5
Dilution	1
Reporting Limit	10.0

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
O	1P	1-Pentene	101	S	10.0	101	100	50	130	6	30
P	C5	Pentane	100	S	10.0	100	100	50	130	6	30
OX	TBA	Tertiary butanol	563	S	125	113	500	50	130	7	30
N	CYP	Cyclopentane	89.6	S	10.0	90	100	50	130	5	30
I	2MP	2-Methylpentane	99.7	S	10.0	100	100	50	130	2	30
OX	MTBE	MTBE	93.2	S	10.0	93	100	50	130	6	30
I	3MP	3-Methylpentane	101	S	10.0	101	100	50	130	5	30
O	1HEX	1-Hexene	97.9	S	10.0	98	100	50	130	7	30
P	C6	Hexane	97.4	S	10.0	97	100	50	130	4	30
OX	DIPE	Diisopropyl Ether (DIPE)	96.4	S	10.0	96	100	50	130	5	30
OX	ETBE	Ethyl Tertiary Butyl Ether (ETBE)	98.3	S	10.0	98	100	50	130	5	30
N	MCYP	Methylcyclopentane	99.1	S	10.0	99	100	50	130	5	30
I	24DMP	2,4-Dimethylpentane	97.8	S	10.0	98	100	50	130	3	30
N	CH	Cyclohexane	98.3	S	10.0	98	100	50	130	3	30
		2-Methylhexane	95.3	S	10.0	95	100	50	130	2	30
A	B	Benzene	90.4	S	10.0	90	100	50	130	3	30
I	23DMP	2,3-Dimethylpentane	99.6	S	10.0	100	100	50	130	4	30
I	3MH	3-Methylhexane	92.9	S	10.0	93	100	50	130	5	30
OX	TAME	TAME	86.4	S	10.0	86	100	50	130	5	30
I	ISO	Isooctane	95.7	S	10.0	96	100	50	130	7	30
P	C7	Heptane	96.3	S	10.0	96	100	50	130	8	30
		Methylcyclohexane	91.1	S	10.0	91	100	50	130	5	30
I	2MHEP	2-Methylheptane	101	S	10.0	102	100	50	130	5	30
I	3MHEP	3-Methylheptane	92.2	S	10.0	92	100	50	130	5	30
A	T	Toluene	95.5	S	10.0	96	100	50	130	6	30
P	C8	Octane	96.8	S	10.0	97	100	50	130	5	30
A	EB	Ethylbenzene	93.0	S	10.0	93	100	50	130	6	30
A	MPX	p/m-Xylene	190	S	20.0	95	200	50	130	6	30
P	C9	Nonane	89.0	S	10.0	89	100	50	130	5	30
A	OX	o-Xylene	94.2	S	10.0	94	100	50	130	6	30
A	IPB	Isopropylbenzene	94.8	S	10.0	95	100	50	130	7	30
A	PROPB	n-Propylbenzene	93.6	S	10.0	94	100	50	130	8	30
A	1M3EB	1-Methyl-3-ethylbenzene	93.6	S	10.0	94	100	50	130	9	30
A	1M4EB	1-Methyl-4-ethylbenzene	95.2	S	10.0	95	100	50	130	11	30
A	135TMB	1,3,5-Trimethylbenzene	96.1	S	10.0	96	100	50	130	8	30
O	1D	1-Decene	92.0	S	10.0	92	100	50	130	4	30
A	1M2EB	1-Methyl-2-ethylbenzene	95.7	S	10.0	96	100	50	130	7	30
P	C10	Decane	97.9	S	10.0	98	100	50	130	6	30
A	124TMB	1,2,4-Trimethylbenzene	95.2	S	10.0	95	100	50	130	6	30
A	SECBUT	sec-Butylbenzene	93.6	S	10.0	94	100	50	130	8	30
A	1M4PB	1-Methyl-4-propylbenzene	92.7	S	10.0	93	100	50	130	10	30
A	BUTB	n-Butylbenzene	92.6	S	10.0	93	100	50	130	9	30
A	12DEB	1,2-Diethylbenzene	99.8	S	10.0	100	100	50	130	8	30
A	PENTB	Pentylbenzene	93.1	S	10.0	93	100	50	130	6	30
P	C12	Dodecane	114	S	10.0	114	100	50	130	6	30

Surrogates (% Recovery)	
Dibromofluoromethane	93
Toluene-d8	91
4-Bromofluorobenzene	95

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	CBTX-742201-022715	CBTX-742201-022715
Lab ID	1503002-02	1503002-02D
Matrix	NAPL	NAPL
Reference Method	PIANO High	PIANO High
Batch ID	VO030415B01	VO030415B01
Date Collected	02/27/2015	02/27/2015
Date Received	03/03/2015	03/03/2015
Date Prepped	03/04/2015	03/04/2015
Date Analyzed	03/07/2015	03/07/2015
Sample Size (wet)	0.1036	0.1055
% Solid	100.00	100.00
File ID	V4008382.D	V4008383.D
Units	mg/Kg	mg/Kg
Final Volume	5	5
Dilution	10	10
Reporting Limit	96.5	94.8

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
I	IP	Isopentane	13000	D	1930	14100	D	1900	8	30	
O	1P	1-Pentene		U	96.5		U	94.8		30	N/A
O	2M1B	2-Methyl-1-butene		U	96.5		U	94.8		30	N/A
P	C5	Pentane	21200	D	1930	22100	D	1900	4	30	
O	T2P	2-Pentene (trans)		U	96.5		U	94.8		30	N/A
O	C2P	2-Pentene (cis)		U	96.5		U	94.8		30	N/A
OX	TBA	Tertiary butanol		U	1210		U	1180		30	N/A
N	CYP	Cyclopentane	1830		96.5	1940		94.8	6	30	
I	23DMB	2,3-Dimethylbutane	803		96.5	829		94.8	3	30	
I	2MP	2-Methylpentane	8570		96.5	9100		94.8	6	30	
OX	MTBE	MTBE		U	96.5		U	94.8		30	N/A
I	3MP	3-Methylpentane	5890		96.5	6240		94.8	6	30	
O	1HEX	1-Hexene		U	96.5		U	94.8		30	N/A
P	C6	Hexane	15500	D	1930	16000	D	1900	3	30	
OX	DIPE	Diisopropyl Ether (DIPE)		U	96.5		U	94.8		30	N/A
OX	ETBE	Ethyl Tertiary Butyl Ether (ETBE)		U	96.5		U	94.8		30	N/A
I	22DMP	2,2-Dimethylpentane	122		96.5	131		94.8	7	30	
N	MCYP	Methylcyclopentane	10500	D	1930	11000	D	1900	4	30	
I	24DMP	2,4-Dimethylpentane	466		96.5	479		94.8	3	30	
ADD	12DCA	1,2-Dichloroethane		U	96.5		U	94.8		30	N/A
N	CH	Cyclohexane	3550		96.5	3760		94.8	6	30	
		2-Methylhexane	4080		96.5	4340		94.8	6	30	
A	B	Benzene	917		96.5	983		94.8	7	30	
I	23DMP	2,3-Dimethylpentane	1830		96.5	1970		94.8	8	30	
S	THIO	Thiophene		U	96.5		U	94.8		30	N/A
I	3MH	3-Methylhexane	6100		96.5	6430		94.8	5	30	
OX	TAME	TAME		U	96.5		U	94.8		30	N/A
O	1H	1-Heptene/1,2-DMCP (trans)[1]	9850		193	10400		190	6	30	
I	ISO	Isooctane		U	96.5		U	94.8		30	N/A
P	C7	Heptane	13000	D	1930	13400	D	1900	3	30	
		Methylcyclohexane	7320		96.5	7600		94.8	4	30	
I	25DMH	2,5-Dimethylhexane	450		96.5	459		94.8	2	30	
I	24DMH	2,4-Dimethylhexane	904		96.5	901		94.8	0	30	
I	223TMP	2,2,3-Trimethylpentane	23.2	J	96.5	23.7	J	94.8	2	30	
I	234TMP	2,3,4-Trimethylpentane	86.7	J	96.5	89.1	J	94.8	3	30	
I	233TMP	2,3,3-Trimethylpentane	20.5	J	96.5	22.3	J	94.8	9	30	
I	23DMH	2,3-Dimethylhexane	764		96.5	806		94.8	5	30	
I	3EH	3-Ethylhexane	609		96.5	664		94.8	9	30	
I	2MHEP	2-Methylheptane	5840		96.5	6120		94.8	5	30	
I	3MHEP	3-Methylheptane	3110		96.5	3220		94.8	4	30	
A	T	Toluene	2640		96.5	2760		94.8	5	30	
S	2MTHIO	2-Methylthiophene		U	96.5		U	94.8		30	N/A
S	3MTHIO	3-Methylthiophene		U	96.5		U	94.8		30	N/A
O	1O	1-Octene		U	96.5		U	94.8		30	N/A
P	C8	Octane	8970		96.5	9360		94.8	4	30	

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

		Client ID	CBTX-742201-022715			CBTX-742201-022715			
		Lab ID	1503002-02			1503002-02D			
		Matrix	NAPL			NAPL			
		Reference Method	PIANO High			PIANO High			
		Batch ID	VO030415B01			VO030415B01			
		Date Collected	02/27/2015			02/27/2015			
		Date Received	03/03/2015			03/03/2015			
		Date Prepped	03/04/2015			03/04/2015			
		Date Analyzed	03/07/2015			03/07/2015			
		Sample Size (wet)	0.1036			0.1055			
		% Solid	100.00			100.00			
		File ID	V4008382.D			V4008383.D			
		Units	mg/Kg			mg/Kg			
		Final Volume	5			5			
		Dilution	10			10			
		Reporting Limit	96.5			94.8			
Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
ADD	12DBE	1,2-Dibromoethane		U	96.5		U	94.8		30	N/A
A	EB	Ethylbenzene	757		96.5	774		94.8	2	30	
S	2ETHIO	2-Ethylthiophene		U	96.5		U	94.8		30	N/A
A	MPX	p/m-Xylene	3030		193	3140		190	3	30	
O	1N	1-Nonene		U	96.5		U	94.8		30	N/A
P	C9	Nonane	6650		96.5	6670		94.8	0	30	
A	STY	Styrene		U	96.5		U	94.8		30	N/A
A	OX	o-Xylene	1240		96.5	1300		94.8	4	30	
A	IPB	Isopropylbenzene	283		96.5	299		94.8	6	30	
A	PROPB	n-Propylbenzene	399		96.5	410		94.8	3	30	
A	1M3EB	1-Methyl-3-ethylbenzene	969		96.5	1000		94.8	4	30	
A	1M4EB	1-Methyl-4-ethylbenzene	449		96.5	460		94.8	2	30	
A	135TMB	1,3,5-Trimethylbenzene	638		96.5	647		94.8	1	30	
O	1D	1-Decene		U	96.5		U	94.8		30	N/A
A	1M2EB	1-Methyl-2-ethylbenzene	526		96.5	541		94.8	3	30	
P	C10	Decane	5300		96.5	5120		94.8	4	30	
A	124TMB	1,2,4-Trimethylbenzene	2840		96.5	2920		94.8	2	30	
A	SECBUT	sec-Butylbenzene	189		96.5	183		94.8	3	30	
A	1M3IPB	1-Methyl-3-isopropylbenzene	386		96.5	395		94.8	2	30	
A	1M4IPB	1-Methyl-4-isopropylbenzene	239		96.5	243		94.8	2	30	
A	1M2IPB	1-Methyl-2-isopropylbenzene	38.0	J	96.5	38.6	J	94.8	2	30	
A	IN	Indan	45.2	J	96.5	47.0	J	94.8	4	30	
A	1M3PB	1-Methyl-3-propylbenzene	550		96.5	557		94.8	1	30	
A	1M4PB	1-Methyl-4-propylbenzene	217		96.5	218		94.8	0	30	
A	BUTB	n-Butylbenzene	203		96.5	202		94.8	0	30	
A	12DM4EB	1,2-Dimethyl-4-ethylbenzene	418		96.5	414		94.8	1	30	
A	12DEB	1,2-Diethylbenzene	75.5	J	96.5	75.6	J	94.8	0	30	
A	1M2PB	1-Methyl-2-propylbenzene	277		96.5	279		94.8	1	30	
A	14DM2EB	1,4-Dimethyl-2-ethylbenzene	370		96.5	372		94.8	1	30	
P	C11	Undecane	4650		96.5	4270		94.8	8	30	
A	13DM4EB	1,3-Dimethyl-4-ethylbenzene	397		96.5	396		94.8	0	30	
A	13DM5EB	1,3-Dimethyl-5-ethylbenzene	478		96.5	483		94.8	1	30	
A	13DM2EB	1,3-Dimethyl-2-ethylbenzene	139		96.5	139		94.8	1	30	
A	12DM3EB	1,2-Dimethyl-3-ethylbenzene	255		96.5	252		94.8	1	30	
A	1245TMP	1,2,4,5-Tetramethylbenzene	275		96.5	272		94.8	1	30	
A	PENTB	Pentylbenzene	41.6	J	96.5	46.3	J	94.8	11	30	
P	C12	Dodecane	3950		96.5	4010		94.8	2	30	
2	N0	Naphthalene	237		96.5	224		94.8	5	30	
2	BT0	Benzothiophene		U	96.5		U	94.8		30	N/A
ADD	MMT	MMT		U	241		U	237		30	N/A
P	C13	Tridecane	4070		241	4250		237	4	30	
A	2MN	2-Methylnaphthalene	977		241	1030		237	5	30	
A	1MN	1-Methylnaphthalene	772		241	809		237	5	30	

Surrogates (% Recovery)		
Dibromofluoromethane	88	86
Toluene-d8	87	87
4-Bromofluorobenzene	96	97

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Pool-022715			CBTX-742201-022715	
Lab ID	1503002-01			1503002-02	
Matrix	NAPL			NAPL	
Reference Method	PIANO High			PIANO High	
Batch ID	VO030415B01			VO030415B01	
Date Collected	02/27/2015			02/27/2015	
Date Received	03/03/2015			03/03/2015	
Date Prepped	03/04/2015			03/04/2015	
Date Analyzed	03/07/2015			03/07/2015	
Sample Size (wet)	0.0653			0.1036	
% Solid	100.00			100.00	
File ID	V4008381.D			V4008382.D	
Units	mg/Kg			mg/Kg	
Final Volume	5			5	
Dilution	1			10	
Reporting Limit	15.3			96.5	

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL
I	IP	Isopentane	2.19	J	15.3	13000	D	1930
O	1P	1-Pentene		U	15.3		U	96.5
O	2M1B	2-Methyl-1-butene		U	15.3		U	96.5
P	C5	Pentane		U	15.3	21200	D	1930
O	T2P	2-Pentene (trans)		U	15.3		U	96.5
O	C2P	2-Pentene (cis)		U	15.3		U	96.5
OX	TBA	Tertiary butanol		U	191		U	1210
N	CYP	Cyclopentane		U	15.3	1830		96.5
I	23DMB	2,3-Dimethylbutane		U	15.3	803		96.5
I	2MP	2-Methylpentane		U	15.3	8570		96.5
OX	MTBE	MTBE		U	15.3		U	96.5
I	3MP	3-Methylpentane		U	15.3	5890		96.5
O	1HEX	1-Hexene		U	15.3		U	96.5
P	C6	Hexane		U	15.3	15500	D	1930
OX	DIPE	Diisopropyl Ether (DIPE)		U	15.3		U	96.5
OX	ETBE	Ethyl Tertiary Butyl Ether (ETBE)		U	15.3		U	96.5
I	22DMP	2,2-Dimethylpentane		U	15.3	122		96.5
N	MCYP	Methylcyclopentane		U	15.3	10500	D	1930
I	24DMP	2,4-Dimethylpentane		U	15.3	466		96.5
ADD	12DCA	1,2-Dichloroethane		U	15.3		U	96.5
N	CH	Cyclohexane		U	15.3	3550		96.5
		2-Methylhexane		U	15.3	4080		96.5
A	B	Benzene		U	15.3	917		96.5
I	23DMP	2,3-Dimethylpentane		U	15.3	1830		96.5
S	THIO	Thiophene		U	15.3		U	96.5
I	3MH	3-Methylhexane		U	15.3	6100		96.5
OX	TAME	TAME		U	15.3		U	96.5
O	1H	1-Heptene/1,2-DMCP (trans)[1]		U	30.6	9850		193
I	ISO	Isooctane		U	15.3		U	96.5
P	C7	Heptane		U	15.3	13000	D	1930
		Methylcyclohexane		U	15.3	7320		96.5
I	25DMH	2,5-Dimethylhexane		U	15.3	450		96.5
I	24DMH	2,4-Dimethylhexane		U	15.3	904		96.5
I	223TMP	2,2,3-Trimethylpentane		U	15.3	23.2	J	96.5
I	234TMP	2,3,4-Trimethylpentane		U	15.3	86.7	J	96.5
I	233TMP	2,3,3-Trimethylpentane		U	15.3	20.5	J	96.5
I	23DMH	2,3-Dimethylhexane		U	15.3	764		96.5
I	3EH	3-Ethylhexane		U	15.3	609		96.5
I	2MHEP	2-Methylheptane		U	15.3	5840		96.5
I	3MHEP	3-Methylheptane		U	15.3	3110		96.5
A	T	Toluene	1.56	J	15.3	2640		96.5
S	2MTHIO	2-Methylthiophene		U	15.3		U	96.5
S	3MTHIO	3-Methylthiophene		U	15.3		U	96.5
O	1O	1-Octene		U	15.3		U	96.5
P	C8	Octane	5.63	J	15.3	8970		96.5

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

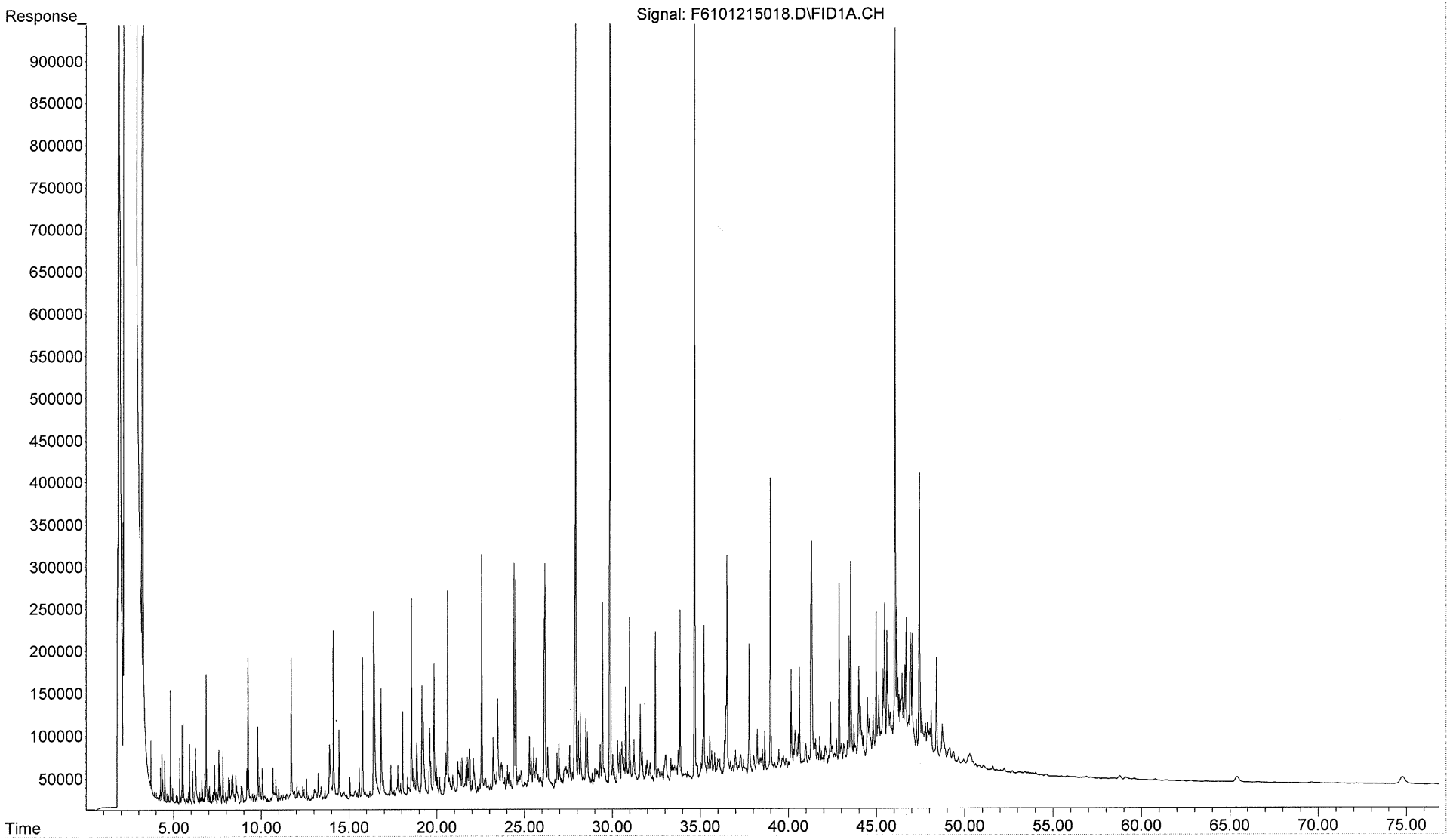
		Client ID	Pool-022715		CBTX-742201-022715	
		Lab ID	1503002-01		1503002-02	
		Matrix	NAPL		NAPL	
		Reference Method	PIANO High		PIANO High	
		Batch ID	VO030415B01		VO030415B01	
		Date Collected	02/27/2015		02/27/2015	
		Date Received	03/03/2015		03/03/2015	
		Date Prepped	03/04/2015		03/04/2015	
		Date Analyzed	03/07/2015		03/07/2015	
		Sample Size (wet)	0.0653		0.1036	
		% Solid	100.00		100.00	
		File ID	V4008381.D		V4008382.D	
		Units	mg/Kg		mg/Kg	
		Final Volume	5		5	
		Dilution	1		10	
		Reporting Limit	15.3		96.5	
Class	Abbrev	Analytes	Result	SSRL	Result	SSRL
ADD	12DBE	1,2-Dibromoethane	U	15.3	U	96.5
A	EB	Ethylbenzene	U	15.3	757	96.5
S	2ETHIO	2-Ethylthiophene	U	15.3	U	96.5
A	MPX	p/m-Xylene	4.33 J	30.6	3030	193
O	1N	1-Nonene	U	15.3	U	96.5
P	C9	Nonane	21.9	15.3	6650	96.5
A	STY	Styrene	U	15.3	U	96.5
A	OX	o-Xylene	6.37 J	15.3	1240	96.5
A	IPB	Isopropylbenzene	U	15.3	283	96.5
A	PROPB	n-Propylbenzene	U	15.3	399	96.5
A	1M3EB	1-Methyl-3-ethylbenzene	6.44 J	15.3	969	96.5
A	1M4EB	1-Methyl-4-ethylbenzene	3.61 J	15.3	449	96.5
A	135TMB	1,3,5-Trimethylbenzene	7.89 J	15.3	638	96.5
O	1D	1-Decene	U	15.3	U	96.5
A	1M2EB	1-Methyl-2-ethylbenzene	6.27 J	15.3	526	96.5
P	C10	Decane	95.2	15.3	5300	96.5
A	124TMB	1,2,4-Trimethylbenzene	25.5	15.3	2840	96.5
A	SECBUT	sec-Butylbenzene	2.93 J	15.3	189	96.5
A	1M3IPB	1-Methyl-3-isopropylbenzene	7.79 J	15.3	386	96.5
A	1M4IPB	1-Methyl-4-isopropylbenzene	5.28 J	15.3	239	96.5
A	1M2IPB	1-Methyl-2-isopropylbenzene	U	15.3	38.0 J	96.5
A	IN	Indan	1.42 J	15.3	45.2 J	96.5
A	1M3PB	1-Methyl-3-propylbenzene	16.9	15.3	550	96.5
A	1M4PB	1-Methyl-4-propylbenzene	7.24 J	15.3	217	96.5
A	BUTB	n-Butylbenzene	6.16 J	15.3	203	96.5
A	12DM4EB	1,2-Dimethyl-4-ethylbenzene	16.9	15.3	418	96.5
A	12DEB	1,2-Diethylbenzene	2.83 J	15.3	75.5 J	96.5
A	1M2PB	1-Methyl-2-propylbenzene	9.79 J	15.3	277	96.5
A	14DM2EB	1,4-Dimethyl-2-ethylbenzene	16.2	15.3	370	96.5
P	C11	Undecane	250	15.3	4650	96.5
A	13DM4EB	1,3-Dimethyl-4-ethylbenzene	17.8	15.3	397	96.5
A	13DM5EB	1,3-Dimethyl-5-ethylbenzene	24.1	15.3	478	96.5
A	13DM2EB	1,3-Dimethyl-2-ethylbenzene	7.19 J	15.3	139	96.5
A	12DM3EB	1,2-Dimethyl-3-ethylbenzene	15.0 J	15.3	255	96.5
A	1245TMP	1,2,4,5-Tetramethylbenzene	20.2	15.3	275	96.5
A	PENTB	Pentylbenzene	4.94 J	15.3	41.6 J	96.5
P	C12	Dodecane	509	15.3	3950	96.5
2	N0	Naphthalene	33.7	15.3	237	96.5
2	BT0	Benzothiophene	U	15.3	U	96.5
ADD	MMT	MMT	U	38.3	U	241
P	C13	Tridecane	716 D	383	4070	241
A	2MN	2-Methylnaphthalene	214	38.3	977	241
A	1MN	1-Methylnaphthalene	175	38.3	772	241

Surrogates (% Recovery)		
Dibromofluoromethane	86	88
Toluene-d8	86	87
4-Bromofluorobenzene	92	96

U: The analyte was analyzed for but not detected at the sample specific level reported.
B: Found in associated blank as well as sample.
J: Estimated value, below quantitation limit.
E: Estimated value, exceeds the upper limit of calibration.
NA: Not Applicable
D: Secondary Dilution Performed
D1: Tertiary Dilution Performed
[a]: Value outside of QC Limits.
§: Surrogate value outside of acceptable range.
X: It is not possible to calculate RPD, one result is below the detection limit, the other is above reporting limit.
G: Matrix Interference.
P: Greater than 40% RPD between the two columns, the higher value is reported according to the method.
I: Due to interference, the lower value is reported.
N: Spike recovery outside control limits.
E: Estimated due to Interference. (Metals)
¤: Duplicate outside control limits.
P: Spike compound. (Metals)
J: Below CRDL, Project DL, or RL but greater than or equal to MDL
C: Sample concentration is > 4 times the spike level, recovery limits do not apply. (Metals)
S: Spike Compound. (Organics)
§: RPD criteria not applicable to results less than 5 times the reporting limit. (Metals)
T: Tentatively identified corexit compound.
C: Co-elution.
Z: Result not surrogate corrected.
DL: Surrogate result diluted out of sample.
W: Matrix interference may be present based on chemical reasonableness evaluation.

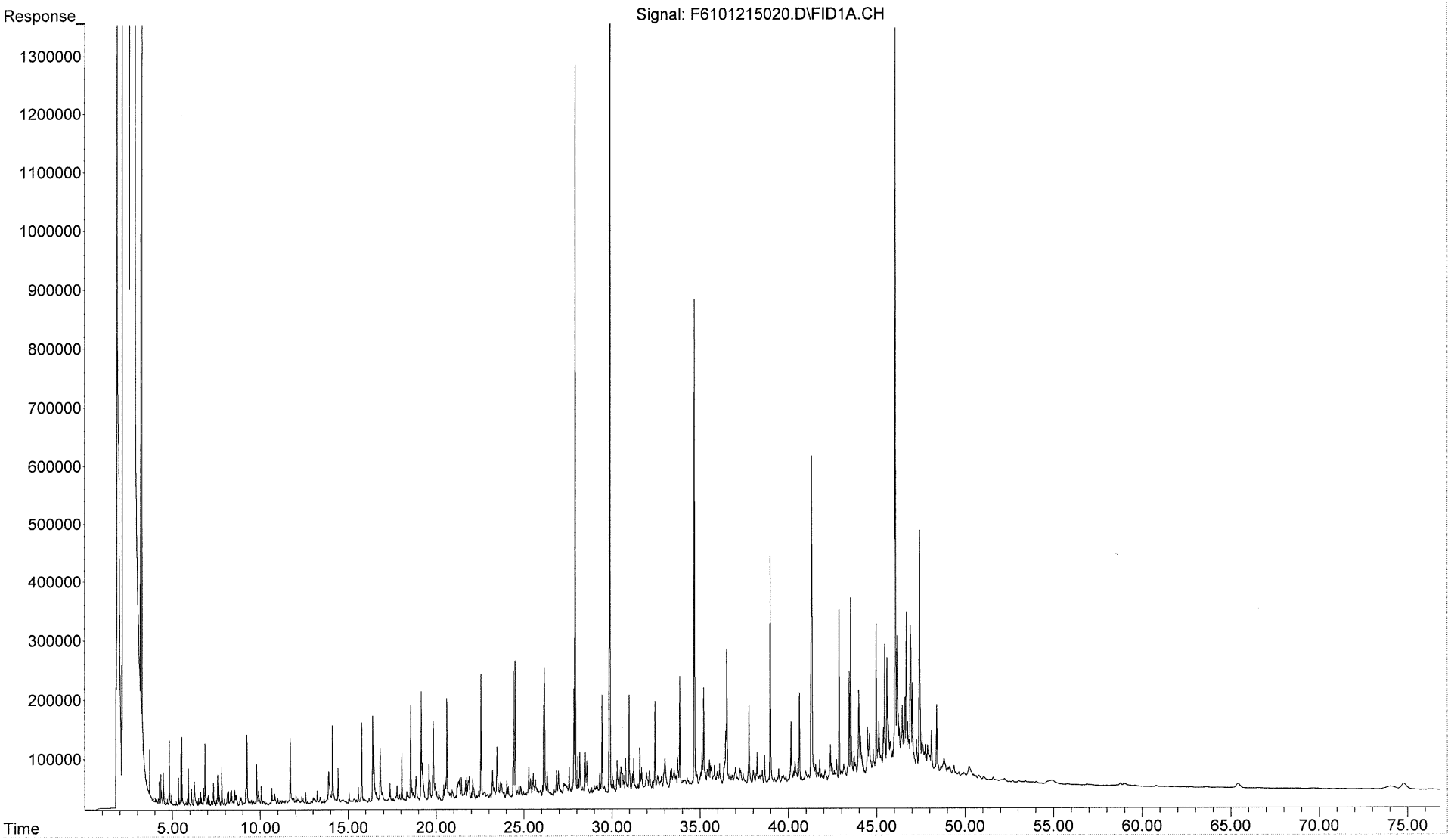
File :U:\2015 AWHL Data\CSXT Mt Carbon WV\1510001\Preliminary FID\
... F6101215018.D
Operator : FID6:NL
Instrument : FID6
Acquired : 13 Oct 2015 12:46 am using AcqMethod FID6A.M
Sample Name: 1510001-01
Misc Info : 1X

SED-KAN-DNS100
1510001-01



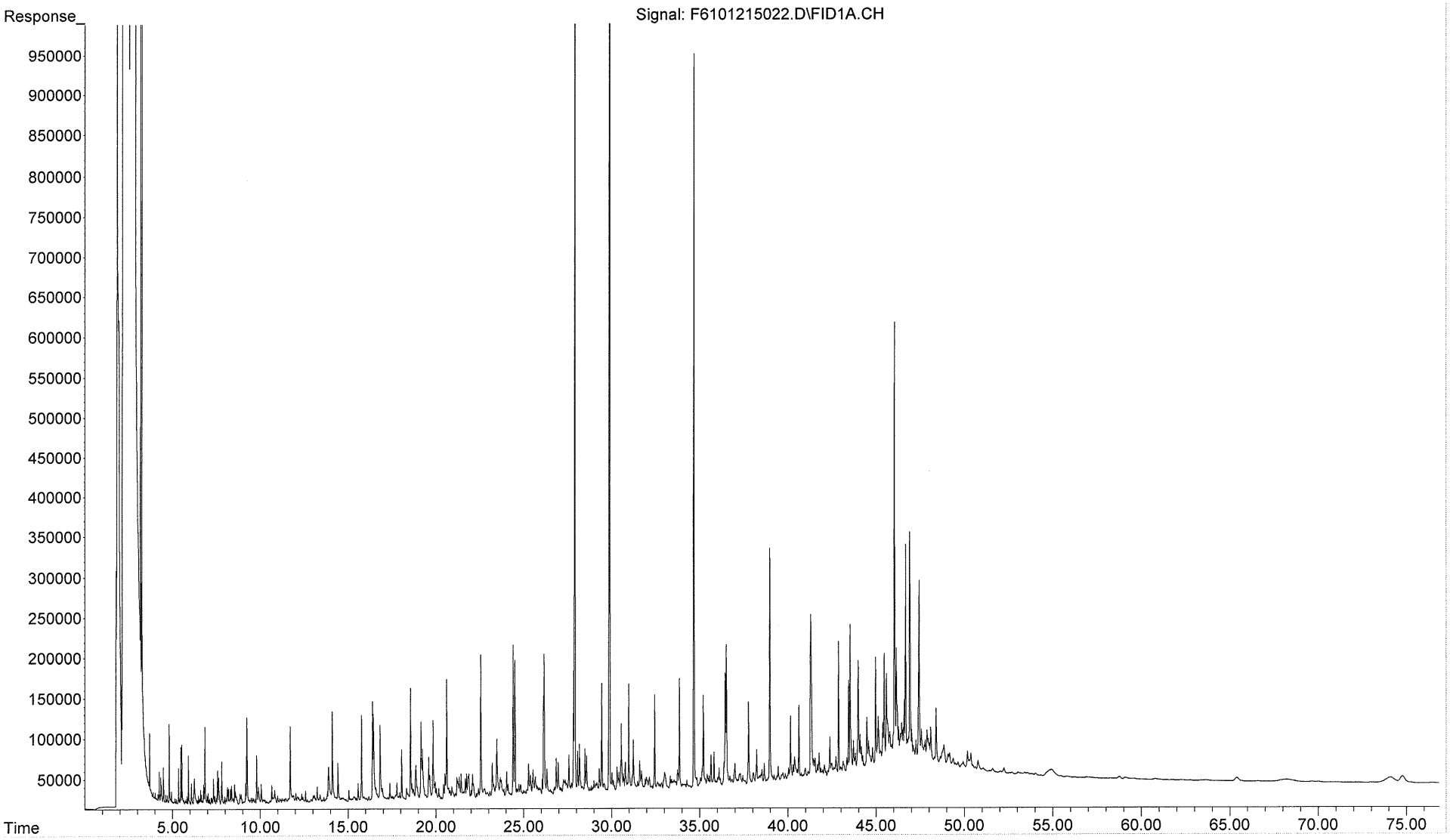
File :U:\2015 AWHL Data\CSXT Mt Carbon WV\1510001\Preliminary FID\
... F6101215020.D
Operator : FID6:NL
Instrument : FID6
Acquired : 13 Oct 2015 2:15 am using AcqMethod FID6A.M
Sample Name: 1510001-01D
Misc Info : 1X

SED-KAN-DNS100
1510001-01D



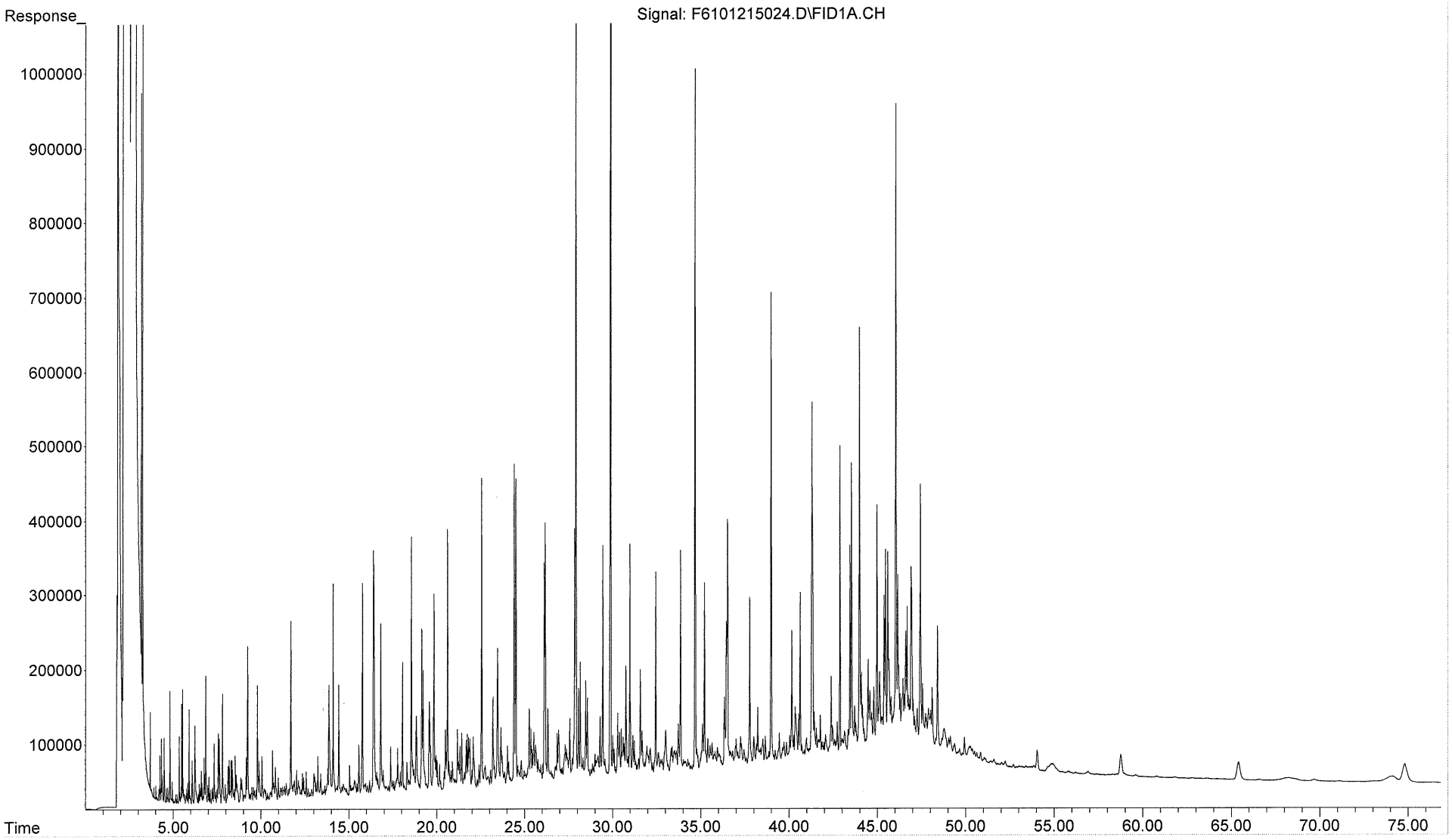
File :U:\2015 AWHL Data\CSXT Mt Carbon WV\1510001\Preliminary FID\
... F6101215022.D
Operator : FID6:NL
Instrument : FID6
Acquired : 13 Oct 2015 3:44 am using AcqMethod FID6A.M
Sample Name: 1510001-02
Misc Info : 1X

SED-KAN-DNS050
1510001-02



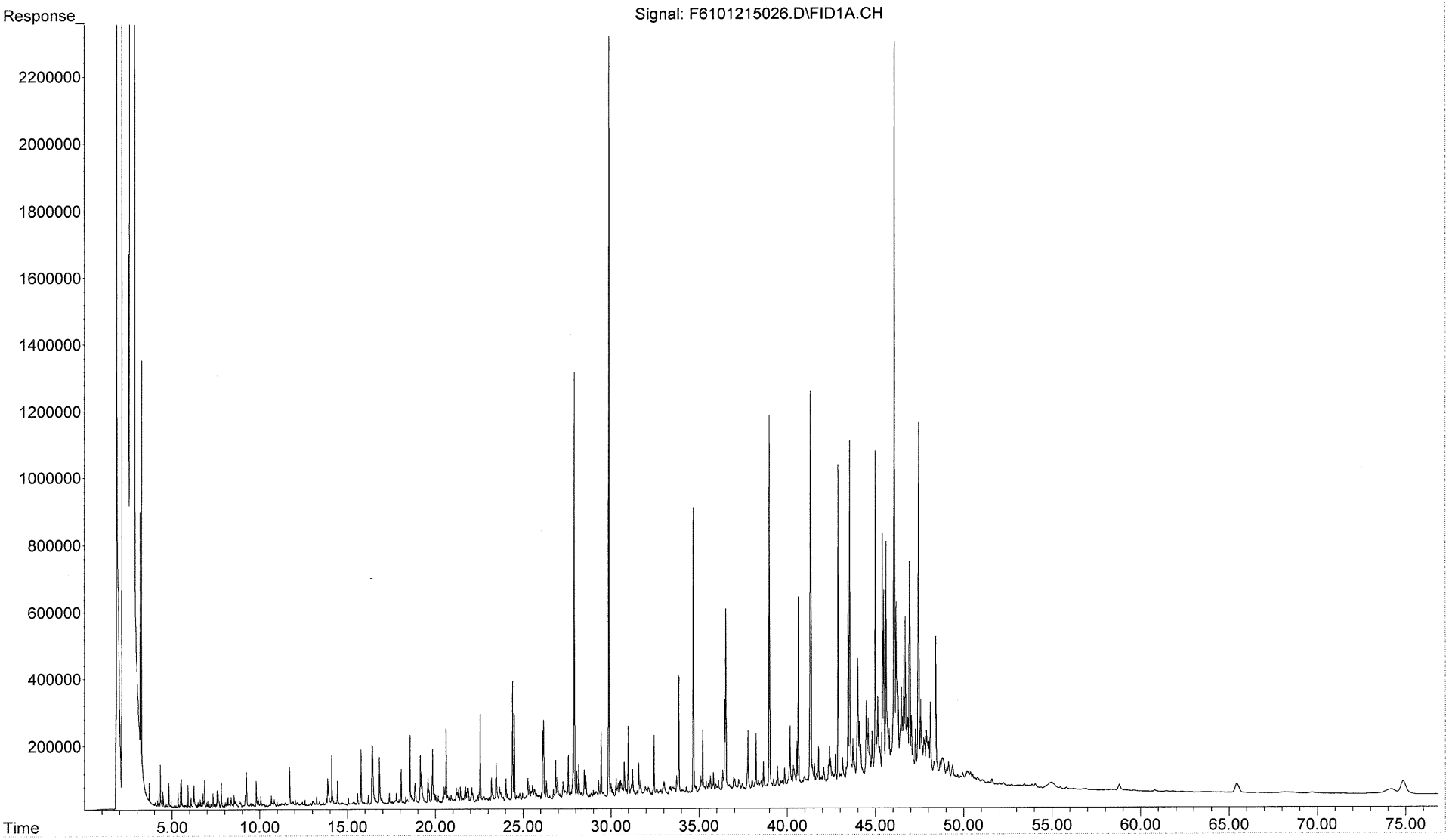
File :U:\2015 AWHL Data\CSXT Mt Carbon WV\1510001\Preliminary FID\
... F6101215024.D
Operator : FID6:NL
Instrument : FID6
Acquired : 13 Oct 2015 5:12 am using AcqMethod FID6A.M
Sample Name: 1510001-03
Misc Info : 1X

SED-KAN-MS06
1510001-03



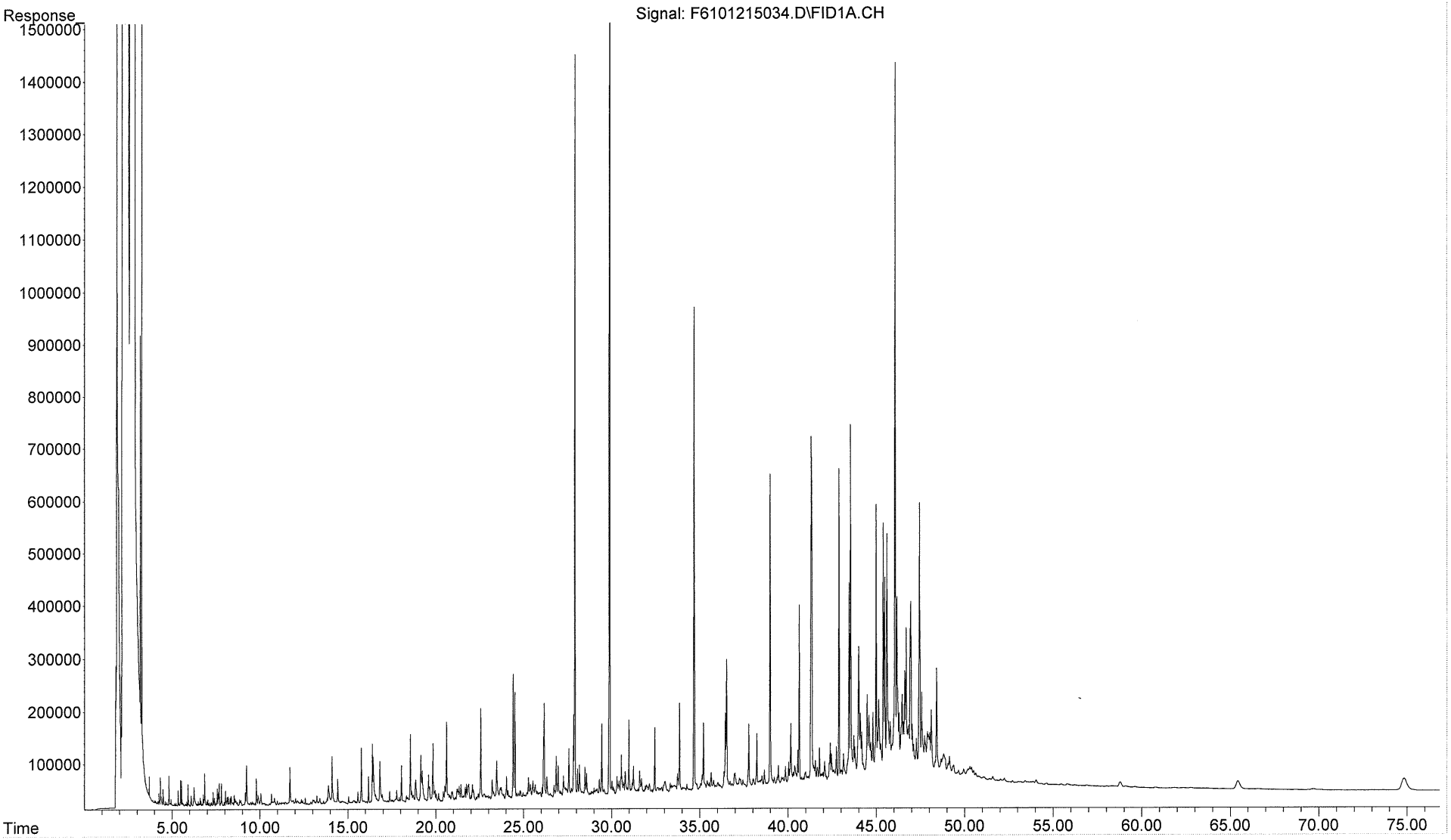
File :U:\2015 AWHL Data\CSXT Mt Carbon WV\1510001\Preliminary FID\
... F6101215026.D
Operator : FID6:NL
Instrument : FID6
Acquired : 13 Oct 2015 6:41 am using AcqMethod FID6A.M
Sample Name: 1510001-04
Misc Info : 1X

SED-KAN-MS05
1510001-04



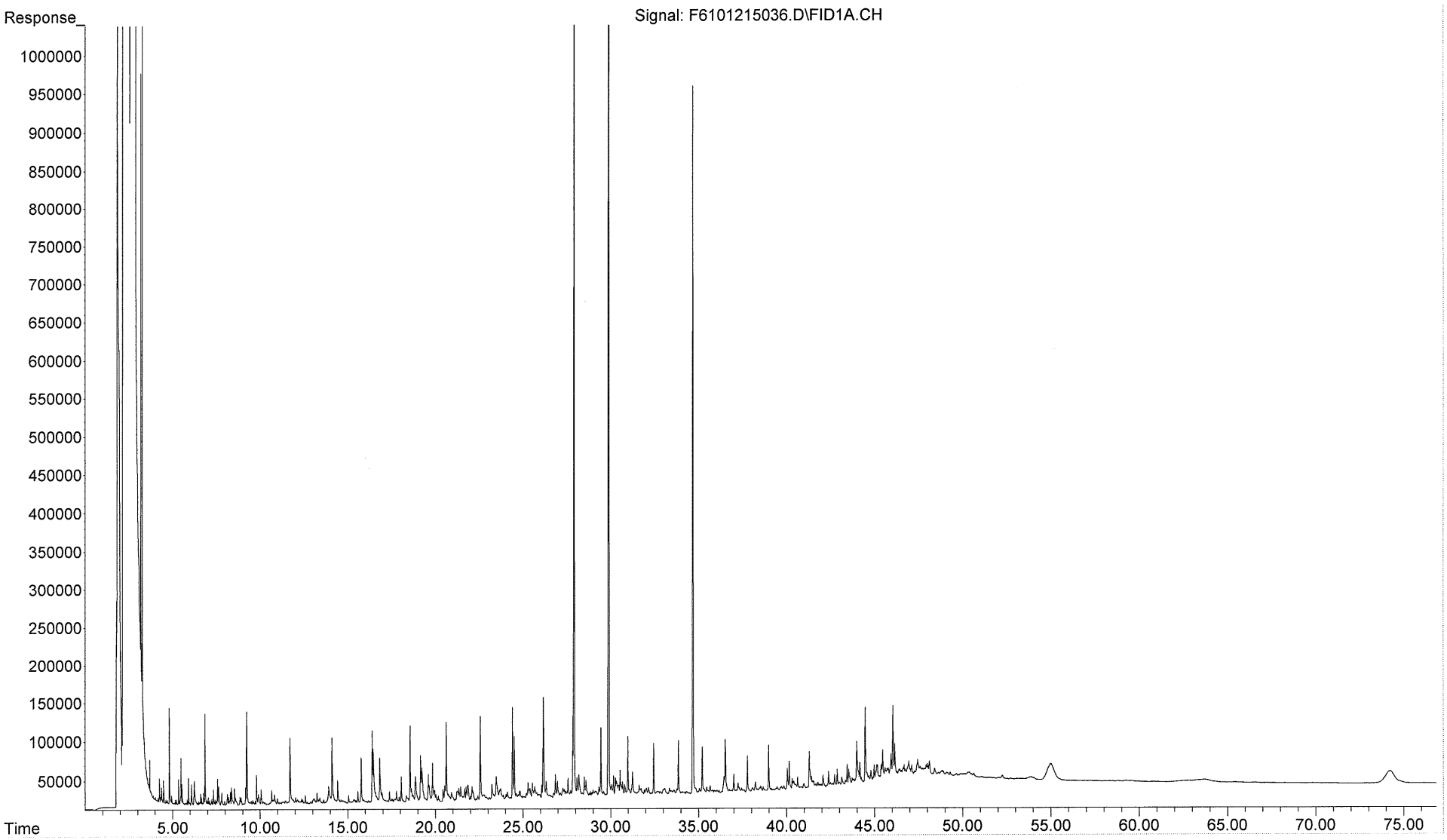
File :U:\2015 AWHL Data\CSXT Mt Carbon WV\1510001\Preliminary FID\
... F6101215034.D
Operator : FID6:NL
Instrument : FID6
Acquired : 13 Oct 2015 12:36 pm using AcqMethod FID6A.M
Sample Name: 1510001-05
Misc Info : 1X

SED-KAN-MS04
1510001-05



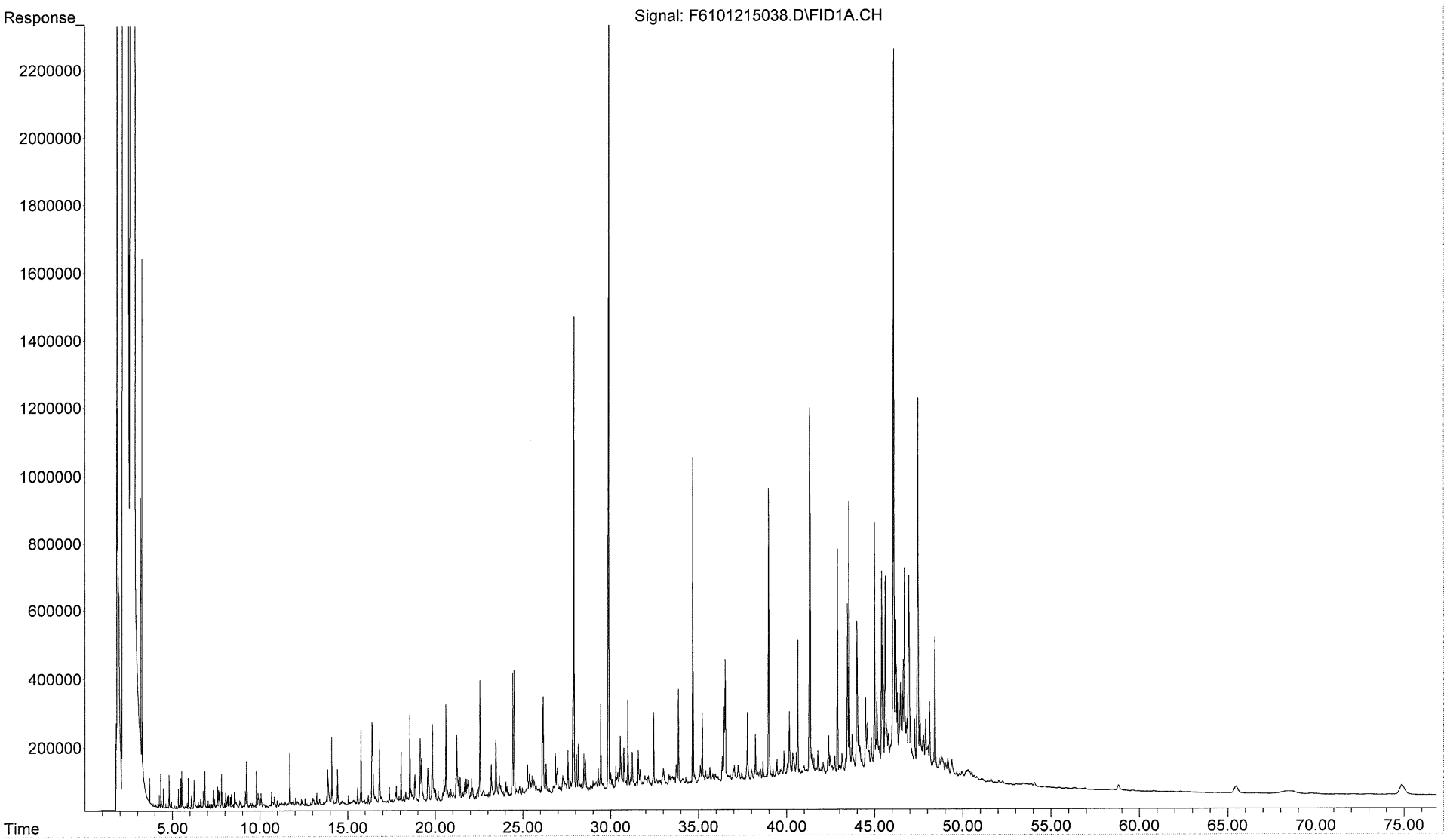
File :U:\2015 AWHL Data\CSXT Mt Carbon WV\1510001\Preliminary FID\
... F6101215036.D
Operator : FID6:NL
Instrument : FID6
Acquired : 13 Oct 2015 2:05 pm using AcqMethod FID6A.M
Sample Name: 1510001-06
Misc Info : 1X

SED-KAN-MS03
1510001-06



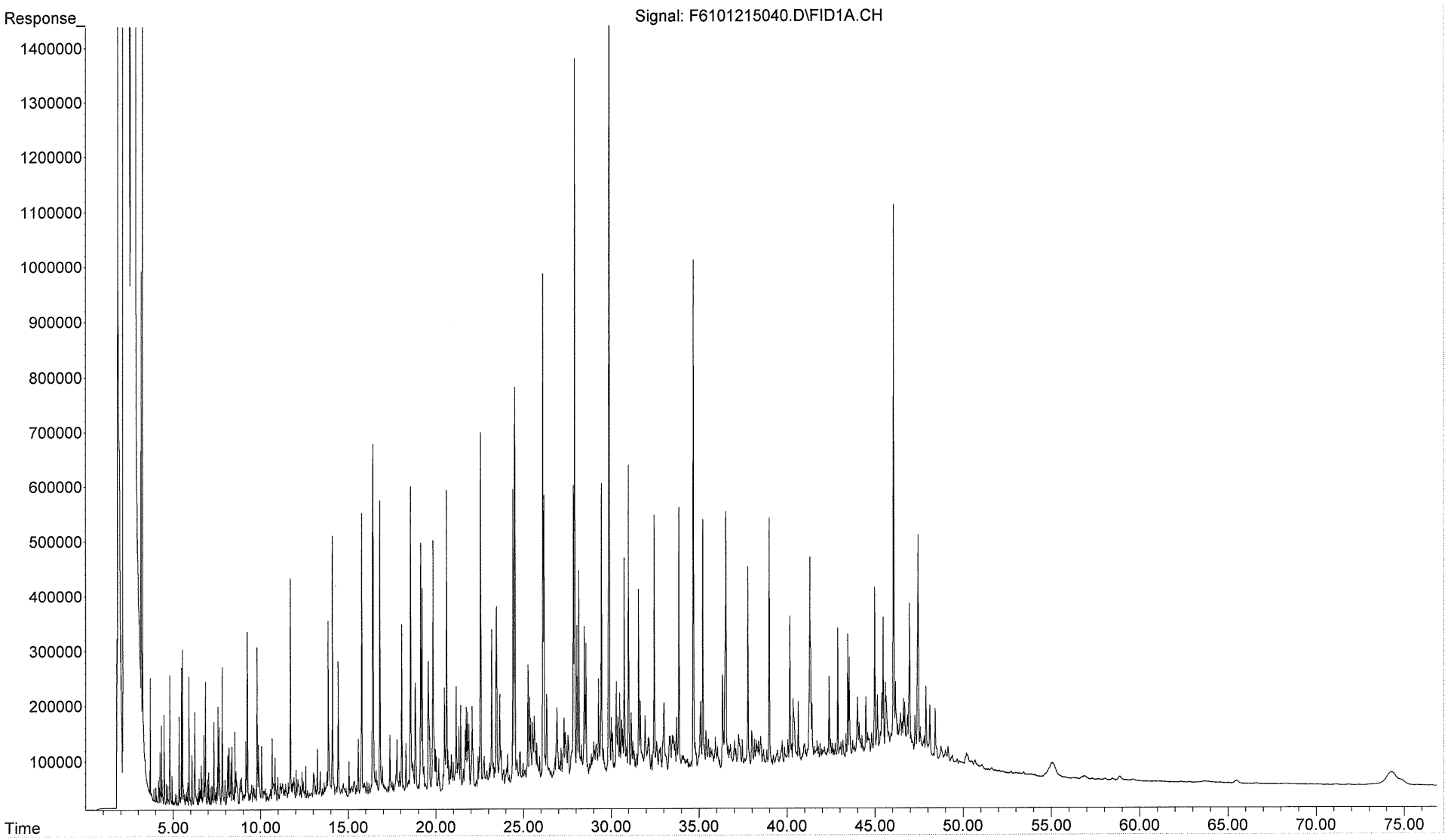
File :U:\2015 AWHL Data\CSXT Mt Carbon WV\1510001\Preliminary FID\
... F6101215038.D
Operator : FID6:NL
Instrument : FID6
Acquired : 13 Oct 2015 3:34 pm using AcqMethod FID6A.M
Sample Name: 1510001-07
Misc Info : 1X

SED-KAN-MS02
1510001-07



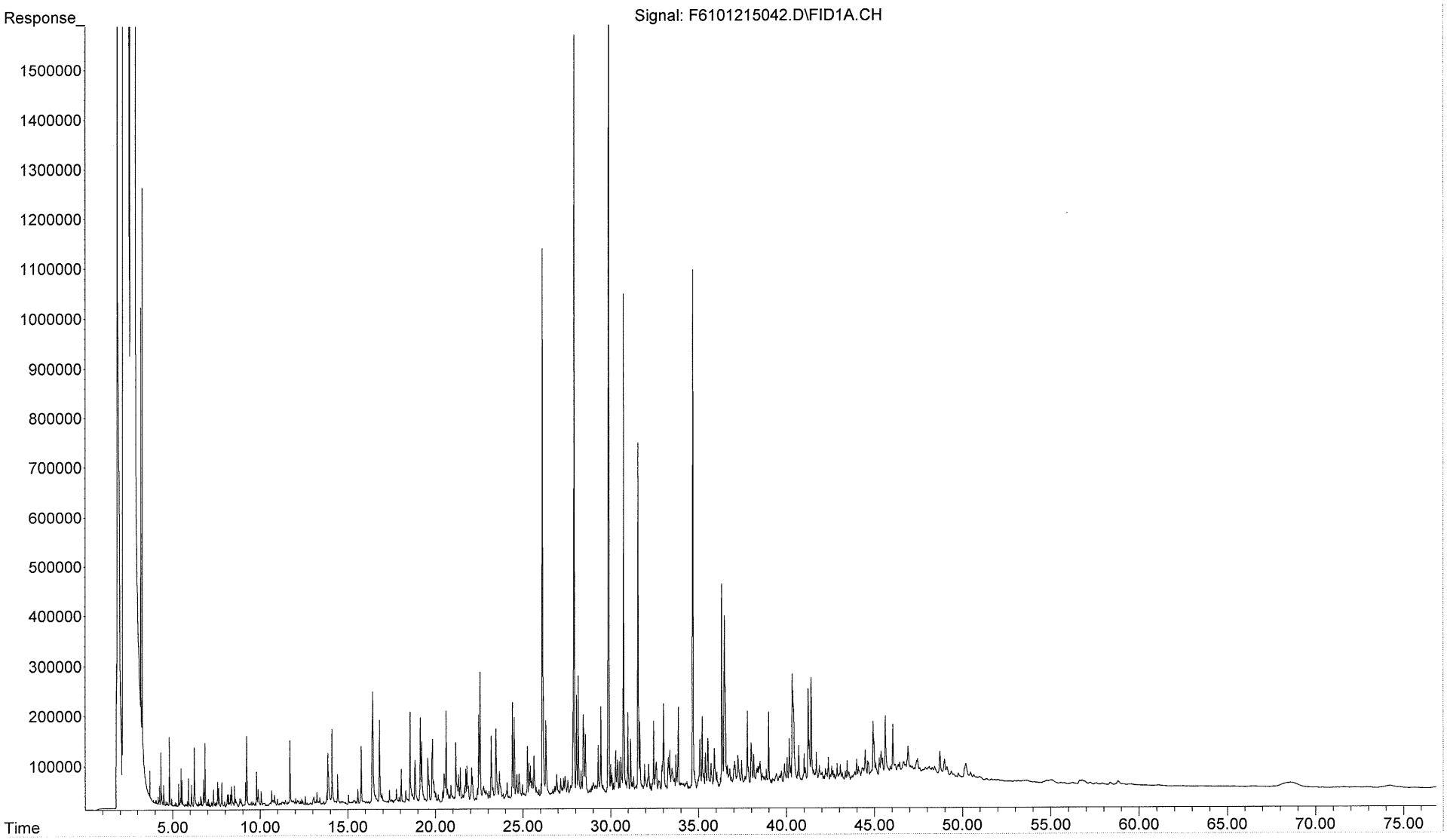
File :U:\2015 AWHL Data\CSXT Mt Carbon WV\1510001\Preliminary FID\
... F6101215040.D
Operator : FID6:NL
Instrument : FID6
Acquired : 13 Oct 2015 5:02 pm using AcqMethod FID6A.M
Sample Name: 1510001-08
Misc Info : 1X

SED-KAN-MS01
1510001-08



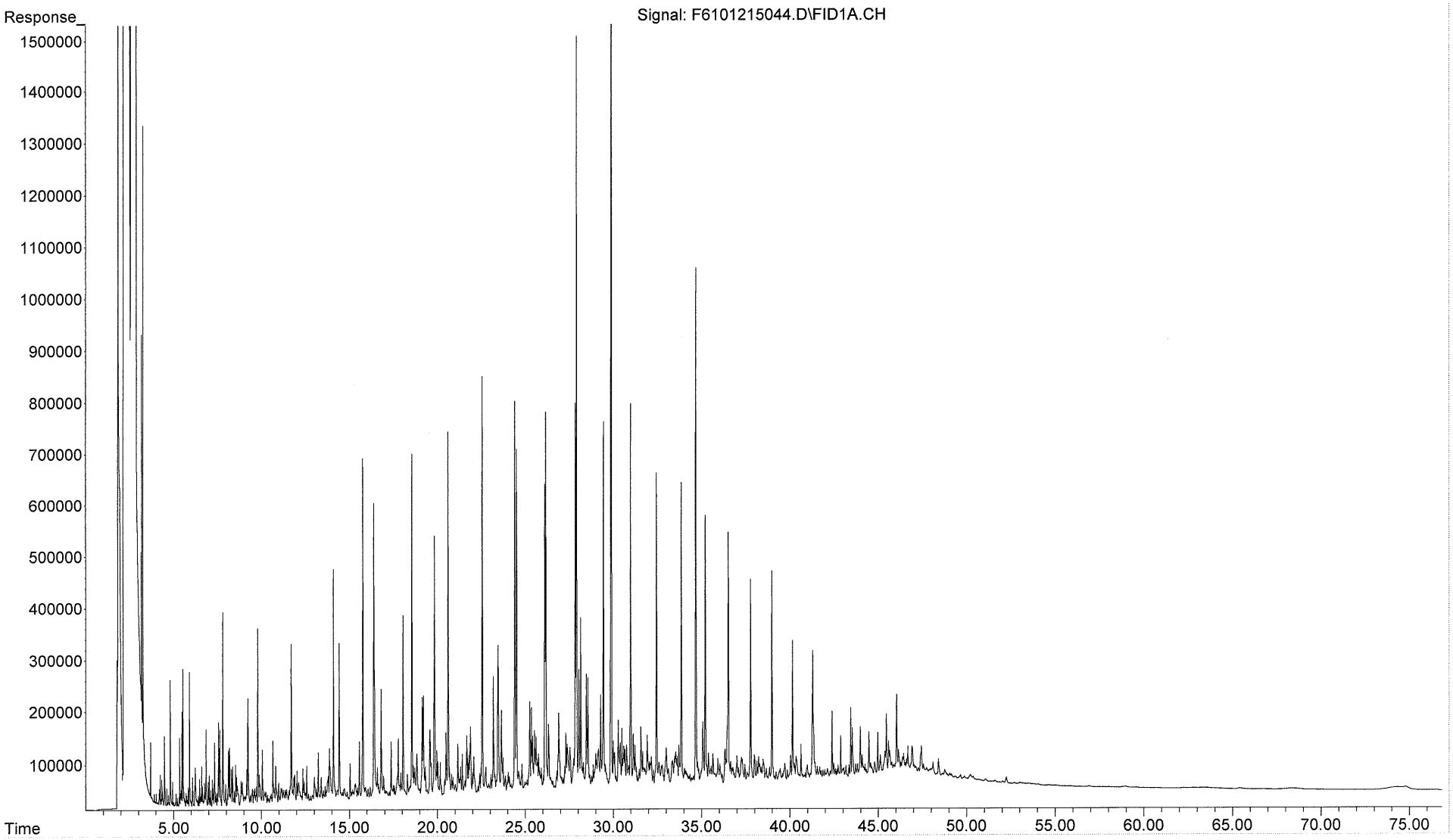
File :U:\2015 AWHL Data\CSXT Mt Carbon WV\1510001\Preliminary FID\
... F6101215042.D
Operator : FID6:NL
Instrument : FID6
Acquired : 13 Oct 2015 6:31 pm using AcqMethod FID6A.M
Sample Name: 1510001-09
Misc Info : 1X

SED-CONFLUENCE
1510001-09



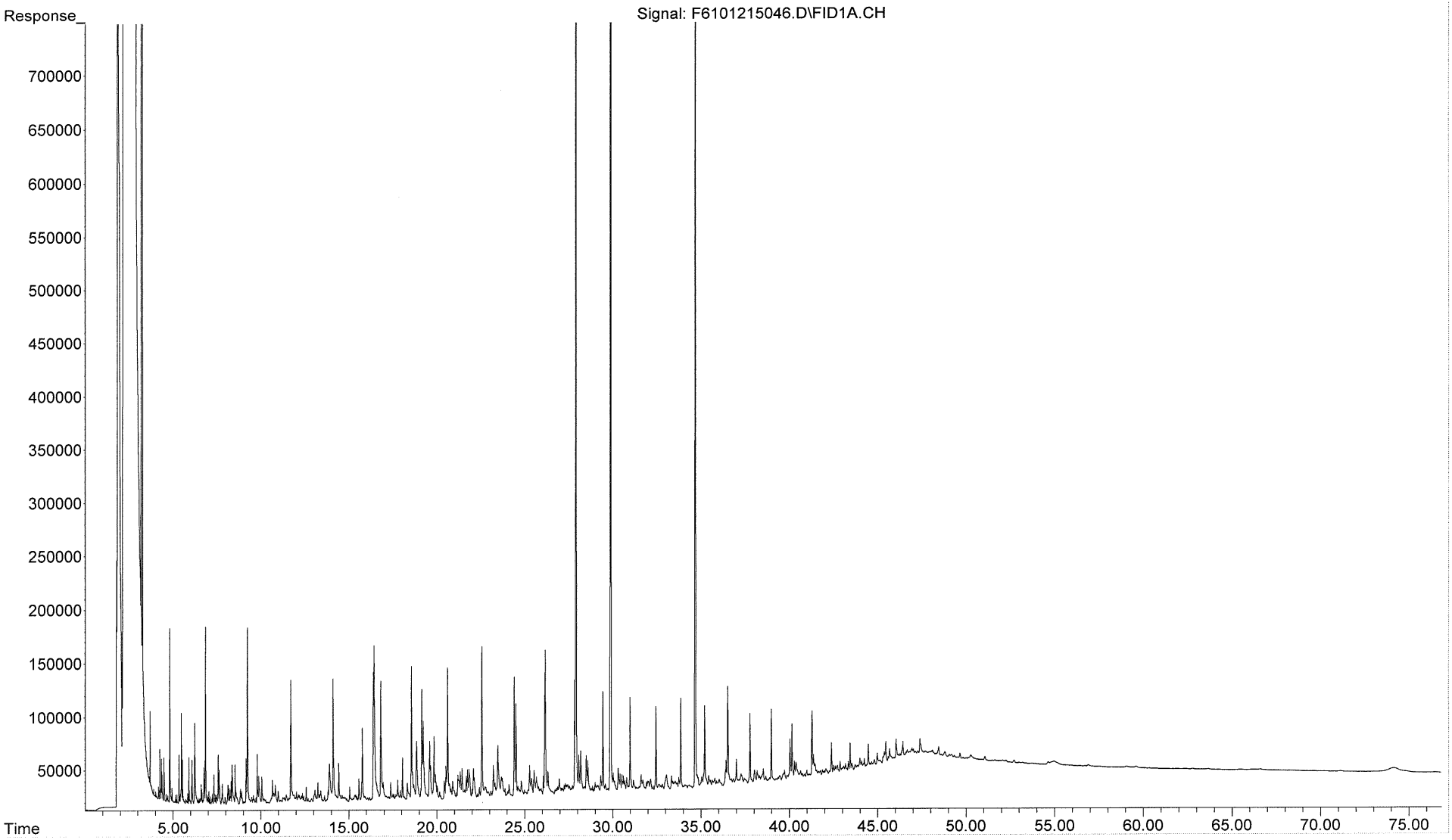
File :U:\2015 AWHL Data\CSXT Mt Carbon WV\1510001\Preliminary FID\
... F6101215044.D
Operator : FID6:NL
Instrument : FID6
Acquired : 13 Oct 2015 8:00 pm using AcqMethod FID6A.M
Sample Name: 1510001-10
Misc Info : 1X

SED-KAN-UPS050
1510001-10



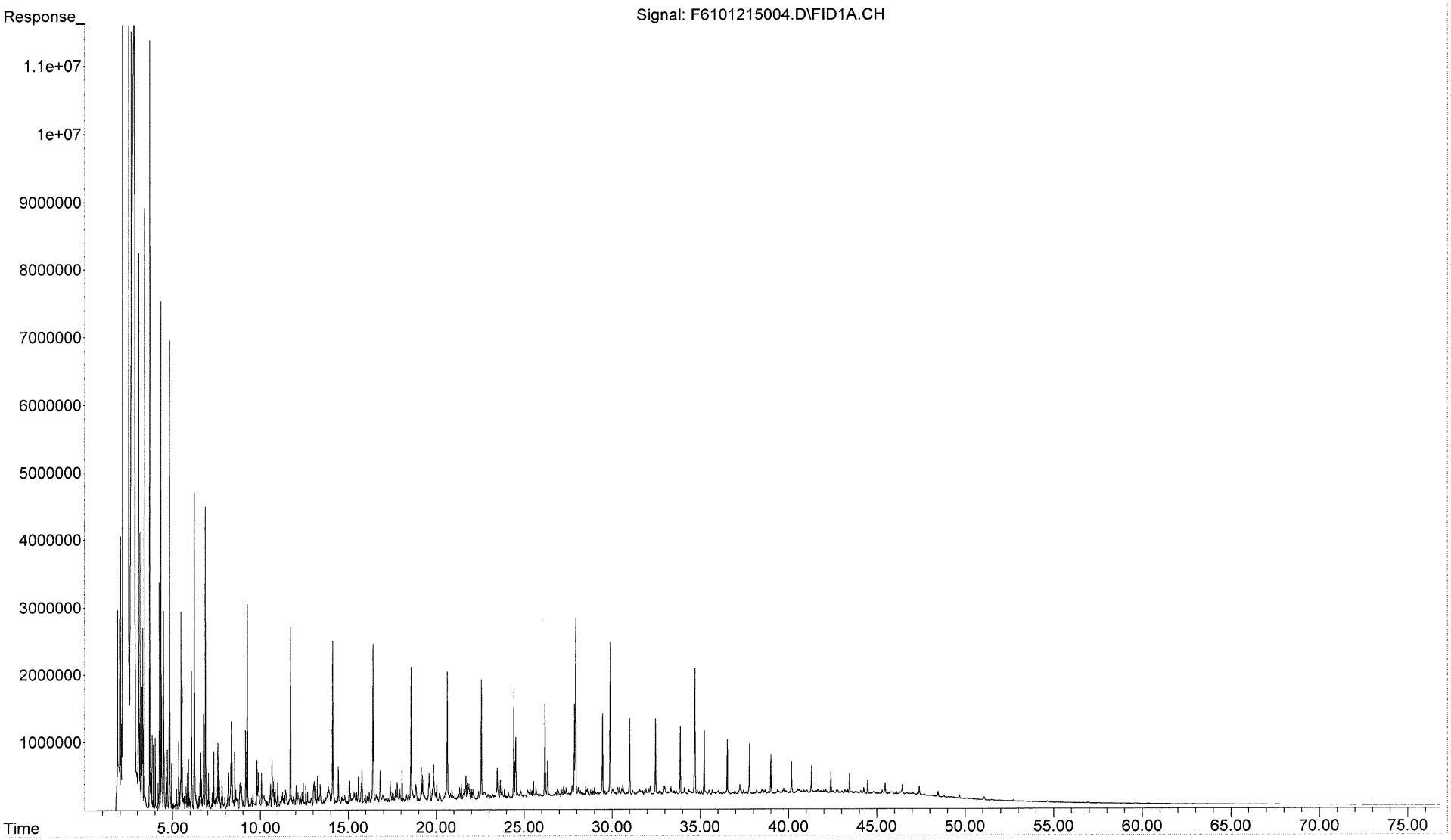
File :U:\2015 AWHL Data\CSXT Mt Carbon WV\1510001\Preliminary FID\
... F6101215046.D
Operator : FID6:NL
Instrument : FID6
Acquired : 13 Oct 2015 9:28 pm using AcqMethod FID6A.M
Sample Name: 1510001-11
Misc Info : 1X

SED-ARM-UPS100
1510001-11



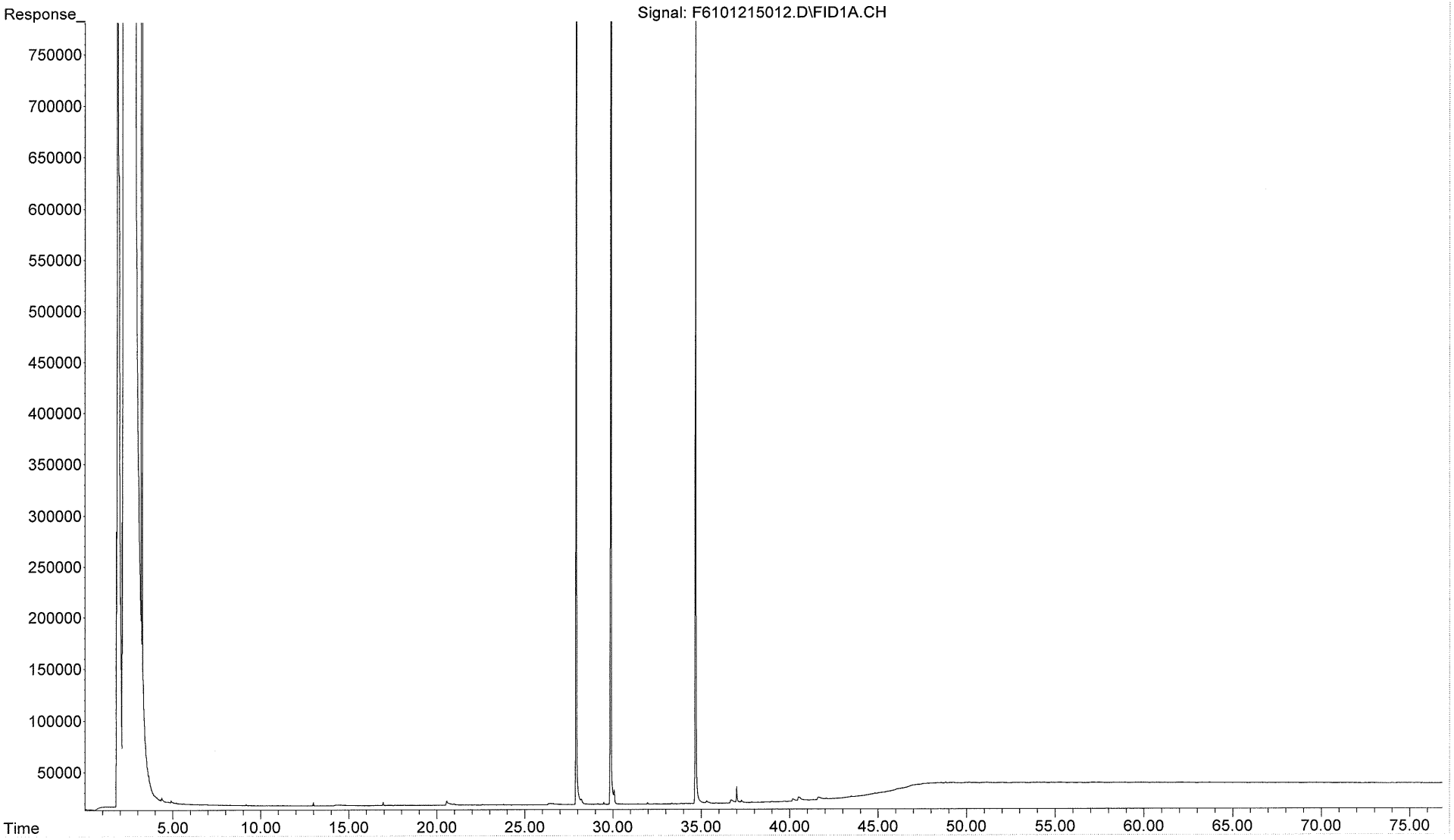
File :U:\2015 AWHL Data\CSXT Mt Carbon WV\1510001\Preliminary FID\
... F6101215004.D
Operator : FID6:NL
Instrument : FID6
Acquired : 12 Oct 2015 2:26 pm using AcqMethod FID6A.M
Sample Name: ANS
Misc Info : FRAW36 10.382mg/mL

North Slope Crude
Reference Standard



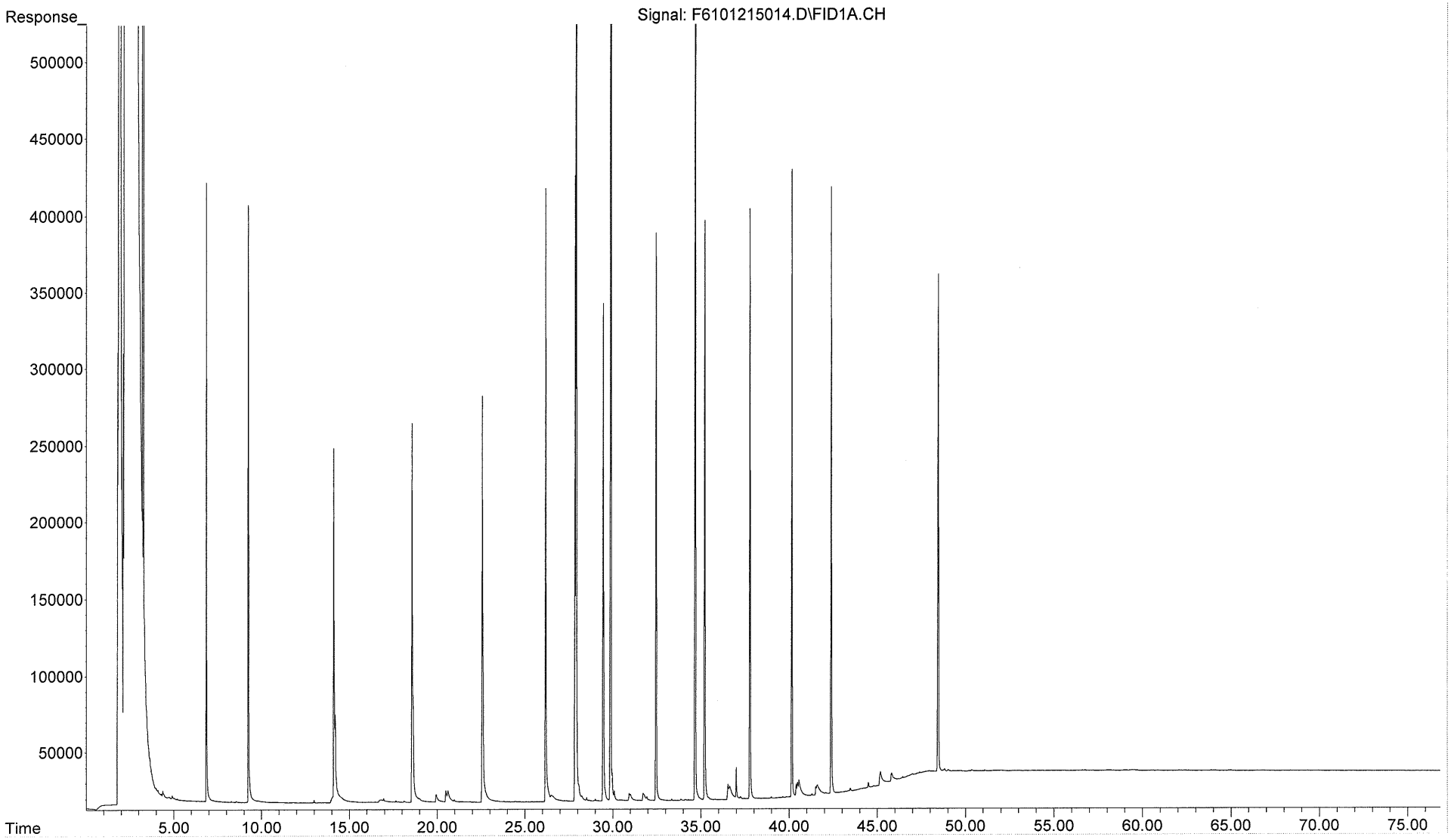
File :U:\2015 AWHL Data\CSXT Mt Carbon WV\1510001\Preliminary FID\
... F6101215012.D
Operator : FID6:NL
Instrument : FID6
Acquired : 12 Oct 2015 8:21 pm using AcqMethod FID6A.M
Sample Name: SS100615B02
Misc Info : 1X ETR 1510001

Method Blank
SS100615B02



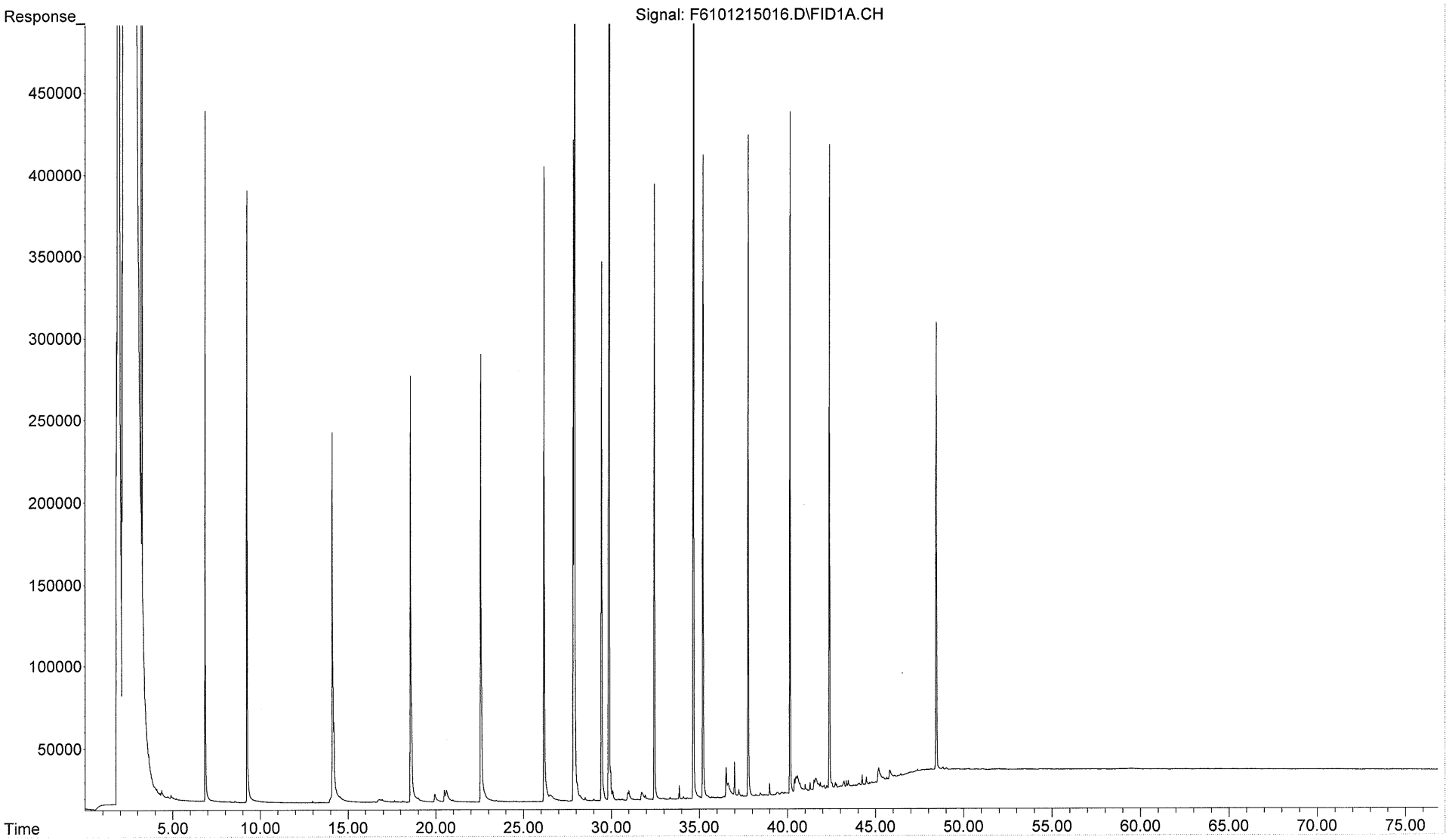
File :U:\2015 AWHL Data\CSXT Mt Carbon WV\1510001\Preliminary FID\
... F6101215014.D
Operator : FID6:NL
Instrument : FID6
Acquired : 12 Oct 2015 9:50 pm using AcqMethod FID6A.M
Sample Name: SS100615LCS01
Misc Info : 1X ETR 1510001

Lab Control Sample
SS100615LCS01



File :U:\2015 AWHL Data\CSXT Mt Carbon WV\1510001\Preliminary FID\
... F6101215016.D
Operator : FID6:NL
Instrument : FID6
Acquired : 12 Oct 2015 11:18 pm using AcqMethod FID6A.M
Sample Name: SS100615LCSD01
Misc Info : 1X ETR 1510001

Lab Control Sample Duplicate
SS100615LCSD01



Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Method Blank
Lab ID	SS100615B02
Matrix	Sediment
Reference Method	SHC
Batch ID	SS100615B02
Date Collected	N/A
Date Received	N/A
Date Prepped	10/06/2015
Date Analyzed	10/12/2015
Sample Size (wet)	30
% Solid	100.00
File ID	F6101215012.D
Units	mg/Kg
Final Volume	2
Dilution	1
Reporting Limit	0.0667

Class	Abbrev	Analytes	Result		SSRL
SHC	C9	n-Nonane (C9)		U	0.0667
SHC	C10	n-Decane (C10)		U	0.0667
SHC	C11	n-Undecane (C11)		U	0.0667
SHC	C12	n-Dodecane (C12)		U	0.0667
SHC	C13	n-Tridecane (C13)		U	0.0667
SHC	1380	2,6,10 Trimethyldodecane (1380)		U	0.0667
SHC	C14	n-Tetradecane (C14)		U	0.0667
SHC	1470	2,6,10 Trimethyltridecane (1470)		U	0.0667
SHC	C15	n-Pentadecane (C15)		U	0.0667
SHC	C16	n-Hexadecane (C16)	0.00113	J	0.0667
SHC	1650	Norpristane (1650)		U	0.0667
SHC	C17	n-Heptadecane (C17)		U	0.0667
SHC	Pr	Pristane		U	0.0667
SHC	C18	n-Octadecane (C18)		U	0.0667
SHC	Ph	Phytane		U	0.0667
SHC	C19	n-Nonadecane (C19)		U	0.0667
SHC	C20	n-Eicosane (C20)	0.00260	J	0.0667
SHC	C21	n-Heneicosane (C21)		U	0.0667
SHC	C22	n-Docosane (C22)		U	0.0667
SHC	C23	n-Tricosane (C23)		U	0.0667
SHC	C24	n-Tetracosane (C24)		U	0.0667
SHC	C25	n-Pentacosane (C25)		U	0.0667
SHC	C26	n-Hexacosane (C26)		U	0.0667
SHC	C27	n-Heptacosane (C27)	0.00160	J	0.0667
SHC	C28	n-Octacosane (C28)	0.0144	CJ	0.0667
SHC	C29	n-Nonacosane (C29)	0.000667	J	0.0667
SHC	C30	n-Triacontane (C30)		U	0.0667
SHC	C31	n-Hentriacontane (C31)	0.00133	J	0.0667
SHC	C32	n-Dotriacontane (C32)		U	0.0667
SHC	C33	n-Tritriacontane (C33)		U	0.0667
SHC	C34	n-Tetratriacontane (C34)		U	0.0667
SHC	C35	n-Pentatriacontane (C35)		U	0.0667
SHC	C36	n-Hexatriacontane (C36)		U	0.0667
SHC	C37	n-Heptatriacontane (C37)		U	0.0667
SHC	C38	n-Octatriacontane (C38)		U	0.0667
SHC	C39	n-Nonatriacontane (C39)		U	0.0667
SHC	C40	n-Tetracontane (C40)		U	0.0667
SHC	TSH	Total Saturated Hydrocarbons	0.0217	J	0.0667
SHC	TPH	Total Petroleum Hydrocarbons (C9-C44)		U	2.20

Surrogates (% Recovery)	
ortho-Terphenyl	89
d50-Tetracosane	92

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Laboratory Control Sample
Lab ID	SS100615LCS01
Matrix	Sediment
Reference Method	SHC
Batch ID	SS100615B02
Date Collected	N/A
Date Received	N/A
Date Prepped	10/06/2015
Date Analyzed	10/12/2015
Sample Size (wet)	30
% Solid	100.00
File ID	F6101215014.D
Units	mg/Kg
Final Volume	2
Dilution	1
Reporting Limit	0.0667

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	n-Nonane (C9)	0.472	S	0.0667	71	0.667	50	130
SHC	C10	n-Decane (C10)	0.535	S	0.0667	80	0.667	50	130
SHC	C12	n-Dodecane (C12)	0.619	S	0.0667	93	0.667	50	130
SHC	C14	n-Tetradecane (C14)	0.582	S	0.0667	87	0.667	50	130
SHC	C16	n-Hexadecane (C16)	0.639	S	0.0667	96	0.667	50	130
SHC	C18	n-Octadecane (C18)	0.655	S	0.0667	98	0.667	50	130
SHC	C19	n-Nonadecane (C19)	0.563	S	0.0667	84	0.667	50	130
SHC	C20	n-Eicosane (C20)	0.629	S	0.0667	94	0.667	50	130
SHC	C22	n-Docosane (C22)	0.636	S	0.0667	95	0.667	50	130
SHC	C24	n-Tetracosane (C24)	0.640	S	0.0667	96	0.667	50	130
SHC	C26	n-Hexacosane (C26)	0.628	S	0.0667	94	0.667	50	130
SHC	C28	n-Octacosane (C28)	0.640	S	0.0667	96	0.667	50	130
SHC	C30	n-Triacontane (C30)	0.635	S	0.0667	95	0.667	50	130
SHC	C36	n-Hexatriacontane (C36)	0.596	S	0.0667	89	0.667	50	130

Surrogates (% Recovery)	
ortho-Terphenyl	95
d50-Tetracosane	97

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Laboratory Control Sample Dup
Lab ID	SS100615LCSD01
Matrix	Sediment
Reference Method	SHC
Batch ID	SS100615B02
Date Collected	N/A
Date Received	N/A
Date Prepped	10/06/2015
Date Analyzed	10/12/2015
Sample Size (wet)	30
% Solid	100.00
File ID	F6101215016.D
Units	mg/Kg
Final Volume	2
Dilution	1
Reporting Limit	0.0667

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
SHC	C9	n-Nonane (C9)	0.469	S	0.0667	70	0.667	50	130	0	30
SHC	C10	n-Decane (C10)	0.516	S	0.0667	77	0.667	50	130	4	30
SHC	C12	n-Dodecane (C12)	0.586	S	0.0667	88	0.667	50	130	5	30
SHC	C14	n-Tetradecane (C14)	0.563	S	0.0667	84	0.667	50	130	3	30
SHC	C16	n-Hexadecane (C16)	0.623	S	0.0667	93	0.667	50	130	3	30
SHC	C18	n-Octadecane (C18)	0.639	S	0.0667	96	0.667	50	130	3	30
SHC	C19	n-Nonadecane (C19)	0.548	S	0.0667	82	0.667	50	130	3	30
SHC	C20	n-Eicosane (C20)	0.612	S	0.0667	92	0.667	50	130	3	30
SHC	C22	n-Docosane (C22)	0.624	S	0.0667	94	0.667	50	130	2	30
SHC	C24	n-Tetracosane (C24)	0.636	S	0.0667	95	0.667	50	130	1	30
SHC	C26	n-Hexacosane (C26)	0.618	S	0.0667	93	0.667	50	130	2	30
SHC	C28	n-Octacosane (C28)	0.616	S	0.0667	92	0.667	50	130	4	30
SHC	C30	n-Triacontane (C30)	0.586	S	0.0667	88	0.667	50	130	8	30
SHC	C36	n-Hexatriacontane (C36)	0.509	S	0.0667	76	0.667	50	130	16	30

Surrogates (% Recovery)	
ortho-Terphenyl	93
d50-Tetracosane	94

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	SED-KAN-DNS100	SED-KAN-DNS100
Lab ID	1510001-01	1510001-01D
Matrix	Sediment	Sediment
Reference Method	SHC	SHC
Batch ID	SS100615B02	SS100615B02
Date Collected	09/29/2015	09/29/2015
Date Received	10/01/2015	10/01/2015
Date Prepped	10/06/2015	10/06/2015
Date Analyzed	10/13/2015	10/13/2015
Sample Size (wet)	30.87	30.54
% Solid	75.41	75.41
File ID	F6101215018.D	F6101215020.D
Units	mg/Kg	mg/Kg
Final Volume	2	2
Dilution	1	1
Reporting Limit	0.0859	0.0868

Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	RPD	RPD Limit	
SHC	C9	n-Nonane (C9)	0.222		0.0859	0.162		0.0868	31	30	¤
SHC	C10	n-Decane (C10)	0.294		0.0859	0.205		0.0868	36	30	¤
SHC	C11	n-Undecane (C11)	0.306		0.0859	0.220		0.0868	32	30	¤
SHC	C12	n-Dodecane (C12)	0.388		0.0859	0.293		0.0868	28	30	
SHC	C13	n-Tridecane (C13)	0.356		0.0859	0.266		0.0868	29	30	
SHC	1380	2,6,10 Trimethyldodecane (1380)	0.166		0.0859	0.144		0.0868	14	30	
SHC	C14	n-Tetradecane (C14)	0.395		0.0859	0.300		0.0868	27	30	
SHC	1470	2,6,10 Trimethyltridecane (1470)	0.311		0.0859	0.302		0.0868	3	30	
SHC	C15	n-Pentadecane (C15)	0.449		0.0859	0.318		0.0868	34	30	¤
SHC	C16	n-Hexadecane (C16)	0.580		0.0859	0.440		0.0868	27	30	
SHC	1650	Norpristane (1650)	0.320		0.0859	0.259		0.0868	21	30	
SHC	C17	n-Heptadecane (C17)	0.484		0.0859	0.395		0.0868	20	30	
SHC	Pr	Pristane	0.574		0.0859	0.544		0.0868	5	30	
SHC	C18	n-Octadecane (C18)	0.527		0.0859	0.419		0.0868	23	30	
SHC	Ph	Phytane	0.148		0.0859	0.137		0.0868	8	30	
SHC	C19	n-Nonadecane (C19)	0.408		0.0859	0.316		0.0868	25	30	
SHC	C20	n-Eicosane (C20)	0.361		0.0859	0.295		0.0868	20	30	
SHC	C21	n-Heneicosane (C21)	0.365		0.0859	0.305		0.0868	18	30	
SHC	C22	n-Docosane (C22)	0.323		0.0859	0.282		0.0868	13	30	
SHC	C23	n-Tricosane (C23)	0.364		0.0859	0.361		0.0868	1	30	
SHC	C24	n-Tetracosane (C24)	0.315		0.0859	0.300		0.0868	5	30	
SHC	C25	n-Pentacosane (C25)	0.572		0.0859	0.511		0.0868	11	30	
SHC	C26	n-Hexacosane (C26)	0.306		0.0859	0.261		0.0868	16	30	
SHC	C27	n-Heptacosane (C27)	0.715		0.0859	0.811		0.0868	13	30	
SHC	C28	n-Octacosane (C28)	0.252		0.0859	0.261		0.0868	4	30	
SHC	C29	n-Nonacosane (C29)	0.483		0.0859	1.66	G	0.0868	110	30	¤
SHC	C30	n-Triacontane (C30)	0.154		0.0859	0.151		0.0868	2	30	
SHC	C31	n-Hentriacontane (C31)	0.256		0.0859	0.325		0.0868	24	30	
SHC	C32	n-Dotriacontane (C32)	0.198		0.0859	0.201		0.0868	1	30	
SHC	C33	n-Tritriacontane (C33)	0.375		0.0859	0.471		0.0868	23	30	
SHC	C34	n-Tetratriacontane (C34)	0.147		0.0859	0.158		0.0868	7	30	
SHC	C35	n-Pentatriacontane (C35)	0.819	G	0.0859	1.04	G	0.0868	24	30	
SHC	C36	n-Hexatriacontane (C36)		U	0.0859		U	0.0868		30	N/A
SHC	C37	n-Heptatriacontane (C37)	0.0188	J	0.0859	0.0202	J	0.0868	7	30	
SHC	C38	n-Octatriacontane (C38)	0.0204	J	0.0859	0.0243	J	0.0868	17	30	
SHC	C39	n-Nonatriacontane (C39)	0.0119	J	0.0859	0.0107	J	0.0868	10	30	
SHC	C40	n-Tetracontane (C40)		U	0.0859		U	0.0868		30	N/A
SHC	TSH	Total Saturated Hydrocarbons	12.0		0.0859	12.2		0.0868	2	30	
SHC	TPH	Total Petroleum Hydrocarbons (C9-C44)	97.5		2.84	101		2.87	4	30	

Surrogates (% Recovery)		
ortho-Terphenyl	88	79
d50-Tetracosane	95	89

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Alaska North Slope Crude
Lab ID	TW121114ANC01
Matrix	Oil
Reference Method	SHC
Batch ID	N/A
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	12/04/2014
Sample Size (wet)	0.10045
% Solid	100.00
File ID	F6120314034.D
Units	mg/Kg
Final Volume	10
Dilution	1
Reporting Limit	99.6

Class	Abbrev	Analytes	Result	SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit
SHC	C9	n-Nonane (C9)	6130	99.6	98	6286.00	65	135
SHC	C10	n-Decane (C10)	4950	99.6	98	5047.00	65	135
SHC	C11	n-Undecane (C11)	4490	99.6	95	4703.00	65	135
SHC	C12	n-Dodecane (C12)	3960	99.6	95	4155.00	65	135
SHC	C13	n-Tridecane (C13)	3780	99.6	93	4058.00	65	135
SHC	1380	2,6,10 Trimethyldodecane (1380)	874	99.6	103	845.00	65	135
SHC	C14	n-Tetradecane (C14)	3520	99.6	96	3670.00	65	135
SHC	1470	2,6,10 Trimethyltridecane (1470)	1260	99.6	92	1367.00	65	135
SHC	C15	n-Pentadecane (C15)	3900	99.6	107	3660.00	65	135
SHC	C16	n-Hexadecane (C16)	3080	99.6	92	3330.00	65	135
SHC	1650	Norpristane (1650)	1020	99.6	93	1093.00	65	135
SHC	C17	n-Heptadecane (C17)	2730	99.6	91	3012.00	65	135
SHC	Pr	Pristane	2150	99.6	100	2145.00	65	135
SHC	C18	n-Octadecane (C18)	2430	99.6	90	2700.00	65	135
SHC	Ph	Phytane	1440	99.6	119	1215.00	65	135
SHC	C19	n-Nonadecane (C19)	2330	99.6	101	2305.00	65	135
SHC	C20	n-Eicosane (C20)	2570	99.6	110	2337.00	65	135
SHC	C21	n-Heneicosane (C21)	2090	99.6	102	2044.00	65	135
SHC	C22	n-Docosane (C22)	1960	99.6	99	1972.00	65	135
SHC	C23	n-Tricosane (C23)	1710	99.6	98	1745.00	65	135
SHC	C24	n-Tetracosane (C24)	1630	99.6	99	1641.00	65	135
SHC	C25	n-Pentacosane (C25)	1640	99.6	105	1562.00	65	135
SHC	C26	n-Hexacosane (C26)	1350	99.6	98	1378.00	65	135
SHC	C27	n-Heptacosane (C27)	1030	99.6	95	1083.00	65	135
SHC	C28	n-Octacosane (C28)	748	99.6	96	776.00	65	135
SHC	C29	n-Nonacosane (C29)	764	99.6	104	734.00	65	135
SHC	C30	n-Triacontane (C30)	593	99.6	95	627.00	65	135
SHC	C31	n-Hentriacontane (C31)	476	99.6	93	514.00	65	135
SHC	C32	n-Dotriacontane (C32)	500	99.6	109	458.00	65	135
SHC	C33	n-Tritriacontane (C33)	318	99.6	82	388.00	65	135
SHC	C34	n-Tetratriacontane (C34)	278	99.6	80	347.00	65	135
SHC	C35	n-Pentatriacontane (C35)	237	99.6	85	278.00	65	135
SHC	C36	n-Hexatriacontane (C36)	156	99.6	84	186.00	65	135
SHC	C37	n-Heptatriacontane (C37)	160	99.6	105	152.00	65	135
SHC	C38	n-Octatriacontane (C38)	126	99.6	97	131.00	65	135
SHC	C39	n-Nonatriacontane (C39)	80.2 J	99.6	90	88.70	65	135
SHC	C40	n-Tetracontane (C40)	81.3 J	99.6	88	92.30	65	135
SHC	TSH	Total Saturated Hydrocarbons	66500	99.6	98	68122.00	65	135
SHC	TPH	Total Petroleum Hydrocarbons (C9-C44)	540000	3280	97	554993.00	65	135

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

		Client ID	SED-KAN-DNS100		SED-KAN-DNS050		SED-KAN-MS06	
		Lab ID	1510001-01		1510001-02		1510001-03	
		Matrix	Sediment		Sediment		Sediment	
		Reference Method	SHC		SHC		SHC	
		Batch ID	SS100615B02		SS100615B02		SS100615B02	
		Date Collected	09/29/2015		09/29/2015		09/29/2015	
		Date Received	10/01/2015		10/01/2015		10/01/2015	
		Date Prepped	10/06/2015		10/06/2015		10/06/2015	
		Date Analyzed	10/13/2015		10/13/2015		10/13/2015	
		Sample Size (wet)	30.87		30.07		30.1	
		% Solid	75.41		74.67		75.00	
		File ID	F6101215018.D		F6101215022.D		F6101215024.D	
		Units	mg/Kg		mg/Kg		mg/Kg	
		Final Volume	2		2		2	
		Dilution	1		1		1	
		Reporting Limit	0.0859		0.0891		0.0886	
Class	Abbrev	Analytes	Result	SSRL	Result	SSRL	Result	SSRL
SHC	C9	n-Nonane (C9)	0.222	0.0859	0.153	0.0891	0.256	0.0886
SHC	C10	n-Decane (C10)	0.294	0.0859	0.184	0.0891	0.346	0.0886
SHC	C11	n-Undecane (C11)	0.306	0.0859	0.187	0.0891	0.407	0.0886
SHC	C12	n-Dodecane (C12)	0.388	0.0859	0.268	0.0891	0.557	0.0886
SHC	C13	n-Tridecane (C13)	0.356	0.0859	0.218	0.0891	0.525	0.0886
SHC	1380	2,6,10 Trimethyldodecane (1380)	0.166	0.0859	0.109	0.0891	0.292	0.0886
SHC	C14	n-Tetradecane (C14)	0.395	0.0859	0.252	0.0891	0.596	0.0886
SHC	1470	2,6,10 Trimethyltridecane (1470)	0.311	0.0859	0.212	0.0891	0.554	0.0886
SHC	C15	n-Pentadecane (C15)	0.449	0.0859	0.292	0.0891	0.664	0.0886
SHC	C16	n-Hexadecane (C16)	0.580	0.0859	0.383	0.0891	0.785	0.0886
SHC	1650	Norpristane (1650)	0.320	0.0859	0.213	0.0891	0.574	0.0886
SHC	C17	n-Heptadecane (C17)	0.484	0.0859	0.342	0.0891	0.779	0.0886
SHC	Pr	Pristane	0.574	0.0859	0.402	0.0891	0.938	0.0886
SHC	C18	n-Octadecane (C18)	0.527	0.0859	0.367	0.0891	0.604	0.0886
SHC	Ph	Phytane	0.148	0.0859	0.108	0.0891	0.275	0.0886
SHC	C19	n-Nonadecane (C19)	0.408	0.0859	0.256	0.0891	0.571	0.0886
SHC	C20	n-Eicosane (C20)	0.361	0.0859	0.249	0.0891	0.555	0.0886
SHC	C21	n-Heneicosane (C21)	0.365	0.0859	0.220	0.0891	0.584	0.0886
SHC	C22	n-Docosane (C22)	0.323	0.0859	0.211	0.0891	0.479	0.0886
SHC	C23	n-Tricosane (C23)	0.364	0.0859	0.251	0.0891	0.536	0.0886
SHC	C24	n-Tetracosane (C24)	0.315	0.0859	0.206	0.0891	0.442	0.0886
SHC	C25	n-Pentacosane (C25)	0.572	0.0859	0.393	0.0891	0.742	0.0886
SHC	C26	n-Hexacosane (C26)	0.306	0.0859	0.218	0.0891	0.508	0.0886
SHC	C27	n-Heptacosane (C27)	0.715	0.0859	0.629	0.0891	1.32	0.0886
SHC	C28	n-Octacosane (C28)	0.252	0.0859	0.165	0.0891	0.340	0.0886
SHC	C29	n-Nonacosane (C29)	0.483	0.0859	0.395	0.0891	0.986	0.0886
SHC	C30	n-Triacontane (C30)	0.154	0.0859	0.106	0.0891	0.184	0.0886
SHC	C31	n-Hentriacontane (C31)	0.256	0.0859	0.209	0.0891	0.500	0.0886
SHC	C32	n-Dotriacontane (C32)	0.198	0.0859	0.151	0.0891	0.289	0.0886
SHC	C33	n-Tritriacontane (C33)	0.375	0.0859	0.305	0.0891	0.535	0.0886
SHC	C34	n-Tetratriacontane (C34)	0.147	0.0859	0.0686 J	0.0891	0.147	0.0886
SHC	C35	n-Pentatriacontane (C35)	0.819 G	0.0859	0.585 G	0.0891	0.889	0.0886
SHC	C36	n-Hexatriacontane (C36)	U	0.0859	U	0.0891	U	0.0886
SHC	C37	n-Heptatriacontane (C37)	0.0188 J	0.0859	0.0243 J	0.0891	0.0250 J	0.0886
SHC	C38	n-Octatriacontane (C38)	0.0204 J	0.0859	U	0.0891	U	0.0886
SHC	C39	n-Nonatriacontane (C39)	0.0119 J	0.0859	0.00811 J	0.0891	0.0135 J	0.0886
SHC	C40	n-Tetracontane (C40)	U	0.0859	U	0.0891	U	0.0886
SHC	TSH	Total Saturated Hydrocarbons	12.0	0.0859	8.34	0.0891	17.8	0.0886
SHC	TPH	Total Petroleum Hydrocarbons (C9-C44)	97.5	2.84	76.4	2.94	159	2.92
		Surrogates (% Recovery)						
		ortho-Terphenyl	88		88		89	
		d50-Tetracosane	95		93		98	

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

		Client ID	SED-KAN-MS05		SED-KAN-MS04		SED-KAN-MS03	
		Lab ID	1510001-04		1510001-05		1510001-06	
		Matrix	Sediment		Sediment		Sediment	
		Reference Method	SHC		SHC		SHC	
		Batch ID	SS100615B02		SS100615B02		SS100615B02	
		Date Collected	09/29/2015		09/29/2015		09/29/2015	
		Date Received	10/01/2015		10/01/2015		10/01/2015	
		Date Prepped	10/06/2015		10/06/2015		10/06/2015	
		Date Analyzed	10/13/2015		10/13/2015		10/13/2015	
		Sample Size (wet)	30.96		30.61		30.02	
		% Solid	33.50		70.67		78.30	
		File ID	F6101215026.D		F6101215034.D		F6101215036.D	
		Units	mg/Kg		mg/Kg		mg/Kg	
		Final Volume	2		2		2	
		Dilution	1		1		1	
		Reporting Limit	0.193		0.0925		0.0851	
Class	Abbrev	Analytes	Result	SSRL	Result	SSRL	Result	SSRL
SHC	C9	n-Nonane (C9)	0.300	0.193	0.109	0.0925	0.160	0.0851
SHC	C10	n-Decane (C10)	0.434	0.193	0.141	0.0925	0.191	0.0851
SHC	C11	n-Undecane (C11)	0.491	0.193	0.155	0.0925	0.166	0.0851
SHC	C12	n-Dodecane (C12)	0.727	0.193	0.235	0.0925	0.215	0.0851
SHC	C13	n-Tridecane (C13)	0.700	0.193	0.216	0.0925	0.169	0.0851
SHC	1380	2,6,10 Trimethyldodecane (1380)	0.438	0.193	0.138	0.0925	0.0565 J	0.0851
SHC	C14	n-Tetradecane (C14)	0.849	0.193	0.252	0.0925	0.180	0.0851
SHC	1470	2,6,10 Trimethyltridecane (1470)	0.851	0.193	0.239	0.0925	0.103	0.0851
SHC	C15	n-Pentadecane (C15)	0.996	0.193	0.303	0.0925	0.218	0.0851
SHC	C16	n-Hexadecane (C16)	1.21	0.193	0.387	0.0925	0.244	0.0851
SHC	1650	Norpristane (1650)	0.809	0.193	0.229	0.0925	0.121	0.0851
SHC	C17	n-Heptadecane (C17)	1.60	0.193	0.457	0.0925	0.202	0.0851
SHC	Pr	Pristane	1.36	0.193	0.482	0.0925	0.188	0.0851
SHC	C18	n-Octadecane (C18)	1.00	0.193	0.370	0.0925	0.320	0.0851
SHC	Ph	Phytane	0.392	0.193	0.122	0.0925	0.0647 J	0.0851
SHC	C19	n-Nonadecane (C19)	0.802	0.193	0.282	0.0925	0.156	0.0851
SHC	C20	n-Eicosane (C20)	0.856	0.193	0.262	0.0925	0.156	0.0851
SHC	C21	n-Heneicosane (C21)	0.903	0.193	0.235	0.0925	0.114	0.0851
SHC	C22	n-Docosane (C22)	0.739	0.193	0.225	0.0925	0.115	0.0851
SHC	C23	n-Tricosane (C23)	1.41	0.193	0.310	0.0925	0.121	0.0851
SHC	C24	n-Tetracosane (C24)	0.780	0.193	0.243	0.0925	0.113	0.0851
SHC	C25	n-Pentacosane (C25)	2.58	0.193	0.524	0.0925	0.167	0.0851
SHC	C26	n-Hexacosane (C26)	0.816	0.193	0.324	0.0925	0.0978	0.0851
SHC	C27	n-Heptacosane (C27)	5.64	0.193	1.31	0.0925	0.115	0.0851
SHC	C28	n-Octacosane (C28)	0.907	0.193	0.264	0.0925	0.0852 B	0.0851
SHC	C29	n-Nonacosane (C29)	6.04	0.193	1.18	0.0925	0.0902	0.0851
SHC	C30	n-Triacontane (C30)	0.498	0.193	0.137	0.0925	0.0349 J	0.0851
SHC	C31	n-Hentriacontane (C31)	2.97	0.193	0.732	0.0925	0.0431 J	0.0851
SHC	C32	n-Dotriacontane (C32)	1.36	0.193	0.393	0.0925	0.214	0.0851
SHC	C33	n-Tritriacontane (C33)	3.16	0.193	0.883	0.0925	0.0849 J	0.0851
SHC	C34	n-Tetratriacontane (C34)	1.37	0.193	0.361	0.0925	0.0129 J	0.0851
SHC	C35	n-Pentatriacontane (C35)	6.71 G	0.193	1.42 G	0.0925	0.0180 J	0.0851
SHC	C36	n-Hexatriacontane (C36)	0.116 J	0.193	U	0.0925	U	0.0851
SHC	C37	n-Heptatriacontane (C37)	0.0762 J	0.193	0.0282 J	0.0925	0.0101 J	0.0851
SHC	C38	n-Octatriacontane (C38)	0.0438 J	0.193	U	0.0925	U	0.0851
SHC	C39	n-Nonatriacontane (C39)	0.0492 J	0.193	0.0108 J	0.0925	0.00468 J	0.0851
SHC	C40	n-Tetracontane (C40)	U	0.193	0.0146 J	0.0925	U	0.0851
SHC	TSH	Total Saturated Hydrocarbons	50.0	0.193	13.0	0.0925	4.35	0.0851
SHC	TPH	Total Petroleum Hydrocarbons (C9-C44)	433	6.36	119	3.05	41.3	2.81

Surrogates (% Recovery)			
ortho-Terphenyl	87	88	90
d50-Tetracosane	96	94	93

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID		SED-KAN-MS02		SED-KAN-MS01		SED-CONFLUENCE		
Lab ID		1510001-07		1510001-08		1510001-09		
Matrix		Sediment		Sediment		Sediment		
Reference Method		SHC		SHC		SHC		
Batch ID		SS100615B02		SS100615B02		SS100615B02		
Date Collected		09/29/2015		09/29/2015		09/29/2015		
Date Received		10/01/2015		10/01/2015		10/01/2015		
Date Prepped		10/06/2015		10/06/2015		10/06/2015		
Date Analyzed		10/13/2015		10/13/2015		10/13/2015		
Sample Size (wet)		30.73		30.2		30.36		
% Solid		62.08		70.92		79.01		
File ID		F6101215038.D		F6101215040.D		F6101215042.D		
Units		mg/Kg		mg/Kg		mg/Kg		
Final Volume		2		2		2		
Dilution		1		1		1		
Reporting Limit		0.105		0.0934		0.0834		
Class	Abbrev	Analytes	Result	SSRL	Result	SSRL	Result	SSRL
SHC	C9	n-Nonane (C9)	0.201	0.105	0.315	0.0934	0.155	0.0834
SHC	C10	n-Decane (C10)	0.279	0.105	0.484	0.0934	0.196	0.0834
SHC	C11	n-Undecane (C11)	0.338	0.105	0.664	0.0934	0.202	0.0834
SHC	C12	n-Dodecane (C12)	0.490	0.105	0.837	0.0934	0.276	0.0834
SHC	C13	n-Tridecane (C13)	0.470	0.105	0.853	0.0934	0.223	0.0834
SHC	1380	2,6,10 Trimethyldodecane (1380)	0.311	0.105	0.522	0.0934	0.0970	0.0834
SHC	C14	n-Tetradecane (C14)	0.539	0.105	1.02	0.0934	0.279	0.0834
SHC	1470	2,6,10 Trimethyltridecane (1470)	0.606	0.105	1.14	0.0934	0.223	0.0834
SHC	C15	n-Pentadecane (C15)	0.647	0.105	1.03	0.0934	0.303	0.0834
SHC	C16	n-Hexadecane (C16)	0.777	0.105	1.34	0.0934	0.496	0.0834
SHC	1650	Norpristane (1650)	0.628	0.105	1.04	0.0934	0.404	0.0834
SHC	C17	n-Heptadecane (C17)	0.781	0.105	1.07	0.0934	0.312	0.0834
SHC	Pr	Pristane	1.00	0.105	1.77	0.0934	0.349	0.0834
SHC	C18	n-Octadecane (C18)	0.587	0.105	0.897	0.0934	0.346	0.0834
SHC	Ph	Phytane	0.292	0.105	0.491	0.0934	0.431	0.0834
SHC	C19	n-Nonadecane (C19)	0.530	0.105	0.959	0.0934	0.235	0.0834
SHC	C20	n-Eicosane (C20)	0.563	0.105	0.988	0.0934	0.289	0.0834
SHC	C21	n-Heneicosane (C21)	0.559	0.105	1.05	0.0934	0.277	0.0834
SHC	C22	n-Docosane (C22)	0.447	0.105	0.843	0.0934	0.227	0.0834
SHC	C23	n-Tricosane (C23)	0.572	0.105	0.884	0.0934	0.292	0.0834
SHC	C24	n-Tetracosane (C24)	0.433	0.105	0.775	0.0934	0.231	0.0834
SHC	C25	n-Pentacosane (C25)	0.869	0.105	0.938	0.0934	0.362	0.0834
SHC	C26	n-Hexacosane (C26)	0.574	0.105	0.693	0.0934	0.241	0.0834
SHC	C27	n-Heptacosane (C27)	2.12	0.105	0.864	0.0934	0.229	0.0834
SHC	C28	n-Octacosane (C28)	0.536	0.105	0.500	0.0934	0.132 B	0.0834
SHC	C29	n-Nonacosane (C29)	2.69	0.105	0.678	0.0934	0.117	0.0834
SHC	C30	n-Triacontane (C30)	0.244	0.105	0.271	0.0934	0.0893	0.0834
SHC	C31	n-Hentriacontane (C31)	1.20	0.105	0.398	0.0934	0.0632 J	0.0834
SHC	C32	n-Dotriacontane (C32)	0.629	0.105	0.220	0.0934	0.140	0.0834
SHC	C33	n-Tritriacontane (C33)	1.29	0.105	0.523	0.0934	0.0491 J	0.0834
SHC	C34	n-Tetratriacontane (C34)	0.549	0.105	0.157	0.0934	0.0333 J	0.0834
SHC	C35	n-Pentatriacontane (C35)	3.28 G	0.105	1.12 G	0.0934	0.0548 J	0.0834
SHC	C36	n-Hexatriacontane (C36)	1.06	0.105	0.0467 J	0.0934	0.0277 J	0.0834
SHC	C37	n-Heptatriacontane (C37)	0.0373 J	0.105	0.0265 J	0.0934	U	0.0834
SHC	C38	n-Octatriacontane (C38)	U	0.105	U	0.0934	U	0.0834
SHC	C39	n-Nonatriacontane (C39)	0.0229 J	0.105	0.0140 J	0.0934	U	0.0834
SHC	C40	n-Tetracontane (C40)	0.0241 J	0.105	U	0.0934	U	0.0834
SHC	TSH	Total Saturated Hydrocarbons	26.2	0.105	25.4	0.0934	7.38	0.0834
SHC	TPH	Total Petroleum Hydrocarbons (C9-C44)	258	3.46	212	3.08	98.1	2.75
		Surrogates (% Recovery)						
		ortho-Terphenyl	89		78		89	
		d50-Tetracosane	98		94		98	

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID		SED-KAN-UPS050		SED-ARM-UPS100		
Lab ID		1510001-10		1510001-11		
Matrix		Sediment		Sediment		
Reference Method		SHC		SHC		
Batch ID		SS100615B02		SS100615B02		
Date Collected		09/29/2015		09/29/2015		
Date Received		10/01/2015		10/01/2015		
Date Prepped		10/06/2015		10/06/2015		
Date Analyzed		10/13/2015		10/13/2015		
Sample Size (wet)		30.25		30.48		
% Solid		81.58		77.13		
File ID		F6101215044.D		F6101215046.D		
Units		mg/Kg		mg/Kg		
Final Volume		2		2		
Dilution		1		1		
Reporting Limit		0.0810		0.0851		
Class	Abbrev	Analytes	Result	SSRL	Result	SSRL
SHC	C9	n-Nonane (C9)	0.195	0.0810	0.223	0.0851
SHC	C10	n-Decane (C10)	0.290	0.0810	0.261	0.0851
SHC	C11	n-Undecane (C11)	0.474	0.0810	0.223	0.0851
SHC	C12	n-Dodecane (C12)	0.664	0.0810	0.260	0.0851
SHC	C13	n-Tridecane (C13)	0.876	0.0810	0.188	0.0851
SHC	1380	2,6,10 Trimethyldodecane (1380)	0.513	0.0810	0.0635 J	0.0851
SHC	C14	n-Tetradecane (C14)	0.964	0.0810	0.230	0.0851
SHC	1470	2,6,10 Trimethyltridecane (1470)	0.925	0.0810	0.118	0.0851
SHC	C15	n-Pentadecane (C15)	1.10	0.0810	0.255	0.0851
SHC	C16	n-Hexadecane (C16)	1.30	0.0810	0.305	0.0851
SHC	1650	Norpristane (1650)	0.690	0.0810	0.170	0.0851
SHC	C17	n-Heptadecane (C17)	1.23	0.0810	0.203	0.0851
SHC	Pr	Pristane	1.30	0.0810	0.209	0.0851
SHC	C18	n-Octadecane (C18)	1.07	0.0810	0.309	0.0851
SHC	Ph	Phytane	0.344	0.0810	0.0714 J	0.0851
SHC	C19	n-Nonadecane (C19)	1.13	0.0810	0.165	0.0851
SHC	C20	n-Eicosane (C20)	1.10	0.0810	0.175	0.0851
SHC	C21	n-Heneicosane (C21)	1.15	0.0810	0.142	0.0851
SHC	C22	n-Docosane (C22)	0.919	0.0810	0.140	0.0851
SHC	C23	n-Tricosane (C23)	0.880	0.0810	0.146	0.0851
SHC	C24	n-Tetracosane (C24)	0.782	0.0810	0.126	0.0851
SHC	C25	n-Pentacosane (C25)	1.03	0.0810	0.218	0.0851
SHC	C26	n-Hexacosane (C26)	0.666	0.0810	0.131	0.0851
SHC	C27	n-Heptacosane (C27)	0.638	0.0810	0.123	0.0851
SHC	C28	n-Octacosane (C28)	0.433	0.0810	0.106 B	0.0851
SHC	C29	n-Nonacosane (C29)	0.490	0.0810	0.128	0.0851
SHC	C30	n-Triacontane (C30)	0.194	0.0810	0.0572 J	0.0851
SHC	C31	n-Hentriacontane (C31)	0.202	0.0810	0.0482 J	0.0851
SHC	C32	n-Dotriacontane (C32)	0.149	0.0810	0.0399 J	0.0851
SHC	C33	n-Tritriacontane (C33)	0.206	0.0810	0.0402 J	0.0851
SHC	C34	n-Tetratriacontane (C34)	0.0575 J	0.0810	0.0286 J	0.0851
SHC	C35	n-Pentatriacontane (C35)	0.0448 J	0.0810	0.0297 J	0.0851
SHC	C36	n-Hexatriacontane (C36)	0.0780 GJ	0.0810	0.0247 J	0.0851
SHC	C37	n-Heptatriacontane (C37)	0.0254 J	0.0810	0.0137 J	0.0851
SHC	C38	n-Octatriacontane (C38)	0.0218 J	0.0810	0.0113 J	0.0851
SHC	C39	n-Nonatriacontane (C39)	0.0115 J	0.0810	0.00927 J	0.0851
SHC	C40	n-Tetracontane (C40)	0.00721 J	0.0810	0.0103 J	0.0851
SHC	TSH	Total Saturated Hydrocarbons	22.1	0.0810	5.00	0.0851
SHC	TPH	Total Petroleum Hydrocarbons (C9-C44)	135	2.67	47.6	2.81

Surrogates (% Recovery)		
ortho-Terphenyl	88	90
d50-Tetracosane	100	94

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Method Blank
Lab ID	SS100615B02
Matrix	Sediment
Reference Method	Modified 8270D
Batch ID	SS100615B02
Date Collected	N/A
Date Received	N/A
Date Prepped	10/06/2015
Date Analyzed	10/10/2015
Sample Size (wet)	30
% Solid	100.00
File ID	F2310081525.D
Units	µg/Kg
Final Volume	2
Dilution	1
Reporting Limit	0.667

Class	Abbrev	Analytes	Result		SSRL
2	D0	cis/trans-Decalin	0.117	J	0.667
2	D1	C1-Decalins		U	0.667
2	D2	C2-Decalins		U	0.667
2	D3	C3-Decalins		U	0.667
2	D4	C4-Decalins		U	0.667
2	BT0	Benzothiophene		U	0.667
2	BT1	C1-Benzo(b)thiophenes		U	0.667
2	BT2	C2-Benzo(b)thiophenes		U	0.667
2	BT3	C3-Benzo(b)thiophenes		U	0.667
2	BT4	C4-Benzo(b)thiophenes		U	0.667
2	N0	Naphthalene	0.0792	J	0.667
2	N1	C1-Naphthalenes	0.0894	J	0.667
2	N2	C2-Naphthalenes	0.243	J	0.667
2	N3	C3-Naphthalenes	0.176	J	0.667
2	N4	C4-Naphthalenes		U	0.667
2	B	Biphenyl	0.0565	J	0.667
3	DF	Dibenzofuran	0.0678	J	0.667
3	AY	Acenaphthylene		U	0.667
3	AE	Acenaphthene		U	0.667
3	F0	Fluorene	0.0237	J	0.667
3	F1	C1-Fluorenes		U	0.667
3	F2	C2-Fluorenes		U	0.667
3	F3	C3-Fluorenes		U	0.667
3	A0	Anthracene		U	0.667
3	P0	Phenanthrene	0.185	J	0.667
3	PA1	C1-Phenanthrenes/Anthracenes	0.0803	J	0.667
3	PA2	C2-Phenanthrenes/Anthracenes		U	0.667
3	PA3	C3-Phenanthrenes/Anthracenes		U	0.667
3	PA4	C4-Phenanthrenes/Anthracenes		U	0.667
3	RET	Retene		U	0.667
3	DBT0	Dibenzothiophene	0.0119	J	0.667
3	DBT1	C1-Dibenzothiophenes		U	0.667
3	DBT2	C2-Dibenzothiophenes		U	0.667
3	DBT3	C3-Dibenzothiophenes		U	0.667
3	DBT4	C4-Dibenzothiophenes		U	0.667
4	BF	Benzo(b)fluorene		U	0.667
4	FL0	Fluoranthene	0.0401	J	0.667
4	PY0	Pyrene	0.0468	J	0.667
4	FP1	C1-Fluoranthenes/Pyrenes		U	0.667
4	FP2	C2-Fluoranthenes/Pyrenes		U	0.667
4	FP3	C3-Fluoranthenes/Pyrenes		U	0.667
4	FP4	C4-Fluoranthenes/Pyrenes		U	0.667
4	NBT0	Naphthobenzothiophenes	0.0381	J	0.667
4	NBT1	C1-Naphthobenzothiophenes		U	0.667
4	NBT2	C2-Naphthobenzothiophenes		U	0.667
4	NBT3	C3-Naphthobenzothiophenes		U	0.667
4	NBT4	C4-Naphthobenzothiophenes		U	0.667
4	BA0	Benz[a]anthracene	0.0246	J	0.667
4	C0	Chrysene/Triphenylene	0.0600	J	0.667
4	BC1	C1-Chrysenes		U	0.667
4	BC2	C2-Chrysenes		U	0.667
4	BC3	C3-Chrysenes		U	0.667
4	BC4	C4-Chrysenes		U	0.667
5	BBF	Benzo[b]fluoranthene	0.0618	J	0.667
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene	0.0630	J	0.667
5	BAF	Benzo[a]fluoranthene		U	0.667
5	BEP	Benzo[e]pyrene	0.0453	J	0.667
5	BAP	Benzo[a]pyrene	0.0440	J	0.667
5	PER	Perylene		U	0.667
6	IND	Indeno[1,2,3-cd]pyrene	0.0241	J	0.667
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	0.0257	J	0.667
6	GHI	Benzo[g,h,i]perylene	0.0159	J	0.667
3	CAR	Carbazole		U	0.667
3	4MDT	4-Methyldibenzothiophene		U	0.667
3	2MDT	2/3-Methyldibenzothiophene		U	0.667
3	1MDT	1-Methyldibenzothiophene		U	0.667
3	3MP	3-Methylphenanthrene	0.0198	J	0.667
3	2MP	2-Methylphenanthrene	0.0208	J	0.667
3	2MA	2-Methylanthracene		U	0.667
3	9MP	9/4-Methylphenanthrene	0.0176	J	0.667
3	1MP	1-Methylphenanthrene	0.0165	J	0.667

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Method Blank
Lab ID	SS100615B02
Matrix	Sediment
Reference Method	Modified 8270D
Batch ID	SS100615B02
Date Collected	N/A
Date Received	N/A
Date Prepped	10/06/2015
Date Analyzed	10/10/2015
Sample Size (wet)	30
% Solid	100.00
File ID	F2310081525.D
Units	µg/Kg
Final Volume	2
Dilution	1
Reporting Limit	0.667

Class	Abbrev	Analytes	Result		SSRL
t23	T4	C23 Tricyclic Terpane		U	0.667
t24	T5	C24 Tricyclic Terpane		U	0.667
t25	T6	C25 Tricyclic Terpane		U	0.667
te24	T6a	C24 Tetracyclic Terpane		U	0.667
t26S	T6b	C26 Tricyclic Terpane-22S		U	0.667
t26R	T6c	C26 Tricyclic Terpane-22R		U	0.667
t28S	T7	C28 Tricyclic Terpane-22S		U	0.667
t28R	T8	C28 Tricyclic Terpane-22R		U	0.667
t29S	T9	C29 Tricyclic Terpane-22S		U	0.667
t29R	T10	C29 Tricyclic Terpane-22R		U	0.667
Ts	T11	18a-22,29,30-Trisnorneohopane-TS		U	0.667
t30S	T11a	C30 Tricyclic Terpane-22S		U	0.667
t30R	T11b	C30 Tricyclic Terpane-22R		U	0.667
Tm	T12	17a(H)-22,29,30-Trisnorhopane-TM		U	0.667
BNH	T14a	17a/b,21b/a 28,30-Bisnorhopane		U	0.667
25N	T14b	17a(H),21b(H)-25-Norhopane		U	0.667
H29	T15	30-Norhopane		U	0.667
C29Ts	T16	18a(H)-30-Norneohopane-C29Ts		U	0.667
X	X	17a(H)-Diahopane		U	0.667
M29	T17	30-Normoretane		U	0.667
OL	T18	18a(H)&18b(H)-Oleananes		U	0.667
H30	T19	Hopane		U	0.667
M30	T20	Moretane		U	0.667
H31S	T21	30-Homohopane-22S		U	0.667
H31R	T22	30-Homohopane-22R		U	0.667
T22A	T22A	T22a-Gammacerane/C32-diahopane		U	0.667
H32S	T26	30,31-Bishomohopane-22S		U	0.667
H32R	T27	30,31-Bishomohopane-22R		U	0.667
H33S	T30	30,31-Trishomohopane-22S		U	0.667
H33R	T31	30,31-Trishomohopane-22R		U	0.667
H34S	T32	Tetrakishomohopane-22S		U	0.667
H34R	T33	Tetrakishomohopane-22R		U	0.667
H35S	T34	Pentakishomohopane-22S		U	0.667
H35R	T35	Pentakishomohopane-22R		U	0.667
d27S	S4	13b(H),17a(H)-20S-Diacholestane		U	0.667
d27R	S5	13b(H),17a(H)-20R-Diacholestane		U	0.667
d28S	S8	13b,17a-20S-Methyldiacholestane		U	0.667
aa27S	S12	14a(H),17a(H)-20S-Cholestane/13b(H),17a(H)-20S-Ethyldiacholestane (S12)		U	0.667
aa27R	S17	14a(H),17a(H)-20R-Cholestane/13b(H),17a(H)-20R-Ethyldiacholestane (S17)		U	0.667
d29R	S18	Unknown Sterane (S18)		U	0.667
d29S	S19	13a,17b-20S-Ethyldiacholestane		U	0.667
aa28S	S20	14a,17a-20S-Methylcholestane		U	0.667
aa28R	S24	14a,17a-20R-Methylcholestane		U	0.667
aa29S	S25	14a(H),17a(H)-20S-Ethylcholestane		U	0.667
aa29R	S28	14a(H),17a(H)-20R-Ethylcholestane		U	0.667
bb27R	S14	14b(H),17b(H)-20R-Cholestane		U	0.667
bb27S	S15	14b(H),17b(H)-20S-Cholestane		U	0.667
bb28R	S22	14b,17b-20R-Methylcholestane		U	0.667
bb28S	S23	14b,17b-20S-Methylcholestane		U	0.667
bb29R	S26	14b(H),17b(H)-20R-Ethylcholestane		U	0.667
bb29S	S27	14b(H),17b(H)-20S-Ethylcholestane		U	0.667
RC26/SC27TA	RC26/SC27TA	C26,20R- +C27,20S- triaromatic steroid		U	0.667
SC28TA	SC28TA	C28,20S-triaromatic steroid		U	0.667
RC27TA	RC27TA	C27,20R-triaromatic steroid		U	0.667
RC28TA	RC28TA	C28,20R-triaromatic steroid		U	0.667

Surrogates (% Recovery)	
Naphthalene-d8	87
Phenanthrene-d10	98
Benzo[a]pyrene-d12	77
5B(H)Cholane	88

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Laboratory Control Sample
Lab ID	SS100615LCS01
Matrix	Sediment
Reference Method	Modified 8270D
Batch ID	SS100615B02
Date Collected	N/A
Date Received	N/A
Date Prepped	10/06/2015
Date Analyzed	10/10/2015
Sample Size (wet)	30
% Solid	100.00
File ID	F2310081526.D
Units	µg/Kg
Final Volume	2
Dilution	1
Reporting Limit	0.667

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit
2	N0	Naphthalene	31.4	S	0.667	94	33.3	50	130
3	AY	Acenaphthylene	30.0	S	0.667	90	33.3	50	130
3	AE	Acenaphthene	32.2	S	0.667	97	33.3	50	130
3	F0	Fluorene	33.4	S	0.667	100	33.3	50	130
3	A0	Anthracene	32.5	S	0.667	98	33.3	50	130
3	P0	Phenanthrene	34.8	S	0.667	105	33.3	50	130
4	FL0	Fluoranthene	36.6	S	0.667	110	33.3	50	130
4	PY0	Pyrene	34.1	S	0.667	102	33.3	50	130
4	BA0	Benz[a]anthracene	31.9	S	0.667	96	33.3	50	130
4	C0	Chrysene/Triphenylene	32.4	S	0.667	97	33.3	50	130
5	BBF	Benzo[b]fluoranthene	32.8	S	0.667	98	33.3	50	130
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene	38.3	S	0.667	115	33.3	50	130
5	BAP	Benzo[a]pyrene	31.5	S	0.667	94	33.3	50	130
6	IND	Indeno[1,2,3-cd]pyrene	30.0	S	0.667	90	33.3	50	130
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	30.5	S	0.667	92	33.3	50	130
6	GHI	Benzo[g,h,i]perylene	29.3	S	0.667	88	33.3	50	130

Surrogates (% Recovery)	
Naphthalene-d8	91
Phenanthrene-d10	104
Benzo[a]pyrene-d12	84
5B(H)Cholane	86

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Laboratory Control Sample Dup
Lab ID	SS100615LCSD01
Matrix	Sediment
Reference Method	Modified 8270D
Batch ID	SS100615B02
Date Collected	N/A
Date Received	N/A
Date Prepped	10/06/2015
Date Analyzed	10/10/2015
Sample Size (wet)	30
% Solid	100.00
File ID	F2310081527.D
Units	µg/Kg
Final Volume	2
Dilution	1
Reporting Limit	0.667

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit	RPD	RPD Limit
2	N0	Naphthalene	30.3	S	0.667	91	33.3	50	130	4	30
3	AY	Acenaphthylene	29.1	S	0.667	87	33.3	50	130	3	30
3	AE	Acenaphthene	31.3	S	0.667	94	33.3	50	130	3	30
3	F0	Fluorene	32.4	S	0.667	97	33.3	50	130	3	30
3	A0	Anthracene	31.6	S	0.667	95	33.3	50	130	3	30
3	P0	Phenanthrene	33.8	S	0.667	101	33.3	50	130	3	30
4	FL0	Fluoranthene	35.9	S	0.667	108	33.3	50	130	2	30
4	PY0	Pyrene	33.9	S	0.667	102	33.3	50	130	1	30
4	BA0	Benz[a]anthracene	32.3	S	0.667	97	33.3	50	130	1	30
4	C0	Chrysene/Triphenylene	31.5	S	0.667	95	33.3	50	130	3	30
5	BBF	Benzo[b]fluoranthene	32.1	S	0.667	96	33.3	50	130	2	30
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene	37.5	S	0.667	112	33.3	50	130	2	30
5	BAP	Benzo[a]pyrene	31.3	S	0.667	94	33.3	50	130	0	30
6	IND	Indeno[1,2,3-cd]pyrene	30.0	S	0.667	90	33.3	50	130	0	30
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	30.2	S	0.667	91	33.3	50	130	1	30
6	GHI	Benzo[g,h,i]perylene	28.8	S	0.667	86	33.3	50	130	2	30

Surrogates (% Recovery)	
Naphthalene-d8	88
Phenanthrene-d10	101
Benzo[a]pyrene-d12	84
5B(H)Cholane	89

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID		SED-KAN-DNS100		SED-KAN-DNS100				
Lab ID		1510001-01		1510001-01D				
Matrix		Sediment		Sediment				
Reference Method		Modified 8270D		Modified 8270D				
Batch ID		SS100615B02		SS100615B02				
Date Collected		09/29/2015		09/29/2015				
Date Received		10/01/2015		10/01/2015				
Date Prepped		10/06/2015		10/06/2015				
Date Analyzed		10/10/2015		10/10/2015				
Sample Size (wet)		30.87		30.54				
% Solid		75.41		75.41				
File ID		F2310081528.D		F2310081529.D				
Units		µg/Kg		µg/Kg				
Final Volume		2		2				
Dilution		1		1				
Reporting Limit		0.859		0.868				
Class	Abbrev	Analytes	Result	SSRL	Result	SSRL	RPD	RPD Limit	
2	D0	cis/trans-Decalin	45.0	0.859	34.4	0.868	27	30	
2	D1	C1-Decalins	35.6	0.859	25.1	0.868	35	30	¤
2	D2	C2-Decalins	28.2	0.859	22.2	0.868	24	30	
2	D3	C3-Decalins	16.5	0.859	13.5	0.868	20	30	
2	D4	C4-Decalins	25.3	0.859	21.1	0.868	18	30	
2	BT0	Benzothiophene	2.86	0.859	1.30	0.868	75	30	¤
2	BT1	C1-Benzo(b)thiophenes	6.02	0.859	5.48	0.868	9	30	
2	BT2	C2-Benzo(b)thiophenes	5.46	0.859	6.46	0.868	17	30	
2	BT3	C3-Benzo(b)thiophenes	6.82	0.859	6.58	0.868	4	30	
2	BT4	C4-Benzo(b)thiophenes	3.64	0.859	3.30	0.868	10	30	
2	N0	Naphthalene	212	0.859	200	0.868	6	30	
2	N1	C1-Naphthalenes	424	0.859	320	0.868	28	30	
2	N2	C2-Naphthalenes	434	0.859	362	0.868	18	30	
2	N3	C3-Naphthalenes	272	0.859	250	0.868	8	30	
2	N4	C4-Naphthalenes	137	0.859	126	0.868	8	30	
2	B	Biphenyl	66.8	0.859	53.4	0.868	22	30	
3	DF	Dibenzofuran	134	0.859	110	0.868	20	30	
3	AY	Acenaphthylene	11.7	0.859	10.9	0.868	7	30	
3	AE	Acenaphthene	11.3 G	0.859	9.57 G	0.868	16	30	
3	F0	Fluorene	16.3	0.859	14.4	0.868	13	30	
3	F1	C1-Fluorenes	29.4	0.859	26.5	0.868	11	30	
3	F2	C2-Fluorenes	124	0.859	114	0.868	8	30	
3	F3	C3-Fluorenes	128	0.859	106	0.868	19	30	
3	A0	Anthracene	22.0	0.859	28.2	0.868	25	30	
3	P0	Phenanthrene	456	0.859	399	0.868	13	30	
3	PA1	C1-Phenanthrenes/Anthracenes	439	0.859	431	0.868	2	30	
3	PA2	C2-Phenanthrenes/Anthracenes	285	0.859	358	0.868	23	30	
3	PA3	C3-Phenanthrenes/Anthracenes	122	0.859	226	0.868	60	30	¤
3	PA4	C4-Phenanthrenes/Anthracenes	53.6	0.859	100	0.868	61	30	¤
3	RET	Retene	32.0	0.859	60.1	0.868	61	30	¤
3	DBT0	Dibenzothiophene	21.0	0.859	19.2	0.868	9	30	
3	DBT1	C1-Dibenzothiophenes	37.9	0.859	34.9	0.868	8	30	
3	DBT2	C2-Dibenzothiophenes	28.3	0.859	30.8	0.868	8	30	
3	DBT3	C3-Dibenzothiophenes	16.0	0.859	25.4	0.868	45	30	¤
3	DBT4	C4-Dibenzothiophenes	7.00	0.859	12.8	0.868	59	30	¤
4	BF	Benzo(b)fluorene	20.9	0.859	22.2	0.868	6	30	
4	FL0	Fluoranthene	292	0.859	163	0.868	57	30	¤
4	PY0	Pyrene	212	0.859	176	0.868	19	30	
4	FP1	C1-Fluoranthenes/Pyrenes	175	0.859	258	0.868	38	30	¤
4	FP2	C2-Fluoranthenes/Pyrenes	268	0.859	320	0.868	18	30	
4	FP3	C3-Fluoranthenes/Pyrenes	184	0.859	251	0.868	31	30	¤
4	FP4	C4-Fluoranthenes/Pyrenes	117	0.859	124	0.868	5	30	
4	NBT0	Naphthobenzothiophenes	66.0	0.859	64.5	0.868	2	30	
4	NBT1	C1-Naphthobenzothiophenes	65.2	0.859	70.3	0.868	8	30	
4	NBT2	C2-Naphthobenzothiophenes	45.3	0.859	41.5	0.868	9	30	
4	NBT3	C3-Naphthobenzothiophenes	21.2	0.859	18.0	0.868	17	30	
4	NBT4	C4-Naphthobenzothiophenes	12.4	0.859	13.3	0.868	7	30	
4	BA0	Benz[a]anthracene	76.3	0.859	81.6	0.868	7	30	
4	C0	Chrysene/Triphenylene	178	0.859	149	0.868	18	30	
4	BC1	C1-Chrysenes	122	0.859	129	0.868	6	30	
4	BC2	C2-Chrysenes	109	0.859	107	0.868	2	30	
4	BC3	C3-Chrysenes	110	0.859	99.9	0.868	9	30	
4	BC4	C4-Chrysenes	62.5	0.859	58.5	0.868	7	30	
5	BBF	Benzo[b]fluoranthene	100	0.859	88.6	0.868	12	30	
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene	61.5	0.859	52.3	0.868	16	30	
5	BAF	Benzo[a]fluoranthene	10.4	0.859	11.1	0.868	6	30	
5	BEP	Benzo[e]pyrene	109	0.859	127	0.868	16	30	
5	BAP	Benzo[a]pyrene	55.0	0.859	61.0	0.868	10	30	
5	PER	Perylene	27.8	0.859	27.4	0.868	2	30	
6	IND	Indeno[1,2,3-cd]pyrene	37.4	0.859	38.3	0.868	2	30	
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	15.8	0.859	18.3	0.868	15	30	
6	GHI	Benzo[g,h,i]perylene	64.1	0.859	91.7	0.868	35	30	¤
3	CAR	Carbazole	22.8	0.859	11.4	0.868	67	30	¤
3	4MDT	4-Methyldibenzothiophene	13.6	0.859	12.5	0.868	8	30	
3	2MDT	2/3-Methyldibenzothiophene	15.4	0.859	13.4	0.868	14	30	
3	1MDT	1-Methyldibenzothiophene	5.33	0.859	5.48	0.868	3	30	
3	3MP	3-Methylphenanthrene	88.4	0.859	83.6	0.868	6	30	
3	2MP	2-Methylphenanthrene	124	0.859	113	0.868	9	30	
3	2MA	2-Methylanthracene	7.24	0.859	14.2	0.868	65	30	¤
3	9MP	9/4-Methylphenanthrene	114	0.859	120	0.868	4	30	
3	1MP	1-Methylphenanthrene	101	0.859	94.6	0.868	6	30	

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID		SED-KAN-DNS100			SED-KAN-DNS100				
Lab ID		1510001-01			1510001-01D				
Matrix		Sediment			Sediment				
Reference Method		Modified 8270D			Modified 8270D				
Batch ID		SS100615B02			SS100615B02				
Date Collected		09/29/2015			09/29/2015				
Date Received		10/01/2015			10/01/2015				
Date Prepped		10/06/2015			10/06/2015				
Date Analyzed		10/10/2015			10/10/2015				
Sample Size (wet)		30.87			30.54				
% Solid		75.41			75.41				
File ID		F2310081528.D			F2310081529.D				
Units		µg/Kg			µg/Kg				
Final Volume		2			2				
Dilution		1			1				
Reporting Limit		0.859			0.868				
Class	Abbrev	Analytes	Result	SSRL	Result	SSRL	RPD	RPD Limit	
t23	T4	C23 Tricyclic Terpane	0.915	0.859	1.22	0.868	28	30	
t24	T5	C24 Tricyclic Terpane	1.16	0.859	0.789 J	0.868	38	30	¤
t25	T6	C25 Tricyclic Terpane	1.71	0.859	1.82	0.868	6	30	
te24	T6a	C24 Tetracyclic Terpane	5.24	0.859	4.50	0.868	15	30	
t26S	T6b	C26 Tricyclic Terpane-22S	1.70	0.859	1.52	0.868	12	30	
t26R	T6c	C26 Tricyclic Terpane-22R	U	0.859	U	0.868		30	N/A
t28S	T7	C28 Tricyclic Terpane-22S	0.357 J	0.859	0.375 J	0.868	5	30	
t28R	T8	C28 Tricyclic Terpane-22R	0.734 J	0.859	1.27	0.868	53	30	¤
t29S	T9	C29 Tricyclic Terpane-22S	U	0.859	U	0.868		30	N/A
t29R	T10	C29 Tricyclic Terpane-22R	U	0.859	U	0.868		30	N/A
Ts	T11	18a-22,29,30-Trisnorneohopane-TS	4.63	0.859	3.73	0.868	22	30	
t30S	T11a	C30 Tricyclic Terpane-22S	0.745 J	0.859	0.699 J	0.868	6	30	
t30R	T11b	C30 Tricyclic Terpane-22R	0.860	0.859	0.645 J	0.868	29	30	
Tm	T12	17a(H)-22,29,30-Trisnorhopane-TM	13.9	0.859	9.37	0.868	39	30	¤
BNH	T14a	17a/b,21b/a 28,30-Bisnorhopane	0.986	0.859	7.37	0.868	153	30	¤
25N	T14b	17a(H),21b(H)-25-Norhopane	5.13 G	0.859	9.44 G	0.868	59	30	¤
H29	T15	30-Norhopane	29.2	0.859	20.2	0.868	36	30	¤
C29Ts	T16	18a(H)-30-Norneohopane-C29Ts	4.44	0.859	4.42	0.868	0	30	
X	X	17a(H)-Diahopane	5.11	0.859	2.56	0.868	67	30	¤
M29	T17	30-Normoretane	3.58	0.859	2.29	0.868	44	30	¤
OL	T18	18a(H)&18b(H)-Oleananes	1.33	0.859	1.05	0.868	24	30	
H30	T19	Hopane	41.1	0.859	26.7	0.868	42	30	¤
M30	T20	Moretane	14.0 G	0.859	12.4 G	0.868	13	30	
H31S	T21	30-Homohopane-22S	18.2	0.859	12.0	0.868	41	30	¤
H31R	T22	30-Homohopane-22R	12.5	0.859	8.18	0.868	42	30	¤
T22A	T22A	T22a-Gammacerane/C32-diahopane	4.40	0.859	5.48	0.868	22	30	
H32S	T26	30,31-Bishomohopane-22S	28.6 G	0.859	29.3 G	0.868	2	30	
H32R	T27	30,31-Bishomohopane-22R	10.9	0.859	8.90	0.868	20	30	
H33S	T30	30,31-Trishomohopane-22S	13.5	0.859	13.5	0.868	0	30	
H33R	T31	30,31-Trishomohopane-22R	2.99	0.859	2.43	0.868	21	30	
H34S	T32	Tetrakishomohopane-22S	18.8	0.859	22.8	0.868	19	30	
H34R	T33	Tetrakishomohopane-22R	21.5 G	0.859	20.3 G	0.868	6	30	
H35S	T34	Pentakishomohopane-22S	2.37	0.859	2.40	0.868	1	30	
H35R	T35	Pentakishomohopane-22R	1.49	0.859	1.44	0.868	4	30	
d27S	S4	13b(H),17a(H)-20S-Diacholestane	2.25	0.859	2.09	0.868	7	30	
d27R	S5	13b(H),17a(H)-20R-Diacholestane	1.23	0.859	1.69	0.868	32	30	¤
d28S	S8	13b,17a-20S-Methyldiacholestane	2.05	0.859	1.62	0.868	23	30	
aa27S	S12	14a(H),17a(H)-20S-Cholestane/13b(H),17a(H)-20S-Ethyldiacholestane (S12)	5.39	0.859	3.90	0.868	32	30	¤
aa27R	S17	14a(H),17a(H)-20R-Cholestane/13b(H),17a(H)-20R-Ethyldiacholestane (S17)	6.20	0.859	4.30	0.868	36	30	¤
d29R	S18	Unknown Sterane (S18)	1.41	0.859	0.954	0.868	39	30	¤
d29S	S19	13a,17b-20S-Ethyldiacholestane	U	0.859	U	0.868		30	N/A
aa28S	S20	14a,17a-20S-Methylcholestane	3.85	0.859	2.23	0.868	53	30	¤
aa28R	S24	14a,17a-20R-Methylcholestane	2.97	0.859	2.20	0.868	30	30	
aa29S	S25	14a(H),17a(H)-20S-Ethylcholestane	3.92	0.859	2.98	0.868	27	30	
aa29R	S28	14a(H),17a(H)-20R-Ethylcholestane	4.32	0.859	3.22	0.868	29	30	
bb27R	S14	14b(H),17b(H)-20R-Cholestane	1.91	0.859	1.38	0.868	32	30	¤
bb27S	S15	14b(H),17b(H)-20S-Cholestane	1.42	0.859	1.35	0.868	5	30	
bb28R	S22	14b,17b-20R-Methylcholestane	3.97	0.859	2.57	0.868	43	30	¤
bb28S	S23	14b,17b-20S-Methylcholestane	5.34	0.859	3.46	0.868	43	30	¤
bb29R	S26	14b(H),17b(H)-20R-Ethylcholestane	7.64	0.859	5.79	0.868	28	30	
bb29S	S27	14b(H),17b(H)-20S-Ethylcholestane	6.06	0.859	3.63	0.868	50	30	¤
RC26/SC27TA	RC26/SC27TA	C26,20R- +C27,20S- triaromatic steroid	6.33	0.859	4.05	0.868	44	30	¤
SC28TA	SC28TA	C28,20S-triaromatic steroid	7.36	0.859	5.43	0.868	30	30	
RC27TA	RC27TA	C27,20R-triaromatic steroid	5.84	0.859	4.46	0.868	27	30	
RC28TA	RC28TA	C28,20R-triaromatic steroid	4.47	0.859	3.56	0.868	23	30	

Surrogates (% Recovery)		
Naphthalene-d8	75	69
Phenanthrene-d10	94	87
Benzo[a]pyrene-d12	91	82
5B(H)Cholane	96	87

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Alaska North Slope Crude
Lab ID	SS091115ANC01
Matrix	Oil
Reference Method	Modified 8270D
Batch ID	N/A
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	09/09/2015
Sample Size (wet)	0.05246
% Solid	100.00
File ID	F2309081514.D
Units	mg/Kg
Final Volume	10
Dilution	1
Reporting Limit	1.91

Class	Abbrev	Analytes	Result		SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit
2	D0	cis/trans-Decalin	493		1.91	103	479.20	65	135
2	D1	C1-Decalins	744		1.91	102	728.90	65	135
2	D2	C2-Decalins	635		1.91	100	635.50	65	135
2	D3	C3-Decalins	332		1.91	101	329.80	65	135
2	D4	C4-Decalins	313		1.91	96	326.50	65	135
2	BT0	Benzothiophene	6.17		1.91	114	5.40	65	135
2	BT1	C1-Benzo(b)thiophenes	31.6		1.91	109	28.90	65	135
2	BT2	C2-Benzo(b)thiophenes	50.1		1.91	101	49.60	65	135
2	BT3	C3-Benzo(b)thiophenes	99.8		1.91	101	99.00	65	135
2	BT4	C4-Benzo(b)thiophenes	86.1		1.91	99	87.10	65	135
2	N0	Naphthalene	563		1.91	101	555.80	65	135
2	N1	C1-Naphthalenes	1200		1.91	102	1167.30	65	135
2	N2	C2-Naphthalenes	1450		1.91	103	1409.70	65	135
2	N3	C3-Naphthalenes	1040		1.91	101	1035.90	65	135
2	N4	C4-Naphthalenes	556		1.91	99	561.10	65	135
2	B	Biphenyl	157		1.91	108	145.70	65	135
3	DF	Dibenzofuran	55.8		1.91	109	51.20	65	135
3	AY	Acenaphthylene	6.81		1.91	105	6.50	65	135
3	AE	Acenaphthene	19.4		1.91	104	18.70	65	135
3	F0	Fluorene	81.9		1.91	110	74.60	65	135
3	F1	C1-Fluorenes	178		1.91	105	170.20	65	135
3	F2	C2-Fluorenes	267		1.91	105	255.40	65	135
3	F3	C3-Fluorenes	233		1.91	98	238.50	65	135
3	A0	Anthracene		U	1.91				
3	P0	Phenanthrene	232		1.91	109	212.20	65	135
3	PA1	C1-Phenanthrenes/Anthracenes	464		1.91	107	432.70	65	135
3	PA2	C2-Phenanthrenes/Anthracenes	486		1.91	104	465.90	65	135
3	PA3	C3-Phenanthrenes/Anthracenes	296		1.91	93	317.40	65	135
3	PA4	C4-Phenanthrenes/Anthracenes	129		1.91	100	129.00	65	135
3	RET	Retene		U	1.91				
3	DBT0	Dibenzothiophene	159		1.91	114	138.90	65	135
3	DBT1	C1-Dibenzothiophenes	310		1.91	111	278.60	65	135
3	DBT2	C2-Dibenzothiophenes	404		1.91	107	377.50	65	135
3	DBT3	C3-Dibenzothiophenes	363		1.91	106	341.40	65	135
3	DBT4	C4-Dibenzothiophenes	194		1.91	106	183.40	65	135
4	BF	Benzo(b)fluorene	7.70		1.91				
4	FL0	Fluoranthene	4.90		1.91	122	4.00	65	135
4	PY0	Pyrene	14.7		1.91	113	13.00	65	135
4	FP1	C1-Fluoranthenes/Pyrenes	65.3		1.91	104	63.10	65	135
4	FP2	C2-Fluoranthenes/Pyrenes	106		1.91	103	102.20	65	135
4	FP3	C3-Fluoranthenes/Pyrenes	124		1.91	104	119.60	65	135
4	FP4	C4-Fluoranthenes/Pyrenes	109		1.91	105	104.00	65	135
4	NBT0	Naphthobenzothiophenes	50.7		1.91	116	43.80	65	135
4	NBT1	C1-Naphthobenzothiophenes	133		1.91	114	117.20	65	135
4	NBT2	C2-Naphthobenzothiophenes	194		1.91	119	163.30	65	135
4	NBT3	C3-Naphthobenzothiophenes	155		1.91	120	128.70	65	135
4	NBT4	C4-Naphthobenzothiophenes	107		1.91	121	89.00	65	135
4	BA0	Benz[a]anthracene	2.75		1.91	131	2.10	65	135
4	C0	Chrysene/Triphenylene	40.2		1.91	114	35.20	65	135
4	BC1	C1-Chrysenes	70.8		1.91	113	62.80	65	135
4	BC2	C2-Chrysenes	96.4		1.91	112	86.00	65	135
4	BC3	C3-Chrysenes	115		1.91	118	97.60	65	135
4	BC4	C4-Chrysenes	71.2		1.91	120	59.40	65	135
5	BBF	Benzo[b]fluoranthene	5.70		1.91	110	5.20	65	135
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene		U	1.91				
5	BAF	Benzo[a]fluoranthene		U	1.91				
5	BEP	Benzo[e]pyrene	10.9		1.91	111	9.80	65	135
5	BAP	Benzo[a]pyrene	1.71	J	1.91	90	1.90	65	135
5	PER	Perylene	3.27		1.91	117	2.80	65	135
6	IND	Indeno[1,2,3-cd]pyrene	0.913	J	1.91				
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	1.08	J	1.91				
6	GHI	Benzo[g,h,i]perylene	3.54		1.91	114	3.10	65	135
3	CAR	Carbazole	6.74		1.91	112	6.00	65	135
3	4MDT	4-Methyldibenzothiophene	147		1.91	111	131.80	65	135
3	2MDT	2/3-Methyldibenzothiophene	109		1.91	112	97.50	65	135
3	1MDT	1-Methyldibenzothiophene	49.1		1.91	111	44.20	65	135
3	3MP	3-Methylphenanthrene	98.0		1.91	110	89.40	65	135
3	2MP	2-Methylphenanthrene	104		1.91	107	97.70	65	135
3	2MA	2-Methylanthracene	3.39		1.91	106	3.20	65	135
3	9MP	9/4-Methylphenanthrene	156		1.91	110	141.20	65	135
3	1MP	1-Methylphenanthrene	101		1.91	104	97.40	65	135

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID	Alaska North Slope Crude
Lab ID	SS091115ANC01
Matrix	Oil
Reference Method	Modified 8270D
Batch ID	N/A
Date Collected	N/A
Date Received	N/A
Date Prepped	N/A
Date Analyzed	09/09/2015
Sample Size (wet)	0.05246
% Solid	100.00
File ID	F2309081514.D
Units	mg/Kg
Final Volume	10
Dilution	1
Reporting Limit	1.91

Class	Abbrev	Analytes	Result	SSRL	% Rec	Spike Conc.	Lower Limit	Upper Limit
t23	T4	C23 Tricyclic Terpane	74.1	1.91	110	67.30	65	135
t24	T5	C24 Tricyclic Terpane	47.6	1.91	111	43.00	65	135
t25	T6	C25 Tricyclic Terpane	46.0	1.91	110	42.00	65	135
te24	T6a	C24 Tetracyclic Terpane	15.7	1.91	106	14.80	65	135
t26S	T6b	C26 Tricyclic Terpane-22S	17.8	1.91	100	17.70	65	135
t26R	T6c	C26 Tricyclic Terpane-22R	15.9	1.91	104	15.40	65	135
t28S	T7	C28 Tricyclic Terpane-22S	17.7	1.91	105	16.80	65	135
t28R	T8	C28 Tricyclic Terpane-22R	18.5	1.91	102	18.10	65	135
t29S	T9	C29 Tricyclic Terpane-22S	20.8	1.91	100	20.80	65	135
t29R	T10	C29 Tricyclic Terpane-22R	23.8	1.91	105	22.60	65	135
Ts	T11	18a-22,29,30-Trisnorneohopane-TS	33.5	1.91	107	31.30	65	135
t30S	T11a	C30 Tricyclic Terpane-22S	17.4	1.91	108	16.20	65	135
t30R	T11b	C30 Tricyclic Terpane-22R	16.0	1.91	97	16.40	65	135
Tm	T12	17a(H)-22,29,30-Trisnorhopane-TM	39.9	1.91	106	37.80	65	135
BNH	T14a	17a/b,21b/a 28,30-Bisnorhopane	7.15	1.91	102	7.00	65	135
25N	T14b	17a(H),21b(H)-25-Norhopane	9.02	1.91	104	8.70	65	135
H29	T15	30-Norhopane	105	1.91	105	99.70	65	135
C29Ts	T16	18a(H)-30-Norneohopane-C29Ts	25.9	1.91	103	25.20	65	135
X	X	17a(H)-Diahopane	13.7	1.91	97	14.20	65	135
M29	T17	30-Normoretane	11.8	1.91	102	11.60	65	135
OL	T18	18a(H)&18b(H)-Oleananes	U	1.91				
H30	T19	Hopane	181	1.91	104	173.60	65	135
M30	T20	Moretane	17.8	1.91	102	17.50	65	135
H31S	T21	30-Homohopane-22S	78.4	1.91	104	75.10	65	135
H31R	T22	30-Homohopane-22R	65.7	1.91	102	64.10	65	135
T22A	T22A	T22a-Gammacerane/C32-diahopane	13.6	1.91				
H32S	T26	30,31-Bishomohopane-22S	56.6	1.91	106	53.60	65	135
H32R	T27	30,31-Bishomohopane-22R	40.4	1.91	102	39.60	65	135
H33S	T30	30,31-Trishomohopane-22S	42.6	1.91	102	41.80	65	135
H33R	T31	30,31-Trishomohopane-22R	28.2	1.91	104	27.20	65	135
H34S	T32	Tetrakishomohopane-22S	30.5	1.91	102	29.80	65	135
H34R	T33	Tetrakishomohopane-22R	20.5	1.91	97	21.20	65	135
H35S	T34	Pentakishomohopane-22S	31.0	1.91	103	30.20	65	135
H35R	T35	Pentakishomohopane-22R	25.6	1.91	109	23.50	65	135
d27S	S4	13b(H),17a(H)-20S-Diacholestane	54.4	1.91	109	50.00	65	135
d27R	S5	13b(H),17a(H)-20R-Diacholestane	27.5	1.91	105	26.30	65	135
d28S	S8	13b,17a-20S-Methyldiacholestane	29.4	1.91	114	25.70	65	135
aa27S	S12	14a(H),17a(H)-20S-Cholestane/13b(H),17a(H)-20S-Ethyldiacholestane (S12)	68.6	1.91	106	65.00	65	135
aa27R	S17	14a(H),17a(H)-20R-Cholestane/13b(H),17a(H)-20R-Ethyldiacholestane (S17)	81.6	1.91	108	75.80	65	135
d29R	S18	Unknown Sterane (S18)	22.2	1.91	104	21.30	65	135
d29S	S19	13a,17b-20S-Ethyldiacholestane	3.78	1.91	97	3.90	65	135
aa28S	S20	14a,17a-20S-Methylcholestane	41.5	1.91	111	37.30	65	135
aa28R	S24	14a,17a-20R-Methylcholestane	38.6	1.91	112	34.50	65	135
aa29S	S25	14a(H),17a(H)-20S-Ethylcholestane	58.1	1.91	114	51.00	65	135
aa29R	S28	14a(H),17a(H)-20R-Ethylcholestane	46.0	1.91	116	39.50	65	135
bb27R	S14	14b(H),17b(H)-20R-Cholestane	47.4	1.91	114	41.50	65	135
bb27S	S15	14b(H),17b(H)-20S-Cholestane	47.7	1.91	112	42.50	65	135
bb28R	S22	14b,17b-20R-Methylcholestane	50.3	1.91	112	44.80	65	135
bb28S	S23	14b,17b-20S-Methylcholestane	60.7	1.91	109	55.40	65	135
bb29R	S26	14b(H),17b(H)-20R-Ethylcholestane	70.9	1.91	116	60.90	65	135
bb29S	S27	14b(H),17b(H)-20S-Ethylcholestane	43.0	1.91	107	40.30	65	135
RC26/SC27TA	RC26/SC27TA	C26,20R- +C27,20S- triaromatic steroid	327	1.91	111	293.90	65	135
SC28TA	SC28TA	C28,20S-triaromatic steroid	199	1.91	106	187.60	65	135
RC27TA	RC27TA	C27,20R-triaromatic steroid	196	1.91	109	180.20	65	135
RC28TA	RC28TA	C28,20R-triaromatic steroid	166	1.91	110	150.50	65	135

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

		Client ID		SED-KAN-DNS100		SED-KAN-DNS050		SED-KAN-MS06	
		Lab ID		1510001-01		1510001-02		1510001-03	
		Matrix		Sediment		Sediment		Sediment	
		Reference Method		Modified 8270D		Modified 8270D		Modified 8270D	
		Batch ID		SS100615B02		SS100615B02		SS100615B02	
		Date Collected		09/29/2015		09/29/2015		09/29/2015	
		Date Received		10/01/2015		10/01/2015		10/01/2015	
		Date Prepped		10/06/2015		10/06/2015		10/06/2015	
		Date Analyzed		10/10/2015		10/11/2015		10/11/2015	
		Sample Size (wet)		30.87		30.07		30.1	
		% Solid		75.41		74.67		75.00	
		File ID		F2310081528.D		F2310081530.D		F2310081531.D	
		Units		µg/Kg		µg/Kg		µg/Kg	
		Final Volume		2		2		2	
		Dilution		1		1		1	
		Reporting Limit		0.859		0.891		0.886	
Class	Abbrev	Analytes	Result	SSRL	Result	SSRL	Result	SSRL
2	D0	cis/trans-Decalin	45.0	0.859	26.7	0.891	65.6	0.886
2	D1	C1-Decalins	35.6	0.859	19.2	0.891	63.4	0.886
2	D2	C2-Decalins	28.2	0.859	16.7	0.891	54.6	0.886
2	D3	C3-Decalins	16.5	0.859	10.3	0.891	33.6	0.886
2	D4	C4-Decalins	25.3	0.859	14.9	0.891	41.3	0.886
2	BT0	Benzothiophene	2.86	0.859	1.21	0.891	3.18	0.886
2	BT1	C1-Benzo(b)thiophenes	6.02	0.859	5.13	0.891	11.4	0.886
2	BT2	C2-Benzo(b)thiophenes	5.46	0.859	4.44	0.891	9.28	0.886
2	BT3	C3-Benzo(b)thiophenes	6.82	0.859	5.94	0.891	11.4	0.886
2	BT4	C4-Benzo(b)thiophenes	3.64	0.859	2.76	0.891	5.47	0.886
2	N0	Naphthalene	212	0.859	169	0.891	326	0.886
2	N1	C1-Naphthalenes	424	0.859	341	0.891	584	0.886
2	N2	C2-Naphthalenes	434	0.859	353	0.891	626	0.886
2	N3	C3-Naphthalenes	272	0.859	217	0.891	398	0.886
2	N4	C4-Naphthalenes	137	0.859	103	0.891	209	0.886
2	B	Biphenyl	66.8	0.859	50.5	0.891	87.2	0.886
3	DF	Dibenzofuran	134	0.859	108	0.891	183	0.886
3	AY	Acenaphthylene	11.7	0.859	10.6	0.891	28.9	0.886
3	AE	Acenaphthene	11.3 G	0.859	7.98 G	0.891	13.9 G	0.886
3	F0	Fluorene	16.3	0.859	11.2	0.891	18.8	0.886
3	F1	C1-Fluorenes	29.4	0.859	19.1	0.891	30.0	0.886
3	F2	C2-Fluorenes	124	0.859	91.7	0.891	186	0.886
3	F3	C3-Fluorenes	128	0.859	81.4	0.891	174	0.886
3	A0	Anthracene	22.0	0.859	18.8	0.891	65.2	0.886
3	P0	Phenanthrene	456	0.859	315	0.891	583	0.886
3	PA1	C1-Phenanthrenes/Anthracenes	439	0.859	328	0.891	652	0.886
3	PA2	C2-Phenanthrenes/Anthracenes	285	0.859	208	0.891	456	0.886
3	PA3	C3-Phenanthrenes/Anthracenes	122	0.859	89.1	0.891	194	0.886
3	PA4	C4-Phenanthrenes/Anthracenes	53.6	0.859	40.6	0.891	88.6	0.886
3	RET	Retene	32.0	0.859	32.0	0.891	52.8	0.886
3	DBT0	Dibenzothiophene	21.0	0.859	15.1	0.891	27.2	0.886
3	DBT1	C1-Dibenzothiophenes	37.9	0.859	27.5	0.891	54.7	0.886
3	DBT2	C2-Dibenzothiophenes	28.3	0.859	21.1	0.891	49.1	0.886
3	DBT3	C3-Dibenzothiophenes	16.0	0.859	11.8	0.891	27.2	0.886
3	DBT4	C4-Dibenzothiophenes	7.00	0.859	4.94	0.891	13.0	0.886
4	BF	Benzo(b)fluorene	20.9	0.859	13.8	0.891	40.3	0.886
4	FL0	Fluoranthene	292	0.859	104	0.891	331	0.886
4	PY0	Pyrene	212	0.859	94.9	0.891	287	0.886
4	FP1	C1-Fluoranthenes/Pyrenes	175	0.859	113	0.891	260	0.886
4	FP2	C2-Fluoranthenes/Pyrenes	268	0.859	158	0.891	344	0.886
4	FP3	C3-Fluoranthenes/Pyrenes	184	0.859	125	0.891	271	0.886
4	FP4	C4-Fluoranthenes/Pyrenes	117	0.859	79.4	0.891	166	0.886
4	NBT0	Naphthobenzothiophenes	66.0	0.859	41.5	0.891	98.0	0.886
4	NBT1	C1-Naphthobenzothiophenes	65.2	0.859	47.6	0.891	95.6	0.886
4	NBT2	C2-Naphthobenzothiophenes	45.3	0.859	32.7	0.891	65.5	0.886
4	NBT3	C3-Naphthobenzothiophenes	21.2	0.859	16.4	0.891	31.2	0.886
4	NBT4	C4-Naphthobenzothiophenes	12.4	0.859	9.48	0.891	18.9	0.886
4	BA0	Benz[a]anthracene	76.3	0.859	59.6	0.891	188	0.886
4	C0	Chrysene/Triphenylene	178	0.859	105	0.891	260	0.886
4	BC1	C1-Chrysenes	122	0.859	90.4	0.891	202	0.886
4	BC2	C2-Chrysenes	109	0.859	78.9	0.891	172	0.886
4	BC3	C3-Chrysenes	110	0.859	81.5	0.891	173	0.886
4	BC4	C4-Chrysenes	62.5	0.859	48.2	0.891	99.6	0.886
5	BBF	Benzo[b]fluoranthene	100	0.859	74.2	0.891	170	0.886
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene	61.5	0.859	46.7	0.891	135	0.886
5	BAF	Benzo[a]fluoranthene	10.4	0.859	10.5	0.891	30.8	0.886
5	BEP	Benzo[e]pyrene	109	0.859	85.1	0.891	158	0.886
5	BAP	Benzo[a]pyrene	55.0	0.859	52.6	0.891	136	0.886
5	PER	Perylene	27.8	0.859	35.3	0.891	41.5	0.886
6	IND	Indeno[1,2,3-cd]pyrene	37.4	0.859	34.3	0.891	83.2	0.886
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	15.8	0.859	14.3	0.891	31.7	0.886
6	GHI	Benzo[g,h,i]perylene	64.1	0.859	57.5	0.891	98.4	0.886
3	CAR	Carbazole	22.8	0.859	7.43	0.891	16.7	0.886
3	4MDT	4-Methyldibenzothiophene	13.6	0.859	9.41	0.891	18.9	0.886
3	2MDT	2/3-Methyldibenzothiophene	15.4	0.859	10.4	0.891	19.3	0.886
3	1MDT	1-Methyldibenzothiophene	5.33	0.859	4.24	0.891	8.33	0.886
3	3MP	3-Methylphenanthrene	88.4	0.859	65.7	0.891	130	0.886
3	2MP	2-Methylphenanthrene	124	0.859	90.4	0.891	178	0.886
3	2MA	2-Methylanthracene	7.24	0.859	6.16	0.891	19.9	0.886
3	9MP	9/4-Methylphenanthrene	114	0.859	82.8	0.891	167	0.886
3	1MP	1-Methylphenanthrene	101	0.859	71.8	0.891	141	0.886

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

		Client ID	SED-KAN-DNS100			SED-KAN-DNS050			SED-KAN-MS06	
		Lab ID	1510001-01			1510001-02			1510001-03	
		Matrix	Sediment			Sediment			Sediment	
		Reference Method	Modified 8270D			Modified 8270D			Modified 8270D	
		Batch ID	SS100615B02			SS100615B02			SS100615B02	
		Date Collected	09/29/2015			09/29/2015			09/29/2015	
		Date Received	10/01/2015			10/01/2015			10/01/2015	
		Date Prepped	10/06/2015			10/06/2015			10/06/2015	
		Date Analyzed	10/10/2015			10/11/2015			10/11/2015	
		Sample Size (wet)	30.87			30.07			30.1	
		% Solid	75.41			74.67			75.00	
		File ID	F2310081528.D			F2310081530.D			F2310081531.D	
		Units	µg/Kg			µg/Kg			µg/Kg	
		Final Volume	2			2			2	
		Dilution	1			1			1	
		Reporting Limit	0.859			0.891			0.886	
Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	Result		SSRL
t23	T4	C23 Tricyclic Terpane	0.915		0.859	0.830	J	0.891	1.77		0.886
t24	T5	C24 Tricyclic Terpane	1.16		0.859	0.944		0.891	1.17		0.886
t25	T6	C25 Tricyclic Terpane	1.71		0.859	0.937		0.891	3.15		0.886
te24	T6a	C24 Tetracyclic Terpane	5.24		0.859	2.78		0.891	5.02		0.886
t26S	T6b	C26 Tricyclic Terpane-22S	1.70		0.859	1.25		0.891	2.25		0.886
t26R	T6c	C26 Tricyclic Terpane-22R		U	0.859		U	0.891	1.28		0.886
t28S	T7	C28 Tricyclic Terpane-22S	0.357	J	0.859		U	0.891	0.643	J	0.886
t28R	T8	C28 Tricyclic Terpane-22R	0.734	J	0.859	0.914		0.891	1.26		0.886
t29S	T9	C29 Tricyclic Terpane-22S		U	0.859	0.601	J	0.891	0.736	J	0.886
t29R	T10	C29 Tricyclic Terpane-22R		U	0.859	0.868	J	0.891	0.853	J	0.886
Ts	T11	18a-22,29,30-Trisnorneohopane-TS	4.63		0.859	2.88		0.891	5.07		0.886
t30S	T11a	C30 Tricyclic Terpane-22S	0.745	J	0.859		U	0.891	0.911		0.886
t30R	T11b	C30 Tricyclic Terpane-22R	0.860		0.859		U	0.891	1.07		0.886
Tm	T12	17a(H)-22,29,30-Trisnorhopane-TM	13.9		0.859	8.60		0.891	12.6		0.886
BNH	T14a	17a/b,21b/a 28,30-Bisnorhopane	0.986		0.859	0.875	J	0.891	1.07		0.886
25N	T14b	17a(H),21b(H)-25-Norhopane	5.13	G	0.859	4.44	G	0.891	9.38	G	0.886
H29	T15	30-Norhopane	29.2		0.859	19.5		0.891	29.5		0.886
C29Ts	T16	18a(H)-30-Norneohopane-C29Ts	4.44		0.859	3.04		0.891	4.90		0.886
X	X	17a(H)-Diahopane	5.11		0.859	2.10		0.891	4.18		0.886
M29	T17	30-Normoretane	3.58		0.859	2.60		0.891	3.80		0.886
OL	T18	18a(H)&18b(H)-Oleananes	1.33		0.859	1.27		0.891	1.52		0.886
H30	T19	Hopane	41.1		0.859	25.2		0.891	40.4		0.886
M30	T20	Moretane	14.0	G	0.859	10.4	G	0.891	13.1	G	0.886
H31S	T21	30-Homohopane-22S	18.2		0.859	11.3		0.891	17.5		0.886
H31R	T22	30-Homohopane-22R	12.5		0.859	8.42		0.891	12.8		0.886
T22A	T22A	T22a-Gammacerane/C32-diahopane	4.40		0.859	4.97		0.891	6.59		0.886
H32S	T26	30,31-Bishomohopane-22S	28.6	G	0.859	25.7	G	0.891	34.3	G	0.886
H32R	T27	30,31-Bishomohopane-22R	10.9		0.859	6.28		0.891	10.3		0.886
H33S	T30	30,31-Trishomohopane-22S	13.5		0.859	7.06	G	0.891	9.99	G	0.886
H33R	T31	30,31-Trishomohopane-22R	2.99		0.859	1.95		0.891	3.73		0.886
H34S	T32	Tetrakishomohopane-22S	18.8		0.859	19.4		0.891	29.8		0.886
H34R	T33	Tetrakishomohopane-22R	21.5	G	0.859	13.1	G	0.891	30.1	G	0.886
H35S	T34	Pentakishomohopane-22S	2.37		0.859	1.93		0.891	3.22		0.886
H35R	T35	Pentakishomohopane-22R	1.49		0.859	2.22	G	0.891	6.17	G	0.886
d27S	S4	13b(H),17a(H)-20S-Diacholestane	2.25		0.859	1.86		0.891	3.22		0.886
d27R	S5	13b(H),17a(H)-20R-Diacholestane	1.23		0.859	1.13		0.891	1.78		0.886
d28S	S8	13b,17a-20S-Methyldiacholestane	2.05		0.859	1.21		0.891	1.95		0.886
aa27S	S12	14a(H),17a(H)-20S-Cholestane/13b(H),17a(H)-20S-Ethyldiacholestane (S12)	5.39		0.859	3.31		0.891	5.20		0.886
aa27R	S17	14a(H),17a(H)-20R-Cholestane/13b(H),17a(H)-20R-Ethyldiacholestane (S17)	6.20		0.859	3.35		0.891	5.84		0.886
d29R	S18	Unknown Sterane (S18)	1.41		0.859	0.807	J	0.891	1.44		0.886
d29S	S19	13a,17b-20S-Ethyldiacholestane		U	0.859		U	0.891		U	0.886
aa28S	S20	14a,17a-20S-Methylcholestane	3.85		0.859	2.07		0.891	4.27		0.886
aa28R	S24	14a,17a-20R-Methylcholestane	2.97		0.859	1.96		0.891	3.34		0.886
aa29S	S25	14a(H),17a(H)-20S-Ethylcholestane	3.92		0.859	3.12		0.891	5.01		0.886
aa29R	S28	14a(H),17a(H)-20R-Ethylcholestane	4.32		0.859	3.34		0.891	4.95		0.886
bb27R	S14	14b(H),17b(H)-20R-Cholestane	1.91		0.859	1.36		0.891	1.89		0.886
bb27S	S15	14b(H),17b(H)-20S-Cholestane	1.42		0.859	1.42		0.891	2.11		0.886
bb28R	S22	14b,17b-20R-Methylcholestane	3.97		0.859	2.60		0.891	4.26		0.886
bb28S	S23	14b,17b-20S-Methylcholestane	5.34		0.859	3.42		0.891	5.29		0.886
bb29R	S26	14b(H),17b(H)-20R-Ethylcholestane	7.64		0.859	5.04		0.891	9.00		0.886
bb29S	S27	14b(H),17b(H)-20S-Ethylcholestane	6.06		0.859	4.21		0.891	6.38		0.886
RC26/SC27TA	RC26/SC27TA	C26,20R- +C27,20S- triaromatic steroid	6.33		0.859	5.91		0.891	7.98		0.886
SC28TA	SC28TA	C28,20S-triaromatic steroid	7.36		0.859	6.36		0.891	10.0		0.886
RC27TA	RC27TA	C27,20R-triaromatic steroid	5.84		0.859	5.62		0.891	8.21		0.886
RC28TA	RC28TA	C28,20R-triaromatic steroid	4.47		0.859	4.49		0.891	7.37		0.886

Surrogates (% Recovery)			
Naphthalene-d8	75	77	75
Phenanthrene-d10	94	96	93
Benzo[a]pyrene-d12	91	92	94
5B(H)Cholane	96	93	99

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

		Client ID		SED-KAN-MS05		SED-KAN-MS04		SED-KAN-MS03
		Lab ID		1510001-04		1510001-05		1510001-06
		Matrix		Sediment		Sediment		Sediment
		Reference Method		Modified 8270D		Modified 8270D		Modified 8270D
		Batch ID		SS100615B02		SS100615B02		SS100615B02
		Date Collected		09/29/2015		09/29/2015		09/29/2015
		Date Received		10/01/2015		10/01/2015		10/01/2015
		Date Prepped		10/06/2015		10/06/2015		10/06/2015
		Date Analyzed		10/12/2015		10/11/2015		10/11/2015
		Sample Size (wet)		30.96		30.61		30.02
		% Solid		33.50		70.67		78.30
		File ID		F2310081544.D		F2310081534.D		F2310081535.D
		Units		µg/Kg		µg/Kg		µg/Kg
		Final Volume		2		2		2
		Dilution		1		1		1
		Reporting Limit		1.93		0.925		0.851
Class	Abbrev	Analytes	Result	SSRL	Result	SSRL	Result	SSRL
2	D0	cis/trans-Decalin	85.1	1.93	27.5	0.925	18.9	0.851
2	D1	C1-Decalins	71.2	1.93	23.0	0.925	14.2	0.851
2	D2	C2-Decalins	64.3	1.93	20.4	0.925	10.1	0.851
2	D3	C3-Decalins	42.8	1.93	13.7	0.925	6.01	0.851
2	D4	C4-Decalins	57.8	1.93	18.6	0.925	9.40	0.851
2	BT0	Benzothiophene	5.15	1.93	1.71	0.925	0.966	0.851
2	BT1	C1-Benzo(b)thiophenes	17.4	1.93	6.36	0.925	3.37	0.851
2	BT2	C2-Benzo(b)thiophenes	20.0	1.93	6.51	0.925	3.01	0.851
2	BT3	C3-Benzo(b)thiophenes	21.5	1.93	7.79	0.925	3.96	0.851
2	BT4	C4-Benzo(b)thiophenes	9.92	1.93	3.35	0.925	1.91	0.851
2	N0	Naphthalene	550	1.93	147	0.925	96.3	0.851
2	N1	C1-Naphthalenes	989	1.93	310	0.925	248	0.851
2	N2	C2-Naphthalenes	1050	1.93	354	0.925	266	0.851
2	N3	C3-Naphthalenes	677	1.93	229	0.925	148	0.851
2	N4	C4-Naphthalenes	350	1.93	116	0.925	65.4	0.851
2	B	Biphenyl	138	1.93	43.9	0.925	35.6	0.851
3	DF	Dibenzofuran	307	1.93	95.6	0.925	62.9	0.851
3	AY	Acenaphthylene	59.3	1.93	13.5	0.925	3.85	0.851
3	AE	Acenaphthene	27.6 G	1.93	8.13 G	0.925	4.80 G	0.851
3	F0	Fluorene	48.6	1.93	12.6	0.925	8.11	0.851
3	F1	C1-Fluorenes	64.2	1.93	22.5	0.925	17.5	0.851
3	F2	C2-Fluorenes	328	1.93	102	0.925	57.1	0.851
3	F3	C3-Fluorenes	317	1.93	92.9	0.925	45.0	0.851
3	A0	Anthracene	109	1.93	22.8	0.925	7.29	0.851
3	P0	Phenanthrene	1100	1.93	300	0.925	169	0.851
3	PA1	C1-Phenanthrenes/Anthracenes	1140	1.93	340	0.925	171	0.851
3	PA2	C2-Phenanthrenes/Anthracenes	795	1.93	234	0.925	106	0.851
3	PA3	C3-Phenanthrenes/Anthracenes	355	1.93	105	0.925	44.6	0.851
3	PA4	C4-Phenanthrenes/Anthracenes	162	1.93	47.9	0.925	19.4	0.851
3	RET	Retene	96.7	1.93	28.1	0.925	10.6	0.851
3	DBT0	Dibenzothiophene	55.5	1.93	16.3	0.925	9.46	0.851
3	DBT1	C1-Dibenzothiophenes	100	1.93	32.5	0.925	16.5	0.851
3	DBT2	C2-Dibenzothiophenes	84.0	1.93	26.4	0.925	12.5	0.851
3	DBT3	C3-Dibenzothiophenes	50.7	1.93	15.1	0.925	7.45	0.851
3	DBT4	C4-Dibenzothiophenes	23.1	1.93	7.22	0.925	3.23	0.851
4	BF	Benzo(b)fluorene	58.4	1.93	15.1	0.925	5.55	0.851
4	FL0	Fluoranthene	606	1.93	125	0.925	39.2	0.851
4	PY0	Pyrene	518	1.93	114	0.925	35.9	0.851
4	FP1	C1-Fluoranthenes/Pyrenes	464	1.93	126	0.925	50.6	0.851
4	FP2	C2-Fluoranthenes/Pyrenes	642	1.93	178	0.925	72.6	0.851
4	FP3	C3-Fluoranthenes/Pyrenes	522	1.93	149	0.925	57.7	0.851
4	FP4	C4-Fluoranthenes/Pyrenes	332	1.93	94.9	0.925	35.0	0.851
4	NBT0	Naphthobenzothiophenes	178	1.93	48.9	0.925	19.2	0.851
4	NBT1	C1-Naphthobenzothiophenes	186	1.93	54.8	0.925	21.8	0.851
4	NBT2	C2-Naphthobenzothiophenes	132	1.93	39.6	0.925	15.9	0.851
4	NBT3	C3-Naphthobenzothiophenes	69.9	1.93	19.8	0.925	8.56	0.851
4	NBT4	C4-Naphthobenzothiophenes	43.3	1.93	11.6	0.925	4.81	0.851
4	BA0	Benz[a]anthracene	317	1.93	70.1	0.925	21.7	0.851
4	C0	Chrysene/Triphenylene	475	1.93	118	0.925	45.8	0.851
4	BC1	C1-Chrysenes	366	1.93	99.0	0.925	37.9	0.851
4	BC2	C2-Chrysenes	311	1.93	87.8	0.925	33.0	0.851
4	BC3	C3-Chrysenes	323	1.93	93.2	0.925	37.7	0.851
4	BC4	C4-Chrysenes	201	1.93	59.1	0.925	24.6	0.851
5	BBF	Benzo[b]fluoranthene	351	1.93	79.5	0.925	26.1	0.851
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene	257	1.93	59.4	0.925	14.9	0.851
5	BAF	Benzo[a]fluoranthene	58.9	1.93	12.9	0.925	3.06	0.851
5	BEP	Benzo[e]pyrene	312	1.93	79.7	0.925	32.1	0.851
5	BAP	Benzo[a]pyrene	271	1.93	58.6	0.925	16.9	0.851
5	PER	Perylene	86.5	1.93	20.9	0.925	4.73	0.851
6	IND	Indeno[1,2,3-cd]pyrene	182	1.93	40.5	0.925	11.2	0.851
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	65.6	1.93	16.0	0.925	5.21	0.851
6	GHI	Benzo[g,h,i]perylene	210	1.93	52.6	0.925	19.6	0.851
3	CAR	Carbazole	38.4	1.93	8.45	0.925	3.63	0.851
3	4MDT	4-Methyldibenzothiophene	33.3	1.93	11.2	0.925	6.12	0.851
3	2MDT	2/3-Methyldibenzothiophene	39.3	1.93	12.9	0.925	7.04	0.851
3	1MDT	1-Methyldibenzothiophene	14.6	1.93	4.85	0.925	2.11	0.851
3	3MP	3-Methylphenanthrene	231	1.93	69.9	0.925	34.7	0.851
3	2MP	2-Methylphenanthrene	320	1.93	91.7	0.925	49.3	0.851
3	2MA	2-Methylanthracene	34.3	1.93	7.45	0.925	2.02	0.851
3	9MP	9/4-Methylphenanthrene	287	1.93	85.2	0.925	42.7	0.851
3	1MP	1-Methylphenanthrene	243	1.93	72.5	0.925	38.2	0.851

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

		Client ID		SED-KAN-MS05			SED-KAN-MS04		SED-KAN-MS03	
		Lab ID		1510001-04			1510001-05		1510001-06	
		Matrix		Sediment			Sediment		Sediment	
		Reference Method		Modified 8270D			Modified 8270D		Modified 8270D	
		Batch ID		SS100615B02			SS100615B02		SS100615B02	
		Date Collected		09/29/2015			09/29/2015		09/29/2015	
		Date Received		10/01/2015			10/01/2015		10/01/2015	
		Date Prepped		10/06/2015			10/06/2015		10/06/2015	
		Date Analyzed		10/12/2015			10/11/2015		10/11/2015	
		Sample Size (wet)		30.96			30.61		30.02	
		% Solid		33.50			70.67		78.30	
		File ID		F2310081544.D			F2310081534.D		F2310081535.D	
		Units		µg/Kg			µg/Kg		µg/Kg	
		Final Volume		2			2		2	
		Dilution		1			1		1	
		Reporting Limit		1.93			0.925		0.851	
Class	Abbrev	Analytes	Result	SSRL		Result	SSRL		Result	SSRL
t23	T4	C23 Tricyclic Terpane	4.64	1.93		1.02	0.925		0.840 J	0.851
t24	T5	C24 Tricyclic Terpane	5.80	1.93		1.09	0.925		0.539 J	0.851
t25	T6	C25 Tricyclic Terpane	6.59	1.93		1.52	0.925		1.01	0.851
te24	T6a	C24 Tetracyclic Terpane	9.98	1.93		3.26	0.925		1.54	0.851
t26S	T6b	C26 Tricyclic Terpane-22S	5.47	1.93		1.54	0.925		0.549 J	0.851
t26R	T6c	C26 Tricyclic Terpane-22R	U	1.93		U	0.925		U	0.851
t28S	T7	C28 Tricyclic Terpane-22S	3.13	1.93		0.874 J	0.925		0.370 J	0.851
t28R	T8	C28 Tricyclic Terpane-22R	4.52	1.93		1.11	0.925		0.447 J	0.851
t29S	T9	C29 Tricyclic Terpane-22S	1.59 J	1.93		0.661 J	0.925		0.567 J	0.851
t29R	T10	C29 Tricyclic Terpane-22R	6.64 G	1.93		0.640 J	0.925		0.306 J	0.851
Ts	T11	18a-22,29,30-Trisnorneohopane-TS	11.9	1.93		4.27	0.925		1.63	0.851
t30S	T11a	C30 Tricyclic Terpane-22S	2.42	1.93		0.918 J	0.925		U	0.851
t30R	T11b	C30 Tricyclic Terpane-22R	3.00	1.93		0.865 J	0.925		0.488 J	0.851
Tm	T12	17a(H)-22,29,30-Trisnorhopane-TM	27.1	1.93		8.18	0.925		3.26	0.851
BNH	T14a	17a/b,21b/a 28,30-Bisnorhopane	7.13	1.93		1.92	0.925		0.516 J	0.851
25N	T14b	17a(H),21b(H)-25-Norhopane	83.6 G	1.93		19.1 G	0.925		0.998 G	0.851
H29	T15	30-Norhopane	77.6	1.93		22.6	0.925		6.88	0.851
C29Ts	T16	18a(H)-30-Norneohopane-C29Ts	15.5	1.93		5.02	0.925		1.62	0.851
X	X	17a(H)-Diahopane	7.49	1.93		2.57	0.925		1.07	0.851
M29	T17	30-Normoretane	6.94	1.93		2.61	0.925		1.05	0.851
OL	T18	18a(H)&18b(H)-Oleananes	5.58	1.93		1.75	0.925		0.658 J	0.851
H30	T19	Hopane	90.8	1.93		27.1	0.925		9.80	0.851
M30	T20	Moretane	43.8 G	1.93		13.9 G	0.925		1.08	0.851
H31S	T21	30-Homohopane-22S	46.9	1.93		13.8	0.925		4.06	0.851
H31R	T22	30-Homohopane-22R	35.4	1.93		9.44	0.925		3.06	0.851
T22A	T22A	T22a-Gammacerane/C32-diahopane	21.6	1.93		6.04	0.925		1.01	0.851
H32S	T26	30,31-Bishomohopane-22S	150 G	1.93		46.9 G	0.925		7.64 G	0.851
H32R	T27	30,31-Bishomohopane-22R	62.8	1.93		11.8	0.925		2.25	0.851
H33S	T30	30,31-Trishomohopane-22S	42.1 G	1.93		10.9 G	0.925		2.07	0.851
H33R	T31	30,31-Trishomohopane-22R	8.99	1.93		2.40	0.925		1.09	0.851
H34S	T32	Tetrakishomohopane-22S	146 G	1.93		41.7	0.925		5.71	0.851
H34R	T33	Tetrakishomohopane-22R	173 G	1.93		37.3 G	0.925		1.65 G	0.851
H35S	T34	Pentakishomohopane-22S	10.1	1.93		2.91	0.925		U	0.851
H35R	T35	Pentakishomohopane-22R	5.98	1.93		1.84	0.925		U	0.851
d27S	S4	13b(H),17a(H)-20S-Diacholestane	8.29	1.93		2.53	0.925		1.35	0.851
d27R	S5	13b(H),17a(H)-20R-Diacholestane	4.19	1.93		1.21	0.925		0.816 J	0.851
d28S	S8	13b,17a-20S-Methyldiacholestane	6.18	1.93		1.83	0.925		0.875	0.851
aa27S	S12	14a(H),17a(H)-20S-Cholestane/13b(H),17a(H)-20S-Ethyldiacholestane (S12)	16.0	1.93		4.58	0.925		2.14	0.851
aa27R	S17	14a(H),17a(H)-20R-Cholestane/13b(H),17a(H)-20R-Ethyldiacholestane (S17)	17.3	1.93		4.45	0.925		1.94	0.851
d29R	S18	Unknown Sterane (S18)	3.86	1.93		1.40	0.925		0.617 J	0.851
d29S	S19	13a,17b-20S-Ethyldiacholestane	U	1.93		0.393 J	0.925		0.115 J	0.851
aa28S	S20	14a,17a-20S-Methylcholestane	9.30	1.93		3.20	0.925		1.18	0.851
aa28R	S24	14a,17a-20R-Methylcholestane	9.22	1.93		2.70	0.925		1.05	0.851
aa29S	S25	14a(H),17a(H)-20S-Ethylcholestane	13.0	1.93		4.03	0.925		1.33	0.851
aa29R	S28	14a(H),17a(H)-20R-Ethylcholestane	14.8	1.93		4.09	0.925		1.44	0.851
bb27R	S14	14b(H),17b(H)-20R-Cholestane	6.63	1.93		1.82	0.925		0.962	0.851
bb27S	S15	14b(H),17b(H)-20S-Cholestane	7.89	1.93		2.06	0.925		1.05	0.851
bb28R	S22	14b,17b-20R-Methylcholestane	9.35	1.93		3.04	0.925		1.24	0.851
bb28S	S23	14b,17b-20S-Methylcholestane	14.0	1.93		3.91	0.925		1.65	0.851
bb29R	S26	14b(H),17b(H)-20R-Ethylcholestane	23.9	1.93		5.53	0.925		2.78	0.851
bb29S	S27	14b(H),17b(H)-20S-Ethylcholestane	14.4	1.93		4.64	0.925		1.47	0.851
RC26/SC27TA	RC26/SC27TA	C26,20R- +C27,20S- triaromatic steroid	26.6	1.93		6.09	0.925		2.64	0.851
SC28TA	SC28TA	C28,20S-triaromatic steroid	31.2	1.93		7.44	0.925		2.78	0.851
RC27TA	RC27TA	C27,20R-triaromatic steroid	26.4	1.93		6.27	0.925		1.81	0.851
RC28TA	RC28TA	C28,20R-triaromatic steroid	23.6	1.93		5.14	0.925		2.30	0.851

Surrogates (% Recovery)			
Naphthalene-d8	73	75	77
Phenanthrene-d10	94	95	98
Benzo[a]pyrene-d12	92	92	93
5B(H)Cholane	97	95	94

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

		Client ID		SED-KAN-MS02		SED-KAN-MS01		SED-CONFLUENCE
		Lab ID		1510001-07		1510001-08		1510001-09
		Matrix		Sediment		Sediment		Sediment
		Reference Method		Modified 8270D		Modified 8270D		Modified 8270D
		Batch ID		SS100615B02		SS100615B02		SS100615B02
		Date Collected		09/29/2015		09/29/2015		09/29/2015
		Date Received		10/01/2015		10/01/2015		10/01/2015
		Date Prepped		10/06/2015		10/06/2015		10/06/2015
		Date Analyzed		10/11/2015		10/11/2015		10/11/2015
		Sample Size (wet)		30.73		30.2		30.36
		% Solid		62.08		70.92		79.01
		File ID		F2310081536.D		F2310081537.D		F2310081538.D
		Units		µg/Kg		µg/Kg		µg/Kg
		Final Volume		2		2		2
		Dilution		1		1		1
		Reporting Limit		1.05		0.934		0.834
Class	Abbrev	Analytes	Result	SSRL	Result	SSRL	Result	SSRL
2	D0	cis/trans-Decalin	55.5	1.05	128	0.934	26.9	0.834
2	D1	C1-Decalins	51.8	1.05	97.0	0.934	19.7	0.834
2	D2	C2-Decalins	52.3	1.05	88.6	0.934	16.7	0.834
2	D3	C3-Decalins	37.3	1.05	50.9	0.934	9.85	0.834
2	D4	C4-Decalins	44.3	1.05	76.6	0.934	14.1	0.834
2	BT0	Benzothiophene	3.10	1.05	5.74	0.934	4.57	0.834
2	BT1	C1-Benzo(b)thiophenes	10.9	1.05	23.1	0.934	10.9	0.834
2	BT2	C2-Benzo(b)thiophenes	11.5	1.05	18.8	0.934	11.7	0.834
2	BT3	C3-Benzo(b)thiophenes	12.8	1.05	24.2	0.934	12.5	0.834
2	BT4	C4-Benzo(b)thiophenes	6.74	1.05	11.7	0.934	7.51	0.834
2	N0	Naphthalene	308	1.05	584	0.934	239	0.834
2	N1	C1-Naphthalenes	585	1.05	1170	0.934	431	0.834
2	N2	C2-Naphthalenes	635	1.05	1330	0.934	483	0.834
2	N3	C3-Naphthalenes	425	1.05	896	0.934	368	0.834
2	N4	C4-Naphthalenes	229	1.05	464	0.934	181	0.834
2	B	Biphenyl	82.2	1.05	176	0.934	53.8	0.834
3	DF	Dibenzofuran	190	1.05	416	0.934	275	0.834
3	AY	Acenaphthylene	30.8	1.05	22.6	0.934	195	0.834
3	AE	Acenaphthene	15.2 G	1.05	56.7	0.934	51.5	0.834
3	F0	Fluorene	22.1	1.05	74.5	0.934	291	0.834
3	F1	C1-Fluorenes	36.0	1.05	60.9	0.934	112	0.834
3	F2	C2-Fluorenes	202	1.05	393	0.934	159	0.834
3	F3	C3-Fluorenes	199	1.05	458	0.934	138	0.834
3	A0	Anthracene	55.5	1.05	163	0.934	407	0.834
3	P0	Phenanthrene	645	1.05	1720	0.934	1620	0.834
3	PA1	C1-Phenanthrenes/Anthracenes	691	1.05	1600	0.934	892	0.834
3	PA2	C2-Phenanthrenes/Anthracenes	464	1.05	999	0.934	454	0.834
3	PA3	C3-Phenanthrenes/Anthracenes	215	1.05	444	0.934	180	0.834
3	PA4	C4-Phenanthrenes/Anthracenes	105	1.05	194	0.934	69.9	0.834
3	RET	Retene	58.8	1.05	120	0.934	30.1	0.834
3	DBT0	Dibenzothiophene	33.5	1.05	86.1	0.934	96.8	0.834
3	DBT1	C1-Dibenzothiophenes	65.1	1.05	127	0.934	79.2	0.834
3	DBT2	C2-Dibenzothiophenes	53.5	1.05	97.8	0.934	50.8	0.834
3	DBT3	C3-Dibenzothiophenes	34.0	1.05	49.4	0.934	26.8	0.834
3	DBT4	C4-Dibenzothiophenes	18.4	1.05	22.2	0.934	10.5	0.834
4	BF	Benzo(b)fluorene	32.8	1.05	54.7	0.934	132	0.834
4	FL0	Fluoranthene	314	1.05	844	0.934	1500	0.834
4	PY0	Pyrene	272	1.05	659	0.934	1110	0.834
4	FP1	C1-Fluoranthenes/Pyrenes	251	1.05	506	0.934	715	0.834
4	FP2	C2-Fluoranthenes/Pyrenes	361	1.05	702	0.934	599	0.834
4	FP3	C3-Fluoranthenes/Pyrenes	302	1.05	555	0.934	349	0.834
4	FP4	C4-Fluoranthenes/Pyrenes	198	1.05	338	0.934	189	0.834
4	NBT0	Naphthobenzothiophenes	102	1.05	201	0.934	196	0.834
4	NBT1	C1-Naphthobenzothiophenes	110	1.05	205	0.934	139	0.834
4	NBT2	C2-Naphthobenzothiophenes	80.2	1.05	133	0.934	74.6	0.834
4	NBT3	C3-Naphthobenzothiophenes	42.4	1.05	53.7	0.934	30.6	0.834
4	NBT4	C4-Naphthobenzothiophenes	27.8	1.05	31.7	0.934	11.2	0.834
4	BA0	Benz[a]anthracene	174	1.05	320	0.934	699	0.834
4	C0	Chrysene/Triphenylene	258	1.05	446	0.934	655	0.834
4	BC1	C1-Chrysenes	217	1.05	360	0.934	422	0.834
4	BC2	C2-Chrysenes	191	1.05	315	0.934	228	0.834
4	BC3	C3-Chrysenes	199	1.05	309	0.934	178	0.834
4	BC4	C4-Chrysenes	121	1.05	170	0.934	96.5	0.834
5	BBF	Benzo[b]fluoranthene	182	1.05	280	0.934	458	0.834
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene	141	1.05	228	0.934	488	0.834
5	BAF	Benzo[a]fluoranthene	30.8	1.05	41.8	0.934	136	0.834
5	BEP	Benzo[e]pyrene	168	1.05	268	0.934	371	0.834
5	BAP	Benzo[a]pyrene	145	1.05	243	0.934	498	0.834
5	PER	Perylene	42.1	1.05	61.4	0.934	125	0.834
6	IND	Indeno[1,2,3-cd]pyrene	97.5	1.05	158	0.934	287	0.834
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	35.3	1.05	58.0	0.934	106	0.834
6	GHI	Benzo[g,h,i]perylene	112	1.05	185	0.934	268	0.834
3	CAR	Carbazole	16.5	1.05	110	0.934	92.6	0.834
3	4MDT	4-Methyldibenzothiophene	21.4	1.05	40.6	0.934	24.3	0.834
3	2MDT	2/3-Methyldibenzothiophene	23.8	1.05	45.7	0.934	31.4	0.834
3	1MDT	1-Methyldibenzothiophene	9.78	1.05	19.9	0.934	9.87	0.834
3	3MP	3-Methylphenanthrene	143	1.05	349	0.934	210	0.834
3	2MP	2-Methylphenanthrene	195	1.05	461	0.934	260	0.834
3	2MA	2-Methylanthracene	17.1	1.05	37.0	0.934	78.7	0.834
3	9MP	9/4-Methylphenanthrene	177	1.05	409	0.934	183	0.834
3	1MP	1-Methylphenanthrene	147	1.05	334	0.934	148	0.834

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

		Client ID	SED-KAN-MS02			SED-KAN-MS01			SED-CONFLUENCE	
		Lab ID	1510001-07			1510001-08			1510001-09	
		Matrix	Sediment			Sediment			Sediment	
		Reference Method	Modified 8270D			Modified 8270D			Modified 8270D	
		Batch ID	SS100615B02			SS100615B02			SS100615B02	
		Date Collected	09/29/2015			09/29/2015			09/29/2015	
		Date Received	10/01/2015			10/01/2015			10/01/2015	
		Date Prepped	10/06/2015			10/06/2015			10/06/2015	
		Date Analyzed	10/11/2015			10/11/2015			10/11/2015	
		Sample Size (wet)	30.73			30.2			30.36	
		% Solid	62.08			70.92			79.01	
		File ID	F2310081536.D			F2310081537.D			F2310081538.D	
		Units	µg/Kg			µg/Kg			µg/Kg	
		Final Volume	2			2			2	
		Dilution	1			1			1	
		Reporting Limit	1.05			0.934			0.834	
Class	Abbrev	Analytes	Result		SSRL	Result		SSRL	Result		SSRL
t23	T4	C23 Tricyclic Terpane	3.42		1.05	2.84		0.934	0.739	J	0.834
t24	T5	C24 Tricyclic Terpane	2.04		1.05	1.48		0.934	0.695	J	0.834
t25	T6	C25 Tricyclic Terpane	4.35		1.05	5.92		0.934	2.28		0.834
te24	T6a	C24 Tetracyclic Terpane	6.07		1.05	10.1		0.934	3.40		0.834
t26S	T6b	C26 Tricyclic Terpane-22S	3.53		1.05	4.81		0.934	3.30		0.834
t26R	T6c	C26 Tricyclic Terpane-22R	2.09		1.05	1.64		0.934	0.846		0.834
t28S	T7	C28 Tricyclic Terpane-22S	1.87		1.05	0.513	J	0.934	0.234	J	0.834
t28R	T8	C28 Tricyclic Terpane-22R	3.88		1.05	1.20		0.934	0.855		0.834
t29S	T9	C29 Tricyclic Terpane-22S	1.19		1.05	1.10		0.934	0.615	J	0.834
t29R	T10	C29 Tricyclic Terpane-22R	3.61	G	1.05	3.69	G	0.934	0.771	J	0.834
Ts	T11	18a-22,29,30-Trisnorneohopane-TS	7.17		1.05	7.01		0.934	3.21		0.834
t30S	T11a	C30 Tricyclic Terpane-22S	1.41		1.05		U	0.934	0.784	J	0.834
t30R	T11b	C30 Tricyclic Terpane-22R	2.03		1.05	1.67		0.934	0.898		0.834
Tm	T12	17a(H)-22,29,30-Trisnorhopane-TM	15.5		1.05	23.6		0.934	7.44		0.834
BNH	T14a	17a/b,21b/a 28,30-Bisnorhopane	3.34		1.05	1.80		0.934		U	0.834
25N	T14b	17a(H),21b(H)-25-Norhopane	41.6	G	1.05	7.85	G	0.934	1.16	G	0.834
H29	T15	30-Norhopane	39.7		1.05	49.4		0.934	13.2		0.834
C29Ts	T16	18a(H)-30-Norneohopane-C29Ts	7.24		1.05	5.48		0.934	1.83		0.834
X	X	17a(H)-Diahopane	5.05		1.05	7.40		0.934	1.83		0.834
M29	T17	30-Normoretane	3.41		1.05	7.45		0.934	1.79		0.834
OL	T18	18a(H)&18b(H)-Oleananes	3.49		1.05	1.64		0.934	0.791	J	0.834
H30	T19	Hopane	51.6		1.05	71.7		0.934	19.5		0.834
M30	T20	Moretane	18.8	G	1.05	6.65		0.934	2.17		0.834
H31S	T21	30-Homohopane-22S	25.6		1.05	32.3		0.934	8.13		0.834
H31R	T22	30-Homohopane-22R	18.4		1.05	21.8		0.934	5.64		0.834
T22A	T22A	T22a-Gammacerane/C32-diahopane	6.56		1.05	4.92		0.934	1.29		0.834
H32S	T26	30,31-Bishomohopane-22S	58.9	G	1.05	29.4	G	0.934	7.92	G	0.834
H32R	T27	30,31-Bishomohopane-22R	26.0		1.05	15.9		0.934	3.89		0.834
H33S	T30	30,31-Trishomohopane-22S	19.1	G	1.05	11.1		0.934	2.50		0.834
H33R	T31	30,31-Trishomohopane-22R	4.24		1.05	6.38		0.934	1.44		0.834
H34S	T32	Tetrakishomohopane-22S	66.9		1.05	27.2		0.934	3.38		0.834
H34R	T33	Tetrakishomohopane-22R	82.6	G	1.05	19.8	G	0.934	1.67	G	0.834
H35S	T34	Pentakishomohopane-22S	4.31		1.05	3.13		0.934	1.03		0.834
H35R	T35	Pentakishomohopane-22R	2.84		1.05	2.53		0.934	0.678	J	0.834
d27S	S4	13b(H),17a(H)-20S-Diacholestane	6.11		1.05	5.31		0.934	3.41		0.834
d27R	S5	13b(H),17a(H)-20R-Diacholestane	2.98		1.05	2.09		0.934	0.778	J	0.834
d28S	S8	13b,17a-20S-Methyldiacholestane	3.75		1.05	3.27		0.934	1.03		0.834
aa27S	S12	14a(H),17a(H)-20S-Cholestane/13b(H),17a(H)-20S-Ethyldiacholestane (S12)	10.4		1.05	7.19		0.934	3.20		0.834
aa27R	S17	14a(H),17a(H)-20R-Cholestane/13b(H),17a(H)-20R-Ethyldiacholestane (S17)	12.5		1.05	8.35		0.934	3.07		0.834
d29R	S18	Unknown Sterane (S18)	3.32		1.05	1.86		0.934	0.739	J	0.834
d29S	S19	13a,17b-20S-Ethyldiacholestane	0.656	J	1.05		U	0.934		U	0.834
aa28S	S20	14a,17a-20S-Methylcholestane	6.43		1.05	6.42		0.934	1.86		0.834
aa28R	S24	14a,17a-20R-Methylcholestane	5.12		1.05	5.45		0.934	1.59		0.834
aa29S	S25	14a(H),17a(H)-20S-Ethylcholestane	8.53		1.05	7.52		0.934	2.50		0.834
aa29R	S28	14a(H),17a(H)-20R-Ethylcholestane	7.51		1.05	6.99		0.934	1.96		0.834
bb27R	S14	14b(H),17b(H)-20R-Cholestane	4.26		1.05	2.72		0.934	1.14		0.834
bb27S	S15	14b(H),17b(H)-20S-Cholestane	4.78		1.05	2.24		0.934	1.11		0.834
bb28R	S22	14b,17b-20R-Methylcholestane	5.47		1.05	6.28		0.934	1.85		0.834
bb28S	S23	14b,17b-20S-Methylcholestane	8.39		1.05	8.78		0.934	2.66		0.834
bb29R	S26	14b(H),17b(H)-20R-Ethylcholestane	13.0		1.05	12.9		0.934	3.98		0.834
bb29S	S27	14b(H),17b(H)-20S-Ethylcholestane	9.69		1.05	10.3		0.934	2.58		0.834
RC26/SC27TA	RC26/SC27TA	C26,20R- +C27,20S- triaromatic steroid	16.6		1.05	8.31		0.934	3.07		0.834
SC28TA	SC28TA	C28,20S-triaromatic steroid	22.6		1.05	10.3		0.934	4.30		0.834
RC27TA	RC27TA	C27,20R-triaromatic steroid	14.4		1.05	8.63		0.934	2.75		0.834
RC28TA	RC28TA	C28,20R-triaromatic steroid	17.2		1.05	7.12		0.934	3.15		0.834

Surrogates (% Recovery)			
Naphthalene-d8	74	77	75
Phenanthrene-d10	93	98	97
Benzo[a]pyrene-d12	93	87	98
5B(H)Cholane	99	97	105

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID			SED-KAN-UPS050		SED-ARM-UPS100	
Lab ID			1510001-10		1510001-11	
Matrix			Sediment		Sediment	
Reference Method			Modified 8270D		Modified 8270D	
Batch ID			SS100615B02		SS100615B02	
Date Collected			09/29/2015		09/29/2015	
Date Received			10/01/2015		10/01/2015	
Date Prepped			10/06/2015		10/06/2015	
Date Analyzed			10/11/2015		10/11/2015	
Sample Size (wet)			30.25		30.48	
% Solid			81.58		77.13	
File ID			F2310081539.D		F2310081540.D	
Units			µg/Kg		µg/Kg	
Final Volume			2		2	
Dilution			1		1	
Reporting Limit			0.810		0.851	
Class	Abbrev	Analytes	Result	SSRL	Result	SSRL
2	D0	cis/trans-Decalin	120	0.810	21.6	0.851
2	D1	C1-Decalins	96.3	0.810	15.3	0.851
2	D2	C2-Decalins	72.0	0.810	11.2	0.851
2	D3	C3-Decalins	40.2	0.810	6.28	0.851
2	D4	C4-Decalins	66.2	0.810	7.98	0.851
2	BT0	Benzothiophene	1.82	0.810	0.689 J	0.851
2	BT1	C1-Benzo(b)thiophenes	10.6	0.810	3.60	0.851
2	BT2	C2-Benzo(b)thiophenes	8.49	0.810	3.24	0.851
2	BT3	C3-Benzo(b)thiophenes	14.0	0.810	3.91	0.851
2	BT4	C4-Benzo(b)thiophenes	6.36	0.810	1.95	0.851
2	N0	Naphthalene	205	0.810	137	0.851
2	N1	C1-Naphthalenes	449	0.810	395	0.851
2	N2	C2-Naphthalenes	501	0.810	402	0.851
2	N3	C3-Naphthalenes	343	0.810	208	0.851
2	N4	C4-Naphthalenes	210	0.810	83.7	0.851
2	B	Biphenyl	90.8	0.810	49.6	0.851
3	DF	Dibenzofuran	208	0.810	93.6	0.851
3	AY	Acenaphthylene	8.07	0.810	4.27	0.851
3	AE	Acenaphthene	13.9 G	0.810	5.00 G	0.851
3	F0	Fluorene	14.1	0.810	11.1	0.851
3	F1	C1-Fluorenes	25.0	0.810	23.9	0.851
3	F2	C2-Fluorenes	341	0.810	65.4	0.851
3	F3	C3-Fluorenes	328	0.810	55.1	0.851
3	A0	Anthracene	24.6	0.810	9.96	0.851
3	P0	Phenanthrene	1010	0.810	241	0.851
3	PA1	C1-Phenanthrenes/Anthracenes	1150	0.810	242	0.851
3	PA2	C2-Phenanthrenes/Anthracenes	651	0.810	152	0.851
3	PA3	C3-Phenanthrenes/Anthracenes	240	0.810	65.6	0.851
3	PA4	C4-Phenanthrenes/Anthracenes	102	0.810	29.1	0.851
3	RET	Retene	51.3	0.810	15.3	0.851
3	DBT0	Dibenzothiophene	30.8	0.810	13.4	0.851
3	DBT1	C1-Dibenzothiophenes	70.2	0.810	22.3	0.851
3	DBT2	C2-Dibenzothiophenes	55.8	0.810	15.5	0.851
3	DBT3	C3-Dibenzothiophenes	27.0	0.810	9.13	0.851
3	DBT4	C4-Dibenzothiophenes	12.2	0.810	3.68	0.851
4	BF	Benzo(b)fluorene	12.9	0.810	9.18	0.851
4	FL0	Fluoranthene	138	0.810	39.4	0.851
4	PY0	Pyrene	153	0.810	40.3	0.851
4	FP1	C1-Fluoranthenes/Pyrenes	216	0.810	79.3	0.851
4	FP2	C2-Fluoranthenes/Pyrenes	455	0.810	119	0.851
4	FP3	C3-Fluoranthenes/Pyrenes	433	0.810	100	0.851
4	FP4	C4-Fluoranthenes/Pyrenes	264	0.810	65.7	0.851
4	NBT0	Naphthobenzothiophenes	127	0.810	29.4	0.851
4	NBT1	C1-Naphthobenzothiophenes	159	0.810	43.4	0.851
4	NBT2	C2-Naphthobenzothiophenes	92.8	0.810	32.0	0.851
4	NBT3	C3-Naphthobenzothiophenes	33.6	0.810	17.2	0.851
4	NBT4	C4-Naphthobenzothiophenes	17.5	0.810	10.3	0.851
4	BA0	Benz[a]anthracene	81.0	0.810	30.1	0.851
4	C0	Chrysene/Triphenylene	214	0.810	68.2	0.851
4	BC1	C1-Chrysenes	227	0.810	85.0	0.851
4	BC2	C2-Chrysenes	188	0.810	84.7	0.851
4	BC3	C3-Chrysenes	171	0.810	91.3	0.851
4	BC4	C4-Chrysenes	101	0.810	52.7	0.851
5	BBF	Benzo[b]fluoranthene	76.3	0.810	37.8	0.851
5	BJKF	Benzo[j]fluoranthene/Benzo[k]fluoranthene	35.0	0.810	17.2	0.851
5	BAF	Benzo[a]fluoranthene	5.81	0.810	3.57	0.851
5	BEP	Benzo[e]pyrene	98.9	0.810	60.2	0.851
5	BAP	Benzo[a]pyrene	40.3	0.810	23.7	0.851
5	PER	Perylene	11.0	0.810	3.77	0.851
6	IND	Indeno[1,2,3-cd]pyrene	23.2	0.810	12.6	0.851
6	DA	Dibenz[ah]anthracene/Dibenz[ac]anthracene	15.8	0.810	8.40	0.851
6	GHI	Benzo[g,h,i]perylene	49.2	0.810	29.6	0.851
3	CAR	Carbazole	9.76	0.810	6.99	0.851
3	4MDT	4-Methyldibenzothiophene	21.6	0.810	7.87	0.851
3	2MDT	2/3-Methyldibenzothiophene	21.9	0.810	9.78	0.851
3	1MDT	1-Methyldibenzothiophene	11.4	0.810	2.87	0.851
3	3MP	3-Methylphenanthrene	239	0.810	48.9	0.851
3	2MP	2-Methylphenanthrene	352	0.810	70.2	0.851
3	2MA	2-Methylanthracene	10.4	0.810	5.47	0.851
3	9MP	9/4-Methylphenanthrene	275	0.810	61.2	0.851
3	1MP	1-Methylphenanthrene	264	0.810	52.5	0.851

Project Name: CSXT-Mt. Carbon, WV.
Project Number: 7197

Client ID		SED-KAN-UPS050			SED-ARM-UPS100	
Lab ID		1510001-10			1510001-11	
Matrix		Sediment			Sediment	
Reference Method		Modified 8270D			Modified 8270D	
Batch ID		SS100615B02			SS100615B02	
Date Collected		09/29/2015			09/29/2015	
Date Received		10/01/2015			10/01/2015	
Date Prepped		10/06/2015			10/06/2015	
Date Analyzed		10/11/2015			10/11/2015	
Sample Size (wet)		30.25			30.48	
% Solid		81.58			77.13	
File ID		F2310081539.D			F2310081540.D	
Units		µg/Kg			µg/Kg	
Final Volume		2			2	
Dilution		1			1	
Reporting Limit		0.810			0.851	
Class	Abbrev	Analytes	Result	SSRL	Result	SSRL
t23	T4	C23 Tricyclic Terpane	0.857	0.810	0.811 J	0.851
t24	T5	C24 Tricyclic Terpane	0.545 J	0.810	0.549 J	0.851
t25	T6	C25 Tricyclic Terpane	4.45	0.810	1.16	0.851
te24	T6a	C24 Tetracyclic Terpane	6.05	0.810	1.52	0.851
t26S	T6b	C26 Tricyclic Terpane-22S	3.18	0.810	0.974	0.851
t26R	T6c	C26 Tricyclic Terpane-22R	0.949	0.810	0.509 J	0.851
t28S	T7	C28 Tricyclic Terpane-22S	U	0.810	0.278 J	0.851
t28R	T8	C28 Tricyclic Terpane-22R	0.883	0.810	0.606 J	0.851
t29S	T9	C29 Tricyclic Terpane-22S	0.521 J	0.810	0.501 J	0.851
t29R	T10	C29 Tricyclic Terpane-22R	U	0.810	0.483 J	0.851
Ts	T11	18a-22,29,30-Trisnorneohopane-TS	3.29	0.810	2.23	0.851
t30S	T11a	C30 Tricyclic Terpane-22S	U	0.810	U	0.851
t30R	T11b	C30 Tricyclic Terpane-22R	0.995	0.810	U	0.851
Tm	T12	17a(H)-22,29,30-Trisnorhopane-TM	11.5	0.810	4.37	0.851
BNH	T14a	17a/b,21b/a 28,30-Bisnorhopane	0.654 J	0.810	0.760 J	0.851
25N	T14b	17a(H),21b(H)-25-Norhopane	1.81 G	0.810	U	0.851
H29	T15	30-Norhopane	21.6	0.810	9.29	0.851
C29Ts	T16	18a(H)-30-Norneohopane-C29Ts	2.38	0.810	1.97	0.851
X	X	17a(H)-Diahopane	4.23	0.810	0.964	0.851
M29	T17	30-Normoretane	3.69	0.810	1.56	0.851
OL	T18	18a(H)&18b(H)-Oleananes	0.560 J	0.810	0.829 J	0.851
H30	T19	Hopane	33.6	0.810	12.9	0.851
M30	T20	Moretane	7.07 G	0.810	1.53	0.851
H31S	T21	30-Homohopane-22S	13.7	0.810	6.05	0.851
H31R	T22	30-Homohopane-22R	9.18	0.810	4.68	0.851
T22A	T22A	T22a-Gammacerane/C32-diahopane	2.52	0.810	1.25	0.851
H32S	T26	30,31-Bishomohopane-22S	18.4 G	0.810	5.41 G	0.851
H32R	T27	30,31-Bishomohopane-22R	6.60	0.810	3.04	0.851
H33S	T30	30,31-Trishomohopane-22S	4.64	0.810	2.72	0.851
H33R	T31	30,31-Trishomohopane-22R	2.58	0.810	1.82	0.851
H34S	T32	Tetrakishomohopane-22S	12.2	0.810	2.23	0.851
H34R	T33	Tetrakishomohopane-22R	6.10 G	0.810	1.50 G	0.851
H35S	T34	Pentakishomohopane-22S	U	0.810	1.34	0.851
H35R	T35	Pentakishomohopane-22R	U	0.810	1.28	0.851
d27S	S4	13b(H),17a(H)-20S-Diacholestane	2.95	0.810	1.61	0.851
d27R	S5	13b(H),17a(H)-20R-Diacholestane	0.753 J	0.810	0.726 J	0.851
d28S	S8	13b,17a-20S-Methyldiacholestane	1.95	0.810	1.20	0.851
aa27S	S12	14a(H),17a(H)-20S-Cholestane/13b(H),17a(H)-20S-Ethyldiacholestane (S12)	3.46	0.810	2.64	0.851
aa27R	S17	14a(H),17a(H)-20R-Cholestane/13b(H),17a(H)-20R-Ethyldiacholestane (S17)	4.07	0.810	2.98	0.851
d29R	S18	Unknown Sterane (S18)	0.969	0.810	0.850 J	0.851
d29S	S19	13a,17b-20S-Ethyldiacholestane	0.380 J	0.810	U	0.851
aa28S	S20	14a,17a-20S-Methylcholestane	2.80	0.810	1.70	0.851
aa28R	S24	14a,17a-20R-Methylcholestane	3.23	0.810	1.59	0.851
aa29S	S25	14a(H),17a(H)-20S-Ethylcholestane	3.65	0.810	1.77	0.851
aa29R	S28	14a(H),17a(H)-20R-Ethylcholestane	3.33	0.810	2.08	0.851
bb27R	S14	14b(H),17b(H)-20R-Cholestane	1.61	0.810	1.26	0.851
bb27S	S15	14b(H),17b(H)-20S-Cholestane	0.897	0.810	1.28	0.851
bb28R	S22	14b,17b-20R-Methylcholestane	3.54	0.810	1.52	0.851
bb28S	S23	14b,17b-20S-Methylcholestane	4.36	0.810	2.17	0.851
bb29R	S26	14b(H),17b(H)-20R-Ethylcholestane	7.22	0.810	3.32	0.851
bb29S	S27	14b(H),17b(H)-20S-Ethylcholestane	3.83	0.810	2.26	0.851
RC26/SC27TA	RC26/SC27TA	C26,20R- +C27,20S- triaromatic steroid	3.24	0.810	3.25	0.851
SC28TA	SC28TA	C28,20S-triaromatic steroid	3.34	0.810	3.53	0.851
RC27TA	RC27TA	C27,20R-triaromatic steroid	3.51	0.810	2.70	0.851
RC28TA	RC28TA	C28,20R-triaromatic steroid	1.47	0.810	3.29	0.851

Surrogates (% Recovery)		
Naphthalene-d8	84	74
Phenanthrene-d10	109	97
Benzo[a]pyrene-d12	93	94
5B(H)Cholane	99	93

U: The analyte was analyzed for but not detected at the sample specific level reported.
B: Found in associated blank as well as sample.
J: Estimated value, below quantitation limit.
E: Estimated value, exceeds the upper limit of calibration.
NA: Not Applicable
D: Secondary Dilution Performed
D1: Tertiary Dilution Performed
[a]: Value outside of QC Limits.
§: Surrogate value outside of acceptable range.
X: It is not possible to calculate RPD, one result is below the detection limit, the other is above reporting limit.
G: Matrix Interference.
P: Greater than 40% RPD between the two columns, the higher value is reported according to the method.
I: Due to interference, the lower value is reported.
N: Spike recovery outside control limits.
E: Estimated due to Interference. (Metals)
¤: Duplicate outside control limits.
P: Spike compound. (Metals)
J: Below CRDL, Project DL, or RL but greater than or equal to MDL
C: Sample concentration is > 4 times the spike level, recovery limits do not apply. (Metals)
S: Spike Compound. (Organics)
§: RPD criteria not applicable to results less than 5 times the reporting limit. (Metals)
T: Tentatively identified corexit compound.
C: Co-elution.
Z: Result not surrogate corrected.
DL: Surrogate result diluted out of sample.
W: Matrix interference may be present based on chemical reasonableness evaluation.

Appendix C

Freshwater Mussel Survey within the Potentially Impacted Area of the Kanawha River

FINAL Report:

FRESHWATER MUSSEL MONITORING SURVEY
MT. CARBON, WV

Prepared for:

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Project No. 7179 Task 5

Date: January 26, 2016

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Figure 2. Mussel Distribution Detected during the Qualitative Mussel Survey of the Kanawha River (RM 88.5) near Mt. Carbon, Kanawha County, WV.

Figure 2. Mussel Distribution Detected during the Quality Assurance/ Quality Control Quadrats excavated in the Kanawha River (RM 88.5) near Mt. Carbon, Kanawha County, WV.

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Table 1. Status, Numbers, and Relative Abundance of All Freshwater Mussels Collected From the Kanawha River at the CSXT Mt. Carbon Derailment Location, Kanawha County, West Virginia September and October, 2015

LIST OF APPENDICES

Appendix A. Digital Images Recorded during the Mussel Survey on the Kanawha River (RM88.5) near Mt. Carbon in Kanawha County, WV on September 28th – 30th.

Appendix B. Completed WVDNR Field Forms

ACKNOWLEDGEMENTS

This survey was completed on behalf of CSX Transportation (CSXT). The CSXT Project Manager was Mr. Matt Adkins. The EnviroScience (ES) field team was supervised by Mr. Ryan Schwegman who also served as the lead malacologist. Field personnel for ES included: Mr. Patrick Evankovich, Mr. Nicklaus Shoots, Mr. Paul Eastbourn served as dive supervisors; Mr. Shawn Nairn, Mr. Spencer Pignatelli, Mr. Frankie Moger, and Mr. Carl Burkey served as divers; Mr. Matthew Johnson, Mr. Dale Dunford and Ms. Jordan Findley server as biologist/ malacologist. Mr. Schwegman and Mr. Dunford co-authored the present report, Ms. Racheal Goliver provided mapping and Mr. Joe Papineau completed final edits.

INTRODUCTION

EnviroScience, Inc. (ES) is pleased to submit a final report to CSX Transportation (CSXT) for a freshwater mussel monitoring survey completed at Kanawha River Mile 88.6, where a train derailment and crude oil fire occurred on February 16, 2015, adjacent to the river near Mount Carbon, WV ("the incident"). As part of the incident response, a sheet pile wall was constructed along the south bank of the Kanawha River to prevent migration of oil into the river. Barges were also deployed along the bank of the river to serve as work platforms and secondary containment.

The incident and subsequent emergency response activities could have affected mussels in several ways. Those living in the direct physical impact area may have been crushed, smothered, or dislodged by structures or equipment. Temporary disturbance of the stream bed and riverbanks may have resulted in local scouring and downstream sediment deposition, which is a putative source of unionid impairment and decline (Fuller, 1974; Aldridge *et al*., 1987; Bogan, 1993; Williams, 1993). Additionally, host fish activity could have been altered by minor changes in habitat, which could lead to disruption of unionids' life cycles.

The project site is located in the upper Ohio River basin, which has experienced a dramatic decline in its unionid mussel fauna due to numerous factors such as impoundment, channelization, acid mine drainage, sedimentation, pollution, and invasive species. Consequently, of the 54 recent mussel species in the upper Ohio River basin, two are considered extinct (*Epioblasma flexuosa* and *E. t. torulosa*), seven others are listed as federally endangered (*Cyprogenia stegaria*, *Lampsilis abrupta*, *Obovaria retusa*, *Plethobasus cicatricosus*, *Plethobasus cooperianus*, *Plethobasus cyphyus*, *Epioblasma triquetra*, *Villosa fabalis*, *Pleurobema clava*, and *Pleurobema plenum*), and numerous others are listed as state-protected or federal-concern species. The Kanawha River beginning below Kanawha Falls is known to contain some of the few remaining and stable populations of federally endangered *C. stegaria, L. abrupta*, and *P. cyphyus* in the Ohio River Valley (EnviroScience, Inc. 2005). In the summer of

2014, while assisting the WVDNR with data collection, ES collected federally endangered *C. stegaria, L. abrupta*, and *P. cyphyus* approximately 3.2 km (2 mi) upstream of the incident. Additionally, the federally endangered spectaclecase mussel (*Cumberlandia monodonta*) has recently been discovered approximately 18 km (11.2 mi) downstream of the incident location (EnviroScience, 2003). The 2015 West Virginia Mussel Survey Protocol, ("the Protocol") classifies the entire length of the Kanawha River as a large stream where endangered mussel species are expected (i.e. a "Group 4" stream).

In recent decades, numerous scientific studies have demonstrated the ecological importance of unionid mussels in maintaining good water quality and healthy stream ecosystems. As filter feeders, these animals provide vital links between the water column and river bottom food chains, in that they stimulate robust macroinvertebrate communities which in turn provide food directly to fish populations. Additionally, freshwater mussels have been shown to stabilize river bottom habitats most favorable for fish spawning.

All mussel resources are protected within West Virginia, and as a Group 4 stream federally endangered mussels are known to exist within the Kanawha River and could reasonably be expected to occur within a nominal distance of the incident. CSXT, USFWS and WVDNR therefore agreed that it was prudent to collect data regarding the mussel community in the immediate vicinity of the incident to determine if mussels were inhabiting the area and to assess any impacts that may have occurred.

METHODS

The survey scope and methodology was jointly developed by CSXT, USFWS and WVDNR under a Cooperative Assessment Agreement executed by and between CSXT and Natural Resource Trustees, using the 2015 West Virginia Mussel Survey Protocol as a basis.

Survey Area

The size and dimensions of a cell-based survey area were determined using mapping developed by ES to delineate the location of barges relative to a 10 ft depth contour (based on loaded barge draft). A 5 m "Area of Direct Impact" (ADI) buffer was applied to the delineated barge locations and a 10 m ADI buffer was applied along the shoreline near the incident. An additional 10 m buffer was then applied to the ADI buffers to determine the final cell-based extents. A grid of 10 m by 10 m cells was then overlaid to encompass the extents. Five lateral transects extending 100 m from shore were also established downstream of the cell-based survey area. Lead–core transect lines were used to delineate the study area which included a combination of cells and transects, Figure 2 provides and aerial view of the survey area.

Mussel Habitat Survey

Mussel habitat survey was conducted concurrently with the mussel survey. For each cell and 10 m transect section, divers communicated substrate type according to the Wentworth Scale (percent each of bedrock, boulder, gravel, sand, silt, mud, clay, detritus, woody debris) to the surface where data were recorded.

Mussel Survey

Divers utilized surface supplied air with communications to the surface and examined a 1 m wide belt of river bottom along each transect at a rate of no more than 1 m^2/min in heterogeneous habitat. For cell searches, divers examined each cell at a rate of no more than 0.2 m^2/min in heterogeneous habitat. Mussels were located visually and by tactile means. Additionally, probing, fanning, and minor excavation were used to detect mussels below the surface. As each mussel was found, it was reported to the surface and then placed in a nylon mesh collecting bag. At the end of each 10 m transect line segment, the diver tied off the collecting bag with a wire clasp to produce a discrete sample. When the bag was full, it was sent to the surface where it was marked with an identifying tag and placed back in the river to await processing as described below by the team malacologist. Taxonomy used followed Turgeon et al., 1998.

In addition to the surface sampling methods, divers excavated three randomly placed 0.25 m^2 quadrats to provide information on any crushed or buried shells that would represent mussels that were potentially impacted during incident response activities.

Mussel Handling and Data Collection

All live mussels were identified to species, counted, measured (length in mm), and sexed (sexually dimorphic species only). All dead shells were scored as either fresh dead (lustrous nacre, dead <1yr), weathered dead (dull or chalky nacre, dead one to many years), or subfossil (heavily weathered and fragmented, dead many years to many decades) and noted as present. Live mussels were maintained submersed in ambient river water before and after processing. All mussel processing occurred on a sorting table placed in the river for rapid transfer of mussels from and back to the water. Mussels were kept cool and moist during processing and were not be out of the water more than 1 min. All prescribed data for mussels (size, species, % zebra mussel infestation, etc.) and habitat (substrate composition) were collected as outlined in the Protocol. Digital images of representative specimens of each mussel species with scale comparisons and site reference points were taken. If available, several dead shells of each common species were retained as vouchers and sent to the Ohio State Museum of Biological Diversity (Columbus, OH). All live mussels were returned to the area of their collection and were hand-placed into the substrate by divers.

Quality Control

The mussel survey cell and transects were placed with a high degree of accuracy using sub-meter GPS equipment. All divers performing the work had training and experience specifically in mussel survey work. Using accurately placed transects, divers were able to cover the cells thoroughly with excellent underwater visibility. Quadrat excavations were used to ascertain effectiveness of mussel survey methodology.

RESULTS

Field conditions at the commencement of the survey effort, on September 28, 2015,

were outstanding. The Kanawha River provided excellent visibility (≥1.0 m) and the Kanawha River was slightly below season flows at ~3,000 cfs, as reported by the USGS gage at Kanawha Falls (USGS 03193000). The occurrence of several intermittent thunderstorms limited field work on September 29. Due largely to heavy rain in the upper New River drainage, river conditions deteriorated quickly, with flows over 25,000 cfs (USGS 03193000) present within the survey area by the afternoon of September 30. All survey activities were suspended after the conclusion of the field day on September 30 due to health and safety concerns and the rapidly decreasing visibility. Coordination with the Trustees indicated that no further survey effort would be required due to satisfactory data collection and the clear indication of a very limited mussel assemblage within the survey area.

Mussel Habitat Survey

Despite its breadth, the Kanawha River within the survey site was relatively shallow, with measured depths seldom exceeding 3.7 m (20 ft). Substrates composed of sand, gravel and cobble are typically defined as suitable habitat for mussels and were located throughout majority of the survey area, see Figure 1. Downstream of the gravel bar near the confluence of Armstrong Creek, a slack water area persisted; in this area substrates were dominated by mud and finer sediments.

Mussel Survey Results

A total of five live mussel were located during the entire survey effort. Four mussels were located during the qualitative survey and only a single mussel was detected during the quadrat excavations. Additionally, very few (7) dead shells were located. The area examined during this study does not appear to be or have been inhabited by a substantial freshwater mussel population. During the survey effort, one weathered dead specimen was collected and could not be properly identified on site. This specimen was sent to Dr. Tom Watters at the Ohio State Museum of Biological Diversity and identified as a Round pigtoe (*Pleurobema sintoxia*). Table 1 provides summary information about the freshwater mussel community in the vicinity of the incident.

DISCUSSION AND CONCLUSION

The upper navigational pools of the Kanawha River possess excellent habitat for many freshwater mussel species and have provided refugia for several endangered species. However, because few live freshwater mussels were observed and shell material was sparsely collected, the findings of this survey indicate that the subject reach of the Kanawha River did not accommodate a healthy assemblage of mussels. Therefore, this study provides no evidence that freshwater mussel resources were appreciably impacted by the incident or subsequent response activities.

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Figures

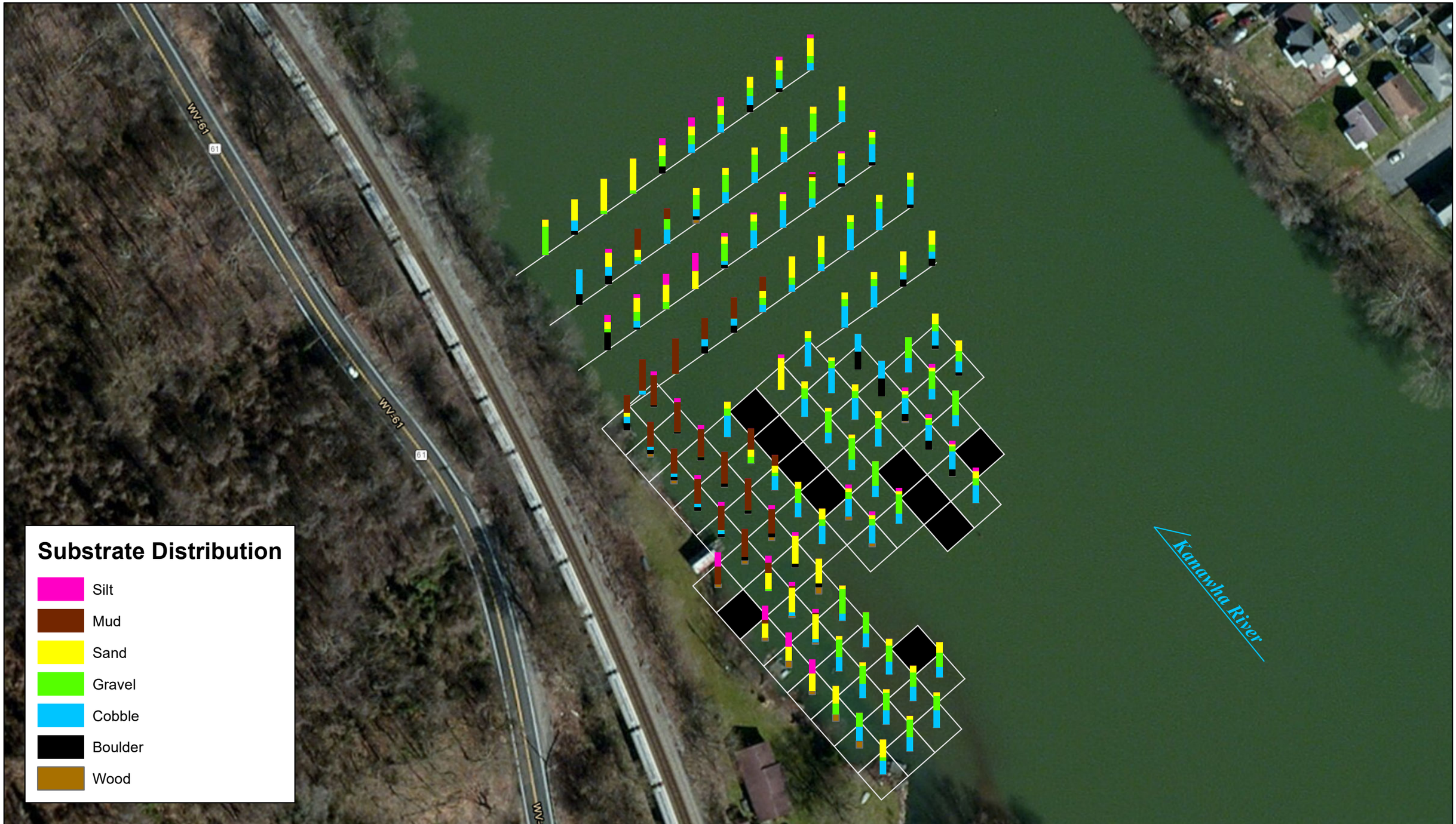


Figure 1. Substrate Map
of the Kanawha River (RM 88.5)
near Mt. Carbon, Kanawha County, WV.

Diving Transects

No Survey Work Completed

0 50 100 200 Feet

0 15 30 60 Meters

EnviroScience
Excellence In Any Environment

Path: C:\Users\Rachel Golver\Desktop\CSX_WV_MtCarbon\GIS\MtCarbonSurvey\1_Substrate.mxd

Date: 11/20/2015

Basemap courtesy of Esri.

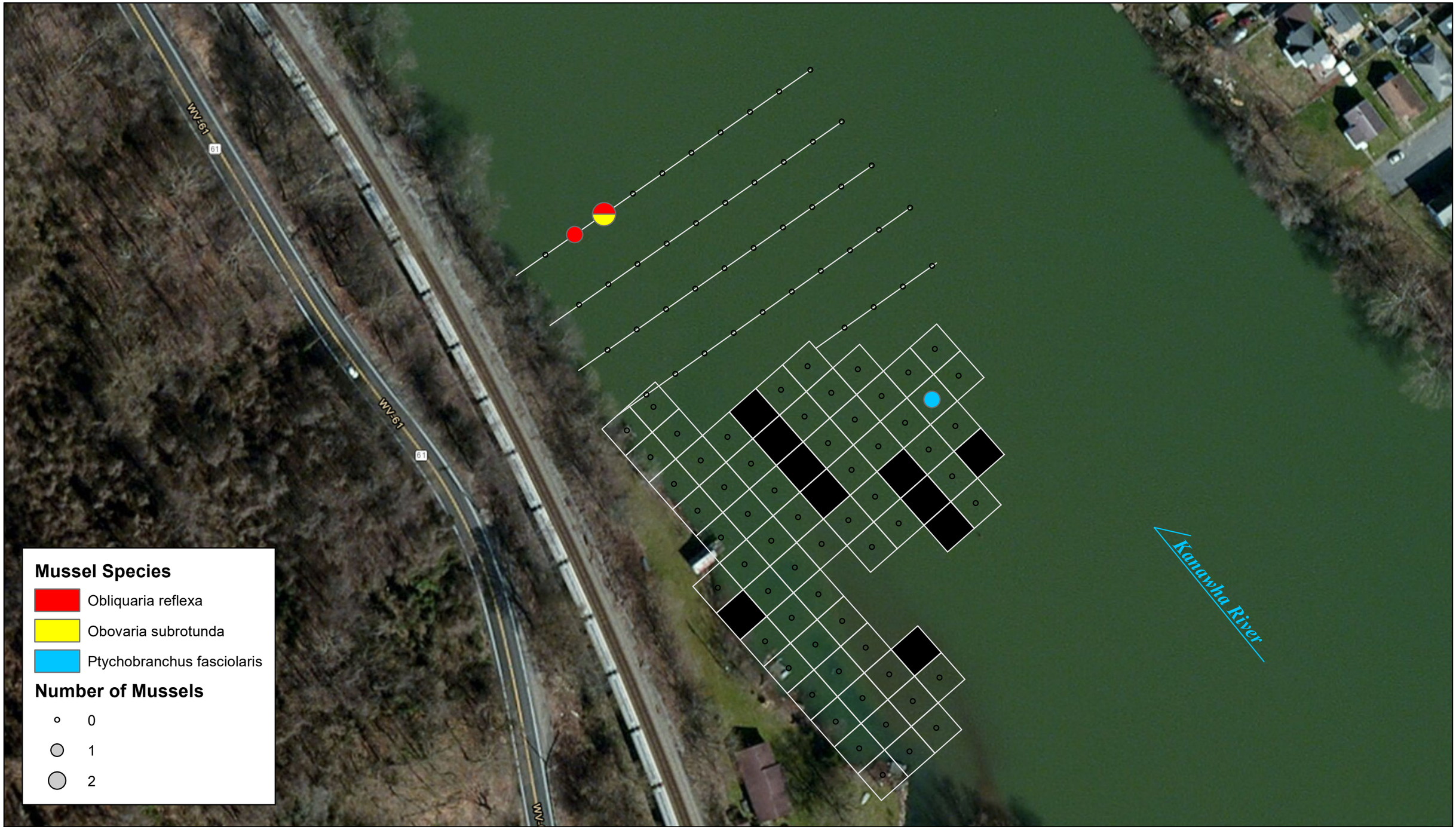


Figure 2. Mussel Distribution Detected during the Qualitative Mussel Survey of the Kanawha River (RM 88.5) near Mt. Carbon, Kanawha County, WV.

Diving Transects

No Survey Work Completed

0 50 100 200 Feet

0 15 30 60 Meters

EnviroScience
Excellence In Any Environment

Date: 11/20/2015 Path: C:\Users\Rachel Golver\Desktop\CSX_WV_MrCarbon\GIS\MtCarbonSurvey\2_Qualitative.mxd

Basemap courtesy of Esri.

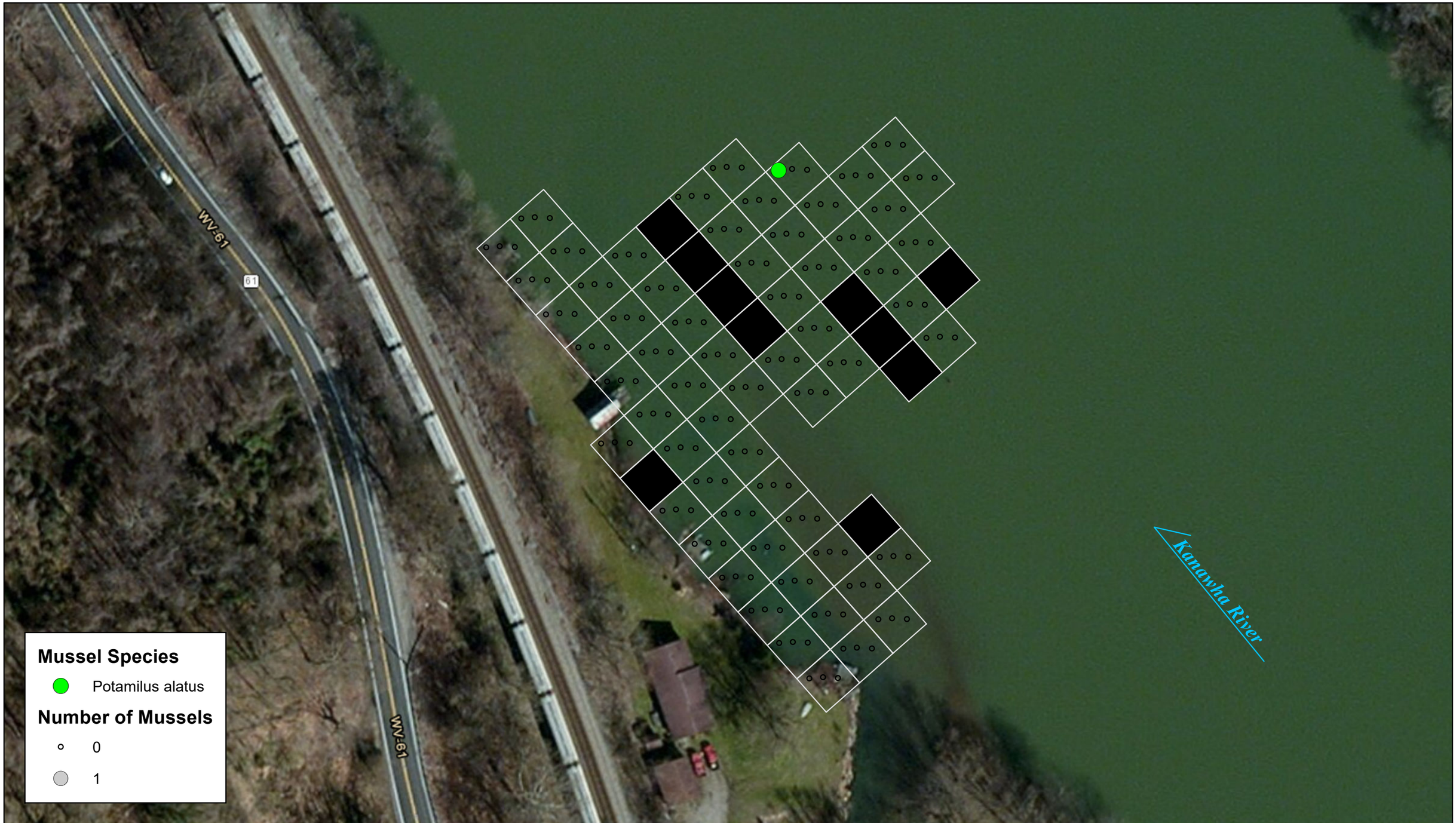


Figure 3. Mussel Distribution Detected during the Quality Assurance/ Quality Control Quadrats excavated in the Kanawha River (RM 88.5) near Mt. Carbon, Kanawha County, WV.

Mussel Survey Cell

No Survey Work Completed

0 25 50 100 Feet

0 10 20 40 Meters

EnviroScience
Excellence In Any Environment

Path: C:\Users\Rachel Goliver\Desktop\CSX_WV_MtCarbon\GIS\MtCarbonSurvey\3_Quadrat.mxd

Date: 11/20/2015

Basemap courtesy of Esri.

Tables

Table 1

Status, Numbers, and Relative Abundance of All Freshwater Mussels Collected From the Kanawha River at the CSXT Mt. Carbon Derailment Location, Kanawha County, West Virginia September and October, 2015

Species	Common Name	Federal Status[1]	WV Status[1]	Live	Dead	Relative frequency (% total)
Amblema plicata	Threeridge				2	0.0%
Lasmigona costata	Fluted		S2 (T)		2	0.0%
Obliquaria reflexa	Threehorn wartyback		S2 (T)	2		40.0%
Obovaria subrotunda	Round hickorynut			1		20.0%
Pleurobema sintoxia	Round pigtoe		S2 (T)		1	0.0%
Potamilus alatus	Pink heelsplitter			1	1	20.0%
Ptychobranchus fasciolaris	Kidney shell			1	2	20.0%
Total:				5	8	100.0%
No. of Species (Total Live + Dead):				4	5	

S2(T) = WV Threatened

Appendices

Appendix A

Digital Images Recorded during the Mussel Survey on the Kanawha River (RM88.5) near Mt. Carbon in Kanawha County, WV on September 28th – 30th

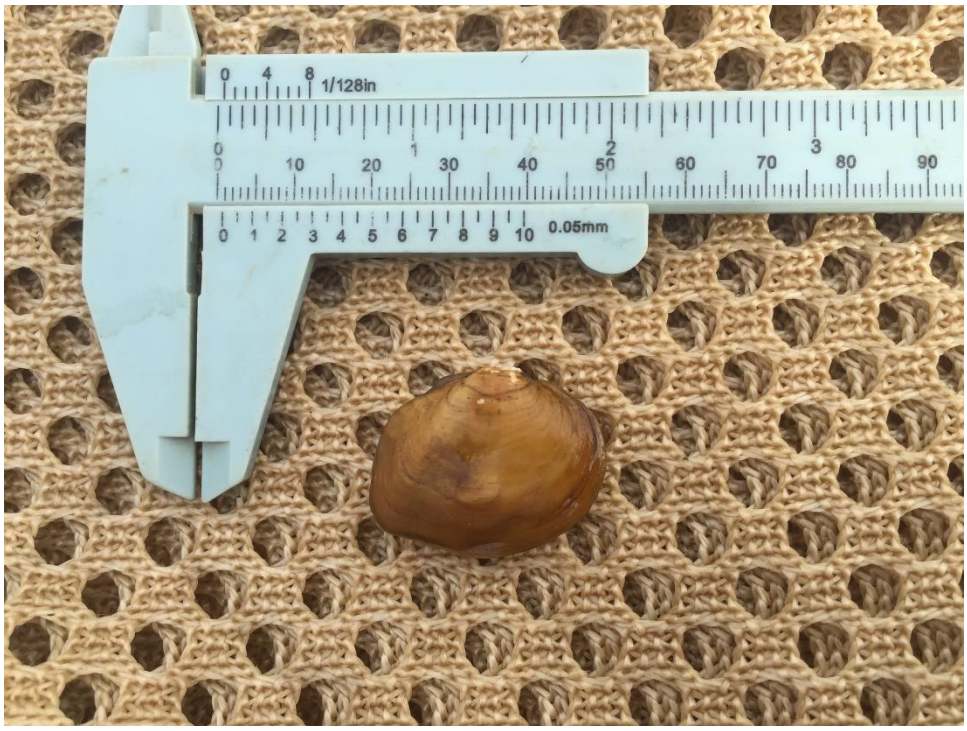
Digital Image 1. Upstream view of the survey area

Digital Image 2. ES dive vessel near the left descending bank

Appendix A

Digital Images Recorded during the Mussel Survey on the Kanawha River (RM88.5) near Mt. Carbon in Kanawha County, WV on September 28th – 30th

Digital Image 3. Pink heelsplitter (*Potamilus alatus*)



Digital Image 4. Threehorn wartyback (*Obliquaria reflexa*)

Appendix A

Digital Images Recorded during the Mussel Survey on the Kanawha River (RM88.5) near Mt. Carbon in Kanawha County, WV on September 28th – 30th

Digital Image 5. Round hickorynut (*Obovaria subrotunda*)

Digital Image 6. Kidney shell (*Ptychobranchus fasciolaris*)

Appendix B

WVDNR Field Forms

Mussel Survey Data Sheet

Section A

1. Collector Name: Schwegman, Ryan J **2. Collector ID:** 2015.165

1b. Surveyor(s) (Last Name, First, MI) **1c. Agency** EnviroScience, Inc

Dunford, Dale; Eastbourn, Paul; Shoots, Nick; Scuillo, Evan; Nairn, Shawn; Pignatelli, Spenser

Burkey, Carl

3. Stream/Site Name: Kanawha River/Mt. Carbon

4. LLID:

5. Date: Month: September **Day:** 28-30 **Year:** 2015

6. Project: Monitoring **7. Work Plan:** 1500 **8. Job:**

9. Permitee ID:

Section B: Survey Method	Section C: Survey Time	Section D: Other Surveys Conducted
! Waterscope	(24hr) Start: 0800	! Semi-quantitative
! SCUBA	End: 1200	! Quantitative
! Snorkel		! Quantitative with excavation
! Other SSA	Total (minutes):	! Other

Section E

Species	Observer/Area 1	2	3	4	5	Total Number Live	Fresh Dead	Weathered Dead
Amblema plicata								2
Lasmigona costata								2
Obliquaria reflexa						2		
Obovaria subrotunda						1		
Pluerobema sintoxia								1
Potamilus alatus						1		1
Ptychobranchus fasciolaris						1		2

NOTES

Site Record

1. Collector Name Ryan Schwegman	**2. Collector ID** 2015.165			
3. Stream/Site Name Kanawha River/CSXT Mt. Carbon	**4a. Site Type (Circle One)**	**Point**	**Transect**	**Area**
4b. System Type (circle one)	**Lacustrine**	**Riverine**	**Palustrine**	
5. LLID	**6. Permitee ID** 2015.165			
7. Date	**Month:** 9	**Day:** 28-30	**Year:** 2015	
8. Project Monitoring				
11. Travel Directions: At the confluence of Armstrong Creek and the Kanawha River in Mt. Carbon, WV				
12. Upstream Latitude dd 38.149849	**Upstream Longitude dd** -81.291911°			
Latitude and longitude are recorded as decimal degrees (dd). Refer to the instruction sheet for further information and means of calculation. Unless single transect, record upstream and downstream most coordinants. If single transect, give coordinates for both ends.				
14. Downstream Latitude dd 38.151445	**15. Downstream Longitude dd** -81.293488°			
16. NA Datum (1983 preferred) 1983	**17. Accuracy Code**			
19. County Name Fayette	**20. Quadrangle Name** Montgomery			
24. Notes				

Current Stream and Weather Conditions

Section A
1. Collector Name: Ryan Schwegman
3. Stream/Site Name: Kanawha River
4. LLID (dnr use):
5. Date (MM/DD/YYYY): 9/28/2015-9/30/2015
6. Project: CSXT Mt. Carbon Survey
9. Permitee ID: 2015.165

Section B			
Weather Conditions	**Current Conditions**	**Past 24 Hours**	**Past Week**
	Precipitation ☐ Moderate or heavy rain shower ☐ Light rain shower ☒ Light rain ☐ Moderate rain ☐ Heavy rain ☐ None **Sky Conditions** 0 25 50 (75) 100% cloud cover ___15_ Air temp (^{o}C)	**Precipitation** ☐ Moderate or heavy rain shower ☐ Light rain shower ☒ Light rain ☐ Moderate rain ☐ Heavy rain ☐ None **Sky Conditions** 0 25 50 (75) 100% cloud cover ___15_ Air temp (^{o}C)	Has there been a heavy rain in the last 7 days? (Yes) No

Section C			
Stream Characterization	**Human Influence**		
	☐ Engineered Dam	☐ Pipes(inlet/outlet)	☐ Trash
	☐ Pipeline crossing	☐ Channelized	☒ Island_____
	☐ Ford	☐ Bridge (pillars in stream)	☐ Other_____
	☐ Pipeline (parallel to stream)	☐ Bridge (no pillars in stream)	☒ Wall/Dike/Revet-ment/Riprap
	In Stream Cover		
	☐ Debris Dam	☐ Blow Down	☐ Beaver Dam
	☐ Woody debris	☐ Other _____	

Section D				
Aquatic Vegetation	**Indicate the dominant types and record the dominant species present.**			
	☒ Rooted emergent	☐ Rooted floating	☐ Floating algae	☐ None
	☐ Rooted submergent	☐ Free floating	☐ Attached algae	☐ Moss
	Dominant species_____			
	Percent of the reach with aquatic vegetation __5____ **% (in terms of area)**			

Section E										
Watershed Features	**Human Influence/Watershed Features** (within survey reach)					P=>10m from shore, C=within 10m, B=on the bank, **D=dominant land use (check no more than two)**				
		P	C	B	D		P	C	B	D
	Wall/Rip rap			x		Railroad (Active)	x			
	Railroad (rails to trails)					Railroad (Inactive)				
	Buildings	x				Landfill/trash				
	Pavement					Park/Lawn				
	Road					Row Crops				
	Pasture					Feed lots				
	Logging operations					Mining activity				

Watershed Features (Cont.)		P	C	B	D		P	C	B	D
	Forest					Commercial/Industrial				
	Old field					Hay field				
	Residential		x			Other_____				

Local Watershed Erosion (pertains to land use, not failing stream banks)

☒ None
☐ Moderate
☐ Heavy

Section F

Water Quality

Temperature (°C) _____
Conductivity uS/cm _____
Dissolved Oxygen mg/L_____
pH _____
Turbidity (mg/L) _____
Secchi depth (m.mm) _____
Meters used:_____
_____

Hach Kit used Yes/No
Water Sample Collected for Lab analysis Yes/No

Water Odors

☒ Normal/None ☐ Sewage
☐ Petroleum ☐ Chemical
☐ Fishy ☐ Other_____

Turbidity (visual)

☐ Clear ☒ Slightly turbid ☐ Turbid
☐ Opaque ☐ Stained ☐ Other _____

Water Surface Oils

☐ Slick ☐ Sheen ☐ None
☐ Globs ☐ Flecks ☐ Other_____

Flow at nearest USGS gauging station (cfs)_____
Gauging station:_____

Section G

Sediment/ Substrate

Odors

☒ Normal ☐ None ☐ Sewage
☐ Petroleum ☐ Chemical
☐ Anaerobic (methane)
☐ Other_____

Deposits

☐ Sludge ☒ Leaf Litter ☐ Sand
☐ Relict Shells ☐ Other _____
☐ Paper/fiber ☐ Other _____

Substrate Type (rank top three, 1 being dominant)

__Bedrock __Boulder _3Cobble _1Gravel _2Sand __Silt/clay

Section H

Streambank and Riparian Zone Characterization

Canopy Cover

☒ Mostly Open ☐ Shaded
☐ Mostly Shaded ☐ None

Stream Bank Failure Present? (within survey reach only)

Right Descending Bank Yes/No
Left Descending Bank Yes/No

Riparian Zone (10 meters) fully intact

Right Descending Bank Yes/No
Left Descending Bank Yes/No

Notes:_____
_____
_____
_____
_____
_____
_____
_____

Appendix D

Ecological Restoration Plan for Mt. Carbon, West Virginia

Ecological Restoration Plan

For Mount Carbon, West Virginia

Prepared for:

CSX Transportation, Inc.

500 Water St. J-275

Jacksonville, FL 32202

Prepared by:

EnviroScience
Excellence In Any Environment

5070 Stow Rd
Stow OH 44224
800-940-4025
www.EnviroScienceInc.com

ES Project Number: 7197

December 16, 2016

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1.0 INTRODUCTION

On behalf of CSX Transportation, Inc. (CSXT), EnviroScience, Inc. (ES) has developed a site restoration plan for a location near Kanawha River Mile 88.6. This plan has been created in accordance with the *United States Environmental Protection Agency (USEPA) Administrative Order on Consent Docket No. CWA-03-2015-0105CW* and the *Cooperative Assessment and Funding Agreement Regarding Natural Resource Damages Assessment Related to the CSX Train Derailment, Mt. Carbon, Fayette County, WV* entered into between CSXT and the United States Department of Interior, acting by and through the United States Fish and Wildlife Service (FWS) and the West Virginia Department of Natural Resources (WVDNR) (collectively, the "Trustees"), in response to the February 16, 2015 CSXT Train K08014 derailment (the incident), which occurred near Mount Carbon, WV. As a result of the incident, 27 railcars containing Bakken crude oil derailed, igniting the crude oil in 19 of the cars and releasing the combustion by-products of the resulting fire as well as some crude oil.

The incident occurred near CSXT Mile Post CA 424.4, approximately 150 feet from the left descending bank of the Kanawha River, near the confluence of Armstrong Creek. The location is bound to the north and east by the Kanawha River, Armstrong Creek to the southeast West Virginia Route 61 to the west. The area is primarily residential; a subdivision is located to the southeast side of Armstrong Creek and the town of Boomer Branch is on the eastern side of the Kanawha River.

As outlined in the *Response Action Plan: CSXT Oil Derailment, Mount Carbon, West Virginia March 2015* produced by Arcadis on behalf of CSXT as part of the incident response, a sheet pile wall was constructed along the south bank of the Kanawha River to prevent released crude from migrating into the river. Barges were deployed along the bank of the river to serve as work platforms and secondary containment. Excavation activities have removed approximately 19,000 tons of soil, and over 300,000 gallons of oil and water were disposed of as non-hazardous waste. Filtermat ™ AS material was installed at the bottom of the excavation to absorb residual crude oil, and Reactive Core Mat (RCM) barriers were installed in two locations below the tracks to control the run off following precipitation for areas unable to be excavated.

Following the incident, during September 2015, the resident mussel population within potentially impacted area was evaluated. It was determined that no appreciable mussel community existed at that locale, as only a few individuals were collected, and therefore, no injury had occurred as a result of the incident. Concurrent with the mussel survey, eleven sediment samples were collected from the proximal area for chemical fingerprinting analysis, including a detailed analysis of polycyclic aromatic hydrocarbons (PAHs). Although the fingerprinting analysis did detect the presence of some pyrogenic byproducts of the fire that occurred following the incident, no discernible evidence of crude oil residues were found in sampled sediments. Reports detailing these efforts were submitted to the Trustees on March 16, 2016.

CSXT has acquired the affected property where the incident occurred and is prepared to implement the following plan to mitigate any remaining stressors or injury to riparian areas and to

generally enhance the ecological function of the affected area. This plan is focused on establishing native riparian vegetation, creation of wetlands, reforestation and treatment of invasive species. Conceptual restoration plan maps of the site showing natural resources, delineated wetlands, vegetation communities, and impact areas are contained in Figures 1-3 in Attachment A.

1.1 Agency Coordination

Since the incident, CSXT has communicated or coordinated with multiple state and federal agencies via letter, email, phone, and in person. The latest communication was an onsite meeting on September 29, 2016 with FWS, WVDNR, CSXT, ES, and Arcadis. At this meeting, the existing conditions of the site were reviewed and potential restoration targets and goals were developed. These included:

1. Removal of a stand of non-native bamboo along Armstrong Creek;
2. Enhancement of the streambank slopes with woody vegetation along the Kanawha River and Armstrong Creek;
3. Enhancement of existing drainage and creation of a small seepage wetland community;
4. Removal of existing ditch draining potential wetland area;
5. Introduction of additional topsoil to the disturbed upland area;
6. Enhancement of the riparian buffer;
7. Enhancement of nearshore habitat downstream of Armstrong Creek with woody deadfall, if possible.

2.0 RESTORATION APPROACH

2.1 Pre-Derailment and Existing Conditions at Project Site

Pre-incident conditions were evaluated using existing literature sources and maps as well as using historic aerial photographs and photographs taken immediately following the derailment. The site had a residential home and garage occupying approximately 0.13 acres. The parcel was regularly maintained as turf grass up to the river's edge. Three large trees as well as several medium sized shrubs were present near the river. A complete report of the site and any work conducted since the incident has been detailed in Arcadis-produced reports: *Focused Soil Excavation Summary Report; CSXT Crude Oil Derailment, Mount Carbon WV* and *Response Action Plan; CSXT Crude Oil Derailment, Mount Carbon, West Virginia*. ES has reviewed the detailed accounts of activities, actions and outcomes with regard to opportunities for restoration and enhancement and implementation of same at the site.

2.2 Summary of Proposed Restoration Activities

General observations during the site visit indicated that banks were vegetated to the normal base flow waterline with no visible signs of slumping or exposed soil. At the toe of the bank, deposition of fine silts was observed along with wetland (*Juncus effusus*) vegetation. Taken together, these observations suggest very low near bank velocities. Sparse woody species recruitment (i.e cottonwood) was observed; however, the streambanks were dominated by herbaceous vegetation. A majority of the Kanawha River streambank section is also somewhat protected behind a large gravel delta bar that is present at the mouth of Armstrong Creek. A restoration

approach was collectively developed during the September 29, 2016 site visit aimed at developing a foundation for long-term recovery of the site and realization of greatest ecological benefit. As depicted in Figure 1, the restoration approach will address multiple areas (1-10) including the streambanks of the Kanawha River and Armstrong Creek, riparian vegetation, wetlands, existing ditches and invasive species. Figure 2 presents additional specifications and details for some of the restoration components. Each proposed restoration feature is described in more detail below.

1. **Reforestation (0.32 acres) -** Three reforestation zones are proposed with the project area to recover and enhance the riparian corridor. The three separate zones are situated to facilitate future access for any supplemental operations and maintenance activities, monitoring well readings as well as habitat complexity. Trees will be installed on 10- to 12-foot centers, and of various sizes including 2-inch caliper, 10- to 15-gallon and 2- to 3-gallon containerized stock. Prior to installation, the subgrade will be de-compacted to a minimum 1ft depth (see item #10, below). More detailed tree specifications are provided in Figure 2. Trees will be equipped with tree guards and trees over the 15-gallon size will be staked at the time of planting.

2. **Bamboo Invasive Treatment and Removal (0.13 acres) -** A large stand of bamboo is located along Armstrong Creek, the size of which is estimated to be approximately 0.13 acres. This invasive species is particularly problematic to eradicate because of its growth by rhizome and resilience to treatments. A multi-stage approach will be necessary to eradicate this area. Because excavators will be on-site during the restoration activities, it would be very effective to cut down the existing stand and remove the rhizome/root mass and associated soil; however, this would also create additional disturbance along the stream banks. To minimize additional disturbance, bamboo eradication will be approached by performing an initial cut down of the mature vegetation during the winter or early spring of 2016/2017. Early spring shoots would be sprayed with glyphosate. Two additional applications are proposed during 2017. No re-vegetation is planned for this area in 2017 to ensure that bamboo stand is dying and to allow for additional eradication measures, if necessary (i.e. removal of rhizome/root mass). During the spring of 2018, seeding and live stakes will be installed in this area. Two inspection/treatment events will then be performed each year for the following three years.

3. **Wetland Restoration (0.06 acres)-** Prior to emergency response seepage from the west was conveyed through drainage pipes and swales associated with the previous residence. During the emergency response, the house and associated drainage was removed and the soils became inundated, hindering ongoing response and remediation work. A drainage ditch was installed (see item #4 below) to convey this seepage water from the work zone. Expansion and enhancement of this potential wetland area is proposed for a total of 0.06 acres. Minor excavation and grading will be used to shape the wetland and create a subgrade to allow for installation of topsoil. Depths in the wetland will not exceed 0.5 feet. Grading will be performed in a manner to create variable topography. The wetland will be planted with a combination of live stakes, native seed and herbaceous plugs. Excess water will be conveyed down a new drainage path (see item #8 below).

4. **Ditch Plug (72 feet)-** In effort to enhance hydrology within the proposed wetland (see item #3 above) and create an improved drainage feature, the existing ditch will be plugged with on-site borrow material, sourced from the creation of a new drainage path (see item #8 below). Borrow material will be placed into the ditch and compacted as necessary to prevent water from infiltrating through the fill material.

5. **Streambank Enhancement (660 feet)-** The existing stream banks were observed to be in relatively stable condition at the time of the September 29, 2016 site visit. During the emergency response, the banks along the Kanawha were not modified but work was performed at the toe in conjunction with sheet pile placement and removal. During subsequent remedial excavations the slopes were lightly graded but topsoil was not removed along the Kanawha. Streambanks along Armstrong Creek were subject to material excavation and grading activities; however, those banks were subsequently restored to pre-existing conditions and seeded with a grass mix. From a restoration and enhancement perspective, the streambanks would benefit from a vegetation shift to more woody dominated species. As the woody vegetation develops, the tree trunks and root systems will be much more resilient to erosion and elevated flows. Further, overhanging branches provide shade and habitat for fish and wildlife. Therefore it is proposed to restore/establish a mixture of woody species on the bank slopes (Table 1). General spacing will be on 12- to 15-foot centers. Sizes will range from 3- to 5-gallon containerized stock for trees and 1-gallon containerized stock for shrubs (e.g. willows). A native seed mix suitable for slopes and facultative wet conditions will be over seeded at a rate of 5 pounds per acre. Refer to Figure 3 for details and specifications relating to spacing and installation.

6. **Woody Habitats (3-5 structures)-** The gravel delta bar of Armstrong Creek creates a protected backwater area. Water depths range from shallow to approximately 6 feet in depth. To enhance instream habitat, and in conjunction with the shoreline (see item #7 below) and streambank enhancements (see item #5 above), it is proposed to install 3-5 woody habitat structures within the backwater area. These woody habitats will consist of tree tops or whole trees with root ball still attached to mimic a tree which has fallen off the streambank. Trees will be placed at a downstream-oriented angle, not to exceed 45 degrees and extending out into the water. Since excavation into the streambank is not desirable, trees will be anchored using multiple anchoring pins fashioned from branches 3 to 5 inches in diameter and of variable length, but not less than 3 feet. Pins will be driven into the existing bank slope by an excavator bucket in an “x” pattern at key locations along the woody habitat to secure the structures to the ground. Pins will be installed in a manner to discourage both horizontal and lifting forces from dislodging the woody habitat. See Figure 3 for details and specifications.

7. **Shoreline Enhancement (660 feet)**
   For the purposes of this plan, the shoreline is being considered the area from the normal project pool elevation (London Dam, 614 feet) to approximately 2 feet above that elevation. This area was observed to have little habitat diversity and it is proposed to install woody live stakes of several different species to enhance this area. Live stakes of 2 to 3 feet in length will be installed at approximately 3-foot spacing at varying elevations within the shoreline zone. Therefore, depending on spring water levels at the time of implementation, some live stakes may be installed below waterline with an expectation that water level will decrease to normal project pool elevation. It is then also possible that these live stakes may have a lower chance of survival due to potential extended periods of high water. It is estimated that 300 live stakes will be installed in this zone. Live stakes of the following species:
   - Sandbar willow
   - Peach leaved willow
   - Black willow
   - Silky willow

8. **Drainage path (165 feet)-** The proposed wetland (see item #3 above) will provide some storage capacity, but it is assumed that excess water would sheet flow out of the wetland and eventually make its way to Armstrong Creek and/or the Kanawha River. To prevent rill erosion, a shallow swale is proposed to convey drainage to an intermediate elevation terrace prior to entering into Armstrong Creek. The proposed swale will have a slope complementary to the existing topography and therefore it is expected to a combination of steeper transition grades down slopes and flatter grades between contours. The swale in flatter slope areas is proposed to be approximately 5 feet wide with a maximum depth of 0.5 feet. It is anticipated that at least one steeper intermediate transition will occur prior to conveyance down the Armstrong Creek (see item #9 below) stream banks. The length of the intermediate transition will be determined during implementation based on observed topography, but a rock lined channel is proposed for this element. The channel shape will also be modified to a slightly narrower and deeper channel (4 feet wide with a 1-foot maximum depth) to be more typical of steeper stream types.

9. **Rock Channel Transition (15 feet)-** To prevent erosion on the streambanks of Armstrong Creek, a rock channel transition is proposed to convey drainage from the restored wetland and drainage swale. The rock transition will be constructed using larger diameter rip-rap (approximately 9- to 15-inch diameter) choked with sand, gravel and cobble to prevent interstitial flow through the larger rock. Rock will be compacted using an excavator bucket into a shape appropriate to convey flow and blend with the drainage path (see item #8 above). Estimated dimensions are 6 feet wide by a maximum depth of 1 foot.

10. **Existing Lawn Area (1.03 acres)-** The existing lawn area is essentially the existing reclaimed site area. During the site visit it was observed that topsoil was lacking due to recent activity on the site. Sparse herbaceous growth was also observed, but the site had

also been recently seeded. To restore the topsoil layer, a 3- to 6-inch thick layer of imported topsoil is proposed to be placed over the 1.03 acre area. Prior to installation, compaction of the existing soils will be assessed, but it is assume that de-compaction to a depth of at least 1-foot will occur with a soil ripping attachment as practical based on site conditions and restraints. Following topsoil installation, the seedbed will be prepped with a tilling attachment, skid-steer rake, rock hound or some combination depending on the quality and condition of imported topsoil. Once the seedbed is prepared, a native upland seed mix (Table 2) will be installed at a rate of 12 pounds per acre. This seeding rate is slightly below the supplier's recommended rate so as not to create an overly dense meadow community that will hinder woody species/tree recruitment.

Table 1. Proposed Tree and Shrub Species for Restoration Areas.					
Location	**Scientific Name**	**Common Name**	**Status**	**Container Size***	**Quantity**
Terrace	*Acer rubrum*	red maple	OBL	2 inch	10
Terrace	*Aesculus flava*	yellow buckeye	OBL	3-gal	10
Terrace	*Acer negundo*	box elder	FACW	3-gal	30
Terrace	*Platanus occidentalis*	sycamore	FAC	2 in.	20
Terrace	*Salix nigra*	black willow	FACW	3-gal	15
Terrace	*Juglans nigra*	black walnut	FACW	3 gal	25
Terrace	*Carpinus caroliniana*	ironwood	FACW	3-gal	15
Terrace	*Quercus palustris*	pin oak	FAC	10-15 gal	25
Terrace	*Quercus macrocarpus*	bur oak	FAC	10-15 gal	25
Terrace	*Tilia americana*	basswood	FACU	3-gal	10
Terrace	*Liriodendron tulipifera*	tulip tree	FAC	2 inch	10
Terrace	*Nyssa sylvatica*	black gum	FAC	10-15 gal	15
				TOTAL	**210**
Slope and Water's Edge	*Acer negundo*	box elder	FAC	3-gal	100
Slope and Water's Edge	*Platanus occidentalis*	sycamore	FACW	3-gal	100
Slope and Water's Edge	*Salix nigra*	black willow	OBL	Live stake 3-gal	50
Slope and Water's Edge	*Salix interior*	sandbar willow	FACW	live stake	500
Slope and Water's Edge	*Salix sericea*	silky willow	FACW	live stake	300
Slope and Water's Edge	*Justicia americana*	water willow	OBL	Seed/plug	50
Slope and Water's Edge	*Schoenoplectus tabernaemontani*	softstem clubrush	OBL	seed	N/A
Seep Wetland	*Carex vulpinoidea*	fox sedge	OBL	Seed/plug	100
Seep Wetland	*Carex crinita*	fringed sedge	OBL	seed	
Seep Wetland	*Symplocarpus foetidus*	skunk cabbage	OBL	Seed/plug	25
Seep Wetland	*Scirpus cyperinus*	wool grass	OBL	seed	N/A
Seep Wetland	*Angelica atropurpurea*	purplestem angelica	OBL	seed	N/A
Seep Wetland	*Carex torta*	twisted sedge	OBL	seed	N/A
Seep Wetland	*Carex scabrata*	eastern rough sedge	OBL	seed	N/A
Seep Wetland	*Juncus effusus*	soft rush	OBL	Seed/plug	25
Seep Wetland	*Carex lurida*	shallow sedge	OBL	seed	N/A
Seep Wetland	*Carex frankii*	frank' sedge	OBL	Seed/plug	25
Seep Wetland	*Leersia oryzoides*	rice cut grass	OBL	seed	N/A
				TOTAL	**1225**

* Container size will depend on season of planting and availability

Table 2. Proposed Seed Mix for Upland Restoration Areas*		
Scientific Name	**Common Name**	**% Quantity**
Sorghastrum nutans	Indiangrass	32.2
Lolium multiflorum	annual ryegrass	20
Elymus virginicus	Virginia wildrye	18
Andropogon gerardii	big bluestem	8
Agrostis perennans	autumn bentgrass	6
Panicum virgatum	switchgrass	4.5
Agrostis scabra	ticklegrass (rough bentgrass)	2
Chamaecrista fasciculata	partridge pea	2
Tridens flavus	purpletop	2
Coreopsis lanceolata	lanceleaf coreopsis	1
Heliopsis helianthoides	oxeye sunflower	1
Rudbeckia hirta	blackeyed Susan	1
Lespedeza virginica	slender bushclover	0.7
Liatris spicata	marsh (dense) blazing star	0.6
Monarda fistulosa	wild bergamot	0.5
Aster novae-angliae	New England aster	0.4
Pycnanthemum tenuifolium	slender mountainmint	0.1
		100%

* Final seed mix dependent upon availability

3.0 RESTORATION MONITORING

3.1 Monitoring Plan and Schedule

The site will be monitored over the next three years. Years one, two, and three will include bi-annual invasive species management with herbicide applications. Photographs will be taken of the site at fixed photo location points. Wetland boundaries will be delineated using GPS. The proposed success criteria for the restoration is 80% survival of planted stock and 80% vegetative cover overall (sum of herbaceous and woody). If less than 80% survival is observed, additional woody plants will be planted to reach the 80% mark. Year three will include a vegetative plot assessment to assess the restoration is on the proper trajectory. If the 80% survivability of trees is achieved no additional will be planted. Percent aerial dominance of different vegetative stratum will be estimated at five fixed sample plots:

Sample plot 1- restored slope area,
Sample plot 2- restored wetland area
Sample plot 3- restored forested area
Sample plot 4- restored upland area
Sample plot 5- restored bamboo management area.

The areal coverage of the herbaceous vegetation in year three will also help to determine the needs, if any over years four and five. Year three will include an agency site visit. If the site achieves its performance goals by year three, CSXT will request release of any further requirements. If the performance goals are not met, contingency actions will include additional herbicide spraying of invasive species and evaluate the need for planting any additional native species plants.

Table 3. Proposed Schedule and Monitoring Activities	
Activity	**Start Date**
Invasive Cutting and Management	March 2017
Restoration Construction	Early April – Early May 2017
Restoration Plantings	Immediately Following or During Construction
As-built Report	December 31, 2017
Invasive Monitoring Event 1	Late Spring 2018
Invasive Monitoring Event 2	Late Summer 2018
Year 1 Report	December 31, 2018
Invasive Monitoring Event 3	Late Spring 2019
Invasive Monitoring Event 4	Late Summer 2019
Year 2 Report	December 31, 2019
Invasive Monitoring Event 5	Late Spring 2020
Invasive Monitoring Event 6	Late Summer 2020
Agency Site Visit	Summer 2020
Year 3 Report	December 31, 2020

4.0 PERFORMANCE STANDARDS

The success criteria for the restoration site is eighty percent survival of planted stock and eighty percent vegetative cover overall (sum of herbaceous and woody). If less than eighty percent survival is documented, additional woody plants will be planted to reach the eighty percent mark. If the site achieves its performance goals by year three, ES will request release of any further requirements.

5.0 CONTINGENCY

If less than eighty percent survival is documented, additional woody plants will be planted to reach the eighty percent mark.

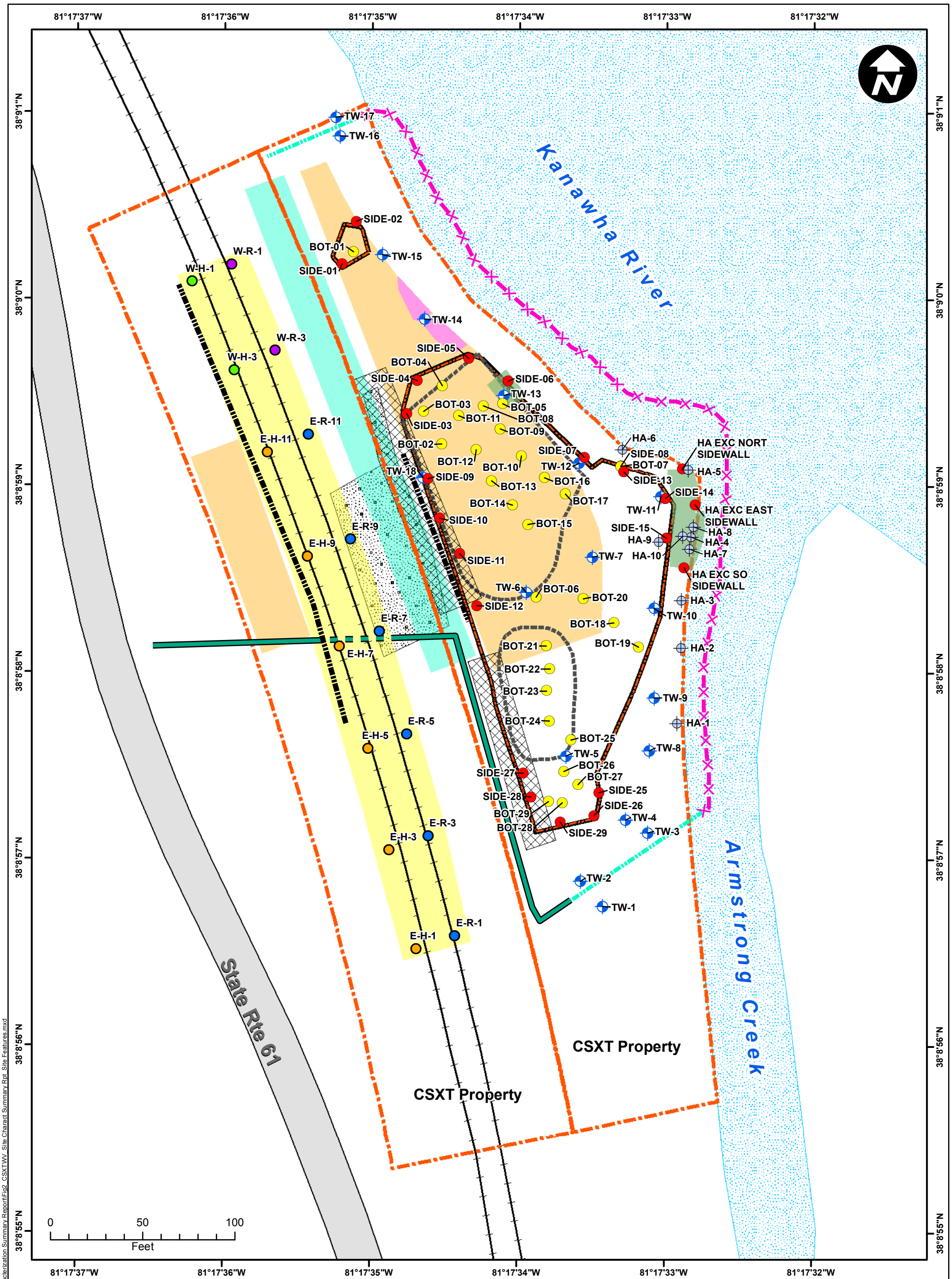
6.0 REPORTING

Annual monitoring reports will be submitted to the Trustees by December 31 of their respective year.

ATTACHMENT A

FIGURES

EnviroScience



Legend

- Soil Sample Location - Bottom
- Soil Sample Location - Side
- East End – Hill Side (E-H)
- East End – River Side (E-R)
- West End – Hill Side (W-H)
- West End – River Side (W-R)
- Hand Auger
- Former Temporary Well
- Railroad
- Culvert Pipe
- Culvert Pipe Under Railroad
- AquaBlok Wall
- AquaBlok Lined Ditch
- Former Sheet Pile Wall
- Focused Soil Excavation
- Test Pit
- Approximate Shallow Surface Soil Excavation
- Approximate Slope Excavation
- Rail Bed Excavation
- July 2016 Targeted Excavation
- Extent of Reactive Core Mat
- Filter Mat ™ AS
- Rip Rap
- Road
- Water
- Parcel Boundaries

CSXT CRUDE OIL DERAILMENT
MOUNT CARBON, FAYETTE COUNTY, WEST VIRGINIA
MD001249.0004

SITE CHARACTERIZATION SUMMARY REPORT

Site Features

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

User: DHolmes Location: On-Site Citrix
Path: Z:\GISPROJECTS_ENV\CSX_MTCARBON_WVM\MXD\2016 Site Characterization Summary Report\Fig2_CSXTWV_Site Charact Summary Rpt_Site Features.mxd

0' 30' 60'
FEET

N

RiverReach Construction

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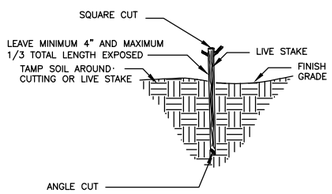
LEGEND:

Reforestation
Bamboo Invasive Removal
Wetland
Ditch Plug
Streambank Plantings
Woody Habitat
Existing Lawn Area
Ditch
Drainage Path

FIGURE 2
MT. CARBON RESTORATION

FIGURE 3

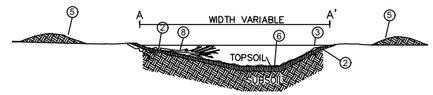


LIVE STAKE CROSS SECTION
NOT TO SCALE

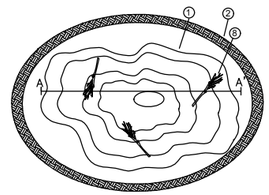
INSTALLATION SPECIFICATIONS

1. LIVE STAKES SHALL RANGE FROM 1/2" TO 1" IN DIAMETER AND BE FROM 2 TO 3 FT IN LENGTH
2. CARE SHALL BE TAKEN NOT TO DAMAGE THE LIVE STAKES DURING INSTALLATION.
3. A PILOT HOLE WILL BE REQUIRED TO ENSURE THAT THE LIVE STAKE IS NOT DAMAGED WHEN DRIVEN THROUGH THE SUBSOIL. PILOT HOLE SHALL BE MADE THROUGH THE USE OF A STEEL SPIKE, REBAR, OR SIMILAR TOOL TO WORK AN OPENING THROUGH THE SUBSOIL.
4. LIVE STAKES SHALL BE CUT TO A POINT ON THE BASAL END FOR INSERTION IN THE GROUND.
5. SEE CONTRACT DOCUMENTS FOR SPECIES, SIZE, SPACING, LOCATION, AND FINAL DETERMINATION ON USE OF LIVE STAKES.
6. USE A DEAD BLOW HAMMER TO DRIVE LIVE STAKES INTO THE PILOT HOLE.
7. LEAVE BETWEEN 4" AND 8" OF LIVE STAKE EXPOSED ABOVE FINISH GRADE.
8. TAMP SOIL AROUND LIVE STAKES.

LIVE STAKE PLANTING



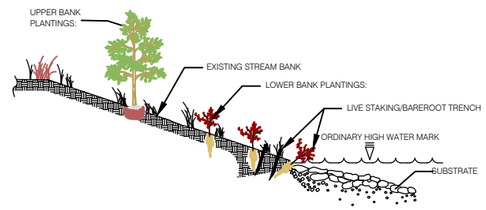
CROSS SECTION



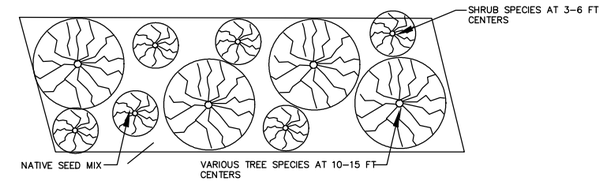
PLAN VIEW

1. PROPOSED VERNAL POOL BOUNDARY DOES NOT HAVE TO BE CIRCULAR BUT SHOULD BE A MINIMUM OF APPROXIMATELY 30FT BY 30FT.
2. EXCAVATE AND GRADE SUBSOIL. COMPACT IF NECESSARY WITH EQUIPMENT BUCKET OR MACHINE TRACKS.
3. GRADE SIDE SLOPES OF VERNAL POOL AT A MINIMUM OF 15:1 OVER 50% OF THE SIDE SLOPES.
4. MAXIMUM WATER DEPTH SHALL BE 0.5 FT OVER 10–25% OF THE TOTAL AREA.
5. USE SPOIL FROM SUBSOIL EXCAVATION TO CREATE A BERM SURROUNDING THE VERNAL POOL. IF NECESSARY ON THE DOWN SLOPE SIDE.
6. USE TOPSOIL TO ACHIEVE FINISH GRADE AND SHAPE. INSTALL A MINIMUM OF 4 INCHES AND MAXIMUM OF 8 INCHES OF TOPSOIL. DO NOT OVER COMPACT TOPSOIL, LEAVING SOIL AS LOOSE AS POSSIBLE
7. INSTALL WOODY DEBRIS / DEADFALL IN THE VERNAL POOL.
6. PLANT NATIVE SHRUBS AND PLUGS AT DEPTHS ACCORDING TO SPECIES REQUIREMENTS.

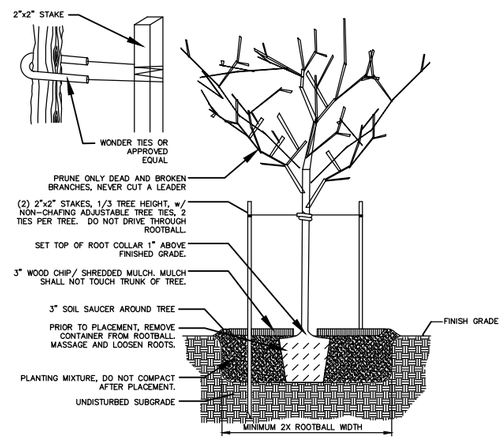
WETLAND DETAIL



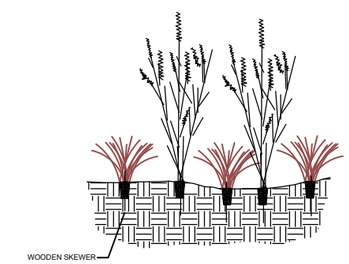
TYPICAL BANK STABLIZATION



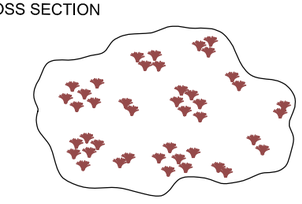
PLANT SPACING



TREE PLANTING AND STAKING (15 GALLON POT)
NON-INUNDATED AREAS



CROSS SECTION

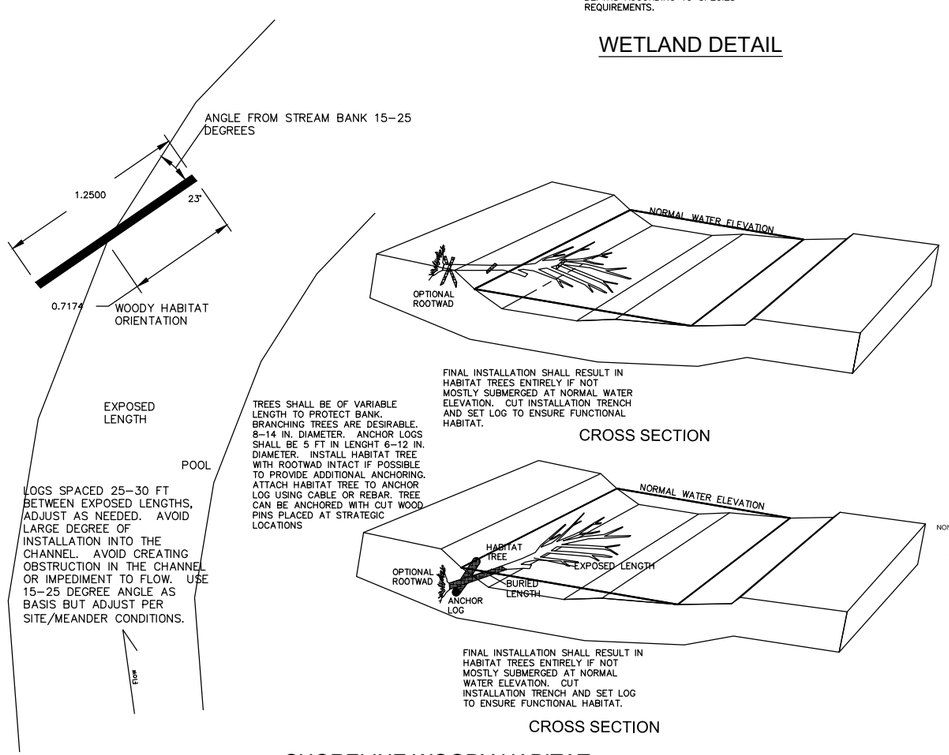


PLAN VIEW

INSTALLATION SPECIFICATIONS

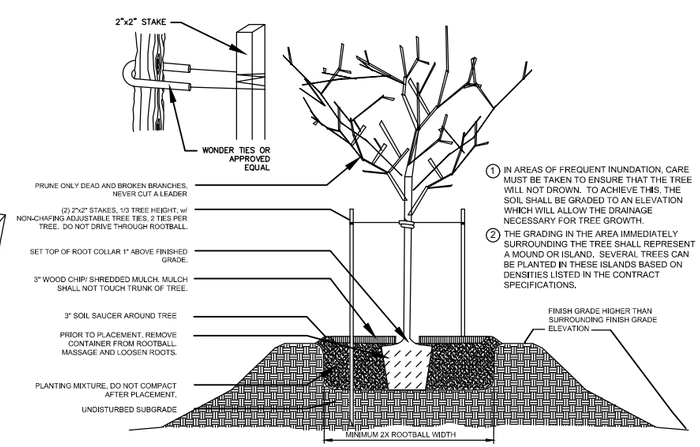
1. PREPARE HOLE FOR PLANTING BY REMOVING FINISH GRADE TOPSOIL WITH A GARDEN TROWEL OR SIMILAR TOOL. REMOVE JUST ENOUGH TOPSOIL TO FIT THE SOIL AND ROOTS OF THE PLUG INTO THE GOUND.
2. REMOVE PLUG FROM CONTAINER AND INSPECT THE ROOTS. IF THE ROOTS ARE TIGHLY WRAPPED AROUND THE SOIL, LOOSEN THEM AND SPREAD THEM OUT GENTLY. IF INSTEAD THE SOIL IS VERY LOOSE AROUND THE ROOTS, KEEP AS MUCH SOIL AS POSSIBLE AROUND THE ROOTS.
3. PLACE THE PLUG INTO THE HOLE SO THAT THE TOP OF THE SOIL PLUG IS FLUSH WITH FINISH GRADE. SECURE EACH PLUG IN PLACE WITH ONE 8 - 10" BAMBOO SKEWER. TAMP SOIL AROUND THE PLUG, AND WATER GENEROUSLY. USE ENOUGH WATER TO DISPLACE ANY TRAPPED AIR WITHIN THE HOLE.
4. HERBACEOUS PLUGS SHALL BE INSTALLED ACCORDING TO DENSITIES LISTED IN THE CONTRACT SPECIFICATIONS. PLANT PLUGS IN GROUPS OF TWO TO SIX INDIVIDUALS, RATHER THAN IN EQUAL INTERVALS.

HERBACEOUS PLUG PLANTING



SHORELINE WOODY HABITAT

OUTSIDE MEANDER LOG/BRANCH HABITAT



1. IN AREAS OF FREQUENT INUNDATION, CARE MUST BE TAKEN TO ENSURE THAT THE TREE WILL NOT DROWN. TO ACHIEVE THIS, THE SOIL SHALL BE GRADED TO AN ELEVATION WHICH WILL ALLOW THE DRAINAGE NECESSARY FOR TREE GROWTH.
2. THE GRADING IN THE AREA IMMEDIATELY SURROUNDING THE TREE SHALL REPRESENT A MOUND OR ISLAND. SEVERAL TREES CAN BE PLANTED IN THESE ISLANDS BASED ON DENSITIES LISTED IN THE CONTRACT SPECIFICATIONS.

TREE PLANTING AND STAKING (15 GALLON POT)
INUNDATED AREAS

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FIGURE 3
MT. CARBON RESTORATION